# PROPOSED DALY UNIT NO. 13 APPLICATION FOR ENHANCED OIL RECOVERY WATERFLOOD PROJECT LODGEPOLE FORMATION DALY, MANITOBA

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Corex Resources Ltd.

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#### INTRODUCTION

The Daly portion of the Daly Sinclair Field is located in Townships 8 to 11 Ranges 27 to 29 W1M. The field was originally developed with vertical wells but recent exploitation has shifted to horizontal development. Corex Resources Ltd. (Corex) drilled the first horizontal well on the lands at 102/08-36-009-29 W1M and has followed with 11 additional Lodgepole horizontal wells.

Corex is proposing a unit be created in Section 25 and NE/4 and S/2 of Section 36 in Township 9 Range 29 W1M and believes the potential exists for incremental production and reserves from an Enhanced Oil Recovery (EOR) waterflood project in the Lodgepole formation. Currently, Corex is the operator of the lands within the proposed unit that contains 12 horizontal wells, 18 vertical wells (10 are currently producing) and 1 disposal well. We anticipate converting some of the producing horizontal wells into injectors when implementing the EOR waterflood project. Corex plans to produce any newly drilled wells for a year before converting them to injectors. Corex hereby submits an application to establish Daly Unit No. 13 and implement an EOR Waterflood Project within the Lodgepole Formation (Figure 1).

The proposed Daly Unit No. 13 falls within the Daly Sinclair Lodgepole Pool (Figure 2).

#### **SUMMARY**

- 1. The proposed Daly Unit No. 13 is to include 22 producing wells (10 vertical and 12 horizontal wells) within the 28 legal subdivisions (LSD) that were completed in the Lodgepole formation (Figure 1).
- 2. The original oil in place (OOIP) for the proposed Daly Unit No. 13 is calculated as 8.657 10<sup>6</sup>m<sup>3</sup> (54.449 MMbbl), for an average of 309.2 10<sup>3</sup>m<sup>3</sup> (1,945 Mbbl) per LSD.
- 3. Cumulative production in the proposed Daly Unit No. 13 to the end of February 2015 is 158.8  $10^3$ m<sup>3</sup> (999 Mbbl) of oil. This represents a 1.8% recovery factor of the total OOIP.
- 4. In May, 1965, production from the proposed Daly Unit No. 13 reached an initial peak at 14.0 m<sup>3</sup>/d (87.8 b/d), or an average of 4.65 m<sup>3</sup>/d (29.3 b/d) per well, with a 33.7% watercut (Figure 3).
- 5. The Expected Ultimate Recovery (EUR) of oil on primary production within the proposed Daly Unit No. 13 using decline analysis is 315.3 10<sup>3</sup>m<sup>3</sup> (1,983 Mbbl), with 156.5 10<sup>3</sup>m<sup>3</sup> (984.3 Mbbl) remaining as of February 2015. The Expected Ultimate Recovery Factor (EURF) would be 3.6% of the total OOIP.
- 6. With the implementation of a waterflood within the Flossie Lake member of the Lodgepole formation, incremental reserves of 390 10<sup>3</sup>m<sup>3</sup> (2.45 MMbbl) are expected while the incremental recovery factor is expected to be 4.5% for a total recovery factor of 8.1%.

7. The development plan will be to continue producing the existing horizontal and vertical wells. Horizontal wells will be converted into water injectors and the waterflood initiated in Q1 2016 (Figure 4). This timing is contingent upon the approval of the unitization and EOR waterflood application. All horizontal wells in the proposed Daly Unit No. 13 have been completed using multi-stage hydraulic fracturing.

#### **GEOLOGY**

#### **Stratigraphy**

The Lodgepole formation in the proposed unit area contains a significant volume of hydrocarbon, and conformably overlies the hydrocarbon-bearing Bakken formation. It was deposited in a gently sloping carbonate ramp setting and has been subdivided by Corex into six laterally continuous, shallowing upwards cycles. In ascending order, the sequence consists of two non-reservoir cycles: the Basal Limestone and the Cromer Shale, which are overlain by four reservoir cycles: the Cruikshank Crinoidal, the Lower Daly, the Middle Daly and the Flossie Lake. The Lodgepole formation is unconformably overlain by the red silts and shales of the Lower Amaranth, and the anhydrites and shales of the Upper Amaranth which forms the top seal for the hydrocarbon system. The stratigraphy of the Lodgepole formation is shown on the type well and structural section which runs north to south through the middle of the proposed unit (Appendix I).

#### Sedimentology

Starting at the base of the Lodgepole section and working upwards, the first cycle immediately overlying the Bakken formation is the Basal Limestone. The Basal Limestone is a cream to pink cherty, slightly argillaceous limestone with traces of fossil hash. This unit is considered non-reservoir, and is capped by an argillaceous marker bed commonly called the "false Bakken" shale.

The next cycle, the Cromer Shale, consists of tan to light brown, occasionally dolomitic, limestone with minor anhydrite, grey-green shale, and very fine quartzose siltstone components. The Cromer Shale is a non-reservoir unit, and is capped by a light to medium grey "shale" marker bed.

The overlying Cruikshank Crinoidal is the first reservoir quality cycle deposited within the Lodgepole formation. It is comprised of tan to off white, argillaceous limestone with occasional vertical fracturing. This unit displays little faunal variation, and bioclastic components are dominated by crinoids indicating deposition in a slightly restricted marine slope environment. Porosities and permeabilities are not available for the crinoidal as there are no cores in the proposed unit area. It thickens slightly towards the north end of the unit area as can be seen from the isopach map (Appendix II). The net pay values from a 6% log cutoff range from 0 to 3m with gross thickness ranging from 0 to 3m (Appendices III and II respectively). The 9-25 well is the only well completed in the Cruikshank Crinoidal.

The Lower Daly is the next shallowing upwards reservoir quality cycle and grades from a tan to light brown lime mudstone into bioclastic wackestone. It is occasionally argillaceous with traces

of pyrite, dolomite, and biofragments, indicating deposition in a relatively quiet, muddy, slightly upslope environment. There are no cores through this section therefore permeability and porosity values are not posted. The unit thickens towards the north with values ranging from 7 to 14m gross (Appendix IV) with net pays from 0 to 3m using a 6% log porosity cutoff (Appendix V). One well, the 1-36, is completed in the Lower Daly.

The Middle Daly is a light tan to tan, partially recrystallized very fine to fine dolomitic biofragmental wackestone which grades to a cryptocrystalline mudstone with minor anhydrite and shale components. The rock becomes increasingly calcareous moving up section. Deposition of this shallowing upward sequence occurred in a more restricted marine ramp environment than the underlying Lower Daly, and is reminiscent of the Midale Marly of Southeast Saskatchewan. Within the proposed unit area, there are no cores. The unit varies in gross thickness from 10 to 15m (Appendix VI) with net pays (Appendix VII) using a 6% porosity log cutoff ranging from 2 to 5m.

The final, and thickest, reservoir quality cycle in the Lodgepole sequence is the Flossie Lake. The base of the Flossie Lake is a dolomitic limestone. The cycle then grades upward into an interbedded dolomite and anhydrite facies, indicating deposition in the uppermost shallow evaporitic ramp setting. This interval forms the main reservoir facies and is comprised of light to medium brown, horizontally laminated, microsucrosic, occasionally shaly, dolomite interbedded with dense, white anhydrite in beds up to 0.3m thick which may also occur as inclusions or lenses. The uppermost 3 to 4m of the Flossie Lake is dominated by anhydrite and contains only minor oil stained dolomite beds though is still considered reservoir. Within the proposed unit area, the porosities and permeabilities range from 9 to 16% and 0.4 to 3.8mD (Appendices VIII and IX) using no core cutoffs. The gross isopach is from 20 to 30m with net pay ranging from 9 to 22m using a 6% log cutoff (Appendices X and XI). The Flossie Lake is the current target within the Lodgepole for the horizontals drilled by Corex in the immediate area.

#### **Structure**

The general structure within the proposed unit area dips gently to the southwest with variations interpreted as being caused by dissolution of the underlying Prairie Evaporites. Localized dissolution events, as seen on proprietary 3D seismic do not appear to represent continuous barriers to lateral fluid flow within the reservoir as they do not appear to interrupt the lateral continuity of the reservoir beds. There is no direct evidence indicating significant natural faulting in the vicinity of the proposed unit area. Structure maps for all four reservoir units are included in the Appendices XII to XV.

#### Reservoir

Maps for each of the four reservoir units were generated using available openhole logs and core analysis data, and include porosity-thickness, permeability-thickness, and net pay. Net pay for the Flossie Lake in the proposed unit area ranges from 9 to 22m using a 6% LS density porosity cutoff. Weighted average permeabilities were calculated without using a cutoff, and range from 0.4 to

3.8mD. Using a 6% LS density porosity cutoff, net pay for the Middle Daly ranges from 2 to 5m, net pay for the Lower Daly ranges from 0 to 3m, and net pay for the Cruikshank Crinoidal ranges 0 to 3m.

#### Fluid Contacts

There is no oil-water contact seen in the Flossie Lake, the Middle nor the Lower Daly on logs within the proposed unit area.

#### OIL IN PLACE, PRODUCTION HISTORY AND EXPECTED RECOVERY

#### Original Oil in Place

The original-oil-in-place (OOIP) for the proposed Daly Unit No. 13 is 8.657 m3 (54.449 MMbbl) for the Lodgepole formation. The OOIP was calculated in-house. Values of thickness, porosity and water saturation of each LSD for the various reservoir zones are used to calculate the OOIP on an individual LSD basis. Details of the calculations are summarized in Table 1.

#### **Historical Production**

Figure 3 shows the production history of the wells within the proposed Daly Unit No. 13. There are 10 vertical wells and 12 horizontal wells currently on production. Well 100/08-36-009-29W1/00 is used for water disposal. These wells are mainly perforated in the Lodgepole formation, with a few wells commingled with the Bakken zone.

To the end of February 2015, the proposed Daly Unit No. 13 has produced cumulative volumes of oil at 158.8 10<sup>3</sup>m<sup>3</sup> (999 Mbbl) and water at 1,090 10<sup>3</sup>m<sup>3</sup> (6,857 Mbbl). The current recovery factor is 1.8%.

In May 1965, the wells in the proposed Daly Unit No. 13 had a peak oil production rate of 14.0  $\text{m}^3/\text{d}$  (87.8 b/d), along with 7.1  $\text{m}^3/\text{d}$  (44.7 b/d) of water. The corresponding water cut is 33.7%.

Currently (February 2015), the proposed Daly Unit No. 13 is producing  $53.7 \text{ m}^3/\text{d}$  (338 b/d) of oil and  $79.4 \text{ m}^3/\text{d}$  (499 b/d) of water. The water disposal rate is  $112 \text{ m}^3/\text{d}$  (704 b/d). These production rates correspond to rates on a per well basis as  $2.7 \text{ m}^3/\text{d/well}$  (17 b/d/well) of oil, and  $4.0 \text{ m}^3/\text{d}$  (25 b/d/well) of water.

#### Primary Recovery

Table 3 lists the wells within the proposed unit area, together with the cumulative oil production to the end of February 2015 and the EUR estimated using decline analysis. The total EUR for the proposed Daly Unit No. 13 is 315.3 10<sup>3</sup>m<sup>3</sup> (1,983 Mbbl), for a recovery factor of 3.6% of the total OOIP.

#### Secondary Recovery

Within the Lodgepole formation, the proposed waterflood will target the Flossie Lake member, which contains over 80% of the total OOIP. A section model of only the Flossie Lake zone was built to estimate the expected recovery from waterflooding the Flossie Lake member. This section model used average reservoir properties and was tuned to match the type production profile of representative horizontal producers within the Flossie Lake member. With seven horizontal wells at a 200 m well spacing, model results suggest an EURF of 3.0% under primary depletion. With three of the seven horizontal wells converted into injectors, the section model yields an EURF of 8.5%, or an incremental recovery factor of 5.5%. Note that these recovery factors are based on the OOIP of the Flossie Lake zone and not the entire Lodgepole formation. Additional information on the section model is included in Appendix XVI.

#### **UNITIZATION**

The basis for unitization is to implement a waterflood to increase the ultimate recovery of the OOIP from the proposed project area.

#### Unit Name

Corex proposes that the name of the new unit shall be Daly Unit No. 13.

#### **Unit Operator**

Corex will be the Operator for Daly Unit No. 13.

#### **Unitized Zones**

The unitized zone to be waterflooded in the Daly Unit No. 13 will be the Lodgepole Formation.

#### Unit Wells

The 22 producing wells (12 horizontal and 10 vertical) in the proposed Daly Unit No. 13 are outlined in Table 2 with their current status.

#### **Unit Lands**

The Daly Unit No. 13 will consist of all 28 LSDs within Section 25 and the South half and Northeast quarter of Section 36, Township 9, Range 29W1. The lands included in the 40 acre tracts are outlined in Appendix XVII.

#### Tract Factors

The proposed Daly Unit No. 13 will consist of 28 tracts based on remaining OOIP using maps created internally by Corex per LSD, as of February 2015, with the production from the horizontal wells being divided according to the existing production allocation agreement. The calculation of the tract factors are outlined in Table 1.

#### Working Interest Owners

Appendix XVII outlines the working interest for each recommended tract within the proposed Daly Unit No. 13. Corex will have a 100% WI across all tracts.

#### WATERFLOOD DEVELOPMENT

The objective of implementing a waterflood is to provide pressure support and improve recovery. The Lodgepole formation is relatively shallow, with saturated oil having low solution gas-oil ratios. As such, there is not much drive energy within the system. Corex believes that additional energy is required to improve the recovery. Waterflooding will enhance the recovery by providing pressure support as well as displacing the oil from the injectors towards the producers.

#### Rock and Fluid Properties

Rock and fluid properties for the Lodgepole formation are summarized in Table 4. These properties were estimated using standard correlations in the literature. Core analysis is currently underway to determine the pertinent reservoir and fluid properties.

Using Corex's internal database on fracture treatments and step rate tests, the fracture gradient for the Lodgepole formation is estimated to range between 19.0 kPa/m and 25.9 kPa/m, with an average of 23.3 kPa/m. The surface fracturing pressure is estimated to range between 6,590 kPa and 11,900 kPa. Step rate test will be conducted to confirm the fracturing pressure once the proposed injectors are converted.

#### Expected Recovery

Using the results from a Flossie Lake section model, the incremental reserves of 390 10<sup>3</sup>m<sup>3</sup> (2.45 MMbbl) are expected. Based on the total OOIP for the Lodgepole formation, the incremental recovery factor is expected to be 4.5% for an overall recovery factor of 8.1%.

#### **Economic Limit**

The economic limit will be when the net oil rate and net oil price revenue stream becomes less than the current producing operating costs. Based on current price forecasts, the economic limit for the project would be  $1 \text{ m}^3/\text{d}$ .

#### Source of Injection Water

Source of injection water will be from the Lodgepole formation. It is desired to reactivate the 100/03-32-009-28W1 well to supply Lodgepole source water for the waterflood. This well produced up to July 2012 when it was shut-in due to an electrical strike at the 12-29-9-28W1 battery. Since then the well has not been on production. At last producing date it produced at 400 to 415 m³/d (2500 to 2600 b/d) water, and 99.7% watercut. This will require a short tie-in from 12-29 to the 9-30 surface, and the group line from the 9-30 will be used as a source water line. Currently the 103/10-29-9-28W1 well is producing down this pipeline, it will be carried through to the source water system at the facility. The oil from these two wells will be skimmed off the water tanks and sent to the FWKO to be processed and sold. Carryover oil levels at the battery for source water will be kept to a minimum, and chemical will be used to treat the fluid to assist in separation as necessary. The 100/3-32 water will be sampled in 2015 to be analyzed for compatibility. Once this compatibility testing and the core analysis are completed, filters can then be sized accordingly to ensure pore throats will not be plugged and sweep efficiency is maintained.

A simplified process flow diagram of the system from the 15-25-9-29W1 to the injectors is located in Figure 5. The injector wells will be equipped with injection volume metering and rate/pressure control (Figures 6 and 7). Water injection volumes and balancing will be utilized to monitor the entire system measurement and integrity on a daily basis. The corrosion control program outlining the planned system design and operational practices to prevent corrosion is located in Figure 8.

#### Operating Strategy

The plan is to have alternating producer-injector within the proposed Daly Unit No. 13. The following six wells are proposed to be converted into injectors:

- 1. 102/08-36-009-29W1/00
- 2. 103/01-36-009-29W1/00
- 3. 103/13-25-009-29W1/00
- 4. 103/12-25-009-29W1/00
- 5. 103/05-25-009-29W1/00
- 6. 103/04-25-009-29W1/00

Injection rates are expected to be in the range of 200 m³/d to 400 m³/d, subject to a maximum injection pressure of 8,900 kPa at the well head. This maximum pressure is based on a fracture pressure of 9,950 kPa and a safety factor of 90%. Initially, injection will target a monthly voidage replacement ratio (VRR) between 1.25 and 1.75. This over-injection will serve to replace the existing voidage within the proposed unit area. Once a cumulative VRR of one is attained, the injection rate will be scaled back to maintain the VRR at one, both on a monthly basis and a cumulative basis.

All producers will be kept at pump-off condition. This will minimize cross-flow between the Lodgepole and Bakken formations for the vertical producers that have commingled production from both zones.

#### Pressure

The initial pressure is estimated to be between 8,000 kPa and 8,400 kPa. This is based on the depth of the Flossie Lake zone and a static gradient ranging between 10.5 kPa/m and 10.8 kPa/m. Recently, pressure measurements were taken at two horizontal wells, as follows:

- A build-up test was conducted on Well 103/04-25-009-29W1/00 from February 6<sup>th</sup> to March 3<sup>rd</sup>, 2014. Results suggest a pressure of about 7600 kPa.
- A mini-frac test was performed at Well 102/08-36-009-29W1/00. Analysis of the data estimated a reservoir pressure of 5700 kPa.

Waterflooding will help to re-pressurize and add energy to the reservoir. During the initial over-injection period, the reservoir pressure is expected to increase from the current level. Once the cumulative VRR reaches one, a monthly VRR of one will be maintained. At this stage, the reservoir pressure is expected to be slightly below its initial value.

#### Waterflood Facilities

Within the project area, all of the producing wells are pipelined to the 15-25-009-29W1 Battery. The new horizontal wells have all been tied in on a new pipeline system and kept separate from the old vertical producing wells.

In the winter of 2014, the 15-25 Battery underwent a major facility upgrade which included the install of a FWKO, injection pump, two 2000bbl water tanks, MCC and electrical upgrade, flare stack and associated piping. This was done to accommodate the development program for this area. As the wells have been on primary decline it is now desired to waterflood the reservoir to bring pressure back up.

While installing new pipelines to the new horizontal wells and satellites, injection pipelines were installed in the common trench for future waterflood use. The field is able to be converted for injection fairly easily with lower capital cost. Corex plans to use nearby Lodgepole source water, filtered and treated, for injection fluid. If the source water is not compatible with the Flossie formation, a nearby fresh water source well may be required.

As the current disposal well located at 100/8-36-9-29W1 is injecting into the Crinoidal and lower Daly zones, it will be desired to drill a new disposal that will properly dispose the fluid to a separate non-hydrocarbon bearing formation below our target formation. The pipeline that runs to the 8-36 disposal is also a limiting factor as its MAWP is too low for proper disposal and operating at the facility. A new disposal would be drilled at the 15-25 facility.

#### Waterflood Surveillance

Waterflood response within the proposed Daly Unit No. 13 will be closely monitored with the following:

- Regular production well testing to monitor fluid rate and water cut to watch for waterflood response
- Comparison of daily injection rates and pressure monitoring to targets
- Monitor monthly and cumulative voidage replacement ratio by pattern and overall unit
- Evaluation of Hall plots
- New injection targets will be sent to the field on a regular basis

#### Project Schedule

Conversions of current horizontal producers into injectors are expected to start in 2016. Along with these conversions, the necessary facility changes will also be implemented. First water injection is expected in Q1 2016. This schedule is contingent upon the approval of the Unitization and Waterflood application, as well as the various stake holders coming to agreement.

#### **NOTIFICATIONS**

Corex will notify all surface and mineral owners of the proposed EOR project and formation of the Daly Unit No. 13. Copies of the Notices, and proof of service, to all surface rights owners will be forwarded to the Petroleum Branch, when available, to complete the Daly Unit No. 13 Application.

Unitization and execution of the formal Daly Unit No. 13 agreement by affected mineral owners will occur once the Petroleum Branch has reviewed the tract factors. Copies of the agreement will be forwarded to the Petroleum Branch to complete the Daly Unit No. 13 application.

Please contact David McGuinness at 403-718-6345, by email at davidm@corexresources.ca or at Suite 3200, 700 – 2nd Street SW, Calgary, Alberta, T2P 2W2 for any other questions or clarification. Alternatively, please contact Stephen Wong at 587-390-0297, or by email at stephenw@corexresources.ca.

Corex Resources Ltd.

David McGuinness Executive VP Land

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations

Tract LSD	Tract Weighting	Total	1 1-25-09-29W1	2 2-25-09-29W1	3 3-25-09-29W1	4 4-25-09-29W1	5 5-25-09-29W1
Tract Factor	vvoigning	100%	4.629506376%	4.469293286%	4.148867104%	4.148867104%	3.987005526%
11401140101		10070	1.0200000.070	11.10020020070			0.007 00002070
Flossie							
Area (ac)		1,120	40	40	40	40	40
h (m)			22.0	21.0	19.0	19.0	18.0
Vb (ac-ft)		57,348	2,887	2,756	2,493	2,493	2,362
phi			12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV			1.980	1.890	1.710	1.710	1.620
OOIP (Mbbls)		44,608	2,016	1,924	1,741	1,741	1,649
OOIP (Mstb)		41,690	1,884	1,798	1,627	1,627	1,541
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	300	286	259	259	245
Middle Daly (Green)		•					
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		1,120	5.0	5.0	5.0	5.0	5.0
Vb (ac-ft)		13,648	656	656	656	656	656
phi		10,040	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		9	0.450	0.450	0.450	0.450	0.450
OOIP (Mbbls)		9,529	458	458	458	458	458
OOIP (Mstb)		8,906	428	428	428	428	428
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	68	68	68	68	68
, ,		1,410	00	00	00	00	00
Lower Daly (Purple)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)			2.0	2.0	2.0	2.0	2.0
Vb (ac-ft)		5,118	262	262	262	262	262
phi			12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		4	0.180	0.180	0.180	0.180	0.180
OOIP (Mbbls)		3,574	183	183	183	183	183
OOIP (Mstb)		3,340	171	171	171	171	171
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	27	27	27	27	27
Crinoid							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)			0.0	0.0	0.0	0.0	0.0
Vb (ac-ft)		1,181	0	0	0	0	0
phi			8.0%	8.0%	8.0%	8.0%	8.0%
Sw			25%	25%	25%	25%	25%
HCPV		1	0.000	0.000	0.000	0.000	0.000
OOIP (Mbbls)		550	0	0	0	0	0
OOIP (Mstb)		514	0	0	0	0	0
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	0	0	0	0	0
Total Lodgepole							
Total OOIP (Mstb)		54,449	2,483	2,398	2,226	2,226	2,141
Total OOIP (10 3 m 3)		8,657	395	381	354	354	340
Cumulative Oil (Mstb)		999	8.9	8.9	8.9	8.9	9.8
OOIP-Cum Prd (Mstb)	100%	53,450	8.9 2,474	2,389	2,218	2,218	9.8 2,131
OOIF-Cuili Flu (WStb)	10076	33,430	2,414	2,309	2,210	2,210	2,131

<u>Comments:</u> Bo Cumulative production to February 2015

		I		I	
Well 1	102/04-25-009-29W1/00	102/04-25-009-29W1/00	102/04-25-009-29W1/00	102/04-25-009-29W1/00	102/05-25-009-29W1/00
Factor	0.25	0.25	0.25	0.25	0.25
Cumulative Oil (Mstb)	22.8	22.8	22.8	22.8	27.1
Well 2	103/04-25-009-29W1/00	103/04-25-009-29W1/00	103/04-25-009-29W1/00	103/04-25-009-29W1/00	103/05-25-009-29W1/00
Factor	0.25	0.25	0.25	0.25	0.243946712
Cumulative Oil (Mstb)	12.8	12.8	12.8	12.8	12.4
Well 3					
Factor					
Cumulative Oil (Mstb)					

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations (cont'd)

Tract LSD	Tract	Total	6 6-25-09-29W1	7 7-25-09-29W1	8 8-25-09-29W1	9 9-25-09-29W1	10
Tract Factor	Weighting	100%	3.986755696%	4.467366727%	4.467610927%	4.315104310%	10-25-09-29W1 3.644230466%
Flossie							
Area (ac)		1,120	40	40	40	40	40
h (m)			18.0	18.0	21.0	17.0	17.0
Vb (ac-ft)		57,348	2,362	2,362	2,756	2,231	2,231
phi			12.0%	14.0%	12.0%	14.0%	14.0%
Sw			25%	25%	25%	25%	25%
HCPV			1.620	1.890	1.890	1.785	1.785
OOIP (Mbbls)		44,608	1,649	1,924	1,924	1,817	1,817
OOIP (Mstb)		41,690	1,541	1,798	1,798	1,698	1,698
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	245	286	286	270	270
Middle Daly (Green)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		, -	5.0	5.0	5.0	5.0	3.0
Vb (ac-ft)		13,648	656	656	656	656	394
phi			12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		9	0.450	0.450	0.450	0.450	0.270
OOIP (Mbbls)		9,529	458	458	458	458	275
OOIP (Mstb)		8,906	428	428	428	428	257
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	68	68	68	68	41
Lower Daly (Purple)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		.,	2.0	2.0	2.0	2.0	
Vb (ac-ft)		5,118	262	262	262	262	0
phi		-,	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		4	0.180	0.180	0.180	0.180	0.000
OOIP (Mbbls)		3,574	183	183	183	183	0
OOIP (Mstb)		3,340	171	171	171	171	0
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	27	27	27	27	0
Crinoid							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		.,.20	0.0	0.0	0.0	1.0	1.0
Vb (ac-ft)		1,181	0	0	0	131	131
phi		, -	8.0%	8.0%	8.0%	8.0%	8.0%
Sw			25%	25%	25%	25%	25%
HCPV		1	0.000	0.000	0.000	0.060	0.060
OOIP (Mbbls)		550	0	0	0	61	61
OOIP (Mstb)		514	0	0	0	57	57
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	0	0	0	9	9
Total Lodgepole							
Total OOIP (Mstb)		54,449	2,141	2,398	2,398	2,355	2,012
Total OOIP (10 3 m 3)	,	8,657	340	381	381	374	320
Cumulative Oil (Mstb)		999	9.9	9.9	9.8	48.5	64.6
OOIP-Cum Prd (Mstb)	100%	53,450	2,131	2,388	2,388	2,306	1,948
		,	=,	_,	_,	-,	-,

Well 1	102/05-25-009-29W1/00	102/05-25-009-29W1/00	102/05-25-009-29W1/00	100/09-25-009-29W1/00	100/10-25-009-29W1/00
Factor	0.25	0.25	0.25	1	1
Cumulative Oil (Mstb)	27.1	27.1	27.1	37.5	52.8
Well 2	103/05-25-009-29W1/00	103/05-25-009-29W1/00	103/05-25-009-29W1/00	102/12-25-009-29W1/00	102/12-25-009-29W1/00
Factor	0.254714707	0.255931958	0.245406623	0.25	0.25
Cumulative Oil (Mstb)	12.4	12.4	12.4	18.1	18.1
Well 3				103/12-25-009-29W1/00	103/12-25-009-29W1/00
Factor				0.23380853	0.26015018
Cumulative Oil (Mstb)				27.9	27.9

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations (cont'd)

Tract	Tract	Total	11	12	13	14	15
LSD	Weighting		11-25-09-29W1	12-25-09-29W1	13-25-09-29W1	14-25-09-29W1	15-25-09-29W1
Tract Factor		100%	4.540599913%	3.328944662%	4.125005138%	3.663023193%	3.210623604%
Flossie							
Area (ac)		1,120	40	40	40	40	40
h (m)			22.0	16.0	18.0	19.0	16.0
Vb (ac-ft)		57,348	2,887	2,100	2,362	2,493	2,100
phi			14.0%	14.0%	14.0%	14.0%	14.0%
Sw			25%	25%	25%	25%	25%
HCPV			2.310	1.680	1.890	1.995	1.680
OOIP (Mbbls)		44,608	2,352	1,710	1,924	2,031	1,710
OOIP (Mstb)		41,690	2,198	1,599	1,798	1,898	1,599
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	349	254	286	302	254
Middle Daly (Green)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		,	2.0	3.0	2.0	1.0	2.0
Vb (ac-ft)		13,648	262	394	262	131	262
phi		-,-	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		9	0.180	0.270	0.180	0.090	0.180
OOIP (Mbbls)		9,529	183	275	183	92	183
OOIP (Mstb)		8,906	171	257	171	86	171
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	27	41	27	14	27
Lower Daly (Purple)		.,		•••		• • •	
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		1,120	1.0	40.0	3.0	0.0	0.0
Vb (ac-ft)		5,118	131	0	394	0.0	0.0
phi		3,110	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		4	0.090	0.000	0.270	0.000	0.000
OOIP (Mbbls)		3,574	92	0.000	275	0.000	0.000
OOIP (Mstb)		3,340	86	0	257	0	0
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	14	0	41	0	0
Crinoid		331	14	U	41	U	U
Area (ac)		4.400	40.0	40.0	40.0	40.0	40.0
h (m)		1,120	0.0	40.0	40.0	0.0	40.0 0.0
Vb (ac-ft)		1,181	0.0	0	0	0.0	0.0
		1,101	8.0%	8.0%	8.0%	8.0%	8.0%
phi Sw			25%	8.0% 25%	8.0% 25%	25%	8.0% 25%
HCPV		1	0.000	0.000	0.000		0.000
			0.000	0.000	0.000	0.000 0	0.000
OOIP (Mbbls)		550		0	0	0	0
OOIP (Mstb)		514	0				
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	0	0	0	0	0
Total Lodgepole		F4.440	0.455	4.055	0.000	4.004	4 770
Total OOIP (Mstb)		54,449	2,455	1,855	2,226	1,984	1,770
Total OOIP (10 <sup>3</sup> m <sup>3</sup> )		8,657	390	295	354	315	281
Cumulative Oil (Mstb)	4000/	999	27.9	76.1	21.7	26.0	53.7
OOIP-Cum Prd (Mstb)	100%	53,450	2,427	1,779	2,205	1,958	1,716

100/11-25-009-29W1/00	100/12-25-009-29W1/00	100/13-25-009-29W1/00	100/14-25-009-29W1/00	100/15-25-009-29W1/00
1	1	1	1	1
16.1	64.7	12.9	17.2	44.9
102/12-25-009-29W1/00	102/12-25-009-29W1/00	102/13-25-009-29W1/00	102/13-25-009-29W1/00	102/13-25-009-29W1/00
0.25	0.25	0.25	0.25	0.25
18.1	18.1	20.0	20.0	20.0
103/12-25-009-29W1/00	103/12-25-009-29W1/00	103/13-25-009-29W1/00	103/13-25-009-29W1/00	103/13-25-009-29W1/00
0.25907859	0.24691265	0.25	0.25	0.25
27.9	27.9	15.2	15.2	15.2
	1 16.1 102/12-25-009-29W1/00 0.25 18.1 103/12-25-009-29W1/00 0.25907859	1 1 64.7  102/12-25-009-29W1/00 102/12-25-009-29W1/00 0.25 0.25 18.1 18.1  103/12-25-009-29W1/00 103/12-25-009-29W1/00 0.25907859 0.24691265	1         1         1         1         1         12.9           102/12-25-009-29W1/00         102/12-25-009-29W1/00         102/13-25-009-29W1/00         102/13-25-009-29W1/00         0.25         0.25         0.25         0.25         18.1         20.0           103/12-25-009-29W1/00         103/12-25-009-29W1/00         103/13-25-009-29W1/00         103/13-25-009-29W1/00         0.25	1     1     1     1       16.1     64.7     12.9     17.2       102/12-25-009-29W1/00     102/12-25-009-29W1/00     102/13-25-009-29W1/00     102/13-25-009-29W1/00       0.25     0.25     0.25     0.25       18.1     18.1     20.0     20.0       103/12-25-009-29W1/00     103/12-25-009-29W1/00     103/13-25-009-29W1/00     103/13-25-009-29W1/00       0.25907859     0.24691265     0.25     0.25

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations (cont'd)

Tract	Tract	Total	16	17	18	19	20
LSD	Weighting		16-25-09-29W1	1-36-09-29W1	2-36-09-29W1	3-36-09-29W1	4-36-09-29W1
Tract Factor	0 0	100%	3.881833133%	3.513299602%	2.911595745%	3.042722384%	3.415345826%
Flossie							
Area (ac)		1,120	40	40	40	40	40
h (m)			16.0	13.0	12.0	12.0	14.0
Vb (ac-ft)		57,348	2,100	1,706	1,575	1,575	1,837
phi			14.0%	14.0%	14.0%	14.0%	14.0%
Sw			25%	25%	25%	25%	25%
HCPV			1.680	1.365	1.260	1.260	1.470
OOIP (Mbbls)		44,608	1,710	1,390	1,283	1,283	1,497
OOIP (Mstb)		41,690	1,599	1,299	1,199	1,199	1,399
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	254	206	191	191	222
Middle Daly (Green)		,					
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		.,.20	4.0	5.0	2.0	3.0	4.0
Vb (ac-ft)		13,648	525	656	262	394	525
phi		10,040	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		9	0.360	0.450	0.180	0.270	0.360
OOIP (Mbbls)		9,529	367	458	183	275	367
OOIP (Mstb)		8,906	343	428	171	257	343
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	54	68	27	41	54
		1,410	34	00	21	41	34
Lower Daly (Purple)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)			2.0	2.0	3.0	2.0	2.0
Vb (ac-ft)		5,118	262	262	394	262	262
phi			12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		4	0.180	0.180	0.270	0.180	0.180
OOIP (Mbbls)		3,574	183	183	275	183	183
OOIP (Mstb)		3,340	171	171	257	171	171
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	27	27	41	27	27
Crinoid							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		•	0.0	0.0		1.0	0.0
Vb (ac-ft)		1,181	0	0	0	131	0
phi		, -	8.0%	8.0%	8.0%	8.0%	8.0%
Sw			25%	25%	25%	25%	25%
HCPV		1	0.000	0.000	0.000	0.060	0.000
OOIP (Mbbls)		550	0	0	0	61	0
OOIP (Mstb)		514	0	0	0	57	0
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	0	0	0	9	0
Total Lodgepole		Ü_	•	· ·	•	· ·	·
Total OOIP (Mstb)		54,449	2,112	1,898	1,627	1,684	1,913
Total OOIP (10 3 m 3)		8,657	336	302	259	268	304
Cumulative Oil (Mstb)		999	37.5	20.4	70.8	57.8	87.0
OOIP-Cum Prd (Mstb)	100%	53,450	37.5 2,075	1,878	1,556	1,626	1,826
JOIF-Guill Fru (WISTD)	10070	33,430	2,013	1,070	1,330	1,020	1,020

100/16-25-009-29W1/00	100/01-36-009-29W1/00	100/02-36-009-29W1/00	100/03-36-009-29W1/00	100/04-36-009-29W1/00
1	1	1	1	1
28.7	9.5	60.0	47.0	76.2
102/13-25-009-29W1/00	102/01-36-009-29W1/00	102/01-36-009-29W1/00	102/01-36-009-29W1/00	102/01-36-009-29W1/00
0.25	0.25	0.25	0.25	0.25
20.0	24.8	24.8	24.8	24.8
103/13-25-009-29W1/00	103/01-36-009-29W1/00	103/01-36-009-29W1/00	103/01-36-009-29W1/00	103/01-36-009-29W1/00
0.25	0.25	0.25	0.25	0.25
15.2	18.5	18.5	18.5	18.5
	1 28.7 102/13-25-009-29W1/00 0.25 20.0 103/13-25-009-29W1/00 0.25	1 1 9.5 28.7 9.5 102/13-25-009-29W1/00 102/01-36-009-29W1/00 0.25 0.25 20.0 24.8 103/13-25-009-29W1/00 103/01-36-009-29W1/00 0.25 0.25	1 1 1 60.0  28.7 9.5 60.0  102/13-25-009-29W1/00 102/01-36-009-29W1/00 102/01-36-009-29W1/00 0.25 0.25 0.25 20.0 24.8 24.8  103/13-25-009-29W1/00 103/01-36-009-29W1/00 0.25 0.25 0.25	102/13-25-009-29W1/00 102/01-36-009-29W1/00 102/01-36-009-29W1/00 102/01-36-009-29W1/00 0.25 0.25 0.25 0.25 24.8 24.8 24.8 103/13-25-009-29W1/00 103/01-36-009-29W1/00 103/01-36-009-29W1/00 0.25 0.25 0.25 0.25 0.25

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations (cont'd)

Tract	Tract	Total	21	22	23	24	25
LSD	Weighting		5-36-09-29W1	6-36-09-29W1	7-36-09-29W1	8-36-09-29W1	9-36-09-29W1
Tract Factor		100%	2.731157860%	2.336154380%	3.020048587%	2.467358849%	2.883835635%
Flossie							
Area (ac)		1,120	40	40	40	40	40
h (m)			13.0	11.0	12.0	9.0	10.0
Vb (ac-ft)		57,348	1,706	1,444	1,575	1,181	1,312
phi			14.0%	14.0%	14.0%	14.0%	14.0%
Sw			25%	25%	25%	25%	25%
HCPV			1.365	1.155	1.260	0.945	1.050
OOIP (Mbbls)		44,608	1,390	1,176	1,283	962	1,069
OOIP (Mstb)		41,690	1,299	1,099	1,199	899	999
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	206	175	191	143	159
Middle Daly (Green)		-,-					
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		1,120	2.0	3.0	3.0	4.0	4.0
Vb (ac-ft)		13,648	262	394	394	525	525
phi		13,040	12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		9	0.180	0.270	0.270	0.360	0.360
OOIP (Mbbls)		9,529	183	275	275	367	367
OOIP (Mstb)		8,906	171	275 257	273 257	343	343
					41		
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	27	41	41	54	54
Lower Daly (Purple)							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)			1.0	0.0	2.0	1.0	1.0
Vb (ac-ft)		5,118	131	0	262	131	131
phi			12.0%	12.0%	12.0%	12.0%	12.0%
Sw			25%	25%	25%	25%	25%
HCPV		4	0.090	0.000	0.180	0.090	0.090
OOIP (Mbbls)		3,574	92	0	183	92	92
OOIP (Mstb)		3,340	86	0	171	86	86
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	14	0	27	14	14
Crinoid							
Area (ac)		1,120	40.0	40.0	40.0	40.0	40.0
h (m)		.,	0.0	0.0	0.0		2.0
Vb (ac-ft)		1,181	0	0	0	0	262
phi		.,	8.0%	8.0%	8.0%	8.0%	8.0%
Sw			25%	25%	25%	25%	25%
HCPV		1	0.000	0.000	0.000	0.000	0.120
OOIP (Mbbls)		550	0	0	0	0	122
OOIP (Mstb)		514	0	0	0	0	114
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	0	0	0	0	18
Total Lodgepole		02	· ·	· ·	· ·	· ·	.0
Total OOIP (Mstb)		54,449	1,556	1,356	1,627	1,327	1,541
Total OOIP (10 3 m 3)		8,657	247	216	259	211	245
Cumulative Oil (Mstb)		999	95.9	107.2	12.8	8.5	0.0
OOIP-Cum Prd (Mstb)	100%	53,450	1,460	1,249	1,614	6.5 1,319	1,541
JOIF-Guill Fru (WISTD)	10070	33,430	1,400	1,249	1,014	1,319	1,341

## <u>Comments:</u> Bo

Well 1	100/05-36-009-29W1/00	100/06-36-009-29W1/00	100/07-36-009-29W1/00	100/08-36-009-29W1/00
Factor	1	1	1	1
Cumulative Oil (Mstb)	87.4	98.7	4.3	0.0
Well 2	102/08-36-009-29W1/00	102/08-36-009-29W1/00	102/08-36-009-29W1/00	102/08-36-009-29W1/00
Factor	0.25	0.25	0.25	0.25
Cumulative Oil (Mstb)	24.9	24.9	24.9	24.9
Well 3	103/08-36-009-29W1/00	103/08-36-009-29W1/00	103/08-36-009-29W1/00	103/08-36-009-29W1/00
Factor	0.25	0.25	0.25	0.25
Cumulative Oil (Mstb)	9.2	9.2	9.2	9.2

Table 1 – Summary of Original Oil In Place and Tract Factor Calculations (cont'd)

• .					
Tract	Tract	Total	26	27	28
LSD	Weighting		10-36-09-29W1	15-36-09-29W1	16-36-09-29W1
Tract Factor	0 0	100%	2.887489869%	2.438236380%	3.338117719%
Flossie					
Area (ac)		1,120	40	40	40
h (m)		, -	11.0	11.0	12.0
Vb (ac-ft)		57,348	1,444	1,444	1,575
phi		- ,	14.0%	14.0%	14.0%
Sw			25%	25%	25%
HCPV			1.155	1.155	1.260
OOIP (Mbbls)		44,608	1,176	1,176	1,283
OOIP (Mstb)		41,690	1,099	1,099	1,199
OOIP (10 <sup>3</sup> m <sup>3</sup> )		6,628	175	175	191
Middle Daly (Green)		0,020	170	170	101
		4.400	10.0	40.0	10.0
Area (ac)		1,120	40.0	40.0	40.0
h (m)			4.0	3.0	5.0
Vb (ac-ft)		13,648	525	394	656
phi			12.0%	12.0%	12.0%
Sw			25%	25%	25%
HCPV		9	0.360	0.270	0.450
OOIP (Mbbls)		9,529	367	275	458
OOIP (Mstb)		8,906	343	257	428
OOIP (10 <sup>3</sup> m <sup>3</sup> )		1,416	54	41	68
Lower Daly (Purple)					
Area (ac)		1,120	40.0	40.0	40.0
h (m)			1.0		0.0
Vb (ac-ft)		5,118	131	0	0
phi			12.0%	12.0%	12.0%
Sw			25%	25%	25%
HCPV		4	0.090	0.000	0.000
OOIP (Mbbls)		3,574	92	0	0
OOIP (Mstb)		3,340	86	0	0
OOIP (10 <sup>3</sup> m <sup>3</sup> )		531	14	0	0
Crinoid					
Area (ac)		1,120	40.0	40.0	40.0
h (m)		1,120	1.0	40.0	3.0
Vb (ac-ft)		1,181	131	0	394
phi		1,101	8.0%	8.0%	8.0%
Sw			25%	25%	25%
HCPV		1	0.060	0.000	0.180
OOIP (Mbbls)		550	61	0.000	183
OOIP (Mstb)		514	57	0	171
OOIP (10 <sup>3</sup> m <sup>3</sup> )		82	9	0	27
Total Lodgepole		02	J	U	21
Total Codgepole Total OOIP (Mstb)		54,449	1,584	1,356	1,798
Total OOIP (10 3 m 3)		8,657	252	216	286
Cumulative Oil (Mstb)	4000/	999	40.9	52.6	14.1
OOIP-Cum Prd (Mstb)	100%	53,450	1,543	1,303	1,784

Well 4	400/40 20 000 20\\/4/00	400/45 20 000 20/4/00	400/40 20 000 20/4/4/00
Well 1	100/10-36-009-29001/00	100/15-36-009-29W1/00	100/16-36-009-29W1/00
Factor	1	1	1
Cumulative Oil (Mstb)	40.9	52.6	14.1
Well 2			
Factor			
Cumulative Oil (Mstb)			
Well 3			
Factor			
Cumulative Oil (Mstb)			

 $Table\ 2-Well\ List-Status\ and\ Injector\ Conversion$ 

Well ID	Prod./Inject. Formation	First Prod YYYY/MM	Last Prod. YYYY/MM	Туре	Proposed Injector
102/04-25-009-29W1/00	Mlodgepl	2014/02	2015/02	Horizontal	
103/04-25-009-29W1/00	Mlodgepl	2014/02	2015/02	Horizontal	Injector
102/05-25-009-29W1/00	Mlodgepl	2013/11	2015/02	Horizontal	
103/05-25-009-29W1/00	Mlodgepl	2014/03	2015/02	Horizontal	Injector
100/09-25-009-29W1/00	Mlodgepl	1985/12	1999/01	Vertical	
100/10-25-009-29W1/00	Mlodgepl	1985/01	2015/02	Vertical	
100/11-25-009-29W1/00	Mlodgepl	1984/07	1994/10	Vertical	
100/12-25-009-29W1/00	Mlodgepl	1984/10	2015/02	Vertical	
102/12-25-009-29W1/00				Horizontal	
103/12-25-009-29W1/00				Horizontal	Injector
100/13-25-009-29W1/00	Mlodgepl	1984/07	1994/02	Vertical	
102/13-25-009-29W1/00	Mlodgepl			Horizontal	
103/13-25-009-29W1/00	Mlodgepl	2014/03	2015/02	Horizontal	Injector
100/14-25-009-29W1/00	Mlodgepl	1984/02	1988/06	Vertical	
100/15-25-009-29W1/00	Mlodgepl	1984/04	2015/02	Vertical	
100/16-25-009-29W1/00	Mlodgepl	1985/06	2015/02	Vertical	
100/01-36-009-29W1/00	Mldgpl_U	1985/12	2000/07	Vertical	
102/01-36-009-29W1/00	Mlodgepl	2013/12	2015/02	Horizontal	
103/01-36-009-29W1/00	Mlodgepl	2013/11	2015/02	Horizontal	Injector
100/02-36-009-29W1/00	Mlodgepl	1964/02	1997/10	Vertical	
100/03-36-009-29W1/00	Mlodgepl	1984/12	2015/02	Vertical	
100/04-36-009-29W1/00	Mlodgepl	1984/08	2015/02	Vertical	
100/05-36-009-29W1/00	Mfloss_lk	1965/03	2015/02	Vertical	
100/05-36-009-29W1/02				Vertical	
100/06-36-009-29W1/00	Mfloss_lk	1965/04	2015/02	Vertical	
100/06-36-009-29W1/02				Vertical	
100/07-36-009-29W1/00	Mldgpl_U	1984/06	1986/07	Vertical	
102/08-36-009-29W1/00	Mlodgepl	2013/03	2015/02	Horizontal	Injector
103/08-36-009-29W1/00	Mlodgepl	2014/12	2015/02	Horizontal	
100/10-36-009-29W1/00	Mlodgepl	1985/11	2015/02	Vertical	
100/10-36-009-29W1/02				Vertical	
100/15-36-009-29W1/00	Mldgpl_U	1985/03	2015/02	Vertical	
100/16-36-009-29W1/00	Mlodgepl	1985/07	2002/10	Vertical	

Table 3 – Cumulative Oil Production and Expected Ultimate Recovery

Well	Туре	Cumulative Oil Mbbl	Expected Ultimate Recovery Mbbl
102/04-25-009-29W1/0	Horizontal	22.798	109.33
103/04-25-009-29W1/0	Horizontal	12.850	81.02
102/05-25-009-29W1/0	Horizontal	27.071	94.31
103/05-25-009-29W1/0	Horizontal	12.401	54.81
100/09-25-009-29W1/0	Vertical	37.468	37.47
100/10-25-009-29W1/0	Vertical	52.780	56.77
100/11-25-009-29W1/0	Vertical	16.142	16.14
100/12-25-009-29W1/0	Vertical	64.674	86.95
102/12-25-009-29W1/0	Horizontal	18.084	60.57
103/12-25-009-29W1/0	Horizontal	27.886	115.69
100/13-25-009-29W1/0	Vertical	12.863	12.86
102/13-25-009-29W1/0	Horizontal	20.007	100.39
103/13-25-009-29W1/0	Horizontal	15.206	99.79
100/14-25-009-29W1/0	Vertical	17.163	17.16
100/15-25-009-29W1/0	Vertical	44.886	47.04
100/16-25-009-29W1/0	Vertical	28.660	34.15
100/01-36-009-29W1/0	Vertical	9.536	9.54
102/01-36-009-29W1/0	Horizontal	24.829	80.76
103/01-36-009-29W1/0	Horizontal	18.465	73.26
100/02-36-009-29W1/0	Vertical	59.973	59.97
100/03-36-009-29W1/0	Vertical	46.975	57.47
100/04-36-009-29W1/0	Vertical	76.165	127.23
100/05-36-009-29W1/0	Vertical	87.357	112.03
100/05-36-009-29W1/2	Vertical	0.000	0.00
100/06-36-009-29W1/0	Vertical	98.674	138.18
100/06-36-009-29W1/2	Vertical	0.000	0.00
100/07-36-009-29W1/0	Vertical	4.306	4.31
102/08-36-009-29W1/0	Horizontal	24.868	82.21
103/08-36-009-29W1/0	Horizontal	9.221	100.29
100/10-36-009-29W1/0	Vertical	40.864	43.40
100/10-36-009-29W1/2	Vertical	0.000	0.00
100/15-36-009-29W1/0	Vertical	52.633	56.01
100/16-36-009-29W1/0	Vertical	14.088	14.09

Table 4 – Summary of Rock and Fluid Properties

Proposed Daly Unit No. 13			
Rock and Fluid Properties			
Formation Pressure	kPa	8000	
Oil Gravity	°API	35.7	
Solution Gas-Oil Ratio	m3/m³	15	
Oil Formation Volume Factor	Rm3/Sm <sup>3</sup>	1.04	
Average Porosity	fraction	0.135	
Average Air Permeability	mD	0.5	

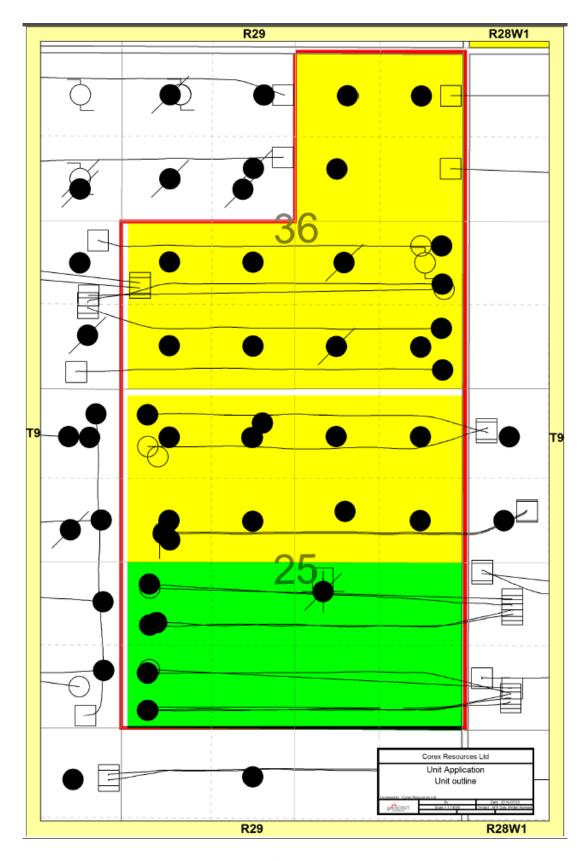


Figure 1 – Location of Proposed Daly Unit No. 13

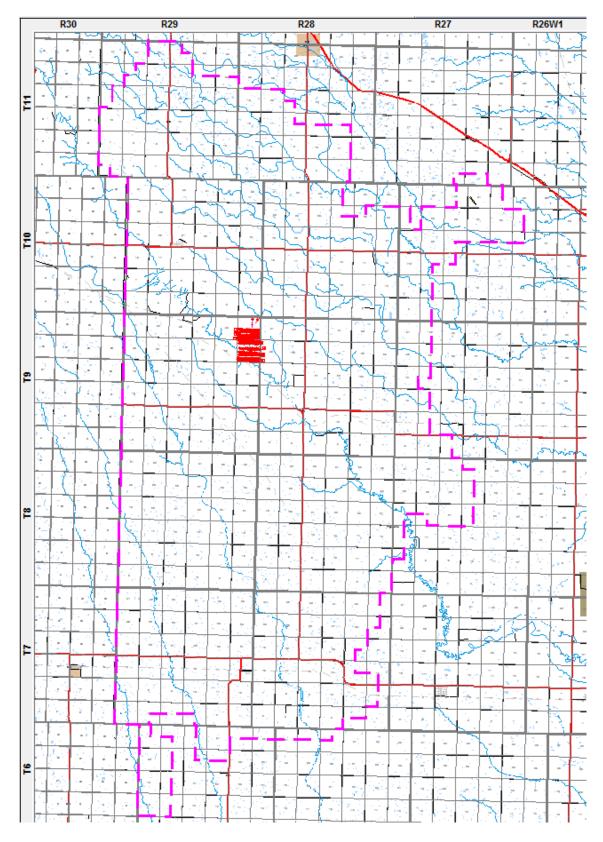


Figure 2 – Location of Proposed Daly Unit No. 13 within the Daly Sinclair Field



Figure 3 – Production History of Wells within Proposed Daly Unit No. 13

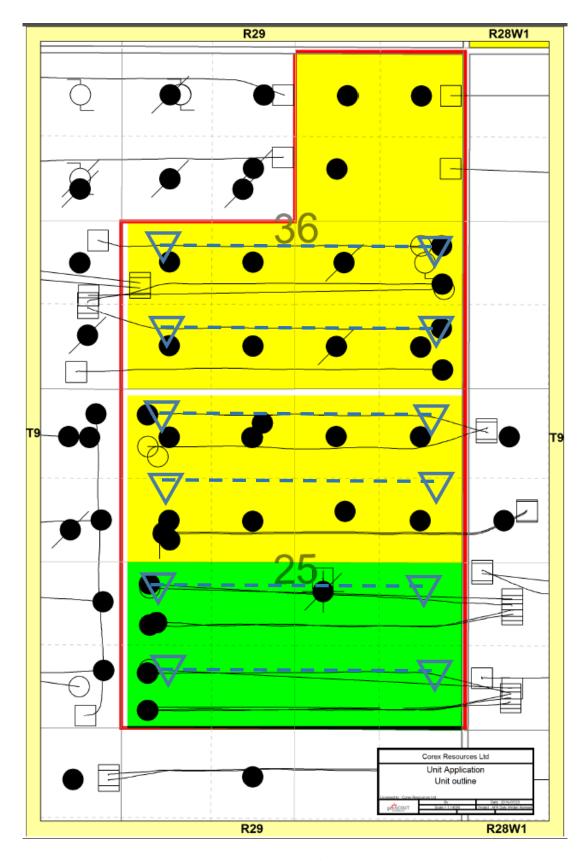


Figure 4 – Proposed Injector Locations

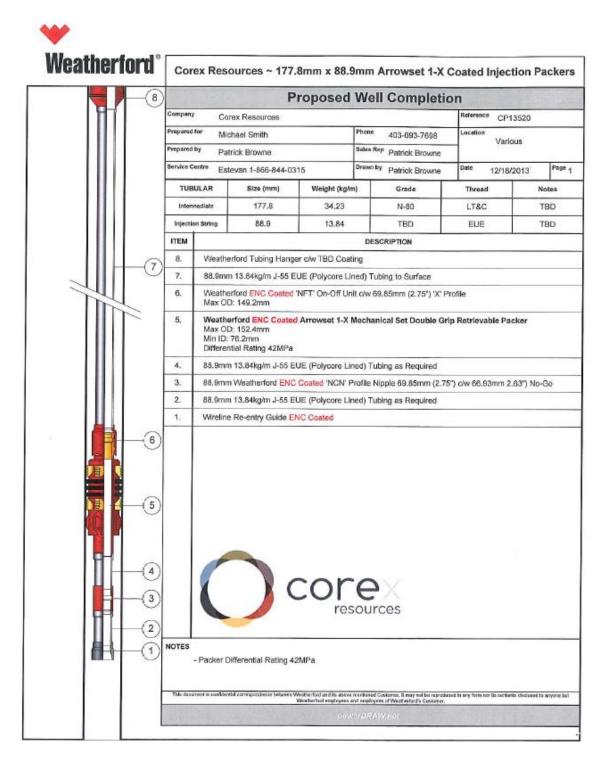


Figure 5 – Wellbore Schematic for Typical Injector

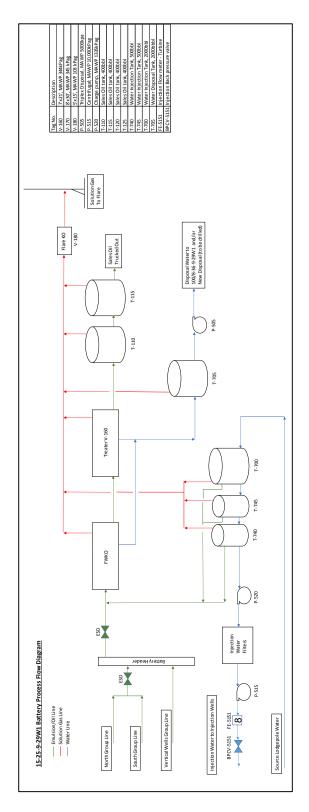


Figure 6 – Simplified Flow Diagram from Battery

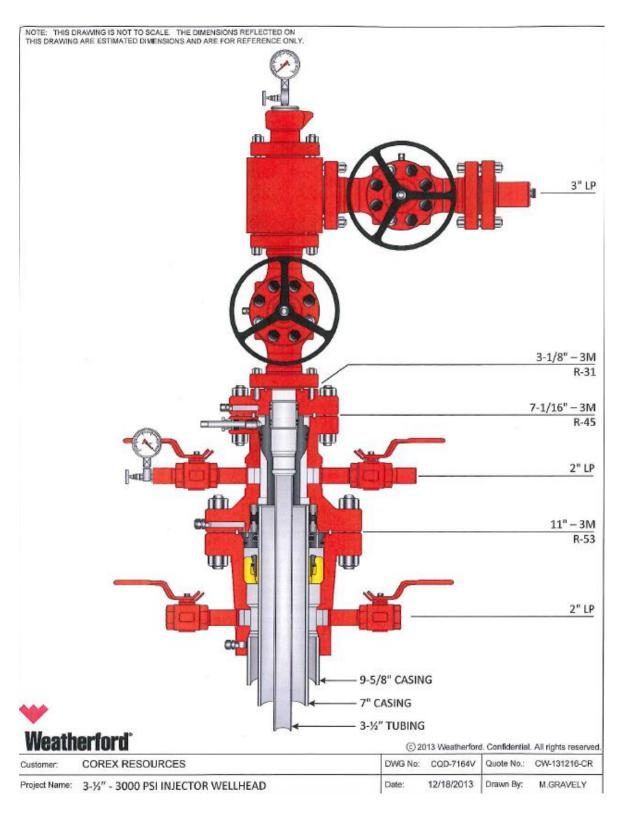
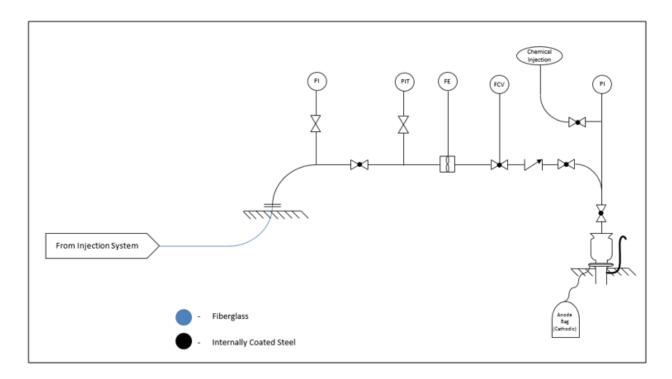


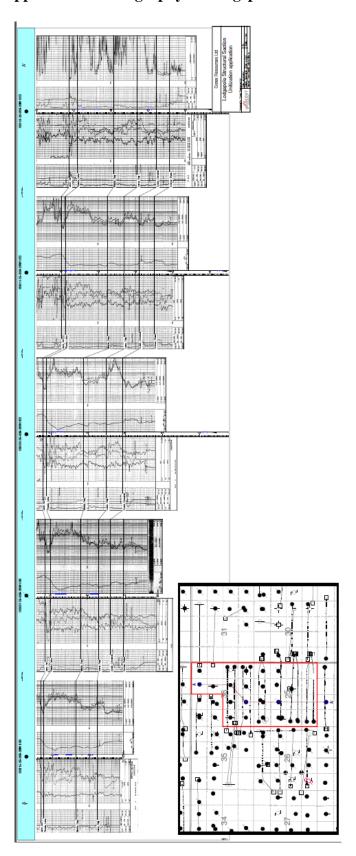
Figure 7 – Well Control and Metering



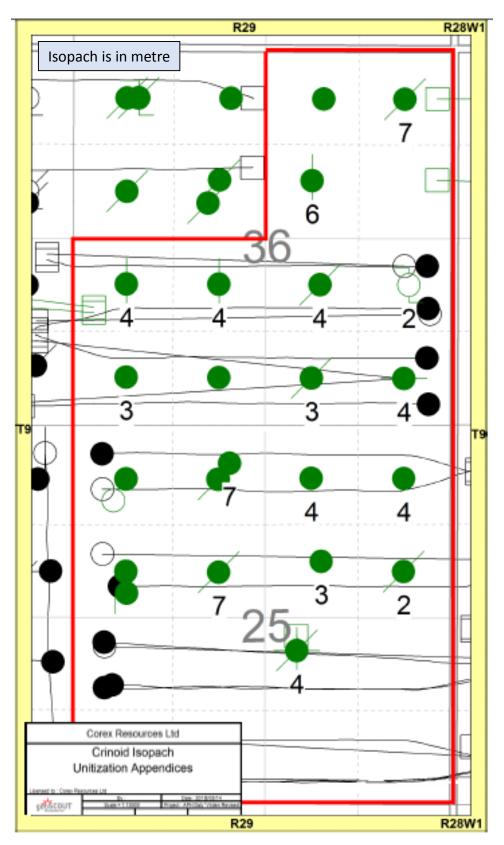
All injection pipelines will have corrosion inhibitor injected at the 15-25 facility, which will carry through to the wellhead for downhole corrosion control. Scale inhibitor will be injected in as well at the wellhead through continuous pumps. Both of these chemicals are also injected upstream at the producing source wells to protect the pipelines and the injection facilities at the battery.

Figure 8 – Corrosion Control System

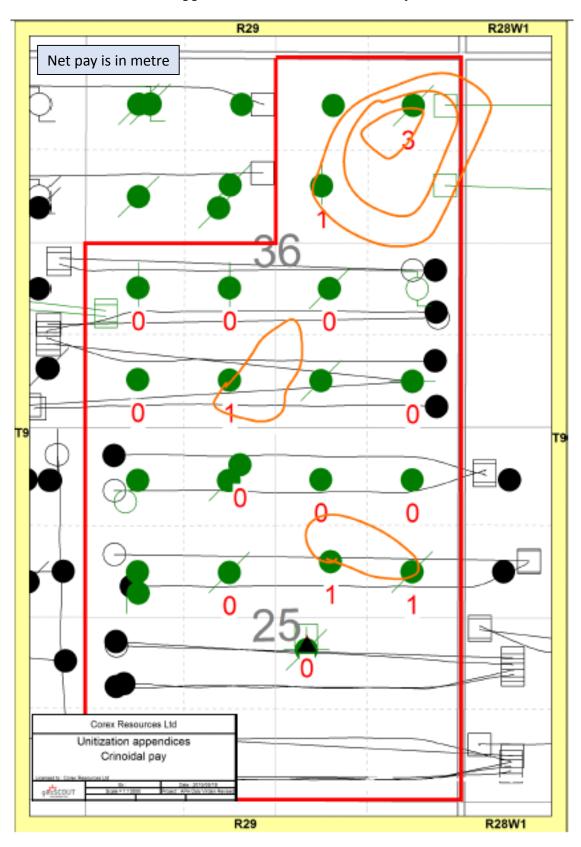
## ${\bf Appendix} \; {\bf I-Stratigraphy} \; {\bf of} \; {\bf Lodgepole} \; {\bf Formation}$



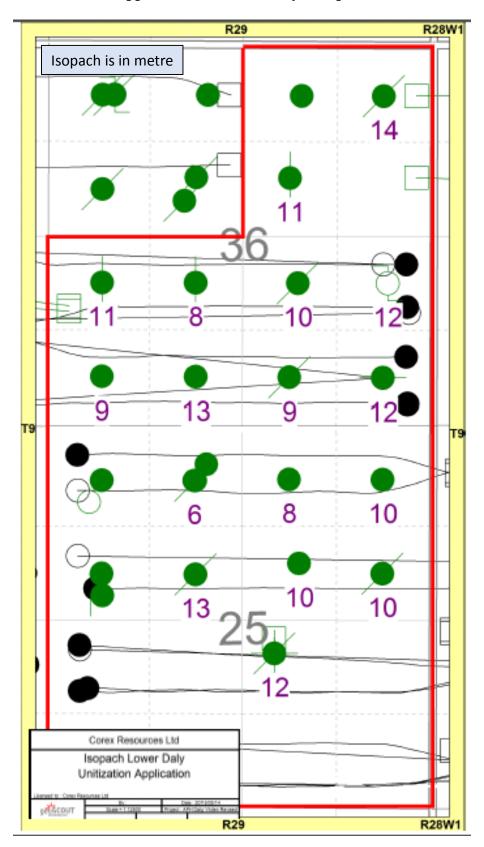
Appendix II - Crinoidal - Isopach



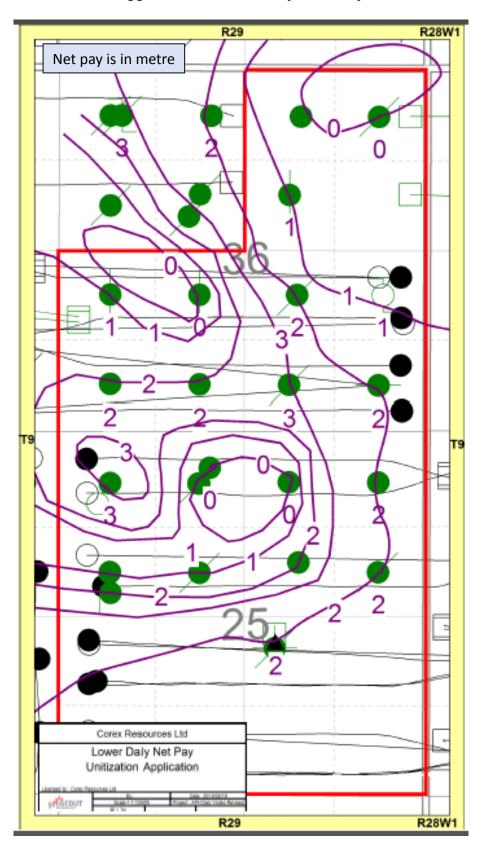
Appendix III - Crinoidal - Net Pay



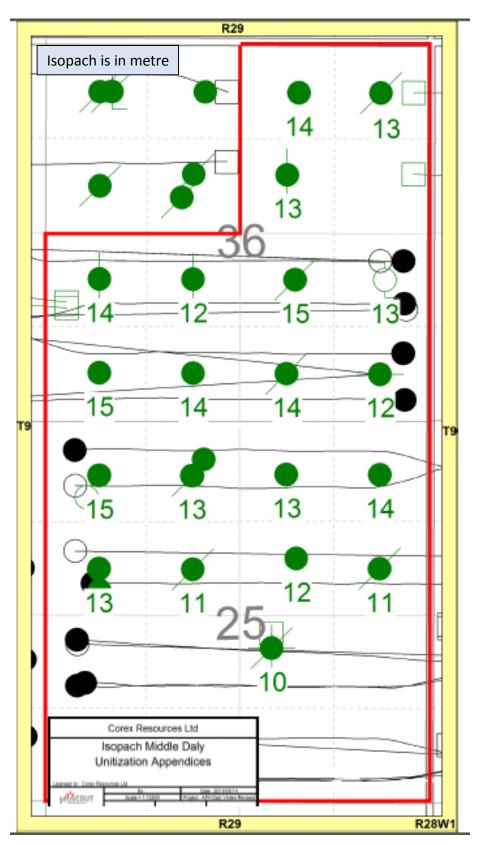
Appendix IV - Lower Daly - Isopach



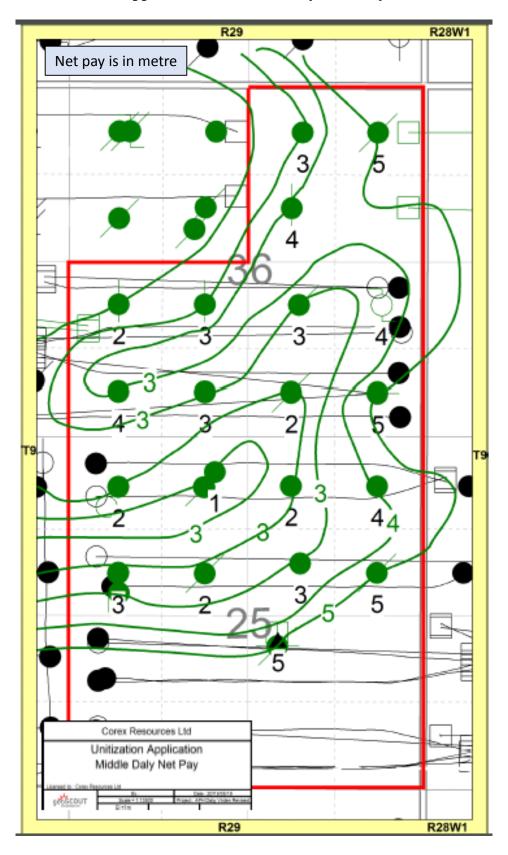
Appendix V – Lower Daly – Net Pay



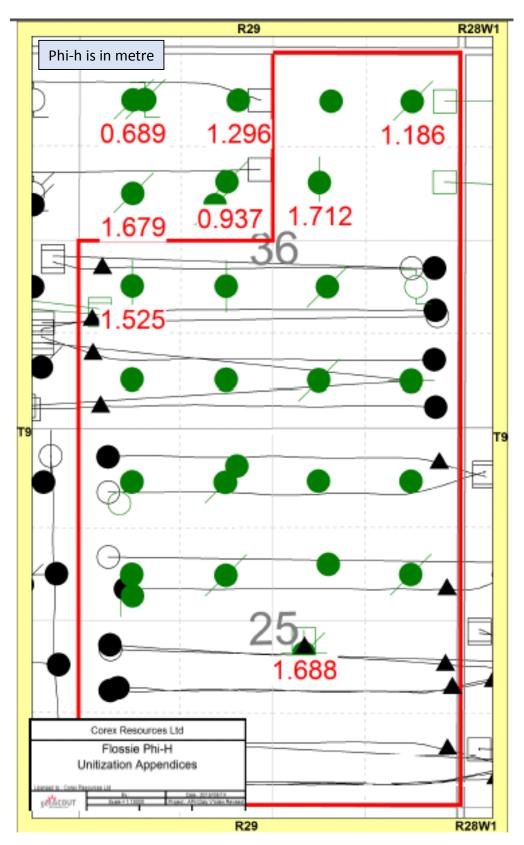
Appendix VI – Middle Daly – Isopach



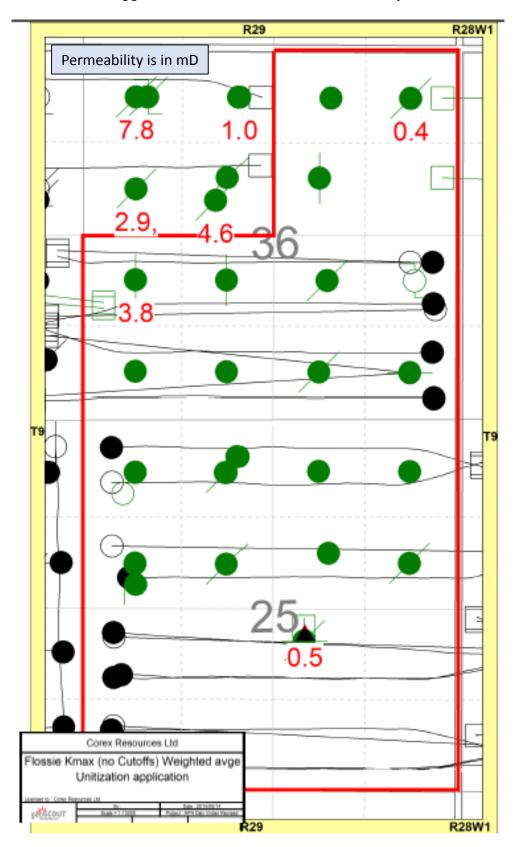
Appendix VII – Middle Daly – Net Pay



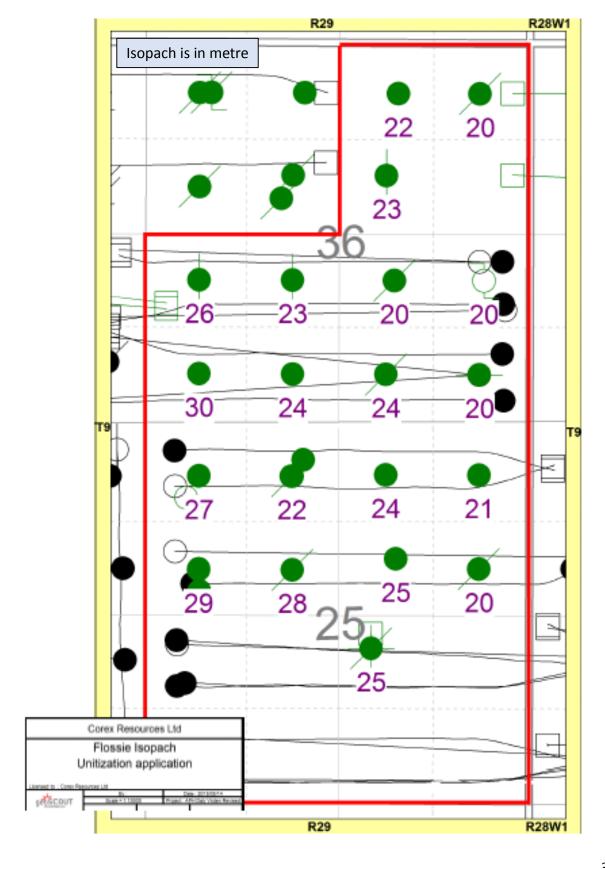
Appendix VIII - Flossie Lake - Porosity-Thickness



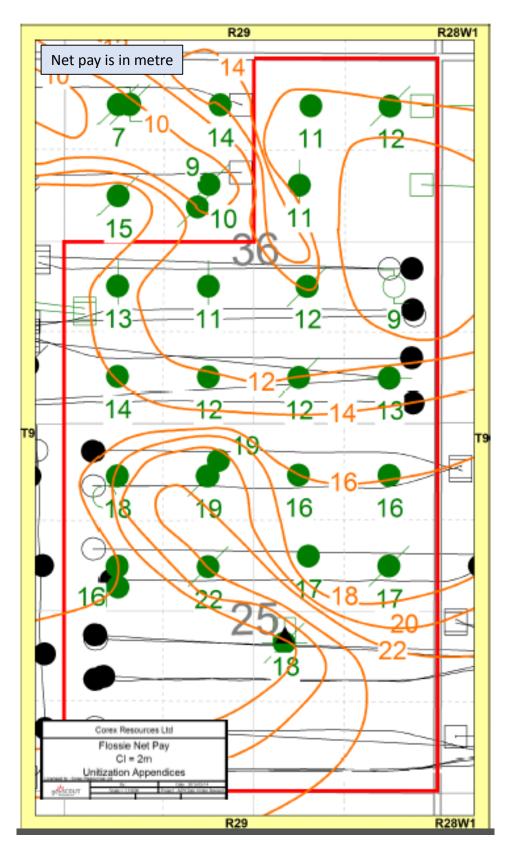
Appendix IX - Flossie Lake - Permeability



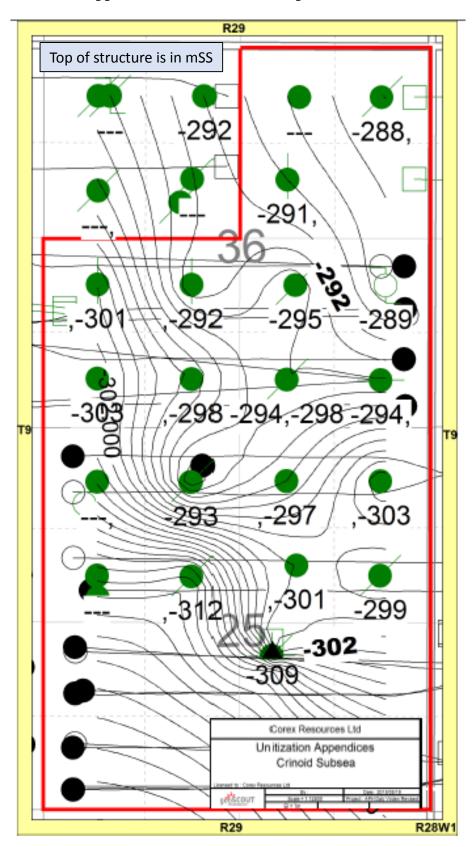
Appendix X – Flossie Lake – Isopach



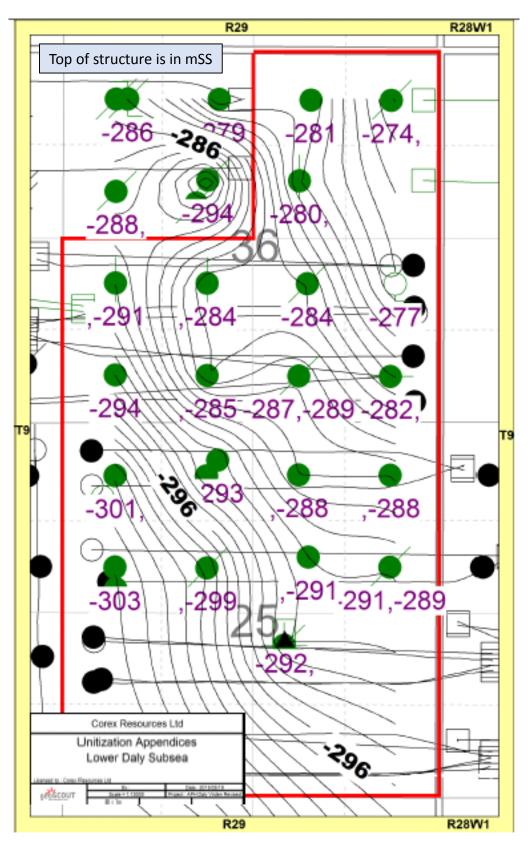
Appendix XI – Flossie Lake – Net Pay



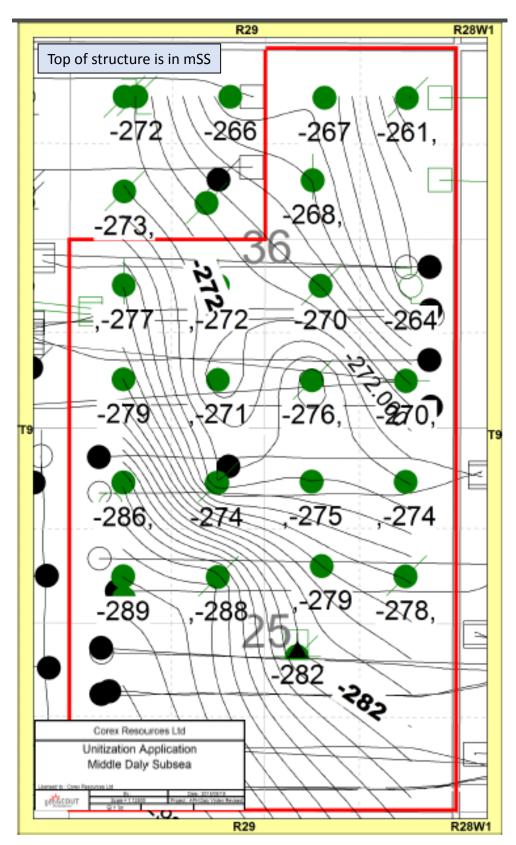
Appendix XII - Crinoidal - Top of Structure



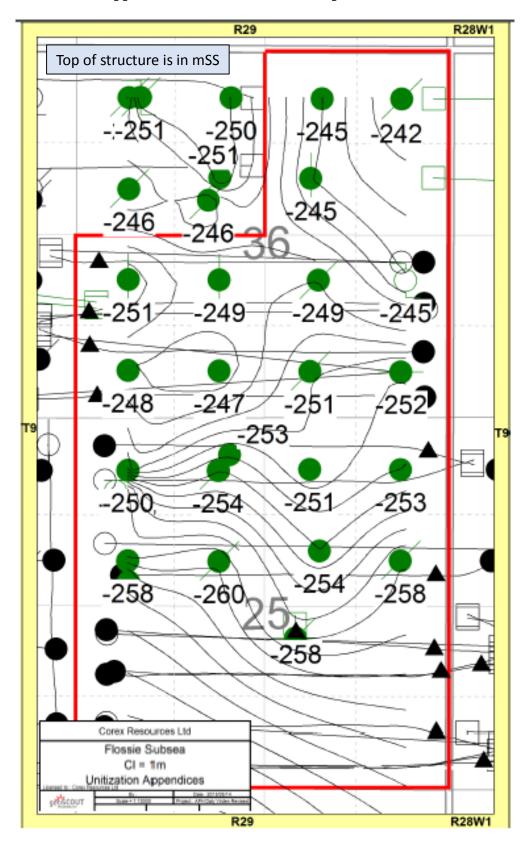
Appendix XIII – Lower Daly – Top of Structure



Appendix XIV - Middle Daly - Top of Structure

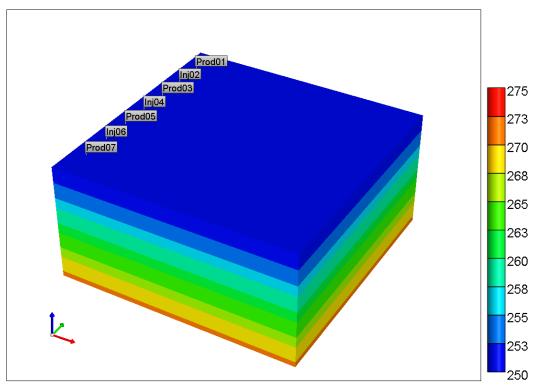


Appendix XV - Flossie Lake - Top of Structure

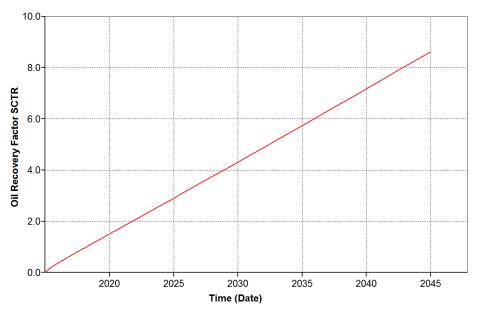


#### Appendix XVI - Flossie Lake - Section Model

Grid Top (m) 2015-01-01



Section Model - Flossie Lake - 3D View



Section Model - Flossie Lake - Forecast - Oil Recovery Factor versus Time

#### Appendix XVII - Tract Description and Working Interest Owners

	<b>Land</b>		<u>W.I.</u>	<u>W.I.</u>	
<b>Tract</b>	<b>Description</b>	<b>Tract Factor</b>	Owner	<b>Percent</b>	<b>Mineral Owner</b>
1	1-25-09-29W1	3.410362049%	Corex	100%	Heritage Royalty
2	2-25-09-29W1	3.408900054%	Corex	100%	Heritage Royalty
3	3-25-09-29W1	3.624284570%	Corex	100%	Heritage Royalty
4	4-25-09-29W1	3.625926838%	Corex	100%	Heritage Royalty
5	5-25-09-29W1	3.610469374%	Corex	100%	Heritage Royalty
6	6-25-09-29W1	3.610469374%	Corex	100%	Heritage Royalty
7	7-25-09-29W1	3.471386863%	Corex	100%	Heritage Royalty
8	8-25-09-29W1	3.395111747%	Corex	100%	Heritage Royalty
9	9-25-09-29W1	4.238722179%	Corex	100%	Harley/Kormylo (1)
10	10-25-09-29W1	3.386459958%	Corex	100%	Harley/Kormylo (1)
11	11-25-09-29W1	3.261165351%	Corex	100%	Harley/Kormylo (1)
12	12-25-09-29W1	3.445722034%	Corex	100%	Harley/Kormylo (1)
13	13-25-09-29W1	3.012086067%	Corex	100%	Harley/Kormylo (1)
14	14-25-09-29W1	4.360013334%	Corex	100%	Harley/Kormylo (1)
15	15-25-09-29W1	3.613076897%	Corex	100%	Harley/Kormylo (1)
16	16-25-09-29W1	3.582673012%	Corex	100%	Harley/Kormylo (1)
17	1-36-09-29W1	3.565848802%	Corex	100%	Jones et al (2)
18	2-36-09-29W1	3.219434343%	Corex	100%	Jones et al (2)
19	3-36-09-29W1	3.573462337%	Corex	100%	5206197/5188807 (3)
20	4-36-09-29W1	3.286895784%	Corex	100%	5206197/5188807 (3)
21	5-36-09-29W1	3.286895784%	Corex	100%	5206197/5188807 (3)
22	6-36-09-29W1	3.642235869%	Corex	100%	5206197/5188807 (3)
23	7-36-09-29W1	3.445722034%	Corex	100%	Jones et al (2)
24	8-36-09-29W1	3.445722034%	Corex	100%	Jones et al (2)
25	9-36-09-29W1	3.935660636%	Corex	100%	Computershare/69763 (4)
26	10-36-09-29W1	3.962580339%	Corex	100%	Computershare/69763 (4)
27	15-36-09-29W1	3.935660636%	Corex	100%	Computershare/69763 (4)
<u>28</u>	16-36-09-29W1	3.643051699%	Corex	100%	Computershare/69763 (4)
<b>Total</b>		100.000000000%			

#### Notes:

- 1. Don Harley Insurance Agency Ltd. (50%) and Joanne Kormylo (50%)
- 2. Clifford Jones (25%), Elizabeth Forsyth (12.5%), Jane Forsyth Payne (12.5%), Kool Resources Ltd. (25%), Computershare Trust Company of Canada (25%)
- 3. 5206197 Manitoba Ltd. (50%) and 5188807 Manitoba Ltd. (50%)
- 4. Computershare Trust Company of Canada (75%) and 69763 Manitoba Ltd. (25%)