

2010 Annual Report – Daly Unit #4

Daly Unit #4 is characterized by a thick and heterogeneous pay interval with significant discontinuities, both laterally and vertically. Low reservoir energies as well as low effective permeability during primary production have been seen. The expected recovery efficiencies may range from 8 to 12 percent on the current 40-acre well spacing.

On the basis of further optimizing Daly Unit #4 Zargon is currently identifying areas within the Daly member where the reservoir quality is poorly drained where oil volumes are likely to be found that are best suited for infill drilling. Zargon's principal objective of the current Geological study is to evaluate a targeted infill drilling and optimization strategy for future field development in Daly Unit #4.

Zargon is investigating the option of horizontal infill drilling not only to increase oil recoveries from primary production but also to enhance sweep efficiencies and hopefully improve recovery from our secondary enhanced oil recovery project.

In review of the production performance in the area reduced well spacing is recommended as we observe low oil recoveries and poor sweep efficiencies which are indicative of the significant reservoir discontinuity.

A detailed geological review is ongoing to better understand the reservoir heterogeneity which will help Zargon to determine how to optimize the current enhanced oil recovery project.

Daly Unit #4 area was discovered in 1962 of which three wells were initially drilled and abandoned in 1970 due to poor productivity. The area was not further delineated until 1983 where an aggressive drilling program was initiated. From 1980 – 1983, 51 wells were drilled.

Prior to being unitized in April 1988 the area was developed on 40-acre spacing of which cumulative oil production before field unitization was ~562 MSTB from wells completed in the Lodgepole reservoir. Following unitization of the field in 1988, a pilot waterflood pattern was initiated in section 27, pattern 1 and 2 in 1991 and pattern 3 and 4 in 2000. These pilot areas and well pattern allocation are identified in Figure 1. The existing waterflood program in the unit have been developed with four patterns of which three are 40-acre inverted five-spot and one 160-acre inverted nine-spot patterns.

The cumulative oil produced as of December 2010 is approximately 1,609 Mbbl. Figure 2 exhibits the historical oil, water, and water injection rates for Daly Unit #4. The monthly producing rate for each of the water injection patterns are summarized in Table 1 and the cumulative producing rate for each of the water injection patterns and Unit area are summarized in Table 2. Table 3 summarizes the voidage on a monthly and cumulative basis since the start of injection excluding primary production. Figures 3-11 graphically displays the tabulated data.

The Lodgepole carbonates in the Daly Unit are characterized by thick, very heterogeneous pay intervals. Gross interval thickness in the potential reservoir ranges from 30-40 m.

The average effective porosities vary from 6% to 13%, and the in-situ connate water saturations surmised range from 35% to 45%. Core and log information indicate the Daly Lodgepole Unit contains shallow water carbonate cycles. The targeted gross reservoir within the Lodgepole member is 15-20 m. The mapped volumetric OOIP for this potential reservoir for this interval ranges from 22 - 28 MMbbl of which 6 - 7.5% has been recovered to date. Previous submitted interpretation analyzed by Chevron of the entire column equates an approximate OOIP of 32 MMbbl.

The average effective oil permeability in the area of interest is typically 1-3 md but can be less than 1 md in some intervals. The Lodgepole carbonates in the area are also characterized by significant discontinuities in both lateral and areal directions.

Diagenetic processes in the area have either destroyed or have enhanced porosity, but the lack of connectivity is caused by low effective oil permeability's. In the Daly area these diagenetic processes tend to destroy any original permeability-porosity relationships. On this basis neither pore-throat size nor distribution is an accurate predictor of reservoir quality.

We have also observed in the area that some porosity trends appear to be influenced by and maybe controlled by depositional structure. We have also observed that some permeability trends appear to be influenced by structure and localized salt dissolution. This observation is supported by historical cumulative oil production in the area which coincidentally corresponds to permeability trends.

The complexities in porosity and permeability distribution make it difficult to derive effective porosity using traditional log analysis. Figure 12 illustrates this problem in the area within and around Daly Unit #4. The semi-log plot of the core of derived permeability against core-derived porosity shows the lack of any discernible relationship between permeability and porosity.

In Daly Unit #4 the Lodgepole member is observed that good porosity development is present however the immediate area exhibits low permeability trends due to poor connectivity between pores. The poor performance in the area is largely due to this poor permeability matrix, limited well drainage areas during primary depletion.

Chevron Canada Resources, the previous operator of the subject unit, had requested an exemption from the requirement of conducting annual reservoir pressure surveys in September 1990 due to poor permeability matrix. This is not surprising with the large column of discontinuous lenses where the time required for pressure build-up to achieve a stabilized pressure would be uneconomical and not very representative due to the complexity of cross flow from a number of unknown pressure contribution from different lenses that may not be laterally extensive.

Initial fluid properties were obtained from analysis of fluid samples taken in September 1953 from the 06-10-010-28W1 (06-10) of which the parameters have been matched and summarized as follows. The 06-10 well is located one and half miles directly north of Daly Unit #4 and is a reasonable analogy to the producing reservoir.

Approximate Initial Reservoir Fluid Properties for Daly Unit #4

Pi (kPaa)	7450
Pb (kPaa)	3000
Boi (m3/m3)	1.067
Rsi (m3/m3)	21.62
Sw (%)	35%

The Monthly wellhead Injection pressures for each of the water injection wells are summarized as follows:

Wellhead Injection Pressures (kPa) for Daly Unit #4

2010	Injection Well Pressures			
	00/07-35-009-28W1/0	02/14-35-009-28W1/0	02/15-27-009-28W1/0	02/16-35-009-28W1/0
January	7800	6600	7600	6600
February	8100	6600	7700	6700
March	8000	6600	7700	6700
April	8100	6700	7900	6700
May	8000	6650	7600	6700
June	8100	6700	7600	6700
July	7800	6700	7900	6800
August	8100	6650	7800	6700
September	8000	6700	7600	6700
October	7800	6650	7600	6700
November	8100	6650	7600	6800
December	7800	6700	7900	6800

The 2010 workovers for the Daly Unit #4 area are summarized as follows:

Workovers for Daly Unit #4

Location	Finish Date	Comments
00/04-02-10-28W1	10/09/2010	Replaced Pump
02/16-35-009-28W1	08/07/2010	Repaired Packer
00/09-35-9-28W1	04/10/2010	Replaced Pump

The injected water in the area is currently treated with corrosion inhibitor to ensure the integrity of the field equipment is maintained.

For 2011 Zargon intends to further evaluate reservoir strategies that further develop and optimize the enhanced oil recovery project, for 2012, by introducing horizontal infill wells and eventually pilot horizontal water injection in the area of interest.

If the Manitoba Petroleum Branch have any further questions in respect to this Annual Report Summary please contact the undersigned at (403) 515-5695.

Sincerely,

Pete Janjua
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