

## **A Tale of Two Saskatchewan Oil Pools – Elswick and**

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### **Introduction**

The Elswick and Bromhead Oil Pools produce oil from the Mississippian Midale Beds in southeast Saskatchewan. This core presentation shows how depositional environment directly influences reservoir quality laterally across the two pools. Since Elswick lies about 10 km updip from Bromhead the two pools are ideal candidates to challenging our dolomitization model.

### **Discussion**

Elswick is a good upper Midale (Marly) dolomite reservoir with unit and non-unit cumulative production of about  $3.3 \times 10^6 \text{m}^3$ . By contrast, the Upper Midale at Bromhead is largely non-dolomitized limestone and is non-productive. Bromhead cumulative production is  $3.7 \times 10^5 \text{m}^3$  from the lower Midale (Vuggy). Fracturing associated with collapse of the Devonian Prairie Evaporite beneath the Bromhead Pool appears to enhance production. The lower Midale is dominantly limestone but lacks the typical vuggy nature and coated-grain components. There is some lower Midale calcareous algal grainstone production along the southern margin of Elswick Pool.

The cores presented will show that the rocks of the Upper Midale at both Elswick and Bromhead have similar characteristics suggesting deposition under similar paleo-environmental conditions, but they will also illustrate that extensive dolomitization plays a major role in forming the reservoir rocks in the upper Midale at Elswick, and patchy dolomitization in the same rocks at Bromhead yields only scattered oil staining. According to Harvey et al. (2004) there are three determining factors in the Midale Beds that produce reservoir quality rocks: degree of dolomitization, good planar-e to planar-s crystal form, and good uniformity of pore throat sizes. Thin sections from cores in the Elswick pool support these conclusions.

The variations in the degrees of dolomitization in the two fields lead to the question of a dolomitization model. Since both fields are under the canopy of the Midale Evaporite, a reflux model appears to be appropriate.

### **Reference**

Harvey, D., Kent, D.M., and Qing, H. (2004): Limited accommodation space: an important factor in the formation of early dolomites in Mississippian Midale and Ratcliffe Beds of southeast Saskatchewan (5x10<sup>9</sup> barrels ooi): in Dolomites – The Spectrum; Mechanisms, Models, Reservoir Development: Canadian Society of Petroleum Geologists, Seminar and Core Conference, CD-ROM Paper, 15p.