

## FluxTool Liner Conveyed 5.5" Injection System Overview

In August 2014 AFS installed an injection control device system with a SAGD producer in the Canadian Oilsands. This is a unique 34 tool, 5.5" liner deployed injection control system. Most existing systems are either 4.5" tubing deployed or 6 5/8" or 7" liner deployed completions. The 5.5" completion combines the hydraulic advantages of a liner system with the potential for an extended lateral wellbore. (800m +). All of the information shared is publicly available.

### Completion Details:

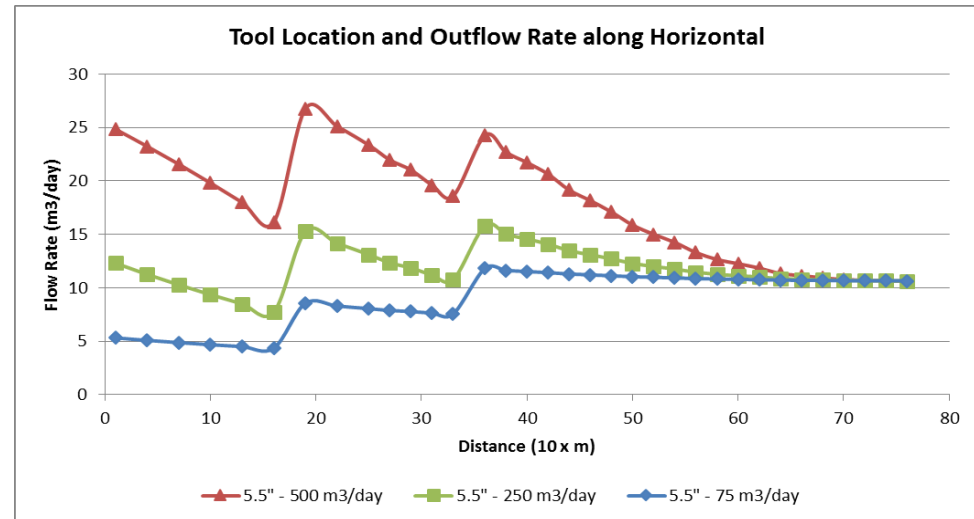
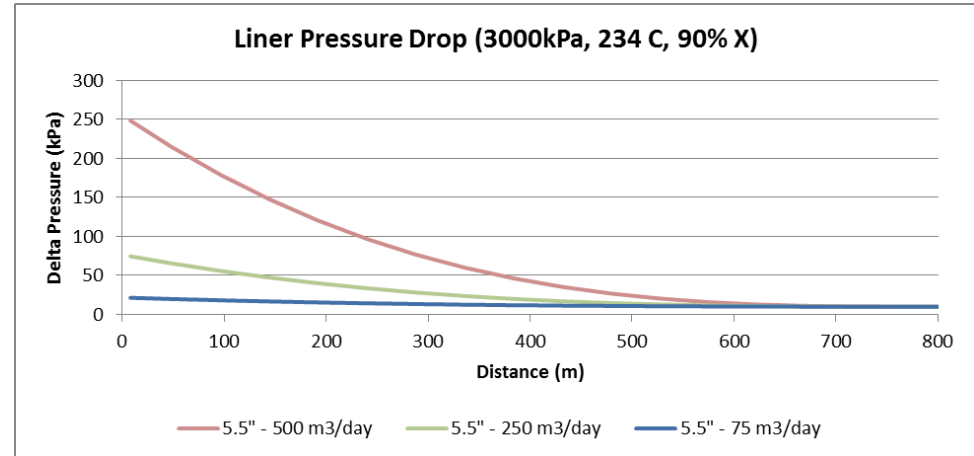
- 34 tools, spaced along 800m horizontal.
- Re-entry well that had been producing for ~5 years.
- Tool placement and sizing design was independent of geology / reservoir temperature profile. The primary goal was to base outflow rates off of the liner-reservoir pressure differential.
- System designed using CMG FlexWell and QFLOW.

### Design Overview:

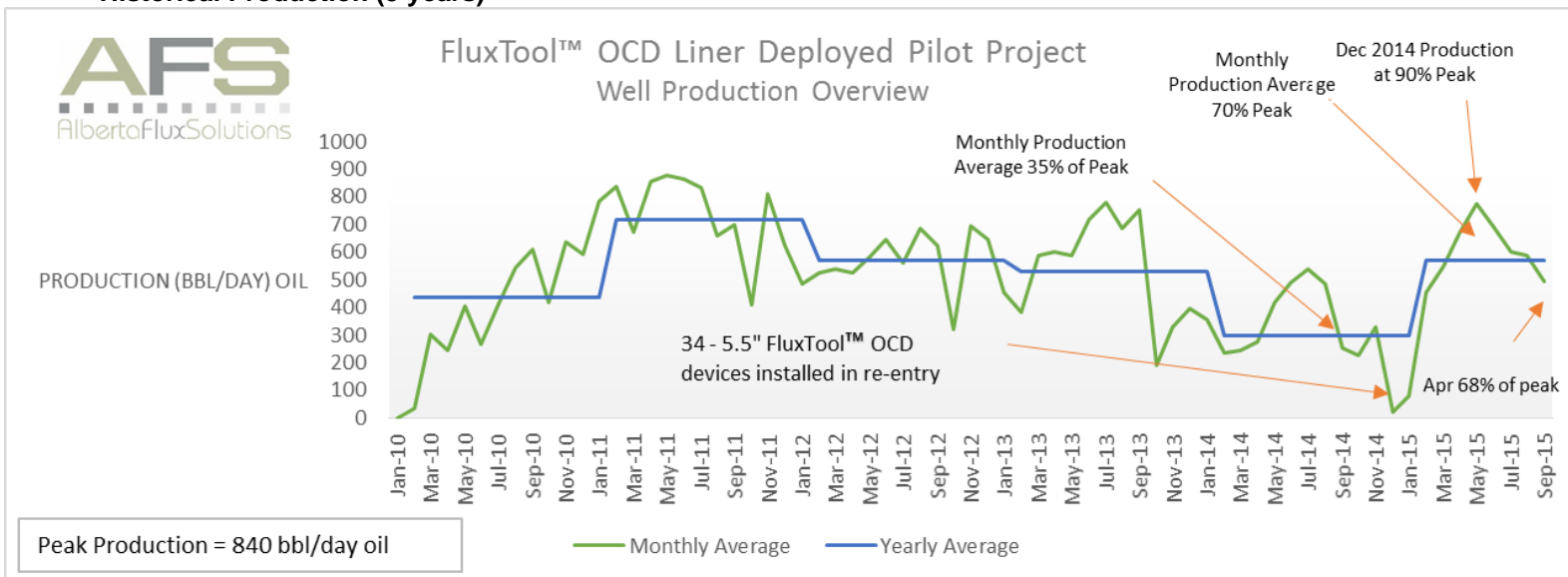
The liner pressure loss gradient for a range of flow rates and injection pressures was used to size the devices. For example, at near peak rates of 500 m<sup>3</sup>/day CWE the pressure differential at the heel is 250-150 kPa. At 250 m<sup>3</sup>/day that differential is 80-50 kPa. Three injection zones were targeted: 1) 0 – 150m, 2) 150m-350m, 3) 350m-800m. Each injection zone had a specific tool size and spacing.

### Production:

- Peak Production of 880 bbl/day in Dec 2010
- Production reduced to ~300 bbl/day by mid-2014.
- AFS system installed Aug 22, 2014
- Production doubled to ~600 bbl/day (monthly average)
- WOR of ~3:1, Water Cut: 0.75



### Historical Production (5 years)



### Historical Production (2 years)

