The First Eocene reservoir at Wafra Field in the PNZ is a Paleocene/Eocene age dolomite reservoir. The 40-acre, LSP steamflood project consists of 56 new wells (producers, injectors, and temperature observation wells), of which four are cored through the producing interval. The project area also includes four older wells, one of which was cored.

Semivariogram models computed from the LSP wells (25-100 m well spacing) have correlation lengths on the order of 200-300 m whereas previous full field studies determined correlation lengths of 1500-2000 m using the primary development wells (500 m typical spacing). To test the impact of semivariogram model parameters and data density on fluid flow response five sets of static reservoir models were built. The fine scale static models (5 m areal grids, 4.5 million total cells) were simulated without up-scaling using 3D streamline simulation. The dynamic scenarios selected were designed to reduce the noise of well distance, sweep direction and material balance error on the results. Analysis of variance (ANOVA) shows, with above 95% confidence, that models built using short semivariogram ranges have significantly higher recovery than models built using large semivariogram range. The conditioning well density does not significantly impact recovery.

The effect of areal grid size was also examined. Static models were generated using 10 m, 20 m, and 40 m areal grid sizes and fluid flow response investigated using 3D streamline simulation. The results suggest that grid size may also significantly impact recovery as models generated using the 40 m grid size gave more optimistic results compared to models generated using the smaller areal grid sizes.
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