ABSTRACT

DEVELOPMENT OF AN AUTOMATED STEAMFLOODING ASSEMBLY

LORNA JENNIFER MOHAMMED

The objectives of this study were to develop an automated steamflooding assembly and to test the assembly by conducting preliminary investigations into the effects of crude oil thermal behaviour on the steamflooding process.

Experimental equipment consisting of a steamflooding tube with steam injection, production and temperature monitoring facilities was assembled. A microcomputer was used in one of the runs to collect, store and process temperature data. Results obtained from the manual temperature measuring system were more reliable than that of the automated temperature measuring system.

Steamflooding runs were performed under non-adiabatic conditions using sand packs saturated with brine and also crude oil with brine. Heat losses were significant in all runs. It was recommended that a heat compensation

system be integrated into the steamflooding assembly to prevent heat loss from the tube.

The crude oil samples were selected on the basis of distillation parameters obtained from thermal analysis tests. The methods of Differential Scanning Calorimetry and Thermogravimetric Analysis were used to estimate the thermal characteristics of the crude oil samples. The distillation and viscosity characteristics of the crude oil samples were used to explain the temperature profiles and percentage recoveries obtained. Future work should be conducted to investigate the effects of pressure, thermal history and porous media on crude oil thermal analysis.