

Alkylphenols in Crude Oils: Indicators of Migration

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Reservoired crude oils comprise many different compound classes with a wide range of properties. One class of compounds with special properties are the alkylphenols. The property of phenols relevant to this study is their high water solubility and, consequently, when in contact with water most reservoired crude oils can contribute alkylphenols into a water phase. If the water migrates away from the crude oil, the characteristic oil alkylphenol distribution pattern from the oil provides a record of the crude oil-water contact. Similarly, if a reservoired crude oil has remigrated away from a parent reservoir, the relocated crude oil will show water-washing features, namely a depleted abundance of the more water-soluble alkylphenols. Most Australian crude oils have been shown to contain significant amounts of phenols, thus making this study pertinent to Australian petroleum exploration.

The recent development of new, highly sensitive methods of analysing alkylphenols in both formation waters and crude oils has provided a considerably more accurate and

sensitive methods for the analysis of alkylphenols. The new protocols involve analysis using the technique of gas chromatography-mass spectroscopy (GC-MS).

Model experiments will be used to establish indicators for subsurface waters that have had a prior oil contact, and crude oils that have undergone water washing and/or migration. This method has the potential to relate the migration history of crude oils in an oil field and truly establish migration pathways.