

## **Compositional Changes in Spilled Oil as a Consequence of Evaporative Losses**

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Oil spilled at the earth's surface is unstable and is degraded by natural processes including evaporation, biodegradation, and water washing. The role of evaporation has been investigated in laboratory studies and shows the preferential evaporative loss of light ends that leads to oils with decreased API gravities and increased viscosities. The main emphasis has been on understanding the development of vertical compositional profiles.

Experiments were carried out using a custom-made 600 ml glass cell fitted with a vertical row of sampling ports. This was placed in a Plexiglas container with an air compressor that provided a stream of air at 1500 ml/sec. At selected time intervals from 3 hours to 100 hours samples were withdrawn from the sampling ports using a hypodermic syringe. These were analyzed gas chromatographically.

For heavy oils a marked compositional profile developed with the near-surface layers depleted preferentially in normal alkanes>naphthenes>aromatics – a sequence opposite to that found in water washing. In contrast lighter oils did not show compositional trends with depth but gave a uniform reduction in volatile components through the whole column. Here also normals were lost faster than naphthenes and aromatics.

These observations have important consequences in sampling for environmental forensics because the position selected in the vertical profile can have a marked influence on chemical composition. In addition the volatile compounds lost by evaporation lead to air pollution and many are health hazards.