Open File #D3945 (CD-ROM)

Gasoline range and saturate fraction gas chromatograms of Jeanne d'Arc Basin Crude Oils

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INTRODUCTION

This Open File contains digital files of gasoline range and C15+ saturate fraction gas chromatograms of oils obtained from drill stem tests undertaken on wells drilled in the Jeanne d'Arc Basin. Oils from wells drilled in the last two years are not included because of confidentiality reasons. This Open File partly updates an earlier one (Fowler et al., 1989) which included hard copies of saturate fraction gas chromatograms and gas chromatography-mass spectrometry (GC-MS) mass fragmentograms. With the present report we are able to make use of recent technological advances to provide the data in an electronic format that should make it more amenable for use. In addition to gasoline range data previously unreleased, this report contains saturate fraction data for 105 oil samples compared with 65 samples included in the earlier report. GC-MS data will be released in a similar format at a future date. The data in this report can also be accessed from the BASIN data base operated by GSC Atlantic.

The gasoline range gas chromatograms have all been obtained during the last year using a modified methodology to that used in the past by this laboratory for this type of analyses. Hence there may be some minor differences in values obtained using this data from that published in earlier papers (e.g. Fowler and Brooks, 1990) on these samples.
The C15+ saturate fraction gas chromatograms have been obtained over the last ten years or so. More than one temperature program has been used for gas chromatography (see below) and consequently there is some variation in retention times between different samples.

The significance of the data will not be discussed here. This will be done in some future publications. However, it should be noted that major reasons for the variation in the chromatograms are maturity and biodegradation. The latter is discussed in another Open File Report to be released in the near future (Shimeld and Moir, 2001).

EXPERIMENTAL

Preparation of crude oils

About 30-45ml of oil were poured into a tared flask, boiling chips were added and the oil was heated up to 210^{o}C. The fraction boiling below 210^{o}C was distilled into a separate flask and weighed. The remaining fraction was cooled and weighed. About 4-5 grams of the fraction boiling above 210^{o}C was deasphalted by adding an excess of pentane (40 volumes). About 100 milligrams of each deasphalted oil were then fractionated using open column liquid chromatography.

Analysis of gasoline fraction hydrocarbons

The gasoline range hydrocarbons (iC5-nC8) were analysed on a HP5890 Gas Chromatograph connected to an OI Analytical 4560 purge-and-Trap Sample Concentrator. A small amount of the whole crude oil was mixed with deactivated alumina and transferred to the Sample Concentrator which was fitted with a tenax/silica gel/charcoal trap (OI trap #9). This was connected to asplit/splitless injector on the Gas Chromatograph which was equipped with a 60m x 0.32mm DB-1 column. The initial temperature was held at 30^{o}C for 10 minutes and then programmed to 40^{o} C at a rate of 1^{o} C/min. The final temperature was held for 25 minutes. The eluting hydrocarbons were detected using a flame ionization detector.

Liquid chromatography

A mixture of 28-200 mesh Silica Gel (MCB) and 80-200 mesh alumina (ALCOA) (1/3:2/3 by weight respectively) was used as a support for the column. The support is activated by heating at 120^{o}-150^{o}C for 12 hours. A glass wool plug is placed at a bottom of the column and covered with a 1 cm thick layer of sand. The support, weighed as 1 g of support/10 mg of deasphalted sample, is slowly settled in pentane and any air trapped is released by gentle tapping on the column. A deasphalted sample, dissolved in a minimal amount of previously measured pentane, is then added to the column. Saturates are recovered by eluting with pentane (3.5 ml/g support), aromatics with a 50:50 mixture of pentane and dichloromethane (4 ml/g support), resins with methanol (4 ml/g support) and any remaining asphaltenes with chloroform. The solvents are rotary-evaporated, separate fractions transferred to tared 1 dram vials, dried in a slow stream of nitrogen and weighed to constant weight.

Gas chromatography

Saturate fractions were analysed using gas chromatography (GC). A Varian 3700 FID gas chromatograph was used with 30m DB-1 column with helium as the carrier gas. The temperature programmed was 60^{o}C to 300^{o}C at a rate of 6^{o}C/min and then isothermal for 30 min. The eluting compounds were detected and quantitatively determined using a hydrogen flame ionization detector.

REFERENCES

Fowler, M.G. and Brooks, P.W. (1989) Organic geochemistry as an aid in the interpretation of the history of oil migration into different reservoirs at the Hibernia K-18 and Ben Nevis I-45 wells, Jeanne d'Arc Basin, offshore eastern Canada. Organic Geochemistry vol. 16, p. 461-475.

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RECOMMENDED CITATION

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