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Introduction

This Open File contains results of Rock-Eval/TOC pyrolysis of well core and cuttings samples collected from fifty-one petroleum boreholes drilled in the Alberta portion of the Western Canada Sedimentary Basin.
Cuttings samples have been analyzed typically on a 30 foot or 10 meter spacing over the depth intervals noted for the wells listed below. Every effort was made to obtain a representative sample from the vial of cuttings, but because of the small sample size, mixed lithology samples may not always be completely representative and mixed lithology intervals may yield some scatter in the data.
The data are reported in *.pdf (portable document file) and *.xls (MS Excel) formats. All analytical work was done at the Organic Geochemistry Laboratory at the Calgary Office of the Geological Survey of Canada in the 1990s using Delsi Rock-Eval II unit equipped with a total organic carbon (TOC) analysis module. TOC values are not reported for some samples where it appears that the detector operation failed or the sampling robot mishandled the sample as it was transferred from the pyrolysis oven.

Well name and location	Depth interval		
HESS CROWN AQ 2-2-73-1W6	640	10150	ft
SHELL SIMONETTE 2-11-63-25W5	6160	12020	ft
UOHL CARIBOU 2-27-114-13W5	750	5690	ft
GULF AEC KARR 3-22-66-3W6	1770	4030	m
CVE GILBY 4-5-41-2W5	9700	10520	ft
BA IOE NEGUS CREEK 4-33-110-24W5	990	5690	ft
HB EAST VIRGINIA HILLS No1 5-31-65-6W5	700	8360	ft
SHELL CLEAR HILLS 6-2-91-12W6	640	5206	ft
ACL CRAN 6-4-96-4W6	2720	7820	ft
CRZ ET AL HUSSAR 6-8-26-19W4	810.35	846.8	m
IMP PAN AM NEPTUNE 6-8-85-12W6	700	6300	ft
DOME ET AL SNEDDON 6-10-81-9W6	2100	9370	ft
NCO ET AL IRON SPRINGS 6-11-11-20W4	1465	1510	ft
CALIFORNIA STNDRD CROWSNEST 6-14-8-5W5	40	7440	ft

PINE CLIFF VIK-KINS 6-14-46-9W4	240	6750	ft
BUTTES MESA GULF CLAIR 6-22-73-5W6	10	11140	ft
CNRL ET AL DUNVEG 6-22-81-4W6	2900	7610	ft
CNRL 7-5-58-6W6	430	3380	m
TEXEX ET AL ELK POINT 7-14-57-6W4	1250	5200	ft
AMOCO TONY 7-16-62-24W5	5000	13578	ft
GEI ET AL HEART RIVER 7-18-78-14W5	350	2080	m
PHILLIPS-KSITUAN No1 7-36-77-9W6	3200	11650	ft
QUESTFIRE SHANE 8-1-77-2W6	1230	2870	m
DEVON DEWBY 8-12-53-4W4	3480	4440	ft
TXNE COUNTESS 8-13-22-16W4	471	599	m
POR NORCEN GILWOOD 8-16-72-18W5	810	2632	m
PARA HB ET AL CAMERONH 9-2-126-22W5	420	1610	m
CNRL PCOUPE 10-8-81-13W6	2000	11670	ft
MDC GIROUXLK 10-9-66-21W5	1160	10928	ft
BANNER KEHO 10-13-11-23W4	2491	2533.4	ft
HOME IMP FINA GRIZZLY MTN 10-16-69-7W5	10	8253	ft
FINA AMOCO HB SAKWATAMAU 10-21-62-15W5	5000	11270	ft
ANDERSON ET AL PARADISE 10-22-47-3W4	1342	1580	ft
FINA ET AL KEG RIVER 10-27-102-21W5	40	5460	ft
NORCENPL ET AL NVILLE 10-33-79-23	1310	7700	ft
PC WILLGR 11-15-42-7W5	2255	2273.2	m
TPPL DEEP VALLEY 11-21-64-25W5	5710	12720	ft
B.A. GRAND FORKS 12-14-12-12W4	10	6980	ft
WAINOCO ET AL MANNING 12-17-93-21W5	800	6005	ft
MOBIL WHITESAND 12-31-124-11W5	360	3170	ft
CHEVRON STEEN RIVER 12-33-118-23W5	560	4840	ft

TOTAL PCP HYTHE 14-4-73-10W6	1380	2520	m
PEOC WILDON 14-14-55-15W4	710	6520	ft
CVE SUFFIELD 14-26-19-8W4	460	683	m
CALSTAN PACIFIC MARWAYNE 14-29-52-2W4	630	5460	ft
CHEVRON SCURRY SQUARE 15-2-90-9W6	1200	2930	m
PAN AM A-1 WEST GIROUX 15-17-65-21W5	660	11090	ft
ESSO WIZARD LAKE CPR B-3 15-21-48-27W4	7630	9537	ft
EMBER BASHAW 16-21-42-21W4	805	1043.9	m
HESS CROWN AJ 1A-8-68-23W5	630	11140	ft
PENN WEST ET AL BARONS 8-25-12-24W4	1340	1357.2	m

Depth units used (feet or meters) are those in which the original well was drilled and logged, and in which the samples are currently labelled. No attempt has been made to review the stratigraphy and the significance of the analytical data is not discussed in this report.

Experimental

Rock-Eval/TOC analysis provides fast and reliable characterization of the quantity and quality of sedimentary organic matter, as well as its thermal maturity. Pyrolysis experiments were conducted using Delsi Rock-Eval II unit equipped with a Total Organic Carbon analysis module. A typical Rock-Eval experiment was initiated with heating of a pulverized rock sample at 300ºC for 3 min in helium atmosphere, when naturally occurring hydrocarbons (free and adsorbed) are volatilized. During the next stage, the oven temperature is steadily increased to 600ºC at a rate of 25ºC/min and decomposition of kerogen occurs. The final stage involves oxidation and combustion of the residual organic matter at 600ºC. The amounts of hydrocarbons volatilized at 300ºC and evolved from kerogen at 300ºC to 600ºC are quantitatively determined by a flame ionization detector, and recorded as the S1 and S2 peaks, respectively. The temperature measured at the maximum of the S2 peak is referred to as Tmax. The quantity of organic CO_2 generated from 300ºC to 390ºC, determined using a thermal conductivity detector, comprises the S3 peak. The percentage of carbon in CO_2 formed during oxidation at 600ºC (S4 peak) and in S3 peak, and in the hydrocarbon peaks S1 and S2 are used to define the total organic carbon content (TOC), expressed as a weight percentage. The determination of the

quality of organic matter is based upon the calculation of Hydrogen (HI) and Oxygen (OI) indices (HI=S2/TOCx100, OI=S3/TOCx100) which are related to the atomic H/C and O/C ratios (Espitalié et al., 1977). The OI versus HI cross plots ("pseudo van Krevelen diagrams") can be used as an organic matter type indicator at low and moderate maturities. The Tmax is an indicator of relative thermal maturity. According to Espitalié et al. (1985) the oil window is defined by the following Tmax ranges: 440º-448ºC (Type I kerogen), 430º-455ºC (Type II kerogen) and 430º-470ºC (Type III kerogen). A cross plot of Tmax versus HI is used to constrain estimations of organic matter type and its thermal maturity, while the Production Index (PI=S1/[S1+S2]) is used to indicate staining of a sample or as an additional maturity parameter.

Rock-Eval results correlate to other techniques (Espitalié et al., 1985; Tissot and Welte, 1978). Petroleum source rock potential is sensitive to lithology, TOC and S2 values. It is common practice to rate carbonate rocks with lower TOC comparable with clastic rocks richer in organic matter. Extractable hydrocarbon yields from leaner carbonate rocks are comparable to bitumen-rich clastic rocks (Tissot and Welte, 1978, p. 430; Gehman, 1962). The organic matter associated with carbonate rocks is often more hydrogen-rich and thermally labile than that in fine-grained clastic rocks. As a result, more TOC in carbonate rocks may be transformed into bitumen compared with average clastic source rocks of comparable maturity.

Rock-Eval/TOC parameters have significance only above threshold TOC, S1 and S2 values. If TOC is ≤ 0.3% then all parameters have questionable significance and the experiment suggests no potential. Oxygen Index (OI), S3/TOC, has questionable significance if TOC is ≤ 0.5%. Both Tmax and Production Index (PI = S1/(S1+S2)), have questionable significance if S1 and S2 values are less than or equal to about 0.35 mg HC/g rock. Results can be affected by mineral matrix effects due to either retainion of generated compounds, generally lowering the S1 or S2 peaks, while increasing Tmax, or liberating inorganic CO_2 and increasing S3 and OI. These effects are important if TOC, S1 and S2 are low, an effect not significant where sources have TOC values > 5%. OI values > 150 mg/g TOC suggest either low TOC or a mineral matrix CO_2 contribution during pyrolysis. Generally, a TOC content of at least 2% is needed for a petroleum source rock. Note that TOC and Hydrogen Index decrease with increasing thermal maturity due to hydrocarbon generation. Additional guidelines on the interpretation of Rock-Eval data may be found in Peters (1986), Snowdon (1995) and Sykes and Snowdon (2002).

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