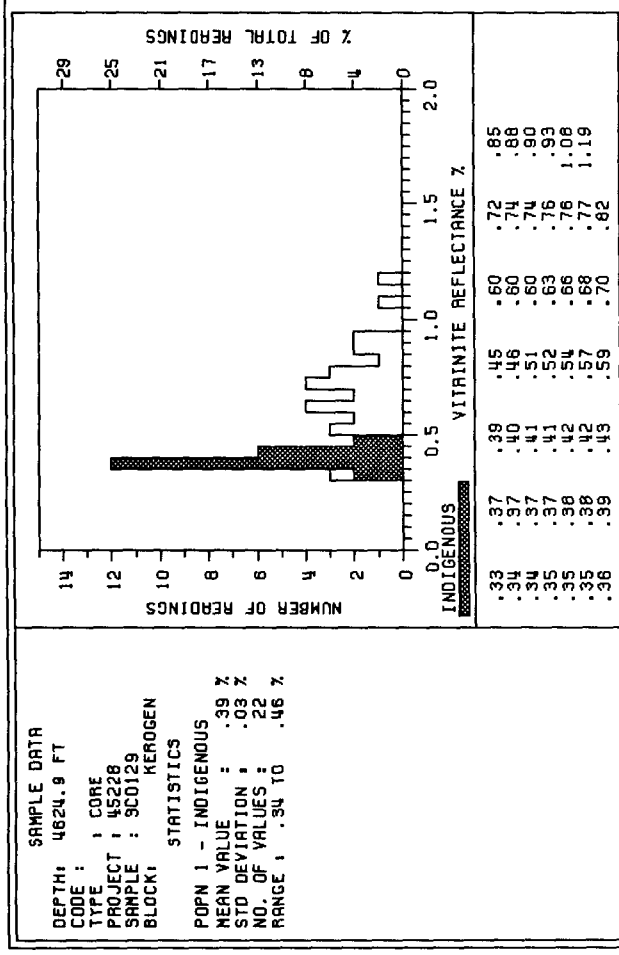
B002

COMPANY: WSR MANUAL WELL: TRIBAL 12-15 LOCATION: USA

| GENERAL DATA | | | MATURITY DATA | | KEROGEN COMPOSITION DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH (Feet) | SAMPLE TYPE | ANALYSED LITHOLOGY | SPORE COLOUR INDEX | VITR. REFL. R oil av % | % (Visual, from microscopy) | | | % (Calculated) | | | |
| | | | | | INERTINITE | VITRINITE | SAPROPEL | INERT | VIT | ALG SAP | WXY SAP |
| 4624.9 | Core | SH, dk gy, calc+ SH v lt gy | 3.5 | .39(22) | | | | | | | |

MATURITY AND KEROGEN COMPOSITION DATA

TABLE : 1A




COMPANY : WSR MANUAL
WELL : TRIBAL 12-15
LOCATION : USA

HISTOGRAMS, DATA AND STATISTICS
FOR VITRINITE REFLECTIVITY

APPENDIX 3 .1

| MATURITY ZONE | HYDROCARBON GENERATION ZONE | VITRINITE REFLECTANCE (% Ro) | SPORE COLOUR INDEX (RG 1 – 10) | THERMAL ALTERATION INDEX (TAI) | | | ROCK – EVAL TMAX (°C) (BARNARD ET AL, 1981) | | | LOM | FLUORESCENCE IN UV/BLUE LIGHT | | COAL RANK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | STAPLIN | EXLOG | BATTEN | TYPE I | TYPE II | TYPE IIIA | | SPORES | SAP. AMORPH. | |
| IMMATURE | BIOGENIC GAS ONLY | 0.2 | 1 | 1 | 1 | 1 | | | | 1 | YELLOW | YELLOW | PEAT |
| | | | 2 | 1.5 | | 1/2 | | | 420 | 2 | | | LIGNITE |
| | | 0.3 | | | 1.5 | 2 | | | | 3 | | | |
| | | | 3 | 2 | | | 400 | | 425 | | | | |
| | | | | | | 2/3 | | 430 | | 4 | | | |
| EARLY MATURE | TRANSITION ZONE, WET GAS AND SOLUBLE BITUMEN INCREASE. SOME CARBONATE SOURCES MAY GENERATE HEAVY, HIGH SULPHUR CRUDES | 0.4 | 4 | | | 3 | | | 430 | 5 | YELLOW/ ORANGE | ORANGE | |
| | | | | | | 3/4 | | | 435 | | | | SUB – BITUMINOUS |
| | | 0.5 | 5 | 2.5 | 2 | 4 | 410 | | | 6 | | | |
| MIDDLE MATURE | MEDIUM GRAVITY OILS (35° – 42° API), MIGRATION OCCURS | 0.6 | | | | 4/5 | | 440 | 440 | | ORANGE | | |
| | | | 6 | | | | 430 | | | 7 | | | |
| | | 0.7 | | | | 5 | | | | | | | |
| | | | 7 | | 2.5 | 5/6 | 440 | | 450 | 8 | ORANGE/ BROWN | | HIGH VOLATILE BITUMINOUS |
| | | 0.8 | | | | | | | | | | | |
| LATE MATURE | LIGHT OILS (>42° API) WITH TRANSITION TO CONDENSATE AND WET GAS | | | | | 6 | 450 | 450 | | 9 | | | |
| | | 0.9 | 8 | | | | | | | | | | |
| | | 1.0 | | | 3 | | | | 460 | 10 | | | |
| | | | | | | | | | | 11 | | | MEDIUM/LOW V.B. |
| | | 1.3 | 8.5 | 3 | | | | | | | | | |
| POST MATURE | WET GAS TO MAIN DRY GAS PHASE | | | | | 6/7 | | | | 12 | NONE | NONE | |
| | | | 9 | | 3.5 | | | | | 13 | | | |
| | | 2.0 | | 3.5 | | | | | | 14 | | | SUB – ANTHRACITE |
| | | | 9.5 | | 4 | | | | | 15 | | | |
| | | | | 4 | | | | | | 16 | | | ANTHRACITE |
| | | 3.0 | 10 | 5 | | 7 | | | | 17 | | | |

11b.017.1a

**Generalised correlation of hydrocarbon generation and selected maturity parameters (based on North Sea – other basins may show differences)**

SPT

COMPANY: WSR MANUAL WELL: TRIBAL 12-15 LOCATION: USA

| GENERAL DATA | | | CHEMICAL ANALYSIS DATA | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH (Feet) | SAMPLE TYPE | ANALYSED LITHOLOGY | TOC % OF ROCK | PYROLYSIS | | | | | SOLVENT EXTRACTION/FRACTIONATION | | | | | |
| | | | | Tmax °C | HI | OI | PI | POT.YLD. (ppm) | EXTR. (ppm) | HC (ppm) | EXTR. % OC | HC %OOC | HC %EX | ALK. %HC |
| 4624.9 | Core | SH, dk gy, calc+ SH, v lt gy | 2.83 | 426 | 272 | 11 | .08 | 7700 | 18500 | 960 | 65.4 | 34 | 56 | 39 |

SUMMARY OF CHEMICAL ANALYSIS DATA

TABLE : 2A

COMPANY: WSR MANUAL WELL: TRIBAL 12-15 LOCATION: USA

| GENERAL DATA | | | CHEMICAL ANALYSIS DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH (Feet) | SAMPLE TYPE | ANALYSED LITHOLOGY | TOC % OF ROCK | PYROLYSIS | | | | | | | |
| | | | | S1 (ppm) | S2 (ppm) | S3 (ppm) | HI | OI | PI | Tmax °C | S2/S3 |
| 4624.9 | Core | SH, dk gy, calc+ SH, v lt gy | 2.83 | 680 | 7700 | 310 | 272 | 11 | .08 | 426 | 24.84 |

ORGANIC CARBON AND ROCK-EVAL PYROLYSIS DATA

TABLE : 5A

COMPANY: WSR MANUAL WELL: TRIBAL 12-15 LOCATION: USA

| SAMPLE DATA | | | | | | |
|---|---|---|---|---|---|---|
| SAMPLE DEPTH (Feet) | 4624.9 | | | | | |
| SAMPLE TYPE | Core | | | | | |

| COMPONENTS | QUANTIFIED NORMAL AND ISOPRENOID ALKANE ABUNDANCES ( % ) | | | | | |
|---|---|---|---|---|---|---|
| n-C10 | | | | | | |
| n-C11 | | | | | | |
| n-C12 | | | | | | |
| n-C13 | | | | | | |
| n-C14 | 1.90 | | | | | |
| n-C15 | 6.54 | | | | | |
| n-C16 | 8.60 | | | | | |
| n-C17 | 7.88 | | | | | |
| n-C18 | 4.89 | | | | | |
| n-C19 | 4.61 | | | | | |
| n-C20 | 3.94 | | | | | |
| n-C21 | 3.32 | | | | | |
| n-C22 | 3.45 | | | | | |
| n-C23 | 3.73 | | | | | |
| n-C24 | 3.48 | | | | | |
| n-C25 | 3.34 | | | | | |
| n-C26 | 2.25 | | | | | |
| n-C27 | 4.23 | | | | | |
| n-C28 | 2.47 | | | | | |
| n-C29 | 3.76 | | | | | |
| n-C30 | 1.72 | | | | | |
| n-C31 | 3.43 | | | | | |
| n-C32 | 1.28 | | | | | |
| n-C33 | 1.42 | | | | | |
| n-C34 | .78 | | | | | |
| n-C35 | 1.13 | | | | | |
| n-C36 | .32 | | | | | |
| i-C15 (Farnesane) | .77 | | | | | |
| i-C16 | 2.43 | | | | | |
| i-C18 (Norpristane) | 3.02 | | | | | |
| i-C19 (Pristane) | 9.63 | | | | | |
| i-C20 (Phytane) | 5.68 | | | | | |

| GENERAL DATA | | | | | | |
|---|---|---|---|---|---|---|
| Total Abundance( % ) | 100 | | | | | |
| TOC (% of Rock) | 2.83 | | | | | |
| Extract (ppm) | 18500 | | | | | |
| Hydrocarbons (ppm) | 960 | | | | | |
| Hydrocarbon(mg/gTOC) | 34 | | | | | |
| Alks(% Hydrocarbons) | 39 | | | | | |
| Rock-Eval HI | 272 | | | | | |
| Rock-Eval PI | .08 | | | | | |

| RATIOS | | | | | | |
|---|---|---|---|---|---|---|
| CPI-1 | 1.67 | | | | | |
| CPI-2 | 1.70 | | | | | |
| CPI-3 | 1.79 | | | | | |
| Bias | 1.18 | | | | | |
| i-C19 / n-C17 | 1.22 | | | | | |
| i-C20 / n-C18 | 1.16 | | | | | |
| i-C19 / i-C20 | 1.70 | | | | | |

| LEGEND | | |
|---|---|---|
| i - isoprenoid | n - normal | For definition of Ratios CPI-1,-2,-3 and Bias - see following page |

ALKANE GAS CHROMATOGRAPHY DATA

TABLE : 9A

Alkane gas chromatography data - definition of ratios

CPI 1 (Bray and Evans) = $$\frac{1}{2} \times \left[ \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{24}+C_{26}+C_{28}+C_{30}+C_{32}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{26}+C_{28}+C_{30}+C_{32}+C_{34}} \right]$$

CPI 2 (Radke and Statoil) = $$\frac{1}{2} \times \left[ \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}} \right]$$

CPI 3 (Statoil and Philippi) = $$\frac{2 \times C_{27}}{C_{26}+C_{28}}$$

Bias = $$\frac{C_{16} + C_{17} + C_{18} + C_{19} + C_{20} + C_{21} + C_{22}}{C_{23}+C_{24}+C_{25}+C_{26}+C_{27}+C_{28}+C_{29}+C_{30}+C_{31}+C_{32}+C_{33}}$$

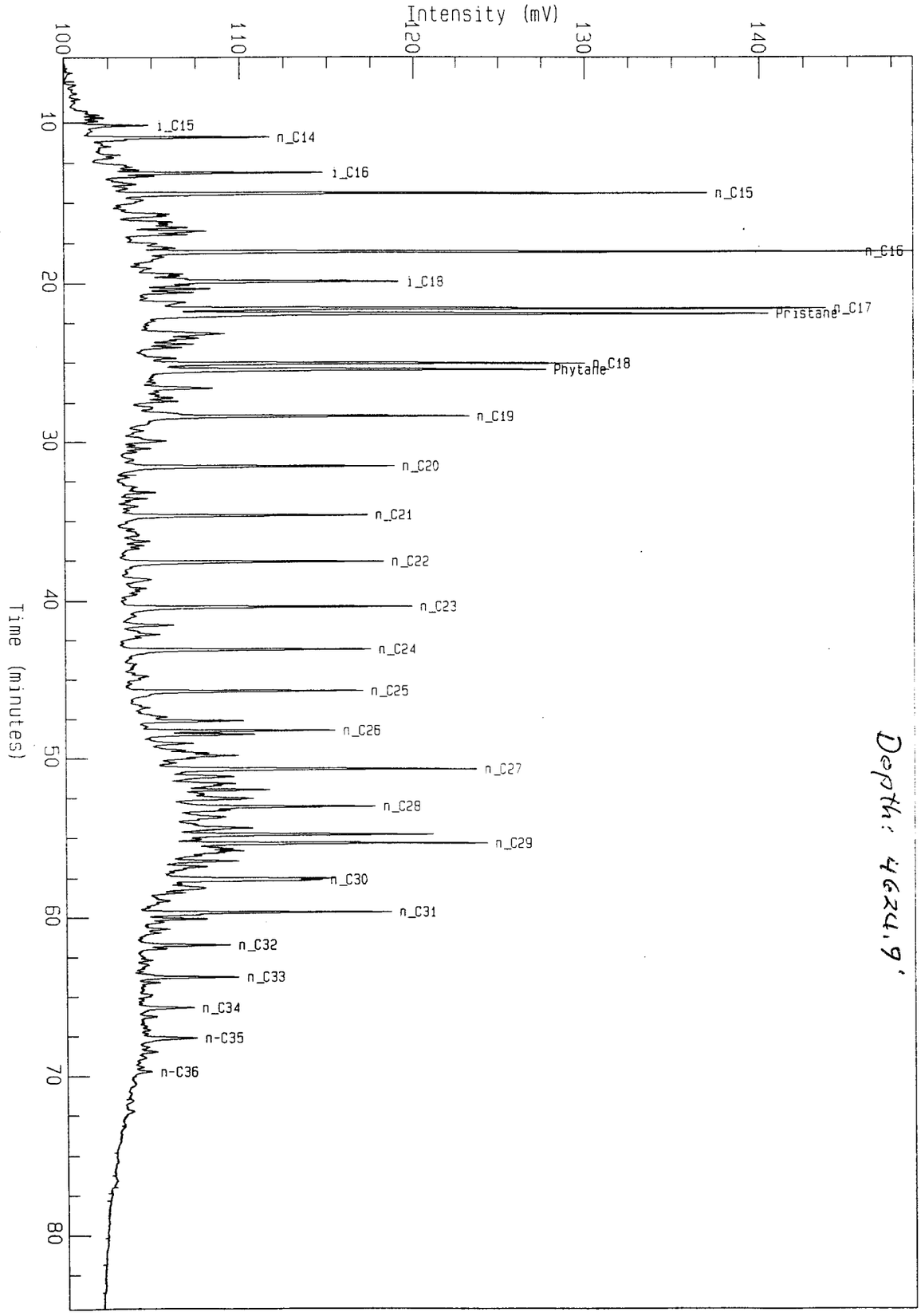
SIMON LABORATORIES

Analysis Name : 5 S93C0129R0, 1, 1.

93C 129 WORLD SOURCE ROCKS TRIBAL 12-15 Amount : 1.000



SATURATES G.C. C15+ BY METHOD OLS/016




Depth: 4624.9'

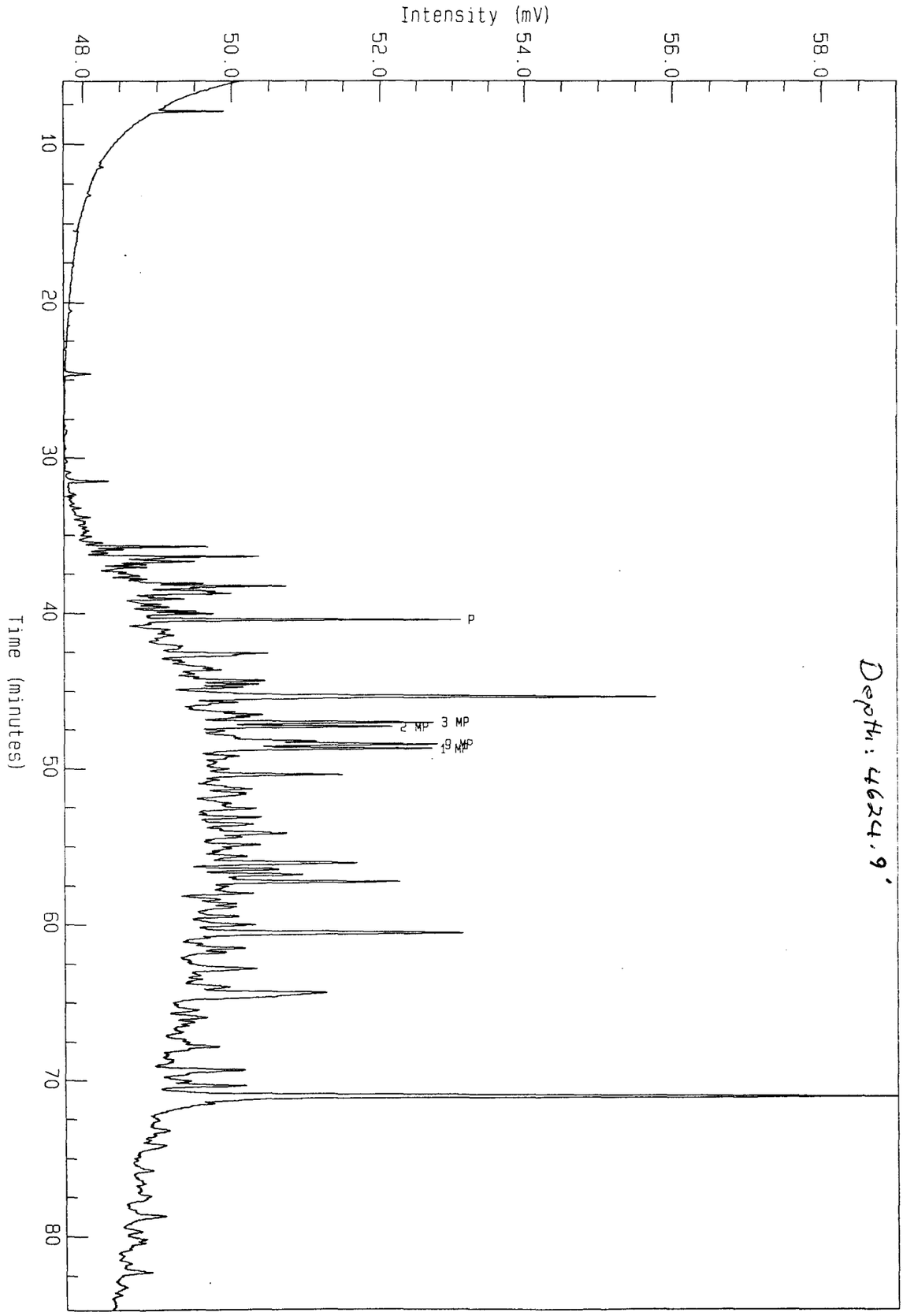
SIMON LABORATORIES

Analysis Name : 9 A93C0129R0, 1, 1.

93C 129 WORLD SOURCE ROCKS TRIBAL 12-15 Amount : 1.000



AROMATIC GC




Depth: 4624.9'

## APPENDIX 1
## ABBREVIATIONS USED IN ANALYTICAL DATA SHEETS

| | | |
|---|---|---|
| a/a | - | as above |
| Ac | - | acritarchs |
| ADD | - | mud additive |
| Al | - | algae |
| Am | - | amorphous |
| ang | - | angular |
| ANH | - | anhydrite |
| aren | - | arenaceous |
| arg | - | argillaceous |
| BAS | - | basalt |
| bd | - | bedded/bedding |
| B(IT) | - | bitumen/bituminous |
| bl | - | blue |
| bld | - | bleached |
| blk | - | black |
| bri | - | brilliant |
| brn | - | brown |
| calc | - | calcareous |
| CALT | - | calcite |
| carb | - | carbonaceous |
| CGL | - | conglomerate |
| CHK | - | chalk |
| CHT | - | chert |
| CLYST | - | claystone |
| CMT | - | cement |
| Comp | - | composite |
| crs | - | coarse |
| CSG | - | casing point/shoe |
| Ctgs | - | ditch cuttings |
| Cu | - | cuticle |
| C(vd) | - | caved |
| decarb | - | decarbonated |
| Di | - | dinocysts |
| dk | - | dark |
| DLT | - | dolerite |
| DOL/dol | - | dolomite/dolomitic |
| dsk | - | dusky |
| Ex | - | exinite |
| Exs | - | exsudatinite |
| extr | - | extracted |
| f | - | fine |
| fel | - | feldspathic |
| fer | - | ferruginous |
| flu | - | fluorescence |
| fm | - | formation |
| foss | - | fossils/fossiliferous |
| fr | - | friable |
| frac | - | fracture |
| frags | - | fragments |
| Fu | - | fusinite |
| GLC/glc | - | glauconite/glauconitic |
| gn | - | green |
| grd | - | graded/grading to |
| grns | - | grains |
| gy | - | grey |
| GYP | - | gypsum |
| HAL | - | halite |
| hd | - | hard |
| hor | - | horizontal |
| H(RV) | - | high reflecting vitrinite |
| i- | - | iso- |
| i/b | - | inter-bedded |
| IGN | - | igneous rocks |
| inc | - | including |
| Inert | - | inertinite |
| lam | - | laminae/laminated |
| LCM | - | lost circulation material |
| LIG/Lig | - | lignite/lignitic |
| lns | - | lens(es) |
| L(RV) | - | low reflecting vitrinite |
| LST | - | limestone |
| lt | - | light |
| mass | - | massive |
| MDST | - | mudstone |
| med | - | medium |
| MET | - | metamorphic rocks |
| mic | - | mica/micaceous |
| micr | - | micritic |
| min | - | mineral |
| mnr | - | minor |
| mod | - | moderate |
| mtl | - | mottled |
| n- | - | normal |
| NA | - | not available |
| nod | - | nodule/nodular |
| NS | - | no sample |
| occ | - | occasional |
| ol | - | olive |
| ool | - | oolitic |
| orng | - | orange |
| OS | - | oil stain |
| P | - | picked lithology |
| pal | - | pale |
| Ph | - | phytane |
| pnk | - | pink |
| por | - | porous/porosity |
| pp | - | purple |
| Pr | - | pristane |
| pred | - | predominantly |
| Prt | - | present |
| PYR/pyr | - | pyrite/pyritic |
| QTZ(T) | - | quartz(ite) |
| Re | - | resin |
| R(ew) | - | reworked |
| rnd | - | round(ed) |
| Sap | - | sapropel |
| sbng | - | subangular |
| sbrd | - | subrounded |
| SCI | - | spore colour index |
| Sf | - | semifusinite |
| sft | - | soft |
| SH | - | shale |
| shly | - | shaly |
| sil | - | siliceous |
| sks | - | slickenside surface |
| SLA | - | slate |
| SLT(ST) | - | silt(stone) |
| slty | - | silty |
| SND | - | sand |
| sndy | - | sandy |
| Sp | - | spores |
| SST | - | sandstone |
| st | - | stained |
| stks | - | streaks |
| suc | - | sucrosic |
| surf | - | surface |
| SWC | - | side wall core |
| TD | - | total depth |
| TOC | - | total organic carbon |
| tr | - | trace(s) |
| trns | - | transparent |
| v | - | very |
| vgt | - | variegated |
| Vit | - | vitrinite |
| vn | - | vein |
| VOLC | - | volcanic rocks |
| VR | - | vitrinite reflectivity |
| wht | - | white |
| xln | - | crystalline |
| yel | - | yellow |
| - | - | no analysis carried out |
| * | - | analysed but no data obtained |
| gy-gn | - | greyish green |
| gy/gn | - | grey-green (gradation) |
| gn-gy | - | greenish grey |

Note: (Maturity data tables only). Number in brackets refers to number of reflectivity values averaged to give quoted result. Preferred values for indigenous phytoclasts are listed first.