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KOORKAH-1

FINAL WELL REPORT

VOLUME 1 - GEOLOGY

SEPTEMBER, 1986

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277002

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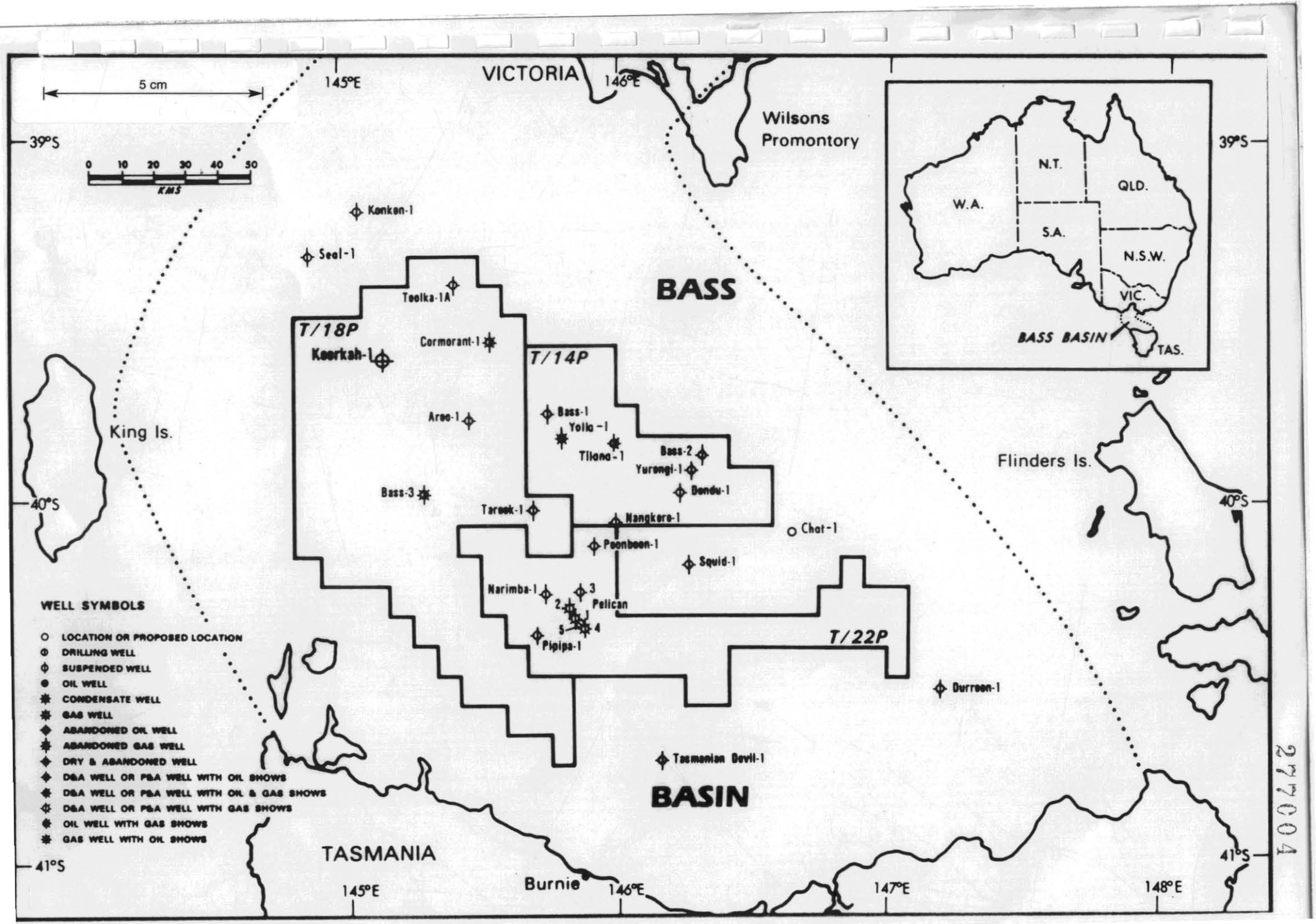
5 cm
0 10 20 30 40 50
KMS
VICTORIA
145°E
146°E
147°E
148°E
39°S
40°S
41°S
Wilsons Promontory
N.T.
QLD.
W.A.
S.A.
N.S.W.
VIC.
TAS.
BASS BASIN
Konkon-1
Seal-1
BASS
Tooka-1A
T/18P
Cormorant-1
Koorkah-1
T/14P
Area-1
Bass-1
Yolla-1
Tilana-1
Bass-2
Yurangi-1
Bass-3
Bondu-1
Tarook-1
Mangkore-1
Chat-1
Poonboon-1
Squid-1
King Is.
Flinders Is.
Narimba-1
Pelican
Pipipa-1
T/22P
Durroon-1
Tasmanian Devil-1
BASIN
TASMANIA
Burnie
WELL SYMBOLS
LOCATION OR PROPOSED LOCATION
DRILLING WELL
SUSPENDED WELL
OIL WELL
CONDENSATE WELL
GAS WELL
ABANDONED OIL WELL
ABANDONED GAS WELL
DRY & ABANDONED WELL
D&A WELL OR P&A WELL WITH OIL SHOWS
D&A WELL OR P&A WELL WITH OIL & GAS SHOWS
D&A WELL OR P&A WELL WITH GAS SHOWS
OIL WELL WITH GAS SHOWS
GAS WELL WITH OIL SHOWS

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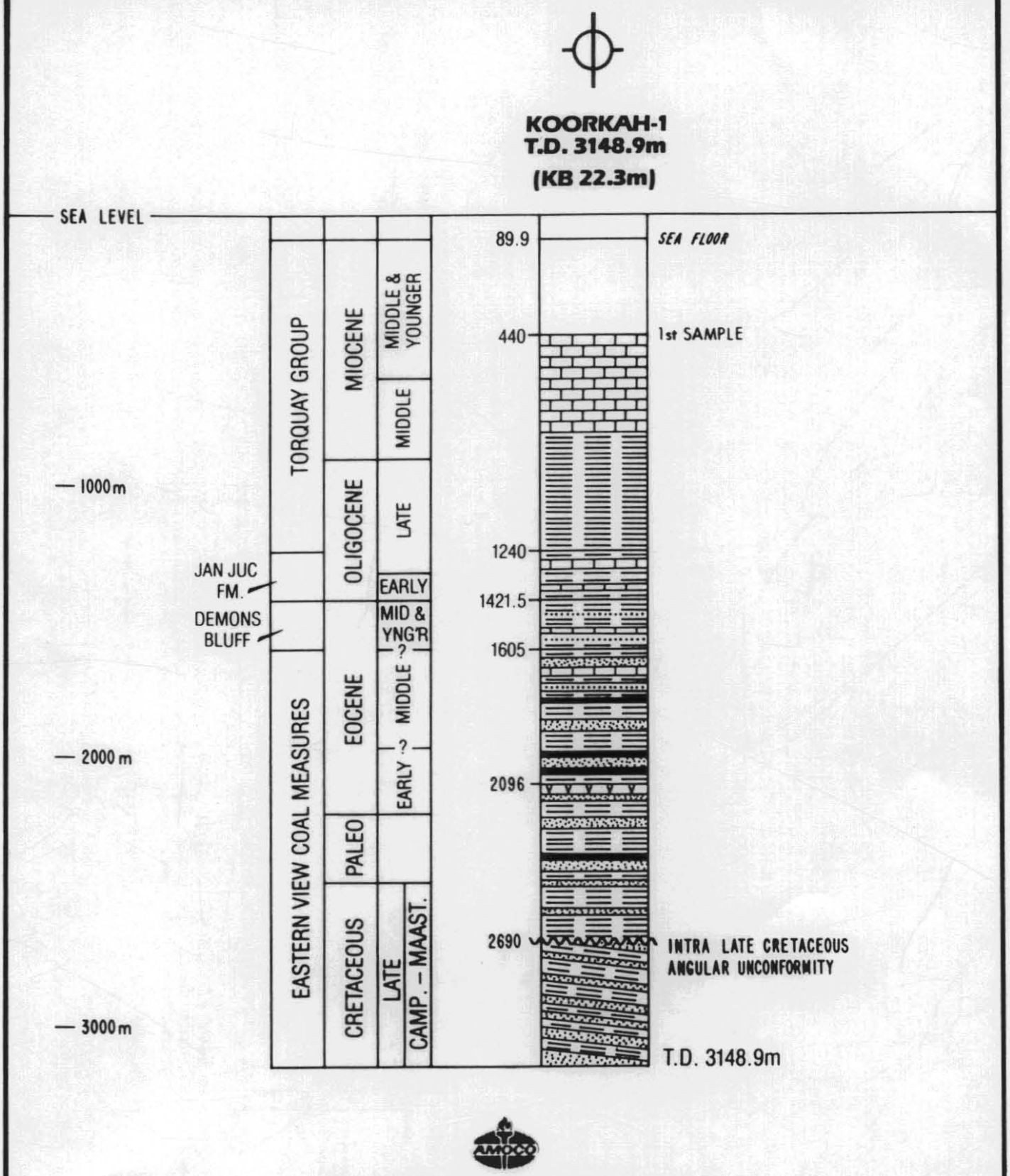

Amoco Australia Petroleum Company

FIGURE 2

STRATIGRAPHIC COLUMN KOORKAH-1

5 cm

AUTHOR K. GRANT , JULY 1986

277006

WELL SUMMARY SHEET

COMPANY	: AMOCO AUSTRALIA PETROLEUM COMPANY	WELL	: KOORKAH-1
SPUDDED	: NOVEMBER 27, 1985	BASIN	: BASS BASIN,TASMANI
DATE TOTAL DEPTH	: DECEMBER 22, 1985	PERMIT	: T/18P
RIG RELEASED	: DECEMBER 29, 1985	LATITUDE	: 30 DEGREES 37' 57. SOUTH
TOTAL OPERATING TIME	: 28 DAYS	LONGITUDE	: 145 DEGREES 09' 05 EAST
DRILLING CONTRACTOR/RIG	: DIAMOND M EPOCH	S.P.	296.5
TOTAL DEPTH	: 3148.9M	LINE	TP05-7
WATER DEPTH	: 67.6M	STATUS	DRY PLUGGED AND ABANDONED
KELLY BUSHING	: 22.3M		

FORMATION	LOG RKB (M)	SUBSEA(M)	T.W.T. (MS)	LITHOLOGI SUMMARY
SEAFLOOR	89.9	67.6	90	BRYOZOAN CALCARENITE
TORQUAY GROUP	: 89.9	67.6	428	
JAN JUC	: 1240	1217.7	1138	CALCAREOUS SILTSTONE VAR. AMTS. QUARTZ SAN
DEMONS BLUFF	: 1421.5	1399.2	1286	INTERBEDDED LIMESTONE MUDSTONE AND SANDSTON
EASTERN VIEW COAL MEASURES	: 1605	1582.7	1415	INTERBEDDED SANDSTONE CLAYSTONE AND INTRUSI
IGNEOUS INTR.	TOP 2092	2069.7	-	WITH MINOR SHOWS
	BASE 2161	2138.7	-	
TOTAL DEPTH	: 3148.9	3126.6	2290	

DITCH CUTTINGS (RKB)	FROM (M)	TO (M)	SIDEWALL CORES: SUITE NO. 1
	400	3148.9	SHOT 55, RECOVERED 51, LOST 4, EMP

WIRELINE LOGS (MRKB)	SUITE 1 (1593-25.9M)	SUITE 2 (3153-1589M)
	DEC 07, 1985: ISF-BHC-GR-SP-CAL	DEC 22, 1985: ISF-BHC-GR-SP-CAL
		DEC 22, 1985: LDL-CNL-GR-CAL
		DEC 22, 1985: HDT
		DEC 22, 1985: CST
		DEC 23, 1985: VSP (3124-403M)

CASING	SIZE (INCHES)	30"	20"	13 3/8"
	SHOE AT (MRKB)	191	402	1587.4
	CEMENT (SACKS)	1080 SACKS CLASS G, 1% $CACL_2$	1500 SACKS CLASS G, 2.5% $CALC_2$	2400 SACKS CLASS G, 2. PREHYDRATED GEL, 0.5% 0.16% AR-5

PLUGS (MRKB)

1. 1617.8 - 1556.9M, 200 SACKS
   CLASS G; 0.15% HR-12, 0.40% CFR-2

2. 173.7 - 128M, 100 SACKS
   CLASS G - NEAT

Summary

Koorkah-1, was the first exploration well drilled in the exploration permit T/18P in the Bass Basin by Amoco Australia Petroleum Company and the third in a series drilled by the Company in the Bass Basin. T/18P is one of three permits operated by Amoco in the Bass Basin, located offshore between Victoria and Tasmania (Figure 1). Amoco farmed in to this permit acquiring a 50 percent interest and the operatorship on March 23, 1984.

Koorkah-1, with a planned depth of 3250 meters, was spudded on November 27, 1985. The well was a test of a northwesterly trending faulted anticline with seismically mapped structural closure of Early Eocene to Early Paleocene-aged sediments within the Eastern View Coal Measures (E.V.C.M.); see Enclosure 1. Less reliable seismically defined structural closure was thought to be present at the Late Cretaceous level within the E.V.C.M. The primary target of the Koorkah-1 well was the sandstones of Early Eocene - Late Cretaceous age within the E.V.C.M. The secondary drilling target was sandstones of the upper part of the Early Cretaceous Otway Group, expected to be present beneath an angular unconformity at the base of the E.V.C.M. (Enclosure 1).

The stratigraphy of the E.V.C.M. in the Koorkah-1 well was much as predicted, and consisted of interbedded sandstones, siltstones, claystones and minor coals with a doleritic intrusion encountered between 2096-2130 meters (Figure 2). The dolerite may be correlative with the intrusions of Early Miocene to Late Oligocene age that were encountered in the Yolla-1 and Tilana-1 wells. An angular unconformity is present at 2690 meters in Koorkah-1. Since the age of the sedimentary section on both sides of the unconformity is Late Cretaceous (Maastrichtian), these rocks belong to the lower part of the E.V.C.M. and not to the anticipated upper part of the Lower Cretaceous Otway Group. The age of the rocks at total depth (3148.9m) is Maastrichtian-Campanian (Late Cretaceous), representing the lower part of the E.V.C.M.

The Koorkah-1 well was terminated at 3148.9 meters because of confirmation by the wireline logs of increasingly poorer reservoir quality high water saturated sandstones with depth and lack of reliable structural closure below the unconformity. Due to a lack of encouraging hydrocarbon shows throughout the E.V.C.M., the well was plugged and abandoned on December 29, 1985 without testing.

PREVIOUS WORK

GEOLOGICAL

Prior to the drilling of Koorkah-1, five exploratory wells had been drilled in permit T/18P. Of the five, only Cormorant-1 and Bass-3 recovered hydrocarbons. Cormorant-1 recovered biodegraded oil near the top of the Early Eocene and Bass-3 recovered gas-condensate and water at the top of the Paleocene.

The stratigraphic sequence in permit T/18P is believed to contain in excess of 4500 meters of non-marine to shallow marine, early Cretaceous to late Eocene clastics overlain by in excess of 2100 meters of late Eocene to Recent marine clastics and carbonates. This is based on a combination of surrounding well control, regional geology and seismic data. The primary reservoir objectives are the sandstones of the Late Cretaceous to Late Eocene Eastern View Coal Measures (E.V.C.M.) with a secondary stratigraphic objective, the sandstones of the Turonian and older Otway Group.

GEOPHYSICAL

Geophysical surveys have been undertaken in the Bass Basin since 1960, with the more relevant surveys being shot during the years 1972 to 1984. A number of lines from these previous surveys were reprocessed (1518 km) to compliment the Amoco 1984 TNK survey, in which 979 kilometers of data was acquired in T/18P. A further 360 kilometers of data was acquired in May, 1985 to detail the Koorkah structure. Prior to drilling Koorkah, a seafloor survey, and a high resolution survey were conducted to determine the presence of shallow faults and gas.

Enclosure 1 shows the structure of Koorkah at the Early Paleocene level and the dip line TPO 5-7, on which Koorkah-1 was drilled. The Koorkah feature is a faulted four-way dip closure at Early Eocene to Early Paleocene levels within the E.V.C.M. Koorkah-1 was not sited on structural closure at the prognosed top Otway Group level, as the upper levels were considered more prospective. Nevertheless, the additional stratigraphic information to be acquired by drilling the Otway Group was considered advantageous for future exploration within the Bass Basin.

STRATIGRAPHY

SUMMARY

The formation tops in Koorkah-1 were determined utilizing all available data including wellsite lithological descriptions, wireline logs, paleontology and palynology. These data were also incorporated into the construction of the composite well log (Enclosure-3). A tabulated summary is presented below:

STRATIGRAPHIC TABLE
KOORKAH-1

(DEPTH IN METERS)

FORMATION	TOP (RKB)	TOP (SUBSEA)	THICKNESS	AGE
Seafloor	89.9	67.6	-	
Torquay Group	89.9	67.6	971.5	Middle Miocene or Younger to Early Oligocene
First Sample	460.0	437.7		
Jan Juc	1240	1217.7	181.5	?Early to Late Oligocene
Demons Bluff	1421.5	1399.2	183.5	Late Eocene
Eastern View Coal Measures	1605	1582.7	1543.9	Late Eocene to Maastrichtian
Igneous (Top)	2092	2069.7	69	Probable Early Miocene to Late Oligocene
Intrusive (Base)	2161	2138.7		
Total Depth	3148.9	3126.6	-	Campanian

FORMATION DESCRIPTIONS

Torquay Group (89.9-1240m); Middle Miocene - Early Oligocene.

In the Koorkah-1 well, the sedimentary rocks of the Torquay Group range in age from Middle Miocene (and younger ?) to Early Oligocene. The upper part of the Torquay Group (460-799m) consists of 339 meters of light grey to greenish-grey coloured bio-clastic limestone (bryozoan fragments and forams dominating) with several interbedded thin, light greenish-grey coloured calcareous claystones at the base of the section. These rocks are of Middle Miocene and younger age (planktonic foram Zones E1-D2). The lower part of the Torquay Group (799-1240m) consists of 441 meters of light grey to greenish grey coloured calcareous, fossiliferous claystones of Middle Miocene to Late Oligocene age (planktonic foram Zones H2-E1). The rocks of the Torquay Group represent sediments that were deposited in a relatively shallow marine environment (water depths less than 120m) possibly associated with lagoonal and reef apron environments.

Jan Juc Formation (1240-1421.5m); Early to Late Oligocene.

The Jan Juc Formation comprises 181.5 meters of generally brownish-grey coloured silty fossiliferous claystone with minor interbedded limestone and dolomitic limestone. The age of the Jan Juc Formation ranges from Early to Late Oligocene (planktonic foraminiferal Zones J2-I1). The rocks represent sediments that were deposited in a shallow (less than 90m) restricted marine environment possibly lagoonal.

Demons Bluff Formation (1421.5-1605m) Late Eocene.

In the Koorkah-1 well the Demons Bluff Formation consists of 183.5 Meters of light to dark greyish brown to reddish brown coloured variously silty claystones interbedded in the lower half of the formation with thin beds of tan coloured limestones and greyish brown coloured quartzose sandstones. Foraminifera and glauconite pellets are abundant from 1421.5-1460m with pyrite nodules and glauconite pellets common below 1535m. The age of the formation is Late Eocene (planktonic foraminiferal Zone K). The environment of deposition was nearshore marine, possibly inner lagoonal.

Eastern View Coal Measures (1605-3148.9m) Late Eocene - Late Cretaceous (Maastrichtian).

The lithology of the E.V.C.M. is dominated by interbedded sandstones and claystones with minor coals, siltstones and cherty limestone/dolomites. The carbonates are very thin bedded and non-porous and are confined to the uppermost 151 meters of the E.V.C.M. The sandstones are generally whiteish grey coloured, variously calcaerous, moderately to well sorted, medium-grained with varying amounts of contained clay. From the top of the E.V.C.M. (1605m) to a depth of 2926 meters, clay content of the sandstones varies from 5-15% (locally 30%) and is minimal below 2926 meters. The claystones are generally moderately soft to hard, non-calcareous and variously silty to sandy and pyritic between 1775-2431 meters. From the top of the E.V.C.M. (1605m) to 2027 meters the claystones are medium to dark reddish brown coloured changing to grey to greyish brown below 2027 meters to total depth (3148.9m). The coals which are dark reddish brown to black coloured are confined to the interval 1775-2431 meters. The variously calcareous and generally sandy siltstones are mainly confined to the interval from top E.V.C.M. to 2027 meters and from 3054-3088 meters. However, some of the sandstone and claystone intervals are very silty and often grade to siltstones. The environments of deposition within the E.V.C.M. range from marginally marine (1605-2240m) to non-marine (2240-3148.9m) and possibly represent sediments deposited in upper delta plain to meandering river with associated flood plain environments.

CONCLUSIONS

Age equivalent sandstones (with a similar stratigraphic position within the E.V.C.M.) to those that tested hydrocarbons in the Yolla-1 well are present in the Koorkah-1 well. However, no encouraging shows of hydrocarbons were seen during the drilling of the Koorkah well. Only poor indications of hydrocarbon fluorescence were noted in sidewall cores. Petrophysical analyses of Schlumberger Wireline Logs showed all zones to be water wet with minor indications of immovable hydrocarbons (see Appendix 4 and Enclosure 8). The lack of hydrocarbons in the Koorkah-1 well may be accounted for by the following:

1. The results of the geochemical analyses (vitrinite reflectivity and pyrolysis) show that the sedimentary section down to around 2950 meters in the Koorkah well is thermally immature to marginally mature for the generation of liquid hydrocarbons. In addition, the D.O.M. within the claystones and siltstones is dominated by vitrinite and inertinite with only minor resinites present (see Appendix 7). Under these conditions, the main hydrocarbon that is likely to be generated below 2950 meters is gas. Traces of free oil prevalent from 2400 meters to total depth are considered to represent early maturity oil that has migrated from a deeper more mature resinite rich section, possibly offstructure.

2. Petrophysical analyses and lithological descriptions indicate that sandstones of Paleocene age have only fair porosity, and that permeability is low due to clay matrix and silica cement plus the presence of locally abundant mica. The sandstones of Late Cretaceous age have poor porosity and permeability because of a high clay matrix plus calcite cement. Therefore, neither the Paleocene nor the Late Cretaceous sandstones encountered in the Koorkah-1 well can be considered as being suitable for the accumulation of large volumes of hydrocarbons.

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APPENDIX 1

DETAILED CUTTINGS DESCRIPTIONS

KOORKAH-1

440-700M (1476'-2297')

BIOCALCARENITE: LT GY TO GRN-GY, CRMY-WHT WITH PNK AND TAN, DOM UNCONSOL FOSS FRAGS AND DEBRIS. FOSS DOM BRYAZOA, SPICULES, CORAL FRAGS, SHELL FRAGS AND FORAMS. C GR FOSS AT TOP DECREASING IN GR SIZE WITH DEPTH ALONG WITH INCREASE IN CL CONTENT. ABUN LT TO DK GRN GLAUC SPHEROIDS AND BLK NON-CALC FORAMS. OCC PY AGGREGATES.

700 - 800M (2297'-2625')

CALCILUTITE: CONTINUED FROM ABOVE WITH DECREASE IN FOSS CONTENT. DOM LT GRN-GY MICROXTLN CALC AND CL WITH 15-30% FOSS DEBRIS. CL CONTENT 15-20% AT TOP TO 50% AT 800M.

800 - 1200M (2756'-3937')

CLST: DOM LT GY TO GRN-GY OCC GY-WHT, M GY AND TAN, ALL SFT TO V SFT AND DRLG DISP (GUMBO TO 1020M WHERE IT BEGINS TO FIRM UP), FNT FISS DEVELOPED BELOW 1050, CALC TO V CALC (15-30%) AS MICROXTLN CALCITE MIXED WITH CLY AND AS ABUN MICROFOSS (DOM FORAMS) AND MICRO FOSS FRAGS, BECOMES OCC SLTY BELOW 960M, OCC LOOSE F TO M GR ANG CLR QTZ, ABUN M TO DK GRN GLAUC PEL, ABUN V F CLR MICA, MOD ABUN PY NODULES AND BLEBS. CLST BECOMES SLIGHTLY DKER GY BELOW 1050M.

SST: TR AT 910M, LT TAN, V F GR, ANG, W SRT, CMT WITH CALC, MOD FRI, 5% VIS POR.

1200-1410M (3937'-4626')

CLST (95-100%): LT TO M GY TO BRN GRY BECOMING DKER AND MORE BRN WITH DEPTH (ESP BELOW 1250M: 70-80%M TO DK BRN BELOW 1270M), ALL V SFT TO MOD SFT WITH SL INC IN FIRMNESS WITH DEPTH, MOD DRLG DISP. DOM BLKY TO SL FISS WITH OCC BLADE-LIKE FRAG, V CALC (30%) AT 1200M BUT STEADILY DECREASING IN CALC CONTENT WITH DEPTH TO APPROX 10% AT 1390M, OCC SLTY (UP TO 15%) WITH V THIN LT RD-TAN CLYEY SLST STRINGERS BETWEEN 1220-30M. ABUN MICROFOSS AND FRAGS DECREASING WITH DEPTH, MOD ABUN M TO DK GRN GLAUC PEL EMBEDDED AND AS LOOSE GRS.

LMST (0-5%: BEGINS BELOW 1250M): LT ORNG-TAN, HD, BRITT, SUB-CONC TO BLKY FRACT. DOL AND SILIC IN PLACES, GRADING LOCALLY TO DOL, CONSISTENT PERCENT FROM 1250-1410 PROBABLY AS THIN INTERBEDS.

1410-1460M (4625'-4789')

MDST: DK BRN TO LT GY, SUB-FISS TO BLKY, VAR SLTY UP TO 10% SST, FOSS FRAGS UP TO 15%, COMM TO ABUN MICROFOSS, MIC MIC TO MIC AS FLAKES ON LAMIN PLANES. UP TO 15% CALC, 10% GLAU DK GRN.

CHERT: (5%) ORNG-TAN, HD, BRITT BLOCKY TO SUB-CONC FRACT, LOCALLY GRADES TO SILIC LMST/DOL. LMST; MICROXTL. INTERPRETED AS THIN INTERBEDS.

SST: MINOR THIN INTERBEDS OF WELL STD, V FRIABLE VF GR SST AS LOOSE, CLEAR, ANG TO SUB-RND QUARTZ GR.
NODULAR PYRITE (1-2%) OCCURS IN ALL SAMPLES. BULK SAMPLES AT 1460M SHOWED TRACE PALE TRANSP TO SL MILKY BLU-WHT CRUSH CUT FLUOR WITH PALE-MOD BRT DISCONT PALE YELL-BLU WHT DESS RNG FLUOR.

1460-1535M (4789'-5035')

MDST: BRN TO DK GY, SUB-FISS. BULK FLUOR AT 1490M; TR PALE TRANSP TO SL MILKY BLU-WHT CRUSH CUT FLOUR, PALE YELL-BLU WHT DESS RING, INTERBEDDED WITH SST: V F GR MOD TO WELL SRT, A-SA, FRIABLE, MOD TO GOOD VIS EFF POR. AT 1525-1530M; V SLOW, DULL, TRANSL V PALE BLU WHT CRUSH CUT FLOUR. PALE YELL-WHT DES RING.

1535-1599M (5035'-5245')

LMST: ORNG-TAN, HD, BRITT, BLKY. MDST: LT BRN TO RD-BLK, SUB-FISS, SL CARB, GLAU, MIC, PY 1-2%.
SST: V F GR, MOD SRT, A-SA, FRIABLE, TR CALC CMT. EST VIS POR 10-15%. SST: PATCHY 10% PALE YELL GOLD FLOUR, V SLOW TRANSL TO SL CLOUDY DULL BLU WHT TINGED WITH YELL DESS RING.

1600-1610M (5250'-5282')

CLST (100%): M TO DK RD-BRN OCC MOTTLED WITH GY-WHT AND GRDNG TO LT TO M GY, MOD HD TO HD, IRREG FRAC, OCC BANDED AND SILC, VAR SNDY FROM 0-25% (LT GY MORE SNDY) OF DOM F TO M GR, SR CLR TO OCC MLKY QTZ, OCC M GRN EMBDD GLAUC, OCC MICROFOSS AND MICROFOSS FRAGS, ABUN V F DESS PY WITH OCC PY AGG AND TUBES.

1610-1621M (5282'-5319')

SST (100% WITH POSS THIN (LESS THAN .05M) INTBD CLST): EXISTING ALMOST WHOLLY OF UNCONSOL FREE QTZ: DOM M GR OCC C GR WITH TR F GR, DOM WR TO OCC SA, 5% LT TAN TO WHT CLY MTX, RARE FRAG MOD HD. WHT CMT WITH CLR CALC AND SILC OVERGRWTHS: VIS POR PROB 20-30% BUT RARE FRAG LESS THAN 10% INDICATING SELECTIVE DIAGENESIS.

1621-1664M (5321'-5460')

SST: M GR (RNG F TO C) SR-R, MOD SRT, CL TO OCC SL MILKY, ARGILL CEMENT/MATRIX. EST POR 20-30% FOR UNCOL, 10% FOR CMTED SST. ORG FLAKES COMM, OCC GLAUC, WHT MICA UP TO 10%, CLST: DK BRN TO RD-BLK, SUB-FISS, CARB, MIC- MIC, PYRITIC (5-20%) AS DESS GR AND BURROW FILLED TUBES, OCC GLAUC, GRDS TO ARGILL F SST WITH VAR SILC CMT, TR CALC CMT. DOL: LT GY, MICROXTLN, HD, BRITT, SUB-CONC FRAC, PYR 5-10% AS DESS BLEBS, AND GR, PROM GOLD MIN FLUOR. LMST: TAN, CHERTY, HD, BRITT FLAKY FRAGS.

1664-1693M (5460'-5555')

CLST: RD TO DK BRN, CARB, PY UP TO 15% AS BURROWS AND F DESS GR, SL CALC, OCC FOSS FRAGS ALTERED TO CALC BLEBS, WHT MICA COMM ALONG BEDDING PLANES. SST: F TO M GR, GRADS TO SLST, SILC WITH TR CALC CMT, EST POR 20-30% FOR UNCON, LESS THAN 10% FOR CONSOL. LMST: M GY, OCC TAN, HD, BRITT, FLINTY, GRDS TO CHERTY LMST.

1693-1744M (5555'-5722')

CLST: M TO DK GY-BRN, SFT TO MOD SFT, IRREG FRAC, TR CALC, ABUND PY, ABUND WHT MICA, OCC DK RD-BRN RESINOUS ORG MATTER? SLST: LT GY, MOD SFT, FRI, LT GY WHT CLY MATRIX, MOD TO ABUND V F DESS PY, WHT MICA, AND MOD ABUND DK RD-BRN ORG MATTER AS PART OF MATRIX?

1744-1828M (5722'-5998')

CLST: M TO DK RD-BRN, OCC GRDNG TO LIGNITE AND OCC TO DOL, MOD SILTY, SNDY, DESS PY UP TO 5%, RARE M GR GLAUC PELL, BRN ORG FLAKES AND BLK PLANT FRAGS. SST: V F GR, GRDS TO SLST, WHT TO LT GY-BRN, SR TO SA, WELL SRT, FRI TO V FRI, WHT CLY CMT, TR CALC CMT, MOD ABUND WHT MICA, OCC F DESS PY, TR GLAU, EST POR 0-15%, OCC PATCHY LT BRN STAIN. COAL: BIT, BLK TO V DK RD-BRN, MOD SOFT TO HD, PLATY TO BLKY TO SUB-CONC FRAC, SL CALC, MOD PY.

1828-1885M (5998'-6185')

SLST: LT BRN TO PALE ORN-BRN, GRADS TO V F SST, A-SA, P SRT, FM TO HD, IRR BLKY FRAC, TR LITHIC GR, MOD TO ABUN BRN CLY MATRIX, VAR CALC CMT AND SILC CMT, PATCHY ORNG/BRN STAIN, POOR VIS POR. SST: WHT TO PALE ORG-BRN, V F GR, GRADS TO SLST, SR TO SA, W SRT, FRI, MOD CMT WITH CLY, (1-2%).

1885-1926.6M (6185'-6321')

SST: WHT TO TAN CRM, M GR, RANGES FROM V FN TO C, GRADS TO SLST IN PT, SA TO SR, 10-15% WHT CLY, TR CALC CMT, TR GLAUC, MOD TO ABUND MICA, MOD TO ABUND LT TO DK BRN PATCHY RESINOUS STAIN. SLST: LT TO PALE ORNG-BRN, A-SA P SRT, FM TO HD, IRR FRAC, GRADS LOCALLY TO SLTY CLST AND SLTY DOL CHERT. CLST: DK BRN TO SL ORNG-BRN WHERE GRADS TO SLST, OCC V F SST.

CLST: LT TO M BRN IN PT WITH ABUN BLK CARB FLECKS, MOD HD, BLKY TO SUB-FISS, GRADS TO SLST IN PT, TR PY, TR FNT TRANS TO SLIGHTLY MLKY PALE YELL WHT TO PALE BLU-WHT CUT FLUOR, FAINT MOD BRT BLU - WHT DESS RING, CL RES. SST: V F GR IN PT GRADS TO SLST, FRI TO WEAKLY CMTED, 0-15% WHT CLY CMT ABUND PATCHES WISPS AND MICROLAMINS OF LT BRN TO DK ORNG-BRN AND BLK RESINOUS MATTER, VIS POR 0-15%, MINOR DULL ORNGE-GLD MIN FLUOR FROM CALC CMT. TR CUT FLUOR THROUGHT ASS WITH ORG MATTER; MAINLY SLW WEAK PALE GOLD PALE YELL-WHT OR PALE BLU-WHT TRANSLUC TO SLIGHTLY MLKY CUT FLUOR WITH V FNT TO PALE YELL-WHT OR BLU DESS RING, CLR RES RESIDUE. SLST: LT BRN TO PALE ORNG-BRN, IN PT SANDY, FM TO MOD HD, TR LITHICS, HACKLY IRR FRAC, MOD ABUND CLY MATRIX, VAR CALC CMT. V MINOR V SLW TRANS TO SL MLKY BLU-WHT FLUOR, V FAINT PALE YELL-WHT DESS RNG, CLR RES. SST: F TO C GR, SA TO SR, W SRT, 0-15% CLY MATRIX, TR CALC CMT, VIS POR 20-25%, COAL: DK RD-BRN TO BLK, SUB-BIT TO BIT, BLKY TO CONC FRAC, BIT LUST, TR CALC, GRDS IN PT TO BIT SH AND SLST. SLOW TO MOD FAST PALE BLU-WHT MLKY CUT FLUOR, MOD BR BLU-WHT TO PALE YELL-WHT DESS RNG, CLR TO V PALE RES. CUT LIBERATES TR GAS.

1926.6-2027.5M

INTERVAL MAINLY THINLY LAM CLST (GRDG IN PLACES TO SHALE ?) AND SST: V F GR WITH GEN MINOR BUT VARYING AMOUNTS OF SLST, SHALE, MINOR COAL, LOOSE QUARTZ GRAINS AND TRACES PYRITE, COAL, GLAUC, MICA, TR CHERT FROM 1954M.
SST (10-30%): AS THIN LESS THAN 2MM LAMINAE INTERBEDED WITH CLST (MOST ABUN 1945-1951, AND 1969-1975M) DOM WHT IN PART LT ORNG BRN, V F GR, GRDS LOCALLY TO C SLST, SA-SA, WELL SRT, FRI-SFT, LOCALLY WITH UP TO 15% WHT CLY/CALC CMT; OCC GR WITH PATCHY TO FINELY LAM AND WISPY LT BRN TO DK ORNG BRN MATRIX OF RESINOUS ORGANIC MATTER. VAR (0-15%) VIS POR. MINOR ORNG-GOLD MIN FLUOR FROM OCC GR WITH CALC CMT. MINOR CUT FLUOR ASS WITH PATCHY ORGANIC MATTER: MAINLY SLW WEAK, PALE GOLD, PL YELL-WHT TO BLU-WHT TRANSL TO SL MLKY CUT AND CRUSH CUT FLUOR, WITH V FNT TO FNT PL YELL-WHT OR BLU-WHT DESS RNG FLUOR; CLEAR CUT AND DESS RNG RESIDUE.

CLST AS PREV DESCRIBED (35-70%): INTERBEDDED WITH SST AS ABOVE, MOST ABUN 1936-1951-1966M; LT-M BRN OFTEN FLECKED WITH BLACK CARB MAT, SLTY, GRDS IN PART TO SLST, V SFT, MOD HD IN PART, BLOCKY TO SUB-FISS.
MINOR FNT TRANSL SL MLKY PL YELL TO BLU-WHT? FLUOR AND FNT BRN/PL-WHT DESS RNG FLUOR, CLEAR CUT, DESS RNG RESIDUE.
SLST (5-15): MAINLY 1927.5-192733, 1954-66M LT BRN TO PL ORNG BRN, IN PART SDY, FM-MOD HD, TR LITHIC FRAGS, HACKLY FRAC, MOD-ABUN BRN CLY MATRIX, VAR (0-15%) CALC AND SILIC CMT.
V MINOR, V SLOW AND FNT TRANSL - BLU-WHT CUT FLUOR, V PALE YELL WHT DESS RNG, CLEAR CUT AND DESS RNG RESIDUE.
SH (0-5%) (MAINLY 1927.5-1933M): DK BRN, IN PART LT OLIVE BRN, FISS, MOD SOFT - MOD HD, AS THIN LAMINAE AND PLATES POSSIBLY GRDS TO CLST OR SLST ABOVE. MINOR V SLW, PL BLU-WHT SL MLKY CUT FLUOR WITH FNT V PL YELL-WHT DESS RNG FLUOR, CLR RESIDUE.
QTZ GRAINS (0-5%, REL ABUN ABOVE 1927-1954M, 1963-1966M DECR WITH DEPTH) AS PER DESCRIBED: CLR-MLKY, F-C DOM M GR, A-SR, WELL SRT.
CHERT (0-5%) MAINLY 1957, 1963-1966M LT BRN-TAN, HD, BLKY-HACKLY FRAC, MICROCRYST.

2027.5-2095.0M (6652'-6873')

CLST: DK BRN TO DK GY AND BLK, FISS HACKLY TO SPLINTERY FRAC, IN PT GRDS TO CLST, SST: TRANSLUC TO GY, F TO M GR, SA TO SR, M TO W SRT, CLY AND SIL CMT, POR LESS THAN 10%, ABOVE 2065 PATCHY LT-DK RD-BRN RES STAIN AND OCC BLK BIT MATRIX. AT 2031; V SLW STRNG TRANSLUC TO BLU-WHT CUT FLUOR. SLOW-MOD FAST CRUSH CUT, PALE TO MOD BRT V LT YELL-WHT DESS RNG, CLR RES. BELOW 2065; MINOR CUT FLUOR PATCHY MOD BRT LT GLD-YELL PINPOINT CUT FLUOR, PALE-MOD BRT LT YELL-WHT DESS RNG, CLR RES.

2095.5-2129M (6873'-6985')

DOLERITE (?) (100%):
MOTTLED MILKY WHT AND DK GRY-GRN, F GR, EQUIGRANULAR, HOLOCRYSTALLINE, MOD-STRONGLY WEATHERED. PLAGIOCLASE, PYROXENE, WITH ACCESSORY HORNBLENDE?, BIOTITE, PYRITE, QUARTZ (?) AND (SECONDARY) CALCITE.

2129-2233M (6985'-7326')

SST: F TO M GR, SR TO SA, RARE WHT TAN CLY, MATRIX MINOR CALC, P VIS POR 0-10%. OCC GRDS TO HIGHLY CMTED SLST, VAR GLAUC, MINOR DESS PY, CLR MICA, FRAGS DESS ORG MATTER. CLST: M BRN TO DK GY-BRN, MINOR M GY TOWARDS BASE, SUB-FISS, GRDS TO SHALE, INDURATED MOD SFT TO HD, BRITT, FISS TO SPLINTERY, ARGILL, OCC GRDS TO TO SLST. POOR TO MOD ORG CONTENT, DECREASE WITH DEPTH AS WHISPS AND LAMINAE OF COALY DEBRIS, CLR MICA, VAR V F DESS PY AND AS THIN LAMINAE. TR V PALE TRANSLUC BLU-WHT CRUSH CUT FLUOR.

2233-2332M (7326'-7651')

CLST: BRN-GY TO DK BRN-GY, VAR SOFT TO MOD HD, SUB-FISS TO FISS, IRREG TO BLKY FRAC, GRDS IN PT SILTY CLST, TR CARB MATTER AS SMALL BLK BLEBS AND ORNG-BRN STREAKS AND WISPS, VAR TO TR TO 5% PY AS NODULES AND DESS THROUGHOUT, TR MICA. SST: RANGES FROM V F TO C, DOM M, A TO SR, MOD TO WELL SRT, 5-15% CLY CMT, VAR CALC AND SILIC, VIS POR 0-15%.

2332-2476M (7651'-8124')

CLST: M TO DK GY TO GY-BRN, SFT TO MOD HD, SUB-FISS, NONCALC. LOW ORG CONTENT AS DESS BLK-RD-BRN FLAKES, IRREG WHISPS OF LAMIN BLK TO RD-BRN (RESINOUS) PLANT FRAGS, GRADS FROM SLTY CLST TO SNDY CLST, COMM STAINED WITH FE?, TR PY AS DESS AND NODULES, ABUND CLR MICA (MIC-MIC), OCC SPECKS AND FLAKES OF RD-BRN MICA, TR SLOW V WEAK TRANSLUC BLU-WHT CRUSH CUT FLOUR. SST: V F TO C, DOM F TO M, A TO R, VAR CALC CMT INCR WITH DEPTH, IN NON-CALC SILICA CMT; FRI TO MOD HD, TR TO ABUND ORG MATTER AS FLAKES, DESS AND WHISPS BECOMING COALY IN PART. ABUND CLR MICA, OCC RD-BRN MICA. VIS POR 0-15%. 2446-2419M: TR SLOW DULL TRANSLUC BLU-WHT CRUSH CUT FLUOR, WEAK TO MOD YELL-WHT DESS RING, PALE BRN RESIDUE RING. 2434-2443M: SLOW DULL TRANSLUC BLU-WHT CRUSH CUT FLUOR, MOD BRT YELL-WHT DESS RING, CLR RESINOUS RES.

2476-2578M (8124'-8458')

CLST (100%) M GY TO BRN-GY, HOMOGENEOUS, SUB-FISS TO MASSIVE, BLADED-PLATY, MOD HD TO SFT, OCC HD (SHALE), NON-CALC, ABUN DESS CLR MIC MIC, OCC LGR FLECKS CLR RD-BRN MICA. ZERO TO TR DESS V F PY, OCC PY NODULE, LOW ORG CONTENT, RARE COALY DEBRIS UP TO 10% AS WISPS, OCC LAMIN, MOSTLY SMALL RD-BRN FLAKES PLANT MATTER, V RARELY GRDG TO V F SST AND SLST. POR ZERO TO 5%, RARE V THIN INTERBEDS OF CLST: BUFF TO LT BRN, SL MICROXTLN, MOD HD, FLINTY FRACT, NONCALC, ABUND SUB-PARALLEL COALY WISPS.

2578-2605M (8458'-8547')

SST: F TO C GR DOM F, SR TO R, W SRT, VAR CMT, DOM SILIC WITH CALC AND CRMY WHT CLY, COMM CLR MICA FLAKES, CLR MIC MIC, OCC COAL FRAGS AS THIN LAMIN WITH PLANT FRAGS, VIS POR 0-5%, TR V SLOW WEAK TRANSLUC BLU-WHT CRUSH CUT FLOUR, WEAK BLU-WHT DESS RING, POSS GILSONITE OR PIPE DOPE CONTAMINATION. CLST: GY-BRN TO DK GY, SFT TO HD, MASS SUB-FISS, BLADED-PLATY, VAR QTZ AND, VAR MINOR DESS COAL FRAGS, VAR MINOR DESS V F PY, COMM CLR MIC-MIC, GRADS IN PT TO ARGILL SST.

2605-2731M (8547'-8960')

CLST: M TO LT GY TO GY BRN, OCC DK BRN, SFT TO HD, MASSIVE TO SUB-FISS. BLADED TO OCC PLATY, NONCALC, OCC QTZ SAND GR, ANG FRAGS PALE BLU-GY CMT, ABUND DESS COAL FRAGS, OCC WISPS, LAMINA, ABUND DESS CLR MICMIC, OCC CLR MICA, RD-BRN MICA, FLAKES OF RD-BRN IRON CMT, TR DESS PY, RARE PY NODULES. SST: V F TO M PREDOM M, SA TO SR, VAR CMTS, IN PT ARGILL UP TO 30%, SILICA, TR TO COMM CALC AND IN PT HEAVY MANGANESE CMT, OCC COAL AS FRAGS, WISPS, LAMINA, AND BLEBS, TR TO COMM CLR MICA, MIC MIC.

2731-2872M (8960'-9423')

SST: V F TO M GR, SA TO SR, P TO MOD SRT, SFT TO HD, VAR CLY CMT 0-30%, SILICA? WITH VAR CALC CMT. IN PT UP TO 10-15% SMOKY QTZ GR, LITHIC FRAGS, TR ORGANIC MATTER? TR CLR MICA AND ORNG-BLK BIOTITE, MOD ABUND CARB AND COALY WISPS, PARTINGS AND FRAGS, POSS STYOLITIC. PERSISTENT UNIFORM SPOTTY ORANG-GOLD CARB MIN? FLOUR. VAR AND VERY IRREG TR CUT FLUOR THROUGHOUT: SLOW TO V SLOW TRANSLUC TO SLIGHTLY MILKY BLU-WHT CUT FLOUR. V LT DULL TO RARELY MOD BRT PALE YELL-WHT DESS RING, CLR RESIDUE .

2872-2926M (9423'-9600')

CLST: UNIFORM GY AND LT BRN-GY TO DK BRN-GY, SFT TO MOD HD, IRREG FRAC, SUB-FISS. SST: V F TO M GR, SA TO SR, MOD SRT, FRI TO MOD HD, IN PART UP TO 20-30% SMOKY QTZ AND OCC LITHIC FRAGS, LOCALLY ABUND CARB AS BLEBS, SPOTS, FRAGS AND PARTINGS, TR WHT MICA, ORNG-BRN BIOTITE WITH OCC PLEOCHROIC HALOS, TR-MOD ABUN ORNG-BRN RESINOUS MATTER OFTEN FLAKEY ORG MATTER. VIS POR 0-15%. COMM UNIFORM PINPT MIN GLD FLUOR FROM CARB CMT. VAR AND IRR TR CUT FLOUR THROUGHOUT: SLW TO V SLW TRANSLUC TO MLKY V PALE BLU-WHT TO V LT DULL YELL-WHT DESS RNG, CLR RES.

2926-3054M (9600'-10,020')

SST: F TO C DOM M, A TO SR, MOD SRT, FRI TO MOD HD, V HD WITH DEPTH, SILIC CMT DOM. TR CALC CMT, TR WHT CLY CMT, ABUND FRAMEWORK GR OF ROSE QTZ, PALE GRN QTZ, GY LITHICS, TR BIOTITE, WHT MICA. VAR ORG MATTER AS BLK CARB FLAKES, WISPS, PARTINGS, AND RESINOUS FLAKES. TR TRANSLUC PALE YELL-WHT TO BLU-WHT CUT FLOUR AND CRUSH CUT FLOUR, V LT DISCON V PALE YELL-WHT DESS RING, CLR RES. CLST: DOM BRN-GY, IN PT LT BRN-GY, SFT TO MOD HD, IRR BLKY TO SUB-FISS FRAC IN PT GRADS TO SH: TR BLK CARB FLAKES, WISPS AND PARTINGS. RARE WHT MICA. GRADS IN PT TO SLTY CLST. IN SLTY CLST; OCC TR V FNT SLW TRANSLUC SL MLKY V PALE PINKISH WHT CUT FLOUR.

3054-3088M (10,020'-10,132')

SST (80-95%): CRM-WHT, DOM M GR BUT RNGING FROM F TO C AND OCC V C, DOM CLR AND MLKY WHT QTZ, SA-SR WITH OCC ANG AND RND GR, MOD W TO LOCALLY V PR SRT, MOD HD TO MOD SFT, ABUN V HD, MOD FRI, 20-30% LT GY, ROSE AND DK GY LITHIC GR AND FRAGS, V WKLY CMT WITH CLR TO MLKY SILC AND OCC LT TAN-WHT CLY, TR CALC, LOCAL ABUN BLK BITUMINOUS WISPS, BNDS (UP TO 1MM THICK) AND DESS FRAGMENTS OCC BECOMING COALY, ABUN LARGE FLAKES OF ORNG-BRN BIOTITE AND CLR MUSC, OCC NODULES OF PY. 0-5% VIS POR. LOCAL PATCHES OF SPOTTY BRN-BLK RESINOUS STAIN (?) CLOSELY ASSOC. WITH ORG MAT. DULL TO MOD BRT ORNG-GOLD PATCHY TO EVEN FLUOR, NO CUT OR CRUSH CUT. OCC BLK BIT FRAG GIVES A MOD BRT TO BRT GRN-YELL FLUOR. V SLW STRMG MOD BRT TRANSP GRN-YELL TO BLU-WHT CUT AND CRUSH CUT FLUOR, CLR DESS RNG WITH A MOD BRT GOLD-YELL FLUOR. CLST (TR-15%): M GY TO BRN-GY, BLKY TO SUBFISS AND IRREG FRAC, OCC PLATEY, DOM INDURATED AND MOD HD BUT OCC MOD SFT, ABUN V F SPECS OF MICMICA (?), TR CALC, VAR ABUN OF DESS BLK ORG FRAG. OCC PINPOINT DULL ORNG FLUOR, FNT DULL TRANSP BLU-WHT CRUSHCUT FLUOR, CLR DESS RNG WITH A MOD BRT GRN-YELL FLUOR. SLST (0-5%): LT TO M GY, IRREG FRAC, MOD SFT AND FRI, V ARG (30-40% CLY) AND SNDY-GRD TO V F GR SST. ABUN LITHIC FRAG AND MICAS (BIO/MUSC), MOD ABUN V F BLK SPECS AND LARGER FRAG AND WISPS OF BLK ORG MAT (?), TR CALC. APPEARS TO BE A FINER GR VERSION OF SST. CUTS AS IN SST BUT SLIGHTLY STRONGER.

3088-3127M (10,132'-10,260')

CLST (100%): M TAN-GY WITH OCC DK GY AND LT TAN, BECOMES MORE GY AND LESS TAN BELOW 3309M. MOD SFT TO OCC MOD HD, IRREG TO BLKY FRAC TO OCC SUBFISS, OCC LARGER FRAG FISS AND SPLINTERY GRD TO SHALE, NON TO TR CALC, SLKY LUSTRE, ABUN MICMIC, MOD ABUN DESS FRAG AND BNDS OF BLK TO DK RD-BRN ORG MAT DECREASING SLIGHTLY BELOW 3100, OCC LOCAL PATCHES OF V F SND, OCC BECOMES SLTY AND GRDS TO CLYEY SLST AS IN 3054-88M INTERVAL. PALE TRANSP GRN-YELL CUT AND CRUSH CUT FLUOR, CLR DESS RNG WITH A BRT GRN-YEL FLUOR.

3127-3133M (10,260'-10,279')

SST (95%): AS DECRIBED IN 3054-88M INTERVAL. 0-5% VIS POR. OCC PATCHES OF SPOTTY DK BRN TO BLK RESINOUS STN (?) DULL ORNG FLUOR, NO CUT, V DULL ORNG YELL CRUSH CUT FLUOR, CLR DESS RNG WITH A V FNT BLU-WHT FLUOR. SLST/CLST (5%): AS IN 3054-88M INTERVAL.

3133-3148.9M (10,279'-10,331')

SST (60-95%): CRMY-WHT, DOM M GR BUT RANGING FROM F TO C AND OCC V C, DOM CLR TO MLKY QTZ, SA-SR WITH OCC A AND RND GR, MOD W TO OCC V PR SRT, MOD HD OCC V HD, ABUN CLR SILC CMT, OCC WHT TO LT TAN CLY CMT AND RELICT FELD (?), TR PATCHY CALC, ABUN LT BLU-GY RND QTZITE GR, ABUN LT TO DK GY AND BLK LITHIC GR, LOCALLY ABUN DK RD-BRN TO BLK CARB MAT AS FRAGS, WISPS, BANDS (1MM THICK) AND DESS, ABUN ORNG-BRN AND CLR MICA FLAKES AND 'CLOTS'. 0-5% VIS POR, DOM 0%, OCC LOCAL DK BRN-BLK RESINOUS BLOTCHES GEN ASS WITH ORG MAT, PINPOINT TO PATCHY DULL ORNG-GOLD MIN (?) FLUOR, NO CUT, QUESTIONABLE CRUSH CUT, CLR DESS RNG WITH A V FNT BLU-WHT FLUOR.

277025

APPENDIX 2

SIDEWALL CORE DESCRIPTIONS

KOORKAH -1

WELL: KOORKAH-1 BASS BASIN
DATE: 22 DECEMBER 1985

SUMMARY OF SIDEWALL CORE DESCRIPTIONS

LOGGING SUITE NO: 2 By: Schlumberger
RUN NO.: 1 SHOT: 55 RECOVERED: 51

GEOLOGIST: B.F. WHEELER

277026

SHOT NO.	DEPTH (m)	PULL (lbs)	REC'D (cms)	CONDITION	ROCK TYPE	VISUAL POROSITY	ODOR	STAIN	FLUORESCENCE	CUT FLUORESCENCE	CRUSH CUT FLUORESCENCE	CUT RESIDUE	RATING
1	3140	576	3	INTACT	V clyey lithic sst	0-5%	Nil	Nil	Even pinpoint dul orng min fluor	Nil	v fnt sl mlky bl-wh	clr w/a fnt grn-yel fluor	Poor - Nil
2	3126	396	2	I	Clyst	-	Nil	Nil	Nil	Nil	mod brt transp bl-wh	clr w/a mod brt bl-wh fluor	Poor - Nil
3	3109.5	337	2.5	BROKEN	Clyst	-	Nil	Nil	Nil	V fnt transp bl-wh	mod brt transp bl-wh	clr w/a brt gold-yel fluor	Poor- Nil
4	3095	309	3.5	I	Clyst	-	Nil	Nil	Patchy pinpt mod brt grn-yel	mod brt slw stmng mlky yel	mod brt sl mlky bl-yel	clr w/a v fnt gold yel fluor	Poor
5	3081.5	409	2.5	I	V clyey sst	0-10%	Nil	Nil	Even dist dl orig min(?) fluor	Nil	v fnt sl mlky bl-wh	clr w/a v fnt grn-yel fluor	Poor- Nil
6	3062	1641	3.5	I	Clyst	-	Nil	Nil	Nil	Nil	v fnt transp bl-wh	clr w/a fnt grn-yel fluor	Poor - Nil
7	3030	468	2.5	I	Clyst	-	Nil	Nil	Nil	Local mod brt mlky gold-yel strng	Fnt transp bl-wh	clr w/fnt bl-wh fluor	Poor - Nil
8	3019	811	3.5	B	V clyey sst	Gen 0%	Nil	Nil	Patchy pinpt dl orng (min?)	Nil	Nil	Nil	Nil
9	3001	424	3.5	I	Clyst	-	Nil	Nil	Nil	Pl sl mlky bl-wh	Mod brt transp bl-wh	clr w/a fnt yel-wh fluor	Poor - Nil
10	2959.5	582	3	I	Clyst	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11	2955	198	3	B	Clyey sst	Gen 0% Locally to 15%	Nil	Nil	Even pinput dl orng (min?)	Nil	Nil	Nil	Nil
12	2920	302	3.5	I	Clyst	-	Nil	Nil	Nil	Nil	v fnt transp bl-wh	clr w/a fnt gold-yel fluor	Poor - Nil
13	2884	204	3	B	Clyst	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil
14	2858	1804	2.5	I	Sndy Clyst	-	Nil	Nil	Nil	Spotty mod brt Slw stng mlky yel	dl to mod brt slw strng mlky yel	clr w/l fnt bl/yel fluor	Poor
15	2818	741	2.5	I	Clyey sst	Gen 0% locally to 15%	Nil	Nil	patchy pinput dl orng (min?)	Fnt sl mlky yel wh	Fnt transp bl-wh	clr w/a v fnt gold-yel fluor	Poor - Nil
16	2794.5	562	2	I	Clyey and Organic sst	0%	Nil	Nil	Banded even dl orng (min?)	mod brt transp bl-wh slw stng	Mod brt to brt trans bl-wh	c/r w/a mod brt gold-yel	Poor
17	2763.5	192	3	I	Clyst	-	Nil	Nil	Patchy pinpnt dl orng	Nil	Nil	Nil	Nil
18	2756.9	120	2.5	I	Clyey sst	0.10%	Nil	Nil	Even pinpnt dl to mod brt orng	Nil	Nil	Nil	Nil
19	2727.9	95	2.5	I	Clyey and Organic sst	Gen 0% locally to 10%	Nil	Nil	Patchy pinput dl (min?) fluor	Local mod brt slw stng mlky yel	mod brt transp bl-wh	clr w/a fnt gold-yel	Poor
20	2676	45	2.5	I	Clyst	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil
21	2621	268	3	I	Chert	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil
22	2610	566	4	I	Clyey sst	Gen 0% locally to 15%	Nil	Nil	Tr pinpt dl orng (min?)fluor	Nil	Nil	Nil	Nil
23	2603	158	3	I	Clyey sst	0-10%	Nil	Nil	Even pinpt dl orng (min?)	Local mod brt slw Strng yel-bl	fnt sl mlky yel-wh	clr w/a v fnt bl-wh fluor	Poor - Nil
24	2555	110.7	3	I	Clyst	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil
25	2465.5	491.5	35	B	Clyst	-	Nil	Nil	Nil	v fnt transp bl-wh	Fnt transp bl-wh	clr w/a dl bl-wh fluor	Poor - Nil

DATE: 22 DECEMBER, 1985

LOGGING SUITE NO: 2 By: SCHLUMBERGER
RUN NO.: 1 SHOT: 55 RECOVERED: 51

GEOLOGIST: B.F. WHEELER
PAGE 2 OF 3

277027

SHOT NO.	DEPTH (m)	PULL (lbs)	REC'D (cms)	CONDITION	ROCK TYPE	VISUAL POROSITY	ODOR	STAIN	FLUORESCENCE	CUT FLUORESCENCE	CRUSH CUT FLUORESCENCE	CUT RESIDUE	RATING
26	2440	584.5	3.5	I	Sst	5-20%	Nil	tr vlt brn(?)	Patchy pinpt dl orng (min?)	mod brt slw transp bl-wh	mod brt transp bl-wh	clr w/a dl gold-yel fluor	Poor
27	2349	424.5	4	I	Clyst	-	Nil	Nil	Nil	v fnt transp bl-wh	v fnt transp bl-wh	clr w/a fnt bl-wh fluor	Poor - Nil
28	2305.5	1617	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
29	2297.5	669	3.5	B	Sst	5-10%	Nil	Patchy lt brn(?)	Patchy dl orng	Nil	v fnt transp bl-wh	tr	Nil
30	2266.4	210	5	I	Clyst	-	Nil	Nil	Nil	Patchy brt sl strng mlky yel	mod brt transp bl-wh	clr w/a fnt gold-yel fluor	Poor - Nil
31	2241	155	4.5	I	Clyst	-	Nil	Nil	Nil	V fnt transp bl-wh	tr transp bl-wh	clr w/a tr bl-wh fluor	Poor - Nil
32	2213	1488	4	I	Clyst	-	Nil	Nil	Nil	tr patchy mod brt mlky yel vslw stn	Nil	Nil	Nil
33	2200	218	2.5	B	Sst	15-20%	Nil	tr patchy v lt straw (?)	Nil	Nil	Nil	Nil	Nil
34	2196.5	203	3	I	Sst	15-25%	Nil	tr patchy v lt straw (?)	Nil	Nil	v fnt transp bl-wh	clr w/a fnt bl-wh fluor	Poor - Nil
35	2181	668	4.5	I	Sst inlam w/ clyst	20-25%	Nil	tr pinpt blk resinous pyrobit	Nil	v fnt transp	fnt transp bl-wh	clr w/a fnt bl-wh fluor	Poor - Nil
36	2160	1449	4.5	I	Clyst	-	Nil	Nil	Nil	v fnt transp bl-wh	v fnt sl mlky gold yel	clr w/a tr gold-yel fluor	Poor - Nil
37	2146	619	4	I	Sst	25-30%	Nil	mod abun pinpt blk res pyrobit(?)	tr pinpt dl orng (min?)	tr pinpt mod brt mlky yel vslw stn	tr vpl transp bl-wh	clr w/a fnt bl-wh fluor	Poor - Nil
38	2135	689	4.5	I	Sst	Gen 15% locally to 25%	Nil	Nil Abun blk org cly in mtx	Nil	Nil	Nil	Nil	Nil
39	2127.5	315	2.5	B	Gabbro	-	Nil	Nil	tr lt bl-wh min	Nil	tr vvfnt transp bl-wh	Nil	Nil-Poor
40	2083	1823	5	I	Clyst	-	Nil	Nil	Nil	Nil	tr vv fnt transp bl-wh	clr w/a v fnt bl-wh fluor	Poor - Nil
41	2070	2198	5	I	Sst	10-15%	Nil	Nil	Nil	tr v pl trans bl-wh	NR	NR	NR
42	2037	1796	NR	NR	NR	NR	NR	NR	NR	NR	Nil	Nil	Nil
43	2031	1031	4.5	I	Sst	15-25%	Nil	Nil	Nil	Nil	mod brt trnesp bl-wh	clr w/a mod brt bl-wh fluor	Poor
44	1972.4	1982	3.5	B	Clyst	-	Nil	Nil	Nil	fnt transp bl-wh	fnt transp bl-wh	clr w/a mod brt bl-wh fluor	Poor
45	1910	272	4	I	Clyst	-	Nil	Nil	Nil	fnt transp bl-wh	mod brt sl mlky yel-wh	clr w/a v fnt dl gold-yel fluor	Poor
46	1904.9	1249	5.5	I	Clyey sst	Gen 5% locally to 15%	Nil	Nil	Patchy dl orng (min?) fluor	fnt sl-mlky yel-wh	mod brt sl mlky bl-wh	clr w/a mod brt bl-wh fluor	Poor
47	1850.4	191	4	B	Clyst	-	Nil	Nil	Nil	s/w med brt s mlky bl-wh	fnt transp bl-wh	clr w/a v fnt bl-wh fluor	Poor
48	1801.0	177	4.5	I	Clyst	-	Nil	Nil	Nil	fnt transp bl-wh	v fnt transp bl-wh	clr w/a tr bl-wh fluor	Poor - Nil
49	1779.0	242	4	I	Clyst w/ v thin interlam of sst	-	Nil	Nil	Nil	v fnt transp bl-wh			Poor - Nil

DATE: 22 DECEMBER, 1985

LOGGING SUITE NO: 2 By: SCHLUMBERGER
RUN NO.: 1 SHOT: 55 RECOVERED: 51

GEOLOGIST: B.F. WHEELER
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SHOT NO.	DEPTH (m)	PULL (lbs)	REC'D (cms)	CONDITION	ROCK TYPE	VISUAL POROSITY	ODOR	STAIN	FLUORESCENCE	CUT FLUORESCENCE	CRUSH CUT FLUORESCENCE	CUT RESIDUE	RATING
50	1748.4	554	4	I	Sst	25%	Nil	Nil	Nil	Nil	Nil	Nil	Nil
51	1702.0	759	4	B	Clyst	-	Nil	Nil	Nil	Nil	v fnt transp bl-wh	clr w/a mod brt bl-wh fluor	Poor - Nil
52	1655	890	4	I	Clyst	-	Nil	Nil	Nil	fnt transp bl-wh	fnt transp bl-wh	clr w/a fnt bl-wh fluor	Poor - Nil
53	1636	1453	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
54	1615.5	1839	4	I	Sst	20-25%	Nil	Nil	Nil	Nil	Nil	Nil	Nil
55	1605	1482	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 1 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 1 DEPTH: 3140M RECOVERY: 3CM OVERPULL: 576 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: SST: WHT TO LT GY WHT, F TO M GR W/ ABUN C AND V C GR QTZ AND GY-BRN CLY LITHIC CLASTS (UP TO PEBBLE SIZE), ANG TO SUBANG, POORLY TO MOD W SRT, MOD TO V FRI, 30-40% WHT CLY MTX, ABUN RND V F SAND AND SLT, ABUN (15-25%) LITHIC FRAGS; LOCAL WISPS AND FRAG OF BLK RESINOUS BITUMINOUS MATTER, MOD ABUN CLR AND ORNG BRN MICA. NO EFF POROSITY TO 5%?, V DISP IN 10% HCL.

ODOR: - STAIN: LOCAL PATCHES OF BLK RESINOUS PYROBIT(?)

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: V FNT SL MLKY BLU-WHT

CUT RESIDUE: CLR W/ A V FNT GRN-YELL FLUOR

CORE NO.: 2 DEPTH: 3126M RECOVERY: 2CM OVERPULL: 396 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK BRN-GY, IRREG TO SL CURRILINEAR FRAC, SFT TO HD, HOMOGENEOUS TEXTURE,M SLKY LUSTRE, NON CALC, TR SLTY, MOD ABUN V F DESS BLK ORG MAT AND OCC FRAG, MICMICA, TR PY STREAKS.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: MOD BRT TRANSP BL-WH

CUT RESIDUE: CLR W/A MOD BRT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 2 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 3 DEPTH: 3109.5M RECOVERY: 2.5 CM OVERPULL: 337 LB

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY-BRN, IRREG FRAC, SFT TO MOD HD, SUB FISS, TR CALC, TR SLT, MOD ABUN V THIN MICROBEDS (LESS THAN 1MM) OF SFT BLK GLOSSY COAL

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A BRT GOLD-YELL FLUOR

CORE NO.: 4 DEPTH: 3095M RECOVERY: 3.5 CM OVERPULL: 309 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY, BLKY TO SUB CONCH FRAC, HD, W IND AND SIL W/ A SLKY LUSTRE, NON CALC, MOD ABUN F DESS BLK ORG MAT.

ODOR: -

OIL FLUORESCENCE: PATCHY PINPOINT MOD BRT GRN-YELL

FLUORESCENCE OF CUT - BEFORE CRUSHING: MOD BRT SLW STRMG MLKY YELL

AFTER CRUSHING: MOD BRT SL MLKY. BLU-YELL

CUT RESIDUE: CLR W/A V FNT GOLD-YELL FLUOR

CONFIDENTIAL

CLASS 1

SWC RUN NO: 1 WELL: KOORKAH-1

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 5 DEPTH: 3081.5M RECOVERY: 2.5 CM OVERPULL: 409 LB

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: VERY CLAYEY SANDSTONE

DESCRIPTION: CRMY-WHT TO LT GY-WHT, F TO M GR, SUBANG - SUBRND, MOD W SRT, V SFT AND FRI, 35% WHT FLAKEY CLY, 15% WHT CALC, ABUN M TO DK GY LITHIC FRAG, OCC ORNG-BRN AND CLR MICA, MOD ABUN OF F DESS, FRAGS AND WISPS OF DK RD-BRN TO BLK ORG MAT. NO EFF POROSITY, 0-10% LOCALLY.

ODOR: - STAIN:LOCAL PATCHES OF BRN-BLK RESINOUS ORG MAT

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: V FNT, SL MLKY BLU-WHT

CUT RESIDUE: CLR W/ A V FNT GRN-YELL

CORE NO.: 6 DEPTH: 3062M RECOVERY: 3.5 CM OVERPULL: 1641 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY TO SL BRN-GY, IRREG FRAC, V HD, W IND AND SILC, SLKY LUSTRE; MOD SLTY, NON CALC, MOD ABUN F DESS BLK ORG MAT.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 4 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 7 DEPTH: 3030M RECOVERY: 2.5 CM OVERPULL: 468 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY, MOD SFT, SUB FISS, IRREG FRAC, NON CALC, FNT LINEATIONS, MOD ABUN V F DESS BLK ORG MAT, TR SLTY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: LOCAL MOD BRT MILKY GOLD-YEL STRMG

AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

CORE NO.: 8 DEPTH: 3019M RECOVERY: 3.5 CM OVERPULL: 811 LB.

LITHOLOGICAL TYPE: VERY CLAYEY SANDSTONE

DESCRIPTION: WHT, V F TO M GR OCC C GR, SUBANG, MOD W TO MOD PR SRT, V SFT AND FRI; 45% WHT CLY, 15% WHT ANG SLT, NON CALC, MOD ABUN CLY LITHIC CLASTS, MOD ABUN ORNG-BRN AND CLR MICA, LOCAL PATCHES OF BRN-BLK RESINOUS ORG MAT. NO EFF POROSITY, LOCALLY UP TO 15%.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 5 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 9 DEPTH: 3001M RECOVERY: 3.5 CM OVERPULL: 424 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TO DK BRN-GY, SFT, BLKY TO IRREG FRAC, SUBFISS, NONCALC, HOMOGENEOUS TEXTURE

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: PL SL MLKY BLU-WHT

AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT YELL-WHT FLUOR

CORE NO.: 10 DEPTH: 2959.5M RECOVERY: 3 CM OVERPULL: 582 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY, SFT, IRREG FRAC, GRITTY W/ ABUN CLR QTZ SLT, FNT LINEATIONS, ABUN V F DESS AND WISPS OF BLK ORG MAT, NON CALC.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 6 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 11 DEPTH: 2955M RECOVERY: 3 CM OVERPULL: 198 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: WHT TO LT GY-WHT, DOM V F TO F GR W/ OCC M GR AND ABUN SLT, SUBANG, MOD W SRT, V SFT AND FRI, 25% WHT CLY, MOD ABUN LT GY SMKY QTZ AND CLY LITHIC FRAG, ABUN ORNG-BRN AND CLR MICA, LOCALLY ABUN BRN-BLK FRAG AND WISPS OF RESINOUS TO COALY ORG MAT, EFF POROSITY 0 TO 15% LOCALLY.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 12 DEPTH: 2928M RECOVERY: 3.5 CM OVERPULL: 302 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M BRN-GY, SFT, FLAKEY, SUBFISS, IRREG FRAC, MOD SLTY, V ABUN MICMICA AND V F DESS AND WISPS OF BLKY ORG (COALY) MATERIAL, NON CALC

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT GOLD-YELL FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 7 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 13 DEPTH 2884M RECOVERY: 3 CM OVERPULL: 204 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: LT TO M GY, SFT, GRITTY, W/ 20% V F CLR ANG SLT, SUBFISS, ABUN LT TAN CLY CLASTS, SL CALC, MICMICA, V F DESS AND WISPS OF ORG MAT

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 14 DEPTH: 2858M RECOVERY: 2.5 CM OVERPULL: 1084 LB.

LITHOLOGICAL TYPE: SANDY CLAYSTONE

DESCRIPTION: M GY W/ V THIN BNDS OF WHT, SFT, IRREG FRAC, SUB FISS, FNT LINEATIONS, MOD ABUN V F SND EMBD AND V THIN LAM OF WHT, CLYEY V F GR SST, MOD ABUN V F DESS BLK ORG MAT.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: SPOTTY MOD BRT SLW STRMG MLKY YELL

- AFTER CRUSHING: DL TO MOD BRT SL MLKY BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-YELL FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 8 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 15 DEPTH: 2818M RECOVERY: 2.5 CM OVERPULL: 741 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: LT TAN-GY TO WHT, V F TO F GR W/ ABUN SLT AND OCC M GR, SUB-RND TO SUB ANG, MOD W SRT, V SFT AND FRI - 20% LT TAN-GY TO WHT CLY MTX, TR CALC IN PART, V ABUN ORNG-BRN AND CLR MICA, OCC LITHIC FRAG, MOD ABUN F DESS AND FRAGS OF RESINOUS TO COALY BLK ORG MAT.

ODOR: - STAIN: -

OIL FLUORESCENCE: PATCHY PINPOINT DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT SL MLKY YELL-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A V FNT GOLD-YELL FLUOR

CORE NO.: 16 DEPTH: 2794.5 RECOVERY: 2 CM OVERPULL: 562 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY AND ORGANIC RICH SANDSTONE

DESCRIPTION: LT GY WHT SST F INTERLAMINATED W/ A DK RD-BRN TO BLK ORG RICH BEDS. SST; DOM F GR W/ ABUN V F AND SLT, OCC M GR, SUBANG, MOD W SRT, V SFT AND FRI, 35% WHT CLY, SL CALC, ABUN ORNG-BRN AND CLR MICA, ABUN F DESS BLK ORG MAT. ORG LAM: DK RD-BRN TO BLK, FLAKEY AND RESINOUS TO COALY, SFT, ABUN CLR AND ORNG-BRN MICA.

ODOR: - STAIN: -

OIL FLUORESCENCE: BANDED EVEN DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: MOD BRT TRANSP BLU-WHT SLW STRMG

- AFTER CRUSHING: MOD BRT TO BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A MOD BRT GOLD-YELL

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 9 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 17 DEPTH: 2763.5M RECOVERY: 3 CM OVERPULL: 192 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TO DK BRN-GY W/ F LAM OF LT GY-WHT, V SFT, SUBFISS, FNT LINEATIONS AND ALIGNED V F BLK ORG MAT, SL SNDY AND SLTY, MICMICA, NON CALC, W LAM V F SNDY 30% WHT CLY, V SFT, SL CALC, ABUN SLT, MICMICA, MOD ABUN V F DESS DK RD-BRN TO BLK ORG MAT.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 18 DEPTH: 2756.9M RECOVERY: 2.5 CM OVERPULL: 120 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: LT GY-WHT, V F TO F GR W/ ABUN SLT, ANG, MOD W SRT, V SFT AND FRI, 30% WH CLY MTX, 15% CALC CMT, ABUN M GY RND LITHIC GR GIVING SALT AND PEPPER APPEAR, ABUN MICMICA, OCC PATCHES OF BRN-BLK ORG MAT, NO EFF VIS POR

ODOR: - STAIN: -

OIL FLUORESCENCE: EVEN PINPOINT DL TO MOD BRT ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 10 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO.: SCHLUMBERGER

CORE NO.: 19 DEPTH: 2727.9M RECOVERY: 2.5 CM OVERPULL: 95 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY AND ORGANIC RICH SANDSTONE

DESCRIPTION: LT GY-WHT W/ ABUN DK RD-BRN TO BLK LAM AND PATCHES, V F TO F GR, SUBANG TO SUBRND, MOD W SRT, MOD SFT TO MOD HD, 25% WHT CLY MTX AND TR CALC, ABUN BLK COALY TO RESINOUS ORG MAT AS INERSTITIAL FRAGS AND LAMINATIONS, MOD ABUN SLT, ABUN ORNG-BRN AND CLR MICA. NO EFF VIS POROSITY, LOCALLY UP TO 10%.

ODOR: - STAIN: -

OIL FLUORESCENCE: PATCHY PINPOINT DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: LOCAL MOD BRT SLW STRMG MLKY YELL

- AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT GOLD-YELL

CORE NO.: 20 DEPTH: 2676M RECOVERY: 2.5 CM OVERPULL: 45 LB.

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TO DK GY, MOD HD, SPLINTERY TO SUBCONC AND IRREG FRAG, FNT LINEATIONS; HOMOGENEOUS TEX, MICMICA? V F DESS BLK ORG MAT, SLKY LUSTRE, NON CALC

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 11 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO: 21 DEPTH: 2621M RECOVERY: 3 CM OVERPULL: 268 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SILTSTONE

DESCRIPTION: M GRY BLKY FRAC MOD CALC, F DISS BLK SPECS.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 22 DEPTH: 2610 RECOVERY: 4 CM OVERPULL: 566 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: LT GY-WHT, DOM F GR BUT ABUN V F AND M, SUBANG-SUBRND, MOD W SRT; MOD SFT AND FRI, W CMT (WHT CRM-WH CLY AND CALC), OCC LITHIC GR, LOCAL PATCHES OF BLK DESS AND WISPS OF ORG MAT. ABUN CLR AND ORNG-BRN MICA. NO VIS POROSITY IN GENERAL, LOCALLY TO 15%.

ODOR: - STAIN: -

OIL FLUORESCENCE: TR PINPOINT DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 12 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO.: SCHLUMBERGER

CORE NO.: 23 DEPTH: 2603M RECOVERY: 3 CM OVERPULL: 158 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: LT GY-WHT, V F TO F GR, OCC M, SUBANG, MOD W SRT, V SFT AND FRI, 35% WHT CLY MTX, 10% CALC, ABUN SLT, MOD ABUN LITHIC FRAG AND GR, OCC BLK ORG FRAG, ABUN CLR MICA, GEN NO EFF POROSITY, LOCALLY TO 10%

ODOR: - STAIN: -

OIL FLUORESCENCE: EVEN PINPOINT DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: LOCAL MOD BRT SLW STRMG BLU-YELL

- AFTER CRUSHING: FNT SL MLKY YELL-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

CORE NO.: 24 DEPTH: 2555M RECOVERY: 3 CM OVERPULL: 111 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY, MOD SFT AND WAXY, IRREG TO SPLINTERY FRAC, FNT LINEATIONS, HOMOGENEOUS TEX, SLKY LUSTRE, NON CALC, ABUN V F DESS BLK ORG MAT, SL SLTY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 13 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO.: SCHLUMBERGER

CORE NO.: 25 DEPTH: 2465.5M RECOVERY: 3.5 CM OVERPULL: 492 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY-BRN, MOD SFT, IRREG FRAC, FNT LINEATIONS, NON CALC, ABUN MICMICA AND MICROCARB.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A DL BLU-WHT FLUOR

CORE NO.: 26 DEPTH: 2440M RECOVERY: 3.5 CM OVERPULL: 585 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: CRM-WHT, F GR, SUBRND-SUBANG, MOD W SRT, MOD SFT AND FRI, OCC M GR SND AND OCC SLT, SND GR DOM CLR AND OCC MLKY QTZ, 10% CLY MTX, SL CALC, ABUN THIN LAM (1 MM OR LESS IN THICKNESS) OF RESINOUS TO COALY MAT-DK RD-BRN TO BLK.
GEN 5-10% POROSITY, LOCALLY UP TO 20%

ODOR: - STAIN: TR (?) LT BRN PATCHY

OIL FLUORESCENCE: PATCHY PINPOINT DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: MOD BRT SLW TRANSP BLU-WHT

- AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A DL GOLD-YELL FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 14 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 27 DEPTH: 2349M RECOVERY: 4 CM OVERPULL: 425 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK BRN-GY, MOD SFT TO MOD HD, FIRM, SUB FIS W/ IRREG FRAC, HOMOGENEOUS TEX, V F MICROCARB, NON CALC

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

CORE NO.: 28 DEPTH: 2305.5M RECOVERY: NO REC. OVERPULL:1617 LB.

CORE CONDITION: - CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: -

DESCRIPTION: NO RECOVERY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 15 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO.: SCHLUMBERGER

CORE NO.: 29 DEPTH: 2297.5M RECOVERY: 3.5 CM OVERPULL: 669 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TAN-WHT, F TO M GR, ANG, MOD PR SRT, MOD SFT TO MOD HD, ABUN WHT CLY (10%), CLR TO MLKY QTZ, V CALC (10-15%), ABUN CLR ARG SLT, ABUN CLR MICA, MOD ABUN CARB WISPS; 5-15% VIS POROSITY.

ODOR: - STAIN: V LT BRN PATCHY(?)

OIL FLUORESCENCE: PATCHY DL ORNG

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: TR

CORE NO.: 30 DEPTH: 2266.4M RECOVERY: 5 CM OVERPULL: 210 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY-BRN, HD, SUBFISS, BLKY TO PLATY FRAC, NON CALC, MOD ABUN SLT, HOMOGENEOUS TEX, OCC V F BLK DESS ORG MAT.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: PATCHY BRT SLW STRMG MLKY YELL

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CH W/ A FNT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 16 OF 28

DATE: DECEMBER 22, 1986 GEOLOGIST: B.F. WHEELER

SERVICE CO.: SCHLUMBERGER

CORE NO.: 31 DEPTH: 2241M RECOVERY: 4.5 CM OVERPULL: 155 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY-BRN, MOD HD, SPLINTERY TO IRREG FRAC, WAXY, SLKY LUSTRE, MICMICA, HOMOGENEOUS TEX, OCC V F BLK DESS ORG MAT

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT GOLD-YELL FLUOR

CORE NO.: 32 DEPTH: 2213M RECOVERY: 4 CM OVERPULL: 1488LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY, MOD SFT TO MOD HD, SUBFISS, IRREG FRAC, FNT LINEATIONS, V THIN BNDS OF LT GY-WHT V F GR SND AND WISPS OF BLK ORG (COALY) MAT, TR SLTY, V F MICMICA, ABUN V F DESS BLK ORG MAT, NON CALC

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: TR PATCHY MOD BRT MLKY-YELL V SLW STRMG

- AFTER CRUSHING: TR TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A TR BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 17 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 33 DEPTH: 2200M RECOVERY: 2.5 CM OVERPULL: 218 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: CRMY-WH, F TO M GR, SUBANG-SUBRND, MOD W SRT, V SFT AND FRI, V CLYEY (25% WH CLY MTX), V SLTY (15% SLT), DOM CLR QTZ, MOD ABUN F GR LITHIC FRAG, TR CALC, OCC LOCAL PATCHES OF TAN-GY ARG MAT AND ORG MAT. LOCAL VIS POROSITY 15-20%, GEN POOR (LESS THAN 10%) BECAUSE OF CLY CONTENT.

ODOR: - STAIN: TR PATCHY V LT STRW(?)

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 34 DEPTH: 2196.5M RECOVERY: 3 CM OVERPULL: 203 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: WH, DOM M GR W/ ABUN F AND V F, ANG, MOD PR TO MOD W SRT, V SFT AND FRI, MOD ABUN WHT CLY MTX, NON CALC, ABUN CLR MICA, ABUN SLT, OCC
LOCAL PATCHES OF DK-BRN BLK RESINOUS TO COALY ORG MAT; POROSITY VARIES FROM 10% TO LOCALLY 25%.

ODOR: - STAIN: TR PATCHY V LT STRAW(?)

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 18 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 35 DEPTH: 2181M RECOVERY: 4.5 CM OVERPULL: 668 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD:

LITHOLOGICAL TYPE: SANDSTONE WITH CLAYSTONE LAMINATIONS

DESCRIPTION: LT GY-WHT, F GR, ANG, W SRT, FIRM BUT EASILY FRI, DOM CLR TO MLKY QTZ. MOD W CMT W/ WHT CLY (10%), TR CALC AND SL SILC, AND LOCAL PATCHES AND F LAM OF GY-TAN TO GRN-GY ARG MAT AND ABUN DK RD-BRN TO BLK WISPS AND LAM OF RESINOUS TO COALY ORG MAT, OCC MICA AND LITHIC CLASTS. 1/2 CM LAM OF M ORNG-TAN CLST, V HD, BRITT, SILC AND SL DOL, TR SNDY, SST VIS POROSITY GEN 20-25%.

ODOR: - STAIN: TR PINPOINT PATCHES OF BRN-BLK

OIL FLUORESCENCE: - PYROBIT(?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

CORE NO.: 36 DEPTH: 2160M RECOVERY: 4.5 CMS OVERPULL: 1449 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK GY-BRN, IRREG TO SL SPLINTERY AND SUBCONC FRAC; MOD HD TO HD, SLKY LUSTRE, WAXY SURFACE, NON CALC, SL SLTY, MOD ABUN MICMICA, ABUN V F BLK ORG MAT, MOD ABUN F PY NODULES

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 19 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 37 DEPTH: 2146M RECOVERY: 4 CM OVERPULL: 619 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TAN WHT, DOM M GR W/ OCC F AND C, ANG TO SUBANG, DOM MOD W SRT, MOD FIRM BUT V FRI, 5-10%, LT TAN TO WHT CLY AND CALC CMT, LOCAL PATCHES OF ARG MAT, THIN LAM (LESS THAN 2MM) OF DK GY SFT CLY, OCC LITHIC CLASTS, OCC SLTY, V F DESS AND WISPS OF SLT BLK ORG MAT, 25-30% VIS POROSITY

ODOR: - STAIN: MOD ABUN V F BLK RESINOUS PATCHES

OIL FLUORESCENCE: TR PINPOINT DL ORNG (MINERAL?) OF PYROBIT (?),PATCHES OF V LT STRW STN (?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: TR PINPOINT MOD BRT MLKY YELL V SLW STRMG

- AFTER CRUSHING: V FNT SL MLKY GOLD-YELL

CUT RESIDUE: CLR W/ A TR GOLD-YELL FLUOR

CORE NO.: 38 DEPTH: 2135M RECOVERY: 4.5 CM OVERPULL: 689 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: M GY MOTTLED W/ WH, DOM F GR W/ OCC M TO C, DOM SUBANG, GEN W SRT, FIRM BUT V FRI, 10% CLY CMT, NON CALC, ABUN V F ANG SLT, ABUN CLR MICA, V ABUN SFT BLK ORG CLY AS MTX AND DISCRETE BLEBS GIVING ROCK A DK APPEARANCE. GEN 15% VIS POROSITY W/ LOCALLY UP TO 25%.

ODOR: - STAIN: ABUN SFT BLK ORG CLY IN MTX AND SURROUNDING SND GR

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: TR V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 20 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 39 DEPTH: 2127.5M RECOVERY: 2.5 CM OVERPULL: 315 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: GABBRO

DESCRIPTION: MOTTLED WHT, LT AND DK GRN, RD-BRN AND BLK, F TO M XTLN, HIGHLY ALTERED, DOM WHT MLKY TO CLR FELD AND DK GRN PYROX W/ ABUN GRN-BRN AMPHIBOLE; ABUN CHLORITES AS ALTERATION PRODUCTS, SFT (FROM DRLG FLUID) TO V HD (FRESH), SL CALC.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 40 DEPTH: 2083M RECOVERY: 5 CM OVERPULL: 1823 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: BLK, MOD SFT TO MOD HD, SUBFISS, STRIATED, V ORG RICH, ABUN MICA, OCC F WISPS OF SNDY GY CLST, MOD SLTY; NONCALC

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: TR V V FNT TRANSP BLU-WHT

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 21 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 41 DEPTH: 2070M RECOVERY: 5 CM OVERPULL: 2198 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TAN-GY, F TO M GR, SUBANG-SUBRND, W SRT, V SFT AND FRI, 20% LT TAN CLY MTX, NONCALC, ABUN VF CLR QTZ SLT. 10-15% VIS POROSITY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: TR V PL TRANSP BLU-WHT

- AFTER CRUSHING: TR V V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A V FNT BLU-WHT FLUOR

CORE NO.: 42 DEPTH: 2037M RECOVERY: NO RECOVERY OVERPULL: 1796 LB.

CORE CONDITION: CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE:

DESCRIPTION: NO RECOVERY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 22 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 43 DEPTH: 2031M RECOVERY: 4.5 CM OVERPULL: 1031 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TAN, F TO M GR, SUBANG- SUBRND, W SRT, V SFT AND FRI, 5-10%
LT TAN CLY MTX, 15% V F QTZ SLT, THIN WISPY LAM OF SFT BLK RESINOUS TO COALY ORG MAT, OCC MICA, NONCALC, 15-25% VIS POROSITY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 44 DEPTH: 1972.4 M RECOVERY: 3.5 CM OVERPULL: 1982 LB

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TAN BRN, BLKY AND SUBFISS W/ W DEVELOPED LINEATIONS, MOD HD, SL CALC AND V DISP IN 10% HCL, V THIN LAM OF LT GY-CRM SNDY CLST, ABUN V F DESS M BRN ORG MAT

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT TRANSP BLU-WHT

- AFTER CRUSHING: MOD BRT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A MOD BRT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 23 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 45 DEPTH: 1910M RECOVERY: 4 CM OVERPULL: 272 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TAN BRN, F INTERLAM W/ WHT, SUBFISS W/ W DEVELOPED LINEATIONS MOD SFT, BRN HAS ABUN V F DESS M BRN ORG MAT, WHT IS V F SNDY (30%), MOD ABUN MICMICA, TR CALC AND V. DISP IN 10% HCL, 20% SLTY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT - TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A MOD BRT BLU-WHT FLUOR

CORE NO.: 46 DEPTH: 1904.9M RECOVERY: 5.5 CM OVERPULL: 1249 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYEY SANDSTONE

DESCRIPTION: LT TAN BRN, DOM M AND F GR, SUBRND QTZ, PR SRT, V SFT, FRI AND DISP IN 10% HCL, 40-50% LT TAN-BRN CLY AND SL CALC MTX, ABUN V F QTZ, SLT, OCC V HD SIL CHERTY NODULES, OCC C GR QTZ, OCC M BRN F DESS ORG MAT, ABUN CLR MICA GEN LESS THAN 5% VIS POROSITY W/ LOCAL FRAG TO 15%

ODOR: - STAIN: -

OIL FLUORESCENCE: PATCHY DL ORNG (MINERAL?)

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT SLW STRMG YELL-WHT

- AFTER CRUSHING: MOD BRT SL MLKY YELL-WHT

CUT RESIDUE: CLR W/ A V FNT DL GOLD-YELL FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 24 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 47 DEPTH: 1850.4M RECOVERY: 4 CM OVERPULL: 191 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M TAN BRN, SUBFISS TO SPLINTERY, W DEVELOPED LINEATIONS, HD AND W INDURATED, SLKY LUSTRE, ABUN M BRN V F DESS ORG MAT, AND V ABUN LT BRN MICA ALIGNED ALONG LINEATION PLANES, MOD ABUN SLT, SL CALC AND MOD DISP IN 10% HCL BREAKING INTO TINY FLAKES. THIN INTERLAM OF SFT, WHT SNDY CLST.

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: SLW MOD BRT SL MLKY BLU-WHT

- AFTER CRUSHING: MOD BRT SL MLKY BLU-WHT

CUT RESIDUE: CLR W/ A MOD BRT BLU-WHT FLUOR

CORE NO.: 48 DEPTH: 1801M RECOVERY: 4.5 CM OVERPULL: 177 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY-BRN, IRREG FRAC, SUBFISS W/ PRLY DEVELOPED LINEATIONS, MOD SFT TO MOD HD, NONCALC BUT V DISP IN 10% HCL, 15%, V F SLT, OCC V F SND, ABUN MICMICA, MOD ABUN V F DESS ORG MAT, OCC FINE WISPS AND MOTTLING OF WHT CLY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A V FNT BLU-WHT FLUOR

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 25 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 49 DEPTH: 1779M RECOVERY: 4 CM OVERPULL: 242 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE WITH THIN LAMINATIONS OF CLAYEY SANDSTONE

DESCRIPTION: LT GY-TAN TO M TAN-BRN AND LT-GY-WHT (SST), W LAM AND SUBFISS, SFT, CLST W/ ABUN V F ORG MAT AND THIN RESINOUS TO COALY BNDS, NONCALC BUT V DISP IN 10% HCL, SST V F GR TO SLT, 40% WHT CLY, NONCALC AND DISP, ABUN V F MICA

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: V FNT TRANSP BLU-WHT

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A TR BLU-WHT FLUOR

CORE NO.: 50 DEPTH: 1748.4M RECOVERY: 4 CM OVERPULL: 554 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TAN, F FR, SUBANG, W SRT, V SFT AND FRI, 20% LT TAN CLY, NONCALC, OCC F MICA, OCC V F DK RD-BRN RESINOUS BLEBS OF PYROBIT(?), 25% VIS POROSITY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO: 1 WELL: KOORKAH-1 PAGE 26 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 51 DEPTH: 1702M RECOVERY: 4 CM OVERPULL: 759 LB.

CORE CONDITION: BROKEN CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: DK BRN, SFT, WAXY, IRREG FRAC, NON TO TR CALC, V HOMOGENEOUS

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: V FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A MOD BRT BLU-WHT FLUOR

CORE NO.: 52 DEPTH: 1655M RECOVERY: 4 CM OVERPULL: 890 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: CLAYSTONE

DESCRIPTION: M GY-BRN, V FIRM, WAXY SURFACE, IRREG FRAG, NON CALC BUT V DISP IN 10% HCL, MOD SLTY, OCC V F LAM OF LT GY-WHT CLST, ABUN V F MICROCARB

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: FNT TRANSP BLU-WHT

- AFTER CRUSHING: FNT TRANSP BLU-WHT

CUT RESIDUE: CLR W/ A FNT BLU-WHT FLUOR

SWC RUN NO.1 WELL: KOORKAH-1 PAGE 27 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 53 DEPTH:1636M RECOVERY: NO REC. OVERPULL: 1453 LB.

CORE CONDITION: CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: -

DESCRIPTION: NO RECOVERY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

CORE NO.: 54 DEPTH: 1615.5M RECOVERY: 4 CM OVERPULL: 1839 LB.

CORE CONDITION: INTACT CONTAMINATION BY DRILLING MUD: -

LITHOLOGICAL TYPE: SANDSTONE

DESCRIPTION: LT TO M TAN-BRN, F TO M GR, ANG TO SUBRND, MOD W TO PR, SRT; V SFT AND FRI, 25% LT TAN CLY, NONCALC BUT V DISP IN 10% HCL, ABUN F QTZ SLT, OCC LT GRN GR OF GLAUC, MOD ABUN LT TAN MICA, OCC PATCHES OF V F DK-BRN RESINOUS SPECS. 20-25% VIS POROSITY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING:-

- AFTER CRUSHING: -

CUT RESIDUE: -

SWC RUN NO.1 WELL: KOORKAH-1 PAGE 28 OF 28

DATE: DECEMBER 22, 1985 GEOLOGIST: B.F. WHEELER

SERVICE CO: SCHLUMBERGER

CORE NO.: 55 DEPTH:1605M RECOVERY: NO REC. OVERPULL: 1482 LB.

CORE CONDITION: CONTAMINATION BY DRILLING MUD:

LITHOLOGICAL TYPE:

DESCRIPTION: NO RECOVERY

ODOR: - STAIN: -

OIL FLUORESCENCE: -

FLUORESCENCE OF CUT - BEFORE CRUSHING: -

- AFTER CRUSHING: -

CUT RESIDUE: -

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APPENDIX 3

DIPMETER SUMMARY

KOORKAH -1

STRUCTURAL DIP

The high resolution dipmeter (HDT) was run over the interval 1589.0 to 3152.0 meters in Koorkah-1. It was processed using the Schlumberger Cluster Program with a correlation interval of 1.0 meter, a step distance of 0.5 meter and a 35 degree search angle.

Structural dip data was interpreted only where good consistent data were present in the very fine grained to clay sequences. Discrete packages of dip orientations throughout the logged portion (azimuths and magnitudes) are plotted on the Composite Well Log (Enclosure 3). A listing is made below.

Structural Dip

Interval (mRKB)	Magnitude (degrees)	Azimuth
1842-1845	1-2	31 degrees E
1950-1953	2	37 degrees E
2398-2402	3	24 degrees W
2500-2504	2	34 degrees W
2545-2551	2	37 degrees W
2680-2685	1	88 degrees W
3025-3032	3-4	N 5 degrees E

The structural dips have a low magnitude and azimuth which in general is consistent with the structural interpretation of the Koorkah-1 feature to 2690 meters (RKB). At 2690 meters the intra-Late Cretaceous unconformity based on the sharp increase in dip magnitude and azimuth. However, it must be borne in mind that the data quality is poor below this unconformity, being a function of friable sands and hole washout.

APPENDIX-4

LOG ANALYSIS

KOORKAH-1

SUMMARY

No significant hydrocarbon shows were encountered during the drilling of the Koorkah-1 well. For this reason, no conventional cores were cut and no RFT's or DST's were carried out. To provide information on porosity and water saturation values for comparison with other Bass Basin wells, the interval from 1600-3133 meters was analysed utilizing Amoco's computerized in-house techniques. A Schlumberger cyberlook evaluation (Enclosure 8) was made from 1600m to total depth. The analyses confirmed that no zones indicating recoverable hydrocarbons were present in the Koorkah-1 well.

LOG QUALITY

The general quality of the Koorkah-1 logs received in this office is good. Exceptions to the above are found in the Dipmeter and the Neutron-Density log in intervals of rugose hole.

Anomalous sonic responses are noted over the following intervals and are probably due to cycle skipping:

6545'-6548'	(1994.9-1995.9 meters)
7078'-7083'	(2157.4-2158.9 meters)
7815'-7818'	(2382.0-2383.0 meters)
7843'-7846'	(2390.6-2391.5 meters)
8005'-8008'	(2440.0-2440.9 meters)

The tension signal on the LDT survey was interrupted over the 8149'-8179' (2483.8-2493.0 meters) interval.

The dipmeter tension curve shows the tool to be frequently sticking over the 7348'-10334' (2239.7-3149.8 meters) interval.

INTERPRETATION

The gross 5250' - 10280' (1600.2-3133.4 meters) interval is interpreted as wet. Minor occurrences of hydrocarbons are calculated at water saturations predominantly ranging from 80% to 100%. These zones are mostly associated with badhole conditions, bed boundary effects, and possible thin beds of coal.

Coal beds are interpreted in the following intervals:

5827'-5830'	(1776.1-1777.0 meters)
5846'-5848'	(1781.9-1782.5 meters)
6302'-6303'	(1920.9-1921.2 meters)
6509'-6515'	(1984.0-1985.8 meters)

The well was divided into five zones for processing.

Zone 1:	5250.0' - 6878.5'	(1600.2-2096.6 meters)	
Zone 2:	6879.0' - 6987.5'	(2096.7-2129.8 meters	- igneous interval)
Zone 3:	6988.0' - 7377.5'	(2130.0-2248.7 meters)	
Zone 4:	7378.0' - 8320.5'	(2248.8-2536.1 meters)	
Zone 5:	8321.0' - 10280.0'	(2536.3-3133.4 meters)	

The Reservoir Summary Tables (Attachment 1) tabulate meters of interpreted sandstone passing the indicated porosity and water saturation cutoffs.

Average porosity, water saturation, and volume of shale is listed in Attachment 2 for interpreted sandstone. Intervals less than a foot (0.3 meters) thick are not listed.

Attachment 3 summarizes the parameters used in processing.

ATTACHMENT NO. 1

RESERVOIR SUMMARY TABLE

WELL: KOORKAH NO. 2

INTERVAL TOP = 1600.2
INTERVAL BASE = 2096.4

	POROSITY						
	=> 5%	=> 10%	=> 15%	=> 20%	=> 25%	=> 30%	=> 35%
SW <= 10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 50%	0.3	0.3	0.3	0.3	0.3	0.0	0.0
SW <= 60%	0.3	0.3	0.3	0.3	0.3	0.0	0.0
SW <= 70%	0.3	0.3	0.3	0.3	0.3	0.0	0.0
SW <= 80%	0.3	0.3	0.3	0.3	0.3	0.0	0.0
SW <= 90%	0.9	0.9	0.9	0.9	0.3	0.0	0.0
SW <= 100%	91.1	91.1	86.3	64.3	30.8	5.2	0.0

INTERVAL TOP = 2096.7 (Igneous interval)
INTERVAL BASE = 2129.7

	POROSITY						
	=> 5%	=> 10%	=> 15%	=> 20%	=> 25%	=> 30%	=> 35%
SW <= 10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 60%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 70%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 80%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 90%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: 1. The symbol "<=" represents less than or equal to.
2. The symbol "=>" represents greater than or equal to.
3. Meters of interpreted sandstone tabulated for VSH <= 35%.

ATTACHMENT NO. 1 (cont'd)

RESERVOIR SUMMARY TABLE

WELL: KOORKAH NO. 2

INTERVAL TOP = 2130.0
INTERVAL BASE = 2248.5

	POROSITY						
	=> 5%	=> 10%	=> 15%	=> 20%	=> 25%	=> 30%	=> 35%
SW <= 10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 60%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 70%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 80%	0.6	0.6	0.6	0.3	0.0	0.0	0.0
SW <= 90%	1.5	1.5	1.2	0.3	0.0	0.0	0.0
SW <= 100%	53.0	51.2	39.6	20.7	2.7	0.0	0.0

INTERVAL TOP = 2248.8
INTERVAL BASE = 2536.0

	POROSITY						
	=> 5%	=> 10%	=> 15%	=> 20%	=> 25%	=> 30%	=> 35%
SW <= 10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 60%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 70%	0.3	0.3	0.3	0.3	0.3	0.0	0.0
SW <= 80%	1.8	1.8	1.8	1.2	0.3	0.0	0.0
SW <= 90%	3.7	3.7	3.7	1.5	0.3	0.0	0.0
SW <= 100%	17.1	15.4	9.5	1.5	0.3	0.0	0.0

Note: 1. The symbol "<=" represents less than or equal to.
2. The symbol "=>" represents greater than or equal to.
3. Meters of interpreted sandstone tabulated for VSH <= 35%.

ATTACHMENT NO. 1 (cont'd)

RESERVOIR SUMMARY TABLE

WELL: KOORKAH NO. 2

INTERVAL TOP = 2536.0
INTERVAL BASE = 3133.4

	POROSITY						
	=> 5%	=> 10%	=> 15%	=> 20%	=> 25%	=> 30%	=> 35%
SW <= 10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 20%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 30%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 40%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 50%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 60%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 70%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 80%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 90%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW <= 100%	9.1	2.4	0.0	0.0	0.0	0.0	0.0

Note: 1. The symbol "<=" represents less than or equal to.
2. The symbol "=>" represents greater than or equal to.
3. Meters of interpreted sandstone tabulated for VSH <= 35%.

ATTACHMENT NO. 2

AUSTRALIA WELL KOORKAH NO. 2

AVERAGE RESERVOIR PARAMETERS
FOR
INTERPRETED INTERVALS OF SANDSTONE

TOP METER	BOTTOM METER	THICK METER	TOP FEET	BOTTOM FEET	THICK FEET	AVERAGE VSH %	AVERAGE PHI %	AVERAGE SW %
1613.02	1614.09	1.07	5292.00	5295.50	3.50	16.50	27.20	98.30
1615.15	1616.37	1.22	5299.00	5303.00	4.00	9.80	29.50	98.10
1617.14	1618.81	1.68	5305.50	5311.00	5.50	13.90	26.70	100.00
1619.27	1621.56	2.29	5312.50	5320.00	7.50	11.40	27.60	100.00
1622.77	1624.30	1.52	5324.00	5329.00	5.00	18.50	22.90	100.00
1624.60	1625.67	1.07	5330.00	5333.50	3.50	24.60	21.70	100.00
1628.72	1629.02	0.30	5343.50	5344.50	1.00	31.20	18.40	99.10
1629.18	1629.63	0.46	5345.00	5346.50	1.50	31.20	18.40	99.10
1631.46	1633.90	2.44	5352.50	5360.50	8.00	23.00	21.30	100.00
1634.51	1643.35	8.84	5362.50	5391.50	29.00	4.80	25.30	100.00
1643.81	1646.24	2.44	5393.00	5401.00	8.00	18.60	20.60	100.00
1746.83	1747.59	0.76	5731.00	5733.50	2.50	17.80	23.30	100.00
1747.90	1750.64	2.74	5734.50	5743.50	9.00	6.30	23.80	100.00
1750.94	1752.01	1.07	5744.50	5748.00	3.50	21.10	19.40	100.00
1767.71	1768.01	0.30	5799.50	5800.50	1.00	30.20	14.90	100.00
1782.80	1783.71	0.91	5849.00	5852.00	3.00	22.60	18.30	100.00
1784.02	1787.22	3.20	5853.00	5863.50	10.50	17.20	21.10	100.00
1794.84	1795.29	0.46	5888.50	5890.00	1.50	30.40	18.50	93.90
1807.03	1807.94	0.91	5928.50	5931.50	3.00	29.50	18.20	100.00
1809.77	1811.60	1.83	5937.50	5943.50	6.00	23.60	19.80	100.00
1811.91	1815.26	3.35	5944.50	5955.50	11.00	12.20	23.80	100.00
1816.48	1818.31	1.83	5959.50	5965.50	6.00	12.80	22.50	100.00
1839.19	1839.49	0.30	6034.00	6035.00	1.00	31.60	16.30	100.00
1845.74	1846.81	1.07	6055.50	6059.00	3.50	10.70	22.60	100.00
1848.94	1849.24	0.30	6066.00	6067.00	1.00	30.40	18.70	92.50
1854.43	1854.88	0.46	6084.00	6085.50	1.50	18.80	23.20	100.00
1855.04	1856.25	1.22	6086.00	6090.00	4.00	18.80	23.20	100.00
1858.69	1859.46	0.76	6098.00	6100.50	2.50	21.70	15.00	100.00
1861.28	1861.74	0.46	6106.50	6108.00	1.50	25.40	13.30	100.00
1865.70	1866.62	0.91	6121.00	6124.00	3.00	8.40	21.60	100.00
1868.75	1869.06	0.30	6131.00	6132.00	1.00	30.30	16.70	96.20
1869.97	1870.58	0.61	6135.00	6137.00	2.00	24.20	17.30	97.40
1880.33	1881.25	0.91	6169.00	6172.00	3.00	14.90	16.40	100.00
1882.32	1883.08	0.76	6175.50	6178.00	2.50	16.70	21.20	100.00
1885.36	1886.13	0.76	6185.50	6188.00	2.50	25.40	17.30	97.20

ATTACHMENT NO. 2
(cont'd)

AUSTRALIA WELL KOORKAH NO. 2

AVERAGE RESERVOIR PARAMETERS
FOR
INTERPRETED INTERVALS OF SANDSTONE

TOP METER	BOTTOM METER	THICK METER	TOP FEET	BOTTOM FEET	THICK FEET	AVERAGE VSH %	AVERAGE PHI %	AVERAGE SW %
1889.33	1890.24	0.91	6198.50	6201.50	3.00	19.80	21.30	100.00
1891.15	1892.22	1.07	6204.50	6208.00	3.50	20.50	18.70	100.00
1893.14	1894.35	1.22	6211.00	6215.00	4.00	23.00	14.90	100.00
1900.91	1901.67	0.76	6236.50	6239.00	2.50	24.00	14.80	100.00
1905.63	1908.38	2.74	6252.00	6261.00	9.00	18.30	16.00	100.00
1915.39	1916.61	1.22	6284.00	6288.00	4.00	13.60	19.80	100.00
1916.76	1918.89	2.13	6288.50	6295.50	7.00	13.60	19.80	100.00
1932.61	1933.67	1.07	6340.50	6344.00	3.50	16.80	17.70	99.30
1945.26	1945.87	0.61	6382.00	6384.00	2.00	22.10	18.80	99.90
1946.93	1947.24	0.30	6387.50	6388.50	1.00	30.00	17.80	96.20
1984.88	1985.19	0.30	6512.00	6513.00	1.00	18.70	27.20	45.20
1994.64	1995.09	0.46	6544.00	6545.50	1.50	26.90	21.80	88.30
2010.94	2011.40	0.46	6597.50	6599.00	1.50	17.70	20.70	100.00
2018.56	2019.02	0.46	6622.50	6624.00	1.50	20.70	19.30	87.80
2029.23	2035.17	5.94	6657.50	6677.00	19.50	2.30	24.00	100.00
2043.86	2045.99	2.13	6705.50	6712.50	7.00	10.90	21.70	100.00
2047.52	2047.98	0.46	6717.50	6719.00	1.50	30.90	17.30	100.00
2051.48	2053.92	2.44	6730.50	6738.50	8.00	12.70	25.90	100.00
2055.44	2056.36	0.91	6743.50	6746.50	3.00	22.10	25.30	100.00
2065.81	2066.57	0.76	6777.50	6780.00	2.50	13.00	20.70	100.00
2068.55	2081.20	12.65	6786.50	6828.00	41.50	3.40	28.50	100.00
2092.02	2093.70	1.68	6863.50	6869.00	5.50	15.30	17.80	100.00
2094.15	2095.68	1.52	6870.50	6875.50	5.00	11.00	19.10	100.00
2132.10	2133.63	1.52	6995.00	7000.00	5.00	16.20	17.00	100.00
2134.08	2140.64	6.55	7001.50	7023.00	21.50	9.60	22.70	100.00
2142.01	2142.62	0.61	7027.50	7029.50	2.00	23.20	22.80	99.00
2145.67	2147.49	1.83	7039.50	7045.50	6.00	16.70	24.00	99.80
2148.87	2149.17	0.30	7050.00	7051.00	1.00	32.70	19.80	88.00
2149.78	2152.98	3.20	7053.00	7063.50	10.50	23.80	22.10	97.50
2154.50	2157.55	3.05	7068.50	7078.50	10.00	19.90	20.80	99.40
2175.69	2176.60	0.91	7138.00	7141.00	3.00	21.00	18.90	100.00
2179.96	2180.26	0.30	7152.00	7153.00	1.00	16.70	18.30	99.70
2180.41	2183.31	2.90	7153.50	7163.00	9.50	16.70	18.30	99.70
2183.61	2184.83	1.22	7164.00	7168.00	4.00	23.50	16.20	99.60
2185.59	2186.51	0.91	7170.50	7173.50	3.00	26.50	15.70	100.00
2189.71	2190.78	1.07	7184.00	7187.50	3.50	22.80	18.30	100.00

ATTACHMENT NO. 2
(cont'd)

AUSTRALIA WELL KOORKAH NO. 2

AVERAGE RESERVOIR PARAMETERS
FOR
INTERPRETED INTERVALS OF SANDSTONE

TOP METER	BOTTOM METER	THICK METER	TOP FEET	BOTTOM FEET	THICK FEET	AVERAGE VSH %	AVERAGE PHI %	AVERAGE SW %
2193.06	2193.67	0.61	7195.00	7197.00	2.00	23.40	16.30	100.00
2196.42	2196.87	0.46	7206.00	7207.50	1.50	24.40	12.10	100.00
2197.33	2197.79	0.46	7209.00	7210.50	1.50	28.40	12.50	100.00
2199.62	2201.14	1.52	7216.50	7221.50	5.00	7.40	20.10	100.00
2202.05	2202.66	0.61	7224.50	7226.50	2.00	22.30	18.10	96.40
2203.58	2206.32	2.74	7229.50	7238.50	9.00	13.50	22.40	100.00
2206.47	2207.08	0.61	7239.00	7241.00	2.00	13.50	22.40	100.00
2210.89	2211.35	0.46	7253.50	7255.00	1.50	28.70	13.80	89.20
2214.55	2215.31	0.76	7265.50	7268.00	2.50	11.80	19.40	75.30
2216.53	2217.45	0.91	7272.00	7275.00	3.00	23.30	13.40	100.00
2217.90	2227.20	9.30	7276.50	7307.00	30.50	17.20	13.30	99.80
2227.66	2234.36	6.71	7308.50	7330.50	22.00	9.50	17.60	99.80
2234.82	2236.65	1.83	7332.00	7338.00	6.00	8.10	16.80	100.00
2237.72	2238.17	0.46	7341.50	7343.00	1.50	22.10	12.00	100.00
2243.20	2243.66	0.46	7359.50	7361.00	1.50	30.10	11.30	100.00
2246.25	2247.32	1.07	7369.50	7373.00	3.50	20.80	15.80	96.20
2306.14	2306.60	0.46	7566.00	7567.50	1.50	11.40	16.80	95.10
2307.97	2308.43	0.46	7572.00	7573.50	1.50	16.60	12.50	100.00
2308.74	2310.41	1.68	7574.50	7580.00	5.50	18.50	9.70	100.00
2377.16	2378.38	1.22	7799.00	7803.00	4.00	16.00	11.00	100.00
2379.91	2380.21	0.30	7808.00	7809.00	1.00	21.30	13.30	100.00
2382.65	2383.26	0.61	7817.00	7819.00	2.00	10.30	15.90	96.40
2389.51	2390.27	0.76	7839.50	7842.00	2.50	9.80	18.50	93.20
2392.86	2393.47	0.61	7850.50	7852.50	2.00	16.80	14.70	94.50
2410.84	2411.30	0.46	7909.50	7911.00	1.50	17.90	11.00	100.00
2412.98	2413.74	0.76	7916.50	7919.00	2.50	6.90	16.80	88.90
2423.19	2425.48	2.29	7950.00	7957.50	7.50	9.40	16.80	99.70
2425.78	2428.37	2.59	7958.50	7967.00	8.50	3.90	17.60	96.90
2428.83	2430.66	1.83	7968.50	7974.50	6.00	12.90	14.70	99.70
2438.43	2440.72	2.29	8000.00	8007.50	7.50	9.00	20.50	78.80
2443.46	2443.92	0.46	8016.50	8018.00	1.50	18.10	16.60	80.70
2456.26	2456.57	0.30	8058.50	8059.50	1.00	17.20	12.40	100.00
2599.67	2602.11	2.44	8529.00	8537.00	8.00	36.90	9.40	100.00
2610.19	2610.49	0.30	8563.50	8564.50	1.00	37.80	8.40	100.00
2645.09	2645.39	0.30	8678.00	8679.00	1.00	42.00	9.50	100.00

ATTACHMENT NO. 2
(cont'd)

AUSTRALIA WELL KOORKAH NO. 2

AVERAGE RESERVOIR PARAMETERS
FOR
INTERPRETED INTERVALS OF SANDSTONE

TOP METER	BOTTOM METER	THICK METER	TOP FEET	BOTTOM FEET	THICK FEET	AVERAGE VSH %	AVERAGE PHI %	AVERAGE SW %
2700.56	2704.07	3.51	8860.00	8871.50	11.50	38.10	5.00	100.00
2705.13	2706.96	1.83	8875.00	8881.00	6.00	38.90	6.90	100.00
2717.02	2717.93	0.91	8914.00	8917.00	3.00	41.80	6.10	100.00
2718.85	2719.61	0.76	8920.00	8922.50	2.50	41.70	6.50	100.00
2719.92	2721.29	1.37	8923.50	8928.00	4.50	35.30	4.60	100.00
2721.59	2721.90	0.30	8929.00	8930.00	1.00	38.70	0.10	100.00
2722.81	2723.27	0.46	8933.00	8934.50	1.50	47.20	2.70	100.00
2723.57	2726.01	2.44	8935.50	8943.50	8.00	32.00	6.00	100.00
2746.59	2747.81	1.22	9011.00	9015.00	4.00	35.70	8.70	100.00
2751.77	2756.34	4.57	9028.00	9043.00	15.00	37.00	4.90	100.00
2756.80	2757.71	0.91	9044.50	9047.50	3.00	34.30	5.20	100.00
2758.47	2759.24	0.76	9050.00	9052.50	2.50	44.20	4.00	100.00
2759.54	2760.61	1.07	9053.50	9057.00	3.50	39.40	6.90	100.00
2979.30	2979.76	0.46	9774.50	9776.00	1.50	37.70	3.50	100.00
2980.22	2980.68	0.46	9777.50	9779.00	1.50	33.10	5.70	100.00
2982.50	2982.96	0.46	9785.00	9786.50	1.50	38.80	3.70	100.00
2984.33	2984.79	0.46	9791.00	9792.50	1.50	31.20	2.20	100.00
2996.22	2996.98	0.76	9830.00	9832.50	2.50	31.90	6.70	100.00
3008.41	3008.72	0.30	9870.00	9871.00	1.00	13.80	5.00	100.00
3055.20	3055.50	0.30	10023.50	10024.50	1.00	22.20	5.60	100.00
3055.81	3057.03	1.22	10025.50	10029.50	4.00	23.10	8.20	100.00
3076.54	3076.84	0.30	10093.50	10094.50	1.00	22.60	5.00	100.00
3090.56	3090.86	0.30	10139.50	10140.50	1.00	27.70	5.80	100.00

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AUSTRALIA KOORKAH - 1
********** JOB CONTROL PARAMETERS **********

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

********TOP OF COMPUTATION INTERVAL	=	525#. (16##.2 METERS)
********BOTTOM OF COMPUTATION INTERVAL	=	1#28#. (3133.4 METERS)
********COMPUTATION INCREMENT	=	#.5### (#.152 METERS)
********INTERPRETATION PROCEDURE	=	6.
********PLOT PRESENTATION	=	1.2###
********INPUT TAPEFILE	=	1277#.
********COMPUTED RESULTS STORED ON TAPEFILE	=	12771.

AUSTRALIA KOORKAH - 1
HOLE CONSTANTS AT TIME OF LOGGING

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

SURVEY NUMBER	=	2.
SURVEY TOP	=	52##. (1589.# METERS)
SURVEY BOTTOM	=	1#368. (316#.2 METERS)
BIT SIZE	=	12.25##
MUD WEIGHT	=	9.3###
MUD RESISTIVITY,MEASURED	=	#.887#
MUD TEMPERATURE	=	84.
MUD FILTRATE RESISTIVITY(RMF)	=	#.851#
MUD FILTRATE TEMPERATURE.	=	61.
MAXIMUM RECORDED TEMPERATURE	=	21#.

2770699

AUSTRALIA KOORKAH - 1
POROSITY AND WATER SATURATION PARAMETERS.

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

ZONE NUMBER	=	1.
ZONE TOP	=	5250. (1600.2 METERS)
ZONE BOTTOM	=	6878.5 (2096.6 METERS)
SW EQUATION NO.	=	6.
FORMATION FACTOR -A-	=	1.
CEMENTATION EXPONENT -M-	=	9.
WATER SATURATION EXPONENT -N-	=	2.
FORMATION WATER RESISTIVITY -RW-	=	0.1000
TEMP. OF FORM. WATER RESISTIVITY	=	144.
SXO=SW**X WHERE X	=	1.
SWB=VSH**Y WHERE Y	=	0.9000
AVG. MEAN SURFACE TEMP.	=	50.
*** FORMATION TEMPERATURE	=	143.5840
*** TEMPERATURE GRADIENT DEG/100 FT.	=	1.5432
*** RW AT FORMATION TEMPERATURE	=	0.1003
*** RMF AT FORMATION TEMPERATURE	=	0.3843
POROSITY MODEL	=	2.
MAXIMUM POROSITY	=	0.3500
COMPUTE SECONDARY POROSITY?	=	0.
MINERAL 1------- MATRIX DENSITY	=	2.6500
MINERAL 1--------HYDROGEN INDEX	=	0.
MINERAL 1--------TRANSIT TIME	=	55.7000
MINERAL 2--------MATRIX DENSITY	=	2.9800
MINERAL 2--------HYDROGEN INDEX	=	0.
MINERAL 2--------TRANSIT TIME	=	50.
MUD FILTRATE DENSITY	=	1.
*** MUD FILTRATE SALINITY	=	80797.7305
*** MUD FILTRATE DENSITY	=	1.0057
*** MUD FILTRATE HYDROGEN INDEX	=	0.9975
HYDROCARBON DENSITY	=	1.
*** HYDROCARBON HYDROGEN INDEX	=	1.
FLUID TRANSIT TIME	=	189.
BAD HOLE CONSTANTS MAXIMUM HOLESIZE	=	14.2500
MAXIMUM DENSITY CORR.	=	0.1500
SONIC LIMIT?(1=YES)	=	1.
DELTA T AT 0 POROSITY	=	0.
DELTA T AT 20% POROSITY	=	0.
DELTA T MATRIX	=	55.7000
DELTA T FLUID	=	189.

277070

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AUSTRALIA KOORKAH - 1
*****SHALE PARAMETERS*****
*****************************************************************************
*     SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS    *
*            ZONE NUMBER          =          1.                              *
*            ZONE TOP             =       5250. (1600.2 METERS)
*            ZONE BOTTOM          =   6878.5 (2096.6 METERS)
* SHALE PARAMETERS          RESISTIVITY              =          3.            *
*                           BOUND WATER-RWB          =          1.            *
*                           DENSITY                  =      2.5800            *
*                           NEUTRON POROSITY         =      0.2700            *
*                           TRANSIT TIME             =         97.            *
* SHALE INDICATORS      USE GAMMA RAY(1=YES)         =          0.            *
*                           GAMMA RAY-SHALE          =          0.            *
*                           GAMMA RAY-CLEAN          =          0.            *
*                       USE SP(1=YES)                =          0.            *
*                           SP -CLEAN                =          0.            *
*                           SP-SHALE                 =          0.            *
*                       USE NEUTRON-DENSITY(1=YES)=              1.            *
*                           NEUTRON PHI AT 2.70      =     -0.0700            *
*                           NEUTRON PHI AT 2.20      =      0.2300            *
*                       USE SONIC-DENSITY(1=YES)     =          0.            *
*                           TRANSIT TIME AT 2.70     =          0.            *
*                           TRANSIT TIME AT 2.20     =          0.            *
*                       USE NEUTRON-SONIC(1=YES)     =          0.            *
*                           TRANSIT TIME AT PHI=0    =          0.            *
*                           TRANSIT TIME AT PHI=20=              0.            *
*                       USE NEUTRON PHI (1=YES)      =          0.            *
*                           CLEAN FORMATION PHI      =          0.            *
*                       USE RT (1=YES)               =          0.            *
*                           MAXIMUM RT,CLEAN         =          0.            *
*                       USE M-N CROSS-PLOT (1=YES)=              0.            *
*                           POINT 1-  M              =      0.8200            *
*                                 -  N               =      0.6700            *
*                           POINT 2-  M              =      0.6500            *
*                                 -  N               =      0.8000            *
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277071

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AUSTRALIA KOORKAH - 1
LISTING OPTIONS,NET PAY CUTOFFS AND RECALIBRATION
*****************************************************************************
*     SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS  *
*          ZONE NUMBER     =          1.                                   *
*          ZONE TOP        =       5250. (1600.2 METERS)                   *
*          ZONE BOTTOM     =   6878.5 (2096.6 METERS)                      *
*  LISTINGS(1=YES)  LIST INPUT DATA          =          0.                 *
*                   LIST SHALE INDICATORS    =          0.                 *
*                   LIST ACTUAL CALCULATIONS=           0.                 *
*                   LIST NET PAY             =          0.                 *
*  PAY SUBJECT TO   POROSITY GREATER THAN    =      0.1000                 *
*                   SW LESS THAN OR EQUAL TO=           1.                 *
*                   VSHALE LESS THAN         =      0.5000                 *
*                   SW/SXO RATIO LESS THAN   =          1.                 *
*                   TOP OF PAY INTERVAL      =       5250. (1600.2 METERS) *
*                   BOTTOM OF PAY INTERVAL   =   6878.5 (2129.8 METERS)    *
*  LOG ADJUSTMENTS  DI FACTOR CNL TO DENSITY=           1.                 *
*                   OLD DENSITY-POINT 1      =          0.                 *
*                   NEW DENSITY-POINT 1      =          0.                 *
*                   OLD DENSITY-POINT 2      =          0.                 *
*                   NEW DENSITY-POINT 2      =          0.                 *
*                   OLD NEUTRON PHI-POINT 1 =           0.                 *
*                   NEW NEUTRON PHI-POINT 1 =           0.                 *
*                   OLD NEUTRON PHI-POINT 2 =           0.                 *
*                   NEW NEUTRON PHI-POINT 2 =           0.                 *
*                   OLD TRANSIT TIME-POINT 1=           0.                 *
*                   NEW TRANSIT TIME-POINT 1=           0.                 *
*                   OLD TRANSIT TIME-POINT 2=           0.                 *
*                   NEW TRANSIT TIME-POINT 2=           0.                 *
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CONFIDENTIAL
CLASS.1 27707?2

AUSTRALIA KOORKAH - 1
POROSITY AND WATER SATURATION PARAMETERS

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

	ZONE NUMBER	2.
	ZONE TOP	6879. (2096.7 METERS)
	ZONE BOTTOM	6987.5 (2129.8 METERS)
SW	EQUATION NO.	6.
	FORMATION FACTOR -A-	1.
	CEMENTATION EXPONENT -M-	9.
	WATER SATURATION EXPONENT -N-	2.
	FORMATION WATER RESISTIVITY -RW-	.1000
	TEMP. OF FORM. WATER RESISTIVITY	159.
	SXO=SW**X WHERE X	1.
	SWB=VSH**Y WHERE Y	.9000
	AVG. MEAN SURFACE TEMP.	50.
***	FORMATION TEMPERATURE	156.9945
***	TEMPERATURE GRADIENT DEG/100 FT.	1.5432
***	RW AT FORMATION TEMPERATURE	.1012
***	RMF AT FORMATION TEMPERATURE	.3529
POROSITY	MODEL	2.
	MAXIMUM POROSITY	.3500
	COMPUTE SECONDARY POROSITY?	0.
	MINERAL 1------- MATRIX DENSITY	2.6500
	MINERAL 1--------HYDROGEN INDEX	0.
	MINERAL 1--------TRANSIT TIME	55.7000
	MINERAL 2--------MATRIX DENSITY	2.9800
	MINERAL 2--------HYDROGEN INDEX	0.
	MINERAL 2--------TRANSIT TIME	50.
	MUD FILTRATE DENSITY	1.
***	MUD FILTRATE SALINITY	80797.7305
***	MUD FILTRATE DENSITY	1.0057
***	MUD FILTRATE HYDROGEN INDEX	.9975
	HYDROCARBON DENSITY	1.
***	HYDROCARBON HYDROGEN INDEX	1.
	FLUID TRANSIT TIME	189.
BAD HOLE CONSTANTS	MAXIMUM HOLESIZE	12.2500
	MAXIMUM DENSITY CORR.	.1500
	SONIC LIMIT?(1=YES)	1.
	DELTA T AT 0 POROSITY	0.
	DELTA T AT 20% POROSITY	0.
	DELTA T MATRIX	55.7000
	DELTA T FLUID	189.

2270273

AUSTRALIA KOORKAH - 1
*****SHALE PARAMETERS*****

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

	ZONE NUMBER	=	2.
	ZONE TOP	=	6879. (2096.7 METERS)
	ZONE BOTTOM	=	6987.5 (2129.8 METERS)
SHALE PARAMETERS	RESISTIVITY	=	3.
	BOUND WATER-RWB	=	1.
	DENSITY	=	2.5800
	NEUTRON POROSITY	=	0.2700
	TRANSIT TIME	=	97.
SHALE INDICATORS	USE GAMMA RAY(1=YES)	=	1.
	GAMMA RAY-SHALE	=	60.
	GAMMA RAY-CLEAN	=	20.
	USE SP(1=YES)	=	0.
	SP -CLEAN	=	0.
	SP-SHALE	=	0.
	USE NEUTRON-DENSITY(1=YES)	=	0.
	NEUTRON PHI AT 2.70	=	-0.0700
	NEUTRON PHI AT 2.20	=	0.2300
	USE SONIC-DENSITY(1=YES)	=	0.
	TRANSIT TIME AT 2.70	=	0.
	TRANSIT TIME AT 2.20	=	0.
	USE NEUTRON-SONIC(1=YES)	=	0.
	TRANSIT TIME AT PHI=0	=	0.
	TRANSIT TIME AT PHI=20	=	0.
	USE NEUTRON PHI (1=YES)	=	0.
	CLEAN FORMATION PHI	=	0.
	USE RT (1=YES)	=	0.
	MAXIMUM RT,CLEAN	=	0.
	USE M-N CROSS-PLOT (1=YES)	=	0.
	POINT 1- M	=	0.8200
	- N	=	0.6700
	POINT 2- M	=	0.6500
	- N	=	0.8000

27074

AUSTRALIA KOORKAH - 1
LISTING OPTIONS,NET PAY CUTOFFS AND RECALIBRATION

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

	ZONE NUMBER =	2.
	ZONE TOP =	6879. (2096.7 METERS)
	ZONE BOTTOM =	6987.5 (2129.8 METERS)
LISTINGS(1=YES)	LIST INPUT DATA =	0.
	LIST SHALE INDICATORS =	0.
	LIST ACTUAL CALCULATIONS=	0.
	LIST NET PAY =	0.
PAY SUBJECT TO	POROSITY GREATER THAN =	0.1000
	SW LESS THAN OR EQUAL TO=	1.
	VSHALE LESS THAN =	0.5000
	SW/SXO RATIO LESS THAN =	1.
	TOP OF PAY INTERVAL =	0.
	BOTTOM OF PAY INTERVAL =	6987.5 (2129.8 METERS)
LOG ADJUSTMENTS	DI FACTOR CNL TO DENSITY=	1.
	OLD DENSITY-POINT 1 =	0.
	NEW DENSITY-POINT 1 =	0.
	OLD DENSITY-POINT 2 =	0.
	NEW DENSITY-POINT 2 =	0.
	OLD NEUTRON PHI-POINT 1 =	0.
	NEW NEUTRON PHI-POINT 1 =	0.
	OLD NEUTRON PHI-POINT 2 =	0.
	NEW NEUTRON PHI-POINT 2 =	0.
	OLD TRANSIT TIME-POINT 1=	0.
	NEW TRANSIT TIME-POINT 1=	0.
	OLD TRANSIT TIME-POINT 2=	0.
	NEW TRANSIT TIME-POINT 2=	0.

27075

AUSTRALIA KOORKAH - 1
POROSITY AND WATER SATURATION PARAMETERS

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

	ZONE NUMBER	3.
	ZONE TOP	6988. (2130.0 METERS)
	ZONE BOTTOM	7377.5 (2248.7 METERS)
SW	EQUATION NO.	6.
	FORMATION FACTOR -A-	1.
	CEMENTATION EXPONENT -M-	9.
	WATER SATURATION EXPONENT -N-	2.
	FORMATION WATER RESISTIVITY -RW-	0.1000
	TEMP. OF FORM. WATER RESISTIVITY	162.
	SXO=SW**X WHERE X	1.
	SWB=VSH**Y WHERE Y	0.9000
	AVG. MEAN SURFACE TEMP.	50.
	*** FORMATION TEMPERATURE	160.8448
	*** TEMPERATURE GRADIENT DEG/100 FT.	1.5432
	*** RW AT FORMATION TEMPERATURE	0.1007
	*** RMF AT FORMATION TEMPERATURE	0.3448
POROSITY	MODEL	2.
	MAXIMUM POROSITY	0.3500
	COMPUTE SECONDARY POROSITY?	0.
	MINERAL 1------- MATRIX DENSITY	2.6500
	MINERAL 1--------HYDROGEN INDEX	0.
	MINERAL 1--------TRANSIT TIME	55.7000
	MINERAL 2--------MATRIX DENSITY	2.9800
	MINERAL 2--------HYDROGEN INDEX	0.
	MINERAL 2--------TRANSIT TIME	50.
	MUD FILTRATE DENSITY	1.
	*** MUD FILTRATE SALINITY	80797.7305
	*** MUD FILTRATE DENSITY	1.0057
	*** MUD FILTRATE HYDROGEN INDEX	0.9975
	HYDROCARBON DENSITY	1.
	*** HYDROCARBON HYDROGEN INDEX	1.
	FLUID TRANSIT TIME	189.
BAD HOLE CONSTANTS	MAXIMUM HOLESIZE	14.2500
	MAXIMUM DENSITY CORR.	0.1500
	SONIC LIMIT?(1=YES)	1.
	DELTA T AT 0 POROSITY	0.
	DELTA T AT 20% POROSITY	0.
	DELTA T MATRIX	55.7000
	DELTA T FLUID	189.

27707G

AUSTRALIA KOORKAH - 1
*****SHALE PARAMETERS*****

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

ZONE NUMBER		=	3.
ZONE TOP		=	6988. (2130.8 METERS)
ZONE BOTTOM		=	7377.5 (2248.7 METERS)
SHALE PARAMETERS	RESISTIVITY	=	3.
	BOUND WATER-RWB	=	1.
	DENSITY	=	2.580
	NEUTRON POROSITY	=	0.270
	TRANSIT TIME	=	97.
SHALE INDICATORS	USE GAMMA RAY(1=YES)	=	0.
	GAMMA RAY-SHALE	=	60.
	GAMMA RAY-CLEAN	=	20.
	USE SP(1=YES)	=	0.
	SP -CLEAN	=	0.
	SP-SHALE	=	0.
	USE NEUTRON-DENSITY(1=YES)	=	1.
	NEUTRON PHI AT 2.70	=	-0.070
	NEUTRON PHI AT 2.20	=	0.230
	USE SONIC-DENSITY(1=YES)	=	0.
	TRANSIT TIME AT 2.70	=	0.
	TRANSIT TIME AT 2.20	=	0.
	USE NEUTRON-SONIC(1=YES)	=	0.
	TRANSIT TIME AT PHI=0	=	0.
	TRANSIT TIME AT PHI=20	=	0.
	USE NEUTRON PHI (1=YES)	=	0.
	CLEAN FORMATION PHI	=	0.
	USE RT (1=YES)	=	0.
	MAXIMUM RT,CLEAN	=	0.
	USE M-N CROSS-PLOT (1=YES)	=	0.
	POINT 1- M	=	0.820
	- N	=	0.670
	POINT 2- M	=	0.650
	- N	=	0.800

AUSTRALIA KOORKAH - 1
LISTING OPTIONS,NET PAY CUTOFFS AND RECALIBRATION

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS		
ZONE NUMBER	=	3.
ZONE TOP	=	6988. (213Ø.Ø METERS)
ZONE BOTTOM	=	7377.5 (2248.7 METERS)
LISTINGS(1=YES) LIST INPUT DATA	=	Ø.
LIST SHALE INDICATORS	=	Ø.
LIST ACTUAL CALCULATIONS	=	Ø.
LIST NET PAY	=	Ø.
PAY SUBJECT TO POROSITY GREATER THAN	=	Ø.1ØØØ
SW LESS THAN OR EQUAL TO	=	1.
VSHALE LESS THAN	=	Ø.5ØØØ
SW/SXO RATIO LESS THAN	=	1.
TOP OF PAY INTERVAL	=	Ø.
BOTTOM OF PAY INTERVAL	=	7377.5 (2248.7 METERS)
LOG ADJUSTMENTS DI FACTOR CNL TO DENSITY	=	1.
OLD DENSITY-POINT 1	=	Ø.
NEW DENSITY-POINT 1	=	Ø.
OLD DENSITY-POINT 2	=	Ø.
NEW DENSITY-POINT 2	=	Ø.
OLD NEUTRON PHI-POINT 1	=	Ø.
NEW NEUTRON PHI-POINT 1	=	Ø.
OLD NEUTRON PHI-POINT 2	=	Ø.
NEW NEUTRON PHI-POINT 2	=	Ø.
OLD TRANSIT TIME-POINT 1	=	Ø.
NEW TRANSIT TIME-POINT 1	=	Ø.
OLD TRANSIT TIME-POINT 2	=	Ø.
NEW TRANSIT TIME-POINT 2	=	Ø.

AUSTRALIA KOORKAH - 1
POROSITY AND WATER SATURATION PARAMETERS

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS		
	ZONE NUMBER	4.
	ZONE TOP	7378. (2248.8 METERS)
	ZONE BOTTOM	8328.5 (2536.1 METERS)
SW	EQUATION NO.	6.
	FORMATION FACTOR -A-	1.
	CEMENTATION EXPONENT -M-	9.
	WATER SATURATION EXPONENT -N-	2.
	FORMATION WATER RESISTIVITY -RW-	.1500
	TEMP. OF FORM. WATER RESISTIVITY	166.
	SXO=SW**X WHERE X	1.
	SWB=VSH**Y WHERE Y	.9000
	AVG. MEAN SURFACE TEMP.	50.
	*** FORMATION TEMPERATURE	171.1303
	*** TEMPERATURE GRADIENT DEG/100 FT.	1.5432
	*** RW AT FORMATION TEMPERATURE	.1457
	*** RMF AT FORMATION TEMPERATURE	.3249
POROSITY	MODEL	2.
	MAXIMUM POROSITY	.3500
	COMPUTE SECONDARY POROSITY?	0.
	MINERAL 1------- MATRIX DENSITY	2.6500
	MINERAL 1--------HYDROGEN INDEX	0.
	MINERAL 1--------TRANSIT TIME	55.7000
	MINERAL 2--------MATRIX DENSITY	2.9800
	MINERAL 2--------HYDROGEN INDEX	0.
	MINERAL 2--------TRANSIT TIME	50.
	MUD FILTRATE DENSITY	1.
	*** MUD FILTRATE SALINITY	80797.7305
	*** MUD FILTRATE DENSITY	1.0057
	*** MUD FILTRATE HYDROGEN INDEX	.9975
	HYDROCARBON DENSITY	1.
	*** HYDROCARBON HYDROGEN INDEX	1.
	FLUID TRANSIT TIME	189.
BAD HOLE CONSTANTS	MAXIMUM HOLESIZE	14.2500
	MAXIMUM DENSITY CORR.	.1500
	SONIC LIMIT?(1=YES)	1.
	DELTA T AT 0 POROSITY	0.
	DELTA T AT 20% POROSITY	0.
	DELTA T MATRIX	55.7000
	DELTA T FLUID	189.

277079

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AUSTRALIA KOORKAH - 1
*****SHALE PARAMETERS*****
*****************************************************************************
*     SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS    *
*            ZONE NUMBER          =          4.                              *
*            ZONE TOP             =       7378. (2248.8 METERS)                *
*            ZONE BOTTOM          =   8320.5 (2536.1 METERS)                   *
* SHALE PARAMETERS          RESISTIVITY              =          3.             *
*                           BOUND WATER-RWB          =      1.5000             *
*                           DENSITY                  =      2.6400             *
*                           NEUTRON POROSITY         =      0.4100             *
*                           TRANSIT TIME             =         85.             *
* SHALE INDICATORS      USE GAMMA RAY(1=YES)         =          0.             *
*                           GAMMA RAY-SHALE          =         60.             *
*                           GAMMA RAY-CLEAN          =         20.             *
*                       USE SP(1=YES)                =          0.             *
*                           SP -CLEAN                =          0.             *
*                           SP-SHALE                 =          0.             *
*                       USE NEUTRON-DENSITY(1=YES)=           1.             *
*                           NEUTRON PHI AT 2.70      =     -0.0700             *
*                           NEUTRON PHI AT 2.20      =      0.2300             *
*                       USE SONIC-DENSITY(1=YES)     =          0.             *
*                           TRANSIT TIME AT 2.70     =          0.             *
*                           TRANSIT TIME AT 2.20     =          0.             *
*                       USE NEUTRON-SONIC(1=YES)     =          0.             *
*                           TRANSIT TIME AT PHI=0    =          0.             *
*                           TRANSIT TIME AT PHI=20=           0.             *
*                       USE NEUTRON PHI (1=YES)      =          0.             *
*                           CLEAN FORMATION PHI      =          0.             *
*                       USE RT (1=YES)               =          0.             *
*                           MAXIMUM RT,CLEAN         =          0.             *
*                       USE M-N CROSS-PLOT (1=YES)=           0.             *
*                           POINT 1-  M              =      0.8000             *
*                                 -  N               =      0.6700             *
*                           POINT 2-  M              =      0.6300             *
*                                 -  N               =      0.8000             *
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27080

AUSTRALIA KOORKAH - 1
LISTING OPTIONS,NET PAY CUTOFFS AND RECALIBRATION

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

ZONE NUMBER = 4.
ZONE TOP = 7378. (2248.8 METERS)
ZONE BOTTOM = 8328.5 (2536.1 METERS)

LISTINGS(1=YES)	LIST INPUT DATA	= 0.
	LIST SHALE INDICATORS	= 0.
	LIST ACTUAL CALCULATIONS	= 0.
	LIST NET PAY	= 0.
PAY SUBJECT TO	POROSITY GREATER THAN	= 0.1000
	SW LESS THAN OR EQUAL TO	= 1.
	VSHALE LESS THAN	= 0.5000
	SW/SXO RATIO LESS THAN	= 1.
	TOP OF PAY INTERVAL	= 0.
	BOTTOM OF PAY INTERVAL	= 8328.5 (2536.1 METERS)
LOG ADJUSTMENTS	DI FACTOR CNL TO DENSITY	= 1.
	OLD DENSITY-POINT 1	= 0.
	NEW DENSITY-POINT 1	= 0.
	OLD DENSITY-POINT 2	= 0.
	NEW DENSITY-POINT 2	= 0.
	OLD NEUTRON PHI-POINT 1	= 0.
	NEW NEUTRON PHI-POINT 1	= 0.
	OLD NEUTRON PHI-POINT 2	= 0.
	NEW NEUTRON PHI-POINT 2	= 0.
	OLD TRANSIT TIME-POINT 1	= 0.
	NEW TRANSIT TIME-POINT 1	= 0.
	OLD TRANSIT TIME-POINT 2	= 0.
	NEW TRANSIT TIME-POINT 2	= 0.

27081

AUSTRALIA KOORKAH - 1
POROSITY AND WATER SATURATION PARAMETERS

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

	ZONE NUMBER	5.
	ZONE TOP	8321. (2536.3 METERS)
	ZONE BOTTOM	10288. (3133.4 METERS)
SW	EQUATION NO.	1.
	FORMATION FACTOR -A-	1.
	CEMENTATION EXPONENT -M-	9.
	WATER SATURATION EXPONENT -N-	2.
	FORMATION WATER RESISTIVITY -RW-	0.3000
	TEMP. OF FORM. WATER RESISTIVITY	190.
	SXO=SW**X WHERE X	1.
	SWB=VSH**Y WHERE Y	0.9000
	AVG. MEAN SURFACE TEMP.	50.
***	FORMATION TEMPERATURE	193.5261
***	TEMPERATURE GRADIENT DEG/100 FT.	1.5432
***	RW AT FORMATION TEMPERATURE	0.2947
***	RMF AT FORMATION TEMPERATURE	0.2886
POROSITY	MODEL	2.
	MAXIMUM POROSITY	0.3500
	COMPUTE SECONDARY POROSITY?	0.
	MINERAL 1------- MATRIX DENSITY	2.6500
	MINERAL 1--------HYDROGEN INDEX	0.
	MINERAL 1--------TRANSIT TIME	55.7000
	MINERAL 2--------MATRIX DENSITY	2.9800
	MINERAL 2--------HYDROGEN INDEX	0.
	MINERAL 2--------TRANSIT TIME	50.
	MUD FILTRATE DENSITY	1.
***	MUD FILTRATE SALINITY	80797.7305
***	MUD FILTRATE DENSITY	1.0057
***	MUD FILTRATE HYDROGEN INDEX	0.9975
	HYDROCARBON DENSITY	1.
***	HYDROCARBON HYDROGEN INDEX	1.
	FLUID TRANSIT TIME	189.
BAD HOLE CONSTANTS	MAXIMUM HOLESIZE	12.2600
	MAXIMUM DENSITY CORR.	0.0600
	SONIC LIMIT?(1=YES)	1.
	DELTA T AT 0 POROSITY	0.
	DELTA T AT 20% POROSITY	0.
	DELTA T MATRIX	55.7000
	DELTA T FLUID	189.

2770822

AUSTRALIA KOORKAH - 1
*****SHALE PARAMETERS*****

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS

ZONE NUMBER		=	5.
ZONE TOP		=	8321. (2536.3 METERS)
ZONE BOTTOM		=	10288. (3133.4 METERS)
SHALE PARAMETERS	RESISTIVITY	=	3.
	BOUND WATER-RWB	=	1.5000
	DENSITY	=	2.6600
	NEUTRON POROSITY	=	0.2700
	TRANSIT TIME	=	80.
SHALE INDICATORS	USE GAMMA RAY(1=YES)	=	1.
	GAMMA RAY-SHALE	=	107.
	GAMMA RAY-CLEAN	=	35.
	USE SP(1=YES)	=	0.
	SP -CLEAN	=	0.
	SP-SHALE	=	0.
	USE NEUTRON-DENSITY(1=YES)	=	0.
	NEUTRON PHI AT 2.70	=	-0.0700
	NEUTRON PHI AT 2.20	=	0.2300
	USE SONIC-DENSITY(1=YES)	=	0.
	TRANSIT TIME AT 2.70	=	0.
	TRANSIT TIME AT 2.20	=	0.
	USE NEUTRON-SONIC(1=YES)	=	0.
	TRANSIT TIME AT PHI=0	=	0.
	TRANSIT TIME AT PHI=20	=	0.
	USE NEUTRON PHI (1=YES)	=	0.
	CLEAN FORMATION PHI	=	0.
	USE RT (1=YES)	=	0.
	MAXIMUM RT,CLEAN	=	0.
	USE M-N CROSS-PLOT (1=YES)	=	0.
	POINT 1- M	=	0.8400
	- N	=	0.6000
	POINT 2- M	=	0.7000
	- N	=	0.7000

2770083

AUSTRALIA KOORKAH - 1
LISTING OPTIONS,NET PAY CUTOFFS AND RECALIBRATION

SUMMARY OF IMPORTANT CONSTANTS USED AND/OR COMPUTED IN THIS ANALYSIS		
ZONE NUMBER	=	5.
ZONE TOP	=	8321. (2536.3 METERS)
ZONE BOTTOM	=	10288. (3133.4 METERS)
LISTINGS(1=YES) LIST INPUT DATA	=	0.
LIST SHALE INDICATORS	=	0.
LIST ACTUAL CALCULATIONS	=	0.
LIST NET PAY	=	0.
PAY SUBJECT TO POROSITY GREATER THAN	=	0.1000
SW LESS THAN OR EQUAL TO	=	1.
VSHALE LESS THAN	=	0.5000
SW/SXO RATIO LESS THAN	=	1.
TOP OF PAY INTERVAL	=	0.
BOTTOM OF PAY INTERVAL	=	10280. (3133.4 METERS)
LOG ADJUSTMENTS DI FACTOR CNL TO DENSITY	=	1.
OLD DENSITY-POINT 1	=	0.
NEW DENSITY-POINT 1	=	0.
OLD DENSITY-POINT 2	=	0.
NEW DENSITY-POINT 2	=	0.
OLD NEUTRON PHI-POINT 1	=	0.
NEW NEUTRON PHI-POINT 1	=	0.
OLD NEUTRON PHI-POINT 2	=	0.
NEW NEUTRON PHI-POINT 2	=	0.
OLD TRANSIT TIME-POINT 1	=	0.
NEW TRANSIT TIME-POINT 1	=	0.
OLD TRANSIT TIME-POINT 2	=	0.
NEW TRANSIT TIME-POINT 2	=	0.

277084

APPENDIX 5

FORAMINIFERA SEQUENCE

KOORKAH -1

MODIFIED FROM REPORT BY
DAVID TAYLOR
FEBRUARY, 1986

SUMMARY

Paleontological analyses were done on Koorkah-1 samples from 440m-1600m to define the foraminiferal zones in the Torquay Group, Jan Juc Formation and the Demons Bluff Formation. The results indicate probable continuous deposition from Early Ogilocene through Middle Miocene and younger (?) time. The interval from 1420-1600 meters was barren of foraminifera.

INTRODUCTION

Twenty intervals of ditch cutting samples were examined between 440m and 1600m in Koorkah-1. Unlike Yolla-1 and Tilana-1, mud contamination was prevalent in Koorkah-1; note microfossil occurrences marked with an asterisk (*) on Tables 2 and 3. For instance, Orbulina universa was present some 600m to 800m below its assumed in situ position (refer Table 2).

A summary of the Koorkah-1 sequence is given as Table 1; whilst factual data on distribution of planktonic and benthonic foraminifera is presented on Tables 2 and 3.

A brief discussion of the sequence, in ascending stratigraphic order is given below, with correlation to other Bass Basin sequences.

? LATE EOCENE? - TOP APPROXIMATING 1420M

No planktonic foraminifera were found in this unit. Therefore the Late Eocene age is purely by inference and similarity with other Late Eocene sediments of the Bass Basin which do contain Late Eocene planktonic faunas (for example, Tilana-1).

The microfossil assemblages were dominated by pyritic tubes and other forms of biogenic pyrite as well as grey, fine textured specimens of Haplophragmoides spp; the arenaceous benthonic foraminifera which can tolerate anoxic conditions and fluctuating water salinities. This interval in Koorkah is a typical expression of the Demons Bluff Formation in the Bass Basin.

EARLY TO LATE OLIGOCENE - TOP APPROXIMATING 1240M

This unit embraces assemblages which represent the Planktonic Foraminiferal Zones J-2, J-1 and I-1. Although Zone I-2 could not be identified, it was probably present, especially as Globorotalia testarugosa (which does not extend up into Zone I-1), was associated with a definite Zone I-1 assemblage in Koorkah (refer Table 2). Therefore sedimentation was probably continuous during the Oligocene in Koorkah and the sequence was more akin to the Bass No.1, No.2 and No.3 sequences than to Yolla-1 and Tilana-1 where the Oligocene hiatus occurred (refer Taylor, 1985, diagram on page 4).

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CLASS

Within the interval, the planktonic foraminiferal faunas were numerically sparse with low specific diversity, suggesting very limited access to oceanic currents. The occurrence of benthonic foraminifera was sporadic both numerically and in specific diversity. Burrowing gastropods occur in two samples, suggesting a soft substrate. These gastropods were always infilled with pyrite and there was an abundance of other forms of biogenic pyrite. The gross aspect of the microfossil associations suggest deposition in shallow water (less than 90m paleodepth), in an anoxic substrate beneath normal salinity sea water.

This interval appears to be the equivalent of the Jan Juc Formation without any equivalents of the more sandy facies of the Angahook Formation being present in the sequence. Thus the Koorkah unit is more akin to the Bass No. 1 and No. 3 sequences than to Yolla-1 and Tilana-1 (refer Taylor, 1985, p.4).

LATE OLIGOCENE AND EARLY TO MID MIOCENE - TOP AT 680M

This is a bioclastic carbonate unit with continuous sedimentation from Zone No. 2 (Late Oligocene) to Zone D-2 (Mid Miocene). Micro faunas were sporadic in both numerical frequency and specific diversity, suggesting some restriction to oceanic circulation, though oxygenation and sea water salinities appeared to have been normal. Fragmentation of bryozoal, skeletal debris, indicates high energy transportation and deposition; especially towards the base of the sequence. Paleo-water depths probably did not exceed 120 metres.

MID MIOCENE AND YOUNGER - TOP SAMPLE AT 440M

The litho-facies of this unit was a bioclastic carbonate similar to the unit below, but the rich foraminiferal faunas denote a dramatic improvement in water circulation and availability of nutrients. The presence of the planktonic species Globorotalia conica and G. miozea at 600m is suggestive of an influx of oceanic water from the east (the Gippsland Basin) rather than from the west (the Otway Basin).

REFERENCE

TAYLOR, David, 1985 - The Foraminiferal Sequence in Tilana-1 - Bass Basin.

for: Amoco Australia Petroleum Company, October 30, 1985.

277087

BIOSTRATIGRAPHY			PALEO-DEPTH Estimates in metres	LITHO - UNITS and PALEO-ENVIRONMENTS
AGE	Sample depth for 'Tops' * in metres	PLANKTONIC FORAMINIFERAL ZONE	0 100 200	
Top Sample	440			
MID MIOCENE or YOUNGER		?		- Bryozoal calcarenite - nutrient enriched with oxygenated with apparent access by oceanic currents from the Tasman Sea.
	600			
MID MIOCENE		D-2/ E-1		680
	900			- Bryozoal calcarenite. Restricted oceanic circulation though oxygenation increased gradually upsection, with marked improvement above 1010 metres.
EARLY MIOCENE		E-2 /F		
	1010			
		G/H-1		
	1140			
LATE OLIGOCENE		H-2		
	1240			1240
		I-1/2		- Calcareous siltstone with varying amount of quartz sand. Restricted anoxic marine environment, with limited oceanic circulation.
EARLY OLIGOCENE	1320	J-1		
	1380	J-2		
? ?	1420	? ?		1420
? LATE ? EOCENE		? K ?		- Dark grey/brown siltstone & sandy siltstones. Marginal marine anoxic environment with no oceanic circulation.
Basal Sample	at 1590-1600			

TABLE 1: INTERPRETED FORAMINIFERAL SEQUENCE - KOORKAH # 1 - BASS BASIN.

(Factual data Tables 2 & 3)

* only ditch cutting samples available

David Taylor,
February 18th, 1986

5 cm

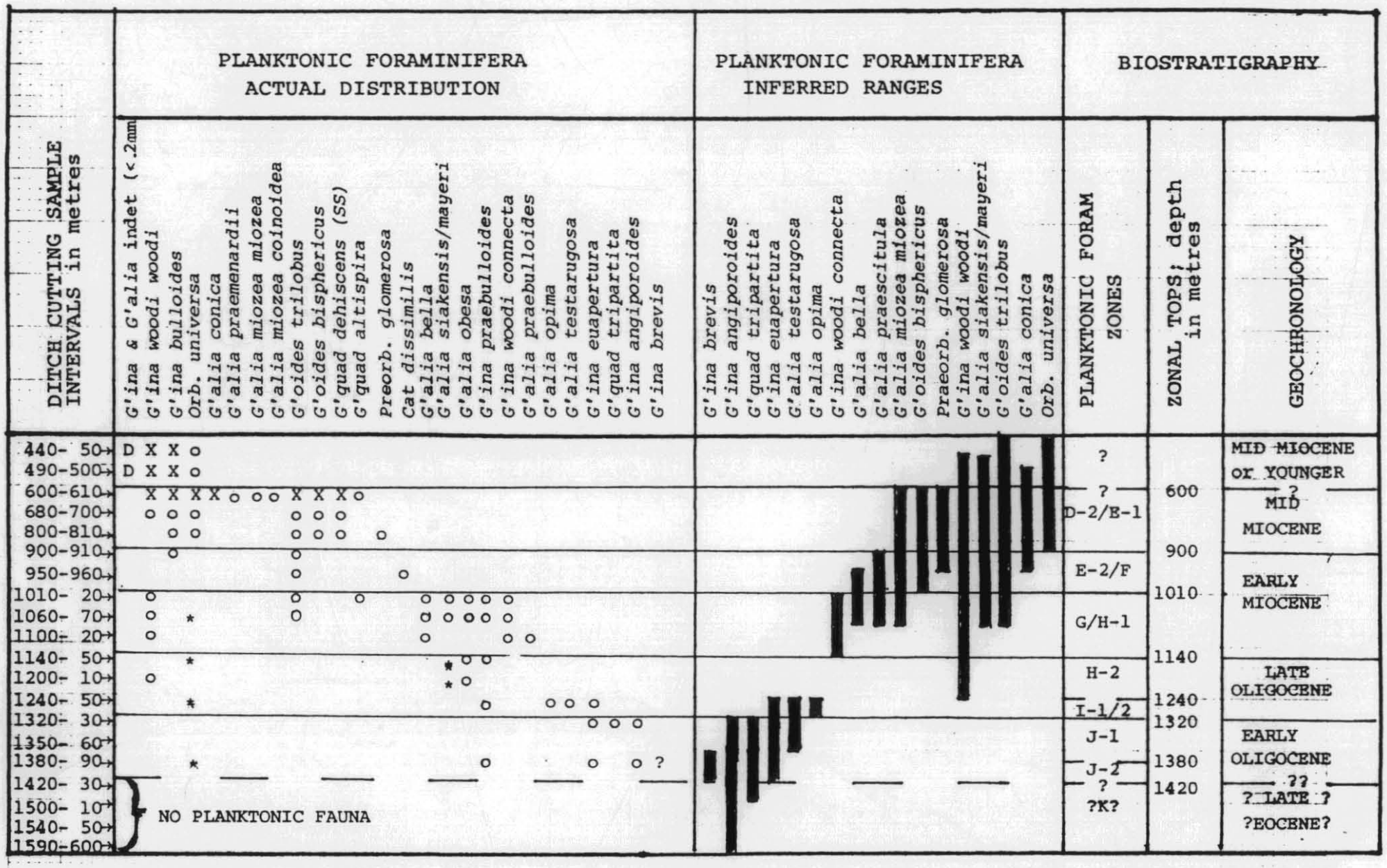

TABLE 2 - BIOSTRATIGRAPHIC DATA - KOORKAH # 1 - BASS BASIN

o = 1-20 specimens : X = >20 specimens: D = Dominant >60% specimens: ? identification: * = mud contaminant.

David Taylor, Feb. 3rd, 1986

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| DITCH CUTTING SAMPLE INTERVALS in metres | ARENACEOUS FORAMINIFERA | | | | | | | | | | CALCAREOUS BENTHONIC FORAMINIFERA | | | | | | | | | |

277090

APPENDIX 6

PALYNOLOGY

KOORKAH -1

MODIFIED FROM REPORT BY
ROGER MORGAN
MAY, 1986

SUMMARY

Fifty five samples (cuttings and sidewall cores) over the interval 1440-3126 meters were analysed for age, depositional environments and additional control on thermal maturity. The section examined apparently represent continuous deposition from Campanian (T.lillei Zone) to Late Eocene (middle N. asperus Zone). Marine influence is strongest towards the top of the Demons Bluff Formation.

The thermal maturity data (spore colour indicies) indicate that sediments from within the T. longus Zone to tota depth are mature for oil generation.

INTRODUCTION

Fifty five samples were studied overall, comprising thirty seven cuttings samples and eighteen sidewall cores.

Palynomorph occurrence data are shown on Appendix I and form the basis for the assignment of the samples to ten spore-pollen units of Late Eocene to Campanian age. The zonation is that of Stover and Evans (1973) and Stover and Partridge (1973) set up in the Gippsland Basin, and modified for the Bass Basin by Partridge (1973). Minor modification of the late Cretaceous zones is in Helby, Morgan and Partridge (in press).

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 1 Maturity Profile of Amoco Koorkah-1.

PALYNOSTRATIGRAPHY

A. 1440-1609m (cutts): middle N. asperus Zone

Assignment to the middle Nothofagidites asperus Zone is indicated at the top by the youngest occurrences of Beaupreadites elegansiformis (1440-50m cutts), Proteacidites crassus, P. incurvatus and Triorites magnificus (1470-80m cutts), and the dinoflagellate data. The youngest occurrences of Anacolosidites luteoides, Beaupreadites verrucosus (1530-40m cutts) and Proteacidites leightonii (1560-70m cutts) support the assignment. The Zone base is defined by the oldest occurrence of Triorites magnificus (1590-1600m cutts) and Riccia boxatus (1530-40m cutts). The oldest occurrence of Aglaoreidia qualumis at 1470-80m (cutts) indicates a point near the top of the zone. No sidewall cores are available in this interval, but the zone base is probably accurate, as caving appears to be minor at this level.

Age significant dinoflagellates include Alisocysta ornata in the interval 1440-1510m, indicating assignment to the upper part of the middle N. asperus Zone. Other significant forms include Deflandrea phosphoritica, Systematophora placacantha, Aerosphaeridium arcuatum and Phthanoperidinium comatum, all of which indicate a lower N. asperus Zone assignment or younger.

Environments grade from marginal marine at the base (where trace very low diversity dinoflagellates occur) to marine shelf at the top (where dinoflagellates comprise 15% of palynomorphs, and are of moderate diversity).

Yellow spore colours indicate immaturity for hydrocarbon generation.

B. 1655 (swc)-1834m (cutts (1779m swc): lower N. asperus Zone.

The top of the lower Nothofagidites asperus Zone is defined by the absence of younger indicators seen above, and the zone base is defined by the base of Nothofagidites dominated assemblages. Oldest occurrences supporting the zone base include Periporopollenites vesicus (1825-34m cutts, although it occurs rarely as caved specimens beneath), Nothofagidites falcatus (1798-1870m cutts) and Gemmatricolporites gestus (1779.0m swc).

Dinoflagellates are extremely scarce to absent, but Phthanoperidinium comatum (1699-1708m cutts and above) and Aerosphaeridium arcuatum (1663-72m cutts and above) indicate the lower N. asperus Zone or younger, and confirm the spore pollen assignment.

Marginally marine to non-marine environments are indicated by the very scarce to absent dinoflagellates, common and diverse spores and pollen, and common cuticle fragments.

Yellow to yellow-brown spaore colours indicate immaturity to near marginal maturity for hydrocarbons.

C. 1861-1942m (cutts): P. asperopolus Zone

Assignment to the Proteacidites asperopolus Zone is indicated at the top by the youngest Haloragacidites harrisii dominated assemblages, in contrast to the Nothofagidites dominated assemblages above. Supporting data include the absence of younger indicators, and the youngest occurrences of consistent Intratriporopollenites notabilis, Proteacidites obesolabrus, P. grandis (1861-70m cutts) and Myrtaceidites tenuis (1933-42m cutts). The zone base is defined by the oldest occurrence of Proteacidites asperopolus and relatively common P. pachypolus. Considerable caving of the overlying N. asperus Zone has occurred and makes difficult the picking of these boundaries from cuttings.

Non-marine environments are most likely, on the basis of the abundant spores, pollen and plant cuticle. The very rare dinoflagellates seen include some obvious caving (Phthanoperidinium comatum) and on the basis of regional knowledge, are all considered caved. No sidewall cores were available in this interval.

Spore colours of yellow/brown indicate marginal maturity for oil, but immaturity for gas/condensate.

D. 1972.5 (swc)-2032m (cutts) : upper M. diversus Zone

Assignment to the upper Malvacipollis diversus Zone is indicated at the top by the absence of younger indicators, and at the base by the oldest occurrence of Proteacidites pachypolus. The oldest occurrences of Proteacidites obesolabrus (2023-32m cutts), Myrataceidites tenuis (1996-2004m cutts) and Santalumidites cainozoicus (1972.5m swc) confirm the assignment. Significant spore pollen caving from above has occurred in these samples.

Age diagnostic dinoflagellates include Homotriblium tasmaniense, confirming the assignment.

Environments are marginally marine, with rare low diversity dinoflagellates seen in every sample.

Spore colours of yellow-brown indicate marginal maturity for oil, and immaturity for gas/condensate.

E. 2059-68m (cutts) : middle M. diversus Zone

Assignment to the middle Malvacipollis diversus Zone is indicated at the top by the youngest occurrence of Tricolpites gillii, and the absence of younger indicators. The zone base is defined by the oldest occurrences of Proteacidites leightonii and P. ornatum considered to be in place.

The very rare dinoflagellates seen are not age diagnostic.

Environments are marginally marine, as shown by the presence of rare low diversity dinoflagellates amongst the dominant spores and pollen.

Spore colours cover a wide range. The majority of specimens are in the very dark brown to brown-black range, and indicate full maturity to post maturity for oil, and full maturity for gas/condensate. A smaller number of specimens show lighter colours, right back to yellow/brown, but are considered caved.

F. 2077 (cutts)-2083m (swc) : post-mature

These two samples are totally barren with the residues consisting only of inertinite, with very rare obviously caved light coloured fossils. The samples are therefore indeterminate and post-mature.

G. 2160 (swc)-2205m (cutts) : lower M. diversus Zone

Assignment to the lower Malvacipollis diversus Zone is shown at the top by the absence of younger indicators in place, and at the base by the oldest occurence of M. diversus and the absence of older indicators. The upper sample is a sidewall core and lacks the younger indicators. The deeper sample is of cuttings, and contains indicators for the middle M. diversus Zone, but these are considered caved in light of the sidewall core data. Minor Triassic reworking is seen.

The very rare dinoflagellates include Apectodinium homomorphum which only confirms an upper L. balmei assignment or younger.

Marginally marine environments are indicated by the very rare low diversity dinoflagellates and common spores and pollen.

H. 2241.0m (swc)-2302m (cutts) (2266.5m swc) : upper L. balmei Zone

Assignment to the upper Lygistepollenites balmei Zone is indicated at the top by the youngest occurrences of Gambierina rudata and Lygistepollenites balmei. The zone base is defined by the oldest occurrences of Proteacidites grandis (2292-2302m cutts, 2266.5m in swc) and P. incurvatus (2241.0m swc). Other obvious caving is seen at 2292-2302m however (M. diversus, P. leightonii) and so P. grandis at 2266.5m in swc is more firmly based. Minor Triassic reworking was noted.

Age diagnostic dinoflagellates occur only in the cuttings from 2292-2302m and are probably caved. They do include A. homomorphum which would confirm an upper L. balmei or younger assignment, if in place.

Environments are non-marine to very marginally marine. The sidewall cores contain very few dinoflagellates, mostly Morkallacysta pyramidalis which is considered to be a lacustrine form. The other very rare dinoflagellates indicate very slight marine influence. The cuttings are probably contaminated and so unreliable.

Spore colours of light brown indicate marginal maturity for oil and immaturity for gas/condensate.

I. 2329 (cutts)-2465m (swc) : lower L. balmei Zone

Zonal assignment is indicated at the top by the absence of younger indicators, and at the base by the absence of older indicators, confirmed by the oldest occurrence of Polycolpites langstonii and consistent Lygistepollenites balmei. The presence of Tetracolporites verrucosus at 2465m indicates the lower half of the zone. Minor Triassic reworking was seen.

Non-marine environments are indicated by the abundant spores and pollen, and absence of dinoflagellates other than Morkallacysta Pyramidalis. Other dinoflagellates in the cuttings are considered to be caved.

Spore colours of light brown approaching mid brown indicate marginal maturity for oil, and immaturity for gas/condensate.

J. 2491 (cutts)-2763.5m (swc) : T. longus Zone

Assignment to the Tricolpites longus Zone is indicated at the top by the youngest occurrence of Tricolpites confessus and confirmed by that of T. waipawaensis. The zone base is indicated by the oldest occurrence of Grapnelispora evansii (2763.5m swc) and Tricolpites longus (2728.0m swc). These taxa are very scarce, however, and the base of this zone is not as confidently defined as some others. Trace quanitities of reworked Triassic taxa were seen.

Non-marine environments are indicated by the dominance of spores and pollen and only very rare dinoflagellates in the form of the probably lacustrine M. pyramidalis.

Spore colours of mid brown indicate maturity for oil, but only marginal maturity for gas/condensate.

K. 2797 (cutts)-3148m (cutts) (3126.0m swc) : T. lillei Zone

Assignment to the Tricolpites lillei Zone is indicated at the top by the absence of younger indicators and at the base by the oldest occurrences of G. rudata, T. waipawaensis, Triporopollenites sectilis and Stereisporites regium, all at 3139-48m (cutts). In sidewall cores, G. rudata and T. waipawaensis confirm the assignemtn at 3126.0m. Trace Triassic and occassionally Permian reworking are seen.

Non-marine environments are indicated by the common and diverse spores and pollen and presence only of rare M. pyramidalis amongst the dinoflagellates.

Spore colours of mid brown indicate maturity for oil, and immaturity but approaching maturity for gas/condensate.

IV CONCLUSIONS

A. The drilled section is apparently complete and conformable and the studied section is of Campanian (T. lillei Zone) to Late Eocene (middle N. asperus Zone) age.

B. Marine influence is restricted to the late Paleocene to Late Eocene part of the section but is never great until the top of the Demons Bluff Formation, as is usual within the basin.

C. The cuttings are fairly clean, but significantly caved into the early to middle Eocene. Relatively few sidewall cores have been examined, and therefore some picks (especially base middle asperus, base asperopolus, base middle diversus and base upper balmei) may have been picked too low.

D. Maturity shows a good overall trend, but the section is only mature for oil (not yet peak mature) and not yet mature for gas/condensate. Near 2080m, a local igneous event has produce4d high maturities over a limited part of the section.

REFERENCES

Harris, W.K. (1985) Middle to Late Eocene Depositional Cycles and Dinoflagellate Zones in Southern Australia Spec. Publ., S. Aust. Dept. Mines and Energy 5 : 133-144

Helby, R.J., Morgan, R.P., and Partridge, A.D., (in press) A palynological zonation of the Australia Mesozoic Australas. Assoc. Palaeontol. Mem. 3.

Partridge, A.D. (1973) Revision of the Spore-pollen Zonation in the Bass Basin Esso unpubl. palaeo. rept. 1973/74

Partridge, A.D. (1976) The geological Expression of Eustacy in the Early Tertiary of the Gippsland Basin Aust. Pet. Explor. Assoc. J., 16 : 73-79.

Stover, L.E. and Evans, P.R. (1973) Upper Cretaceous - Eocene Spore Pollen Zonation, offshore Gippsland Basin, Australia Spec. Publ. geol. soc. Aust., 4 : 55-72

Stover, L.E. and Partridge, A.D. (1973) Tertiary and Late Cretaceous Spores and Pollen from the Gippsland Basin, South-eastern Australia Proc. R. Soc. Vict., 85 : 237-286.

277097

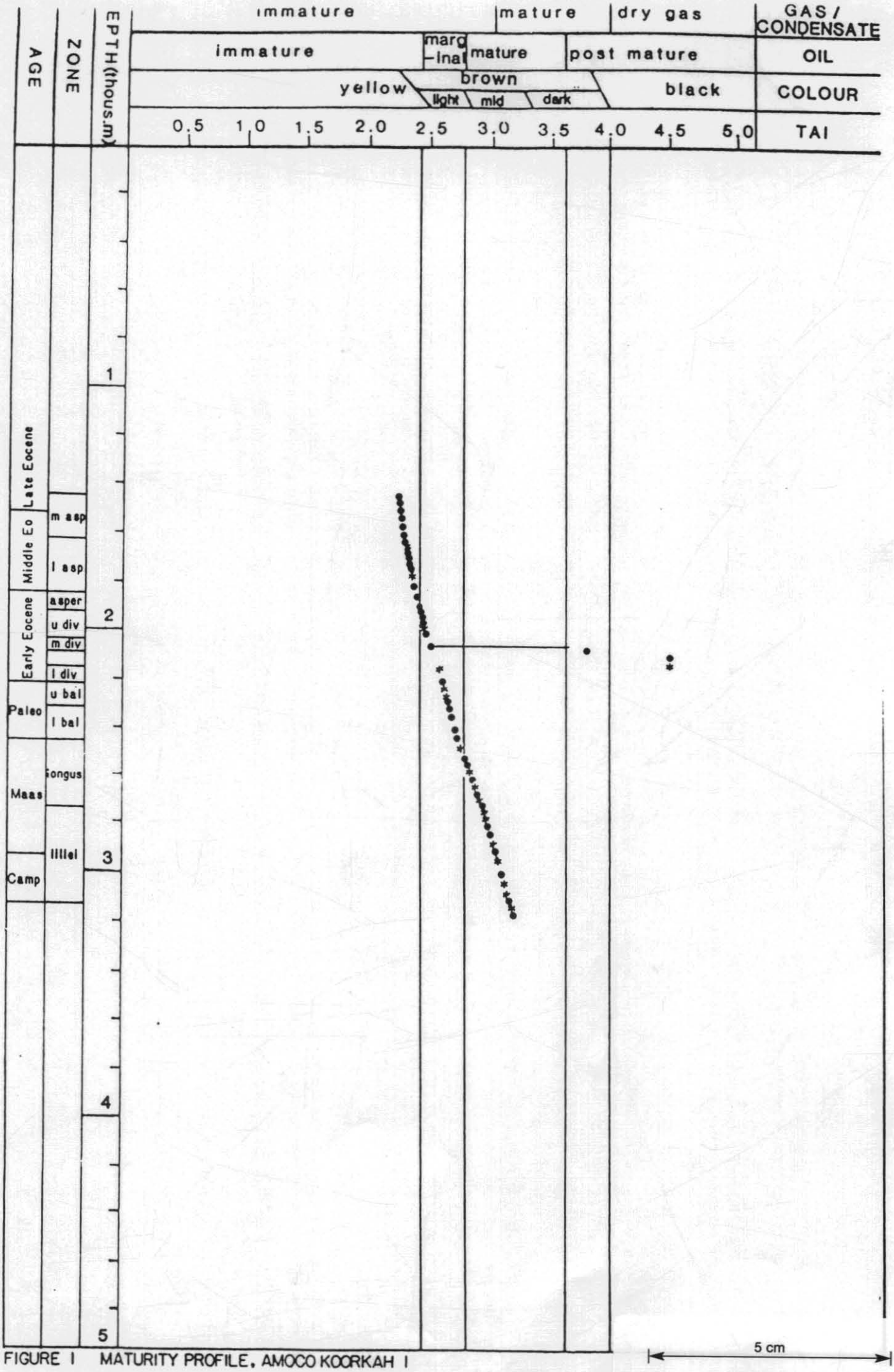

FIGURE 1 MATURITY PROFILE, AMOCO KOORKAH 1

KOORKAH #1 DINOS

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

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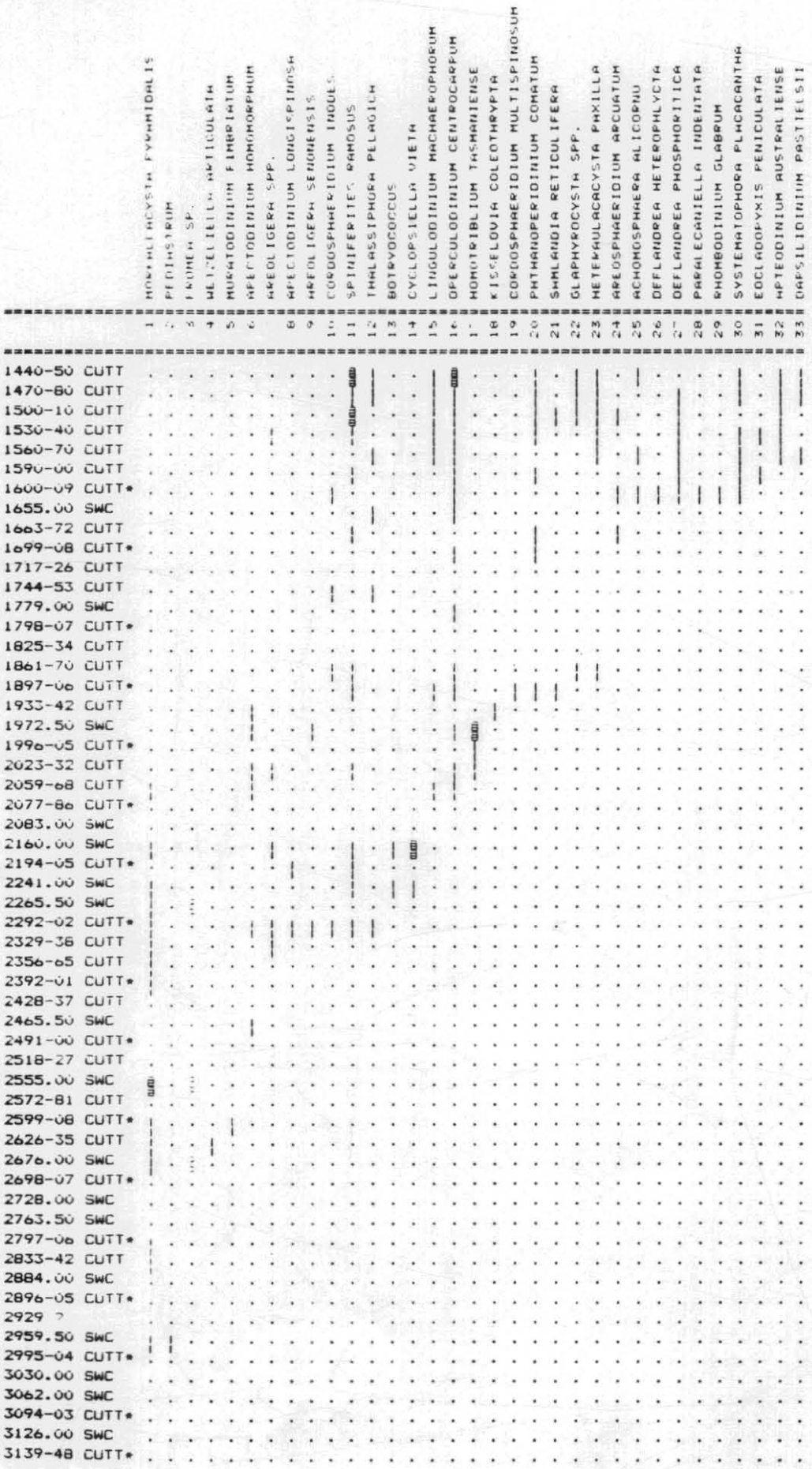
= Abundant
= Common
= Few
= Rare
= Very Rare
? = Questionably Present
. = Not Present



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		DISTINGUISHING ELLIPTICUM	DIPHENA FOLLICERUM	HELISOLYSIM ORNATA	AREOSPHAERIDIUM MULTICORNUTUM	GLAPHYROCYSTIS MICROFENESTRATUM	GLAPHYROCYSTIS TEXTUM	MYCTACACAPSUMM FIGHUTINE	IMPAGIDINIUM DISPERTITUM	IMPLETOSPHERIDIUM SP.1 MANUM	LAMELLODINIUM CHLAMYDOPHORA	SCHEMATOPHORA SPECIOSA	AREOSPHAERIDIUM DICTYOPLOXUS	PENTAGONIUM LATICINCTUM	TECTATODINIUM PELLITUM
		34	35	36	37	38	39	40	41	42	43	44	45	46	47
1440-50	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1470-80	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1500-10	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1530-40	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1560-70	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1590-00	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1600-09	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1655.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1663-72	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699-08	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1717-26	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1744-53	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1779.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1798-07	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1825-34	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1861-70	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1897-06	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1933-42	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1972.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1996-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2023-32	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2059-68	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2077-86	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2083.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2160.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2194-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2241.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2265.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2292-02	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2329-38	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2356-65	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392-01	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2428-37	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2465.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2491-00	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2518-27	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2555.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2572-81	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2599-08	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2626-35	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2676.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2698-07	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2728.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2763.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2797-06	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2833-42	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2884.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2896-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2929 ?		.	.	.	.	.	.	.	.	.	.	.	.	.	.
2959.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2995-04	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3030.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3062.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3094-03	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3126.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3139-48	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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6	APECTODINIUM HOMOMORPHUM
8	APECTODINIUM LONGISPINOSA
32	APTEODINIUM AUSTRALIENSE
9	AREOLIGERA SENONENSIS
7	AREOLIGERA SPP.
24	AREOSPHAERIDIUM ARCUATUM
45	AREOSPHAERIDIUM DICTYOPLOXUS
37	AREOSPHAERIDIUM MULTICORNUTUM
13	BOTRYOCOCCUS
10	CORDOSPHAERIDIUM INODES
19	CORDOSPHAERIDIUM MULTISPINOSUM
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12	THALASSIPHORA PELAGICA
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277101

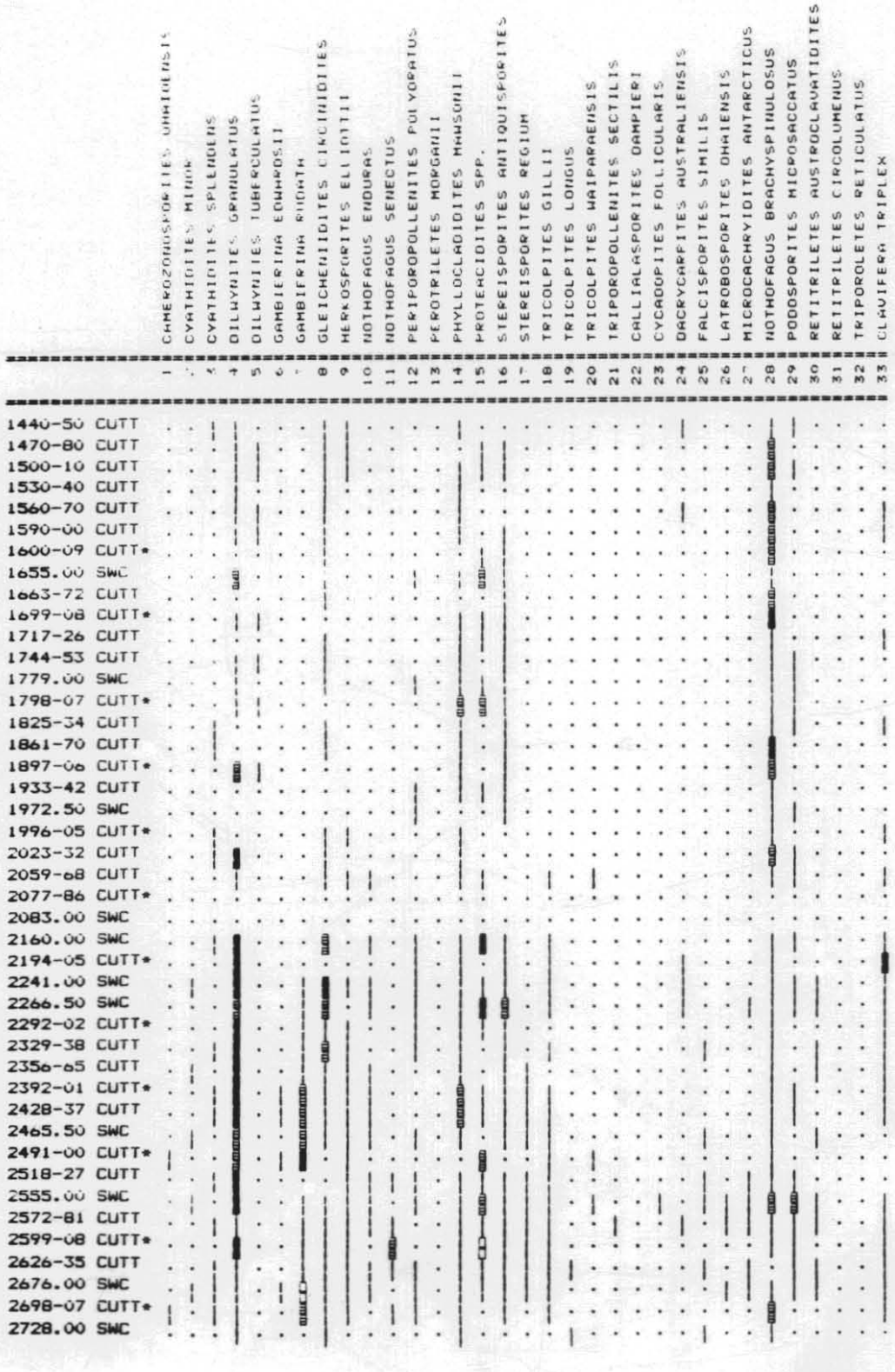
DESCRIPTION:

PALYNOLOGICAL INTERPRETATION FOR AMOCO (BY ROGER MORGAN - APRIL 1985.
N.B. * INDICATES "HOT" SAMPLES
ALL SAMPLE DEPTHS ARE IN METRES

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

= Abundant
= Common
= Few
= Rare
= Very Rare

? = Questionably Present
. = Not Present



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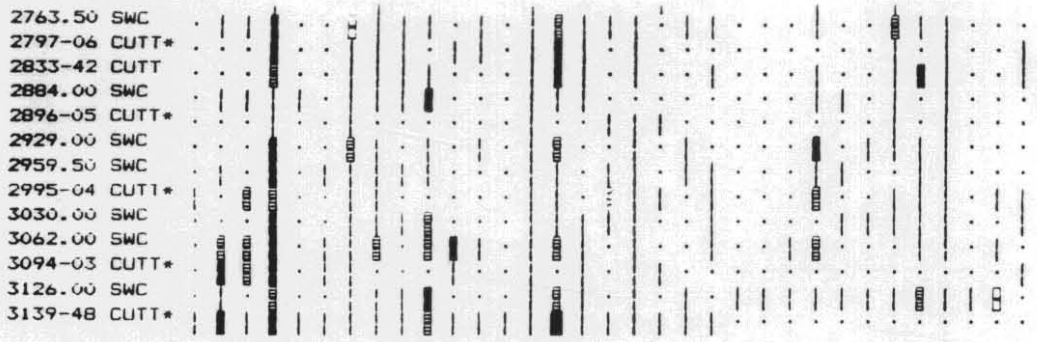
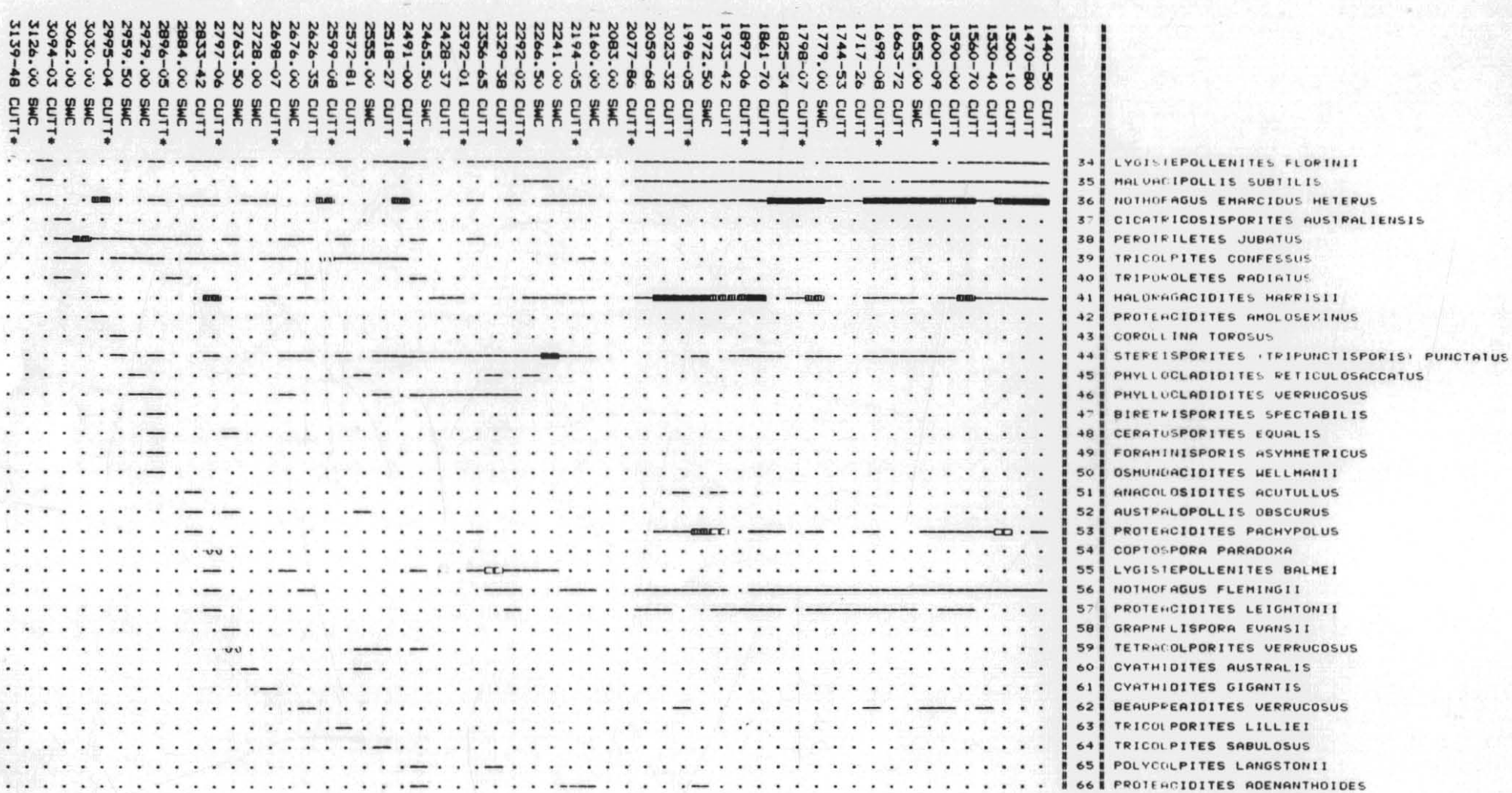

2763.50 SWC
2797-06 CUTT*
2833-42 CUTT
2884.00 SWC
2896-05 CUTT*
2929.00 SWC
2959.50 SWC
2995-04 CUTT*
3030.00 SWC
3062.00 SWC
3094-03 CUTT*
3126.00 SWC
3139-48 CUTT*


1440-50 CUTT
1470-80 CUTT
1500-10 CUTT
1530-40 CUTT
1560-70 CUTT
1590-00 CUTT
1600-09 CUTT*
1655.00 SWC
1663-72 CUTT
1699-08 CUTT*
1717-26 CUTT
1744-53 CUTT
1779.00 SWC
1798-07 CUTT*
1825-34 CUTT
1861-70 CUTT
1897-06 CUTT*
1933-42 CUTT
1972.50 SWC
1996-05 CUTT*
2023-32 CUTT
2059-68 CUTT
2077-86 CUTT*
2083.00 SWC
2160.00 SWC
2194-05 CUTT*
2241.00 SWC
2266.50 SWC
2292-02 CUTT*
2329-38 CUTT
2356-65 CUTT
2392-01 CUTT*
2428-37 CUTT
2465.50 SWC
2491-00 CUTT*
2518-27 CUTT
2555.00 SWC
2572-81 CUTT
2599-08 CUTT*
2626-35 CUTT
2676.00 SWC
2698-07 CUTT*
2728.00 SWC
2763.50 SWC
2797-06 CUTT*
2833-42 CUTT
2884.00 SWC
2896-05 CUTT*
2929.00 SWC
2959.50 SWC
2995-04 CUTT*
3030.00 SWC
3062.00 SWC
3094-03 CUTT*
3126.00 SWC
3139-48 CUTT*
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35 MALVACIPOLLIS SUBTILIS
36 NOTHOFAGUS EMARCIDUS HETERUS
37 CICATRICOSISPORITES AUSTRALIENSIS
38 PEROTRILETES JUBATUS
39 TRICOLPITES CONFESSUS
40 TRIPOROLETES RADIATUS
41 HALORAGACIDITES HARRISII
42 PROTEACIDITES AMOLOSEXINUS
43 COROLLINA TOROSUS
44 STEREISPORITES (TRIPUNCTISPORIS) PUNCTATUS
45 PHYLLOCLADIDITES RETICULOSACCATUS
46 PHYLLOCLADIDITES VERRUCOSUS
47 BIRETRISPORITES SPECTABILIS
48 CERATUSPORITES EQUALIS
49 FORAMINISPORIS ASYMMETRICUS
50 OSMUNDACIDITES WELLMANII
51 ANACOLOSIDITES ACUTULLUS
52 AUSTRALOPOLLIS OBSCURUS
53 PROTEACIDITES PACHYPOLUS
54 COPTOSPORA PARADOXA
55 LYGISTEPOLLENITES BALMEI
56 NOTHOFAGUS FLEMINGII
57 PROTEACIDITES LEIGHTONII
58 GRAPNELISPORA EVANSII
59 TETRACOLPORITES VERRUCOSUS
60 CYATHIDITES AUSTRALIS
61 CYATHIDITES GIGANTIS
62 BEAUPREAIDITES VERRUCOSUS
63 TRICOLPORITES LILLIEI
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1470-80 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1500-10 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1530-40 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1560-70 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1590-00 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1600-09 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1655.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1663-72 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699-08 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1717-26 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1744-53 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1779.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1798-07 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1825-34 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1861-70 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1897-06 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1933-42 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1972.50 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1996-05 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2023-32 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2059-68 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2077-86 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2083.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2160.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2194-05 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2241.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2266.50 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2292-02 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2329-38 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2356-65 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392-01 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2428-37 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2465.50 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2491-00 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2518-27 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2555.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2572-81 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2599-08 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2626-35 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2676.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2698-07 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2728.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2763.50 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2797-06 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2833-42 CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2884.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2896-05 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2929.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2959.50 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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3062.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3094-03 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3126.00 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3139-48 CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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		#100	#101	#102	#103	#104	#105	#106	#107	#108	#109	#110	#111	#112	#113	#114	#115	#116	#117	#118	#119	#120	#121	#122	#123	#124	#125	#126
		GEMMATRICOLPORITES GE[illegible]US	NOTHOFAGUS VANSTEENISII	PERIPOROPOLLENITES VE[illegible]ICUS	PROTEACIDITES ASPEROPI[illegible]US	NOTHOFAGUS SPP.	PROTEACIDITES KOPIENSI[illegible]	PROTEACIDITES RUGULATI[illegible]	SAPOTACEOIDAEPOLLENITE[illegible] ROTUNDUS	NOTHOFAGUS ASPERUS	PROTEACIDITES RETICULA[illegible]US	TRICOLPORITES ESTOUTU[illegible]	MYRTACEIDITES VERRUCOS[illegible]S	PROTEACIDITES TENUIEXTIUS	NOTHOFAGUS FALCATUS	ILEXPOLLENITES ANGULOC[illegible]AVATUS	PROTEACIDITES RECTOMA[illegible]INIS	PROTEACIDITES TUBERCULATUS	TRIPOROPOLLENITES CHNOUS	PROTEACIDITES STIPPLATIS	TRIORITES MAGNIFICUS	MALVACIPOLLIS GRANDIS	ANACOLOSIDITES LUTEOIDES	MILFORDIA HYPOLAENOIDE[illegible]	PROTEACIDITES ANGULATI[illegible]	PROTEACIDITES DELICATU[illegible]	AGLAOREIDIA QUALUMIS	PROTEACIDITES CONFRAGOUS
1440-50	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1470-80	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1500-10	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1530-40	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1560-70	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1590-00	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1600-09	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1655.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1663-72	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699-08	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1717-26	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1744-53	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1779.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1798-07	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1825-34	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1861-70	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1897-06	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1933-42	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1972.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1996-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2023-32	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2059-68	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2077-86	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2083.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2160.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2194-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2241.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2266.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2292-02	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2329-38	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2356-65	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392-01	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2428-37	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2465.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2491-00	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2518-27	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2555.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2572-81	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2599-08	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2626-35	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2676.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2698-07	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2728.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2763.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2797-06	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2833-42	CUTT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2884.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2896-05	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2929.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2959.50	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2995-04	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3030.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3062.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3094-03	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3126.00	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3139-48	CUTT*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
125	AGLAOREIDIA QUALUMIS
51	ANACOLOSIDITES ACUTULLUS
121	ANACOLOSIDITES LUTEOIDES
52	AUSTRALOPOLLIS OBSCURUS
93	BANKSIEACIDITES ELONGATUS
87	BEAUPREAIDITES ELEGANSIFORMIS
62	BEAUPREAIDITES VERRUCOSUS
47	BIRETRISPORITES SPECTABILIS
22	CALLIALASPORITES DAMPIERI
1	CAMEROZONOSPORITES OHAIOENSIS
48	CERATOSPORITES EQUALIS
37	CICATRICOSISPORITES AUSTRALIENSIS
33	CLAVIFERA TRIPLEX
54	COPTOSPORA PARADOXA
43	COROLLINA TOROSUS
69	CUPANIEIDITES ORTHOTEICHUS
60	CYATHIDITES AUSTRALIS
61	CYATHIDITES GIGANTIS
2	CYATHIDITES MINOR
3	CYATHIDITES SPLENDENS
23	CYCADOPITES FOLLICULARIS
24	DACRYCARPITES AUSTRALIENSIS
4	DILWYNITES GRANULATUS
5	DILWYNITES TUBERCULATUS
99	ERICIPITES SCABRATUS
67	FALCISPORITES GRANDIS
25	FALCISPORITES SIMILIS
49	FORAMINISPORIS ASYMMETRICUS
6	GAMBIERINA EDWARDSII
7	GAMBIERINA RUDATA
100	GEMMATRICOLPORITES GESTUS
8	GLEICHENIIDITES CIRCINIDITES
58	GRAPNELISPORA EVANSII
41	HALORAGACIDITES HARRISII
9	HERKOSPORITES ELLIOTTII
114	ILEXPOLLENITES ANGULOCLAVATUS
83	INTRATRIPOROPOLLENITES NOTABILIS
73	ISCHYOSPORITES GREMIUS
94	KUYLISPORITES WATERBOLKII
70	LATROBOSPORITES CRASSUS
26	LATROBOSPORITES OHAIENSIS
88	LILIACIDITES LANCEOLATUS
55	LYGISTEPOLLENITES BALMEI
34	LYGISTEPOLLENITES FLORINII
71	MALVACIPOLLIS DIVERSUS
120	MALVACIPOLLIS GRANDIS
35	MALVACIPOLLIS SUBTILIS
27	MICROCACHRYIDITES ANTARCTICUS
122	MILFORDIA HYPOLAENOIDES
84	MYRTACEIDITES PARVUS/MESONESUS
89	MYRTACEIDITES TENUIS
111	MYRTACEIDITES VERRUCOSUS
108	NOTHOFAGUS ASPERUS
28	NOTHOFAGUS BRACHYSPINULOSUS
85	NOTHOFAGUS DEMINUTUS
36	NOTHOFAGUS EMARCIDUS/HETERUS
10	NOTHOFAGUS ENDURAS
113	NOTHOFAGUS FALCATUS
56	NOTHOFAGUS FLEMINGII
11	NOTHOFAGUS SENECTUS
104	NOTHOFAGUS SPP.
101	NOTHOFAGUS VANSTEENISII
50	OSMUNDACIDITES WELLMANII
81	PERIPOROPOLLENITES DEMARCATUS
12	PERIPOROPOLLENITES POLYORATUS
102	PERIPOROPOLLENITES VESICUS
38	PEROTRILETES JUBATUS
13	PEROTRILETES MORGANII
14	PHYLLOCLADIDITES MAWSONII
45	PHYLLOCLADIDITES RETICULOSACCATUS
46	PHYLLOCLADIDITES VERRUCOSUS
29	PODOSPORITES MICROSACCATUS
95	POLYCOLPITES ESOBALTEUS
65	POLYCOLPITES LANGSTONII
96	POLYCOLPITES SIMPLEX
66	PROTEACIDITES ADENANTHOIDES
42	PROTEACIDITES AMOLOSEXINUS
123	PROTEACIDITES ANGULATUS
78	PROTEACIDITES ANNULARIS

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103	PROTEACIDITES ASPEROPOLUS
68	PROTEACIDITES CLARUS
126	PROTEACIDITES CONFRAGOSUS
75	PROTEACIDITES CRASSUS
124	PROTEACIDITES DELICATUS
72	PROTEACIDITES GRANDIS
74	PROTEACIDITES INCURVATUS
105	PROTEACIDITES KOPIENSIS
76	PROTEACIDITES LAPIS
57	PROTEACIDITES LEIGHTONII
86	PROTEACIDITES OBESOLABRUS
90	PROTEACIDITES OBSCURUS
77	PROTEACIDITES ORNATUS
53	PROTEACIDITES PACHYPOLUS
79	PROTEACIDITES PSEUDOMOIDES
115	PROTEACIDITES RECTOMARGINIS
109	PROTEACIDITES RETICULATUS
106	PROTEACIDITES RUGULATUS
15	PROTEACIDITES SPP.
118	PROTEACIDITES STIPPLATUS
112	PROTEACIDITES TENUIEXINUS
116	PROTEACIDITES TUBERCULATUS
80	RETITRILETES
30	RETITRILETES AUSTROCLAVATIDITES
31	RETITRILETES CIRCOLUMENUS
91	RICCIA BOXATUS
97	SANTALUMIDITES CAINOZOICUS
107	SAPOTACEOIDAEPOLLENITES ROTUNDUS
98	SPINIZONOCOLPITES PROMINATUS
44	STEREISPORITES (TRIPUNCTISPORIS) PUNCTATUS
16	STEREISPORITES ANTIQUISPORITES
17	STEREISPORITES REGIUM
59	TETRACOLPORITES VERRUCOSUS
39	TRICOLPITES CONFESSUS
18	TRICOLPITES GILLII
19	TRICOLPITES LONGUS
64	TRICOLPITES SABULOSUS
20	TRICOLPITES WAIPARAENSIS
110	TRICOLPORITES ESTOUTUS
63	TRICOLPORITES LILLIEI
119	TRIORITES MAGNIFICUS
40	TRIPOROLETES RADIATUS
32	TRIPOROLETES RETICULATUS
92	TRIPOROPOLLENITES AMBIGUUS
117	TRIPOROPOLLENITES CHNOSUS
21	TRIPOROPOLLENITES SECTILIS
82	VERRUCOSISPORITES KOPUKUENSIS

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APPENDIX 7

PETROLEUM GEOCHEMISTRY

KOORKAH -1

PART 1: HYDROCARBON SOURCE ROCK EVALUATION

PART 2: VITRINITE REFLECTANCE AND KEROGEN TYPING

PART 1: HYDROCARBON SOURCE ROCK EVALUATION

INTRODUCTION

A suite of canned cuttings (84 samples) and sidewall cores (11 samples) from Koorkah-1 was submitted for organic geochemical analysis.

The aims of the investigation were twofold:

1. to assess the hydrocarbon source potential of the Eastern View Coal Measures in Koorkah-1; and

2. to evaluate the possible presence of migrated hydrocarbons or residual oil in the well section between 1780 and 2730 metres depth.

ANALYTICAL PROCEDURE

Details of the analytical methods are given in Appendix 1.

RESULTS

Analytical data are summarised and presented herein as follows:

	Table	Figure	Appendix
Headspace gas	1,2	1-4	-
Total organic carbon (TOC)	3-5	-	-
Rock-Eval pyrolysis	4,5	5-7	-
C15+ extract (EOM, total hydrocarbons)	6	8-13	-
Kerogen pyrolysis-GC	7	14-20	-
Vitrinite reflectance	-	-	2

DISCUSSION

Maturity

The vitrinite reflectance versus depth profile for Koorkah-1 (Appendix 2) indicates that the Eocene section above 2000 metres depth is thermally immature (VR less than 0.5%). Liquid hydrocarbon generation from sediments of such low rank can be expected only where the DOM is rich in resinite (Snowdon and Powell, 1982; Powell, 1985). This is not the case in Koorkah-1 (Watson, 1986).

Apart from a localised zone of elevated rank immediately adjacent to the dolerite sill (2095-2129 metres depth), Eocene, Paleocene and Cretaceous sediments within the interval 2000-2950 metres depth are marginally mature (VR = 0.5-0.7%). The rank threshold for significant gas generation from terrestrial (woody-herbaceous) organic matter (VR = 0.6% Monnier et al., 1983) occurs at 2730 metres depth in the Cretaceous sequence.

Oil generation from resinite-poor terrestrial organic matter commences at VR = 0.7% (Powell, 1985). Thus, the top of the oil window in Koorkah-1 is located at approximately 2950 metres depth, in the Cretaceous section of the Eastern View Coal Measures.

Rock-Eval Tmax values are in good agreement with measured vitrinite reflectance (Figs. 5-7).

Rock-Eval production index, another maturity-dependent parameter, displays a less well defined trend of increasing values with depth in Koorkah-1 (Tables 4 and 5). Values increase from PI = 0.07 at the top of the Eastern View Coal Measures to PI = 0.21 at the base. The anomalously high production indices (PI = 0.31-0.50), and related very low S2, PC and HI values, of cuttings samples from immediately above the sill are the result of local heating caused by its intrusion into the basal part of the Eocene sequence. Other positive excursions in the production index versus depth profile for Koorkah-1 (Table 6) were investigated (section 4.4) to see if they represented zones of migrated hydrocarbons.

Headspace gas data also have the potential to delineate maturation trends (see e.g. Alexander et al., 1983; Monnier et al., 1983). In the Koorkah-1 well section, a clearly defined maximum in the total gas (C1-C4) profile (Fig. 1) coincides with the dolerite sill. The i-C4/n-C4 profile (Fig. 3) is as would be expected for the maturity range documented by VR data (cf. Alexander et al., 1983, fig. 1). This isomeric ratio decreases to less than unity at the anticipated onset of significant gas generation (VR = 0.6%, 2750 metres depth).

Percent wet gas (Fig. 2) and i-C5/n-C5 (Fig. 4) display no obvious relationship with increasing depth and/or maturity. In samples with significant gas yields (C1-C4 more than 10,000 ppm), wet gas values greater than 50% occur above 2750 metres depth (Fig. 2B). This may indicate extensive upward migration of C2-C4 hydrocarbons from within the underlying gas generation window.

Source Richness

Cuttings gas (C1-C4) yields below 1600 metres depth in Koorkah-1 are mostly fair (1,000-10,000 ppm), although intervals with good to very good gas richness (10,000-100,000+ ppm) are reasonably common throughout the Eastern View Coal Measures (Fig. 1). Wet gas (C5+) yields, however, are uniformly poor (less than 1,000 ppm) throughout (Table 2).

Total organic values (Tables 3-5) decrease with increasing depth in the Eastern View Coal Measures, thus:

	TOC		
	Range %	Mean %	n
Eocene	0.61-10.9	3.19	11*
Paleocene	1.35-2.16	1.83	4
Cretaceous	0.43-6.45	1.35	17

*Excludes 2 samples which come from the same depth as the sill and therefore represent cavings.

Source richness is mostly poor to fair as indicated by potential hydrocarbon yields (oil and gas) in the range S1+S2 = 0.3-5 kg/tonne (Tables 4 and 5). However, the following samples display good to very good source richness for petroleum hydrocarbons.

Age	Depth m	S1 + S2 mg h'c/g	PC %	TOC %
Eocene	1780-89	36.5	3.04	10.9
	1924-33	24.7	2.05	4.85
	1978-87	13.3	1.10	5.45
	1996-05	7.2	0.59	3.40
Paleocene	2284-93	7.5	0.62	2.10
	2392-01	6.9	0.57	2.16
Cretaceous	2728	15.1	1.25	6.45

Source Quality and Kerogen Type

Hydrogen index values (HI = 60-450 mg S2/g TOC: Tables 4 and 5) suggest the presence of organic matter which ranges in composition from oil and gas-prone Type II-III kerogen to gas-prone Type III kerogen (Figs. 5-7). The best quality organic matter (albeit immature) occurs in the Eocene and Paleocene sections of the Eastern View Coal Measures. Samples with hydrogen index values greater than HI = 200 are considered to have significant liquid hydrocarbon source potential.

Very low hydrogen index values (HI less than 50) characterise thermally altered Eocene sediments immediately overlying the sill (Fig. 5). (Note: Tmax values in these samples are unreliable because of the small, ill-defined S2 peaks in their Rock-Eval pyrograms).

Organic petrological examination of another suite of cuttings and sidewall core samples from Koorkah-1 (Watson, 1986) confirms the presence of woody-herbaceous DOM rich in intertinite and vitrinite. High vitrinite contents (V = 50-70% of DOM) are reasonably common in Eocene shales and siltstones, whereas the Paleocene and Cretaceous DOM tends to be predominantly inertinitic. Exinite contents are uniformly low throughout (E = 5-10% of DOM).

In order to more rigorously assess their liquids-generation potential, seven samples (4 Eocene, 2 Paleocene, 1 Cretaceous) were selected for kerogen isolation and pyrolysis-GC (PGC : Table 7). (Note: A contaminant compound of unknown origin coelutes with the C16 n-alkane peak in all but one of these PGC traces. The true concentration of n-C16:0 in these pyrograms has been estimated from the adjacent C15 and C17 n-alkene/n-alkane pairs, and an appropriate correction made to the relevant paramaters in Table 7 (viz. % C11+, C1-C4/C5+). Fortunately, this contamination does not obscure the overall character of the kerogen pyrolysate).

Inspection of the PGC traces (Figs. 14-20) reveals kerogen pyrolysates of remarkably similar composition, notwithstanding the range of hydrogen index values represented (HI = 196-444). The Cretaceous kerogen (2728 metres depth) is obviously gas-prone (Fig. 20), being the most aromatic (toluene/n-C7:1 = 3.8; m + p-xylene/n-C8:1 = 2.5) and having the highest "gas/oil ratio" (C1-C4/C5+ = 1.58) (Table 7). Samples from 1924-33 metres (Eocene) and 2284-93 metres (Paleocene) have the lowest "gas/oil ratios" (C1-C4/C5+ less than 1 : table 7) but even these kerogens are, at best, potential sources of only gas-condensate.

Residual Oil Analysis

Of the six samples selected for residual oil analysis (Table 6), only two gave EOM/total hydrocarbon GC traces that resemble those of an oil or condensate (viz. 2032-43 metres, Eocene, and 2284-93 metres, Paleocene : Figs. 11 and 12). The migrated hydrocarbons which stain both these intervals are characterised by high pristane/phytane and pristane/n-heptadecane ratios (pr/ph = 4; pr/n-C17 more than 1). The latter feature suggests relative immaturity. Immature condensate (MPI-derived source VR = 0.7%) recovered from the Eocene in Pelican-5 (RFT 3, 2788.2 metres) has a similarly high pristane/n-heptadecane ratio.

The remaining extracts represent indigenous immature source-rock bitumen (Figs. 8-10, 13).

CONCLUSIONS

1. Non-marine sediments of the Eastern View Coal Measures above 2000 metres depth in Koorkah-1 are thermally immature (VR less than 0.5%).

2. Intrusion of a 34 metre thick dolerite sill into the basal part of the Eocene section has produced a zone of elevated maturity which is clearly evident on the vitrinite reflectance profile for Koorkah-1 between 1900 and 2400 metres depth.

3. The rank thresholds for the onset of hydrocarbon generation from resinite-poor terrestrial organic matter are located within the Cretaceous sequence as follows:

Threshold	VR %	Depth m
Top of gas window	0.60	2730
Top of oil window	0.70	2950

Optimum maturity for oil generation is approached only at T.D. in this well (VR = 0.95% at 3148 metres).

4. The richest potential source rocks in Koorkah-1 occur between 1780 and 2005 metres depth in the Eocene section of the Eastern View Coal Measures (TOC = 3.11%; S1+S2 = 7-37 kg h'cs/tonnes). These sediments contain gas/condensate-prone Type II-III kerogen which, although immature at Koorkah-1, may well be generative elsewhere in the permit area.

5. Although less abundant and still only marginally mature (VR = 0.5-0.6%), dispersed organic matter of similar quality is present in the Paleocene section of the Koorkah-1 well (notably at 2284-2401 metres depth). The Cretaceous sequence is essentially gas-prone.

6. Migrated oil/condensate appears to have stained cuttings from at least two intervals in Koorkah-1 (viz. 2032-2043 metres, Eocene; 2284-2293 metres, Paleocene).

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CONFIDENTIAL
CLASS 1

TABLE 1

AMDEL HEADSPACE GAS ANALYSIS

Client AMOCO

Well KOORKAH 1

DEPTH (m)	METHANE	ETHANE	PROPANE	I-BUTANE	N-BUTANE	I-PENTANE	N-PENTANE	HEXANE	HEPTANES+
1618-27	7	16	38	17	11	8	5	0	0
1636-45	614	103	97	50	28	24	9	26	21
1654-63	63	7	44	24	16	12	7	14	8
1672-81	757	212	195	71	33	22	7	18	10
1690-99	2581	992	443	127	42	29	8	18	8
1708-17	1823	261	207	87	27	24	6	17	8
1726-35	39	74	67	36	13	15	5	19	26
1744-53	8	9	17	12	5	7	0	8	5
1762-71	215	38	42	37	17	26	7	37	51
1780-89	15121	4275	1256	341	97	74	14	55	44
1798-07	5	2	11	9	4	6	2	11	12
1816-25	5	14	29	15	8	9	4	15	16
1834-43	260	0	7	10	5	8	3	15	18
1852-61	11179	69	99	44	26	19	8	25	39
1870-79	362	210	202	100	42	44	13	45	65
1888-97	6	0	18	11	16	7	5	10	19
1906-15	3	0	11	5	16	4	4	7	11
1924-33	18538	20	71	51	48	21	9	17	15
1942-51	4629	3132	1464	730	426	169	45	76	56
1960-69	3072	2116	1034	515	306	98	25	53	43
1978-87	30182	7849	2647	883	537	127	34	48	33
1996-05	8980	3951	1951	801	489	213	57	85	43
2014-23	26456	6838	3123	941	525	356	183	239	90
2032-43	11305	6632	4148	1146	610	443	230	484	209
2050-59	72997	1546	1269	375	192	126	54	103	47
2068-77	102469	1089	1123	326	174	121	55	145	81
2086-95	100367	2059	1325	452	229	165	123	128	47
2104-13	48062	581	291	86	49	35	28	37	17
2122-31	71112	203	189	67	42	32	26	44	22
2140-49	43871	1195	1034	275	126	80	32	65	35
2158-67	511	38	45	21	14	17	9	25	18
2176-85	4130	813	775	218	122	89	31	60	31
2194-03	76600	1129	1004	279	151	114	37	77	38
2212-21	11491	475	513	168	98	78	29	60	30
2230-39	11066	546	559	195	134	76	38	54	29
2266-75	2011	512	1337	715	387	206	68	84	29
2284-93	18000	471	991	379	220	95	35	56	30
2302-11	562	283	582	226	134	68	29	56	41
2320-29	22	0	5	3	2	1	1	1	1
2338-47	3777	2282	2753	946	316	115	45	44	17
2356-65	3904	1734	1841	501	204	89	36	48	31
2374-83	7666	3976	2858	724	266	125	39	63	36
2392-01	15775	4471	2055	468	205	109	37	70	49
2410-19	4781	2864	2111	498	224	108	35	65	43
2428-37	866	497	484	89	64	30	14	29	35
2446-55	103	52	35	8	6	3	2	3	0
2464-73	198	107	136	37	26	12	8	12	8
2482-91	1	0	2	1	1	1	0	0	0
2500-09	2197	92	187	46	32	11	11	12	8
2518-27	37840	1172	1133	178	108	31	24	23	13

TABLE 1 contd.

AMDEL HEADSPACE GAS ANALYSIS

Client AMOCO

Well KOORKAH 1

DEPTH (m)	METHANE	ETHANE	PROPANE	I-BUTANE	N-BUTANE	I-PENTANE	N-PENTANE	HEXANE	HEPTANES+
2536-45	1435	1169	1226	205	131	38	30	27	14
2554-63	29082	1760	1685	249	171	43	33	30	14
2572-81	1561	1328	1461	232	173	48	32	33	0
2590-99	18287	3051	2014	273	187	56	30	40	22
2608-17	3964	1582	1512	257	182	57	34	41	23
2626-35	1172	2054	1920	251	172	40	28	28	16
2644-53	1398	1732	2012	309	190	45	31	31	18
2662-71	1482	1491	1715	247	178	42	29	28	23
2680-89	2565	2342	2182	375	318	92	53	66	41
2698-07	5	27	92	22	18	7	4	8	9
2716-25	4171	3117	2288	310	277	73	39	46	26
2734-43	376	714	1104	178	158	50	28	34	20
2752-61	1216	899	728	94	92	30	17	25	17
2770-79	1080	564	511	73	80	27	17	28	22
2788-97	531	198	189	31	32	12	7	9	5
2806-15	1201	547	471	65	73	22	13	16	12
2824-33	174	140	198	40	44	17	12	19	11
2842-51	732	0	14	6	9	4	2	5	8
2860-69	1520	1231	1732	340	340	117	62	85	52
2878-87	30052	220	332	62	74	29	19	29	31
2896-05	2813	2410	2463	337	421	104	61	69	42
2914-23	1722	818	791	178	131	58	30	46	27
2932-41	2810	2441	2481	450	470	161	93	129	85
2950-59	14	16	45	13	18	8	8	16	26
2968-77	63	54	87	15	22	7	6	10	14
2986-95	3657	2790	2014	267	355	112	68	84	51
3004-13	434	611	518	56	83	27	20	32	29
3022-31	366	320	312	49	78	31	26	41	35
3040-49	178	117	274	43	76	30	21	34	36
3058-67	6500	87	150	27	48	22	15	29	30
3076-85	1005	714	867	102	169	59	35	52	40
3094-03	17673	78	237	45	80	38	25	45	40
3112-21	70381	1181	1615	293	443	196	98	142	97
3130-39	16791	90	145	28	40	18	12	18	15

TABLE 2

AMDEL HEADSPACE GAS ANALYSIS

Client AMOCO

Well KOORKAH 1

DEPTH m	WET GAS (%)	iC4/nC4	iC5/nC5	C1-C4 ppm	C5+ ppm
1618-27	92.0	1.52	1.36	89	13
1636-45	31.2	1.79	1.18	892	79
1654-63	59.3	1.53	1.28	154	41
1672-81	40.3	2.15	1.52	1269	57
1690-99	38.3	3.05	1.42	4184	63
1708-17	24.2	3.26	1.11	2404	56
1726-35	83.1	2.73	0.88	229	66
1744-53	84.3	2.31	0.73	50	20
1762-71	38.3	2.26	0.64	348	121
1780-89	28.3	3.52	1.32	21090	188
1798-07	84.5	2.34	0.62	31	31
1816-25	93.5	2.00	0.85	71	44
1834-43	7.9	1.85	0.64	282	44
1852-61	2.1	1.71	1.36	11417	90
1870-79	60.5	2.42	0.95	916	167
1888-97	89.2	0.71	2.36	51	40
1906-15	91.7	0.34	3.93	35	27
1924-33	1.0	1.07	2.31	18728	62
1942-51	55.4	1.71	2.52	10381	346
1960-69	56.4	1.68	3.12	7043	219
1978-87	28.3	1.64	4.21	42097	243
1996-05	44.5	1.64	2.29	16172	399
2014-23	30.2	1.79	1.47	37883	868
2032-43	52.6	1.88	1.38	23840	1366
2050-59	4.4	1.95	1.52	76379	330
2068-77	2.6	1.88	1.44	105181	402
2086-95	3.9	1.97	1.39	104433	462
2104-13	2.1	1.75	1.41	49068	117
2122-31	0.7	1.59	1.31	71613	124
2140-49	5.7	2.18	1.59	46503	211
2158-67	18.6	1.50	0.82	628	69
2176-85	31.8	1.79	1.37	6058	212
2194-03	3.2	1.84	1.32	79163	266
2212-21	9.8	1.73	1.26	12744	196
2230-39	11.5	1.45	1.77	12501	196
2266-75	59.5	1.85	1.88	4963	387
2284-93	10.3	1.73	2.32	20062	216
2302-11	68.5	1.69	1.96	1787	194
2320-29	32.2	1.13	2.37	32	4
2338-47	62.5	2.99	2.76	10074	221
2356-65	52.3	2.45	2.30	8184	203
2374-83	50.5	2.72	2.12	15491	263
2392-01	31.3	2.29	1.88	22974	265
2410-19	54.4	2.23	2.07	10479	252
2428-37	56.7	1.39	2.15	2000	108
2446-55	49.8	1.42	1.98	204	7
2464-73	60.8	1.39	2.11	504	41
2482-91	71.0	0.94	0.79	5	1
2500-09	14.0	1.43	2.79	2554	42

TABLE 2 contd.

AMDEL HEADSPACE GAS ANALYSIS

Client AMOCO

Well KOORKAH 1

DEPTH m	WET GAS (%)	iC4/nC4	iC5/nC5	C1-C4 ppm	C5+ ppm
2518-27	6.4	1.65	3.51	40432	91
2536-45	65.6	1.56	3.46	4167	109
2554-63	11.7	1.46	4.01	32947	120
2572-81	67.2	1.33	3.61	4755	114
2590-99	23.2	1.46	3.36	23812	147
2608-17	47.1	1.41	3.20	7497	155
2626-35	79.0	1.46	4.33	5569	111
2644-53	75.2	1.62	4.21	5641	125
2662-71	71.0	1.39	4.28	5114	122
2680-89	67.0	1.18	3.45	7782	252
2698-07	96.7	1.21	2.41	164	28
2716-25	59.0	1.12	3.81	10163	183
2734-43	85.1	1.13	3.17	2531	130
2752-61	59.9	1.02	3.11	3029	88
2770-79	53.2	0.90	2.93	2308	94
2788-97	45.9	0.98	2.76	982	32
2806-15	49.1	0.89	3.26	2356	64
2824-33	70.9	0.93	2.55	595	58
2842-51	3.8	0.62	2.20	761	20
2860-69	70.6	1.00	2.90	5164	317
2878-87	2.2	0.84	2.59	30740	108
2896-05	66.7	0.80	4.06	8444	275
2914-23	52.7	1.36	2.26	3641	161
2932-41	67.5	0.96	2.92	8652	468
2950-59	86.8	0.72	2.07	106	58
2968-77	73.8	0.67	2.98	242	37
2986-95	59.7	0.75	3.16	9083	316
3004-13	74.5	0.67	3.07	1701	108
3022-31	67.5	0.63	2.53	1124	133
3040-49	74.1	0.56	2.57	690	120
3058-67	4.6	0.56	2.19	6811	97
3076-85	64.8	0.60	2.85	2858	186
3094-03	2.4	0.56	2.10	18113	148
3112-21	4.8	0.66	2.26	73913	533
3130-39	1.8	0.70	2.20	17094	64

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TABLE 3: TOTAL ORGANIC CARBON CONTENTS OF SIDEWALL CORES, KOORKAH-1

SWC No.	Depth m	TOC %
25	2465.5	1.73*
24	2555	1.26*
20	2676	1.03*
19	2728	6.45*
17	2763.5	1.12*
13	2884	0.45
12	2929	1.20*
10	2959.5	0.90
7	3030	1.20*
6	3062	0.65
2	3126	1.27*

*Selected for Rock Eval pyrolysis (Table 4).

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TABLE 4

AMDEL

ROCK-EVAL PYROLYSIS

06/03/86

Client AMOCO

Well KOORKAH-1 Sidewall Cores

DEPTH	T MAX	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI
2465.50	438	0.25	2.60	0.36	2.85	0.09	7.22	0.23	1.73	150	20
2555.00	440	0.17	1.48	0.25	1.65	0.10	5.92	0.13	1.26	117	19
2676.00	443	0.16	0.65	0.51	0.81	0.19	1.27	0.06	1.03	63	49
2728.00	439	2.04	13.05	1.42	15.09	0.14	31.07	1.25	6.45	202	6
2763.50	441	0.29	1.77	0.12	2.06	0.14	14.75	0.17	1.12	158	10
2929.00	441	0.35	1.55	0.92	1.90	0.18	1.68	0.15	1.20	129	76
3030.00	448	0.21	0.78	0.48	0.99	0.20	1.62	0.08	1.20	65	40
3126.00	445	0.36	1.33	0.13	1.69	0.21	10.23	0.16	1.27	104	10

TABLE 5

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AMOEL

ROCK-EVAL PYROLYSIS

08/05/86

Client AMOCO

Well KOORKAH-1 Cuttings

DEPTH (m)	T MAX	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI
1780-89	426	2.48	34.06	0.87	36.54	0.07	39.14	3.04	10.90	312	8
1924-33	431	3.16	21.55	1.17	24.71	0.13	18.41	2.05	4.85	444	24
1978-87	431	0.91	12.40	1.08	13.31	0.07	11.48	1.10	5.45	228	20
1996-05	431	0.51	6.66	1.21	7.17	0.07	5.50	0.59	3.40	196	36
2014-23	429	0.36	4.59	2.11	4.95	0.07	2.17	0.41	2.84	162	74
2032-43	440	0.23	2.48	0.76	2.71	0.09	3.26	0.22	3.30	75	23
2050-59	436	0.09	0.17	0.29	0.26	0.35	0.58	0.02	0.53	32	54
2068-77	439	0.17	0.18	0.27	0.35	0.50	0.66	0.02	1.28	14	21
2086-95	432	0.10	0.22	0.20	0.32	0.31	1.10	0.02	0.61	36	32
2104-13	431	0.55	2.96	0.31	3.51	0.16	9.54	0.29	0.81	365	38
2122-31	431	0.09	0.70	0.26	0.79	0.12	2.69	0.06	0.28	250	93
2140-49	439	0.12	0.84	0.52	0.96	0.12	1.61	0.08	0.78	108	67
2194-03	434	0.19	2.09	0.63	2.28	0.08	3.31	0.19	1.15	182	55
2284-93	436	1.38	6.14	0.36	7.52	0.18	17.05	0.62	2.10	292	17
2374-83	438	0.18	2.29	0.44	2.47	0.07	5.20	0.20	1.35	170	33
2392-01	436	0.76	6.14	0.67	6.90	0.11	9.16	0.57	2.16	284	31
2518-27	441	0.12	1.52	0.32	1.64	0.07	4.75	0.13	1.23	123	26
2554-63	441	0.17	2.03	0.41	2.20	0.08	4.95	0.18	1.43	142	29
2590-99	441	0.14	1.87	0.61	2.01	0.07	3.06	0.16	1.44	130	42
2878-87	435	0.26	2.78	0.52	3.04	0.09	5.34	0.25	1.52	183	34
3094-03	445	0.14	0.90	2.50	1.04	0.13	0.36	0.09	0.71	127	352
3112-21	449	0.14	0.85	0.81	0.99	0.14	1.04	0.09	0.72	118	113
3130-39	449	0.10	0.53	0.24	0.63	0.16	2.20	0.06	0.43	123	56

KEY TQ ROCK-EVAL PYROLYSIS DATA SHEET

	PARAMETER	SPECIFICITY
T max	position of S_2 peak in temperature program (^{o}C)	Maturity/Kerogen type
S_1	kg hydrocarbons (extractable)/tonne rock	Kerogen type/Maturity/Migrated oil
S_2	kg hydrocarbons (kerogen pyrolysate)/tonne rock	Kerogen type/Maturity
S_3	kg CO_2 (organic)/tonne rock	Kerogen type/Maturity *
$S_1 + S_2$	Potential Yield	Organic richness/Kerogen type
PI	Production Index ($S_1/S_1 + S_2$)	Maturity/Migrated Oil
PC	Pyrolysable Carbon (wt. percent)	Organic richness/Kerogen type/Maturity
TOC	Total Organic Carbon (wt. percent)	Organic richness
HI	Hydrogen Index (mg h'c (S_2)/g TOC)	Kerogen type/Maturity
OI	Oxygen Index (mg CO_2(S_3)/g TOC)	Kerogen type/Maturity *

*Also subject to interference by CO_2 from decomposition of carbonate minerals.

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TABLE 6: SAMPLES SELECTED FOR RESIDUAL OIL ANALYSIS, KOORKAH-1

Depth m	Sample Type	Wt Sample g	EOM ppm	Total Hydrocarbons % EOM
1780-1789	Cuttings	19.56	6109	43.1
1924-1933	Cuttings	33.67	169050	7.9
1978-1987	Cuttings	20.61	6341	n.d.
2032-2041	Cuttings	32.50	1772	60.0*
2284-2293	Cuttings	30.10	2943	42.8*
2728	SWC	13.20	924	n.d.

n.d. = not determined. *oil/condensate-like GC trace.

TABLE 7: KEROGEN PYROLYSIS-GC DATA, KOORKAH-1

Depth m	Age	HI	C_1-C_4 %	C_5-C_{10} %	C_{11+} %	$\frac{C_1\text{-}C_4}{C_{5+}}$	$\frac{Tol}{n\text{-}C_{7:1}}$	$\frac{m,p\text{-}Xyl}{n\text{-}C_{8:1}}$
1780-1789	Eocene	312	52.0	27.6	20.4	1.08	2.4	1.8
1924-1933	Eocene	444	48.9	27.4	23.7*	0.96*	2.4	1.6
1978-1987	Eocene	228	53.5	26.8	19.7*	1.15*	2.3	1.6
1996-2005	Eocene	196	52.2	28.3	19.5*	1.09*	2.2	1.6
2284-2293	Paleocene	292	49.8	30.6	19.5*	0.99*	2.0	1.3
2392-2401	Paleocene	284	59.1	25.8	15.1*	1.44*	2.1	1.6
2728	Cretaceous	202	61.3	21.8	16.9*	1.58*	3.8	2.5

*Corrected for contaminant peak at $\underline{n}$-$C_{16:0}$

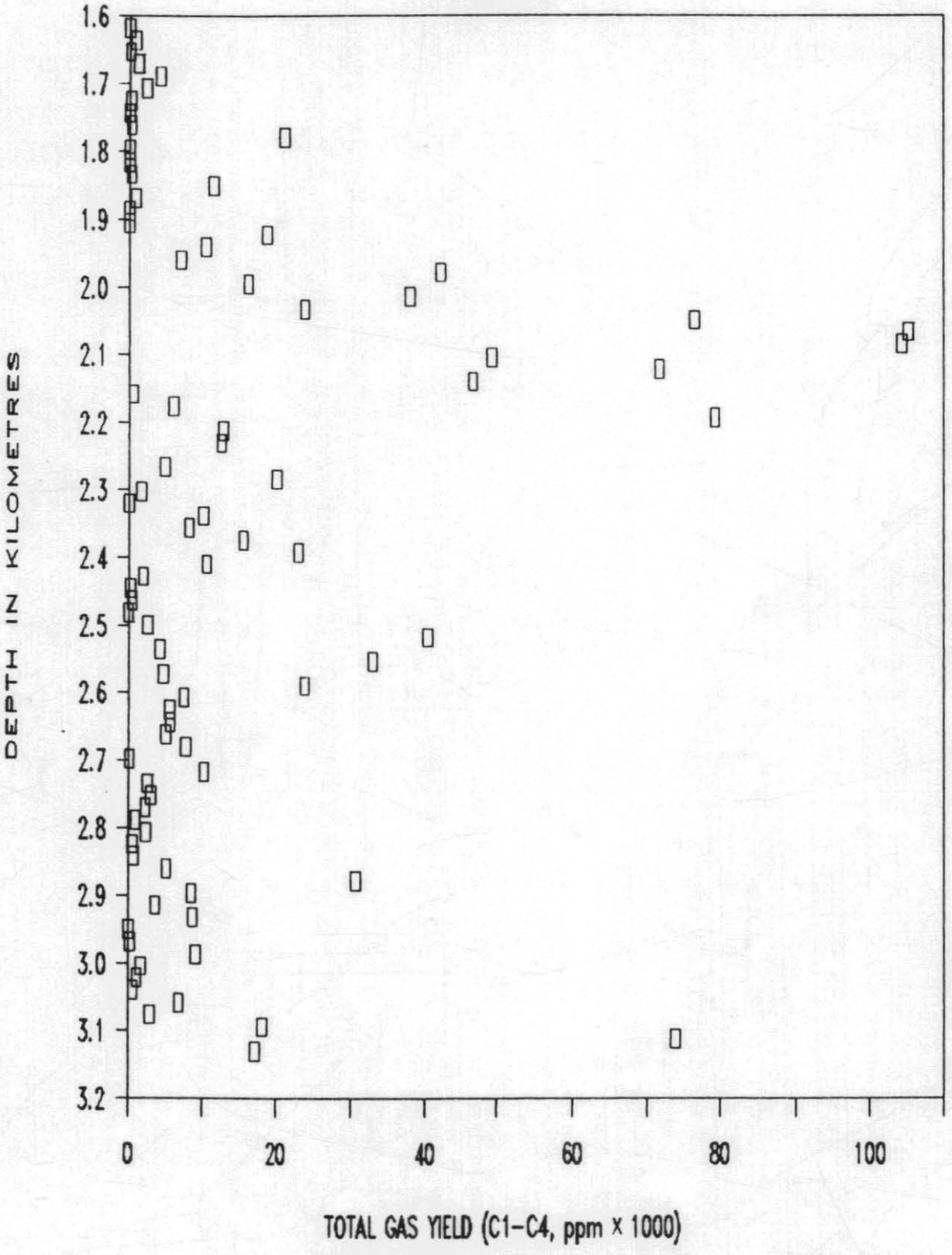
%C_1-C_4, C_5-C_{10} and C_{11+} = percentage of all compounds in the nominated carbon number ranges.

HI = hydrogen index (mg S_2/g TOC)

FIGURE 1

AMOCO

KOORKAH 1



5 cm

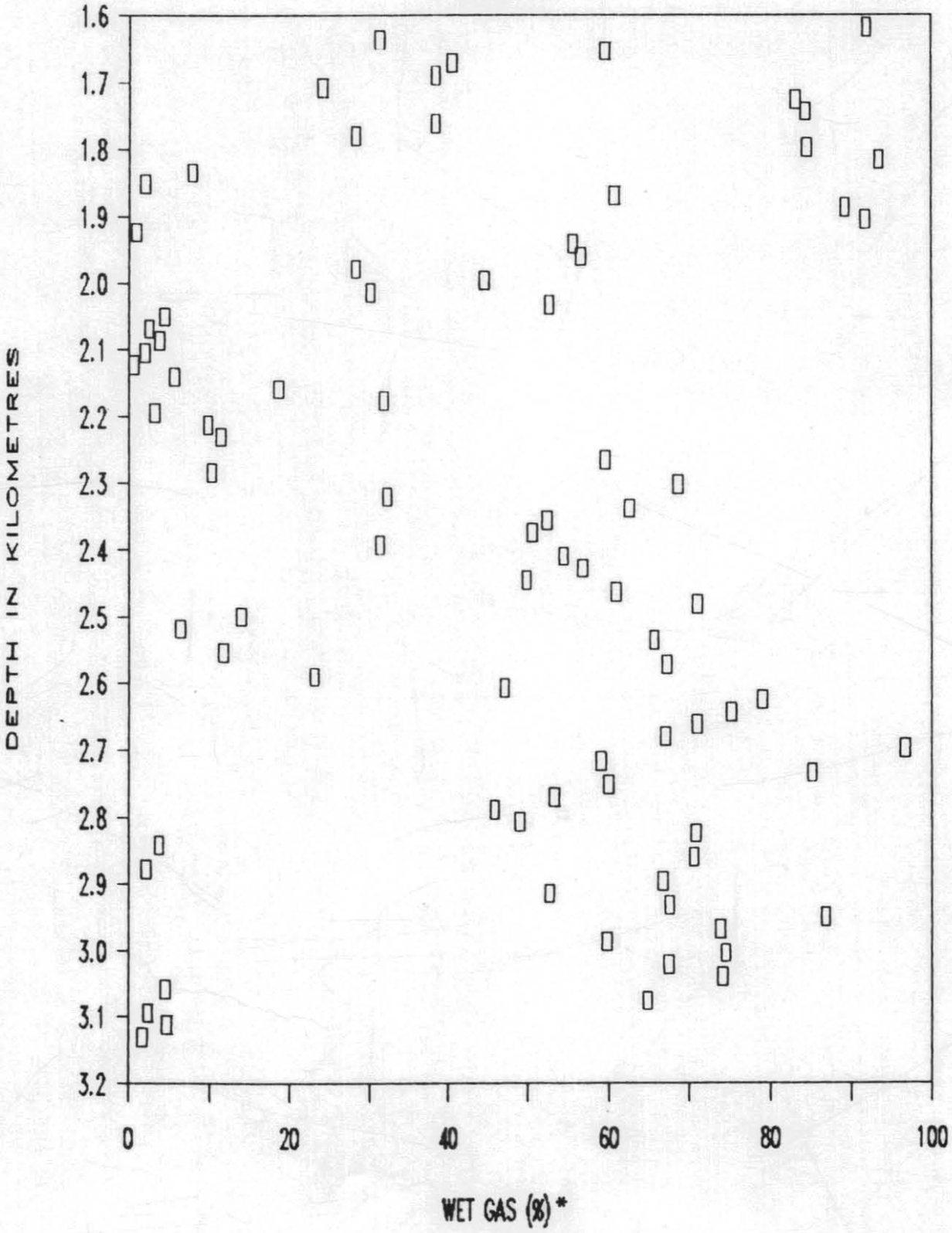
amdel

277125

FIGURE 2A

AMOCO

KOORKAH 1



* All samples

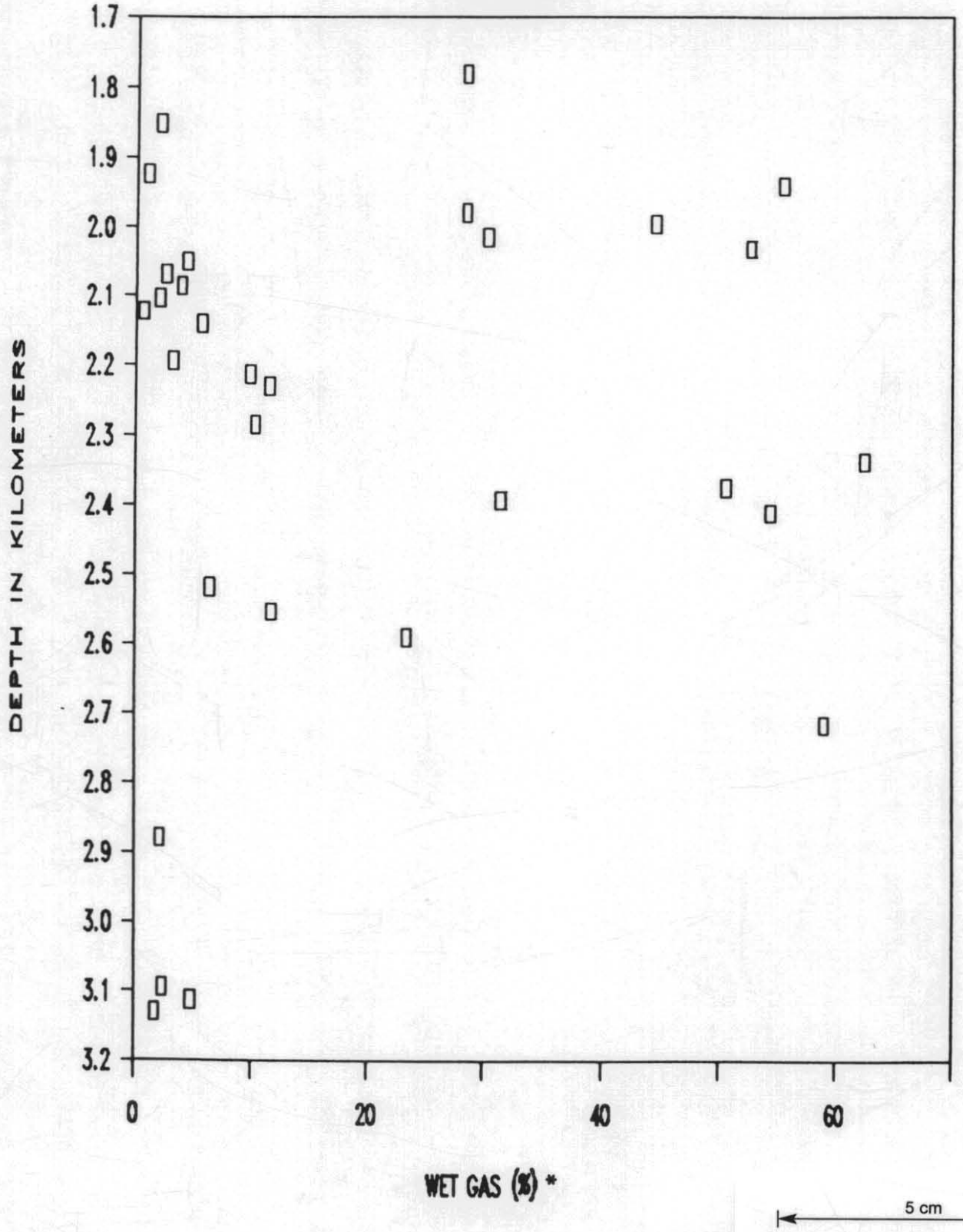
5 cm

277126

FIGURE 2B

AMOCO

KOORKAH 1

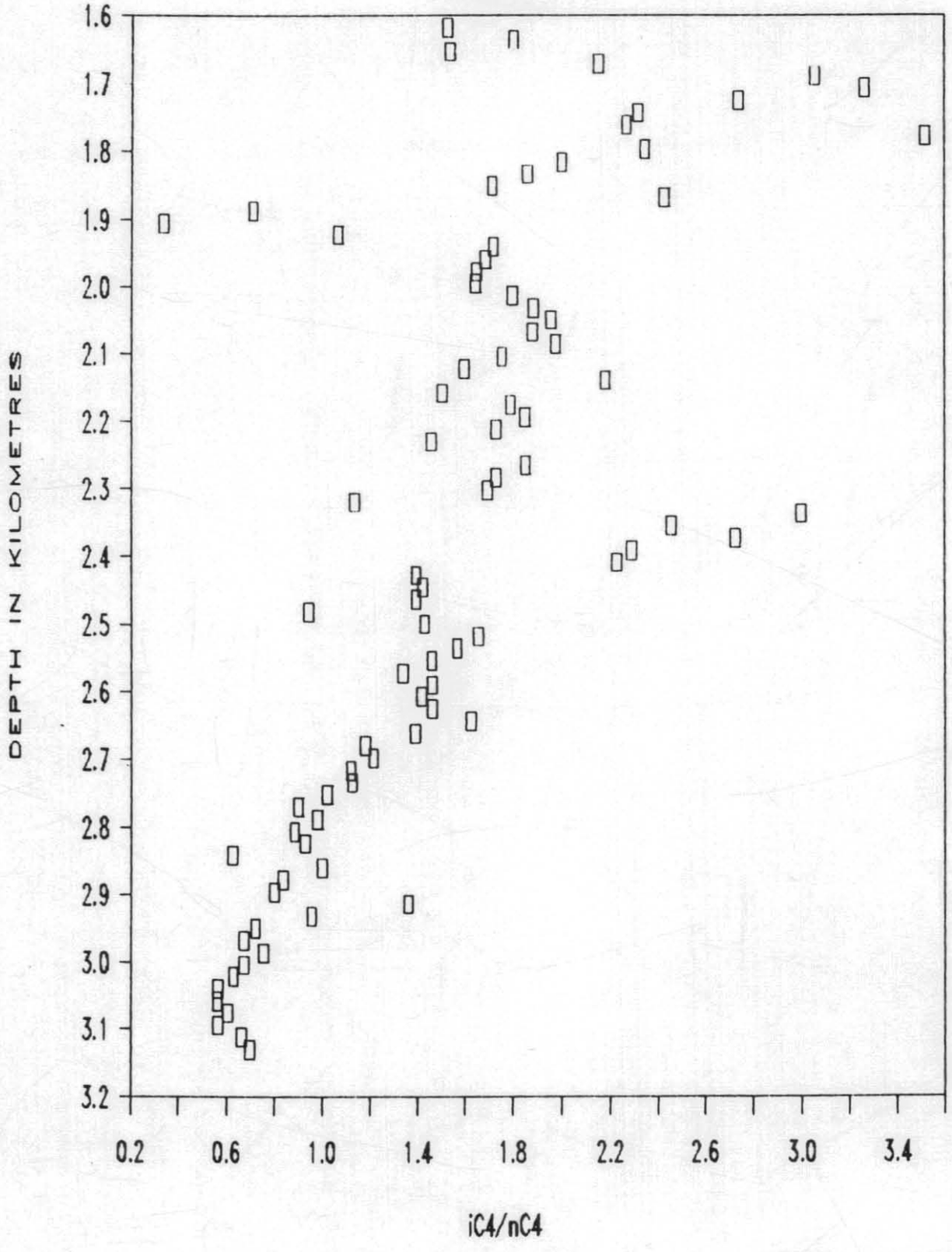


* Samples yielding >10,000 ppm C_1-C_4

FIGURE 3

AMOCO

KOORKAH 1



5 cm

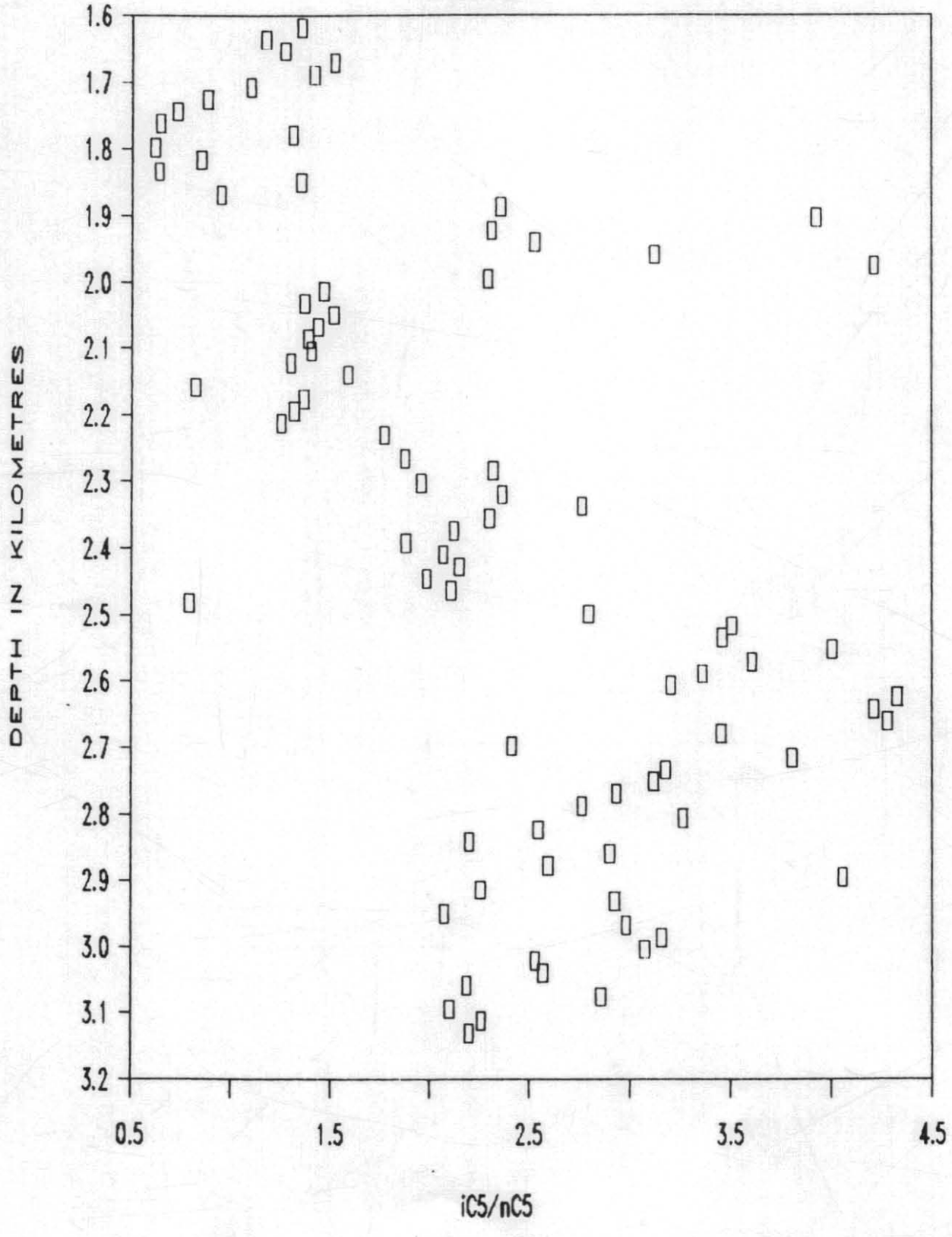
amdel

277128

FIGURE 4

AMOCO

KOORKAH 1

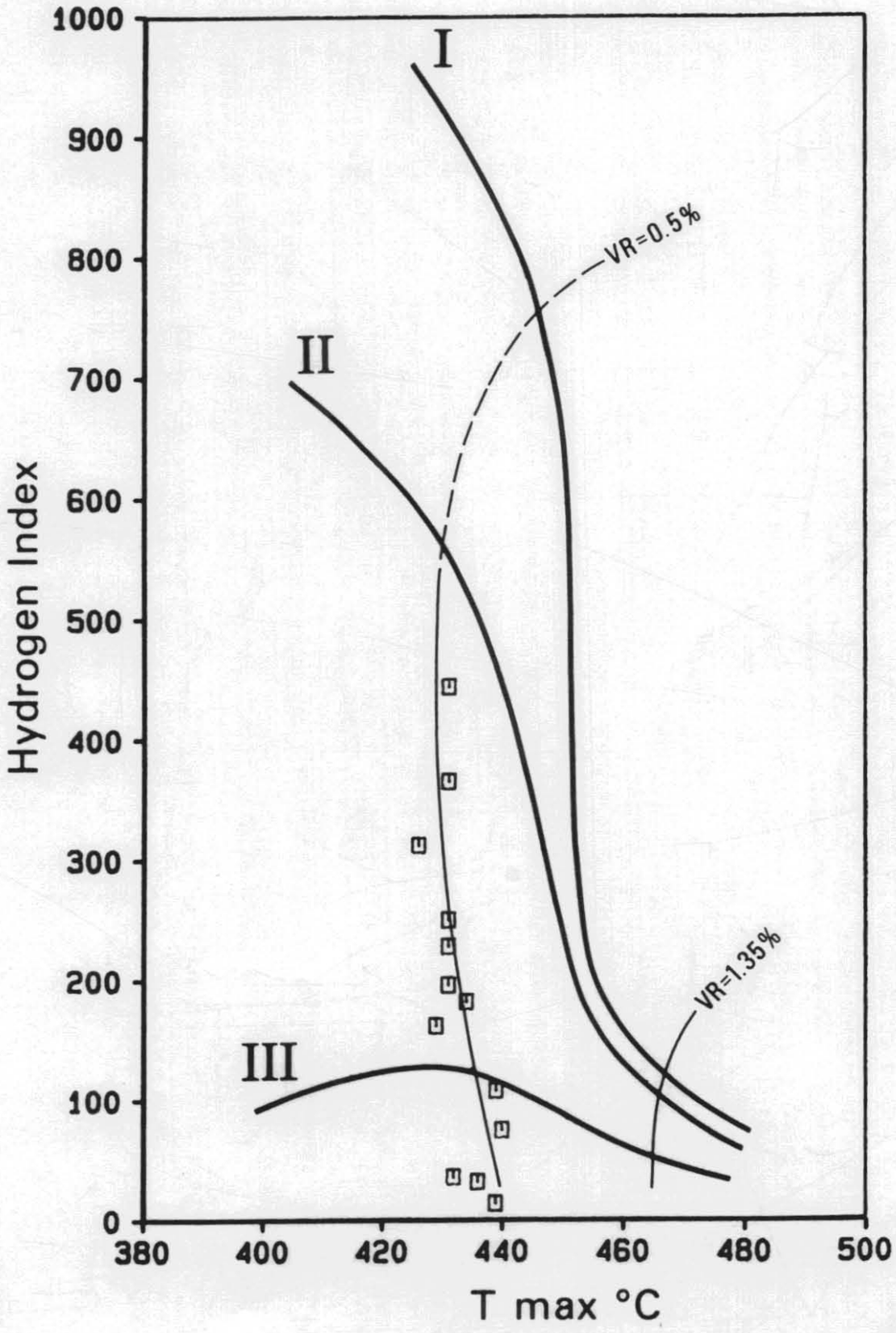


5 cm

amdel

FIGURE 5

Client : AMOCO
Well name : KOORKAH-1
Interval : EOCENE

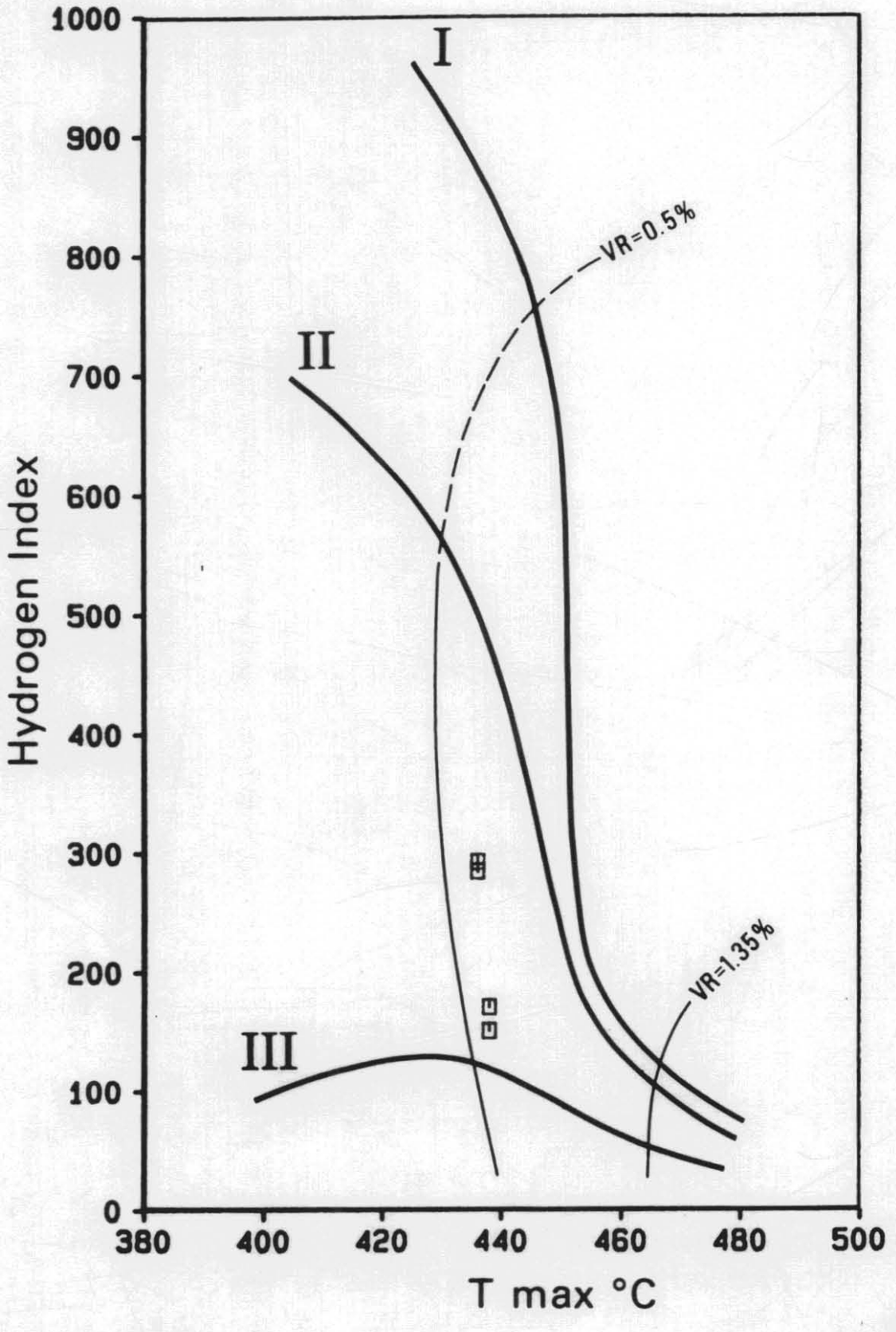


5 cm

277130

FIGURE 6

Client : AMOCO
Well name : KOORKAH-1
Interval : PALEOCENE

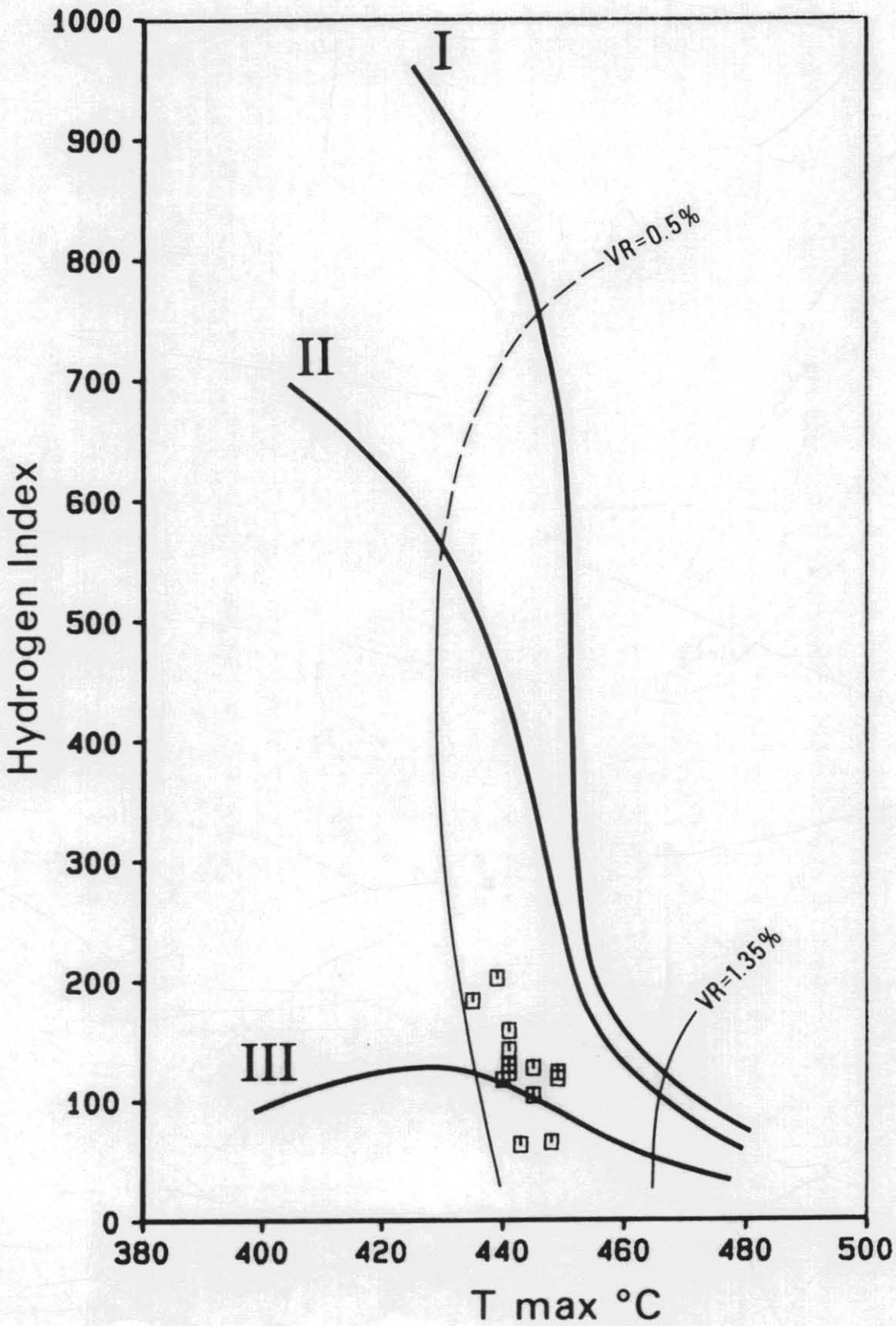


5 cm

277131

FIGURE 7

Client : AMOCO
Well name : KOORKAH-1
Interval : CRETACEOUS

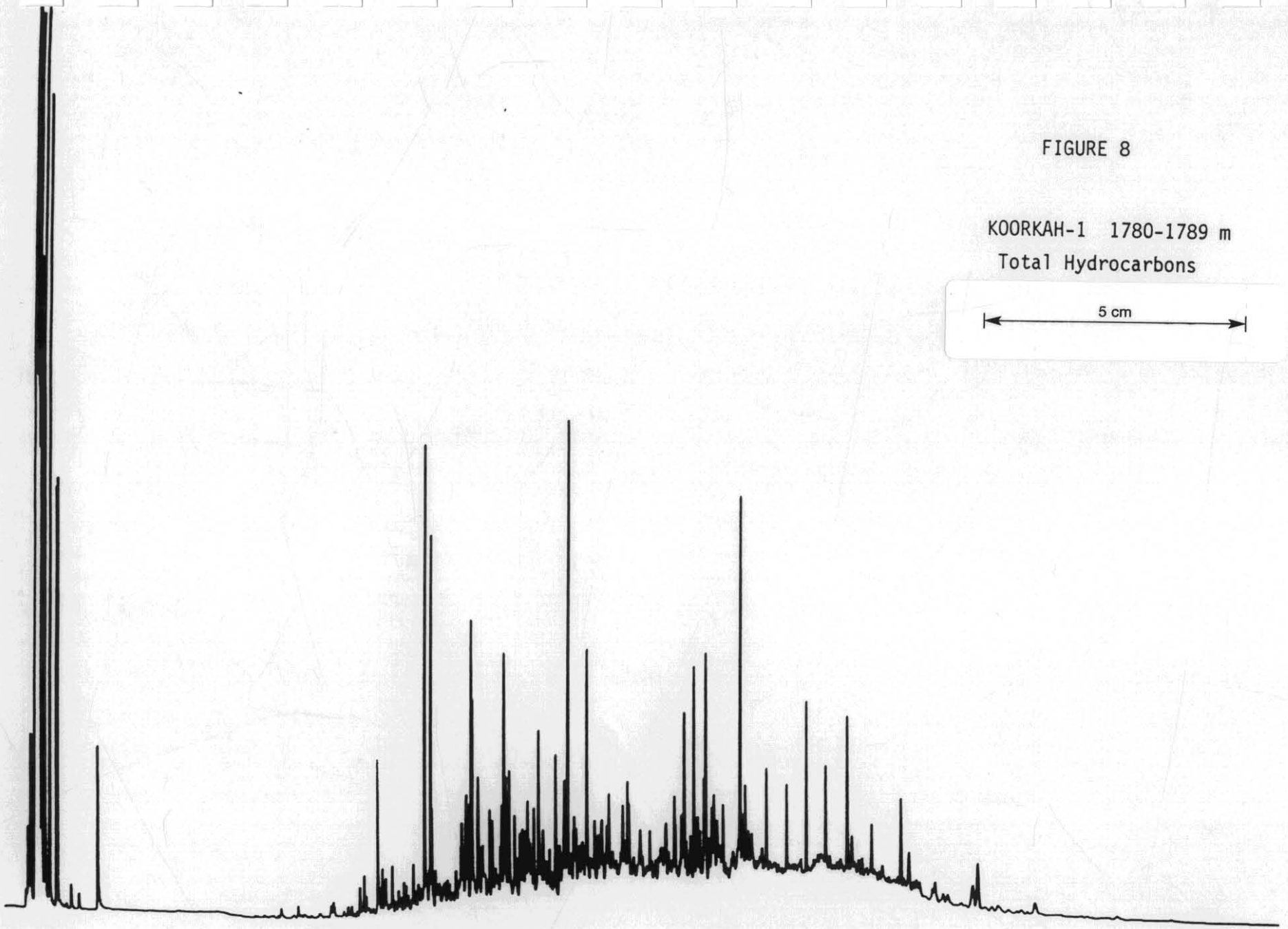


5 cm

FIGURE 8

KOORKAH-1 1780-1789 m

Total Hydrocarbons



amdel

277132

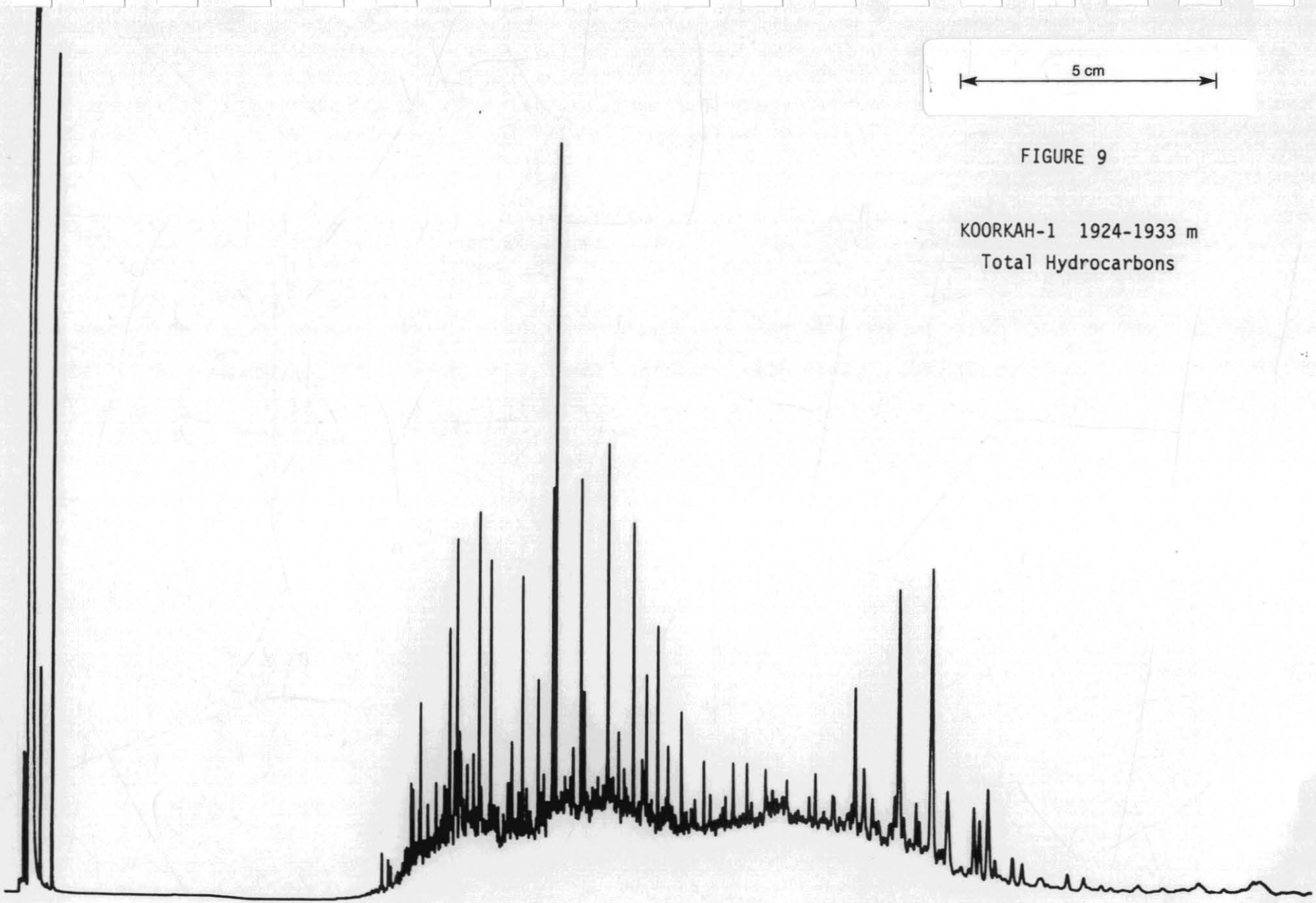


FIGURE 9

KOORKAH-1 1924-1933 m
Total Hydrocarbons

amdel

277133

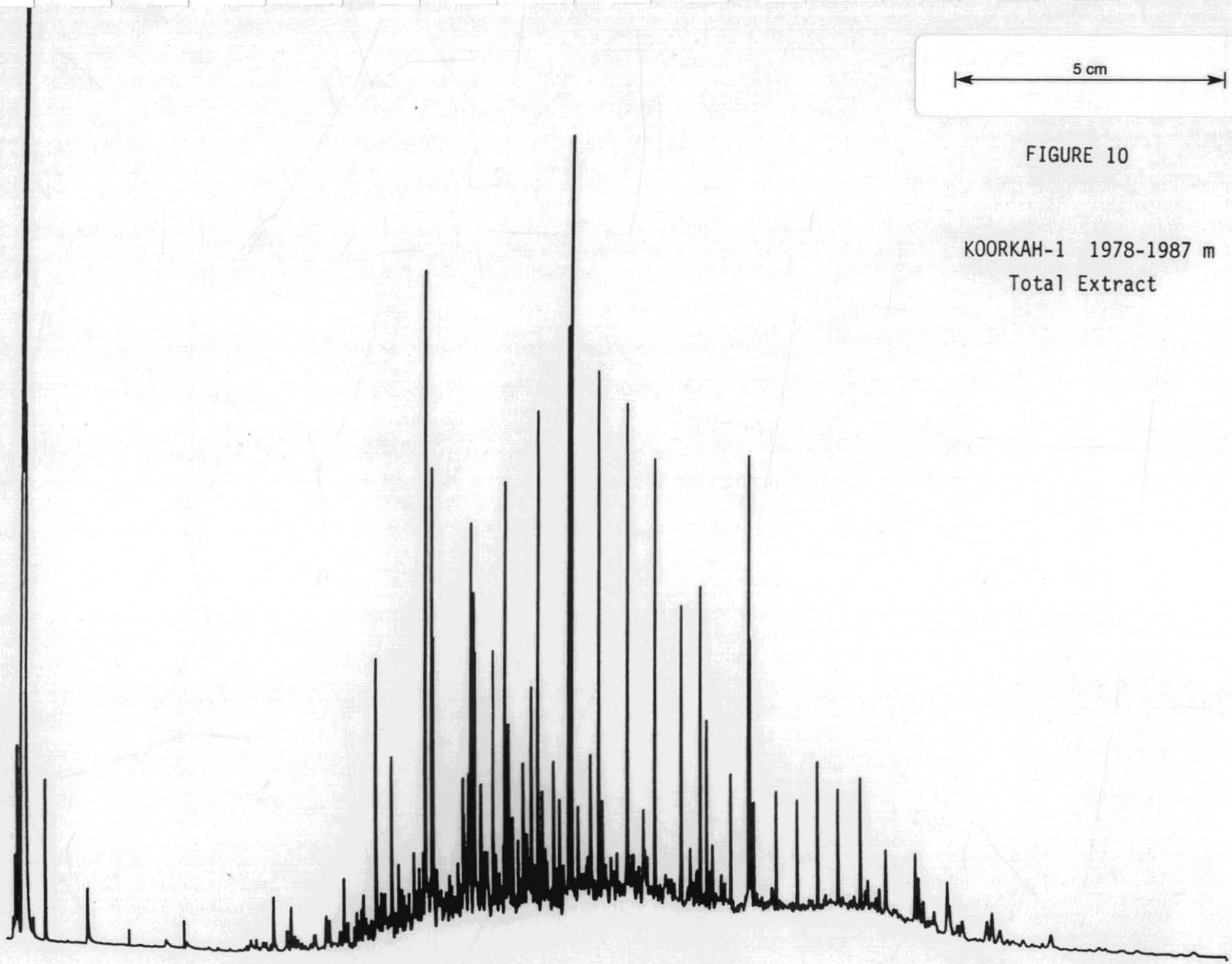


FIGURE 10

KOORKAH-1 1978-1987 m
Total Extract

amdel

27,134

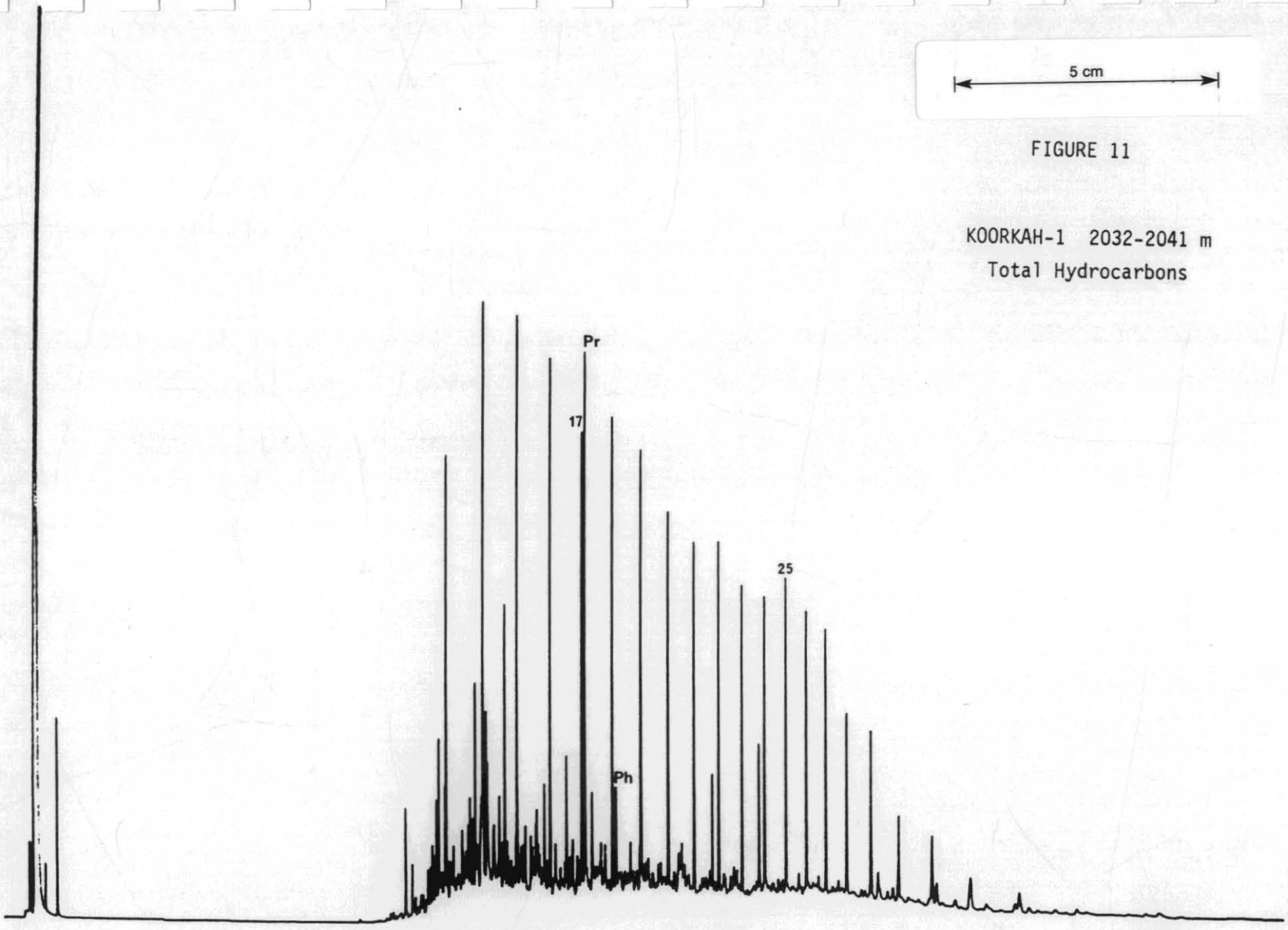


FIGURE 11

KOORKAH-1 2032-2041 m
Total Hydrocarbons

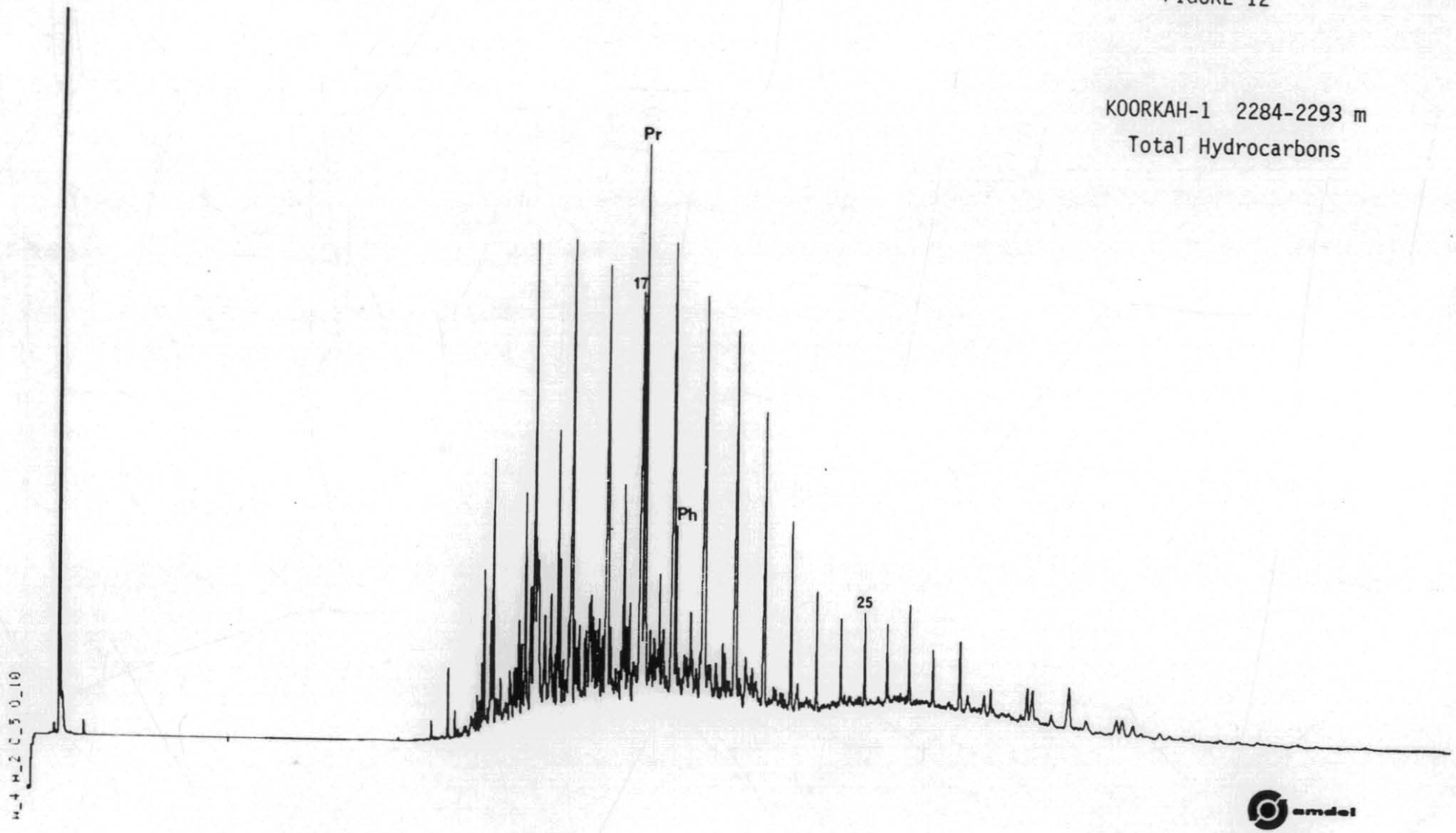
amdel

277135

5 cm

FIGURE 12

KOORKAH-1 2284-2293 m
Total Hydrocarbons



amdel

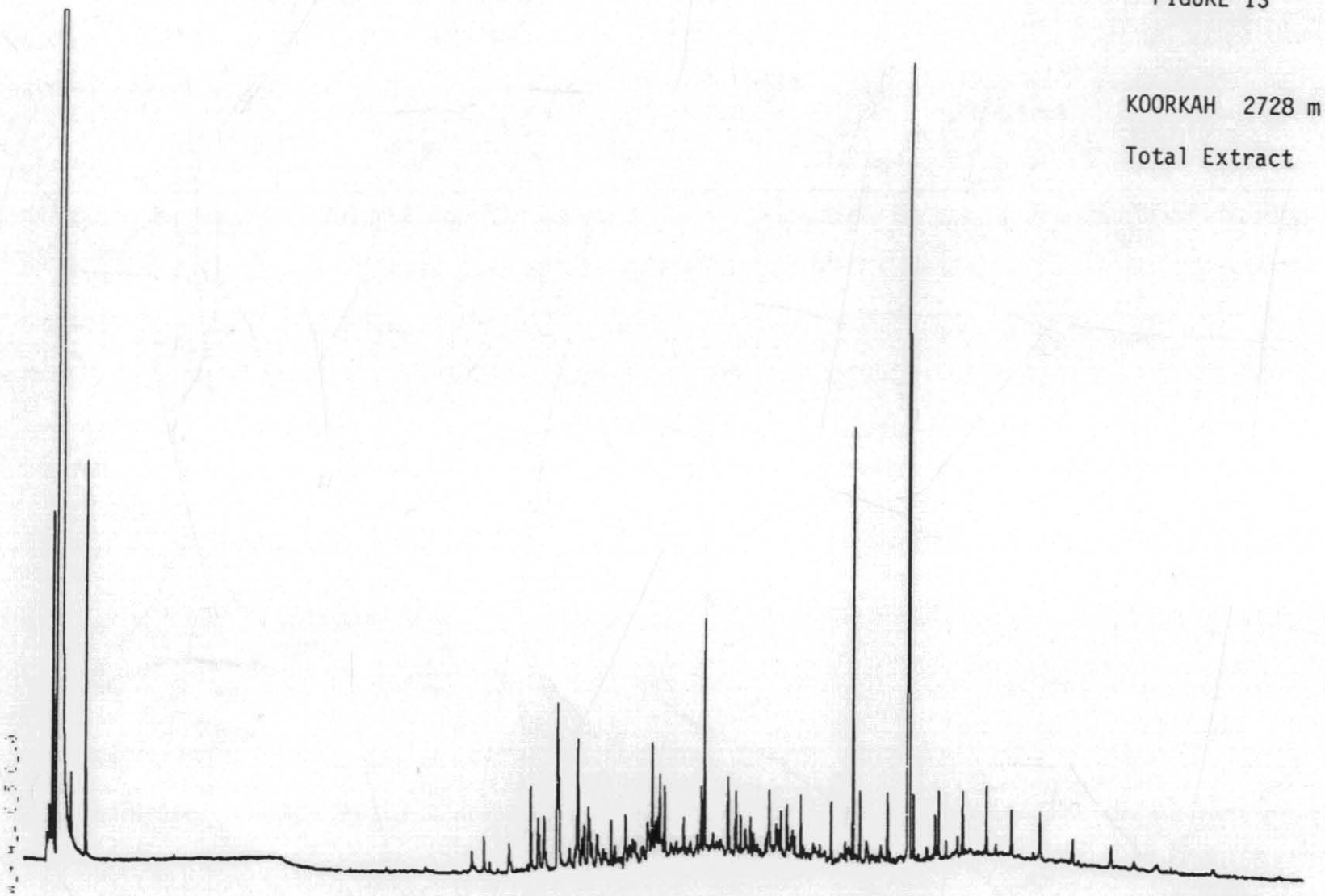
27436

5 cm

FIGURE 13

KOORKAH 2728 m

Total Extract



amdel

277138

FIGURES 14-20

PYROLYSIS-GC TRACES OF KEROGENS FROM EASTERN VIEW COAL MEASURES, KOORKAH-1

Key : A = aromatic hydrocarbon; numbers refer to carbon numbers of n-alkene/n-alkane doublets

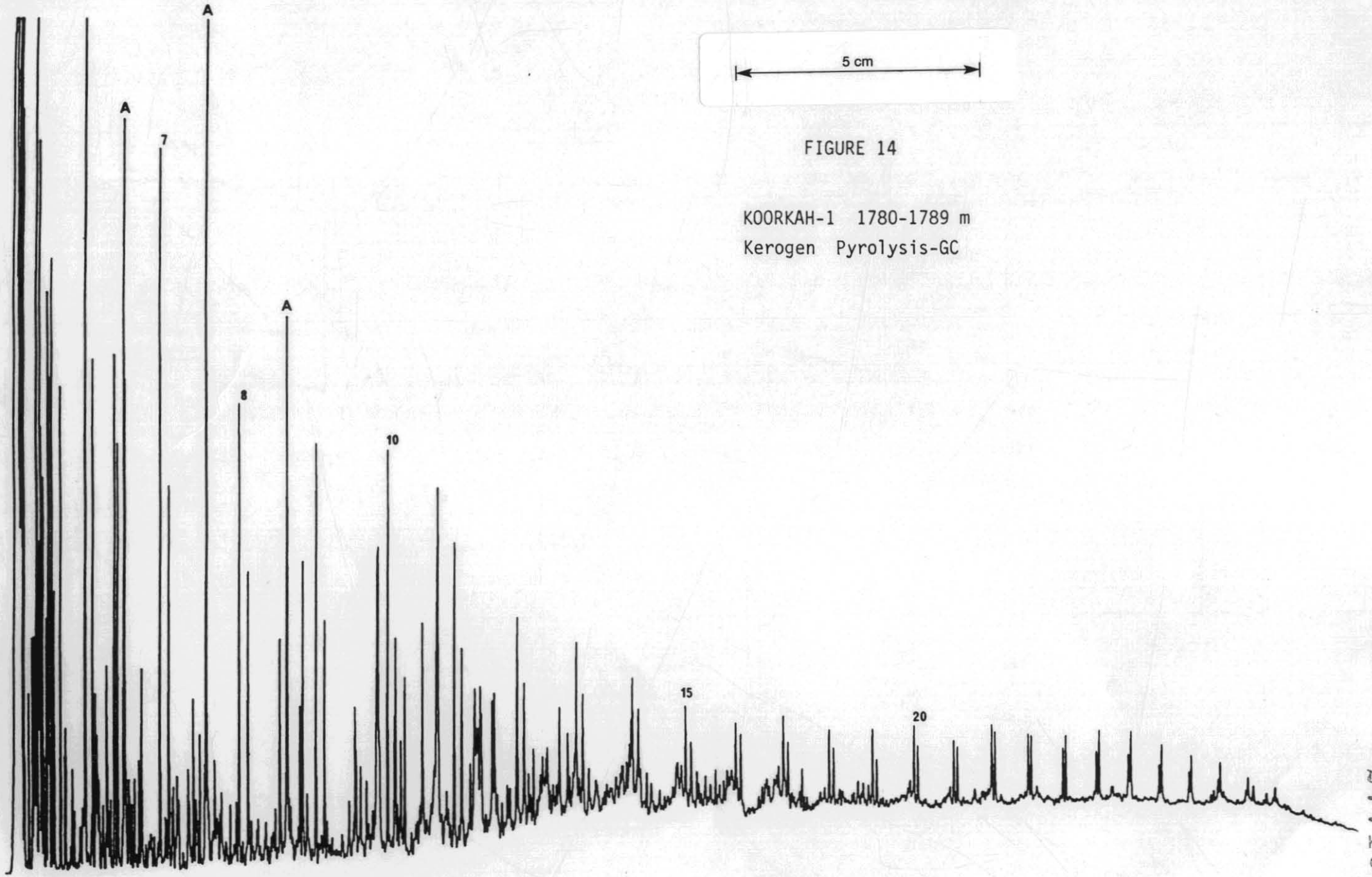


FIGURE 14

KOORKAH-1 1780-1789 m
Kerogen Pyrolysis-GC

27727139

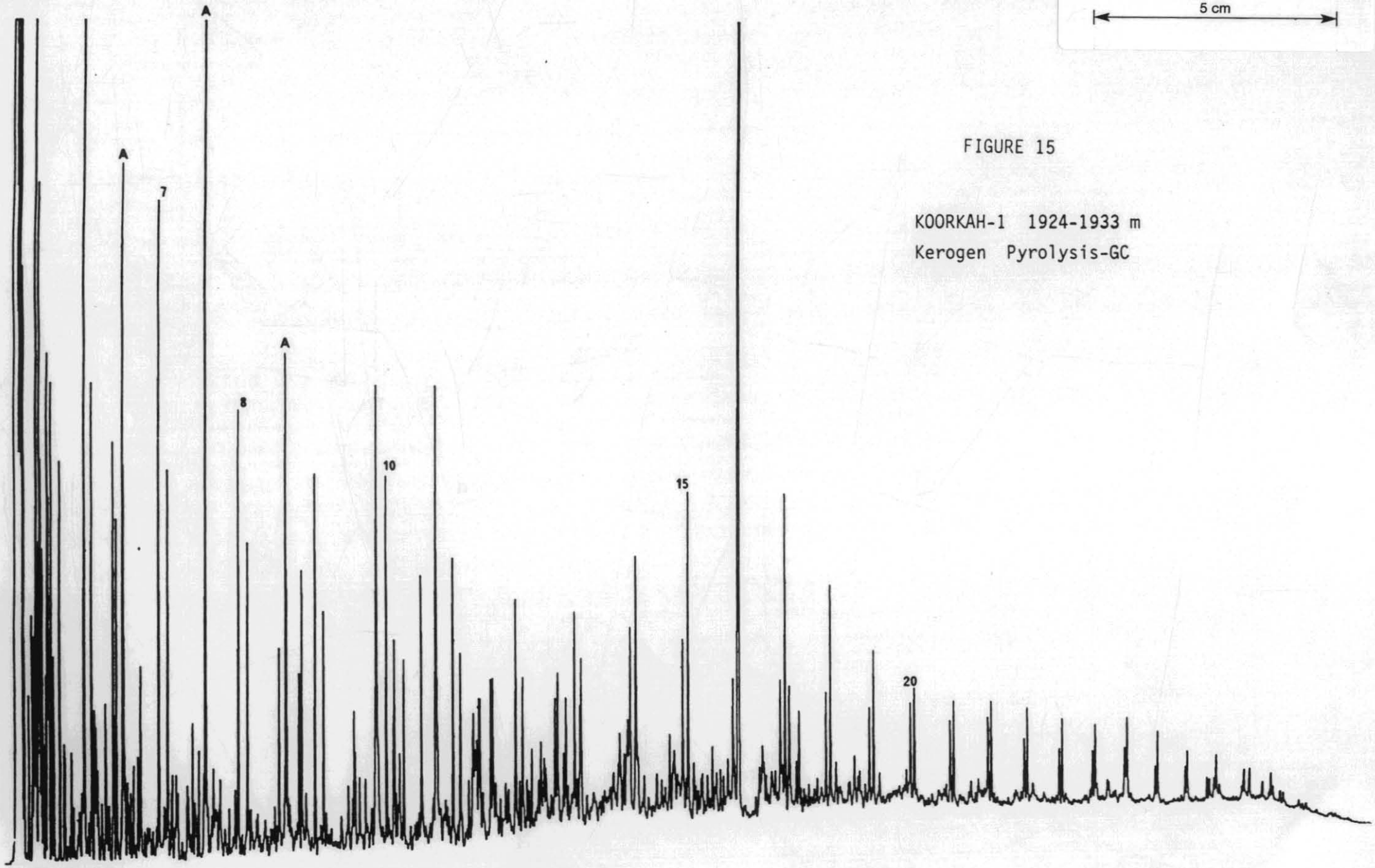


FIGURE 15

KOORKAH-1 1924-1933 m
Kerogen Pyrolysis-GC

27717 40

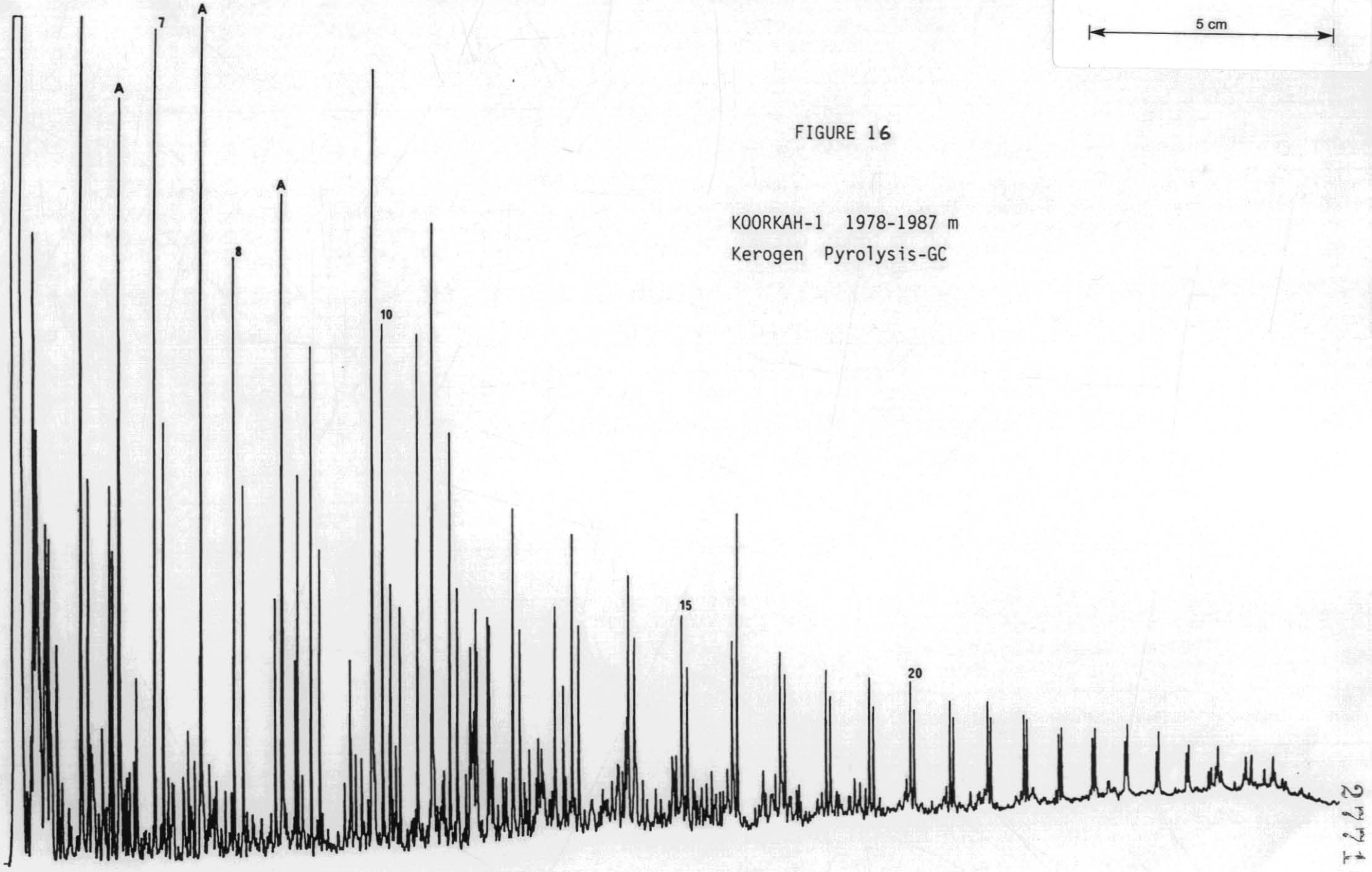


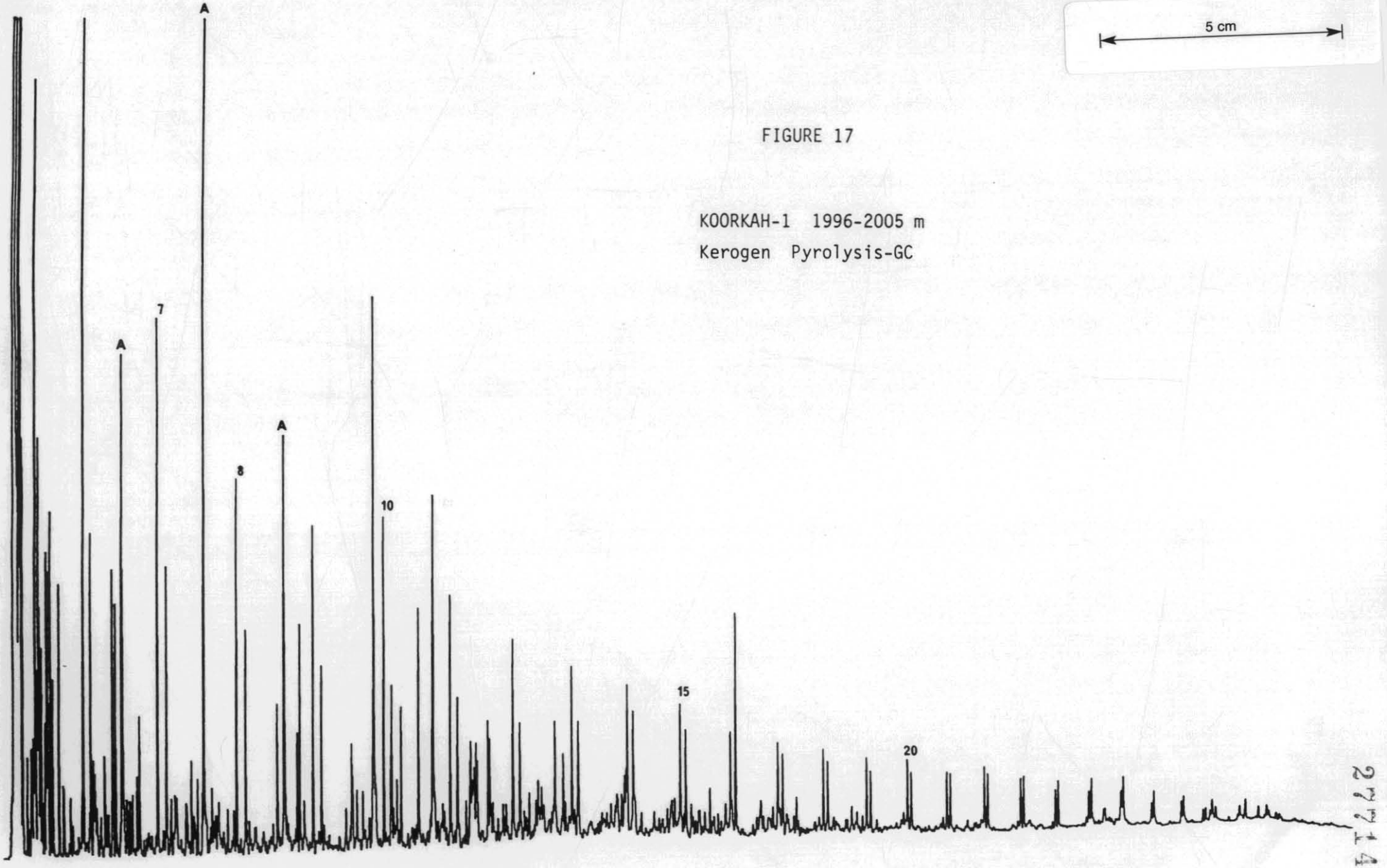
FIGURE 16

KOORKAH-1 1978-1987 m
Kerogen Pyrolysis-GC

29141

FIGURE 17

KOORKAH-1 1996-2005 m
Kerogen Pyrolysis-GC



27,142

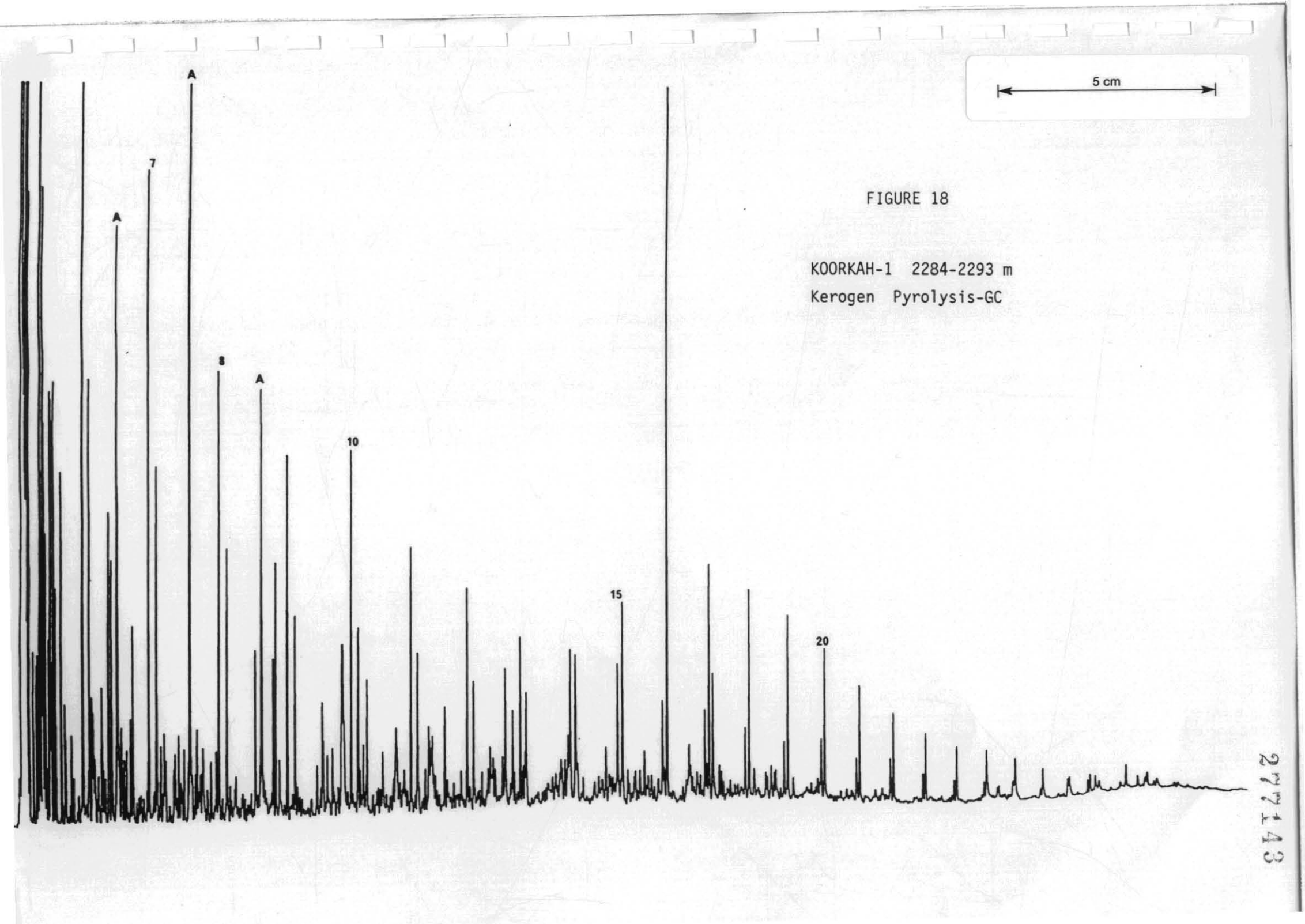


FIGURE 18

KOORKAH-1 2284-2293 m
Kerogen Pyrolysis-GC

27743

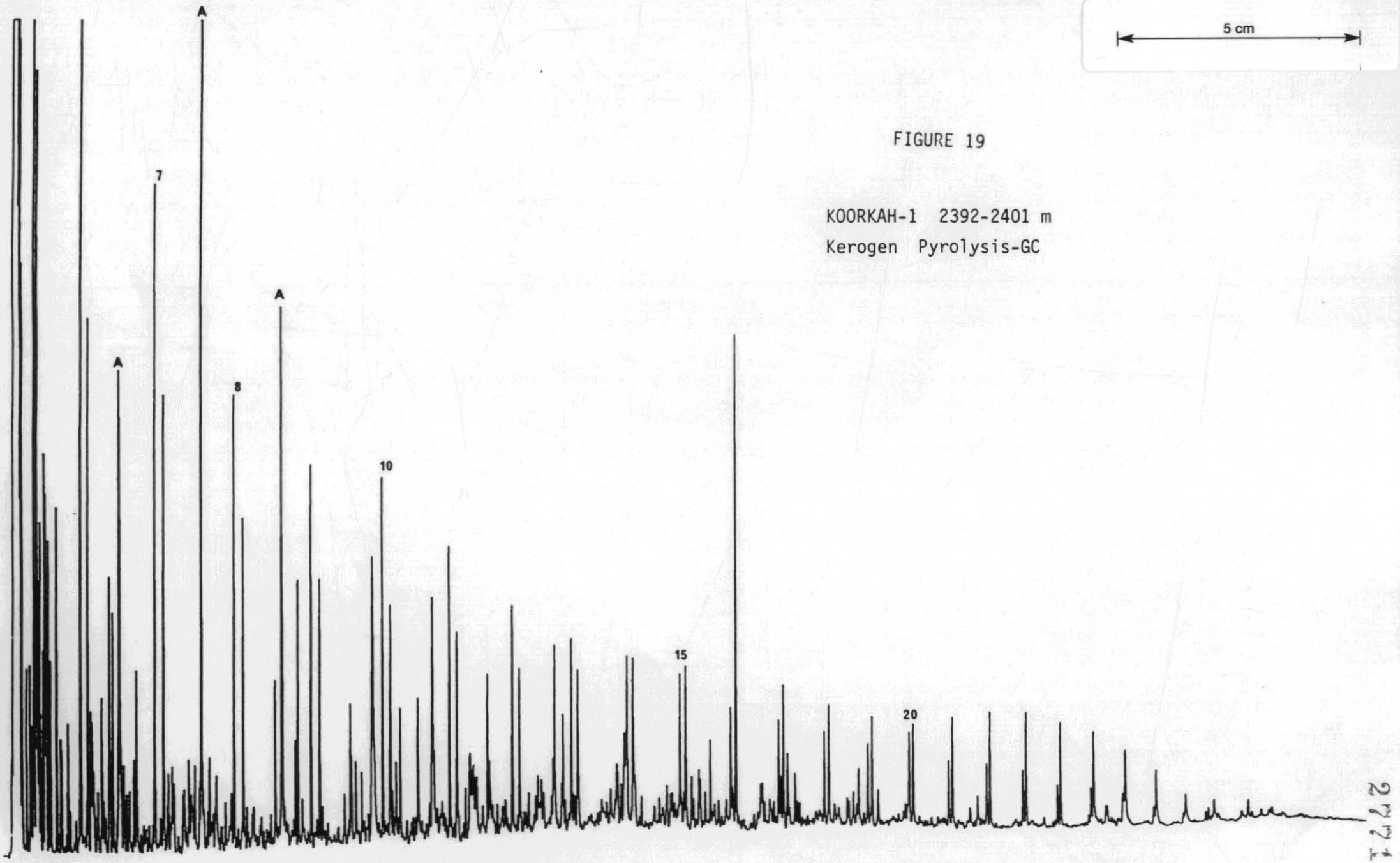


FIGURE 19

KOORKAH-1 2392-2401 m
Kerogen Pyrolysis-GC

27144

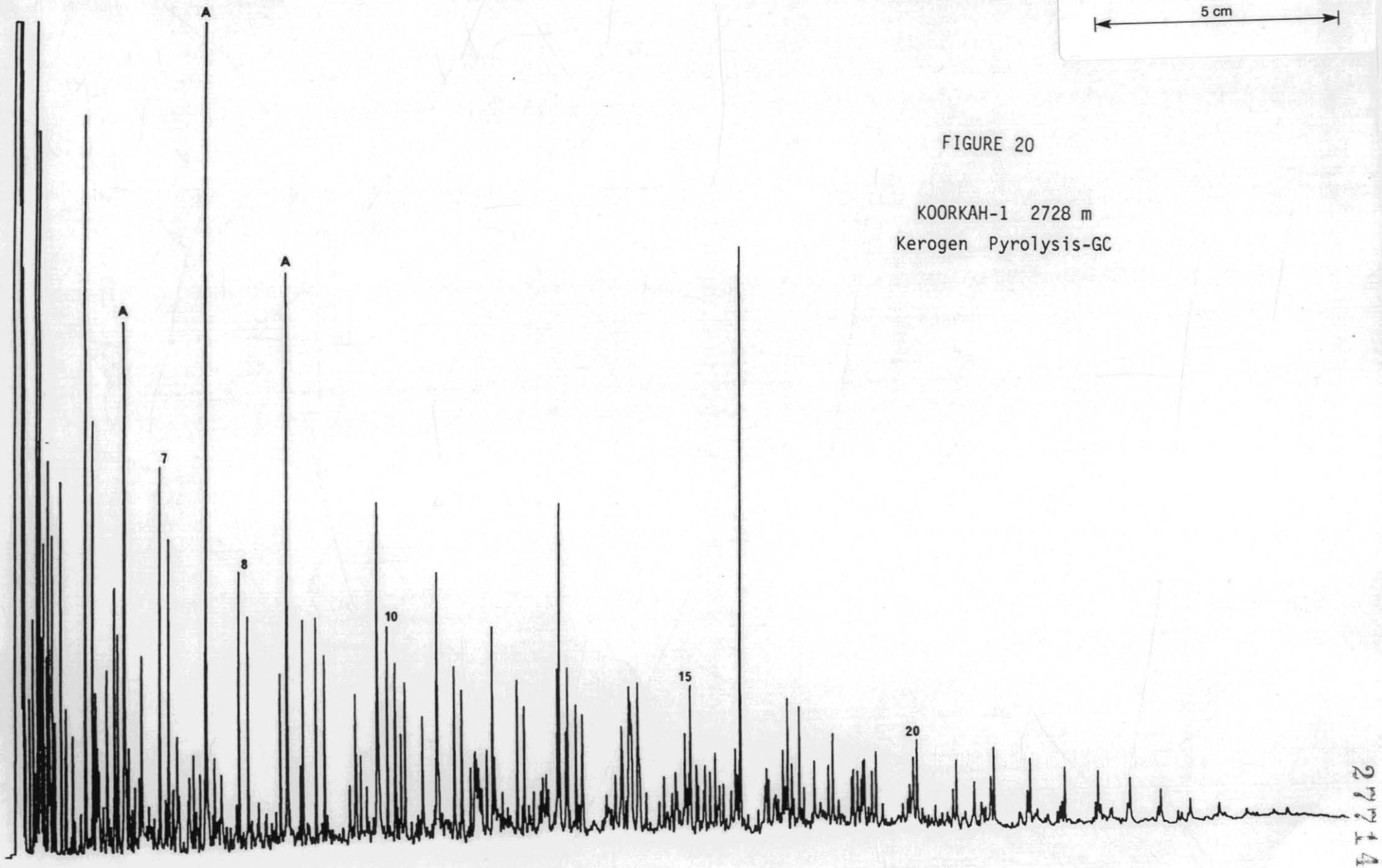


FIGURE 20

KOORKAH-1 2728 m
Kerogen Pyrolysis-GC

27741 45

277146

APPENDIX 1

ANALYTICAL METHODS

1. HEADSPACE GAS (C_1-C_{5+})

A silicone rubber septum was glued to the lid of each can. The lid was punctured through the septum and a 5 ml sample of headspace gas withdrawn with a gas-tight syringe. Cans were not shaken prior to sampling. The sample was analysed by gas chromatography using the following instrumental parameters:

Gas chromatograph:	Perkin Elmer Sigma 2 fitted with flame ionisation detector
Column:	6' x ⅛" i.d. copper packed with activated alumina (80-100 mesh)
Column temperature:	40-275°C at 15° per minute
Carrier gas:	N_2
Quantitation:	Peak areas integrated with Perkin Elmer Sigma 10 Data System. Peak areas calibrated against a standard mixture comprising 100 ppm of each of methane, ethane, propane, n-butane, n-pentane and n-hexane in N_2.

Cuttings gas (C_1-C_4) yields are expressed as ppm by volume of headspace.

$$\text{Percent wet gas} = \frac{C_2\text{-}C_4}{C_1\text{-}C_4} \times 100\%$$

Also determined from headspace analysis were total C_{5+} hydrocarbon yield (ppm by volume) and i-pentane/n-pentane ratio.

2. SAMPLE PREPARATION

Cuttings were washed in water to remove mud and lost circulation material and then air-dried at 60°. Clean dry cuttings and sidewall cores (scraped free of mud cake) were ground in a Siebtechnik mill for 20-30 secs. In the case of the samples selected for residual oil analysis, aliquots of intact cuttings or sidewall core were set aside for solvent extraction.

3. TOTAL ORGANIC CARBON (TOC)

Total organic carbon was determined by digestion of a known weight (≈0.2 g) of powdered rock in 50% HCl to remove carbonates, followed by combustion in oxygen in the induction furnace of a Leco IR-12 Carbon Determinator and measurement of the resultant CO_2 by infra-red detection.

4. ROCK-EVAL ANALYSIS

A 100 mg portion of powdered rock was analysed by the Rock-Eval pyrolysis technique (Girdel IFP-Fina Mark 2 instrument; operating mode, Cycle 1).

5. RESIDUAL OIL ANALYSIS

Intact cuttings and sidewall core chips (13-33 g) were extracted with dichloromethane in Soxhlet apparatus for 4-5 hours. Removal of solvent by careful rotary evaporation gave the crude extract (nominally C_{15+} EOM).

In most cases, a total hydrocarbon fraction (saturates and aromatics) was isolated from the EOM by liquid chromatography on activated alumina (sample : adsorbent ratio = 1:100). Hydrocarbons were eluted with petroleum ether/dichloromethane (50:50).

6. GAS CHROMATOGRAPHY (GC)

Total hydrocarbons (or EOM) were examined by gas chromatography using the following instrumental parameters:

Gas chromatograph:	Perkin Elmer Sigma 2 fitted with on-column injector
Column:	25 m x 0.3 mm fused silica, SGE QC3/BP1
Detector temperature:	300°C
Carrier gas:	He at 85 kPa
Column temperature:	100-290°C at 5° per minute and held at 290°C until all peaks eluted
Quantification:	Relative concentrations of individual normal and iso-prenoid alkanes obtained by measurement of peak areas with a Perkin Elmer LCI-100 integrator

7. KEROGEN ISOLATION AND PYROLYSIS-GC

Solvent-extracted rock powder was forwarded to Laola Pty Limited, Perth, for kerogen isolation by a standard palynological acid digestion technique.

Kerogen concentrates were then submitted to the Petroleum Geochemistry Group, Western Australian Institute of Technology for analysis by pyrolysis-GC using a Chemical Data Systems Pyroprobe 120 in the subambient mode.

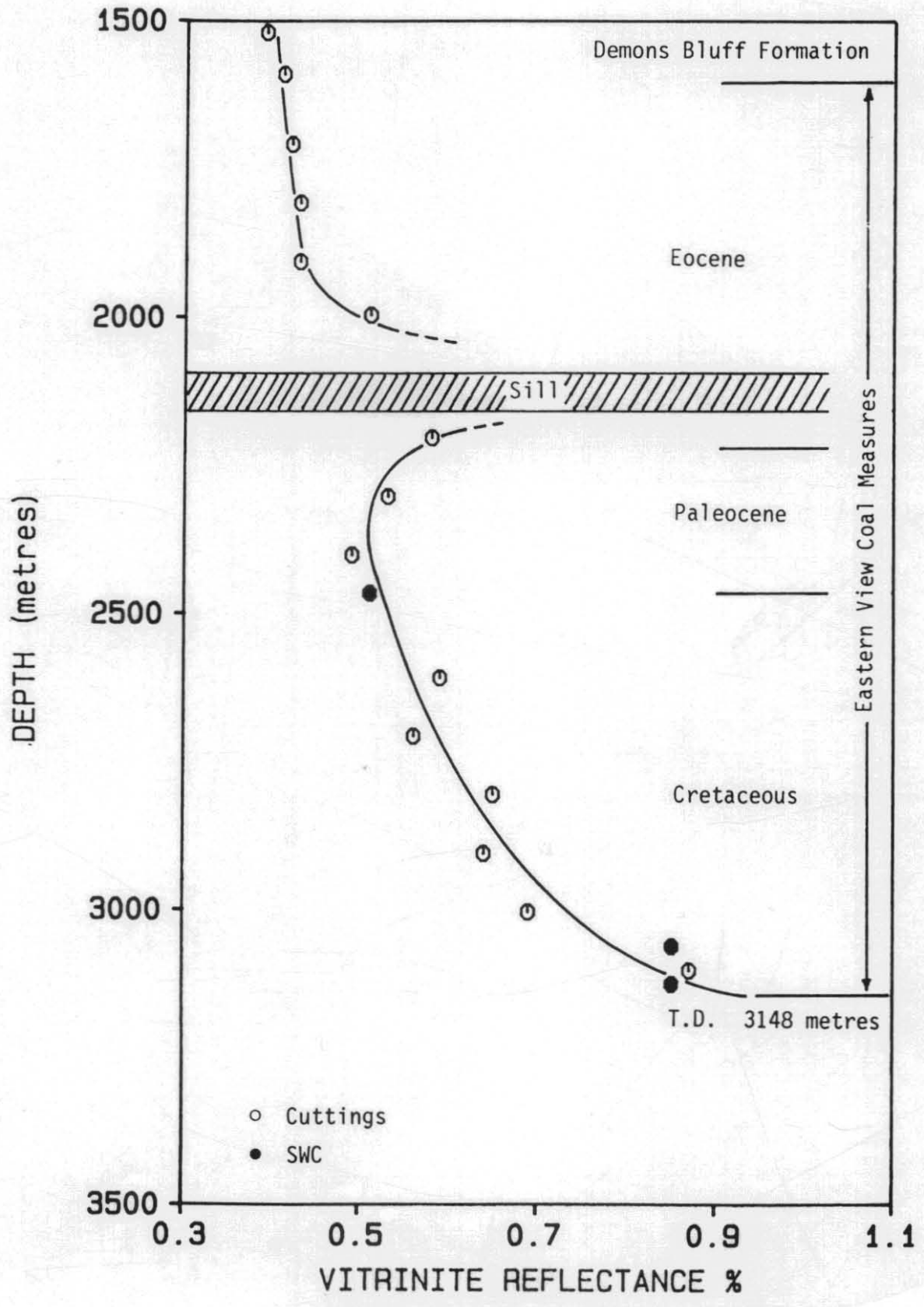
277149

APPENDIX 2

VITRINITE REFLECTANCE PROFILE, KOORKAH-1
(after Watson, 1986)

277150

VITRINITE REFLECTANCE Vs. DEPTH PLOT, KOORKAH-1



5 cm

277151

PART 2: VITRINITE MEASUREMENT AND KEROGEN TYPING

ANALYTICAL PROCEDURE

Representative portions of each sample (crushed to -14+35 BSS mesh) were obtained with a sample splitter and then mounted in cold setting Glasscraft resin using a 2.5 cm diameter mould. Each block was ground flat using diamond impregnated laps and carborundum paper. The surface was then polished with aluminium oxide and finally magnesium oxide.

Reflectance measurements were made with a Leitz MPV1.1 microphotometer fitted to a Leitz Ortholux microscope and calibrated against synthetic standards. All measurements were taken using oil immersion (n = 1.518) and incident monochromatic light (wavelength 546 nm) at a temperature of 23±1 C. Fluorescence observations were made on the same microscope utilising a 3 mm BG3 excitation filter, a TK400 dichroic mirror and a K510 suppression filter.

RESULTS

Vitrinite reflectance determinations are summarised in Table 1. Figure 1 is a plot of vitrinite reflectance versus depth. Histogram plots of this data are presented in Appendix 1. Descriptions of the dispersed organic matter in these samples are presented in Tables 2-4.

DISCUSSION

Maturity

The vitrinite reflectance data (Table 1, Figure 1) indicate that the sedimentary section penetrated by Koorkah-1 is sufficiently mature for the generation of light oil from resinite-rich dispersed organic matter (DOM) below approximately 1950 metres depth (threshold VR = 0.45%; Snowdon and Powell, 1982).

Significant gas generation from woody-herbaceous DOM (vitrinite, and to a lesser extent, inertinite) commences at VR = 0.6% (Monier et al., 1983). On this basis, sediments below 2800 metres depth in Koorkah-1 should be sufficiently mature to generate significant quantities of gas.

Oil generation from terrestrial organic matter rich in exinites other than resinite commences at VR = 0.7% (Connan and Cassou, 1980). The top of this oil generation window occurs at approximately 2950 metres depth in Koorkah-1.

Narrow intervals of mature and overmature sediments occur above and below the sill (2085-2129 metres depth). These intervals are similar in thickness to the sill.

277152

Organic Richness

Organic richness is generally poor in the samples examined from Koorkah-1 (Table 3), with DOM contents generally less than 1%. Organic richness is fair in the following intervals:

1996 - 2005 m
2465.5 - 2555 m

In these samples DOM contents range up to 1-2%.

The low organic richness is in this well in comparison to other Bass Basin wells studied is largely due to the absence of the thick coaly sequences which are prolific in other parts of the basin. However, this effect is coupled with the lower organic richness of the shale and siltstone sediments in the Koorkah-1 location.

Organic Matter Type and Source Quality

Exinite contents are significantly lower in Koorkah-1 than other parts of the Bass Basin. The estimated proportions of exinite in the dispersed organic matter included in the shales, siltstones and coals, ranges from <<5% to 10% (Table 2). Only one sample contained cuttings with a greater proportion of exinite and in this case the exinite was bitumen (sandstone 1906-1915 metres depth).

Vitrinite contents are similar in this well to the shales and siltstones in wells previously examined. However, the vitrinite contents are low in the intervals 2465.5-2617 metres depth and 2905-3013 metres depth indicating a slightly more oxidising environment of deposition.

Free oil occurs in most samples below 2400 metres although this oil becomes significantly more abundant below 3050 metres depth. This oil is thought to have migrated into these sediments rather than to have been generated in situ.

Exsudatinite is present in the coals from 2806-2815 metres depth.

Bitumen is present in a large proportion of the samples below 1700 metres depth. This bitumen is likely to be a contaninant from the drilling mud (Gilsonite) in many of these samples. However, in the sidewall core sample from 3062 metres depth the bitumen occurs as small spheres (up to 0.05 mm diameter) in the silty shale and is unlikely to be a contaminant.

277153

CONCLUSIONS

The vitrinite reflectance data indicates that the:

1. sediments from Koorkah-1 are sufficiently mature for the generation of:

   - light napthenic oil from resinite-rich organic matter below 1950 metres depth.

   - significant quantities of gas from vitrinite (and to a lesser extent inertinite) rich organic matter below 2800 metres depth.

   - oil from exinite-rich organic matter below 2950 metres depth.

2. Organic richness of the sediments from Koorkah-1 is generally poor although sediments with fair organic richness occur in the intervals:

   1996 -2005 m
   2465.5 -2555 m

   This low organic richness is uncharacteristic of Bass Basin wells previously examined and stems from a lack of thick coaly sequences and a lower organic content in the siltstones and shales of Koorkah-1.

3. Source potential for the generation of liquid hydrocarbons is generally poor (exinite contents <<5-10%; DOM contents <0.5-2%). Source potential for gas generation is also fairly poor with few mature sediments having vitrinite contents greater than 20% (DOM content of mature sediments range from 0.5-1%).

   The uncharacteristic low organic richness and poor source quality in the Koorkah-1 location may be linked with a lower sedimentation rate in this location (Ibach, 1982).

4. Free oil is present in most samples below 2400 metres depth although this oil becomes significantly more abundant below 3050 metres depth. The majority of this oil is thought to have migrated into this sequence rather than to have been generated in situ.

5. Exsudatinite is present in the thin coaly intervals between 2806-2815 metres depth.

277154

Bitumen is present in a large proportion of the samples below 1700 metres depth. In most of these cases this bitumen is likely to be gilsonite from the drilling mud. However, the bitumen in the sidewall core from 3062 metres occurs as small spheres in the silty shale and is unlikely to have been introduced from the drilling mud.

REFERENCES

MONIER, F., POWELL, T.G. and SNOWDON, L.R., 1983. Qualitative and quantitative aspects of gas generation during maturation of sedimentary organic matter. Examples from Canadian Frontier basins. In : Bjoroy, M. et al., (eds), Advances in Organic Chemistry 1981, Wiley, pp. 487495.

SNOWDEN, L.R., and POWELL, T.G., 1982. Immature oil and condensate-modification of hydrocarbon generation model for terrestrial organic matter. Bull. Am. Assoc. Petrol. Geol., 66, pp. 775-778.

IBACH, L.E.J., 1982. Relationship between sedimentation rate and total organic carbon content in ancient marine sediments. AAPG Bull., V66 No. 2, pp. 170-188.

277155

TABLE 1: SUMMARY OF VITRINITE REFLECTANCE MEASUREMENTS, KOORKAH-1

Depth (m)	Mean Maximum Reflectance (%)	Standard Deviation	Range	Number of Determinations
1520-1530	0.39	0.08	0.32-0.52	28
1590-1600	0.41	0.03	0.36-0.44	7
1708-1717	0.42	0.03	0.38-0.46	15
1807-1816	0.43	0.08	0.37-0.54	19
1906-1915	0.43	0.05	0.36-0.49	7
1996-2005	0.51	0.04	0.47-0.59	15
2086-2095	-	-	-	-
2203-2212	0.58	0.05	0.50-0.71	16
2302-2311	0.53	0.04	0.46-0.66	27
2401-2410	0.49	0.03	0.42-0.54	18
2465.5+	0.55* (0.51)	0.06	0.44-0.65	23
2500-2509	-	-	-	-
2555+	-	-	-	-
2608-2617	0.59	0.03	0.53-0.63	8
2707-2716	0.56	0.03	0.52-0.62	8
2806-2815	0.65	0.04	0.55-0.75	24
2905-2914	0.64	0.01	0.63-0.65	2
3004-3013	0.69	0.07	0.53-0.76	10
3062+	0.85	0.06	0.74-0.98	36
3103-3112	0.87	0.07	0.77-1.00	21
3126+	0.85	0.06	0.69-0.85	31

*influenced by reworked vitrinite.

( )preferred value.

+SWC

277156

TABLE 2: PERCENTAGE OF VITRINITE, INERTINITE AND EXINITE IN DISPERSED ORGANIC MATTER, KOORKAH-1

Depth (m)		Percentage of		
		Vitrinite	Inertinite	Exinite
1520-1530	Si,Sh	60	30	10
1590-1600	Ca	50	40	10
1708-1717	Si	25	70	5
1807-1816	Si	60	30	10
1906-1915	Si,Sh,Ca	10	80	10
	Sa	10	-	90
1996-2005	Sh,Si	60	30	10
2086-2095	Sa,Si	<5	90	<<5
2203-2212	Sa,Ca	10	85	<5
	Sh,Si	70	20	10
2302-2311	Sh	15	75	10
2401-2410	Si,Sh	15	75	10
2465.5+	Si	<5	85	10
2500-2509	Sh	-	90	10
2555.5+	Sh	-	90	10
2608-2617	Si,Sh	<5	85	10
2707-2716	Sa,Si	15	75	10
2806-2815	Sh,Sa	20	75	5
	C	95	-	5
2905-2914	Sa,Si	5	90	5
3004-3013	Sa,Si,Sh	5	95	<5
3062+	Sh	60	30	10
3103-3112	Sh	10	85	5
3126+	Sh	30	60	10

Key

Sh Shale
Si Siltstone
C Coal
Cs Carbonaceous Shale
Ca Carbonate
Sa Sandstone
+SWC

277157

TABLE 3: ORGANIC MATTER TYPE AND ABUNDANCE, KOORKAH-1

Depth (m)	Exinite Macerals	Estimated Volume of DOM	Exinites
1520-1530	spo,lipto,cut,phyto	≈0.5	Ra
1590-1600	phyto,lipto	≈0.5	Ra-Vr
1708-1717	bmite,phyto,spo	0.5-1	Vr
1807-1816	res,cut,spo,sub	0.5-1	Ra
1906-1915	bmen,spo,cut	0.5-1	Ra
1996-2005	spo,lipto,cut,res,bmite	1-2	Ra
2086-2095	bmen	0.5-1	Tr
2203-2212	spo,cut,lama,res,tela	<0.5	Ra
2302-2311	phyto,lipto,spo,cut,thuc	0.5-1	Ra
2401-2410	lipto,lama,spo,res,cut,phyto,bmen, thuc,?oil	0.5-1	Ra
2465.5+	spo,lama,cut,?tela,res,?oil	≈1	Ra-Vr
2500-2509	lama,lipto,phyto,tela,spo,?oil	≈1	Ra
2555+	lama,tela,?oil,spo	≈1	Ra
2608-2617	lipto,lama,spo,cut,phyto,tela,bmen, ?oil	0.5-1	Ra
2707-2716	lama,lipto,bmen,?oil	≈0.5	Ra-Vr
2806-2815	lama,lipto,spo,exs,cut,tela	≈0.5	Vr
2905-2914	lama,lipto,spo,cut,?phyto,bmen	≈0.5	Vr
3004-3013	lama,lipto,spo,cut,?phyto,bmen	<0.5	Vr
3062+	?oil,spo,cut,sub,bmen	≈0.5	Ra-Vr
3103-3112	oil,spo,bmen,cut,bmite	0.5-1	Ra
3162+	spo,bmen,?oil,lama	0.5-1	Ra-Vr

+SWC

TABLE 4: EXINITE MACERAL ABUNDANCE AND FLUORESCENCE CHARACTERISTICS

Depth (m)	Exinite Macerals	Lithology/Comments
1520-1530	spo(Ra;mY-dO),lipto(Vr;mO),?phyto(Tr;mY)	chiefly sandy siltstone, ~5% shale, ~5% carbonate; some sporinite appears to be oxidised.
1590-1600	phyto(Ra-Vr;iY),lipto(Vr;iY)	carbonate:
1708-1717	bmite(Vr-Tr;dO),phyto(Vr;mY),spo(Tr;mO)	siltstone.
1807-1816	res(Ra;iG-mO),cut(Ra;mO),spo(Ra;mO),sub(Vr;dO)	50-60% sandstone, 40-50% siltstone.
1906-1915	bmen(Ra;dO-dB),spo(Vr;mY-mO),cut(Vr;mO)	chiefly siltstone and shale, ~30% sandstone, ~20% carbonate. Bitumen is interstitial to quartz in the sandstone.
1996-2005	spo(Ra;mY-mO),lipto(Ra;mO-dO),cut(Vr;mO),res(Vr;iY),bmite(Vr;dO)	shale and siltstone.
2086-2095	bmen(Tr;dB)	chiefly sandstone, 10-15% siltstone. DOM is over-mature.
2203-2212	spo(Ra;mY-mO),cut(Ra;mY-mO),lama(Vr;mO),res(Tr;mY),tela(Tr;mY-mO)	chiefly sandstone, 10-20% siltstone and shale, ~5% intrusives (?cavings).
2302-2311	phyto(Ra;iY),lipto(Ra;mY-mO),spo(Vr;mY-mO),cut(Vr;mO),thuc(Tr;dO)	chiefly shale with silty bands ~5% carbonate, <5% sandstone. Thucholite is evidence of oil migration.
2401-2410	lipto(Ra;mY-mO),lama(Ra;mO),spo(Vr;mO),res(Vr;iY-mO),cut(Vr;dO),phyto(Vr;mY);bmen(Vr;dO),thuc(Tr;dO),?oil(Tr;iY-iO)	chiefly siltstone and shale, <5% carbonate. ?Oil and bmen occur in sandier siltstones.
2465.5	spo(Ra-Vr;mO),lama(Ra-Vr; mY-mO),cut(Vr;mO),?tela(Vr;iO),res(Vr-Tr;iY-mO),?oil(Tr;iY)	silty shale, telaginite as appears to be biodegraded and may be Botryococcus-related.
2500-2509	lama(Ra;mO),lipto(Ra;mY-mO),phyto(Vr;iY),tela(Vr;iY),spo(Vr;dO),?oil(Tr;iY-iO)	shale; ?oil as above. Sporinite is oxidised.

.../cont.

TABLE 4: (Continued)

Depth (m)	Exinite Macerals	Lithology/Comments
2555	lama(Ra;mO),tela(Vr;iO-mO),?oil(Vr-Tr;iG-iY),spo(Tr;mY-mO)	siltstone; telalginite appears to be biodegraded and may be Botryococcus-related.
2608-2617	lipto(Ra;mY-mO),lama(Ra;mO),spo(Vr;mY),cut(Vr;mO),phyto(Tr;iY),tela(Tr;iY-iO),bmen(Tr;dO),?oil(Tr;iG-iY)	siltstone and shale.
2707-2716	lama(Ra-Vr;mO),lipto(Vr-Tr;mO),bmen(Tr;dO),?oil(Tr;iG-iY)	chiefly silty sandstone, 5-10% siltstone. Oil and bitumen occur in the sandstones.
2806-2815	lama(Vr;mO),lipto(Vr;mY-mO),spo(Vr-Tr;mY-mO),exs(Vr-Tr;iG-iY),cut(Tr;mY-mO),tela(Tr;mY-mO)	chiefly fine-grained sandstone, ≈5% shale, <5% coal; exsudatinite occurs in the coals.
2905-2914	lama(Vr;mO),lipto(Vr;mO),spo(Tr;mO),cut(Tr;mO),phyto(Tr;iY)bmen(Tr;dB)	chiefly fine-grained sandstone, ≈5 carbonate-rich siltstone.
3004-3013	bmite(Vr;dO-dB),lipto(Vr;mO),?oil(Vr-Tr;iG)	chiefly sandstone, ≈5% siltstone and shale; oil occurs in both sandstone and siltstone cuttings
3062	?oil(Ra-Vr;iY),spo(Ra-Vr;mO-NoFl),cut(Tr;dO),sub(Tr;NoFl),bmen(Tr;dO-dB)	silty shale with coal fragments (up to 0.1 mm). Exinite consists largely of ?oil. Some sporinite and cutinite are oxidised.
3103-3112	oil(Ra;iY),spo(Vr;mO-dO),bmen(Vr;dO),cut(Vr;mO-dO),bmite(Vr;dB-NoFl)	shale with silty bands and lenses; oil and bitumen generally occurs in the silty bands.
3126	spo(Ra-Vr;dO),bmen(Ra-Vr;dO-dB),?oil(Vr;iY),lama(Tr;mO-dO)	shale with siltstone bands; oil and bitumen are more common in the siltstone bands. Bitumen occurs as spheres (up to 0.05 mm diameter).

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KEY TO DISPERSED ORGANIC MATTER DESCRIPTIONS

MACERAL GROUPS

V	Vitrinite
I	Inertinite
E	Exinite

EXINITE MACERALS

spo	Sporinite
cut	Cutinite
res	Resinite
sub	Suberinite
lipto	Liptodetrinite
fluor	Fluorinite
exs	Exsudatinite
phyto	Phytoplankton
tela	Telalginite
lama	Lamalginite
bmite	Bituminite
bmen	Bitumen
thuc	Thucholite

ABUNDANCE (by vol.)

Ma	Major	>15%
Ab	Abundant	2-15%
Co	Common	1-2%
Sp	Sparse	0.5-1%
Ra	Rare	0.1-0.5%
Vr	Very Rare	∿0.1%
Tr	Trace	<0.1%

FLUORESCENCE COLOUR AND INTENSITY

G	Green	i	Intense
Y	Yellow	m	Moderate
O	Orange	d	Dull
B	Brown		

FIGURE 1

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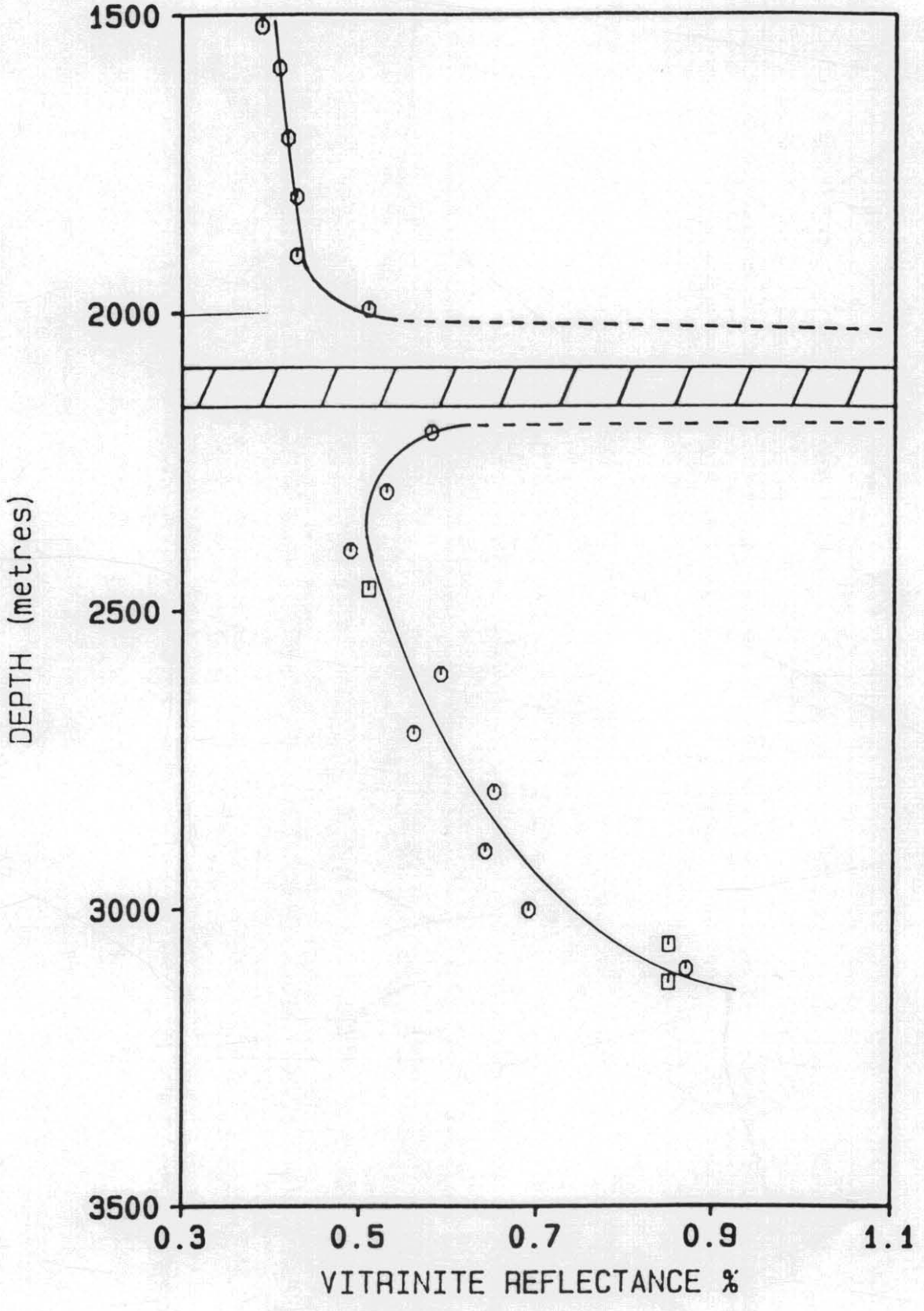
VITRINITE REFLECTANCE Vs. DEPTH PLOT, KOORKAH-1



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APPENDIX 8

VELOCITY SURVEY

KOORKAH-1

SUMMARY

A velocity survey was shot in Koorkah-1 on December 23, 1985. A total of 25 levels were shot during the survey over the interval 3132m to 403m (below KB) using an air gun source. Twenty one of the 25 levels were used to derive the Time-Depth curve for the well and to calibrate the sonic log. Check shot levels omitted from the data set were either poor quality or disregarded in preference to adjacent levels.

A "Seismic Calibration Log" showing corrected Sonic, Gamma Ray and Density logs together with a Time Depth curve and velocity curves was assembled and is included as Enclosure 5. Synthetic seismograms ("Geograms") for both minimum and zero phase are included as Enclosures 6 and 7.

VELOCITY SURVEY LEVELS

Level Depth (m below KB)	Stacked Shots	Rejected Shots	Quality	Comments
403	3	2	Good	
1600	4	0	Good	
1640	3	0	Good	
1650	3	0	Fair	Omitted
1749	5	1	Good	
1825	3	0	Good	
1973	9	2	Good	
2015	3	0	Good	
2087	3	1	Good	
2165	3	0	Good	
2250	3	1	Good	
2365	3	0	Good	
2475	3	1	Good	
2545	2	1	Good	
2550	3	3	Good	Omitted
2615	3	0	Good	
2675	5	2	Good	
2685	2	2	Fair	Omitted
2783	3	0	Good	
2837	4	1	Good	
2962	3	2	Good	
3040	2	2	Good	
3100	8	4	Good	
3124.6	7	7	Good	
3132	6	5	Fair	Distorted/Omitted

CONFIDENTIAL
CLASS 1

COMPANY : AMOCO AUSTRALIA PETROLEUM COMPANY WELL : KOORKAH-1

LONG DEFINITIONS

GLOBAL

KB -ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD -ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB -ELEVATION OF KELLY BUSHING
GL -ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
VELHYD -VELOCITY OF THE MEDIUM BETWEEN THE SOURCE AND THE HYDROPHONE
VELSUR -VELOCITY OF THE MEDIUM BETWEEN THE SOURCE AND THE SRD

MATRIX

GUNELZ -SOURCE ELEVATION ABOVE SRD (ONE FOR THE WHOLE JOB; OR ONE PER SHOT)
GUNEWZ - SOURCE DISTANCE FROM THE BOREHOLE AXIS IN EW DIRECTION (CF. GUNELZ)
GUNNSZ -SOURCE DISTANCE FROM THE BOREHOLE AXIS IN NS DIRECTION (CF. GUNELZ)
HYDELZ -HYDROPHONE ELEVATION ABOVE SRD (CF. GUNELZ)
HYDEWZ -HYDROPHONE DISTANCE FROM THE BOREHOLE AXIS IN EW DIRECTION (CF GUNELZ)
HYDNSZ -HYDROPHONE DISTANCE FROM THE BOREHOLE AXIS IN NS DIRECTION (CF GUNELZ)
TRTHYD -TRAVEL TIME FROM THE HYDROPHONE TO THE SOURCE
TRTSRD -TRAVEL TIME FROM THE SOURCE TO THE SRD
DEVWEL -DEVIATED WELL DATA PER SHOT : MEAS. DEPTH, VERT. DEPTH, EW,NS

SAMPLED

SHOT.GSH -SHOT NUMBER
DKB.GSH -MEASURED DEPTH FROM KELLY-BUSHING
DSRD.GSH -DEPTH FROM SRD
DGL.GSH -VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
TIMO.GSH -MEASURED TRAVEL TIME FROM HYDROPHONE TO GEOPHONE
TIMV.GSH -VERTICAL TRAVEL TIME FROM THE SOURCE TO THE GEOPHONE
SHTM.GSH -SHOT TIME (WST)
AVGV.GSH -AVERAGE SEISMIC VELOCITY
DELZ.GSH -DEPTH INTERVAL BETWEEN SUCCESSIVE SHOTS
DELT.GSH -TRAVEL TIME INTERVAL BETWEEN SUCCESSIVE SHOTS
INTV.GSH -INTERNAL VELOCITY, AVERAGE

(GLOBAL PARAMETERS)		(VALUE)	
ELEV OF KB AB. MSL (WST)	KB	:	22.3000 M
ELEV OF SRD AB. MSL (WST)	SRD	:	0 M
ELEVATION OF KELLY BUSHING	EKB	:	22.3000 M
ELEV OF GL AB. SRD (WST)	GL	:	-67.6000 M
VEL SOURCE-HYDRO(WST)	VELHYD	:	1600.00 M/S
VEL SOURCE-SRD (WST)	VELSUR	:	1600.00 M/S

(MATRIX PARAMETERS)

	SOURCE ELV M	SOURCE EW M	SOURCE NS M	HYDRO ELEV M	HYDRO EW M	HYDRO NS M
1	-3.00	12.42	34.11	-3.00	12.42	34.11

	TRT HYD-SC MS	TRT SC-SRD MS
1	0	2.00

	MD @ KB M	VD @ KB M	VD @ SRD M	E-W COORD M	N-S COORD M
1	89.90	89.90	67.60	0	0
2	403.00	403.00	380.70	0	0
3	1600.00	1600.00	1577.70	0	0
4	1640.00	1640.00	1617.70	0	0
5	1749.00	1749.00	1726.70	0	0
6	1825.00	1825.00	1802.70	0	0
7	1973.00	1973.00	1950.70	0	0
8	2015.00	2015.00	1992.70	0	0
9	2087.00	2087.00	2064.70	0	0
10	2165.00	2165.00	2142.70	0	0
11	2250.00	2250.00	2227.70	0	0
12	2365.00	2365.00	2342.70	0	0
13	2475.00	2475.00	2452.70	0	0
14	2545.00	2545.00	2522.70	0	0
15	2615.00	2615.00	2592.70	0	0
16	2675.00	2675.00	2652.70	0	0
17	2783.00	2783.00	2760.70	0	0
18	2837.00	2837.00	2814.70	0	0
19	2962.00	2962.00	2939.70	0	0
20	3040.00	3040.00	3017.70	0	0
21	3100.00	3100.00	3077.70	0	0
22	3124.60	3124.60	3102.30	0	0

LEVEL NUMBER	MEASUR DEPTH FROM KB M	VERTIC DEPTH FROM SRD M	VERTIC DEPTH FROM GL M	OBSERV TRAVEL TIME HYD/GEO MS	VERTIC TRAVEL TIME SRC/GEO MS	VERTIC TRAVEL TIME SRD/GEO MS	AVERAGE VELOC SRD/GEO M/S	DELTA DEPTH BETWEEN SHOTS M	DELTA TIME BETWEEN SHOTS MS	INTERV VELOC BETWEEN SHOTS M/S
1	89.90	67.60	0	49.40	43.07	45.07	1500			
								313.10	151.04	2073
2	403.00	380.70	313.10	195.00	194.11	196.11	1941			
								1197.00	509.71	2348
3	1600.00	1577.70	1510.10	704.00	703.81	705.81	2235			
								40.00	14.01	2856
4	1640.00	1617.70	1550.10	718.00	717.82	719.82	2247			
								109.00	33.01	3302
5	1749.00	1726.70	1659.10	751.00	750.83	752.83	2294			
								76.00	28.01	2713
6	1825.00	1802.70	1735.10	779.00	778.84	780.84	2309			
								148.00	43.02	3441
7	1973.00	1950.70	1883.10	822.00	821.86	823.86	2368			
								42.00	13.00	3230
8	2015.00	1992.70	1925.10	835.00	834.86	836.86	2381			
								72.00	24.01	2999
9	2087.00	2064.70	1997.10	859.00	858.87	860.87	2398			
								78.00	18.01	4332
10	2165.00	2142.70	2075.10	877.00	876.87	878.87	2438			
								85.00	25.01	3399
11	2250.00	2227.70	2160.10	902.00	901.88	903.88	2465			
								115.00	34.01	3382
12	2365.00	2342.70	2275.10	936.00	935.89	937.89	2498			
								110.00	30.01	3666
13	2475.00	2452.70	2385.10	966.00	965.89	967.89	2534			
								70.00	19.00	3683
14	2545.00	2522.70	2455.10	985.00	984.90	986.90	2556			
								70.00	20.00	3499
15	2615.00	2592.70	2525.10	1005.00	1004.90	1006.90	2575			
								60.00	17.00	3529
16	2675.00	2652.70	2585.10	1022.00	1021.90	1023.90	2591			
								108.00	28.00	3856
17	2783.00	2760.70	2693.10	1050.00	1049.91	1051.91	2624			
								54.00	14.00	3856
18	2837.00	2814.70	2747.10	1064.00	1063.91	1065.91	2641			
								125.00	30.01	4166
19	2962.00	2939.70	2872.10	1094.00	1093.92	1095.92	2682			
								78.00	23.00	3391
20	3040.00	3017.70	2950.10	1117.00	1116.92	1118.92	2697			
								60.00	13.00	4615
21	3100.00	3077.70	3010.10	1130.00	1129.92	1131.92	2719			
								24.60	9.00	2733
22	3124.60	3102.30	3034.70	1139.00	1138.92	1140.92	2719			

R136/8C

TPR
OR-286
Vol II/3

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CONFIDENTIAL
CLASS 1

Amoco Australia Petroleum Company

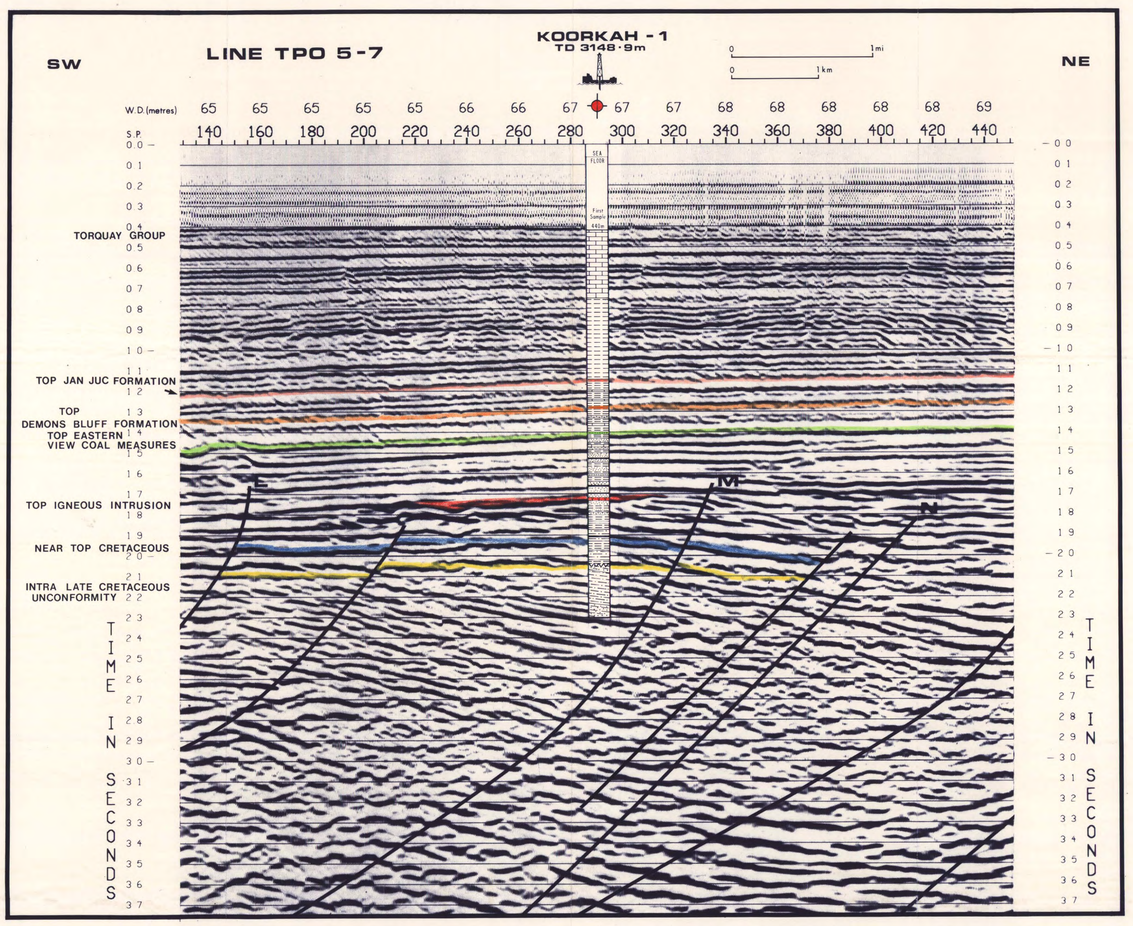
KOORKAH-1

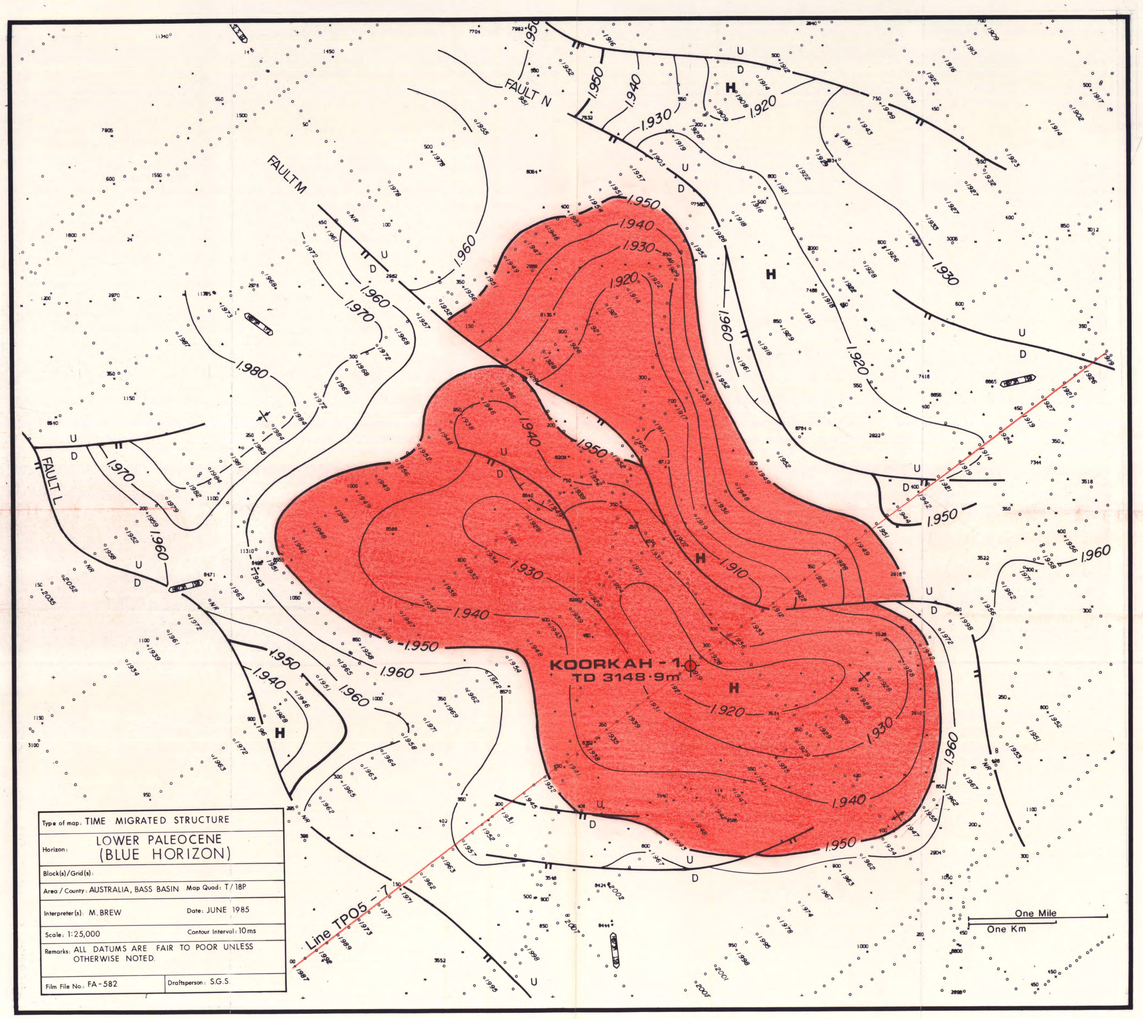
Final Well Report

Volume II-Geological Enclosures

TPR
OR-286
(VOL II)/3

September 1986





SEISMIC HORIZONS

FORMATION TOPS	DEPTH (KB) (metres)	TWT (SEC)
TORQUAY GROUP	89·9	0·09
JAN JUC	1240	1·139
DEMONS BLUFF	1421·5	1·286
EASTERN VIEW	1605	1·415
IGNEOUS INTRUSION	2092	1·721

AGE	DEPTH (KB) (metres)	TWT (SEC)
TOP LATE EOCENE	1420	1·285
TOP PALEOCENE	2240	1·802
NEAR TOP CRETACEOUS	2469	1·934
INTRA LATE CRETACEOUS UNCONFORMITY	2690	2·056

LINE TP05-7

AMOCO AUSTRALIA PETROLEUM COMPANY
PERMIT T-18P
1985A AMOCO BASS BASIN SURVEY

53 DEGREES — DIRECTION SHOT

MIGRATION

FIELD DATA

DATA SHOT BY	G.S.I. PARTY 2931 M.V. EUGENE MCDERMOTT II
DATE SHOT	MAY, 1985
RECORDING INSTRUMENTS	TRACE SEQUENTIAL RECORDER
RECORDING FILTERS	HIGH CUT FILTER AND SLOPE 128 HZ @ 72 DB/OCTAVE LOW CUT FILTER AND SLOPE 8 HZ @ 18 DB/OCTAVE
RECORDING POLARITY	A POSITIVE PRESSURE AT THE HYDROPHONE PRODUCES A POSITIVE NUMBER ON TAPE
DIGITAL TAPE FORMAT	SEG D 6250 BPI PHASE ENCODED
RECORD LENGTH / SAMPLE RATE	6.0 SECONDS AT 2 MILLISECOND SAMPLE RATE
ENERGY SOURCE	4075 CU. IN. AIRGUN ARRAY OPERATING AT 2000 PSI
GUN DELAY	51.2 MILLISECONDS
SOURCE DEPTH	10 METRES AVERAGE
SOURCE TO ANTENNA DISTANCE	62.1 METRES
SHOTPOINT INTERVAL	30 METRES (1 POP PER SHOT DIST)
SHOTPOINT ANNOTATION	SHOTPOINTS ANNOTATED AT SOURCE POSITION
STREAMER LENGTH	3600 METRES 240 GROUPS METRE GROUP INTERVAL
STREAMER TYPE	G.S.I. MULTIPLEXOR STREAMER
STREAMER DEPTH	13 METRES AVERAGE
HYDROPHONES	40 PER GROUP
COVERAGE	60 FOLD 240 TRACE
PRIMARY NAVIGATION SYSTEM	MAXIRAN
BACKUP NAVIGATION SYSTEM	GEONAV

SPREAD DIAGRAM



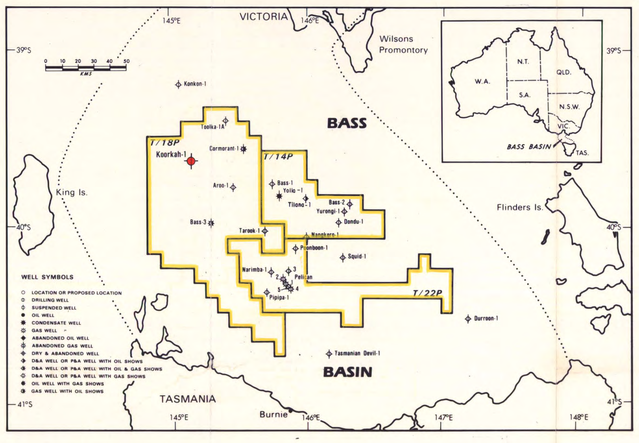
DIGITAL PROCESSING

POLARITY CONVENTION	THE POLARITY OF THE FIELD RECORDING WAS MAINTAINED THROUGHOUT PROCESSING AND DISPLAY
PROCESSING RECORD LENGTH	6.0 SECONDS
RESAMPLE	MINIMUM PHASE RESAMPLE FROM 2 TO 4 MSEC
PROCESSING SAMPLE PERIOD	4 MILLISECONDS
STATIC CORRECTIONS	AIRGUN DELAY 51.2 MSEC
ADJACENT TRACE SUM	ADJACENT FIELD TRACES SUMMED 2 ON 1
AMPLITUDE RECOVERY(TAR)	4.0 DB PER SECOND FROM 0 TO 4.0 SECONDS. SPHERICAL DIVERGENCE CORRECTIONS APPLIED
PRE DECONVOLUTION MUTE	RAMP LENGTH 96 MSECS OFFSET(METRES) 386 676 3971 START TIME(MSECS) 0 850 3000
DECONVOLUTION	1 X 240 MSEC ACTIVE FILTER LENGTH NO GAP DESIGN GATES (25 PERCENT OVERLAP) OFFSET(METRES) 386 3971 START TIME(MSECS) 200 3500 END TIME(MSECS) 4000 6000
BRUTE STACK	60 FOLD 6 SECONDS 4 MSEC
VELOCITY ANALYSIS	USING 9 DEPTH POINT VELSCAN ANALYSES LOCATED EVERY 4 KMS TO DETERMINE DEMULT FUNCTION
DEMULTIPLE	HORIZONTAL CUT-OFF VELOCITY IN FK PLANE 6700± METRES/SECOND
VELOCITY ANALYSIS	USING 9 DEPTH POINT VELSCAN ANALYSES LOCATED EVERY 2 KMS TO DETERMINE STACKING FUNCTION
FINAL CORRECTIONS	SHOT & STREAMER STATIC CORRECTIONS 12 MSEC
NORMAL MOVEOUT CORRECTION	USING ANNOTATED VELOCITIES
"RMS" BREAK SUPPRESSION	RAMP LENGTH 96 MSECS X OFFSET(METRES) 386 676 3971 START TIME(MSECS) 0 800 3100
INSIDE TRACE MUTING	RAMP LENGTH 96 MSECS OFFSET(METRES) 386 1282 1783 START TIME(MSECS) 100 100 100 END TIME(MSECS) 1200 2800 6000
COMMON DEPTH POINT STACK	60 FOLD CDP STACK
MIGRATION V/T	KIRCHHOFF WAVE EQUATION MIGRATION IN FK DOMAIN WITH DIP LIMIT 40 DEGREES USING ANNOTATED VELOCITIES 100 PERCENT 0-2 SECONDS 90 PERCENT 3-6 SECONDS
TIME VARIANT FILTERING	FREQUENCY (HZ) TIME (MSEC) 10 - 55 0 8 - 40 2000 6 - 25 4000 5 - 20 6000
TIME VARIANT SCALING	DIGITAL GAIN CONTROL SCALING 1000 MSEC GATE

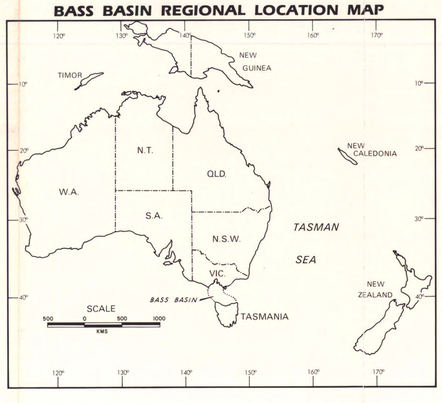
DISPLAY

HORIZONTAL SCALE	42 670000	TR/IN	66 666657	TR/KM
VERTICAL SCALE	3 750000	IN / SEC		
POLARITY	NORMAL			
TRACE TYPE BIAS	VAR	50 PERCENT		
DATUM	SEA LEVEL			
DISPLAY UNIT	0 697704 CM			

DISPLAY GAIN



BASS BASIN REGIONAL LOCATION MAP



AMOCO

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Amoco Australia Petroleum Company

CONFIDENTIAL CLASS 1

Bass Basin, Tasmania

T/18P XU8628=2

KOORKAH - 1 MONTAGE

Report No.	ENCLOSURE 1	Author WLW / MB / RGM
Date MAY, 1986	Scale	Drfts'm. L.M. / Drwg. No. FU-200

5 cm

OR-286

Amoco Australia Petroleum Company

WELL **KOORKAH No.1**
LOCATION BASS STRAIT, TASMANIA
SEISMIC LINE TP05-7 S.P. 296·5

AREA T/18P
SURFACE LOCATION LAT. 39°37'57.24"S, LONG. 145°09'05.13"E
BOTTOM HOLE LOCATION

SPUD NOVEMBER 27, 1985
COMPLETION PLUGGED AND ABANDONED 2245 hrs DEC 25, 1985
WATER DEPTH/KB ELEV. 67.6m/22.3m
DRILLERS T.D. 3148.9m

GEOLOGICAL SUMMARY / DRILLING HISTORY

EVALUATION PROGRAM: MUD SAMPLES | DITCH SAMPLES | CONVENTIONAL CORES | ANALYTICAL PROGRAM | WIRELINE LOGGING | TESTING | OBJECTIVE (P/S)

1 litre can mud in'ver every 250m
3m Washed & Dried (6 vers)
10m Washed & Dried (6 vers)
9m Wet Composites - Cloth bags (2 vers)
10m Wet Composites - Cans (1 set)
Conventional cores will be cut to investigate reservoir and source rocks.
Palynology - every 100m on wet composites (cloth bag) approx. every 25m on core, SWC and cuttings
Geochemistry - TOC & Rock-Eval - every 30m on composite SWC and cuttings Vitrinite Reflectance - every 200m on cuttings
SUITE No. 1: ISF-BHC-GR-SP; LDT-CNT-GR; VSP; CST
CASED HOLE DST's & RFTs as required

SEISMIC EVENT

PROGNOSED: Stratigraphy | Lithology
DRILLED: Stratigraphy | Lithology

Prognosed	Drilled
89m	
145.6m Top Demons Bluff Fm (dark orange)	Demons Bluff Fm 145.1
163.6m Top E.V.C.M. (light green)	160.5
191.1m Top Lower Eocene (yellow)	
206.6m Within Lower Eocene (orange)	
218.0m Top Paleocene (brown)	
246.1m Within Lower Paleocene (blue)	246.9 Top K
261.1m Top Cretaceous (green)	269.0 Intra Upper K Unconf'y
301.1m Upper Cretaceous Unconformity (light blue) TD 3200m	TD 3148.9m

TORQUAY GROUP — DEMONS BLUFF FM. — EASTERN VIEW COAL MEASURES — TORQUAY GROUP — EASTERN VIEW COAL MEASURES

NO RETURNS 420m

VITRINITE REFLECTANCE (0.20 0.40 0.60 0.80)

PALEONTOLOGY / PALYNOLOGY

DEPTH (m) FROM SPOT SAMPLES AND SWCs	PALEO-DEPTH ESTIMATES (m) PALYNOLOGICAL ZONATION	AGE	PLANKTONIC FORAM ZONES
440		MIDDLE MIOCENE OR YOUNGER	?
600		MIDDLE MIOCENE	D-2 / E-1
900			
1010		EARLY MIOCENE	E-2 / F / G/H -1
1140			
1240		LATE OLIGOCENE	H-2
1320			I-1/2
1380		EARLY OLIGOCENE	J-1
1420		?	J-2
			?K?

0 100 200 300 400 (paleo-depth scale)

1480-1609	Middle N. aspersus Zone	Late Eocene to Middle Eocene
1655-1834	Lower N. aspersus Zone	Middle Eocene
1861-1941	P. asperopolus	Middle Eocene
1972-2002	Upper M. diversus Zone	Early Eocene
2009-2068	Middle M. diversus Zone	Early Eocene
2077-2083	Indeterminate	
2160-2209	Lower M. diversus Zone	Early Eocene
2241-2300	Upper L. balmei Zone	Paleocene
2309-2655	Lower L. balmei Zone	Paleocene
2691-2763	T. longus Zone	Maastrichtian
2797-3126	T. lillei Zone	Maastrichtian to Campanian

MARINE INFLUENCE

CASING: Prognosed | Actual

Prognosed: 30" 194m; 20" 594m; 13⅜" 1698m
Actual: 30" 191m; 20" 602m; FCCT 13.2 ppg EMW "leak off"; 13⅜" 1587.4m; FCCT 16.0 ppg EMW "no leak off"; ±7⅝" 3200m

Depth m RKB / ft RKB

Spud Date: November 27, 1986
Accumulated days from spud date: 28

DRILLING

ANCHOR — SPUD — 2 DAYS — Nov 27 — Nov 29 — Dec 1 — Dec 3 — Dec 5 — Dec 7 — Dec 9 — Dec 11 — Dec 13 — Dec 15 — Dec 17 — Dec 19 — Dec 21 — Dec 23 — Dec 25 — Dec 27

DRILL 36" HOLE
SET 30" CONDUCTOR
DRILL 26" HOLE
SET 20" CASING, INSTALL BOP'S
DRILL 17½" HOLE
LOG SUITE No.1, SET 13⅜" CASING
CHANGE TO FRESH WATER MUD SYSTEM
DRILL 12¼" HOLE
Plugged & Abandoned 2245 hrs Dec 25/85
LOG SUITE No.2, SET 9⅝" CASING., TEST, P & A (57 DAYS FROM SPUD)

WIRELINE LOGGING PROGRAM

CONTRACTER : SCHLUMBERGER

SUITE No.	DATE	TYPE	DEPTH (m)
1	Dec 06/85	ISF-BHC-GR-SP-CAL	25.9 - 1233.0 (BRIDGE)
	Dec 07/85	ISF-BHC-GR-SP-CAL	25.9 - 1593.0
2	Dec 22/85	ISF-BHC-GR-SP-CAL	1589.0 - 3152.0
	Dec 22/85	LDL-CNL-GR-CAL	Failed
	Dec 22/85	LDL-CNL-GR-CAL	1589.0 - 3153.0
	Dec 22/85	HDT	1589.0 - 3153.0
	Dec 22/85	CST	1605.1 - 3140.1
	Dec 23/85	VSP	403.0 - 3124.0

MUD WT. (lbs/gal)

8.7 8.9 9.1 9.3

277169

Amoco Australia Petroleum Company

CONFIDENTIAL
CLASS 1

BASS BASIN, TASMANIA

T/18P XU8629-2
KOORKAH—1
DRILLING PANEL WITH LITHOLOGY PALEONTOLOGY, PALYNOLOGY AND VITRINITE REFLECTANCE

Scale :- 1:10,000	ENCLOSURE 2	Drwg. No. FU - 198
Date :- March, 1986	Author :- R.G. McCullough	

5 cm

OR-286

AMOCO AUSTRALIA PETROLEUM COMPANY

COMPOSITE WELL LOG

KOORKAH-1

XU 8636-2

CONFIDENTIAL CLASS 1 PT1179

DISCOVERY

WELL DATA

LOGGING DATA

RUN	DATE	CASING	FROM	TO
WIRELINE LOG AND SERVICES				

LOCATION MAP

LEGEND

LITHOLOGIC SYMBOLS

PRECAMBRIAN METAMORPHIC ROCKS

COMMUNICATION ROCKS

METAMORPHIC ROCKS

IGNEOUS ROCKS

OTHER ROCKS

FOSSIL SYMBOLS

MISCELLANEOUS SYMBOLS

OPERATIONAL SYMBOLS

NO RETURNS

NO RETURNS

LOWER BUCKLEY FORMATION

TOP 1 PRE-TERTIARY

TOP 2 PRE-TERTIARY

TOP 3 PRE-TERTIARY

TOP 4 PRE-TERTIARY

TOP 5 PRE-TERTIARY

TOP 6 PRE-TERTIARY

TOP 7 PRE-TERTIARY

TOP 8 PRE-TERTIARY

TOP 9 PRE-TERTIARY

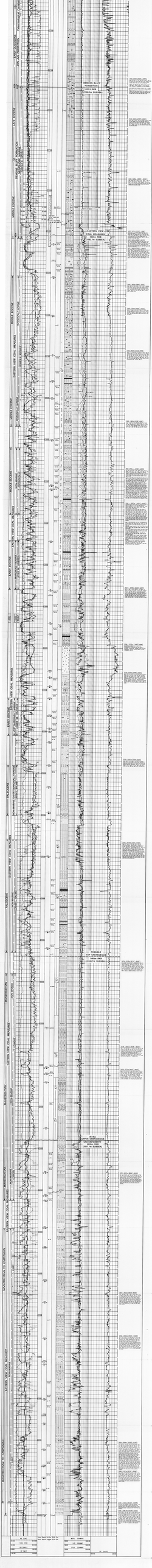
TOP 10 PRE-TERTIARY

TOP 11 PRE-TERTIARY

TOP 12 PRE-TERTIARY

TOP 13 PRE-TERTIARY

TOP



EARLY EOCENE
LATE EOCENE
MIDDLE EOCENE
PALEOCENE
MAASTRICHTIAN
MAASTRICHTIAN TO CAMPANIAN
EASTERN VIEW COAL MEASURES

EXLOG

OPERATOR: ...
COMPANY: ...
WELL: ...
FIELD: ...
REGION: ...
LOCATION: ...
COUNTY/PARISH: ...
STATE/PROVINCE: ...
API/PERMANENT WELL NO: ...
ELEVATION: ... KB ... DF ... GL ...
TOTAL DEPTH: ...
DATE: ... TO ...
DRILLING CONTRACTOR: ...
RIG NAME & TYPE: ...
SPUD DATE: ...
LOG INTERVAL: ... TO ...
DATE: FROM ... TO ...
CASING: ... @ ...
LOG ENGINEER: ...

HOLE SIZE
... @ ... TO ...
... @ ... TO ...
... @ ... TO ...
... @ ... TO ...

CASING RECORD
... @ ...
... @ ...
... @ ...
... @ ...

MUD TYPES
... @ ... TO ...
... @ ... TO ...
... @ ... TO ...
... @ ... TO ...

LITHOLOGY SYMBOLS

SHALE | LIMESTONE | DOLOMITE | SANDSTONE | SILTSTONE | ANHYDRITE | SALT | COAL | GYPSUM | CHERT | CONGLOMERATE | GRANITE | BASEMENT | IGNEOUS / METAMORPHIC

DRILLING EVENTS
CONNECTION GAS (CG) | TRIP GAS (TG) | BACKGROUND GAS (BG) | FLUID LOSS | FLUID GAIN | WIPER GAS (WG) | SWABBING | SURGING | CIRCULATING | REAMING | DRILLING BREAK | NO RETURNS | SHOW | KICK | PUMP PRESSURE INCREASE | PUMP PRESSURE DECREASE | PUMP STROKE INCREASE | PUMP STROKE DECREASE | PUMP CHANGE | CASING SEATING | CEMENTING | DIVERTER | BOP TESTING | DRILLING TIME | SURVEY | CORE | DST | LOGGING RUN | CASING | FORMATION TOP

ABBREVIATIONS
GAS - GASEOUS UNITS
WOB - WEIGHT ON BIT
ROP - RATE OF PENETRATION
RPM - ROTARY SPEED
SPP - STANDPIPE PRESSURE
MW - MUD WEIGHT
FV - FUNNEL VISCOSITY
PV - PLASTIC VISCOSITY
YP - YIELD POINT
GEL - GEL STRENGTH
WL - WATER LOSS
MC - MUD CAKE
PH - PH
CL - CHLORIDES
SAND - SAND CONTENT
MBT - METHYLENE BLUE TEST
PM - ALKALINITY MUD
PF - ALKALINITY FILTRATE
MF - ALKALINITY MIXED
CA - CALCIUM
LCM - LOST CIRCULATION MATERIAL
TVD - TRUE VERTICAL DEPTH
MD - MEASURED DEPTH
ECD - EQUIVALENT CIRCULATING DENSITY
SPM - STROKES PER MINUTE
GPM - GALLONS PER MINUTE
BPM - BARRELS PER MINUTE
BBL - BARRELS
MIN - MINUTES
HR - HOURS
FT - FEET
M - METERS
DEG - DEGREES
API - AMERICAN PETROLEUM INSTITUTE
ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS

FORMATION EVALUATION LOG

DEPTH OF TRACK FROM ... TO ...

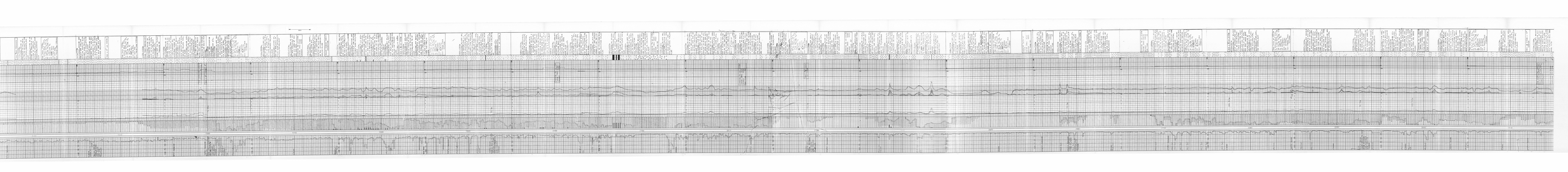
DRILLING TIME IN MIN/FT | LITHOLOGY DESCRIPTION AND SAMPLES | TOTAL GAS IN UNITS | CHROMATOGRAPHIC BREAKDOWN IN PPM | LITHOLOGY SYMBOLS AND SAMPLES

LITHOLOGY DESCRIPTION AND SAMPLES

TOTAL GAS IN UNITS

CHROMATOGRAPHIC BREAKDOWN IN PPM

LITHOLOGY SYMBOLS AND SAMPLES



277172

5 cm

EXLOG

ENCLOSURE 4a

COMPANY AMOCO AUSTRALIA

WELL KOORKAH #1

FIELD WILDCAT

REGION BASS BASIN

COORDINATES LAT : 39° 37' 54·24" S
LONG: 145° 09' 05·13" E

API WELL INDEX NO.

SPUD DATE 15:12HRS NOV 27TH 1985

ELEVATION RT-MSL 22·3M
MSL-SEABED 67·6M

TOTAL DEPTH 3149M

CONTRACTOR DIAMOND M DRILLING Co.

RIG / TYPE DIAMOND M EPOCH/SEMI SUB

LOG INTERVAL

DEPTH FROM 402M TO 3149M

DATE FROM 1/12/85 TO 21/12/85

SCALE 1:500 0 UNIT 216

LOG PREPARED BY FELL HODGE NEW

HOLE SIZE

36"	TO	192M	12¼"	TO	3149M
26"	TO	415·4M		TO	
17½"	TO	1599M		TO	

CASING RECORD

30"	AT	190M		AT	
20"	AT	402M		AT	
13⅜"	AT	1587·5M		AT	

MUD TYPES

SEA-WATER/GEL PILLS	TO	402M
FRESH-WATER GEL	TO	1599M
FRESH-WATER/LSND/DFCL	TO	3149M

LITHOLOGY SYMBOLS

LIMESTONE, DOLOMITE, ANHYDRITE AND GYPSUM, HALITE, COAL AND LIGNITE, CLAY, SHALE, SILT AND SILTSTONE, SILTY SANDSTONE, SAND AND SANDSTONE, CONGLOMERATE, CHERT, IGNEOUS UNDIFFERENTIATED

EXLOG SUITE

FORMATION EVALUATION LOG ☒ WIRELINE DATA PRESSURE LOG ☒
PRESSURE EVALUATION LOG ☒ TEMPERATURE DATA LOG ☒
DRILLING DATA PRESSURE LOG ☐ GEMDAS COMPUTER LOGS ☐

ABBREVIATIONS

NB	NEW BIT	SVG	SURVEY GAS
RRB	RERUN BIT	C	CARBIDE TEST
CB	CORE BIT	W	MUD DENSITY 2PG
WOB	WEIGHT ON BIT	V	FUNNEL VISCOSITY
RPM	REVS PER MINUTE	F	FILTRATE — API
FLC	FLOW CHECK	FC	FILTER CAKE
CR	CIRCULATE RETURNS	PV	PLASTIC VISCOSITY
PR	POOR RETURNS	YP	YIELD POINT
NR	NO RETURNS	SOL	SOLIDS — %
LAT	LOGGED AFTER TRIP	SD	SAND — %
BG	BACKGROUND GAS	S	SALINITY — PPM Cl
TG	TRIP GAS	RM	MUD RESISTIVITY
STG	SHORT TRIP GAS	RMF	FILTRATE RESISTIVITY
CG	CONNECTION GAS		
SWG	SWAB GAS		

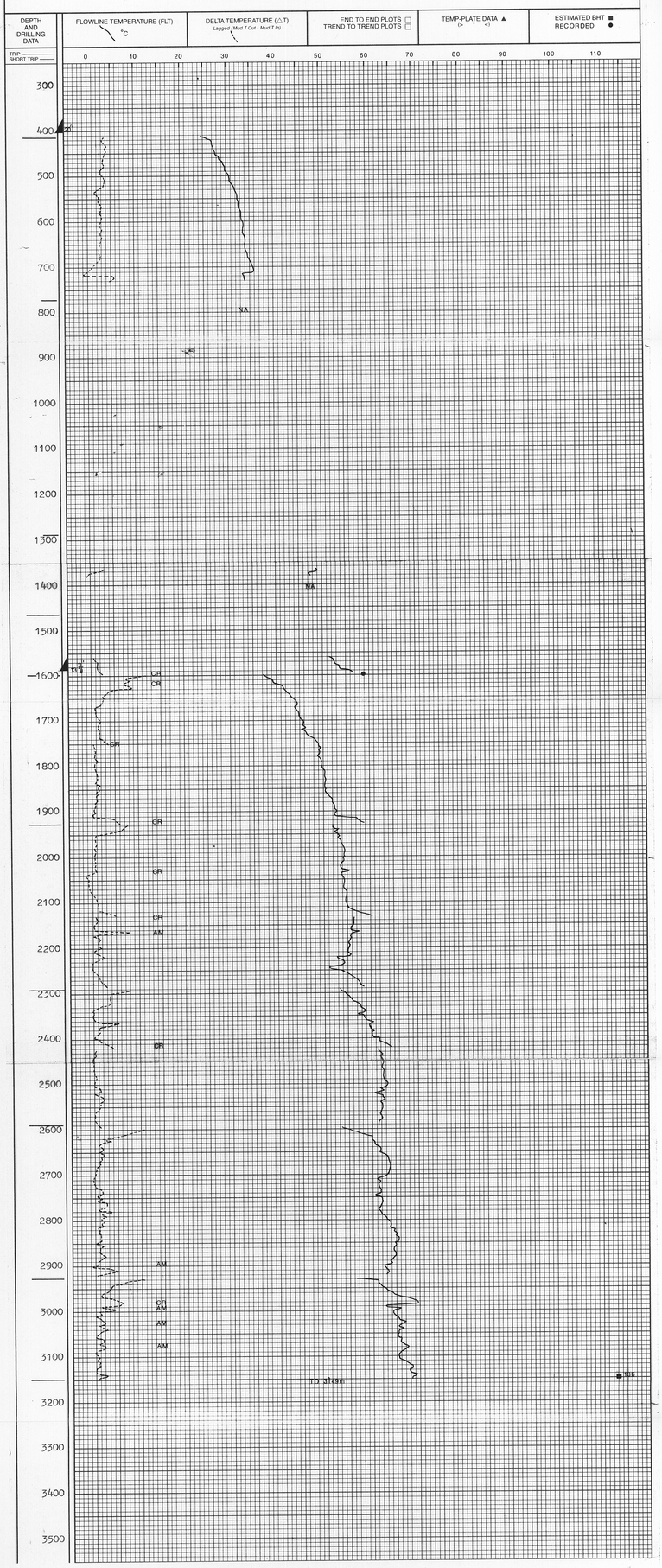
CASING SEAT; WIRELINE LOG RUN; CORED INTERVAL; TEST INTERVAL; NO RECOVERY; WIRELINE TEST; SIDEWALL CORE

GAS — 100 Total gas units is equivalent to 2% methane-in-air.

OIL — Based on live oil in unwashed cuttings and percentage staining of washed cuttings.

OR 286

TEMPERATURE DATA LOG



277173

5 cm

EXLOG

ENCLOSURE 4b

COMPANY AMOCO AUSTRALIA

WELL KOORKAH #1

FIELD WILDCAT

REGION BASS BASIN

COORDINATES LAT : 39° 37' 54.24" S
LONG: 145° 09' 05.13" E

API WELL INDEX NO.

SPUD DATE 15:10Hrs Nov 27TH 1985

ELEVATION RT-MSL 22.3M
MSL-SEABED 67.6M

TOTAL DEPTH 3149M

CONTRACTOR DIAMOND M DRILLING Co.

RIG / TYPE DIAMOND M EPOCH/SEMISUB

LOG INTERVAL

DEPTH FROM 402M TO 3149M

DATE FROM 1/12/85 TO 11/12/85

SCALE 1:500 C UNIT 216

LOG PREPARED BY FELL HODGE NEW

HOLE SIZE

36"	TO	192M	12¼"	TO	3149M
26"	TO	415.4M		TO	
17½"	TO	1599M		TO	

CASING RECORD

30"	AT	190M		AT	
20"	AT	402M		AT	
13⅜"	AT	1587.5M		AT	

MUD TYPES

SEA-WATER/GEL PILLS	TO	402M
FRESH-WATER GEL	TO	1599M
FRESH-WATER/LSND/DFCL	TO	3149M

LITHOLOGY SYMBOLS

LIMESTONE, DOLOMITE, ANHYDRITE AND GYPSUM, HALITE, COAL AND LIGNITE, CLAY, SHALE, SILT AND SILTSTONE, SILTY SANDSTONE, SAND AND SANDSTONE, CONGLOMERATE, CHERT, IGNEOUS UNDIFFERENTIATED

EXLOG SUITE

FORMATION EVALUATION LOG
PRESSURE EVALUATION LOG
DRILLING DATA PRESSURE LOG
WIRELINE DATA PRESSURE LOG
TEMPERATURE DATA LOG
GEMDAS COMPUTER LOGS

ABBREVIATIONS

NB	NEW BIT	SVG	SURVEY GAS
RRB	RERUN BIT	C	CARBIDE TEST
CB	CORE BIT	W	MUD DENSITY
WOB	WEIGHT ON BIT	V	FUNNEL VISCOSITY
RPM	REVS PER MINUTE	F	FILTRATE — API
FLC	FLOW CHECK	FC	FILTER CAKE
CR	CIRCULATE RETURNS	PV	PLASTIC VISCOSITY
PR	POOR RETURNS	YP	YIELD POINT
NR	NO RETURNS	SOL	SOLIDS — %
LAT	LOGGED AFTER TRIP	SD	SAND — %
BG	BACKGROUND GAS	S	SALINITY — PPM Cl
TG	TRIP GAS	RM	MUD RESISTIVITY
STG	SHORT TRIP GAS	RMF	FILTRATE RESISTIVITY
CG	CONNECTION GAS		
SWG	SWAB GAS		

CASING SEAT
CORED INTERVAL
NO RECOVERY
SIDEWALL CORE
WIRELINE LOG RUN
TEST INTERVAL
WIRELINE TEST

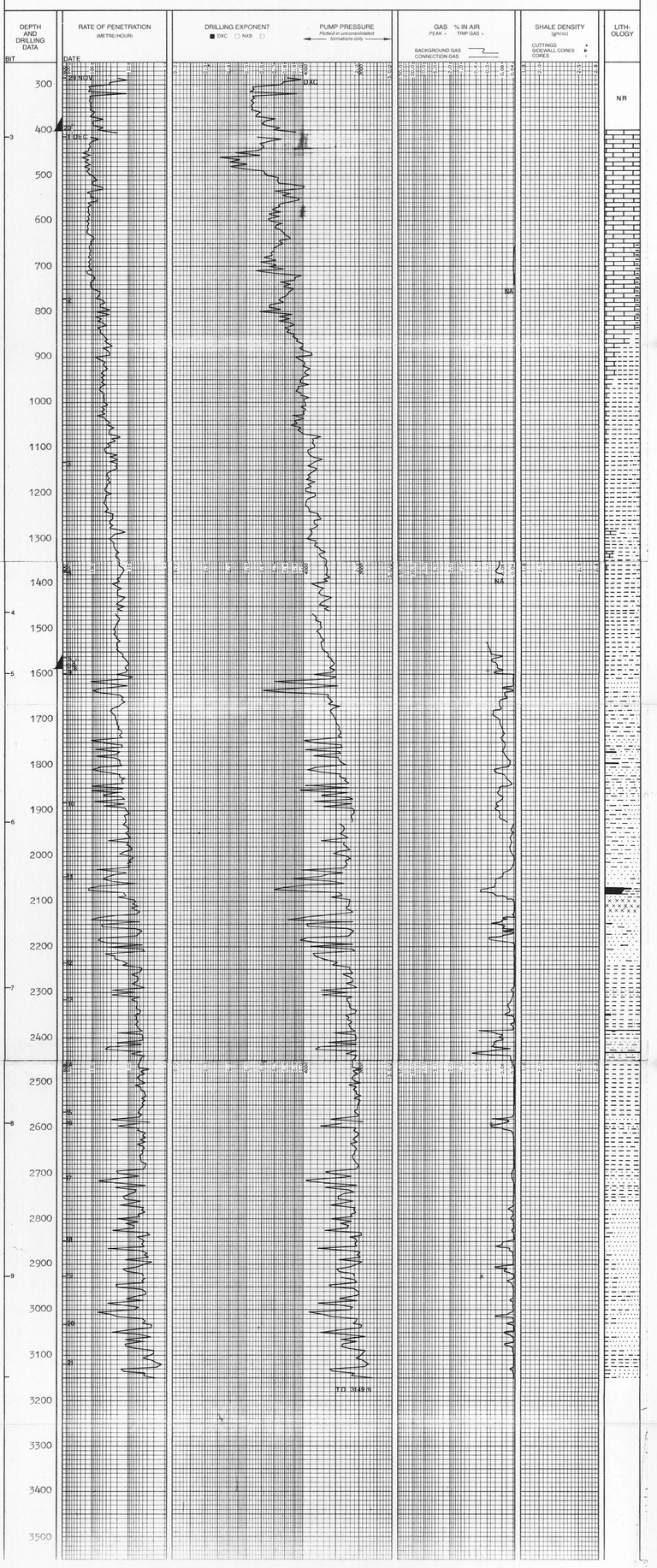
GAS — 100 Total gas units is equivalent to 2% methane-in-air.

OIL — Based on live oil in unwashed cuttings and percentage staining of washed cuttings.

CLASS II

OR-286

DRILLING DATA PRESSURE LOG



277174 OR_286

5 cm

ENCLOSURE 5 CLASS II

AUSTRALIAN LOG INTERPRETATION CENTRE

SEISMIC CALIBRATION LOG

ADJUSTED CONTINUOUS VELOCITY LOG

SCHLUMBERGER

COMPANY	AMOCO AUSTRALIA PETROLEUM CO.
WELL	KOORKAH #1
FIELD	WILDCAT
COUNTRY	AUSTRALIA

LOCATION COORDINATES:		ELEVATIONS:	
LATITUDE	39 37 57.24 S	KB	22.3 M
LONGITUDE	145 09 05.13 E	DF	22.0 M
		GL	-67.6 M

COMPUTER CENTER	ASJ
ANALYST	R.BUNT
JOB REFERENCE	540466
DATE PROCESSED	09-JAN-86

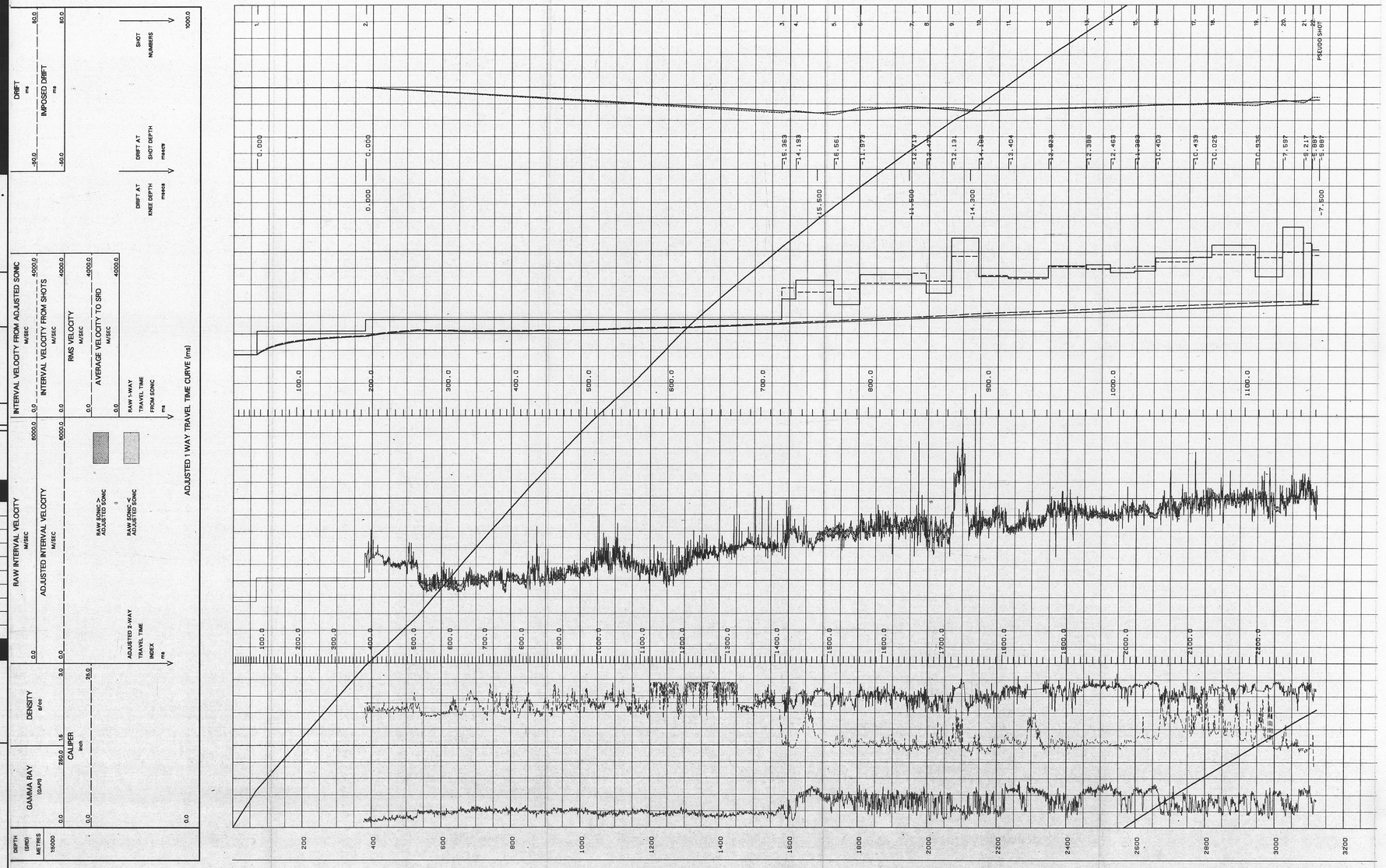
SEISMIC REFERENCE DATUM: MEAN SEA LEVEL

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

UNITS:	METRES
PERMANENT DATUM:	MSL
LOGS MEASURED FROM:	KB
DRILLING MEASURED FROM:	KB
VELOCITY LOG DEPTHS REFERRED TO:	MSL
DATE OF SONIC RUN:	6-DEC, 22-DEC-85
DATE OF CHECK SHOT RUNS:	23-DEC-85
WELL TOTAL DEPTH:	3145 M
TOTAL NUMBER OF CHECK LEVELS:	21
WELL DEVIATION:	NIL

WST RUN	DATE LOGGED	GUN ELEVATION	ACCEL. ELEVATION
1	23-DEC-85	3M BELOW MSL	3M BELOW MSL
BIT SIZE/DEPTH	CASING SIZE/DEPTH	GUN OFFSET	HYDRO OFFSET
12.25"/3149 M	13.375"/1589 M	36.3 M	36.3 M
BOT INTERVAL	TOP INTERVAL	SONDE TYPE	
3124 M	403 M	WSC-A	

REMARKS
BOTTOM SHOT AT 3124M, DRIFT EXTRAPOLATED TO TD.
IMPOSED SHOT AT SEABED - 89.9M KB



COMPANY AMOCO AUSTRALIA PETROLEUM CO.
FIELD WILDCAT
WELL KOORKAH #1
COUNTRY AUSTRALIA

Schlumberger

OR 286

277175

ENCLOSURE 6 CLASS II

AUSTRALIAN LOG INTERPRETATION CENTRE

GEOGRAM
SYNTHETIC SEISMOGRAM

SCHLUMBERGER

COMPUTED USING THE FOLLOWING SERVICES:
SONIC DENSITY WST

COMPANY AMOCO AUSTRALIA PETROLEUM CO.
WELL KOORKAH #1
FIELD WILDCAT
COUNTRY AUSTRALIA

LOCATION COORDINATES:
LATITUDE 039 37 57.24 S
LONGITUDE 145 09 05.13 E

COMPUTER CENTER ASJ
ANALYST R.BUNT
JOB REFERENCE 540466
DATE PROCESSED 09-JAN-86

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND ARE CONSENT AND ARE NOT AN AUTHORIZED TAX ACCOUNT OR CONSTITUTION OF ANY INTERPRETATIONS, AND OR WHICH ARE EXCEPT TO THE EXTENT OF GROSS OR WILLFUL NEGLIGENCE ON THE PART OF ANY OTHER PERSON OR ANY OTHER PERSON WHICH ARE OBTAINED FROM OTHER PERSONS. THE COMPANY OR OTHERS CONSIDERED AS SUITABLE OF ANY OTHER PERSON WHICH ARE OBTAINED FROM OTHER PERSONS. THE COMPANY OR OTHERS CONSIDERED AS SUITABLE OF ANY OTHER PERSON WHICH ARE OBTAINED FROM OTHER PERSONS. THE COMPANY OR OTHERS CONSIDERED AS SUITABLE OF ANY OTHER PERSON WHICH ARE OBTAINED FROM OTHER PERSONS.

LOG INFORMATION

TRUE VERTICAL DEPTH CORRECTION - NO UNIT: METRE
SONIC TOOL TYPE : SLS-RD
SONIC LOG CORRECTED BY WST - YES
SONIC TOP READING: 403 M BOTTOM READING: 3145 M
DENSITY TOP READING: 1605 M BOTTOM READING: 3145 M
DENSITY TOOL TYPE : PGD-S

GEOGRAM

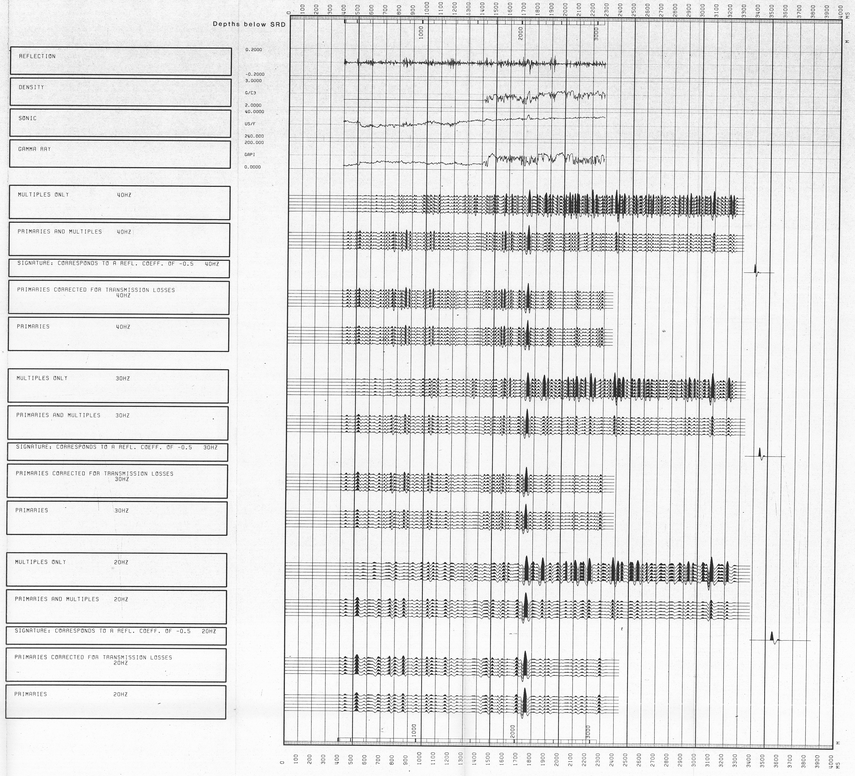
SEISMIC REFERENCE DATUM - MEAN SEA LEVEL
WAVELET USED: MINIMUM PHASE RICKER
FILTER FREQUENCY: 20, 30, 40 HZ
POLARITY: NORMAL , REVERSE
GEOGRAM SAMPLING RATE - 2 MS

REMARKS
TIME SCALE = 3.75 IN/SEC

CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : KOORKAH #1

GEOGRAM AFTER SONIC CALIBRATION
RICKER WAVELETS
MINIMUM PHASE
NORMAL POLARITY

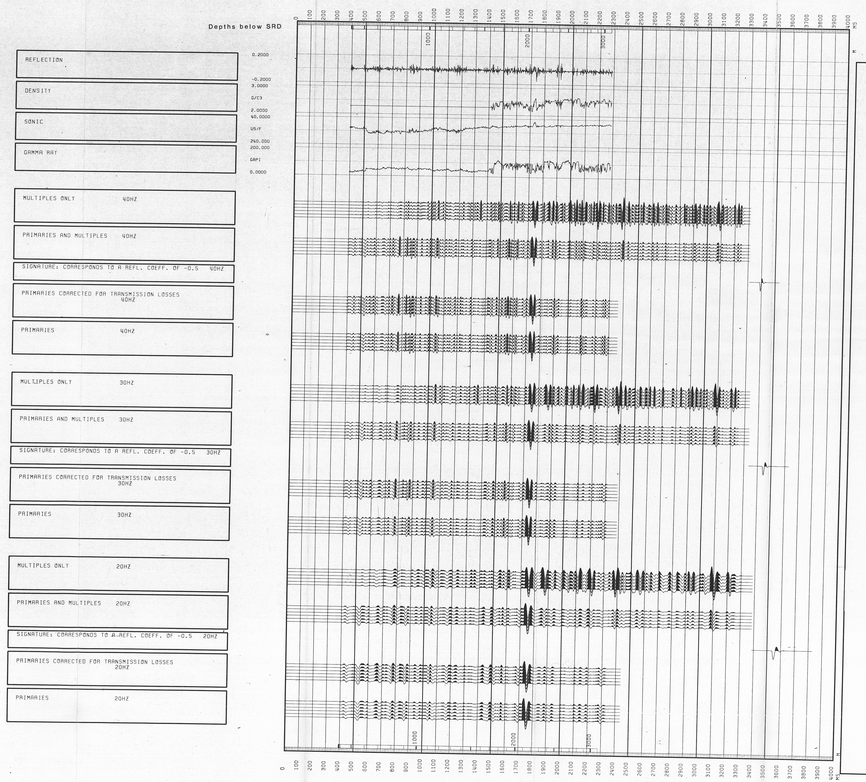
KOORKAH #1



CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : KOORKAH #1

GEOGRAM AFTER SONIC CALIBRATION
RICKER WAVELETS
MINIMUM PHASE
REVERSE POLARITY

KOORKAH #1



COMPANY AMOCO AUSTRALIA PETROLEUM CO.
FIELD WILDCAT
WELL KOORKAH #1
COUNTRY AUSTRALIA

Schlumberger

5 cm

OR 286

277176

ENCLOSURE 7 CLASS II

AUSTRALIAN LOG INTERPRETATION CENTRE

GEOGRAM
SYNTHETIC SEISMOGRAM

SCHLUMBERGER

COMPUTED USING THE FOLLOWING SERVICES:
SONIC DENSITY WST

COMPANY	AMOCO AUSTRALIA PETROLEUM CO.
WELL	KOORKAH #1
FIELD	WILDCAT
COUNTRY	AUSTRALIA

LOCATION COORDINATES:

LATITUDE	039 37 57.24 S
LONGITUDE	145 09 05.13 E

COMPUTER CENTER	ASJ
ANALYST	R.BUNT
JOB REFERENCE	540466
DATE PROCESSED	09-JAN-86

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT EXCEPT TO THE EXTENT OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS OR AGENTS OR EMPLOYEES FROM INTERPRETATIONS MADE BY US IN GOOD FAITH. THESE ARE CONDITIONS WE HAVE TO SET OUT FOR CLEARER PRICE REASONS.

LOG INFORMATION

TRUE VERTICAL DEPTH CONNECTION - NO	UNIT: METRE
SONIC TOOL TYPE : SLS-RD	
SONIC LOG CORRECTED BY WST - YES	
SONIC TOP READING: 609 M	BOTTOM READING: 3165 M
DENSITY TOP READING: 1805 M	BOTTOM READING: 3165 M
DENSITY TOOL TYPE : FDD-G	

GEOGRAM

SEISMIC REFERENCE DATUM - MEAN SEA LEVEL

WAVELET USED: ZERO PHASE RICKER

FILTER FREQUENCY: 20, 30, 60 HZ

POLARITY: NORMAL , REVERSE

GEOGRAM SAMPLING RATE - 2 MS

REMARKS

TIME SCALE = 3.75 IN/SEC

CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : KOORKAH #1

SMY.GES.001= SPM.GES.001= SMG.GES.001= SMD.GES.001= DTM= RHOB= REFL= CAL= SMY.GES.002= SPM.GES.002= SMG.GES.002= SMD.GES.002=

GEOGRAM AFTER SONIC CALIBRATION
RICKER WAVELETS
ZERO PHASE
NORMAL POLARITY

KOORKAH #1

Depths below SRD

REFLECTION

DENSITY

SONIC

GAMMA RAY

MULTIPLES ONLY 40HZ

PRIMARIES AND MULTIPLES 40HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 40HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 40HZ

PRIMARIES 40HZ

MULTIPLES ONLY 30HZ

PRIMARIES AND MULTIPLES 30HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 30HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 30HZ

PRIMARIES 30HZ

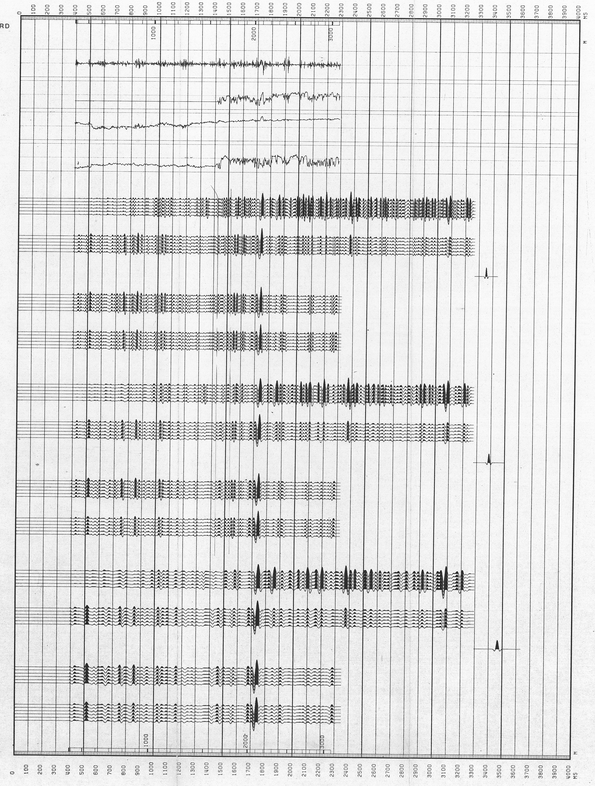
MULTIPLES ONLY 20HZ

PRIMARIES AND MULTIPLES 20HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 20HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 20HZ

PRIMARIES 20HZ



CLIENT : AMOCO AUSTRALIA PETROLEUM CO.
FIELD : WILDCAT
WELL : KOORKAH #1

SMY.GES.001= SPM.GES.001= SMG.GES.001= SMD.GES.001= DTM= RHOB= REFL= CAL= SMY.GES.002= SPM.GES.002= SMG.GES.002= SMD.GES.002=

GEOGRAM AFTER SONIC CALIBRATION
RICKER WAVELETS
ZERO PHASE
REVERSE POLARITY

KOORKAH #1

Depths below SRD

REFLECTION

DENSITY

SONIC

GAMMA RAY

MULTIPLES ONLY 40HZ

PRIMARIES AND MULTIPLES 40HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 40HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 40HZ

PRIMARIES 40HZ

MULTIPLES ONLY 30HZ

PRIMARIES AND MULTIPLES 30HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 30HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 30HZ

PRIMARIES 30HZ

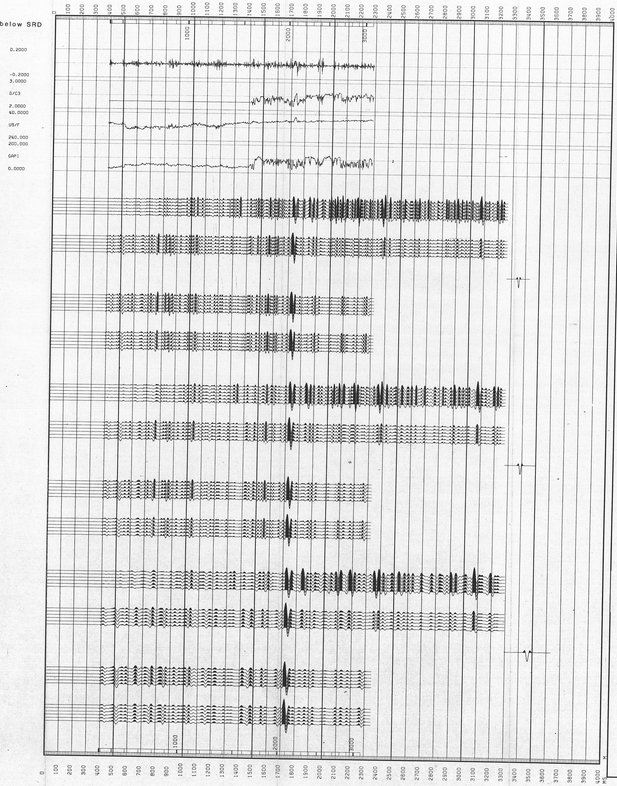
MULTIPLES ONLY 20HZ

PRIMARIES AND MULTIPLES 20HZ

SIGNATURE; CORRESPONDS TO A REFL. COEFF. OF -0.5 20HZ

PRIMARIES CORRECTED FOR TRANSMISSION LOSSES 20HZ

PRIMARIES 20HZ



COMPANY AMOCO AUSTRALIA PETROLEUM CO.
FIELD WILDCAT
WELL KOORKAH #1
COUNTRY AUSTRALIA

Schlumberger

OIL SHC

VERSION# 61 1100A/200 SITE#:16508

CSU FmtLog

COMPANY: WMOIE AUSTRALIA PETROLEUM LTD.
WELL: VERNON #1
FIELD: WILDCAT
COUNTY: OFFSHORE
STATE: NT/AUSTRALIA
SERVICE: ONE RUN(S).
LOCATION: 1000 FNSL&1000 FWEL

CLASS II

OTHER SERVICES:

LATITUDE: 12 30'00.000"S
LONGITUDE: 130 30'00.000"E

PERMANENT DATUM: MSL ELEVATIONS:
ELEV OF PERM. DATUM: 0.0 M KB: 22.0 M
LOG MEASURED FROM: 22.0 M ABOVE PERM. DATUM DF: 12.0 M
DRILLING MEASURED FROM: RKB

PROGRAM VER: 10.4

DATE: 27 JUN 86
RUN NO: -

DEPTH-DRILLER: 2149.0 M
DEPTH-LOGGER: 2147.0 M
BTM LOG INTERVAL: 2145.0 M
TOP LOG INTERVAL: 1600.0 M

CASING-DRILLER: 406.0 M @ 1562.0 M 0.0 M
CASING-LOGGER: 406.0 M @ 1562.0 M 0.0 M
BIT SIZE: 311.1MM @ 406.0M 215.9MM @ 2149.0M
TYPE FLUID: WATER GEL MUD WT: 1.04 SG VISC: 40.0 S PH: 10.0 FLUID LOSS: 0.0 C3 RESISTIVITY: 0.000 OHMM @ 0.0 DEGF

TYPE FLUID IN HOLE: FRESH WATER GEL
DENSITY: 9.00 LB/G
VISC: 70.0 S
PH/FL: 10.0 /
SOURCE OF SAMPLE: FLOWLINE
RM @ MEAS TEMP: 0.000 OHMM @ 0.0 DEGF
RMF: 0.000 OHMM @ 0.0 DEGF
RMC: 0.000 OHMM @ 0.0 DEGF
SOURCE RMF/RMC: PRESS/PRESS
RM @ BHT: 0.000 OHMM @ 0.0 DEGF
TIME SINCE CIRC: 0.0 HR
MAX REC TEMP: 0.0 DEGF
EQUIP LOCATION: 0.0 KM
RECORDED BY: R.CASEY/J.MAY
WITNESSED BY: P.JAMES

EQUIPMENT NUMBERS:

THE INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

IP 20.4 FILE: VERNON1 DFI: -102.00000

CHANNEL PARAMETERS

NAME	VALUE	UNIT	DEPTH + M -	NAME	VALUE	UNIT	DEPTH + M -
BPAL	10.0000	U/F	2049.6				
BPAL	10.0000	U/F	2049.6	BPOL	9.90000	U/F	2049.6

