W1114
MOONFISH-2
WCR VOL. 2

Esso Australia Ltd.

WELL COMPLETION REPORT

MOONFISH 2

VOLUME 2

INTERPRETED DATA

GIPPSLAND BASIN, VICTORIA

ESSO AUSTRALIA LTD

Compiled by : M.E. Fittall
January 1996

CONTENTS

I. INTRODUCTION

The Moonfish Field is a small faulted anticlinal structure, which is bounded to the north by a a high angle reverse fault. It is located approximately 5 kms north of Snapper Platform in VIC/L10 licence area (see Figure 1). The Moonfish 1 discovery well, and the downdip sidetrack Moonfish 1ST1, were drilled on the northern and western flanks of the field in 1992. These wells discovered intra-Latrobe oil and gas pools in Eocene and Paleocene reservoirs.

Moonfish 2 was a Production Department funded appraisal well located near the crest of the field, approximately 760m ENE of Moonfish 1 and 1050m NE of Moonfish 1ST1. The well was spudded on 16th December 1994, and plugged and abandoned on 26th January 1995. The well was deviated from a rig position approximately 300m to the SW, to avoid the Marlin-to-shore gas pipeline overlying the crest of the field.

The objectives of the well were to evaluate structural elevation, reservoir properties, and possible presence of an updip gas cap, in the crestal part of the field. These objectives were designed to reduce uncertainties in reservoir description and reserves assessment, thus assisting in the determination of the appropriate development plan for the field.

II. FORMATION TOPS

FORMATION	AGE	PROGNOSED mTVDSS	ACTUAL mMDKB	ACTUAL mTVDSS	
Gippsland Limestone	Recent	52	85.0	54.0	
Top of Latrobe Group	Mid Eocene (Lwr n. asp.)	1485	1558.6	1483.7	1m High
Top of N-1.9 Coal	Early Eocene (Lwr m. div.)	1641	1729.3	1641.2	0m
Top of M-2 Reservoir	Early Eocene (Lwr m. div.)	1694	1800.8	1708.0	14m Low
Top of L-8 Reservoir	Late Cretac. (Lwr l. bal.)	1915	2019.2	1918.1	3m Low
Top of Volcanics Coal	Late Cretac. (Lwr l. bal.)	1980	2095.2	1993.3	13m Low
Top of Subvolcanics Reservoir	Late Cretac. (Lwr l. bal.)	2025	2134.0	2031.9	7m Low
Total Depth	Late Cretac. (Upr t. lon.)	2350	2318.0	2215.5	135m High

Moonfish 2 was drilled below the Subvolcanics reservoir to evaluate an equivalent section in Moonfish 1 where shows were encountered but not logged due to stuck pipe. Moonfish 2 did not reach the programmed total depth because the well is interpreted to have drilled through the bounding fault into Golden Beach Group at 2318m MDKB. Mud losses were encountered at this depth during drilling which required the addition of lost circulation material. Drilling was slow and only poor gas shows were encountered in the section above 2318m MDKB, so the decision was made to terminate drilling of Moonfish 2 at this depth.

III. STRUCTURE

Moonfish Field is located on the northern flank of the Gippsland Basin between Emperor and Snapper Fields (see Figure 1). The Latrobe Group section progressively thickens southwards from Emperor and Sweetlips, through Moonfish and Snapper, and toward the centre of the basin. The Moonfish structure formed as a result of a Late Eocene/Oligocene compressional event reactivating and reversing normal growth faults developed on the northern margin in association with rifting and extensional basin development. Force folds have developed in the hanging wall as a result of the reactivation of the east-west trending basin forming faults. Moonfish Field is a small faulted anticlinal structure, bounded to the north by a high angle reverse fault, which is an example of one of these forced folds (see Enclosure 6).

Moonfish 2 penetrated the top of Latrobe Group close to prediction. The primary target M-2 reservoir was encountered 14m TVD low to prognosis at 1801m MDKB (1708.0m TVDSS, adjusted to field OWC). This is 9m TVD updip of the net reservoir in Moonfish 1, and is near the crest of the field. The Subvolcanics reservoir was encountered 7m TVD low to prognosis at 2134m MDKB (2031.9m TVDSS, adjusted to field OWC), which is a similar depth to Moonfish 1.

Post-drill mapping of Moonfish Field has been completed. No closure is mapped at Top of Latrobe level, although a minor amount was mapped pre-drill (see Enclosure 7). 16m of fault independent closure, which spills to the south towards Snapper Field, is mapped at the major seismic horizon, the N-1.9 Coal Marker. 25m of closure is mapped at the top of the main oil zone, the M-2 reservoir, with 10m of the closure fault independent. This structure also spills to the south towards Snapper Field (see Enclosure 8). 18m of fault-independent closure is mapped at the top of the secondary oil zone, the Subvolcanics reservoir, including 12m of closure updip of Moonfish 2. A total of 56m of independent and fault-dependent closure is mapped with a spill level at -2075m towards the west (see Enclosure 9).

An increasing amount and complexity of faulting with depth is shown by the faulting interpreted on the Top of Subvolcanics map compared to the shallower mapping. However, mapping of seismic horizons at this level is difficult.

The processed FMI dipmeter data (see Appendix 2c) interprets structural dip of 3 degrees to the northwest over the interval 1820-1850m MDKB (near M-2, M-3 reservoirs). This is consistent with the mapping at the top of M-2 reservoir, where Moonfish-2 is shown slightly off crest of the structure. Other structural dips are not easy to interpret due to the washed out hole in the shales resulting in few consistent low-angle dip patterns. However, several zones can be assumed to represent structural dip over the interval 2090-21723m MDKB (near Subvolcanics reservoir). These dips average approximately 10 degrees to the north, which is broadly consistent with the seismic mapping at Volcanics level.

IV. STRATIGRAPHY

The Latrobe Group section intersected in Moonfish-2 is the same as that seen in Moonfish-1/1ST, and consists of Late Cretaceous to Eocene sediments deposited in a fluvial to coastal plain environment (see Enclosures 1&3, Figure 2).

The uppermost Latrobe Group consists of approximately 10m of glauconitic pyritic marine shale, referred to as the Gurnard Formation. It is of Mid Eocene age (Lower N. asperus spore pollen zone) in Moonfish-2.

The upper Latrobe Group from top of Coarse Clastics down to the top of the N-1.4 sand consists of interbedded sands, shales and coals of Mid Eocene age (basal Lower N. asperus spore pollen zone), deposited in a fluvial to coastal plain environment. This section has a low to moderate sand:shale ratio.

The N-1.4 sand consists of approximately 80m of massive quartose sandstone, interpreted to have been deposited in a stacked braided stream environment. This section is interpreted to be Early Eocene in age (Upper M. diversus spore pollen zone). This thick sand sequence is regionally extensive and is interpreted to have been initially deposited in the lowstand systems tract following a basinwide drop in relative sea-level at 51.5My. Several other sequence boundaries with associated deposition of lowstand systems tract sands are probably expressed within the N-1.4 sand sequence, with a suggestion of some missing section (Mid M. diversus, P. asperopolus - see Appendix 1).

The regionally extensive N-1.9 coal (major seismic marker) and the N-1.9 sand, separated by a thin shale, underlie the N-1.4 sand. This section is probably of Early Eocene age. The N-1.9 sand is interpreted to have been deposited in a braided stream environment as part of the lowstand systems tract developed after a drop in relative sea-level at 52.0My, whereas the overlying N-1.9 coal formed in a swamp environment during deposition of the transgressive systems tract.

An interbedded sequence of sands, shales, and thin coals which includes the major M-2 and minor M-3 reservoirs underlies the N-1.9 sand. This section is Early Eocene in age (Lower M.diversus spore pollen zone). Examination of Cores 1-3 in this interval of Moonfish-2 shows the major sands to be coarse grained with trough cross-bedding, which are interpreted to have been deposited in a fluvial channel to lower point bar environment. The high energy environment is supported by sedimentary paleodips of typically 15 to 18 degrees.

Approximately 250m of thinly interbedded sands, shales and coals with an overall low net-to-gross underlies the M-3 reservoir. This section is Paleocene (Lower L. balmei spore pollen zone) to Early Eocene (Lower M. diversus) in age, and is interpreted to have been deposited in a low energy fluvial floodplain to coastal plain environment.

A 16m thick layer of weathered basaltic volcanic material is present in Moonfish-2 within the Lower L. balmei sequence. It is not clear whether the volcanics are extrusive or intrusive in origin (see Appendix 4). A 3m thick coal, which is a mappable seismic marker, immediately overlies the volcanics.

The section beneath the volcanics, including the Subvolcanics reservoir, consists of interbedded sands, shales and occasional thin coals. This interval has a moderate to high sand:shale ratio, and is Late Cretaceous in age (Lower L. balmei to Upper T. longus spore pollen zones). The environment of deposition is interpreted to have been low sinuosity fluvial to floodplain.

V. HYDROCARBONS

Moonfish-2 encountered the major hydrocarbon zones seen in Moonfish1/1ST. Drilling Moonfish-2 in a crestal location resulted in the intersection of previously unseen gas caps in the M-2 and M-3 reservoirs (see Enclosures 1&3, Appendix 2a).

Note all subsea depths quoted below have been adjusted to tie the Moonfish-2 RFT contacts to the electric-log defined contacts in Moonfish-1, which has been picked as the datum to which the other wells are tied. Specifically, the unadjusted M-2 OWC derived from RFT data was 2.8m TVD deep in Moonfish-2, and the unadjusted Subvolcanics OWC derived from RFT data was 3.2m TVD deep (see Appendix 3). These differences are assumed to be due to minor survey uncertainties.

The N-1.9 gas reservoir was the first hydrocarbon zone encountered in Moonfish-2, at 1743.0m MDKB (-1654.0m TVD), which is the crestal intersection. Log analysis interprets 19.3m TVD of net gas sand with an average porosity of 20% and average gas saturation of 87%. A GWC was previously intersected in Moonfish-1 at -1674.7m TVD, establishing a gross gas column of 20.7m after Moonfish-2. This GWC closely matches the mapped structural spillpoint to the south, with spill up to Snapper Field.

Moonfish-2 encountered the M-2 reservoir at 1800.8m MDKB (-1708.0m TVD), intersected a 5.3m TVD gross gas column and established a GOC at 1806.5m MDKB (-1713.3m TVD). Log analysis indicates 4.4m TVD of net gas with an average porosity of 21% and average gas saturation of 78%. The M-2 oil zone was encountered down to 1816.2 m MDKB (-1722.4m TVD) where a previously unseen non-net section was encountered in Moonfish-2. The overall net-to-gross of the M-2 reservoir was much lower than expected due to this shale and coal section. Log analysis indicates 8.9m of net oil with an average porosity of 23% and oil saturation of 81%. The M-2 OWC was previously intersected in Moonfish-1 at -1713.3m TVD, establishing a gross oil column of 18.0m TVD after Moonfish-2. This OWC closely matches the mapped structural spillpoint to the south, with spill up to Snapper Field.

Moonfish-2 encountered the M-3 reservoir at 1848.0m MDKB (-1752.4m TVD), intersected a 5.1m TVD gross gas column and established a GOC at 1853.4m MDKB (-1757.5m TVD). Log analysis indicates 4.9m TVD of net gas with an average porosity of 23% and average gas saturation of 76%. The M-3 oil zone comprised 1.6m TVD of gross oil sand. Log analysis indicates 1.5m TVD of net oil with an average porosity of 24% and average oil saturation of 56%. The definition of the M-3 OWC is not clear. RFT data from Moonfish-2 interprets an OWC at -1760.9m TVD, which establishes a gross oil column of 3.4m TVD. Log analysis indicates high water saturation sand (Sw = 81%) down to -1764.2m TVD in Moonfish-2, as well as in Moonfish-1 (Sw = 63% down to -1764.3m TVD) and in Moonfish-1ST (Sw = 74% down to -1764.7m TVD). A 3.4m TVD residual oil column probably exists in the M-3 reservoir based on the Moonfish-1 data.

Moonfish-2 encountered the L-8 reservoir at 2019.3m MDKB (-1918.2m TVD), and intersected a 4.6m TVD gross gas column. Log analysis indicates 4.0m TVD of net gas with an average porosity of 18% and average gas saturation of 65%. The L-8 oil zone comprised 3.0m TVD of gross oil sand. Log analysis indicates 2.6m TVD of net oil with an average porosity of 24% and average oil saturation of 88%. The L-8 OWC was previously established in Moonfish-1 at -1929.9m TVD. The definition of the L-8 GOC is not clear, but if taken as low proved gas in Moonfish-1 at -1923.8m TVD, a gross gas column of 5.6m TVD and gross oil column of 6.1m TVD are indicated.

Moonfish-2 encountered the Subvolcanics reservoir at 2134.0m MDKB (-2031.9m TVD), and intersected an 11.4m TVD gross oil column. Log analysis indicates 9.7m TVD of net oil with an average porosity of 19% and average oil saturation of 62%. The Subvolcanics gross oil column was established as 11.8m TVD with an OWC at -2043.3m TVD in Moonfish-1.

Several other sands, typically less than 2.0m TVD net, are interpreted to be hydrocarbon bearing in Moonfish-2. These sands are thin and interpreted to be laterally discontinuous, and therefore of negligible commercial significance.

Three continuous cores were cut in the M-2 and top of M-3 reservoirs in Moonfish-2 from 1801-1852m MD (Drillers Depth) with high recovery. A good match has been achieved between log porosity (PHIE) and core porosity (PHIC.OB) (see Appendix 2a). Core analysis results demonstrate the high quality nature of the reservoirs, with coarse grained sands exhibiting multi-darcy permeabilities (see Appendix 2b).

VI. GEOPHYSICAL SUMMARY

The Moonfish-2 well was positioned from the interpretation of the G93A-3D seismic data. Data quality is quite good in the shallower section but suffers severe multiple contamination of both water bottom and peg-legs from the coals at the target horizon.

Pre-drill depth conversion involved a conventional Vnmo methodology to the N-1.9 coal seismic marker, and then exponentially varying interval velocities were used to isopach up and down to other seismic marker horizons, followed by a bulk shift to the actual reservoir horizon. The upper horizons came close to prognosis in Moonfish-2 but the main reservoir horizons were all deeper than predicted (see Formation Tops, Page 2).

For the post-drill analysis the sonic and density logs were adjusted for the well deviation and corrected to the checkshot survey (see Enclosure 4 for Time-Depth curve). Synthetic seismograms were then produced using both Sierra and Geoquest software (see Enclosure 5 for synthetic displayed at 80cm/sec).

A reconstruction cut seismic line was produced to run along the Moonfish-1ST and Moonfish-2 wellbores for tying to the synthetics (see Enclosure 6). The Moonfish-2 synthetic gives an excellent tie to the Top of Latrobe and N-1.4, N-1.9 coals. However, below this the ties are poor and the checkshot data have to honoured in preference to the poor seismic character tie. Based on this, the main M-2 reservoir was picked approximately 5msec shallower than the pre-drill pick. Similarly the Top of Volcanics coal seismic marker was picked substantially shallower.

Depth conversion for the Top of Latrobe surface was achieved by using a standard Vnmo procedure with an appropriate conversion factor to produce average velocity maps. These were combined with the time picks to give the Top of Latrobe depth map (see Enclosure 7). Note there appears to be no closure at this level and any hydrocarbons migrating to this level would then spill up to Snapper Field.

Depth conversion for the reservoir horizons was effected in a similar manner to the pre-drill method by using standard Vnmo methodology to the N-1.9 Coal seismic marker, and then isopaching down from this well defined horizon. A careful analysis of the interval velocities in the three wells was used to get an appropriate velocity model to use with the respective seismic isochrons to produce the reservoir depth maps. Minor adjustments were then made to correctly tie the wells to the mapped surfaces (see Enclosures 8,9).

VII. OTHER GEOLOGICAL DETAILS

Moonfish 2 was an appraisal well drilled to evaluate the structural elevation, reservoir continuity and thickness, and possible presence of upstructure gas, in the intra-Latrobe M-2 and Subvolcanics reservoirs in the crestal part of the field. The well was required to improve the definition of reserve size to assist in development planning for the field. It was assessed that pre-drill most likely/upside reserve sizes would be optimally developed by a monotower or subsea cluster development, whereas lowside reserves would be best developed by high angle wells from Snapper platform. The well was planned to be cased and suspended if results were encouraging. The well results indicated lowside reserves, so it was decided to plug and abandon the well and seek to develop the field from Snapper.

Openhole wireline logs were run, including dipole sonic, dual laterolog-MSFL, high resolution density and neutron, Formation Imager, spectral gamma ray and caliper logs. Formation pressures and fluid samples were obtained using the RFT tool. A suite of 30 sidewall cores was obtained. The wellbore was badly washed out in the lower part of the Lakes Entrance Formation, and throughout the Latrobe Group. The major coals in particular, as well as the shales, were prone to significant washout.

The results of removal of structural dip from the FMI dipmeter data for the hydrocarbon reservoirs show a variable paleodip, and therefore transport direction (see Appendix 4). This is expected because the interpretation of the environment of deposition for most of these sands is fluvial channel to point bar, where paleoflow directions would vary considerably for individual sand bodies. It should be noted the definition of structural dip has not been easy because of the poor hole conditions in the shales, and may need to be treated with caution.

It is assumed the interval between 1804 to 1809m MDKB within the M-2 reservoir, represents fluvial channel deposition because of the high cross-bed dips, very clean and highly permeable nature of the sandstone, and the very coarse grain size. This interval has a paleodip of 55 degrees which is subparallel to the bounding fault of the Moonfish structure, suggesting sediment transport subparallel to the fault. However, this interpretation conflicts a regional understanding of the basin at this time when major accomodation was being created near the basin centre to the southwest of Moonfish. This interpretation implies the transport direction should have been approximately sub-perpendicular to the Moonfish bounding fault.

FIGURES

FIGURES

PE905650

This is an enclosure indicator page.
The enclosure PE905650 is enclosed within the container PE900926 at this location in this document.

The enclosure PE905650 has the following characteristics:

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CONTAINER_BARCODE =	PE900926
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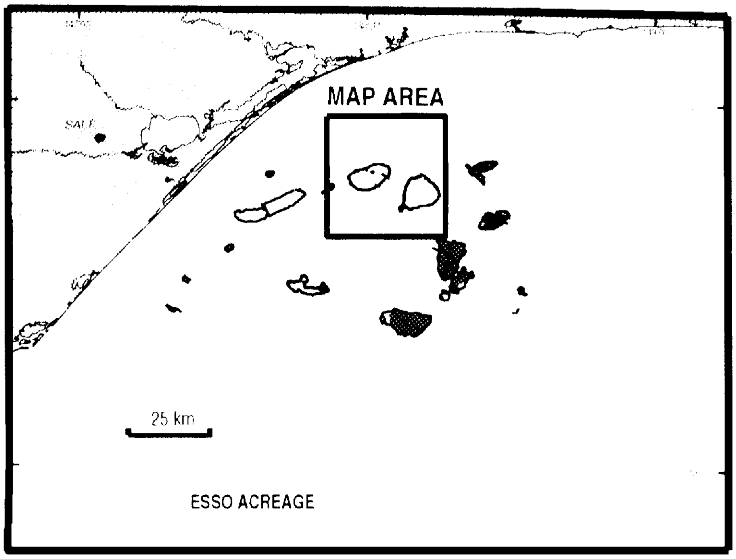
BASIN =	GIPPSLAND
PERMIT =	VIC/L10
TYPE =	GENERAL
SUBTYPE =	PROSPECT MAP
DESCRIPTION =	Moonfish-2 Well Location Map, fig 1 from WCR vol 2
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	7/03/96
W_NO =	W1114
WELL_NAME =	MOONFISH-2
CONTRACTOR =	
CLIENT_OP_CO =	ESSO AUSTRALIA RESOURCES LTD.

(Inserted by DNRE - Vic Govt Mines Dept)

Moonfish-2 Location Map



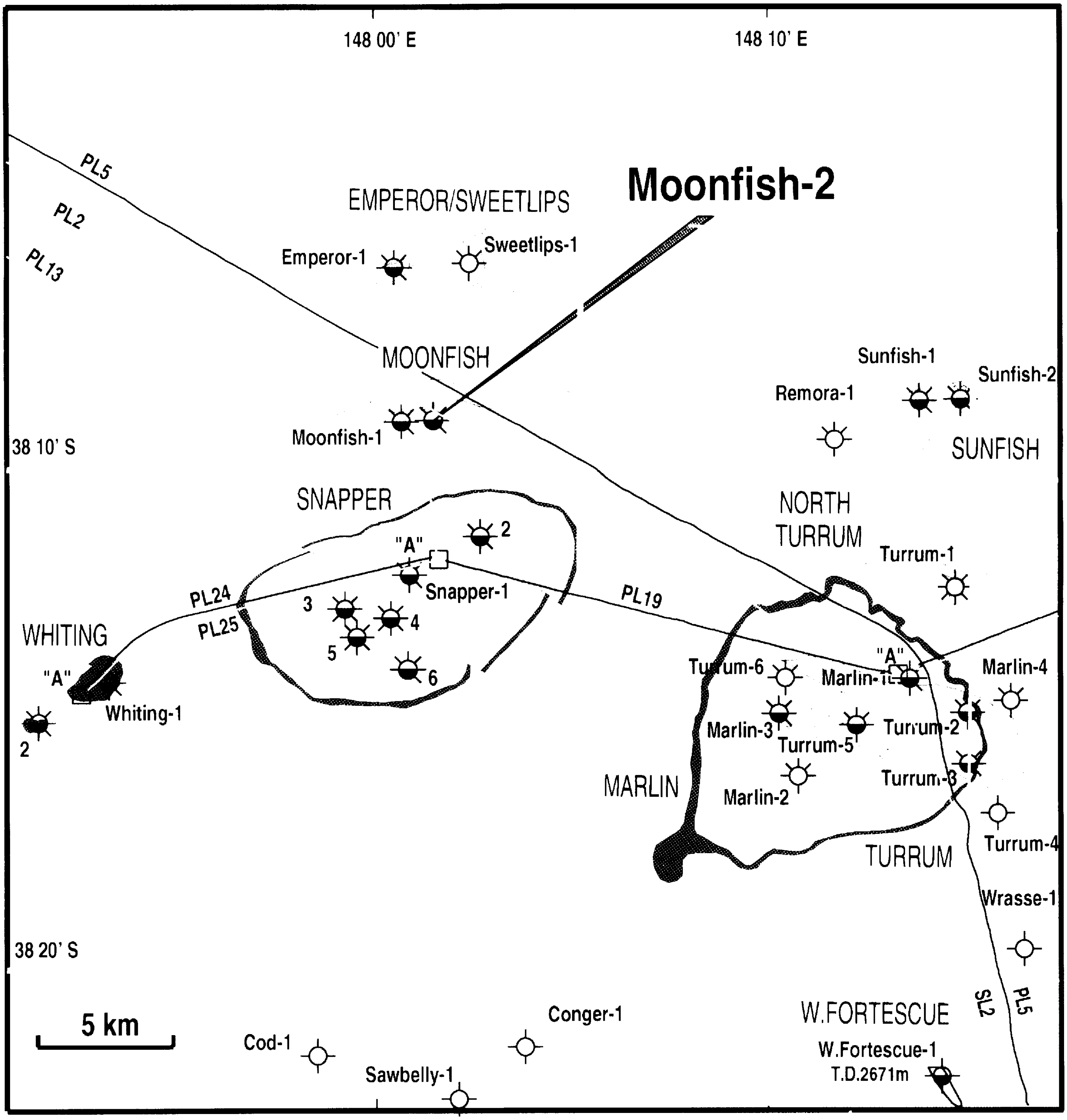
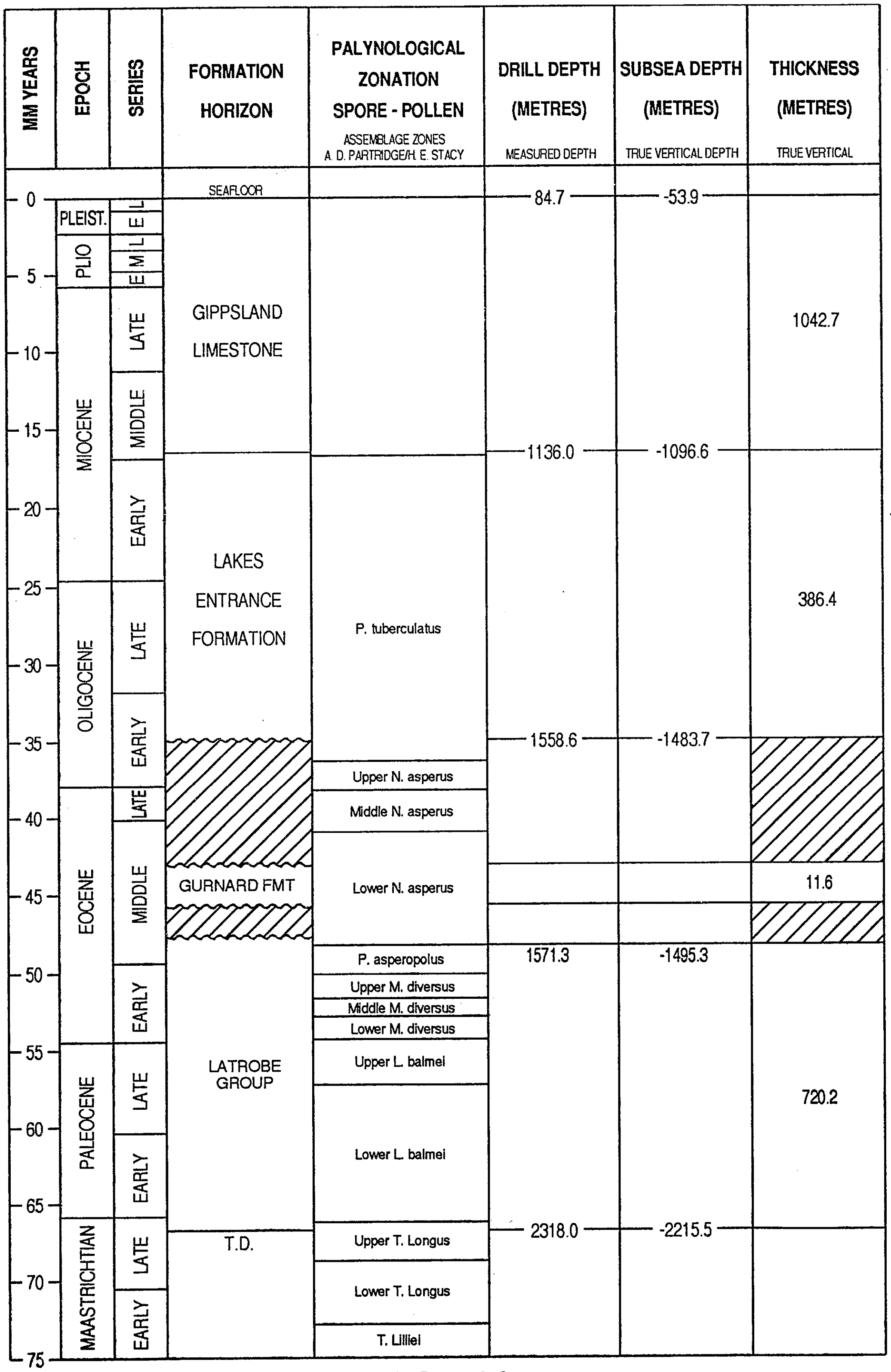


Figure 1

GPV01414 8/12/95

GIPPSLAND BASIN
MOONFISH-2 STRATIGRAPHIC SECTION
FIGURE 2



K.B. = 30.8m

APPENDIX 1

APPENDIX 1

APPENDIX 1

Moonfish-2

Palynological Analysis

Palynological Analysis of Moonfish-2, Gippsland Basin.

by

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Biostrata Report 1995/2

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INTERPRETATIVE DATA

BASIC DATA

INTERPRETATIVE DATA

Introduction

Twenty-one samples comprising 19 sidewall cores and 2 core samples were analysed in Moonfish 2. The author cleaned, split the selected sidewall cores and forwarded them to Laola Pty Ltd in Perth for processing to prepare the palynological slides. The two core samples were sent as supplied. Lithological units and palynological zones recognised in the Latrobe Group are given in the following summary. The interpretative data with zone identification and Confidence Ratings are recorded in Table 1 and basic data on residue yields, preservation and diversity are recorded on Tables 2 and 3. All species which have been identified with binomial names are tabulated on the palynomorph range chart. Relinquishment list for palynological slides and residues from samples analysed in Moonfish 2 are provided at the end of the report.

Palynological Summary of Moonfish-2

AGE	UNIT/FACIES (mTVDRT)	SPORE-POLLEN ZONES (MICROPLANKTON ZONES)	DEPTHS (mMDKB)
MIDDLE EOCENE	LATROBE GROUP Gurnard Formation 1558.6-1571.3	Lower *N. asperus* *(D. heterophlycta)*	1564-1568 (1564-1568)
MIDDLE & EARLY EOCENE	LATROBE GROUP Undifferentiated coastal plain facies of shale, coals and sands	Lower *N. asperus* Upper *M.diversus* Lower *M.diversus*	1596.5-1623 1660 1775-1816.51
PALEOCENE	1571.3-2235 (Volcanics 2100-2134)	Upper *L. balmei* *(A. homomorphum)* Lower *L. balmei*	1871-1954 (1954) 1995-2204
MAASTRICHTIAN		Upper *T. longus*	2272

T.D. 2318mMDKB

An average of 16 grams of the conventional core samples but only 12 grams of the sidewall cores were processed for palynological analysis (Table 2). Residue yields were very low from the cores and mostly moderate to high from the sidewall cores, except for the two samples from the Gurnard Formation which gave very low yields. Palynomorph concentration on the slides was variable but generally decreased with depth as the preservation got worse (Table 3). Spore-pollen diversity is very low to high from 2 to 38+ species. The average diversity is 25+ species in the nineteen most productive samples. Microplankton diversity is overall very low (1-3 species) with the exception of one Early Eocene sample at 1775m and the two samples from the Gurnard Formation which all had moderate diversities.

Geological Comments

1. The oldest rocks penetrated in Moonfish 2 are from the top of the Upper *T. longus* Zone at 2272m MDRT (~2200m TVDRT) which approximates to the top of this zone in Moonfish 1 Sidetrack at 2415m MDRT (~2220m TVD).

2. Above the Maastrichtian Upper *T. longus* Zone through to the Early Eocene Lower *M. diversus* Zone the section penetrated represents a seemingly continuous set of zones which appear to agree well with age datings in the adjacent Moonfish 1 Sidetrack.

3. Above the Lower *M. diversus* Zone in the predominantly sandy section from 1641-1765m MDRT (~1593-1707m TVDRT) the section, on the limited sampling available, appears to be incomplete with both the Middle *M. diversus* and *P. asperopolus* Zone not recorded in either Moonfish 2 or Moonfish 1 Sidetrack (Partridge, 1992).

4. The shallowest coaly section between 1572-1641m MDRT (~1528-1593m TVDRT) belongs to lower part of Lower *N. asperus* Zone and the same age was also obtained from the equivalent section in Moonfish 1 Sidetrack.

5. The two shallowest samples analysed were from thin Gurnard Formation between 1559-1572m MDRT (~1517-1528m TVDRT). They belonged to the *D. heterophlycta* microplankton Zone of Middle Eocene age and their spacing and the thickness of the unit suggests there is unlikely to be any Late Eocene in the well. The Gurnard Formation was not samples in Moonfish 1 but its presence was predicted between 1605.5-1620.5m (Partridge, 1992).

Biostratigraphy

Zone and age determinations are based on the spore-pollen zonation scheme proposed by Stover & Partridge (1973), partially modified by Stover & Partridge (1982) and Helby, Morgan & Partridge (1987), and a dinoflagellate zonation scheme which has only been published in outline by Partridge (1975, 1976). Other modifications and embellishments to both zonation schemes can be found in the many palynological reports on the Gippsland Basin wells drilled by Esso Australia Ltd. Unfortunately this work is not collated or summarised in a single report.

Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982), Helby, Morgan & Partridge (1987) and those for dinoflagellates can be found in the index of Lentin & Williams (1993). Species names followed by "ms" are unpublished manuscript names.

Lower *Nothofagidites asperus* Zone 1564.0-1523.0 metres Middle Eocene.
and
***Deflandrea heterophlycta* Zone: 1564.0-1568.0 metres Middle Eocene.**

The two deeper of the four samples from this interval are assigned to the Lower *N. asperus* Zone based on the abundance of *Nothofagidites* spp. (28% at 1596.5m and 19% at 1623m) relative to *Haloragacidites harrisii* (9% at 1596.5m and 15% at 1623m), supported by presence of the index species *Tricolpites simatus* at 1623m and absence of the key index species *Myrtaceidites tenuis* and *Intratriporopollenites notabilis* which become extinct at the top of the underlying *P. asperopolus* Zone. The two shallower samples contain the additional index species *Nothofagidites falcatus*, in both samples, and *Proteacidites reflexus* at 1564m. These are no younger than the zone on the presence of *Proteacidites pachypolus* in the higher sample and the presence of key microplankton of the *D. heterophlycta* Zone. The eponymous species *Deflandrea heterophlycta* is represented by good specimens at 1568m but only an endocyst was recorded from the limited recovery in the upper sample. The identification of the acritarch *Tritonites inaequalis* at 1568m confirms the zone assignment following Marshall & Partridge (1988).

Upper *M. diversus* Zone: 1660.0 metres Early Eocene.

Although a high diversity assemblage (38+ species) was recovered from the single sample the assemblage composition provides some conflicting data. *Proteacidites pachypolus* is common as would be expected but *Myrtaceidites tenuis* is absent. A single specimen of *Sapotaceoidaepollenites rotundatus* in the sample suggests a *P. asperopolus* Zone assignment but supporting species such as the eponymous species and the important index spore *Conbaculites apiculatus* ms are apparently absent. On balance an Upper *M. diversus* Zone assignment is favoured but a younger age is possible.

Lower *M. diversus* Zone: 1775.0-1816.51 metres **Early Eocene.**

Three sidewall cores and a core sample are assigned to the Lower *M. diversus* Zone with the best assemblage being recorded from the shallowest sidewall core at 1775m. This sample contained a high diversity assemblage with 38+ species with frequent *Proteacidites grandis* and *P. incurvatus* amongst the abundant *Proteacidites* pollen which comprised 25% of the spore-pollen assemblage. Although an extensive search was conducted no index species of the Middle *M. diversus* Zone were recorded. The assemblage also contained moderate diversity microplankton comprising 12% of the total count. The dinoflagellates recorded whilst characteristic of the Early Eocene are not assignable to any of the zones established in the basin. The four deeper samples contain assemblages of much lower diversity which are assigned to the zone on the presence of *P. grandis* and absence of index species for the underlying *L. balmei* Zone.

Upper *Lygistepollenites balmei* Zone: 1871.0-1954.0 metres
and
***Apectodinium homomorphum* Zone: 1954.0 metres** **Late Paleocene.**

Of the three samples over this interval only the deepest contains *insitu* microplankton including the eponymous species of the *A. homomorphum* microplankton Zone. The spore-pollen are assigned to the Upper subzone on presence of *Malvacipollis subtilis* and consistent presence of *Verrucosisporites kopukuensis*, but otherwise evidence for the zone assignment is weak. Frequent to common *Lygistepollenites balmei* with rare *Polycolpites langstonii* clearly show the samples are no younger than this zone.

Lower *Lygistepollenites balmei* Zone: 1995.0-2204.0 metres
Early Paleocene.

Three sidewall cores can be assigned to this zone whilst there are another three samples at 1967m, 2092m and 2265m which may belong to the zone but contain poor assemblages. The samples at 2121m, 2204m and 2265m are characteristic of this zone based on the presence of *Tetracolporites verrucosus* whilst the poorly preserved shallower sample at 1995m is assigned on the presence of probable *Proteacidites angulatus*.

Upper *Tricolpites longus* Zone: 2272.0 metres **Maastrichtian.**

The deepest sidewall core in the well yielded a moderate diversity assemblage containing the species *Forcipites* (al. *Tricolpites*) *longus*, *Tricolporites lilliei* and *Proteacidites otwayensis* ms which in combination is diagnostic of the top of the *T. longus* Zone. As the next shallowest sample was only seven metres above it was also considered as likely to belong to this zone, but an extensive search failed to find any index species. The sample nevertheless did contain *Spiniferites* sp. and a microforaminiferal liner which if not caved may hint at the *M. druggii* Zone marine incursion at the top of the *T. longus* Zone. The problem with being definitive about this sample is that it is extremely poorly preserved and the palynomorph are present in only a low concentration.

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Table-1: Interpretative Palynological Data for Moonfish-2, Gippsland Basin.

Sample Type	Depth (m)	Spore-Pollen Zones (Microplankton Zones)	*CR	Comments or Key Species
SWC 30	1564.0	Lower *N. asperus* (*D. heterophylcta*)	B1 B3	Low yield assemblage. *Deflandrea heterophylcta* identified on endophragm only.
SWC 29	1568.0	Lower *N. asperus* (*D. heterophylcta*)	B1 B3	*Deflandrea heterophylcta* and *Tritonites inaequalis* present.
SWC 28	1596.5	Lower *N. asperus*	B4	*Nothofagidites* sp. >28% greater than *Haloragacidites harrisii* at <10%. No index species recorded.
SWC 26	1623.0	Lower *N. asperus*	B1	*Nothofagidites* sp.19% greater than *H. harrisii* at 15%. *Tricolpites simatus* also present.
SWC 25	1660.0	Upper *M. diversus*	B4	*Proteacidites pachypolus* present.
SWC 24	1677.5	Indeterminate		Virtually barren. Palynomorphs present interpreted as contaminants.
SWC 21	1775.0	Lower *M. diversus*	B1	Frequent *Proteacidites grandis* with low diversity dinoflagellate assemblage. No younger index species recorded.
SWC 20	1782.0	Lower *M. diversus*	B4	Low diversity assemblage.
SWC 19	1790.0	Lower *M. diversus*	B2	*Malvacipollis diversus* frequent.
Core-2	1816.5	Lower *M. diversus*	B3	Sample dominated by *Gleicheniidites* spp. and *Clavifera triplex* in very low yield. *Proteacidites grandis* key zone species present.
Core-3	1840.14	Indeterminate		Virtually barren, but similar to sample from Core-2 and probably same age.
SWC 18	1871.0	Upper *L. balmei*	B3	Common *Lygistepollenites balmei* with frequent *Verrucosisporites kopukuensis*.
SWC 16	1915.0	Upper *L. balmei*	B3	*Verrucosisporites kopukuensis* frequent with rare *H. harrisii* and *M. subtilis*.
SWC 15	1954.0	Upper *L. balmei* (*A. homomorphum*)	B3 B3	*V. kopukuensis*, *M. subtilis* and *Tetracolporites textus* present. Dinoflagellate *Apectodinium homomorphum* frequent.
SWC 14	1967.0	*L. balmei*	B4	*M. subtilis* present, but no index species for subzones.
SWC 13	1995.0	Lower *L. balmei*	B3	*Polycolpites langstonii* and fragments of *V. kopukuensis* present.
SWC 10	2092.0	*L. balmei*	B4	Probably lower subzone.
SWC 7	2121.0	Lower *L. balmei*	B2	*Tetracolporites verrucosus* frequent.
SWC 4	2204.0	Lower *L. balmei*	B3	Poorly preserved assemblage with *Tetracolporites verrucosus*.
SWC 2	2265.0	Indeterminate or Lower *L. balmei*		Low diversity assemblage without zone index species for *T. longus* Zone.
SWC 1	2272.0	Upper *T. longus*	B3	Confident zone assignment based on present of *Forcipites longus* and *Tricolporites lilliei*.

*CR = Confidence Ratings

Confidence Ratings

The concept of Confidence Ratings applied to palaeontological zone picks was originally proposed by Dr. L.E. Stover in 1971 to aid the compilation of micropalaeontological and palynological data and to expedite the revision of the then rapidly evolving zonation concepts in the Gippsland Basin. The original scheme which mixed confidence in fossil species assemblage with confidence due to sample type gradually proved to be rather limiting as additional refinements to existing zonations were made. With the development of the STRATDAT computer database as a replacement for the increasingly unwieldy paper based Palaeontological Data Sheet files a new format for the Confidence Ratings was proposed. These are given for individual zone assignments on Table 1, and their meanings are summarised below:

Alpha codes: Linked to sample type

A	Core
B	Sidewall core
C	Coal cuttings
D	Ditch cuttings
E	Junk basket
F	Miscellaneous/unknown
G	Outcrop

Numeric codes: Linked to fossil assemblage

1	**Excellent confidence:**	High diversity assemblage recorded with key zone species.
2	**Good confidence:**	Moderately diverse assemblage recorded with key zone species.
3	**Fair confidence:**	Low diversity assemblage recorded with key zone species.
4	**Poor confidence:**	Moderate to high diversity assemblage recorded without key zone species.
5	**Very low confidence:**	Low diversity assemblage recorded without key zone species.

BASIC DATA

Table 2: Basic Sample Data - Moonfish-2, Gippsland Basin.

SAMPLE TYPE	DEPTH (Metres)	REC (cm)	LITHOLOGY	SAMPLE WT (g)	RESIDUE YIELD
SWC 30	1564.0	3.0	Green glauconitic sandstone with brown claystone matrix. Quartz pebbles up to 3mm.	11.9	Very low
SWC 29	1568.0	3.5	Sample broken, two lithologies; green-grey to brown glauconitic claystone with quartz pebbles up to 3mm & medium grey claystone which may be Lakes Entrance Formation mixed in SWC. Latter lithology not processed.	18.6	Very low
SWC 28	1596.5	>3.0	Two lithologies in sample. Mostly off-white fine grained sandstone with one third of sample composed of brown-dk grey plastic claystone with carbonaceous fragments. This could be contamination but processed to check.	11.5	High
SWC 26	1623	>2.5	Carbonaceous siltstone with wavy microlaminations. Clean sample.	14.4	High
SWC 25	1660	3.0	Two lithologies, comprising white fine grained sandstone and interlaminated tan to medium brown siltstone-claystone . Laminae <1mm. Latter lithology processed. Well cleaned.	6.7	Moderate
SWC 24	1677.5	4.8	Light grey homogeneous claystone.	17.0	Very low
SWC 21	1775.0	<2.5	Med-dk brown claystones with faint laminations. Well cleaned.	11.1	High
SWC 20	1782.0	>2.5	Laminated carbonaceous siltstone and brown (medium) fine sandstone. Laminae up to 3mm. Well cleaned.	8.9	High
SWC 19	1790.0	2.0	Light grey homogeneous claystone with waxy texture. Well cleaned.	11.1	Moderate
Core-2	1816.51		Medium grey homogeneous claystone.	16.5	Low
Core-3	1840.14		Light grey homogeneous claystone.	15.6	Very low
SWC 18	1871.0	4.5	Light grey to brown homogeneous claystone. Well cleaned.	19.7	Moderate
SWC 16	1915.0	3.2	Light grey homogeneous claystone with small carbonaceous flecks. Well cleaned.	9.9	Moderate
SWC 15	1954.0	4.0	Dark brown homogeneous siltstone.	14.1	Moderate
SWC 14	1967.0	<3.0	Light brown mottled siltstone. Poorly cleaned.	10.4	High
SWC 13	1995.0	<3.0	Laminated chocolate brown claystone and tan brown siltstone. Laminae 0.5-2mm. Moderately well cleaned.	10.5	High
SWC 10	2092.0	3.5	Medium grey homogeneous claystone. Well cleaned.	14.0	High
SWC 7	2121.0	<3.5	Medium grey-dark grey fissile shale. Poorly cleaned - possibly mud penetration.	11.0	High
SWC 4	2204.0	>3.0	Light grey homogeneous claystone. Well cleaned.	14.9	Moderate
SWC 2	2265.0	2.5	Dark grey carbonaceous claystone.	8.7	High
SWC 1	2272.0	4.0	Dark grey claystone, fracture and badly mud penetrated. Poorly cleaned.	12.8	High

Table-3: Basic Palynomorph Data for Moonfish-2, Gippsland Basin

Sample Type	Depth (m)	Palynomorph Concentration	Palynomorph Preservation	Number S-P Species*	Microplankton Abundance	Number MP Species*
SWC 30	1564.0	High	Good	29+	Rare	11+
SWC 29	1568.0	High	Good	41+	Frequent	11+
SWC 28	1596.5	Moderate	Poor	28+	(Frequent)*	(6+)*
SWC 26	1623	Moderate	Poor	36+	Rare	2+
SWC 25	1660	Moderate	Fair	38+	NR	
SWC 24	1677.5	Very low	Poor	2	NR	
SWC 21	1775.0	Moderate	Fair	39+	Common	10+
SWC 20	1782.0	Moderate	Fair	19+	Very rare	2
SWC 19	1790.0	Low	Fair	26+	NR	
CORE-2	1816.51	Moderate	Poor-fair	12+	NR	
CORE-3	1840.14	Very low	Poor	3+	NR	
SWC 18	1871.0	Moderate	Fair-good	21+	NR	
SWC 16	1915.0	Low	Poor-fair	19+	(Rare)*	(3+)*
SWC 15	1954.0	High	Fair	38+	Common	3+
SWC 14	1967.0	Low	Poor	22+	(Rare)*	(3+)*
SWC 13	1995.0	Low	Poor	23+	NR	
SWC 10	2092.0	Moderate	Poor-fair	25+	NR	
SWC 7	2121.0	Low	Poor	21+	NR	
SWC 4	2204.0	Very low	Very poor	14+	NR	
SWC 2	2265.0	Low	Poor	11+	Very rare	1+ (1+)*
SWC 1	2272.0	Moderate	Poor-fair	24+	NR	

NR = Not recorded
( )* = Caved MP Species

Diversity:

Very low	= 1-5	species
Low	= 6-10	species
Moderate	= 11-25	species
High	= 26-74	species
Very high	= 75+	species

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: MOONFISH-2
PREPARED BY: A.D. PARTRIDGE
DATE: 30 MAY 1995

Sheet 1 of 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 30	1564.0	P196704	Kerogen slide sieved/unsieved fractions
SWC 30	1564.0	P196790	Oxidised slide 2 - 10μm
SWC 29	1568.0	P196705	Kerogen slide sieved/unsieved fractions
SWC 29	1568.0	P196706	Oxidised slide 2 - 10μm
SWC 28	1596.5	P196707	Kerogen slide sieved/unsieved fractions
SWC 28	1596.5	P196708	Oxidised slide 2 - 10μm
SWC 28	1596.5	P196709	Oxidised slide 3 - 10μm
SWC 28	1596.5	P196710	Oxidised slide 4 - 15μm
SWC 28	1596.5	P196711	Oxidised slide 5 - 15μm
SWC 26	1623.0	P196712	Kerogen slide sieved/unsieved fractions
SWC 26	1623.0	P196713	Oxidised slide 2 - 10μm
SWC 26	1623.0	P196714	Oxidised slide 3 - 10μm
SWC 26	1623.0	P196715	Oxidised slide 4 - 15μm
SWC 26	1623.0	P196716	Oxidised slide 5 - 15μm
SWC 25	1660.0	P196717	Kerogen slide sieved/unsieved fractions
SWC 25	1660.0	P196718	Oxidised slide 2 - 10μm
SWC 25	1660.0	P196719	Oxidised slide 3 - 10μm
SWC 25	1660.0	P196720	Oxidised slide 4 - 15μm
SWC 25	1660.0	P196721	Oxidised slide 5 - 15μm
SWC 24	1677.5	P196722	Kerogen slide
SWC 21	1775.0	P196723	Kerogen slide sieved/unsieved fractions
SWC 21	1775.0	P196724	Oxidised slide 2 - 10μm
SWC 21	1775.0	P196725	Oxidised slide 3 - 10μm
SWC 21	1775.0	P196726	Oxidised slide 4 - 15μm
SWC 21	1775.0	P196727	Oxidised slide 5 - 15μm
SWC 20	1782.0	P196728	Kerogen slide sieved/unsieved fractions
SWC 20	1782.0	P196729	Oxidised slide 2 - 10μm
SWC 20	1782.0	P196730	Oxidised slide 3 - 10μm
SWC 20	1782.0	P196731	Oxidised slide 4 - 15μm
SWC 19	1790.0	P196732	Kerogen slide sieved/unsieved fractions
SWC 19	1790.0	P196733	Oxidised slide 2 - 10μm
SWC 19	1790.0	P196734	Oxidised slide 3 - 10μm
SWC 19	1790.0	P196735	Oxidised slide 4 - 15μm
SWC 19	1790.0	P196736	Oxidised slide 5 - 15μm

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: MOONFISH-2
PREPARED BY: A.D. PARTRIDGE
DATE: 30 MAY 1995

Sheet 2 of 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
CORE 2	1816.51	P196737	Kerogen slide sieved/unsieved fractions
CORE 2	1816.51	P196738	Oxidised slide 2 - 10μm
CORE 3	1840.14	P196739	Kerogen slide sieved/unsieved fractions
CORE 3	1840.14	P196740	Oxidised slide 2 - 10μm
SWC 18	1871.0	P196741	Kerogen slide sieved/unsieved fractions
SWC 18	1871.0	P196742	Oxidised slide 2 - 10μm
SWC 18	1871.0	P196743	Oxidised slide 3 - 10μm
SWC 18	1871.0	P196744	Oxidised slide 4 - 15μm
SWC 18	1871.0	P196745	Oxidised slide 5 - 15μm
SWC 16	1915.0	P196746	Kerogen slide sieved/unsieved fractions
SWC 16	1915.0	P196747	Oxidised slide 2 - 10μm
SWC 16	1915.0	P196748	Oxidised slide 3 - 10μm
SWC 16	1915.0	P196749	Oxidised slide 4 - 15μm
SWC 16	1915.0	P196750	Oxidised slide 5 - 15μm
SWC 15	1954.0	P196751	Kerogen slide sieved/unsieved fractions
SWC 15	1954.0	P196752	Oxidised slide 2 - 10μm
SWC 15	1954.0	P196753	Oxidised slide 3 - 10μm
SWC 15	1954.0	P196754	Oxidised slide 4 - 15μm
SWC 14	1967.0	P196755	Kerogen slide sieved/unsieved fractions
SWC 14	1967.0	P196756	Oxidised slide 2 - 10μm
SWC 14	1967.0	P196757	Oxidised slide 3 - 10μm
SWC 14	1967.0	P196758	Oxidised slide 4 - 15μm
SWC 14	1967.0	P196759	Oxidised slide 5 - 15μm
SWC 13	1995.0	P196760	Kerogen slide sieved/unsieved fractions
SWC 13	1995.0	P196761	Oxidised slide 2 - 10μm
SWC 13	1995.0	P196762	Oxidised slide 3 - 10μm
SWC 13	1995.0	P196763	Oxidised slide 4 - 15μm
SWC 13	1995.0	P196764	Oxidised slide 5 - 15μm
SWC 10	2092.0	P196765	Kerogen slide sieved/unsieved fractions
SWC 10	2092.0	P196766	Oxidised slide 2 - 10μm
SWC 10	2092.0	P196767	Oxidised slide 3 - 10μm
SWC 10	2092.0	P196768	Oxidised slide 4 - 15μm
SWC 10	2092.0	P196769	Oxidised slide 5 - 15μm

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: MOONFISH-2
PREPARED BY: A.D. PARTRIDGE
DATE: 30 MAY 1995

Sheet 3 of 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 7	2121.0	P196770	Kerogen slide sieved/unsieved fractions
SWC 7	2121.0	P196771	Oxidised slide 2 - 10μm
SWC 7	2121.0	P196772	Oxidised slide 3 - 10μm
SWC 7	2121.0	P196773	Oxidised slide 4 - 15μm
SWC 7	2121.0	P196774	Oxidised slide 5 - 15μm
SWC 4	2204.0	P196775	Kerogen slide sieved/unsieved fractions
SWC 4	2204.0	P196776	Oxidised slide 2 - 10μm
SWC 4	2204.0	P196777	Oxidised slide 3 - 10μm
SWC 4	2204.0	P196778	Oxidised slide 4 - 15μm
SWC 4	2204.0	P196779	Oxidised slide 5 - 15μm
SWC 2	2265.0	P196780	Kerogen slide sieved/unsieved fractions
SWC 2	2265.0	P196781	Oxidised slide 2 - 10μm
SWC 2	2265.0	P196782	Oxidised slide 3 - 10μm
SWC 2	2265.0	P196783	Oxidised slide 4 - 15μm
SWC 2	2265.0	P196784	Oxidised slide 5 - 15μm
SWC 1	2272.0	P196785	Kerogen slide sieved/unsieved fractions
SWC 1	2272.0	P196786	Oxidised slide 2 - 10μm
SWC 1	2272.0	P196787	Oxidised slide 3 - 10μm
SWC 1	2272.0	P196788	Oxidised slide 4 - 15μm
SWC 1	2272.0	P196789	Oxidised slide 5 - 15μm
		P196790*	

***Note:** Slide P196790 is out of sequence and has been inserted at depth of 1564.0m for slide from SWC-30

RELINQUISHMENT LIST - PALYNOLOGY RESIDUES

WELL NAME & NO: MOONFISH-2
PREPARED BY: A.D. PARTRIDGE
DATE: 31 MAY 1995

SAMPLE TYPE	DEPTH (M)	DESCRIPTION
SWC 28	1596.5	Kerogen residue
SWC 28	1596.5	Oxidised residue
SWC 26	1623.0	Kerogen residue
SWC 26	1623.0	Oxidised residue
SWC 25	1660.0	Kerogen residue
SWC 25	1660.0	Oxidised residue
SWC 21	1775.0	Kerogen residue
SWC 21	1775.0	Oxidised residue
SWC 20	1782.0	Kerogen residue
SWC 20	1782.0	Oxidised residue
SWC 18	1871.0	Oxidised residue?
SWC 14	1967.0	Oxidised residue
SWC 13	1995.0	Kerogen residue
SWC 13	1995.0	Oxidised residue
SWC 10	2092.0	Kerogen residue
SWC 10	2092.0	Oxidised residue
SWC 7	2121.0	Kerogen residue
SWC 7	2121.0	Oxidised residue
SWC 4	2204.0	Oxidised residue
SWC 2	2265.0	Kerogen residue
SWC 2	2265.0	Oxidised residue
SWC 1	2272.0	Kerogen residue
SWC 1	2272.0	Oxidised residue

PE900927

This is an enclosure indicator page.
The enclosure PE900927 is enclosed within the container PE900926 at this location in this document.

The enclosure PE900927 has the following characteristics:

ITEM_BARCODE = PE900927
CONTAINER_BARCODE = PE900926
NAME = Palynomorph Range Chart
BASIN = GIPPSLAND
PERMIT = VIC/L10
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Palynomorph Range Chart (enclosure from appendix 1 WCR vol.2) for Moonfish-2
REMARKS =
DATE_CREATED = 28/05/1995
DATE_RECEIVED =
W_NO = W1114
WELL_NAME = Moonfish-2
CONTRACTOR =
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 2

APPENDIX 2

APPENDIX 2

Moonfish-2

Quantitative Log Analysis

MOONFISH 2 LOG ANALYSIS

Moonfish 2 wireline logs have been analysed for effective porosity and water saturation over the interval 1550m to 2265m. Analysis was carried out using density-neutron total porosity and a Dual Water saturation model. These calculations were performed using Exxon's in-house log analysis package SOLAR.

Please note that all depths quoted below are MDKB unless specified otherwise.

Logs Acquired

Suite 1

DLL-AS-GR	TD (840m) to 141m

Suite 2

DLL-MSFL-DSI-GR	TD (2318m) to 836m (MSFL to 1530m)
LDT-CNL-NGT-FMI	TD to 1475m (FMI to 1545m)
MDT	Tool failed after one pretest.
RFT	22 pretests, 3 segregated samples, 3 regular samples
CSI	TD to 955m, 10 level checkshot
CST	2272m to 1564m, 30/30 recovered

Note: All logs acquired on wireline.

Logs Used

LLD, LLS, MSFL, LDT count-rates, NPHI, DTCO, GR (Schlumberger)

The borehole corrected resistivity curves were used to derive an invasion corrected RT curve. The NPHI curve was environmentally corrected by adding 0.03 to the entire log. The LDT count-rates were acquired in hi-res mode and a high resolution bulk density curve derived via the LOGIC programme ALPHA_LDT in SOLAR..

Log Quality

In general log quality is good in sands but poor in shaly and coaly intervals which have tended to wash out.

Sonic porosity has been substituted for density-neutron in some thin sands in shaly intervals.

The LOGIC programme ALPHA_LDT was used to produce a bulk density curve with less noise than Schlumberger's high-res processing of the same data.

Analysis Parameters

a	1.0
m	2.0
n	2.0
Apparent Shale Porosity (PHISH)	0.3
Shale Resistivity	20 ohmm
Borehole size	12.25 inches
Mud Type	KCL/PHPA/POLYMER/GLYCOL
Mud Filtrate Resistivity	0.058 @ 88 DEGC
Bottom Hole Temperature	88 DEGC

Total Porosity

Total porosity was derived from the density-neutron using the LOGIC programme XPL. In some thin sands where the density-neutron was affected by poor hole conditions a sonic derived total porosity was substituted. In these zones, sonic porosity was derived from the DTCO curve via the LOGIC programme PHIS and then normalised to density-neutron total porosity in good hole.

Crossplots of log total porosity and core total porosity show good agreement in the higher porosity sand intervals and fair agreement in lower porosity zones. The lower porosity zones represent shaly sands where typically the density-neutron will overestimate total porosity compared to core. It is planned to use Exxon's LASER program to provide a more rigorous mineral volume approach to porosity in a field study of the Moonfish wells once all core analysis has been completed. This approach which typically uses spectral gamma and photoelectric effect curves along with Corelab MINERALOG data should provide a better match with core porosity.

Effective Porosity

Effective porosity is derived from total porosity using a gamma ray derived VSH curve. In the field study it is planned to derive effective porosity from LASER total porosity using LASER volume of wet clay. Both density-neutron and LASER provide a similar effective porosity curve where lithology is well known however the LASER model is considered a more rigorous approach, in particular in complex mineralogy, and is likely to become the standard method of porosity calculation in all Gippsland Basin reservoirs.

Shale Volume

Shale volume was derived from the gamma ray curve using the LOGIC programme VSH with the Clavier option and a gamma ray minimum and maximum of 40 and 120 API units.

Formation Water Resistivity

An apparent water resistivity curve was derived from the LOGIC programme RWA using total porosity and an invasion corrected RT curve. RW was selected in known water sands and used for water saturation calculations in the overlying hydrocarbon zones except in the N and M hydrocarbon zones where fresh water has replaced the original underlying water. In these the RW has been estimated based on regional data and capillary pressure water saturation calculations in other wells.

It is planned to perform capillary pressure on core plugs from both Moonfish wells and this data will be incorporated into water saturation calculations in a subsequent field study.

Listed below are the selected Rw values and equivalent salinity.

Depth (mdkb)	Rw (ohmm)	Salinity ppmNaCleq.	Comments
1550 - 1735	1.00	3000	Fresh Water
1735 - 1820	0.15	20000	N1.9, M2 hydrocarbon zones
1820 - 1840	0.25	11000	Fresh Water
1840 - 1855	0.15	20000	M3 hydrocarbon zones
1855 - 2120	0.25	10500	Fresh water
2120 - 2265	0.10	26000	Saline Water

Water Saturation

Total water saturation was calculated using total porosity and RT in the Dual Water programme DWGP. Effective porosity and effective water saturation were then calculated using the gamma ray derived VSH curve.

Water saturation was set to 1 and porosity to 0 in coaly and volcanic zones.

Comments

Attached is a summary table of results, core analysis plots, a listing and a log analysis depthplot.

The comments on sand content should be treated with some caution in thin zones due to poor borehole conditions. The content in these sands has been estimated from wireline log response, mudlog shows and Moonfish 1 and Sidetrack 1 results.

MOONFISH 2 LOG ANALYSIS SUMMARY

Net porosity cut-off..........: 0.120 volume per volume

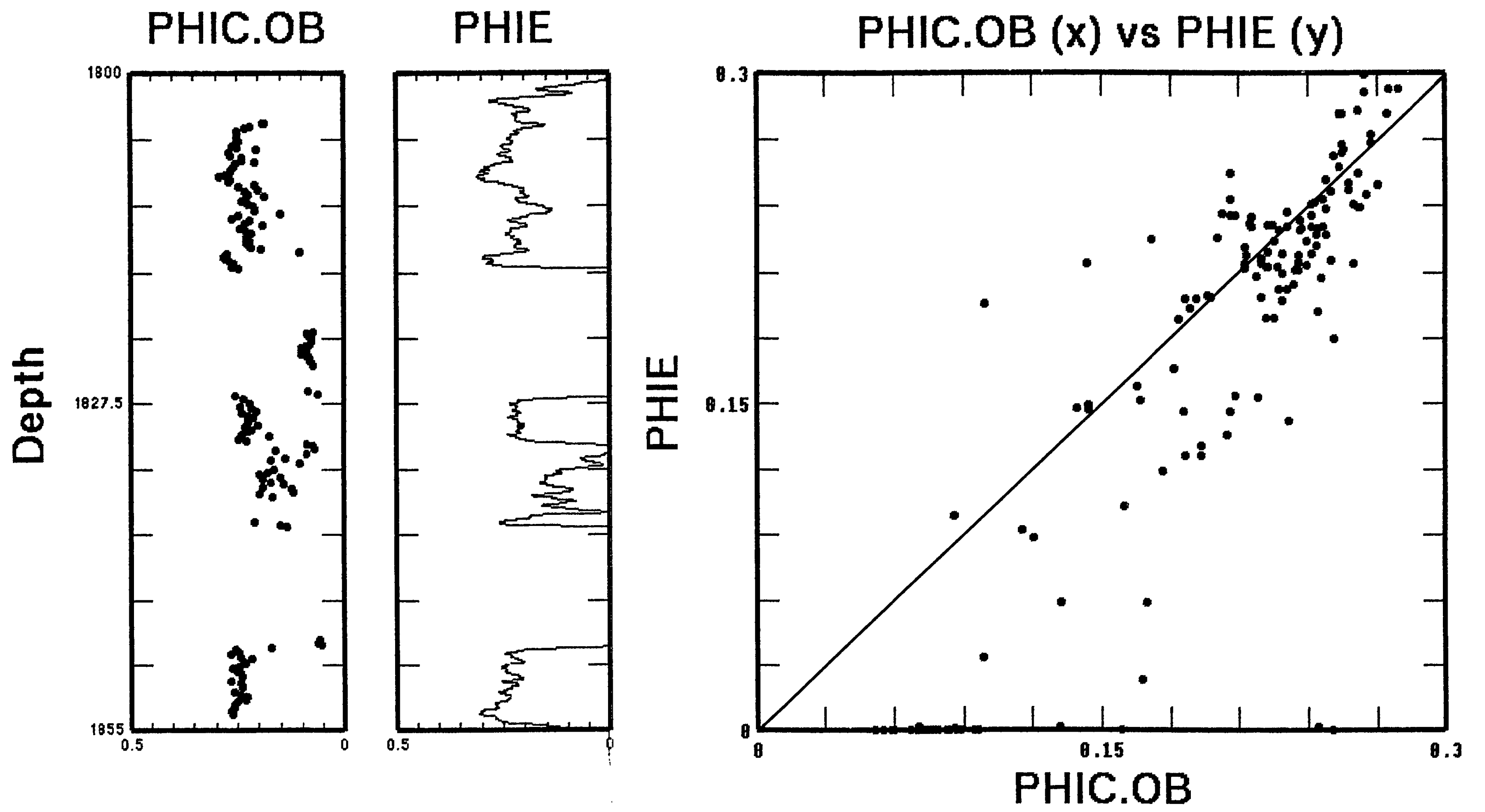
Net Porous Interval based on Porosity cut-off only.

	GROSS INTERVAL		NET INTERVAL					
	Depth (m)	Gross (m)	Net (m)	N/G (%)	Mean Vsh	Mean Porosity	Mean Sw	Comments
MDKB	1559.8-1566.9	7.2	3.1					
TVDSS	1484.8-1491.3	6.6	2.8	43%	0.32	0.17(0.034)	1.00	Water
MDKB	1572.8-1584.0	11.1	10.0					
TVDSS	1496.7-1506.9	10.2	9.2	90%	0.05	0.24 (0.026)	1.00	Water
MDKB	1589.8-1590.9	1.1	0.4					
TVDSS	1512.3-1513.3	1.0	0.3	32%	0.25	0.13 (0.004)	1.00	Water
MDKB	1596.1-1609.8	13.8	10.8					
TVDSS	1518.0-1530.7	12.7	10.0	79%	0.12	0.22 (0.047)	1.00	Water
MDKB	1615.1-1616.1	1.0	0.8					
TVDSS	1535.5-1536.5	1.0	0.7	74%	0.33	0.16 (0.012)	1.00	Water
MDKB	1623.3-1625.6	2.3	1.9					
TVDSS	1543.1-1545.2	2.1	1.8	85%	0.13	0.22 (0.037)	0.94	Water
MDKB	1626.4-1629.8	3.4	2.7					
TVDSS	1545.9-1549.1	3.1	2.5	79%	0.17	0.19 (0.043)	1.00	Water
MDKB	1641.0-1658.9	17.9	17.1					
TVDSS	1559.4-1576.0	16.5	15.8	96%	0.02	0.23 (0.033)	1.00	Water
MDKB	1660.7-1675.3	14.6	13.5					
TVDSS	1577.7-1591.2	13.5	12.5	92%	0.03	0.23 (0.020)	1.00	Water
MDKB	1678.3-1729.1	50.8	48.6					
TVDSS	1593.9-1641.1	47.1	45.1	96%	0.03	0.23 (0.027)	1.00	Water
N1.9 RESERVOIR								
MDKB	1743.0-1764.3	21.3	20.8					
TVDSS	1654.0-1673.8	19.8	19.3	98%	0.06	0.20 (0.029)	0.13	Gas
MDKB	1769.9-1771.0	1.1	0.9					
TVDSS	1679.0-1680.0	1.0	0.8	82%	0.12	0.18 (0.029)	0.30	Gas
MDKB	1779.2-1780.3	1.1	0.6					
TVDSS	1687.7-1688.7	1.0	0.6	58%	0.16	0.17 (0.021)	0.43	Gas
MDKB	1785.4-1785.8	0.5	0.0					
TVDSS	1693.5-1693.9	0.4	0.0	0%	-	-	-	Gas - Non Net

	Depth (m)	Gross (m)	Net (m)	N/G (%)	Mean Vsh	Mean Porosity	Mean Sw	Comments
	GROSS INTERVAL		NET INTERVAL					
M2 RESERVOIR								
MDKB	1800.7-1806.5	5.8	5.0					
TVDSS	1707.9-1713.3	5.4	4.4	87%	0.08	0.21 (0.034)	0.22	Gas
	Gas - Oil Contact @ 1806.5m (-1713.3mSS)							
MDKB	1806.5-1816.2	9.7	9.5					
TVDSS	1713.3-1722.4	9.1	8.9	99%	0.06	0.23 (0.041)	0.19	Oil
MDKB	1827.0-1831.3	4.3	3.8					
TVDSS	1732.6-1736.6	4.1	3.6	88%	0.07	0.21 (0.019)	0.72	Water/Resid. Oil
MDKB	1832.9-1837.8	4.9	2.9					
TVDSS	1738.2-1742.8	4.6	2.8	60%	0.2	0.17 (0.039)	0.65	Water/Resid. Oil
M3 RESERVOIR								
MDKB	1848.0-1853.4	5.4	5.2					
TVDSS	1752.4-1757.5	5.1	4.9	97%	0.02	0.23 (0.022)	0.24	Gas
	Gas - Oil Contact @ 1853.4m (-1757.5mSS)							
MDKB	1853.4-1855.0	1.6	1.5					
TVDSS	1757.4-1759.0	1.6	1.5	93%	0.07	0.24 (0.056)	0.44	Oil
	Oil - Water Contact @ 1855.0m (-1759.0mSS)							
MDKB	1855.1-1860.5	5.3	4.3					
TVDSS	1759.1-1764.2	5.0	4.1	81%	0.15	0.20 (0.043)	0.84	Water/Resid. Oil
MDKB	1888.4-1890.0	1.5	1.3					
TVDSS	1790.9-1792.3	1.4	1.2	84%	0.06	0.14 (0.006)	0.64	Gas
MDKB	1905.1-1905.9	0.8	0.5					
TVDSS	1806.9-1807.7	0.8	0.5	60%	0.15	0.21 (0.034)	0.53	Gas
MDKB	1916.1-1917.1	1.0	0.0					
TVDSS	1817.5-1818.5	0.9	0.0	0%	-	-	-	Water - Non Net
MDKB	1917.5-1919.1	1.6	1.4					
TVDSS	1818.9-1820.4	1.6	1.3	86%	0.09	0.25 (0.042)	1.00	Water
MDKB	1922.6-1923.8	1.2	0.9					
TVDSS	1823.8-1825.0	1.2	0.9	79%	0.27	0.16 (0.016)	0.57	Gas
MDKB	1926.2-1929.1	2.9	0.0					
TVDSS	1827.3-1830.1	2.8	0.0	0%	-	-	-	Gas - Non Net
MDKB	1959.4-1961.7	2.3	1.7					
TVDSS	1859.5-1861.8	2.2	1.6	74%	0.19	0.15 (0.017)	0.34	Gas
MDKB	1964.5-1966.0	1.4	0.2					
TVDSS	1864.5-1865.9	1.4	0.2	17%	0.33	0.14 (0.013)	0.45	Gas
MDKB	1990.4-1991.2	0.8	0.0					
TVDSS	1889.9-1890.6	0.8	0.0	0%	-	-	-	Gas - Non Net

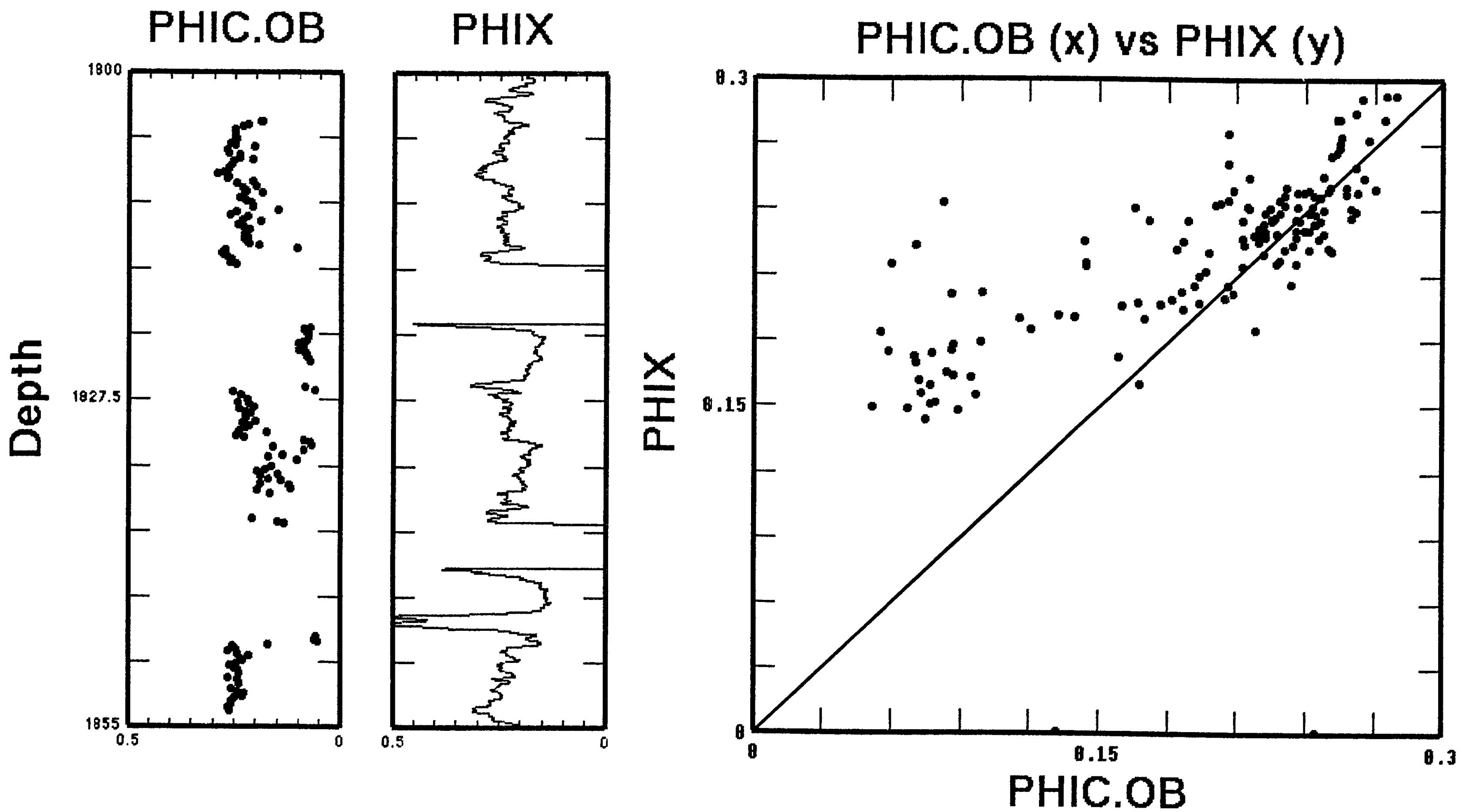
	GROSS INTERVAL		NET INTERVAL					
	Depth (m)	Gross (m)	Net (m)	N/G (%)	Mean Vsh	Mean Porosity	Mean Sw	Comments
MDKB	2001.2-2001.8	0.6	0.0					
TVDSS	1900.4-1901.0	0.6	0.0	0%	-	-	-	Gas - Non Net
MDKB	2008.1-2009.2	1.1	0.1					
TVDSS	1907.2-1908.3	1.1	0.1	8%	0.26	0.12 (0.001)	0.56	Gas
L8 RESERVOIR								
MDKB	2019.3-2024.0	4.7	4.0					
TVDSS	1918.2-1922.8	4.6	4.0	86%	0.12	0.18 (0.029)	0.35	Gas
	Gas - Oil Contact @ 2024.0m (-1922.8mSS)							
MDKB	2024.1-2027.2	3.1	2.7					
TVDSS	1922.9-1925.9	3.0	2.6	87%	0.03	0.24 (0.026)	0.12	Oil
	Oil - Water Contact in shaly interval, approx @ 2031.1m (-1929.8mSS)							
MDKB	2027.8-2035.4	7.7	1.8					
TVDSS	1926.5-1934.1	7.6	1.7	23%	0.23	0.14 (0.013)	1.00	Water
MDKB	2036.2-2045.3	9.1	8.4					
TVDSS	1934.8-1943.8	9.0	8.3	92%	0.13	0.20 (0.032)	1.00	Water
MDKB	2049.3-2053.0	3.7	2.1					
TVDSS	1947.8-1951.4	3.6	2.1	58%	0.15	0.16 (0.019)	1.00	Water
MDKB	2058.7-2059.2	0.5	0.0					
TVDSS	1957.1-1957.6	0.5	0.0	0%	-	-	-	Water - Non Net
MDKB	2068.5-2069.3	0.8	0.0					
TVDSS	1966.8-1967.6	0.8	0.0	0%	-	-	-	Gas/Oil? - Non Net
MDKB	2076.7-2083.6	6.9	6.5					
TVDSS	1974.9-1981.8	6.8	6.5	94%	0.03	0.22 (0.034)	1.00	Water
SUBVOLCANICS RESERVOIR								
MDKB	2134.0-2145.4	11.4	9.7					
TVDSS	2031.9-2043.3	11.4	9.7	86%	0.07	0.19 (0.032)	0.38	Oil
	Oil - Water Contact @ 2145.5m (-2043.3mSS)							
MDKB	2145.5-2152.4	6.9	6.7					
TVDSS	2043.3-2050.2	6.9	6.7	97%	0.02	0.23 (0.033)	0.89	Water/Resid. Oil
MDKB	2153.6-2169.8	16.3	12.4					
TVDSS	2051.3-2067.6	16.2	12.4	76%	0.06	0.17 (0.030)	1.00	Water
MDKB	2171.3-2177.5	6.2	5.8					
TVDSS	2069.0-2075.3	6.2	5.8	93%	0.07	0.17 (0.025)	1.00	Water
MDKB	2185.5-2191.7	6.2	5.8					
TVDSS	2083.2-2089.4	6.2	5.8	93%	0.03	0.18 (0.022)	1.00	Water
MDKB	2193.9-2198.2	4.3	3.3					
TVDSS	2091.6-2095.9	4.3	3.3	78%	0.1	0.15 (0.020)	1.00	Water

	GROSS INTERVAL		NET INTERVAL					
	Depth (m)	Gross (m)	Net (m)	N/G (%)	Mean Vsh	Mean Porosity	Mean Sw	Comments
MDKB	2213.7-2216.2	2.5	2.0					
TVDSS	2111.3-2113.8	2.5	2.0	79%	0.04	0.17 (0.028)	1.00	Water
MDKB	2222.9-2223.6	0.7	0.0					
TVDSS	2120.5-2121.2	0.7	0.0	0%	-	-	-	Water - Non Net
MDKB	2224.3-2237.4	13.2	11.8					
TVDSS	2121.9-2135.1	13.2	11.8	90%	0.04	0.18 (0.028)	0.96	Water
MDKB	2240.7-2241.8	1.1	1.0					
TVDSS	2138.3-2139.4	1.1	1.0	88%	0.08	0.20 (0.026)	1.00	Water
MDKB	2243.6-2245.1	1.5	0.9					
TVDSS	2141.3-2142.7	1.5	0.9	62%	0.1	0.16 (0.018)	1.00	Water
MDKB	2250.7-2262.1	11.4	9.8					
TVDSS	2148.3-2159.7	11.4	9.8	86%	0.07	0.16 (0.023)	0.87	Water/Resid. Oil



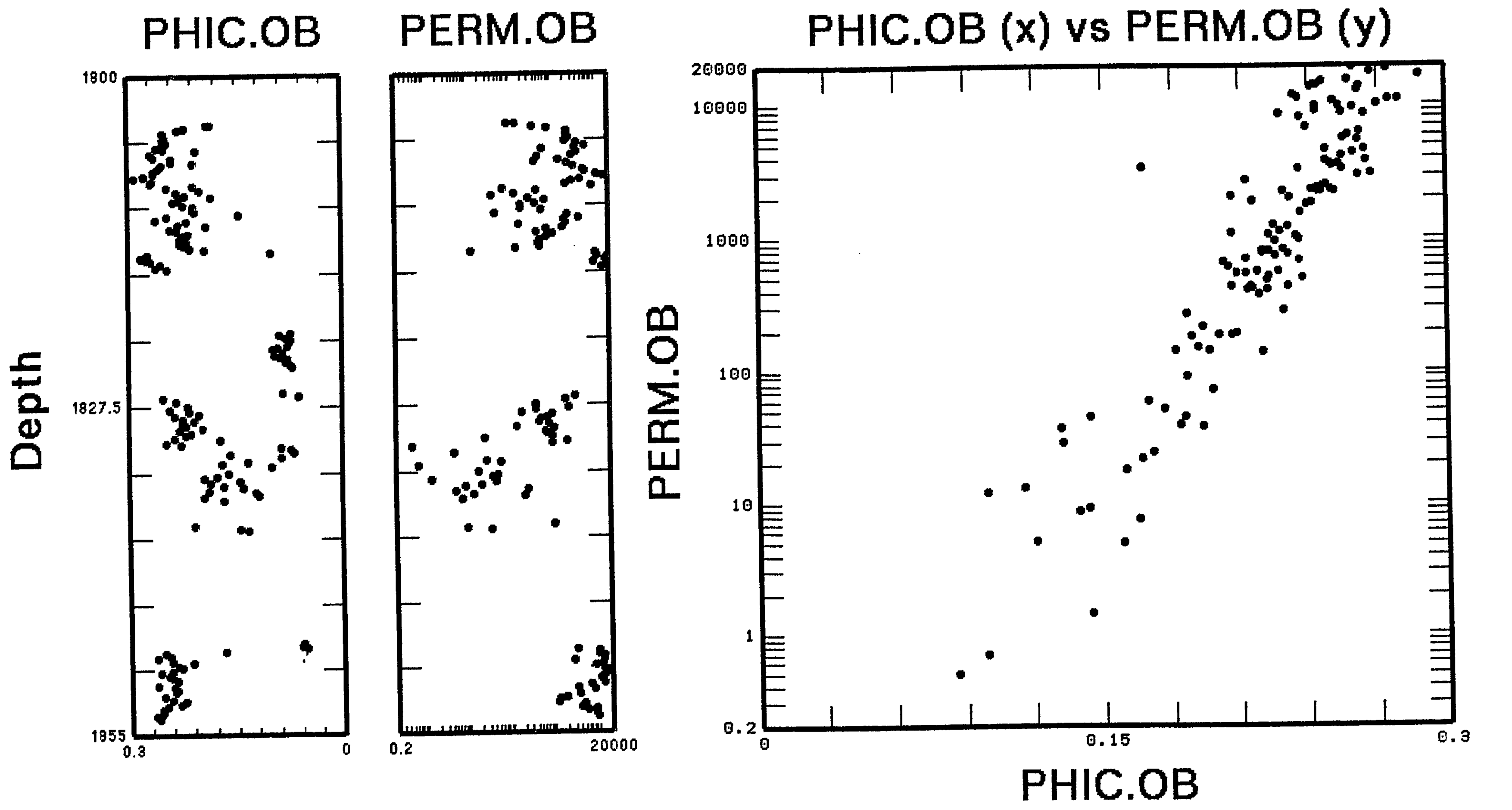
MOONFISH_2
Thursday, May 11, 1995
10:18:41 am (GMT+)

EFFECTIVE POROSITY VS CORE POROSITY



MOONFISH_2
Thursday, May 11, 1995
10:19:35 am (GMT+)

TOTAL POROSITY VS CORE POROSITY



MOONFISH_2
Thursday, May 11, 1995
10:21:06 am (GMT+)

CORE PERMEABILITY VS CORE POROSITY

MOONFISH 2 DATA LISTING

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1550	61	N	1.341	0.310	356	0.132	0.001	1.00
1551	64	2.5	1.301	0.458	328	0.165	0.001	1.00
1552	65	3.2	1.930	0.322	311	0.163	0.001	1.00
1553	67	2.5	2.148	0.345	315	0.178	0.001	1.00
1554	66	3.6	2.335	0.278	293	0.170	0.001	1.00
1555	62	3.1	1.215	0.283	273	0.145	0.001	1.00
1556	59	2.9	1.520	0.526	270	0.112	0.001	1.00
1557	62	2.1	1.378	0.484	283	0.144	0.001	1.00
1558	65	4.9	2.039	0.375	274	0.157	0.001	1.00
1559	84	7.7	2.116	0.373	350	0.338	0.001	1.00
1560	89	3.9	2.306	0.402	332	0.406	0.188	1.00
1561	74	4.9	2.277	0.304	325	0.249	0.202	1.00
1562	84	6.3	2.291	0.260	286	0.349	0.148	1.00
1563	84	7.3	2.487	0.249	292	0.344	0.088	1.00
1564	92	9.9	2.610	0.353	283	0.453	0.070	1.00
1565	91	6.8	2.381	0.322	295	0.423	0.128	1.00
1566	97	7.3	2.395	0.335	259	0.516	0.068	1.00
1567	102	7.7	2.454	0.313	285	0.611	0.009	1.00
1568	111	10.9	2.599	0.345	273	0.766	0.000	1.00
1569	116	10.3	2.415	0.337	289	0.889	0.000	1.00
1570	109	4.0	2.697	0.327	285	0.737	0.000	1.00
1571	100	4.2	2.533	0.280	282	0.586	0.000	1.00
1572	50	126.7	2.734	0.029	233	0.054	0.001	1.00
1573	48	20.2	2.505	0.105	322	0.047	0.099	1.00
1574	50	10.7	2.278	0.237	299	0.061	0.228	1.00
1575	57	11.0	2.251	0.231	306	0.102	0.224	1.00
1576	50	12.0	2.211	0.258	333	0.057	0.262	1.00
1577	55	9.5	2.053	0.320	333	0.093	0.001	1.00
1578	49	11.7	2.190	0.276	327	0.051	0.279	1.00
1579	49	8.1	2.252	0.260	338	0.049	0.250	1.00
1580	47	11.5	2.224	0.258	329	0.039	0.263	1.00
1581	41	15.7	2.288	0.197	322	0.000	0.227	1.00
1582	34	13.1	2.306	0.228	335	0.000	0.233	1.00
1583	32	20.8	2.381	0.185	354	0.000	0.190	1.00
1584	59	6.7	2.273	0.259	367	0.111	0.001	1.00
1585	105	8.6	2.192	0.224	358	0.534	0.001	1.00
1586	139	18.2	2.253	0.351	399	1.000	0.000	1.00
1587	33	111.2	1.257	0.574	431	0.000	0.001	1.00
1588	83	28.5	1.405	0.446	455	0.356	0.001	1.00
1589	57	456.9	1.355	0.597	410	0.096	0.001	1.00
1590	86	17.3	2.329	0.303	303	0.382	0.075	1.00
1591	106	36.5	2.190	0.366	369	0.664	0.000	1.00
1592	44	476.2	1.224	0.563	371	0.039	0.001	1.00
1593	62	51.9	1.272	0.577	354	0.140	0.001	1.00
1594	74	16.4	1.263	0.530	297	0.241	0.001	1.00
1595	95	32.5	2.389	0.254	303	0.507	0.001	1.00
1596	102	21.8	2.428	0.238	297	0.615	0.003	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1597	85	20.4	2.365	0.230	314	0.365	0.107	1.00
1598	74	20.6	2.381	0.219	318	0.245	0.133	1.00
1599	70	16.7	2.319	0.263	316	0.215	0.181	1.00
1600	70	12.7	2.272	0.257	330	0.205	0.195	1.00
1601	54	19.7	2.236	0.264	338	0.087	0.246	0.87
1602	44	18.6	2.209	0.239	341	0.023	0.266	0.88
1603	52	19.2	2.191	0.250	365	0.072	0.263	0.87
1604	50	14.0	2.206	0.288	287	0.057	0.275	1.00
1605	64	13.5	2.186	0.278	332	0.158	0.249	1.00
1606	52	10.3	2.269	0.274	236	0.073	0.244	1.00
1607	34	148.7	2.605	0.039	212	0.000	0.051	1.00
1608	38	74.1	2.512	0.115	327	0.000	0.116	1.00
1609	45	9.1	2.192	0.248	315	0.026	0.276	1.00
1610	123	22.0	1.679	0.491	367	1.000	0.000	1.00
1611	90	21.3	1.358	0.409	421	0.429	0.001	1.00
1612	85	20.5	1.461	0.521	319	0.364	0.001	1.00
1613	101	28.2	2.448	0.268	286	0.592	0.000	1.00
1614	96	22.7	2.467	0.228	274	0.515	0.022	1.00
1615	113	29.4	2.322	0.320	315	0.916	0.000	1.00
1616	87	16.6	2.312	0.269	289	0.372	0.138	1.00
1617	53	54.0	1.245	0.550	343	0.073	0.001	1.00
1618	94	23.8	1.808	0.432	405	0.479	0.001	1.00
1619	82	108.9	1.481	0.474	327	0.282	0.001	1.00
1620	101	19.6	2.371	0.296	298	0.589	0.021	1.00
1621	94	17.0	1.259	0.522	371	0.498	0.001	1.00
1622	87	28.7	1.774	0.404	286	0.372	0.001	1.00
1623	114	27.7	2.355	0.329	308	0.864	0.000	1.00
1624	58	25.2	2.312	0.252	320	0.127	0.204	0.81
1625	48	10.6	2.205	0.233	343	0.037	0.262	1.00
1626	123	55.7	2.322	0.402	300	1.000	0.000	1.00
1627	53	16.0	2.160	0.255	331	0.073	0.276	0.88
1628	79	25.8	2.355	0.227	278	0.301	0.127	1.00
1629	67	21.5	2.333	0.233	322	0.196	0.168	1.00
1630	64	22.0	2.318	0.298	384	0.170	0.001	1.00
1631	47	159.2	1.504	0.549	368	0.017	0.001	1.00
1632	76	56.9	1.471	0.463	463	0.290	0.001	1.00
1633	36	240.8	1.239	0.550	447	0.000	0.001	1.00
1634	77	180.1	1.569	0.587	398	0.261	0.001	1.00
1635	108	14.1	1.963	0.437	357	0.695	0.000	1.00
1636	105	12.5	2.024	0.451	316	0.655	0.000	1.00
1637	103	15.3	1.732	0.469	352	0.610	0.000	1.00
1638	90	17.5	1.714	0.475	342	0.438	0.001	1.00
1639	101	22.5	1.561	0.410	248	0.588	0.000	1.00
1640	112	27.1	2.068	0.437	239	0.802	0.000	1.00
1641	101	19.8	2.322	0.320	258	0.629	0.008	1.00
1642	45	19.3	2.275	0.269	268	0.030	0.252	0.93
1643	30	17.4	2.263	0.228	257	0.000	0.249	1.00
1644	38	17.7	2.274	0.219	244	0.000	0.241	1.00
1645	37	19.2	2.251	0.227	266	0.000	0.253	0.96

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1646	38	15.8	2.290	0.209	275	0.000	0.231	1.00
1647	38	14.4	2.290	0.206	271	0.000	0.230	1.00
1648	35	17.0	2.290	0.213	324	0.000	0.233	1.00
1649	35	14.2	2.275	0.203	251	0.000	0.235	1.00
1650	43	17.1	2.303	0.200	248	0.013	0.219	1.00
1651	45	14.3	2.439	0.137	271	0.030	0.140	1.00
1652	56	16.4	2.490	0.102	255	0.109	0.084	1.00
1653	44	20.1	2.212	0.232	322	0.021	0.263	0.87
1654	49	14.7	2.312	0.217	307	0.057	0.210	1.00
1655	49	19.0	2.246	0.235	324	0.050	0.243	0.97
1656	41	14.7	2.254	0.230	322	0.001	0.253	1.00
1657	42	14.5	2.170	0.230	314	0.012	0.282	0.99
1658	44	10.9	2.349	0.176	301	0.018	0.192	1.00
1659	62	14.0	2.477	0.132	224	0.119	0.099	1.00
1660	130	18.4	2.423	0.287	298	1.000	0.000	1.00
1661	68	22.2	2.250	0.241	283	0.201	0.198	0.86
1662	62	11.9	1.962	0.349	273	0.124	0.001	1.00
1663	49	11.6	2.253	0.215	261	0.052	0.232	1.00
1664	47	8.7	2.337	0.218	280	0.036	0.207	1.00
1665	48	16.3	2.273	0.229	283	0.049	0.231	1.00
1666	43	19.6	2.305	0.203	283	0.012	0.220	1.00
1667	47	15.4	2.197	0.227	340	0.037	0.262	1.00
1668	43	16.6	2.273	0.221	335	0.019	0.237	1.00
1669	53	11.9	2.326	0.201	325	0.084	0.190	1.00
1670	43	14.3	2.266	0.201	249	0.017	0.232	1.00
1671	43	17.1	2.330	0.178	257	0.016	0.200	1.00
1672	39	17.3	2.290	0.187	321	0.000	0.223	1.00
1673	41	16.6	2.254	0.211	319	0.002	0.245	1.00
1674	45	17.0	2.264	0.214	328	0.027	0.235	1.00
1675	43	14.0	2.280	0.217	277	0.020	0.233	1.00
1676	116	10.8	1.678	0.417	264	0.866	0.000	1.00
1677	116	12.4	2.218	0.420	329	0.861	0.000	1.00
1678	111	12.6	2.265	0.382	268	0.793	0.000	1.00
1679	71	14.8	2.411	0.222	271	0.206	0.137	1.00
1680	103	27.6	2.552	0.205	291	0.610	0.000	1.00
1681	64	14.9	2.366	0.247	303	0.147	0.180	1.00
1682	57	18.1	2.371	0.237	315	0.108	0.185	1.00
1683	44	11.3	2.283	0.245	307	0.024	0.241	1.00
1684	57	14.4	2.256	0.254	314	0.101	0.231	1.00
1685	50	13.9	2.311	0.234	316	0.058	0.216	1.00
1686	51	12.2	2.271	0.248	317	0.071	0.232	1.00
1687	45	11.2	2.444	0.185	298	0.028	0.163	1.00
1688	37	18.7	2.309	0.202	316	0.000	0.222	1.00
1689	38	16.5	2.300	0.206	315	0.000	0.227	1.00
1690	39	12.0	2.282	0.211	312	0.001	0.235	1.00
1691	35	14.6	2.225	0.228	332	0.000	0.263	1.00
1692	35	13.4	2.184	0.237	327	0.000	0.282	1.00
1693	42	7.9	2.245	0.215	315	0.012	0.247	1.00
1694	48	11.3	2.273	0.214	317	0.044	0.227	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1695	45	16.3	2.275	0.234	316	0.027	0.238	1.00
1696	49	18.1	2.336	0.213	318	0.056	0.200	1.00
1697	51	11.1	2.419	0.145	287	0.056	0.143	1.00
1698	47	14.0	2.306	0.209	316	0.037	0.214	1.00
1699	36	15.3	2.199	0.246	328	0.000	0.280	0.96
1700	36	17.5	2.187	0.235	326	0.000	0.281	0.92
1701	42	10.0	2.264	0.219	310	0.011	0.242	1.00
1702	35	11.8	2.219	0.233	327	0.000	0.267	1.00
1703	36	16.2	2.251	0.224	316	0.000	0.252	1.00
1704	48	11.9	2.414	0.173	294	0.040	0.161	1.00
1705	44	9.6	2.313	0.189	279	0.018	0.210	1.00
1706	50	22.3	2.312	0.219	321	0.061	0.209	1.00
1707	46	16.9	2.261	0.211	307	0.033	0.233	1.00
1708	40	16.2	2.284	0.194	309	0.000	0.228	1.00
1709	41	11.4	2.283	0.227	317	0.004	0.240	1.00
1710	40	16.3	2.250	0.222	320	0.003	0.250	1.00
1711	39	19.3	2.306	0.197	316	0.000	0.221	1.00
1712	51	8.3	2.307	0.237	299	0.069	0.215	1.00
1713	43	11.1	2.302	0.230	307	0.018	0.230	1.00
1714	41	14.4	2.281	0.219	311	0.002	0.238	1.00
1715	34	14.9	2.283	0.216	314	0.000	0.237	1.00
1716	35	16.4	2.266	0.218	317	0.000	0.244	1.00
1717	34	16.9	2.266	0.192	298	0.000	0.234	1.00
1718	37	13.3	2.255	0.203	293	0.000	0.242	1.00
1719	34	13.4	2.255	0.212	311	0.000	0.246	1.00
1720	35	15.3	2.269	0.221	314	0.000	0.244	1.00
1721	50	7.9	2.245	0.212	307	0.062	0.231	1.00
1722	51	11.9	2.295	0.229	314	0.068	0.217	1.00
1723	46	15.8	2.305	0.217	310	0.032	0.220	1.00
1724	46	16.4	2.284	0.217	314	0.041	0.224	1.00
1725	45	17.9	2.243	0.230	312	0.027	0.249	0.97
1726	42	16.5	2.237	0.234	321	0.013	0.257	0.99
1727	44	18.0	2.269	0.229	312	0.020	0.241	1.00
1728	44	16.8	2.267	0.214	303	0.020	0.236	1.00
1729	51	5.1	2.469	0.141	265	0.059	0.001	1.00
1730	47	200.0	1.250	0.550	439	0.033	0.001	1.00
1731	54	423.9	1.288	0.561	440	0.083	0.001	1.00
1732	50	500.0	1.302	0.516	394	0.060	0.001	1.00
1733	50	600.0	1.285	0.542	420	0.058	0.001	1.00
1734	45	700.0	1.233	0.558	393	0.027	0.001	1.00
1735	43	821.4	1.266	0.516	444	0.008	0.001	1.00
1736	47	342.1	1.444	0.530	451	0.035	0.001	1.00
1737	98	16.1	2.016	0.455	290	0.540	0.001	1.00
1738	107	10.2	2.193	0.427	300	0.679	0.000	1.00
1739	94	10.0	2.076	0.500	316	0.495	0.001	1.00
1740	101	12.7	2.138	0.520	295	0.605	0.000	1.00
1741	116	17.0	1.816	0.405	255	0.860	0.000	1.00
1742	125	62.0	2.460	0.245	287	1.000	0.000	1.00
1743	99	35.5	2.461	0.212	294	0.606	0.000	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1744	62	38.1	2.376	0.191	324	0.143	0.151	0.28
1745	59	53.0	2.348	0.200	308	0.120	0.171	0.20
1746	52	77.4	2.324	0.164	307	0.070	0.180	0.18
1747	56	72.7	2.249	0.152	326	0.096	0.195	0.15
1748	48	170.3	2.208	0.089	337	0.050	0.198	0.11
1749	50	131.3	2.187	0.089	314	0.062	0.203	0.11
1750	48	271.0	2.189	0.059	322	0.050	0.192	0.07
1751	56	139.5	2.227	0.108	331	0.093	0.186	0.10
1752	44	282.2	2.078	0.060	338	0.025	0.246	0.07
1753	45	221.9	2.170	0.072	332	0.023	0.214	0.10
1754	54	98.2	2.233	0.102	341	0.088	0.183	0.14
1755	59	58.9	2.283	0.087	317	0.133	0.143	0.20
1756	47	269.5	2.158	0.070	333	0.032	0.215	0.08
1757	48	287.7	2.126	0.074	338	0.043	0.227	0.07
1758	39	317.3	2.115	0.052	331	0.002	0.234	0.09
1759	47	149.0	2.233	0.081	315	0.046	0.186	0.12
1760	41	185.6	2.114	0.066	328	0.004	0.240	0.11
1761	47	119.3	2.126	0.073	331	0.045	0.226	0.11
1762	35	250.1	2.183	0.069	314	0.000	0.214	0.11
1763	42	100.6	2.149	0.077	330	0.015	0.227	0.15
1764	43	35.2	2.150	0.099	319	0.013	0.236	0.29
1765	30	163.4	1.197	0.539	485	0.000	0.001	1.00
1766	42	100.0	1.262	0.541	475	0.001	0.001	1.00
1767	31	50.0	1.255	0.515	435	0.000	0.001	1.00
1768	99	16.3	1.579	0.331	330	0.545	0.001	1.00
1769	99	20.3	1.836	0.317	323	0.557	0.000	1.00
1770	83	39.5	2.382	0.376	337	0.416	0.099	0.13
1771	92	26.9	2.204	0.259	361	0.406	0.001	1.00
1772	79	129.6	1.443	0.549	355	0.218	0.001	1.00
1773	121	19.2	2.284	0.239	297	1.000	0.000	1.00
1774	123	16.8	2.451	0.300	288	1.000	0.000	1.00
1775	138	18.4	2.307	0.329	313	1.000	0.000	1.00
1776	110	19.7	2.416	0.354	290	0.725	0.000	1.00
1777	117	16.5	1.696	0.322	303	1.000	0.000	1.00
1778	116	15.6	1.957	0.408	316	0.876	0.000	1.00
1779	92	20.7	2.173	0.379	370	0.442	0.001	1.00
1780	58	17.5	2.144	0.179	319	0.100	0.187	0.45
1781	95	18.5	2.216	0.485	343	0.472	0.001	1.00
1782	108	19.1	1.681	0.270	284	0.699	0.000	1.00
1783	114	16.3	1.651	0.376	350	0.948	0.000	1.00
1784	98	23.0	1.569	0.220	281	0.534	0.001	1.00
1785	116	16.1	1.881	0.382	314	0.909	0.000	1.00
1786	106	19.0	2.238	0.266	297	0.664	0.000	1.00
1787	74	6.1	1.304	0.528	261	0.280	0.001	1.00
1788	135	36.9	2.571	0.281	182	1.000	0.000	1.00
1789	116	41.3	2.556	0.232	299	0.924	0.000	1.00
1790	144	45.7	2.708	0.263	243	1.000	0.000	1.00
1791	114	21.6	2.504	0.273	253	0.986	0.000	1.00
1792	115	18.5	2.423	0.262	420	0.756	0.000	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1793	77	9.9	1.320	0.516	367	0.288	0.001	1.00
1794	104	29.5	1.944	0.274	225	0.606	0.000	1.00
1795	103	12.0	1.561	0.423	367	0.689	0.000	1.00
1796	49	153.9	1.327	0.563	335	0.056	0.001	1.00
1797	106	14.2	2.068	0.423	248	0.615	0.000	1.00
1798	132	17.6	1.778	0.310	293	1.000	0.000	1.00
1799	116	34.5	2.561	0.234	258	0.911	0.000	1.00
1800	109	28.1	2.483	0.242	277	0.761	0.000	1.00
1801	85	26.8	2.425	0.209	336	0.403	0.068	0.48
1802	66	44.1	2.304	0.173	352	0.208	0.150	0.19
1803	58	52.8	2.241	0.141	345	0.097	0.193	0.21
1804	54	23.4	2.227	0.172	341	0.081	0.216	0.32
1805	44	89.2	2.183	0.076	352	0.026	0.210	0.17
1806	40	78.8	2.138	0.107	341	0.000	0.249	0.18
1807	44	61.4	2.299	0.226	323	0.015	0.230	0.21
1808	41	122.8	2.188	0.241	339	0.010	0.279	0.11
1809	45	56.2	2.309	0.313	348	0.014	0.267	0.19
1810	57	56.9	2.318	0.224	315	0.098	0.198	0.20
1811	65	31.2	2.406	0.224	304	0.153	0.156	0.33
1812	53	51.8	2.315	0.239	325	0.088	0.209	0.21
1813	49	55.3	2.275	0.239	334	0.059	0.231	0.18
1814	53	54.9	2.279	0.217	319	0.078	0.215	0.19
1815	37	102.4	2.259	0.206	320	0.000	0.242	0.16
1816	35	190.1	2.258	0.217	326	0.000	0.247	0.12
1817	34	69.4	1.309	0.541	362	0.000	0.001	1.00
1818	75	18.3	1.656	0.498	384	0.224	0.001	1.00
1819	105	7.7	1.907	0.476	268	0.648	0.000	1.00
1820	107	15.1	1.817	0.416	201	0.663	0.000	1.00
1821	115	11.1	1.749	0.424	268	0.795	0.000	1.00
1822	126	44.1	2.530	0.225	249	1.000	0.000	1.00
1823	112	29.7	2.552	0.225	265	0.815	0.000	1.00
1824	114	39.7	2.593	0.222	272	0.814	0.000	1.00
1825	133	47.2	2.548	0.269	283	1.000	0.000	1.00
1826	134	25.6	2.290	0.315	299	1.000	0.000	1.00
1827	90	25.9	2.280	0.297	307	0.564	0.044	0.72
1828	48	8.2	2.304	0.222	298	0.037	0.220	0.76
1829	47	8.8	2.317	0.219	299	0.044	0.213	0.76
1830	48	10.3	2.346	0.228	306	0.048	0.206	0.70
1831	97	14.1	2.429	0.200	258	0.458	0.044	1.00
1832	93	34.9	2.489	0.218	278	0.478	0.028	0.81
1833	82	24.5	2.483	0.227	285	0.370	0.071	0.68
1834	64	13.8	2.401	0.225	287	0.174	0.151	0.71
1835	77	17.0	2.467	0.237	301	0.291	0.104	0.73
1836	79	16.1	2.323	0.252	300	0.358	0.131	0.56
1837	69	16.5	2.275	0.265	309	0.255	0.183	0.48
1838	42	9.7	2.234	0.248	344	0.015	0.001	1.00
1839	28	84.9	1.386	0.553	363	0.000	0.001	1.00
1840	73	70.8	1.454	0.472	287	0.170	0.001	1.00
1841	89	12.6	1.621	0.505	278	0.362	0.001	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1842	135	14.3	2.234	0.313	268	1.000	0.000	1.00
1843	146	33.1	2.613	0.236	234	1.000	0.000	1.00
1844	158	34.2	2.626	0.210	247	1.000	0.000	1.00
1845	147	28.8	2.570	0.208	258	1.000	0.000	1.00
1846	138	17.0	1.883	0.272	277	1.000	0.000	1.00
1847	135	21.7	2.444	0.290	252	1.000	0.000	1.00
1848	97	26.3	2.520	0.182	320	0.711	0.000	1.00
1849	39	88.9	2.157	0.069	321	0.000	0.225	0.19
1850	41	77.3	2.129	0.079	331	0.006	0.239	0.18
1851	45	60.4	2.091	0.081	330	0.026	0.250	0.19
1852	45	29.0	2.143	0.134	337	0.020	0.252	0.29
1853	43	27.5	2.112	0.127	351	0.011	0.264	0.28
1854	41	20.1	2.209	0.232	323	0.009	0.268	0.37
1855	74	12.4	2.420	0.239	286	0.261	0.127	0.80
1856	85	13.2	2.388	0.220	282	0.362	0.096	0.84
1857	74	9.2	2.311	0.261	307	0.240	0.175	0.72
1858	60	7.4	2.272	0.245	318	0.127	0.214	0.79
1859	42	5.3	2.270	0.252	315	0.005	0.254	0.84
1860	56	6.0	2.288	0.181	267	0.081	0.197	1.00
1861	120	21.0	2.107	0.317	267	1.000	0.000	1.00
1862	111	18.5	2.132	0.366	273	0.807	0.000	1.00
1863	117	15.9	2.172	0.381	258	1.000	0.000	1.00
1864	74	8.3	1.444	0.530	248	0.261	0.001	1.00
1865	133	16.7	1.645	0.491	217	1.000	0.000	1.00
1866	113	20.2	2.057	0.286	283	0.813	0.000	1.00
1867	127	22.1	2.589	0.244	260	1.000	0.000	1.00
1868	122	31.8	2.666	0.237	249	1.000	0.000	1.00
1869	121	26.1	2.711	0.205	247	0.968	0.000	1.00
1870	121	32.2	2.581	0.173	262	1.000	0.000	1.00
1871	140	31.9	2.592	0.224	260	1.000	0.000	1.00
1872	141	29.6	2.570	0.267	264	1.000	0.000	1.00
1873	148	26.1	2.597	0.193	255	1.000	0.000	1.00
1874	126	14.4	2.066	0.464	298	1.000	0.000	1.00
1875	132	12.7	2.183	0.262	275	1.000	0.000	1.00
1876	128	16.7	1.677	0.319	289	1.000	0.000	1.00
1877	94	21.7	1.219	0.410	370	0.512	0.001	1.00
1878	102	22.1	1.968	0.281	315	0.551	0.000	1.00
1879	96	17.5	1.681	0.540	345	0.426	0.001	1.00
1880	109	29.9	2.236	0.302	280	0.717	0.000	1.00
1881	115	20.7	1.590	0.311	239	0.819	0.000	1.00
1882	119	18.4	2.585	0.233	254	1.000	0.000	1.00
1883	101	11.8	2.060	0.376	322	0.575	0.000	1.00
1884	81	12.1	2.180	0.487	312	0.316	0.001	1.00
1885	114	12.2	2.091	0.344	291	0.834	0.000	1.00
1886	124	18.7	2.156	0.303	246	1.000	0.000	1.00
1887	127	20.3	2.406	0.221	258	1.000	0.000	1.00
1888	134	21.9	2.430	0.209	276	1.000	0.000	1.00
1889	48	35.6	2.438	0.141	264	0.052	0.136	0.57
1890	80	22.0	2.252	0.203	260	0.204	0.001	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1891	103	19.5	1.577	0.371	287	0.616	0.000	1.00
1892	100	17.1	1.423	0.391	284	0.611	0.000	1.00
1893	99	14.8	1.919	0.461	267	0.554	0.000	1.00
1894	104	13.4	2.101	0.401	250	0.636	0.000	1.00
1895	95	14.2	2.095	0.400	271	0.476	0.001	1.00
1896	84	20.0	1.657	0.423	338	0.339	0.001	1.00
1897	85	9.8	1.306	0.463	242	0.381	0.001	1.00
1898	111	21.2	2.118	0.255	241	0.751	0.000	1.00
1899	113	25.1	2.431	0.197	251	0.797	0.000	1.00
1900	126	19.2	1.616	0.195	269	1.000	0.000	1.00
1901	107	14.3	1.715	0.336	246	0.742	0.000	1.00
1902	119	20.6	2.333	0.225	275	0.999	0.000	1.00
1903	124	28.6	2.497	0.225	235	1.000	0.000	1.00
1904	130	21.7	2.608	0.255	247	1.000	0.000	1.00
1905	89	12.3	2.377	0.139	288	0.450	0.036	1.00
1906	70	13.5	2.163	0.269	356	0.187	0.001	1.00
1907	72	15.0	1.276	0.514	371	0.205	0.001	1.00
1908	99	9.8	1.541	0.461	260	0.523	0.001	1.00
1909	108	12.6	1.657	0.381	271	0.722	0.000	1.00
1910	128	22.3	2.258	0.303	274	1.000	0.000	1.00
1911	109	10.3	2.258	0.526	269	0.689	0.000	1.00
1912	106	19.0	2.519	0.283	277	0.694	0.000	1.00
1913	99	21.6	1.993	0.316	228	0.521	0.001	1.00
1914	112	19.2	2.389	0.207	263	0.863	0.000	1.00
1915	126	32.9	2.552	0.239	255	1.000	0.000	1.00
1916	97	14.7	2.428	0.229	272	0.571	0.011	1.00
1917	97	13.6	2.454	0.215	282	0.497	0.027	1.00
1918	60	5.6	2.283	0.301	320	0.156	0.227	0.98
1919	40	3.5	2.246	0.215	358	0.000	0.250	1.00
1920	102	21.4	2.501	0.321	288	0.477	0.001	1.00
1921	116	15.7	1.809	0.548	304	0.968	0.000	1.00
1922	92	9.0	1.486	0.187	366	0.451	0.001	1.00
1923	73	21.9	2.290	0.223	339	0.254	0.161	0.49
1924	95	12.8	2.364	0.208	295	0.510	0.037	1.00
1925	126	28.7	2.545	0.313	277	1.000	0.000	1.00
1926	103	27.6	2.572	0.192	265	0.653	0.000	1.00
1927	82	19.2	2.441	0.236	269	0.320	0.070	1.00
1928	84	19.3	1.859	0.240	311	0.346	0.072	0.98
1929	89	16.4	1.810	0.262	311	0.403	0.041	1.00
1930	120	13.8	1.845	0.214	255	0.918	0.000	1.00
1931	106	19.9	2.610	0.187	243	0.607	0.000	1.00
1932	123	17.0	1.786	0.206	280	1.000	0.000	1.00
1933	133	11.3	2.483	0.283	270	1.000	0.000	1.00
1934	85	202.3	2.754	0.104	181	0.399	0.001	1.00
1935	125	21.1	1.330	0.270	241	0.940	0.000	1.00
1936	123	17.6	1.576	0.173	249	1.000	0.000	1.00
1937	127	11.8	1.690	0.395	219	1.000	0.000	1.00
1938	132	16.8	1.823	0.249	255	1.000	0.000	1.00
1939	124	10.7	1.735	0.226	305	0.947	0.000	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1940	138	12.6	2.608	0.208	255	1.000	0.000	1.00
1941	149	22.7	2.482	0.234	233	1.000	0.000	1.00
1942	130	13.8	1.458	0.352	305	1.000	0.000	1.00
1943	118	14.2	2.044	0.319	260	1.000	0.000	1.00
1944	129	13.3	1.740	0.332	336	1.000	0.000	1.00
1945	115	15.6	1.975	0.288	245	0.850	0.000	1.00
1946	115	13.3	1.320	0.554	431	1.000	0.000	1.00
1947	91	12.2	1.274	0.525	419	0.459	0.001	1.00
1948	110	15.3	1.448	0.552	310	0.661	0.000	1.00
1949	104	22.6	1.513	0.531	303	0.699	0.000	1.00
1950	96	18.7	1.703	0.415	495	0.544	0.001	1.00
1951	48	37.8	1.838	0.566	305	0.037	0.001	1.00
1952	117	16.7	2.309	0.291	247	0.823	0.000	1.00
1953	128	25.1	2.462	0.352	285	1.000	0.000	1.00
1954	109	17.6	2.380	0.241	290	0.780	0.000	1.00
1955	156	22.6	2.508	0.237	267	1.000	0.000	1.00
1956	122	19.8	2.481	0.263	281	0.914	0.000	1.00
1957	129	19.1	2.053	0.291	276	1.000	0.000	1.00
1958	115	15.9	2.035	0.310	258	0.870	0.000	1.00
1959	105	27.1	2.601	0.237	284	0.722	0.000	1.00
1960	80	20.1	2.349	0.213	283	0.322	0.116	0.55
1961	62	59.5	2.310	0.129	295	0.162	0.143	0.26
1962	66	30.7	2.286	0.165	301	0.186	0.001	1.00
1963	115	20.1	1.785	0.465	359	0.834	0.000	1.00
1964	100	17.6	1.321	0.504	343	0.557	0.000	1.00
1965	90	21.5	2.436	0.216	278	0.318	0.094	0.65
1966	94	18.8	2.405	0.199	299	0.425	0.062	0.88
1967	107	25.1	2.623	0.249	252	0.728	0.000	1.00
1968	134	29.0	2.505	0.296	262	1.000	0.000	1.00
1969	122	18.5	1.467	0.221	263	0.923	0.000	1.00
1970	82	28.5	1.602	0.463	265	0.264	0.001	1.00
1971	126	16.1	1.887	0.304	240	1.000	0.000	1.00
1972	139	13.7	1.361	0.349	238	1.000	0.000	1.00
1973	106	14.0	1.335	0.433	378	0.748	0.000	1.00
1974	85	25.4	1.354	0.481	287	0.294	0.001	1.00
1975	112	22.6	2.088	0.276	249	0.727	0.000	1.00
1976	126	26.1	2.055	0.215	237	1.000	0.000	1.00
1977	122	17.0	2.072	0.394	321	1.000	0.000	1.00
1978	136	23.5	2.131	0.256	266	1.000	0.000	1.00
1979	120	16.1	1.538	0.349	386	1.000	0.000	1.00
1980	111	21.1	1.310	0.442	351	0.725	0.000	1.00
1981	127	26.0	2.498	0.225	234	1.000	0.000	1.00
1982	123	26.3	1.919	0.204	268	1.000	0.000	1.00
1983	123	21.7	2.005	0.416	322	1.000	0.000	1.00
1984	114	25.4	2.436	0.217	260	0.910	0.000	1.00
1985	100	26.3	2.434	0.193	327	0.513	0.016	1.00
1986	77	20.6	1.330	0.524	449	0.307	0.001	1.00
1987	54	43.8	1.524	0.548	263	0.074	0.001	1.00
1988	110	20.6	1.985	0.341	278	0.701	0.000	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
1989	136	24.1	2.376	0.292	265	1.000	0.000	1.00
1990	111	27.6	2.561	0.267	280	0.748	0.000	1.00
1991	98	19.7	2.280	0.218	299	0.418	0.066	0.75
1992	44	105.2	1.178	0.552	414	0.003	0.001	1.00
1993	124	22.1	2.574	0.354	242	1.000	0.000	1.00
1994	120	33.4	2.562	0.198	247	0.927	0.000	1.00
1995	117	36.5	2.704	0.220	216	1.000	0.000	1.00
1996	96	143.0	2.717	0.106	192	0.525	0.001	1.00
1997	112	22.1	2.541	0.197	268	0.793	0.000	1.00
1998	65	46.4	1.480	0.465	279	0.262	0.001	1.00
1999	77	58.4	1.892	0.355	250	0.184	0.001	1.00
2000	105	38.6	2.282	0.253	269	0.612	0.000	1.00
2001	94	29.9	2.456	0.208	295	0.496	0.024	1.00
2002	80	29.3	2.269	0.182	306	0.328	0.001	1.00
2003	89	31.3	1.283	0.475	354	0.378	0.001	1.00
2004	120	11.6	1.369	0.415	317	1.000	0.000	1.00
2005	98	21.2	1.610	0.442	383	0.606	0.000	1.00
2006	87	40.6	1.486	0.406	415	0.283	0.001	1.00
2007	114	23.1	1.464	0.450	381	0.866	0.000	1.00
2008	83	49.4	2.375	0.329	280	0.370	0.001	1.00
2009	90	19.7	2.410	0.194	295	0.360	0.077	0.90
2010	116	23.8	2.407	0.206	307	0.873	0.000	1.00
2011	61	81.1	1.492	0.548	328	0.106	0.001	1.00
2012	111	25.4	1.927	0.218	261	0.746	0.000	1.00
2013	114	16.8	1.557	0.373	299	0.885	0.000	1.00
2014	110	21.0	2.046	0.363	273	0.880	0.000	1.00
2015	80	20.4	1.356	0.441	248	0.272	0.001	1.00
2016	108	20.1	1.523	0.215	313	0.723	0.000	1.00
2017	85	28.1	1.507	0.461	369	0.376	0.001	1.00
2018	118	16.0	1.698	0.419	300	1.000	0.000	1.00
2019	127	23.2	2.542	0.281	284	1.000	0.000	1.00
2020	62	34.9	2.318	0.148	299	0.156	0.150	0.41
2021	66	25.4	2.353	0.182	298	0.154	0.152	0.42
2022	50	145.7	2.204	0.080	317	0.057	0.194	0.16
2023	56	32.2	2.243	0.161	297	0.062	0.211	0.41
2024	83	29.0	2.428	0.206	290	0.303	0.096	0.45
2025	37	296.0	2.201	0.187	305	0.000	0.256	0.10
2026	34	499.4	2.248	0.198	299	0.000	0.243	0.10
2027	46	70.7	2.181	0.211	326	0.000	0.001	1.00
2028	77	14.9	2.417	0.220	261	0.294	0.108	0.91
2029	81	13.1	2.462	0.209	271	0.329	0.080	1.00
2030	71	12.0	2.393	0.232	269	0.233	0.139	0.81
2031	76	10.0	2.441	0.203	268	0.294	0.093	1.00
2032	81	10.3	2.445	0.218	264	0.292	0.100	1.00
2033	80	10.1	2.462	0.208	268	0.312	0.085	1.00
2034	77	7.1	2.411	0.207	280	0.275	0.109	1.00
2035	71	6.2	2.404	0.222	267	0.188	0.144	1.00
2036	97	17.9	2.486	0.218	261	0.568	0.003	1.00
2037	62	5.5	2.310	0.247	294	0.143	0.198	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
2038	62	5.1	2.351	0.243	280	0.110	0.193	1.00
2039	55	4.0	2.343	0.234	290	0.077	0.201	1.00
2040	47	3.8	2.289	0.235	293	0.034	0.232	1.00
2041	55	4.3	2.255	0.218	279	0.043	0.235	1.00
2042	71	10.7	2.317	0.231	277	0.221	0.164	0.84
2043	53	3.9	2.279	0.241	296	0.054	0.232	1.00
2044	80	7.0	2.433	0.232	277	0.362	0.089	1.00
2045	68	3.2	2.293	0.255	296	0.115	0.215	1.00
2046	121	13.3	1.959	0.277	249	1.000	0.000	1.00
2047	120	15.2	1.534	0.234	265	0.971	0.000	1.00
2048	114	10.6	1.495	0.185	256	0.936	0.000	1.00
2049	108	18.0	2.168	0.207	256	0.702	0.000	1.00
2050	79	8.4	2.451	0.219	275	0.301	0.096	1.00
2051	65	7.0	2.381	0.208	275	0.198	0.141	1.00
2052	57	4.7	2.345	0.216	269	0.094	0.187	1.00
2053	62	4.7	2.457	0.182	273	0.129	0.001	1.00
2054	80	5.9	1.681	0.164	277	0.323	0.001	1.00
2055	114	10.0	1.638	0.377	317	0.918	0.000	1.00
2056	97	14.3	1.625	0.323	267	0.540	0.001	1.00
2057	117	14.8	1.539	0.283	266	0.855	0.000	1.00
2058	124	16.6	2.545	0.253	240	1.000	0.000	1.00
2059	83	3.5	2.413	0.194	288	0.328	0.086	1.00
2060	104	25.7	1.901	0.359	261	0.675	0.000	1.00
2061	119	19.2	1.986	0.326	315	0.968	0.000	1.00
2062	104	20.4	1.515	0.389	250	0.598	0.000	1.00
2063	115	17.5	1.870	0.258	242	0.779	0.000	1.00
2064	86	12.8	2.395	0.235	283	0.411	0.068	1.00
2065	104	19.6	1.423	0.420	255	0.692	0.000	1.00
2066	117	18.2	1.813	0.278	245	0.876	0.000	1.00
2067	84	9.4	2.388	0.168	267	0.342	0.001	1.00
2068	100	17.8	1.772	0.412	272	0.692	0.000	1.00
2069	52	27.1	1.235	0.542	286	0.045	0.092	1.00
2070	215	10.6	2.361	0.250	243	1.000	0.000	1.00
2071	104	9.9	2.330	0.210	266	0.385	0.046	1.00
2072	118	18.8	2.350	0.286	260	1.000	0.000	1.00
2073	72	20.1	1.337	0.457	215	0.189	0.001	1.00
2074	102	12.3	2.289	0.398	231	0.537	0.001	1.00
2075	102	12.9	2.522	0.200	254	0.599	0.000	1.00
2076	87	8.6	2.472	0.177	256	0.407	0.037	1.00
2077	68	10.0	2.386	0.213	258	0.226	0.133	1.00
2078	45	5.2	2.304	0.216	282	0.038	0.217	1.00
2079	41	4.2	2.296	0.217	294	0.012	0.229	1.00
2080	36	4.4	2.260	0.214	293	0.000	0.245	1.00
2081	37	5.0	2.260	0.206	302	0.000	0.241	1.00
2082	32	4.1	2.255	0.228	299	0.000	0.252	1.00
2083	49	3.9	2.318	0.198	280	0.018	0.212	1.00
2084	98	19.2	2.492	0.225	249	0.507	0.019	1.00
2085	89	12.1	2.484	0.235	289	0.471	0.039	1.00
2086	54	2.5	2.498	0.223	278	0.046	0.001	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
2087	104	9.9	1.877	0.434	320	0.629	0.000	1.00
2088	108	16.9	1.782	0.356	231	0.522	0.001	1.00
2089	116	9.4	2.445	0.207	250	0.851	0.000	1.00
2090	104	9.1	2.538	0.203	257	0.667	0.000	1.00
2091	138	18.8	2.463	0.262	275	1.000	0.000	1.00
2092	136	17.3	2.696	0.251	248	1.000	0.000	1.00
2093	120	16.4	2.564	0.232	260	1.000	0.000	1.00
2094	123	12.5	2.563	0.224	243	0.930	0.000	1.00
2095	123	12.3	2.327	0.320	305	1.000	0.000	1.00
2096	43	21.6	1.361	0.528	454	0.051	0.001	1.00
2097	32	65.7	1.273	0.551	437	0.000	0.001	1.00
2098	47	13.1	1.560	0.508	401	0.029	0.001	1.00
2099	55	2.2	1.556	0.518	329	0.077	0.001	1.00
2100	69	3.2	2.056	0.434	296	0.236	0.001	1.00
2101	30	52.6	1.958	0.514	362	0.000	0.001	1.00
2102	33	3.7	2.648	0.269	254	0.000	0.001	1.00
2103	30	7.7	2.517	0.254	223	0.000	0.001	1.00
2104	28	24.4	2.707	0.149	186	0.000	0.001	1.00
2105	28	30.0	2.686	0.129	198	0.000	0.001	1.00
2106	29	24.3	2.489	0.175	189	0.000	0.001	1.00
2107	29	10.7	2.444	0.333	235	0.000	0.001	1.00
2108	29	24.4	2.549	0.213	190	0.000	0.001	1.00
2109	30	103.4	2.579	0.141	189	0.000	0.001	1.00
2110	28	80.5	2.568	0.161	178	0.000	0.001	1.00
2111	26	66.9	2.354	0.145	172	0.000	0.001	1.00
2112	27	68.9	2.499	0.099	187	0.000	0.001	1.00
2113	31	157.4	2.520	0.098	165	0.000	0.001	1.00
2114	31	181.1	2.334	0.126	172	0.000	0.001	1.00
2115	28	313.2	1.606	0.055	175	0.000	0.001	1.00
2116	32	113.0	1.728	0.103	168	0.000	0.001	1.00
2117	37	14.1	2.237	0.206	189	0.000	0.001	1.00
2118	40	6.9	2.344	0.272	182	0.000	0.001	1.00
2119	89	1.2	2.822	0.237	243	0.364	0.001	1.00
2120	74	44.7	2.052	0.494	298	0.155	0.001	1.00
2121	135	14.6	2.673	0.278	254	1.000	0.000	1.00
2122	120	5.5	2.284	0.238	259	0.855	0.000	1.00
2123	81	13.7	2.128	0.522	315	0.567	0.000	1.00
2124	65	29.0	1.512	0.479	259	0.138	0.001	1.00
2125	127	13.9	2.202	0.275	242	1.000	0.000	1.00
2126	132	12.9	2.204	0.287	247	1.000	0.000	1.00
2127	118	13.7	2.285	0.231	256	1.000	0.000	1.00
2128	78	39.6	1.416	0.475	270	0.131	0.001	1.00
2129	126	9.5	1.603	0.405	246	1.000	0.000	1.00
2130	147	13.9	2.313	0.267	254	1.000	0.000	1.00
2131	119	11.7	1.747	0.402	234	1.000	0.000	1.00
2132	115	23.8	2.560	0.230	228	0.889	0.000	1.00
2133	95	9.0	1.405	0.403	268	0.576	0.000	1.00
2134	81	11.3	2.468	0.194	290	0.375	0.057	0.92
2135	56	20.7	2.328	0.211	300	0.142	0.176	0.26

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
2136	90	17.9	2.462	0.220	286	0.580	0.004	1.00
2137	51	17.2	2.350	0.208	300	0.066	0.190	0.36
2138	36	86.8	2.273	0.203	294	0.000	0.235	0.16
2139	52	17.4	2.340	0.172	284	0.050	0.184	0.41
2140	45	35.9	2.357	0.169	290	0.046	0.178	0.28
2141	48	23.6	2.377	0.181	291	0.043	0.176	0.34
2142	86	15.4	2.311	0.171	273	0.228	0.141	0.41
2143	46	17.0	2.310	0.248	254	0.092	0.213	0.34
2144	40	9.9	2.296	0.187	246	0.000	0.221	0.53
2145	51	6.9	2.344	0.191	249	0.059	0.187	0.71
2146	33	3.0	2.236	0.225	250	0.000	0.258	0.86
2147	33	2.8	2.235	0.222	287	0.000	0.257	0.87
2148	34	2.9	2.243	0.208	290	0.000	0.249	0.89
2149	49	3.9	2.340	0.204	286	0.068	0.191	0.99
2150	47	3.6	2.134	0.249	270	0.036	0.296	0.61
2151	41	3.3	2.405	0.158	285	0.005	0.169	1.00
2152	66	3.3	2.360	0.198	255	0.091	0.175	0.88
2153	133	18.5	2.566	0.258	268	1.000	0.000	1.00
2154	48	2.9	2.326	0.210	284	0.061	0.201	0.96
2155	45	3.1	2.314	0.191	287	0.027	0.208	0.94
2156	52	3.8	2.374	0.168	284	0.089	0.158	1.00
2157	39	2.8	2.359	0.188	284	0.000	0.198	1.00
2158	61	4.9	2.442	0.153	261	0.069	0.135	1.00
2159	51	4.7	2.390	0.176	283	0.095	0.154	0.97
2160	44	3.2	2.377	0.186	283	0.031	0.182	0.99
2161	87	6.5	2.461	0.196	257	0.380	0.058	1.00
2162	57	3.6	2.406	0.173	278	0.129	0.137	1.00
2163	48	2.6	2.394	0.173	272	0.023	0.173	1.00
2164	58	3.5	2.420	0.178	280	0.124	0.137	1.00
2165	65	3.6	2.375	0.171	276	0.123	0.149	0.97
2166	64	4.6	2.429	0.158	265	0.127	0.124	1.00
2167	76	5.1	2.493	0.161	267	0.217	0.080	1.00
2168	36	2.6	2.311	0.187	301	0.000	0.215	0.95
2169	73	3.7	2.482	0.168	270	0.168	0.101	1.00
2170	51	4.0	2.431	0.179	291	0.064	0.152	0.99
2171	120	15.6	2.615	0.237	256	1.000	0.000	1.00
2172	49	2.9	2.354	0.199	300	0.026	0.197	0.93
2173	52	2.9	2.454	0.179	278	0.075	0.143	1.00
2174	51	3.2	2.397	0.184	291	0.076	0.161	1.00
2175	48	2.9	2.344	0.196	282	0.030	0.198	0.94
2176	44	2.7	2.349	0.190	297	0.033	0.193	1.00
2177	58	2.9	2.377	0.170	283	0.065	0.165	1.00
2178	138	7.7	2.387	0.298	259	1.000	0.000	1.00
2179	135	7.6	2.153	0.276	248	1.000	0.000	1.00
2180	126	9.2	2.618	0.292	247	1.000	0.000	1.00
2181	135	9.4	2.452	0.288	239	1.000	0.000	1.00
2182	133	8.6	2.635	0.238	235	1.000	0.000	1.00
2183	85	5.4	2.517	0.172	246	0.390	0.028	1.00
2184	103	10.2	2.554	0.160	243	0.707	0.000	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
2185	102	12.6	2.568	0.167	240	0.735	0.000	1.00
2186	43	3.0	2.348	0.183	282	0.028	0.192	0.99
2187	36	3.4	2.364	0.155	281	0.000	0.183	1.00
2188	35	3.3	2.339	0.181	292	0.000	0.203	0.99
2189	34	3.3	2.310	0.166	287	0.000	0.207	0.97
2190	45	3.6	2.348	0.173	272	0.022	0.190	0.94
2191	53	3.4	2.408	0.182	272	0.075	0.157	1.00
2192	67	5.0	2.467	0.162	262	0.189	0.096	1.00
2193	68	5.6	2.471	0.161	254	0.187	0.095	1.00
2194	69	6.4	2.441	0.182	265	0.270	0.089	1.00
2195	59	3.2	2.408	0.163	263	0.079	0.147	1.00
2196	60	2.9	2.380	0.190	263	0.095	0.163	1.00
2197	54	2.7	2.450	0.185	264	0.127	0.131	1.00
2198	70	3.0	2.479	0.169	244	0.153	0.108	1.00
2199	117	12.6	2.498	0.212	265	0.891	0.000	1.00
2200	71	3.8	2.468	0.153	245	0.186	0.092	1.00
2201	129	4.2	2.564	0.224	256	1.000	0.000	1.00
2202	136	7.8	2.143	0.293	254	1.000	0.000	1.00
2203	148	8.4	2.579	0.250	245	1.000	0.000	1.00
2204	147	10.6	2.268	0.259	246	1.000	0.000	1.00
2205	131	9.8	2.581	0.249	243	1.000	0.000	1.00
2206	88	4.8	2.508	0.181	262	0.454	0.016	1.00
2207	95	3.5	2.495	0.176	258	0.419	0.027	1.00
2208	139	13.3	2.382	0.228	237	1.000	0.000	1.00
2209	132	14.4	2.268	0.234	235	1.000	0.000	1.00
2210	132	13.9	2.380	0.234	233	1.000	0.000	1.00
2211	110	15.3	2.552	0.234	247	1.000	0.000	1.00
2212	88	5.8	2.518	0.176	262	0.422	0.020	1.00
2213	80	6.3	2.454	0.174	261	0.282	0.079	1.00
2214	59	4.6	2.475	0.179	271	0.146	0.116	1.00
2215	38	2.3	2.322	0.185	294	0.000	0.211	0.99
2216	85	3.6	2.408	0.162	275	0.150	0.126	0.97
2217	133	10.1	2.573	0.334	255	1.000	0.000	1.00
2218	138	13.0	2.273	0.301	240	1.000	0.000	1.00
2219	137	12.2	2.061	0.313	236	1.000	0.000	1.00
2220	129	14.6	2.331	0.261	225	1.000	0.000	1.00
2221	125	13.6	2.359	0.310	202	1.000	0.000	1.00
2222	104	9.3	1.656	0.429	244	0.699	0.000	1.00
2223	65	9.8	2.458	0.154	249	0.199	0.091	0.76
2224	120	10.6	2.496	0.283	303	1.000	0.000	1.00
2225	56	4.3	2.358	0.193	290	0.100	0.171	0.80
2226	49	2.9	2.379	0.200	278	0.065	0.177	1.00
2227	36	5.9	2.374	0.152	232	0.000	0.179	0.72
2228	36	20.6	2.621	0.053	233	0.000	0.053	1.00
2229	42	3.5	2.400	0.150	281	0.006	0.166	1.00
2230	40	2.9	2.335	0.179	279	0.000	0.203	0.98
2231	60	4.3	2.428	0.178	276	0.111	0.139	1.00
2232	54	4.5	2.355	0.196	277	0.083	0.178	0.92
2233	49	4.8	2.369	0.175	287	0.059	0.172	0.98

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	DT us/m	VSH frac	PHIE frac	SWE frac
2234	45	3.8	2.306	0.196	289	0.026	0.213	0.93
2235	36	3.0	2.312	0.202	290	0.000	0.221	0.99
2236	37	2.4	2.300	0.201	293	0.000	0.225	1.00
2237	56	3.0	2.343	0.179	271	0.066	0.180	0.99
2238	134	10.7	2.797	0.293	262	1.000	0.000	1.00
2239	156	12.8	2.589	0.278	264	1.000	0.000	1.00
2240	150	10.5	2.603	0.288	270	1.000	0.000	1.00
2241	37	1.4	2.323	0.204	300	0.004	0.216	1.00
2242	136	2.7	2.493	0.218	254	1.000	0.000	1.00
2243	106	8.9	2.963	0.271	253	0.723	0.000	1.00
2244	59	2.1	2.441	0.229	301	0.187	0.138	1.00
2245	107	5.5	2.296	0.239	255	0.483	0.040	0.93
2246	153	15.2	2.440	0.268	246	1.000	0.000	1.00
2247	91	23.9	1.989	0.432	241	0.650	0.000	1.00
2248	124	22.1	2.460	0.209	236	1.000	0.000	1.00
2249	145	13.1	2.277	0.309	255	1.000	0.000	1.00
2250	145	13.3	2.604	0.279	254	1.000	0.000	1.00
2251	78	9.5	2.393	0.232	274	0.308	0.116	0.69
2252	67	5.5	2.424	0.193	275	0.182	0.126	1.00
2253	46	6.4	2.401	0.193	283	0.034	0.177	0.91
2254	45	7.4	2.417	0.177	284	0.039	0.163	0.90
2255	54	6.2	2.383	0.196	290	0.075	0.171	0.87
2256	67	7.8	2.447	0.182	273	0.162	0.120	0.97
2257	50	5.3	2.353	0.189	273	0.029	0.192	0.83
2258	39	8.8	2.446	0.160	257	0.024	0.150	0.86
2259	33	9.2	2.493	0.101	251	0.000	0.116	1.00
2260	57	5.2	2.419	0.199	273	0.127	0.147	0.97
2261	36	6.0	2.396	0.169	254	0.000	0.178	0.79
2262	36	8.9	2.536	0.098	198	0.000	0.100	1.00
2263	124	10.9	2.541	0.189	268	0.666	0.000	1.00
2264	149	13.0	2.235	0.373	310	1.000	0.000	1.00
2265	142	9.8	2.407	0.330	289	1.000	0.000	0.00

PE600820

This is an enclosure indicator page.
The enclosure PE600820 is enclosed within the container PE900926 at this location in this document.

The enclosure PE600820 has the following characteristics:

ITEM_BARCODE = PE600820
CONTAINER_BARCODE = PE900926
NAME = Quantative Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Quantative Log
REMARKS =
DATE_CREATED = 12/05/1995
DATE_RECEIVED = 07/03/1996
W_NO = W1114
WELL_NAME = Moonfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE600740

This is an enclosure indicator page.
The enclosure PE600740 is enclosed within the container PE900926 at this location in this document.

The enclosure PE600740 has the following characteristics:

ITEM_BARCODE =	PE600740
CONTAINER_BARCODE =	PE900926
NAME =	CPI Quantative Log
BASIN =	GIPPSLAND
PERMIT =	VIC/L10
TYPE =	WELL
SUBTYPE =	WELL_LOG
DESCRIPTION =	Computer Processed Quantative Log (enclosure from WCR vol.2) for Moonfish-2
REMARKS =	
DATE_CREATED =	12/05/1995
DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 3

APPENDIX 3

APPENDIX 3

Moonfish-2

Core Analysis Reports

31 January, 1995

ACS
LABORATORIES
AUSTRALIA

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

REPORT: 002-193 - WELL NAME: MOONFISH No.2

CLIENT REFERENCE: Contract No. 2710080 RFS No.5

MATERIAL: Core plugs

LOCALITY: Gippsland, VIC-L-10

WORK REQUIRED: Routine Core Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

(Bill Derksema)
Laboratory Supervisor
on behalf of ACS Laboratories Pty. Ltd.

Address: P.O. Box 396, Chermside, Qld. 4032 Australia
Telephone: 61 7 350 1222 Facsimile: 61 7 359 0666
ACS Laboratories Pty. Ltd.
ACN: 008 273 005

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31 January, 1995

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

FINAL DATA REPORT - ROUTINE CORE ANALYSIS

REPORT: 002-193 WELL NAME: MOONFISH No.2

LOGISTICS

A total of twenty-eight, 1.5" diameter core plugs were received by ACS Laboratories, Brisbane, via courier.

Twelve samples from core no. 1 were received on 31 December, 1994.

Nine samples from core no. 2 and 7 samples from core no. 3 were received on 4 January, 1995.

INTRODUCTION

The following report includes tabular data of overburden permeability to air, helium injection porosity, and density determinations. Data presented graphically includes a porosity versus permeability to air plot.

STUDY AIMS

The analyses were performed with the following aims:

1. To provide overburden air permeability, helium injection porosity and density data.

SAMPLING

The core was sampled as follows:

A. 1.5 " diameter core plugs were drilled from the whole core, at well-site, at the bottom of each 1 metre interval through the sand sections of the core. 21000ppm KCl brine was used as the bit lubricant. The core was orientated such that the plugs were drilled parallel to the bedding.

B. All plugs were trimmed and offcuts retained. The offcuts were dispatched to Esso Australia for viewing and possible selection of petrology/palaeontology samples.

The core was sampled and analysed as follows:

1. SAMPLE EXTRACTION AND DRYING

The plugs were initially dried at 80°C for 2 hours. The plugs were then placed in a soxhlet extractor to remove hydrocarbons. The initial solvent used was toluene. When the toluene in the Soxhlet was no longer discoloured, the solvent was changed to 3:1 Chloroform:Methanol to remove further hydrocarbons and salt. The core plugs were removed and checked under ultraviolet light to ensure all hydrocarbons had been removed.

After cleaning, all plugs were dried in a controlled humidity environment at 60°C and 40% relative humidity. The plugs were stored in an airtight plastic container and allowed to cool to room temperature before analysis.

2. AIR PERMEABILITY AT OVERBURDEN PRESSURE

The plugs are placed in a heavy duty Hassler sleeve. The assembly is loaded into a thick walled hydrostatic cell capable of withstanding the simulated reservoir overburden stress.

During the measurement a known air pressure is applied to the upstream face of the sample, creating a flow of air through the sample. Permeability for each sample is then calculated using Darcy's Law through knowledge of the upstream pressure and flow rate during the test, the viscosity of air and the plug dimensions.

3. POROSITY AT OVERBURDEN PRESSURE

To determine the porosity of the core plug at overburden pressure, the sample was firstly placed into a heavy walled rubber sleeve and this assembly loaded into a hydrostatic cell after determination of the pore volume at 400 psi. The overburden pressure 3100 psig, was then applied to the sample in the cell and the pore volume reduction caused by this increase in pressure measured. By this means the actual overburden pore volume and the bulk volume can be determined and are used to derive porosity at the applied overburden pressure.

Porosity Methods Summary:

Lead Sleeve & Coarse Grained Samples

- Grain volume determined by helium injection.
- Pore volume determined by helium injection @ 400 psi.
- Overburden pore volume determined by helium injection @ 3100 psi.
- For lead sleeve samples, volume of screens/lead sleeve is deducted from measured grain volume and pore volume of steel screens deducted from measured pore volume.

Consolidated Samples

- Grain volume determined by helium injection.
- Bulk volume determined by mercury displacement.
- Ambient pore volume calculated.
- Reduction in pore volume determined between 400 psi and 3100 psi.
- Pore volume reduction at overburden applied to calculated ambient pore volume and measured bulk volume to determine overburden porosity.

4. APPARENT GRAIN DENSITY

The apparent grain density was determined by dividing the weight of the sample by the grain volume determined from the helium injection porosity measurement.

5. ABSOLUTE GRAIN DENSITY

A plug offcut which has been extracted with 3:1 chloroform methanol and dried, is used for this measurement. The sample is crushed to approximately grain size, or a little coarser, and the granular material weighed. The volume of the grains is determined by conventional pycnometry (Archimedes' principle) and by this means the actual density of the grain is determined.

On completion of the analysis the plug samples and offcuts were returned to Esso Australia Ltd.

We have enjoyed working with Esso and look forward to working with you in the near future.

<u>END OF REPORT</u>

CORE ANALYSIS FINAL REPORT

COMPANY	:	ESSO AUSTRALIA LTD	DATE	:	18/01/95
WELL	:	MOONFISH NO. 2	FILE	:	2-193
FIELD	:	MOONFISH	LOCATION	:	VIC-L-10
CORE INTERVAL	:	C# 1: 1801.00 - 1815.00 m	ACS LAB	:	002
CORE INTERVAL	:	C# 2: 1816.00 - 1834.00 m	ANALYST	:	WJD
CORE INTERVAL	:	C# 3: 1834.00 - 1851.30 m			

Sample Number	Depth /Dir	3100 psi Overburden Pressures		Density		Remarks
		Porosity	Permeability	Grain	Absolute	
1	1801.96	23.4	7211.08	2.63	2.63	C#1
2	1802.97	25.9	8802.62	2.65	2.64	MP
3	1803.96	24.5	3945.74	2.65	2.65	
4	1804.96	26.7	6951.00	2.65	2.66	
5	1805.85	29.2	13527.27	2.65	2.65	MP
6	1806.97	23.3	1028.89	2.66	2.65	
7	1807.97	19.7	267.34	2.66	2.65	
8	1808.97	21.3	1276.23	2.65	2.65	
9	1809.96	22.4	1049.87	2.65	2.65	
10	1810.96	22.3	757.98	2.65	2.64	
11	1811.97	24.9	7962.37	2.66	2.65	
12	1812.98	27.6	12178.47	2.65	2.65	MP
13	1824.96	18.7	166.52	2.66	2.65	C#2
14	1825.96	23.1	1290.57	2.66	2.66	
15	1826.98	20.8	784.64	2.66	2.65	
16	1827.98	22.4	1324.84	2.66	2.65	
17	1828.96	10.7	0.31	2.68	2.66	
18	1829.96	9.1	2.95	2.64	2.62	
19	1830.98	19.9	139.17	2.67	2.66	
20	1831.95	16.8	31.67	2.66	2.65	
21	1832.98	14.7	2.09	2.57	2.56	
22	1835.12	17.2	39.69	2.60	2.59	C#3
23	1845.98	24.8	9134.43	2.65	2.63	MP
24	1846.98	25.1	14073.31	2.65	2.65	MP
25	1847.98	24.2	13455.36	2.65	2.66	MP
26	1848.98	24.5	8111.61	2.67	2.65	MP
27	1849.98	21.2	1172.15	2.65	2.72	
28	1850.91	21.4	3675.73	2.65	2.65	

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP = Short Plug
C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
TR = Probable Transition Zone; GC = Probable Gas Cap; NS = Not suitable for SCAL

SAMPLE DESCRIPTIONS

SAMPLE DESCRIPTIONS

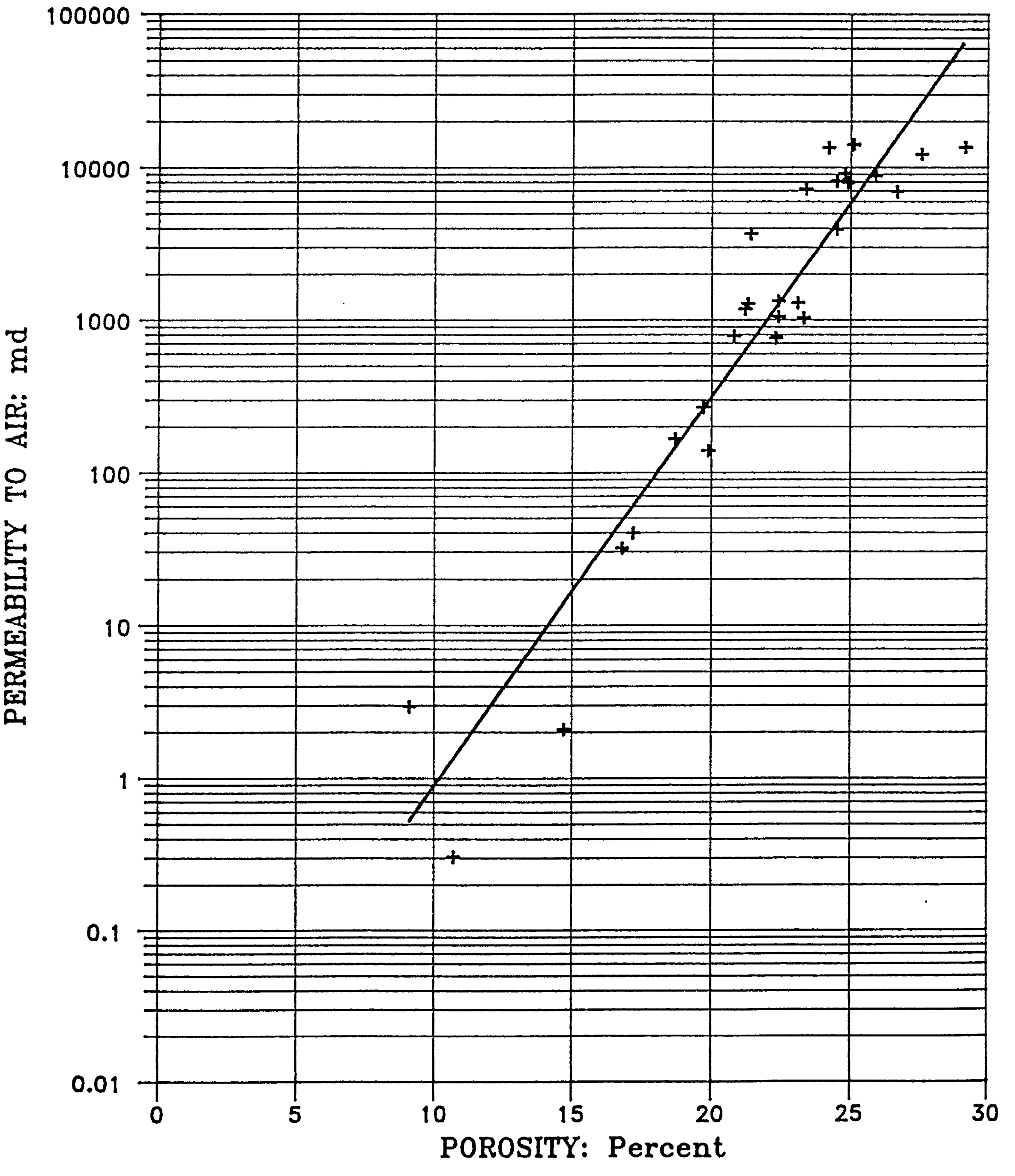
Sample #		Sample Description
1	Sst	lt gry, med-crs gr, sbang, mod wl srt, fria, abd intrst Cl I.P., C lam wl assoc cl, tr Mic, prly cmt.
2	Sst	lt gry, med gr, sbang, mod wl srt, uncon mod intrst Cl, tr Mic, prly cmt, sleeved sample.
3	Sst	lt gry, med-crs gr, sbrd-sbang, mod wl srt, fria abd Cl, Cl rich lam, tr carb spk, prly cmt.
4	Sst	As in 3.
5	Sst	As in 3, uncon, sleeved sample.
6	Sst	lt gry, f gr, sbang-sbrnd, wl srt, abd intrst Cl, tr Mic, tr carb spk, prly cmt.
7	Sst	As in 6.
8	Sst	As in 6 w/ Cl/Md len.
9	Sst	As in 6.
10	Sst	As in 6.
11	Sst	lt gry, med gr, sbrnd-sbang, mod wl srt, tr Mic, tr carb spk, mod wl cmt.
12	Sst	lt gry, med-crs gr, sband, mod wl srt, uncon, mod Cl, tr carb spk prly cmt, sample sleeved.
13	Sst	lt gry, f gr, sbang, wl srt, abd intrst Cl, tr Mic, tr carb spk, mod wl cmt.
14	Sst	As in 13 wl carb lam.
15	Sst	As in 14 wl med gr Sd bnd.
16	Sst	lt gry, f-med gr, sbrnd-sbang, mod wl srt, abd intrst Cl, tr carb spk, tr Mic.
17	Sst	lt gry, vf gr, sbrnd, mod wl srt, lam, abd intrst Cl, tr f carb stk, tr py nod, tr Mic, f bd, mod ind.

Sample #		Sample Description
18	Slt st	lt gry, tr carb strk, tr Mic, bd lam Sltst and f gr Sst, abd Cl, tr Py.
19	Sst	lt gry, f gr, wl srt, sband, abd intrst Cl, tr carb strk lam, tr Mic, mod Ind.
20	Sst	As in 19 with frac.
21	Sst	lt gry, vf gr, abd carb lam, mod wl srt, Py nod, tr Mic.
22	Sst	lt gry, f-med gr, wl srt, sbang, abd intrst Cl, carb lam, frac, tr Mic.
23	Sst	lt gry, med-crs gr, wl srt, sbang-sbrnd, uncon, mod abd intrst Cl, tr carb spk, sample sleeved.
24	Sst	As in 23, sample sleeved.
25	Sst	As in 23, sample sleeved.
26	Sst	As in 23, sample sleeved.
27	Sst	lt gry, med-crs gr, mod srt, sbrnd-sbang, abd intrst Cl, tr carb spk, mod-wl Ind.
28	Sst	lt gry, crs gr, mod srt, sbang, abd intrst Cl I.P., Cl rich lam, th carb lam, Cl/Md len, prly Ind.

POROSITY vs PERMEABILITY PLOT

POROSITY vs PERMEABILITY
At Overburden Pressure

Company: ESSO AUSTRALIA LTD.
Well: MOONFISH No.2
Depth: 1801.96 – 1861.96 Metres
OB Press: 3100



8 May, 1995

ACS
LABORATORIES
AUSTRALIA

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

REPORT: 002-205 - WELL NAME: MOONFISH No.2

CLIENT REFERENCE: Contract No. 2710080 RFS No.5

MATERIAL: Core plugs

LOCALITY: Gippsland Basin, VIC-L-10

WORK REQUIRED: Routine Core Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

W J (Bill) DERKSEMA
Laboratory Supervisor
on behalf of ACS Laboratories Pty. Ltd.

Brisbane Laboratory: P.O. Box 396, Chermside Qld 4032, Australia
Telephone: 61 7 350 1222 Facsimile: 359 0666
ACS Laboratories Pty Ltd
ACN: 008 273 005

CONTENTS

LIST OF PLOTS

8 May, 1995

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

FINAL DATA REPORT - ROUTINE CORE ANALYSIS

REPORT: 002-205 WELL NAME: MOONFISH No.2

LOGISTICS

152 core plugs were delivered to ACS Laboratories, Brisbane, on 22 April 1995. The plugs arrived stored in vials and consist of 61 plugs from Core No.1, 58 plugs from Core No.2 and 33 plugs from Core No.3. Four more plugs from the top of Core No.3 were delivered at a later date.

INTRODUCTION

The following report includes tabular data of overburden permeability to air, helium injection porosity, density determinations and fluid saturations. Data presented graphically includes a core log plot of the above plus a porosity versus permeability to air plot.

STUDY AIMS

The analyses were performed with the following aims:

1. To quantify residual fluid saturation.
2. To provide overburden air permeability, helium injection porosity and density data.

Samples were prepared and analysed as follows:-

1. RESIDUAL FLUID SATURATION/HYDROCARBON EXTRACTION

Plugs from Core No. 1 and Core No. 3 were analysed to determine the residual fluid saturation by the Dean and Stark method. Samples are placed in the Dean and Stark apparatus. Toluene (boiling point 110°C) vapour is condensed and collects in calibrated side arm where it overflows. The overflowing toluene and the vapour leach the residual oil and water from the plug. The toluene is continually refluxed and water, being heavier than toluene, collects in the side arm. When the volume of water being collected ceases to increase the plugs are removed and cleaned in a Soxhlet. The Soxhlet extraction uses a mixture of 3:1 chloroform/methanol, providing a second clean to remove any remaining oil and salt.

Plugs from Core No. 2 were cleaned initially in a Soxhlet with toluene solvent, followed by continued Soxhlet extraction using 3:1 chloroform/methanol as above. Core plugs were removed and checked under ultraviolet light to ensure all hydrocarbons had been removed.

Fluid saturations are calculated using direct measurement of water volume and pore volume, and indirect determination of oil volume using the weight difference between 'wet' and cleaned/dried plug, oil specific gravity and previously measured water volume. Fluid saturations are corrected relevant to the overburden pore volume of samples.

2. SAMPLE DRYING

After cleaning, all plugs were dried in a controlled humidity environment at 60°C and 40% relative humidity. The plugs were stored in an airtight plastic container and allowed to cool to room temperature before analysis.

3. OVERBURDEN AIR PERMEABILITY

The plugs are placed in a heavy duty Hassler sleeve. The assembly is loaded into a thick walled hydrostatic cell capable of withstanding the simulated reservoir overburden stress. The overburden pressure used, as supplied by Esso, was 3100psi.

During the measurement a known air pressure is applied to the upstream face of the sample, creating a flow of air through the sample. Permeability for each sample is then calculated using Darcy's Law through knowledge of the upstream pressure and flow rate during the test, the viscosity of air and the plug dimensions.

4. OVERBURDEN HELIUM INJECTION POROSITY

Overburden Helium Injection Porosities are determined indirectly by the following method:

The apparent grain volume of each sample was measured by expansion of helium into the sample loaded in a matrix cup. The grain volume is derived by application of Boyle's law. The bulk volume of the sample is determined by mercury immersion. The sample is then loaded into a hydrostatic cell where the pore volume reduction, from ambient to the applied overburden stress is determined by measuring changes in the helium pressure within the pore space and applying Boyle's law. The reduction in the bulk volume is assumed to be equivalent to a reduction in the pore volume. Grain volume remains constant. Where samples are sleeved, corrections are made to account for the weight and volume of sleeves and screens.

5. APPARENT GRAIN DENSITY

The apparent grain density is determined by dividing the weight of the plug by the grain volume determined from the helium injection porosity measurement.

6. ABSOLUTE GRAIN DENSITY

A plug offcut which has been extracted with 3:1 chloroform/methanol and oven dried is used for this measurement. The sample is crushed to approximately grain size or a little coarser and the granular material weighed. The volume of the grains is determined by pyconometry (Archimedes' Principle). By this means the actual density of the grains is determined.

7. COMMENTS

Several plugs broke up during the course of analysis due to fracturing and the friable nature of those samples (plug numbers 240 and 243). This accounts for gaps in the overburden data.

On completion of the analysis the plug samples were re-wrapped in tissue, stored in vials and returned to Esso Australia Ltd.

We have enjoyed working with Esso and look forward to working with you in the near future.

END OF REPORT

CORE ANALYSIS FINAL REPORT

COMPANY	:	ESSO AUSTRALIA LTD	**DATE**	:	01/03/05
WELL	:	MOONFISH NO. 2	**FILE**	:	2-205
FIELD	:	MOONFISH	**LOCATION**	:	VIC-L-10
CORE INTERVAL	:	C#1: 1801.00 - 1815.00 m	**ACS LAB**	:	BRISBANE
CORE INTERVAL	:	C#2: 1816.00 - 1834.00 m	**ANALYST**	:	CG
CORE INTERVAL	:	C#3: 1834.00 - 1851.30 m			
CORE INTERVAL	:				

Sample Number	Depth (m)	Porosity (%)		Density		Permeability (mD)	Summation of Fluids		Remarks
		Amb	OB	Grain	Abs	OB Ka	OB Sw %	OB Oil %	
1	1801.15	20.3	18.7	2.58	2.63	90.1	50.9	2.3	
3	1801.25	19.1	18.2	2.63	2.64	142	54.5	1.3	
5	1801.40	22.9	21.9	2.65	2.67	380	49.2	1.5	
7	1801.60	24.0	22.9	2.65	2.64	830	44.3	1.5	
9	1801.80	26.0	25.0	2.65	2.65	2300	41.7	.2	
14	1802.20	25.8	24.7	2.65	2.67	2451	49.7	8.0	
16	1802.44	26.1	24.8	2.65	2.65	2539	40.5	5.2	
18	1802.60	25.9	24.5	2.64	2.62	2242	43.2	3.3	
20	1802.80	26.1	24.8	2.64	2.66	3857	33.5	5.2	
24	1803.03	26.9	25.8	2.65	2.65	5985	28.4	9.0	
27	1803.20	26.0	25.0	2.66	2.65	3622	29.8	10.5	
29	1803.35	21.6	20.3	2.65	2.69	663	36.3	35.6	
31	1803.60	27.6	26.6	2.65	2.65	3851	23.0	26.0	
33	1803.80	27.4	26.2	2.65	2.65	2990	35.6	31.1	
35	1804.03	25.1	23.8	2.66	2.67	498	36.4	39.1	
38	1804.20	24.9	23.7	2.65	2.65	1547	35.5	38.6	
40	1804.40	21.7	20.7	2.65	2.66	430	45.3	31.9	
42	1804.56	26.1	25.2	2.65	2.67	2269	26.6	37.6	
44	1804.80	26.5	25.5	2.65	2.65	3310	28.6	38.8	
46	1805.06	28.2	26.2	2.63	2.67	5439	36.0	42.3	MP
49	1805.20	28.0	26.3	2.64	2.65	6328	27.6	38.3	MP
51	1805.40	29.4	27.6	2.65	2.65	11087	26.4	33.5	MP
53	1805.55	31.1	28.9	2.65	2.64	16523	27.8	26.9	MP
55	1805.80	28.5	26.5	2.65	2.65	4566	53.8	45.8	MP
58	1806.00	29.1	26.8	2.65	2.66	3044	55.6	36.6	MP SP
60	1806.20	23.6	20.7	2.65	2.47	2086	53.7	14.8	MP SP
62	1806.40	26.4	24.4	2.65	2.65	8934	43.5	42.1	MP
64	1806.60	20.9	19.8	2.66	2.66	72.5	48.2	30.5	
66	1806.80	24.3	23.1	2.66	2.68	434	35.2	39.8	
68	1807.03	23.0	22.0	2.66	2.68	137	45.5	27.5	
70	1807.20	19.4	18.4	2.66	2.74	39.6	47.9	27.3	
73	1807.40	24.0	22.9	2.66	2.68	288	40.7	31.4	
75	1807.60	24.6	23.6	2.66	2.67	668	36.4	34.4	
77	1807.80	23.2	22.2	2.66	2.69	405	37.1	40.2	
79	1808.04	22.1	20.9	2.66	2.65	193	45.6	28.6	
81	1808.20	21.6	20.7	2.66	2.66	185	45.7	35.1	
84	1808.40	21.8	20.5	2.65	2.68	598	38.8	33.3	
86	1808.60	15.8	14.5	2.64	2.65	44.9	51.3	30.2	
88	1808.80	25.9	24.5	2.65	2.65	2383	30.6	40.3	

Sample Number	Depth (m)	Porosity (%)		Density		Permeability (mD)	Summation of Fluids		Remarks
		Amb	OB	Grain	Abs	OB Ka	OB Sw %	OB Oil %	
90	1809.04	27.2	26.0	2.65	2.65	4368	26.2	43.6	
92	1809.20	22.8	21.6	2.64	2.65	1902	40.8	38.3	
95	1809.40	24.2	22.9	2.64	2.63	2255	26.6	48.7	
97	1809.60	20.1	18.9	2.65	2.65	180	46.6	31.0	
99	1809.80	25.2	24.0	2.65	2.65	1819	29.7	40.0	
101	1810.03	24.2	23.1	2.66	2.66	760	41.9	33.6	
103	1810.20	22.5	21.5	2.66	2.68	432	42.4	33.6	
106	1810.45	23.4	22.3	2.65	2.65	1047	41.2	31.3	
108	1810.60	23.6	22.6	2.66	2.67	739	41.2	30.0	
110	1810.85	23.0	21.8	2.65	2.66	552	46.6	29.0	
112	1811.03	23.7	22.7	2.66	2.66	549	43.7	25.4	
114	1811.20	23.1	22.2	2.66	2.65	485	43.6	28.5	
117	1811.40	22.3	21.3	2.65	2.65	541	46.3	26.9	
119	1811.60	20.2	19.2	2.65	2.65	151	52.8	21.2	
121	1811.80	10.8	10.0	2.68	2.70	12.2	42.7	20.7	
123	1812.03	28.7	27.1	2.65	2.65	10086	30.2	32.1	MP
125	1812.20	29.8	28.0	2.65	2.65	10972	26.4	22.5	MP
128	1812.40	29.3	27.5	2.65	2.67	18572	32.6	28.1	MP
130	1812.56	29.1	26.8	2.64	2.64	17659	36.7	23.0	MP
132	1812.80	27.1	25.4	2.64	2.66	9728	32.3	27.0	MP
134	1813.04	28.3	26.0	2.65	2.65	19079	37.5	21.5	MP
137	1813.20	26.2	24.5	2.65	2.66	14239	37.4	26.4	MP B#1
139	1819.04	7.3	7.1	2.68	2.69	0.01			C#2
141	1819.20	9.4	8.7	2.68	2.73	0.02			
144	1819.40	8.3	7.8	2.69	2.70	0.02			
146	1819.60	7.5	7.2	2.68	2.72	0.01			
148	1819.80	7.8	7.5	2.69	2.69	0.01			
150	1820.04	8.3	7.7	2.70	2.71	0.01			
152	1820.20	9.7	8.9	2.69	2.69	0.02			
155	1820.35	10.2	9.7	2.68	2.68	0.09			
157	1820.55	9.5	8.4	2.68	2.69	0.06			
159	1820.85	10.4	9.5	2.66	2.67	0.05			
161	1821.04	9.2	8.7	2.66	2.67	0.02			
163	1821.20	8.3	7.7	2.65	2.66	0.01			
166	1821.40	8.3	7.9	2.65	2.65	0.01			
168	1821.60	7.7	7.3	2.66	2.68	0.01			
170	1821.75	7.5	7.0	2.61	2.63	0.01			
172	1824.00	9.2	8.3	2.65	2.64	0.03			
174	1824.17	6.3	6.0	2.64	2.66	0.01			
177	1824.40	26.1	25.1	2.65	2.65	3458			
179	1824.60	24.1	23.2	2.65	2.65	2015			
183	1825.03	22.7	21.6	2.65	2.65	421			
185	1825.20	25.0	24.2	2.65	2.65	2324			
188	1825.40	22.4	21.4	2.66	2.66	410			
190	1825.60	21.0	20.1	2.66	2.67	186			
192	1825.80	24.5	23.5	2.65	2.65	1022			
194	1826.03	23.2	22.3	2.65	2.69	790			
196	1826.15	22.5	20.9	2.65	2.65	546			FRAC
199	1826.40	23.1	22.3	2.66	2.69	506			

Sample Number	Depth (m)	Porosity (%)		Density		Permeability (mD)	Summation of Fluids		Remarks
		Amb	OB	Grain	Abs	OB Ka	OB Sw %	OB Oil %	
201	1826.60	22.9	22.0	2.65	2.66	805			
203	1826.80	20.9	19.7	2.65	2.66	143			
205	1827.03	23.9	22.8	2.66	2.65	1108			
207	1827.20	22.4	21.3	2.66	2.67	689			
210	1827.40	23.1	22.0	2.66	2.69	768			
212	1827.60	24.6	23.6	2.66	2.65	968			
214	1827.80	18.4	17.2	2.65	2.67	24.6			
216	1828.03	25.8	24.6	2.65	2.65	2254			
218	1828.20	23.6	22.6	2.66	2.66	955			
221	1828.40	9.8	8.6	2.68	2.67	0.49			
223	1828.60	7.7	7.1	2.68	2.68	0.02			
225	1828.80	7.3	6.7	2.68	2.68	0.01			
227	1829.03	17.2	15.9	2.68	2.67	4.95			SP
229	1829.20	9.7	8.6	2.67	2.67	0.05			
234	1829.60	14.9	13.3	2.67	2.67	28.6			FRAC
236	1829.80	19.4	17.0	2.67	2.67	60.6			FRAC
238	1830.03	11.3	9.9	2.65	2.66	0.69			FRAC
240	1830.20	16.8		2.66	2.68				FRAC
243	1830.40	18.2		2.67	2.68				FRAC
245	1830.60	17.7	16.0	2.67	2.66	17.9			FRAC
247	1830.85	18.9	17.7	2.66	2.65	51.7			
249	1831.03	20.4	19.4	2.67	2.69	38.4			
251	1831.25	15.6	14.5	2.67	2.69	1.43			
254	1831.40	20.0	18.6	2.67	2.68	45.8			FRAC
256	1831.60	17.8	16.7	2.67	2.66	21.7			
258	1831.85	16.4	14.0	2.67	2.68	8.70			FRAC
260	1832.03	19.8	18.7	2.67	2.66	268			
262	1832.20	14.0	12.1	2.64	2.61	5.20			FRAC
265	1832.40	13.6	11.6	2.65	2.67	13.2			Coal layer
267	1832.60	20.5	19.4	2.66	2.65	217			
269	1832.85	18.1	16.6	2.63	2.62	7.60			B#2 coaly
271	1835.03	22.1	20.7	2.61	2.64	1082	42.5	25.0	C#3
273	1835.20	16.2	14.4	2.69	2.68	9.30	90.6	8.6	
276	1835.40	14.5	13.2	2.65	2.50	36.9	72.5	23.8	FRAC
292	1845.03	5.8	5.5	2.65	2.64	0.01	65.2	25.8	
294	1845.20	6.4	5.9	2.68	2.67	0.01	62.0	22.1	
297	1845.40	5.6	5.2	2.69	2.68	0.01	72.6	11.5	
299	1845.60	18.2	16.8	2.67	2.68	3434	34.2	3.4	
301	1845.80	27.2	25.2	2.65	2.65	10607	40.0	5.2	MP
303	1846.03	26.1	24.4	2.65	2.66	9958	51.2	5.3	MP
305	1846.20	28.1	26.2	2.64	2.63	12957	41.0	4.9	MP
308	1846.40	26.3	24.2	2.65	2.65	13578	37.8	5.1	MP
310	1846.60	24.0	21.3	2.65	2.65	2761	57.7	5.5	
312	1846.80	25.4	23.4	2.64	2.65	12097	54.2	2.1	MP
314	1847.03	24.9	22.8	2.64	2.65	8537	59.5	1.3	MP
316	1847.20	26.1	24.3	2.64	2.66	13966	47.8	1.4	MP
319	1847.40	27.7	25.8	2.64	2.65	15282	47.5	2.4	MP
321	1847.60	26.5	24.7	2.64	2.65	15017	49.7	3.4	MP

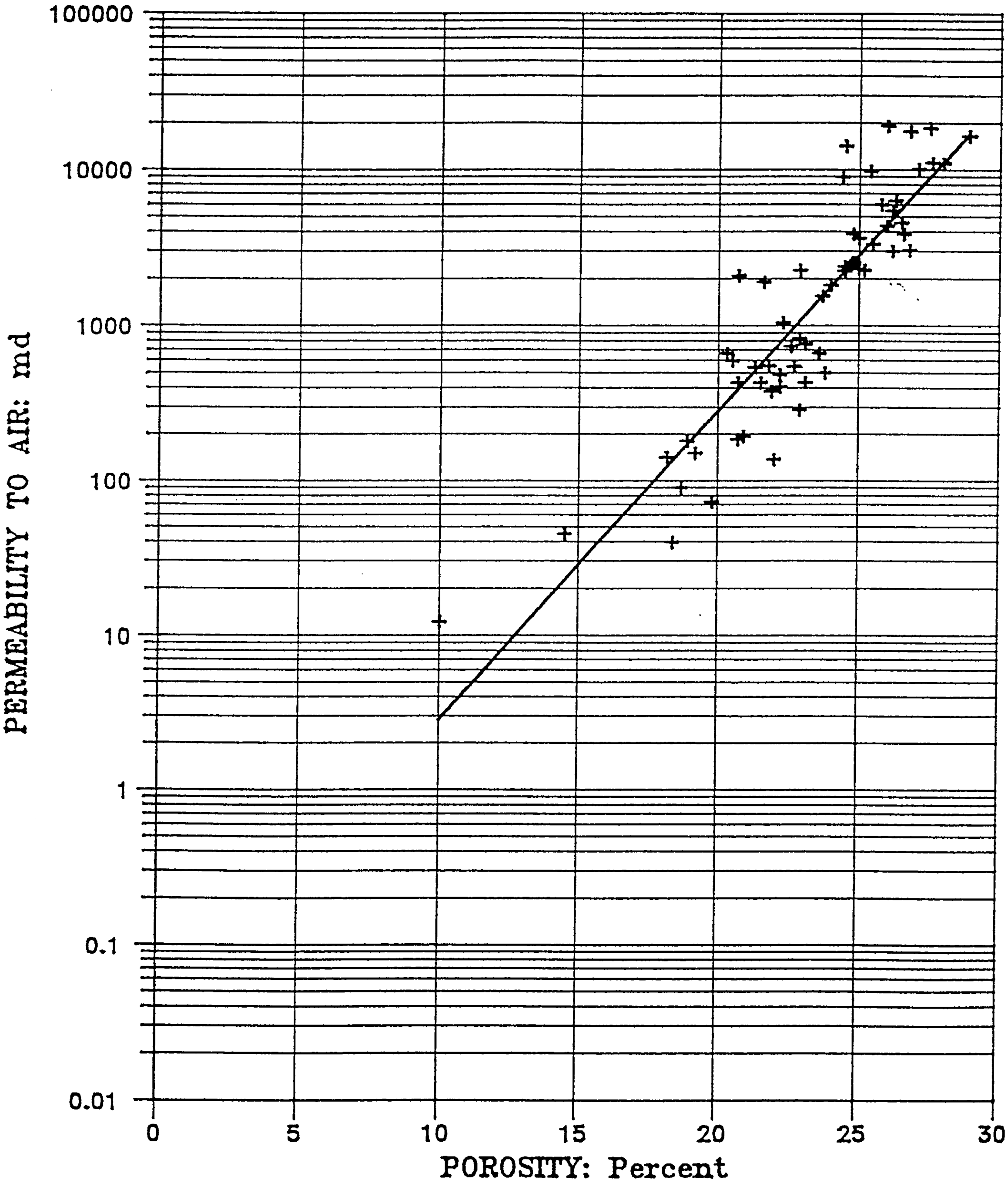
Sample Number	Depth (m)	Porosity (%)		Density		Permeability (mD)	Summation of Fluids		Remarks
		Amb	OB	Grain	Abs	OB Ka	OB Sw %	OB Oil %	
323	1847.80	26.2	24.2	2.65	2.66	13816	49.2	2.0	MP
325	1848.03	25.5	23.6	2.64	2.64	11373	45.7	10.7	MP
330	1848.40	28.2	26.3	2.64	2.65	13852	37.9	8.2	MP
332	1848.60	25.8	24.0	2.65	2.65	6782	52.5	.8	MP
334	1848.80	25.4	23.6	2.66	2.65	3353	53.3	6.5	MP
336	1849.03	25.6	23.7	2.68	2.66	8011	43.4	5.1	MP
341	1849.40	26.5	25.4	2.65	2.65	3607	34.6	5.4	
343	1849.60	25.2	24.2	2.65	2.66	1845	47.4	4.8	
345	1849.80	23.5	22.5	2.64	2.66	1252	55.8	3.9	
347	1850.04	24.2	23.1	2.70	2.66	1204	53.7	6.7	
349	1850.20	25.9	24.8	2.64	2.65	4686	42.7	3.8	
352	1850.40	26.9	25.5	2.65	2.68	4111	38.4	3.9	
354	1850.60	26.9	25.5	2.71	2.69	8723	38.0	4.8	
356	1850.77	27.0	25.6	2.64	2.66	5662	40.0	5.7	
358	1851.03	28.1	26.5	2.64	2.65	8648	24.3	25.4	
360	1851.20	27.0	26.0	2.64	2.65	9561	16.9	24.6	B#3
365	1834.20	7.0	6.7	2.62	2.62	0.01	90.7	2.6	C#2
367	1834.40	25.1	23.4	2.62	2.61	371	56.2	15.8	COALY
369	1834.60	18.6	16.9	2.64	2.63	109	68.4	18.9	COALY
371	1834.80	23.7	21.8	2.59	2.61	305	58.4	14.7	COALY

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP = Short Plug
C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
Tr = Probable Transition Zone; GC = Probable Gas Cap; NS = Not suitable for SCAL

POROSITY vs PERMEABILITY CROSSPLOTS

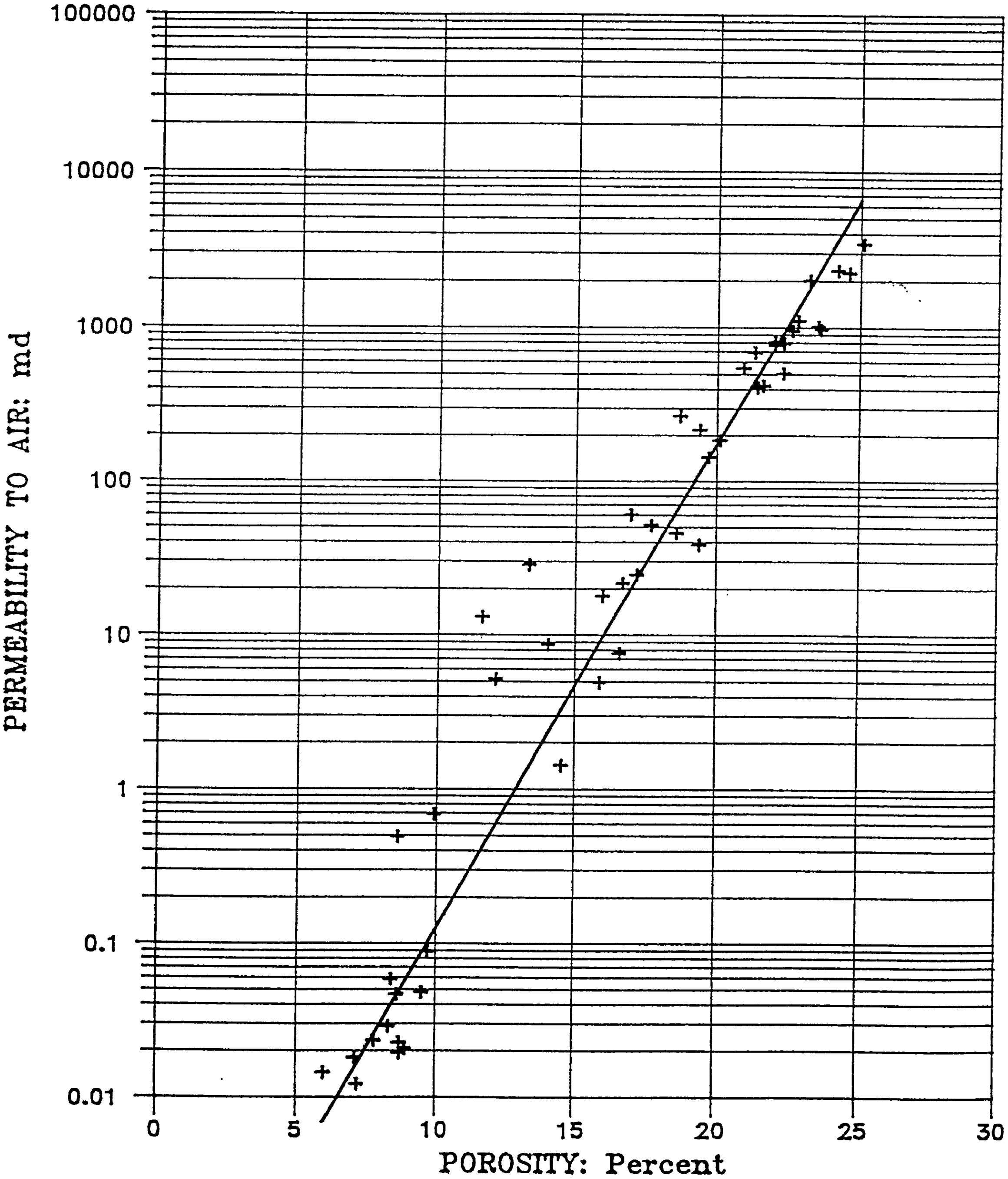
POROSITY vs PERMEABILITY
At Overburden Pressure

Company: ESSO AUSTRALIA LTD
Well: Moonfish No.2
Depth: 1801.00 – 1815.00 Metres
OB Press: 3100



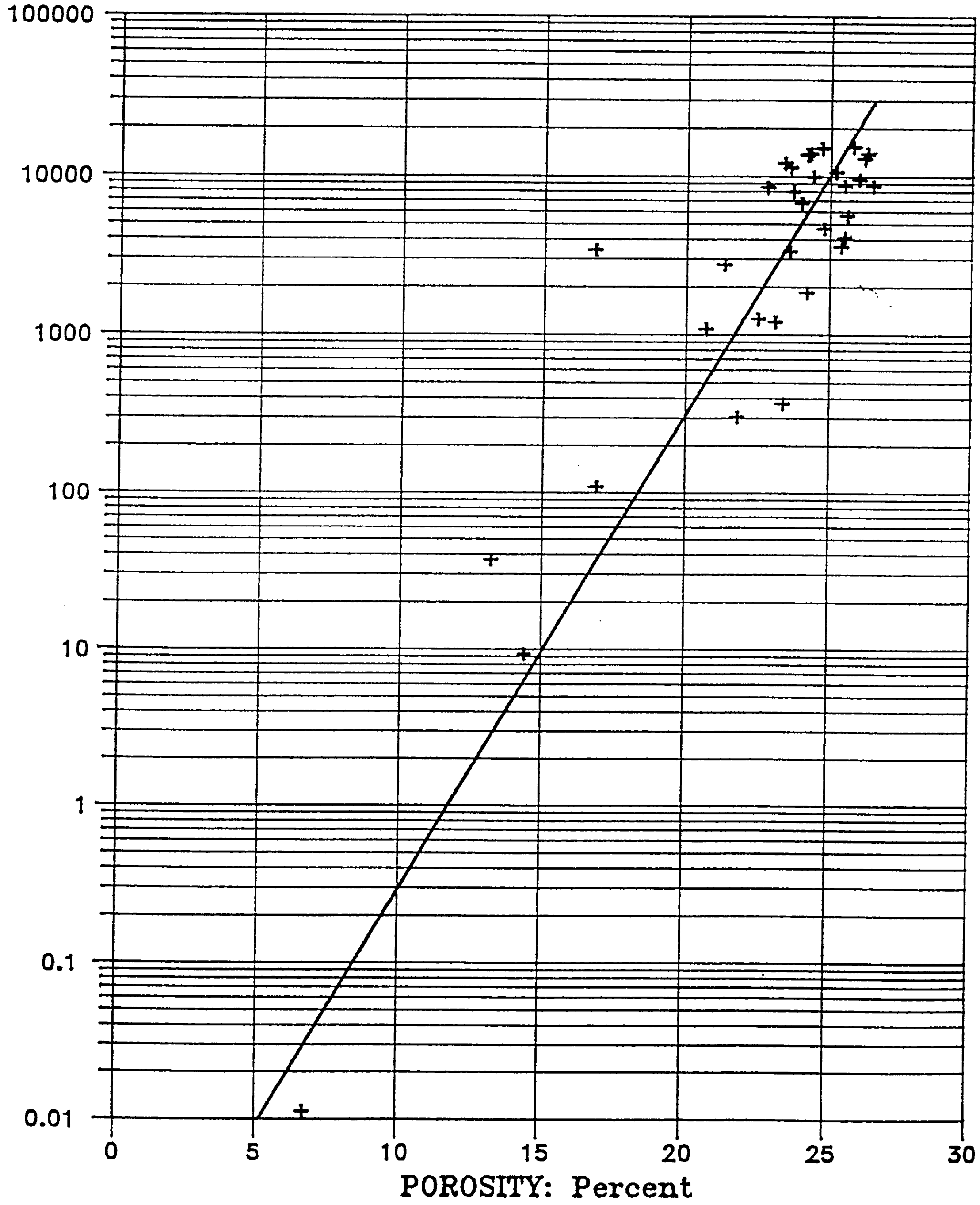
POROSITY vs PERMEABILITY
At Overburden Pressure

Company: ESSO AUSTRALIA LTD.
Well: Moonfish No.2
Depth: 1815.00 – 1834.00 Metres
OB Press: 3100



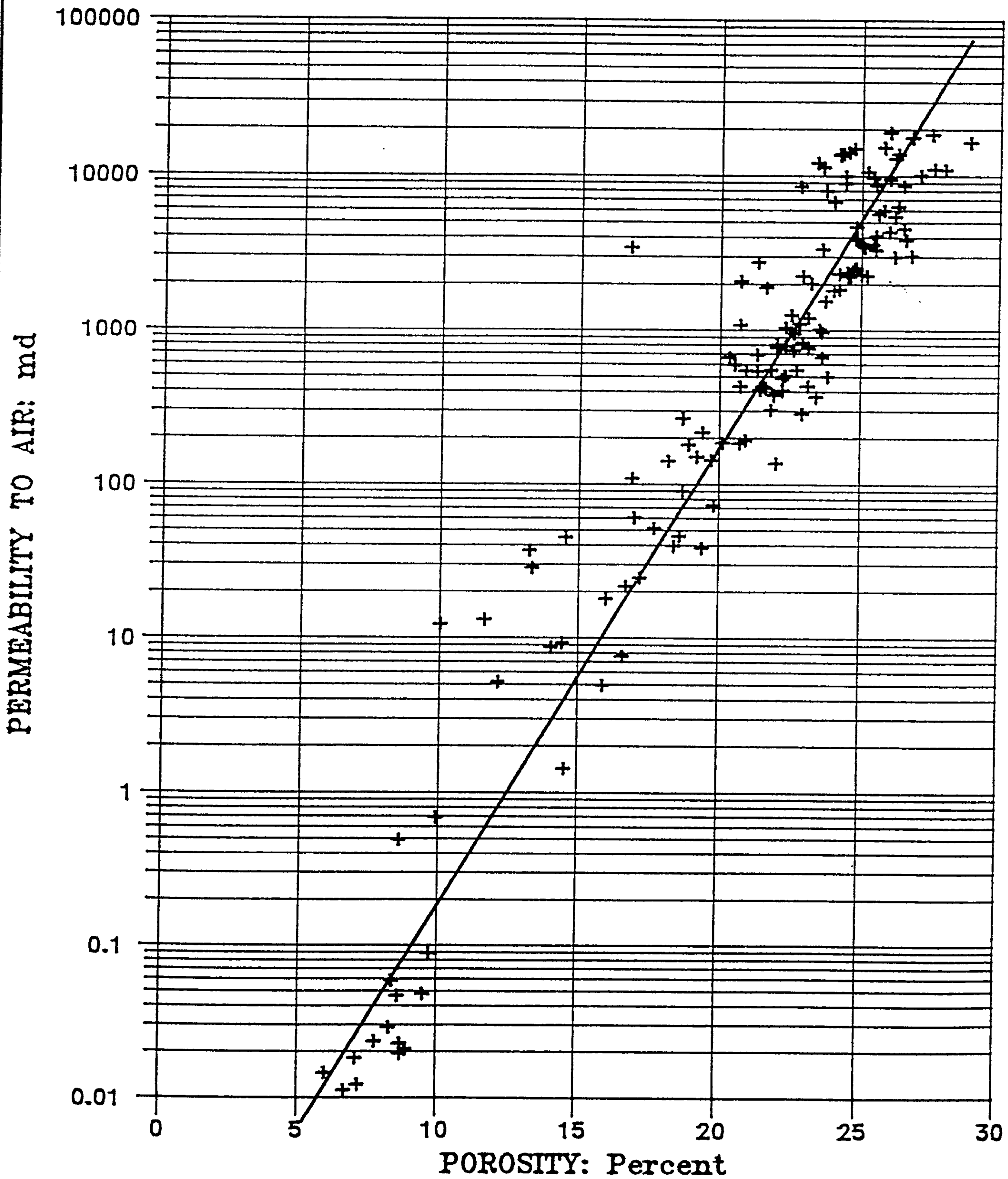
POROSITY vs PERMEABILITY
At Overburden Pressure

Company: ESSO AUSTRALIA LTD.
Well: Moonfish No.2
Depth: 1834.00 – 1851.30 Metres
OB Press: 3100



POROSITY vs PERMEABILITY
At Overburden Pressure

Company: ESSO AUSTRALIA LTD.
Well: Moonfish No.2
Depth: 1801.00 – 1851.30 Metres
OB Press: 3100



CORE PLOT

PE604030

This is an enclosure indicator page.
The enclosure PE604030 is enclosed within the container PE900926 at this location in this document.

The enclosure PE604030 has the following characteristics:

ITEM_BARCODE = PE604030
CONTAINER_BARCODE = PE900926
NAME = Core Plot
BASIN = GIPPSLAND
PERMIT = VIC/L10
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Moonfish-2 Core Plot, including overburden porosity, overburden permeability, oil water saturation, grain and natural density, appendix 3 from WCR vol 2
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 7/03/96
W_NO = W1114
WELL_NAME = MOONFISH-2
CONTRACTOR = ACS LABORATORIES PTY LTD
CLIENT_OP_CO = ESSO AUSTRALIA RESOURCES LTD.

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 4

APPENDIX 4

APPENDIX 4

Moonfish-2

FMI/Dipmeter Analysis

EXXON EXPLORATION COMPANY
POST OFFICE BOX 4778 • HOUSTON, TEXAS 77210-4778

March 3, 1995

A. Mills
Esso Australia Limited

Dear Andy:

The attached summary on the Moonfish-2 FMI processing and interpretation, by S.C. Wilmot, documents the FMI interpretation of the Moonfish-2 well originally requested by your organization on February 24, 1995. This project took four days to complete: 1 day for image processing, 1.5 days for dip-interpretation, 1 day for plot and figures generation, and 0.5 days for report write-up. This time was charged to the Moonfish-2 AFE, number L053240001.

The Formation Evaluation group of EEC Technology appreciates this opportunity to provide your organization with this log analysis assistance. If you have questions regarding this work or require additional assistance, please contact myself or Fritz Merz.

Sincerely,

M.G. Thompson
Formation Evaluation Supervisor

MGT:tcl
Attachments
c: (w/ letter and summary only)
R.D. Hammond
D.M. Maughan
K. Kuttan
T.W. Garrett

RECYCLED

MOONFISH 2 FMI PROCESSING AND INTERPRETATION SUMMARY

FMI PROCESSING

FMI data were received from EAL in DLIS format on 4mm DAT. File FBSTB .093 (FBSTB-LDTD-CNTG-NGTD-AMS-DTAA-DTCA main pass, 2297-1475m) was loaded into GEOFRAME version gf1c1b_04. A default FMI processing chain was set-up (Figure 1) with processing parameters as displayed in Figures 2, 3, and 4. The raw conductivity curves were equalized over a 4.5m window and both accelerometer and image-based depth corrections were applied. A dynamic normalized image was made over the entire recorded interval using a 0.6096m sliding window with 64 color classes. A static normalized image was made from 1550-2265m using 64 color classes. The dynamic and static images were written to FLIP format so that interpretation could be done in FRACVIEW.

INTERPRETATION

The GEOFRAME processed dynamic image was loaded into FLIP version 4.4A and interpretation was done in FRACVIEW version 1.3A. (Note: the imported FLIP image does not have the same color map as the exported GEOFRAME image until the option "enhance" is run on the FLIP image.) Data quality was generally very good in the sands, but the washed-out borehole resulted in poor data in the shales and coals. Dips were picked over the intervals 1740-1860m, 2020-2050m, and 2130-2185m. Dips were classified into 4 sets: structural beds, crossbeds, bed boundaries (primarily basal erosional events), and undetermined (high-angle events in the Sub-Volcanics). These classifications do not strictly adhere to what EAL requested because we did not know enough about the geology of the area, nor was there enough time budgeted for a detailed interpretation and classification, as was done on the Halibut 2 well by EAL. The EAL geologists should be able to work with the dip data however, and re-classify it as they see fit. All dips are true dips without any structural dip removal.

DIP TABLE

EVENT	INTERVAL	DIP ANGLE	DIP AZIMUTH	DATA POINTS
Structural Beds	1820-1850m	3.2	316	9
Bed Boundaries	1740-2190m	12.6	192	38
Crossbeds	1743-1765m N-1.9	6.3	46	46
Crossbeds	1801-1818m M-2	9.5	33	33
Crossbeds	1848-1860m M-3	8.6	348	26
Crossbeds	2019-2053m L-8	14.3	19	80
Crossbeds	2130-2185m Sub-Volcanics	15.2	344	124
Undetermined	2135-2200m	48	179	32

The data above is also shown graphically in Figures 5-12.

PRODUCTS

- 4mm DAT containing FLIP dynamic and static image files and associated interpreted dip data
- Listing of data structure and file sizes (total 455mb of data)
- 1:20 dynamic image plot with interpreted dips
- 1:50 static image
- 1:200 static image, density-neutron, interpreted dips, and SLB calculated dips plot

Figure 5

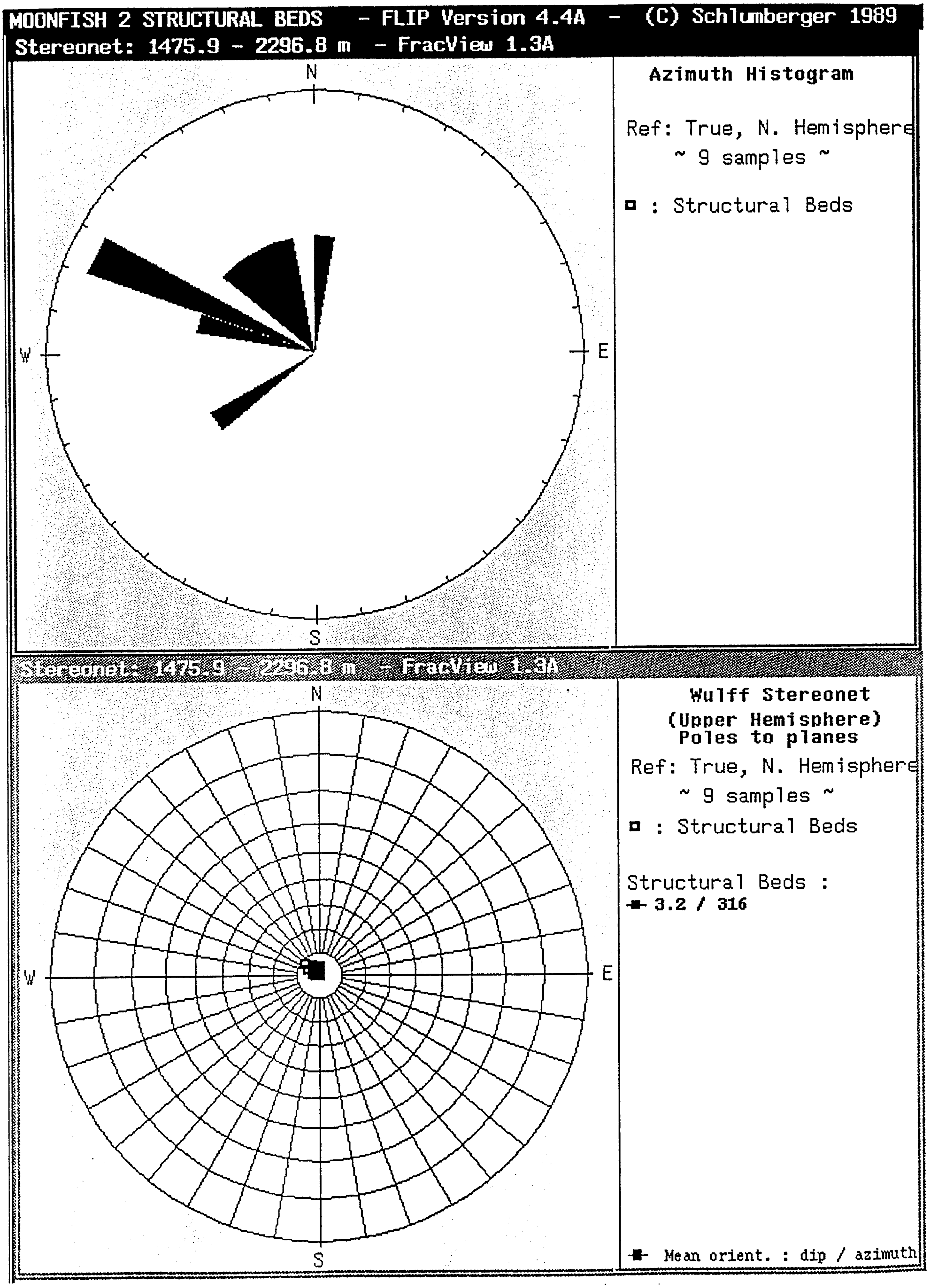

MOONFISH 2 STRUCTURAL BEDS - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1475.9 - 2296.8 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 9 samples ~
: Structural Beds
Stereonet: 1475.9 - 2296.8 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 9 samples ~
: Structural Beds
Structural Beds :
3.2 / 316
Mean orient. : dip / azimuth

Figure 6

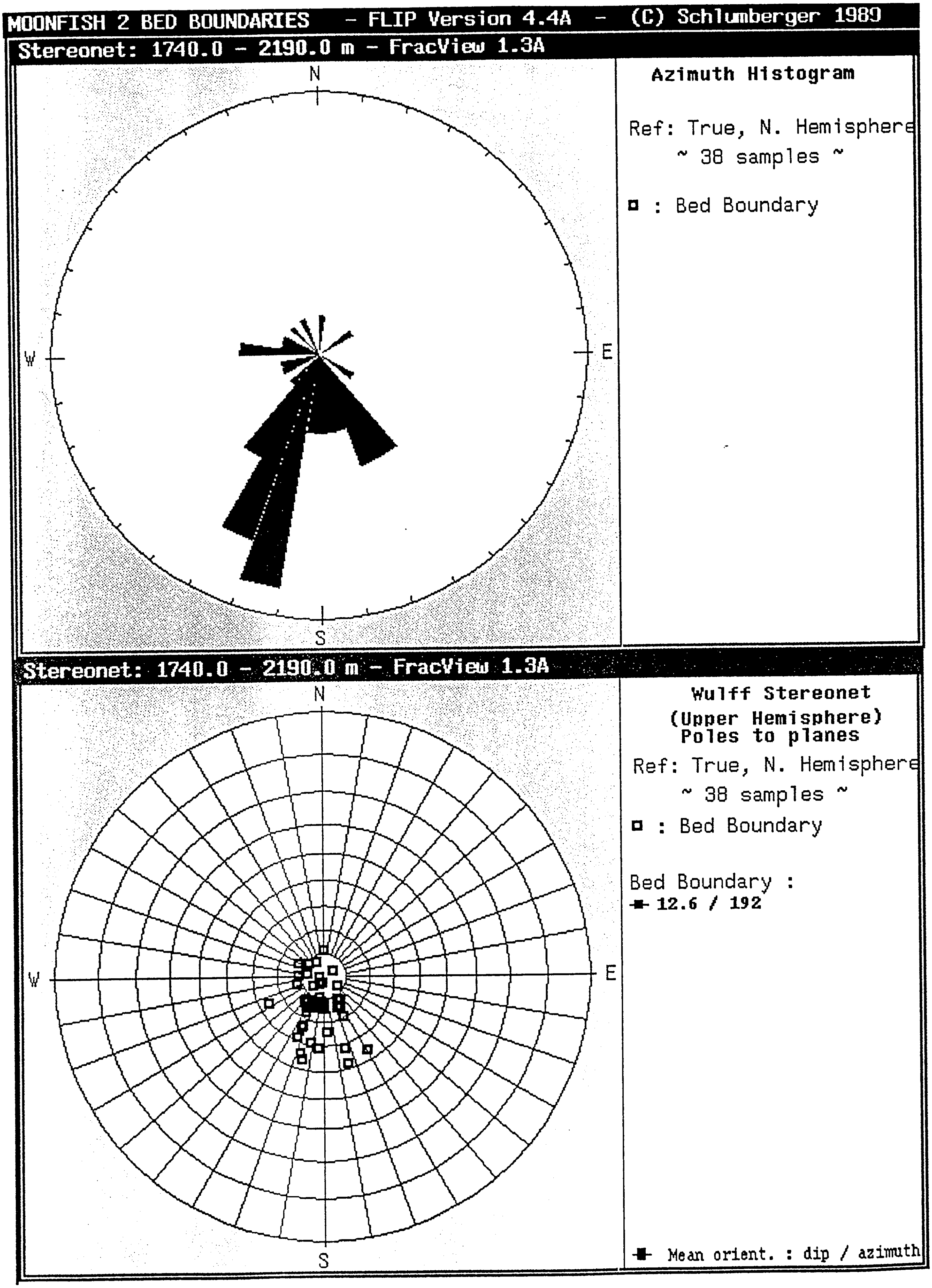

MOONFISH 2 BED BOUNDARIES - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1740.0 - 2190.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 38 samples ~
: Bed Boundary
Stereonet: 1740.0 - 2190.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 38 samples ~
: Bed Boundary
Bed Boundary :
12.6 / 192
Mean orient. : dip / azimuth

Figure 7

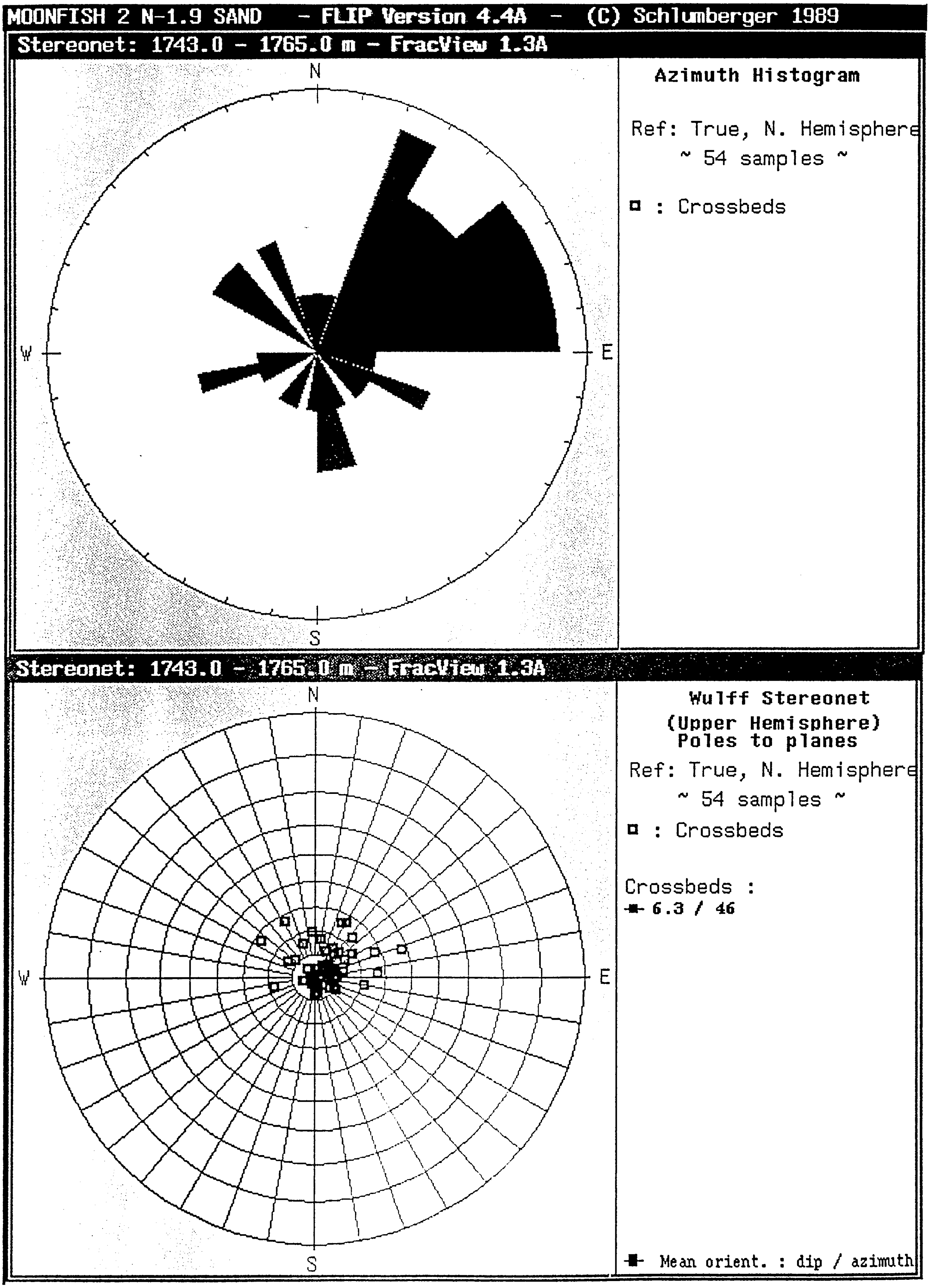

MOONFISH 2 N-1.9 SAND - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1743.0 - 1765.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 54 samples ~
: Crossbeds
Stereonet: 1743.0 - 1765.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 54 samples ~
: Crossbeds
Crossbeds :
6.3 / 46
Mean orient. : dip / azimuth

Figure 8

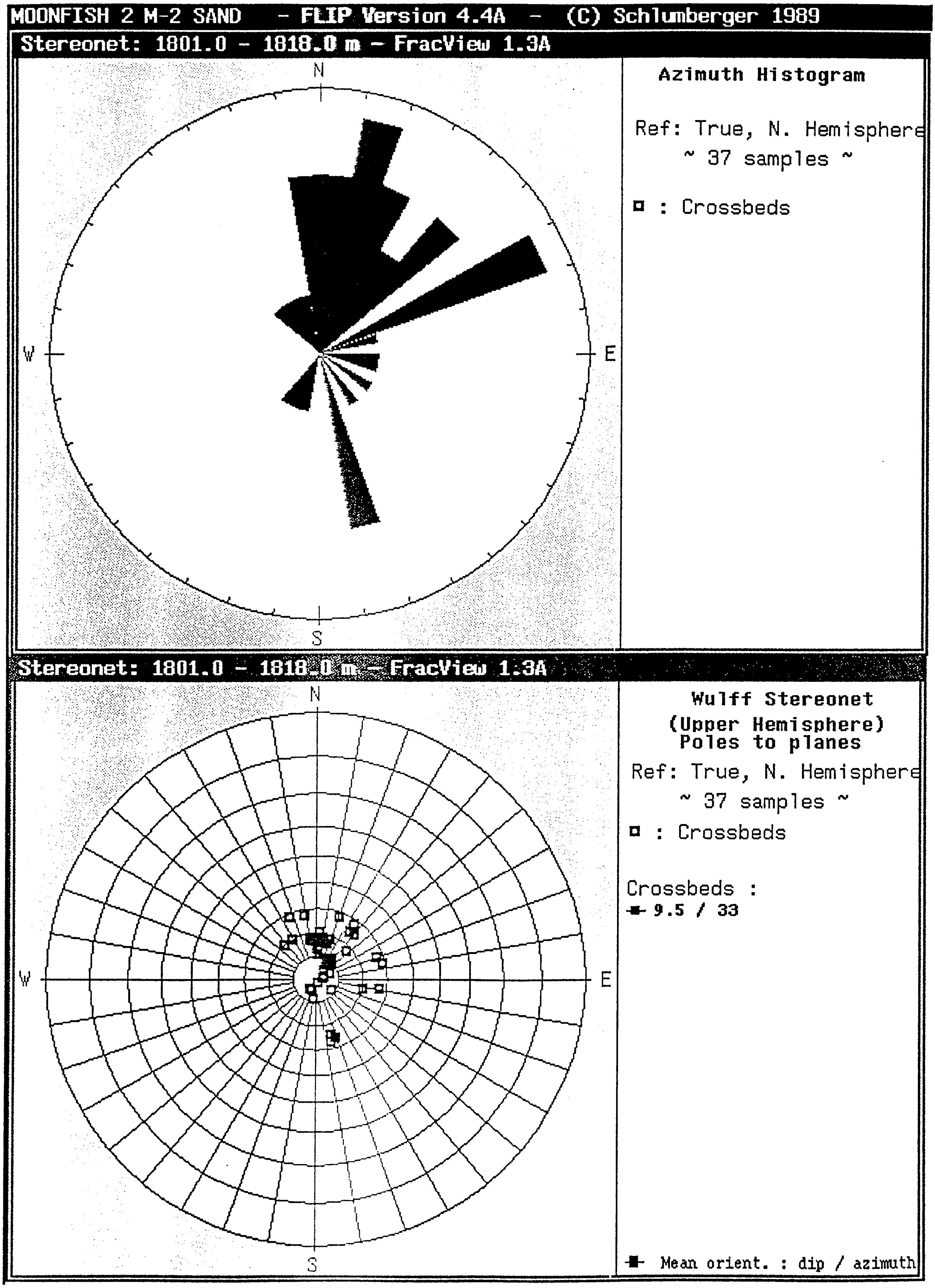

MOONFISH 2 M-2 SAND - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1801.0 - 1818.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 37 samples ~
: Crossbeds
Stereonet: 1801.0 - 1818.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 37 samples ~
: Crossbeds
Crossbeds :
9.5 / 33
Mean orient. : dip / azimuth

Figure 9

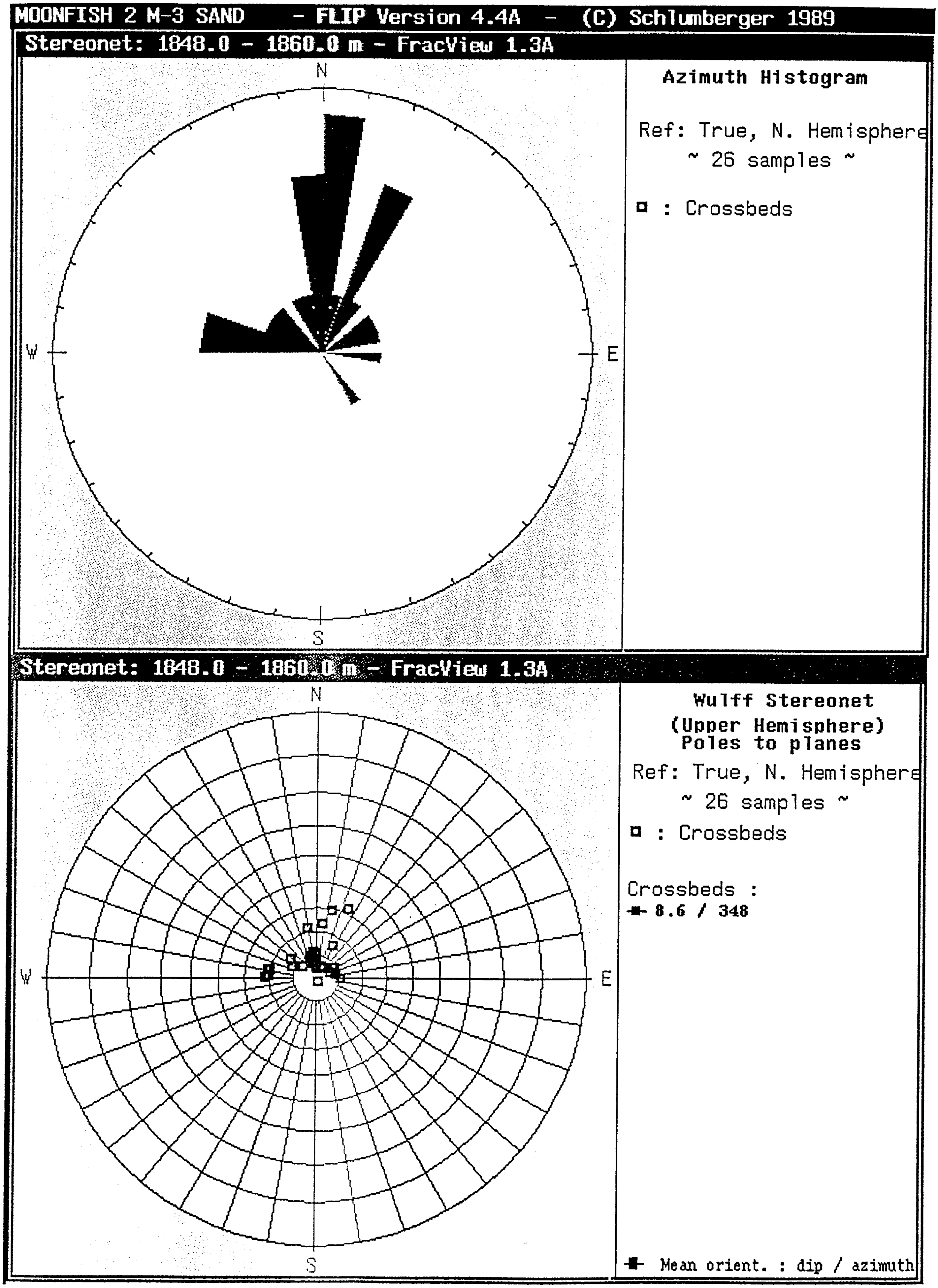

MOONFISH 2 M-3 SAND - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1848.0 - 1860.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 26 samples ~
: Crossbeds
Stereonet: 1848.0 - 1860.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 26 samples ~
: Crossbeds
Crossbeds :
8.6 / 348
Mean orient. : dip / azimuth

Figure 10

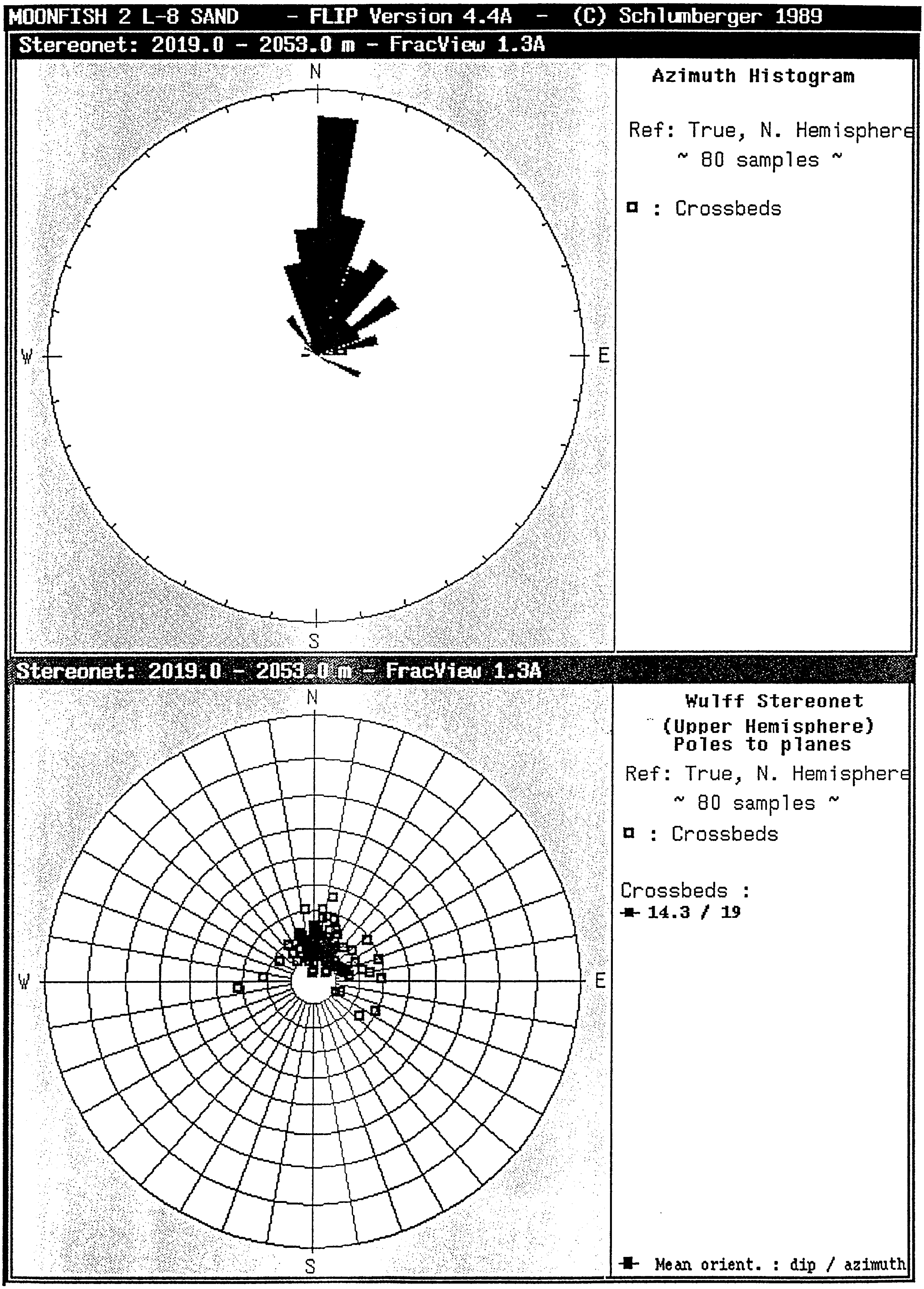

MOONFISH 2 L-8 SAND - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 2019.0 - 2053.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 80 samples ~
: Crossbeds
Stereonet: 2019.0 - 2053.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 80 samples ~
: Crossbeds
Crossbeds :
14.3 / 19
Mean orient. : dip / azimuth

Figure 11

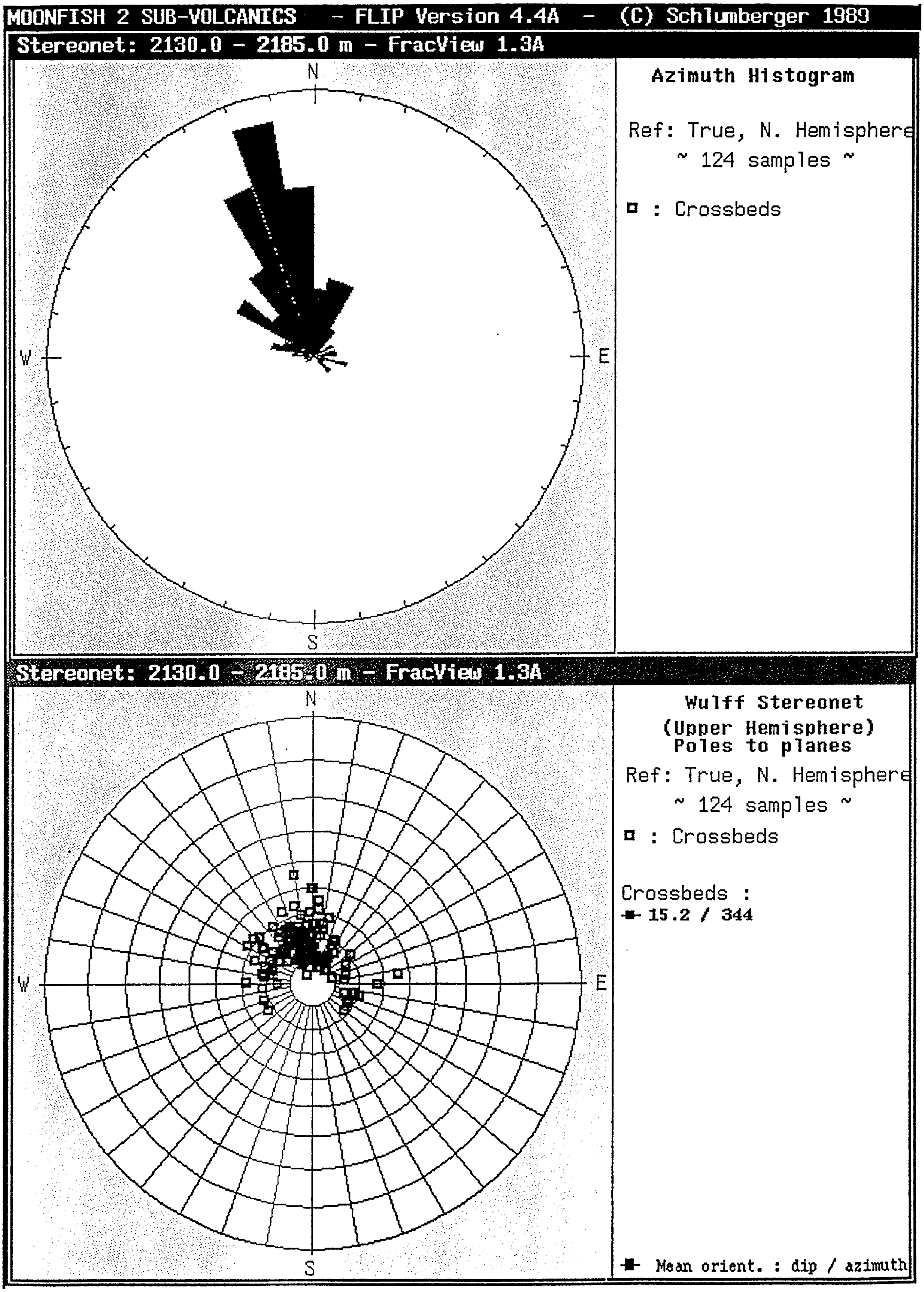
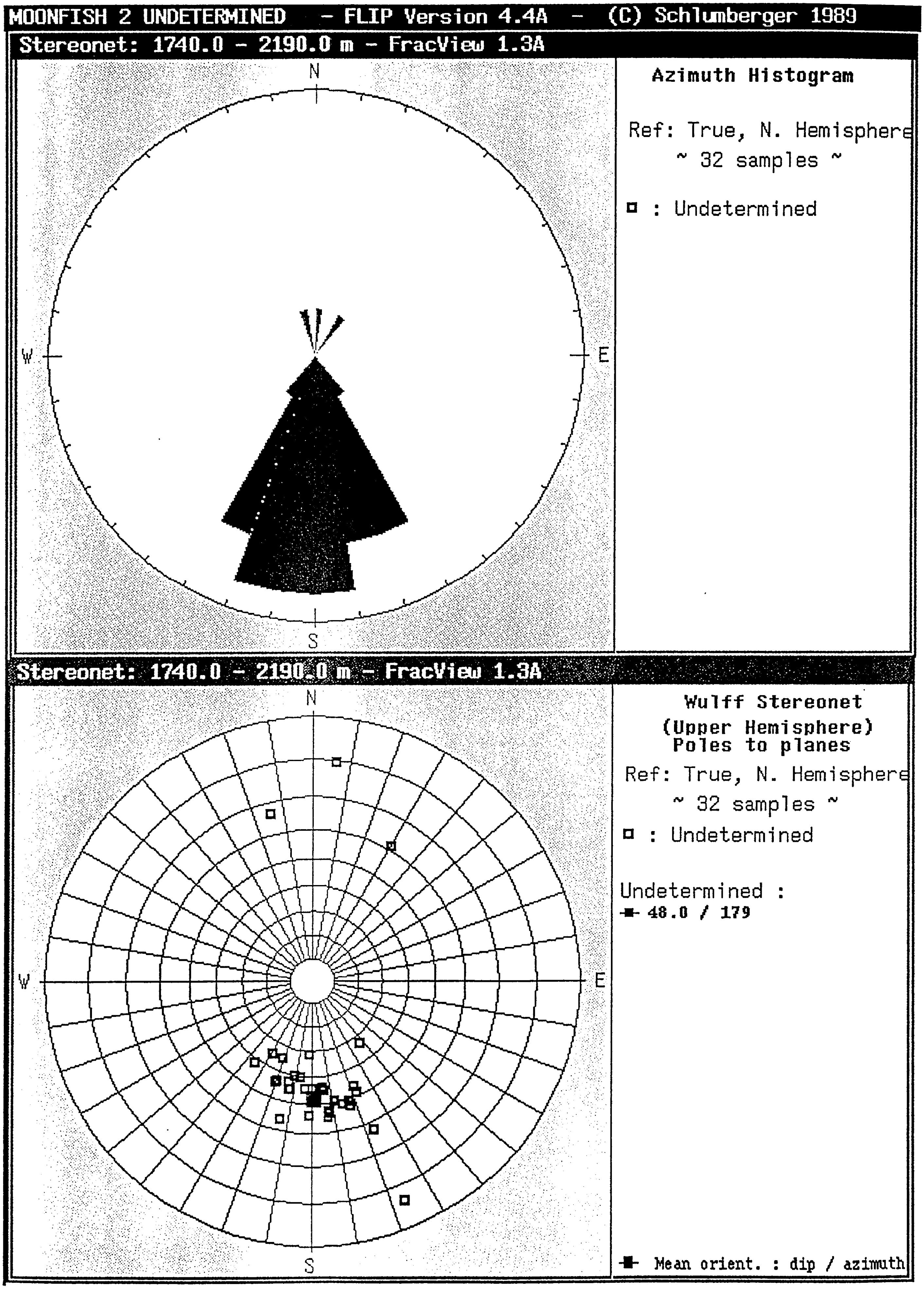

MOONFISH 2 SUB-VOLCANICS - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 2130.0 - 2185.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 124 samples ~
: Crossbeds
Stereonet: 2130.0 - 2185.0 m - FracView 1.3A
N
W
E
S
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 124 samples ~
: Crossbeds
Crossbeds :
15.2 / 344
Mean orient. : dip / azimuth

Figure 12


MOONFISH 2 UNDETERMINED - FLIP Version 4.4A - (C) Schlumberger 1989
Stereonet: 1740.0 - 2190.0 m - FracView 1.3A
N
W
E
S
Azimuth Histogram
Ref: True, N. Hemisphere
~ 32 samples ~
: Undetermined
Stereonet: 1740.0 - 2190.0 m - FracView 1.3A
Wulff Stereonet
(Upper Hemisphere)
Poles to planes
Ref: True, N. Hemisphere
~ 32 samples ~
: Undetermined
Undetermined :
48.0 / 179
Mean orient. : dip / azimuth

MEMORANDUM

TO:	File	**DATE:**	7 December, 1995
FROM:	Mike Fittall	**OUR REF:**	H:\EX\GPS\MISC\95memo52:MF:vf
SUBJECT:	**Moonfish-2 FMI Processing**		

Mike Fittall and Lachie Finlayson spent the afternoon of 1 June 1995 at the Schlumberger offices in St Kilda Road, Melbourne working with the Moonfish-2 FMI data.

The FMI data was loaded into the Schlumberger system, and their FMS/FMI Image Examiner software was used to process the data. Structural dips were removed (see attached table), and the resulting sedimentary paleodips calculated for detailed sections of the hydrocarbon reservoirs in Moonfish-2 (see attached table).

The Schlumberger Fracview software was sued to generate colour plots of the detailed reservoir sections analysed (see attached plots).

MOONFISH-2 FMI PROCESSING

STRUCTURAL DIP SUMMARY		
(m MDKB)		
1659-1661 :	5 deg @ 10 (from Cluster)	
1822-1826.5 :	3.2 deg @ 316. Range 300 to 340.	From Schlumberger, used for stratigraphic dips.
1843-1845 :	5 deg @ 340. Range 320 to 0.	
	5 deg @ 340. FOR L,M SANDS	
2090-2095 :	8 deg @ 0. Range 340 to 20. (from Cluster).	
2152-2154 :	12 deg @ 340.	
2170-2172 :	12 deg @ 0. Range 350 to 20.	
	10 deg @ 0. FOR SUB VOLCANIC RESERVOIR.	
2243-2245 :	15 deg @ 0. (from MSD fax).	
2263-2266 :	22 deg @ 0. Range 350 to 10. (from MSD fax).	
2270-2272 :	22 deg @ 350. Range 345 to 30. (from MSD fax).	
	20 deg @ 0. FOR SUB VOLCANIC RESERVOIR.	

STRATIGRAPHIC DIP SUMMARY

	DEPTH (m MDKB)	MEAN DIP	MEAN AZIMUTH
N-1.9 SAND	1743 - 1765	7	73
M-2 SAND	1798 - 1804	6	174
	1804 - 1809	17	55
	1809 - 1813	9	19
	1813 - 1816	15	14
	1827.5 - 1830	17	266
	1830 - 1838	12	357
	Total 1798 - 1840	5	20
M-3 SAND	1848.5 - 1854.5	5	55
L-8 SAND	2018 - 2055	6	53
SUBVOLCANICS	2133 - 2152	4	52
	2153.4 - 2177	9	301
	Total 2133 - 2177	6	317

STRUCTURAL DIP, M-2 RESERVOIR

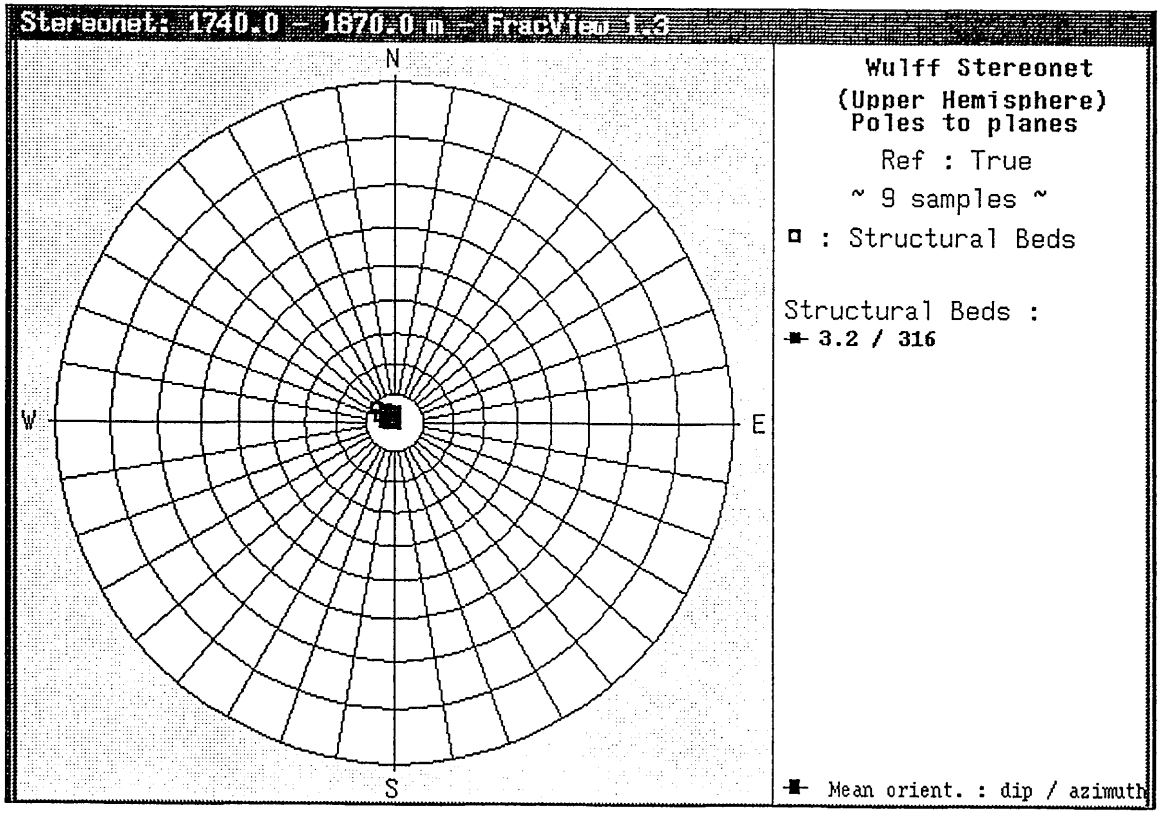


Figure 1

ALL N-1.9 RESERVOIR, 3.2 @ 316 STRUCTURAL DIP REMOVED

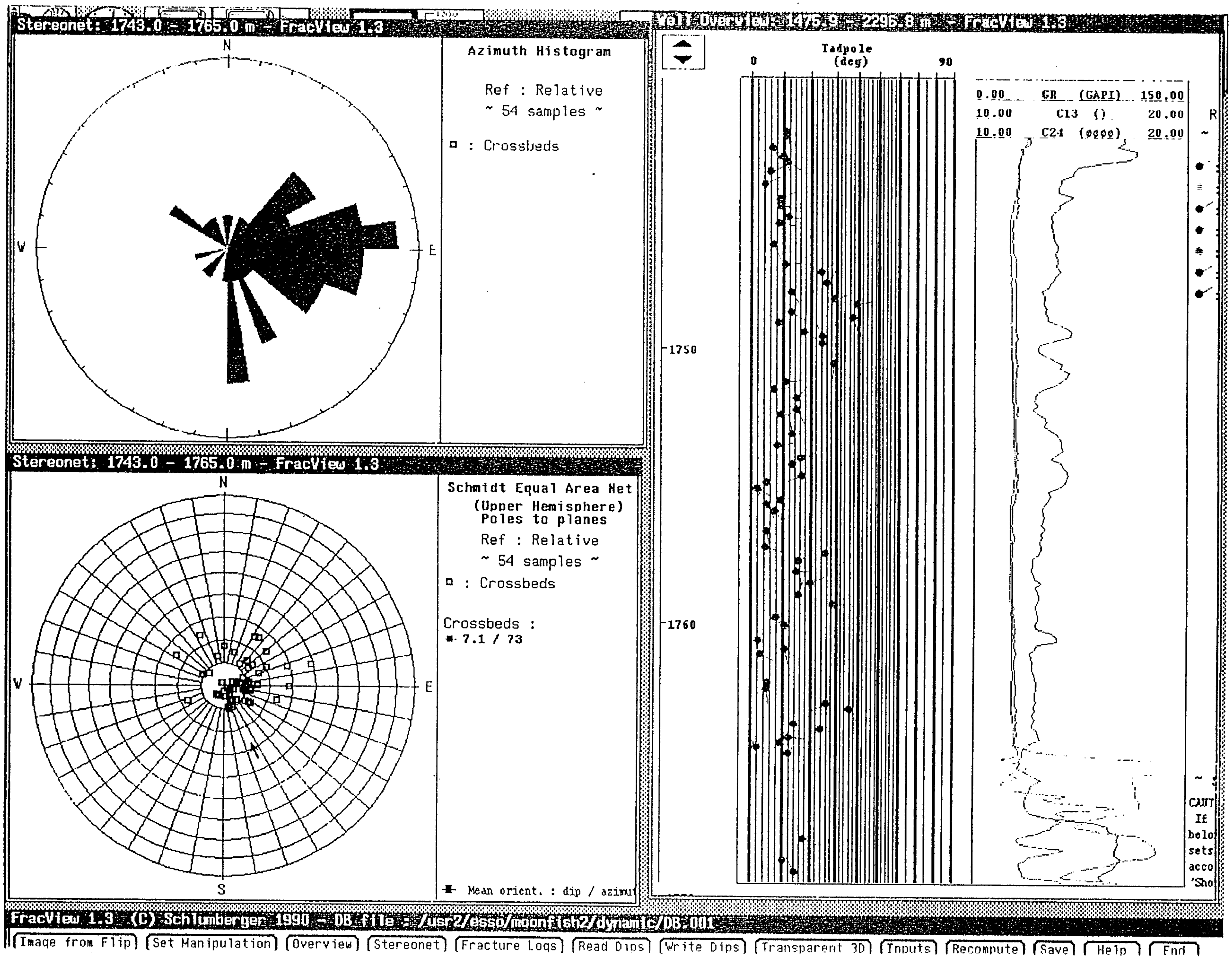


Figure 2

ALL M-2 RESERVOIR, 3.2 @ 316 STRUCTURAL DIP REMOVED

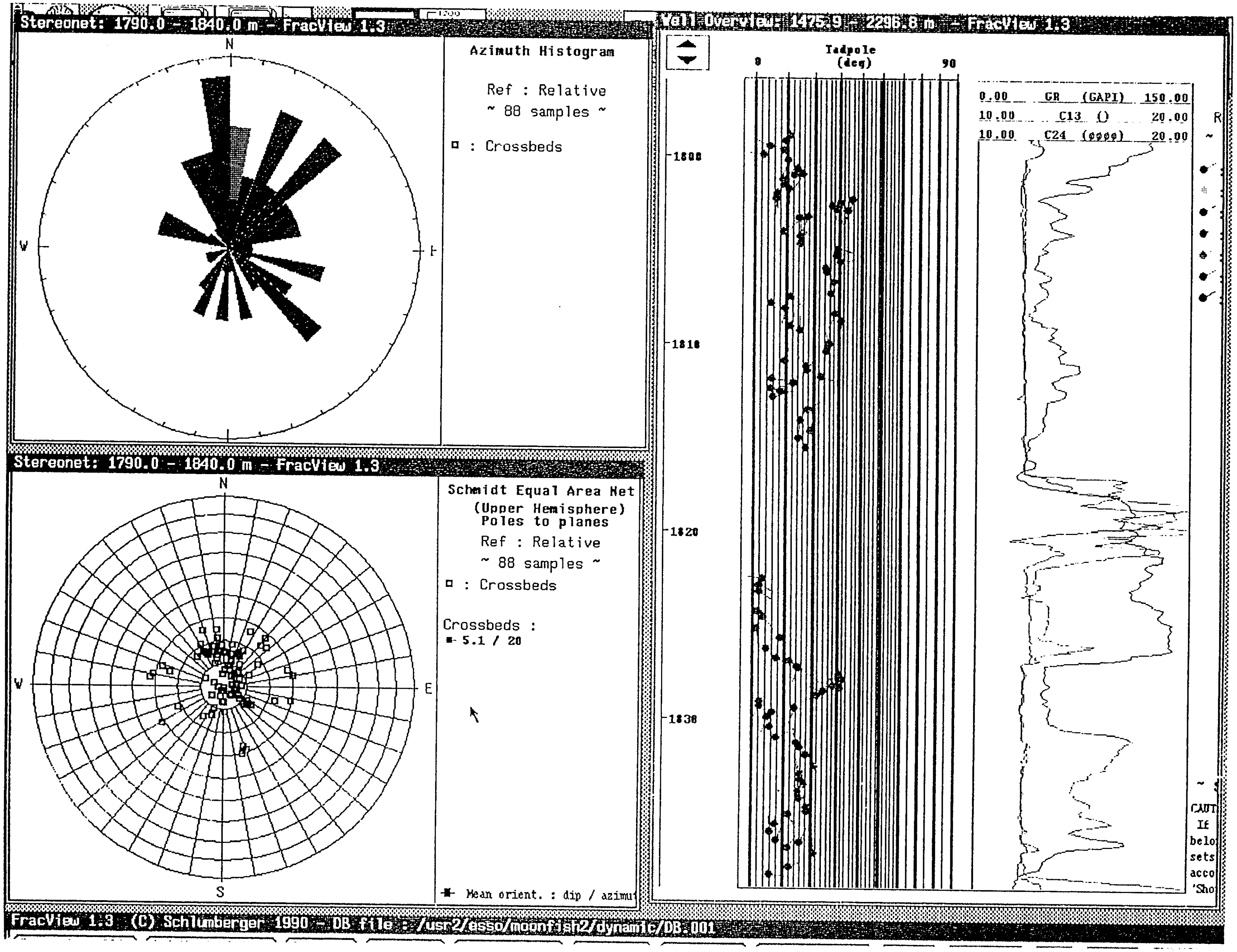


Figure 3

M-2 DETAILS

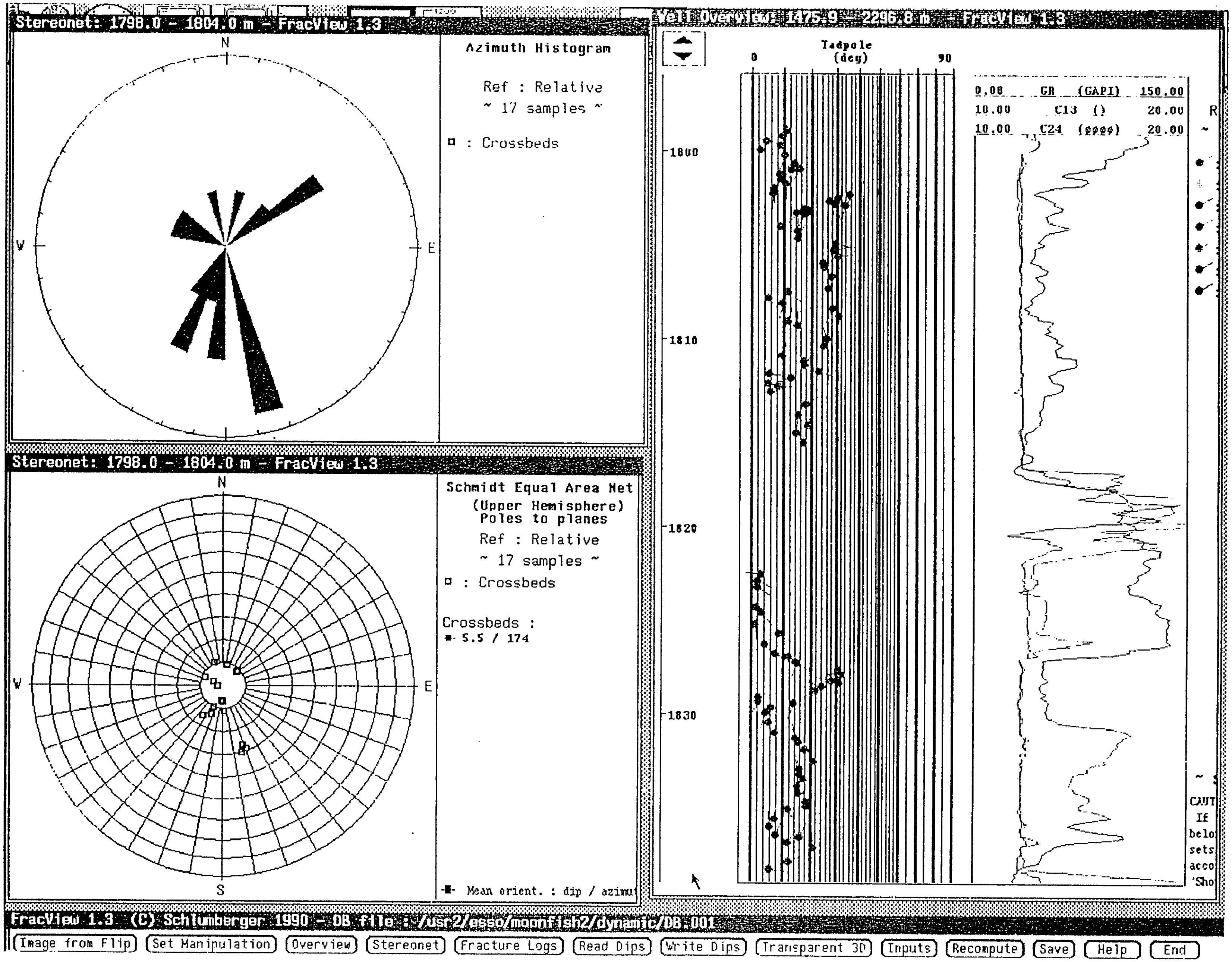


Figure 4

M-2 DETAILS

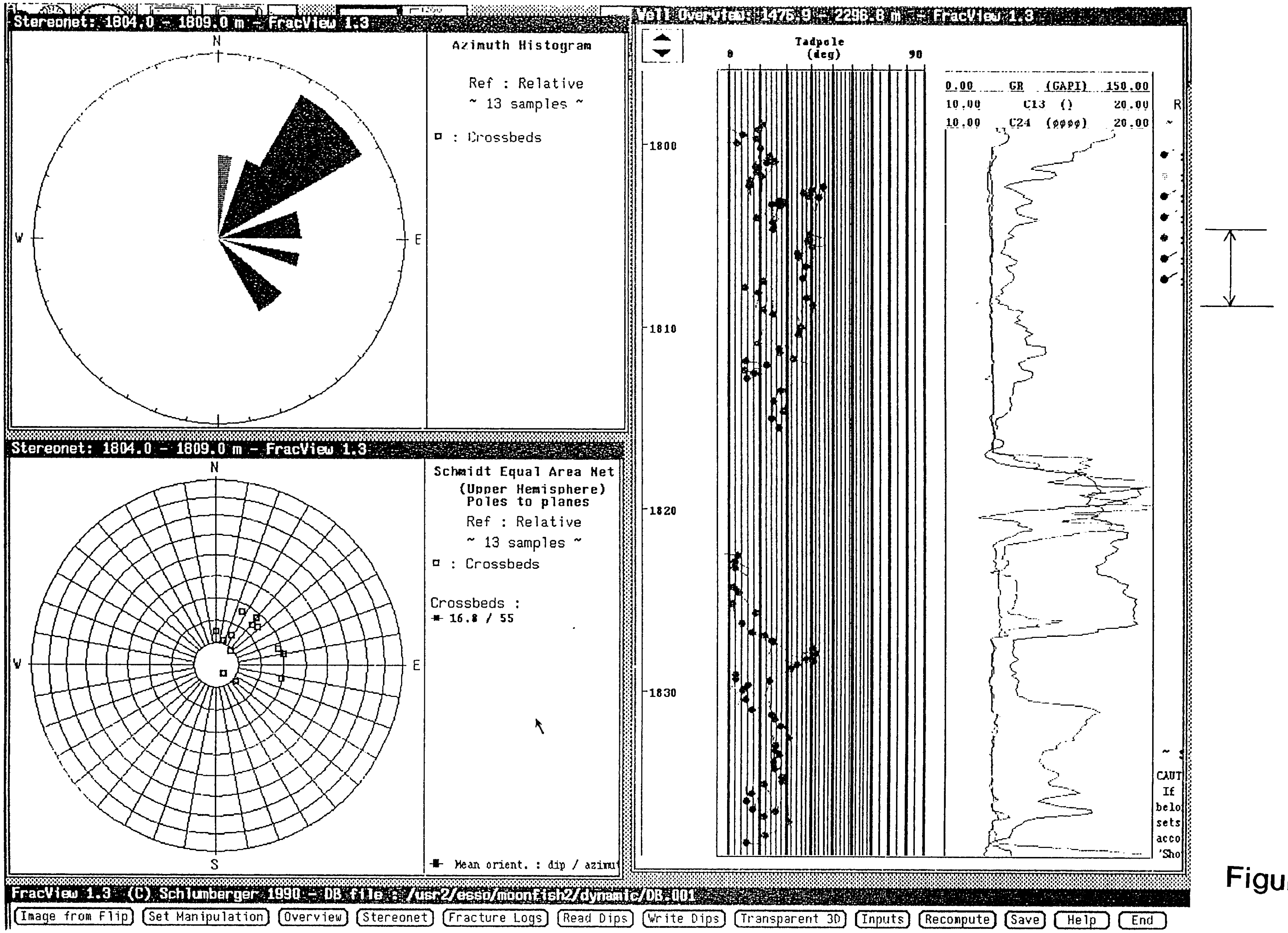


Figure 5

M-2 DETAILS

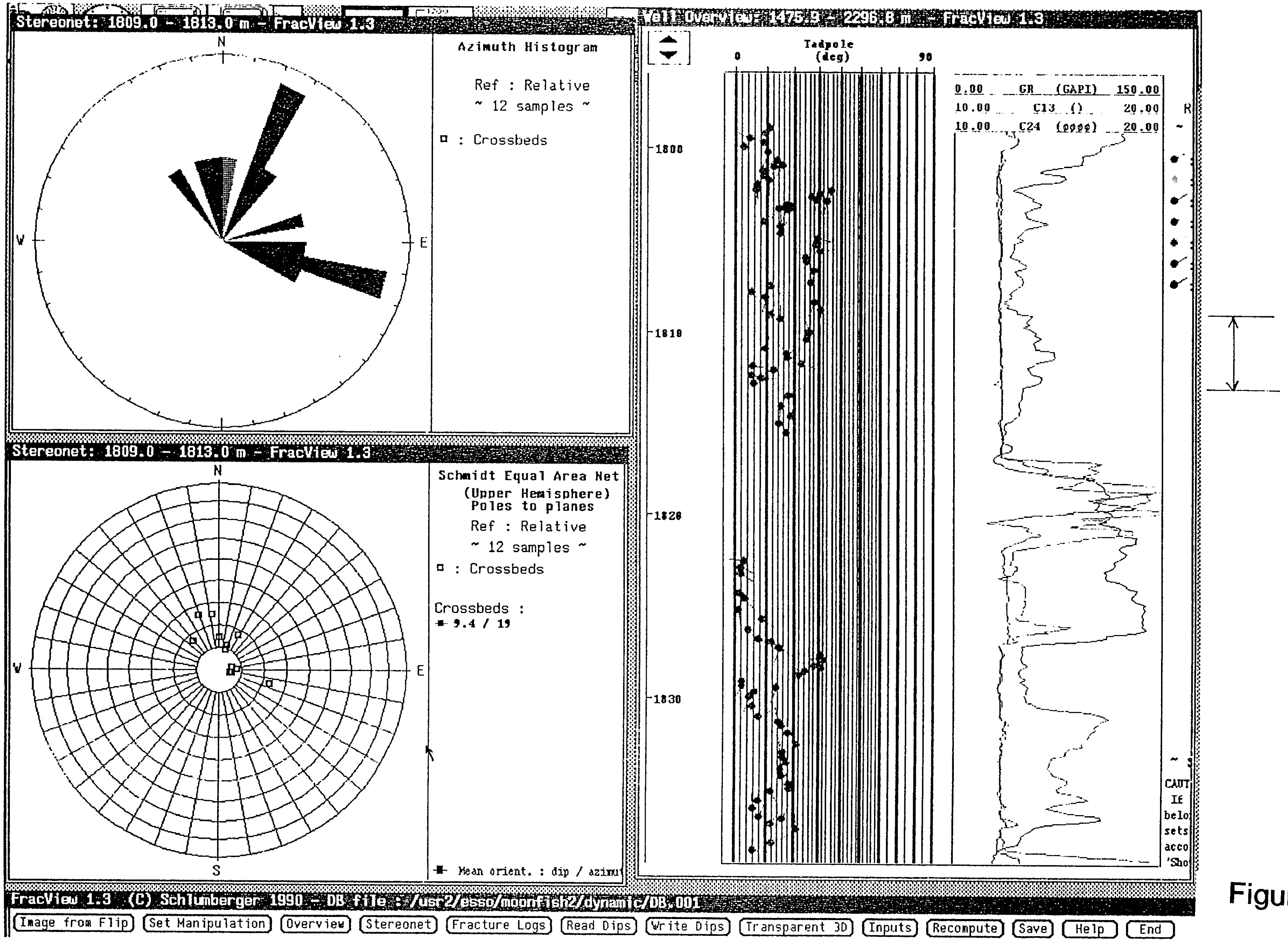


Figure 6

M-2 DETAILS

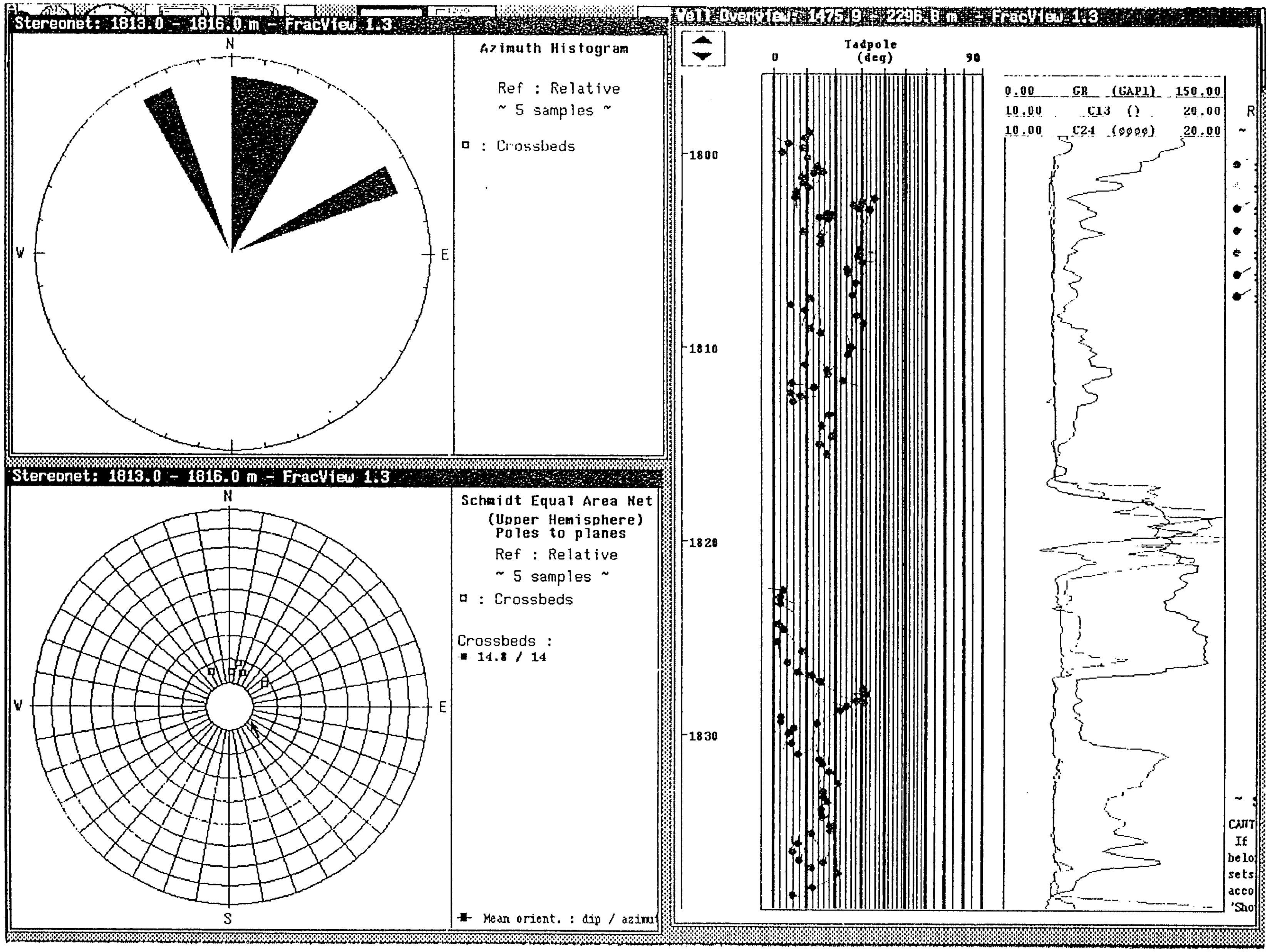


Figure 7

M-2 DETAILS

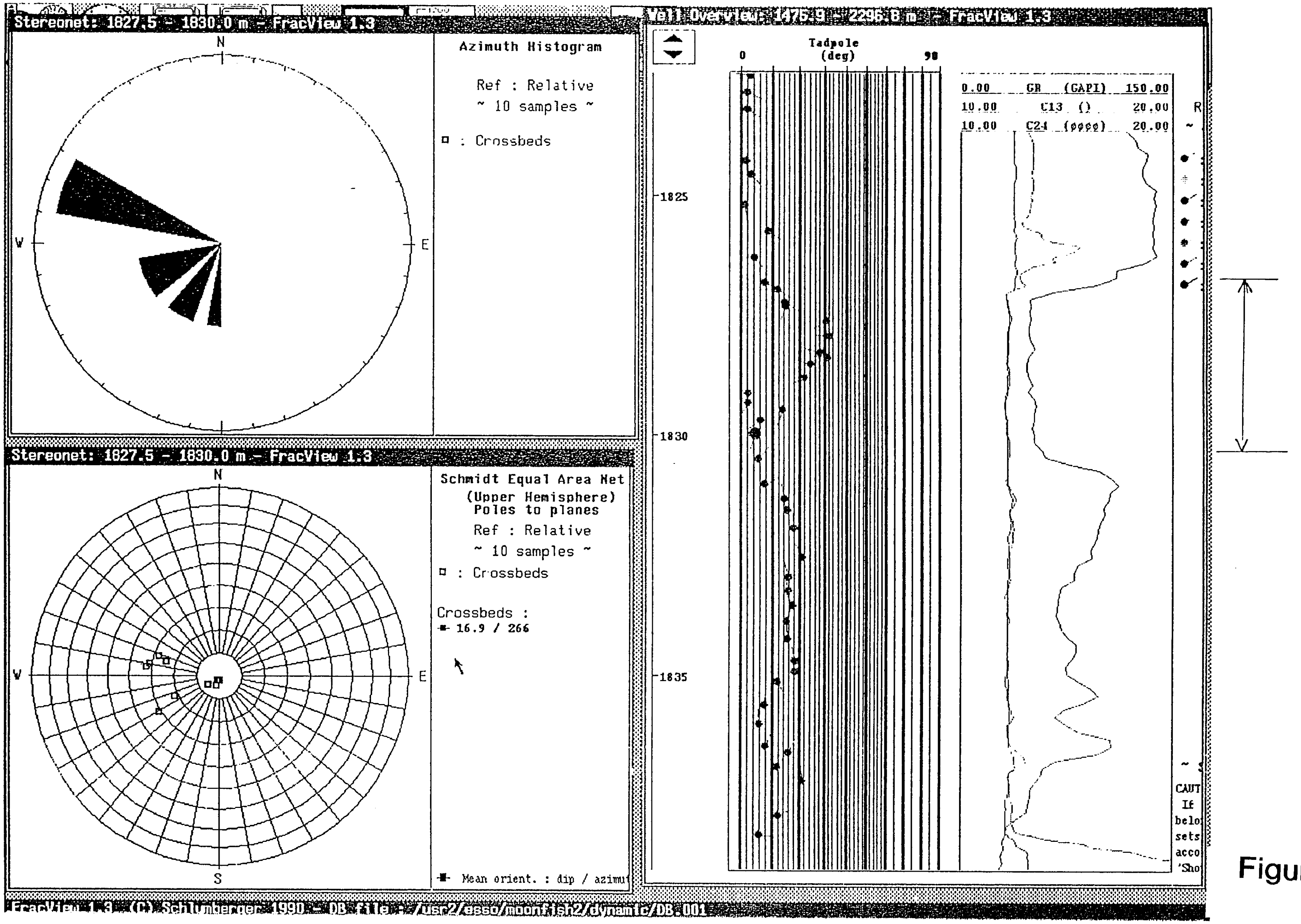


Figure 8

M-2 DETAILS

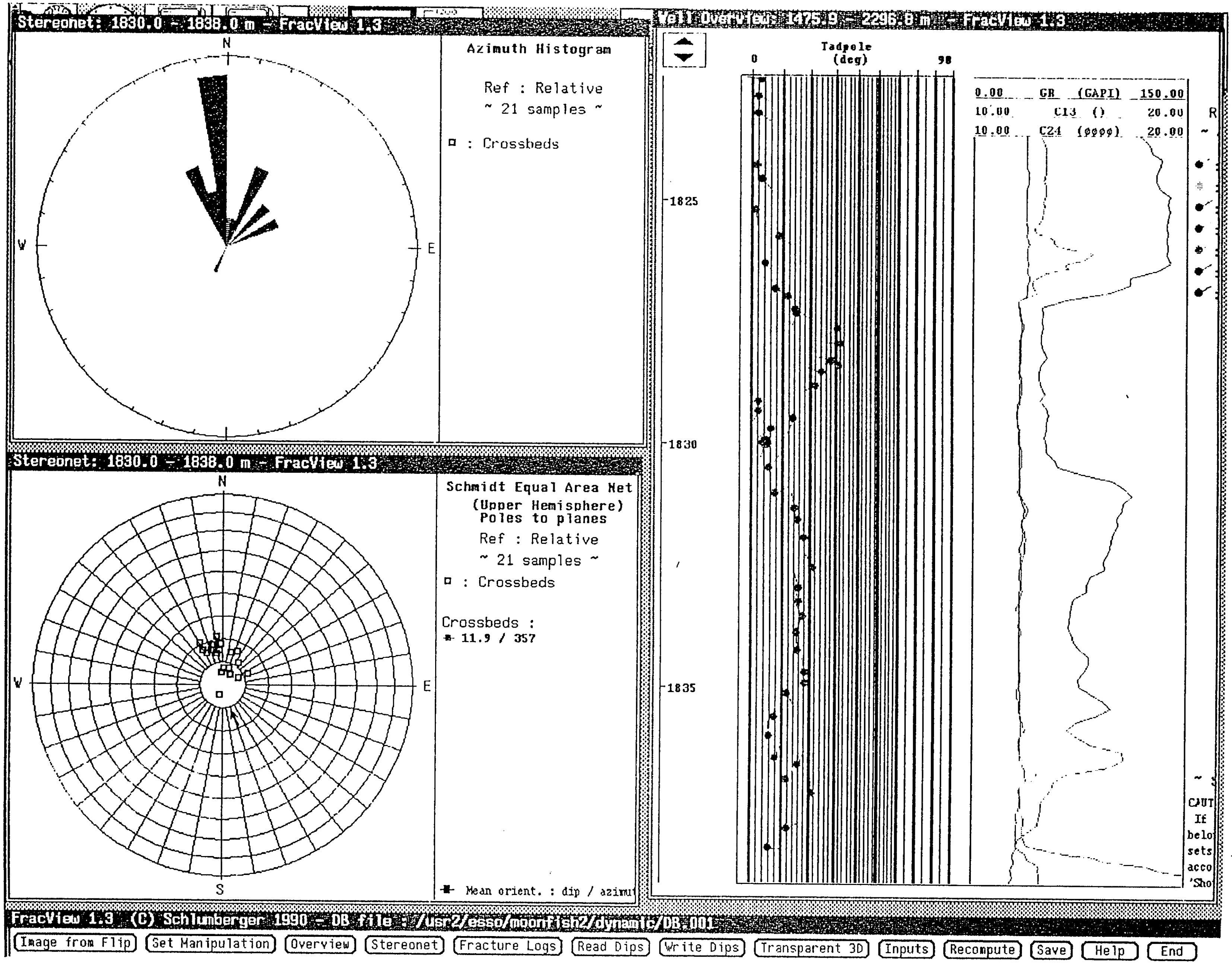


Figure 9

ALL M-3 RESERVOIR, 3.2 @ 316 STRUCTURAL DIP REMOVED

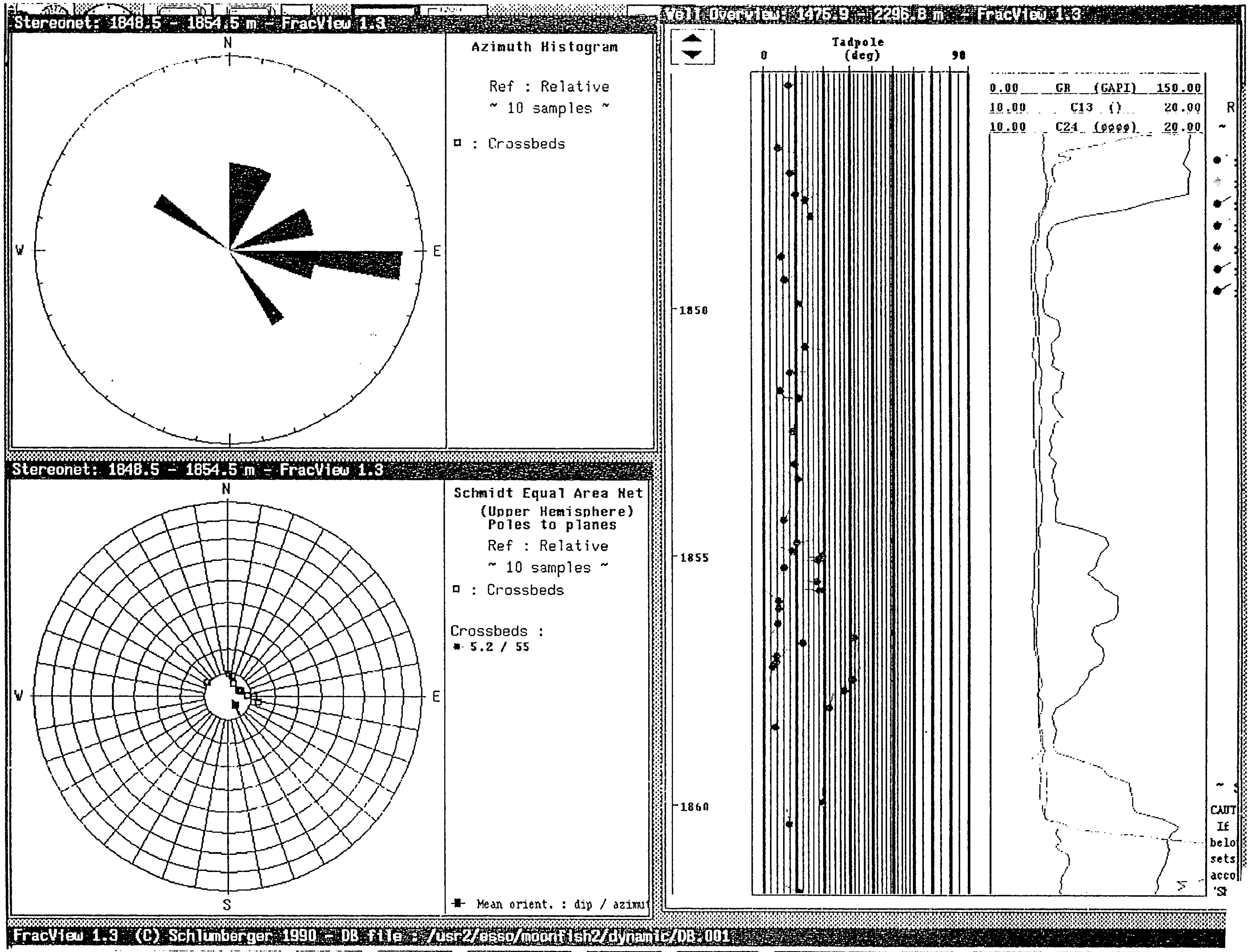


Figure 10

ALL L-8 RESERVOIR, 10 @ 0 STRUCTURAL DIP REMOVED

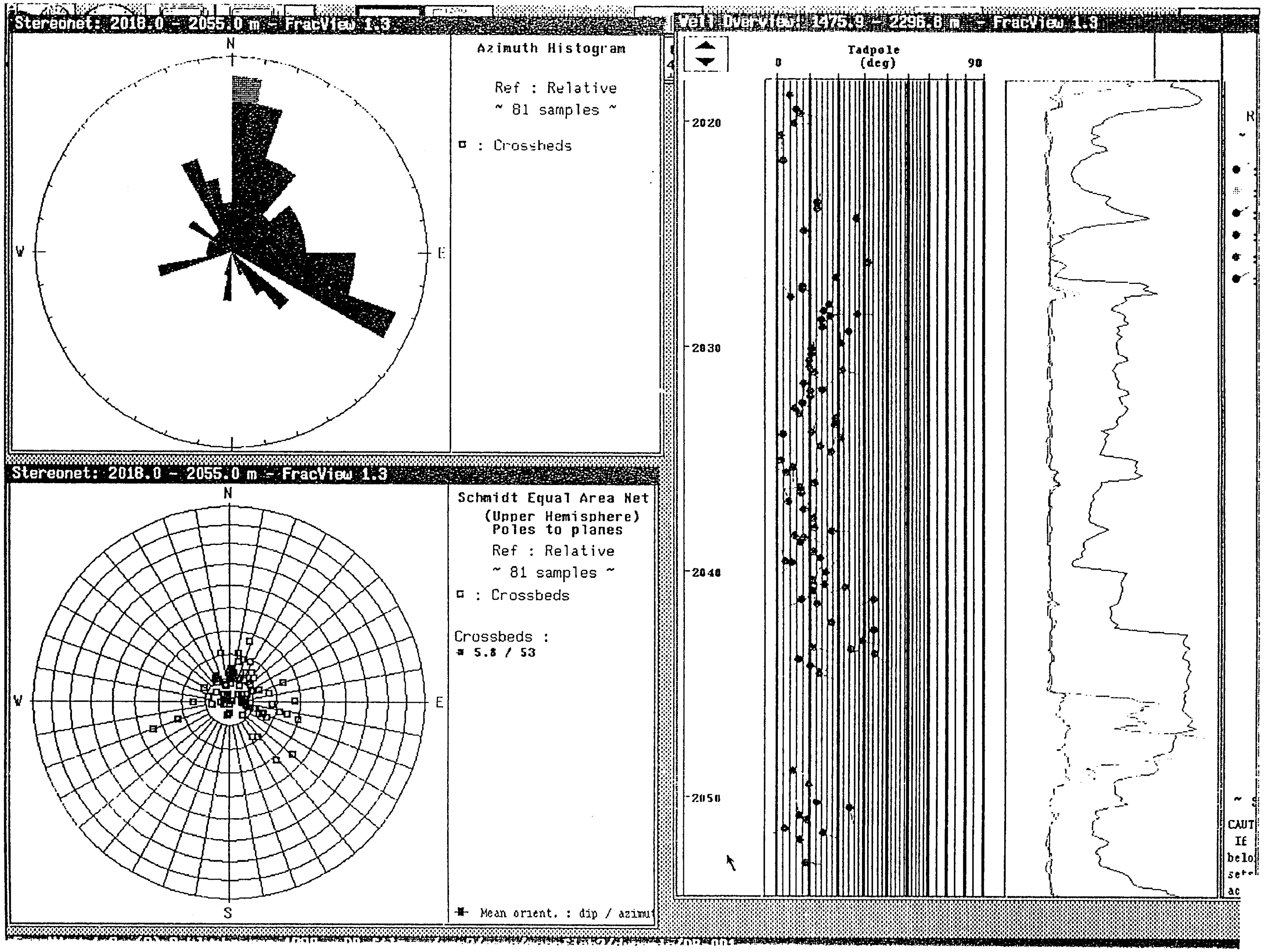


Figure 11

ALL SUBVOLCANICS, 10 @ O STRUCTURAL DIP REMOVED

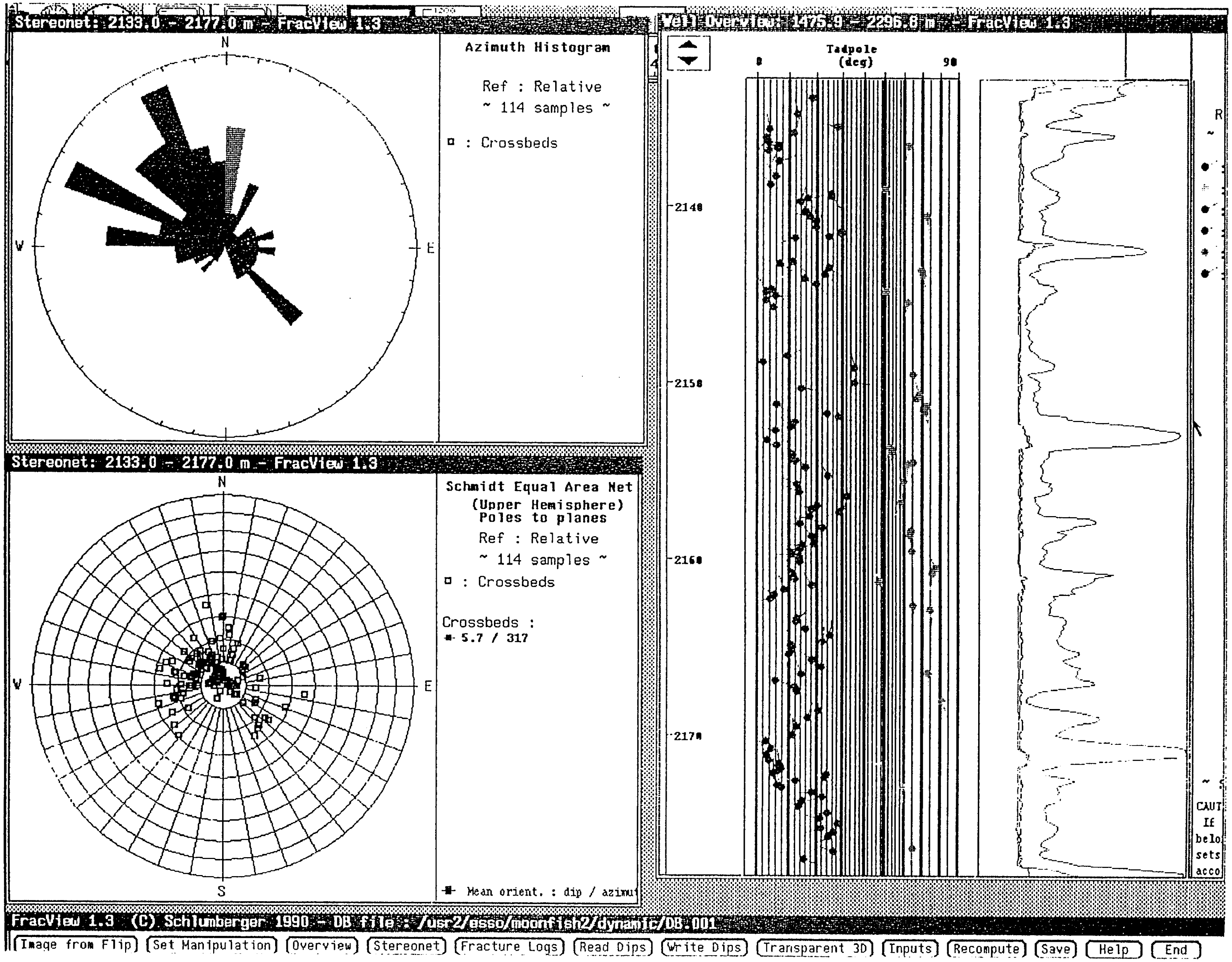


Figure 12

UPPER SUBVOLCANICS, 10 @ 0 STRUCTURAL DIP REMOVED

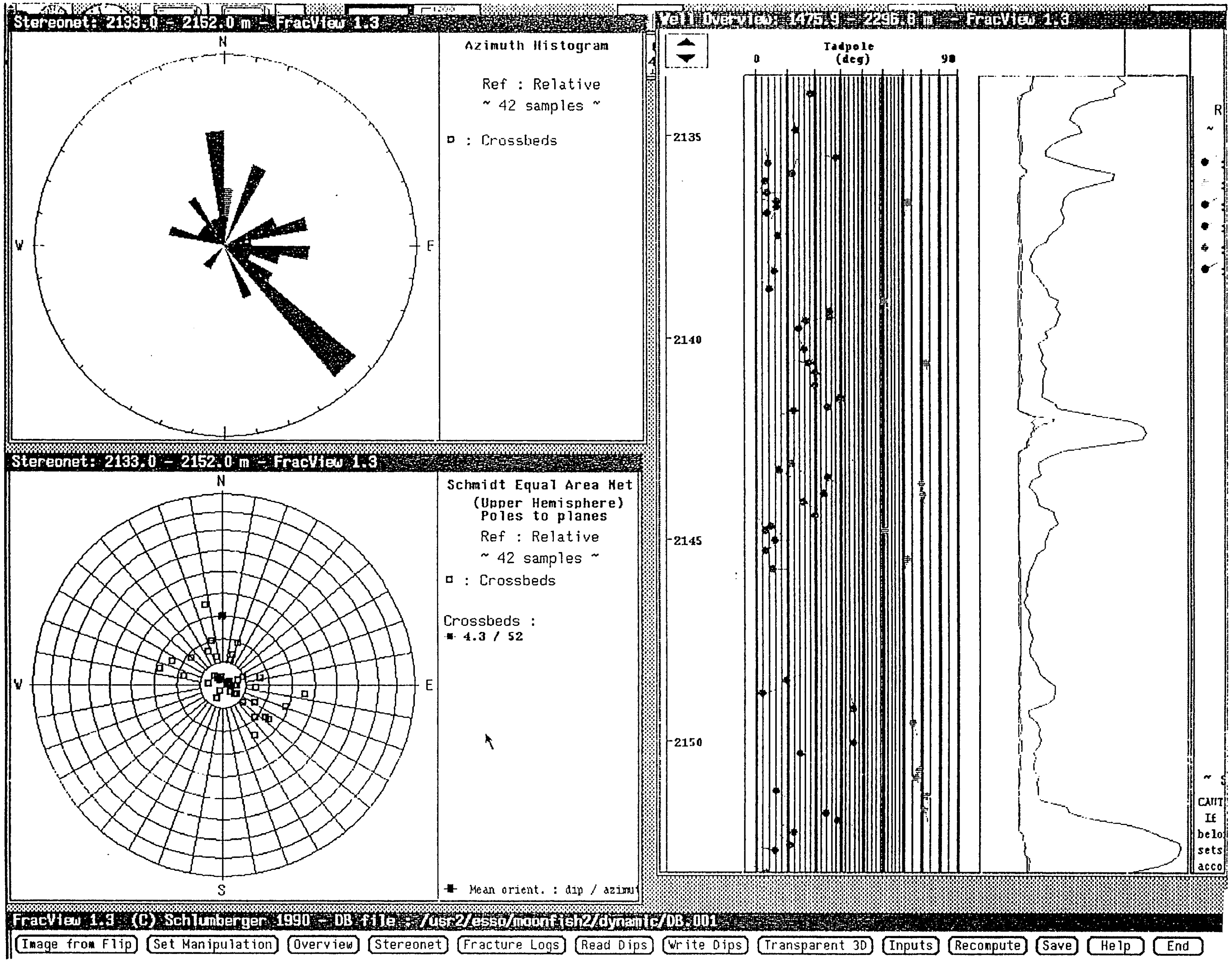


Figure 13

LOWER SUBVOLCANICS, 10 @ 0 STRUCTURAL DIP REMOVED

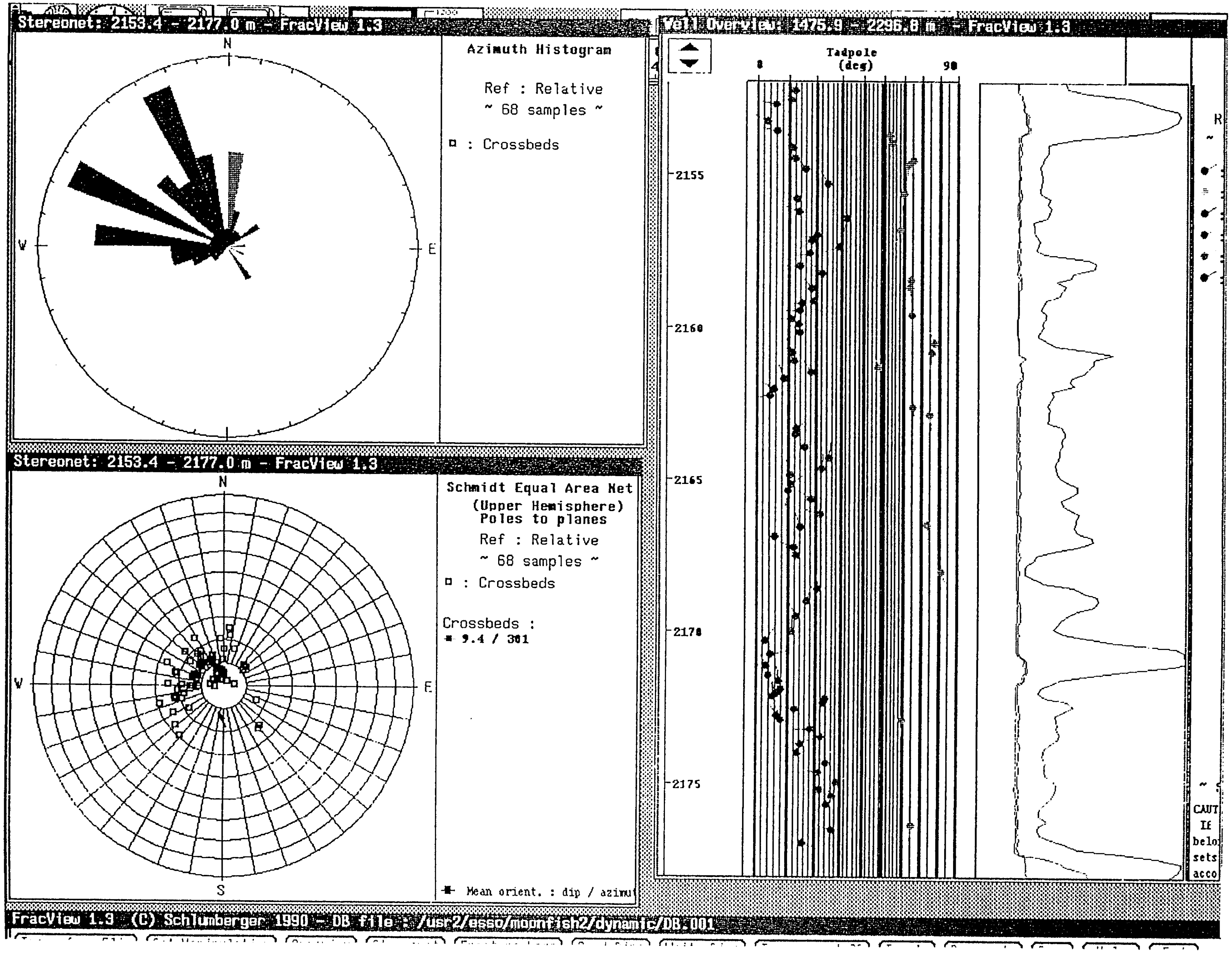


Figure 14

APPENDIX 5

APPENDIX 5

APPENDIX 5

Moonfish-2

Wireline Test (MDT) Report

MEMORANDUM

TO:	Dennis Mitchell	MELBOURNE:	7 March 1995
FROM:	Paul S Kwon	REF:	
C.C.:	Brodie Thompson Mike Hordern Mike Shaw Mike Scott Ralph Youie		
SUBJECT:	Moonfish-2 Formation Testing Results (Final Report)		

Attached are the interpreted results of the Moonfish-2 MDT/RFT program. The original formation testing and sampling program was reduced due to poor hole conditions. Such hole conditions caused differential sticking of the MDT tool which was subsequently damaged during fishing. The back-up RFT was used for all pressure seats and samples. However, the results indicate good quality data.

The pretest results indicate continuing aquifer drawdown since MF-1 in mid-1992. Drawdown from the original aquifer gradient was 105 psi and 75 psi above and below a pressure discontinuity at around -1850 mSS respectively. This compares with 93 and 50 psi respectively for MF-1.

The unadjusted M-2 OWC at -1734.1 mSS was 3m lower than MF-1 contact at 1731.3 mSS. The fact that Subvolcanics OWC was offset by a similar amount (-2047.5 vs -2043.3 mSS) suggests differences are due to survey errors. The MF-2 TVD SS number were adjusted to match MF-1 contacts. Additional pressure tests and samples were taken in N-1.9, M-2, M-3, and Sub Volcanic accumulations as well as at selected aquifer locations (see Table 2 and Figure 1).

The M-2 and M-3 gascaps were intersected for the first time with this crestal well. This was an unexpected result as the MF-1 PVT results had indicated undersaturated crude (by over 200psi). A previous study[1] have indicated that increase of more than 50degF in the reservoir temperature is required to reach bubble point given current M-2 compositions. This suggests that MF-1 sample is not representative of the reservoir fluid and that current PVT work on MF-2 samples might throw new light on fluid characteristics.

[1] "Moonfish 1 PVT Data and Reservoir Temperature" memo dated 7/11/94 from Ralph Youie

Summary of MF-2 Formation Testing Programme

ESSO Observer: **Paul Kwon/Mike Scott**

Day 1 (17/1/95):
Run #1
- Prepared MDT tool (with multi-sample chamber) and run into hole.
- First pressure seat taken at 1646m MD on 08:25 and retracted on 08:29.
- Differentially stuck - required a fishing job.

Day 2 (18/1/95):
Run #2
- Run into hole with MDT tool.
- Pressure seat at 1813.5m MD on 18:37.
- Sampling at same depth aborted due to plugged probe.
- Re-attemped at same depth after retraction but unsuccessful in establishing seal.
- Operator notices drop in hydraulic pressure. Pull out of hole.
- One of the pushing arms not retracted fully and bent when inspected on surface.
- Decision made to proceed with the backup RFT-A.

Day 3 (19/1/95):
Run #3
- Run into hole with RFT tool.
- First pressure seat taken at 1752m MD on 01:40.
- 15 pressure seats successful down to 2188m MD.
- A sampling seat attempted at 1813.5m MD but unsuccessful in establishing seal.
- Moved sampling seat to 1814.5m MD on 05:17.
- Slow sampling rate for both 6 & $2^{3/4}$ gallon chambers during fillup.
- Seal chambers without establishing pressure equilibrium and pull out of hole.

Run #4
- Decision made to use Martineau probe for subsequent sampling runs.
- Run into hole with RFT tool (6 & 1 gallon sample chambers)
- Take sampling seat at 2138m MD on 10:43.
- Fill both chambers successfully.
- Decision made to run seismic checkshot survey log before next RFT run.

Day 4 (20/1/95)
Run #5
- Run into hole with RFT tool (6 & $2^{3/4}$ gallon chambers)
- Take sampling seat at 1815.3m MD on 07:59.
- Fill both chambers successfully.

Run #6
- Run into hole with RFT tool (dual 1 gallon chambers)
- Established sampling seat at 1748m MD on 12:29 at the second attempt.
- Filled one of the sample chambers successfully.
- Subsequent attempts to take seat at other locations (incl casing) failed.
- Pulled out of hole.
- Detect leakage in Martineau probe flowline.
- Decide to proceed with long-nosed probe.

Run #7

- Run into hole with RFT tool (dual 1 gallon chambers)
- First seat taken at 1805.3m on 17:53.
- Filled one of the sample chambers successfully.
- Second seat taken at 1808m MD but sampling rate unsatisfactory.
- Retract and reset at same depth.
- Slow sampling rate - filled to 100 psi below reservoir pressure.
- 7 subsequent seats for pressure successful.
- Pull out of hole

Table 1: Comparison of MF-1 and MF-2 Results

	MF-2	MF-1
Drawdown Pressure		
- above 1850m	104 - 114 (108) psi	93 psi
- below 1850m	75 - 83 (80) psi	50 psi
Gas Oil Contacts		
- M-2	-1713.2m	N/A
Oil Water Contacts		
- M-2	-1731.3m	-1731.3m (Log)
- S-V	-2043.7m (Log -2043.3m)	-2043.3m (Log)

Table 2: MF-2 RFT Onsite Fluid Samples

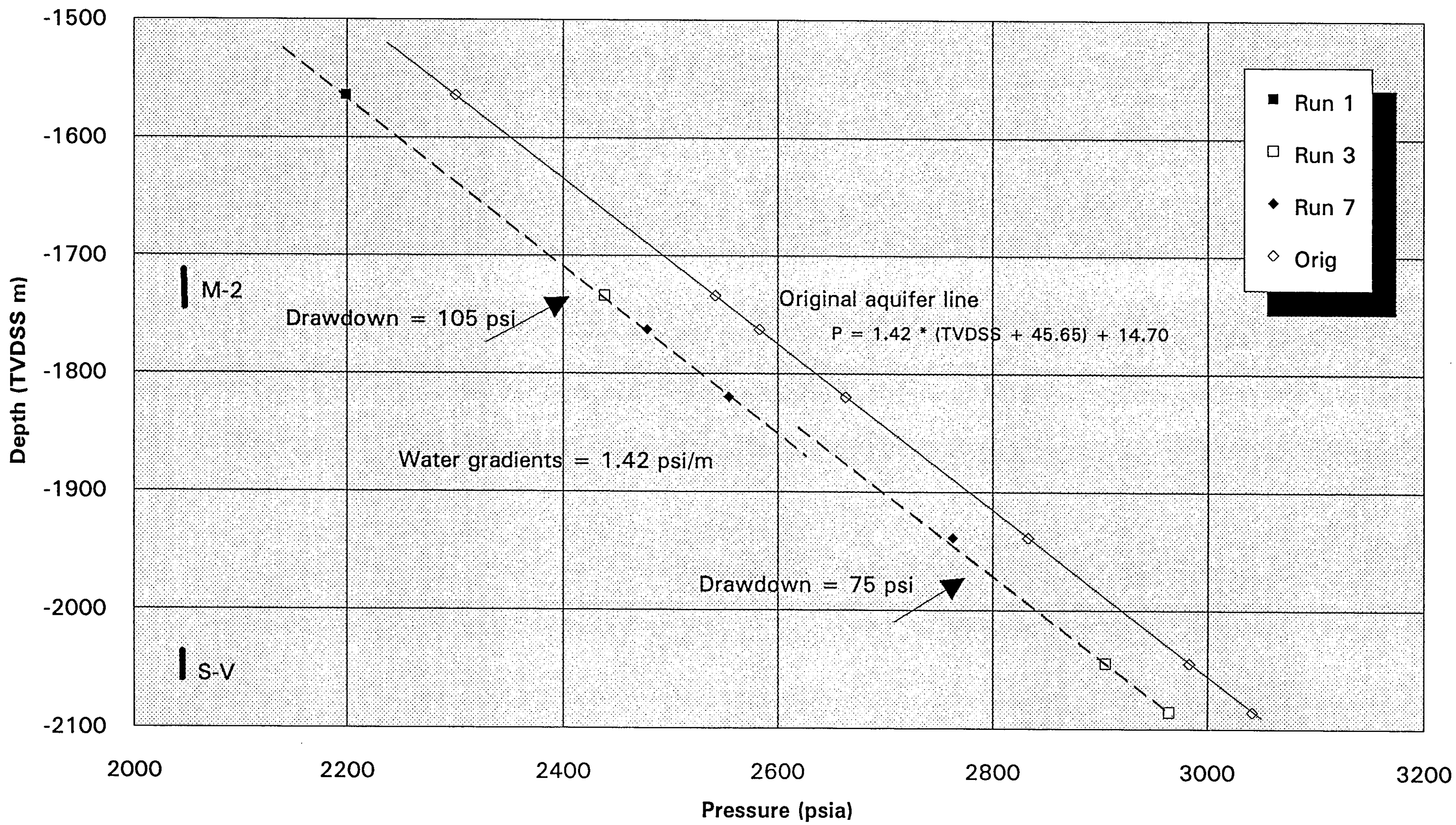
Date: 19-20 Jan 1995 | Observer: PSK/MTS

Zone	Run	MDRKB (m)	TVDSS (m)	Phase	Oil Vol (l)	Gas Vol (cu ft)	H2S (ppm)	CO2 (vol %)	API grav (deg API)	Pour Point (deg C)	Comments
M-2	3/18 (6g)	1814.5	-1720.9	oil	*13.9*	*31*	*<1*	*5.8*	*37.5*	*24*	Tight
	(2.75gal)			oil	*2.9*	*8*	*<1*	*5.8*	*37.5*	*24*	Tight
	5/20 (6gal)	1815.3	-1721.6	oil	**25.8**	**35.9**	**<1**	**4.8**	**39.2**	**24**	Good
	(2.75gal)			oil	PRESERVED						Good
	7/22 (1gal)	1805.3	-1712.2	gas	trace	21.7	<1	5.0	N/A		Good
	7/23 (1gal)	1808.0	-1714.7	oil	3.4	4+	<1	5.0	N/A		Tight
S-V	4/19 (6gal)	2138.0	-2035.8	oil	**22.4**	**53.8**	**<1**	**7.2**	**34.1**	**30**	Good
	(1gal)			oil	PRESERVED						Good
N-1.9	6/21 (1gal)	1748.0	-1658.6	gas	trace	20.5	<1	2.0	N/A		Good

N.B. MF-2 TVDSS adjusted to match MF-1 contacts.

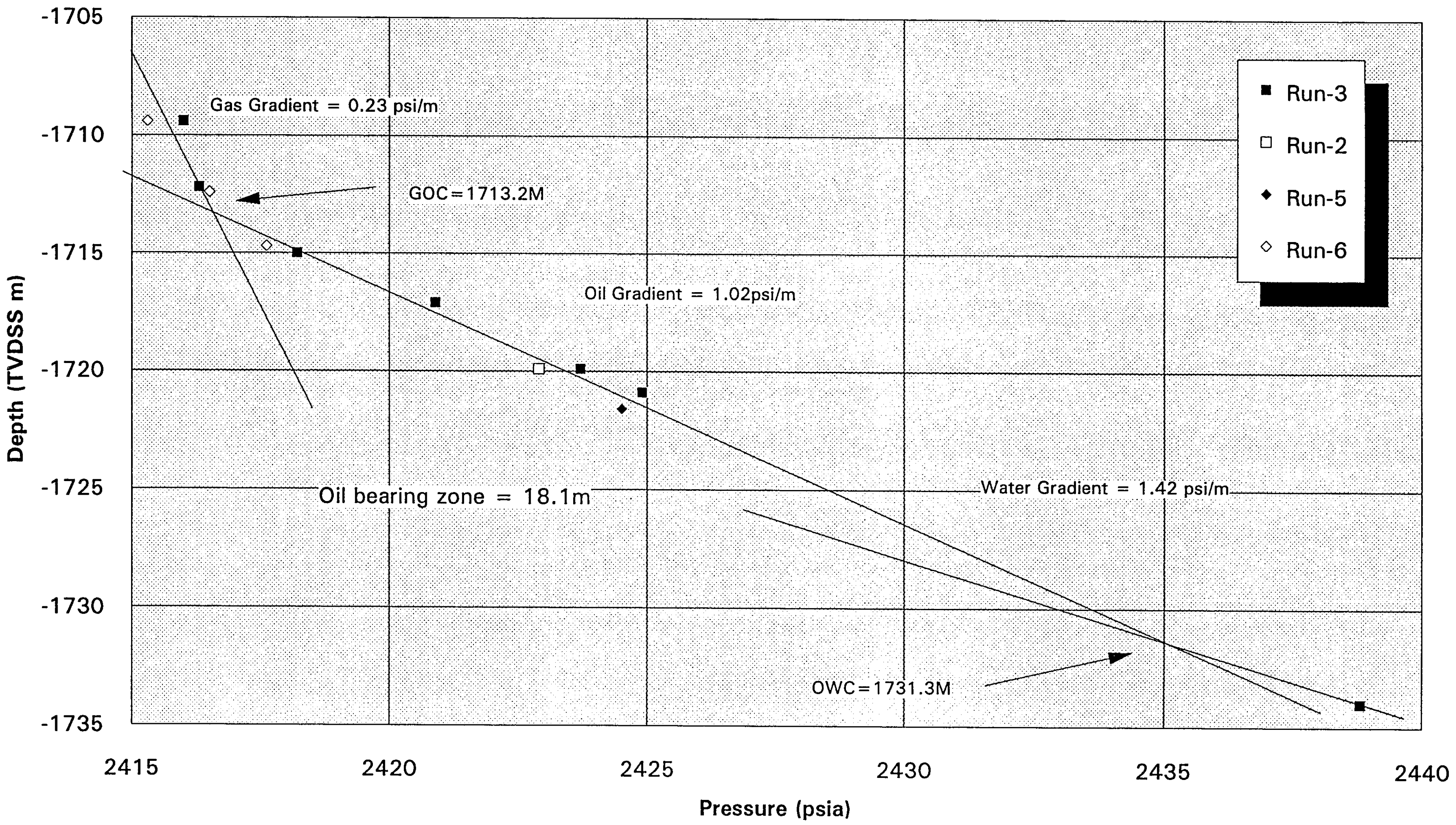
psk7/03/95

Figure 1: Moonfish-2 Aquifer Pressures



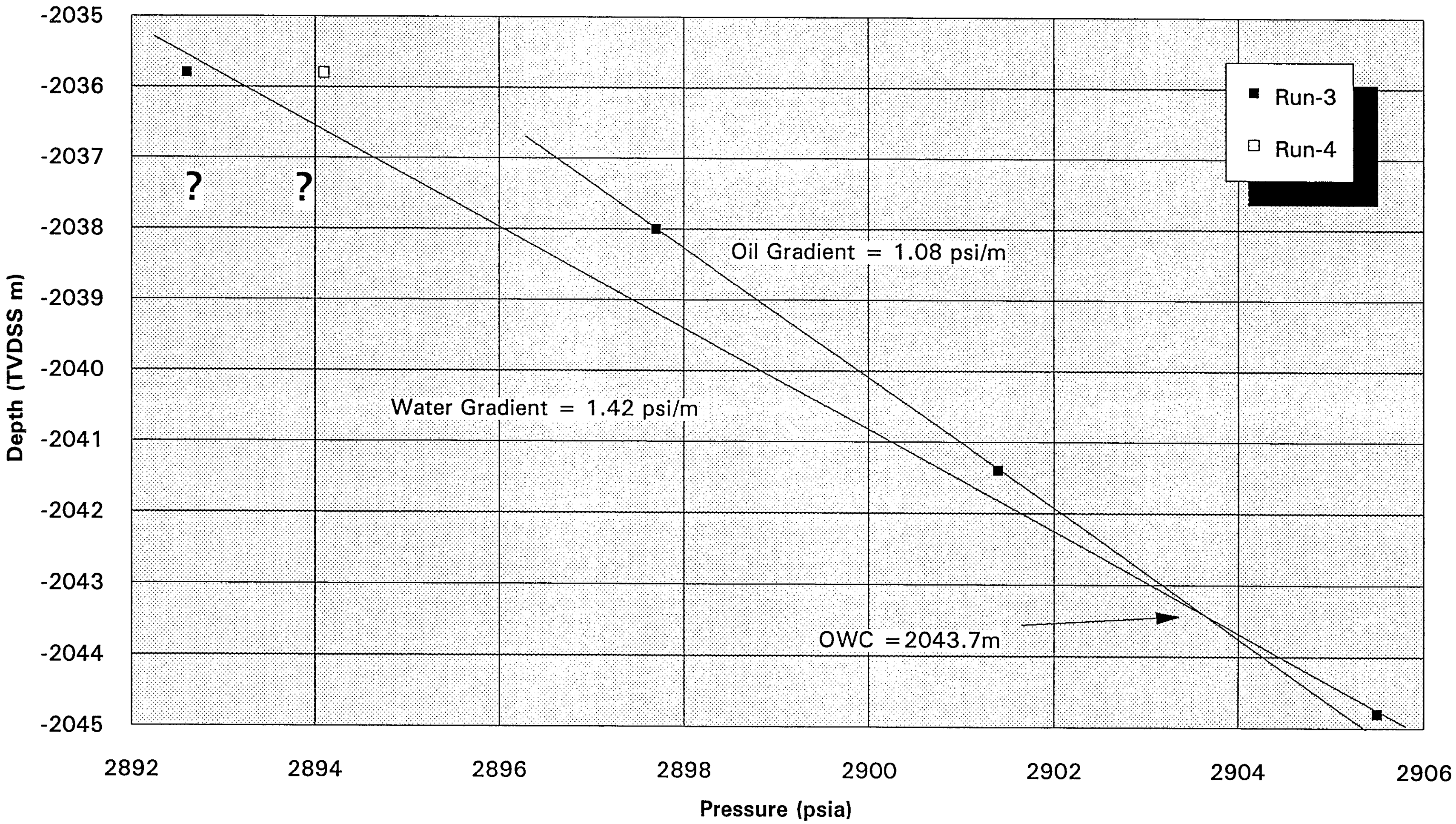
psk7/03/95

Figure 2: M-2 Accumulation



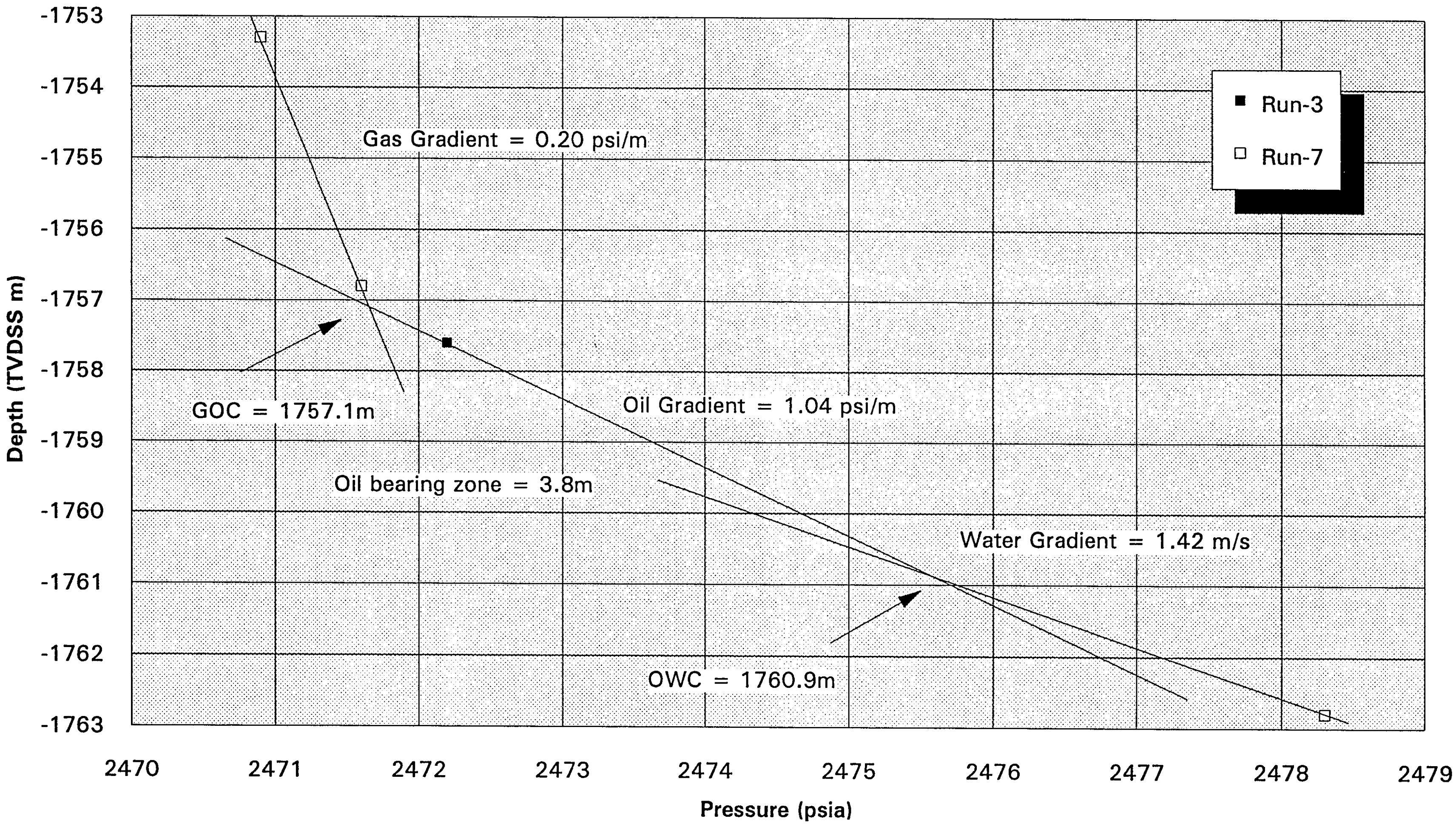
psk7/03/95

Figure 3: Sub Volcanics Accumulation



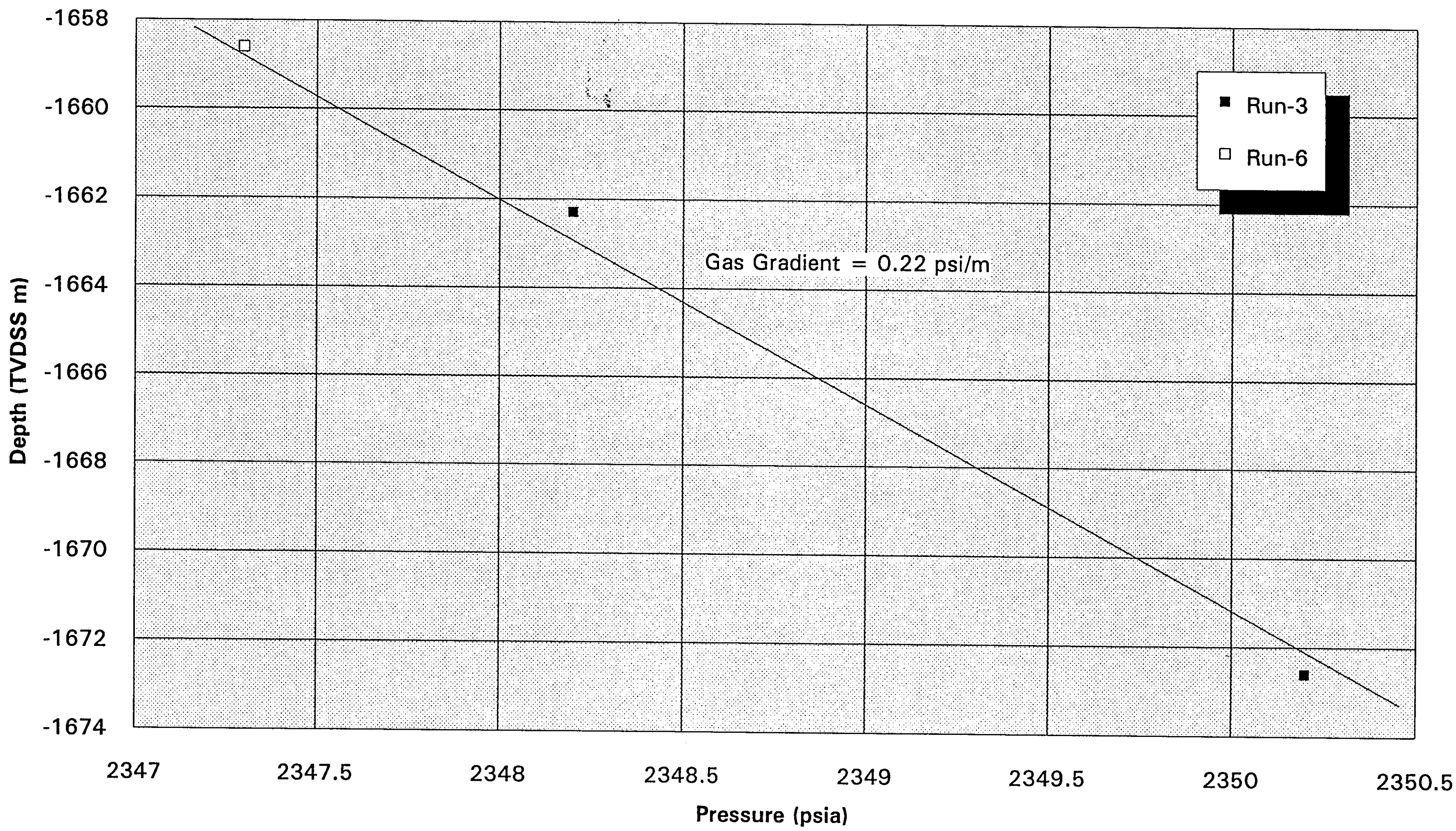
psk7/03/95

Figure 4: M-3 Accumulation



psk7/03/95

Figure 5: N-1.9 Accumulation



psk7/03/95

APPENDIX 6

APPENDIX 6

APPENDIX 6

Moonfish-2

Petrology Report

PETROLOGY REPORT

of

MOONFISH-2 SIDEWALL CORES

A report prepared for

ESSO AUSTRALIA LTD

by

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September 1995

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CONTENTS

1. EXECUTIVE SUMMARY

- Esso Australia Ltd submitted two sidewall cores from Moonfish-2 for detailed petrographic description.

- Sample 8 (2101.7 m) comprises abundant (45-55%) plagioclase lathes (0.2-2.0 mm long), probable microcrystalline quartz mesostasis (20-25%), altered alkali feldspar mesostasis (5-10%), disseminated pseudomorphs and diffuse areas of leucoxene (5-10%) and patches of interstitial carbonate (2-3%). This sample is classified as a dolerite on the basis of its grain size and basic composition. The size of the plagioclase lathes indicate moderately rapid cooling and formation within a shallow intrusion (?sill or dyke) or an extrusive flow.

- Sample 9 (2104.5 m) comprises 50-55% fresh plagioclase lathes (to 0.5 mm long), 40-45% interstitial carbonate and minor (1-2%) leucoxenised dendritic opaque material. This sample is classified as a basalt on the basis of its grain size and basic composition. The finely crystalline nature of the plagioclase and presence of dendritic oxides indicate more rapid cooling than sample 8. This suggests formation as either a very thin intrusive body (?dyke) or as an extrusive flow.

- A severely impact-damaged claystone comprising lithic fragments and planktic foraminifers is present in sample 8. Its relationship to the dolerite could not be determined and it seems likely that the claystone has been highly modified by sampling. Planktic foraminifers indicate deposition in an open marine environment.

2. INTRODUCTION

Esso Australia Ltd submitted two sidewall cores from Moonfish-2 for detailed petrographic description (Table 1). A summary of the major aims follows:-

- Provide thin section descriptions to include classification, description of lithology and texture, estimated composition and environment of formation.

- Discuss the origin of the igneous lithologies present in terms of an intrusive versus extrusive origin.

Sample Details			Petrographic Technique			
Sample	Depth (m)	Formation	TS	SEM	XRD (clay)	XRD (bulk)
8	2101.7		*			
9	2104.5		*			

Table 1: Summary of petrographic analyses performed on Moonfish-2 sidewall cores.

3. METHODS

Thin section preparation

Each sample was impregnated with blue-stained araldite prior to thin section preparation in order to facilitate description of porosity and permeability. Thin sections were then prepared using standard techniques.

4. RESULTS

Thin section descriptions of sample 8 (2101.7 m) and sample 9 (2104.5 m) are presented overleaf.

SAMPLE 8 (2101.7 m)

Overview

This sample comprises fragments of a basic igneous rock of dolerite appearance (Fig. 1) and an impact-damaged claystone (Fig. 2).

Lithology and Texture

Fragments of dolerite are extensively altered and impact-damaged. Plagioclase lathes (0.2-2 mm long) are abundant and comprise 45-55% by volume. Individual lathes are variably altered and include fresh-looking crystals, calcite-veined crystals, and composite lathes in which the calcic core has been replaced by calcite and the sodic rim is relatively fresh. Large areas of mesostasis (to 5 mm max. dia.) are common (ca. 20-25%) (Fig. 1). These areas have been infiltrated by blue epoxy making identification of mineralogy difficult. Microcrystalline quartz or fine flinty kaolinite is the most likely component. Altered alkali feldspar mesostasis is probably present (5-10%). Leucoxene (ca. 5-10%) is present as disseminated pseudomorphs (to 0.4 dia.) after opaque oxides and as diffuse areas at the sites of former (weakly titaniferous) clinopyroxene grains. Several large areas of insterstitial carbonate (to 2 mm dia.) are a minor component (3-5%).

The claystone (Fig. 2) is severely impact-damaged and may contain a component of drilling mud. It contains abundant lithic fragments and has been extensively disrupted during sampling, making description extremely difficult. Lithic fragments include quartz-rich siltstone, laminated calcareous claystone with planktic foraminifers and bioclastic debris, clay-altered vitric tuff and fragments of veined plagioclase. Planktic foraminifers are present within the detrital clay matrix.

Environment of Formation

The basic igneous rock is classified as a dolerite on the basis of grain sizes exhibited by plagioclase and accessory opaque oxides. This suggests a shallow intrusive origin such as a sill or dyke, although an extrusive flow origin cannot be ruled out. The relationship with the sediment is ambiguous. The sediment is not metamorphosed and was either present as fracture fill within the cooled dolerite or is an artefact of sidewall coring. Planktic foraminifers indicate an original marine environment.

PE905284

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The enclosure PE905284 has the following characteristics:

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BASIN =	GIPPSLAND
PERMIT =	VIC/L10
TYPE =	WELL
SUBTYPE =	PHOTOMICROGRAPH
DESCRIPTION =	Moonfish-2, Photomicrographs under plain and cross polarised light of dolerite. Some calcitized and veined plagioclase lathes and microcrystalline quartz or kaolinite mesostasis. Sample 8 (2101.7 m). From appendix 6 of WCR volume 2.
REMARKS =	This item is in colour.
DATE_CREATED =	30/09/1995
DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ACS Laboratories Pty Ltd
CLIENT_OP_CO =	Esso Australia Resources Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

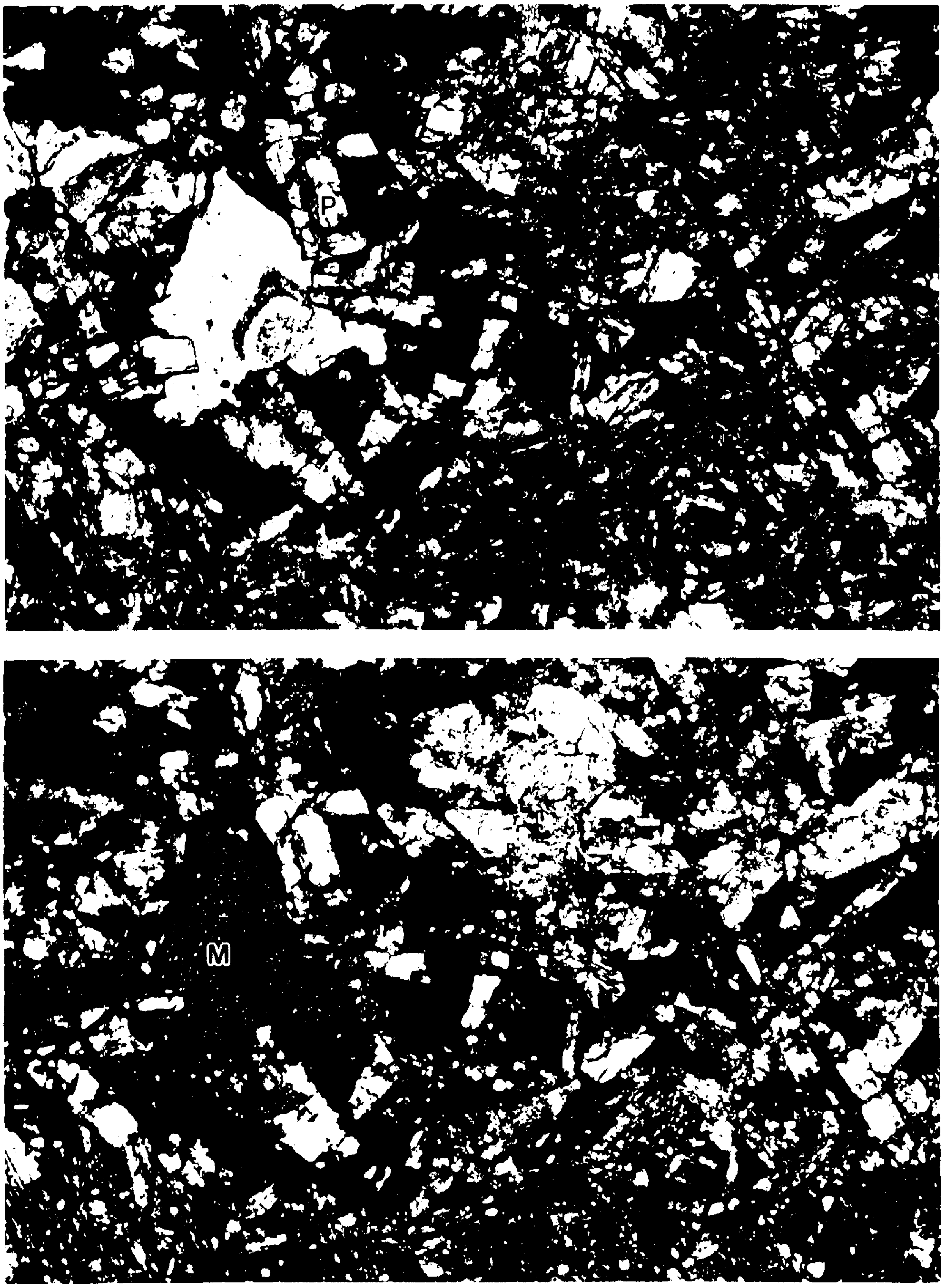

Figure 1: **Sample 8 (2101.7 m)**: Plain (upper) and cross polarised (lower) photomicrographs of dolerite. Note variably calcitized and veined plagioclase lathes (P) and microcrystalline quartz or 'cherty' kaolinite mesostasis (M). Blue colouration is due to impregnation by epoxy. Long axes of photomicrographs are equal to 2.72 mm.

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DESCRIPTION =	Moonfish-2, Photomicrograph of impact-damaged and altered calystone. Some lithic fragments and planktic foraminifers. Sample 8 (2101.7 m). From appendix 6 of WCR volume 2.
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DATE_RECEIVED =	07/03/1996
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CONTRACTOR =	ACS Laboratories Pty Ltd
CLIENT_OP_CO =	Esso Australia Resources Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

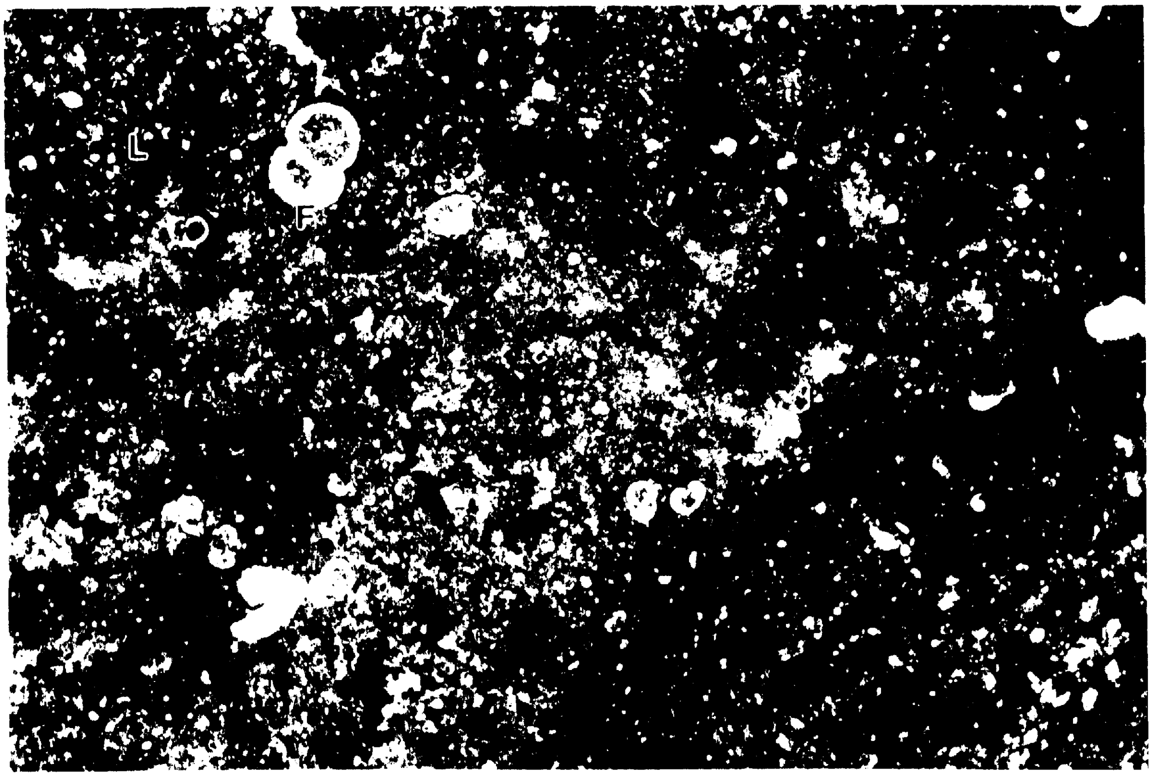

Figure 2: **Sample 8 (2101.7 m)**: Photomicrograph of impact-damaged and altered claystone. Note lithic fragments (L) and planktic foraminifers (F). Long axis of photomicrograph is equal to 2.72 mm.

SAMPLE 9 (2104.5 m)

Overview

This sample comprises several fragments of a homogeneous, plagioclase-rich, altered basalt (Fig. 3).

Lithology and Texture

The basalt comprises 50-55% fresh plagioclase lathes (to 0.5 mm long) and 40-45% interstitial carbonate (Fig. 3). The latter possibly occupies pyroxene sites in the original lithology. Leucoxenized dendritic opaque material is a minor component (1-2%). Small aggregates of microcrystalline quartz are a trace component. Rare clays have locally replaced some areas of plagioclase, although most of the feldspar seem to be fresh. Very minor amounts of porosity are indicated by blue stained epoxy.

Environment of Formation

The finely crystalline nature of the plagioclase and presence of dendritic oxides indicate rapid cooling and formation as either a thin intrusive body such as a dyke or as an extrusive flow.

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PERMIT =	VIC/L10
TYPE =	WELL
SUBTYPE =	PHOTOMICROGRAPH
DESCRIPTION =	Moonfish-2, Photomicrographs under plain and cross polarised light of plagioclase-rich basalt. Some plagioclase lathes and calcite possible replacing pyroxene. Sample 9 (2104.5 m). From appendix 6 of WCR volume 2.
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DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ACS Laboratories Pty Ltd
CLIENT_OP_CO =	Esso Australia Resources Ltd

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ACS LABORATORIES PTY. LTD.

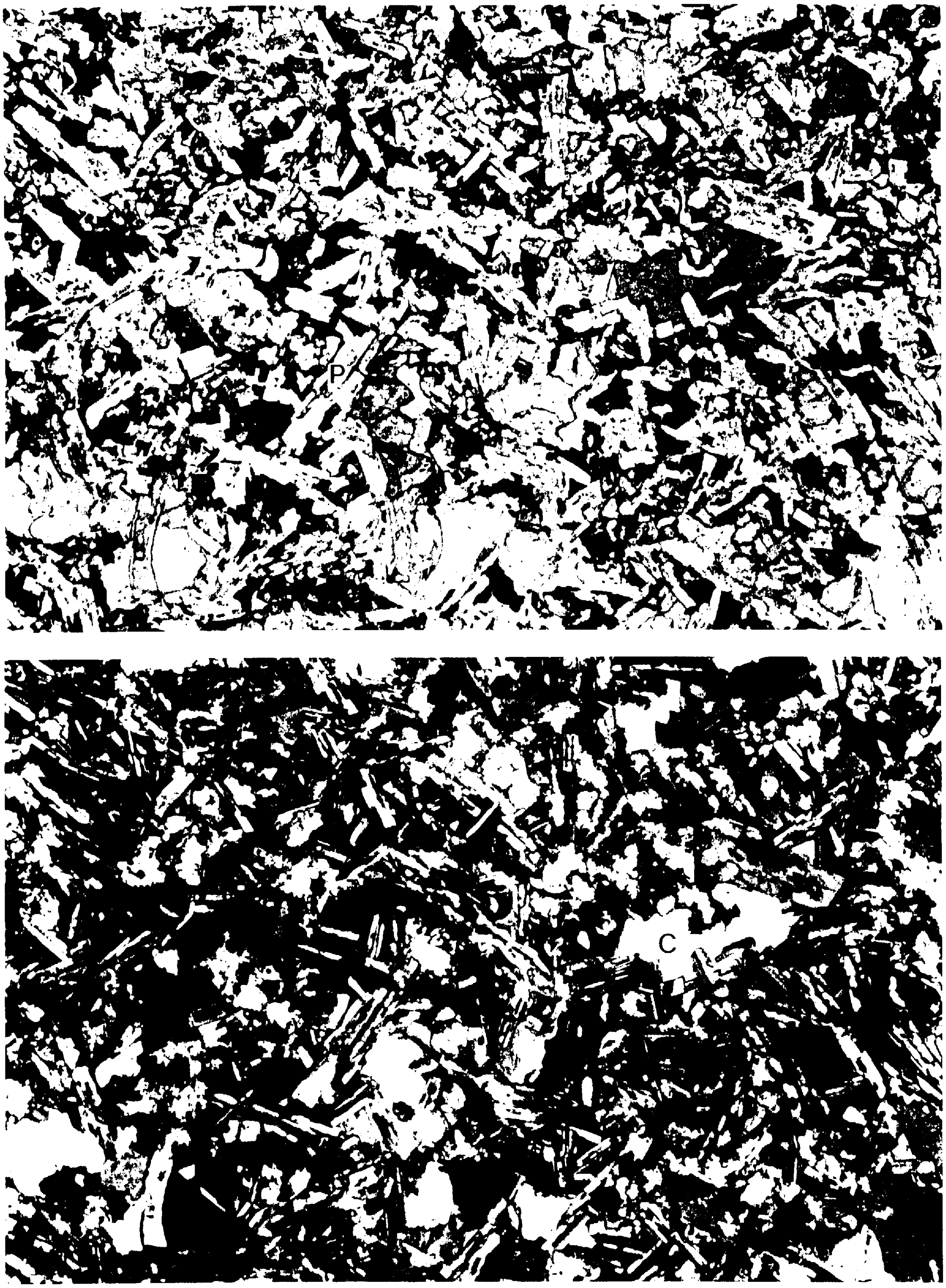

Figure 3: **Sample 9 (2104.5 m)**: Plain (upper) and cross polarised (lower) photomicrographs of plagioclase-rich basalt. This comprises plagioclase lathes (P) and calcite (C) possibly replacing pyroxene. Long axes of photomicrographs are equal to 2.72 mm.

5. GLOSSARY

Dendritic. Said of a mineral that has crystallized in a branching pattern, pertaining to a dendrite.

Leucoxene. A general term for fine-grained, opaque, whitish alteration products of ilmenhite, commonly consisting mostly of rutile and partly of anastase or sphene, and occurring in some igneous rocks.

Mesostasis: The last formed interstitial material, either glassy or aphanitic, of an igneous rock.

ENCLOSURES

ENCLOSURES

ENCLOSURE 1

Moonfish Field

Structural Cross-Section

PE900928

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DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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ENCLOSURE 2

Moonfish-2

Mud Log

PE600741

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PERMIT =	VIC/L10
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SUBTYPE =	WELL_LOG
DESCRIPTION =	Well Log (enclosure 2 of WCR vol.2) for Moonfish-2
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DATE_RECEIVED =	7/03/96
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	HALIBURTON
CLIENT_OP_CO =	ESSO

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ENCLOSURE 3

Moonfish-2

Well Completion Log

PE600742

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BASIN = GIPPSLAND
PERMIT = VIC/L10
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log (enclosure 3 of WCR) for Moonfish-2
REMARKS =
DATE_CREATED = 26/01/1995
DATE_RECEIVED = 07/03/1996
W_NO = W1114
WELL_NAME = Moonfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

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ENCLOSURE 4

Moonfish-2

Time Depth Curve

PE600743

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TYPE = WELL
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DESCRIPTION = Seismic Calibration Log - Adjusted Continuous Velocity (enclosure 4 of WCR vol.2) for Moonfish-2
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WELL_NAME = Moonfish-2
CONTRACTOR = SCHLUMBERGER
CLIENT_OP_CO = ESSO

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ENCLOSURE 5

Moonfish-2

Synthetic Seismic Trace

PE600744

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TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismogram (enclosure 5 of WCR) for moonfish-2
REMARKS =
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DATE_RECEIVED = 07/03/1996
W_NO = W1114
WELL_NAME = Moonfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

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ENCLOSURE 6

Moonfish-2

Reconstruction Cut Seismic Line
MF1 - MF2 Wellpaths

PE900929

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BASIN =
GIPPSLAND
PERMIT = VIC/L10
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Gippsland Basin Moonfish Field
Wellpath, Moonfish-1 & Moonfish-2
Wellpath, (enclosure 6 of WCR vol.2)
for Moonfish-2
REMARKS =
DATE_CREATED = 27/02/1996
DATE_RECEIVED = 07/03/1996
W_NO = W1114
WELL_NAME = Moonfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

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ENCLOSURE 7

Moonfish-2

Depth Structure Map to Top of Latrobe Group

PE900930

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PERMIT =	VIC/L10
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Top of Latrobe Depth Map (enclosure 7 of WCR vol.2) for Moonfish-2
REMARKS =	
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DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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ENCLOSURE 8

Moonfish-2

Depth Structure Map to Top of M-2 Reservoir

PE900931

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TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Top M2 Reservoir Depth Map (enclosure 8 of WCR vol.2) for Moonfish-1
REMARKS =	
DATE_CREATED =	12/12/1995
DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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ENCLOSURE 9

Moonfish-2

Depth Structure Map to
Top of Sub-volcanic Reservoir

PE900932

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BASIN =	GIPPSLAND
PERMIT =	VIC/L10
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SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Top Subvolcanic Sand Depth Map (enclosure 9 of WCR vol.2) for Moonfish-2
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DATE_RECEIVED =	07/03/1996
W_NO =	W1114
WELL_NAME =	Moonfish-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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