WCR VOL 2

GREAT WHITE - 1

W1162

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

WELL COMPLETION REPORT

GREAT WHITE 1

VOLUME 2
INTERPRETATIVE DATA

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

M. A. V. Moore
May 1997

TABLE OF CONTENTS

1. Summary of Well Results

2. Introduction

3. Stratigraphy

4. Structure

5. Hydrocarbons

6. Geophysical Discussion
   - 6.1 Time Interpretation
   - 6.2 Depth Conversion

7. Geological Discussion

Tables
1. Prognosed vs Actual Formation Tops
2. Time Interpretation and Depth Conversion Analysis

Figures
1. Locality Map

Appendices
1. Palynological Analysis
2. Quantitative Formation Evaluation

Enclosures
1. Great White-1 Well Completion Log
2. Great White-1 Synthetic Seismogram
3. Seismic Line G94BV-438
4. Seismic Line G94BV-698
5. Top of Latrobe Group Depth Structure Map (Post-Drill)
6. Base of Eocene Channel Depth Structure Map (Post-Drill)

1. SUMMARY OF WELL RESULTS

Great White-1 was spudded in VIC/P24 on December 26, 1996. The water depth at the well location is 658.5 metres. The well was designed to test a prospect defined by an erosional monadnock at the base of the Lower Eocene Tuna/Flounder Channel. The reservoir was as prognosed, consisting of Late Cretaceous estuarine and shoreface sandstones. Seal was anticipated to have been provided by marine transgressive mudstones and siltstones of the Lower to Middle Eocene Flounder Formation. The Flounder Formation was not penetrated in the well and instead effective seal was provided by the overlying Lakes Entrance Formation. A thin Middle to Upper Eocene Turrum Formation channel fill section was present at the top of the Latrobe Group.

The top of the Latrobe Group reservoirs was intersected at 3241.0 mKB, some 110.5 metres low to prognosis. No hydrocarbon shows were recorded during drilling and the well was drilled to a total depth of 3472 mKB. Log interpretation indicates that the target reservoir is water saturated and no hydrocarbon pay is mapped.

Post-drill analysis suggests a valid trap is present and that inadequate hydrocarbon migration pathways represent the most likely reason for failure. Formation tops are summarised in Table 1 below.

Great White-1 was plugged and abandoned on January 11, 1997. The drilling of the Great White-1 well satisfied the VIC/P24 Permit Year 3 work program commitment consisting of one well.

Table 1 : Prognosed vs. Actual Formation Tops

Formation/Horizon	Predicted Depth (mss TVD)	Actual Depth (mss TVD)
Gippsland Limestone	-662	-658.5
Lakes Entrance Formation	-2660	-2774.5
Turrum Formation (Top of Latrobe Group)	Not Prognosed	-3191.5
Flounder Formation	-3000	Not Present
Base of Eocene Channel (Latrobe Group reservoirs)	-3100	-3210.5
Bronze Sequence Flooding Surface	-3265	-3331.5
Total Depth	-3340	-3441.5

KB = 30.5 metres

2. *INTRODUCTION*

Great White-1 is a wildcat exploration well located in VIC/P24 some 12 km northeast of the Blackback/Terakihi Oil Field and 22 km southeast of the Flounder Oil and Gas Field (Figure 1). Great White-1 was drilled as the first well in the 1996/7 Sedco 703 program and fulfilled the Year 3 work program commitment for VIC/P24.

The well was designed to test an erosional monadnock at the base of the Lower Eocene Tuna/Flounder Channel. The key risks identified pre-drill were the sealing quality of the expected Flounder Formation channel fill and migration of hydrocarbons into a non-structural erosional trap.

3. *STRATIGRAPHY*

The Great White-1 Well Completion Log is presented as Enclosure 1. Palynological analysis details are contained in Appendix 1.

A thick succession (2116 m) of Gippsland Limestone (Middle Miocene to Recent age, 689-2805 mKB) was penetrated by Great White-1. No cuttings were collected down to 1466 mKB as this section was drilled without a riser. Below this depth the Gippsland Limestone comprises light grey to greenish grey calcisiltite grading to calcilutite. The limestone changes to a marl with depth due to a progressive increase in clastic content.

The Lakes Entrance Formation (Oligocene to Middle Miocene age, 2805-3222 mKB) is 417 metres thick and comprises grey calcareous claystone with traces of carbonaceous detritus. An increase in siltstone content occurs over the lower part of this interval.

The pre-drill prognosis was for 100 metres of Lower to Middle Eocene Flounder Formation to be penetrated by Great White-1. It is now apparent that the section prognosed as Flounder Formation is actually the lower part of the Lakes Entrance Formation. A thin Middle to Upper Eocene Turrum Formation channel fill section, comprising light grey-brown siltstones and sandstones, was penetrated by the well and is interpreted to cover the crestal area of the Great White erosional monadnock (3222 mKB-3241 mKB). The total channel fill increases rapidly off-structure. The Flounder Formation is interpreted to be the major component of this fill in the channel axis and to onlap the flanks of the feature.

Beneath the Turrum Formation, Late Cretaceous Latrobe Group was penetrated from 3241 mKB to TD at 3472 mKB (231 metres). The section comprises the partially eroded Rose Madder Lake Sequence (3241 mKB-3285 mKB), the Bronze Sequence (3285 mKB-3397 mKB) and the Crimson Sequence (3397 mKB-TD at 3472 mKB). The total Latrobe Group section belongs to the T.Longus spore-pollen zone. The individual sequences were as prognosed with only slight variations in lithology. The Rose Madder Lake Sequence comprises lowstand/transgressive estuarine/upper shoreface sandstones. The Bronze Sequence comprises lowstand/transgressive estuarine/upper shoreface sandstones overlain by interbedded coastal plain sandstones, siltstones and minor coals. The Crimson Sequence comprises interbedded coastal plain sandstones, siltstones and shales.

4. STRUCTURE

The Great White trap is defined by an erosional monadnock formed by the incision associated with the base of the Lower Eocene age Tuna/Flounder Channel. Great White is situated in the central axis of the channel system which extends across the structurally passive floor of the Latrobe Group rift graben. Erosion was concentrated within a sinuous meandering channel system during a tectonically induced lowstand in the Lower Eocene. The tectonic uplift resulted from a major compressional event which induced structural arching of the central basin area. Progressive erosion and stream evulsion within the meandering channel system resulted in the formation of the Great White feature as an isolated palaeohigh with several hundred metres topographic relief. Post-drill mapping suggests the Base of the Tuna/Flounder Channel surface has at least 169 metres of vertical closure with an areal extent of 18.1 sq km. The well penetrated this surface 21.5 metres below the crestal location, although the remaining updip closure has an areal extent of only 0.2 sq km.

The surface mapped pre-drill as the Top of Latrobe Group, now recognised as being an intra-Lakes Entrance Formation surface, has only minor closure at the well location. The deeper surface recognised post-drill as the Top of Latrobe Group represents the top of porosity in the well. A thin Middle to Upper Eocene Turrum Formation channel fill section is present between the Top of Latrobe Group surface and the Base of the Tuna/Flounder Channel surface at the well location. The Top of Latrobe Group surface diverges from the base of the channel surface on the flanks of the palaeohigh, although drape over the feature ensures significant closure at this stratigraphic level. Post-drill mapping suggests the Top of Latrobe Group surface has 104 metres of vertical closure with an areal extent of 11.2 sq km. Almost 60 metres of closure on this surface remains updip from the well location, although the areal extent is relatively limited at 3.3 sq km.

The Latrobe Group is unfaulted under the Great White feature and only minor Golden Beach Group faults are present at depth. There is little structural overprint with the exception of a gentle southwesterly plunging nose extending from the northeast margin of the basin. The lack of a structural focus for migrating hydrocarbons was recognised pre-drill as a significant risk.

5. HYDROCARBONS

No significant hydrocarbon shows were encountered within the Gippsland Limestone or Lakes Entrance Formation in Great White-1. Background gas levels within the Gippsland Limestone varied from 10-250 units, typically comprising 99.5 % methane, 0.4 % ethane and 0.1% propane. Background gas levels within the Lakes Entrance

Formation varied from 10-60 units, typically comprising 98.8 % methane, 1.0 % ethane and 0.2 % propane.

No significant hydrocarbon shows were encountered within the Latrobe Group. Background gas levels varied from 2-5 units, typically comprising 99.5 % methane and 0.5 % ethane. No hydrocarbon fluorescence was recorded over this interval. Small variations were observed in gas levels, the most significant of which occurred between 3330-3355 m KB and between 3420-3435 m KB with up to 8-10 units of gas, over a background level of 2-4 units, comprising 97.8 % methane, 1.9 % ethane and 0.3% propane. These variations are interpreted to be related to lithological changes.

Log interpretation indicated all reservoir sandstones are water saturated and no hydrocarbon pay is mapped (Appendix 2).

6. GEOPHYSICAL DISCUSSION

The Great White feature is located under the present day shelf slope break. The steep and rugose slope, combined with local incision of deep seafloor canyons, degrades seismic data quality and introduces significant time distortions in this area. The Great White feature was defined as a drillable prospect using the G94BV 3D seismic survey. The application of post-stack depth migration and dynamic water replacement statics improved the data quality significantly, although it remains only fair by Gippsland Basin standards.

6.1 Time Interpretation

The pre-drill seismic interpretation was constrained by limited well penetrations of the Latrobe Group channel facies. Great White-1 is the only well positioned in the main channel system within a radius of 15 kilometres. The nearest well control was Volador-1, 7.9 km to the northwest, and Terakihi-1, 9.3 km to the southwest, both wells being positioned on the flanks of the main channel system. The Base of the Tuna/Flounder Channel was readily identified as a significant erosive surface defined by truncation of conventional Latrobe Group stratigraphy beneath the unconformity and onlap of channel fill above. The top of the channel fill, and hence the Top of Latrobe Group, is less well defined. Seismic stratigraphy, seismic modelling and seismic attribute analysis were all used in an attempt to identify this surface and the more shale-prone intervals of the channel fill. The pre-drill prognosis was that channel fill completely covered the Great White monadnock, with 100 metres of Flounder Formation channel fill expected at the well location. A significant intra-channel fill surface was recognised pre-drill and was thought to represent a transition from more sand-prone fill towards the base of the channel to more shale-prone fill towards the top.

The pre-drill seismic picks for both the Top of Latrobe Group and the Base of the Tuna/Flounder Channel were interpreted to be at the lower zero crossing of the lead trough for quadrature phase data. This implied increases in impedance from the Lakes Entrance Formation to the Flounder Formation channel fill and from the channel fill to the Latrobe Group proper respectively.

The surface mapped pre-drill as the Top of Latrobe Group is now recognised as being an intra-Lakes Entrance Formation surface. The actual Top of Latrobe Group surface at the well location is 76 msecs low to prognosis and very close to the pre-drill Base of the Tuna/Flounder Channel surface identified pre-drill. Off-structure this surface is now interpreted to be the previously identified significant event thought pre-drill to have been within the channel fill. The Top of Latrobe Group seismic pick post-drill is at the lower zero crossing of the lead trough for quadrature data, reflecting the increase in impedance from the Lakes Entrance Formation to the Turrum Formation.

The actual Base of the Tuna/Flounder Channel surface at the well location is 27 msecs below the pre-drill prognosis. The seismic pick is at the lower zero crossing of a lead peak for quadrature data, reflecting the decrease in impedance from the channel fill to the Latrobe Group proper. As the channel fill thickens away from the well location the impedance relationship across the base of the channel is interpreted to change with lower impedance fill in the base of the channel leading to a change in the seismic pick to the lower zero crossing of a lead trough for quadrature data. The channel fill at the well location consists solely of Turrum Formation. However, the underlying Flounder Formation is interpreted to be the major component of the fill in the channel axis and to onlap the flanks of the Great White palaeohigh.

A comparison of the pre-drill prognosis versus the post-drill results is contained in Table 2. A synthetic seismogram for Great White-1 is presented in Enclosure 2. Seismic lines through the well location illustrating the post-drill seismic interpretation are presented in Enclosures 3 and 4.

6.2 Depth Conversion

The steep and rugose water bottom topography combined with the progradational and severely channelled nature of the Miocene limestone section introduces significant time distortions in the seismic data over the Great White feature. Pre-stack depth migration was carried out on selected lines from the 3D dataset in an attempt to establish a stable velocity field across the area. These velocities were then used in a complete post-stack depth migration of the 3D dataset. Significant artefacts remain in the depth migrated data and it was recognised that a reliable smoothing technique was needed to remove these high frequency artefacts.

The Mid Miocene Marker surface at the top of the Lakes Entrance Formation is recognised across the Gippsland Basin as being relatively unstructured other than for local drape and compaction effects and a post-Mid Miocene regional tilt to the east. This surface was interpreted across the dataset, tied to the well control and smoothed to remove obvious velocity artefacts. The amount of post-Mid Miocene easterly tilt is the greatest uncertainty in this depth conversion technique. An alternative version of the Mid Miocene Marker surface with a greater tilt to the east was created pre-drill to measure the sensitivity of the technique. Great White remained as a significant closure at the base of the Tuna/Flounder Channel on both the maps produced.

Depth conversion to the Top of Latrobe Group was achieved by isopaching down from the Mid Miocene Marker surface. Isopaching was also used to depth convert from the Top of Latrobe Group to the Base of the Tuna/Flounder Channel and key intra-channel and intra-Latrobe Group surfaces. Interval velocities within the Lakes Entrance Formation and the Latrobe Group are relatively stable and so isopaching is generally a reliable depth conversion technique.

A comparison of the pre-drill prognosis versus the post-drill results is contained in Table 2. The total depth conversion error to the Base of Tuna/Flounder Channel surface is 110.5 metres or 3.6%. The time interpretation component error is estimated to be 44 metres; the depth conversion component is estimated to be 66.5 metres. The depth conversion error at the Base of the Tuna/Flounder Channel surface was less than that at the Mid Miocene Marker surface due to a slower than expected Lakes Entrance Formation. The actual Mid Miocene Marker surface has a slightly greater dip to the east than that displayed on the alternative pre-drill depth map of the surface, implying a faster section between water bottom and the Mid Miocene Marker than prognosed.

The same depth conversion technique, incorporating the additional depth velocity information provided by the well, was applied during the post-drill mapping process. The post-drill maps for the Top of Latrobe Group and the Base of the Tuna/Flounder Channel are presented in Enclosures 5 and 6. Great White-1 is interpreted to have tested valid closures at both of these levels with the Top of Latrobe Group surface estimated to have a total of 104 metres of vertical relief (44.5 metres at the well location) and an areal extent of 11.2 square kilometres and the Base of Tuna/Flounder Channel surface estimated to have at least 169 metres of vertical closure (147.5 metres at the well location) and 18.1 square kilometres areal extent.

Table 2 : Time Interpretation and Depth Conversion Analysis

	Water Bottom	Mid Miocene Marker	Top of Latrobe	Base of T/F Channel
Pre-drill Seis. Time (sec,TWT)	0.576	2.090	2.319	2.380
Post-drill Seis. Time (sec,TWT)	0.576	2.090	2.395	2.407
Time Interpretation Error (sec)	0.000	0.000	0.076	0.027
Pre-drill depth (m,ss)	662	2660	3000	3100
Post-drill Depth (m,ss)	658.5	2774.5	3191.5	3210.5
Total Depth Error (m)	-3.5	114.5	191.5	110.5
Pre-drill Pseudo Interval Velocity (m/sec)		2639	2969	3279
Post-drill Pseudo Interval Velocity (m/sec)		2795	2734	3167
Interval Velocity Error (m/sec)		156	-235	-112

Note : Seismic times are sourced from the G94BV 3D survey with a water replacement static of 2200 m/sec applied.

7. *GEOLOGICAL DISCUSSION*

As detailed in the earlier sections covering post-drill structural analysis, it is interpreted that Great White-1 tested valid closures at both the Top of Latrobe Group and the Base of the Tuna/Flounder Channel levels. An analysis of the key geological parameters of seal, reservoir and hydrocarbon migration is thus key to identifying the reasons for the trap failure.

The Lakes Entrance Formation, 417 metres thick at the well location and comprised for the most part of calcareous claystone, should be an extremely effective seal for the Top of Latrobe Group closure. The Turrum Formation channel fill at the well location, 19 metres thick and comprised for the most part of siltstone, is less likely to act as a competent seal at the Base of the Tuna/Flounder Channel surface, although the basal 12 metres has a greater shale content. The total channel fill increases rapidly off-structure with slightly older, and more shale-prone, Flounder Formation interpreted to comprise the major component of the section. As this interval was not actually penetrated by the well it is not possible to state conclusively that a competent seal exists at the Base of the Tuna/Flounder Channel surface or even at some intra-channel level. It is possible that seal failure may therefore be used to explain the absence of hydrocarbons at the Base of the Tuna/Flounder Channel level but it cannot be used to explain the absence at the Top of Latrobe Group level.

The reservoir quality of the Late Cretaceous Latrobe Group interval penetrated by the well was better than prognosed. The pre-drill prognosis for the target reservoir interval was for an average porosity of 18 % and an average net/gross of 50 %. The actual parameters for the Late Cretaceous Latrobe Group section penetrated by the well between 3241 m KB and TD at 3415 m KB are an average porosity of 22 % and an average net/gross of 93 %. This better than expected result is due partly to the removal by erosion (at the base of the Tuna/Flounder Channel) of lower shoreface siltstones expected at the top of the Rose Madder Lake sequence and partly to the failure of a prognosed Bronze sequence facies change, from predominantly shaley coastal plain in Volador-1 to lower shoreface/upper shoreface section, to occur. The Bronze sequence at the well location actually consists of thick lowstand/transgressive estuarine/upper shoreface sandstones with interbedded coastal plain sandstones, siltstones and coals.

Pre-drill studies indicated that the presence of adequate hydrocarbon migration pathways was a key risk for the prospect. Source rock volumes and maturity levels were interpreted to be adequate to generate substantial hydrocarbon volumes within the drainage area of the prospect and as trap formation pre-dates hydrocarbon generation, the timing of generation and migration was not considered a key risk. However, migration must be able to occur from the relatively deep mature source intervals (5000-6000 m,ss) to the level of the trap (3200 m,ss) if the play is to be viable. The Latrobe Group is unfaulted under Great White and only minor Golden Beach Group faulting is present at depth. There is little structural overprint with the exception of a gentle southwesterly plunging nose extending from the northeast margin of the basin. The lack of a structural focus for migrating hydrocarbons was recognised pre-drill as a significant risk. In order for efficient vertical migration to occur, in the absence of faulting, significant facies changes within the Latrobe Group are required to enable cross-stratal migration. Lateral facies changes within the Late Cretaceous section were interpreted to occur in the vicinity of Great White by analogy with the Hermes-1 and Angler-1 wells drilled on the southern side of the basin. The former comprises thick lower coastal plain mudstones and coals whilst the latter, 14 km to the southeast, comprises mainly offshore marine siltstones and lower shoreface sandstones for the same T.Lilliei age section. For the Great White prospect the same facies change needed to occur over the 7.5 km between Volador-1 and the well location.

To further aid efficient vertical migration the individual sequences within the T.Lilliei section needed to be aggradationally stacked to allow individual shoreface belts to directly overlay each other. If this were the case then hydrocarbons generated in the deep lower coastal plain source rocks could laterally follow regional dip into the stacked shoreface sandstone belts whereby vertical migration into the trap would be possible. The seismic data quality is not adequate to map these individual facies belts in this area and as the well did not drill deep enough to penetrate this section, the occurrence of these facies changes remains conjectural. Studies undertaken pre-drill to determine migration efficiency through the coastal plain section penetrated at Volador-1, the nearest offset well, suggest vertical migration could occur through this section albeit at reduced efficiencies.

The absence of adequate hydrocarbon migration pathways is difficult to prove. Although the absence of a structural focus is well documented, the well did not drill deep enough to provide data on the lithology of the deep intra-Latrobe Group section. However, the lack of hydrocarbon shows in the well possibly suggests that hydrocarbons have not migrated through this location. Accordingly, the lack of adequate migration pathways is interpreted to be the a likely reason for the failure of the prospect to contain hydrocarbons.

Figures

Figures

PE906094

This is an enclosure indicator page.
The enclosure PE906094 is enclosed within the container PE900827 at this location in this document.

The enclosure PE906094 has the following characteristics:

ITEM_BARCODE = PE906094
CONTAINER_BARCODE = PE900827
NAME = Locality Map
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = GENERAL
SUBTYPE = PROSPECT_MAP
DESCRIPTION = Locality Map (Figure 1) Vol 2 of WCR for Great White-1.
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = GREAT WHITE-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

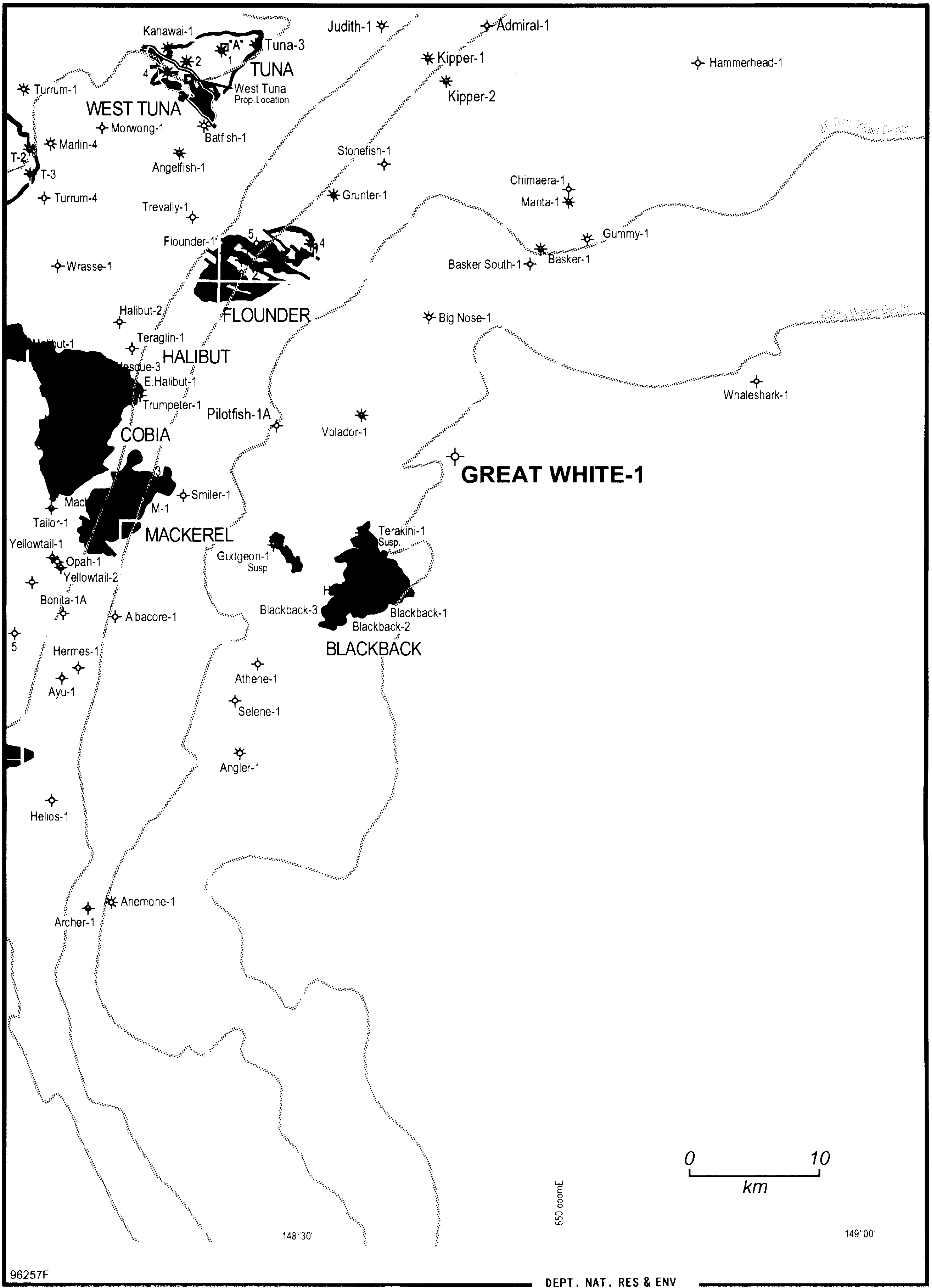

Judith-1
Admiral-1
Kahawai-1
"A"
Tuna-3
1
2
4
TUNA
West Tuna
Prop. Location
WEST TUNA
Kipper-1
Kipper-2
Hammerhead-1
Turrum-1
Morwong-1
Batfish-1
Marlin-4
T-2
T-3
Angelfish-1
Turrum-4
Stonefish-1
Grunter-1
Chimaera-1
Manta-1
Trevally-1
Gummy-1
Basker-1
Basker South-1
Flounder-1
5
4
2
Wrasse-1
FLOUNDER
Big Nose-1
Halibut-2
Teraglin-1
HALIBUT
E.Halibut-1
Trumpeter-1
Pilotfish-1A
Volador-1
Whaleshark-1
COBIA
GREAT WHITE-1
3
Smiler-1
M-1
Tailor-1
MACKEREL
Yellowtail-1
Opah-1
Yellowtail-2
Terakihi-1
Susp.
Gudgeon-1
Susp.
Bonita-1A
Albacore-1
Blackback-3
Blackback-1
Blackback-2
BLACKBACK
5
Hermes-1
Ayu-1
Athene-1
Selene-1
Angler-1
Helios-1
Anemone-1
Archer-1
0
10
km
650 000mE
148°30'
149°00'
96257F

Figure-1

Appendix 1

Appendix 1

Palynological analysis of cuttings samples from Great White-1, offshore Gippsland Basin.

by

Alan D. Partridge

Biostrata Pty Ltd
A.C.N. 053 800 945

Biostrata Report 1997/6

28 February 1997

Palynological analysis of cuttings samples from Great White-1, offshore Gippsland Basin.

by Alan D. Partridge

Table of Contents

INTERPRETATIVE DATA

Introduction 1

Palynological Summary of Great White-1 1

Geological Comments 2

Biostratigraphy 3

References 7

Table-1: Interpretative Palynological Data for Great White-1 8

Confidence Ratings 9

BASIC DATA

Table-2: Basic Sample and Palynomorph Data for Great White-1 10

Table-3: Species List for Great White-1, Gippsland Basin 11

RELINQUISHMENT LIST — PALYNOLOGY SLIDES 16

INTERPRETATIVE DATA

Introduction

Twenty-six cuttings samples between 3030m and 3470m from across the top of Latrobe in Great White-1 have been analysed to determine the age of the sequence. The following table summarises the results.

Palynological Summary of Great White-1

AGE	UNIT/FACIES	SPORE-POLLEN ZONES (MICROPLANKTON ZONES)	DEPTHS mKB
MIOCENE TO OLIGOCENE	SEASPRAY GROUP	*P. tuberculatus* (*Operculodinium* Superzone) (*F. leos* Zone)	3030 – 3190 (3030 – 3190) (3190)
MIDDLE EOCENE	LATROBE GROUP Turrum Formation equivalent	Lower *N. asperus* (*D. heterophlycta*)	3220 – 3240 (3220–3240)
MAASTRICHTIAN	LATROBE GROUP Undifferentiated	Undifferentiated *T. longus* Upper *T. longus* Lower *T. longus*	3300–3470 3310–3340 3430–3470

T.D. 3472m

An average of 12.5 grams of cuttings were collected and forwarded to Laola Pty Ltd in Perth on 28 January 1997 for processing to prepare the palynological slides for analysis. The material was returned on 6 February and initial provisional results provided on 10 February. 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.

The residue yields recovered from the cuttings were mostly very low to low from both the Seaspray and Latrobe Groups. Less than one third of the samples gave moderate or high yields. Principally because of the low yields palynomorph concentrations on the slides was low to very low in the Latrobe Group increasing to moderate and high in the shallower samples examined from the Seaspray Group. Preservation of palynomorphs was generally poor to fair. Average spore-pollen diversity was 14+ species per sample and average microplankton diversity was 8+ species per sample. All species which have been identified with binomial names are tabulated on Table 3. The relinquishment list for palynological slides is provided at the end of the report. No palynological residues remained after preparation of the slides.

Geological Comments

1. The cuttings analysed from Great White-1 between 3030-3470m have provided confident age dating of the basal Seaspray Group and underlying ~250 metres of the Latrobe Group notwithstanding the low assemblage yields and masking of the Latrobe Group assemblages by cavings from the overlying Seaspray Group.

2. The assemblages clearly indicate two major breaks or unconformities. The older separates a Maastrichtian age section of undifferentiated Latrobe coarse clastics from a Middle Eocene glauconitic facies equivalent in age to the Turrum and Gurnard Formations. The younger unconformity separates the Middle Eocene from the deep distal marine facies of the basal Seaspray Group which at its base is Early Oligocene in age.

3. Two additional breaks or unconformities are probably present in the section. However, the presence of these breaks are suggested with more caution and much less confidence as the changes the palynological assemblages are more subtle and obscured by cavings in the cuttings. The older of these breaks is between the Upper and Lower *T. longus* Zones. In the cuttings it lithologically separates sandy and possibly glauconitic sediments from the shallowest occurrences of carbonaceous shales and coaly fragments below 3430m. The younger of the two breaks is in the Seaspray Group and separates probable Early Miocene sediments from basal Oligocene sediments of the "Early Oligocene wedge" which has been previously found in nearby wells Blackback-3 and Gudgeon-1 (Partridge; 1994, 1995a).

4. Absent from the cuttings assemblages are any spores, pollen or microplankton considered diagnostic of Paleocene and Early Eocene ages represented by the *L. balmei*, *M. diversus* and *P. asperopolus* Zones or any microplankton considered restricted to the Late Eocene. Stratigraphic sections of these ages have been removed at the postulated unconformities.

5. A feature of the palynological assemblages from the cuttings is a biased towards larger palynomorphs compared to palynological preparations on equivalent sidewall cores. This is most clearly expressed by the consistent and common occurrence of the large and robust spore *Cyatheacidites annulatus* in nearly all samples. Although this spore is a conspicuous component of most sidewall core samples from the Seaspray Group it is

seldom common. The difference in character is interpreted as due to the removal of the finer and softer clay lithologies in the sediments when the drilling mud has been washed from the cuttings. As well as increasing the abundance of the larger and heavier palynomorphs it tends to remove the smaller index species. This is evident in Great White-1 by the rarity of the microplankton *Fromea leos* ms and the fact that none of the key *Tritonites* acritarch species were recorded.

Biostratigraphy

Zone and age determinations are based on the spore-pollen zonation scheme proposed by Stover & Partridge (1973), subsequently 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).

Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982), Helby, Morgan & Partridge (1987) and Mildenhall & Pocknall (1989) or other references cited herein. Author citations for dinoflagellates can be found in the index of Lentin & Williams (1993) or other references cited herein. Species names followed by "ms" are unpublished manuscript names.

***Proteacidites tuberculatus* Spore-Pollen Zone:** **3030–3190 metres**
Miocene to Early Oligocene.

The seven samples assigned to this zone all contain numerous specimens of the key index species *Cyatheacidites annulatus*. Other index species are rare consisting of *Acaciapollenites myriosporites* and *Foveotriletes lacunosus* at 3090m. Provided these species are not caved they suggest a latest Oligocene to Early Miocene age for the shallowest three samples. Overall the assemblages are of moderate diversity dominated by the long ranging spores *Cyathidites palaeospora, Ischyosporites irregularis* ms, *Matonisporites ornamentalis*, *Laevigatosporites* spp. and *Stereisporites antiquisporites* and the widely distributed gymnosperm pollen *Araucariacites australis* and *Podocarpidites* spp. The angiosperm pollen are likewise relatively non-diagnostic being dominated by *Nothofagidites* spp. and *Haloragacidites harrisii.*

***Operculodinium* Microplankton Superzone:** **3030–3190 metres**
Oligocene-Miocene.

All samples analysed from the Seaspray Group are dominated by dinoflagellates characteristic of the *Operculodinium* Superzone which has a broad Oligocene to Miocene age range. The assemblages are mostly dominated by *Spiniferites* spp. and *Operculodinium centrocarpum*. Unfortunately, many of the key species in the microflora are still undocumented and are identified by manuscript names. These include *Nematosphaeropsis rhizoma* ms, *Pyxidinopsis pontus* ms, *Protoellipsodinium simplex* ms and *Tectatodinium scabroellipticus* ms, which are widespread in the basin and long-ranging. Other manuscript species are recorded less often and may have only local significance. Of potential stratigraphic importance are *Hexagonifera* n.sp. found here at 3030m but previously recorded from Smiler-1 between 2487-2501m (Partridge, 1995b) and *Protoellipsodinium mamilatus* ms recorded herein between 3030-3090m (with a probable caved occurrence at 3210m), and previously recorded from Blackback-3 between 2772.4-2798m (Partridge, 1994).

Within the superzone the cutting between 3030-3090m all gave moderate yields and are considered to have a Miocene (or possibly late Oligocene) age based on presence the presence of *Tuberculodinium vancampoae* at 3030m. In contrast the cutting between 3120–3190m all gave surprisingly low yields. This latter interval can be characterised by the more consistent and often common occurrence of *Crassosphaera concinnia, Dapsilidinium pseudocolligerum* and *Hystrichokolpoma rigaudae*. These species are often typical of but not necessarily restricted to the basal portion of the superzone. The identification of the *F. leos* Zone at the base of this lower interval suggests that part if not all of the lower part of the Superzone belongs to the "Early Oligocene wedge" and is Early Oligocene in age.

Fromea leos Microplankton Zone: 3190 metres basal Oligocene.

The *F. leos* Zone is the only formal zone currently established within the *Operculodinium* Superzone. It was first defined in Blackback-3 by Partridge (1994) as the interval above the acme of *Phthanoperidinium comatum* to the Last Appearance Datum (LAD) of *Fromea leos* ms. It is only identified in one sample in Great White-1 based on the rare occurrence of the eponymous species. This record confirms the presence of the "Early Oligocene wedge" which is also found in adjacent wells Blackback-3 and Gudgeon-1 (Partridge; 1994, 1995a).

Lower *Nothofagidites asperus* Spore-Pollen Zone: 3220-3240 metres Middle Eocene.

Cuttings between 3210–3240m have spore-pollen composition most similar to the broad *N. asperus* Zone. The three deeper samples are assigned to the Lower *N. asperus* Zone with very low confidence based largely on the associated microplankton assemblage. The only pollen species which could be considered diagnostic are *Proteacidites pachypolus* at 3220m and 3240m and *P. recavus* at 3230m. These species are more typical of the Lower rather than Middle or Upper *N. asperus* Zones. In contrast *Proteacidites rectomarginis* identified at 3210m and

3220m would normally be considered more typical of the Middle or Upper *N. asperus* Zones. This species however could just as easily be caved as it is often recorded from sidewall core samples at the base of the Seaspray Group.

No species that occur commonly in the Early Eocene, and therefore likely to be picked up in cuttings, such as *Proteacidites grandis, Myrtaceidites tenuis* or *Malvacipollis diversus* were recorded from Great White-1. It is therefore unlikely the older *P. asperopolus* or *M. diversus* Zones are present in the well.

***Deflandrea heterophlycta* Microplankton Zone:** **3220-3240 metres**
late Middle Eocene.

A limited suit of Middle to Late Eocene microplankton are recorded in the cuttings between 3210–3240m. The samples between 3220-3240m are assigned to the *D. heterophlycta* Zone based on the common occurrence of the eponymous species and absence of microplankton index species of younger or older Eocene zones. The zone may extend to the deepest occurrence of *D. heterophlycta* at 3270m but this is considered unlikely as a change in the character of the cuttings occurs between 3240m and 3260m. Overall the microplankton assemblages is most reminiscent of this zone found in the Turrum Formation in Turrum-1 between 1955-2036m rather than assemblages from the sandy Eocene section in the Blackback wells.

The sample at 3210m could still be Eocene in age as it contains *Deflandrea phosphoritica, Impagidinium victorianum* and the youngest occurrence of frequent *Thalassiphora pelagica*. However, all these species occur in the underlying samples and there where no microplankton recorded which could be considered diagnostic of younger zones. Considering that the provisional log pick for the top of the Latrobe Group is about 3220m it is possible that the Eocene species could be reworked.

***Tricolpites longus* Spore-Pollen Zone:** **3300–3470 metres**
Maastrichtian.

In the twelve cuttings examined between 3300–3470m the sporadic but consistent presence of pollen species which become extinct in the Maastrichtian provide a confident identification of the top of the *T. longus* Zone even though the overall assemblage diversity is low. The key species are *Tricolporites lilliei* recorded in five samples, *Battenipollis sectilis* recorded in four samples, *Nothofagidites senectus* recorded in two samples and *Forcipites* (al. *Tricolpites*) *longus*, *Proteacidites reticuloconcavus* ms and *Quadraplanus brossus* all recorded from the deepest sample.

The samples at 3310m and 3340m are considered to belong to the Upper *T. longus* Zone based on the common occurrence of *Gambierina rudata*. The two best of the deeper samples at 3430m and 3470m are considered to belong to the Lower *T. longus* Zone based on the lack of any *G. rudata* abundance. These samples contain the highest occurrence of carbonaceous to coaly lithologies in Great White-1. All the other samples are best left as undifferentiated *T. longus* Zone as their recorded assemblages are simply too limited.

The index dinoflagellate *Manumiella druggii* was recorded at 3430m but as it was only represented by two specimens no great significance can be attached to its stratigraphic position. Several poor specimens assigned to *Isabelidinium greenense* Marshall 1990 were also recorded from the deepest sample at 3470m. This species has been recorded as ranging to the top of the microplankton succession and top of the *T. lilliei* Zone in Pisces-1 (Marshall, 1990) so it is likely it can range into the *T. longus* Zone

References

HELBY, R., MORGAN, R. & PARTRIDGE, A.D., 1987. A palynological zonation of the Australian Mesozoic. *Memoir Association Australasian Palaeontologists 4,* 1-94.

LENTIN, J.K. & WILLIAMS, G.L., 1993. Fossil Dinoflagellates: Index to genera and species, 1993 Edition. *AASP Contribution Series No. 28,* 1-856.

MARSHALL, N.G., 1990. Campanian dinoflagellates from southeastern Australia. *Alcheringa 14,* 1-38.

MILDENHALL, D.C. & POCKNALL, D.T., Miocene-Pleistocene spores and pollen from Central Otago, South Island, New Zealand. *New Zealand Geological Survey Palaeontological Bulletin 59*, 12-128.

PARTRIDGE, A.D., 1975. Palynological zonal scheme for the Tertiary of the Bass Strait Basin (Introducing Paleogene Dinoflagellate Zones and Late Neogene Spore-Pollen Zones). *Geol. Soc. Aust. Symposium on the Geology of Bass Strait and Environs, Melbourne*, November, 1975. *Esso Aust. Ltd. Palaeo. Rept. 1975/17* (unpubl.).

PARTRIDGE, A.D., 1976. The geological expression of eustacy in the early Tertiary of the Gippsland Basin. *APEA Journal 16* (1), 73-79.

PARTRIDGE, A.D., 1994. Palynological analysis of sidewall cores from Blackback-3, Gippsland Basin. *Biostrata Report 1994/6*, 1-23.

PARTRIDGE, A.D., 1995a. Palynological analysis of sidewall cores between 3012.1m to 3057.1m in Gudgeon-1, Gippsland Basin. *Biostrata Report 1995/10,* 1-11.

PARTRIDGE, A.D., 1995b. Palynological analysis of Smiler-1, Gippsland Basin. *Biostrata Report 1995/17*, 1-15.

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. *Proceedings Royal Society of Victoria 85,* 237-286.

STOVER, L.E. & PARTRIDGE, A.D., 1982. Eocene spore-pollen from the Werillup Formation, Western Australia. *Palynology 6*, 69-95.

Table–1: Interpretative Palynological Data Great White-1

Sample type	Depth (m)	Spore-Pollen Zone	*CR	Microplankton Zone	*CR	Key Species and Comments
Cuttings	3030	*P. tuberculatus*	D2	*Operculodinium* spp.	D2	*Hexigonifera* n.sp. and *Tuberculodinium vancompoae* suggest Miocene age.
Cuttings	3060	*P. tuberculatus*	D2	*Operculodinium* spp.	D2	Common *Cyatheacidites annulatus* and rare *Foveotriletes crater.*
Cuttings	3090	*P. tuberculatus*	D2	*Operculodinium* spp.	D2	Frequent *Protoellipsodinium mamilatus* ms with specimens of *Acaciapollenites myriosporites* and *Foveotriletes lacunosus* .
Cuttings	3120	*P. tuberculatus*	D5	*Operculodinium* spp.	D5	Low yield—assemblage substantially caved.
Cuttings	3150	*P. tuberculatus*	D2	*Operculodinium* spp.	D2	Assemblage largely caved. Presence of *Alisocysta ornata* hints at Eocene reworking?
Cuttings	3170	*P. tuberculatus*	D2	*Operculodinium* spp.	D2	Assemblage largely caved.
Cuttings	3190	*P. tuberculatus*	D2	*F. leos*	D2	Rare *Fromea leos* ms confirms basal Oligocene section present.
Cuttings	3210	*P. tuberculatus* or *N. asperus*		Indeterminate		Highest occurrences of *Impagidinium victorianum* and *Deflandrea phosphoritica* indicates top of Eocene.
Cuttings	3220	Lower *N. asperus*	D4	*D. heterophlycta*	D3	Highest occurrence of *Deflandrea heterophlycta* confirms top of Eocene.
Cuttings	3230	Lower *N. asperus*	D4	*D. heterophlycta*	D3	Common *Deflandrea heterophlycta* with pollen *Proteacidites pachypolus* and *P. recavus.*
Cuttings	3240	Lower *N. asperus*	D4	*D. heterophlycta*	D3	Common *D. heterophlycta.*
Cuttings	3260	Indeterminate				Virtually barren.
Cuttings	3270	*P. tuberculatus and N. asperus*		*Operculodinium* spp. and *D. heterophlycta*		Mixed assemblage interpreted as largely caved.
Cuttings	3290	Indeterminate				Virtually barren.
Cuttings	3300	*T. longus*	D5			Highest occurrence of consistent *Gambierina rudata.*
Cuttings	3310	Upper *T. longus*	D3			Frequent *G. rudata* with highest occurrence of *Tricolporites lilliei.*
Cuttings	3320	Indeterminate				Low yield assemblage with mostly caved fossils.
Cuttings	3340	Upper *T. longus*	D2			Frequent *G. rudata* with *T. lilliei* and *Battenipollis sectilis.*
Cuttings	3350	*T. longus*	D4			*B. sectilis* present.
Cuttings	3360	*T. longus*	D4			*Tetradopollis securus* ms present.
Cuttings	3370	*T. longus*	D4			*Proteacidites wahooensis ms* and *Tricolpites confessus* present.
Cuttings	3390	Indeterminate				Virtually barren.
Cuttings	3410	Indeterminate				Virtually barren.
Cuttings	3430	Lower *T. longus*	D2			Placed in lower subzone on absence of *G. rudata* abundance.
Cuttings	3440	*T. longus*	D4			Low yield sample.
Cuttings	3470	Lower *T. longus*	D1			*Forcipites (al. Tricolpites) longus* and *Proteacidites reticuloconcavus* ms present.
			*CR =	Confidence Rating		

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.

Table-2: Basic Sample and Palynomorph Data for Great White-1

Sample type	Depth (m)	Wt	Vom (cc)	O/Yield	Visual Yield	Palynomorph Concentration	Preservation	Number SP Species	Number MP Species
Cuttings	3030	16.4	1.9	0.115	Moderate	High	Fair	21	15
Cuttings	3060	18.8	2.40	0.127	Moderate	Moderate	Poor-good	23	18
Cuttings	3090	16.0	0.80	0.050	Moderate	High	Poor-good	24	17
Cuttings	3120	12.4	0.1	0.008	Very low	Low	Poor-fair	5	7
Cuttings	3150	12.6	0.1	0.007	Very low	Low	Poor-fair	16	12
Cuttings	3170	12.5	0.2	0.016	Low	Moderate	Poor-fair	16	14
Cuttings	3190	9.6	0.4	0.041	Low	Low	Poor-fair	26	14
Cuttings	3210	12.4	0.4	0.032	Low	Moderate	Poor-fair	26	20
Cuttings	3220	10.9	0.3	0.027	Low	Moderate	Poor-good	20	14
Cuttings	3230	10.5	0.2	0.019	Low	Moderate	Poor-fair	26	22
Cuttings	3240	12.5	0.3	0.024	Moderate	Moderate	Poor-good	25	17
Cuttings	3260	12.9	0.05	0.003	Low	Very low	Poor	NR	1
Cuttings	3270	10.8	0.1	0.009	Very low	Low	Poor	12	14
Cuttings	3290	13.9	0.1	0.003	Very low	Very low	Poor-fair	2	2
Cuttings	3300	10.8	0.05	0.004	Very low	Very low	Poor-fair	6	1
Cuttings	3310	10.2	0.1	0.009	Low	Low	Poor-good	11	1
Cuttings	3320	12.4	0.1	0.008	Low	Low	Poor-fair	12	3
Cuttings	3340	10.1	0.3	0.029	Low	Low	Poor-fair	19	3
Cuttings	3350	11.5	0.2	0.017	Moderate	Low	Poor-fair	13	3
Cuttings	3360	11.0	0.3	0.027	Moderate	Low	Fair-poor	17	NR
Cuttings	3370	13.8	0.1	0.007	Low	Very low	Poor-fair	10	1
Cuttings	3390	13.4	0.05	0.003	Very low	Very low	Poor	NR	1
Cuttings	3410	12.3	0.01		Low	Very low	Poor-fair	2	1
Cuttings	3430	11.5	0.01		Very low	Low	Poor-fair	16	8
Cuttings	3440	11.4	0.1	0.008	Low	Low	Poor-fair	8	4
Cuttings	3470	13.2	0.4	0.030	High	Low	Poor-good	29	5
Averages:		**12.5**						**14.8**	**8.4**
	Abbreviations								
	Wt. =		Weight of samples in grams						
	Vom (cc) =		Volume of aqueous suspension of kerogen residue recovered by Laola Pty Ltd						
	O/Yield =		Volume (cc) divided by Weight (grams)						

Table-3: Species List for Great White-1, Gippsland Basin.

Sample Depths	3030m	3060m	3090m	3120m	3150m	3170m	3190m	3210m	3220m	3230m	3240m	3260m	3270m	3290m	3300m	3310m	3320m	3340m	3350m	3360m	3370m	3390m	3410m	3430m	3440m	3470m
SPORE-POLLEN SPECIES																										
Acaciapollenites myriosporites			X																							
Araucariacites australis	X	X			X	X	X	X	X	X	X							X						X		C
Baculatisporites spp.		X	X				X											X						X		X
Battenipollis sectilis																		X	X	F						X
Bluffopollis scabratus							X																			
Camarozonosporites heskermensis	X					X							X							X						
Cicatricosisporites australiensis **RW**							RW																			
Cyatheacidites annulatus	C	C	C	C	C	C	X	C	X	X	X		F	X			X		X		F			X		
Cyathidites australis																									X	
Cyathidites minor																										C
Cyathidites paleospora	X	C	X	X	X	C	X	C	C	X	X							X		X				X		
Cyathidites splendens	RW			X	X						C		X		X	X	X	X		X						X
Dacrycarpites australiensis							X	X	X																	
Densoisporites velatus											RW								X							
Dictyophyllidites arcuatus		X				X							X													
Dilwynites granulatus		X	X				X	X	X		X															X
Dilwynites tuberculatus							X			X																
Ericipites scabratus							X	X			X															X
Forcipites longus																										X
Foveotriletes balteus	X																									
Foveotriletes crater		X																								
Foveotriletes lacunosus			X																							
Foveotriletes palaequetrus			X					X																		
Gambierina edwardsii																								X		X
Gambierina rudata											RW				X	C	X	C	X	X	X			F	X	X
Gleicheniidites circinidites					X		X	X										X								X
Granulatisporites trisinus **RW**			RW																							
Haloragacidites harrisii	C	X	C		X	X	F	F	X	X	X													X		
Herkosporites elliottii			X						X	X								X								X
Ischyosporites gremius								X	X	X			X													
Ischyosporites irregularis ms	X	X	X		X	X	X	X	X	X	X															
Kuylisporites waterbolki		X				X																		X		
Laevigatosporites major		X	X					X		X	X				X		X				X					X

Table-3: Species List for Great White-1, Gippsland Basin.

Sample Depths	3030m	3060m	3090m	3120m	3150m	3170m	3190m	3210m	3220m	3230m	3240m	3260m	3270m	3290m	3300m	3310m	3320m	3340m	3350m	3360m	3370m	3390m	3410m	3430m	3440m	3470m
Laevigatosporites ovatus	X	X	C						X		X		X				F	X		X	F			X		C
Latrobosporites amplus											RW					X										F
Latrobosporites marginis					X								X													
Latrobosporites ohiensis																X	X									
Leptolepidites verrucatus **RW**			RW																							
Lycopodiumsporites/Retitriletes spp.	X	X	X				X	X		X	X						X	F								X
Lygistepollenites balmei																										X
Lygistepollenites florinii	X	X			X	X	X	X	X	X	X		X			X				X						X
Malvacipollis subtilis		X									X															
Matonisporites ornamentalis	X	X	F		X		X	X	X	X	X						X									
Microcachryidites antacticus								F											X							
Nothofagidites asperus	X																									
Nothofagidites brachyspinulosus																										X
Nothofagidites deminutus	X		X					X	X	X	X															
Nothofagidites emarcidus/heturus	X	C	C		X	X	C	C	C	X	X		X		X											
Nothofagidites endurus																		X	F	X						F
Nothofagidites falcatus	X		X				X						X													
Nothofagidites flemingii							X		X	X	X															
Nothofagidites senectus																		X		X						
Nothofagidites vansteenisii							X	X	X																	
Peninsulapollis gillii																	X			F				X		X
Phyllocladidites mawsonii	X		F		X			X	C	X	F					X	F	X	X	F	X		X	X	X	F
Pilosisporites notensis **RW**										RW									RW							
Plicatipollenites spp. **RW**			RW		RW			RW		RW																
Podocarpidites spp.	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	F	X			F		X
Podosporites microsaccatus		X					X												X		X					
Polypodiidites perverrucatus	X									X	X													CV		
Proteacidites otwayensis ms											RW					X				X				X		X
Proteacidites pachypolus										X	X															
Proteacidites pseudomoides										X																
Proteacidites recavus										X																
Proteacidites recticuloconcavus ms																										X
Proteacidites rectomaginis								X	X																	
Proteacidites spp.	X		F		X	X		X		X	F		X		X		X	C	F	C	X		X	X	F	C

Table-3: Species List for Great White-1, Gippsland Basin.

Sample Depths	3030m	3060m	3090m	3120m	3150m	3170m	3190m	3210m	3220m	3230m	3240m	3260m	3270m	3290m	3300m	3310m	3320m	3340m	3350m	3360m	3370m	3390m	3410m	3430m	3440m	3470m
Proteacidites wahooensis ms																					X					
Protohaploxypinus spp. **RW**	RW	RW				RW				RW																
Quadraplanus brossus																										X
Stereisporites antiquisporites	F	F	X		X	X	F	X	X	X	X		X	F	X			X	X	F						X
Stereisporites (Tripunctisporis) sp.										X																
Tetradopllis securus ms																				X						
Tricolpites confessus																X				X	X					
Tricolpites waiparaensis																		X	X							
Tricolporites lilliei																X		F	F						X	F
Tricolporites paenestriatus			RW																							
Tubulifloridites antipodica														T			T							T		
Verrucatosporites attinatus ms								X																		
Verrucosisporites cristatus			X				X																			
Verrucosisporites kopukuensis	X				X			X	X	X	X							CV								
MICROPLANKTON SPECIES																										
Achomosphaera alcicornu	X	X	X	X																						
Achomosphaera ramulifera		X			X			X																		
Alisocysta ornatum					F		cf																			
Apectodinium sp.			X				X																			
Apteodinium australiense						X																				
Apteodinium sp.																										
Cooksonidium capricornum								X	X																	
Crassosphaera concinnia				C	C	F	X	X	X	X					X						CV					
Cyclopsiella vieta	X	X							X	X																
Cymatisphaera spp.								X			X													X		
Dapsilidinium pseudocolligerum			F			X		X	X	X																
Deflandrea flounderensis												cf														
Deflandrea heterophlycta									X	C	C		F					CV								
Deflandrea phosphoritica								X		X																
Deflandrea truncata													X													
Deflandrea sp. indent.											C		X													
Diphyes ariensis ms										X																
Enneadocysta spp.													X													

Table-3: Species List for Great White-1, Gippsland Basin.

Sample Depths	3030m	3060m	3090m	3120m	3150m	3170m	3190m	3210m	3220m	3230m	3240m	3260m	3270m	3290m	3300m	3310m	3320m	3340m	3350m	3360m	3370m	3390m	3410m	3430m	3440m	3470m
Fromea leos ms							X																			
Hexagonifera n.sp.	X																						CV			
Homotryblium tasmaniense											RW															
Hystrichokolpoma bullatus							X																			
Hystrichokolpoma rigaudae			F		X	C	C	X	F																	
Impagidinium dispertitum										X																
Impagidinium leos ms		X	X																							
Impagidinium spp.		X	X	X	X	X							X			CV								CV	CV	
Impagidinium victorianum								X	X	X																
Isabelidinium greenense																										X
Lejeunecysta sp.							X	X																		
Lingulodinium machaerophorum	X	X					X	X	X	X	X															
Lingulodinium solarum					X		X		X																	
Manumiella druggii																								X		
Nematosphaeropsis delicata ms										X																
Nematosphaeropsis rhizoma ms	X	X	X			X		X	X	X	X															
Operculodinium centrocarpum	A	C	A	X	X	C	C	X	F	X	X		X						CV			CV		CV	CV	CV
Operculodinium tabulatum ms								X		X			X						CV							
Pentadinium laticinctum		X		X				X	X	X	X															
Protoellipsodinium clavatus ms													X													
Protoellipsodinium mamilatus ms.	X	X	C					X																		
Protoellipsodinium n.sp.											X															
Protoellipsodinium simplex ms.	X	X	X	X	F	X	X	X	X	X	CV		CV				CV	CV						CV	CV	
Pyxidinopsis beta ms	X	X	X		F		X	X	X	X	X			X										CV		CV
Pyxidinopsis pontus ms	C	C	X	F	X	X		X	X		X			F			CV							CV	CV	CV
Pyxidinopsis waipawaensis											X															
Rottnestia borussica			X																							
Samlandia reticulifera									X	X	X															
Selemophemphix nephroides		X						X	X																	
Spiniferites spp.	A	A	A			C	C	C	C	X	X													X		X
Systematophora placacantha	X	X	X			X		X	X																	
Tasmanites sp.													X					X								
Tectatodinium ovatum ms		X	X																							
Tectatodinium pellitum								X	F	X																

Table-3: Species List for Great White-1, Gippsland Basin.

Sample Depths	3030m	3060m	3090m	3120m	3150m	3170m	3190m	3210m	3220m	3230m	3240m	3260m	3270m	3290m	3300m	3310m	3320m	3340m	3350m	3360m	3370m	3390m	3410m	3430m	3440m	3470m
Tectatodinium scabroellipticus ms	X	X				X	X				X		X				CV							CV		
Thalassiphora pelagica								F	F	X	X		X													
Trichodinium hirsutum																			X							
Tuberculodinium vancampoae	X							CV		CV																
Vozzhennikova rotunda											X															
OTHER PALYNOMORPHS																										
Botryococcus sp.						X	X	X		X	X					X										X
Fungal fruiting bodies	X		X				X	X																		
Fungal spores & hyphae	X	X	X				X		X	X										X						
Microforaminiferal liners	C	C	F		C	C	F	F	F	X	F		F							F				F		X
Scolecodonts			X			X	X											X								

A = Abundant
CV = Caved
C = Common
T = Contamination
F = Frequent
RW = Reworked
X = Present
cf = Compare with

RELINQUISHMENT LIST — PALYNOLOGY SLIDES

WELL NAME & NO: GREAT WHITE-1
PREPARED BY: A.D. PARTRIDGE
DATE: 25 February 1997 Sheet 1 of 2

Sample Type	Depth (m)	Catalogue Number	Description
Cuttings	3030	P197127	Kerogen slide filtered/unfiltered fractions
Cuttings	3030	P197128	Oxidised slide 2
Cuttings	3030	P197129	Oxidised slide 3
Cuttings	3030	P197130	Oxidised slide 4 - 1/2 cover slip
Cuttings	3060	P197131	Kerogen slide filtered/unfiltered fractions
Cuttings	3060	P197132	Oxidised slide 2
Cuttings	3060	P197133	Oxidised slide 3
Cuttings	3060	P197134	Oxidised slide 4 - 1/2 cover slip
Cuttings	3090	P197135	Kerogen slide filtered/unfiltered fractions
Cuttings	3090	P197136	Oxidised slide 2
Cuttings	3090	P197137	Oxidised slide 3
Cuttings	3120	P197138	Kerogen slide filtered/unfiltered fractions
Cuttings	3150	P197139	Kerogen slide filtered/unfiltered fractions
Cuttings	3170	P197140	Kerogen slide filtered/unfiltered fractions
Cuttings	3170	P197141	Oxidised slide 2 - 1/4 cover slip
Cuttings	3190	P197142	Kerogen slide filtered/unfiltered fractions
Cuttings	3190	P197143	Oxidised slide 2 - 1/2 cover slip
Cuttings	3210	P197144	Kerogen slide filtered/unfiltered fractions
Cuttings	3210	P197145	Oxidised slide 2
Cuttings	3220	P197146	Kerogen slide filtered/unfiltered fractions
Cuttings	3220	P197147	Oxidised slide 2 - 1/2 cover slip
Cuttings	3230	P197148	Kerogen slide filtered/unfiltered fractions
Cuttings	3230	P197149	Oxidised slide 2 - 1/2 cover slip
Cuttings	3240	P197150	Kerogen slide filtered/unfiltered fractions
Cuttings	3240	P197151	Oxidised slide 2
Cuttings	3240	P197152	Oxidised slide 3
Cuttings	3260	P197153	Kerogen slide filtered - 1/2 cover slip
Cuttings	3270	P197154	Kerogen slide filtered/unfiltered fractions
Cuttings	3290	P197155	Kerogen slide filtered/unfiltered fractions
Cuttings	3300	P197156	Kerogen slide filtered/unfiltered fractions
Cuttings	3310	P197157	Kerogen slide filtered/unfiltered fractions
Cuttings	3320	P197158	Kerogen slide filtered/unfiltered fractions
Cuttings	3340	P197159	Kerogen slide filtered/unfiltered fractions
Cuttings	3340	P197160	Oxidised slide 2
Cuttings	3350	P197161	Kerogen slide filtered/unfiltered fractions
Cuttings	3350	P197162	Oxidised slide 2
Cuttings	3350	P197163	Oxidised slide 3

RELINQUISHMENT LIST — PALYNOLOGY SLIDES

WELL NAME & NO: GREAT WHITE-1

PREPARED BY: A.D. PARTRIDGE

DATE: 25 February 1997 Sheet 2 of 2

Sample Type	Depth (m)	Catalogue Number	Description
Cuttings	3360	P197164	Kerogen slide filtered/unfiltered fractions
Cuttings	3360	P197165	Oxidised slide 2
Cuttings	3360	P197166	Oxidised slide 3
Cuttings	3360	P197167	Oxidised slide 4
Cuttings	3370	P197168	Kerogen slide filtered/unfiltered fractions
Cuttings	3370	P197169	Oxidised slide 2 - 1/2 cover slip
Cuttings	3390	P197170	Kerogen slide filtered - 1/2 cover slip
Cuttings	3410	P197171	Kerogen slide filtered/unfiltered fractions
Cuttings	3430	P197172	Kerogen slide filtered/unfiltered fractions
Cuttings	3440	P197173	Kerogen slide filtered/unfiltered fractions
Cuttings	3470	P197174	Kerogen slide filtered/unfiltered fractions
Cuttings	3470	P197175	Oxidised slide 2
Cuttings	3470	P197176	Oxidised slide 3
Cuttings	3470	P197177	Oxidised slide 4

Appendix 2

Appendix 2

Esso Australia Ltd
Exploration Department

GREAT WHITE-1
Formation Evaluation
Log Analysis Report

Petrophysicist: P.J. Burnett
January 1997

Endorsed by: ______________
FE Team Leader

Date: 11/4/97

GREAT WHITE 1 LOG ANALYSIS

Great White 1 electric log data acquired at total depth have been analysed for effective porosity and water saturation over the interval 3200m to 3415m MDKB.

The 12 1/4" hole was drilled out of 13 3/8" casing from 1466m to a total depth of 3472m (drillers depths). Note that all depths quoted below are logged MDKB unless specified otherwise. A depth plot of the interpretation is included as Figure 1.

DATA

Logs Acquired

Schlumberger Wireline data:

GR-DLL-SP-CALS (Supercombo)	3447m to 1443m
MSFL (Supercombo)	3428m to 2500m
LDT-CNL (Supercombo)	3424m to 2500m
AS (Supercombo)	3440m to 2500m
CSI (Checkshot)	3440m to 2100m

Log Quality

- All of the logs used in this interpretation were acquired as a single (supercombo) run-in-the-hole. Apart from some sticky fill-on-bottom causing loggers TD to occur at 3454m, the hole condition was good, with no pulls while logging, and this resulted in the logs being well depth-matched.

- Similarly the good hole condition resulted in all of the data being acceptable for use in the interpretation.

- Given the good hole condition and overlay between the neutron and density curves on a sandstone compatible scale over the clean sandstones, the porosity logs were initially thought to require no corrections. However, computed porosities in clean sandstones (i.e. less than 10% Vsh) were higher than might be expected from comparison to regional data (see Figure 2, intervals used being the same as those quoted below), and this lead to an investigation into the correctness of the nuclear data to be undertaken.

Log Processing

- Minimal depth alignment was necessary prior to the logs being used in the interpretation. The neutron log was depth aligned to the density to compensate for resolution mismatches introduced by processing of the TNPH.

- A standard temperature correction was made to the neutron porosity (TNPH) to generate TNPHC for use in the interpretation.

- The resistivity logs were environmentally corrected and then invasion corrected to generate an RT curve for use in the interpretation.

INTERPRETATION

Logs Used

GR, RT, RHOBC, TNPHC.

Analysis Parameters

a	1
m	2
n	2
Apparent Shale Neutron Porosity	0.30
Apparent Shale Bulk Density	2.55 gm/cc
Input Hydrocarbon Density	0.7 gm/cc
Shale Resistivity	4 ohmm
Lower Grain Density Limit	2.630 gm/cc
Upper Grain Density Limit	2.675 gm/cc
Formation Water Salinity	30,000 ppm NaCleq
Bottom Hole Temperature	72 DegC
Measured Rmf	0.03 ohmm @ 72 Deg C

Free Formation Water Resistivity

The free formation water salinity of 30,000 ppm was derived from Rwa calculations in clean water sands. This results in 100% water saturation in the quartzose sands whereas the highest porosity feldspathic sands calculate less than 100% Sw.

Shale Volume, Total Porosity and Water Saturation

To assess the correctness of the nuclear data, the following series of validation checks were made.

A comparison of the average density (2.274 g/cc, Figure 3a) over a clean sandstone interval (3240-3310m) at Great White 1 with comparable intervals at Terakihi 1 (2.362 g/cc over 2855-2925m, Figure 3b) and Volador 1 (2.344 g/cc over 3310-3360m, Figure 3c) indicated that the density was an average of 0.09 g/cc lower (or about 3-4 P.U. higher). When plotted on a single crossplot (Figure 3d) all three wells fall close to the clean-sand line suggesting that both nuclear tools are responding to higher porosities at Great White 1.

A further check was made by computing the Wyllie sonic porosity at the wells and plotting against the density porosity for comparison. Figures 6 and 7 (Track 4) show that the Wyllie porosity at both Great White 1 and Terakihi 1 is consistently higher (except in dolomitic rocks) than the neutron-density crossplot porosity, demonstrating that two independent porosity tools are resulting in comparatively higher calculated porosities at Great White 1.

Alongside the lowest density responses (e.g. 3250m, 3270m) at Great White 1, the GR increases slightly suggesting the presence of potassium feldspar. Given that Potass. Feldsp. has a slight lower density than quartz, then its presence could account for a slight increase in apparent calculated porosity. However, the interpreted proportion of Feldspar is insufficient to account for difference in calculated porosity between Great White-1 and the surrounding regional data. The calibration data on the logs were checked and Schlumberger also recalibrated the density tool and recomputed the data. This resulted in an average correction of +0.010 to +0.015 g/cc (0.6 to 1.0 p.u. reduction in porosity). Although significant, the decrease is again not enough to account for the higher than regional porosities calculated at Great White-1.

The conclusion is that the porosities of some of the clean sands at Great White 1 are higher than at nearby wells.

The interpretation methodology is summarised as follows: an initial Vsh was calculated from the GR and compared to a calculated neutron-density value to test for input into an iterative log analysis model. Initial neutron-density total porosity and dual-water total water saturation were then calculated and hydrocarbon and shale corrections applied to the neutron and density data using those values. The resulting calculated grain density was compared to a supplied grain density window and the initial Vsh increased or decreased until the calculated GD fell within the window.

Effective Porosity and Water Saturations

Effective porosity was calculated using the final values of total porosity and Vsh and the effective water saturation from the total water saturation using the following equations:

PHIE = (PHIT - (VSH * PHISH))
SWE = (1 - ((PHIT/PHIE) * (1 - SWT)))

DISCUSSION

1. Porosities calculated at Great White 1 are higher in some sections than those calculated for the nearest offset wells. This may be caused in part by the low grain density of the potassium feldspar content of the rocks, but may also be related in part to Great White 1 being located in a cool part of the basin resulting in less cementation.

2. The calculated salinity of 30,000 ppm is considered reasonable as it is consistent with measured salinities of regional water recoveries, and results in 100% water saturation in the clean quartz sandstones. Its use has resulted in the calculation of less than 100% water saturation in those apparent high porosity sections were the density is being reduced by low density mineralogy.

GREATWHITE_1

PETROPHYSICS ANALYSIS SUMMARY

Net porosity cut-off:	0.120 volume per volume
Net water saturation cut-off:	0.500 volume per volume
Depth reference:	MDKB

Net Porous Interval based on Porosity cut-off only.
Both Porosity and Sw cut-offs invoked when generating Hydrocarbon-Metres.

GROSS INTERVAL (metres)	NET POROUS INTERVAL								
	Gross Metres	Net Metres	Net to Gross(%)	Mean Vwclay	(Std.) (Dev.)	Mean Porosity	(Std.) (Dev.)	Mode Porosity	Mean Sw
MDKB 3200.0-3221.5	21.5	0.0	0%	-	-	-	-	-	-
MDKB 3221.5-3240.8	19.3	6.2	32%	0.35	-0.047	0.15	-0.016	0.15	0.91
MDKB 3240.8-3291.1	50.3	50.2	100%	0.10	-0.055	0.24	-0.024	0.25	0.97
MDKB 3291.1-3309.5	18.4	15.7	85%	0.24	-0.073	0.18	-0.033	0.17	1.00
MDKB 3309.5-3333.4	23.9	23.9	100%	0.04	-0.031	0.24	-0.015	0.24	1.00
MDKB 3309.5-3333.4	23.9	23.9	100%	0.04	-0.031	0.24	-0.015	0.24	1.00
MDKB 3333.4-3360.1	26.7	17.2	65%	0.23	-0.093	0.18	-0.039	0.16	1.00
MDKB 3360.1-3397.0	36.9	36.9	100%	0.08	-0.037	0.24	-0.031	0.28	0.98
MDKB 3397.0-3415.0	18.0	18.0	100%	0.20	-0.073	0.2	-0.027	0.18	0.99

GREATWHITE_1
Well Data Listing

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	VWCLAY frac	PHIE frac	SWE frac
3200	59	2.3	2.452	0.270	0.66	0.00	1.00
3201	65	2.3	2.501	0.263	0.74	0.00	1.00
3202	56	2.3	2.457	0.276	0.67	0.00	1.00
3203	61	2.2	2.454	0.299	0.79	0.00	1.00
3204	59	2.1	2.443	0.268	0.60	0.01	1.00
3205	67	2.2	2.469	0.302	0.82	0.00	1.00
3206	64	2.5	2.465	0.289	0.77	0.00	1.00
3207	64	2.2	2.462	0.259	0.63	0.00	1.00
3208	61	2.1	2.453	0.290	0.75	0.00	1.00
3209	57	2.0	2.446	0.323	0.85	0.00	1.00
3210	64	2.1	2.421	0.293	0.67	0.00	1.00
3211	62	2.1	2.425	0.307	0.73	0.00	1.00
3212	59	2.0	2.420	0.292	0.65	0.00	1.00
3213	56	2.3	2.459	0.273	0.69	0.00	1.00
3214	59	2.1	2.391	0.314	0.66	0.00	1.00
3215	61	2.1	2.430	0.287	0.68	0.00	1.00
3216	61	2.3	2.454	0.312	0.82	0.00	1.00
3217	66	2.1	2.422	0.348	0.84	0.00	1.00
3218	58	2.1	2.438	0.287	0.68	0.00	1.00
3219	62	2.3	2.452	0.287	0.71	0.00	1.00
3220	63	2.3	2.468	0.275	0.72	0.00	1.00
3221	47	2.9	2.522	0.227	0.65	0.00	1.00
3222	70	3.1	2.308	0.279	0.37	0.18	0.71
3223	68	3.0	2.457	0.224	0.48	0.06	1.00
3224	73	2.5	2.355	0.239	0.39	0.15	0.96
3225	64	2.6	2.361	0.259	0.39	0.16	0.89
3226	64	2.5	2.365	0.243	0.33	0.16	0.96
3227	64	2.9	2.429	0.248	0.48	0.07	1.00
3228	64	3.0	2.390	0.213	0.31	0.15	0.95
3229	62	2.6	2.435	0.251	0.51	0.06	1.00
3230	74	2.8	2.398	0.261	0.49	0.07	0.95
3231	83	3.0	2.454	0.240	0.54	0.03	1.00
3232	103	3.0	2.441	0.250	0.58	0.01	1.00
3233	91	3.2	2.426	0.261	0.57	0.02	1.00
3234	93	3.3	2.423	0.294	0.72	0.00	1.00
3235	81	3.0	2.376	0.277	0.52	0.06	0.92
3236	84	3.5	2.399	0.256	0.50	0.06	0.90
3237	84	3.8	2.444	0.258	0.61	0.00	1.00
3238	98	4.5	2.458	0.308	0.81	0.00	1.00
3239	95	4.8	2.447	0.269	0.69	0.00	1.00
3240	74	4.1	2.526	0.232	0.69	0.00	1.00
3241	64	1.9	2.399	0.203	0.30	0.14	1.00
3242	77	1.3	2.285	0.241	0.19	0.21	1.00
3243	92	1.9	2.302	0.228	0.18	0.20	1.00
3244	50	1.7	2.242	0.233	0.12	0.24	0.97
3245	45	1.7	2.234	0.238	0.06	0.26	0.93

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	VWCLAY frac	PHIE frac	SWE frac
3246	44	1.8	2.238	0.253	0.05	0.26	0.89
3247	45	1.8	2.227	0.224	0.06	0.26	0.91
3248	46	1.9	2.240	0.202	0.04	0.25	0.94
3249	45	1.7	2.206	0.248	0.09	0.27	0.88
3250	51	1.6	2.182	0.284	0.14	0.28	0.85
3251	47	1.7	2.202	0.241	0.09	0.27	0.92
3252	52	1.6	2.253	0.233	0.14	0.23	1.00
3253	63	1.5	2.232	0.230	0.11	0.25	1.00
3254	79	3.0	2.383	0.170	0.15	0.16	1.00
3255	50	2.1	2.270	0.227	0.13	0.23	0.91
3256	45	1.5	2.195	0.251	0.07	0.27	0.93
3257	51	1.6	2.202	0.246	0.11	0.26	0.91
3258	52	1.5	2.213	0.250	0.16	0.25	0.94
3259	43	1.8	2.212	0.215	0.04	0.26	0.91
3260	53	1.5	2.232	0.253	0.15	0.25	0.97
3261	55	1.6	2.222	0.240	0.12	0.25	0.95
3262	50	1.6	2.270	0.218	0.12	0.23	1.00
3263	76	2.3	2.280	0.192	0.04	0.23	0.99
3264	54	1.7	2.248	0.210	0.08	0.24	0.98
3265	52	1.4	2.210	0.214	0.03	0.26	1.00
3266	48	1.7	2.280	0.195	0.09	0.22	1.00
3267	62	1.8	2.282	0.217	0.16	0.21	1.00
3268	52	1.8	2.242	0.220	0.11	0.24	0.95
3269	42	1.5	2.227	0.231	0.03	0.27	0.99
3270	45	1.8	2.198	0.248	0.06	0.28	0.92
3271	43	1.7	2.241	0.208	0.03	0.25	0.98
3272	38	1.5	2.265	0.222	0.00	0.25	1.00
3273	42	1.9	2.312	0.199	0.02	0.22	1.00
3274	44	1.7	2.322	0.197	0.05	0.22	1.00
3275	48	1.6	2.221	0.254	0.09	0.26	0.94
3276	48	1.5	2.217	0.233	0.08	0.26	0.98
3277	54	1.6	2.217	0.211	0.02	0.26	0.97
3278	55	1.5	2.201	0.241	0.09	0.27	0.94
3279	46	1.7	2.230	0.228	0.08	0.25	0.95
3280	48	1.6	2.216	0.224	0.07	0.26	0.96
3281	53	1.6	2.234	0.261	0.15	0.25	0.94
3282	49	1.6	2.213	0.228	0.08	0.26	0.94
3283	56	1.5	2.205	0.210	0.02	0.27	0.97
3284	51	1.8	2.241	0.241	0.14	0.24	0.92
3285	102	1.7	2.288	0.194	0.02	0.23	1.00
3286	60	1.5	2.216	0.235	0.10	0.26	0.98
3287	71	2.2	2.317	0.194	0.15	0.19	1.00
3288	76	1.5	2.227	0.240	0.13	0.25	0.98
3289	46	1.6	2.251	0.213	0.08	0.24	1.00
3290	73	1.6	2.245	0.233	0.13	0.24	1.00
3291	69	1.7	2.288	0.182	0.08	0.21	1.00
3292	85	2.1	2.307	0.229	0.21	0.20	0.97
3293	79	2.4	2.368	0.213	0.27	0.16	1.00
3294	107	3.0	2.413	0.193	0.29	0.13	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	VWCLAY frac	PHIE frac	SWE frac
3295	61	1.6	2.267	0.196	0.06	0.23	1.00
3296	63	1.6	2.277	0.232	0.22	0.21	1.00
3297	52	1.3	2.224	0.271	0.15	0.25	1.00
3298	88	2.4	2.397	0.266	0.53	0.04	1.00
3299	76	2.0	2.329	0.214	0.18	0.19	1.00
3300	83	2.8	2.351	0.202	0.20	0.17	0.94
3301	82	3.0	2.388	0.212	0.32	0.14	0.98
3302	72	2.1	2.318	0.239	0.31	0.18	0.99
3303	55	1.3	2.275	0.289	0.26	0.22	1.00
3304	84	1.9	2.428	0.271	0.59	0.04	1.00
3305	117	1.9	2.423	0.285	0.66	0.00	1.00
3306	95	2.6	2.339	0.215	0.24	0.17	0.95
3307	87	2.6	2.415	0.211	0.37	0.12	1.00
3308	77	1.7	2.309	0.218	0.22	0.19	1.00
3309	65	1.9	2.344	0.207	0.26	0.16	1.00
3310	42	1.7	2.275	0.188	0.03	0.23	1.00
3311	47	1.6	2.246	0.203	0.05	0.24	1.00
3312	45	1.7	2.268	0.241	0.09	0.24	0.99
3313	49	1.7	2.260	0.222	0.09	0.24	0.99
3314	49	1.5	2.217	0.245	0.12	0.26	0.96
3315	48	1.6	2.226	0.218	0.06	0.26	0.97
3316	44	1.7	2.250	0.204	0.04	0.24	1.00
3317	42	1.9	2.258	0.194	0.03	0.24	0.97
3318	46	1.6	2.251	0.202	0.05	0.24	1.00
3319	40	1.7	2.258	0.246	0.06	0.25	0.96
3320	40	1.7	2.268	0.199	0.01	0.24	1.00
3321	43	1.6	2.272	0.219	0.04	0.24	1.00
3322	42	1.7	2.302	0.207	0.04	0.23	1.00
3323	39	1.8	2.296	0.201	0.00	0.23	1.00
3324	45	2.0	2.320	0.173	0.05	0.20	1.00
3325	36	1.7	2.294	0.205	0.00	0.24	1.00
3326	39	1.7	2.300	0.197	0.00	0.23	1.00
3327	39	2.0	2.285	0.175	0.00	0.23	1.00
3328	40	2.0	2.300	0.180	0.00	0.22	1.00
3329	40	1.8	2.295	0.172	0.01	0.22	1.00
3330	42	1.9	2.297	0.191	0.02	0.22	1.00
3331	45	1.9	2.286	0.215	0.05	0.23	0.97
3332	39	1.8	2.293	0.209	0.00	0.24	1.00
3333	43	1.7	2.293	0.183	0.04	0.22	1.00
3334	84	3.2	2.444	0.194	0.39	0.10	1.00
3335	57	1.6	2.323	0.226	0.22	0.19	1.00
3336	72	1.7	2.390	0.235	0.39	0.13	1.00
3337	102	2.9	2.435	0.225	0.47	0.07	1.00
3338	80	1.5	2.340	0.213	0.25	0.17	1.00
3339	66	2.1	2.376	0.196	0.29	0.14	1.00
3340	87	2.5	2.407	0.245	0.47	0.08	1.00
3341	111	4.9	2.528	0.232	0.72	0.00	1.00
3342	113	3.2	2.470	0.253	0.69	0.00	1.00
3343	77	2.3	2.384	0.214	0.33	0.14	1.00

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	VWCLAY frac	PHIE frac	SWE frac
3344	51	1.1	2.254	0.219	0.10	0.24	1.00
3345	62	1.5	2.286	0.232	0.24	0.20	1.00
3346	110	11.8	2.227	0.394	-	-	Coal
3347	88	2.2	2.385	0.193	-	-	Coal
3348	91	2.7	2.439	0.234	0.51	0.05	1.00
3349	91	3.8	2.451	0.222	0.50	0.05	0.97
3350	75	3.1	2.412	0.180	0.28	0.13	1.00
3351	47	1.7	2.285	0.238	0.09	0.23	1.00
3352	52	1.2	2.239	0.238	0.14	0.24	1.00
3353	76	3.8	2.187	0.356	-	-	Coal
3354	74	2.0	2.359	0.211	-	-	Coal
3355	62	1.5	2.264	0.237	0.19	0.22	1.00
3356	76	1.2	2.211	0.234	0.02	0.27	1.00
3357	47	1.7	2.328	0.184	0.08	0.20	1.00
3358	68	2.1	2.343	0.212	0.29	0.16	1.00
3359	74	2.3	2.342	0.237	0.34	0.16	0.98
3360	54	2.1	2.346	0.213	0.18	0.18	1.00
3361	50	2.2	2.331	0.191	0.12	0.19	1.00
3362	47	1.7	2.236	0.229	0.09	0.25	0.95
3363	43	1.5	2.209	0.248	0.04	0.28	0.92
3364	43	1.6	2.185	0.246	0.03	0.28	0.87
3365	47	1.6	2.202	0.244	0.07	0.27	0.89
3366	49	1.6	2.196	0.270	0.11	0.28	0.88
3367	48	1.6	2.175	0.257	0.09	0.28	0.86
3368	47	1.7	2.173	0.259	0.08	0.28	0.83
3369	51	1.6	2.189	0.253	0.13	0.27	0.86
3370	44	1.5	2.180	0.236	0.04	0.28	0.89
3371	38	1.5	2.183	0.280	0.06	0.29	0.87
3372	45	1.5	2.175	0.287	0.07	0.29	0.85
3373	41	1.5	2.202	0.257	0.02	0.28	0.91
3374	43	1.6	2.240	0.227	0.04	0.26	0.97
3375	49	1.6	2.280	0.203	0.11	0.22	1.00
3376	47	1.7	2.277	0.198	0.08	0.22	1.00
3377	50	1.7	2.313	0.190	0.12	0.20	1.00
3378	55	1.6	2.267	0.199	0.07	0.23	1.00
3379	52	1.6	2.283	0.229	0.15	0.22	1.00
3380	53	1.7	2.279	0.188	0.07	0.22	1.00
3381	53	1.9	2.310	0.180	0.10	0.20	1.00
3382	73	1.8	2.286	0.203	0.13	0.21	1.00
3383	76	1.8	2.269	0.230	0.13	0.23	0.96
3384	70	1.5	2.293	0.220	0.18	0.21	1.00
3385	55	1.6	2.263	0.209	0.10	0.23	1.00
3386	44	1.8	2.269	0.203	0.05	0.23	0.99
3387	48	1.7	2.287	0.230	0.11	0.23	1.00
3388	47	1.7	2.290	0.198	0.07	0.22	1.00
3389	54	1.5	2.249	0.212	0.08	0.24	1.00
3390	51	1.8	2.222	0.215	0.05	0.25	0.92
3391	59	1.6	2.212	0.226	0.08	0.26	0.94
3392	52	1.6	2.234	0.228	0.09	0.25	0.97

DEPTH (mRKB)	GR api	RT ohmm	RHOB g/cc	NPHI frac	VWCLAY frac	PHIE frac	SWE frac
3393	52	1.6	2.253	0.208	0.08	0.24	1.00
3394	48	1.7	2.279	0.188	0.05	0.23	1.00
3395	50	1.6	2.235	0.212	0.07	0.25	1.00
3396	56	1.7	2.242	0.212	0.08	0.24	0.97
3397	54	1.6	2.283	0.211	0.15	0.21	1.00
3398	73	1.9	2.267	0.232	0.19	0.22	0.94
3399	70	1.8	2.259	0.253	0.26	0.21	0.91
3400	76	1.6	2.265	0.274	0.27	0.22	0.98
3401	91	1.8	2.250	0.237	0.10	0.24	0.93
3402	98	2.5	2.339	0.227	0.26	0.18	0.90
3403	99	1.6	2.254	0.240	0.12	0.24	0.97
3404	95	2.4	2.325	0.212	0.17	0.19	0.94
3405	72	1.6	2.253	0.217	0.12	0.23	1.00
3406	75	1.8	2.274	0.187	0.04	0.23	1.00
3407	121	2.6	2.378	0.215	0.31	0.15	1.00
3408	99	2.0	2.323	0.233	0.25	0.18	1.00
3409	104	2.4	2.360	0.214	0.26	0.16	1.00
3410	100	2.2	2.335	0.201	0.16	0.19	1.00
3411	88	1.9	2.364	0.210	0.25	0.16	1.00
3412	99	2.3	2.343	0.226	0.27	0.17	0.99
3413	100	2.2	2.327	0.227	0.24	0.18	0.98
3414	98	2.2	2.310	0.216	0.16	0.20	0.95
3415	89	2.3	2.350	0.223	Nul	0.00	0.00

Attached are the following presentations of results:

- Table 1 - Summary of Results
- Table 2 - Log Analysis Listing
- Figure 1 - Depth Plot of Interpretation
- Figure 2 - Crossplot of Porosity in Low Vsh Sandstone
- Figure 3a - Histogram of Great White 1 RHOB (3240-3310m)
- Figure 3b - Histogram of Terakihi 1 RHOB (2855-2925m)
- Figure 3c - Histogram of Volador 1 RHOB (3310=3360m)
- Figure 3d - Neutron-Density Crossplot Comparison of Clean Sandstone Intervals
- Figure 4a - Depth Plot of Great White 1; Wyllie to Xplot Porosity Comparison
- Figure 4b - Depth Plot of Terakihi 1; Wyllie to Xplot Porosity Comparison
- Attachment 1 - Analysis Depth Plot

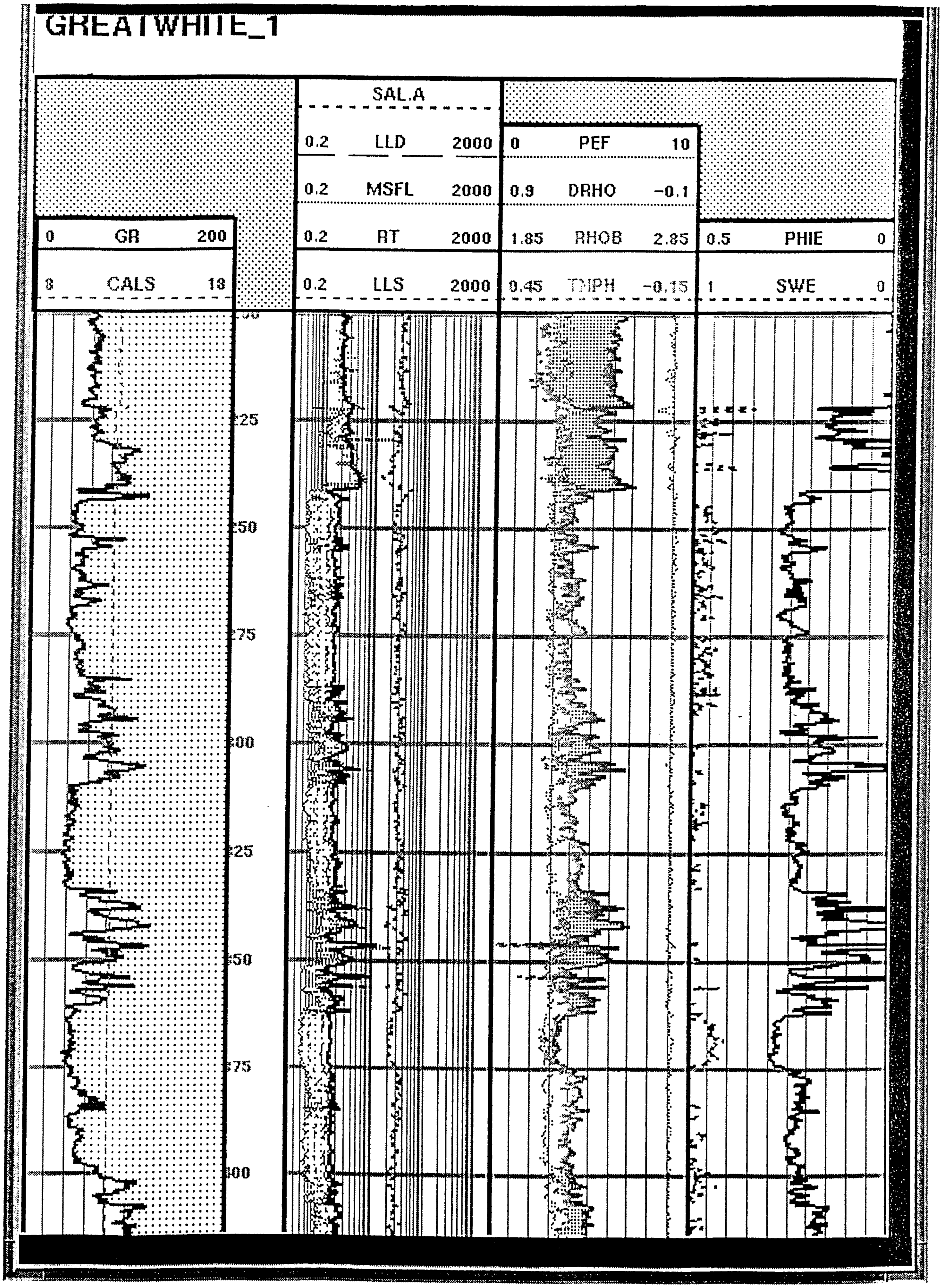

GREATWHITE_1
0 GR 200
8 CALS 18
SAL.A
0.2 LLD 2000
0.2 MSFL 2000
0.2 RT 2000
0.2 LLS 2000
0 PEF 10
0.9 DRHO -0.1
1.85 RHOB 2.85
0.45 TNPH -0.15
0.5 PHIE 0
1 SWE 0
25
50
75
00
25
50
75
00

Figure 1

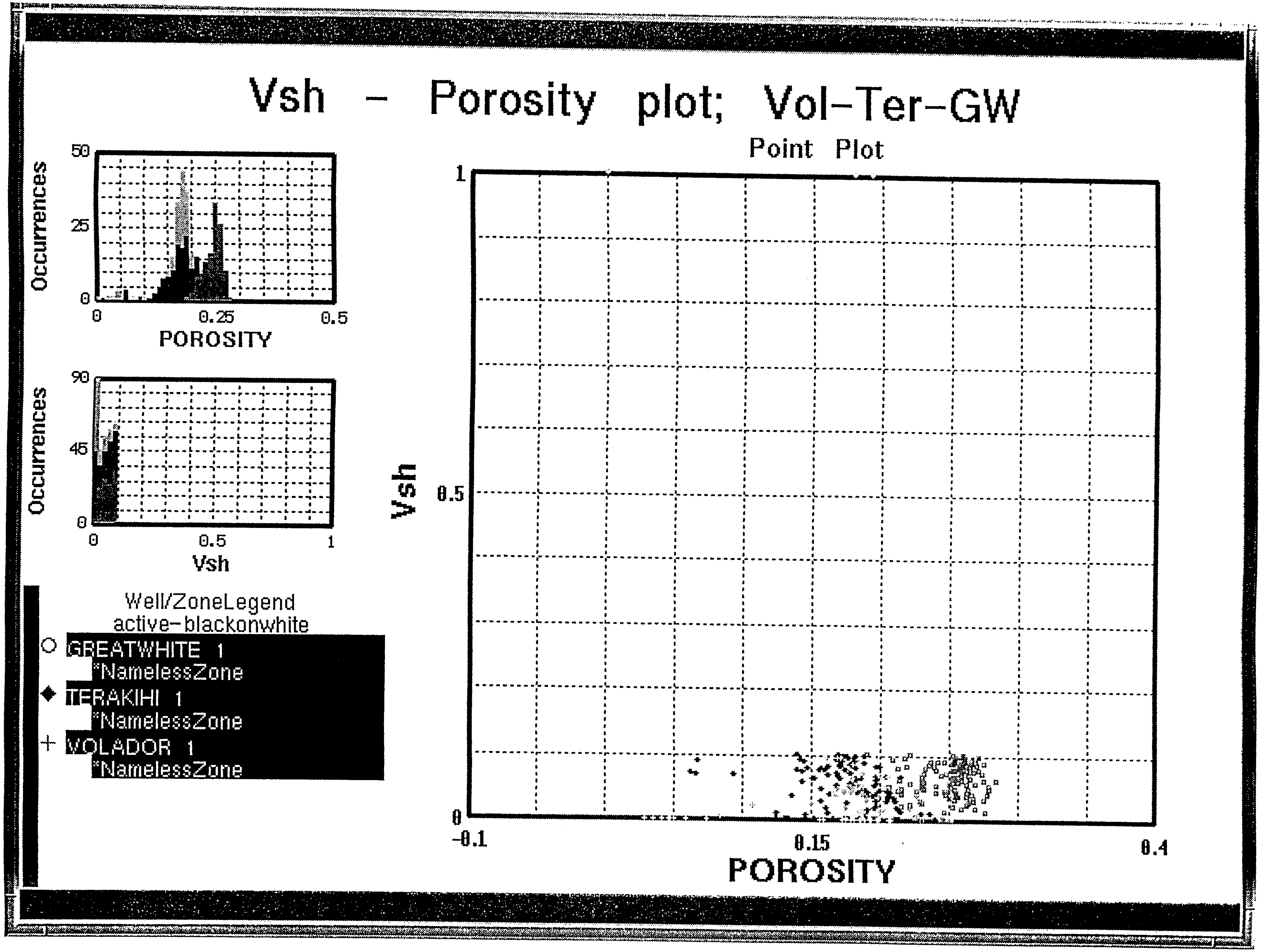
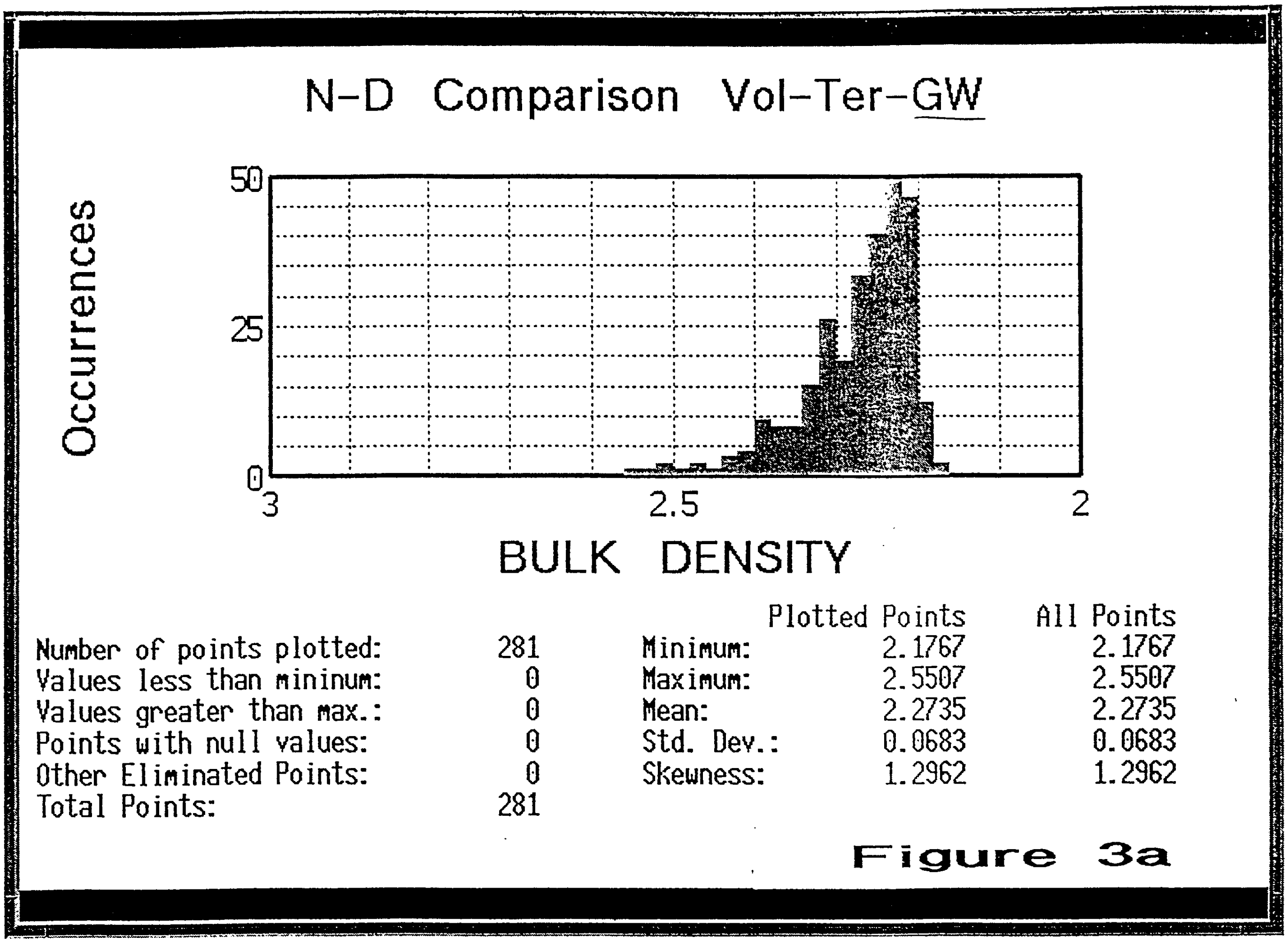

Vsh - Porosity plot; Vol-Ter-GW
Point Plot
Occurrences
50
25
0
0
0.25
0.5
POROSITY
Occurrences
90
45
0
0
0.5
1
Vsh
Well/ZoneLegend
active-blackonwhite
○ GREATWHITE 1
*NamelessZone
◆ TERAKIHI 1
*NamelessZone
+ VOLADOR 1
*NamelessZone
Vsh
1
0.5
0
-0.1
0.15
0.4
POROSITY

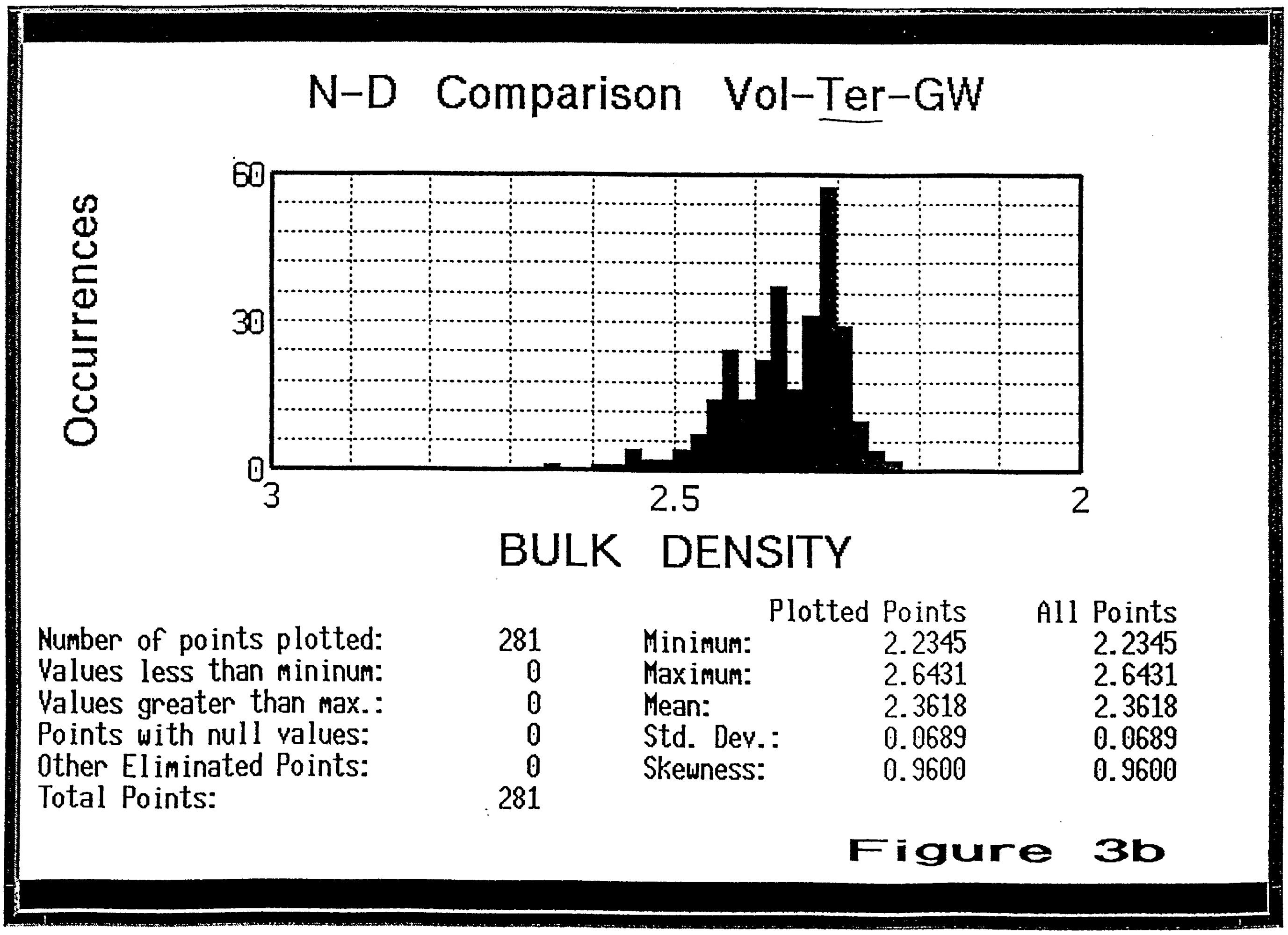
Figure 2



N-D Comparison Vol-Ter-GW

```
                                                    Plotted Points     All Points
Number of points plotted:        281      Minimum:          2.1767         2.1767
Values less than mininum:          0      Maximum:          2.5507         2.5507
Values greater than max.:          0      Mean:             2.2735         2.2735
Points with null values:           0      Std. Dev.:        0.0683         0.0683
Other Eliminated Points:           0      Skewness:         1.2962         1.2962
Total Points:                    281
```

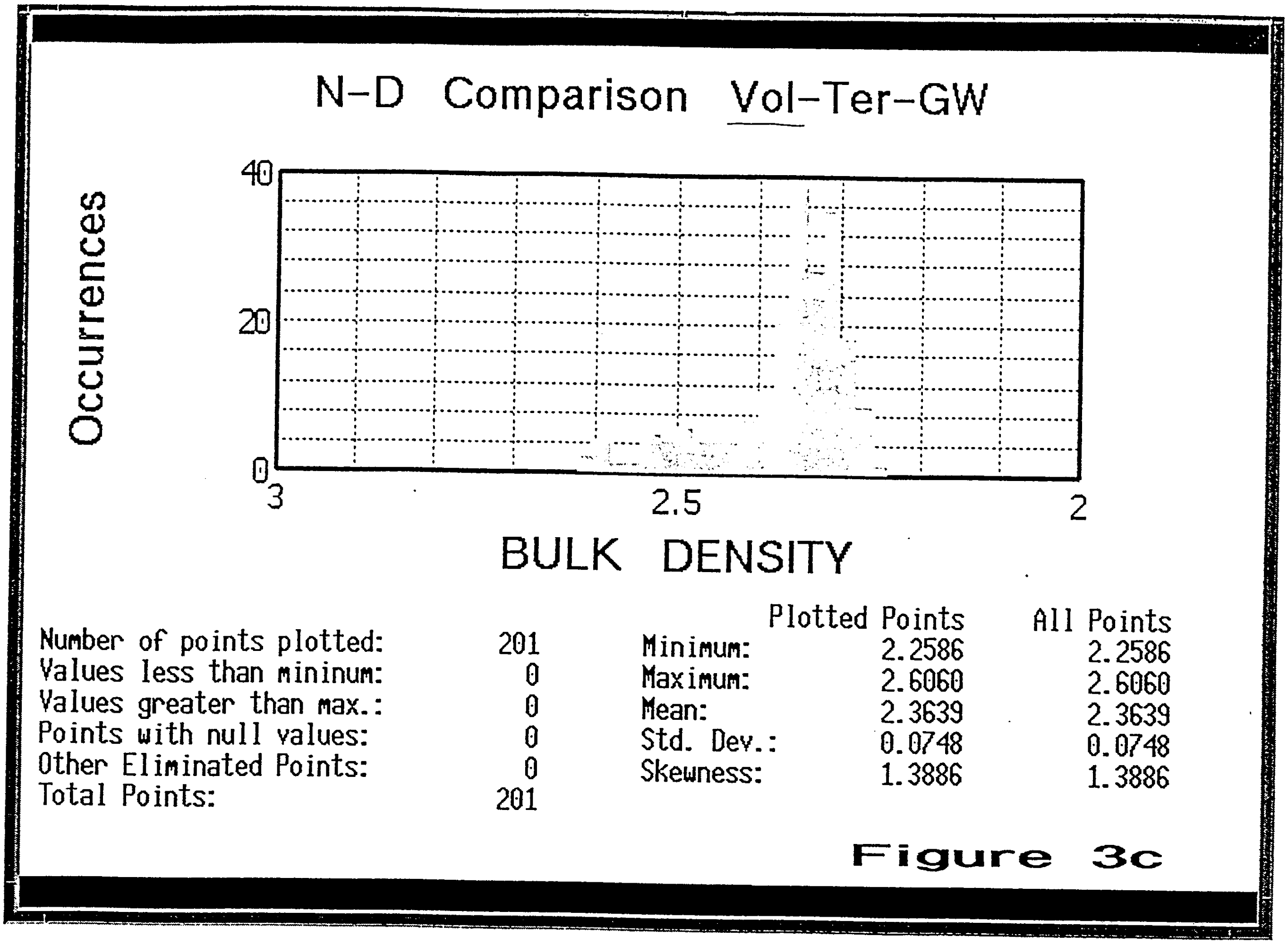
Figure 3a



N-D Comparison Vol-Ter-GW

```
                                                    Plotted Points     All Points
Number of points plotted:        281      Minimum:          2.2345         2.2345
Values less than mininum:          0      Maximum:          2.6431         2.6431
Values greater than max.:          0      Mean:             2.3618         2.3618
Points with null values:           0      Std. Dev.:        0.0689         0.0689
Other Eliminated Points:           0      Skewness:         0.9600         0.9600
Total Points:                    281
```

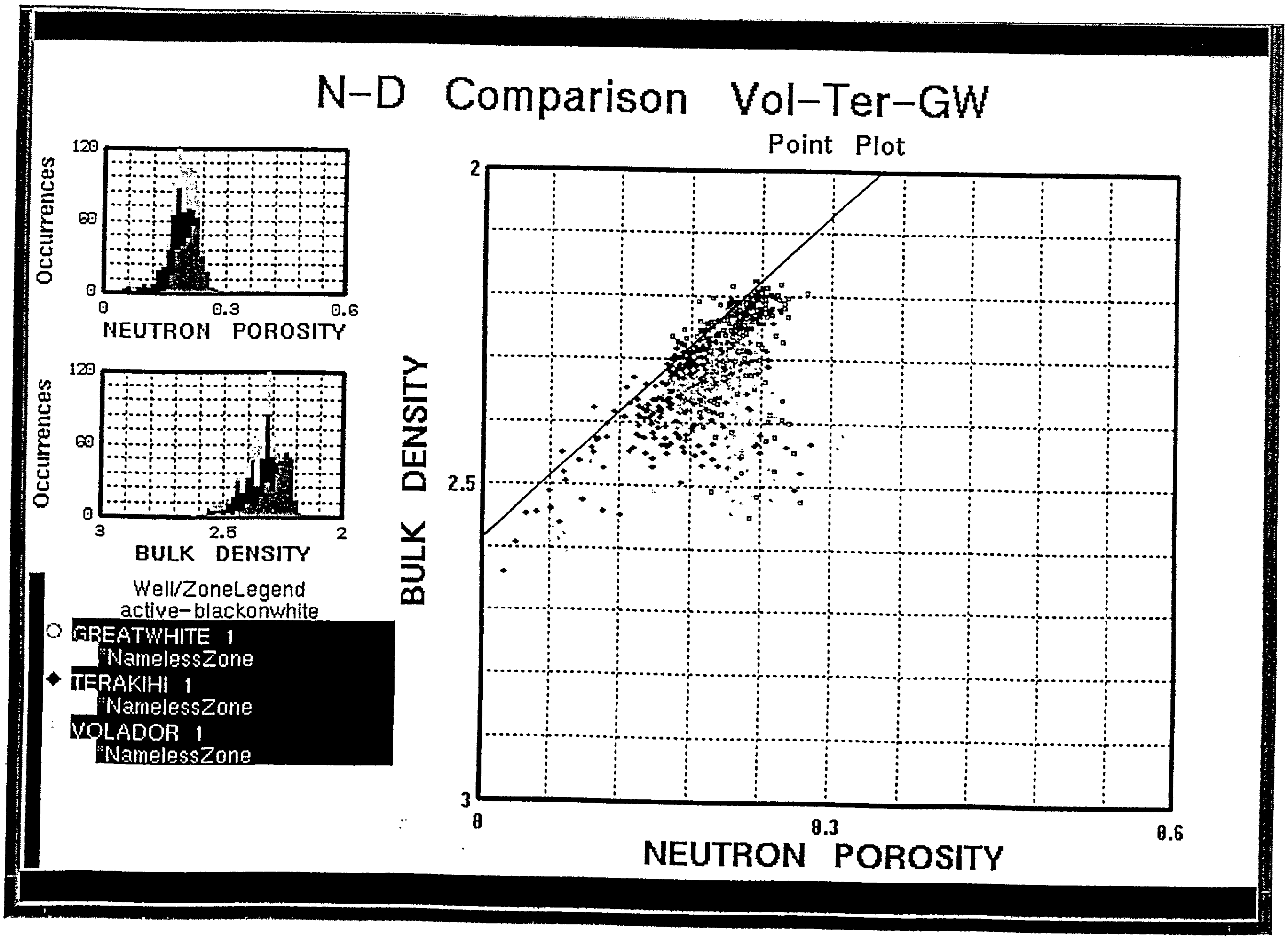
Figure 3b



Number of points plotted:	201
Values less than mininum:	0
Values greater than max.:	0
Points with null values:	0
Other Eliminated Points:	0
Total Points:	201

	Plotted Points	All Points
Minimum:	2.2586	2.2586
Maximum:	2.6060	2.6060
Mean:	2.3639	2.3639
Std. Dev.:	0.0748	0.0748
Skewness:	1.3886	1.3886

Figure 3c



Fiqure 3d

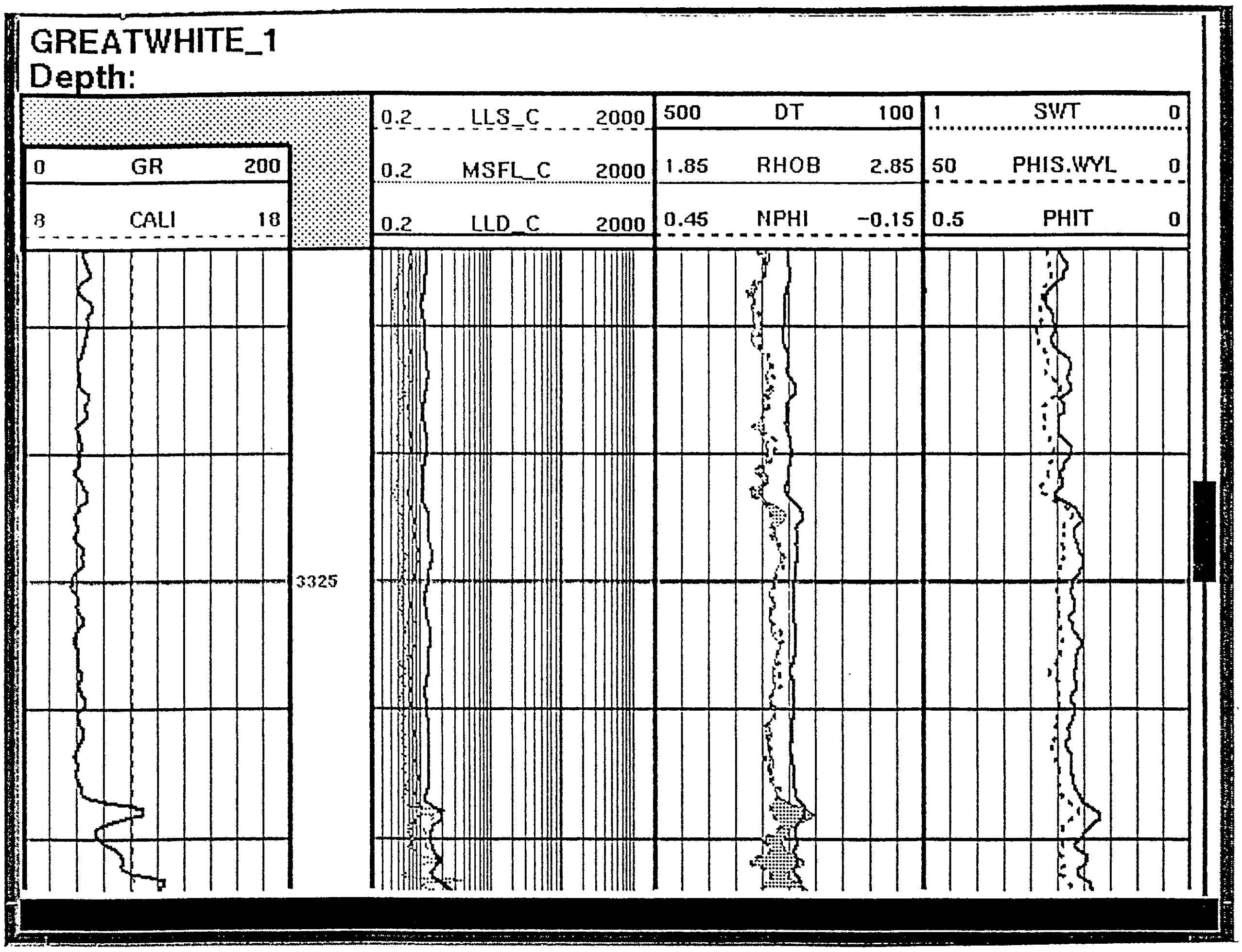


Figure 4a

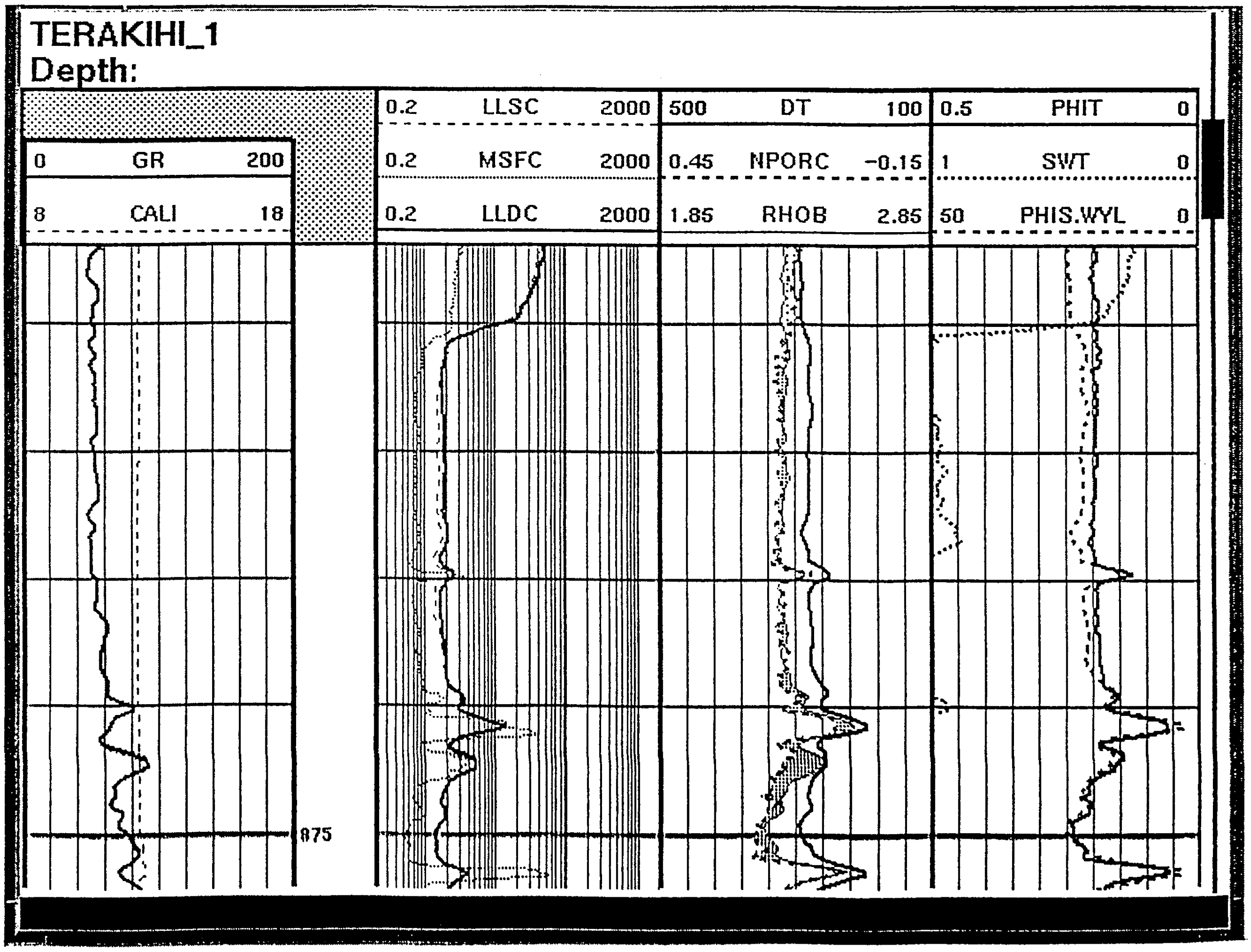


Figure 4b

PE600649

This is an enclosure indicator page.
The enclosure PE600649 is enclosed within the container PE900827 at this location in this document.

The enclosure PE600649 has the following characteristics:

ITEM_BARCODE = PE600649
CONTAINER_BARCODE = PE900827
NAME = CPI Well Log
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = CPI Well Log(from appendix 2 of WCR vol.2) for Great White-1
REMARKS = Well log does not have a given title
DATE_CREATED = 26/03/1997
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = SOLAR
CLIENT_OP_CO = ESSO AUSTRALIA LTD

(Inserted by DNRE - Vic Govt Mines Dept)

Enclosures

Enclosures

PE600650

This is an enclosure indicator page.
The enclosure PE600650 is enclosed within the container PE900827 at this location in this document.

The enclosure PE600650 has the following characteristics:

ITEM_BARCODE = PE600650
CONTAINER_BARCODE = PE900827
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Well Completion Log (Composite Log)
Enclosure 1 of WCR for Great White-1
REMARKS =
DATE_CREATED = 8/01/97
DATE_RECEIVED = 26/06/97
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = Esso Australia Resources Limited
CLIENT_OP_CO = Esso Australia Resources Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE600651

This is an enclosure indicator page.
The enclosure PE600651 is enclosed within the container PE900827 at this location in this document.

The enclosure PE600651 has the following characteristics:

ITEM_BARCODE = PE600651
CONTAINER_BARCODE = PE900827
NAME = Synthetic Seismogram - enclosure 2
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismogram (enclosure 2 of WCR) for Great White-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = Esso Australia Limited
CLIENT_OP_CO = Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE900828

This is an enclosure indicator page.
The enclosure PE900828 is enclosed within the container PE900827 at this location in this document.

The enclosure PE900828 has the following characteristics:

ITEM_BARCODE = PE900828
CONTAINER_BARCODE = PE900827
NAME = Seismic Line G94BV- 438 - Enclosure 3
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Seismic Line G94BV- 438 - Enclosure 3 of WCR for Great White-1
REMARKS =
DATE_CREATED = 07/05/1997
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = GeoQuest systems
CLIENT_OP_CO = Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE900829

This is an enclosure indicator page.
The enclosure PE900829 is enclosed within the container PE900827 at this location in this document.

The enclosure PE900829 has the following characteristics:
ITEM_BARCODE = PE900829
CONTAINER_BARCODE = PE900827
NAME = Seismic Line G94BV - 698 - Enclosure 4
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Seismic Line G94BV - 698 - Enclosure 4 of WCR for Great White-1
REMARKS =
DATE_CREATED = 07/05/1997
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = GeoQuest systems
CLIENT_OP_CO = Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE900830

This is an enclosure indicator page.
The enclosure PE900830 is enclosed within the container PE900827 at this location in this document.

The enclosure PE900830 has the following characteristics:

ITEM_BARCODE = PE900830
CONTAINER_BARCODE = PE900827
NAME = Top of Latrobe Group Post Drill Depth Structure Map - Enclosure 5
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Post Drill Depth Structure Map - Enclosure 5 of WCR for Great White-1
REMARKS =
DATE_CREATED = 20/02/1997
DATE_RECEIVED = 26/06/1997
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = ESSO AUSTRALIA PTY LTD
CLIENT_OP_CO = Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)

PE900831

This is an enclosure indicator page.
The enclosure PE900831 is enclosed within the container PE900827 at this location in this document.

The enclosure PE900831 has the following characteristics:

ITEM_BARCODE = PE900831
CONTAINER_BARCODE = PE900827
NAME = Post Drill Depth Structure Map
BASIN = GIPPSLAND
PERMIT = VIC/P24
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Base of Eocene Channelling/Top of Latrobe Group Post Drill Depth Structure Map - Enclosure 6 of WCR for Great White-1
REMARKS =
DATE_CREATED = 20/02/97
DATE_RECEIVED = 26/06/97
W_NO = W1162
WELL_NAME = Great White-1
CONTRACTOR = ESSO AUSTRALIA PTY LTD
CLIENT_OP_CO = Esso Australia Limited

(Inserted by DNRE - Vic Govt Mines Dept)