W962. HENKE-1. W.C.R. VOL 1 OF 2.

PEP 105
OTWAY BASIN

HENKE NO. 1

WELL COMPLETION REPORT

TEXT & APPENDICES

BY

B.L. RAYNER
FEBRUARY
1988

15 MAR 1988

PETROLEUM DIVISION

BEACH PETROLEUM N.L.

(Incorporated in South Australia)

W962

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HENKE NO. 1.

WELL COMPLETION REPORT

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B.L. RAYNER

For : Beach Petroleum N.L.
685 Burke Road,
CAMBERWELL.....3124
VICTORIA.

February 1988.

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BHC-GR	1	1:500
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DOO-MSFL-GR	1	1:500
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CST	1	1:200
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SUMMARY

Henke No. 1 was drilled as a wildcat exploration well in PEP 105, Otway Basin, Victoria.

Participants were Beach Petroleum N.L. (operator), Gas & Fuel Exploration N.L., SOCDET Production Pty. Limited and CONEX Australia Ltd.

The well, located 52 km NW of Portland and 43 km SE of Mt. Gambier, was the first of a four well progam conducted by Beach in PEP 105 and nearby PEP 118.

The prospect was a seismically defined, faulted rollover and the principal target was the uppermost Paaratte Formation.

Drilling commenced on the 25th June, 1987.

At a depth of 1339m, DST No. 1 was conducted over the interval 1339m-1326.7m.

Drilling continued to a total depth of 1435m, reached on the 6th July, 1987.

At total depth the following wireline logs were run: Dual Laterolog/Microspherically Focused Log, Litho-Density/Compensated Neutron Log, Gamma Ray-Sonic Log, Check Shot Survey and Sidewall cores.

No significant hydrocarbon shows were noted in the cuttings, drilling mud, sidewall cores or logs.

Henke No. 1 was plugged and abandoned as a dry hole, and the rig released on the 8th July, 1987.

1. INTRODUCTION

Henke No. 1 was drilled in the Tyrendarra Embayment of the Otway Basin.

The Otway Basin is an east-west trending trough extending from Cape Jaffa in South Australia to the King Island-Mornington Peninsula Ridge. This basin contains up to 8000 metres of late Jurassic to recent sediments and has an areal extent of 105,000 square kilometres.

The well was designed to test the hydrocarbon prospectivity at the top of the Upper Cretaceous Paaratte Formation. Secondary targets were the basal Tertiary Pebble Point Formation and the intra-Pember Sand.

The prospect is a dip/fault feature first identified by the Beach 1984 Wanwin-Gorae Seismic Survey and subsequently refined by the Beach 1985 Wanwin-Gorae Detail and the Beach 1986 Henke Seismic Survey.

The feature is a part of a prominent north/north-east, south/south-west nose which began forming at the beginning of the Upper Cretaceous and continued through the Mesozoic. Critical closure is dependant on the south bounding Wanwin Fault.

The Wanwin Fault was proposed to be the major conduit by which hydrocarbons generated at depth in the Eumeralla Formation migrated into the Paaratte Formation. The Pember Mudstone and possibly the Pebble Point Formation were thought to provide adequate cap rocks.

PEP 105 **OTWAY BASIN** **HENKE NO. 1** **BEACH PETROLEUM N.L.**

Status: P & A, Dry Hole.

Hole Size: 12¼" to 301m, 8½" to 1435m.

Casing Shoe: 297.6m.

Plugs: No. 1 1325-1275m, No. 2 317-267m.
No. 3 Surface.

Location: Lat. 38° 0' 20.35" S Long. 141° 11' 25.82" E

Seismic: 60m west of SP 1036, HE86-416.

Elevation: 34.1m G.L. 38.7 K.B.

Spudded: 25 June 1987. Rig Release: 8 July 1987.

Rig: O.D.E. Rig 19, Kremco K600H.

Rock Unit	**KB(m)**	Depth SL	**Thickness(m)**	**Rock Unit**	**KB(m)**		**Thickness(m)**
Heytesbury Grp	Surface	+20.3	59.4	Paaratte Formation	1340	-1301.3	+95
Nirranda Grp	abs						
Burrungule Mbr	64	-25.3	64				
Dilwyn Formation	128	-89.3	910				
Pember Mudstone Mbr	1038	-999.3	282	Total Depth (Driller)	1435	-1396.3	
Intra-Pember Sand	abs	-	-				
Pebble Point Fm	1320	-1281.3	20	Total Depth (Logger)	1433.5		

Logs: DLL/MSFL/SP/GR, LDL/CNL, GR/BHC, WST, CST, Mudlog.

Tests: DST No. 1 (1339-1326.7m), rec. one bbl muddy water before test tool and anchor pipe plugged, Rw = 4.54 ohm.m. @ 25°C.

Cores: Nil.

Summary & Conclusions:

The Henke Prospect was a dip/fault rollover, part of a prominent NNE-SSW Mesozoic nose on the downthrown side of the Tartwaup Fault.

Principal targets were the Paaratte Formation, the Pebble Point Formation and the intra-Pember Sand.

No significant hydrocarbon shows were noted in the cuttings, drilling mud, sidewall cores or logs. The "Near Top Pebble Point" seismic pick was incorrect over the prospect. A diminished structural culmination does exist but Henke No. 1 was drilled outside closure.

Prepared by: B.L. Rayner. **Date:** December 1987.

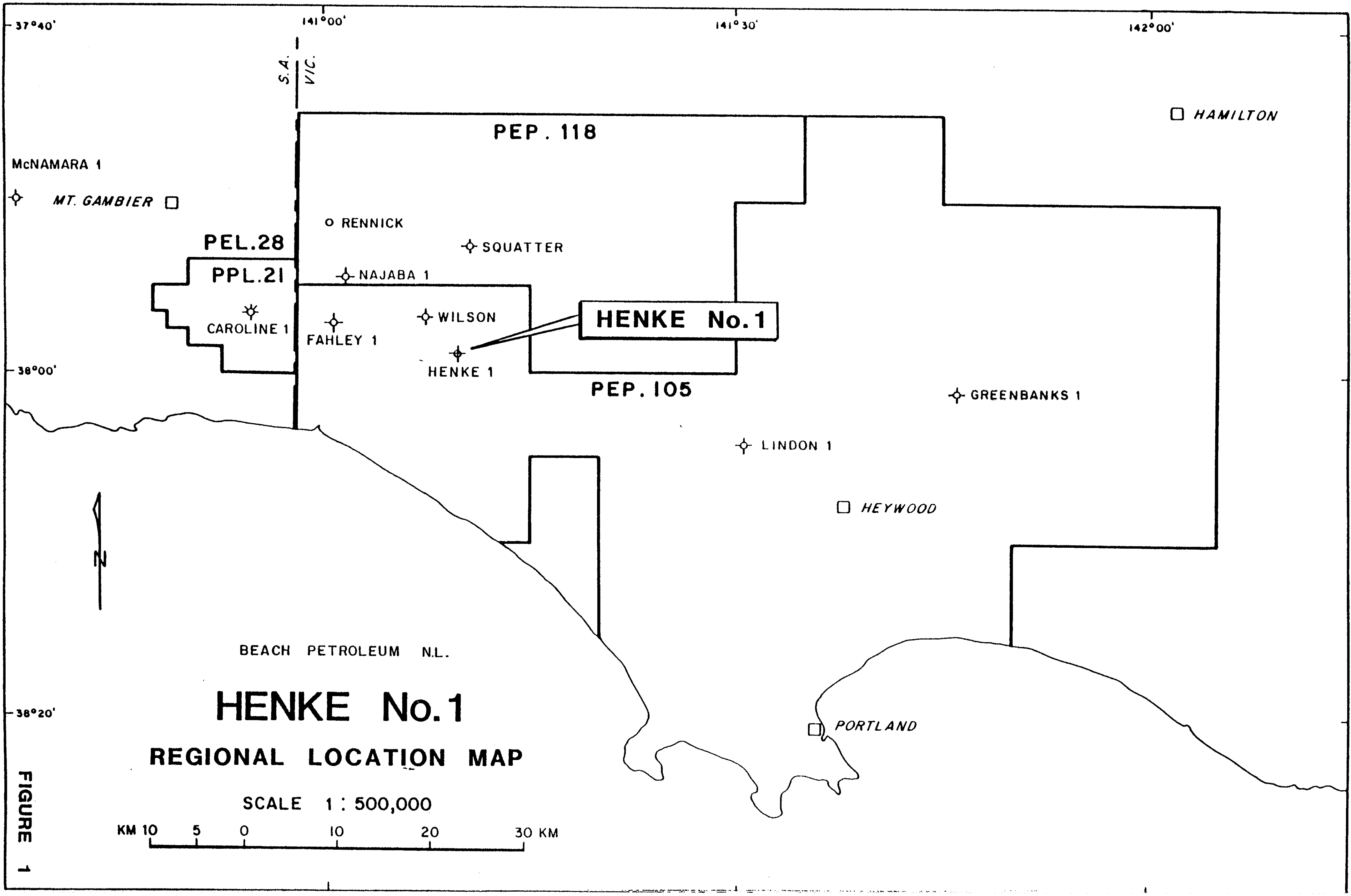
2. WELL HISTORY

2.1 Location (See Figure 1)

Co-ordinates:	Latitude 38° 0' 20.35" S Longitude 141° 11' 25.82" E
Geophysical Control:	60 metres west of shotpoint 1036, Seismic Line HE86-416
Real Property Description:	County of Follett Parish of Kinkella Shire of Portland
Property Owner:	B. Hines "Marapana"

2.2 General Data (See Figure 2)

Well Name and Number:	Henke No. 1
Tenement:	PEP 105
Operator:	Beach Petroleum N.L. 685 Burke Road CAMBERWELL VIC 3124
Participants:	Beach Petroleum N.L. Gas and Fuel Exploration N.L. 151 Flinders Street MELBOURNE VIC 3000 SOCDET Production Limited 44 Margaret Street SYDNEY NSW 2000



BEACH PETROLEUM N.L.

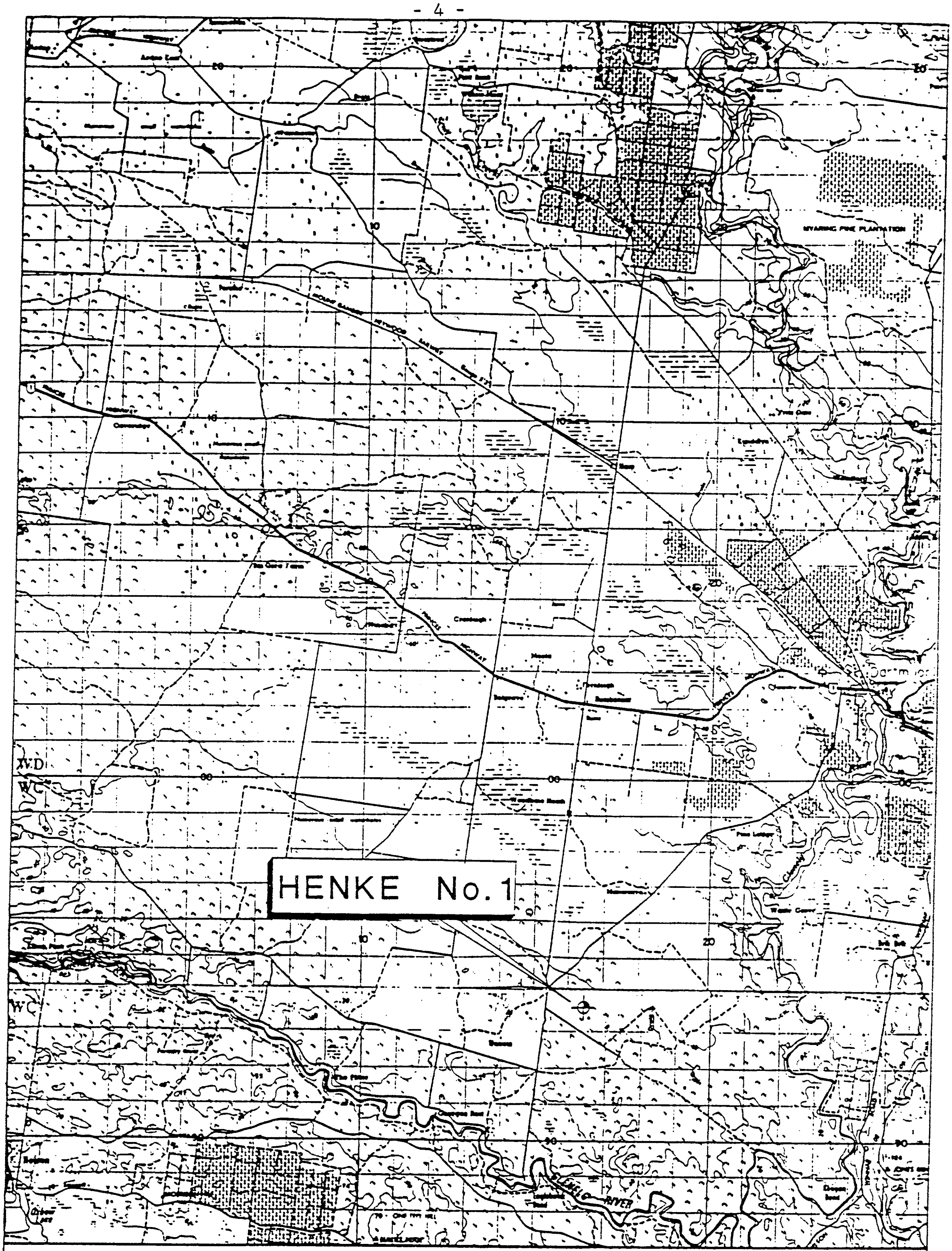
HENKE No.1

REGIONAL LOCATION MAP

SCALE 1 : 500,000

FIGURE 1

OT 3827



BEACH PETROLEUM N.L.

HENKE No.1

DETAILED LOCATION MAP

0 1 2 3 4 5 6 7 Km

FIGURE 2

CONEX Australia
106 Forrest Street
COTTESLOE WA 6001

Elevation:	Ground Level 34.10m ASL Kelly Bushing 38.70m ASL (unless otherwise stated, all depths refer to KB.)
Total Depth:	Driller 1435 m Wireline Logger 1433.5 m
Drilling Commenced:	25 June, 1987 @ 0830 hours
Total Depth Reached:	6 July, 1987 @ 0400 hours
Rig Released:	8 July 1987 @ 1600 hours
Drilling Time to T.D:	14 days
Status:	Plugged and abandoned, dry hole.

2.3 Drilling Data (See also Appendicies 1 and 2)

2.3.1 Drilling Contractor

O.D. & E. Pty Limited
Westport Road
ELIZABETH WEST , SA 5112

2.3.2 Drilling Rig

O.D. & E. Rig 19, Kremco K600H.

2.3.3 Casing and Cementing Details

Conductor

A 16" conductor pipe was set at 9m.

Surface Casing

Size:	9-5/8"
Weight and Grade:	30 joints 36 lb/ft K55 STC
Centralisers:	At first, second and third joints.
Float Collar:	284.6m - 285.07m
Shoe:	297.6m
Cement:	226 sacks Class "A" with 2% prehydrated gel and 162 sacks Class "A" neat.
Cemented to:	Surface
Method:	Single plug displacement. (Top plug only).
Equipment:	Dowell Schlumberger (Western) S.A.

Cement Plugs

Plug No. 1

Interval:	1325 - 1275 m
Cement:	65 sacks Class "A" neat
Method:	Balanced
Tested:	No

Plug No. 2

Interval:	317 - 267 m
Cement:	65 sacks Class "A" neat
Method:	Balanced
Tested:	5000 lbs weight

Plug No. 3

Interval:	Surface cement plug
Cement:	25 sacks Class "A" neat

2.3.4 Drilling Fluid (See Appendix 3 for details)

12¼" Hole, 16.5m to 301m

The 12¼" hole was drilled with a lime flocculated Bentonite mud system.

Typical mud properties were:

Weight:	9.0 ppg
Viscosity:	35 seconds
PV/YP:	5/14
Gels:	10/15
Filtrate:	No control
PH:	11-12

This portion of the hole was drilled and cased without incident.

8½" hole, 301m to 1435m

The 8½" hole was drilled to approximately 823m with a similar mud system to that of the 12¼" hole. It was then converted to a freshwater Bentonite-CMC mud system.

Typical mud properties for this section of the 8½" hole were:

Weight:	9.2+ ppg
Viscosity:	40-42 seconds
PV/YP:	12-16/11-16
Gels:	4-6/18-22
Filtrate:	7.4-8.0 cc
PH:	9-10
MBT:	12-14 ppb
Cl^-:	900-1200 ppm

Some tight sections of hole were encountered towards the base of the Dilwyn Formation, relating to mudcake development over gauge sandstone units.

A DST over the interval 1339 - 1326.7 m recovered one bbl of muddy water before the test tool sample chamber and the perforated pipe plugged with clay. The clay may have been filter cake or hydrated clay from the cap rock. Over the primary zone of interest the hole was in gauge and was logged and plugged without incident.

2.3.5 Water Supply

Fresh water was carted to the wellsite by a water tanker for most of the wells duration. Water was also obtained from the sump and a seepage hole.

2.4 Formation Sampling and Testing

2.4.1 Cuttings

Cuttings samples were collected at 10 metre intervals from the surface to 895 metres, and at 5 metre intervals from 895 metres to T.D. Each sample was washed, oven dried, divided into 4 splits and stored in labelled polythene bags. One complete sample set was distributed to the following: Beach Petroleum N.L., Gas and Fuel Exploration N.L., SOCDET Production Ltd., and the Victorian Department of Industry, Technology and Resources.

In addition, from surface to T.D., unwashed samples were collected at 10 metre intervals. These samples were stored in labelled calico bags and allowed to dry in the sun. This set of unwashed samples has been retained by Beach Petroleum N.L. and may be used for any special analysis in the future.

2.4.2 Cores

Twenty two sidewall cores were attempted, twenty one were recovered and one was left in the hole. Listed overleaf are the depths and recovery of the sidewall cores (See Appendix 4 for descriptions).

SWC No.		Depth (m)	Recovery (cm)
1	A	1430.0	2.5
2		1429.5	2.5
3		1392.0	3.0
4	V	1382.0	2.5
5	V	1365.0	2.5
6	A	1358.0	3.0
7		1352.0	3.0
8	A	1344.0	1.5
9	A	1330.0	3.2
10	V A	1327.5	4.3
11	A	1321.5	5.2
12		1319.0	Nil
13	A	1318.0	4.5
14	A	1310.0	4.0
15	A	1285.0	5.2
16	A	1268.5	5.5
17	A	1263.0	3.5
18	V	1250.0	4.0
19	A	1117.0	4.0
20		1045.0	4.3
21		1009.0	4.0
22		1008.0	3.9

Note:

V - Vitrinite Reflectance Data Available (Appendix 6)
A - Age Dating Available (Appendix 7)
P - Petrological Data Available (Appendix 8)

2.4.3 Tests

One conventional bottom hole drill stem test was performed.

Interval Tested:	1339 - 1326.7 m
Packers Set:	1326.7 - 1324.5 m
Water Cushion:	304 m
Formation Tested:	Pebble Point Formation
Preflow:	15 minutes, slight bubble

Initial Shut-in: 30 minutes

Second Flow: 45 minutes, no bubble

Final Shut-in: 45 minutes

Pressure: Pressure unreadable due to plugging of anchor pipe and tools.

Recovery: One bbl muddy water, RW 4.54 ohm.m @ 25°C, 10 ppm Calcium 270 ppm Chloride.

Assessment: A small amount of formation fluid entered the test string before the anchor pipe and test tool became plugged. The sample collected is heavily contaminated and does not accurately represent the formation fluid. As no free oil or gas is associated with the recovery it is likely that the zone tested was permeable and water wet. The porosity is indeterminate.

2.5 Logging and Surveys (See Enclosure 1)

2.5.1 Mud Logging

A standard skid-mounted Exlog unit was used to provide penetration rate, continous mud gas monitoring, intermittent mud and cuttings gas analysis, pump rate and mud volume data. The Masterlog is included as Enclosure 2.

2.5.2 Wireline Logging

Wireline logging was performed by Schlumberger Seaco Incorporated using a truck-mounted Cyber Service Unit. One run was performed and details are listed below. A summary of findings is included in section 4.2.

Dual Laterolog Resistivity (DLL/SP/CAL/GR)	1429.0m - 297.0m
Micro-Spherically Focused Log (MSFL)	1429.0m - 970m
Litho-Density/Compensated Neuton/ Log (LDL/CNL)	1432.0m - 970m
Borehole Compensated Sonic Log (BHC-GR)	1431.5m - 297m GR to surface

In addition, a Cyberlook log was generated at the wellsite over the interval 1430m - 970m.

2.5.3 Deviation Surveys

A Totco double recorder 0-8° was used to measure hole deviation, the results of which are listed below:

Depth (m)	Deviation (°)
40	0.25
153	0.75
226	0.125
291	0.25
456	0.50
600	1.00
677	0.75
753	1.00
811	1.00
908	0.75
985	1.75
1076	1.50
1210	1.00
1325	0.50
1430	0.75

2.5.4 Velocity Survey

A velocity survey was carried out by Schlumberger Seaco Incorporated, the result of which is included as Appendix 5.

3. RESULTS OF DRILLING

3.1 Stratigraphy

The following stratigraphic intervals have been delineated using penetration rate, cuttings and sidewall core analysis, palynology and wireline log interpretation. The Nirranda Group and the intra-Pember Mudstone sand were not developed at this location but all other formations were present as predicted. (Figures 3 & 4).

Group	Formation	Depth (m)	Thickness (m)
Heytesbury	-	Surface	59.4
Nirranda	-	-	-
Wangerrip	Burrungule Mbr	64	64
	Dilwyn	128	910
	Pember Mdst Mbr	1038	282
	Pebble Point	1320	20
Sherbrook	Paaratte	1340	95+
	T.D.	1435	

3.2 Lithological Descriptions

3.2.1 HEYTESBURY GROUP (Surface to 64m)

Calcarenite, off white to light grey, medium orange to medium grey in part, loose to friable bryozoan and shell fragments, common calcilutitic and argillaceous matrix, occasional calcitic cement with minor interbedded CLAYSTONE, medium grey, very soft, sticky, common fossil fragments, trace pyrite.

3.2.2 WANGERRIP GROUP (64 - 1340m)

Burrungule Member 64m to 124m

CLAYSTONE, dark to very dark brown, medium brown in part, very soft,

BEACH PETROLEUM N.L.

HENKE No. 1

PROGNOSED AND ACTUAL STRATIGRAPHY

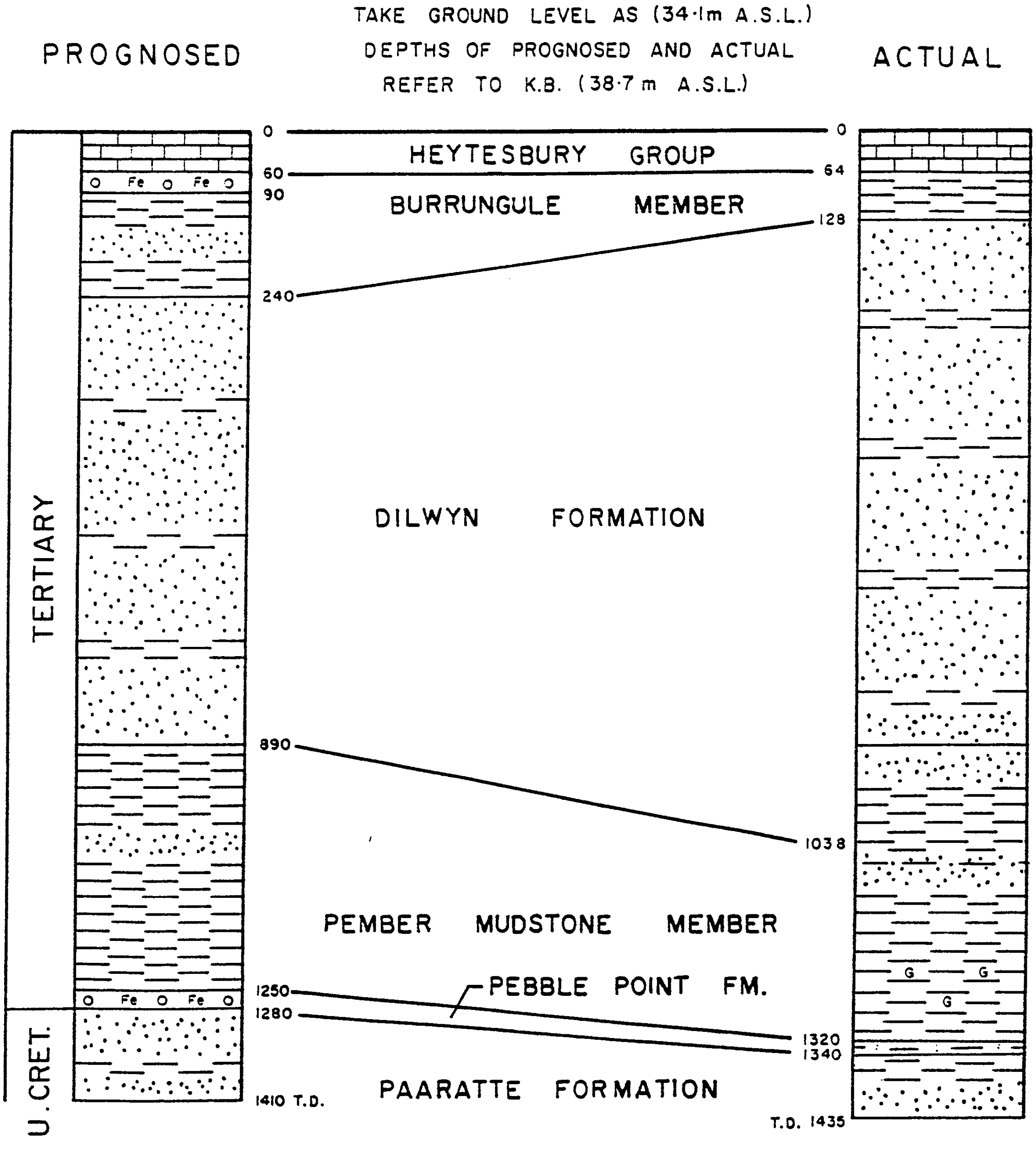


FIGURE 3

BEACH PETROLEUM N.L.

PEP 105/118 AND ENVIRONMENTS — OTWAY BASIN

STRATIGRAPHIC TABLE

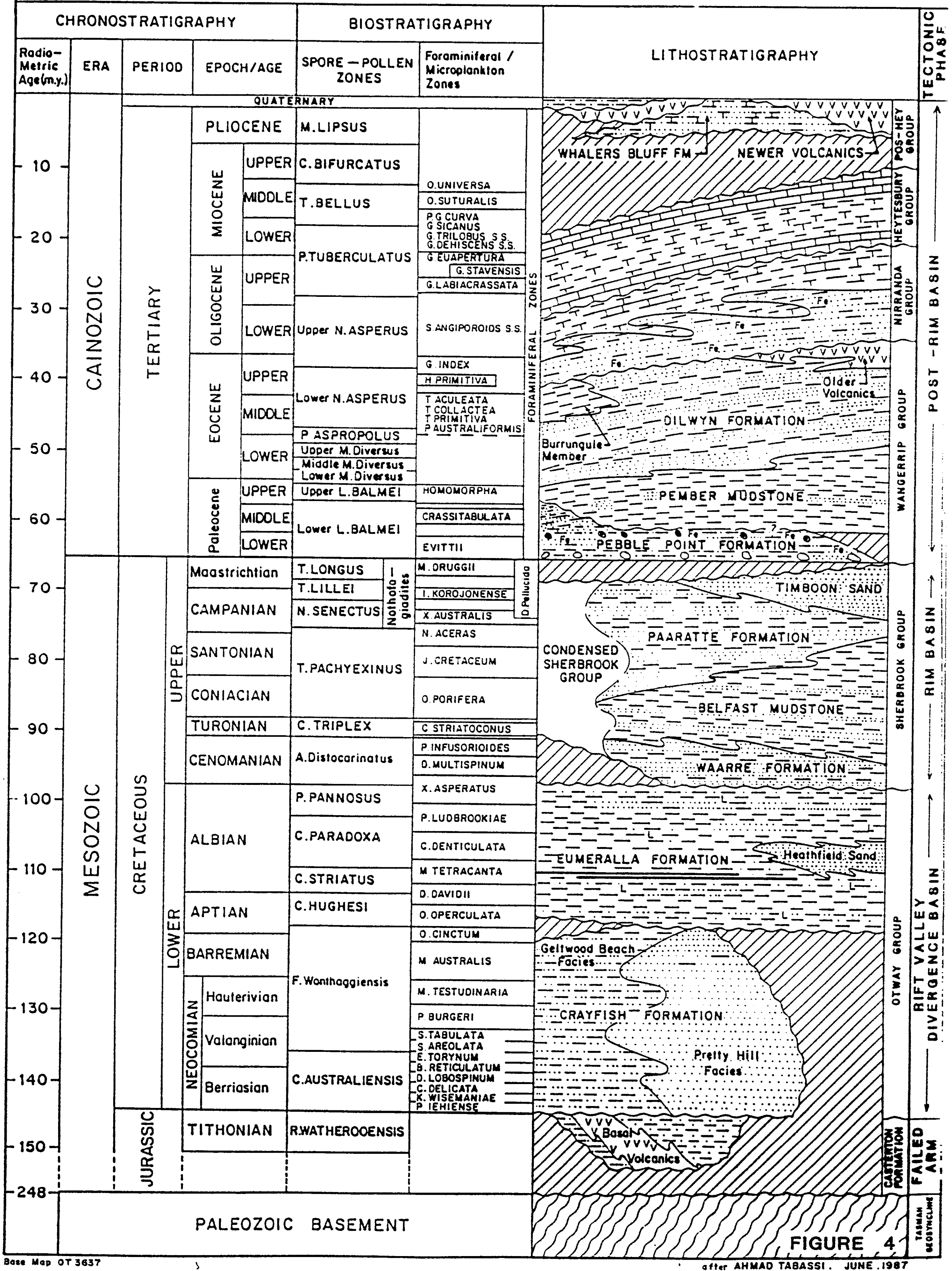


FIGURE 4

Base Map OT 3637

after AHMAD TABASSI. JUNE.1987
DRG No. OT. 3830 (F)

sticky, very carbonaceous, common pyrite, occasional very fine to coarse subrounded quartz grains, common gastropods, bryozoa and shell fragments.

Dilwyn Formation	128m to 1038m SANDSTONE, light to medium brown, light grey brown, loose, very fine to granule, dominantly medium to coarse grained, subangular to subrounded, moderately sorted, occasionally iron oxide stained quartz, trace to common dispersive argillaceous matrix, weak siliceous cement in part, trace to rare calicte cement, trace to common coarse mica flakes, trace to common black coally detritus, trace pyrite, rare grey and green cherty lithics, rare amber, fair to good visual porosity with interbedded CLAYSTONE, medium to dark brown, dark grey brown, dark grey, soft, sticky, occasionally very dispersive, moderate to very carbonaceous, common to minor coally laminae, common pyrite, trace mica, moderately silty with very fine quartz grains. Rare DOLOMITE towards the base, medium brown, very hard, cryptocrystalline, moderately argillaceous. Minor COAL, black, firm to hard, earthy in part.
Pember Mudstone	1038m to 1320m From 1038m to 1160m, CLAYSTONE, light to medium brown, medium to dark brown grey, firm to moderately

hard, massive to subfissile, very dispersive, common micromicaceous, moderately silty, moderately carbonaceous with common coally detritus and rare coally laminae, occasionally very fine quartz sand laminae, trace pyrite, trace dolomite, rare coarse mica flakes. Interbedded with minor SANDSTONE, off white to light grey, loose, very fine to coarse, dominantly fine grained, moderate sorting, trace light grey matrix, good visual porosity.

From 1160m to 1267m, CLAYSTONE, as above with trace to common dolomite, trace glauconite.

From 1267m to 1320m, CLAYSTONE, dark grey, very dark grey brown, light grey in part, firm to moderately hard, massive, slightly micromicaceous, slightly silty, slightly calcareous, very carbonaceous, trace to abundant glauconite, trace to common pyrite, occasionally very fine to very coarse quartz sand grains, and minor laminae of a very fine grained calcareous sandstone.

Pebble Point Formation

1320m to 1340m

ARGILLACEOUS SANDSTONE, mottled, dark green grey to medium brown, 60% quartz sand grains in agrillaceous matrix; the sand grains are very fine to very coarse, dominantly medium grained, subangular to dominantly subrounded, very poorly sorted quartz grains occasionally with brown, iron oxide stain; the claystone matrix is dark green grey in part, medium brown grey in part, slightly calcareous. Nil to very poor visual porosity, grading to

CLAYSTONE, very dark brown grey, firm, massive, very silty, very carbonaceous, trace micromicaceous, with rounded, very fine quartz sand grains, common pyrite.

This horizon becomes coarser grained and less argillaceous towards the base, where it is a SANDSTONE, off white to light brown, very fine to coarse, dominantly medium grained, subangular to subrounded, moderately well sorted, trace to common light brown to off white dispersive clay matrix, trace siliceous cement, abundant black, glauconitic, rounded pellets, trace pyrite, fair to good visual porosity. This basal sandstone has up to 40% very dull orange brown fluorescence with nil cut, odour or stain.

The Palaeocene/Eocene rocks of this well are quite different to most other wells drilled in this area by Beach. The basal Pember Mudstone Member is older and contains more glauconitic pellets than usual, while the Pebble Point Formation lacks the degree of iron staining and ferrigenous pellets typical of this formation. Similarly the log characteristics of "classic" Pebble Point and Pember Mudstone are not evident at this well.

3.2.3 SHERBROOK GROUP (1340.0m to 1435m)

SANDSTONE, off white to light grey, friable to hard, very fine to very coarse, dominantly fine grained,

subangular, poorly sorted, trace to moderate white kaolinitic matrix, moderate calcareous cement in part, trace siliceous cement, trace carbonaceous detritus, trace red and grey lithics, trace pyrite, fair visual porosity.
Interbedded with CLAYSTONE, medium to dary grey brown, firm, massive to subfissile, micromicaceous, trace to common black coally detritus, trace pyrite, grades to SILTSTONE. Minor COAL, black, sub-vitreous, brittle, silty with common very fine sand laminae.

3.3 Hydrocarbon Indications

3.3.1 Mud Gas Readings

The gas detection equipment was operational from surface to total depth.

A background mud gas of trace to 100 ppm C_1 was relatively constant throughout the entire section. Trace levels of C_2 and C_3 were noted in the interval 1268m to 1336m.

3.3.2 Sample Fluorescence

Cuttings were routinely inspected for oil fluorescence at 10m intervals from surface to 895m and at 5m intervals from 895m to T.D.

Fluorescence was noted in the sandstone across the interval 1335m to 1339m. The sandstone had up to 40% very dull orange brown fluorescence without cut, odour or stain.

4. GEOLOGY

4.1 Structure

4.1.1 Seismic

The Henke Prospect was delineated by the Beach 1984 Wanwin Gorae (WG) Seismic Survey and refined by the Beach 1985 Wanwin Gorae Detail (WGD) and Beach 1986 Henke Seismic Surveys.

Henke No. 1 was drilled 10 metres west of shot point 1036 on seismic line HE86-416 and was designed to test the hydrocarbon prospectivity of the uppermost Paaratte Formation. Secondary targets were any intra-Pember Mudstone sands that may have developed and the Pebble Point Formation (Figure 5).

Seismic mapping was carried out at "Near Top Pember Mudstone" and "Near Top Pebble Point" horizons, prior to drilling, which suggested some 3.3 km^2 of closure at each horizon (Figure 6).

The Henke Prospect was recognised to have four way dip closure at the crest but the area of closure could have been extended by relying on the down-to-basin Haines Fault which abutted the prospect.

The check shot survey shows that what was interpreted as "Near Top Pebble Point" is in fact the top of a subtle lithological variation towards the base of the Pember Mudstone. This means that the throw of Haines Fault is much less than expected and critical dip into the fault is absent at the level of the primary target. A small structure is still present but Henke No. 1 was drilled just outside closure (Figure 7).

4.2 Porosity and Water Saturation

Wireline log evaluation was facilitated by a Schlumberger Cyber Service Unit at the wellsite. No conventional cores were cut

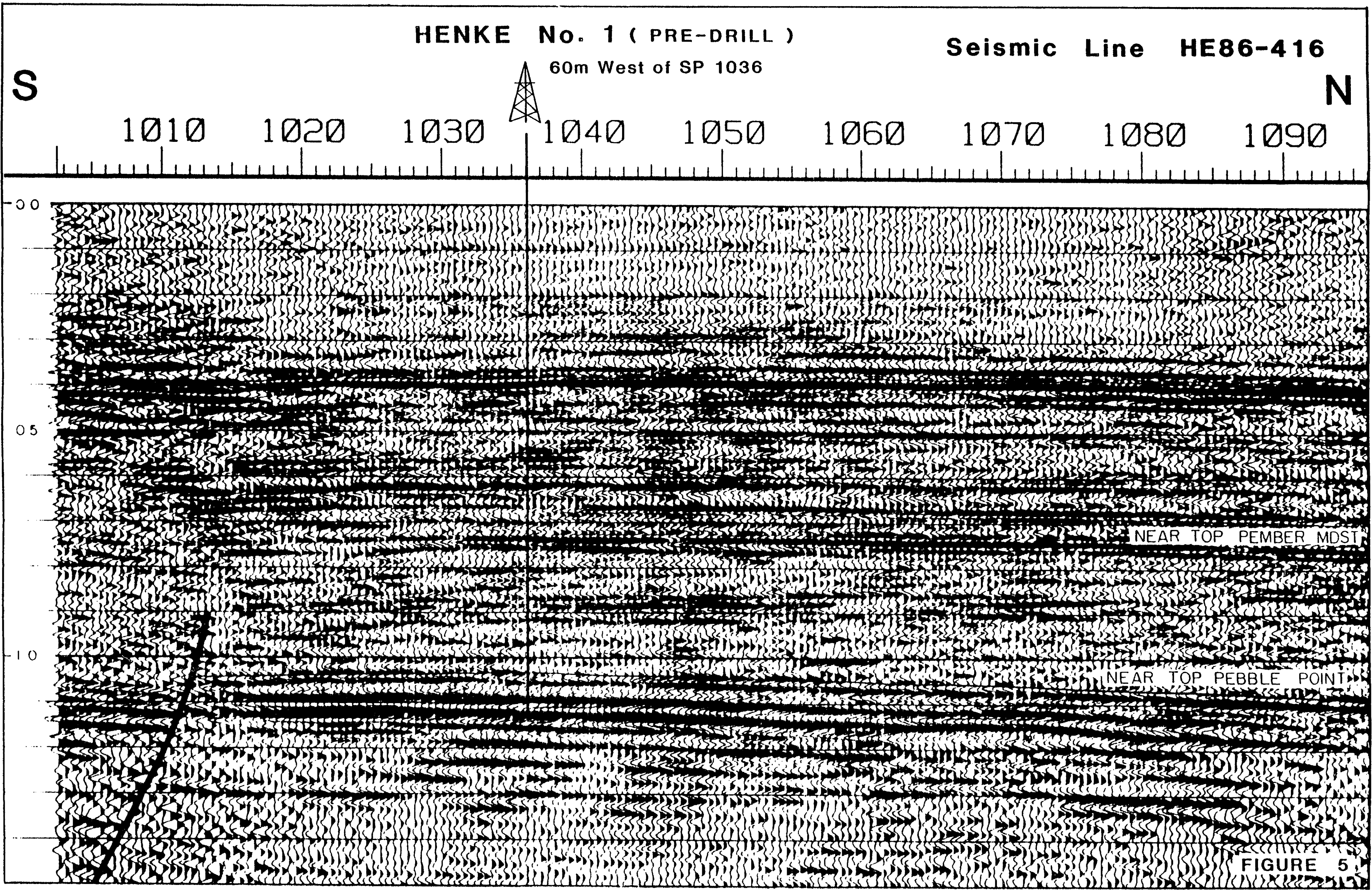
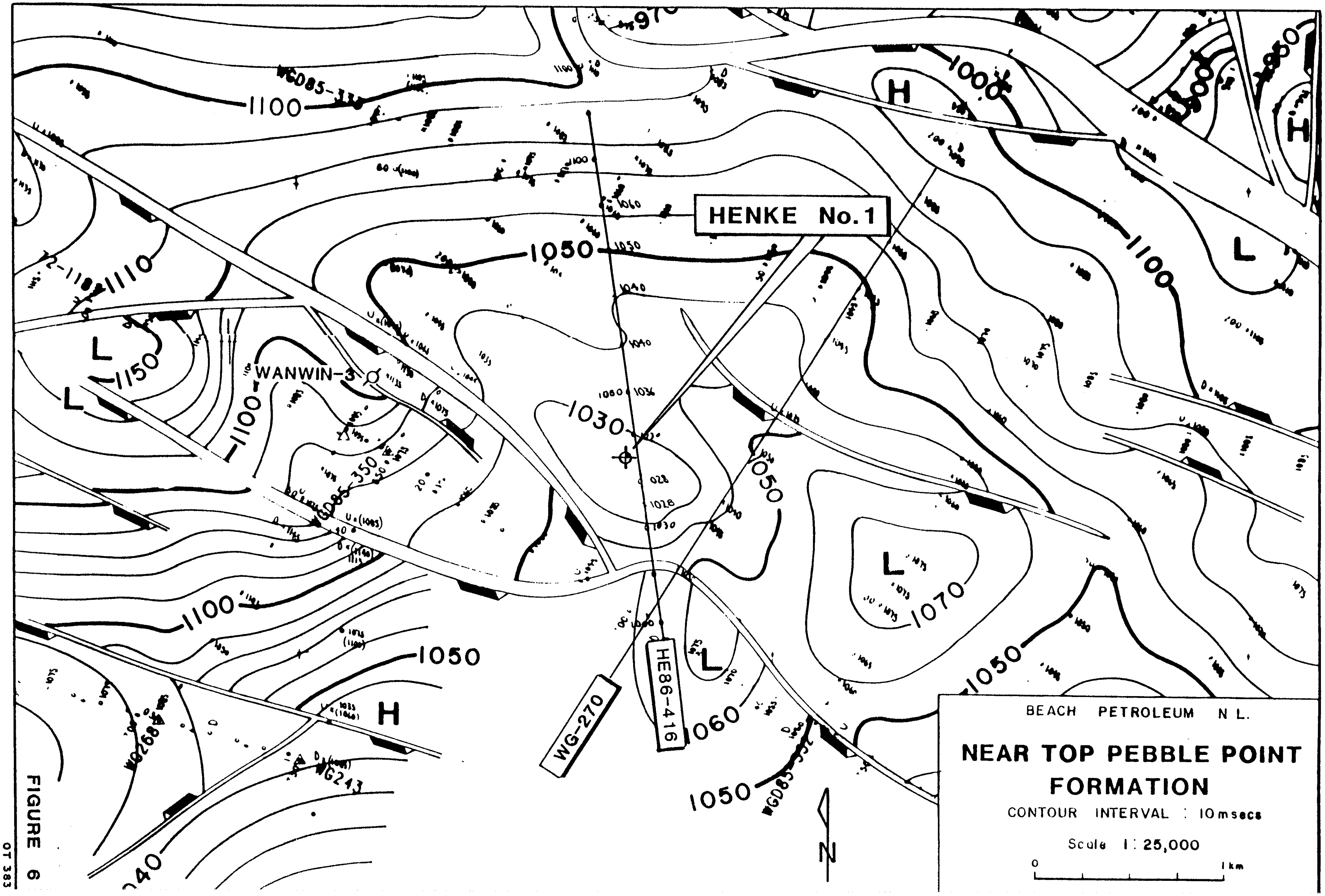

HENKE No. 1 (PRE-DRILL)
60m West of SP 1036
Seismic Line HE86-416
S
N
1010
1020
1030
1040
1050
1060
1070
1080
1090
0.0
0.5
1.0
NEAR TOP PEMBER MDST
NEAR TOP PEBBLE POINT

FIGURE 5



BEACH PETROLEUM N.L.

NEAR TOP PEBBLE POINT FORMATION

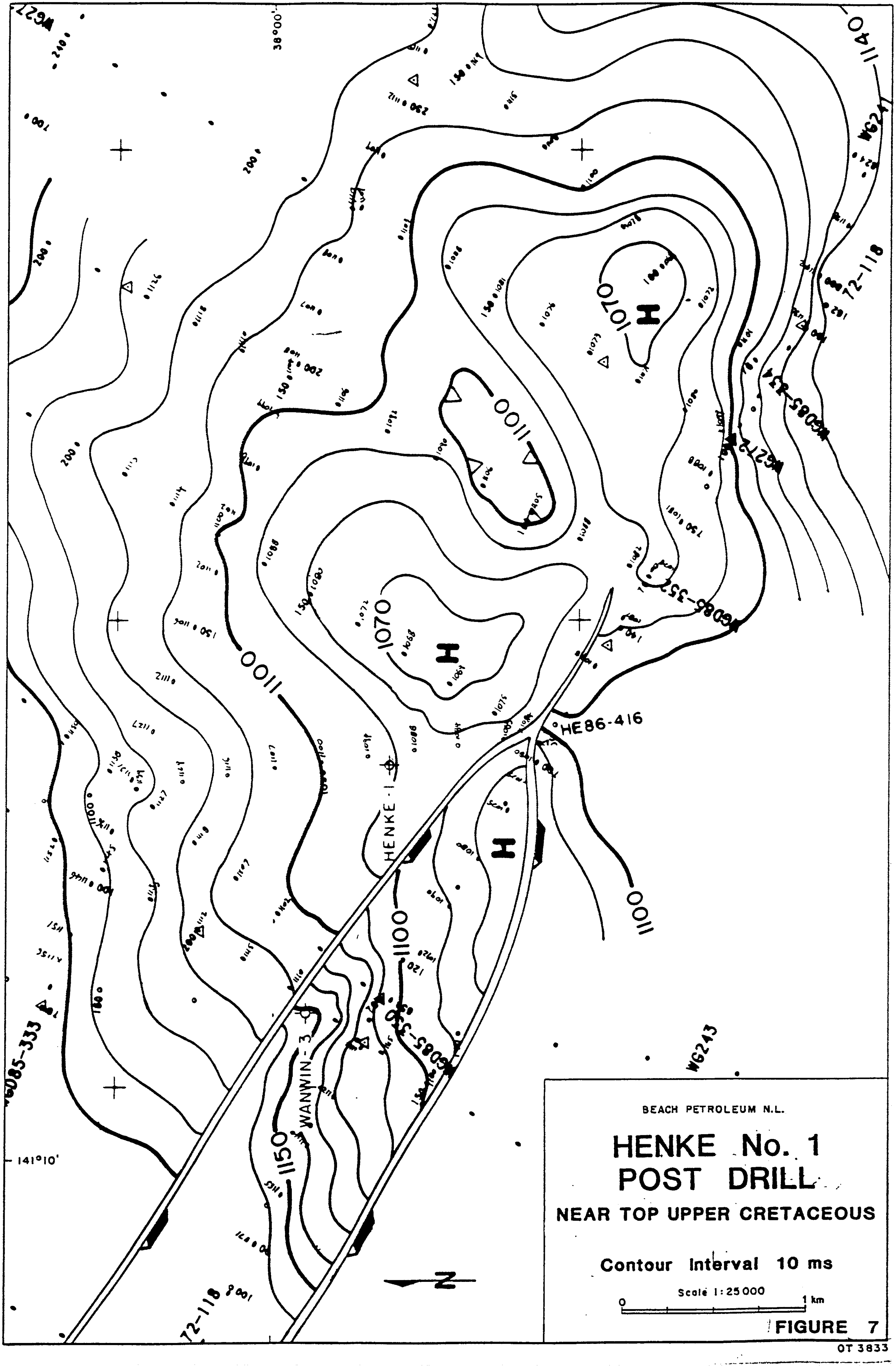
CONTOUR INTERVAL : 10 msecs

Scale 1 : 25,000

0 1 km

FIGURE 6

OT 383



BEACH PETROLEUM N.L.

HENKE No. 1
POST DRILL

NEAR TOP UPPER CRETACEOUS

Contour Interval 10 ms

Scale 1:25000

0 1 km

FIGURE 7

OT 3833

and no true formation waters were recovered. All porosity and salinity values are therefore log derived.

All horizons appear to be water wet.

The Dilwyn Formation consists of a sequence of relatively clean quartzose sandstones with only minor interbedded claystones. Log derived porosities are in excess of 25% in the cleaner zones. An intra-Pember sand was not developed at this location.

The Pebble Point Formation is poorly developed at Henke No. 1. The base of this unit is an argillaceous sandstone grading to a claystone at the top where it merges with the Pember Mudstone. Porosity logs indicate effective porosity of less than 8% with Vclay in excess of 85% throughout the entire interval. From 1335m to 1340m, however, the cuttings and rate of penetration infer a more sandy formation with better porosity which is not reflected in the logs. It was in this portion of the Pebble Point Formation that the cuttings had up to 40% very dull orange brown fluorescence without cut, odour or stain. A drill stem test conducted over the interval recovered a small amount of contaminated formation water before the test tool became plugged. This suggests some degree of permeability.

The Paaratte Formation at this well is unusual in that the top of this sequence was relatively argillaceous. Good porosity is observed below 1390m with log estimates between 20 to 30%.

4.3 Maturation and Source Rock Analysis

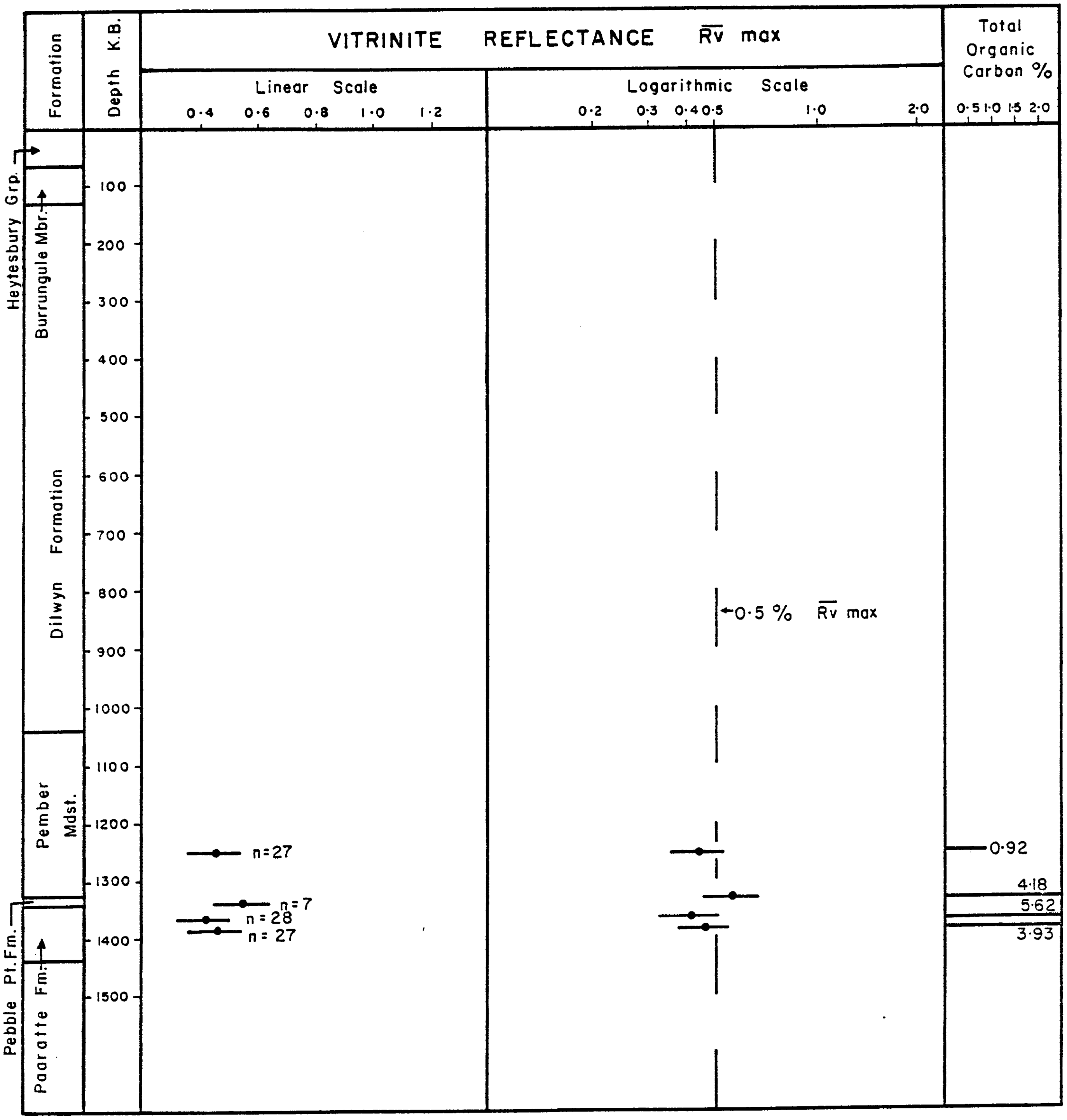
Vitrinite reflectance estimates (R_V max) and total organic carbon analysis (TOC) were carried out on four sidewall core samples. An additional twelve sidewall cores were palynologically examined to determine the age, source potential and maturation of the sediments (see Appendicies 6 and 7).

4.3.1 Maturation/Organic Type

All the samples submitted were submature for oil generation. Vitrinite reflectance counts were generally good with a

HENKE No.1

VITRINITE REFLECTANCE & TOTAL ORGANIC CARBON PROFILE



NOTE :

(1) —●— n = 27 = $\overline{Rv}$ max and range

(2) n = number of sample counts

(3) Samples were all sidewall cores.

FIGURE 8.

OT 383

range of 0.43% to 0.56% (Figure 8). Spore colours were yellow to yellow brown.

The Pember Mudstone sidewall core had moderate levels of dispersed organic matter with vitrinite common, inertinite sparse and exinite rare. This association suggests fair wet gas potential. The Pebble Point Formation sidewall core also had moderate levels of dispersed organic matter, dominantly inertinite with rare vitrinite and exinite. This association suggests some dry gas potential. The Paaratte Formation sidewall cores both had abundant dispersed organic matter. Inertinite and vitrinite were abundant with exinite common to sparse, indicating fair wet gas potential at this level.

4.3.2 Total Organic Carbon

The samples submitted had between 0.92% and 5.62% total organic carbon. Generally, rocks such as these with greater than 0.5% organic carbon are considered to have good potential as source rocks. However many other factors need to be considered before a definitive statement on the source potential can be made.

4.4 Relevance to Occurrence of Hydrocarbons

Henke No. 1 was not a valid test of a structural closure at the level of the primary target.

Sample fluorescence but no cut, odour or stain was observed in cuttings from the Pebble Point Formation. A DST across the interval recovered 1 bbl of muddy water before the test tool and anchor pipe became plugged. This together with cuttings analysis and rate of penetration tends to support the idea that the Pebble Point Formation has limited porosity and permeability but is water wet. Wireline log analysis is misleading to some extent because of the high proportion of clay and chlorite/limonite within the Pebble Point Formation.

Maturity indicators show that the Pebble Point Formation is immature for oil generation. The organic content of the basal Tertiary is terrestrially derived with fair potential for wet gas generation. The fluorescence observed at this level has therefore not been generated 'in-situ' and probably reflects oil migration in the past.

Hence, Henke No. 1 demonstrates that this portion of the Otway Basin is oil prone, that migratory paths exist between the source rocks and the Tertiary, and that the Pebble Point Formation has sufficient porosity and permeability to be a part of that system.

The Pebble Point Formation at Henke No. 1 can be considered as either a very poor reservoir rock or a leaky seal. The ideal situation would be to have this formation thinly developed and more argillaceous such that an effective seal would overly the Paaratte Formation sands. If the genesis of the Pebble Point Formation can be related to laterite development then the ideal situation may exist towards the basin margin.

APPENDIX - 1

APPENDIX 1

Details of Drilling Plant

APPENDIX 1.

DETAILS OF DRILLING PLANT

O.D. & E. PTY. LIMITED.

RIG #19

CONTRACTOR'S RIG	:	Rig #19 - rated to 7500 ft. with 4-1/2" - 16.6 lbs/ft. Drill Pipe.
DRAWWORKS	:	Kremco K600H with 22" single rotor hydromatic brake, 16" x 37" main drum grooved for 1.1/8" line, 12.5/8" x 39" Sandline Drum with capacity for 14200' of 9/16 line powered by G.M. 8V92 T.A. diesel engine 435 H.P. at 2100 R.P.M. with Allison model CLT5861-5 converter and transmission. 5 speeds forward and one reverse. Mounted on 5 axle Kremco model K990 self propelled back in type carrier.
SUBSTRUCTURE	:	235 ton telescoping substructure, 16' long x 10' wide x 13' high skid, plated top and bottom to eliminate the need for matting with 8' x 7' cellar area and removable beam to allow removal from wellhead. Floor area 13' high x 16' long x 16' wide. Supports on driller's side for doghouse. NOTE: Substructure telescopes down to 10' for road transport. Rotary beam clearance 10'10". Rotary beam loading: 270,000 lb. Set back area loading: 200,000 lb. (Loaded concurrently)
MAST	:	Kremco 109' 270,000 lbs. hydraulic raise and telescope, high strenghth square tubular legs, girts and diagonal bracing, ladder to crown, safety platform and handrails, travelling block carrying cradle, vertically hinged "Y" type base with screw type tilt adjustment, double acting raising ram and single telescoping ram, both equipped with safety chokes to protect mast from free failing. Automatic erecting racking board, mounted 67' from ground level with three additional mounting locations, safety chains on all fingers and capacity for 8000' of 4.1/2" drill pipe in doubles. Sufficient travel to allow for mousehole connections with 35 ft. Kelly. Standard crown with

		1 x 30" diam. fast line, 3 x 24" diam. fleet and 1 x 24" diam. deal line sheaves, grooved for 1.1/8" line. 1 x 20" diam. sandline sheave grooved 9/16". 1 x 12" diam. catline sheave grooved 1.1/2". 1 x 8" diam. winch line sheave grooved 1/2".
CATHEADS	:	Hydraulic breakout and make up catheads mounted in mast. 1 Foster 27S spinning cathead. 1 Foster 27B breakout cathead.
TRAVELLING BLOCK	:	Ideco UTB-160-4-30 shorty travelling block with unitized hook with 4 x 30" sheaves grooved 1.1/8". API working load 160 tons.
SWIVEL	:	Ideco TL-200 Tru-line swivel. API bearing rating @ 100 RPM - 123 tons.
RIG LIGHTING	:	Electric Power Systems, lighting system with fluorescent lights for mast, floor pipe rack, cellar, engine, pump and mud tank areas. Explosion proof lights.
KELLY DRIVE	:	Varco 4KRVS kelly drive bushing to suite 4.1/4" square kelly.
MUD PUMPS	:	One (1) Gardner-Denver PZ-7-550HP triplex mud pump belt driven by Caterpillar D379 TAC engine, with Faywick air clutch, MCM model 5 x 6 charging pump (pinion driven), Hydril K10-5000 pulsation dampener, Larkin suction stabilizer, unitized on 3 runner oilfield skid. One (1) Gardner-Denver PAHBFC-275HP triplex mud pump driven by Detroit Diesel 8V92T engine with Allison model HT750DRD transmission, 5 x 4 charging pump (hydraulic driven) K-10-3000 Hydril pulsation dampener unitized on 3 runner oilfield skid.
MIXING PUMP	:	One (1) Harrisburg 8" x 6" centrifugal pump powered by 60 HP 1775 RPM electric motor.
MUD AGITATORS	:	3 Harrisburg 5 HP (2 suction tank, 1 shaker tank) model MA-5.
SHALE SHAKER	:	Harrisburg, single unit with dual deck powered by 5 HP flameproof electic motor.

DEGASSER : Mechanical mud gas separator, Shell Co. design (capacity via choke - 200 GPM).

MUD CLEANER : Harrisburg MC800 2 screen combination mud cleaner or desilter capacity of 800 GPM c/w 5 HP 1800 RPM flameproof electric motor charged with Harrisburg 5 x 6 centrifugal pump with 10" Impeller and 60 HP 1800 RPM electric motor.

DESANDER : Harrisburg DSN-1000 unit with 2 x 10" cones charged with Harrisburg 5 x 6 centrifugal pump with 10" Impellor and 60 HP 1800 RPM electric motor.

GENERATORS : 2 Caterpillar 3406TA, 250 KW prime, 300 KW standby, 60 HZ, 230/460 generating sets.

B.O.P.'s AND ACCUMULATOR : NL Shaffer spherical 11" - 5000# flanged bottom, studded top annular B.O.P.

Shaffer L.W.S.11' - 5000# studded top and bottom B.O.P. with 7", 5.1/2", 4.1/2", 3.1/2", 2.7/8", 2.3/8" CSO ram assemblies.

Koomey model 120LS type 80, 3000 PSI, 120 gallon accumulator equipped with 12 x 11 gallon bottles, UP2RB5AR model "P" 5 station control manifold, UFT-15B triplex charging pump with 15 HP 60 Hz electric motor, model U7A26 dual air pump package (capacity 6.4 GPM @ 3000 PSI) and model A5GRV air operated master remote control panel with 5 valves for operation of B.O.P.s and hydraulic gate valve, 1 valve for operation of bypass valve and 100' remote control hose. C/w 1" B.O.P. test outlet and gauge for testing to 5000 P.S.I.

KELLY COCK (UPPER) : Packard 5000 PSI upper Kelly Cock w/- 6.5/8" reg. L.H. connections P/N T65LH85.

KELLY COCK (LOWER) : Packard 5000 PSI lower Kelly Cock w/- 4" IF connections P/N T401F65.

DRILL PIPE SAFETY VALVE : Packard 5000 PSI w/- 4" IF connections and crossover to suit 8" drill collars.

AIR COMPRESSORS AND RECEIVERS : Two (2) Sullair model 10B-25 air compressor 105 CFM - 125 PSI with 60 HZ electric motor and air receiver. Separator 1 24" x 72" air receiver tank.

One (1) Swan model MV-201 Cold Start air compressor with Petters diesel engine and 8 CFM compressor.

SERVICE WINCH : One (1) model #14 Gearomatic Hydraulic winch mounted on carrier with control at drillers console. Drum pull-back 7100 at 92 ft. per min. mean 4760 t 137 ft. per min. Full 3580 ft 182 ft. per min.

POWER TONGS : Foster model 54 power casing tong c/with 95/8 7" 5 1/2 jaws.

Foster model 58-93-R hydraulic unit with 2.3/8", 2.7/8" and 3.1/2" jaws operated from rig hydraulic system.

SPOOLS : 1 only 11" - 5000# FE x 11" - 5000# FE drilling spool w/- 1 x 3" - 5000# FE and 1 x 2" - 5000# FE outlet.

1 only 11" - 5000# FE x 11" - 5000# FE Spacer Spool.

1 only 11" - 5000# x 11" - 3000# Double Studded Adaptor.

1 only 11" - 5000# x 7.1/16" - 5000# Double Studded Adaptor.

1 only 11" - 5000# x 7.1/16" - 3000# Crossover Spool, double studded adaptor.

ROTARY TABLE : Ideco SR-175 Rotary Table.
Rated capacity 325 tons dead load.
Rated capacity 200 tons rotating.

MUD TANKS : 1 only skid mounted suction tank 33' long x 9' wide x 6' high with platform for mixing hopper, mud ditch, pill tank, mud guns, walkways and agitators.
Overall skid length 42'.
Capacity: 317 BBLS
(Suction: 260 BBLS)
(Pill : 57 BBLS)

1 only skid mounted shaker tank, 28' long x 9' wide x 6' high fitted with shale shaker, desander, mud cleaner, mud ditch partitions, mud guns, walkways and agitators.
Overall skid length 42'.
Capacity : 271 BBLS
(Sand trap: 31 BBLS
(Desander : 38 BBLS)
(Desilter : 38 BBLS)
(Reserve : 164 BBLS)

TRIP TANK	:	1 Trip Tank 4' x 6'2" x 7'6" high (mounted on shaker tank). Capacity: 33 BBLS.
KILL MANIFOLD	:	1 - 2" 5000# Lynn check valve F/E 1 - 2" 5000# Cameron gate valve F/E 1 - 3" 5000# Cameron gate valve F/E 1 - 3" 5000# Cameron hydraulic gate valve F/E.
CHOKE MANIFOLD	:	1 x 5000# unit with 1 x 3" positive and 1 x 3" adjustable choke.
DRILL PIPE	:	7000' 16.6 LB/FT grade 'E' 4.1/2" OD drill pipe w/- 6.1/4" OD Tool Joints and 4" IF Connections, internally plastic coated.
PUP JOINTS	:	1 - 10' 4.1/2" OD 18° taper w/- - 4" IF conns. 1 - 5' 4.1/2" OD 18° taper w/- 4" IF conns.
HEVI-WEIGHT DRILL-PIPE	:	6 JTS H.W.D.P. 4.1/2 OD w/- 4" IF conns.
DRILL COLLARS	:	6 only 8" OD Drill Collars w/- 6.5/8" Reg. Connections. 24 only 6.1/2" OD Drill Collars w/- 4" IF Connections.
KELLIES	:	2 only 4.1/4" square x 35' working space (38' overall) with 6.5/8" reg. L.H. box x 4" IF pin.
FISHING TOOLS	:	1 only Bowen Type Z Jar 6.1/4" D. 1 only Bowen Series 150 overshot 7.5/8" OD. 1 only Bowen Series 150 overshot 9.5/8" OD. 1 only Junk Sub 12.1/4" Hole. 1 only Junk Sub 8.1/2" Hole.
SUBS	:	3 only 4" IF Saver Subs. 2 only 6.5/8" Reg. Pin x 4" IF Box x/Over Sub. 12 only 4" IF Lifting Nubbins. 3 only 6.5/8" reg. Lifting Nubins. 1 only 6.5/8" Reg. Box x 6.5/8" Reg. Box Bit. Sub. (5F-6R float recess) 2 only 4" IF Box x 4.1/2" Reg Box Bit Sub (4R float recess) 1 only 4.1/2" reg pin x 4.1/2" FH pin 4" long 1 only 4" IF box x 6.5/8" reg box 1 only 4" IF pin x 2" LP pin (circ sub), 12" long.

HANDLING TOOLS : 1 set Baash Ross Type "AAX" short handle tongs complete with hangers range 2.7/8" - 13.3/8".

1 set forged elevator links 2.1/4 x 96" capacity 250 tons.

2 sets of 4.1/2" - T-150 Drill Pipe Elevators.
1 set 9.5/8" - H-150 Casing Elevator.
1 set 7" - H-150 Casing Elevator.
1 set 5.1/2" - J-150 Casing Elevator.
1 set 3.1/2" - C-100 Tubing Elevator.
1 set 2.7/8" - C-100 Tubing Elevator.
1 set 2.3/8" - C-100 Tubing Elevator.
1 set 9.5/8" Single Joint Elevator. 1 set 7" Single Joint Elevator.
1 set 5.1/2" Single Joint Elevator.
1 set 3.1/2" Single Joint Elevator.
1 only 9.5/8" CMSXL Casing Slips.
1 only 7" CMSXL Casing Slips.
1 only 5.1/2" SDL-M Casing Slips.
2 only 4.1/2" SDL-M Drill Pipe Slips.
1 only Cavins Type "C" - HD air spider with 2.3/8", 2.7/8", 3.1/2" and 5.1/2" slips, 250,000 # capacity.
1 set 6.3/4 - 8.1/4 DCS-L Drill Collar Slips.
1 set 5" - 7" DCS-R Drill Collar Slips.
1 only 5.1/2" - 7" MPR Safety Clamp.
1 only 6.3/4" - 8.1/4" MPR Safety Clamp.
1 set Quick Lift Drill Collar 42" x 2" links - 100 ton and Drill Collar adaptor.
1 only 8" HD-100 Drill Collar Elevator.
1 only 6.1/2" HD-100 Drill Collar Elevator.

Varco "CU" casing bushing with No. 2 insert bowl to handle 9.5/8" - 13.3/8" casing.

Foster model 77 hydraulic kelly spinner, operated from rig hydraulic system.

Weatherford Lamb model 13000-J-29 spinnerhawk.

Varco PS-20 spring slip assy. dressed with 4.1/2" drill pipe slips.

WELDING EQUIPMENT : 1 only Lincoln 400AS Diesel Powered Welder.
1 only Oxy-Acetylene Welder and cutting set.

DOG HOUSE : 1 only Steel Dog House 14' x 7' x 7'.

UTILITY HOUSE : 1 only Steel Utility house to accommodate generators, switch gear, workshop and store room (45' long x 10' wide).

TOOL HOUSE/STORE ROOM : Toolhouse/Spares house with welders workshop skid mounted, 40' long x 8' wide x 8' high.

CAT WALKS : 1 set Catwalks incorporating junk rack 48' long x 5' wide x 42" high.

PIPE RACKS : 1 set (6) Tumble type pipe racks each 28' long x 42" high.

DAY FUEL TANK : 1 only 9' 9" long x 7' 10" wide x 2' deep.
Capacity 4300 litres. Mounted on top of water/fuel tank and recessing into water/fuel tank to minimise loads during moves.

WATER/FUEL TANK : 1 only skid mounted water tank 23' long x 9' 6" wide x 8' high (capacity 356 BBLS) with fuel storage tank (capacity 5800 galls.) one end.
Overall skid length 42'. 2 x 10 HP water pumps mounted one end, 2 x 5 HP fuel pumps mounted other end including one (1) fresh water pump.

ACCUMULATOR & OIL STORAGE SKID : 1 only skid 8' wide x 20' long to accommodate oil storage and accumulator.

DRILLING RATE RECORDER : Martin Decker 5 Pen Record-O-Graph (Penetration, weight, pump pressure, rotary torque and rotary R.P.M.).

DEVIATION INSTRUMENT : 1 only Totco Double Recorder 0-8 deg.

INSTRUMENTS AND INDICATORS : Martin Decker F.S. Weight Indicator 40,000lb
single line pull c/w 40' hose.
National F.S. deadline anchor c/w E160 load cell.
Martin Decker H-6B-28 Tong Torque Indicator 25' hose and load cylinder sensator, box mt. 20,000 lb. line pull.
Martin Decker Rotary Torque, model FA-9.
Swaco 96-11-321 stroke rate meter c/w limit switches for No. 1 and No. 2 pump.
Martin Decker RPM tacho system.
Watco Flo Sho recorder.
Watco Pit-O-Graf (two tank system).
Watco Trip Tank Monitor.
Martin Decker SA-102 satelite drilling control.

MUD TESTING : 1 only Baroid Mud Lab mounted on mud tank.

RATHOLE DRILLER : Wichita engineering rat hole driller for 4.1/4" kelly.

MUD SAVER	Harrisburg Unit with 4.1/2", 3.1/2", 2.7/8" and 2.3/8" end sealing rubbers.
CELLAR PUMP	Pacific Diaphragm Pump, 3" w/- 3 HP explosion proof electric motor.
WATER PUMP	1 only Robin Self-Priming Pump with Diesel Engine.
FIRE EXTINGUISHERS	1 set extinguishers as required by State Mining Regulations.
HIGH PRESSURE WATER BLASTER	1 only Gerni G-115 unit with Lister Diesel Engine.
PIPE BINS	2 only Pipe Bins 36' x 10' x 3' 6" High.
CUP TESTER	Cameron Type "F" cup tester mandrel with 4" IF connections.
TRANSPORT EQUIPMENT & MOTOR VEHICLES	1 - International 520 Payloader with Pipe Forks. 1 - 4 x 4 Toyota Pick-up. 1 - 4 x 4 Toyota Crew car.
CAMP EQUIPMENT	1 - Toolpusher/Engineer office unit 40' x 10 x 10'. 1 - Crew Lunch Room/Toilet Block.

NOTE: At Contractor's discretion any of the foregoing items may be replaced by equipment of equivalent or greater capacity.

APPENDIX - 2

APPENDIX 2

Summary of Wellsite Operation

APPENDIX 2

SUMMARY OF DRILLING OPERATIONS

The Henke No. 1 drill site was prepared by Mount Gamiber Earthmovers.

Prior to the rig arriving a 16" conductor pipe had been installed to 12 m.

The OD & E Rig 19 was rigged up and Henke No. 1 was spudded at 0830 hours on the 25th June, 1987.

A 12-1/4" hole was drilled to 301 m where the 9-5/8" casing was set.

The B.O.P.'s were installed and all functions were tested to 1500 psi.

Drilling resumed with 8-1/2" hole to 306 m at which point a leak-off test established a formation integrity of 12 ppg.

The 8-1/2" hole was continued to 1339 m with bit changes at 822 m, 991 m, 1222 m.

DST No. 1 was attempted over the interval 1339 m to 1326.7 m but the test tool and anchor pipe became plugged after one barrel of fluid entered the string.

The 8-1/2" hole was continued to a total depth of 1435 m, reached at 0400 hours 6th July, 1987.

Schlumberger ran DLL/MSFL, LDL/CNL, BHC/GR, WST and CST.

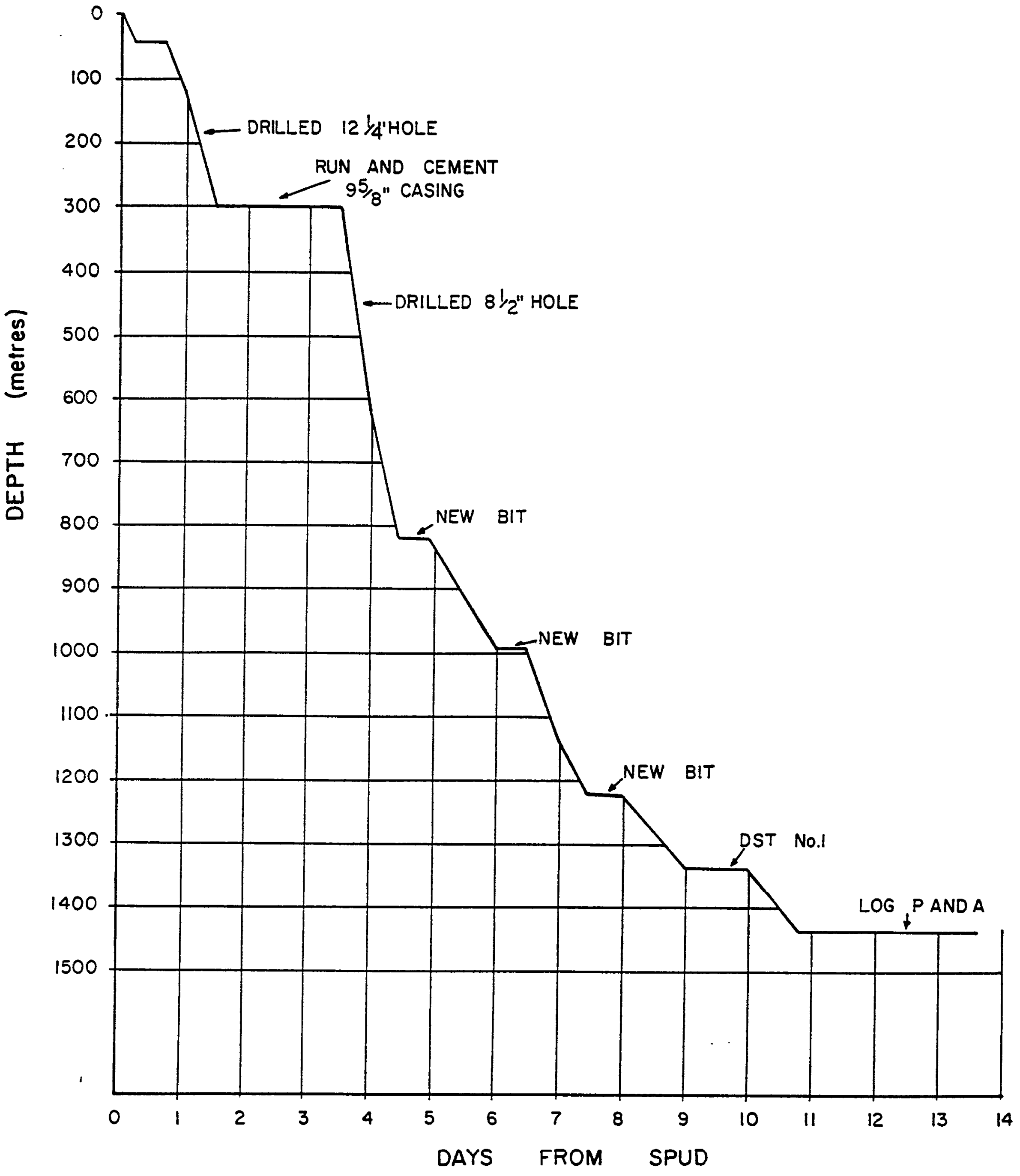
Cement plugs were then set over the interval 1325 m - 1275 m, 317 m - 267 m and at the surface.

The rig was released at 1600 hours, 8th July, 1987.

BEACH PETROLEUM N.L.

HENKE No1

SPUDDED : 0830HRS 25-6-87
T.D. REACHED : 0400HRS 6-7-87
RIG RELEASE : 1600 HRS 8-7-87



PENETRATION PROFILE

FIGURE 9

APPENDIX - 3

APPENDIX 3

Drilling Fluid Recap

BEACH PETROLEUM NL
DRILLING FLUID RECAP
HENKE NO. 1

Prepared By : M. Olejniczak

Dated : July 1987

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WELL SUMMARY

Operator	:	Beach Petroleum NL
Well Number	:	Henke No. 1
Location	:	PEP 105
Contractor	:	O. D. & E.
Rig	:	No. 19
Rig on Location	:	24 June 1987
Spud Date	:	25 June 1987
Water Depth/RKB-Sea Bed	:	4.6 m
Total Depth	:	1435 m
* Date Reached T.D.	:	8 July 1987
* Total Days Drilling	:	15
Rig off Location	:	9 July 1987
Total Days on Well	:	17

Drilling Fluid Type	Interval	Hole Size	Cost
FW Gel/Lime Spud Mud	0 - 301 m	$12^1/4$"	$1,527.71
FW Gel/Lime - FW Gel/CMC	301 - 1435 m	$8^1/2$"	4,358.70

MUD MATERIALS CHARGED TO DRILLING			$5,886.41

Engineer on Location from : 24-06-87 to 08-07-87

* Mud Engineering : 15 days @ $350 per day	5,625.00
* TOTAL DRILLING COST MATERIALS & ENGINEERING SERVICE	$11,511.41
Mud Materials not charged to Drilling	-
Engineering not charged to Drilling	-

Casing Program	:	$9^5/8$" @ 297.5 m
Drilling Supervisors	:	H. Walker
Baroid Mud Engineers	:	M. Olejniczak

DISCUSSION BY INTERVAL

$12^{1}/4$" Hole 16.5 m to 301 m 3 days

The $12^{1}/4$" hole was programmed to be spudded in with Lime flocculated Bentonite spud mud. However, after mixing 200 bbl prehydrated Bentonite, there was insufficient water inflow in the seepage water supply holes to provide any more mud volume. This meant that prehydrated Bentonite had to be used direct to drill the rathole, mousehole and to actually spud in at 0930 hours on 25th June, 1987.

A water tanker had to be called in and used for the bulk of water supply for the rest of the well with some water being taken from the sump and seepage holes.

Drilled through loose surface sands to 20 m and then calcarnite. Began adding Lime to flocculate the mud. A pump rate of 300 gpm was used while drilling. At 40 m, the conductor washed out, probably due to vibration in the loose sand that it was set in and a cement plug was set on bottom.

After waiting on cement $6^{1}/2$ hours, the top of cement was tagged at 12.8 m and then drilled out with full returns. Drilling continued at a controlled rate of approximately 3 singles per hour with the pump rate gradually being increased back to 300 pgm. From 65 m, the calcarnite changed to claystone with the loose Dilwyn Sands from 128 m and the $12^{1}/4$" TD being decided upon after drilling into a clay band within the sands at 301 m.

During drilling, cuttings at the shakers cleaned up rapidly while circulating out after each single, indicating a stable and uniform guage hole. The shaker had to be partially bypassed due to blinding of the screens by loose sand. With the bulk of the sand being removed by the desander with output rates of up to 25-30 bbl/hr, the desilter was run as a mud cleaner to remove the finer sand without additional mud volume loss.

The mud used was high pH Lime flocculated Bentonite incorporating as much of the Native Clays as possible to reduce costs.

DISCUSSION BY INTERVAL

$12^1/4$" Hole (Cont.)

Typical mud properties were:

Weight	:	9.0 ppg
Viscosity	:	35
PV/YP	:	5 / 14
Gels	:	10 / 15
Filtrate	:	No Control
pH	:	11-12

The funnel viscosity was relatively low at 35 seconds but its relativley high yield point and gel strengths enabled it to easily clean the hole even with gravelly sands so that fill was not a problem.

At 301 m, a wiper trip was run without problems and a 40 bbl Hi-Viscosity pill spotted on bottom. The $9^5/8$" casing was run but hit a ledge or hole sidestep at 218 m and wouldn't wash down so the casing had to be pulled back out and a wiper trip run. The drill pipe ran to bottom without any problems so a six stand short trip was run working through the problem area. The casing was then rerun without problems and cemented in place at 297.5 m. Cement returned to surface 2 minutes after displacement began indicating that the hole had been in reasonably good guage.

DISCUSSION BY INTERVAL

$8^1/2$" Hole 301 m to 1435 m 10 days

As it was intended to continue with Lime flocculated Aquagel-Native Clay mud through the rest of the Dilwyn Sands and into the top of the Pember Mudstone, as much of the old mud from the $12^1/4$" hole as possible was saved during the $9^5/8$" casing cement job.

After nippling up and testing the BOP stack, drilled out the cement and casing shoe with slightly diluted old mud then drilled 5 m of new hole and ran a leak off test giving a 12.0 ppg equivalent mud weight.

Then continued drilling through the Dilwyn Formation with loose sands and occasional clays. The shaker had to be partially bypassed due to sand blinding of the screens and the desander relied upon to discharge most of the sands at rates of up to 20-30 bbl/hr and weights of up to 15 ppg. The desilter was run as a mud cleaner discharging the smaller proportion of finer sands without additional mud loss.

Mud maintenance involved mainly additions of caustic and lime for viscosity and water for volume with only a small amount of prehydrated Bentonite having to be added as the section was more agillaceous than expected.

Typical mud properties were:

Weight	:	8.9+ ppg
Viscosity	:	35-37 seconds
PV/YP	:	5-7 / 11-15
Gels	:	11-12 / 15-18
Filtrate	:	16-25 ccs

From about 580 m, claystone became prodominant and prehydrated Bentonite additions were ceased with only water and Lime being required and mud losses also stabilised to about 20 bbl/hr indicating a more in gauge hole and reduced filtration losses.

DISCUSSION BY INTERVAL

8^1/2" Hole (Cont.)

With the first target being the Inter-Pember sand, began treating the mud with Bicarbonate and CMC (EHV) to gradually reduce water loss from the trip for a bit change and stabiliser addition at 823 m, prior to reaching the Pember Mudstone. Only had to ream 6 m at 411 m and 27 m back to bottom running in with the stabiliser.

From about 930 m, the drilling rate slowed dramatically to 3-3^1/2 m/hr as the Pember Mudstone was reached. At 992 m, POH, working tight spots around 900 m and changed the JD3 bit to a softer formation X3A bit. Ran back in with no problems and continued drilling at a much faster rate of about 20 m/hr. A drilling break in the Inter-Pember sand was circulated out at 1007 m with no show and drilling resumed at a gradually reducing drill rate.

Mud properties by this stage had become reasonably stable as follows:

Weight : 9.2+ ppg
Viscosity : 40-42 seconds
PV/YP : 12-16 / 11-16
Gels : 4-6 / 18-22
pH : 9.0-10.0
Filtrate : 7.4-8.0 ccs
MBT : 12-14 ppb
Cl- : 900-1200 ppm

Treatment consisted of adding prehydrated Bentonite to maintain yield point and gel strengths with CMC (EHV) and CMC (LV) added for filtration control and also additional viscosity. The mud being basically a fresh water, non dispersed Aquagel-CMC mud.

The mud weight began to increase rapidly through the Pember Mudstone and regular dumping of the sand trap every 3 singles had to be instituted to allow dilution to control the weight to 9.3 ppg or less.

DISCUSSION BY INTERVAL

$8^1/2$" Hole (Cont.)

On the trip for a bit change at 1222 m, the pipe had to be worked through tight hole from 1060 m to 909 m and again when running back in. The problem area was apparently the Inter-Pember Sand and was later shown to have been due to filter cake build up on the in gauge sandstone, by the caliper log.

The drilling rate increased with a formation change to dark siltstone from about 1285 m and drilling breaks at 1314 m and 1336 m were circulated out till the Pebble Point sand was finally reached. Circulated the hole clean in at 1339 m in preparation for a drill stem test which was to be run to get fluid samples even though there was no show. A 28 stand wiper trip was run with only one slightly tight spot, the Inter-Pember Sand having freed up. The pipe was then run back to bottom circulated a few minutes, with a stand being pulled and the circulation finished higher up to protect the future packer seat.

The drill stem test was then run with 1000 ft of water cushion at 1326 m after having to work the tool through a tight spot at 325 m. One barrel of muddy formation water was recovered with the test tool sample chamber and the perforated pipe plugged with clay and unreadable pressure readings. It appeared most likely that hydrated clay from circulating above the packer seats washed from the sides down the hole and was later responsible for plugging the tool.

When drilling resumed after the DST, had several occurrences of abundant twisted Splintery Shale cavings at the shakers suggesting some possible pressure instability in the Pember Mudstone. During drilling of the Pember Mudstone, there had been very small connection gases observed which disappeared towards the base of the Pember also supported this conclusion. It was decided not to try to reduce the 9.3 ppg mud weight after the DST incase this problem persisted but it was not noticed again. A drilling break was circulated out at 1392 m at the top of the Parbate Formation and the drill string pulled for a bit change at 1435 m. The decision was then made to call this TD so a rerun bit was run in for a wiper trip.

DISCUSSION BY INTERVAL

$8^1/2$" Hole (Cont.)

Schlumberger Logs were run without problems and the well then plugged and abandoned.

The Schlumberger Log showed the hole to be in reasonably good, although not excellent gauge, and the hole stability was good right throughout logging.

SUMMARY AND CONCLUSIONS

Henke No. 1 was anticipated as having a very sandy sequence and for this reason was programmed for a fresh water mud system throughout with Lime flocculated Bentonite from surface converting to a non dispersed Bentonite-CMC from the top of the Pember Mudstone.

The 12^{1}/4" hole was drilled quite adequately with Lime flocculated Bentonite, except for a washed out conductor at 40 m which was fixed with a cement plug. The continued use of this Lime flocculated Bentonite mud through the Dilwyn sands provided a cheap effective mud for cleaning the hole and forming a filter cake to stabilise the hole. This type of mud with its low funnel viscosity but high yield point and gel strengths is quite capable of lifting gravels out of the hole.

The conversion to a freshwater Bentonite-CMC mud began from 823 m and this mud type was maintained to TD, with the only problem being excessive mud weight increase through the Pember Mudstone requiring increased dumping and dilution to control the mud weight to 9.3 ppg or less.

The only problem encounterd while drilling was very tight hole through the Inter-Pember sand on a trip at 1222 m. This problem disappeared on subsequent trips and from the Caliper Log was later shown to have been due to filter cake build up on the close to gauge sand.

The other problem encountered was the plugging of the DST tool with clay. It appears that this clay was most likely the result of clay washed off the side of the hole while circulating one stand off bottom and later pushed to bottom with the test tool. For this reason, it was decided to run a low KCl concentration of around 2% on future wells to try to produce a firmer wellbore in the clay sections. It would also enable the KCl% to be easily raised if it was later felt necessary, without major mud property alterations.

Apart from these problems, the reasonable good guage of the hole as shown on the caliper and its good stability mean that the mud was reasonably successful in its programmed intentions with the final mud cost of $5823.33 also being very close to the programmed cost of $5713.81.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY	BEACH PETROLEUM NL	MUD TYPES	FW GEL-LIME SPUD MUD	HOLE SIZE	12¼
WELL	HENKE NO.1			INTERVAL TO	301 m
LOCATION	PEP 105, VICTORIA			FROM	16.7 m
COST/DAY	$470.64			MTRS DRILLED	284·3 m
COST/M	$ 4.97	CONTRACTOR	O.D.& E.		
COST/BBL	$ 1.54	DRILLING DAYS/PHASE	3		
RECAPPED BY	M. OLEJNICZAK	ROTATING HRS/PHASE	18½		
DATE	27-06-87			MUD CONSUMPTION FACTOR	3.22 BBL/M

MATERIAL	UNIT	UNIT COST	ESTIMATED		ACTUAL		TOTAL COST	
			USED	KG/M³	USED	KG/M³	ESTIMATED	ACTUAL
AQUAGEL	100 lb	15.25			89			1357.25
CAUSTIC SODA	25 kg	21.90			6			131.40
LIME	25 kg	4.29			7			30.03
BARITE	50 kg				1			9.03

CHEMICAL VOLUME	15 BBL	
FRESH WATER	900 BBL	
SEA WATER		
TOTAL MUD MADE	915 BBL	
COST LESS BARYTES		1518.68
COST WITH BARYTES		1527.71

COMMENTS

7SACKS AQUAGEL USED FOR LEAD SLURRY MIX WATER FOR 9-5/8" CASING CEMENT JOB. 1SACK BARITE USED FOR RIG FLOOR WHILE RUNNING CASING.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL RECAP

COMPANY	BEACH PETROLEUM NL	MUD TYPES	FW GEL-LIME CONVERTED TO FW GEL/CMC	HOLE SIZE	8½
WELL	HENKE NO. 1			INTERVAL TO	1435 m
LOCATION	PEP 105, VICTORIA			FROM	301 m
COST/DAY	$396.25			MTRS DRILLED	1134 m
COST/M	$ 3.84	CONTRACTOR	O. D. & E.		
COST/ BBL	$ 3.12	DRILLING DAYS/PHASE	11		
RECAPPED BY	M. OLEJNICZAK	ROTATING HRS/PHASE	107		
DATE	08-07-87			MUD CONSUMPTION FACTOR	1.23 BBL/M

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
AQUAGEL	100 lb	15.25			111			1692.75
CAUSTIC SODA	25 kg	21.90			15			328.50
BICARBONATE	40 kg	21.63			4			86.52
CMC (EHV)	25 kg	59.03			16			944.48
LIME	25 kg	4.29			5			21.45
CMC (LV) [BEACH STOCK]	25 kg	51.40			25			1285.00

CHEMICAL VOLUME	25 BBL	
FRESH WATER	1370 BBL	
SEA WATER		
TOTAL MUD MADE	1395 BBL	
COST LESS BARYTES		
COST WITH BARYTES		$4358.70

COMMENTS

CMC-LV IS OLD BEACH STOCK, WITH PRICE OF $51.40/SACK BEING THE CURRENT BAROID PRICE USED FOR COMPARATIVE PURPOSES.

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

MATERIAL SUMMARY

COMPANY	BEACH PETROLEUM	MUD TYPE	FW GEL/LIME CONVERTING TO FW GEL/CMC	HOLE SIZE	METRES DRILLED	DRILLING DAYS
WELL	HENKE NO.1					
LOCATION	PEP 105, VICTORIA			12¼	284.3	3
COST/DAY	$420.42			8½	1134	11
COST/M	$ 4.15	TOTAL ROTATING HRS	125½			
COST/BBL	$ 2.55	TOTAL DAYS ON HOLE	14			
RECAPPED BY	M. OLEJNICZAK	TOTAL DEPTH	1435 m	TOTAL	1418.3 m	14 days
DATE	08-07-87	MUD CONSUMPTION : WELL AVERAGE	1.63 bbl/m			

MATERIAL	UNIT	UNIT COST	ESTIMATED USED	ESTIMATED KG/M³	ACTUAL USED	ACTUAL KG/M³	TOTAL COST ESTIMATED	TOTAL COST ACTUAL
AQUAGEL	100 lb	15.25			200			3050.00
CAUSTIC SODA	25 kg	21.90			21			459.90
BICARBONATE	40 kg	21.63			4			86.52
LIME	25 kg	4.29			12			51.48
CMC (EHV)	25 kg	59.03			16			944.48
CMC (LV) BEACH STOCK	25 kg	51.40			25			1285.00
BARITE	50 kg	9.03			1			9.03

CHEMICAL VOLUME	40 BBL	
FRESH WATER	2270 BBL	
SEA WATER		
TOTAL MUD MADE	2310 BBL	
COST LESS BARYTES		$5877.38
COST WITH BARYTES		$5886.41
COMMENTS		

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

DRILLING FLUID PROPERTY RECAP

COMPANY BEACH PETROLEUM NL

WELL HENKE NO.1

DATE	DEPTH m	HOLE SIZE	TEMP °C	WEIGHT PPG	VIS SEC	PV	YP	GELS 10 sec	GELS 10 min	WATER LOSS API	CAKE mm	pH	Pf	Mf	Cl mg/l	Ca mg/l	SAND %	SOLIDS %	WATER %	OIL %	MBC PPG	REMARKS TREATMENT	FORMATION
25/6	40	12¼	-	8.7	35	5	15	15	20	20	4	11.5					¼	2	98	-	-	SPUD IN. WASHED CONDUCTOR.	SAND/CALCARENITE.
26/6	301	12¼	-	9.0	35	5	14	10	15	NC	4	12.0	1.8	-	1000	100	TR	4	96	-	-	DRILLING. RUN CSG.	SANDS/CLAY.
27/6	301	12¼	-	9.0	35	5	14	10	15	NC	4	12.0	1.8	-	1000	100	¼	4	96	-	-	RERAN CASING. CEMENTED.	
28/6	413	8½	-	8.9	35	5	15	12	15	25	4	11.5	1.1	-	500	40	TR	4	96	-	-	DRILL OUT SHOE, DRILL.	SANDS.
29/6	823	8½	-	8.9+	37	7	11	14	18	16	3	10.5	.8	-	500	20	TR	4	96	-	-	DRILLING, BIT CHANGED.	SANDS/CLAY.
30/6	986	8½	-	9.0+	37	7	12	12	18	10.0	2	9.5	.15	-	400	20	TR	4	96	-	-	DRILLING, WIPER TRIP.	CLAYSTONE/SANDS.
1/7	1082	8½	-	9.1	39	10	11	7	19	9.0	2	9.5	.1	-	200	60	TR	4	96	-	15	DRILL. BIT CHANGE. DRILL.	CLAYSTONE/SANDS.
2/7	1222	8½	-	9.2+	41	14	12	4	22	7.8	2	9.5	.1	-	1200	20	TR	6	94	-	14	DRILL, BIT CHANGE.	
3/7	1336	8½	-	9.2	42	16	16	5	18	7.4	2	10	.4	-	900	20	TR	6	94	-	12	DRILLING.	
4/7	1339	8½	-	9.2	42	16	16	5	18	7.4	2	10	.4	-	900	20	TR	6	94	-	12	DRILL STEM TEST.	
5/7	1429	8½	-	9.3	40	14	13	5	18	7.8	2	9.5	.3	-	900	20	TR	7	93	-	12	DRILLING.	
6/7	1435	8½	-	9.2+	39	12	13	4	15	7.5	2	9.5	.15	-	900	20	TR	6	94	-	12	T.D. LOGGING.	
7/7	1435	8½	-	9.2+	39	12	13	14	15	7.5	2	9.5	.15	-	900	20	TR	6	94	-	12	LOGGING, BEGIN P&A.	

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

BIT RECORD

COMPANY BEACH PETROLEUM NL
WELL HENKE NO.1
CONTRACTOR/RIG O.D.& E. RIG 19
LOCATION PEP 105, VICTORIA
SPUD DATE 25-06-87
DATE REACHED T.D.
COMPANY SUPERVISORS H. WALKER
TOOLPUSHERS R. PYNE
PUMPS: MAKE, TYPE
LINERS USED
DRILL COLLARS 8" / 6½"
DRILL PIPE 4½"
MUD SYSTEMS, DEPTHS BENTONITE/LIME SPUD MUD TO 301 M. F.W. GEL/CMC TO T.D.

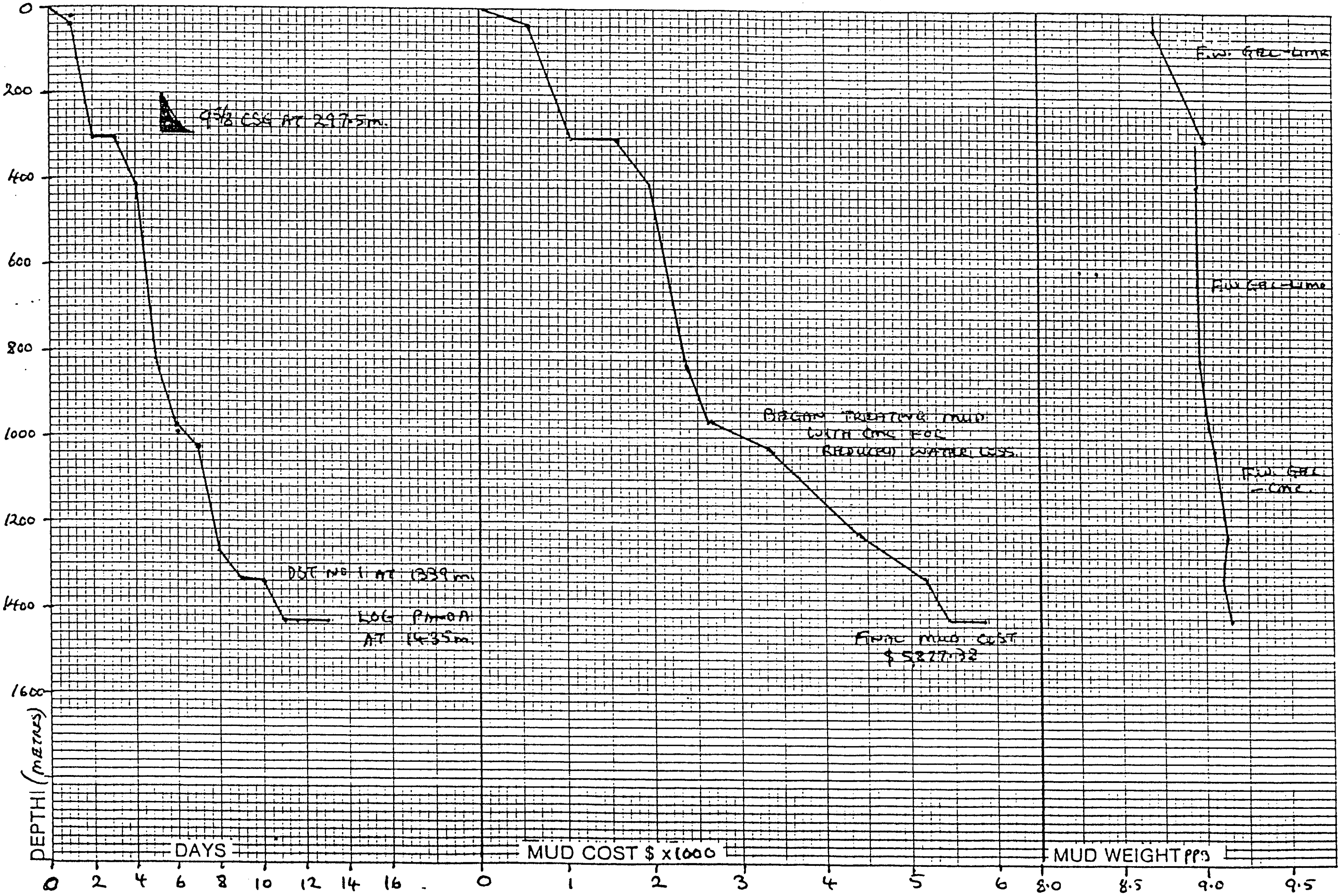
DATE	No.	SIZE	MAKE	TYPE	JETS 32nd"	DEPTH OUT m	METRES DRILLED	HOURS	MTRS/ HR	ACCUM DRLG HOURS	BIT WEIGHT tonnes	RPM	VERT DEV'N	PUMP PRESSURE p.s.i.	PUMP RATE spm	WT PPG	MUD VIS sec	CONDITION			FORMATION	REMARKS
																		T	B	G		
26/6	1	12¼	HTC	OSC3J	3 x 20	301	301	18½	16.2	18½	0-7	110	1/4	400	150	9.0	35	2	4	I	CALYSTONE/SANDS.	
	1RR		WIPER TRIP																			
29/6	2	8½	HTC	X3A	3 x 10	822	521	24½	21.2	43	0-8	140	1	800	100	8.9+	37	6	3	1/16	SANDS/CLAYSTONE.	
1/7	3	8½	HTC	JD3	3 x 10	991	169	23	7.3	66	20-25	70/110	1-3/4	875	110	9.1	38	7	2	1/16	SST/CLAYSTONE.	
2/7	4	8½	HTC	X3A	3 x 10	1222	231	23½	9.8	89½	20-25	110	1	1000	110	9.2+	41	7	4	1/16	SST/CLAYSTONE.	
4/7	5	8½	HTC	JD3	3 x 10	1339	117	14½	8.6	104	12-24	70-90	½	1000	110	9.2	42	1	1	IN	CLAYSTONE/SST.	
6/7	5RR	8½	HTC	JD3	3 x 10	1435	96	21½	4.5	125½	20-25	90	3/4	1000	110	9.2+	39	7	3	1	CLAYSTONE/SST.	
6/7	4RR	8½	WIPER TRIP PRIOR TO LOGGING.																			

Baroid Australia PTY. LTD./NL INDUSTRIES INC.

GRAPH SUMMARY

OPERATOR BEACH PETROLEUM

WELL HENKE No 1.



SHEET NO.

WEEKLY INVENTORY SHEET

BAROID AUSTRALIA PTY LTD

OPERATOR: BEACH PETROLEUM NL

WELL: HENKE NO.1

RIG: O. D. & E. #19

		DATE:	24-06-87			25-06-87			26-06-87			27-06-87			28-06-87			29-06-87			30-06-87			
PRODUCT	UNIT	START WEEK	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	STOCK COUNT
AQUAGEL	100 lb		280		280		35	245		25	220		29	191		27	164		17	147		9	138	
CAUSTIC SODA	25 kg		20		20		2	18		3	15		1	14			14			14			14	
SODA ASH	40 kg		20		20			20			20			20			20			20			20	
BICARBONATE	40 kg		20		20			20			20			20			20		2	18			18	
LIME	25 kg		40		40		2	38		3	35		2	33		1	32		4	28			28	
CMC (EHV)	25 kg		40		40			40			40			40			40		2	38		2	36	
Q-BROXIN	25 kg		8		8			8			8			8			8			8			8	
BARITE	50 kg		100		100			100			100		1	99			99			99			99	
EZ SPOT	200 lt		1		1			1			1			1			1			1			1	
FINNFIX (CMC LV)	25 kg		52		52			52			52			52			52			52			52	
OLD BEACH STOCK																								

SHEET NO.

WEEKLY INVENTORY SHEET

BAROID AUSTRALIA PTY LTD

OPERATOR: BEACH PETROLEUM NL

WELL: HENKE NO.1

RIG: O. D. & E. #19

		DATE:	01-07-87			02-07-87			03-07-87			04-07-87			05-07-87			06-07-87			07-07-87			
PRODUCT	UNIT	START WEEK	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	REC	USE	BAL	STOCK COUNT
AQUAGEL	100 lb	138	210	17	331		16	315		10	305			305		10	295		5	290			290	
CAUSTIC SODA	25 kg	14	20	1	33		11	22		2	20			20		1	19			19			19	
SODA ASH	40 kg	20			20			20			20			20			20			20			20	
BICARBONATE	40 kg	18		1	17		1	16			16			16			16			16			16	
LIME	25 kg	28			28			28			28			28			28			28			28	
CMC (EHV)	25 kg	36		3	33		3	30		4	26			26		1	25		1	24			24	
Q-BROXIN	25 kg	8			8			8			8			8			8			8			8	
BARITE	50 kg	99			99			99			99			99			99			99			99	
EZ SPOT	200 lt	1			1			1			1			1			1			1			1	
FINNFIX (CMC LV)	25 kg	52		5	47		8	39		6	33			33		1	32		5	27			27	
OLD BEACH STOCK																								

APPENDIX B

$8^1/2$" Hole Caliper (25m Averages)

Depth (m)	Hole Size (Ins)	Depth (m)	Hole Size (Ins)
325	$10^1/2$	875	$8^3/4$
350	$10^3/4$	900	$8^3/4$
375	11	925	9
400	$10^1/2$	950	$8^3/4$
425	$9^3/4$	975	$8^3/4$
450	$11^1/4$	1000	$8^3/4$
475	$10^1/2$	1025	$8^3/4$
500	$9^1/4$	1050	$8^7/8$
525	$9^1/4$	1100	9
550	9	1125	$9^1/2$
575	$8^3/4$	1150	$9^3/4$
600	$8^3/4$	1175	$9^3/4$
625	$8^3/4$	1200	$11^1/4$
650	$9^1/2$	1225	10
675	9	1250	$9^1/2$
700	9	1275	$9^1/4$
725	9	1300	$9^1/4$
750	9	1325	$9^1/2$
775	$9^1/4$	1350	$8^3/4$
800	$8^3/4$	1375	$8^3/4$
825	$9^1/4$	1400	$8^3/4$
850	$9^1/4$	1425	$8^1/2$

APPENDIX - 4

APPENDIX - 4

APPENDIX 4

Sidewall Core Descriptions

HENKE NO. 1

SIDEWALL CORES DESCRIPTIONS

SWC	Depth (m)	Rec. (cm)	Description
1	1430m	2.5	SANDSTONE, off white to light grey, very fine to medium grained, dominantly fine-grained, friable, subangular, poorly sorted, moderate white kaolin matrix, weak siliceous cement, non-calcareous, trace red lithics, trace carbonaceous detritus, good visual porosity. No show.
2	1429.5	2.5	Interlaminated CLAYSTONE and SANDSTONE. CLAYSTONE, medium brown, firm, massive, very silty, slightly micromicaceous, trace black coally detritus, non-calcareous. SANDSTONE, off white to light grey, friable, very fine to fine grained, dominantly very fine grained, subangular, moderately sorted, trace white kaolin matrix, weak siliceous cement, moderate calcareous cement, trace grey lithics, trace carbonaceous detritus, poor visual porosity. No show.
3	1392.0m	3.0	SANDSTONE, off white to light grey, very fine-grained to occasional medium grained, dominantly fine grained, friable, subangular, moderate to well sorted, trace white kaolin matrix, very weak siliceous cement, non-calcareous, trace grey lithics, trace carbonaceous detritus, good visual porosity, No show.
4	1382m	2.5	CLAYSTONE, dark brown grey, firm, sub-fissile, common micromica, slightly silty, moderate carbonaceous with occasional very fine sandstone laminae. No show.
5	1365m	2.5	CLAYSTONE, dark brown grey, firm, massive to sub-fissile, common micromica, slight to moderately silty, moderately carbonaceous, trace pyrite. No show.
6	1358m	3.0	Interlaminated SILTSTONE with minor (10%) SANDSTONE. SILTSTONE, dark brown grey, firm, massive to slightly sub-fissile, common micromica, moderately carbonaceous, slight to moderately argillaceous, rare pyrite (nodule), non-calcareous. SANDSTONE, off white to light grey, very fine grained. No show.

7	1352m	3.0	SILTSTONE, dark grey, firm, massive, trace micromica, very carbonaceous, rare very coarse quartz lithics, moderately argillaceous with irregular laminae. SANDSTONE, off white to medium grey, very fine grained, friable, subangular, moderately sorted, abundant silt and clay matrix in part, weak siliceous cement, non-calcareous, very carbonaceous, very poor visual porosity. No show.
8	1344m	1.5	CLAYSTONE, dark grey, firm to moderately hard, massive, trace micromica, moderate to very silty, moderately carbonaceous, common very fine - coarse grained, subangular, quartz and feldspar lithics, slightly calcareous. No show.
9	1330m	3.2	ARGILLACEOUS SANDSTONE, mottled, dark green-grey to medium brown, 60% quartz sandstone grains in argillaceous matrix; the sand grains are very fine - very coarse, dominantly medium-grained, subangular to dominantly sub-rounded, very poorly sorted, quartz grains occassionally with brown (iron oxide) stain; the claystone matrix is dark green grey in part, medium brown grey in part, slightly calcareous. Nil to very poor visual porosity. No show.
10	1327.5m	4.3	CLAYSTONE, very dark brown grey, firm, massive, very silty, very carbonaceous, trace micromica, with rounded, very fine quartz sand grains, common marcasite, non-calcareous. No show.
11	1321.5m	5.2	CLAYSTONE, dark brown grey, minor medium grey in places, moderately hard, massive, trace micromica, very silty, non calcareous, moderately carbonaceous, trace medium grained glauconite, trace marcasite with 20% very fine to very coarse quartz sand grains. No show.
12	1319.0m	Nil	No recovery.
13	1318m	4.5	CLAYSTONE, dark brown grey, minor dark green in places, moderately hard, massive, slightly micromicaceous, slight to moderately silty, non-calcareous, moderate to very carbonaceous, up to 10% dark green glauconite, trace dolomitic lithics, buff to light brown, angular, trace black coally detritus. No show.
14	1310m	4.0	CLAYSTONE, very dark brown grey, moderately hard, massive, slightly micromicaceous, moderately silty, very carbonaceous, common glauconite, common marcasite, moderately calcareous. No show.

15	1285m	5.2	CLAYSTONE, very dark brown grey, moderately hard, massive, slightly micromicaceous, slightly silty, very carbonaceous, rare glauconite, minor calcareous, disrupted bands. No show.
16	1268.5m	5.5	CLAYSTONE, dark brown grey, moderately hard, massive, trace micromica, moderately silty, very carbonaceous, common marcasite, slightly calcareous. No show.
17	1263m	3.5	CLAYSTONE, medium brown grey, firm, moderately hard, massive, trace micromica, moderately silty, rare very fine grained to silty laminae, slightly calcareous. No show.
18	1250m	4.0	CLAYSTONE, medium brown grey, moderately hard, commonly micromicaceous, occasional coarse mica flakes, moderately silty, common disseminated pyrite in part, minor carbonaceous detritus, common very fine quartz sand in part, non-calcareous. No show.
19	1117.0m	4.0	CLAYSTONE, medium brown, firm, massive, moderately silty, trace micromica, trace very fine quartz sand laminae, trace coally detritus, non-calcareous. No show.
20	1045m	4.3	CLAYSTONE, dark brown grey, firm, massive, moderately silty, trace micromica, moderately carbonaceous, trace carbonaceous detritus, non-calcareous. No show.
21	1009m	4.0	Finely interbedded SANDSTONE and SILTSTONE. SANDSTONE, light grey, very fine to fine grained, dominantly fine grained, friable, subangular, well sorted, nil to abundant silt and argillaceous matrix, very weak siliceous cement, non-calcareous, very poor to very good visual porosity. No show. SILTSTONE, dark brown, firm, massive, trace micromica, moderately argillaceous in part, moderately carbonaceous, abundant very fine quartz sand in part.
22	1008m	3.9	SANDSTONE, medium brown grey, medium coarse grained, dominantly medium grained, subangular - subrounded, moderately sorted, loose, minor medium brown argillaceous matrix (probably mud filter cake) trace red quartz lithics, trace coarse mica flakes, trace siliceous cement, non-calcareous. Very good visual porosity. No show.

APPENDIX - 5

APPENDIX 5

Velocity Survey

Schlumberger

BEACH PETROLEUM N.L.

GEOGRAM PROCESSING REPORT

HENKE - 1

FIELD	WILDCAT
STATE	VICTORIA
COUNTRY	AUSTRALIA
COORDINATES	038 deg 00' 20.35" S 141 deg 11' 25.81" E
DATE OF SURVEY	07-JULY-1987
REFERENCE NO.	570709

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1. Introduction

A checkshot survey was shot in the Henke - 1 well on 7 July 1987. Data was acquired using a dynamite source located near the wellhead. Twenty one levels were shot from 1432 metres to 39 metres below KB. Three levels are used in the sonic calibration processing.

2. Data Acquisition

The data was acquired using the well seismic tool (WST). Recording was made on the Schlumberger Cyber Service Unit (CSU) using LIS format at a tape density of 800 BPI. The checkshot quality was variable; first break times could not be accurately picked on most levels due to the use of non-instaneous detonators. Three levels at 288, 1387 and 1432 were of good quality and consistent with instantaneous source detonation.

Table 1: Survey Parameters

Datum	MSL
Elevation KB	38.7 metres AMSL
Elevation DF	38.4 metres AMSL
Elevation GL	34.1 metres AMSL
Total Depth	1433 metres below KB
Energy Source	Dynamite
Source Offset	32 metres
Source Depth	1.7 metres
Reference Sensor	Geophone and Fire pulse
Downhole Geophone	Geospace HS-1 High Temp. (350 deg F) Coil Resist. 225Ω ±10 % Natural Freq. 8-12 hertz Sensitivity 0.45 V/in/sec Maximum tilt angle 60 deg

3. Sonic Calibration Processing

3.1 Sonic Calibration

A 'drift' curve is obtained using the sonic log and the vertical check level times. The term 'drift' is defined as the seismic time (from check shots) minus the sonic time (from integration of edited sonic). Commonly the word 'drift' is used to identify the above difference, or to identify the gradient of drift verses increasing depth, or to identify a difference of drift between two levels.

The gradient of drift, that is the slope of the drift curve, can be negative or positive.

For a negative drift $\frac{\Delta drift}{\Delta depth} < 0$, the sonic time is greater than the seismic time over a certain section of the log.

For a positive drift $\frac{\Delta drift}{\Delta depth} > 0$, the sonic time is less than the seismic time over a certain section of the log.

The drift curve, between two levels, is then an indication of the error on the integrated sonic or an indication of the amount of correction required on the sonic to have the TTI of the corrected sonic match the check shot times.

Two methods of correction to the sonic log are used.

1. **Uniform or block shift** This method applies a uniform correction to all the sonic values over the interval. This uniform correction is applied in the case of positive drift and is the average correction represented by the drift curve gradient expressed in μsec/ft.

2. **ΔT Minimum** In the case of negative drift a second method is used, called Δt minimum. This applies a differential correction to the sonic log, where it is assumed that the greatest amount of transit time error is caused by the lower velocity sections of the log. Over a given interval the method will correct only Δt values which are higher than a threshold, the Δt_{min}. Values of Δt which are lower than the threshold are not corrected. The correction is a reduction of the excess of Δt over Δt_{min}, Δt - Δt_{min}.

   $\Delta t - \Delta t_{min}$ is reduced through multiplication by a reduction coefficient which remains constant over the interval. This reduction coefficient, named G, can be be defined as:

   $$G = 1 + \frac{drift}{\int (\Delta t - \Delta t_{min}) dZ}$$

   Where drift is the drift over the interval to be corrected and the value $\int (\Delta t - \Delta t_{min}) dZ$ is the time difference between the integrals of the two curves Δt and Δt_{min}, only over the intervals where $\Delta t > \Delta t_{min}$.

   Hence the corrected sonic: $\Delta t = G(\Delta t - \Delta t_{min}) + \Delta t_{min}$.

3.2 Checkshot Data

Three checkshots at 288, 1387 and 1432 metres are used to calibrate the sonic log.

The sonic calibration processing has been referenced to the seismic datum at MSL. A surface velocity of 1900 metres/sec is used to correct transit times to datum. The equivalent static time from source depth to datum is -17.05 msec one way time.

3.3 Open Hole Logs

The sonic log was recorded from 1432 metres to the casing shoe at 298 metres below KB. The sonic is extended linearly upto ti top checkshot at 288 meters. The density log was recorded up to 970 metres and is extrapolated to the surface at a constant density of 2.25 gm/cc.

The caliper and gamma ray curves are included as correlation curves.

3.4 Sonic Calibration Results

The top checkshot (288 metres below KB) is chosen as the origin for the calibration drift curve.

The checkshots used for sonic calibration are at the extreme intervals of the sonic log. A drift curve has been selected with a shape consistent to nearby wells and passing throught the checkshot values. A list of shifts used on the sonic data is given below.

Table 2: Sonic Drift

Depth Interval (metres below KB)	Block Shift μsec/ft	Δt_{min} μsec/ft	Equiv Block Shift μsec/ft
288-510	-	131.48	-4.67
510-701	-	117.59	-2.55
701-1432	-	100.59	-0.63

4. Synthetic Seismogram Processing

GEOGRAM plots were generated using 10-60 hertz zero phase butterworth wavelets.

The presentations include both normal and reverse polarity on a time scale of 3.75 in/sec.

GEOGRAM processing produces synthetic seismic traces based on reflection coefficients generated from sonic and density measurements in the well-bore. The steps in the processing chain are the following:

Depth to time conversion
Reflection coefficients
Attenuation coefficients
Convolution
Output.

4.1 Depth to Time Conversion

Open hole logs are recorded from the bottom to top with a depth index. This data is converted to a two-way time index and flipped to read from the top to bottom in order to match the seismic section.

4.2 Primary Reflection Coefficients

Sonic and density data are averaged over chosen time intervals (normally 2 or 4 millisecs). Reflection coefficients are then computed using:

$$R = \frac{\rho_2.\nu_2 - \rho_1.\nu_1}{\rho_2.\nu_2 + \rho_1.\nu_1}$$

where:

ρ_1 = density of the layer above the reflection interface
ρ_2 = density of the layer below the reflection interface
ν_1 = compressional wave velocity of the layer above the reflection interface
ν_2 = compressional wave velocity of the layer below the reflection interface

This computation is done for each time interval to generate a set of primary reflection coefficients without transmission losses.

4.3 Primaries with Transmission Loss

Transmission loss on two-way attenuation coefficients are computed using:

$$A_n = (1 - R_1^2).(1 - R_2^2).(1 - R_3^2)...(1 - R_n^2)$$

A set of primary reflection coefficients with transmission loss is generated using:

$$Primary_n = R_n.A_{n-1}$$

4.4 Primaries plus Multiples

Multiples are computed from these input reflection coefficients using the transform technique from the top of the well to obtain the impulse response of the earth. The transform outputs primaries plus multiples.

4.5 Multiples Only

By subtracting previously calculated primaries from the above result we obtain multiples only.

4.6 Wavelet

A theoretical wavelet is chosen to use for convolution with the reflection coefficients previously generated. Choices available include:

Klauder wavelet
Ricker zero phase wavelet
Ricker minimum phase wavelet
Butterworth wavelet
User defined wavelet.

Time variant butterworth filtering can be applied after convolution.

4.7 Polarity Convention

An increase in acoustic impedance gives a positive reflection coefficent and is displayed as a white trough under normal polarity. Polarity conventions are displayed in Figure-1.

4.8 Convolution

Standard procedure of convolution of wavelet with reflection coefficients. The output is the synthetic seismogram.

A Summary of Geophysical Listings

Six geophysical data listings are appended to this report. Following is a brief description of the format of each listing.

A1 Geophysical Airgun Report

1. Level number : the level number starting from the top level (includes any imposed shots).
2. Vertical depth from KB : *dkb*, the depth in metres from kelly bushing .
3. Vertical depth from SRD : *dsrd*, the depth in metres from seismic reference datum.
4. Vertical depth from GL : *dgl*, the depth in metres from ground level.
5. Observed travel time HYD to GEO : *tim0*, the transit time picked from the stacked data by subtracting the surface sensor first break time from the downhole sensor first break time.
6. Vertical travel time SRC to GEO : *timv*, is corrected for source to hydrophone distance and for source offset.
7. Vertical travel time SRD to GEO : *shtm*, is *timv* corrected for the vertical distance between source and datum.
8. Average velocity SRD to GEO : the average seismic velocity from datum to the corresponding checkshot level, $\frac{dsrd}{shtm}$.
9. Delta depth between shots : $\Delta depth$, the vertical distance between each level.
10. Delta time between shots : $\Delta time$, the difference in vertical travel time (*shtm*) between each level.
11. Interval velocity between shots : the average seismic velocity between each level, $\frac{\Delta depth}{\Delta time}$.

A2 Drift Computation Report

1. Level number : the level number starting from the top level (includes any imposed shots).
2. Vertical depth from KB : the depth in metres from kelly bushing .
3. Vertical depth from SRD : the depth in metres from seismic reference datum.
4. Vertical depth from GL : the depth in metres from ground level.
5. Vertical travel time SRD to GEO : the calculated vertical travel time from datum to downhole geophone (see column 7, Geophysical Airgun Report).

6. Integrated raw sonic time : the raw sonic log is integrated from top to bottom and listed at each level. An initial value at the top of the sonic log is set equal to the checkshot time at that level. This may be an imposed shot if a shot was not taken at the top of the sonic.
7. Computed drift at level : the checkshot time minus the integrated raw sonic time.
8. Computed blk-shft correction : the drift gradient between any two checkshot levels $(\frac{\Delta drift}{\Delta depth})$.

A3 Sonic Adjustment Parameter Report

1. Knee number : the knee number starting from the highest knee. (The first knees listed will generally be at SRD and the top of sonic. The drift imposed at these knees will normally be zero.)
2. Vertical depth from KB : the depth in metres from kelly bushing .
3. Vertical depth from SRD : the depth in metres from seismic reference datum.
4. Vertical depth from GL : the depth in metres from ground level.
5. Drift at knee : the value of drift imposed at each knee.
6. Blockshift used : the change in drift divided by the change in depth between any two levels.
7. Delta-T minimum used : see section 4 of report for an explanation of Δt_{min}.
8. Reduction factor : see section 4 of report.
9. Equivalent blockshift : the gradient of the imposed drift curve.

A4 Velocity Report

1. Level number : the level number starting from the top level (includes any imposed shots).
2. Vertical depth from KB : the depth in metres from kelly bushing .
3. Vertical depth from SRD : the depth in metres from seismic reference datum
4. Vertical depth from GL : the depth in metres from ground level
5. Vertical travel time SRD to GEOPH : the vertical travel time from SRD to downhole geophone (see column 7, Geophysical Airgun Report)
6. Integrated adjusted sonic time : the adjusted sonic log is integrated from top to bottom. An initial value at the the top of the sonic is set equal the checkshot time at that level. (The adjusted sonic log is the drift corrected sonic log.)

7. Drift=shot time-raw son : the check shot time minus the raw integrated sonic time.
8. Residual=shot time-adj son : the check shot time minus the adjusted integrated sonic time. This is the difference between calculated drift and the imposed drift.
9. Adjusted interval velocity : the interval velocity calculated from the integrated adjusted sonic time at each level.

A5 Time Converted Velocity Report

The data in this listing has been resampled in time.

1. Two way travel time from SRD : This is the index for the data in this listing. The first value is at SRD (0 millisecs) and the sampling rate is 2 millisecs.
2. Measured depth from KB : the depth from KB at each corresponding value of two way time.
3. Vertical depth from SRD : the vertical depth from SRD at each corresponding value of two way time.
4. Average velocity SRD to GEO : the vertical depth from SRD divided by half the two way time.
5. RMS velocity : the root mean square velocity from datum to the corresponding value of two way time.
$$v_{rms} = \sqrt{\Sigma_1^n v_i^2 t_i / \Sigma_1^n t_i}$$
where v_i is the velocity between each 2 millisecs interval.
6. First normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 3000 feet).
$$\Delta t = \sqrt{t^2 + (\frac{X}{v_{rms}})^2} - t$$
where:

   Δt = normal moveout (secs)
   X = moveout distance (metres)
   t = two way time (secs)
   v_{rms} = rms velocity (metres /sec)
7. Second normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 4500 feet).
8. Third normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 6000 feet).
9. Interval velocity : the velocity between each sampled depth. Typically, the sampling rate is 2 millisecs two way time, (1 millisec one way time) therefore the interval velocity will be equal to the depth increment divided by 0.001. It is equivalent to column 9 from the the Velocity Report.

A6 Synthetic Seismogram Table

1. Two way travel time from SRD : This is the index for the data in this listing. The first value is at the top of the sonic. The default sampling rate is 2 millisecs.

2. Vertical depth from SRD : the vertical depth from SRD at each corresponding value of two way time.

3. Interval velocity : the velocity between each sampled depth. Typically, the sampling rate is 2 millisecs two way time, (1 millisec one way time) therefore the interval velocity will be equal to the depth increment divided by 0.001. It is equivalent to column 9 from the the Velocity Report.

4. Interval density : the average density between two successive values of two way time.

5. Reflect. coeff. : the difference in acoustic impedance divided by the sum of the acoustic impedance between any two levels. The acoustic impedance is the product of the interval density and the interval velocity.

6. Two way atten. coeff. : is computed from the series

$$A_n = (1 - R_1^2).(1 - R_2^2).(1 - R_3^2)...(1 - R_n^2)$$

7. Sythetic seismo. primary : the product of the reflection coefficient at each depth and the two way attenuation coefficient up to that depth.

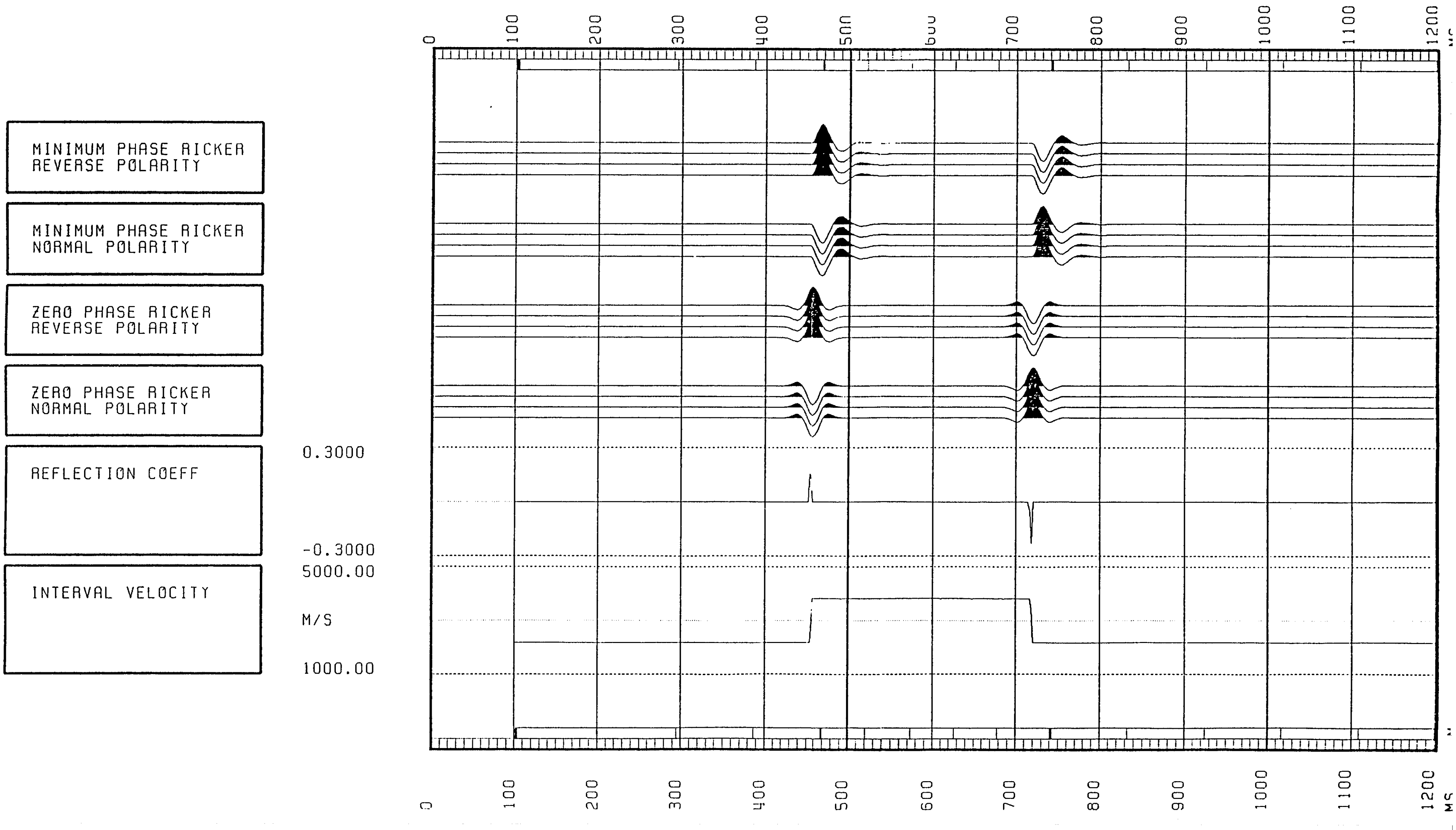
$$Primary_n = R_n.A_{n-1}$$

8. Primary + multiple : a transform technique is used to calculate multiples from the input reflection coefficients.

9. Multiples only : (Primary + multiple) - (Synthetic seismo. primary)

SCHLUMBERGER (SEG-1976) WAVELET POLARITY CONVENTION

Figure 1



Shots

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ANALYST:                 15-OCT-87 11:40:06    PROGRAM: GSHOT  007.E08



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                      GEOPHYSICAL AIRGUN REPORT

                COMPANY  : BEACH PETROLEUM N.L.
                WELL     : HENKE # 1
                FIELD    : WILDCAT
                REFERENCE: 57C709
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ANALYST:                         15-OCT-87 11:40:06     PROGRAM: GSHOT  007.E08




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                                          *   SCHLUMBERGER   *
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                                       GEOPHYSICAL AIRGUN REPORT

                                 COMPANY   : BEACH PETROLEUM N.L.
                                 WELL      : HENKE # 1
                                 FIELD     : WILDCAT
                                 REFERENCE: 570709
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```
         LONG DEFINITIONS

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

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

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

    (GLOBAL PARAMETERS)                        (VALUE)

ELEV OF KB AB. MSL (WST)   KB           :   38.7000   M
ELEV OF SRD AB. MSL(WST)   SRD          :         0   M
ELEVATION OF KELLY BUSHI   EKB          :   38.7000   M
ELEV OF GL AB. SRD(WST)    GL           :   34.1000   M
VEL SOURCE-HYDRO(WST)      VELHYD       :   1900.00   M/S
VEL SOURCE-SRD (WST)       VELSUR       :   1900.00   M/S

    (MATRIX PARAMETERS)
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```
     SOURCE ELV      SOURCE EW      SOURCE NS      HYDRO ELEV      HYDRO EW      HYDRO NS
         M               M              M               M              M              M

1        32.40          -29.67          11.99           32.40          -29.67          11.99


     TRT HYD-SC           TRT SC-SRD
         MS                   MS

1             0               -17.05


        MD @ KB        VD @ KB        VD @ SRD    E-W COORD    N-S COORD
           M              M              M             M            M

1       288.00         288.00         249.30          0            0
2      1387.00        1387.00        1348.30          0            0
3      1432.00        1432.00        1393.30          0            0
```

COMPANY : BEACH PETROLEUM N.L. WELL : HENKE # 1

LEVEL NUMBER	MEASUR DEPTH FROM KB M	VERTIC DEPTH FROM SRD M	VERTIC DEPTH FROM GL M	OBSERV TRAVEL TIME HYD/GEO MS	VERTIC TRAVEL TIME SRC/GEO MS	VERTIC TRAVEL TIME SRD/GEO MS	AVERAGE VELOC SRD/GEO M/S	DELTA DEPTH BETWEEN SHOTS M	DELTA TIME BETWEEN SHOTS MS	INTERV VELOC BETWEEN SHOTS M/S
1	288.00	249.30	283.40	162.00	160.96	143.91	1732	1099.00	423.88	2593
2	1387.00	1348.30	1382.40	585.00	584.84	567.79	2375	45.00	14.01	3213
3	1432.00	1393.30	1427.40	599.00	598.85	581.80	2395			

Drift

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ANALYST:                          15-OCT-87 11:44:21    PROGRAM: GDRIFT 007.E09




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                                      DRIFT COMPUTATION REPORT

                               COMPANY  : EEACH PETROLEUM N.L.
                               WELL     : HENKE # 1
                               FIELD    : WILDCAT
                               REFERENCE: 57C709
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ANALYST:                     15-OCT-87 11:44:21    PROGRAM: GDRIFT 007.E09




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                                 *   SCHLUMBERGER  *
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                              DRIFT COMPUTATION REPORT

                        COMPANY  : BEACH PETROLEUM N.L.
                        WELL     : HENKE # 1
                        FIELD    : WILDCAT
                        REFERENCE: 570709
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```
        LONG DEFINITIONS

             GLOBAL
KB      - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD     - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB     - ELEVATION OF KELLY BUSHING
GL      - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
XSTART  - TOP OF ZONE PROCESSED BY WST
XSTOP   - BOTTOM OF ZONE PROCESSED BY WST
GAD001  - RAW SONIC CHANNEL NAME USED FOR WST SONIC ADJUSTMENT
UNFDEN  - UNIFORM DENSITY VALUE

             ZONE
LOFDEN  - LAYER OPTION FLAG FOR DENSITY : -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYDEN  - USER SUPPLIED DENSITY DATA

             SAMPLED
SHOT    - SHOT NUMBER
DKE     - MEASURED DEPTH FROM KELLY-BUSHING
DSRD    - DEPTH FROM  SRD
DGL     - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
SHTM    - SHOT TIME (WST)
RAWS    - RAW SONIC (WST)
SHDR    - DRIFT AT SHOT OR KNEE
BLSH    - BLOCK SHIFT BETWEEN SHOTS OR KNEE

  (GLOBAL PARAMETERS)                          (VALUE)

ELEV OF KB AB. MSL (WST)   KB          :  38.7000   M
ELEV OF SRD AB. MSL(WST)   SRD         :        0   M
ELEVATION OF KELLY BUSHI   EKB         :  38.7000   M
ELEV OF GL AB. SRD(WST)    GL          :  34.1000   M
TOP OF ZONE PROCD (WST)    XSTART      :        0   M
BOT OF ZONE PROCD (WST)    XSTOP       :        0   M
RAW SONIC CH NAME (WST)    GAD001      : DT.ATT.003.IPA.FLP.*
UNIFORM DENSITY VALUE      UNFDEN      :  2.30000   G/C3

  (ZONED PARAMETERS)                           (VALUE)            (LIMITS)

LAYER OPTION FLAG DENS    LOFDEN       : 1.000000         30479.7  -        0
USER SUPPLIED DENSITY DA  LAYDEN       :-999.2500   G/C3  30479.7  -        0
```

```
   LEVEL      MEASURED    VERTICAL    VERTICAL    VERTICAL   INTEGRATED   COMPUTED     COMPUTED
  NUMBER       DEPTH       DEPTH       DEPTH       TRAVEL    RAW SONIC     DRIFT      BLK-SHFT
               FROM        FROM        FROM         TIME       TIME       AT LEVEL   CORRECTION
                KB          SRD         GL        SRD/GEO
                M           M           M           MS          MS          MS          US/F

                                                                                          0
        1     288.00      249.30      283.40      143.91      143.91          0
                                                                                      -2.06
        2    1387.00     1348.30     1382.40      567.79      575.21       -7.42
                                                                                       -.31
        3    1432.00     1393.30     1427.40      581.80      589.26       -7.46
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ANALYST:                      15-OCT-87 17:11:24    PROGRAM: GADJST 008.E08




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                                   *   SCHLUMBERGER  *
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                              SONIC ADJUSTMENT PARAMETER REPORT

                           COMPANY   : BEACH PETROLEUM N.L.
                           WELL      : HENKE # 1
                           FIELD     : WILDCAT
                           REFERENCE: 57C709
```

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          LONG DEFINITIONS

              GLOBAL
SRCDRF - ORIGIN OF ADJUSTMENT DATA
CONADJ - CONSTANT ADJUSTMENT TO AUTOMATIC DELTA-T MINIMUM = 7.5 US/F
UNERTH - UNIFORM EARTH VELOCITY  (GTRFRM)

              ZONE
ZDRIFT - USER DRIFT AT BOTTOM OF THE ZONE
ADJOPZ - TYPE OF ADJUSTMNENT IN THE DRIFT ZONE : 0=DELTA-T MIN, 1=BLOCKSHIFT
ADJUSZ - DELTA-T MINIMUM USED FOR ADJUSTMENT IN THE DRIFT ZONE
LOFVEL - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL - USER SUPPLIED VELOCITY DATA

              SAMPLED
SHOT   - SHOT NUMBER
VDKB   - VERTICAL DEPTH RELATIVE TO KB
DSRD   - DEPTH FROM  SRD
DGL    - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
KNEE   - KNEE
BLSH   - BLOCK SHIFT BETWEEN SHOTS OR KNEE
DTMI   - VALUE OF DELTA-T MINIMUM USED
COEF   - DELTA-T MIN COEFFICIENT USED IN THE DRIFT ZONE
DRGR   - GRADIENT OF DRIFT CURVE

   (GLOBAL PARAMETERS)                          (VALUE)

ORIG OF ADJ DATA (WST)     SRCDRF      :  2.00000
CONS SONIC ADJST (WST)     CONADJ      :  7.50000  US/F
UNIFORM EARTH VELOCITY     UNERTH      :  2133.60  M/S

   (ZONED PARAMETERS)                           (VALUE)            (LIMITS)

USER DRIFT ZONE (WST)     ZDRIFT       :-6.500000  MS     1432.00   - 701.000
                                        -5.000000         701.000     510.000
                                        -3.400000         510.000     288.000
                                                0         288.000           0
ADJUSMNT MODE (WST)       ADJOPZ       :-999.2500         30479.7   -       0
USER DELTA-T MIN (WST)    ADJUSZ       :-999.2500  US/F   30479.7   -       0
LAYER OPTION FLAG VELOC   LOFVEL       : 1.000000         30479.7   -       0
USER VELOC (WST)          LAYVEL       : 1732.000  M/S    288.000   - 38.7000
                                         1900.000         38.7000           0
```

```
COMPANY  : BEACH PETROLEUM N.L.          WELL     : HENKE # 1                        PAGE   2

 KNEE        VERTICAL   VERTICAL   VERTICAL     DRIFT  BLOCKSHIFT   DELTA-T   REDUCTION EQUIVALENT
NUMBER        DEPTH      DEPTH      DEPTH        AT                 MINIMUM    FACTOR
              FROM       FROM       FROM        KNEE      USED       USED        G      BLOCKSHIFT
               KB         SRD        GL
               M          M          M           MS       US/F       US/F                 US/F

                                                              0                                0
        2    288.00     249.30     283.40          0
                                                                        131.48      .63      -4.67
        3    510.00     471.30     505.40      -3.40
                                                                        117.59      .75      -2.55
        4    701.00     662.30     696.40      -5.00
                                                                        100.59      .94       -.63
        5   1432.00    1393.30    1427.40      -6.50
```

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ANALYST:                    15-OCT-87 17:11:41     PROGRAM: GADJST 008.E03



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                                     VELOCITY REPORT

                            COMPANY  : BEACH PETROLEUM N.L.

                            WELL     : HENKE # 1

                            FIELD    : WILDCAT

                            REFERENCE: 57C709
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ANALYST:                      15-OCT-87 17:11:41    PROGRAM: GADJST 008.E08




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                                        *   SCHLUMBERGER   *
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                                          VELOCITY REPORT

                                COMPANY  : BEACH PETROLEUM N.L.
                                WELL     : HENKE # 1
                                FIELD    : WILDCAT
                                REFERENCE: 570709
```

```
          LONG DEFINITIONS

              GLOBAL
KB       - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD      - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB      - ELEVATION OF KELLY BUSHING
GL       - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
UNERTH - UNIFORM EARTH VELOCITY  (GTRFRM)

              ZONE
LOFVEL - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL - USER SUPPLIED VELOCITY DATA

              SAMPLED
SHOT     - SHOT NUMBER
DKB      - MEASURED DEPTH FROM KELLY-BUSHING
DSRD     - DEPTH FROM  SRD
DGL      - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
SHTM     - SHOT TIME (WST)
ADJS     - ADJUSTED SONIC TRAVEL TIME
SHDR     - DRIFT AT SHOT OR KNEE
REST     - RESIDUAL TRAVEL TIME AT KNEE
INTV     - INTERNAL VELOCITY, AVERAGE

   (GLOBAL PARAMETERS)                      (VALUE)

ELEV OF KB AB. MSL (WST)   KB          :  38.7000  M
ELEV OF SRD AB. MSL(WST)   SRD         :        0  M
ELEVATION OF KELLY BUSHI   EKB         :  38.7000  M
ELEV OF GL AB. SRD(WST)    GL          :  34.1000  M
UNIFORM EARTH VELOCITY     UNERTH      :  2133.60  M/S

   (ZONED PARAMETERS)                       (VALUE)              (LIMITS)

LAYER OPTION FLAG VELOC   LOFVEL      : 1.000000          30479.7   -        0
USER VELOC (WST)          LAYVEL      : 1732.000   M/S    288.000   - 38.7000
                                        1900.000          38.7000           0
```

LEVEL NUMBER	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	VERTICAL DEPTH FROM GL M	VERTICAL TRAVEL TIME SRD/GEOPH MS	INTEGRATED ADJUSTED SONIC TIME MS	DRIFT = SHOT TIME - RAW SON MS	RESIDUAL = SHOT TIME - ADJ SON MS	ADJUSTED INTERVAL VELOCITY M/S
1	288.00	249.30	283.40	143.91	143.91	0	0	1732
2	1387.00	1348.30	1382.40	567.79	568.86	-7.42	-1.07	2586
3	1432.00	1393.30	1427.40	581.80	582.91	-7.46	-1.11	3203

Time / Depth

```
ANALYST:                  15-OCT-87 17:17:50    PROGRAM: GTRFRM 001.E12




                                ********************
                                *                  *
                                *                  *
                                *                  *
                                ********************
                                *                  *
                                *   SCHLUMBERGER   *
                                *                  *
                                ********************


                          TIME CONVERTED VELOCITY REPORT

                      COMPANY  : BEACH PETROLEUM N.L.
                      WELL     : HENKE # 1
                      FIELD    : WILDCAT
                      REFERENCE: 570709
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ANALYST:                    15-OCT-87 17:17:50    PROGRAM: GTRFRM 001.E12




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                                   *                 *
                                   *                 *
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                                   *                 *
                                   *   SCHLUMBERGER  *
                                   *                 *
                                   *******************


                              TIME CONVERTED VELOCITY REPORT

                          COMPANY  : BEACH PETROLEUM N.L.
                          WELL     : HENKE # 1
                          FIELD    : WILDCAT
                          REFERENCE: 570709
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          LONG DEFINITIONS

               GLOBAL
KB      - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD     - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
GL      - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
UNERTH  - UNIFORM EARTH VELOCITY  (GTRFRM)
UNFDEN  - UNIFORM DENSITY VALUE

               MATRIX
MVODIS  - MOVE-OUT DISTANCE FROM BOREHOLE

               ZONE
LOFVEL  - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL  - USER SUPPLIED VELOCITY DATA
LOFDEN  - LAYER OPTION FLAG FOR DENSITY : -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYDEN  - USER SUPPLIED DENSITY DATA

               SAMPLED
TWOT    - TWO WAY TRAVEL TIME (RELATIVE TO THE SEISMIC REFERENCE
DKB     - MEASURED DEPTH FROM KELLY-BUSHING
DSRD    - DEPTH FROM  SRD
AVGV    - AVERAGE SEISMIC VELOCITY
RMSV    - ROOT MEAN SQUARE VELOCITY (SEISMIC)
MVOT    - NORMAL MOVE-OUT
MVOT    - NORMAL MOVE-OUT
MVOT    - NORMAL MOVE-OUT
INTV    - INTERNAL VELOCITY, AVERAGE

  (GLOBAL PARAMETERS)                          (VALUE)

ELEV OF KB AB. MSL (WST)  KB           :  38.7000  M
ELEV OF SRD AB. MSL(WST)  SRD          :        0  M
ELEV OF GL AB. SRD(WST)   GL           :  34.1000  M
UNIFORM EARTH VELOCITY    UNERTH       :  2133.60  M/S
UNIFORM DENSITY VALUE     UNFDEN       :  2.30000  G/C3

  (MATRIX PARAMETERS)



     MVOUT DIST
         M

  1      1000.0
  2      1500.0
  3      2000.0
```

```
 (ZONED PARAMETERS)                           (VALUE)              (LIMITS)

LAYER OPTION FLAG VELOC  LOFVEL      : 1.000000          30479.7  -        0
USER VELOC (WST)         LAYVEL      : 1732.000   M/S    288.000  - 38.7000
                                       1900.000          38.7000           0
LAYER OPTION FLAG DENS   LOFDEN      :-1.000000          30479.7  -        0
USER SUPPLIED DENSITY DA LAYDEN      :-999.2500   G/C3   30479.7  -        0
```

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
0	38.70	0						1900
2.00	40.43	1.73	1732	1732	575.37	864.05	1152.74	1732
4.00	42.16	3.46	1732	1732	573.38	862.06	1150.74	1732
6.00	43.90	5.20	1732	1732	571.40	860.07	1148.75	1732
8.00	45.63	6.93	1732	1732	569.42	858.09	1146.76	1732
10.00	47.36	8.66	1732	1732	567.45	856.11	1144.78	1732
12.00	49.09	10.39	1732	1732	565.49	854.13	1142.80	1732
14.00	50.82	12.12	1732	1732	563.54	852.16	1140.82	1732
16.00	52.56	13.86	1732	1732	561.59	850.20	1138.85	1732
18.00	54.29	15.59	1732	1732	559.65	848.24	1136.87	1732
20.00	56.02	17.32	1732	1732	557.71	846.28	1134.91	1732
22.00	57.75	19.05	1732	1732	555.79	844.33	1132.94	1732
24.00	59.48	20.78	1732	1732	553.87	842.38	1130.98	1732
26.00	61.22	22.52	1732	1732	551.95	840.44	1129.03	1732
28.00	62.95	24.25	1732	1732	550.05	838.50	1127.07	1732
X 30.00	64.68	25.98	1732	1732	548.15	836.57	1125.12	1732
32.00	66.41	27.71	1732	1732	546.25	834.64	1123.18	1732
34.00	68.14	29.44	1732	1732	544.37	832.72	1121.23	1732
36.00	69.88	31.18	1732	1732	542.49	830.80	1119.30	1732
38.00	71.61	32.91	1732	1732	540.62	828.88	1117.36	1732
40.00	73.34	34.64	1732	1732	538.75	826.97	1115.43	1732
42.00	75.07	36.37	1732	1732	536.89	825.07	1113.50	1732
44.00	76.80	38.10	1732	1732	535.04	823.17	1111.57	1732
46.00	78.54	39.84	1732	1732	533.20	821.27	1109.65	1732

COMPANY : BEACH PETROLEUM N.L. WELL : HENKE # 1 PAGE 4

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
48.00	80.27	41.57	1732	1732	531.36	819.38	1107.73	1732
50.00	82.00	43.30	1732	1732	529.53	817.49	1105.82	1732
52.00	83.73	45.03	1732	1732	527.70	815.61	1103.90	1732
54.00	85.46	46.76	1732	1732	525.89	813.73	1102.00	1732
56.00	87.20	48.50	1732	1732	524.08	811.86	1100.09	1732
58.00	88.93	50.23	1732	1732	522.27	809.99	1098.19	1732
60.00	90.66	51.96	1732	1732	520.48	808.13	1096.29	1732
62.00	92.39	53.69	1732	1732	518.69	806.27	1094.40	1732
64.00	94.12	55.42	1732	1732	516.90	804.41	1092.51	1732
66.00	95.86	57.16	1732	1732	515.13	802.56	1090.62	1732
68.00	97.59	58.89	1732	1732	513.36	800.72	1088.73	1732
70.00	99.32	60.62	1732	1732	511.60	798.88	1086.85	1732
72.00	101.05	62.35	1732	1732	509.84	797.04	1084.98	1732
74.00	102.78	64.08	1732	1732	508.09	795.21	1083.10	1732
76.00	104.52	65.82	1732	1732	506.35	793.38	1081.23	1732
78.00	106.25	67.55	1732	1732	504.61	791.56	1079.37	1732
80.00	107.98	69.28	1732	1732	502.88	789.74	1077.50	1732
82.00	109.71	71.01	1732	1732	501.16	787.92	1075.64	1732
84.00	111.44	72.74	1732	1732	499.45	786.11	1073.79	1732
86.00	113.18	74.48	1732	1732	497.74	784.31	1071.93	1732
88.00	114.91	76.21	1732	1732	496.03	782.51	1070.08	1732
90.00	116.64	77.94	1732	1732	494.34	780.71	1068.24	1732
92.00	118.37	79.67	1732	1732	492.65	778.92	1066.39	1732
94.00	120.10	81.40	1732	1732	490.97	777.14	1064.55	1732

COMPANY : BEACH PETROLEUM N.L. WELL : HENKE # 1

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
96.00	121.84	83.14	1732	1732	489.29	775.36	1062.72	1732
98.00	123.57	84.87	1732	1732	487.63	773.58	1060.89	1732
100.00	125.30	86.60	1732	1732	485.96	771.80	1059.06	1732
102.00	127.03	88.33	1732	1732	484.31	770.04	1057.23	1732
104.00	128.76	90.06	1732	1732	482.66	768.27	1055.41	1732
106.00	130.50	91.80	1732	1732	481.02	766.51	1053.59	1732
108.00	132.23	93.53	1732	1732	479.38	764.76	1051.77	1732
110.00	133.96	95.26	1732	1732	477.75	763.01	1049.96	1732
112.00	135.69	96.99	1732	1732	476.13	761.26	1048.15	1732
114.00	137.42	98.72	1732	1732	474.51	759.52	1046.35	1732
116.00	139.16	100.46	1732	1732	472.90	757.78	1044.55	1732
118.00	140.89	102.19	1732	1732	471.30	756.05	1042.75	1732
120.00	142.62	103.92	1732	1732	469.71	754.32	1040.95	1732
122.00	144.35	105.65	1732	1732	468.12	752.60	1039.16	1732
124.00	146.08	107.38	1732	1732	466.53	750.88	1037.37	1732
126.00	147.82	109.12	1732	1732	464.96	749.17	1035.59	1732
128.00	149.55	110.85	1732	1732	463.39	747.46	1033.81	1732
130.00	151.28	112.58	1732	1732	461.82	745.75	1032.03	1732
132.00	153.01	114.31	1732	1732	460.26	744.05	1030.25	1732
134.00	154.74	116.04	1732	1732	458.71	742.36	1028.48	1732
136.00	156.48	117.78	1732	1732	457.17	740.66	1026.72	1732
138.00	158.21	119.51	1732	1732	455.63	738.98	1024.95	1732
140.00	159.94	121.24	1732	1732	454.10	737.29	1023.19	1732
142.00	161.67	122.97	1732	1732	452.57	735.61	1021.43	1732

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
144.00	163.40	124.70	1732	1732	451.05	733.94	1019.68	1732
146.00	165.14	126.44	1732	1732	449.54	732.27	1017.93	1732
148.00	166.87	128.17	1732	1732	448.03	730.61	1016.18	1732
150.00	168.60	129.90	1732	1732	446.53	728.94	1014.44	1732
152.00	170.33	131.63	1732	1732	445.04	727.29	1012.70	1732
154.00	172.06	133.36	1732	1732	443.55	725.64	1010.96	1732
156.00	173.80	135.10	1732	1732	442.07	723.99	1009.22	1732
158.00	175.53	136.83	1732	1732	440.60	722.35	1007.49	1732
160.00	177.26	138.56	1732	1732	439.13	720.71	1005.77	1732
162.00	178.99	140.29	1732	1732	437.66	719.07	1004.04	1732
164.00	180.72	142.02	1732	1732	436.21	717.44	1002.32	1732
166.00	182.46	143.76	1732	1732	434.76	715.82	1000.61	1732
168.00	184.19	145.49	1732	1732	433.31	714.19	998.89	1732
170.00	185.92	147.22	1732	1732	431.87	712.58	997.18	1732
172.00	187.65	148.95	1732	1732	430.44	710.97	995.47	1732
174.00	189.38	150.68	1732	1732	429.02	709.36	993.77	1732
176.00	191.12	152.42	1732	1732	427.60	707.75	992.07	1732
178.00	192.85	154.15	1732	1732	426.18	706.15	990.37	1732
180.00	194.58	155.88	1732	1732	424.78	704.56	988.68	1732
182.00	196.31	157.61	1732	1732	423.37	702.97	986.99	1732
184.00	198.04	159.34	1732	1732	421.98	701.38	985.30	1732
186.00	199.78	161.08	1732	1732	420.59	699.80	983.62	1732
188.00	201.51	162.81	1732	1732	419.20	698.22	981.94	1732
190.00	203.24	164.54	1732	1732	417.83	696.65	980.26	1732

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
192.00	204.97	166.27	1732	1732	416.45	695.03	978.59	1732
194.00	206.70	168.00	1732	1732	415.09	693.51	976.92	1732
196.00	208.44	169.74	1732	1732	413.73	691.95	975.25	1732
198.00	210.17	171.47	1732	1732	412.37	690.40	973.59	1732
200.00	211.90	173.20	1732	1732	411.03	688.84	971.93	1732
202.00	213.63	174.93	1732	1732	409.68	687.30	970.27	1732
204.00	215.36	176.66	1732	1732	408.35	685.75	968.62	1732
206.00	217.10	178.40	1732	1732	407.02	684.21	966.97	1732
208.00	218.83	180.13	1732	1732	405.69	682.68	965.32	1732
210.00	220.56	181.86	1732	1732	404.37	681.15	963.67	1732
212.00	222.29	183.59	1732	1732	403.06	679.62	962.03	1732
214.00	224.02	185.32	1732	1732	401.75	678.10	960.40	1732
216.00	225.76	187.06	1732	1732	400.45	676.58	958.76	1732
218.00	227.49	188.79	1732	1732	399.15	675.07	957.13	1732
220.00	229.22	190.52	1732	1732	397.86	673.56	955.50	1732
222.00	230.95	192.25	1732	1732	396.58	672.05	953.88	1732
224.00	232.68	193.98	1732	1732	395.30	670.55	952.26	1732
226.00	234.42	195.72	1732	1732	394.02	669.05	950.64	1732
228.00	236.15	197.45	1732	1732	392.76	667.56	949.03	1732
230.00	237.88	199.18	1732	1732	391.49	666.07	947.42	1732
232.00	239.61	200.91	1732	1732	390.24	664.59	945.81	1732
234.00	241.34	202.64	1732	1732	388.98	663.11	944.21	1732
236.00	243.08	204.38	1732	1732	387.74	661.63	942.60	1732
238.00	244.81	206.11	1732	1732	386.50	660.16	941.01	1732

COMPANY : BEACH PETROLEUM N.L. WELL : HENKE # 1

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
240.00	246.54	207.84	1732	1732	385.26	658.69	939.41	1732
242.00	248.27	209.57	1732	1732	384.03	657.23	937.82	1732
244.00	250.00	211.30	1732	1732	382.81	655.77	936.23	1732
246.00	251.74	213.04	1732	1732	381.59	654.31	934.65	1732
248.00	253.47	214.77	1732	1732	380.38	652.86	933.07	1732
250.00	255.20	216.50	1732	1732	379.17	651.41	931.49	1732
252.00	256.93	218.23	1732	1732	377.97	649.97	929.91	1732
254.00	258.66	219.96	1732	1732	376.77	648.53	928.34	1732
256.00	260.40	221.70	1732	1732	375.58	647.09	926.77	1732
258.00	262.13	223.43	1732	1732	374.39	645.66	925.21	1732
260.00	263.86	225.16	1732	1732	373.21	644.24	923.64	1732
262.00	265.59	226.89	1732	1732	372.03	642.81	922.08	1732
264.00	267.32	228.62	1732	1732	370.86	641.39	920.53	1732
266.00	269.06	230.36	1732	1732	369.70	639.98	918.98	1732
268.00	270.79	232.09	1732	1732	368.54	638.57	917.43	1732
270.00	272.52	233.82	1732	1732	367.38	637.16	915.88	1732
272.00	274.25	235.55	1732	1732	366.23	635.76	914.34	1732
274.00	275.98	237.28	1732	1732	365.08	634.36	912.80	1732
276.00	277.72	239.02	1732	1732	363.94	632.97	911.26	1732
278.00	279.45	240.75	1732	1732	362.81	631.58	909.73	1732
280.00	281.18	242.48	1732	1732	361.68	630.19	908.20	1732
282.00	282.91	244.21	1732	1732	360.55	628.81	906.67	1732
284.00	284.64	245.94	1732	1732	359.44	627.43	905.15	1732
286.00	286.38	247.68	1732	1732	358.32	626.05	903.62	1732

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
288.00	288.19	249.49	1733	1733	357.04	624.41	901.74	1813
290.00	290.32	251.62	1735	1736	355.03	621.60	898.26	2129
292.00	292.45	253.75	1738	1739	353.04	618.83	894.82	2129
294.00	294.58	255.88	1741	1742	351.08	616.08	891.42	2129
296.00	296.71	258.01	1743	1744	349.15	613.37	888.06	2129
298.00	298.84	260.14	1746	1747	347.23	610.69	884.74	2129
300.00	300.97	262.27	1748	1750	345.34	608.04	881.46	2129
302.00	303.08	264.38	1751	1753	343.50	605.47	878.28	2118
304.00	305.23	266.53	1753	1756	341.62	602.82	375.00	2144
306.00	307.34	268.64	1756	1758	339.83	600.32	871.91	2112
308.00	309.39	270.69	1758	1760	338.20	598.06	869.15	2051
310.00	311.43	272.73	1760	1762	336.60	595.86	366.46	2041
312.00	313.38	274.68	1761	1764	335.20	593.96	864.19	1952
314.00	315.36	276.66	1762	1765	333.77	592.01	861.85	1974
316.00	317.38	278.68	1764	1767	332.25	589.92	859.30	2022
318.00	319.55	280.85	1766	1770	330.43	587.34	856.09	2173
320.00	321.74	283.04	1769	1773	328.61	584.74	852.85	2186
322.00	323.94	285.24	1772	1775	326.78	582.14	849.59	2197
324.00	326.13	287.43	1774	1778	324.99	579.58	846.39	2193
326.00	328.28	289.58	1777	1781	323.29	577.16	843.40	2155
328.00	330.41	291.71	1779	1783	321.68	574.89	840.58	2122
330.00	332.58	293.88	1781	1786	319.98	572.47	837.57	2172
332.00	334.76	296.06	1783	1788	318.29	570.04	834.54	2182
334.00	336.89	298.19	1786	1791	316.71	567.81	831.77	2130

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
336.00	339.05	300.35	1788	1793	315.09	565.49	828.89	2163
338.00	341.22	302.52	1790	1796	313.47	563.18	826.01	2167
340.00	343.39	304.69	1792	1798	311.87	560.89	823.16	2169
342.00	345.57	306.87	1795	1800	310.26	558.53	820.28	2182
344.00	347.74	309.04	1797	1803	308.70	556.34	817.49	2167
346.00	349.95	311.25	1799	1805	307.08	554.01	814.56	2206
348.00	352.11	313.41	1801	1808	305.56	551.82	811.84	2163
350.00	354.24	315.54	1803	1810	304.10	549.74	809.27	2132
352.00	356.37	317.67	1805	1812	302.66	547.68	806.70	2135
354.00	358.50	319.80	1807	1814	301.24	545.64	804.18	2129
356.00	360.61	321.91	1808	1815	299.87	543.70	801.78	2103
358.00	362.72	324.02	1810	1817	298.50	541.73	799.35	2115
360.00	364.83	326.13	1812	1819	297.15	539.80	796.96	2110
362.00	366.97	328.27	1814	1821	295.76	537.80	794.48	2141
364.00	369.16	330.46	1816	1823	294.31	535.70	791.85	2184
366.00	371.34	332.64	1818	1825	292.88	533.63	789.26	2182
368.00	373.52	334.82	1820	1827	291.47	531.58	786.70	2178
370.00	375.69	336.99	1822	1829	290.08	529.55	784.17	2177
372.00	377.83	339.13	1823	1831	288.76	527.66	781.81	2133
374.00	379.89	341.19	1825	1833	287.56	525.94	779.70	2066
376.00	382.11	343.41	1827	1835	286.15	523.87	777.10	2213
378.00	384.30	345.60	1829	1837	284.77	521.86	774.57	2196
380.00	386.42	347.72	1830	1838	283.53	520.06	772.33	2121
382.00	388.63	349.93	1832	1841	282.17	518.06	769.82	2203

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
384.00	390.77	352.07	1834	1842	280.90	516.22	767.53	2146
386.00	392.92	354.22	1835	1844	279.65	514.39	765.24	2150
388.00	395.08	356.38	1837	1846	278.33	512.54	762.93	2161
390.00	397.20	358.50	1838	1847	277.20	510.81	760.79	2116
392.00	399.73	361.03	1842	1851	275.39	508.05	757.19	2531
394.00	402.16	363.46	1845	1855	273.78	505.60	754.04	2426
396.00	404.37	365.67	1847	1857	272.50	503.71	751.65	2210
398.00	406.60	367.90	1849	1859	271.20	501.73	749.21	2234
400.00	408.68	369.98	1850	1860	270.12	500.21	747.27	2082
402.00	410.78	372.08	1851	1861	269.02	498.61	745.28	2098
404.00	412.90	374.20	1852	1863	267.91	496.95	743.25	2119
406.00	415.10	376.40	1854	1864	266.69	495.17	740.98	2201
408.00	417.29	378.59	1856	1866	265.50	493.40	738.74	2195
410.00	419.49	380.79	1857	1868	264.32	491.64	736.52	2193
412.00	421.68	382.98	1859	1870	263.14	489.89	734.32	2195
414.00	423.88	385.18	1861	1871	261.97	488.14	732.11	2205
416.00	426.13	387.43	1863	1873	260.75	486.31	729.77	2247
418.00	428.32	389.62	1864	1875	259.61	484.61	727.63	2189
420.00	430.49	391.79	1866	1877	258.51	482.96	725.55	2173
422.00	432.69	393.99	1867	1878	257.38	481.27	723.42	2197
424.00	434.89	396.19	1869	1880	256.26	479.60	721.30	2196
426.00	437.09	398.39	1870	1881	255.15	477.93	719.19	2199
428.00	439.28	400.58	1872	1883	254.06	476.28	717.10	2194
430.00	441.50	402.80	1873	1885	252.95	474.61	714.98	2215

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
432.00	443.70	405.00	1875	1886	251.86	472.97	712.90	2203
434.00	445.92	407.22	1877	1888	250.76	471.30	710.78	2222
436.00	448.29	409.59	1879	1890	249.50	469.35	708.26	2366
438.00	450.53	411.83	1881	1892	248.39	467.67	706.11	2245
440.00	452.59	413.89	1881	1893	247.49	466.34	704.46	2062
442.00	454.80	416.10	1883	1895	246.45	464.75	702.44	2207
444.00	457.03	418.33	1884	1896	245.38	463.13	700.37	2229
446.00	459.16	420.46	1885	1897	244.43	461.70	698.57	2134
448.00	461.40	422.70	1887	1899	243.38	460.09	696.50	2239
450.00	463.64	424.94	1889	1901	242.33	458.48	694.45	2240
452.00	465.89	427.19	1890	1902	241.28	456.87	692.38	2248
454.00	468.12	429.42	1892	1904	240.25	455.30	690.37	2233
456.00	470.34	431.64	1893	1905	239.26	453.77	688.43	2214
458.00	472.73	434.03	1895	1908	238.07	451.92	686.02	2391
460.00	475.03	436.33	1897	1910	237.00	450.25	683.86	2306
462.00	477.35	438.65	1899	1912	235.92	448.58	681.70	2314
464.00	479.66	440.96	1901	1914	234.86	446.92	679.55	2312
466.00	481.96	443.26	1902	1915	233.82	445.30	677.46	2300
468.00	484.27	445.57	1904	1917	232.77	443.67	675.35	2312
470.00	486.61	447.91	1906	1919	231.70	442.00	673.18	2340
472.00	488.94	450.24	1908	1921	230.66	440.38	671.06	2324
474.00	491.26	452.56	1910	1923	229.63	438.76	668.97	2324
476.00	493.60	454.90	1911	1925	228.60	437.14	666.85	2336
478.00	495.92	457.22	1913	1927	227.59	435.55	664.79	2321

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
480.00	498.22	459.52	1915	1928	226.60	434.00	662.78	2307
482.00	500.52	461.82	1916	1930	225.63	432.48	660.80	2298
484.00	502.83	464.13	1918	1932	224.66	430.95	658.82	2307
486.00	505.12	466.42	1919	1933	223.71	429.46	656.89	2289
488.00	507.43	468.73	1921	1935	222.75	427.94	654.91	2314
490.00	509.70	471.00	1922	1937	221.84	426.51	653.06	2267
492.00	511.96	473.26	1924	1938	220.94	425.10	651.22	2265
494.00	514.23	475.53	1925	1940	220.05	423.69	649.40	2264
496.00	516.42	477.72	1926	1941	219.23	422.41	647.75	2190
498.00	518.68	479.98	1928	1942	218.35	421.02	645.95	2261
500.00	521.01	482.31	1929	1944	217.41	419.53	644.00	2335
502.00	523.33	484.63	1931	1945	216.50	418.07	642.09	2319
504.00	525.71	487.01	1933	1947	215.54	416.55	640.08	2372
506.00	528.07	489.37	1934	1949	214.60	415.03	638.10	2367
508.00	530.41	491.71	1936	1951	213.69	413.58	636.19	2340
510.00	532.73	494.03	1937	1952	212.81	412.17	634.34	2315
512.00	535.16	496.46	1939	1954	211.83	410.59	632.24	2435
514.00	537.55	498.85	1941	1956	210.90	409.09	630.27	2384
516.00	539.97	501.27	1943	1958	209.95	407.54	628.22	2428
518.00	542.41	503.71	1945	1960	209.00	406.00	626.17	2433
520.00	544.84	506.14	1947	1962	208.05	404.46	624.12	2436
522.00	547.25	508.55	1948	1964	207.14	402.98	622.17	2404
524.00	549.68	510.98	1950	1966	206.21	401.48	620.17	2429
526.00	552.09	513.39	1952	1968	205.31	400.01	618.22	2412

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
528.00	554.51	515.81	1954	1970	204.41	398.54	616.27	2419
530.00	556.90	518.20	1955	1972	203.54	397.13	614.39	2391
532.00	559.30	520.60	1957	1974	202.67	395.70	612.50	2404
534.00	561.63	522.98	1959	1975	201.82	394.32	610.67	2380
536.00	564.08	525.38	1960	1977	200.97	392.93	608.82	2394
538.00	566.55	527.85	1962	1979	200.06	391.43	606.82	2475
540.00	569.01	530.31	1964	1981	199.18	389.98	604.87	2454
542.00	571.41	532.71	1966	1983	198.34	388.61	603.05	2402
544.00	573.81	535.11	1967	1985	197.51	387.25	601.23	2405
546.00	576.23	537.53	1969	1986	196.68	385.88	599.40	2415
548.00	578.66	539.96	1971	1988	195.84	384.49	597.55	2433
550.00	581.06	542.36	1972	1990	195.03	333.16	595.78	2400
552.00	583.47	544.77	1974	1991	194.22	331.83	593.99	2412
554.00	585.93	547.23	1976	1993	193.39	380.44	592.12	2460
556.00	588.31	549.61	1977	1995	192.61	379.16	590.41	2381
558.00	590.72	552.02	1979	1997	191.82	377.85	588.67	2408
560.00	593.20	554.50	1980	1998	190.99	376.47	586.81	2474
562.00	595.65	556.95	1982	2000	190.18	375.12	584.99	2457
564.00	598.07	559.37	1984	2002	189.41	373.84	583.26	2417
566.00	600.34	561.64	1985	2003	188.74	372.74	531.81	2272
568.00	602.67	563.97	1986	2004	188.04	371.58	580.26	2324
570.00	605.07	566.37	1987	2006	137.29	370.33	578.58	2406
572.00	607.55	568.85	1989	2008	186.50	369.00	576.79	2475
574.00	610.01	571.31	1991	2009	185.72	367.70	575.04	2457

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
576.00	612.55	573.85	1993	2011	184.89	366.31	573.14	2545
578.00	615.00	576.30	1994	2013	184.14	365.04	571.43	2448
580.00	617.45	578.75	1996	2015	183.39	363.78	569.72	2451
582.00	620.01	581.31	1998	2017	182.57	362.39	567.82	2563
584.00	622.44	583.74	1999	2018	181.85	361.18	566.19	2424
586.00	624.83	586.13	2000	2020	181.15	360.01	564.61	2398
588.00	627.19	588.49	2002	2021	180.48	358.89	563.10	2356
590.00	629.61	590.91	2003	2023	179.78	357.70	561.50	2424
592.00	632.33	593.63	2005	2025	178.89	356.17	559.33	2712
594.00	634.64	595.94	2007	2026	178.26	355.12	557.97	2319
596.00	637.25	598.55	2009	2029	177.45	353.74	556.07	2606
598.00	639.75	601.05	2010	2030	176.73	352.50	554.38	2498
600.00	642.19	603.49	2012	2032	176.04	351.33	552.79	2444
602.00	644.71	606.01	2013	2034	175.31	350.08	551.09	2518
604.00	647.14	608.44	2015	2035	174.64	348.95	549.55	2425
606.00	649.58	610.88	2016	2037	173.97	347.30	547.98	2447
608.00	652.09	613.39	2018	2038	173.26	346.59	546.33	2507
610.00	654.65	615.95	2020	2040	172.53	345.33	544.60	2558
612.00	657.13	618.43	2021	2042	171.85	344.16	543.00	2486
614.00	659.61	620.91	2022	2043	171.18	343.02	541.43	2471
616.00	662.05	623.35	2024	2045	170.53	341.91	539.92	2443
618.00	664.55	625.85	2025	2046	169.85	340.75	538.32	2501
620.00	667.04	628.34	2027	2048	169.19	339.60	536.75	2493
622.00	669.47	630.77	2028	2049	168.56	338.53	535.28	2432

COMPANY : BEACH PETROLEUM N.L. WELL : HENKE # 1

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
624.00	671.90	633.20	2030	2051	167.94	337.46	533.82	2430
626.00	674.35	635.65	2031	2052	167.32	336.39	532.35	2446
628.00	676.78	638.08	2032	2053	166.70	335.33	530.90	2434
630.00	679.22	640.52	2033	2055	166.09	334.28	529.45	2437
632.00	681.64	642.94	2035	2056	165.49	333.25	528.04	2422
634.00	684.16	645.46	2036	2058	164.85	332.13	526.50	2513
636.00	686.78	648.08	2038	2060	164.15	330.91	524.80	2619
638.00	689.37	650.67	2040	2061	163.47	329.72	523.15	2593
640.00	691.97	653.27	2041	2063	162.79	328.54	521.51	2600
642.00	694.61	655.91	2043	2065	162.10	327.32	519.81	2641
644.00	697.16	658.46	2045	2067	161.46	326.21	518.26	2550
646.00	699.70	661.00	2046	2069	160.83	325.10	516.73	2545
648.00	702.12	663.42	2048	2070	160.27	324.13	515.39	2413
650.00	704.53	665.83	2049	2071	159.72	323.17	514.07	2410
652.00	706.96	668.26	2050	2072	159.15	322.19	512.72	2437
654.00	709.44	670.74	2051	2074	158.57	321.18	511.31	2479
656.00	711.90	673.20	2052	2075	158.01	320.19	509.94	2458
658.00	714.33	675.63	2054	2076	157.44	319.19	508.56	2477
660.00	716.88	678.18	2055	2078	156.86	318.18	507.14	2500
662.00	719.40	680.70	2056	2079	156.27	317.15	505.72	2518
664.00	721.96	683.26	2058	2081	155.67	316.09	504.23	2562
666.00	724.51	685.81	2059	2082	155.08	315.04	502.77	2552
668.00	727.03	688.33	2061	2084	154.51	314.04	501.37	2518
670.00	729.54	690.84	2062	2085	153.95	313.05	499.98	2510

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
672.00	732.07	693.37	2064	2087	153.38	312.04	498.57	2534
674.00	734.61	695.91	2065	2088	152.81	311.04	497.17	2532
676.00	737.12	698.42	2066	2090	152.26	310.05	495.80	2520
678.00	739.66	700.96	2068	2091	151.70	309.07	494.41	2531
680.00	742.38	703.68	2070	2093	151.05	307.91	492.78	2719
682.00	744.96	706.26	2071	2095	150.43	306.89	491.34	2536
684.00	747.66	708.96	2073	2097	149.86	305.77	489.76	2695
686.00	750.32	711.62	2075	2099	149.26	304.69	488.23	2666
688.00	752.89	714.19	2076	2100	148.70	303.71	486.84	2570
690.00	755.47	716.77	2078	2102	148.15	302.72	485.45	2576
692.00	757.93	719.23	2079	2103	147.65	301.83	484.21	2465
694.00	760.52	721.82	2080	2104	147.10	300.85	482.82	2586
696.00	763.15	724.45	2082	2106	146.54	299.83	481.33	2633
698.00	765.68	726.98	2083	2107	146.02	298.91	480.08	2531
700.00	768.35	729.65	2085	2109	145.45	297.87	478.61	2667
702.00	771.06	732.36	2086	2111	144.86	296.81	477.09	2707
704.00	773.60	734.90	2088	2113	144.35	295.90	475.80	2539
706.00	776.13	737.43	2089	2114	143.85	295.00	474.53	2530
708.00	778.65	739.95	2090	2115	143.35	294.11	473.27	2526
710.00	781.17	742.47	2091	2116	142.86	293.23	472.03	2514
712.00	783.73	745.03	2093	2118	142.36	292.32	470.74	2559
714.00	786.30	747.60	2094	2119	141.85	291.41	469.44	2575
716.00	788.88	750.18	2095	2121	141.35	290.50	468.15	2575
718.00	791.44	752.74	2097	2122	140.85	289.60	466.88	2567

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
720.00	794.04	755.34	2098	2123	140.35	288.69	465.53	2592
722.00	796.62	757.92	2099	2125	139.85	287.79	464.30	2582
724.00	799.30	760.60	2101	2126	139.32	286.82	462.91	2677
726.00	802.08	763.38	2103	2129	138.75	285.77	461.41	2780
728.00	804.78	766.08	2105	2130	138.22	284.80	460.01	2703
730.00	807.45	768.75	2106	2132	137.70	233.85	458.65	2675
732.00	810.06	771.36	2108	2133	137.21	282.96	457.38	2605
734.00	812.71	774.01	2109	2135	136.71	282.04	456.06	2654
736.00	815.33	776.63	2110	2137	136.22	281.16	454.80	2616
738.00	818.11	779.41	2112	2139	135.67	280.15	453.34	2783
740.00	820.76	782.06	2114	2140	135.13	279.25	452.05	2652
742.00	823.40	784.70	2115	2142	134.70	278.37	450.79	2631
744.00	826.07	787.37	2117	2143	134.21	277.47	449.48	2675
746.00	828.70	790.00	2118	2145	133.74	276.60	448.23	2632
748.00	831.30	792.60	2119	2146	133.28	275.76	447.03	2600
750.00	833.93	795.23	2121	2147	132.81	274.91	445.80	2625
752.00	836.65	797.95	2122	2149	132.32	273.99	444.47	2721
754.00	840.28	801.58	2126	2154	131.42	272.30	441.97	3628
756.00	842.95	804.25	2128	2156	130.95	271.43	440.71	2674
758.00	845.56	806.86	2129	2157	130.51	270.62	439.54	2610
760.00	848.18	809.48	2130	2159	130.06	269.80	438.35	2623
762.00	850.82	812.12	2132	2160	129.61	268.97	437.16	2641
764.00	853.47	814.77	2133	2161	129.17	268.14	435.97	2641
766.00	856.12	817.42	2134	2163	128.72	267.32	434.77	2653

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
768.00	858.68	819.98	2135	2164	128.31	266.56	433.68	2556
770.00	861.52	822.82	2137	2166	127.80	265.61	432.29	2841
772.00	864.12	825.42	2138	2167	127.38	264.83	431.17	2600
774.00	866.67	827.97	2139	2168	126.98	264.09	430.10	2555
776.00	869.23	830.53	2141	2169	126.58	263.35	429.02	2561
778.00	871.96	833.26	2142	2171	126.12	262.50	427.78	2731
780.00	874.69	835.99	2144	2173	125.67	261.66	426.56	2726
782.00	877.32	838.62	2145	2174	125.26	260.88	425.43	2634
784.00	879.84	841.14	2146	2175	124.88	260.19	424.42	2516
786.00	882.43	843.73	2147	2176	124.48	259.44	423.35	2594
788.00	885.08	846.38	2148	2177	124.07	258.67	422.22	2650
790.00	887.75	849.05	2149	2179	123.65	257.89	421.09	2662
792.00	890.29	851.59	2150	2180	123.27	257.19	420.07	2549
794.00	892.83	854.13	2151	2181	122.90	256.50	419.07	2540
796.00	895.45	856.75	2153	2182	122.51	255.77	418.00	2611
798.00	898.11	859.41	2154	2183	122.10	255.00	416.88	2668
800.00	900.74	862.04	2155	2185	121.71	254.27	415.81	2625
802.00	903.72	865.02	2157	2187	121.20	253.31	414.39	2978
804.00	906.36	867.66	2158	2188	120.81	252.58	413.32	2643
806.00	909.03	870.33	2160	2189	120.42	251.84	412.23	2665
808.00	911.74	873.04	2161	2191	120.01	251.06	411.10	2720
810.00	914.44	875.74	2162	2192	119.61	250.31	409.99	2696
812.00	917.01	878.31	2163	2193	119.25	249.64	409.01	2567
814.00	919.72	881.02	2165	2195	118.85	248.88	407.90	2711

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
816.00	922.60	883.90	2166	2197	118.40	248.03	406.63	2878
818.00	925.29	886.59	2168	2198	118.01	247.30	405.56	2689
820.00	928.01	889.31	2169	2199	117.61	246.54	404.45	2728
822.00	930.80	892.10	2171	2201	117.20	245.76	403.29	2790
824.00	933.59	894.89	2172	2203	116.79	244.98	402.14	2785
826.00	936.48	897.78	2174	2205	116.35	244.15	400.90	2889
828.00	939.22	900.52	2175	2206	115.96	243.41	399.80	2746
830.00	942.05	903.35	2177	2208	115.55	242.62	398.64	2821
832.00	944.84	906.14	2178	2209	115.15	241.86	397.51	2793
834.00	947.60	908.90	2180	2211	114.76	241.12	396.42	2765
836.00	950.40	911.70	2181	2212	114.36	240.37	395.29	2801
838.00	953.14	914.44	2182	2214	113.99	239.65	394.23	2739
840.00	955.81	917.11	2184	2215	113.63	238.97	393.23	2671
842.00	958.51	919.81	2185	2216	113.27	238.29	392.22	2694
844.00	961.18	922.48	2186	2217	112.92	237.63	391.24	2669
846.00	963.83	925.13	2187	2219	112.58	236.97	390.27	2649
848.00	966.50	927.80	2188	2220	112.23	236.31	389.29	2674
850.00	969.12	930.42	2189	2221	111.90	235.68	388.36	2618
852.00	971.78	933.08	2190	2222	111.56	235.03	387.40	2663
854.00	974.62	935.92	2192	2224	111.18	234.29	386.29	2845
856.00	977.20	938.50	2193	2224	110.86	233.70	385.41	2572
858.00	979.95	941.25	2194	2226	110.51	233.01	384.39	2752
860.00	982.73	944.03	2195	2227	110.14	232.31	383.35	2779
862.00	985.48	946.78	2197	2229	109.79	231.64	382.33	2753

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
864.00	988.19	949.49	2198	2230	109.45	230.99	381.37	2706
866.00	990.97	952.27	2199	2231	109.09	230.30	380.34	2787
868.00	993.75	955.05	2201	2233	108.74	229.62	379.32	2773
870.00	996.52	957.82	2202	2234	108.39	228.95	378.32	2773
872.00	999.36	960.66	2203	2236	108.03	228.24	377.26	2839
874.00	1002.21	963.51	2205	2237	107.66	227.54	376.20	2851
876.00	1005.07	966.37	2206	2239	107.29	226.83	375.13	2861
878.00	1007.89	969.19	2208	2240	106.94	226.15	374.11	2818
880.00	1010.69	971.99	2209	2242	106.59	225.48	373.11	2804
882.00	1013.53	974.83	2211	2243	106.24	224.79	372.08	2842
884.00	1016.51	977.81	2212	2245	105.86	224.04	370.94	2971
886.00	1019.51	980.81	2214	2247	105.46	223.28	369.80	2999
888.00	1022.38	983.68	2215	2249	105.11	222.59	368.76	2876
890.00	1025.22	986.52	2217	2250	104.77	221.93	367.75	2834
892.00	1028.00	989.30	2218	2252	104.44	221.30	366.80	2779
894.00	1030.87	992.17	2220	2253	104.09	220.62	365.78	2876
896.00	1033.68	994.98	2221	2255	103.76	219.98	364.81	2806
898.00	1036.47	997.77	2222	2256	103.44	219.35	363.86	2797
900.00	1039.37	1000.67	2224	2258	103.09	218.67	362.84	2893
902.00	1042.13	1003.43	2225	2259	102.78	218.07	361.95	2763
904.00	1044.91	1006.21	2226	2260	102.46	217.45	361.00	2780
906.00	1047.75	1009.05	2227	2262	102.14	216.81	360.03	2845
908.00	1050.56	1011.86	2229	2263	101.82	216.20	359.10	2802
910.00	1053.28	1014.58	2230	2264	101.52	215.62	358.23	2722

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
912.00	1056.15	1017.45	2231	2266	101.19	214.98	357.26	2375
914.00	1059.12	1020.42	2233	2267	100.85	214.30	356.22	2963
916.00	1062.02	1023.32	2234	2269	100.51	213.65	355.23	2906
918.00	1064.97	1026.27	2236	2271	100.17	212.98	354.22	2947
920.00	1067.83	1029.13	2237	2272	99.86	212.36	353.28	2857
922.00	1070.65	1031.95	2239	2273	99.55	211.76	352.36	2826
924.00	1073.47	1034.77	2240	2275	99.24	211.16	351.46	2818
926.00	1076.31	1037.61	2241	2276	98.94	210.56	350.54	2843
928.00	1079.20	1040.50	2242	2278	98.62	209.94	349.59	2891
930.00	1082.05	1043.35	2244	2279	98.32	209.34	348.68	2847
932.00	1084.97	1046.27	2245	2281	98.00	208.71	347.73	2918
934.00	1087.86	1049.16	2247	2282	97.69	208.10	346.80	2888
936.00	1090.69	1051.99	2248	2283	97.39	207.52	345.91	2837
938.00	1093.50	1054.80	2249	2285	97.10	206.95	345.04	2813
940.00	1096.36	1057.66	2250	2286	96.80	206.37	344.14	2855
942.00	1099.36	1060.66	2252	2288	96.47	205.72	343.15	3003
944.00	1102.30	1063.60	2253	2289	96.16	205.10	342.21	2935
946.00	1105.31	1066.61	2255	2291	95.84	204.46	341.22	3014
948.00	1108.25	1069.55	2256	2293	95.53	203.85	340.29	2941
950.00	1111.26	1072.56	2258	2294	95.21	203.21	339.31	3010
952.00	1114.24	1075.54	2260	2296	94.90	202.60	338.37	2973
954.00	1117.13	1078.43	2261	2297	94.60	202.02	337.48	2899
956.00	1120.06	1081.36	2262	2299	94.30	201.43	336.58	2927
958.00	1122.95	1084.25	2264	2300	94.02	200.86	335.70	2893

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
960.00	1125.85	1087.15	2265	2302	93.73	200.29	334.83	2895
962.00	1128.85	1090.15	2266	2303	93.42	199.68	333.89	3004
964.00	1131.73	1093.03	2268	2305	93.14	199.13	333.04	2873
966.00	1134.64	1095.94	2269	2306	92.86	198.56	332.16	2913
968.00	1137.71	1099.01	2271	2308	92.54	197.93	331.19	3070
970.00	1140.75	1102.05	2272	2310	92.23	197.32	330.24	3043
972.00	1143.80	1105.10	2274	2312	91.92	196.70	329.30	3051
974.00	1146.79	1108.09	2275	2313	91.63	196.12	328.40	2987
976.00	1149.69	1110.99	2277	2315	91.35	195.57	327.55	2904
978.00	1152.55	1113.85	2278	2316	91.09	195.05	326.75	2858
980.00	1155.42	1116.72	2279	2317	90.82	194.52	325.93	2871
982.00	1158.28	1119.58	2280	2318	90.56	194.00	325.13	2854
984.00	1161.18	1122.48	2281	2320	90.30	193.47	324.31	2903
986.00	1164.13	1125.43	2283	2321	90.02	192.92	323.46	2950
988.00	1167.06	1128.36	2284	2322	89.75	192.38	322.63	2926
990.00	1170.00	1131.30	2285	2324	89.48	191.84	321.79	2940
992.00	1172.92	1134.22	2287	2325	89.21	191.31	320.97	2922
994.00	1175.83	1137.13	2288	2327	88.95	190.79	320.17	2909
996.00	1178.78	1140.08	2289	2328	88.68	190.25	319.34	2947
998.00	1181.70	1143.00	2291	2329	88.42	189.73	318.53	2930
1000.00	1184.63	1145.93	2292	2331	88.16	189.21	317.72	2922
1002.00	1187.56	1148.86	2293	2332	87.90	188.69	316.91	2935
1004.00	1190.53	1151.83	2294	2333	87.64	188.16	316.09	2964
1006.00	1193.50	1154.80	2296	2335	87.37	187.63	315.27	2975

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
1008.00	1196.41	1157.71	2297	2336	87.12	187.13	314.49	2907
1010.00	1199.31	1160.61	2298	2337	86.87	186.63	313.72	2899
1012.00	1202.23	1163.53	2299	2339	86.62	186.13	312.94	2925
1014.00	1205.12	1166.42	2301	2340	86.38	185.64	312.18	2886
1016.00	1208.02	1169.32	2302	2341	86.14	185.15	311.42	2902
1018.00	1210.92	1172.22	2303	2342	85.89	184.66	310.66	2901
1020.00	1213.85	1175.15	2304	2344	85.65	184.17	309.90	2925
1022.00	1216.78	1178.08	2305	2345	85.40	183.68	309.13	2931
1024.00	1219.79	1181.09	2307	2346	85.14	183.16	308.32	3010
1026.00	1222.74	1184.04	2308	2348	84.90	182.66	307.55	2955
1028.00	1225.68	1186.98	2309	2349	84.66	182.18	306.79	2938
1030.00	1228.63	1189.93	2311	2350	84.41	181.69	306.03	2950
1032.00	1231.58	1192.88	2312	2352	84.17	181.20	305.26	2955
1034.00	1234.51	1195.81	2313	2353	83.93	180.72	304.52	2927
1036.00	1237.51	1198.81	2314	2354	83.69	180.22	303.74	3003
1038.00	1240.43	1201.73	2315	2356	83.46	179.76	303.01	2911
1040.00	1243.33	1204.63	2317	2357	83.23	179.30	302.29	2908
1042.00	1246.25	1207.55	2318	2358	83.00	178.83	301.57	2916
1044.00	1249.15	1210.45	2319	2359	82.77	178.38	300.86	2903
1046.00	1252.12	1213.42	2320	2360	82.54	177.90	300.11	2970
1048.00	1255.04	1216.34	2321	2362	82.31	177.45	299.40	2916
1050.00	1257.99	1219.29	2322	2363	82.08	176.98	298.67	2954
1052.00	1260.94	1222.24	2324	2364	81.85	176.52	297.95	2949
1054.00	1263.89	1225.19	2325	2365	81.62	176.06	297.23	2949

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
1056.00	1266.88	1228.18	2326	2367	81.39	175.59	296.49	2990
1058.00	1269.56	1230.86	2327	2367	81.21	175.22	295.91	2680
1060.00	1272.26	1233.56	2327	2368	81.02	174.84	295.32	2701
1062.00	1275.04	1236.34	2328	2369	80.82	174.44	294.70	2773
1064.00	1277.83	1239.13	2329	2370	80.62	174.04	294.08	2794
1066.00	1280.60	1241.90	2330	2371	80.43	173.65	293.47	2764
1068.00	1283.34	1244.64	2331	2371	80.24	173.27	292.87	2738
1070.00	1286.05	1247.35	2332	2372	80.06	172.90	292.29	2717
1072.00	1288.82	1250.12	2332	2373	79.87	172.51	291.68	2771
1074.00	1291.51	1252.81	2333	2373	79.69	172.15	291.12	2691
1076.00	1294.17	1255.47	2334	2374	79.51	171.80	290.57	2659
1078.00	1296.85	1258.15	2334	2375	79.34	171.44	290.02	2673
1080.00	1299.43	1260.73	2335	2375	79.17	171.12	289.50	2585
1082.00	1302.03	1263.33	2335	2375	79.01	170.79	288.99	2597
1084.00	1304.68	1265.98	2336	2376	78.84	170.44	288.45	2650
1086.00	1307.37	1268.67	2336	2377	78.66	170.09	287.89	2696
1088.00	1310.03	1271.33	2337	2377	78.49	169.74	287.36	2660
1090.00	1312.65	1273.95	2338	2378	78.33	169.41	286.84	2615
1092.00	1315.24	1276.54	2338	2378	78.17	169.09	286.34	2592
1094.00	1317.82	1279.12	2338	2378	78.01	168.77	285.84	2581
1096.00	1320.43	1281.73	2339	2379	77.85	168.44	285.33	2612
1098.00	1323.35	1284.65	2340	2380	77.65	168.04	284.68	2912
1100.00	1326.14	1287.44	2341	2381	77.47	167.66	284.09	2797
1102.00	1329.09	1290.39	2342	2382	77.26	167.25	283.44	2942

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
1104.00	1332.61	1293.91	2344	2384	76.97	166.65	282.48	3527
1106.00	1335.91	1297.21	2346	2386	76.72	166.13	281.66	3293
1108.00	1339.18	1300.48	2347	2388	76.47	165.63	280.86	3270
1110.00	1342.62	1303.92	2349	2391	76.20	165.07	279.97	3439
1112.00	1345.93	1307.23	2351	2393	75.95	164.55	279.15	3316
1114.00	1349.48	1310.78	2353	2395	75.67	163.97	278.21	3546
1116.00	1353.04	1314.34	2355	2398	75.38	163.38	277.26	3565
1118.00	1356.51	1317.81	2357	2400	75.11	162.82	276.38	3472
1120.00	1359.47	1320.77	2359	2401	74.92	162.43	275.75	2957
1122.00	1362.37	1323.67	2359	2402	74.74	162.05	275.16	2894
1124.00	1365.44	1326.74	2361	2404	74.53	161.63	274.48	3077
1126.00	1368.62	1329.92	2362	2405	74.31	161.18	273.76	3180
1128.00	1371.78	1333.08	2364	2407	74.09	160.73	273.06	3156
1130.00	1375.01	1336.31	2365	2408	73.87	160.27	272.32	3234
1132.00	1378.32	1339.62	2367	2410	73.63	159.79	271.54	3310
1134.00	1381.39	1342.69	2368	2412	73.43	159.37	270.89	3070
1136.00	1384.43	1345.73	2369	2413	73.24	158.97	270.25	3038
1138.00	1387.44	1348.74	2370	2414	73.05	158.58	269.63	3014
1140.00	1390.63	1351.93	2372	2416	72.83	158.14	268.93	3183
1142.00	1393.76	1355.06	2373	2417	72.63	157.73	268.26	3126
1144.00	1397.00	1358.30	2375	2419	72.41	157.28	267.54	3245
1146.00	1400.36	1361.66	2376	2421	72.18	156.80	266.77	3357
1148.00	1403.66	1364.96	2378	2423	71.96	156.34	266.03	3304
1150.00	1406.89	1368.19	2379	2424	71.75	155.90	265.33	3221

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								3055
1152.00	1409.94	1371.24	2381	2425	71.56	155.51	264.71	
								3116
1154.00	1413.06	1374.36	2382	2427	71.36	155.11	264.07	
								3199
1156.00	1416.25	1377.55	2383	2428	71.16	154.69	263.39	
								3082
1158.00	1419.34	1380.64	2385	2430	70.97	154.30	262.77	
								3112
1160.00	1422.45	1383.75	2386	2431	70.78	153.90	262.14	
								3186
1162.00	1425.64	1386.94	2387	2432	70.58	153.49	261.48	
								3410
1164.00	1429.05	1390.35	2389	2434	70.35	153.02	260.72	

Synthetic

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ANALYST:                  15-OCT-87 18:27:52    PROGRAM: GMULTP 006.E06




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                               *                 *
                               *   SCHLUMBERGER  *
                               *                 *
                               *******************


                          SYNTHETIC SEISMOGRAM TABLE

                     COMPANY  : BEACH PETROLEUM N.L.
                     WELL     : HENKE # 1
                     FIELD    : WILDCAT
                     REFERENCE: 570709
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ANALYST:                  15-OCT-87 18:27:52    PROGRAM: GMULTP 006.E06




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                                   *                 *
                                   *   SCHLUMBERGER  *
                                   *                 *
                                   *******************


                              SYNTHETIC SEISMOGRAM TABLE

                         COMPANY  : EEACH PETROLEUM N.L.
                         WELL     : HENKE # 1
                         FIELD    : WILDCAT
                         REFERENCE: 57C709
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THE HEADINGS AND FLAGS SHOWN IN THE DATA LIST ARE DEFINED
AS FOLLOWS:


IGEOFL- FLAG INDICATING  MODE OF PROCESSING
        IGEOFL = 0    WST DATA AVAILABLE AND PROCESSED
        IGEOFL = 1    WST DATA NOT AVAILABLE

LOG INPUT DATA :
GRF001- CHANNEL NAME FOR INPUT DENSITY LOG DATA
GTROC1- CHANNEL NAME FOR INPUT SONIC LOG DATA
GCURVE- CORRELATION LOG NAMES

USER DEFINED MODELING

LOFVEL- LAYER OPTION FLAG FOR VELOCITY
LOFDEN- LAYER OPTION FLAG FOR DENSITY
LAYVEL- LAYERED VELOCITY VALUES FOR USER SUPPLIED ZONE LIMIT
        WITH RESPECT TO SONIC LOG DATA
LAYDEN- LAYERED DENSITY VALUES FOR USER SUPPLIED ZONE LIMITS
        WITH RESPECT TO SONIC LOG DATA
UNERTH- UNIFORM EARTH VELOCITY
UNFDEN- UNIFORM EARTH DENSITY
SRATE   SAMPLING RATE IN MS
INIDEP  START DEPTH FOR COMPUTING SYNTHETIC SEISMOGRAM
        WITH RESPECT TO SONIC LOG DATA
IGESTP  STOP DEPTH FOR COMPUTING SYNTHETIC SEISMOGRAM
        WITH RESPECT TO SONIC LOG DATA
INITAU  TWO WAY TRAVEL TIME FROM TOP SONIC TO SRD
EKB     ELEVATION OF KELLY BUSHING WITH RESPECT TO
        MEAN SEA LEVEL
SRDGEO  SEISMIC REFERENCE DEPTH WITH RESPECT TO
        MEAN SEA LEVEL
ICDP    FLAG FOR COMPUTING RESIDUAL MULTIPLES
CDPTIM  TWO WAY TIME INTERVAL FOR COMPUTATION OF
        RESIDUAL MULTIPLES
SCRTIM  SURFACE REFLECTOR TWO WAY TIME ABOVE INITAU
SCREFL  SURFACE REFLECTION COEFFICIENT
RCMAX   REFLECTION COEFFICIENTS THAT ARE EQUAL TO OR
        GREATER  THAN THIS VALUE SHALL BE FLAGGED

*NOTE*  IN CASE OF MODELING A SYNTHETIC SEISMOGRAM WITHOUT
        SONIC LOG DATA ,THE DEPTH REFERENCES SHALL BE USER
        DEFINED


OUTPUT DATA

RMSVWE  ROOT MEAN SQUARE VELOCITY FOUND FOR THE WELL
SRDTIM  TWO WAY TRANSIT TIME BETWEEN INIDEP AND SRDGEO

CHANNNEL NAMES
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TWOT- TWO WAY TRAVEL TIME
DSRD- DEPTH OF COMPUTED DATA WITH RESPECT TO SRD
INTV- INTERVAL VELOCITY ON A TIME SCALE
RHOT- INTERVAL DENSITY  ON A TIME SCALE
REFL- REFLECTION COEFFICIENT AT GIVEN TWO WAY TRAVEL TIMES
ATTE- ATTENUATION COEFFICIENT AT GIVEN TWO WAY TRAVEL TIMES
PRIM- SYNTHETIC SEISMOGRAM  - PRIMARIES
MULT- SYNTHETIC SEISMOGRAM  - PRIMARIES + MULTIPLES
MUON- MULTIPLES ONLY



             CHANNEL NAMES

CHAN    1 - TWOT.GMU.002.*
CHAN    2 - DSRD.GRF.006.*
CHAN    3 - INTV.GRF.007.*
CHAN    4 - RHOT.GRF.001.*
CHAN    5 - REFL.GRF.001.*
CHAN    6 - ATTE.GRF.001.*
CHAN    7 - PRIM.GRF.001.*
CHAN    8 - MULT.GMU.001.*
CHAN    9 - MUON.GMU.001.*

  (GLOBAL PARAMETERS)                          (VALUE)

MODE OF PROC (GEOGRAM)      IGEOFL    :          0
INITIALIZE CDP LOGIC        ICDP      :          0
CDP TIME                    CDPTIM    :    .200000  S
TIME SAMPLING (WST)         SRATE     :    2.00000  MS
TOP DEPTH OF PROCESSING     INIDEP    :    249.300  M
BOTTOM DEPTH OF PROCESSI    IGESTP    :    1393.00  M
INITIAL TWO WAY TRAVEL T    INITAU    :    .287820  S
SRD FOR GEOGRAM             SRDGEO    :   -30479.7  M
ELEVATION OF KELLY BUSHI    EKB       :          0  M
SRD TIME                    SRDTIM    :          0  MS
SURFACE COEFFICIENT OF R    SCRTIM    :          0  MS
SURFACE COEFFICIENT OF R    SCREFL    :   -1.00000
REFLECTION COEFF MAXIMUM    RCMAX     :    .300000
RMS VELOCITY IN WELL        RMSVWE    :    2627.00  M/S
UNIFORM EARTH VELOCITY      UNERTH    :    2133.60  M/S
UNIFORM DENSITY VALUE       UNFDEN    :    2.30000  G/C3
```

```
 (MATRIX PARAMETERS)



    1 GR*
    2 CALI*

 (ZONED PARAMETERS)                         (VALUE)              (LIMITS)
LAYER OPTION FLAG DENS   LOFDEN      :-1.000000          30479.7  -        0
LAYER OPTION FLAG VELOC  LOFVEL      : 1.000000          30479.7  -        0
USER SUPPLIED DENSITY DA LAYDEN      :-999.2500    G/C3  30479.7  -        0
USER VELOC (WST)         LAYVEL      : 1732.000    M/S   288.000  - 38.70000
                                       1900.000          38.7000           0
```

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 TWO WAY      DEPTH    INTERVAL  INTERVAL    REFLECT.    TWO WAY   SYNTHETIC    PRIMARY    MULTIPLES
 TRAVEL     FROM SRD   VELOCITY   DENSITY     COEFF.      ATTEN.    SEISMO.        +          ONLY
  TIME      (OR TOP)                                      COEFF.    PRIMARY    MULTIPLES
   MS          M          M/S      G/C3
                          2148     2.250
  289.8      251.45                            -.004      .99998    -.00429     -.00429          0
                          2129     2.250
  291.8      253.58                                0      .99998          0     -.00002     -.00002
                          2129     2.250
  293.8      255.71                                0      .99998          0           0          0
                          2129     2.250
  295.8      257.84                                0      .99998          0           0          0
                          2129     2.250
  297.8      259.97                                0      .99998          0           0          0
                          2129     2.250
  299.8      262.10                            -.003      .99997    -.00332     -.00332          0
                          2115     2.250
  301.8      264.21                             .006      .99994     .00573      .00570     -.00003
                          2140     2.250
  303.8      266.35                            -.004      .99992    -.00366     -.00361      .00005
                          2124     2.250
  305.8      268.47                            -.016      .99968    -.01578     -.01581     -.00003
                          2058     2.250
  307.8      270.53                            -.003      .99967    -.00288     -.00302     -.00014
                          2046     2.250
  309.8      272.58                            -.023      .99914    -.02290     -.02292     -.00003
                          1955     2.250
  311.8      274.53                             .004      .99913     .00408      .00388     -.00020
                          1971     2.250
  313.8      276.50                             .010      .99903     .00990      .00998      .00008
                          2010     2.250
  315.8      278.51                             .036      .99772     .03621      .03624      .00003
                          2161     2.250
  317.8      280.68                             .004      .99770     .00443      .00465      .00022
                          2181     2.250
  319.8      282.86                             .005      .99767     .00459      .00477      .00018
                          2201     2.250
  321.8      285.06                            -.002      .99767    -.00169     -.00186     -.00017
                          2193     2.250
  323.8      287.25                            -.006      .99764    -.00593     -.00590      .00003
                          2167     2.250
  325.8      289.42                            -.012      .99748    -.01242     -.01267     -.00025
                          2114     2.250
  327.8      291.53                             .013      .99732     .01264      .01199     -.00065
                          2168     2.250
  329.8      293.70                             .004      .99730     .00415      .00392     -.00023
                          2187     2.250
  331.8      295.89                            -.014      .99712    -.01364     -.01360      .00004
                          2127     2.250
  333.8      298.01                             .009      .99703     .00913      .01037      .00124
                          2167     2.250
  335.8      300.18                            -.001      .99703    -.00084      .00004      .00089
                          2163     2.250
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TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
337.8	302.34			.002	.99703	.00192	.00365	.00173
		2172	2.250					
339.8	304.52			.003	.99702	.00251	.00252	.00001
		2182	2.250					
341.8	306.70			-.004	.99701	-.00354	-.00448	-.00094
		2167	2.250					
343.8	308.87			.007	.99696	.00740	.00539	-.00201
		2199	2.250					
345.8	311.06			-.006	.99692	-.00620	-.00624	-.00004
		2172	2.250					
347.8	313.24			-.009	.99684	-.00854	-.00946	-.00092
		2135	2.250					
349.8	315.37			-.001	.99684	-.00148	-.00099	.00049
		2129	2.250					
351.8	317.50			.001	.99684	.00080	.00176	.00096
		2132	2.250					
353.8	319.63			-.005	.99682	-.00470	-.00461	.00009
		2112	2.250					
355.8	321.75			-.001	.99682	-.00128	-.00141	-.00013
		2107	2.250					
357.8	323.85			.002	.99681	.00197	.00177	-.00021
		2115	2.250					
359.8	325.97			.001	.99681	.00117	.00182	.00065
		2120	2.250					
361.8	328.09			.016	.99655	.01633	.01594	-.00038
		2191	2.250					
363.8	330.28			-.002	.99654	-.00234	-.00261	-.00027
		2181	2.250					
365.8	332.46			0	.99654	.00022	.00011	-.00011
		2182	2.250					
367.8	334.64			-.003	.99653	-.00267	-.00330	-.00063
		2170	2.250					
369.8	336.81			-.005	.99651	-.00515	-.00570	-.00054
		2148	2.250					
371.8	338.96			-.020	.99611	-.01983	-.01976	.00008
		2064	2.250					
373.8	341.02			.032	.99511	.03151	.03197	.00046
		2199	2.250					
375.8	343.22			.005	.99509	.00520	.00558	.00038
		2222	2.250					
377.8	345.44			-.026	.99444	-.02539	-.02477	.00062
		2111	2.250					
379.8	347.56			.018	.99411	.01316	.01836	.00020
		2190	2.250					
381.8	349.75			-.008	.99405	-.00783	-.00701	.00082
		2156	2.250					
383.8	351.90			-.002	.99404	-.00223	-.00188	.00035
		2146	2.250					
385.8	354.05			.004	.99403	.00382	.00342	-.00039

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2163	2.250					
387.8	356.21			-.011	.99390	-.01106	-.01165	-.00059
		2115	2.250					
389.8	358.32			.050	.99141	.04975	.04751	-.00224
		2338	2.250					
391.8	360.66			.055	.98839	.05477	.05614	.00137
		2611	2.250					
393.8	363.27			-.083	.98161	-.08182	-.08208	-.00027
		2212	2.250					
395.8	365.49			.004	.98160	.00390	.00470	.00081
		2230	2.250					
397.8	367.72			-.030	.98072	-.02932	-.02830	.00102
		2100	2.250					
399.8	369.82			-.001	.98072	-.00132	-.00145	-.00013
		2095	2.250					
401.8	371.91			.005	.98070	.00463	.00283	-.00179
		2114	2.250					
403.8	374.02			.019	.98035	.01856	.01795	-.00061
		2196	2.250					
405.8	376.22			.001	.98035	.00069	.00096	.00027
		2199	2.250					
407.8	378.42			-.003	.98034	-.00283	-.00194	.00089
		2186	2.250					
409.8	380.61			.002	.98033	.00238	.00436	.00198
		2197	2.250					
411.8	382.80			.001	.98033	.00100	.00277	.00177
		2202	2.250					
413.8	385.00			.009	.98026	.00867	.00915	.00047
		2241	2.250					
415.8	387.25			-.010	.98017	-.00935	-.01537	-.00602
		2199	2.250					
417.8	389.44			-.007	.98012	-.00661	-.00883	-.00222
		2169	2.250					
419.8	391.61			.006	.98008	.00636	.00141	-.00494
		2197	2.250					
421.8	393.81			0	.98008	.00040	.00587	.00546
		2199	2.250					
423.8	396.01			-.001	.98008	-.00110	.00120	.00231
		2194	2.250					
425.8	398.20			.001	.98008	.00139	.00423	.00284
		2201	2.250					
427.8	400.41			.002	.98007	.00230	.00517	.00286
		2211	2.250					
429.8	402.62			-.001	.98007	-.00106	-.00249	-.00142
		2206	2.250					
431.8	404.82			-.002	.98007	-.00189	-.00760	-.00571
		2198	2.250					
433.8	407.02			.039	.97854	.03868	.04228	.00360
		2378	2.250					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
435.8	409.40	2263	2.250	-.025	.97794	-.02420	-.02418	.00003
437.8	411.66	2067	2.250	-.045	.97592	-.04448	-.04856	-.00408
439.8	413.73	2188	2.250	.029	.97512	.02790	.02966	.00175
441.8	415.92	2234	2.250	.010	.97502	.01016	.00936	-.00080
443.8	418.15	2135	2.250	-.023	.97451	-.02219	-.02010	.00209
445.8	420.29	2232	2.250	.022	.97403	.02159	.02262	.00103
447.8	422.52	2240	2.250	.002	.97403	.00183	.00012	-.00170
449.8	424.76	2247	2.250	.002	.97403	.00161	.00414	.00253
451.8	427.00	2229	2.250	-.004	.97401	-.00394	-.00221	.00173
453.8	429.23	2222	2.250	-.002	.97401	-.00148	-.00501	-.00353
455.8	431.46	2385	2.250	.035	.97280	.03434	.03436	.00002
457.8	433.84	2302	2.250	-.018	.97250	-.01715	-.01473	.00242
459.8	436.14	2313	2.250	.002	.97249	.00233	-.00184	-.00417
461.8	438.46	2312	2.250	0	.97249	-.00026	-.00322	-.00296
463.8	440.77	2299	2.250	-.003	.97248	-.00276	.00115	.00391
465.8	443.07	2312	2.250	.003	.97248	.00265	.00243	-.00022
467.8	445.38	2342	2.250	.006	.97243	.00630	.00868	.00238
469.8	447.72	2324	2.250	-.004	.97242	-.00364	-.00272	.00092
471.8	450.04	2321	2.250	-.001	.97242	-.00064	.00182	.00246
473.8	452.37	2332	2.250	.002	.97241	.00230	.00248	.00017
475.8	454.70	2324	2.250	-.002	.97241	-.00163	-.00480	-.00318
477.8	457.02	2313	2.250	-.002	.97241	-.00230	-.00724	-.00493
479.8	459.34	2296	2.250	-.004	.97239	-.00373	.00127	.00500
481.8	461.63	2307	2.250	.002	.97239	.00235	.00123	-.00112
483.8	463.94			-.004	.97237	-.00365	-.00741	-.00376

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2290	2.250					
485.8	466.23			.005	.97235	.00461	.01008	.00547
		2311	2.250					
487.8	468.54			-.008	.97229	-.00788	-.01044	-.00256
		2274	2.250					
489.8	470.81			-.002	.97228	-.00227	-.00100	.00127
		2264	2.250					
491.8	473.08			0	.97228	-.00003	-.00099	-.00095
		2264	2.250					
493.8	475.34			-.016	.97203	-.01552	-.02012	-.00460
		2192	2.250					
495.8	477.53			.016	.97180	.01522	.01608	.00086
		2262	2.250					
497.8	479.80			.013	.97163	.01268	.01972	.00705
		2322	2.250					
499.8	482.12			-.001	.97163	-.00053	-.00336	-.00283
		2319	2.250					
501.8	484.44			.011	.97150	.01105	.01391	.00285
		2373	2.250					
503.8	486.81			-.002	.97150	-.00150	-.00402	-.00251
		2365	2.250					
505.8	489.18			-.005	.97148	-.00445	-.00717	-.00272
		2344	2.250					
507.8	491.52			-.005	.97145	-.00532	-.00835	-.00303
		2318	2.250					
509.8	493.84			.023	.97095	.02212	.02637	.00425
		2426	2.250					
511.8	496.26			-.010	.97086	-.00933	-.00831	.00103
		2380	2.250					
513.8	498.64			.010	.97076	.00959	.00911	-.00048
		2428	2.250					
515.8	501.07			.001	.97076	.00071	.00085	.00014
		2431	2.250					
517.8	503.50			0	.97076	.00027	.00360	.00334
		2433	2.250					
519.8	505.94			-.004	.97075	-.00419	-.00423	-.00004
		2412	2.250					
521.8	508.35			.003	.97074	.00300	.00218	-.00082
		2427	2.250					
523.8	510.77			-.003	.97073	-.00255	.00147	.00402
		2414	2.250					
525.8	513.19			0	.97073	.00041	-.00534	-.00575
		2416	2.250					
527.8	515.60			-.005	.97071	-.00462	-.00738	-.00276
		2393	2.250					
529.8	518.00			.002	.97071	.00146	.00354	.00208
		2400	2.250					
531.8	520.40			-.003	.97070	-.00277	-.00328	-.00051
		2387	2.250					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
533.8	522.78			.001	.97070	.00113	.00410	.00297
		2392	2.250					
535.8	525.18			.014	.97051	.01332	.01206	-.00126
		2459	2.250					
537.8	527.63			0	.97051	.00014	-.00705	-.00719
		2459	2.250					
539.8	530.09			-.010	.97042	-.00958	.00761	.01718
		2411	2.250					
541.8	532.51			-.002	.97042	-.00183	-.00816	-.00633
		2402	2.250					
543.8	534.91			.003	.97041	.00269	-.00715	-.00984
		2416	2.250					
545.8	537.32			.004	.97039	.00395	.01095	.00701
		2435	2.250					
547.8	539.76			-.006	.97035	-.00620	-.00898	-.00278
		2404	2.250					
549.8	542.16			0	.97035	-.00012	-.00531	-.00519
		2404	2.250					
551.8	544.57			.011	.97023	.01070	.01547	.00478
		2457	2.250					
553.8	547.02			-.011	.97012	-.01077	-.00997	.00080
		2404	2.250					
555.8	549.43			-.004	.97010	-.00381	-.00119	.00262
		2385	2.250					
557.8	551.81			.018	.96979	.01735	.01415	-.00319
		2472	2.250					
559.8	554.28			-.003	.96978	-.00269	-.00620	-.00351
		2458	2.250					
561.8	556.74			-.006	.96974	-.00629	.00195	.00824
		2426	2.250					
563.8	559.17			-.031	.96878	-.03051	-.03337	-.00286
		2278	2.250					
565.8	561.45			.015	.96856	.01458	.01329	-.00129
		2348	2.250					
567.8	563.79			.005	.96854	.00495	.00456	-.00040
		2372	2.250					
569.8	566.17			.020	.96814	.01961	.02120	.00159
		2470	2.250					
571.8	568.64			-.002	.96814	-.00206	-.00581	-.00374
		2459	2.250					
573.8	571.10			.015	.96793	.01421	.01614	.00193
		2533	2.250					
575.8	573.63			-.013	.96776	-.01269	-.01097	.00172
		2467	2.250					
577.8	576.10			-.005	.96773	-.00518	-.00477	.00041
		2441	2.250					
579.8	578.54			.024	.96716	.02362	.02408	.00046
		2563	2.250					
581.8	581.10			-.026	.96651	-.02508	-.02421	.00087

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2433	2.250					
583.8	583.53			-.007	.96646	-.00666	-.00591	.00074
		2400	2.250					
585.8	585.93			-.008	.96640	-.00787	-.01366	-.00580
		2361	2.250					
587.8	588.30			.008	.96634	.00751	.00535	-.00216
		2398	2.250					
589.8	590.69			.063	.96254	.06057	.06545	.00488
		2719	2.250					
591.8	593.41			-.076	.95700	-.07303	-.06759	.00543
		2336	2.250					
593.8	595.75			.050	.95464	.04755	.04243	-.00512
		2580	2.250					
595.8	598.33			-.014	.95446	-.01314	-.00839	.00475
		2510	2.250					
597.8	600.84			-.015	.95425	-.01421	-.01482	-.00060
		2436	2.250					
599.8	603.27			.021	.95384	.01961	.01133	-.00829
		2538	2.250					
601.8	605.81			-.023	.95332	-.02225	-.02483	-.00259
		2423	2.250					
603.8	608.24			.003	.95332	.00260	.00491	.00231
		2436	2.250					
605.8	610.67			.013	.95315	.01276	.01664	.00388
		2502	2.250					
607.8	613.17			.009	.95306	.00895	.00863	-.00032
		2549	2.250					
609.8	615.72			-.009	.95298	-.00871	-.00680	.00191
		2503	2.250					
611.8	618.23			-.006	.95295	-.00584	-.00226	.00358
		2473	2.250					
613.8	620.70			-.008	.95289	-.00751	-.01570	-.00819
		2434	2.250					
615.8	623.13			.014	.95269	.01359	.01882	.00523
		2504	2.250					
617.8	625.64			-.002	.95269	-.00198	-.00759	-.00562
		2494	2.250					
619.8	628.13			-.011	.95257	-.01084	-.00688	.00396
		2438	2.250					
621.8	630.57			-.002	.95256	-.00151	-.00646	-.00494
		2430	2.250					
623.8	633.00			.003	.95256	.00250	.00478	.00228
		2443	2.250					
625.8	635.44			-.002	.95256	-.00147	-.00101	.00046
		2436	2.250					
627.8	637.88			0	.95256	.00022	.00220	.00198
		2437	2.250					
629.8	640.32			-.004	.95254	-.00398	-.00374	.00024
		2416	2.250					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
631.8	642.73	2503	2.250	.018	.95225	.01668	.01575	-.00093
633.8	645.23	2617	2.250	.022	.95177	.02133	.02243	.00110
635.8	647.85	2590	2.250	-.005	.95174	-.00495	-.00704	-.00209
637.8	650.44	2599	2.250	.002	.95174	.00156	.00176	.00021
639.8	653.04	2640	2.250	.008	.95168	.00744	.00661	-.00082
641.8	655.68	2564	2.250	-.015	.95148	-.01390	-.00965	.00425
643.8	658.24	2534	2.250	-.006	.95145	-.00549	-.01207	-.00658
645.8	660.78	2445	2.250	-.018	.95114	-.01708	-.01299	.00409
647.8	663.22	2397	2.250	-.010	.95105	-.00929	-.01022	-.00093
649.8	665.62	2432	2.250	.007	.95100	.00682	.00597	-.00085
651.8	668.05	2478	2.250	.009	.95092	.00891	.01628	.00737
653.8	670.53	2470	2.250	-.002	.95092	-.00157	-.00628	-.00472
655.8	673.00	2459	2.250	-.002	.95091	-.00218	-.00355	-.00137
657.8	675.46	2511	2.250	.010	.95081	.00994	.01438	.00443
659.8	677.97	2512	2.250	0	.95081	.00033	-.00278	-.00311
661.8	680.48	2551	2.250	.008	.95075	.00718	.00307	-.00411
663.8	683.03	2562	2.250	.002	.95075	.00216	.00251	.00035
665.8	685.59	2520	2.250	-.008	.95068	-.00787	-.00578	.00209
667.8	688.11	2500	2.250	-.004	.95067	-.00372	-.00282	.00090
669.8	690.61	2544	2.250	.009	.95060	.00819	.00442	-.00377
671.8	693.16	2530	2.250	-.003	.95059	-.00267	-.00076	.00191
673.8	695.69	2520	2.250	-.002	.95059	-.00174	-.00052	.00122
675.8	698.21	2528	2.250	.002	.95058	.00143	-.00161	-.00304
677.8	700.74	2699	2.250	.033	.94957	.03103	.03287	.00184
679.8	703.43			-.015	.94934	-.01470	-.00627	.00842

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2616	2.250					
681.8	706.05			.012	.94920	.01164	-.00184	-.01348
		2681	2.250					
683.8	708.73			-.003	.94919	-.00264	.00368	.00633
		2666	2.250					
685.8	711.40			-.019	.94886	-.01768	-.01400	.00367
		2569	2.250					
687.8	713.97			.001	.94886	.00130	-.00021	-.00152
		2576	2.250					
689.8	716.54			-.017	.94858	-.01637	-.01279	.00358
		2489	2.250					
691.8	719.03			.015	.94837	.01411	-.00222	-.01633
		2564	2.250					
693.8	721.60			.010	.94827	.00987	.01338	.00351
		2618	2.250					
695.8	724.21			-.015	.94805	-.01424	.00191	.01614
		2540	2.250					
697.8	726.75			.022	.94759	.02104	.00267	-.01837
		2656	2.250					
699.8	729.41			.014	.94740	.01340	.03308	.01969
		2732	2.250					
701.8	732.14			-.037	.94608	-.03533	-.03916	-.00383
		2535	2.250					
703.8	734.68			0	.94608	-.00036	-.00763	-.00726
		2533	2.250					
705.8	737.21			0	.94608	.00017	.00135	.00119
		2534	2.250					
707.8	739.75			-.007	.94604	-.00619	-.00978	-.00359
		2501	2.250					
709.8	742.25			.013	.94587	.01262	.01138	-.00124
		2569	2.250					
711.8	744.82			-.001	.94587	-.00116	-.00379	-.00263
		2563	2.250					
713.8	747.38			.002	.94586	.00212	.00355	.00143
		2574	2.250					
715.8	749.95			-.002	.94586	-.00173	.00504	.00677
		2565	2.250					
717.8	752.52			.007	.94582	.00616	.01254	.00638
		2598	2.250					
719.8	755.12			-.004	.94581	-.00372	-.01474	-.01102
		2578	2.250					
721.8	757.69			.017	.94552	.01634	.02412	.00778
		2669	2.250					
723.8	760.36			.019	.94517	.01831	.01703	-.00127
		2774	2.250					
725.8	763.14			-.012	.94503	-.01152	-.01832	-.00680
		2707	2.250					
727.8	765.84			-.003	.94502	-.00325	-.00453	-.00128
		2689	2.250					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
729.8	768.53			-.018	.94472	-.01676	-.00981	.00696
		2595	2.250					
731.8	771.13			.010	.94462	.00974	.00809	-.00165
		2649	2.250					
733.8	773.78			-.009	.94455	-.00819	-.01000	-.00181
		2604	2.250					
735.8	776.38			.035	.94340	.03295	.02793	-.00501
		2792	2.250					
737.8	779.17			-.024	.94236	-.02264	-.01669	.00595
		2661	2.250					
739.8	781.83			-.006	.94283	-.00526	-.00072	.00454
		2631	2.250					
741.8	784.47			.007	.94278	.00670	-.00236	-.00906
		2669	2.250					
743.8	787.13			-.005	.94275	-.00500	.00676	.01176
		2641	2.250					
745.8	789.78			-.007	.94270	-.00705	-.00761	-.00056
		2602	2.250					
747.8	792.38			.004	.94268	.00423	-.00239	-.00662
		2625	2.250					
749.8	795.00			.012	.94254	.01170	.01554	.00384
		2691	2.250					
751.8	797.69			.139	.92432	.13104	.12236	-.00863
		3560	2.250					
753.8	801.25			-.121	.91072	-.11213	-.10421	.00792
		2790	2.250					
755.8	804.04			-.037	.90947	-.03369	-.04015	-.00646
		2591	2.250					
757.8	806.63			.005	.90944	.00478	.00116	-.00362
		2618	2.250					
759.8	809.25			.004	.90943	.00402	.01320	.00918
		2641	2.250					
761.8	811.89			0	.90943	.00007	-.00647	-.00655
		2642	2.250					
763.8	814.54			.004	.90941	.00398	.00437	.00039
		2665	2.250					
765.8	817.20			-.022	.90897	-.02001	-.02035	-.00034
		2550	2.250					
767.8	819.75			.052	.90647	.04766	.04445	-.00321
		2833	2.250					
769.8	822.58			-.040	.90499	-.03660	-.02707	.00953
		2613	2.250					
771.8	825.20			-.011	.90488	-.01022	-.01109	-.00088
		2554	2.250					
773.8	827.75			.002	.90487	.00165	-.00245	-.00410
		2564	2.250					
775.8	830.32			.026	.90424	.02388	.02367	-.00020
		2703	2.250					
777.8	833.02			.007	.90420	.00615	.00300	-.00315

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2740	2.250					
779.8	835.76			-.017	.90394	-.01539	-.02758	-.01220
		2648	2.250					
781.8	838.41			-.025	.90335	-.02304	-.01283	.01021
		2516	2.250					
783.8	840.92			.014	.90317	.01274	.01629	.00355
		2588	2.250					
785.8	843.51			.011	.90307	.00953	.00985	.00032
		2644	2.250					
787.8	846.15			.003	.90306	.00286	.00502	.00215
		2660	2.250					
789.8	848.81			-.019	.90274	-.01701	-.00486	.01215
		2562	2.250					
791.8	851.38			-.005	.90272	-.00407	-.02185	-.01777
		2539	2.250					
793.8	853.92			.012	.90259	.01106	.01474	.00367
		2602	2.250					
795.8	856.52			.011	.90248	.00988	.00693	-.00295
		2660	2.250					
797.8	859.18			-.005	.90246	-.00449	-.00783	-.00334
		2633	2.250					
799.8	861.81			.062	.89902	.05574	.06284	.00710
		2980	2.250					
801.8	864.79			-.061	.89569	-.05467	-.05829	-.00362
		2638	2.250					
803.8	867.43			.004	.89567	.00388	-.00290	-.00678
		2661	2.250					
805.8	870.09			.009	.89560	.00844	.02498	.01654
		2712	2.250					
807.8	872.80			-.001	.89559	-.00128	-.00275	-.00147
		2704	2.250					
809.8	875.51			-.025	.89501	-.02282	-.02636	-.00354
		2570	2.250					
811.8	878.08			.024	.89450	.02134	.02259	.00125
		2695	2.250					
813.8	880.77			.026	.89392	.02287	.02537	.00250
		2837	2.250					
815.8	883.61			-.018	.89364	-.01572	-.02707	-.01135
		2739	2.250					
817.8	886.35			-.003	.89363	-.00258	.00607	.00865
		2723	2.250					
819.8	889.07			.011	.89353	.00987	.00893	-.00094
		2784	2.250					
821.8	891.86			0	.89353	.00009	-.00042	-.00051
		2785	2.250					
823.8	894.64			.020	.89318	.01764	.01444	-.00320
		2897	2.250					
825.8	897.54			-.026	.89257	-.02326	-.02763	-.00437
		2750	2.250					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
827.8	900.29			.001	.89257	.00112	.00451	.00339
		2757	2.250					
829.8	903.04			.015	.89236	.01355	.02263	.00908
		2842	2.250					
831.8	905.88			-.012	.89223	-.01097	-.01073	.00024
		2773	2.250					
833.8	908.66			.006	.89220	.00508	.01083	.00575
		2804	2.250					
835.8	911.46			-.010	.89211	-.00908	-.01105	-.00197
		2748	2.250					
837.8	914.21			-.014	.89194	-.01236	-.02725	-.01489
		2673	2.250					
839.8	916.88			.004	.89193	.00321	-.00544	-.00865
		2692	2.250					
841.8	919.57			-.004	.89191	-.00380	.01442	.01822
		2669	2.250					
843.8	922.24			-.003	.89190	-.00277	-.01033	-.00756
		2653	2.250					
845.8	924.90			.003	.89189	.00307	.00251	-.00057
		2671	2.250					
847.8	927.57			-.008	.89183	-.00706	-.00351	.00355
		2629	2.250					
849.8	930.20			.007	.89179	.00600	.00575	-.00025
		2653	2.259					
851.8	932.85			.045	.88996	.04043	.03726	-.00318
		2858	2.297					
853.8	935.71			-.067	.88600	-.05936	-.07018	-.01082
		2559	2.245					
855.8	938.27			.044	.88432	.03862	.03417	-.00445
		2751	2.278					
857.8	941.02			.008	.88427	.00683	.04267	.03584
		2778	2.291					
859.8	943.79			-.003	.88426	-.00298	-.01618	-.01320
		2735	2.312					
861.8	946.53			-.004	.88424	-.00319	-.00701	-.00382
		2720	2.308					
863.8	949.25			.017	.88400	.01472	.01166	-.00306
		2774	2.339					
865.8	952.02			-.004	.88398	-.00360	.00534	.00894
		2780	2.315					
867.8	954.80			-.010	.88390	-.00884	-.01864	-.00979
		2773	2.276					
869.8	957.58			.008	.88384	.00693	.01348	.00655
		2848	2.250					
871.8	960.42			-.015	.88364	-.01334	-.01921	-.00587
		2847	2.184					
873.8	963.27			-.001	.88364	-.00087	.01574	.01661
		2839	2.186					
875.8	966.11			.005	.88361	.00478	-.01167	-.01645

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2843	2.207					
877.8	968.95			-.027	.88295	-.02419	-.01959	.00460
		2782	2.135					
879.8	971.73			.017	.88269	.01516	.00807	-.00709
		2845	2.161					
881.8	974.58			.025	.88216	.02164	.02791	.00627
		2956	2.184					
883.8	977.54			.007	.88212	.00602	.02056	.01454
		3006	2.177					
885.8	980.54			-.012	.88198	-.01097	-.02893	-.01795
		2870	2.225					
887.8	983.41			-.012	.88185	-.01091	-.00952	.00139
		2842	2.192					
889.8	986.25			-.013	.88171	-.01106	-.01108	-.00003
		2804	2.166					
891.8	989.06			.008	.88165	.00720	-.00627	-.01347
		2849	2.167					
893.8	991.91			-.004	.88163	-.00391	.01448	.01838
		2823	2.167					
895.8	994.73			-.010	.88155	-.00869	-.01384	-.00514
		2779	2.159					
897.8	997.51			.040	.88012	.03541	.01969	-.01572
		2906	2.238					
899.8	1000.41			.010	.88004	.00846	.02871	.02025
		2779	2.385					
901.8	1003.19			-.007	.88000	-.00620	.00224	.00844
		2775	2.355					
903.8	1005.97			.010	.87991	.00867	-.01166	-.02033
		2825	2.360					
905.8	1008.79			0	.87991	-.00043	.01694	.01737
		2824	2.358					
907.8	1011.62			-.022	.87950	-.01900	-.02451	-.00551
		2727	2.339					
909.8	1014.34			.032	.87861	.02806	.01802	-.01004
		2845	2.389					
911.8	1017.19			.028	.87790	.02497	.03436	.00939
		2970	2.423					
913.8	1020.16			-.028	.87720	-.02477	-.02354	.00123
		2882	2.360					
915.8	1023.04			.017	.87694	.01518	.00999	-.00518
		2971	2.370					
917.8	1026.01			-.024	.87641	-.02147	-.00893	.01254
		2862	2.342					
919.8	1028.87			-.005	.87639	-.00420	-.01340	-.00919
		2829	2.347					
921.8	1031.70			0	.87639	.00013	-.00364	-.00377
		2820	2.355					
923.8	1034.52			.008	.87634	.00694	.01952	.01259
		2833	2.381					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
925.8	1037.35	2901	2.371	.010	.87626	.00837	-.00034	-.00871
927.8	1040.26	2835	2.376	-.010	.87616	-.00900	-.00174	.00726
929.8	1043.09	2929	2.333	.007	.87612	.00620	.00311	-.00309
931.8	1046.02	2872	2.373	-.001	.87612	-.00130	-.00719	-.00589
933.8	1048.89	2848	2.368	-.005	.87610	-.00445	-.00159	.00285
935.8	1051.74	2813	2.335	-.013	.87594	-.01166	-.01087	.00079
937.8	1054.55	2858	2.342	.010	.87586	.00836	.00589	-.00247
939.8	1057.41	2985	2.365	.027	.87524	.02333	.02137	-.00195
941.8	1060.40	2933	2.373	-.007	.87519	-.00630	.00541	.01171
943.8	1063.33	3008	2.402	.019	.87489	.01634	.00834	-.00800
945.8	1066.34	2954	2.312	-.028	.87419	-.02466	-.03253	-.00787
947.8	1069.29	2998	2.360	.018	.87392	.01557	.03292	.01735
949.8	1072.29	2974	2.272	-.023	.87345	-.02022	-.02365	-.00343
951.8	1075.26	2915	2.379	.013	.87330	.01144	.00238	-.00906
953.8	1078.18	2921	2.400	.005	.87327	.00475	.00430	-.00045
955.8	1081.10	2899	2.392	-.005	.87325	-.00474	.00214	.00688
957.8	1084.00	2886	2.390	-.003	.87324	-.00225	-.00075	.00150
959.8	1086.88	3007	2.389	.020	.87288	.01770	-.00010	-.01780
961.8	1089.89	2879	2.386	-.022	.87245	-.01955	-.01031	.00924
963.8	1092.77	2909	2.384	.005	.87243	.00401	.01470	.01069
965.8	1095.68	3059	2.354	.019	.87211	.01653	.00945	-.00707
967.8	1098.74	3036	2.396	.005	.87209	.00451	-.00061	-.00512
969.8	1101.77	3057	2.394	.003	.87208	.00254	.01299	.01044
971.8	1104.83	2997	2.394	-.010	.87200	-.00857	-.00730	.00127
973.8	1107.83			-.020	.87164	-.01772	-.02389	-.00617

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2908	2.369					
975.8	1110.73			-.036	.87051	-.03134	-.03217	-.00083
		2867	2.236					
977.8	1113.60			-.019	.87020	-.01649	-.02038	-.00389
		2868	2.153					
979.8	1116.47			.025	.86966	.02163	.01760	-.00403
		2857	2.271					
981.8	1119.33			.018	.86940	.01522	.01903	.00381
		2891	2.324					
983.8	1122.22			.009	.86932	.00796	.00479	-.00317
		2948	2.322					
985.8	1125.16			-.010	.86924	-.00834	-.01654	-.00821
		2929	2.292					
987.8	1128.09			.002	.86924	.00205	.01305	.01099
		2940	2.294					
989.8	1131.03			-.007	.86920	-.00584	.00057	.00641
		2924	2.276					
991.8	1133.96			.009	.86913	.00760	.01265	.00505
		2908	2.329					
993.8	1136.87			0	.86913	-.00032	-.00318	-.00286
		2939	2.302					
995.8	1139.81			-.010	.86904	-.00887	-.01400	-.00512
		2937	2.258					
997.8	1142.74			.011	.86895	.00915	-.00699	-.01614
		2918	2.320					
999.8	1145.66			-.010	.86886	-.00882	-.00168	.00714
		2935	2.261					
1001.8	1148.60			.002	.86885	.00183	.00053	-.00130
		2960	2.251					
1003.8	1151.56			-.004	.86884	-.00352	-.00224	.00127
		2979	2.219					
1005.8	1154.54			-.012	.86871	-.01070	.00187	.01257
		2913	2.214					
1007.8	1157.45			-.016	.86849	-.01372	-.01081	.00292
		2897	2.157					
1009.8	1160.35			.009	.86843	.00745	-.00940	-.01685
		2924	2.174					
1011.8	1163.27			0	.86843	-.00019	.01267	.01286
		2890	2.199					
1013.8	1166.16			.013	.86829	.01099	.00195	-.00905
		2901	2.246					
1015.8	1169.06			-.021	.86792	-.01787	-.02561	-.00774
		2900	2.156					
1017.8	1171.96			.013	.86778	.01116	.01921	.00805
		2919	2.199					
1019.8	1174.88			-.010	.86769	-.00848	-.00547	.00302
		2931	2.147					
1021.8	1177.81			.022	.86729	.01871	.01438	-.00433
		3008	2.184					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1023.8	1180.82			.009	.86722	.00761	.01193	.00432
		2957	2.261					
1025.8	1183.78			.012	.86709	.01073	.00996	-.00077
		2941	2.331					
1027.8	1186.72			.007	.86705	.00584	.00329	-.00255
		2950	2.355					
1029.8	1189.67			-.005	.86703	-.00410	-.00724	-.00314
		2944	2.338					
1031.8	1192.61			-.008	.86698	-.00653	.00461	.01114
		2932	2.312					
1033.8	1195.54			.021	.86660	.01826	.00697	-.01129
		2999	2.358					
1035.8	1198.54			-.027	.86599	-.02302	-.00591	.01711
		2915	2.300					
1037.8	1201.46			.003	.86598	.00300	-.01276	-.01576
		2918	2.314					
1039.8	1204.38			.014	.86581	.01192	.02472	.01280
		2917	2.379					
1041.8	1207.29			.003	.86581	.00223	-.01142	-.01365
		2903	2.403					
1043.8	1210.20			.009	.86574	.00740	.00174	-.00566
		2949	2.406					
1045.8	1213.14			.001	.86574	.00089	.01022	.00933
		2921	2.434					
1047.8	1216.07			.006	.86571	.00484	.01860	.01376
		2962	2.428					
1049.8	1219.03			.003	.86571	.00268	.00325	.00057
		2950	2.452					
1051.8	1221.98			0	.86571	.00003	-.00597	-.00600
		2944	2.457					
1053.8	1224.92			.005	.86569	.00417	-.00494	-.00911
		2989	2.444					
1055.8	1227.91			-.068	.86173	-.05849	-.03916	.01933
		2719	2.346					
1057.8	1230.63			-.016	.86152	-.01349	-.04034	-.02686
		2696	2.294					
1059.8	1233.33			.015	.86134	.01263	.01748	.00485
		2765	2.303					
1061.8	1236.09			.013	.86119	.01137	.02114	.00977
		2794	2.340					
1063.8	1238.89			-.003	.86118	-.00225	-.00944	-.00719
		2769	2.349					
1065.8	1241.65			-.009	.86111	-.00806	.00284	.01091
		2741	2.329					
1067.8	1244.40			-.003	.86110	-.00296	-.01829	-.01533
		2721	2.330					
1069.8	1247.12			.006	.86106	.00545	-.01456	-.02001
		2764	2.323					
1071.8	1249.88			-.013	.86092	-.01106	.01213	.02319

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2705	2.313					
1073.8	1252.59			-.014	.86075	-.01226	-.01782	-.00555
		2652	2.293					
1075.8	1255.24			.009	.86067	.00797	.01899	.01103
		2680	2.312					
1077.8	1257.92			-.021	.86031	-.01772	-.03127	-.01355
		2592	2.294					
1079.8	1260.51			.001	.86031	.00114	-.00036	-.00149
		2595	2.298					
1081.8	1263.10			.011	.86020	.00940	.01410	.00469
		2627	2.319					
1083.8	1265.73			-.006	.86017	-.00498	-.00324	.00173
		2702	2.230					
1085.8	1268.43			-.060	.85704	-.05191	-.06500	-.01309
		2671	1.998					
1087.8	1271.10			.004	.85703	.00365	.00447	.00082
		2612	2.061					
1089.8	1273.72			.013	.85688	.01116	.01470	.00354
		2607	2.119					
1091.8	1276.32			-.062	.85355	-.05346	-.05641	-.00295
		2576	1.893					
1093.8	1278.90			-.023	.85310	-.01947	-.01870	.00077
		2574	1.810					
1095.8	1281.47			.142	.83580	.12148	.10099	-.02049
		2941	2.110					
1097.8	1284.42			.044	.83419	.03667	.05744	.02077
		2776	2.441					
1099.8	1287.19			.039	.83289	.03293	.04582	.01289
		2923	2.509					
1101.8	1290.11			.089	.82631	.07405	.07845	.00440
		3481	2.517					
1103.8	1293.60			-.056	.82375	-.04599	-.02763	.01836
		3315	2.365					
1105.8	1296.91			-.011	.82365	-.00392	-.02825	-.01933
		3253	2.359					
1107.8	1300.16			.031	.82285	.02574	.03622	.01049
		3419	2.388					
1109.8	1303.58			-.003	.82284	-.00258	.00966	.01223
		3359	2.416					
1111.8	1306.94			.011	.82274	.00889	-.00145	-.01034
		3489	2.377					
1113.8	1310.43			.024	.82226	.01997	.01686	-.00311
		3598	2.419					
1115.8	1314.03			-.033	.82137	-.02711	-.02691	.00020
		3488	2.337					
1117.8	1317.52			-.075	.81674	-.06167	-.04236	.01931
		3000	2.337					
1119.8	1320.52			-.030	.81598	-.02483	-.02109	.00375
		2871	2.298					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1121.8	1323.39	3070	2.333	.041	.81461	.03347	.02146	-.01201
1123.8	1326.46	3161	2.347	.018	.81436	.01428	.01344	-.00084
1125.8	1329.62	3163	2.387	.009	.81430	.00706	-.01295	-.02001
1127.8	1332.78	3235	2.380	.010	.81422	.00804	.00765	-.00038
1129.8	1336.02	3316	2.382	.013	.81408	.01037	.00658	-.00379
1131.8	1339.33	3084	2.410	-.030	.81334	-.02466	-.01340	.01126
1133.8	1342.41	3041	2.425	-.004	.81333	-.00317	.00218	.00535
1135.8	1345.46	2993	2.412	-.011	.81323	-.00871	-.01435	-.00564
1137.8	1348.45	3188	2.331	.015	.81306	.01183	.00560	-.00623
1139.8	1351.64	3125	2.239	-.030	.81232	-.02447	-.02053	.00394
1141.8	1354.76	3231	2.315	.033	.81142	.02709	.00972	-.01736
1143.8	1357.99	3363	2.231	.001	.81142	.00118	.01646	.01527
1145.8	1361.36	3305	2.199	-.016	.81122	-.01283	.00226	.01509
1147.8	1364.66	3228	2.184	-.015	.81103	-.01240	-.02299	-.01059
1149.8	1367.89	3079	2.230	-.013	.81088	-.01073	-.00993	.00080
1151.8	1370.97	3097	2.196	-.005	.81087	-.00387	-.01841	-.01454
1153.8	1374.07	3208	2.227	.025	.81037	.02007	.02292	.00284
1155.8	1377.27	3079	2.203	-.026	.80982	-.02102	-.00185	.01917
1157.8	1380.35	3122	2.219	.011	.80973	.00851	-.02122	-.02973
1159.8	1383.48	3131	2.198	-.003	.80973	-.00274	.02546	.02820
1161.8	1386.61	3401	2.393	.084	.80405	.06778	.06326	-.00452
1163.8	1390.01	3240	2.269	-.051	.80197	-.04091	-.04995	-.00905
1165.8	1393.25			0	0	0	.01637	.01637
1167.8							-.00451	-.00451
1169.8							-.01686	-.01686

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1171.8							.01377	.01377
1173.8							-.00272	-.00272
1175.8							-.00658	-.00658
1177.8							.01121	.01121
1179.8							.00431	.00431
1181.8							-.00342	-.00342
1183.8							-.00331	-.00331
1185.8							-.01500	-.01500
1187.8							.00451	.00451
1189.8							.00558	.00558
1191.8							.01372	.01372
1193.8							-.00830	-.00830
1195.8							-.00046	-.00046
1197.8							.00013	.00013
1199.8							-.03026	-.03026
1201.8							.00897	.00897
1203.8							.00458	.00458
1205.8							.00007	.00007
1207.8							.01345	.01345
1209.8							.01432	.01432
1211.8							-.02759	-.02759
1213.8							.00560	.00560
1215.8							-.01508	-.01508
1217.8							.02176	.02176

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1219.8							.02158	.02158
1221.8							-.01380	-.01380
1223.8							-.00446	-.00446
1225.8							.00076	.00076
1227.8							.00179	.00179
1229.8							-.00688	-.00688
1231.8							-.00459	-.00459
1233.8							.01074	.01074
1235.8							-.00540	-.00540
1237.8							.01924	.01924
1239.8							-.01140	-.01140
1241.8							-.02115	-.02115
1243.8							.01377	.01377
1245.8							.00531	.00531
1247.8							-.02526	-.02526
1249.8							.00867	.00867
1251.8							.02790	.02790
1253.8							-.01230	-.01230
1255.8							.00001	.00001
1257.8							-.00154	-.00154
1259.8							-.00797	-.00797
1261.8							.00031	.00031
1263.8							-.01586	-.01586
1265.8							.02360	.02360
1267.8							-.00410	-.00410

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1269.8							-.01983	-.01983
1271.8							.02090	.02090
1273.8							.00232	.00232
1275.8							-.02524	-.02524
1277.8							.01520	.01520
1279.8							.00644	.00644
1281.8							-.00247	-.00247
1283.8							-.00312	-.00312
1285.8							.00250	.00250
1287.8							-.00744	-.00744
1289.8							.01490	.01490
1291.8							-.00679	-.00679
1293.8							-.01476	-.01476
1295.8							.01031	.01031
1297.8							.01517	.01517
1299.8							-.01051	-.01051
1301.8							.02382	.02382
1303.8							-.00982	-.00982
1305.8							-.01504	-.01504
1307.8							.01026	.01026
1309.8							-.00794	-.00794
1311.8							-.00635	-.00635
1313.8							.00262	.00262
1315.8							-.00263	-.00263

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1317.8							.02279	.02279
1319.8							-.02599	-.02599
1321.8							.00022	.00022
1323.8							-.00035	-.00035
1325.8							.01026	.01026
1327.8							-.00195	-.00195
1329.8							-.01648	-.01648
1331.8							-.00247	-.00247
1333.8							.00748	.00748
1335.8							-.00007	-.00007
1337.8							.00679	.00679
1339.8							.00315	.00315
1341.8							.00286	.00286
1343.8							-.00311	-.00311
1345.8							-.02162	-.02162
1347.8							.00674	.00674
1349.8							.01323	.01323
1351.8							.00267	.00267
1353.8							-.01435	-.01435
1355.8							.00728	.00728
1357.8							.01238	.01238
1359.8							-.01194	-.01194
1361.8							.00086	.00086
1363.8							-.00739	-.00739
1365.8							.02097	.02097

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1367.8							.00032	.00032
1369.8							-.01212	-.01212
1371.8							.00533	.00533
1373.8							.00106	.00106
1375.8							-.01369	-.01369
1377.8							.01229	.01229
1379.8							.00719	.00719
1381.8							-.01819	-.01819
1383.8							.01019	.01019
1385.8							.00548	.00548
1387.8							-.01480	-.01480
1389.8							.00357	.00357
1391.8							-.01595	-.01595
1393.8							.01130	.01130
1395.8							.00957	.00957
1397.8							-.00473	-.00473
1399.8							-.00181	-.00181
1401.8							.00408	.00408
1403.8							-.01438	-.01438
1405.8							.01762	.01762
1407.8							-.00627	-.00627
1409.8							.01060	.01060
1411.8							-.01269	-.01269
1413.8							.00126	.00126

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1415.8							-.00799	-.00799
1417.8							.00168	.00168
1419.8							.00005	.00005
1421.8							.01775	.01775
1423.8							-.01684	-.01684
1425.8							.01233	.01233
1427.8							-.01240	-.01240
1429.8							.00056	.00056
1431.8							.00913	.00913
1433.8							-.00165	-.00165
1435.8							-.00240	-.00240
1437.8							.02372	.02372
1439.8							-.00485	-.00485
1441.8							-.00382	-.00382
1443.8							-.02661	-.02661
1445.8							-.00489	-.00489
1447.8							.00952	.00952
1449.8							.00962	.00962
1451.8							-.01306	-.01306
1453.8							.00632	.00632
1455.8							.00710	.00710
1457.8							.00694	.00694
1459.8							-.00759	-.00759
1461.8							-.00326	-.00326
1463.8							.00516	.00516

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1465.8							.00855	.00855
1467.8							-.00301	-.00301
1469.8							-.00465	-.00465
1471.8							-.00090	-.00090
1473.8							-.01656	-.01656
1475.8							.00854	.00854
1477.8							-.00082	-.00082
1479.8							.00052	.00052
1481.8							.00221	.00221
1483.8							.00449	.00449
1485.8							-.00705	-.00705
1487.8							-.00126	-.00126
1489.8							-.00266	-.00266
1491.8							-.00424	-.00424
1493.8							.00008	.00008
1495.8							.01356	.01356
1497.8							-.00830	-.00830
1499.8							.00665	.00665
1501.8							.00959	.00959
1503.8							-.00291	-.00291
1505.8							-.01025	-.01025
1507.8							-.00702	-.00702
1509.8							.00348	.00348
1511.8							-.00880	-.00880

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1513.8							.01808	.01808
1515.8							.00735	.00735
1517.8							.00137	.00137
1519.8							.00769	.00769
1521.8							.00380	.00380
1523.8							-.02899	-.02899
1525.8							-.00181	-.00181
1527.8							.02113	.02113
1529.8							-.00759	-.00759
1531.8							-.00250	-.00250
1533.8							-.01196	-.01196
1535.8							-.00935	-.00935
1537.8							.00895	.00895
1539.8							-.00081	-.00081
1541.8							.01793	.01793
1543.8							-.01035	-.01035
1545.8							-.00343	-.00343
1547.8							.00796	.00796
1549.8							.01140	.01140
1551.8							-.02674	-.02674
1553.8							.00869	.00869
1555.8							.01415	.01415
1557.8							-.01154	-.01154
1559.8							-.03527	-.03527
1561.8							.00732	.00732

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1563.8							.00754	.00754
1565.8							-.00364	-.00364
1567.8							.03035	.03035
1569.8							-.00027	-.00027
1571.8							-.01979	-.01979
1573.8							.00712	.00712
1575.8							.00501	.00501
1577.8							-.01080	-.01080
1579.8							.01422	.01422
1581.8							.01346	.01346
1583.8							-.00725	-.00725
1585.8							-.01122	-.01122
1587.8							-.00025	-.00025
1589.8							.01021	.01021
1591.8							-.00055	-.00055
1593.8							-.00252	-.00252
1595.8							-.00209	-.00209
1597.8							.00425	.00425
1599.8							.00842	.00842
1601.8							-.00714	-.00714
1603.8							.00692	.00692

APPENDIX - 6

APPENDIX 6

Maturation and Source Rock Analysis

HENKE NO.1

K.K. No.	Depth (m)	$\bar{R}_v$max	Range	N	Description Including Exinite Fluorescence
x7004	1250 Core	0.46	0.33-0.55	27	Rare ?phytoplankton, greenish yellow and yellow to orange, rare cutinite, orange. (Siltstone>claystone. Dom common, V>I>E. Vitrinite common, inertinite spare, exinite rare. Diffuse humic organic matter present. Rare sclerotinite. Pyrite abundant.)
x7005	1327.5 Core	0.56	0.44-0.60	7	Rare ?phytoplankton, greenish yellow, rare liptodetrinite, orange to dull orange. (Carbonaceous shale and sandstone. Dom common, I>V>E. Inertinite common, vitrinite and exinite rare. Diffuse humic organic matter possibly related to bituminite, major. Very fine particles of humic organic matter probably represent chemically/biochemically altered ?vitrinite. Pyrite abundant.)
	$\bar{R}_I$	0.90	0.64-1.44	25	
x7006	1365 Core	0.43	0.30-0.64	28	Sparse sporinite, orange to dull orange, sparse ?phytoplankton, greenish yellow and yellow to orange, rare to sparse cutinite, orange, rare resinite, yellow, rare <u>Botryococcus</u>-related telalginite, bright yellow. (Siltstone. Dom abundant, V>I>E. Vitrinite and inertinite abundant, exinite common. Diffuse humic organic matter abundant. Abundant micrinite in some vitrinite. Pyrite common.)
x7007	1382 Core	0.47	0.37-0.60	27	Sparse sporinite, orange to dull orange, sparse ?phytoplankton, orange to dull orange, rare resinite, yellow, rare cutinite, orange. (Siltstone. Dom abundant, I>V>E. Inertinite and vitrinite abundant, exinite sparse. Diffuse humic organic matter abundant. Rare sclerotinite. Pyrite sparse.)

VITRINITE REFLECTANCE WORKSHEET

WELL NAME Henke-1 SAMPLE NO. X7007 DEPTH 1382m TYPE core

FGV = First Generation Vitrinite I = Inertinite

Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type
.10				.46	5			.82				1.18				1.54				1.90			
.11				.47	2			.83				1.19				1.55				1.91			
.12				.48	2			.84				1.20				1.56				1.92			
.13				.49	2			.85				1.21				1.57				1.93			
.14				.50				.86				1.22				1.58				1.94			
.15				.51	1	FGV		.87				1.23				1.59				1.95			
.16				.52	1			.88				1.24				1.60				1.96			
.17				.53	1			.89				1.25				1.61				1.97			
.18				.54				.90				1.26				1.62				1.98			
.19				.55				.91				1.27				1.63				1.99			
.20				.56	1			.92				1.28				1.64				2.00			
.21				.57	1			.93				1.29				1.65							
.22				.58				.94				1.30				1.66							
.23				.59				.95				1.31				1.67							
.24				.60	1	↓		.96				1.32				1.68							
.25				.61				.97				1.33				1.69							
.26				.62				.98				1.34				1.70							
.27				.63				.99				1.35				1.71							
.28				.64				1.00				1.36				1.72							
.29				.65				1.01				1.37				1.73							
.30				.66				1.02				1.38				1.74							
.31				.67				1.03				1.39				1.75							
.32				.68				1.04				1.40				1.76							
.33				.69				1.05				1.41				1.77							
.34				.70				1.06				1.42				1.78							
.35				.71				1.07				1.43				1.79							
.36				.72				1.08				1.44				1.80							
.37	1	↑		.73				1.09				1.45				1.81							
.38				.74				1.10				1.46				1.82							
.39				.75				1.11				1.47				1.83							
.40	2			.76				1.12				1.48				1.84							
.41				.77				1.13				1.49				1.85							
.42	1			.78				1.14				1.50				1.86							
.43	2			.79				1.15				1.51				1.87							
.44	2			.80				1.16				1.52				1.88							
.45	2			.81				1.17				1.53				1.89							

Organic matter Comp.(%)

Exinite	Alginite
0.2	0
Vitrinite	**Inertinite**
2.5	3.0

Keiraville Konsultants Pty Ltd.

VITRINITE REFLECTANCE WORKSHEET

WELL NAME........Henke-1........ SAMPLE NO.....X 7006..... DEPTH.....1365 m..... TYPE.....Core.....

FGV = First Generation Vitrinite I = Inertinite

Ro %	No. Read	Pop Rnge	Pop Type	Ro %	NO. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	NO. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type
.10				.46				.82				1.18				1.54				1.90			
.11				.47	2			.83				1.19				1.55				1.91			
.12				.48	1			.84				1.20				1.56				1.92			
.13				.49				.85				1.21				1.57				1.93			
.14				.50	1			.86				1.22				1.58				1.94			
.15				.51				.87				1.23				1.59				1.95			
.16				.52				.88				1.24				1.60				1.96			
.17				.53	2			.89				1.25				1.61				1.97			
.18				.54				.90				1.26				1.62				1.98			
.19				.55				.91				1.27				1.63				1.99			
.20				.56				.92				1.28				1.64				2.00			
.21				.57		FGY		.93				1.29				1.65							
.22				.58				.94				1.30				1.66							
.23				.59				.95				1.31				1.67							
.24				.60				.96				1.32				1.68							
.25				.61				.97				1.33				1.69							
.26				.62				.98				1.34				1.70							
.27				.63				.99				1.35				1.71							
.28				.64	1	↓		1.00				1.36				1.72							
.29				.65				1.01				1.37				1.73							
.30	1	↑		.66				1.02				1.38				1.74							
.31				.67				1.03				1.39				1.75							
.32				.68				1.04				1.40				1.76							
.33				.69				1.05				1.41				1.77							
.34				.70				1.06				1.42				1.78							
.35				.71				1.07				1.43				1.79							
.36	1	↑		.72				1.08				1.44				1.80							
.37	2			.73				1.09				1.45				1.81							
.38	2			.74				1.10				1.46				1.82							
.39	2			.75				1.11				1.47				1.83							
.40	1			.76				1.12				1.48				1.84							
.41	4			.77				1.13				1.49				1.85							
.42	2			.78				1.14				1.50				1.86							
.43	1			.79				1.15				1.51				1.87							
.44	3			.80				1.16				1.52				1.88							
.45	2			.81				1.17				1.53				1.89							

Organic matter Comp.(%)

Exinite	Alginite
0.6	<0.1
Vitrinite	**Inertinite**
3.5	2.0

Keiraville Konsultants Pty Ltd.

VITRINITE REFLECTANCE WORKSHEET

WELL NAME Henke-1

SAMPLE NO. X7005

DEPTH 1327.5m

TYPE Core

FGV = First Generation Vitrinite   I = Inertinite

Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type
.10				.46				.82				1.18	1			1.54				1.90			
.11				.47				.83				1.19				1.55				1.91			
.12				.48				.84				1.20	1			1.56				1.92			
.13				.49				.85				1.21				1.57				1.93			
.14				.50				.86				1.22				1.58				1.94			
.15				.51	2			.87				1.23				1.59				1.95			
.16				.52				.88	1			1.24				1.60				1.96			
.17				.53	1			.89				1.25				1.61				1.97			
.18				.54				.90	1			1.26				1.62				1.98			
.19				.55				.91				1.27				1.63				1.99			
.20				.56				.92				1.28				1.64				2.00			
.21				.57		FGV		.93				1.29				1.65							
.22				.58	2			.94	1			1.30	1			1.66							
.23				.59				.95				1.31				1.67							
.24				.60	3	↓		.96				1.32				1.68							
.25				.61				.97				1.33				1.69							
.26				.62				.98				1.34				1.70							
.27				.63				.99				1.35				1.71							
.28				.64	1	↑		1.00	1			1.36				1.72							
.29				.65				1.01				1.37				1.73							
.30				.66	1			1.02				1.38				1.74							
.31				.67				1.03				1.39				1.75							
.32				.68	2			1.04				1.40				1.76							
.33				.69				1.05				1.41				1.77							
.34				.70	2			1.06				1.42				1.78							
.35				.71				1.07				1.43				1.79							
.36				.72	1			1.08	2			1.44	2	↓		1.80							
.37				.73		INERTINITE		1.09				1.45				1.81							
.38				.74	5			1.10				1.46				1.82							
.39				.75				1.11				1.47				1.83							
.40				.76	1			1.12				1.48				1.84							
.41				.77				1.13				1.49				1.85							
.42				.78				1.14				1.50				1.86							
.43				.79				1.15				1.51				1.87							
.44	1	↑		.80	1			1.16				1.52				1.88							
.45				.81				1.17				1.53				1.89							

Organic matter Comp. (%)

Exinite	Alginite
<0.1	0
Vitrinite	**Inertinite**
<0.1	0.6

Keiraville Konsultants Pty Ltd.

[illegible] WORKSHEET

WELL NAME Henke-1 SAMPLE NO. X7004 DEPTH 1250m TYPE Core

FGV = First Generation Vitrinite I = Inertinite

Ro %	No. Read	Pop Rnge	Pop Type	Ro %	NO. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	NO. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type	Ro %	No. Read	Pop Rnge	Pop Type
.10				.46				.82				1.18				1.54				1.90			
.11				.47	2			.83				1.19				1.55				1.91			
.12				.48	1			.84				1.20				1.56				1.92			
.13				.49	1			.85				1.21				1.57				1.93			
.14				.50	2			.86				1.22				1.58				1.94			
.15				.51	2			.87				1.23				1.59				1.95			
.16				.52	1			.88				1.24				1.60				1.96			
.17				.53	1			.89				1.25				1.61				1.97			
.18				.54	1			.90				1.26				1.62				1.98			
.19				.55	2			.91				1.27				1.63				1.99			
.20				.56				.92				1.28				1.64				2.00			
.21				.57				.93				1.29				1.65							
.22				.58				.94				1.30				1.66							
.23				.59				.95				1.31				1.67							
.24				.60				.96				1.32				1.68							
.25				.61				.97				1.33				1.69							
.26				.62				.98				1.34				1.70							
.27				.63				.99				1.35				1.71							
.28				.64				1.00				1.36				1.72							
.29				.65				1.01				1.37				1.73							
.30				.66				1.02				1.38				1.74							
.31				.67				1.03				1.39				1.75							
.32				.68				1.04				1.40				1.76							
.33	1			.69				1.05				1.41				1.77							
.34				.70				1.06				1.42				1.78							
.35				.71				1.07				1.43				1.79							
.36				.72				1.08				1.44				1.80							
.37				.73				1.09				1.45				1.81							
.38	2			.74				1.10				1.46				1.82							
.39	1			.75				1.11				1.47				1.83							
.40	1	FGV		.76				1.12				1.48				1.84							
.41	1			.77				1.13				1.49				1.85							
.42	2			.78				1.14				1.50				1.86							
.43	3			.79				1.15				1.51				1.87							
.44	1			.80				1.16				1.52				1.88							
.45				.81				1.17				1.53				1.89							

Organic matter Comp.(%)

Exinite	Alginite
<0.1	0
Vitrinite	**Inertinite**
1.0	0.3

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HENKE NO. 1

KK No.	Depth (m)	TOC
x7004	1250	0.92%
x7005	1327.5	4.18%
x7006	1365	5.62%
x7007	1382	3.93%

APPENDIX - 7

APPENDIX 7

Palynology

PALYNOLOGY OF BEACH HENKE-1,

OTWAY BASIN, AUSTRALIA

BY

ROGER MORGAN

FOR BEACH PETROLEUM SEPTEMBER, 1987.

PALYNOLOGY OF BEACH HENKE-1,

OTWAY BASIN, AUSTRALIA

BY

ROGER MORGAN

CONTENTS PAGE

I SUMMARY

1117m (swc) - 1263m (swc) : upper M.diversus Zone : Early Eocene : nearshore to marginal marine : immature.

1268m (swc) - 1285m (swc) : middle M.diversus Zone : Early Eocene : nearshore marine : immature.

1310m (swc) - 1321.5m (swc) : upper L.balmei Zone (dinoflagellate Zone unknown) : late Paleocene : nearshore to offshore marine : immature.

1327.5m (swc) : lower L.balmei Zone (T.evittii Dinoflagellate Zone) : offshore marine : immature.

1330m (swc) - 1430m (swc) : T.longus Zone : Maastrichtian : brackish at 1430m, nearshore marine (M.druggii Dinoflagellate Zone) 1358m to 1330m : marginally mature.

II INTRODUCTION

Twelve sidewall cores were examined from Beach Henke-1 for biostratigraphy and spore colour. Yields were generally good. The samples are assigned to five palynological zones on the basis of the supporting data presented here as Appendix I. The Cretaceous zonation used is basically that of Helby, Morgan and Partridge (1987), which draws on all previous work. The Tertiary zonation is that of Stover and Partridge (1973) and Stover and Evans (1973) as modified by Partridge (1976).

Maturity data was generated on the Thermal Alteration Index (TAI) Scale of Staplin and plotted on Figure 2 as a Maturity Profile. The oil and gas windows on Figure 2 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (2.7) to dark brown (3.6) and would correspond to Vitrinite Reflectances of 0.6% to 1.3%. Geochemists, however, have not reached universal agreement on these values and argue variations based on kerogen type, basin type and basin history. The maturity interpretation is thus open to reinterpretation using the basic colour observations as raw data. However, the range of interpretation philosophies is not great, and would probably not move the oil window by more than 200 metres. Instrumental geochemistry offers quantitative and repeatable raw data.

AGE		SPORE - POLLEN ZONES	DINOFLAGELLATE ZONES
Early Tertiary	Early Oligocene	P. tuberculatus	
	Late Eocene	upper N. asperus	P. comatum
		middle N. asperus	V. extensa
	Middle Eocene	lower N. asperus	D. heterophlycta W. echinosuturata
		P. asperopolus	W. edwardsii W. thompsonae
	Early Eocene	upper M. diversus	W. ornata W. waipawaensis
		middle M. diversus	
		lower M. diversus	W. hyperacantha
	Paleocene	upper L. balmei	A. homomorpha
		lower L. balmei	E. crassitabulata T. evittii
Late Cretaceous	Maastrichtian	T. longus	M. druggii
	Campanian	T. lillei	I.korojonense
		N. senectus	X. australis
	Santonian	T. pachyexinus	N. aceras I. cretaceum O. porifera
	Coniacian Turonian	C. triplex	C. striatoconus P. infusorioides
	Cenomanian	A. distocarinatus	
Early Cretaceous	Albian Late	P. pannosus	
	Albian Middle	upper C. paradoxa	
		lower C. paradoxa	
	Albian Early	C. striatus	
	Aptian	upper C. hughesi	
		lower C. hughesi	
	Barremian Hauterivian	F. wonthaggiensis	
	Valanginian	upper C. australiensis	
	Berriasian	lower C. australiensis	
Juras.	Tithonian	R. watherooensis	

FIGURE 1 ZONATION FRAMEWORK

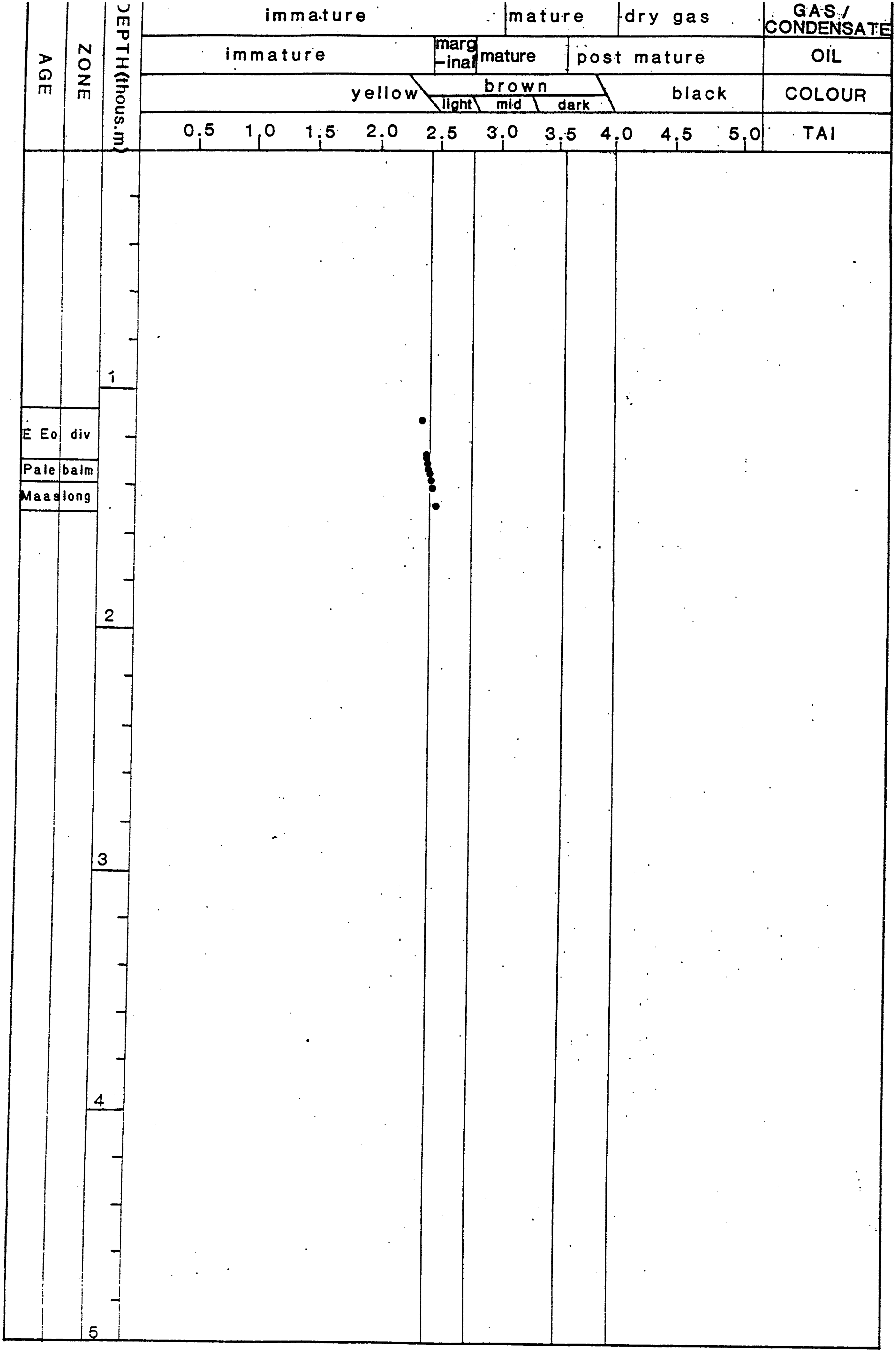

FIGURE 2 MATURITY PROFILE, HENKE-1

III PALYNOSTRATIGRAPHY

A. 1117m (swc) -1263m(swc) : upper M.diversus Zone

Assignment to the upper Malvacipollis diversus Zone is indicated at the top by the absence of younger indicators and at the base by oldest Proteacidites pachypolus. Proteacidites and Dilwynites dominate the assemblages, and the presence of Anacolosidites acutullus, Cyathidites gigantis, Proteacidites kopiensis and Triporopollenires ambiguus generally support the assignment. Minor Permian reworking was seen.

The dinoflagellates include Apectodinium homomorphum, Deflandrea obliquipes and Muratodinium fimbriatum but are not sufficient for clear dinoflagellate zonal assignment.

Nearshore marine environments are indicated at 1263m by the 25% dinoflagellate content and moderate diversity. Marginal marine environments are indicated at 1117m by the rare dinoflagellates and their low diversity.

Yellow spore colours indicate immaturity for hydrocarbons.

B. 1268m (swc) - 1285m (swc) : middle M.diversus Zone

Assignment to the middle Malvacipollis diversus Zone is indicated at the top by the absence of younger indicators, and at the base by oldest Anacolosidites acutullus. Banksieacidites arcuatus, and Triporopollenites ambiguus without older indicarors. Haloragacidites harrisii is the most common pollen seen. Dinoflagellates include Apectodinium homomorphum, Muratodinium fimbriatum, Deflandrea dartmooria and Hafniasphaera septata and are consistent with the spore pollen assignment, but not sufficient for clear dinoflagellate zonal assignment.

Nearshore marine environments are indicated by the frequent (30%) dinoflagellate content and moderate diversity. Leaf fragments and spores and pollen are very common.

Yellow spore colours indicate immaturity for hydrocarbons.

C. 1310m (swc) - 1321.5m (swc) : upper L.balmei Zone

Assignment to the upper Lygistepollenites balmei zone is indicated at the top by youngest Gambierina rudata, G edwardsii and Lygistepollenites balmei, and at the base by oldest Proteacidites incurvatus and P. grandis. Proteacidites and Gleicheniidites are the dominant forms.

The dinoflagellates seen are generally consistent with the spore pollen zonal assignment, but not sufficient for dinoflagellate zonal assignment.

Nearshore marine environments are indicated by high dinoflagellate contents (60% at 1310m, 50% at 1321.5m, 30% at 1318m), and moderate diversity. Spores and pollen are also common and diverse.

Yellow to yellow/brown spore colours indicate immaturity for hydrocarbon generation.

D. 1327.5m (swc) : lower L. balmei Zone (T. evittii Dinoflagellate Zone)

Assignment to the lower Lygistepollenites balmei Zone is indicated by the absence of younger or older indicators, and confirmed by the dinoflagellates. Spores and pollen are relatively scarce, swamped by the dinoflagellates.

Assignment to T. evittii Dinoflagellate Zone is indicated by the dominance of Palaeoperidinium pyrophorum in a moderately diverse assemblage which also included Deflandrea and Spinidinium spp.

Offshore marine environments are indicated by the dominance (90% of palynomorphs) of dinoflagellates and the scarcity of spores and pollen.

Yellow to yellow/brown spore colours indicate immaturity for hydrocarbon generation.

E. 1330m (swc) - 1430m (swc) : T.longus Zone

Assignment to the Tricolpites longus Zone is indicated at the top (1330m) on dinoflagellate evidence, confirmed at 1358m on youngest Quadraplanus brossus, Tricolpites confessus, T. longus , T. waiparaensis and Triporopollenites sectilis. At the base, zonal assignment is indicated by oldest Tetracolporites verrucosus and Tricolpites longus. Proteacidites and Dilwynites dominate the assemblages. Minor Eocene caving was seen at 1330m.

Age diagnostic dinoflagellates include Isabelidinium pellucidium and common Manumiella coronata at 1330m and 1344m and rare I. pellucidum, M. coronata and M. druggii at 1358m indicating assignment of these samples to the M. druggii dinoflagellate zone. The sample at 1430m lacks age diagnostic dinoflagellates and cannot be assigned to any zone. Nearshore marine environments are indicated at 1330m to 1358m, where frequent low diversity dinoflagellates occur. At 1430m, dinoflagellates are extremely scarce, and brackish environments are indicated.

Yellow /brown spore colours indicate marginal maturity for oil generation, and immaturity for gas/condensate generation.

IV CONCLUSIONS

A. Log picks are generally compatible with the palynology with two major exceptions.

The usual situation is for Pember Formation (upper L. balmei Zone at its base) to conformably overlie Pebble Point Formation (upper L. balmei Zone and coeval E. crassitabulata Dinoflagellate Zone) which then unconformably overlies Curdies or Paaratte Formation (Late Cretaceous T. longus Zone). In this well, the Pebble Point top and base log picks appear to be at 1320m and 1339.5m respectively (relying heavily on the PEF log).

This clearly suggest Pebble Point lithology at 1330m with a late Cretaceaus date. This is highly anomalous and may represent very heavy reworking (perhaps a fallen block from the fault scarp), sample mixup, or a new piece of geological knowledge. Examination of cuttings may eliminate the second possibility, while mounting regional knowledge may help to evaluate the other two.

This also clearly suggests that normal L. balmei Zone (E.crassitabulata Zone) section exists at this location (1320m - 1327m). There is scope to argue that the interval 1303m - 1320m may belong to the Pebble Point Formation on sonic and PEF response, but the lithology is certainly anomolous.

The presence of Pebble Point Formation of lower L. balmei (T. evitti) assignment is unusual as this Zone is not normally seen outside the Gippsland Basin. Its presence here and in Wilson - 1 suggests that it may be more common than previously recognised, and may represent Pebble Point Formation older than previously seen. Alternatively, it may represent a facies feature, with a background Pebble Point dinoflagellate assemblage, with the evittii Zone features superimposed under favourable facies conditions.

B. Environments are generally compatible with the regional picture, with the most marine intervals in the latest Cretaceous and Paleocene. The Eocene Dilwyn section in this location is significantly more marine than is often seen in the Otway Basin.

C. Maturity data indicate that the base of the drilled section is only marginally mature for oil. Deeper burial offstructure and the undrilled section could have provided suitable mature source rocks.

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APPENDIX I

PALYNOMORPH OCCURRENCE DATA

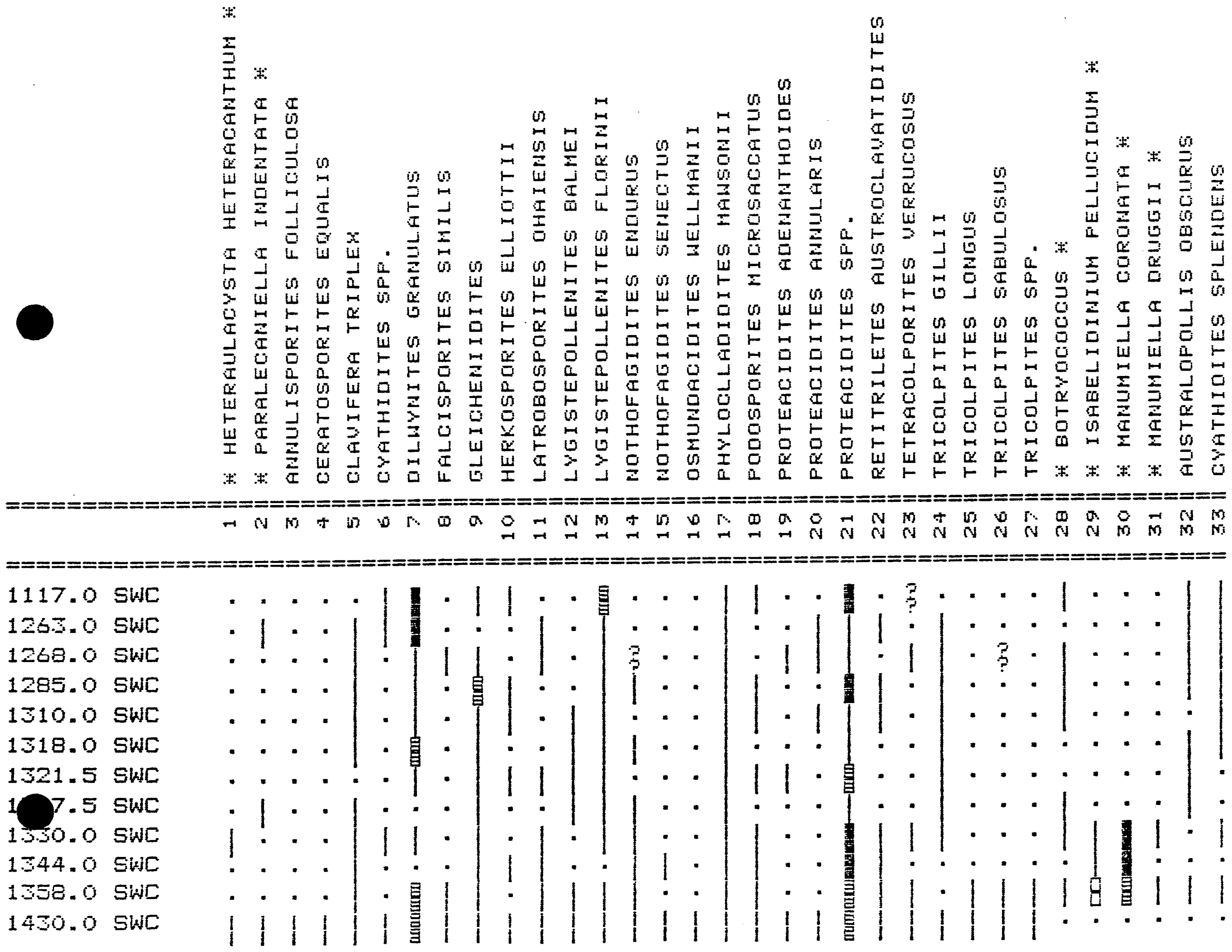
HENKE #1

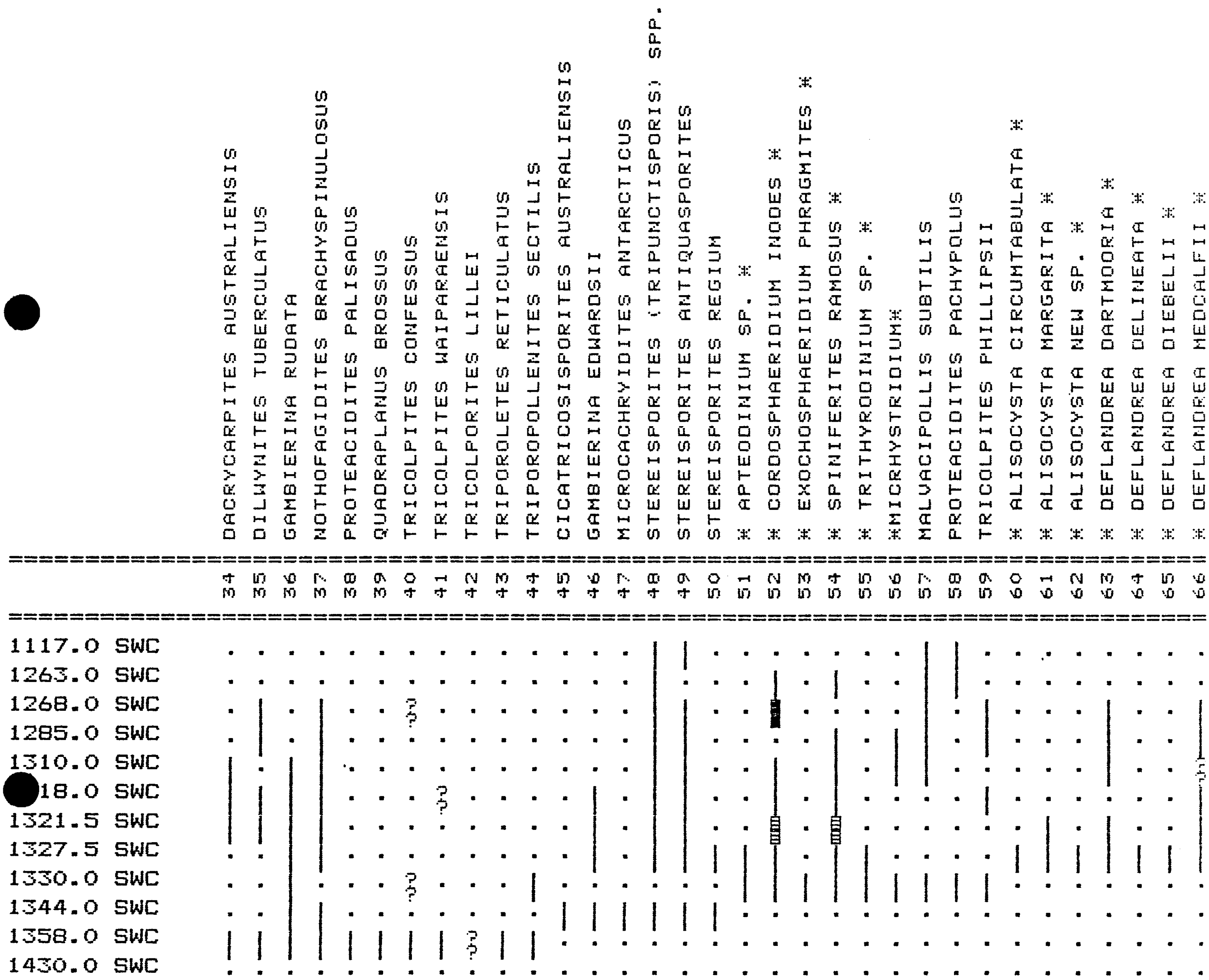
DESCRIPTION:

PALYNOLOGICAL INTERPRETATION OF DATA BY ROGER MORGAN - SEPTEMBER 1987.
ALL SAMPLE DEPTHS ARE IN METRES.
* INDICATES DINOFLAGELLATE *

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

█ = Abundant
▓ = Common
▥ = Few
☐ = Rare
| = Very Rare
? Questionably Present
. = Not Present

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36 GAMBIERINA RUDATA
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38 PROTEACIDITES PALISADUS
39 QUADRAPLANUS BROSSUS
40 TRICOLPITES CONFESSUS
41 TRICOLPITES WAIPARAENSIS
42 TRICOLPORITES LILLEI
43 TRIPOROLETES RETICULATUS
44 TRIPOROPOLLENITES SECTILIS
45 CICATRICOSISPORITES AUSTRALIENSIS
46 GAMBIERINA EDWARDSII
47 MICROCACHRYIDITES ANTARCTICUS
48 STEREISPORITES (TRIPUNCTISPORIS) SPP.
49 STEREISPORITES ANTIQUASPORITES
50 STEREISPORITES REGIUM
51 * APTEODINIUM SP. *
52 * CORDOSPHAERIDIUM INODES *
53 * EXOCHOSPHAERIDIUM PHRAGMITES *
54 * SPINIFERITES RAMOSUS *
55 * TRITHYRODINIUM SP. *
56 *MICRHYSTRIDIUM*
57 MALVACIPOLLIS SUBTILIS
58 PROTEACIDITES PACHYPOLUS
59 TRICOLPITES PHILLIPSII
60 * ALISOCYSTA CIRCUMTABULATA *
61 * ALISOCYSTA MARGARITA *
62 * ALISOCYSTA NEW SP. *
63 * DEFLANDREA DARTMOORIA *
64 * DEFLANDREA DELINEATA *
65 * DEFLANDREA DIEBELII *
66 * DEFLANDREA MEDCALFII *
1117.0 SWC
1263.0 SWC
1268.0 SWC
1285.0 SWC
1310.0 SWC
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1321.5 SWC
1327.5 SWC
1330.0 SWC
1344.0 SWC
1358.0 SWC
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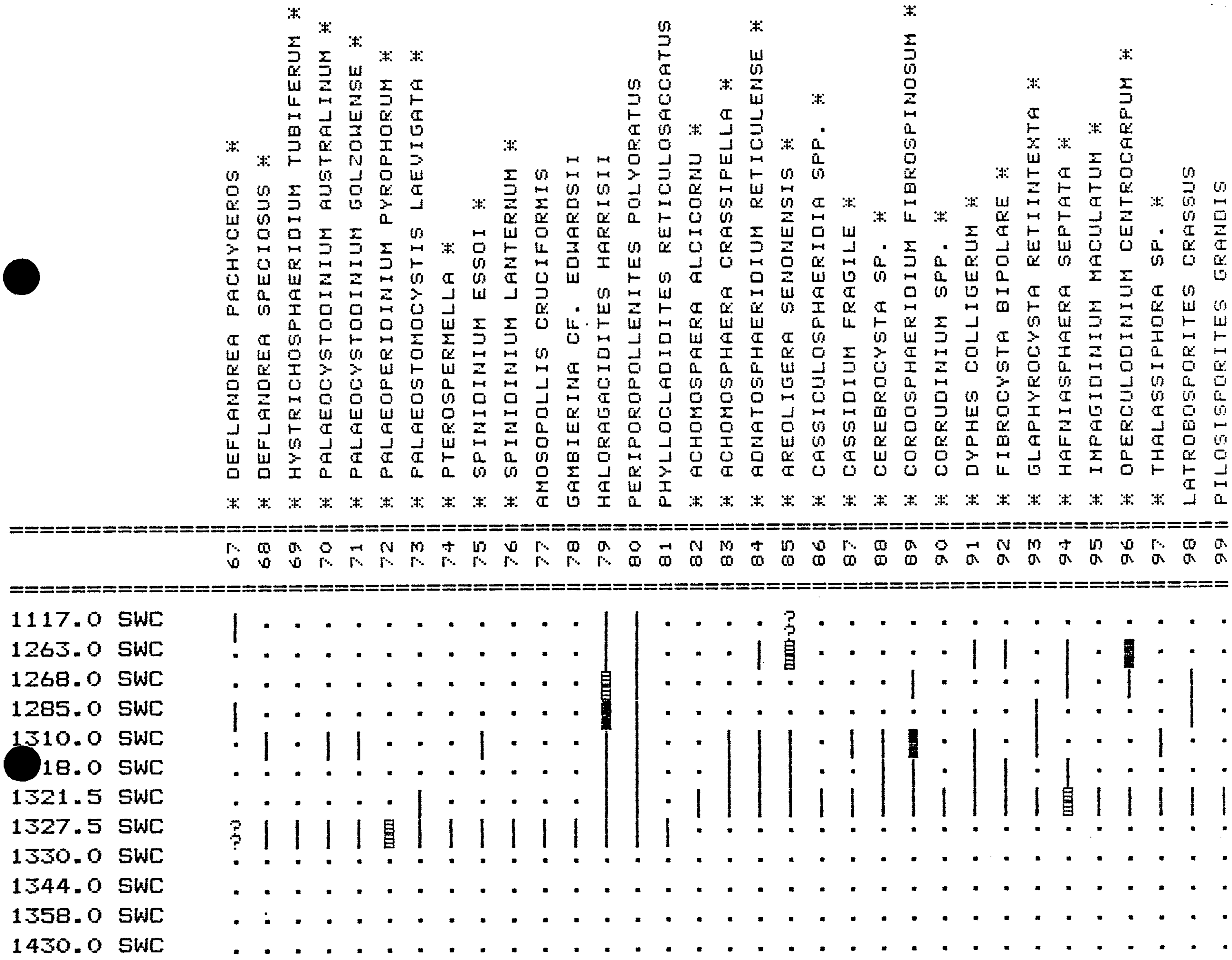

67 * DEFLANDREA PACHYCEROS *
68 * DEFLANDREA SPECIOSUS *
69 * HYSTRICHOSPHAERIDIUM TUBIFERUM *
70 * PALAEOCYSTODINIUM AUSTRALINUM *
71 * PALAEOCYSTODINIUM GOLZOWENSE *
72 * PALAEOPERIDINIUM PYROPHORUM *
73 * PALAEOSTOMOCYSTIS LAEVIGATA *
74 * PTEROSPERMELLA *
75 * SPINIDINIUM ESSOI *
76 * SPINIDINIUM LANTERNUM *
77 AMOSOPOLLIS CRUCIFORMIS
78 GAMBIERINA CF. EDWARDSII
79 HALORAGACIDITES HARRISII
80 PERIPOROPOLLENITES POLYORATUS
81 PHYLLOCLADIDITES RETICULOSACCATUS
82 * ACHOMOSPAERA ALCICORNU *
83 * ACHOMOSPHAERA CRASSIPELLA *
84 * ADNATOSPHAERIDIUM RETICULENSE *
85 * AREOLIGERA SENONENSIS *
86 * CASSICULOSPHAERIDIA SPP. *
87 * CASSIDIUM FRAGILE *
88 * CEREBROCYSTA SP. *
89 * CORDOSPHAERIDIUM FIBROSPINOSUM *
90 * CORRUDINIUM SPP. *
91 * DYPHES COLLIGERUM *
92 * FIBROCYSTA BIPOLARE *
93 * GLAPHYROCYSTA RETIINTEXTA *
94 * HAFNIASPHAERA SEPTATA *
95 * IMPAGIDINIUM MACULATUM *
96 * OPERCULODINIUM CENTROCARPUM *
97 * THALASSIPHORA SP. *
98 LATROBOSPORITES CRASSUS
99 PILOSISPORITES GRANDIS
1117.0 SWC
1263.0 SWC
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1310.0 SWC
1318.0 SWC
1321.5 SWC
1327.5 SWC
1330.0 SWC
1344.0 SWC
1358.0 SWC
1430.0 SWC

	100 POLYCOLPITES LANGSTONII	101 PROTEACIDITES GRANDIS	102 PROTEACIDITES INCURVATUS	103 * DEFLANDREA DILWYNENSIS *	104 * FIBROCYSTA VECTENSE *	105 GEPHRAPOLLENITES WAHOOENSIS	106 NOTHOFAGIDITES FLEMINGII	107 PROTEACIDITES ORNATUS	108 TRIPOROPOLLENITES AMBIGUUS	109 * AREOSPHAERIDIUM MULTICORNUTUM *	110 * CORDOSPHAERIDIUM MULTISPINOSUM *	111 * EOCLADOPYXIS PENICULATA *	112 * IMPAGIDINIUM DISPERTITUM *	113 * KENLEYIA PACHYCERATA *	114 * THALASSIPHORA PELAGICA *	115 CYATHIDITES GIGANTIS	116 INTRATRIPOROPOLLENITES NOTABILIS	117 PERIPOROPOLLENITES DEMARCATUS	118 PHYLLOCLADIDITES VERRUCOSUS	119 * APECTODINIUM HOMOMORPHA (L.) *	120 * APECTODINIUM HOMOMORPHA (SH.) *	121 * APECTODINIUM HYPERACANTHA *	122 * APECTODINIUM QUINQUELATA *	123 * DEFLANDREA CF. EXTENSA *	124 * DEFLANDREA TRUNCATA *	125 * GLAPHYROCYSTA SP. *	126 * MURATODINIUM FIMBRIATUM *	127 * WETZELIELLA ARTICULATA *	128 ANACOLOSIDITES ACUTULLUS	129 BANKSIEACIDITES ELONGATUS	130 DIPORITES SP.	131 ISCHYOSPORITES GREMIUS	132 PROTEACIDITES TENUIEXINUS
1117.0 SWC	.	|	|	.	.	.	.	.	|	.	.	.	.	.	.	|	|	.	.	|	.	.	.	.	.	.	.	.	|	|	.	.	.
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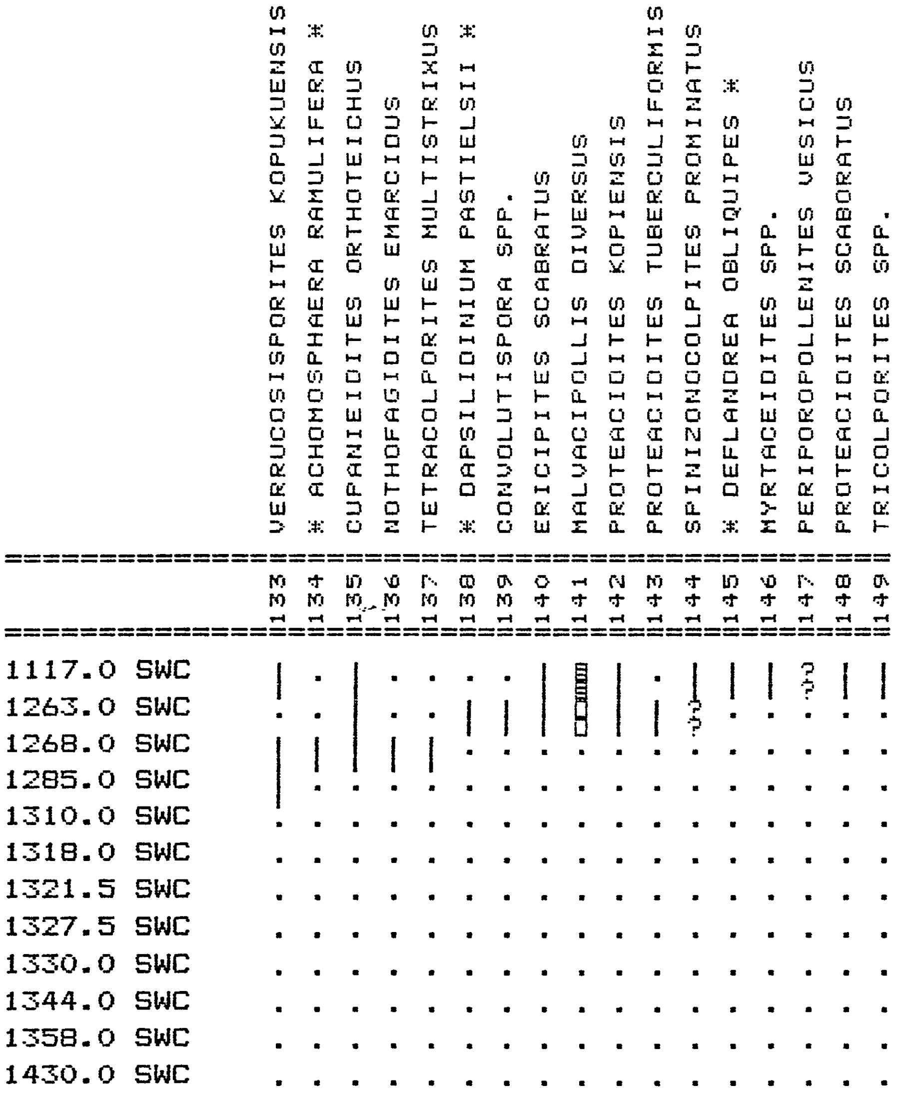
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1321.5 SWC
1327.5 SWC
1330.0 SWC
1344.0 SWC
1358.0 SWC
1430.0 SWC
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SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
82	* ACHOMOSPAERA ALCICORNU *
83	* ACHOMOSPHAERA CRASSIPELLA *
134	* ACHOMOSPHAERA RAMULIFERA *
84	* ADNATOSPHAERIDIUM RETICULENSE *
60	* ALISOCYSTA CIRCUMTABULATA *
61	* ALISOCYSTA MARGARITA *
62	* ALISOCYSTA NEW SP. *
119	* APECTODINIUM HOMOMORPHA (L.) *
120	* APECTODINIUM HOMOMORPHA (SH.) *
121	* APECTODINIUM HYPERACANTHA *
122	* APECTODINIUM QUINQUELATA *
51	* APTEODINIUM SP. *
85	* AREOLIGERA SENONENSIS *
109	* AREOSPHAERIDIUM MULTICORNUTUM *
28	* BOTRYOCOCCUS *
86	* CASSICULOSPHAERIDIA SPP. *
87	* CASSIDIUM FRAGILE *
88	* CEREBROCYSTA SP. *
89	* CORDOSPHAERIDIUM FIBROSPINOSUM *
52	* CORDOSPHAERIDIUM INODES *
110	* CORDOSPHAERIDIUM MULTISPINOSUM *
90	* CORRUDINIUM SPP. *
138	* DAPSILIDINIUM PASTIELSII *
123	* DEFLANDREA CF. EXTENSA *
63	* DEFLANDREA DARTMOORIA *
64	* DEFLANDREA DELINEATA *
65	* DEFLANDREA DIEBELII *
103	* DEFLANDREA DILWYNENSIS *
66	* DEFLANDREA MEDCALFII *
145	* DEFLANDREA OBLIQUIPES *
67	* DEFLANDREA PACHYCEROS *
68	* DEFLANDREA SPECIOSUS *
124	* DEFLANDREA TRUNCATA *
91	* DYPHES COLLIGERUM *
111	* EOCLADOPYXIS PENICULATA *
53	* EXOCHOSPHAERIDIUM PHRAGMITES *
92	* FIBROCYSTA BIPOLARE *
104	* FIBROCYSTA VECTENSE *
93	* GLAPHYROCYSTA RETIINTEXTA *
125	* GLAPHYROCYSTA SP. *
94	* HAFNIASPHAERA SEPTATA *

94	* HAFNIASPHAERA SEPTATA *
1	* HETERAULACYSTA HETERACANTHUM *
69	* HYSTRICHOSPHAERIDIUM TUBIFERUM *
112	* IMPAGIDINIUM DISPERTITUM *
95	* IMPAGIDINIUM MACULATUM *
29	* ISABELIDINIUM PELLUCIDUM *
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30	* MANUMIELLA CORONATA *
31	* MANUMIELLA DRUGGII *
126	* MURATODINIUM FIMBRIATUM *
96	* OPERCULODINIUM CENTROCARPUM *
70	* PALAEOCYSTODINIUM AUSTRALINUM *
71	* PALAEOCYSTODINIUM GOLZOWENSE *
72	* PALAEOPERIDINIUM PYROPHORUM *
73	* PALAEOSTOMOCYSTIS LAEVIGATA *
2	* PARALECANIELLA INDENTATA *
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75	* SPINIDINIUM ESSOI *
76	* SPINIDINIUM LANTERNUM *
54	* SPINIFERITES RAMOSUS *
114	* THALASSIPHORA PELAGICA *
97	* THALASSIPHORA SP. *
55	* TRITHYRODINIUM SP. *
127	* WETZELIELLA ARTICULATA *
56	*MICRHYSTRIDIUM*
77	AMOSOPOLLIS CRUCIFORMIS
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3	ANNULISPORITES FOLLICULOSA
32	AUSTRALOPOLLIS OBSCURUS
129	BANKSIEACIDITES ELONGATUS
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5	CLAVIFERA TRIPLEX
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135	CUPANIEIDITES ORTHOTEICHUS
115	CYATHIDITES GIGANTIS
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6	CYATHIDITES SPP.
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35	DILWYNITES TUBERCULATUS
130	DIPORITES SP.
140	ERICIPITES SCABRATUS
8	FALCISPORITES SIMILIS
78	GAMBIERINA CF. EDWARDSII
46	GAMBIERINA EDWARDSII
36	GAMBIERINA RUDATA
105	GEPHRAPOLLENITES WAHOOENSIS

9	GLEICHENIIDITES
79	HALORAGACIDITES HARRISII
10	HERKOSPORITES ELLIOTTII
116	INTRATRIPOROPOLLENITES NOTABILIS
131	ISCHYOSPORITES GREMIUS
98	LATROBOSPORITES CRASSUS
11	LATROBOSPORITES OHAIENSIS
12	LYGISTEPOLLENITES BALMEI
13	LYGISTEPOLLENITES FLORINII
141	MALVACIPOLLIS DIVERSUS
57	MALVACIPOLLIS SUBTILIS
47	MICROCACHRYIDITES ANTARCTICUS
146	MYRTACEIDITES SPP.
37	NOTHOFAGIDITES BRACHYSPINULOSUS
136	NOTHOFAGIDITES EMARCIDUS
14	NOTHOFAGIDITES ENDURUS
106	NOTHOFAGIDITES FLEMINGII
15	NOTHOFAGIDITES SENECTUS
16	OSMUNDACIDITES WELLMANII
117	PERIPOROPOLLENITES DEMARCATUS
80	PERIPOROPOLLENITES POLYORATUS
147	PERIPOROPOLLENITES VESICUS
81	PHYLLOCLADIDITES RETICULOSACCATUS
118	PHYLLOCLADIDITES VERRUCOSUS
17	PHYLOCLLADIDITES MAWSONII
99	PILOSISPORITES GRANDIS
18	PODOSPORITES MICROSACCATUS
100	POLYCOLPITES LANGSTONII
19	PROTEACIDITES ADENANTHOIDES
20	PROTEACIDITES ANNULARIS
101	PROTEACIDITES GRANDIS
102	PROTEACIDITES INCURVATUS
142	PROTEACIDITES KOPIENSIS
107	PROTEACIDITES ORNATUS
58	PROTEACIDITES PACHYPOLUS
38	PROTEACIDITES PALISADUS
148	PROTEACIDITES SCABORATUS
21	PROTEACIDITES SPP.
132	PROTEACIDITES TENUIEXINUS
143	PROTEACIDITES TUBERCULIFORMIS
39	QUADRAPLANUS BROSSUS
22	RETITRILETES AUSTROCLAVATIDITES
144	SPINIZONOCOLPITES PROMINATUS
48	STEREISPORITES (TRIPUNCTISPORIS) SPP.
49	STEREISPORITES ANTIQUASPORITES
50	STEREISPORITES REGIUM
137	TETRACOLPORITES MULTISTRIXUS
23	TETRACOLPORITES VERRUCOSUS

40	TRICOLPITES CONFESSUS
24	TRICOLPITES GILLII
25	TRICOLPITES LONGUS
59	TRICOLPITES PHILLIPSII
26	TRICOLPITES SABULOSUS
27	TRICOLPITES SPP.
41	TRICOLPITES WAIPARAENSIS
42	TRICOLPORITES LILLEI
149	TRICOLPORITES SPP.
43	TRIPOROLETES RETICULATUS
108	TRIPOROPOLLENITES AMBIGUUS
44	TRIPOROPOLLENITES SECTILIS
133	VERRUCOSISPORITES KOPUKUENSIS

APPENDIX - 8

APPENDIX 8

Petrology

Sample: Henke-1, SWC 9, 1330 m; TSC49203

Rock Name:
Sideritic sandstone

Thin Section:
An optical estimate of the constituents gives the following:

Constituent	%
Quartz and quartzite	55-60
Feldspar	1
Clay matrix	5-10
Carbonate	30-40

The most notable feature of this sandstone is the abundance of carbonate in the `matrix' areas; any significant reduction of porosity and permeability will have resulted from the precipitation of the carbonate in the diagenetic phase of the rock's history.

Detrital grains are equant and sub-round; they show moderate sorting about an average size of approximately 0.3-0.4 mm. Many of the quartz grains show the incursion of carbonate along cracks and some have surficial etching by carbonate also. Where the matrix consists mainly of clay, many quartz grains show a rim of carbonate - this is such as to indicate deposition in an agitated current situation in which carbonate precipitated on grain surfaces in a concretionary manner.

Carbonate has several habits in this rock: as well as rims and fracture-fillings, it occurs as a dense, dark and mottled aggregate which fills the bulk of the intergranular spaces; it forms small, yellow rosettes; and, finally, it is present as a monomineralic veinlet completely occupied by rosettes of carbonate and a network of colourless, granular carbonate. Clearly, the carbonate crystallised in the diagenetic environment, probably quite early in most cases, possibly somewhat later in the case of cleaner, granular carbonate. Much of the carbonate was probably derived from the ?shallow marine environment of deposition.

Clay is present as dark, brown indeterminate patches which are locally abundant in intergranular areas.

2. X-RAY DIFFRACTION ANALYSIS

2.1 Procedure

Portion of each sample was powdered finely and used to prepare an X-ray diffractometer trace which was interpreted by standard procedures.

Further, weighed, lightly pre-ground subsamples were taken and dispersed in water with the aid of deflocculants and an electric blender, and allowed to sediment to produce −2 µm e.s.d. size fractions by the pipette method. The resulting dispersions were examined by plummet balance to determine their solids contents, and were then used to produce oriented clay preparations on ceramic plates. Two plates were prepared per sample, both being saturated with Mg^{++} ions, and one in addition being treated with glycerol. When air-dry, these were examined in the X-ray diffractometer. Additional diagnostic examinations carried out consisted of examination of the glycerol-free plate hot at ≃130°C, after heating at 375°C for 1½ hours, and after heating at 550°C for 1 hour.

2.2 Results

The results are given in Table 1, which lists the following:

(a) The mineralogy of the total sample, as derived from examination of the bulk material, with supporting evidence as available. The minerals found are listed in approximate order of decrasing abundance, using the semiquantitative abbreviations given. Coverage of clays may be incomplete, and for full clay mineralogy Section (c) should be consulted. This section (a) is for information on non-clay minerals and to give a general idea of the makeup and proportion.

(b) The proportion of the sample found to separate into the −2 µm size fraction, as determined by the plummet balance. The Figure obtained applies only to the pre-treatment and dispersions conditions used.

(c) The mineralogy of the −2 µm fraction given as in Sectin (a).

2.3 Remarks

2.3.1 Clays

The interpretation of the clay mineralogy of the −2 µm fractions was very difficult. The mineralogical makeup proved to be more-or-less uninterpretable in terms of a mixture of conventional clay minerals. The clays consist mainly of iron-rich phyllosilicates, these evidently being an intimate mixture, or even an interstratification, of bertheirine and poorly-crystalline chlorite of varying stability.

There was good evidence for a 14Å mineral and this proves the presence of chlorite, although in some cases this did not survive a heat treatment at 375°C, indicating it to be unstable as well as poorly crystalline. The diagnostic test used for berthierine was the shrinkage of the basal spacing on heat treatment to 375°C, corresponding to the oxidation of iron ions from the ferrous to the ferric state. The average shrinkage was from 7.11Å to 6.99Å.

The chlorite, as remarked, was often unstable against heat and also was always poorly crystalline. Its thermal stability is summarised in the table. A 'good' chlorite should give a 13.9Å peak after 550°C.

Sample	Survives 375°C	Gives peak after 500°
Core 7	No	-
Core 9	No	-
Core 13	Yes	Yes
Core 17	Yes	Yes
Core 19	No	-
Core 21	Yes	Yes

Smectite is reported only in Cores 19 and 21. The quantities present are insufficient to allow a proper assessment, but it is suspected to be interstratified, but it is not possible to determine with what. In both cases it appears to be "inhibited", i.e. due to interlayering of foreign material it does not collapse when interlayer water is driven out at temperatures above 100°C.

There may be an unfamiliar interstratification present incorporating these two iron-rich minerals, and possibly including some smectite layers, but the situation was too difficult to be resolved. Kaolinite was well crystalline but a minor or absent component, and illite appeared only as a trace.

2.3.2 Carbonates

As will be perceived, the composition of the carbonates was variable from sample to sample. Iron-bearing carbonates were common, both siderite itself and a siderite showing appreciable diffraction peak displacement, confirmed as a calcian siderite in the SEM examination.

Dolomite also existed both as a stoichiometric dolomite and as a partly-substituted calcian dolomite.

3. SCANNING ELECTRON MICROSCOPY

Small fractured pieces of the six samples were mounted on aluminium stubs and coated with evaporated carbon and gold-palladium layers. The coated fragments were examined using an ETEC SEM. Energy-dispersive analysis was used where appropriate for mineral identification.

Polaroid positive/negative film was used to photograph areas of interest and a selection of fields is presented in the accompanying plates.

The resulting enlarged photographs are given herewith. The length of the bar scale |————————| on each photograph corresponds to the indicated number of micrometres (10 or 100).

TABLE 1: MINERALOGY OF SIX DRILLCORE SAMPLES, WILSON#1

Sample	Core 7		Core 9		Core 13		Core 17		Core 19		Core 21	
Bulk Mineralogy:	Q	D	Q	D	Q	D	Q	D	Sid'	D	Q	D
	Sid	A	Sid	SD	Ber	A	Ber	A	Q	SD	Sid'	SD
	Ber	A	Dol	A-SD	Dol'	Tr-A	Dol'	Tr-A	Ber	A	Ber	A
	M	Tr	Sid'	A	Sid'	Tr	F	Tr	F	Tr	Dol'	A
	F	Tr	Ber	A	F	Tr					Cal	A
			F	Tr							F	Tr
-2 μm fract. %:	12		12		9		8		9		9	
Mineralogy:	Ber	D	Ber	D	Ber	D	C	D	Ber	D	Ber	D
	C	SD	C	SD	C	SD	Ber	SD	C?	A-SD	C	SD
	K	A	K	A	M	Tr	M	Tr	K	A	Sm^+	A
	M	Tr	M	Tr	Q	Tr	Q	Tr	Sm^+	A	M	Tr-A
	Sid	Tr	Sid	Tr					M	Tr	Sid	Tr
	Q	Tr	Dol	Tr					Sid	Tr	Q	Tr
			Q	Tr					Q	Tr		

Mineral Key

Ber	Berthierine (formerly chamosite)
C	Chlorite, of variable stability to heat (see text)
Cal	Calcite
Dol	Dolomite
Dol'	Calcian dolomite
F	K feldspar
K	Kaolinite
M	Mica/illite
Q	Quartz
Sid	Siderite
Sid'	Calcian siderite
Sm^+	Smectite-related material, uncertain interstratification (see text).

SEMIQUANTITATIVE ABBREVIATIONS:

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

PE905827

This is an enclosure indicator page.
The enclosure PE905827 is enclosed within the container PE902204 at this location in this document.

The enclosure PE905827 has the following characteristics:

ITEM_BARCODE = PE905827
CONTAINER_BARCODE = PE902204
NAME = Core Thinsection for Henke-1 (page 1 of 2)
BASIN = OTWAY BASIN
PERMIT = PEP/105
TYPE = WELL
SUBTYPE = PHOTOMICROGRAPH
DESCRIPTION = Core Thinsection Photographs, page 1 of 2, (from Appendix 8--Petrology--of WCR) for Henke-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W962
WELL_NAME = HENKE-1
CONTRACTOR =
CLIENT_OP_CO = BEACH PETROLOEUM NL.

(Inserted by DNRE - Vic Govt Mines Dept)

(a)

(b)

FIGURE 6 (a and b): Henke-1, SWC 9. PPL (a) and crossed Nicols (b), 2 mm. Typical field. Grains show a mantle of carbonate of several stages whereas most intergranular space is occupied by iron stained clay. Porosity (blue) is probably of secondary origin.

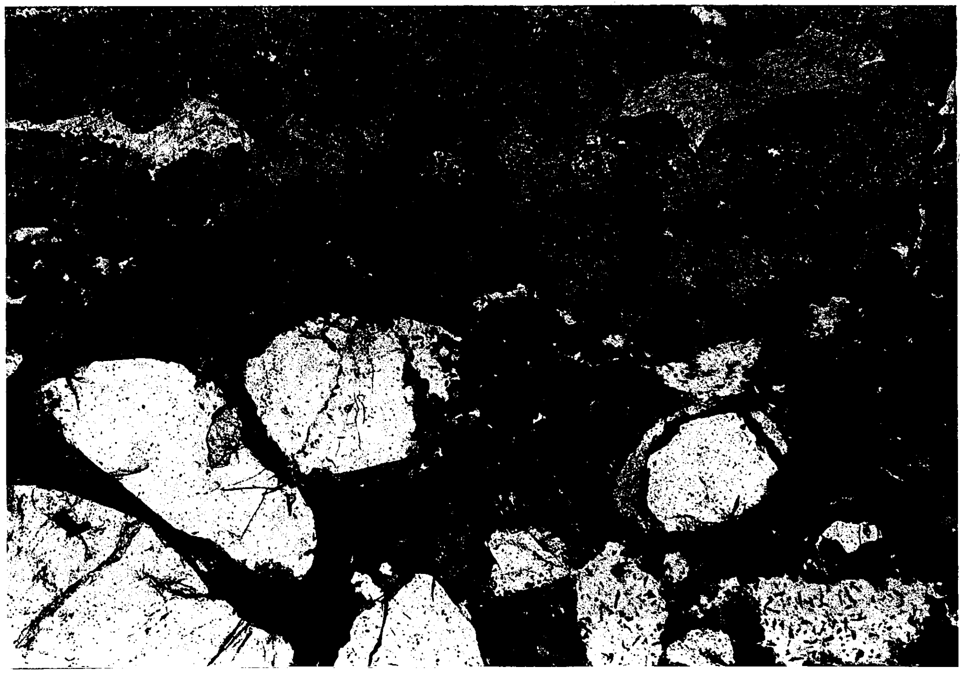

FIGURE 5: Henke-1, SWC 9, PPL, 2 mm. Part of large carbonate vein (top half of field) and normal sandstone. The quartz grains show mantling by early carbonate rim.

PE905828

This is an enclosure indicator page.
The enclosure PE905828 is enclosed within the
container PE902204 at this location in this
document.

The enclosure PE905828 has the following characteristics:

ITEM_BARCODE = PE905828
CONTAINER_BARCODE = PE902204
NAME = Core Thinsection for Henke-1 (page 2 of 2)
BASIN = OTWAY BASIN
PERMIT = PEP/105
TYPE = WELL
SUBTYPE = PHOTOMICROGRAPH
DESCRIPTION = Core Thinsection Photographs, page 2 of 2, (from Appendix 8--Petrology--of WCR) for Henke-1
REMARKS = page contains 2 photos
DATE_CREATED =
DATE_RECEIVED =
W_NO = W962
WELL_NAME = HENKE-1
CONTRACTOR =
CLIENT_OP_CO = BEACH PETROLOEUM NL.

(Inserted by DNRE - Vic Govt Mines Dept)

PE905829

This is an enclosure indicator page.
The enclosure PE905829 is enclosed within the container PE902204 at this location in this document.

The enclosure PE905829 has the following characteristics:

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CONTAINER_BARCODE = PE902204
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BASIN = OTWAY BASIN
PERMIT = PEP/105
TYPE = WELL
SUBTYPE = PHOTOMICROGRAPH
DESCRIPTION = Magnified Photgraph of Core 9 (from Appendix 8--Petrology--of WCR) for Henke-1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W962
WELL_NAME = HENKE-1
CONTRACTOR =
CLIENT_OP_CO = BEACH PETROLOEUM NL.

(Inserted by DNRE - Vic Govt Mines Dept)

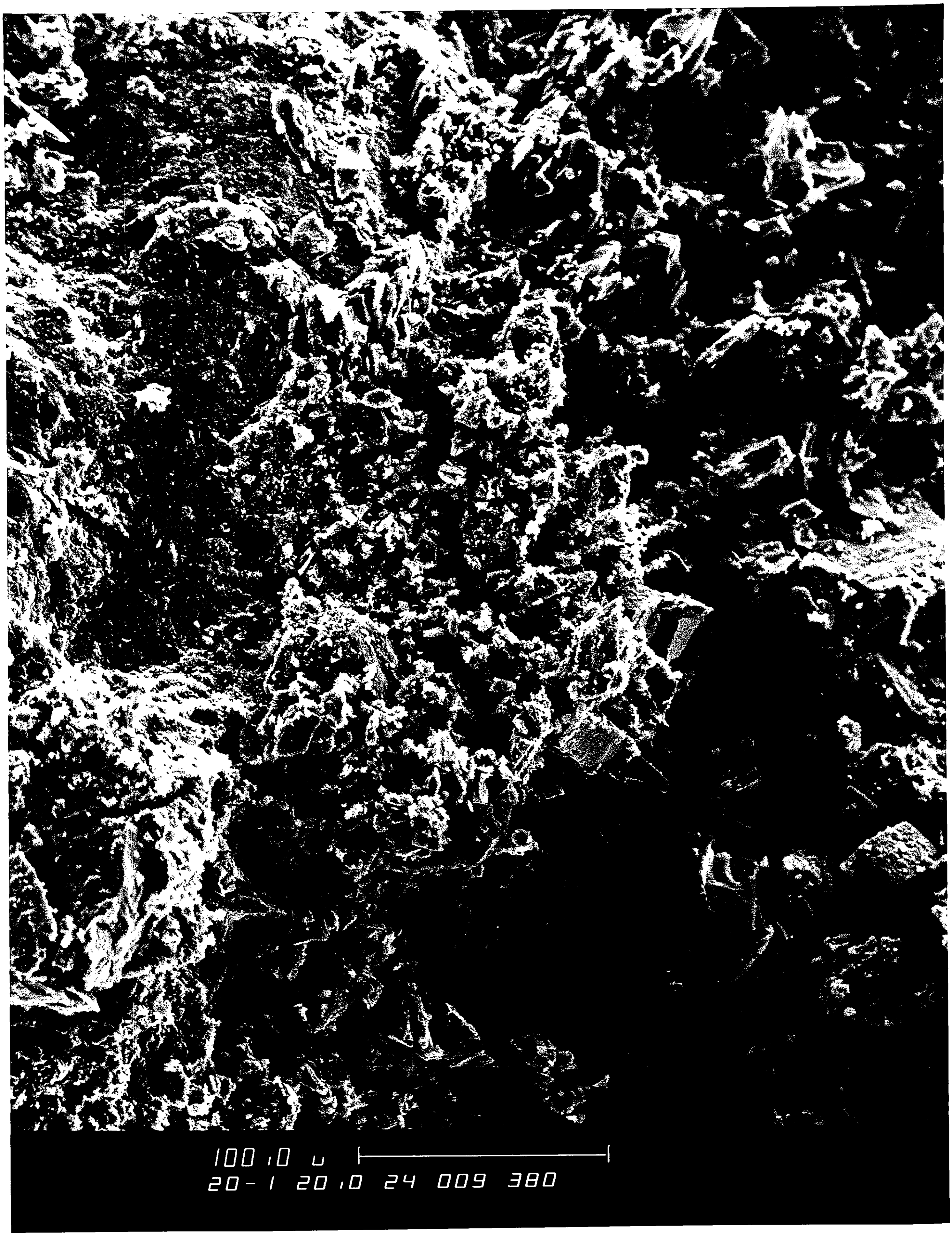

100.0 u
20-1 20.0 24 009 380

PLATE 2: Core 9 (Henke-1) (x 510)

The large angular rhombs in the bottom RH corner are K feldspar, as is some of the fine angular fragmentary material across the centre of the field. The large, rounded, partly-exposed mass in the top left quarter showed Si, Al, Fe with patches of Ti and is apparently clay, possibly incorporating siderite. It exhibits a smoother surface at high magnifications.

APPENDIX - 9

APPENDIX - 9

APPENDIX 9

DST No.1 Fluid Analysis

amdel
technology and enterprise

Amdel Limited - Inc. in S.A.
31 Flemington Street,
Frewville, S.A. 5063

Telephone: (08) 372 2700

Address all correspondence to:
P.O. Box 114,
Eastwood, S.A. 5063

Telex: AA82520
Facsimile: (08) 79 6623

NATA CERTIFICATE

20 August 1987

The Manager
Beach Oil NL
PO Box 360
CAMBERWELL VIC 3124

REPORT AC 109/88

YOUR REFERENCE:	Application dated 9 July 1987
REPORT COMPRISING:	Cover Sheet Page W1
DATE RECEIVED:	10 July 1987
Approved Signatory:	Martin R. Hanckel

Hanckel

Manager, Chemistry Services

for Dr William G. Spencer
General Manager
Applied Sciences Group

The report relates specifically to the sample tested and also to the entire batch in so far as the sample is truly representative of the sample source.

ij

[illegible] Association of Testing Authorities.
[illegible] been performed in accordance with
[illegible] not be reproduced except in full.

amdel

REPORT AC 0109/88
Page W1

SAMPLE ID	HENKE 1 DST 1 (PEP 105)		METHOD:
	MG/L	ME/L	
CALCIUM	10	0.499	W2/1
MAGNESIUM	6.2	0.510	W2/1
SODIUM	665	28.92	W2/1
POTASSIUM	14	0.358	W2/1
CHLORIDE	270	7.617	W2/1
SULPHATE	290	6.038	W2/1
NITRATE	<0.1		W2/1
pH	8.2		W2/1
CONDUCTIVITY MICRO-S/CM @ 25 C	2200		W2/1
RESISTIVITY OHM.M @25 C	4.54		W2/1
TOTAL DISSOLVED SOLIDS BASED ON E.C.	1250		W2/1
TOTAL HARDNESS AS CaCO3	50.5		W2/1

COMMENTS: DUE TO HIGH SOLID CONTENT OF SAMPLE A FULL ANALYSIS COULD NOT BE PREFORMED
CO3-HCO3 TITRATIONS REQUIRE A MINIMUM OF 40mls
IT WAS NOT POSSIBLE TO EXTRACT THIS AMOUNT

MG/L=MILLIGRAMS PER LITRE
ME/L=MILLIEQUIVILANTS PER LITRE

APPENDIX - 10

APPENDIX - 10

APPENDIX 10

Surveying Report

SAWLEY, LOCK
AND ASSOCIATES PTY. LTD.

LICENSED AND CONSULTING SURVEYORS
Cadastral, Engineering, Mining, Topographic.

3 SHORT STREET,
MOUNT GAMBIER,
SOUTH AUSTRALIA, 5290
Telephone (087) 25 8422
A.H. (087) 25 8422

Bryant C. Lock
Craig J. Lock
Peter G. Pain

194 MORPHETT STREET,
ADELAIDE,
SOUTH AUSTRALIA, 5000
Telephone (08) 212 4010

Mrs. P. Ames
Tuesday, Wednesday, Thursday.

When replying please quote

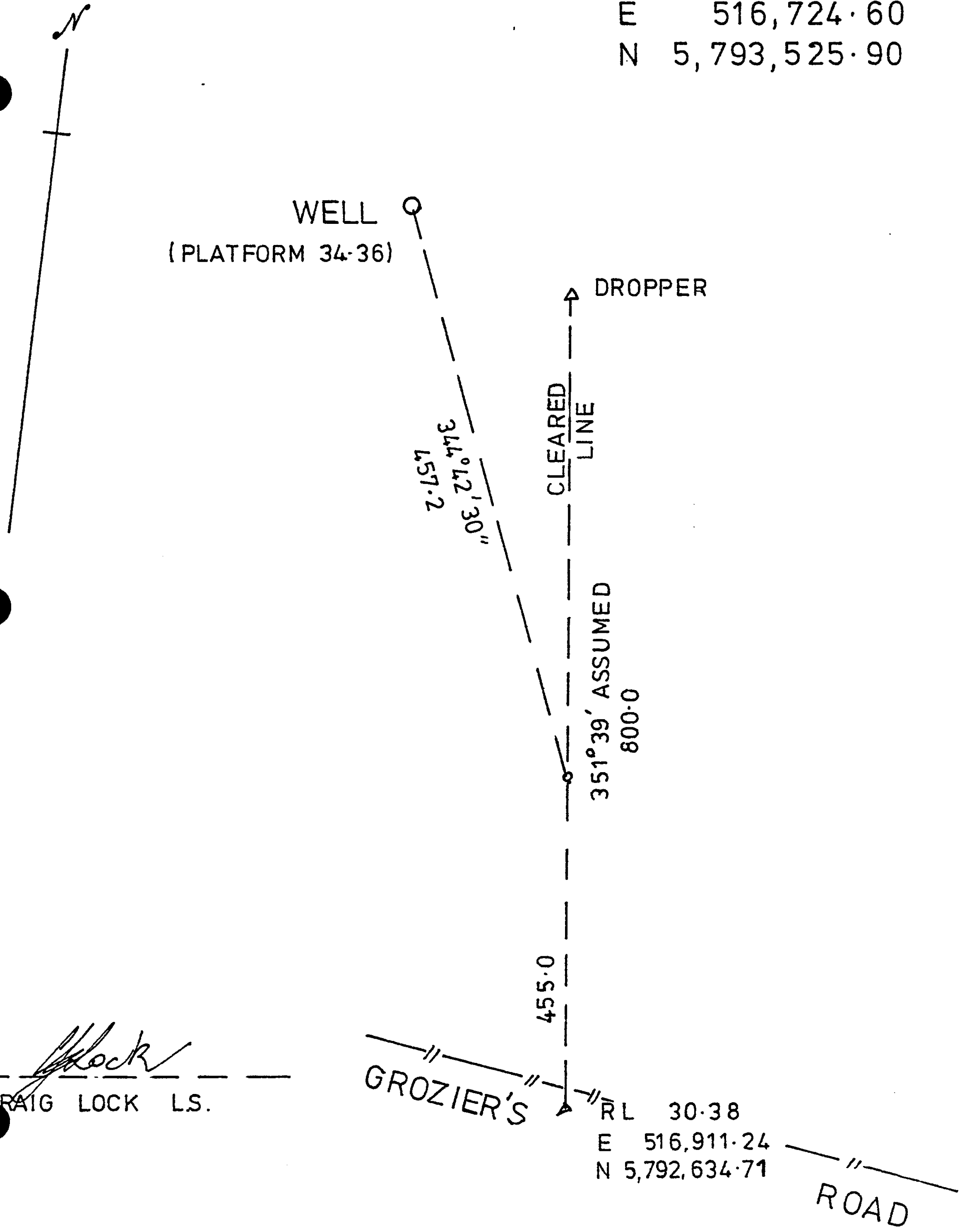
Our Ref: F4007 P268

Your Ref:

Date: 24-6-87

HENKE

GROUND LEVEL 34·10
E 516,724·60
N 5,793,525·90



CLock

CRAIG LOCK LS.