OG 31563

MINERVA-2A

DEPT. NAT. RES & ENV
PE602777

BHP

WELL SUMMARY

PETROLEUM PERMIT: VIC/P31, OTWAY BASIN

SURFACE LOCATION
SEISMIC REFERENCE: LINE: OE80A-1056 SP:4067
LONGITUDE: 142 57 20.800"E; X: 670,032.46mE
LATITUDE: 38 43 04.535"S; Y: 5,712,694.21mN

PRIMARY TARGET:
UPPER SHIPWRECK GROUP RESERVOIR SEQUENCE
DEPTH: 1829mRT, 1802mTVDSS
LONGITUDE: 142 57 21.0"E X: 670,037.6mE
LATITUDE: 38 43 04.7"S Y: 5,712,689mN

SECONDARY TARGET:
N/A

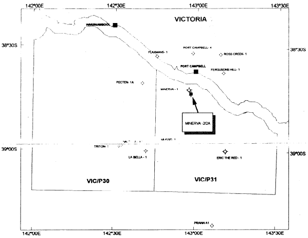
WELL STATUS: GAS WELL – SUSPENDED

ELEVATION: DATUM: MEAN SEA LEVEL
LOG REF : RT, 25m ABOVE DATUM
SEA BED : [illegible] BELOW DATUM

DATES: ON LOCATION: 1915hrs, 21-SEP-1993
SPUDDED: 2245hrs, 21-SEP-1993
TOTAL DEPTH: 1800hrs, 11-OCT-1993
RIG RELEASED: 0830hrs, 17-OCT-1993

TOTAL DEPTH: 2170mRT 2141.7mTVDSS

DRILLED BY: BYFORD DOLPHIN
DOLPHIN DRILLING



WIRELINE SUMMARY

	Suite 1	Suite 2	Suite 3	Suite 4	Suite 5	Suite 6
Date	14-MAR-1993	12-OCT-1993				
First Reading	1517.5M	2170.0M				
Last Reading	553.0M	2166.0M				
CSG (Logger)	553.0M	1526.0M				
CSG (Driller)	553.0M	1526.0M				
Depth (Driller)	1538.0M	2170.0M				
Mud Type	KCL/GEL/POLYMER	KCL/PHPA/POLYMER				
Mud Resistivity	0.113 ohmm at 16.0C	0.115 ohmm at 14.0C				
Rmf	0.098 ohmm at 16.0C	0.097 ohmm at 14.0C				
Rmc	0.166 ohmm at 16.0C	0.169 ohmm at 14.0C				
Max. Rec. Temp.	58.0 C	82.0C				
Bit Size	17 1/2"	12 1/4"				
Casing Size	20"	13 3/8"				
Wireline Logs	DLL-MSFL-SDT-GPIT-GR	DLL-MSFL-AS-GR-AMS				
	-AMS	LDL-CNL-GR-FMS-AMS				
		RFT-HP-GR-AMS				
		CSI-VSP				
		CST-GR (30 SHOT)				

LITHOLOGY AND ENGINEERING LEGEND

CLASTICS

- CONGLOMERATE
- SANDSTONE – COARSE
- SANDSTONE – MEDIUM
- SANDSTONE – FINE
- SILTSTONE
- CLAYSTONE
- CALCAREOUS CLAYSTONE
- SHALE
- COAL

CARBONATES

- CALCARENITE
- CALCILUTITE
- CALCISILTITE
- LIMESTONE
- DOLOMITE
- ANHYDRITE
- GYPSUM
- HALITE
- MARL

OTHERS

- BRECCIA
- CHERT
- VOLCANICS
- METASEDIMENTS
- IGNEOUS
- DOLERITE
- INDETERMINATE
- A Amber
- Fe Ferruginous

ACCESSORIES

- ARGILLACEOUS
- CALCAREOUS
- DOLOMITIC
- F FOSSILIFEROUS
- FORAMINIFERA
- GASTROPODS
- PLANT REMAINS
- BIVALVE
- BRYOZOA
- CORAL
- INOCERAMUS

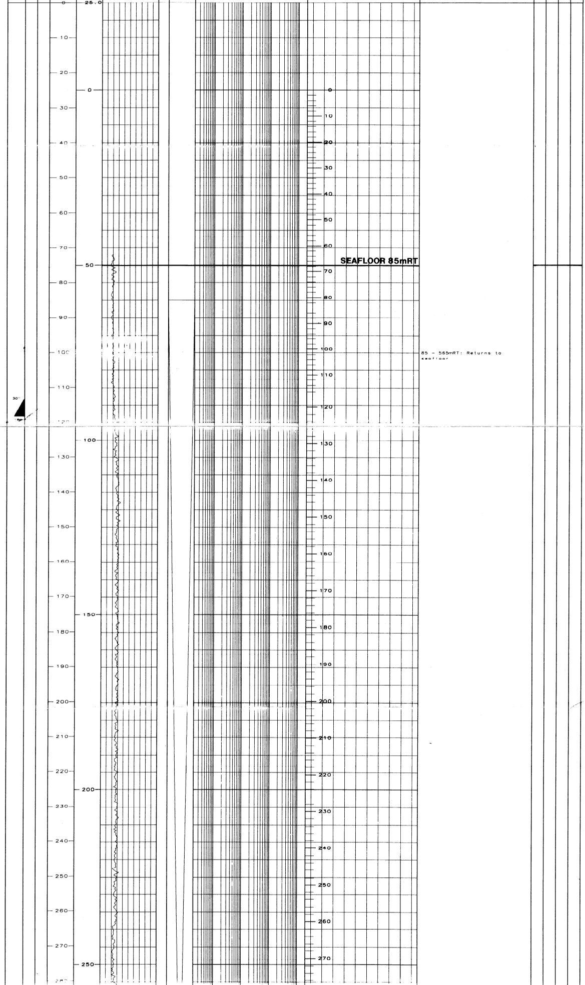
- RADIOLARITES
- FELDSPATHIC
- FRACTURES
- RECRYSTALLIZED
- GLAUCONITIC
- SIDERITIC
- SILICEOUS
- CARBONACEOUS
- MICACEOUS
- LITHIC FRAGMENTS
- ◆ PYRITE

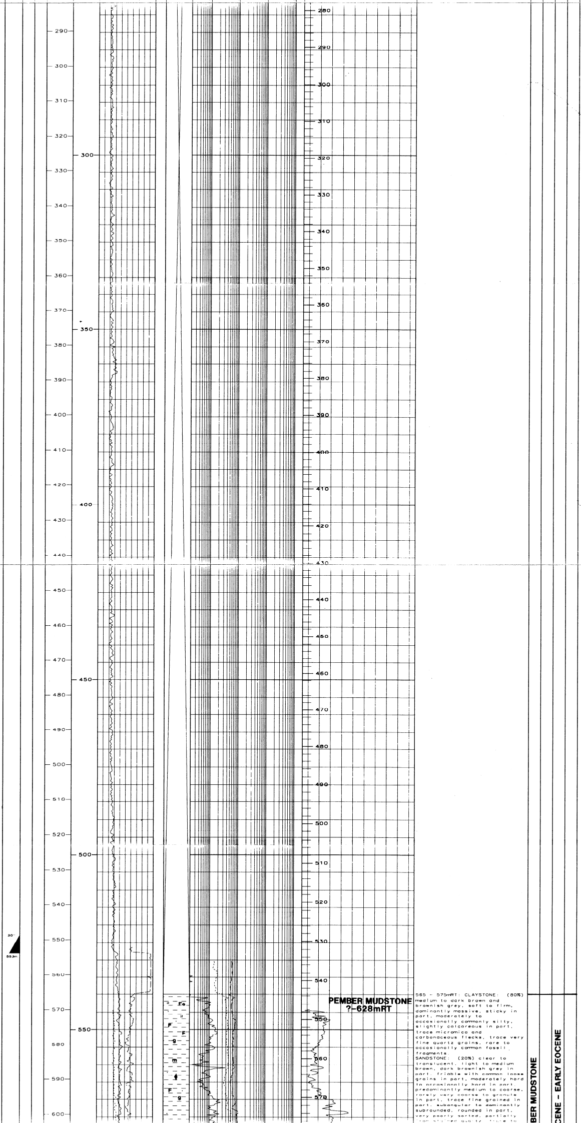
ENGINEERING

- CASING SHOE
- CASING HANGER
- RFT PRETEST
- RFT SAMPLE
- HYDROCARBON SHOW
- PERFORATIONS
- CORED INTERVAL
  CORE LOSS
- SIDEWALL CORE
- SIDEWALL CORE – NO RECOVERY
- PLUGGED INTERVAL

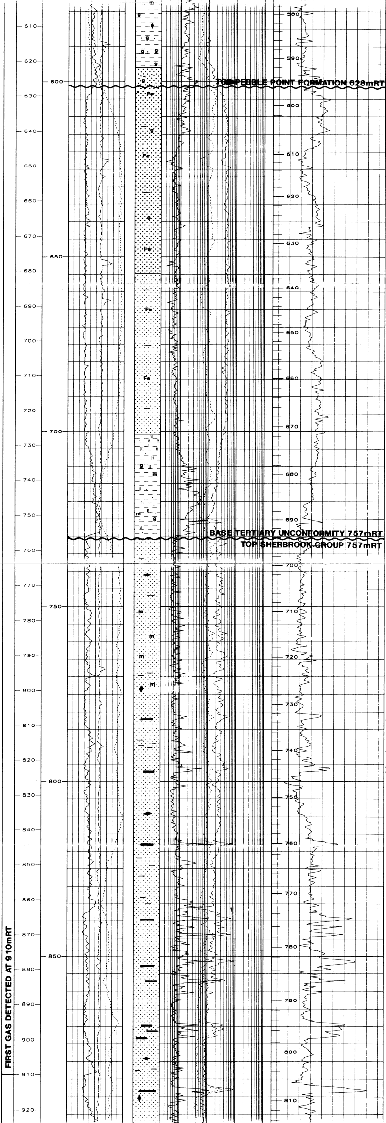
INTERPRETATION BY: A.LOCKE/S.HORAN
COMPILED BY: M.LEMAIRE
DRAWN BY:
SCALE: 1:500

CSG PLUGS PERFS	TESTS	HYDROC. INDIC	DEPTH RT (m)	TVDSS (m)	0 GAMMA RAY 200 6" CALIPER 26" -80 SP 20	CORES	LITHOLOGY	RESISTIVITY (Ohms.m^2/m) LLD LLS MSFL 0.2 2000	INTERVAL TRANSIT TIME (us/m) with VSP TWTIME (ms) scale 500 100	LITHOLOGY DESCRIPTION	STRATIGRAPHY FM	GROUP	STAGE	SYSTEM





565 - 575mRT: CLAYSTONE: (80%) medium to dark brown and brownish grey, soft to firm, dominantly massive, sticky in part, moderately to occasionally commonly silty, slightly calcareous in part, trace micromica and carbonaceous flecks, trace very fine quartz grains, rare to occasionally common fossil fragments.
SANDSTONE: (20%) clear to translucent, light to medium brown, dark brownish grey in part, friable with common loose grains in part, moderately hard to occasionally hard in part, predominantly medium to coarse, rarely very coarse to granule in part, trace fine grained in part, subangular to dominantly subrounded, rounded in part, very poorly sorted, partially iron stained quartz, trace to



dark grey to brownish grey and dark brown silty argillaceous matrix, chamositic in part, grading in part to Arenaceous Claystone, trace to common strong to very strong pyrite cement in part, trace to rare moderately strong to strong siliceous and calcareous cement, partially dolomitic, trace fine to medium dark green glauconite pellets, trace fine to occasionally medium dark brown to black iron oxide/hydroxide pellets, trace mica, fossil fragments and lithics, nil to trace forams, very poor to rarely fair inferred porosity.

575 – 628mRT: CLAYSTONE GRADING TO ARENACEOUS CLAYSTONE: (100%) medium brown to brownish grey, soft, rarely firm in part, sticky in part, commonly micromicaceous, slightly calcareous in part, moderately silty, rarely finely arenaceous at top, becoming commonly to abundantly finely arenaceous with depth and grading to Arenaceous Claystone with depth, trace fine glauconite and carbonaceous flecks, rare fossil fragments, trace pyrite nodules.

628 – 680mRT: GRANULE SANDSTONE: (100%) light to medium green, clear to opaque, light to medium brown in part, reddish orange to reddish brown with depth, very light grey in part, friable with abundant loose grains, moderately hard to hard in part, coarse to granule, dominantly very coarse grained, rarely medium in part, subangular to dominantly subrounded, occasionally rounded, poorly to rarely moderately sorted, partially iron and ?chloritic/glauconitic stained quartz, trace to dominantly common, dispersive, moderately silty in part, medium greenish grey and brownish grey, in part reddish brown and rarely limonitic argillaceous matrix (washed away), trace moderately strong calcareous cement in part, nil to trace moderately strong pyrite and siliceous cement, trace grey, brown and green lithics (some with ?metamorphic origin), trace to common glauconite, trace medium to coarse grained iron oxide/hydroxide pellets, nil to trace mica and pyrite nodules, fair inferred porosity.

680 – 720mRT: SANDSTONE: (100%) generally as above, light to medium brown, occasionally reddish brown, rarely light to medium green in part, friable with abundant loose grains, rarely moderately hard in part, dominantly medium to coarse, very coarse to granule in part, subangular to subrounded, poorly sorted, dominantly iron stained quartz, trace to common yellowish brown to medium brown dispersive argillaceous matrix (washed away), nil to trace moderately strong siliceous matrix, trace grey and brown cherty lithics, trace medium to coarse, rounded in part, dark brown iron oxide/hydroxide pellets, poor to fair inferred porosity.

720 – 757mRT: ARENACEOUS CLAYSTONE: (100%) medium to dark grey, occasionally brownish grey, soft to rarely firm, sticky in part, dispersive in part, commonly to abundantly finely arenaceous, commonly silty, trace to common micromica, trace carbonaceous flecks, trace glauconite, non

757 – 1040mRT: SANDSTONE: (100%) clear to very light grey, occasionally very light brownish grey, friable with abundant loose grains, rarely moderately hard to hard in part, medium to very coarse grained, dominantly coarse grained, occasionally dominantly medium grained, subangular to subrounded, moderately sorted clear quartz, trace light grey to very light brown dispersive argillaceous matrix (washed away), trace moderately strong pyrite cement, nil to trace moderately weak to moderately strong calcareous and rarely siliceous cement, trace hard grey and brown chert bands, trace biotite and muscovite, trace brown, grey and non glauconitic green lithics, trace coaly detritus, good inferred porosity.

PEM

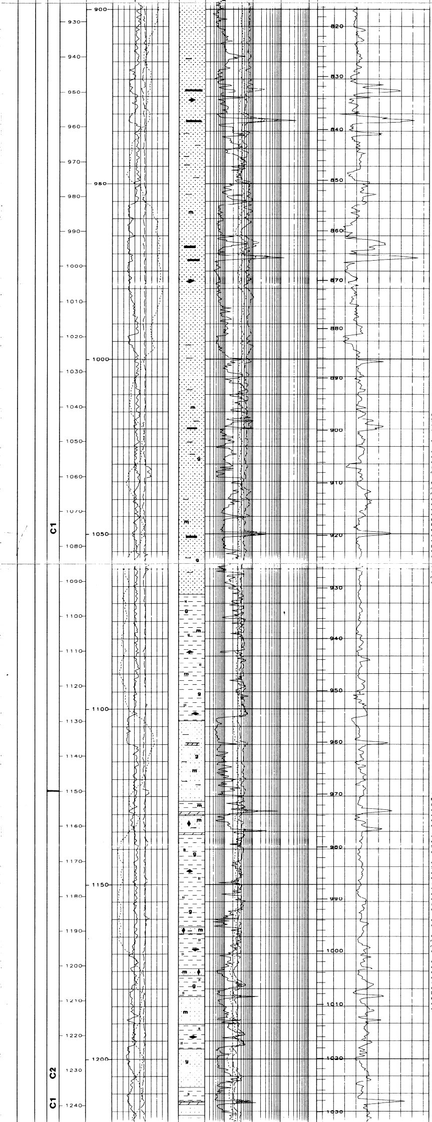
PEBBLE POINT FORMATION

WANGERRIP GROUP

LATE PALEOC

MAASTRICHTIAN – LATE PALEOCENE

TERTIARY



1040 – 1127mRT: SANDSTONE AND CLAYSTONE.

SANDSTONE:(50–80%) clear to very light grey, occasionally very light brownish grey, friable with abundant loose grains, rarely moderately hard to hard in part, medium to very coarse grained, dominantly coarse grained, occasionally dominantly medium grained, subangular to subrounded, moderately sorted clear quartz, trace light grey to very light brown dispersive argillaceous matrix (washed away), trace moderately strong pyrite cement, nil to trace moderately weak to moderately strong calcareous and rarely siliceous cement, trace hard grey and brown chert bands, trace biotite and muscovite, trace brown, grey and non glauconitic green lithics, trace coaly detritus, good inferred porosity.

CLAYSTONE: (20 50%) medium grey [illegible] light grey and rarely [illegible] very [illegible] white, soft, sticky, trace micromica, moderately silty in part, trace carbonaceous flecks, nil to trace glauconite.

1127 – 1291mRT: CLAYSTONE WITH MINOR SANDSTONE AND DOLOMITE.

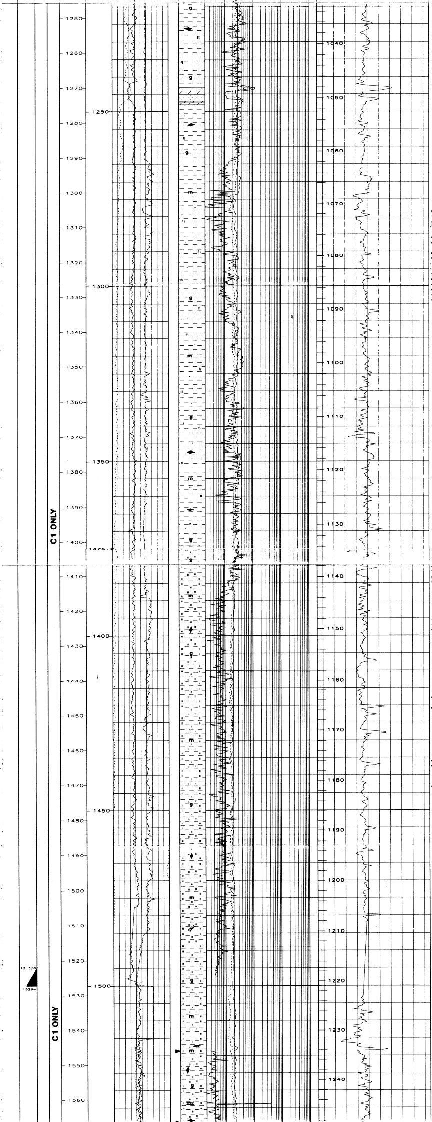
CLAYSTONE: (60–90%) generally as above, medium grey, light grey and rarely light brownish grey in part, very rarely white and kaolinitic, soft, sticky, trace micromica, moderately silty in part, occasionally commonly silty and grading to Silty Claystone, trace carbonaceous flecks and [illegible], nil to trace glauconite.

SANDSTONE: (10–40%) very light grey to translucent, friable with abundant loose grains, rarely moderately hard in part, very fine to dominantly fine grained, very rarely coarse grained in part, subangular to subrounded, well sorted clear quartz, no apparent matrix at top (washed away ?), trace to common, becoming common to abundant with depth, light grey to occasionally white/kaolinitic argillaceous matrix at depth, nil to trace moderately strong pyrite cement, trace moderately strong to strong medium brown dolomite cement at depth, trace brown and grey lithics, trace to rare coarse to very coarse quartz overgrowths (partially reworked), nil to trace mica, good inferred porosity.

DOLOMITE: (Tr) medium orange brown, subblocky irregular conchoidal fracture, very hard, common fine quartz grains, trace carbonaceous flecks, trace ?glauconite

SHERBROOK GROUP

LATE SANTONIAN – EARLY MAASTRICHTIAN



1291 - 1400mRT: CLAYSTONE: (100%) generally as above, light to medium grey to brownish grey, trace off white (kaolinite?) and fawn, firm to soft, sticky in part, rare micromica and trace mica flakes, trace to occasionally abundantly silty and grading to argillaceous siltstone in part, trace fine to fine/medium quartz grains, trace carbonaceous fragments, trace microcrystalline pyrite, trace medium grey lithic fragments and altered feldspar, trace glauconite grains and pyritised carbonaceous fragments, commonly grades to silty claystone and to argillaceous siltstone in part.

[illegible] CLAYSTONE WITH MINOR ARGILLACEOUS SANDSTONE, SILTSTONE AND DOLOMITE.

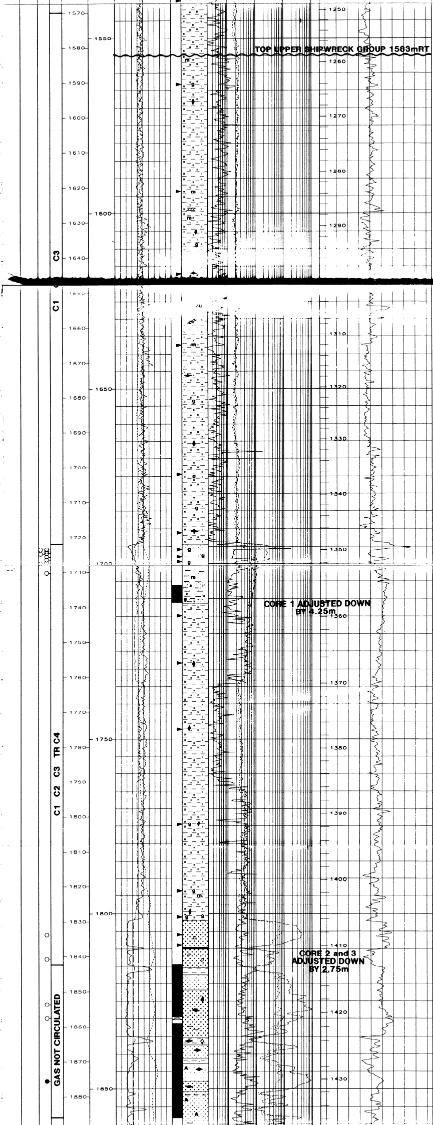
SILTY CLAYSTONE: (100%), medium to dark grey and browny grey, soft to firm, sticky in part, subblocky, common to abundant silt, grades to argillaceous siltstone in part, trace very fine quartz grains, slightly to occasionally moderately calcareous, commonly micromicaceous, common carbonaceous flakes, trace mica flakes, trace very fine grained glauconite, trace frambriodal to nodular pyrite, nil to trace inoceramus fragments.

SANDSTONE: (0-TR), clear to light grey, light green/grey, friable to trace moderately hard aggregates, very fine to fine grained, subrounded to subangular, very well sorted, trace light grey argillaceous matrix, trace siliceous and calcite cement, trace micaceous, trace carbonaceous specks, trace very fine grained glauconite, very fine grained altered feldspar and lithics, very poor to good inferred porosity.

SILTSTONE: (0-TR) orange/brown to light/medium brown, hard, grades to very fine grained sandstone, rare to common medium brown argillaceous matrix, abundant strong siliceous cement, nil to trace calcite cement, nil to rare pyrite cement, trace micromicaceous, trace carbonaceous specks.

DOLOMITE: (0-TR), medium brown, very hard, trace very fine glauconite pellets.

LATE CRETACEOUS



1583–1721mRT: SILTY CLAYSTONE WITH MINOR SANDSTONE, SILTSTONE AND DOLOMITE.
SILTY CLAYSTONE: (100%), medium to dark grey, commonly light to medium brown/grey, commonly light green/brown, soft to hard, predominantly firm, subblocky–dominantly blocky, rarely subfissile, common to abundant silt, grades to argillaceous siltstone in part, trace to common very fine quartz grains, trace to rare fine grained glauconite, trace pyrite nodules, nil to trace hard dolomite with trace glauconite, trace light orange/brown vein calcite, trace carbonaceous specks, trace inoceramus fragments.
SHOW: SWC, no direct, no cut, no crush cut, thin dull green/yellow residual ring.
SILTSTONE: (TR), orange/brown to light/medium brown, friable to hard siltstone grades to very fine quartz sandstone in places, rare to common light brown argillaceous matrix, abundant very strong siliceous cement, trace calcite cement, trace carbonaceous specks
SANDSTONE: (TR), light grey to medium/dark grey, clear quartz grains, friable with common loose grains, very fine grained, subrounded, well sorted trace to abundant light grey to dark brown argillaceous matrix, grades to argillaceous sandstone, trace micromicaceous, very poor to fair inferred porosity.
DOLOMITE: (0–TR), medium brown, very hard, trace very fine grained glauconite pellets.

1721–1737.8mRT: SANDSTONE GRADING TO ARGILLACEOUS SANDSTONE AND SILTY CLAYSTONE
SANDSTONE: (TR–100%), clear to medium grey, friable with abundant loose grains, very fine to granule sized, predominantly fine grained, subangular to subrounded, moderately to well sorted quartz, abundant light grey to medium grey argillaceous matrix, sandstone becoming argillaceous with depth and grading to arenaceous/silty [illegible] calcite cement, trace to rare glauconite, trace green lithics, trace microcrystalline pyrite, trace dolomite, trace carbonaceous specks, poor visual porosity.
SHOWS: SWC, no direct, no to instant dull yellow cut, instant dull yellow crush cut, thick moderately bright green/yellow residual ring.
SILTY CLAYSTONE: (tr) as above.

1737.8 – 1829mRT: SILTY CLAYSTONE: (100%) medium to dark grey and brownish grey, firm to dominantly moderately hard, soft to firm in part, blocky, rarely subfissile in part, commonly to occasionally abundantly silty, rarely to commonly finely arenaceous in part, trace micromica, carbonaceous flecks and laminae, non calcareous, disseminated cryptocrystalline pyrite and calcite crystal, nil to trace very fine glauconite and light to medium green (non-glauconitic) lithics, pyrite nodule and partially altered feldspar, nil to trace inoceramus.

1829–1841.5mRT: PEBBLY SANDSTONE WITH MINOR SILTY CLAYSTONE.
PEBBLY SANDSTONE: (tr–100%), 20–80% loose grains, translucent to milky white and yellow, very fine grained to pebbles, bimodal, predominantly course to very course, predominantly subangular to subrounded, pebbles well rounded, poorly sorted, trace buff to off white very fine to medium grained argillaceous sandstone with light to medium brown matrix, trace reddy brown matrix, trace altered feldspars, trace green fine grained lithics (non-glauconitic), trace microcrystalline pyrite, trace quartz overgrowths, trace carbonaceous specks, trace micromicaceous, poor to good inferred porosity.
SILTY CLAYSTONE: (tr–50%) as above, interpreted as cavings.

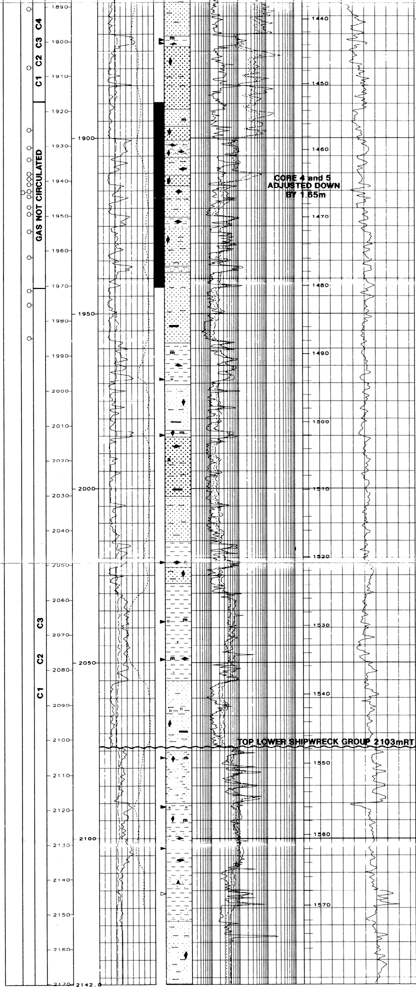
1841.5–1858.2mRT: SANDSTONE INTERBEDDED WITH MINOR CLAYSTONE AND COAL: For descriptions see descriptions of CORE 2 below and Arditto 1994 for detailed core descriptions

1858.2–1885.2mRT: SANDSTONE INTERBEDDED WITH MINOR CLAYSTONE AND COAL: For descriptions see descriptions of CORE 3 below and Arditto 1994 for detailed core descriptions

1885.25–1916.6mRT: SANDSTONE WITH MINOR CLAYSTONE
SANDSTONE: (0–90%) very light grey, clear to light grey

UPPER SHIPWRECK GROUP

TURONIAN – EARLY SANTONIAN



loose grains, very fine grains to granules, predominantly medium to coarse grained, subangular to subrounded, angular in part, moderate to occasional low sphericity, well sorted quartz, trace quartz overgrowth cement, trace very light grey argillaceous matrix, trace altered feldspar, trace weathered microcrystalline pyrite, good inferred porosity.
CLAYSTONE: (10-100%) dark grey, hard, subblocky to blocky, predominantly light olive grey argillaceous material, trace quartz silt, trace very fine grained quartz sand, trace carbonaceous specks, trace micromica, non calcareous.
SHOWS: no direct, moderately bright slow blooming bluish/white cut, slow to instant bluish/white to greenish/yellow crush cut, thick green/yellow residual ring.

1916.6-1944.4mRT SANDSTONE WITH MINOR INTERBEDDED CLAYSTONE: For descriptions see core descriptions of CORE 4 below and Arditto 1994 for detailed core descriptions

1944.6-1970.6mRT SANDSTONE WITH INTERBEDDED CLAYSTONE AND COAL: For descriptions see core descriptions of CORE 5 below and Arditto 1994 for detailed core descriptions

1970.6 - 2083mRT: SANDSTONE WITH MINOR CLAYSTONE
SANDSTONE: (60-95%) light grey to light medium grey, translucent to very light grey grains, moderately hard but loose grains, medium to very course grained, trace fine grained and granule sized in part, subangular to rounded, moderate to high sphericity, moderately sorted quartz, trace to rare moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, trace to minor very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous fragments and thin carbonaceous laminae, fair to good inferred porosity.
CLAYSTONE: (5-40%) medium to dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous matrix, trace to common quartz silt, nil to trace very fine quartz grains, trace carbonaceous specks, trace micromica, non calcareous.
SHOWS: from SWC, no direct, nil to trace slow fast streaming green/yellow cut, nil to trace instant dull green/yellow crush cut, moderate to thick green/yellow residual ring.

2083 - 2103mRT: SANDSTONE WITH MINOR SILTY CLAYSTONE.
SANDSTONE: (60-100%) light to light medium grey, translucent to light medium grey grains, friable to moderately hard but loose grains, very fine to fine grains, subangular to rounded, high sphericity, well to very well sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace to rare very light grey argillaceous matrix, trace coalified woody fragments, trace calcite grains, fair to good inferred porosity.
SILTY CLAYSTONE: (0-40%) light medium to medium grey, medium dark grey in part, firm to moderately hard, blocky to subblocky, predominantly olive grey argillaceous matrix, minor to abundant quartz silt (grading in part to claystone), trace carbonaceous specks, trace micromica, non calcareous.

2103 - 2170mRT: ARGILLACEOUS SANDSTONE WITH INTERBEDDED CLAYSTONE
ARGILLACEOUS SANDSTONE: (0-100%) very light grey to light medium grey, translucent to very light grey grains, friable to moderately hard but predominantly loose grains, fine to coarse grained, common very coarse grained to small pebbles, subangular to rounded, low to moderate sphericity, poorly to moderately sorted, trace to rare moderately weak to moderately strong silica cement, trace microcrystalline pyrite cement, rare to abundant very light to light grey argillaceous matrix, trace coalified woody fragments, trace amber trace calcite grains, poor to fair inferred porosity. Shows, from cuttings, nil to 5% moderately bright bluish white pinpoint direct, nil to trace bleeding to blooming green/yellow cut dull green to green/yellow crush cut, moderately to strong green yellow residual ring.
CLAYSTONE: (tr-100%) medium to dark grey, hard, subblocky, predominantly olive grey argillaceous matrix, rare to minor quartz silt (grading in part to silty claystone), trace carbonaceous specks, trace micromica, non calcareous
SHOWS: from SWC, no direct, no cut, nil to moderate dull green/yellow crush cut, thin to thick yellow/green residual ring.

LOWER SHIPWRECK GROUP

CENOMANIAN

MINERVA-2A - OPEN HOLE RFT RESULTS

Test No.	Depth		Time	Initial Hydrostatic Pressure		Formation Pressure		Temperature	Final Hydrostatic Pressure		Mobility	Permeability*	Comments
				Strain Gauge	HP Gauge	Strain Gauge	HP Gauge		Strain Gauge	HP Gauge			
	mAHKB	mTVDSS	hh:mm	psig	psia	psig	psia	DegC	psig	psia	mD/cp	mD	
1	1722.5	1697.2	06:10	2870.6	2890.86	2692.10	2711.00	65.1	2870.0	2890.49	18.1	52	Possibly supercharged
2	1723.5	1698.2	06:25	2871.2	2891.71	2696.00	2717.00	65.2	2871.3	2891.82	3.3	9	Tight
3	1724.5	1699.2	06:42	2872.6	2893.01	2691.30	2711.32	64.7	2872.1	2893.05	136.0	390	Good Test
4	1725.5	1700.2	06:58	2873.8	2894.64	2691.50	2712.15	64.9	2874.5	2895.36	6.8	19	Low Permeability
5	1726.5	1701.2	07:12	2876.1	2896.55	2695.50	2716.44	64.9	2876.1	2897.18	0.5	1	Tight
6	1727.3	1702.0	07:28	2877.3	2897.78	2698.10	2718.83	65.1	2877.4	2898.09	5.9	17	Tight?
7	1722.5	1697.2	07:45	2868.4	2889.56	-	-	65.3	2868.2	2890.02			Tight
8	1723.0	1697.7	07:55	2870.3	2891.15	2691.50	2712.38	65.1	2870.4	2891.40	9.3	27	Possibly supercharged
9	1723.5	1698.2	08:05	2871.2	2892.29	-	-	65.2	-	-			Lost Seal
10	1723.7	1698.4	08:12	2871.1	2892.34	2696.40	2717.50	65.3	2871.1	2893.08	0.9	3	Tight
11	1724.5	1699.2	08:27	2872.3	2892.81	2690.80	2711.52	65.4	2872.0	2893.37	9.8	28	Low Permeability
12	1729.2	1703.9	08:38	2880.1	2901.18	-	-	65.5	2880.7	2902.41			Tight
13	1833.0	1807.7	09:01	3052.5	3073.29	2710.30	2729.56	69.7	3052.2	3072.87	420.0	602	Good Test
14	1840.0	1814.7	09:16	3063.3	3084.26	2711.60	2730.76	69.2	3063.4	3084.13	224.3	643	Good Test
15	1853.0	1827.7	09:31	3085.7	3106.33	2713.40	2732.82	68.6	3085.4	3105.95	50.4	144	Good Test
16	1875.0	1849.7	09:50	3121.6	3142.62	2717.00	2736.12	69.1	3121.5	3142.19	764.6	1096	Good Test
17	1890.0	1864.7	10:08	3146.5	3167.25	2720.20	2738.98	69.5	3146.2	3166.70	362.0	519	Good Test
18	1907.0	1881.7	10:21	3174.7	3195.84	2722.50	2741.60	70.8	3174.8	3195.35	43.9	126	Good Test
19	1925.0	1899.7	10:45	3205.8	3226.42	2726.10	2744.82	72.5	3204.6	3224.93	12.4	36	Good Test
20	1930.0	1904.7	10:59	3213.1	3233.34	-	-	71.9	3212.2	3233.22			Tight (shale test)
21	1933.5	1908.2	11:08	3218.4	3238.85	2727.70	2745.93	71.2	3218.3	3238.34	22.7	65	Good Test
22	1937.5	1912.2	11:25	3225.0	3244.80	2732.00	2751.77	71.2	3224.7	3244.80	2.5	7	Possibly supercharged
23	1939.0	1913.7	11:56	3227.6	3247.26	2728.70	2746.75	71.5	3227.1	3247.28	N/A	N/A	Good Test
24	1940.5	1915.2	12:21	3229.6	3250.31	2729.00	2747.35	71.9	3229.2	3249.84	972.2	418	Good Test
25	1942.5	1917.2	12:33	3232.6	3253.25	-	-	-	-	-			Tight
26	1942.8	1917.5	12:42	3233.2	3253.61	2733.70	2753.12	72.2	3233.6	3254.10	11.2	5	Possibly supercharged
27	1944.0	1918.7	12:56	3235.3	3256.27	2734.00	2752.47	72.3	3235.8	3256.47	135.0	58	Good Test
28	1947.0	1921.7	13:10	3240.9	3261.20	2738.20	2756.32	72.1	3240.3	3260.36	120.5	52	Good Test
29	1949.0	1923.7	13:27	3244.0	3263.59	2740.80	2758.60	72.0	3243.5	3263.20	268.1	115	Good Test
30	1954.0	1928.7	13:50	3251.9	3271.32	2748.10	2766.14	72.5	3251.3	3271.65	446.7	192	Good Test
31	1961.5	1936.2	14:04	3263.9	3284.47	2758.20	2775.90	72.5	3264.0	3283.76	191.2	82	Good Test
32	1971.0	1945.7	14:28	3279.3	3299.63	2770.80	2789.95	72.9	3279.2	3299.36	19.8	9	Good Test
33	1975.0	1949.7	14:35	3286.6	3307.18	2776.90	2795.26	73.1	3286.5	3306.16	86.7	37	Good Test
34	1984.5	1959.2	14:53	3302.3	3322.40	2790.30	2808.22	73.4	3302.3	3322.09	79.7	34	Good Test
S1	1875.0	1849.7	15:25	3121.2	3141.15	2717.70	2736.28	71.6	3120.9	3141.14			Segregated sample

Filtrate:		
	Temp	179.6 Deg F
	% NaCl	74250 ppm
	Pressure	2742 psia
	Viscosity	0.43 Cp

*N.B. Permeabilities rounded.
K(h)/k(v)=1
Filtrate Viscosity = 0.43 cP
k(rw)=1.0 in water zone
k(rw)=.15 or .3 in h/c zone if perm. < or > 1D respectively.

MINERVA-2A - RFT SAMPLE DATA SHEET

Well: Minerva-2A **Date:** 13 October 1993.

KB: 25.3 m
Sample No 1 **Depth:** 1875 mAHKB
Formation Pressure 2736.3 psia

	Lower	Upper	
Chamber No:	RFS-AD-1289	RFS-AD-1227	
Chamber Size:	2.75	1	gal
Flowing Pressure:	approx 2500	approx 2700	psig
Time To Fill:	10	5	minutes
Opening Pressure:			psig
Gas Volume:	Preserved for	Preserved for	ft^3
Total Liquids:	PVT Analysis	PVT Analysis	cc
Oil/Condensate Volume:			cc
Filtrate/Water Volume:			cc
Gas Oil Ratio:			scf/stb
Condensate Gas Ratio:			stb/MMscf

MINERVA-2A - SIDEWALL CORE SUMMARY

Suite	Run	Bullets	Depth From	Depth To	No. Fired	No. Misfires	No. Empty	No. Lost	No. Recovered
2	1	30	2144	1545	30	0	1	0	29
	TOTAL	30	2144	1545	30	0	1	0	29

Sample Number	Depth mRT	Recovery (mm)	Lithology	Sample Number	Depth mRT	Recovery (mm)	Lithology
1	2144	0	EMPTY BULLET	16	1801.5	35	CLAYSTONE
2	2131	32	CLAYSTONE/ARENACEOUS CLAYSTONE	17	1774	30	CLAYSTONE
3	2119	44	SILTY CLAYSTONE	18	1755	30	CLAYSTONE
4	2105	25	SANDSTONE/CLAYSTONE	19	1741.5	30	ARENACEOUS CLAYSTONE
5	2077	29	CLAYSTONE	20	1726	30	ARGILLACEOUS SANDSTONE
6	2066	31	CLAYSTONE/SILTY CLAYSTONE	21	1724.5	25	ARGILLACEOUS SANDSTONE
7	2049	30	CLAYSTONE/SILTY CLAYSTONE	22	1722.5	23	ARGILLACEOUS SANDSTONE
8	2012.5	28	CLAYSTONE	23	1717.7	30	CLAYSTONE
9	1990.5	30	CLAYSTONE	24	[illegible]	[illegible]	CLAYSTONE
10	1900	35	CLAYSTONE	25	1664	60	CLAYSTONE
11	1899	20	CLAYSTONE	26	1643.5	31	CLAYSTONE
12	1836	10	SANDSTONE	27	1620	50	CLAYSTONE
13	1833	15	SANDSTONE	28	1589.5	40	CLAYSTONE
14	1828	35	GLAUCONITIC CLAYSTONE	29	1565.5	40	CLAYSTONE
15	1820.5	30	ARENACEOUS CLAYSTONE	30	1545	33	CLAYSTONE

MINERVA-2A - CORE SUMMARY AND DESCRIPTIONS

Core No.	Bit Size	Drillers Depths	Recovered Core Depths	Log Correlation Depths	Recovery
		Interval Cored			
1	12.25"	1728.5 - 1733.5 m	1728.5 - 1733.5 m	1732.8 - 1737.8 m	100% (5.0m)
2	12.25"	1839.0 - 1855.5 m	1839.0 - 1853.8 m	1841.5 - 1856.5 m	94% (14.8m)
3	12.25"	1855.5 - 1882.5 m	1855.5 - 1882.5 m	1858.5 - 1885.5 m	100% (17.0m)
4	12.25"	1915.0 - 1943.0 m	1915.0 - 1942.3 m	1917.0 - 1944.3 m	97% (27.3m)
5	12.25"	1943.0 - 1969.0 m	1943.0 - 1969.0 m	1944.7 - 1970.1 m	100% (26.0m)

CORE 1

Lithological Description

The entire cored interval, 1728.50m to 1733.60m is sandstone, very fine grained and silty towards the base, grading upwards to very fine to fine grained muddy sandstone at the top. It is very poorly sorted through intensive bioturbation with sparse sand-filled dwelling burrows developed near the top of the interval. Faint subhorizontal disturbed laminations are developed throughout although primary sedimentary features are largely destroyed through biological churning of the original sediment. Sporadic sideritic nodular mudstone intervals are developed within some burrow features.

Environmental Interpretation

The relatively short length of core together with the homogeneity of lithology and structures make it difficult to be categoric in the discussion of depositional environment. The relatively fine grained and intensely bioturbated nature of the interval, combined with an absence of wave generated features, indicate a possible offshore open marine setting. Wireline log data indicates that core was taken from near the base of a grossly upward coarsening (progradational) cycle some 70 m thick. The inferred environmental setting is that of a distal toe of a prograding shoreface (or ?deltaic) unit just below wavebase.

Samples for palynology taken at 1733.50m and 1733.60m had a high ratio and diversity of dinoflagellates and were inferred to be nearshore marine.

CORES 2 AND 3

Lithological Description

The interval 1838.80m to 1839.67m is sandstone, medium up to coarse grained and granule, comprised of fining upward cycles 0.1m to 0.3m in thickness separated by scour surfaces and pebble lags. The sandstone is well sorted and trough cross bedded with minor flasers towards the top of each unit. The interval 1839.67m to 1840.77m is shale, medium grey, mottled with sparse carbonaceous rootlets. It is generally homogeneous with minor starved ripple and microfoundering features in the lower half. Sparse scattered resin blebs occur in the upper half of the interval. The interval 1840.77m to 1840.79m is coal, black and sub bituminous. The interval 1840.79 to 1841.15m comprises shale, silty, with starved ripples and microfoundering features. Rare resin blebs occur at the top of the unit.

The interval 1841.15m to 1841.82m is sandstone, very coarse grained to granule, moderately sorted and trough cross bedded to planar laminated with rip up clasts and flasers near the top which is transitional into the overlying unit. The base of the unit rests on a scour surface. The interval 1841.82m to 1842.80m is sandstone, coarse to very coarse grained and well sorted with minor granule trains along sporadic lamina. Internally it is trough cross bedded with minor high angle carbonaceous flaser drapes. The base of the unit rests of a prominent scour surface.

The interval 1842.80m to the base of core 2 (1855.05m) is sandstone, predominantly coarse to very coarse grained and well sorted. This interval is comprised of stacked upward fining units, typically 0.2m to 0.5m in thickness, separated by scour surfaces. Internally the sandstone units are trough cross bedded and typically have basal pebble lags and minor carbonaceous flaser laminated tops.

Core 3 commences at 1855.60m and the interval 1855.75m comprises grey argillaceous siltstone core rubble. The interval 1855.75m to 1860.23m is sandstone, fine to medium up to very coarse grained and comprised of upward fining units 0.15m to 0.70m in thickness separated by scour surfaces and pebble or shale rip up clast lags. Internally these units are trough cross bedded with several containing flaser laminations or lenticular bedded sandstone near the top. Several units over the interval 1858.90m to 1857.55m contain sparse up to abundant ophiomorpha burrows along with an overall upward fining throughout.

The interval 1860.23m to 1861.75m is shale, highly carbonaceous with sparse rootlets and minor thin coals, black and sub bituminous. Small resin blebs occur within the shale adjacent to the coaly horizons. Internally the shale is homogeneous throughout.

The interval 1861.75m to 1865.30m is predominantly sandstone, medium up to coarse grained, comprised of upward fining units 0.4m to 0.7m in thickness capped by carbonaceous flaser laminations or, more rarely, flasered thin shale intervals. Internally these units are trough cross bedded and separated by scour surfaces with sporadic basal shale rip up clast lags.

The interval 1865.30m to 1866.00m is sandstone, coarse grained at the base and fining up to fine to medium grained at the top. The lower one third contains shale rip up clasts and pebbles overlain by a trough cross bedded zone grading upward to flaser to lenticular bedded sandstone with burrows at the very top.

The interval 1866.00m to 1866.75m is sandstone, predominantly fine to medium grained and muddy, comprised of three upward fining units. Internally it is heavily burrowed to bioturbated with recognisable ophiomorpha burrows. The lower half is flaser to lenticular bedded.

The interval 1866.75m to 1869.55m is sandstone, predominantly fine to medium grained, trough cross bedded in the lower half and flaser to current ripple laminated in the upper half. The interval 1869.55m to 1871.70m is sandstone, medium up to coarse grained, comprised of three upward fining units separated by scour surfaces. Internally the bulk of each unit is trough cross bedded with the uppermost part flaser laminated. The interval 1871.70m to 1873.90m is sandstone, predominantly coarse to very coarse grained up to granule and pebbly, comprised of four upward fining units, around 0.55m in thickness, separated by prominent scour surfaces and pebble lags. Internally these units have well developed trough cross bedding. The interval 1873.90m to 1876.35m is sandstone, predominantly medium to coarse grained, comprised of six upward fining units separated by scour surfaces and pebble lags. Internally these units are trough cross bedded and some have thin flaser laminated tops.

The interval 1876.35m to 1876.58m is shale, black and carbonaceous with silty starved ripples. The interval 1876.58m to 1880.63m is predominantly sandstone comprised of a series of stacked units, separated by scour surfaces, ranging in thickness from 0.40m to 0.90m. This interval displays an overall upward fining stacked succession from coarse to very coarse grained at the base to fine to medium grained at the top. Internally the basal 0.80m is trough cross bedded (basal 0.30m pyrite cemented) and well sorted and grades upwards into muddy poorly sorted burrowed to bioturbated finer grained sandstone for the remainder of the interval. Recognisable ophiomorpha burrows occur throughout.

The interval 1880.63m to 1881.05m is shale, black and highly carbonaceous with fine silty starved current ripple flasers. It is pyritic throughout with a layer of resin blebs at the very top. The remainder of the core (1881.05m to 1882.50m) is sandstone, predominantly medium to coarse grained and moderately well sorted, comprised of five upward fining units separated by scour surfaces. Internally the units are homogeneous to current ripple and flaser laminated with local development of ophiomorpha burrow horizons.

Environmental Interpretation

The interval 1838.80m to 1839.67m is interpreted to be a series of stacked basal channel fill units deposited during the late flood to early falling stage cycle within a low sinuosity fluvial system. The interval 1839.67m to 1841.80m is interpreted to represent a relatively complete accretionary point bar cycle deposited during low stage within a high sinuosity fluvial system. The cycle grades up from a lower through middle to upper point bar/abandoned channel fill succession. The interval 1841.80m to 1855.05m (base core 2) is interpreted to be a succession of stacked basal channel fill units deposited during late flood to early falling stage in a low sinuosity fluvial system. Palynological studies on shale samples from 1839.75m, 1841.00m and 1843.20m interpreted the environment to be that of a slightly brackish oxic to anoxic lake setting.

The interval 1855.75m (in situ top of core 3) to 1860.23m is interpreted to be a series of stacked basal channel fill units. Much of the succession is interpreted to be deposited in a low sinuosity fluvial dominated system although the 1857.55m to 1858.90m contains good ophiomorpha burrows which indicate shallow water marine conditions. This latter interval is interpreted to be deposited as a series of channel units building out into a shallow water estuary at the mouth of a fluvial complex and represents a small transgressive pulse into a predominantly fluvial system. A palynological study of a shale sample from 1857.30m gave a slightly brackish anoxic lake setting.

The interval 1860.23m to 1862.45m is interpreted to represent a relatively complete accetionary point bar cycle deposited during low stage within a high sinuosity fluvial system. This cycle grades relatively abruptly from lower point bar channel fill to upper point bar/abandoned channel fill with very little middle point bar preserved. A palynological study of a shale sample from 1860.30m was interpreted to be a brackish lake (tidal influence) setting. The interval 1862.45m to 1864.60m is interpreted as a series of stacked basal channel fill units deposited during late flood to early falling stage in a low sinuosity fluvial system.

The interval 1864.69m to 1866.00m contains two upward fining, trough cross bedded, sandstone channel fill units with flasered and burrowed tops. These are interpreted as a stream mouth bar or proximal estuary channel succession deposited in a nearshore marine setting at the mouth of a low sinuosity fluvial system. The interval 1866.00m to 1866.75m a distal tidal (estuary) stacked channel succession as indicated by the intensity of burrowing and bioturbation throughout. This interval represents the maximum extent of a minor marine transgression into a predominantly fluvial dominated system. A palynological study on a shale sample from 1866.50m was interpreted to be marginal marine lagoon or estuary.

The interval 1866.75m to 1871.70m is interpreted as a succession of stacked tidal/estuarine channel units within the mouth of a fluvial system entering a bay. Although no burrows are evident the entire interval is highly flasered indicative of episodic (?tidal) flow. The interval also demonstrates an overall upward fining pattern suggestive of a rise in base level (onset of a transgression).

The interval 1871.70m to 1876.35m is interpreted as a succession of stacked basal channel fill units deposited during a late flood stage cycle in a low sinuosity fluvial system. This interval gradually coarsens up through the successive stacking of coarser grained channel units to 1872.80m followed be a gradual fining upwards through the successive stacking of finer grained channel units. This vertical grainsize distribution is interpreted as initial prograding of the fluvial system over the underlying more marine units followed be a retreat of the fluvial system during a transgressive phase into the overlying more marine units.

The interval 1876.35m to 1882.50m is interpreted to be a succession of stacked tidal estuarine channel units deposited beyond the mouth of the feeding fluvial system. These channels typically have unidirectional current flow structures in the lower half with burrowed to bioturbated zones in the upper half. This estuary setting interpretation is further re-enforced by the presence of common ophiomorpha burrows within the channel sandstones.

Minor overbank/abandoned channel fill units occur over the interval 1876.35m to 1876.55m and 1880.63m to 1881.05m. These are interpreted to have been deposited during the low stage cycle of a high sinuosity tidal/estuary system and are preserved erosional remnants.

Palynological studies on shale samples taken over the above interval gave the following interpretations; 1876.50m (marginal marine lagoon or estuary), 1879.00m (nearshore ?tidal lagoon or estuary) and 1881.00m (very nearshore anoxic ?stagnant brackish lagoon or estuarine backwater).

CORES 4 AND 5

Lithological Description

The interval 1915.00m (top of core 4) to 1916.57m is sandstone, coarse grained up to very coarse grained and pebbly, comprised of several units separated by scour surfaces. Upward fining character is evident the upper units. Internally these units are trough cross bedded to flaser laminated with minor shale rip up clast horizons.

The interval 1916.57m to 1917.13m is sandstone, predominantly very coarse grained, muddy and poorly sorted, comprised of three units separated by scour surfaces. Internally the sandstone contains discontinuous flaser laminations and minor burrows. The interval 1917.13m to 1918.30m is sandstone, predominantly fine to medium grained, muddy and very poorly sorted. The upper 0.15m is pebbly and grades up to very coarse grained. Internally the interval is homogeneous and heavily burrowed with ophiomorpha burrows.

The interval 1918.30m to 1920.33m is sandstone, fine to medium grained up to medium to coarse grained, comprised of five units of variable thickness separated by scour surfaces. Internally these units are trough cross bedded with flaser laminated tops. The interval 1920.33m to 1921.75m is sandstone, predominantly fine to medium grained (ranging from very fine to coarse grained) muddy and very poorly sorted. Internally the sandstone contains minor trough cross bedding, flaser laminations and burrows (including ophiomorpha) and can be divided into several units separated by scour surfaces.

The interval 1921.75m to 1926.20m is sandstone, predominantly medium to coarse grained and well sorted, comprised of nine upward fining units of variable thickness separated by scour surfaces. Internally these units are trough cross bedded with minor carbonaceous flaser laminations towards the top. Shale rip up clast horizons form basal lags in a few of these units.

The interval 1926.20m to 1926.75m is siltstone grading upwards to shale. The lower half is lenticular bedded with minor rootlets and the upper half is carbonaceous with common rootlets and minor resin blebs. The entire interval contains sparse nodular pyrite cement. The interval 1926.75m to 1928.90m is siltstone to very fine grained sandstone grading upwards into very fine grained sandstone. Internally the lower half of the interval contains abundant sandy microfoundering structures with minor current ripple to flaser laminations, rare wave oscillation ripple laminations, and minor pyrite cement. The upper half has better developed and common current ripple to flaser laminations and is burrowed to bioturbated. The topmost part contains carbonaceous rootlets.

The interval 1928.90m to 1930.35m is sandstone, comprised of three upward fining units fine to medium grained at the base grading upwards to very fine grained at the top and separated by scour surfaces. Internally they are current ripple to flaser laminated with minor microfoundering features and rare mud cracks. Rare burrows occur towards the base of the units. The interval 1930.35m to 1932.30m is sandstone, predominantly fine to medium up to coarse grained, comprised of eight units of variable thickness separated by scour surfaces. Overall the interval has an upward fining character developed through the stacking of successively finer grained units. Internally individual units are trough cross bedded or current ripple laminated to flaser or lenticular bedded with burrows developed in the upper four units.

The interval 1932.30m to 1933.20m is sandstone, very fine grained and silty, lenticular bedded in the lower half and current ripple to flaser laminated in the upper half. The interval 1933.20m to 1933.97m is sandstone, fine to medium up to coarse grained and muddy, comprised of four upward fining units of varying thickness separated by scour surfaces. Internally these units are lenticular bedded and burrowed. The interval 1933.97m to 1934.50m is sandstone, coarse to very coarse grained and well sorted. Internally it is trough cross bedded with minor shale rip up clasts and flaser to lenticular bedded at the very top.

The interval 1934.50m to 1935.55m is sandstone, fine up to fine to medium grained, muddy and poorly sorted. Internally it is flaser laminated to burrowed and bioturbated with a 15cm long sand-filled burrow projecting down from the top of the interval. Minor pyrite occurs throughout the interval.

The interval 1935.55m to 1937.25m is sandstone, predominantly medium to coarse grained, well sorted and trough cross bedded. The very top of the interval is burrowed. The basal 0.25m of this interval fines from very coarse grained, with a pebble lag above a scour surface upwards to medium to coarse grained. The interval 1937.25m to 1939.35m is sandstone, medium to coarse up to very coarse grained, comprised of five upward fining units separated by scour surfaces and basal pebble lags. Internally these units are homogeneous to trough cross bedded with rare flaser laminations and rip up clasts.

The interval 1939.35m to 1941.35m is sandstone, fine to medium towards the base fining upwards to very fine grained silty sandstone at the top through a succession of stacked progressively finer grained upward fining units. Internally the interval is flaser bedded and burrowed in the lower half and burrowed to bioturbated with carbonaceous flasers and pyrite cemented towards the top. Overall the interval is muddy and very poorly sorted. The interval 1941.35m to 1942.70m (base of core 4) is sandstone, predominantly medium grained up to very coarse grained, comprised of seven upward fining units of variable thickness separated by scour surfaces. Internally these units and homogeneous to trough cross bedded with minor burrows and flaser laminations.

The interval 1943.00m (top of core 5) to 1943.20m is shale, dark grey with abundant silty microfoundering features. The interval 1943.20m to 1945.07m is sandstone, fine grained up to very coarse grained, comprised of a succession nine upward fining units of variable thickness separated by scour surfaces and pebble lags. Internally the units are homogeneous to trough cross bedded within the basal coarser grained part and are flaser to lenticular bedded in the finer grained upper part. The interval displays an overall upward fining character through the vertical stacking of successively finer sandstone units.

The interval 1945.07m to 1947.95m is sandstone, medium up to coarse grained and well sorted, comprised of six upward fining units separated by scour surfaces. The entire interval displays an overall upward fining through the stacking of successively finer units. Internally these units are trough cross bedded with flaser and lenticular bedding and dewatering features in the uppermost unit. The interval 1947.95m to 1949.25m is sandstone, medium to coarse grained at the base and grading upwards to very fine grained at the top. Internally the basal portion is trough cross bedded with the bulk of the interval current ripple to flaser laminated. The uppermost portion is lenticular bedded with microfoundering features. Sporadic pyrite cement is dispersed throughout the interval.

The interval 1949.25m to 1951.05m is sandstone, fine up to coarse grained, comprised of four upward fining units separated by scour surfaces. Internally these units are current ripple to flaser laminated or lenticular bedded with sporadic microfoundering features in the finer grained units. The interval 1951.05m to 1952.95m is sandstone, predominantly medium grained up to coarse grained and moderately well sorted, comprised of four upward fining units separated by scour surfaces. Internally these units are trough cross bedded in the lower half and current ripple to flaser laminated in the upper half. Shale rip up clasts occur as a basal lag in the lowest unit and the top of the uppermost unit is burrowed.

The interval 1952.95m to 1956.95m is sandstone, predominantly fine grained grading up to very coarse grained, comprised of a succession of upward fining units. The entire interval displays an upward fining character through the stacking of successively finer grained units. Internally the interval is muddy and very poorly sorted through intense bioturbation. Rare load (pillow) features, dewatering features and current ripple to flaser laminations occur towards the base. The basal 7 cm of the interval contains quartz pebble and shale rip up clast lag material. The interval 1956.95m to 1959.35m is a repeat of the above interval with coarse to very coarse grained sandstone at the base grading upwards,the stacking of successively finer units, to fine grained sandstone at the top.

The basal half of the interval contains recognisable burrows and current ripple laminations while the upper half is bioturbated with thin lenticular bedded horizons and load cast (pillow) horizons.

The interval 1959.35m to 1960.60m is sandstone, predominantly coarse to very coarse grained and well sorted, comprised of four upward fining units separated by scour surfaces. Internally these units are trough cross bedded with thin flaser to lenticular bedded tops. The interval 1960.60m to 1960.78m is sandstone, coarse grained and heavily burrowed. The interval 1960.78m to 1962.24m is sandstone, predominantly medium grained, comprised of four upward fining units separated by scour surfaces. Internally the basal unit is homogeneous to trough cross bedded with successive overlying units having flaser to lenticular bedding with burrows to finally becoming bioturbated towards the top.

The interval 1962.24m to 1964.32m is sandstone, predominantly fine grained, comprised of eight fining upward units separated by scour surfaces. Internally the interval is homogeneous to current ripple laminated to lenticular bedded with rare burrows and bioturbation. The interval 1964.32m to 1967.03m is sandstone, medium grained, comprised of at least seven units separated by scour surfaces or load and flame surfaces. Internally the interval is current ripple to flaser laminated with rare trough cross bedding. The basal unit contains inclined flaser draped accretionary surfaces. The uppermost 0.4m of the interval contains long dwelling burrows. The interval 1967.03m to 1969.00m (base of core 5) is sandstone, comprised of stacked upward fining units, (separated by scour surfaces), varying in grainsize from very coarse grained and pebbly to very fine to fine grained. Internally these units are trough cross bedded to current ripple and flaser laminated with sparse ophiomorpha burrows. Minor dewatering, load and flame features are locally developed.

Environmental Interpretation

The interval 1915.00m to 1917.13m is interpreted as a succession of stream mouth bar channel units deposited in a inner bay setting proximal to a fluvial system (only rare burrows are recognised). The interval 1917.13m to 1918.30m is interpreted to represent more distal tidal/estuary channel deposition as evidenced by the presence of abundant ophiomorpha burrows. This interval represents a small marine transgressive cycle into a predominantly fluvially dominated system. A palynological study on a shale sample taken at 1917.35m gave a brackish swamp setting for the environment. The interval 1918.30m to 1920.33m is interpreted as a succession of stream mouth bar channel units deposited in an inner bay setting proximal to a fluvial setting (rare burrows preserved). The interval 1920.33m to 1921.75m is interpreted to represent more distal tidal/estuary channel deposition as evidenced by the presence of ophiomorpha and other non identifiable dwelling burrows.

The interval 1921.75m to 1926.20m is interpreted to represent a succession of stacked channel units deposited in a high energy low sinuosity fluvial system during the late flood stage cycle. The interval 1926.20m to 1926.75m is interpreted as deposition of overbank or abandoned channel fill during the low stage of a high sinuosity fluvial system. A palynological study of a shale sample taken at 1926.25m gave a non-marine (?levee bank or freshwater swamp) setting for the environment. The interval 1926.75m to 1930.35m is interpreted as a succession of proximal to distal crevasse splay units deposited during the falling stage cycle of a high sinuosity fluvial system.

The interval 1930.35m to 1932.30m is interpreted as a succession of stream mouth bar channels building into a proximal estuary setting. The interval 1932.30m to 1933.20m is interpreted to represent more distal deposition of the overlying channel units. A palynological study on a shale sample taken at 1933.10m gave a brackish swamp setting for the environment. The interval 1933.20m to 1934.50m is interpreted to be a succession of stacked stream mouth bar or tidal/estuary channel units building into a proximal bay setting. The interval 1934.50m to 1935.55m is interpreted as a succession of distal tidal/estuary channel units related to the overlying interval. A palynological study on a shale sample taken at 1935.50m gave a nearshore marine lagoon or estuary setting for the environment.

The interval 1935.55m to 1939.35m is interpreted as a succession of stacked channel units deposited in a high energy low sinuosity fluvial system during the late flood stage cycle. The interval 1939.35m to 1942.70m (base of core 4) is interpreted to represent a succession of stacked tidal/estuarine channel units deposited during an overall waning fluvial (early falling cycle grading upwards to late falling or low stage cycle). A palynological study made on shale samples taken at 1939.35m and 1941.65m gave a nearshore marine lagoon or estuary setting for the environment.

The interval 1943.00m (top of core 5) to 1945.07m is interpreted to be a succession of stacked channel units grading upwards from high energy basal channel fill to abandoned channel fill deposited during a flood to falling and low stage cycle within a low sinuosity fluvial system. A palynological study made on a shale sample taken at 1943.00 gave a non-marine (freshwater lake) setting for the environment. The interval 1945.07m to 1947.95m is interpreted to be a repeat of the above cycle. The interval 1947.95m to 1952.95m is interpreted to represent the deposition of three waning fluvial to estuary channel successions building into an inner bay setting. A palynological study made on a shale sample taken at 1948.00m gave a non-marine (freshwater lake or swamp) setting for the environment.

The interval 1952.95m to 1956.95m is interpreted to represent a succession of proximal to distal estuary channel units, which display an overall upward waning in energy, deposited in an inner to middle bay setting. A palynological study of shale samples over this interval made the following interpretation; 1953.00m (brackish lagoon or estuary) and 1955.60m (very nearshore - near normal salinity estuary). The interval 1956.95m to 1959.35m is a repeat of the above depositional setting. The interval 1959.35m to 1960.60m is interpreted to be a succession of stacked basal channel units deposited during the late flood stage of a low sinuosity fluvial system.

The interval 1960.60m to 1962.25m is interpreted to be a succession of stacked proximal estuary basal channel units deposited in an inner bay setting (good ophiomorpha and other dwelling burrows occur throughout). A palynological study made on a shale sample taken from 1961.25m inferred a very nearshore (?backbarrier tidal lagoon) setting for the environment. The interval 1962.25m to 1964.32m is interpreted as a succession of stacked middle to upper point bar tidal channel units deposited around the bay fringe near the mouth of a fluvial system. The interval 1964.32m to 1966.75m is interpreted as a succession of stacked middle point bar estuary channel units deposited at the mouth of a fluvial system. The interval 1966.75m to 1969.00m (base of core 5) is interpreted to be a succession of stacked proximal estuary basal channel units deposited at the mouth of a fluvial system. A palynological study made on a shale sample taken from 1968.25m inferred a very nearshore (?backbarrier tidal lagoon) setting for the environment and a study from a swc sample taken from 1996.50m inferred a nearshore marine setting for the environment.