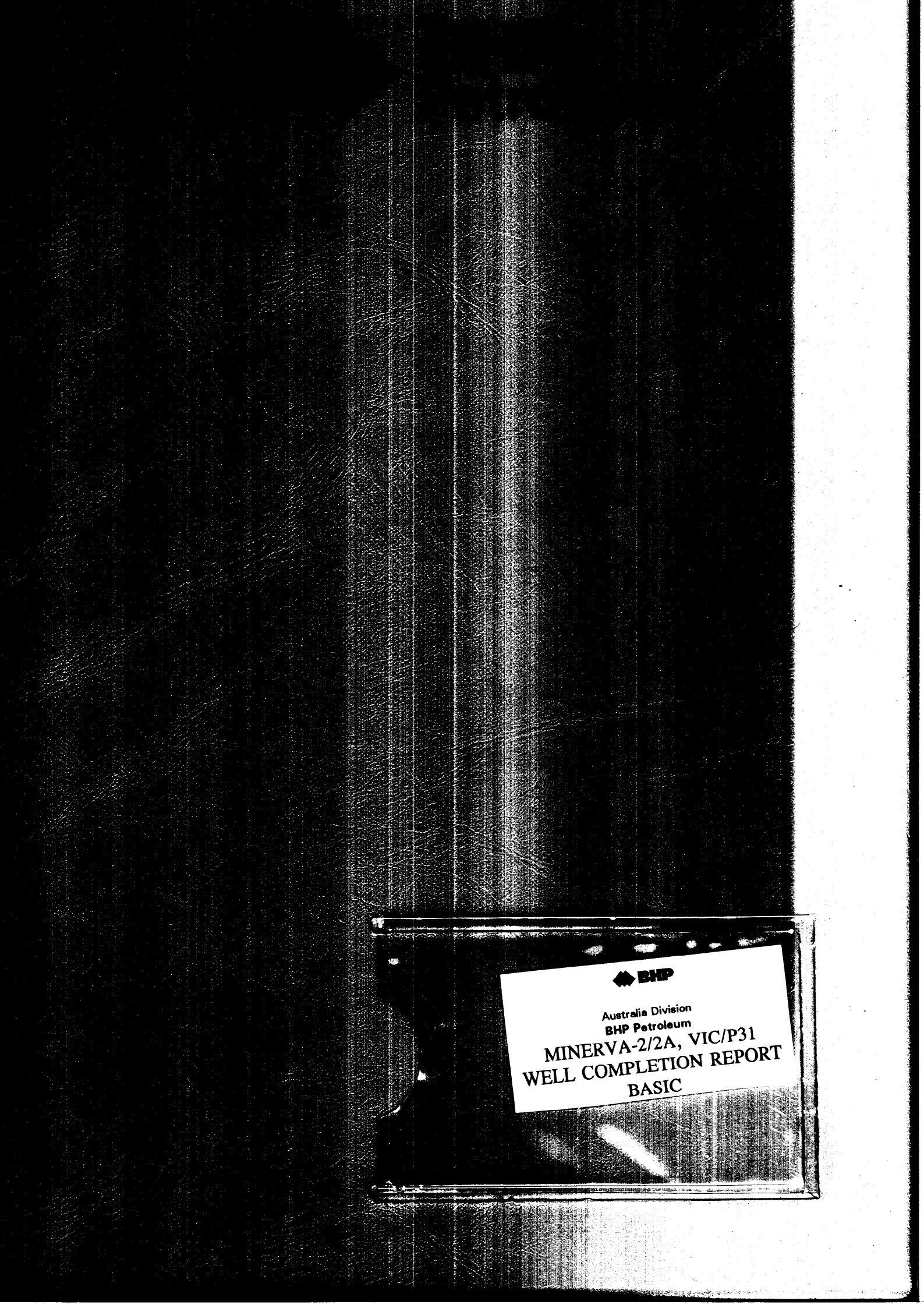
BHP
Australia Division
BHP Petroleum
MINERVA-2/2A, VIC/P31
WELL COMPLETION REPORT
BASIC

BHP Petroleum

BHP PETROLEUM PTY. LTD.
A.C.N. 006 918 832

MINERVA-2/2A, VIC/P31

BASIC WELL COMPLETION REPORT

VOL. 1

PREPARED BY: E. Smith
Operations T.A.

70353_1.WCR

DATE: June 1994

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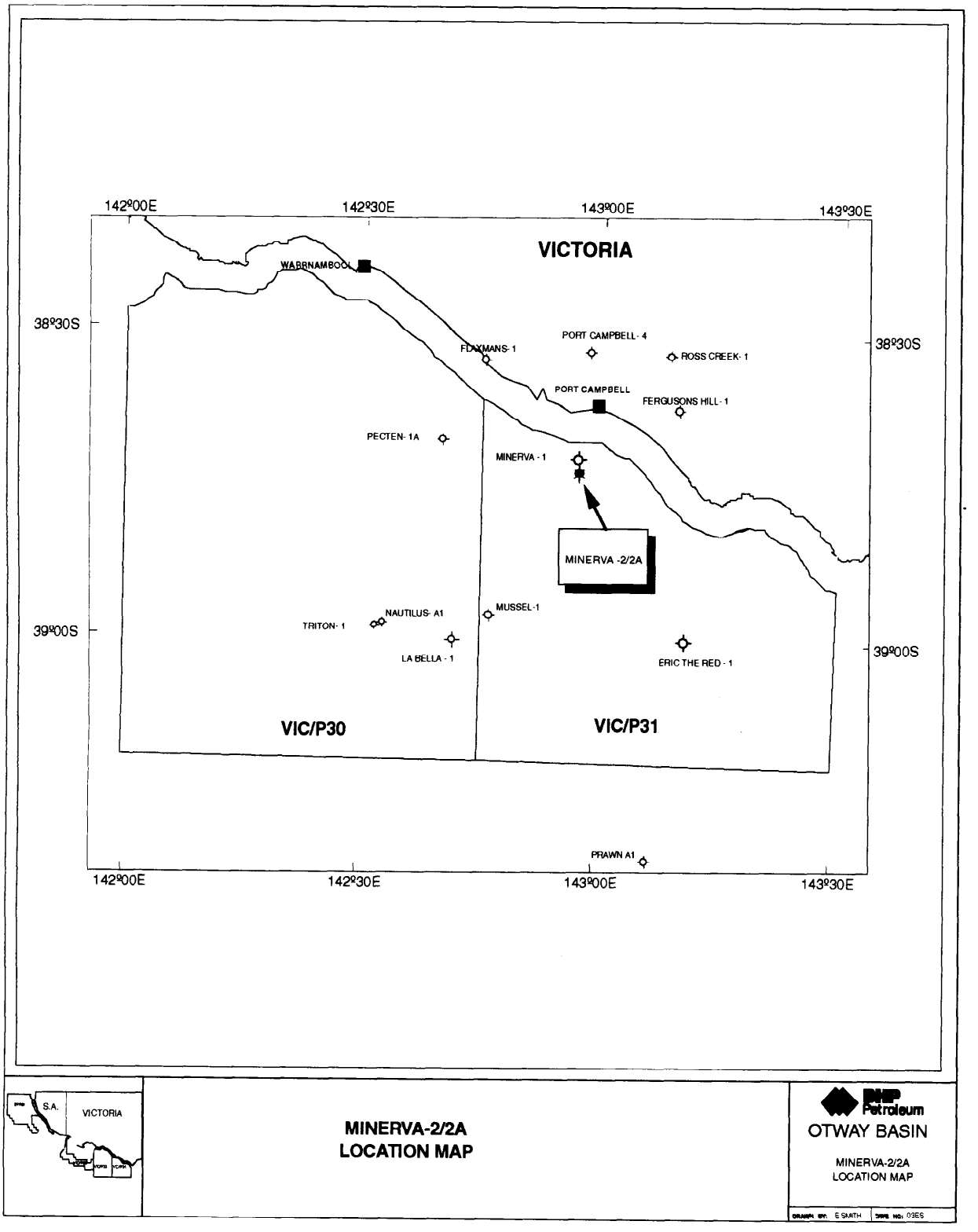
142°00E
142°30E
143°00E
143°30E
VICTORIA
WARRNAMBOOL
38°30S
PORT CAMPBELL - 4
FLAXMANS - 1
ROSS CREEK - 1
PORT CAMPBELL
FERGUSONS HILL - 1
PECTEN - 1A
MINERVA - 1
MINERVA -2/2A
NAUTILUS - A1
MUSSEL - 1
TRITON - 1
39°00S
LA BELLA - 1
ERIC THE RED - 1
VIC/P30
VIC/P31
PRAWN A1
S.A.
VICTORIA
MINERVA-2/2A
LOCATION MAP
BHP Petroleum
OTWAY BASIN
MINERVA-2/2A
LOCATION MAP
E SMITH

1 WELL SUMMARY SHEET

a. Minerva-2

Well:	Minerva-2
Permit:	VIC/P31 Otway Basin
Well Path:	Vertical
Planned Location:	Lat: 38° 43' 04.30"S Long: 142° 57' 19.476"E
Actual Location:	Lat: 38° 43' 04.165"S Long: 142° 57' 19.476"E East: 670 000.74 North: 5 712 706.29 UTM: 84 CM: 141° E
Seismic Reference:	Line: OE80A-1056 SP:4067
Elevation:	RT to MSL:25.3m
Water Depth MSL to Seabed:	59.7m
Total Depth Driller:	560mMD
(TVD)Driller:	560mTDV
Rig on Location:	1906 hrs, 16 September 1993
Spud Date:	2030 hrs, 18 September 1993
Reached TD:	1 day 7.5 hours
Rig Released:	1915 hrs, 21 September 1993
Total Rig Days:	9 Days 1:15 Hours
Well Status:	PLUGGED and ABANDONED
Operator:	BHP PETROLEUM PTY. LTD.
Rig Name:	BYFORD DOLPHIN
Drilling Contractor:	DOLPHIN DRILLING
Actual Well Cost:	$ 1.585M

b Minerva-2A

Well:	Minerva-2A
Permit:	VIC/P31 Otway Basin
Well Path:	Vertical
Planned Location:	Lat: 38° 43' 04.30"S Long: 142° 57' 19.90"E
Actual Location:	Lat: 38° 43' 04.535"S Long: 142° 57' 20.800"E East: 670 032.46 North: 5 712 694.21 UTM: 84 CM: 141° E
Seismic References:	Line: OE80A-1056 SP:4067
Elevation:	RT to MSL:25.3m
Water Depth MSL to Seabed:	59.7m
Total Depth Driller:	2170mMD
(TVD)Driller:	2170mTDV
Rig on Location:	1915 hrs, 21 September 1993
Spud Date:	2045 hrs, 21 September 1993
Reached TD:	11 October 1993 1800hours
Rig Released:	0830 hrs, 17 October 1993
Total Rig Days:	19 Days 22.45 Hours
Well Status:	Gas Well, Plugged and Suspended
Operator:	BHP PETROLEUM PTY. LTD.
Rig Name:	BYFORD DOLPHIN
Drilling Contractor:	DOLPHIN DRILLING
Actual Well Cost:	$ 5.791M

N

2 FINAL DRILLING REPORT

FINAL DRILLING REPORT

BHP PETROLEUM PTY. LTD.

PERMIT: VIC/P31

MINERVA-2/2A

NOVEMBER 1993

BHP Petroleum

DISTRIBUTION LIST

MINERVA-2/2A

Exploration	2 copies (1 copy unbound for distribution to partners and government)
Drilling - Well File	1 copy Original
Exploration Information Centre	1 copy

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SECTION 1

1.0 WELL DATA

MINERVA-2

Well	:	MINERVA-2
Permit	:	VIC/P31
Designation	:	APPRAISAL
Operator	:	BHP PETROLEUM PTY. LTD.
Rig	:	BYFORD DOLPHIN
Type	:	SEMISUBMERSIBLE
Drilling Contractor	:	DOLPHIN DRILLING
Water Depth	:	59.7m
RT Elevation	:	25.3m
Total Depth	:	560mMD 560mTVD
Final Surface Location	:	Lat S 38° 43' 04.165" Long E 142° 57' 19.476" Easting 670 000.7 Northing 5 712 706.3
Location Reference Datum	:	ADG84, WGM 54 141°E
Commencement Date	:	1830 hrs, 12 September 1993
Rig on Location	:	1906 hrs, 16 September 1993
Well Spudded	:	2030 hrs, 18 September 1993
TD Date	:	0400 hrs, 20 September 1993
Drilling Days to TD	:	1 Days, 7.5 hours
Rig Released	:	1915 hrs, 21 September 1993
Total Well Duration	:	9 Days, .75 hours
Status	:	ABANDONED

1.0 WELL DATA

MINERVA-2A

Well	:	MINERVA-2A
Permit	:	VIC/P31
Designation	:	APPRAISAL
Operator	:	BHP PETROLEUM PTY. LTD.
Rig	:	BYFORD DOLPHIN
Type	:	SEMISUBMERSIBLE
Drilling Contractor	:	DOLPHIN DRILLING
Water Depth	:	59.7m
RT Elevation	:	25.3m
Total Depth	:	2170mMD 2170mTVD
Final Surface Location	:	Lat S 38° 43' 04.535" Long E 142° 57' 20.800" Easting 670 032.5 Northing 5 712 694.2
Location Reference Datum	:	AGD84, WGM54 141°E
Commencement Date	:	1915 hrs, 21 September 1993
Rig on Location	:	1915 hrs, 21 September 1993
Well Spudded	:	2245 hrs, 21 September 1993
TD Date	:	1800 hrs, 11 October 1993
Drilling Days to TD	:	19 Days, 19.25 hours
Rig Released	:	0830 hrs, 17 October 1993
Total Well Duration	:	25 Days, 13.25 hours
Status	:	SUSPENDED

1.1 CONTRACTORS

MINERVA-2/2A

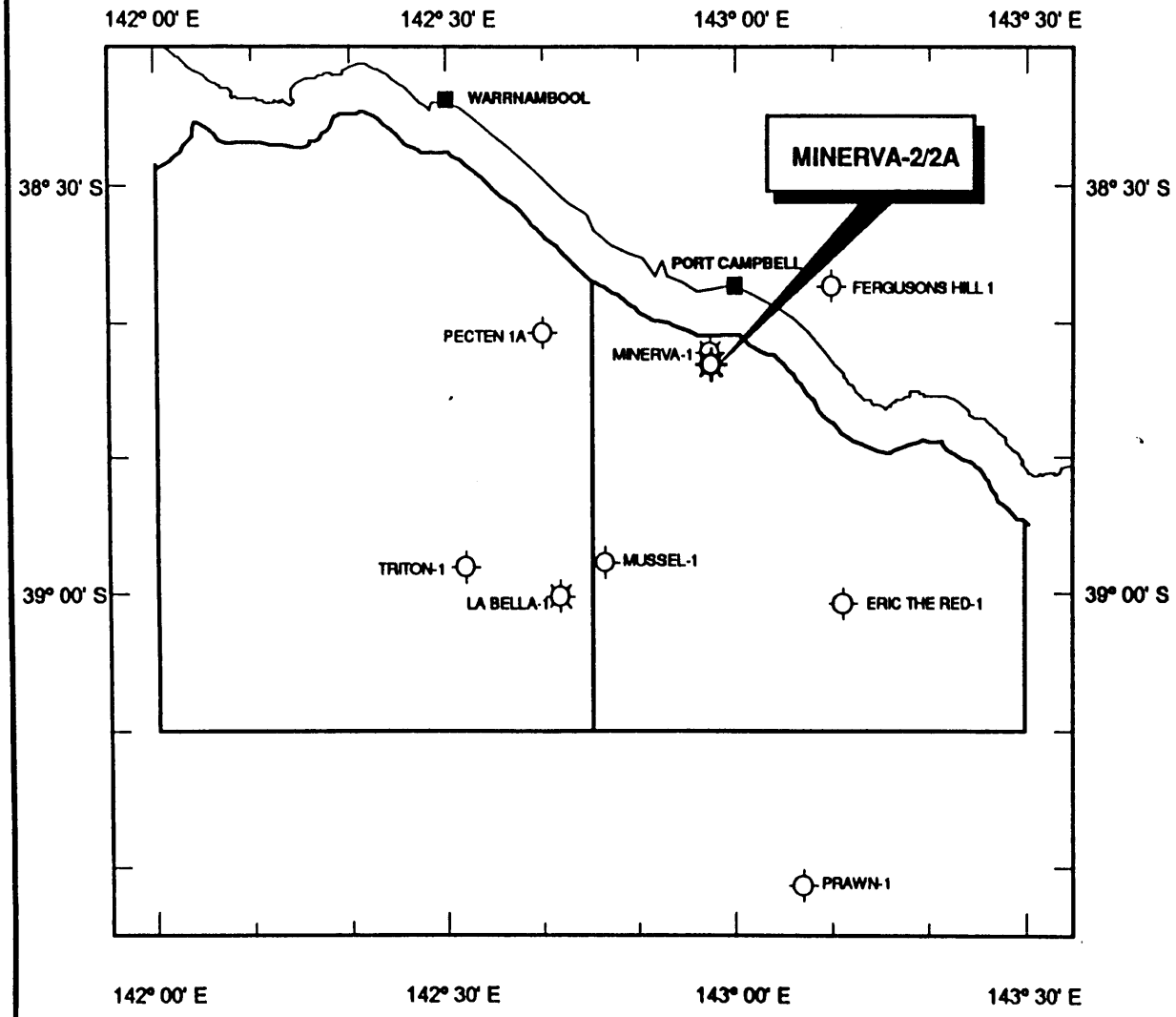
SERVICE	CONTRACTOR
CEMENT SUPPLY	HALLIBURTON
CEMENTING	HALLIBURTON
CORING	DIAMANT BOART
DIRECTIONAL	HALLIBURTON
DIVING/ROV	DRILL SUPPORT
DRILLING FLUIDS	INTEQ
ELECTRIC LOGGING	SCHLUMBERGER
HELICOPTERS	LLOYD HELICOPTERS
JARS & SHOCK SUBS	MARETECH
MUD LOGGING	INTEQ
MWD	INTEQ
ROLLER REAMERS	GEARHART UNITED PT
SOLIDS CONTROL	OILTOOLS
STANDBY VESSEL	SWIRE:PAC.MARLIN
SUPPLY VESSEL	AOS:FARSWORD
SUPPLY VESSEL	TW:BONAVISTA
WEATHER	OCEAN ROUTES
WELL TESTING	HALLIBURTON RESERV
WELLHEAD	DRILQUIP
WELLHEAD SEVERANCE	AUSTOIL

BHP Petroleum

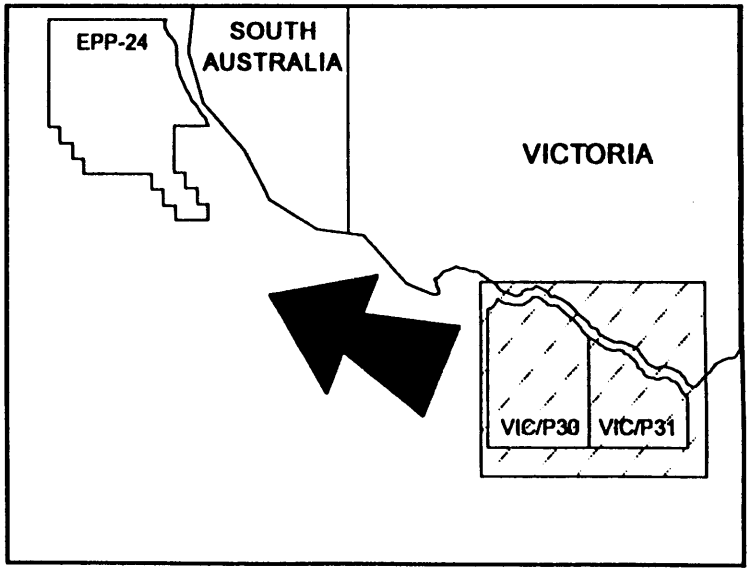
FINAL DRILLING REPORT

1.2 LOCATION MAP

WELL : MINERVA-2/2A



Permit No.	:	VIC/P31
Rig	:	BYFORD DOLPHIN
Latitude	:	38° 43' 04.535" S
Longitude	:	142° 57' 20.800" E



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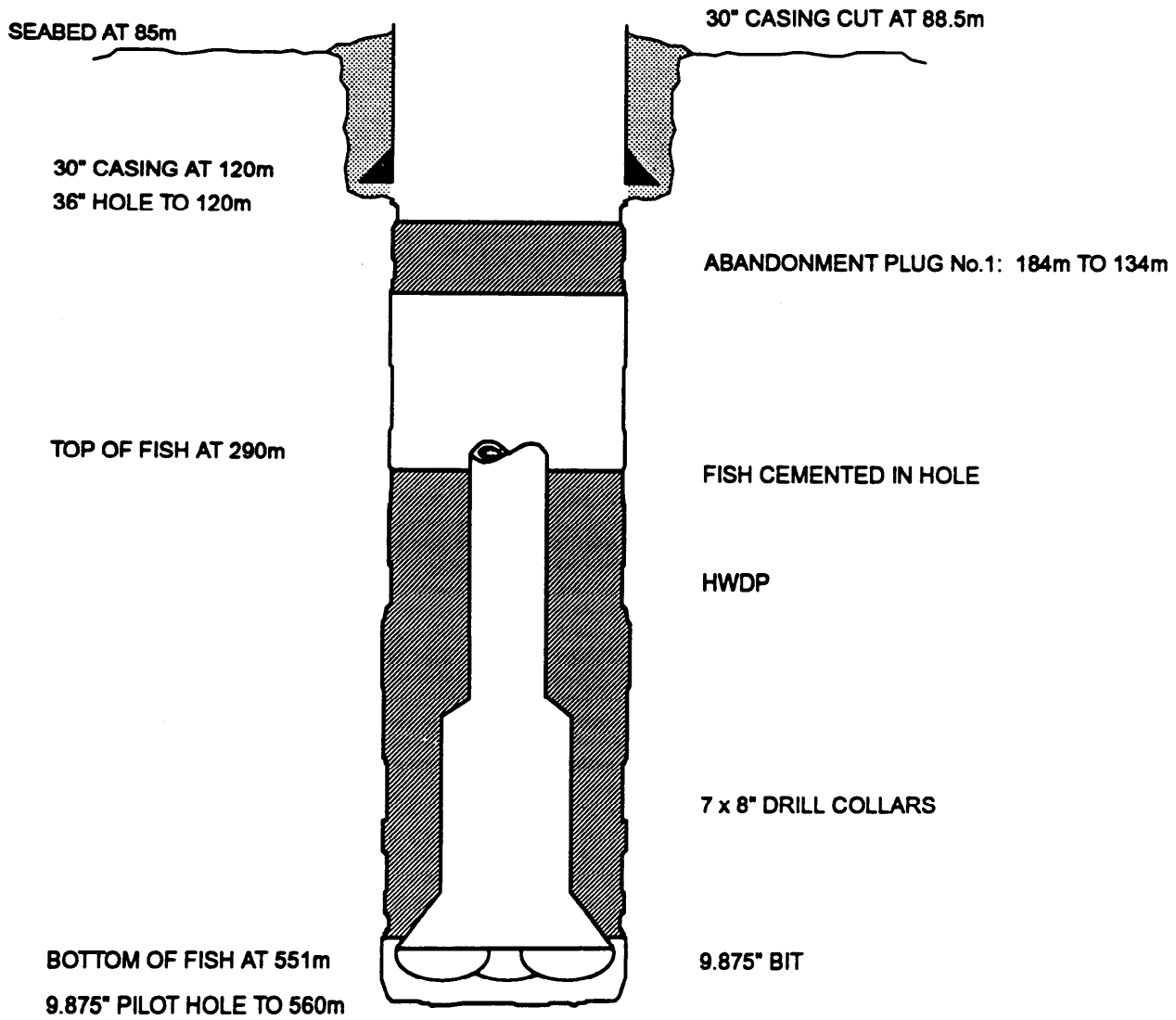
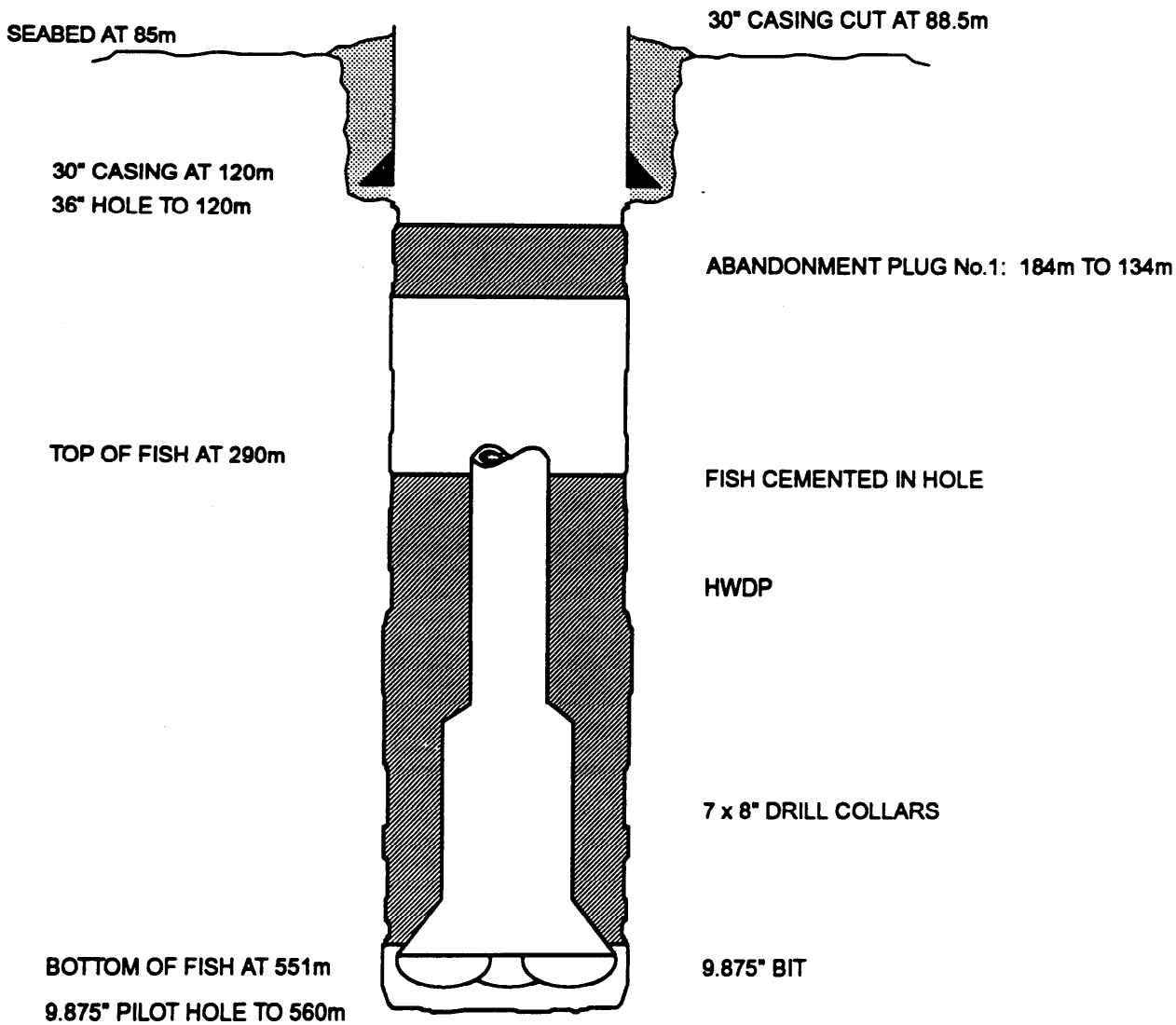
Date: 12-NOV-93

ALL DEPTHS RT BYFORD DOLPHIN

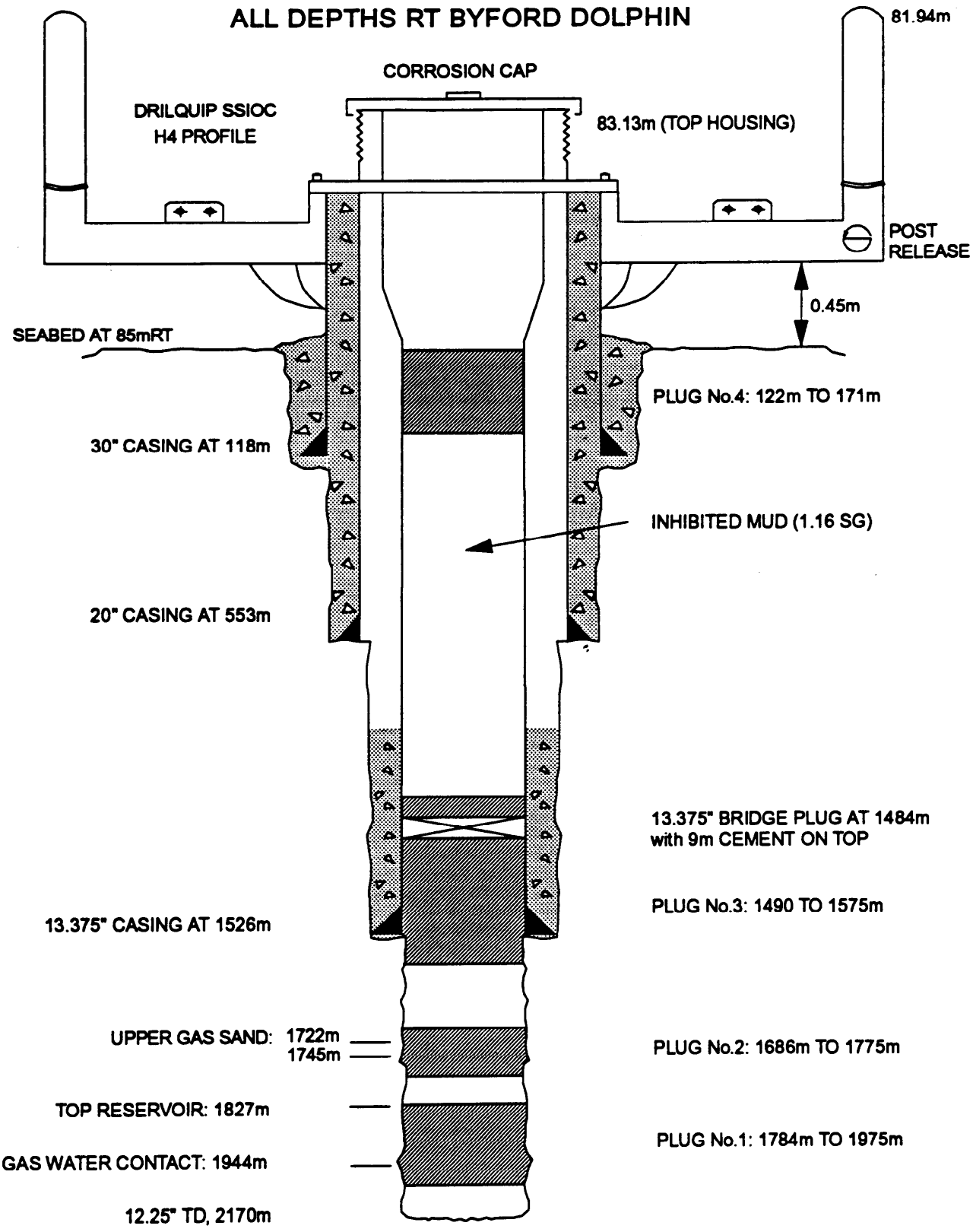


ALL DEPTHS RT BYFORD DOLPHIN



1.3.1 WELL SCHEMATIC

MINERVA-2A



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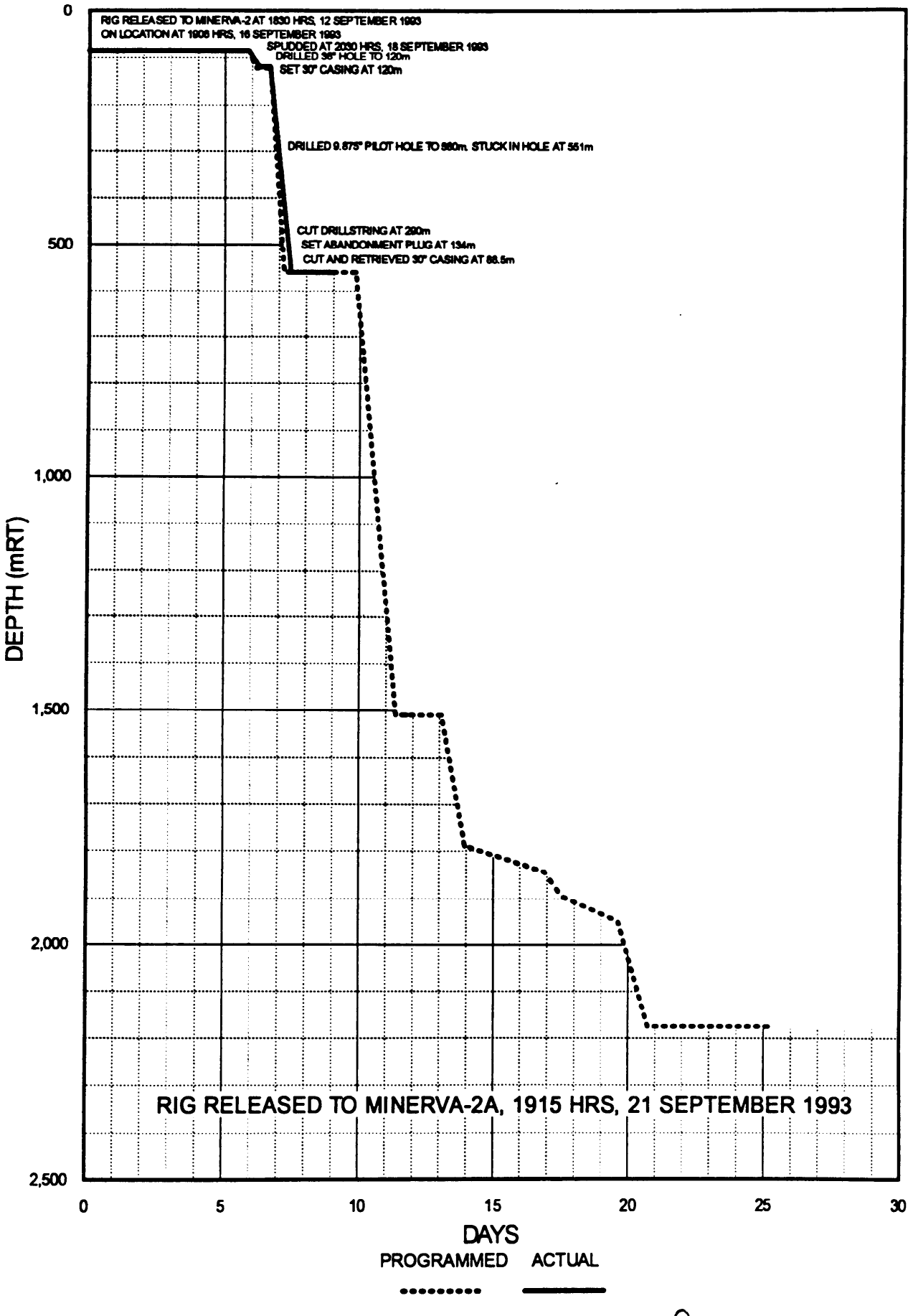
FINAL DRILLING REPORT

1.4 TIME vs DEPTH CURVE

MINERVA-2



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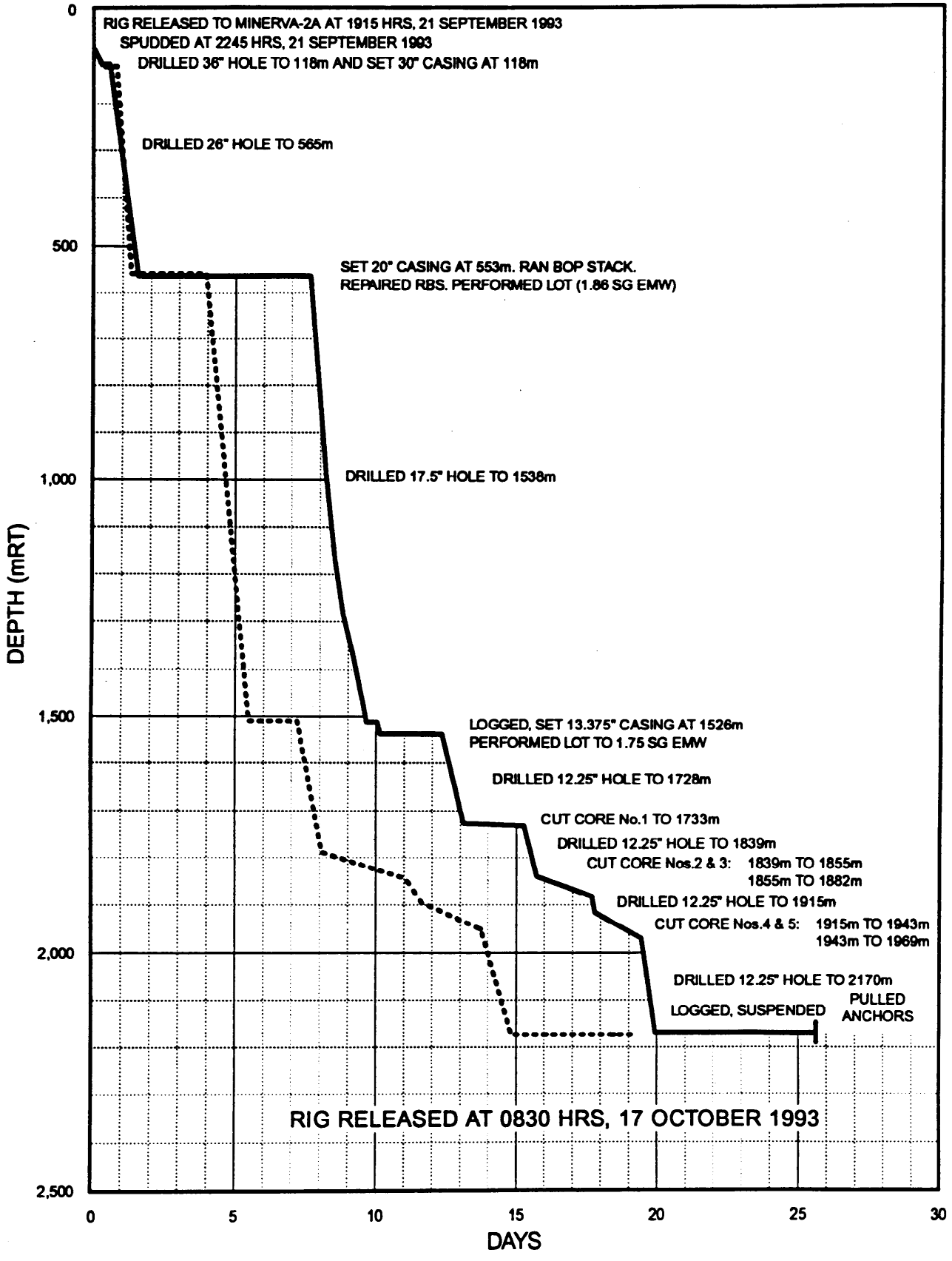
FINAL DRILLING REPORT

1.4.1 TIME vs DEPTH CURVE

MINERVA-2A



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SECTION 2

The rig was released from Vivonne-1 at 1830hrs, 12th September 1993 and the first anchor dropped at Minerva-2 at 1930hrs, 16th September 1993. All anchors were pretensioned 159tonne.

Minerva-2 was spudded at 2030hrs, 18th September 1993, and the 36" hole was drilled from 85m to 120m. The 30" casing was set at 120m and cemented back to the sea floor. A 9.875" shallow gas pilot hole was drilled to a depth of 560m. No gas indications were observed and the hole was plugged back with cement. While cementing, the drillstring became stuck, a free point indicator was run and the pipe severed at 290m. An abandonment plug was set in the 30" casing from 134m to 184m. The 30" casing/PGB was subsequently mechanically cut and retrieved.

The rig was skidded 35m, on a bearing of 115 degrees, at 1915hrs, 21st September 1993 and Minerva-2A spudded at 2245hrs the same day. The 36" hole was drilled from 85m to 118m, and the 30" casing was run and cemented at 118m.

The 26" hole was drilled from 118m to 565m and the 20" casing was run, set at 553m and cemented back to the seafloor.

The BOP stack was run and successfully tested to 10,000psi. When running in with the 17.5" BHA and F2000S Dynadrill, a guide assembly hinge pin from the lower port side TDS carriage sheared. The remaining seven guide assemblies were removed and five pins were found to be cracked and another considered suspect. All of the guide assemblies were sent into Portland and the hinge pins replaced.

On completion of rig repairs, the 17.5" BHA with 9.625" high flow motor was run in. The shoe track was drilled out and 3m of new hole was drilled to 568m. An FIT was conducted to 1.86 SG EMW and the 17.5" hole continued to 1538m. Due to sloughing hole conditions, the MW was increased to 1.16 SG at 1512m. On completion of Suite No.1 wire line logs, the 13.375" casing was run and cemented at 1526m.

The BOP stack was pressure tested, 12.25" hole was drilled to 1541m and a leak off tested conducted to 1.75 SG EMW. Drilling continued to 1728m, where an attempt to cut core No.1 failed due to high torque. A clean out trip was made and the hole drilled to 1728.5m. Core No.1 was cut from 1728.5m to 1733.5m before a pressure loss and drop in ROP terminated the coring operation. The pressure drop was found to be due to a cracked fibreglass inner barrel. Core recovery was 100%. Drilling continued to 1839m and Core No.2 was cut from 1839m to 1855.5m (97.5% recovery). Due to a slightly under gauge core head, a trip was made to ream out the bottom section. Core No.3 was cut from 1855.5m to 1882.5m (100%). Drilling continued to 1915m after which Cores No.4 and No.5 were cut; 1915m to 1943m (99% recovery) and 1943m to 1969m (100% recovery). The 12.25" hole was drilled to a total depth of 2170m and Suite No.2 wireline logs were run. On completion of wireline logs the well was plugged and suspended, and the rig released at 0830hrs, 17th October 1993.

2.1 DAILY OPERATIONS

MINERVA-2

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
12/09/93	1	0.00	18:30	24:00	5.50	ON TOW TO LOCATION WITH FAR SWORD. TRAVELLED 6 Nm, 381 Nm TO GO. SPEED 2-3 knots
13/09/93	2		00:00	24:00	24.00	ON TOW TO LOCATION WITH FAR SWORD. DISTANCE TRAVELLED : 97 Nm TOTAL DISTANCE TO LOCATION : 387 Nm AVERAGE SPEED : 3.3 knots CURRENT SPEED : 4.2 knots ETA : 2100 hrs 16/9/93. POSITION : 37°2.7'S 137°19.5'E
14/09/93	3		00:00	24:00	24.00	ON TOW TO LOCATION WITH FAR SWORD. DISTANCE TRAVELLED : 200 Nm TOTAL DISTANCE TO LOCATION : 387 Nm AVERAGE SPEED : 3.7 knots CURRENT SPEED : 4.2 knots POSITION : 37:51.1'S 139:22.4'E ETA: 2100hrs 16/09/93
15/09/93	4		00:00	24:00	24.00	ON TOW TO LOCATION WITH FAR SWORD. DISTANCE TRAVELLED : 311 Nm TOTAL DISTANCE TO LOCATION: 387 Nm TOTAL SPEED : 4.0 knots CURRENT SPEED : 4.5 knots POSITION : 38:40.5'S 141:18.3'E ETA:1730 hrs,16/9/93
16/09/93	5		00:00	19:30	19.50	ON TOW TO LOCATION WITH FAR SWORD. DISTANCE TO LOCATION : 387 Nm AT 4.3 knots DROPPED ANCHOR No.6 AT 1906 hrs, ON BOTTOM AT 1930 hrs.
			19:30	20:15	0.75	OFFLOADED BONAVISTA.
			20:15	24:00	3.75	RAN ANCHORS AS FOLLOWS: BONAVISTA: No.12 ON BOTTOM AT 2208hrs. NOTE: No.7 ANCHOR CHAIN PARTED AT 0125hrs AT RIG GYPSY. BONAVISTA WORKWIRE PARTED AT SOCKET WHILE RECOVERING.
17/09/93	6		00:00	24:00	24.00	CONTINUED TO RUN ANCHORS AS FOLLOWS: FAR SWORD OFF TOW BRIDLE AT 0210. FARSWORD : No.1 ON BOTTOM AT 0442hrs. No.11 ON BOTTOM AT 1050hrs. No.2 ON BOTTOM AT 1245hrs. No.5 ON BOTTOM AT 1550hrs. No.8 ON BOTTOM AT 1720hrs. No.9 ON BOTTOM AT 1828hrs. No.10 ON BOTTOM AT 1940hrs. No.3 ON BOTTOM AT 2122hrs. No.4 ON BOTTOM AT 2312hrs.
18/09/93	7	1.00	00:00	10:30	10.50	COMPLETED RUNNING ANCHORS. FAR SWORD :

2.1 DAILY OPERATIONS — MINERVA-2

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
18/09/93	7	1.00				No.7 ON BOTTOM AT 0735hrs. PRE-TENSIONED ALL ANCHORS TO 350 kip - OK.
			10:30	15:45	5.25	BALLASTED RIG TO DRILLING DRAFT.
			15:45	19:30	3.75	PICKED UP AND RACKED DP STANDS IN DERRICK WHILE MIXING MUD AND BACKLOADING FAR SWORD.
			19:30	20:30	1.00	RIH WITH 36" BHA AND TAGGED SEABED AT 85m RT.
			20:30	24:00	3.50	DRILLED 36" HOLE FROM 85m TO 114m PUMPING 50 bbl HI VIS MUD/SINGLE.
19/09/93	8	2.00	00:00	00:45	0.75	DRILLED 36" HOLE FROM 114m TO 120m PUMPING 50bbl HI-VISMUD/SINGLE.
			00:45	01:00	0.25	DISPLACED HOLE WITH 300bbl PRE-MIX.
			01:00	02:00	1.00	POH. HOLE CONDITION GOOD.
			02:00	08:00	6.00	RAN 3 JOINTS 30" CASING (SHOE,INTERMEDIATE, HOUSING). UNABLE TO MAKEUP RT INTO HOUSING, PICKED UP BACKUP RT. STABBED INTO 36" HOLE WITH ROV OBSERVATION,LANDED SHOE AT 120m. TOTAL CASING LENGTH:35.9m, HOUSING AT 84m.
			08:00	08:30	0.50	CIRCULATED 30bbl SEAWATER,GOOD RETURNS.
			08:30	09:00	0.50	CEMENTED CASING WITH 480 sxs G AT 1.9 SG c/w 2% BWOC CaCl2.GOOD RETURNS THROUGHOUT.
			09:00	10:15	1.25	CONFIRMED PGB ANGLE AT 1 DEGREE TOWARDS No.4 POST, BACKED OUT AND RECOVERED RT.
			10:15	11:15	1.00	PICKED UP DRILLPIPE STANDS.
			11:15	12:45	1.50	RIH WITH 9.875" PILOT HOLE ASSEMBLY.
			12:30	24:00	11.50	DRILLED 9.875" PILOT HOLE FROM 120m TO 541m, SWEEPING 20bbl HI-VIS MUD/SINGLE.
20/09/93	9	3.00	00:00	04:00	4.00	DRILLED 9.875" PILOT HOLE FROM 541m TO 560m SWEEPING 20 bbl HI-VIS MUD/SINGLE, RETURNS GOOD.
			04:00	04:30	0.50	SET PILOT HOLE ABANDONMENT PLUG WITH 45sx G NEAT AT 1.9 SG FROM 551m. GOOD RETURNS.
			04:30	13:30	9.00	SET PIPE IN SLIPS,BROKE OFF CEMENT HOSE, PIPE STUCK. WORKED PIPE WITH UP TO 400 kips OVER-PULL BUT NO MOVEMENT. UNABLE TO ROTATE OR CIRCULATE INITIALLY. REGAINED CIRCULATION AFTER 0.5hrs AND SWEPT SEVERAL 50bbl HI-VIS SLUGS. CONTINUED TO WORK PIPE: NO MOVEMENT.
			13:30	17:30	4.00	RIGGED UP 5" ELEVATORS ON 2 RISER TENSIONERS TO SUPPORT DRILLSTRING UNDER THE DRILLFLOOR.
			17:30	22:30	5.00	RIGGED AND RAN SCHLUMBERGER FREE POINT INDICATOR. PIPE FREE ABOVE 290m.
			22:30	24:00	1.50	RIGGED SCHLUMBERGER COLLIDING TOOL.
21/09/93	10	4.00	00:00	00:45	0.75	RIGGED UP SCHLUMBERGER. MADE UP CHARGE.
			00:45	01:30	0.75	STABBED SCHLUMBERGER INTO PIPE. LATCHED ELEVATORS AND PULLED 15kip OVERPULL. BLEW PIPE AT 290m.
			01:30	02:15	0.75	RIGGED DOWN SCHLUMBERGER, BAILS AND SLINGS.

2.1 DAILY OPERATIONS

MINERVA-2

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
21/09/93	10	4.00	02:15	02:45	0.50	LAID OUT DRILL PIPE DOUBLE. POH TO 184m.
			02:45	03:15	0.50	RIGGED UP CEMENT UNIT AND TESTED TO 2000psi. CEMENTED PILOT HOLE FROM 184m-134m WITH 150sx 1.9 SG NEAT CLASS 'G' CEMENT.
			03:15	04:00	0.75	PULLED BACK TO 125m. FLUSHED PIPE AND POH. LOST IN HOLE - BIT, FLOAT SUB, 7x8" DC, X/O, 12xHWDP, 9x5" S135 DP.
			04:00	06:00	2.00	RIGGED UP AND PICKED UP 8" DRILL COLLARS AND HWDP. RACKED BACK SAME.
			06:00	10:15	4.25	PICKED UP AND MADE UP CASING CUTTER. TESTED SAME. RIH. STABBED IN WITH ROV OBSERVATION.
			10:15	15:30	5.25	CUT 30" CASING AT 88.5m.
			15:30	16:45	1.25	POH. LAID OUT SWIVEL, CROSS-OVER AND CUTTER.
			16:45	18:30	1.75	RIH WITH 30" RUNNING TOOL AND ENGAGED SAME.
			18:30	19:15	0.75	POH WITH 30" CASING/PGB. LANDED ON BEAMS. RIG RELEASED TO MINERVA-2A AT 1915hrs, 21/09/93.

2.1 DAILY OPERATIONS

MINERVA-2A

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
21/09/93	1	1.00	19:15	21:45	2.50	MOVED RIG 35m ON A BEARING OF 115°. (RACKED 30" RUNNING TOOL ON STAND OF S135 IN DERRICK. LAID OUT 30" CASING CUTTER AND MOVED PGB FROM MOONPOOL BEAMS.)
			21:45	22:45	1.00	RIH WITH 36" HOLE OPENER. TAGGED SEABED AT 85m.
			22:45	24:00	1.25	DRILLED 26" HOLE, OPENED TO 36" FROM 85m TO 115m. PUMPED 50bbl HI-VIS MUD/SINGLE.
22/09/93	2	2.00	00:00	00:30	0.50	DRILLED 26" HOLE, OPENED TO 36" FROM 115m TO 119m (36" HOLE TO 118m.).
			00:30	01:15	0.75	DISPLACED HOLE TO 300bbl PRE-HYDRATED GEL.
			01:15	01:45	0.50	POH WITH 26" BIT AND 36" HOLE OPENER.
			01:45	02:00	0.25	MADE UP CEMENT SWEDGE.
			02:00	02:45	0.75	POSITIONED PGB IN MOONPOOL.
			02:45	04:30	1.75	RIGGED UP AND PICKED UP 30" CASING. PICKED UP RUNNING TOOL AND CONTINUED RUNNING 30" CASING ON DRILL-PIPE.
			04:30	05:00	0.50	PICKED UP PGB AND CONTINUED RIH ON DRILL-PIPE. FILLED CASING AND CLOSED VALVES.
			05:00	05:45	0.75	STABBED INTO HOLE WITH ROV OBSERVATION.
			05:45	06:45	1.00	RIGGED UP CEMENT LINE AND CIRCULATED PRIOR TO CEMENT JOB AT 400gpm AND 450psi.
			06:45	07:30	0.75	TESTED CEMENT LINES TO 2000psi. MIXED AND PUMPED 500sx 1.9 SG, CLASS 'G' CEMENT WITH 1.5% CaCl2 AND 60bbl MIXWATER. DISPLACED WITH 12bbl SEAWATER.
			07:30	08:15	0.75	BACKED OUT RUNNING TOOL. POH WITH 30" RUNNING STRING AND LAID OUT RUNNING TOOL.
			08:15	09:45	1.50	PICKED UP 18.75" WELLHEAD AND RUNNING TOOL. MADE UP SINGLE BELOW AND PUP ABOVE. LAID OUT SAME.
			09:45	12:45	3.00	PICKED UP 5" DRILL-PIPE AND RIH.
			12:45	13:15	0.50	LAID OUT 36" BHA.
			13:15	16:00	2.75	MADE UP 26" BIT, HOLE OPENER AND FLOAT SUB. RIH AND TAGGED CEMENT AT 115m.
			16:00	16:45	0.75	DRILLED CEMENT AND SHOE TO 117.5m AND RAT HOLE TO 119m.
			16:45	24:00	7.25	DRILLED 26" HOLE FROM 119m TO 458m. PUMPED 30bbl HI-VIS MUD/HALF STAND. WORKED FULL STAND ON CONNECTIONS.
23/09/93	3	3.00	00:00	03:30	3.50	CONTINUED DRILLING 26" HOLE FROM 458m TO 565m. SWEPT 30-50bbl HI-VIS MUD/HALF STAND. WORKED FULL STAND ON CONNECTIONS.
			03:30	05:45	2.25	CIRCULATED BOTTOMS UP - PUMPED 50bbl HI-VIS MUD/15min. SWEPT HOLE WITH 200bbl HI-VIS MUD AND DISPLACED HOLE TO 900bbl PRE-HYDRATED GEL.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
23/09/93	3	3.00	05:45	06:00	0.25	DROPPED TOTCO SURVEY.
			06:00	06:45	0.75	POH. TIGHT HOLE FROM 539m TO 510m. (80 kip OVERPULL). HOOKED UP TDS AND WORKED THROUGH SAME. POH TO 461m.
			06:45	07:45	1.00	WORKED PIPE WHILE MIXING MUD.
			07:45	08:00	0.25	RIH TO 553m.
			08:00	08:30	0.50	PUMPED 250bbl 6% KCL/PHPA/POLYMER PILL.
			08:30	11:00	2.50	POH TO RUN 20" CASING. RETRIEVED SURVEY AT 9.5" DRILL COLLARS.
			11:00	12:00	1.00	RIGGED UP TO RUN 20" CASING.
			12:00	17:30	5.50	RAN 20" X-52 CASING (36 INTERMEDIATES, SHOE, CROSS OVER AND WELLHEAD). WASHED TIGHT HOLE FROM 286m TO 307m.
			17:30	19:30	2.00	RIH WITH CEMENT STINGER.
			19:30	21:00	1.50	PICKED UP 18.75" WELLHEAD. MADE UP SAME AND RIH WITH LANDING STRING. STOOD UP AT 551m. WASHED FROM 551m TO 553m AND LANDED WITH WELLHEAD AT 82m. TOOK 50kip OVERPULL.
			21:00	22:00	1.00	BACKED OUT RUNNING TOOL AND PULLED TO SURFACE DUE TO LEAKING BALL VALVE. RIH AND RE-ENGAGED RUNNING TOOL.
			22:00	23:00	1.00	CIRCULATED CASING AT 450gpm AND 500psi.
			23:00	24:00	1.00	TESTED LINES TO 3000psi. CEMENTED 20" CASING AS FOLLOWS: LEAD- 1080sx CLASS 'G' AT 1.5SG WITH 0.45gps ECONOLITE AND 320bbl MIXWATER; TAIL- 910sx CLASS 'G' AT 1.9SG NEAT AND 108bbl MIXWATER. DISPLACED WITH 49bbl S/WATER
24/09/93	4	4.00	00:00	01:15	1.25	CONTINUED CEMENTING 20" CASING.
			01:15	03:00	1.75	BACKED OUT RUNNING TOOL. POH WITH LANDING STRING AND BROKE OUT AND SERVICED RUNNING TOOL. LAID OUT SAME. STRAPPED PIPE - RT TO 18.75" WELLHEAD 81.88m.
			03:00	09:15	6.25	RIGGED UP TO RUN BOP's. CHANGED OUT AX/VX RING ON LOWER PACKAGE CONNECTOR. CHANGED OUT LATCHING DOG FOR AX/VX RING GASKET.
			09:15	09:30	0.25	REPAIRED BURST HYDRAULIC HOSE ON GANTRY CRANE.
			09:30	13:00	3.50	CHANGED OUT AX RING GASKET ON LMRP. INSTALLED GUIDE WIRES AND ATTACHED BEACONS AND BULLSEYE. PREPARED TO RUN BOP's.
			13:00	15:00	2.00	REMOVED RISER FROM LMRP AND REPAIRED JUNCTION BOX ON BLUE POD. VERIFIED ALL FUNCTIONS AND NIPPLED UP DOUBLE.
			15:00	19:45	4.75	RAN RISER. TESTED CHOKE AND KILL LINES TO 500/5000psi FOR 5min. PICKED UP SLIP JOINT AND LANDING JOINT. HOOKED UP CHOKE AND KILL LINES AND PICKED UP SUPPORT RING.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
24/09/93	4	4.00	19:45	21:30	1.75	PULLED ROV TO SURFACE TO REPAIR THRUSTER MOTOR. WHILE ON SURFACE HYDRAULIC HOSE TO ROV CRANE BLEW. REPAIRED SAME AND JUMPED ROV.
			21:30	24:00	2.50	MOVED RIG AFT AND LANDED BOP AT 2215hrs. TESTED LATCH WITH 50kips OVERPULL. LAID OUT LANDING JOINT AND NIPPLED UP DIVERTER.
25/09/93	5	5.00	00:00	00:30	0.50	INSTALLED DIVERTER.
			00:30	01:30	1.00	RIGGED DOWN RISER HANDLING EQUIPMENT.
			01:30	02:00	0.50	MADE UP TEST PLUG AND RIH.
			02:00	06:30	4.50	TESTED BOPs. TESTED CONNECTOR TO 10,000psi. ALL RAMS, FAILSAFES AND ANNULARS TO 500/3000psi. SHEAR RAMS AND CASING TO 500/1500psi (3.8bbl). CHOKE MANIFOLD TO 500/3000psi. TESTED ON YELLOW POD, FUNCTION TESTED BLUE POD.
			06:30	07:00	0.50	POH WITH TEST PLUG.
			07:00	10:00	3.00	RIGGED UP AND TESTED SURFACE EQUIPMENT - IBOP TO 500/5000psi. STANDPIPE AND KELLY HOSE TO 500/4000psi. STAB IN VALVES TO 500/5000psi.
			10:00	11:15	1.25	RIH AND SET NOMINAL SEAT PROTECTOR. STRAPPED OUT - RT TO HP WELLHEAD 82m. POH AND LAID OUT TOOL. (CONTINUED PRESSURE TESTING MUD MANIFOLD TO 500/5000psi).
			11:15	16:45	5.50	RIGGED UP AND PICKED UP 5" DRILL PIPE.
			16:45	17:30	0.75	LAID OUT 26" BHA.
			17:30	19:15	1.75	PICKED UP SPARE DYNADRILL, BROKE OUT SLEEVE AND LAID OUT MOTOR. PICKED UP DYNADRILL AND EXCHANGED SLEEVE, MADE UP CROSS OVERS AND BIT. TESTED MOTOR AT SURFACE.
			19:15	20:30	1.25	RIH WITH BHA (PICKED UP 2 x STRING ROLLER REAMERS) TO 87m.
			20:30	24:00	3.50	LOWER PORT SIDE GUIDE ROLLER ASSEMBLY HINGE PIN FAILED AND ASSEMBLY FELL 4.5m TO FLOOR. SECURED LOWER DOLLY ASSEMBLY AND REMOVED LOWER STARBOARD SIDE ROLLER ASSEMBLY.
26/09/93	6	6.00	00:00	24:00	24.00	SECURED TDS BLOCK RETRACT ASSEMBLY TO GUIDE RAILS. REMOVED REAR ROLLERS FROM TRAVELLING BLOCK RETRACT ASSEMBLY. SECURED TRAVELLING BLOCK RETRACT ASSEMBLY IN A STOWED POSITION. REMOVED BOGIES FROM UPPER CARRIAGE. ALL HINGE PINS FOUND TO BE CRACKED. SECURED LOWER CARRIAGE IN STOWED POSITION AND REMOVED REMAINING TWO BOGIES - ONE PIN CRACKED, THE OTHER SUSPECT. RIGGED UP STORM LINES TO SECURE BLOCKS AND LAID OUT 2 x 8" DRILL COLLARS (BIT AT 67m). REMOVED BUSHINGS FROM GUIDE ROLLER ASSEMBLY HINGE POINT.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
27/09/93	7	7.00	00:00	24:00	24.00	REMOVED GUIDE ASSEMBLY HINGE BUSHINGS AND CLEANED RECESSES. SERVICED ASSEMBLY ROLLERS AND PREPARED TDS RETRACT ASSEMBLY FOR RE-INSTALLATION OF GUIDE ASSEMBLIES. FABRICATED PADEYES AND SAFETY CHAINS FOR ASSEMBLIES AND COMMENCED INSTALLATION OF GUIDE ASSEMBLIES UPON ARRIVAL.
28/09/93	8	8.00	00:00	24:00	24.00	CONTINUED TO INSTALL GUIDE ASSEMBLIES ON RETRACT ASSEMBLY. ATTACHED SAFETY CHAINS TO GUIDE ASSEMBLIES.
29/09/93	9	9.00	00:00	03:45	3.75	CONTINUED TO INSTALL GUIDE ASSEMBLIES AND SAFETY CHAINS.
			03:45	06:15	2.50	PICKED UP TWO 8" DRILLCOLLARS,JARS AND PONY COLLAR. RIH AND TAGGED CEMENT AT 540m.
			06:15	07:30	1.25	DRILLED FIRM CEMENT TO SHOE AT 553m.
			07:30	08:00	0.50	DISPLACED HOLE TO MUD AND CLEANED OUT RATHOLE TO 565m.
			08:00	08:15	0.25	DRILLED 17.5" HOLE FROM 565m TO 568m.
			08:15	09:30	1.25	CIRCULATED HOLE CLEAN.
			09:30	10:45	1.25	PULLED BACK INTO SHOE AND PERFORMED FIT TO 1.86 SG EMW (MW=1.07 SG;PRESSSURE=625psi).
			10:45	24:00	13.25	DRILLED 17.5" HOLE FROM 568m TO 987m. HARD DRILLING DUE TO WELL CEMENTED SANDS FROM 568m TO 620m. HOLE CONDITION GOOD.FROM 620m ONWARDS FAST ROP AND SAND CAUSING BLINDING OF SHAKERS.
30/09/93	10	10.00	00:00	24:00	24.00	DRILLED 17.5" HOLE FROM 987m TO 1379m. FLOW CHECKED DRILLING BREAKS. HOLE CONDITION GOOD.
01/10/93	11	11.00	00:00	10:45	10.75	DRILLED 17.5" HOLE FROM 1379m TO 1512m. HOLE CONDITION GOOD.
			10:45	12:45	2.00	CIRCULATED HOLE CLEAN.
			12:45	13:00	0.25	DROPPED SURVEY.
			13:00	16:15	3.25	POH 4 STANDS THEN PUMPED OUT FROM 1313m TO 1086m. GENERAL OVERPULL 30000-50000lb. MAX OVERPULL 150000lb. CONTINUED TO POH TO 970m WITHOUT PUMPS. RIH.
			16:15	16:45	0.50	WASHED AND REAMED FROM 1473m TO 1512m WITH 25000lb WOB.
			16:45	20:00	3.25	CIRCULATED HOLE-UNABLE TO CLEAN HOLE AFTER 2 CIRCULATIONS. LARGE AMOUNT OF CUTTINGS COMING OVER SHAKERS.INCREASED MUD WEIGHT TO 1.16 SG.
			20:00	22:15	2.25	DRILLED 17.5" HOLE FROM 1512m TO 1538m.
			22:15	24:00	1.75	CIRCULATED HOLE.
02/10/93	12	12.00	00:00	01:00	1.00	CONTINUED TO CIRCULATE HOLE CLEAN. SPOTTED 200bbl HI-VIS PILL ON BOTTOM.
			01:00	06:00	5.00	FLOWCHECKED.POH 10 STANDS WET. FLOWCHECKED.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
02/10/93	12	12.00				PUMPED SLUG. CONTINUED TO POH- AVERAGE DRAG 10000lb, MAXIMUM OVERPULL OF 40000lb BETWEEN 1300m AND 1340m.
			06:00	07:00	1.00	SERVICED AND LAID OUT MOTOR. LAID OUT BOTTOM REAMER AND BIT.
			07:00	09:00	2.00	MADE UP 13.375" CASING HANGER/PACKOFF ONTO DP STAND, CEMENT HEAD ONTO DP STAND AND RACKED BOTH IN DERRICK.
			09:00	14:45	5.75	RIGGED UP SCHLUMBERGER FOR LOG SUITE NO.1 RUN NO.1 GPIT/MSFL/DLL/SDT/GR/AMS.UNABLE TO PASS 1525m. BHST; 58 DEG C.
			14:45	15:15	0.50	RIH AND RECOVERED WEAR BUSHING.
			15:15	24:00	8.75	RIGGED UP AND RAN 13.375" CASING-TOTAL 0F 122 JOINTS. 50000lb DRAG TOWARDS END OF CASING RUN. PREPARED TO PICK UP RUNNING STRING.
03/10/93	13	13.00	00:00	01:00	1.00	MADE UP 13.375" HANGER AND RIH ON LANDING STRING. TAKING WEIGHT ON THE LAST STAND-UP TO 150000lb.
			01:00	01:30	0.50	WASHED CASING DOWN LAST 9m.
			01:30	03:30	2.00	CIRCULATED TWICE BOTTOMS UP.
			03:30	06:45	3.25	RIGGED UP CEMENT LINES AND TESTED TO 3000psi.DROPPED BALL,MIXED AND PUMPED CEMENT AS FOLLOWS: LEAD : 270sx AT 1.5 SG WITH 0.45gal/sx ECONOLITE IN 80bbl DRILLWATER. TAIL : 924sx AT 1.9 SG NEAT IN 110bbl DRILLWATER. DROPPED DART AND SHEARED BOTTOM PLUG AT 2700psi. DISPLACED CEMENT WITH 710bbl SEAWATER AND BUMPED PLUG TO 3000psi.
			06:45	07:15	0.50	SET SEAL ASSEMBLY AND TESTED TO 3500psi.
			07:15	10:15	3.00	TESTED BOPs TO 500/3000psi.
			10:15	11:00	0.75	SHEARED OUT RUNNING TOOL WITH 70000lb OVERPULL AND POH.
			11:00	12:30	1.50	TESTED SURFACE EQUIPMENT TO 500/5000 psi.
			12:30	13:45	1.25	RIH WITH WEAR BUSHING AND SET SAME.
			13:45	16:15	2.50	LAID OUT 9.5" DC. MADE UP BIT, JUNK SUB AND MWD.
			16:15	16:45	0.50	TESTED MWD.
			16:45	22:00	5.25	CONTINUED TO PICK UP 12.25" BHA AND RIH. PICKED UP 9 STANDS DP ON WAY IN.
			22:00	24:00	2.00	TAGGED CEMENT AT 1498m AND DRILLED SHOETRACK. PUMPED 100bbl HI-VIS PILL AND DISPLACED HOLE TO MUD AT SHOE.
04/10/93	14	14.00	00:00	00:45	0.75	CONTINUED TO DISPLACE HOLE TO MUD AND CLEANED RATHOLE TO 1538m. WORKED JUNK SUB.
			00:45	01:45	1.00	DRILLED 12.25" HOLE FROM 1538m TO 1541m.

2.1 DAILY OPERATIONS

MINERVA-2A

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
04/10/93	14	14.00	01:45	02:15	0.50	CIRCULATED HOLE CLEAN.
			02:15	03:30	1.25	PULLED BACK INTO SHOE AND PERFORMED LOT TO 1.75 SG (1.16 SG MUD,1280psi).
			03:30	05:30	2.00	DRILLED 12.25" HOLE FROM 1541m TO 1554m.
			05:30	06:15	0.75	DECREASE IN ROP FROM 18m/hr TO 5m/hr. PICKED UP OFF BOTTOM - SUSPECTED JUNK IN HOLE. WORKED PIPE, PULLED BACK INTO SHOE IN ATTEMPT TO DISLODGE JUNK. RIH.
			06:15	22:15	16.00	DRILLED 12.25" HOLE FROM 1554m TO 1728m. REAMED EACH CONNECTION. FLOWCHECKED DRILLING BREAKS AT 1622m AND AT 1722m.
			22:15	24:00	1.75	CIRCULATED SAMPLES AT 1722m. MAXIMUM GAS 4%.
05/10/93	15	15.00	00:00	00:15	0.25	CONTINUED TO CIRCULATE FOR SAMPLE.
			00:15	00:30	0.25	SURGED FOR JUNK.
			00:30	02:15	1.75	FLOWCHECKED AND PUMPED SLUG. UP TO 50000lb DRAG. FROM 1612m 100000lb OVERPULL. PUMPED OUT TO SHOE.HOLE TOOK 4bbl LESS.FLOWCHECKED AND RIH TO TD.
			02:15	03:45	1.50	CIRCULATED BOTTOMS UP: 6.8% GAS.
			03:45	07:45	4.00	FLOWCHECKED AND POH TO SHOE-10000 TO 20000lb DRAG. FLOWCHECKED,PUMPED SLUG AND POH-HOLE CONDITION GOOD. DUMPED MWD MEMORY ON SURFACE. DEEP HORIZONTAL GROOVES ON CUTTERS OF NEAR BIT REAMER. RECOVERED 0.5lb JUNK. STRAPPED PIPE 0.3m LONGER THAN TALLY.
			07:45	08:15	0.50	SERVICED TDS.
			08:15	14:00	5.75	MADE UP 27m COREBARREL AND RIH.
			14:00	16:30	2.50	HELD UP AT 1712m. REAMED UNDERGAUGE HOLE TO 1728m.
			16:30	17:30	1.00	EXPERIENCED HIGH TORQUE ON BOTTOM.UNABLE TO PUT WEIGHT ON BIT WITHOUT STRING STALLING. TRIP GAS- 0.11%.
			17:30	21:30	4.00	PUMPED SLUG.PULLED 10 STANDS-HOLE CONDITION GOOD.FLOWCHECKED.CONTINUED TO POH.
			21:30	24:00	2.50	MADE UP BIT,JUNK SUB,REAMER AND RIH.
06/10/93	16	16.00	00:00	01:15	1.25	CONTINUED TO RIH. FILLED PIPE AT SHOE AND BEFORE TAGGING BOTTOM.
			01:15	01:30	0.25	TAGGED UP AT 1716m. PICKED BACK UP TO 1702m. LIGHT REAMED AND WASHED TO 1728m.
			01:30	01:45	0.25	DRILLED 12.25" HOLE FROM 1728m TO 1728.5m.
			01:45	03:00	1.25	REAMED LAST STAND 3 TIMES,SURGED FOR JUNK AND CIRCULATED BOTTOMS UP. TRIP GAS AT 0.24%.
			03:00	06:15	3.25	PULLED BACK TO SHOE,FLOWCHECKED,PUMPED SLUG AND POH.FLOWCHECKED AT BOPs.
			06:15	10:00	3.75	MADE UP 27m COREBARREL AND RIH.
			10:00	10:30	0.50	TOOK WEIGHT AT 1693m. LIGHT REAMED AND WASHED TO BOTTOM AT 1728.5m.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
06/10/93	16	16.00	10:30	11:30	1.00	CIRCULATED BOTTOMS UP. TRIP GAS AT 0.06%.
			11:30	12:15	0.75	DROPPED BALL AND PICKED UP 6m PUP JOINT FOR SPACE OUT. ESTABLISHED CIRCULATION. BALL LANDED-PRESSURE AT 550psi,60spm.PRESSURE INCREASED TO 1000psi OFF BOTTOM. SLOWED PUMPS.PRESSURE STABILISED AT 60spm,950psi.
			12:15	12:45	0.50	PRESSURE STABILISED AT 850psi ON BOTTOM. CUT CORE No.1 FROM 1728.5m TO 1733.5m AT 10 TO 15 m/hr. PRESSURE DROPPED TO 525psi AND ROP DROPPED TO 5m/hr.
			12:45	16:15	3.50	PUMPED SLUG.POH.FLOWCHECKED AT TD AND SHOE.
			16:15	17:15	1.00	BREAK OUT INNER BARRELS AND LAID OUT CORE-100% RECOVERY.LOWER INNER BARREL WITH V-SHAPED CRACK APPROXIMATELY 4m FROM BOTTOM.
			17:15	18:30	1.25	MADE UP NEW INNER BARRELS, BROKE OUT BIT AND RACKED BACK CORE BARREL.
			18:30	20:30	2.00	LAID OUT MWD-RESISTIVITY SENSOR MALFUNCTION. PICKED UP NEW MWD,ROLLER REAMERS AND MADE UP.
			20:30	24:00	3.50	MADE UP BIT AND RIH.
07/10/93	17	17.00	00:00	01:15	1.25	CONTINUED TO RIH. FILLED PIPE AT SHOE.HELD TRIP DRILL.
			01:15	02:00	0.75	RIH TO 1704m AND REAMED MWD TO BOTTOM.
			02:00	03:30	1.50	DRILLED 12.25" HOLE FROM 1733.5m TO 1751m.
			03:30	04:00	0.50	CHANGED OUT SWIVEL PACKING. CIRCULATED ON CEMENT HOSE.
			04:00	09:30	5.50	DRILLED 12.25" HOLE FROM 1751m TO 1823.5m. DRILLING BREAK AT 1823m.
			09:30	09:45	0.25	FLOWCHECKED-OK.
			09:45	10:30	0.75	CIRCULATED FOR SAMPLE.GAS AT 0.44%.
			10:30	11:15	0.75	DRILLED 1823.5m TO 1830m. FLOWCHECKED DRILLING BREAKS AT 1828.5m AND 1830m-OK
			11:15	12:15	1.00	CIRCULATED FOR SAMPLE AT 1830m. GAS AT 0.66%.
			12:15	12:45	0.50	DRILLED 12.25" HOLE FROM 1830m TO 1839m. FLOWCHECKED DRILLING BREAK AT 1839m-OK.
			12:45	14:30	1.75	CIRCULATED FOR SAMPLE. GAS AT 2.86%.
			14:30	18:00	3.50	POH-HOLE GOOD.DOWNLOADED MWD.
			18:00	20:30	2.50	MADE UP 27m CORE BARREL AND RIH TO SHOE.
			20:30	20:45	0.25	BROKE CIRCULATION AND ESTABLISHED CIRCULATING RATE : 60spm WITH 300psi.
			20:45	21:45	1.00	SLIPPED AND CUT DRILL LINE.
			21:45	22:15	0.50	CONTINUED TO RIH TO 1818m-HELD UP.
			22:15	23:00	0.75	WASHED AND REAMED FROM 1818m TO 1839m WITH 10000lb. HIGH TORQUE FOR LAST METRE-PIPE STALLING. REAMED REPEATEDLY-OK.
			23:00	24:00	1.00	CIRCULATED BOTTOMS UP-GAS AT 0.72%. DROPPED BALL.SPACED OUT.
08/10/93	18	18.00	00:00	01:15	1.25	CUT CORE No.2:1839m TO 1855.5m. FROM 1854m

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
08/10/93	18	18.00				ONWARDS EXCESSIVE TORQUE EXPERIENCED WITH TENDENCY TO STALL OUT STRING EVEN WITH NO WOB AND LOW RPM.
			01:15	05:00	3.75	FLOWCHECKED. POH TO SHOE-NORMAL DRAG PUMPED SLUG.CONTINUED TO POH. FLOWCHECKED AT SHOE AND AT BOPs.
			05:00	08:00	3.00	LAID OUT CORE-97.5% RECOVERY. MADE UP NEW INNER BARRELS INTO COREBARREL.ROTATED TOP/BOTTOM STABILISER.RACKED BACK COREBARREL. NOTE: BOTTOM STABILISER 3/16" UNDERGAUGE.
			08:00	11:00	3.00	RIH FOR REAMING RUN-HOLE CONDITION GOOD.
			11:00	11:45	0.75	REAMED MWD FROM 1830m TO 1855.5m.
			11:45	12:45	1.00	CIRCULATED BOTTOMS UP. GAS AT 7.73%.
			12:45	15:45	3.00	FLOWCHECKED.PUMPED SLUG.POH-HOLE CONDITION GOOD.FLOWCHECKED AT SHOE AND AT BOPs.
			15:45	18:45	3.00	RIH WITH COREBARREL.PICKED UP 12 JOINTS DP.
			18:45	19:00	0.25	BROKE CIRCULATION AT SHOE AND ESTABLISHED CIRCULATION RATE 60spm,300psi.
			19:00	19:45	0.75	CONTINUED TO RIH TO 1819m
			19:45	20:00	0.25	PRECAUTIONARY REAMED FROM 1819m TO 1855.5m. REAMED WITH 10000lb FROM 1846m TO 1855.5m
			20:00	21:00	1.00	CIRCULATED BOTTOMS UP. GAS AT 0.25%.
			21:00	21:15	0.25	DROPPED BALL AND SPACED OUT.ESTABLISHED CIRCULATION RATE AT 60spm,550psi.
			21:15	22:15	1.00	CUT CORE No.3 FROM 1855.5m TO 1882.5m. CIRCULATING AT 60spm,650psi.
			22:15	24:00	1.75	FLOWCHECKED.POH TO SHOE-HOLE GOOD.FLOWCHECKED AND PUMPED SLUG.POH.
09/10/93	19	19.00	00:00	02:15	2.25	CONTINUED TO POH.
			02:15	05:15	3.00	LAID OUT INNER BARRELS-100% CORE RECOVERY. REDRESSED INNER BARRELS.RACKED BACK CORE BARREL.
			05:15	09:15	4.00	RIH WITH DRILLING BHA.SHIMMED LOWER REAMER. TWO STUDS SHEARED OFF WHILE TIGHTENING UP. REPLACED ALL BLOCK STUDS ON REMAINING REAMERS ONE OTHER SHEARED STUD ON UPPER REAMER.
			09:15	09:45	0.50	BROKE CIRCULATION AT SHOE AND SERVICED TDS.
			09:45	10:45	1.00	CONTINUED TO RIH TO 1832m.
			10:45	12:00	1.25	REAMED MWD TOOL FROM 1832m TO 1882m. GAS-9.5%
			12:00	14:30	2.50	DRILLED 12.25" HOLE FROM 1882m TO 1915m.
			14:30	15:15	0.75	CIRCULATED BOTTOMS UP. GAS AT 0.11%.
			15:15	19:00	3.75	FLOWCHECKED.PUMPED SLUG.POH-HOLE CONDITION GOOD.FLOWCHECKED AT SHOE AND AT BOPs.
			19:00	22:00	3.00	PICKED UP COREBARREL.INNER BARREL SPACING FOUND TO BE TOO LONG.NO SHIMS ON SWIVEL/ BEARING.MACHINED CORESHOE TO FIT SPACING.
			22:00	24:00	2.00	RIH WITH COREBARREL.

2.1 DAILY OPERATIONS

MINERVA-2A

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
10/10/93	20	20.00	00:00	02:00	2.00	CONTINUED TO RIH TO SHOE.FILLED PIPE AND ESTABLISHED CIRCULATION RATE.
			02:00	02:30	0.50	WASH AND REAMED 1885m TO 1915m WITH 10000lb.
			02:30	03:30	1.00	CIRCULATED BOTTOMS UP.GAS AT 0.14%.DROPPED BALL AND SPACED OUT.
			03:30	04:30	1.00	CUT CORE No.4 FROM 1915m TO 1943m.
			04:30	08:30	4.00	POH TO SHOE. PUMPED SLUG.FLOWCHECKED AT SHOE/BOPs.
			08:30	11:00	2.50	RECOVERED INNER BARRELS.MADE UP NEW INNER BARRELS.RECOVERED 99% CORE.
			11:00	13:15	2.25	RIH WITH 27m COREBARREL TO SHOE.
			13:15	13:45	0.50	FILLED PIPE AND ESTABLISHED CIRCULATION RATE.SERVICED TDS.
			13:45	14:15	0.50	CONTINUED TO RIH TO 1905m.
			14:15	15:15	1.00	WASHED AND REAMED FROM 1905m TO 1943m. TOOK 15000lb FROM 1930m ONWARDS.
			15:15	16:30	1.25	CIRCULATED BOTTOMS UP.GAS AT 6.67%. DROPPED BALL AND SPACED OUT.
			16:30	18:00	1.50	CUT CORE No.5 FROM 1943m TO 1969m.
			18:00	21:30	3.50	FLOWCHECKED.PUMPED SLUG AND POH.FLOWCHECKED AT SHOE/BOPs.
			21:30	22:15	0.75	LAID OUT INNER BARRELS-100% RECOVERY.
			22:15	23:45	1.50	LAID OUT CORE BARREL.
			23:45	24:00	0.25	MADE UP PDC BIT.
11/10/93	21		00:00	03:00	3.00	MADE UP DRILLING BHA. RIH. BROKE CIRCULATION.
			03:00	06:00	3.00	REAMED MWD FROM 1896m TO 1969m.
			06:00	07:15	1.25	DRILLED 12.25" HOLE FROM 1969m TO 1990m.
			07:15	08:00	0.75	REPLACED SWIVEL PACKING.CIRCULATED WELL WITH CEMENT HOSE.
			08:00	18:00	10.00	DRILLED 12.25" HOLE FROM 1990m TO 2170m. MWD FAILED AT 1995m.
			18:00	18:45	0.75	MADE WIPER TRIP TO 1968m-25kip OVERPULL.RIH.
			18:45	19:45	1.00	CIRCULATED BOTTOMS UP.
			19:45	24:00	4.25	FLOWCHECKED. PUMPED SLUG.POH.FLOWCHECKED AT SHOE/BOP. LAID OUT BIT,MWD,NBRR,2XSTRING RR. ALL ROLLER REAMER CUTTER BEARINGS LOOSE EXCEPT FOR SECOND REAMER FROM TOP.
12/10/93	22	21.00	00:00	00:30	0.50	CONTINUED LAYING DOWN BHA.
			00:30	01:00	0.50	RIGGED UP SCHLUMBERGER FOR LOG SUITE NO.2.
			01:00	09:00	8.00	LOGS RUN AS FOLLOWS: 0100-0630 RUN No.1: DLT/MSFL/GR/AMS/DTL 0630-0900 RUN No.2: LDL/CNL/GR/AMS/FMS
			09:00	10:30	1.50	POH WITH RUN No.2 AND REPAIRED DAMAGED WIRE.
			10:30	16:30	6.00	CONTINUE RUN No.2. POH. HOLE TIGHT AT 2170m AND 1721m. MAXIMUM OVERPULL 3500 lb. RIGGED DOWN SCHLUMBERGER.
			16:30	20:00	3.50	MADE UP 12.25" BHA AND RIH TO 13.375" SHOE AT

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
12/10/93	22	21.00				1526m. FILLED PIPE AND RIH TO 1558m.
			20:00	21:00	1.00	WASHED AND REAMED FROM 1558m TO 1762m.
			21:00	21:30	0.50	CONTINUED RIH FROM 1762m TO 1900m
			21:30	22:00	0.50	CONTINUED RIH FROM 1900m TO 2170m. WASHED AND REAMED TIGHT SPOTS FROM 1900m TO 1939m; 1948m TO 1958m; 2100m TO 2170m.
			22:00	24:00	2.00	CIRCULATED AND CONDITIONED MUD. MAXIMUM TRIP GAS 2.5%. FLOW CHECKED, PUMPED SLUG AND POH. NOTE: REAMING NECESSARY DUE TO PROBABLE FILTER CAKE BUILD-UP ACROSS SANDS.
13/10/93	23	22.00	00:00	03:00	3.00	CONTINUED POH. FLOW CHECKED AT SHOE AND BELOW BOP STACK.
			03:00	18:00	15.00	RIGGED UP SCHLUMBERGER. CONTINUED LOG SUITE No.2. RUN No.3: RFT-B/GR. CONDUCTED 34 PRETESTS AND 1 SEGREGATED SAMPLE AT 1875m.
			18:00	24:00	6.00	RUN NO.4: VSP. NOTE: MUD LOSSES WHILE LOGGING OF 11 bbl OVER 12 HOURS.
14/10/93	24	23.00	00:00	05:15	5.25	CONTINUED LOG SUITE No.2. RUN No.4 : VSP.
			05:15	09:30	4.25	RUN No.5 : 30 SHOT CST. 29 RECOVERED.
			09:30	10:00	0.50	RIGGED DOWN SCHLUMBERGER.
			10:00	12:30	2.50	LAID DOWN 12.25" BHA.
			12:30	15:30	3.00	RIGGED UP AND RIH WITH MULE SHOE ON DRILL PIPE TO 1975m.
			15:30	16:30	1.00	CIRCULATED BOTTOMS UP AT 725 gpm AND 2150 psi
			16:30	17:30	1.00	RIGGED UP HALLIBURTON AND TESTED LINES TO 2000 psi. PUMPED SUSPENSION PLUG No.1 WITH 10 bbl SPACER AHEAD OF 537 sx CLASS 'G'IN 64 bbl MIXWATER AND 2 gal/10bbl SCR-100L. DISPLACED WITH 1 bbl SPACER AND 101.5 bbl MUD.
			17:30	18:00	0.50	POH TO 1775m.
			18:00	19:00	1.00	CIRCULATED AT 725 gpm AND 960 psi WHILE WAITING ON CEMENT. DUMPED CEMENT RETURNS.
			19:00	19:30	0.50	RIH AND TAGGED PLUG No.1 AT 1784m. POH TO 1775m.
			19:30	20:30	1.00	RIGGED UP CEMENT LINE AND TESTED SAME TO 2000 psi. PUMPED SUSPENSION PLUG No.2 WITH 10bbl SPACER AHEAD OF 284 sx 1.9 SG, CLASS 'G' WITH 34 bbl MIXWATER AND 1 gal/10bbl SCR-100L. DISPLACED WITH 1 bbl SPACER AND 95 bbl MUD.
			20:30	22:00	1.50	POH TO 1630m AND CIRCULATE AT 725 gpm AND 930 psi WHILE WAITING ON CEMENT.
			22:00	22:30	0.50	RIH AND TAGGED PLUG No.2 AT 1686m. POH TO 1575m.
			22:30	23:30	1.00	RIGGED UP AND TESTED CEMENT LINES TO 2000psi.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
14/10/93	24	23.00				PUMPED SUSPENSION PLUG No.3 WITH 10bbl SPACER AHEAD OF 318 sx 1.9 SG, CLASS 'G' WITH 38 bbl MIXWATER. DISPLACED WITH 1bbl SPACER AND 83 bbl MUD.
			23:30	24:00	0.50	POH TO 1488m AND REVERSE CIRCULATED 200 bbl (2 x STRING VOLUME).
15/10/93	25	24.00	00:00	03:30	3.50	PUMPED SLUG AND POH. LAID DOWN EXCESS DRILL-PIPE.
			03:30	06:30	3.00	RIGGED UP SCHLUMBERGER. RIH WITH BRIDGE PLUG AND TAGGED PLUG No.3 AT 1490m. PULLED BACK AND SET PLUG AT 1484m. POH AND RIGGED DOWN.
			06:30	08:00	1.50	RIH TO 1484m. TAGGED BRIDGE PLUG.
			08:00	08:30	0.50	PUMPED SUSPENSION PLUG No.4 WITH 10bbl SPACER AHEAD OF 84 sx 1.9 SG, CLASS 'G'. DISPLACED WITH 1 bbl SPACER AND 81bbl MUD.
			08:30	09:30	1.00	PULLED BACK TO 1475m AND REVERSE CIRCULATED 600 bbl INHIBITED MUD.
			09:30	11:00	1.50	POH TO 171m.
			11:00	11:30	0.50	RIGGED UP CEMENT LINE AND TESTED SAME TO 2000 psi. PUMPED SUSPENSION PLUG No.5 WITH 10bbl SPACER AHEAD OF 129 sx 1.9 SG, CLASS 'G'. DISPLACED WITH 1 bbl SPACER AND 6 bbl MUD.
			11:30	13:00	1.50	POH TO 118m AND REVERSE CIRCULATED 20 bbl. DISPLACED RISER TO SEAWATER. FLUSHED CHOKE AND KILL LINES.
			13:00	13:30	0.50	POH WITH MULE SHOE.
			13:30	15:00	1.50	PICKED UP DIVERTER. NIPPLED DOWN CHOKE AND KILL LINES.
			15:00	16:00	1.00	RIH AND TAGGED PLUG No.5 AT 122m. SPOTTED 25 bbl INHIBITED SEAWATER. POH.
			16:00	16:30	0.50	RETRIEVED WEAR BUSHING.
			16:30	24:00	7.50	RIGGED UP AND PULLED BOP STACK (UNLATCHED AT 2000 hrs). LAID OUT RISER AND LANDED STACK ON BEAMS AT 2220 hrs. FREED GUIDE LINES, LOWERED POSTS AND PREPARED TO SPLIT UPPER PACKAGE. (ATTEMPTED TO RELEASE CONNECTOR FROM WELLHEAD FOR 2 hrs BEFORE SUCCESSFUL)
16/10/93	26	25.00	00:00	04:30	4.50	SPLIT LMRP AND BOP. LATCHED TO TEST STUMPS (0200 hrs). BROKE DOWN DOUBLE RISER AND LAID OUT. RIGGED DOWN RISER HANDLING EQUIPMENT.
			04:30	06:00	1.50	PICKED UP CORROSION CAP AND MADE UP. RIH, FILLED PIPE AND LANDED SAME WITH ROV OBSERVATION. BACKED OFF RUNNING TOOL AND POH.
			06:00	10:00	4.00	DE-BALLASTED RIG. CUT GUIDE LINES WITH ROV.
			10:00	24:00	14.00	PULLED ANCHORS AS FOLLOWS: FAR SWORD: No.3 RACKED AT 1420hrs.

2.1 DAILY OPERATIONS

MINERVA-2A

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
16/10/93	26	25.00				No.4 RACKED AT 1725hrs. No.2 RACKED AT 2136hrs. BONAVISTA: No.9 RACKED AT 1237hrs. No.10 RACKED AT 1535hrs. No.8 RACKED AT 2055hrs.
17/10/93	27	26.00	00:00	08:30	8.50	CONTINUED PULLING ANCHORS AS FOLLOWS: BONAVISTA: No.5 RACKED AT 0219hrs. No.6 RACKED AT 0458hrs. No.1 RACKED AT 0735hrs. FAR SWORD: No.11 RACKED AT 0018hrs. No.12 RACKED AT 0258hrs. RIG: No.7 RACKED AT 0830hrs. RIG RELEASED TO LOCH ARD-1 AT 0830hrs, 17th OCTOBER, 1993.

SECTION 3

BHP Petroleum

FINAL DRILLING REPORT

3.0 MUD SUMMARY BY HOLE SECTION

MINERVA-2

Hole Size (in)	Interval (mRT)	Type	Density (S.G.)		Viscosity (sec/l)		PV (cp)		YP (lbs/100ft^2)		Gels				KCl (%)	Fluid Loss (cc)
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.0	Max.0	Min.10	Max.10		
36"	85 - 120	SEAWATER & HI-VIS	1.07	1.07	80	80	14	14	44	44	35	35	45	45		
9.875"	120 - 560	SEAWATER & HI-VIS	1.05	1.05	100	100	20	20	110	110	60	60	70	70		

BHP Petroleum

FINAL DRILLING REPORT

3.0 MUD SUMMARY BY HOLE SECTION

MINERVA-2A

Hole Size (in)	Interval (mRT)	Type	Density (S.G.)		Viscosity (sec/l)		PV (cp)		YP (lbs/100ft^2)		Gels				KCl (%)	Fluid Loss (cc)
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.0	Max.0	Min.10	Max.10		
36"	85 - 119	SEAWATER & HI-VIS	1.05	1.05	100	100	20	20	110	110	60	60	70	70		
26"	119 - 565	SEAWATER & HI-VIS	1.05	1.05	100	100	20	20	110	110	60	60	70	70		
17.5"	565 - 1538	KCL PHPA/POLYMER	1.11	1.16	51	56	14	18	22	32	7	8	13	15	6.2-7.5	4.6-6.0
12.25"	1538 - 2170	KCL PHPA/POLYMER	1.17	1.17	41	45	11	16	20	25	4	7	7	13	7.1-7.5	5.4-5.9

BHP Petroleum

FINAL DRILLING REPORT

3.1 MUD PROPERTIES RECORD

MINERVA-2

Date	Mud Type	Depth (mRT)	Temp. (C°)	Density (S.G.)	Viscosity (sec/l)	PV (Cp)	YP (lb/100 ft²)	6 RPM	Gels 0	Gels 10	API WL (ml)	MBT (lb/bbl)	pH	%Solid	%H2O	HGS	LGS	%Sand	Ca+ (mg/L)	Cl- (mg/L)	K+ (mg/L)	%KCl
18/09/93	SEAWATER+HI-VIS	114		1.07	80	14	44		35	45		32.0	10.5									
19/09/93		541		1.05	100	20	110		60	70			11.0									
20/09/93		560		1.05	100	20	110	80	60	70			11.0									

BHP Petroleum

FINAL DRILLING REPORT

3.1 MUD PROPERTIES RECORD

MINERVA-2A

Date	Mud Type	Depth (mRT)	Temp. (C°)	Density (S.G.)	Viscosity (sec/l)	PV (Cp)	YP (lb/100 ft²)	6 RPM	Gels 0	Gels 10	API WL (ml)	MBT (lb/bbl)	pH	%Solid	%H2O	HGS	LGS	%Sand	Ca+ (mg/L)	Cl- (mg/L)	K+ (mg/L)	%KCl
21/09/93	SEAWATER+HI-VIS	541		1.05	100	20	110		60	70			11.0									
22/09/93		458		1.05	100	20	110		60	70			11.0									
23/09/93		565		1.05	100								11.0									
24/09/93	KCl PHPA POLY.	565		1.07	65	18	29	13	11	25	7	12.0	9.4	5.0	95		2.40		220	50000	47700	
25/09/93		565		1.08	63	18	29	13	10	22	7	12.0	9.5	5.0	95		1.10		220	50000	47700	9.0
26/09/93		565		1.08	63	18	29	13	10	22	6	12.0	9.5	5.0	95		1.10		220	50000	47700	9.0
27/09/93		565		1.08	63	18	29	13	10	22	6	12.0	9.5	5.0	95		1.10		220	50000	47700	9.0
28/09/93		565		1.08	63	18	29	13	10	22	6	12.0	9.5	5.0	95				220	50000	47000	9.0
29/09/93		986	39	1.12	56	14	22	10	7	15	6	7.0	8.7	8.0	92		5.10	3.50	420	45000	37000	6.6
30/09/93		1379	52	1.11	56	16	32	9	8	14	6	7.5	8.2	6.8	93.2		3.40	3.00	440	50000	39000	7.5
01/10/93		1538	53	1.16	51	18	29	9	7	13	4.6	10.5	9.3	9.0	91	1.60	4.60	0.75	180	43000	32000	6.2
02/10/93		1538		1.16	53	18	28	9	8	13	4.8	10.5	9.1	9.0	91	1.90	3.20	0.50	180	42000	33000	6.3
03/10/93		1538		1.16	53	18	27	9	8	13	5	10.0	8.9	9.0	91	1.50	5.10	0.50	260	37000	31000	6.0
04/10/93		1728	49	1.17	44	16	23	8	7	13	5.4	11.5	9.5	10.0	90	1.40	5.50	0.10	200	46000	40000	7.7
05/10/93		1728		1.17	42	12	20	7	4	9	5.8	11.5	9.2	10.0	90	1.30	5.70	0.25	200	43000	37000	7.1
06/10/93		1734		1.17	42	11	21	6	5	9	5.7	10.5	9.0	10.0	90	1.40	5.50	0.25	280	45000	39000	7.5
07/10/93		1839	49	1.17	42	13	25	7	5	9	5.9	10.5	9.0	9.0	91	1.70	4.60	0.50	260	46000	39000	7.5
08/10/93		1882	49	1.17	42	13	22	6	4	8	5.8	11.0	9.5	10.0	90	1.40	5.40	0.50	120	46000	38500	7.4
09/10/93		1915		1.17	45	14	22	7	5	8	5.6	10.5	9.3	9.0	91	1.70	4.20	0.25	120	46000	38000	7.3
10/10/93		1969		1.17	41	13	20	6	4	7	5.5	10.0	9.0	9.0	91	1.60	4.80	0.10	140	44000	37000	7.1
11/10/93		2170	54	1.17	42	14	23	7	5	10	5.9	9.0	9.2	9.8	90.2	1.40	5.40	0.50	80	47000	37500	7.2
12/10/93		2170	55	1.17	43	13	22	6	4	8	4.9	10.0	9.2	10.0	90	1.40	5.50	0.50	90	46000	37000	7.1
13/10/93		2170		1.16	44	13	22	6	5	10	5	9.5	9.3	9.0	91	1.20	5.00	0.01	90	46000	37000	7.1
14/10/93		2170		1.16	50	18	24	8	8	30	6	9.5	12.2	9.3	90.7	1.20	5.00		780	46000	37000	7.1
15/10/93		2170		1.16	50	16	28	9	10	30	7	12.6	10.2	9.3	90.7	1.20	5.10		1200	45000	37000	7.1

3.2 MATERIALS CONSUMPTION

MINERVA-2

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	11
LIME	25.00	KG	18
MD	25.00	LTR	8
MIL-BAR	100.00	LB	286
MILGEL BULK	100.00	LB	1168
SODA ASH	25.00	KG	11

36" / 26" HOLE SECTIONS

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	10
LIME	25.00	KG	12
MD	25.00	LTR	8
MIL-BAR	100.00	LB	286
MILGEL BULK	100.00	LB	684
SODA ASH	25.00	KG	10

9.875" HOLE SECTION

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	1
LIME	25.00	KG	6
MILGEL BULK	100.00	LB	484
SODA ASH	25.00	KG	1

3.2 MATERIALS CONSUMPTION

MINERVA-2A

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	121
CAUSTIC SODA	25.00	KG	7
CITRIC ACID	25.00	KG	13
CONQOR 303	205.00	LT	13
KCL SACK	25.00	KG	520
KWIKSEAL	40.00	LB	43
LIME	25.00	KG	19
MD	25.00	LTR	13
MILBAR BULK	100.00	LB	1520
MILBIO	5.00	GAL	46
MILGEL BULK	100.00	LB	620
MILGUAR	25.00	KG	4
MILPAC	25.00	KG	170
NOXYGEN-L	25.00	KG	69
POT CHLORIDE	1.00	MT	74
POT HYDROXIDE	25.00	KG	127
SAPP	25.00	KG	12
SODA ASH	25.00	KG	4
SODIUM BICARB	25.00	KG	32
WO DEFOAM	20.00	LT	2
XCD POLYMER	25.00	KG	151

36" / 26" HOLE SECTIONS

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	6
CAUSTIC SODA	25.00	KG	5
LIME	25.00	KG	18
MILGEL BULK	100.00	LB	486
MILPAC	25.00	KG	6
POT CHLORIDE	1.00	MT	2
SODA ASH	25.00	KG	4

17.5" HOLE SECTION

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	83
CAUSTIC SODA	25.00	KG	2
LIME	25.00	KG	1
MILBAR BULK	100.00	LB	859
MILBIO	5.00	GAL	25
MILGEL BULK	100.00	LB	90
MILPAC	25.00	KG	132
NOXYGEN-L	25.00	KG	26
POT CHLORIDE	1.00	MT	67
POT HYDROXIDE	25.00	KG	57
SODIUM BICARB	25.00	KG	2
WO DEFOAM	20.00	LT	2
XCD POLYMER	25.00	KG	119

12.25" HOLE SECTION

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	32
CITRIC ACID	25.00	KG	13
CONQOR 303	205.00	LT	13
KCL SACK	25.00	KG	520
KWIKSEAL	40.00	LB	43
MD	25.00	LTR	13
MILBAR BULK	100.00	LB	661
MILBIO	5.00	GAL	21
MILGEL BULK	100.00	LB	44
MILGUAR	25.00	KG	4
MILPAC	25.00	KG	32
NOXYGEN-L	25.00	KG	43
POT CHLORIDE	1.00	MT	5
POT HYDROXIDE	25.00	KG	70
SAPP	25.00	KG	12
SODIUM BICARB	25.00	KG	30
XCD POLYMER	25.00	KG	32

SECTION 4

BHP Petroleum

FINAL DRILLING REPORT

4.0 BIT RECORD

MINERVA-2

Bit No	Run No	Size / Make	Bit Type / Serial No.	Jets / TFA	Depth In / Out	Total Metres	Total Hours	ROP (m/hr)	WOB (klbs)	RPM	Pump gpm / psi	IADC Bit Grading / Comments
1	1	26	S3S	24 24 24 - - -	85	35.0	4.25	8.2	5.0 / 15.0	70 / 80	1250 / 2400	2.2.WT.A.1.I.NO.TD
		SECURITY	495343	1.33	120							w/36" H.O.
2	2	9.875	S33SF	32 32 32 - - -	120	440.0	15.25	28.9	20.0 / 25.0	100 / 100	540 / 1200	
		SECURITY	533996	2.36	560							LOST IN HOLE

BHP Petroleum

FINAL DRILLING REPORT

4.0 BIT RECORD

MINERVA-2A

Bit No	Run No	Size / Make	Bit Type / Serial No.	Jets TFA	Depth In / Out	Total Metres	Total Hours	ROP (m/hr)	WOB (klbs)	RPM	Pump gpm / psi	IADC Bit Grading / Comments
1RR1	1	26	S3S	24 24 24 - - -	85	34.0	1.75	19.4	5.0 / 15.0	60 / 120	1050 / 1100	2.2.WT.A.2.I.NO.TD
		SECURITY	495343	1.33	119							36" HOLE
1RR2	2	26	S3S	24 24 24 - - -	119	446.0	10.75	41.5	5.0 / 40.0	80 / 140	1150 / 2100	2.2.WT.A.2.I.BU.TD
		SECURITY	495343	1.33	565							BADLY BALLED
2	3	17.5	M02SOD	14 18 18 20 - -	565	973.0	50.50	19.3	0.0 / 50.0	/ 200	1080 / 3100	2.2.BT.A.E.2.EC.TD
		SMITH	KX4222	0.95	1538							
3	4	12.25	M1S	16 16 18 - - -	1538	190.0	19.00	10.0	30.0 / 40.0	180 / 180	750 / 2900	1.1.NO.A.E.2.NO.CP
		SMITH	NC2757	0.64	1728							
C1	5	12.25	CD93RCC	26 26 26 - - -	1728	0.0	0.00	0.0	/	/	/	0.0.NO.A.D.I.NO.TQ
		DBS	7931089	1.56	1728							UNDERGAUGE HOLE
4	6	12.25	JG8	18 18 18 - - -	1728	0.5	0.25	2.0	25.0 / 25.0	100 / 100	864 / 2675	0.0.NO.A.0.1.NO.CP
		HUGHES	C89BS	0.75	1728.5							REAMING RUN
C1RR1	7	12.25	CD93RCC	26 26 26 - - -	1728.5	5.0	0.50	10.0	10.0 / 13.0	90 / 104	325 / 850	0.1.FC.N.D.I.NO.PR
		DBS	7931089	1.56	1733.5							
5	8	12.25	ATM11HG	16 16 18 - - -	1733.5	105.5	8.25	12.8	40.0 / 50.0	140 / 150	750 / 2950	2.2.NO.A.F.2.NO.CP
		HUGHES	L85BV	0.64	1839							
C1RR2	9	12.25	CD93RCC	26 26 26 - - -	1839	16.5	1.25	13.2	0.0 / 15.0	90 / 90	324.6 / 850	1.1.FC.N.D.1.CT.TQ
		DBS	7931089	1.56	1855.5							
4RR1	10	12.25	JG8	18 18 18 - - -	1855.5	0.0	0.00	0.0	/	/	750 / 2900	0.0.NO.A.E.1.NO.CP
		HUGHES	C89BS	0.75	1855.5							REAMING RUN
C2RR1	11	12.25	CD93RCC	26 26 26 - - -	1855.5	27.0	1.00	27.0	15.0 / 20.0	90 / 100	324.6 / 650	1.1.FC.N.D.1.CT.TD
		DBS	7930949	1.56	1882.5							
6	12	12.25	M2SD	16 16 18 - - -	1882.5	32.5	2.50	13.0	30.0 / 30.0	120 / 120	750 / 2950	1.1.WT.A.E.I.NO.CP
		SMITH	NB9535	0.64	1915							
C2RR2	13	12.25	CD93RCC	26 26 26 - - -	1915	28.0	1.00	28.0	15.0 / 20.0	100 / 120	324 / 800	1.2.FC.N.D.1.CT.TD
		DBS	7930949	1.56	1943							
C2RR3	14	12.25	CD93RCC	26 26 26 - - -	1943	26.0	1.50	17.3	20.0 / 20.0	140 / 140	324 / 650	2.3.FC.N.D.1.CT.TD
		DBS	7930949	1.56	1969							
7	15	12.25	TD19M	14 14 14 14 14 13	1969	201.0	11.25	17.9	5.0 / 30.0	150 / 150	810 / 2950	8.2.FC.A.2.1.CT.TD
		DBS	7291232	0.88	2170							
4RR2	16	12.25	JG8	16 16 18 - - -	2170	0.0	0.00	0.0	5.0 / 30.0	50 / 100	395 / 2600	2.2.WT.A.2.1.NO.LOG
		HUGHES	C89BS	0.64	2170							WIPER TRIP

File: MINA_BIT		Checked:	Date: 23-Nov-93

4.1 BHA SUMMARY — MINERVA-2

BHA Name: 1. 36" SPUD | Depth In: 85 m. | Depth Out: 120 m.

Purpose: DRILL 36" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	26.000	0.55
1	HOLE OPENER	36.000	3.02
1	BIT SUB	9.000	0.92
6	DRILL COLLAR 9.5IN	9.500	56.03
1	CROSS OVER	9.000	0.78
1	DRILL COLLAR 8IN	8.000	9.19
1	CROSS OVER	7.625	1.54
		Total BHA Length :	72.03

BHA Name: 2. 9.875" PILOT HOLE | Depth In: 120 m. | Depth Out: 560 m.

Purpose: PILOT HOLE

Joints	BHA Item	O.D.	Length
1	BIT	9.875	0.26
1	BIT SUB	8.000	1.22
7	DRILL COLLAR 8IN	8.000	64.23
1	CROSS OVER	7.600	1.52
12	HEVI-WATE DRL PIPE	5.000	108.42
		Total BHA Length :	175.65

BHP Petroleum

FINAL DRILLING REPORT

4.1 BHA SUMMARY — MINERVA-2A

BHA Name: 1. 36" SPUD — Depth In: 85 m. — Depth Out: 119 m.

Purpose: DRILL 36" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	26.000	0.55
1	HOLE OPENER	36.000	3.02
1	BIT SUB	9.000	0.92
6	DRILL COLLAR 9.5IN	9.500	55.13
1	CROSS OVER	9.000	0.78
1	DRILL COLLAR 8IN	8.000	9.34
1	CROSS OVER	7.625	1.54
		Total BHA Length :	71.28

BHA Name: 2. 26" HOLE — Depth In: 119 m. — Depth Out: 565 m.

Purpose: DRILL 26" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	26.000	0.55
1	HOLE OPENER	26.000	2.54
1	BIT SUB	9.000	0.92
1	SHOCK TOOL	8.000	3.33
6	DRILL COLLAR 9.5IN	9.500	55.13
1	CROSS OVER	9.000	0.78
6	DRILL COLLAR 8IN	8.000	55.36
1	CROSS OVER	7.625	1.54
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	200.28

BHA Name: 3. 17.5" HOLE — Depth In: 565 m. — Depth Out: 1538 m.

Purpose: DRILL 17.5" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	17.500	0.42
1	DYNADRILL	10.813	8.15
1	DRILL COLLAR	9.313	9.35
1	STRING ROLLER REAMER	17.500	2.90
1	DRILL COLLAR	9.500	9.27
1	STRING ROLLER REAMER	17.500	2.17
4	DRILL COLLAR	9.500	36.51
1	CROSS OVER	9.000	0.78
4	DRILL COLLAR	8.000	36.88
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.54
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	215.43

BHA Name: 4. 12.25"BHA — Depth In: 1538 m. — Depth Out: 1728 m.

Purpose: DRILL 12.25"BHA

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.30
1	JUNK SUB	9.500	1.15
1	NEAR BIT ROLLER REAMER	12.250	2.44
1	CROSS OVER	8.250	0.47

BHP Petroleum

FINAL DRILLING REPORT

4.1 BHA SUMMARY — MINERVA-2A

1	MWD TOOL	8.250	12.22
1	DRILL COLLAR	8.000	9.20
1	NEAR BIT ROLLER REAMER	12.250	2.33
15	DRILL COLLAR	8.000	137.64
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**274.73**

BHA Name: 5. CORE BHA — Depth In: 1728 m. — Depth Out: 1728 m.

Purpose: CUT CORE NO.1

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
12	DRILL COLLAR	8.000	110.10
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**248.37**

BHA Name: 6. JUNK RUN — Depth In: 1728 m. — Depth Out: 1728.5 m.

Purpose: REAM/SURGE FOR JUNK

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.30
1	JUNK SUB	9.500	1.05
1	NEAR BIT ROLLER REAMER	12.250	2.46
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
13	DRILL COLLAR	8.000	119.17
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**252.79**

BHA Name: 7. CORE BHA — Depth In: 1728.5 m. — Depth Out: 1733.5 m.

Purpose: CUT CORE NO.1

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
10	DRILL COLLAR	8.000	91.76
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13

4.1 BHA SUMMARY

MINERVA-2A

Total BHA Length : **250.86**

BHA Name: 8. 12.25"BHA Depth In: 1733.5 m. Depth Out: 1839 m.

Purpose: DRILL 12.25"BHA

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.29
1	NEAR BIT ROLLER REAMER	12.250	2.46
1	PONY COLLAR	8.000	2.62
1	STRING ROLLER REAMER	12.250	2.33
1	CROSS OVER	8.250	0.47
1	MWD TOOL	8.250	12.21
1	STRING ROLLER REAMER	12.250	2.33
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
	Total BHA Length :		**280.89**

BHA Name: 9. CORE BHA Depth In: 1839 m. Depth Out: 1855.5 m.

Purpose: CUT CORE NO.2

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
1	DRILL COLLAR	8.000	9.37
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
	Total BHA Length :		**278.37**

BHA Name: 10. REAMING RUN Depth In: 1855.5 m. Depth Out: 1855.5 m.

Purpose: REAM 12.25" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.29
1	NEAR BIT ROLLER REAMER	12.250	2.46
1	PONY COLLAR	8.000	2.62
1	STRING ROLLER REAMER	12.250	2.33
1	CROSS OVER	8.250	0.47
1	MWD TOOL	8.250	12.21
1	STRING ROLLER REAMER	12.250	2.33
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52

9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**280.89**

BHA Name: 11. CORE BHA Depth In: 1855.5 m. Depth Out: 1882.5 m.

Purpose: CUT CORE NO.3

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
1	DRILL COLLAR	8.000	9.37
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**278.37**

BHA Name: 12. 12.25"BHA Depth In: 1882.5 m. Depth Out: 1915 m.

Purpose: DRILL 12.25" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.29
1	NEAR BIT ROLLER REAMER	12.250	2.46
1	PONY COLLAR	8.000	2.62
1	STRING ROLLER REAMER	12.250	2.33
1	CROSS OVER	8.250	0.47
1	MWD TOOL	8.250	12.21
1	STRING ROLLER REAMER	12.250	2.33
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**280.89**

BHA Name: 13. CORE BHA Depth In: 1915 m. Depth Out: 1943 m.

Purpose: CUT CORE NO.4

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
1	DRILL COLLAR	8.000	9.37
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	**278.37**

4.1 BHA SUMMARY

MINERVA-2A

BHA Name: 14. CORE BHA Depth In: 1943 m. Depth Out: 1969 m.

Purpose: CUT CORE NO.5

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.31
3	CORE BARREL	8.000	28.98
1	DRILL COLLAR	8.000	9.37
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	278.37

BHA Name: 15. 12.25"BHA Depth In: 1969 m. Depth Out: 2170 m.

Purpose: DRILL 12.25" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.54
1	NEAR BIT ROLLER REAMER	12.250	2.46
1	PONY COLLAR	8.000	2.62
1	STRING ROLLER REAMER	12.250	2.33
1	CROSS OVER	8.250	0.47
1	MWD TOOL	8.250	12.21
1	STRING ROLLER REAMER	12.250	2.33
2	DRILL COLLAR	8.000	18.47
1	STRING ROLLER REAMER	12.250	2.36
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.78
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	281.14

BHA Name: 16. 12.25"BHA Depth In: 2170 m. Depth Out: 2170 m.

Purpose: WIPER TRIP

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.28
1	NEAR BIT ROLLER REAMER	12.250	2.44
1	DRILL COLLAR	8.000	9.37
1	STRING ROLLER REAMER	12.250	2.35
14	DRILL COLLAR	8.000	128.37
1	DRILLING JARS	8.000	5.75
1	PONY COLLAR	8.000	3.07
2	DRILL COLLAR	8.000	18.48
1	CROSS OVER	7.625	1.52
9	HEVI-WATE DRL PIPE	5.000	80.13
		Total BHA Length :	251.76

4.2 DEVIATION SURVEYS

MINERVA-2A

Depth	Angle	Azimuth	Method	Missrun	
561.0	0.50	0.0	Totco Punch		
1538.0	1.00	0.0	Totco Punch		
1539.2	2.20	37.6	MWD		
1571.0	2.30	43.9	MWD		
1599.0	2.50	46.8	MWD		
1687.0	3.20	62.9	MWD		
1748.0	3.30	83.3	MWD		
1776.0	3.70	90.4	MWD		
1806.0	3.90	94.2	MWD		
1901.0	3.90	99.8	MWD		
1977.5	3.80	102.7	MWD		
2036.0	3.60	102.7	MWD		
2154.0	3.70	112.9	MWD		

SECTION 5

BHP Petroleum

FINAL DRILLING REPORT

5.0 CASING REPORT - 30" CONDUCTOR 1

MINERVA-2

Hole Size	: 36 in	Total Depth	: 120 m		
Weight in Slips	: 39000 lbs	Casing Shoe at	: 119.86 m		
R.T. to Wellhead	: 83 m	Top of Casing	: 84 m		
		Liner Overlap	: m		

Casing Flange / Wellhead

Manufacturer	:	DRILQUIP
Model	:	SS-10-C
Size	:	30 in
Rating	:	2100 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
CONDUCTOR HSG		30	310	B-56		HD-90	1	11.97	95.97 - 84.00
INT CONDUCTOR		30	310	B-56		HD-90	1	11.92	107.89 - 95.97
CONDUCTOR SHOE		30	310	B-56		HD-90	1	11.97	119.86 - 107.89

HOLE / RUNNING CONDITIONS

Mud Type	: SEAWATER+HI-VIS	Avg. Make Up Torque	:	ft.lbs.	Avg. Drag	:	lbs.
Density	: 1.05 S.G.	RPM	:		Max. Drag	:	lbs.
Viscosity	: 100	Avg. Torque Rot.	:	ft.lbs.	Volume Lost	:	bbl
PV / YP	: 20 / 110	Max. Torque Rot.	:	ft.lbs.			

Remarks :

BHP Petroleum

FINAL DRILLING REPORT

5.0 CASING REPORT - 30" CONDUCTOR 1

MINERVA-2A

Hole Size	: 36 in	Total Depth	: 119 m		
Weight in Slips	: 41600 lbs	Casing Shoe at	: 118 m		
R.T. to Wellhead	: 82.5 m	Top of Casing	: 82.5 m		
		Liner Overlap	: m		

Casing Flange / Wellhead

Manufacturer	:	DRILQUIP
Model	:	SS10-C
Size	:	30 in
Rating	:	2100 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
WELLHEAD	DRILQUIP	30	457	B-56		SF-60	1	12	94.50 - 82.50
INT CONDUCTOR	SUMITOMO	30	310	B-56		SF-60	1	11.75	106.25 - 94.50
CONDUCTOR SHOE	SUMITOMO	30	310	B-56		SF-60	1	11.75	118.00 - 106.25

HOLE / RUNNING CONDITIONS

Mud Type	: SEAWATER+HI-VIS	Avg. Make Up Torque	:	ft.lbs.	Avg. Drag	:	lbs.
Density	: 1.05 S.G.	RPM	:		Max. Drag	:	lbs.
Viscosity	: 100	Avg. Torque Rot.	:	ft.lbs.	Volume Lost	:	bbl
PV / YP	: 20 / 110	Max. Torque Rot.	:	ft.lbs.			

Remarks : CEMENTED USING STINGER

BHP Petroleum

FINAL DRILLING REPORT

5.0 CASING REPORT - 20" CONDUCTOR 2

MINERVA-2A

Hole Size	: 26 in	Total Depth	: 565 m	Casing Flange / Wellhead	
Weight in Slips	: 145350 lbs	Casing Shoe at	: 552.88 m	Manufacturer	: DRIL-QUIP
R.T. to Wellhead	: 81.6 m	Top of Casing	: 81.6 m	Model	: SS-10C
		Liner Overlap	: m	Size	: 18.75 in
				Rating	: 10000 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
WELLHEAD	DRILQUIP	20	133	X-52		HD-90	1	8.02	89.62 - 81.60
CROSS OVER	SUMITOMO	20	94	X-52		HD-90	1	12.31	101.93 - 89.62
INTERMEDIATE CASING	SUMITOMO	20	94	X-52		SWIFT DW	36	437.75	539.68 - 101.93
CASING SHOE	SUMITOMO	20	94	X-52		SWIFT DW	1	13.2	552.88 - 539.68

HOLE / RUNNING CONDITIONS

Mud Type	: SEAWATER+HI-VIS	Avg. Make Up Torque	: 22000 ft.lbs.	Avg. Drag	:	lbs.
Density	: 1.05 S.G.	RPM	:	Max. Drag	:	lbs.
Viscosity	: 100	Avg. Torque Rot.	: ft.lbs.	Volume Lost	:	bbl
PV / YP	: 20 / 110	Max. Torque Rot.	: ft.lbs.			

Remarks : CEMENTED USING STINGER

BHP Petroleum

FINAL DRILLING REPORT

5.0 CASING REPORT - 13.375" SURFACE CASING

MINERVA-2A

Hole Size	: 17.5 in	**Total Depth**	: 1538 m	**Casing Flange / Wellhead**	
Weight in Slips	: 250000 lbs	**Casing Shoe at**	: 1525.65 m	**Manufacturer**	: DRIL-QUIP
R.T. to Wellhead	: 81.6 m	**Top of Casing**	: 83 m	**Model**	: SS-10C
		Liner Overlap	: m	**Size**	: 18.75 in
				Rating	: 10000 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
HANGER	DRILQUIP	13.375	68	N80		BTC	1	4.26	87.26 - 83.00
INTERMEDIATE JT	SUMITOMO	13.375	68	N80		BTC	118	1390.3	1477.55 - 87.26
BAKERLOK JT	SUMITOMO	13.375	68	N80		BTC	1	11.88	1489.43 - 1477.55
FLOAT COLLAR JT	SUMITOMO	13.375	68	N80		BTC	1	12.11	1501.54 - 1489.43
BAKERLOK JT	SUMITOMO	13.375	68	N80		BTC	1	11.88	1513.42 - 1501.54
FLOAT SHOE JT	SUMITOMO	13.375	68	N80		BTC	1	12.23	1525.65 - 1513.42

ACCESSORIES INFORMATION

Item	Manufacturer	Number	Spacing	Interval	How Fixed
CENTRALIZER	HOWCO	3	6	1525.65 - 1489.43	

HOLE / RUNNING CONDITIONS

Mud Type	: KCl PHPA POLY.	**Avg. Make Up Torque**	: 10000 ft.lbs.	**Avg. Drag**	: lbs.
Density	: 1.16 S.G.	**RPM**	:	**Max. Drag**	: 150000 lbs.
Viscosity	: 53	**Avg. Torque Rot.**	: ft.lbs.	**Volume Lost**	: bbl
PV / YP	: 18 / 28	**Max. Torque Rot.**	: ft.lbs.		

Remarks : AVERAGE DRAG TOWARDS END OF CASING RUN ABOUT 50000lb.
TOOK WEIGHT UP TO 1500001b ON LAST STAND IN-HAD TO WASH DOWN TO LAND CASING.

BHP Petroleum

FINAL DRILLING REPORT

5.1 CEMENTING REPORT - 30" CONDUCTOR

MINERVA-2

Date	: 19/09/93	**Report No.**	: 8	**Job Type**	: PRIMARY
Cementer	: HALLIBURTON			**Total Stages**	: 01
Supervisor	: HARGRAEVES			**Cemented Interval**	: 85 - 120 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM	**Displacement Fluid**	: SEAWATER	**Top Plug**	: No		
Density Measured By	: DENSOMETER	**Fluid Density**	: 1.03 S.G.	**Bottom Plug**	: No		
Start Mix Cement	: 08:36 hrs	**Fluid Volume**	: 15 bbls	**Bump Plug**	: No		
Start Slurry Disp.	: 08:37 hrs	**Displac't Avg. Rat**	: 9 bpm				
Start Fluid Disp.	: 08:54 hrs	**Displac't Max. Rate**	: 9 bpm	**Returns**	: YES		
End Pumping	: 08:56 hrs			**Total Mud Lost**	:	bbl	
End Pumping Date	: 19/09/93						

Type	: SEAWATER+HI-VIS	**Gels (10 sec)**	: 60	**Circ. Prior to Cementing**	: 0.50 hrs
Density	: 1.05 S.G.	**Gels (10 min)**	: 70	**Mud Circ. Rate**	: 400 gpm
Viscosity	: 100 s/qt			**Mud Circ. Press**	: 300 psi
PV / YP	: 20 / 110				

CBL Run	: No	**Top of Cement**	: 85 m.	**Casing Pressure Test**	: psi
CET Run	: No	**Top of Cement Determined by**	: RETURNS	**Pressure Held For**	: min
Bond Quality	:				
Hours Prior to Log	:			**Shoetrack Cement**	: Yes
BHT Run	: No				

Stage Number	001 OF 001
Slurry Number	001 OF 001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	480
Volume (bbl)	98
Yield (ft^3/sx)	1.15
Excess (%)	100
From / To (m)	85 / 120
Density	1.9
Thickening Time (hrs)	2.5
Temp. (°C)	15
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	SEAWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives: of 2 % bwoc CACL2

BHP Petroleum

FINAL DRILLING REPORT

5.1 CEMENTING REPORT - 30" CONDUCTOR — MINERVA-2A

Date	: 22/09/93	**Report No.**	: 1	**Job Type**	: PRIMARY
Cementer	: HALLIBURTON			**Total Stages**	: 01
Supervisor	: J. HARGRAEVES			**Cemented Interval**	: 85 - 118 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM		**Displacement Fluid**	: SEAWATER	**Top Plug**	: No	
Density Measured By	: DENSOMETER		**Fluid Density**	: 1.03 S.G.	**Bottom Plug**	: No	
Start Mix Cement	: 07:11	hrs	**Fluid Volume**	: 12 bbls	**Bump Plug**	: No	
Start Slurry Disp.	: 07:12	hrs	**Displac't Avg. Rat**	: 8.8 bpm			
Start Fluid Disp.	: 07:26	hrs	**Displac't Max. Rate**	: 8.8 bpm	**Returns**	: YES	
End Pumping	: 07:28	hrs			**Total Mud Lost**	:	bbl
End Pumping Date	: 22/09/93						

Type	: SEAWATER+HI-VIS		**Gels (10 sec)**	: 60	**Circ. Prior to Cementing**	:	1.50 hrs
Density	: 1.05	S.G.	**Gels (10 min)**	: 70	**Mud Circ. Rate**	:	450 gpm
Viscosity	: 100	s/qt			**Mud Circ. Press**	:	400 psi
PV / YP	: 20	/ 110					

CBL Run	: No		**Top of Cement**	: 85 m.	**Casing Pressure Test**	:	psi
CET Run	: No		**Top of Cement Determined by**	: VISUAL RETURNS	**Pressure Held For**	:	min
Bond Quality	:						
Hours Prior to Log	:				**Shoetrack Cement**	:	Yes
BHT Run	: No						

Stage Number	001 OF 001
Slurry Number	001 OF 001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	500
Volume (bbl)	103
Yield (ft^3/sx)	1.15
Excess (%)	100
From / To (m)	85 / 118
Density	1.9
Thickening Time (hrs)	3.5
Temp. (°C)	15
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	SEAWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives: BWOC of 1.5 % bwoc CALC2 LIQUID

BHP Petroleum

FINAL DRILLING REPORT

5.1 CEMENTING REPORT - 20" CONDUCTOR — MINERVA-2A

Date	23/09/93	**Report No.**	3	**Job Type**	PRIMARY
Cementer	HALLIBURTON			**Total Stages**	01
Supervisor	HARGRAEVES			**Cemented Interval**	85 - 553 m.

STAGE NUMBER : 001 of 001

Mixing Method	RCM	**Displacement Fluid**	SEAWATER	**Top Plug**	No		
Density Measured By	DENSOMETER	**Fluid Density**	1.03 S.G.	**Bottom Plug**	No		
Start Mix Cement	23:00 hrs	**Fluid Volume**	49 bbls	**Bump Plug**	No		
Start Slurry Disp.	23:30 hrs	**Displac't Avg. Rat**	8 bpm				
Start Fluid Disp.	01:00 hrs	**Displac't Max. Rate**	8 bpm	**Returns**	YES		
End Pumping	01:15 hrs			**Total Mud Lost**		bbl	
End Pumping Date	24/09/93						

Type	SEAWATER+HI-VIS	**Gels (10 sec)**	60	**Circ. Prior to Cementing**	1.00 hrs
Density	1.05 S.G.	**Gels (10 min)**	70	**Mud Circ. Rate**	450 gpm
Viscosity	100 s/qt			**Mud Circ. Press**	500 psi
PV / YP	20 / 110				

CBL Run	No	**Top of Cement**	85 m.	**Casing Pressure Test**	psi
CET Run	No	**Top of Cement Determined by**	RETURNS	**Pressure Held For**	min
Bond Quality					
Hours Prior to Log				**Shoetrack Cement**	Yes
BHT Run	No				

Stage Number	001 OF 001
Slurry Number	001 OF 002
Slurry Type	LEAD SLURRY
Slurry Class	CLASS G
Slurry Description	SCAVENGER
Amount (sacks)	1080
Volume (bbl)	405
Yield (ft^3/sx)	2.11
Excess (%)	50
From / To (m)	85 / 403
Density	1.5
Thickening Time (hrs)	
Temp. (°C)	
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	12.44
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives: gal/sa of .45 gps ECONOLITE

Stage Number	001 OF 001
Slurry Number	002 OF 002
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	910
Volume (bbl)	180
Yield (ft^3/sx)	1.15
Excess (%)	50
From / To (m)	403 / 553
Density	1.9
Thickening Time (hrs)	4
Temp. (°C)	25
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives

BHP Petroleum

FINAL DRILLING REPORT

5.1 CEMENTING REPORT - 13.375" CASING

MINERVA-2A

Date	02/10/93	**Report No.**	12	**Job Type**	PRIMARY
Cementer	HALLIBURTON			**Total Stages**	01
Supervisor	D.WINN			**Cemented Interval**	1026 - 1526 m.

STAGE NUMBER : 001 of 001

Mixing Method	RCM		**Displacement Fluid**	SEAWATER		**Top Plug**	Yes
Density Measured By	DENSOMETER		**Fluid Density**	1.03 S.G.		**Bottom Plug**	Yes
Start Mix Cement	03:55	hrs	**Fluid Volume**	710 bbls		**Bump Plug**	Yes
Start Slurry Disp.	03:56	hrs	**Displac't Avg. Rat**	12 bpm			
Start Fluid Disp.	05:04	hrs	**Displac't Max. Rate**	12 bpm		**Returns**	YES
End Pumping	06:00	hrs				**Total Mud Lost**	0 bbl
End Pumping Date	03/10/93						

Type	KCl PHPA POLY.	**Gels (10 sec)**	8	**Circ. Prior to Cementing**	2.00 hrs
Density	1.16 S.G.	**Gels (10 min)**	13	**Mud Circ. Rate**	540 gpm
Viscosity	53 s/qt			**Mud Circ. Press**	800 psi
PV / YP	18 / 28				

CBL Run	No	**Top of Cement**	1026 m.	**Casing Pressure Test**	3000 psi
CET Run	No	**Top of Cement Determined by**	THEORETICAL	**Pressure Held For**	5 min
Bond Quality					
Hours Prior to Log				**Shoetrack Cement**	Yes
BHT Run	No				

Stage Number	001 OF 001
Slurry Number	001 OF 002
Slurry Type	LEAD SLURRY
Slurry Class	CLASS G
Slurry Description	SCAVENGER
Amount (sacks)	270
Volume (bbl)	104
Yield (ft^3/sx)	2.17
Excess (%)	20
From / To (m)	1026 / 1226
Density	1.5
Thickening Time (hrs)	8
Temp. (°C)	65
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	12.44
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	65
BHCT (°C)	51

Additives: gal/sa of .45 gps ECONOLITE

Stage Number	001 OF 001
Slurry Number	002 OF 002
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	924
Volume (bbl)	189
Yield (ft^3/sx)	1.15
Excess (%)	20
From / To (m)	1226 / 1526
Density	1.9
Thickening Time (hrs)	2.37
Temp. (°C)	65
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	65
BHCT (°C)	51

Additives

BHP Petroleum

FINAL DRILLING REPORT

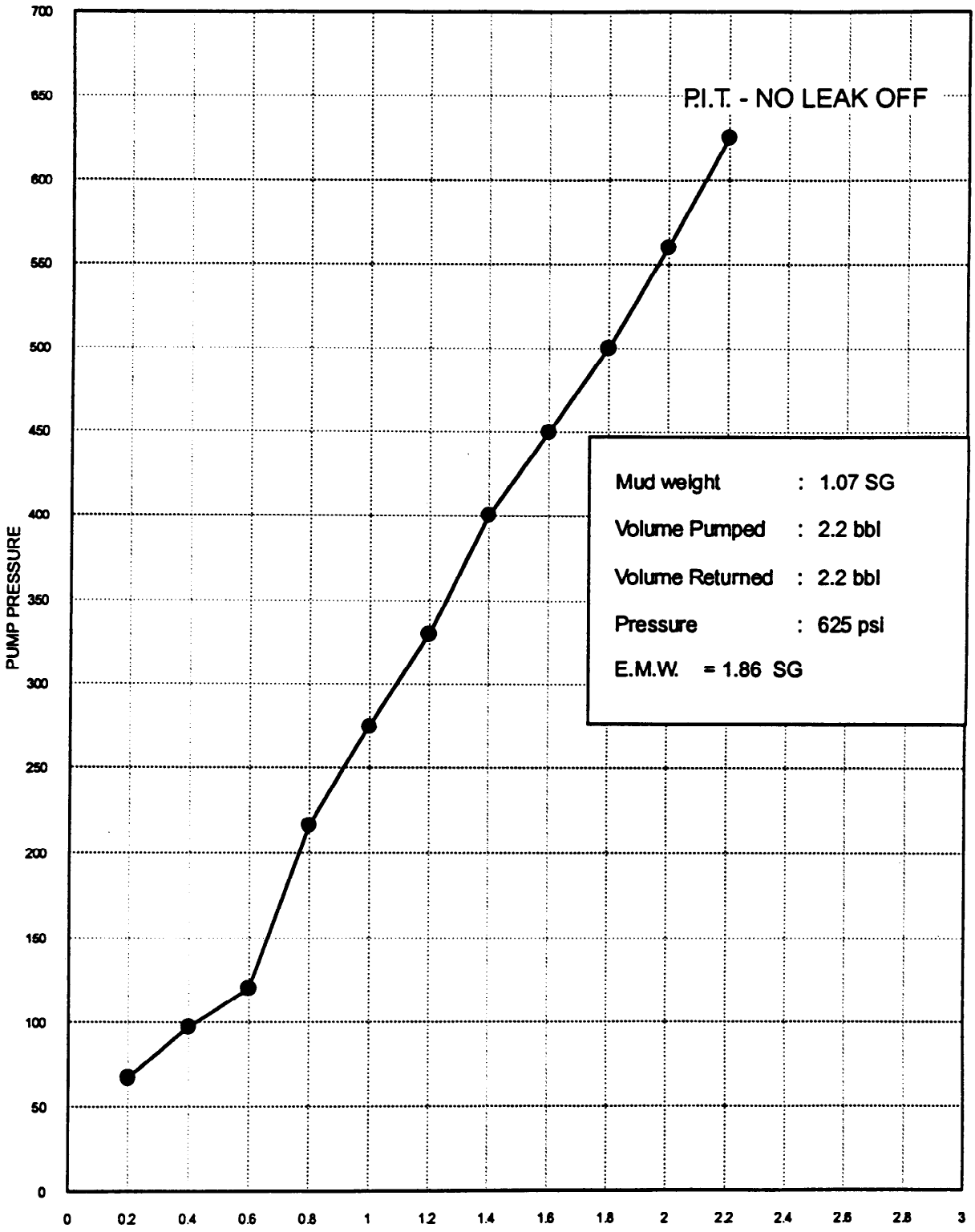
5.2 LEAK OFF TEST DIAGRAM

MINERVA-2A

TVD : 568m

Casing Diameter : 20" 94 lb/ft

Shoe TVD : 553m



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BHP Petroleum

FINAL DRILLING REPORT

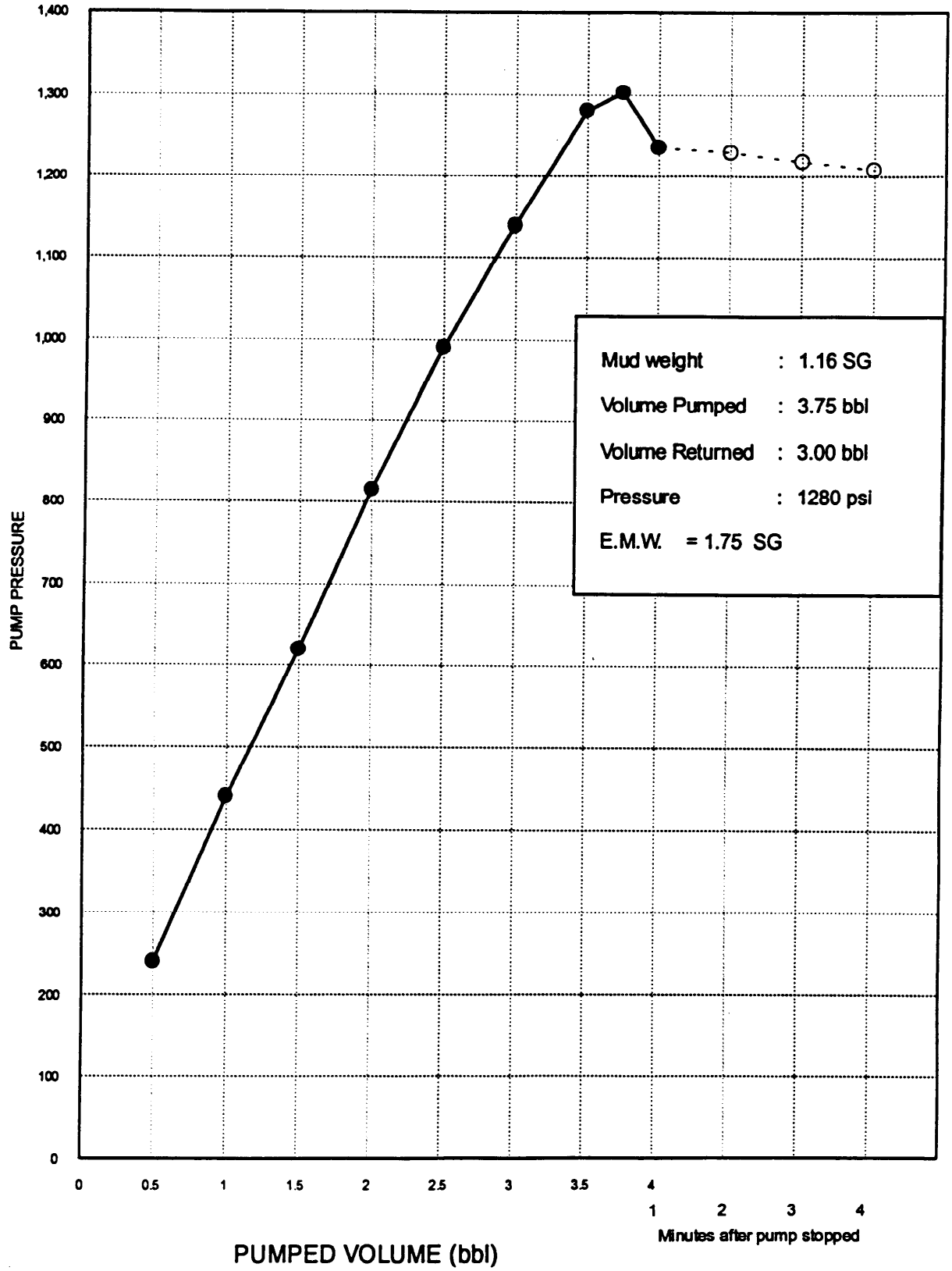
5.2.1 LEAK OFF TEST DIAGRAM

MINERVA-2A

TVD : 1541m

Casing Diameter : 13.375" 68 lb/ft

Shoe TVD : 1526m



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SECTION 6

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #1 PLUG — MINERVA-2

Date	20/09/93	**Report No.**	9	**Plug Type**	P&A PLUG #1
Cementer	HALLIBURTON			**Total Stages**	01
Supervisor	J.HARGREAVES			**Cemented Interval**	290 - 551 m.

STAGE NUMBER : 001 of 001

Mixing Method		**Displacement Fluid**			**Top Plug**	No	
Density Measured By		**Fluid Density**		0.00 S.G.	**Bottom Plug**	No	
Start Mix Cement	04:00 hrs	**Fluid Volume**		bbls	**Bump Plug**	No	
Start Slurry Disp.	hrs	**Displac't Avg. Rat**		bpm			
Start Fluid Disp.	hrs	**Displac't Max. Rate**		bpm	**Returns**		
End Pumping	04:30 hrs				**Total Mud Lost**		bbl
End Pumping Date	20/09/93						

Type	SEAWATER+HI-VIS	**Gels (10 sec)**	60	**Circ. Prior to Cementing**	hrs
Density	1.05 S.G.	**Gels (10 min)**	70	**Mud Circ. Rate**	gpm
Viscosity	100 s/qt			**Mud Circ. Press**	psi
PV / YP	20 / 110				

CBL Run	No	**Top of Cement**	290 m.	**Casing Pressure Test**	psi
CET Run	No	**Top of Cement Determined by**	THEORETICAL (F.P.	**Pressure Held For**	min
Bond Quality					
Hours Prior to Log				**Shoetrack Cement**	N/A
BHT Run	No				

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	45
Volume (bbl)	93
Yield (ft^3/sx)	
Excess (%)	
From / To (m)	290 / 551
Density	1.9
Thickening Time (hrs)	0
Temp. (°C)	
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	0.5
Water Source	SEAWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #2 PLUG

MINERVA-2

Date : 21/09/93 Report No. : 10 Plug Type : P&A PLUG #2

Cementer : HALLIBURTON Total Stages : 01

Supervisor : JOHN HARGREAVES Cemented Interval : 134 - 184 m.

STAGE NUMBER : 001 of 001

Mixing Method	:		Displacement Fluid	:	SEAWATER	Top Plug	:	No
Density Measured By	:		Fluid Density	:	1.04 S.G.	Bottom Plug	:	No
Start Mix Cement	:	02:52 hrs	Fluid Volume	:	bbls	Bump Plug	:	No
Start Slurry Disp.	:	: hrs	Displac't Avg. Rat	:	bpm			
Start Fluid Disp.	:	hrs	Displac't Max. Rate	:	bpm	Returns	:	
End Pumping	:	03:09 hrs				Total Mud Lost	:	bbl
End Pumping Date	:	21/09/93						

Type	:	SEAWATER+HI-VIS	Gels (10 sec)	:	60	Circ. Prior to Cementing	:	hrs
Density	:	1.05 S.G.	Gels (10 min)	:	70			
Viscosity	:	100 s/qt				Mud Circ. Rate	:	gpm
PV / YP	:	20 / 110				Mud Circ. Press	:	psi

CBL Run	:	No	Top of Cement	:	184 m.	Casing Pressure Test	:	psi
CET Run	:	No	Top of Cement Determined by	:	THEORETICAL	Pressure Held For	:	min
Bond Quality	:							
Hours Prior to Log	:					Shoetrack Cement	:	N/A
BHT Run	:	No						

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	NEAT
Amount (sacks)	150
Volume (bbl)	31
Yield (ft^3/sx)	
Excess (%)	
From / To (m)	134 / 184
Density	1.9
Thickening Time (hrs)	0
Temp. (°C)	
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	SEAWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #1 PLUG

MINERVA-2A

Date	: 14/10/93	**Report No.**	: 24	**Plug Type**	: P&A PLUG #1
Cementer	: HALLIBURTON			**Total Stages**	: 01
Supervisor	: J. HARGRAEVES			**Cemented Interval**	: 1784 - 1975 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM		**Displacement Fluid**	: MUD	**Top Plug**	: No	
Density Measured By	: DENSOMETER		**Fluid Density**	: 1.16 S.G.	**Bottom Plug**	: No	
Start Mix Cement	: 16:30	hrs	**Fluid Volume**	: 96 bbls	**Bump Plug**	: No	
Start Slurry Disp.	: 16:35	hrs	**Displac't Avg. Rat**	: 9 bpm			
Start Fluid Disp.	: 17:00	hrs	**Displac't Max. Rate**	: 9 bpm	**Returns**	: YES	
End Pumping	: 17:15	hrs			**Total Mud Lost**	:	bbl
End Pumping Date	: 14/10/93						

Type	: KCl PHPA POLY.		**Gels (10 sec)**	: 8	**Circ. Prior to Cementing**	:	1.00 hrs
Density	: 1.16	S.G.	**Gels (10 min)**	: 30	**Mud Circ. Rate**	:	800 gpm
Viscosity	: 50	s/qt			**Mud Circ. Press**	:	2150 psi
PV / YP	: 18	/ 24					

CBL Run	: No	**Top of Cement**	: 1784	m.	**Casing Pressure Test**	:	0 psi
CET Run	: No	**Top of Cement Determined by**	: TAGGED		**Pressure Held For**	:	min
Bond Quality	:						
Hours Prior to Log	:				**Shoetrack Cement**	:	N/A
BHT Run	: No						

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	LOW WATER LOSS
Amount (sacks)	537
Volume (bbl)	110
Yield (ft^3/sx)	1.15
Excess (%)	25
From / To (m)	1784 / 1975
Density	1.9
Thickening Time (hrs)	2.3
Temp. (°C)	78
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	78
BHCT (°C)	55

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #2 PLUG

MINERVA-2A

Date	: 15/10/93	**Report No.**	: 25	**Plug Type**	: P&A PLUG #2
Cementer	: HALLIBURTON			**Total Stages**	: 01
Supervisor	: J. HARGRAEVES			**Cemented Interval**	: 1686 - 1775 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM		**Displacement Fluid**	: MUD	**Top Plug**	: No	
Density Measured By	: DENSOMETER		**Fluid Density**	: 1.16 S.G.	**Bottom Plug**	: No	
Start Mix Cement	: 19:30	hrs	**Fluid Volume**	: 95 bbls	**Bump Plug**	: No	
Start Slurry Disp.	: 19:40	hrs	**Displac't Avg. Rat**	: 9 bpm			
Start Fluid Disp.	: 19:50	hrs	**Displac't Max. Rate**	: 9 bpm	**Returns**	: YES	
End Pumping	: 20:00	hrs			**Total Mud Lost**	:	bbl
End Pumping Date	: 14/10/93						

Type	: KCl PHPA POLY.		**Gels (10 sec)**	: 8	**Circ. Prior to Cementing**	: 1.50 hrs	
Density	: 1.16	S.G.	**Gels (10 min)**	: 30			
Viscosity	: 50	s/qt			**Mud Circ. Rate**	: 800 gpm	
PV / YP	: 18	/ 24			**Mud Circ. Press**	: 960 psi	

CBL Run	: No		**Top of Cement**	: 1686 m.	**Casing Pressure Test**	: 0 psi	
CET Run	: No		**Top of Cement Determined by**	: TAGGED	**Pressure Held For**	:	min
Bond Quality	:						
Hours Prior to Log	:				**Shoetrack Cement**	: N/A	
BHT Run	: No						

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	LOW WATER LOSS
Amount (sacks)	327
Volume (bbl)	58
Yield (ft^3/sx)	1.15
Excess (%)	25
From / To (m)	1686 / 1775
Density	1.9
Thickening Time (hrs)	2.25
Temp. (°C)	72
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	72
BHCT (°C)	49

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #3 PLUG — MINERVA-2A

Date : 16/10/93 | Report No. : 26 | Plug Type : P&A PLUG #3
Cementer : HALLIBURTON | Total Stages : 01
Supervisor : J. HARGRAEVES | Cemented Interval : 1490 - 1575 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM		Displacement Fluid	: MUD	Top Plug	: No	
Density Measured By	: DENSOMETER		Fluid Density	: 1.16 S.G.	Bottom Plug	: No	
Start Mix Cement	: 22:25	hrs	Fluid Volume	: 83 bbls	Bump Plug	: No	
Start Slurry Disp.	: 22:30	hrs	Displac't Avg. Rat	: 9 bpm			
Start Fluid Disp.	: 22:45	hrs	Displac't Max. Rate	: 9 bpm	Returns	: YES	
End Pumping	: 22:57	hrs			Total Mud Lost	:	bbl
End Pumping Date	: 14/10/93						

Type	: KCl PHPA POLY.	Gels (10 sec)	: 8	Circ. Prior to Cementing	: 1.50 hrs
Density	: 1.16 S.G.	Gels (10 min)	: 30	Mud Circ. Rate	: 800 gpm
Viscosity	: 50 s/qt			Mud Circ. Press	: 930 psi
PV / YP	: 18 / 24				

CBL Run	: No	Top of Cement	: 1490 m.	Casing Pressure Test	: 0 psi
CET Run	: No	Top of Cement Determined by	: TAGGED	Pressure Held For	: min
Bond Quality	:				
Hours Prior to Log	:			Shoetrack Cement	: N/A
BHT Run	: No				

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	LOW WATER LOSS
Amount (sacks)	318
Volume (bbl)	65
Yield (ft^3/sx)	1.15
Excess (%)	25
From / To (m)	1490 / 1575
Density	1.9
Thickening Time (hrs)	2.5
Temp. (°C)	66
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILLWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	65
BHCT (°C)	45

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #4 PLUG

MINERVA-2A

Date	17/10/93	**Report No.**	27	**Plug Type**	P&A PLUG #4
Cementer	HALLIBURTON			**Total Stages**	01
Supervisor	J. HARGRAEVES			**Cemented Interval**	1475 - 1484 m.

STAGE NUMBER : 001 of 001

Mixing Method	RCM		**Displacement Fluid**	MUD		**Top Plug**	No
Density Measured By	DENSOMETER		**Fluid Density**	1.16 S.G.		**Bottom Plug**	No
Start Mix Cement	08:00	hrs	**Fluid Volume**	82 bbls		**Bump Plug**	No
Start Slurry Disp.	08:05	hrs	**Displac't Avg. Rat**	9 bpm			
Start Fluid Disp.	08:10	hrs	**Displac't Max. Rate**	9 bpm		**Returns**	YES
End Pumping	08:15	hrs				**Total Mud Lost**	bbl
End Pumping Date	15/10/93						

Type	KCl PHPA POLY.		**Gels (10 sec)**	10		**Circ. Prior to Cementing**	hrs
Density	1.16	S.G.	**Gels (10 min)**	30			
Viscosity	50	s/qt				**Mud Circ. Rate**	gpm
PV / YP	16	/ 28				**Mud Circ. Press**	psi

CBL Run	No	**Top of Cement**	1475 m.	**Casing Pressure Test**	0 psi
CET Run	No	**Top of Cement Determined by**	THEORETICAL	**Pressure Held For**	min
Bond Quality					
Hours Prior to Log				**Shoetrack Cement**	N/A
BHT Run	No				

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	LOW WATER LOSS
Amount (sacks)	84
Volume (bbl)	17
Yield (ft^3/sx)	1.15
Excess (%)	10
From / To (m)	1480 / 1490
Density	1.9
Thickening Time (hrs)	2.5
Temp. (°C)	66
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	DRILL WATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	65
BHCT (°C)	45

Additives

BHP Petroleum

FINAL DRILLING REPORT

6.0 CEMENTING REPORT - P&A PLUG #5 PLUG

MINERVA-2A

Date : 18/10/93
Report No. : 28
Plug Type : P&A PLUG #5
Cementer : HALLIBURTON
Total Stages : 01
Supervisor : J. HARGRAEVES
Cemented Interval : 122 - 171 m.

STAGE NUMBER : 001 of 001

Mixing Method	: RCM		Displacement Fluid	: MUD	Top Plug	: No	
Density Measured By	: DENSOMETER		Fluid Density	: 1.16 S.G.	Bottom Plug	: No	
Start Mix Cement	: 11:30	hrs	Fluid Volume	: 7 bbls	Bump Plug	: No	
Start Slurry Disp.	: 11:35	hrs	Displac't Avg. Rat	: 9 bpm			
Start Fluid Disp.	: 11:40	hrs	Displac't Max. Rate	: 9 bpm	Returns	:	
End Pumping	: 11:42	hrs			Total Mud Lost	:	bbl
End Pumping Date	: 15/10/93						

Type	: KCl PHPA POLY.		Gels (10 sec)	: 10	Circ. Prior to Cementing	:	1.50 hrs
Density	: 1.16	S.G.	Gels (10 min)	: 30	Mud Circ. Rate	:	475 gpm
Viscosity	: 50	s/qt			Mud Circ. Press	:	900 psi
PV / YP	: 16	/ 28					

CBL Run	: No		Top of Cement	: 122 m.	Casing Pressure Test	:	0 psi
CET Run	: No		Top of Cement Determined by	: TAGGED	Pressure Held For	:	min
Bond Quality	:						
Hours Prior to Log	:				Shoetrack Cement	:	N/A
BHT Run	: No						

Stage Number	001
Slurry Number	001
Slurry Type	TAIL SLURRY
Slurry Class	CLASS G
Slurry Description	LOW WATER LOSS
Amount (sacks)	129
Volume (bbl)	24
Yield (ft^3/sx)	1.15
Excess (%)	10
From / To (m)	122 / 170
Density	1.9
Thickening Time (hrs)	
Temp. (°C)	
Free Water (%)	
Temp. (°C)	
Fluid Loss (cc)	
Temp. (°C)	
Water Used (gal/sack)	5
Water Source	SEAWATER
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
Comp. Strength (psi)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	

Additives

SECTION 7

BHP Petroleum

FINAL DRILLING REPORT

7.0 WEATHER DATA

MINERVA-2A

Date	Day	Wind Vel (Knots)	Wind Dir	Temp High (degC)	Visibility (Nm)	Weather State	Swell Height (m)	Swell Per (sec)	Swell Dir	Wave Height (m)	Wave Per (sec)	Wave Dir	Heave (m)	Pitch (deg)	Roll (deg)	Bar Pressure (HPa)
21/09/93	1	20	260	18	15	FINE	3	10	250	1.8	4	250	2	0.5	0.8	1021
22/09/93	2	10	180	18	15	FINE	3	10	240	1.5	3	260	1.7	1	0.6	1028
23/09/93	3	10	170	18	15	FINE	2	10	240	0.3	4	170	1	0.3	0.5	1028
24/09/93	4	10	240	18	15	FINE	2	10	240	0.5	3	240	0.5	0.3	0.2	1028
25/09/93	5	10	240	18	15	FINE	1.7	10	240	0.5	3	240	1.4	0.3	0.3	1030
26/09/93	6	5		16	15	FINE	2	12	240	0.5			1.5	0.6	0.2	1030
27/09/93	7	24	10	18	15	FINE	1.8	10	240	1.5	4	10	1.3	0.2	0.5	1023
28/09/93	8	24	10	23	15	CLOUDY/CLEAR	1.5	10	240	1.5	4	10	1.2	0.2	0.2	1016
29/09/93	9	15	300	19	15	CLOUDY/CLEAR	1.3	10	250	1	3	300	0.5	0.3	0.2	1016
30/09/93	10	30	40	23	10	CLOUDY/SHOWERS	2.6	10	250	1	3	30	1.3	0.6	0.3	1016
01/10/93	11	30	340	20	10	CLOUDY/SHOWERS	2.6	12	250	1	4	340	1.5	0.9	0.4	1022
02/10/93	12	30	110	16	15	CLOUDY/CLEAR	2.5	10	250	1.5	4	110	1.2	0.3	0.3	1024
03/10/93	13	35	160	16	15	CLOUDY	2.5	11	250	2.5	4	250	1.2	0.3	0.3	1012
04/10/93	14	28	260	18	10	CLOUDY/SHOWERS	2.5	10	230	1.5	3	230	1	0.5	0.8	1016
05/10/93	15	30	260	16	10	OVERCAST	3	10	240	2	3	270	2.2	2	1	1017
06/10/93	16	30	260	16	10	CLOUDY	4	11	240	2	3	270	2	1.5	0.8	1019
07/10/93	17	35	340	22	15	FINE/CLEAR	1.5	11	240	1.5	3	340	1.8	0.8	0.5	1018
08/10/93	18	35	310	26	10	CLOUDY/SHOWERS	2.6	11	250	1.5	3	310	2	0.8	0.5	1006
09/10/93	19	60	300	14	10	SQUALLS	5	11	250	3	3	300	4	2.5	2	1008
10/10/93	20	30	180	18	15	CLOUDY/CLEAR	5	11	250	2	3	180	2.5	1.7	1	1025
11/10/93	21	14	225	18	15	CLOUDY/CLEAR	3.2	11	240	0.6	3	180	1.4	0.8	0.5	1029
12/10/93	22			16	15	FINE	3	11	240	0.4	3	280	1.2	0.4	0.3	1029
13/10/93	23			24	15	FINE	2	12	250	0.3	2	180	1.2	0.6	0.2	1026
14/10/93	24			24	15	FINE	2.5	12	250				1	0.5	0.2	1024
15/10/93	25			18	15	FINE	1.7	12	240	0.3	3	90	0.6	0.5	0.2	1022
16/10/93	26	10	20	18	15	FINE	1.7	12	240	0.4	3	100		2	1	1017

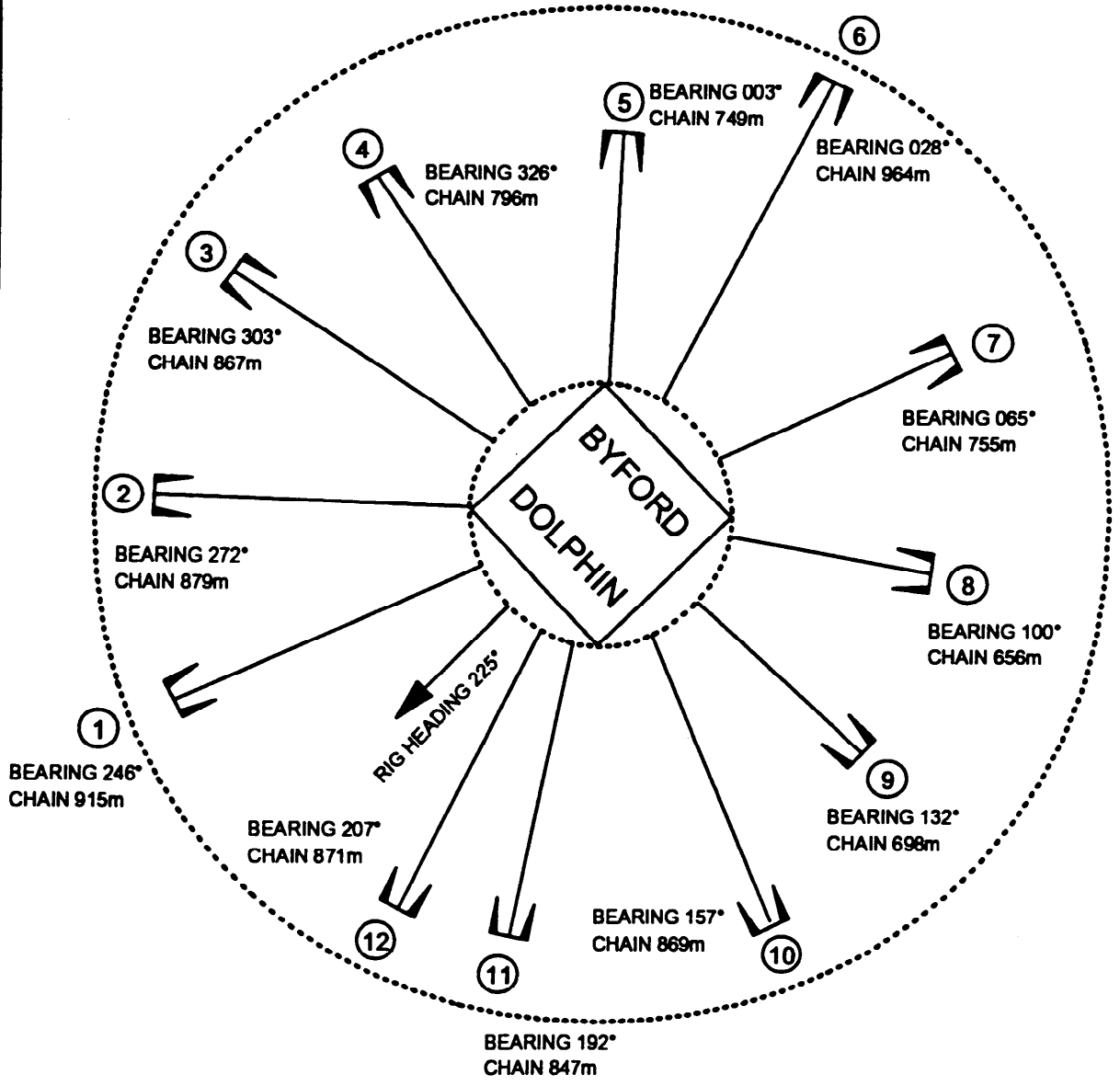
BHP Petroleum

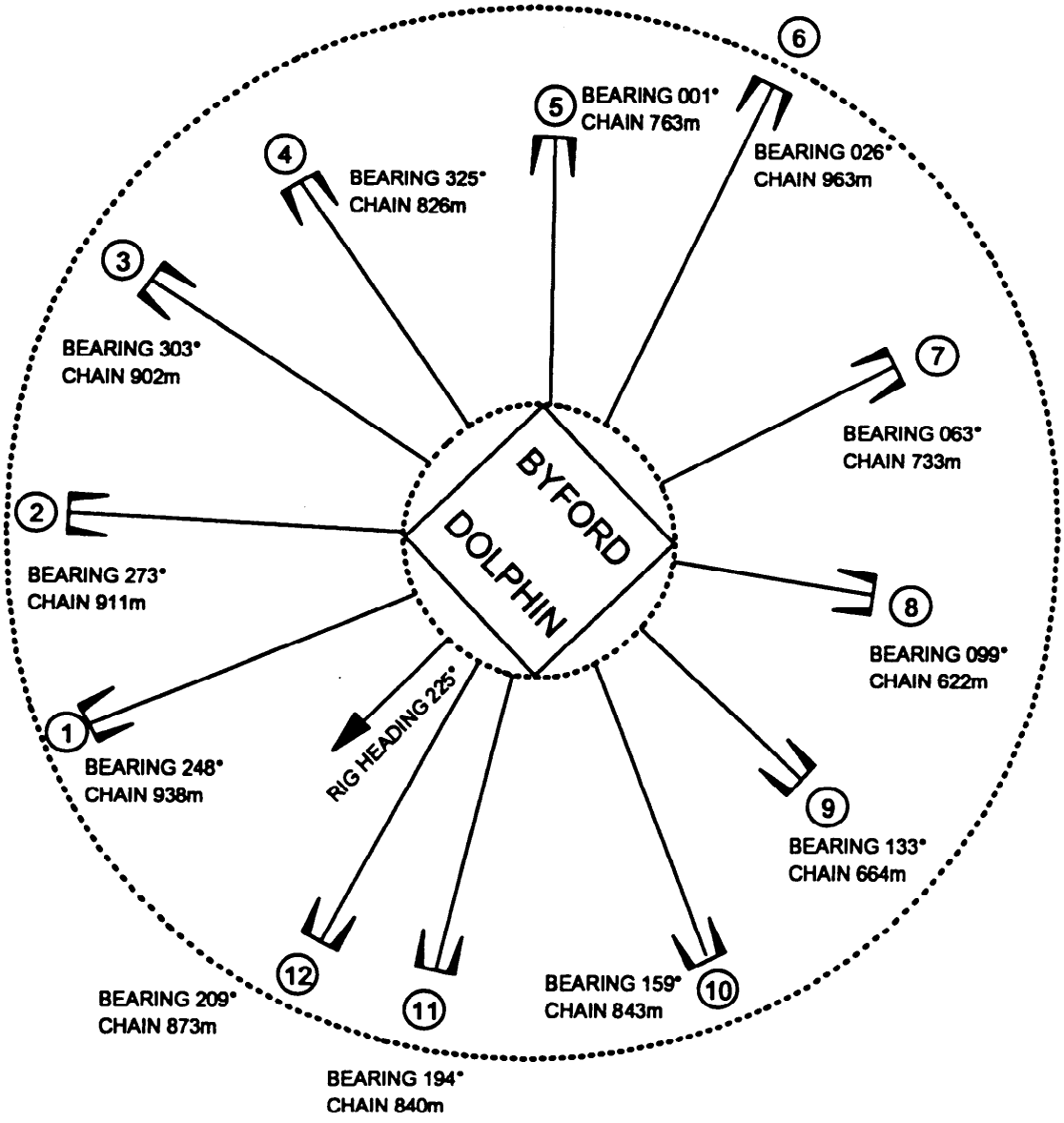
FINAL DRILLING REPORT

7.0 WEATHER DATA

MINERVA-2

Date	Day	Wind Vel (Knots)	Wind Dir	Temp High (degC)	Visibility (Nm)	Weather State	Swell Height (m)	Swell Per (sec)	Swell Dir	Wave Height (m)	Wave Per (sec)	Wave Dir	Heave (m)	Pitch (deg)	Roll (deg)	Bar Pressure (HPa)
12/09/93	1	28	120	17	10		3	10	240	2.5	3	150		2	2.4	1032
13/09/93	2	22	130	17	15	MOSTLY CLEAR	2.6	10	160	0.7	3	170		1.5	1.9	1028
14/09/93	3	14	160	9	12	FINE	1.4	12	240	0.5	3	150		0.7	1.5	1018
15/09/93	4	15	160	18	12	CLEAR/COLD.	2	13	230	0.2	3	150		0.7	1.2	1014
16/09/93	5	8	320	15	12	FINE	1	11	240	2	3	320		0.8	1.5	1010
17/09/93	6	22	360	8	12	FINE	1.5	10	240	1	4	340		0.6	0.6	1009
18/09/93	7	15	30	17	12	OVERCAST	1.5	10	240	0.8	2	60	0.8	0.6	0.6	999
19/09/93	8	40	250	17	12	OVERCAST	2.5	10	260	2.5	4	250	0.8	1.3	1.4	1004
20/09/93	9	30	240	13	12	WINDY/ROUGH.	3	10	250	2.5	4	240	2	1.5	0.6	1016
21/09/93	10	20	260	18	15	FINE	3	10	250	1.8	4	250	2	0.5	0.8	1021


6
5
BEARING 003°
CHAIN 749m
4
BEARING 326°
CHAIN 796m
BEARING 028°
CHAIN 964m
3
BEARING 303°
CHAIN 867m
7
BEARING 065°
CHAIN 755m
BYFORD
DOLPHIN
2
BEARING 272°
CHAIN 879m
8
BEARING 100°
CHAIN 656m
RIG HEADING 225°
1
BEARING 246°
CHAIN 915m
9
BEARING 132°
CHAIN 698m
BEARING 207°
CHAIN 871m
12
11
BEARING 157°
CHAIN 869m
10
BEARING 192°
CHAIN 847m


6
5
BEARING 001°
CHAIN 763m
4
BEARING 325°
CHAIN 826m
BEARING 026°
CHAIN 963m
3
BEARING 303°
CHAIN 902m
7
BEARING 063°
CHAIN 733m
BYFORD
DOLPHIN
2
BEARING 273°
CHAIN 911m
8
BEARING 099°
CHAIN 622m
1
BEARING 248°
CHAIN 938m
RIG HEADING 225°
9
BEARING 133°
CHAIN 664m
12
BEARING 209°
CHAIN 873m
11
BEARING 194°
CHAIN 840m
BEARING 159°
CHAIN 843m
10

BHP Petroleum

FINAL DRILLING REPORT

MINERVA-2/2A

Compiled By: _____ 24/11/93
Technical Assistant — Date
Eric Hocking

Reviewed By: _____ 24/11/93
Senior Drilling Engineer — Date

_____ 24.11.93
Drilling Superintendent — Date

Approved By: _____ 24/11/93
FOR Manager Drilling — Date

3

3 SAMPLES, SIDEWALL CORES, CONVENTIONAL CORES

3.1 Cuttings

COLLECTION INTERVAL(m)	Treatment
570-2170	Cutting Samples - 2 sets unwashed - 5 sets washed and air dried

The following samples were missed due to coring and drill returns not being circulated: 1730, 1840, 1845, 1850, 1855, 1860, 1865, 1870, 1875, 1880, 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965m.

Cuttings Lithological Description - Appendix 1.

3.2 Sidewall Cores

CST:

COLLECTION INTERVAL(m)	SHOT	RECOVERED	LOST
1545-2144mRT	30	29	1

MSCT:

No MSCT's were cut in Minerva-2/2A.

CST Lithological Descriptions - Appendix 2.

3.3 Conventional Cores

Core No.	Cored Interval(mRT)	Recovery(m)
1	1728.5-1733.6	5.00 (100%)
2	1838.8-1855.6	15.10 (89.8%)
3	1855.5-1882.5	27.00 (100%)
4	1915.0-1942.74	27.75 (100%)
5	1943.0-1969.0	26.00 (100%)

Core Lithological Descriptions - Appendix 3.
Core Analysis Report - Appendix 4.

3.4 Palynology

COLLECTION INTERVAL(m)

570-2131

Sixty eight samples were submitted: 23 core chips
20 sidewall cores
25 cuttings

Range Charts - Appendix 5.

3.5 Micropalaeontology

No Micropalaeontology data was obtained for Minerva -2/2A.

3.6 Geochem

Geochem TOC, RockEval and Vitrinite data generated from the following intervals at the time of compilation of this report:

COLLECTION INTERVAL	SAMPLE TYPE
1732.8-1963.7m	Core

Geochem Basic Data - Appendix 6.

4 LOGGING AND SURVEYS

4.1 Mudlogging

Mudlogging was provided by Baker Hughes Inteq . Interval : 85-2170m.

End of Well Report - Appendix 7.
(includes Mudlog/Formation Evaluation Log)

4.2 Measurement While Drilling

Measurement by drilling (MWD) was provided by Eastman Teleco Measurement While Drilling Services. Interval : 1538 - 2170m.

End of Well Report - Appendix 8
(includes MWD Log)

4.3 Wireline Logs

Suite No.	Run No.	Log Type	Interval	Date
1	1	DLL-MSFL-AS-GR-SP-CAL-AMS-GPIT	1538-85 (GR to seafloor)	03/10/93
2	2	DLL-MSFL-AS-GR-SP-CAL-AMS	2170-1526	12/10/93
2	1	LDL-CNL-GR-AMS	2170-1526	12/10/93
2	1	FMS-GR-AMS	2170-1526	12/10/93
2	1	RFT-GR-HP	1984.5-1722.5	13/10/93
2	1	Zero Offset	2160-680	14/10/93
2	1	CST-GR (30 Shots)	2144-1545	14/10/93

4.4 Processed Logs

Suite No.	Run No.	Log Type	Interval	Date
2	1	MSD(wellsite)	2170-1526	12/10/93

4.5 Velocity Surveys

Velocity Survey was provided by Schlumberger Seaco Inc.

Well Seismic Processing Report has been sent previously.

4.6 Rig Location Survey

Survey was conducted by Racal Survey Australia Limited.

Rig Location Survey - Appendix 9.

5

5 FORMATION TESTING

5.1 RFT

One RFT run was carried out in Minerva-2A on 12 October 1993. A total of 34 pretests were performed, only 21 gave reliable formation pressures.
Of the remaining pretests, 8 were tight, 1 resulted in seal failure and 4 were considered supercharged. One segregated sample comprising of a one gallon upper chamber and a 2-3/4 gallon lower chamber was taken at 1849.7m TVDSS.

5.2 DST

No DST runs were performed in Minerva-2/2A.

5.3 Production Tests

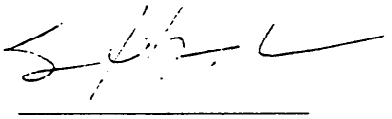
No Production Testing were performed in Minerva-2/2A.

Minerva-2A

RFT REPORT

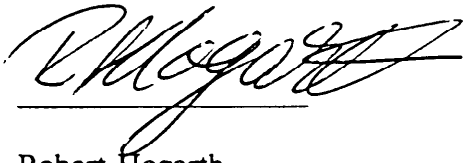
25 January 1994

Prepared by



Sean Hanrahan

Approved by



Robert Hogarth
Reservoir Evaluation Manager

January 1994.

Our Ref: rah:ly:1567:ec
File No: Min-2A/WL/G02/R

Well Data Sheet

Table 1.

Well:		Minerva-2A	
Permit:		VIC/P31	
Location:		Lat: 38 º 43 ' 4.54 " South Long: 142 º 57 ' 20.80 " East	
Rig:		Semi-Submersible Byford Dolphin	
Seismic Reference Line:		OE80A-1056 SP 4067	
KB Elevation:		25.3	m above MSL
Water Depth		60.0	m
Well TD (12.25" Hole) :		2170.0	mKB
Spud Date:		21st September 1993	
Date Reached TD:		11th October 1993	
Well Status:		Suspended	
Casing Points:		30" @ 118 mKB 20" @ 553 mKB 13 3/8" @ 1526 mKB	
Reservoir Tops:	Upper Shipwreck 1	1721.5	mKB
	Main Upper Shipwreck	1829.0	mKB
Datum Depth (FWL):		1915.1	mTVDSS
Pressure at Datum:		2747.1	psia
Reservoir Temperature:		95.0	deg C (ex-MINERVA-1)
Trittium Used:		No	
Fluids In Well:	Gas:	Yes	
	Oil:	No	
	Water:	Yes	
Contacts:	GOC:	N/A	
	OWC:	N/A	
	FWL:	1915.1	mTVDSS

MINERVA-2A OPEN HOLE RF. 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	2711.99	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	2892.25	-	-	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	2690.60	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	68.8	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.

Table 2.

RFT Sample Data Sheet

Table 3.

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

APPENDICES

6 APPENDICES

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6.1 APPENDIX 1 Cuttings lithological descriptions

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6.2 APPENDIX 2 CST descriptions

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2 Date:14th October 1993
1	2144	-	EMPTY BULLET
2	2131	32	**CLAYSTONE (80%):** medium grey to medium dark grey, firm, blocky to subblocky, predominantly light greenish grey to light olive grey argillaceous material, trace carbonaceous specks and trace coalified woody fragments, non calcareous, finely interlaminated with: **ARENACEOUS CLAYSTONE (20%):** very light grey, soft to firm, blocky to subblocky, predominantly light greenish grey to white argillaceous matrix, 20-30% fine to occasional very fine quartz sand, trace medium to coarse quartz grains, trace carbonaceous specks. **SHOWS:** No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
3	2119	44	**SILTY CLAYSTONE:** medium dark grey, firm, subblocky to subfissile, predominantly light olive grey argillaceous material, common to abundant quartz silt, trace carbonaceous specks and flecks, trace micromica, non calcareous. **SHOWS:** No direct, no cut, moderately fas dull greenish yellow crush cut, thick moderately bright greenish yellow residual ring.
4	2105	25	**SANDSTONE:** very light grey, translucent to very light grey grains, friable, very fine to fine to occasional medium grains, angular to subrounded, low to high sphericity, well sorted quartz, 30% very light grey to light olive grey argillaceous matrix, trace microcrystalline pyrite cement in part, trace carbonaceous fragments, trace micromica, poor visual porosity, trace lenticular interbed of claystone: **CLAYSTONE:** medium dark grey, soft, predominantly light greenish grey argillaceous material, trace carbonaceous specks and flecks, trace to rare microcrystalline pyrite nodules. **SHOWS:** No direct, no cut, no crush cut, thick dull greenish yellow residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Date:14th October 1993 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2
5	2077	29	**CLAYSTONE:** medium dark grey, firm, subblocky, predominantly light olive grey argillaceous material, very light grey argillaceous material in part, minor to common quartz silt, trace very fine quartz sand, trace carbonaceous specks and woody fragments, trace micromica, non calcareous, finely laminated in part. **SHOWS:** No direct, no cut, no crush cut, patchy dull greenish yellow residual ring.
6	2066	31	**CLAYSTONE:** medium dark grey, firm, subblocky, predominantly light olive grey argillaceous material, very light grey argillaceous material in part, rare quartz silt, trace very fine quartz sand, trace carbonaceous specks and woody fragments, trace micromica, non calcareous, finely laminated, interbedded with: **SILTY CLAYSTONE:** medium grey, firm, subblocky to subfissile, predominantly light olive grey argillaceous material, abundant quartz silt, rare very fine quartz sand, trace carbonaceous specks and flecks, trace micromica, non calcareous. **SHOWS:** No direct, no cut, no crush cut, moderately thick dull greenish yellow residual ring.
7	2049	30	**CLAYSTONE (80%):** medium grey to medium dark grey, firm, blocky to subblocky, predominantly light greenish grey to light olive grey argillaceous material, minor quartz silt, trace carbonaceous specks and trace coalified woody fragments, non calcareous, interlaminated with: **SILTY CLAYSTONE (20%):** very light grey, firm, blocky to subblocky, predominantly light greenish grey to white argillaceous matrix, abundant quartz silt, trace to rare very fine quartz sand, trace carbonaceous specks. **SHOWS:** No direct, moderately bright slow streaming greenish yellow cut, instant dull greenish yellow crush cut, thick moderately bright greenish yellow residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA_2
Permit: VIC/P 31
Geologist(s): C.MENHENNITT/A.SYME
Logging Suite No: 2
Date:14th October 1993

Core No.	Depth (mRT)	Recovery (mm)	
8	2012.5	28	**CLAYSTONE:** medium dark grey, moderately hard, subfissile, predominantly light olive grey argillaceous material, trace quartz silt, trace microcrystalline pyrite nodules, trace to rare carbonaceous specks and coalified woody fragments, trace micromica, non calcareous. **SHOWS:** No direct, moderately bright fast streaming greenish yellow cut, instant moderately bright greenish yellow crush cut, thick moderately bright greenish yellow residual ring.
9	1996.5	36	**CLAYSTONE:** medium dark grey, moderately hard, subfissile, predominantly light olive grey argillaceous material, trace very light grey argillaceous material in part, trace quartz silt, trace very fine to fine quartz sand in part, trace carbonaceous specks and coalified woody fragments, trace micromica, non calcareous. **SHOWS:** No direct, dull very slow greenish yellow cut, instant dull greenish yellow crush cut, thick moderately bright greenish yellow residual ring.
10	1900	35	**CLAYSTONE:** medium dark grey, firm to moderately hard, subfissile, predominantly light olive grey argillaceous material, trace very light grey argillaceous material in part, minor quartz silt, trace carbonaceous specks and flecks, trace micromica, non calcareous. **SHOWS:** No direct, moderately bright slow blooming greenish yellow cut, instant moderately bright greenish yellow crush cut, thick dull greenish yellow residual ring.
11	1899	20	**CLAYSTONE:** medium dark grey, firm to moderately hard, subfissile, predominantly light olive grey argillaceous material, trace very light grey argillaceous material in part, minor quartz silt, trace carbonaceous specks and flecks, trace micromica, non calcareous. **SHOWS:** No direct, moderately bright, slow, blooming bluish white cut and crush cut fluorescence, bluish white, thick, moderately bright residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Date:14th October 1993 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2
12	1836	10	<u>SANDSTONE:</u> white to very light grey, clear to translucent grains, occasionally light bluish grey, fine to very coarse grained, trace granules, predominantly medium to coarse grained, predominantly angular to sub angular, sub rounded in part, low to moderate sphericity, poorly sorted quartz, trace quartz overgrowth cementation, common white argillaceous matrix, poor visual porosity. NOTE: Sample is very broken up due to impact of bullet. Hardness description not possible. <u>SHOWS:</u> No direct, cut or crush cut fluorescence, yellow green, thin, dull residual ring.
13	1833	15	<u>SANDSTONE:</u> white to very light grey, clear to translucent grains, occasionally light bluish grey, fine grains to medium pebbles, predominantly medium to coarse grained, predominantly angular to sub angular, sub rounded in part, low to moderate sphericity, poorly sorted quartz, trace quartz overgrowth cementation, common white argillaceous matrix, poor visual porosity. NOTE: Sample is very broken up due to impact of bullet. Pebble grains are shattered. <u>SHOWS:</u> No direct,cut or crush cut fluorescence, yellowish green, thin, dull residual ring.
14	1828	35	<u>GLAUCONITIC CLAYSTONE:</u> medium grey to greenish grey, soft, medium light grey to brownish grey argillaceous material, abundant fine grained glauconite, common microcrystalline pyrite, trace pyritised wood, trace quartz silt, trace carbonaceous flecks, non calcareous. <u>SHOWS:</u> No direct or cut fluorescence, very slow, dull, greenish yellow to bluish white crush cut fluorescence, bluish white, moderately thick, dull residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA_2
Permit: VIC/P 31 Date:14th October 1993
Geologist(s): C.MENHENNITT/A.SYME
Logging Suite No: 2

Core No.	Depth (mRT)	Recovery (mm)	
15	1820.5	30	**ARENACEOUS CLAYSTONE:** medium light grey to medium grey, moderately firm to firm, sub fissile, medium grey argillaceous material, common very fine to fine grained quartz throughout, trace sand lenses, rare glauconite, trace silt, trace microcrystalline pyrite, trace carbonaceous flecks, trace mica, non calcareous. **SHOWS:** No direct or cut fluorescence, bluish white, moderately thick, dull residual ring.
16	1801.5	35	**CLAYSTONE:** medium dark grey to brownish grey, soft to moderately firm, sub blocky, trace silt, trace glauconite, trace microcrystalline pyrite, trace micromica, predominantly non calcareous, the sample has a wispy < 1mm vein. **SHOWS:** No direct, cut or crush cut fluorescence, greenish yellow, patchy, dull residue.
17	1774	30	**CLAYSTONE:** medium grey to medium dark grey, moderately firm to firm, blocky, medium grey argillaceous material, trace quartz silt, trace micromica, trace microcrystalline pyrite, non calcareous. **SHOWS:** No direct, cut or crush cut fluorescence, greenish yellow, very patchy, dull residue.
18	1755	30	**CLAYSTONE:** medium grey to medium dark grey, moderately firm to firm, blocky, medium grey argillaceous material, trace very fine grained quartz laminae, trace quartz silt, trace micromica, trace microcrystalline pyrite, non calcareous. **SHOWS:** No direct or cut fluorescence, dull, very slow, bluish white to greenish yellow crush cut fluorescence, bluish white, moderately thick, very dull residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Date:14th October 1993 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2
19	1741.5	30	**ARENACEOUS CLAYSTONE:** medium grey to medium dark grey, soft to moderately firm, predominantly medium grey argillaceous material, dark greenish grey in part, common very fine to fine grained quartz throughout, rare microcrystalline pyrite, trace very fine grained glauconite, trace micromica, trace silt, trace carbonaceous flecks and fragments, non calcareous. **SHOWS:** No direct or cut fluorescence, very slow, dull, greenish yellow to bluish white crush cut fluorescence, bluish white, moderately thick, dull residual ring.
20	1726	30	**ARGILLACEOUS SANDSTONE:** medium light grey to medium grey, moderately firm, very fine to medium grained, predominantly fine grained, sub angular to sub rounded, moderate to high sphericity, well sorted quartz, trace moderately weak calcite cement, trace microcrystalline pyrite cement, abundant light grey to medium light grey argillaceous matrix, trace glauconite, poor visual porosity. **SHOWS:** No direct or cut fluorescence, very slow, dull, greenish yellow to bluish white crush cut fluorescence, bluish white, moderately thick, dull residual ring.
21	1724.5	25	**ARGILLACEOUS SANDSTONE:** medium light grey to medium grey, friable to moderately firm, very fine to medium grained, predominantly fine grained, sub angular to sub rounded, moderate to high sphericity, well sorted quartz, trace moderately weak calcite cement, trace microcrystalline pyrite cement, abundant light grey to medium light grey argillaceous matrix, trace glauconite, trace carbonaceous specks, poor visual porosity. **SHOWS:** 10% very dull orange mineral fluorescence (calcite?), no cut, instant dull yellowish white crush cut, moderately thick moderately bright greenish yellow residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Date:14th October 1993 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2
22	1722.5	23	ARGILLACEOUS SANDSTONE: medium light grey to medium grey, friable to moderately firm, very fine grained to granules, predominantly fine to medium grained, subangular to subrounded, moderate to high sphericity, poorly to moderately sorted quartz, rare moderately weak calcite cement (calcimetry 10% calcite, 0% dolomite), trace microcrystalline pyrite cement, abundant very light grey to medium light grey argillaceous matrix, trace light to moderate green lithics (non-glauconitic), trace coalified woody fragments, poor visual porosity. SHOWS: 90% dull orange mineral fluorescence (?calcite), instant dull yellowish white cut, thick moderately bright greenish yellow residual ring.
23	1717.75	30	CLAYSTONE: medium dark grey, moderately hard, subblocky to subfissile, predominantly light olive grey to light brownish grey argillaceous material, trace calcareous material, trace carbonaceous specks. SHOWS: No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
24	1701	32	CLAYSTONE: medium dark grey, firm, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace calcareous material, trace very fine grained glauconite, trace carbonaceous specks, trace micromica. SHOWS: No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
25	1664	60	CLAYSTONE: medium dark grey, firm to moderately hard, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace very fine quartz grains, trace medium quartz grains in part, trace calcareous material, trace carbonaceous specks, trace micromica. SHOWS: No direct, no cut, no crush cut, thin dull greenish yellow residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA_2 Permit: VIC/P 31 Date:14th October 1993 Geologist(s): C.MENHENNITT/A.SYME Logging Suite No: 2
26	1643.5	31	**CLAYSTONE:** medium dark grey, firm to moderately hard, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace very fine quartz grains, trace calcareous material, trace carbonaceous specks, trace micromica. **SHOWS:** No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
27	1620	50	**CLAYSTONE:** medium dark grey, firm to moderately hard, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace quartz silt, trace calcareous material, trace carbonaceous specks, trace micromica. **SHOWS:** No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
28	1589.5	40	**CLAYSTONE:** medium dark grey, firm to moderately hard, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace very fine quartz sand, trace calcareous material, trace very fine grained glauconite, trace carbonaceous specks, trace micromica. **SHOWS:** No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
29	1565.5	40	**CLAYSTONE:** medium dark grey, firm to moderately hard, subblocky, predominantly light olive grey argillaceous material, trace quartz silt, trace calcareous material, trace carbonaceous specks, trace micromica. **SHOWS:** No direct, no cut, no crush cut, thin dull greenish yellow residual ring.
30	1545	33	**CLAYSTONE:** medium dark grey, soft to firm, sticky, subblocky, predominantly light olive grey to light brownish grey argillaceous material, trace quartz silt, trace calcareous material, trace carbonaceous specks, trace micromica. **SHOWS:** No direct, no cut, no crush cut, patchy to thin dull greenish yellow residual ring.

Cuttings Descriptions

The following detailed cuttings descriptions were prepared at the wellsite.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
570 (spot)	80	-	-	tr	CLAYSTONE: 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 sand grains, rare to occasionally common fossil fragments.
	20	-	tr	-	SANDSTONE: 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 common, occasionally abundant 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 visual porosity. No shows.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
575 (spot)	80	-	-	tr	CLAYSTONE: as above.
	20	-	tr	-	SANDSTONE: generally as above, clear to translucent, light brown in part, friable with common loose grains in part, moderately hard in part, predominantly medium to coarse, trace fine grained in part, subangular to dominantly subrounded, rounded in part, very poorly sorted, rarely iron stained quartz, trace to common, occasionally abundant dark grey to brownish grey and dark brown silty argillaceous matrix, chamositic in part, trace to rare moderately strong to strong pyrite, siliceous and calcareous cement, partially dolomitic, trace fine to medium dark green glauconite pellets, trace mica, fossil fragments and lithics, nil to trace forams, very poor to rarely fair visual porosity. No shows.
580	100	-	tr	tr	CLAYSTONE: medium brown to brownish grey, soft, rarely firm in part, sticky in part, commonly micromicaceous, slightly calcareous in part, moderately silty, rarely finely arenaceous in part, trace fine glauconite and carbonaceous flecks, rare fossil fragments, trace pyrite nodules.
	tr	-	tr	-	SANDSTONE: as above.
585 (spot)	100	-	tr	tr	CLAYSTONE: as above
590 (spot)	100	-	tr	tr	CLAYSTONE: as above
595 (spot)	100	-	tr	tr	CLAYSTONE: as above

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: **MINERVA-2A** Permit: **VIC/P31** Geologist(s): **A. TABASSI/D. PICKAVANCE**
600	100	-	tr	tr	CLAYSTONE: generally as above, dominantly medium brown to brownish grey, occasionally medium to dark brown, soft, rarely firm in part, sticky in part, commonly micromicaceous, slightly calcareous in part, moderately silty, rarely finely arenaceous in part, trace fine glauconite and carbonaceous flecks, rare fossil fragments, trace pyrite nodules.
605 (spot)	100	-	tr	tr	CLAYSTONE: as above
610 (spot)	100	-	c	tr	CLAYSTONE: as above, common glauconite.
615 (spot)	100	-	c	tr	CLAYSTONE: generally as above, common to abundant very fine quartz sand grains, in part grading to Argillaceous Sandstone, trace hard, medium dull brown dolomitic and light grey to white calcareous bands with common glauconite pellets.
620	100	-	c	tr	ARENACEOUS CLAYSTONE: medium to dark brownish grey, soft to occasionally firm, dominantly dispersive, abundant clear, silt to fine grained quartz sand grains, trace micromica, trace pyrite nodules, common fine to occasionally medium grained glauconite, in part grading to fine Argillaceous Sandstone.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-2A**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
630 (spot)	100	-	c	-	GRANULE SANDSTONE: light to medium green, clear to opaque, light to medium brown in part, reddish orange in part, 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 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, nil to trace mica and pyrite nodules, fair inferred porosity. No shows.
640	100	-	tr	-	GRANULE SANDSTONE: as above, trace glauconite.
660	100	-	tr	-	GRANULE SANDSTONE: generally as above, dominantly medium brown to reddish brown, trace medium to coarse iron oxide/hydroxide pellets, trace to rare dispersive, limonitic argillaceous matrix.
680	100	-	tr	-	GRANULE SANDSTONE: as above, occasionally medium grained.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-2A**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
700	100	-	-	-	SANDSTONE: 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, occasionally very coarse grained, 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. No shows.
720	100	-	-	-	SANDSTONE: generally as above, dominantly very coarse to rarely granule, rare medium grained.
740	50	-	-	-	SANDSTONE: as above
	50	-	tr	tr	ARENACEOUS CLAYSTONE: 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 calcareous.
760	100	-	tr	tr	ARENACEOUS CLAYSTONE: generally as above, dominantly medium to dark brownish grey, dominantly dispersive.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-2A**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
780	50	-	tr	tr	ARENACEOUS CLAYSTONE: generally as above, dominantly medium 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 calcareous.
	50	-	-	tr	SANDSTONE: clear to very light grey, occasionally very light brownish grey, friable with abundant loose grains, rarely moderately hard in part, medium to very coarse grained, dominantly coarse 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 biotite and muscovite, trace brown, grey and non glauconitic green lithics, trace coaly detritus, good inferred/visual porosity. No shows.
800	100	-	-	tr	SANDSTONE: as above, clear to very light grey, occasionally very light brownish grey, friable with abundant loose grains, rarely moderately hard in part, medium to very coarse grained, dominantly coarse 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 biotite and muscovite, trace brown, grey and non glauconitic green lithics, trace coaly detritus, good inferred/visual porosity. No shows.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
820	100	-	-	tr	SANDSTONE: generally as above, dominantly clear to light grey, rarely moderately hard to hard in part, dominantly very coarse grained.
840	100	-	-	tr	SANDSTONE: generally as above, dominantly coarse grained.
860	100	-	-	tr	SANDSTONE: generally as above, common to occasionally abundant, light grey, silty in part, dispersive argillaceous matrix, fair to occasionally good inferred/visual porosity. No shows.
880	100	-	-	tr	SANDSTONE: generally as above, dominantly very coarse grained, trace to common argillaceous matrix, trace medium to dark grey, hard chert bands, fair inferred/visual porosity. No shows.
900	100	-	-	tr	SANDSTONE: generally as above, dominantly medium to coarse grained, rarely fine grained in part.
920	100	-	-	tr	SANDSTONE: generally as above, very light grey to clear, friable with abundant loose grains, rarely moderately hard in part, dominantly medium grained, rarely fine and coarse grained, subangular to subrounded, moderate to well sorted clear quartz, trace light grey, very rarely white kaolinitic, dispersive argillaceous matrix (washed away), rare moderately strong pyrite cement, nil to trace moderately weak to moderately strong calcareous and siliceous cement in part, trace mica, coaly detritus and brown, grey and green lithics, good to fair visual/inferred porosity. No shows.
940	100	-	-	tr	SANDSTONE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
960	100	-	-	tr	SANDSTONE: generally as above, dominantly medium to coarse grained, occasionally very coarse grained quartz overgrowths.
980	100	-	-	tr	SANDSTONE: generally as above, dominantly medium grained.
1000	100	-	-	tr	SANDSTONE: generally as above, dominantly medium to coarse grained, occasionally very coarse grained quartz overgrowths.
1020	100	-	-	tr	SANDSTONE: as above.
1040	100	-	-	tr	SANDSTONE: as above, dominantly medium grained.
1060	80	-	tr	tr	SANDSTONE: generally as above, very light grey to clear, friable with abundant loose grains, rarely moderately hard in part, dominantly medium grained, rarely fine and coarse grained, subangular to subrounded, moderate to well sorted clear quartz, trace light grey, very rarely white kaolinitic, dispersive argillaceous matrix (washed away), rare moderately strong pyrite cement, nil to trace moderately weak to moderately strong calcareous and siliceous cement in part, trace mica, coaly detritus and brown, grey and green lithics, nil to trace glauconite, good to fair visual/inferred porosity. No shows.
	20	-	tr	tr	CLAYSTONE: medium grey, light grey and rarely light brownish grey in part, very rarely white and kaolinitic, soft, sticky, trace micromica, moderately silty in part, trace carbonaceous flecks, nil to trace glauconite.
1080	60	-	tr	tr	SANDSTONE: as above.
	40	-	tr	tr	CLAYSTONE: as above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-2A**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1100	50	-	tr	tr	SANDSTONE: as above.
	50	-	tr	tr	CLAYSTONE: as above.
1120	40	-	tr	tr	SANDSTONE: as above.
	60	-	tr	tr	CLAYSTONE: as above.
1140	50	-	tr	tr	SANDSTONE: as above.
	50	-	tr	tr	CLAYSTONE: as above.
1160	90	-	tr	tr	CLAYSTONE: 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 laminae, nil to trace glauconite.
	10	-	tr	tr	SANDSTONE: very light grey to translucent, friable with abundant loose grains, rarely moderately hard in part, very fine to dominantly fine grained, subangular to subrounded, well sorted clear quartz, no apparent matrix (washed away ?), nil to trace moderately strong pyrite cement, trace brown and grey lithics, nil to trace mica, good inferred porosity. No shows.
1177 (spot)	90	-	tr	tr	SANDSTONE: as above.
	10	-	tr	tr	CLAYSTONE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1180	90	-	tr	tr	CLAYSTONE: generally as above, medium grey to brownish grey, 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 laminae, nil to trace glauconite.
	10	-	tr	tr	SANDSTONE: generally as above, very light grey to translucent, friable with abundant loose grains, rarely moderately hard in part, very fine to dominantly fine grained, subangular to subrounded, well sorted clear quartz, trace light grey to occasionally white/kaolinitic argillaceous matrix (washed away), nil to trace moderately strong pyrite and medium brown dolomite cement, trace brown and grey lithics, nil to trace mica, good inferred porosity. No shows.
1195 (spot)	90	-	tr	tr	CLAYSTONE: as above
	10	-	tr	tr	SANDSTONE: as above
1200	90	-	tr	tr	CLAYSTONE: as above
	10	-	tr	tr	SANDSTONE: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1220	60	-	tr	tr	CLAYSTONE: as above
	40	-	-	tr	SANDSTONE: generally as above, very light grey and off white to translucent, friable aggregates with common loose grains, trace moderately hard in part, very fine to medium grained with trace very coarse grains (possibly cavings?), subangular to subrounded moderately well sorted clear quartz grains, with trace to rare off white kaolinitic and light grey argillaceous matrix, trace weak siliceous and calcite cement, nil to trace strong pyrite cement, trace medium brownish grey to grey lithic fragments, trace mica flakes, trace carbonaceous matter, good visual porosity. No shows.
1240	60	-	tr	tr	CLAYSTONE: as above
	40	-	tr	tr	SANDSTONE: generally as above, very coarse grains show signs of quartz overgrowths and reworking.
1260	70	-	tr	tr	CLAYSTONE: generally as above, typically light brownish grey and sticky to off white (kaolinite) and soft, grading to Silty Claystone.
	30	-	-	tr	SANDSTONE: generally as above, with trace to abundant off white kaolinitic matrix, grading to Argillaceous Sandstone, poor to moderately good visual porosity.
	tr	-	-	tr	DOLOMITE: medium orange brown, subblocky with irregular conchoidal fracture, very hard, with common fine quartz grains, trace carbonaceous flecks, trace ?glauconite.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1280	80	-	tr	tr	CLAYSTONE: generally as above, predominantly medium to medium/dark grey to brownish grey, with trace off white (kaolinite).
	20	-	-	tr	SANDSTONE: generally as above, grades to Argillaceous Sandstone, trace dolomite.
1300	100	-	tr	tr	CLAYSTONE: generally as above, light to medium grey to brownish grey with 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 grained 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.
	r	-	-	tr	SANDSTONE: generally as above, light grey to whitish grey, friable aggregates with abundant loose grains, very fine to rarely fine grained, subrounded well sorted clear quartz grains, with common to abundant light grey argillaceous matrix and occasionally rare off white ?kaolinite matrix, trace silica and calcite cement and occasional trace to rare very strong pyrite cement, trace carbonaceous detritus, trace micromica, trace medium to light grey fine lithic grains, very poor visual porosity, sample grades to argillaceous sandstone. No shows.
	tr	-	tr	tr	DOLOMITE: light orange brown to medium brown as above, very hard, with trace carbonaceous detritus, trace fine quartz grains and glauconite.
1320	100	-	tr	tr	CLAYSTONE: as above

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1340	100	-	tr	tr	CLAYSTONE: as above
360	100	-	tr	tr	CLAYSTONE: as above
1380	100	-	tr	tr	CLAYSTONE: generally as above, dominantly medium to dark grey to brownish grey with trace off white (kaolinite?) and fawn, firm to soft, moderately hard in part,sticky in part, subblocky 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 grained 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, trace dolomite bands as above .
1400	100	-	tr	tr	CLAYSTONE: as above
1405 (spot)	100	-	tr	tr	SILTY CLAYSTONE: medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, common micromica and carbonaceous flecks, commonly to abundantly silty, in part grade to Argillaceous Siltstone, trace fine glauconite and very fine quartz sand grains.
	tr	-	tr	tr	SANDSTONE: light grey to light greenish grey, friable, very rarely moderately hard in part, very fine to fine, dominantly subrounded very well sorted clear quartz, no apparent matrix or cement, trace mica, very fine glauconite, carbonaceous detritus, very fine partially altered feldspar and fine grey and brown lithics, good to very good visual porosity. No shows.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1410 (spot)	100 tr	- -	tr tr	tr tr	SILTY CLAYSTONE: as above. SANDSTONE: as above.
1415 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1420	100	-	tr	tr	SILTY CLAYSTONE: as above.
1425 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1430 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1440	100	-	tr	tr	SILTY CLAYSTONE: as above.
1445 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1450 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1455 (spot)	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, common micromica and carbonaceous flecks, trace mica flakes, commonly to abundantly silty, in part grades to Argillaceous Siltstone, trace fine glauconite and very fine quartz sand grains.
1460	100	-	tr	tr	SILTY CLAYSTONE: generally as above, rarely buff in colour, with trace framboidal to nodular pyrite, grades in part to Argillaceous Siltstone.
1465 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1470 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1475 (spot)	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with possible slickensides, evidence of fault plane?
1480	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with possible slickensides, evidence of fault plane?
1485 (spot)	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with possible slickensides, evidence of fault plane?
1490 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1495 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1500	100	-	tr	tr	SILTY CLAYSTONE: generally as above, rarely very hard, with trace pyritised carbonaceous fragment, trace calcite vein (indicative of fracturing?), trace very hard brown dolomite as above.
	tr	-	-	tr	SANDSTONE: clear to light grey, friable to fairly hard aggregates, fine grained, subangular well sorted clear quartz grains, with trace light grey argillaceous matrix, trace siliceous and calcareous cement, trace carbonaceous matter, very poor to ?nil visual porosity. No shows.
1505 (spot)	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace aggregates of dark green fine grained glauconite pellets with microcrystalline pyrite cement.
1512	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace aggregates of dark green fine grained glauconite pellets.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1515	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, common micromica and carbonaceous flecks, trace mica flecks, commonly to abundantly silty, in part grades to Argillaceous Siltstone, trace to occasionally common fine glauconite and very fine quartz sand grains, nil to trace inoceramus, nil to trace hard, medium brown dolomite bands.
1520	100	-	tr	tr	SILTY CLAYSTONE: as above.
1525	100	-	tr	tr	SILTY CLAYSTONE: as above.
1530	100	-	tr	tr	SILTY CLAYSTONE: as above.
1535	100	-	tr	tr	SILTY CLAYSTONE: as above.
1538	100	-	tr	tr	SILTY CLAYSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1540	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, trace to common micromica and carbonaceous flecks, trace mica flecks, commonly to abundantly silty, in part grades to Argillaceous Siltstone, trace to rare fine glauconite,trace to rare very fine quartz sand grains, in part grades to Arenaceous Claystone, trace pyrite nodules, nil to trace hard, medium brown dolomite bands with trace glauconite.
1545	100	-	tr	tr	SILTY CLAYSTONE: as above
1550	100	-	tr	tr	SILTY CLAYSTONE: as above
1555	100	-	tr	tr	SILTY CLAYSTONE: as above
	r	-	tr	tr	ARGILLACEOUS SANDSTONE: medium to medium/dark brownish grey, friable aggregates with abundant loose grains, very fine grained, subrounded well sorted clear quartz grains, with abundant dark brownish grey argillaceous matrix and grading to arenaceous claystone in part, trace siliceous cement, trace to ?rare mica flakes and micromica, trace carbonaceous detritus, trace altered feldspar, trace disseminated microcrystalline pyrite, very poor to nil visual porosity. No shows.
	r	-	tr	-	DOLOMITE: medium brown, very hard, trace very fine glauconite pellets.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1560	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, trace to common micromica and carbonaceous flecks, trace mica flecks, commonly to abundantly silty, in part grades to Argillaceous Siltstone, trace to rare fine glauconite,trace to rare very fine quartz sand grains, in part grades to Arenaceous Claystone, trace pyrite nodules.
	r	-	tr	tr	SANDSTONE: light grey to medium/dark brownish grey, friable aggregates with common loose grains, very fine grained, subrounded well sorted clear quartz grains, trace to abundant light grey to dark brownish grey argillaceous matrix grading to argillaceous sandstone as above, trace micromica, trace carbonaceous detritus, very poor to ?fair visual porosity. No shows.
	r	-	-	-	SILTSTONE: orange brown to light/medium brown, very hard, sit grade grading to very fine quartz grains, rare to common medium brown argillaceous matrix, abundant very strong siliceous cement, nil to trace calcareous cement and nil to rare very strong pyritic cement, trace micromica, trace carbonaceous flecks.
	tr	-	tr	-	DOLOMITE: generally as above, medium brown, very hard, trace very fine glauconite pellets.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1565	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace coaly fragment (possibly detritus).
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	tr	-	DOLOMITE: as above.
1570	100	-	tr	tr	SILTY CLAYSTONE: generally as above, commonly arenaceous and grading to Arenaceous Claystone.
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	tr	-	DOLOMITE: as above.
1575	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace off white/buff colour.
	tr	-	tr	tr	SANDSTONE: as above, trace nodular pyrite.
	tr	-	-	-	SILTSTONE: medium grey to light/medium orange brown, extremely hard, quartz silt grading to very fine quartz sand, rare to common medium grey to brown argillaceous matrix, abundant very strong silica cement, trace calcareous (dolomitic?) cement, trace silt grade to fine grained glauconite.
1580	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	tr	SANDSTONE: as above, trace clear loose very coarse quartz grains.
	r	-	-	-	SILTSTONE: as above, extremely hard.
1585	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	-	-	SILTSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1590	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	-	-	SILTSTONE: as above.
	tr	-	-	-	DOLOMITE: medium brown to orange brown, very hard, blocky and angular, trace very fine glauconite grains.
1595	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace pyrite nodules.
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	-	-	SILTSTONE: as above.
	tr	-	-	-	DOLOMITE: medium brown to orange brown, very hard, blocky and angular, trace very fine glauconite grains.
1600	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace pyrite nodules.
	tr	-	tr	tr	SANDSTONE: generally as above, trace strong pyrite cement.
	tr	-	-	-	SILTSTONE: as above.
	tr	-	-	-	DOLOMITE: medium brown to orange brown, very hard, blocky and angular, trace very fine glauconite grains. SHOWS: no direct or cut fluorescence, very slow very weak yellowish green bleeding crush cut fluorescence from carbonaceous matter in claystone, very thin dull yellowish green residual ring fluorescence.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
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Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1605	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace echinoid spicule.
	tr	-	tr	tr	SANDSTONE: as above.
	tr	-	-	-	SILTSTONE: as above.
	tr	-	-	-	DOLOMITE: medium brown to orange brown, very hard, blocky and angular, trace very fine glauconite grains. SHOWS: no direct or cut fluorescence, very slow very weak yellowish green bleeding crush cut fluorescence from carbonaceous matter in claystone, very thin dull yellowish green residual ring fluorescence.
1610	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey and brownish grey, soft to firm, rarely moderately hard in part, sticky in part, subblocky in part, slightly to occasionally moderately calcareous, trace dolomitic, trace to common micromica and carbonaceous flecks, trace mica flecks, commonly to abundantly silty, in part grades to Argillaceous Siltstone, trace to rare fine glauconite, trace to rare very fine quartz sand grains, in part grades to Arenaceous Claystone, trace pyrite nodules.
	tr	-	-	tr	SANDSTONE: generally as above, light orange brown, friable aggregates, very fine grained, subrounded well sorted clear quartz grains, trace to minor light grey to dark brownish grey argillaceous matrix grading to Argillaceous Sandstone as above, trace micromica, trace carbonaceous specks, very poor to ?fair visual porosity. No shows

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
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Geologist(s): A. TABASSI/
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Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1615	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace very fine/fine quartz sand.
	tr	-	-	tr	SANDSTONE: generally as above, trace angular medium quartz fragments
	tr	-	tr	tr	SILTSTONE: generally as above, light brownish grey, very hard, predominantly quartz silt, minor to common light brown argillaceous material, trace carbonaceous specks, trace very fine grained medium green glauconite.
	tr	-	-	tr	DOLOMITE: generally as above, light orange brown, hard to very hard, trace quartz silt, trace carbonaceous specks.
1620	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	tr	SANDSTONE: light grey, friable to slightly hard, subblocky, very fine to fine grained, subangular to subrounded moderately well sorted quartz grains, trace light grey argillaceous matrix, rare to minor moderately strong silica cement, trace to rare calcareous cement, trace calcareous cement, trace altered feldspar?, trace medium grey lithic fragments, trace mica, trace carbonaceous detritus, poor to ?fair visual porosity. No shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1625	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to medium/dark brownish grey, soft and slightly sticky to firm and subblocky, slightly calcareous, common to abundant silt, trace carbonaceous detritus, trace to ?rare micromica, trace glauconite grains, trace to rare very fine quartz grains and grading to arenaceous claystone in part, trace pyrite nodules in part.
	tr	-	tr	-	SILTSTONE: medium to medium/dark brownish grey, hard, subblocky, grades to very fine quartz grains in part, common to abundant medium/dark grey argillaceous matter, abundant strong siliceous cement, trace calcareous (dolomitic?) cement, trace carbonaceous matter, trace micromica, trace glauconite.
	tr	-	tr	-	DOLOMITE: medium brown to orange brown, very hard, blocky, rare argillaceous matter, trace very fine glauconite grains.
1630	100	-	tr	tr	SILTY CLAYSTONE: as above
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	tr	SANDSTONE: light yellowish brown, friable, very fine to fine grained, subrounded moderately well sorted clear quartz grains, rare yellowish brown silty argillaceous matrix, trace to rare moderately weak silica cement and dolomitic cement, trace mica flakes and micromica, trace carbonaceous detritus, poor to ?fair visual porosity. No shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
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Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1635	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace buff colour.
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
1640	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace off white (kaolinite?) .
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	tr	SANDSTONE: off white to clear, moderately hard, very fine to fine grained, subrounded to subangular moderately well sorted quartz grains, with trace to nil off white kaolinite matrix, common to abundant strong siliceous cement/overgrowths, trace calcareous cement, trace carbonaceous matter, very poor to nil visual porosity. No shows.
1645	100	-	tr	tr	SILTY CLAYSTONE: as above
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	tr	SANDSTONE: as above. No shows.
1650	100	-	tr	tr	SILTY CLAYSTONE: as above
	tr	-	t	-	SILTSTONE: as above

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Well: **MINERVA-2A**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/ D. PICKAVANCE/A. SYME**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1655	100	-	tr	tr	SILTY CLAYSTONE: generally as above, with trace buff silty claystone, trace pyritised carbonaceous fragments, trace *inoceramus* fragments.
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	tr	SANDSTONE: generally as above, with occasional aggregates containing common moderately weak pyrite cement. No shows.
1660	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace *inoceramus* fragments, trace calcite vein filling, trace nodular pyrite (possibly associated with sandstone?).
	tr	-	tr	-	SILTSTONE: as above
	tr	-	tr	-	DOLOMITE: as above
	tr	-	-	-	SANDSTONE: generally as above, typically containing common moderately weak pyrite cement. No shows.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/
D. PICKAVANCE/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1665	100	-	tr	tr	SILTY CLAYSTONE: generally as above, light brownish grey to dark grey, soft to hard, predominantly light greenish brown argillaceous material, abundant quartz silt, trace carbonaceous specks and flecks, trace medium/dark green very fine to fine glauconite, trace very fine quartz grains, trace pyrite nodules, trace light orange/brown vein calcite, trace *inoceramus*.
	tr	-	tr	tr	SILTSTONE: generally as above, light orange/brown, dominantly firm with friable aggregates, predominantly quartz silt grading in part to very fine quartz sand, rare to minor light brown argillaceous material, trace calcite cement, trace carbonaceous specks.
1670	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	-	SILTSTONE: as above.
	tr	-	tr	-	DOLOMITE: generally as above, medium orange/brown, very hard, trace greenish grey argillaceous material, trace carbonaceous specks.
1675	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	tr	SILTSTONE: generally as above, trace very fine quartz grains, trace very fine medium/dark green glauconite.
	tr	-	-	tr	DOLOMITE: as above.
1680	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	tr	tr	SILTSTONE: as above.
	tr	-	-	tr	DOLOMITE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1685	100	-	tr	tr	SILTY CLAYSTONE: generally as above.
	tr	-	tr	tr	SILTSTONE: as above.
	tr	-	tr	tr	DOLOMITE: generally as above, trace silica cement(?), trace very fine quartz grains, trace light/medium green lithic fragments, trace medium/dark green angular glauconite nodules, trace carbonaceous specks. SHOWS: no direct, cut or crush cut fluorescence, moderately thick to patchy, very weak very dull green residual ring.
1690	100	-	tr	tr	SILTY CLAYSTONE: as above, trace dolomite as above.
	tr	-	tr	tr	SILTSTONE: as above.
1695	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to dark grey to brownish grey, dominantly firm, occasionally soft, rarely moderately hard, subblocky to dominantly blocky, rarely subfissile in part, commonly to occasionally abundantly silty, in part grades to Argillaceous Siltstone, common micromica, trace carbonaceous flecks and rarely laminae, non calcareous, trace fine glauconite, nil to trace fine to very fine quartz sand grains, nil to trace pyrite nodules, nil to trace calcite filled microfracture, nil to trace hard, medium dull brown dolomite with very fine quartz sand grains, green lithics and glauconite.
1700	100	-	tr	tr	SILTY CLAYSTONE: as above.
1705	100	-	tr	tr	SILTY CLAYSTONE: as above.
1710	100	-	tr	tr	SILTY CLAYSTONE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1715	100	-	tr	tr	SILTY CLAYSTONE: as above.
1719 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1720 (spot)	100	-	tr	tr	SANDSTONE: clear to very light grey, friable with abundant loose grains, rarely moderately hard in part, fine to occasionally medium, subangular to dominantly subrounded, moderately to wel l sorted quartz, trace to occasionally common very light grey to white/kaolinitic dispersive in part argillaceous matrix, trace to rare moderately weak calcite cement, trace to rare fine glauconite and carbonaceous detritus, nil to trace pyrite nodules, trace grey and green lithics, trace calcite crystals and mica, fair to good visual/inferred porosity. No shows.
1721 (spot)	100	-	tr	tr	SANDSTONE: as above.
1722 (spot)	100	-	tr	tr	SANDSTONE: as above, becoming fine to dominantly medium grained.
1723 (spot)	100	-	tr	tr	SANDSTONE: as above, dominantly medium grained, occasionally coarse in part, nil to trace partially altered feldspar, good visual/inferred porosity. No shows.
1724 (spot)	100	-	tr	tr	SANDSTONE: as above.
1725	100	-	tr	tr	SANDSTONE: as above, nil to trace pyrite cement in part, fair to good visual porosity.
1726 (spot)	100	-	tr	tr	SANDSTONE: as above.
1727 (spot)	100	-	tr	tr	SANDSTONE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1728 (spot)	100	-	tr	tr	SANDSTONE: generally as above, clear to very light grey, friable with abundant loose grains, rarely moderately hard in part, dominantly medium grained, medium to coarse grained in part, subangular to dominantly subrounded, moderately to well sorted quartz, trace to occasionally common very light grey to white/kaolinitic, dispersive in part, argillaceous matrix, trace to rare moderately weak calcite cement, nil to trace moderately strong pyrite cement, trace to rare fine glauconite and carbonaceous detritus, nil to trace pyrite nodules, trace grey and green lithics, trace calcite crystals, mica and partially altered feldspar, fair to good visual/inferred porosity. No shows.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1728.5-1733.5	CUT CORE #1				SEE CORE DESCRIPTION SHEET.
1735	100	-	tr	tr	SILTY CLAYSTONE: medium to dark grey and brownish grey, firm to dominantly moderately hard, 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, pyrite nodule and partially altered feldspar.
1740	100	-	tr	tr	SILTY CLAYSTONE: as above.
1745	100	-	tr	tr	SILTY CLAYSTONE: as above, nil to trace inoceramus.
1750	100	-	tr	tr	SILTY CLAYSTONE: generally as above, soft to firm in part.
1755	100	-	tr	tr	SILTY CLAYSTONE: as above.
1760	100 tr	- -	tr -	tr -	SILTY CLAYSTONE: as above. SANDSTONE: loose, fine to coarse/very coarse, predominantly fine to fine/medium, predominantly rounded to subrounded, coarser grains trace angular, moderately sorted quartz sand (cavings?)
1765	100 tr	- -	tr -	tr -	SILTY CLAYSTONE: as above. SANDSTONE: as above (cavings?)
1770	100 tr	- -	tr -	tr -	SILTY CLAYSTONE: as above. SANDSTONE: as above (cavings?)

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1775	100	-	tr	tr	SILTY CLAYSTONE: generally as above, in part medium/dark brown, very hard with trace dolomite.
	tr	-	-	-	SANDSTONE: generally as above, predominantly very fine/fine to fine grained (cavings?)
1780	100	-	tr	tr	SILTY CLAYSTONE: as above, trace medium/dark brown and dolomitic in part.
	tr	-	-	-	SANDSTONE: as above (cavings?)
1785	100	-	tr	tr	SILTY CLAYSTONE: as above, trace medium/dark brown and dolomitic in part.
1790	100	-	tr	tr	SILTY CLAYSTONE: as above, trace medium/dark brown and dolomitic in part.
1795	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to medium/dark brownish grey, trace buff/off white, predominantly firm but slightly hard in part, subblocky, abundantly silty, with trace to occasionally minor clear fine quartz grains (grades to arenaceous silty claystone in part), trace to rare altered feldspar grains, trace carbonaceous matter, trace micromica and mica flakes, trace nodular and cryptocrystalline pyrite, trace fine to medium grained glauconite faecal pellets, occasional calcite crystal (apparently not fossil), trace echinoderm spicule, trace burrow infilled with pyrite and pyrite replacement of coaly detrital fragment.
1800	100	-	tr	tr	SILTY CLAYSTONE: generally as above, typically commonly arenaceous and grading to arenaceous silty claystone.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1805	100	-	tr	tr	SILTY CLAYSTONE: generally as above, common to abundant very fine to very fine/fine grained quartz sand, grades to arenaceous silty claystone, trace amber.
1807.5 (spot)	100	-	tr	tr	SILTY CLAYSTONE: as above.
1810	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace shell fragments.
1815	100	-	tr	tr	SILTY CLAYSTONE: generally as above, subfissile in part.
1820	100	-	tr	tr	SILTY CLAYSTONE: as above.
1821	100	-	tr	tr	SILTY CLAYSTONE: generally as above, trace fine quartz sand, trace light to light/medium green lithics (non-glauconitic).
1822	100	-	tr	tr	SILTY CLAYSTONE: as above.
1823 (B/U)	100	-	tr	tr	SILTY CLAYSTONE: generally as above, medium to medium/dark brownish grey, predominantly firm but slightly hard in part, predominantly subblocky, subfissile in part, abundantly silty, common to abundant very fine to very fine/fine quartz sand, fine grained in part (grades to arenaceous silty claystone in part), trace to rare altered feldspar grains, trace carbonaceous specks, trace micromica and mica flakes, trace light to medium green (non-glauconitic) detritus, trace microcrystalline pyrite, trace very fine/fine glauconite pellets, trace loose calcite grains.
1825	100	-	tr	tr	SILTY CLAYSTONE: as above.
1827	100	-	tr	tr	SILTY CLAYSTONE: as above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1828	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	-	tr	ARGILLACEOUS SANDSTONE: buff to off white, friable to moderately hard, predominantly very fine to fine/medium grained quartz sand, subangular to subrounded, moderately sorted, 20-25% light/medium brownish grey argillaceous matrix, trace carbonaceous specks, trace light to light/medium green lithics (non-glauconitic), trace micromica, poor visual porosity (seen in coarse sieve) SHOWS: no direct, no cut, no crush cut, thick dull moderately strong green residual ring.
1829	100	-	tr	tr	SILTY CLAYSTONE: as above.
1830 (B/U)	100	-	tr	tr	SILTY CLAYSTONE: as above.
	tr	-	-	tr	ARGILLACEOUS SANDSTONE: as above.
	tr	-	-	-	PEBBLY SANDSTONE?: loose, translucent to milky white, very fine/fine grained quartz sand to small/medium quartz pebbles, subrounded to well rounded, pebble fraction predominantly well rounded but broken from drilling, poorly sorted. SHOWS: no direct, no cut, no crush cut, patchy to moderately thick, dull to moderately bright, weak green/yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1831	95	-	-	tr	SANDSTONE: generally as above, loose, clear to off white, translucent orange in part, very fine to coarse grained, predominantly fine/medium to medium/coarse, trace small pebbles, subangular to subrounded, spherical to slightly elongate, trace altered feldspar grains, trace microcrystalline pyrite aggregates, trace woody fragments; trace aggregate, clear to off white, moderately hard to hard, predominantly fine to fine/medium quartz grains, subangular to subrounded, spherical to slightly elongate, rare quartz overgrowths, trace microcrystalline pyrite as cement and in vein, fair visual porosity.
	5	-	-	tr	SILTY CLAYSTONE: as above.
	tr	-	-	tr	ARGILLACEOUS SANDSTONE: as above. SHOWS: no direct, no cut, no crush cut, moderately thick, moderately dull green to green/white residual ring.
1833.5	70	-	-	tr	SILTY CLAYSTONE: as above. (possibly cavings)
	30	-	-	-	PEBBLY SANDSTONE: generally as above, loose, clear to light grey to off white to light yellow/white, very fine to very coarse quartz grained, abundant small to small/medium quartz pebbles, angular to subrounded, pebbles well rounded, spherical to slightly elongate, elongate in part, trace to rare quartz overgrowths, trace altered feldspar grains.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1835	60	-	-	tr	SILTY CLAYSTONE: as above. (possibly cavings)
	40	-	-	-	PEBBLY SANDSTONE: generally as above, loose, clear to light grey to off white to light yellow/white, very fine to very coarse quartz grained, abundant small to small/medium quartz pebbles, angular to subrounded, pebbles well rounded, spherical to slightly elongate, elongate in part, trace to rare quartz overgrowths, trace altered feldspar grains, trace medium green fine grained well rounded lithics (non-glauconitic). SHOWS: no direct, no cut, moderately bright, moderately fast, greenish yellow streaming crush cut, patchy to thick, very weak dull greenish yellow residual ring.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1837	60	-	-	tr	SILTY CLAYSTONE: generally as above, medium to dark grey, hard to very hard, predominantly light/medium to medium brown argillaceous material, 25-30% quartz silt, minor to common very fine to very fine/fine quartz sand (grading to arenaceous silty claystone in part, trac light to medium green lithics (non-glauconitic), trace carbonaceous specks. (possibly cavings)
	40	-	-	-	PEBBLY SANDSTONE: as above.
	tr	-	tr	-	ARGILLACEOUS SANDSTONE: generally as above, buff to off white, friable to moderately hard, predominantly very fine to fine/medium grained quartz sand, subangular to subrounded, moderately sorted, common to abundant light/medium brownish grey argillaceous matrix, trace white ?kaolinitic matrix, trace carbonaceous specks, trace microcrystalline pyrite, poor visual porosity (seen in coarse sieve, possibly cavings)

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1838.8 (B/U)	50	-	-	-	PEBBLY/CONGLOMERATIC SANDSTONE: bimodal 80% loose, broken grains in part, translucent to milky white, translucent yellow in part, small to medium quartz pebbles, sub angular to sub rounded, elongate in part; 20% loose, translucent to milky white, fine to very coarse quartz sand, subangular to subrounded, predominantly subangular; trace aggregates medium to medium/coarse grained quartz sand, moderately well indurated, trace reddish brown argillaceous matrix, trace organic specks, excellent inferred porosity,
	50	-	-	tr	SILTY CLAYSTONE: generally as above (interpreted as cavings), medium to medium/dark grey, hard to very hard, predominantly subblocky, subfissile in part, abundantly silty, common to abundant very fine to fine quartz sand (grades to arenaceous silty claystone in part), trace to rare altered feldspar grains, trace carbonaceous specks and flecks, trace micromica and mica flakes, trace altered light to medium green lithics (chloritic?), trace disseminated microcrystalline pyrite and trace microcrystalline pyrite aggregates, trace very fine/fine glauconite pellets, trace loose calcite grains. SHOWS: no direct, no cut, very slow very weak moderately bright bleeding green to green/yellow crush cut, patchy to moderately thick moderately bright green/yellow residual ring.
1838.8-1855.5	CUT CORE #2				SEE CORE DESCRIPTION SHEET

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1855.5-1882.5	CUT CORE #3				SEE CORE DESCRIPTION SHEET
1885	80	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant 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.
	20	-	-	-	CLAYSTONE: dark grey, hard, subblocky to blocky, predominantly light olive grey argillaceous material, trace quartz silt, trace organic specks, trace micromica, non calcareous. SHOWS: Trace to 5% pinpoint bright green to bluish green direct fluorescence, bright moderately slow to moderately fast blooming bluish white cut fluorescence, instant blooming very bright bluish white crush cut, patchy to moderately thick very bright blue to bluish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1890	90	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant loose grains, very fine grains to granules, predominantly fine to medium grained, subangular to subrounded, moderate to high low sphericity, well sorted quartz, trace weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, minor in patches, trace altered feldspar, good inferred porosity.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: Nil
1895	90	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant loose grains, very fine to very coarse grains, predominantly medium to very coarse grained, subangular to rounded, moderate sphericity, low sphericity in part, poorly sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, good inferred porosity.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: Nil

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1900	80	-	-	tr	CLAYSTONE: as above.
	20	-	-	-	SANDSTONE: as above, interpreted as cavings (MWD indicates thick claystone 1896-1901) SHOWS: Trace to 5% pinpoint bright green to bluish green direct fluorescence, no cut fluorescence, slow bleeding dull orange crush cut, no residual ring.
1905	70	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant loose grains, very fine grains to granules, predominantly very coarse grains to granules, subrounded to rounded, moderate to high sphericity, moderately sorted, trace weak silica cement, moderately weak in part, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, good inferred porosity.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: Trace to 5% pinpoint bright green to bluish green direct fluorescence, no cut fluorescence, moderately fast streaming moderately dull to moderately bright orange crush cut, patchy to moderately thick moderately bright blue to bluish green residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1910	95	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant loose grains, very fine to very coarse grains, predominantly medium to coarse grained, subrounded to rounded, moderate to high sphericity, moderately sorted quartz, trace weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, good inferred porosity.
	5	-	-	tr	CLAYSTONE: as above. SHOWS: 5% pinpoint moderately bright orange, occasional green direct fluorescence, no cut, bright moderately slow streaming orange to bluish white crush cut fluorescence, thick moderately dull green to greenish yellow residual ring fluorescence, moderately bright orange to bluish white residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE/A. SYME/C. MENHENNITT
1915	80	-	-	-	SANDSTONE: very light grey, clear to light grey grains, friable with abundant loose grains, fine grains to granules, predominantly medium to coarse grained, subangular to rounded, moderate to high sphericity, well sorted quartz, trace weak silica cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace microcrystalline pyrite nodules, good inferred porosity.
	20	-	-	tr	CLAYSTONE: dark grey, hard, subblocky to blocky, predominantly light olive grey argillaceous material, trace quartz silt, trace organic specks, trace micromica, non calcareous. SHOWS: 5% pinpoint moderately bright orange, occasional green direct fluorescence, no cut, bright moderately slow streaming orange to bluish white crush cut fluorescence, thick moderately dull green to greenish yellow residual ring fluorescence, moderately bright orange to bluish white residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1970	70	-	-	tr	SANDSTONE: light grey, translucent to very light grey grains, moderately hard to hard but loose grains, fine grained to granule, predominantly coarse to very coarse grained, predominantly medium grained in part, subangular to rounded, low to high sphericity, poorly sorted quartz, rare moderately strong quartz overgrowth cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous fragments, fair to good inferred porosity.
	30	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous matrix, trace to rare quartz silt, nil to trace very fine quartz sand, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: no direct, no cut, no crush cut, patchy to moderately thick bright greenish yellow residual ring.
1975	95	-	-	tr	SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: generally as above, grades in part to silty claystone. SHOWS: no direct, no cut, no crush cut, patchy thin dull to moderately bright greenish yellow residue.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1980	70	-	-	tr	SANDSTONE: light grey, translucent to very light grey grains, friable to moderately hard but loose grains, fine grained to granule, predominantly medium grained, subrounded to rounded, high sphericity, moderately sorted quartz, trace moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous fragments, good inferred porosity.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, patchy to trace dull to moderately bright greenish yellow residue.
1985	70	-	-	tr	SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, patchy to trace dull to moderately bright greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1990	70	-	-	tr	SANDSTONE: light grey, translucent to very light grey grains, friable to moderately hard but loose grains, fine grained to granule, predominantly medium to coarse grained, subangular to rounded, moderate to high sphericity, poorly to moderately sorted quartz, trace to rare moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous fragments, good inferred porosity.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, patchy to trace dull to moderately bright greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1995	60	-	-	tr	SANDSTONE: light medium grey, translucent to very light grey grains, moderately hard but loose grains, fine to very coarse grained, very fine to fine in part, subangular to rounded, moderate to high sphericity, poorly sorted quartz, trace moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, rare to minor very light grey argillaceous matrix, trace to rare altered feldspar grains, trace carbonaceous fragments, fair inferred porosity.
	40	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous matrix, trace to rare quartz silt, nil to trace very fine quartz sand, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: no direct, no cut, no crush cut, patchy to moderately thick dull greenish yellow residual ring.
2000	70	-	-	tr	SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, patchy to moderately thick dull greenish yellow residual ring.
2005	70	-	-	tr	SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, patchy to moderately thick dull greenish yellow residual ring.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2010	70	-	-	tr	SANDSTONE: light medium grey, translucent to very light grey grains, moderately hard but loose grains, medium to very coarse grained, subangular to subrounded, moderate to high sphericity, poorly to moderately sorted quartz, trace to rare moderately weak to moderately strong quartz overgrowth cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous fragments, good inferred porosity.
	30	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous matrix, trace quartz silt, nil to trace very fine quartz sand, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: no direct, very slow dull greenish white cut fluorescence, dull to moderately bright instant greenish white crush cut, patchy to thin dull greenish yellow residue.
2015	80	-	-	tr	SANDSTONE: generally as above, predominantly coarse to very coarse grained, moderately to well sorted quartz.
	20	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, no crush cut, trace dull greenish yellow residue.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENNENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2020	70	-	-	tr	SANDSTONE: generally as above, trace amber.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, very slow dull greenish white cut fluorescence, dull to moderately bright instant greenish white crush cut, patchy to thin dull greenish yellow residue.
2025	80	-	-	tr	SANDSTONE: light grey to light medium grey, translucent to very light grey grains, moderately hard but loose grains, medium to very coarse grained, fine grained 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.
	20	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous matrix, trace quartz silt, nil to trace very fine quartz sand, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: no direct, very slow dull greenish white cut fluorescence, dull to moderately bright instant greenish white crush cut, moderately bright patchy to moderately thick residual ring.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2030	90	-	-	tr	SANDSTONE: generally as above, predominantly medium grained, moderately sorted quartz.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, slow blooming dull greenish white crush cut, patchy to thin dull greenish yellow residue.
2035	80	-	-	tr	SANDSTONE: as above.
	20	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, instant dull greenish white crush cut, patchy to thin dull greenish yellow residue.
2040	90	-	-	tr	SANDSTONE: generally as above, trace coalified wood fragments.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, very slow dull greenish white cut fluorescence, dull to moderately bright instant greenish white crush cut, patchy to thin dull greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
2045	70	-	-	tr	SANDSTONE: very light grey to light medium grey, translucent to very light grey grains, friable to moderately hard but predominantly loose grains, predominantly fine to medium grained, common to abundant coarse to very coarse grains, subangular to rounded, moderate to high sphericity, poorly sorted quartz, trace to rare moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, minor, common in part, very light to light medium grey argillaceous matrix (grading in part to argillaceous sandstone), trace altered feldspar grains, trace carbonaceous fragments and coalified wood fragments, fair inferred porosity.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: no direct, no cut, dull slow blooming greenish white crush cut, patchy to thin dull greenish yellow residue.
2050	70	-	-	tr	SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above. SHOWS: 5% pinpoint, bright, moderately strong yellow fluorescence, no cut, moderately fast, moderately dull, weak greenish white to bluish white crush cut fluorescence, thin, broken, moderately strong bluish white residual ring.
2055	80	-	-	tr	SANDSTONE: as above.
	20	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, no cut, moderately fast, moderately dull, weak greenish white to bluish white crush cut fluorescence, thin, broken, moderately strong bluish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
2060	70	-	-	tr	SANDSTONE: very light grey to medium grey, very light green in part, translucent to very light grey grains to very light green in part, friable to moderately hard but predominantly loose grains, predominantly very fine to medium grained, rare to minor coarse to very coarse grains, subangular to subrounded, angular in part, moderate sphericity to high sphericity, moderately sorted quartz, trace to weak moderately weak to moderately strong silica cement, trace microcrystalline pyrite cement, trace to rare very light grey argillaceous matrix, common to abundant medium grey argillaceous matrix in part (grading to argillaceous sandstone), trace carbonaceous fragments, fair inferred porosity.
	30	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard, subblocky, subfissile in part, predominantly olive grey argillaceous matrix, trace quartz silt, nil to trace very fine quartz sand, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: 5% pinpoint bright, moderately strong greenish yellow fluorescence, moderately fast, streaming, bright, moderately strong cut fluorescence, moderately bright green to bluish white crush cut fluorescence, moderately thick, moderately strong bluish white residual ring.
2065	90	-	-	tr	SANDSTONE: generally as above, moderately hard to hard in part.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, no cut or crush cut, trace dull greenish yellow residue.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2070	90	-	-	tr	CLAYSTONE: as above.
	5	-	-	tr	SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: (2) light brown, soft, predominantly light brown to pale yellowish brown argillaceous material, trace quartz silt, trace carbonaceous specks, trace micromica, trace calcareous, trace calcite grains. SHOWS: No direct, no cut, moderately dull, weak bluish white crush cut fluorescence, trace dull greenish yellow residue.
2075	95	-	-	tr	SANDSTONE: light grey, translucent to translucent light medium grey grains, friable but loose grains, fine to very coarse sand, predominantly medium grained, subangular to occasional subrounded, moderate to high sphericity, well sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified woody fragments, trace calcite grains, good inferred porosity.
	5	-	-	tr	CLAYSTONE: medium to dark grey, moderately hard, subblocky, predominantly olive grey argillaceous matrix, rare to common quartz silt (grading in part to silty claystone), trace carbonaceous specks, trace micromica, non calcareous. SHOWS: No direct, no cut, dull, weak bluish white crush cut fluorescence, trace dull greenish yellow residue.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2080	50	-	-	tr	SILTY CLAYSTONE: 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.
	50	-	-	tr	SANDSTONE: light to light medium grey, translucent to translucent light medium grey grains, friable to moderately hard but loose grains, very fine to fine grains sand, 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. SHOWS: No direct, no cut, dull, weak bluish white crush cut fluorescence, trace dull greenish yellow residue.
2085	50	-	-	tr	SILTY CLAYSTONE: as above.
	50	-	-	tr	SANDSTONE: as above.
	tr	-	-	tr	CLAYSTONE: light brown, soft, predominantly light brown to pale yellowish brown argillaceous material, trace quartz silt, trace carbonaceous specks, trace micromica, trace calcareous, trace calcite grains. SHOWS: 5% pin point bright, moderately strong greenish yellow fluorescence, no cut, dull, weak bluish white crush cut fluorescence, trace dull greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
2090	70	-	-	tr	SANDSTONE: generally as above, rare coarse to very coarse grains, minor to common very light grey argillaceous matrix.
	30	-	-	tr	SILTY CLAYSTONE: as above.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: No direct or cut fluorescence, moderately dull greenish yellow to bluish white crush cut fluorescence, thick, moderately strong bluish white residual ring.
2095	90	-	-	tr	SILTY CLAYSTONE: generally as above, grading to claystone.
	10	-	-	tr	ARGILLACEOUS SANDSTONE: very light grey to light grey, translucent to very light grey grains, friable to moderately hard but predominantly loose grains, very fine to fine grained, medium to coarse grained in part, subangular to subrounded, moderate to high sphericity, moderate sorted quartz, trace microcrystalline pyrite cement, common to abundant very light grey argillaceous matrix, trace carbonaceous material, trace calcareous, trace dolomitic (calcimetry 2% calcite, 1% dolomite), poor to fair visual porosity. SHOWS: No direct or cut fluorescence, moderately dull greenish yellow to bluish white crush cut fluorescence, thick, moderately dull bluish white residual ring.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2100	70	-	-	tr	ARGILLACEOUS SANDSTONE: 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, sub angular 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 calcite grains, poor to fair visual porosity.
	30	-	-	tr	CLAYSTONE: 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: No direct or cut fluorescence, dull, moderately weak greenish yellow crush cut fluorescence, moderately thick, moderately bright bluish white residual ring.
2105	95	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace weak calcareous cement.
	5	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, cut, or crush cut fluorescence, very weak, patchy dull green residue.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2110	95	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace to rare weak calcareous cement.
	5	-	-	tr	CLAYSTONE: as above. SHOWS: 5% moderately bright, bluish white pin point fluorescence, no cut, very slow, blooming, moderately dull, dark green crush cut fluorescence, trace dull greenish yellow residue.
2115	95	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, moderately hard to hard in part, trace to rare moderately weak calcareous cement.
	5	-	-	tr	CLAYSTONE: as above. SHOWS: No direct or cut fluorescence, moderately slow, blooming, dull green to greenish yellow crush cut fluorescence, thick, moderately strong greenish white residual ring.
2120	90	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, moderately hard to hard in part, trace to rare moderately weak calcareous cement.
	10	-	-	tr	CLAYSTONE: as above. SHOWS: No direct or cut fluorescence, moderately fast, blooming, dull green to greenish yellow crush cut fluorescence, thick, moderately strong greenish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
2125	95	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, moderately hard to hard in part, trace to rare moderately weak calcareous cement.
	5	-	-	tr	CLAYSTONE: as above. SHOWS: No direct or cut fluorescence, moderately slow, bleeding, dull green to greenish yellow crush cut fluorescence, thick, moderately strong greenish white residual ring.
2130	95	-	-	tr	ARGILLACEOUS SANDSTONE: very light grey to light medium grey, translucent to very light grey grains, friable to moderately hard but predominantly loose grains, occasional hard, very fine to fine grained, trace granules, subangular to subrounded, moderate to high sphericity, moderately to well sorted, trace to rare moderately weak calcareous cement, trace moderately weak to moderately strong silica cement, trace microcrystalline pyrite cement, common to abundant very light to light grey argillaceous matrix, trace carbonaceous fragments and thin laminae, poor to fair visual porosity.
	5	-	-	tr	CLAYSTONE: medium to dark grey, hard, subblocky, predominantly olive grey argillaceous matrix, rare to minor quartz silt, trace carbonaceous specks, trace micromica, non calcareous. SHOWS: No direct or cut fluorescence, slow, bleeding, dull green to greenish yellow crush cut fluorescence, thick, moderately strong greenish white residual ring.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2135	100	-	-	tr	ARGILLACEOUS SANDSTONE: as above.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: 5% moderately bright, bluish white pin point fluorescence, no cut, very slow, blooming, moderately dull, dark green crush cut fluorescence, trace dull greenish yellow residue.
2140	100	-	-	tr	ARGILLACEOUS SANDSTONE: very light to light grey, translucent to very light grey grains, friable to moderately hard but predominantly loose grains, very fine to coarse grained, occasional very coarse grained to small pebbles, subangular to subrounded, low to high sphericity, poorly to moderately, trace to rare moderately weak calcareous cement, trace moderately weak to moderately strong silica cement, trace microcrystalline pyrite cement, common to abundant very light to light grey argillaceous matrix, trace carbonaceous fragments and thin laminae, trace amber, fair visual porosity.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: 5% moderately bright, bluish white pin point fluorescence, no cut or crush cut fluorescence, moderately thick, moderately bright greenish yellow residual ring.
2145	100	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, moderately to well sorted.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, cut or crush cut fluorescence, very weak, slow, bleeding, dull dark green fluorescence, moderately bright greenish yellow residual ring.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2150	100	-	-	tr	ARGILLACEOUS SANDSTONE: as above.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: 5% strong, moderately bright, bluish white pinpoint fluorescence, very slow, weak, bleeding, moderately bright, bluish white to greenish yellow cut fluorescence, very weak, bleeding, dull green to dark green crush cut fluorescence, trace dull greenish yellow residue.
2155	100	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace weak calcareous cement.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: No direct or cut fluorescence, moderately slow, bleeding, dull green to greenish yellow crush cut fluorescence, thick, moderately strong greenish white residual ring.
2160	100	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace weak calcareous cement.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, cut or crush cut fluorescence, moderately thick, moderately bright greenish yellow residue.
2165	100	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace weak calcareous cement.
	tr	-	-	tr	CLAYSTONE: as above. SHOWS: No direct, cut or crush cut fluorescence, moderately thick, moderately bright greenish yellow residue.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2170	100	-	-	tr	ARGILLACEOUS SANDSTONE: generally as above, trace weak calcareous cement.
	tr	-	-	tr	CLAYSTONE: as above.
					SHOWS: No direct, cut or crush cut fluorescence, moderately thick, moderately bright greenish yellow residue.

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APPENDIX 3 Conventional core description

Core Description

The following core descriptions were prepared at the wellsite after evaluation of chip samples at 1 m intervals.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1728.5	100	-	tr	tr	BIOTURBATED ARGILLACEOUS SANDSTONE: light to medium grey, off white in part, moderately hard to hard, dominantly fine to occasionally medium grained, subrounded to subangular, well sorted clear quartz grains, common to occasionally abundant light to dominantly medium grey (silty in part) and occasionally off white kaolinitic argillaceous matrix, trace to common moderately strong siliceous cement, rare moderately strong calcareous cement, trace to rare moderately strong pyrite cement, trace to common partially altered feldspar and fine glauconite grains, trace mica, green and grey lithics, coaly detritus, poor to dominantly very poor visual porosity. Bioturbated portions lighter in colour and occasionally off white. FLUORESCENCE: Nil

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1729	100	-	tr	tr	ARGILLACEOUS SANDSTONE: light to medium grey, off white in part, moderately hard to hard, dominantly fine to occasionally medium grained, subrounded to subangular well sorted clear quartz grains, common to occasionally abundant light to dominantly medium grey (silty in part) and occasionally off white kaolinitic argillaceous matrix, trace to common moderately strong siliceous cement, rare moderately strong calcareous cement, trace to rare moderately strong pyrite cement, trace to common partially altered feldspar and fine glauconite grains, trace mica, green and grey lithics, carbonaceous and coaly detritus, disseminated cryptocrystalline pyrite, trace pyritised carbonaceous fragments, poor to dominantly very poor visual porosity. Bioturbated in part, grades to arenaceous claystone. FLUORESCENCE: Nil

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1730	100	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARENACEOUS CLAYSTONE: light to medium grey, off white in part, moderately hard to hard, dominantly fine to occasionally medium grained, subrounded to subangular, well sorted clear quartz grains, common to occasionally abundant light to dominantly medium grey (silty in part) and occasionally off white kaolinitic argillaceous matrix, trace to common moderately strong siliceous cement, rare moderately strong calcareous cement, trace to rare moderately strong pyrite cement, trace to common partially altered feldspar and fine glauconite grains, trace mica, green and grey lithics, carbonaceous and coaly detritus, disseminated cryptocrystalline pyrite, trace pyritised carbonaceous fragments, poor to dominantly very poor visual porosity. Slightly bioturbated in part, grades to arenaceous claystone. FLUORESCENCE: No direct, no cut, no crush cut, moderately weak moderately dull thin broken to patchy in part green to greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1731	100	-	-	tr	SILTY CLAYSTONE: medium to dark grey, firm to hard, dominantly moderately hard, massive, abundantly silty, common micromica, occasionally slightly to moderately finely arenaceous, trace to occasionally common partially altered feldspar, rare to occasionally common coaly detritus, carbonaceous flakes and pyritised coaly fragments, trace pyrite nodules and disseminated cryptocrystalline pyrite, microframboidal in part, trace micromica and mica flakes, non- to slightly-calcareous, interlaminated with minor argillaceous sandstone as per 1730 m. FLUORESCENCE: No direct, no cut, no crush cut, moderately weak moderately dull thin to moderately thick green to greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1732	100	-	tr	tr	**ARGILLACEOUS SANDSTONE GRADING TO SILTY ARENACEOUS CLAYSTONE:** light to medium grey, off white in part, moderately hard to hard, dominantly fine to occasionally medium grained, subrounded to subangular, well sorted clear quartz grains, common to occasionally abundant light to dominantly medium grey (silty in part) and occasionally off white kaolinitic argillaceous matrix, trace to common moderately strong siliceous cement, rare moderately strong calcareous cement, trace to rare moderately strong pyrite cement, trace to common partially altered feldspar and fine glauconite grains, trace mica, green and grey lithics, carbonaceous and coaly detritus, disseminated cryptocrystalline pyrite, trace pyritised carbonaceous fragments, poor to dominantly very poor visual porosity. Slightly bioturbated in part, grades to silty arenaceous claystone. **FLUORESCENCE:** No direct, no cut, no crush cut, very weak moderately dull broken thin green residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 1 1728.5 mRT - 1733.5 mRT recovery: 5 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): A. TABASSI/ D. PICKAVANCE/A. SYME
1733.5	100	-	tr	tr	<u>ARGILLACEOUS SANDSTONE GRADING TO SILTY ARENACEOUS CLAYSTONE:</u> light to medium grey, off white in part, moderately hard to hard, dominantly fine to occasionally medium grained, subrounded to subangular, well sorted clear quartz grains, common to occasionally abundant light to dominantly medium grey (silty in part) and occasionally off white kaolinitic argillaceous matrix, trace to common moderately strong siliceous cement, rare moderately strong calcareous cement, trace to rare moderately strong pyrite cement, trace to common partially altered feldspar and fine glauconite grains, trace mica, green and grey lithics, carbonaceous and coaly detritus, disseminated cryptocrystalline pyrite, trace pyritised carbonaceous fragments, poor to dominantly very poor visual porosity. Slightly bioturbated in part, grades to silty arenaceous claystone. <u>FLUORESCENCE:</u> No direct, no cut, no crush cut, very weak moderately dull thin to moderately thick broken green to greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1838.8	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, translucent medium dark grey grains in part, hard, fine grained to small pebbles, predominantly medium grained, subrounded to occasional subangular, spherical to slightly spherical, slightly elongate in part, moderately sorted quartz, trace moderately strong quartz cement overgrowths, rare light grey argillaceous matrix, trace altered feldspar grains, trace microcrystalline pyrite aggregates, trace carbonaceous flecks, good visual porosity. FLUORESCENCE: no direct, slow bleeding moderately strong moderately bright green to greenish white cut, slow blooming moderately dull to moderately bright milky green to greenish white crush cut, thick moderately strong moderately bright green to greenish white residual ring.
1840	100	-	-	r	CLAYSTONE: medium dark grey to brownish grey, moderately hard, predominantly medium dark grey argillaceous material, trace quartz silt, rare amber, rare coalified wood fragments, vitreous in part, rare carbonaceous wisps, trace very fine quartz grains with microcrystalline pyrite cement in part, non calcareous. FLUORESCENCE: no direct, moderately bright slow bleeding greenish yellow cut, very fast blooming moderately dull to moderately bright green to greenish white crush cut, thick bright green to greenish yellow.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1841	100	-	-	r	SILTY CLAYSTONE: medium dark grey to brownish grey, moderately hard to hard, predominantly medium dark grey argillaceous material, abundant quartz silt, rare amber, common carbonaceous wisps, trace weathered pyrite, non calcareous. FLUORESCENCE: no direct, no cut, slow bleeding dull green crush cut, thick dull green residual ring.
1842	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, translucent medium dark grey grains in part, hard, fine grained to granules, predominantly medium grained, subrounded to occasional subangular, spherical to slightly spherical, slightly elongate in part, moderately to well sorted quartz, trace moderately strong quartz cement overgrowths, trace light grey argillaceous matrix, trace altered feldspar grains, trace microcrystalline pyrite aggregates, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: 5% patchy moderately dull green direct, dull very slow bleeding cut, slow bleeding dull green crush cut, thick very dull green residual ring.

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CORE DESCRIPTION SHEET

CORE # 2 1838.8mRT - 1855.6 mRT
Recovery: 15.1 m (97.5%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1843	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, translucent medium dark grey grains in part, moderately hard to hard, fine grained to granules, predominantly medium grained, subrounded to occasional subangular, spherical to slightly spherical, slightly elongate in part, moderately to well sorted quartz, trace moderately strong quartz cement overgrowths, trace light grey argillaceous matrix, trace altered feldspar grains, trace microcrystalline pyrite aggregates, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: 5% pin point moderately dull green to greenish yellow direct, moderately dull fast blooming milky green yellowish white cut, instant blooming moderately bright greenish yellow crush cut, thick moderately bright greenish yellow residual ring.
1844	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, translucent medium dark grey grains in part, moderately hard to hard, fine grained to small pebbles, predominantly medium grained, subrounded to occasional subangular, spherical to slightly spherical, slightly elongate in part, moderately to well sorted quartz, trace moderately strong quartz cement overgrowths, trace light grey argillaceous matrix, trace altered feldspar grains, trace microcrystalline pyrite aggregates, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: no direct, no cut, instant blooming moderately bright green crush cut, thick moderately dull to moderately bright green residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1845.3	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, coarse to very coarse grained, trace medium grains, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, trace light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: no direct, dull slow bleeding green cut, very fast moderately bright green to greenish yellow crush cut, moderately thick bright greenish yellow residual ring.
1846	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to predominantly very coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, rare very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: no direct, moderately dull slow bleeding green cut, instant moderately bright greenish yellow crush cut, patchy to moderately thick moderately bright to bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1847	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to predominantly very coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, rare very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, trace coalified woody fragments, good visual porosity. FLUORESCENCE: 5% patchy moderately bright green direct, dull slow bleeding green cut, fast moderately bright green to greenish yellow crush cut, thick bright greenish yellow residual ring.
1848	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to predominantly very coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, rare very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: no direct, no cut, instant moderately dull to moderately bright green to greenish yellow crush cut, thick moderately bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1849	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to predominantly very coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, trace coalified woody fragments, excellent visual porosity. FLUORESCENCE: 5% patchy moderately dull greenish yellow direct, moderately dull very slow bleeding green cut, slow dull greenish yellow crush cut, patchy to thin moderately dull greenish yellow residual ring.
1850	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to predominantly very coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak quartz overgrowth cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace carbonaceous flecks, excellent visual porosity. FLUORESCENCE: 5% patchy moderately bright greenish yellow direct, no cut, slow dull greenish yellow crush cut, thin dull to moderately bright green residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1851	100	-	-	r	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace to rare carbonaceous fragments, excellent visual porosity. FLUORESCENCE: 5-10% patchy moderately bright green direct, no cut, slow dull greenish yellow crush cut, patchy to thin moderately bright greenish yellow residual ring.
1852	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to coarse grained, trace granule, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace to rare carbonaceous fragments, excellent visual porosity. FLUORESCENCE: 5% patchy moderately bright greenish yellow direct, no cut, moderately fast dull greenish yellow crush cut, patchy to thick dull to moderately bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1853	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to coarse grained, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace altered feldspar grains, trace to rare carbonaceous fragments, excellent visual porosity. FLUORESCENCE: 5% patchy moderately bright greenish yellow direct, dull slow greenish yellow cut, moderately fast moderately bright greenish yellow crush cut, moderately thick moderately bright greenish yellow residual ring.
1854.4	100	-	-	tr	SANDSTONE: light grey, clear to light grey grains, moderately hard, medium to very coarse grained, predominantly medium to coarse, subrounded to rounded, predominantly spherical, occasional elongate, well sorted quartz, trace moderately weak silica cement, trace very light grey argillaceous matrix, minor to common coalified and pyritised woody fragments, trace altered feldspar grains, trace carbonaceous specks, excellent visual porosity. FLUORESCENCE: no direct, bright moderately fast streaming green cut, very fast bright green crush cut, thick bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 2 1838.8mRT - 1855.6 mRT Recovery: 15.1 m (97.5%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1854.9	100	-	-	tr	SANDSTONE: light grey, moderately hard, fine to small pebbles, predominantly very coarse to granule, subangular to subrounded, predominantly subrounded, spherical to occasionally elongate, moderately sorted quartz, trace moderately strong quartz overgrowth cement, trace patchy microcrystalline pyrite cement, trace light grey to white argillaceous matrix, trace fine to medium altered feldspar grains, trace carbonaceous flecks, good to excellent visual porosity. FLUORESCENCE: no direct, dull slow blooming greenish yellow cut, moderately dull very slow bleeding greenish white crush cut, no residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1855.5	100	-	-	tr	CLAYSTONE: dark grey, very hard, predominantly olive grey argillaceous material, trace quartz silt, trace micromicaceous, trace fine carbonaceous specks and fragments, non calcareous. One large pebble has white to light brown crystalline calcite veins. Calcimetry 23% calcite. FLUORESCENCE: Nil.
1856.0	100	-	-	tr	SANDSTONE: very light grey to light grey, hard, clear to translucent grains, pale yellowish orange in part, translucent dark grey in part, predominantly medium to very coarse grained, rare fine grains, subangular to subrounded, predominantly moderate to occasionally low sphericity, well sorted quartz, rare strong quartz overgrowth cementation, trace microcrystalline pyrite cement, trace very light argillaceous matrix, trace altered feldspar grains, trace weathered pyritised wood fragments, trace carbonaceous matter, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, moderately thick greenish yellow to bluish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1857.0	100	-	-	-	SANDSTONE: light grey, clear, translucent to very light grey grains, translucent medium dark grey and pale yellowish orange in part, friable to moderately hard, coarse grained to medium pebbles, medium grained in part, predominantly subrounded to rounded, subangular in part, moderate to low sphericity, moderately sorted quartz, trace to rare moderately weak quartz overgrowth cementation, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, excellent visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, patchy greenish yellow to bluish white residue.
1858.0	100	-	-	tr	SANDSTONE: very light grey, translucent to very light grey grains, translucent medium dark grey and pale yellowish orange in part, friable to moderately hard, coarse to predominantly very coarse grained, occasional granules to medium pebbles, predominantly subrounded to rounded, subangular in part, moderate to high sphericity, well sorted quartz, trace to rare moderately weak quartz overgrowth cementation, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy greenish yellow to bluish white residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1859.0	100	-	-	tr	SANDSTONE: very light grey, translucent to very light grey grains, translucent medium dark grey and pale yellowish orange in part, friable to moderately hard, coarse to predominantly very coarse grained, occasional granules to medium pebbles, predominantly subrounded to rounded, subangular in part, moderate sphericity, well sorted quartz, trace to rare moderately weak quartz overgrowth cementation, trace very light grey argillaceous matrix, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, trace greenish yellow residue.
1860.0	100	-	-	tr	SANDSTONE: very light grey, translucent to very light grey grains, translucent medium dark grey in part, friable to moderately hard, coarse to predominantly very coarse grained, occasional granules to medium pebbles, predominantly subrounded to rounded, subangular in part, moderate sphericity, well sorted quartz, trace to rare moderately weak quartz overgrowth cementation, trace very light grey argillaceous matrix, common in patches, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, patchy greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1861.0	100	-	-	-	CLAYSTONE: dark grey to greyish black, hard, subfissile, predominantly dark grey argillaceous material, trace quartz silt, trace micromicaceous, non calcareous. FLUORESCENCE: No direct, no cut, no crush cut, patchy greenish yellow residue.
1862.0	100	-	-	tr	SANDSTONE: very light grey, translucent to very light grey grains, translucent medium dark grey in part, friable to moderately hard, medium to coarse grained, subangular to rounded, moderate sphericity, well sorted quartz, trace to rare moderately weak quartz overgrowth cementation, rare very light grey argillaceous matrix, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, patchy greenish yellow residue.
1863.0	100	-	-	-	SANDSTONE: very light grey, translucent to very light grey grains, friable to moderately hard, fine grained to granule, predominantly medium to coarse grained, subangular to subrounded, moderate to high sphericity, poorly sorted quartz, trace weak quartz overgrowth cementation, trace very light grey argillaceous matrix, trace weathered feldspar grains, excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy greenish yellow to bluish white residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1863.6	100	-	-	tr	SANDSTONE: brownish grey, translucent to very light grey grains, friable to moderately hard, fine grained to granule, predominantly medium to coarse grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace very weak quartz overgrowth cementation, trace to rare light olive grey to olive grey argillaceous matrix, trace organic specks, trace mica, good to excellent visual porosity. FLUORESCENCE: No direct, weak milky white cut and crush cut, thin greenish yellow to bluish white residual ring.
1865.0	100	-	-	-	SANDSTONE: light grey, translucent to very light grey grains, friable to moderately hard, fine to very coarse grained, predominantly medium to coarse grained, subangular to subrounded, moderate to high sphericity, moderately sorted quartz, trace moderately strong quartz overgrowth cementation, trace microcrystalline pyrite cement in part, rare very light grey argillaceous matrix, common in patches, excellent visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, thin patchy greenish yellow to bluish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1866.0	100	-	-	-	SANDSTONE: light grey, translucent to very light grey grains, translucent pale green in part, friable to moderately hard, fine to very coarse grained, predominantly medium to coarse grained, subangular to subrounded, moderate to high sphericity, moderately sorted quartz, trace moderately strong quartz overgrowth cementation, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, common in patches, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, thin greenish yellow to bluish white residual ring.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 3 1855.5 mRT - 1882.5 mRT
Recovery: 27 m (100%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1867.0	60	-	-	-	SANDSTONE: light grey, translucent to light grey grains, translucent dark grey in part, moderately hard, very fine to medium grained, predominantly fine grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace to rare very light grey argillaceous matrix, trace coalified wood fragments, good visual porosity, trace intraclasts of and interbedded with:
	40	-	-	tr	CLAYSTONE: medium dark grey to dark grey black, firm to moderately hard, subfissile in part, predominantly medium to dark brownish grey argillaceous material, rare quartz silt, trace micromica, trace carbonaceous specks, non calcareous. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.
1868.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, moderately hard, very fine to medium grained, predominantly fine grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous wisps, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1869.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to predominantly medium grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous wisps, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.
1870.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to predominantly medium grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, rare very light grey argillaceous matrix, trace carbonaceous wisps, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1871.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to predominantly medium grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residual ring.
1872.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, medium to coarse grained, predominantly medium grained, trace granules, subangular to subrounded, moderate to high sphericity, moderately well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1872.8	100	-	-	tr	SANDSTONE: light grey to light brownish grey, translucent to light grey grains, friable to moderately hard, medium to coarse grained, predominantly coarse grained, trace granules, subangular to subrounded, moderate to high sphericity, moderately well sorted quartz, trace moderately strong silica cement, rare very light grey to light brownish grey argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.
1874.0	100	-	-	-	SANDSTONE: light grey to light brownish grey, translucent to light grey grains, friable to moderately hard, medium to coarse grained, predominantly coarse grained, trace granules, subangular to subrounded, angular in part, moderate to high sphericity, moderately well sorted quartz, trace moderately strong silica cement, rare very light grey to light brownish grey argillaceous matrix, trace feldspar grains, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1875.0	100	-	-	-	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, medium to coarse grained, predominantly coarse grained, trace granules, subangular to subrounded, angular in part, moderate to high sphericity, moderately well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace feldspar grains, trace weathered feldspar grains, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.
1876.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, medium to coarse grained, predominantly coarse grained, rare to minor granules, subangular to subrounded, angular in part, moderate to high sphericity, moderately well sorted quartz, trace moderately strong silica cement, rare very light grey argillaceous matrix, trace feldspar grains, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, patchy pale greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1877.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to medium grained, predominantly medium grained, trace coarse grains, subangular to subrounded, angular in part, moderate to high sphericity, well sorted quartz, trace moderately strong silica cement, rare very light grey argillaceous matrix, trace feldspar grains, rare weathered feldspar grains, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, moderately thick moderately bright greenish yellow to bluish white residual ring.
1878.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to medium grained, predominantly medium grained, trace coarse grains to granules, subangular to subrounded, angular in part, moderate sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace wispy dark grey argillaceous matrix, trace feldspar grains, rare weathered feldspar grains, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, very patchy pale greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1879.0	100	-	-	r	SANDSTONE: light grey, translucent to light grey grains, moderately hard, fine to medium, predominantly medium grained, trace coarse grains to granules, subangular to subrounded, angular in part, moderate sphericity, well sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace feldspar grains, rare weathered feldspar grains, trace amber, minor wisps of very dark grey argillaceous matrix and coalified carbonaceous material, trace large pebble-sized intraclasts of sandstone (as above), good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, dull thin patchy greenish yellow residual ring.
1880.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine grained to small pebbles, predominantly coarse to very coarse grained, subangular to predominantly subrounded, rounded in part, moderate to high sphericity, moderately sorted quartz, trace moderately strong silica cement, trace very light grey argillaceous matrix, trace wisps of medium to dark grey argillaceous matrix, trace feldspar grains, trace coalified wood fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, patchy very weak greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1881.0	100	-	-	tr	CLAYSTONE: medium dark to dark grey, subblocky to blocky, hard to very hard, predominantly light olive grey to olive grey, trace quartz silt, trace organic specks, trace micromica, non calcareous. FLUORESCENCE: No direct, no cut, no crush cut, patchy very weak greenish yellow residue.
1882.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, translucent medium to dark grey grains in part, moderately hard, fine to coarse grained, predominantly medium grained, subangular to subrounded, moderate to high sphericity, well sorted quartz, trace moderately weak silica cement, rare very light grey argillaceous matrix, trace carbonaceous wisps, good to excellent visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, moderately thin moderately bright bluish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 3 1855.5 mRT - 1882.5 mRT Recovery: 27 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1882.5	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, moderately hard, fine grained to very small pebbles, predominantly medium to coarse sand, subangular to subrounded, rounded in part, high to moderate sphericity, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace wisps of medium to dark grey argillaceous matrix, trace carbonaceous fragments, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, dull thin patchy greenish yellow residual ring.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 4 1915 mRT - 1942.75 mRT
Recovery: 27.75 m (99%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1915.0	100	-	-	tr	SANDSTONE: light to medium light grey, clear to translucent medium grey grains, friable to moderately hard, medium grained to small pebbles, predominantly medium to coarse grained, subrounded to rounded, moderate to high sphericity, moderately sorted, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace carbonaceous fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thin moderately weak greenish yellow residual ring.
1916.0	100	-	-	tr	SANDSTONE: light to medium light grey, clear to translucent medium grey grains, friable to moderately hard, medium grained to small pebbles, predominantly medium to coarse grained, subangular to rounded, moderate to high sphericity, moderately sorted, trace moderately strong silica cement, trace weathered microcrystalline pyrite cement in part, trace very light grey argillaceous matrix, trace carbonaceous fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thick moderately bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1917.0	100	-	-	tr	SANDSTONE: light to medium light grey, clear to light grey to translucent medium grey grains, friable to moderately hard, medium grained to small pebbles, predominantly coarse to granule grained, subangular to rounded, moderate to high sphericity, moderately sorted, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace to rare very light grey argillaceous matrix, trace carbonaceous fragments, thin lamina of medium dark grey argillaceous material, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thin moderately weak greenish yellow residual ring.
1918.0	100	-	-	tr	SANDSTONE: light to medium light grey, clear to light grey to translucent medium grey grains, friable to moderately hard, fine to coarse grained, predominantly medium grained, subangular to subrounded, moderate to high sphericity, well sorted, trace to rare moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified wood fragments, thin lamina of medium dark grey argillaceous material, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thick moderately bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1919.0	100	-	-	tr	SANDSTONE: light to medium light grey, clear to light grey to translucent medium grey grains, friable to moderately hard, fine grains to granules, predominantly coarse grained, subangular to subrounded, moderate sphericity, poorly sorted, trace to rare moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace carbonaceous fragments, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thin moderately weak greenish yellow residual ring.
1920.0	100	-	-	tr	SANDSTONE: light grey, clear to translucent medium grey grains, friable to moderately hard, very fine to medium grained, very coarse grains to small pebbles in part, predominantly medium grained, subangular to subrounded, moderate to high sphericity, moderately sorted, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace carbonaceous fragments, thin wispy laminae of olive grey argillaceous material, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thin moderately weak greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1921.0	100	-	-	tr	SANDSTONE: light grey, clear to translucent light grey grains, moderately hard, fine to medium grained, subangular to subrounded, moderate to high sphericity, very well sorted, trace moderately strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous fragments, thin wispy laminae of olive grey argillaceous material, fair to good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thick moderately bright greenish yellow residual ring.
1922.0	100	-	-	tr	SANDSTONE: light grey, clear to translucent light grey grains, moderately hard, fine to medium grained, common coarse grains to granules, subangular to rounded, moderate to high sphericity, moderately sorted, trace moderately weak to moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified woody fragments, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thin moderately weak greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1923.6	100	-	-	tr	SANDSTONE: medium grey, translucent to light grey to translucent medium grey grains, friable, fine to very coarse grains, predominantly medium to coarse grained, subangular to subrounded, rounded in part, moderate to occasional high sphericity, well sorted quartz, trace weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace carbonaceous fragments, good to excellent visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, patchy greenish yellow residue.
1924.0	100	-	-	tr	SANDSTONE: medium grey, translucent to light grey to translucent light medium grey grains, friable to moderately hard, fine to coarse grains, granules in part, predominantly medium to coarse grained, subangular to subrounded, low to moderate sphericity, moderately sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, medium dark grey in patches, trace carbonaceous fragments, trace moderate reddish brown oxidised coal fragments, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, patchy greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1925.0	100	-	-	tr	SANDSTONE: medium grey, translucent to translucent light medium grey grains, friable to moderately hard, fine to very coarse grains, predominantly medium to coarse grained, occasional very coarse grains to granules, subrounded to rounded, moderate to occasional high sphericity, moderately sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified wood fragments, good visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, moderately thick moderately bright greenish yellow residual ring.
1926.0	100	-	-	-	SANDSTONE: medium grey, translucent to light grey grains, friable to moderately hard, fine grains to small pebbles, predominantly coarse to very coarse grained, subrounded to occasional rounded, low to moderate sphericity, moderately sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement in part, trace very light grey argillaceous matrix, good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1927.0	70	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, very fine to occasional fine grains, common silt, subangular to subrounded, moderate sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity.
	30	-	-	ab	CARBONACEOUS CLAYSTONE: dark grey, moderately hard to hard, predominantly olive grey argillaceous material, abundant carbonaceous specks and flecks, minor quartz silt, rare very fine quartz sand, trace microcrystalline pyrite, trace micromica, finely laminated with sandstone. FLUORESCENCE: (sandstone) No direct, no cut, dull weak milky white crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1928.0	80	-	-	r	CLAYSTONE: dark grey, moderately hard to hard, predominantly olive grey argillaceous material, minor quartz silt, minor very fine quartz sand, rare carbonaceous specks, trace microcrystalline pyrite, trace micromica, finely laminated with sandstone.
	20	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, very fine to occasional fine grains, common silt, subangular to subrounded, moderate sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, patchy dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1929.0	90	-	-	r	CLAYSTONE: dark grey, moderately hard to hard, predominantly olive grey argillaceous material, minor quartz silt, rare very fine quartz grains, rare carbonaceous specks and fragments, trace microcrystalline pyrite, microcrystalline pyrite nodules in part, trace micromica, finely laminated with sandstone.
	10	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, very fine to occasional fine grains, common silt, subangular to subrounded, moderate sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, weak dull patchy greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1930.0	80	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, very fine to occasional fine grains, common silt, subangular to subrounded, moderate sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity.
	20	-	-	r	CLAYSTONE: dark grey, moderately hard to hard, predominantly olive grey argillaceous material, minor quartz silt, rare very fine quartz grains, rare carbonaceous specks and fragments, trace microcrystalline pyrite, trace amber, trace mica flakes, finely laminated with sandstone. FLUORESCENCE: Mineral fluorescence from amber.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 4 1915 mRT - 1942.75 mRT
Recovery: 27.75 m (99%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1931.0	95	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, fine to medium grained, subangular to rounded, high sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, fair visual porosity.
	5	-	-	r	CLAYSTONE: dark grey, moderately hard, predominantly olive grey argillaceous material, rare quartz silt, rare carbonaceous specks and fragments, trace micromica, non calcareous, finely laminated with sandstone. FLUORESCENCE: No direct, no cut, dull weak milky white crush cut, thin dull greenish yellow residual ring.
1932.0	90	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium dark grey grains, moderately hard, fine to occasional medium grained, subangular to rounded, high sphericity, well sorted quartz, trace moderately strong silica cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, fair visual porosity.
	10	-	-	r	CLAYSTONE: dark grey, moderately hard, subfissile in part, predominantly olive grey argillaceous material, trace quartz silt, rare carbonaceous specks, trace micromica, non calcareous, finely laminated with sandstone. FLUORESCENCE: (sandstone) No direct, dull weak milky white cut and crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1932.5	100	-	-	tr	CLAYSTONE: medium dark grey, hard, subblocky, predominantly olive grey argillaceous material, trace quartz silt, trace micromica, trace carbonaceous specks, non calcareous. FLUORESCENCE: No direct, no cut, no crush cut, patchy dull greenish yellow residue.
1933.0	90	-	-	tr	CLAYSTONE: medium dark grey, hard, subblocky to subfissile, predominantly olive grey argillaceous material, trace quartz silt, trace micromica, trace carbonaceous specks, non calcareous.
	10	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium grey grains, moderately hard to hard, very fine to fine grained, subangular to subrounded, high sphericity, well sorted quartz, trace moderately strong to strong silica cement, trace microcrystalline pyrite cement, rare very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1934.0	80	-	-	tr	SANDSTONE: very light grey, translucent to light grey grains, moderately hard, fine grained to medium pebbles, predominantly very coarse grains to small pebbles, subrounded to rounded, moderate to high sphericity, moderately sorted quartz, rare very light grey argillaceous matrix, rare coalified carbonaceous fragments with abundant microcrystalline pyrite alteration, fair visual porosity.
	20	-	-	tr	CLAYSTONE: interbedded with sandstone, medium dark grey, moderately hard, predominantly olive grey argillaceous material, rare to minor carbonaceous material, trace microcrystalline pyrite. FLUORESCENCE: (from sandstone) No direct, no cut, dull milky white crush cut, patchy dull greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1935.0	90	-	-	tr	SANDSTONE: medium grey, translucent to translucent medium grey grains, moderately hard to hard, very fine to fine grained, trace medium grains, subangular to subrounded, high sphericity, very well sorted quartz, trace moderately strong to strong silica cement, trace microcrystalline pyrite cement, rare to minor very light grey argillaceous matrix, trace carbonaceous material, poor to fair visual porosity.
	10	-	-	tr	CLAYSTONE: medium dark grey, moderately hard to hard, subblocky to subfissile, predominantly olive grey argillaceous material, trace quartz silt, trace carbonaceous specks and fragments, trace micromica, thin wispy laminations within sandstone. FLUORESCENCE: No direct, no cut, no crush cut, patchy very weak greenish yellow residue.
1936.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine to very coarse grains, predominantly coarse to very coarse, subangular to subrounded, rounded in part, moderate to high sphericity, poorly sorted quartz, trace moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified carbonaceous fragments, fair to good visual porosity. FLUORESCENCE: No direct, dull weak milky white cut and crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1937.0	100	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, friable to moderately hard, fine grains to small pebbles, predominantly coarse grains to granules, subangular to subrounded, rounded in part, low to high sphericity, very poorly sorted quartz, trace moderately strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace coalified carbonaceous fragments, good visual porosity. FLUORESCENCE: No direct, dull milky white, cut and crush cut, patchy dull greenish yellow residue.
1938.0	100	-	-	tr	SANDSTONE: medium light grey, translucent to light grey grains, translucent medium light grey in part, friable to moderately hard, fine grains to small pebbles, predominantly coarse grains to granules, subangular to subrounded, rounded in part, moderate to high sphericity, very poorly sorted quartz, trace to moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace partly pyritised coalified carbonaceous fragments, good visual porosity. FLUORESCENCE: No direct, dull milky white cut and crush cut, moderately thick dull greenish yellow residual ring.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 4 1915 mRT - 1942.75 mRT
Recovery: 27.75 m (99%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1939.0	100	-	-	tr	SANDSTONE: medium grey, translucent to light grey grains, friable to moderately hard, fine to very coarse grained, predominantly coarse to very coarse grained, subangular to subrounded, rounded in part, moderate to high sphericity, moderately sorted quartz, trace to moderately weak silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, good to excellent visual porosity. FLUORESCENCE: Nil.
1940.0	60	-	-	tr	CLAYSTONE: medium dark grey, moderately hard to hard, subblocky, predominantly olive grey argillaceous material, trace quartz silt, trace carbonaceous specks, trace mica, trace sandstone intraclast within claystone.
	40	-	-	tr	SANDSTONE: light grey, translucent to light grey grains, moderately hard to hard, very fine to fine grained, subangular to subrounded, high sphericity, well sorted quartz, trace moderately strong silica cement, minor very light grey argillaceous matrix, trace carbonaceous material, trace amber, poor to fair visual porosity. FLUORESCENCE: No direct, dull milky white cut and crush cut, moderately thick dull greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 4 1915 mRT - 1942.75 mRT Recovery: 27.75 m (99%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1941.0	100	-	-	tr	SANDSTONE: light to medium light grey, translucent to light grey to translucent medium light grey grains, friable to moderately hard, fine to medium grained, predominantly fine grained, subrounded to rounded, moderate to high sphericity, well sorted quartz, rare moderately strong to strong silica cement, trace microcrystalline pyrite cement, microcrystalline pyrite nodules in part, trace very light grey argillaceous matrix, trace carbonaceous fragments and thin wispy laminae, trace amber, common burrows infilled with medium dark grey argillaceous material and sandstone, good (fair in part) visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, moderately thin dull greenish yellow residual ring.
1942.1	100	-	-	tr	SANDSTONE: medium light grey, translucent to light grey to translucent medium light grey grains, friable to moderately hard, fine grained to granules, predominantly medium to coarse grained, subrounded to rounded, moderate to high sphericity, moderately sorted quartz, rare moderately strong to strong silica cement, trace microcrystalline pyrite cement, trace very light grey argillaceous matrix, trace carbonaceous fragments and wispy thin laminae, trace amber, good (fair in part) visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, patchy dull greenish yellow residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1943.0	100	-	-	tr	ARENACEOUS CLAYSTONE: medium dark grey to dark grey, medium light grey in part, hard, common to abundant very fine to fine grained quartz, trace carbonaceous flecks, trace micromica, subfissile, non calcareous. FLUORESCENCE: no direct, no cut, no crush cut, patchy to thin dull greenish white residual ring.
1944.0	70	-	-	-	SANDSTONE: very light grey to light grey, white to light bluish grey grains, hard, fine to coarse grained, predominantly medium grained, subangular to subrounded, moderate to high sphericity, moderately well sorted quartz, common moderately strong silica cement, occasional to minor very light grey argillaceous matrix, trace weathered feldspar grains, trace carbonaceous fragments, poor visual porosity, with interlaminated coal:
	30	-	-	a	COAL: brownish black to black, soft to moderately firm, predominantly dull, subvitreous in part, subconchoidal fracture in part, rare to occasional silt, trace millimetre scale amber clasts, trace very fine grained quartz. FLUORESCENCE: no direct, dull moderately fast greenish yellow cut, instant moderately bright greenish yellow crush cut, moderately bright moderately thick yellowish white residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1945.0	100	-	-	c	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, fine to coarse grained, predominantly medium to coarse, subangular to subrounded, angular in part, moderate to high sphericity, poorly to moderately sorted quartz, rare quartz overgrowth cementation, trace white argillaceous matrix, minor wispy coaly laminae, good to excellent visual porosity. FLUORESCENCE: no direct, dull moderately fast bleeding greenish yellow cut, dull to moderately bright greenish yellow crush cut, patchy to thick moderately bight greenish yellow residue.
1946.0	100	-	-	r	SANDSTONE: very light grey, clear to translucent grains, light bluish grey grains in part, moderately hard, predominantly medium to coarse grained, angular to subangular, subrounded in part, moderate sphericity, well sorted quartz, minor moderately weak quartz overgrowth cementation, trace white argillaceous matrix, trace feldspar grains, trace carbonaceous wisps and fragments, fair to good visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, trace dull green residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1947.0	100	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, light bluish grey grains in part, friable to moderately firm, medium to coarse grained, angular to subangular, subrounded in part, moderate sphericity, well sorted quartz, minor moderately weak quartz overgrowth cementation, trace white argillaceous matrix, trace feldspar grains, trace carbonaceous wisps and fragments, fair to good visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, dull patchy greenish yellow residual ring.
1948.0	100	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, light bluish grey grains in part, friable to moderately firm, medium to coarse grained, trace very coarse grains, angular to subangular, subrounded in part, moderate to high sphericity, well sorted quartz, minor moderately weak quartz overgrowth cementation, trace white argillaceous matrix, trace feldspar grains, trace carbonaceous wisps and fragments, good visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, moderately bright patchy to moderately thick greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1949.0	70	-	-	tr	INTERLAMINATED CLAYSTONE: dark grey, moderately hard, fissile in part, trace micromica, trace carbonaceous flecks, non calcareous, with interlaminated:
	30	-	-	r	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, very fine grained, subangular to subrounded, high sphericity, well sorted quartz, trace moderately strong silica cement, minor white argillaceous matrix, rare carbonaceous fragments, cross bedded in part, very poor visual porosity. FLUORESCENCE: no direct, no cut, weak dull green crush cut, dull patchy to thin greenish yellow residual ring.
1949.9	100	-	-	c	SANDSTONE: very light grey, clear to translucent grains, moderately hard to hard, predominantly fine to medium grained, subrounded to rounded, high sphericity, well sorted quartz, trace to minor moderately strong silica cement, abundant strong pyrite cement in part, trace white argillaceous matrix, common centimetre scale fragments of pyritised and coalified wood, trace amber, trace feldspar grains, fair visual porosity. FLUORESCENCE: no direct, dull to moderately bright very fast streaming greenish yellow cut, instant moderately bright greenish yellow crush cut, thin bright greenish yellow residual ring, patchy to thick moderately bright greenish yellow residue.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 5 1943 mRT - 1969 mRT
Recovery: 26 m (100%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1951.0	40	-	-	tr	INTERLAMINATED CLAYSTONE: greyish black, moderately hard, trace silt, trace carbonaceous flecks, trace very fine grained quartz, rare amber fragments, non calcareous, interlaminated with:
	30	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, very fine to medium grained, angular to subangular, moderate to high sphericity, poorly to moderately sorted quartz, trace moderately weak silica cement, common white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, poor visual porosity, interlaminated with:
	30	-	-	-	COAL: black, moderately firm, bright to subvitreous lustre, brittle, subconchoidal fracture. FLUORESCENCE: no direct, dull slow bleeding yellowish white cut, instant dull yellowish white crush cut, patchy to thick moderately bright to bright yellow white residue.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1952.0	70	-	-	tr	INTERLAMINATED SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, very fine to predominantly medium grained, subangular to subrounded, moderate to high sphericity, poorly to moderately sorted quartz, trace moderately weak silica cement, rare white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, fair visual porosity, interlaminated with:
	30	-	-	-	COAL: brownish black, moderately soft, earthy to subvitreous lustre, subconchoidal fracture in part, rare amber clasts. FLUORESCENCE: no direct, no cut, no crush cut, patchy to moderately thick dull to moderately bright greenish yellow residual ring.
1953.0	80	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, very fine to medium grained, angular to subangular, moderate to high sphericity, poorly to moderately sorted quartz, trace moderately weak silica cement, common white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, poor visual porosity, interlaminated with:
	20	-	-	tr	CLAYSTONE: medium dark grey to dark grey, moderately hard, rare carbonaceous fragments, trace micromica, non calcareous. FLUORESCENCE: no direct, no cut, no crush cut, patchy to thin dull greenish yellow residue.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 5 1943 mRT - 1969 mRT
Recovery: 26 m (100%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1954.0	80	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, very fine to medium grained, angular to subangular, moderate to high sphericity, poorly to moderately sorted quartz, trace moderately weak silica cement, common white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, poor visual porosity, interlaminated with:
	20	-	-	tr	CLAYSTONE: medium dark grey to dark grey, moderately hard, rare carbonaceous fragments, trace micromica, non calcareous. FLUORESCENCE: no direct, no cut, no crush cut, patchy to thin dull greenish yellow residue.
1955.0	60	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, fine to predominantly medium grained, angular to subangular, moderate to high sphericity, moderately sorted quartz, trace moderately weak silica cement, common white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, poor visual porosity, interlaminated with:
	40	-	-	tr	CLAYSTONE: medium dark grey to dark grey, moderately hard, rare quartz silt, rare carbonaceous fragments, trace micromica, trace intraclasts of sandstone as above, non calcareous. FLUORESCENCE: Nil.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1956.0	100	-	-	tr	SANDSTONE: very light grey to medium light grey, clear to translucent grains, moderately hard, fine to coarse grained, predominantly medium to coarse grained, subangular to subrounded, moderate to high sphericity, moderately sorted quartz, minor moderately strong silica cement in part, minor strong pyrite cement in part, trace white argillaceous matrix, trace wispy coal laminae and fragments, poor visual porosity. FLUORESCENCE: Nil.
1957.0	100	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, light bluish grey in part, friable to moderately firm, fine to very fine grained, subangular, high sphericity, well sorted quartz, rare moderately strong silica cement, trace white argillaceous matrix, trace coaly fragments, trace interlaminated claystone, poor to fair visual porosity. FLUORESCENCE: Nil.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1958.0	80	-	-	tr	SANDSTONE: white to very light grey, clear to translucent grains, moderately hard, fine to predominantly medium grained, angular to subangular, moderate to high sphericity, moderately sorted quartz, trace moderately weak silica cement, common white argillaceous matrix, trace carbonaceous fragments, trace feldspar grains, poor visual porosity, interlaminated with:
	20	-	-	r	CLAYSTONE: medium dark grey to dark grey, moderately hard, rare quartz silt, rare carbonaceous fragments, trace micromica, trace intraclasts of sandstone as above, non calcareous. FLUORESCENCE: Nil.
1959.2	100	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, moderately hard, medium to coarse grained, predominantly medium grained, occasional pebbles, angular to subangular, low to moderate sphericity, moderately sorted quartz, moderately strong silica cement, trace carbonaceous fragments, trace claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.

BHP Petroleum

CORE DESCRIPTION SHEET

CORE # 5 1943 mRT - 1969 mRT
Recovery: 26 m (100%)

Well: MINERVA-2A
Permit: VIC/P31
Geologist(s): C.MENHENNITT/A. SYME

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1960.0	100	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, moderately hard, medium to coarse grained, predominantly medium grained, occasional pebbles, angular to subangular, low to moderate sphericity, moderately sorted quartz, moderately strong silica cement, trace carbonaceous fragments, trace claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.
1961.0	100	-	-	tr	SANDSTONE: very light grey to light grey, clear to translucent grains, light bluish grey in part, friable to moderately hard, medium to coarse grained, predominantly medium grained, occasional granules, subangular to subrounded, moderate sphericity, well sorted quartz, moderately weak silica cement, trace carbonaceous fragments, trace claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.
1962.0	100	-	-	tr	SANDSTONE: very light grey to light grey, clear to translucent grains, light bluish grey in part, friable to moderately hard, predominantly medium grained, occasional coarse grains, subangular to subrounded, moderate sphericity, well sorted quartz, moderately weak silica cement, trace carbonaceous fragments, trace carbonaceous claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1963.0	100	-	-	tr	CLAYSTONE: dark grey, moderately hard to hard, subfissile, trace quartz silt, rare micromica, minor carbonaceous flecks, trace very fine grained quartz, trace amber, non calcareous. FLUORESCENCE: Nil.
1964.0	100	-	-	tr	CLAYSTONE: medium dark grey to dark grey, moderately hard to hard, subfissile, trace quartz silt, rare micromica, minor carbonaceous flecks, trace very fine grained quartz, trace amber, non calcareous. FLUORESCENCE: Nil.
1965.0	100	-	-	tr	SANDSTONE: very light grey to light grey, clear to translucent grains, light bluish grey in part, friable to moderately hard, predominantly medium grained, occasional coarse grains, subangular to subrounded, moderate sphericity, well sorted quartz, moderately weak silica cement, trace carbonaceous fragments, rare carbonaceous claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1966.0	100	-	-	tr	SANDSTONE: very light grey to light grey, clear to translucent grains, friable to moderately hard, predominantly medium grained, occasional coarse grains, subangular to subrounded, moderate sphericity, well sorted quartz, moderately weak silica cement, trace carbonaceous fragments, rare carbonaceous claystone laminae, fair to good visual porosity. FLUORESCENCE: Nil.
1967.0	100	-	-	tr	SANDSTONE: very light grey to light grey, clear to translucent grains, friable to moderately hard, fine to predominantly medium grained, occasional coarse grains, subangular to subrounded, angular in part, moderate sphericity, well sorted quartz, moderately weak silica cement, trace carbonaceous fragments, rare carbonaceous claystone laminae, fair to good visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, patchy to thin moderately bright greenish yellow residual ring.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CORE DESCRIPTION SHEET CORE # 5 1943 mRT - 1969 mRT Recovery: 26 m (100%) Well: MINERVA-2A Permit: VIC/P31 Geologist(s): C.MENHENNITT/A. SYME
1968.0	100	-	-	-	SANDSTONE: very light grey to light grey, clear to translucent grains, friable to moderately hard, medium to granule sized grains, predominantly very coarse to granule,subangular to subrounded, rounded in part, moderate to high sphericity, moderately sorted quartz, moderately weak silica cement, trace white argillaceous matrix, trace weathered feldspar grains, fair to good visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, trace dull greenish yellow residual ring.
1969.0	100	-	-	-	SANDSTONE: light grey, clear to translucent grains, friable to moderately hard, medium to coarse grained, predominantly coarse grained ,subangular to subrounded, moderate to high sphericity, moderately sorted quartz, moderately weak silica cement, rare microcrystalline pyrite cement, trace weathered feldspar grains, excellent visual porosity. FLUORESCENCE: no direct, no cut, no crush cut, trace dull greenish yellow residual ring.

4

APPENDIX 4 Core Analysis Description

ROUTINE CORE ANALYSIS
STUDY FOR
MINERVA 2A

ACS
LABORATORIES
AUSTRALIA

26 November 1993

BHP Petroleum Pty Ltd
120 Collins Street
MELBOURNE VIC 3000

Attention: Jim Phipps

REPORT: 005/207

CLIENT REFERENCE:	-
MATERIAL:	Core
LOCALITY:	Minerva 2A
WORK REQUIRED:	Routine Core Analysis

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

WARREN W FARLEY
Regional Manager
Australia & Oceania

26 November 1993

BHP Petroleum Pty Limited
120 Collins Street
MELBOURNE VIC 3000

Attention: Jim Phipps

FINAL DATA REPORT - CONVENTIONAL CORE ANALYSIS

REPORT: 5 - 207 MINERVA No. 2a

LOGISTICS

Cores No. 1 through to 5 were delivered to the Adelaide laboratory of ACS Laboratories on the 16th of October 1993.
Core intervals include:

Core No.1 : 1728.50 - 1733.60 m (5.10m)
Core No.2 : 1838.80 - 1854.88 m (16.08m)
Core No.3 : 1855.50 - 1882.50 m (27.00m)
Core No.4 : 1915.00 - 1942.73 m (27.73m)
Core No.5 : 1943.00 - 1969.00 m (26.00m).

A total of 101.91 meters of core was analysed, from which 341 fluid summation samples, 341 'R' plugs and 113 'A' plugs were removed for analytical testing.

INTRODUCTION

The following report includes tabular data of permeability to air, helium injection porosity, summation of fluids porosity and density determinations. Data presented graphically includes a continuous core gamma log, a core log plot and a porosity versus permeability to air plot.

STUDY AIMS

The analyses were performed with the following aims:

1. To provide depth correlation through provision of a continuous core gamma log over the cored interval.

2. To provide fluid saturation, (So & Sw) and summation of fluids porosity data.

3. To provide 72 hour air permeability (maximum and intermediate values), helium injection porosity and density data.

4. To determine the effect of overburden stress on air permeability and helium injection porosity data.

5. To provide information on the strength of the formation through Brinell Hardness measurements.

SAMPLING

The core was sampled as follows:

A. 2cm slices were taken across the core at 30cm intervals for fluid saturation and summation of fluids porosity measurements.

B. 1.5" diameter core plugs were drilled from the whole core at 30cm intervals using specially made brine solution as lubricant. The core was oriented such that the plugs were drilled parallel to the bedding. These plugs are designated as the 'regular' plugs.

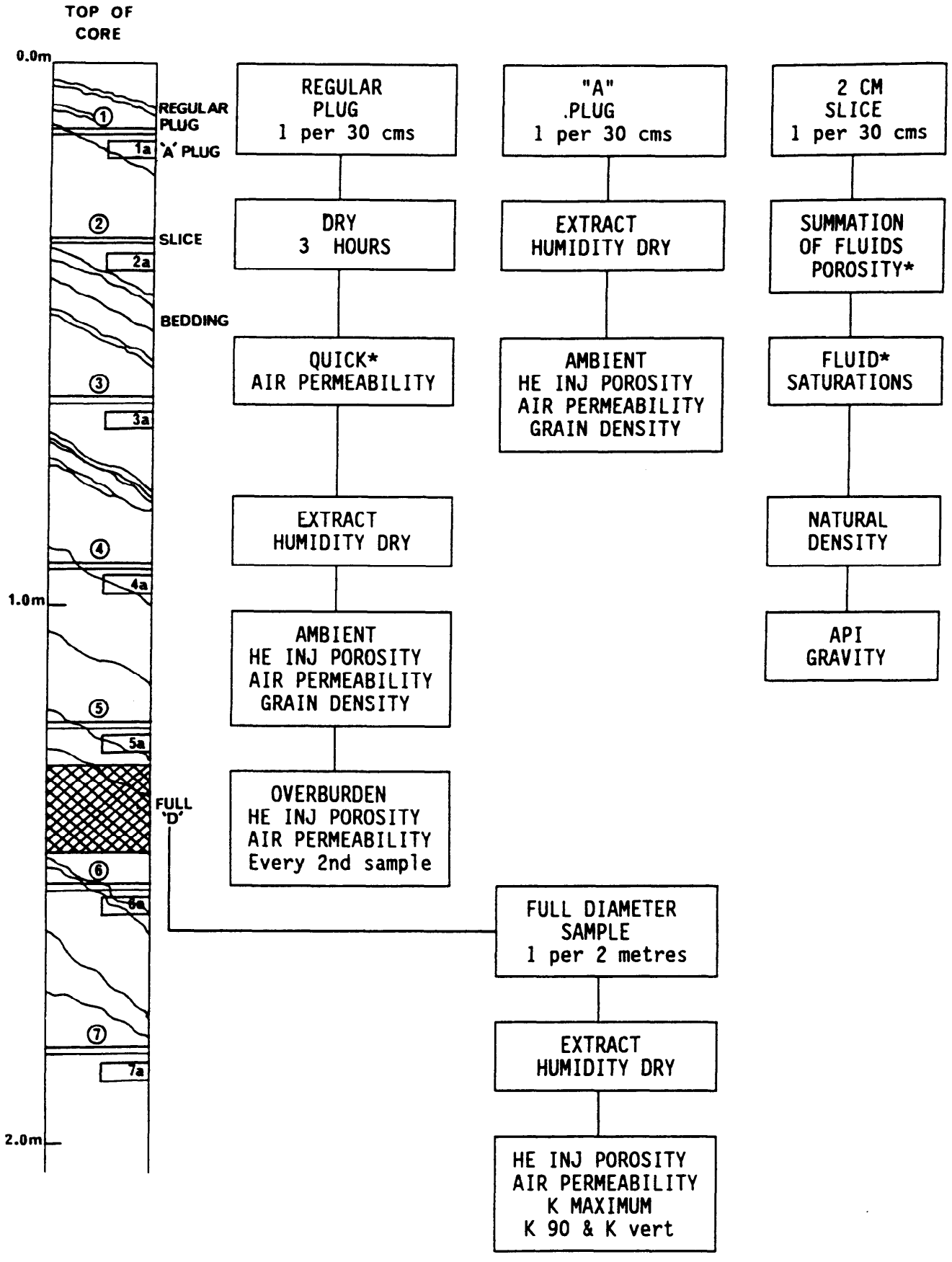
C. Further 1.5" diameter plugs were taken from approxamately 90cm intervals but with the core oriented such that the plugs were drilled perpendicular to the 'regular' plug and parallel to the dip. These plugs are designated as the 'A' plugs.

D. All 'regular' and 'A' plugs were trimmed and offcuts retained. The offcuts were dispatched immediately to BHP Petroleum for viewing and possible selection of petrology/palaeontology samples.

This sampling procedure is illustrated along with an analytical flow chart on the following page for easy reference.

The core was sampled and analysed as follows:

ANALYTICAL FLOW CHART



* Data reported within 16 hours of receipt of core

1. CONTINUOUS CORE GAMMA

The core was laid out according to depth markings, and a continuous core gamma trace produced by passing the core beneath a gamma radiation detector. The detector is protected from extraneous radiation by a lead tunnel. The detector signal is amplified and digitised to produce a gamma trace for comparison with the downhole log.

2. FLUID SATURATIONS AND SUMMATION OF FLUIDS POROSITY

The 2cm slices taken at 30cm intervals were used for these analyses. Approximately 100 gms of material was taken from the centre of the slice, crushed and placed in a thermostatically controlled high temperature retort. The retort is programmed to heat initially to 180°C. At this temperature pore water is vaporised, condensed and recovered in receiving tubes. When water production ceases at 180°C the retort temperature is increased to 650°C. At this temperature residual hydrocarbons and remaining bound water are recovered. Using this procedure the volumes of oil and water in a known weight of core material can be determined.

To determine the gas volume, approximately 40g of fresh core is taken from the same slice, weighed and placed in a mercury displacement pump to determine bulk volume. Mercury is then injected into the sample at 750psig (5200 kpa). The amount of mercury injected corresponds to the gas volume of the sample. From these measurements the summation of fluids porosity is calculated and oil and water saturations expressed as a percentage of the porosity.

3. NATURAL DENSITY

The natural density of the sample is obtained by dividing the weight of the fresh sample used for the gas volume measurement by it's bulk volume.

4. SAMPLE EXTRACTION AND DRYING

After sampling as described in section 2B and 2C the 'regular' and 'A' set of plugs were initially dried in a humidity oven at 80°C for 3 hours. After which the plugs were placed in a soxhlet extractor to remove hydrocarbons. When the toluene in the Soxhlet was no longer discoloured the core plugs were removed and checked under ultraviolet light to ensure all hydrocarbons had been removed.

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

5. AIR PERMEABILITY

Air permeability was determined on the 'regular' and 'A' set plugs. The plugs are placed in a Hassler cell at a confining pressure of 250 psig (1720 kpa). This pressure is used to prevent bypassing of air around the sample when the measurement is made. During the measurement a known air pressure is applied to the upstream face of the sample, creating a flow of air through the sample. Permeability for each sample is then calculated using Darcy's Law through knowledge of the upstream pressure and flow rate during the test, the viscosity of air and the plug dimensions.

6. HELIUM INJECTION POROSITY

The helium injection porosity of the extracted and dried 'regular' and 'A' set of core plugs was determined as follows. The plugs were sealed in a matrix cup. A known volume of helium was held at 100psi reference pressure and then introduced to the cup. From the resultant pressure change the unknown grain volume was calculated using Boyles law, i.e P1V1 = P2V2.

The bulk volume of the plugs was determined by mercury immersion. The difference between the grain volume and the bulk volume is the pore volume and from this the porosity is calculated as the volume percentage of pores with respect to the bulk volume. The porosity calculated using this technique is an effective porosity.

7. APPARENT GRAIN DENSITY

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

8. POROSITY AND PERMEABILITY AT OVERBURDEN PRESSURE

To determine the porosity and permeability of the core plugs at overburden pressure, the sample is placed in a heavy duty Hassler sleeve. The assembly is loaded into a thick walled hydrostatic cell capable of withstanding the simulated reservoir overburden stress. After loading helium injection porosity and air permeability was determined at simulated reservoir load conditions. The overburden stress values used in these analyses were supplied by BHP Petroleum. Approximately every forth 'R' plug was used in these analyses.

9. BRINELL HARDNESS

Brinell hardness readings were conducted on the 'R' set of core plugs. Where possible, five readings (in a crossed pattern) are taken at each sample point. A pre-load of 10 kgs and a constant load of 20 kgs are applied at the load point using the 3.175 mm indentor; the depth of indentation is measured and this is used to obtain the Brinell Hardness. An average is given for the five points at each sample depth. Using this technique, the minimum attainable Brinell Hardness reading is 4.

10. ROLLING AND SPECIFIED AVERAGES

These averages of both Helium injection porosity and permeability are obtained by using a "rolling" three (3) point method. In the case of porosity a weighted arithmetic average is used:

$$\phi \text{ av}_{(i+1)} = [\phi_i + 2\phi_{(i+1)} + \phi_{(i+2)}] /4$$

In the case of permeability a weighted geometric average is used:

$$K \text{ av}_{(i+1)} = 10^{[(\log_{10} K_i + 2 \log_{10} K_{(i+1)} + \log_{10} K_{(i+2)}) /4]}$$

At any sample point, excluding the first and last, a rolling average is obtained by using the value at the specified sample point, the value before it and the value of the sample point after it. In the cases of the first and last sample points, only 2 sample points are used.

Using porosity as an example, the average of the first data point is obtained from the formula:

$$\phi \text{ av}_{(i)} = [2\phi_i + \phi_{(i+1)}] /3$$

The average at the final data point is obtained by:

$$\phi \text{ av}_{(f)} = [\phi_{(f-1)} + 2\phi_{(f)}] /3$$

The same method is used for permeability averages. At any break in the data the rolling averages are "re-started".

Data Key:		
	ϕ	= porosity
	K	= permeability
	i	= initial
	av	= average
	f	= final

Specified averages are normal arithmetic averages which can be taken over any specified section of the core, as well as over the whole core.

On completion of the analysis the core was slabbed into one half, and two quarter slabs using water as the lubricating medium. One quarter was packed and shipped to the BMR core storage, Canberra. The remaining quarter was packed and shipped to the Victorian Department of Industry, Technology and Resources in Melbourne, Victoria. The one half slab was photographed under both white light and ultra-violet light. This half was then packed and shipped to the BHPP core store in Melbourne.

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

END OF REPORT.

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY.LTD.
Well : MINERVA-2A
Field : MINERVA
Core Int. : CORE NO.1 1728.50-1733.60 M
Core Int. : CORE NO.2&3 1838.80-1882.50 M
Core Int. : CORE NO.4&5 1915.00-1969.00 M

Date : 04/11/93
File : 5-207
Location : OTWAY
ACS Lab. : ADELAIDE
Analyst : CG,WJD,JC

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Ø	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
1	1728.60	10.1	10.0	2.48	2.65	0.16	0.14	9.3	0.0	87.7	C#1
2	1728.90	9.8	9.8	2.47	2.66	0.10	0.12	10.4	0.0	83.1	
3	1729.20	9.6	9.5	2.47	2.64	0.11	0.11	10.1	0.0	85.4	
4	1729.50	9.0	9.1	2.48	2.65	0.10	0.09	10.6	0.0	87.0	
5	1729.80	8.9	8.8	2.48	2.66	0.06	0.06	9.2	0.0	86.4	
6	1730.10	8.5	8.7	2.49	2.65	0.06	0.06	8.4	0.0	85.8	
7	1730.40	8.9	9.3	2.47	2.65	0.06	0.08	9.2	0.0	80.9	
8	1730.70	10.7	9.7	2.47	2.66	0.24	0.13	10.5	0.0	87.2	
9	1731.00	8.6	9.3	2.48	2.65	0.08	0.09	9.6	0.0	85.6	
10	1731.30	9.2	9.0	2.46	2.64	0.06	0.09	10.7	0.0	86.8	
11	1731.60	8.9	9.0	2.47	2.66	0.28	0.13	9.7	5.1	81.4	
12	1731.90	9.1	9.2	2.48	2.64	0.07	0.13	10.5	0.0	89.5	
13	1732.20	9.7	9.4	2.47	2.66	0.16	0.14	10.1	0.0	90.8	
14	1732.50	9.2	9.4	2.48	2.65	0.18	0.18	10.4	0.0	95.7	
15	1732.80	9.3	9.2	2.46	2.64	0.21	0.13	10.7	4.6	87.6	
16	1733.10	9.1	9.0	2.48	2.65	0.03	0.06	10.1	2.5	93.5	
17	1733.37	8.4	11.7	2.48	2.65	0.06	0.46	9.3	0.0	91.0	B#1
18	1839.00	20.9	18.2	2.19	2.64	315	65.4	21.9	0.0	50.0	C#2
19	1839.30	22.6	21.1	2.18	2.64	2890	2173	20.8	0.0	41.8	
20	1839.55	18.4	16.7	2.16	2.83	8471	594	23.1	0.0	42.1	
21	1839.90	7.2	9.9	2.47	2.59	0.60	7.1	8.7	8.5	73.9	SP VF
22	1840.20	6.8	6.9	2.55	2.68	0.84	0.37	6.9	0.0	88.9	SP VF
23	1840.50	6.9	6.9	2.48	2.65	0.05	0.21	8.3	5.9	86.3	SP
24	1840.80	7.1	6.9	2.45	2.65	1.17	0.72	8.7	5.6	78.6	SP VF
25	1841.10	6.6	9.1	2.46	2.60	4.36	21.4	9.2	8.1	75.1	VF
26	1841.40	16.2	13.9	2.34	2.65	9437	1554	13.9	0.0	48.8	
27	1841.70	16.6	16.4	2.29	2.65	15007	11898	17.5	0.0	40.6	
28	1842.00	16.2	17.2	2.15	2.65	9430	10937	23.0	0.0	35.5	
29	1842.30	19.8	19.3	2.24	2.65	10721	9705	18.9	0.2	41.4	
30	1842.60	21.3	20.9	2.15	2.65	8183	8095	23.3	0.0	40.7	
31	1842.90	21.2	18.8	2.13	2.65	5981	976	23.4	0.0	34.7	
32	1843.20	11.6	15.4	2.32	2.53	3.10	121	13.1	5.3	65.4	VF
33	1843.50	17.1	16.0	2.15	2.65	3777	868	22.4	0.0	36.5	
34	1843.80	18.3	18.6	2.21	2.65	12865	10631	16.6	1.3	37.3	
35	1844.10	20.6	20.0	2.23	2.65	20434	12143	20.2	0.0	44.2	
36	1844.40	20.3	20.3	2.23	2.65	4048	5997	18.7	0.0	48.9	
37	1844.70	19.9	20.2	2.22	2.65	3864	5385	20.1	0.0	45.4	
38	1845.00	20.5	20.6	2.19	2.65	13913	8014	20.0	0.0	40.6	
39	1845.30	21.4	18.3	2.12	2.65	5515	3542	22.7	0.0	25.2	
40	1845.60	9.9	15.0	2.39	2.65	372	761	11.8	0.0	26.2	
41	1845.90	18.8	16.2	2.18	2.65	440	518	21.6	0.0	44.4	
42	1846.20	17.3	17.7	2.21	2.65	1005	691	19.9	0.0	37.8	
43	1846.50	17.3	18.0	2.22	2.64	513	931	18.9	0.0	28.2	

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
44	1846.80	20.0	19.5	2.16	2.64	2840	2543	21.9	0.0	40.3	
45	1847.10	20.7	20.4	2.23	2.65	10101	5658	19.8	0.0	39.6	
46	1847.40	20.0	20.4	2.27	2.65	3536	4518	17.0	0.0	29.4	
47	1847.70	20.9	20.4	2.24	2.64	3298	5546	19.8	0.2	47.5	
48	1848.00	19.6	19.4	2.18	2.65	24603	11094	20.7	0.0	30.5	
49	1848.30	17.3	18.5	2.20	2.65	7586	11762	21.0	0.0	36.8	
50	1848.60	19.8	18.7	2.19	2.65	13515	10215	19.8	0.0	28.7	
51	1848.90	17.7	19.1	2.20	2.65	7856	10521	20.5	0.0	33.2	
52	1849.20	21.3	19.1	2.25	2.65	14688	7524	17.8	0.0	30.3	
53	1849.50	15.9	18.3	2.18	2.65	1891	3362	21.8	0.0	40.0	
54	1849.80	19.9	18.1	2.16	2.65	2431	2576	22.2	0.0	37.8	
55	1850.10	16.7	18.0	2.19	2.64	3937	2747	20.7	0.0	35.0	
56	1850.40	18.7	17.7	2.21	2.65	1511	2389	19.9	0.0	38.9	
57	1850.70	16.7	17.5	2.24	2.65	3626	2226	18.3	0.0	45.3	
58	1851.00	17.7	17.8	2.19	2.65	1237	2431	20.4	0.0	33.2	
59	1851.30	19.1	18.2	2.21	2.65	6299	2975	21.0	0.0	48.3	
60	1851.60	16.9	17.4	2.19	2.65	1596	3888	20.8	0.0	43.1	
61	1851.90	16.8	16.9	2.26	2.65	14241	7245	17.9	0.0	42.9	
62	1852.20	17.2	16.4	2.19	2.65	8513	8568	20.3	0.0	32.3	
63	1852.50	14.5	15.9	2.24	2.65	5222	6757	18.6	0.0	37.2	
64	1852.80	17.5	16.2	2.22	2.65	8978	4236	17.6	0.0	36.6	
65	1853.10	15.2	16.3	2.26	2.65	765	2283	17.8	0.0	36.7	
66	1853.40	17.2	16.9	2.23	2.65	5170	2508	17.8	0.0	32.6	
67	1853.70	18.1	17.5	2.24	2.65	1936	3078	19.8	0.0	43.0	
68	1854.00	16.4	17.0	2.24	2.65	4634	4212	18.1	0.0	33.4	
69	1854.30	17.1	17.2	2.25	2.65	7573	6398	16.7	0.0	20.3	
70	1854.60	18.2	17.4	2.21	2.66	6305	5078	19.4	0.0	28.5	SP
71	1854.90	15.9	16.5	2.23	2.65	2210	3436	19.0	0.0	30.5	B#2
72	1855.80	15.9	16.0	2.30	2.65	4530	4940	16.4	0.0	32.2	C#3
73	1856.10	16.2	16.3	2.22	2.65	13133	11318	19.5	0.0	34.1	
74	1856.40	16.7	16.8	2.21	2.65	21003	18291	20.4	0.0	36.8	
75	1856.70	17.7	17.0	2.21	2.65	19321	20518	18.8	0.0	24.6	
76	1857.00	16.0	15.9	2.20	2.65	22603	7655	21.5	0.0	44.1	
77	1857.30	13.9	15.1	2.35	2.65	348	1710	14.9	0.3	45.7	
78	1857.60	16.4	15.5	2.35	2.64	3127	797	15.1	0.0	54.6	
79	1857.90	15.1	15.7	2.30	2.65	119	571	16.8	0.5	49.4	
80	1858.20	16.1	16.8	2.20	2.65	2415	1987	21.1	0.0	38.5	
81	1858.50	19.7	18.9	2.30	2.65	22508	11584	16.9	0.0	45.1	
82	1858.80	19.9	19.3	2.27	2.65	14714	12727	18.1	0.0	42.6	
83	1859.10	17.8	18.1	2.25	2.65	5383	6698	20.5	0.0	58.3	
84	1859.40	16.7	17.4	2.25	2.65	4719	6613	19.5	0.0	50.7	
85	1859.70	18.2	16.7	2.32	2.65	15957	4884	17.0	0.0	55.9	
86	1860.00	13.5	14.1	2.31	2.65	474	68.1	16.3	0.0	48.2	
87	1860.30	11.0	11.0	2.05	2.26	<0.01	0.09	13.3	46.3	40.1	MP
88	1860.60	8.6	9.1	2.38	2.53	<0.01	<0.01	13.5	44.3	47.8	MP
89	1860.90	8.0	7.6	2.33	2.50	<0.01	<0.01	16.0	42.2	49.5	MP
90	1861.20	5.9	6.9	2.55	2.68	<0.01	<0.01	8.4	6.1	88.0	MP
91	1861.52	7.9	7.0	2.36	2.52	<0.01	<0.01	9.8	24.1	70.0	MP
92	1861.83	6.4	10.9	2.47	2.58	0.06	0.40	7.7	22.5	67.6	VF
93	1862.10	22.8	19.2	2.12	2.64	1797	159	23.3	0.0	38.1	
94	1862.40	24.7	23.9	2.19	2.65	3231	2741	21.6	1.5	46.6	
95	1862.65	23.3	23.2	2.36	2.64	3010	4197	14.7	0.0	69.0	
96	1863.00	21.6	23.0	2.15	2.65	10606	7177	22.6	0.0	41.0	

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Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
97	1863.30	25.6	24.1	2.13	2.65	7835	7949	23.9	0.0	44.5	
98	1863.55	23.7	24.8	2.08	2.65	6131	5209	24.3	3.4	36.8	
99	1863.90	26.1	25.3	2.05	2.65	2500	3080	27.0	0.0	32.6	
100	1864.20	25.1	24.7	2.05	2.65	2348	1973	26.5	0.0	37.1	
101	1864.50	22.4	22.9	2.13	2.71	1100	2258	24.0	0.0	52.6	
102	1864.80	21.8	21.9	2.18	2.65	9139	4537	22.6	0.0	55.9	
103	1865.10	21.4	21.0	2.16	2.66	4609	1872	23.3	0.0	57.5	
104	1865.40	19.5	21.3	2.13	2.65	63.3	487	23.5	0.0	41.7	
105	1865.70	24.7	18.3	2.06	2.65	3058	95.6	26.2	0.0	35.4	
106	1866.00	4.2	12.6	2.26	2.64	0.14	4.20	19.7	1.1	71.3	
107	1866.30	17.4	12.1	2.40	2.65	5.1	1.64	13.1	5.5	75.1	
108	1866.60	9.4	14.7	2.47	2.63	1.95	7.0	9.1	5.4	81.1	
109	1866.90	22.4	18.7	2.34	2.64	125	51.7	14.7	3.2	65.1	
110	1867.20	20.5	20.8	2.20	2.65	234	175	21.8	1.0	41.5	
111	1867.53	19.9	20.7	2.04	2.47	136	252	27.4	0.7	34.2	VF
112	1867.80	22.5	21.7	2.11	2.64	931	392	24.2	0.9	32.2	
113	1868.10	21.9	22.8	2.00	2.64	201	461	24.8	0.0	13.7	
114	1868.40	24.7	24.3	2.11	2.65	1198	894	24.9	0.0	37.2	
115	1868.70	25.9	26.1	2.02	2.66	2216	2089	23.1	0.0	10.5	
116	1869.00	27.8	26.8	1.94	2.65	3240	2621	29.7	0.0	26.8	
117	1869.30	25.8	26.2	1.97	2.65	2028	2237	28.4	0.0	20.8	
118	1869.60	25.4	25.7	1.99	2.65	1878	1894	26.6	0.0	18.7	
119	1869.90	26.2	26.2	2.07	2.66	1799	2091	25.2	0.4	27.9	
120	1870.20	26.9	26.5	1.99	2.65	3145	2361	27.5	0.0	26.1	
121	1870.50	26.0	26.2	2.04	2.65	1748	2295	27.6	0.7	40.6	
122	1870.80	25.8	25.7	1.99	2.67	2887	2892	27.0	0.0	17.0	
123	1871.10	25.0	24.8	2.00	2.66	4804	5258	27.0	1.5	26.7	
124	1871.40	23.4	24.1	2.19	2.65	11468	10327	21.5	0.0	41.6	
125	1871.70	24.5	23.2	2.13	2.65	18003	10638	23.7	0.4	38.5	
126	1872.00	20.5	21.0	2.15	2.65	3445	7252	21.5	0.0	36.9	
127	1872.30	18.3	18.7	2.22	2.64	12945	7948	19.6	0.0	31.7	
128	1872.63	17.8	17.7	2.15	2.65	6914	7926	21.9	0.5	35.3	
129	1872.90	16.7	17.9	2.12	2.64	6376	7445	24.3	0.0	41.9	
130	1873.20	20.2	19.8	2.22	2.66	10929	11802	21.3	0.0	54.2	
131	1873.50	22.1	21.7	2.17	2.65	25472	21436	22.6	0.0	49.0	
132	1873.80	22.5	22.1	2.17	2.65	29776	21270	23.0	0.0	44.2	
133	1874.10	21.1	21.7	2.14	2.64	9063	12573	23.4	0.0	40.2	
134	1874.40	21.9	22.5	2.10	2.65	10218	9175	25.9	0.0	43.8	
135	1874.70	25.1	23.9	2.11	2.65	7491	7159	24.9	0.0	36.4	
136	1875.00	23.3	24.3	2.10	2.65	4581	6706	26.2	0.0	43.3	
137	1875.30	25.4	25.0	2.13	2.65	12867	8419	22.7	0.0	44.1	
138	1875.60	26.0	24.9	2.04	2.64	6625	6497	25.2	0.0	25.1	
139	1875.90	22.3	24.0	2.17	2.64	3155	4223	22.1	0.0	41.2	
140	1876.20	25.2	20.2	2.05	2.65	4822	691	23.9	0.0	26.6	
141	1876.50	7.9	14.9	2.46	2.63	3.10	49.5	11.1	19.9	68.7	
142	1876.80	18.4	16.9	2.10	2.66	129	59.3	25.2	0.8	32.5	
143	1877.10	23.0	22.0	2.08	2.64	238	325	24.3	0.0	32.5	
144	1877.40	23.6	23.4	2.14	2.65	1530	921	22.5	0.0	29.5	
145	1877.70	23.2	23.1	2.06	2.65	1294	1257	24.9	0.0	28.9	
146	1878.00	22.4	22.4	2.06	2.65	974	644	24.1	0.0	23.9	
147	1878.30	21.4	22.2	2.12	2.65	140	339	25.7	0.0	42.1	
148	1878.60	23.7	21.3	2.15	2.64	694	167	21.3	0.0	33.4	
149	1878.90	16.4	17.5	2.35	2.64	11.5	29.1	14.8	0.0	66.9	

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Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
150	1879.20	13.4	16.1	2.32	2.65	7.8	34.2	15.8	0.0	60.3	
151	1879.50	21.3	19.8	2.08	2.64	1975	637	24.2	0.0	21.4	
152	1879.80	23.1	22.4	2.21	2.65	5422	4398	22.2	1.0	53.7	
153	1880.10	21.9	21.9	2.12	2.64	6441	6327	23.2	0.0	35.6	
154	1880.40	20.8	17.5	2.20	2.65	7125	500	21.1	0.0	41.7	
155	1880.70	6.4	9.8	2.57	2.67	0.19	4.28	5.4	18.9	66.0	SP VF
156	1881.00	5.5	9.6	2.56	2.63	1.29	5.5	4.5	17.0	62.3	VF
157	1881.30	21.1	17.3	2.09	2.65	2881	393	24.0	0.0	27.8	
158	1881.60	21.5	21.1	2.06	2.64	2230	1274	26.3	0.0	30.5	
159	1881.90	20.4	18.5	1.99	2.68	184	174	27.1	0.0	23.5	
160	1882.20	11.6	15.2	2.42	2.63	12.2	56.6	12.5	3.9	59.8	
161	1882.50	17.2	16.2	2.22	2.65	376	264	18.7	0.0	35.6	B#3
162	1915.10	18.7	18.6	2.32	2.65	2812	1303	16.8	2.1	44.2	C#4
163	1915.30	19.8	18.0	2.19	2.66	968	962	20.9	0.0	31.4	
164	1915.60	13.6	15.8	2.31	2.71	325	502	17.0	0.1	42.1	
165	1915.90	16.3	16.0	2.25	2.65	621	571	18.4	0.0	36.7	
166	1916.23	17.6	17.0	2.25	2.65	847	871	19.8	2.3	41.9	
167	1916.50	16.5	14.5	2.23	2.66	1292	167	19.3	0.0	33.4	
168	1916.80	7.5	13.1	2.37	2.63	0.55	19.2	14.8	0.0	43.2	
169	1917.10	20.7	17.7	2.35	2.65	353	73.6	14.8	0.0	50.8	
170	1917.40	21.8	22.3	2.21	2.65	431	450	21.3	0.0	49.0	
171	1917.70	25.0	22.8	2.06	2.65	625	334	25.6	0.0	35.4	
172	1918.00	19.4	22.3	2.26	2.64	73.9	227	17.9	0.0	46.7	
173	1918.30	25.2	23.2	2.10	2.65	784	554	25.3	0.0	29.9	
174	1918.60	22.9	23.5	2.08	2.65	2074	1956	24.8	0.0	25.1	
175	1918.90	23.1	23.6	2.09	2.65	4340	3579	25.2	0.0	29.9	
176	1919.20	25.1	24.6	2.08	2.65	4198	3374	25.3	0.0	39.3	
177	1919.50	25.2	25.1	2.04	2.65	1694	2567	26.9	0.0	31.9	
178	1919.80	24.8	24.2	2.07	2.65	3602	2366	25.0	0.0	29.9	
179	1920.10	22.1	23.2	2.15	2.65	1426	1244	22.1	0.5	31.2	
180	1920.40	23.9	19.9	2.09	2.65	326	102	25.3	0.4	41.4	
181	1920.70	9.6	16.3	2.25	2.64	0.71	12.1	19.9	3.4	53.2	
182	1921.00	22.0	19.7	2.09	2.64	128	57.0	25.2	0.0	35.7	
183	1921.30	25.1	24.3	2.03	2.65	908	556	28.0	0.0	35.4	
184	1921.60	25.1	24.7	2.02	2.65	905	1300	28.1	0.0	35.3	
185	1921.90	23.5	24.5	2.06	2.65	3845	3376	25.4	0.0	31.7	
186	1922.20	25.8	24.5	2.07	2.65	9720	7543	26.2	0.0	43.3	
187	1922.50	23.0	23.3	2.09	2.65	8910	8105	26.7	0.0	48.6	
188	1922.80	21.3	20.7	2.16	2.64	5594	1987	22.0	0.0	37.3	
189	1923.14	17.2	19.2	2.28	2.55	55.9	469	18.0	1.3	53.3	VF
190	1923.40	21.1	20.1	2.14	2.66	2776	1162	22.5	0.0	47.7	
191	1923.70	21.0	21.4	2.14	2.65	4232	4523	24.1	0.0	53.3	SP
192	1924.00	22.3	22.3	2.14	2.65	8420	6747	22.9	0.0	36.5	
193	1924.30	23.6	22.3	2.13	2.66	6908	4061	24.4	0.0	46.4	
194	1924.63	19.5	21.6	2.19	2.65	677	2311	21.3	0.0	39.0	
195	1924.90	23.6	22.4	2.08	2.65	9004	3940	24.6	0.0	27.8	
196	1925.20	22.8	23.3	2.12	2.65	4388	5950	23.6	0.0	30.6	
197	1925.50	23.9	23.7	2.15	2.65	7231	7386	23.8	1.8	44.3	
198	1925.80	24.0	23.7	2.08	2.65	12969	11758	25.4	0.0	37.7	
199	1926.10	23.0	19.0	2.13	2.67	15715	1809	24.1	0.0	44.2	
200	1926.40	6.1	10.1	2.28	2.40	3.35	16.9	13.5	25.4	54.1	VF
201	1926.70	5.1	6.8	2.50	2.60	0.47	0.48	9.5	21.1	71.3	
202	1927.00	10.9	10.5	2.45	2.65	0.07	0.15	12.1	0.4	87.3	

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Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H20%	Remarks
203	1927.30	15.1	14.3	2.39	2.66	0.21	0.19	15.0	1.6	86.3	
204	1927.60	16.2	14.8	2.38	2.67	0.43	0.26	16.1	0.7	85.9	
205	1927.90	11.5	12.4	2.43	2.66	0.12	0.21	13.4	3.6	85.0	
206	1928.20	10.3	10.6	2.48	2.65	0.34	0.21	10.1	6.1	83.5	
207	1928.50	10.3	9.5	2.49	2.64	0.13	0.19	8.8	5.7	82.2	
208	1928.80	7.1	8.4	2.49	2.66	0.21	0.23	8.3	6.0	77.8	VF
209	1929.10	9.2	8.9	2.47	2.64	0.48	0.81	10.4	4.8	78.7	
210	1929.40	10.3	9.6	2.45	2.63	9.0	1.47	10.3	4.7	82.9	VF
211	1929.70	8.5	9.4	2.50	2.68	0.12	0.36	9.3	2.7	85.5	
212	1930.00	10.1	10.8	2.39	2.66	0.12	0.22	13.7	1.7	74.9	SP
213	1930.30	14.3	12.7	2.34	2.71	1.25	0.64	15.5	1.5	69.7	
214	1930.60	12.1	14.3	2.44	2.67	0.89	1.78	11.9	0.2	80.0	
215	1930.90	18.5	16.8	2.22	2.67	10.2	6.4	21.5	1.0	55.6	
216	1931.20	18.0	18.4	2.39	2.66	18.5	34.0	14.0	3.4	73.7	
217	1931.50	19.0	19.0	2.25	2.65	383	207	18.7	1.2	45.8	
218	1931.80	19.9	18.9	2.25	2.66	674	830	20.1	0.0	54.7	SP
219	1932.10	16.9	17.5	2.32	2.65	2736	387	16.4	2.8	72.4	
220	1932.40	16.4	16.3	2.43	2.67	4.46	18.2	13.3	9.1	74.8	
221	1932.70	15.5	15.7	2.42	2.71	2.01	1.83	11.4	6.4	76.2	
222	1933.00	15.3	13.9	2.47	2.66	0.63	1.67	9.4	5.3	63.4	
223	1933.30	9.3	11.7	2.47	2.65	9.9	7.8	7.8	9.5	72.6	VF
224	1933.60	13.0	12.5	2.25	2.63	61.0	61.7	18.1	0.0	48.4	
225	1933.90	14.7	15.4	2.26	2.63	394	436	18.0	0.6	46.5	
226	1934.20	19.1	16.7	2.24	2.65	3814	1148	18.1	0.0	43.2	
227	1934.50	13.7	14.7	2.35	2.70	303	105	16.2	0.0	50.9	
228	1934.80	12.1	13.3	2.34	2.65	0.35	4.08	15.9	2.2	73.6	
229	1935.10	15.4	14.5	2.25	2.66	7.7	2.98	20.2	1.1	64.8	
230	1935.40	15.1	17.0	2.28	2.67	3.88	33.1	20.0	3.4	60.3	
231	1935.70	22.5	20.5	2.14	2.65	10379	1118	22.3	0.0	35.5	
232	1936.00	22.0	22.8	2.16	2.65	3730	7736	22.0	0.0	43.2	
233	1936.30	24.7	23.6	2.12	2.65	24794	12498	24.4	0.0	47.0	
234	1936.60	23.1	23.2	2.10	2.65	10639	10747	24.2	0.0	38.1	
235	1936.90	21.8	21.5	2.13	2.65	4754	4820	22.6	0.0	38.6	
236	1937.20	19.4	19.6	2.21	2.65	2245	3611	19.3	0.0	49.2	
237	1937.50	17.8	18.9	2.14	2.65	7097	6383	22.1	0.0	37.8	
238	1937.80	20.5	20.2	2.18	2.65	14682	11546	20.7	0.0	39.9	
239	1938.10	21.8	22.1	2.10	2.65	11615	15375	23.8	0.0	35.3	
240	1938.40	24.3	23.1	2.12	2.65	28211	19136	23.4	0.0	43.6	
241	1938.70	22.1	23.4	2.14	2.65	14508	17990	22.1	0.0	40.6	
242	1939.00	25.0	21.8	2.09	2.65	17641	10029	22.8	0.0	38.5	
243	1939.30	15.1	16.1	2.31	2.65	2241	320	15.9	0.0	59.8	
244	1939.60	9.0	11.3	2.46	2.66	0.12	1.80	9.3	5.3	84.6	
245	1939.90	12.2	11.5	2.43	2.74	0.34	0.24	10.8	4.5	83.2	
246	1940.20	12.6	13.2	2.38	2.64	0.23	0.42	14.0	3.4	78.0	
247	1940.50	15.2	16.5	2.37	2.63	1.72	2.53	14.8	3.2	77.1	
248	1940.80	22.8	20.7	2.20	2.64	59.1	27.1	23.9	0.9	66.1	
249	1941.10	22.1	21.3	2.17	2.64	90.1	92.9	23.7	0.0	57.9	
250	1941.40	18.2	19.1	2.32	2.65	155	128	17.5	4.0	62.2	
251	1941.70	17.9	15.7	2.33	2.64	123	30.4	16.5	2.8	66.3	
252	1942.00	8.6	13.0	2.41	2.63	0.36	16.5	12.2	4.0	71.4	
253	1942.30	16.9	16.0	2.23	2.65	4559	476	20.3	0.0	49.6	
254	1942.60	21.5	16.6	2.18	2.65	6808	143	21.6	1.0	41.4	B#4
255	1943.10	6.4	11.7	2.49	2.63	<0.01	2.06	8.2	7.6	75.8	C#5

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
256	1943.30	12.5	12.2	2.37	2.88	663	48.1	15.8	0.0	72.2	
257	1943.60	17.5	13.9	2.41	2.64	6104	202	12.9	3.7	67.0	
258	1943.90	8.2	11.4	2.43	2.63	0.07	5.7	11.4	10.7	72.6	
259	1944.20	11.6	12.9	2.15	2.50	39.4	27.7	24.6	0.0	56.9	
260	1944.50	20.0	18.7	2.22	2.64	5698	1481	20.5	0.0	51.8	
261	1944.80	23.0	21.5	2.21	2.65	3765	4449	21.1	0.0	55.5	
262	1945.10	19.9	20.5	2.20	2.64	4850	2330	23.2	1.9	66.3	
263	1945.40	19.0	20.7	2.25	2.63	333	1443	20.0	0.0	64.1	
264	1945.70	24.9	22.7	2.19	2.64	8071	2657	24.6	0.0	65.0	
265	1946.00	22.0	21.8	2.18	2.64	2301	1785	25.7	0.0	76.5	
266	1946.30	18.1	20.3	2.15	2.65	237	1029	24.2	1.8	67.7	
267	1946.60	22.8	21.3	2.21	2.65	8649	3444	23.4	0.0	75.8	
268	1946.90	21.4	22.8	2.27	2.65	7921	7964	21.2	0.0	64.4	
269	1947.20	25.7	23.6	2.20	2.65	7414	7731	24.8	0.0	78.0	
270	1947.50	21.4	22.9	2.21	2.65	8206	7935	24.2	0.0	73.0	
271	1947.80	23.0	18.3	2.19	2.65	7942	1011	25.1	0.0	75.1	
272	1948.10	5.7	11.7	2.47	2.60	2.02	15.3	10.1	9.8	78.0	VF
273	1948.40	12.4	9.4	2.44	2.61	1.70	4.61	10.4	9.4	75.0	
274	1948.70	7.0	9.1	2.48	2.61	78.1	9.4	9.1	8.2	73.7	VF
275	1949.00	10.1	8.6	2.51	2.65	0.76	5.1	9.2	8.2	79.0	
276	1949.30	7.3	10.1	2.53	2.64	15.5	29.4	7.5	6.7	84.3	VF
277	1949.60	15.7	15.1	2.47	2.65	4137	284	8.3	8.9	68.6	
278	1949.90	21.7	16.8	2.17	2.63	24.5	52.5	22.5	2.9	48.1	
279	1950.20	8.2	11.8	2.43	2.62	3.08	4.40	11.4	4.3	72.6	
280	1950.50	8.9	9.9	2.46	2.62	1.62	2.43	8.7	11.3	70.7	
281	1950.80	13.7	11.6	2.20	2.65	4.30	17.9	21.3	2.1	54.8	SP
282	1951.10	10.2	13.6	2.49	2.67	3455	471	8.8	8.5	84.6	SP VF
283	1951.40	20.3	18.1	2.21	2.65	958	991	20.6	0.0	52.4	
284	1951.70	21.6	20.9	2.25	2.65	305	552	19.8	0.0	72.7	
285	1952.00	20.0	20.4	2.15	2.65	1047	556	22.4	0.0	40.4	
286	1952.30	20.1	20.3	2.24	2.65	287	483	21.2	3.2	59.0	
287	1952.60	21.1	20.3	2.16	2.61	631	540	22.4	1.0	55.2	
288	1952.90	18.8	16.2	2.45	2.66	743	74.8	16.6	1.5	63.7	
289	1953.20	6.2	9.6	2.52	2.62	0.09	0.95	7.2	10.6	67.0	
290	1953.50	7.3	9.1	2.45	2.64	0.14	0.57	10.6	4.6	71.3	
291	1953.80	15.6	11.6	2.39	2.66	64.4	3.64	13.7	3.5	67.9	
292	1954.10	8.0	12.2	2.43	2.64	0.31	3.72	11.9	4.1	71.5	
293	1954.40	17.3	12.7	2.41	2.64	31.4	3.32	16.2	1.5	70.1	
294	1954.70	8.2	11.8	2.50	2.65	0.40	2.25	9.0	8.3	72.3	
295	1955.00	13.4	11.4	2.51	2.65	5.0	1.92	8.5	8.8	70.5	
296	1955.30	10.4	10.8	2.37	2.66	1.33	1.25	15.7	6.0	69.3	
297	1955.60	8.9	11.3	2.39	2.64	0.27	2.38	13.1	5.5	72.9	
298	1955.90	17.1	12.6	2.32	2.64	327	13.6	17.5	1.3	63.9	
299	1956.20	7.2	9.4	2.53	2.64	1.16	3.73	6.3	13.9	67.7	
300	1956.50	6.1	8.5	2.50	2.64	0.44	2.57	8.0	10.9	65.4	
301	1956.80	14.6	12.9	2.33	2.74	192	13.6	16.4	5.0	75.3	
302	1957.10	16.3	15.6	2.29	2.64	2.13	7.4	17.8	1.3	77.0	
303	1957.40	15.2	14.0	2.34	2.78	3.38	1.36	15.9	1.5	70.8	
304	1957.70	9.3	10.9	2.45	2.63	0.14	0.33	10.4	7.0	82.0	
305	1958.00	9.7	11.4	2.44	2.63	0.18	0.48	10.4	7.0	70.5	
306	1958.30	16.8	16.1	2.35	2.69	12.4	12.8	15.2	1.5	75.5	
307	1958.60	21.1	20.2	2.25	2.65	1002	273	19.8	0.0	77.3	
308	1958.90	21.6	21.5	2.20	2.65	448	682	22.0	0.0	68.1	

BHP PETROLEUM PTY.LTD. :
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Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
309	1959.20	21.6	21.9	2.18	2.65	1075	787	21.0	0.0	44.7	
310	1959.50	22.6	21.2	2.20	2.65	741	1047	21.4	0.0	60.8	
311	1959.80	18.0	19.5	2.26	2.65	2035	1569	19.7	0.6	69.9	
312	1960.10	19.4	19.1	2.21	2.67	1975	1929	21.8	1.5	66.9	
313	1960.40	19.6	19.3	2.22	2.65	1745	1168	21.2	0.0	57.7	
314	1960.70	18.4	16.8	2.35	2.66	309	92.7	15.8	1.5	75.7	
315	1961.00	10.9	12.3	2.33	2.66	0.44	3.82	16.2	0.0	71.9	
316	1961.30	8.9	12.0	2.47	2.64	3.52	7.6	9.6	2.6	79.5	
317	1961.60	19.4	16.6	2.23	2.66	612	217	21.3	0.5	62.8	
318	1961.90	18.8	19.7	2.25	2.65	1689	1185	21.5	0.0	66.9	
319	1962.20	21.6	20.3	2.24	2.65	1129	507	21.3	0.0	68.4	
320	1962.50	19.3	16.4	2.45	2.66	30.6	70.0	12.6	0.4	83.7	
321	1962.80	5.2	8.6	2.55	2.66	22.6	24.1	6.6	7.7	85.1	
322	1963.10	4.8	6.1	2.58	2.66	21.6	14.1	5.0	2.6	82.0	VF
323	1963.40	9.6	7.5	2.54	2.66	3.72	8.8	8.0	6.3	82.3	
324	1963.70	5.8	6.5	2.54	2.65	19.7	9.2	7.6	10.1	77.2	
325	1964.00	4.7	8.4	2.54	2.65	4.95	14.0	7.2	7.1	84.6	
326	1964.30	18.3	14.7	2.48	2.73	80.3	31.4	10.6	2.3	75.0	
327	1964.60	17.6	18.4	2.24	2.66	30.4	42.1	22.5	1.0	70.5	
328	1964.90	20.0	19.6	2.25	2.65	42.2	62.5	22.0	0.5	68.5	
329	1965.20	20.7	20.3	2.25	2.65	281	129	21.5	1.0	74.3	
330	1965.50	19.6	20.0	2.24	2.69	82.5	131	23.3	0.1	75.0	
331	1965.80	20.0	20.1	2.22	2.65	152	127	23.1	1.0	71.0	
332	1966.10	20.9	20.8	2.32	2.65	135	155	19.0	1.2	73.3	
333	1966.40	21.3	20.2	2.47	2.65	206	249	9.2	8.1	70.1	
334	1966.70	17.1	18.8	2.29	2.64	668	756	20.1	3.4	69.7	
335	1967.00	19.7	19.5	2.24	2.65	3553	2985	21.2	1.1	57.2	
336	1967.30	21.3	20.5	2.22	2.65	9411	5132	23.1	0.2	67.4	
337	1967.60	19.6	20.1	2.27	2.65	2205	2344	19.8	0.2	67.6	
338	1967.90	19.8	16.2	2.23	2.65	659	98.9	23.2	0.2	71.9	
339	1968.20	5.7	9.2	2.50	2.68	0.10	0.75	8.2	9.1	73.1	
340	1968.50	5.6	8.3	2.45	2.65	0.05	0.79	8.3	4.5	80.1	
341	1968.80	16.2	12.7	2.27	2.64	1773	52.9	18.6	0.9	53.6	B#5

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

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY.LTD.
Well : MINERVA-2A
Field : MINERVA
Core Int. : CORE NO.1 1728.50-1733.60 M
Core Int. : CORE NO.2&3 1838.80-1882.50 M
Core Int. : CORE NO.4&5 1915.00-1969.00 M

Date : 04/11/93
File : 5-207
Location : OTWAY
ACS Lab. : ADELAIDE
Analyst : CG,WJD,JC

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Ø	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
1	1728.60	10.1		2.48	2.65	0.16		9.3	0.0	87.7	C#1
1A	1728.60	8.0			2.66	0.03					
2	1728.90	9.8		2.47	2.66	0.10		10.4	0.0	83.1	
3	1729.20	9.6		2.47	2.64	0.11		10.1	0.0	85.4	
4	1729.50	9.0		2.48	2.65	0.10		10.6	0.0	87.0	
4A	1728.90	8.7			2.65	0.07					
5	1729.80	8.9		2.48	2.66	0.06		9.2	0.0	86.4	
6	1730.10	8.5		2.49	2.65	0.06		8.4	0.0	85.8	
7	1730.40	8.9		2.47	2.65	0.06		9.2	0.0	80.9	
7A	1730.40	8.7			2.65	0.35					
8	1730.70	10.7		2.47	2.66	0.24		10.5	0.0	87.2	
9	1731.00	8.6		2.48	2.65	0.08		9.6	0.0	85.6	
10	1731.30	9.2		2.46	2.64	0.06		10.7	0.0	86.8	
10A	1731.30	9.3			2.64	0.03					
11	1731.60	8.9		2.47	2.66	0.28		9.7	5.1	81.4	
12	1731.90	9.1		2.48	2.64	0.07		10.5	0.0	89.5	
13	1732.20	9.7		2.47	2.66	0.16		10.1	0.0	90.8	
13A	1732.20	8.4			2.65	0.03					
14	1732.50	9.2		2.48	2.65	0.18		10.4	0.0	95.7	
15	1732.80	9.3		2.46	2.64	0.21		10.7	4.6	87.6	
16	1733.10	9.1		2.48	2.65	0.03		10.1	2.5	93.5	
16A	1733.10	8.8			2.65	1.82					
17	1733.37	8.4		2.48	2.65	0.06		9.3	0.0	91.0	B#1
18	1839.00	20.9		2.19	2.64	315		21.9	0.0	50.0	C#2
18A	1839.00	21.1			2.65	696					
19	1839.30	22.6		2.18	2.64	2890		20.8	0.0	41.8	
20	1839.55	18.4		2.16	2.83	8471		23.1	0.0	42.1	
20A	1839.55	16.5			2.67	1154					
21	1839.90	7.2		2.47	2.59	0.60		8.7	8.5	73.9	SP VF
22	1840.20	6.8		2.55	2.68	0.84		6.9	0.0	88.9	SP VF
23	1840.50	6.9		2.48	2.65	0.05		8.3	5.9	86.3	SP
24	1840.80	7.1		2.45	2.65	1.17		8.7	5.6	78.6	SP VF
24A	1840.80	6.2			2.60	0.26					
25	1841.10	6.6		2.46	2.60	4.36		9.2	8.1	75.1	VF
26	1841.40	16.2		2.34	2.65	9437		13.9	0.0	48.8	
27	1841.70	16.6		2.29	2.65	15007		17.5	0.0	40.6	
27A	1841.70	14.8			2.65	2352					
28	1842.00	16.2		2.15	2.65	9430		23.0	0.0	35.5	
29	1842.30	19.8		2.24	2.65	10721		18.9	0.2	41.4	
30	1842.60	21.3		2.15	2.65	8183		23.3	0.0	40.7	
30A	1842.60	20.3			2.65	19111					
31	1842.90	21.2		2.13	2.65	5981		23.4	0.0	34.7	
32	1843.20	11.6		2.32	2.53	3.10		13.1	5.3	65.4	VF

BHP PETROLEUM PTY.LTD. :
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Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
33	1843.50	17.1		2.15	2.65	3777		22.4	0.0	36.5	
33A	1843.50	19.0			2.65	3158					
34	1843.80	18.3		2.21	2.65	12865		16.6	1.3	37.3	
35	1844.10	20.6		2.23	2.65	20434		20.2	0.0	44.2	
36	1844.40	20.3		2.23	2.65	4048		18.7	0.0	48.9	
36A	1844.40	18.9			2.64	453					
37	1844.70	19.9		2.22	2.65	3864		20.1	0.0	45.4	
38	1845.00	20.5		2.19	2.65	13913		20.0	0.0	40.6	
39	1845.30	21.4		2.12	2.65	5515		22.7	0.0	25.2	
39A	1845.30	14.1			2.65	3605					
40	1845.60	9.9		2.39	2.65	372		11.8	0.0	26.2	
41	1845.90	18.8		2.18	2.65	440		21.6	0.0	44.4	
42	1846.20	17.3		2.21	2.65	1005		19.9	0.0	37.8	
42A	1846.20	16.6			2.65	1356					
43	1846.50	17.3		2.22	2.64	513		18.9	0.0	28.2	
44	1846.80	20.0		2.16	2.64	2840		21.9	0.0	40.3	
45	1847.10	20.7		2.23	2.65	10101		19.8	0.0	39.6	
45A	1847.10	19.0			2.64	5705					
46	1847.40	20.0		2.27	2.65	3536		17.0	0.0	29.4	
47	1847.70	20.9		2.24	2.64	3298		19.8	0.2	47.5	
48	1848.00	19.6		2.18	2.65	24603		20.7	0.0	30.5	
48A	1848.00	20.2			2.65	10907					
49	1848.30	17.3		2.20	2.65	7586		21.0	0.0	36.8	
50	1848.60	19.8		2.19	2.65	13515		19.8	0.0	28.7	
51	1848.90	17.7		2.20	2.65	7856		20.5	0.0	33.2	
51A	1848.90	19.2			2.65	9396					
52	1849.20	21.3		2.25	2.65	14688		17.8	0.0	30.3	
53	1849.50	15.9		2.18	2.65	1891		21.8	0.0	40.0	
54	1849.80	19.9		2.16	2.65	2431		22.2	0.0	37.8	
54A	1849.80	16.9			2.65	5552					
55	1850.10	16.7		2.19	2.64	3937		20.7	0.0	35.0	
56	1850.40	18.7		2.21	2.65	1511		19.9	0.0	38.9	
57	1850.70	16.7		2.24	2.65	3626		18.3	0.0	45.3	
57A	1850.70	18.0			2.64	7668					
58	1851.00	17.7		2.19	2.65	1237		20.4	0.0	33.2	
59	1851.30	19.1		2.21	2.65	6299		21.0	0.0	48.3	
60	1851.60	16.9		2.19	2.65	1596		20.8	0.0	43.1	
60A	1851.60	16.1			2.65	3957					
61	1851.90	16.8		2.26	2.65	14241		17.9	0.0	42.9	
62	1852.20	17.2		2.19	2.65	8513		20.3	0.0	32.3	
63	1852.50	14.5		2.24	2.65	5222		18.6	0.0	37.2	
63A	1852.50	13.6			2.65	5096					
64	1852.80	17.5		2.22	2.65	8978		17.6	0.0	36.6	
65	1853.10	15.2		2.26	2.65	765		17.8	0.0	36.7	
66	1853.40	17.2		2.23	2.65	5170		17.8	0.0	32.6	
66A	1853.40	17.3			2.65	671					
67	1853.70	18.1		2.24	2.65	1936		19.8	0.0	43.0	
68	1854.00	16.4		2.24	2.65	4634		18.1	0.0	33.4	
69	1854.30	17.1		2.25	2.65	7573		16.7	0.0	20.3	
69A	1854.30	17.0			2.65	3832					
70	1854.60	18.2		2.21	2.66	6305		19.4	0.0	28.5	SP
71	1854.90	15.9		2.23	2.65	2210		19.0	0.0	30.5	B#2
72	1855.80	15.9		2.30	2.65	4530		16.4	0.0	32.2	C#3
72A	1855.80	15.2			2.65	7579					

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H2O%	Remarks
73	1856.10	16.2		2.22	2.65	13133		19.5	0.0	34.1	
74	1856.40	16.7		2.21	2.65	21003		20.4	0.0	36.8	
75	1856.70	17.7		2.21	2.65	19321		18.8	0.0	24.6	
75A	1856.70	16.8			2.65	9650					
76	1857.00	16.0		2.20	2.65	22603		21.5	0.0	44.1	
77	1857.30	13.9		2.35	2.65	348		14.9	0.3	45.7	
78	1857.60	16.4		2.35	2.64	3127		15.1	0.0	54.6	
78A	1857.60	14.7			2.65	22.0					
79	1857.90	15.1		2.30	2.65	119		16.8	0.5	49.4	
80	1858.20	16.1		2.20	2.65	2415		21.1	0.0	38.5	
81	1858.50	19.7		2.30	2.65	22508		16.9	0.0	45.1	
81A	1858.50	19.9			2.65	29035					
82	1858.80	19.9		2.27	2.65	14714		18.1	0.0	42.6	
83	1859.10	17.8		2.25	2.65	5383		20.5	0.0	58.3	
84	1859.40	16.7		2.25	2.65	4719		19.5	0.0	50.7	
84A	1859.40	14.2			2.65	5149					
85	1859.70	18.2		2.32	2.65	15957		17.0	0.0	55.9	
86	1860.00	13.5		2.31	2.65	474		16.3	0.0	48.2	
87	1860.30	11.0		2.05	2.26	<0.01		13.3	46.3	40.1	MP
88	1860.60	8.6		2.38	2.53	<0.01		13.5	44.3	47.8	MP
89	1860.90	8.0		2.33	2.50	<0.01		16.0	42.2	49.5	MP
90	1861.20	5.9		2.55	2.68	<0.01		8.4	6.1	88.0	MP
91	1861.52	7.9		2.36	2.52	<0.01		9.8	24.1	70.0	MP
92	1861.83	6.4		2.47	2.58	0.06		7.7	22.5	67.6	VF
93	1862.10	22.8		2.12	2.64	1797		23.3	0.0	38.1	
93A	1862.10	23.2			2.65	3762					
94	1862.40	24.7		2.19	2.65	3231		21.6	1.5	46.6	
95	1862.65	23.3		2.36	2.64	3010		14.7	0.0	69.0	
96	1863.00	21.6		2.15	2.65	10606		22.6	0.0	41.0	
96A	1863.00	23.1			2.65	7020					
97	1863.30	25.6		2.13	2.65	7835		23.9	0.0	44.5	
98	1863.55	23.7		2.08	2.65	6131		24.3	3.4	36.8	
99	1863.90	26.1		2.05	2.65	2500		27.0	0.0	32.6	
99A	1863.90	26.4			2.65	2569					
100	1864.20	25.1		2.05	2.65	2348		26.5	0.0	37.1	
101	1864.50	22.4		2.13	2.71	1100		24.0	0.0	52.6	
102	1864.80	21.8		2.18	2.65	9139		22.6	0.0	55.9	
102A	1864.80	23.6			2.65	7158					
103	1865.10	21.4		2.16	2.66	4609		23.3	0.0	57.5	
104	1865.40	19.5		2.13	2.65	63.3		23.5	0.0	41.7	
105	1865.70	24.7		2.06	2.65	3058		26.2	0.0	35.4	
105A	1865.70	23.4			2.65	2699					
106	1866.00	4.2		2.26	2.64	0.14		19.7	1.1	71.3	
107	1866.30	17.4		2.40	2.65	5.1		13.1	5.5	75.1	
108	1866.60	9.4		2.47	2.63	1.95		9.1	5.4	81.1	
108A	1866.60	6.8			2.68	0.31					
109	1866.90	22.4		2.34	2.64	125		14.7	3.2	65.1	
110	1867.20	20.5		2.20	2.65	234		21.8	1.0	41.5	
111	1867.53	19.9		2.04	2.47	136		27.4	0.7	34.2	VF
111A	1867.53	23.2			2.68	961					
112	1867.80	22.5		2.11	2.64	931		24.2	0.9	32.2	
113	1868.10	21.9		2.00	2.64	201		24.8	0.0	13.7	
114	1868.40	24.7		2.11	2.65	1198		24.9	0.0	37.2	
114A	1868.40	24.1			2.65	608					

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
115	1868.70	25.9		2.02	2.66	2216		23.1	0.0	10.5	
116	1869.00	27.8		1.94	2.65	3240		29.7	0.0	26.8	
117	1869.30	25.8		1.97	2.65	2028		28.4	0.0	20.8	
117A	1869.30	26.8			2.65	2922					
118	1869.60	25.4		1.99	2.65	1878		26.6	0.0	18.7	
119	1869.90	26.2		2.07	2.66	1799		25.2	0.4	27.9	
120	1870.20	26.9		1.99	2.65	3145		27.5	0.0	26.1	
120A	1870.20	25.5			2.65	2431					
121	1870.50	26.0		2.04	2.65	1748		27.6	0.7	40.6	
122	1870.80	25.8		1.99	2.67	2887		27.0	0.0	17.0	
123	1871.10	25.0		2.00	2.66	4804		27.0	1.5	26.7	
123A	1871.10	26.1			2.65	5387					
124	1871.40	23.4		2.19	2.65	11468		21.5	0.0	41.6	
125	1871.70	24.5		2.13	2.65	18003		23.7	0.4	38.5	
126	1872.00	20.5		2.15	2.65	3445		21.5	0.0	36.9	
126A	1872.00	22.1			2.65	4672					
127	1872.30	18.3		2.22	2.64	12945		19.6	0.0	31.7	
128	1872.63	17.8		2.15	2.65	6914		21.9	0.5	35.3	
128A	1872.63	18.7			2.65	14044					
129	1872.90	16.7		2.12	2.64	6376		24.3	0.0	41.9	
130	1873.20	20.2		2.22	2.66	10929		21.3	0.0	54.2	
131	1873.50	22.1		2.17	2.65	25472		22.6	0.0	49.0	
132	1873.80	22.5		2.17	2.65	29776		23.0	0.0	44.2	
132A	1873.80	20.2			2.65	6060					
133	1874.10	21.1		2.14	2.64	9063		23.4	0.0	40.2	
134	1874.40	21.9		2.10	2.65	10218		25.9	0.0	43.8	
135	1874.70	25.1		2.11	2.65	7491		24.9	0.0	36.4	
135A	1874.70	24.9			2.65	5974					
136	1875.00	23.3		2.10	2.65	4581		26.2	0.0	43.3	
137	1875.30	25.4		2.13	2.65	12867		22.7	0.0	44.1	
138	1875.60	26.0		2.04	2.64	6625		25.2	0.0	25.1	
138A	1875.60	26.6			2.65	11690					
139	1875.90	22.3		2.17	2.64	3155		22.1	0.0	41.2	
140	1876.20	25.2		2.05	2.65	4822		23.9	0.0	26.6	
140A	1876.20	25.0			2.65	2651					
141	1876.50	7.9		2.46	2.63	3.10		11.1	19.9	68.7	
142	1876.80	18.4		2.10	2.66	129		25.2	0.8	32.5	
143	1877.10	23.0		2.08	2.64	238		24.3	0.0	32.5	
144	1877.40	23.6		2.14	2.65	1530		22.5	0.0	29.5	
144A	1877.40	22.8			2.65	822					
145	1877.70	23.2		2.06	2.65	1294		24.9	0.0	28.9	
146	1878.00	22.4		2.06	2.65	974		24.1	0.0	23.9	
147	1878.30	21.4		2.12	2.65	140		25.7	0.0	42.1	
147A	1878.30	21.9			2.65	238					
148	1878.60	23.7		2.15	2.64	694		21.3	0.0	33.4	
149	1878.90	16.4		2.35	2.64	11.5		14.8	0.0	66.9	
150	1879.20	13.4		2.32	2.65	7.8		15.8	0.0	60.3	
150A	1879.20	19.1			2.66	370					
151	1879.50	21.3		2.08	2.64	1975		24.2	0.0	21.4	
152	1879.80	23.1		2.21	2.65	5422		22.2	1.0	53.7	
153	1880.10	21.9		2.12	2.64	6441		23.2	0.0	35.6	
153A	1880.10	23.5			2.65	9365					
154	1880.40	20.8		2.20	2.65	7125		21.1	0.0	41.7	

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
155	1880.70	6.4		2.57	2.67	0.19		5.4	18.9	66.0	SP VF
156	1881.00	5.5		2.56	2.63	1.29		4.5	17.0	62.3	VF
157	1881.30	21.1		2.09	2.65	2881		24.0	0.0	27.8	
157A	1881.30	6.0			2.61	0.27					
158	1881.60	21.5		2.06	2.64	2230		26.3	0.0	30.5	
159	1881.90	20.4		1.99	2.68	184		27.1	0.0	23.5	
159A	1881.90	26.8			2.65	3159					
160	1882.20	11.6		2.42	2.63	12.2		12.5	3.9	59.8	
161	1882.50	17.2		2.22	2.65	376		18.7	0.0	35.6	B#3
162	1915.10	18.7		2.32	2.65	2812		16.8	2.1	44.2	C#4
162A	1915.10	17.0			2.67	1780					
163	1915.30	19.8		2.19	2.66	968		20.9	0.0	31.4	
164	1915.60	13.6		2.31	2.71	325		17.0	0.1	42.1	
165	1915.90	16.3		2.25	2.65	621		18.4	0.0	36.7	
165A	1915.90	17.9			2.66	1442					
166	1916.23	17.6		2.25	2.65	847		19.8	2.3	41.9	
167	1916.50	16.5		2.23	2.66	1292		19.3	0.0	33.4	
168	1916.80	7.5		2.37	2.63	0.55		14.8	0.0	43.2	
168A	1916.80	16.6			2.67	2029					
169	1917.10	20.7		2.35	2.65	353		14.8	0.0	50.8	
170	1917.40	21.8		2.21	2.65	431		21.3	0.0	49.0	
171	1917.70	25.0		2.06	2.65	625		25.6	0.0	35.4	
171A	1917.70	26.0			2.65	527					
172	1918.00	19.4		2.26	2.64	73.9		17.9	0.0	46.7	
173	1918.30	25.2		2.10	2.65	784		25.3	0.0	29.9	
174	1918.60	22.9		2.08	2.65	2074		24.8	0.0	25.1	
174A	1918.60	24.9			2.65	3489					
175	1918.90	23.1		2.09	2.65	4340		25.2	0.0	29.9	
176	1919.20	25.1		2.08	2.65	4198		25.3	0.0	39.3	
177	1919.50	25.2		2.04	2.65	1694		26.9	0.0	31.9	
177A	1919.50	25.0			2.65	1991					
178	1919.80	24.8		2.07	2.65	3602		25.0	0.0	29.9	
179	1920.10	22.1		2.15	2.65	1426		22.1	0.5	31.2	
180	1920.40	23.9		2.09	2.65	326		25.3	0.4	41.4	
180A	1920.40	24.8			2.65	551					
181	1920.70	9.6		2.25	2.64	0.71		19.9	3.4	53.2	
182	1921.00	22.0		2.09	2.64	128		25.2	0.0	35.7	
183	1921.30	25.1		2.03	2.65	908		28.0	0.0	35.4	
183A	1921.30	26.4			2.65	1295					
184	1921.60	25.1		2.02	2.65	905		28.1	0.0	35.3	
185	1921.90	23.5		2.06	2.65	3845		25.4	0.0	31.7	
186	1922.20	25.8		2.07	2.65	9720		26.2	0.0	43.3	
186A	1922.20	25.2			2.65	3519					
187	1922.50	23.0		2.09	2.65	8910		26.7	0.0	48.6	
188	1922.80	21.3		2.16	2.64	5594		22.0	0.0	37.3	
189	1923.14	17.2		2.28	2.55	55.9		18.0	1.3	53.3	VF
189A	1923.14	18.9			2.61	50.8					
190	1923.40	21.1		2.14	2.66	2776		22.5	0.0	47.7	
191	1923.70	21.0		2.14	2.65	4232		24.1	0.0	53.3	SP
192	1924.00	22.3		2.14	2.65	8420		22.9	0.0	36.5	
192A	1924.00	22.7			2.65	3847					
193	1924.30	23.6		2.13	2.66	6908		24.4	0.0	46.4	
194	1924.63	19.5		2.19	2.65	677		21.3	0.0	39.0	

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H20%	Remarks
195	1924.90	23.6		2.08	2.65	9004		24.6	0.0	27.8	
195A	1924.90	23.3			2.65	5015					
196	1925.20	22.8		2.12	2.65	4388		23.6	0.0	30.6	
197	1925.50	23.9		2.15	2.65	7231		23.8	1.8	44.3	
198	1925.80	24.0		2.08	2.65	12969		25.4	0.0	37.7	
198A	1925.80	19.7			2.65	517					
199	1926.10	23.0		2.13	2.67	15715		24.1	0.0	44.2	
200	1926.40	6.1		2.28	2.40	3.35		13.5	25.4	54.1	VF
201	1926.70	5.1		2.50	2.60	0.47		9.5	21.1	71.3	
201A	1926.70	9.7			2.68	0.15					
202	1927.00	10.9		2.45	2.65	0.07		12.1	0.4	87.3	
203	1927.30	15.1		2.39	2.66	0.21		15.0	1.6	86.3	
204	1927.60	16.2		2.38	2.67	0.43		16.1	0.7	85.9	
204A	1927.60	12.3			2.65	0.20					
205	1927.90	11.5		2.43	2.66	0.12		13.4	3.6	85.0	
206	1928.20	10.3		2.48	2.65	0.34		10.1	6.1	83.5	
207	1928.50	10.3		2.49	2.64	0.13		8.8	5.7	82.2	
207A	1928.50	8.7			2.66	0.15					
208	1928.80	7.1		2.49	2.66	0.21		8.3	6.0	77.8	VF
209	1929.10	9.2		2.47	2.64	0.48		10.4	4.8	78.7	
210	1929.40	10.3		2.45	2.63	9.0		10.3	4.7	82.9	VF
210A	1929.40	9.3			2.76	0.17					
211	1929.70	8.5		2.50	2.68	0.12		9.3	2.7	85.5	
212	1930.00	10.1		2.39	2.66	0.12		13.7	1.7	74.9	SP
213	1930.30	14.3		2.34	2.71	1.25		15.5	1.5	69.7	
213A	1930.30	14.5			2.66	1.03					
214	1930.60	12.1		2.44	2.67	0.89		11.9	0.2	80.0	
215	1930.90	18.5		2.22	2.67	10.2		21.5	1.0	55.6	
216	1931.20	18.0		2.39	2.66	18.5		14.0	3.4	73.7	
216A	1931.20	16.1			2.66	9.4					
217	1931.50	19.0		2.25	2.65	383		18.7	1.2	45.8	
218	1931.80	19.9		2.25	2.66	674		20.1	0.0	54.7	SP
219	1932.10	16.9		2.32	2.65	2736		16.4	2.8	72.4	
219A	1931.50	17.8			2.64	2804					
220	1932.40	16.4		2.43	2.67	4.46		13.3	9.1	74.8	
221	1932.70	15.5		2.42	2.71	2.01		11.4	6.4	76.2	
222	1933.00	15.3		2.47	2.66	0.63		9.4	5.3	63.4	
222A	1933.00	5.5			2.62	0.50					VF
223	1933.30	9.3		2.47	2.65	9.9		7.8	9.5	72.6	VF
224	1933.60	13.0		2.25	2.63	61.0		18.1	0.0	48.4	
225	1933.90	14.7		2.26	2.63	394		18.0	0.6	46.5	
225A	1933.90	14.8			2.65	559					
226	1934.20	19.1		2.24	2.65	3814		18.1	0.0	43.2	
227	1934.50	13.7		2.35	2.70	303		16.2	0.0	50.9	
228	1934.80	12.1		2.34	2.65	0.35		15.9	2.2	73.6	
228A	1934.80	19.6			2.65	82.6					
229	1935.10	15.4		2.25	2.66	7.7		20.2	1.1	64.8	
230	1935.40	15.1		2.28	2.67	3.88		20.0	3.4	60.3	
231	1935.70	22.5		2.14	2.65	10379		22.3	0.0	35.5	
231A	1935.70	21.3			2.65	8774					
232	1936.00	22.0		2.16	2.65	3730		22.0	0.0	43.2	
233	1936.30	24.7		2.12	2.65	24794		24.4	0.0	47.0	
234	1936.60	23.1		2.10	2.65	10639		24.2	0.0	38.1	
234A	1936.60	22.4			2.65	6259					

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H2O%	Remarks
235	1936.90	21.8		2.13	2.65	4754		22.6	0.0	38.6	
236	1937.20	19.4		2.21	2.65	2245		19.3	0.0	49.2	
237	1937.50	17.8		2.14	2.65	7097		22.1	0.0	37.8	
237A	1937.50	20.6			2.65	12954					
238	1937.80	20.5		2.18	2.65	14682		20.7	0.0	39.9	
239	1938.10	21.8		2.10	2.65	11615		23.8	0.0	35.3	
240	1938.40	24.3		2.12	2.65	28211		23.4	0.0	43.6	
240A	1938.40	21.4			2.65	10504					
241	1938.70	22.1		2.14	2.65	14508		22.1	0.0	40.6	
242	1939.00	25.0		2.09	2.65	17641		22.8	0.0	38.5	
243	1939.30	15.1		2.31	2.65	2241		15.9	0.0	59.8	
243A	1939.30	6.9			2.63	0.11					
244	1939.60	9.0		2.46	2.66	0.12		9.3	5.3	84.6	
245	1939.90	12.2		2.43	2.74	0.34		10.8	4.5	83.2	
246	1940.20	12.6		2.38	2.64	0.23		14.0	3.4	78.0	
246A	1940.20	14.9			2.66	0.59					
247	1940.50	15.2		2.37	2.63	1.72		14.8	3.2	77.1	
248	1940.80	22.8		2.20	2.64	59.1		23.9	0.9	66.1	
249	1941.10	22.1		2.17	2.64	90.1		23.7	0.0	57.9	
249A	1941.10	21.8			2.74	119					
250	1941.40	18.2		2.32	2.65	155		17.5	4.0	62.2	
251	1941.70	17.9		2.33	2.64	123		16.5	2.8	66.3	
252	1942.00	8.6		2.41	2.63	0.36		12.2	4.0	71.4	
252A	1942.00	17.4			2.64	727					
253	1942.30	16.9		2.23	2.65	4559		20.3	0.0	49.6	
254	1942.60	21.5		2.18	2.65	6808		21.6	1.0	41.4	B#4
255	1943.10	6.4		2.49	2.63	<0.01		8.2	7.6	75.8	C#5
256	1943.30	12.5		2.37	2.88	663		15.8	0.0	72.2	
256A	1943.30	13.0			2.65	180					
257	1943.60	17.5		2.41	2.64	6104		12.9	3.7	67.0	
258	1943.90	8.2		2.43	2.63	0.07		11.4	10.7	72.6	
258A	1943.90	12.2			2.62	3.88					
259	1944.20	11.6		2.15	2.50	39.4		24.6	0.0	56.9	
260	1944.50	20.0		2.22	2.64	5698		20.5	0.0	51.8	
261	1944.80	23.0		2.21	2.65	3765		21.1	0.0	55.5	
261A	1944.80	22.4			2.65	3340					
262	1945.10	19.9		2.20	2.64	4850		23.2	1.9	66.3	
263	1945.40	19.0		2.25	2.63	333		20.0	0.0	64.1	
264	1945.70	24.9		2.19	2.64	8071		24.6	0.0	65.0	
264A	1945.70	24.7			2.64	6007					
265	1946.00	22.0		2.18	2.64	2301		25.7	0.0	76.5	
266	1946.30	18.1		2.15	2.65	237		24.2	1.8	67.7	
267	1946.60	22.8		2.21	2.65	8649		23.4	0.0	75.8	
267A	1946.60	25.2			2.63	6193					
268	1946.90	21.4		2.27	2.65	7921		21.2	0.0	64.4	
269	1947.20	25.7		2.20	2.65	7414		24.8	0.0	78.0	
270	1947.50	21.4		2.21	2.65	8206		24.2	0.0	73.0	
270A	1947.50	22.7			2.65	7320					
271	1947.80	23.0		2.19	2.65	7942		25.1	0.0	75.1	
272	1948.10	5.7		2.47	2.60	2.02		10.1	9.8	78.0	VF
273	1948.40	12.4		2.44	2.61	1.70		10.4	9.4	75.0	
273A	1948.40	8.6			2.61	57.8					VF
274	1948.70	7.0		2.48	2.61	78.1		9.1	8.2	73.7	VF

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
275	1949.00	10.1		2.51	2.65	0.76		9.2	8.2	79.0	
276	1949.30	7.3		2.53	2.64	15.5		7.5	6.7	84.3	VF
277	1949.60	15.7		2.47	2.65	4137		8.3	8.9	68.6	
278	1949.90	21.7		2.17	2.63	24.5		22.5	2.9	48.1	
278A	1949.90	21.5			2.64	53.7					
279	1950.20	8.2		2.43	2.62	3.08		11.4	4.3	72.6	
280	1950.50	8.9		2.46	2.62	1.62		8.7	11.3	70.7	
281	1950.80	13.7		2.20	2.65	4.30		21.3	2.1	54.8	SP
281A	1950.80	12.8			2.65	7.3					
282	1951.10	10.2		2.49	2.67	3455		8.8	8.5	84.6	SP VF
283	1951.40	20.3		2.21	2.65	958		20.6	0.0	52.4	
283A	1951.40	19.5			2.64	1360					
284	1951.70	21.6		2.25	2.65	305		19.8	0.0	72.7	
285	1952.00	20.0		2.15	2.65	1047		22.4	0.0	40.4	
285A	1952.00	19.1			2.61	388					
286	1952.30	20.1		2.24	2.65	287		21.2	3.2	59.0	
287	1952.60	21.1		2.16	2.61	631		22.4	1.0	55.2	
288	1952.90	18.8		2.45	2.66	743		16.6	1.5	63.7	
288A	1952.90	11.3			2.71	1.52					
289	1953.20	6.2		2.52	2.62	0.09		7.2	10.6	67.0	
290	1953.50	7.3		2.45	2.64	0.14		10.6	4.6	71.3	
291	1953.80	15.6		2.39	2.66	64.4		13.7	3.5	67.9	
291A	1953.80	9.1			2.64	0.32					
292	1954.10	8.0		2.43	2.64	0.31		11.9	4.1	71.5	
293	1954.40	17.3		2.41	2.64	31.4		16.2	1.5	70.1	
294	1954.70	8.2		2.50	2.65	0.40		9.0	8.3	72.3	
294A	1954.70	15.3			2.66	17.9					
295	1955.00	13.4		2.51	2.65	5.0		8.5	8.8	70.5	
296	1955.30	10.4		2.37	2.66	1.33		15.7	6.0	69.3	
297	1955.60	8.9		2.39	2.64	0.27		13.1	5.5	72.9	
297A	1955.60	7.2			2.66	0.62					
298	1955.90	17.1		2.32	2.64	327		17.5	1.3	63.9	
299	1956.20	7.2		2.53	2.64	1.16		6.3	13.9	67.7	
300	1956.50	6.1		2.50	2.64	0.44		8.0	10.9	65.4	
300A	1956.50	7.2			2.63	0.29					
301	1956.80	14.6		2.33	2.74	192		16.4	5.0	75.3	
302	1957.10	16.3		2.29	2.64	2.13		17.8	1.3	77.0	
303	1957.40	15.2		2.34	2.78	3.38		15.9	1.5	70.8	
303A	1957.40	17.4			2.62	21.6					VF
304	1957.70	9.3		2.45	2.63	0.14		10.4	7.0	82.0	
305	1958.00	9.7		2.44	2.63	0.18		10.4	7.0	70.5	
306	1958.30	16.8		2.35	2.69	12.4		15.2	1.5	75.5	
306A	1958.30	13.7			2.73	4.37					
307	1958.60	21.1		2.25	2.65	1002		19.8	0.0	77.3	
308	1958.90	21.6		2.20	2.65	448		22.0	0.0	68.1	
309	1959.20	21.6		2.18	2.65	1075		21.0	0.0	44.7	
309A	1959.20	13.9			2.65	1530					
310	1959.50	22.6		2.20	2.65	741		21.4	0.0	60.8	
311	1959.80	18.0		2.26	2.65	2035		19.7	0.6	69.9	
312	1960.10	19.4		2.21	2.67	1975		21.8	1.5	66.9	
312A	1960.10	21.5			2.65	3196					
313	1960.40	19.6		2.22	2.65	1745		21.2	0.0	57.7	
314	1960.70	18.4		2.35	2.66	309		15.8	1.5	75.7	

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Summation of Fluids Oil%	Summation of Fluids H2O%	Remarks
315	1961.00	10.9		2.33	2.66	0.44		16.2	0.0	71.9	
315A	1961.00	10.4			2.65	0.72					
316	1961.30	8.9		2.47	2.64	3.52		9.6	2.6	79.5	
317	1961.60	19.4		2.23	2.66	612		21.3	0.5	62.8	
318	1961.90	18.8		2.25	2.65	1689		21.5	0.0	66.9	
318A	1961.90	20.3			2.65	1004					
319	1962.20	21.6		2.24	2.65	1129		21.3	0.0	68.4	
320	1962.50	19.3		2.45	2.66	30.6		12.6	0.4	83.7	
321	1962.80	5.2		2.55	2.66	22.6		6.6	7.7	85.1	
321A	1962.80	9.2			2.67	8.0					
322	1963.10	4.8		2.58	2.66	21.6		5.0	2.6	82.0	VF
323	1963.40	9.6		2.54	2.66	3.72		8.0	6.3	82.3	
324	1963.70	5.8		2.54	2.65	19.7		7.6	10.1	77.2	
324A	1963.70	6.3			2.67	0.53					
325	1964.00	4.7		2.54	2.65	4.95		7.2	7.1	84.6	
326	1964.30	18.3		2.48	2.73	80.3		10.6	2.3	75.0	
327	1964.60	17.6		2.24	2.66	30.4		22.5	1.0	70.5	
327A	1964.60	20.4			2.65	120					VF
328	1964.90	20.0		2.25	2.65	42.2		22.0	0.5	68.5	
329	1965.20	20.7		2.25	2.65	281		21.5	1.0	74.3	
330	1965.50	19.6		2.24	2.69	82.5		23.3	0.1	75.0	
330A	1965.50	16.0			2.63	80.7					
331	1965.80	20.0		2.22	2.65	152		23.1	1.0	71.0	
332	1966.10	20.9		2.32	2.65	135		19.0	1.2	73.3	
333	1966.40	21.3		2.47	2.65	206		9.2	8.1	70.1	
333A	1966.40	21.1			2.65	154					
334	1966.70	17.1		2.29	2.64	668		20.1	3.4	69.7	
335	1967.00	19.7		2.24	2.65	3553		21.2	1.1	57.2	
336	1967.30	21.3		2.22	2.65	9411		23.1	0.2	67.4	
336A	1967.30	22.6			2.65	8104					
337	1967.60	19.6		2.27	2.65	2205		19.8	0.2	67.6	
338	1967.90	19.8		2.23	2.65	659		23.2	0.2	71.9	
339	1968.20	5.7		2.50	2.68	0.10		8.2	9.1	73.1	
339A	1968.20	6.2			2.66	0.03					
340	1968.50	5.6		2.45	2.65	0.05		8.3	4.5	80.1	
341	1968.80	16.2		2.27	2.64	1773		18.6	0.9	53.6	B#5
341A	1968.80	16.0			2.67	1039					SP

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

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY.LTD.
Well : MINERVA-2A
Field : MINERVA
Core Int. : CORE NO.1 1728.50-1733.60 M
Core Int. : CORE NO.2&3 1838.80-1882.50 M
Core Int. : CORE NO.4&5 1915.00-1969.00 M

Date : 04/11/93
File : 5-207
Location : OTWAY
ACS Lab. : ADELAIDE
Analyst : CG,WJD,JC

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Ø	Summation of Fluids Oil%	Summation of Fluids H20%	Remarks
1A	1728.60	8.0		2.66		0.03					
4A	1728.90	8.7		2.65		0.07					
7A	1730.40	8.7		2.65		0.35					
10A	1731.30	9.3		2.64		0.03					
13A	1732.20	8.4		2.65		0.03					
16A	1733.10	8.8		2.65		1.82					
18A	1839.00	21.1		2.65		696					
20A	1839.55	16.5		2.67		1154					
24A	1840.80	6.2		2.60		0.26					
27A	1841.70	14.8		2.65		2352					
30A	1842.60	20.3		2.65		19111					
33A	1843.50	19.0		2.65		3158					
36A	1844.40	18.9		2.64		453					
39A	1845.30	14.1		2.65		3605					
42A	1846.20	16.6		2.65		1356					
45A	1847.10	19.0		2.64		5705					
48A	1848.00	20.2		2.65		10907					
51A	1848.90	19.2		2.65		9396					
54A	1849.80	16.9		2.65		5552					
57A	1850.70	18.0		2.64		7668					
60A	1851.60	16.1		2.65		3957					
63A	1852.50	13.6		2.65		5096					
66A	1853.40	17.3		2.65		671					
69A	1854.30	17.0		2.65		3832					
72A	1855.80	15.2		2.65		7579					
75A	1856.70	16.8		2.65		9650					
78A	1857.60	14.7		2.65		22.0					
81A	1858.50	19.9		2.65		29035					
84A	1859.40	14.2		2.65		5149					
93A	1862.10	23.2		2.65		3762					
96A	1863.00	23.1		2.65		7020					
99A	1863.90	26.4		2.65		2569					
102A	1864.80	23.6		2.65		7158					
105A	1865.70	23.4		2.65		2699					
108A	1866.60	6.8		2.68		0.31					
111A	1867.53	23.2		2.68		961					
114A	1868.40	24.1		2.65		608					
117A	1869.30	26.8		2.65		2922					
120A	1870.20	25.5		2.65		2431					
123A	1871.10	26.1		2.65		5387					
126A	1872.00	22.1		2.65		4672					
128A	1872.63	18.7		2.65		14044					

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H20%	Remarks
132A	1873.80	20.2			2.65	6060					
135A	1874.70	24.9			2.65	5974					
138A	1875.60	26.6			2.65	11690					
140A	1876.20	25.0			2.65	2651					
144A	1877.40	22.8			2.65	822					
147A	1878.30	21.9			2.65	238					
150A	1879.20	19.1			2.66	370					
153A	1880.10	23.5			2.65	9365					
157A	1881.30	6.0			2.61	0.27					
159A	1881.90	26.8			2.65	3159					
162A	1915.10	17.0			2.67	1780					
165A	1915.90	17.9			2.66	1442					
168A	1916.80	16.6			2.67	2029					
171A	1917.70	26.0			2.65	527					
174A	1918.60	24.9			2.65	3489					
177A	1919.50	25.0			2.65	1991					
180A	1920.40	24.8			2.65	551					
183A	1921.30	26.4			2.65	1295					
186A	1922.20	25.2			2.65	3519					
189A	1923.14	18.9			2.61	50.8					
192A	1924.00	22.7			2.65	3847					
195A	1924.90	23.3			2.65	5015					
198A	1925.80	19.7			2.65	517					
201A	1926.70	9.7			2.68	0.15					
204A	1927.60	12.3			2.65	0.20					
207A	1928.50	8.7			2.66	0.15					
210A	1929.40	9.3			2.76	0.17					
213A	1930.30	14.5			2.66	1.03					
216A	1931.20	16.1			2.66	9.4					
219A	1931.50	17.8			2.64	2804					
222A	1933.00	5.5			2.62	0.50					VF
225A	1933.90	14.8			2.65	559					
228A	1934.80	19.6			2.65	82.6					
231A	1935.70	21.3			2.65	8774					
234A	1936.60	22.4			2.65	6259					
237A	1937.50	20.6			2.65	12954					
240A	1938.40	21.4			2.65	10504					
243A	1939.30	6.9			2.63	0.11					
246A	1940.20	14.9			2.66	0.59					
249A	1941.10	21.8			2.74	119					
252A	1942.00	17.4			2.64	727					
256A	1943.30	13.0			2.65	180					
258A	1943.90	12.2			2.62	3.88					
261A	1944.80	22.4			2.65	3340					
264A	1945.70	24.7			2.64	6007					
267A	1946.60	25.2			2.63	6193					
270A	1947.50	22.7			2.65	7320					
273A	1948.40	8.6			2.61	57.8					VF
278A	1949.90	21.5			2.64	53.7					
281A	1950.80	12.8			2.65	7.3					
283A	1951.40	19.5			2.64	1360					
285A	1952.00	19.1			2.61	388					

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by
ACS LABORATORIES PTY. LTD.

Sample Number	Depth	Porosity % HeInj	Porosity % Roll Ø	Density ND	Density GD	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids 0	Oil%	H20%	Remarks
288A	1952.90	11.3		2.71		1.52					
291A	1953.80	9.1		2.64		0.32					
294A	1954.70	15.3		2.66		17.9					
297A	1955.60	7.2		2.66		0.62					
300A	1956.50	7.2		2.63		0.29					
303A	1957.40	17.4		2.62		21.6					VF
306A	1958.30	13.7		2.73		4.37					
309A	1959.20	13.9		2.65		1530					
312A	1960.10	21.5		2.65		3196					
315A	1961.00	10.4		2.65		0.72					
318A	1961.90	20.3		2.65		1004					
321A	1962.80	9.2		2.67		8.0					
324A	1963.70	6.3		2.67		0.53					
327A	1964.60	20.4		2.65		120					VF
330A	1965.50	16.0		2.63		80.7					
333A	1966.40	21.1		2.65		154					
336A	1967.30	22.6		2.65		8104					
339A	1968.20	6.2		2.66		0.03					
341A	1968.80	16.0		2.67		1039					SP

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

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

OVERBURDEN ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY.LTD.
Well : MINERVA-2A
Field : MINERVA
Core Int. : CORE NO.1 1728.50-1733.60 M
Core Int. : CORE NO.2&3 1838.80-1882.50 M
Core Int. : CORE NO.4&5 1915.00-1969.00 M

Date : 04/11/93
File : 5-207
Location : OTWAY
ACS Lab. : ADELAIDE
Analyst : CG,WJD,JC

SAMPLE NUMBER	DEPTH	POROSITY at OVERBURDEN Pressures: Ambient Porosity	psi 2100	psi 0	psi 0	Porosity: psi Rolling Average	PERMEABILITY at OVERBURDEN Pressures: Ambient Permeability	psi 2100	psi 0	psi 0	PERM. psi Rolling Average
						2100					2100
1	1728.60	10.1	9.6			9.2	0.16	0.03			0.02
5	1729.80	8.9	8.5			8.8	0.06	0.01			0.01
9	1731.00	8.6	8.4			8.7	0.08	0.01			0.01
13	1732.20	9.7	9.4			11.8	0.16	0.01			0.16
18	1839.00	20.9	19.9			16.8	315	270			50.2
20	1839.55	18.4	17.9			17.7	8471	6253			3059
26	1841.40	16.2	15.2			16.8	9437	8295			7793
29	1842.30	19.8	19.0			17.6	10721	8573			8737
34	1843.80	18.3	17.2			18.1	12865	9560			7041
37	1844.70	19.9	19.1			18.4	3864	3137			2485
41	1845.90	18.8	18.3			18.9	440	406			1427
45	1847.10	20.7	19.7			19.1	10101	8037			4759
48	1848.00	19.6	18.7			18.1	24603	19566			'22
53	1849.50	15.9	15.2			16.2	1891	1635			..62
57	1850.70	16.7	15.7			15.7	3626	3077			3173
62	1852.20	17.2	16.1			16.1	8513	6554			4891
66	1853.40	17.2	16.6			16.2	5170	4331			3946
71	1854.90	15.9	15.3			15.8	2210	1972			4116
74	1856.40	16.7	15.9			15.4	21003	17053			2739
79	1857.90	15.1	14.3			15.9	119	98.2			1175
82	1858.80	19.9	19.0			16.2	14714	11598			1533
86	1860.00	13.5	12.6			16.6	474	418			1347
93	1862.10	22.8	22.0			19.3	1797	1622			1733
96	1863.00	21.6	20.5			21.8	10606	8206			3880
100	1864.20	25.1	24.2			21.9	2348	2075			1192
104	1865.40	19.5	18.6			20.7	63.3	57.1			159
109	1866.90	22.4	21.5			20.7	125	93.8			97.1
113	1868.10	21.9	21.1			22.7	201	177			300
116	1869.00	27.8	27.1			25.2	3240	2767			1214
119	1869.90	26.2	25.4			25.1	1799	1602			2889
124	1871.40	23.4	22.6			21.9	11468	9811			5466
128	1872.63	17.8	16.9			19.5	6914	5790			9543
132	1873.80	22.5	21.4			20.6	29776	25213			10905
136	1875.00	23.3	22.5			22.7	4581	3842			6320
140	1876.20	25.2	24.4			23.5	4822	4287			3127
144	1877.40	23.6	22.8			23.3	1530	1354			1492
148	1878.60	23.7	23.0			22.8	694	631			1283
152	1879.80	23.1	22.3			21.9	5422	5033			2491
157	1881.30	21.1	20.1			19.7	2881	2408			5
161	1882.50	17.2	16.2			17.0	376	311			598
165	1915.90	16.3	15.4			16.7	621	551			417
169	1917.10	20.7	19.9			18.5	353	319			247

BHP PETROLEUM PTY.LTD. :
MINERVA-2A : Analysis by

ACS LABORATORIES PTY. LTD.

SAMPLE NUMBER	DEPTH	POROSITY at OVERBURDEN Pressures Ambient Porosity	psi 2100	psi 0	psi 0	Porosity Rolling Average	PERMEABILITY at OVERBURDEN Pressures Ambient Permeability	psi 2100	psi 0	psi 0	PERMEAB Rolling Average
						2100					2100
172	1918.00	19.4	18.7			20.4	73.9	65.9			270
176	1919.20	25.1	24.3			22.6	4198	3843			735
180	1920.40	23.9	23.2			23.8	326	300			733
184	1921.60	25.1	24.4			23.1	905	834			1008
188	1922.80	21.3	20.4			21.7	5594	4943			3522
192	1924.00	22.3	21.5			21.4	8420	7546			5805
196	1925.20	22.8	22.0			21.9	4388	4034			6354
199	1926.10	23.0	22.0			20.3	15715	13270			625
204	1927.60	16.2	15.3			15.3	0.43	0.22			3.45
209	1929.10	9.2	8.4			11.4	0.48	0.23			0.27
213	1930.30	14.3	13.5			13.4	1.25	0.43			1.96
217	1931.50	19.0	18.1			16.4	383	343			106
219	1932.10	16.9	15.9			15.4	2736	2471			553
224	1933.60	13.0	11.8			14.4	61.0	44.6			356
226	1934.20	19.1	18.0			17.4	3814	3259			1438
231	1935.70	22.5	21.6			20.5	10379	9031			5745
235	1936.90	21.8	20.8			21.6	4754	4099			7887
240	1938.40	24.3	23.3			19.8	28211	25508			698
245	1939.90	12.2	11.8			17.2	0.34	0.09			9.9
248	1940.80	22.8	21.9			17.9	59.1	48.2			29.6
253	1942.30	16.9	15.9			16.4	4559	3720			794
	1943.30	12.5	11.8			14.6	663	597			1603
260	1944.50	20.0	19.0			17.0	5698	4980			1424
263	1945.40	19.0	18.0			18.9	333	278			1272
268	1946.90	21.4	20.5			17.6	7921	6808			375
273	1948.40	12.4	11.3			14.5	1.70	1.53			86.6
277	1949.60	15.7	14.7			15.4	4137	3517			140
278	1949.90	21.7	20.8			18.9	24.5	20.2			187
283	1951.40	20.3	19.4			19.7	958	848			247
286	1952.30	20.1	19.2			18.1	287	258			235
291	1953.80	15.6	14.5			15.1	64.4	53.7			38.4
295	1955.00	13.4	12.3			13.8	5.0	2.92			18.9
298	1955.90	17.1	15.9			13.2	327	276			9.2
304	1957.70	9.3	8.7			13.5	0.14	0.03			3.27
308	1958.90	21.6	20.8			16.8	448	407			55.5
311	1959.80	18.0	17.0			15.7	2035	1787			162
316	1961.30	8.9	7.9			13.4	3.52	0.53			26.6
319	1962.20	21.6	20.7			14.5	1129	1017			32.1
323	1963.40	9.6	8.8			14.0	3.72	1.96			23.0
326	1964.30	18.3	17.7			16.1	80.3	72.3			33.5
332	1966.10	20.9	20.3			19.7	135	123			310
336	1967.30	21.3	20.3			19.0	9411	8418			1894
341	1968.80	16.2	15.2			16.9	1773	1474			2635

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

SPECIFIED AVERAGE REPORT

Company	: BHP PETROLEUM PTY.LTD.	Date	: 04/11/93
Well	: MINERVA-2A	File	: 5-207
Field	: MINERVA	Location	: OTWAY
Core Int.	: CORE NO.1 1728.50-1733.60 M	ACS Lab.	: ADELAIDE
Core Int.	: CORE NO.2&3 1838.80-1882.50 M	Analyst	: CG,WJD,JC
Core Int.	: CORE NO.4&5 1915.00-1969.00 M		

SUMMATION POROSITY Average sample 1 to 17 Sample Type : R
POROSITY Average : 9.9 over 17 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % OIL Average Sample 1 to 17 Sample Type : R
% OIL Average : 0.7 over 17 Samples
0 Samples with a ZERO % Oil Value Ignored
SUMMATION % WATER Average Sample 1 to 17 Sample Type : R
% WATER Average : 87.4 over 17 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 1 to 17 Sample Type : R
POROSITY Average : 9.2 over 17 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 1 to 17 Sample Type : R
PERMEABILITY Average : 0.12 over 17 Samples
0 Samples with a ZERO Permeablity Value Ignored

OVERBURDEN POROSITY Average Sample 1 to 13 Sample Type : R
POROSITY Average : 9.0 over 4 Samples
0 Samples with a ZERO Porosity Value Ignored
OVERBURDEN PERMEABILITY Average Sample 1 to 13 Sample Type : R
PERMEABILITY Average : 0.0 over 4 Samples
0 Samples with a ZERO Permeability Value Ignored

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

SPECIFIED AVERAGE REPORT

Company	: BHP PETROLEUM PTY.LTD.	Date	: 04/11/93
Well	: MINERVA-2A	File	: 5-207
Field	: MINERVA	Location	: OTWAY
Core Int.	: CORE NO.1 1728.50-1733.60 M	ACS Lab.	: ADELAIDE
Core Int.	: CORE NO.2&3 1838.80-1882.50 M	Analyst	: CG,WJD,JC
Core Int.	: CORE NO.4&5 1915.00-1969.00 M		

SUMMATION POROSITY Average sample 18 to 161 Sample Type : R
POROSITY Average : 20.0 over 144 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % OIL Average Sample 18 to 161 Sample Type : R
% OIL Average : 2.1 over 144 Samples
0 Samples with a ZERO % Oil Value Ignored

SUMMATION % WATER Average Sample 18 to 161 Sample Type : R
% WATER Average : 42.4 over 144 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 18 to 161 Sample Type : R
POROSITY Average : 18.6 over 144 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 18 to 161 Sample Type : R
PERMEABILITY Average : 5288 over 144 Samples
0 Samples with a ZERO Permeablity Value Ignored

OVERBURDEN POROSITY Average Sample 18 to 161 Sample Type : R
POROSITY Average : 19.4 over 36 Samples
0 Samples with a ZERO Porosity Value Ignored

OVERBURDEN PERMEABILITY Average Sample 18 to 161 Sample Type : R
PERMEABILITY Average : 5169.7 over 36 Samples
0 Samples with a ZERO Permeability Value Ignored

ACS LABORATORIES PTY. LTD.

ACN: 008 273 005

Petroleum Reservoir Engineering Data

SPECIFIED AVERAGE REPORT

Company	: BHP PETROLEUM PTY.LTD.	Date	: 04/11/93
Well	: MINERVA-2A	File	: 5-207
Field	: MINERVA	Location	: OTWAY
Core Int.	: CORE NO.1 1728.50-1733.60 M	ACS Lab.	: ADELAIDE
Core Int.	: CORE NO.2&3 1838.80-1882.50 M	Analyst	: CG,WJD,JC
Core Int.	: CORE NO.4&5 1915.00-1969.00 M		

SUMMATION POROSITY Average sample 162 to 341 Sample Type : R
POROSITY Average : 17.7 over 180 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % OIL Average Sample 162 to 341 Sample Type : R
% OIL Average : 2.6 over 180 Samples
0 Samples with a ZERO % Oil Value Ignored
SUMMATION % WATER Average Sample 162 to 341 Sample Type : R
% WATER Average : 61.1 over 180 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 162 to 341 Sample Type : R
POROSITY Average : 16.8 over 180 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 162 to 341 Sample Type : R
PERMEABILITY Average : 2326 over 180 Samples
0 Samples with a ZERO Permeablity Value Ignored

OVERBURDEN POROSITY Average Sample 165 to 341 Sample Type : R
POROSITY Average : 17.4 over 45 Samples
0 Samples with a ZERO Porosity Value Ignored
OVERBURDEN PERMEABILITY Average Sample 165 to 341 Sample Type : R
PERMEABILITY Average : 2559.4 over 45 Samples
0 Samples with a ZERO Permeability Value Ignored

BRINELL HARDNESS DATA

Company BHP Petroleum **Report** 005/207

Well Minerva 2A

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
1	1728.60	18
2	1728.90	17
3	1729.20	18
4	1729.50	17
5	1729.80	18
6	1730.10	15
7	1730.40	18
8	1730.70	17
9	1731.00	19
10	1731.30	17
11	1731.60	16
12	1731.90	19
13	1732.20	15
14	1732.50	17
15	1732.80	16
16	1733.10	18
17	1733.37	14
18	1839.00	5
19	1839.30	12
20	1839.55	18
21	1839.90	14
22	1840.20	14
23	1840.50	15
24	1840.80	17
25	1841.10	8
26	1841.40	7
27	1841.70	21
28	1842.00	27
29	1842.30	24
30	1842.60	18
31	1842.90	14
32	1843.20	14
33	1843.50	29
34	1843.80	11
35	1844.10	14
36	1844.40	22
37	1844.70	21

ACS Laboratories Pty Ltd
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Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
38	1845.00	19
39	1845.30	21
40	1845.60	39
41	1845.90	19
42	1846.20	22
43	1846.50	13
44	1846.80	19
45	1847.10	20
46	1847.40	19
47	1847.70	21
48	1848.00	18
49	1848.30	26
50	1848.60	13
51	1848.90	18
52	1849.20	18
53	1849.50	29
54	1849.80	19
55	1850.10	22
56	1850.40	23
57	1850.70	29
58	1851.00	19
59	1851.30	19
60	1851.60	23
61	1851.90	34
62	1852.20	26
63	1852.50	23
64	1852.80	25
65	1853.10	27
66	1853.40	23
67	1853.70	23
68	1854.00	21
69	1854.30	24
70	1854.60	22
71	1854.90	20
72	1855.80	33
73	1856.10	34
74	1856.40	16
75	1856.70	24
76	1857.00	35
77	1857.30	23
78	1857.60	17
79	1857.90	16
80	1858.20	15
81	1858.50	13
82	1858.80	12
83	1859.10	25
84	1859.40	21
85	1859.70	24
86	1860.00	26
87	1860.30	14
88	1860.60	14

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)	
89	1860.90	17	Sample fractured during test
90	1861.20	15	" " " "
91	1861.52	15	" " " "
92	1861.83	17	" " " "
93	1862.10	12	
94	1862.40	13	
95	1862.65	16	
96	1863.00	12	
97	1863.30	10	
98	1863.55	14	
99	1863.90	12	
100	1864.20	12	
101	1864.50	14	
102	1864.80	12	
103	1865.10	15	
104	1865.40	17	
105	1865.70	15	
106	1866.00	22	
107	1866.30	12	
108	1866.60	6	
109	1866.90	4	
110	1867.20	6	
111	1867.53	5	
112	1867.80	14	
113	1868.10	13	
114	1868.40	12	
115	1868.70	12	
116	1869.00	8	
117	1869.30	11	
118	1869.60	11	
119	1869.90	10	
120	1870.20	11	
121	1870.50	11	
122	1870.80	12	
123	1871.10	13	
134	1871.40	16	
125	1871.70	10	
126	1872.00	18	
127	1872.30	17	
128	1872.63	12	
129	1872.90	17	
130	1873.20	5	
131	1873.50	5	
132	1873.80	6	
133	1874.10	19	
134	1874.40	14	
135	1874.70	5	
136	1875.00	7	
137	1875.30	5	
138	1875.60	15	
139	1875.90	8	

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
140	1876.20	13
141	1876.50	14
142	1876.80	12
143	1877.10	13
144	1877.40	6
145	1877.70	8
146	1878.00	11
147	1878.30	8
148	1878.60	6
149	1878.90	15
150	1879.20	7
151	1879.50	5
152	1879.80	14
153	1880.10	7
154	1880.40	8
155	1880.70	14
156	1881.00	14
157	1881.30	5
158	1881.60	7
159	1881.90	9
160	1882.20	13
161	1882.50	7
162	1915.10	13
163	1915.30	15
164	1915.60	25
165	1915.90	18
166	1916.23	19
167	1916.50	10
168	1916.80	22
169	1917.10	11
170	1917.40	15
171	1917.70	14
172	1918.00	7
173	1918.30	10
174	1918.60	11
175	1918.90	11
176	1919.20	9
177	1919.50	13
178	1919.80	11
179	1920.10	17
180	1920.40	15
181	1920.70	14
182	1921.00	11
183	1921.30	13
184	1921.60	13
185	1921.90	5
186	1922.20	9
187	1922.50	11
188	1922.80	14
189	1923.14	13
190	1923.40	18

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
191	1923.70	5
192	1924.00	14
193	1924.30	11
194	1924.63	13
195	1924.90	13
196	1925.20	15
197	1925.50	15
198	1925.80	10
199	1926.10	12
200	1926.40	4
201	1926.70	18
202	1927.00	15
203	1927.30	11
204	1927.60	11
205	1927.90	16
206	1928.20	14
207	1928.50	15
208	1928.80	20
209	1929.10	15
210	1929.40	15
211	1929.70	14
212	1930.00	16
213	1930.30	13
214	1930.60	16
215	1930.90	14
216	1931.20	15
217	1931.50	17
218	1931.80	17
219	1932.10	21
220	1932.40	16
221	1932.70	13
222	1933.00	16
223	1933.30	9
224	1933.60	22
225	1933.90	19
226	1934.20	18
227	1934.50	5
228	1934.80	16
229	1935.10	15
230	1935.40	13
231	1935.70	11
232	1936.00	15
233	1936.30	15
234	1936.60	12
235	1936.90	11
236	1937.20	20
237	1937.50	21
238	1937.80	13
239	1938.10	18
240	1938.40	12
241	1938.70	14

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
242	1939.00	12
243	1939.30	27
244	1939.60	21
245	1939.90	23
246	1940.20	18
247	1940.50	13
248	1940.80	16
249	1941.10	22
250	1941.40	17
251	1941.70	13
252	1942.00	24
253	1942.30	17
254	1942.60	19
255	1943.10	21
256	1943.30	20
257	1943.60	15
258	1943.90	16
259	1944.20	17
260	1944.50	15
261	1944.80	15
262	1945.10	6
263	1945.40	14
264	1945.70	12
265	1946.00	8
266	1946.30	12
267	1946.60	15
268	1946.90	11
269	1947.20	12
270	1947.50	12
271	1947.80	12
272	1948.10	23
273	1948.40	5
274	1948.70	16
275	1949.00	13
276	1949.30	17
277	1949.60	26
278	1949.90	11
279	1950.20	16
280	1950.50	17
281	1950.80	9
282	1951.10	12
283	1951.40	17
284	1951.70	19
285	1952.00	20
286	1952.30	19
287	1952.60	16
288	1952.90	19
289	1953.20	19
290	1953.50	21
291	1953.80	15
292	1954.10	14

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
293	1954.40	14
294	1954.70	17
295	1955.00	18
296	1955.30	12
297	1955.60	19
298	1955.90	17
299	1956.20	22
300	1956.50	19
301	1956.80	27
302	1957.10	17
303	1957.40	25
304	1957.70	18
305	1958.00	18
306	1958.30	18
307	1958.60	15
308	1958.90	15
309	1959.20	14
310	1959.50	14
311	1959.80	12
312	1960.10	20
313	1960.40	16
314	1960.70	12
315	1961.00	17
316	1961.30	19
317	1961.60	12
318	1961.90	22
319	1962.20	19
320	1962.50	16
321	1962.80	25
322	1963.10	18
323	1963.40	26
324	1963.70	19
325	1964.00	24
326	1964.30	16
327	1964.60	16
328	1964.90	15
329	1965.20	16
330	1965.50	15
331	1965.80	14
332	1966.10	19
333	1966.40	13
334	1966.70	19
335	1967.00	13
336	1967.30	13
337	1967.60	18
338	1967.90	26
339	1968.20	20
340	1968.50	18
341	1968.80	13

CORE PLUG DESCRIPTION

Company: BHP PETROLEUM Ltd

Well: MINERVA #2a

Field: OTWAY BASIN

Location:

Country: AUSTRALIA

Report: 5-207

Date: 11/11/93

Core Interval: C#1 1728.50 - 1733.60m
C#2 1838.80 - 1854.88m
C#3 1855.50 - 1882.50m
C#4 1915.00 - 1942.73m
C#5 1943.00 - 1969.00m

Sample Number		Description
1-17	Sst	med gry, v.f-f gr, sbang-sbrndd, wl srt, hd, arg-slty, Tr calc cmt, Qtz/Tr C frag/Tr Musc & Pyr, abd bioturb and Bur, prly lam.
18-19	Sst	v.lt gry, v.f-v.crs gr, sbang-sbrndd, pr srt, mod hd, wh cl Mtrx, Qtz/Tr Musc & C frag/Tr Pyr, Bd.
20	Sst	med lt gry, f-v.crs gr, pred med-crs gr, sbang-sbrndd, pr srt, md hd, wh cl Mtrx,abd pyr cmt IP, Qtz ovgth com, Qtz/Tr C, open framework IP
21-25	Sltst	dk-med gry, Cl rich, sft, occ Strks or carb Mat, Sd, Cl, Tr amber, pr lam, tending to split along lam.
26	Sst	lt gry, bd w/med crs gr wl srt lyr & f-v.crs/pbl pr srt lyr, sbang-rndd, mod hd, Cl Mtrx, med open framework IP, Qtz & Qtz ovgths.
27-28	Sst	lt gry, f-v.crs gr-pbl, sbrndd-rndd, pr srt, mod hd, cl Mtrx, sml open framework IP w/occ lrg pores, Qtz/Tr Pyr, bd.
29	Sst	As in 26.
30-31	Sst	lt gry, pred med gr, sbrndd-rndd,wl srt, slty fri-mod hd, low Mtrx content, Qtz ovgths & sil cmt cmn, Qtz/Tr C/Tr Pbl, mass.
32	Sst	lt-med gry, interlam v.f-f gr Sd & carb Sltst.
33-35	Sst	As in 27-28, incr in open Framework IP.
36-39	Sst	As in 30-31, Tr thn irr bdg.

Sample Number		Description
40	Cgl	lt blsh-gry, Mtrx: med-crs, Pbl sze Qtz gr, sbrndd-ang,pr srt, hd w cl & sil Mtrx, Qtz/Cl/Tr C frag, gd vis Por.
41	Sst	lt gry, f-med gr, sbrndd, wl-mod srt, mod hd, arg-slty, cl Mtrx, Qtz ovgths,Qtz/Cl/C frag & thn lam, Tr bdg, occ pbl sze Qtz gr, mod-gd vis Por.
42	Sst	As in 41, vis Por incr, Tr x-bd.
43	Sst	As in 41, abd gry arg lam,Bd, gd vis Por in v.crs Lyr, occ Pbl sze Qtz gr.
44	Sst	As in 43, C frag incr, grad bdg.
45-47	Sst	As in 41, abd vis Por.
48-56	Sst	lt gry, dom med gr w Pblsze Qtz gr, sbrndd-sbang, mod-pr srt, sil, mod ind w sil & cl Mtrx, Qtz ovgths, Tr c frag & Pyr, mod-gd vis Por, Tr thn irr bdg IP.
57-63	Sst	lt gry, med-Pbl sze Qtz gr dom v.crs gr, sbrndd, mod-pr srt, mod ind w Qtz ovgths sil & cl Mtrx, Qtz/Cl/Tr C frag & fPyr, crs-Pbl sze Qtz Bd, open framework IP.
64-69	Sst	lt gry, f-med gr, sbrndd, mod-wl srt, mod-wl ind w Qtzovgths, sil 7 cl Mtrx Tr calc cmt, Qtz/Cl/Tr C & Pyr frag, thn irr bdg def by crs Qtz Lyr, open framework IP.
70	Sst	a.a, pyr repl of wdy Mat
71-86	Sst	lt-med gry, f - pred med gr, occ crs gr, mod-wl srt, ang - sbang, mod-wl ind, non calc, sil & cl Mtrx, Tr Pyr, Qtz/Cl, occ mic, mass Tr thn bdg.
87-91	Sltst	Mounted Plugs
92	Sltst	drk blsh gry, arg-sil IP, fn Qtz strngrs, pyr IP, arg mic samp, frac Plug.
93-95	Sst	lt-med gry, f-pred med gr, occ crs gr, mod-wlsrt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil& cl Mtrx, Qtz/Cl/drk arg Mat/C frag, occ mic, Tr thn bdg.3
96	Sst	a.a, incr in gr sze dom med-crs gr.
97-100	Sst	a.a, occ v.crs sze Qtz gr.
101	Sst	a.a, pyr repl of wdy Mat abd, thn bdg def by drk arg Mat & v.crs Lyr.
102-105	Sst	As in 93-95, sm irr thn lam.
106	Sltst	med drk gry, arg-sil IP, mic/arg, C frag & Pyr abd, irr bdg, Bur IP.
107-110	Sst	lt-med gry, dom f-med gr, mod-wl srt, sbrndd, wl ind w arg & sil Mtrx, calc cmt IP, Qtz/Cl/C frag, occ Musc/Pyr & drk arg Mat, thn irr bdg.

Sample Number		Description
111	Sst	a.a, dom f gr, carb lyr w pyr repl of wdy Mat, frac IP.
112-126	Sst	lt-med gry, f-v.crs gr, pred med gr,occ Pbl Qtz Gr, mod wl srt, sbang-sbrndd, wl indw wh Cl Mtrx & sil, Tr calc cmt, Qtz/Cl/Tr C frag & Pyr, mass IP, Tr thn irr lam.
127-135	Sst	lt gry, med-Pbl sze Qtz gr dom v.crs gr, rndd-sbang, mod-pr srt, mod ind w sil & cl Mtrx, Qtz/Cl/Tr C frag & f Pyr, crs-Pbl sze Qtz, open framework IP, occ pyr repl of wdy Mat.
136-140	Sst	lt gry, f-med gr occ crs Qtz gr, mod-wl srt, sbrndd-sbang,mod ind w Cl & sil Mtrx, Qtz/Cl/Tr C frag & f Pyr, mic IP, occ Bdg
141	Sltst	drk blsh gry, arg & sil IP w f. Qtz strngr, carb/mic samp, pyr repl of carb Mat, Bd, mnr Bur.
142-149	Sst	lt gry, f-med gr occ crs Qtz gr, sbrndd-sbang, mod srt, mod-wl ind w arg & sil Mtrx, Tr calccmt, Qtz/Cl/Tr Pyr repl of carb Mat, Tr lam def bdg, mass IP.
150-154	Sst	med gry, f-pred med gr, occ v.crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/drk arg Mat/C frag, occmic, Tr thn bdg.
155-156	Sltst	As in 141, pyr clusters.
157-158	Sst	As in 150-154
159	Sst	a.a, mic arg Lyr def bdg, Pbl sze Qtz gr wthn Bd.
160	Sltst/Sst	As in 141 & 150-154, intrbd.
161-167	Sst	med gry, med-Pbl gr dom v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por in v.crs lyr Bd.
168	Sst	a.a, incr in arg lyr and pbl sze Qtz gr, pyr repl of wdy Mat.
169-172	Sst	med gry, f-pred med gr, occ v.crs gr, mod-wl srt, sbrndd-sbang, mod-wlind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/drk arg Mat/C frag, occ mic, Tr thn bdg, bioturb IP, occ Bur.
173-185	Sst	lt-med gry, f-pred medgr, occ crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp 181 & 182 have arg lam def thn irr bdg/Bur IP.
186-188	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por, mass.
189	Sst	As in 173, carb Mat & resin abd, occ pyr repl of wdy Mat.
190-199	Sst	As in 186-188, mass, C frag IP.
200	Coal	Mass carb Mat, pyr repl of wdy Mat abd, conc frac.

Sample Number		Description
201-216	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wl ind wCl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr & C frag, bioturb& occ Bur, thn irr bdg, mic & arg samp.
217-219	Sst	lt-med gry, f-pred med gr,occ crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass.
220-221	Sst	As in 201-216.
222	Sltst	drk blsh gry, arg & sil IP w f.Qtz strngr, carb/mic samp, pyr repl of carb Mat, Bd, mnr Bur.
223-227	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por, carb lyr def bdg, occ pbl sze Qtz gr, #227 pyr repl of wdy lyr.
228-230	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wlind w Cl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic,occ pyr & C frag, bioturb & occ Bur, thn irr bdg, mic & arg samp
231-243	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & si Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Frameworkmass, incr in Pbl
244-252	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wlind w Cl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr & C frag,bioturb & occ Bur, thn irr bdg, mic & arg samp.
253-254	Sst	lt-med gry, f-pred med gr,occ crs gr, mod-wl srt, sbrndd-sbang mod - w ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass.
255	Sst	As in 201-216.
256	Sst	As in 217-219, mass pyr cmt.
257	Sst	lt-med gry, f-predmed gr, occ crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag,dom mass.
258-259	Sst	As in 201-216, #259 abd carb Mat w resin & frac.
260-271	Sst	As in 173-185.
272	Sst	As in 201-216, abd carb Mat w resin & frac.
273-276	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wlind w Cl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr& C frag, bioturb & occ Bur, thn irr bdg, mic & arg samp.
277	Sst	lt-med gry, f-pred med gr, occ crs gr, mod-wlsrt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp 181 & 182 have arg lam def thn irr bdg/Bur IP

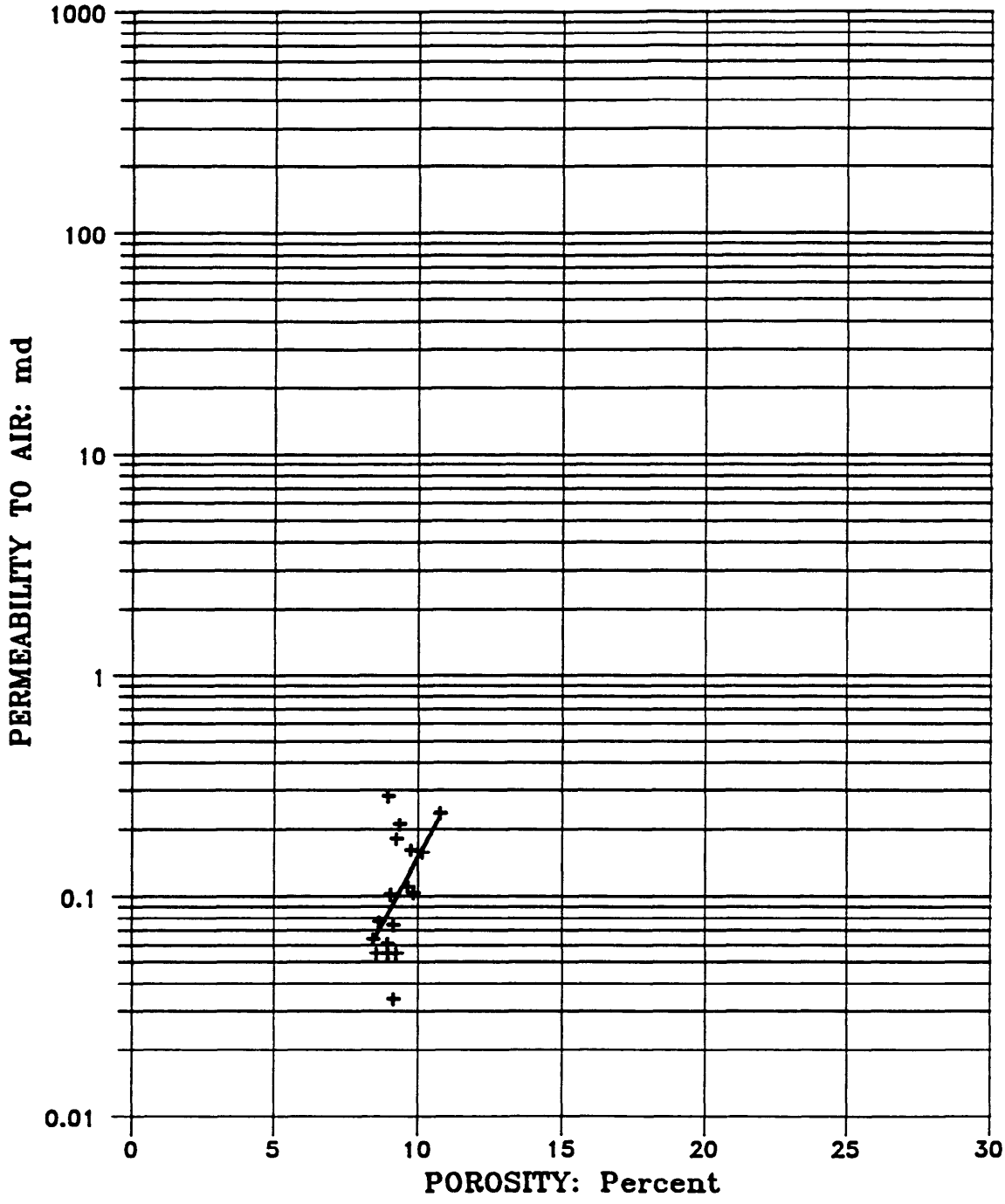
Sample Number		Description
278	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wl ind wCl * sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr & C frag,bioturb occ Bur, thn irr bdg, mic & arg samp.
279-282	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por, carb lyr def bdg, occ pbl sze Qtz gr, pyr repl of wdy lyr.
283-286	Sst	med gry, f-pred med gr, occ v.crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & clMtrx, Qtz/Cl/drk arg Mat/C frag, occ mic, Tr thn bdg.
287-288	Sst	lt-med gry, f-pred med gr, occ crs gr, mod-wl srt,sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp, arg lam def thn irr bdg/Bur IP.
289-297	Sst	med gry, med-Pbl gr dom v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por in v.crs lyr Bd.
298	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil mtrx, Tr calc cmt, Q
299-301	Sst	med-drk gry, med-v.crs gr,mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por, carb lyr def bdg, occ pbl sze Qtz gr, pyr repl of wdy lyr.
302-306	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt,sbrndd, mod-wl ind w Cl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr & C frag,bioturb & occ Bur, thn irr bdg, mic & arg samp.
307-311	Sst	lt-med gry, f-pred medgr, occ crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp , arg lam def thn irr bdg/Bur IP.
312	Sst	as above with abd crs qtz grns, drk brn arg la
313-314	Sst	lt-med gry, f-pred med gr,occ crs gr, mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp , arg lam def thn irr bdg/Bur IP.
315-316	Sst	med-drk gry, med-v.crs gr,mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cmt, Qtz/Cl/Pyr/C frag, open Framework IP w gd vis Por, carb lyr def bdg, occ pbl sze Qtz gr, pyr repl wdy lyr.
317-320	Sst	lt-med gry, f-pred med gr, occ crs gr, mod-wl srt,sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp 317 & 320 have arg lam def thn irr bdg/Bur IP.
321-325	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wlind wCl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr & Cfrag, bioturb & occ Bur, thn irr bdg, mic & arg samp.
326	Sst	as above with abd pyr.

Sample Number	Description

327-333	Sst	lt-med gry, f-pred med gr, occ crs gr,mod-wl srt, sbrndd-sbang, mod-wl ind, calc cmt IP, sil & cl Mtrx, Qtz/Cl/Mic/Tr drk arg Mat/C frag, dom mass-samp 327 & 331 have arg lam def thn irr bdg/Bur IP.
334-338	Sst	lt-med gry, med-v.crs gr, mod-pr srt, sbrndd-sbang, mod ind w Cl & sil Mtrx, Tr calc cm
339-340	Sst	lt-med drk gry, v.f-med dom f gr, mod-wl srt, sbrndd, mod-wlind wCl & sil mtrx, Tr calc cmt, Qtz/Cl/Carb Mat/Mic, occ pyr& C frag, bioturb & occ Bur, thn irr bdg, mic & arg samp.
341	Sst	lt gry, med-Pbl sze Qtz gr dom v.crs gr, rndd-sbang, mod-pr srt, mod ind w sil & cl Mtrx, Qtz/Cl/Tr C frag & f Pyr, crs-Pbl sze Qtz, open framework IP, occ pyr repl of wdy Mat.

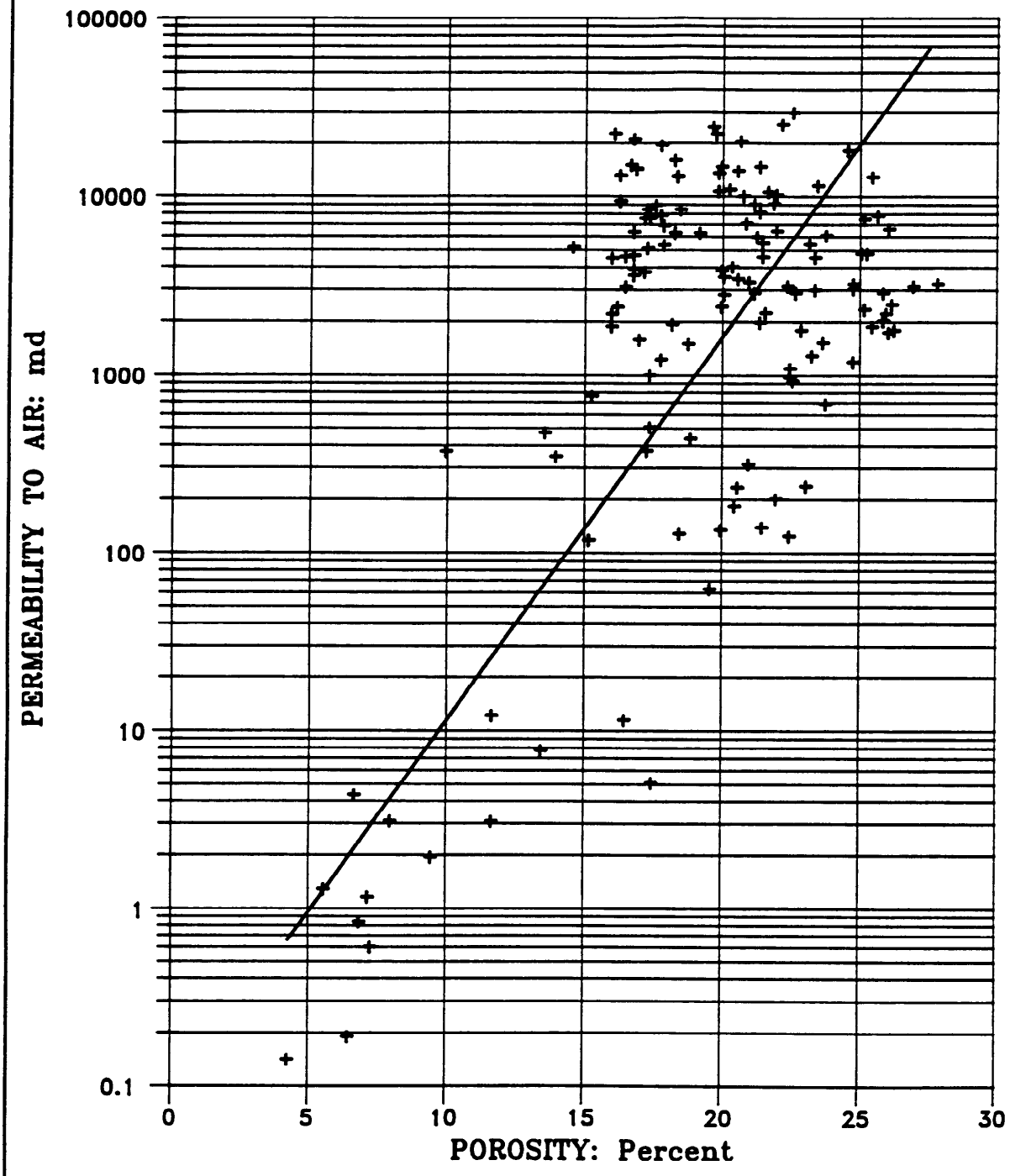
POROSITY vs PERMEABILITY

Company: BHP PETROLEUM PTY.LTD.
Well: MINERVA—2A
Depth: 1728.60 – 1733.37 Metres



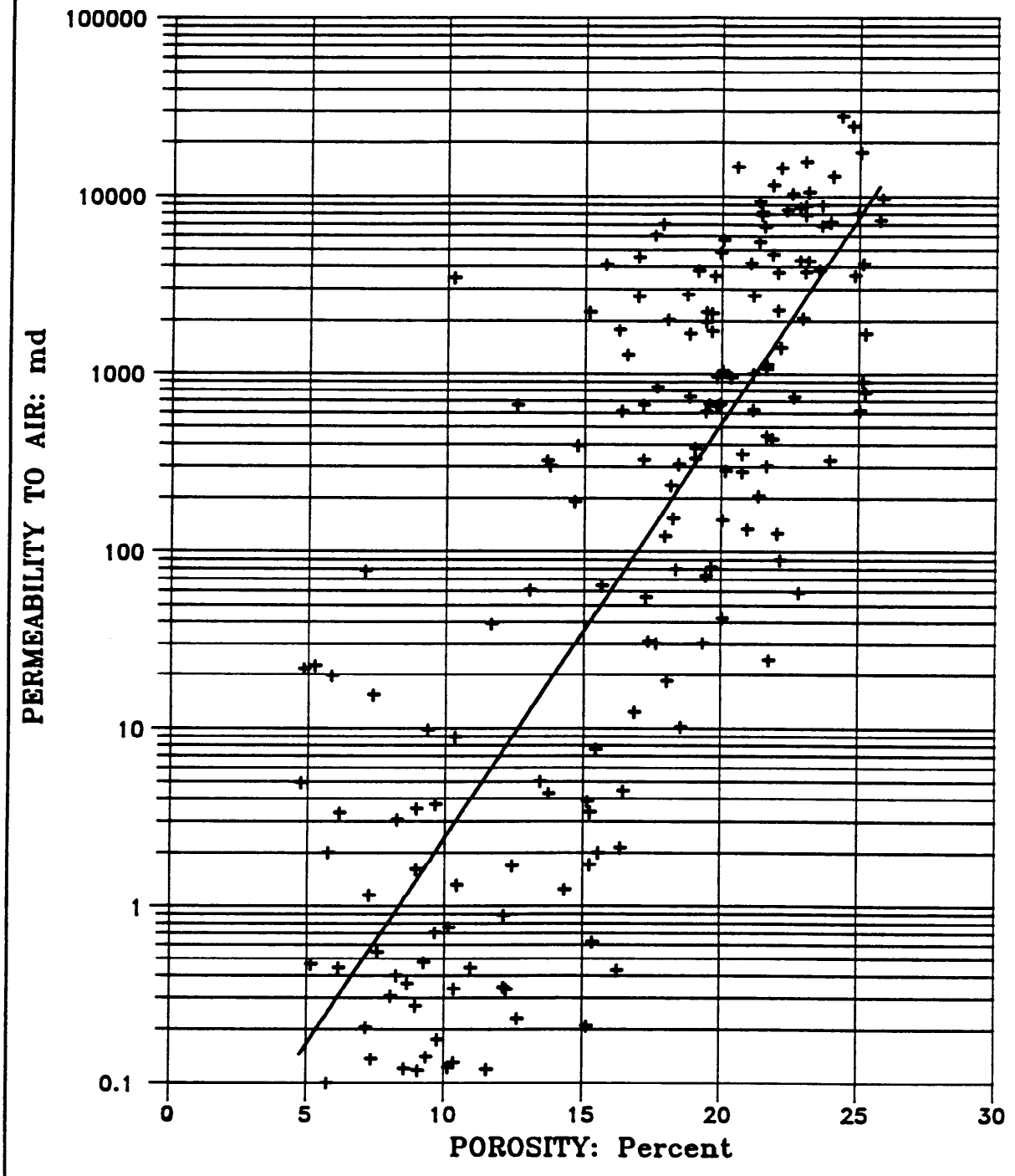
POROSITY vs PERMEABILITY

Company: BHP PETROLEUM PTY.LTD.
Well: MINERVA-2A
Depth: 1839.00 - 1882.50 Metres



POROSITY vs PERMEABILITY

Company: BHP PETROLEUM PTY.LTD.
Well: MINERVA-2A
Depth: 1915.10 - 1968.80 Metres



PE902252

This is an enclosure indicator page.
The enclosure PE902252 is enclosure within the
container PE900117 at this location in this document.

The enclosure PE902252 has the following characteristics:

ITEM_BARCODE	=	PE902252
CONT AINER_BARCODE	=	PE900117
NAME	=	Minerva-2_2A, Core Plot
BASIN	=	OTWAY
PERMIT	=	
TYPE	=	WELL
SUBTYPE	=	Diagram
DESCRIPTION	=	Minerva-2_2A, Core Plot
DATE_CREATED	=	
DATE_RECEIVED	=	
W_NO	=	
WELL_NAME	=	Minerva-2_2A
CONTRATOR	=	ACS Laboratories Australia
CLIENT_OP_CO	=	BHP

PE902253

This is an enclosure indicator page.
The enclosure PE902253 is enclosure within the
container PE900117 at this location in this document.

The enclosure PE902253 has the following characteristics:

ITEM_BARCODE	=	PE902253
CONT AINER_BARCODE	=	PE900117
NAME	=	Minerva-2_2A, Core Plot
BASIN	=	OTWAY
PERMIT	=	
TYPE	=	WELL
SUBTYPE	=	Diagram
DESCRIPTION	=	Minerva-2_2A, Core Plot
DATE_CREATED	=	
DATE_RECEIVED	=	
W_NO	=	
WELL_NAME	=	Minerva-2_2A
CONTRATOR	=	ACS Laboratories Australia
CLIENT_OP_CO	=	BHP

PE902254

This is an enclosure indicator page.
The enclosure PE902254 is enclosure within the
container PE900117 at this location in this document.

The enclosure PE902254 has the following characteristics:

ITEM_BARCODE	=	PE902254
CONT AINER_BARCODE	=	PE900117
NAME	=	Minerva-2_2A, Core Plot
BASIN	=	OTWAY
PERMIT	=	
TYPE	=	WELL
SUBTYPE	=	Diagram
DESCRIPTION	=	Minerva-2_2A, Core Plot
DATE_CREATED	=	
DATE_RECEIVED	=	
W_NO	=	
WELL_NAME	=	Minerva-2_2A
CONTRATOR	=	ACS Laboratories Australia
CLIENT_OP_CO	=	BHP

5

6.5 APPENDIX 5 Palynology Range Charts

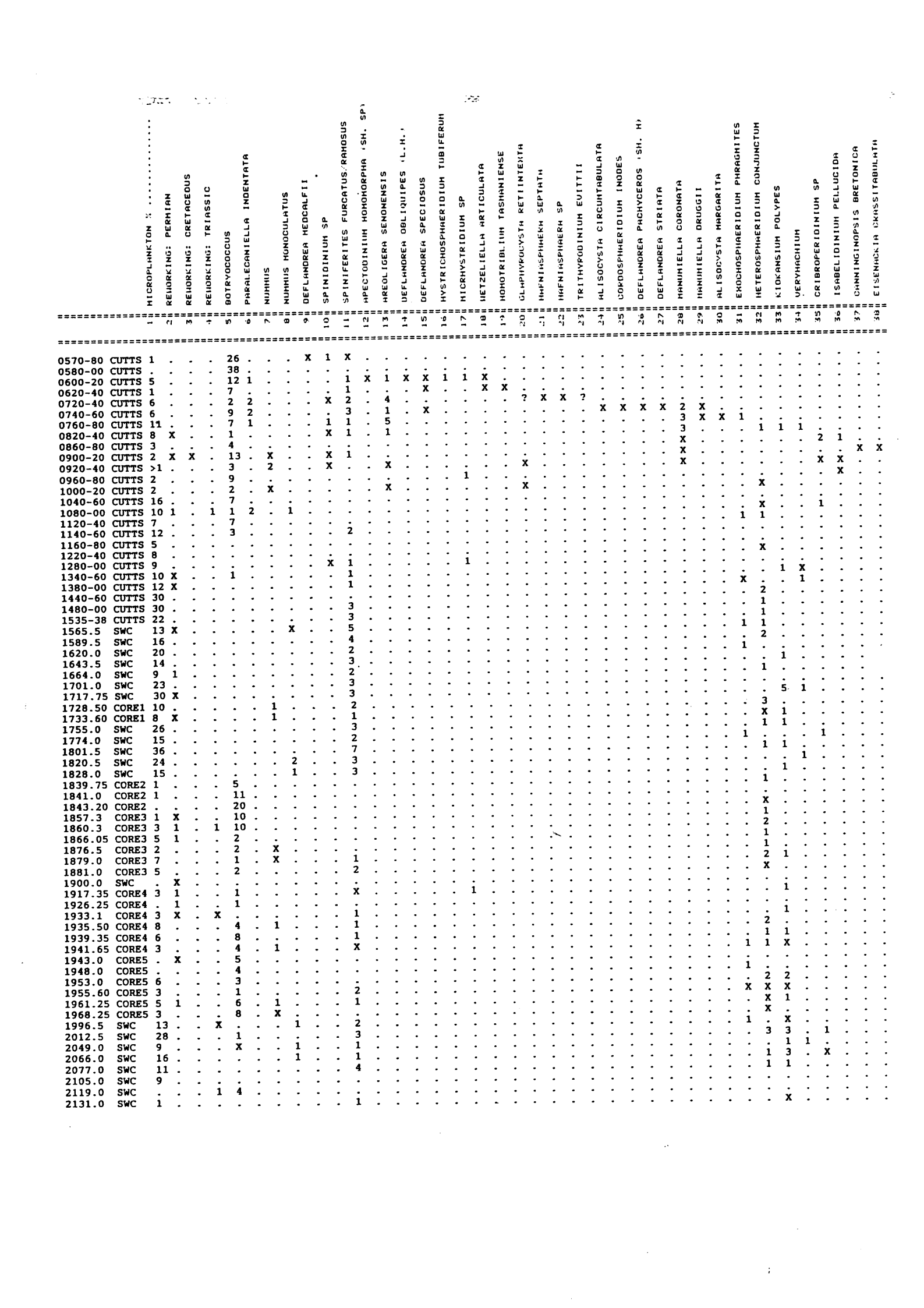
MINERVA #2A

MORGAN PALAEO ASSOCIATES ... Palynological Consultants
Box 161, Maitland, South Australia, 5573.
phone (088) 32 2795 ... fax (088) 32 2798

C L I E N T: BHPP
W E L L: MINERVA #2A
F I E L D / A R E A: OFFSHORE OTWAY BASIN, VICTORIA
A N A L Y S T S: Roger Morgan / Nigel Hooker D A T E: Feb. '94
N O T E S: all depths are in metres
all figures are percentages based on 100 specimen count
"X" represents RARE presence outside the count
in uncounted samples: "A" = abundant "C" = common
"F" = few "R" = rare

RANGE CHART OF OCCURRENCES BY % & HIGHEST APPEARANCE:grouped

		ODONTOCHITINA NO HORNS	OLIGOSPHAERIDIUM COMPLEX	CASSICULOSPHAERIDIA RETICHAGNA	DINOGYMNIUM ACUMINATUM	ODONTOCHITINA COSTATA	SUBTILISPHAERA ROTUNDATA	CIRCULODINIUM DEFLANDREI	ISABELIDINIUM CF BELFASTENSE	ISABELIDINIUM COOKSONIAE	AMPHIDIADEMA DENTICULATA	ISABELIDINIUM RECTANGULARE CONTRACTUM	TRITHYRODINIUM SUSPECTUM	ISABELIDINIUM RECTANGULARE DIVERSUM	ISABELIDINIUM RECTANGULARIS	ISABELIDINIUM BALMEI	TANYOSPHAERIDIUM SALPINX	CONOSPHAERIDIUM STRIATOCONUS	XENASCUS CERATOIDES	CIRCULODINIUM SOLIDA	APTEODINIUM GRANULATUM	CYMOSOSPHAERIDIUM MAGNIFICA	DAPSILIDINIUM SP	FLORENTINIA DEANEI	HETERBIA ACUMINATUM	CHLAMYDOPHORELLA NYEI/AMBIGUA	CRIBROPERIDINIUM EDWARDSII	PALAEOPERIDINIUM CRETACEUM	CONOSPHAERIDIUM TUBULOSUM	ISABELIDINIUM GLABRUM	CYCLONEPHELIUM COMPACTUM	CHATANGIELLA MICROCANTHA	ISABELIDINIUM SP	CANNINGIA SPINY	CLEISTOSPHAERIDIUM	ARMOCARINOCITES AUSTRALIS	CLAVIFERA TRIPLEX	CYATHIDITES GIGANTIS	CYATHIDITES SPP
		77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114
0570-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	X	7
0580-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	X	.	4
0600-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	6
0620-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	1	.
0720-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	7
0740-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	9
0760-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.
0820-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
0860-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
0900-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.
0920-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
0960-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.
1000-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1040-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1080-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.
1120-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1140-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1160-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1220-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	.
1280-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	X	.	.
1340-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.
1380-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	
1440-60	CUTTS	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	
1480-00	CUTTS	X	X	X	1	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	
1535-38	CUTTS	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	2	.	.
1565.5	SWC	.	.	.	.	.	.	1	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.
1589.5	SWC	.	.	.	.	X	.	1	.	4	?	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.
1620.0	SWC	.	X	.	.	.	.	1	.	3	.	X	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1643.5	SWC	.	1	.	.	.	.	1	.	.	.	X	.	2	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.
1664.0	SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	2	.	.
1701.0	SWC	.	.	.	.	.	.	1	.	.	.	.	X	.	.	2	.	X	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.
1717.75	SWC	.	4	.	.	.	.	3	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1728.50	CORE1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.
1733.60	CORE1	.	1	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	X	.	.
1755.0	SWC	.	.	.	.	.	1	3	.	.	.	.	.	.	.	2	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	.	.
1774.0	SWC	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	2	.	.
1801.5	SWC	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1	X	1	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1820.5	SWC	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	X	2	X	1	.	.	.	.	.	.	.	.	5	.	.	.
1828.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	X	.	X	.	.	.	.	.	.	.	3	.	.	.
1839.75	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.
1841.0	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
1843.20	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1857.3	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.
1860.3	CORE3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	X	.	.
1866.05	CORE3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	1	.	.	.	.	.	.	.	5	.	.	.
1876.5	CORE3	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	4	1	.	.
1879.0	CORE3	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	X	.	.	.	.	2	X	.	.
1881.0	CORE3	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	4	.	.	.
1900.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.
1917.35	CORE4	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.
1926.25	CORE4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1933.1	CORE4	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	.	.	.
1935.50	CORE4	.	X	.	.	.	.	2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	.	.	.
1939.35	CORE4	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	.	.
1941.65	CORE4	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	2	X	.	.
1943.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.
1948.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1953.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	1	.	.
1955.60	CORE5	.	X	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	4	1	.	.
1961.25	CORE5	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	1	1	.	.
1968.25	CORE5	.	1	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
1996.5	SWC	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.	2	.	.	.	X	.	.	.	3	.	.	.	.
2012.5	SWC	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	3	.	.	.
2049.0	SWC	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.	.	.	1	.	.	.	2	1	.	.
2066.0	SWC	.	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	2	1	.	.	X	.	.	.	4	X	.	.
2077.0	SWC	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	3	.	.	.
2105.0	SWC	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
2119.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2131.0	SWC	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	?	.	.	.	.	.	.	.	.	3	.	.	.



		39 ISABELIDINIUM KOROJONENSE	40 APTEA SP	41 CHATANGIELLA TRIPARTITA	42 HETEROSPHAERIDIUM HETEROCANTHUM	43 OLIGOSPHAERIDIUM PULCHERRIMUM	44 TRICHODINIUM INTERMEDIUM	45 XENASCUS AUSTRALIENSE	46 XENICODON AUSTRALIS	47 NELSONIELLA ACERAS	48 NELSONIELLA SEMIRECTICULATA	49 NELSONIELLA SP	50 ODONTOCHITINA PORIFERA	51 ODONTOCHITINA STUBBY	52 TRICHODINIUM	53 NELSONIELLA TUBERCULATA	54 PALAEOHYSTRICHOSPHORA INFUSORIOIDES	55 EUCLADINIUM MADUENSE	56 MADURADINIUM PENTAGONUM	57 ODONTOCHITINA OPERCULATA	58 HETEROSPHAERIDIUM CF LATEROBRACHIUS	59 GILLINIA HYMENOPHORA	60 ISABELIDINIUM CRETACEUM	61 PTEROSPERMELLA AUREOLATA	62 TRITHYRODINIUM MARSHALLII	63 AREOSPHAERIDIUM SUGGESTUM	64 NELSONIELLA CF ACERAS (PSILATE)	65 ODONTOCHITINA CRIBROPODA	66 ODONTOCHITINA OBESA	67 PTEROSPERMELLA AUSTRALIENSIS	68 KIPHOPHORIDIUM ALATUM	69 CHLADOSPHAERIDIUM ASYMMETRICUM	70 CHATANGIELLA VICTORIENSIS	71 ISABELIDINIUM BELFASTENSE ROTUNDATA	72 TRITHYRODINIUM (THICK RETIC)	73 TRITHYRODINIUM GLABRA (THICK SMOOTH)	74 BOURKIDINIUM GRANULATUM	75 HYSTRICHODINIUM PULCHRUM	76 ISABELIDINIUM BELFASTENSE
0570-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0580-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0600-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0620-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0720-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0740-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0760-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0820-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0860-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0900-20	CUTTS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0920-40	CUTTS	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0960-80	CUTTS	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1000-20	CUTTS	.	X	.	X	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1040-60	CUTTS	.	.	.	.	.	.	.	.	17	X	X	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1080-00	CUTTS	.	.	.	.	.	.	.	.	7	1	X	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1120-40	CUTTS	.	.	.	1	.	.	.	.	3	X	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1140-60	CUTTS	.	.	.	1	.	.	.	.	5	1	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1160-80	CUTTS	.	.	.	2	.	.	.	.	1	.	.	.	1	.	.	X	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220-40	CUTTS	.	.	.	2	.	.	.	.	3	.	.	.	.	.	.	.	2	.	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1280-00	CUTTS	.	.	.	1	1	.	.	.	2	X	.	.	.	.	.	.	.	.	.	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1340-60	CUTTS	.	.	.	4	.	.	.	.	.	2	.	.	X	.	X	.	1	.	.	X	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.
1380-00	CUTTS	.	.	.	6	.	.	.	.	.	1	.	.	X	.	.	.	1	.	X	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.
1440-60	CUTTS	.	.	X	7	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	X	.	.	12	.	.	.	.	.	.	.	.	.	.	.	.	.
1480-00	CUTTS	.	.	.	12	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.
1535-38	CUTTS	.	.	.	5	.	.	.	.	.	.	.	.	2	X	.	.	.	.	X	.	.	.	1	.	1	4	.	.	.	.	.	.	.	.	.	.
1565.5	SWC	.	.	.	4	.	.	.	.	.	.	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
1589.5	SWC	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.	.	.
1620.0	SWC	.	.	.	11	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	1	.	.	.
1643.5	SWC	.	X	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
1664.0	SWC	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
1701.0	SWC	.	.	.	7	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.
1717.75	SWC	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1728.50	CORE1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
1733.60	CORE1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1755.0	SWC	.	.	.	11	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
1774.0	SWC	.	.	.	3	.	.	.	.	.	.	.	.	.	.	X	.	7	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1801.5	SWC	.	1	.	12	.	.	X	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	X	.	.	.	.
1820.5	SWC	.	2	.	5	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
1828.0	SWC	.	1	.	4	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.75	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1841.0	CORE2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1843.20	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1857.3	CORE3	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1860.3	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1866.05	CORE3	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1876.5	CORE3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1879.0	CORE3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1881.0	CORE3	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1900.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1917.35	CORE4	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1926.25	CORE4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1933.1	CORE4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1935.50	CORE4	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1939.35	CORE4	.	.	.	1	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1941.65	CORE4	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1948.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1953.0	CORE5	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1955.60	CORE5	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1961.25	CORE5	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1968.25	CORE5	.	.	.	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1996.5	SWC	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2012.5	SWC	.	.	.	10	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2049.0	SWC	.	.	.	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2066.0	SWC	.	.	.	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2077.0	SWC	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2119.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2131.0	SWC	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

		TRICOLPITES VARIVERRUCATUS	LAEVIGATOSPORITES SPP	FORAMINISPORIS WONTHAGGIENSIS	SESTROSPORITES PSEUDOALVEOLATUS	APPENDICISPORITES TRICORNITATUS	CAMEROZONOSPORITES SOLIDA	RETITRILETES FACETUS	PHYLLOCLADIDITES EUNUCHUS	COPTOSPORA PARADOXA	KUYLISPORITES ZIPPERI	SENECTOTETRADITES FISTULOSUS	DICTYOPHYLLIDITES	HOEGISPORIS	TRIPOROLETES RADIATUS	PHYLLOCLADIDITES CF MAWSONII	DICTYOTOSPORITES SPECIOSUS	FORAMINISPORIS ASYMMETRICUS	STERIESPORITES REGIUM	
		229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	
0570-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0570-80 CUTTS
0580-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0580-00 CUTTS
0600-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0600-20 CUTTS
0620-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0620-40 CUTTS
0720-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0720-40 CUTTS
0740-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0740-60 CUTTS
0760-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0760-80 CUTTS
0820-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0820-40 CUTTS
0860-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0860-80 CUTTS
0900-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0900-20 CUTTS
0920-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0920-40 CUTTS
0960-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0960-80 CUTTS
1000-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1000-20 CUTTS
1040-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1040-60 CUTTS
1080-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1080-00 CUTTS
1120-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1120-40 CUTTS
1140-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1140-60 CUTTS
1160-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1160-80 CUTTS
1220-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1220-40 CUTTS
1280-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1280-00 CUTTS
1340-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1340-60 CUTTS
1380-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1380-00 CUTTS
1440-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1440-60 CUTTS
1480-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1480-00 CUTTS
1535-38	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1535-38 CUTTS
1565.5	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1565.5 SWC
1589.5	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1589.5 SWC
1620.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1620.0 SWC
1643.5	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1643.5 SWC
1664.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1664.0 SWC
1701.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1701.0 SWC
1717.75	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1717.75 SWC
1728.50	CORE1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1728.50 CORE1
1733.60	CORE1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1733.60 CORE1
1755.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1755.0 SWC
1774.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1774.0 SWC
1801.5	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1801.5 SWC
1820.5	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1820.5 SWC
1828.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1828.0 SWC
1839.75	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1839.75 CORE2
1841.0	CORE2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1841.0 CORE2
1843.20	CORE2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1843.20 CORE2
1857.3	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1857.3 CORE3
1860.3	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1860.3 CORE3
1866.05	CORE3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1866.05 CORE3
1876.5	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1876.5 CORE3
1879.0	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1879.0 CORE3
1881.0	CORE3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1881.0 CORE3
1900.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1900.0 SWC
1917.35	CORE4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1917.35 CORE4
1926.25	CORE4	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1926.25 CORE4
1933.1	CORE4	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	1933.1 CORE4
1935.50	CORE4	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1935.50 CORE4
1939.35	CORE4	.	.	1	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	1939.35 CORE4
1941.65	CORE4	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1941.65 CORE4
1943.0	CORE5	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	1943.0 CORE5
1948.0	CORE5	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	1948.0 CORE5
1953.0	CORE5	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1953.0 CORE5
1955.60	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1955.60 CORE5
1961.25	CORE5	.	.	.	.	.	X	.	.	.	.	1	.	.	.	.	.	.	.	1961.25 CORE5
1968.25	CORE5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1968.25 CORE5
1996.5	SWC	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1996.5 SWC
2012.5	SWC	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	2012.5 SWC
2049.0	SWC	.	.	.	.	1	.	.	X	.	.	.	2	1	1	.	.	.	.	2049.0 SWC
2066.0	SWC	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	2066.0 SWC
2077.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2077.0 SWC
2105.0	SWC	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.	2105.0 SWC
2119.0	SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2119.0 SWC
2131.0	SWC	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	X	1	X	2131.0 SWC

		115 DILWYNITES GRANULATUS	116 ERICIPITES SCABRATUS	117 FALCISPORITES SIMILIS	118 FOVEOTRILETES CRATER	119 GEPHRAPOLLENITES WAHOOENSIS	120 HALORAGACIDITES HARRISII	121 LAEVIGATOSPORITES OVATUS	122 LAEVIGATOSPORITES USHENSIS	123 LYGISTIPOLLENITES FLORINII	124 MALVACIPOLLIS DIVERSUS	125 MALVACIPOLLIS SUBTILIS	126 MICROCACHRYIDITES ANTARCTICUS	127 MYRTACEIDITES PARVUS/MESONESUS	128 NOTHOFAGUS BRACHYSPINULOSUS	129 NOTHOFAGUS EMARCIDUS/HETERUS	130 NOTHOFAGUS FLEMINGII	131 PERIPOROPOLLENITES POLYORATUS	132 PERIPOROPOLLENITES VESICUS	133 PHYLLOCLADIDITES MAWSONII	134 PODOSPORITES MICROSACCATUS	135 PROTEACIDITES	136 PROTEACIDITES GRANDIS	137 PROTEACIDITES INCURVATUS	138 PROTEACIDITES KOPIENSIS	139 STEREISPORITES ANTIQUISPORITES	140 STEREISPORITES PUNCTATUS	141 TRICOLPORITES	142 TRILETES TUBERCULIFORMIS	143 TRIPOROPOLLENITES AMBIGUUS	144 VERRUCOSISPORITES KOPUKUENSIS	145 CUPANIEIDITES ORTHOTEICHUS	146 GLEICHENIIDITES CIRCINIDITES	147 PROTEACIDITES CLARUS	148 PROTEACIDITES LEIGHTONII	149 PROTEACIDITES SCABORATUS	150 RETITRILETES AUSTROCLAVATIDITES	151 AUSTRALOPOLLIS OBSCURUS	152 CAMEROZONOSPORITES BULLATUS
0570-80	CUTTS	15	1	7	?	X	5	1	X	7	1	4	2	1	X	1	X	1	1	3	2	6	2	X	X	X	1	1	X	X	X	.	.	.	.	.	.	.	.
0580-00	CUTTS	10	1	6	.	.	6	1	.	5	1	1	1	.	X	.	.	1	1	.	2	13	.	1	.	.	.	.	.	.	X	X	4	X	1	X	1	.	.
0600-20	CUTTS	11	.	8	.	.	5	1	.	2	.	1	2	.	1	.	X	.	.	2	.	21	.	.	.	4	.	1	1	.	1	1	5	1	.	.	.	1	1
0620-40	CUTTS	17	2	7	.	.	3	2	.	5	X	1	1	.	2	.	.	2	.	1	.	9	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.
0720-40	CUTTS	10	.	20	.	.	.	.	.	X	.	.	7	.	1	.	.	.	.	5	5	15	X	.	.	2	3	.	.	.	.	.	3	.	.	.	2	3	.
0740-60	CUTTS	9	.	14	.	.	.	.	.	.	2	1	3	.	.	.	.	.	.	4	3	16	.	.	.	3	1	.	.	.	.	.	4	.	.	X	.	1	X
0760-80	CUTTS	5	.	14	.	.	.	1	.	2	.	.	4	.	.	.	.	1	.	11	1	15	.	.	.	2	.	.	1	.	.	.	.	.	.	.	1	.	.
0820-40	CUTTS	2	.	11	.	X	.	3	.	1	.	.	5	.	.	.	.	.	.	7	4	9	.	.	.	5	.	.	.	.	.	.	.	.	.	.	2	.	.
0860-80	CUTTS	7	2	11	.	X	3	1	.	3	.	.	7	.	.	.	.	.	.	4	6	18	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.
0900-20	CUTTS	3	1	7	.	X	.	1	.	1	.	.	.	.	.	.	.	X	.	3	5	21	.	.	.	3	.	.	.	.	.	.	.	.	.	.	4	1	.
0920-40	CUTTS	9	1	16	.	.	1	.	.	.	.	.	4	.	.	.	.	.	.	5	4	13	.	.	.	1	X	.	.	.	.	.	.	.	.	.	1	.	.
0960-80	CUTTS	4	.	13	.	1	1	.	.	.	.	.	4	.	.	.	.	.	.	4	.	10	.	.	.	3	.	.	.	.	.	.	.	.	.	.	2	.	.
1000-20	CUTTS	3	1	15	.	.	.	.	.	X	.	.	6	.	.	18	.	1	.	4	5	13	.	.	.	1	.	X	.	.	.	.	.	.	.	.	2	.	.
1040-60	CUTTS	1	.	16	.	.	.	2	.	.	.	.	3	.	.	.	.	.	.	3	2	7	.	.	.	1	.	1	.	.	.	.	.	.	.	.	2	X	.
1080-00	CUTTS	6	.	13	.	.	.	1	.	.	.	.	7	.	.	.	.	.	.	2	4	11	.	.	.	1	.	.	.	.	.	.	.	.	.	.	5	.	.
1120-40	CUTTS	10	.	20	.	.	.	1	.	.	.	.	12	.	.	.	.	.	.	3	3	9	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	1	.
1140-60	CUTTS	11	.	17	.	.	.	1	.	.	.	.	14	.	.	.	.	.	.	4	X	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.
1160-80	CUTTS	22	.	11	.	.	.	2	.	.	.	.	4	.	.	.	.	.	.	3	8	15	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	2	.
1220-40	CUTTS	5	.	15	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	4	2	5	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	3	.
1280-00	CUTTS	14	.	21	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	3	1	9	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	1	.
1340-60	CUTTS	11	.	18	.	.	.	1	.	.	.	.	7	.	.	.	.	.	.	.	8	8	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	X	.
1380-00	CUTTS	16	.	26	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	2	2	6	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	1	.
1440-60	CUTTS	19	.	11	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	1	4	3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	1	.
1480-00	CUTTS	13	.	15	.	.	.	.	.	.	.	.	10	.	.	.	.	.	.	1	4	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
1535-38	CUTTS	11	.	15	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	2	6	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.
1565.5	SWC	17	.	21	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	3	8	X	.	.	.	4	.	.	.	.	.	.	.	.	.	.	2	.	.
1589.5	SWC	16	.	30	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	1	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.
1620.0	SWC	9	.	24	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	1	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.
643.5	SWC	6	.	18	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.
564.0	SWC	7	.	22	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1701.0	SWC	8	.	23	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1717.75	SWC	1	.	25	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.
1728.50	CORE1	2	.	16	.	.	.	1	.	.	.	.	8	.	.	.	.	.	.	2	5	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	1	1	.
1733.60	CORE1	9	.	18	.	.	.	1	.	.	.	.	9	.	.	.	.	.	.	5	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	2	.
1755.0	SWC	8	.	15	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	1	4	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.
1774.0	SWC	12	.	26	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	X	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
1801.5	SWC	16	.	16	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1820.5	SWC	31	.	12	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
1828.0	SWC	17	.	21	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	3	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	1	.	.
1839.75	CORE2	9	.	9	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	1	32	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
1841.0	CORE2	21	.	20	.	.	.	.	.	.	.	.	10	.	.	.	.	.	.	1	6	1	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.
1843.20	CORE2	10	.	17	.	.	.	X	.	.	.	.	14	.	.	.	.	.	.	2	6	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	1	.	.
1857.3	CORE3	14	.	13	.	.	.	2	.	.	.	.	7	.	.	.	.	.	.	2	10	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
1860.3	CORE3	22	.	12	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	3	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1866.05	CORE3	7	.	22	.	.	.	1	.	.	.	.	13	.	.	.	.	.	.	.	6	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
1876.5	CORE3	11	.	27	.	.	.	2	.	.	.	.	6	.	.	.	.	.	.	1	4	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
1879.0	CORE3	14	.	21	.	.	.	.	.	.	.	.	11	.	.	.	.	.	.	.	5	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	.	.
1881.0	CORE3	27	.	13	.	.	.	1	.	.	.	.	7	.	.	.	.	.	.	.	2	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	.	.
1900.0	SWC	5	.	24	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	1	6	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	2	.	.
1917.35	CORE4	16	.	25	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	1	4	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.
1926.25	CORE4	15	.	10	.	.	.	4	.	.	.	.	3	.	.	.	.	.	.	6	10	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	X	.
1933.1	CORE4	27	.	14	.	.	.	1	.	.	.	.	8	.	.	.	.	.	.	.	4	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.
1935.50	CORE4	7	.	18	.	.	.	1	.	.	.	.	9	.	.	.	.	.	.	3	6	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	1	.
1939.35	CORE4	20	.	10	.	.	.	3	.	.	.	.	9	.	.	.	.	.	.	1	3	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.
1941.65	CORE4	8	.	14	.	.	.	5	.	.	.	.	8	.	.	.	.	.	.	5	15	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	X	.
1943.0	CORE5	4	.	21	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	5	3	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	.	.
1948.0	CORE5	3	.	20	.	.	.	1	.	.	.	.	11	.	.	.	.	.	.	6	6	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	2	.	.
1953.0	CORE5	9	.	21	.	.	.	1	.	.	.	.	8	.	.	.	.	.	.	3	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.
1955.60	CORE5	20	.	20	.	.	.	.	.	.	.	.	15	.	.	.	.	.	.	4	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.
1961.25	CORE5	16	.	22	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	2	4	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.
1968.25	CORE5	17	.	16	.	.	.	1	.	.	.	.	10	.	.	.	.	.	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
1996.5	SWC	20	.	15	.	.	.	X	.	.	.	.	8	.	.	.	.	.	.	.	5	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
2012.5	SWC	18	.	13	.	.	.	X	.	.	.	.	4	.	.	.	.	.	.	X	4	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	.	.
2049.0	SWC	15	.	15	.	.	.	.	.	.	.	.	12	.	.	.	.	.	.	X	6	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	1	.	.
2066.0	SWC	19	.	17	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
2077.0	SWC	20	.	14	.	.	.	X	.	.	.	.	13	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	.	.
2105.0	SWC	X	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	?	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.
2119.0	SWC	.	.	30	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	3	.	.
2131.0	SWC	12	.	20	.	.	.	.	.	.	.	.	16	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.

		INTRATRIPOROPOLLENITES NOTABILIS	LYGISTIPOLLENITES BALMEI	NOTHOFAGUS ENDURUS	PROTEACIDITES ANNULARIS	PROTEACIDITES ORNATUS	SPINIZONOCOLPITES PROMINATUS	TRICOLPITES	AMOSOPOLLIS CRUCIFORMIS	CAMEROZONOSPORITES OHAIENSIS	CERATOSPORITES EQUALIS	CICATRICOSISPORITES FOVEOAUSTRALIENSIS	CYATHIDITES MINOR	CYATHIDITES SPLENDENS	FALCISPORITES GRANDIS	FOVEOGLEICHENIDITES	GAMBIERINA RUDATA	GLEICHENIIDITES	TRICOLPITES PHILLIPSII	TRIPOROLETES RETICULATUS	AEQUITRIRADITES SPINULOSUS	NOTHOFAGUS SENECTUS	CONTIGNISPORITES COOKSONIAE	GAMBIERINA EDWARDSII	GRAPNELISPORA EVANSII	HERKOSPORITES ELLIOTTII	PROTEACIDITES MAPUKUI	TRICOLPITES CONFESSUS	TRICOLPITES LONGUS	TRICOLPORITES LILLIEI	TRIPOROPOLLENITES SECTILIS	COROLLINA TOROSUS	CYATHIDITES AUSTRALIS	PROTEACIDITES PALISADUS	CINGUTRILETES CLAVUS	CYCADOPITES FOLLICULARIS	GAMBIERINA RUDATA 'TWISTED'	ORNAMENTIFERA SENTOSA	OSMUNDACIDITES WELLMANII
		153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
0570-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0580-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0600-20	CUTTS	1	1	1	1	1	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0620-40	CUTTS	.	1	4	1	.	.	.	X	X	2	1	7	1	6	1	X	5	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0720-40	CUTTS	.	1	1	.	.	.	.	1	.	.	.	.	.	.	.	1	.	1	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0740-60	CUTTS	.	1	1	.	.	.	.	.	X	2	.	.	.	.	.	4	.	.	.	.	1	1	X	X	X	1	1	1	X	X	.	.	.	.	.	.	.	.	.
0760-80	CUTTS	.	1	3	.	.	.	1	3	1	1	.	4	.	2	.	1	1	.	.	.	.	.	.	.	.	X	.	X	.	.	1	1	X	.	.	.	.	.	.
0820-40	CUTTS	.	.	3	.	.	.	.	.	.	3	.	4	.	2	.	2	5	.	.	X	.	.	.	.	2	1	.	1	2	1	1	3	1	1	1	1	1	3	.
0860-80	CUTTS	.	1	4	.	.	.	.	.	1	1	.	6	.	.	.	1	3	.	.	.	1	.	X	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.
0900-20	CUTTS	.	X	2	.	.	.	.	.	1	1	.	5	.	5	.	3	2	.	.	.	1	.	.	.	.	.	X	.	X	.	1	5	2	.	1	.	.	1	.
0920-40	CUTTS	.	.	7	.	.	.	.	.	.	3	.	3	.	3	.	2	10	.	.	.	3	.	X	.	.	.	.	X	.	1	.	5	.	.	.	.	.	1	.
0960-80	CUTTS	.	2	8	.	.	.	.	.	2	1	.	7	.	4	.	2	2	.	.	.	3	.	.	.	.	.	.	.	1	.	.	3	.	.	.	.	.	2	.
1000-20	CUTTS	.	.	.	.	.	.	.	.	1	1	.	6	.	.	.	.	4	.	.	.	3	.	.	.	.	.	1	.	.	.	.	5	.	.	.	.	.	X	.
1040-60	CUTTS	.	.	.	.	.	.	1	.	2	2	.	8	.	2	.	.	7	.	.	.	1	.	.	.	.	.	1	.	.	.	1	3	.	1	1	.	.	1	.
1080-00	CUTTS	.	.	.	.	.	.	.	.	.	2	.	7	.	2	.	.	2	.	.	.	5	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	1	.
1120-40	CUTTS	.	.	.	.	.	.	.	1	1	.	.	5	.	2	.	X	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	.	2	.
1140-60	CUTTS	.	.	1	.	.	.	.	X	2	.	.	10	.	1	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	1	2	1	1	2	.	.	2	.
1160-80	CUTTS	.	.	1	.	.	.	2	.	.	1	.	5	.	1	.	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1	.	2	1	.	.	1	.
1220-40	CUTTS	.	.	1	.	.	.	.	.	X	.	.	10	.	4	.	.	3	.	.	.	3	1	.	.	.	.	.	.	.	.	4	2	.	2	2	.	.	5	.
1280-00	CUTTS	.	.	1	.	.	.	1	.	X	1	.	8	.	4	.	X	3	.	.	.	1	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	1	4	.
1340-60	CUTTS	.	.	.	.	.	.	2	.	.	2	.	6	.	6	.	.	2	.	.	.	X	X	.	.	.	.	.	.	.	.	1	2	.	X	.	.	X	4	.
1380-00	CUTTS	.	.	.	.	.	.	.	.	X	.	.	8	.	2	.	.	1	.	X	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	2	.	.	?	.
1440-60	CUTTS	.	.	.	.	.	.	X	X	1	2	.	7	.	1	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	1	1	.	.	.	.
1480-00	CUTTS	.	.	.	.	.	.	.	X	.	2	.	3	.	3	.	.	3	.	2	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	1	.	.	.	.
1535-38	CUTTS	.	.	.	.	.	.	.	1	2	1	.	9	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	2	.	.	2	.
1565.5	SWC	.	.	.	.	.	.	.	X	.	1	.	7	.	1	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	X	.	.	2	.
1589.5	SWC	.	.	.	.	.	.	.	5	.	1	.	2	.	4	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.
1620.0	SWC	.	.	.	.	.	.	.	5	.	2	.	8	.	6	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	1	.	.	1	.
1643.5	SWC	.	.	.	.	.	.	.	9	.	2	.	18	.	3	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	1	.
1664.0	SWC	.	.	.	.	.	.	.	2	.	5	.	9	.	5	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	1	.	X	1	.
1701.0	SWC	.	.	.	.	.	.	.	5	.	1	.	10	.	3	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	.	.	.	1	.
1717.75	SWC	.	.	.	.	.	.	.	10	.	1	.	7	.	4	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6	.	.	1	.	.	2	.
1728.50	CORE1	.	.	.	.	.	.	1	9	.	1	.	10	.	3	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	.	1	1	.	.	3	.
1733.60	CORE1	.	.	.	.	.	.	1	10	.	2	.	13	.	2	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	1	1	.	.	1	.
1755.0	SWC	.	.	.	.	.	.	.	12	.	.	.	6	.	3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	2	.	.	1	.
1774.0	SWC	.	.	.	.	.	.	.	6	.	2	.	3	.	5	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	.	5	.
1801.5	SWC	.	.	.	.	.	.	.	2	.	.	.	5	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	1	.	.	2	.
1820.5	SWC	.	.	.	.	.	.	.	11	.	1	.	1	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.
1828.0	SWC	.	.	.	.	.	.	.	8	.	1	.	5	.	4	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	1	.	.	.	5	.
1839.75	CORE2	.	.	.	.	.	.	.	.	.	1	.	14	.	1	.	.	5	.	.	X	.	.	.	.	.	.	.	.	.	.	3	4	.	1	1	.	.	1	.
1841.0	CORE2	.	.	.	.	.	.	.	3	.	.	.	7	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	1	.	.	1	.
1843.20	CORE2	.	.	.	.	.	.	.	3	.	1	.	7	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	1	.
1857.3	CORE3	.	.	.	.	.	.	.	5	.	2	.	9	.	1	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	2	.	.	2	.
1860.3	CORE3	.	.	.	.	.	.	.	3	.	3	.	3	.	3	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	1	1	.	.	1	.
1866.05	CORE3	.	.	.	.	.	.	.	4	.	1	.	7	.	3	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	1	2	.	.	4	.
1876.5	CORE3	.	.	.	.	.	.	1	4	.	.	.	10	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6	.	1	1	.	.	4	.
1879.0	CORE3	.	.	.	.	.	.	1	3	.	.	.	13	.	5	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	1	.	.	4	.
1881.0	CORE3	.	.	.	.	.	.	.	4	.	X	.	10	.	2	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	1	4	.	.	1	.
1900.0	SWC	.	.	.	.	.	.	.	X	.	2	X	14	.	4	.	.	4	.	X	.	.	.	.	.	.	.	.	.	.	.	5	5	.	1	2	.	.	1	.
1917.35	CORE4	.	.	.	.	.	.	.	6	.	1	.	5	.	4	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	1	2	.	.	4	.
1926.25	CORE4	.	.	.	.	.	.	.	.	.	1	.	18	.	4	.	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6	.	1	1	.	.	1	.
1933.1	CORE4	.	.	.	.	.	.	.	1	.	1	.	8	.	2	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	1	1	.	.	6	.
1935.50	CORE4	.	.	.	.	.	.	.	.	.	3	.	7	.	4	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	.	.	.	2	.
1939.35	CORE4	.	.	.	.	.	.	.	3	.	1	.	5	.	2	.	.	7	.	.	.	.	X	.	.	.	.	.	.	.	.	2	4	.	1	.	.	.	3	.
1941.65	CORE4	.	.	.	.	.	.	1	.	.	.	.	10	.	1	.	.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	1	.	.	1	.
1943.0	CORE5	.	.	.	.	.	.	.	.	.	3	.	19	.	3	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	2	6	.	1	2	.	.	5	.
1948.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	17	.	3	.	.	9	.	X	.	.	.	.	.	.	.	.	.	.	.	2	3	.	1	1	.	.	2	.
1953.0	CORE5	.	.	.	.	.	.	.	.	.	.	.	5	.	6	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	1	1	.	.	2	.
1955.60	CORE5	.	.	.	.	.	.	.	.	.	.	.	13	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	3	.	1	1	.	.	1	.
1961.25	CORE5	.	.	.	.	.	.	.	.	.	1	.	11	.	2	.	.	6	.	.	.	.	X	.	.	.	.	.	.	.	.	1	4	.	1	1	.	.	2	.
1968.25	CORE5	.	.	.	.	.	.	.	.	.	2	.	10	.	1	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	1	1	.	.	2	.
1996.5	SWC	.	.	.	.	.	.	.	.	.	.	X	12	.	3	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	2	4	.	.	.	.	.	1	.
2012.5	SWC	.	.	.	.	.	.	.	.	.	1	.	14	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	1	.	.	.	.
2049.0	SWC	.	.	.	.	.	.	.	.	.	2	.	7	.	2	.	.	5	.	1	.	.	.	.	.	.	.	.	.	.	.	3	1	.	1	2	.	.	1	.
2066.0	SWC	.	.	.	.	.	.	.	1	.	X	.	12	.	1	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	.	.	1	.	.	4	.
2077.0	SWC	.	.	.	.	.	.	.	2	.	1	.	14	.	4	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	X	1	.	.	?	.
2105.0	SWC	.	.	.	.	.	.	.	X	.	X	.	X	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.
2119.0	SWC	.	.	.	.	.	.	.	.	.	1	.	18	.	3	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	.	.	.	.	.
2131.0	SWC	.	.	.	.	.	.	.	.	.	2	.	23	.	3	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	3	6	.	.	1	.	.	3	.

		191 PEROTRILETES JUBATUS/MORGANII	192 TRICOLPITES GILLII	193 VITREISPORITES PALLIDUS	194 ISCHYOSPORITES PUNCTATUS	195 TRICOLPORITES APOXYEXINUS	196 CICATRICOSISPORITES AUSTRALIENSIS	197 CICATRICOSISPORITES LUDBROOKIAE	198 TRICOLPITES SABULOSUS	199 KLUKISPORITES SCABERIS	200 PHYLLOCLADIDITES VERRUCOSUS	201 CALLIALASPORITES TURBATUS	202 CRYBELOSPORITES STRIATUS	203 LEPTOLEPIDITES MAJOR	204 PROTEACIDITES LARGE	205 TETRACOLPORITES RETICULATA	206 MUROSPORA FLORIDA	207 AEQUITRIRADITES VERRUCOSUS	208 ORNAMENTIFERA MINIMA	209 CAMEROZONOSPORITES HORRENDUS	210 LYCOPODIACIDITES ASPERATUS	211 COPTOSPORA PILEOSA	212 LEPTOLEPIDITES VERRUCATUS	213 PHIMOPOLLENITES PANNOSUS	214 PILOSISPORITES NOTENSIS	215 RETITRILETES NODOSUS	216 CALLIALASPORITES DAMPIERI	217 TRIPOROLETES SIMPLEX	218 DENSOISPORITES VELATUS	219 PERINOPOLLENITES ELATOIDES	220 PEROTRILETES MAJUS	221 CYCLOSPORITES HUGHESI	222 BALMEISPORITES HOLODICTYUS	223 RETITRILETES CIRCOLUMENUS	224 FORAMINISPORIS DAILYI	225 CYATHEACIDITES TECTIFERA	226 RETITRILETES EMINULUS	227 APPENDICISPORITES DISTOCARINATUS	228 DILWYNITES TUBERCULATUS
0570-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0580-00	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0600-20	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0620-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0720-40	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0740-60	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0760-80	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0820-40	CUTTS	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0860-80	CUTTS	.	4	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0900-20	CUTTS	.	1	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0920-40	CUTTS	X	.	.	.	1	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0960-80	CUTTS	.	.	.	1	.	1	.	2	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1000-20	CUTTS	.	2	.	.	.	1	X	1	.	.	1	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1040-60	CUTTS	.	.	1	.	.	.	X	1	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1080-00	CUTTS	.	.	3	1	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1120-40	CUTTS	.	.	1	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1140-60	CUTTS	.	.	.	.	.	.	.	2	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1160-80	CUTTS	.	.	1	.	.	1	.	2	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220-40	CUTTS	.	.	2	.	.	.	.	1	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1280-00	CUTTS	.	X	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1340-60	CUTTS	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1380-00	CUTTS	.	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1440-60	CUTTS	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1480-00	CUTTS	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1535-38	CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1565.5	SWC	.	.	X	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.
1589.5	SWC	.	1	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	X	1	X	.	.	.	.	.	.	.	.
620.0	SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	X	.	.	.	.	.	.	.
643.5	SWC	.	.	.	.	X	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1664.0	SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.
1701.0	SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
1717.75	SWC	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.
1728.50	CORE1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
1733.60	CORE1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
1755.0	SWC	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
1774.0	SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.
1801.5	SWC	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1820.5	SWC	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	.
1828.0	SWC	.	.	.	1	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	1
1839.75	CORE2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1841.0	CORE2	.	.	3	1	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
1843.20	CORE2	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	X	.
1857.3	CORE3	.	.	1	.	.	X	.	.	.	.	2	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1860.3	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1866.05	CORE3	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1876.5	CORE3	X	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	1	.
1879.0	CORE3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
1881.0	CORE3	.	.	1	.	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	.
1900.0	SWC	.	.	2	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	1	.	1	.	.	.	1	.	.	1	.	.	.	.	.	.	.	X	.
1917.35	CORE4	1	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
1926.25	CORE4	1	.	1	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1933.1	CORE4	X	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1935.50	CORE4	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	X	.	.	X	.
1939.35	CORE4	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1941.65	CORE4	.	.	1	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
1943.0	CORE5	.	.	.	1	.	1	.	.	.	.	.	.	X	.	.	X	X	.	.	.	.	.	X	.	.	.	.	.	.	1	.	1	.	.	.	.	X	.
1948.0	CORE5	.	.	.	1	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	X	.
1953.0	CORE5	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1955.60	CORE5	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.	X	.
1961.25	CORE5	.	.	.	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1968.25	CORE5	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	1	X	.
1996.5	SWC	1	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.
2012.5	SWC	.	.	X	X	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	.
2049.0	SWC	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
2066.0	SWC	.	.	.	1	.	2	2	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.
2077.0	SWC	1	.	.	X	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
2105.0	SWC	.	.	.	X	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2119.0	SWC	1	.	.	.	.	.	.	.	.	.	5	.	2	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	X	.
2131.0	SWC	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Index numbers are the columns in which species appear.

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207	AEQUITRIRADITES VERRUCOSUS
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30	ALISOCYSTA MARGARITA
100	ALTERBIA ACUMINATUM
160	AMOSOPOLLIS CRUCIFORMIS
86	AMPHIDIADEMA DENTICULATA
12	APECTODINIUM HOMOMORPHA (SH. SP)
227	APPENDICISPORITES DISTOCARINATUS
233	APPENDICISPORITES TRICORNITATUS
40	APTEA SP
96	APTEODINIUM GRANULATUM
111	ARAUCARIACITES AUSTRALIS
13	AREOLIGERA SENONENSIS
63	AREOSPHAERIDIUM SUGGESTIUM
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101	CHLAMYDOPHORELLA NYEI/AMBIGUA
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211	COPTOSPORA PILEOSA
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183	COROLLINA TOROSUS
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35	CRIBROPERIDINIUM SP
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184	CYATHIDITES AUSTRALIS
113	CYATHIDITES GIGANTIS
164	CYATHIDITES MINOR
165	CYATHIDITES SPLENDENS
114	CYATHIDITES SPP
187	CYCADOPITES FOLLICULARIS
106	CYCLONEPHELIUM COMPACTUM
221	CYCLOSPORITES HUGHESI
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9	DEFLANDREA MEDCALFII
14	DEFLANDREA OBLIQUIPES (L.H.)
26	DEFLANDREA PACHYCEROS (SH. H)
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218	DENSOISPORITES VELATUS
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244	DICTYOTOSPORITES SPECIOSUS
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31	EXOCHOSPHAERIDIUM PHRAGMITES
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32	HETEROSPHAERIDIUM CONJUNCTUM
42	HETEROSPHAERIDIUM HETEROCANTHUM
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75	HYSTRICHODINIUM PULCHRUM
16	HYSTRICHOSPHAERIDIUM TUBIFERUM
153	INTRATRIPOROPOLLENITES NOTABILIS
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76	ISABELIDINIUM BELFASTENSE
71	ISABELIDINIUM BELFASTENSE ROTUNDATA
84	ISABELIDINIUM CF BELFASTENSE
85	ISABELIDINIUM COOKSONIAE
60	ISABELIDINIUM CRETACEUM
105	ISABELIDINIUM GLABRUM
39	ISABELIDINIUM KOROJONENSE
36	ISABELIDINIUM PELLUCIDA
87	ISABELIDINIUM RECTANGULARE CONTRACTUM
89	ISABELIDINIUM RECTANGULARE DIVERSUM
90	ISABELIDINIUM RECTANGULARIS
108	ISABELIDINIUM SP
194	ISCHYOSPORITES PUNCTATUS
33	KIOKANSIUM POLYPES
199	KLUKISPORITES SCABERIS
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121	LAEVIGATOSPORITES OVATUS
230	LAEVIGATOSPORITES SPP
122	LAEVIGATOSPORITES USMENSIS
203	LEPTOLEPIDITES MAJOR
212	LEPTOLEPIDITES VERRUCATUS
210	LYCOPODIACIDITES ASPERATUS
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123	LYGISTIPOLLENITES FLORINII
56	MADURADINIUM PENTAGONUM
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29	MANUMIELLA DRUGGII
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1	MICROPLANKTON % .....
206	MUROSPORA FLORIDA
127	MYRTACEIDITES PARVUS/MESONESUS
47	NELSONIELLA ACERAS
64	NELSONIELLA CF ACERAS (PSILATE)
48	NELSONIELLA SEMIRECTICULATA
49	NELSONIELLA SP
53	NELSONIELLA TUBERCULATA
128	NOTHOFAGUS BRACHYSPINULOSUS
129	NOTHOFAGUS EMARCIDUS/HETERUS
155	NOTHOFAGUS ENDURUS
130	NOTHOFAGUS FLEMINGII
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7	NUMMUS
8	NUMMUS MONOCULATUS
81	ODONTOCHITINA COSTATA
65	ODONTOCHITINA CRIBROPODA
77	ODONTOCHITINA NO HORNS
66	ODONTOCHITINA OBESA
57	ODONTOCHITINA OPERCULATA
50	ODONTOCHITINA PORIFERA
51	ODONTOCHITINA STUBBY

51	ODONTOCHITINA STUBBY
78	OLIGOSPHAERIDIUM COMPLEX
43	OLIGOSPHAERIDIUM PULCHERRIMUM
208	ORNAMENTIFERA MINIMA
189	ORNAMENTIFERA SENTOSA
190	OSMUNDACIDITES WELLMANII
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103	PALAEOPERIDINIUM CRETACEUM
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219	PERINOPOLLENITES ELATOIDES
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220	PEROTRILETES MAJUS
213	PHIMOPOLLENITES PANNOSUS
243	PHYLLOCLADIDITES CF MAWSONII
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133	PHYLLOCLADIDITES MAWSONII
200	PHYLLOCLADIDITES VERRUCOSUS
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134	PODOSPORITES MICROSACCATUS
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178	PROTEACIDITES HAPUKUI
137	PROTEACIDITES INCURVATUS
138	PROTEACIDITES KOPIENSIS
204	PROTEACIDITES LARGE
148	PROTEACIDITES LEIGHTONII
157	PROTEACIDITES ORNATUS
185	PROTEACIDITES PALISADUS
149	PROTEACIDITES SCABORATUS
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67	PTEROSPERMELLA AUSTRALIENSIS
150	RETITRILETES AUSTROCLAVATIDITES
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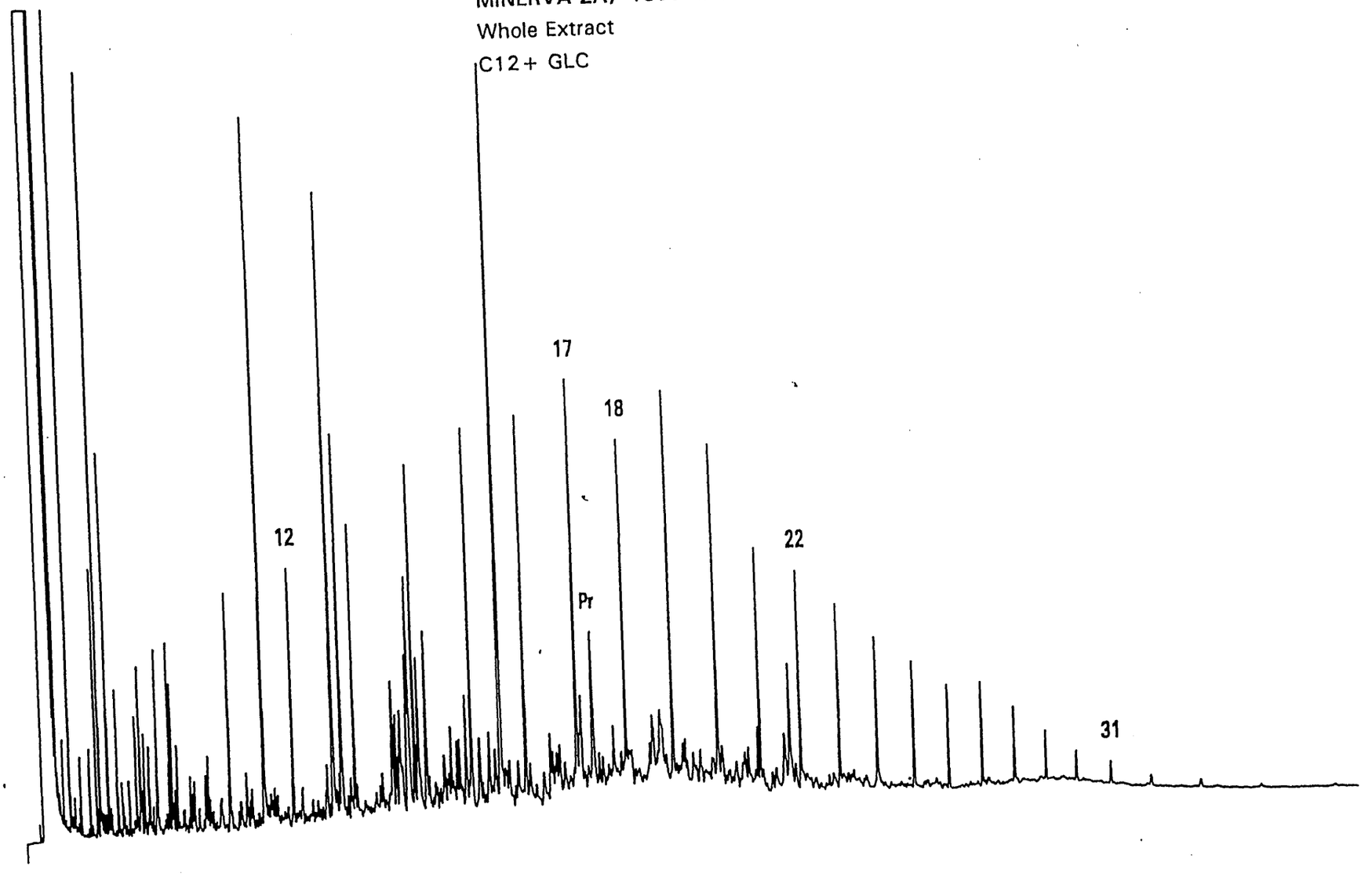
226	RETITRILETES EMINULUS
235	RETITRILETES FACETUS
215	RETITRILETES NODOSUS
3	REWORKING: CRETACEOUS
2	REWORKING: PERMIAN
4	REWORKING: TRIASSIC
239	SENECTOTETRADITES FISTULOSUS
232	SESTROSPORITES PSEUDOALVEOLATUS
10	SPINIDINIUM SP
11	SPINIFERITES FURCATUS/RAMOSUS
158	SPINIZONOCOLPITES PROMINATUS
139	STEREISPORITES ANTIQUISPORITES
140	STEREISPORITES PUNCTATUS
246	STERIESPORITES REGIUM
82	SUBTILISPHAERA ROTUNDATA
92	TANYOSPHAERIDIUM SALPINX
205	TETRACOLPORITES RETICULATA
52	TRICHODINIUM
44	TRICHODINIUM INTERMEDIUM
159	TRICOLPITES
179	TRICOLPITES CONFESSUS
192	TRICOLPITES GILLII
180	TRICOLPITES LONGUS
170	TRICOLPITES PHILLIPSII
198	TRICOLPITES SABULOSUS
229	TRICOLPITES VARIVERRUCATUS
141	TRICOLPORITES
195	TRICOLPORITES APOXYEXINUS
181	TRICOLPORITES LILLIEI
142	TRILETES TUBERCULIFORMIS
242	TRIPOROLETES RADIATUS
171	TRIPOROLETES RETICULATUS
217	TRIPOROLETES SIMPLEX
143	TRIPOROPOLLENITES AMBIGUUS
182	TRIPOROPOLLENITES SECTILIS
72	TRITHYRODINIUM (THICK RETIC)
23	TRITHYRODINIUM EVITTII
73	TRITHYRODINIUM GLABRA (THICK SMOOTH)
62	TRITHYRODINIUM MARSHALLII
88	TRITHYRODINIUM SUSPECTUM
144	VERRUCOSISPORITES KOPUKUENSIS
34	VERYHACHIUM
193	VITREISPORITES PALLIDUS
18	WETZELIELLA ARTICULATA
45	XENASCUS AUSTRALIENSE
94	XENASCUS CERATOIDES
46	XENIKOON AUSTRALIS
68	XIPHOPHORIDIUM ALATUM

6

6.6 APPENDIX 6 Geochem Basic Data

MINV2-2A/PE900117/P317

MINERVA 2A, 1860.3m, Core
Whole Extract
C12+ GLC



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MINERVA 2A, 1963.7m, Core
Whole Extract
C12+ GLC

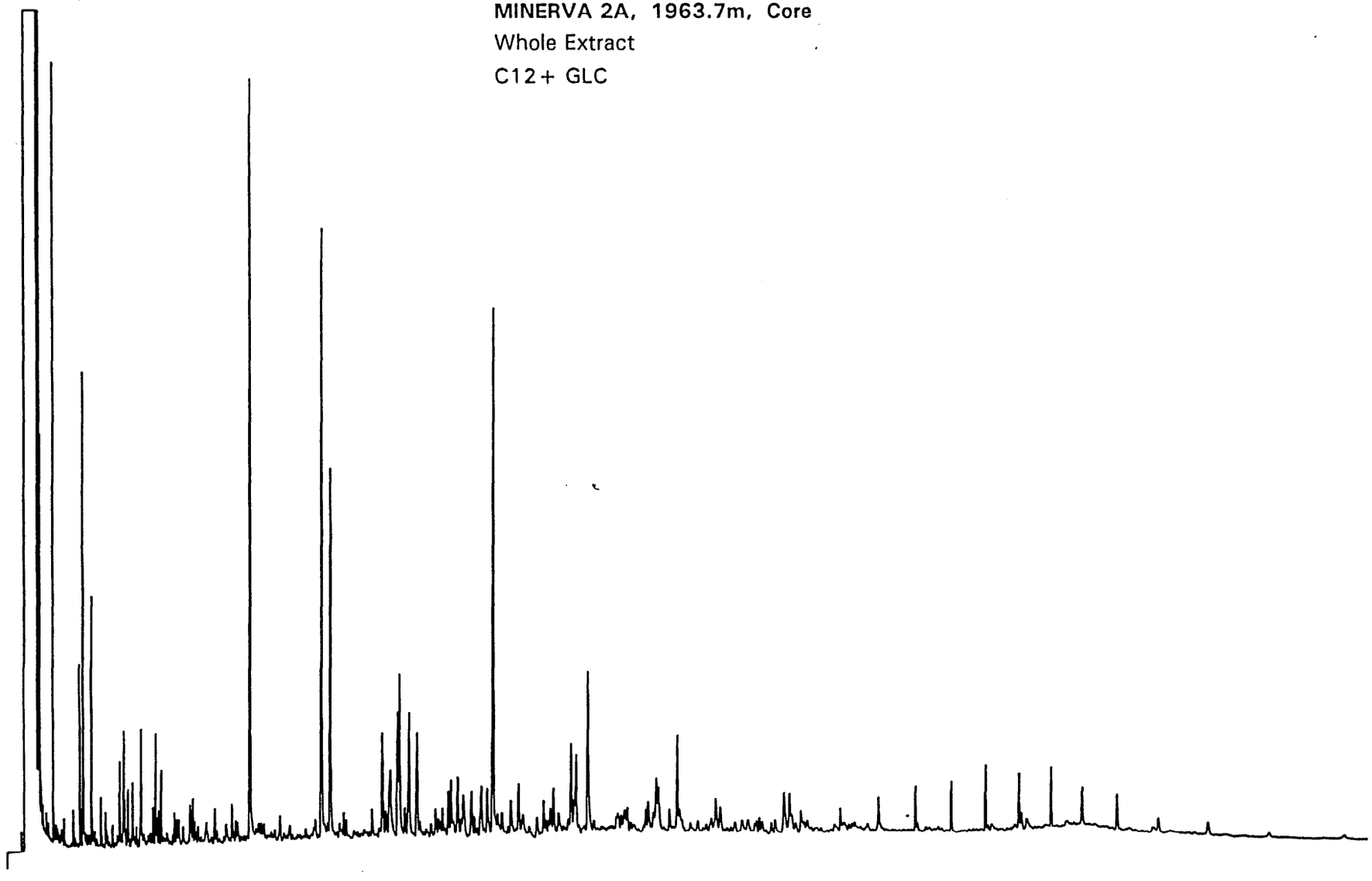

TABLE 1

Summary of Extraction and Liquid Chromatography

MINERVA 2A Dec-93

A. Concentrations of Extracted Material

				-------Hydrocarbons-------			----Nonhydrocarbons----		
	Weight of	Total	Loss on			HC			NonHC
	Rock Extd	Extract	Column	Saturates	Aromatics	Total	NSO's	Asphalt	Total
DEPTH(m)	(grams)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
1732.8	60.9	208.6	nd	nd	nd	nd	nd	nd	nd
1860.3	33.9	7158.9	nd	nd	nd	nd	nd	nd	nd
1928.2	44.6	354.5	nd	nd	nd	nd	nd	nd	nd
1956.2	53.6	278.2	nd	nd	nd	nd	nd	nd	nd
1963.7	25.4	471.7	nd	nd	nd	nd	nd	nd	nd

TABLE 1

Summary of Extraction and Liquid Chromatography

MINERVA 2A Dec-93

B. Compositional Data

	---Hydrocarbons----			---Nonhydrocarbons-----			EOM(mg)	SAT(mg)	SAT	ASPH	HC
							-------	-------	-------	-------	-------
DEPTH(m)	%SAT	%AROM	%HC's	%NSO	%ASPH	%Non HC's	TOC(g)	TOC(g)	AROM	NSO	Non HC
1732.8	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1860.3	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1928.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1963.7	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd = no data

TABLE 2

MINERVA 2A Summary of Gas Chromatography Data

A. Alkane Compositional Data

DEPTH(m)	Prist./Phyt.	Prist./n-C17	Phyt./n-C18	CPI(1)	CPI(2)	(C21 + C22)/(C28 + C29)
1732.8	nd	nd	nd	nd	nd	nd
1860.3	nd	0.19	nd	0.96	0.94	3.41
1928.2	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd
1963.7	nd	nd	nd	nd	nd	nd

TABLE 2

MINERVA 2A Summary of Gas Chromatography Data

B. n-Alkane Distributions

DEPTH(m)	nC12	nC13	nC14	nC15	nC16	nC17	iC19	nC18	iC20	nC19	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29	nC30	nC31
1732.8	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	.nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1860.3	4.9	5.8	6.6	8.3	8.9	11.0	2.1	8.3	nd	8.4	8.0	4.5	5.0	3.7	3.7	2.6	2.1	2.2	1.8	1.0	0.7	0.6
1928.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1963.7	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd = no data

MINERVA 2A, 1860.3m, Core
Saturate Fraction
C12+ GLC

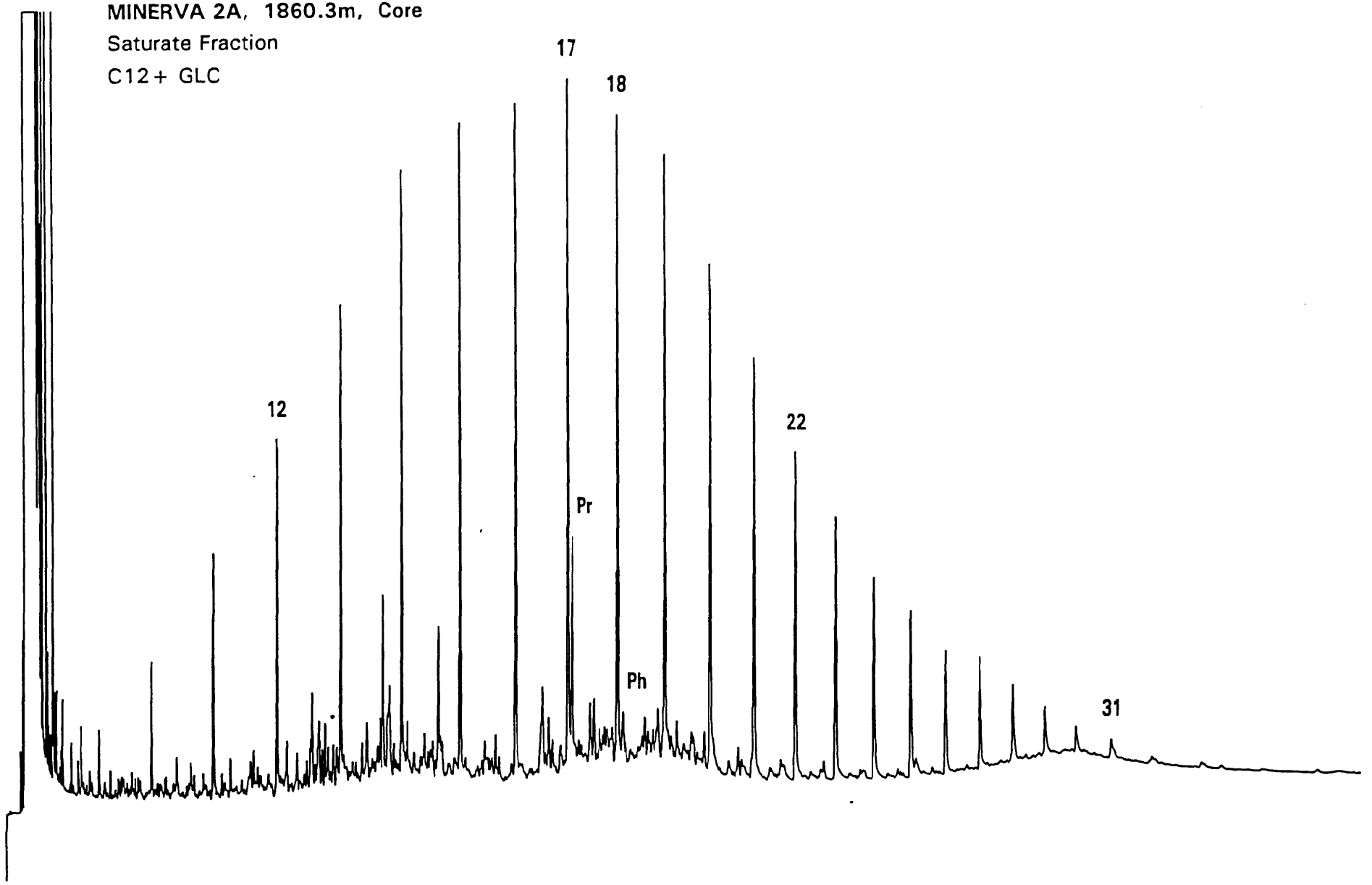

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TABLE 1

Summary of Extraction and Liquid Chromatography

MINERVA 2A Jan-94

A. Concentrations of Extracted Material

				-------Hydrocarbons-------			----Nonhydrocarbons----		
	Weight of	Total	Loss on			HC			NonHC
	Rock Extd	Extract	Column	Saturates	Aromatics	Total	NSO's	Asphalt	Total
DEPTH(m)	(grams)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
1732.8	60.9	208.6	nd	nd	nd	nd	nd	nd	nd
1860.3	33.9	7158.9	1434.2	1502.0	2179.1	3681.0	2043.6	nd	2043.6
1928.2	44.6	354.5	nd	nd	nd	nd	nd	nd	nd
1956.2	53.6	278.2	nd	nd	nd	nd	nd	nd	nd
1963.7	25.4	471.7	nd	nd	nd	nd	nd	nd	nd

TABLE 1

Summary of Extraction and Liquid Chromatography

MINERVA 2A Jan-94

B. Compositional Data

	---Hydrocarbons----			---Nonhydrocarbons-----			EOM(mg)	SAT(mg)	SAT	ASPH	HC
							-------	-------	-------	-------	-------
DEPTH(m)	%SAT	%AROM	%HC's	%NSO	%ASPH	%Non HC's	TOC(g)	TOC(g)	AROM	NSO	Non HC
1732.8	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1860.3	26.2	38.1	64.3	35.7	nd	35.7	nd	nd	0.7	nd	1.8
1928.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1963.7	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd = no data

TABLE 2

MINERVA 2A Summary of Gas Chromatography Data

A. Alkane Compositional Data

DEPTH(m)	Prist./Phyt.	Prist./n-C17	Phyt./n-C18	CPI(1)	CPI(2)	(C21 + C22)/(C28 + C29)
1732.8	nd	nd	nd	nd	nd	nd
1860.3	4.59	0.33	0.07	1.12	1.10	4.62
1928.2	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd
1963.7*	nd	nd	nd	0.93	0.91	0.40

TABLE 2

MINERVA 2A Summary of Gas Chromatography Data

B. n-Alkane Distributions

DEPTH(m)	nC12	nC13	nC14	nC15	nC16	nC17	iC19	nC18	iC20	nC19	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29	nC30	nC31
1732.8	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1860.3	3.7	5.2	6.4	7.6	8.2	9.3	3.0	9.0	0.7	8.8	8.1	6.5	4.9	4.2	3.3	2.9	2.1	2.2	1.6	0.9	0.5	0.6
1928.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1956.2	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1963.7*	-	-	-	-	-	-	0.0	-	0.0	-	10.8	2.4	6.2	5.1	9.3	7.7	9.0	11.6	11.3	10.1	8.7	7.8

nd = no data

* = Whole extract

TABLE 5.1

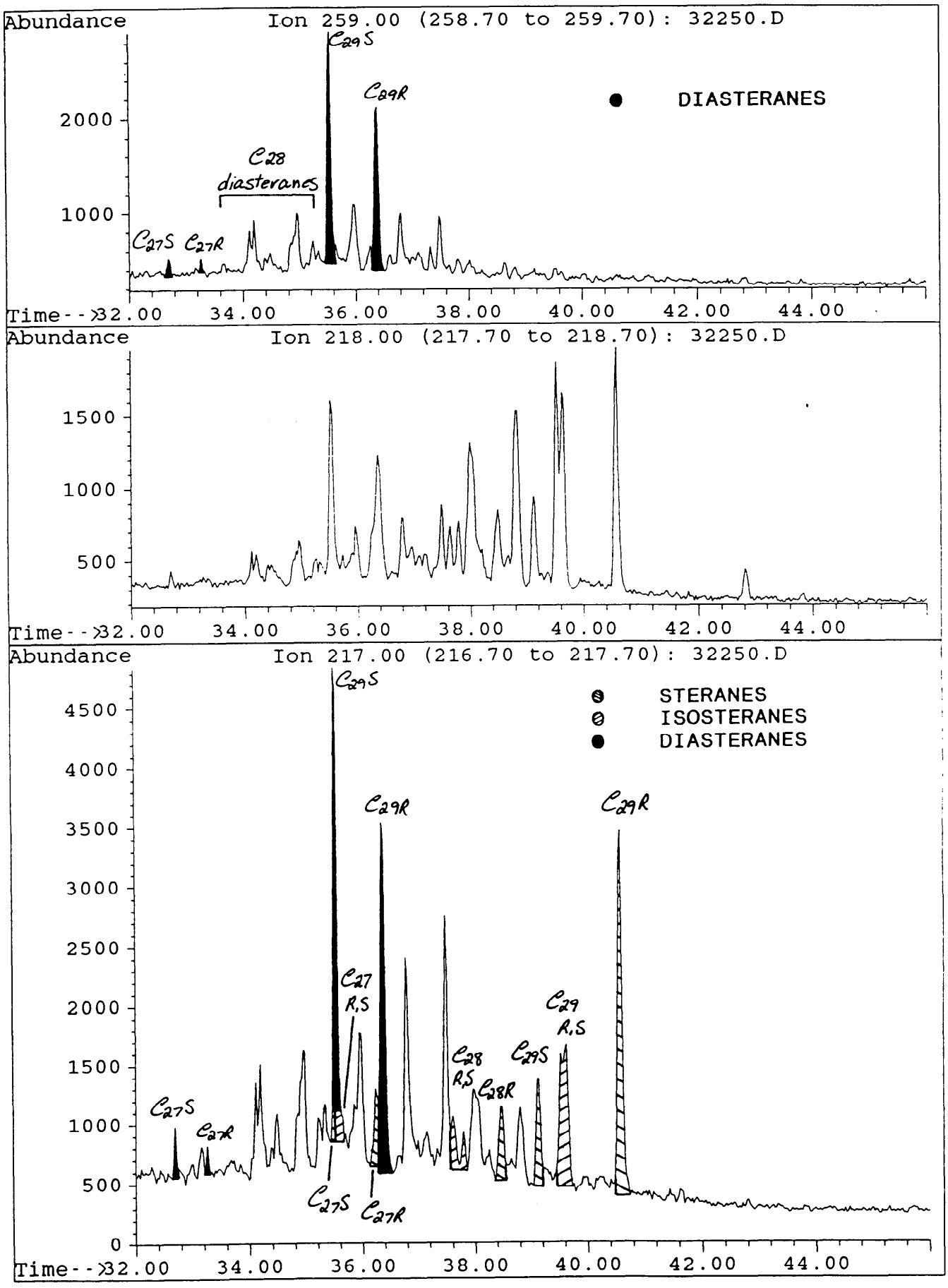
SELECTED PARAMETERS FROM GC/MS ANALYSIS

MINERVA 2A, 1860.3m, Core

	Parameter	Ion(s)	Value
1.	18 α (H)- hopane/17 α (H)-hopane (Ts/Tm)	191	0.08
2.	C30 hopane/C30 moretane	191	2.87
3.	C31 22S hopane/C31 22R hopane	191	1.41
4.	C32 22S hopane/C32 22R hopane	191	1.15
5.	C29 20S $\alpha\alpha\alpha$ sterane/C29 20R $\alpha\alpha\alpha$ sterane	217	0.30
6.	C29 $\alpha\alpha\alpha$ steranes (20S / 20S+20R)	217	0.23
7.	C29 $\alpha\beta\beta$ steranes / C29 $\alpha\alpha\alpha$ steranes + C29 $\alpha\beta\beta$ steranes	217	0.36
8.	C27/C29 diasteranes	259	0.09
9.	C27/C29 steranes	217	0.22
10.	18 α (H)-oleanane/C30 hopane	191	nd
11.	C29 diasteranes / C29 $\alpha\alpha\alpha$ steranes + C29 $\alpha\beta\beta$ steranes	217	1.17
12.	C30 (hopane + moretane) / C29 (steranes + diasteranes)	191/217	0.65
13.	C15 drimane/C16 homodrimane	123	0.75
14.	Rearranged drimanes/normal drimanes	123	0.83

nd = not detectable

File : 32250.D
Sample : MINERVA, 1860.3m B/C
Misc. Info : COL#143. 13-1-94. GEC.



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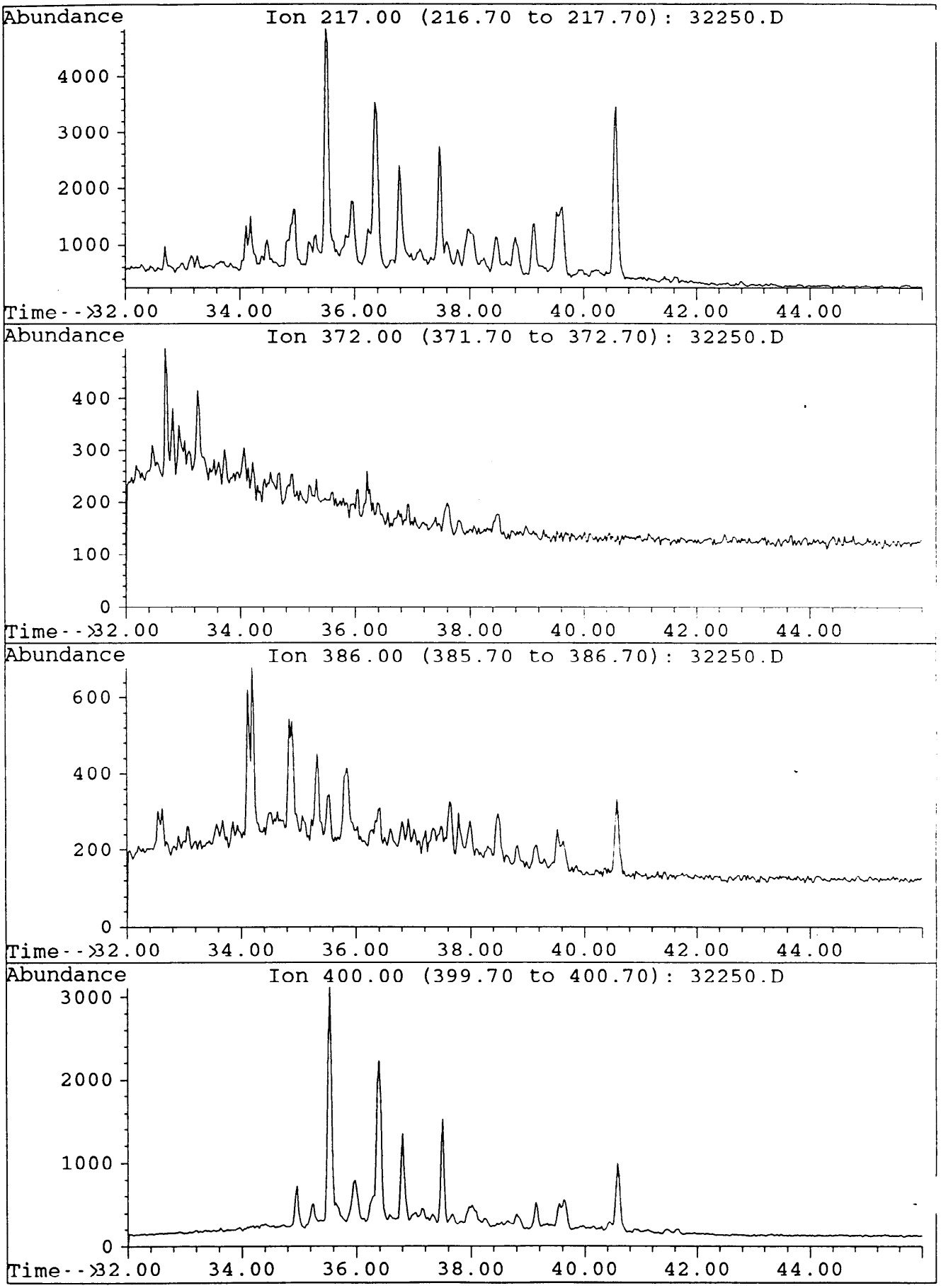

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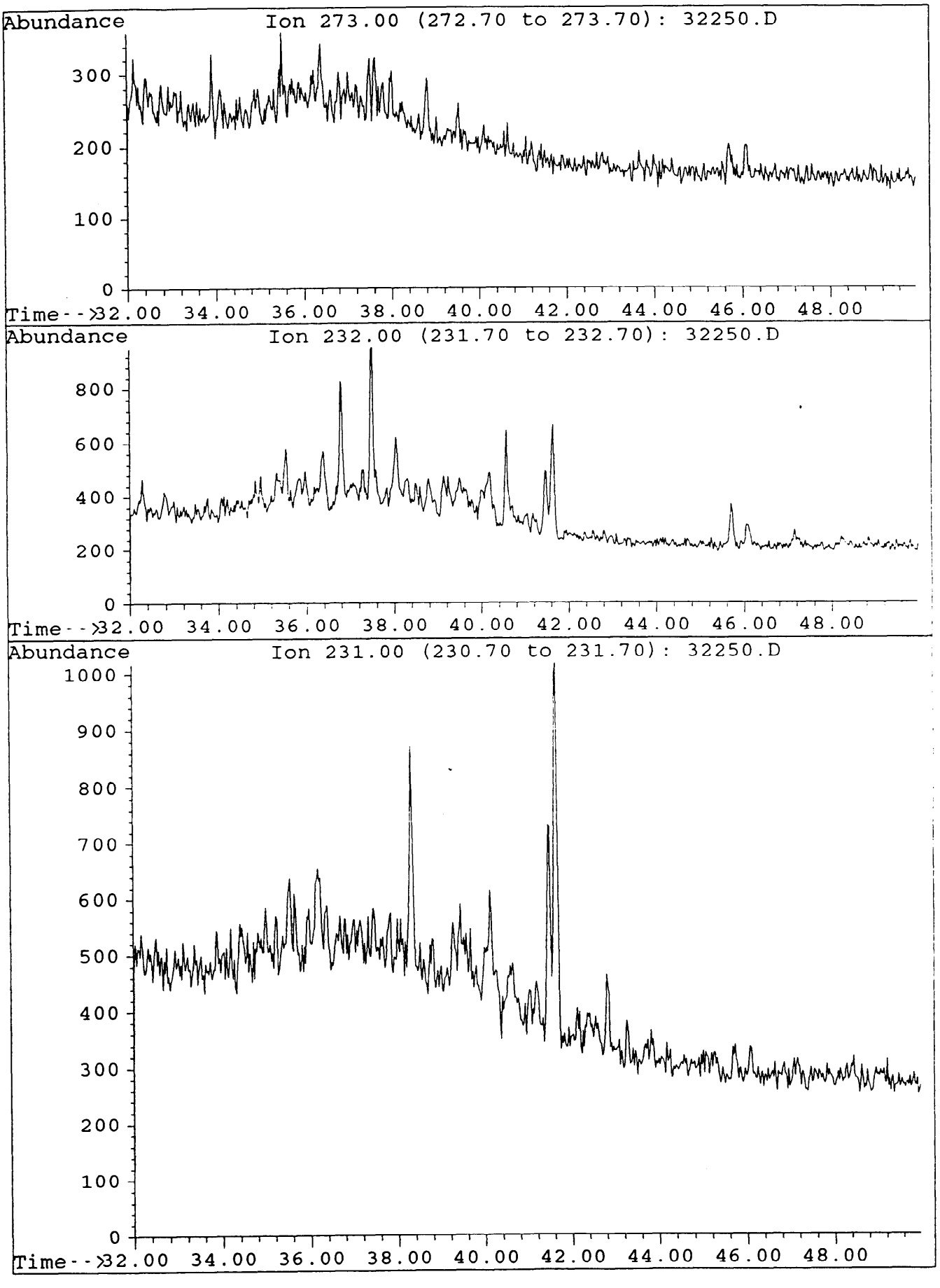

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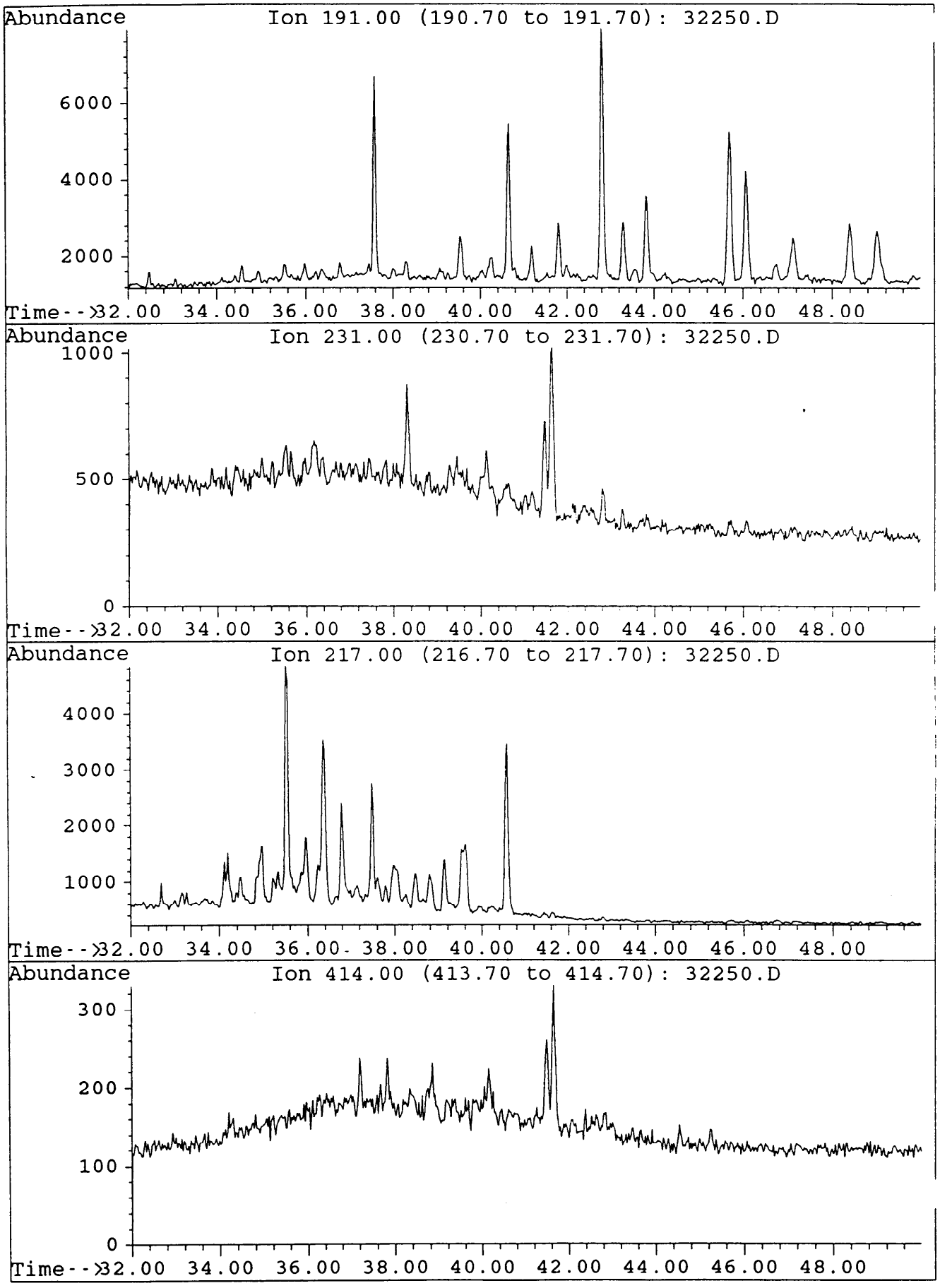

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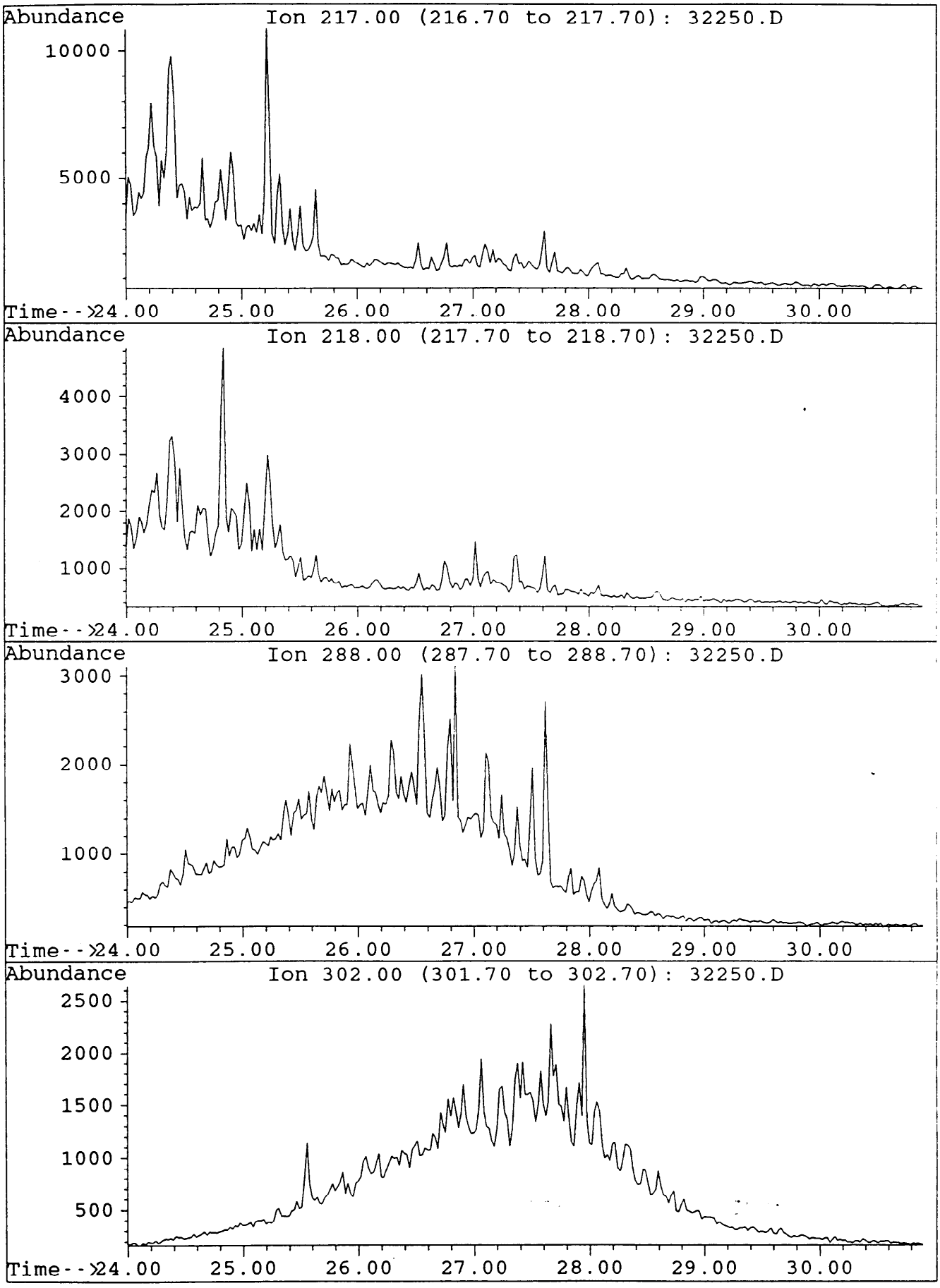

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Sample : MINERVA, 1860.3m B/C
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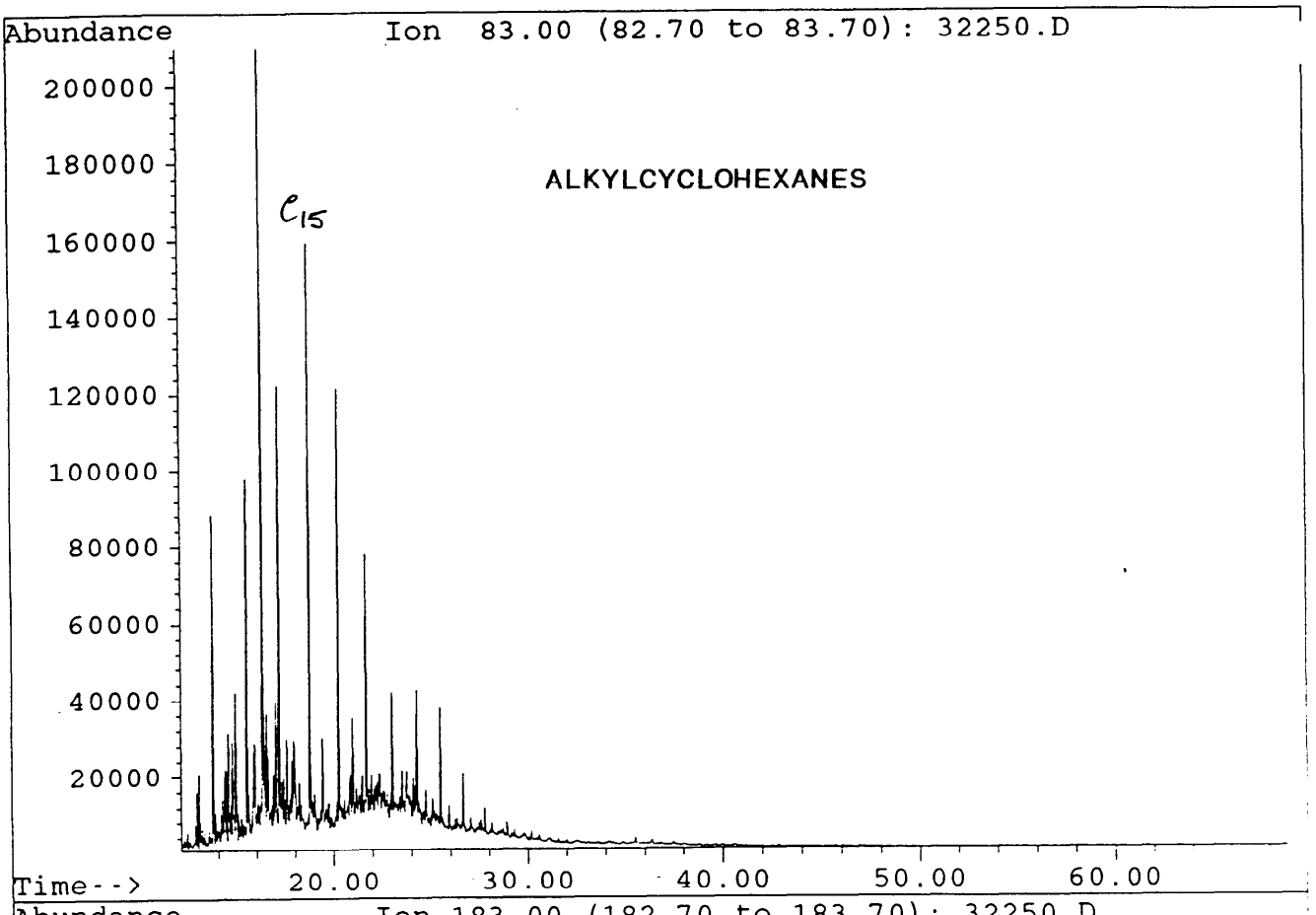

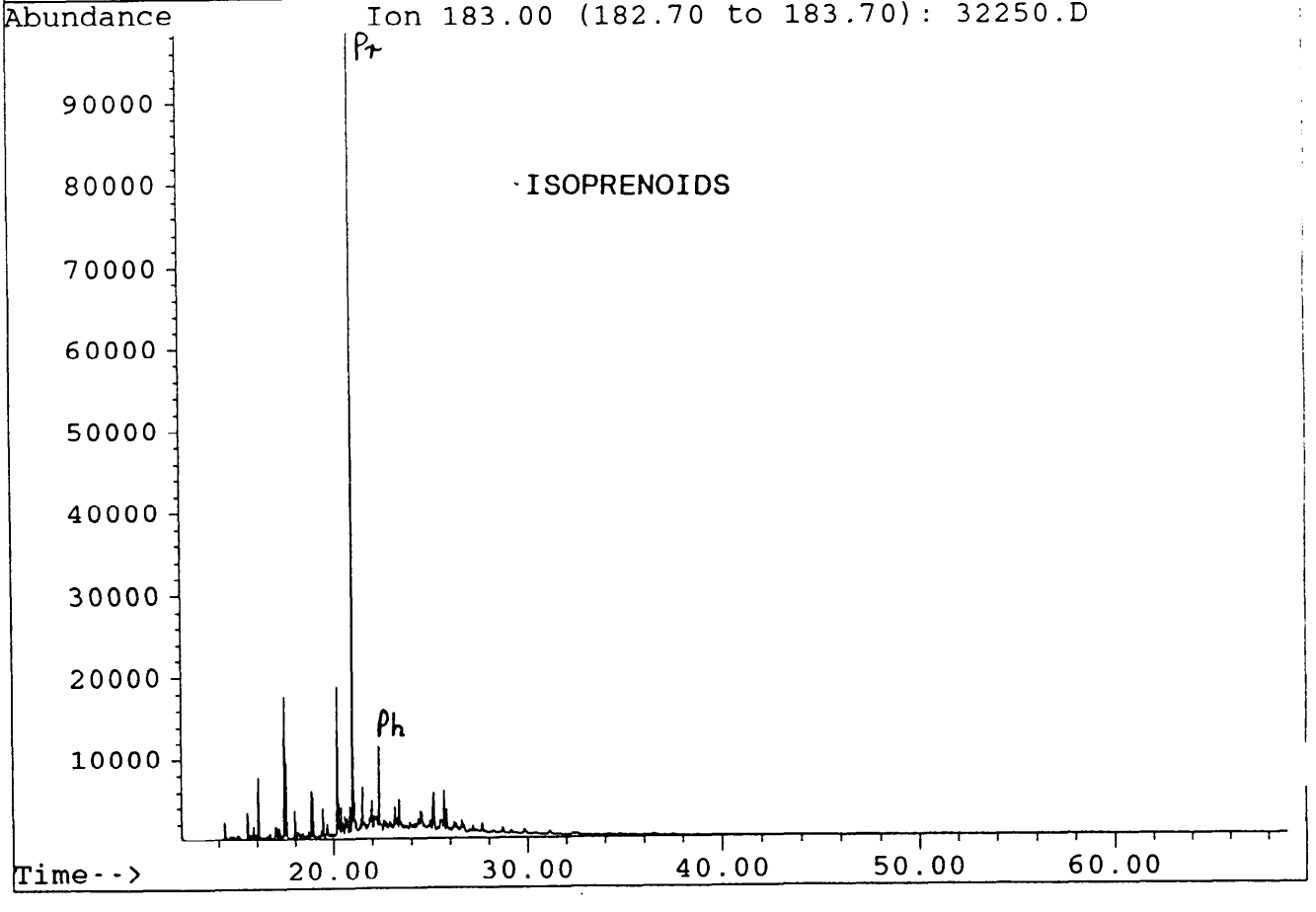

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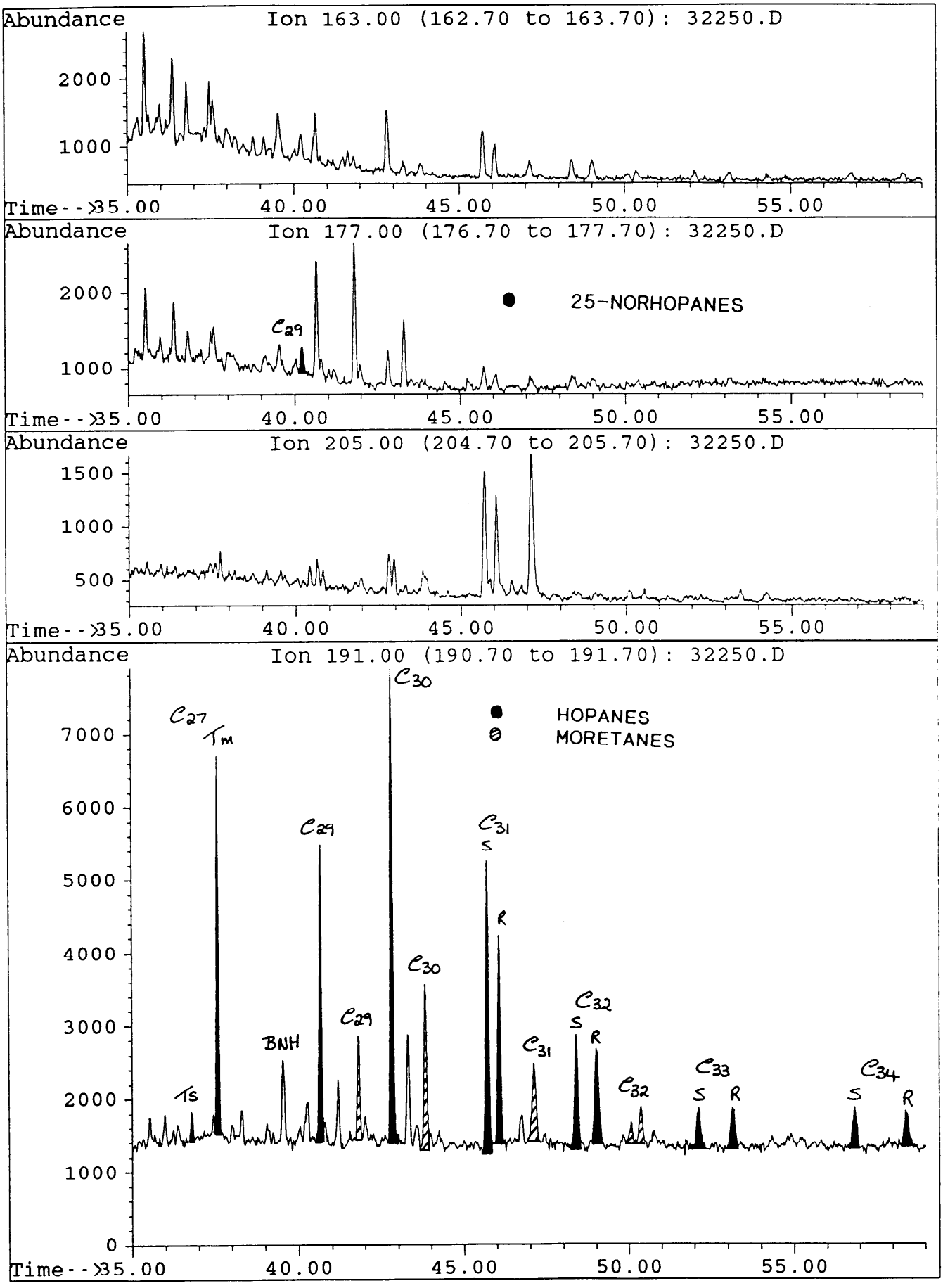

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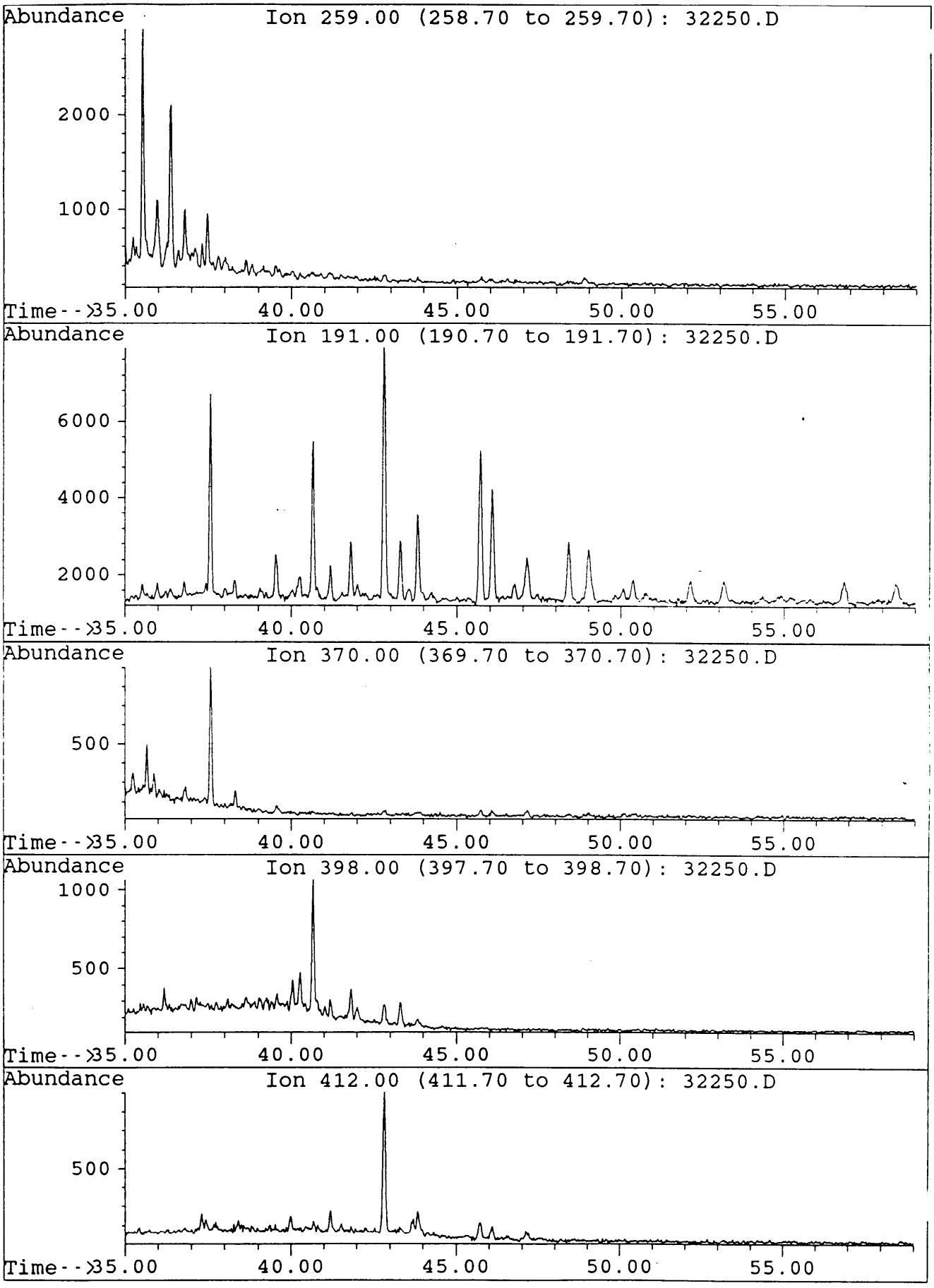

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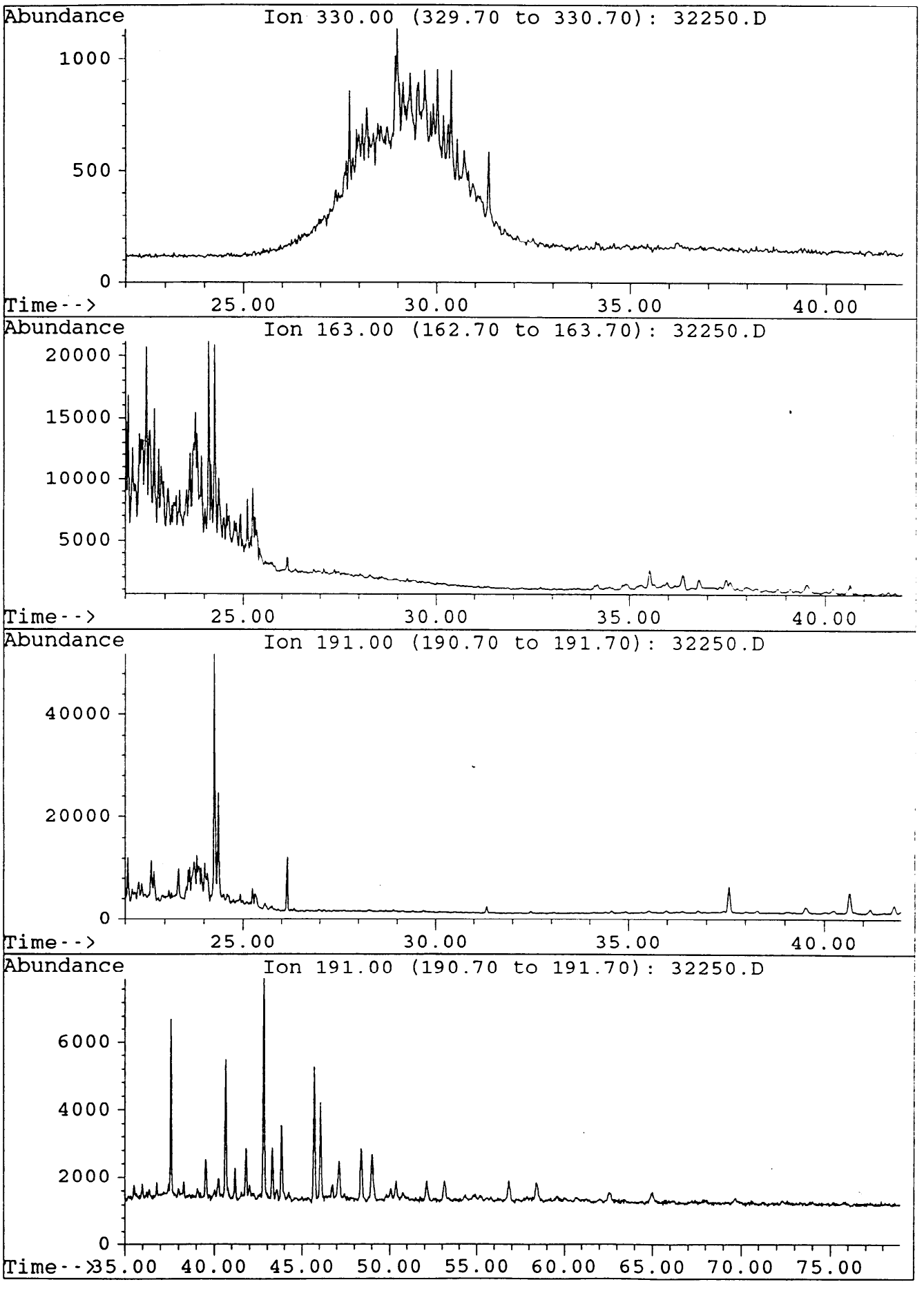

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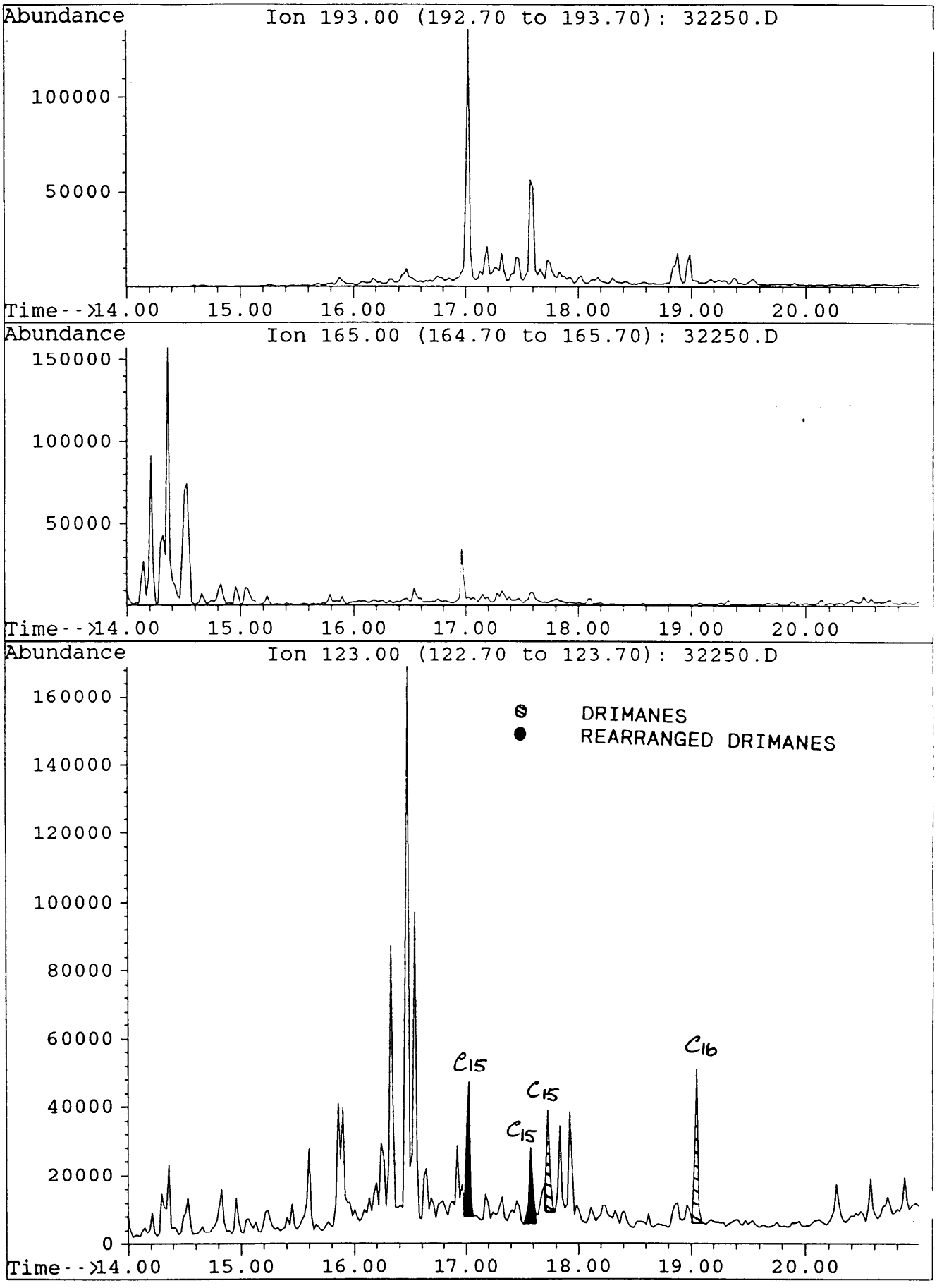

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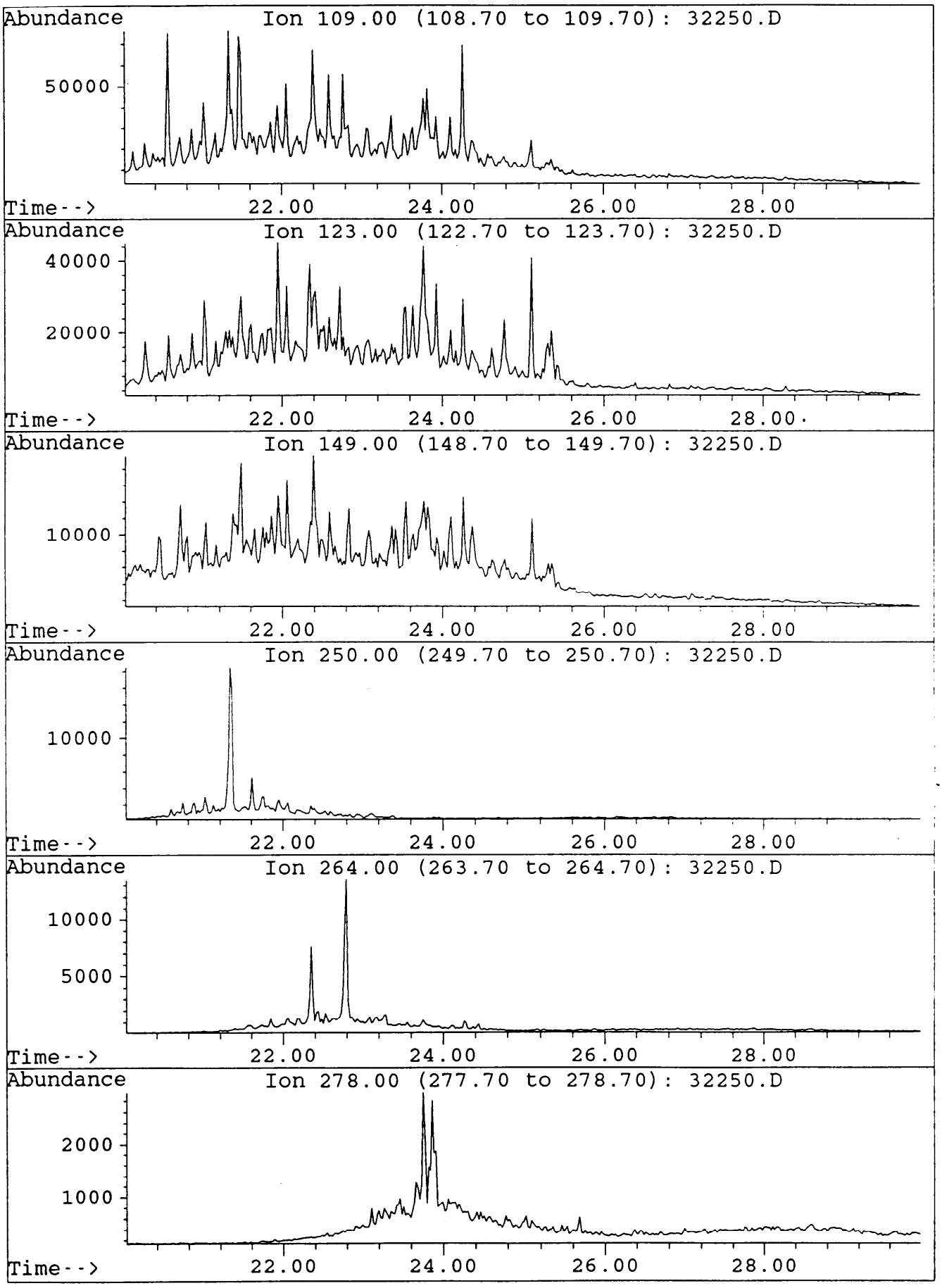

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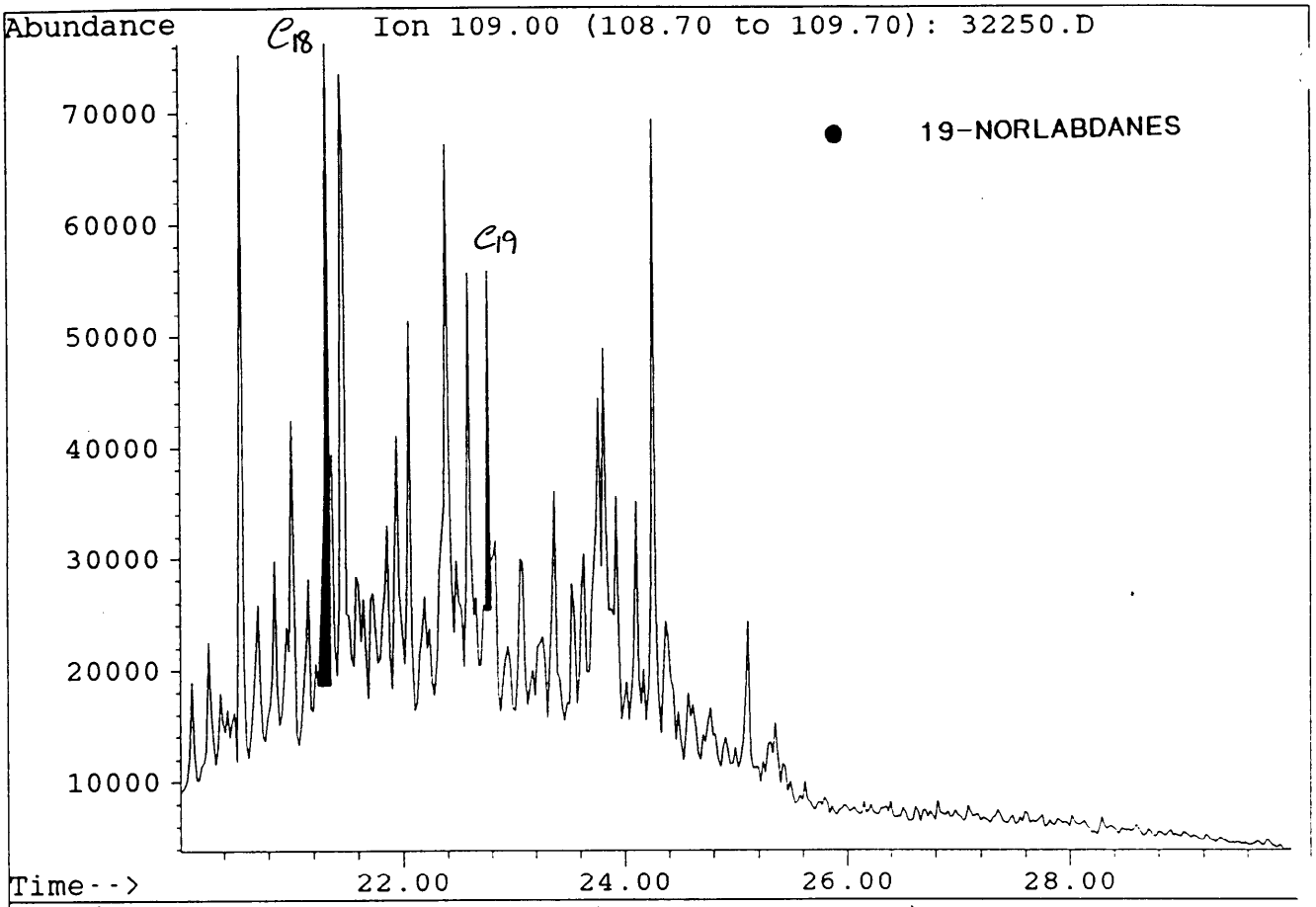

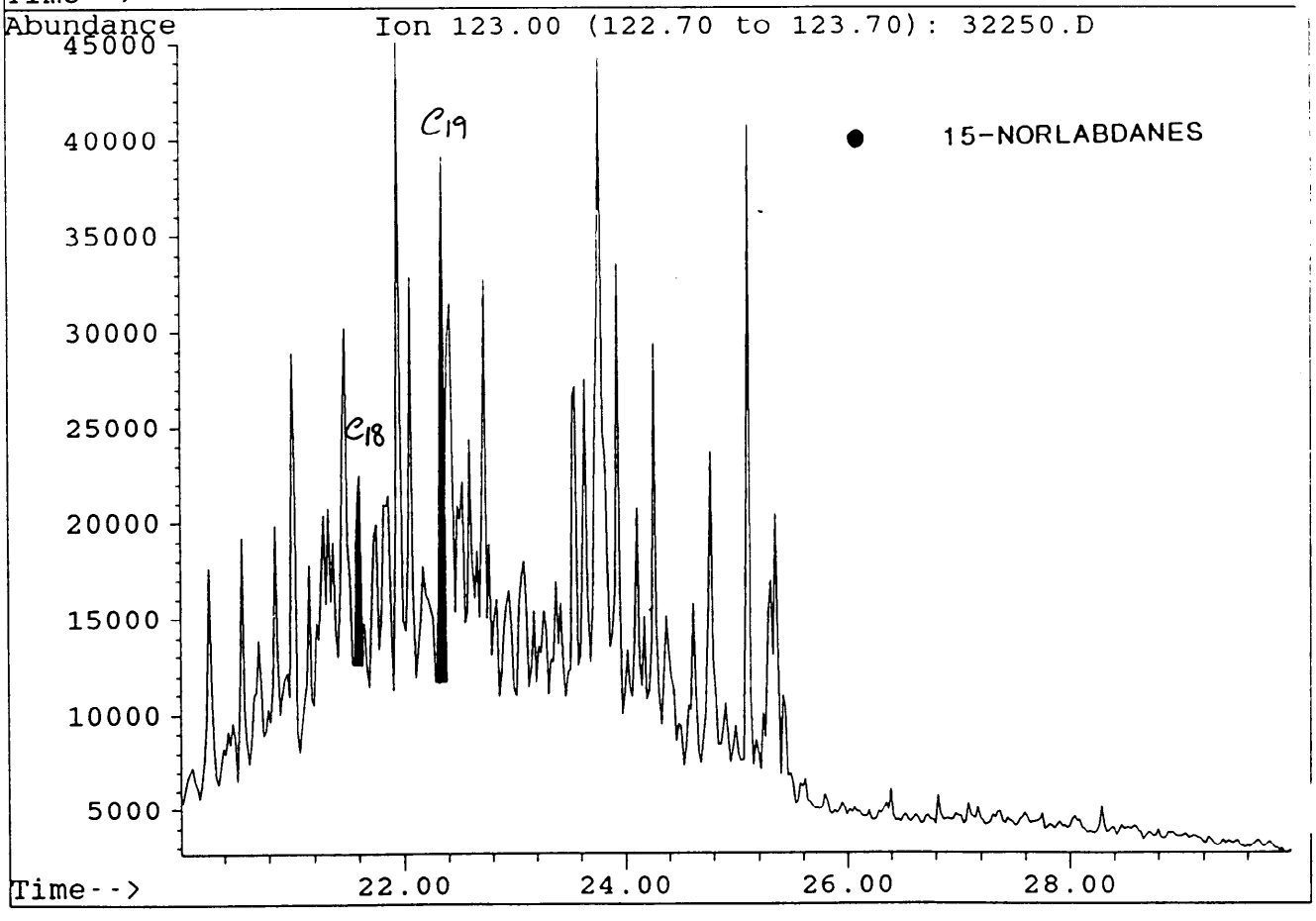

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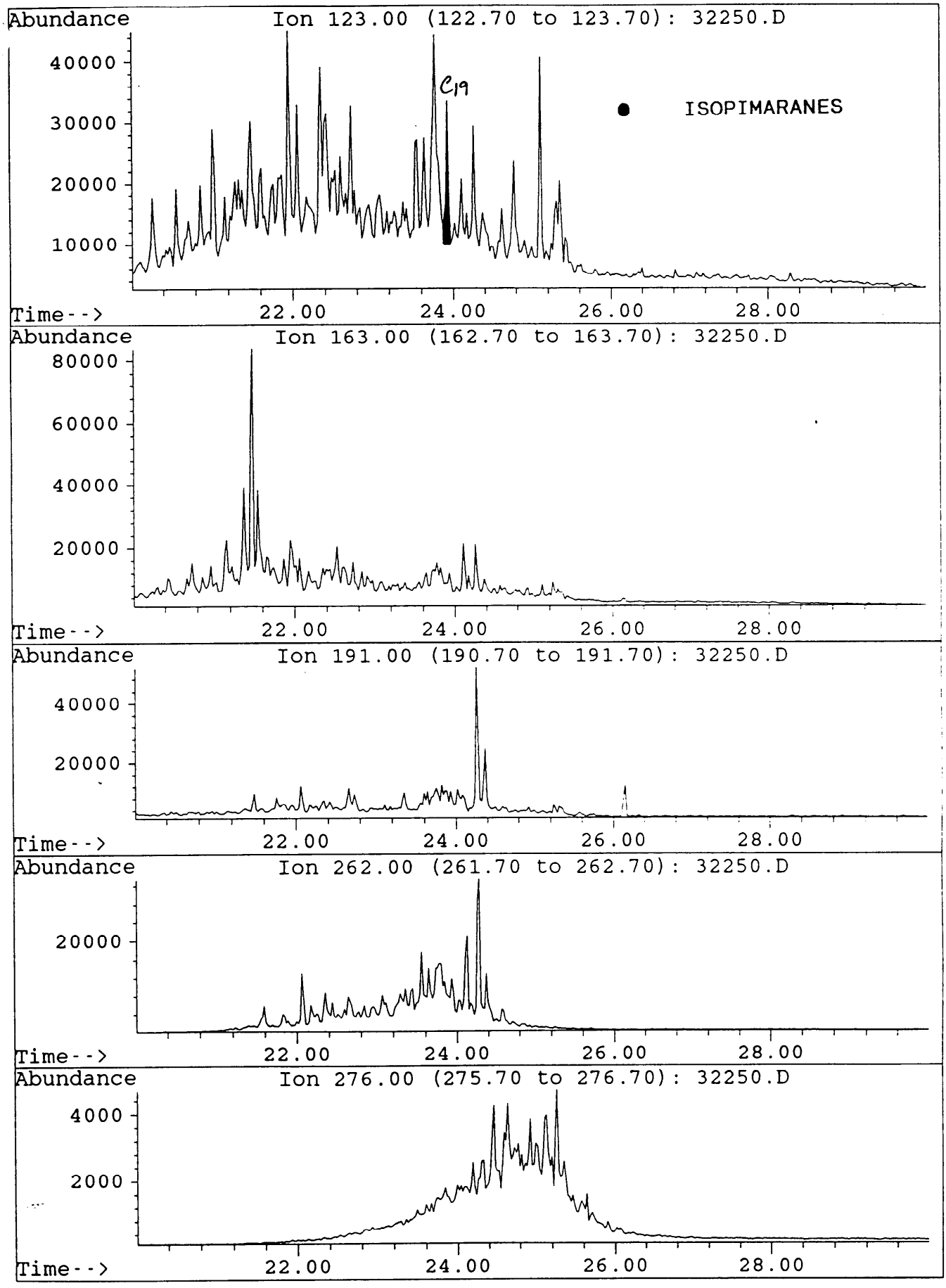

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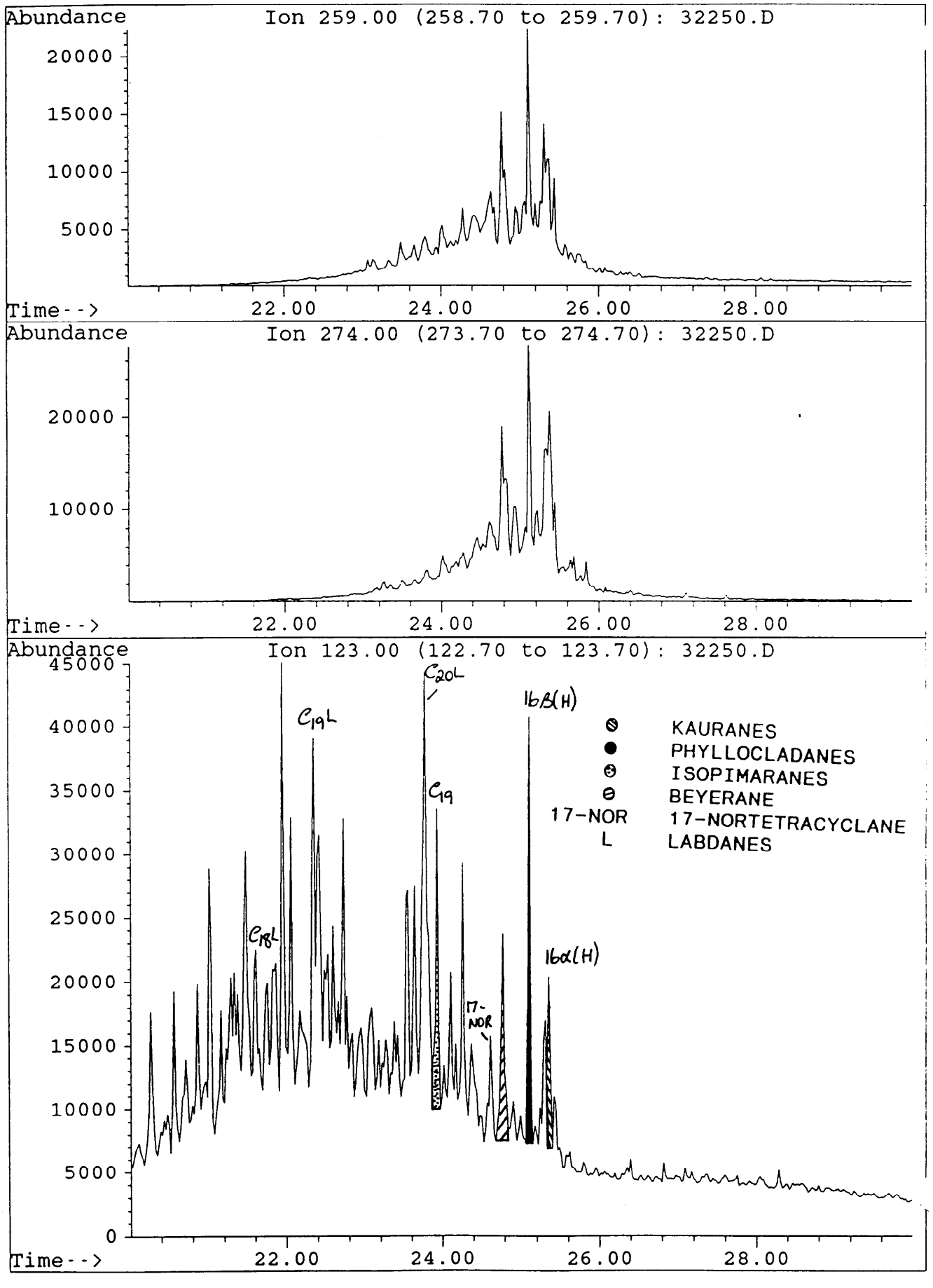

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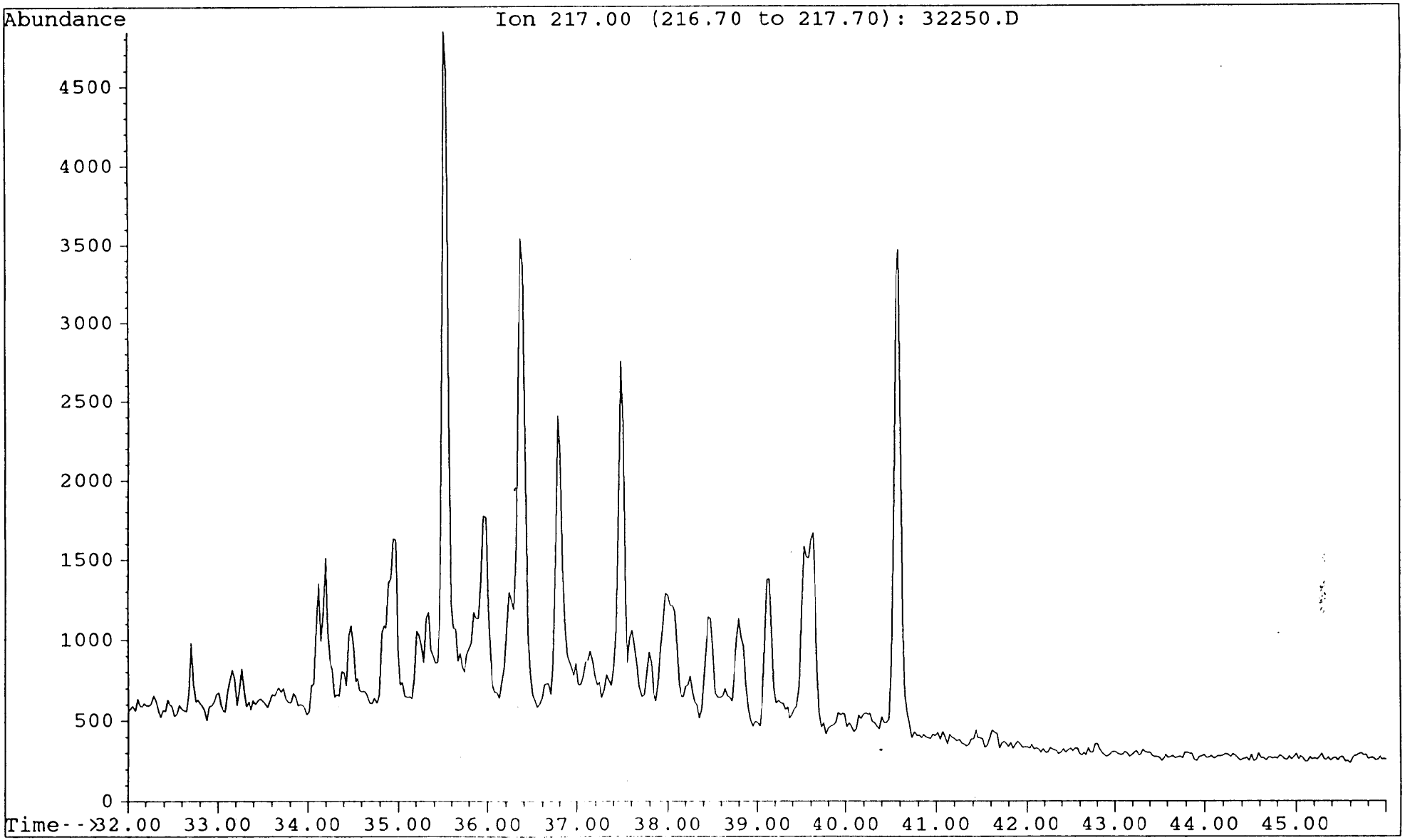

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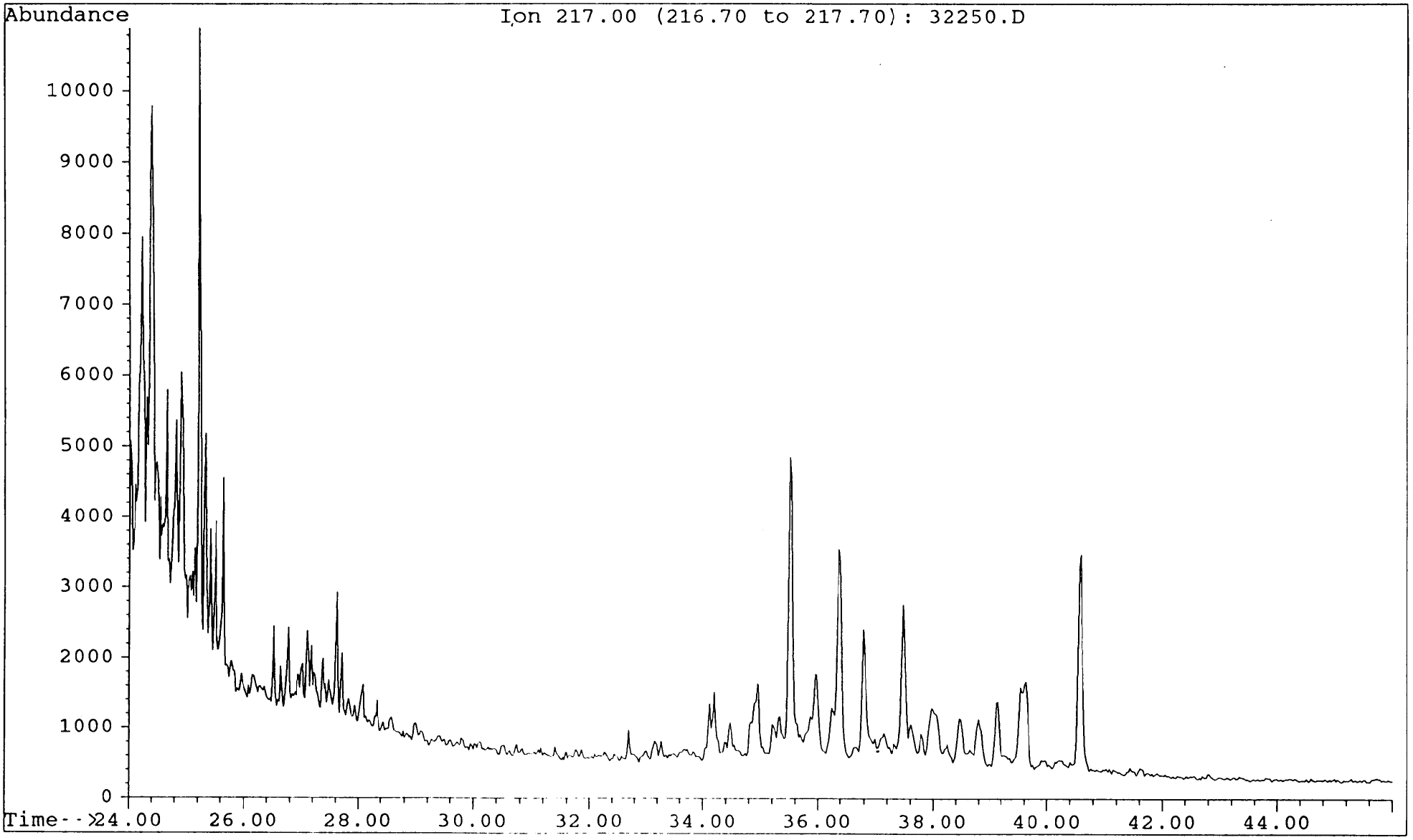

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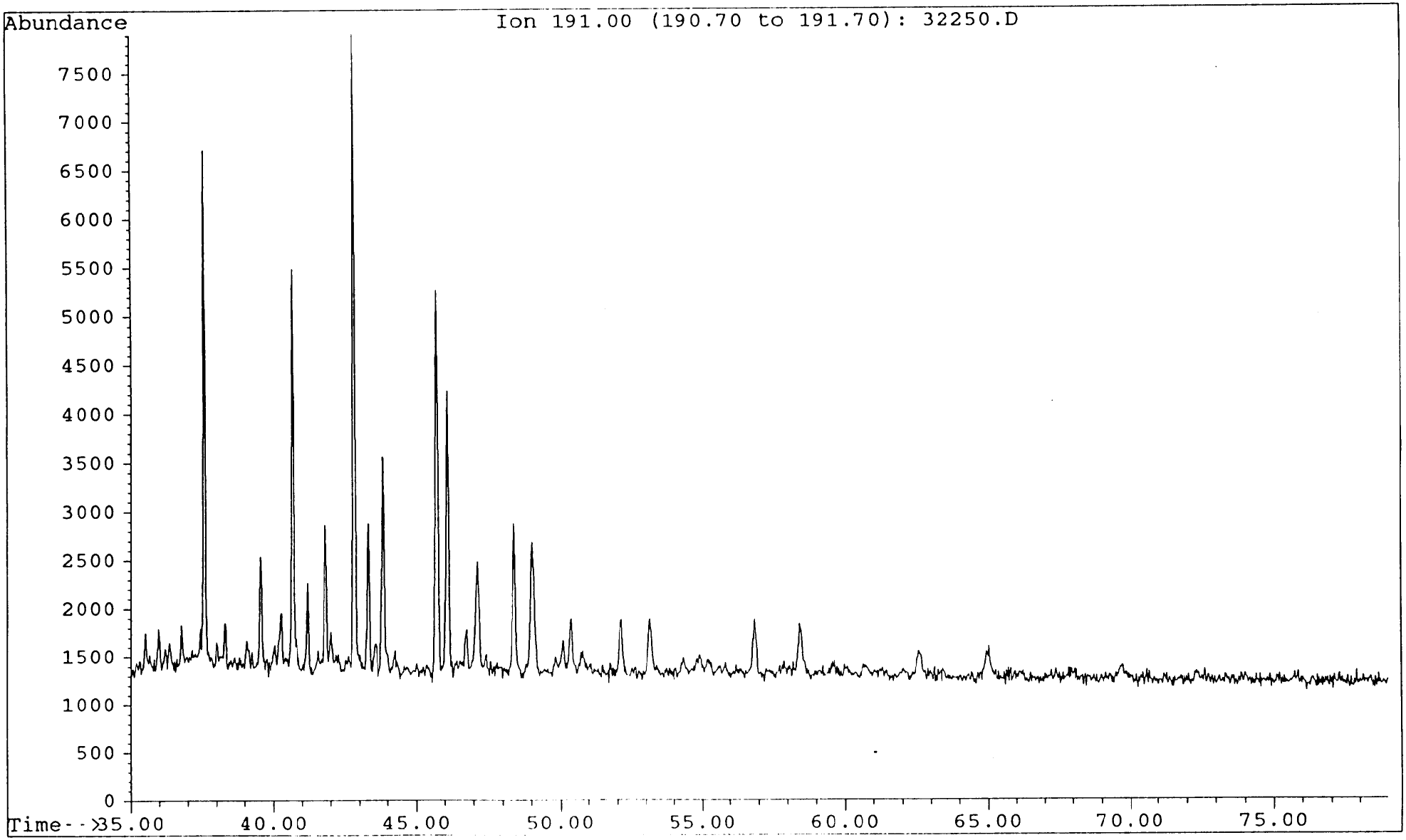

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Sample : MINERVA, 1860.3m B/C
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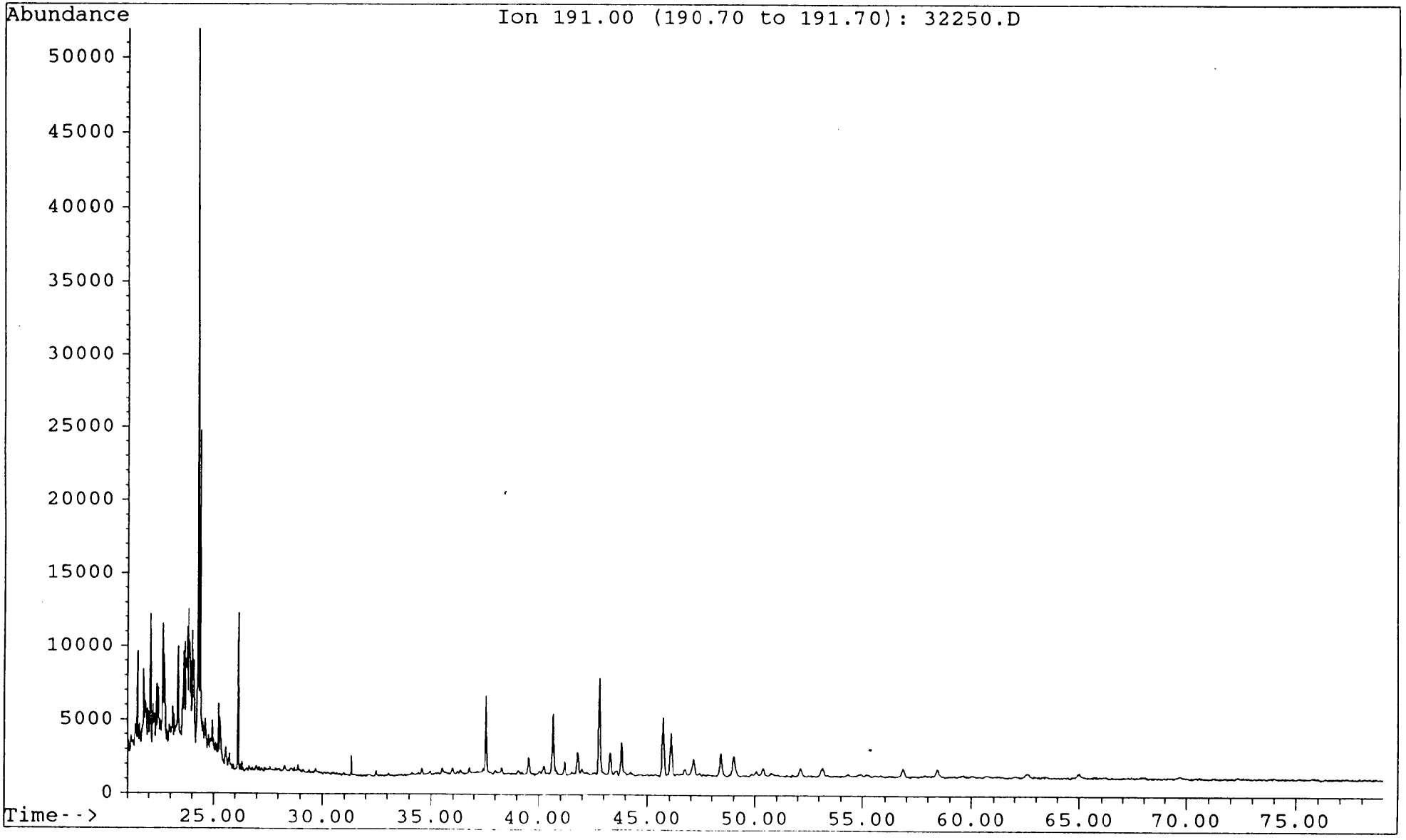
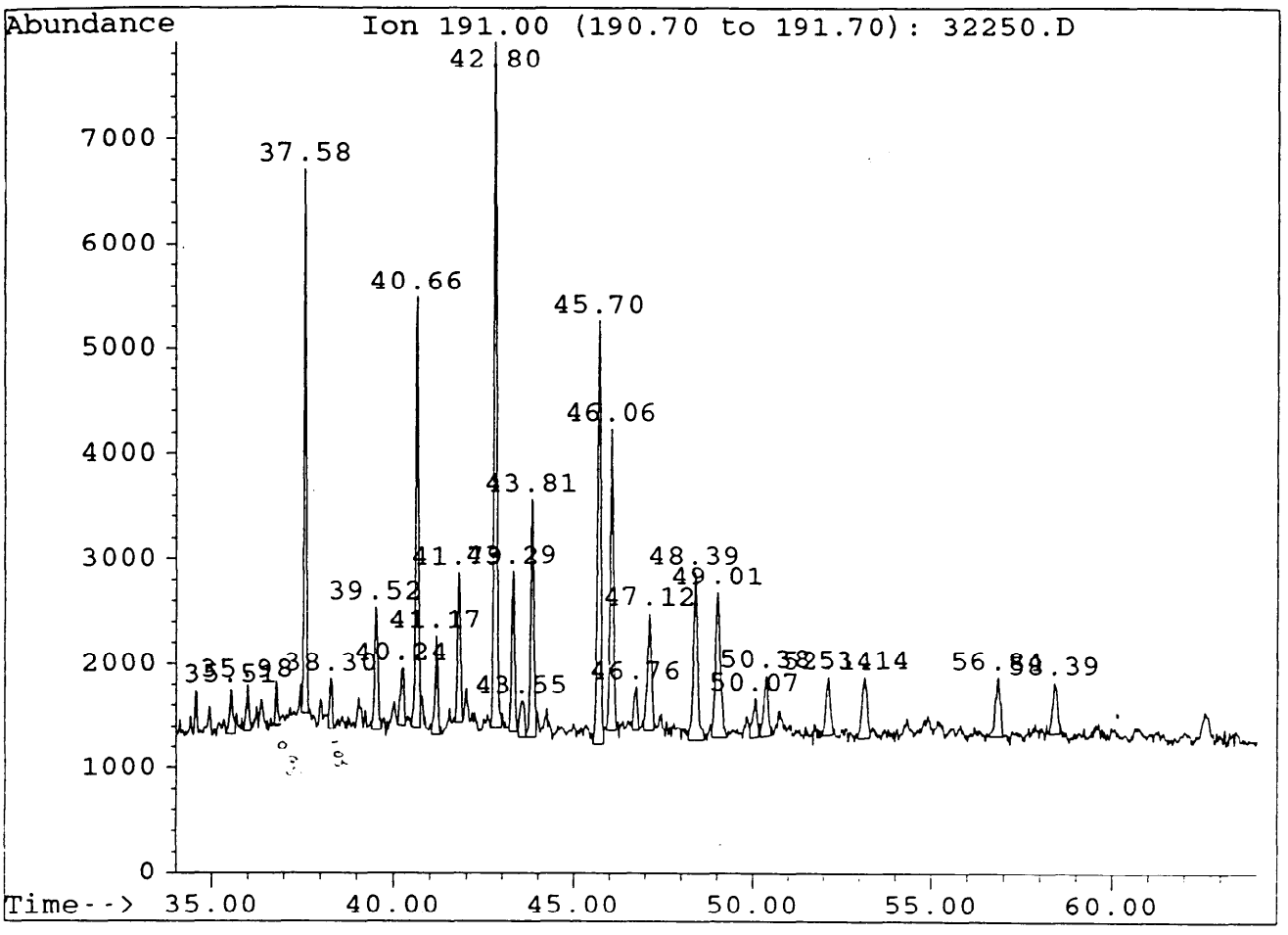
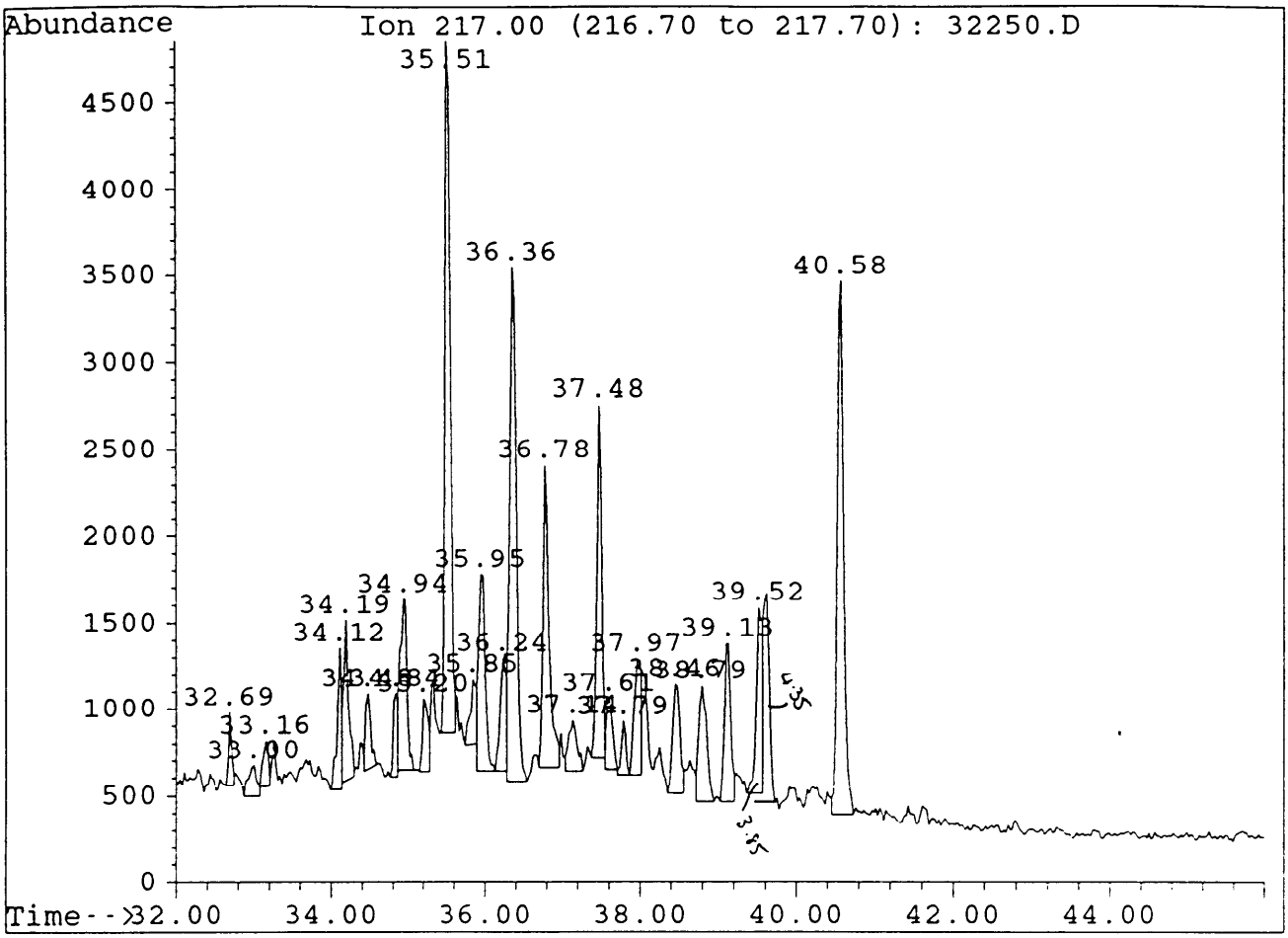




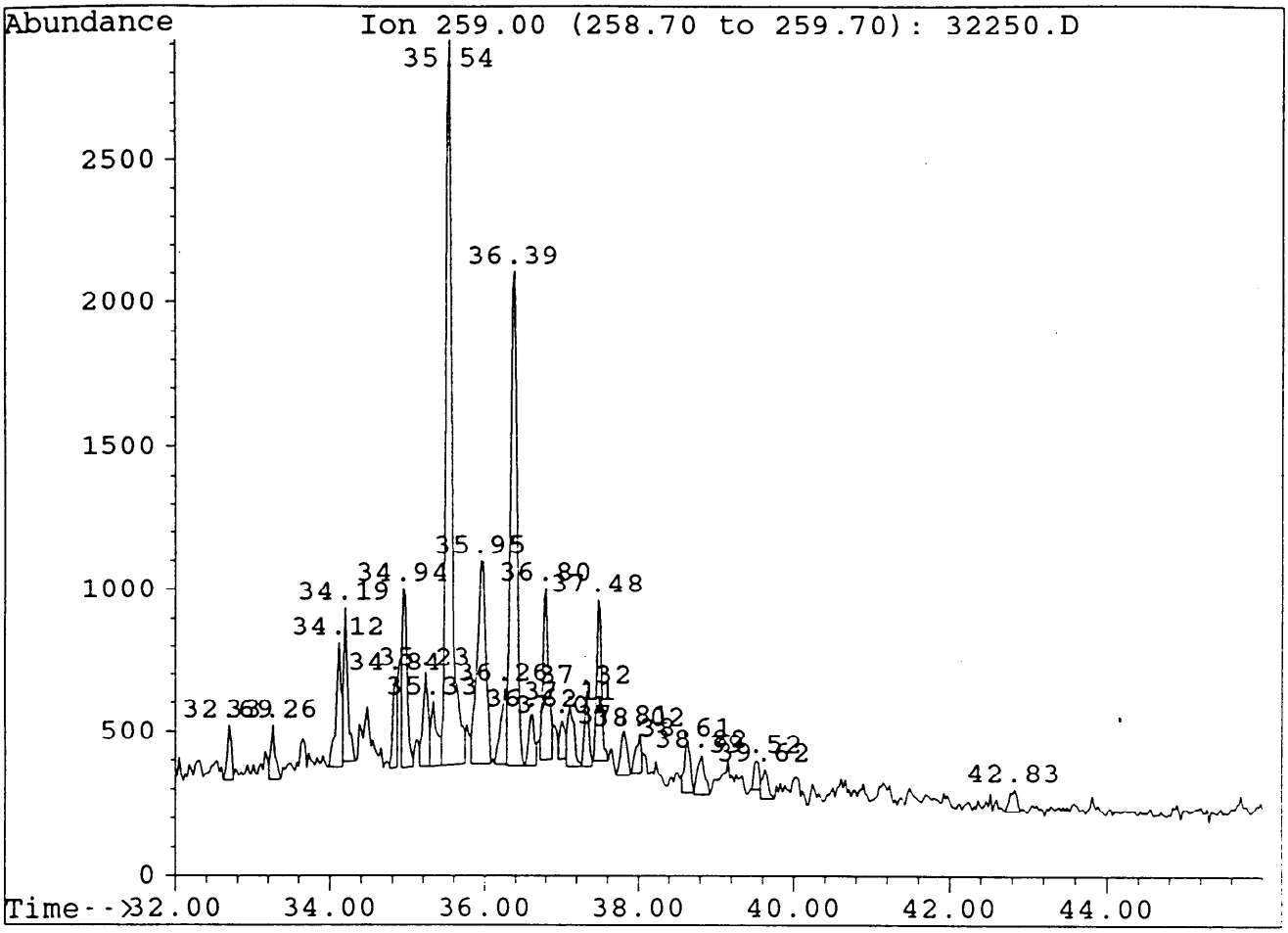
Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	35.51	3018	432	1.20	8.39
2	35.98	2351	443	0.94	6.53
3	37.58	21025	5185 Tm	8.39	58.42
4	38.30	2543	480	1.02	7.07
5	39.52	7393	1177 BUH	2.95	20.54
6	40.24	3841	552 2S-NOR	1.53	10.67
7	40.66	21464	4105 29H	8.57	59.64
8	41.17	5161	953 30dia	2.06	14.34
9	41.79	7728	1430 29M	3.09	21.47
10	42.80	35987	6522 30H	14.37	100.00
11	43.29	9259	1535	3.70	25.73
12	43.55	2908	346	1.16	8.08
13	43.81	14518	2270 30M	5.80	40.34
14	45.70	27230	4043 31S	10.87	75.67
15	46.06	18270	2877 31R	7.29	50.77
16	46.76	2819	423	1.13	7.83
17	47.12	9049	1123 31M	3.61	25.15
18	48.39	13314	1603 32S	5.32	37.00
19	49.01	13507	1390 32R	5.39	37.53
20	50.07	3283	384 32M	1.31	9.12
21	50.38	5058	589	2.02	14.06
22	52.14	4867	563	1.94	13.52
23	53.14	5807	597	2.32	16.14
24	56.84	5483	573	2.19	15.24
25	58.39	4610	499	1.84	12.81



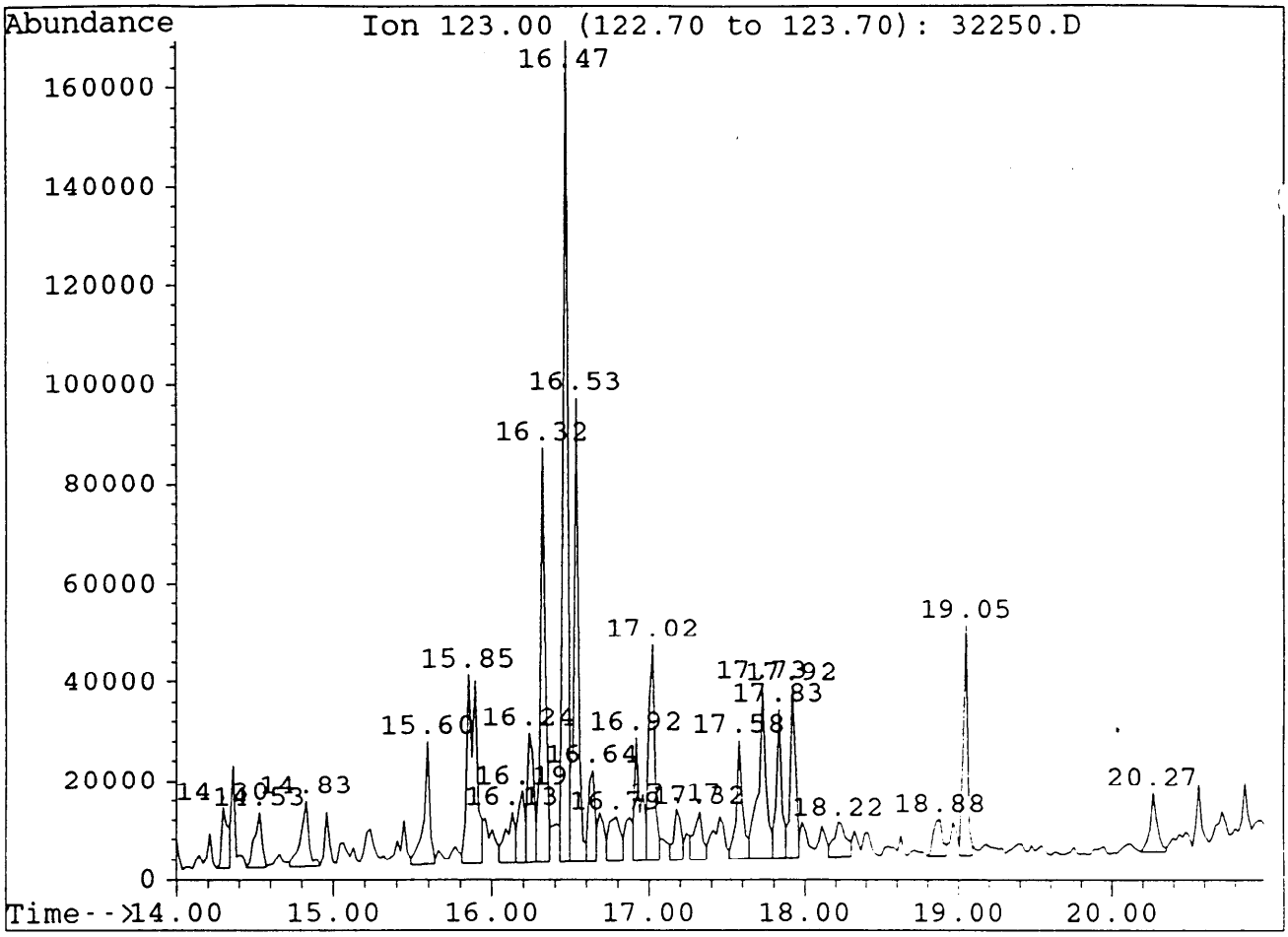
Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	32.69	1186	426	0.85	6.33
2	33.00	1323	174	0.95	7.06
3	33.16	1269	261	0.91	6.77
4	34.12	3412	819	2.45	18.20
5	34.19	3906	933	2.80	20.84
6	34.48	2061	419	1.48	10.99
7	34.84	2238	485	1.60	11.94
8	34.94	6067	991	4.35	32.37
9	35.20	2325	422	1.67	12.40
10	35.51	18745	3986 29dia S	13.44	100.00
11	35.85	2343	383	1.68	12.50
12	35.95	6274	1141	4.50	33.47
13	36.24	3934	661 27R	2.82	20.99
14	36.36	17373	2964 diaR	12.46	92.68
15	36.78	9684	1748	6.94	51.66
16	37.14	2233	294	1.60	11.91
17	37.48	9252	2041	6.63	49.36
18	37.61	2117	414	1.52	11.29
19	37.79	1282	310	0.92	6.84
20	37.97	4439	674	3.18	23.68
21	38.46	4234	632 28R	3.04	22.59
22	38.79	4716	670	3.38	25.16
23	39.13	5307	iso S = 4.35 / 3.85 * 2 → 912 29S	3.80	28.31
24	39.52	6316	1069 isoR	4.53	33.69
25	40.58	17448	3073 29R	12.51	93.08



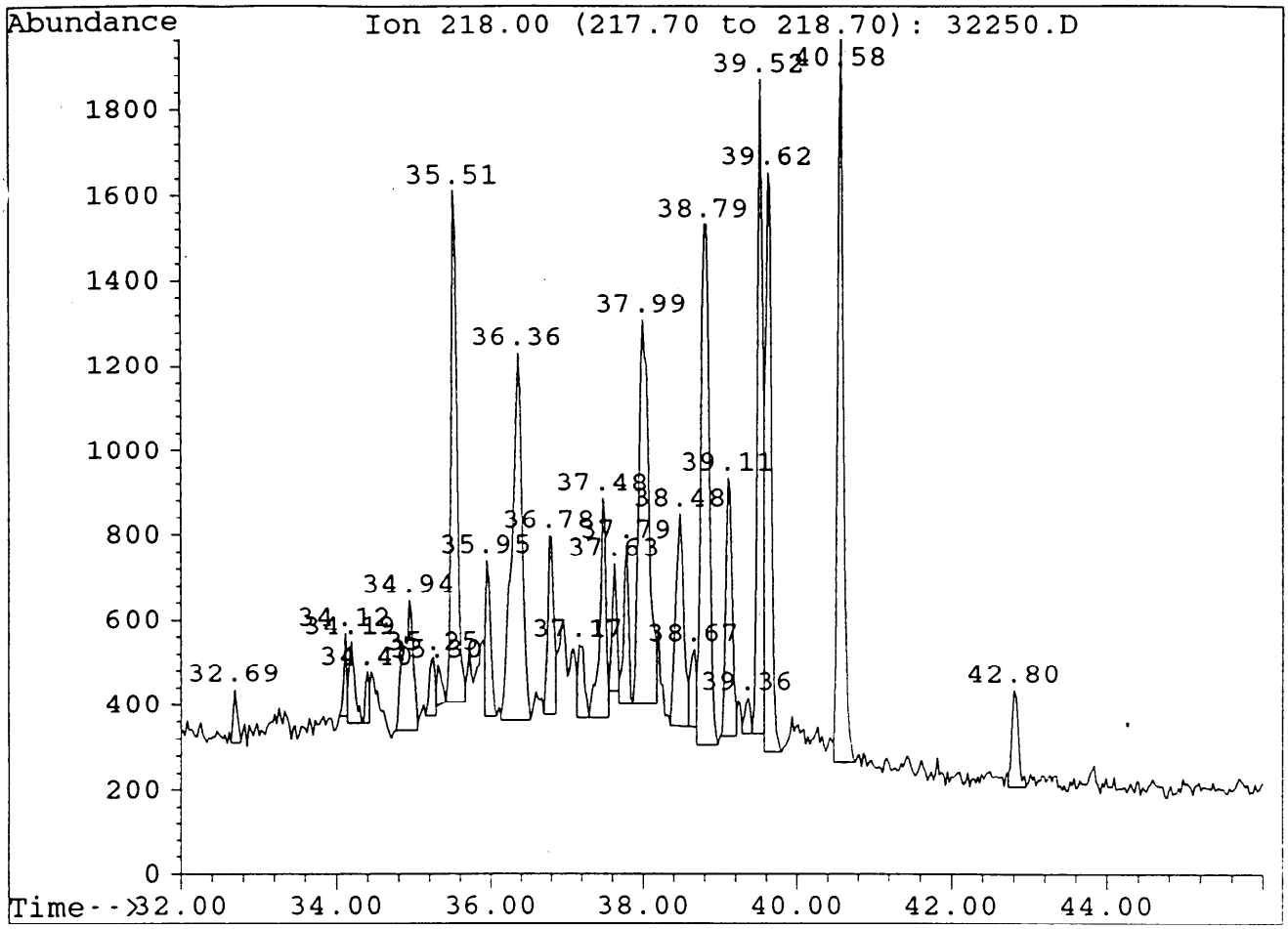
Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	32.69	706	192 22S	1.24	5.14
2	33.26	730	189 22R	1.28	5.31
3	34.12	2314	438	4.05	16.84
4	34.19	1700	540 28S	2.98	12.37
5	34.84	1411	316	2.47	10.27
6	34.94	2519	629 28R	4.41	18.34
7	35.23	1577	328	2.76	11.48
8	35.33	1292	223	2.26	9.40
9	35.54	13738	2532 29S	24.06	100.00
10	35.95	5470	711	9.58	39.82
11	36.26	1462	265	2.56	10.64
12	36.39	9785	1727 29R	17.13	71.23
13	36.62	964	177	1.69	7.02
14	36.80	3175	602	5.56	23.11
15	37.01	660	132	1.16	4.80
16	37.11	1172	204	2.05	8.53
17	37.32	975	262	1.71	7.10
18	37.48	2550	564	4.47	18.56
19	37.81	901	153	1.58	6.56
20	38.02	682	135	1.19	4.96
21	38.61	874	169	1.53	6.36
22	38.82	896	135	1.57	6.52
23	39.52	505	100	0.88	3.68
24	39.62	514	103	0.90	3.74
25	42.83	538	78	0.94	3.92



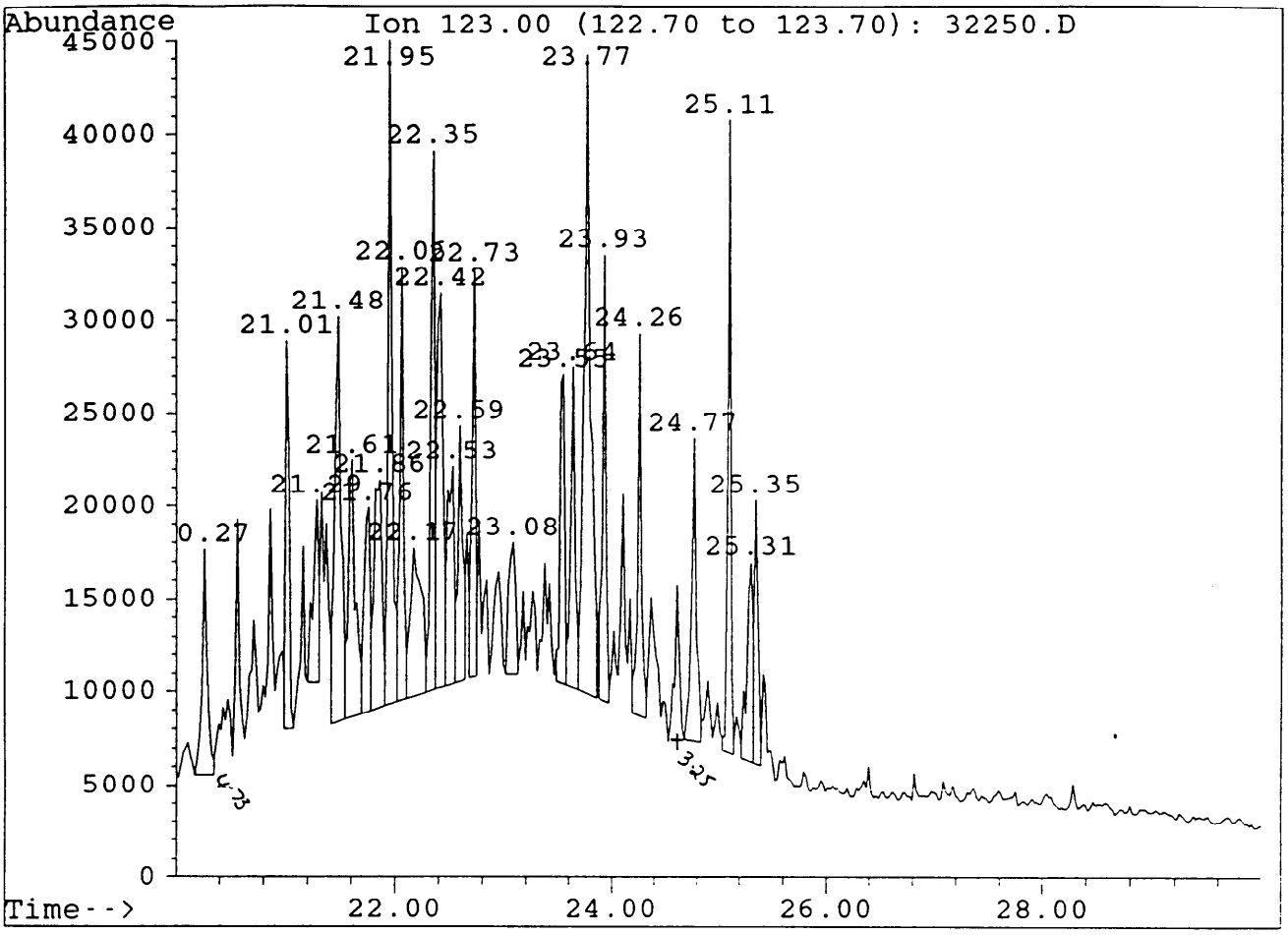
Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	14.30	37708	12435	1.78	11.18
2	14.53	36888	11166	1.74	10.94
3	14.83	48570	13411	2.30	14.40
4	15.60	66174	24969	3.13	19.62
5	15.85	159033	38172	7.52	47.15
6	16.13	41828	10249	1.98	12.40
7	16.19	43082	14545	2.04	12.77
8	16.24	71010	26292	3.36	21.05
9	16.32	183383	83978	8.67	54.37
10	16.47	337293	165762	15.94	100.00
11	16.53	185910	93857	8.79	55.12
12	16.64	52614	18577	2.49	15.60
13	16.79	45836	8929	2.17	13.59
14	16.92	72012	24944	3.40	21.35
15	17.02	116056	43647 R1	5.48	34.41
16	17.17	32476	10433	1.53	9.63
17	17.32	35386	9700	1.67	10.49
18	17.58	69736	24108 R2	3.30	20.68
19	17.73	121719	34912 D	5.75	36.09
20	17.83	71595	30168	3.38	21.23
21	17.92	83468	34391	3.94	24.75
22	18.22	39177	6811	1.85	11.62
23	18.88	31175	7401	1.47	9.24
24	19.05	94750	46676 HD	4.48	28.09
25	20.27	39224	12075	1.85	11.63



Sample : MINERVA, 1860.3m B/C

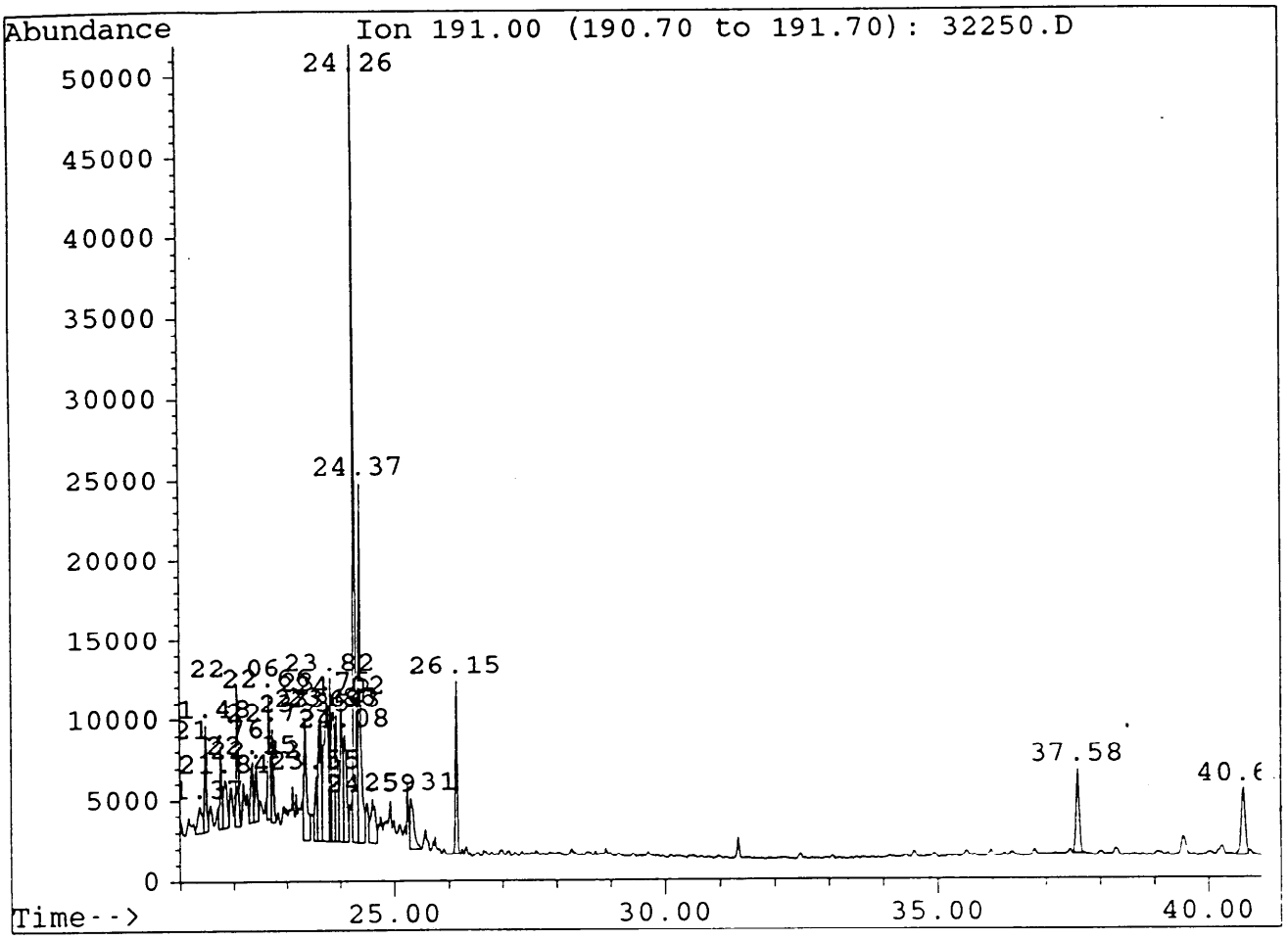
Peak	Ret.Time	Area	Height	Area %	Ratio %
1	32.69	465	127	0.56	4.96
2	34.12	563	196	0.68	6.01
3	34.19	913	192	1.10	9.74
4	34.40	460	121	0.55	4.91
5	34.94	2692	306	3.24	28.73
6	35.25	715	139	0.86	7.63
7	35.30	428	~~294~~ 27	0.52	4.57
8	35.51	6318	1207	7.61	67.44
9	35.95	1468	367	1.77	15.67
10	36.36	7990	869	9.62	85.28
11	36.78	2363	420	2.84	25.22
12	37.17	966	173	1.16	10.31
13	37.48	3037	517	3.66	32.42
14	37.63	1288	299 28	1.55	13.75
15	37.79	1732	371 28	2.09	18.49
16	37.99	8511	908	10.25	90.84
17	38.48	3710	498	4.47	39.60
18	38.67	937	181	1.13	10.00
19	38.79	9369	1226	11.28	100.00
20	39.11	3552	608	4.28	37.91
21	39.36	401	84	0.48	4.28
22	39.52	7816	1539 29	9.41	83.42
23	39.62	7050	1364 29	8.49	75.25
24	40.58	8981	1699	10.81	95.86
25	42.80	1344	228	1.62	14.35



Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	20.27	39224	12075	2.65	25.13
2	21.01	47233	20946	3.19	30.26
3	21.29	37765	9854	2.55	24.19
4	21.48	89866	21872	6.08	57.56
5	21.61	62189	13828	4.21	39.84
6	21.76	42065	10997	2.85	26.95
7	21.86	63821	12294	4.32	40.88
8	21.95	97158	35741	6.57	62.24
9	22.06	56091	23367	3.79	35.93
10	22.17	56236	7863	3.80	36.02
11	22.35	85520	29088	5.78	54.78
12	22.42	78087	21277	5.28	50.02
13	22.53	48611	11720	3.29	31.14
14	22.59	42313	13756	2.86	27.10
15	22.73	48253	22013	3.26	30.91
16	23.08	30873	7041	2.09	19.78
17	23.55	49160	16606	3.32	31.49
18	23.64	50625	17197	3.42	32.43
19	23.77	156114	34233	10.56	100.00
20	23.93	51978	23988 19 nor iso	3.52	33.29
21	24.26	50480	20601	3.41	32.34
22	24.77	52003	16280 B	3.52	33.31
23	25.11	69142	34084 P	4.68	44.29
24	25.31	43260	10684	2.93	27.71
25	25.35	30433	14263 K	2.06	19.49

17-NOR = 3·25 / 4·73 * 12075



Sample : MINERVA, 1860.3m B/C

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	21.37	9676	1728	1.45	7.90
2	21.48	15182	6609	2.28	12.39
3	21.76	14878	5187	2.23	12.14
4	21.84	13133	2997	1.97	10.72
5	22.06	20737	8834	3.11	16.93
6	22.35	13360	3817	2.01	10.91
7	22.42	10639	3500	1.60	8.68
8	22.66	23487	7748	3.53	19.17
9	22.73	13936	5805	2.09	11.38
10	23.35	27309	7476	4.10	22.29
11	23.55	13155	4007	1.98	10.74
12	23.64	30709	7844	4.61	25.07
13	23.75	53083	8864	7.97	43.33
14	23.82	22386	10114	3.36	18.27
15	23.86	27025	7963	4.06	22.06
16	23.93	21494	7832	3.23	17.54
17	24.02	31412	8660	4.72	25.64
18	24.08	20947	6643	3.14	17.10
19	24.26	122508	49552	18.39	100.00
20	24.37	63423	22450	9.52	51.77
21	24.59	15831	2733	2.38	12.92
22	25.31	14717	3171	2.21	12.01
23	26.15	24697	10628	3.71	20.16
24	37.58	21000	5185	3.15	17.14
25	40.66	21330	4091	3.20	17.41

TABLE 3

SELECTED AROMATIC PARAMETERS

MINERVA 2A Jan-94

DEPTH	TYPE	DNR-1	DNR-5	DNR-6	TNR-1	TNR-5	TNR-6	MPR-1	MPI-1	MPI-2	Rc(a)	Rc(b)
1860.3m	Core	2.08	124.4	1.06	0.41	12.99	nd	1.52	0.39	0.48	0.64	2.06

response factors have been applied to DNR 6, TNR 1, TNR 5, MPI 1 and MPI 2

TABLE 3

SELECTED AROMATIC PARAMETERS CONT.

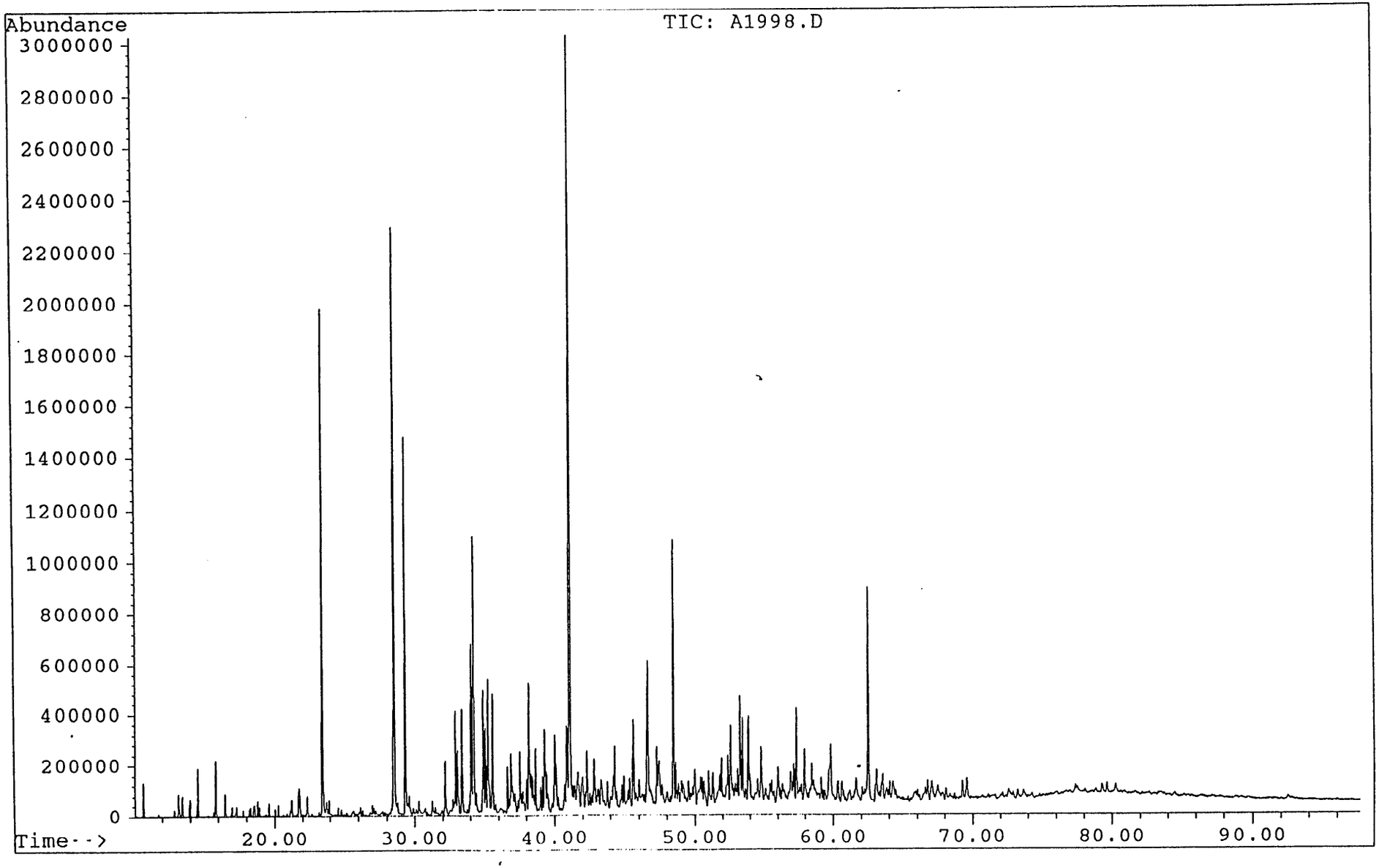
MINERVA 2A Jan-94

DEPTH	TYPE	1,7-DMP/X (m/z 206)	RETENE/9-MP (m/z 219,192)	1MP/9MP
1860.3m	Core	2.58	0.86	0.71

nd = no data

MNV2-2A/PE900117/P350

File : A1998.D
Sampl : MINERVA#24, 1860.3m, AROS.
Misc. Info : COL#155. 11-1-94. GEC.



File : A1998.D
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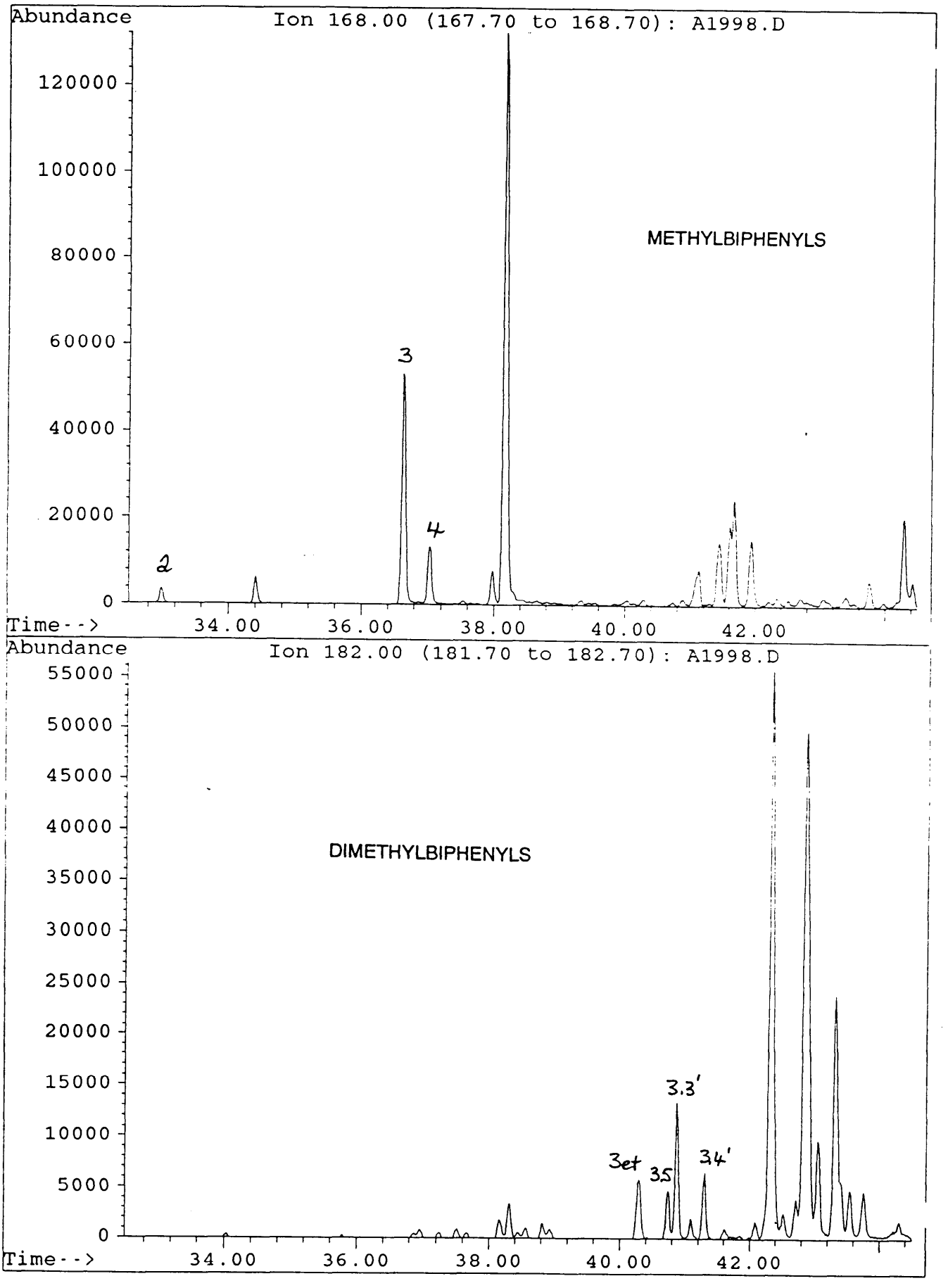
Misc. Info : COL#155. 11-1-94. GEC.



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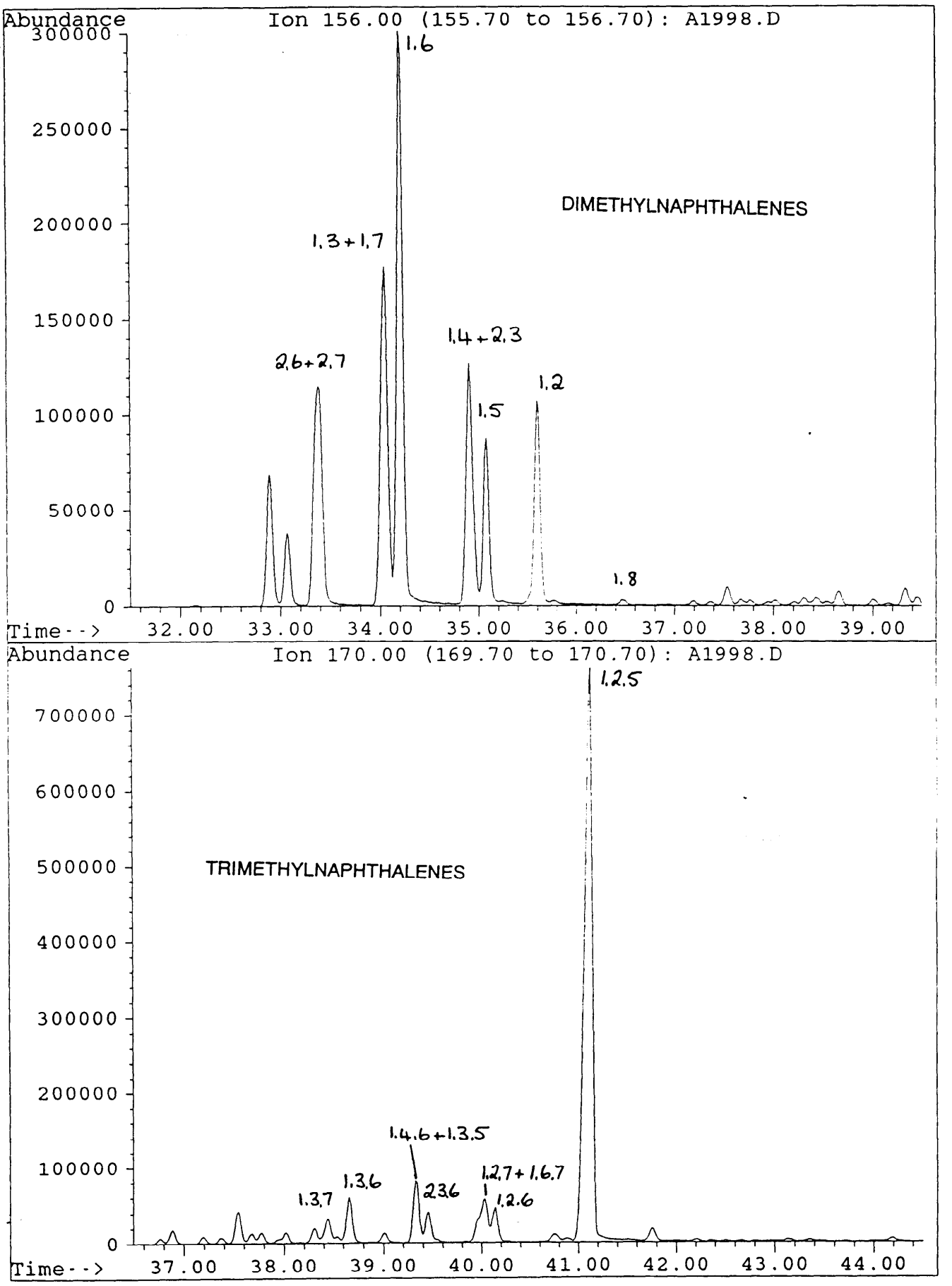

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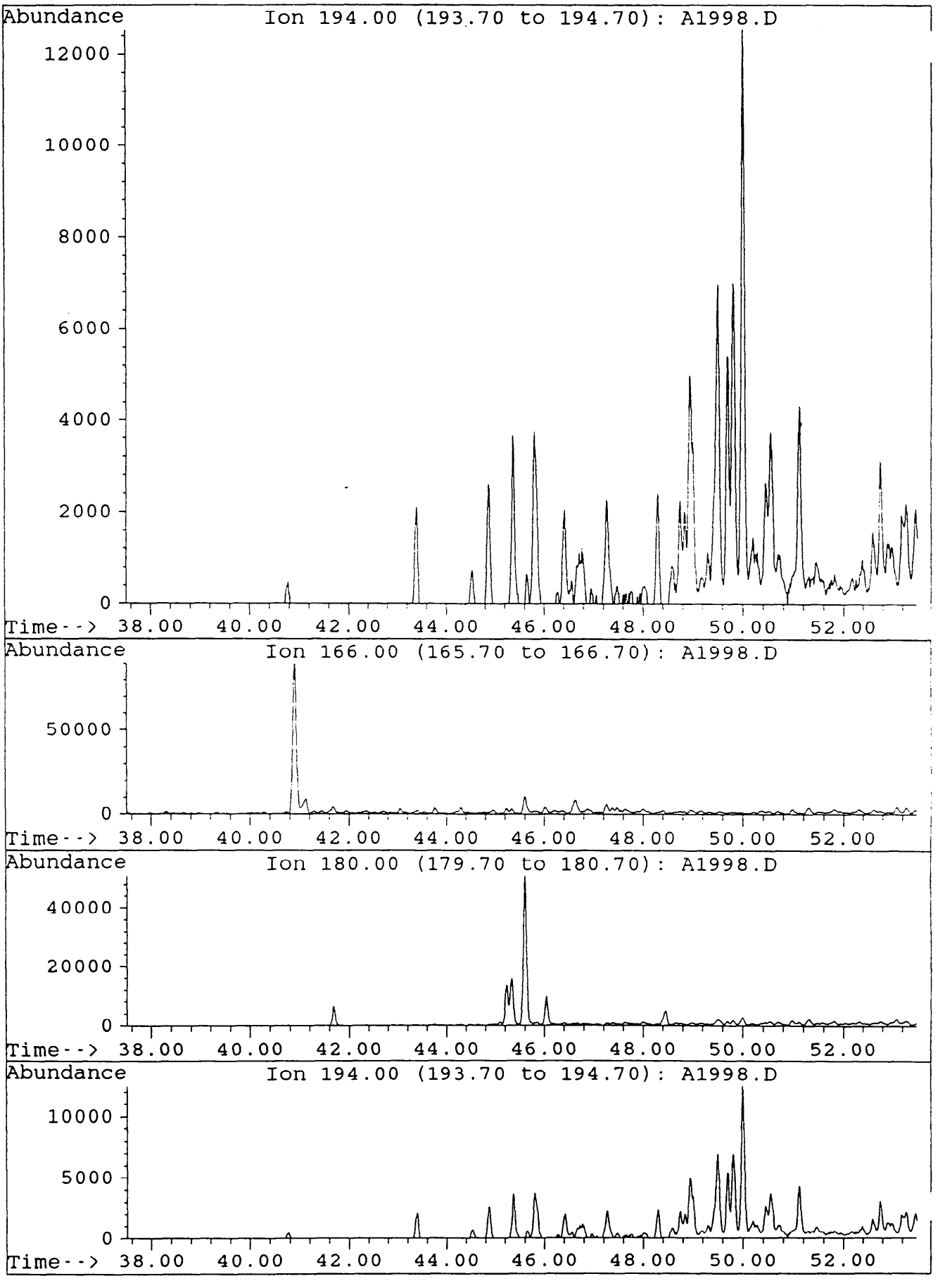
Sample : MINERVA#24, 1860.3m, AROS.
Misc. Info : COL#155. 11-1-94. GEC.

FLUORENES



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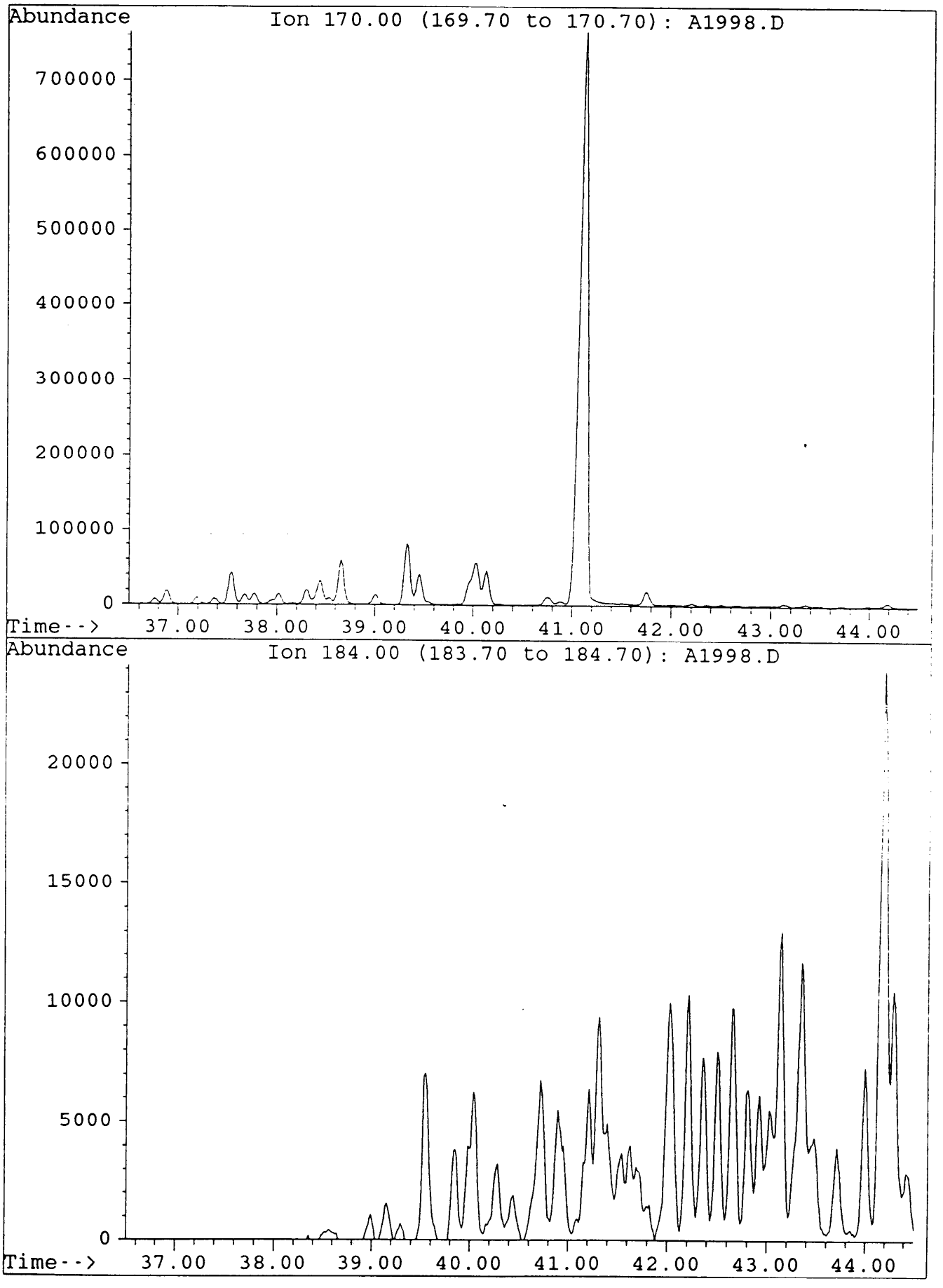
Misc. Info : COL#155. 11-1-94. GEC.



File : A1998.D
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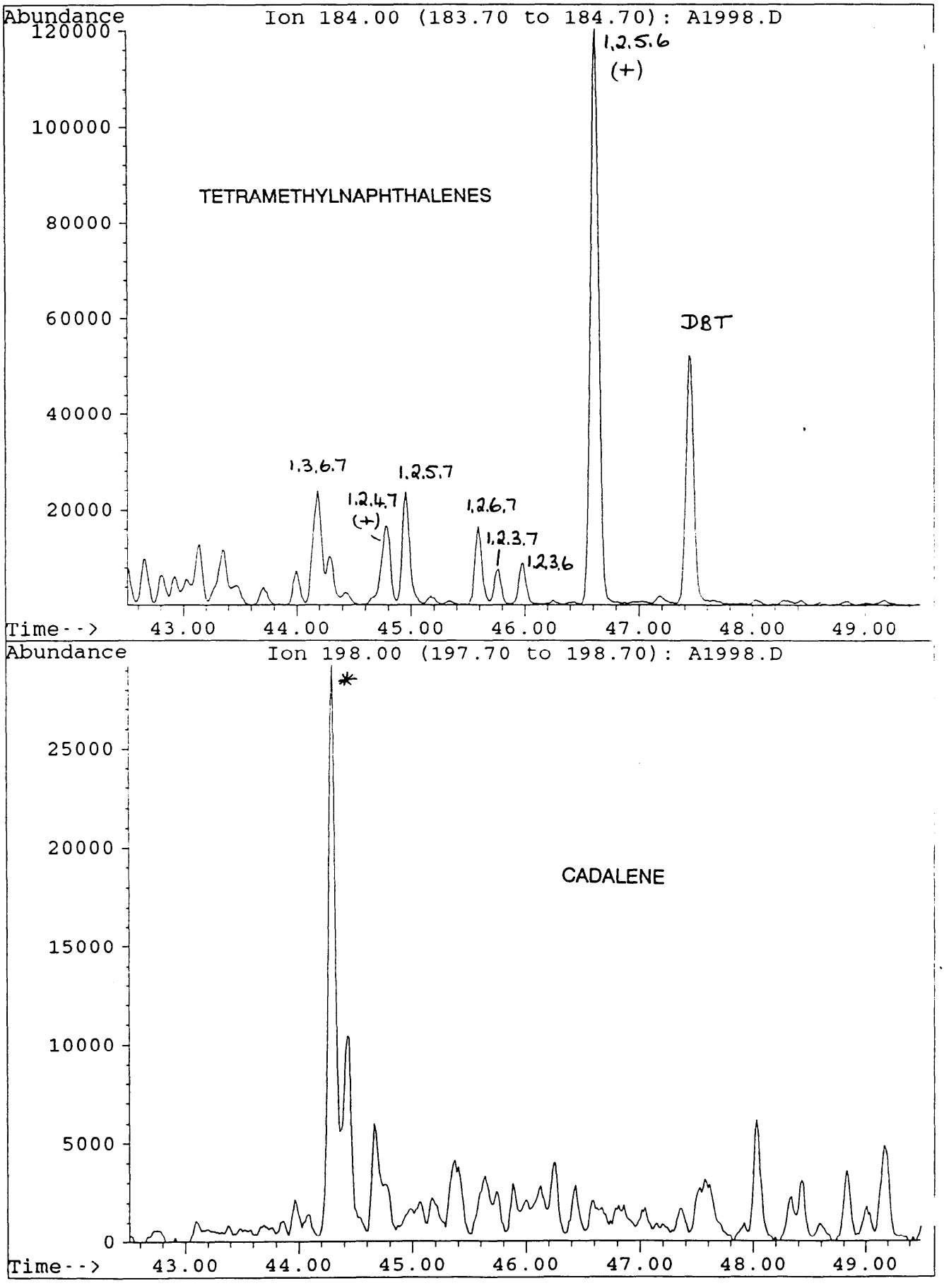
Misc. Info : COL#155. 11-1-94. GEC.



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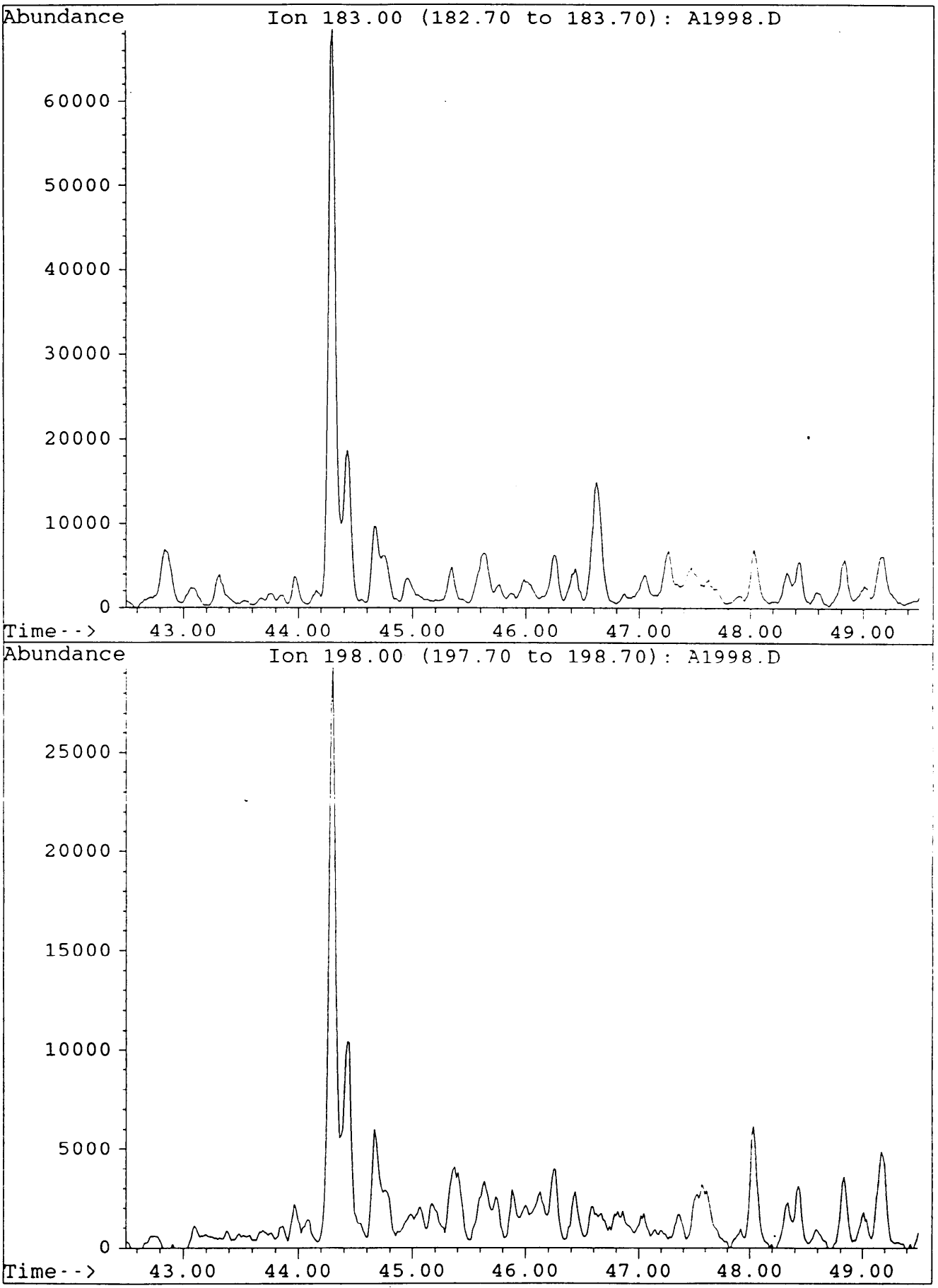
Misc. Info : COL#155. 11-1-94. GEC.



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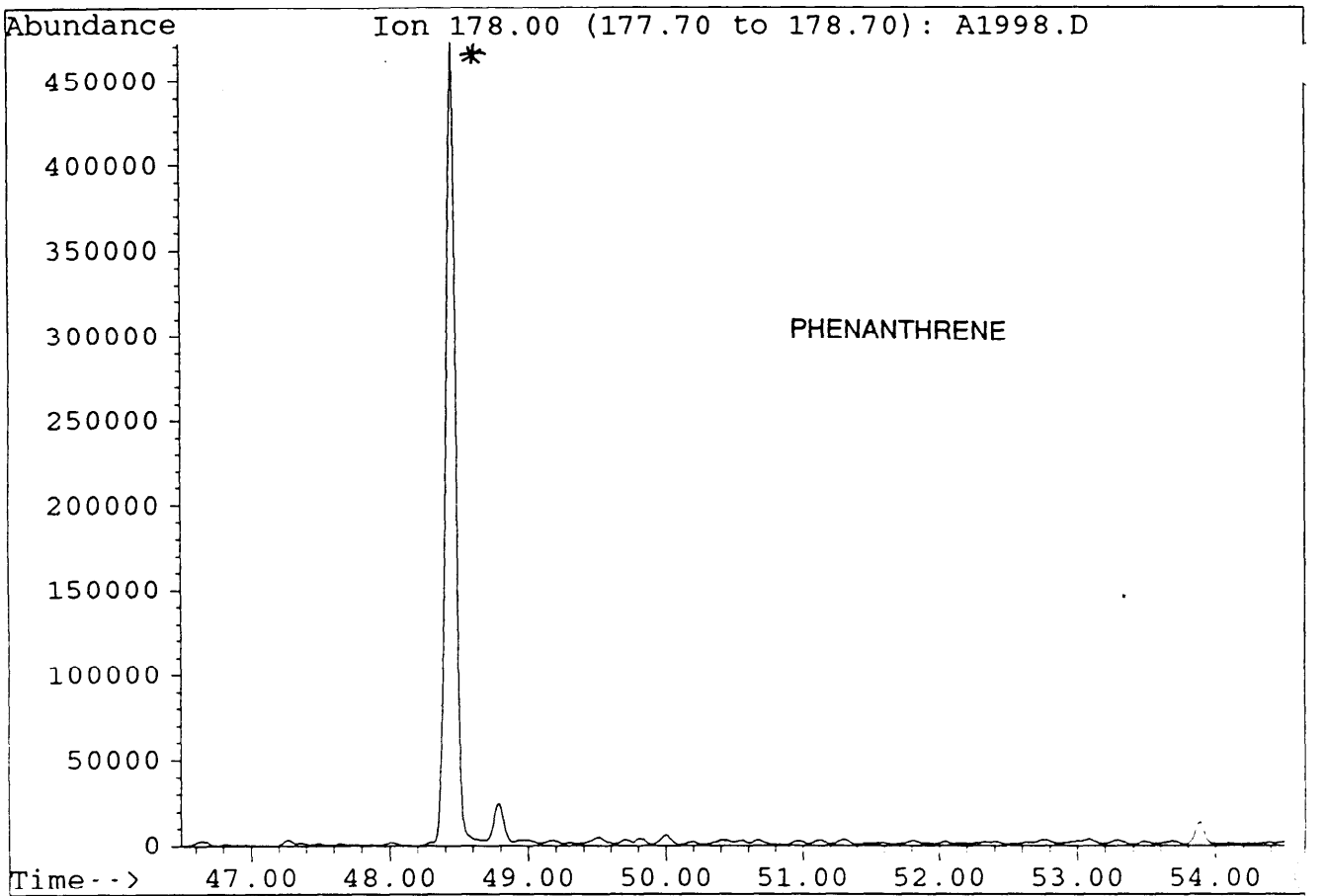
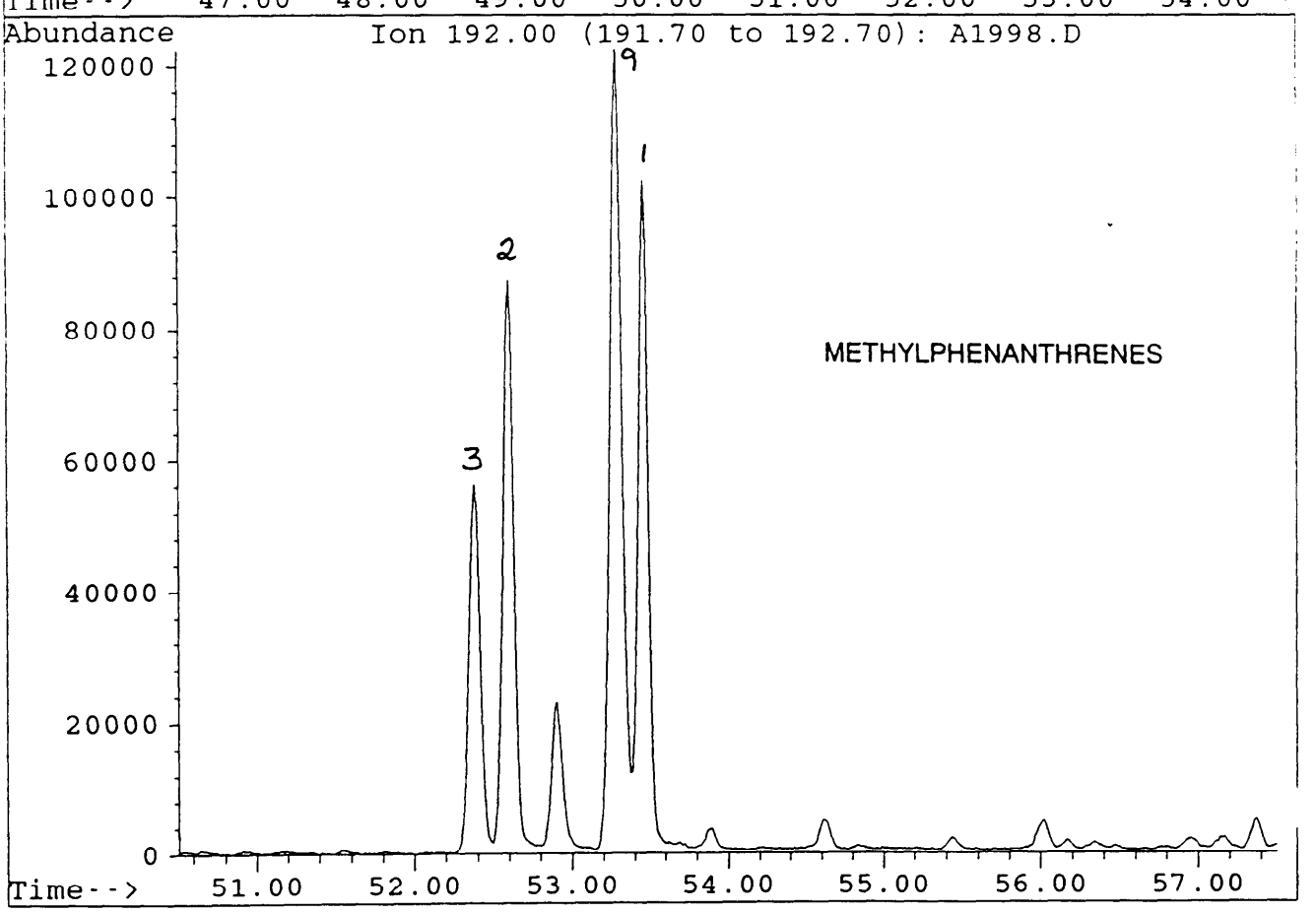
Misc. Info : COL#155. 11-1-94. GEC.





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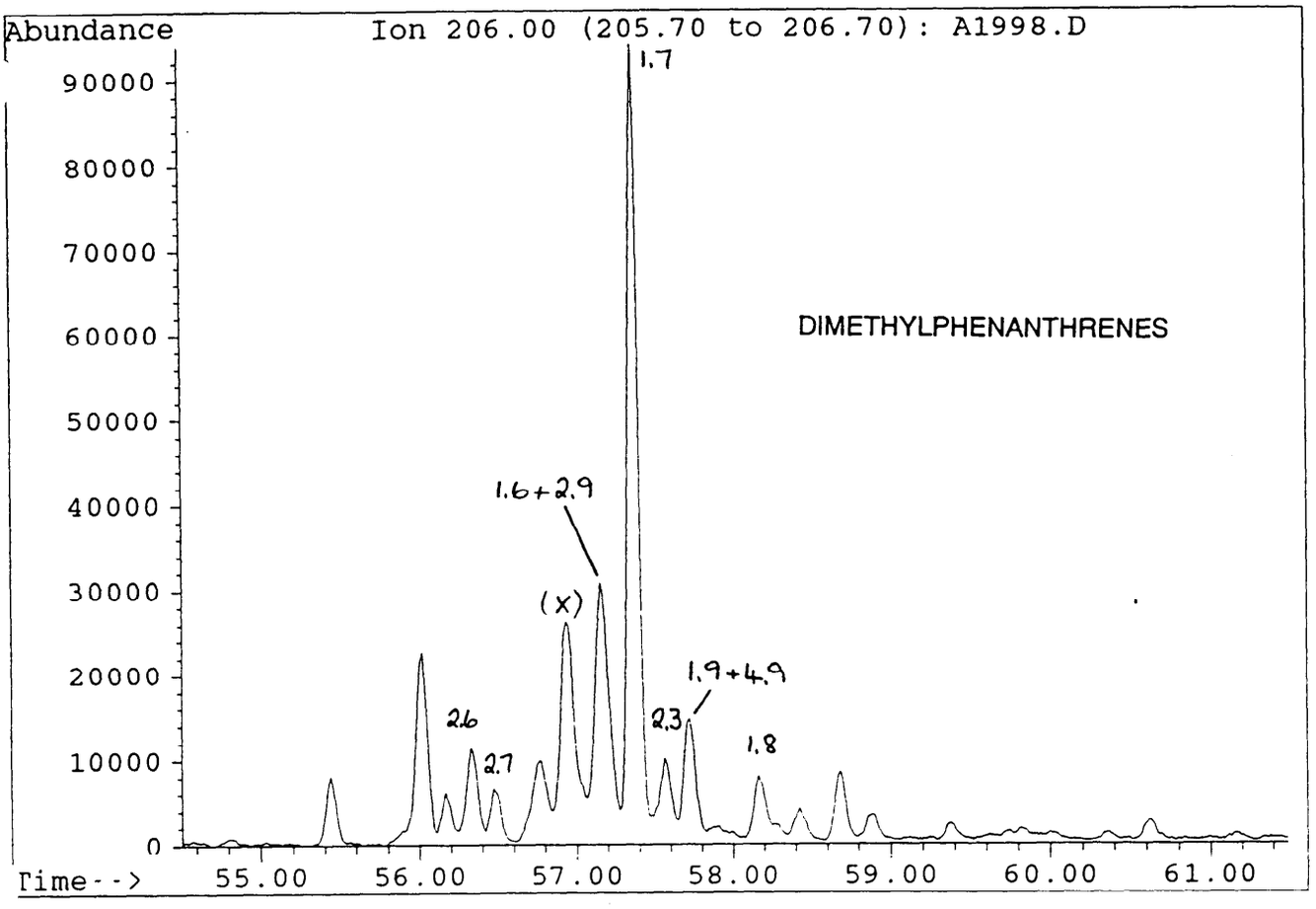

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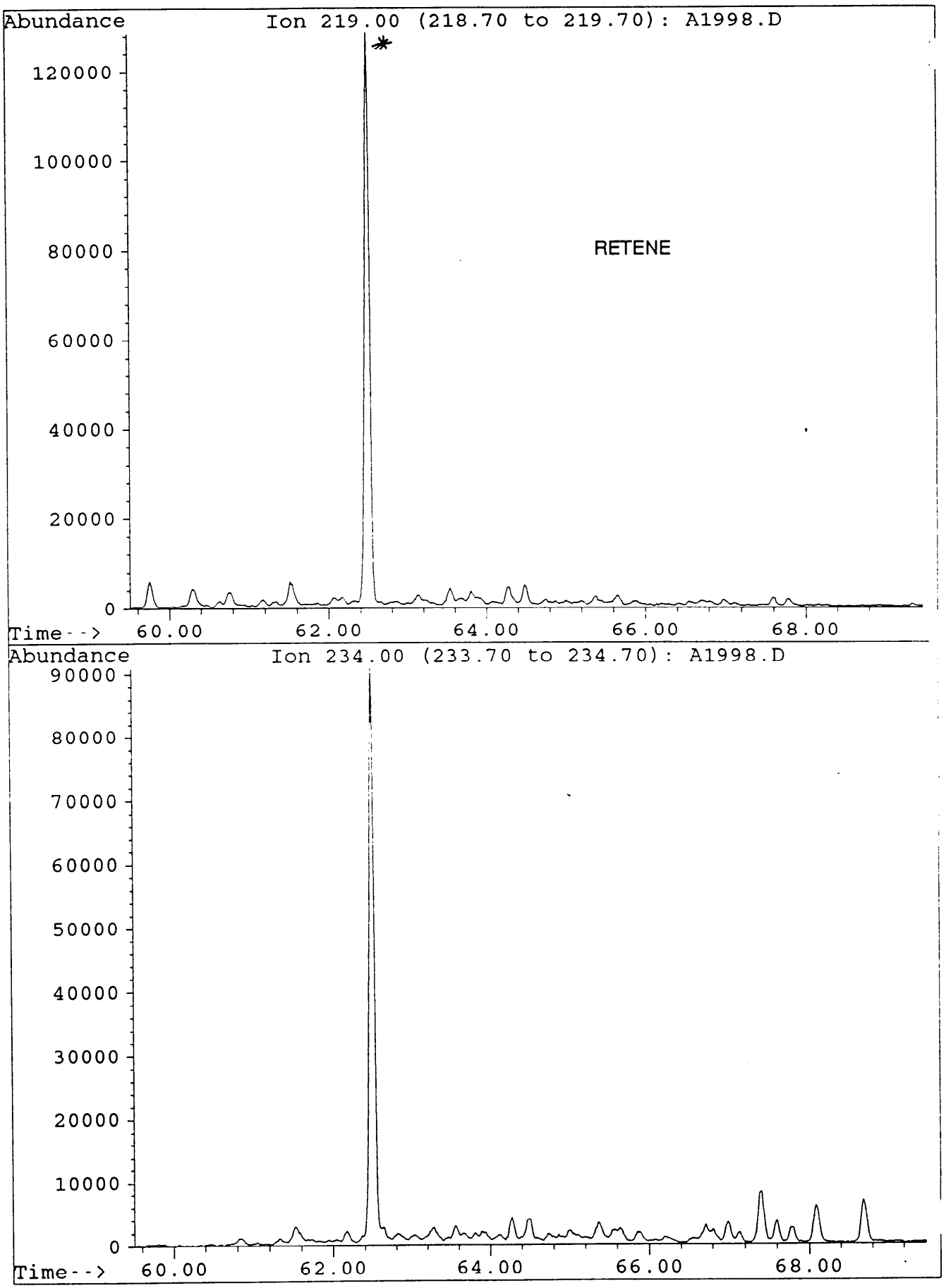
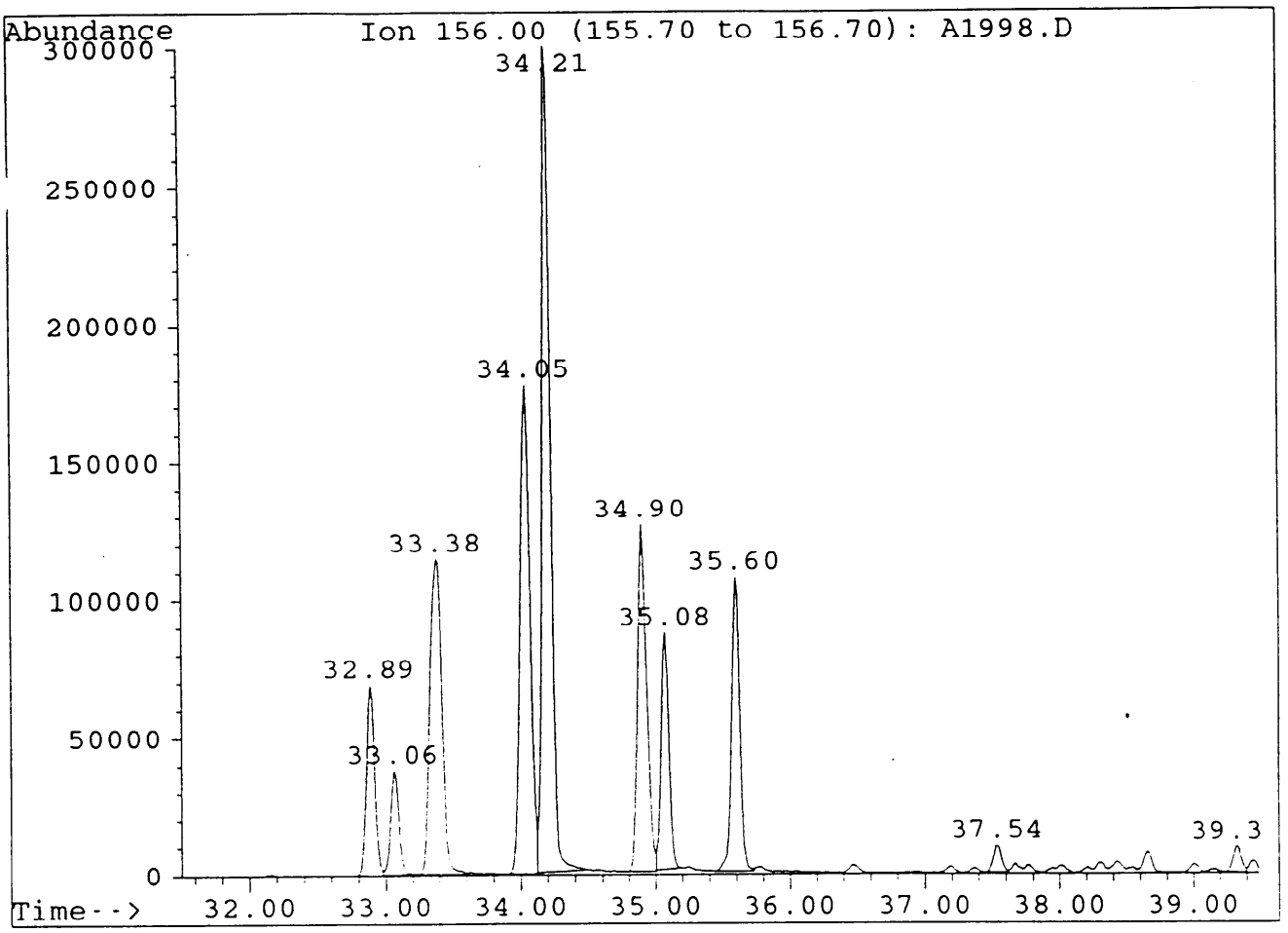
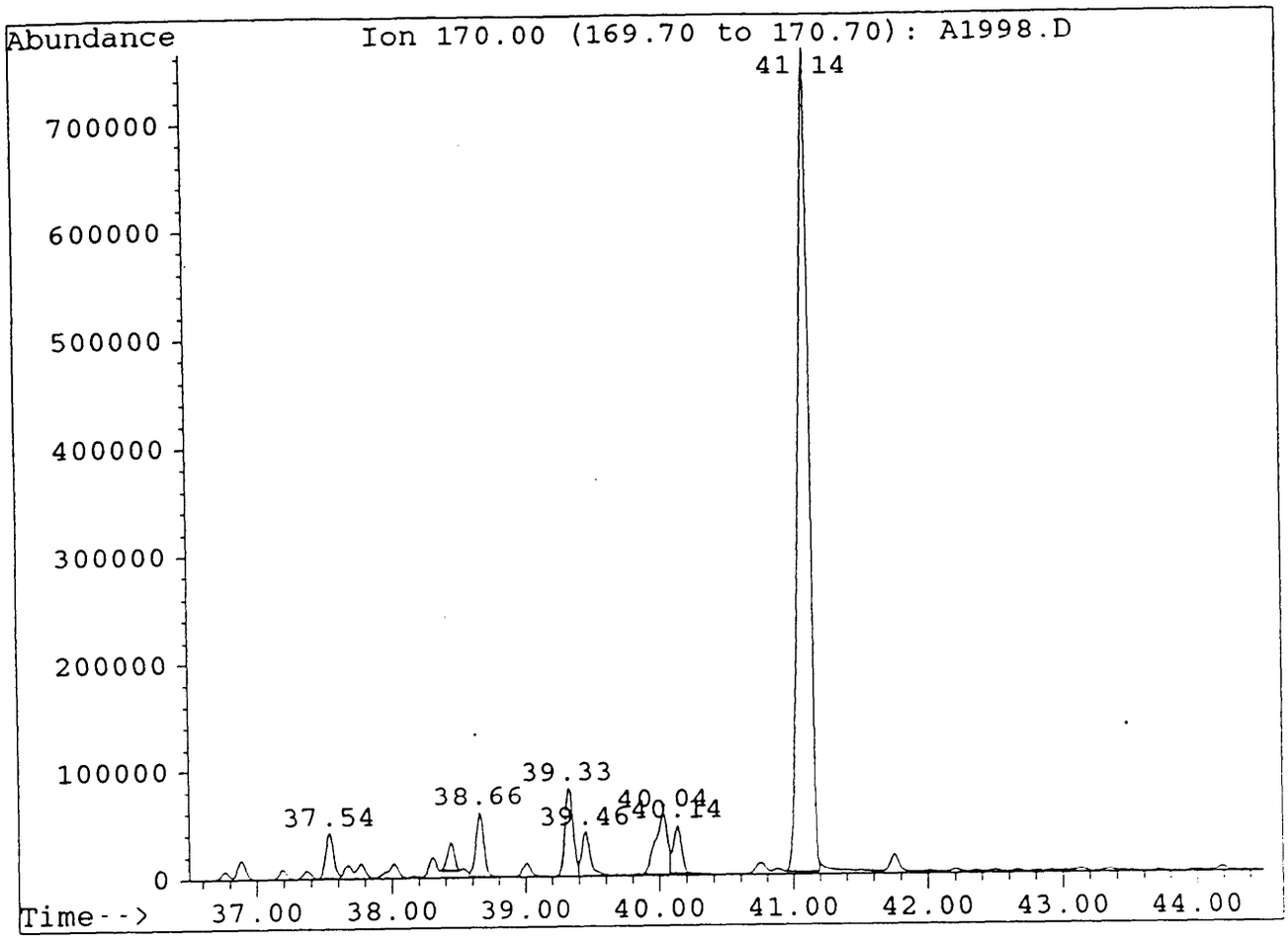
Sample : MINERVA#24, 1860.3m, AROS.
Misc. Info : COL#155. 11-1-94. GEC.





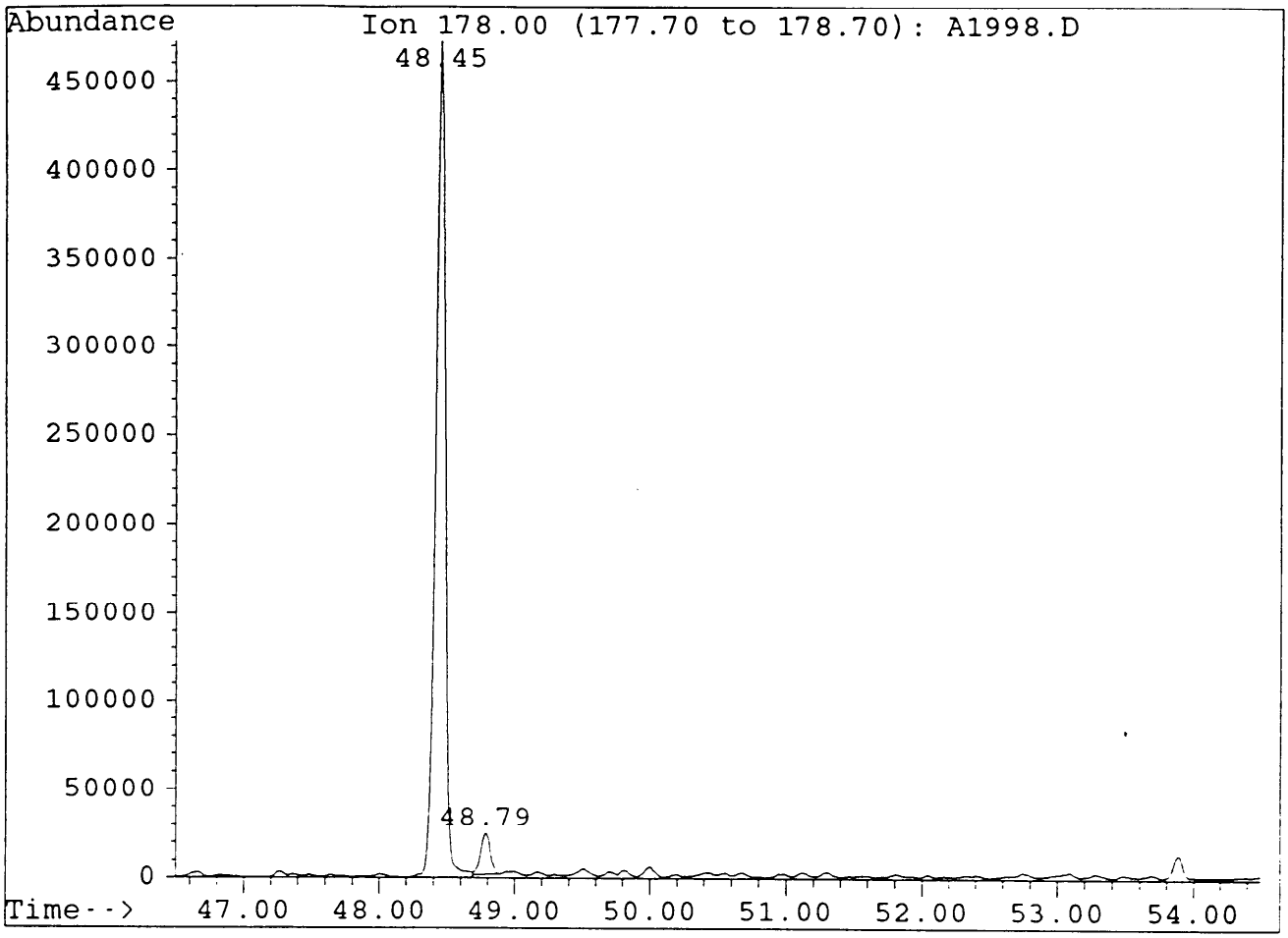
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area		Height	Area %	Ratio %
1	32.89	295314		69168	6.11	23.01
2	33.06	158513		38037	3.28	12.35
3	33.38	706275	86	114349	14.62	55.03
4	34.05	902397	-	177277	18.68	70.31
5	34.21	1283462	16	299109	26.57	100.00
6	34.90	607019	14	125842	12.57	47.30
7	35.08	340221	15	85731	7.04	26.51
8	35.60	456488		106867	9.45	35.57
9	37.54	= 1/2 x 41281	18	9773	0.85	3.22
10	39.33	39779		9430	0.82	3.10



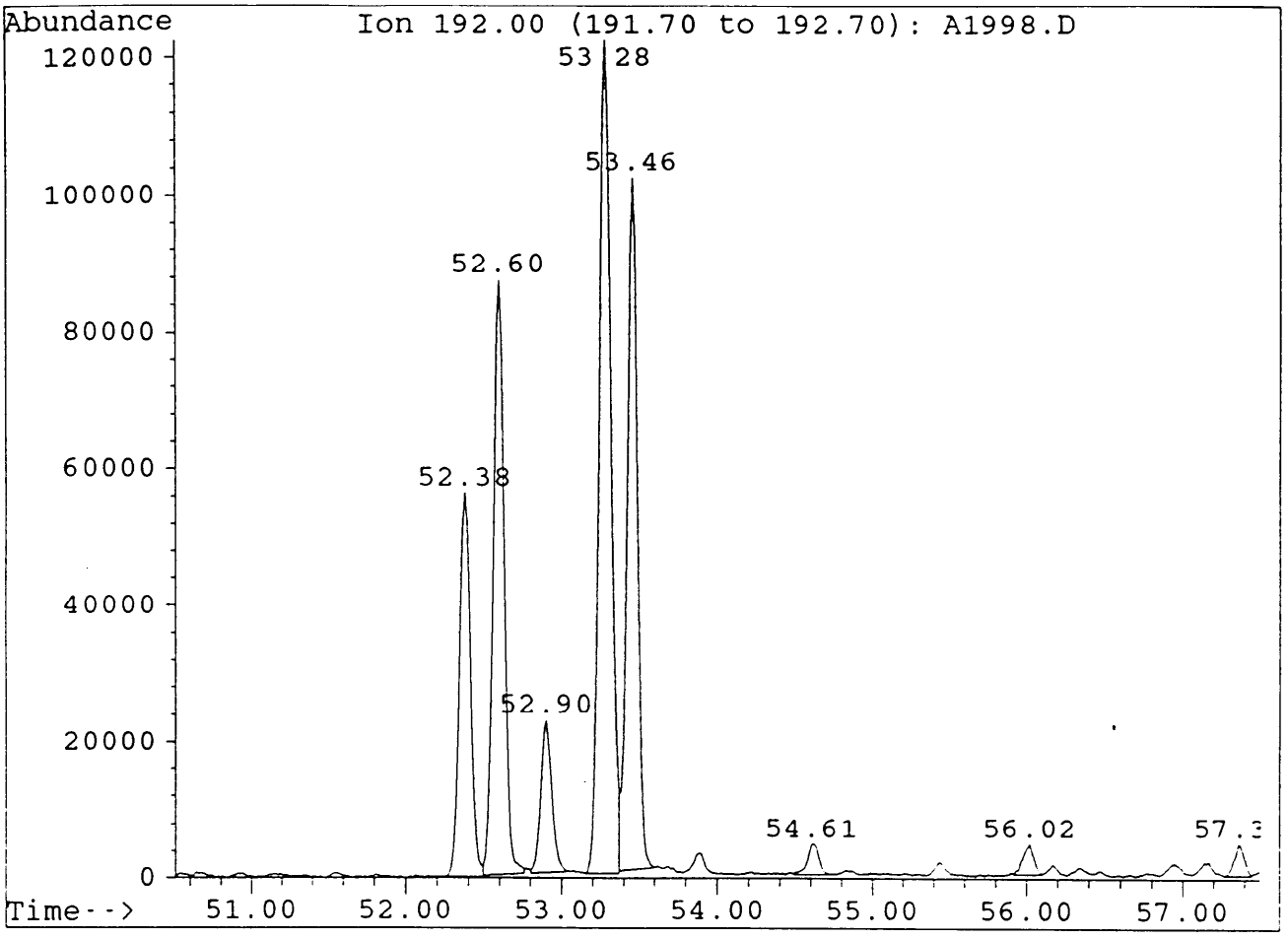
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	37.54	176278	42067	3.06	4.14
2	38.66	246200	59831	4.28	5.78
3	39.33	356743	81490	6.20	8.37
4	39.46	179073	40453	3.11	4.20
5	40.04	355580	55319	6.18	8.34
6	40.14	180867	44799	3.14	4.24
7	41.14	4262756	763014	74.04	100.00



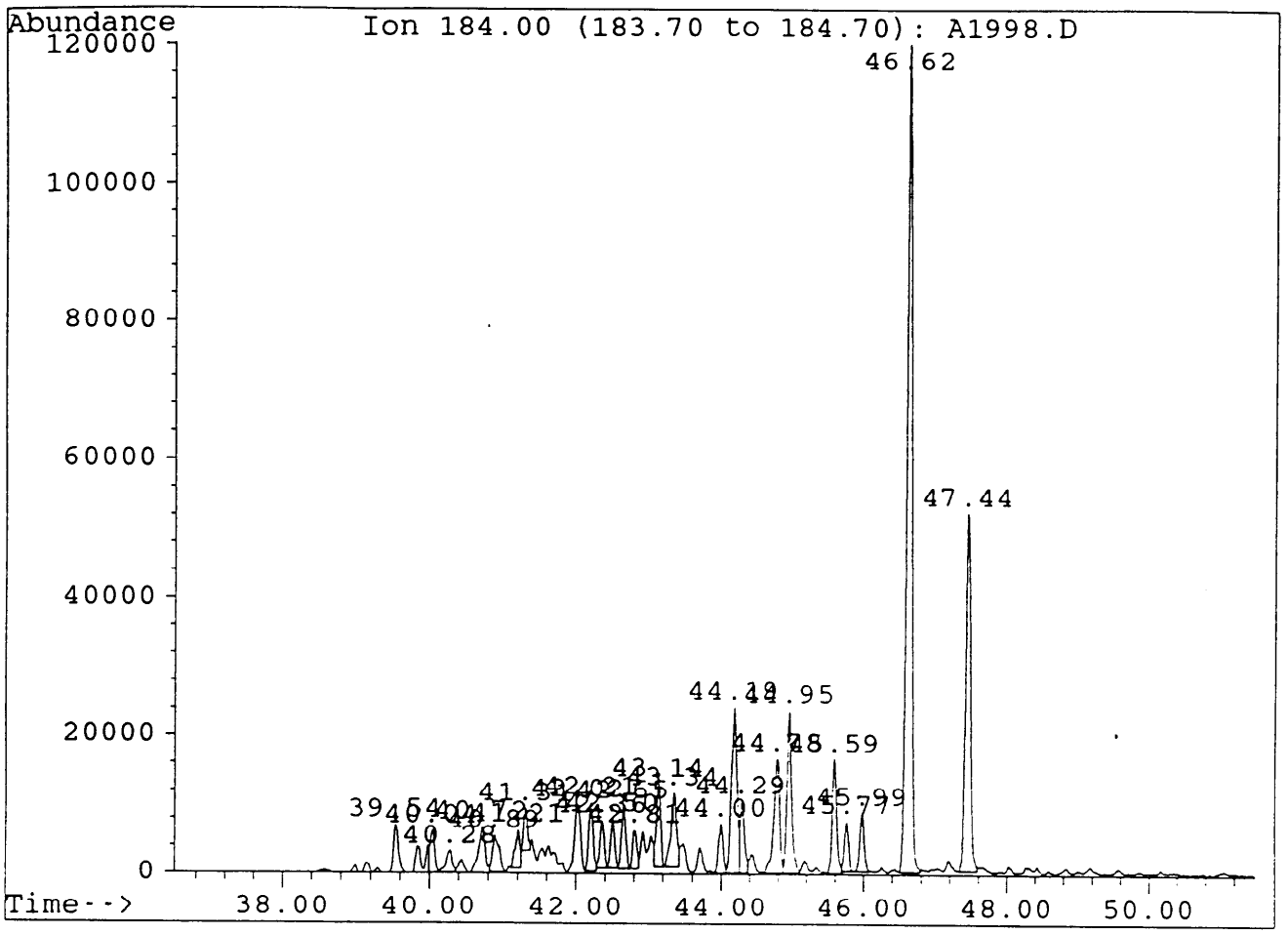
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	48.45	2342308 P	472333	95.38	100.00
2	48.79	113352	22905	4.62	4.84



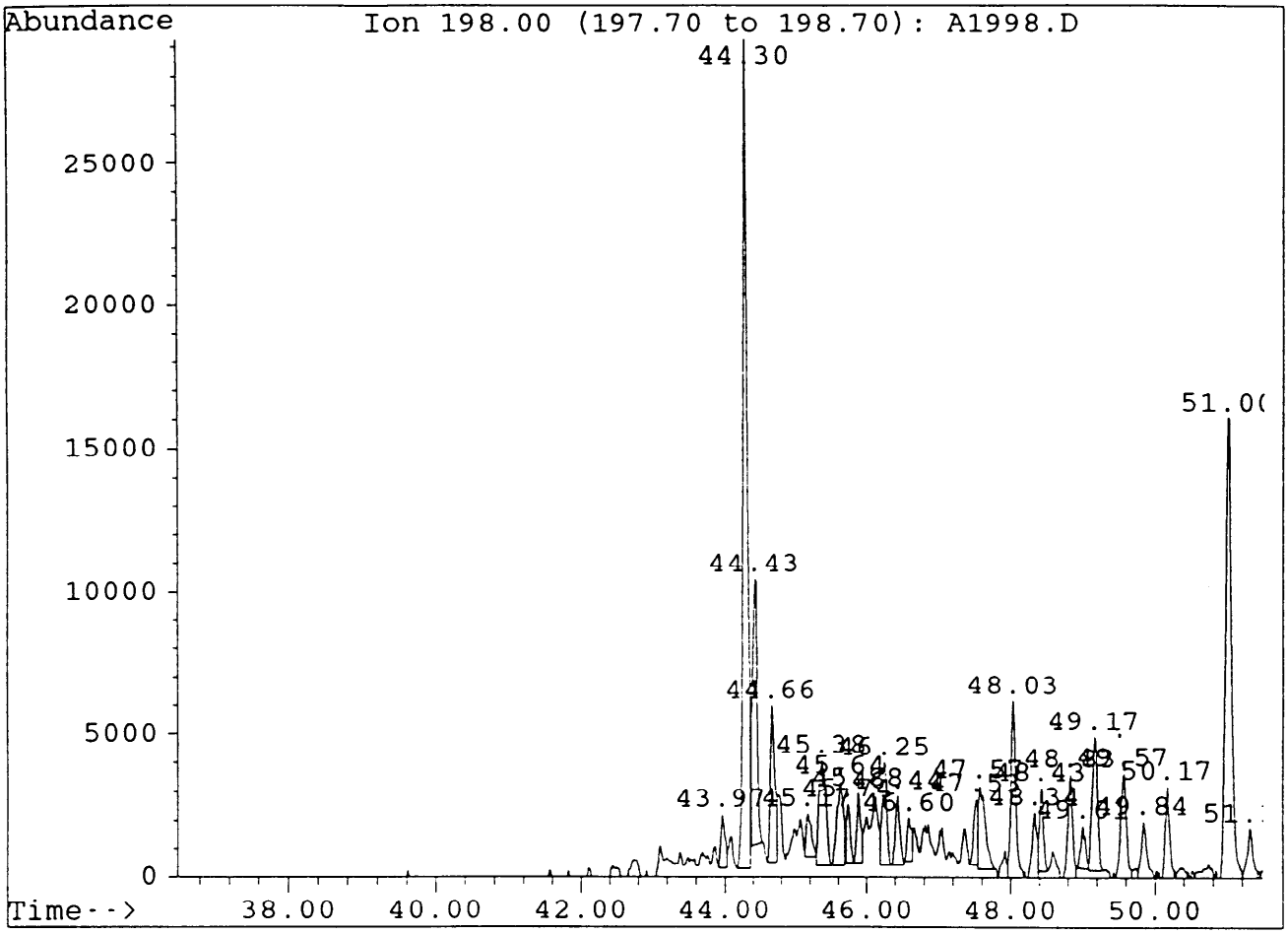
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	52.38	279023 3	56209	14.03	43.09
2	52.60	423802 2	87067	21.31	65.44
3	52.90	109330	22255	5.50	16.88
4	53.28	647601 9	121924	32.56	100.00
5	53.46	462488 1	101183	23.25	71.42
6	54.61	24256	4572	1.22	3.75
7	56.02	21197	4482	1.07	3.27
8	57.37	21178	4672	1.06	3.27



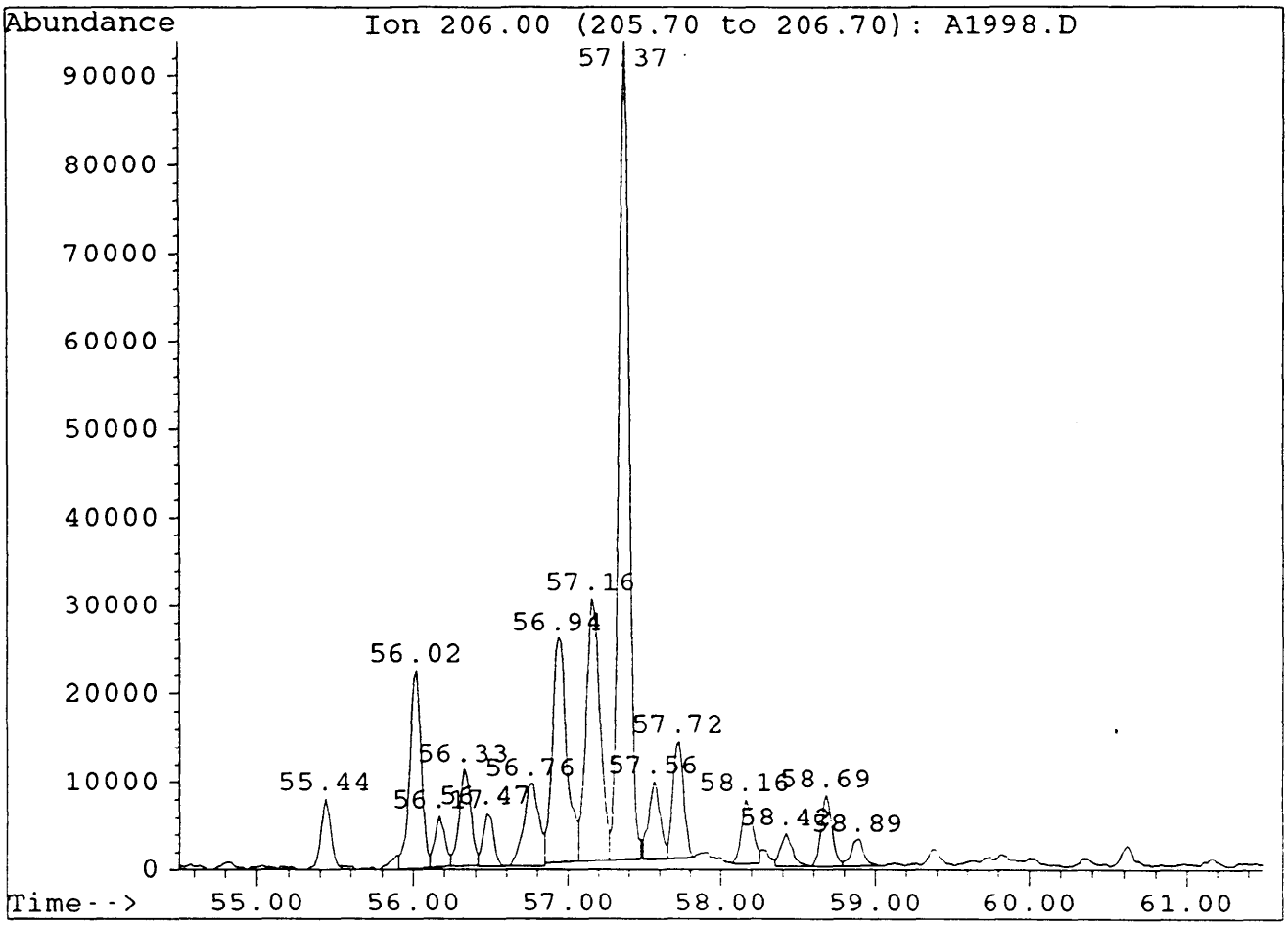
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	39.54	33925	7063	1.76	5.74
2	40.04	26275	6202	1.37	4.44
3	40.28	17788	3161	0.93	3.01
4	40.72	42584	6776	2.22	7.20
5	40.89	32911	5272	1.71	5.57
6	41.21	26883	5677	1.40	4.55
7	41.31	23850	6200	1.24	4.03
8	42.02	58793	10058	3.06	9.95
9	42.21	42192	10027	2.19	7.14
10	42.36	28308	6936	1.47	4.79
11	42.50	28106	7176	1.46	4.75
12	42.65	39049	9113	2.03	6.61
13	42.81	24533	5701	1.28	4.15
14	43.14	51160	12078	2.66	8.65
15	43.34	59961	10749	3.12	10.14
16	44.00	29873	7178	1.55	5.05
17	44.19	134266	24006	6.98	22.71
18	44.29	41953	10354	2.18	7.10
19	44.78	96053	16568	5.00	16.25
20	44.95	107121	23522	5.57	18.12
21	45.59	72965	16456	3.80	12.34
22	45.77	30180	7342	1.57	5.11
23	45.99	36974	8590	1.92	6.25
24	46.62	591123	119961	30.75	100.00
25	47.44	245649	51832	12.78	41.56



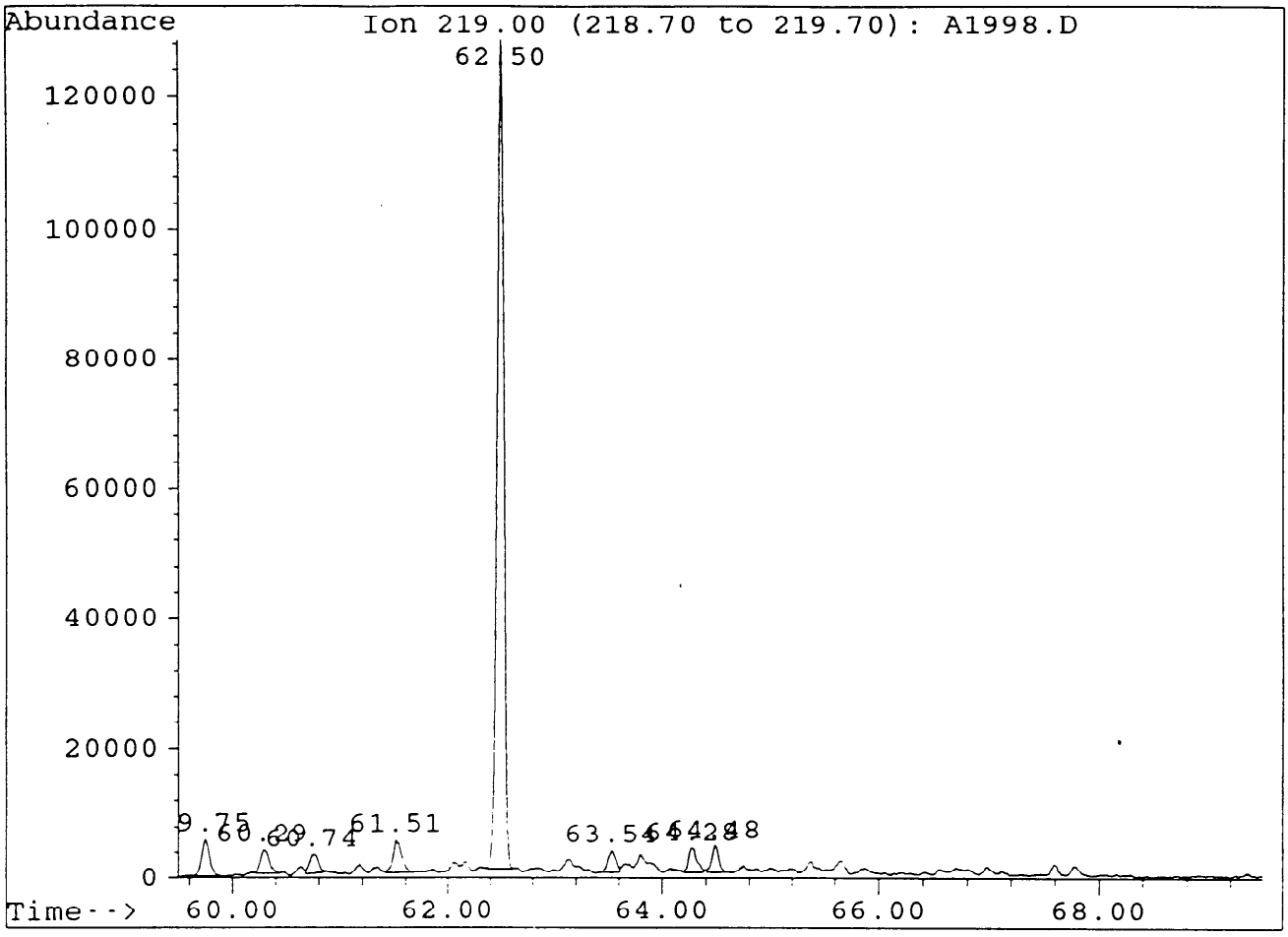
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	43.97	7542	1886	1.32	5.96
2	44.30	126487	29013	22.07	100.00
3	44.43	40870	9217	7.13	32.31
4	44.66	24933	5452	4.35	19.71
5	45.17	7611	1520	1.33	6.02
6	45.38	25856	3681	4.51	20.44
7	45.64	19159	2958	3.34	15.15
8	45.74	6970	2061	1.22	5.51
9	45.88	9639	2448	1.68	7.62
10	46.25	15996	3578	2.79	12.65
11	46.44	10163	2421	1.77	8.03
12	46.60	7033	1533	1.23	5.56
13	47.53	9395	2304	1.64	7.43
14	47.57	18786	2920	3.28	14.85
15	48.03	29117	6182	5.08	23.02
16	48.34	11546	2302	2.01	9.13
17	48.43	10676	2909	1.86	8.44
18	48.83	16368	3619	2.86	12.94
19	49.01	6707	1533	1.17	5.30
20	49.17	24516	4664	4.28	19.38
21	49.57	19997	3670	3.49	15.81
22	49.84	10408	1989	1.82	8.23
23	50.17	13347	3212	2.33	10.55
24	51.00	90395	16078	15.77	71.47
25	51.30	9585	1747	1.67	7.58



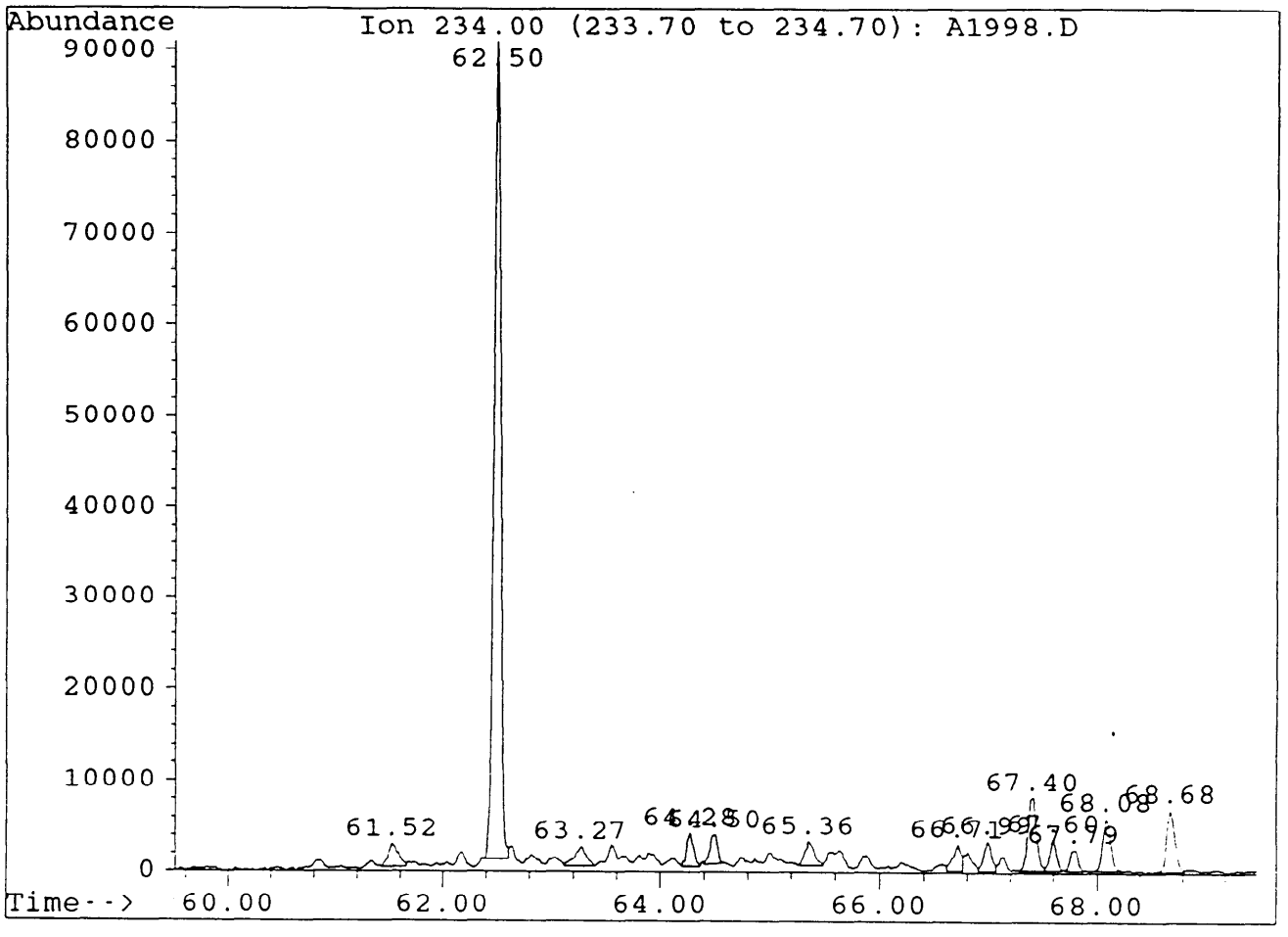
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	55.44	37441	8201	2.76	8.62
2	56.02	117291	22645	8.63	27.01
3	56.17	27149	6007	2.00	6.25
4	56.33	58344	11155	4.29	13.43
5	56.47	28506	6221	2.10	6.56
6	56.76	67965	9433	5.00	15.65
7	56.94	168173 x	25430	12.38	38.72
8	57.16	191369	29849	14.09	44.06
9	57.37	434304 17	92817	31.97	100.00
10	57.56	46256	8805	3.40	10.65
11	57.72	65429	13289	4.82	15.07
12	58.16	38510	7453	2.83	8.87
13	58.42	19861	3814	1.46	4.57
14	58.69	39797	8171	2.93	9.16
15	58.89	18127	3132	1.33	4.17



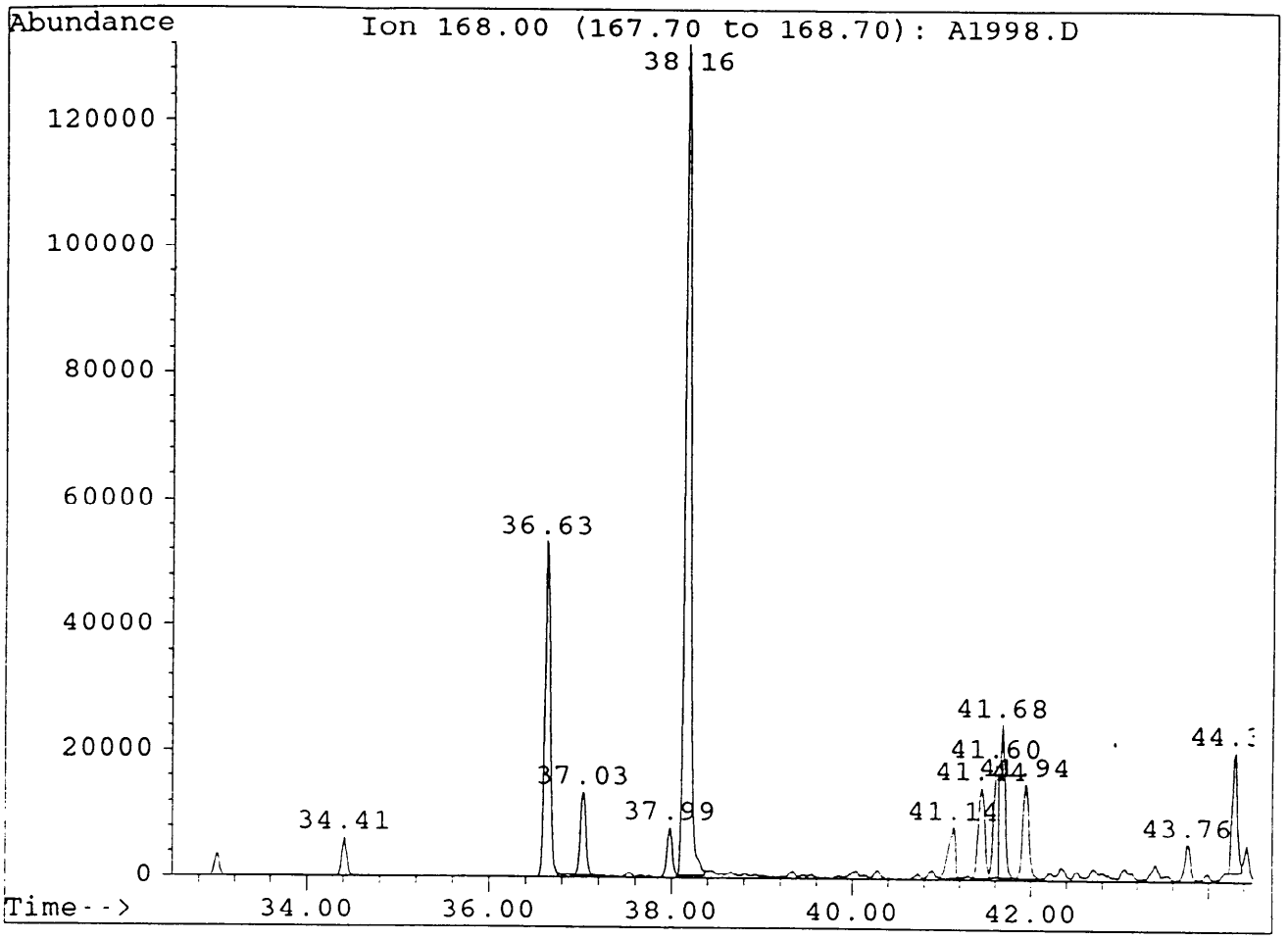
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	59.75	28205	5849	3.98	5.07
2	60.29	21447	3843	3.03	3.85
3	60.74	16900	2979	2.38	3.04
4	61.51	28723	5246	4.05	5.16
5	62.50	556555 R	127358	78.54	100.00
6	63.54	17479	3574	2.47	3.14
7	64.28	20556	3780	2.90	3.69
8	64.48	18734	4252	2.64	3.37



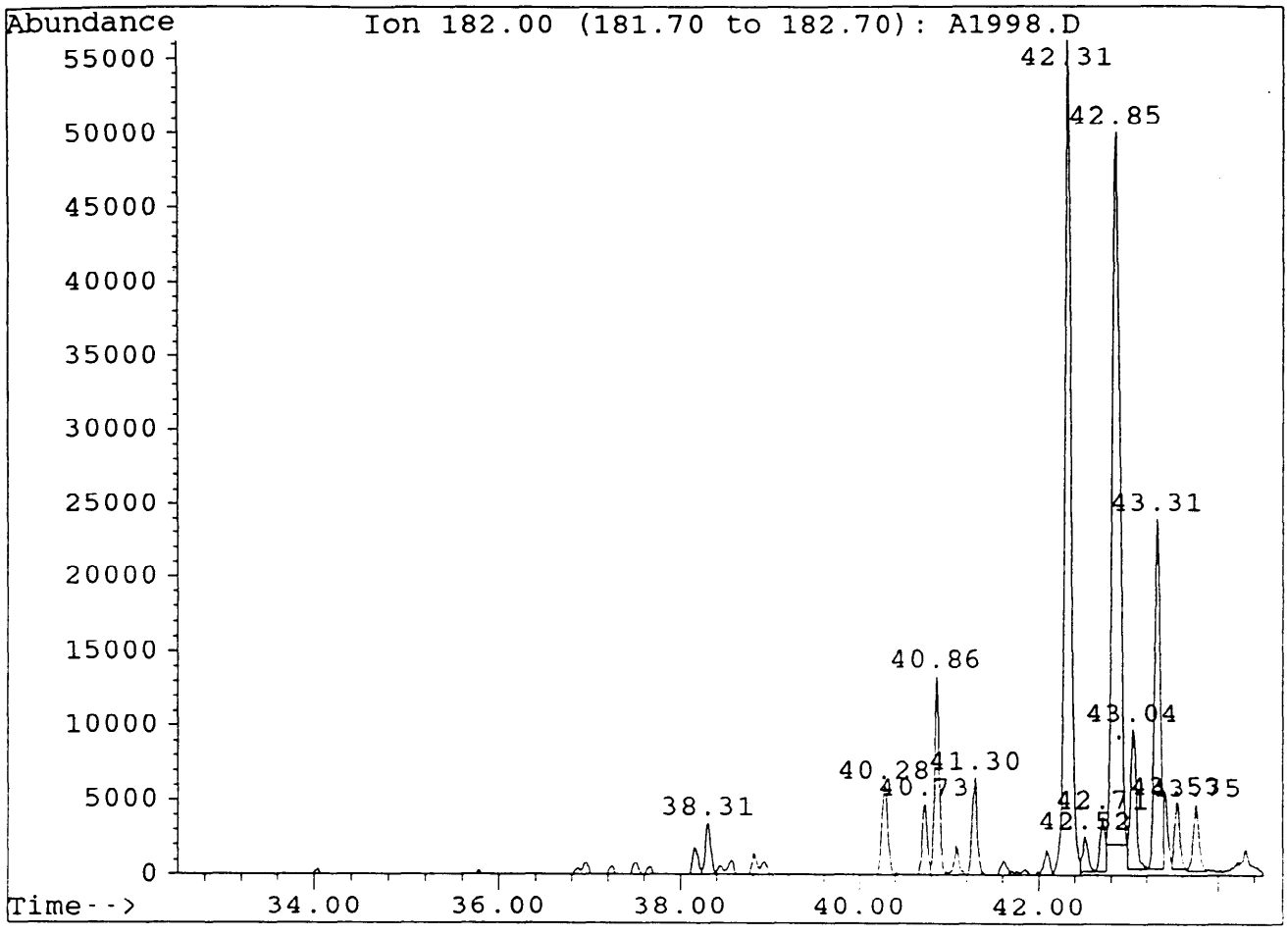
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	61.52	16586	2539	2.58	4.25
2	62.50	390254	89614	60.71	100.00
3	63.27	16256	2157	2.53	4.17
4	64.28	16640	3704	2.59	4.26
5	64.50	16051	3172	2.50	4.11
6	65.36	15839	2674	2.46	4.06
7	66.71	15243	2903	2.37	3.91
8	66.99	16344	3277	2.54	4.19
9	67.40	44901	8074	6.99	11.51
10	67.60	15657	3507	2.44	4.01
11	67.79	12005	2340	1.87	3.08
12	68.08	30713	5823	4.78	7.87
13	68.68	36306	6830	5.65	9.30



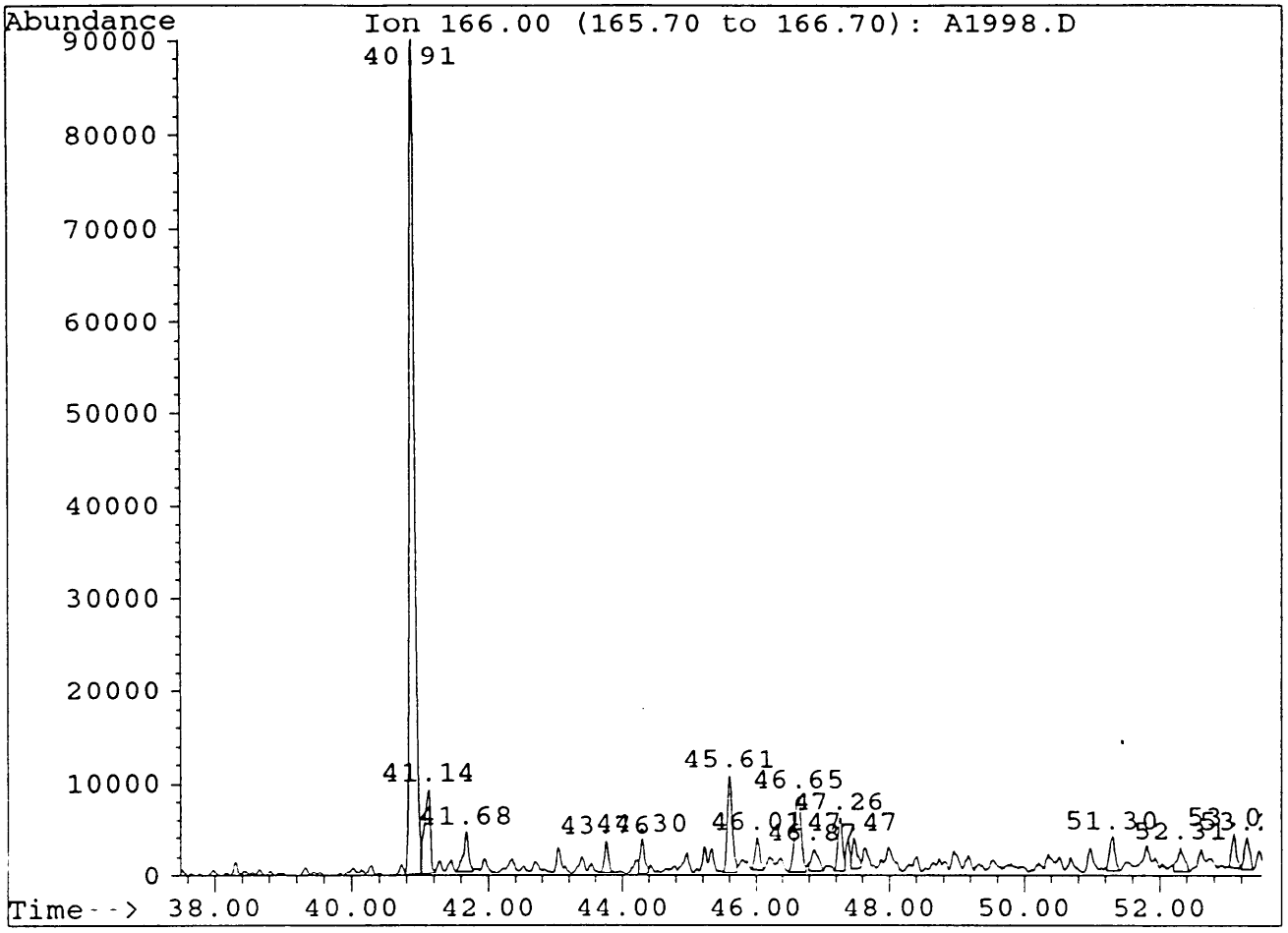
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	34.41	23279	6374	1.67	3.95
2	36.63	225413	53440	16.15	38.24
3	37.03	56162	13229	4.02	9.53
4	37.99	34664	8044	2.48	5.88
5	38.16	589439	131807	42.23	100.00
6	41.14	47603	8207	3.41	8.08
7	41.44	73747	14435	5.28	12.51
8	41.60	68979	17894	4.94	11.70
9	41.68	94515	24360	6.77	16.03
10	41.94	75085	15199	5.38	12.74
11	43.76	29493	6046	2.11	5.00
12	44.30	77390	19070	5.54	13.13



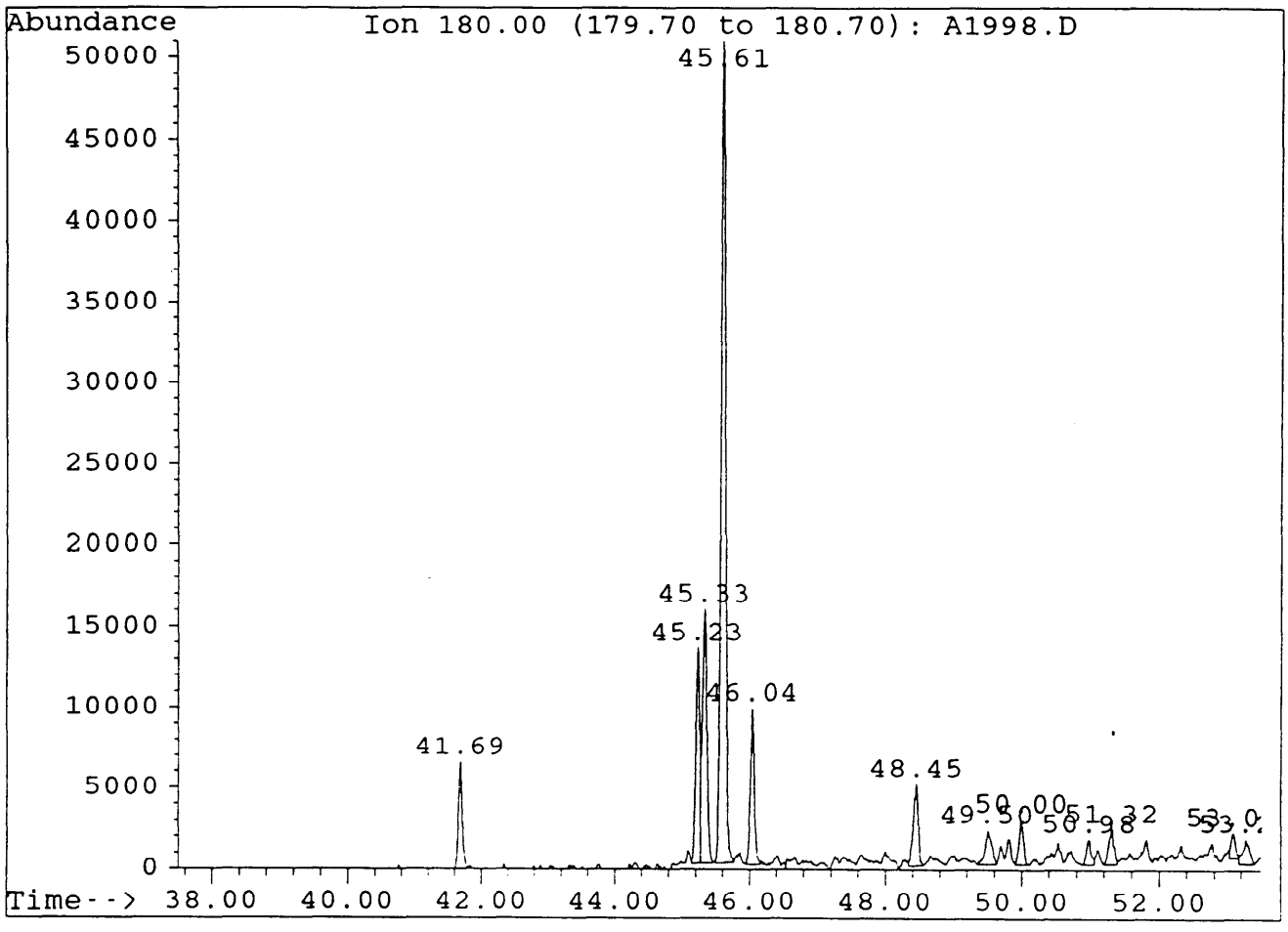
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	38.31	14176	3458	1.57	5.05
2	40.28	28287	5946	3.13	10.07
3	40.73	18705	4796	2.07	6.66
4	40.86	49456	13420	5.48	17.61
5	41.30	25462	6590	2.82	9.07
6	42.31	269015	56272	29.80	95.81
7	42.52	9823	2341	1.09	3.50
8	42.71	15083	3730	1.67	5.37
9	42.85	280789	48000	31.10	100.00
10	43.04	41566	9400	4.60	14.80
11	43.31	111424	23641	12.34	39.68
12	43.53	18832	4501	2.09	6.71
13	43.75	20237	4477	2.24	7.21



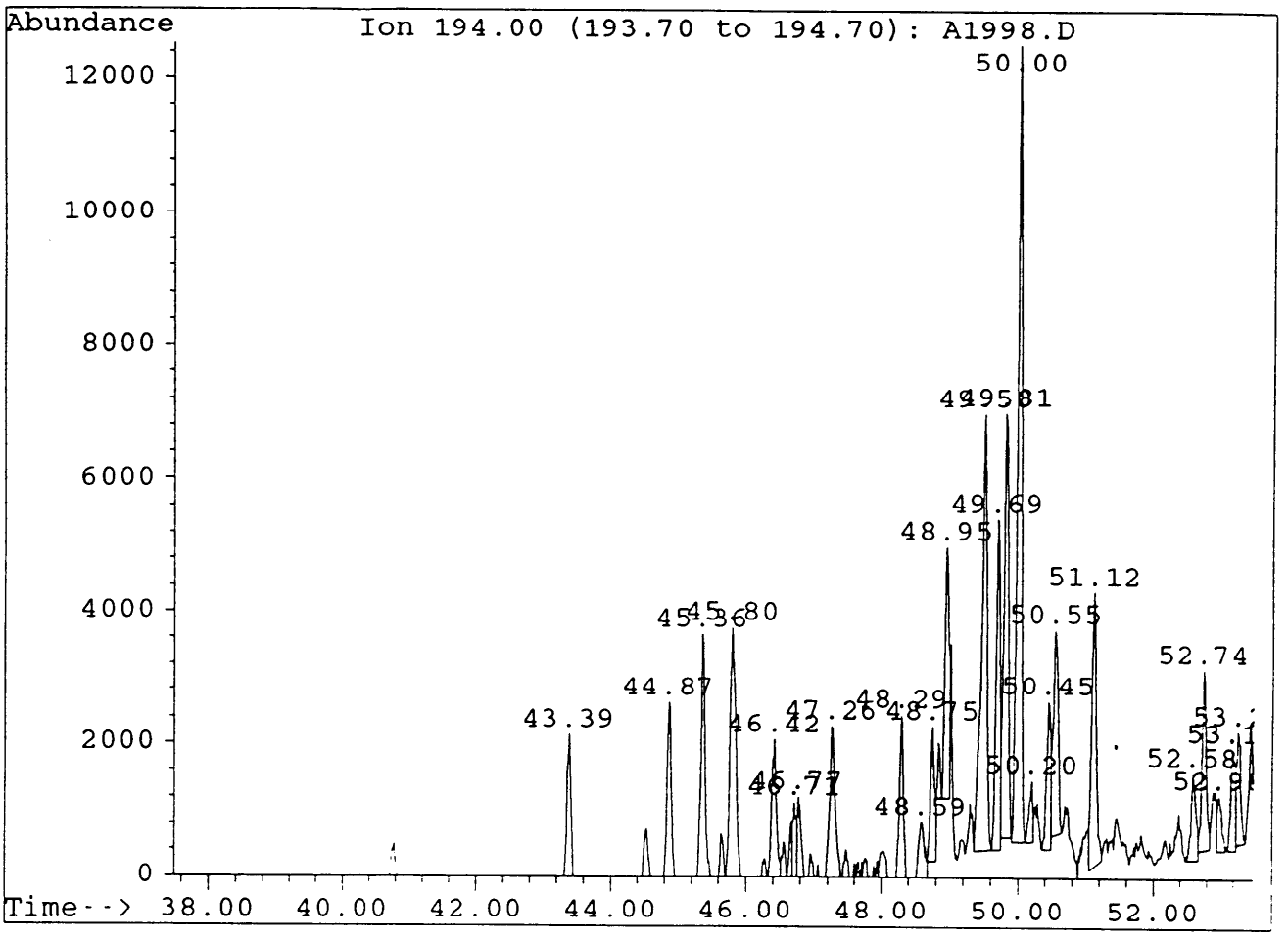
Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	40.91	482600	90132	56.43	100.00
2	41.14	55060	9167	6.44	11.41
3	41.68	24174	4299	2.83	5.01
4	43.76	15074	3400	1.76	3.12
5	44.30	16973	3710	1.98	3.52
6	45.61	54618	10525	6.39	11.32
7	46.01	16626	3442	1.94	3.45
8	46.65	57647	8273	6.74	11.95
9	46.87	16461	2345	1.92	3.41
10	47.26	27597	5698	3.23	5.72
11	47.47	16795	3203	1.96	3.48
12	51.30	19713	3662	2.30	4.08
13	52.31	17605	2560	2.06	3.65
14	53.09	16381	3649	1.92	3.39
15	53.28	17939	3428	2.10	3.72



Sample : MINERVA#24, 1860.3m, AROS.

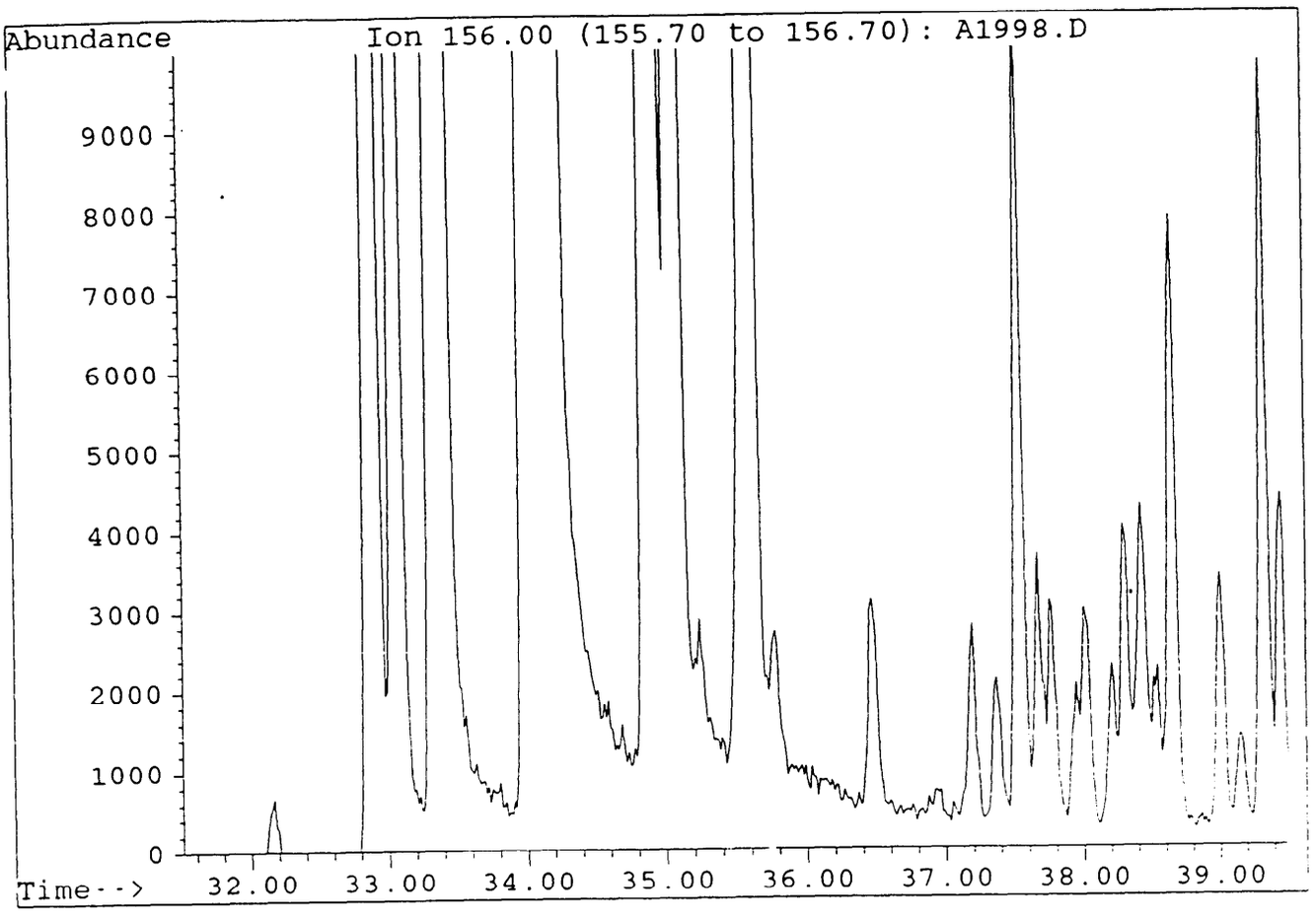
Peak	Ret.Time	Area	Height	Area %	Ratio %
1	41.69	26769	6590	5.15	11.42
2	45.23	56921	13321	10.95	24.29
3	45.33	71145	15701	13.69	30.36
4	45.61	234308	50619	45.09	100.00
5	46.04	40597	9651	7.81	17.33
6	48.45	25731	4989	4.95	10.98
7	49.50	14273	2071	2.75	6.09
8	50.00	12759	2769	2.46	5.45
9	50.98	7886	1558	1.52	3.37
10	51.32	11766	2153	2.26	5.02
11	53.08	7118	1535	1.37	3.04
12	53.27	10317	1518	1.99	4.40



Sample : MINERVA#24, 1860.3m, AROS.

Peak	Ret.Time	Area	Height	Area %	Ratio %
1	43.39	8631	2128	2.42	15.94
2	44.87	11010	2614	3.08	20.34
3	45.36	15499	3660	4.34	28.63
4	45.80	21465	3765	6.01	39.65
5	46.42	10124	2060	2.84	18.70
6	46.71	4006	1129	1.12	7.40
7	46.77	3887	1216	1.09	7.18
8	47.26	12925	2275	3.62	23.87
9	48.29	9926	2439	2.78	18.33
10	48.59	4903	841	1.37	9.06
11	48.75	9090	2026	2.55	16.79
12	48.95	16695	3801	4.68	30.84
13	49.50	37647	6581	10.55	69.54
14	49.69	21762	5006	6.10	40.20
15	49.81	29534	6384	8.27	54.55
16	50.00	54137	11995	15.17	100.00
17	50.20	3645	938	1.02	6.73
18	50.45	9962	2234	2.79	18.40
19	50.55	15006	3087	4.20	27.72
20	51.12	20003	4157	5.60	36.95
21	52.58	6799	1310	1.90	12.56
22	52.74	12118	2717	3.39	22.38
23	52.98	3810	840	1.07	7.04
24	53.18	7607	1529	2.13	14.05
25	53.27	6781	1683	1.90	12.53

File : A1998.D
Sample : MINERVA#24, 1860.3m, AROS.
Misc. Info : COL#155. 11-1-94. GEC.



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6.7 APPENDIX 7 Mudloggers End of Well Report

FINAL WELL REPORT

BHP Petroleum Pty Ltd

Minerva-2 / Minerva-2A

Otway Basin, Victoria

September - October 1993

by

Baker Hughes InteQ

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1. INTRODUCTION

a. Well & Rig Data

Company	:	BHP Petroleum Pty Ltd
Well Name	:	Minerva-2 / Minerva-2A
Location	:	Otway Basin, Victoria
Permit	:	VIC/P31
Latitude	:	38° 43' 04.3" South
Longitude	:	142° 57' 19.9" East
Field	:	Minerva
Rig	:	"Byford Dolphin" Semi-submersible
RT - MSL	:	25.0 metres
RT - Seabed	:	85.0 metres
Spud Date	:	18th September 1993
Total Depth	:	2170 metres
Total Depth Date	:	11th October 1993
Completion Status	:	Appraisal Well
INTEQ Unit No	:	503
Crew, DrillByte	:	K. Clarke, N. Flores A. Thangam, G. Timmis
Crew, Logging	:	C. Dickinson, D. Alsop V. Surla

b. Prognosis

Minerva-2 is located in the northwestern part of Vic/P31 in the Eastern Otway Basin, approximately 1.625 km South of Minerva-1. It was designed as an appraisal well to follow the Minerva-1 discovery, and confirm the extension of gas bearing reservoir within the southern fault block of the structure.

The Minerva Field is presently defined by a 1.25 x 1.25 km seismic grid. At the Shipwreck Group level, the structure comprises a northern horst block bounded by two northwest trending normal faults and a southern tilted fault block bounded by a northwest trending normal fault. A structural saddle at the southeastern extent of the field forms the most likely hydrocarbon spill point. The structure has approximately 200 m of vertical relief in the most likely case, with a gas-water contact located at 1919 mSS, and a crest at around 1720 mSS.

Minerva-2 was predicted to intersect a section very similar to that penetrated in Minerva-1, ranging in age from Early Cretaceous to Recent. The primary target was the Santonian aged Shipwreck Group, predicted at 1765 mSS.

Baker Hughes InteQ provided DrillByte Service on Minerva-2 from spud to Total Depth at 2170 m. In addition to formation evaluation and conventional mud logging, real time data monitoring and recording as well as pressure and drilling analyses were carried out. The continuous evaluation of pressures and drilling progress provided an aid in optimizing drilling costs and ensured that drilling continued with the maximum safety to personnel, the well, and equipment. The operator was continuously advised as to the status of these analyses, with data and results stored on floppy disks for post-well evaluation. The printouts and plots of the results of these services are contained in the appendices to this report.

c. Sample Distribution

Formation evaluation services were provided from 85 - 2170 metres.

The following samples were prepared:

- two sets of unwashed cuttings samples
- two sets of 100 m composite samples (200 gm) from 565 m to TD
- one set 100 m composite samples (1 kg)
- five sets of washed and dried cuttings samples (100 gm)
- one set of mud samples from the top and bottom of each hole section (2x1 ltr)
- one set of Petrocraft sample vials

These were distributed as follows:

To: BHP Petroleum Pty Ltd BHP Core Store C/- Kestrel Management Unit 58 Slough Estate 170 Forester Road Mt Waverley Victoria 3149	2 sets 200 gm unwashed 2 sets 100 gm washed and dried 2 sets 200 gm composite 100 m samples 1 set 1 kg composite 100 m samples Mud samples
To: Officer-in-Charge BMR Core and Cuttings Laboratory 80 Collie Street Fyshwick ACT 2609	1 set 100 gm washed and dried samples
To: Mr. G. Roder Bridge Oil Ltd 255 Elizabeth Street Sydney, NSW 2000	1 set 100 gm washed and dried samples
To: Mr. V. Davoli DEM Corelab 196 Turner Street Port Melbourne, VIC 3207	1 set 100 gm washed and dried samples
To: Mr. J. Phipps BHP Petroleum 15th Floor 120 Collins Street Melbourne, VIC 3000	Petrocraft sample vials and charts

Mud samples were collected at the following depths:
- 565 m, 1538 m, 2170 m.

Samples were collected and processed from the 20" casing shoe over the following intervals:

- 565 - 1538 m : 20 m samples
- 1538 - 2170 m : 5 m samples

The following samples were missed due to coring and drill returns not being circulated:

- 1730 metres
- 1840, 1845, 1850, 1855, 1860, 1865, 1870, 1875, 1880 metres
- 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965 metres

2. DRILLING and ENGINEERING

a. Well History

The rig "Byford Dolphin" arrived at the Minerva-2 location on the 16th September 1993. The drill floor was 25 m above sea level, and 85 m above the seabed (water depth was 65 m). Note that all bit hours refer to rotating hours on-bottom unless otherwise indicated.

After securing anchors and ballasting down, Minerva-2 was spudded at 20:30 hrs on the 18th August 1993.

36" Hole Section: 85 to 120 metres.

RRB#1, a 26.0" Security S3SJ (3x24 jets), was made up and run in tandem with a 36" hole-opener (4x20 jets). It drilled from the seabed to 120 m in 3.8 hrs at an average ROP of 9.2 m/hr and was graded 2-2-WT-2-I-NO-TD. Hi-vis pills (50 bbls) were spotted after each single had been drilled and all returns were to the sea floor. At 120 m, the hole was swept with 300 bbls of spud mud. The bit was then pulled to run 30" casing.

Three joints of 30.0" casing (Drill Quip, 430/210 lbs/ft, B) were run into the hole without any problems, with the shoe being set at 120 m. The casing was cemented with 537 sacks class "G" cement at 1.90 sg, with 2% $CaCl_2$.

9.875" Pilot Hole Section: 120 to 560 metres.

Due to the possibility of encountering shallow gas, a small (9.875") diameter hole was first drilled, to be subsequently opened to 26".

RRB#2, a 9.875" Security S33SF (open jets), drilled to 560 m in 12.9 hrs at an average ROP of 34.1 m/hr. Hi-vis pills (20 bbls) were spotted after each single had been drilled and all returns were to the sea floor. At 560 m, the cement line was installed and tested to 2000 psi. The pilot hole was then cemented with 450 sacks class 'G' cement at 15.9 ppg. After the cement job, the drillstring was found to be stuck in the hole with 400 klbs overpull (when pulling the drillstring). The pipe was worked while continuously circulating the hole. However, all attempts to free the pipe were unsuccessful.

The wireline unit was rigged up and a Free-point Indicator was run. It was followed by a charge and the pipe was blown at 290 m. The wireline unit was rigged down and remainder of the drillstring was pulled back to 184 m were cement was pumped to plug the pilot hole. After pumping cement, the pipe was pulled further up to 125 m where it was flushed prior to complete pull out.

A 30" casing cutter assembly was then made up, run in, and casing was cut at 88.5 m. It was subsequently pulled out, together with the PGB.

Minerva-2A

36" Hole Section: 85 to 119 metres.

Minerva-2A was spudded at 22:45 hrs on the 21st September 1993 after skidding the rig 35 m (Azimuth 115°) from the original location.

RRB#1, a 26.0" Security S3SJ (3x24 jets), in tandem with a 36" hole-opener (4x20 jets) drilled from the seabed to 119 m in 1.3 hrs at an average ROP of 26 m/hr and was graded 2-2-WT-A-2-I-NO-TD. Hi-vis pills (50 bbls) were spotted after each single had been drilled and all returns were to the sea floor. At 119 m, the hole was swept with 300 bbls of hi-vis mud. The bit was then pulled to run 30" casing.

Three joints of 30.0" casing (Drill Quip, 430/210 lbs/ft, B) were run into the hole without any problems, with the shoe being set at 118 m. The casing was cemented with 500 sacks class "G" cement at 1.90 sg, with 2% $CaCl_2$.

26.0" Hole Section: 119 to 565 metres.

RRB#1.1, a 26" Security S3SJ (3x24 jets), was made up and run into the hole. The cement (TOC 115 m) and casing shoe (118 m) were drilled out and 26" hole was drilled to 565 m, with 20 bbls of hi-vis sweeps being pumped on every single drilled. At 565 m, bottoms-up was circulated and 50 bbls hi-vis sweeps were pumped every 15 minutes. Thereafter, 200 bbls hi-vis was pumped before displacing the hole with 900 bbls prehydrated gel mud. A Totco survey tool was dropped and pipe was pulled out. Tight spots were encountered from 539-510 m with 280 klbs overpull. The pipe was then worked and pulled back to 461 m. It was run back in to 553 m and 250 bbls of 6%-KCl/PHPA Mud was pumped. Thereafter, the pipe was pulled out of the hole without any problems. The bit drilled 446 m in 7.3 hrs for an average ROP of 61 m/hr and was graded 2-2-WT-A-2-I-NO-TD.

25 joints of 20.0" casing (Swift, X52, 94 lb/ft) were run, with the shoe set at 553 m. The casing was cemented with a lead of 1082 sx class "G" cement at 1.50 sg with 0.45 gal/sack Econolite, and a tail slurry of 910 sx of class "G" cement at 1.90 sg, and displaced with 49 bbls of seawater.

The BOPs and riser were rigged up and run to the sea floor. The BOPs were tested to BHPP specifications.

17.50" Hole Section: 565.0 - 1538.0 metres.

NB#2, a 17.5" Smith MO2SOD-C (14-18-18-20 jets), with a down-hole motor, was made up and run into the hole. While making up the bottomhole assembly, the Top Drive lower port guide roller assembly hinge failed and it fell 5 m to the drillfloor. Repairs were then made to the Top Drive system which took 3.5 days to complete.

After repairing the Top Drive System, the bit was run back in tagging the top of cement at 540 m. This was subsequently drilled, together with the shoe at 553 m. The 26.0" rathole was reamed to 565 m whilst displacing the hole and riser to a new gel polymer mud system. Three metres of new hole were drilled from 565-568 m. After circulating and cleaning the hole, the bit was pulled back into the shoe and a Formation Integrity Test was conducted. The results were as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Integrity Press (sg EMD)
568	553.0	17.50	1.07	1.86

After the Formation Integrity Test, the bit was run back to bottom and new formation was drilled to the casing point at 1512 m. The hole was circulated clean, a survey dropped, a slug pumped and the trip out commenced. The first few stands were very tight (30-50 klbs overpull) and it was decided to pump out the pipe until the string pulled freely.

After twenty stands, the bit was run back to bottom and the hole circulated clean. Due to the fact that the hole would not circulate clean, the mud density was increased and drilling recommenced. New hole was drilled to 1538 m and bottoms-up was circulated. After circulating and cleaning the hole, the bit was pulled out of the hole without encountering any problems. This bit drilled a total of 973 m in 42.07 hrs giving an average penetration rate of 23.13 m/hr. It was graded 2-2-BT-A-E-1/8-ER-TD.

The wireline unit was rigged up and the following log was run:

Run	Log Type	Interval
1	MSFL-DLL-SLS-GR-AMS-SP-GPIT	553 - 1517 m

One hundred and twenty-two joints of 13.375" casing (Buttress, N80, 64 lb/ft) were run, with the shoe set at 1526 m. The casing was cemented with a lead of 270 sx Class 'G' cement at 1.50 sg with 0.45 gal/sx Econolite, along with a tail of 924 sx Class 'G' cement at 1.90 sg neat, and displaced with 710 bbls seawater.

12.25" Hole Section: 1538.0 - 2170.0 metres.

NB#3, a 12.25" Smith M1S-C (16-16-18 jets), was made up with an MWD tool. It drilled the float (1501 m), cement and the shoe at 1526 m. The 17.5" rathole was reamed to 1538 m and new hole was drilled from 1538-1541 m. The hole was circulated clean and the bit was pulled

back into the shoe to conduct an FIT. The results were as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Grad. (sg EMD)
1541	1525.65	12.25	1.16	1.75

New hole was drilled from 1541-1554 m where the bit was pulled back inside the shoe and worked on suspected junk above the BHA. Drilling recommenced and new hole was drilled to 1728 m where to a drilling break up was circulated to surface. Upon evaluating MWD data, it was decided to pull out of the hole for coring. As the hole was initially tight, a short wiper trip to the shoe was performed prior to running back to bottom and circulating the hole clean. The bit was then pulled out of the hole and preparations were made for coring. This bit drilled a total of 190 m in 15.25 hours at an average penetration rate of 12.5 m/hr. It was graded 1-1-NO-A-E-3/32-NO-CR.

CB#1, a Diamant Boart Stratabit CD93 (TFA=1.503 in^2), was made up in conjunction with a 27 m core barrel and run into the hole. The core bit was washed and reamed from 1700-1712 m. From 1712-1728 m, the hole was under-gauge and had to be reamed to bottom with excessive torque. After circulating bottoms-up, a slug was pumped and the core bit pulled back to surface in order to use a tooth-bit and junk sub to clean up the bottom of the hole.

NB#4, a 12.25" Hughes JG8 (3x18 jets), was made up in conjunction with a junk sub and roller-reamer. The hole was washed and reamed from 1702-1728 m. A further 0.5 m of new hole was then drilled down to 1728.5 m. From this depth, bottoms-up was circulated and hole was surged for junk. The drillstring was then pulled out of the hole. The bit was graded 0-0-NO-A-E-I-NO-CP.

CB#1.1, a DBS CD93 (TFA=1.503 in^2), was made up to a 27 m core barrel and run into the hole. The hole was washed and reamed from 1693-1728.5 m. On reaching bottom, returns were circulated. A 6 m pup joint was then picked up and run in prior to cutting the core. Core-1 was then cut from 1728.5-1733.5 m. At 1733.5 m, a drop in the pump pressure was noted. A washout was suspected and the core barrel was pulled out of the hole. Recovery was 5.0 m (100%). This bit cut a total of 5 m of core in 0.6 hrs at an average penetration rate of 8.33 m/hr. It was graded 0-0-NO-A-X-I-NO-PR.

NB#5, a 12.25" Hughes ATM11HG (16-16-18 jets), was run in conjunction with an INTEQ MWD tool. The hole was washed and reamed to bottom. New hole was drilled from 1735.5-1830 m. Drill breaks at 1823.5 m, 1830 m, and 1838 m were flow-checked (static). A sample at 1830 m was circulated to surface before drilling ahead to 1839 m. Samples were again circulated to surface, the pipe was slugged and the bit pulled out of the hole to core. This bit drilled a total of 105.5 m in 6.47 hrs with an average penetration rate of 16.31 m/hr. It was graded 2-2-NO-A-8-I-NO-CP.

CB#1.2, a DBS CD93 (TFA=1.503 in^2), was made up to a 27 m core barrel and run in. The hole was washed and reamed from 1818-1839 m. After returns were circulated, Core-2 was cut from 1839-1855.5 m at which point it was decided to pull the core due to high torque. Recovery of the core was 100%. This bit cut a total of 16.5 m in 0.76 hrs with an average penetration rate of 21.71 m/hr. It was graded 2-2-BT-NS-X -I-CT-TQ.

RRB#4.1, a 12.25" Hughes JG8 bit (16-18-18 jets), was made up in conjunction with a junk sub and roller-reamer. The hole was washed and reamed from 1819-1855.5 m. Bottoms-up was circulated and the hole was surged for junk. The bit was pulled out of the hole after pumping a slug in preparation to cut Core-3. The bit was graded 0-0-NO-A-E-1-NO-CP.

CB#2.0, a DBS CD93 (TFA=1.503 in^2), was made up to a 27 m core barrel and run in. The hole was washed and reamed from 1819-1855.5 m. On reaching bottom, returns were circulated up prior to cutting Core-3 to 1882.5 m where the bit was tripped out. This bit cut a total of 27.0 m in 0.88 hrs with an average penetration rate of 30.7 m/hr. It was graded 3-3-BT-NS-X-I-CT-TD. Core recovery was 100%.

NB#6, a 12.25" Smith M2SD (16-16-18 jets), was made up in conjunction with an INTEQ MWD tool and run into the hole. The hole was washed and reamed from 1832-1882.5 m and bottoms-up was circulated. New hole was drilled from 1882.5-1903 m where drilling had to stop due to problems with the Top Drive System hydraulic pump. After repairs were completed, drilling continued to 1915 m as per drilling program, and bottoms-up was circulated. The hole was flow-checked, a slug was pumped, and the bit was pulled to the shoe where another flow-check was performed. The trip out recommenced and the bit pulled to surface in preparation to core. This bit drilled a total of 32.5 m in 1.85 hrs with an average penetration rate of 17.30 m/hr. It was graded 1-1-WT-A-E-I-NO-CP.

CB#2.1, a DBS CD93 (TFA=1.503 in^2), was made up to a 27 m core barrel and run in. The hole was washed and reamed from 1885-1915 m. On reaching bottom, returns were circulated. Core-4 was cut from 1915-1943 m and recovery was 100%. This bit cut a total of 28 m in 0.88 hrs with an average penetration rate of 31.8 m/hr. The bit was graded 1-2-FC-N-X-I-CT-TD.

CB#2.2, a DBS CD93 (TFA=1.503 in^2), was made up to a 27 m core barrel and run into the hole to continue the coring program. The hole was washed and reamed from 1905-1943 m. Upon circulating bottoms-up, Core-5 was cut from 1943-1969 m (100% recovery). This bit cut a total of 26 m in 1.18 hrs at an average penetration rate of 22.0 m/hr. The bit was graded 2-3-FC-N-X-1-CT-TD.

NB#7, a 12.25" DBS TD19M (5x14 and 1x13 jets) was made up in conjunction with an INTEQ MWD tool and run into the hole. The hole was washed and reamed slowly from 1896-1969 m to allow MWD readings to be taken over the cored section. New hole was drilled from 1969 m to Total Depth at 2170 m. An eight stand wiper trip was run over the coring interval and, when the bit was run back to bottom, the hole

was circulated clean. The pipe was slugged and the bit pulled to surface to run wireline logs. This bit drilled a total of 201 m in 9.48 hrs at an average penetration rate of 21.20 m/hr. It was graded 8-2-FC-A-2-1-CT-TD.

The following wireline logs were then run:

Run	Log Type	Interval
1	DLL-MSFL-AS-GR-SP-CAL-AMS	2170 - 1526 m
2	LDL-CNL-GR-FMS-AMS	2170 - 1526 m
3	RFT-HP-GR-AMS	
4	VSP	2160 - 680 m
5	CST-GR 30 shots 29 recovered	2144 - 1545 m

The second logging run was rerun which, on pulling out, tight hole conditions were noted with a maximum overpull of 3.5 klb. A wiper trip was then made (using **RRB4.2**), reaming from 1558-1762 m, and washing and reaming from 1900-2170 m. Bottoms-up was circulated and a trip gas of 2.5% was recorded. Good hole conditions were noted on the way out.

After completion and evaluation of the wireline logs, a plug and suspend program was undertaken for Minerva-2A.

b. Bit Optimisation

Bit performance was continuously monitored and the operator advised of the rate of penetration, torque and formation changes. See Table-4 for a detailed breakdown of bit data. No bits were tripped on a cost/metre criteria.

Minerva-2 and Minerva-2A were drilled using a total of 8 new bits, and 2 re-run bits, in 104.82 hrs on-bottom at an average penetration rate of 24.42 m/hr.

Minerva-2

The 36" hole was drilled using **RRB1.0** 26" bit (IADC 111), run in tandem with a 36" hole-opener. It drilled 35 m, to 120 m, where the bit was pulled to run casing. This section was drilled in 3.8 hrs at an average ROP of 9.2 m/hr and the bit was graded 2-2-WT-A-2-I-NO-TD. Typical drilling parameters used were WOB 10-15 klbs, RPM 70-80 and pump pressure 1200 psi at 1080 gpm.

RRB2.0 (IADC 116), was used to drill the 9.875" pilot hole for the 26" hole sections. This bit drilled a total of 440 m in a total of 12.9 hrs at ROPs varying from 20-260 m/hr and averaging 34.1 m/hr. Typical drilling parameters were: WOB 5-20 klbs, RPM 90-100 and pump pressure was 500-550 psi at a flow rate of 540 gpm. The bit was lost in the hole after the Minerva-2 pilot hole was plugged back.

Minerva-2A

The 36" hole was drilled using **RRB1.0** (IADC 111), again run in tandem with a 36" hole-opener. It drilled 34 m, to 119 m, where the bit was pulled to run the 30" casing. This section was drilled in 1.3 hrs at an average ROP of 26 m/hr and the bit was graded 2-2-WT-A-2-I-NO-TD. Typical drilling parameters were: WOB 10 klbs, RPM 120 and pump pressure 2000 psi at 1080 gpm.

The 26" hole was drilled utilising **RRB1.1** (IADC 111). It drilled 446 m in 7.3 hrs at an average ROP of 61.0 m/hr and was graded 2-2-WT-A-2-I-NO-TD. Typical drilling parameters were: WOB 0-20 klb, RPM 70-140 and pump pressure 2000 psi at 1100 gpm.

The 17.5" hole was drilled using only **NB2**, a PDC bit (IADC n/a), in tandem with a down-hole motor. This bit drilled 973 m in 42.07 hrs at an average ROP of 23.13 m/hr. The lithology through this section was predominantly sandstone in the upper part, with claystone becoming predominant in the lower section. The bit performed well in the sandstone sections, but slower in the claystone sections. The drilling parameters used were: WOB 30-50 klbs, RPM 155-225 and pump pressure 2700 psi at 1080 gpm. It was graded 2-2-BT-A-E-1/8-ER-TD.

The 12.25" hole was drilled using a total of 7 bits, in 37.45 hrs on-bottom at an average ROP of 16.87 m/hr.

NB#3 (IADC 435), drilled 190 m in 15.25 hrs at an average penetration rate of 12.5 m/hr. The lithology was massive claystone and the bit encountered no problems drilling this section. Variations in ROP were caused by lithological changes in the claystone with regard to pyrite and the calcareous nature of the claystone. Typical drilling parameters were: WOB 30-40 klb, RPM 180, and pump pressure of 2650 psi at 750 gpm. It was graded 1-1-NO-A-E-3/32-NO-CR.

CB#1 (IADC n/a) reamed and washed 28 m to bottom (at 1728 m) where excessive torque was recorded. Coring was abandoned and the bit was tripped to run a wiper trip. It was graded 0-0-NO-A-X-I-NO-TQ.

NB#4 (IADC 347) was made up in conjunction with a junk sub and roller reamer, reaming from 1702-1728 m before proceeding to drill 0.5 m of new formation. The bit was graded 0-0-NO-A-E-I-NO-CP.

CB#1.1 washed and reamed from 1693-1728.5 m. It cut 5 m of core before a suspected washout halted coring. It cored for 0.6 hrs at an average penetration rate of 8.33 m/hr and was graded 0-0-NO-A-X-I-NO-PR. The coring parameters used were: WOB 6-13 klbs, 50-105 RPM and pump pressure 540-880 psi at 325 gpm.

NB#5 (IADC 437) was run in conjunction with an MWD tool. It penetrated a massive claystone section before reaching the sandstone reservoir. It drilled a total of 105.5 m in 6.47 hrs with an average penetration rate of 16.31 m/hr. The drilling parameters used were: WOB 28-50 klbs, 140 RPM and pump pressure 2920-3060 psi at 770 gpm. It was graded 2-2-NO-A-8-I-NO-CP.

CB#1.2 cored 16.5 m of fine to medium sandstone in a total of 0.76 hrs with an average penetration rate of 21.71 m/hr. The coring parameters used were: WOB 9-20 klbs, 77-89 RPM and pump pressure 548-765 psi at 326-337 gpm. It was graded 2-2-BT-NS-X -I-CT-TQ.

RRB#4.1 was run in conjunction with a junk sub and roller-reamer to condition the hole. The bit washed and reamed the final 36 m to bottom (1855.5 m) where it surged for junk before pulling out of the hole. The bit was graded 0-0-NO-A-E-1-NO-CP.

CB#2.0 cored 27.0 m of hard to very hard, brittle sandstone in 0.88 hrs at an average penetration rate of 30.7 m/hr. The coring parameters used were: WOB 13-23 klbs, 105 RPM and pump pressure 640-800 psi at 340 gpm. The bit was graded 3-3-BT-NS-X-I-CT-TD.

NB#6 (IADC 515) was run in conjunction with an MWD tool. It drilled through a predominantly sandstone section with minor claystone stringers. It drilled 32.5 m in 1.85 hrs at an average penetration rate of 17.30 m/hr. The drilling parameters used were: WOB 30-35 klbs, 115 RPM and pump pressure 2730-2980 psi at 760 gpm. It was graded 1-1-WT-A-E-I-NO-CP.

CB#2.1 cored 28.0 m of sandstone in 0.88 hrs at an average rate of penetration of 31.8 m/hr using the following parameters: WOB 11-23 klbs, 83-105 RPM and pump pressure 692-811 psi at 323 gpm. The bit was graded 1-2-FC-N-X-I-CT-TD.

CB#2.2 cored a further 26.0 m in 1.18 hrs at an average penetration rate of 22.0 m/hr. The coring parameters used during this run were: WOB 10-22 klbs, 120-130 RPM, and pump pressure 680-1010 psi at 335 gpm. The bit was graded 2-3-FC-N-X-1-CT-TD.

NB#7 (IADC n/a) was run in conjunction with an MWD tool. It drilled a total of 201 m to Total Depth in 9.48 hrs with an average penetration rate of 21.20 m/hr through sandstone, interbedded with claystone. Typical drilling parameters used were: WOB 7-26 klbs, 90-150 RPM and pump pressure 2430-810 psi at 810 gpm. This formation proved quite abrasive as it was graded 8-2-FC-A-2-1-CT-TD.

RRB#4.2 completed a wiper trip during wireline logging at Total Depth. The bit was graded 2-2-WT-A-2-1-NO-LOG.

c. Hydraulics Optimisation

Hydraulics analyses were provided for the operator on a daily basis. Results of these analyses were provided on the daily Geological - Engineering reports and on the Hydraulic data printouts in Appendices IX and X respectively. A summary is also provided in Table 5.

The rig was equipped with two NATIONAL 12P 160 triplex pumps with a pump output of 5.41 gal/stk at 97% efficiency.

Minerva-2

The drilling of the 36" hole was done using seawater with hi-vis sweeps. Flow rates of 1010-1100 gpm were used giving laminar flow regimes within all annular sections. The impact force and percentage pressure loss were 699 lbf and 29%, with the low percentage pressure loss due to the presence of the 36" hole-opener.

The 9.875" pilot hole section was also drilled with returns to the seabed, using seawater as the drilling fluid at a flow rate of 540-560 gpm with 20 bbl hi-vis gel sweeps at every half stand, producing excellent cuttings transport properties but turbulent flow regimes within the 9.875" annular section.

Minerva-2A

The 36" section was drilled using seawater with hi-vis sweeps. Flow rates of 1080-1100 gpm were used giving laminar flow regimes within all annular sections. The impact force and percentage pressure loss were 659 lbf and 23%, with the low percentage pressure loss due to the presence of the 36" hole-opener.

The 26" section was also drilled with seawater and hi-vis sweeps with flow rates of 1080-1120 gpm giving turbulent flow regimes within all annular sections. The impact force and percentage loss were 1279 lbf and 42%.

The 17.5" section was drilled using a closed KCl/Gel/Polymer mud system. The mud density used for this section was maintained at 1.10-1.16 sg, with PV and YP at 16-18 and 29-32 respectively. The flow rate used was 1080 gpm and this produced laminar flow regimes throughout all sections of the annulus, therefore keeping hole erosion to a minimum, while maintaining good hydraulics. Annular velocities in the largest annular section (the riser) of 23 m/min helped to maintain sufficient cuttings velocities. Typical bit pressure losses were 38-42%, producing a hydraulic power at the bit of between 676-766 hhp with an impact force of between 1966-2027 lbf.

The 12.25" section was drilled from 1538-2170 m with an MWD tool in the BHA assembly, and using a KCL/PHPA/Polymer mud. The mud density was successfully kept stable at 1.16-1.17 sg, along with PVs and YPs of 18-13 and 28-22 respectively. A consistent configuration of 16-16-18 nozzles were in place when using tri-cone bits. With a flow rate

of 756-770 gpm, the pressure loss at the bit wase 1035-1296 psi, 49-52% of the total pressure loss of 2608-2970 psi. The pressure drop across the MWD tool accounted for 400-500 psi. This provided good hydraulic and hole cleaning capabilities while maintaining laminar flow regimes through the annulus, reducing hole erosion to a minimum. The hydraulic power at the bit ranged from 550-582 hhp with an impact force of 1446-1500 lbf.

While coring, a TFA of 1.503 in^2 was use along with a flow rate of 325-340 gpm, with pressure loss at the bit of 45 psi, 10% of the total pressure loss of 680-1000 psi. This caused the hydraulics to be below optimum, but no appreciable affect was observed on the ROP's as drilling was rapid while coring and no attempts were made to circulated the cuttings to surface.

On the final bit run, a PDC bit with a TFA of 0.8813 in^2 was used with a flow rate of 810 gpm, producing good hydraulics with laminar flow through the annulus, with a bit loss of 759 psi, 34% of the total pressure loss of 2800 psi.

d. Borehole Condition.

Borehole condition was monitored by observing rotary torque, overpull on connections and during trips, hole fill after trips and cavings. Carbide checks were run on a regular basis to check the lag and obtain an estimate of the average hole size.

9.875" pilot hole, 36" and 26" Hole Sections

The 9.875" pilot hole in Minerva-2 is believed to have collapsed thereby necessitating to move the rig 35 m off location. No hole problems were noted while drilling the 36" and 26" hole sections at Minerva-2A. The 30" casing and 20" casing were run and cemented without problems.

17.5" Hole Section:

This hole section was drilled fairly well with minor hole problems. The occasional drop in penetration rates were mainly associated with claystone sections and occasional indurated sandstone sections. Carbide checks were made at 765 m, 910 m, and 1519 m while drilling this section. The results from these carbide runs indicated that the hole was 8.2-10.1% out of gauge (diameter range of 18.93"-19.26"). The carbide data corresponded to the wireline caliper log. No hole problems were encountered while drilling however, during the trip at 1512 m, tight hole conditions were encountered at 1313-1086 m. This necessitated a wiper trip and the mud density to be increased to 1.16 sg. After increasing the mud density, the hole was drilled deeper to 1538 m. During the trip out at this depth, no hole problems were encountered. While running 13.375" casing, the casing stood up at 1517 m and required to be washed down to bottom.

12.25" Hole Section:

No carbide checks were made through out this hole section for it was feared that the carbide would mask the gas readings of the anticipated gas reservoir. However, the formation logged corresponded well with the MWD data, hence the lag proved correct with minimal hole erosion. Tight hole conditions were noted in this 12.25" hole section. Noted at 1612 m were overpulls of 50 klb, with excessive torque at 1728 m and 1855 m which also recorded a 35 klb overpull. Light washing/reaming was required between the section 1905-1945 m. While running wireline logs at TD, tight hole was noted requiring a wiper trip with reaming from 1558-1762 m, and washing and reaming from 1900-2170 m. The shallower section is probably a reflection of increased pore pressure however the lower section is more likely a combination of newly drilled hole left unwiped, along with a slightly abnormal pore pressure.

3. PRESSURE EVALUATION

a. Formation Fracture Pressure

Fracture pressures were calculated using the "Constant Effective Stress Ratio" method. This utilized leak-off data and allowed for lithological and pore pressure variations. It should be noted that this method assumes uniform tectonic stress, and any unconformities may place the section on either side in a different stress regime. See Appendix IV, Pressure Gradient Analysis Plot.

Two Formation Integrity Tests were conducted during the drilling of Minerva-2. The results of the FITs at 568 m and 1526 m are as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Press (sg EMD)
568	553.0	17.50	1.07	1.86
1541	1526.0	12.25	1.16	1.75

No losses to the formation were noted during the drilling of the 17.5" and the 12.25" hole. It is unlikely that any hydraulic fracturing would have occurred as the minimum fracture gradients of 1.86 and 1.75 sg EMD were not exceeded at any time by the maximum circulating density of 1.19 sg. While running E-logs, losses of 0.5 bbls/hr were noted, and it is believed to be due to seepage within the porous sandstone.

b. Formation Pore Pressure

Pore pressure indicators, including Dxc, flowline temperature, mud resistivity, hole condition, cavings and gas values, were monitored on a continuous basis while drilling and pore pressure estimates were reported to the operator on a daily basis. When the MWD tool was run, these results were used in the estimation of pore pressures. Plots of the relevant pressure indicators and pressure estimates are detailed in the Drilling Data Pressure Plot in Appendix II, Composite Pressure Data Plot in Appendix III and the Pressure Gradient Analysis Plot in Appendix IV. Based on data from nearby wells a normal pore pressure gradient of 1.03 sg EMD was assumed for Minerva-2A.

9.875" pilot hole, 36" and 26" Hole Sections:

It was not possible to accurately monitor pore pressure through these sections as there were no returns to surface and drilling was generally controlled by using a very low weight on bit. The absence of any hole problems while drilling or running casing suggests that pore pressure remained normal at 1.03 sg EMD through these intervals.

17.5" Hole Section.

The pore pressure was estimated to be normal at 1.03 sg EMD from the casing shoe to 1050 m where a gradual increase in pore pressure might have occurred. From 1050-1538 m, the pore pressure is estimated to be at 1.06-1.09 sg EMD. This was based primarily on data from Minerva-1. This was also supported by tight hole conditions on a wiper trip which required NB#2 to be pumped out from 1313-1086 m, and be washed and reamed to bottom from 1473-1512 m with maximum overpulls of 40 klb.

On running in 13.375" casing, the casing stood up at 1517 m and had to be washed to bottom. No trend can be established from the Dxc plot since the points were scattered due to the use of a down-hole motor and, furthermore, the section drilled was mostly sandstone. Connection gases were not observed and this was due to the mud density which was maintained at 1.12-1.16 sg. Other parameters which may indicate overpressuring were not observed while drilling this section.

12.25" Hole Section

Tight hole conditions continued to persist with maximum overpulls of 100 klb from 1612 m to the shoe, accompanied by an increase in the amount of trip gas. The section between 1700-1728 m exhibited excessive torque and required washing and reaming. The Dxc showed a change in trend to the left, suggesting an abnormal compaction trend from 1440 m, continuing to 1890 m. The further change in Dxc trend from 1800-1890 m is related to the relative change in lithology as the siliceous content increased and is not indicative of further increase in pore pressure.

When comparing these section to the MWD logs, the gamma ray showed a trend to the left from 1580 m to 1690 m followed by shifting trends from 1740 m until it reaches the sand. The resistivity shows corresponding changes with the gamma and is in itself inconclusive to the indication of overpressured zones.

The mud was considered to be well over-balanced with a density of 1.16-1.17 sg, explaining why no connection gases were noted and minute trip gasses were observed, with the only exceptions being at 1943 m and 2170 m where the trip gas was 6.67% and 2.5% which was attributed to excessive swabbing, and no excessive cavings were noted while drilling. The background gas remained in the range of 0.1%-0.2% which is considered low. The flowline temperature was generally dampened due to heat losses in the riser. Based on these and information from Minerva-1, the pore pressure was estimated to range from 1.09 to 1.13 sg EMD for the overpressured sections, reverting to being normally pressured from 1890 m.

4. GEOLOGY AND SHOWS

Cuttings samples were collected at 20 metres intervals from the 20" casing shoe to the base of the 17.5" hole section, from 565 m to 1538 m.

Cuttings samples were also collected at 5 metre intervals from the 13.375" casing shoe to the base of the 12.25" hole section, from 1538 m to 2170 m.

The following samples were missed due to coring and drill returns not being circulated: 1730, 1840, 1845, 1850, 1855, 1860, 1865, 1870, 1875, 1880, 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965 m.

Geology Summary

DEPTH INTERVAL (mRT)	ROP (m/hr)			TOTAL GAS (%)		CHROMATOGRAPH ANALYSIS (%)									
						C1		C2		C3		C4		C5	
	Min	Max	Avg	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
565- 596	2	81	22	0	0	-	-	-	-	-	-	-	-	-	-
596- 603	20	43	33	0	0	-	-	-	-	-	-	-	-	-	-
603-1492	4	263	35	0	1.006	0	0.966	0	0.029	0	0.007	0	Tr	-	-
1492-2170	3	67	22	0.026	3.895	0.017	3.795	0	0.234	0	0.022	0	0.007	-	-

The lithologies seen in Minerva-2A are described below. For further descriptions see Appendix XI (Formation Evaluation Log).

Spud to 565 m
Returns to the sea floor

565 - 596 mRT: CLAYSTONE

CLAYSTONE: generally light brown to medium brown in colour, and occasionally dark brown. It was soft, massive, silty in parts, and occasionally very arenaceous. Accessory minerals include pyrite grains, common quartz grains (from the associated sandstone ?), carbonaceous material in parts and occasional fossils.

No Gas and no shows were recorded.

596 - 603 mRT: SANDSTONE

SANDSTONE: generally light brown to brown in colour and consisted of essentially friable aggregates of the quartz with a silica cement. The grain size was medium to coarse, with the grain shapes being subangular to subrounded, and the sandstone being moderately well sorted. A calcitic cement was occasionally noted in part, and a very common argillaceous matrix was also present. As in the claystone, fossils were occasionally seen. The sandstone had a poor visible porosity and no shows were present

No gas and no oil shows were recorded.

603 - 1492 mRT: SANDSTONE with interbedded CLAYSTONE, grading to CLAYSTONE with interbedded SANDSTONE

SANDSTONE: light to dark brown, dominantly medium brown at the top of this section, and tended to become grey brown in colour and then grey as the depth increased. The majority of the sandstone within the section was very light to light grey, occasionally white and occasionally grey brown. It was generally friable with abundant loose grains, and was occasionally moderately hard in parts, bound by a moderately hard silicic cement. A calcitic cement was also noted but tended to be fairly rare, as was a rare pyritic cement. It was very fine to coarse, occasionally very coarse, but dominantly fine to medium grained.

The sandstone was poorly to moderately well sorted, and only occasionally was it well sorted. The grain shape was subangular to subrounded, and rounded in parts, and were generally transparent to translucent grains. A trace to common light grey to medium grey, occasionally brown and white in parts, very dispersive argillaceous material was present. Accessory minerals seen included trace to common pyritic grains and aggregates as well as trace glauconite in parts. Trace green, black and yellow lithics were noted and although fairly rare, iron staining on some quartz grains was also present. Trace micaceous material was seen as well as very hard dark brown crystalline dolomite fragments towards the bottom of the formation. Trace fossils were also seen. Visible porosity was generally good to very good. No oil shows were seen.

CLAYSTONE: generally light grey to medium grey in the upper part of the section, and medium to dark brown grading to olive black as the depth increases. It was dominantly soft and only occasionally firm, and moderately to very dispersive. The claystone was often very arenaceous and massive and was rarely sticky or silty. Accessory minerals include trace fine pyrite aggregates and trace to rare dark brown crystalline dolomite fragments. Fossils were also recognized occasionally and Inoceramus was positively identified.

There were no shows recorded in this section although gas was noted from 908 mRT. The highest gas peak recorded was 1.0058% at 1405 mRT.

1492-2170 mRT: CLAYSTONE grading to SANDSTONE with interbedded CLAYSTONE

CLAYSTONE: medium to dark grey to grey brown, to brown black in parts, grading into very light to light grey towards the bottom of the formation. It was dominantly soft to firm, occasionally moderately hard, and hard in the upper sections of the formation, arenaceous throughout the section, and moderately to very dispersive, particularly at the top of the formation. It was particularly silty in the upper sections of the formation. It was sub-blocky to blocky, sub-fissile in parts of the formation and also tended to be fairly sticky in the lower section. Accessory minerals include trace to common fine black carbonaceous specks throughout the formation, trace fossils in the upper section (Inoceramus), trace glauconite, trace medium to dark brown crystalline dolomite fragments and trace pyrite fragments and aggregates. Trace dull black and brittle coal was also seen mid-section. No shows were seen within the clay fraction of the formation, although gas occurred throughout.

SANDSTONE: white to light grey throughout the section, and consisted of a fine to coarse grain size, dominantly medium although very coarse in parts. The sand was dominantly friable or consisted of loose grains, although it was moderately hard to hard in parts. The dominant cement was weak to moderately strong silica cement although trace to common calcitic cement was noted in parts, even though calcimetry values tended to be very low throughout the formation. The grains were dominantly subrounded to subangular although they were often seen to be angular to very angular in parts, translucent to transparent, and the sandstone as a whole had a fair to poorly sorted nature, occasionally moderately well sorted in parts.

A white to light grey very dispersive argillaceous matrix was noted throughout the section. Accessory minerals include fragments and aggregates of pyrite, trace glauconite, trace fine black carbonaceous specks, trace fine black lithics and occasional yellow and red lithics. Trace to rare dull to sub-vitreous brittle black coal was also recognized in the formation. Visible porosity ranged from fair to good in the upper sections of the sandstone, to very good to excellent in the mid sections of the sand and good to very good lower down the formation. Various gas peaks and shows (tabulated below) were seen throughout the sands of this interval.

SHOW: 1855 mRT: Up to 5% pin point, patchy in part, moderately dull, moderately weak, green to green yellow direct fluorescence with a fast blooming, moderately dull, strong, milky green yellow cut and an instantaneous blooming, moderately bright, moderately strong green yellow crush cut. A thick moderately bright, moderately strong green yellow residual ring remained.

SHOW: 1888 mRT: 5% pin point, moderately strong bright green direct fluorescence with no cut. A moderately slow streaming, moderately strong bright green yellow crush cut and a thin, moderately strong bright green yellow residual ring.

SHOW: 1910 mRT: 5% moderately strong pin point, bright orange direct fluorescence with a trace moderately bright green pin point fluorescence in parts. No cut although a moderately slow streaming, moderately strong, bright orange to blue white crush cut and a thick green to green yellow moderately strong, moderately dull residual ring. A moderately bright and moderately strong orange to blue white residue was also present.

Below is a table listing the various gas peaks that occurred throughout this interval.

DEPTH (mRT)	TOTAL GAS (%)	C1	C2	C3	C4	C5
1722	3.8945	3.7945	0.0456	0.0220	0.0068	0
1838	3.0080	2.0873	0.2342	0.0090	0	0
1890	3.8948	2.9480	0.0348	0.0177	0.0059	0
1902	2.4629	1.7388	0.0184	0.0088	0.0063	0
1907	1.8781	1.4115	0.0357	0.0082	0.0016	0

5. TESTING AND EVALUATION

a. Hydrocarbon Evaluation and Gas Ratio Analysis

Standard mud logging techniques were utilized while drilling. Total combustible gas levels in the mud were monitored continuously using an FID Total Gas Detector. The gas was also analyzed for its components (methane through pentane) using an FID Chromatograph. Carbon dioxide and hydrogen sulfide detectors were also run for the duration of the well. Mud returns, unwashed and washed cuttings were observed under ultra-violet light and cut with solvent to check for the presence of liquid hydrocarbons.

As returns were not circulated while coring, the gas record in the reservoir section is incomplete. Hence, no gas ratio analysis was performed over this interval.

b. Wireline Logging

Depth	Hole Diameter	LOGS
1538	17.25	MSFL-DLL-SLS-GR-AMS-SP-GPIT
2170	12.25	DLL-MSFL-AS-GR-SP-CAL-AMS LDL-CNL-GR-FMS-AMS RFT-GR0 VSP CST-GR (Shot 30 CST, recover 29)

c. Coring

Five cores were cut in Minerva-2A over the following intervals:

CORE	INTERVAL	RECOVERY
1	1728.5 - 1733.5 m	100 %
2	1839.0 - 1855.5 m	97.5%
3	1855.5 - 1882.5 m	100 %
4	1915.0 - 1943.0 m	100 %
5	1943.0 - 1969.0 m	100 %

d. Measurement while Drilling.

Measurement while drilling services were provided by Baker Hughes InteQ Information Technology (Eastman-Teleco). Data was regularly transferred to InteQ Drillbyte database, and combined drill data/MWD plots were submitted to BHPP on a daily basis (See Appendix V for the MWD data plot). This data was also output to a composite plot and used for pressure evaluation (See Appendix III).

The range of MWD data obtained was 1531-1998.5 m, while the RWD data ranged from 1531-1906.5 m. The remaining data to TD was not transferred due to tool failure.

e. Repeat Formation Test

RFT measurements were taken in the 12.25" hole section:

Test #	V.Depth mbrt	Formation Pressure Strain Gauge psig	Hp Gauge psia	Temp °C	Comments
1	1722.5	2692.10	2711.99	65.1	Good Test
2	1723.5	2696.00	2717.00	65.2	Low Permeability
3	1724.5	2691.30	2711.32	64.7	Good Test
4	1725.5	2691.50	2712.15	64.9	Low Permeability
5	1726.5	2695.50	2716.44	64.9	Tight
6	1727.3	2698.10	2718.83	65.1	Low Permeability
7	1722.5	-	-	65.3	Tight
8	1723.0	2691.50	2712.38	65.1	Low Permeability
9	1723.5	-	-	65.2	Lost Seal
10	1723.7	2696.40	2717.50	65.3	Low Permeability
11	1724.5	2690.60	2711.52	65.4	Low Permeability
12	1729.2	-	-	65.5	Tight
13	1833.0	2710.30	2729.56	69.7	Good Test
14	1840.0	2711.60	2730.76	69.2	Good Test
15	1853.0	2713.40	2732.82	68.8	Good Test
16	1875.0	2717.00	2736.12	69.1	Good Test
17	1890.0	2720.20	2738.98	69.5	Good Test
18	1907.0	2722.50	2741.60	70.8	Good Test
19	1925.0	2726.10	2744.82	72.5	Good Test
20	1930.0	-	-	71.9	Tight (shale)
21	1933.5	2727.70	2745.93	71.2	Good Test
22	1937.5	2732.00	2751.77	71.2	Supercharged?
23	1939.0	2728.70	2746.75	71.5	Good Test
24	1940.5	2729.00	2747.35	71.9	Good Test
25	1942.5	-	-	-	Tight
26	1942.8	2733.70	2753.12	72.2	Supercharged?
27	1944.0	2734.00	2752.47	72.3	Good Test
28	1947.0	2738.20	2756.32	72.1	Good Test
29	1949.0	2740.80	2758.60	72.0	Good Test
30	1954.0	2748.10	2766.14	72.5	Good Test
31	1961.5	2758.20	2775.90	72.5	Good Test
32	1971.0	2770.80	2789.95	72.9	Good Test
33	1975.0	2776.90	2795.26	73.1	Good Test
34	1984.5	2790.30	2808.22	73.4	Good Test

f. Drill Stem Testing

No DSTs were run during or after the drilling of Minerva-2A.

6. DATA INVENTORY

The following were supplied to BHPP on a daily basis or as required:

1 copy	Morning Report
1 copy	Hydraulics Printout
1 copy	Formation Evaluation Log
1 copy	Drilling Data Plot
1 copy	Drilling Data Pressure Plot

On completion of Minerva-2/2A, all charts, work sheets, raw data and data disks were forwarded to BHPP Australia. Four (4) copies of the Final Well Report were compiled, with Baker Hughes InteQ retaining one (1) copy, as well as a copy of all relevant data.

Baker Hughes InteQ will use all reasonable diligence to maintain and store the listed items in a manner to reasonably prevent damage or loss. Provided, however, Baker Hughes InteQ assumes no responsibility for the loss, damage or theft of these items or information contained herein, and shall not be liable to the Operator in any such event irrespective of cause, fault, or the active or passive negligence of Baker Hughes InteQ and its employees.

TABLES

1. Deviation Survey Record
2. Drilling Fluid Properties
3. Casing and Cementing Details
4. Bit Record
5. Bit Hydraulics Record

TABLES

TABLE 1.

EXLOG DRILLBYTE EAP : DIRECTIONAL SURVEY ANALYSIS

Well MINERVA-2
Latitude 38deg43'04.3"S
Longitude 142deg57'19.9"E

Measured Depth m	Incl deg	Azimuth (corr) deg	quad	Tool Type	Course Length m	Dogleg deg/10m	Vertical Depth m	Position North m	East m	Calc Method
86.0	0.00	0.00	N0.00E	SS	86.0	0.000	86.0	0.0	0.0	TIE IN
560.0	0.50	0.00	N0.00E	SS	474.0	0.011	560.0	2.1	0.0	MIN CURV
580.0	2.81	111.23	S68.77E	PG	20.0	1.514	580.0	2.0	0.5	MIN CURV
610.0	2.56	112.18	S67.82E	PG	30.0	0.085	610.0	1.5	1.8	MIN CURV
640.0	1.99	159.75	S20.25E	PG	30.0	0.636	639.9	0.7	2.6	MIN CURV
670.0	3.58	29.70	N29.70E	PG	30.0	1.698	669.9	1.0	3.2	MIN CURV
700.0	3.70	350.16	N9.84W	PG	30.0	0.821	699.9	2.8	3.5	MIN CURV
730.0	2.47	93.44	S86.56E	PG	30.0	1.632	729.8	3.7	4.0	MIN CURV
760.0	2.15	146.09	S33.91E	PG	30.0	0.689	759.8	3.2	4.9	MIN CURV
790.0	2.26	84.35	N84.35E	PG	30.0	0.755	789.8	2.8	5.8	MIN CURV
820.0	2.65	44.59	N44.59E	PG	30.0	0.570	819.8	3.4	6.9	MIN CURV
850.0	2.31	41.62	N41.62E	PG	30.0	0.121	849.7	4.3	7.8	MIN CURV
880.0	3.20	302.57	N57.43W	PG	30.0	1.410	879.7	5.2	7.5	MIN CURV
910.0	3.63	263.06	S83.06W	PG	30.0	0.781	909.7	5.5	5.9	MIN CURV
940.0	2.65	271.47	N88.53W	PG	30.0	0.360	939.6	5.5	4.2	MIN CURV
970.0	3.05	246.41	S66.41W	PG	30.0	0.432	969.6	5.1	2.8	MIN CURV
1000.0	3.15	273.62	N86.38W	PG	30.0	0.487	999.5	4.9	1.2	MIN CURV
1030.0	2.94	259.08	S79.08W	PG	30.0	0.266	1029.5	4.8	-0.3	MIN CURV
1060.0	1.63	297.60	N62.40W	PG	30.0	0.650	1059.5	4.8	-1.5	MIN CURV
1090.0	1.91	276.92	N83.08W	PG	30.0	0.231	1089.5	5.1	-2.3	MIN CURV
1120.0	3.10	237.85	S57.85W	PG	30.0	0.672	1119.4	4.7	-3.5	MIN CURV
1150.0	2.31	255.33	S75.33W	PG	30.0	0.378	1149.4	4.1	-4.8	MIN CURV
1180.0	3.62	222.66	S42.66W	PG	30.0	0.696	1179.4	3.3	-6.0	MIN CURV
1210.0	4.22	213.80	S33.80W	PG	30.0	0.284	1209.3	1.7	-7.3	MIN CURV
1240.0	1.42	284.72	N75.28W	PG	30.0	1.329	1239.3	0.9	-8.3	MIN CURV
1270.0	3.93	235.28	S55.28W	PG	30.0	1.065	1269.2	0.4	-9.5	MIN CURV
1300.0	1.71	273.54	N86.46W	PG	30.0	0.932	1299.2	-0.2	-10.7	MIN CURV
1330.0	2.58	296.43	N63.57W	PG	30.0	0.402	1329.2	0.1	-11.8	MIN CURV
1360.0	3.47	316.97	N43.03W	PG	30.0	0.463	1359.1	1.1	-13.0	MIN CURV
1390.0	3.14	304.08	N55.92W	PG	30.0	0.270	1389.1	2.2	-14.3	MIN CURV
1420.0	2.84	187.95	S7.95W	PG	30.0	1.692	1419.1	1.9	-15.1	MIN CURV
1450.0	1.97	184.05	S4.05W	PG	30.0	0.295	1449.0	0.7	-15.2	MIN CURV
1480.0	1.36	147.40	S32.60E	PG	30.0	0.399	1479.0	-0.1	-15.1	MIN CURV
1510.0	2.01	110.43	S69.57E	PG	30.0	0.411	1509.0	-0.6	-14.4	MIN CURV
1521.0	1.00	0.00	N0.00E	PG	11.0	2.308	1520.0	-0.6	-14.2	MIN CURV
1539.0	2.20	37.60	N37.60E	MWD	18.0	0.852	1538.0	-0.1	-14.0	MIN CURV
1571.0	2.30	43.90	N43.90E	MWD	32.0	0.083	1570.0	0.8	-13.2	MIN CURV
1599.0	2.50	46.80	N46.80E	MWD	28.0	0.084	1598.0	1.6	-12.4	MIN CURV
1687.0	3.20	62.90	N62.90E	MWD	88.0	0.120	1685.8	4.1	-8.8	MIN CURV
1748.0	3.30	83.30	N83.30E	MWD	61.0	0.189	1746.7	5.0	-5.5	MIN CURV
1776.5	3.70	90.40	S89.60E	MWD	28.5	0.207	1775.2	5.1	-3.8	MIN CURV
1806.0	3.90	94.20	S85.80E	MWD	29.5	0.109	1804.6	5.1	-1.8	MIN CURV
1901.0	3.90	99.80	S80.20E	MWD	95.0	0.040	1899.4	4.3	4.6	MIN CURV
1977.5	3.80	102.70	S77.30E	MWD	76.5	0.029	1975.7	3.3	9.6	MIN CURV
2036.0	3.60	102.70	S77.30E	MWD	58.5	0.034	2034.1	2.4	13.3	MIN CURV
2154.0	3.70	112.90	S67.10E	MWD	118.0	0.056	2151.9	0.1	20.4	MIN CURV

Table 2.

Mud Properties

Depth m	MW sg	Vis sec/qt	PV cp	YP lb/cft²	Gels lb/cft² 10s/10m	F cc	FC 1/32"	SOL %	OIL %	SD %	MBT	pH	Cl Kppm	Ca mg/l	K+ Kmg/l	KCl %	PHPA lb/bbl
565.0	1.03	Seawater with Guar Gum Hi-Vis sweeps used for the 36.0, 26.0", 9.875" hole sections															
KCl/Gel/Polymer																	
649	1.08	52	12	19	7/15	6.0	1.0	5.0	-	0.20	8.0	9.5	52.0	220	47.0	9.0	-
946	1.12	56	13	23	7/15	6.0	1.0	7.5	-	3.00	7.0	8.7	45.0	420	34.2	6.6	-
1256	1.11	56	15	28	7/12	5.5	1.0	7.0	-	3.00	7.5	9.3	50.0	320	40.0	7.7	-
1538	1.16	51	18	29	7/13	4.6	1.0	9.0	-	0.75	10.5	9.3	43.0	180	32.0	6.2	-
KCL/PHPA/POLYMER																	
1541	1.16	53	18	27	8/13	5.0	1.0	9.0	-	-	10.0	8.9	37.0	260	31.0	6.0	0.50
1728	1.17	44	16	23	7/13	5.4	1.0	9.8	-	-	11.5	9.5	46.0	200	40.0	7.7	0.50
1733	1.17	42	12	20	4/9	5.8	1.0	9.8	-	0.25	11.5	9.2	43.0	200	37.0	7.1	0.50
1751	1.17	43	11	21	4/7	5.6	1.0	9.8	-	0.50	10.5	9.1	45.0	280	39.0	7.5	0.50
1824	1.165	41	13	23	5/8	5.8	1.0	9.3	-	0.25	10.5	9.3	46.0	280	37.5	7.2	0.50
1839	1.165	42	13	25	6/9	5.9	1.0	9.3	-	0.50	10.5	9.0	46.0	260	39.0	7.5	0.50
1855	1.165	42	13	22	4/8	6.1	1.0	9.3	-	0.50	10.5	9.0	46.0	280	38.5	7.4	0.50
1882	1.17	42	13	22	4/8	5.8	1.0	9.8	-	0.50	11.0	9.5	46.0	120	38.5	7.4	0.50
1915	1.17	43	15	23	5/8	5.6	1.0	9.8	-	0.50	10.5	9.4	46.0	120	38.0	7.3	0.50
2013	1.165	42	13	23	5/8	5.4	1.0	9.3	-	1.00	10.5	9.3	45.0	120	38.0	7.3	0.50
2125	1.65	43	13	22	5/8	5.6	1.0	9.3	-	0.50	10.0	9.3	45.0	120	36.5	7.0	0.50
2170	1.17	42	14	23	5/10	5.9	1.0	9.8	-	1.50	9.0	9.2	47.0	80	37.5	7.2	0.50

Table 3.

Casing and Cementing Summary

Hole Depth m	Hole Size in	Casing Size Nom in	Casing Size ID in	Weight ppf	Shoe Depth m	Joints Run	Cement Details
119.0	36.00	30.000	29.000	310	118	3	500sx 'G' cement @ 1.90 sg (15.9 ppg) + 2% $CaCl_2$ Displaced with 12 bbl seawater
565.5	26.00	20.000	19.130	94	553	25	Lead: 1082 sx Class 'G' cement @ 1.50 sg (12.5 ppg) + 0.45 gal/sx Econolite Tail: 910 sx Class 'G' cement @ 1.90 sg (15.9 ppg) Displaced with 49 bbl seawater
1538.0	17.50	13.375 13 3/8	12.347	68	1526	122	Lead: 270 sx Class 'G' cement @ 1.50 sg (12.5 ppg) + 0.45 gal/sx Econolite Tail: 924 sx Class 'G' cement @ 1.90 sg (15.9 ppg) neat. Displaced with 710 bbls seawater

Table 4. Bit Record

Minerva-2

Run #	Bit #	Vendor	Type	Size in	IADC	Jets 1/32"	Depth In (m)	Metres run	Hours	Avg ROP	WOB klb	RPM	Torque amps	Pump psi	GPM	Grade IODLBGOR
1	RR1.0	Security H/O	S3SJ	26.00 36.00	111 111	24,24,24 20,20,20,20	85.0	35.0	3.80	9.20	10-15	70-80	60-250	1200	1080	2-2-WT-A-2-I-NO-TD
2	RR2.0	Security	S33SF	9.875	116	OPEN	120.0	440.0	12.90	34.10	5-20	90-100	100-250	550	533	LOST

Minerva-2A

Run #	Bit #	Vendor	Type	Size in	IADC	Jets 1/32"	Depth In (m)	Metres run	Hours	Avg ROP	WOB klb	RPM	Torque amps	Pump psi	GPM	Grade IODLBGOR
1	RR1.0	Security H/O	S3SJ	26.00 36.00	111 111	24,24,24 20,20,20,20	85.0	34.0	1.30	26.00	10	120	60-260	1100	1080	2-2-WT-A-2-I-NO-TD
2	RR1.1	Security	S3SJ	26.00	111	24,24,24	119.0	446.0	7.30	61.00	0-20	70-140	100-350	2000	1080	2-2-WT-A-2-I-2-WT-TD
3	NB2	Smith	M02SOD-C	17.50		18,18,14,20	565.0	973.0	42.07	23.13	30-50	155-225	200-450	2700	1080	2-2-BT-A-E-1/8-ER-TD
4	NB3	Smith	M1S-C	12.25	435	18,16,16	1538.0	190.0	15.25	12.50	30-40	180	250-370	2900	756	1-1-NO-A-E 3/32-NO-CP
5	CB 1.0	DBS	CD93	12.25		10 x 14	1728.0	0.0	DID NOT DRILL DUE TO HIGH TORQUE RUNNING IN							0-0-NO-A-X-I-NO-TQ
6	NB4.0	Hughes	JG8	12.25	347	18,18,18	1728.5	0.5	WASHED AND SURGED FOR JUNK ON BOTTOM							0-0-NO-A-E-I-NO-CP
7	CB 1.1	DBS	CD93	12.25		10 x 14	1728.5	5.0	0.60	8.33	6-13	50-105	214-534	850	325	0-0-NO-A-X-I-NO-PR
8	NB5	Hughes	ATM11HG	12.25	437	16,16,18	1733.5	105.5	6.47	16.31	28-50	140	275-501	3000	770	2-2-NO-A-8-I-NO-CP
9	RCB1.2	DBS	CD93	12.25		TFA=1.503	1839.0	16.5	0.76	21.7	9-20	77-89	391-978	648-765	337	2-2-BT-NS-X I-CT-TQ
10	RRB4.1	Hughes	JD8	12.25	347	16,16,18			WASHED AND REAMED TO BOTTOM							0-0-NO-A-E-1-NO-CP
11	CB2	DBS	CD93	12.25		TFA=1.503	1855.5	27.0	0.88	30.7	13-23	105	289-751	640-800	340	3-3-BT-NS-X I-CT-TD
12	NB6	SMITH	M2SD	12.25	515	16,16,18	1882.5	32.5	1.85	17.3	30-35	115	260-460	2730 - 2980	760	1-1-WT-A-E-I-NO-CP
13	RCB2.1	DBS	CD93	12.25		TFA=1.503	1915.0	28.0	0.88	31.8	11-23	81-105	425-864	692-811	323	1-2-FC-N-X-I-CT-TD
14	RCB2.2	DBS	CD93	12.25		TFA=1.503	1943	26.0	1.88	22.0	10-22	120-130	280-790	680 - 1010	335	2-3-FC-N-X-1-CT-TD
15	NB7	DBS	TD19M	12.25		5X14,1X13	1969	201.0	9.48	21.2	9-26	90-150	380-730	2430-2930	810	8-2-FC-A-2-1-CT-TD

Table 5.
Hydraulics Summary

Minerva-2

Bit #	Depth ft	Hole Size in	Jets	MW sg	PV/YP	Flow Rate gpm	ECD sg	Annular Velocities Min ¦ DP ¦ DC ¦ Crit ft/min	Jet Vel ft/sec	HHP hp	Impact Force lbf	Loss Bit psi	Pump Pres psi	%Bit Loss
RR1.0	120	36.000	24,24,24	1.04	1/1	1100	1.04	- ¦ - ¦ 7 ¦ 7	43	98	699	152	1200	29
RR2.0	560	9.875	32,32,32	1.04	1/1	533	1.04	5 ¦ 55 ¦ 119¦ 29	22	13	174	41	550	16

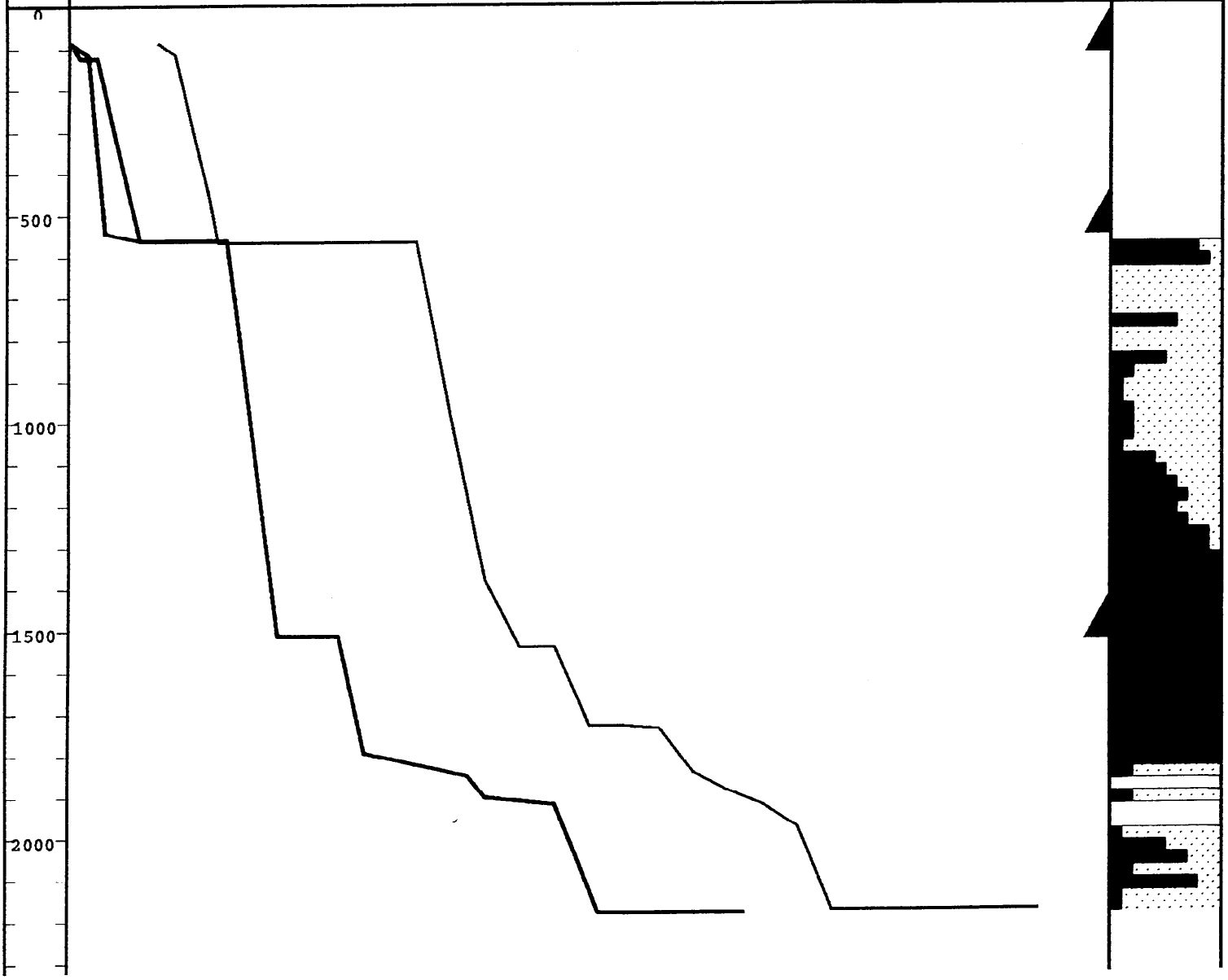
Minerva-2A

Bit #	Depth ft	Hole Size in	Jets	MW sg	PV/YP	Flow Rate gpm	ECD sg	Annular Velocities Min ¦ DP ¦ DC ¦ Crit ft/min	Jet Vel ft/sec	HHP hp	Impact Force lbf	Loss Bit psi	Pump Pres psi	%Bit Loss
RR1.0	119	36.000	24,24,24	1.04	1/1	1080	1.04	- ¦ - ¦ 7 ¦ 7	41	90	659	143	1200	23
RR1.1	565	26.000	24,24,24	1.04	1/1	1100	1.04	11 ¦ 11 ¦ 14 ¦ 9	81	353	1317	550	2050	42
NB#2	987	17.500	TFA=0.954	1.12	7/15	1100	1.13	23 ¦ 30 ¦ 39¦ 111	114	766	2027	1177	2500	47
	1379	17.500	TFA=0.954	1.09	8/14	1080	1.10	23 ¦ 29 ¦ 38¦ 138	111	676	1848	1073	2700	42
	1538	17.500	TFA=0.954	1.16	18/29	1080	1.17	22 29 37 122	111	719	1967	1142	2700	39
NB#3	1541	12.250	18,16,16	1.16	18/28	691	1.18	14 ¦ - ¦ 63¦ 149	105	417	2068	1035	1550	50
	1728	12.250	18,16,16	1.17	16/23	756	1.19	16 ¦ 45 ¦ 69¦ 131	115	551	1446	1249	2900	50
RCB1	1733	12.250	TFA=1.503	1.17	16/23	324	1.19	7 ¦ 20 ¦ 30¦ 148	21	8	113	42	376	11
NB5	1839	12.25	18,16,16	1.17	13/25	770	1.19	16 ¦ 47 ¦ 70¦ 136	117	582	1500	1296	2516	52
CB2	1882	12.25	TFA=1.503	1.17	13/22	340	1.19	7 ¦ 21 ¦ 30¦ 138	22	9	125	46	505	9
NB6	1915	12.25	16,16,18	1.17	15/23	760	1.19	16 ¦ 46 ¦ 69¦ 130	116	560	1462	1263	2582	49
RCB2.2	1969	12.25	TFA=1.503	1.17	14/22	335	1.18	7 ¦ 20 ¦ 29¦ 124	22	9	121	45	462	10
NB7	2170	12.25	5x14,1x13	1.17	14/23	810	1.18	17 ¦ 49 ¦ 70¦ 127	90	259	1208	759	2249	34

B H P PETROLEUM

MINERVA-2 / MINERVA-2A

Well Progress Plot



APPENDIX VIII: Drilling Data Printout

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
18 Sept 1993																				
Spud Minerva-2 at 20:30 hrs. RT-seabed: 85m. Water Depth: 60m.																				
RRB#1, 26" Security S35J (3 x 24 jets) with 36" hole opener (4 x 20 jets).																				
20:45:00	86.0	86.0	4.1	3	53	148	1177	918	1	1.04	1.04	14.4	17.7	85.0	665	1.0	0:02	1.04	1.81	0.00
20:48:07	87.0	87.0	19.3	3	53	169	1183	925	1	1.04	1.04	14.4	17.7	85.0	630	2.0	0:05	1.04	1.34	0.00
20:51:01	88.0	88.0	21.1	3	52	199	1192	932	1	1.04	1.04	14.3	17.7	85.0	602	3.0	0:08	1.04	1.28	0.00
20:58:15	89.0	89.0	8.2	3	56	174	1204	906	1	1.04	1.04	14.3	17.7	86.0	542	4.0	0:15	1.04	1.07	0.00
21:02:57	90.0	90.0	12.9	3	61	145	1214	918	1	1.04	1.04	14.2	17.7	86.4	506	5.0	0:20	1.04	0.63	0.00
21:06:14	91.0	91.0	17.9	3	61	146	1343	958	1	1.04	1.04	14.2	17.7	86.8	505	6.0	0:23	1.04	0.61	0.00
21:11:02	92.0	92.0	12.8	2	61	129	1386	987	1	1.04	1.04	14.2	17.7	88.1	521	7.0	0:28	1.04	0.61	0.00
21:18:17	93.0	93.0	8.2	2	61	183	1368	973	1	1.04	1.04	14.2	17.7	89.1	546	8.0	0:35	1.04	0.69	0.00
21:27:43	94.0	94.0	6.8	3	61	185	1119	1096	1	1.04	1.04	14.1	17.6	91.6	587	9.0	0:45	1.04	0.75	0.00
21:37:16	95.0	95.0	6.3	6	61	209	1124	1101	1	1.04	1.04	14.1	17.6	92.9	620	10.0	0:54	1.04	0.85	0.00
21:43:28	96.0	96.0	9.7	11	71	204	1132	1104	1	1.04	1.04	14.1	17.6	93.4	647	11.0	1:00	1.04	0.87	0.00
21:54:23	97.0	97.0	5.7	10	71	181	1138	1105	1	1.04	1.04	14.1	17.5	94.5	680	12.0	1:11	1.04	0.95	0.00
22:02:44	98.0	98.0	7.2	6	73	193	1130	1106	1	1.04	1.04	14.1	17.4	95.4	647	13.0	1:20	1.04	0.84	0.00
22:06:26	99.0	99.0	16.2	8	75	192	1117	1106	1	1.04	1.04	14.1	17.3	95.9	652	14.0	1:23	1.04	0.74	0.00
22:11:02	100.0	100.0	13.2	8	75	201	1119	1105	1	1.04	1.04	14.1	17.2	96.4	655	15.0	1:28	1.04	0.78	0.00
22:15:00	101.0	101.0	15.6	7	75	185	1118	1106	1	1.04	1.04	14.1	17.1	96.7	654	16.0	1:32	1.04	0.74	0.00
22:18:58	102.0	102.0	14.5	9	74	208	1117	1107	0	1.04	0.00	14.1	00.0	97.0	653	17.0	1:36	1.04	0.77	0.00
22:24:54	103.0	103.0	18.4	10	74	169	1110	1108	0	1.04	0.00	14.1	00.0	98.3	616	18.0	1:42	1.04	0.73	0.00
22:33:05	104.0	104.0	10.4	6	75	152	1123	1111	0	1.04	0.00	14.1	00.0	100.6	603	19.0	1:50	1.04	0.80	0.00
22:59:46	105.0	105.0	4.3	12	73	189	1133	1107	0	1.04	0.00	14.1	00.0	103.9	606	20.0	2:05	1.04	0.98	0.00
23:05:43	106.0	106.0	5.6	15	75	204	1100	1107	0	1.04	0.00	14.1	00.0	104.4	604	21.0	2:11	1.04	1.00	0.00
23:13:55	107.0	107.0	4.6	16	73	219	1102	1107	0	1.04	0.00	14.1	00.0	105.5	575	22.0	2:20	1.04	1.07	0.00
23:25:30	108.0	108.0	5.2	16	72	208	1090	1110	0	1.04	0.00	14.1	00.0	106.7	577	23.0	2:31	1.04	1.05	0.00
23:35:18	109.0	109.0	6.1	15	72	215	1087	1111	0	1.04	0.00	14.1	00.0	107.2	577	24.0	2:41	1.04	1.00	0.00
23:39:53	110.0	110.0	13.1	10	72	214	1090	1111	0	1.04	0.00	14.1	00.0	107.6	549	25.0	2:46	1.04	0.81	0.00
23:47:05	111.0	111.0	8.3	6	72	166	1116	1112	0	1.04	0.00	14.1	00.0	108.1	516	26.0	2:53	1.04	0.82	0.00
23:51:19	112.0	112.0	14.2	8	72	197	1082	1111	0	1.04	0.00	14.2	00.0	108.5	516	27.0	2:57	1.04	0.77	0.00
23:56:54	113.0	113.0	10.7	9	72	209	1080	1110	0	1.04	0.00	14.2	00.0	109.3	510	28.0	3:03	1.04	0.83	0.00
23:59:43	114.0	114.0	21.3	12	72	236	1080	1110	0	1.04	0.00	14.1	00.0	109.9	516	29.0	3:05	1.04	0.79	0.00
19 September 1993																				
00:04:33	115.0	115.0	12.4	10	72	202	1081	1109	0	1.04	0.00	14.1	00.0	110.4	521	30.0	3:10	1.04	0.81	0.00
00:11:23	116.0	116.0	8.8	8	72	188	1092	1110	0	1.04	0.00	14.1	00.0	111.4	546	31.0	3:17	1.04	0.85	0.00
00:15:52	117.0	117.0	13.4	8	72	188	1082	1112	0	1.04	0.00	14.1	00.0	112.3	565	32.0	3:22	1.04	0.77	0.00
00:21:48	118.0	118.0	10.1	9	72	193	1080	1112	0	1.04	0.00	14.1	00.0	113.4	582	33.0	3:27	1.04	0.83	0.00
00:24:34	119.0	119.0	21.7	12	72	229	1088	1114	0	1.04	0.00	14.1	00.0	114.3	583	34.0	3:30	1.04	0.74	0.00
00:37:37	120.0	120.0	10.7	11	73	185	1080	1114	0	1.04	0.00	14.1	00.0	116.2	548	35.0	3:43	1.04	0.78	0.00
Pull out of hole at 120m to run 30" casing.																				

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
19 Sept 93																				
RRB#2, 9.875" Security S33SF with open jets.																				
Drill 9-7/8" Pilot Hole from 120m.																				
13:06:30	121.0	121.0	14.8	7	69	95	190	435	0	1.04	1.04	14.3	15.1	119.8	653	1.0	0:06	1.04	0.93	0.00
13:07:01	122.0	122.0	124.1	6	80	89	191	434	0	1.04	1.04	14.3	15.1	119.8	653	2.0	0:06	1.04	0.49	0.00
13:10:50	123.1	123.1	139.1	9	81	140	248	434	0	1.04	1.04	14.2	15.2	120.1	645	3.1	0:09	1.04	0.51	0.00
13:11:34	124.0	124.0	81.2	15	84	133	263	434	0	1.04	1.04	14.2	15.2	120.2	644	4.0	0:09	1.04	0.72	0.00
13:12:49	125.0	125.0	48.0	11	85	130	256	434	0	1.04	1.04	14.2	15.2	120.4	644	5.0	0:11	1.04	0.79	0.00
13:14:29	126.0	126.0	36.0	8	92	127	248	434	0	1.04	1.04	14.2	15.2	120.6	644	6.0	0:12	1.04	0.82	0.00
13:15:27	127.0	127.0	61.5	9	99	132	250	434	0	1.04	1.04	14.2	15.3	120.7	642	7.0	0:13	1.04	0.74	0.00
13:17:02	128.0	128.0	37.9	10	100	123	285	433	0	1.04	1.04	14.2	15.3	120.9	637	8.0	0:15	1.04	0.86	0.00
13:18:27	129.0	129.0	44.3	14	100	142	277	434	0	1.04	1.04	14.2	15.3	121.1	636	9.0	0:16	1.04	0.90	0.00
13:19:39	130.0	130.0	49.8	14	100	130	269	434	0	1.04	1.04	14.2	15.3	121.3	636	10.0	0:17	1.04	0.86	0.00
13:21:00	131.0	131.0	44.2	13	100	135	275	433	0	1.04	1.04	14.2	15.3	121.5	635	11.0	0:19	1.04	0.89	0.00
13:22:08	132.0	132.0	52.9	14	100	134	288	434	0	1.04	1.04	14.2	15.3	121.6	636	12.0	0:20	1.04	0.85	0.00
13:23:12	133.0	133.0	57.1	12	100	126	277	434	0	1.04	1.04	14.2	15.3	121.8	633	13.0	0:21	1.04	0.80	0.00
13:24:40	134.0	134.0	40.6	10	100	118	251	434	0	1.04	1.04	14.2	15.4	122.0	633	14.0	0:22	1.04	0.85	0.00
13:26:03	135.0	135.0	43.4	10	100	109	272	434	0	1.04	1.04	14.2	15.4	122.0	629	15.0	0:24	1.05	0.84	0.00
13:35:18	138.0	138.0	117.4	13	100	119	304	432	0	1.04	1.04	14.2	15.4	124.7	631	18.0	0:26	1.04	0.62	0.00
13:36:36	139.0	139.0	47.5	6	104	115	259	412	0	1.04	1.04	14.2	15.5	125.4	626	19.0	0:27	1.05	0.73	0.00
13:38:03	140.0	140.0	41.2	8	104	121	272	420	0	1.04	1.04	14.2	15.5	126.2	624	20.0	0:29	1.05	0.82	0.00
13:38:50	141.0	141.0	76.6	12	103	138	299	421	0	1.04	1.04	14.1	15.5	126.9	622	21.0	0:29	1.05	0.74	0.00
13:39:41	142.0	142.0	75.4	12	101	135	300	421	0	1.04	1.04	14.2	15.5	127.5	623	22.0	0:30	1.05	0.75	0.00
13:40:21	143.0	143.0	90.0	12	101	147	303	426	0	1.04	1.04	14.2	15.5	127.8	624	23.0	0:31	1.05	0.70	0.00
13:40:56	144.1	144.1	109.8	13	101	164	339	428	0	1.04	1.04	14.2	15.5	128.1	622	24.1	0:31	1.05	0.68	0.00
13:41:27	145.0	145.0	114.3	15	101	147	322	429	0	1.04	1.04	14.1	15.6	128.3	624	25.0	0:32	1.05	0.69	0.00
13:42:12	146.0	146.0	80.0	14	101	138	301	429	0	1.04	1.04	14.1	15.6	128.9	624	26.0	0:33	1.05	0.76	0.00
13:43:57	147.0	147.0	34.3	14	101	130	290	430	0	1.04	1.04	14.1	15.6	130.0	623	27.0	0:34	1.05	0.95	0.00
13:44:35	148.0	148.0	100.0	18	101	149	332	430	0	1.04	1.04	14.1	15.6	130.4	623	28.0	0:35	1.05	0.76	0.00
13:45:16	149.1	149.1	92.9	19	101	146	313	430	0	1.04	1.04	14.1	15.6	130.8	622	29.1	0:36	1.05	0.78	0.00
13:46:24	150.0	150.0	52.7	17	101	137	294	430	0	1.04	1.04	14.1	15.6	131.7	622	30.0	0:37	1.05	0.90	0.00
13:47:17	151.0	151.0	67.3	15	101	128	287	430	0	1.04	1.04	14.1	15.6	132.3	622	31.0	0:38	1.05	0.82	0.00
13:48:31	152.0	152.0	48.6	16	101	131	298	430	0	1.04	1.04	14.1	15.6	133.4	623	32.0	0:39	1.05	0.91	0.00
13:49:27	153.1	153.1	71.5	17	101	144	320	430	0	1.04	1.04	14.1	15.6	133.9	623	33.1	0:40	1.05	0.83	0.00
13:50:25	154.0	154.0	60.5	19	101	135	310	430	0	1.04	1.04	14.1	15.6	134.4	623	34.0	0:41	1.05	0.89	0.00
13:51:50	155.0	155.0	42.1	18	101	136	307	431	0	1.04	1.04	14.1	15.6	135.2	624	35.0	0:42	1.05	0.97	0.00
13:52:43	156.0	156.0	67.9	22	101	141	353	430	0	1.04	1.04	14.1	15.5	135.7	623	36.0	0:43	1.05	0.90	0.00
13:53:30	157.0	157.0	80.6	24	101	149	338	430	0	1.04	1.04	14.1	15.5	135.9	624	37.0	0:44	1.05	0.87	0.00
13:54:33	158.0	158.0	56.7	22	101	139	326	430	0	1.04	1.04	14.1	15.5	136.4	623	38.0	0:45	1.05	0.94	0.00
13:55:26	159.0	159.0	67.9	22	101	155	346	430	0	1.04	1.04	14.1	15.5	138.3	623	39.0	0:46	1.05	0.89	0.00
13:56:30	160.0	160.0	58.5	24	101	150	416	430	0	1.04	1.04	14.1	15.5	139.1	617	40.0	0:47	1.05	0.96	0.00
13:57:53	161.0	161.0	43.4	22	101	133	385	429	0	1.04	1.04	14.1	15.5	140.0	614	41.0	0:48	1.05	1.02	0.00
13:59:02	162.0	162.0	52.2	20	101	132	307	430	0	1.04	1.04	14.1	15.5	141.1	613	42.0	0:50	1.05	0.93	0.00
14:00:11	163.0	163.0	52.2	16	101	125	288	431	0	1.04	1.04	14.1	15.5	142.5	612	43.0	0:51	1.05	0.89	0.00
14:01:29	164.0	164.0	46.2	15	101	128	286	431	0	1.04	1.04	14.1	15.5	144.6	612	44.0	0:52	1.05	0.91	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	BIT DIST	BIT HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
14:02:51	165.0	165.0	43.8	16	101	120	285	431	0	1.04	1.04	14.1	15.5	146.2	613	45.0	0:53	1.05	0.92	0.00
14:11:30	166.6	166.6	117.4	23	106	169	384	434	0	1.04	1.04	14.1	15.5	149.2	618	46.6	0:54	1.05	0.61	0.00
14:11:51	167.0	167.0	160.7	22	105	154	355	433	0	1.04	1.04	14.1	15.6	149.5	617	47.0	0:54	1.05	0.67	0.00
14:12:44	168.0	168.0	67.9	20	105	145	330	435	0	1.04	1.04	14.1	15.6	150.3	616	48.0	0:55	1.05	0.87	0.00
14:13:25	169.0	169.0	87.3	21	105	159	346	434	0	1.04	1.04	14.1	15.6	150.9	616	49.0	0:56	1.05	0.82	0.00
14:14:02	170.0	170.0	97.3	23	105	171	400	432	0	1.04	1.04	14.1	15.6	151.4	615	50.0	0:56	1.05	0.82	0.00
14:14:40	171.0	171.0	94.7	25	105	170	375	431	0	1.04	1.04	14.1	15.6	151.8	615	51.0	0:57	1.05	0.84	0.00
14:15:22	172.0	172.0	85.7	24	105	161	384	432	0	1.04	1.04	14.1	15.6	152.4	615	52.0	0:58	1.05	0.84	0.00
14:16:05	173.1	173.1	93.1	23	105	164	377	431	0	1.04	1.04	14.1	15.6	153.3	615	53.1	0:58	1.05	0.83	0.00
14:16:46	174.0	174.0	86.1	21	105	145	355	432	0	1.04	1.04	14.1	15.6	153.9	615	54.0	0:59	1.05	0.83	0.00
14:17:42	175.0	175.0	64.3	21	105	148	352	432	0	1.04	1.04	14.1	15.6	154.4	615	55.0	1:00	1.05	0.90	0.00
14:18:32	176.0	176.0	72.0	21	105	160	365	432	0	1.04	1.04	14.1	15.6	155.0	616	56.0	1:01	1.05	0.88	0.00
14:19:06	177.1	177.1	114.3	23	105	165	382	432	0	1.04	1.04	14.1	15.7	155.5	613	57.1	1:02	1.05	0.77	0.00
14:19:50	178.0	178.0	80.4	23	105	157	398	432	0	1.04	1.04	14.1	15.7	156.3	605	58.0	1:02	1.05	0.86	0.00
14:21:09	179.0	179.0	47.0	23	105	147	452	432	0	1.04	1.04	14.1	15.7	157.4	604	59.0	1:04	1.05	1.01	0.00
14:22:11	180.1	180.1	62.6	22	105	170	376	432	0	1.04	1.04	14.1	15.6	158.3	603	60.1	1:05	1.06	0.92	0.00
14:22:49	181.1	181.1	93.9	22	105	169	356	432	0	1.04	1.04	14.1	15.6	159.0	604	61.1	1:05	1.06	0.82	0.00
14:23:26	182.1	182.1	97.3	24	105	173	382	432	0	1.04	1.04	14.1	15.6	159.5	602	62.1	1:06	1.06	0.82	0.00
14:24:01	183.0	183.0	101.7	24	105	176	391	432	0	1.04	1.04	14.1	15.6	160.0	603	63.0	1:06	1.06	0.81	0.00
14:24:50	184.1	184.1	77.7	23	105	159	375	432	0	1.04	1.04	14.1	15.6	160.6	603	64.1	1:07	1.06	0.87	0.00
14:25:27	185.0	185.0	96.8	22	105	160	375	432	0	1.04	1.04	14.1	15.6	161.0	602	65.0	1:08	1.06	0.80	0.00
14:26:11	186.0	186.0	81.4	23	105	172	379	432	0	1.04	1.04	14.1	15.6	161.4	602	66.0	1:09	1.06	0.86	0.00
14:26:55	187.0	187.0	80.9	24	105	159	388	432	0	1.04	1.04	14.1	15.6	162.1	603	67.0	1:09	1.06	0.87	0.00
14:27:39	188.0	188.0	81.8	24	105	167	391	432	0	1.04	1.04	14.1	15.6	162.7	602	68.0	1:10	1.06	0.87	0.00
14:28:54	189.0	189.0	49.7	23	105	164	376	432	0	1.04	1.04	14.1	15.6	163.6	602	69.0	1:11	1.06	0.99	0.00
14:29:49	190.0	190.0	64.9	24	105	176	398	432	0	1.04	1.04	14.1	15.6	164.3	602	70.0	1:12	1.06	0.93	0.00
14:30:56	191.1	191.1	58.4	22	104	163	347	432	0	1.04	1.04	14.1	15.6	164.9	603	71.1	1:13	1.06	0.93	0.00
14:32:01	192.0	192.0	54.6	18	103	147	336	433	0	1.04	1.04	14.1	15.7	165.2	604	72.0	1:14	1.06	0.90	0.00
14:33:38	193.0	193.0	36.9	17	103	138	338	433	0	1.04	1.04	14.1	15.7	165.3	602	73.0	1:16	1.06	0.98	0.00
14:44:52	194.0	194.0	52.6	18	103	133	340	437	0	1.04	1.04	14.1	15.7	172.6	607	74.0	1:19	1.06	0.92	0.00
14:46:18	195.0	195.0	41.9	20	102	157	370	441	0	1.04	1.04	14.1	15.7	174.7	606	75.0	1:20	1.06	1.00	0.00
14:47:21	196.0	196.0	57.1	22	102	172	398	441	0	1.04	1.04	14.1	15.7	176.2	606	76.0	1:22	1.06	0.95	0.00
14:48:12	197.0	197.0	70.2	27	102	182	418	441	0	1.04	1.04	14.1	15.7	177.4	606	77.0	1:22	1.06	0.93	0.00
14:49:17	198.0	198.0	55.4	23	102	158	392	442	0	1.04	1.04	14.1	15.7	179.0	604	78.0	1:23	1.06	0.96	0.00
14:50:32	199.1	199.1	50.7	23	102	167	419	442	0	1.04	1.04	14.1	15.8	180.8	592	79.1	1:25	1.06	0.98	0.00
14:51:40	200.0	200.0	51.7	27	102	168	510	441	0	1.04	1.04	14.1	15.8	182.5	596	80.0	1:26	1.06	1.02	0.00
14:53:23	201.0	201.0	35.0	24	102	159	438	441	0	1.04	1.04	14.1	15.8	184.9	593	81.0	1:28	1.06	1.10	0.00
14:54:32	202.0	202.0	50.0	24	102	173	388	442	0	1.04	1.04	14.1	15.8	186.6	589	82.0	1:29	1.06	1.00	0.00
14:55:44	203.0	203.0	51.6	24	102	174	403	442	0	1.04	1.04	14.1	15.8	188.3	589	83.0	1:30	1.06	0.99	0.00
14:56:51	204.0	204.0	53.7	24	102	177	424	442	0	1.04	1.04	14.1	15.8	189.9	589	84.0	1:31	1.06	0.98	0.00
14:57:51	205.0	205.0	67.1	24	102	180	433	441	0	1.04	1.04	14.1	15.8	191.3	589	85.0	1:32	1.06	0.92	0.00
14:58:47	206.0	206.0	64.0	24	102	178	428	442	0	1.04	1.04	14.1	15.8	192.7	590	86.0	1:33	1.06	0.93	0.00
15:00:09	207.0	207.0	43.9	24	102	181	409	441	0	1.04	1.04	14.1	15.8	193.5	590	87.0	1:34	1.06	1.04	0.00
15:01:27	208.0	208.0	45.9	23	102	182	368	441	0	1.04	1.04	14.1	15.8	193.5	589	88.0	1:36	1.06	1.00	0.00
15:03:12	209.0	209.0	34.3	21	102	161	375	442	0	1.04	1.04	14.1	15.8	194.0	589	89.0	1:37	1.06	1.06	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DIC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
15:04:21	210.0	210.0	54.1	24	102	182	404	442	0	1.04	1.04	14.1	15.9	194.9	589	90.0	1:39	1.06	0.98	0.00
15:05:36	211.0	211.0	47.8	26	102	201	375	442	0	1.04	1.04	14.1	15.9	195.8	589	91.0	1:40	1.06	1.04	0.00
15:06:43	212.0	212.0	53.7	25	102	189	400	442	0	1.04	1.04	14.1	15.9	197.1	589	92.0	1:41	1.06	1.00	0.00
15:07:55	213.0	213.0	51.8	23	102	172	372	442	0	1.04	1.04	14.1	15.9	198.0	590	93.0	1:42	1.06	0.97	0.00
15:09:27	214.0	214.0	39.1	22	102	171	382	442	0	1.04	1.04	14.1	15.9	199.2	590	94.0	1:44	1.06	1.05	0.00
15:10:55	215.0	215.0	40.7	24	102	180	411	442	0	1.04	1.04	14.1	15.9	200.2	591	95.0	1:45	1.06	1.05	0.00
15:12:44	216.0	216.0	33.7	25	102	189	399	442	0	1.04	1.04	14.1	15.9	201.1	591	96.0	1:47	1.06	1.12	0.00
15:14:42	217.0	217.0	30.3	25	102	178	420	442	0	1.04	1.04	14.1	15.9	202.5	590	97.0	1:49	1.06	1.15	0.00
15:16:20	218.0	218.0	36.0	24	102	191	407	442	0	1.04	1.04	14.1	16.0	203.8	590	98.0	1:51	1.06	1.09	0.00
15:18:06	219.0	219.0	34.7	24	102	183	408	442	0	1.04	1.04	14.1	16.0	205.5	581	99.0	1:52	1.06	1.10	0.00
15:20:06	220.0	220.0	30.0	25	102	173	422	442	0	1.04	1.04	14.1	16.0	206.9	578	100.0	1:54	1.06	1.15	0.00
15:23:25	221.0	221.0	28.6	24	102	161	370	442	0	1.04	1.04	14.1	16.0	209.1	576	101.0	1:58	1.06	1.15	0.00
15:34:14	222.0	222.0	25.9	17	102	142	351	443	0	1.04	1.04	14.1	16.0	212.4	693	102.0	2:01	1.06	1.11	0.00
15:35:42	223.0	223.0	41.4	16	104	174	374	430	0	1.04	1.04	14.1	16.0	213.3	692	103.0	2:03	1.06	0.95	0.00
15:36:28	224.0	224.0	78.3	20	104	210	393	431	0	1.04	1.04	14.1	16.1	213.7	691	104.0	2:03	1.06	0.84	0.00
15:37:06	225.1	225.1	101.1	20	104	203	386	431	0	1.04	1.04	14.1	16.1	214.1	690	105.1	2:04	1.06	0.77	0.00
15:38:11	226.0	226.0	54.9	22	104	214	317	431	0	1.04	1.04	14.1	16.1	214.8	689	106.0	2:05	1.06	0.96	0.00
15:38:55	227.0	227.0	81.8	19	104	224	376	432	0	1.04	1.04	14.1	16.1	215.2	689	107.0	2:06	1.06	0.81	0.00
15:39:42	228.1	228.1	81.4	18	104	218	409	431	0	1.04	1.04	14.1	16.1	215.7	682	108.1	2:07	1.06	0.80	0.00
15:40:19	229.0	229.0	96.0	17	104	216	435	431	0	1.04	1.04	14.1	16.1	216.0	676	109.0	2:07	1.06	0.75	0.00
15:40:59	230.0	230.0	95.6	20	104	222	510	431	0	1.04	1.04	14.1	16.1	216.5	674	110.0	2:08	1.06	0.80	0.00
15:41:37	231.0	231.0	94.0	25	104	216	533	430	0	1.04	1.04	14.1	16.1	216.8	672	111.0	2:08	1.05	0.84	0.00
15:42:37	232.0	232.0	61.0	24	104	212	534	431	0	1.04	1.04	14.1	16.1	217.4	670	112.0	2:09	1.05	0.95	0.00
15:43:45	233.0	233.0	52.2	25	104	207	437	431	0	1.04	1.04	14.1	16.1	218.1	668	113.0	2:11	1.05	1.00	0.00
15:44:38	234.0	234.0	75.4	25	104	222	430	431	0	1.04	1.04	14.1	16.1	218.6	668	114.0	2:11	1.05	0.90	0.00
15:45:59	235.0	235.0	44.2	25	104	211	428	432	0	1.04	1.04	14.1	16.1	219.5	669	115.0	2:13	1.05	1.05	0.00
15:46:49	236.0	236.0	75.6	24	104	223	436	431	0	1.04	1.04	14.1	16.1	219.9	668	116.0	2:14	1.05	0.88	0.00
15:47:40	237.1	237.1	74.2	20	104	203	417	432	0	1.04	1.04	14.1	16.1	220.4	669	117.1	2:14	1.05	0.83	0.00
15:48:38	238.0	238.0	60.8	23	104	211	436	432	0	1.04	1.04	14.1	16.1	221.0	669	118.0	2:15	1.05	0.94	0.00
15:49:52	239.0	239.0	48.4	24	104	216	417	431	0	1.04	1.04	14.1	16.1	221.6	669	119.0	2:17	1.05	1.02	0.00
15:51:14	240.0	240.0	43.9	25	104	215	428	431	0	1.04	1.04	14.1	16.1	222.0	668	120.0	2:18	1.05	1.06	0.00
15:52:44	241.0	241.0	41.2	25	104	210	420	431	0	1.04	1.04	14.1	16.0	222.0	668	121.0	2:20	1.05	1.07	0.00
15:53:53	242.0	242.0	51.9	25	104	208	434	431	0	1.04	1.04	14.1	15.9	222.3	668	122.0	2:21	1.05	1.00	0.00
15:54:55	243.0	243.0	58.1	24	104	208	430	431	0	1.04	1.04	14.1	15.9	222.9	669	123.0	2:22	1.05	0.96	0.00
15:56:07	244.1	244.1	52.6	25	104	207	423	431	0	1.04	1.04	14.1	15.9	224.5	669	124.1	2:23	1.05	1.00	0.00
15:57:06	245.0	245.0	60.3	24	104	203	420	431	0	1.04	1.04	14.1	15.9	225.6	670	125.0	2:24	1.05	0.95	0.00
15:58:08	246.0	246.0	58.1	23	104	202	422	431	0	1.04	1.04	14.1	15.9	226.4	663	126.0	2:25	1.05	0.95	0.00
15:59:08	247.0	247.0	63.7	22	104	190	464	431	0	1.04	1.04	14.1	15.8	227.7	657	127.0	2:26	1.05	0.91	0.00
16:01:03	248.0	248.0	31.2	23	104	178	518	430	0	1.04	1.04	14.1	15.8	230.2	652	128.0	2:28	1.05	1.13	0.00
16:01:59	249.0	249.0	67.3	24	104	206	451	431	0	1.04	1.04	14.1	15.9	231.4	652	129.0	2:29	1.05	0.93	0.00
16:03:05	250.0	250.0	54.5	23	104	185	408	431	0	1.04	1.04	14.1	15.8	232.5	651	130.0	2:30	1.05	0.97	0.00
16:04:32	251.0	251.0	41.1	19	104	167	391	431	0	1.04	1.04	14.1	15.8	233.4	650	131.0	2:31	1.05	0.98	0.00
16:14:51	252.0	252.0	25.5	12	102	157	375	429	0	1.04	1.04	14.1	15.9	238.2	653	132.0	2:34	1.05	1.02	0.00
16:15:40	253.0	253.0	80.9	15	101	212	376	429	0	1.04	1.04	14.1	15.9	238.9	653	133.0	2:35	1.05	0.77	0.00
16:16:16	254.0	254.0	100.0	21	101	262	390	430	0	1.04	1.04	14.1	15.9	239.4	652	134.0	2:36	1.05	0.79	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
16:16:57	255.0	255.0	87.8	24	101	251	389	430	0	1.04	1.04	14.1	15.9	240.0	652	135.0	2:36	1.05	0.85	0.00
16:17:31	256.1	256.1	105.9	23	101	247	392	430	0	1.04	1.04	14.1	15.9	240.5	648	136.1	2:37	1.05	0.81	0.00
16:18:15	257.1	257.1	82.8	20	101	214	389	430	0	1.04	1.04	14.2	15.8	241.2	647	137.1	2:38	1.05	0.81	0.00
16:18:56	258.1	258.1	87.3	17	101	213	397	430	0	1.04	1.04	14.2	15.8	241.8	641	138.1	2:38	1.05	0.77	0.00
16:19:57	259.0	259.0	58.5	18	101	215	388	431	0	1.04	1.04	14.2	15.8	242.7	644	139.0	2:39	1.05	0.89	0.00
16:21:25	260.0	260.0	41.9	23	101	262	435	430	0	1.04	1.04	14.2	15.8	244.0	637	140.0	2:41	1.05	1.04	0.00
16:23:08	261.0	261.0	34.8	26	101	239	522	430	0	1.04	1.04	14.1	15.8	245.5	629	141.0	2:43	1.05	1.12	0.00
16:26:11	262.0	262.0	19.7	27	101	218	439	430	0	1.04	1.04	14.1	15.7	248.2	628	142.0	2:46	1.05	1.30	0.00
16:27:31	263.0	263.0	48.0	24	101	221	410	431	0	1.04	1.04	14.1	15.6	249.4	627	143.0	2:47	1.05	1.01	0.00
16:28:27	264.0	264.0	63.9	22	101	235	373	431	0	1.04	1.04	14.1	15.6	250.2	627	144.0	2:48	1.05	0.90	0.00
16:29:23	265.0	265.0	70.9	20	102	202	315	432	0	1.04	1.04	14.1	15.6	251.0	628	145.0	2:49	1.05	0.85	0.00
16:29:48	266.0	266.0	144.0	16	102	168	312	432	0	1.04	1.04	14.1	15.6	251.3	627	146.0	2:49	1.05	0.62	0.00
16:30:07	267.0	267.0	188.4	12	102	148	310	432	0	1.04	1.04	14.1	15.6	251.3	628	147.0	2:50	1.05	0.52	0.00
16:30:26	268.0	268.0	189.5	8	102	121	310	432	0	1.04	1.04	14.1	15.6	251.3	626	148.0	2:50	1.05	0.46	0.00
16:30:46	269.0	269.0	180.0	5	102	124	307	432	0	1.04	1.04	14.1	15.5	251.3	628	149.0	2:50	1.05	0.44	0.00
16:31:18	270.1	270.1	123.3	3	102	116	304	432	0	1.04	1.04	14.1	15.6	251.3	627	150.1	2:51	1.05	0.46	0.00
16:31:52	271.1	271.1	104.4	5	102	132	300	432	0	1.04	1.04	14.1	15.6	251.3	628	151.1	2:51	1.05	0.58	0.00
16:32:20	272.1	272.1	139.5	8	102	126	299	432	0	1.04	1.04	14.1	15.5	251.3	629	152.1	2:52	1.05	0.54	0.00
16:32:39	273.0	273.0	185.3	6	102	106	296	432	0	1.04	1.04	14.1	15.5	251.3	628	153.0	2:52	1.05	0.43	0.00
16:33:03	274.0	274.0	304.5	3	102	91	290	432	0	1.04	1.04	14.1	15.5	251.3	629	154.0	2:52	1.05	0.29	0.00
16:33:45	275.3	275.3	391.8	2	102	86	289	432	0	1.04	1.04	14.1	15.5	251.3	629	155.3	2:52	1.05	0.34	0.00
16:34:05	276.1	276.1	237.2	2	102	133	294	432	0	1.04	1.04	14.1	15.5	251.4	629	156.1	2:53	1.05	0.36	0.00
16:34:43	277.0	277.0	152.7	3	102	99	289	432	0	1.04	1.04	14.1	15.5	251.9	628	157.0	2:53	1.05	0.42	0.00
16:35:24	278.0	278.0	89.3	5	102	117	289	432	0	1.04	1.04	14.1	15.5	252.6	629	158.0	2:54	1.05	0.60	0.00
16:35:57	279.0	279.0	116.9	4	102	96	287	432	0	1.04	1.04	14.1	15.5	253.2	629	159.0	2:54	1.05	0.51	0.00
16:44:23	280.5	280.5	177.0	6	102	108	281	433	0	1.04	1.04	14.1	15.5	258.2	634	160.5	2:55	1.05	0.45	0.00
16:44:53	281.0	281.0	116.7	4	103	140	290	432	0	1.04	1.04	14.1	15.3	258.7	633	161.0	2:56	1.05	0.55	0.00
16:48:48	282.0	282.0	15.3	18	102	167	317	435	0	1.04	1.04	14.1	15.3	261.1	619	162.0	2:60	1.05	1.23	0.00
16:52:19	283.1	283.1	21.1	25	102	185	337	434	0	1.04	1.04	14.1	15.2	262.0	615	163.1	3:03	1.05	1.37	0.00
16:52:35	284.3	284.3	255.1	20	103	137	302	435	0	1.04	1.04	14.1	15.2	262.1	613	164.3	3:03	1.05	0.48	0.00
16:52:45	285.1	285.1	347.3	9	103	99	278	436	0	1.04	1.04	14.1	15.2	262.2	614	165.1	3:04	1.05	0.34	0.00
16:54:37	289.3	289.3	539.1	6	103	92	276	436	0	1.04	1.04	14.1	15.2	263.8	613	169.3	3:04	1.05	0.17	0.00
16:55:04	290.5	290.5	346.1	0	103	78	270	436	0	1.04	1.04	14.1	15.2	264.2	614	170.5	3:04	1.05	0.22	0.00
16:55:17	291.1	291.1	262.2	0	103	77	272	435	0	1.04	1.04	14.1	15.2	264.4	614	171.1	3:04	1.05	0.26	0.00
16:55:36	292.1	292.1	211.7	1	103	76	281	436	0	1.04	1.04	14.1	15.2	264.7	613	172.1	3:04	1.05	0.34	0.00
16:55:54	293.1	293.1	197.2	3	102	79	284	436	0	1.04	1.04	14.1	15.2	265.3	614	173.1	3:05	1.05	0.38	0.00
16:56:16	294.0	294.0	160.9	3	103	83	283	436	0	1.04	1.04	14.1	15.2	265.9	614	174.0	3:05	1.05	0.43	0.00
16:56:40	295.1	295.1	170.4	4	103	93	292	436	0	1.04	1.04	14.1	15.2	266.9	614	175.1	3:05	1.05	0.47	0.00
16:56:59	296.0	296.0	186.7	7	102	112	300	435	0	1.04	1.04	14.1	15.2	267.8	614	176.0	3:06	1.05	0.49	0.00
16:57:15	297.0	297.0	259.4	12	103	135	313	436	0	1.04	1.04	14.1	15.2	268.4	614	177.0	3:06	1.05	0.47	0.00
16:57:30	298.0	298.0	236.1	14	103	136	315	436	0	1.04	1.04	14.1	15.2	268.9	614	178.0	3:06	1.05	0.50	0.00
16:57:46	299.1	299.1	260.9	14	103	134	311	435	0	1.04	1.04	14.1	15.2	269.5	613	179.1	3:07	1.05	0.48	0.00
16:58:03	300.1	300.1	246.6	14	103	114	310	435	0	1.04	1.04	14.1	15.2	270.0	614	180.1	3:07	1.05	0.46	0.00
16:58:22	301.1	301.1	188.7	6	103	82	281	435	0	1.04	1.04	14.1	15.2	270.5	614	181.1	3:07	1.05	0.43	0.00
16:59:08	302.0	302.0	77.4	2	103	83	279	435	0	1.04	1.04	14.1	15.2	272.1	614	182.0	3:08	1.05	0.49	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
16:59:47	303.0	303.0	93.1	1	102	139	279	435	0	1.04	1.04	14.1	15.2	273.2	614	183.0	3:09	1.05	0.40	0.00
17:00:18	304.0	304.0	116.1	0	102	151	292	435	0	1.04	1.04	14.1	15.2	273.9	614	184.0	3:09	1.05	0.37	0.00
17:00:48	305.1	305.1	133.3	0	103	89	300	435	0	1.04	1.04	14.1	15.2	275.3	613	185.1	3:10	1.05	0.35	0.00
17:01:19	306.1	306.1	116.1	2	103	85	297	435	0	1.04	1.04	14.1	15.2	276.2	611	186.1	3:10	1.05	0.45	0.00
17:01:59	307.0	307.0	88.4	2	103	82	315	435	0	1.04	1.04	14.1	15.2	277.1	606	187.0	3:11	1.05	0.48	0.00
17:03:25	308.0	308.0	41.6	4	103	98	315	435	0	1.04	1.04	14.1	15.2	279.2	602	188.0	3:12	1.05	0.72	0.00
17:04:27	309.0	309.0	59.0	4	103	93	297	435	0	1.04	1.04	14.1	15.1	279.9	602	189.0	3:13	1.05	0.62	0.00
17:12:52	310.0	310.0	91.7	0	94	72	238	427	0	1.04	1.04	14.1	15.1	283.7	604	190.0	3:14	1.05	0.40	0.00
17:13:20	311.0	311.0	227.2	1	101	95	269	426	0	1.04	1.04	14.1	15.1	284.3	603	191.0	3:14	1.05	0.35	0.00
17:13:55	312.1	312.1	110.8	1	102	75	271	426	0	1.04	1.04	14.1	15.1	285.1	603	192.1	3:15	1.05	0.42	0.00
17:14:52	313.1	313.1	77.3	0	102	76	269	426	0	1.04	1.04	14.1	15.1	286.5	603	193.1	3:16	1.05	0.27	0.00
17:15:29	314.1	314.1	175.7	2	102	85	270	427	0	1.04	1.04	14.1	15.0	287.3	602	194.1	3:16	1.05	0.40	0.00
17:15:53	315.0	315.0	145.0	3	102	79	270	427	0	1.04	1.04	14.1	15.0	287.9	604	195.0	3:17	1.05	0.47	0.00
17:16:26	316.0	316.0	109.1	4	102	77	272	427	0	1.04	1.04	14.0	15.0	288.7	602	196.0	3:17	1.05	0.52	0.00
17:17:05	317.0	317.0	92.9	4	102	79	278	427	0	1.04	1.04	14.1	15.0	289.5	602	197.0	3:18	1.05	0.56	0.00
17:17:45	318.0	318.0	89.3	4	102	78	279	427	0	1.04	1.04	14.1	15.0	290.6	602	198.0	3:18	1.05	0.55	0.00
17:18:25	319.0	319.0	89.4	4	102	78	279	427	0	1.04	1.04	14.1	15.0	291.5	601	199.0	3:19	1.05	0.54	0.00
17:19:03	320.0	320.0	95.6	4	102	79	276	428	0	1.04	1.04	14.1	14.9	292.4	602	200.0	3:20	1.05	0.53	0.00
17:19:43	321.0	321.0	95.4	4	102	81	275	427	0	1.04	1.04	14.0	15.0	293.3	602	201.0	3:20	1.05	0.53	0.00
17:20:21	322.0	322.0	93.1	4	102	83	271	428	0	1.04	1.04	14.0	14.9	294.1	602	202.0	3:21	1.05	0.55	0.00
17:21:11	323.0	323.0	75.8	3	102	78	270	428	0	1.04	1.04	14.1	14.9	295.4	601	203.0	3:22	1.05	0.55	0.00
17:21:52	324.0	324.0	87.8	3	102	84	270	427	0	1.04	1.04	14.0	14.9	296.3	603	204.0	3:23	1.05	0.53	0.00
17:22:25	325.0	325.0	108.3	4	102	77	270	427	0	1.04	1.04	14.1	14.9	297.1	604	205.0	3:23	1.05	0.51	0.00
17:23:02	326.1	326.1	113.7	3	102	72	270	428	0	1.04	1.04	14.0	14.9	297.9	602	206.1	3:24	1.05	0.49	0.00
17:23:39	327.0	327.0	95.1	3	102	72	264	427	0	1.04	1.04	14.0	14.9	298.8	600	207.0	3:24	1.05	0.52	0.00
17:24:24	328.0	328.0	80.4	3	102	74	273	428	0	1.04	1.04	14.1	14.9	299.9	593	208.0	3:25	1.05	0.55	0.00
17:25:01	329.1	329.1	102.8	5	102	83	282	428	0	1.04	1.04	14.1	14.9	300.8	592	209.1	3:26	1.05	0.55	0.00
17:25:44	330.0	330.0	83.3	6	101	93	282	427	0	1.04	1.04	14.0	14.9	301.7	591	210.0	3:26	1.05	0.63	0.00
17:26:22	331.0	331.0	96.0	8	102	94	280	427	0	1.04	1.04	14.1	14.9	302.6	588	211.0	3:27	1.05	0.62	0.00
17:26:46	332.0	332.0	165.8	10	101	119	274	427	0	1.04	1.04	14.0	14.9	303.2	590	212.0	3:28	1.05	0.56	0.00
17:27:05	333.1	333.1	231.2	12	102	90	272	427	0	1.04	1.04	14.0	14.9	303.7	588	213.1	3:28	1.05	0.48	0.00
17:27:27	334.0	334.0	161.2	7	102	69	270	427	0	1.04	1.04	14.1	14.9	304.2	589	214.0	3:28	1.05	0.48	0.00
17:28:08	335.0	335.0	87.4	4	102	70	270	428	0	1.04	1.04	14.1	14.9	305.1	588	215.0	3:29	1.05	0.55	0.00
17:28:54	336.1	336.1	81.2	3	102	70	269	428	0	1.04	1.04	14.0	14.9	306.1	588	216.1	3:30	1.05	0.56	0.00
17:29:38	337.1	337.1	81.8	4	102	74	268	428	0	1.04	1.04	14.0	14.9	307.2	588	217.1	3:30	1.05	0.57	0.00
17:30:37	338.0	338.0	60.7	5	102	77	265	428	0	1.04	1.04	14.0	14.9	308.6	588	218.0	3:31	1.05	0.65	0.00
17:40:12	339.0	339.0	47.4	4	103	78	261	429	0	1.04	1.04	14.0	14.9	309.3	592	219.0	3:33	1.05	0.67	0.00
17:40:58	340.1	340.1	82.4	4	104	84	262	432	0	1.04	1.04	14.0	14.9	310.1	592	220.1	3:33	1.05	0.57	0.00
17:41:38	341.1	341.1	90.0	3	104	74	263	432	0	1.04	1.04	14.0	14.9	311.4	588	221.1	3:34	1.05	0.52	0.00
17:42:31	342.0	342.0	67.2	4	103	92	260	432	0	1.04	1.04	14.0	14.9	312.6	588	222.0	3:35	1.05	0.63	0.00
17:43:38	343.0	343.0	53.7	10	104	106	265	432	0	1.04	1.04	14.0	14.9	313.8	588	223.0	3:36	1.05	0.81	0.00
17:43:56	344.1	344.1	238.0	10	104	104	270	433	0	1.04	1.04	14.0	14.9	314.4	588	224.1	3:36	1.05	0.46	0.00
17:44:21	345.2	345.2	165.1	11	103	116	270	432	0	1.04	1.04	14.0	14.9	315.2	587	225.2	3:37	1.05	0.46	0.00
17:44:36	346.0	346.0	214.6	10	104	82	270	432	0	1.04	1.04	14.0	14.9	315.6	588	226.0	3:37	1.05	0.47	0.00
17:45:01	347.1	347.1	157.9	6	104	79	270	433	0	1.04	1.04	14.0	14.9	316.3	588	227.1	3:37	1.05	0.48	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
17:45:35	348.0	348.0	104.6	3	104	72	270	432	0	1.04	1.04	14.0	14.9	317.0	588	228.0	3:38	1.05	0.49	0.00
17:46:07	349.0	349.0	112.5	3	104	76	271	433	0	1.04	1.04	14.0	14.9	317.8	589	229.0	3:39	1.05	0.49	0.00
17:46:37	350.1	350.1	128.5	2	104	72	268	433	0	1.04	1.04	14.0	14.9	318.4	588	230.1	3:39	1.05	0.44	0.00
17:47:08	351.1	351.1	116.1	2	104	68	270	433	0	1.04	1.04	14.0	14.9	319.0	588	231.1	3:40	1.05	0.43	0.00
17:47:52	352.1	352.1	87.8	1	104	69	264	433	0	1.04	1.04	14.0	14.9	320.1	583	232.1	3:40	1.05	0.45	0.00
17:48:20	353.0	353.0	126.3	1	104	72	267	432	0	1.04	1.04	14.0	14.9	321.0	580	233.0	3:41	1.05	0.41	0.00
17:48:48	354.0	354.0	126.8	2	104	78	285	433	0	1.04	1.04	14.0	14.9	321.6	578	234.0	3:41	1.05	0.45	0.00
17:49:24	355.1	355.1	138.8	2	104	71	290	432	0	1.04	1.04	14.0	15.0	322.3	576	235.1	3:42	1.05	0.43	0.00
17:49:56	356.0	356.0	111.1	2	104	76	295	432	0	1.04	1.04	14.0	14.9	322.8	576	236.0	3:42	1.05	0.46	0.00
17:51:41	357.1	357.1	34.3	7	103	108	294	432	0	1.04	1.04	14.0	14.9	325.3	592	237.1	3:44	1.05	0.86	0.00
17:52:00	358.1	358.1	211.7	13	104	101	283	432	0	1.04	1.04	14.0	14.9	325.8	600	238.1	3:44	1.05	0.51	0.00
17:52:19	359.1	359.1	187.7	11	103	111	286	432	0	1.04	1.04	14.0	14.9	326.7	606	239.1	3:45	1.05	0.51	0.00
17:52:55	360.0	360.0	99.0	11	103	125	290	432	0	1.04	1.04	14.0	14.9	328.0	618	240.0	3:45	1.05	0.67	0.00
17:53:30	361.1	361.1	110.2	10	103	113	288	432	0	1.04	1.04	14.0	14.9	328.0	629	241.1	3:46	1.05	0.64	0.00
17:53:58	362.1	362.1	128.6	8	104	88	287	433	0	1.04	1.04	14.0	14.9	328.3	630	242.1	3:46	1.05	0.56	0.00
17:54:35	363.0	363.0	95.7	5	104	81	277	433	0	1.04	1.04	14.0	14.9	329.1	632	243.0	3:47	1.05	0.55	0.00
17:55:29	364.0	364.0	66.7	2	104	73	271	433	0	1.04	1.04	14.0	14.9	330.3	628	244.0	3:48	1.05	0.56	0.00
17:56:05	365.0	365.0	106.7	2	104	71	267	432	0	1.04	1.04	14.0	14.9	331.2	625	245.0	3:48	1.05	0.47	0.00
17:56:36	366.1	366.1	126.8	3	104	76	272	432	0	1.04	1.04	14.0	14.9	332.5	620	246.1	3:49	1.05	0.46	0.00
18:06:55	367.1	367.1	24.7	5	104	82	288	432	0	1.04	1.04	14.0	14.9	338.8	683	247.1	3:52	1.05	0.82	0.00
18:07:54	368.1	368.1	61.0	11	104	145	272	424	0	1.04	1.04	14.0	14.9	340.2	681	248.1	3:53	1.05	0.80	0.00
18:09:29	369.0	369.0	36.7	24	103	203	324	425	0	1.04	1.04	14.0	14.9	342.6	681	249.0	3:54	1.05	1.10	0.00
18:10:30	370.0	370.0	59.0	25	104	155	290	425	0	1.04	1.04	14.0	14.8	344.2	679	250.0	3:55	1.05	0.97	0.00
18:10:43	371.1	371.1	339.6	18	104	104	263	426	0	1.04	1.04	14.0	14.8	344.4	679	251.1	3:56	1.05	0.42	0.00
18:10:52	372.2	372.2	525.9	12	104	82	260	426	0	1.04	1.04	13.9	14.8	344.7	680	252.2	3:56	1.05	0.28	0.00
18:11:04	373.1	373.1	296.9	8	104	81	260	426	0	1.04	1.04	14.0	14.8	345.0	679	253.1	3:56	1.05	0.37	0.00
18:11:26	374.1	374.1	162.2	4	104	72	259	426	0	1.04	1.04	14.0	14.8	345.6	679	254.1	3:56	1.05	0.43	0.00
18:12:51	375.5	375.5	381.9	2	104	72	258	427	0	1.04	1.04	14.0	14.8	347.7	679	255.5	3:57	1.05	0.25	0.00
18:13:21	376.0	376.0	117.4	2	104	90	261	427	0	1.04	1.04	13.9	14.8	348.4	680	256.0	3:57	1.05	0.48	0.00
18:14:16	377.0	377.0	68.2	2	104	88	262	427	0	1.04	1.04	14.0	14.7	349.8	679	257.0	3:58	1.05	0.54	0.00
18:15:07	378.0	378.0	70.6	4	104	92	268	426	0	1.04	1.04	14.0	14.7	351.0	674	258.0	3:59	1.05	0.59	0.00
18:15:51	379.1	379.1	87.8	3	104	87	280	426	0	1.04	1.04	14.0	14.7	352.0	668	259.1	3:60	1.05	0.55	0.00
18:17:03	380.0	380.0	49.7	5	104	102	292	426	0	1.04	1.04	14.0	14.7	353.9	663	260.0	4:01	1.05	0.69	0.00
18:17:58	381.0	381.0	65.5	6	104	108	292	427	0	1.04	1.04	14.0	14.7	355.2	661	261.0	4:02	1.05	0.68	0.00
18:19:17	382.0	382.0	45.4	8	104	119	279	427	0	1.04	1.04	14.0	14.7	357.3	660	262.0	4:03	1.05	0.79	0.00
18:21:00	383.0	383.0	35.5	14	104	144	273	427	0	1.04	1.04	14.0	14.7	359.8	662	263.0	4:05	1.05	0.95	0.00
18:25:23	384.0	384.0	14.1	20	104	151	312	426	0	1.04	1.04	14.0	14.7	366.3	662	264.0	4:09	1.05	1.30	0.00
18:32:33	385.0	385.0	8.2	24	104	160	303	426	0	1.04	1.04	14.0	14.7	369.1	664	265.0	4:17	1.05	1.50	0.00
18:40:33	386.0	386.0	7.7	25	104	161	322	426	0	1.04	1.04	14.0	14.6	380.0	665	266.0	4:25	1.05	1.54	0.00
18:46:45	387.0	387.0	9.7	25	104	176	321	426	0	1.04	1.04	14.0	14.6	383.5	662	267.0	4:31	1.05	1.48	0.00
18:49:41	388.0	388.0	20.5	23	104	155	314	425	0	1.04	1.04	14.0	14.6	384.0	649	268.0	4:34	1.05	1.23	0.00
18:50:06	389.1	389.1	181.5	14	104	102	292	426	0	1.04	1.04	14.0	14.6	384.1	648	269.1	4:34	1.05	0.55	0.00
18:50:31	390.0	390.0	139.8	9	103	110	279	426	0	1.04	1.04	14.0	14.6	384.1	648	270.0	4:34	1.05	0.55	0.00
18:51:01	391.1	391.1	128.6	5	104	77	262	426	0	1.04	1.04	14.0	14.6	384.2	648	271.1	4:35	1.05	0.50	0.00
18:51:48	392.0	392.0	100.6	2	104	79	259	427	0	1.04	1.04	14.0	14.6	384.4	647	272.0	4:36	1.05	0.45	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
18:52:25	393.1	393.1	104.7	2	104	74	259	427	0	1.04	1.04	14.0	14.6	384.4	648	273.1	4:36	1.05	0.46	0.00
18:52:57	394.1	394.1	248.3	2	104	70	260	427	0	1.04	1.04	14.0	14.5	384.5	646	274.1	4:36	1.05	0.31	0.00
18:53:56	395.9	395.9	141.2	1	104	68	260	427	0	1.04	1.04	13.9	14.5	384.6	647	275.9	4:36	1.05	0.30	0.00
18:55:55	397.0	397.0	127.5	1	104	78	300	427	0	1.04	1.04	13.9	14.5	384.9	651	276.0	4:37	1.05	0.33	0.00
19:03:01	398.0	398.0	138.4	1	104	74	310	434	0	1.04	1.04	13.9	14.5	385.1	648	277.0	4:39	1.05	0.26	0.00
19:03:08	399.0	399.0	138.1	1	104	84	320	437	0	1.04	1.04	13.9	14.5	385.1	648	278.0	4:39	1.05	0.46	0.00
19:04:16	400.0	400.0	111.2	3	104	84	320	436	0	1.04	1.04	13.9	14.5	385.1	647	279.0	4:39	1.05	0.50	0.00
19:04:36	401.0	401.0	138.7	5	104	93	320	437	0	1.04	1.04	13.9	14.5	385.2	648	280.0	4:40	1.05	0.62	0.00
19:05:06	402.0	402.0	88.5	11	104	124	320	437	0	1.04	1.04	13.9	14.5	385.3	647	281.0	4:40	1.05	0.69	0.00
19:06:02	403.0	403.0	66.9	12	104	132	320	439	0	1.04	1.04	13.9	14.5	385.4	647	282.0	4:40	1.05	0.78	0.00
19:06:20	404.0	404.0	114.3	6	104	100	310	440	0	1.04	1.04	13.9	14.5	385.4	647	283.0	4:42	1.05	0.43	0.00
19:06:46	405.0	405.0	186.4	1	104	78	310	441	0	1.04	1.04	13.9	14.5	385.5	647	284.0	4:42	1.05	0.43	0.00
19:08:01	406.0	406.0	170.6	0	104	111	310	441	0	1.04	1.04	13.9	14.5	385.6	646	285.0	4:43	1.05	0.31	0.00
19:08:49	407.0	407.0	135.6	0	104	125	310	441	0	1.04	1.04	13.9	14.5	385.7	646	286.0	4:43	1.05	0.28	0.00
19:09:01	408.0	408.0	110.9	0	104	75	310	445	0	1.04	1.04	13.9	14.5	385.8	645	287.0	4:43	1.05	0.43	0.00
19:09:49	409.0	409.0	69.9	2	104	74	320	444	0	1.04	1.04	13.9	14.5	385.9	639	288.0	4:43	1.05	0.68	0.00
19:10:47	410.0	410.0	97.0	10	104	104	350	444	0	1.04	1.04	13.9	14.5	386.0	633	289.0	4:43	1.05	0.65	0.00
19:11:28	411.0	411.0	76.8	8	104	100	350	444	0	1.04	1.04	13.9	14.5	386.1	633	290.0	4:44	1.05	0.59	0.00
19:11:59	412.0	412.0	83.2	10	104	106	350	443	0	1.04	1.04	13.9	14.5	386.2	632	291.0	4:44	1.05	0.84	0.00
19:13:08	413.0	413.0	121.1	16	104	139	320	444	0	1.04	1.04	13.9	14.5	386.5	631	292.0	4:45	1.05	0.60	0.00
19:13:13	414.0	414.0	121.1	10	104	118	310	444	0	1.04	1.04	13.9	14.5	386.5	631	293.0	4:46	1.05	0.54	0.00
19:14:06	415.0	415.0	137.1	4	104	79	310	444	0	1.04	1.04	13.9	14.5	386.6	630	294.0	4:47	1.05	0.51	0.00
19:14:44	416.0	416.0	107.4	2	104	72	300	444	0	1.04	1.04	13.9	14.5	386.7	630	295.0	4:47	1.05	0.54	0.00
19:15:28	417.0	417.0	87.8	4	104	76	310	444	0	1.04	1.04	13.9	14.5	386.8	631	296.0	4:48	1.05	0.53	0.00
19:16:12	418.0	418.0	81.2	2	104	70	310	444	0	1.04	1.04	13.9	14.5	386.9	630	297.0	4:49	1.05	0.51	0.00
19:16:53	419.0	419.0	85.4	2	104	71	310	444	0	1.04	1.04	13.9	14.5	387.0	631	298.0	4:50	1.05	0.51	0.00
19:17:35	420.0	420.0	90.4	4	104	75	320	444	0	1.04	1.04	13.9	14.5	387.1	632	299.0	4:51	1.05	0.46	0.00
19:18:03	421.0	421.0	113.3	4	104	77	320	444	0	1.04	1.04	13.9	14.5	387.1	629	300.0	4:52	1.05	0.48	0.00
19:18:28	422.0	422.0	134.5	4	104	83	330	444	0	1.04	1.04	13.9	14.5	387.2	626	301.0	4:52	1.05	0.49	0.00
19:18:53	423.0	423.0	150.3	6	104	80	330	444	0	1.04	1.04	13.9	14.5	387.2	621	302.0	4:52	1.05	0.72	0.00
19:21:30	424.0	424.0	26.8	5	97	84	333	444	0	1.04	1.04	14.0	14.5	390.8	616	304.5	4:53	1.05	0.81	0.00
19:22:16	425.0	425.0	37.1	6	97	88	324	445	0	1.04	1.04	14.0	14.5	392.0	614	305.0	4:54	1.05	0.78	0.00
19:31:29	426.1	426.1	26.1	6	102	80	295	431	0	1.04	1.04	14.0	14.5	395.9	702	306.1	4:56	1.05	0.85	0.00
19:32:00	427.0	427.0	113.4	4	103	85	292	429	0	1.04	1.04	14.0	14.5	396.0	700	307.0	4:57	1.05	0.52	0.00
19:32:31	428.0	428.0	124.1	2	103	75	289	429	0	1.04	1.04	14.0	14.5	396.2	701	308.0	4:57	1.05	0.45	0.00
19:33:06	429.1	429.1	125.6	3	103	78	286	429	0	1.04	1.04	14.0	14.5	396.5	699	309.1	4:58	1.05	0.47	0.00
19:33:36	430.1	430.1	119.2	2	103	70	280	429	0	1.04	1.04	14.0	14.5	396.7	700	310.1	4:58	1.05	0.45	0.00
19:34:07	431.0	431.0	115.2	1	103	74	279	429	0	1.04	1.04	14.0	14.5	396.8	699	311.0	4:59	1.05	0.43	0.00
19:34:42	432.1	432.1	111.6	2	103	76	277	429	0	1.04	1.04	14.0	14.5	396.8	700	312.1	4:59	1.05	0.46	0.00
19:35:19	433.1	433.1	97.3	3	103	85	279	429	0	1.04	1.04	14.0	14.5	398.3	700	313.1	4:60	1.05	0.51	0.00
19:35:57	434.1	434.1	94.7	2	103	72	274	430	0	1.04	1.04	14.0	14.5	400.6	700	314.1	5:01	1.05	0.47	0.00
19:36:43	435.0	435.0	77.6	2	103	85	276	430	0	1.04	1.04	14.0	14.5	401.5	700	315.0	5:01	1.05	0.54	0.00
19:37:19	436.0	436.0	99.4	5	103	92	274	430	0	1.04	1.04	14.0	14.5	402.1	700	316.0	5:02	1.05	0.56	0.00
19:37:48	437.0	437.0	124.1	3	103	85	276	430	0	1.04	1.04	14.0	14.5	402.5	700	317.0	5:02	1.05	0.47	0.00
19:38:25	438.0	438.0	96.8	2	103	83	276	430	0	1.04	1.04	14.0	14.5	403.8	700	318.0	5:03	1.05	0.50	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
19:39:05	439.0	439.0	90.6	1	103	72	278	430	0	1.04	1.04	14.0	14.5	404.9	699	319.0	5:04	1.05	0.46	0.00
19:39:46	440.0	440.0	91.5	2	103	86	278	429	0	1.04	1.04	14.0	14.5	405.2	700	320.0	5:04	1.05	0.49	0.00
19:40:17	441.1	441.1	116.1	2	103	73	280	429	0	1.04	1.04	14.0	14.5	405.2	699	321.1	5:05	1.05	0.45	0.00
19:40:50	442.0	442.0	111.3	2	103	82	281	429	0	1.04	1.04	14.0	14.5	405.2	699	322.0	5:05	1.05	0.45	0.00
19:41:33	443.1	443.1	85.7	2	103	72	285	429	0	1.04	1.04	14.0	14.5	406.7	692	323.1	5:06	1.05	0.48	0.00
19:42:19	444.0	444.0	77.1	2	103	74	294	429	0	1.04	1.04	14.0	14.4	408.5	686	324.0	5:07	1.05	0.51	0.00
19:42:56	445.0	445.0	106.7	3	103	78	310	429	0	1.04	1.04	14.0	14.5	409.3	686	325.0	5:08	1.05	0.50	0.00
19:43:46	446.0	446.0	71.5	3	103	86	314	429	0	1.04	1.04	14.0	14.5	410.2	681	326.0	5:08	1.05	0.58	0.00
19:44:33	447.1	447.1	81.8	5	103	92	309	429	0	1.04	1.04	14.0	14.5	411.3	679	327.1	5:09	1.05	0.61	0.00
19:45:10	448.1	448.1	97.3	5	103	85	310	429	0	1.04	1.04	14.0	14.5	412.1	678	328.1	5:10	1.05	0.56	0.00
19:45:48	449.0	449.0	93.1	5	103	83	302	429	0	1.04	1.04	14.0	14.5	412.6	677	329.0	5:10	1.05	0.57	0.00
19:46:24	450.1	450.1	109.1	3	103	78	300	428	0	1.04	1.04	14.0	14.5	413.2	678	330.1	5:11	1.05	0.51	0.00
19:46:56	451.0	451.0	110.4	4	103	86	295	429	0	1.04	1.04	14.0	14.5	414.2	676	331.0	5:12	1.05	0.53	0.00
19:47:36	452.0	452.0	95.6	5	103	94	292	429	0	1.04	1.04	14.0	14.5	415.2	677	332.0	5:12	1.05	0.58	0.00
19:48:17	453.0	453.0	87.8	6	103	90	290	429	0	1.04	1.04	14.0	14.5	416.1	677	333.0	5:13	1.05	0.60	0.00
19:49:22	454.0	454.0	55.1	6	103	86	290	430	0	1.04	1.04	14.0	14.5	417.5	677	334.0	5:14	1.05	0.70	0.00
19:58:24	455.0	455.0	25.4	8	105	123	288	433	0	1.04	1.04	14.0	14.4	423.3	681	335.0	5:16	1.05	0.94	0.00
19:59:14	456.0	456.0	75.8	12	105	143	285	434	0	1.04	1.04	14.0	14.4	423.9	681	336.0	5:17	1.05	0.76	0.00
19:59:43	457.0	457.0	123.1	12	105	143	281	434	0	1.04	1.04	14.0	14.4	424.0	682	337.0	5:18	1.05	0.65	0.00
20:00:42	458.0	458.0	67.3	15	105	168	288	434	0	1.04	1.04	14.0	14.4	424.4	673	338.0	5:19	1.05	0.83	0.00
20:01:07	459.2	459.2	220.6	14	104	98	283	435	0	1.04	1.04	14.0	14.4	424.6	669	339.2	5:19	1.05	0.50	0.00
20:01:20	460.0	460.0	260.9	9	105	87	282	435	0	1.04	1.04	14.0	14.4	424.7	667	340.0	5:19	1.05	0.41	0.00
20:01:40	461.0	461.0	201.1	3	105	72	280	434	0	1.04	1.04	14.0	14.4	424.9	666	341.0	5:20	1.05	0.39	0.00
20:02:12	462.0	462.0	112.5	1	105	71	296	434	0	1.04	1.04	14.0	14.4	425.1	662	342.0	5:20	1.05	0.42	0.00
20:02:52	463.0	463.0	90.0	1	105	75	306	434	0	1.04	1.04	14.0	14.4	425.2	660	343.0	5:21	1.05	0.47	0.00
20:03:36	464.0	464.0	81.4	1	105	75	305	434	0	1.04	1.04	14.0	14.4	425.2	658	344.0	5:22	1.05	0.45	0.00
20:04:17	465.0	465.0	92.3	1	105	76	309	434	0	1.04	1.04	14.0	14.4	425.2	656	345.0	5:22	1.05	0.46	0.00
20:04:47	466.0	466.0	119.0	2	105	81	300	434	0	1.04	1.04	14.0	14.4	425.2	656	346.0	5:23	1.05	0.45	0.00
20:05:31	467.0	467.0	86.2	1	105	78	286	435	0	1.04	1.04	14.0	14.4	425.5	656	347.0	5:23	1.05	0.45	0.00
20:06:15	468.0	468.0	124.1	0	105	80	289	435	0	1.04	1.04	14.0	14.4	426.4	655	348.0	5:24	1.05	0.36	0.00
20:06:52	469.0	469.0	95.8	2	105	89	292	435	0	1.04	1.04	14.0	14.4	427.6	655	349.0	5:25	1.05	0.49	0.00
20:07:27	470.0	470.0	102.3	2	105	74	291	434	0	1.04	1.04	14.0	14.4	428.6	656	350.0	5:25	1.05	0.44	0.00
20:08:03	471.0	471.0	480.0	1	105	72	292	434	0	1.04	1.04	14.0	14.4	429.7	655	351.0	5:25	1.05	0.18	0.00
20:08:49	472.1	472.1	163.7	1	105	88	295	434	0	1.04	1.04	14.0	14.4	430.9	656	352.1	5:26	1.05	0.39	0.00
20:09:29	473.0	473.0	89.6	3	104	74	298	435	0	1.04	1.04	14.0	14.4	432.1	656	353.0	5:26	1.05	0.52	0.00
20:10:07	474.0	474.0	90.0	3	102	71	298	435	0	1.04	1.04	14.0	14.4	433.0	656	354.0	5:27	1.05	0.51	0.00
20:10:51	475.0	475.0	87.8	2	102	77	298	435	0	1.04	1.04	14.0	14.3	434.0	657	355.0	5:28	1.05	0.52	0.00
20:11:37	476.1	476.1	82.3	2	102	69	300	435	0	1.04	1.04	14.0	14.3	435.2	658	356.1	5:29	1.05	0.53	0.00
20:12:18	477.0	477.0	86.7	2	102	69	306	435	0	1.04	1.04	14.0	14.3	436.2	654	357.0	5:29	1.05	0.52	0.00
20:13:11	478.0	478.0	67.9	5	102	87	317	434	0	1.04	1.04	14.0	14.3	437.6	648	358.0	5:30	1.05	0.63	0.00
20:14:01	479.0	479.0	71.5	7	102	99	334	434	0	1.04	1.04	14.0	14.3	438.8	647	359.0	5:31	1.05	0.68	0.00
20:16:06	480.0	480.0	28.8	15	102	150	364	434	0	1.04	1.04	14.0	14.3	442.1	644	360.0	5:33	1.05	1.03	0.00
20:16:44	481.0	481.0	100.9	17	101	113	311	434	0	1.04	1.04	14.0	14.3	443.0	645	361.0	5:34	1.05	0.73	0.00
20:17:14	482.1	482.1	125.9	12	101	88	305	435	0	1.04	1.04	14.0	14.3	443.7	644	362.1	5:34	1.05	0.61	0.00
20:18:01	483.0	483.0	75.8	6	102	78	298	435	0	1.04	1.04	14.0	14.3	444.6	643	363.0	5:35	1.05	0.62	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
20:27:14	484.0	484.0	39.1	3	103	98	286	429	0	1.04	1.04	14.0	14.2	448.6	646	364.0	5:37	1.05	0.67	0.00
20:27:48	485.0	485.0	104.8	4	103	89	287	430	0	1.04	1.04	14.0	14.2	449.4	645	365.0	5:37	1.05	0.54	0.00
20:28:22	486.0	486.0	105.9	4	102	91	289	430	0	1.04	1.04	14.0	14.2	450.4	645	366.0	5:38	1.05	0.54	0.00
20:28:56	487.0	487.0	113.1	5	102	84	293	430	0	1.04	1.04	14.0	14.2	451.3	644	367.0	5:38	1.05	0.53	0.00
20:29:30	488.1	488.1	113.7	5	103	92	299	430	0	1.04	1.04	14.0	14.2	452.1	645	368.1	5:39	1.05	0.53	0.00
20:30:01	489.0	489.0	113.7	4	103	78	302	430	0	1.04	1.04	14.0	14.2	452.8	643	369.0	5:39	1.05	0.50	0.00
20:30:39	490.0	490.0	103.6	3	103	84	306	430	0	1.04	1.04	14.0	14.2	453.5	643	370.0	5:40	1.05	0.51	0.00
20:31:19	491.0	491.0	89.4	4	103	100	310	430	0	1.04	1.04	14.0	14.2	453.9	645	371.0	5:41	1.05	0.57	0.00
20:31:58	492.0	492.0	92.3	5	102	97	309	430	0	1.04	1.04	14.0	14.2	454.1	643	372.0	5:41	1.05	0.58	0.00
20:32:40	493.0	493.0	85.7	5	103	138	309	430	0	1.04	1.04	14.0	14.2	454.1	643	373.0	5:42	1.05	0.61	0.00
20:33:19	494.0	494.0	92.3	4	103	111	307	430	0	1.04	1.04	14.0	14.2	454.1	643	374.0	5:43	1.05	0.57	0.00
20:33:49	495.1	495.1	128.6	3	103	79	304	430	0	1.04	1.04	14.0	14.2	454.1	643	375.1	5:43	1.05	0.47	0.00
20:35:15	497.0	497.0	82.4	3	103	77	293	431	0	1.04	1.04	14.0	14.2	456.1	643	377.0	5:45	1.05	0.55	0.00
20:35:56	498.0	498.0	95.2	3	103	83	287	431	0	1.04	1.04	14.0	14.2	456.1	643	378.0	5:45	1.05	0.53	0.00
20:36:27	499.1	499.1	127.1	3	103	76	292	431	0	1.04	1.04	14.0	14.2	456.1	642	379.1	5:46	1.05	0.48	0.00
20:36:59	500.0	500.0	100.0	3	103	78	288	430	0	1.04	1.04	14.0	14.2	456.6	644	380.0	5:46	1.05	0.52	0.00
20:37:41	501.0	501.0	85.7	4	103	84	287	430	0	1.04	1.04	14.0	14.2	457.5	644	381.0	5:47	1.05	0.56	0.00
20:39:07	503.0	503.0	100.9	3	103	76	293	431	0	1.04	1.04	14.0	14.3	460.6	643	383.0	5:48	1.05	0.55	0.00
20:39:48	504.0	504.0	85.3	3	103	78	292	431	0	1.04	1.04	14.0	14.3	462.1	643	384.0	5:49	1.05	0.53	0.00
20:40:34	505.0	505.0	80.9	3	103	77	294	431	0	1.04	1.04	14.0	14.2	463.1	643	385.0	5:50	1.05	0.56	0.00
20:41:18	506.0	506.0	86.2	4	103	80	299	431	0	1.04	1.04	14.0	14.2	464.1	643	386.0	5:51	1.05	0.55	0.00
20:42:09	507.0	507.0	70.6	4	103	78	298	431	0	1.04	1.04	14.0	14.2	465.3	643	387.0	5:51	1.05	0.59	0.00
20:42:53	508.0	508.0	86.7	4	103	85	301	430	0	1.04	1.04	14.0	14.2	466.4	642	388.0	5:52	1.05	0.57	0.00
20:43:40	509.0	509.0	76.1	4	103	89	298	430	0	1.04	1.04	14.0	14.2	467.3	644	389.0	5:53	1.05	0.61	0.00
20:44:21	510.0	510.0	87.8	5	102	86	298	430	0	1.04	1.04	14.0	14.2	468.2	644	390.0	5:54	1.05	0.59	0.00
20:45:10	511.0	511.0	75.0	6	103	95	298	430	0	1.04	1.04	14.0	14.2	469.3	637	391.0	5:55	1.05	0.65	0.00
20:46:00	512.0	512.0	71.3	7	103	91	299	431	0	1.04	1.04	14.0	14.2	470.8	632	392.0	5:55	1.05	0.68	0.00
20:54:49	513.0	513.0	31.2	10	102	109	302	432	0	1.04	1.04	14.1	14.2	475.3	628	393.0	5:57	1.05	0.91	0.00
20:55:35	514.0	514.0	78.3	13	101	130	305	433	0	1.04	1.04	14.0	14.2	476.2	627	394.0	5:58	1.05	0.76	0.00
20:56:22	515.1	515.1	80.0	15	101	135	305	432	0	1.04	1.04	14.0	14.2	477.2	627	395.1	5:59	1.05	0.77	0.00
20:57:04	516.0	516.0	84.7	17	100	149	303	433	0	1.04	1.04	14.1	14.2	478.1	626	396.0	5:60	1.05	0.78	0.00
20:57:51	517.0	517.0	81.2	19	101	160	302	433	0	1.04	1.04	14.1	14.2	478.9	626	397.0	6:00	1.05	0.82	0.00
20:58:37	518.0	518.0	77.7	21	101	177	298	433	0	1.04	1.04	14.0	14.2	479.4	628	398.0	6:01	1.05	0.85	0.00
20:59:19	519.0	519.0	85.7	21	101	172	295	433	0	1.04	1.04	14.0	14.2	479.7	624	399.0	6:02	1.05	0.82	0.00
21:00:06	520.0	520.0	76.6	20	101	175	301	433	0	1.04	1.04	14.0	14.2	480.3	619	400.0	6:03	1.05	0.84	0.00
21:01:01	521.0	521.0	69.2	20	100	188	304	434	0	1.04	1.04	14.0	14.2	481.4	615	401.0	6:03	1.05	0.87	0.00
21:02:04	522.0	522.0	56.5	22	101	187	359	433	0	1.04	1.04	14.0	14.2	482.8	611	402.0	6:05	1.05	0.94	0.00
21:04:09	523.0	523.0	28.8	25	101	200	406	432	0	1.04	1.04	14.1	14.2	483.1	609	403.0	6:07	1.05	1.18	0.00
21:07:35	524.0	524.0	17.5	29	101	189	373	433	0	1.04	1.04	14.0	14.2	487.6	610	404.0	6:10	1.05	1.37	0.00
21:13:51	525.0	525.0	9.6	28	101	175	345	433	0	1.04	1.04	14.1	14.2	497.0	610	405.0	6:16	1.05	1.52	0.00
21:20:34	526.0	526.0	8.9	27	101	175	356	433	0	1.04	1.04	14.1	14.1	506.2	609	406.0	6:23	1.05	1.53	0.00
21:27:07	527.0	527.0	8.9	26	101	169	331	434	0	1.04	1.04	14.1	14.0	512.2	611	407.0	6:30	1.05	1.52	0.00
21:32:00	528.0	528.0	12.7	26	100	168	352	434	0	1.04	1.04	14.1	13.9	516.7	612	408.0	6:34	1.05	1.41	0.00
21:38:14	529.0	529.0	9.4	26	95	163	355	434	0	1.04	1.04	14.1	13.7	522.7	599	409.0	6:41	1.05	1.48	0.00
21:57:32	530.0	530.0	3.1	26	101	128	306	434	0	1.04	1.04	14.1	13.6	526.1	598	410.0	6:60	1.05	1.65	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
22:06:09	531.0	531.0	7.0	28	101	144	306	433	0	1.04	1.04	14.1	13.4	527.5	600	411.0	7:09	1.05	1.62	0.00
22:14:37	532.0	532.0	7.1	27	101	155	327	433	0	1.04	1.04	14.1	13.3	528.9	600	412.0	7:17	1.05	1.60	0.00
22:25:49	533.0	533.0	5.4	25	101	140	334	434	0	1.04	1.04	14.1	13.2	529.6	486	413.0	7:28	1.05	1.64	0.00
22:36:51	534.0	534.0	5.8	27	100	152	515	540	0	1.04	1.04	14.1	13.1	530.3	383	414.0	7:39	1.05	1.64	0.00
22:49:32	535.0	535.0	4.8	26	100	152	465	544	0	1.04	1.04	14.1	13.0	532.2	428	415.0	7:52	1.05	1.69	0.00
22:58:34	536.0	536.0	6.6	26	100	172	458	543	0	1.04	1.04	14.1	13.0	533.1	417	416.0	8:01	1.05	1.60	0.00
23:07:51	537.0	537.0	6.9	26	100	155	490	545	0	1.04	1.04	14.1	12.9	533.9	323	417.0	8:10	1.05	1.58	0.00
23:17:16	538.0	538.0	6.5	26	101	155	460	552	0	1.04	1.04	14.0	12.9	534.5	380	418.0	8:20	1.05	1.59	0.00
23:32:16	539.0	539.0	4.1	26	101	144	459	552	0	1.04	1.04	14.0	12.8	536.0	468	419.0	8:35	1.05	1.73	0.00
23:56:39	540.0	540.0	3.4	26	94	153	484	550	0	1.04	1.04	14.0	12.7	538.0	505	420.0	8:52	1.05	1.76	0.00
20 Sept 93																				
00:02:52	541.0	541.0	3.1	27	87	133	492	526	0	1.04	1.04	14.0	12.6	538.5	490	421.0	8:59	1.05	1.77	0.00
00:19:03	542.0	542.0	3.9	27	86	160	466	530	0	1.04	1.04	14.0	12.6	540.4	491	422.0	9:15	1.05	1.72	0.00
00:30:42	543.0	543.0	5.1	28	83	166	488	534	0	1.04	1.04	14.0	12.5	541.4	493	423.0	9:26	1.05	1.65	0.00
00:41:31	544.0	544.0	5.9	29	83	158	479	534	0	1.04	1.04	14.0	12.5	542.0	495	424.0	9:37	1.05	1.62	0.00
00:54:37	545.0	545.0	4.6	29	83	157	482	534	0	1.04	1.04	14.0	12.5	543.0	496	425.0	9:50	1.05	1.69	0.00
01:06:52	546.0	546.0	5.2	28	83	163	463	534	0	1.04	1.04	14.0	12.4	544.0	499	426.0	10:03	1.05	1.64	0.00
01:17:44	547.0	547.0	5.5	28	83	159	475	536	0	1.04	1.04	14.0	12.4	544.7	501	427.0	10:14	1.05	1.62	0.00
01:29:52	548.0	548.0	4.9	28	83	143	442	537	0	1.04	1.04	14.0	12.4	545.7	502	428.0	10:26	1.05	1.66	0.00
01:40:22	549.0	549.0	5.7	27	83	162	480	538	0	1.04	1.04	14.0	12.3	546.6	510	429.0	10:36	1.05	1.60	0.00
01:52:53	550.0	550.0	4.8	27	83	158	470	539	0	1.04	1.04	14.0	12.3	547.7	511	430.0	10:49	1.05	1.65	0.00
02:01:53	551.0	551.0	6.7	27	83	156	458	540	0	1.04	1.04	14.0	12.2	548.3	512	431.0	10:58	1.05	1.56	0.00
02:08:56	552.0	552.0	8.5	28	83	171	459	541	0	1.04	1.04	14.0	12.2	549.0	513	432.0	11:05	1.05	1.51	0.00
02:25:08	553.0	553.0	3.7	27	83	161	472	546	0	1.04	1.04	14.0	12.2	550.2	509	433.0	11:21	1.05	1.73	0.00
02:38:15	554.0	554.0	4.6	28	83	168	476	550	0	1.04	1.04	14.0	12.1	551.8	505	434.0	11:34	1.05	1.67	0.00
02:54:59	555.0	555.0	3.6	27	83	155	442	551	0	1.04	1.04	14.0	12.0	552.9	567	435.0	11:51	1.05	1.72	0.00
03:07:25	556.0	556.0	4.8	27	83	155	467	552	0	1.04	1.04	14.0	11.9	553.7	564	436.0	12:03	1.05	1.65	0.00
03:18:09	557.0	557.0	5.6	28	83	173	477	552	0	1.04	1.04	14.0	11.8	554.4	565	437.0	12:14	1.05	1.62	0.00
03:35:05	558.0	558.0	3.5	28	83	152	492	552	0	1.04	1.04	14.0	11.7	555.4	552	438.0	12:31	1.05	1.67	0.00
03:51:29	559.0	559.0	3.7	28	84	148	493	552	0	1.04	1.04	14.0	11.7	556.9	550	439.0	12:47	1.05	1.74	0.00
03:59:06	560.0	560.0	4.3	28	84	126	430	549	0	1.04	1.04	14.0	11.6	557.4	550	440.0	12:55	1.05	1.67	0.00

POOH to open pilot hole to 26".

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
21 Sep 93																				
Spud Minerva-2A @ 22:45 hrs.																				
RRB#1, 26" Security S3SJ (3x24 jets) with 36" Hole Opener (4x20 jets).																				
22:45:23	87.0	87.0	54.3	8	118	268	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	2.0	0:03	1.04	0.72	0.00
22:45:53	88.0	88.0	54.3	8	118	297	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	3.0	0:05	1.04	0.69	0.00
22:46:19	89.0	89.0	95.9	8	118	321	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	4.0	0:06	1.04	0.63	0.00
22:46:53	90.0	90.0	73.0	9	118	350	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	5.0	0:08	1.04	0.63	0.00
22:47:14	91.0	91.0	55.3	7	118	294	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	6.0	0:09	1.04	0.69	0.00
22:48:02	92.0	92.0	71.9	8	118	321	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	7.0	0:12	1.04	0.62	0.00
22:52:34	93.0	93.0	57.8	9	118	327	1127	1076	0	1.04	1.04	14.0	12.9	96.9	368	8.0	0:13	1.04	0.68	0.00
22:55:26	94.0	94.0	34.0	8	119	261	1139	1073	0	1.04	1.04	14.0	12.9	98.3	467	9.0	0:15	1.04	0.71	0.00
22:56:40	95.0	95.0	29.5	8	119	280	1128	1064	0	1.04	1.04	14.0	12.9	97.3	491	10.0	0:17	1.04	0.68	0.00
23:03:22	96.0	96.0	26.8	8	119	267	1100	1070	0	1.04	1.04	14.0	12.9	94.0	548	11.0	0:18	1.04	0.71	0.00
23:16:46	97.0	97.0	46.2	10	119	325	1121	1077	0	1.04	1.04	14.1	12.9	95.6	398	12.0	0:20	1.04	0.66	0.00
23:19:01	98.0	98.0	60.5	10	119	206	678	1070	0	1.04	1.04	14.1	12.9	85.4	575	13.0	0:21	1.04	0.58	0.00
23:20:52	99.0	99.0	17.0	7	119	208	680	904	0	1.04	1.04	14.0	12.9	88.7	601	14.0	0:23	1.04	0.71	0.00
23:33:24	100.1	100.1	39.1	7	119	237	967	782	0	1.04	1.04	14.0	12.9	92.4	578	15.0	0:24	1.04	0.57	0.00
23:35:11	101.0	101.0	27.8	8	118	218	1120	1077	0	1.04	1.04	14.0	12.9	99.1	417	16.0	0:26	1.04	0.72	0.00
23:37:37	102.0	102.0	30.2	7	119	256	1088	1035	0	1.04	1.04	14.0	12.9	95.6	520	17.0	0:27	1.04	0.70	0.00
23:47:26	103.0	103.0	57.1	13	119	353	1124	1077	0	1.04	1.04	14.0	12.9	96.0	385	18.0	0:28	1.04	0.66	0.00
23:48:32	104.0	104.0	54.3	14	119	357	1126	1077	0	1.04	1.04	14.0	12.9	96.4	376	19.0	0:29	1.04	0.68	0.00
23:43:25	105.1	105.1	32.6	8	119	284	1146	1076	0	1.04	1.04	14.1	12.9	98.8	440	20.1	0:30	1.04	0.71	0.00
23:50:53	106.0	106.0	47.4	16	119	394	1129	1077	0	1.04	1.04	14.0	12.9	97.4	362	21.0	0:32	1.04	0.73	0.00
23:52:11	107.0	107.0	46.0	17	119	409	1130	1077	0	1.04	1.04	14.0	12.9	97.9	355	22.0	0:33	1.04	0.74	0.00
23:53:48	108.0	108.0	38.3	15	119	367	1150	1077	0	1.04	1.04	14.0	12.9	98.6	350	23.0	0:35	1.04	0.75	0.00
23:54:41	109.0	109.0	67.1	16	119	398	1147	1078	0	1.04	1.04	14.0	12.9	99.0	362	24.0	0:35	1.04	0.66	0.00
23:56:00	110.1	110.1	52.2	16	118	396	1122	1078	0	1.04	1.04	14.0	12.9	99.5	384	25.0	0:37	1.04	0.71	0.00
23:57:08	111.1	111.1	52.7	18	119	399	1120	1077	0	1.04	1.04	14.0	12.9	100.0	404	26.1	0:38	1.04	0.72	0.00
23:58:11	112.0	112.0	56.5	20	119	411	1120	1078	0	1.04	1.04	14.0	12.9	100.4	418	27.0	0:39	1.04	0.72	0.00
23:59:43	113.1	113.1	43.9	20	119	380	1121	1078	0	1.04	1.04	14.0	12.9	101.0	440	28.1	0:40	1.04	0.75	0.00
23:59:59	114.0	114.0	37.6	17	119	338	1122	1078	0	1.04	1.04	14.0	12.9	101.7	448	29.0	0:42	1.04	0.77	0.00
22 Sept 93																				
00:03:00	115.0	115.0	31.9	15	119	343	1125	1079	0	1.04	1.04	14.0	12.9	102.9	450	30.0	0:44	1.04	0.79	0.00
00:05:28	116.0	116.0	25.0	12	119	298	1147	1079	0	1.04	1.04	14.0	12.9	104.7	447	31.0	0:46	1.04	0.80	0.00
00:07:49	117.0	117.0	26.5	11	119	289	1127	1079	0	1.04	1.04	14.1	12.9	106.1	447	32.0	0:49	1.04	0.78	0.00
00:09:48	118.0	118.0	30.3	12	119	296	1120	1079	0	1.04	1.04	14.1	12.9	107.3	445	33.0	0:51	1.04	0.77	0.00
36" Hole T.D. POOH to run 30" casing.																				

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
22 Sept 93																				
RRB#1.1, 26" Security S3SF with 3x24 jets.																				
16:53:04	120.0	120.0	43.9	18	79	275	840	817	0	1.04	1.04	14.3	15.4	118.3	664	1.0	0:21	1.04	0.71	0.00
16:53:30	121.0	121.0	43.9	18	79	275	840	817	0	1.04	1.04	14.3	15.4	118.3	664	2.0	0:31	1.04	0.71	0.00
16:53:56	122.0	122.0	67.9	20	88	286	859	821	0	1.04	1.04	14.3	15.4	118.3	666	3.0	0:32	1.04	0.67	0.00
16:55:24	123.0	123.0	42.9	19	91	251	907	826	0	1.04	1.04	14.3	15.5	118.5	658	4.0	0:34	1.04	0.77	0.00
16:56:45	124.0	124.0	42.4	17	98	229	1227	923	0	1.04	1.04	14.3	15.5	118.6	646	5.0	0:35	1.04	0.76	0.00
16:57:51	125.0	125.0	56.5	16	100	227	1388	1038	0	1.04	1.04	14.3	15.5	118.8	639	6.0	0:36	1.04	0.71	0.00
16:59:06	126.1	126.1	54.1	15	117	232	1421	1085	0	1.04	1.04	14.3	15.5	118.9	631	7.1	0:37	1.04	0.73	0.00
17:00:09	127.0	127.0	56.5	14	126	221	1420	1088	0	1.04	1.04	14.3	15.5	119.0	626	8.0	0:39	1.04	0.73	0.00
17:01:24	128.0	128.0	48.0	14	126	209	1421	1087	0	1.04	1.04	14.3	15.5	119.2	620	9.0	0:40	1.04	0.76	0.00
17:02:45	129.1	129.1	49.8	15	120	236	1422	1088	0	1.04	1.04	14.3	15.5	119.7	613	10.1	0:41	1.04	0.76	0.00
17:03:36	130.1	130.1	71.6	18	120	271	1424	1089	0	1.04	1.04	14.3	15.5	120.3	608	11.1	0:42	1.04	0.73	0.00
17:04:30	131.1	131.1	66.7	20	120	264	1424	1089	0	1.04	1.04	14.3	15.5	121.0	604	12.1	0:43	1.04	0.73	0.00
17:05:21	132.0	132.0	68.6	20	120	275	1425	1089	0	1.04	1.04	14.3	15.5	122.0	600	13.0	0:44	1.04	0.73	0.00
17:06:15	133.0	133.0	66.7	20	120	241	1424	1089	0	1.04	1.04	14.2	15.5	122.7	596	14.0	0:45	1.04	0.73	0.00
17:07:15	134.0	134.0	59.7	19	120	260	1426	1089	0	1.04	1.04	14.3	15.4	123.4	592	15.0	0:46	1.04	0.76	0.00
17:24:40	135.1	135.1	56.7	11	121	224	1450	1076	0	1.04	1.04	14.3	15.4	128.5	639	16.1	0:47	1.04	0.68	0.00
17:25:31	136.0	136.0	69.9	18	121	271	1454	1077	0	1.04	1.04	14.2	15.4	128.9	639	17.0	0:48	1.04	0.72	0.00
17:26:28	137.0	137.0	67.1	18	121	270	1458	1078	0	1.04	1.04	14.2	15.4	129.5	636	18.0	0:48	1.04	0.73	0.00
17:31:36	138.0	138.0	30.7	18	120	247	1456	1080	0	1.04	1.04	14.2	15.4	132.4	619	19.0	0:50	1.04	0.89	0.00
17:57:41	140.5	140.5	49.2	15	154	300	1666	1093	0	1.04	1.04	14.2	15.3	137.5	617	21.5	0:51	1.04	0.70	0.0
17:58:03	141.1	141.1	60.9	17	139	306	1570	1087	0	1.04	1.04	14.2	15.2	137.5	615	22.1	0:52	1.04	0.69	0.0
17:58:44	142.0	142.0	28.2	18	140	290	1559	1088	0	1.04	1.04	14.3	15.2	137.5	614	23.0	0:52	1.04	0.93	0.00
17:59:35	143.0	143.0	73.7	15	140	281	1560	1085	0	1.04	1.04	14.3	15.2	137.8	612	24.0	0:53	1.04	0.82	0.00
18:00:18	144.1	144.1	86.7	17	141	309	1561	1085	0	1.04	1.04	14.3	15.2	138.4	618	25.1	0:54	1.04	0.70	0.00
18:01:05	145.1	145.1	80.9	19	141	298	1570	1086	0	1.04	1.04	14.2	15.1	138.7	616	26.1	0:55	1.04	0.71	0.00
18:01:50	146.0	146.0	80.0	18	141	310	1573	1088	0	1.04	1.04	14.3	15.2	138.7	613	27.0	0:55	1.04	0.72	0.00
18:02:30	147.0	147.0	93.1	22	140	343	1577	1088	0	1.04	1.04	14.3	15.2	138.7	613	28.0	0:56	1.04	0.72	0.00
18:03:12	148.0	148.0	84.4	21	141	319	1580	1090	0	1.04	1.04	14.3	15.2	138.7	609	29.0	0:57	1.04	0.73	0.00
18:03:51	149.0	149.0	92.3	19	140	280	1581	1091	0	1.04	1.04	14.3	15.2	138.7	609	30.0	0:57	1.04	0.69	0.00
18:04:41	150.0	150.0	74.0	17	140	273	1581	1092	0	1.04	1.04	14.3	15.2	138.7	607	31.0	0:58	1.04	0.73	0.00
18:05:25	151.0	151.0	81.2	19	140	291	1580	1091	0	1.04	1.04	14.3	15.2	138.7	605	32.0	0:59	1.04	0.73	0.00
18:06:12	152.1	152.1	80.0	18	141	259	1579	1090	0	1.04	1.04	14.3	15.2	138.7	602	33.1	0:60	1.04	0.71	0.00
18:07:00	153.0	153.0	76.6	15	141	247	1579	1089	0	1.04	1.04	14.3	15.2	138.7	599	34.0	1:01	1.04	0.71	0.00
18:07:52	154.0	154.0	67.9	14	141	240	1576	1088	0	1.04	1.04	14.2	15.1	138.7	601	35.0	1:01	1.04	0.71	0.00
18:08:48	155.0	155.0	64.0	14	141	253	1643	1088	0	1.04	1.04	14.3	15.1	138.7	602	36.0	1:02	1.04	0.73	0.00
18:09:51	156.1	156.1	61.0	14	141	252	1637	1090	0	1.04	1.04	14.2	15.1	138.7	597	37.1	1:03	1.04	0.74	0.00
18:10:48	157.0	157.0	62.4	14	141	257	1578	1089	0	1.04	1.04	14.2	15.1	138.7	593	38.0	1:04	1.04	0.73	0.00
18:11:47	158.1	158.1	67.9	14	141	245	1573	1089	0	1.04	1.04	14.3	15.1	138.7	591	39.1	1:05	1.04	0.71	0.00
18:12:40	159.0	159.0	67.2	13	141	234	1569	1090	0	1.04	1.04	14.2	15.1	140.5	588	40.0	1:06	1.04	0.70	0.00
18:13:49	160.0	160.0	54.5	12	141	220	1567	1089	0	1.04	1.04	14.2	15.1	141.7	592	41.0	1:07	1.04	0.73	0.00
18:14:49	161.0	161.0	60.0	12	141	228	1564	1089	0	1.04	1.04	14.2	15.1	142.8	607	42.0	1:08	1.04	0.71	0.00
18:15:42	162.0	162.0	67.5	13	141	240	1567	1090	0	1.04	1.04	14.3	15.1	143.8	620	43.0	1:09	1.04	0.70	0.00
18:16:35	163.0	163.0	75.8	15	141	252	1563	1091	0	1.04	1.04	14.2	15.1	144.7	632	44.0	1:10	1.04	0.70	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
18:17:28	164.0	164.0	67.6	16	140	264	1564	1091	0	1.04	1.04	14.3	15.1	145.7	644	45.0	1:11	1.04	0.73	0.00
18:18:19	165.0	165.0	75.4	16	141	240	1561	1091	0	1.04	1.04	14.2	15.0	146.5	652	46.0	1:12	1.04	0.72	0.00
18:19:05	166.1	166.1	80.1	15	141	235	1598	1091	0	1.04	1.04	14.3	15.0	147.4	655	47.1	1:13	1.04	0.69	0.00
18:20:09	167.0	167.0	55.8	13	141	217	1704	1092	0	1.04	1.04	14.3	15.0	148.6	653	48.0	1:14	1.04	0.74	0.00
18:34:42	168.1	168.1	47.1	11	138	196	1586	1091	0	1.04	1.04	14.3	15.0	157.0	646	49.1	1:15	1.04	0.56	0.00
18:35:38	170.0	170.0	63.2	8	135	227	1745	1087	0	1.04	1.04	14.2	15.0	157.8	644	51.0	1:16	1.04	0.62	0.00
18:35:56	171.0	171.0	63.3	12	137	228	1670	1089	0	1.04	1.04	14.3	15.1	157.7	643	52.0	1:16	1.04	0.69	0.00
18:36:17	172.0	172.0	61.5	12	136	260	1670	1089	0	1.04	1.04	14.2	15.0	157.8	642	53.0	1:17	1.04	0.76	0.00
18:36:37	173.0	173.0	66.7	13	136	260	1670	1089	0	1.04	1.04	14.2	15.0	157.9	641	54.0	1:17	1.04	0.86	0.00
18:36:57	174.1	174.1	66.3	12	136	251	1665	1090	0	1.04	1.04	14.2	15.0	158.2	640	55.1	1:17	1.04	0.69	0.00
18:37:38	175.1	175.1	87.3	13	136	277	1670	1090	0	1.04	1.04	14.3	15.0	158.8	639	56.1	1:18	1.04	0.63	0.00
18:38:30	176.0	176.0	68.6	14	136	284	1670	1090	0	1.04	1.04	14.3	15.0	159.8	637	57.0	1:19	1.04	0.71	0.00
18:39:21	177.0	177.0	70.6	15	136	273	1674	1090	0	1.04	1.04	14.2	15.0	160.7	634	58.0	1:20	1.04	0.71	0.00
18:40:10	178.0	178.0	72.7	15	136	273	1673	1091	0	1.04	1.04	14.3	15.0	161.7	632	59.0	1:21	1.04	0.70	0.00
18:41:03	179.0	179.0	71.3	15	136	273	1675	1090	0	1.04	1.04	14.3	15.1	162.7	630	60.0	1:21	1.04	0.71	0.00
18:41:50	180.1	180.1	82.3	15	136	264	1675	1090	0	1.04	1.04	14.3	15.1	163.5	628	61.1	1:22	1.04	0.68	0.00
18:42:40	181.0	181.0	70.9	14	136	256	1677	1090	0	1.04	1.04	14.2	15.1	164.5	624	62.0	1:23	1.04	0.70	0.00
18:43:37	182.0	182.0	66.1	14	136	244	1679	1091	0	1.04	1.04	14.2	15.0	165.6	618	63.0	1:24	1.04	0.71	0.00
18:44:30	183.0	183.0	67.9	12	136	240	1676	1091	0	1.04	1.04	14.3	15.0	166.5	610	64.0	1:25	1.04	0.69	0.00
18:45:24	184.0	184.0	67.3	13	136	269	1677	1091	0	1.04	1.04	14.2	15.0	167.6	602	65.0	1:26	1.04	0.71	0.00
18:46:10	185.1	185.1	88.5	13	136	254	1679	1090	0	1.04	1.04	14.2	15.0	168.4	596	66.1	1:27	1.04	0.65	0.00
18:47:03	186.0	186.0	67.0	13	136	239	1691	1090	0	1.04	1.04	14.2	15.0	169.4	592	67.0	1:27	1.04	0.69	0.00
18:48:20	187.1	187.1	49.0	12	136	235	1820	1090	0	1.04	1.04	14.2	15.0	170.9	584	68.1	1:29	1.04	0.72	0.00
18:49:22	188.0	188.0	57.6	12	136	265	1677	1090	0	1.04	1.04	14.2	15.0	172.1	576	69.0	1:30	1.04	0.72	0.00
18:50:18	189.0	189.0	66.1	13	136	268	1669	1089	0	1.04	1.04	14.2	15.0	173.1	570	70.0	1:31	1.04	0.71	0.00
18:51:22	190.0	190.0	56.2	13	136	266	1663	1090	0	1.04	1.04	14.2	15.0	174.3	563	71.0	1:32	1.04	0.74	0.00
18:52:10	191.0	191.0	74.2	15	136	288	1661	1090	0	1.04	1.04	14.2	15.0	174.9	559	72.0	1:33	1.04	0.70	0.00
18:53:07	192.0	192.0	63.5	15	136	289	1659	1090	0	1.04	1.04	14.2	15.0	175.8	552	73.0	1:34	1.04	0.73	0.00
18:53:50	193.0	193.0	82.8	16	136	294	1657	1089	0	1.04	1.04	14.2	15.0	176.4	552	74.0	1:34	1.04	0.68	0.00
18:54:34	194.0	194.0	88.9	17	136	337	1662	1089	0	1.04	1.04	14.2	15.0	177.0	559	75.0	1:35	1.04	0.69	0.00
18:55:13	195.1	195.1	94.7	18	136	311	1665	1090	0	1.04	1.04	14.2	15.0	177.8	565	76.1	1:36	1.04	0.69	0.00
18:55:53	196.0	196.0	87.0	17	136	302	1665	1090	0	1.04	1.04	14.2	15.0	178.3	574	77.0	1:36	1.04	0.68	0.00
18:56:49	197.1	197.1	66.7	15	136	297	1661	1090	0	1.04	1.04	14.2	15.0	179.2	585	78.1	1:37	1.04	0.72	0.00
19:07:19	198.1	198.1	41.5	13	133	235	1651	1088	0	1.04	1.04	14.2	15.0	186.2	624	79.1	1:39	1.04	0.79	0.00
19:07:57	199.0	199.0	92.7	14	136	304	1642	1080	0	1.04	1.04	14.2	15.0	186.6	621	80.0	1:39	1.04	0.67	0.00
19:08:43	200.0	200.0	78.3	16	137	266	1640	1083	0	1.04	1.04	14.2	15.0	187.1	618	81.0	1:40	1.04	0.70	0.00
19:09:34	201.1	201.1	73.5	14	137	309	1643	1084	0	1.04	1.04	14.2	15.0	187.7	615	82.1	1:41	1.04	0.70	0.00
19:10:15	202.0	202.0	86.5	17	137	288	1640	1083	0	1.04	1.04	14.2	15.0	188.4	612	83.0	1:42	1.04	0.69	0.00
19:11:20	203.0	203.0	60.1	12	137	215	1640	1084	0	1.04	1.04	14.1	15.0	189.2	608	84.0	1:43	1.04	0.71	0.00
19:12:42	204.2	204.2	60.0	17	138	320	1643	1085	0	1.04	1.04	14.1	15.0	190.4	604	85.2	1:44	1.04	0.77	0.00
19:13:16	205.0	205.0	104.0	19	139	312	1643	1085	0	1.04	1.04	14.2	15.0	190.9	598	86.0	1:45	1.04	0.67	0.00
19:15:22	206.0	206.0	28.5	17	139	225	1644	1085	0	1.04	1.04	14.1	15.0	193.0	591	87.0	1:47	1.04	0.92	0.00
19:16:21	207.1	207.1	67.9	18	139	313	1644	1085	0	1.04	1.04	14.1	15.0	194.1	589	88.1	1:48	1.04	0.75	-0.00
19:17:11	208.0	208.0	70.9	16	139	292	1644	1086	0	1.04	1.04	14.1	15.0	195.1	584	89.0	1:49	1.04	0.73	0.00
19:17:59	209.1	209.1	81.2	19	139	334	1647	1086	0	1.04	1.04	14.2	15.0	195.9	582	90.1	1:49	1.04	0.73	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
19:18:45	210.0	210.0	75.5	20	139	326	1645	1086	0	1.04	1.04	14.1	15.0	196.8	580	91.0	1:50	1.04	0.74	0.00
19:19:41	211.0	211.0	64.3	20	138	345	1650	1086	0	1.04	1.04	14.1	15.0	197.5	575	92.0	1:51	1.04	0.78	0.00
19:20:16	212.1	212.1	125.6	22	138	327	1646	1087	0	1.04	1.04	14.1	15.0	197.8	571	93.1	1:52	1.04	0.72	0.00
19:20:50	213.0	213.0	102.9	19	139	319	1650	1086	0	1.04	1.04	14.1	15.0	197.8	571	94.0	1:52	1.04	0.67	0.00
19:21:34	214.0	214.0	81.8	18	139	318	1650	1087	0	1.04	1.04	14.1	15.0	197.8	568	95.0	1:53	1.04	0.71	0.00
19:22:44	215.0	215.0	52.0	20	139	319	1698	1087	0	1.04	1.04	14.1	15.0	197.8	566	96.0	1:54	1.04	0.74	0.00
19:23:52	216.0	216.0	52.2	20	139	336	1793	1087	0	1.04	1.04	14.1	15.0	197.8	562	97.0	1:55	1.04	0.82	0.00
19:24:58	217.0	217.0	54.5	19	138	374	1866	1088	0	1.04	1.04	14.1	15.0	197.8	568	98.0	1:56	1.04	0.80	0.00
19:25:54	218.0	218.0	64.3	20	139	365	1659	1089	0	1.04	1.04	14.2	15.0	197.8	572	99.0	1:57	1.04	0.78	0.00
19:26:47	219.0	219.0	67.9	21	139	392	1658	1089	0	1.04	1.04	14.2	15.0	197.8	578	100.0	1:58	1.04	0.77	0.00
19:27:34	220.0	220.0	80.9	21	139	372	1659	1090	0	1.04	1.04	14.2	15.0	198.0	585	101.0	1:59	1.04	0.73	0.00
19:28:21	221.0	221.0	76.1	20	139	350	1661	1089	0	1.04	1.04	14.1	15.0	198.6	586	102.0	1:60	1.04	0.74	0.00
19:29:05	222.0	222.0	86.1	18	139	356	1658	1089	0	1.04	1.04	14.2	15.0	199.5	591	103.0	2:00	1.04	0.70	0.00
19:29:52	223.1	223.1	78.3	19	139	341	1660	1089	0	1.04	1.04	14.2	15.0	200.3	598	104.1	2:01	1.04	0.72	0.00
19:30:36	224.0	224.0	80.6	19	138	331	1660	1089	0	1.04	1.04	14.2	15.0	201.0	600	105.0	2:02	1.04	0.72	0.00
19:32:07	225.0	225.0	39.6	22	139	357	1658	1088	0	1.04	1.04	14.2	15.0	202.6	606	106.0	2:04	1.04	0.90	0.00
19:32:52	226.0	226.0	80.0	20	139	327	1659	1088	0	1.04	1.04	14.2	15.0	203.1	607	107.0	2:04	1.04	0.73	0.00
19:33:41	227.0	227.0	73.5	17	135	263	1657	1090	0	1.04	1.04	14.2	15.0	203.5	610	108.0	2:05	1.04	0.71	0.00
19:43:47	228.0	228.0	85.7	16	137	338	1655	1079	0	1.04	1.04	14.2	14.9	209.4	590	109.0	2:06	1.04	0.69	0.00
19:44:37	229.1	229.1	74.5	16	138	310	1647	1082	0	1.04	1.04	14.2	14.9	210.2	586	110.1	2:07	1.04	0.72	0.00
19:45:22	230.0	230.0	80.7	22	138	388	1650	1082	0	1.04	1.04	14.2	14.9	211.0	584	111.0	2:08	1.04	0.75	0.00
19:46:15	231.0	231.0	66.7	21	138	360	1650	1083	0	1.04	1.04	14.2	14.9	212.3	584	112.0	2:09	1.04	0.78	0.00
19:47:23	232.0	232.0	52.9	20	138	337	1649	1082	0	1.04	1.04	14.2	14.9	213.6	582	113.0	2:10	1.04	0.82	0.00
19:48:13	233.1	233.1	74.2	19	138	322	1649	1084	0	1.04	1.04	14.2	14.9	214.4	583	114.1	2:11	1.04	0.74	0.00
19:48:54	234.0	234.0	87.4	17	138	307	1650	1083	0	1.04	1.04	14.2	14.9	214.9	584	115.0	2:12	1.04	0.69	0.00
19:49:44	235.1	235.1	76.6	18	138	325	1651	1084	0	1.04	1.04	14.2	14.9	215.5	584	116.1	2:12	1.04	0.73	0.00
19:50:39	236.0	236.0	65.0	22	138	368	1651	1083	0	1.04	1.04	14.2	14.8	216.1	583	117.0	2:13	1.04	0.79	0.00
19:51:40	237.1	237.1	59.3	23	138	359	1656	1083	0	1.04	1.04	14.2	14.8	216.9	584	118.1	2:14	1.04	0.81	0.00
19:52:39	238.0	238.0	60.6	21	138	347	1654	1084	0	1.04	1.04	14.2	14.8	217.7	583	119.0	2:15	1.04	0.80	0.00
19:53:45	239.0	239.0	54.5	20	138	332	1653	1084	0	1.04	1.04	14.2	14.8	218.9	583	120.0	2:16	1.04	0.81	0.00
19:54:42	240.0	240.0	63.2	21	138	345	1654	1082	0	1.04	1.04	14.2	14.8	219.8	583	121.0	2:17	1.04	0.79	0.00
19:55:27	241.0	241.0	81.8	22	139	338	1654	1082	0	1.04	1.04	14.2	14.7	220.5	583	122.0	2:18	1.04	0.74	0.00
19:56:14	242.0	242.0	77.4	20	139	344	1652	1082	0	1.04	1.04	14.2	14.7	221.5	585	123.0	2:19	1.04	0.74	0.00
19:57:09	243.1	243.1	80.4	20	138	358	1647	1083	0	1.04	1.04	14.2	14.8	222.5	586	124.1	2:20	1.04	0.73	0.00
19:57:53	244.1	244.1	81.8	21	143	353	1736	1083	0	1.04	1.04	14.2	14.8	223.2	576	125.1	2:21	1.04	0.74	0.00
19:58:41	245.0	245.0	74.1	21	150	345	1849	1084	0	1.04	1.04	14.2	14.7	223.9	572	126.0	2:21	1.04	0.77	0.00
19:59:36	246.0	246.0	67.3	21	151	383	1704	1084	0	1.04	1.04	14.2	14.7	224.4	567	127.0	2:22	1.04	0.79	0.00
20:00:14	247.0	247.0	94.2	21	151	347	1666	1084	0	1.04	1.04	14.2	14.7	224.9	571	128.0	2:23	1.04	0.72	0.00
20:01:02	248.0	248.0	74.2	20	151	331	1662	1084	0	1.04	1.04	14.2	14.7	225.7	584	129.0	2:24	1.04	0.76	0.00
20:01:57	249.1	249.1	67.6	21	151	353	1670	1084	0	1.04	1.04	14.2	14.7	226.6	600	130.1	2:25	1.04	0.79	0.00
20:02:45	250.0	250.0	74.1	22	151	374	1680	1085	0	1.04	1.04	14.2	14.6	227.0	613	131.0	2:25	1.04	0.78	0.00
20:03:38	251.0	251.0	69.2	21	151	347	1676	1084	0	1.04	1.04	14.2	14.6	227.0	628	132.0	2:26	1.04	0.80	0.00
20:04:36	252.0	252.0	67.9	21	151	357	1670	1084	0	1.04	1.04	14.2	14.6	227.0	646	133.0	2:27	1.04	0.79	0.00
20:05:27	253.1	253.1	73.5	24	151	357	1668	1085	0	1.04	1.04	14.2	14.6	227.0	649	134.1	2:28	1.04	0.81	0.00
20:06:35	254.0	254.0	52.2	21	151	335	1671	1084	0	1.04	1.04	14.2	14.6	227.0	652	135.0	2:29	1.04	0.85	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
20:07:33	255.1	255.1	66.1	21	151	350	1685	1085	0	1.04	1.04	14.2	14.6	227.0	653	136.1	2:30	1.04	0.84	0.00
20:08:36	256.0	256.0	56.0	22	151	328	1855	1086	0	1.04	1.04	14.2	14.6	227.0	641	137.0	2:31	1.04	0.81	0.00
20:20:13	257.0	257.0	21.8	19	140	286	1702	1083	0	1.04	1.04	14.2	14.6	235.3	629	138.0	2:34	1.04	0.90	0.00
20:22:22	258.0	258.0	27.9	24	139	373	1659	1082	0	1.04	1.04	14.2	14.6	237.1	627	139.0	2:36	1.04	1.00	0.00
20:23:19	259.0	259.0	65.5	24	139	415	1665	1085	0	1.04	1.04	14.2	14.7	237.9	626	140.0	2:37	1.04	0.81	0.00
20:24:25	260.1	260.1	54.5	21	139	387	1664	1085	0	1.04	1.04	14.2	14.7	238.8	626	141.1	2:38	1.04	0.83	0.00
20:25:38	261.1	261.1	57.6	24	139	431	1661	1085	0	1.04	1.04	14.2	14.7	239.9	629	142.1	2:39	1.04	0.83	0.00
20:26:25	262.0	262.0	74.8	22	139	397	1662	1085	0	1.04	1.04	14.2	14.7	240.8	629	143.0	2:40	1.04	0.76	0.00
20:28:01	263.0	263.0	37.4	21	140	289	1660	1084	0	1.04	1.04	14.1	14.7	242.3	629	144.0	2:42	1.04	0.90	0.00
20:28:23	264.1	264.1	180.0	21	139	296	1666	1083	0	1.04	1.04	14.2	14.7	242.6	630	145.1	2:42	1.04	0.56	0.00
20:28:39	265.1	265.1	240.0	16	140	208	1667	1083	0	1.04	1.04	14.2	14.7	242.9	631	146.1	2:42	1.04	0.46	0.00
20:28:51	266.1	266.1	362.3	10	140	193	1673	1083	0	1.04	1.04	14.2	14.7	243.1	630	147.1	2:43	1.04	0.35	0.00
20:29:13	267.0	267.0	161.0	8	140	252	1676	1084	0	1.04	1.04	14.1	14.7	243.6	631	148.0	2:43	1.04	0.49	0.00
20:30:15	268.7	268.7	138.8	7	141	196	1678	1085	0	1.04	1.04	14.1	14.7	244.7	633	149.7	2:43	1.04	0.37	0.00
20:31:04	269.1	269.1	74.0	6	140	191	1679	1084	0	1.04	1.04	14.1	14.7	245.4	631	150.1	2:44	1.04	0.37	0.00
20:32:00	270.0	270.0	62.3	9	139	230	1679	1085	0	1.04	1.04	14.1	14.7	246.5	630	151.0	2:45	1.04	0.67	0.00
20:33:10	271.0	271.0	52.4	16	140	262	1676	1084	0	1.04	1.04	14.1	14.7	247.8	629	152.0	2:46	1.04	0.78	0.00
20:33:27	272.3	272.3	261.3	14	139	234	1746	1084	0	1.04	1.04	14.1	14.7	248.1	623	153.3	2:46	1.04	0.43	0.00
20:33:39	273.1	273.1	288.0	8	140	172	1846	1084	0	1.04	1.04	14.1	14.7	248.3	622	154.1	2:47	1.04	0.37	0.00
20:35:13	276.1	276.1	177.0	2	140	192	1508	1086	0	1.04	1.04	14.1	14.6	249.8	620	157.1	2:47	1.04	0.31	0.00
20:36:05	277.1	277.1	248.8	1	140	188	1686	1085	0	1.04	1.04	14.1	14.7	250.6	634	158.1	2:47	1.04	0.32	0.00
20:37:00	278.2	278.2	154.3	2	140	149	1687	1084	0	1.04	1.04	14.1	14.7	251.5	647	159.2	2:48	1.04	0.37	0.00
20:38:50	279.1	279.1	51.2	1	140	150	1688	1085	0	1.04	1.04	14.1	14.7	253.1	666	160.1	2:49	1.04	0.50	0.00
20:41:31	280.0	280.0	22.5	7	140	182	1684	1085	0	1.04	1.04	14.1	14.8	255.5	664	161.0	2:52	1.04	0.60	0.00
20:44:01	281.0	281.0	23.8	23	140	293	1677	1086	0	1.04	1.04	14.1	14.7	256.5	664	162.0	2:54	1.04	1.03	0.00
20:45:07	282.0	282.0	63.7	23	139	339	1671	1085	0	1.04	1.04	14.1	14.8	256.5	665	163.0	2:55	1.04	0.80	0.00
20:45:24	283.3	283.3	276.9	12	139	89	1670	1084	0	1.04	1.04	14.1	14.8	256.5	666	164.3	2:56	1.04	0.47	0.00
20:45:36	284.1	284.1	266.7	8	140	118	1670	1084	0	1.04	1.04	14.1	14.8	256.5	668	165.1	2:56	1.04	0.37	0.00
20:45:54	285.1	285.1	198.2	2	140	104	1670	1083	0	1.04	1.04	14.2	14.8	256.5	666	166.1	2:56	1.04	0.33	0.00
20:59:44	287.2	287.2	100.6	2	140	103	1671	1083	0	1.04	1.04	14.1	14.8	260.2	623	168.2	2:57	1.04	0.41	0.00
21:00:30	288.0	288.0	85.7	1	139	100	1682	1087	0	1.04	1.04	14.1	14.7	260.8	622	169.0	2:57	1.04	0.44	0.00
21:01:46	289.1	289.1	56.7	1	139	102	1691	1087	0	1.04	1.04	14.1	14.7	261.9	620	170.1	2:59	1.04	0.47	0.00
21:02:38	290.0	290.0	67.3	1	139	103	1691	1088	0	1.04	1.04	14.1	14.7	262.5	620	171.0	2:60	1.04	0.48	0.00
21:03:16	291.0	291.0	100.0	1	139	103	1686	1087	0	1.04	1.04	14.1	14.7	263.0	619	172.0	3:00	1.04	0.42	0.00
21:03:53	292.1	292.1	113.2	1	139	107	1689	1086	0	1.04	1.04	14.1	14.7	264.3	619	173.1	3:01	1.04	0.42	0.00
21:04:26	293.0	293.0	110.5	1	139	102	1691	1085	0	1.04	1.04	14.1	14.7	265.3	620	174.0	3:01	1.04	0.43	0.00
21:05:03	294.0	294.0	97.3	1	139	111	1690	1084	0	1.04	1.04	14.1	14.7	266.4	620	175.0	3:02	1.04	0.42	0.00
21:05:37	295.1	295.1	124.9	2	139	119	1690	1084	0	1.04	1.04	14.1	14.7	267.3	620	176.1	3:03	1.04	0.43	0.00
21:06:11	296.0	296.0	104.3	2	139	143	1691	1084	0	1.04	1.04	14.1	14.7	268.1	620	177.0	3:03	1.04	0.47	0.00
21:06:49	297.0	297.0	100.9	2	138	117	1696	1085	0	1.04	1.04	14.1	14.7	268.9	621	178.0	3:04	1.04	0.46	0.00
21:07:33	298.0	298.0	81.4	2	139	113	1693	1084	0	1.04	1.04	14.1	14.7	269.4	620	179.0	3:05	1.04	0.47	0.00
21:08:11	299.2	299.2	123.1	3	139	169	1701	1084	0	1.04	1.04	14.1	14.7	269.9	620	180.2	3:05	1.04	0.45	0.00
21:08:45	300.0	300.0	100.7	2	139	115	1696	1084	0	1.04	1.04	14.1	14.7	270.2	619	181.0	3:06	1.04	0.45	0.00
21:09:19	301.0	301.0	105.3	2	139	101	1700	1084	0	1.04	1.04	14.1	14.7	270.6	620	182.0	3:06	1.04	0.45	0.00
21:09:58	302.0	302.0	100.5	2	139	110	1698	1085	0	1.04	1.04	14.1	14.7	272.0	620	183.0	3:07	1.04	0.46	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
21:10:33	303.1	303.1	108.3	2	139	127	1690	1084	0	1.04	1.04	14.1	14.7	273.2	621	184.1	3:08	1.04	0.47	0.00
21:11:08	304.0	304.0	100.6	2	139	112	1771	1086	0	1.04	1.04	14.1	14.7	273.8	613	185.0	3:08	1.04	0.46	0.00
21:11:55	305.1	305.1	81.3	2	140	114	1905	1085	0	1.04	1.04	14.1	14.7	274.4	596	186.1	3:09	1.04	0.49	0.00
21:12:36	306.0	306.0	86.8	2	139	101	1920	1085	0	1.04	1.04	14.1	14.7	275.7	590	187.0	3:10	1.04	0.48	0.00
21:13:22	307.0	307.0	82.2	3	139	103	1786	1086	0	1.04	1.04	14.1	14.7	277.1	592	188.0	3:10	1.04	0.51	0.00
21:14:00	308.0	308.0	93.7	3	139	111	1714	1086	0	1.04	1.04	14.1	14.6	277.6	601	189.0	3:11	1.04	0.49	0.00
21:14:44	309.0	309.0	81.8	2	139	108	1708	1086	0	1.04	1.04	14.1	14.6	278.2	614	190.0	3:12	1.04	0.49	0.00
21:15:24	310.0	310.0	95.4	2	139	124	1708	1085	0	1.04	1.04	14.1	14.6	278.8	627	191.0	3:12	1.04	0.47	0.00
21:16:09	311.0	311.0	81.8	3	139	117	1712	1085	0	1.04	1.04	14.1	14.6	279.0	641	192.0	3:13	1.04	0.50	0.00
21:16:51	312.0	312.0	85.7	2	139	106	1714	1085	0	1.04	1.04	14.1	14.6	279.3	652	193.0	3:14	1.04	0.48	0.00
21:17:36	313.1	313.1	81.2	2	139	117	1717	1085	0	1.04	1.04	14.1	14.6	279.6	666	194.1	3:15	1.04	0.50	0.00
21:18:17	314.0	314.0	87.0	2	139	110	1720	1085	0	1.04	1.04	14.1	14.6	279.8	668	195.0	3:15	1.04	0.48	0.00
21:31:34	315.1	315.1	32.7	2	124	120	1743	1085	0	1.04	1.04	14.1	14.6	285.1	678	196.1	3:17	1.04	0.49	0.00
21:32:10	316.0	316.0	98.0	1	134	148	1779	1095	0	1.04	1.04	14.1	14.7	285.1	675	197.0	3:18	1.04	0.42	0.00
21:32:59	317.1	317.1	81.8	1	138	122	1781	1097	0	1.04	1.04	14.1	14.7	285.1	673	198.1	3:19	1.04	0.43	0.00
21:33:30	318.1	318.1	116.1	2	139	172	1781	1098	0	1.04	1.04	14.1	14.7	285.1	674	199.1	3:19	1.04	0.43	0.00
21:34:01	319.0	319.0	113.7	2	140	117	1777	1098	0	1.04	1.04	14.1	14.6	285.1	671	200.0	3:20	1.04	0.44	0.00
21:34:35	320.1	320.1	115.2	1	138	112	1775	1098	0	1.04	1.04	14.1	14.6	285.1	672	201.1	3:20	1.04	0.41	0.00
21:35:07	321.2	321.2	127.1	2	137	143	1778	1097	0	1.04	1.04	14.1	14.6	285.1	672	202.2	3:21	1.04	0.42	0.00
21:35:35	322.1	322.1	126.7	2	139	140	1776	1098	0	1.04	1.04	14.1	14.6	285.1	673	203.1	3:21	1.04	0.44	0.00
21:36:03	323.0	323.0	127.4	2	138	126	1773	1098	0	1.04	1.04	14.1	14.6	285.1	672	204.0	3:22	1.04	0.39	0.00
21:36:35	324.0	324.0	111.6	1	138	127	1775	1098	0	1.04	1.04	14.1	14.6	285.1	672	205.0	3:22	1.04	0.39	0.00
21:37:06	325.0	325.0	126.3	1	139	151	1776	1098	0	1.04	1.04	14.1	14.6	285.1	674	206.0	3:23	1.04	0.41	0.0
21:37:37	326.0	326.0	115.2	2	138	151	1777	1099	0	1.04	1.04	14.1	14.6	285.1	673	207.0	3:23	1.04	0.44	0.00
21:38:16	327.0	327.0	96.0	2	139	175	1774	1100	0	1.04	1.04	14.1	14.6	285.1	677	208.0	3:24	1.04	0.47	0.00
21:38:46	328.0	328.0	116.1	2	139	121	1771	1100	0	1.04	1.04	14.1	14.6	285.1	674	209.0	3:24	1.04	0.41	0.00
21:39:20	329.0	329.0	105.3	1	139	111	1766	1101	0	1.04	1.04	14.1	14.6	285.1	678	210.0	3:25	1.04	0.39	0.00
21:39:59	330.0	330.0	94.7	2	140	109	1766	1100	0	1.04	1.04	14.1	14.6	285.1	678	211.0	3:26	1.04	0.46	0.00
21:40:33	331.1	331.1	111.3	3	139	131	1749	1100	0	1.04	1.04	14.1	14.6	285.1	679	212.1	3:26	1.04	0.47	0.00
21:41:01	332.0	332.0	127.8	2	139	107	1763	1099	0	1.04	1.04	14.1	14.6	285.4	676	213.0	3:27	1.04	0.41	0.00
21:41:35	333.0	333.0	105.3	0	139	107	1910	1100	0	1.04	1.04	14.1	14.6	286.5	665	214.0	3:27	1.04	0.39	0.00
21:42:13	334.1	334.1	113.4	1	139	113	1945	1096	0	1.04	1.04	14.1	14.6	287.6	658	215.1	3:28	1.04	0.41	0.00
21:42:57	335.0	335.0	81.4	1	139	111	1891	1091	0	1.04	1.04	14.1	14.6	288.2	655	216.0	3:28	1.04	0.45	0.00
21:43:50	336.0	336.0	67.6	2	139	189	1727	1089	0	1.04	1.04	14.1	14.6	288.9	650	217.0	3:29	1.04	0.52	0.00
21:44:37	337.0	337.0	76.6	5	139	190	1720	1089	0	1.04	1.04	14.1	14.6	289.7	645	218.0	3:30	1.04	0.58	0.00
21:45:17	338.0	338.0	90.0	4	138	195	1720	1090	0	1.04	1.04	14.1	14.6	290.4	646	219.0	3:31	1.04	0.53	0.00
21:46:00	339.1	339.1	99.2	3	139	200	1723	1090	0	1.04	1.04	14.1	14.6	291.4	646	220.1	3:32	1.04	0.49	0.00
21:46:38	340.1	340.1	94.7	3	138	151	1725	1090	0	1.04	1.04	14.1	14.6	292.3	642	221.1	3:32	1.04	0.50	0.00
21:47:51	341.1	341.1	50.0	4	138	208	1727	1090	0	1.04	1.04	14.1	14.6	294.1	643	222.1	3:33	1.04	0.53	0.00
21:48:46	342.0	342.0	63.8	8	139	209	1729	1090	0	1.04	1.04	14.1	14.6	295.3	644	223.0	3:34	1.04	0.66	0.00
21:49:18	343.0	343.0	111.9	5	139	183	1718	1090	0	1.04	1.04	14.2	14.6	296.0	645	224.0	3:35	1.04	0.51	0.00
22:01:20	344.0	344.0	31.9	3	137	158	1776	1084	0	1.04	1.04	14.1	14.6	305.2	601	225.0	3:37	1.04	0.65	0.00
22:01:51	345.0	345.0	124.6	3	139	151	1735	1078	0	1.04	1.04	14.1	14.6	305.9	599	226.0	3:37	1.04	0.45	0.00
22:02:50	346.2	346.2	80.9	4	138	141	1729	1078	0	1.04	1.04	14.1	14.6	307.0	599	227.2	3:38	1.04	0.54	0.00
22:03:08	347.0	347.0	190.9	4	138	142	1732	1078	0	1.04	1.04	14.1	14.6	307.4	599	228.0	3:38	1.04	0.39	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
22:03:40	348.1	348.1	124.1	1	138	120	1734	1078	0	1.04	1.04	14.1	14.6	308.0	594	229.1	3:39	1.04	0.41	0.00
22:05:10	349.0	349.0	39.7	5	138	143	1752	1081	0	1.04	1.04	14.1	14.6	309.9	596	230.0	3:41	1.04	0.69	0.00
22:05:39	350.0	350.0	122.0	7	139	154	1751	1087	0	1.04	1.04	14.1	14.6	310.3	595	231.0	3:41	1.04	0.53	0.00
22:06:07	351.0	351.0	139.5	4	140	166	1756	1087	0	1.04	1.04	14.1	14.6	311.0	597	232.0	3:41	1.04	0.44	0.00
22:06:44	352.0	352.0	96.6	2	140	113	1759	1087	0	1.04	1.04	14.1	14.6	311.7	597	233.0	3:42	1.04	0.43	0.00
22:07:25	353.0	353.0	102.9	0	139	118	1760	1088	0	1.04	1.04	14.1	14.6	312.6	596	234.0	3:43	1.04	0.37	0.00
22:08:00	354.0	354.0	113.4	2	139	118	1760	1089	0	1.04	1.04	14.1	14.6	313.2	595	235.0	3:43	1.04	0.40	0.00
22:08:44	355.0	355.0	81.8	2	139	132	1759	1087	0	1.04	1.04	14.1	14.6	313.8	597	236.0	3:44	1.04	0.42	0.00
22:09:12	356.0	356.0	124.1	6	139	161	1759	1088	0	1.04	1.04	14.2	14.6	314.2	598	237.0	3:44	1.04	0.52	0.00
22:09:33	357.1	357.1	180.0	4	138	141	1759	1088	0	1.04	1.04	14.1	14.5	314.4	597	238.1	3:45	1.04	0.41	0.00
22:10:38	358.0	358.0	56.0	5	138	179	1749	1087	0	1.04	1.04	14.1	14.5	314.6	616	239.0	3:46	1.04	0.47	0.00
22:11:39	359.0	359.0	58.1	12	138	201	1748	1086	0	1.04	1.04	14.1	14.5	314.6	639	240.0	3:47	1.04	0.72	0.00
22:12:27	360.0	360.0	74.5	7	139	153	1746	1086	0	1.04	1.04	14.1	14.5	314.6	653	241.0	3:48	1.04	0.60	0.00
22:13:06	361.0	361.0	95.2	5	137	141	1845	1086	0	1.04	1.04	14.1	14.5	314.6	652	242.0	3:48	1.04	0.54	0.00
22:13:49	362.1	362.1	98.2	6	139	162	1946	1086	0	1.04	1.04	14.1	14.5	314.6	660	243.1	3:49	1.04	0.54	0.00
22:14:14	363.1	363.1	141.6	4	139	145	1924	1087	0	1.04	1.04	14.1	14.5	314.6	665	244.1	3:49	1.04	0.45	0.00
22:14:47	364.0	364.0	107.5	2	138	150	1779	1087	0	1.04	1.04	14.1	14.5	314.6	669	245.0	3:50	1.04	0.43	0.00
22:15:29	365.0	365.0	88.9	2	137	149	1739	1086	0	1.04	1.04	14.1	14.5	314.6	678	246.0	3:51	1.04	0.47	0.00
22:16:45	366.0	366.0	47.2	6	139	189	1730	1086	0	1.04	1.04	14.1	14.5	314.9	689	247.0	3:52	1.04	0.68	0.00
22:18:46	367.0	367.0	29.8	11	138	195	1722	1085	0	1.04	1.04	14.1	14.5	317.1	696	248.0	3:54	1.04	0.84	0.00
22:21:11	368.0	368.0	25.0	15	138	227	1719	1085	0	1.04	1.04	14.1	14.5	320.7	694	249.0	3:56	1.04	0.87	0.00
22:22:18	369.0	369.0	62.6	18	138	242	1718	1086	0	1.04	1.04	14.1	14.4	322.4	694	250.0	3:58	1.04	0.90	0.00
22:22:32	370.1	370.1	282.8	13	138	163	1720	1086	0	1.04	1.04	14.1	14.4	322.8	696	251.1	3:58	1.04	0.41	0.00
22:22:51	371.0	371.0	186.8	7	139	125	1721	1086	0	1.04	1.04	14.1	14.4	323.4	694	252.0	3:58	1.04	0.43	0.00
22:23:30	372.0	372.0	92.3	2	139	108	1718	1086	0	1.04	1.04	14.1	14.4	324.5	696	253.0	3:59	1.04	0.45	0.00
22:32:02	373.9	373.9	175.0	2	137	103	1721	1086	0	1.04	1.04	14.1	14.4	333.4	670	254.9	3:60	1.04	0.30	0.00
22:32:07	374.0	374.0	205.2	0	140	145	1730	1078	0	1.04	1.04	14.1	14.3	333.5	670	255.0	3:60	1.04	0.31	0.00
22:32:40	375.1	375.1	120.0	1	140	140	1732	1080	0	1.04	1.04	14.1	14.3	334.2	668	256.1	4:00	1.04	0.35	0.00
22:33:13	376.1	376.1	105.5	2	140	148	1738	1081	0	1.04	1.04	14.1	14.3	334.8	671	257.1	4:01	1.04	0.47	0.00
22:34:03	377.1	377.1	72.0	5	140	177	1735	1082	0	1.04	1.04	14.1	14.4	335.6	670	258.1	4:02	1.04	0.58	0.00
22:34:56	378.0	378.0	67.6	3	140	147	1733	1082	0	1.04	1.04	14.1	14.4	336.6	669	259.0	4:03	1.04	0.55	0.00
22:35:40	379.0	379.0	81.2	5	140	169	1732	1082	0	1.04	1.04	14.1	14.3	337.6	666	260.0	4:03	1.04	0.58	0.00
22:36:28	380.0	380.0	74.6	8	140	184	1739	1083	0	1.04	1.04	14.1	14.3	338.5	667	261.0	4:04	1.04	0.63	0.00
22:38:04	381.0	381.0	37.5	13	140	224	1741	1084	0	1.04	1.04	14.1	14.3	340.3	670	262.0	4:06	1.04	0.82	0.00
22:39:49	382.0	382.0	37.9	16	139	256	1742	1085	0	1.04	1.04	14.1	14.3	341.6	671	263.0	4:07	1.04	0.85	0.00
22:41:44	383.0	383.0	31.1	20	139	250	1740	1086	0	1.04	1.04	14.1	14.4	343.6	673	264.0	4:09	1.04	0.93	0.00
22:43:30	384.0	384.0	38.1	19	139	274	1741	1086	0	1.04	1.04	14.1	14.3	343.6	673	265.0	4:11	1.04	0.88	0.00
22:44:45	385.0	385.0	47.7	23	139	299	1735	1086	0	1.04	1.04	14.1	14.3	343.6	673	266.0	4:12	1.04	0.87	0.00
22:46:06	386.1	386.1	50.0	25	139	316	1730	1086	0	1.04	1.04	14.1	14.3	343.6	673	267.1	4:14	1.04	0.87	0.00
22:46:47	387.2	387.2	128.6	23	140	260	1728	1085	0	1.04	1.04	14.1	14.3	343.6	671	268.2	4:14	1.04	0.64	0.00
22:47:00	388.2	388.2	273.7	17	140	191	1730	1086	0	1.04	1.04	14.2	14.3	343.6	668	269.2	4:15	1.04	0.44	0.00
22:47:12	389.1	389.1	284.9	13	140	197	1730	1085	0	1.04	1.04	14.2	14.3	343.6	665	270.1	4:15	1.04	0.41	0.00
22:47:31	390.1	390.1	218.2	8	139	161	1726	1086	0	1.04	1.04	14.1	14.3	343.6	664	271.1	4:15	1.04	0.43	0.00
22:47:56	391.0	391.0	140.1	4	140	114	1718	1086	0	1.04	1.04	14.1	14.3	343.8	658	272.0	4:16	1.04	0.42	0.00
22:48:55	392.0	392.0	94.7	1	140	110	1839	1085	0	1.04	1.04	14.1	14.3	345.1	645	273.0	4:16	1.04	0.41	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
22:49:36	393.0	393.0	94.7	2	141	127	1911	1085	0	1.04	1.04	14.1	14.3	346.1	635	274.0	4:17	1.04	0.48	0.00
22:50:35	394.0	394.0	61.0	1	140	109	1778	1086	0	1.04	1.04	14.1	14.3	347.6	623	275.0	4:18	1.04	0.46	0.00
22:51:19	395.1	395.1	93.9	1	140	113	1736	1085	0	1.04	1.04	14.1	14.3	348.3	617	276.1	4:19	1.04	0.45	0.00
22:51:54	396.0	396.0	101.4	2	140	113	1734	1085	0	1.04	1.04	14.2	14.3	348.6	616	277.0	4:19	1.04	0.45	0.00
22:53:02	397.1	397.1	52.9	1	140	115	1731	1086	0	1.04	1.04	14.2	14.3	349.9	623	278.1	4:20	1.04	0.49	0.00
22:53:43	398.0	398.0	86.4	2	140	122	1731	1085	0	1.04	1.04	14.2	14.3	350.9	619	279.0	4:21	1.04	0.48	0.00
22:54:26	399.0	399.0	88.2	1	140	126	1734	1085	0	1.04	1.04	14.2	14.3	352.0	613	280.0	4:22	1.04	0.46	0.00
22:55:07	400.0	400.0	87.5	2	140	116	1735	1085	0	1.04	1.04	14.2	14.3	352.8	607	281.0	4:22	1.04	0.48	0.00
22:55:55	401.0	401.0	76.6	2	140	135	1738	1085	0	1.04	1.04	14.2	14.3	353.8	602	282.0	4:23	1.04	0.48	0.00
23:06:47	402.0	402.0	22.8	13	135	193	1746	1087	0	1.04	1.04	14.2	14.3	364.0	614	283.0	4:26	1.04	0.93	0.00
23:07:03	403.1	403.1	264.0	12	139	123	1750	1088	0	1.04	1.04	14.2	14.3	364.3	612	284.1	4:26	1.04	0.41	0.00
23:07:25	404.0	404.0	161.0	5	141	113	1752	1088	0	1.04	1.04	14.2	14.3	364.8	609	285.0	4:27	1.04	0.43	0.00
23:07:51	405.0	405.0	137.6	1	141	108	1751	1087	0	1.04	1.04	14.2	14.3	365.2	607	286.0	4:27	1.04	0.37	0.00
23:08:55	406.8	406.8	295.9	1	141	108	1752	1087	0	1.04	1.04	14.2	14.3	365.9	601	287.8	4:27	1.04	0.23	0.00
23:09:00	407.0	407.0	144.7	0	141	104	1770	1088	0	1.04	1.04	14.2	14.3	365.9	600	288.0	4:27	1.04	0.26	0.00
23:09:45	408.5	408.5	175.0	0	141	166	1768	1090	0	1.04	1.04	14.2	14.3	366.4	598	289.5	4:28	1.04	0.32	0.00
23:10:01	409.0	409.0	206.0	2	141	159	1768	1090	0	1.04	1.04	14.2	14.3	366.5	595	290.0	4:28	1.04	0.39	0.00
23:11:48	410.1	410.1	205.2	12	141	161	1770	1089	0	1.04	1.04	14.2	14.3	367.3	592	291.1	4:30	1.04	0.83	0.00
23:12:13	411.0	411.0	143.0	10	140	172	1773	1089	0	1.04	1.04	14.2	14.3	367.5	592	292.0	4:30	1.04	0.53	0.00
23:13:34	412.0	412.0	46.0	15	141	235	1771	1088	0	1.04	1.04	14.2	14.3	367.9	585	293.0	4:31	1.04	0.81	0.00
23:13:56	413.0	413.0	144.0	16	141	226	1775	1088	0	1.04	1.04	14.2	14.3	368.1	585	294.0	4:32	1.04	0.58	0.00
23:14:15	414.2	414.2	266.7	12	141	138	1779	1088	0	1.04	1.04	14.2	14.3	368.2	584	295.2	4:32	1.04	0.42	0.00
23:14:28	415.0	415.0	263.4	8	141	122	1779	1088	0	1.04	1.04	14.2	14.3	368.7	582	296.0	4:32	1.04	0.39	0.00
23:14:53	416.1	416.1	163.6	5	139	118	1775	1088	0	1.04	1.04	14.2	14.3	369.4	582	297.1	4:33	1.04	0.44	0.00
23:15:21	417.0	417.0	125.4	2	141	111	1777	1088	0	1.04	1.04	14.2	14.3	370.3	581	298.0	4:33	1.04	0.43	0.00
23:15:53	418.1	418.1	127.7	1	141	119	1768	1087	0	1.04	1.04	14.2	14.3	371.0	580	299.1	4:34	1.04	0.42	0.00
23:16:23	419.1	419.1	116.1	1	141	134	1771	1087	0	1.04	1.04	14.2	14.3	371.5	582	300.1	4:34	1.04	0.41	0.00
23:16:52	420.1	420.1	124.1	1	141	115	1821	1087	0	1.04	1.04	14.2	14.3	371.8	580	301.1	4:35	1.04	0.38	0.00
23:17:23	421.0	421.0	114.3	1	141	123	1936	1087	0	1.04	1.04	14.2	14.3	372.2	578	302.0	4:35	1.04	0.44	0.00
23:18:04	422.1	422.1	94.7	3	141	161	1911	1087	0	1.04	1.04	14.2	14.3	372.2	575	303.1	4:36	1.04	0.51	0.00
23:18:39	423.0	423.0	104.1	4	141	141	1794	1087	0	1.04	1.04	14.2	14.3	372.2	572	304.0	4:37	1.04	0.50	0.00
23:19:33	424.0	424.0	65.2	4	140	173	1789	1087	0	1.04	1.04	14.2	14.3	372.2	569	305.0	4:37	1.04	0.58	0.00
23:21:00	425.0	425.0	41.4	11	141	209	1790	1087	0	1.04	1.04	14.1	14.3	372.2	566	306.0	4:39	1.04	0.78	0.00
23:21:30	426.1	426.1	186.2	13	141	185	1790	1088	0	1.04	1.04	14.2	14.3	372.2	565	307.1	4:39	1.04	0.51	0.00
23:21:58	427.0	427.0	126.1	10	140	164	1793	1088	0	1.04	1.04	14.1	14.3	372.6	564	308.0	4:40	1.04	0.55	0.00
23:22:23	428.0	428.0	150.0	9	141	148	1795	1088	0	1.04	1.04	14.2	14.3	373.1	562	309.0	4:40	1.04	0.51	0.00
23:22:55	429.1	429.1	127.1	5	141	135	1797	1088	0	1.04	1.04	14.2	14.2	373.7	560	310.1	4:41	1.04	0.48	0.00
23:31:28	430.1	430.1	54.1	4	139	121	1794	1086	0	1.04	1.04	14.2	14.3	380.2	658	311.1	4:42	1.04	0.52	0.00
23:31:54	431.0	431.0	131.7	5	138	176	1800	1078	0	1.04	1.04	14.1	14.2	380.5	660	312.0	4:42	1.04	0.49	0.00
23:32:23	432.0	432.0	124.6	4	139	205	1800	1084	0	1.04	1.04	14.1	14.2	380.7	658	313.0	4:43	1.04	0.47	0.00
23:32:55	433.0	433.0	112.5	3	140	217	1800	1086	0	1.04	1.04	14.1	14.2	381.0	656	314.0	4:43	1.04	0.47	0.00
23:33:32	434.1	434.1	97.3	5	140	227	1800	1087	0	1.04	1.04	14.1	14.2	381.3	652	315.1	4:44	1.04	0.53	0.00
23:33:58	435.0	435.0	140.3	6	140	153	1801	1088	0	1.04	1.04	14.1	14.2	381.5	653	316.0	4:44	1.04	0.53	0.00
23:34:33	436.0	436.0	102.9	6	140	181	1800	1088	0	1.04	1.04	14.1	14.2	381.9	650	317.0	4:45	1.04	0.53	0.00
23:35:00	437.1	437.1	144.0	5	140	165	1797	1088	0	1.04	1.04	14.2	14.2	382.1	648	318.1	4:45	1.04	0.47	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
23:35:28	438.1	438.1	130.9	3	140	145	1796	1088	0	1.04	1.04	14.1	14.2	382.3	646	319.1	4:46	1.04	0.44	0.00
23:36:09	439.1	439.1	87.4	3	140	181	1800	1089	0	1.04	1.04	14.2	14.2	382.7	642	320.1	4:47	1.04	0.52	0.00
23:36:34	440.0	440.0	142.1	3	139	170	1798	1089	0	1.04	1.04	14.2	14.2	382.9	644	321.0	4:47	1.04	0.42	0.00
23:37:09	441.0	441.0	102.9	1	139	147	1798	1089	0	1.04	1.04	14.1	14.2	383.2	639	322.0	4:48	1.04	0.43	0.00
23:37:46	442.0	442.0	100.0	1	140	167	1795	1089	0	1.04	1.04	14.1	14.2	383.5	639	323.0	4:48	1.04	0.43	0.00
23:38:21	443.1	443.1	109.6	2	141	200	1795	1089	0	1.04	1.04	14.1	14.2	383.8	635	324.1	4:49	1.04	0.44	0.00
23:38:52	444.1	444.1	115.2	2	140	171	1798	1089	0	1.04	1.04	14.1	14.2	384.1	635	325.1	4:49	1.04	0.42	0.00
23:39:29	445.1	445.1	103.8	2	140	134	1789	1089	0	1.04	1.04	14.1	14.2	384.6	638	326.1	4:50	1.04	0.45	0.00
23:40:04	446.1	446.1	109.1	2	140	130	1826	1090	0	1.04	1.04	14.1	14.2	385.0	638	327.1	4:51	1.04	0.44	0.00
23:40:35	447.0	447.0	114.0	0	139	143	1956	1090	0	1.04	1.04	14.1	14.2	385.3	634	328.0	4:51	1.04	0.39	0.00
23:41:16	448.1	448.1	87.8	1	140	148	1918	1089	0	1.04	1.04	14.1	14.2	385.8	629	329.1	4:52	1.04	0.46	0.00
23:41:47	449.0	449.0	113.7	2	140	162	1812	1089	0	1.04	1.04	14.1	14.2	386.1	631	330.0	4:52	1.04	0.44	0.00
23:42:29	450.1	450.1	101.4	3	140	167	1796	1089	0	1.04	1.04	14.1	14.2	387.3	627	331.1	4:53	1.04	0.47	0.00
23:43:18	451.0	451.0	71.8	5	140	205	1793	1088	0	1.04	1.04	14.1	14.2	389.1	623	332.0	4:54	1.04	0.60	0.00
23:44:05	452.0	452.0	76.6	7	139	186	1799	1087	0	1.04	1.04	14.1	14.2	390.9	621	333.0	4:55	1.04	0.61	0.00
23:45:06	453.0	453.0	61.5	9	140	232	1799	1088	0	1.04	1.04	14.1	14.2	392.3	617	334.0	4:56	1.04	0.68	0.00
23:46:18	454.0	454.0	49.7	11	140	261	1802	1088	0	1.04	1.04	14.1	14.2	393.6	612	335.0	4:57	1.04	0.75	0.00
23:48:00	455.1	455.1	40.4	15	139	245	1804	1089	0	1.04	1.04	14.1	14.2	395.6	608	336.1	4:58	1.04	0.83	0.00
23:50:06	456.0	456.0	28.5	16	140	252	1847	1088	0	1.04	1.04	14.1	14.2	397.5	603	337.0	5:01	1.04	0.91	0.00
23:51:31	457.1	457.1	42.5	10	140	215	1814	1088	0	1.04	1.04	14.1	14.2	399.4	598	338.1	5:02	1.04	0.75	0.00
23:56:39	458.0	458.0	11.7	8	140	206	1801	1088	0	1.04	1.04	14.1	14.2	401.2	580	339.0	5:07	1.04	0.96	0.00
23 Sept 93																				
00:15:29	459.1	459.1	45.3	4	133	226	1806	1078	0	1.04	1.04	14.1	14.2	411.5	621	340.1	5:08	1.04	0.50	0.00
00:16:00	460.1	460.1	116.1	2	133	210	1857	1079	0	1.04	1.04	14.1	14.2	412.1	619	341.1	5:09	1.04	0.45	0.00
00:16:47	461.0	461.0	76.2	6	133	234	1815	1079	0	1.04	1.04	14.1	14.2	413.1	620	342.0	5:10	1.04	0.59	0.00
00:17:12	462.1	462.1	161.2	5	133	237	1790	1080	0	1.04	1.04	14.2	14.2	413.6	620	343.1	5:10	1.04	0.43	0.00
00:17:34	463.0	463.0	159.6	4	134	238	1787	1079	0	1.04	1.04	14.2	14.2	414.2	621	344.0	5:10	1.04	0.43	0.00
00:17:56	464.1	464.1	175.6	3	133	267	1790	1079	0	1.04	1.04	14.2	14.2	414.6	620	345.1	5:11	1.04	0.38	0.00
00:17:58	466.0	466.0	175.6	-1	132	308	1790	1079	0	1.04	1.04	14.0	14.2	414.5	620	347.0	5:11	1.04	0.35	0.00
00:18:21	467.0	467.0	158.8	2	133	258	1790	1079	0	1.04	1.04	14.1	14.2	415.0	621	348.0	5:11	1.04	0.38	0.00
00:18:49	468.1	468.1	139.3	2	133	254	1793	1079	0	1.04	1.04	14.1	14.2	415.7	618	349.1	5:12	1.04	0.40	0.00
00:19:27	469.1	469.1	94.5	3	133	275	1795	1079	0	1.04	1.04	14.1	14.2	416.5	617	350.1	5:12	1.04	0.49	0.00
00:20:16	470.0	470.0	73.0	5	134	294	1795	1080	0	1.04	1.04	14.1	14.2	417.6	614	351.0	5:13	1.04	0.58	0.00
00:22:16	471.0	471.0	32.7	15	133	340	1797	1081	0	1.04	1.04	14.1	14.2	420.4	607	352.0	5:15	1.04	0.86	0.00
00:22:39	472.0	472.0	156.5	16	133	367	1799	1081	0	1.04	1.04	14.2	14.2	420.9	604	353.0	5:15	1.04	0.55	0.00
00:23:03	473.1	473.1	181.3	11	133	323	1799	1081	0	1.04	1.04	14.2	14.2	421.5	605	354.1	5:16	1.04	0.48	0.00
00:23:28	474.0	474.0	140.3	6	133	269	1801	1082	0	1.04	1.04	14.1	14.2	422.0	602	355.0	5:16	1.04	0.47	0.00
00:23:59	475.0	475.0	124.8	3	133	288	1794	1081	0	1.04	1.04	14.1	14.2	422.7	602	356.0	5:17	1.04	0.45	0.00
00:24:30	476.0	476.0	114.9	3	134	291	1816	1082	0	1.04	1.04	14.1	14.2	423.5	600	357.0	5:17	1.04	0.46	0.00
00:25:08	477.0	477.0	94.7	3	133	279	1878	1082	0	1.04	1.04	14.1	14.2	424.2	597	358.0	5:18	1.04	0.48	0.00
00:26:01	480.0	480.0	56.7	-2	132	317	1711	1090	0	1.04	1.04	14.1	14.1	425.5	594	361.0	5:19	1.04	0.65	0.00
00:26:24	483.0	483.0	60.2	3	133	233	1800	1086	0	1.04	1.04	14.1	14.5	425.6	591	364.0	5:19	1.04	0.50	0.00
00:26:48	485.1	485.1	67.8	4	134	305	1801	1083	0	1.04	1.04	14.1	14.1	426.1	591	366.1	5:20	1.04	0.46	0.00
00:27:17	487.0	487.0	67.0	2	134	304	1827	1084	0	1.04	1.04	14.3	14.4	426.8	589	368.0	5:20	1.04	0.49	0.00
00:27:17	488.0	488.0	67.0	2	134	304	1827	1084	0	1.04	1.04	14.3	14.4	426.8	589	369.0	5:20	1.04	0.49	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
00:38:44	489.0	489.0	87.3	0	132	252	1760	1065	0	1.04	1.04	14.2	14.3	436.3	602	370.0	5:21	1.04	0.40	0.00
00:39:20	490.0	490.0	98.2	1	132	271	1763	1067	0	1.04	1.04	14.1	14.3	437.2	598	371.0	5:21	1.04	0.43	0.00
00:39:55	491.0	491.0	102.9	2	133	282	1801	1073	0	1.04	1.04	14.1	14.3	438.1	593	372.0	5:22	1.04	0.46	0.00
00:40:25	492.0	492.0	124.1	3	135	280	1810	1081	0	1.04	1.04	14.1	14.2	438.8	590	373.0	5:22	1.04	0.45	0.00
00:40:56	493.1	493.1	125.2	3	135	289	1810	1084	0	1.04	1.04	14.1	14.2	439.7	585	374.1	5:23	1.04	0.44	0.00
00:41:25	494.1	494.1	128.6	2	135	281	1810	1086	0	1.04	1.04	14.1	14.3	440.4	581	375.1	5:23	1.04	0.43	0.00
00:41:53	495.0	495.0	126.0	2	135	288	1810	1086	0	1.04	1.04	14.1	14.3	441.1	577	376.0	5:24	1.04	0.43	0.00
00:42:23	496.0	496.0	125.6	2	133	307	1810	1086	0	1.04	1.04	14.1	14.3	441.9	574	377.0	5:24	1.04	0.43	0.00
00:42:55	497.0	497.0	112.5	2	134	287	1812	1087	0	1.04	1.04	14.1	14.3	442.7	570	378.0	5:25	1.04	0.44	0.00
00:43:29	498.1	498.1	117.1	2	135	273	1816	1087	0	1.04	1.04	14.2	14.3	443.6	565	379.1	5:25	1.04	0.43	0.00
00:43:59	499.0	499.0	116.1	2	135	285	1817	1087	0	1.04	1.04	14.2	14.3	444.4	563	380.0	5:26	1.04	0.45	0.00
00:44:57	500.2	500.2	96.4	2	135	282	1817	1087	0	1.04	1.04	14.2	14.3	445.9	557	381.2	5:27	1.04	0.44	0.00
00:45:37	501.0	501.0	96.2	1	135	299	1811	1087	0	1.04	1.04	14.1	14.3	447.0	552	382.0	5:27	1.04	0.43	0.00
00:46:16	502.1	502.1	97.3	2	135	278	1848	1088	0	1.04	1.04	14.2	14.2	448.0	547	383.1	5:28	1.04	0.45	0.00
00:46:49	503.0	503.0	103.6	3	135	304	1942	1088	0	1.04	1.04	14.2	14.3	448.7	544	384.0	5:28	1.04	0.49	0.00
00:47:33	504.1	504.1	90.0	5	135	292	1875	1089	0	1.04	1.04	14.2	14.2	450.0	538	385.1	5:29	1.04	0.53	0.00
00:48:05	505.0	505.0	111.0	5	134	296	1824	1089	0	1.04	1.04	14.2	14.2	450.8	535	386.0	5:30	1.04	0.50	0.00
00:48:39	506.1	506.1	115.2	4	134	294	1820	1090	0	1.04	1.04	14.2	14.2	451.6	532	387.1	5:30	1.04	0.48	0.00
00:49:11	507.0	507.0	110.4	3	134	313	1820	1090	0	1.04	1.04	14.1	14.2	452.6	528	388.0	5:31	1.04	0.48	0.00
00:49:51	508.1	508.1	93.3	3	134	302	1820	1090	0	1.04	1.04	14.2	14.2	453.6	524	389.1	5:31	1.04	0.49	0.00
00:50:35	509.0	509.0	81.6	3	134	293	1822	1090	0	1.04	1.04	14.2	14.2	454.7	519	390.0	5:32	1.04	0.51	0.00
00:52:06	510.0	510.0	39.3	4	135	296	1844	1092	0	1.04	1.04	14.2	14.2	457.0	509	391.0	5:34	1.04	0.65	0.00
00:54:03	511.0	511.0	27.8	4	135	321	1992	1145	0	1.04	1.04	14.2	14.2	460.3	498	392.0	5:36	1.04	0.69	0.00
00:55:21	512.0	512.0	46.2	10	135	329	2004	1153	0	1.04	1.04	14.2	14.2	462.3	488	393.0	5:37	1.04	0.74	0.00
00:56:13	513.1	513.1	70.0	13	134	340	2003	1154	0	1.04	1.04	14.2	14.2	463.8	484	394.1	5:38	1.04	0.69	0.00
00:57:30	514.1	514.1	46.6	10	135	314	2023	1154	0	1.04	1.04	14.2	14.2	466.0	476	395.1	5:39	1.04	0.73	0.00
00:59:46	515.0	515.0	26.5	10	134	309	2054	1156	0	1.04	1.04	14.2	14.2	469.8	468	396.0	5:41	1.04	0.83	0.00
01:04:01	516.0	516.0	14.2	8	134	293	2019	1159	0	1.04	1.04	14.2	14.2	476.8	464	397.0	5:46	1.04	0.91	0.00
01:07:01	517.0	517.0	19.8	11	134	317	2021	1160	0	1.04	1.04	14.1	14.1	481.7	462	398.0	5:49	1.04	0.91	0.00
01:47:24	519.0	519.0	16.7	19	125	365	2148	1210	0	1.04	1.04	14.1	14.0	500.6	553	400.0	5:55	1.04	0.77	0.00
01:48:31	520.1	520.1	55.0	24	128	433	2162	1215	0	1.04	1.04	14.1	14.0	501.4	552	401.1	5:56	1.04	0.83	0.00
01:49:32	521.1	521.1	58.8	28	128	466	2260	1216	0	1.04	1.04	14.1	14.0	502.1	548	402.1	5:57	1.04	0.84	0.00
01:50:39	522.0	522.0	54.0	26	127	435	2156	1217	0	1.04	1.04	14.1	14.0	503.0	545	403.0	5:58	1.04	0.82	0.00
01:52:17	523.0	523.0	38.3	20	128	389	2145	1216	0	1.04	1.04	14.1	14.0	504.2	541	404.0	6:00	1.04	0.87	0.00
01:53:29	524.0	524.0	49.7	22	128	456	2141	1217	0	1.04	1.04	14.1	14.0	505.1	538	405.0	6:01	1.04	0.84	0.00
01:54:56	525.0	525.0	41.9	24	128	468	2140	1217	0	1.04	1.04	14.1	14.0	506.2	539	406.0	6:03	1.04	0.89	0.00
01:56:27	526.0	526.0	39.3	24	128	425	2139	1218	0	1.04	1.04	14.1	14.0	507.3	532	407.0	6:04	1.04	0.88	0.00
01:57:59	527.0	527.0	42.4	23	128	452	2137	1219	0	1.04	1.04	14.1	14.0	508.4	530	408.0	6:06	1.04	0.89	0.00
01:59:36	528.0	528.0	37.1	24	128	421	2129	1218	0	1.04	1.04	14.1	14.0	509.6	526	409.0	6:07	1.04	0.91	0.00
02:01:09	529.0	529.0	38.5	19	128	397	2127	1219	0	1.04	1.04	14.1	14.0	510.8	524	410.0	6:09	1.04	0.86	0.00
02:03:05	530.0	530.0	31.0	23	128	416	2128	1219	0	1.04	1.04	14.1	14.0	512.2	521	411.0	6:11	1.04	0.95	0.00
02:04:48	531.0	531.0	35.3	26	127	467	2177	1219	0	1.04	1.04	14.1	14.0	513.5	518	412.0	6:13	1.04	0.94	0.00
02:06:03	532.0	532.0	47.6	28	127	458	2120	1220	0	1.04	1.04	14.1	14.0	514.4	514	413.0	6:14	1.04	0.88	0.00
02:07:56	533.0	533.0	31.9	24	128	443	2119	1220	0	1.04	1.04	14.1	14.0	515.8	511	414.0	6:16	1.04	0.91	0.00
02:09:30	534.0	534.0	38.3	24	127	464	2120	1221	0	1.04	1.04	14.1	13.9	517.0	508	415.0	6:17	1.04	0.91	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	BIT DIST	BIT HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
02:11:15	535.1	535.1	35.3	25	129	446	2119	1220	0	1.04	1.04	14.1	13.9	518.0	504	416.1	6:19	1.04	0.93	0.00
02:13:31	536.1	536.1	29.3	24	133	476	2120	1221	0	1.04	1.04	14.2	13.9	518.1	499	417.1	6:21	1.04	0.98	0.00
02:15:08	537.1	537.1	37.0	29	133	506	2122	1222	0	1.04	1.04	14.1	13.9	518.1	496	418.1	6:23	1.04	0.96	0.00
02:16:46	538.0	538.0	36.8	28	133	486	2122	1222	0	1.04	1.04	14.1	13.9	518.1	492	419.0	6:25	1.04	0.96	0.00
02:18:44	539.0	539.0	32.9	25	134	468	2122	1222	0	1.04	1.04	14.1	13.9	518.1	488	420.0	6:26	1.04	0.96	0.00
02:21:09	540.1	540.1	27.3	23	134	448	2202	1223	0	1.04	1.04	14.1	13.9	518.1	484	421.1	6:29	1.04	0.98	0.00
02:22:55	541.0	541.0	33.7	23	134	407	2124	1223	0	1.04	1.04	14.1	13.9	518.1	480	422.0	6:31	1.04	0.94	0.00
02:24:21	542.0	542.0	42.4	24	134	406	2124	1224	0	1.04	1.04	14.2	13.9	518.3	477	423.0	6:32	1.04	0.93	0.00
02:26:02	543.0	543.0	38.9	23	134	410	2127	1224	0	1.04	1.04	14.1	13.9	519.4	474	424.0	6:34	1.04	0.91	0.00
02:27:31	544.1	544.1	40.9	24	134	424	2127	1225	0	1.04	1.04	14.1	13.9	520.6	469	425.1	6:35	1.04	0.91	0.00
02:30:23	545.0	545.0	20.8	21	134	378	2130	1225	0	1.04	1.04	14.1	13.9	522.7	465	426.0	6:38	1.04	1.01	0.00
02:33:24	546.0	546.0	19.8	20	134	363	2167	1226	0	1.04	1.04	14.1	13.9	524.5	458	427.0	6:41	1.04	1.02	0.00
02:34:39	547.0	547.0	24.2	15	134	323	2132	1226	0	1.04	1.04	14.1	13.9	525.3	455	428.0	6:42	1.04	0.98	0.00
02:57:35	548.0	548.0	14.6	20	132	405	2078	1212	0	1.04	1.04	14.1	13.9	534.9	482	429.0	6:46	1.04	1.08	0.00
02:59:25	549.0	549.0	32.7	22	132	385	2107	1201	0	1.04	1.04	14.1	13.9	535.9	477	430.0	6:48	1.04	0.93	0.00
03:01:06	550.1	550.1	40.9	27	133	449	2113	1208	0	1.04	1.04	14.1	13.9	536.8	472	431.1	6:50	1.04	0.92	0.00
03:02:42	551.0	551.0	37.2	28	133	437	2111	1209	0	1.04	1.04	14.1	13.9	537.7	468	432.0	6:52	1.04	0.95	0.00
03:04:24	552.0	552.0	35.3	22	133	411	2132	1213	0	1.04	1.04	14.1	13.9	538.6	466	433.0	6:53	1.04	0.91	0.00
03:06:29	553.0	553.0	28.8	19	133	397	2137	1216	0	1.04	1.04	14.1	13.9	539.8	460	434.0	6:55	1.04	0.94	0.00
03:08:18	554.0	554.0	33.0	26	133	445	2140	1218	0	1.04	1.04	14.1	13.9	540.8	456	435.0	6:57	1.04	0.96	0.00
03:10:05	555.0	555.0	33.6	23	133	423	2135	1218	0	1.04	1.04	14.1	13.9	541.8	453	436.0	6:59	1.04	0.94	0.00
03:11:23	556.0	556.0	46.2	27	133	463	2173	1214	0	1.04	1.04	14.1	14.0	542.5	451	437.0	7:00	1.04	0.90	0.00
03:13:14	557.0	557.0	33.0	28	133	430	2147	1213	0	1.04	1.04	14.1	13.9	543.5	448	438.0	7:02	1.04	0.93	0.00
03:14:33	558.0	558.0	44.7	26	133	430	2115	1213	0	1.04	1.04	14.1	14.0	544.2	445	439.0	7:03	1.04	0.90	0.00
03:16:30	559.0	559.0	33.7	25	133	438	2114	1213	0	1.04	1.04	14.1	14.0	545.3	440	440.0	7:05	1.04	0.95	0.00
03:17:59	560.0	560.0	40.2	23	133	410	2118	1213	0	1.04	1.04	14.1	14.0	546.2	438	441.0	7:07	1.04	0.90	0.00
03:20:04	561.0	561.0	28.8	19	133	361	2116	1214	0	1.04	1.04	14.1	13.9	547.1	434	442.0	7:09	1.04	0.93	0.00
03:21:56	562.0	562.0	33.6	21	133	386	2117	1213	0	1.04	1.04	14.1	13.9	547.2	430	443.0	7:11	1.04	0.92	0.00
03:23:39	563.1	563.1	35.3	23	133	408	2116	1213	0	1.04	1.04	14.1	13.9	547.2	427	444.1	7:13	1.04	0.92	0.00
03:25:22	564.1	564.1	35.0	23	133	417	2119	1214	0	1.04	1.04	14.1	13.9	547.2	422	445.1	7:14	1.04	0.93	0.00
03:28:29	565.0	565.0	36.5	25	133	378	2120	1214	0	1.04	1.04	14.1	13.9	547.2	477	448.0	7:17	1.04	0.94	0.00

26" Hole T.D. POOH to run 20" csg.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
29 Sept 93																				
NB#2, 17-1/2" Smith MO2SOD-C with 14x18x18x20 jets and Downhole motor.																				
08:08:15	566.0	566.0	14.5	30	141	278	1017	704	817	1.08	1.08	19.5	28.3	563.1	613	1.0	0:03	1.06	1.30	0.00
08:12:51	567.0	567.0	13.7	30	141	278	1017	704	817	1.08	1.08	19.5	28.3	563.1	613	2.0	0:16	1.06	1.30	0.00
08:18:11	568.0	568.0	11.2	34	146	288	1019	698	686	1.08	1.08	19.5	28.1	563.6	702	3.0	0:21	1.06	1.37	0.00
11:35:46	569.0	569.0	1.6	36	151	136	1550	868	982	1.08	1.08	27.4	29.7	568.3	558	4.0	1:03	1.09	1.90	0.00
12:12:54	570.0	570.0	1.6	32	166	127	1828	1107	1134	1.08	1.08	28.9	30.0	569.2	566	5.0	1:38	1.09	1.88	0.00
12:41:53	571.0	571.0	2.1	32	164	156	1874	1112	1149	1.08	1.08	30.7	31.7	570.0	562	6.0	2:07	1.09	1.80	0.00
12:45:19	572.0	572.0	17.5	29	163	229	1954	1112	1141	1.08	1.08	31.3	32.7	570.1	563	7.0	2:11	1.09	1.24	0.00
12:49:23	573.0	573.0	14.8	29	164	237	1972	1114	1147	1.08	1.08	31.6	32.9	570.2	562	8.0	2:15	1.09	1.29	0.00
12:52:46	574.0	574.0	17.7	31	164	255	1993	1114	1148	1.08	1.08	32.0	33.1	570.2	561	9.0	2:18	1.09	1.26	0.00
12:56:33	575.0	575.0	15.9	30	164	245	1982	1114	1118	1.08	1.08	32.2	33.2	570.4	563	10.0	2:22	1.09	1.28	0.00
13:00:37	576.0	576.0	14.8	30	164	239	1987	1115	1123	1.08	1.08	32.4	33.4	570.4	563	11.0	2:26	1.09	1.29	0.00
13:04:14	577.0	577.0	16.6	30	164	240	1992	1114	1124	1.08	1.08	32.6	33.7	570.5	561	12.0	2:30	1.09	1.27	0.00
13:08:23	578.0	578.0	14.8	30	164	237	1994	1114	1118	1.08	1.08	32.8	33.9	570.6	561	13.0	2:34	1.09	1.29	0.00
13:12:42	579.0	579.0	14.1	30	164	226	1985	1114	1104	1.08	1.08	33.0	34.1	570.9	559	14.0	2:38	1.09	1.30	0.00
13:16:37	580.0	580.0	15.5	29	164	230	1982	1113	1105	1.08	1.08	33.2	34.3	571.7	554	15.0	2:42	1.09	1.28	0.00
13:20:24	581.0	581.0	15.7	30	164	228	1981	1113	1104	1.08	1.08	33.3	34.4	572.6	537	16.0	2:46	1.09	1.28	0.00
13:24:22	582.0	582.0	15.2	30	164	220	1977	1115	1128	1.08	1.08	33.5	34.7	573.6	533	17.0	2:50	1.09	1.29	0.00
13:28:16	583.0	583.0	15.4	30	163	243	1976	1112	1151	1.08	1.08	33.7	34.8	574.6	528	18.0	2:54	1.09	1.28	0.00
13:32:08	584.0	584.0	15.7	30	163	259	1982	1112	1160	1.08	1.08	33.8	35.0	575.5	523	19.0	2:58	1.09	1.28	0.00
13:35:40	585.0	585.0	17.0	35	163	284	2010	1107	1156	1.08	1.08	33.9	35.2	576.3	524	20.0	3:01	1.09	1.32	0.00
13:39:13	586.0	586.0	16.9	36	163	283	2028	1110	1135	1.08	1.08	34.1	35.4	577.3	523	21.0	3:05	1.09	1.33	0.00
13:42:32	587.0	587.0	18.1	38	164	275	2032	1114	1141	1.08	1.08	34.3	35.6	577.9	521	22.0	3:08	1.09	1.32	0.00
13:46:05	588.0	588.0	17.0	37	163	275	2044	1114	1133	1.08	1.08	34.5	35.7	578.7	520	23.0	3:12	1.09	1.34	0.00
13:49:59	589.0	589.0	15.3	35	164	267	2037	1115	1154	1.08	1.08	34.7	35.9	579.6	522	24.0	3:15	1.09	1.34	0.00
14:06:48	590.0	590.0	18.0	10	164	176	1928	1108	1109	1.08	1.08	34.4	35.5	581.9	518	25.0	3:19	1.09	0.57	0.00
14:10:40	591.0	591.0	15.5	30	164	256	2018	1114	1134	1.08	1.08	34.4	35.6	583.3	512	26.0	3:23	1.09	1.29	0.00
14:14:01	592.0	592.0	18.0	41	164	323	2087	1117	1125	1.08	1.08	34.6	36.3	584.5	516	27.0	3:27	1.09	1.32	0.00
14:17:13	593.0	593.0	18.7	41	164	317	2075	1117	1129	1.08	1.08	34.7	36.5	585.6	516	28.0	3:30	1.09	1.35	0.00
14:20:15	594.0	594.0	20.8	40	164	311	2083	1117	1196	1.08	1.08	35.0	36.6	586.7	515	29.0	3:33	1.09	1.31	0.00
14:23:01	595.0	595.0	21.7	40	164	308	2080	1119	1208	1.08	1.08	35.2	36.6	587.7	516	30.0	3:36	1.09	1.30	0.00
14:25:09	596.0	596.0	28.0	36	164	299	2055	1118	1162	1.08	1.08	35.3	36.7	588.5	520	31.0	3:38	1.09	1.19	0.00
14:28:14	597.0	597.0	19.5	44	164	339	2112	1119	1145	1.08	1.08	35.5	36.8	589.6	518	32.0	3:41	1.09	1.36	0.00
14:30:51	598.0	598.0	22.9	45	164	336	2117	1118	1186	1.08	1.08	35.5	36.8	590.2	517	33.0	3:44	1.09	1.33	0.00
14:32:50	599.0	599.0	32.5	41	164	296	2084	1118	1181	1.08	1.08	35.5	36.8	590.7	523	34.0	3:46	1.09	1.20	0.00
14:34:33	600.0	600.0	34.8	41	164	314	2096	1117	1158	1.08	1.08	35.5	37.0	591.1	525	35.0	3:47	1.09	1.18	0.00
14:36:20	601.0	601.0	33.6	41	164	314	2102	1118	1177	1.08	1.08	35.6	37.1	591.6	523	36.0	3:49	1.09	1.19	0.00
14:37:46	602.1	602.0	42.9	41	164	319	2107	1117	1182	1.08	1.08	35.6	37.3	591.9	526	37.1	3:50	1.09	1.13	0.00
14:39:17	603.0	603.0	39.3	42	164	334	2106	1116	1233	1.08	1.08	35.6	37.4	592.4	527	38.0	3:52	1.09	1.15	0.00
14:41:14	604.0	604.0	30.8	42	164	330	2105	1115	1203	1.08	1.08	35.7	37.4	593.0	528	39.0	3:54	1.09	1.22	0.00
14:42:59	605.0	605.0	34.3	40	164	311	2105	1115	1162	1.08	1.08	35.7	37.5	593.5	531	40.0	3:56	1.09	1.18	0.00
14:44:58	606.0	606.0	32.3	46	164	337	2137	1114	1133	1.08	1.08	35.8	37.5	594.3	535	41.0	3:58	1.09	1.23	0.00
14:46:40	607.0	607.0	34.7	49	164	353	2159	1114	1188	1.08	1.08	35.9	37.5	594.6	536	42.0	3:59	1.09	1.24	0.00
14:48:26	608.0	608.0	34.8	50	163	371	2187	1115	1278	1.08	1.08	36.0	37.6	595.3	535	43.0	4:01	1.09	1.25	0.08

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
14:49:55	609.0	609.0	40.4	48	164	353	2164	1115	1194	1.08	1.08	36.3	37.6	595.8	535	44.0	4:03	1.09	1.20	0.31
14:51:32	610.0	610.0	36.9	50	163	376	2186	1115	1122	1.08	1.08	36.4	37.7	596.4	536	45.0	4:04	1.09	1.23	0.31
14:53:09	611.0	611.0	37.1	52	163	387	2200	1114	1157	1.08	1.08	36.5	37.7	596.8	537	46.0	4:06	1.09	1.26	0.17
14:54:43	612.0	612.0	38.3	52	164	370	2184	1115	1158	1.08	1.08	36.7	37.8	597.2	537	47.0	4:07	1.09	1.24	0.09
14:56:25	613.0	613.0	35.3	54	164	391	2204	1114	1165	1.08	1.08	36.9	37.9	597.8	534	48.0	4:09	1.09	1.27	0.03
14:58:38	614.0	614.0	27.1	52	163	379	2173	1114	1149	1.08	1.08	36.9	37.9	598.8	532	49.0	4:11	1.09	1.33	0.01
15:01:20	615.0	615.0	22.2	50	163	370	2166	1114	1179	1.08	1.08	36.9	37.9	600.3	532	50.0	4:14	1.09	1.37	0.01
15:03:55	616.0	616.0	24.1	47	164	365	2146	1114	1180	1.08	1.08	37.0	37.9	601.7	530	51.0	4:17	1.09	1.33	0.01
15:06:32	617.0	617.0	22.9	48	164	353	2166	1115	1229	1.08	1.08	37.1	37.9	603.2	529	52.0	4:19	1.09	1.35	0.01
15:09:48	618.0	618.0	18.4	50	164	356	2175	1115	1160	1.08	1.08	37.2	37.9	604.9	525	53.0	4:22	1.09	1.43	0.01
15:13:08	619.0	619.0	18.0	50	164	334	2172	1115	1165	1.08	1.08	37.3	37.9	606.5	523	54.0	4:26	1.09	1.43	0.01
15:17:03	620.0	620.0	15.3	45	163	301	2146	1115	1141	1.08	1.08	37.4	38.0	608.6	524	55.0	4:30	1.09	1.44	0.00
15:34:13	621.0	621.0	22.2	39	169	321	2117	1102	1095	1.08	1.08	37.1	37.0	611.5	510	56.0	4:32	1.09	1.29	0.00
15:36:03	622.1	622.1	33.3	34	171	280	2076	1103	1101	1.08	1.08	37.1	37.3	612.6	509	57.1	4:34	1.09	1.14	0.00
15:38:04	623.0	623.0	29.6	34	171	298	2075	1103	1097	1.08	1.08	37.1	37.9	613.5	508	58.0	4:36	1.09	1.17	0.00
15:39:35	624.0	624.0	40.7	32	171	318	2070	1103	1110	1.08	1.08	37.1	38.3	614.1	507	59.0	4:38	1.09	1.08	0.00
15:41:08	625.0	625.0	38.7	36	171	338	2071	1102	1118	1.08	1.08	37.1	38.5	614.6	508	60.0	4:39	1.09	1.12	0.00
15:42:16	626.0	626.0	52.6	36	171	352	2079	1102	1115	1.08	1.08	37.1	38.7	615.3	508	61.0	4:40	1.09	1.04	0.00
15:43:14	627.1	627.1	72.0	33	170	349	2075	1102	1111	1.08	1.08	37.1	38.8	615.3	509	62.1	4:41	1.09	0.94	0.00
15:43:58	628.0	628.0	80.6	31	170	361	2057	1102	1124	1.08	1.08	37.2	38.8	615.5	507	63.0	4:42	1.09	0.89	0.00
15:45:02	629.0	629.0	58.1	33	171	316	2070	1102	1120	1.08	1.08	37.3	38.8	615.9	507	64.0	4:43	1.09	1.00	0.00
15:45:51	630.1	630.0	72.0	35	171	306	2084	1103	1119	1.08	1.08	37.3	38.9	616.2	506	65.1	4:44	1.09	0.96	0.00
15:46:30	631.1	631.1	106.9	34	171	306	2085	1102	1117	1.08	1.08	37.4	38.9	616.4	505	66.1	4:45	1.09	0.85	0.00
15:47:05	632.1	632.1	101.6	33	171	306	2077	1102	1122	1.08	1.08	37.4	38.8	616.6	505	67.1	4:45	1.09	0.86	0.00
15:47:42	633.0	633.0	96.3	33	171	312	2084	1102	1124	1.08	1.08	37.5	38.9	616.9	506	68.0	4:46	1.09	0.87	0.00
15:48:17	634.1	634.1	116.1	32	171	272	2075	1102	1129	1.08	1.08	37.5	38.9	617.1	504	69.1	4:47	1.09	0.81	0.00
15:48:45	635.1	635.1	140.0	30	171	283	2056	1103	1140	1.08	1.08	37.6	38.9	617.2	505	70.1	4:47	1.09	0.76	0.00
15:49:12	636.1	636.1	132.6	29	171	329	2052	1102	1137	1.08	1.08	37.6	38.9	617.3	505	71.1	4:47	1.09	0.76	0.00
15:49:37	637.0	637.0	141.2	28	171	336	2066	1102	1137	1.08	1.08	37.6	38.9	617.4	504	72.0	4:48	1.09	0.75	0.00
15:50:02	638.0	638.0	142.1	29	171	310	2077	1102	1133	1.08	1.08	37.7	39.0	617.6	504	73.0	4:48	1.09	0.75	0.00
15:50:43	639.0	639.0	93.1	32	171	314	2089	1103	1134	1.08	1.08	37.7	39.0	617.8	503	74.0	4:49	1.09	0.87	0.00
15:51:17	640.1	640.1	116.1	35	171	345	2123	1103	1140	1.08	1.08	37.8	39.0	617.9	504	75.1	4:49	1.09	0.84	0.00
15:51:43	641.1	641.1	150.9	36	171	354	2154	1103	1162	1.08	1.08	37.8	39.1	618.0	505	76.1	4:50	1.09	0.77	0.00
15:52:08	642.1	642.1	142.9	36	171	319	2125	1103	1143	1.08	1.08	37.8	39.1	618.1	506	77.1	4:50	1.09	0.79	0.00
15:52:39	643.1	643.0	115.4	33	171	281	2093	1103	1127	1.08	1.08	37.8	39.1	618.3	506	78.1	4:51	1.09	0.82	0.00
15:53:04	644.0	644.0	144.0	28	171	268	2075	1103	1129	1.08	1.08	37.9	39.1	618.4	509	79.0	4:51	1.09	0.74	0.00
15:53:26	645.0	645.0	161.2	26	171	258	2053	1103	1116	1.08	1.08	37.9	39.1	618.4	512	80.0	4:52	1.09	0.69	0.00
15:53:50	646.1	646.1	166.9	24	171	253	2057	1103	1139	1.08	1.08	37.9	39.1	618.6	513	81.1	4:52	1.09	0.67	0.00
15:54:15	647.1	647.1	144.0	23	171	259	2042	1103	1121	1.08	1.08	37.9	39.1	618.7	515	82.1	4:52	1.09	0.70	0.00
15:54:42	648.0	648.0	130.9	19	171	254	2024	1103	1106	1.08	1.08	37.9	39.2	618.8	519	83.0	4:53	1.09	0.69	0.00
15:55:27	649.1	649.1	81.4	11	171	236	2000	1103	1100	1.08	1.08	37.8	39.2	619.0	520	84.1	4:54	1.09	0.71	0.00
16:31:29	650.1	650.1	75.8	2	167	162	1723	1061	1233	1.08	1.08	37.3	38.4	634.3	540	85.1	4:54	1.09	0.43	0.00
16:31:58	651.1	651.1	109.6	11	165	225	1740	1039	1216	1.08	1.08	37.2	38.4	634.6	536	86.1	4:54	1.09	0.68	0.00
16:32:17	652.1	652.1	110.4	11	164	219	1732	1030	1198	1.08	1.08	37.2	38.5	634.8	533	87.1	4:55	1.09	0.63	0.00
16:32:42	653.0	653.0	120.4	14	164	253	1774	1024	1209	1.08	1.08	37.2	38.5	635.0	531	88.0	4:55	1.09	0.68	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
16:33:05	654.0	654.0	114.5	21	164	251	1784	1030	1256	1.08	1.08	37.2	38.5	635.2	526	89.0	4:56	1.09	0.72	0.00
16:33:24	655.1	655.1	143.8	22	165	266	1783	1034	1219	1.08	1.08	37.2	38.5	635.3	525	90.1	4:56	1.09	0.68	0.00
16:33:42	656.2	656.2	125.9	22	165	272	1794	1036	1227	1.08	1.08	37.3	38.5	635.4	523	91.2	4:56	1.09	0.72	0.00
16:33:55	657.1	657.0	127.4	23	165	270	1785	1037	1238	1.08	1.08	37.3	38.5	635.5	522	92.1	4:56	1.09	0.72	0.00
16:34:07	658.1	658.1	122.3	23	165	257	1782	1037	1234	1.08	1.08	37.3	38.5	635.6	519	93.1	4:57	1.09	0.74	0.00
16:34:19	659.0	659.0	111.2	24	165	301	1813	1037	1224	1.08	1.08	37.3	38.5	635.7	517	94.0	4:57	1.09	0.76	0.00
16:34:42	660.1	660.1	124.0	24	165	261	1796	1037	1206	1.08	1.08	37.3	38.5	636.0	515	95.1	4:57	1.09	0.74	0.00
16:35:05	661.0	661.0	152.1	25	165	280	1810	1037	1211	1.08	1.08	37.3	38.5	636.2	514	96.0	4:58	1.09	0.70	0.00
16:49:13	662.2	662.2	135.9	22	165	234	1755	1036	1196	1.08	1.08	37.3	38.6	648.1	484	97.2	4:58	1.09	0.66	0.00
16:49:26	663.0	663.0	263.0	8	176	212	2018	1131	1173	1.08	1.08	38.0	38.4	648.3	484	98.0	4:58	1.09	0.46	0.00
16:49:54	664.1	664.1	141.6	13	177	234	2070	1137	1172	1.08	1.08	38.0	38.4	648.8	482	99.1	4:59	1.09	0.63	0.00
16:50:22	665.1	665.0	127.1	16	177	222	2072	1139	1162	1.08	1.08	38.0	38.4	649.3	476	100.1	4:59	1.09	0.68	0.00
16:50:52	666.1	666.0	120.0	15	177	208	2059	1138	1174	1.08	1.08	38.0	38.4	649.8	472	101.1	4:60	1.09	0.68	0.00
16:51:26	667.2	667.2	122.0	14	177	210	2058	1138	1150	1.08	1.08	38.0	38.4	650.3	468	102.2	5:00	1.09	0.66	0.00
16:51:51	668.0	668.0	140.1	13	177	212	2058	1139	1140	1.08	1.08	38.1	38.3	650.8	467	103.0	5:01	1.09	0.63	0.00
16:52:22	669.1	669.1	127.1	14	177	214	2071	1138	1133	1.08	1.08	38.1	38.3	651.3	464	104.1	5:01	1.09	0.66	0.00
16:52:50	670.0	670.0	125.2	15	177	222	2065	1139	1131	1.08	1.08	38.1	38.3	651.7	464	105.0	5:02	1.09	0.67	0.00
16:53:24	671.1	671.1	114.3	15	177	260	2080	1139	1144	1.08	1.08	38.1	38.3	652.2	460	106.1	5:02	1.09	0.69	0.00
16:53:57	672.1	672.1	118.0	16	177	254	2081	1140	1143	1.08	1.08	38.1	38.3	652.8	461	107.1	5:03	1.09	0.70	0.00
16:54:25	673.0	673.0	126.3	18	177	264	2096	1139	1113	1.08	1.08	38.1	38.4	653.3	461	108.0	5:03	1.09	0.70	0.00
16:54:41	674.1	674.0	119.8	19	177	270	2090	1140	1109	1.08	1.08	38.1	38.4	653.4	462	109.1	5:04	1.09	0.72	0.00
16:54:56	675.1	675.1	128.7	20	177	297	2116	1140	1118	1.08	1.08	38.1	38.4	653.6	461	110.1	5:04	1.09	0.71	0.00
16:55:13	677.0	677.0	118.3	21	177	213	2073	1140	1150	1.08	1.08	38.1	38.6	653.6	464	112.0	5:04	1.09	0.74	0.00
16:55:20	677.3	677.3	120.4	20	177	247	2090	1140	1135	1.08	1.08	38.1	38.5	653.7	464	112.3	5:04	1.09	0.73	0.00
16:55:45	678.0	678.0	139.2	21	177	255	2109	1139	1112	1.08	1.08	38.1	38.5	654.0	463	113.0	5:05	1.09	0.71	0.00
17:06:34	679.1	679.0	109.1	14	177	237	2106	1132	1077	1.08	1.08	37.7	37.8	659.9	472	114.1	5:06	1.09	0.73	0.00
17:07:10	680.1	680.0	100.0	16	178	260	2117	1138	1060	1.08	1.08	37.6	37.7	660.5	472	115.1	5:07	1.09	0.73	0.00
17:07:44	681.1	681.0	105.9	15	178	358	2119	1141	1016	1.08	1.08	37.6	37.7	661.0	471	116.1	5:07	1.09	0.71	0.00
17:07:56	682.1	682.1	114.2	15	178	393	2104	1141	1043	1.08	1.08	37.5	37.8	660.9	470	117.1	5:07	1.09	0.69	0.00
17:08:06	683.1	683.1	113.9	15	178	348	2091	1141	1055	1.08	1.08	37.5	37.9	661.0	469	118.1	5:08	1.09	0.70	0.00
17:08:18	684.1	684.1	114.8	15	178	379	2100	1142	1071	1.08	1.08	37.5	37.9	661.2	469	119.1	5:08	1.09	0.70	0.00
17:08:27	685.2	685.1	141.5	15	178	387	2088	1142	1071	1.08	1.08	37.5	37.9	661.3	468	120.2	5:08	1.09	0.65	0.00
17:08:37	686.0	686.0	134.6	16	178	409	2089	1142	1091	1.08	1.08	37.4	38.0	661.4	467	121.0	5:08	1.09	0.66	0.00
17:08:48	687.2	687.2	134.1	17	178	391	2092	1142	1088	1.08	1.08	37.5	38.0	661.5	466	122.2	5:08	1.09	0.67	0.00
17:08:58	688.1	688.1	140.4	17	178	392	2117	1143	1062	1.08	1.08	37.5	38.0	661.6	466	123.1	5:08	1.09	0.67	0.00
17:09:07	689.1	689.1	134.1	18	178	321	2135	1142	1047	1.08	1.08	37.4	38.0	661.7	465	124.1	5:09	1.09	0.69	0.00
17:09:15	691.0	691.0	124.2	16	179	250	2121	1142	1049	1.08	1.08	37.6	38.0	661.8	464	126.0	5:09	1.09	0.72	0.00
17:09:17	691.1	691.1	125.6	17	178	284	2130	1142	1047	1.08	1.08	37.5	38.0	661.8	464	126.1	5:09	1.09	0.70	0.00
17:09:26	692.1	692.1	120.0	17	179	257	2099	1142	1042	1.08	1.08	37.4	38.0	661.9	463	127.1	5:09	1.09	0.70	0.00
17:09:40	693.2	693.2	121.4	18	179	273	2127	1143	1034	1.08	1.08	37.4	38.0	662.1	462	128.2	5:09	1.09	0.70	0.00
17:09:50	694.1	694.1	113.5	18	179	263	2131	1143	1011	1.08	1.08	37.4	38.0	662.1	461	129.1	5:09	1.09	0.72	0.00
17:09:59	695.2	695.1	117.7	18	179	264	2124	1143	1014	1.08	1.08	37.4	38.0	662.2	461	130.2	5:10	1.09	0.72	0.00
17:10:11	696.1	696.1	117.9	18	179	280	2135	1143	1014	1.08	1.08	37.4	38.0	662.4	462	131.1	5:10	1.09	0.72	0.00
17:10:21	697.0	697.0	115.4	19	179	213	2096	1143	1026	1.08	1.08	37.4	38.0	662.4	460	132.0	5:10	1.09	0.73	0.00
17:10:30	698.0	698.0	112.3	19	179	271	2135	1143	1038	1.08	1.08	37.3	38.1	662.6	459	133.0	5:10	1.09	0.73	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
17:10:42	699.1	699.0	120.2	18	179	240	2092	1143	1046	1.08	1.08	37.4	38.1	662.7	461	134.1	5:10	1.09	0.71	0.00
17:10:48	700.1	700.1	119.7	18	179	261	2129	1143	1084	1.08	1.08	37.4	38.1	662.8	460	135.1	5:10	1.09	0.72	0.00
17:10:57	701.1	701.1	103.2	19	179	284	2133	1143	1106	1.08	1.08	37.3	38.1	662.9	458	136.1	5:10	1.09	0.75	0.00
17:11:14	702.0	702.0	96.7	18	179	241	2118	1142	1079	1.08	1.08	37.4	38.1	663.3	455	137.0	5:11	1.09	0.76	0.00
17:11:24	703.2	703.2	110.6	18	179	208	2097	1143	1065	1.08	1.08	37.3	38.1	663.4	456	138.2	5:11	1.09	0.76	0.00
17:11:33	704.1	704.1	121.6	18	179	223	2106	1143	1073	1.08	1.08	37.3	38.1	663.7	457	139.1	5:11	1.09	0.71	0.00
17:11:43	705.1	705.1	118.0	18	179	247	2107	1144	1085	1.08	1.08	37.4	38.1	663.7	454	140.1	5:11	1.09	0.72	0.00
17:11:55	706.1	706.1	124.2	18	179	249	2108	1144	1086	1.08	1.08	37.3	38.1	664.0	453	141.1	5:11	1.09	0.70	0.00
17:12:02	707.1	707.1	124.0	16	179	228	2038	1144	1103	1.08	1.08	37.3	38.1	664.1	453	142.1	5:12	1.09	0.69	0.00
17:12:16	708.3	708.3	158.4	16	178	269	2049	1142	1094	1.08	1.08	37.3	38.1	664.4	452	143.3	5:12	1.09	0.64	0.00
17:12:25	709.1	709.1	148.9	16	178	253	2045	1138	1072	1.08	1.08	37.3	38.1	664.4	452	144.1	5:12	1.09	0.65	0.00
17:12:42	710.0	710.0	131.1	17	178	265	2074	1134	1088	1.08	1.08	37.3	38.1	664.6	452	145.0	5:12	1.09	0.68	0.00
17:12:51	711.1	711.1	119.3	17	177	291	2100	1132	1080	1.08	1.08	37.3	38.2	664.8	453	146.1	5:12	1.09	0.71	0.00
17:13:00	712.0	712.0	110.7	19	178	251	2057	1131	1087	1.08	1.08	37.3	38.1	664.9	453	147.0	5:13	1.09	0.73	0.00
17:13:09	713.1	713.1	123.5	19	177	271	2088	1130	1078	1.08	1.08	37.3	38.2	665.0	451	148.1	5:13	1.09	0.72	0.00
17:13:20	714.0	714.0	107.4	19	177	274	2065	1130	1080	1.08	1.08	37.2	38.2	665.2	451	149.0	5:13	1.09	0.74	0.00
17:13:30	715.1	715.1	130.8	19	177	297	2053	1128	1061	1.08	1.08	37.3	38.2	665.5	450	150.1	5:13	1.09	0.70	0.00
17:13:45	716.3	716.3	147.4	20	177	239	2043	1127	1055	1.08	1.08	37.2	38.2	665.7	451	151.3	5:13	1.09	0.68	0.00
17:14:03	717.0	717.0	190.7	19	177	247	2043	1125	1045	1.08	1.08	37.2	38.2	666.3	449	152.0	5:14	1.09	0.61	0.00
17:14:16	718.1	718.1	146.9	17	176	328	2027	1123	1031	1.08	1.08	37.2	38.3	666.5	446	153.1	5:14	1.09	0.66	0.00
17:14:24	719.0	719.0	144.0	17	176	384	2050	1123	1009	1.08	1.08	37.2	38.3	666.7	446	154.0	5:14	1.09	0.66	0.00
17:14:52	720.1	720.0	129.7	17	176	407	2050	1124	1002	1.08	1.08	37.2	38.3	667.5	446	155.1	5:14	1.09	0.69	0.00
17:15:55	721.0	721.0	57.0	22	176	388	2022	1123	1007	1.08	1.08	37.2	38.4	669.5	444	156.0	5:15	1.09	0.91	0.00
17:16:31	722.2	722.1	97.5	22	176	408	2053	1123	1039	1.08	1.08	37.2	38.5	670.4	446	157.2	5:16	1.09	0.79	0.00
17:16:37	723.1	723.1	97.5	22	176	413	2060	1122	1061	1.08	1.08	37.2	38.6	670.6	446	158.1	5:16	1.09	0.79	0.00
17:16:47	724.1	724.1	96.7	24	176	391	2062	1122	1068	1.08	1.08	37.2	38.6	670.8	443	159.1	5:16	1.09	0.81	0.00
17:16:59	725.1	725.1	97.0	23	176	377	2049	1122	1078	1.08	1.08	37.2	38.6	671.1	441	160.1	5:17	1.09	0.80	0.00
17:17:08	726.2	726.2	97.0	23	176	371	2041	1122	1053	1.08	1.08	37.1	38.6	671.1	439	161.2	5:17	1.09	0.80	0.00
17:17:36	727.0	727.0	98.9	23	176	367	2052	1119	1046	1.08	1.08	37.2	38.6	672.1	436	162.0	5:17	1.09	0.79	0.00
17:18:20	728.0	728.0	81.8	21	176	362	2025	1118	1035	1.08	1.08	37.1	38.7	673.6	432	163.0	5:18	1.09	0.82	0.00
17:19:10	729.1	729.0	77.4	24	176	398	2050	1121	1026	1.08	1.08	37.2	38.8	675.2	431	164.1	5:19	1.09	0.87	0.00
17:20:04	730.1	730.1	66.7	33	176	445	2082	1122	992	1.08	1.08	37.2	38.9	677.0	426	165.1	5:20	1.09	0.98	0.00
17:21:28	731.0	731.0	44.6	32	176	399	2020	1123	1019	1.08	1.08	37.2	39.0	679.7	423	166.0	5:21	1.09	1.10	0.00
17:21:45	732.0	732.0	42.5	33	176	446	2070	1122	1000	1.08	1.08	37.2	39.0	679.9	421	167.0	5:21	1.09	1.08	0.00
17:22:08	733.0	733.0	40.8	33	176	385	2034	1122	984	1.08	1.08	37.2	39.1	680.5	422	168.0	5:22	1.09	1.09	0.00
17:23:23	734.0	734.0	47.7	33	176	394	2057	1122	996	1.08	1.08	37.2	39.1	682.8	420	169.0	5:23	1.09	1.05	0.00
17:24:52	735.0	735.0	40.4	32	176	395	2059	1122	1048	1.08	1.08	37.3	39.2	685.7	419	170.0	5:24	1.09	1.08	0.00
17:26:32	736.0	736.0	36.0	29	176	367	2051	1122	1063	1.08	1.08	37.4	39.2	689.0	419	171.0	5:26	1.09	1.09	0.00
17:41:18	737.0	737.0	17.2	31	176	271	2063	1122	1085	1.08	1.08	37.4	38.7	707.5	404	172.0	5:30	1.09	1.29	0.00
17:42:40	738.0	738.0	45.6	33	175	298	2107	1125	1088	1.08	1.08	37.3	38.4	710.1	402	173.0	5:31	1.09	1.07	0.00
17:44:56	739.0	739.0	26.4	36	175	314	2129	1126	1093	1.08	1.08	37.3	38.5	714.5	398	174.0	5:33	1.09	1.23	0.00
17:47:03	740.0	740.0	28.3	33	175	303	2118	1126	1102	1.08	1.08	37.3	38.4	718.6	396	175.0	5:35	1.09	1.18	0.00
17:49:07	741.0	741.0	28.8	30	175	292	2099	1126	1101	1.08	1.08	37.3	38.2	722.6	395	176.0	5:37	1.09	1.15	0.00
17:51:01	742.0	742.0	32.4	32	175	300	2106	1126	1110	1.08	1.08	37.2	38.1	726.3	390	177.0	5:39	1.09	1.14	0.00
17:53:31	743.0	743.0	23.5	34	175	296	2116	1125	1107	1.08	1.08	37.2	38.2	731.1	387	178.0	5:42	1.09	1.24	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
17:56:48	744.0	744.0	18.3	35	175	302	2118	1125	1097	1.08	1.08	37.3	38.4	734.3	390	179.0	5:45	1.09	1.32	0.00
18:00:15	745.0	745.0	17.6	34	175	299	2115	1125	1076	1.08	1.08	37.3	38.7	736.2	392	180.0	5:48	1.09	1.31	0.00
18:03:05	746.0	746.0	20.8	33	175	295	2126	1125	1079	1.08	1.08	37.4	38.9	736.7	396	181.0	5:51	1.09	1.26	0.00
18:06:12	747.0	747.0	19.4	36	175	322	2172	1125	1056	1.08	1.08	37.5	39.1	736.7	402	182.0	5:54	1.09	1.31	0.00
18:09:47	748.0	748.0	16.9	37	175	309	2150	1123	1064	1.08	1.08	37.6	39.2	736.9	406	183.0	5:58	1.09	1.35	0.00
18:14:22	749.0	749.0	13.2	37	175	308	2146	1122	1056	1.08	1.08	37.8	39.5	739.3	410	184.0	6:03	1.09	1.41	0.00
18:19:04	750.0	750.0	15.9	30	175	303	2120	1120	1053	1.08	1.08	38.1	39.5	741.1	414	185.0	6:06	1.09	1.30	0.00
18:21:16	751.0	751.0	27.1	35	174	323	2139	1119	1068	1.08	1.08	38.3	39.5	742.2	414	186.0	6:09	1.09	1.22	0.00
18:23:04	752.0	752.0	35.3	35	174	356	2184	1118	1074	1.08	1.08	38.5	39.5	742.8	411	187.0	6:10	1.09	1.14	0.00
18:24:32	753.0	753.0	40.9	32	174	336	2172	1119	1081	1.08	1.08	38.6	39.5	743.3	412	188.0	6:12	1.09	1.08	0.00
18:25:45	754.0	754.0	49.0	36	174	358	2187	1119	1080	1.08	1.08	38.7	39.5	743.6	413	189.0	6:13	1.09	1.07	0.00
18:26:58	755.0	755.0	49.3	35	174	342	2169	1119	1077	1.08	1.08	38.8	39.5	743.9	413	190.0	6:14	1.09	1.05	0.00
18:27:26	756.0	756.0	140.2	22	174	280	2101	1118	1080	1.08	1.08	38.8	39.5	744.1	414	191.0	6:15	1.09	0.68	0.00
18:28:00	757.1	757.0	112.5	17	175	233	2061	1117	1067	1.08	1.08	38.8	39.5	744.3	413	192.1	6:15	1.09	0.71	0.00
18:28:47	758.1	758.1	83.7	20	174	275	2097	1117	1077	1.08	1.08	38.9	39.6	744.5	413	193.1	6:16	1.09	0.80	0.00
18:29:31	759.0	759.0	81.1	24	174	309	2144	1118	1078	1.08	1.08	38.9	39.5	744.7	412	194.0	6:17	1.09	0.85	0.00
18:30:02	760.0	760.0	120.0	25	174	306	2150	1118	1081	1.08	1.08	38.9	39.5	744.8	415	195.0	6:17	1.09	0.80	0.00
18:30:30	761.0	761.0	123.1	25	174	310	2160	1119	1073	1.08	1.08	38.9	39.6	744.9	411	196.0	6:18	1.09	0.76	0.00
18:31:00	762.0	762.0	120.4	25	174	306	2168	1119	1110	1.08	1.08	38.9	39.6	745.1	413	197.0	6:18	1.09	0.77	0.00
18:31:28	763.1	763.1	142.6	25	174	279	2158	1119	1140	1.08	1.08	39.0	39.6	745.2	412	198.1	6:19	1.09	0.72	0.00
18:31:59	764.1	764.1	116.1	25	175	302	2162	1118	1142	1.08	1.08	39.0	39.6	745.4	411	199.1	6:19	1.09	0.77	0.00
18:32:25	765.1	765.1	138.5	23	174	279	2127	1118	1101	1.08	1.08	39.0	39.6	745.5	411	200.1	6:20	1.09	0.71	0.00
18:44:37	766.3	766.2	293.8	22	175	236	2094	1118	1091	1.08	1.08	39.0	39.6	747.7	394	201.3	6:20	1.09	0.46	0.00
18:45:08	767.0	767.0	114.8	9	171	250	2060	1084	1059	1.08	1.08	39.1	39.2	747.8	393	202.0	6:21	1.09	0.63	0.00
18:45:42	768.0	768.0	106.0	12	171	262	2080	1088	1060	1.08	1.08	39.1	39.3	747.9	393	203.0	6:21	1.09	0.67	0.00
18:46:13	769.0	769.0	121.0	14	171	280	2090	1092	1051	1.08	1.08	39.1	39.3	748.0	392	204.0	6:22	1.09	0.66	0.00
18:46:46	770.1	770.1	114.3	14	171	242	2098	1086	1054	1.08	1.08	39.0	39.5	748.2	393	205.1	6:22	1.09	0.68	0.00
18:47:23	771.1	771.1	103.8	17	171	286	2115	1086	1053	1.08	1.08	38.9	39.6	748.3	395	206.1	6:23	1.09	0.73	0.00
18:47:51	772.1	772.1	127.8	18	171	290	2114	1093	1027	1.08	1.08	38.9	39.6	748.4	393	207.1	6:23	1.09	0.69	0.00
18:48:22	773.1	773.1	115.6	19	171	298	2122	1094	1032	1.08	1.08	38.9	39.7	748.5	391	208.1	6:24	1.09	0.73	0.00
18:48:53	774.0	774.0	115.5	20	172	291	2122	1096	1041	1.08	1.08	38.9	39.8	748.6	392	209.0	6:24	1.09	0.73	0.00
18:49:26	775.1	775.1	120.0	21	172	280	2121	1095	1051	1.08	1.08	38.8	39.9	748.7	394	210.1	6:25	1.09	0.73	0.00
18:49:57	776.0	776.0	109.1	22	172	324	2111	1096	1042	1.08	1.08	38.8	39.9	748.8	395	211.0	6:25	1.09	0.76	0.00
18:50:51	777.0	777.0	66.7	27	171	354	2152	1096	1050	1.08	1.08	38.7	39.9	749.0	394	212.0	6:26	1.09	0.92	0.00
18:51:31	778.0	778.0	95.4	29	171	375	2183	1095	1050	1.08	1.08	38.7	40.0	749.1	394	213.0	6:27	1.09	0.84	0.00
18:52:03	779.0	779.0	112.5	29	171	350	2128	1096	1058	1.08	1.08	38.7	40.0	749.2	395	214.0	6:28	1.09	0.80	0.00
18:52:33	780.0	780.0	120.0	29	171	329	2112	1096	1060	1.08	1.08	38.7	40.0	749.3	396	215.0	6:28	1.09	0.79	0.00
18:53:10	781.1	781.0	103.5	32	171	353	2153	1096	1059	1.08	1.08	38.7	40.0	749.5	397	216.1	6:29	1.09	0.85	0.00
18:53:42	782.0	782.0	111.6	34	171	378	2178	1096	1049	1.08	1.08	38.7	40.0	749.6	395	217.0	6:29	1.09	0.85	0.00
18:54:10	783.1	783.0	133.3	37	171	383	2165	1096	1044	1.08	1.08	38.7	40.1	749.6	397	218.1	6:30	1.09	0.81	0.00
18:54:38	784.0	784.0	127.4	37	171	388	2151	1096	1048	1.08	1.08	38.7	40.1	749.6	397	219.0	6:30	1.09	0.82	0.00
18:55:08	785.0	785.0	119.4	37	171	347	2125	1096	1051	1.08	1.08	38.7	40.2	749.6	399	220.0	6:31	1.09	0.85	0.00
18:55:42	786.1	786.1	114.6	38	171	347	2119	1097	1050	1.08	1.08	38.7	40.2	749.8	398	221.1	6:31	1.09	0.86	0.00
18:56:17	787.2	787.2	126.3	38	171	362	2127	1097	1041	1.08	1.08	38.7	40.3	750.1	396	222.2	6:32	1.09	0.83	0.00
18:56:41	788.0	788.0	145.1	36	171	365	2107	1096	1037	1.08	1.08	38.8	40.3	750.3	397	223.0	6:32	1.09	0.79	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
18:57:15	789.1	789.1	114.3	37	171	367	2129	1096	1026	1.08	1.08	38.8	40.3	750.5	396	224.1	6:33	1.09	0.85	0.00
18:57:45	790.0	790.0	118.4	36	171	325	2087	1097	1029	1.08	1.08	38.8	40.3	750.7	398	225.0	6:33	1.09	0.84	0.00
18:58:35	791.0	791.0	75.5	38	171	344	2111	1096	1035	1.08	1.08	38.8	40.4	751.0	399	226.0	6:34	1.09	0.97	0.00
18:59:00	792.0	792.0	142.9	37	171	358	2111	1096	1034	1.08	1.08	38.8	40.4	751.1	398	227.0	6:34	1.09	0.79	0.00
18:59:25	793.1	793.1	159.4	34	171	327	2066	1096	1034	1.08	1.08	38.9	40.5	751.2	398	228.1	6:35	1.09	0.75	0.00
18:59:54	794.1	794.1	124.1	33	171	331	2069	1096	1029	1.08	1.08	38.8	40.5	751.4	399	229.1	6:35	1.09	0.80	0.00
19:09:26	795.0	795.0	38.0	28	169	213	2114	1126	1067	1.08	1.08	38.9	40.3	756.4	406	230.0	6:37	1.09	1.04	0.00
19:09:58	796.1	796.1	124.1	25	182	306	2227	1168	1102	1.08	1.08	38.9	40.0	757.2	406	231.1	6:37	1.09	0.76	0.00
19:10:23	797.1	797.1	156.5	24	182	316	2150	1162	1134	1.08	1.08	38.9	39.9	757.8	404	232.1	6:38	1.09	0.70	0.00
19:10:48	798.1	798.1	143.6	23	180	342	2149	1148	1146	1.08	1.08	38.9	39.8	758.4	403	233.1	6:38	1.09	0.72	0.00
19:11:13	799.0	799.0	140.4	24	180	316	2149	1142	1132	1.08	1.08	38.9	39.9	759.0	404	234.0	6:39	1.09	0.73	0.00
19:11:40	800.1	800.0	145.7	25	179	338	2162	1139	1170	1.08	1.08	38.9	39.9	759.6	399	235.1	6:39	1.09	0.73	0.00
19:12:10	801.2	801.2	146.3	26	179	320	2147	1138	1205	1.08	1.08	38.9	40.0	760.4	400	236.2	6:40	1.09	0.73	0.00
19:12:35	802.1	802.1	142.9	26	179	320	2144	1137	1226	1.08	1.08	39.0	40.1	761.3	400	237.1	6:40	1.09	0.73	0.00
19:13:01	803.0	803.0	140.8	26	179	329	2145	1135	1180	1.08	1.08	38.9	40.1	762.0	401	238.0	6:41	1.09	0.73	0.00
19:13:28	804.0	804.0	128.6	26	179	303	2138	1135	1157	1.08	1.08	39.0	40.1	762.8	401	239.0	6:41	1.09	0.76	0.00
19:13:55	805.1	805.1	146.9	26	179	304	2128	1135	1128	1.08	1.08	39.0	40.1	763.7	401	240.1	6:41	1.09	0.73	0.00
19:14:23	806.1	806.0	127.1	27	179	310	2149	1136	1134	1.08	1.08	39.0	40.2	764.5	399	241.1	6:42	1.09	0.77	0.00
19:14:56	807.2	807.1	118.7	28	179	341	2156	1136	1156	1.08	1.08	39.0	40.3	765.4	397	242.2	6:42	1.09	0.80	0.01
19:15:18	808.1	808.0	160.8	30	179	370	2173	1136	1181	1.08	1.08	39.0	40.4	765.5	396	243.1	6:43	1.09	0.73	0.01
19:15:40	809.0	809.0	158.2	29	179	342	2159	1136	1161	1.08	1.08	39.0	40.5	765.5	396	244.0	6:43	1.09	0.73	0.01
19:16:04	810.1	810.1	166.9	29	179	362	2162	1136	1139	1.08	1.08	39.0	40.5	765.5	395	245.1	6:44	1.09	0.72	0.01
19:16:32	811.1	811.1	135.8	31	179	356	2183	1136	1141	1.08	1.08	39.0	40.6	765.5	396	246.1	6:44	1.09	0.78	0.01
19:17:00	812.0	812.0	125.2	31	179	348	2182	1136	1119	1.08	1.08	39.0	40.7	765.5	397	247.0	6:44	1.09	0.80	0.01
19:17:41	813.0	813.0	87.8	33	179	323	2168	1136	1127	1.08	1.08	39.0	40.8	765.5	400	248.0	6:45	1.09	0.91	0.01
19:18:22	814.0	814.0	87.8	37	179	381	2229	1136	1126	1.08	1.08	39.1	41.0	765.5	395	249.0	6:46	1.09	0.94	0.01
19:19:08	815.1	815.0	82.6	41	179	392	2266	1137	1114	1.08	1.08	39.1	41.0	765.5	396	250.1	6:47	1.09	0.98	0.01
19:19:42	816.1	816.0	105.9	41	179	403	2274	1137	1102	1.08	1.08	39.1	41.0	765.5	396	251.1	6:47	1.09	0.91	0.01
19:20:29	817.2	817.1	87.8	42	179	377	2263	1138	1096	1.08	1.08	39.2	41.1	765.5	396	252.2	6:48	1.09	0.96	0.01
19:20:54	818.1	818.1	142.1	35	179	303	2165	1138	1103	1.08	1.08	39.2	41.1	765.5	395	253.1	6:48	1.09	0.79	0.01
19:21:32	819.0	819.0	93.3	33	179	333	2178	1137	1089	1.08	1.08	39.2	41.1	765.5	395	254.0	6:49	1.09	0.89	0.01
19:22:02	820.1	820.1	133.3	31	179	356	2193	1137	1081	1.08	1.08	39.2	41.1	765.5	395	255.1	6:50	1.09	0.78	0.01
19:22:30	821.0	821.0	126.0	30	179	308	2136	1137	1094	1.08	1.08	39.3	41.1	766.1	395	256.0	6:50	1.09	0.79	0.02
19:23:55	822.0	822.0	42.1	36	179	461	2186	1138	1096	1.08	1.08	39.3	41.1	768.4	395	257.0	6:51	1.09	1.13	0.03
19:24:32	823.1	823.1	105.9	42	179	416	2276	1138	1101	1.08	1.08	39.4	41.1	769.4	394	258.1	6:52	1.09	0.91	0.03
19:32:06	824.1	824.1	65.7	31	168	272	2285	1122	1089	1.08	1.08	39.5	40.8	776.8	376	259.1	6:53	1.09	0.92	0.01
19:32:36	825.0	825.0	117.6	22	178	297	2159	1108	1106	1.08	1.08	39.5	40.4	777.4	376	260.0	6:53	1.09	0.76	0.00
19:33:29	826.0	826.0	67.7	29	179	336	2194	1113	1135	1.08	1.08	39.5	40.5	778.8	376	261.0	6:54	1.09	0.95	0.00
19:34:07	827.2	827.1	120.8	31	180	343	2200	1116	1120	1.08	1.08	39.5	40.5	779.8	376	262.2	6:55	1.09	0.81	0.00
19:34:34	828.0	828.0	130.0	31	180	329	2202	1117	1128	1.08	1.08	39.5	40.5	780.4	374	263.0	6:55	1.09	0.80	0.00
19:35:04	829.0	829.0	120.0	32	180	326	2199	1117	1134	1.08	1.08	39.5	40.6	781.3	372	264.0	6:56	1.09	0.82	0.01
19:35:35	830.1	830.1	130.4	31	180	325	2194	1117	1130	1.08	1.08	39.5	40.6	782.3	374	265.1	6:56	1.09	0.79	0.01
19:36:03	831.1	831.0	127.1	29	180	326	2188	1117	1138	1.08	1.08	39.5	40.7	783.1	371	266.1	6:57	1.09	0.79	0.01
19:36:31	832.0	832.0	126.8	28	180	302	2177	1117	1129	1.08	1.08	39.5	40.7	784.1	371	267.0	6:57	1.09	0.78	0.01
19:37:03	833.0	833.0	112.5	28	179	504	2195	1117	1112	1.08	1.08	39.5	40.8	785.0	370	268.0	6:58	1.09	0.81	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
19:37:37	834.1	834.1	129.7	29	179	513	2188	1118	1127	1.08	1.08	39.5	40.8	785.9	371	269.1	6:58	1.09	0.83	0.00
19:38:06	835.1	835.1	130.1	29	179	348	2187	1118	1129	1.08	1.08	39.5	40.7	786.8	370	270.1	6:59	1.09	0.78	0.00
19:38:34	836.0	836.0	125.0	29	178	312	2183	1117	1108	1.08	1.08	39.6	40.7	787.7	368	271.0	6:59	1.09	0.79	0.00
19:39:06	837.0	837.0	112.5	29	176	295	2173	1117	1120	1.08	1.08	39.6	40.7	788.5	369	272.0	6:60	1.09	0.81	0.00
19:39:39	838.0	838.0	109.1	29	175	316	2192	1117	1108	1.08	1.08	39.6	40.7	789.4	370	273.0	7:01	1.09	0.82	0.00
19:40:13	839.1	839.1	108.4	30	175	322	2186	1118	1105	1.08	1.08	39.6	40.8	790.3	371	274.1	7:01	1.09	0.82	0.00
19:40:53	840.1	840.1	89.8	30	175	334	2202	1119	1107	1.08	1.08	39.6	40.8	791.4	368	275.1	7:02	1.09	0.87	0.00
19:41:30	841.0	841.0	95.4	30	175	320	2192	1118	1098	1.08	1.08	39.6	41.0	792.6	369	276.0	7:02	1.09	0.86	0.00
19:42:14	842.0	842.0	81.8	32	175	331	2216	1118	1095	1.08	1.08	39.6	41.2	793.8	369	277.0	7:03	1.09	0.91	0.00
19:44:29	843.0	843.0	26.6	36	175	297	2178	1118	1104	1.08	1.08	39.7	41.3	794.5	368	278.0	7:05	1.09	1.23	0.00
19:46:16	844.0	844.0	33.8	17	175	209	2085	1116	1101	1.08	1.08	39.8	41.4	794.5	369	279.0	7:07	1.09	0.96	0.00
19:47:06	845.0	845.0	71.3	22	174	292	2139	1108	1095	1.08	1.08	39.8	41.3	794.5	367	280.0	7:08	1.09	0.87	0.00
19:47:57	846.0	846.0	75.6	24	173	397	2154	1108	1097	1.08	1.08	39.9	41.3	794.7	370	281.0	7:09	1.09	0.87	0.00
19:48:47	847.0	847.0	71.7	26	174	298	2141	1108	1102	1.08	1.08	39.9	41.2	795.2	367	282.0	7:10	1.09	0.89	0.00
19:50:29	848.0	848.0	35.3	30	174	281	2157	1108	1120	1.08	1.08	40.0	41.1	798.2	365	283.0	7:11	1.09	1.10	0.00
19:52:20	849.1	849.0	32.7	34	190	306	2179	1109	1131	1.08	1.08	40.0	41.2	802.0	362	284.1	7:13	1.09	1.18	0.00
19:53:16	850.0	850.0	63.5	33	193	347	2219	1109	1122	1.08	1.08	40.0	41.3	803.8	360	285.0	7:14	1.09	1.00	0.00
19:54:02	851.1	851.0	80.0	30	193	334	2191	1109	1133	1.08	1.08	40.1	41.4	805.2	355	286.1	7:15	1.09	0.92	0.00
19:54:39	852.0	852.0	96.6	27	193	316	2161	1109	1122	1.08	1.08	40.1	41.4	806.5	357	287.0	7:16	1.09	0.85	0.00
20:06:11	853.0	853.0	35.0	26	176	323	2185	1105	1091	1.08	1.08	39.9	40.8	816.3	336	288.0	7:17	1.09	1.06	0.00
20:07:07	854.0	854.0	64.1	28	173	329	2203	1106	1095	1.08	1.08	39.9	40.5	817.8	336	289.0	7:18	1.09	0.94	0.00
20:07:53	855.0	855.0	78.3	26	173	287	2156	1108	1097	1.08	1.08	39.9	40.6	819.1	336	290.0	7:19	1.09	0.87	0.00
20:08:36	856.0	856.0	83.7	26	173	308	2163	1108	1086	1.08	1.08	39.9	40.9	820.3	335	291.0	7:20	1.09	0.86	0.00
20:09:26	857.0	857.0	72.0	29	173	343	2184	1108	1081	1.08	1.08	39.9	41.2	821.3	336	292.0	7:21	1.09	0.92	0.00
20:10:16	858.0	858.0	75.4	32	173	349	2197	1108	1091	1.08	1.08	39.9	41.4	821.8	333	293.0	7:21	1.09	0.93	0.00
20:11:52	859.0	859.0	37.6	32	173	348	2220	1109	1080	1.08	1.08	39.9	41.6	823.6	337	294.0	7:23	1.09	1.01	0.01
20:14:00	860.0	860.0	27.9	30	173	314	2171	1109	1088	1.08	1.08	40.1	41.7	823.6	335	295.0	7:25	1.09	1.15	0.01
20:15:24	861.0	861.0	46.2	28	173	301	2177	1108	1094	1.08	1.08	40.3	41.6	823.6	335	296.0	7:26	1.09	1.02	0.01
20:16:18	862.1	862.1	69.5	28	173	308	2195	1109	1094	1.08	1.08	40.5	41.6	824.5	335	297.1	7:27	1.09	0.92	0.01
20:17:07	863.0	863.0	72.3	30	173	312	2208	1109	1115	1.08	1.08	40.5	41.5	825.4	333	298.0	7:28	1.09	0.92	0.01
20:22:40	864.0	864.0	11.1	31	179	241	2158	1108	1128	1.08	1.08	40.7	41.6	834.4	331	299.0	7:34	1.09	1.40	0.01
20:24:38	865.0	865.0	48.4	20	191	276	2213	1108	1099	1.08	1.08	40.9	41.9	838.3	340	300.0	7:35	1.09	0.94	0.01
20:25:47	866.0	866.0	52.6	14	191	253	2197	1108	1091	1.08	1.08	40.7	42.1	841.5	354	301.0	7:36	1.09	0.87	0.01
20:27:21	867.1	867.0	60.0	13	191	286	2195	1109	1084	1.08	1.08	40.4	42.1	841.5	372	302.1	7:37	1.09	0.82	0.01
20:28:18	868.0	868.0	62.4	16	191	262	2107	1108	1084	1.08	1.08	40.3	42.1	842.3	382	303.0	7:38	1.09	0.85	0.01
20:30:14	869.0	869.0	34.0	31	191	333	2120	1108	1090	1.08	1.08	40.2	42.1	843.0	405	304.0	7:40	1.09	1.15	0.01
20:30:44	870.1	870.1	130.9	27	191	329	2105	1109	1093	1.08	1.08	40.1	42.1	843.2	413	305.1	7:41	1.09	0.78	0.00
20:31:23	871.0	871.0	91.1	26	191	373	2137	1108	1091	1.08	1.08	40.1	42.1	843.5	419	306.0	7:41	1.09	0.78	0.00
20:32:00	872.0	872.0	97.3	26	186	335	2104	1108	1094	1.08	1.08	40.0	42.1	844.0	426	307.0	7:42	1.09	0.87	0.00
20:32:34	873.0	873.0	105.1	26	181	314	2102	1107	1095	1.08	1.08	40.0	42.1	844.4	433	308.0	7:42	1.09	0.80	0.00
20:33:39	874.1	874.0	57.4	29	174	321	2119	1107	1090	1.08	1.08	40.0	42.0	845.5	446	309.1	7:44	1.09	0.97	0.00
20:34:28	875.1	875.1	75.0	30	171	358	2137	1108	1100	1.08	1.08	40.0	42.0	846.4	453	310.1	7:44	1.09	0.91	0.00
20:35:36	876.0	876.0	52.6	31	172	271	2045	1108	1111	1.08	1.08	39.9	41.9	847.4	471	311.0	7:45	1.09	1.01	0.00
20:42:04	877.0	877.0	9.9	37	187	246	2005	1107	1095	1.08	1.08	39.8	42.0	852.1	540	312.0	7:52	1.09	1.52	0.00
20:43:09	878.0	878.0	55.4	38	192	324	2074	1109	1082	1.08	1.08	39.8	41.9	852.3	552	313.0	7:53	1.09	1.08	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
20:44:18	879.0	879.0	51.8	36	193	310	2039	1108	1097	1.08	1.08	39.8	41.9	852.3	564	314.0	7:54	1.09	1.08	0.00
20:44:48	880.1	880.1	145.2	30	193	317	2052	1108	1097	1.08	1.08	39.8	41.8	852.3	572	315.1	7:54	1.09	0.78	0.00
20:57:06	881.0	881.0	22.2	28	190	278	2003	1109	1088	1.08	1.08	39.7	41.7	858.0	625	316.0	7:57	1.09	1.20	0.00
20:59:31	882.0	882.0	27.1	38	194	382	2120	1118	1062	1.08	1.08	39.7	41.1	859.3	619	317.0	7:59	1.09	1.27	0.00
21:00:10	883.0	883.0	91.8	38	195	413	2169	1120	1045	1.08	1.08	39.7	41.3	859.6	622	318.0	8:00	1.09	0.95	0.00
21:00:52	884.1	884.0	96.0	36	195	379	2165	1121	1041	1.08	1.08	39.7	41.4	860.0	625	319.1	8:01	1.09	0.92	0.00
21:01:40	885.0	885.0	74.0	36	183	359	2145	1120	1040	1.08	1.08	39.8	41.5	860.4	627	320.0	8:02	1.09	0.97	0.00
21:02:14	886.1	886.1	114.0	35	181	391	2197	1120	1053	1.08	1.08	39.8	41.6	860.9	628	321.1	8:02	1.09	0.85	0.00
21:02:49	887.1	887.1	102.9	34	181	387	2182	1122	1040	1.08	1.08	39.8	41.6	861.4	630	322.1	8:03	1.09	0.88	0.00
21:03:17	888.0	888.0	126.8	34	181	356	2175	1123	1021	1.08	1.08	39.8	41.6	862.0	630	323.0	8:03	1.09	0.82	0.00
21:03:48	889.1	889.1	125.2	31	181	312	2162	1123	1014	1.08	1.08	39.8	41.7	862.5	631	324.1	8:04	1.09	0.80	0.00
21:04:15	890.1	890.0	131.4	29	181	312	2167	1122	1013	1.08	1.08	39.8	41.7	863.0	631	325.1	8:04	1.09	0.78	0.00
21:04:40	891.1	891.0	144.0	27	181	298	2164	1122	1004	1.08	1.08	39.8	41.7	863.1	632	326.1	8:05	1.09	0.74	0.00
21:05:08	892.0	892.0	126.6	26	181	294	2160	1123	1009	1.08	1.08	39.8	41.7	863.2	632	327.0	8:05	1.09	0.77	0.00
21:05:40	893.0	893.0	124.9	25	181	304	2138	1123	1009	1.08	1.08	39.8	41.7	863.4	634	328.0	8:06	1.09	0.76	0.00
21:08:48	894.0	894.0	19.1	30	185	271	2120	1123	1028	1.08	1.08	39.8	41.5	863.8	635	329.0	8:09	1.09	1.26	0.00
21:10:27	895.0	895.0	37.9	29	195	363	2181	1123	1060	1.08	1.08	39.9	41.2	864.2	637	330.0	8:10	1.09	1.10	0.00
21:12:15	896.0	896.0	32.1	35	191	566	2227	1122	1093	1.08	1.08	39.9	40.8	865.1	636	331.0	8:12	1.09	1.19	0.00
21:14:58	897.0	897.0	34.0	24	185	429	2218	1121	1100	1.08	1.08	40.0	40.5	867.1	635	332.0	8:14	1.09	1.06	0.00
21:17:08	898.1	898.0	28.3	36	177	408	2314	1122	1093	1.08	1.08	40.1	40.2	868.4	632	333.1	8:16	1.09	1.20	0.00
21:18:01	899.1	899.0	67.9	30	173	310	2301	1122	1098	1.08	1.08	40.2	40.1	868.8	630	334.1	8:17	1.09	0.93	0.00
21:18:47	900.0	900.0	77.7	29	173	331	2344	1123	1099	1.08	1.08	40.2	40.0	870.1	630	335.0	8:18	1.09	0.90	0.00
21:19:20	901.0	901.0	108.4	27	173	307	2323	1123	1108	1.08	1.08	40.2	40.0	871.0	631	336.0	8:18	1.09	0.80	0.00
21:20:04	902.0	902.0	86.4	26	173	288	2318	1123	1099	1.08	1.08	40.2	40.0	872.2	630	337.0	8:19	1.09	0.85	0.00
21:20:48	903.0	903.0	81.8	28	173	297	2342	1123	1098	1.08	1.08	40.2	39.9	873.2	628	338.0	8:20	1.09	0.87	0.00
21:21:26	904.0	904.0	93.9	28	173	306	2362	1122	1097	1.08	1.08	40.2	39.9	873.9	628	339.0	8:20	1.09	0.84	0.00
21:22:14	905.0	905.0	75.0	29	173	311	2351	1123	1089	1.08	1.08	40.2	39.9	874.5	626	340.0	8:21	1.09	0.90	0.00
21:22:57	906.1	906.0	91.1	30	173	314	2371	1123	1109	1.08	1.08	40.2	39.8	875.3	628	341.1	8:22	1.09	0.87	0.00
21:23:53	907.1	907.0	64.3	32	173	348	2375	1123	1105	1.08	1.08	40.1	39.7	876.0	626	342.1	8:23	1.09	0.97	0.00
21:24:31	908.0	908.0	87.8	32	173	386	2397	1124	1110	1.08	1.08	40.1	39.7	876.1	626	343.0	8:24	1.09	0.89	0.00
21:25:09	909.0	909.0	100.6	31	173	352	2403	1124	1107	1.08	1.08	40.1	39.7	876.2	624	344.0	8:24	1.09	0.84	0.00
21:36:29	910.0	910.0	62.1	27	173	244	2347	1120	1063	1.08	1.08	40.0	39.4	877.8	622	345.0	8:25	1.09	0.93	0.00
21:37:06	911.0	911.0	104.7	31	173	304	2384	1113	1019	1.08	1.08	39.8	38.7	878.4	617	346.0	8:26	1.09	0.86	0.00
21:41:36	912.0	912.0	13.3	36	184	246	2322	1116	1072	1.08	1.08	39.7	39.0	880.9	600	347.0	8:30	1.09	1.42	0.00
21:44:00	913.0	913.0	27.5	34	198	321	2377	1118	1071	1.08	1.08	39.5	39.4	880.9	586	348.0	8:33	1.09	1.23	0.00
21:44:29	914.0	914.0	121.3	28	198	303	2373	1118	1088	1.08	1.08	39.4	39.4	881.0	584	349.0	8:33	1.09	0.80	0.00
21:45:33	915.0	915.0	56.3	28	183	304	2405	1119	1110	1.08	1.08	39.4	39.4	881.1	575	350.0	8:34	1.09	0.98	0.00
21:46:23	916.0	916.0	75.8	36	178	409	2465	1119	1111	1.08	1.08	39.3	39.5	881.1	571	351.0	8:35	1.09	0.96	0.00
21:47:07	917.1	917.1	87.8	34	186	361	2421	1119	1138	1.08	1.08	39.3	39.5	881.1	570	352.1	8:36	1.09	0.92	0.00
21:47:37	918.0	918.0	116.8	33	196	354	2413	1120	1132	1.08	1.08	39.3	39.6	881.1	567	353.0	8:36	1.09	0.86	0.00
21:48:22	919.0	919.0	80.0	34	197	360	2427	1120	1139	1.08	1.08	39.3	39.6	881.2	566	354.0	8:37	1.09	0.96	0.00
21:48:57	920.0	920.0	109.9	34	197	346	2407	1120	1133	1.08	1.08	39.3	39.7	882.0	564	355.0	8:38	1.09	0.88	0.00
21:49:30	921.0	921.0	109.1	32	197	327	2401	1120	1165	1.08	1.08	39.3	39.7	882.6	563	356.0	8:38	1.09	0.87	0.00
21:50:07	922.0	922.0	97.3	33	197	366	2426	1120	1145	1.08	1.08	39.3	39.8	883.5	564	357.0	8:39	1.09	0.91	0.00
21:50:37	923.0	923.0	120.0	32	197	340	2430	1120	1152	1.08	1.08	39.3	39.9	884.0	562	358.0	8:39	1.09	0.85	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
21:51:10	924.1	924.0	114.9	32	197	345	2406	1120	1144	1.08	1.08	39.3	40.0	884.7	561	359.1	8:40	1.09	0.86	0.00
21:51:40	925.0	925.0	119.3	33	197	354	2406	1120	1127	1.08	1.08	39.3	40.2	885.4	561	360.0	8:40	1.09	0.86	0.00
21:52:10	926.1	926.0	129.2	34	195	339	2425	1121	1126	1.08	1.08	39.3	40.3	886.2	561	361.1	8:41	1.09	0.83	0.00
21:52:48	927.0	927.0	93.5	35	182	338	2416	1120	1146	1.08	1.08	39.3	40.4	887.3	560	362.0	8:41	1.09	0.91	0.00
21:53:32	928.1	928.0	86.4	38	185	370	2435	1120	1113	1.08	1.08	39.2	40.6	888.6	560	363.1	8:42	1.09	0.95	0.00
21:53:57	929.0	929.0	140.6	36	197	359	2424	1120	1113	1.08	1.08	39.3	40.7	889.4	560	364.0	8:43	1.09	0.83	0.00
21:54:30	930.0	930.0	116.1	35	200	327	2396	1120	1098	1.08	1.08	39.3	40.8	890.5	560	365.0	8:43	1.09	0.87	0.00
21:55:06	931.1	931.0	106.9	36	200	374	2400	1120	1098	1.08	1.08	39.3	40.9	891.5	561	366.1	8:44	1.09	0.90	0.00
21:55:42	932.0	932.0	98.6	37	199	410	2406	1120	1089	1.08	1.08	39.3	41.0	892.4	559	367.0	8:44	1.09	0.93	0.00
21:56:22	933.0	933.0	88.9	39	200	370	2436	1120	1085	1.08	1.08	39.3	41.0	893.3	560	368.0	8:45	1.09	0.97	0.00
21:57:15	934.0	934.0	71.1	40	200	377	2452	1120	1084	1.08	1.08	39.3	41.1	893.5	560	369.0	8:46	1.09	1.04	0.00
21:57:54	935.1	935.0	98.6	37	201	350	2402	1121	1117	1.08	1.08	39.4	41.2	893.7	558	370.1	8:47	1.09	0.93	0.00
21:58:35	936.1	936.0	87.8	37	200	363	2418	1121	1106	1.08	1.08	39.4	41.2	893.8	558	371.1	8:47	1.09	0.96	0.00
21:59:13	937.1	937.1	100.4	37	200	365	2435	1121	1100	1.08	1.08	39.4	41.3	894.0	559	372.1	8:48	1.09	0.93	0.01
22:00:15	938.0	938.0	57.8	38	200	380	2466	1121	1100	1.08	1.08	39.5	41.3	894.6	558	373.0	8:49	1.09	1.08	0.01
22:11:23	939.0	939.0	57.1	35	191	313	2450	1116	1092	1.08	1.08	39.9	40.7	897.2	549	374.0	8:50	1.09	1.03	0.00
22:12:09	940.1	940.1	89.3	34	193	339	2456	1118	1104	1.08	1.08	40.1	40.2	897.3	544	375.1	8:51	1.09	0.93	0.00
22:12:59	941.1	941.0	71.7	37	194	379	2502	1120	1113	1.08	1.08	40.1	40.2	897.6	539	376.1	8:52	1.09	1.00	0.00
22:13:33	942.0	942.0	103.6	36	194	402	2486	1121	1124	1.08	1.08	40.1	40.4	898.2	536	377.0	8:52	1.09	0.90	0.01
22:14:08	943.0	943.0	102.9	38	194	380	2481	1122	1111	1.08	1.08	40.1	40.7	898.8	537	378.0	8:53	1.09	0.92	0.02
22:14:45	944.0	944.0	103.3	38	194	408	2501	1122	1114	1.08	1.08	40.1	40.9	899.6	535	379.0	8:53	1.09	0.92	0.02
22:15:24	945.1	945.0	94.7	40	194	364	2511	1123	1097	1.08	1.08	40.1	41.2	900.5	533	380.1	8:54	1.09	0.95	0.0
22:16:19	946.0	946.0	65.2	41	194	372	2517	1122	1107	1.08	1.08	40.1	41.4	901.8	531	381.0	8:55	1.09	1.06	0.0
22:18:15	947.0	947.0	30.9	41	194	285	2425	1123	1106	1.08	1.08	40.1	41.5	904.3	529	382.0	8:57	1.09	1.26	0.06
22:22:39	948.0	948.0	13.6	40	195	292	2461	1121	1080	1.08	1.08	40.3	42.0	909.3	526	383.0	9:01	1.09	1.46	0.05
22:23:35	949.1	949.0	67.9	37	196	339	2535	1123	1066	1.08	1.08	40.4	42.1	909.6	526	384.1	9:02	1.09	1.03	0.05
22:25:20	950.1	950.1	35.1	40	196	334	2527	1123	1072	1.08	1.08	40.5	42.2	909.7	520	385.1	9:04	1.09	1.22	0.05
22:26:10	951.0	951.0	67.9	38	196	378	2572	1125	1071	1.08	1.08	40.6	42.3	909.7	518	386.0	9:05	1.09	1.03	0.05
22:27:13	952.0	952.0	59.3	39	196	384	2568	1125	1071	1.08	1.08	40.6	42.3	909.7	517	387.0	9:06	1.09	1.08	0.05
22:28:23	953.0	953.0	51.4	39	196	413	2608	1126	1071	1.08	1.08	40.8	42.4	909.8	512	388.0	9:07	1.09	1.11	0.04
22:29:26	954.1	954.1	65.5	37	196	412	2608	1126	1080	1.08	1.08	41.0	42.4	910.8	512	389.1	9:08	1.09	1.03	0.02
22:30:28	955.0	955.0	57.3	36	197	276	2461	1125	1075	1.08	1.08	41.0	42.4	911.3	507	390.0	9:09	1.09	1.06	0.01
22:45:41	956.0	956.0	4.2	40	181	218	2437	1122	1124	1.08	1.08	41.4	42.3	925.8	466	391.0	9:23	1.09	1.77	0.01
22:53:56	957.1	957.0	9.4	28	184	312	2371	1120	1151	1.08	1.08	41.8	42.6	937.5	504	392.1	9:31	1.09	1.41	0.01
22:55:22	958.0	958.0	41.5	27	195	342	2346	1120	1180	1.08	1.08	41.7	42.6	938.3	512	393.0	9:33	1.09	1.07	0.01
22:57:23	959.0	959.0	32.1	38	195	381	2389	1121	1198	1.08	1.08	41.9	42.6	938.3	521	394.0	9:35	1.09	1.23	0.01
23:00:15	960.0	960.0	20.9	42	196	310	2311	1121	1197	1.08	1.08	41.8	42.6	938.6	530	395.0	9:37	1.09	1.37	0.01
23:02:22	961.0	961.0	28.3	42	195	354	2339	1121	1101	1.08	1.08	41.9	42.6	941.1	538	396.0	9:40	1.09	1.29	0.01
23:04:02	962.0	962.0	36.0	37	196	360	2324	1121	1113	1.08	1.08	42.0	42.6	943.5	548	397.0	9:41	1.09	1.19	0.01
23:06:37	963.0	963.0	23.2	42	195	349	2338	1120	1096	1.08	1.08	42.0	42.6	946.2	551	398.0	9:44	1.09	1.35	0.01
23:08:49	964.0	964.0	27.5	40	195	357	2342	1121	1105	1.08	1.08	42.2	42.6	947.2	554	399.0	9:46	1.09	1.29	0.01
23:10:56	965.0	965.0	28.2	41	195	373	2346	1121	1091	1.08	1.08	42.3	42.6	947.3	555	400.0	9:48	1.09	1.28	0.01
23:13:01	966.0	966.0	28.1	42	195	356	2347	1120	1106	1.08	1.08	42.4	42.6	948.0	558	401.0	9:50	1.09	1.29	0.01
23:24:29	967.0	967.0	26.6	40	195	368	2398	1118	1071	1.08	1.08	42.5	42.7	954.5	544	402.0	9:53	1.09	0.74	0.01
23:27:11	968.0	968.0	22.2	39	194	366	2457	1115	1053	1.08	1.08	42.6	43.1	955.4	536	403.0	9:56	1.09	1.33	0.02

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
23:29:06	969.0	969.0	31.3	37	195	364	2460	1117	1058	1.08	1.08	42.6	43.3	956.0	534	404.0	9:57	1.09	1.23	0.02
23:31:13	970.0	970.0	28.3	34	195	321	2431	1117	1042	1.08	1.08	42.7	43.4	956.7	534	405.0	9:60	1.09	1.22	0.02
23:33:22	971.0	971.0	27.9	37	195	349	2504	1117	1041	1.08	1.08	42.7	43.4	957.4	532	406.0	10:02	1.09	1.25	0.02
23:35:40	972.0	972.0	27.3	38	195	350	2511	1119	1051	1.08	1.08	42.7	43.2	958.2	531	407.0	10:04	1.09	1.27	0.02
23:38:16	973.0	973.0	23.0	37	195	350	2525	1119	1033	1.08	1.08	42.8	43.1	959.1	529	408.0	10:07	1.09	1.31	0.02
23:41:25	974.0	974.0	19.7	37	195	340	2529	1120	1057	1.08	1.08	42.8	43.0	960.1	525	409.0	10:10	1.09	1.34	0.02
23:43:13	975.0	975.0	33.3	37	195	334	2540	1120	1053	1.08	1.08	42.8	42.8	960.7	524	410.0	10:12	1.09	1.21	0.02
23:44:13	976.0	976.0	59.5	35	217	370	2535	1121	1025	1.08	1.08	42.8	42.8	961.1	523	411.0	10:13	1.09	1.07	0.02
23:45:12	977.0	977.0	64.3	35	223	315	2526	1121	1052	1.08	1.08	42.7	42.7	961.4	522	412.0	10:14	1.09	1.05	0.02
23:46:49	978.0	978.0	37.0	37	224	340	2545	1121	1046	1.08	1.08	42.7	42.7	961.9	520	413.0	10:15	1.09	1.22	0.02
23:48:01	979.0	979.0	50.0	39	224	385	2562	1122	1036	1.08	1.08	42.7	42.5	962.3	520	414.0	10:16	1.09	1.15	0.02
23:50:05	980.0	980.0	29.0	38	224	353	2569	1121	1044	1.08	1.08	42.7	42.6	963.0	515	415.0	10:18	1.09	1.29	0.02
23:50:49	981.0	981.0	81.8	34	224	330	2542	1122	1043	1.08	1.08	42.6	42.6	963.3	514	416.0	10:19	1.09	0.98	0.02
23:51:23	982.1	982.1	114.5	28	224	328	2525	1121	1037	1.08	1.08	42.6	42.6	963.5	513	417.1	10:20	1.09	0.86	0.02
23:51:58	983.0	983.0	101.7	28	224	314	2519	1121	1025	1.08	1.08	42.6	42.6	963.6	513	418.0	10:20	1.09	0.88	0.02
23:52:29	984.0	984.0	115.2	27	224	311	2524	1121	1025	1.08	1.08	42.6	42.6	963.8	514	419.0	10:21	1.09	0.85	0.02
23:53:15	985.1	985.1	83.7	28	224	346	2543	1121	1050	1.08	1.08	42.4	42.6	964.1	514	420.1	10:22	1.09	0.94	0.02
30 Sep 93																				
00:05:07	986.2	986.2	83.7	24	204	259	2470	1113	1053	1.08	1.08	41.9	42.3	966.0	496	421.2	10:22	1.09	0.93	0.01
00:05:29	987.0	987.0	150.8	18	207	352	2424	1102	1044	1.08	1.08	41.3	41.8	966.1	496	422.0	10:23	1.09	0.71	0.01
00:06:01	988.0	988.0	116.1	20	221	303	2417	1106	1002	1.08	1.08	41.3	41.8	966.3	492	423.0	10:23	1.09	0.76	0.01
00:06:34	989.0	989.0	113.4	19	223	300	2416	1107	996	1.08	1.08	41.2	41.8	966.5	490	424.0	10:24	1.09	0.79	0.01
00:08:19	990.1	990.0	35.3	24	223	303	2432	1108	1065	1.08	1.08	41.2	41.9	966.9	486	425.1	10:26	1.09	1.11	0.01
00:09:05	991.0	991.0	77.0	34	223	386	2506	1110	1071	1.08	1.08	41.1	42.2	967.1	484	426.0	10:26	1.09	1.01	0.01
00:11:08	992.0	992.0	29.3	36	224	314	2451	1110	1079	1.08	1.08	41.0	42.5	967.8	483	427.0	10:28	1.09	1.27	0.01
00:13:07	993.0	993.0	30.3	38	224	344	2471	1111	1073	1.08	1.08	40.9	42.9	968.7	483	428.0	10:30	1.09	1.27	0.01
00:13:51	994.1	994.0	85.7	34	224	356	2484	1113	1101	1.08	1.08	40.8	43.0	969.1	483	429.1	10:31	1.09	0.97	0.01
00:14:28	995.1	995.1	104.3	31	224	333	2461	1114	1080	1.08	1.08	40.8	43.0	969.4	483	430.1	10:32	1.09	0.91	0.01
00:19:34	996.0	996.0	11.7	35	224	230	2366	1114	1092	1.08	1.08	40.8	43.1	971.6	481	431.0	10:37	1.09	1.50	0.01
00:35:29	997.1	997.1	12.7	33	222	256	2391	1112	1107	1.08	1.08	40.8	43.5	977.5	472	432.1	10:42	1.09	1.44	0.01
00:36:04	998.1	998.1	102.4	27	221	324	2460	1106	1078	1.08	1.08	40.7	43.4	978.2	471	433.1	10:43	1.09	0.87	0.01
00:36:38	999.0	999.0	104.6	24	221	337	2449	1106	1093	1.08	1.08	40.6	43.4	979.0	468	434.0	10:44	1.09	0.84	0.01
00:37:14	1000.0	1000.0	99.5	24	221	330	2448	1107	1100	1.08	1.08	40.6	43.4	979.4	465	435.0	10:44	1.09	0.85	0.01
00:37:48	1001.0	1001.0	105.9	25	221	315	2447	1108	1100	1.08	1.08	40.6	43.4	979.4	464	436.0	10:45	1.09	0.85	0.01
00:38:22	1002.0	1002.0	104.3	26	221	315	2456	1108	1128	1.08	1.08	40.6	43.6	979.4	462	437.0	10:45	1.09	0.86	0.01
00:38:59	1003.0	1003.0	98.0	25	221	324	2471	1108	1103	1.08	1.08	40.5	43.7	979.6	459	438.0	10:46	1.09	0.87	0.01
00:39:35	1004.0	1004.0	100.0	24	221	295	2438	1108	1094	1.08	1.08	40.5	43.8	979.8	458	439.0	10:47	1.09	0.85	0.01
00:40:17	1005.1	1005.1	94.7	22	221	272	2410	1108	1104	1.08	1.08	40.5	43.8	980.5	454	440.1	10:47	1.09	0.85	0.01
00:41:04	1006.0	1006.0	76.1	22	221	275	2413	1108	1107	1.08	1.08	40.6	43.8	981.6	451	441.0	10:48	1.09	0.90	0.01
00:41:57	1007.0	1007.0	75.3	21	221	260	2377	1107	1135	1.08	1.08	40.6	43.8	983.0	449	442.0	10:49	1.09	0.89	0.01
00:56:44	1008.1	1008.0	70.6	14	208	267	2337	1099	1089	1.08	1.08	39.7	43.2	987.4	456	443.1	10:50	1.09	0.82	0.01
00:57:31	1009.1	1009.0	76.6	20	221	311	2381	1104	1101	1.08	1.08	39.6	43.2	988.8	454	444.1	10:51	1.09	0.88	0.01
00:58:20	1010.0	1010.0	72.5	26	222	356	2407	1105	1083	1.08	1.08	39.6	43.5	989.4	453	445.0	10:51	1.09	0.95	0.01
00:59:10	1011.0	1011.0	76.6	34	222	420	2462	1104	1093	1.08	1.08	39.7	43.7	990.0	452	446.0	10:52	1.09	1.00	0.01
00:59:59	1012.0	1012.0	77.0	34	222	426	2456	1107	1094	1.08	1.08	39.8	43.9	990.6	451	447.0	10:53	1.09	1.00	0.01

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	BIT DIST	BIT HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
01:00:48	1013.0	1013.0	72.9	33	222	351	2451	1108	1072	1.08	1.08	40.0	43.9	991.2	452	448.0	10:54	1.09	1.01	0.01
01:02:17	1014.0	1014.0	42.4	36	222	356	2449	1107	1054	1.08	1.08	40.1	44.0	991.9	453	449.0	10:55	1.09	1.17	0.01
01:03:31	1015.0	1015.0	48.4	32	222	327	2409	1106	1064	1.08	1.08	40.2	44.0	992.4	451	450.0	10:57	1.09	1.10	0.01
01:04:46	1016.0	1016.0	48.0	35	222	358	2438	1106	1084	1.08	1.08	40.4	44.0	993.1	451	451.0	10:58	1.09	1.13	0.01
01:05:54	1017.0	1017.0	52.9	35	222	348	2430	1106	1087	1.08	1.08	40.5	43.9	994.6	451	452.0	10:59	1.09	1.10	0.01
01:07:21	1018.0	1018.0	41.9	36	222	317	2419	1107	1098	1.08	1.08	40.7	43.9	995.4	452	453.0	11:00	1.09	1.17	0.01
01:08:15	1019.1	1019.0	66.7	36	222	383	2473	1107	1109	1.08	1.08	40.8	43.9	995.6	453	454.1	11:01	1.09	1.13	0.01
01:08:51	1020.0	1020.0	99.3	34	222	367	2470	1107	1105	1.08	1.08	40.9	43.9	995.7	452	455.0	11:02	1.09	0.93	0.01
01:09:26	1021.1	1021.0	114.3	32	222	367	2459	1108	1093	1.08	1.08	40.9	43.9	995.8	453	456.1	11:02	1.09	0.89	0.01
01:09:57	1022.0	1022.0	110.6	30	222	346	2434	1108	1093	1.08	1.08	41.0	43.9	995.8	454	457.0	11:03	1.09	0.88	0.01
01:10:34	1023.0	1023.0	104.9	29	222	349	2419	1107	1098	1.08	1.08	41.0	43.9	995.8	455	458.0	11:04	1.09	0.89	0.01
01:11:32	1024.1	1024.0	62.1	32	222	364	2422	1107	1123	1.08	1.08	41.1	43.9	996.0	457	459.1	11:05	1.09	0.96	0.01
01:12:45	1025.0	1025.0	48.4	34	222	337	2430	1107	1097	1.08	1.08	41.2	43.9	996.2	459	460.0	11:06	1.09	1.07	0.01
01:14:41	1026.0	1026.0	31.0	36	225	345	2454	1129	1091	1.08	1.08	41.3	43.9	996.4	461	461.0	11:08	1.09	1.25	0.01
01:27:39	1027.0	1027.0	14.4	34	222	281	2399	1105	1037	1.08	1.08	41.5	43.8	996.8	449	462.0	11:12	1.09	1.42	0.01
01:28:26	1028.0	1028.0	76.6	31	221	342	2467	1101	1029	1.08	1.08	41.6	43.2	997.4	449	463.0	11:13	1.09	0.98	0.01
01:29:26	1029.1	1029.0	62.3	34	221	361	2493	1103	1063	1.08	1.08	41.6	43.1	998.6	445	464.1	11:14	1.09	1.05	0.01
01:31:03	1030.0	1030.0	36.9	35	221	381	2499	1103	1088	1.08	1.08	41.7	43.1	1001.1	444	465.0	11:15	1.09	1.20	0.01
01:32:12	1031.0	1031.0	51.9	37	221	402	2519	1104	1057	1.08	1.08	41.7	43.2	1002.9	442	466.0	11:17	1.09	1.12	0.01
01:33:24	1032.0	1032.0	54.1	36	221	376	2486	1104	1050	1.08	1.08	41.8	43.2	1004.7	440	467.0	11:18	1.09	1.10	0.01
01:35:16	1033.0	1033.0	32.0	36	221	357	2483	1104	1055	1.08	1.08	41.9	43.2	1006.8	440	468.0	11:20	1.09	1.24	0.01
01:38:02	1034.0	1034.0	21.6	35	221	357	2474	1104	1074	1.08	1.08	42.0	43.3	1007.1	439	469.0	11:22	1.09	1.33	0.0'
01:39:48	1035.0	1035.0	34.0	34	221	363	2492	1104	1065	1.08	1.08	42.1	43.5	1007.1	438	470.0	11:24	1.09	1.21	0.(
01:41:17	1036.0	1036.0	40.5	32	221	337	2479	1105	1087	1.08	1.08	42.2	43.5	1007.1	437	471.0	11:26	1.09	1.15	0.01
01:43:35	1037.0	1037.0	26.1	35	221	336	2501	1104	1062	1.08	1.08	42.3	43.6	1007.6	436	472.0	11:28	1.09	1.29	0.01
01:45:27	1038.0	1038.0	32.1	35	221	358	2519	1104	1059	1.08	1.08	42.4	43.6	1009.5	433	473.0	11:30	1.09	1.23	0.01
01:48:12	1039.0	1039.0	22.6	37	221	368	2530	1105	1066	1.08	1.08	42.5	43.7	1012.5	435	474.0	11:33	1.09	1.34	0.01
01:49:41	1040.0	1040.0	40.4	34	221	341	2509	1105	1094	1.08	1.08	42.7	43.8	1013.7	430	475.0	11:34	1.09	1.16	0.01
01:52:35	1041.0	1041.0	21.0	35	221	352	2530	1106	1087	1.08	1.08	42.8	43.7	1015.8	429	476.0	11:37	1.09	1.34	0.01
01:55:27	1042.0	1042.0	20.8	37	221	366	2546	1106	1096	1.08	1.08	43.0	43.7	1018.0	425	477.0	11:40	1.09	1.36	0.01
01:59:22	1044.0	1044.0	29.6	33	221	312	2509	1107	1086	1.12	1.12	43.1	43.8	1023.5	421	479.0	11:44	1.09	1.23	0.01
02:02:37	1045.0	1045.0	18.5	33	222	272	2476	1107	1076	1.12	1.12	43.1	43.8	1025.5	418	480.0	11:47	1.09	1.35	0.01
02:06:05	1046.0	1046.0	17.4	34	222	265	2472	1107	1063	1.12	1.12	43.2	44.0	1026.5	416	481.0	11:50	1.09	1.36	0.01
02:07:09	1047.0	1047.0	56.3	30	222	295	2497	1109	1071	1.12	1.12	43.3	44.1	1026.7	417	482.0	11:52	1.09	1.03	0.01
02:08:46	1048.1	1048.0	39.3	32	222	306	2519	1109	1078	1.12	1.12	43.4	44.1	1026.8	416	483.1	11:53	1.09	1.15	0.01
02:10:31	1049.0	1049.0	34.1	34	221	317	2523	1109	1036	1.12	1.12	43.4	44.2	1026.8	417	484.0	11:55	1.10	1.19	0.01
02:12:10	1050.0	1050.0	36.4	35	222	318	2528	1109	1079	1.12	1.12	43.5	44.2	1026.8	415	485.0	11:57	1.10	1.19	0.01
02:13:19	1051.0	1051.0	52.2	33	222	327	2522	1110	1102	1.12	1.12	43.5	44.2	1027.2	413	486.0	11:58	1.10	1.08	0.01
02:15:02	1052.0	1052.0	35.0	36	222	333	2529	1109	1098	1.12	1.12	43.5	44.2	1028.7	413	487.0	11:59	1.10	1.20	0.01
02:16:49	1053.0	1053.0	33.6	35	222	334	2519	1110	1088	1.12	1.12	43.4	44.3	1029.9	418	488.0	12:01	1.10	1.20	0.01
02:17:46	1054.0	1054.0	63.2	34	221	352	2528	1110	1084	1.12	1.12	43.0	44.3	1030.6	418	489.0	12:02	1.10	1.03	0.01
02:18:42	1055.0	1055.0	64.3	34	222	338	2527	1110	1107	1.12	1.12	42.9	44.3	1031.2	419	490.0	12:03	1.10	1.03	0.01
02:30:55	1056.0	1056.0	15.7	32	222	305	2491	1110	1092	1.12	1.12	42.2	44.2	1035.7	417	491.0	12:07	1.11	1.35	0.01
02:33:58	1057.0	1057.0	20.6	33	223	322	2498	1107	1088	1.12	1.12	40.8	44.2	1037.1	423	492.0	12:10	1.11	1.29	0.01
02:36:57	1058.0	1058.0	20.1	36	222	360	2526	1106	1084	1.12	1.12	40.9	44.5	1038.4	432	493.0	12:13	1.11	1.32	0.01

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
02:40:23	1059.0	1059.0	17.4	36	222	343	2494	1106	1095	1.12	1.12	41.1	44.6	1040.0	449	494.0	12:16	1.12	1.35	0.01
02:43:39	1060.0	1060.0	18.4	34	222	344	2494	1106	1110	1.12	1.12	41.3	44.6	1041.1	456	495.0	12:20	1.12	1.32	0.02
02:46:18	1061.0	1061.0	22.6	35	222	357	2499	1105	1120	1.12	1.12	41.4	44.7	1042.0	468	496.0	12:22	1.12	1.28	0.02
02:49:01	1062.0	1062.0	22.1	36	222	343	2506	1105	1119	1.12	1.12	41.5	44.8	1043.3	475	497.0	12:25	1.12	1.29	0.02
02:51:15	1063.0	1063.0	26.9	35	222	368	2517	1105	1088	1.12	1.12	41.6	44.9	1044.4	481	498.0	12:27	1.13	1.24	0.02
02:52:49	1064.0	1064.0	38.3	33	222	377	2483	1107	1114	1.12	1.12	41.7	44.9	1044.9	486	499.0	12:29	1.13	1.13	0.02
02:54:27	1065.0	1065.0	36.7	34	222	353	2483	1105	1092	1.12	1.12	41.7	44.9	1045.2	495	500.0	12:30	1.13	1.15	0.02
02:56:20	1066.0	1066.0	31.9	34	222	348	2486	1105	1102	1.12	1.12	41.8	44.9	1045.6	502	501.0	12:32	1.13	1.17	0.02
02:57:35	1067.0	1067.0	49.3	32	222	347	2475	1105	1094	1.12	1.12	41.9	44.9	1046.2	509	502.0	12:34	1.13	1.06	0.02
02:58:41	1068.0	1068.0	54.5	32	222	362	2504	1105	1121	1.12	1.12	41.9	44.9	1046.9	512	503.0	12:35	1.13	1.03	0.02
02:59:31	1069.0	1069.0	71.3	33	222	353	2500	1105	1109	1.12	1.12	41.9	44.9	1047.5	518	504.0	12:36	1.13	0.98	0.02
03:00:32	1070.0	1070.0	59.0	34	222	337	2493	1105	1111	1.12	1.12	41.9	44.9	1048.1	521	505.0	12:37	1.13	1.03	0.02
03:02:53	1071.0	1071.0	26.1	36	222	344	2505	1106	1107	1.12	1.12	41.9	44.9	1049.3	530	506.0	12:39	1.13	1.25	0.02
03:04:04	1072.2	1072.1	61.3	31	223	297	2443	1105	1111	1.12	1.12	42.0	44.8	1050.1	533	507.2	12:40	1.13	0.99	0.02
03:04:54	1073.0	1073.0	70.8	30	222	300	2453	1105	1102	1.12	1.12	42.0	44.7	1050.7	536	508.0	12:41	1.13	0.95	0.02
03:05:44	1074.1	1074.0	80.9	32	223	318	2479	1106	1103	1.12	1.12	42.0	44.7	1051.2	538	509.1	12:42	1.13	0.94	0.02
03:06:39	1075.0	1075.0	64.6	33	223	316	2468	1107	1109	1.12	1.12	42.0	44.7	1051.8	543	510.0	12:43	1.13	1.01	0.02
03:12:46	1076.0	1076.0	9.8	37	223	252	2413	1105	1092	1.12	1.12	42.0	44.7	1055.6	564	511.0	12:49	1.13	1.50	0.01
03:14:34	1077.0	1077.0	37.5	32	223	311	2438	1107	1098	1.12	1.12	42.1	44.7	1055.7	572	512.0	12:51	1.13	1.12	0.01
03:15:28	1078.0	1078.0	66.1	30	222	306	2453	1107	1091	1.12	1.12	42.1	44.6	1055.7	573	513.0	12:51	1.13	0.97	0.01
03:16:26	1079.0	1079.0	62.1	32	223	336	2471	1107	1093	1.12	1.12	42.1	44.6	1055.7	578	514.0	12:52	1.13	1.01	0.01
03:17:17	1080.0	1080.0	71.1	32	223	382	2492	1108	1068	1.12	1.12	42.1	44.5	1055.8	580	515.0	12:53	1.13	0.97	0.01
03:19:18	1081.0	1081.0	29.6	34	223	346	2495	1108	1077	1.12	1.12	42.1	44.4	1056.2	588	516.0	12:55	1.13	1.20	0.01
03:22:38	1082.0	1082.0	18.8	34	223	335	2497	1108	1095	1.12	1.12	42.1	44.2	1056.7	601	517.0	12:59	1.13	1.31	0.01
03:24:43	1083.0	1083.0	28.6	32	223	335	2490	1110	1087	1.12	1.12	42.1	44.1	1057.4	607	518.0	13:01	1.13	1.19	0.01
03:27:01	1084.0	1084.0	26.9	33	223	322	2462	1112	1087	1.12	1.12	42.1	44.0	1058.1	610	519.0	13:03	1.13	1.21	0.01
03:43:58	1085.0	1085.0	10.4	41	222	344	2522	1111	1084	1.12	1.12	41.8	43.6	1061.7	612	520.0	13:09	1.13	1.52	0.02
03:47:03	1086.0	1086.0	19.6	39	220	337	2512	1111	1089	1.12	1.12	40.7	43.1	1063.0	614	521.0	13:12	1.13	1.34	0.03
03:50:01	1087.0	1087.0	20.2	39	220	336	2517	1111	1094	1.12	1.12	40.4	43.1	1064.6	619	522.0	13:15	1.13	1.34	0.03
03:52:14	1088.0	1088.0	27.0	40	220	366	2517	1108	1094	1.12	1.12	40.3	43.1	1065.8	621	523.0	13:17	1.13	1.27	0.03
03:53:48	1089.0	1089.0	41.1	39	219	338	2497	1097	1102	1.12	1.12	40.3	43.0	1067.0	622	524.0	13:19	1.13	1.16	0.03
03:55:37	1090.0	1090.0	32.9	38	220	328	2498	1110	1113	1.12	1.12	40.5	42.9	1068.6	620	525.0	13:20	1.13	1.21	0.03
03:57:10	1091.0	1091.0	38.7	38	219	329	2506	1098	1118	1.12	1.12	40.7	42.9	1069.9	617	526.0	13:22	1.13	1.17	0.03
03:59:37	1092.0	1092.0	24.5	38	217	346	2513	1080	1084	1.12	1.12	40.9	43.1	1071.2	617	527.0	13:24	1.13	1.28	0.03
04:02:03	1093.0	1093.0	25.4	39	217	343	2502	1080	1070	1.12	1.12	41.1	43.2	1073.2	617	528.0	13:27	1.13	1.28	0.03
04:05:28	1094.0	1094.0	17.4	38	217	333	2480	1081	1065	1.12	1.12	41.4	43.3	1075.3	617	529.0	13:30	1.13	1.37	0.03
04:07:24	1095.0	1095.0	31.2	38	217	367	2524	1081	1070	1.12	1.12	41.6	43.2	1075.6	618	530.0	13:32	1.13	1.22	0.03
04:09:27	1096.0	1096.0	29.5	38	217	337	2496	1081	1071	1.12	1.12	41.7	43.1	1075.8	616	531.0	13:34	1.13	1.23	0.04
04:11:37	1097.0	1097.0	27.4	38	217	346	2517	1082	1062	1.12	1.12	41.8	43.1	1076.7	614	532.0	13:36	1.13	1.25	0.03
04:13:47	1098.0	1098.0	27.7	38	218	329	2508	1080	1052	1.12	1.12	41.9	43.2	1078.6	613	533.0	13:39	1.13	1.24	0.03
04:15:30	1099.0	1099.0	35.0	37	218	354	2510	1081	1064	1.12	1.12	42.0	43.2	1080.0	612	534.0	13:40	1.13	1.18	0.03
04:17:42	1100.0	1100.0	27.3	38	218	346	2531	1081	1053	1.12	1.12	42.0	43.3	1081.1	614	535.0	13:42	1.13	1.26	0.03
04:20:06	1101.0	1101.0	26.6	38	218	344	2526	1080	1037	1.12	1.12	41.8	43.3	1081.8	610	536.0	13:45	1.13	1.25	0.02
04:22:16	1102.0	1102.0	27.6	38	218	325	2533	1082	1039	1.12	1.12	41.7	43.4	1082.6	613	537.0	13:47	1.13	1.25	0.02
04:24:54	1103.0	1103.0	22.8	38	218	301	2505	1083	1010	1.12	1.12	41.7	43.5	1083.7	612	538.0	13:50	1.13	1.29	0.02

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
04:28:14	1104.1	1104.0	19.6	37	218	307	2509	1085	1037	1.12	1.12	41.8	43.7	1084.7	613	539.1	13:53	1.13	1.33	0.02
04:31:09	1105.0	1105.0	20.5	39	218	310	2520	1082	1029	1.12	1.12	42.0	43.8	1084.8	613	540.0	13:56	1.13	1.33	0.02
04:35:09	1106.0	1106.0	15.0	39	218	309	2512	1081	1059	1.12	1.12	42.3	43.8	1084.8	612	541.0	13:60	1.13	1.41	0.02
04:39:14	1107.0	1107.0	14.7	38	218	316	2521	1083	1053	1.12	1.12	42.5	43.8	1085.4	606	542.0	14:04	1.13	1.41	0.01
04:48:33	1109.0	1109.0	10.9	38	218	269	2484	1082	1090	1.12	1.12	42.5	43.8	1088.9	606	544.0	14:13	1.13	1.48	0.01
04:50:30	1110.0	1110.0	30.6	36	218	303	2483	1082	1096	1.12	1.12	42.7	43.8	1090.2	607	545.0	14:15	1.13	1.21	0.01
04:53:40	1111.0	1111.0	19.1	39	218	310	2508	1083	1090	1.12	1.12	42.7	43.9	1091.6	604	546.0	14:18	1.13	1.34	0.01
04:56:55	1112.0	1112.0	18.4	38	218	307	2502	1082	1098	1.12	1.12	42.9	43.9	1092.9	603	547.0	14:22	1.13	1.35	0.01
05:00:52	1113.0	1113.0	15.2	39	218	299	2488	1081	1099	1.12	1.12	42.9	44.0	1094.0	603	548.0	14:26	1.13	1.41	0.01
05:15:22	1114.1	1114.0	9.6	40	218	308	2499	1081	1102	1.12	1.12	43.1	44.0	1099.3	585	549.1	14:32	1.13	1.53	0.01
05:18:16	1115.0	1115.0	20.7	39	208	317	2526	1073	1062	1.12	1.12	42.8	44.0	1100.6	574	550.0	14:35	1.13	1.32	0.01
05:21:45	1116.0	1116.0	17.2	40	172	303	2530	1074	1060	1.12	1.12	43.0	44.5	1101.9	568	551.0	14:38	1.13	1.32	0.01
05:25:57	1117.0	1117.0	14.3	41	171	319	2539	1075	1057	1.12	1.12	43.3	44.8	1103.3	566	552.0	14:43	1.13	1.38	0.01
05:29:57	1118.0	1118.0	15.0	39	171	331	2542	1075	1051	1.12	1.12	43.5	45.0	1104.7	562	553.0	14:47	1.13	1.35	0.01
05:33:00	1119.0	1119.0	19.6	37	172	308	2511	1075	1044	1.12	1.12	43.8	45.1	1105.4	558	554.0	14:50	1.13	1.26	0.01
05:35:39	1120.0	1120.0	22.6	39	172	289	2507	1076	1041	1.12	1.12	44.0	45.3	1106.1	556	555.0	14:52	1.13	1.24	0.01
05:38:51	1121.0	1121.0	18.8	40	172	337	2558	1077	1041	1.12	1.12	44.2	45.3	1106.9	555	556.0	14:56	1.13	1.30	0.01
05:42:49	1122.0	1122.0	15.3	39	172	314	2539	1075	1038	1.12	1.12	44.4	45.4	1107.8	546	557.0	14:59	1.13	1.35	0.01
05:46:22	1123.0	1123.0	16.9	39	172	331	2538	1075	1045	1.12	1.12	44.5	45.4	1108.4	541	558.0	15:03	1.13	1.32	0.01
05:50:10	1124.0	1124.0	15.8	39	171	337	2543	1074	1043	1.12	1.12	44.7	45.6	1109.4	538	559.0	15:07	1.13	1.34	0.01
05:54:20	1125.0	1125.0	15.2	39	171	318	2531	1072	1045	1.12	1.12	44.8	45.6	1110.8	530	560.0	15:11	1.13	1.35	0.01
05:58:29	1126.0	1126.0	14.4	39	171	312	2530	1071	1036	1.12	1.12	44.9	45.7	1112.0	525	561.0	15:15	1.13	1.36	0.00
06:03:05	1127.0	1127.0	13.0	38	171	310	2527	1070	1035	1.12	1.12	45.0	45.8	1113.1	519	562.0	15:20	1.13	1.38	0.00
06:05:34	1128.0	1128.0	26.7	38	171	349	2539	1070	1050	1.12	1.12	44.9	45.8	1113.8	522	563.0	15:22	1.13	1.20	0.00
06:06:27	1129.0	1129.0	70.6	33	171	315	2503	1068	1046	1.12	1.12	44.8	45.9	1113.9	523	564.0	15:23	1.13	0.91	0.00
06:07:19	1130.1	1130.1	73.5	33	171	343	2537	1068	1058	1.12	1.12	44.8	45.9	1114.0	523	565.1	15:24	1.13	0.91	0.00
06:08:12	1131.0	1131.0	66.9	38	171	370	2539	1069	1053	1.12	1.12	44.8	45.9	1114.0	524	566.0	15:25	1.13	0.97	0.00
06:09:09	1132.0	1132.0	64.9	38	171	360	2548	1067	1050	1.12	1.12	44.8	45.9	1114.0	522	567.0	15:26	1.13	0.97	0.00
06:20:46	1134.1	1134.1	62.6	31	170	361	2471	1067	1113	1.12	1.12	44.3	44.6	1114.0	515	569.1	15:28	1.13	0.93	0.00
06:21:55	1135.0	1135.0	51.6	34	170	357	2478	1069	1123	1.12	1.12	44.2	44.7	1114.3	514	570.0	15:29	1.13	1.01	0.00
06:25:47	1136.0	1136.0	16.3	37	212	320	2404	1071	1095	1.12	1.12	44.1	45.2	1115.3	511	571.0	15:33	1.13	1.37	0.01
06:26:53	1137.1	1137.1	56.7	34	218	376	2420	1073	1087	1.12	1.12	44.0	45.5	1115.6	512	572.1	15:34	1.13	1.04	0.01
06:28:02	1138.0	1138.0	51.6	34	218	366	2427	1074	1077	1.12	1.12	44.0	45.5	1115.9	506	573.0	15:35	1.13	1.06	0.01
06:29:13	1139.0	1139.0	50.7	38	218	354	2416	1073	1060	1.12	1.12	44.0	45.6	1116.3	504	574.0	15:36	1.13	1.09	0.01
06:30:23	1140.0	1140.0	53.1	38	218	340	2388	1073	1053	1.12	1.12	44.0	45.6	1116.5	503	575.0	15:37	1.13	1.08	0.01
06:31:43	1141.0	1141.0	44.7	37	218	355	2408	1073	1059	1.12	1.12	44.0	45.6	1116.8	504	576.0	15:39	1.13	1.12	0.01
06:32:57	1142.0	1142.0	48.6	36	218	320	2379	1073	1037	1.12	1.12	43.9	45.6	1117.1	504	577.0	15:40	1.13	1.09	0.01
06:45:33	1143.0	1143.0	21.3	35	218	323	2368	1072	1063	1.12	1.12	43.9	45.6	1119.6	514	578.0	15:43	1.13	1.28	0.00
06:47:31	1144.1	1144.0	32.1	38	218	315	2357	1064	1047	1.12	1.12	43.8	45.6	1120.2	510	579.1	15:45	1.13	1.21	0.01
06:49:19	1145.0	1145.0	33.1	37	218	348	2378	1066	1046	1.12	1.12	43.8	45.7	1120.7	509	580.0	15:46	1.13	1.20	0.01
06:51:09	1146.0	1146.0	32.8	38	218	358	2381	1068	1056	1.12	1.12	43.9	45.9	1121.2	510	581.0	15:48	1.13	1.21	0.01
06:52:30	1147.0	1147.0	44.4	39	218	353	2387	1068	1049	1.12	1.12	44.0	45.9	1121.6	512	582.0	15:50	1.13	1.13	0.01
06:54:42	1148.0	1148.0	27.3	37	218	339	2357	1069	1040	1.12	1.12	44.1	46.0	1122.1	512	583.0	15:52	1.13	1.24	0.01
06:57:37	1149.0	1149.0	20.6	39	218	366	2401	1069	1044	1.12	1.12	44.2	46.0	1122.9	514	584.0	15:55	1.13	1.33	0.01
07:00:35	1150.0	1150.0	20.2	40	218	379	2402	1070	1053	1.12	1.12	44.3	46.0	1123.6	511	585.0	15:58	1.13	1.34	0.01

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
07:02:56	1151.0	1151.0	25.5	37	218	377	2394	1071	1061	1.12	1.12	44.4	46.1	1124.1	503	586.0	16:00	1.13	1.26	0.00
07:05:23	1152.0	1152.0	24.5	38	219	367	2399	1074	1066	1.12	1.12	44.4	46.1	1124.8	486	587.0	16:03	1.13	1.27	0.00
07:16:27	1153.0	1153.0	21.6	28	192	300	2245	1066	1084	1.12	1.12	44.4	46.3	1126.8	490	588.0	16:05	1.13	1.18	0.00
07:19:19	1154.0	1154.0	20.9	35	217	333	2336	1071	1100	1.12	1.12	44.6	46.6	1127.7	489	589.0	16:08	1.13	1.28	0.02
07:28:08	1155.0	1155.0	6.8	38	198	260	2297	1075	1099	1.12	1.12	45.2	46.4	1133.7	484	590.0	16:17	1.13	1.57	0.02
07:29:39	1156.0	1156.0	39.6	38	172	358	2424	1083	1097	1.12	1.12	45.6	46.3	1134.7	483	591.0	16:19	1.13	1.10	0.02
07:30:47	1157.0	1157.0	52.9	37	170	351	2442	1084	1104	1.12	1.12	45.6	46.4	1135.2	482	592.0	16:20	1.13	1.01	0.02
07:32:15	1158.0	1158.0	41.4	40	171	337	2439	1086	1093	1.12	1.12	45.7	46.5	1135.3	482	593.0	16:21	1.13	1.10	0.02
07:34:33	1159.0	1159.0	26.0	38	171	307	2420	1085	1068	1.12	1.12	45.7	46.6	1136.8	479	594.0	16:23	1.13	1.20	0.02
07:37:42	1160.0	1160.0	19.0	39	171	281	2436	1086	1073	1.12	1.12	45.8	46.6	1139.4	479	595.0	16:27	1.13	1.29	0.03
07:40:27	1161.0	1161.0	22.2	39	171	329	2490	1087	1087	1.12	1.12	45.9	46.7	1141.3	479	596.0	16:29	1.13	1.25	0.03
07:43:05	1162.0	1162.0	22.8	39	171	344	2516	1087	1083	1.12	1.12	46.0	46.7	1142.6	480	597.0	16:32	1.13	1.24	0.03
07:46:06	1163.0	1163.0	19.8	39	171	328	2515	1089	1076	1.12	1.12	46.1	46.6	1142.9	480	598.0	16:35	1.13	1.28	0.03
07:49:24	1164.0	1164.0	18.4	38	171	357	2511	1089	1079	1.12	1.12	46.1	46.7	1142.9	479	599.0	16:38	1.13	1.29	0.03
07:52:54	1165.0	1165.0	17.1	40	171	349	2534	1091	1077	1.12	1.12	46.2	46.7	1144.3	476	600.0	16:42	1.13	1.32	0.03
07:56:18	1166.0	1166.0	17.6	38	171	347	2524	1092	1081	1.12	1.12	46.2	46.6	1146.2	471	601.0	16:45	1.13	1.30	0.03
07:59:32	1167.0	1167.0	18.6	37	171	353	2516	1090	1079	1.12	1.12	46.3	46.6	1147.9	470	602.0	16:48	1.13	1.28	0.02
08:02:31	1168.0	1168.0	20.1	38	171	367	2523	1091	1079	1.12	1.12	46.3	46.7	1149.0	469	603.0	16:51	1.13	1.27	0.02
08:05:41	1169.0	1169.0	20.0	38	171	343	2524	1091	1076	1.12	1.12	46.3	46.9	1150.0	472	604.0	16:55	1.13	1.27	0.02
08:07:53	1170.0	1170.0	27.2	37	171	327	2487	1090	1069	1.12	1.12	46.3	47.0	1150.8	470	605.0	16:57	1.13	1.18	0.02
08:10:26	1171.0	1171.0	23.5	36	171	313	2485	1091	1086	1.12	1.12	46.4	47.1	1151.9	471	606.0	16:59	1.13	1.21	0.02
08:26:34	1172.0	1172.0	10.7	36	172	312	2515	1093	1095	1.12	1.12	46.4	47.2	1153.8	453	607.0	17:05	1.13	1.41	0.02
08:29:51	1173.0	1173.0	18.3	36	171	345	2541	1094	1083	1.12	1.12	46.5	46.8	1154.4	450	608.0	17:08	1.13	1.27	0.03
08:32:59	1174.0	1174.0	19.1	35	171	328	2542	1094	1075	1.12	1.12	46.4	47.1	1154.7	447	609.0	17:11	1.13	1.25	0.03
08:35:56	1175.0	1175.0	20.6	36	171	346	2548	1092	1070	1.12	1.12	46.2	47.3	1155.2	447	610.0	17:14	1.13	1.25	0.04
08:39:13	1176.0	1176.0	18.2	38	170	345	2534	1087	1082	1.12	1.12	46.0	47.3	1157.3	447	611.0	17:18	1.13	1.27	0.04
08:42:23	1177.0	1177.0	20.5	38	170	365	2527	1086	1081	1.12	1.12	46.0	47.5	1158.9	448	612.0	17:21	1.13	1.26	0.04
08:45:24	1178.0	1178.0	19.8	36	170	342	2491	1086	1067	1.12	1.12	46.0	47.7	1159.9	447	613.0	17:24	1.13	1.25	0.04
08:48:50	1179.0	1179.0	17.6	37	170	357	2486	1084	1073	1.12	1.12	46.1	47.8	1161.0	448	614.0	17:27	1.13	1.29	0.04
08:52:40	1180.0	1180.0	15.6	36	170	322	2468	1084	1079	1.12	1.12	46.2	47.8	1162.3	450	615.0	17:31	1.13	1.31	0.04
08:55:36	1181.0	1181.0	20.5	35	170	315	2450	1084	1065	1.12	1.12	46.3	47.8	1163.3	447	616.0	17:34	1.13	1.24	0.04
08:59:05	1182.0	1182.0	17.2	36	170	321	2466	1084	1066	1.12	1.12	46.5	47.8	1164.3	448	617.0	17:37	1.13	1.28	0.04
09:02:04	1183.1	1183.0	20.2	35	170	310	2451	1084	1065	1.12	1.12	46.7	47.8	1165.0	446	618.1	17:40	1.13	1.24	0.04
09:06:24	1184.0	1184.0	13.8	34	170	312	2447	1084	1069	1.12	1.12	46.9	47.9	1166.3	442	619.0	17:45	1.13	1.31	0.04
09:09:55	1185.0	1185.0	18.0	35	170	311	2472	1084	1071	1.12	1.12	47.1	47.9	1172.2	442	620.0	17:48	1.13	1.26	0.04
09:14:08	1186.0	1186.0	14.2	34	178	308	2465	1084	1077	1.12	1.12	46.7	48.0	1173.4	446	621.0	17:52	1.13	1.32	0.04
09:18:46	1187.1	1187.0	13.5	35	217	304	2418	1083	1077	1.12	1.12	46.3	48.1	1174.7	451	622.1	17:57	1.13	1.39	0.04
09:21:44	1188.0	1188.0	20.2	35	217	344	2444	1083	1060	1.12	1.12	46.2	48.0	1175.5	455	623.0	18:00	1.13	1.29	0.04
09:25:28	1189.0	1189.0	16.0	35	217	349	2405	1083	1073	1.12	1.12	46.0	48.0	1176.5	461	624.0	18:04	1.13	1.35	0.04
09:29:44	1190.0	1190.0	14.1	34	156	335	2379	1082	1075	1.12	1.12	46.0	48.0	1177.7	462	625.0	18:08	1.13	1.29	0.04
09:34:04	1191.0	1191.0	13.8	34	150	328	2375	1082	1053	1.12	1.12	46.1	48.0	1178.9	464	626.0	18:12	1.13	1.29	0.04
09:38:04	1192.0	1192.0	15.0	34	167	355	2367	1082	1074	1.12	1.12	46.1	48.0	1180.0	467	627.0	18:16	1.13	1.30	0.04
09:43:03	1193.0	1193.0	12.0	36	179	539	2397	1083	1072	1.12	1.12	46.3	48.0	1181.4	470	628.0	18:21	1.13	1.38	0.04
09:51:31	1194.0	1194.0	8.6	32	179	554	2393	1083	1072	1.12	1.12	46.5	48.0	1183.7	472	629.0	18:28	1.13	1.43	0.05
09:55:59	1195.0	1195.0	13.4	35	180	560	2406	1083	1078	1.12	1.12	46.5	48.0	1184.9	473	630.0	18:33	1.13	1.35	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	BIT		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
09:57:39	1196.0	1196.0	36.0	33	180	352	2406	1082	1073	1.12	1.12	46.5	48.0	1185.2	474	631.0	18:35	1.13	1.09	0.04
09:59:18	1197.0	1197.0	36.4	35	180	302	2404	1082	1077	1.12	1.12	46.5	48.0	1185.5	475	632.0	18:36	1.13	1.11	0.04
10:01:16	1198.0	1198.0	32.1	31	181	281	2373	1082	1081	1.12	1.12	46.6	48.1	1185.9	476	633.0	18:38	1.13	1.10	0.04
10:02:45	1199.0	1199.0	40.7	30	181	295	2384	1081	1062	1.12	1.12	46.7	48.1	1186.2	474	634.0	18:40	1.13	1.03	0.04
10:04:17	1200.0	1200.0	38.8	31	181	333	2427	1081	1064	1.12	1.12	46.9	48.1	1186.5	474	635.0	18:41	1.13	1.06	0.05
10:33:31	1201.0	1201.0	30.6	29	180	293	2453	1084	1052	1.12	1.12	47.2	48.1	1191.1	456	636.0	18:43	1.13	1.10	0.03
10:35:23	1202.0	1202.0	32.0	32	179	292	2550	1089	1060	1.12	1.12	47.5	48.1	1191.5	454	637.0	18:45	1.13	1.11	0.04
10:37:53	1203.0	1203.0	24.0	35	179	321	2599	1091	1071	1.12	1.12	47.2	48.0	1192.3	455	638.0	18:48	1.13	1.21	0.04
10:40:56	1204.0	1204.0	19.7	32	180	294	2548	1093	1068	1.12	1.12	46.8	48.0	1192.6	456	639.0	18:51	1.13	1.23	0.04
10:42:52	1205.1	1205.0	31.2	34	179	326	2568	1086	1075	1.12	1.12	46.6	47.9	1193.0	456	640.1	18:53	1.13	1.13	0.04
10:43:55	1206.0	1206.0	57.1	28	178	318	2530	1082	1073	1.12	1.12	46.5	47.9	1193.1	457	641.0	18:54	1.13	0.93	0.04
10:49:02	1207.0	1207.0	11.7	30	178	218	2424	1077	1073	1.12	1.12	46.4	47.9	1193.6	457	642.0	18:59	1.13	1.33	0.04
10:50:17	1208.0	1208.0	48.3	35	177	299	2457	1068	1065	1.12	1.12	46.3	47.8	1193.8	457	643.0	19:00	1.13	1.03	0.04
10:51:19	1209.1	1209.0	60.3	35	177	289	2455	1068	1057	1.12	1.12	46.3	47.8	1194.0	459	644.1	19:01	1.13	0.98	0.04
10:52:43	1210.0	1210.0	42.5	39	177	307	2481	1067	1054	1.12	1.12	46.3	47.8	1194.2	460	645.0	19:02	1.13	1.10	0.05
10:53:49	1211.0	1211.0	56.4	40	178	325	2477	1067	1075	1.12	1.12	46.2	47.9	1194.4	463	646.0	19:04	1.13	1.03	0.05
10:55:13	1212.0	1212.0	42.6	38	179	297	2442	1067	1065	1.12	1.12	46.1	47.9	1194.7	466	647.0	19:05	1.13	1.09	0.05
10:56:58	1213.0	1213.0	34.3	39	179	317	2461	1067	1071	1.12	1.12	46.0	47.9	1195.2	467	648.0	19:07	1.13	1.15	0.06
10:59:39	1214.0	1214.0	22.4	39	179	284	2416	1067	1059	1.12	1.12	45.9	47.9	1196.9	471	649.0	19:09	1.13	1.26	0.08
11:01:26	1215.0	1215.0	33.6	39	179	311	2411	1067	1076	1.12	1.12	45.8	48.0	1197.7	472	650.0	19:11	1.13	1.26	0.09
11:03:48	1216.0	1216.0	25.4	38	179	281	2390	1066	1054	1.12	1.12	45.8	48.0	1199.1	477	651.0	19:14	1.13	1.22	0.09
11:06:42	1217.0	1217.0	20.7	37	179	280	2359	1070	1070	1.12	1.12	45.8	48.0	1200.5	479	652.0	19:16	1.13	1.26	0.0[illegible]
11:10:22	1218.0	1218.0	16.5	37	181	299	2371	1083	1060	1.12	1.12	45.9	48.0	1200.6	484	653.0	19:20	1.13	1.32	0.[illegible]
11:13:33	1219.0	1219.0	19.1	37	181	306	2367	1085	1070	1.12	1.12	46.1	48.1	1200.6	490	654.0	19:23	1.13	1.28	0.06
11:16:45	1220.0	1220.0	18.7	38	181	307	2377	1084	1070	1.12	1.12	46.3	48.1	1200.8	490	655.0	19:27	1.13	1.30	0.06
11:21:00	1221.0	1221.0	14.1	38	181	314	2394	1084	1083	1.12	1.12	46.7	48.2	1202.5	493	656.0	19:31	1.13	1.37	0.06
11:22:51	1222.0	1222.0	36.0	38	181	333	2439	1084	1082	1.12	1.12	46.9	48.2	1203.3	494	657.0	19:33	1.13	1.13	0.06
11:25:40	1223.0	1223.0	30.8	26	176	331	2444	1082	1098	1.12	1.12	46.9	48.3	1204.4	496	658.0	19:35	1.13	1.06	0.07
11:26:59	1224.0	1224.0	45.4	31	180	325	2436	1083	1076	1.12	1.12	46.8	48.3	1205.0	500	659.0	19:36	1.13	1.02	0.07
11:28:28	1225.0	1225.0	40.4	34	181	328	2464	1085	1068	1.12	1.12	46.7	48.4	1205.5	500	660.0	19:37	1.13	1.08	0.08
11:29:44	1226.0	1226.0	47.4	34	180	372	2474	1085	1081	1.12	1.12	46.6	48.4	1206.1	503	661.0	19:39	1.13	1.04	0.08
11:31:00	1227.0	1227.0	47.4	33	177	361	2443	1085	1087	1.12	1.12	46.6	48.4	1206.6	502	662.0	19:40	1.13	1.02	0.08
11:32:26	1228.0	1228.0	41.9	33	181	287	2422	1084	1085	1.12	1.12	46.6	48.5	1207.2	506	663.0	19:41	1.13	1.06	0.08
11:35:23	1229.0	1229.0	20.3	38	181	284	2428	1084	1077	1.12	1.12	46.7	48.5	1208.4	508	664.0	19:44	1.13	1.27	0.09
11:54:08	1230.0	1230.0	12.1	34	181	264	2430	1089	1076	1.12	1.12	46.5	48.0	1214.0	521	665.0	19:49	1.13	1.36	0.09
11:57:01	1231.0	1231.0	20.7	35	182	313	2511	1095	1078	1.12	1.12	46.6	47.9	1215.2	521	666.0	19:52	1.13	1.24	0.09
11:58:05	1232.0	1232.0	56.2	32	182	301	2512	1097	1076	1.12	1.12	46.7	48.0	1215.7	519	667.0	19:53	1.13	0.98	0.08
11:59:45	1233.0	1233.0	39.6	36	182	309	2523	1097	1079	1.12	1.12	46.8	48.0	1216.4	522	668.0	19:55	1.13	1.10	0.08
12:01:16	1234.1	1234.1	42.4	33	182	297	2507	1097	1086	1.12	1.12	46.9	48.1	1217.0	520	669.1	19:56	1.13	1.05	0.08
12:02:39	1235.0	1235.0	43.0	33	182	304	2540	1098	1068	1.12	1.12	47.0	48.0	1217.6	519	670.0	19:58	1.13	1.05	0.08
12:04:00	1236.0	1236.0	47.4	34	182	309	2554	1098	1079	1.12	1.12	47.1	48.0	1218.1	517	671.0	19:59	1.13	1.03	0.07
12:21:27	1237.0	1237.0	3.8	35	186	262	2500	1094	1056	1.12	1.12	47.2	48.0	1224.7	499	672.0	20:15	1.13	1.67	0.08
12:31:07	1238.0	1238.0	9.5	24	175	258	2506	1084	1058	1.12	1.12	47.7	48.4	1229.4	498	673.0	20:21	1.13	1.28	0.06
12:32:58	1239.0	1239.0	32.3	20	165	239	2512	1085	1052	1.12	1.12	47.9	48.5	1229.4	496	674.0	20:23	1.13	0.96	0.06
12:35:16	1240.0	1240.0	26.6	24	164	246	2529	1080	1072	1.12	1.12	47.9	48.6	1229.4	497	675.0	20:25	1.13	1.06	0.06

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
12:38:49	1241.0	1241.0	16.9	28	164	235	2543	1085	1052	1.12	1.12	47.9	48.7	1229.4	495	676.0	20:29	1.13	1.20	0.06
12:42:13	1242.1	1242.0	18.8	33	164	265	2578	1086	1069	1.12	1.12	48.0	48.6	1229.7	497	677.1	20:32	1.13	1.23	0.06
12:44:37	1243.0	1243.0	25.0	35	164	293	2613	1087	1073	1.12	1.12	48.1	48.6	1230.2	496	678.0	20:35	1.13	1.18	0.07
12:46:56	1244.0	1244.0	25.9	40	164	330	2670	1087	1062	1.12	1.12	48.1	48.6	1231.1	496	679.0	20:37	1.13	1.21	0.08
12:49:50	1245.0	1245.0	20.7	40	164	331	2662	1088	1075	1.12	1.12	48.2	48.5	1232.9	495	680.0	20:40	1.13	1.26	0.09
12:53:08	1246.0	1246.0	18.2	37	164	301	2621	1086	1086	1.12	1.12	48.2	48.5	1235.0	493	681.0	20:43	1.13	1.27	0.09
12:56:23	1247.0	1247.0	18.5	35	164	305	2623	1085	1093	1.12	1.12	48.2	48.6	1236.5	492	682.0	20:47	1.13	1.25	0.07
13:11:54	1248.0	1248.0	16.6	37	164	276	2600	1079	1071	1.12	1.12	48.3	48.6	1236.8	488	683.0	20.50	1.13	1.27	0.03
13:12:13	1249.0	1249.0	17.0	38	163	269	2619	1077	1037	1.12	1.12	48.3	46.8	1236.8	486	684.0	20:52	1.13	1.28	0.03
13:13:26	1250.0	1250.0	19.8	34	164	229	2580	1086	1066	1.12	1.12	48.7	49.4	1236.9	486	685.0	20:53	1.13	1.23	0.03
13:14:25	1251.0	1251.0	20.3	38	164	291	2649	1087	1041	1.12	1.12	48.7	49.5	1236.8	486	686.0	20:54	1.13	1.26	0.03
13:16:48	1252.0	1252.0	24.4	34	164	273	2628	1086	1037	1.12	1.12	48.7	49.5	1237.5	487	687.0	20:56	1.13	1.17	0.04
13:20:50	1253.0	1253.0	14.9	38	164	284	2643	1082	1057	1.12	1.12	48.8	49.5	1238.7	488	688.0	21:00	1.13	1.33	0.05
13:22:01	1254.0	1254.0	15.1	37	164	256	2589	1084	1059	1.12	1.12	48.7	49.5	1239.0	488	689.0	21:02	1.13	1.32	0.05
13:25:50	1255.0	1255.0	15.7	38	164	275	2614	1079	1051	1.12	1.12	48.5	49.5	1240.1	488	690.0	21:05	1.13	1.32	0.06
13:29:03	1256.0	1256.0	18.7	39	163	311	2590	1079	1045	1.12	1.12	48.3	49.5	1241.1	492	691.0	21:09	1.13	1.28	0.06
13:32:12	1257.0	1257.0	17.4	38	164	334	2571	1084	1056	1.12	1.12	48.2	49.5	1242.0	492	692.0	21:12	1.13	1.29	0.07
13:33:54	1258.0	1258.0	23.7	38	164	317	2552	1083	1067	1.12	1.12	48.1	49.5	1242.6	493	693.0	21:13	1.13	1.21	0.07
13:51:08	1259.0	1259.0	10.5	37	164	297	2500	1085	1046	1.12	1.12	47.7	48.7	1246.3	490	694.0	21:19	1.13	1.41	0.05
13:54:38	1260.1	1260.0	17.2	38	164	302	2482	1087	1057	1.12	1.12	47.5	49.1	1247.4	494	695.1	21:23	1.13	1.29	0.06
13:57:16	1261.0	1261.0	22.7	38	164	290	2452	1087	1063	1.12	1.12	47.6	49.4	1248.2	494	696.0	21:25	1.13	1.23	0.06
13:59:59	1262.0	1262.0	22.1	39	164	277	2442	1086	1051	1.12	1.12	47.6	49.4	1249.1	495	697.0	21:28	1.13	1.24	0.07
14:02:47	1263.1	1263.0	22.5	38	164	291	2452	1086	1066	1.12	1.12	47.8	49.3	1250.0	497	698.1	21:31	1.13	1.23	0.07
14:05:36	1264.0	1264.0	21.3	38	164	308	2464	1087	1059	1.12	1.12	47.9	49.6	1250.9	496	699.0	21:34	1.13	1.24	0.07
14:08:53	1265.0	1265.0	19.4	40	164	325	2503	1086	1049	1.12	1.12	48.0	49.8	1251.9	496	700.0	21:37	1.13	1.28	0.08
14:12:04	1266.0	1266.0	18.8	39	164	325	2511	1086	1061	1.12	1.12	48.2	49.8	1252.9	497	701.0	21:40	1.13	1.28	0.08
14:14:16	1267.0	1267.0	27.3	37	196	312	2484	1087	1062	1.12	1.12	48.3	49.7	1253.6	498	702.0	21:42	1.13	1.22	0.08
14:23:26	1268.0	1268.0	7.4	39	200	232	2398	1085	1072	1.12	1.12	48.5	49.6	1256.4	500	703.0	21:50	1.13	1.57	0.04
14:27:09	1269.0	1269.0	16.1	38	200	284	2423	1085	1059	1.12	1.12	48.7	49.6	1257.5	497	704.0	21:54	1.13	1.36	0.05
14:28:54	1270.0	1270.0	37.7	34	200	342	2460	1084	1059	1.12	1.12	48.7	49.6	1257.9	477	705.0	21:56	1.13	1.11	0.05
14:31:12	1271.0	1271.0	26.1	34	200	314	2447	1085	1057	1.12	1.12	48.8	49.6	1258.1	466	706.0	21:58	1.13	1.21	0.05
14:34:18	1272.0	1272.0	19.5	36	200	324	2477	1085	1056	1.12	1.12	48.9	49.5	1258.1	466	707.0	22:01	1.13	1.30	0.05
14:37:49	1273.0	1273.0	17.0	37	200	331	2528	1087	1082	1.12	1.12	48.9	49.6	1258.2	468	708.0	22:05	1.13	1.34	0.05
14:40:54	1274.0	1274.0	19.5	39	200	341	2573	1087	1091	1.12	1.12	49.0	49.6	1259.0	465	709.0	22:08	1.13	1.32	0.05
14:44:09	1275.0	1275.0	18.5	38	200	322	2591	1087	1080	1.12	1.12	49.0	49.5	1259.8	463	710.0	22:11	1.13	1.32	0.06
14:48:43	1276.0	1276.0	13.1	36	193	285	2591	1087	1076	1.12	1.12	49.0	49.4	1261.4	463	711.0	22:16	1.13	1.39	0.08
14:51:57	1277.0	1277.0	18.7	38	185	285	2614	1088	1081	1.12	1.12	49.0	49.4	1262.5	461	712.0	22:19	1.13	1.31	0.07
14:55:06	1278.0	1278.0	19.0	37	186	293	2619	1089	1089	1.12	1.12	49.0	49.3	1263.5	459	713.0	22:22	1.13	1.29	0.05
14:59:25	1279.0	1279.0	13.9	32	186	280	2615	1089	1087	1.12	1.12	49.0	49.3	1265.3	456	714.0	22:26	1.13	1.32	0.06
15:04:41	1280.0	1280.0	11.4	38	187	304	2602	1076	1083	1.12	1.12	49.0	49.4	1266.5	450	715.0	22:32	1.13	1.44	0.07
15:09:56	1281.0	1281.0	11.4	37	186	302	2547	1074	1073	1.12	1.12	48.9	49.6	1267.7	444	716.0	22:37	1.13	1.42	0.08
15:14:27	1282.0	1282.0	13.8	38	187	284	2526	1074	1070	1.12	1.12	49.0	49.8	1267.9	442	717.0	22:41	1.13	1.38	0.07
15:18:36	1283.0	1283.0	15.4	39	187	240	2515	1075	1061	1.12	1.12	49.1	49.9	1268.8	438	718.0	22:46	1.13	1.36	0.07
15:22:50	1284.0	1284.0	14.1	37	187	261	2514	1077	1046	1.12	1.12	49.2	49.8	1270.8	433	719.0	22:50	1.13	1.37	0.08
15:26:15	1285.1	1285.0	17.9	38	187	272	2530	1079	1037	1.12	1.12	49.4	49.8	1271.8	430	720.1	22:53	1.13	1.33	0.08

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
15:31:03	1286.0	1286.0	12.5	38	187	271	2516	1082	1040	1.12	1.12	49.4	49.9	1273.1	430	721.0	22:58	1.13	1.41	0.08
15:36:32	1287.0	1287.0	11.8	36	188	297	2531	1085	1047	1.12	1.12	49.5	50.1	1274.7	429	722.0	23:03	1.13	1.40	0.07
15:50:46	1288.0	1288.0	17.2	35	181	278	2598	1094	1049	1.12	1.12	49.5	49.2	1276.7	407	723.0	23:07	1.13	1.33	0.01
15:54:24	1289.0	1289.0	16.5	35	178	281	2635	1110	1065	1.12	1.12	49.3	49.6	1277.6	402	724.0	23:10	1.13	1.29	0.04
15:57:58	1290.0	1290.0	16.8	35	178	299	2658	1111	1051	1.12	1.12	49.3	50.0	1278.4	401	725.0	23:14	1.13	1.29	0.06
16:01:09	1291.0	1291.0	18.8	36	178	316	2678	1113	1051	1.12	1.12	49.3	50.2	1279.1	399	726.0	23:17	1.13	1.27	0.06
16:05:10	1292.0	1292.0	16.1	38	178	333	2694	1113	1050	1.12	1.12	49.4	50.2	1280.0	396	727.0	23:21	1.13	1.33	0.05
16:08:29	1293.0	1293.0	18.0	36	178	310	2669	1112	1051	1.12	1.12	49.5	50.2	1280.8	394	728.0	23:25	1.13	1.28	0.04
16:12:15	1294.0	1294.0	15.9	36	178	308	2689	1113	1046	1.12	1.12	49.6	50.5	1281.6	394	729.0	23:28	1.13	1.32	0.02
16:17:02	1295.0	1295.0	12.5	38	178	312	2679	1113	1054	1.12	1.12	49.3	50.8	1282.7	398	730.0	23:33	1.13	1.39	0.05
16:21:13	1296.0	1296.0	14.3	38	178	316	2617	1110	1050	1.12	1.12	49.0	50.9	1283.7	405	731.0	23:37	1.13	1.36	0.06
16:25:51	1297.0	1297.0	13.6	38	179	323	2522	1109	1040	1.12	1.12	49.0	50.9	1284.7	405	732.0	23:42	1.13	1.38	0.05
16:31:53	1298.0	1298.0	13.9	35	182	312	2452	1107	1046	1.12	1.12	49.0	51.0	1286.1	410	733.0	23:46	1.13	1.34	0.06
16:36:21	1299.1	1299.0	14.1	37	182	321	2448	1105	1045	1.12	1.12	49.1	50.9	1287.1	410	734.1	23:51	1.13	1.36	0.06
16:40:50	1300.0	1300.0	13.4	39	182	317	2460	1106	1045	1.12	1.12	49.5	51.0	1288.2	412	735.0	23:55	1.13	1.39	0.06
16:48:50	1302.0	1302.0	14.7	39	182	316	2501	1105	1059	1.12	1.12	49.7	50.9	1290.3	417	737.0	24:03	1.13	1.36	0.07
16:52:50	1303.0	1303.0	15.0	38	182	332	2509	1104	1042	1.12	1.12	49.7	51.0	1291.4	418	738.0	24:07	1.13	1.36	0.07
16:57:31	1304.0	1304.0	12.8	40	182	323	2521	1103	1049	1.12	1.12	49.8	51.0	1292.5	419	739.0	24:12	1.13	1.41	0.07
17:02:23	1305.0	1305.0	12.3	38	182	297	2503	1103	1040	1.12	1.12	49.8	51.1	1293.7	419	740.0	24:17	1.13	1.41	0.07
17:09:05	1306.0	1306.0	9.0	39	182	260	2502	1102	1045	1.12	1.12	49.9	51.2	1295.2	422	741.0	24:23	1.13	1.50	0.06
17:15:13	1307.0	1307.0	9.8	40	190	302	2534	1102	1036	1.12	1.12	50.1	51.2	1296.6	421	742.0	24:30	1.13	1.49	0.06
17:19:39	1308.0	1308.0	13.6	39	198	307	2535	1102	1052	1.12	1.12	50.2	51.1	1297.6	421	743.0	24:34	1.13	1.41	0.0
17:24:36	1309.0	1309.0	12.1	37	198	283	2506	1102	1041	1.12	1.12	50.2	51.0	1298.1	425	744.0	24:39	1.13	1.42	0.0
17:31:36	1310.0	1310.0	8.6	38	198	269	2498	1101	1049	1.12	1.12	50.2	51.0	1299.8	426	745.0	24:46	1.13	1.52	0.06
17:40:14	1311.0	1311.0	8.1	39	182	281	2518	1099	1048	1.12	1.12	50.1	51.1	1301.6	433	746.0	24:53	1.13	1.52	0.07
17:46:36	1312.0	1312.0	9.4	40	168	292	2541	1100	1061	1.12	1.12	49.8	51.2	1303.1	436	747.0	24:60	1.13	1.47	0.07
17:51:49	1313.0	1313.0	11.5	41	185	297	2498	1100	1068	1.12	1.12	49.7	51.4	1304.2	440	748.0	25:05	1.13	1.46	0.07
17:56:31	1314.0	1314.0	12.8	42	189	300	2487	1099	1069	1.12	1.12	49.7	51.3	1305.0	442	749.0	25:10	1.13	1.44	0.06
18:01:07	1315.0	1315.0	13.0	41	189	299	2457	1100	1057	1.12	1.12	49.7	51.4	1305.7	446	750.0	25:14	1.13	1.43	0.07
18:05:59	1316.0	1316.0	12.8	41	189	296	2483	1099	1062	1.12	1.12	49.8	51.5	1306.4	453	751.0	25:19	1.13	1.44	0.07
18:10:36	1317.0	1317.0	13.0	41	189	285	2490	1100	1057	1.12	1.12	49.8	51.5	1307.2	455	752.0	25:24	1.13	1.43	0.07
18:24:41	1318.0	1318.0	17.7	38	177	265	2442	1081	1072	1.12	1.12	50.3	49.8	1309.3	426	753.0	25:27	1.13	1.39	0.02
18:28:58	1319.0	1319.0	14.0	38	178	292	2513	1092	1054	1.12	1.12	50.2	50.9	1310.0	429	754.0	25:32	1.13	1.37	0.03
18:33:01	1320.0	1320.0	14.8	38	179	297	2526	1095	1043	1.12	1.12	50.3	51.4	1310.7	429	755.0	25:36	1.13	1.35	0.04
18:37:25	1321.0	1321.0	13.6	38	179	296	2541	1095	1043	1.12	1.12	50.4	51.5	1311.4	431	756.0	25:40	1.13	1.38	0.05
18:42:19	1322.0	1322.0	12.2	38	179	273	2547	1096	1051	1.12	1.12	50.5	51.5	1312.3	434	757.0	25:45	1.13	1.40	0.05
18:47:33	1323.0	1323.0	11.9	39	179	296	2585	1096	1056	1.12	1.12	50.7	51.6	1313.1	433	758.0	25:50	1.13	1.42	0.06
18:52:19	1324.0	1324.0	12.6	38	179	285	2584	1096	1060	1.12	1.12	50.7	51.5	1314.0	437	759.0	25:55	1.13	1.39	0.07
18:58:07	1325.0	1325.0	10.4	38	179	277	2580	1095	1062	1.12	1.12	50.8	51.5	1314.9	439	760.0	26:01	1.13	1.44	0.07
19:02:15	1326.0	1326.0	14.5	38	191	304	2610	1096	1060	1.12	1.12	50.6	51.5	1315.6	440	761.0	26:05	1.13	1.38	0.07
19:07:40	1327.0	1327.0	11.1	39	191	296	2593	1096	1091	1.12	1.12	50.5	51.4	1316.6	444	762.0	26:10	1.13	1.41	0.08
19:12:47	1328.0	1328.0	11.7	39	191	294	2575	1096	1081	1.12	1.12	50.3	51.3	1317.4	446	763.0	26:15	1.13	1.44	0.08
19:18:11	1329.0	1329.0	11.1	38	192	278	2551	1096	1093	1.12	1.12	50.2	51.3	1318.6	444	764.0	26:21	1.13	1.45	0.08
19:22:45	1330.0	1330.0	13.1	39	191	275	2540	1094	1055	1.12	1.12	50.1	51.3	1319.5	446	765.0	26:25	1.13	1.41	0.08
19:29:30	1331.0	1331.0	12.5	36	191	261	2492	1094	1061	1.12	1.12	50.1	51.3	1321.0	452	766.0	26:32	1.13	1.40	0.08

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
19:33:49	1332.0	1332.0	13.9	40	191	299	2551	1094	1052	1.12	1.12	50.1	51.4	1321.8	457	767.0	26:36	1.13	1.40	0.07
19:38:02	1333.0	1333.0	14.2	41	191	319	2559	1095	1068	1.12	1.12	50.1	51.3	1322.6	463	768.0	26:41	1.13	1.41	0.07
19:44:02	1334.0	1334.0	10.0	40	191	294	2541	1094	1065	1.12	1.12	50.1	51.4	1323.8	466	769.0	26:47	1.13	1.48	0.07
19:50:07	1335.1	1335.0	9.9	41	189	262	2528	1095	1069	1.12	1.12	50.1	51.5	1325.0	462	770.1	26:53	1.13	1.50	0.03
19:55:35	1336.0	1336.0	11.0	48	153	337	2630	1095	1056	1.12	1.12	50.2	51.6	1326.1	462	771.0	26:58	1.13	1.49	0.03
20:00:48	1337.0	1337.0	11.5	50	152	344	2634	1096	1054	1.12	1.12	50.3	51.8	1327.1	464	772.0	27:03	1.13	1.49	0.07
20:04:56	1338.0	1338.0	14.5	51	152	352	2700	1097	1029	1.12	1.12	50.6	51.9	1327.9	460	773.0	27:08	1.13	1.43	0.07
20:08:47	1339.0	1339.0	15.6	51	152	353	2701	1098	1045	1.12	1.12	50.8	51.8	1328.7	460	774.0	27:11	1.13	1.41	0.07
20:14:48	1340.0	1340.0	10.0	50	152	368	2742	1098	1049	1.12	1.12	50.9	51.8	1329.9	461	775.0	27:17	1.13	1.52	0.07
20:18:50	1341.0	1341.0	14.9	46	152	339	2694	1097	1058	1.12	1.12	50.9	51.8	1330.6	465	776.0	27:21	1.13	1.38	0.07
20:22:23	1342.0	1342.0	16.9	50	152	352	2690	1098	1037	1.12	1.12	50.9	51.8	1331.3	466	777.0	27:25	1.13	1.38	0.07
20:26:27	1343.0	1343.0	14.7	51	152	342	2688	1098	1035	1.12	1.12	50.5	51.8	1332.2	471	778.0	27:29	1.13	1.43	0.07
20:30:20	1344.0	1344.0	15.5	52	152	363	2658	1097	1037	1.12	1.12	50.1	51.7	1333.0	475	779.0	27:33	1.13	1.43	0.07
20:35:05	1345.0	1345.0	12.6	52	152	351	2623	1096	1039	1.12	1.12	50.2	51.7	1333.9	466	780.0	27:38	1.13	1.48	0.06
20:39:31	1346.0	1346.0	13.5	52	152	363	2627	1096	1042	1.12	1.12	50.3	51.7	1334.5	465	781.0	27:42	1.13	1.46	0.05
21:06:49	1347.0	1347.0	8.1	52	152	351	2655	1097	1052	1.12	1.12	50.3	51.7	1338.1	435	782.0	27:50	1.13	1.60	0.04
21:12:21	1348.1	1348.0	10.9	51	154	373	2677	1107	1056	1.12	1.12	49.3	51.2	1339.4	430	783.1	27:55	1.13	1.51	0.04
21:16:17	1349.0	1349.0	15.2	51	154	377	2713	1110	1060	1.12	1.12	49.6	51.2	1339.9	432	784.0	27:59	1.13	1.43	0.03
21:20:35	1350.0	1350.0	14.7	52	154	359	2716	1110	1082	1.12	1.12	49.8	51.5	1340.9	426	785.0	28:03	1.13	1.44	0.06
21:25:38	1351.1	1351.0	11.9	50	154	356	2707	1110	1070	1.12	1.12	49.9	52.0	1342.3	431	786.1	28:08	1.13	1.47	0.06
21:30:15	1352.0	1352.0	13.0	51	154	379	2726	1110	1058	1.12	1.12	49.8	51.9	1343.3	434	787.0	28:13	1.13	1.47	0.08
21:34:51	1353.0	1353.0	14.4	52	154	384	2724	1112	1076	1.12	1.12	49.9	51.7	1344.4	438	788.0	28:18	1.13	1.44	0.06
21:38:21	1354.0	1354.0	17.1	50	154	374	2700	1112	1070	1.12	1.12	49.9	51.8	1345.2	443	789.0	28:21	1.13	1.38	0.03
21:42:40	1355.0	1355.0	14.0	51	154	359	2689	1111	1067	1.12	1.12	49.9	51.8	1346.1	444	790.0	28:25	1.13	1.42	0.03
21:47:51	1356.0	1356.0	12.0	49	154	366	2678	1111	1054	1.12	1.12	49.9	51.7	1346.9	448	791.0	28:31	1.13	1.48	0.04
21:51:52	1357.0	1357.0	14.9	49	154	352	2669	1111	1062	1.12	1.12	49.9	51.7	1346.9	452	792.0	28:35	1.13	1.42	0.04
21:56:07	1358.0	1358.0	14.2	50	154	350	2679	1112	1044	1.12	1.12	50.1	51.6	1346.9	453	793.0	28:39	1.13	1.44	0.04
22:00:30	1359.1	1359.0	13.7	49	154	356	2668	1112	1044	1.12	1.12	50.2	51.7	1346.9	457	794.1	28:43	1.13	1.44	0.04
22:04:40	1360.0	1360.0	14.4	49	154	350	2676	1113	1056	1.12	1.12	50.2	51.7	1347.4	458	795.0	28:47	1.13	1.42	0.06
22:08:33	1361.0	1361.0	15.5	48	152	373	2678	1112	1065	1.12	1.12	50.4	51.8	1348.3	458	796.0	28:51	1.13	1.39	0.08
22:18:35	1362.0	1362.0	9.8	38	160	300	2592	1112	1085	1.12	1.12	50.6	51.7	1350.4	462	797.0	28:57	1.13	1.43	0.10
22:23:09	1363.0	1363.0	13.1	44	157	319	2670	1113	1082	1.12	1.12	50.7	51.8	1351.3	463	798.0	29:02	1.13	1.41	0.10
22:27:38	1364.1	1364.0	14.3	45	157	330	2698	1113	1091	1.12	1.12	50.7	51.9	1352.2	466	799.1	29:06	1.13	1.39	0.10
22:31:20	1365.0	1365.0	16.2	46	157	358	2715	1114	1083	1.12	1.12	50.6	51.9	1353.3	467	800.0	29:10	1.13	1.37	0.11
22:35:56	1366.0	1366.0	13.0	48	157	378	2726	1114	1070	1.12	1.12	50.5	51.8	1354.1	470	801.0	29:15	1.13	1.44	0.11
22:39:32	1367.0	1367.0	16.7	48	157	376	2709	1114	1076	1.12	1.12	50.5	51.9	1355.0	473	802.0	29:18	1.13	1.38	0.10
22:43:28	1368.0	1368.0	15.3	49	157	391	2734	1114	1066	1.12	1.12	50.5	52.0	1355.7	474	803.0	29:22	1.13	1.41	0.11
22:48:17	1369.0	1369.0	12.5	50	157	371	2720	1114	1078	1.12	1.12	50.8	52.0	1356.9	474	804.0	29:27	1.13	1.48	0.11
22:52:24	1370.0	1370.0	14.6	49	157	399	2722	1114	1080	1.12	1.12	50.9	52.0	1357.8	477	805.0	29:31	1.13	1.43	0.11
22:57:41	1371.0	1371.0	11.8	50	157	390	2755	1115	1062	1.12	1.12	50.9	52.0	1358.9	471	806.0	29:37	1.13	1.49	0.11
23:02:54	1372.0	1372.0	11.5	49	157	383	2764	1114	1042	1.12	1.12	51.0	52.0	1360.1	473	807.0	29:42	1.13	1.48	0.10
23:08:46	1373.0	1373.0	11.3	48	157	378	2762	1114	1041	1.12	1.12	51.0	52.0	1361.1	476	808.0	29:48	1.13	1.49	0.09
23:14:06	1374.0	1374.0	11.2	49	157	382	2749	1114	1030	1.12	1.12	50.7	52.0	1361.5	482	809.0	29:53	1.13	1.50	0.10
23:19:41	1375.1	1375.0	11.2	50	157	369	2707	1114	1030	1.12	1.12	50.5	52.0	1362.6	484	810.1	29:59	1.13	1.51	0.10
23:44:20	1376.0	1376.0	6.9	49	153	333	2636	1099	1035	1.15	1.10	50.4	51.6	1366.2	470	811.0	30:07	1.13	1.62	0.09

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
23:50:20	1377.0	1377.0	10.0	48	152	347	2655	1099	1033	1.13	1.12	50.5	51.8	1367.7	472	812.0	30:13	1.13	1.51	0.10
23:54:39	1378.0	1378.0	13.9	49	152	349	2708	1099	1043	1.13	1.17	50.7	52.0	1368.7	472	813.0	30:18	1.13	1.43	0.11
23:59:38	1379.0	1379.0	12.0	47	152	322	2666	1099	1041	1.12	1.16	50.9	52.3	1369.7	473	814.0	30:23	1.13	1.45	0.10
01 Oct 93																				
00:04:07	1380.0	1380.0	13.4	48	152	349	2697	1097	1049	1.09	1.10	51.0	52.4	1370.6	473	815.0	30:27	1.13	1.43	0.10
00:08:22	1381.0	1381.0	14.1	48	152	356	2699	1097	1035	1.09	1.10	51.2	52.4	1371.3	473	816.0	30:31	1.12	1.42	0.10
00:14:10	1382.0	1382.0	10.3	48	152	372	2703	1097	1024	1.09	1.10	51.3	52.6	1372.4	476	817.0	30:37	1.12	1.51	0.10
00:19:23	1383.0	1383.0	11.5	49	152	358	2715	1096	1036	1.09	1.10	51.4	52.5	1373.2	475	818.0	30:42	1.12	1.49	0.10
00:24:36	1384.0	1384.0	12.1	49	152	382	2727	1096	1017	1.09	1.10	51.4	52.3	1374.1	466	819.0	30:47	1.12	1.48	0.13
00:28:57	1385.0	1385.0	13.8	49	152	387	2722	1096	1026	1.09	1.10	51.2	52.4	1374.8	472	820.0	30:52	1.11	1.44	0.17
00:33:39	1386.0	1386.0	13.4	43	168	342	2645	1095	1031	1.09	1.10	51.2	52.5	1375.2	475	821.0	30:57	1.11	1.43	0.18
00:37:51	1387.0	1387.0	14.3	37	192	330	2592	1096	1039	1.09	1.10	51.1	52.4	1375.2	475	822.0	31:01	1.11	1.39	0.17
00:42:22	1388.0	1388.0	13.3	38	192	312	2590	1096	1040	1.09	1.10	51.2	52.3	1376.3	476	823.0	31:05	1.11	1.42	0.12
00:46:40	1389.0	1389.0	14.6	36	192	305	2562	1095	1041	1.09	1.10	51.2	52.3	1377.2	477	824.0	31:10	1.11	1.38	0.10
00:50:47	1390.0	1390.0	14.5	36	192	274	2563	1095	1037	1.09	1.10	51.2	52.3	1378.2	478	825.0	31:14	1.11	1.39	0.11
00:56:08	1391.0	1391.0	11.2	37	192	283	2551	1095	1047	1.09	1.10	51.2	52.3	1379.4	479	826.0	31:19	1.11	1.45	0.11
01:00:18	1392.0	1392.0	15.0	37	192	281	2562	1095	1055	1.09	1.10	51.2	52.3	1380.4	476	827.0	31:23	1.10	1.39	0.11
01:05:18	1393.0	1393.0	12.0	37	202	288	2561	1095	1043	1.09	1.10	51.3	52.4	1381.5	481	828.0	31:28	1.10	1.45	0.11
01:10:30	1394.0	1394.0	11.5	38	215	270	2553	1095	1032	1.09	1.10	51.3	52.4	1382.7	482	829.0	31:33	1.10	1.49	0.11
01:18:42	1395.0	1395.0	7.3	38	191	250	2551	1095	1035	1.09	1.10	51.4	52.5	1384.6	484	830.0	31:42	1.10	1.58	0.10
01:24:55	1396.0	1396.0	9.7	37	191	281	2579	1096	1023	1.09	1.10	51.5	52.5	1386.0	486	831.0	31:48	1.10	1.50	0.11
01:33:14	1397.0	1397.0	7.2	40	170	286	2585	1096	1040	1.09	1.10	51.6	52.5	1387.8	490	832.0	31:56	1.10	1.58	0.1*
01:37:52	1398.0	1398.0	12.9	48	154	341	2688	1097	1036	1.09	1.10	51.6	52.5	1388.9	488	833.0	32:01	1.10	1.48	0..
01:42:36	1399.0	1399.0	12.7	48	154	344	2673	1097	1029	1.09	1.10	51.6	52.5	1389.9	490	834.0	32:05	1.10	1.48	0.13
01:47:11	1400.0	1400.0	13.1	48	154	346	2677	1098	1040	1.09	1.10	51.6	52.5	1390.8	490	835.0	32:10	1.10	1.48	0.13
01:54:52	1401.0	1401.0	12.2	44	155	352	2626	1096	1043	1.09	1.10	51.8	52.5	1392.4	490	836.0	32:15	1.10	1.46	0.12
01:59:18	1402.0	1402.0	13.5	48	155	375	2664	1098	1052	1.09	1.10	51.9	52.6	1393.2	491	837.0	32:19	1.10	1.47	0.12
02:02:21	1403.0	1403.0	19.7	45	154	397	2702	1098	1035	1.09	1.10	52.0	52.6	1393.8	488	838.0	32:22	1.10	1.34	0.12
02:05:58	1404.0	1404.0	16.6	46	155	337	2621	1098	1035	1.09	1.10	52.0	52.5	1394.3	487	839.0	32:26	1.10	1.39	0.12
02:26:05	1405.1	1405.0	8.7	48	158	353	2714	1101	1035	1.09	1.10	52.1	52.7	1396.4	466	840.1	32:33	1.10	1.59	0.02
02:29:48	1406.0	1406.0	16.1	49	158	386	2756	1095	1011	1.09	1.10	52.1	53.0	1396.8	466	841.0	32:37	1.10	1.44	0.06
02:35:46	1407.0	1407.0	10.0	50	157	316	2672	1094	1021	1.09	1.10	52.2	53.1	1398.0	467	842.0	32:43	1.10	1.57	0.08
02:39:01	1408.0	1408.0	18.5	50	160	381	2756	1094	1022	1.09	1.10	52.3	53.1	1398.7	467	843.0	32:46	1.10	1.40	0.09
02:42:06	1409.1	1409.0	21.9	52	156	382	2766	1095	1014	1.09	1.10	52.2	53.1	1399.4	466	844.1	32:49	1.10	1.38	0.10
02:46:28	1410.0	1410.0	13.7	53	156	363	2737	1095	1026	1.09	1.10	52.2	53.0	1400.3	465	845.0	32:54	1.10	1.51	0.11
02:49:48	1411.0	1411.0	18.0	53	156	389	2756	1094	1028	1.09	1.10	52.1	53.1	1400.4	466	846.0	32:57	1.10	1.44	0.11
02:54:15	1412.0	1412.0	14.1	52	156	356	2731	1094	1024	1.09	1.10	52.1	53.1	1401.1	467	847.0	33:01	1.10	1.50	0.17
02:58:45	1413.0	1413.0	13.3	52	156	370	2714	1094	1018	1.09	1.10	52.0	53.2	1402.2	470	848.0	33:06	1.10	1.51	0.43
03:03:09	1414.0	1414.0	13.6	53	156	397	2705	1093	1028	1.09	1.10	51.9	53.2	1403.4	472	849.0	33:10	1.10	1.51	0.67
03:07:20	1415.0	1415.0	14.5	51	156	370	2670	1092	1033	1.09	1.10	51.8	53.1	1404.3	473	850.0	33:14	1.10	1.48	0.64
03:11:38	1416.0	1416.0	13.9	51	156	363	2653	1092	1029	1.09	1.10	51.8	53.1	1404.4	474	851.0	33:19	1.10	1.49	0.61
03:16:17	1417.0	1417.0	12.9	52	156	352	2642	1092	1030	1.09	1.10	51.9	53.3	1405.4	473	852.0	33:23	1.10	1.52	0.32
03:20:39	1418.0	1418.0	13.7	52	156	327	2615	1091	1028	1.09	1.10	52.0	53.4	1406.4	476	853.0	33:28	1.10	1.50	0.21
03:24:50	1419.0	1419.0	14.3	52	156	335	2632	1092	1020	1.09	1.10	52.1	53.5	1407.3	477	854.0	33:32	1.10	1.49	0.19
03:29:03	1420.0	1420.0	14.8	53	156	372	2675	1092	1034	1.09	1.10	52.2	53.5	1408.2	476	855.0	33:36	1.10	1.49	0.19

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
03:33:15	1421.0	1421.0	14.3	53	156	344	2669	1092	1025	1.10	1.11	52.3	53.5	1409.2	476	856.0	33:40	1.10	1.50	0.19
03:39:46	1422.0	1422.0	11.1	52	156	378	2667	1091	1024	1.11	1.11	52.4	53.5	1410.6	477	857.0	33:46	1.10	1.55	0.17
03:44:11	1423.0	1423.0	13.6	52	154	380	2666	1091	1035	1.11	1.11	52.4	53.5	1411.6	473	858.0	33:50	1.10	1.50	0.15
03:48:16	1424.0	1424.0	14.8	52	154	345	2641	1091	1028	1.11	1.11	52.4	53.5	1412.5	473	859.0	33:54	1.10	1.47	0.14
03:53:14	1425.0	1425.0	12.1	52	154	387	2654	1091	1031	1.11	1.11	52.4	53.6	1413.6	477	860.0	33:59	1.10	1.53	0.13
03:57:27	1426.0	1426.0	14.2	53	154	390	2662	1091	1031	1.11	1.11	52.5	53.6	1414.5	469	861.0	34:03	1.11	1.49	0.13
04:01:33	1427.0	1427.0	14.6	54	153	392	2641	1091	1020	1.11	1.11	52.5	53.6	1415.4	469	862.0	34:08	1.11	1.48	0.14
04:05:52	1428.0	1428.0	14.7	52	154	351	2647	1091	1027	1.11	1.11	52.5	53.5	1416.3	470	863.0	34:12	1.11	1.47	0.17
04:09:53	1429.0	1429.0	14.9	52	154	354	2662	1091	1020	1.11	1.11	52.5	53.5	1417.0	470	864.0	34:16	1.11	1.46	0.17
04:13:52	1430.0	1430.0	15.1	51	154	341	2619	1091	1017	1.11	1.11	52.5	53.5	1417.9	470	865.0	34:20	1.11	1.44	0.18
04:17:51	1431.0	1431.0	15.1	52	154	344	2639	1091	1013	1.11	1.11	52.5	53.5	1418.8	471	866.0	34:24	1.11	1.45	0.17
04:21:48	1432.0	1432.0	15.2	53	154	337	2642	1090	1016	1.11	1.11	52.6	53.5	1419.7	470	867.0	34:28	1.12	1.46	0.17
04:26:36	1433.0	1433.0	12.5	51	154	328	2630	1090	1018	1.11	1.11	52.6	53.5	1420.8	470	868.0	34:33	1.12	1.49	0.16
04:44:10	1434.0	1434.0	8.2	51	154	355	2633	1091	1031	1.11	1.11	52.6	53.5	1423.5	457	869.0	34:40	1.12	1.60	0.02
04:47:51	1435.0	1435.0	16.3	52	155	376	2718	1097	1018	1.11	1.11	52.3	53.3	1424.4	455	870.0	34:44	1.12	1.43	0.08
04:52:04	1436.0	1436.0	14.2	50	154	347	2676	1093	1018	1.11	1.11	52.2	53.4	1425.2	458	871.0	34:48	1.12	1.45	0.12
04:55:31	1437.0	1437.0	17.4	50	154	344	2648	1089	1017	1.11	1.11	52.3	53.4	1426.0	458	872.0	34:51	1.12	1.39	0.12
04:59:26	1438.0	1438.0	15.3	49	154	385	2637	1089	1019	1.11	1.11	52.3	53.5	1426.9	457	873.0	34:55	1.12	1.42	0.11
05:04:09	1439.0	1439.0	12.7	50	154	328	2625	1088	1021	1.11	1.11	52.4	53.7	1427.9	458	874.0	35:00	1.12	1.47	0.11
05:08:27	1440.0	1440.0	14.0	49	154	357	2663	1089	1024	1.11	1.11	52.5	53.7	1428.9	462	875.0	35:04	1.12	1.44	0.11
05:12:10	1441.0	1441.0	16.1	49	154	379	2661	1089	1058	1.11	1.11	52.6	53.6	1429.8	462	876.0	35:08	1.12	1.40	0.13
05:17:05	1442.0	1442.0	12.7	49	154	336	2653	1088	1045	1.11	1.11	52.6	53.6	1431.0	465	877.0	35:13	1.12	1.44	0.13
05:20:43	1443.0	1443.0	16.4	48	154	350	2667	1088	1033	1.11	1.11	52.6	53.7	1431.9	465	878.0	35:17	1.12	1.39	0.13
05:24:21	1444.0	1444.0	16.7	50	154	344	2685	1088	1048	1.11	1.11	52.7	53.7	1432.6	462	879.0	35:20	1.12	1.40	0.12
05:28:19	1445.0	1445.0	15.1	49	154	388	2678	1088	1042	1.11	1.11	52.7	53.6	1433.5	463	880.0	35:24	1.12	1.42	0.13
05:32:05	1446.0	1446.0	15.9	47	154	351	2650	1088	1050	1.11	1.11	52.7	53.7	1434.0	464	881.0	35:28	1.12	1.39	0.13
05:35:31	1447.0	1447.0	17.5	48	154	342	2651	1088	1038	1.11	1.11	52.7	53.8	1434.0	462	882.0	35:31	1.12	1.39	0.13
05:42:31	1448.0	1448.0	11.8	46	152	352	2645	1087	1028	1.11	1.11	52.7	53.9	1434.2	465	883.0	35:37	1.12	1.46	0.13
05:49:16	1449.0	1449.0	12.4	49	151	332	2617	1087	1035	1.11	1.11	52.8	53.9	1435.9	470	884.0	35:41	1.12	1.47	0.13
05:53:47	1450.0	1450.0	13.3	44	151	327	2612	1086	1028	1.11	1.11	52.9	53.8	1437.0	468	885.0	35:46	1.12	1.41	0.13
05:57:34	1451.0	1451.0	15.9	47	151	371	2641	1086	1023	1.11	1.11	52.9	53.8	1437.9	468	886.0	35:50	1.12	1.39	0.13
06:01:39	1452.0	1452.0	14.7	50	151	342	2646	1087	1029	1.11	1.11	52.9	53.8	1438.8	469	887.0	35:54	1.12	1.43	0.12
06:05:29	1453.0	1453.0	15.7	51	150	403	2655	1087	1024	1.11	1.11	52.9	53.9	1439.7	469	888.0	35:58	1.12	1.42	0.12
06:09:10	1454.0	1454.0	16.9	51	151	347	2660	1087	1023	1.11	1.11	52.9	53.9	1440.5	470	889.0	36:01	1.12	1.40	0.12
06:14:02	1455.0	1455.0	12.3	51	151	342	2673	1088	1024	1.11	1.11	52.9	53.9	1441.6	470	890.0	36:06	1.12	1.49	0.12
06:17:56	1456.0	1456.0	15.4	50	151	384	2628	1087	1027	1.11	1.11	52.9	53.9	1442.9	469	891.0	36:10	1.12	1.42	0.12
06:22:19	1457.0	1457.0	13.7	49	151	352	2620	1087	1019	1.11	1.11	52.9	53.9	1443.7	471	892.0	36:14	1.12	1.44	0.12
06:25:58	1458.1	1458.0	17.6	51	151	347	2656	1087	1022	1.11	1.11	52.9	53.9	1444.5	470	893.1	36:18	1.12	1.39	0.12
06:29:54	1459.0	1459.0	15.2	50	151	351	2663	1087	1022	1.11	1.11	52.9	53.9	1445.5	474	894.0	36:22	1.12	1.43	0.11
06:33:23	1460.0	1460.0	17.2	52	151	378	2675	1088	1028	1.11	1.11	52.9	53.9	1446.4	473	895.0	36:26	1.12	1.41	0.11
06:37:25	1461.0	1461.0	14.9	50	151	349	2703	1088	1010	1.11	1.11	52.9	53.9	1447.3	470	896.0	36:30	1.12	1.43	0.11
06:41:34	1462.0	1462.0	14.5	44	152	277	2775	1090	1022	1.11	1.11	52.8	53.8	1447.7	470	897.0	36:34	1.12	1.39	0.10
06:51:56	1463.0	1463.0	12.7	40	154	279	2781	1091	1031	1.11	1.11	53.0	53.8	1449.5	472	898.0	36:38	1.12	1.39	0.10
07:14:48	1464.0	1464.0	17.3	48	157	336	2903	1098	1048	1.11	1.11	52.6	53.5	1454.1	440	899.0	36:43	1.12	1.30	0.09
07:18:24	1465.0	1465.0	16.6	49	154	338	2897	1097	1052	1.11	1.11	52.6	53.8	1454.8	440	900.0	36:47	1.12	1.40	0.10

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
07:22:15	1466.0	1466.0	15.6	48	154	365	2894	1098	1055	1.11	1.11	52.6	53.8	1455.5	442	901.0	36:51	1.12	1.41	0.10
07:26:05	1467.1	1467.0	16.7	49	154	371	2924	1098	1061	1.11	1.11	52.7	53.8	1456.2	442	902.1	36:54	1.12	1.40	0.11
07:29:41	1468.0	1468.0	16.6	50	153	375	2922	1098	1061	1.11	1.11	52.8	54.0	1456.8	443	903.0	36:58	1.12	1.40	0.11
07:33:13	1469.0	1469.0	17.0	50	154	335	2906	1098	1056	1.11	1.11	52.8	54.0	1457.4	444	904.0	37:01	1.12	1.40	0.12
07:36:48	1470.0	1470.0	16.7	49	155	348	2902	1098	1066	1.11	1.11	52.9	54.0	1458.0	445	905.0	37:05	1.12	1.39	0.12
07:40:01	1471.0	1471.0	18.8	50	154	338	2913	1098	1056	1.11	1.11	53.0	54.0	1458.6	444	906.0	37:08	1.12	1.41	0.12
07:43:47	1472.0	1472.0	15.8	50	154	346	2919	1098	1062	1.11	1.11	53.0	54.1	1459.3	447	907.0	37:12	1.12	1.41	0.11
07:47:21	1473.0	1473.0	16.8	49	154	359	2901	1098	1048	1.11	1.11	53.0	54.2	1459.9	448	908.0	37:16	1.12	1.39	0.10
07:51:06	1474.0	1474.0	16.0	49	155	334	2916	1099	1057	1.11	1.11	53.1	54.3	1460.6	425	909.0	37:19	1.12	1.40	0.10
07:55:02	1475.0	1475.0	15.3	48	155	342	2923	1099	1030	1.11	1.11	53.2	54.3	1461.3	402	910.0	37:23	1.12	1.41	0.10
07:58:55	1476.0	1476.0	15.5	49	155	362	2938	1098	1037	1.11	1.11	53.3	54.4	1462.0	398	911.0	37:27	1.12	1.42	0.10
08:02:13	1477.0	1477.0	18.2	50	154	373	2943	1096	1038	1.11	1.11	53.3	54.5	1462.6	399	912.0	37:30	1.12	1.38	0.09
08:07:16	1478.0	1478.0	16.4	49	149	352	2861	1094	1035	1.11	1.11	53.4	54.6	1463.6	399	913.0	37:34	1.12	1.38	0.09
08:11:39	1479.0	1479.0	13.7	49	153	347	2916	1092	1026	1.11	1.11	53.5	54.5	1464.7	400	914.0	37:39	1.12	1.45	0.09
08:15:32	1480.0	1480.0	15.6	50	154	372	2925	1092	1035	1.11	1.11	53.5	54.5	1465.7	402	915.0	37:42	1.12	1.42	0.10
08:19:30	1481.0	1481.0	15.1	50	154	340	2894	1093	1036	1.11	1.11	53.6	54.4	1466.6	402	916.0	37:46	1.12	1.43	0.10
08:23:55	1482.0	1482.0	13.6	50	154	376	2894	1092	1036	1.11	1.11	53.6	54.4	1467.8	402	917.0	37:51	1.12	1.46	0.10
08:27:37	1483.0	1483.0	16.2	49	154	370	2898	1092	1035	1.11	1.11	53.5	54.4	1468.7	403	918.0	37:54	1.12	1.40	0.11
08:31:36	1484.0	1484.0	15.1	50	154	365	2920	1092	1044	1.11	1.11	53.5	54.4	1469.8	403	919.0	37:58	1.12	1.43	0.10
08:35:15	1485.0	1485.0	16.4	49	154	378	2912	1092	1043	1.11	1.11	53.5	54.4	1470.8	405	920.0	38:02	1.12	1.40	0.11
08:38:36	1486.0	1486.0	17.9	49	154	331	2877	1092	1032	1.11	1.11	53.5	54.4	1471.7	405	921.0	38:05	1.12	1.37	0.11
08:42:49	1487.0	1487.0	14.7	49	154	337	2857	1092	1019	1.11	1.11	53.5	54.4	1473.1	401	922.0	38:10	1.12	1.43	0.11
08:46:11	1488.0	1488.0	17.8	48	154	354	2908	1093	1042	1.11	1.11	53.3	54.4	1473.7	400	923.0	38:13	1.12	1.37	0.11
08:49:53	1489.0	1489.0	17.1	49	154	348	2958	1095	1035	1.11	1.11	53.2	54.4	1474.6	402	924.0	38:17	1.12	1.39	0.10
08:53:00	1490.0	1490.0	19.2	49	154	338	2953	1096	1046	1.11	1.11	53.1	54.4	1475.3	405	925.0	38:20	1.12	1.36	0.10
08:56:10	1491.0	1491.0	18.9	50	154	339	2970	1098	1048	1.11	1.11	52.9	54.4	1476.2	402	926.0	38:23	1.12	1.37	0.11
09:17:12	1492.0	1492.0	8.3	48	157	329	3011	1100	1038	1.11	1.11	52.3	54.2	1480.2	388	927.0	38:30	1.12	1.58	0.08
09:20:55	1493.0	1493.0	16.2	45	157	358	2955	1100	1033	1.11	1.11	52.4	54.4	1481.1	390	928.0	38:34	1.12	1.37	0.10
09:24:20	1494.0	1494.0	17.5	47	157	371	2836	1097	1036	1.11	1.11	52.6	54.5	1481.9	389	929.0	38:37	1.12	1.37	0.10
09:27:42	1495.0	1495.0	17.8	47	157	361	2831	1098	1034	1.11	1.11	52.7	54.5	1482.7	389	930.0	38:41	1.12	1.37	0.11
09:31:36	1496.0	1496.0	15.5	47	157	345	2821	1098	1030	1.11	1.11	52.9	54.7	1483.7	387	931.0	38:45	1.12	1.40	0.11
09:35:44	1497.0	1497.0	14.5	47	157	345	2824	1098	1045	1.11	1.11	53.1	54.7	1484.8	390	932.0	38:49	1.12	1.42	0.12
09:39:45	1498.0	1498.0	15.5	48	157	357	2842	1099	1051	1.11	1.11	53.2	54.6	1485.9	387	933.0	38:53	1.12	1.41	0.12
09:43:51	1499.0	1499.0	14.6	47	157	352	2822	1099	1044	1.11	1.11	53.5	54.6	1486.9	387	934.0	38:57	1.12	1.42	0.11
09:47:30	1500.0	1500.0	16.4	49	157	367	2847	1099	1046	1.11	1.11	53.7	54.6	1487.8	387	935.0	39:01	1.12	1.40	0.10
09:51:23	1501.0	1501.0	15.5	48	157	395	2841	1099	1042	1.11	1.11	53.8	54.7	1488.9	386	936.0	39:04	1.12	1.41	0.11
09:55:09	1502.1	1502.0	16.2	47	155	357	2791	1099	1050	1.11	1.11	53.7	54.6	1490.0	384	937.1	39:08	1.12	1.39	0.11
09:59:01	1503.0	1503.0	15.5	48	154	354	2810	1099	1055	1.11	1.11	53.6	54.5	1491.0	382	938.0	39:12	1.12	1.41	0.08
10:04:30	1504.0	1504.0	12.7	47	153	363	2795	1097	1063	1.11	1.11	53.5	54.6	1491.1	373	939.0	39:17	1.12	1.45	0.08
10:08:14	1505.0	1505.0	16.1	50	153	376	2788	1097	1058	1.11	1.11	53.5	54.9	1491.1	378	940.0	39:21	1.12	1.41	0.08
10:12:29	1506.0	1506.0	14.1	49	153	347	2737	1097	1057	1.11	1.11	53.5	54.9	1491.2	381	941.0	39:25	1.12	1.44	0.09
10:17:03	1507.0	1507.0	13.1	48	153	383	2716	1096	1048	1.11	1.11	53.5	54.8	1492.0	386	942.0	39:29	1.12	1.45	0.10
10:20:35	1508.0	1508.0	17.0	48	153	347	2709	1096	1051	1.11	1.11	53.5	54.8	1493.0	388	943.0	39:33	1.12	1.38	0.10
10:24:54	1509.0	1509.0	14.6	49	153	355	2703	1095	1047	1.11	1.11	53.5	54.6	1494.0	388	944.0	39:37	1.12	1.43	0.09
10:28:53	1510.0	1510.0	15.0	49	153	347	2691	1095	1045	1.11	1.11	53.4	54.6	1495.2	391	945.0	39:41	1.12	1.42	0.09

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
10:33:02	1511.0	1511.0	14.5	49	152	379	2700	1095	1059	1.11	1.11	53.5	54.6	1496.2	392	946.0	39:45	1.12	1.43	0.10
10:40:39	1512.0	1512.0	14.5	49	152	379	2700	1095	1059	1.11	1.11	53.5	54.6	1496.2	392	947.0	39:59	1.12	1.43	0.10
Wiper Trip.																				
20:02:24	1513.0	1513.0	32.5	34	152	278	2875	1095	958	1.17	1.12	51.5	45.8	1512.0	298	948.0	39:59	1.13	0.81	0.06
20:07:18	1514.0	1514.0	12.2	49	152	323	2970	1099	962	1.17	1.11	51.5	45.6	1512.0	297	949.0	40:04	1.13	1.46	0.06
20:13:09	1515.0	1515.0	10.6	49	152	319	2969	1101	957	1.15	1.13	51.6	45.6	1512.0	299	950.0	40:09	1.13	1.49	0.06
20:17:49	1516.0	1516.0	12.9	49	152	305	2969	1101	978	1.19	1.11	51.4	45.5	1512.0	298	951.0	40:14	1.14	1.43	0.06
20:25:09	1517.0	1517.0	8.2	49	153	285	2983	1102	985	1.20	1.09	51.4	45.5	1512.1	292	952.0	40:21	1.15	1.54	0.06
20:29:16	1518.0	1518.0	14.7	50	153	302	3011	1104	969	1.18	1.11	51.5	45.5	1512.1	299	953.0	40:26	1.15	1.39	0.06
20:34:01	1519.0	1519.0	12.6	50	153	330	3032	1104	965	1.18	1.10	51.5	45.5	1512.1	303	954.0	40:30	1.16	1.43	0.06
20:55:30	1520.0	1520.0	6.7	50	154	321	3082	1106	953	1.18	1.09	51.3	45.4	1512.1	310	955.0	40:39	1.17	1.57	0.06
20:58:18	1521.1	1521.1	15.3	52	156	310	3122	1111	962	1.16	1.08	51.1	45.3	1512.1	310	956.1	40:42	1.13	1.43	0.06
21:00:42	1522.0	1522.0	14.7	51	156	330	3112	1111	940	1.17	1.10	51.1	45.3	1512.5	297	957.0	40:45	1.13	1.44	0.01
21:10:29	1523.0	1523.0	6.3	49	156	298	3074	1108	955	1.19	1.11	51.2	45.3	1514.1	292	958.0	40:54	1.14	1.64	0.02
21:15:00	1524.0	1524.0	13.8	51	156	319	3171	1108	997	1.20	1.11	51.5	45.3	1514.9	294	959.0	40:59	1.14	1.43	0.02
21:19:12	1525.0	1525.0	14.3	53	156	334	3217	1110	991	1.20	1.11	51.7	45.3	1515.6	294	960.0	41:03	1.15	1.43	0.02
21:23:07	1526.0	1526.0	15.3	52	156	330	3210	1110	995	1.18	1.12	51.9	45.3	1516.3	293	961.0	41:07	1.15	1.39	0.02
21:27:32	1527.0	1527.0	13.6	52	154	339	3153	1094	983	1.18	1.12	52.0	45.3	1517.0	290	962.0	41:11	1.16	1.42	0.02
21:31:37	1528.0	1528.0	14.7	52	152	362	3098	1076	970	1.18	1.13	52.1	45.3	1517.7	290	963.0	41:15	1.16	1.40	0.03
21:35:50	1529.0	1529.0	14.2	52	152	352	3108	1076	974	1.18	1.14	52.0	45.4	1518.4	290	964.0	41:19	1.17	1.40	0.03
21:39:59	1530.0	1530.0	14.5	52	152	331	3095	1076	971	1.18	1.14	52.1	45.4	1519.1	289	965.0	41:24	1.17	1.39	0.03
21:44:37	1531.0	1531.0	12.9	51	148	348	2855	1037	936	1.18	1.14	52.2	45.4	1519.8	292	966.0	41:28	1.17	1.40	0.05
21:54:45	1532.0	1532.0	7.6	46	155	314	2973	1038	976	1.19	1.12	52.4	45.5	1521.5	289	967.0	41:36	1.18	1.49	0.11
21:58:19	1533.0	1533.0	16.8	44	165	293	3141	1100	1024	1.19	1.12	52.5	45.6	1522.0	287	968.0	41:40	1.19	1.29	0.12
22:02:28	1534.0	1534.0	15.2	50	161	301	3177	1102	1032	1.18	1.10	52.4	45.7	1522.4	283	969.0	41:44	1.19	1.35	0.11
22:06:15	1535.0	1535.0	15.8	52	160	314	3218	1103	1025	1.19	1.11	52.4	45.7	1522.6	282	970.0	41:48	1.19	1.36	0.10
22:09:54	1536.0	1536.0	16.4	53	160	351	3209	1104	1039	1.18	1.13	52.6	45.8	1523.3	281	971.0	41:51	1.19	1.36	0.06
22:14:44	1537.0	1537.0	12.4	52	161	306	3180	1104	1032	1.19	1.13	52.7	45.9	1524.5	280	972.0	41:56	1.18	1.43	0.04
22:22:55	1538.0	1538.0	14.5	50	161	306	3180	1104	1032	1.19	1.13	52.7	45.9	1526.4	280	972.0	42:06	1.18	1.43	0.06
17-1/2" Hole TD at 1538m. POOH to run logs and 13-3/8" casing.																				

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
04 Oct 1993																				
NB#3, 12.25" Smith M1S-C with 18x16x16 jets.																				
01:44:30	1539.0	1538.9	1.6	37	89	212	2356	733	750	1.11	1.11	32.3	35.2	1538.6	631	1.0	0:51	1.13	1.56	0.02
01:47:08	1540.0	1539.9	23.2	41	89	277	2611	777	752	1.16	1.16	34.0	35.7	1538.6	630	2.0	0:54	1.13	1.20	0.02
03:28:55	1541.0	1540.9	20.3	39	88	278	2630	776	744	1.16	1.16	34.1	35.4	1538.8	624	3.0	0:57	1.18	1.16	0.02
Leak Off Test = 1.75 sg EMW.																				
03:32:00	1542.0	1541.9	19.4	30	89	264	2671	753	702	1.16	1.16	34.3	33.1	1538.8	623	4.0	1:00	1.18	1.11	0.02
03:34:57	1543.0	1542.9	20.3	41	90	281	2695	756	712	1.16	1.16	33.9	35.7	1538.8	639	5.0	1:03	1.18	1.19	0.02
03:38:12	1544.0	1543.9	18.5	40	89	287	2721	757	711	1.16	1.16	33.3	36.6	1539.5	698	6.0	1:06	1.18	1.20	0.02
03:45:11	1545.0	1544.9	8.6	43	90	259	2755	752	711	1.16	1.16	33.1	37.3	1540.9	694	7.0	1:13	1.18	1.45	0.02
03:49:43	1546.0	1545.9	13.3	42	90	276	2203	652	613	1.16	1.16	33.8	37.9	1540.9	697	8.0	1:18	1.18	1.31	0.02
03:53:58	1547.0	1546.9	14.1	41	90	309	2603	736	697	1.16	1.16	34.3	37.9	1540.9	698	9.0	1:22	1.18	1.29	0.02
03:57:44	1548.0	1547.9	15.9	42	90	298	2680	750	708	1.16	1.16	34.7	37.9	1540.9	697	10.0	1:26	1.18	1.26	0.02
04:15:22	1549.0	1548.9	17.7	42	90	326	2700	758	732	1.16	1.16	35.5	37.6	1542.3	698	11.0	1:28	1.18	1.26	0.03
04:16:07	1550.0	1549.9	19.3	44	89	229	2764	765	768	1.16	1.16	36.2	37.3	1542.4	700	12.8	1:29	1.18	1.19	0.03
04:17:09	1551.0	1550.9	18.2	42	89	253	2738	762	753	1.16	1.16	35.9	37.4	1542.5	698	13.0	1:30	1.18	1.23	0.04
04:27:47	1552.0	1551.9	6.5	43	84	282	2842	760	742	1.16	1.16	36.1	37.8	1544.9	702	14.0	1:41	1.18	1.51	0.03
04:49:58	1553.0	1552.9	5.3	40	79	235	2888	762	727	1.16	1.16	36.5	38.2	1550.0	691	15.0	1:52	1.18	1.51	0.02
05:26:39	1554.0	1553.9	3.3	45	97	195	2985	758	712	1.16	1.16	37.1	38.3	1552.7	660	16.0	2:10	1.18	1.76	0.02
06:23:45	1555.0	1554.9	6.0	41	72	241	2731	773	705	1.16	1.16	37.9	39.4	1553.6	664	17.0	2:21	1.18	1.14	0.02
06:26:59	1556.0	1555.9	18.9	42	85	324	2789	771	707	1.16	1.16	38.0	39.5	1553.7	665	18.0	2:24	1.18	1.21	0.02
06:33:39	1557.0	1556.9	9.2	43	90	325	2798	767	705	1.16	1.16	38.2	39.9	1553.8	665	19.0	2:31	1.18	1.43	0.02
06:49:30	1558.0	1557.9	6.2	44	94	298	2835	754	692	1.16	1.16	38.5	40.2	1554.1	668	20.0	2:40	1.18	1.56	0.02
07:01:10	1559.0	1558.9	8.3	42	100	318	2857	762	708	1.16	1.16	38.9	40.2	1555.0	668	21.0	2:48	1.18	1.48	0.02
07:03:37	1560.0	1559.9	24.5	41	118	370	2726	761	721	1.16	1.16	39.2	40.4	1555.8	669	22.0	2:50	1.18	1.22	0.02
07:06:14	1561.0	1560.9	22.8	43	118	353	2751	762	712	1.16	1.16	39.2	40.3	1556.1	670	23.0	2:53	1.18	1.25	0.02
07:10:04	1562.0	1561.9	16.3	43	118	313	2841	763	712	1.16	1.16	39.3	40.4	1556.5	669	24.0	2:56	1.18	1.35	0.02
07:24:31	1563.0	1562.9	12.1	40	92	321	2785	769	712	1.16	1.16	39.4	40.3	1557.6	672	25.0	3:01	1.18	1.32	0.02
07:29:29	1564.0	1563.9	12.1	43	87	356	2867	773	720	1.16	1.16	39.4	40.4	1557.8	670	26.0	3:06	1.18	1.34	0.02
07:39:31	1565.0	1564.9	8.9	42	99	266	2923	771	717	1.16	1.16	39.5	40.8	1558.9	671	27.0	3:13	1.18	1.45	0.02
07:43:02	1566.0	1565.9	17.2	42	111	332	2766	766	696	1.16	1.16	39.6	41.0	1559.2	672	28.0	3:17	1.18	1.30	0.02
07:56:52	1567.0	1566.9	7.3	44	109	251	2884	766	704	1.16	1.16	39.7	41.1	1562.1	668	29.0	3:25	1.18	1.55	0.02
08:18:07	1568.0	1567.9	5.8	38	110	315	2786	766	723	1.16	1.16	40.1	41.4	1564.6	636	30.0	3:35	1.18	1.55	0.03
08:21:38	1569.0	1568.9	17.0	42	92	356	2790	768	716	1.16	1.16	40.2	41.6	1564.7	637	31.0	3:39	1.18	1.25	0.03
08:25:16	1570.0	1569.9	16.5	43	92	373	2799	769	716	1.16	1.16	40.2	41.7	1565.4	635	32.0	3:42	1.18	1.28	0.03
08:28:47	1571.0	1570.9	17.3	46	92	372	2802	769	710	1.16	1.16	40.3	41.8	1566.4	634	33.0	3:46	1.18	1.28	0.03
08:32:15	1572.0	1571.9	17.3	45	91	325	2788	769	719	1.16	1.16	40.4	42.1	1566.6	635	34.0	3:49	1.18	1.28	0.03
08:37:17	1573.0	1572.9	12.5	44	91	351	2873	770	717	1.16	1.16	40.5	42.1	1566.7	637	35.0	3:54	1.18	1.36	0.03
08:44:06	1574.0	1573.9	8.5	46	91	314	3016	773	716	1.16	1.16	40.7	42.2	1567.0	637	36.0	4:01	1.18	1.49	0.03
08:50:21	1575.0	1574.9	10.3	50	84	372	2927	768	713	1.16	1.16	40.9	42.2	1567.0	636	37.0	4:07	1.18	1.45	0.03
08:54:08	1576.0	1575.9	15.8	48	89	360	2810	767	712	1.16	1.16	41.0	42.3	1567.0	638	38.0	4:11	1.18	1.32	0.03
09:07:19	1577.0	1576.9	4.9	46	89	275	2988	769	714	1.16	1.16	41.1	42.2	1569.7	634	39.0	4:24	1.18	1.63	0.03
09:22:57	1578.0	1577.9	3.9	50	88	251	3037	771	717	1.16	1.16	41.3	42.6	1573.2	634	40.0	4:40	1.18	1.74	0.03
09:32:59	1579.0	1578.9	7.7	44	110	354	2819	767	708	1.16	1.16	41.2	43.1	1574.6	635	41.0	4:47	1.18	1.54	0.04
09:38:55	1580.0	1579.9	10.3	38	183	294	2805	759	708	1.16	1.16	41.2	43.2	1576.0	636	42.0	4:53	1.18	1.53	0.05

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
...:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
10:34:33	1582.0	1581.9	5.9	34	181	264	2903	770	780	1.16	1.16	41.8	43.2	1580.1	627	44.0	5:34	1.18	1.63	0.03
10:38:12	1583.0	1582.9	16.4	33	181	313	2766	768	796	1.16	1.16	41.9	43.2	1580.1	622	45.0	5:37	1.18	1.35	0.03
10:46:01	1584.0	1583.9	7.7	34	181	302	2846	769	790	1.16	1.16	42.0	43.2	1580.1	615	46.0	5:45	1.18	1.56	0.03
10:50:12	1585.0	1584.9	14.5	34	181	309	2839	768	796	1.16	1.16	42.1	43.4	1580.2	615	47.0	5:49	1.18	1.39	0.03
11:04:46	1586.0	1585.9	4.1	35	181	250	2939	770	768	1.16	1.16	42.3	43.5	1581.2	613	48.0	6:04	1.18	1.73	0.01
11:11:14	1587.0	1586.9	9.3	34	181	298	2831	765	737	1.16	1.16	42.5	43.7	1581.6	614	49.0	6:10	1.18	1.50	0.02
11:18:05	1588.0	1587.9	8.8	32	181	316	2832	764	734	1.16	1.16	42.5	43.6	1583.0	611	50.0	6:17	1.18	1.50	0.03
11:24:34	1589.0	1588.9	9.3	30	181	296	2848	762	732	1.16	1.16	42.5	43.7	1583.7	609	51.0	6:24	1.18	1.45	0.02
11:27:55	1590.0	1589.9	17.9	29	181	319	2798	760	725	1.16	1.16	42.5	43.9	1584.2	609	52.0	6:27	1.18	1.27	0.03
11:33:07	1591.0	1590.9	11.5	27	181	293	2820	759	730	1.16	1.16	42.6	43.9	1585.3	609	53.0	6:32	1.18	1.36	0.03
11:37:47	1592.0	1591.9	12.9	30	181	315	2804	758	732	1.16	1.16	42.6	44.1	1585.5	608	54.0	6:37	1.18	1.37	0.04
11:42:51	1593.0	1592.9	11.8	30	181	309	2848	760	721	1.16	1.16	42.8	44.1	1585.6	611	55.0	6:42	1.18	1.39	0.03
11:46:30	1594.0	1593.9	16.5	31	181	330	2793	760	725	1.16	1.16	42.8	44.2	1585.9	609	56.0	6:46	1.18	1.32	0.03
11:51:00	1595.0	1594.9	13.3	29	181	314	2813	761	734	1.16	1.16	42.8	44.3	1586.7	611	57.0	6:50	1.18	1.35	0.03
11:55:24	1596.0	1595.9	13.6	28	181	314	2844	761	726	1.16	1.16	42.8	44.4	1587.1	612	58.0	6:55	1.18	1.33	0.03
12:04:01	1597.0	1596.9	7.0	29	181	279	2868	763	733	1.16	1.16	42.9	44.3	1588.6	611	59.0	7:03	1.18	1.41	0.04
12:08:09	1598.0	1597.9	14.5	25	181	324	2792	763	732	1.16	1.16	43.0	44.4	1589.2	611	60.0	7:07	1.18	1.28	0.04
12:12:13	1599.0	1598.9	14.8	26	181	309	2807	763	732	1.16	1.16	43.1	44.4	1590.2	611	61.0	7:11	1.18	1.28	0.04
12:17:17	1600.0	1599.9	11.8	25	181	310	2799	764	736	1.16	1.16	43.2	44.4	1591.2	609	62.0	7:16	1.18	1.32	0.04
12:21:41	1601.0	1600.9	13.6	26	181	280	2830	764	723	1.16	1.16	43.3	44.6	1592.1	609	63.0	7:21	1.18	1.30	0.04
12:26:17	1602.0	1601.9	13.0	26	181	293	2834	764	712	1.16	1.16	43.4	44.7	1592.9	608	64.0	7:25	1.18	1.32	0.04
12:30:53	1603.0	1602.9	13.0	27	181	292	2811	764	710	1.16	1.16	43.4	44.7	1594.1	608	65.0	7:30	1.18	1.32	0.04
12:35:39	1604.0	1603.9	12.6	26	181	292	2848	765	711	1.16	1.16	43.5	44.7	1595.1	608	66.0	7:35	1.18	1.33	0.05
12:40:37	1605.0	1604.9	12.1	27	181	296	2840	766	714	1.16	1.16	43.6	44.8	1596.1	607	67.0	7:40	1.18	1.34	0.05
12:46:11	1606.0	1605.9	11.2	27	181	286	2833	766	717	1.16	1.16	43.7	44.9	1596.8	609	68.0	7:45	1.18	1.36	0.04
:50:34	1607.0	1606.9	13.7	25	181	298	2818	765	715	1.16	1.16	43.7	45.1	1597.4	605	69.0	7:50	1.18	1.29	0.04
12:54:47	1608.0	1607.9	14.2	27	181	297	2826	766	712	1.16	1.16	43.7	45.1	1598.4	608	70.0	7:54	1.18	1.30	0.04
13:14:47	1609.0	1608.9	9.2	27	181	302	2793	766	720	1.16	1.16	43.6	45.1	1601.9	619	71.0	8:00	1.18	1.41	0.04
13:18:35	1610.1	1609.9	16.0	26	181	309	2583	766	707	1.16	1.16	43.4	45.5	1602.7	618	72.1	8:04	1.18	1.27	0.04
13:22:15	1611.1	1610.9	16.4	28	181	303	2549	768	707	1.16	1.16	43.4	45.5	1603.8	621	73.1	8:08	1.18	1.28	0.04
13:26:36	1612.1	1611.9	13.8	27	181	308	2530	768	709	1.16	1.16	43.5	45.4	1604.2	625	74.1	8:12	1.18	1.32	0.04
13:30:22	1613.1	1612.9	15.9	27	181	308	2540	768	709	1.16	1.16	43.5	45.5	1604.9	626	75.1	8:16	1.18	1.29	0.04
13:35:02	1614.0	1613.9	12.8	28	181	312	2551	769	710	1.16	1.16	43.6	45.6	1605.7	627	76.0	8:21	1.18	1.35	0.05
13:39:35	1615.0	1614.9	13.3	30	181	309	2567	770	725	1.16	1.16	43.7	45.7	1606.7	634	77.0	8:25	1.18	1.36	0.05
13:42:52	1616.0	1615.9	18.2	30	181	331	2523	769	741	1.16	1.16	43.8	45.6	1607.5	638	78.0	8:29	1.18	1.28	0.05
13:45:55	1617.0	1616.8	19.7	28	181	319	2486	769	753	1.16	1.16	43.8	45.6	1608.2	632	79.0	8:32	1.18	1.25	0.05
13:49:08	1618.0	1617.8	18.7	30	181	325	2509	768	737	1.16	1.16	43.9	45.6	1608.9	634	80.0	8:35	1.18	1.28	0.06
13:53:53	1619.0	1618.8	12.6	30	181	302	2553	769	732	1.16	1.16	43.9	45.5	1608.9	636	81.0	8:40	1.18	1.38	0.06
13:57:54	1620.0	1619.9	15.1	29	181	311	2551	770	732	1.16	1.16	44.0	45.5	1608.9	636	82.0	8:44	1.18	1.32	0.06
14:02:42	1621.0	1620.9	12.5	29	181	310	2548	770	723	1.16	1.16	44.0	45.5	1609.0	631	83.0	8:48	1.18	1.36	0.06
14:06:31	1622.1	1621.9	17.4	29	180	329	2520	769	717	1.16	1.16	44.0	45.6	1610.1	634	84.1	8:52	1.18	1.28	0.03
14:26:01	1623.0	1622.8	23.1	28	180	321	2482	769	719	1.16	1.16	43.9	45.4	1611.4	645	85.0	8:55	1.18	1.20	0.02
14:30:02	1624.0	1623.8	14.9	27	181	300	2510	769	709	1.16	1.16	43.5	44.1	1612.4	647	86.0	8:59	1.18	1.30	0.03
14:32:28	1625.0	1624.9	24.7	30	181	350	2495	770	721	1.16	1.16	43.5	45.2	1613.0	648	87.0	9:01	1.18	1.21	0.03
14:35:23	1626.0	1625.8	20.5	29	181	333	2547	771	710	1.16	1.16	43.4	45.4	1613.6	646	88.0	9:04	1.18	1.25	0.03

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
14:38:11	1627.0	1626.8	21.8	29	181	335	2514	772	708	1.16	1.16	43.5	45.5	1614.1	644	89.0	9:07	1.18	1.26	0.03
14:40:42	1628.0	1627.8	23.6	30	181	337	2531	772	709	1.16	1.16	43.5	45.5	1614.6	645	90.0	9:09	1.18	1.22	0.03
14:43:31	1629.0	1628.9	21.4	30	181	341	2542	772	709	1.16	1.16	43.5	45.5	1615.3	646	91.0	9:12	1.18	1.25	0.03
14:46:53	1630.0	1629.8	17.8	32	181	323	2549	773	716	1.16	1.16	43.7	45.5	1616.3	646	92.0	9:16	1.18	1.31	0.04
14:53:44	1631.0	1630.8	8.8	32	181	279	2667	774	722	1.16	1.16	43.9	45.7	1618.4	649	93.0	9:23	1.18	1.49	0.03
14:57:14	1632.0	1631.8	17.1	31	181	310	2601	773	717	1.16	1.16	44.0	45.8	1619.2	648	94.0	9:26	1.18	1.31	0.04
15:01:51	1633.0	1632.8	13.0	32	181	316	2623	774	718	1.16	1.16	44.0	45.9	1620.1	650	95.0	9:31	1.18	1.39	0.04
15:07:04	1634.0	1633.8	11.5	31	181	288	2610	773	719	1.16	1.16	44.1	46.1	1621.1	650	96.0	9:36	1.18	1.41	0.04
15:10:13	1635.0	1634.8	19.0	31	181	315	2577	773	717	1.16	1.16	44.2	46.2	1622.1	652	97.0	9:39	1.18	1.29	0.04
15:13:51	1636.0	1635.8	16.5	29	181	317	2569	773	714	1.16	1.16	44.3	46.3	1622.7	651	98.0	9:43	1.18	1.29	0.04
15:17:26	1637.0	1636.8	16.7	30	181	321	2571	772	712	1.16	1.16	44.5	46.3	1623.4	650	99.0	9:46	1.18	1.30	0.04
15:20:56	1638.0	1637.8	17.1	29	181	314	2578	773	716	1.16	1.16	44.6	46.3	1624.3	651	100.0	9:50	1.18	1.29	0.05
15:37:20	1639.0	1638.8	9.4	26	181	297	2576	768	699	1.16	1.16	44.4	45.7	1628.5	639	101.0	9:56	1.18	1.40	0.03
15:41:19	1640.0	1639.8	15.1	28	181	312	2551	768	699	1.16	1.16	44.4	46.0	1629.7	640	102.0	10:00	1.18	1.30	0.03
15:45:09	1641.0	1640.8	15.6	28	181	311	2530	768	708	1.16	1.16	44.5	46.1	1630.5	644	103.0	10:04	1.18	1.30	0.03
15:48:53	1642.0	1641.8	16.1	28	181	310	2557	768	713	1.16	1.16	44.5	46.2	1630.9	645	104.0	10:08	1.18	1.29	0.04
15:52:12	1643.0	1642.8	18.1	31	181	332	2555	768	718	1.16	1.16	44.6	46.3	1631.7	649	105.0	10:11	1.18	1.30	0.04
15:55:44	1644.0	1643.8	17.0	31	181	333	2553	768	721	1.16	1.16	44.6	46.3	1632.5	648	106.0	10:15	1.18	1.32	0.04
16:00:27	1645.0	1644.8	12.7	31	181	306	2557	768	723	1.16	1.16	44.6	46.5	1633.7	653	107.0	10:19	1.18	1.38	0.04
16:03:49	1646.0	1645.8	17.8	31	181	323	2530	768	716	1.16	1.16	44.5	46.6	1634.1	656	108.0	10:23	1.18	1.30	0.04
16:08:04	1647.0	1646.8	14.9	28	181	315	2542	768	717	1.16	1.16	44.5	46.5	1635.3	657	109.0	10:27	1.18	1.31	0.04
16:12:05	1648.0	1647.8	14.9	28	181	314	2535	768	722	1.16	1.16	44.4	46.4	1636.4	661	110.0	10:31	1.18	1.31	0.05
16:15:25	1649.0	1648.8	18.0	30	181	329	2553	768	713	1.16	1.16	44.4	46.5	1637.3	664	111.0	10:34	1.18	1.29	0.05
16:18:33	1650.0	1649.8	19.1	32	181	335	2562	768	693	1.16	1.16	44.4	46.5	1638.0	666	112.0	10:37	1.18	1.30	0.05
16:23:01	1651.0	1650.8	14.1	31	181	312	2581	768	689	1.16	1.16	44.5	46.7	1638.0	665	113.0	10:42	1.18	1.36	0.05
16:26:21	1652.0	1651.8	18.0	30	181	314	2565	768	685	1.16	1.16	44.6	46.7	1638.1	666	114.0	10:45	1.18	1.30	0.05
16:31:11	1653.0	1652.8	12.4	31	181	320	2549	768	687	1.16	1.16	44.8	46.7	1639.6	664	115.0	10:50	1.18	1.39	0.05
16:34:34	1654.0	1653.8	17.7	30	181	326	2567	768	684	1.16	1.16	45.0	46.7	1640.1	663	116.0	10:53	1.18	1.29	0.05
16:37:14	1655.0	1654.8	22.9	30	181	327	2574	768	684	1.16	1.16	45.1	46.8	1640.7	664	117.0	10:56	1.18	1.23	0.05
16:40:36	1656.0	1655.8	17.8	28	181	316	2586	768	684	1.16	1.16	45.2	46.8	1641.5	664	118.0	10:59	1.18	1.27	0.05
16:44:18	1657.0	1656.8	17.0	29	181	325	2597	768	689	1.16	1.16	45.4	46.7	1642.5	663	119.0	11:03	1.18	1.29	0.05
16:47:34	1658.0	1657.8	18.3	30	181	311	2645	769	685	1.16	1.16	45.4	46.7	1643.5	663	120.0	11:06	1.18	1.29	0.05
16:51:19	1659.0	1658.8	16.0	31	181	308	2676	769	686	1.16	1.16	45.5	46.7	1644.3	664	121.0	11:10	1.18	1.33	0.05
16:55:48	1660.0	1659.8	15.5	32	181	326	2692	770	686	1.16	1.16	45.6	46.7	1645.3	660	122.0	11:15	1.18	1.35	0.05
16:59:10	1661.0	1660.8	17.8	31	181	327	2660	770	690	1.16	1.16	45.6	46.7	1646.2	659	123.0	11:18	1.18	1.30	0.05
17:02:56	1662.0	1661.8	17.1	31	181	313	2678	769	696	1.16	1.16	45.6	46.8	1647.1	660	124.0	11:22	1.18	1.31	0.05
17:07:21	1663.0	1662.8	13.6	31	181	311	2721	770	705	1.16	1.16	45.7	46.8	1648.2	660	125.0	11:26	1.18	1.37	0.05
17:10:42	1664.0	1663.8	17.9	31	181	328	2704	771	703	1.16	1.16	45.7	46.9	1649.1	660	126.0	11:29	1.18	1.30	0.05
17:13:52	1665.0	1664.8	19.3	31	181	323	2704	771	714	1.16	1.16	45.8	46.9	1650.1	658	127.0	11:33	1.18	1.28	0.04
17:18:03	1666.0	1665.8	14.3	30	181	313	2781	772	711	1.16	1.16	45.8	47.0	1651.1	658	128.0	11:37	1.18	1.35	0.05
17:21:30	1667.0	1666.8	17.4	29	181	328	2757	772	713	1.16	1.16	45.8	47.0	1652.0	658	129.0	11:40	1.18	1.29	0.06
17:42:29	1668.1	1667.8	23.5	29	180	327	2739	770	700	1.16	1.16	45.9	47.1	1656.6	658	130.1	11:43	1.18	1.26	0.06
17:44:37	1669.0	1668.8	23.8	27	181	311	2768	766	678	1.16	1.16	45.9	47.3	1657.1	659	131.0	11:45	1.18	1.25	0.06
17:48:04	1670.0	1669.8	16.7	30	181	300	2838	767	686	1.16	1.16	46.0	47.3	1657.7	659	132.0	11:48	1.18	1.30	0.06
17:51:26	1671.0	1670.8	17.8	30	181	339	2817	767	681	1.16	1.16	46.0	47.5	1658.8	659	133.0	11:52	1.18	1.30	0.06

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
17:55:04	1672.0	1671.8	16.5	30	181	339	2766	767	685	1.16	1.16	46.0	47.6	1660.0	660	134.0	11:55	1.18	1.31	0.06
17:58:09	1673.0	1672.8	19.6	29	181	336	2763	767	678	1.16	1.16	46.1	47.7	1661.0	659	135.0	11:58	1.18	1.26	0.06
18:04:14	1674.0	1673.8	9.9	28	181	296	2856	769	677	1.16	1.16	46.2	47.8	1662.9	659	136.0	12:05	1.18	1.41	0.06
18:08:11	1675.0	1674.8	15.2	30	181	329	2837	769	681	1.16	1.16	46.3	47.7	1664.2	659	137.0	12:08	1.18	1.33	0.06
18:12:23	1676.0	1675.8	14.9	30	181	340	2810	766	688	1.16	1.16	46.3	47.6	1665.5	657	138.0	12:13	1.18	1.34	0.06
18:14:29	1677.0	1676.8	19.0	30	181	314	2785	764	685	1.16	1.16	46.4	47.5	1666.1	656	139.0	12:15	1.18	1.27	0.07
18:18:17	1678.0	1677.8	15.8	28	181	312	2795	764	681	1.16	1.16	46.4	47.6	1667.2	656	140.0	12:19	1.18	1.29	0.08
18:22:18	1679.1	1678.8	15.7	29	181	319	2818	763	680	1.16	1.16	46.4	47.6	1668.3	655	141.1	12:23	1.18	1.31	0.06
18:25:37	1680.0	1679.8	18.0	30	181	335	2781	761	688	1.16	1.16	46.4	47.5	1669.2	655	142.0	12:26	1.18	1.29	0.07
18:29:13	1681.0	1680.8	16.7	28	181	315	2807	761	686	1.16	1.16	46.4	47.6	1670.2	655	143.0	12:30	1.18	1.28	0.07
18:32:50	1682.0	1681.8	16.6	26	181	332	2805	761	675	1.16	1.16	46.4	47.7	1671.2	654	144.0	12:33	1.18	1.26	0.07
18:38:35	1683.0	1682.8	10.4	29	181	303	2887	763	681	1.16	1.16	46.5	47.8	1672.8	654	145.0	12:39	1.18	1.41	0.07
18:43:42	1684.0	1683.8	11.7	33	181	305	2926	764	685	1.16	1.16	46.6	47.9	1674.3	652	146.0	12:44	1.18	1.43	0.07
18:47:40	1685.0	1684.8	15.1	33	181	318	2886	763	679	1.16	1.16	46.6	48.1	1675.4	652	147.0	12:48	1.18	1.37	0.06
18:53:11	1686.0	1685.8	10.9	35	181	297	2924	764	677	1.16	1.16	46.7	48.1	1676.8	651	148.0	12:53	1.18	1.48	0.06
18:56:59	1687.0	1686.8	16.8	34	181	310	2905	764	674	1.16	1.16	46.8	48.2	1677.7	651	149.0	12:57	1.18	1.36	0.06
19:00:03	1688.0	1687.8	19.5	34	181	347	2858	763	678	1.16	1.16	46.8	48.3	1678.5	651	150.0	13:00	1.18	1.32	0.06
19:02:56	1689.0	1688.8	21.6	36	181	342	2860	764	676	1.16	1.16	46.9	48.3	1679.2	650	151.0	13:03	1.18	1.31	0.06
19:05:21	1690.0	1689.8	24.7	36	181	360	2874	764	677	1.16	1.16	46.9	48.3	1679.9	649	152.0	13:06	1.18	1.28	0.06
19:08:08	1691.0	1690.8	21.6	36	181	357	2858	764	673	1.16	1.16	47.0	48.4	1680.6	648	153.0	13:08	1.18	1.32	0.06
19:11:32	1692.0	1691.8	18.7	36	181	345	2856	765	682	1.16	1.16	47.0	48.5	1681.6	648	154.0	13:12	1.18	1.35	0.06
19:15:02	1693.0	1692.8	17.1	35	181	327	2861	765	673	1.16	1.16	47.1	48.5	1682.4	648	155.0	13:15	1.18	1.36	0.06
19:18:14	1694.0	1693.8	18.8	35	181	340	2830	765	675	1.16	1.16	47.1	48.6	1682.8	648	156.0	13:19	1.18	1.34	0.06
19:21:27	1695.0	1694.8	18.6	37	181	361	2845	765	705	1.16	1.16	47.1	48.8	1683.6	651	157.0	13:22	1.18	1.36	0.06
19:26:00	1696.0	1695.8	13.2	36	181	307	2899	765	704	1.16	1.16	47.2	48.8	1684.3	652	158.0	13:26	1.18	1.43	0.06
:47:41	1697.0	1696.7	11.1	36	180	346	2815	762	716	1.16	1.16	47.4	49.0	1688.6	651	159.0	13:32	1.18	1.49	0.07
19:50:09	1698.0	1697.7	24.6	37	181	381	2855	763	719	1.16	1.16	47.5	49.1	1689.4	650	160.0	13:34	1.18	1.28	0.07
19:53:00	1699.0	1698.7	21.0	38	181	362	2891	763	706	1.16	1.16	47.6	49.2	1690.5	649	161.0	13:37	1.18	1.34	0.07
19:57:04	1700.0	1699.7	14.8	36	181	337	2932	765	711	1.16	1.16	47.7	49.1	1691.7	649	162.0	13:41	1.18	1.41	0.07
20:02:46	1701.0	1700.7	10.5	37	181	305	2925	762	705	1.16	1.16	47.8	49.2	1693.3	622	163.0	13:47	1.18	1.51	0.07
20:05:33	1702.0	1701.7	21.6	38	181	362	2826	758	702	1.16	1.16	47.8	49.2	1694.1	593	164.0	13:50	1.18	1.34	0.07
20:08:02	1703.0	1702.7	24.2	38	181	363	2850	758	709	1.16	1.16	47.8	49.2	1694.9	567	165.0	13:52	1.18	1.30	0.07
20:11:16	1704.0	1703.7	18.6	37	181	343	2828	757	701	1.16	1.16	47.9	49.3	1695.6	545	166.0	13:55	1.18	1.36	0.07
20:13:59	1705.0	1704.7	22.1	38	181	364	2856	755	706	1.16	1.16	48.0	49.3	1696.1	541	167.0	13:58	1.18	1.33	0.07
20:16:59	1706.0	1705.7	20.0	38	181	364	2831	751	707	1.16	1.16	48.0	49.2	1696.1	540	168.0	14:01	1.18	1.36	0.07
20:19:46	1707.0	1706.7	22.2	39	181	373	2882	756	717	1.16	1.16	48.0	49.1	1696.1	539	169.0	14:04	1.18	1.34	0.07
20:22:53	1708.0	1707.7	19.2	38	181	363	2885	756	709	1.16	1.16	48.1	49.2	1696.1	540	170.0	14:07	1.18	1.37	0.07
20:28:05	1709.0	1708.7	11.5	38	181	321	2923	755	721	1.16	1.16	48.1	49.1	1696.1	541	171.0	14:12	1.18	1.50	0.07
20:30:54	1710.0	1709.7	22.7	37	181	381	2827	754	723	1.16	1.16	48.2	49.1	1696.5	538	172.0	14:15	1.18	1.31	0.07
20:33:47	1711.0	1710.7	20.8	36	181	357	2871	756	721	1.16	1.16	48.2	49.2	1697.6	536	173.0	14:18	1.18	1.32	0.07
20:37:31	1712.0	1711.7	16.1	37	181	364	2865	757	716	1.16	1.16	48.2	49.2	1698.9	535	174.0	14:22	1.18	1.40	0.07
20:40:59	1713.0	1712.7	17.3	37	181	340	2885	756	712	1.16	1.16	48.2	49.2	1699.9	535	175.0	14:25	1.18	1.38	0.07
20:44:30	1714.0	1713.7	17.0	39	180	370	2904	757	722	1.16	1.16	48.2	49.4	1700.4	534	176.0	14:28	1.18	1.40	0.07
20:48:22	1715.0	1714.7	15.5	38	181	342	2934	757	715	1.16	1.16	48.2	49.5	1701.1	532	177.0	14:32	1.18	1.42	0.07
20:54:18	1716.0	1715.7	10.1	37	181	315	2987	757	716	1.16	1.16	48.3	49.4	1703.2	530	178.0	14:38	1.18	1.52	0.07

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
20:58:26	1717.0	1716.7	14.5	37	181	329	2920	755	721	1.16	1.16	48.3	49.5	1704.5	530	179.0	14:42	1.18	1.43	0.07
21:05:37	1718.0	1717.7	8.4	38	181	284	2988	757	715	1.16	1.16	48.4	49.6	1706.9	524	180.0	14:50	1.18	1.58	0.08
21:14:07	1719.0	1718.7	7.1	38	181	275	3006	753	721	1.16	1.16	48.5	49.7	1708.8	521	181.0	14:58	1.18	1.63	0.06
21:17:21	1720.0	1719.7	18.6	36	181	336	2853	751	718	1.16	1.16	48.6	49.8	1709.9	519	182.0	15:01	1.18	1.35	0.07
21:21:17	1721.0	1720.7	16.1	35	181	328	2819	752	707	1.16	1.16	48.6	49.9	1711.1	518	183.0	15:05	1.18	1.38	0.07
21:22:15	1722.0	1721.7	62.1	34	180	445	2833	752	706	1.16	1.16	48.6	49.9	1711.3	521	184.0	15:06	1.18	1.01	0.07
21:46:26	1723.0	1722.7	50.6	24	146	338	2831	758	727	1.16	1.16	48.3	48.3	1712.6	509	185.0	15:07	1.18	0.92	0.02
21:47:51	1724.0	1723.7	42.4	30	173	360	2837	760	725	1.16	1.16	48.0	46.2	1712.9	507	186.0	15:09	1.18	1.07	0.02
22:01:45	1725.1	1724.8	45.4	30	179	359	2963	769	737	1.16	1.16	47.7	47.9	1713.6	519	187.1	15:10	1.18	1.08	0.01
22:02:39	1726.0	1725.7	59.7	34	180	390	3059	787	743	1.16	1.16	47.5	49.0	1713.9	517	188.0	15:11	1.18	1.04	0.01
22:04:30	1727.0	1726.7	36.5	42	181	414	2953	775	732	1.16	1.16	47.4	49.0	1714.2	514	189.0	15:13	1.18	1.23	0.05
22:05:50	1728.0	1727.7	36.5	42	181	414	2953	775	732	1.16	1.16	47.4	49.0	1714.2	514	190.0	15:15	1.18	1.15	0.05

Drill to 1728m, circulate bottoms up, POOH to cut Core #1.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
CB#1.1 DBS CD93 TFA 1.503"																				
Wednesday 06 October 1993																				
12:17:13	1729.0	1728.7	6.8	7	36	245	754	423	283	1.17	1.17	38.0	41.7	1728.5	573	0.5	0:07	1.18	1.09	0.02
12:24:28	1730.0	1729.7	6.8	11	101	425	877	323	187	1.17	1.17	41.0	40.0	1728.5	574	1.5	0:14	1.18	1.04	0.02
12:24:28	1731.0	1730.7	10.7	12	101	425	877	323	187	1.17	1.17	41.0	40.0	1728.5	574	2.5	0:14	1.18	1.04	0.02
12:33:47	1732.1	1731.7	15.4	12	104	399	875	324	192	1.17	1.17	40.8	39.7	1728.5	575	3.6	0:24	1.18	0.95	0.02
12:40:11	1733.0	1732.7	9.6	12	104	361	866	324	210	1.17	1.17	40.7	39.6	1728.5	576	4.5	0:30	1.18	1.03	0.02
POOH due to suspected washout																				
NB#5 HTC ATM11 HG 2x16 1x18 jets																				
Thursday 07 October 1993																				
01:59:44	1734.0	1733.7	30.4	12	32	211	965	243	226	1.17	1.17	32.3	29.9	1706.2	595	0.5	0:00	1.19	0.90	0.09
02:00:57	1735.0	1734.7	64.3	1	100	205	2927	767	734	1.17	1.17	34.7	41.8	1707.1	595	1.5	0:01	1.19	0.47	0.10
02:05:30	1736.0	1735.7	48.9	6	100	224	2902	770	745	1.17	1.17	35.9	42.6	1709.9	594	2.5	0:05	1.19	0.62	0.12
02:15:23	1737.0	1736.7	6.1	25	108	254	2912	769	729	1.17	1.17	37.6	42.3	1716.2	594	3.5	0:15	1.19	1.36	0.06
02:21:26	1738.0	1737.7	9.9	40	129	299	2897	767	728	1.17	1.17	39.1	42.4	1720.0	620	4.5	0:21	1.19	1.39	0.05
02:25:46	1739.0	1738.7	13.8	42	137	298	2893	765	730	1.17	1.17	39.8	42.1	1722.7	632	5.5	0:26	1.19	1.40	0.03
02:31:27	1740.0	1739.7	10.6	40	138	302	2850	761	726	1.17	1.17	40.3	42.0	1726.3	622	6.5	0:31	1.19	1.45	0.03
02:35:39	1741.1	1740.7	14.4	40	138	327	2878	762	733	1.17	1.17	40.4	41.9	1728.9	609	7.6	0:35	1.19	1.38	0.04
02:39:31	1742.0	1741.7	15.5	40	138	326	2864	761	723	1.17	1.17	40.6	42.0	1731.3	609	8.5	0:39	1.19	1.35	0.05
02:44:15	1743.0	1742.7	12.7	40	138	322	2860	761	729	1.17	1.17	41.0	42.1	1734.2	610	9.5	0:44	1.19	1.41	0.03
02:49:43	1744.0	1743.7	11.0	39	138	315	2881	761	723	1.17	1.17	41.1	42.1	1736.3	609	10.5	0:49	1.19	1.44	0.04
02:53:30	1745.0	1744.7	15.9	40	149	326	2890	759	729	1.17	1.17	41.2	42.2	1736.6	610	11.5	0:53	1.19	1.38	0.04
02:57:28	1746.1	1745.7	16.0	40	150	315	2872	758	730	1.17	1.17	41.3	42.3	1737.2	610	12.6	0:57	1.19	1.37	0.04
03:01:54	1747.0	1746.7	13.5	39	150	313	2888	758	719	1.17	1.17	41.4	42.3	1737.9	610	13.5	1:02	1.19	1.40	0.04
03:05:44	1748.0	1747.6	15.7	40	150	327	2877	757	730	1.17	1.17	41.5	42.4	1738.6	609	14.5	1:06	1.19	1.38	0.05
03:10:16	1749.0	1748.6	13.2	39	150	320	2872	757	726	1.17	1.17	41.6	42.6	1739.4	608	15.5	1:10	1.19	1.41	0.07
03:14:47	1750.0	1749.7	13.3	40	150	321	2877	758	724	1.17	1.17	41.7	42.7	1740.4	608	16.5	1:15	1.19	1.42	0.07
03:19:46	1751.0	1750.7	12.0	39	150	324	2868	757	711	1.17	1.17	41.9	42.9	1741.9	608	17.5	1:20	1.19	1.43	0.07
04:21:00	1752.0	1751.7	13.6	34	151	316	2883	761	700	1.17	1.17	42.3	43.4	1747.6	593	18.5	1:24	1.19	1.06	0.06
04:25:22	1753.0	1752.7	14.5	38	151	319	2838	761	696	1.17	1.17	42.6	44.0	1748.5	591	19.5	1:28	1.19	1.38	0.07
04:30:03	1754.0	1753.7	12.8	39	151	317	2860	762	694	1.17	1.17	42.8	44.8	1749.5	590	20.5	1:33	1.19	1.42	0.07
04:33:32	1755.1	1754.7	18.7	40	151	318	2871	763	697	1.17	1.17	43.0	45.1	1750.3	591	21.6	1:36	1.19	1.33	0.07
04:37:46	1756.0	1755.7	14.2	40	151	322	2876	765	694	1.17	1.17	43.2	45.1	1751.5	589	22.5	1:41	1.19	1.41	0.08
04:42:18	1757.0	1756.6	13.2	40	151	316	2901	767	694	1.17	1.17	43.5	45.0	1752.0	588	23.5	1:45	1.19	1.43	0.08
04:47:11	1758.0	1757.6	12.3	40	151	308	2916	767	695	1.17	1.17	43.7	45.2	1752.5	589	24.5	1:50	1.19	1.44	0.06
04:52:14	1759.0	1758.7	12.8	34	160	312	2928	767	700	1.17	1.17	43.9	45.1	1753.1	586	25.5	1:55	1.19	1.38	0.04
04:57:30	1760.0	1759.6	11.4	35	160	305	2916	768	694	1.17	1.17	44.1	45.0	1753.7	587	26.5	2:00	1.19	1.42	0.03
05:21:37	1761.0	1760.6	7.9	38	149	308	2955	768	697	1.17	1.17	44.3	45.2	1755.8	584	27.5	2:08	1.19	1.54	0.06
05:27:12	1762.0	1760.7	14.6	39	147	311	2945	763	692	1.17	1.17	44.6	45.8	1756.3	583	28.5	2:12	1.19	1.38	0.07
05:31:25	1763.0	1761.7	14.3	39	148	303	2909	763	693	1.17	1.17	44.8	46.0	1756.8	583	29.5	2:17	1.19	1.39	0.07
05:35:27	1764.0	1762.7	14.9	44	141	319	2926	765	706	1.17	1.17	44.9	46.1	1757.3	581	30.5	2:21	1.19	1.42	0.07
05:38:55	1765.0	1763.7	17.3	43	141	331	2923	766	693	1.17	1.17	45.0	46.1	1757.8	580	31.5	2:24	1.19	1.37	0.07
05:41:50	1766.1	1764.8	21.9	45	141	326	2918	766	692	1.17	1.17	45.1	46.4	1758.2	581	32.6	2:27	1.19	1.32	0.07
05:46:51	1767.1	1765.8	13.3	45	141	307	2951	767	693	1.17	1.17	45.2	46.5	1758.8	549	33.6	2:32	1.19	1.41	0.08

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
05:51:17	1768.0	1766.7	13.5	46	141	299	2964	768	693	1.17	1.17	45.3	46.5	1759.4	550	34.5	2:36	1.19	1.46	0.07
05:55:36	1769.0	1767.7	13.9	45	141	308	2954	767	700	1.17	1.17	45.4	46.6	1760.0	550	35.5	2:41	1.19	1.45	0.07
05:59:03	1770.1	1768.8	17.6	46	141	328	2910	766	705	1.17	1.17	45.5	46.7	1760.4	549	36.6	2:44	1.19	1.39	0.06
06:02:26	1771.0	1769.7	17.7	46	141	309	2952	767	699	1.17	1.17	45.5	46.7	1760.8	549	37.5	2:48	1.19	1.39	0.06
06:07:20	1772.0	1770.7	12.2	46	141	306	2962	767	698	1.17	1.17	45.8	46.7	1761.9	551	38.5	2:53	1.19	1.49	0.06
06:12:46	1773.0	1771.7	11.0	46	141	285	2977	769	693	1.17	1.17	45.8	46.8	1763.1	550	39.5	2:58	1.19	1.52	0.06
06:16:58	1774.0	1772.7	14.3	48	141	313	2964	768	693	1.17	1.17	45.9	47.0	1764.1	547	40.6	3:02	1.19	1.47	0.07
06:20:40	1775.0	1773.7	16.2	49	141	316	2934	769	695	1.17	1.17	45.9	47.1	1765.0	548	41.5	3:06	1.19	1.44	0.06
06:24:43	1776.1	1774.8	15.0	50	141	314	2954	769	694	1.17	1.17	46.0	47.2	1766.2	550	42.6	3:10	1.19	1.47	0.06
06:28:39	1777.0	1775.7	15.2	50	141	293	2970	770	695	1.17	1.17	46.0	47.4	1767.1	548	43.5	3:14	1.19	1.47	0.06
06:32:41	1778.0	1776.7	15.7	49	141	310	2947	770	686	1.17	1.17	46.1	47.5	1768.1	547	44.5	3:18	1.19	1.45	0.06
06:36:42	1779.0	1777.7	14.9	49	141	324	2953	770	689	1.17	1.17	46.3	47.7	1768.7	546	45.5	3:22	1.19	1.47	0.06
06:40:39	1780.0	1778.7	15.2	50	141	326	2945	769	687	1.17	1.17	46.4	47.6	1769.9	545	46.5	3:26	1.19	1.47	0.07
06:44:03	1781.0	1779.7	17.7	50	141	314	2957	770	691	1.17	1.17	46.5	47.7	1770.7	543	47.5	3:29	1.19	1.43	0.07
06:48:45	1782.0	1780.7	12.8	50	141	317	2964	770	700	1.17	1.17	46.6	47.8	1771.7	543	48.5	3:34	1.19	1.52	0.07
06:53:20	1783.0	1781.7	13.1	50	141	303	2953	771	699	1.17	1.17	46.7	47.8	1772.6	542	49.5	3:39	1.19	1.52	0.07
06:57:47	1784.0	1783.6	14.2	50	141	304	2973	772	694	1.17	1.17	46.7	47.8	1773.3	540	50.5	3:43	1.19	1.49	0.07
07:02:07	1785.0	1784.6	13.8	50	141	300	2963	772	692	1.17	1.17	46.7	47.7	1774.5	541	51.5	3:47	1.19	1.50	0.09
07:06:11	1786.1	1785.6	14.8	50	141	341	2919	771	699	1.17	1.17	46.8	47.9	1775.4	541	52.6	3:51	1.19	1.47	0.09
07:09:34	1787.0	1786.6	17.7	48	141	331	2940	772	695	1.17	1.17	46.8	48.2	1776.2	540	53.5	3:55	1.19	1.41	0.09
07:14:10	1788.1	1787.6	13.1	49	141	318	2957	773	696	1.17	1.17	46.9	48.2	1777.4	538	54.6	3:59	1.19	1.50	0.09
07:18:01	1789.1	1788.6	15.6	50	141	316	2970	773	709	1.17	1.17	47.0	48.4	1778.3	538	55.6	4:03	1.19	1.46	0.07
07:38:37	1790.0	1789.6	8.1	43	145	309	2924	768	694	1.17	1.17	47.1	48.4	1782.3	508	56.5	4:11	1.19	1.58	0.06
07:42:27	1791.0	1790.6	15.8	48	141	321	2914	767	689	1.17	1.17	47.2	48.7	1783.1	514	57.5	4:14	1.19	1.44	0.07
07:46:21	1792.0	1791.6	15.4	48	139	329	2925	768	690	1.17	1.17	47.3	48.8	1783.9	510	58.5	4:18	1.19	1.45	0.07
07:49:45	1793.0	1792.6	17.6	50	140	335	2907	769	686	1.17	1.17	47.4	48.8	1784.7	512	59.5	4:22	1.19	1.43	0.07
07:54:31	1794.1	1793.7	15.8	49	140	313	2925	769	687	1.17	1.17	47.5	48.8	1786.3	512	60.6	4:27	1.19	1.45	0.06
07:58:19	1795.0	1794.6	15.7	50	140	327	2907	769	685	1.17	1.17	47.6	49.0	1786.8	510	61.5	4:30	1.19	1.46	0.07
08:01:40	1796.0	1795.6	17.9	50	140	349	2916	769	696	1.17	1.17	47.7	49.1	1787.5	510	62.5	4:34	1.19	1.43	0.07
08:06:22	1797.0	1796.6	13.7	50	140	320	2914	769	685	1.17	1.17	47.8	49.1	1788.6	508	63.5	4:38	1.19	1.50	0.07
08:09:47	1798.1	1797.6	17.6	49	140	323	2916	769	687	1.17	1.17	47.9	49.2	1789.4	508	64.6	4:42	1.19	1.42	0.08
08:14:18	1799.0	1798.6	13.3	48	140	328	2883	769	683	1.17	1.17	47.9	49.1	1789.4	508	65.5	4:46	1.19	1.49	0.08
08:17:24	1800.0	1799.6	19.4	50	140	332	2922	769	685	1.17	1.17	48.0	49.2	1789.4	508	66.5	4:49	1.19	1.40	0.08
08:20:53	1801.1	1800.6	19.3	50	140	344	2907	769	685	1.17	1.17	48.0	49.2	1789.4	507	67.6	4:53	1.19	1.40	0.08
08:24:19	1802.0	1801.6	17.4	50	140	345	2916	768	685	1.17	1.17	48.0	49.1	1789.6	491	68.5	4:56	1.19	1.43	0.08
08:27:48	1803.0	1802.6	17.4	50	140	337	2903	769	686	1.17	1.17	48.0	49.1	1790.6	491	69.5	4:60	1.19	1.43	0.07
08:31:06	1804.0	1803.6	18.2	47	140	335	2897	769	687	1.17	1.17	48.0	49.2	1791.2	491	70.5	5:03	1.19	1.39	0.07
08:34:31	1805.1	1804.6	17.6	48	140	337	2926	769	687	1.17	1.17	48.0	49.3	1792.1	489	71.6	5:07	1.19	1.41	0.07
08:37:52	1806.0	1805.6	17.9	48	140	339	2909	769	694	1.17	1.17	48.1	49.5	1792.9	490	72.5	5:10	1.19	1.40	0.07
08:41:13	1807.0	1806.6	17.9	47	140	344	2918	770	688	1.17	1.17	48.1	49.5	1793.7	488	73.5	5:13	1.19	1.40	0.07
08:44:10	1808.0	1807.6	20.3	48	140	347	2947	770	683	1.17	1.17	48.1	49.5	1794.3	490	74.5	5:16	1.19	1.37	0.07
08:47:46	1809.1	1808.6	19.1	45	140	331	2932	770	686	1.17	1.17	48.2	49.5	1795.3	491	75.6	5:20	1.19	1.36	0.07
08:50:15	1810.0	1809.6	24.1	45	140	349	2920	770	684	1.17	1.17	48.2	49.5	1795.9	490	76.5	5:22	1.19	1.29	0.08
08:52:43	1811.0	1810.6	24.7	48	140	352	2928	770	683	1.17	1.17	48.2	49.7	1796.5	492	77.5	5:25	1.19	1.32	0.08
08:56:12	1812.0	1811.6	17.2	49	140	333	2892	770	684	1.17	1.17	48.3	49.7	1797.3	491	78.5	5:28	1.19	1.42	0.07

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
08:59:23	1813.0	1812.6	20.2	48	140	350	2898	770	685	1.17	1.17	48.3	49.8	1798.1	491	79.5	5:31	1.19	1.37	0.07
09:02:34	1814.0	1813.6	18.8	47	140	338	2897	769	698	1.17	1.17	48.3	49.7	1798.9	491	80.5	5:35	1.19	1.38	0.08
09:05:42	1815.0	1814.5	19.1	49	140	358	2909	770	701	1.17	1.17	48.4	49.8	1799.7	490	81.5	5:38	1.19	1.39	0.08
09:08:12	1816.0	1815.6	25.0	49	140	362	2946	770	708	1.17	1.17	48.5	49.9	1800.4	490	82.5	5:40	1.19	1.31	0.08
09:10:31	1817.0	1816.5	25.8	47	140	365	2924	770	709	1.17	1.17	48.5	50.0	1801.1	490	83.5	5:43	1.19	1.29	0.08
09:13:19	1818.0	1817.5	21.4	47	140	355	2905	770	708	1.17	1.17	48.6	49.9	1801.8	488	84.5	5:45	1.19	1.34	0.08
09:15:50	1819.0	1818.5	23.8	48	140	363	2953	770	703	1.17	1.17	48.6	50.0	1802.9	494	85.5	5:48	1.19	1.33	0.08
09:30:33	1820.0	1818.6	25.7	45	137	355	2914	767	712	1.17	1.17	48.7	50.1	1805.8	501	86.5	5:50	1.19	1.20	0.07
09:33:16	1821.0	1819.6	22.1	44	136	382	2933	768	714	1.17	1.17	48.7	49.7	1806.7	502	87.5	5:53	1.19	1.30	0.09
09:35:19	1822.0	1820.6	29.3	46	136	355	2921	768	720	1.17	1.17	48.7	49.9	1807.4	504	88.5	5:55	1.19	1.24	0.09
09:37:23	1823.0	1821.6	29.0	46	136	338	2923	769	712	1.17	1.17	48.8	50.0	1808.1	506	89.5	5:57	1.19	1.24	0.09
10:38:11	1824.0	1822.6	34.6	43	135	342	2889	767	715	1.17	1.17	49.1	50.6	1823.7	514	90.5	5:59	1.19	1.16	0.31
10:39:38	1825.0	1823.6	41.4	40	139	360	2868	763	690	1.17	1.17	50.1	52.4	1823.7	514	91.5	6:00	1.19	1.10	0.31
10:41:28	1826.0	1824.6	32.7	43	139	365	2899	762	704	1.17	1.17	50.2	52.1	1823.7	515	92.5	6:02	1.19	1.19	0.31
10:44:54	1827.0	1825.6	17.5	46	139	359	2891	762	702	1.17	1.17	50.3	51.6	1823.7	519	93.5	6:05	1.19	1.39	0.31
10:47:31	1828.0	1826.6	23.4	47	139	375	2905	762	709	1.17	1.17	50.4	51.4	1823.7	524	94.5	6:08	1.19	1.32	0.31
11:06:15	1829.0	1827.6	31.3	45	138	384	2923	762	687	1.17	1.17	50.4	51.3	1823.7	543	95.5	6:10	1.19	1.20	0.31
11:07:27	1830.1	1828.6	54.1	37	134	416	2906	755	10	1.17	1.17	50.2	50.4	1823.7	538	96.6	6:11	1.19	1.00	0.31
11:08:36	1831.0	1829.6	51.6	45	136	433	2836	758	4	1.17	1.17	50.2	50.4	1823.7	535	97.5	6:12	1.19	1.08	0.31
12:15:16	1832.0	1830.6	40.7	39	117	392	2974	767	4	1.17	1.17	50.2	50.4	1830.4	540	98.5	6:16	1.19	1.06	0.13
12:17:05	1833.0	1831.6	33.0	41	118	398	2971	767	4	1.17	1.17	50.2	50.4	1830.5	542	99.5	6:18	1.19	1.13	0.13
12:19:34	1834.0	1832.6	24.1	43	120	407	2962	768	4	1.17	1.17	50.2	50.4	1830.5	544	100.5	6:21	1.19	1.23	0.13
12:23:10	1835.0	1833.6	16.7	42	121	360	2965	768	4	1.17	1.17	50.2	50.4	1830.6	547	101.5	6:24	1.19	1.33	0.12
12:24:31	1836.0	1834.6	44.7	40	120	406	2941	768	4	1.17	1.17	50.2	50.4	1830.6	548	102.5	6:26	1.19	1.04	0.12
12:33:10	1837.0	1835.6	39.6	38	120	404	2945	766	4	1.17	1.17	50.2	50.4	1830.7	563	103.5	6:27	1.19	1.05	0.12
POOH to cut core																				
Friday 08 October 1993																				
CB#1.2 DBS CD93																				
00:15:29	1840.0	1838.6	20.9	12	79	397	701	336	190	1.17	1.17	46.7	46.2	1839.0	518	1.0	0:03	2.19	0.44	0.09
00:17:50	1841.0	1839.6	25.5	17	89	535	741	336	150	1.17	1.17	46.7	46.0	1839.0	522	2.0	0:05	2.19	0.48	0.09
00:21:08	1842.0	1840.6	18.2	20	77	615	685	336	151	1.17	1.17	46.5	45.9	1839.0	524	3.0	0:09	2.19	0.52	0.09
00:23:15	1843.0	1841.6	28.3	18	83	568	713	337	118	1.17	1.17	46.4	45.7	1839.0	526	4.0	0:11	2.19	0.47	0.09
00:25:15	1844.0	1842.6	30.3	18	83	573	721	336	212	1.17	1.17	46.3	45.7	1839.0	528	5.0	0:13	2.19	0.46	0.09
00:27:07	1845.0	1843.6	32.1	18	84	569	726	336	227	1.17	1.17	46.2	45.7	1839.0	528	6.0	0:15	2.19	0.45	0.09
00:29:04	1846.0	1844.5	30.7	18	87	524	748	337	221	1.17	1.17	46.1	45.7	1839.0	532	7.0	0:16	2.19	0.46	0.09
00:30:51	1847.0	1845.5	33.5	18	88	546	751	337	228	1.17	1.17	45.9	45.9	1839.0	532	8.0	0:18	2.19	0.45	0.09
00:32:09	1848.0	1846.5	46.2	17	88	546	746	337	193	1.17	1.17	45.8	45.9	1839.0	533	9.0	0:20	2.19	0.41	0.09
00:33:27	1849.0	1847.5	46.2	18	88	536	746	337	166	1.17	1.17	45.8	45.9	1839.0	534	10.0	0:21	2.18	0.41	0.09
00:35:13	1850.0	1848.5	34.0	18	87	514	739	337	164	1.17	1.17	45.6	45.9	1839.0	536	11.0	0:23	2.19	0.45	0.09
00:36:53	1851.0	1849.5	36.5	17	88	574	718	337	178	1.17	1.17	45.5	45.8	1839.0	538	12.0	0:24	2.19	0.44	0.09
00:38:29	1852.0	1850.5	37.5	17	88	520	726	337	157	1.17	1.17	45.4	45.7	1839.0	538	13.0	0:26	2.18	0.44	0.09
00:40:43	1853.0	1851.5	26.9	19	88	527	722	337	180	1.17	1.17	45.3	45.7	1839.0	542	14.0	0:28	2.18	0.48	0.09
00:43:22	1854.0	1852.5	22.6	19	88	496	720	337	218	1.17	1.17	45.2	45.6	1839.0	543	15.0	0:31	2.18	0.50	0.09
00:48:23	1855.0	1853.5	13.3	17	81	531	718	337	98	1.17	1.17	45.0	45.6	1839.0	547	16.0	0:35	2.18	0.51	0.09

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS DEPTH	PVT	---BIT--- DIST	HRS	ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT							
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
POOH to recover core																				
RRB#4.1 Hughes JD8																				
RIH reaming and washing to bottom, circulate bottoms up, POOH to cut core																				
CB#2.0 DBS CD93																				
21:25:29	1856.0	1854.5	12.9	15	55	574	652	337	174	1.17	1.17	44.3	44.6	1855.5	541	0.5	0:05	2.19	0.48	0.03
21:31:09	1857.0	1855.5	10.6	16	94	556	621	339	178	1.17	1.17	44.1	43.3	1855.5	547	1.5	0:11	2.19	0.63	0.03
21:33:20	1858.0	1856.6	30.1	16	106	572	631	339	253	1.17	1.17	43.9	43.3	1855.5	548	2.5	0:13	2.19	0.52	0.03
21:34:56	1859.0	1857.5	37.3	17	104	651	653	339	171	1.17	1.17	43.9	43.3	1855.6	550	3.5	0:14	2.20	0.51	0.03
21:36:15	1860.0	1858.6	47.4	16	106	596	720	339	126	1.17	1.17	43.8	43.2	1855.6	551	4.5	0:16	2.19	0.47	0.03
21:37:52	1861.0	1859.5	36.9	14	107	415	691	339	156	1.17	1.17	43.8	43.3	1855.6	553	5.5	0:17	2.19	0.43	0.03
21:42:09	1862.0	1860.5	14.0	18	107	388	659	339	91	1.17	1.17	43.6	43.5	1855.6	556	6.5	0:22	2.19	0.58	0.03
21:45:10	1863.0	1861.5	21.0	20	100	664	679	339	147	1.17	1.17	43.5	43.5	1855.6	558	7.5	0:25	2.19	0.53	0.03
21:46:28	1864.0	1862.5	45.8	14	106	592	727	339	193	1.17	1.17	43.4	43.4	1855.6	560	8.5	0:26	2.19	0.41	0.03
21:47:53	1865.0	1863.5	42.4	14	105	633	681	339	251	1.17	1.17	43.4	43.3	1855.6	561	9.5	0:27	2.19	0.42	0.03
21:49:35	1866.0	1864.5	35.3	18	96	661	623	339	120	1.17	1.17	43.3	43.4	1855.6	563	10.5	0:29	2.19	0.45	0.03
21:51:50	1867.0	1865.5	26.7	14	106	496	625	339	192	1.17	1.17	43.3	43.3	1855.6	563	11.5	0:31	2.19	0.47	0.03
21:53:43	1868.0	1866.5	32.3	17	105	616	630	339	249	1.17	1.17	43.2	43.2	1855.6	565	12.5	0:33	2.19	0.47	0.03
21:55:02	1869.0	1867.5	45.3	14	106	585	668	339	225	1.17	1.17	43.1	43.1	1855.6	567	13.5	0:34	2.19	0.41	0.03
21:56:46	1870.1	1868.5	37.9	15	104	605	671	340	122	1.17	1.17	43.1	43.2	1855.6	566	14.6	0:36	2.18	0.43	0.03
21:58:05	1871.0	1869.5	45.4	13	106	559	738	339	184	1.17	1.17	43.0	43.0	1855.7	567	15.5	0:38	2.18	0.41	0.03
21:59:29	1872.0	1870.5	42.9	14	105	613	706	339	136	1.17	1.17	43.0	43.2	1855.7	569	16.5	0:39	2.18	0.42	0.03
22:00:51	1873.0	1871.5	43.9	13	105	592	756	339	231	1.17	1.17	43.0	43.3	1855.7	568	17.5	0:40	2.18	0.41	0.03
22:01:50	1874.0	1872.5	60.7	12	106	545	761	339	205	1.17	1.17	43.0	43.3	1855.7	571	18.5	0:41	2.18	0.37	0.0
22:03:09	1875.0	1873.5	45.6	13	106	566	783	339	252	1.17	1.17	42.9	43.0	1855.7	569	19.5	0:43	2.18	0.40	0.03
22:04:06	1876.0	1874.5	63.2	14	106	565	810	339	251	1.17	1.17	42.9	43.1	1855.7	569	20.5	0:44	2.18	0.38	0.03
22:05:12	1877.0	1875.5	60.5	14	106	538	783	339	203	1.17	1.17	42.9	43.2	1855.7	570	21.5	0:45	2.18	0.38	0.03
22:06:38	1878.0	1876.5	41.9	15	105	642	647	340	209	1.17	1.17	42.9	43.2	1855.7	570	22.5	0:46	2.19	0.42	0.03
22:07:57	1879.0	1877.5	46.4	13	106	606	651	340	240	1.17	1.17	42.8	43.0	1855.7	570	23.5	0:47	2.18	0.40	0.03
22:09:12	1880.0	1878.5	47.7	12	106	629	644	340	195	1.17	1.17	42.8	43.1	1855.7	572	24.5	0:49	2.18	0.40	0.03
22:10:52	1881.0	1879.5	36.0	13	105	636	657	339	247	1.17	1.17	42.8	43.2	1855.7	573	25.5	0:50	2.18	0.43	0.03
22:13:30	1882.0	1880.5	27.3	11	107	530	678	339	252	1.17	1.17	42.7	43.2	1855.7	575	26.5	0:53	2.18	0.44	0.03
POOH to recover core																				

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
Saturday 09 October 1993																				
NB#6 Smith M2SD 12.25" 18x16x16 jets																				
11:58:37	1883.0	1881.5	25.9	8	99	241	2621	679	693	1.17	1.17	39.7	40.6	1882.0	589	1.0	0:02	2.12	0.29	0.14
12:02:08	1884.0	1882.5	18.5	26	115	316	2909	754	714	1.17	1.17	40.8	43.2	1882.5	576	2.0	0:05	2.12	0.63	0.14
12:04:51	1885.0	1883.5	22.1	37	118	344	2928	755	727	1.17	1.17	41.0	43.1	1882.6	573	3.0	0:08	2.12	0.67	0.15
12:07:10	1886.0	1884.5	25.9	36	118	330	2891	755	725	1.17	1.17	41.1	43.2	1882.7	574	4.0	0:10	2.12	0.64	0.17
12:08:53	1887.0	1885.5	35.1	35	118	328	2938	755	720	1.17	1.17	41.2	43.4	1882.7	572	5.0	0:12	2.12	0.59	0.18
12:11:05	1888.0	1886.5	27.2	35	118	328	2934	754	724	1.17	1.17	41.3	43.4	1882.8	574	6.0	0:14	2.12	0.63	0.19
12:12:39	1889.0	1887.4	38.2	35	118	329	2919	755	721	1.17	1.17	41.5	43.3	1882.8	573	7.0	0:16	2.12	0.58	0.20
12:15:04	1890.0	1888.5	24.8	35	118	336	2919	755	701	1.17	1.17	41.6	43.5	1882.9	573	8.0	0:18	2.12	0.64	0.21
12:17:31	1891.1	1889.5	28.2	36	118	336	2934	755	723	1.17	1.17	41.7	43.7	1883.0	569	9.1	0:20	2.12	0.63	0.22
12:20:34	1892.1	1890.5	23.8	36	118	338	2906	756	727	1.17	1.17	41.8	43.7	1883.1	573	10.1	0:23	2.12	0.66	0.22
12:23:28	1893.0	1891.5	20.6	37	118	327	2929	756	707	1.17	1.17	41.9	43.8	1883.1	570	11.0	0:26	2.12	0.68	0.21
12:25:48	1894.0	1892.4	25.7	35	118	335	2955	757	709	1.17	1.17	42.1	43.8	1882.8	568	12.0	0:29	2.12	0.64	0.18
12:27:58	1895.1	1893.5	30.2	37	118	349	2893	758	712	1.17	1.17	42.2	43.8	1883.4	571	13.1	0:31	2.12	0.63	0.17
12:30:59	1896.0	1894.4	24.0	38	118	359	2987	760	732	1.17	1.17	42.3	43.8	1883.1	569	14.0	0:34	2.13	0.66	0.21
12:34:59	1897.0	1895.4	17.0	38	118	286	2885	760	758	1.17	1.17	42.4	44.0	1883.4	568	15.0	0:38	2.12	0.71	0.20
12:39:40	1898.0	1896.4	13.2	38	118	300	2945	762	720	1.17	1.17	42.5	44.1	1884.0	567	16.0	0:43	2.13	0.75	0.21
12:43:05	1899.0	1897.4	17.2	32	118	297	2946	763	736	1.17	1.17	42.7	44.0	1883.6	567	17.0	0:46	2.13	0.67	0.24
12:51:50	1900.0	1898.4	7.5	32	116	288	2946	763	716	1.17	1.17	42.9	44.4	1886.2	561	18.0	0:55	2.13	0.79	0.40
12:55:18	1901.0	1899.4	17.3	36	103	318	2947	765	724	1.17	1.17	43.1	44.8	1887.5	561	19.0	0:58	2.13	0.68	0.99
12:57:49	1902.0	1900.4	23.8	35	119	328	2914	765	744	1.17	1.17	43.2	44.9	1888.4	560	20.0	1:01	2.13	0.65	2.40
13:00:43	1903.0	1901.4	20.8	31	119	319	2929	764	734	1.17	1.17	43.2	44.6	1889.5	559	21.0	1:04	2.13	0.64	3.76
13:04:03	1904.1	1902.5	18.2	29	119	305	2934	765	742	1.17	1.17	43.3	44.8	1890.6	556	22.1	1:07	2.13	0.65	4.25
13:48:39	1905.0	1903.4	18.9	29	116	339	2954	756	727	1.17	1.17	43.2	43.3	1898.2	553	23.0	1:15	2.14	0.61	0.27
13:51:26	1906.0	1904.4	22.6	36	118	368	3032	769	721	1.17	1.17	43.1	42.9	1898.6	552	24.0	1:17	2.14	0.66	0.27
13:54:12	1907.0	1905.4	21.7	35	118	369	2962	770	721	1.17	1.17	42.9	44.1	1899.0	549	25.0	1:20	2.14	0.66	0.27
13:55:55	1908.0	1906.4	34.8	36	118	403	2973	771	725	1.17	1.17	42.8	44.7	1899.3	552	26.0	1:22	2.14	0.59	0.25
13:59:19	1909.0	1907.4	17.7	36	118	394	3006	772	723	1.17	1.17	42.9	45.1	1899.8	553	27.0	1:25	1.19	1.24	0.22
14:02:45	1910.0	1908.4	17.5	36	118	417	2971	772	739	1.17	1.17	43.1	45.1	1900.3	551	27.5	1:29	1.19	1.24	0.20
14:06:13	1911.0	1909.4	17.3	33	118	396	3020	773	743	1.17	1.17	43.2	45.5	1900.8	549	28.5	1:32	1.19	1.22	0.40
14:12:47	1912.1	1910.5	12.3	33	118	374	2890	757	723	1.17	1.17	43.6	45.9	1901.7	546	29.6	1:39	1.19	1.30	1.70
14:16:40	1913.0	1911.4	15.4	31	118	431	2886	755	718	1.17	1.17	43.8	45.9	1902.3	551	30.5	1:43	1.19	1.21	1.88
14:20:19	1914.0	1912.4	16.4	30	118	425	2902	755	701	1.17	1.17	44.0	46.2	1902.8	548	31.5	1:46	1.19	1.20	1.31

POOH to cut core.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
10 Oct 1993																				
RIH with CB#2.1 DBS CD93 TFA=1.503																				
03:40:14	1916.1	1914.5	43.4	11	83	541	737	324	236	1.17	1.17	41.9	41.5	1915.0	522	1.1	0:06	1.18	0.75	0.00
03:41:44	1916.5	1914.9	25.4	12	86	544	733	323	205	1.17	1.17	41.9	41.2	1915.0	522	1.5	0:07	1.18	0.75	0.00
03:42:28	1917.0	1915.4	26.7	12	94	575	712	323	169	1.17	1.17	41.8	41.0	1915.0	520	2.0	0:08	1.18	0.83	0.00
03:43:26	1917.5	1915.9	35.3	13	100	551	731	323	169	1.17	1.17	41.7	40.9	1915.0	523	2.5	0:09	1.18	0.72	0.00
03:44:03	1918.0	1916.4	38.0	13	104	537	760	323	149	1.17	1.17	41.7	40.8	1915.0	521	3.0	0:09	1.18	0.78	0.00
03:44:46	1918.5	1916.9	45.0	14	104	566	758	323	172	1.17	1.17	41.6	40.8	1915.0	522	3.5	0:10	1.18	0.78	0.00
03:45:25	1919.0	1917.4	43.9	15	104	600	765	323	209	1.17	1.17	41.5	40.8	1915.0	524	4.0	0:11	1.18	0.79	0.00
03:46:03	1919.5	1917.9	46.8	16	104	569	788	323	194	1.17	1.17	41.5	40.9	1915.0	523	4.5	0:11	1.18	0.78	0.00
03:46:32	1920.1	1918.5	66.7	18	105	586	800	323	162	1.17	1.17	41.5	41.0	1915.0	524	5.1	0:12	1.18	0.78	0.00
03:47:15	1920.5	1918.9	56.4	17	105	582	794	323	211	1.17	1.17	41.4	41.0	1915.0	526	5.5	0:13	1.18	0.76	0.00
03:48:04	1921.1	1919.5	39.1	16	104	608	788	323	231	1.17	1.17	41.4	40.9	1915.0	528	6.1	0:13	1.18	0.82	0.00
03:48:19	1921.5	1919.9	56.0	17	104	645	797	323	206	1.17	1.17	41.4	40.9	1915.0	524	6.5	0:14	1.18	0.79	0.00
03:49:09	1922.1	1920.5	55.6	18	100	711	788	323	255	1.17	1.17	41.3	40.8	1915.0	526	7.1	0:14	1.18	0.75	0.00
03:49:59	1922.5	1920.9	36.0	18	101	684	800	323	265	1.17	1.17	41.3	40.9	1915.0	527	7.5	0:15	1.18	0.77	0.00
03:50:27	1923.0	1921.4	45.7	19	103	649	810	323	270	1.17	1.17	41.2	41.0	1915.0	527	8.0	0:16	1.18	0.82	0.00
03:50:58	1923.5	1921.9	61.0	19	103	628	806	323	259	1.17	1.17	41.2	41.0	1915.0	526	8.5	0:16	1.18	0.82	0.00
03:53:20	1924.0	1922.4	20.8	17	100	670	786	323	228	1.17	1.17	41.1	41.0	1915.0	526	9.0	0:19	1.18	0.95	0.00
03:53:49	1924.5	1922.9	21.1	19	102	675	802	323	251	1.17	1.17	41.0	41.1	1915.0	528	9.5	0:19	1.18	0.98	0.00
03:54:34	1925.0	1923.4	55.7	20	104	599	806	323	224	1.17	1.17	40.9	41.1	1915.0	529	10.0	0:20	1.18	0.79	0.00
03:55:11	1925.5	1923.9	50.0	20	104	596	800	323	160	1.17	1.17	40.9	41.2	1915.0	527	10.5	0:20	1.18	0.85	0.00
03:55:39	1926.0	1924.4	55.2	19	105	608	808	323	166	1.17	1.17	40.9	41.3	1915.0	531	11.0	0:21	1.18	0.78	0.00
03:56:13	1926.5	1924.9	57.8	19	104	647	788	323	223	1.17	1.17	40.8	41.4	1915.0	529	11.5	0:22	1.18	0.78	0.00
03:57:12	1927.0	1925.4	38.6	18	104	666	755	323	244	1.17	1.17	40.8	41.4	1915.0	530	12.0	0:23	1.18	0.84	0.00
03:58:05	1927.5	1925.9	32.0	18	104	628	718	323	195	1.17	1.17	40.7	41.4	1915.0	528	12.5	0:23	1.18	0.82	0.00
03:59:04	1928.0	1926.4	32.1	20	105	554	692	324	135	1.17	1.17	40.7	41.3	1915.0	530	13.0	0:24	1.18	0.90	0.00
04:00:21	1928.5	1926.9	28.5	20	105	525	723	323	167	1.17	1.17	40.6	41.4	1915.0	535	13.5	0:26	1.18	0.89	0.00
04:02:30	1929.0	1927.4	17.5	22	105	482	753	323	193	1.17	1.17	40.6	41.6	1915.0	532	14.0	0:28	1.18	1.06	0.00
04:04:25	1929.5	1927.9	14.8	22	105	491	748	323	192	1.17	1.17	40.6	41.7	1915.0	531	14.5	0:30	1.18	1.01	0.00
04:05:49	1930.0	1928.3	18.1	23	105	521	745	323	162	1.17	1.17	40.6	41.7	1915.0	540	15.0	0:31	1.18	1.07	0.00
04:07:38	1930.5	1928.9	18.7	23	105	485	743	323	180	1.17	1.17	40.6	41.6	1915.0	542	15.5	0:33	1.18	1.09	0.00
04:08:56	1931.0	1929.4	19.3	23	105	498	746	323	184	1.17	1.17	40.6	41.5	1915.0	541	16.0	0:34	1.18	1.05	0.00
04:10:17	1931.6	1929.9	22.7	22	104	610	726	323	200	1.17	1.17	40.6	41.4	1915.0	539	16.6	0:36	1.18	1.05	0.00
04:10:52	1932.0	1930.3	31.0	22	103	679	714	323	201	1.17	1.17	40.6	41.4	1915.0	544	17.0	0:36	1.18	0.93	0.00
04:12:10	1932.5	1930.9	31.8	20	103	699	724	323	194	1.17	1.17	40.6	41.4	1915.0	540	17.5	0:37	1.18	0.97	0.00
04:12:54	1933.0	1931.3	29.5	20	104	612	736	323	189	1.17	1.17	40.6	41.4	1915.0	541	18.0	0:38	1.18	0.92	0.00
04:14:16	1933.5	1931.9	28.5	21	104	527	738	323	221	1.17	1.17	40.6	41.4	1915.0	541	18.5	0:40	1.18	0.90	0.00
04:15:32	1934.0	1932.3	22.8	22	105	467	735	323	221	1.17	1.17	40.6	41.4	1915.0	542	19.0	0:41	1.18	1.00	0.00
04:16:09	1934.5	1932.8	31.9	21	104	527	735	324	149	1.17	1.17	40.6	41.4	1915.0	542	19.5	0:41	1.18	0.92	0.00
04:16:58	1935.0	1933.4	42.6	20	104	610	728	324	135	1.17	1.17	40.6	41.5	1915.0	542	20.0	0:42	1.18	0.85	0.00
04:17:43	1935.5	1933.8	38.3	20	104	589	722	324	158	1.17	1.17	40.6	41.5	1915.0	543	20.5	0:43	1.18	0.90	0.00
04:18:27	1936.0	1934.3	40.2	20	104	593	740	324	187	1.17	1.17	40.7	41.5	1915.0	542	21.0	0:44	1.18	0.86	0.00
04:18:59	1936.5	1934.9	51.6	20	104	599	764	324	199	1.17	1.17	40.7	41.5	1915.0	540	21.5	0:44	1.18	0.85	0.00
04:19:32	1937.0	1935.4	56.5	20	104	638	783	324	191	1.17	1.17	40.7	41.5	1915.0	540	22.0	0:45	1.18	0.78	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
04:20:17	1937.5	1935.8	46.1	20	104	609	796	324	179	1.17	1.17	40.7	41.5	1915.0	541	22.5	0:46	1.18	0.81	0.00
04:20:58	1938.1	1936.4	42.4	19	104	600	809	323	190	1.17	1.17	40.7	41.5	1915.0	538	23.1	0:46	1.18	0.84	0.00
04:21:25	1938.5	1936.8	53.3	20	104	622	811	324	195	1.17	1.17	40.6	41.5	1915.0	542	23.5	0:47	1.18	0.81	0.00
04:21:59	1939.0	1937.3	58.5	20	104	605	799	324	195	1.17	1.17	40.7	41.4	1915.0	541	24.0	0:47	1.18	0.77	0.00
04:22:32	1939.5	1937.8	53.6	20	104	602	793	324	175	1.17	1.17	40.7	41.4	1915.0	541	24.5	0:48	1.18	0.79	0.00
04:23:06	1940.0	1938.3	53.7	20	104	642	766	324	166	1.17	1.17	40.7	41.4	1915.0	543	25.0	0:48	1.18	0.79	0.00
04:24:01	1940.5	1938.8	40.4	20	104	620	759	324	199	1.17	1.17	40.7	41.4	1915.0	541	25.5	0:49	1.18	0.85	0.00
04:24:38	1941.0	1939.3	39.1	19	104	566	771	324	186	1.17	1.17	40.7	41.3	1915.0	540	26.0	0:50	1.18	0.85	0.00
04:24:57	1941.5	1939.8	64.3	19	104	563	793	324	150	1.17	1.17	40.7	41.3	1915.0	541	26.5	0:50	1.18	0.83	0.00
04:25:39	1942.0	1940.3	59.0	19	105	577	801	324	158	1.17	1.17	40.7	41.3	1915.0	540	27.0	0:51	1.18	0.76	0.00
04:26:22	1942.5	1940.8	42.4	19	105	575	778	324	181	1.17	1.17	40.7	41.3	1915.0	540	27.5	0:52	1.18	0.83	0.00
04:27:13	1943.0	1941.3	38.4	18	105	562	754	324	158	1.17	1.17	40.7	41.3	1915.0	544	28.0	0:53	1.18	0.84	0.00
POOH wet, pump slug, FLC, cont POOH. Retrieve 27.73m core.																				
RIH with RRCB2.2, TFA=1.503 to cut core#5.																				
16:59:04	1944.1	1942.4	4.1	24	105	705	733	334	350	1.17	1.17	42.0	41.5	1942.9	489	1.1	0:16	1.18	1.30	0.04
17:01:07	1944.5	1942.8	4.5	18	126	569	920	333	315	1.17	1.17	41.8	41.6	1942.9	488	1.5	0:18	1.18	1.24	0.04
17:03:44	1945.1	1943.4	12.9	11	127	524	1094	332	236	1.17	1.17	41.6	41.8	1942.9	492	2.1	0:21	1.18	1.00	0.04
17:05:06	1945.6	1943.9	18.7	11	128	532	1056	332	223	1.17	1.17	41.6	41.8	1942.9	494	2.6	0:22	1.18	1.11	0.04
17:06:09	1946.0	1944.3	24.7	11	127	607	1010	333	210	1.17	1.17	41.5	41.8	1942.9	491	3.0	0:23	1.18	0.88	0.04
17:07:08	1946.6	1944.9	29.6	11	125	633	1009	333	230	1.17	1.17	41.5	41.6	1942.9	492	3.6	0:24	1.18	0.89	0.04
17:08:22	1947.0	1945.3	27.1	11	125	645	1010	333	231	1.17	1.17	41.5	41.5	1942.9	494	4.0	0:25	1.18	0.85	0.04
17:09:23	1947.5	1945.8	26.5	11	124	650	1011	333	234	1.17	1.17	41.4	41.4	1942.9	494	4.5	0:26	1.18	0.86	0.04
17:10:10	1948.0	1946.3	33.3	12	125	673	1015	333	197	1.17	1.17	41.4	41.3	1942.9	494	5.0	0:27	1.18	0.82	0.04
17:11:35	1948.5	1946.8	27.3	12	124	650	1019	333	212	1.17	1.17	41.4	41.3	1942.9	492	5.5	0:28	1.18	0.83	0.04
17:13:38	1949.0	1947.3	17.3	15	127	486	1064	332	257	1.17	1.17	41.4	41.2	1942.9	495	6.0	0:30	1.18	1.01	0.04
17:15:47	1949.5	1947.8	14.4	17	128	525	1059	332	276	1.17	1.17	41.3	41.2	1942.9	492	6.5	0:33	1.18	0.94	0.04
17:16:16	1950.0	1948.3	22.8	18	129	596	1031	333	268	1.17	1.17	41.3	41.1	1942.9	495	7.0	0:33	1.18	1.01	0.04
17:17:50	1950.7	1948.9	32.5	18	128	604	891	333	252	1.17	1.17	41.2	41.0	1942.9	496	7.7	0:35	1.18	1.03	0.04
17:18:21	1951.0	1949.3	28.8	18	127	662	738	333	272	1.17	1.17	41.2	41.0	1942.9	495	8.0	0:35	1.18	0.95	0.04
17:19:39	1951.6	1949.9	32.8	19	127	672	704	334	262	1.17	1.17	41.2	41.0	1942.9	496	8.6	0:36	1.18	0.92	0.04
17:20:42	1952.0	1950.3	34.3	18	127	661	691	334	243	1.17	1.17	41.1	40.9	1942.9	496	9.0	0:38	1.18	0.91	0.04
17:21:19	1952.5	1950.8	35.9	18	127	642	704	334	215	1.17	1.17	41.1	40.9	1942.9	496	9.5	0:38	1.18	0.94	0.04
17:22:07	1953.0	1951.3	42.1	17	127	661	719	334	251	1.17	1.17	41.1	40.8	1942.9	495	10.0	0:39	1.18	0.85	0.04
17:23:05	1953.5	1951.8	33.9	17	127	632	711	334	254	1.17	1.17	41.1	40.7	1942.9	498	10.5	0:40	1.18	0.90	0.04
17:23:49	1954.0	1952.3	35.3	18	126	644	690	334	216	1.17	1.17	41.0	40.6	1942.9	497	11.0	0:41	1.18	0.90	0.04
17:24:46	1954.5	1952.8	35.6	18	125	656	688	335	212	1.17	1.17	41.0	40.5	1942.9	496	11.5	0:42	1.18	0.90	0.04
17:25:46	1955.1	1953.3	34.6	19	125	611	684	335	195	1.17	1.17	41.0	40.5	1942.9	498	12.1	0:43	1.18	0.91	0.04
17:26:26	1955.5	1953.8	36.0	19	127	610	686	335	192	1.17	1.17	40.9	40.5	1942.9	497	12.5	0:43	1.18	0.91	0.04
17:26:54	1956.0	1954.3	52.7	18	127	634	684	335	229	1.17	1.17	40.9	40.6	1942.9	495	13.0	0:44	1.18	0.82	0.04
17:28:09	1956.5	1954.8	35.0	17	128	610	690	334	237	1.17	1.17	40.9	40.6	1942.9	497	13.5	0:45	1.18	0.87	0.04
17:28:47	1957.0	1955.3	31.7	17	127	614	693	334	218	1.17	1.17	40.9	40.6	1942.9	497	14.0	0:46	1.18	0.91	0.04
17:29:39	1957.5	1955.8	40.0	17	127	597	693	334	262	1.17	1.17	40.9	40.6	1942.9	498	14.5	0:46	1.18	0.88	0.04
17:30:59	1958.0	1956.3	29.8	16	127	550	697	334	295	1.17	1.17	40.8	40.7	1942.9	497	15.0	0:48	1.18	0.92	0.04
17:31:37	1958.5	1956.8	30.9	16	128	536	689	334	237	1.17	1.17	40.8	40.8	1942.9	497	15.5	0:48	1.18	0.89	0.04
17:32:49	1959.1	1957.3	32.8	16	128	555	690	334	202	1.17	1.17	40.8	40.8	1942.9	497	16.1	0:50	1.18	0.90	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
17:33:25	1959.6	1957.9	45.3	16	128	587	706	334	227	1.17	1.17	40.7	40.8	1942.9	499	16.6	0:50	1.18	0.92	0.04
17:34:25	1960.1	1958.4	37.8	17	128	622	740	334	237	1.17	1.17	40.7	40.8	1942.9	498	17.1	0:51	1.18	0.87	0.04
17:34:54	1960.5	1958.8	40.3	16	128	635	731	334	222	1.17	1.17	40.7	40.8	1942.9	495	17.5	0:52	1.18	0.85	0.04
17:35:45	1961.0	1959.3	44.7	15	128	636	723	334	216	1.17	1.17	40.7	40.8	1942.9	495	18.0	0:53	1.18	0.81	0.04
17:36:52	1961.5	1959.8	30.5	15	128	605	706	333	231	1.17	1.17	40.6	40.7	1942.9	498	18.5	0:54	1.18	0.89	0.04
17:37:42	1962.0	1960.3	30.8	15	128	545	690	334	238	1.17	1.17	40.6	40.7	1942.9	497	19.0	0:55	1.18	0.90	0.04
17:38:35	1962.5	1960.8	34.8	15	128	561	702	334	214	1.17	1.17	40.6	40.7	1942.9	496	19.5	0:55	1.18	0.87	0.04
17:39:28	1963.0	1961.3	33.8	16	129	583	719	334	221	1.17	1.17	40.6	40.6	1942.9	495	20.0	0:56	1.18	0.89	0.04
17:40:35	1963.5	1961.8	30.0	18	128	572	708	334	248	1.17	1.17	40.6	40.5	1942.9	497	20.5	0:57	1.18	0.89	0.04
17:41:39	1964.0	1962.3	27.5	20	128	554	697	334	222	1.17	1.17	40.6	40.4	1942.9	497	21.0	0:58	1.18	0.98	0.04
17:42:59	1964.6	1962.8	26.1	19	128	548	692	333	200	1.17	1.17	40.5	40.4	1942.9	495	21.6	0:60	1.18	0.95	0.04
17:44:04	1965.0	1963.3	24.8	19	128	552	696	333	217	1.17	1.17	40.5	40.4	1942.9	497	22.0	1:01	1.18	0.99	0.04
17:44:52	1965.5	1963.8	31.7	19	128	568	718	333	173	1.17	1.17	40.5	40.3	1942.9	498	22.5	1:02	1.18	0.93	0.04
17:46:08	1966.1	1964.3	29.5	19	127	601	700	333	150	1.17	1.17	40.4	40.4	1942.9	496	23.1	1:03	1.18	0.95	0.04
17:47:02	1966.5	1964.8	27.8	18	128	558	677	333	209	1.17	1.17	40.4	40.5	1942.9	497	23.5	1:04	1.18	0.94	0.04
17:47:49	1967.0	1965.3	35.4	18	129	510	673	333	251	1.17	1.17	40.4	40.6	1942.9	498	24.0	1:05	1.18	0.90	0.04
17:49:07	1967.5	1965.8	28.7	18	129	541	674	333	248	1.17	1.17	40.4	40.6	1942.9	496	24.5	1:06	1.18	0.94	0.04
17:50:14	1968.0	1966.3	27.0	17	129	551	676	333	244	1.17	1.17	40.3	40.6	1942.9	496	25.0	1:07	1.18	0.95	0.04
17:51:13	1968.5	1966.8	28.7	18	128	569	677	332	209	1.17	1.17	40.3	40.6	1942.9	494	25.5	1:08	1.18	0.96	0.04
17:52:11	1969.0	1967.3	30.6	21	128	587	675	332	193	1.17	1.17	40.3	40.6	1942.9	498	26.0	1:09	1.18	0.97	0.04
FLC, pump slug, POOH. Recovered 26m core.																				

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
NB#7 DBS TD19M 5x14, 1x13 jets																				
Monday 11 October 1993																				
06:14:08	1970.1	1968.3	39.0	16	107	692	2917	817	772	1.17	1.17	46.6	47.7	1969.0	483	1.1	0:04	1.19	0.82	0.01
06:15:07	1971.1	1969.4	63.2	17	113	707	2837	817	766	1.17	1.17	46.6	47.9	1969.0	483	2.1	0:05	1.19	0.75	0.01
06:16:09	1972.0	1970.3	57.6	16	129	780	2879	816	753	1.17	1.17	46.6	48.0	1969.0	482	3.0	0:06	1.19	0.79	0.01
06:17:05	1973.1	1971.3	78.8	18	130	776	2892	815	767	1.17	1.17	46.6	48.0	1969.0	483	4.1	0:07	1.19	0.74	0.01
06:18:25	1974.1	1972.3	44.9	15	148	645	2864	815	772	1.17	1.17	46.7	47.9	1969.1	481	5.1	0:08	1.19	0.84	0.01
06:20:34	1975.0	1973.3	27.7	12	150	603	2851	814	762	1.17	1.17	46.7	47.6	1969.2	483	6.0	0:10	1.19	0.90	0.01
06:22:21	1976.0	1974.3	33.9	16	150	644	2832	815	762	1.17	1.17	46.8	47.9	1969.3	481	7.0	0:12	1.19	0.93	0.01
06:23:35	1977.0	1975.2	48.3	16	150	665	2855	815	754	1.17	1.17	46.8	48.0	1969.3	482	8.0	0:13	1.19	0.85	0.01
06:25:28	1978.0	1976.3	32.4	17	150	662	2871	815	761	1.17	1.17	46.7	48.0	1969.4	482	9.0	0:15	1.19	0.94	0.01
06:27:10	1979.0	1977.2	35.2	16	150	619	2854	816	755	1.17	1.17	46.8	47.9	1969.5	483	10.0	0:17	1.19	0.91	0.01
06:28:41	1980.1	1978.3	40.2	13	150	640	2844	817	764	1.17	1.17	46.9	48.0	1969.6	482	11.1	0:18	1.19	0.84	0.02
06:29:38	1981.0	1979.2	62.6	13	150	682	2872	816	753	1.17	1.17	46.9	48.1	1969.6	481	12.0	0:19	1.19	0.75	0.02
06:30:55	1982.0	1980.2	46.8	10	150	641	2891	817	766	1.17	1.17	46.9	48.0	1969.7	483	13.0	0:21	1.19	0.76	0.02
06:31:58	1983.1	1981.3	58.1	11	150	720	2882	816	762	1.17	1.17	47.0	48.1	1969.7	484	14.1	0:22	1.19	0.75	0.02
06:33:04	1984.0	1982.3	54.4	13	149	666	2830	817	753	1.17	1.17	47.0	48.1	1969.8	482	15.0	0:23	1.19	0.78	0.02
06:34:24	1985.1	1983.3	45.6	14	149	650	2859	817	767	1.17	1.17	47.0	48.0	1969.8	481	16.1	0:24	1.19	0.83	0.02
06:35:50	1986.0	1984.2	41.6	14	150	558	2822	816	771	1.17	1.17	47.0	47.9	1969.9	481	17.0	0:25	1.19	0.85	0.02
06:37:01	1987.0	1985.2	50.7	13	150	588	2825	816	760	1.17	1.17	47.0	48.2	1969.9	484	18.0	0:27	1.19	0.79	0.02
06:38:35	1988.0	1986.2	38.3	13	150	567	2827	816	772	1.17	1.17	47.0	48.3	1970.0	482	19.0	0:28	1.19	0.85	0.02
06:40:23	1989.0	1987.2	33.3	13	150	576	2814	816	765	1.17	1.17	47.1	48.3	1970.1	481	20.0	0:30	1.19	0.88	0.02
06:42:18	1990.0	1988.2	31.3	14	150	626	2831	816	763	1.17	1.17	47.3	48.4	1969.0	483	21.0	0:32	1.19	0.91	0.02
07:52:24	1991.1	1989.3	18.1	13	149	602	2772	816	754	1.17	1.17	47.3	48.4	1984.2	460	22.1	0:35	1.19	1.00	0.25
07:55:04	1992.0	1990.2	22.4	13	148	589	2897	822	751	1.17	1.17	47.4	49.4	1985.7	457	23.0	0:38	1.19	0.96	0.24
07:57:31	1993.0	1991.2	44.3	15	98	681	2935	822	752	1.17	1.17	47.5	49.7	1986.0	455	24.0	0:40	1.19	0.72	0.23
07:58:23	1994.1	1992.3	58.6	14	148	586	2915	822	750	1.17	1.17	47.6	49.7	1986.1	453	25.1	0:41	1.19	0.77	0.22
07:59:40	1995.0	1993.2	46.6	11	149	552	2907	821	747	1.17	1.17	47.7	49.7	1986.3	465	26.0	0:42	1.19	0.78	0.22
08:00:55	1996.1	1994.3	48.6	14	148	626	2894	822	738	1.17	1.17	47.7	49.8	1986.6	460	27.1	0:43	1.19	0.81	0.23
08:02:29	1997.0	1995.2	38.1	15	148	644	2924	822	745	1.17	1.17	47.8	49.8	1986.8	454	28.0	0:45	1.19	0.88	0.23
08:03:52	1998.0	1996.2	43.2	15	148	635	2927	822	756	1.17	1.17	47.9	49.8	1987.1	452	29.0	0:46	1.19	0.85	0.22
08:05:04	1999.0	1997.2	50.0	13	149	639	2925	822	731	1.17	1.17	48.0	49.8	1987.3	452	30.0	0:47	1.19	0.80	0.21
08:06:38	2000.0	1998.2	38.2	14	148	590	2930	822	743	1.17	1.17	48.1	49.8	1987.6	450	31.0	0:49	1.19	0.87	0.19
08:08:23	2001.0	1999.2	34.3	12	149	550	2886	821	743	1.17	1.17	48.2	49.7	1987.9	447	32.0	0:51	1.19	0.85	0.16
08:10:03	2002.1	2000.2	37.1	14	149	602	2932	822	739	1.17	1.17	48.3	49.7	1988.1	444	33.1	0:52	1.19	0.87	0.14
08:11:30	2003.0	2001.2	41.1	14	148	631	2915	821	729	1.17	1.17	48.4	49.7	1988.4	455	34.0	0:54	1.19	0.85	0.12
08:13:05	2004.0	2002.2	37.7	13	149	590	2912	820	736	1.17	1.17	48.4	49.7	1988.7	463	35.0	0:55	1.19	0.85	0.10
08:14:11	2005.0	2003.2	55.8	12	149	643	2892	821	849	1.17	1.17	48.4	49.8	1988.9	466	36.0	0:56	1.19	0.82	0.08
08:15:11	2006.0	2004.2	58.5	13	148	671	2911	820	854	1.17	1.17	48.5	49.8	1989.0	469	37.0	0:57	1.19	0.77	0.07
08:16:46	2007.0	2005.2	41.4	13	148	575	2922	820	858	1.17	1.17	48.5	49.7	1989.3	472	38.0	0:59	1.19	0.83	0.06
08:18:19	2008.0	2006.2	38.5	13	149	605	2860	820	845	1.17	1.17	48.6	49.6	1989.6	476	39.0	1:01	1.19	0.85	0.05
08:20:16	2009.0	2007.2	30.8	14	148	592	2911	820	853	1.17	1.17	48.7	49.6	1989.9	473	40.0	1:03	1.19	0.91	0.03
08:22:06	2010.0	2008.2	32.7	14	149	557	2882	820	860	1.17	1.17	48.7	49.5	1990.3	462	41.0	1:04	1.19	0.89	0.03
08:24:02	2011.0	2009.2	31.4	14	149	580	2904	820	865	1.17	1.17	48.7	49.5	1990.6	448	42.0	1:06	1.19	0.90	0.03
08:25:34	2012.0	2010.2	39.0	14	148	576	2863	820	858	1.17	1.17	48.6	49.5	1990.9	434	43.0	1:08	1.19	0.87	0.03

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DIC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
08:27:05	2013.0	2011.2	40.0	13	149	546	2898	820	860	1.17	1.17	48.6	49.5	1991.1	424	44.0	1:09	1.19	0.84	0.03
08:28:52	2014.0	2012.2	34.0	11	149	524	2889	820	857	1.17	1.17	48.7	49.6	1991.4	424	45.0	1:11	1.19	0.85	0.03
08:30:24	2015.1	2013.2	39.1	13	149	585	2901	821	840	1.17	1.17	48.6	49.6	1991.7	424	46.1	1:13	1.19	0.85	0.03
08:31:59	2016.0	2014.2	37.9	15	149	571	2868	822	877	1.17	1.17	48.7	49.6	1992.0	423	47.0	1:14	1.19	0.89	0.03
08:33:49	2017.0	2015.2	32.6	15	150	526	2907	822	859	1.17	1.17	48.7	49.6	1992.3	424	48.0	1:16	1.19	0.91	0.03
08:35:24	2018.0	2016.2	37.9	14	149	580	2863	822	863	1.17	1.17	48.8	49.7	1992.6	423	49.0	1:18	1.19	0.86	0.03
08:37:17	2019.1	2017.2	35.6	14	149	557	2889	821	867	1.17	1.17	48.8	49.7	1992.9	423	50.1	1:20	1.19	0.89	0.04
08:52:01	2020.1	2018.3	21.4	14	150	559	2862	815	892	1.17	1.17	48.8	49.5	1998.8	417	51.1	1:22	1.19	0.97	0.18
08:53:24	2021.0	2019.2	43.1	11	151	554	2851	811	901	1.17	1.17	48.8	49.5	1999.6	417	52.0	1:24	1.19	0.79	0.17
08:54:52	2022.0	2020.2	40.9	10	151	555	2807	811	883	1.17	1.17	48.7	49.5	2000.4	416	53.0	1:25	1.19	0.80	0.17
08:56:42	2023.0	2021.2	32.7	11	151	567	2858	810	883	1.17	1.17	48.7	49.8	2001.4	414	54.0	1:27	1.19	0.86	0.18
08:57:57	2024.0	2022.1	47.8	15	151	622	2866	811	907	1.17	1.17	48.7	49.8	2002.1	414	55.0	1:28	1.19	0.83	0.17
08:59:36	2025.0	2023.1	36.4	12	151	561	2844	811	906	1.17	1.17	48.7	49.9	2003.1	415	56.0	1:30	1.19	0.85	0.17
09:01:01	2026.0	2024.2	43.4	11	151	564	2863	811	903	1.17	1.17	48.8	50.0	2004.1	412	57.0	1:31	1.19	0.80	0.20
09:02:16	2027.0	2025.2	48.0	13	151	588	2817	810	877	1.17	1.17	48.8	50.1	2005.0	413	58.0	1:33	1.19	0.81	0.21
09:03:28	2028.1	2026.2	50.7	14	151	632	2863	809	888	1.17	1.17	48.8	50.2	2006.0	413	59.1	1:34	1.19	0.81	0.21
09:05:22	2029.0	2027.1	31.5	14	151	626	2863	809	904	1.17	1.17	48.9	50.2	2007.3	408	60.0	1:36	1.19	0.90	0.21
09:07:18	2030.0	2028.2	31.0	12	151	567	2862	810	902	1.17	1.17	48.9	50.2	2008.3	408	61.0	1:38	1.19	0.87	0.23
09:09:10	2031.1	2029.2	35.6	13	151	578	2848	810	887	1.17	1.17	49.0	50.1	2009.3	406	62.1	1:40	1.19	0.86	0.26
09:10:35	2032.0	2030.1	42.0	12	149	683	2886	810	880	1.17	1.17	49.1	50.0	2010.0	403	63.0	1:41	1.19	0.82	0.26
09:12:24	2033.0	2031.1	46.2	11	151	556	2880	811	908	1.17	1.17	49.1	49.8	2010.7	401	64.0	1:43	1.19	0.78	0.31
09:13:18	2034.0	2032.1	41.0	11	151	576	2782	811	913	1.17	1.17	49.1	50.2	2011.1	402	65.0	1:44	1.19	0.81	0.31
09:13:57	2035.0	2033.1	49.0	12	150	620	2866	811	900	1.17	1.17	49.1	50.3	2011.3	404	66.0	1:44	1.19	0.80	0.31
09:15:14	2036.0	2034.1	40.6	13	151	617	2878	812	899	1.17	1.17	49.1	50.4	2012.0	407	67.0	1:46	1.19	0.83	0.31
09:16:20	2037.0	2035.1	34.0	10	150	615	2755	811	887	1.17	1.17	49.1	50.5	2012.5	411	68.0	1:47	1.19	0.84	0.30
09:18:15	2038.0	2036.1	35.5	14	150	574	2881	811	894	1.17	1.17	49.1	50.5	2013.6	410	69.0	1:49	1.19	0.88	0.28
09:21:38	2039.0	2037.1	16.6	14	149	529	2865	812	914	1.17	1.17	49.1	50.9	2015.5	409	70.0	1:52	1.19	1.03	0.29
09:23:57	2040.1	2038.1	28.1	10	151	606	2865	812	901	1.17	1.17	49.2	50.9	2016.8	409	71.1	1:54	1.19	0.85	0.27
09:26:17	2041.0	2039.1	25.7	11	151	585	2895	812	899	1.17	1.17	49.3	50.9	2018.1	408	72.0	1:57	1.19	0.90	0.22
09:28:38	2042.1	2040.2	30.5	12	151	598	2877	812	901	1.17	1.17	49.4	50.9	2019.4	406	73.1	1:59	1.19	0.89	0.18
09:31:16	2043.0	2041.1	22.7	12	150	607	2866	813	907	1.17	1.17	49.5	51.0	2020.9	410	74.0	2:02	1.19	0.94	0.15
09:33:13	2044.0	2042.1	32.6	12	151	605	2901	813	916	1.17	1.17	49.6	51.1	2022.0	415	75.0	2:04	1.19	0.87	0.13
09:35:00	2045.0	2043.1	33.5	14	150	601	2870	812	903	1.17	1.17	49.7	51.2	2023.1	416	76.0	2:05	1.19	0.90	0.10
09:37:30	2046.0	2044.1	23.9	14	150	601	2877	812	904	1.17	1.17	49.8	51.2	2024.5	418	77.0	2:08	1.19	0.97	0.07
09:39:12	2047.0	2045.1	35.5	13	150	623	2890	812	905	1.17	1.17	49.9	51.2	2025.4	417	78.0	2:10	1.19	0.87	0.06
09:41:25	2048.0	2046.1	28.7	12	150	615	2871	812	910	1.17	1.17	49.9	51.2	2026.7	415	79.0	2:12	1.19	0.90	0.08
09:43:14	2049.0	2047.1	30.8	14	150	622	2890	812	919	1.17	1.17	50.0	51.2	2027.7	416	80.0	2:14	1.19	0.90	0.14
10:04:28	2050.0	2048.1	14.2	13	144	551	2866	811	900	1.17	1.17	50.1	51.6	2036.8	406	81.0	2:18	1.19	1.04	0.18
10:07:43	2051.0	2049.1	18.4	13	147	652	2812	809	883	1.17	1.17	50.2	51.6	2038.0	404	82.0	2:21	1.19	0.99	0.19
10:10:04	2052.0	2050.1	25.9	14	148	616	2857	809	879	1.17	1.17	50.3	51.7	2038.5	402	83.0	2:24	1.19	0.94	0.19
10:12:18	2053.1	2051.1	27.3	14	148	702	2850	808	894	1.17	1.17	50.3	51.7	2039.4	399	84.1	2:26	1.19	0.93	0.18
10:14:16	2054.0	2052.1	30.3	14	147	657	2833	809	890	1.17	1.17	50.4	51.6	2040.3	395	85.0	2:28	1.19	0.91	0.17
10:15:43	2055.0	2053.1	41.6	13	147	677	2855	809	896	1.17	1.17	50.3	51.8	2040.8	392	86.0	2:29	1.19	0.84	0.17
10:19:00	2056.0	2054.1	18.2	15	146	600	2863	809	889	1.17	1.17	50.4	51.8	2042.1	392	87.0	2:32	1.19	1.03	0.16
10:21:00	2057.0	2055.1	30.0	12	148	619	2863	809	895	1.17	1.17	50.4	51.9	2042.8	387	88.0	2:34	1.19	0.88	0.17

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
10:22:56	2058.1	2056.1	34.4	12	148	645	2838	808	900	1.17	1.17	50.4	51.9	2043.8	388	89.1	2:36	1.19	0.85	0.18
10:24:51	2059.0	2057.1	31.2	13	147	572	2848	808	899	1.17	1.17	50.3	51.9	2044.6	389	90.0	2:38	1.19	0.88	0.18
10:27:01	2060.1	2058.1	30.1	10	148	587	2845	808	902	1.17	1.17	50.0	51.9	2045.6	391	91.1	2:41	1.19	0.86	0.18
10:29:13	2061.0	2059.1	27.2	11	148	682	2824	807	904	1.17	1.17	49.9	51.8	2046.6	389	92.0	2:43	1.19	0.88	0.19
10:31:13	2062.1	2060.1	30.1	13	148	635	2814	807	894	1.17	1.17	49.9	51.9	2047.6	392	93.1	2:45	1.19	0.90	0.19
10:32:58	2063.0	2061.1	34.2	13	148	679	2814	809	892	1.17	1.17	49.8	51.8	2048.3	392	94.0	2:46	1.19	0.86	0.20
10:35:00	2064.0	2062.1	29.4	11	148	661	2798	816	907	1.17	1.17	49.7	51.9	2049.3	395	95.0	2:48	1.19	0.87	0.21
10:37:57	2065.0	2063.1	20.3	10	149	526	2758	816	898	1.17	1.17	49.7	52.0	2049.4	396	96.0	2:51	1.19	0.92	0.21
10:40:22	2066.1	2064.1	25.0	13	148	605	2724	816	893	1.17	1.17	49.7	52.1	2049.4	396	97.1	2:54	1.19	0.93	0.21
10:42:39	2067.0	2065.1	26.2	14	147	665	2692	816	911	1.17	1.17	49.7	52.3	2049.4	398	98.0	2:56	1.19	0.94	0.21
10:44:33	2068.0	2066.0	31.4	11	148	604	2704	815	891	1.17	1.17	49.7	52.3	2049.4	397	99.0	2:58	1.19	0.86	0.21
10:50:29	2069.0	2067.1	10.1	14	149	591	2679	815	897	1.17	1.17	49.8	52.4	2049.9	402	100.0	3:04	1.19	1.13	0.14
10:53:34	2070.0	2068.1	22.6	15	131	651	2676	816	893	1.17	1.17	50.0	52.4	2050.5	405	101.0	3:07	1.19	0.96	0.10
10:54:58	2071.0	2069.1	42.9	15	146	713	2701	815	899	1.17	1.17	50.0	52.4	2051.0	404	102.0	3:08	1.19	0.85	0.08
10:56:36	2072.0	2070.1	36.6	14	149	640	2677	815	898	1.17	1.17	50.1	52.3	2051.8	413	103.0	3:10	1.19	0.87	0.09
10:59:09	2073.0	2071.0	23.5	15	149	495	2696	815	900	1.17	1.17	50.2	52.3	2053.0	415	104.0	3:13	1.19	0.98	0.11
11:01:26	2074.0	2072.0	26.3	15	145	733	2687	815	881	1.17	1.17	50.3	52.0	2054.1	420	105.0	3:15	1.19	0.95	0.13
11:03:21	2075.0	2073.0	31.3	13	148	633	2703	815	895	1.17	1.17	50.4	52.2	2055.1	422	106.0	3:17	1.19	0.89	0.14
11:05:29	2076.1	2074.1	28.7	11	149	585	2670	814	904	1.17	1.17	50.4	52.2	2055.7	420	107.1	3:19	1.19	0.88	0.16
11:08:14	2077.0	2075.0	21.7	14	149	612	2685	814	903	1.17	1.17	50.5	52.2	2056.9	422	108.0	3:22	1.19	0.98	0.18
11:10:55	2078.0	2076.0	22.4	14	154	608	2694	812	901	1.17	1.17	50.5	52.1	2058.2	423	109.0	3:24	1.19	0.98	0.17
11:28:40	2079.0	2077.0	9.6	13	155	545	2728	813	909	1.17	1.17	50.5	52.0	2064.6	422	110.0	3:31	1.19	1.13	0.23
11:30:44	2080.0	2078.0	29.3	12	152	588	2754	814	898	1.17	1.17	50.4	51.8	2065.2	421	111.0	3:33	1.19	0.89	0.26
11:33:33	2081.0	2079.0	21.4	12	151	674	2756	815	893	1.17	1.17	50.4	52.2	2066.2	418	112.0	3:36	1.19	0.96	0.25
11:36:03	2082.1	2080.1	26.0	12	152	638	2744	815	896	1.17	1.17	50.5	52.3	2067.4	417	113.1	3:38	1.19	0.92	0.22
11:38:27	2083.0	2081.0	24.9	11	152	534	2731	815	911	1.17	1.17	50.6	52.2	2068.5	414	114.0	3:40	1.19	0.90	0.23
11:41:38	2084.0	2082.0	18.8	10	152	681	2755	815	890	1.17	1.17	50.7	52.6	2068.8	412	115.0	3:44	1.19	0.93	0.25
11:43:50	2085.1	2083.1	27.6	10	151	679	2762	815	896	1.17	1.17	50.7	52.7	2069.1	418	116.1	3:46	1.19	0.86	0.24
11:47:57	2086.0	2084.0	14.6	11	151	700	2749	816	905	1.17	1.17	50.6	52.4	2070.7	420	117.0	3:50	1.19	1.01	0.17
11:53:23	2087.0	2085.0	11.0	11	152	616	2615	815	894	1.17	1.17	50.8	52.5	2073.3	423	118.0	3:55	1.19	1.07	0.29
11:58:42	2088.1	2086.1	11.4	11	152	569	2536	815	892	1.17	1.17	50.9	52.5	2075.7	423	119.1	4:01	1.19	1.06	0.26
12:03:35	2089.0	2087.0	12.3	14	152	665	2566	816	889	1.17	1.17	51.1	52.6	2077.5	418	120.0	4:06	1.19	1.09	0.23
12:06:07	2090.0	2088.0	23.7	14	152	665	2582	816	884	1.17	1.17	51.3	52.5	2078.7	417	121.0	4:08	1.19	0.96	0.22
12:08:29	2091.0	2089.0	23.2	13	152	630	2633	815	877	1.17	1.17	51.4	52.8	2078.8	416	122.0	4:10	1.19	0.96	0.22
12:11:18	2092.0	2090.0	21.3	14	152	662	2609	816	877	1.17	1.17	51.5	52.9	2078.8	418	123.0	4:13	1.19	0.99	0.22
12:13:19	2093.0	2091.0	33.2	14	152	666	2618	816	881	1.17	1.17	51.2	52.9	2078.8	422	124.0	4:15	1.19	0.90	0.22
12:16:22	2094.0	2092.0	19.7	13	146	756	2667	817	888	1.17	1.17	51.0	52.9	2078.8	423	125.0	4:18	1.19	0.98	0.22
12:19:35	2095.0	2093.0	18.6	13	147	700	2683	817	898	1.17	1.17	50.8	52.8	2079.3	427	126.0	4:22	1.19	1.00	0.20
12:22:01	2096.1	2094.1	27.1	14	152	606	2644	816	895	1.17	1.17	50.7	52.8	2080.3	428	127.1	4:24	1.19	0.97	0.24
12:24:07	2097.0	2095.0	28.3	14	151	702	2629	816	893	1.17	1.17	50.8	53.1	2080.9	426	128.0	4:26	1.19	0.92	0.32
12:26:28	2098.0	2096.0	25.4	14	152	637	2625	815	891	1.17	1.17	51.0	53.1	2081.9	428	129.0	4:28	1.19	0.94	0.33
12:28:37	2099.0	2097.0	28.0	15	152	592	2599	815	883	1.17	1.17	51.0	53.1	2082.7	429	130.0	4:31	1.19	0.94	0.34
12:30:42	2100.0	2098.0	28.7	15	152	670	2618	814	883	1.17	1.17	51.2	53.0	2083.4	426	131.0	4:33	1.19	0.94	0.32
12:34:13	2101.0	2099.0	19.7	14	152	552	2601	814	899	1.17	1.17	51.3	53.0	2084.6	429	132.0	4:36	1.19	1.01	0.22
12:39:01	2102.0	2100.0	12.9	14	152	549	2615	814	889	1.17	1.17	51.5	53.2	2086.0	428	133.0	4:41	1.19	1.10	0.20

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD WEIGHT IN	MUD WEIGHT OUT	MUD TEMP IN	MUD TEMP OUT	RETNS DEPTH	PVT	---BIT--- DIST	---BIT--- HRS	ECD	DXC	GAS
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
12:41:12	2103.0	2101.0	27.4	14	152	632	2625	814	886	1.17	1.17	51.5	53.2	2086.4	429	134.0	4:43	1.19	0.94	0.19
12:43:25	2104.1	2102.0	30.0	14	152	656	2655	814	895	1.17	1.17	51.5	53.3	2086.8	429	135.1	4:45	1.19	0.92	0.18
12:45:09	2105.0	2103.0	34.4	14	152	635	2602	814	889	1.17	1.17	51.6	53.4	2087.0	428	136.0	4:47	1.19	0.89	0.18
12:48:21	2106.0	2104.0	18.8	13	152	497	2660	815	901	1.17	1.17	51.7	53.1	2087.6	428	137.0	4:50	1.19	1.00	0.20
12:54:44	2107.0	2105.0	9.4	11	152	443	2668	816	889	1.17	1.17	51.9	53.3	2088.7	427	138.0	4:57	1.19	1.09	0.22
13:08:02	2108.0	2106.0	10.5	11	150	521	2714	815	884	1.17	1.17	52.0	53.3	2091.7	437	139.0	5:02	1.19	1.08	0.09
13:10:28	2109.0	2107.0	24.6	14	143	597	2721	815	891	1.17	1.17	52.0	52.4	2092.6	431	140.0	5:05	1.19	0.94	0.14
13:15:22	2110.0	2108.0	12.4	15	143	455	2735	817	894	1.17	1.17	51.9	52.5	2094.3	425	141.0	5:10	1.19	1.11	0.22
13:20:08	2111.0	2109.0	13.1	15	144	496	2698	818	902	1.17	1.17	51.7	53.2	2096.0	424	142.0	5:15	1.19	1.09	0.24
13:21:57	2112.0	2110.0	33.0	15	147	647	2747	818	885	1.17	1.17	51.7	53.5	2096.8	425	143.0	5:16	1.19	0.91	0.25
13:24:46	2113.0	2111.0	21.3	15	148	546	2735	817	893	1.17	1.17	51.7	53.5	2098.0	425	144.0	5:19	1.19	1.00	0.23
13:29:41	2114.0	2112.0	12.1	17	133	450	2752	818	876	1.17	1.17	51.9	53.5	2100.1	418	145.0	5:24	1.19	1.12	0.22
13:40:29	2115.0	2113.0	5.6	18	91	457	2769	821	892	1.17	1.17	52.2	53.7	2103.7	414	146.0	5:35	1.19	1.23	0.16
13:43:22	2116.0	2114.0	21.3	17	120	528	2783	820	900	1.17	1.17	52.5	54.0	2105.4	411	147.0	5:38	1.19	0.98	0.17
13:44:47	2117.0	2115.0	42.4	18	143	598	2745	818	886	1.17	1.17	52.6	54.0	2105.8	412	148.0	5:39	1.19	0.89	0.17
13:46:47	2118.0	2116.0	29.9	17	143	640	2777	818	879	1.17	1.17	52.6	54.0	2106.0	410	149.0	5:41	1.19	0.95	0.17
13:48:31	2119.0	2117.0	34.6	18	142	618	2768	818	882	1.17	1.17	52.6	54.1	2106.4	408	150.0	5:43	1.19	0.92	0.15
13:50:11	2120.0	2118.0	36.0	17	141	645	2797	819	894	1.17	1.17	52.7	54.1	2106.7	410	151.0	5:45	1.19	0.91	0.13
13:51:59	2121.1	2119.0	36.7	18	138	655	2768	818	890	1.17	1.17	52.7	54.0	2106.9	410	152.1	5:46	1.19	0.91	0.12
13:53:29	2122.0	2120.0	39.9	19	139	669	2812	818	883	1.17	1.17	52.8	54.0	2107.0	412	153.0	5:48	1.19	0.90	0.11
13:55:02	2123.0	2121.0	38.5	17	142	639	2795	818	866	1.17	1.17	52.8	54.0	2107.1	409	154.0	5:49	1.19	0.90	0.11
13:56:55	2124.0	2122.0	31.9	16	142	632	2782	817	872	1.17	1.17	52.9	54.0	2107.4	411	155.0	5:51	1.19	0.93	0.11
13:58:47	2125.0	2123.0	32.1	17	142	619	2769	816	880	1.17	1.17	52.9	54.0	2107.7	409	156.0	5:53	1.19	0.93	0.11
14:00:40	2126.0	2124.0	32.3	16	143	634	2807	816	888	1.17	1.17	53.0	54.0	2107.7	408	157.0	5:55	1.19	0.92	0.11
14:03:15	2127.1	2125.0	23.5	14	145	520	2768	817	875	1.17	1.17	53.0	54.0	2108.2	406	158.1	5:58	1.19	0.96	0.14
14:05:34	2128.0	2125.9	25.8	14	144	557	2783	817	878	1.17	1.17	53.0	54.2	2109.2	404	159.0	6:00	1.19	0.94	0.17
14:08:05	2129.0	2126.9	23.8	14	144	513	2783	817	889	1.17	1.17	53.0	54.0	2109.8	408	160.0	6:03	1.19	0.95	0.13
14:10:51	2130.1	2128.0	21.8	13	145	504	2725	816	877	1.17	1.17	53.0	53.9	2110.1	410	161.1	6:05	1.19	0.96	0.10
14:13:43	2131.0	2128.9	20.8	13	145	516	2749	817	894	1.17	1.17	53.0	54.0	2110.5	409	162.0	6:08	1.19	0.96	0.11
14:16:54	2132.0	2129.9	18.8	14	144	512	2779	817	895	1.17	1.17	52.7	54.0	2111.9	414	163.0	6:11	1.19	1.01	0.13
14:19:06	2133.0	2131.0	28.1	13	144	557	2803	818	901	1.17	1.17	52.6	54.2	2112.6	414	164.0	6:14	1.19	0.91	0.12
14:21:15	2134.0	2131.9	27.8	15	144	515	2789	819	886	1.17	1.17	52.7	54.2	2113.3	413	165.0	6:16	1.19	0.94	0.10
14:24:08	2135.0	2133.0	26.1	16	140	614	2772	819	897	1.17	1.17	52.8	54.2	2113.7	413	166.0	6:19	1.19	0.96	0.08
14:26:11	2136.0	2133.9	29.1	13	143	609	2789	819	900	1.17	1.17	52.9	54.3	2114.0	415	167.0	6:21	1.19	0.89	0.07
14:40:15	2137.0	2134.9	11.3	11	144	550	2781	818	888	1.17	1.17	52.9	53.6	2114.7	419	168.0	6:26	1.19	1.04	0.07
14:42:31	2138.0	2135.9	26.5	16	141	632	2807	819	886	1.17	1.17	52.8	52.1	2115.0	387	169.0	6:28	1.19	0.95	0.16
14:44:35	2139.0	2137.0	32.0	16	140	638	2786	821	913	1.17	1.17	52.8	52.7	2115.6	384	170.0	6:30	1.19	0.92	0.32
14:46:28	2140.0	2137.9	31.8	16	142	607	2834	821	928	1.17	1.17	52.7	53.5	2116.6	384	171.0	6:32	1.19	0.93	0.36
14:50:30	2141.0	2138.9	14.8	18	143	480	2800	821	913	1.17	1.17	52.7	53.6	2118.9	380	172.0	6:36	1.19	1.12	0.29
14:59:24	2142.0	2139.9	7.0	18	86	501	2858	823	906	1.17	1.17	52.6	54.3	2124.0	376	173.0	6:45	1.19	1.17	0.22
15:08:37	2143.0	2140.9	6.5	18	79	526	2872	823	900	1.17	1.17	52.9	54.8	2128.0	374	174.0	6:54	1.19	1.18	0.22
15:13:34	2144.0	2141.9	12.1	19	110	506	2875	823	905	1.17	1.17	53.2	55.0	2129.9	372	175.0	6:59	1.19	1.11	0.19
15:23:35	2145.0	2142.9	6.0	19	88	563	2888	823	893	1.17	1.17	53.6	55.1	2133.5	370	176.0	7:09	1.19	1.22	0.23
15:25:28	2146.0	2143.9	32.0	18	117	658	2908	824	900	1.17	1.17	53.8	55.2	2134.7	368	177.0	7:11	1.19	0.90	0.27
15:27:12	2147.0	2144.9	34.6	18	141	604	2861	821	900	1.17	1.17	53.8	55.3	2135.7	368	178.0	7:13	1.19	0.92	0.26

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA - 2A

TIME	DEPTH	VERT. DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD WEIGHT		MUD TEMP		RETNS	PVT	---BIT---		ECD	DXC	GAS
								IN	OUT	IN	OUT	IN	OUT	DEPTH		DIST	HRS			
h:mm:sec	m	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
15:29:01	2148.0	2145.9	33.0	16	143	582	2856	821	908	1.17	1.17	53.9	55.4	2136.2	368	179.0	7:15	1.19	0.92	0.23
15:30:44	2149.0	2146.9	35.0	16	143	553	2893	821	902	1.17	1.17	53.9	55.2	2136.3	367	180.0	7:16	1.19	0.91	0.22
15:32:27	2150.0	2147.9	35.0	16	143	554	2886	822	905	1.17	1.17	54.0	55.1	2136.5	368	181.0	7:18	1.19	0.90	0.20
15:34:42	2151.0	2148.9	26.6	16	143	565	2878	821	917	1.17	1.17	54.0	55.1	2136.7	367	182.0	7:20	1.19	0.96	0.19
15:37:01	2152.0	2149.9	26.2	15	144	507	2872	823	905	1.17	1.17	54.1	55.3	2136.8	366	183.0	7:23	1.19	0.95	0.19
15:40:18	2153.0	2150.9	18.2	15	143	516	2876	824	904	1.17	1.17	54.1	55.5	2138.0	364	184.0	7:26	1.19	1.02	0.19
15:51:04	2154.0	2151.9	5.8	18	102	442	2892	825	891	1.17	1.17	54.3	55.8	2141.1	359	185.0	7:37	1.19	1.24	0.07
15:58:00	2155.0	2152.9	8.7	18	80	506	2895	825	905	1.17	1.17	54.5	56.1	2142.0	357	186.0	7:44	1.19	1.10	0.08
16:01:11	2156.0	2153.9	18.8	18	99	585	2907	826	904	1.17	1.17	54.6	55.9	2142.2	357	187.0	7:47	1.19	0.98	0.08
16:03:51	2157.0	2154.9	22.5	18	130	586	2923	825	885	1.17	1.17	54.8	56.0	2142.4	357	188.0	7:50	1.19	1.01	0.08
16:07:10	2158.0	2155.9	19.2	18	143	556	2909	823	889	1.17	1.17	54.8	55.9	2143.0	359	189.0	7:53	1.19	1.06	0.07
16:09:42	2159.0	2156.9	23.7	18	145	549	2895	822	884	1.17	1.17	54.9	56.0	2143.5	359	190.0	7:55	1.19	1.02	0.07
16:14:47	2160.0	2157.9	11.8	18	145	501	2891	823	885	1.17	1.17	54.9	55.7	2144.1	357	191.0	8:00	1.19	1.17	0.06
16:16:57	2161.0	2158.9	27.5	20	145	579	2875	822	896	1.17	1.17	54.9	55.7	2144.1	358	192.0	8:03	1.19	1.01	0.06
16:19:32	2162.0	2159.9	23.2	19	145	555	2884	820	895	1.17	1.17	54.8	55.7	2144.4	359	193.0	8:05	1.19	1.03	0.07
16:36:50	2163.0	2160.9	3.5	21	119	458	2831	820	896	1.17	1.17	54.7	56.1	2151.9	359	194.0	8:23	1.19	1.44	0.09
16:46:27	2164.0	2161.9	6.2	21	78	493	2794	819	891	1.17	1.17	54.7	56.7	2153.4	358	195.0	8:32	1.19	1.21	0.06
16:53:56	2165.0	2162.9	8.2	24	76	550	2769	821	894	1.17	1.17	55.1	56.6	2154.3	353	196.0	8:40	1.19	1.19	0.07
17:15:03	2166.0	2163.9	13.4	21	109	323	2725	811	891	1.17	1.17	54.9	55.3	2157.0	362	197.0	8:52	1.19	1.17	0.07
17:20:13	2167.0	2164.9	20.8	25	117	609	2694	811	875	1.17	1.17	54.9	56.0	2157.7	358	198.0	8:54	1.19	1.10	0.08
17:24:11	2168.0	2165.9	15.1	26	135	552	2692	811	866	1.17	1.17	54.9	56.3	2158.4	357	199.0	8:58	1.19	1.21	0.07
17:35:53	2169.0	2166.9	5.5	30	142	489	2726	809	878	1.17	1.17	54.9	56.4	2160.6	359	200.0	9:10	1.19	1.52	0.04

TD 2170m POOH to run E-Logs

APPENDIX IX: Geological-Engineering Morning Reports

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 01

COMPANY BHP PETROLEUM WELL Minerva-2

DATE 18.09.93 TIME 24:00

DEPTH 114.0 m LAST REPORT DEPTH -

RIG OPERATIONS Drilling 36" Hole.

ENGINEERS N. Flores / G. Timmis REPORT RECEIVED BY Roger Anderson (OPTR)

DRILLING REPORT

Bit No. 1 Type Sec S35J Size 26" in Jets 3 x 24

On Bit: Distance 29.0 m Hours 3:08 hh:mm ROP 9.25 m/hr WOB 10-15 klb RPM 70-80

Pump Press 1000/1200 SPM 200 Torque 50-220 TBR 12700 CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.04 sg Mud Density out 0.00 sg ECD 1.04 PV/YP 1/1

Gels - Salinity - PPM Cl Solids -

Hole Volume 119 bbls Annular Volume 111 bbls Tubing Volume 4.5 bbls Displaced Volume 18.4 bbls

Carbide Lag-Calculated Lag - Flowrate 1112 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) --- DrillPipe Annular Vel (Open Hole) ---

Drill Collar Annular Vel (Open Hole) 6.9 m/min Critical Vel 7.2 m/min

Pressure Loss System 532 psi Pressure Loss Bit 152 psi % Pressure Loss 29%

Nozzle Vel 43 m/sec Jet Impact Force 699 lbf HHP 98 hp

PRESSURE PARAMETERS

Drilling Exponent 0.63 - 1.07 Flowline Temp Returns to seabed

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Spud Minerva-2 @ 20:30 hrs 18 Sept 1993. RKB-Seabed: 85m. RKB-MSL: 25m.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 02

COMPANY BHP PETROLEUM WELL Minerva-2

DATE 19.09.93 TIME 24:00

DEPTH 541.0 m LAST REPORT DEPTH 114.0 m

RIG OPERATIONS Drilling 9-7/8" Pilot Hole

ENGINEERS N. Flores / G. Timmis REPORT RECEIVED BY Roger Anderson (OPTR)

DRILLING REPORT

Bit No. 2 Type Security S33SF Size 9.875 in Jets open jets

On Bit: Distance 420.0 m Hours 7:00 hh:mm ROP 46.6 m/hr WOB 5-20 klbs RPM 90-100

Pump Press 500-550 SPM 80-100 Torque 100-220 TBR 54000 CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.04 sg Mud Density out 0.00 sg ECD 1.04 PV/YP 1/1

Gels - Salinity - PPM Cl Solids -

Hole Volume 218 bbls Annular Volume 173 bbls Tubing Volume 26 bbls Displaced Volume 27 bbls

Carbide Lag-Calculated Lag - Flowrate 533 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5 m/min DrillPipe Annular Vel (Open Hole) 56 m/min

Drill Collar Annular Vel (Open Hole) 119 m/min Critical Vel 21.8 m/min

Pressure Loss System 255 psi Pressure Loss Bit 41 psi % Pressure Loss 16%

Nozzle Vel 22 m/sec Jet Impact Force 174 lbf HHP 13 hp

PRESSURE PARAMETERS

Drilling Exponent 0.63 - 1.50 Flowline Temp Returns to seabed

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Drill to 120m; Spot 300 bbls hi-vis mud; POOH to run 30" csg; RIH 30" casing with PGB & stab into 36" hole; R/U cement hose and circ 30 bbls seawater; Test cmt line to 2000 psi and cmt casing with 537 sacks cement at 15.9 ppg; Land casing on bottom and observe; POOH with running to Make up and RIH with 9-7/8" pilot hole assembly; Drill shoe and cmt from 120m-121.5m; Drill 9-7/8 pilot hole from 121.5m to 541m.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 03

COMPANY BHP PETROLEUM WELL Minerva-2

DATE 20.09.93 TIME 24:00

DEPTH 560.0 m LAST REPORT DEPTH 541.0 m

RIG OPERATIONS R/U Schlumberger to run charge; Attempt to backoff.

ENGINEERS N. Flores / G. Timmis REPORT RECEIVED BY Roger Anderson (OPTR)

DRILLING REPORT

Bit No. 2 Type Security S33SF Size 9.875 in Jets open jets

On Bit: Distance 440m m Hours 9:12 hh:mm ROP 34.1 m/hr WOB 5-20 klbs RPM 90-100

Pump Press 500-550 SPM 80-100 Torque 100-220 TBP 54000 CP I:$ - CP B:$ -

HYDRAULICS REPORT

Mud Density In 1.04 sg Mud Density out - sg ECD 1.04 PV/YP 1/1 (seawater)

Gels - Salinity - PPM Cl Solids -

Hole Volume 224 bbls Annular Volume 177 bbls Tubing Volume 28 bbls Displaced Volume 27 bbls

Carbide Lag-Calculated Lag Returns to seabed Flowrate 533 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5.2 m/min DrillPipe Annular Vel (Open Hole) 55.3 m/min

Drill Collar Annular Vel (Open Hole) 118.8 m/min Critical Vel 21.8 m/min

Pressure Loss System 257 psi Pressure Loss Bit 41 bbls % Pressure Loss 16%

Nozzle Vel 22.1 m/sec Jet Impact Force 173.9 lbf HHP 12.7 hp

PRESSURE PARAMETERS

Drilling Exponent 0.50 - 1.50 Flowline Temp Returns to seabed

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Drill 9-7/8" hole from 541-560m; Rig up cmt hose and press test same to 2000 psi; Pump 450 sacks cement at 15.9 ppg; Rig down cmt hose and POOH; Pipe found to be stuck; Circulate and work on stuck pipe; R/U 5" DP elevators in moonpool; R/U Schlumberger and run free-point indicator.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 01

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 21.09.93 TIME 24:00

DEPTH 115.0 m LAST REPORT DEPTH -

RIG OPERATIONS Drilling 36" Hole.

ENGINEERS N. Flores / G. Timmis REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. 1 Type Sec S35J Size 26 in Jets 3x24/4x20 HO

On Bit: Distance 30 m Hours 1.0 hh:mm ROP 30.0 WOB 5-15 klbs RPM 90-120

Pump Press 1100/1200 SPM 200 Torque 100-220 TBR 7200 CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.04 sg Mud Density out 0.00 sg ECD 1.04 PV/YP 1/1 (seawater)

Gels - Salinity - PPM Cl Solids -

Hole Volume 124 bbls Annular Volume 115 bbls Tubing Volume 4.3 bbls Displaced Volume 21 bbls

Carbide Lag-Calculated Lag Returns to seabed Flowrate 1080 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) 6.7 m/min Critical Vel 7.2 m/min

Pressure Loss System 623 psi Pressure Loss Bit 143 bbls % Pressure Loss 23 %

Nozzle Vel 41 m/sec Jet Impact Force 659 lbf HHP 90 hp

PRESSURE PARAMETERS

Drilling Exponent 0.50 - 1.50 Flowline Temp Returns to seabed

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Moved to Minerva-2A location @ 21:50 hrs; spudded at 22:45 hrs.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 02

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 22.09.93 TIME 24:00

DEPTH 458 m LAST REPORT DEPTH 115 m

RIG OPERATIONS Drilling 26" Hole.

ENGINEERS N. Flores / G. Timmis REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. RR1.1 Type Sec S3SJ Size 26.000 in Jets 3 x 24

On Bit: Distance 339 m Hours 4:09 hh:mm ROP 66.0 WOB 5-15 klbs RPM 90-120

Pump Press 1800/2050 SPM 200/220 Torque 100-380 TBR 40221 CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.04 sg Mud Density out 0.00 sg ECD 1.04 PV/YP 1/1 (seawater)

Gels - Salinity - PPM Cl Solids -

Hole Volume 813 bbls Annular Volume 763 bbls Tubing Volume 21 bbls Displaced Volume 36 bbls

Carbide Lag-Calculated Lag Returns to seabed Flowrate 1080 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) 13.8 m/min Critical Vel 8.8 m/min

Pressure Loss System 1270 psi Pressure Loss Bit 534 psi % Pressure Loss 42%

Nozzle Vel 80 m/sec Jet Impact Force 1279 lbf HHP 338 hp

PRESSURE PARAMETERS

Drilling Exponent 0.50 - 1.05 Flowline Temp Returns to seabed

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Drilled 36" hole f/ 115-118m; Circ hole clean; Spot 300 bbls hi-vis on btm & POOH; Run 30" csg with shoe @ 118m; M/U 26" bit & BHA; RIH tag cmt @115m; Drill out cmt & shoe; Drill 26" OH f/ 118-458m w/ seawater/hi-vis sweeps.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 03

COMPANY BHP PETROLEUM | WELL Minerva-2A

DATE 23.09.93 | TIME 24:00

DEPTH 565 m | LAST REPORT DEPTH 458 m

RIG OPERATIONS 20" casing cement job.

ENGINEERS N. Flores / R. Clarke | REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. RRB#1.1 | Type Sec S3SJ | Size 26.000 in | Jets 3 x 24

On Bit: Distance 446 m | Hours 7:18 hh:mm | ROP 61 m/hr | WOB 5-15 klbs | RPM 90-120

Pump Press 1800/2050 | SPM 200/220 | Torque 100-380 | TBR 57264 | CP I:@ - | CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.04 sg | Mud Density out 0.00 sg | ECD 1.04 | PV/YP 1/1 (seawater)

Gels - | Salinity - | PPM Cl | Solids -

Hole Volume 1046 bbls | Annular Volume 987 bbls | Tubing Volume 27 bbls | Displaced Volume 39 bbls

Carbide Lag-Calculated Lag Returns to seabed | Flowrate 1100 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 10.8 m/min | DrillPipe Annular Vel (Open Hole) 10.8 m/min

Drill Collar Annular Vel (Open Hole) 14.0 m/min | Critical Vel 8.8 m/min

Pressure Loss System 1316 psi | Pressure Loss Bit 550 psi | % Pressure Loss 42%

Nozzle Vel 81 m/sec | Jet Impact Force 1317 lbf | HHP 353 hp

PRESSURE PARAMETERS

Drilling Exponent 0.50 - 1.05 | Flowline Temp Returns to seabed

Shale Density - | Shale Factor -

Background Gas - | Max. Formation Gas - @ - | Trip Gas - @ -

Other Gas -

Fill - | Tight Hole -

Cavings Est % - | Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - | Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW | Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - | Estimated Fracture Pressure at TD -

COMMENTS

Drilled 26" hole f/ 458-565m; Circ BU @ TD; Pumped 450 bbls hi-vis mud & sweep hole clean Displaced hole with 1100 bbls of PHG mud & POOH; Tight hole @ 539.5m w/ 280 klbs O/P; Worked pipe free & pulled to 461m; RIH & spot 250 bbls 6% KCl/PHPA mud on btm; POOH; Run 20" csg; Washed f/ 286-307m & landed shoe @ 553m; Circ csg prior to cmt job.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 04

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 24.09.93 TIME 24:00

DEPTH 565 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Install & test BOP stack & Marine riser.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. No drilling Type -- Size 0.000 in Jets --

On Bit: Distance 0.0 m Hours -- hh:mm ROP -- WOB -- RPM --

Pump Press -- SPM -- Torque -- TBR -- CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 0.00 sg Mud Density out 0.00 sg ECD -- PV/YP --

Gels - Salinity - PPM Cl Solids -

Hole Volume -- Annular Volume -- Tubing Volume -- Displaced Volume --

Carbide Lag-Calculated Lag -- Flowrate No Drilling

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) Critical Vel

Pressure Loss System Pressure Loss Bit % Pressure Loss

Nozzle Vel Jet Impact Force HHP

PRESSURE PARAMETERS

Drilling Exponent No Drilling Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Land & cmt 20" csg; POOH R/Tool; RIH & land BOP stack; Install slip joint.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 05

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 25.09.93 TIME 24:00

DEPTH 565 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Working on Top Drive System.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. No Drilling Type -- Size 0.000 in Jets --

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP -- WOB -- RPM --

Pump Press -- SPM -- Torque -- TBR -- CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 0.00 sg Mud Density out 0.00 sg ECD -- FV/TF --

Gels -- Salinity -- PPM Cl Solids --

Hole Volume -- Annular Volume -- Tubing Volume -- Displaced Volume --

Carbide Lag-Calculated Lag -- Flowrate --

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) -- Critical Vel --

Pressure Loss System -- Pressure Loss Bit -- % Pressure Loss --

Nozzle Vel -- Jet Impact Force -- HHP --

PRESSURE PARAMETERS

Drilling Exponent -- Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Test BOP stack and surface equipments; RIH wear bushing; M/U 5" DP's; Work on TDS.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 06

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 26.09.93 TIME 24:00

DEPTH 565 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Rig Repair.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. No Drilling Type -- Size 0.000 in Jets --

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP -- WOB -- RPM --

Pump Press -- SPM -- Torque -- TBR -- CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 0.00 sg Mud Density out 0.00 sg ECD -- PV/YP --

Gels -- Salinity -- PPM Cl Solids --

Hole Volume -- Annular Volume -- Tubing Volume -- Displaced Volume --

Carbide Lag-Calculated Lag -- Flowrate --

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) -- Critical Vel --

Pressure Loss System -- Pressure Loss Bit -- % Pressure Loss --

Nozzle Vel -- Jet Impact Force -- HHP --

PRESSURE PARAMETERS

Drilling Exponent -- Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 07

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 27.09.93 TIME 24:00

DEPTH 565 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Rig Repair.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. No Drilling Type -- Size 0.000 in Jets --

On Bit: Distance 0.0 m Hours 1:00 hh:mm ROP -- WOB -- RPM --

Pump Press -- SPM -- Torque -- TBR -- CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 0.00 sg Mud Density out 0.00 sg ECD -- PV/YP --

Gels -- Salinity -- PPM Cl Solids --

Hole Volume -- Annular Volume -- Tubing Volume -- Displaced Volume --

Carbide Lag-Calculated Lag -- Flowrate --

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) -- Critical Vel --

Pressure Loss System -- Pressure Loss Bit -- % Pressure Loss --

Nozzle Vel -- Jet Impact Force -- HHP --

PRESSURE PARAMETERS

Drilling Exponent -- Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 08

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 28.09.93 TIME 24:00

DEPTH 565 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Rig Repair.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / J. Boorman(OPTR)

DRILLING REPORT

Bit No. No Drilling Type -- Size 0.000 in Jets --

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP -- WOB -- RPM --

Pump Press -- SPM -- Torque -- TBR -- CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 0.00 sg Mud Density out 0.00 sg ECD -- PV/YP --

Gels -- Salinity -- PPM Cl Solids --

Hole Volume -- Annular Volume -- Tubing Volume -- Displaced Volume --

Carbide Lag-Calculated Lag -- Flowrate --

DrillPipe Annular Vel (Max. Dia. Sec.) -- DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) -- Critical Vel --

Pressure Loss System -- Pressure Loss Bit -- % Pressure Loss --

Nozzle Vel -- Jet Impact Force -- HHP --

PRESSURE PARAMETERS

Drilling Exponent -- Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance - Min. Estimated Fracture Pressure (Open Hole) -

Estimated Pore Pressure 1.03 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 09

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 29.09.93 TIME 24:00

DEPTH 987 m LAST REPORT DEPTH 565 m

RIG OPERATIONS Drilling 17-1/2" Hole.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. NB#2 Type STC MO2SOD-C Size 17.500 in Jets 18x18x20x14

On Bit: Distance 422 m Hours 10:20 hh:mm ROP 40.7 m/hr WOB 20/40 RPM 50 / 224

Pump Press 2500 psi SPM 200 spm Torque 300/550 TBR 115650 revs CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.12 sg Mud Density out 1.12 sg ECD 1.13 sg FV/YP 13/23

Gels 7/15 Salinity 45000 PPM Cl Solids 8%

Hole Volume 1072 bbls Annular Volume 971 bbls Tubing Volume 51 bbls Displaced Volume 50 bbls

Carbide Lag-Calculated Lag 8100 stks (Carbide corrected) Flowrate 1100 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 22.9 m/min DrillPipe Annular Vel (Open Hole) 29.7 m/min

Drill Collar Annular Vel (Open Hole) 38.6 m/min Critical Vel 111.3 m/min

Pressure Loss System 2514 psi Pressure Loss Bit 1177 psi % Pressure Loss 46.8%

Nozzle Vel 114.4 m/sec Jet Impact Force 2027 lbf HHP 766 hp

PRESSURE PARAMETERS

Drilling Exponent 0.74 - 1.78 Flowline Temp 42.5 degC

Shale Density - Shale Factor -

Background Gas Tr - 0.02% Max. Formation Gas - @ - Trip Gas - @ -

Other Gas Nil

Fill - Tight Hole -

Cavings Est % Tr - 5% Average Size 3mm x 4mm x 2mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.51 sg Min. Estimated Fracture Pressure (Open Hole) 1.86 sg @ 553m (FIT)

Estimated Pore Pressure 1.04 sg EMW Min. Estimated Pore Pressure (Open Hole) - @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Cont'd work on TDS; RIH with NB#2; Tagged TOC @ 540m; Drill cmt & shoe; Change over to mud; Drill 3m new fm to 568m; Circ & clean hole; Perform Fm Integrity Test; Recorded SCRs & Choke Line pressure drops; Cont'd drilling 17-1/2" hole f/ 568m-987m.

Average Hole Diameter to 910m = 19.12" (f/ Carbide test).

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 10

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 30.09.93 TIME 24:00

DEPTH 1379 m LAST REPORT DEPTH 987 m

RIG OPERATIONS Drilling 17-1/2" Hole.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. NB#2 Type STC MO2SOD-C Size 17.500 in Jets 18x18x20x14

On Bit: Distance 392.0 m Hours 29:28 hh:mm ROP 12.9 m/hr WOB 30/50 RPM 30 / 200

Pump Press 2700 psi SPM 200 spm Torque 200/450 TBR 339500 revs CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.09 sg Mud Density out 1.10 sg ECD 1.10 sg PV/YP 16/32

Gels 8/14 Salinity 50000 PPM Cl Solids 8%

Hole Volume 1456 bbls Annular Volume 1323 bbls Tubing Volume 74 bbls Displaced Volume 59 bbls

Carbide Lag-Calculated Lag 10507 stks (f/ Carbide) Flowrate 1080 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 22.9 m/min DrillPipe Annular Vel (Open Hole) 29.3 m/min

Drill Collar Annular Vel (Open Hole) 38.0 m/min Critical Vel 138.1m/min

Pressure Loss System 2554 psi Pressure Loss Bit 1073 psi % Pressure Loss 42.0%

Nozzle Vel 110.7 m/sec Jet Impact Force 1848 lbf HHP 676 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.74 - 1.67 Flowline Temp 52.1 degC

Shale Density - Shale Factor -

Background Gas 0.01 - 0.10% Max. Formation Gas - @ - Trip Gas - @ -

Other Gas No connection gases recorded from 987m - 1380m.

Fill - Tight Hole -

Cavings Est % Tr - 5% Average Size 3mm x 4mm x 2mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.40 sg Min. Estimated Fracture Pressure (Open Hole) 1.86 sg @ 553m (FIT)

Estimated Pore Pressure 1.06-1.08 sg EMW Min. Estimated Pore Pressure (Open Hole) 1.03 sg EMW @ 553m

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Cont'd drilling 17-1/2" hole f/ 987m-1379m.

* Average Hole Diameter to 1375m - 17.75" (f/ Carbide).

* Pore Pressure estimated from correlation with Minerva-1 data.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 11

COMPANY BHP PETROLEUM WELL Minerva-2A

DATE 01.10.93 TIME 24:00

DEPTH 1538 m LAST REPORT DEPTH 1379 m

RIG OPERATIONS Circulating & cleaning 17-1/2" hole.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. NB#2 Type STC MO2SOD-C Size 17.500 in Jets 18x18x20x14

On Bit: Distance 973.0 m Hours 42:06 hh:mm ROP 23 m/hr WOB 30/50 RPM 30 / 200

Pump Press 2700 psi SPM 200 spm Torque 200/450 TBR 449584 revs CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.16 sg Mud Density out 1.16 sg ECD 1.17 sg PV/YP 18/29

Gels 7/13 Salinity 43000 PPM Cl Solids --

Hole Volume 1601 bbls Annular Volume 1465 bbls Tubing Volume 83 bbls Displaced Volume 53 bbls

Carbide Lag-Calculated Lag 12879 stks (f/ Carbide) Flowrate 1080 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 22.1 m/min DrillPipe Annular Vel (Open Hole) 28.7 m/min

Drill Collar Annular Vel (Open Hole) 37.4 m/min Critical Vel 122.4 m/min

Pressure Loss System 2934 psi Pressure Loss Bit 1142 psi % Pressure Loss 38.9%

Nozzle Vel 110.7 m/sec Jet Impact Force 1966.8 lbf HHP 718.9 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.8 - 1.68 Flowline Temp 54.5 degC

Shale Density - Shale Factor -

Background Gas 0.01 - 0.18% Max. Formation Gas 1.05% @ 1403m Trip Gas Nil @ 1512m

Other Gas No cxn gases recorded from 1379m - 1538m.

Fill - Tight Hole Pump out f/ 1313m - 1086m; Wash & ream f/ 1478m to 1512m.

Cavings Est % 5-10% Average Size 4mm x 6mm x 8mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.40 sg Min. Estimated Fracture Pressure (Open Hole) 1.86 sg @ 553m (FIT)

Estimated Pore Pressure 1.06-1.09 sg EMW* Min. Estimated Pore Pressure (Open Hole) 1.03 sg EMW @ 553m

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Cont'd drilling 17-1/2" hole f/ 1379m - 1512m; Circ btms up; Drop Totco svy tool; Wiper trip; Inc MW to 1.16 sg; Drill 17-1/2" hole f/ 1512m to 1538m; Circ btms up & clean hole..

* Pore Pressure estimated from correlation with data from Minerva-1.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 12

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 02.10.93 TIME 24:00

DEPTH 1538 m LAST REPORT DEPTH 1538 m

RIG OPERATIONS 13-3/8" Casing Run.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. No Drilling Type - Size 0.000 in Jets -

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out - sg ECD - PV/YP 18/28

Gels 8/13 Salinity 41000 PPM Cl Solids 9.0%

Hole Volume 1601 bbls Annular Volume - Tubing Volume - Displaced Volume -

Carbide Lag-Calculated Lag No Drilling Flowrate -

DrillPipe Annular Vel (Max. Dia. Sec.) - DrillPipe Annular Vel (Open Hole) -

Drill Collar Annular Vel (Open Hole) - Critical Vel -

Pressure Loss System - Pressure Loss Bit - % Pressure Loss -

Nozzle Vel - Jet Impact Force - HHP -

PRESSURE PARAMETERS

Drilling Exponent No Drilling Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.40 sg Min. Estimated Fracture Pressure (Open Hole) 1.86 sg @ 553m (FIT)

Estimated Pore Pressure 1.06-1.09 sg EMW* Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ 553m

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Cont 'd circ hole clean; Spot 200 bbls hi-vis on btm; POOH; M/U 13-3/8 csg hanger & cmt head; R/U Schlumberger & run Log #1: GPIT-MSFL-DLL-SDT-GR-AMS; RIH with R/Tool & retrieve wear bushing; P/U & run 13-3/8" csg as per BHPP programme; R/D 500 Ton csg gear; R/U & run landing string.

*Pore Pressure estimated from correlation with data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 13

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 03.10.93 TIME 24:00

DEPTH 1538 m LAST REPORT DEPTH 1538 m

RIG OPERATIONS Drilling out cement & shoe.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. NB#3 Type Smith MIS-C Size 12.25 in Jets 18x16x16

On Bit: Distance CEMENT m Hours 0:12 hh:mm ROP - WOB 25 klbs RPM 50

Pump Press 1550 SPM 128 Torque 50-200 TBR 575 revs CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.16 sg Mud Density out 1.16 sg ECD 1.18 sg PV/YP 18/28

Gels 8/13 Salinity - PPM Cl Solids -

Hole Volume 810 bbls Annular Volume 662 bbls Tubing Volume 81 bbls Displaced Volume 67 bbls

Carbide Lag-Calculated Lag 5172 stks Flowrate 691 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 14.2 m/min DrillPipe Annular Vel (Open Hole) --

Drill Collar Annular Vel (Open Hole) 63.0 m/min Critical Vel 149 m/min

Pressure Loss System 2068 psi Pressure Loss Bit 1035 psi % Pressure Loss 50%

Nozzle Vel 105 m/sec Jet Impact Force 1198 lbf HHP 417 hhp

PRESSURE PARAMETERS

Drilling Exponent No new formation drilled. Flowline Temp 36 degC

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas 0.09 % @ 1538 m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance -- Min. Estimated Fracture Pressure (Open Hole) --

Estimated Pore Pressure 1.06-1.09 sg EMW* Min. Estimated Pore Pressure (Open Hole) -- @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Wash down and land 13-3/8" csg @ 1525.65m; Circ 2x csg vol; R/U Howco lines & test lines to 3000 psi; Cement csg as per BHPP programme; Test BOP stack; Test rig surface equipments; RIH & set wear bushing; M/U and RIH with new 12-1/4" BHA; Tag TOC @ 1498m; Drill out cement, float collar & shoe.

*Pore Pressure estimated from correlation with data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 14

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 04.10.93 TIME 24:00

DEPTH 1728 m LAST REPORT DEPTH 1538 m

RIG OPERATIONS Circulating at 1728m while waiting on orders.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Howard / T. How (OPTR)

DRILLING REPORT

Bit No. NB#3 Type Smith MIS-C Size 12.250 in Jets 18x16x16

On Bit: Distance 190.0 m Hours 15:15 hh:mm ROP 12.46 m/hr WOB 30-40 RPM 180

Pump Press 2600/3000 SPM 140 Torque 250/370 TBR 140024 revs CP I:# -- CP B:# --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 16/23

Gels 7/14 Salinity 46000 PPM Cl Solids -

Hole Volume 900 bbls Annular Volume 737 bbls Tubing Volume 92 bbls Displaced Volume 71 bbls

Carbide Lag-Calculated Lag 5758 stks Flowrate 756 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 15.5 m/min DrillPipe Annular Vel (Open Hole) 45.4 m/min

Drill Collar Annular Vel (Open Hole) 68.9 m/min Critical Vel 131 m/min

Pressure Loss System 2503 psi Pressure Loss Bit 1249 psi % Pressure Loss 49.9%

Nozzle Vel 115 m/sec Jet Impact Force 1446 lbf HHP 551 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.92 - 1.48 Flowline Temp 48.9 degC

Shale Density - Shale Factor -

Background Gas 0.02% - 0.08% Max. Formation Gas 4.0% @ 1721.5 m Trip Gas -- @ --

Other Gas No connection gases recorded from 1538m - 1728m.

Fill - Tight Hole -

Cavings Est % 5% - 10% Average Size 5mm x 6mm x 3mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.68 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.75 sg EMW @ 1526m (LOT)

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Cont'd displacing hole with PHPA mud; Clean out rat hole to 1538m; Work junk sub & drill f/ 1538m to 1541m; Circ hole clean; Perform leak-off test; Drill f/ 1541m-1554m; Pull back to shoe & attempt to work on suspected junk sub above BHA; Drill from 1598m - 1728m; Circ btms up & wait on orders.

*Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 15

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 05.10.93 TIME 24:00

DEPTH 1728 m LAST REPORT DEPTH 1728 m

RIG OPERATIONS RIH with 12-1/4" NB#4 HTC J68.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. NB#4 Type HTC J68 Size 12.250 in Jets 18x18x18

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:# -- CP B:# --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out - sg ECD - PV/YP 16/23

Gels 7/14 Salinity 46000 PPM Cl Solids -

Hole Volume 900 bbls Annular Volume - Tubing Volume - Displaced Volume -

Carbide Lag-Calculated Lag - Flowrate No drilling

DrillPipe Annular Vel (Max. Dia. Sec.) - DrillPipe Annular Vel (Open Hole) -

Drill Collar Annular Vel (Open Hole) - Critical Vel -

Pressure Loss System - Pressure Loss Bit - % Pressure Loss -

Nozzle Vel - Jet Impact Force - HHP -

PRESSURE PARAMETERS

Drilling Exponent No new formation drilled Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas see below @ --

Other Gas -

Fill - Tight Hole 50klbs drag f/ 1612m during wiper trip to shoe

Cavings Est % - Average Size 5mm x 6mm x 3mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.68 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.75 sg EMW @ 1526m (LOT)

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS Cont'd to circ while waiting on orders; Wiper trip to shoe; Circ btms up; POOH; Service TDS; P/U & RIH with core barrel; Wash & ream f/ 1700m-1712m; Excessive torque @ 1728m; Pump slug & POOH; M/U & RIH with NB#4 HTC J68.

Max gas after wiper trip to shoe: 6.8%

Max gas after RIH with core barrel: 0.11%

*Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 16

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 06.10.93 TIME 24:00

DEPTH 1733.5 m LAST REPORT DEPTH 1728 m

RIG OPERATIONS RIH with NB#5 HTC ATM11HG.

ENGINEERS N. Flores / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. CB#1.1 Type Diaboart CB93 Size 12.250 in Jets TFA = 1.503

On Bit: Distance 5.0 m Hours 0:36 hh:mm ROP 8.3 m/hr WOB 6-13 klbs RPM 50-105

Pump Press 540/880 SPM 60 spm Torque 214/534 TBR 3431 revs CP I:@ -- CP B:@ --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.19 sg PV/YP 16/23

Gels 5/9 Salinity 45000 PPM Cl Solids 9.8%

Hole Volume 903.3 bbls Annular Volume 734.0 Tubing Volume 92.2 Displaced Volume 77.1 bbls

Carbide Lag-Calculated Lag 5734 stks Flowrate 324 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 6.7 m/min DrillPipe Annular Vel (Open Hole) 19.6 m/min

Drill Collar Annular Vel (Open Hole) 29.5 m/min Critical Vel 147.9 m/min

Pressure Loss System 376 psi Pressure Loss Bit 42 psi % Pressure Loss 11.1%

Nozzle Vel 21 m/sec Jet Impact Force 113.3 lbf HHP 8 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.93 - 1.14 (while cutting Core#1) Flowline Temp 39.2 degC

Shale Density - Shale Factor -

Background Gas 0.01%-0.02% Max. Formation Gas - @ - Trip Gas see below @ --

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 1.68 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.75 sg EMW @ 1526m (LOT)

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD -

COMMENTS

Cont'd RIH with NB#4; Wash & ream f/ 1702m - btm; Drill 0.5 m of new fm; Work on junk sub; Circ btms up; POOH; RIH with Core barrel; Wash & ream f/ 1693m-1728.5m; Circ btms up; Cut Core#1 f/ 1728.5m - 1733.5m; Pressure drop noted - suspected washout; POOH with Core barrel; Brk out inner barrels & lay out Core#1 (100% recovery); P/U NB#5, MWD, 12-1/4" drlg BHA & RIH.

*Max gas prior to cutting Core#1: 0.06%

*Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 17

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 07.10.93 TIME 24:00

DEPTH 1839 m LAST REPORT DEPTH 1733.5m

RIG OPERATIONS Circ prior to coring.

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. NB#5 Type HTC ATM11 HG Size 12.250 in Jets 2x16,1x18

On Bit: Distance 105.5 m Hours 6:28 hh:mm ROP 16.31 m/hr WOB 0.7-50 klbs RPM 100-160

Pump Press 2879-2970 SPM 140-143spm Torque 205-522 TBR 57696 CP I:$ - CP B:$ --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.19 sg PV/YP 13/25

Gels 6/9 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 953.6 bbls Annular Volume 775.6.0 bbls Tubing Volume 98.3 bbls Displaced Volume 79.7 bbls

Carbide Lag-Calculated Lag 6022 stks Flowrate 770 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 15.8 m/min DrillPipe Annular Vel (Open Hole) 46.5 m/min

Drill Collar Annular Vel (Open Hole) 70.2 m/min Critical Vel 135.9 m/min

Pressure Loss System 2516 psi Pressure Loss Bit 1296 psi % Pressure Loss 51.5 %

Nozzle Vel 117 m/sec Jet Impact Force 1500 lbf HHP 582 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.41 - 1.58 Flowline Temp 50.4 degC

Shale Density - Shale Factor -

Background Gas 0.03%-0.09% Max. Formation Gas 2.86% @ 1838.8m Trip Gas 0.15% @ 1733.5m

Other Gas TG=0.78 % @ 1839m

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.47 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1535m

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.65 sg

COMMENTS

Cont RIH, fill pipe @ shoe(1526m) + @ 1704m. Wash + ream MWD log to 1735.5m. Drill f/ 1733.5 to 1751m. C/o swivel packing. Circ pipe thru cmt hose. Cont drill 1751-1823.5m. FLC D/b @ 1823.5m. Circ BU. Cont drill f/ 1823.5-1828.5m. FLC D/b. Cont drill f/ 1828.5-1830m. FL Circ BU. Drill f/ 1830-1838m. FLC D/b. Drill 1838-1839m. FLC. Circ sample up. Pump slug. POOH M/u core bbl BHA + RIH to 1498m. Brk circ. Slip + cut lines, service TDS. RIH to 1818m. Wash + ream f/ 1818 to 1839m, circ BU.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

DRILLBYTE MORNING REPORT NO 18

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 08.10.93 TIME 24:00

DEPTH 1882 m LAST REPORT DEPTH 1839m

RIG OPERATIONS POOH w/ core#3

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. CB#2 Type DBS CD93 Size 12.250 in Jets TFA=1.5033

On Bit: Distance 26.5 m Hours 0:88 hh:mm ROP 30.11 m/hr WOB 11-23 klbs RPM 105

Pump Press 640-800 SPM 340 spm Torque 289-751 TBR 5406 CP I:@ - CP B:@ --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.19 sg PV/YP 13/22

Gels 4/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 974.2 bbls Annular Volume 792.3 bbls Tubing Volume 103.4 bbls Displaced Volume 78.5 bbls

Carbide Lag-Calculated Lag 6151 stks Flowrate 340 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 7 m/min DrillPipe Annular Vel (Open Hole) 20.5 m/min

Drill Collar Annular Vel (Open Hole) 29.5 m/min Critical Vel 133.7 m/min

Pressure Loss System 505 psi Pressure Loss Bit 46 psi % Pressure Loss 9 %

Nozzle Vel 22 m/sec Jet Impact Force 125 lbf HHP 9 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.37 - 0.63 Flowline Temp 43.2 degC

Shale Density - Shale Factor -

Background Gas 0.17% Max. Formation Gas - @ - Trip Gas WTG=7.33 % @ 1855.5m

Other Gas TG=0.25 % @ 1855.5m (prior to coring)

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.47 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.65 sg

COMMENTS Cut core f/ 1839-1855.5m. Stop drilling due to hi torq. Pull off btm w/ 35klb. POOH. Pump slug @ shoe,FLC. P/u drilling BHA, RIH+fill pipe @ shoe. RIH to 1830m. Hole Good. Wash+ream + Log w/ MWD f/ 1830-1855.5m. Took no wt w/ steady 250 amp. Circ b/u + work pipe. Pump slug, FLC. POOH, FLC @ shoe + BOP. M/u core bbl + RIH. P/u 12 jnt of DP. M/u tds @ shoe. Fill pipe + chk circ rate RIH to 1819m. Wash+ream to 1855.5m. 10klb wt f/ 1846-1855.5m. Circ b/u. Cut core#3 f/ 1855.5m to 1882m. FLC, POOH to shoe. Pump slug, FLC. POOH.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 19

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 09.10.93 TIME 24:00

DEPTH 1915 m LAST REPORT DEPTH 1882m

RIG OPERATIONS RIH w/ core bit.

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. NB#6 Type Smith M2SD Size 12.250 in Jets 2x16,1x18

On Bit: Distance 32.5 m Hours 1:52 hh:mm ROP 17.3 m/hr WOB 30-35 klbs RPM 115

Pump Press 2730-2980 SPM 760 spm Torque 260-460 TBR 19115 CP I:# - CP B:# --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.19 sg PV/YP 15/23

Gels 5/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 990.4 bbls Annular Volume 804.9 bbls Tubing Volume 102.7 bbls Displaced Volume 82.4 bbls

Carbide Lag-Calculated Lag 6249 stks Flowrate 760 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 15.6 m/min DrillPipe Annular Vel (Open Hole) 45.9 m/min

Drill Collar Annular Vel (Open Hole) 69.2 m/min Critical Vel 129.9 m/min

Pressure Loss System 2582 psi Pressure Loss Bit 1263 psi % Pressure Loss 48.9 %

Nozzle Vel 116 m/sec Jet Impact Force 1462 lbf HHP 560 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.29 - 1.30 Flowline Temp 46.2 degC

Shale Density - Shale Factor -

Background Gas 0.2 % Max. Formation Gas - @ - Trip Gas TG=9.52 % @ 1882.5m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.44 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.65 sg

COMMENTS

Cont POOH, FLC @ BOP, Hole took 10bbl extra mud. Retrieve core. M/u drilling BHA. P/up 12 jnt dp. Fill pipe @ shoe + service TD. Cont RIH to 1832m. Fill pipe + wash/ream + MWD log from 1832 to 1882m. Steady 200 amp torq,0-5 klb. Drill f/ 1882 to 1903m. Work on hyd pump. Cont drill f/ 1903-1915m. Circ BU, FLC, pump slug. POOH. FLC @ shoe, 1443m + w/ BHA @ BOP. P/u core bbl. M/u bit, core bbl + BHA. RIH.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 20

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 10.10.93 TIME 24:00

DEPTH 1969m LAST REPORT DEPTH 1915m

RIG OPERATIONS Laying out core#5.

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. CB#2.2 Type DBS CD 93 Size 12.250 in Jets TFA= 1.503

On Bit: Distance 26 m Hours 1:11 hh:mm ROP 22 m/hr WOB 10-22 klbs RPM 120-130

Pump Press 680-1010 SPM 62 spm Torque 280-790 TBR 8365 CP I:# - CP B:# --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 14/22

Gels 6/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 1016.3 bbls Annular Volume 833.3 bbls Tubing Volume 108.8 bbls Displaced Volume 74.2 bbls

Carbide Lag-Calculated Lag 6469 stks Flowrate 335 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 6.9 m/min DrillPipe Annular Vel (Open Hole) 20.0 m/min

Drill Collar Annular Vel (Open Hole) 29 m/min Critical Vel 123.6 m/min

Pressure Loss System 462 psi Pressure Loss Bit 45 psi % Pressure Loss 9.7 %

Nozzle Vel 21.8 m/sec Jet Impact Force 121 lbf HHP 9 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.81 - 1.24 Flowline Temp 40.6 degC

Shale Density - Shale Factor -

Background Gas 0.2 % Max. Formation Gas - @ - Trip Gas TG=6.67 % @ 1943m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.42 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.65 sg

COMMENTS

Cont RIH, fill pipe @ shoe, cont RIH. Fill pipe + wash/ream from 1885-1915m. Circ BU. Drop ball. P/u pipe for space out. Cut core. POOH wet to shoe. Pump slug, FLC, POOH. FLC @ BOP. Retrieve core. RIH w/ CB#2.2. M/u top drive, service TDS. Wash/ream 1905 to 1943m. Took wt 10/15klb f/ 1930-1945m. Circ BU. Max gas 6.67%. Space out. Drop ball. Circ. Cut core#5 from 1945 to 1969. FLC. Pump slug + POOH. FLC @ shoe + BHA below BOP. B/o + L/o core.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 21

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 11.10.93 TIME 24:00

DEPTH 2170 m LAST REPORT DEPTH 1969 m

RIG OPERATIONS POOH to run E-Logs.

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / T. How (OPTR)

DRILLING REPORT

Bit No. NB#7 Type DBS TD 19M Size 12.250 in Jets 5x14, 1x13

On Bit: Distance 201.0 m Hours 9:29 hh:mm ROP 21 m/hr WOB 9-26 klbs RPM 90-150

Pump Press 2430-2930 SPM 150 spm Torque 380-730 TBR 84769 CP I:# - CP B:# --

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 14/23

Gels 5/10 Salinity 47000 PPM Cl Solids 9.8%

Hole Volume 1111.9 bbls Annular Volume 905.6 bbls Tubing Volume 118.9 bbls Displaced Volume 87.5 bbls

Carbide Lag-Calculated Lag 7030 stks Flowrate 810 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 16.6 m/min DrillPipe Annular Vel (Open Hole) 48.9 m/min

Drill Collar Annular Vel (Open Hole) 70.3 m/min Critical Vel 127 m/min

Pressure Loss System 2249 psi Pressure Loss Bit 759 psi % Pressure Loss 33.8 %

Nozzle Vel 89.9 m/sec Jet Impact Force 1208 lbf HHP 359 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.72 - 1.54 Flowline Temp 57.3 degC

Shale Density - Shale Factor -

Background Gas 0.1- 0.2 % Max. Formation Gas 0.42% @ 2116m Trip Gas TG=0.59 % @ 1969m

Other Gas WTG=0.22% @ 2170m.

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.38 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.15-1.16 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ --

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.70 sg

COMMENTS

M/up BHA + RIH. Break circ @ shoe. Wash+ream + log w/ MWD f/ 1896-1969m.
Drill f/ 1969 to 1990m. Rack back std, hook up circ hose + circ hole. While changing swivel packing.
M/u std + ream to btm for conn. Cont to drill to 2170m. Survey @ 2154m. Short wiper trip f/ 2170-1968m.
25klb o/pull. Circ B.u. FLC, pump slug. POOH to log. FLC @ shoe + BHA below BOP.
B/o + L/o MWD.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 22

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 11.10.93 TIME 24:00

DEPTH 2170 m LAST REPORT DEPTH 2170 m

RIG OPERATIONS POOH after wiper trip to continue logging.

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / J. Bowman (OPTR)

DRILLING REPORT

Bit No. RR#5.1 Type HUGHES JD8 Size 12.250 in Jets 2x16, 1x18

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:@ - CP B:@ -

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 13/22

Gels 4/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 1111.9 bbls Annular Volume 905.6 bbls Tubing Volume 118.9 bbls Displaced Volume 87.5 bbls

Carbide Lag-Calculated Lag 7030 stks Flowrate 0

DrillPipe Annular Vel (Max. Dia. Sec.) - DrillPipe Annular Vel (Open Hole) -

Drill Collar Annular Vel (Open Hole) - Critical Vel -

Pressure Loss System - Pressure Loss Bit - % Pressure Loss -

Nozzle Vel - Jet Impact Force - HHP -

PRESSURE PARAMETERS

Drilling Exponent - Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas WTG=2.5% @ 2170m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.38 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.09-1.12 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.09 sg @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.70 sg

COMMENTS Cont. L/o BHA. R/up to run E-logs. Log#1: Sonic-DLT-MSFL-GAMMA-AMS
Log#2: LDL-CNL-GR-AMS-FMS. Log#2 out @ 0900hr. Rerun @ 1035hr. POOH. tight @ 2170m. Max 3.5k o/p.
M/u 12.25" BHA + RIH to shoe. Fill pipe, RIH to 1558m. Ream f/ 1558-1762m.
Cont RIH f/ 1762-1900m. Wash+ream f/ 1900m to 2170m.
Circ + cond mud. FLC. pump slug.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 23

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 13.10.93 TIME 24:00

DEPTH 2170 m LAST REPORT DEPTH 2170 m

RIG OPERATIONS Running VSP

ENGINEERS A. Thangam / K. Clarke REPORT RECEIVED BY G. Blunt / J. Bowman (OPTR)

DRILLING REPORT

Bit No. - Type - Size 12.250 in Jets -

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:$ - CP B:$ -

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 13/22

Gels 4/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume 1111.9 bbls Annular Volume - Tubing Volume - Displaced Volume -

Carbide Lag-Calculated Lag - Flowrate -

DrillPipe Annular Vel (Max. Dia. Sec.) - DrillPipe Annular Vel (Open Hole) -

Drill Collar Annular Vel (Open Hole) - Critical Vel -

Pressure Loss System - Pressure Loss Bit - % Pressure Loss -

Nozzle Vel - Jet Impact Force - HHP -

PRESSURE PARAMETERS

Drilling Exponent - Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.38 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.01-1.12 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.01 sg @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.70 sg

COMMENTS

POOH. FLC @ shoe, and w/ BHA below BOP.

R/u schlumberger + log. Run#1. RFT.

POOH, l/out RFT.

RIH w/ VSP + log.

mud losses while logging is approximately 0.5 bbl/hr.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

BAKER HUGHES INTEQ

DRILLBYTE MORNING REPORT NO 24

COMPANY BHP PETROLEUM WELL Minerva - 2A

DATE 14.10.93 TIME 24:00

DEPTH 2170 m LAST REPORT DEPTH 2170 m

RIG OPERATIONS Reverse Circulate and POOH.

ENGINEERS A. Thangam / G. Timmis REPORT RECEIVED BY G. Blunt / J. Bowman (OPTR)

DRILLING REPORT

Bit No. - Type - Size 12.250 in Jets -

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.18 sg PV/YP 13/22

Gels 4/8 Salinity 46000 PPM Cl Solids 9.8%

Hole Volume - Annular Volume - Tubing Volume - Displaced Volume -

Carbide Lag-Calculated Lag - Flowrate -

DrillPipe Annular Vel (Max. Dia. Sec.) - DrillPipe Annular Vel (Open Hole) -

Drill Collar Annular Vel (Open Hole) - Critical Vel -

Pressure Loss System - Pressure Loss Bit - % Pressure Loss -

Nozzle Vel - Jet Impact Force - HHP -

PRESSURE PARAMETERS

Drilling Exponent - Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas 0.25% @ 1975m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.38 sg EMW Min. Estimated Fracture Pressure (Open Hole) 1.65 sg EMW @ 1725m

Estimated Pore Pressure 1.01-1.12 sg EMW @TD* Min. Estimated Pore Pressure (Open Hole) 1.01 sg @ -

Max. Estimated Pore Pressure (Open Hole) - @ - Estimated Fracture Pressure at TD 1.70 sg

COMMENTS

Log w/ schlumberger : VSP, CST.

R/d schlumberger. RIH w/ 8"DC, lay out same. R/u + RIH w/ mule shoe on 5" dp. RIH to 1975m.

Circ BU. Max gas=0.25%. Test cmt line. Mix + pump slurry#1 plug. POOH @ 1775m.

Circ prior to cmt plug#2. Dump cmt returns. RIH tag #1 plug @ 1784m. POOH @ 1775m.

Test lines, mix + pump slurry-#2 plug in place. POH to 1630m. Circ prior to cmt plug#3.

RIH tag#2 plug @ 1686m. POH to 1575m.

Test lines-mix + pump slurry - #3 plug.

* Pore Pressure estimated from correlation with RFT data from Minerva-1 well.

APPENDIX X: Bit Hydraulics Printouts

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sun Sep 19 00:33:19 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	85.0 m	Jet 1	24 in/32		
Depth	114.0 m	Weakest Fmtn Depth	456.0 m	Jet 2	24 in/32		
Vertical Depth	114.0 m	Mud Density	1.04 sg	Jet 3	24 in/32		
Flow Rate	1112 gpm	300 rpm viscometer	2	Jet 4	20 in/32		
Average ROP	13.2 m/hr	600 rpm viscometer	3	Jet 5	20 in/32		
Cuttings Density	2.25 spc gr	Plastic Viscosity	1.00 cP	Jet 6	20 in/32		
Cuttings Diameter	0.100 in	Yield Point	1.00 #/100ft^2	Jet 7	20 in/32		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2	Total Fluid Area	2.5525 in^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496				

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	42.0	36.000	5.000	4.276	173.5	2.4	170.1	454.3	6.5	6.6	LAMINAR
43.5	9.2	36.000	8.000	2.875	38.0	0.2	36.1	1005.0	6.7	7.0	LAMINAR
52.7	32.3	36.000	9.500	3.063	133.4	1.0	124.1	885.5	6.9	7.2	LAMINAR
85.0	29.0	36.000	9.500	3.063	119.8	0.9	111.4	885.5	6.9	7.2	LAMINAR

Hydrostatic Pressure	166 psi		
Annular Volume	441.7 bbl	3429 strokes	17 mins
Pipe Capacity	4.5 bbl	35 strokes	0 mins
Circulating Volume	446.3 bbl	3464 strokes	17 mins
Pipe Displacement	18.4 bbl		
Total Hole Volume	464.7 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	1012	1032	1052	1072	1092	1112	1132	1152	1172	1192	1212
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	TRANS	TRANS	TRANS
Jet Velocity	m/sec :	38.8	39.5	40.3	41.1	41.8	42.6	43.4	44.1	44.9	45.7	46.4
Impact Force	lbf :	578.8	601.9	625.4	649.4	673.9	698.8	724.1	750.0	776.2	802.9	830.1
Hydraulic Power	hhp :	74.1	78.6	83.2	88.1	93.1	98.3	103.7	109.3	115.1	121.1	127.3
Bit Loss	psi :	126	131	136	141	146	152	157	163	168	174	180
% Bit Loss	:	26.8	27.2	27.6	27.9	28.2	28.5	28.7	28.9	29.1	29.3	29.5
Pipe Loss	psi :	93	96	99	102	105	108	111	114	117	120	124
Annular Loss	psi :	0	0	0	0	0	0	0	0	0	0	0
Cuttings Loss	psi :	48	44	40	37	34	32	30	28	27	25	24
Surface Loss	psi :	202	210	217	225	233	241	249	258	266	274	283
Total Loss	psi :	469	480	492	505	518	532	547	562	578	594	611
Circ Pressure	psi :	215	210	206	203	201	198	196	195	193	191	190
ECD @ TD	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
ECD @ Shoe	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
ECD @ Weakest Depth	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
ECD @ TD (cuttings)	sg :	1.34	1.31	1.29	1.27	1.25	1.24	1.23	1.22	1.21	1.20	1.19

ecommended Minimum Flow to maintain cuttings transport in top section is 879 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1157 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Mon Sep 20 00:54:12 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	120.0 m	Jet 1	32 in/32
Depth	541.0 m	Weakest Form Depth	456.0 m	Jet 2	32 in/32
Vertical Depth	541.0 m	Mud Density	1.04 sg	Jet 3	32 in/32
Flow Rate	533 gpm	300 rpm viscometer	2	Total Fluid Area	2.3562 in^2
Average ROP	5.3 m/hr	600 rpm viscometer	3		
Cuttings Density	2.25 spc	Plastic Viscosity	1.00 cP		
Cuttings Diameter	0.100 in	Yield Point	1.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496		

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.0	217.8	10.9	9.1	TRANSITIONAL
85.0	35.0	28.000	5.000	4.276	87.5	2.0	84.6	217.8	5.2	7.5	LAMINAR
120.0	245.3	9.875	5.000	4.276	76.3	14.3	56.3	217.8	55.3	14.7	TURBULENT
365.3	108.4	9.875	5.000	2.750	33.7	2.6	24.6	526.5	56.0	14.8	TURBULENT
473.8	67.2	9.875	8.000	2.875	20.9	1.8	7.2	481.7	118.8	21.8	TURBULENT

Hydrostatic Pressure	798 psi		
Annular Volume	269.6 bbl	2093 strokes	21 mins
Pipe Capacity	25.6 bbl	199 strokes	2 mins
Circulating Volume	295.2 bbl	2292 strokes	23 mins
Pipe Displacement	26.9 bbl		
Total Hole Volume	322.1 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	483	493	503	513	523	533	543	553	563	573	583
Flow Regime at TD	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB
Jet Velocity	m/sec :	20.0	20.5	20.9	21.3	21.7	22.1	22.5	23.0	23.4	23.8	24.2
Impact Force	lbf :	142.8	148.8	154.9	161.1	167.5	173.9	180.5	187.2	194.0	201.0	208.1
Hydraulic Power	hhp :	9.5	10.1	10.7	11.3	12.0	12.7	13.4	14.2	15.0	15.8	16.6
Bit Loss	psi :	34	35	36	38	39	41	42	44	46	47	49
% Bit Loss	:	15.4	15.6	15.7	15.8	15.9	16.0	13.1	13.7	14.7	15.3	15.6
Pipe Loss	psi :	118	122	126	130	134	139	143	147	151	156	160
Annular Loss	psi :	8	8	8	9	9	9	9	10	10	10	11
Cuttings Loss	psi :	7	6	6	6	6	5	65	56	35	26	21
Surface Loss	psi :	51	53	55	57	59	61	64	66	68	70	73
Total Loss	psi :	217	225	232	240	247	255	323	322	310	310	313
Circ Pressure	psi :	812	812	812	812	812	812	872	863	843	834	830
ECD @ TD	sg :	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
ECD @ Shoe	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
ECD @ Weakest Depth	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.05	1.05
ECD @ TD (cuttings)	sg :	1.06	1.06	1.06	1.06	1.06	1.06	1.14	1.13	1.10	1.09	1.08

Recommended Minimum Flow to maintain cuttings transport in top section is 341 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 98 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Tue Sep 21 00:38:18 1993

INPUT DATA

Hydraulics Model	POWER LAW		Casing Shoe Depth	120.0 m		Jet 1	32 in/32
Depth	560.0 m		Weakest Fmtn Depth	456.0 m		Jet 2	32 in/32
Vertical Depth	560.0 m		Mud Density	1.04 sg		Jet 3	32 in/32
Flow Rate	533 gpm		300 rpm viscometer	2		Total Fluid Area	2.3562 in^2
Average ROP	4.8 m/hr		600 rpm viscometer	3			
Cuttings Density	2.25 sg		Plastic Viscosity	1.00 cP			
Cuttings Diameter	0.100 in		Yield Point	1.00 #/100ft^2			
Cuttings Shape	SPHERICAL		Power Law k	0.05412 #sec^n/100ft^2			
Cuttings Thickness	0.000 in		Power Law n	0.58496			

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.0	217.8	10.9	9.1	TRANSITIONAL
85.0	35.0	28.000	5.000	4.276	87.5	2.0	84.6	217.8	5.2	7.5	LAMINAR
120.0	264.3	9.875	5.000	4.276	82.2	15.4	60.6	217.8	55.3	14.7	TURBULENT
384.3	108.4	9.875	5.000	2.750	33.7	2.6	24.6	526.5	56.0	14.8	TURBULENT
492.8	67.2	9.875	8.000	2.875	20.9	1.8	7.2	481.7	118.8	21.8	TURBULENT

Hydrostatic Pressure	826 psi		
Annular Volume	274.0 bbl	2127 strokes	22 mins
Pipe Capacity	26.7 bbl	207 strokes	2 mins
Circulating Volume	300.7 bbl	2334 strokes	24 mins
Pipe Displacement	27.3 bbl		
Total Hole Volume	328.0 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	483	493	503	513	523	533	543	553	563	573	583
Flow Regime at TD	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB
Jet Velocity	m/sec :	20.0	20.5	20.9	21.3	21.7	22.1	22.5	23.0	23.4	23.8	24.2
Impact Force	lbf :	142.8	148.8	154.9	161.1	167.5	173.9	180.5	187.2	194.0	201.0	208.1
Hydraulic Power	hhp :	9.5	10.1	10.7	11.3	12.0	12.7	13.4	14.2	15.0	15.8	16.6
Bit Loss	psi :	34	35	36	38	39	41	42	44	46	47	49
% Bit Loss	:	15.4	15.5	15.6	15.7	15.8	15.9	13.1	13.8	14.8	15.3	15.6
Pipe Loss	psi :	120	124	128	132	136	140	145	149	153	158	162
Annular Loss	psi :	8	8	8	9	9	9	10	10	10	10	11
Cuttings Loss	psi :	6	6	6	5	5	5	65	50	32	24	19
Surface Loss	psi :	51	53	55	57	59	61	64	66	68	70	73
Total Loss	psi :	219	226	233	241	249	257	325	319	309	309	313
Circ Pressure	psi :	840	840	840	840	840	840	900	886	868	860	856
ECD @ TD	sg :	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
ECD @ Shoe	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
ECD @ Weakest Depth	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.05	1.05
ECD @ TD (cuttings)	sg :	1.06	1.06	1.06	1.06	1.06	1.06	1.13	1.12	1.09	1.08	1.08

Recommended Minimum Flow to maintain cuttings transport in top section is 341 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 98 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Wed Sep 22 00:47:17 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	85.0 m	Jet 1	24 in/32		
Depth	115.0 m	Weakest Fmtn Depth	456.0 m	Jet 2	24 in/32		
Vertical Depth	115.0 m	Mud Density	1.04 sg	Jet 3	24 in/32		
Flow Rate	1080 gpm	300 rpm viscometer	2	Jet 4	20 in/32		
Average ROP	50.0 m/hr	600 rpm viscometer	3	Jet 5	20 in/32		
Cuttings Density	2.25 sg	Plastic Viscosity	1.00 cP	Jet 6	20 in/32		
Cuttings Diameter	0.100 in	Yield Point	1.00 #/100ft^2	Jet 7	20 in/32		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2	Total Fluid Area	2.5525 in^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496				

CALCULATED RESULTS

Section Top (m)	Section Length (m)	Hole Size (in)	Pipe OD (in)	Pipe ID (in)	Volumes & Capacities Hole (bbl)	Pipe (bbl)	Annulus (bbl)	Mud Velocity Pipe (m/min)	Annulus (m/min)	Critical (m/min)	Flow Regime
Surface	32.3	36.000	5.000	4.276	133.4	1.9	130.8	441.3	6.4	6.6	LAMINAR
33.8	10.7	36.000	8.000	2.875	44.2	0.3	42.0	976.1	6.5	7.0	LAMINAR
44.5	40.5	36.000	9.500	3.063	167.3	1.2	155.6	860.0	6.7	7.2	LAMINAR
85.0	30.0	36.000	9.500	3.063	123.9	0.9	115.3	860.0	6.7	7.2	LAMINAR

Hydrostatic Pressure	168 psi		
Annular Volume	443.7 bbl	3445 strokes	17 mins
Pipe Capacity	4.3 bbl	33 strokes	0 mins
Circulating Volume	448.0 bbl	3478 strokes	17 mins
Pipe Displacement	20.8 bbl		
Total Hole Volume	468.8 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate (gpm)	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	113
Flow Regime at TD	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LA
Jet Velocity (m/sec)	39.5	39.8	40.2	40.6	41.0	41.4	41.8	42.1	42.5	42.9	43.
Impact Force (lbf)	599.5	611.2	623.0	635.0	647.0	659.1	671.4	683.8	696.3	708.9	721.
Hydraulic Power (hhp)	78.1	80.4	82.8	85.1	87.6	90.1	92.6	95.2	97.8	100.4	103.
Bit Loss (psi)	130	133	135	138	140	143	146	148	151	154	15
% Bit Loss	21.2	21.6	22.0	22.3	22.6	23.0	23.3	23.6	23.8	24.1	24.
Pipe Loss (psi)	106	107	109	110	112	114	116	117	119	121	12
Annular Loss (psi)	0	0	0	0	0	0	0	0	0	0	
Cuttings Loss (psi)	169	162	155	149	143	137	132	128	123	119	11
Surface Loss (psi)	209	213	217	221	224	228	232	236	240	244	24
Total Loss (psi)	614	615	616	618	620	623	626	630	634	638	64
Circ Pressure (psi)	337	330	323	317	311	305	300	296	291	287	28
ECD @ TD (sg)	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Shoe (sg)	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Weakest Depth (sg)	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ TD (cuttings) (sg)	2.09	2.04	2.00	1.96	1.92	1.89	1.86	1.83	1.80	1.78	1.7

Recommended Minimum Flow to maintain cuttings transport in top section is 871 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1157 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Sep 23 00:45:35 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	118.0 m	Jet 1	24 in/32
Depth	457.0 m	Weakest Fmtn Depth	456.0 m	Jet 2	24 in/32
Vertical Depth	457.0 m	Mud Density	1.04 sg	Jet 3	24 in/32
Flow Rate	1084 gpm	300 rpm viscometer	2	Total Fluid Area	1.3254 in^2
Average ROP	60.0 m/hr	600 rpm viscometer	3		
Cuttings Density	2.25 sg	Plastic Viscosity	1.00 cP		
Cuttings Diameter	0.100 in	Yield Point	1.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496		

CALCULATED RESULTS

Section Top	Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Annulus Pipe	Annulus Hole	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	28.000	5.000	4.276	208.6	4.9	201.9	442.9	10.7	7.5	TURBULENT
85.0	33.0	28.000	5.000	4.276	82.5	1.9	79.8	442.9	10.7	7.5	TURBULENT
118.0	138.8	26.000	5.000	4.276	299.0	8.1	287.8	442.9	12.4	7.8	TURBULENT
256.8	80.1	26.000	5.000	3.000	172.6	2.3	166.1	899.8	12.5	7.8	TURBULENT
336.9	56.9	26.000	8.000	2.875	122.6	1.5	111.0	979.7	13.2	8.4	TURBULENT
393.8	63.2	26.000	9.500	3.063	136.2	1.9	118.0	863.2	13.8	8.8	TURBULENT

Hydrostatic Pressure	674 psi		
Annular Volume	964.6 bbl	7488 strokes	37 mins
Pipe Capacity	20.6 bbl	160 strokes	1 mins
Circulating Volume	985.2 bbl	7648 strokes	38 mins
Pipe Displacement	36.3 bbl		
Total Hole Volume	1021.5 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	1034	1044	1054	1064	1074	1084	1094	1104	1114	1124	113
Flow Regime at TD	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TUR
Jet Velocity	m/sec :	76.3	77.0	77.8	78.5	79.2	80.0	80.7	81.5	82.2	82.9	83.
Impact Force	lbf :	1163.6	1186.2	1209.1	1232.1	1255.4	1278.9	1302.6	1326.5	1350.6	1375.0	1399.
Hydraulic Power	hhp :	293.2	301.7	310.5	319.4	328.5	337.8	347.2	356.8	366.6	376.6	386.
Bit Loss	psi :	486	496	505	515	525	534	544	554	564	575	58
% Bit Loss	:	40.8	41.1	41.3	41.6	41.8	42.1	42.3	42.5	42.8	43.0	43.
Pipe Loss	psi :	329	334	339	344	350	355	360	365	371	376	38
Annular Loss	psi :	0	0	0	0	0	0	0	0	0	0	
Cuttings Loss	psi :	166	163	160	157	154	151	148	146	143	141	13
Surface Loss	psi :	211	214	218	222	226	230	234	238	242	246	25
Total Loss	psi :	1192	1207	1222	1238	1254	1270	1287	1303	1320	1337	135
Circ Pressure	psi :	840	836	833	830	827	825	822	819	817	814	81
ECD @ TD	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Shoe	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Weakest Depth	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ TD (cuttings)	sg :	1.30	1.29	1.29	1.28	1.28	1.27	1.27	1.26	1.26	1.26	1.2

Recommended Minimum Flow to maintain cuttings transport in top section is 642 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 689 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Sep 24 01:21:33 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	118.0 m	Jet 1	24 in/32
Depth	565.0 m	Weakest Fmtn Depth	456.0 m	Jet 2	24 in/32
Vertical Depth	565.0 m	Mud Density	1.04 sg	Jet 3	24 in/32
Flow Rate	1100 gpm	300 rpm viscometer	2	Total Fluid Area	1.3254 in^2
Average ROP	45.0 m/hr	600 rpm viscometer	3		
Cuttings Density	2.25 sg	Plastic Viscosity	1.00 cP		
Cuttings Diameter	0.100 in	Yield Point	1.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496		

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	28.000	5.000	4.276	208.6	4.9	201.9	449.4	10.8	7.5	TURBULENT
85.0	33.0	28.000	5.000	4.276	82.5	1.9	79.8	449.4	10.8	7.5	TURBULENT
118.0	246.8	26.000	5.000	4.276	531.7	14.4	511.8	449.4	12.6	7.8	TURBULENT
364.8	80.1	26.000	5.000	3.000	172.6	2.3	166.0	913.1	12.6	7.8	TURBULENT
444.9	56.9	26.000	8.000	2.875	122.6	1.5	111.0	994.2	13.4	8.4	TURBULENT
501.8	63.2	26.000	9.500	3.063	136.2	1.9	118.0	875.9	14.0	8.8	TURBULENT

Hydrostatic Pressure	833 psi		
Annular Volume	1188.6 bbl	9227 strokes	45 mins
Pipe Capacity	26.9 bbl	209 strokes	1 mins
Circulating Volume	1215.4 bbl	9436 strokes	46 mins
Pipe Displacement	38.7 bbl		
Total Hole Volume	1254.1 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180	120
Flow Regime at TD	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TUR
Jet Velocity	m/sec :	73.8	75.3	76.7	78.2	79.7	81.2	82.6	84.1	85.6	87.1	88.
Impact Force	lbf :	1088.4	1132.3	1177.2	1222.9	1269.5	1316.9	1365.2	1414.4	1464.5	1515.4	1567.
Hydraulic Power	hhp :	265.2	281.4	298.3	315.8	334.1	353.0	372.6	392.9	413.9	435.7	458.
Bit Loss	psi :	455	473	492	511	531	550	571	591	612	633	65
% Bit Loss	:	39.4	39.9	40.4	40.9	41.4	41.8	42.2	42.6	43.0	43.3	43.
Pipe Loss	psi :	339	350	361	372	384	395	407	418	430	442	45
Annular Loss	psi :	0	0	0	0	0	0	0	0	0	0	
Cuttings Loss	psi :	163	156	150	144	139	134	130	125	121	118	11
Surface Loss	psi :	198	205	213	221	228	236	244	253	261	269	27
Total Loss	psi :	1155	1185	1216	1249	1282	1316	1351	1388	1425	1463	150
Circ Pressure	psi :	996	990	983	978	973	968	963	959	955	951	94
ECD @ TD	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Shoe	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ Weakest Depth	sg :	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.0
ECD @ TD (cuttings)	sg :	1.24	1.23	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.19	1.1

Recommended Minimum Flow to maintain cuttings transport in top section is 644 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 689 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Sep 30 02:01:29 1993

INPUT DATA

Hydraulics Model	POWER LAW		Casing Shoe Depth	553.0 m		Jet 1	20 in/32
Depth	987.0 m		Weakest Fmtn Depth	553.0 m		Jet 2	18 in/32
Vertical Depth	987.0 m		Mud Density	1.12 sg		Jet 3	18 in/32
Flow Rate	1116 gpm		300 rpm viscometer	36		Jet 4	14 in/32
Average ROP	40.0 m/hr		600 rpm viscometer	49		Total Fluid Area	0.9541 in^2
Cuttings Density	2.25 sg		Plastic Viscosity	13.00 cP			
Cuttings Diameter	0.100 in		Yield Point	23.00 #/100ft^2			
Cuttings Shape	SPHERICAL		Power Law k	2.31496 #sec^n/100ft^2			
Cuttings Thickness	0.000 in		Power Law n	0.44478			

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.1	456.0	22.9	90.1	LAMINAR
85.0	468.0	19.130	5.000	4.276	545.8	27.3	508.2	456.0	24.5	91.3	LAMINAR
553.0	220.1	17.500	5.000	4.276	214.8	12.8	197.1	456.0	29.7	94.8	LAMINAR
773.1	80.1	17.500	5.000	3.000	78.2	2.3	71.7	926.4	29.7	94.8	LAMINAR
853.2	65.0	17.500	8.000	2.875	63.4	1.7	50.2	1008.7	34.4	103.3	LAMINAR
918.2	68.8	17.500	9.500	3.125	67.2	2.1	47.4	853.7	38.6	108.7	LAMINAR

Hydrostatic Pressure	1570 psi		
Annular Volume	971.5 bbl	7542 strokes	37 mins
Pipe Capacity	51.1 bbl	397 strokes	2 mins
Circulating Volume	1022.6 bbl	7939 strokes	38 mins
Pipe Displacement	50.6 bbl		
Total Hole Volume	1073.3 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	1016	1036	1056	1076	1096	1116	1136	1156	1176	1196	1216
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	104.1	106.2	108.2	110.3	112.3	114.4	116.4	118.5	120.5	122.6	124.6
Impact Force	lbf :	1680.6	1747.4	1815.5	1885.0	1955.7	2027.7	2101.0	2175.7	2251.6	2328.8	2407.4
Hydraulic Power	hhp :	577.9	612.7	648.9	686.5	725.5	765.9	807.8	851.2	896.2	942.7	990.8
Bit Loss	psi :	976	1014	1054	1094	1135	1177	1220	1263	1307	1352	1397
% Bit Loss	:	45.6	45.9	46.1	46.4	46.6	46.8	47.0	47.3	47.5	47.7	47.9
Pipe Loss	psi :	886	913	940	967	995	1023	1051	1080	1109	1138	1167
Annular Loss	psi :	8	8	8	8	8	8	8	8	8	9	9
Cuttings Loss	psi :	48	47	46	46	45	44	43	42	42	41	40
Surface Loss	psi :	220	228	236	244	253	261	270	279	288	297	307
Total Loss	psi :	2137	2210	2284	2360	2436	2514	2593	2673	2754	2836	2920
Circ Pressure	psi :	1626	1625	1624	1623	1622	1622	1621	1620	1620	1619	1618
ECD @ TD	sg :	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
ECD @ Shoe	sg :	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
ECD @ Weakest Depth	sg :	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
ECD @ TD (cuttings)	sg :	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.15

Recommended Minimum Flow to maintain cuttings transport in top section is 21 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 3144 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Oct 1 01:07:40 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	553.0 m	Jet 1	20 in/32
Depth	1379.0 m	Weakest Fmtn Depth	553.0 m	Jet 2	18 in/32
Vertical Depth	1379.0 m	Mud Density	1.09 sg	Jet 3	18 in/32
Flow Rate	1080 gpm	300 rpm viscometer	48	Jet 4	14 in/32
Average ROP	11.1 m/hr	600 rpm viscometer	64	Total Fluid Area	0.9541 in^2
Cuttings Density	2.25 sg	Plastic Viscosity	16.00 cP		
Cuttings Diameter	0.100 in	Yield Point	32.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	3.70906 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.41504		

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Pipe bbl	Annulus bbl	Mud Velocity Pipe m/min	Annulus m/min	Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.1	441.3	22.1	116.2	LAMINAR
85.0	468.0	19.130	5.000	4.276	545.8	27.3	508.2	441.3	23.7	117.6	LAMINAR
553.0	612.1	17.500	5.000	4.276	597.4	35.7	548.1	441.3	28.7	121.7	LAMINAR
1165.1	80.1	17.500	5.000	3.000	78.2	2.3	71.7	896.5	28.7	121.8	LAMINAR
1245.2	65.0	17.500	8.000	2.875	63.4	1.7	50.2	976.1	33.3	131.7	LAMINAR
1310.2	68.8	17.500	9.500	3.125	67.2	2.1	47.4	826.2	37.4	138.1	LAMINAR

Hydrostatic Pressure	2135 psi		
Annular Volume	1322.6 bbl	10268 strokes	51 mins
Pipe Capacity	74.0 bbl	574 strokes	3 mins
Circulating Volume	1396.5 bbl	10842 strokes	54 mins
Pipe Displacement	59.3 bbl		
Total Hole Volume	1455.9 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	980	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	100.4	102.5	104.5	106.6	108.6	110.7	112.7	114.8	116.8	118.9	120.9
Impact Force	lbf :	1521.7	1584.5	1648.5	1713.8	1780.3	1848.1	1917.2	1987.6	2059.2	2132.1	2206.2
Hydraulic Power	hhp :	504.7	536.3	569.1	603.2	638.7	675.5	713.8	753.4	794.5	837.1	881.1
Bit Loss	psi :	883	920	957	995	1033	1073	1113	1154	1195	1238	1281
% Bit Loss	:	40.9	41.1	41.4	41.6	41.8	42.0	42.2	42.4	42.6	42.8	43.0
Pipe Loss	psi :	1042	1074	1107	1140	1173	1207	1241	1276	1310	1345	1381
Annular Loss	psi :	16	16	17	17	17	17	17	17	17	17	18
Cuttings Loss	psi :	19	19	18	18	18	17	17	17	17	16	16
Surface Loss	psi :	200	207	215	223	231	239	248	256	265	273	282
Total Loss	psi :	2160	2237	2314	2393	2473	2554	2636	2720	2804	2890	2977
Circ Pressure	psi :	2171	2170	2170	2170	2170	2169	2169	2169	2169	2169	2169
ECD @ TD	sg :	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
ECD @ Shoe	sg :	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
ECD @ Weakest Depth	sg :	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
ECD @ TD (cuttings)	sg :	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11

Recommended Minimum Flow to maintain cuttings transport in top section is 14 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 3993 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sat Oct 2 00:31:17 1993

INPUT DATA

ydraulics Model	POWER LAW	Casing Shoe Depth	553.0 m	Jet 1	20 in/32
epth	1538.0 m	Weakest Fmtn Depth	553.0 m	Jet 2	18 in/32
Vertical Depth	1538.0 m	Mud Density	1.16 sg	Jet 3	18 in/32
Flow Rate	1080 gpm	300 rpm viscometer	47	Jet 4	14 in/32
Average ROP	23.0 m/hr	600 rpm viscometer	65	Total Fluid Area	0.9541 in^2
Cuttings Density	2.25 sg	Plastic Viscosity	18.00 cP		
Cuttings Diameter	0.100 in	Yield Point	29.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	2.62226 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.46778		

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Pipe bbl	Annulus bbl	Mud Velocity Pipe m/min	Annulus m/min	Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.1	441.3	22.1	100.3	LAMINAR
85.0	468.0	19.130	5.000	4.276	545.8	27.3	508.2	441.3	23.7	101.7	LAMINAR
553.0	771.1	17.500	5.000	4.276	752.6	44.9	690.5	441.3	28.7	105.7	LAMINAR
1324.1	80.1	17.500	5.000	3.000	78.2	2.3	71.7	896.5	28.7	105.8	LAMINAR
1404.2	65.0	17.500	8.000	2.875	63.4	1.7	50.2	976.1	33.3	115.9	LAMINAR
1469.2	68.8	17.500	9.500	3.125	67.2	2.1	47.4	826.2	37.4	122.4	LAMINAR

Hydrostatic Pressure	2534 psi		
Annular Volume	1465.0 bbl	11373 strokes	57 mins
Pipe Capacity	83.2 bbl	646 strokes	3 mins
Circulating Volume	1548.2 bbl	12019 strokes	60 mins
Pipe Displacement	62.9 bbl		
Total Hole Volume	1611.1 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	980	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	100.4	102.5	104.5	106.6	108.6	110.7	112.7	114.8	116.8	118.9	120.9
Impact Force	lbf :	1619.5	1686.2	1754.4	1823.8	1894.7	1966.8	2040.3	2115.2	2191.4	2269.0	2347.9
Hydraulic Power	hhp :	537.1	570.7	605.6	642.0	679.7	718.9	759.6	801.8	845.5	890.8	937.7
Bit Loss	psi :	940	979	1018	1059	1100	1142	1184	1228	1272	1317	1363
% Bit Loss	:	37.8	38.0	38.3	38.5	38.7	38.9	39.1	39.3	39.5	39.7	39.9
Pipe Loss	psi :	1278	1318	1359	1400	1442	1484	1527	1570	1614	1658	1702
Annular Loss	psi :	15	15	15	15	15	15	16	16	16	16	16
Cuttings Loss	psi :	42	41	40	39	38	38	37	36	36	35	34
Surface Loss	psi :	213	221	229	237	246	255	264	273	282	291	300
Total Loss	psi :	2486	2573	2661	2751	2842	2934	3028	3123	3219	3317	3418
Circ Pressure	psi :	2591	2590	2589	2589	2588	2588	2587	2586	2586	2585	2585
ECD @ TD	sg :	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
ECD @ Shoe	sg :	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
ECD @ Weakest Depth	sg :	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
ECD @ TD (cuttings)	sg :	1.19	1.19	1.19	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18

Recommended Minimum Flow to maintain cuttings transport in top section is 17 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 3540 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Mon Oct 4 01:41:02 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	16 in/32
Depth	1538.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	16 in/32
Vertical Depth	1537.9 m	Mud Density	1.16 sg	Jet 3	18 in/32
Flow Rate	691 gpm	300 rpm viscometer	46	Total Fluid Area	0.6412 in^2
Average ROP	3.3 m/hr	600 rpm viscometer	64		
Cuttings Density	2.25 sg	Plastic Viscosity	18.00 cP		
Cuttings Diameter	0.100 in	Yield Point	28.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	2.43285 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.47644		

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Pipe bbl	Annulus bbl	Mud Velocity Pipe m/min	Annulus m/min	Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.1	282.3	14.2	97.2	LAMINAR
85.0	1178.3	12.347	5.000	4.276	572.5	68.7	477.6	282.3	40.6	122.2	LAMINAR
1263.3	80.1	12.347	5.000	3.000	38.9	2.3	32.4	573.6	40.7	122.3	LAMINAR
1343.4	182.4	12.347	8.000	2.875	88.6	4.8	51.4	624.5	58.4	144.6	LAMINAR
1525.8	0.2	12.347	8.250	2.875	0.1	0.0	0.1	624.5	61.2	147.4	LAMINAR
1526.0	12.0	12.250	8.250	2.875	5.7	0.3	3.1	624.5	63.0	148.5	LAMINAR

Hydrostatic Pressure	2534 psi		
Annular Volume	661.7 bbl	5137 strokes	40 mins
Pipe Capacity	81.0 bbl	628 strokes	5 mins
Circulating Volume	742.6 bbl	5765 strokes	45 mins
Pipe Displacement	67.1 bbl		
Total Hole Volume	809.7 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	591	611	631	651	671	691	711	731	751	771	791
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	90.1	93.2	96.2	99.3	102.3	105.4	108.4	111.5	114.5	117.6	120.6
Impact Force	lbf :	876.4	936.7	999.1	1063.4	1129.7	1198.1	1268.4	1340.8	1415.2	1491.6	1569.9
Hydraulic Power	hhp :	260.9	288.2	317.5	348.6	381.8	416.9	454.2	493.6	535.3	579.2	625.4
Bit Loss	psi :	757	809	863	919	976	1035	1096	1158	1222	1288	1356
% Bit Loss	:	48.2	48.6	49.0	49.3	49.7	50.0	50.4	50.7	51.0	51.3	51.6
Pipe Loss	psi :	685	721	758	796	834	873	912	952	993	1034	1076
Annular Loss	psi :	42	42	43	44	44	45	46	46	47	47	48
Cuttings Loss	psi :	5	5	5	5	4	4	4	4	4	4	4
Surface Loss	psi :	83	88	94	99	105	111	117	123	130	136	143
Total Loss	psi :	1572	1666	1763	1862	1964	2068	2175	2284	2396	2510	2627
Circ Pressure	psi :	2581	2582	2582	2583	2583	2584	2584	2585	2585	2585	2586
ECD @ TD	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Shoe	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Weakest Depth	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ TD (cuttings)	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18

Recommended Minimum Flow to maintain cuttings transport in top section is 14 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1630 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Tue Oct 5 02:33:48 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	16 in/32
Depth	1728.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	16 in/32
Vertical Depth	1727.7 m	Mud Density	1.17 sg	Jet 3	18 in/32
Flow Rate	756 gpm	300 rpm viscometer	39	Total Fluid Area	0.6412 in^2
Average ROP	13.0 m/hr	600 rpm viscometer	55		
Cuttings Density	2.25 sg	Plastic Viscosity	16.00 cP		
Cuttings Diameter	0.100 in	Yield Point	23.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.82843 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.49596		

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.1	308.9	15.5	83.4	LAMINAR
85.0	1368.3	12.347	5.000	4.276	664.8	79.7	554.6	308.9	44.4	106.1	LAMINAR
1453.3	72.7	12.347	5.000	3.000	35.3	2.1	29.4	627.5	44.5	106.2	LAMINAR
1526.0	7.4	12.250	5.000	3.000	3.5	0.2	2.9	627.5	45.4	106.7	LAMINAR
1533.4	182.4	12.250	8.000	2.875	87.2	4.8	50.0	683.3	65.6	127.7	LAMINAR
1715.8	12.2	12.250	8.250	2.875	5.8	0.3	3.2	683.3	68.9	130.3	LAMINAR

Hydrostatic Pressure	2872 psi		
Annular Volume	737.2 bbl	5723 strokes	41 mins
Pipe Capacity	92.0 bbl	714 strokes	5 mins
Circulating Volume	829.3 bbl	6438 strokes	46 mins
Pipe Displacement	71.3 bbl		
Total Hole Volume	900.5 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	656	676	696	716	736	756	776	796	816	836	856
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	100.0	103.1	106.1	109.2	112.2	115.3	118.3	121.4	124.4	127.5	130.5
Impact Force	lbf :	1089.1	1156.5	1226.0	1297.4	1370.9	1446.5	1524.0	1603.6	1685.2	1768.8	1854.4
Hydraulic Power	hhp :	359.8	393.7	429.7	467.9	508.2	550.7	595.6	642.9	692.5	744.7	799.5
Bit Loss	psi :	941	999	1059	1121	1184	1249	1316	1385	1456	1528	1602
% Bit Loss	:	48.2	48.6	48.9	49.3	49.6	49.9	50.2	50.5	50.8	51.1	51.4
Pipe Loss	psi :	851	892	933	975	1018	1062	1106	1150	1196	1242	1288
Annular Loss	psi :	40	40	41	41	42	43	43	44	44	45	45
Cuttings Loss	psi :	20	19	18	18	17	17	17	16	16	15	15
Surface Loss	psi :	102	107	113	120	126	132	139	146	153	160	167
Total Loss	psi :	1953	2058	2165	2275	2388	2503	2621	2741	2864	2989	3117
Circ Pressure	psi :	2931	2931	2931	2931	2931	2932	2932	2932	2932	2932	2932
ECD @ TD	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19
ECD @ Weakest Depth	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19
ECD @ TD (cuttings)	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19

Recommended Minimum Flow to maintain cuttings transport in top section is 19 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1430 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Oct 7 02:37:46 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Total Fluid Area	1.5033 in^2
Depth	1733.5 m	Weakest Fmtn Depth	1526.0 m		
Vertical Depth	1733.5 m	Mud Density	1.17 sg		
Flow Rate	324 gpm	300 rpm viscometer	40		
Average ROP	10.0 m/hr	600 rpm viscometer	51		
Cuttings Density	2.25 sg	Plastic Viscosity	11.00 cP		
Cuttings Diameter	0.100 in	Yield Point	29.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	4.60473 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.35050		

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Pipe bbl	Annulus bbl	Mud Velocity Pipe m/min	Annulus m/min	Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	96.8	132.4	6.7	110.8	LAMINAR
85.0	1367.6	12.347	5.000	4.276	664.5	79.7	550.1	132.4	19.2	129.8	LAMINAR
1452.6	73.4	12.347	5.000	3.000	35.7	2.1	29.5	268.9	19.2	129.8	LAMINAR
1526.0	6.7	12.250	5.000	3.000	3.2	0.2	2.6	268.9	19.6	130.2	LAMINAR
1532.7	188.6	12.250	8.000	2.875	90.2	5.0	51.7	292.8	28.1	146.0	LAMINAR
1721.3	12.2	12.250	8.250	2.875	5.8	0.3	3.2	292.8	29.5	147.9	LAMINAR

Hydrostatic Pressure	2882 psi		
Annular Volume	734.0 bbl	5698 strokes	95 mins
Pipe Capacity	92.1 bbl	715 strokes	12 mins
Circulating Volume	826.2 bbl	6414 strokes	107 mins
Pipe Displacement	77.0 bbl		
Total Hole Volume	903.2 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	274	284	294	304	314	324	334	344	354	364	374
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	17.8	18.5	19.1	19.8	20.4	21.1	21.7	22.4	23.0	23.7	24.3
Impact Force	lbf :	81.0	87.1	93.3	99.8	106.4	113.3	120.4	127.7	135.3	143.0	151.0
Hydraulic Power	hhp :	4.8	5.3	5.9	6.5	7.2	7.9	8.6	9.4	10.3	11.2	12.1
Bit Loss	psi :	30	32	34	37	39	42	44	47	50	53	56
% Bit Loss	:	9.1	9.5	9.9	10.3	10.7	11.1	11.4	11.7	11.9	12.0	12.1
Pipe Loss	psi :	199	205	211	218	224	231	240	250	263	278	293
Annular Loss	psi :	43	44	45	45	46	46	47	47	48	48	48
Cuttings Loss	psi :	36	35	34	32	31	30	30	29	28	27	26
Surface Loss	psi :	20	21	23	24	26	27	29	31	32	34	36
Total Loss	psi :	328	337	347	356	366	376	389	404	421	440	459
Circ Pressure	psi :	2961	2960	2960	2959	2959	2958	2958	2957	2957	2957	2956
ECD @ TD	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Weakest Depth	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ TD (cuttings)	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Recommended Minimum Flow to maintain cuttings transport in top section is 6 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1624 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Oct 8 22:40:26 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	14 in/32
Depth	1882.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	14 in/32
Vertical Depth	1880.6 m	Mud Density	1.17 sg	Jet 3	14 in/32
Flow Rate	340 gpm	300 rpm viscometer	38	Jet 4	14 in/32
Average ROP	35.0 m/hr	600 rpm viscometer	51	Jet 5	14 in/32
Cuttings Density	2.25 sg	Plastic Viscosity	13.00 cP	Jet 6	14 in/32
Cuttings Diameter	0.100 in	Yield Point	25.00 #/100ft^2	Jet 7	14 in/32
Cuttings Shape	SPHERICAL	Power Law k	2.76970 #sec^n/100ft^2	Jet 8	14 in/32
Cuttings Thickness	0.200 in	Power Law n	0.42450	Jet 9	14 in/32
				Jet 10	14 in/32
				Total Fluid Area	1.5033 in^2

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	96.8	138.9	7.0	94.5	LAMINAR
85.0	1441.0	12.347	5.000	4.276	700.1	84.0	579.0	138.9	20.1	115.3	LAMINAR
1526.0	77.5	12.250	5.000	4.276	37.1	4.5	30.6	138.9	20.5	115.7	LAMINAR
1603.5	80.1	12.250	5.000	3.000	38.3	2.3	31.6	282.2	20.5	115.8	LAMINAR
1683.6	170.0	12.250	8.000	2.875	81.3	4.5	46.6	307.3	29.5	133.7	LAMINAR
1853.6	28.4	12.250	8.000	6.000	13.6	3.3	7.8	70.6	29.5	133.7	LAMINAR

Hydrostatic Pressure	3126 psi		
Annular Volume	792.3 bbl	6151 strokes	98 mins
Pipe Capacity	103.4 bbl	803 strokes	13 mins
Circulating Volume	895.7 bbl	6954 strokes	111 mins
Pipe Displacement	78.5 bbl		
Total Hole Volume	974.2 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	240	260	280	300	320	340	360	380	400	420	440
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	15.6	16.9	18.2	19.5	20.8	22.1	23.4	24.7	26.0	27.3	28.6
Impact Force	lbf :	62.2	73.0	84.6	97.2	110.5	124.8	139.9	155.9	172.7	190.4	209.0
Hydraulic Power	hhp :	3.2	4.1	5.1	6.3	7.6	9.1	10.8	12.7	14.8	17.2	19.8
Bit Loss	psi :	23	27	31	36	41	46	52	57	64	70	77
% Bit Loss	:	5.7	6.6	7.5	8.2	8.7	9.1	9.7	10.2	10.7	11.1	11.5
Pipe Loss	psi :	171	183	196	215	245	280	306	332	359	386	414
Annular Loss	psi :	33	34	35	36	37	38	39	40	41	42	43
Cuttings Loss	psi :	157	145	134	125	117	110	104	99	94	89	85
Surface Loss	psi :	16	18	21	24	27	30	33	37	41	44	48
Total Loss	psi :	399	407	418	436	467	505	534	565	597	632	668
Circ Pressure	psi :	3316	3305	3296	3288	3281	3275	3270	3265	3261	3257	3254
ECD @ TD	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Weakest Depth	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ TD (cuttings)	sg :	1.24	1.24	1.23	1.23	1.23	1.23	1.22	1.22	1.22	1.22	1.22

Recommended Minimum Flow to maintain cuttings transport in top section is 9 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1540 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Oct 8 01:43:22 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	16 in/32
Depth	1839.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	16 in/32
Vertical Depth	1839.0 m	Mud Density	1.17 sg	Jet 3	18 in/32
Flow Rate	770 gpm	300 rpm viscometer	38	Total Fluid Area	0.6412 in^2
Average ROP	16.0 m/hr	600 rpm viscometer	51		
Cuttings Density	2.25 sg	Plastic Viscosity	13.00 cP		
Cuttings Diameter	0.100 in	Yield Point	25.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	2.76970 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.42450		

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	96.8	314.6	15.8	94.5	LAMINAR
85.0	1441.0	12.347	5.000	4.276	700.1	84.0	579.6	314.6	45.6	115.2	LAMINAR
1526.0	32.1	12.250	5.000	4.276	15.3	1.9	12.7	314.6	46.5	115.7	LAMINAR
1558.1	80.1	12.250	5.000	3.000	38.3	2.3	31.6	639.2	46.5	115.7	LAMINAR
1638.2	188.6	12.250	8.000	2.875	90.2	5.0	51.7	695.9	66.8	133.7	LAMINAR
1826.8	12.2	12.250	8.250	2.875	5.8	0.3	3.2	695.9	70.2	135.9	LAMINAR

Hydrostatic Pressure	3057 psi		
Annular Volume	775.6 bbl	6022 strokes	42 mins
Pipe Capacity	98.3 bbl	763 strokes	5 mins
Circulating Volume	873.9 bbl	6785 strokes	48 mins
Pipe Displacement	79.7 bbl		
Total Hole Volume	953.6 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	720	730	740	750	760	770	780	790	800	810	820
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	109.8	111.3	112.9	114.4	115.9	117.4	119.0	120.5	122.0	123.5	125.1
Impact Force	lbf :	1312.0	1348.7	1385.9	1423.6	1461.8	1500.5	1539.7	1579.5	1619.7	1660.5	1701.7
Hydraulic Power	hhp :	475.7	495.8	516.5	537.7	559.5	581.9	604.9	628.4	652.6	677.4	702.8
Bit Loss	psi :	1133	1165	1197	1230	1263	1296	1330	1364	1399	1434	1470
% Bit Loss	:	50.6	50.8	51.0	51.2	51.3	51.5	51.7	51.8	52.0	52.2	52.3
Pipe Loss	psi :	911	930	949	969	989	1009	1029	1049	1069	1089	1110
Annular Loss	psi :	52	52	52	53	53	53	53	54	54	54	55
Cuttings Loss	psi :	23	23	22	22	22	22	21	21	21	21	20
Surface Loss	psi :	121	124	127	130	134	137	140	144	147	150	154
Total Loss	psi :	2240	2294	2348	2404	2460	2516	2574	2632	2690	2749	2809
Circ Pressure	psi :	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132	3132
ECD @ TD	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Weakest Depth	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ TD (cuttings)	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Recommended Minimum Flow to maintain cuttings transport in top section is 15 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1492 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sat Oct 9 21:57:26 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	16 in/32
Depth	1915.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	16 in/32
Vertical Depth	1913.4 m	Mud Density	1.17 sg	Jet 3	18 in/32
Flow Rate	760 gpm	300 rpm viscometer	38	Total Fluid Area	0.6412 in^2
Average ROP	17.0 m/hr	600 rpm viscometer	53		
Cuttings Density	2.25 sg	Plastic Viscosity	15.00 cP		
Cuttings Diameter	0.100 in	Yield Point	23.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.96611 #sec^n/100ft^2		
Cuttings Thickness	0.200 in	Power Law n	0.47999		

CALCULATED RESULTS

Section Top	Section Length	Hole Size	Pipe OD	Pipe ID	Volumes & Capacities Hole	Pipe	Annulus	Mud Velocity Pipe	Annulus	Critical	Flow Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	83.5	19.750	5.000	4.276	103.8	4.9	96.8	310.5	15.6	84.9	LAMINAR
85.0	1441.0	12.347	5.000	4.276	700.1	84.0	579.0	310.5	45.0	107.2	LAMINAR
1526.0	108.2	12.250	5.000	4.276	51.7	6.3	42.7	310.5	45.9	107.6	LAMINAR
1634.2	80.1	12.250	5.000	3.000	38.3	2.3	31.6	630.9	45.9	107.7	LAMINAR
1714.3	188.5	12.250	8.000	2.875	90.2	5.0	51.7	686.9	66.0	127.4	LAMINAR
1902.8	12.2	12.250	8.250	2.875	5.8	0.3	3.2	686.9	69.2	129.9	LAMINAR

Hydrostatic Pressure	3181 psi		
Annular Volume	804.9 bbl	6249 strokes	44 mins
Pipe Capacity	102.7 bbl	798 strokes	6 mins
Circulating Volume	907.6 bbl	7046 strokes	50 mins
Pipe Displacement	82.4 bbl		
Total Hole Volume	990.0 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	660	680	700	720	740	760	780	800	820	840	860
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	100.7	103.7	106.8	109.8	112.9	115.9	119.0	122.0	125.1	128.1	131.2
Impact Force	lbf :	1102.4	1170.2	1240.1	1312.0	1385.9	1461.8	1539.7	1619.7	1701.7	1785.7	1871.8
Hydraulic Power	hhp :	366.4	400.8	437.2	475.7	516.5	559.5	604.9	652.6	702.8	755.5	810.7
Bit Loss	psi :	952	1011	1071	1133	1197	1263	1330	1399	1470	1543	1617
% Bit Loss	:	47.1	47.5	47.8	48.2	48.6	48.9	49.2	49.5	49.8	50.1	50.4
Pipe Loss	psi :	895	937	980	1024	1068	1113	1159	1205	1253	1300	1349
Annular Loss	psi :	45	46	47	47	48	49	49	50	50	51	51
Cuttings Loss	psi :	28	27	26	26	25	24	24	23	22	22	21
Surface Loss	psi :	103	109	115	121	127	134	140	147	154	161	168
Total Loss	psi :	2023	2130	2239	2351	2465	2582	2702	2824	2949	3077	3206
Circ Pressure	psi :	3254	3254	3254	3254	3254	3254	3254	3254	3254	3254	3254
ECD @ TD	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19	1.19	1.19	1.19
ECD @ Weakest Depth	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19	1.19	1.19	1.19
ECD @ TD (cuttings)	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Recommended Minimum Flow to maintain cuttings transport in top section is 18 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1425 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sun Oct 10 23:50:18 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	14 in/32
Depth	1970.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	14 in/32
Vertical Depth	1968.4 m	Mud Density	1.17 sg	Jet 3	14 in/32
Flow Rate	335 gpm	300 rpm viscometer	36	Jet 4	14 in/32
Average ROP	17.0 m/hr	600 rpm viscometer	50	Jet 5	14 in/32
Cuttings Density	2.25 sg	Plastic Viscosity	14.00 cP	Jet 6	14 in/32
Cuttings Diameter	0.100 in	Yield Point	22.00 #/100ft^2	Jet 7	14 in/32
Cuttings Shape	SPHERICAL	Power Law k	1.93367 #sec^n/100ft^2	Jet 8	14 in/32
Cuttings Thickness	0.000 in	Power Law n	0.47393	Jet 9	14 in/32
				Jet 10	14 in/32
				Total Fluid Area	1.5033 in^2

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Pipe bbl	Annulus bbl	Mud Velocity Pipe m/min	Annulus m/min	Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	97.2	136.9	6.9	82.7	LAMINAR
85.0	1441.0	12.347	5.000	4.276	700.1	84.0	585.3	136.9	19.6	103.7	LAMINAR
1526.0	156.5	12.250	5.000	4.276	74.8	9.1	62.4	136.9	20.0	104.1	LAMINAR
1682.5	80.1	12.250	5.000	3.000	38.3	2.3	31.6	278.1	20.2	104.8	LAMINAR
1762.6	179.0	12.250	8.000	2.875	85.6	4.7	49.1	302.8	29.1	123.6	LAMINAR
1941.6	28.4	12.250	8.000	6.500	13.6	3.8	7.8	59.2	29.1	123.6	LAMINAR

Hydrostatic Pressure	3272 psi		
Annular Volume	833.3 bbl	6469 strokes	104 mins
Pipe Capacity	108.8 bbl	845 strokes	14 mins
Circulating Volume	942.1 bbl	7314 strokes	118 mins
Pipe Displacement	74.2 bbl		
Total Hole Volume	1016.3 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	235	255	275	295	315	335	355	375	395	415	435
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	15.3	16.6	17.9	19.2	20.5	21.8	23.1	24.4	25.7	27.0	28.3
Impact Force	lbf :	59.6	70.2	81.6	93.9	107.1	121.1	136.0	151.8	168.4	185.9	204.3
Hydraulic Power	hhp :	3.0	3.8	4.8	6.0	7.2	8.7	10.4	12.2	14.3	16.6	19.1
Bit Loss	psi :	22	26	30	35	39	45	50	56	62	68	75
% Bit Loss	:	7.0	7.9	8.6	8.9	9.2	9.7	10.1	10.5	10.9	11.2	11.6
Pipe Loss	psi :	166	180	202	236	272	299	327	356	386	417	448
Annular Loss	psi :	27	28	29	30	31	32	33	34	34	35	36
Cuttings Loss	psi :	82	75	70	65	61	57	54	51	48	46	44
Surface Loss	psi :	15	18	20	23	26	29	32	36	40	43	47
Total Loss	psi :	312	326	351	388	429	462	496	532	570	610	650
Circ Pressure	psi :	3381	3376	3371	3367	3364	3361	3359	3357	3355	3353	3352
ECD @ TD	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Shoe	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Weakest Depth	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ TD (cuttings)	sg :	1.21	1.21	1.21	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Recommended Minimum Flow to maintain cuttings transport in top section is 12 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1424 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Tue Oct 12 02:49:56 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1526.0 m	Jet 1	14 in/32		
th	2170.0 m	Weakest Fmtn Depth	1526.0 m	Jet 2	14 in/32		
rtical Depth	2167.9 m	Mud Density	1.17 sg	Jet 3	14 in/32		
Flow Rate	810 gpm	300 rpm viscometer	37	Jet 4	14 in/32		
Average ROP	15.0 m/hr	600 rpm viscometer	51	Jet 5	14 in/32		
Cuttings Density	2.25 sg	Plastic Viscosity	14.00 cP	Jet 6	13 in/32		
Cuttings Diameter	0.100 in	Yield Point	23.00 #/100ft^2	Total Fluid Area	0.8813 in^2		
Cuttings Shape	SPHERICAL	Power Law k	2.12652 #sec^n/100ft^2				
Cuttings Thickness	0.000 in	Power Law n	0.46297				

CALCULATED RESULTS

Section Top m	Section Length m	Hole Size in	Pipe OD in	Pipe ID in	Volumes & Capacities Hole bbl	Volumes & Capacities Pipe bbl	Volumes & Capacities Annulus bbl	Mud Velocity Pipe m/min	Mud Velocity Annulus m/min	Mud Velocity Critical m/min	Flow Regime
Surface	83.5	19.750	5.000	4.276	103.8	4.9	96.8	331.0	16.6	86.3	LAMINAR
85.0	1441.0	12.347	5.000	4.276	700.1	84.0	579.0	331.0	48.0	107.8	LAMINAR
1526.0	363.2	12.250	5.000	4.276	173.7	21.2	143.2	331.0	48.9	108.3	LAMINAR
1889.2	80.1	12.250	5.000	3.000	38.3	2.3	31.6	672.4	48.9	108.3	LAMINAR
1969.3	188.5	12.250	8.000	2.875	90.2	5.0	51.7	732.1	70.3	127.1	LAMINAR
2157.8	12.2	12.250	8.000	6.500	5.8	1.6	3.3	143.2	70.3	127.1	LAMINAR

Hydrostatic Pressure	3604 psi		
Annular Volume	905.6 bbl	7030 strokes	47 mins
Pipe Capacity	118.9 bbl	923 strokes	6 mins
Circulating Volume	1024.5 bbl	7953 strokes	53 mins
Pipe Displacement	87.5 bbl		
Total Hole Volume	1111.9 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	760	770	780	790	800	810	820	830	840	850	860
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	84.3	85.4	86.6	87.7	88.8	89.9	91.0	92.1	93.2	94.3	95.4
Impact Force	lbf :	1063.6	1091.8	1120.3	1149.2	1178.5	1208.1	1238.2	1268.5	1299.3	1330.4	1361.9
Hydraulic Power	hhp :	296.2	308.0	320.2	332.7	345.5	358.6	372.0	385.8	399.9	414.4	429.2
Bit Loss	psi :	668	686	704	722	741	759	778	797	817	836	856
% Bit Loss	:	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.0	34.2	34.3	34.4
Pipe Loss	psi :	1142	1165	1189	1212	1236	1260	1284	1308	1332	1357	1382
Annular Loss	psi :	55	55	56	56	56	57	57	57	58	58	58
tings Loss	psi :	24	24	23	23	23	22	22	22	22	21	21
face Loss	psi :	134	137	140	144	147	150	154	157	161	165	168
Total Loss	psi :	2023	2067	2112	2157	2203	2249	2295	2342	2389	2437	2485
Circ Pressure	psi :	3683	3683	3683	3683	3683	3683	3683	3683	3683	3683	3684
ECD @ TD	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Shoe	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ Weakest Depth	sg :	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
ECD @ TD (cuttings)	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Recommended Minimum Flow to maintain cuttings transport in top section is 18 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1464 gpm

PE602769

This is an enclosure indicator page.
The enclosure PE602769 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602769 has the following characteristics:

ITEM-BARCODE	**= PE602769**
CONTAINER_BARCODE	**= PE900117**
NAME	**= Minerva 2A Drilling Data Plot**
BASIN	**= Otway**
PERMIT	**= VIC/P31**
TYPE	**= WELL**
SUBTYPE	**= WELL-LOG**
DESCRIPTION	**= Minerva 2A Drilling Data Plot, Appendix 7**
REMARKS	**= old barcode PE900118 replaced with PE602769**
DATE-CREATED	**= ***
DATE-RECEIVED	**= ***
W_NO	= W1086
WELL-NAME	**= MINERVA 2**
CONTRACTOR	**=**
CLIENT_OP_CO	**=**

(Inserted by DNRE - Vic **Govt Mines Dept)**

PE602770

This is an enclosure indicator page.
The enclosure PE602770 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602770 has the following characteristics:

ITEM-BARCODE	= PE602770
CONTAINER_BARCODE	= PE900117
NAME	= Minerva 2 Drilling Data Plot
BASIN	= Otway
PERMIT	= VIC/P31
TYPE	= WELL
SUBTYPE	= WELL-LOG
DESCRIPTION	= Minerva 2 Drilling Data Plot, Appendix 7
REMARKS	= old barcode PE900119 replaced with PE602770
DATE-CREATED	= *
DATE-RECEIVED	= *
W_NO	= W1086
WELL-NAME	= MINERVA 2
CONTRACTOR	=
CLIENT_OP_CO	=

(Inserted by DNRE - Vic Govt Mines Dept)

PE602771

This is an enclosure indicator page.
The enclosure PE602771 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602771 has the following characteristics:

ITEM-BARCODE	PE602771
CONTAINER_BARCODE	**PE900117**
NAME	**Minerva 2A Pressure Data Plot**
BASIN	**Otway**
PERMIT	VIC/P31
TYPE	**WELL**
SUBTYPE	**WELL-LOG**
DESCRIPTION	**Minerva 2A Pressure Data Plot, Appendix 7**
REMARKS	**old barcode PE900125 replaced with PE602771**
DATE-CREATED	*
DATE-RECEIVED	*
W_NO	W1086
WELL-NAME	**MINERVA 2**
CONTRACTOR	
CLIENT_OP_CO	

(Inserted by DNRE – Vic **Govt Mines Dept)**

PE602772

This is an enclosure indicator page.
The enclosure PE602772 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602772 has the following characteristics:

ITEM-BARCODE	= PE602772
CONTAINER_BARCODE	= PE900117
NAME	= Minerva 2 Pressure Data Plot
BASIN	= Otway
PERMIT	= VIC/P31
TYPE	= WELL
SUBTYPE	= WELL-LOG
DESCRIPTION	= Minerva 2 Pressure Data Plot, Appendix 7
REMARKS	= old barcode PE900120 replaced with PE602772
DATE-CREATED	= *
DATE-RECEIVED	= *
W_NO	= W1086
WELL-NAME	= MINERVA 2
CONTRACTOR	=
CLIENT_OP_CO	=

(Inserted by DNRE - Vic Govt Mines Dept)

PE602773

This is an enclosure indicator page.
The enclosure PE602773 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602773 has the following characteristics:

ITEM-BARCODE	=	PE602773
CONTAINER_BARCODE	=	PE900117
NAME	=	Minerva 2A Composite Pressure Data
BASIN	=	Otway
PERMIT	=	VIC/P31
TYPE	=	WELL
SUBTYPE	=	WELL-LOG
DESCRIPTION	=	Minerva 2A Composite Pressure Data, Appendix 7
REMARKS	=	old barcode PE900121 replaced with PE602773
DATE-CREATED	=	*
DATE-RECEIVED	=	*
W_NO	=	W1086
WELL-NAME	=	MINERVA 2
CONTRACTOR	=	
CLIENT_OP_CO	=	

(Inserted by DNRE - Vic Govt Mines Dept)

PE602774

This is an enclosure indicator page.
The enclosure PE602774 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602774 has the following characteristics:

ITEM-BARCODE	=	**PE602774**
CONTAINER_BARCODE	=	**PE900117**
NAME	=	**Minerva 2A Pressure Gradient Plot**
BASIN	=	**Otway**
PERMIT	=	VIC/P31
TYPE	=	**WELL**
SUBTYPE	=	**WELL-LOG**
DESCRIPTION	=	**Minerva 2A Pressure Gradient Plot, Appendix 7**
REMARKS	=	**old barcode PE900124 replaced with PE602774**
DATE-CREATED	=	*
DATE-RECEIVED	=	*
W_NO	=	W1086
WELL-NAME	=	**MINERVA 2**
CONTRACTOR	=	
CLIENT_OP_CO	=	

(Inserted by DNRE – Vic **Govt Mines Dept)**

PE602775

This is an enclosure indicator page.
The enclosure PE602775 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602775 has the following characteristics:

ITEM-BARCODE	**PE602775**
CONTAINER_BARCODE	PE900117
NAME	**Minerva 2A Drillbyte MWD Log**
BASIN	**Otway**
PERMIT	VIC/P31
TYPE	**WELL**
SUBTYPE	**WELL-LOG**
DESCRIPTION	**Minerva 2A Drillbyte MWD Log, Appendix 7**
REMARKS	**old barcode** PE900123 **replaced with PE602775**
DATE-CREATED	*
DATE-RECEIVED	*
W_NO	W1086
WELL-NAME	**MINERVA 2**
CONTRACTOR	
CLIENT_OP_CO	

(Inserted by DNRE - Vic **Govt Mines Dept)**

PE602776

This is an enclosure indicator page.
The enclosure PE602776 is enclosed within the container PE900117 at this location in this document.

The enclosure PE602776 has the following characteristics:

ITEM-BARCODE	**PE602776**
CONTAINER_BARCODE	**PE900117**
NAME	**Minerva 2A Drillbyte MWD Time Log**
BASIN	**Otway**
PERMIT	VIC/P31
TYPE	**WELL**
SUBTYPE	**WELL-LOG**
DESCRIPTION	**Minerva 2A Drillbyte MWD Time Log, Appendix 7**
REMARKS	**old barcode PE900122 replaced with PE602776**
DATE-CREATED	*
DATE-RECEIVED	*
W_NO	W1086
WELL-NAME	**MINERVA 2**
CONTRACTOR	
CLIENT_OP_CO	

(Inserted by DNRE - Vic **Govt Mines** Dept)

PE600436

This is an enclosure indicator page.
The enclosure PE600436 is enclosed within the container PE900117 at this location in this document.

The enclosure PE600436 has the following characteristics:

ITEM-BARCODE	= **PE600436**
CONTAINER_BARCODE	= **PE900117**
NAME	= **Minerva 2A Drillbyte Formation Evaluation Log,** 1:500
BASIN	= **OTWAY**
PERMIT	= VIC/P31
TYPE	= **WELL**
SUBTYPE	= **WELL-LOG**
DESCRIPTION	= **Minerva 2A Drillbyte Formation Evaluation Log,** 1:500, **Appendix 7**
REMARKS	=
DATE-CREATED	= 12/10/93
DATE-RECEIVED	= *
W_NO	= W1086
WELL-NAME	= **MINERVA 2 & 2A**
CONTRACTOR	= **Baker Hughes**
CLIENT_OP_CO	= **BHP**

(Inserted by DNRE – Vic **Govt Mines Dept)**

PE600437

This is an enclosure indicator page.
The enclosure PE600437 is enclosed within the container PE900117 at this location in this document.

The enclosure PE600437 has the following characteristics:

ITEM-BARCODE	= **PE600437**
CONTAINER_BARCODE	= **PE900117**
NAME	= **Minerva 2 Drillbyte Formation Evaluation Log,** 1:500
BASIN	= **OTWAY**
PERMIT	= VIC/P31
TYPE	= **WELL**
SUBTYPE	= **WELL-LOG**
DESCRIPTION	= **Minerva 2 Drillbyte Formation Evaluation Log,** 1:500, **Appendix 8**
REMARKS	=
DATE-CREATED	= 20/09/93
DATE-RECEIVED	= *
W_NO	= W1086
WELL-NAME	= **MINERVA 2 & 2A**
CONTRACTOR	= **Baker Hughes**
CLIENT_OP_CO	= **BHP**

(Inserted by DNRE - Vic **Govt Mines Dept)**

6.8 APPENDIX 8 MWD End of Well Report

BHP PETROLEUM
MINERVA-2A
VICTORIA - OTWAY BASIN
SEPTEMBER - OCTOBER 1993

END OF WELL REPORT

EASTMAN TELECO

FIELD SERVICE ENGINEERS

A. FELL

M. SALE

DISCLAIMER

Eastman Teleco does not guarantee the accuracy or correctness of interpretations provided in or from this report. Since all interpretations are opinions based on measurements Eastman Teleco shall, under no circumstances, be responsible for consequential damages or any other loss, costs, damages or expenses incurred or expressed and implied warranties related to its service which is governed by Eastman Teleco's terms and conditions.

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Section 1

INTRODUCTION

1. INTRODUCTION

Eastman Teleco's Dual Propagation Resistivity Measurement While Drilling services were utilized onboard the BYFORD DOLPHIN for the drilling of BHP Petroleum's MINERVA-2A well in the VIC/P31 Permit, offshore Victoria.

MINERVA-2A was spudded on September 19th, 1993 and Eastman Teleco's MWD services were utilized on the well from October 3rd from a depth of 1538m.

The 12 1/4" hole section was drilled from 1538m to 2170m.

Eastman Teleco services were completed on October 11th, 1993. Eastman Teleco depths were measured in meters below the Drill Floor and were based on the drillers pipe tally.

Section 2

GENERAL WELL INFORMATION

2. GENERAL WELL INFORMATION

Oil Company	: BHP PETROLEUM
Oil Company Personnel	: G. HOWARD
Well Name	: MINERVA-2A
Well Type	: EXPLORATION
Well Permit	: VIC/P31
Area	: OTWAY BASIN
D.F. Elevation	: 25.0 m
Water Depth	: 85.0 m
Spud Date	: 21st SEPTEMBER 1993
Teleco Commencement Date	: 3rd OCTOBER 1993
Teleco Completion Date	: 11th OCTOBER 1993
Completion Depth	: 2170 m
Drilling Contractor	: DOLPHIN DRILLING
Rig Name	: BYFORD DOLPHIN
Rig Type	: SEMI-SUBMERSIBLE
Teleco Services	: DPR
Teleco Job Number	: ETAU 248
Teleco Personnel	: A. FELL M. SALE

Section 3

TOOL SUMMARY

3. MWD TOOL SUMMARY

2 tools was used over 5 runs to drill from 1538m to 2170 m.

Run #	Tool Size	Serial No	Tool Type	DPR Hours	Drilled Interval	Failure Type
1	8 1/4"	8442-01	DPR	27.00	1538.0 - 1728.0	505
2	8 1/4"	2261-02	DPR	13.00	1733.0 - 1838.0	-
3	8 1/4"	2261-02	DPR	1.75	1855.5 - 1855.5	-
4	8 1/4"	2261-02	DPR	5.00	1882.5 - 1915.0	-
5	8 1/4"	2261-02	DPR	5.00	1969.0 - 2170.0	906

Interval Drilled: 1538 - 2170m - 632m
Interval Logged: Gamma Ray - 73%
Resistivity - 73%

Failure Statistics

Total DPR hours	51.75
DPR failures	1.0
Mean Time Between Failures	51.75

Section 4

MWD RUN SUMMARIES

RUN SUMMARY
No.1

Hole Size:	12 1/4"
Tool Type & No:	DPR TF4 B8442-01
Time & Date in the Hole:	17:00 hrs 3rd October 1993
Time & Date out of Hole:	07:00 hrs 5th October 1993
Depth Range:	1538m - 1728m
Circulating Hours for Run:	27.00
Operating Hours for Run:	27.00

Comments.

The Teleco tool was run in a packed assembly with a SMITH M1-S-C bit. The assembly consisted of bit, junk sub, near bit roller reamer, X/O, a 12 3/16" sleeve stabiliser on the MWD tool, drill collar and string roller reamer.

From the start of drilling new hole at 1538m, high and erratic torque was seen, causing some problens with decoding. The top drive was frequently stalled out and only very slow progress was made until the RPM was increased, 90 to 180 from 1578m. The torque then became far less erratic and allowed normal decoding of the pulse at the surface.

After a connection at 1668m the pump pressure started increasing and went from 2600 to 2800 psi. It also became erratic (see trace on Exlog pressure readout). The resistivity readings started to become erratic with one set of resisitivity being decoded correctly then the next set being very low.

Drilling torque was constant at 250 - 380 amps with ROP averaging 18 m/hr through a predominantly claystone lithology.

At 1722m the ROP increased from 18 to 60 m/hr. The gamma ray decreased from 80 - 110 to 30 - 50 API whilst the phase and amplitude went from 2 and 3 to 15 and 45 ohm-m respectively. Returns were circulated and the decission was made to pull out of the hole to cut Core #1.

This section of hole was drilled from 1538m to 1728m with inclination building from 2.2 degrees to 3.2 degrees at 1687m. The azimuth fluctuated between 37.6 and 62.9 degrees over the same interval.

Drilling parameters throughout the run were:-WOB 15 to 25 klbs, RPM 60 to 180 , Flow rates of 750 to 770 gpm giving a Pump Pressure of 2550 t 2900 Psi. Rates of penetration ranged from 1 to 25 m/hr.

RUN SUMMARY
No.2

Hole Size:	12 1/4"
Tool Type & No:	DPR / DHB 2261-02
Time & Date in the Hole:	21:00 hrs 6th October 1993
Time & Date out of Hole:	18:00 hrs 7th October 1993
Depth Range:	1733.5 - 1839m
Circulating Hours for Run:	13.00
Operating Hours for Run:	13.00

Comments.

The Teleco tool was run in a packed assembly with a HTC ATM11 bit. The assembly consisted of bit, near bit roller reamer, pony drill collar, string roller reamer, X/O and MWD tool with a 12 1/8" sleeve stabiliser. A string roller reamer was placed on top of the MWD tool and a third one placed two drill collars above that.

At 1826m the ROP increased from 25 to 45 m/hr. The gamma ray decreased from 80 - 110 to 30 - 40 API whilst the phase and amplitude went from 2.5 - 3 to 40 - 60 ohm-m. Returns were circulated and the decission was made to pull out of the hole to cut Core #2.

This section of hole was drilled from 1733.5m to 1839m with inclination building from 3.3 degrees to 3.9 degrees at 1806m. The azimuth turned from 83.3 to 94.2 degrees over the same interval.

Drilling parameters throughout the run were: WOB 30 to 50 klbs, RPM 140 - 150, Flow rates of 765 to 770 gpm giving a Pump Pressure of 2500 to 3000 Psi. Rate of penetration ranged from 15 to 45 m/hr.

RUN SUMMARY

No.3

Hole Size:	12 1/4"
Tool Type & No:	DPR / DHB 2261-02
Time & Date in the Hole:	08:30 hrs 8th October 1993
Time & Date out of Hole:	15:30 hrs 8th October 1993
Depth Range:	1855.5 - 1855.5m
Circulating Hours for Run:	1.75
Operating Hours for Run:	1.75

Comments.

The Teleco tool was run in a packed assembly with a HTC JD8 bit. The assembly consisted of bit, near bit roller reamer, pony drill collar, string roller reamer, X/O and MWD tool with a 12 1/8" sleeve stabiliser. A string roller reamer was placed on top of the MWD tool and a third one placed two drill collars above that.

This run was to establish a gauge hole so that coring could continue. No problems were encountered reaming to bottom.

RUN SUMMARY

No.4

Hole Size:	12 1/4"
Tool Type & No:	DPR / DHB 2261-02
Time & Date in the Hole:	06:15 hrs 9th October 1993
Time & Date out of Hole:	19:15 hrs 9th October 1993
Depth Range:	1882.5 - 1915.0m
Circulating Hours for Run:	5.00
Operating Hours for Run:	5.00

Comments.

The Teleco tool was run in a packed assembly with a SMITH M2-S-D bit. The assembly consisted of bit, near bit roller reamer, pony drill collar, string roller reamer, X/O and MWD tool with a 12 1/8" sleeve stabiliser.

This short bit run was performed to allow the last 54m of reservoir to be cored in two 27m core runs.

This section of hole was drilled from 1882.5m to 1915m with inclination 3.9 degrees and azimuth 99.8 degrees at 1901m.

Drilling parameters throughout the run were: WOB 30 to 40 klbs, RPM 120 - 130, a Flow rate of 755 gpm giving a Pump Pressure of 2800 to 3050 Psi. Rate of penetration ranged from 8 to 25 m/hr.

RUN SUMMARY

No.5

Hole Size:	12 1/4"
Tool Type & No:	DPR / DHB 2261-02
Time & Date in the Hole:	00:00 hrs 11th October 1993
Time & Date out of Hole:	23:30 hrs 11th October 1993
Depth Range:	1969.0 - 2170.0m
Circulating Hours for Run:	16.00
Operating Hours for Run:	5.00

Comments.

The Teleco tool was run in a packed assembly with a DBS TD19A bit. The assembly consisted of bit, near bit roller reamer, pony drill collar, string roller reamer, X/O and MWD tool with a 12 1/8" sleeve stabiliser.

The cored section was reamed to obtain MWD data. The gas/water contact was clearly picked up on the resistivity. New hole was drilled from 1969m. Very high, erratic torque (100-800 amps) was recorded throughout most of the run. The resistivity and gamma ray started to become erratic from 1995m with no usable log obtained from this depth.

This section of hole was drilled from 1970.0m to 2170m with inclination of 3.7 degrees and azimuth 102.7 degrees.

Drilling parameters throughout the run were:- WOB 10 to 30 klbs, RPM 90 - 150, a Flow rate of 820 gpm giving a Pump Pressure of 2700 to 2900 Psi. Rate of penetration ranged from 1 to 40 m/hr.

Section 5

MWD TOOL PERFORMANCE REPORT

PERFORMANCE REPORT NO.1

TOOL DHB 8442-01

Equipment Description:	8 1/4" DPR
	Serial No. B8442-01 TF4 X4 Split Phase
Teleco Run No.:	1
Total Circulating Hours:	27.0
Non Operating Hours:	
Resistivity:	00.00
Gamma Ray:	00.00
Directional:	00.00
Interval Drilled:	1538m - 1728m

Operational Problems

The tool performed to specification until 1668m, where the reisitivity data sent to surface (MWD) became erratic in nature. However, sufficient was transmitted to allow a log to be produced until the TD for this run at 1728m. The memory data downloaded from the tool when on surface was to specification and an RWD log was produced, giving excellent definition due to a 5 second update. The tool subsequently failed a post run calibration/verification test and was not re-run.

PERFORMANCE REPORT NO.2

TOOL DHB 2261-02

Equipment Description:	8 1/4" DPR Serial No. B2261-02 TF4 X4 Split Phase
Teleco Run No.:	2
Total Circulating Hours:	13.00
Non Operating Hours:	
Resistivity:	00.00
Gamma Ray:	00.00
Directional:	00.00
Interval Drilled:	1733.5m - 1839m

Operational Problems

The tool performed to specification throughout the run.

PERFORMANCE REPORT NO.3

TOOL DHB 2262-02

Equipment Description:	8 1/4" DPR
	Serial No. B2262-02 TF4 X4 Split Phase
Teleco Run No.:	3
Total Circulating Hours:	1.75
Non Operating Hours:	
Resistivity:	00.00
Gamma Ray:	00.00
Directional:	00.00
Interval Drilled:	1855.5 - 1855.5m

Operational Problems

The tool performed to specification throughout the run.

PERFORMANCE REPORT NO.4

TOOL DHB 2262-02

Equipment Description:	8 1/4" DPR
	Serial No. B2262-02 TF4 X4 Split Phase
Teleco Run No.:	4
Total Circulating Hours:	5.00
Non Operating Hours:	
Resistivity:	00.00
Gamma Ray:	00.00
Directional:	00.00
Interval Drilled:	1882.5 - 1915.0m

Operational Problems

The tool performed to specification throughout the run.

PERFORMANCE REPORT NO.5

TOOL DHB 2262-02

Equipment Description:	8 1/4" DPR
	Serial No. B2262-02 TF4 X4 Split Phase
Teleco Run No.:	5
Total Circulating Hours:	16.00
Non Operating Hours:	
Resistivity:	5.00
Gamma Ray:	5.00
Directional:	16.00
Interval Drilled:	1969.0 - 2170.0m

Operational Problems

Very high erratic torque (100-800 amps) was recorded throughout most of the run. The resistivity and gamma ray started to become erratic from 1995m with no usable log obtained from this depth.

Section 6

SENSOR VERIFICATION DATA

6.1 FORMATION EVALUATION SENSOR VERIFICATION DATA

Teleco Run No:	Pre 1	Pre 2	Pre 3	Pre 4	Pre 5
DPR Sub No:	8812	8876	8876	8876	8876
PDBV deg:	9.166	9.217	9.217	9.217	9.217
PDOV deg:	9.690	8.946	9.082	8.311	8.483
PDCV +/- deg:	0.520	0.177	0.134	0.906	0.734
ATBV dB:	6.634	5.658	5.658	5.658	5.568
ATOV dB:	7.660	5.853	6.043	5.895	6.017
ATCV +/- dB:	-0.780	-0.193	-0.385	-0.219	-0.359
STEEL m:	1.5	1.5	1.5	1.5	1.5
TCDV deg C:	12.8	19.3	20.1	40.7	12.8
GR Detector No:	443-1	350-1	350-1	350-1	443-1
Background cps:	4.4	3.1	4.3	4.3	4.4

6.2 VERIFICATION MNEMONICS

MNEMONIC		EXPLANATION
PDBV	=	Phase Difference - Shop air-hang calibration temperature corrected for rig verification temperature.
PDOV	=	Phase Difference - Wellsite air-hang verification.
PDCV	=	Phase Difference - Variance.
ATBV	=	Attenuation - Shop air-hang calibration temperature corrected for rig verification temperature.
ATOV	=	Attenuation - Wellsite air-hang verification.
ATCV	=	Attenuation - Variance.
STEEL	=	Distance to nearest steel during wellsite air-hang.
TCDV	=	Teleco Tool Temperature during air-hang verification.

Section 7

SENSOR OFFSETS
and
ENVIRONMENTAL CORRECTIIONS

7.1 SENSOR TO BIT DISTANCE (M)

Teleco Run No	1	2	3	4	5
Resistivity	4.88	8.74	8.75	8.74	8.75
Gamma Ray	6.26	10.10	10.10	10.10	10.10
Directional	8.93	12.74	12.75	12.74	12.75

7.2 LOG ENVIRONMENTAL CORRECTIONS:

Gamma Ray: Normalised for Tool Size, Borehole Size, Sensor Type and mud Potassium

Resistivity: Normalised for Tool Size, Borehole Size, Mud Resistivity, Temperature. No correction has been applied for formation dielectric properties.

7.3 LOG CORRECTIONS

Date	Time	Depth m	Chloride ppm	Resist.(Rm) ohm.m / deg C	KCL %	M.W. sg
04-10-93	08:30	1571	37000	0.0752 / 46	5.70	1.16
04-10-93	14:22	1622	45000	0.0604 / 50	7.71	1.16
04-10-93	20:50	1715	43000	0.0594 / 54	7.00	1.16
07-10-93	02:40	1742	45000	0.0639 / 46	7.50	1.17
07-10-93	04:40	1756	45000	0.0621 / 48	7.50	1.17
07-10-93	02:40	1759	45000	0.0596 / 50	7.50	1.17
07-10-93	02:40	1800	45000	0.0573 / 52	7.50	1.17
09-10-93	13:51	1906	45000	0.0613 / 52	7.50	1.17
11-10-93	08:30	2017	45000	0.0558 / 56	7.50	1.17
11-10-93	10:40	2066	45000	0.0538 / 59	7.50	1.17

Section 8

LOG MNEMONICS

8. TELECO FORMATION EVALUATION LOG INFORMATION

8.1 LOG MNEMONICS

GRAM = Natural Gamma Ray [RWD] (MWD-API)
GRAX = Natural Gamma Ray [MWD] (MWD-API)
TCDM = MWD Tool Temperature [RWD] (Deg C)
TCDX = MWD Tool Temperature [MWD] (Deg C)
RPCX = Resistivity Phase Difference, Corrected [MWD] (Ohmm)
RACX = Resistivity Amplitude Ratio, Corrected [MWD] (Ohmm)
RPCM = Resistivity Phase Difference, Corrected [RWD] (Ohmm)
RACM = Resistivity Amplitude Ratio, Corrected [RWD] (Ohmm)
RPDM = Resistivity Phase Difference, Dielectric Corrected [MWD]
RADM = Resistivity Amplitude Ratio, Dielectric Corrected [RWD]
PDEM = Phase Difference, Elapsed Time Since Drilled [RWD] (Min)
PDDM = Phase Difference, Data Density Integrated.
WBCS = Surface Weight On Bit (1000 Lbs)
ROPS = Rate of Penetration (m/hr)
RPMS = Surface Revolutions Per Minute.

8.2 SUB ASSEMBLY MNEMONICS:

DPR = Dual Propagation Resistivity Sub
DIR = Directional MWD Collar

Section 9

MWD SURVEY LISTING

DIRECTIONAL SURVEYS

Company	BHP PETROLEUM
Well	MINERVA-2A
Field	OTWAY BASIN
County	VIC/P31
State	VICTORIA
Country	AUSTRALIA

Well Location : Latitude Longitude
LAT 38° 43′ 04.535" South
LONG 142° 57′ 20.800" East

Drilling Company : DOLPHIN Rig : BYFORD

Permanent Depth Datum : M.S.L.T. Elev. : 85.0m
Surveys meas. from : R.T., located 25.0m above Perm. Datum.

Spud Date .... 21-09-93 Prop. Azimuth ..... N.A.
MWD Started ... 1533.0m Total Depth 2170.0m
MWD Ended ..... 2170.0m Teleco Job ID .. ETAU 248

Coord. Grid System :
Grid Origin : Grid Corr. : 0
Magnetic Decl. Corr. : 10.83° E Grid Decl. Corr. : 0

Minimum Curvature Method used for Survey Calculations.
Vertical Well : Closure calculated at each survey station.
Initial Tie-in to SEABED.

Company Personnel ..... G. HOWARD, G. BLUNT

Directional Company ...
Directional Driller ...
Teleco Personnel ..... A. FELL, M. SALE

Remarks :

TELECO DIRECTIONAL SURVEY LISTING

Company..... BHP PETROLEUM
Well..... MINERVA-2A
Survey Calc. Method..... Minimum Curvature
Vert. Sect. Calc. Method..... Vertical well: Closure calculated at each survey station.
Proposed Azimuth..... N.A.

Teleco Job ID.: ETAU 248
Grid Correction: 0
Mag. Decl. Corr.: 10.83° E
Grid Decl. Corr.: 0

DEPTH meters	CRS LEN meters	INCLINATION degrees	AZIMUTH degrees	T.V.D. meters	CLOSURE meters	NORTH/SOUTH meters	EAST/WEST meters	DOGLEG SEV deg/30m
			INITIAL TIE-IN COORDINATES					
110.0		0.000	0.000	110.00	0.00	0.00	0.00	
1539.0	1429.0	2.200	37.600	1538.65	27.43	21.73	16.74	0.046
1571.0	32.0	2.300	43.900	1570.62	28.68	22.68	17.56	0.250
1599.0	28.0	2.500	46.800	1598.60	29.85	23.51	18.39	0.251
1687.0	88.0	3.200	62.900	1686.49	34.00	25.94	21.98	0.360
1748.0	61.0	3.300	83.300	1747.40	36.90	26.92	25.24	0.568
1776.5	28.5	3.700	90.400	1775.84	38.17	27.01	26.97	0.620
1806.0	29.5	3.900	94.200	1805.28	39.52	26.93	28.92	0.327
1901.0	95.0	3.900	99.800	1900.06	43.95	26.14	35.33	0.120
1977.5	76.5	3.800	102.700	1976.39	47.56	25.14	40.37	0.086
2036.0	58.5	3.600	102.700	2034.76	50.31	24.31	44.05	0.103
2154.0	118.0	3.700	112.900	2152.53	55.71	22.02	51.17	0.167
			PROJECTED BOTTOM-HOLE LOCATION					
			(Extrapolated from last two survey stations)					
2170.0	16.0	3.714	114.283	2168.49	56.42	21.60	52.12	

CLOSURE AZIMUTH = 67.487

TELECO

Section 10

BOTTOM HOLE ASSEMBLY RECORDS

MWD Run #1

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.30	SMITH M1-S-C
JUNK SUB	9 1/2	2 13/16	1.15	
N.B ROLLER REAMER	12 1/4	2 1/4	2.44	
X / O	8 1/4	2 3/4	0.47	TSI 159
TELECO MWD	8 1/4	-	12.22	B8442-01 DPR
DC	7 7/8	2 7/8	9.20	
ROLLER REAMER	12 1/4	2 13/16	2.33	
DC	7 3/4	2 7/8	8.98	
DC	7 7/8	3	9.19	
DC	8	2 13/16	9.37	
DC	7 3/4	2 7/8	9.10	
DC	8	2 7/8	9.37	
DC	8	2 7/8	9.38	
DC	7 3/4	2 7/8	9.16	
DC	8	2 15/16	9.04	
DC	7 7/8	2 13/16	9.21	
DC	7 3/4	2 13/16	8.93	
DC	7 7/8	3	9.03	
DC	7 7/8	2 15/16	8.99	
DC	7 7/8	2 7/8	9.39	
DC	8	3	9.13	
DC	8	2 7/8	9.37	
JARS	8	2 7/8	5.78	
PONY DC	8	2 15/16	3.07	
DC	8	2 7/8	9.14	
DC	7 13/16	2 7/8	9.34	
X/O	7 5/8	2 7/8	1.52	
9 X HWDP	5	3	80.13	
TOTAL BHA			274.73	

BIT RUN #4 SMITH M1-S-C, 12 1/4" 16,16,18 JETS.
DRILLED FROM 1538m TO 1728m. BIT GRADED 1-1-NO-A-E-1-NO-CP.

TELECO MWD DHB 8442-01 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".
TELECO MWD TOOL HAD A 12 3/16" SLEEVE STABILISER, SN 13356.

MWD Run #2

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.29	SMITH ATM 11H
N.B R/R	12 1/4	2 1/4	2.46	
PONY DC	8	2 3/4	2.62	
STRING R/R	12 1/4		2.33	
X / O	8 1/4	2 3/4	0.47	TSI 159
TELECO MWD	8 1/4	-	12.21	B2261-02 DPR
STRING R/R	12 1/4	2 3/4	2.33	
DC	7 7/8	2 7/8	9.20	
DC	7 3/4	2 7/8	8.98	
STRING R/R	12 1/4	2 13/16	2.36	
DC	7 7/8	3	9.19	
DC	8	2 13/16	9.37	
DC	7 3/4	2 7/8	9.10	
DC	8	2 7/8	9.37	
DC	8	2 7/8	9.38	
DC	7 3/4	2 7/8	9.16	
DC	8	2 15/16	9.04	
DC	7 7/8	2 13/16	9.21	
DC	7 3/4	2 13/16	8.93	
DC	7 7/8	3	9.03	
DC	7 7/8	2 15/16	8.99	
DC	7 7/8	2 7/8	9.39	
DC	8	3	9.13	
DC	8	2 7/8	9.37	
JARS	8	2 7/8	5.78	
PONY DC	8	2 15/16	3.07	
DC	8	2 7/8	9.14	
DC	7 13/16	2 7/8	9.34	
X/O	7 5/8	2 7/8	1.52	
9 X HWDP	5	3	80.13	
TOTAL BHA			280.89	

BIT RUN #8 SMITH ATM 11 HG, 12 1/4" 16,16,18 JETS.
DRILLED FROM 1733.5m TO 1839m. BIT GRADED 2-2-NO-A-8-I-NO-CP.

TELECO MWD DHB 2261-02 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".
TELECO MWD TOOL HAD A 12 1/4" SLEEVE STABILISER, SN 8534.

MWD Run #3

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.29	HTC JD8
N.B R/R	12 1/4	2 1/4	2.46	
PONY DC	8	2 3/4	2.62	
STRING R/R	12 1/4		2.33	
X / O	8 1/4	2 3/4	0.47	TSI 159
TELECO MWD	8 1/4	-	12.21	B2261-02 DPR
STRING R/R	12 1/4	2 3/4	2.33	
DC	7 7/8	2 7/8	9.20	
DC	7 3/4	2 7/8	8.98	
STRING R/R	12 1/4	2 13/16	2.36	
DC	7 7/8	3	9.19	
DC	8	2 13/16	9.37	
DC	7 3/4	2 7/8	9.10	
DC	8	2 7/8	9.37	
DC	8	2 7/8	9.38	
DC	7 3/4	2 7/8	9.16	
DC	8	2 15/16	9.04	
DC	7 7/8	2 13/16	9.21	
DC	7 3/4	2 13/16	8.93	
DC	7 7/8	3	9.03	
DC	7 7/8	2 15/16	8.99	
DC	7 7/8	2 7/8	9.39	
DC	8	3	9.13	
DC	8	2 7/8	9.37	
JARS	8	2 7/8	5.78	
PONY DC	8	2 15/16	3.07	
DC	8	2 7/8	9.14	
DC	7 13/16	2 7/8	9.34	
X/O	7 5/8	2 7/8	1.52	
9 X HWDP	5	3	80.13	
TOTAL BHA			280.89	

BIT RUN #10, HTC JD8, 12 1/4" 16,16,18 JETS.
REAMED FROM 1830.0m TO 1855.5m. BIT GRADED 0-0-NO-A-E-1-NO-CP.

TELECO MWD DHB 2261-02 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".
TELECO MWD TOOL HAD A 12 1/4" SLEEVE STABILISER, SN 8534.

MWD Run #4

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.28	SMITH M2-S-D
N.B R/R	12 1/4	2 1/4	2.46	
PONY DC	8	2 3/4	2.62	
STRING R/R	12 1/4		2.33	
X / O	8 1/4	2 3/4	0.47	TSI 159
TELECO MWD	8 1/4	-	12.21	B2261-02 DPR
STRING R/R	12 1/4	2 3/4	2.33	
DC	7 7/8	2 7/8	9.20	
DC	7 3/4	2 7/8	8.98	
STRING R/R	12 1/4	2 13/16	2.36	
DC	7 7/8	3	9.19	
DC	8	2 13/16	9.37	
DC	7 3/4	2 7/8	9.10	
DC	8	2 7/8	9.37	
DC	8	2 7/8	9.38	
DC	7 3/4	2 7/8	9.16	
DC	8	2 15/16	9.04	
DC	7 7/8	2 13/16	9.21	
DC	7 3/4	2 13/16	8.93	
DC	7 7/8	3	9.03	
DC	7 7/8	2 15/16	8.99	
DC	7 7/8	2 7/8	9.39	
DC	8	3	9.13	
DC	8	2 7/8	9.37	
JARS	8	2 7/8	5.78	
PONY DC	8	2 15/16	3.07	
DC	8	2 7/8	9.14	
DC	7 13/16	2 7/8	9.34	
X/O	7 5/8	2 7/8	1.52	
9 X HWDP	5	3	80.13	
TOTAL BHA			280.89	

BIT RUN #12 SMITH M2-S-D, 12 1/4" 16,16,18 JETS.
DRILLED FROM 1882.5m TO 1915m. BIT GRADED 1-1-WT-A-E-I-NO-CP.

TELECO MWD DHB 2261-02 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".
TELECO MWD TOOL HAD A 12 1/4" SLEEVE STABILISER, SN 8534.

MWD Run #5

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.54	DBS TD19M
N.B R/R	12 1/4	2 1/4	2.46	
PONY DC	8	2 3/4	2.62	
STRING R/R	12 1/4		2.33	
X / O	8 1/4	2 3/4	0.47	TSI 159
TELECO MWD	8 1/4	-	12.21	B2261-02 DPR
STRING R/R	12 1/4	2 3/4	2.33	
DC	7 7/8	2 7/8	9.20	
DC	7 3/4	2 7/8	8.98	
STRING R/R	12 1/4	2 13/16	2.36	
DC	7 7/8	3	9.19	
DC	8	2 13/16	9.37	
DC	7 3/4	2 7/8	9.10	
DC	8	2 7/8	9.37	
DC	8	2 7/8	9.38	
DC	7 3/4	2 7/8	9.16	
DC	8	2 15/16	9.04	
DC	7 7/8	2 13/16	9.21	
DC	7 3/4	2 13/16	8.93	
DC	7 7/8	3	9.03	
DC	7 7/8	2 15/16	8.99	
DC	7 7/8	2 7/8	9.39	
DC	8	3	9.13	
DC	8	2 7/8	9.37	
JARS	8	2 7/8	5.78	
PONY DC	8	2 15/16	3.07	
DC	8	2 7/8	9.14	
DC	7 13/16	2 7/8	9.34	
X/O	7 5/8	2 7/8	1.52	
9 X HWDP	5	3	80.13	
TOTAL BHA			281.14	

BIT RUN #15 DBS TD19M, 12 1/4" 14,14,14,14,14,13 JETS.
DRILLED FROM 1969m TO 2170m. BIT GRADED 8-2-FC-A-2-1-CT-TD.

TELECO MWD DHB 2261-02 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".
TELECO MWD TOOL HAD A 12 1/4" SLEEVE STABILISER, SN 8534.

Section 11

DRILLING DIARY

DRILLING DIARY

Date	Time	Operation
		Teleco Run #1
03-10-93	16:15	P/up & l/out 9 1/2" DC's, p/up & m/up bit, junk sub & MWD.
	16:45	Zero MWD memory & run surface test. OK. Cont to p/up new 12 1/4" BHA & RIH. P/up DP on RIH.
	22:00	Tag TOC @ 1498m. fill pipe & drill float @ 1501m. Pump 100 bbls hi-vis mud & displace hole w/ mud whilst drilling shoe @ 1526m.
04-10-93	00:00	Cont to displace hole to mud & clean out rat hole to 1538m. No cmt below shoe.
	00:45	Work junk sub & drill 12 1/4" hole f/ 1538 - 1541m.
	01:45	Circ hole clean.
	02:15	Pull back inside shoe & perform LOT. EMW = 1.75sg.
	03:30	Drill 12 1/4" hole f/ 1541 - 1554m.
	05:30	Pull back inside shoe & attempt to work suspected junk above BHA.
	06:15	Cont drill 12 1/4" hole f/ 1554 - 1598m. FlC & survey each connx.
	12:00	Cont drill 12 1/4" hole f/ 1598 - 1728m. FLC @ 1622 & 1722m after drilling breaks. FLC each connx & survey each 3rd connx.
	22:15	CBU sample for geology. Max gas 4%
05-10-93	00:00	Cont circ sample for geology.
	00:15	Work junk basket.
	00:30	FLC, pump slug & POOH to 1612m. 50 Klbs drag. Max o/pull 100 Klbs. Hole fill 4 bbls light. Pump out f/ 1612 to shoe. FLC ok. RIH to 1728m.
	02:15	CBU. max gas 6.8%.
	03:45	POOH to shoe. 20 Klbs drag. Hole fill +1.5 bbls. FlC 15 mins. Pump slug & POOH. Dump memory on MWD.
	07:45	Service TDS.
	08:15	R/up, p/up, m/up core bbl. P/up BHA & RIH.
	12:00	Cont RIH. Fill pipe @ shoe.
	14:00	Wash/ream f/ 1700 - 1712m. Ream undergauge hole 1712 - 1728m. Excessive torque @ 1728m.
	17:30	Pump slug & POOH. FLC 10 stds off btm. B/out core bbl, bit & rack bbl in derrick.
	21:30	M/up 12 1/4" bit, junk sub, BHA & RIH.
06-10-93	00:00	Cont RIH. Fill pipe @ shoe & @ btm.
	01:15	Tag @ 1716m. P/up to 1702m & wash/ream to btm @ 1728m.
	01:30	Drill new 12 1/4" hole f/ 1728 - 1728.5m.
	01:45	Work junk sub on btm & CBU.
	03:00	Pull back to shoe, FLC, pump slug & POOH. FLC @ BOP, l/out roller reamer.
	06:15	R/up & m/up core bbl, BHA & RIH.
	10:00	Wash/ream f/1193 to btm.
	10:30	CBU.
	11:30	Rack back std, p/up 6m pup jt.
	12:00	Circ & est parameters for coring.

Date	Time	Operation
	12:15	Cut Core#1 f/ 1728.5 - 1733.5m.
	12:45	Press drop, suspect wash. POOH w/ FLC's.
	16:15	Brk out core bbl & l/out core.
	17:15	P/up new cor bbl. Brk bit @ rack core bbl in derrick.
		Teleco Run #2
	18:30	P/up MWD. Brk dwn & l/out. M/up new MWD. Load memory.
	20:30	M/up bit, BHA & RIH. Install diverter bag. Test MWD.
07-10-93	00:00	Cont RIH. Fill pipe @ shoe.
	01:15	Fill pipe @ 1704m & wash/ream & MWD log to 1733.5m.
	02:00	Drill new 12 1/4" hole f/ 1733.5 - 1751m. Brk in Bit #6.
	03:30	Change out swivel packing. Circ pipe thru cmt hose.
	04:00	Cont drilling f/ 1751 - 1823.5m.
	09:30	FLC hole @ 1823.5m after drill break.
	09:45	Circ sample for geology.
	10:30	Cont to drill f/ 1823.5 - 1828.5m. FLC after drill break x5 mins. Cont to drill f/ 1828.5 - 1830m. FLC x 5 mins - ok.
	11:15	Circ sample for geology.
	12:15	Drill 1830 - 1838m. FLC drill break. Drill 1838 - 1839m. FLC.
	12:45	CBU @ 1839m. FLC.
	14:30	Pump slug, POOH w/ FLC's.
	18:00	M/up core bbl, BHA & RIH to 1496m.
	20:30	Brk circ. Est circ rate. 60 spm, 300 psi.
	20:45	Service TDS.
	21:45	RIH to 1818m.
	22:15	Wash/ream f/ 1818 - 1839m.
	23:00	CBU. Max gas 0.72%.
08-10-93	00:00	Cut Core#3 f/ 1839 - 1855.5m. Stopped drilling due to high torque. Pulled off btm w/ 35 Klbs o/pull.
	01:15	POOH, pump slug @ shoe. FLC @ shoe & BOP's.
	05:00	Retrieve inner bbl & l/out same. Rotate top & btm stabs on core bbl & rack back.
		Teleco Run #3
	08:00	P/up drilling BHA, calibrate MWD & RIH. Fill pipe @ shoe & RIH to 1830m. Hole good.
	11:00	Wash/ream & log w/ MWD f/ 1830 - 1855.5m. Took no weight.
	11:45	CBU. Work pipe.
	12:00	Cont CBU. Max gas 7.73%.
	12:45	Pump slug, FLC. POOH. FLC @ shoe & BOP's.
	15:45	M/up core bbl & RIH. P/up 12 jts DP.
	18:45	M/up TDS @ shoe & fill pipe.
	19:00	RIH to 1819m.
	19:45	Was/ream f/ 1819 - 1855.5m.
	20:00	CBU. Max gas 0.25%.
	21:00	Space out for core bbl & drop ball.
	21:15	Cut Core#3 f/ 1855.5 - 1882.5m.
	22:15	FLC. POOH to shoe. Pump slug. FLC. POOH.

Date	Time	Operation
09-10-93	00:00	Cont to POOH. FLC @ BOP's.
	02:15	Retrieve inner bbl & core & m/up new inner bbl into core bbl & rack back.
		Teleco Run #4
	05:15	M/up 12 1/4" drilling BHA, re-shim string roller reamer. RIH to shoe. P/up 12 jts DP.
	09:15	Fill pipe @ shoe & service TDS.
	09:45	Cont RIH to 1882m.
	10:45	Fill pipe & wash/ream & MWD log f/ 1832 - 1882m.
	13:15	Drill 12 1/4" hole f/ 1882 - 1903m.
	13:30	Unable to brk TDS. Work on hyd pump.
	14:30	CBU.
	15:15	FLC, pump slug, POOH. FLC @ shoe & @ 1443m. Download memory on MWD.
	19:30	P/up core bbl - string spacing incorrect - brk out & machine.
	22:00	M/up bit, core bbl & BHA & RIH.
10-10-93	00:00	Cont RIH. Fill pipe @ shoe.
	02:00	Fill pipe & wash/ream f/ 1885 - 1815 TD.
	02:30	CBU.
	03:30	Drop ball, p/up pipe f/ spaceout. Cut core f/ 1915 - 1945m.
	04:30	POOH to shoe. Pump slug. FLC @ BOP's.
	08:30	Retrieve inner bbl & core. M/up new inner into core bbl.
	12:00	RIH w/ core bbl for Core #5.
	13:15	M/up TDS. Service same.
	13:45	RIH to 1905m.
	14:15	Wash/ream 1905 - 1943m. Took wt f/ 1930 - 1945m.
	15:15	CBU. Max gas 6.67%.
	16:15	Space out & drop ball.
	16:30	Cut Core#5 1943 - 1969m.
	18:00	FlC, pump slug & POOH. FLC.
	21:30	Brk out & l/out core inner bbls & bit.
		Teleco Run #5
	23:45	M/up PDC bit.
11-10-93	00:00	M/up BHA & RIH. Brk circ @ shoe.
	03:00	Wash/ream & MWD log f/ 1896 - 1969m.
	06:00	Drill new 12 1/4" hole f/ 1969 - 1990m.
	07:15	Rack back std, hook up circ hose & circ hole through line whilst changing swivel packing. M/up std & ream to btm for connx.
	08:00	Cont to drill 12 1/4" hole f/ 1990 - 2170m. Survey @ 2154m.
	18:00	Short trip to 1969m. 25 Klbs o/pull.
	18:45	CBU.
	19:45	FLC. Pump slug & POOH to log. FLC @ csg shoe & BHA below BOP's. Down load memory on MWD tool. Brk out & l/dwn MWD & roller reamer.

SECTION 12

MUD RECORD

MUD REPORTS

TELECO RUN #	1	1	1	1	1	1
HOLE SIZE ins	12.25	12.25	12.25	12.25	12.25	12.25
DATE	06-10	06-10	06-10	06-10	07-10	07-10
TIME	08:00	12:00	23:45	23:30	16:30	23:45
DEPTH m	1567	1597	1701	1728	1728	1728
WEIGHT sg	1.16	1.16	1.16	1.17	1.17	1.17
VISCOSITY sec	43	41	43	44	43	42
PV cp	13	13	14	16	12	12
YP lb/100 sq ft	22	20	24	23	21	20
GELS 10s/10min	5/10	5/9	6/12	7/12	4/7	4/9
FILTRATE cc/30 min	5.8	6.2	5.3	5.4	5.8	5.8
HTHP FILTRATE cc/30 min	-	-	-	-	-	-
CAKE 32nd	1.0	1.0	1.0	1.0	1.0	1.0
SOLIDS % by vol	9.0	9.0	9.0	9.8	9.8	9.8
WATER CONTENT % by volume	91.0	91.0	91.0	90.2	90.2	90.2
SAND % by vol	0.50	0.25	0.25	TR	0.50	0.25
pH	9.0	9.6	9.0	9.5	9.3	9.2
CHLORIDE Kppm	35.0	45.0	45.0	46.0	43.0	43.0
CALCIUM mg/l	240	200	200	200	260	200
POTASSIUM Kmg/l % WT KCl	30.00 5.80	40.50 7.80	37.00 7.10	40.00 7.70	37.00 7.10	37.00 7.10

MUD REPORTS

TELECO RUN #	2	2	2	3	3	4
HOLE SIZE ins	12.25	12.25	12.25	12.25	12.25	12.25
DATE	08-10	08-10	08-10	09-10	09-10	10-10
TIME	03:30	10:30	23:00	21:00	22:15	12:00
DEPTH m	1751	1824	1839	1855	1882	1882
WEIGHT sg	1.17	1.16+	1.16+	1.16+	1.17	1.17+
VISCOSITY sec	43	41	42	42	42	43
PV cp	11	13	13	13	13	14
YP lb/100 sq ft	21	23	25	22	22	23
GELS 10s/10min	4/7	5/8	6/9	4/8	4/8	4/8
FILTRATE cc/30 min	5.6	5.8	5.9	-	-	6.0
HPHT FILTRATE cc/30 min	-	-	-	-	-	-
CAKE 32nd	1.0	1.0	1.0	1.0	1.0	1.0
SOLIDS % by vol	9.8	9.3	9.3	9.3	9.8	9.8
WATER CONTENT % by volume	90.2	90.7	90.7	90.7	90.2	90.2
SAND % by vol	0.50	0.25	0.50	0.50	0.50	1.00
pH	9.1	9.3	9.0	9.0	9.5	9.3
CHLORIDE Kppm	45.0	46.0	46.0	46.0	46.0	46.0
CALCIUM mg/l	280	280	260	280	120	120
POTASSIUM Kmg/l % WT KCl	39.00 7.50	37.50 7.20	39.00 7.50	38.50 7.40	38.50 7.40	38.00 7.30

MUD REPORTS

TELECO RUN #	4	5	5	5	5
HOLE SIZE ins	12.25	12.25	12.25	12.25	12.25
DATE	10-10	11-10	11-10	11-10	11-10
TIME	14:30	08:30	14:00	16:30	20:00
DEPTH m	1915	2013	2125	2163	2170
WEIGHT sg	1.17	1.16+	1.16+	1.17	1.17
VISCOSITY sec	42	42	43	45	42
PV cp	14	13	13	15	14
YP lb/100 sq ft	23	23	22	24	23
GELS 10s/10min	4/8	5/8	5/8	6/12	5/10
FILTRATE cc/30 min	6.0	5.4	5.6	5.8	5.9
HPHT FILTRATE cc/30 min	-	-	-	-	-
CAKE 32nd	1.0	1.0	1.0	1.0	1.0
SOLIDS % by vol	9.8	9.3	9.3	9.8	9.8
WATER CONTENT % by volume	90.2	90.7	90.7	90.2	90.2
SAND % by vol	0.50	0.50	1.00	0.15	0.15
pH	9.4	9.3	9.3	9.3	9.2
CHLORIDE Kppm	46.0	45.0	45.0	45.0	47.0
CALCIUM mg/l	120	120	120	90	80
POTASSIUM Kmg/l % WT KCl	38.00 7.30	38.00 7.30	36.50 7.00	35.20 6.80	37.50 7.20

PE600433

This is an enclosure indicator page.
The enclosure PE600433 is enclosed within the container PE900117 at this location in this document.

The enclosure PE600433 has the following characteristics:

ITEM-BARCODE	**PE600433**
CONTAINER_BARCODE	**PE900117**
NAME	**Minerva 2A Dual Propagation Resistivity, Gamma Ray,** 1:200
BASIN	**OTWAY**
PERMIT	VIC/P31
TYPE	**WELL**
SUBTYPE	**WELL-LOG**
DESCRIPTION	**Minerva 2A Dual Propagation Resistivity, Gamma Ray,** 1:200, **Appendix 8**
REMARKS	
DATE-CREATED	11/10/93
DATE-RECEIVED	*
W_NO	W1086
WELL-NAME	**MINERVA 2 & 2A**
CONTRACTOR	**Eastman Teleco**
CLIENT_OP_CO	**BHP**

(Inserted by DNRE - Vic Govt Mines Dept)

PE600434

This is an enclosure indicator page.
The enclosure PE600434 is enclosed within the container PE900117 at this location in this document.

The enclosure PE600434 has the following characteristics:

ITEM-BARCODE	= PE600434
CONTAINER_BARCODE	= PE900117
NAME	= Minerva 2A Dual Propagation Resistivity, Gamma Ray, 1:500
BASIN	= OTWAY
PERMIT	= VIC/P31
TYPE	= WELL
SUBTYPE	= WELL-LOG
DESCRIPTION	= Minerva 2A Dual Propagation Resistivity, Gamma Ray, 1:500, Appendix 8
REMARKS	=
DATE-CREATED	= 11/10/93
DATE-RECEIVED	= *
W_NO	= W1086
WELL-NAME	= MINERVA 2 & 2A
CONTRACTOR	= Eastman Teleco
CLIENT_OP_CO	= BHP

(Inserted by DNRE - Vic Govt Mines Dept)

PE600435

This is an enclosure indicator page.
The enclosure PE600435 is enclosed within the container PE900117 at this location in this document.

The enclosure PE600435 has the following characteristics:

ITEM-BARCODE	=	PE600435
CONTAINER_BARCODE	=	**PE900117**
NAME	=	**Minerva 2A Dual Propagation Resistivity, Gamma Ray,** 1:1000
BASIN	=	**OTWAY**
PERMIT	=	VIC/P31
TYPE	=	**WELL**
SUBTYPE	=	**WELL-LOG**
DESCRIPTION	=	**Minerva 2A Dual Propagation Resistivity, Gamma Ray,** 1:1000, **Appendix 8**
REMARKS	=	
DATE-CREATED	=	11/10/93
DATE-RECEIVED	=	
W_NO	=	W1086
WELL-NAME	=	**MINERVA 2 & 2A**
CONTRACTOR	=	**Eastman Teleco**
CLIENT_OP_CO	=	**BHP**

(Inserted by DNRE - Vic Govt Mines Dept)

9

6.9 APPENDIX 9 Rig Positioning Report

POSITIONING REPORT

FOR

BHP PETROLEUM LTD

RIG MOVE OF THE

DRILLING RIG BYFORD DOLPHIN

LOCATION	:	**MINERVA-2A**
BLOCK / PERMIT	:	**OTWAY BASIN/VIC-P-31**
DATED	:	**8th of SEPTEMBER - 23rd of SEPTEMBER, 1993**
REPORT REF	:	**A2134**

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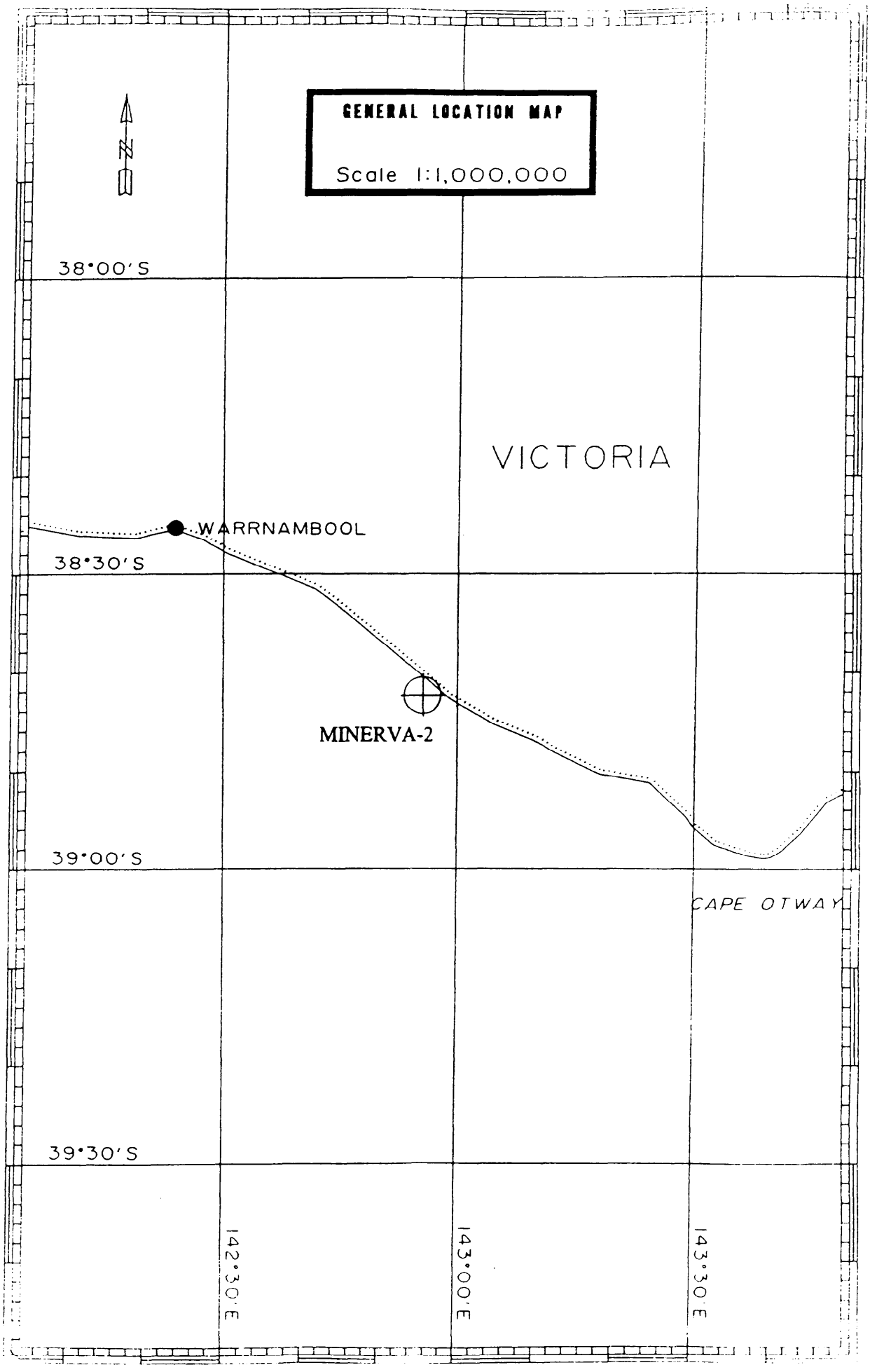
(Note: Appendices have only been included in BHP-E Wollongong and Racal Reports).


GENERAL LOCATION MAP
Scale 1:1,000,000
N
38°00'S
VICTORIA
WARRNAMBOOL
38°30'S
MINERVA-2
39°00'S
CAPE OTWAY
39°30'S
142°30'E
143°00'E
143°30'E

1 ABSTRACT

This report details the services provided by RACAL SURVEY AUSTRALIA LIMITED (Racal), prior to and during the positioning of the semi-submersible drilling rig "BYFORD DOLPHIN" over the MINERVA-2A location in the Otway Basin, offshore Victoria, for BHP Petroleum Limited (BHPP).

Personnel and equipment mobilised to Portland on the 8th of September, 1993. The BHPP supplied Standby/Survey vessel M.V. "PACIFIC MARLIN" was mobilised with the survey equipment on the 9th of September . On the 10th of September, a four transponder acoustic net was deployed and calibrated around the MINERVA-2 location. Positioning equipment was set up on the "Byford Dolphin" on the 16th of September, 1993.

The "Byford Dolphin" was positioned over the MINERVA-2 location, between the 16th and 18th of September, 1993.

A final Differential GPS position was obtained for the MINERVA-2 location, after the "Byford Dolphin" had ballasted down to drilling draught, during the afternoon of the 18th September, 1993.

Shortly after drilling operations had commenced at the MINERVA-2 location problems were experienced with the MINERVA-2 well which resulted in the abandonment of the well and the rig moving approximately 25 metres to the east to commence drilling MINERVA-2A.

A final Differential GPS position was obtained for the MINERVA-2A well on the 22nd of September, 1993.

Proposed Location

The co-ordinates of the proposed location, MINERVA-2, were provided by BHPP as follows:

Datum AGD 84

Latitude	:	38° 43' 04.330" South
Longitude	:	142° 57' 19.864" East

AMG Zone 54 C.M. 141° E

Easting	:	670 009.993m
Northing	:	5 712 701.011m
Rig Heading	:	225°

Final Differential GPS Position -MINERVA-2A

The final DGPS position of the "Byford Dolphin" at MINERVA-2A was derived between 1640 and 1742 hours on the 22nd of September, 1993. The final DGPS position was as follows:

Datum AGD 84

Latitude	:	38° 43' 04.535" South
Longitude	:	142° 57' 20.800" East

AMG Zone 54 C.M. 141° E

Easting	:	670 032.46m
Northing	:	5 712 694.21m
Rig Heading	:	227.1°

The final position is 23.48 metres on a bearing of 105.6° (T) from the intended MINERVA-2 location.

2 REQUIREMENTS

Racal Survey Australia Limited were contracted by BHPP to provide personnel and positioning equipment consisting of a 4 transponder Sonardyne net and interfacing to BHPE's Del Norte 1008 GPS receivers for the rig move of the "Byford Dolphin" onto the MINERVA-2 location. Racal's GNS and Oasis II software were used to provide real-time navigation and acoustic calibration facilities. In addition to the acoustic system, Racal's SkyFix Differential GPS was provided. Racal's SkyFix system was used as the primary navigation system.

The requirements were as follows:

a. To deploy and calibrate, both in relative and absolute position, a four transponder acoustic array around the MINERVA-2 location.

b. To provide real-time positioning for the semi-submersible drilling rig "Byford Dolphin" during the tow and onto the MINERVA-2 location.

c. To track, using a Golf II Laser system the Anchor Handling Vessels, during anchor deployment operations.

d. To provide a final Differential GPS position of the MINERVA-2 well.

e. To deploy and calibrate, both in relative and absolute position, a four transponder acoustic array around the proposed LOCH ARD-1 location, the "Byford Dolphin's" next planned location.

3 SUMMARY OF EVENTS

Racal personnel K.Eddy and S. Kttat departed Perth for Melbourne during the morning of the 8th of September, 1993 and flew to Portland that evening. On arrival in Portland personnel were met by D. Bell (Racal) and the BHP Client Representative, B.Edmonds.

Between 0830 and 1925 on the 9th of September Racal personnel were involved in the fitting and testing of underwater equipment on the "Pacific Marlin" for the Loch Ard-1 site survey. The "Pacific Marlin" departed the Portland wharf at 1740 on the 9th and anchored off the Portland breakwater.

At 0100 on the 10th of September the "Pacific Marlin" departed its anchorage off Portland for the Minerva-2 location and arrived at 0715 that morning.

Minerva-2 acoustic net deployment and calibration was carried out between 0915 and 1955 on the 10th of September. On completion of the acoustic net calibration the "Pacific Marlin" departed Minerva-2 for the Loch Ard-1 location.

After a slow steam overnight the "Pacific Marlin" arrived at the Loch Ard-1 location at 0600 on the 11th of September. Between 0730 and 2215 on the 11th the Loch Ard-1 site survey was carried out. The "Pacific Marlin" departed the Loch Ard-1 location for Portland at 2230 on the 11th of September.

At 0750 on the 12th of September, the "Pacific Marlin" anchored off the Portland breakwater and Racal personnel packed the underwater equipment for shipping to Perth.

The "Pacific Marlin" berthed alongside the Portland Tanker Berth at 0830 on the 13th of September and at 1000 all underwater equipment was off loaded from the "Pacific Marlin" for shipping to Perth. The "Pacific Marlin" departed the Portland Tanker Berth at 1200 on the 13th of September.

Between 1200 on the 13th September and 1030 on the 16th of September, Racal and BHP personnel were on stand by in Portland awaiting the arrival of the "Byford Dolphin" from the Vivonne location off the South Australian coast.

At 1030 on the 16th of September, K.Eddy departed Portland by helicopter for the "Byford Dolphin", arriving at 1103. The remaining Racal and BHP personnel arrived on the "Byford Dolphin" at 1331 and by 1400 on the 16th of September all survey equipment was operational.

The approach to the Minerva-2 location commenced at 1800 on the 16th of September with the "Byford Dolphin" 3 nautical miles from anchor 6 drop point. Anchor 6 was dropped and on the seabed at 1906 on the 16th of September and the rig continued its run in to the location.

Anchor running operations continued until 0708 on the 18th of September when the last anchor was placed on the seabed. Anchor pre-tensioning was carried out between 0853 and 1045 on the 18th of September.

On completion of ballasting down the DGPS position for Minerva-2 was observed between 1556 and 1706 on the 18th of September.

At 1925 on the 18th of September Racal and BHP personnel basket transferred to the "Pacific Marlin" to deploy and calibrate the Loch Ard-1 acoustic net.

Between 0510 and 1026 on the 19th of September the Loch Ard-1 acoustic net was deployed and calibrated.

The "Pacific Marlin" departed Loch Ard-1 for Portland at 1030 on the 19th of September and arrived at 1830 that day. On arrival in Portland Racal and BHP personnel departed the vessel and remained overnight in Portland. Personnel departed for Melbourne and Perth at 0720 on the 20th of September and arrived in Perth at 1045 that day.

Following the abandonment of the Minerva-2 location the rig moved a short distance to a new position and started drilling Minerva-2A. Racal surveyor, K.Eddy departed Perth at 1125 on the 21st of September to determined to Minerva-2A position. K.Eddy and BHP representative, B.Edmonds arrived in Portland at 1940 on the 21st of September.

Racal and BHP personnel departed Portland for the "Byford Dolphin" by helicopter at 0730 on the 22nd of September and arrived at 0809. The survey equipment was set up and operational by 0930 on the 22nd of September and waited on the running of the 26 inch casing.

The final DGPS position for Minerva-2A was observed between 1640 and 1742 on the 22nd of September.

Racal and BHP personnel departed the "Byford Dolphin" for Portland by helicopter at 1210 on the 23rd of September and K.Eddy arrived in Perth at 2040 that day.

4 GEODETIC PARAMETERS

The Geodetic parameters used during the project were as follows:

- The location co-ordinates and the acoustic positioning systems are defined on Australian Geodetic Datum 84 (AGD 84).
- The Global Positioning System (G.P.S.) is referenced to World Geodetic System 1984 (WGS 84).

4.1 DATUMS

DATUM	:	**AGD 1984**
Spheroid	:	Australian National
Semi-major Axis (a)	:	6 378 160.000m
Semi-minor Axis (b)	:	6 356 774.719m
Eccentricity Squared (e^2)	:	0.006 694 542
Flattening ($^1/_f$)	:	298.25
DATUM	:	**WGS-84**
Spheroid	:	WGS-84
Semi-major Axis (a)	:	6 378 137.0000m
Semi-minor Axis (b)	:	6 356 752.3142
Eccentricity Squared (e^2)	:	0.006 694 380
Flattening ($^1/_f$)	:	298.257 223 563

4.2 PROJECTION	:	**U.T.M.**
AMG Zone	:	54
Central Meridian (C.M.)	:	141° East
Scale factor on the C.M.:	:	0.9996
False Easting	:	500 000m
False Northing	:	10 000 000m
Latitude of Origin	:	0° (Equator)
Unit of Measure	:	International Metre

4.3 DATUM TRANSFORMATION PARAMETERS

The datum transformation parameters used in Racal software to convert WGS 84 co-ordinates to AGD 84 co-ordinates were as follows:

Dx	=	+	116.00m
Dy	=	+	50.47m
Dz	=	–	141.69m
Rx	=	+	0.230"
Ry	=	+	0.390"
Rz	=	+	0.344"
Scale(k)	=	–	0.0983

4.4 GEOID/SPHEROID SEPARATION

The computed WGS 84 Geoid/Spheroid separation value (N) at the MINERVA-2 location is –1.4m. This value was computed using the Ohio State University OSU91A Geoid Interpretation Program.

5 GLOBAL POSITION SYSTEM (GPS)

5.1 SYSTEM DESCRIPTION

The NAVSTAR GPS (Navigational Satellite Timing and Ranging Global Positioning System) is an USA Military all weather, space based positioning system that transmits signals from a constellation of satellites orbiting the Earth. It is capable of providing suitably equipped users worldwide with accurate three dimensional positions on or near the Earth's surface. The accuracy of the determined positions can vary from a few millimetres to 100 metres depending on the method of data acquisition and processing. System design consists of three integrated parts: the Ground Control Segment, the Space Segment and the User Segment. The Space Segment is still in the process of being installed and as such is not completely operational.

When completed, the operational space segment will consist of 21 production satellites and 3 active spares; the term Space Vehicle (SV) is used as a synonym for satellite. The satellites will be in high orbits, at approximately 20,200km, having an orbit period of 12 hours. They will be arranged in 6 orbital planes, inclined at 55 degrees with near circular orbits.

The final configuration will provide complete 4 satellite (3D) coverage worldwide. With the present launch schedule, 24 hour 3 dimensional coverage will not be available until late 1993.

The current configuration consists of both Block I (testing) and Block II satellites orbiting and transmitting healthy data. The Block I's are SV's 3, 12, and 13. The current Block II satellites are SV's 1, 2, 7, 9, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 and 31. The amount of coverage that the satellite configuration provides, depends upon the geographical position of the user.

It should be noted that available coverage does not represent actual usable working periods, as the satellites will at times combine to produce poor geometry and therefore poor positioning. This can happen for short periods during the middle of multi-satellite coverage and is a result of the limited satellite constellations presently available. It is essential to ascertain the periods of good coverage prior to commencing any project involving GPS. Predicted satellite availability printouts are contained in Appendix G.

Individual satellites can be set 'unhealthy' from time to time whilst they are manoeuvred into new orbital planes or due to other operational circumstances which are usually predicted. The status of GPS and individual satellites can be obtained from one of the USA based GPS Bulletin Board Services. Prior to a project commencing Racal Australia download by modem the current status and almanac file, usually from the US Coast Guard Bulletin Board. In addition the Racal Survey Ltd office in Great Yarmouth, England monitor the GPS status daily and fax to all Racal operating companies any Notice Advisory to NAVSTAR Users (NANU's) that may affect the operational capabilities of the system.

5.2 OBSERVATIONS

There are two important types of GPS observations (observables):

Pseudo-range and Carrier phase.

Carrier phase is sometimes also referred to as carrier beat phase. Pseudo-range techniques are generally used for navigation e.g. Deltanav. In high-precision baseline surveying the carrier phase is used. Although the (undifferenced) phase can be used directly, it has become common practice, at least in surveying applications, to process certain linear combinations of the original carrier phase observations (double differences and triple differences).

5.2.1 Pseudo-ranges

The pseudo-range is a measure of the distance between the satellite and the receiver at the epochs of transmission and reception of the signals. The transit time of the signals is measured by comparing (correlating) identical pseudo-random noise (PRN) codes generated by the satellite and by the receiver. A code-tracking loop within the receiver shifts the internal replica of the PRN code in time until maximum correlation occurs. The codes generated at the receiver are derived from the receiver's own clock, and the codes of the satellite transmissions are generated by the satellite system of clocks. It follows that unavoidable timing errors in both the satellite and the receiver clock will cause the measured quantity (pseudo-range) to differ from the geometric distance.

In applications offshore where instantaneous positions are required, the Pseudo-range is the preferred observable. Given the satellite ephemeris (i.e. the position of the satellite at the epoch of transmission), there are seven unknowns: two clock errors, three receiver co-ordinates and the ionospheric and tropospheric delays. The effect of the satellite clock error is negligible for the typical navigation solution, particularly considering that the time errors are indistinguishable from the ionospheric and tropospheric delays. The satellite clocks are constantly monitored and synchronized with GPS time as maintained by the control centre. Actual offsets of the satellite clocks are approximated by polynomials in time and transmitted as part of the navigation message to the user for the correction of the measured pseudo-ranges. The ionospheric and tropospheric delays can be computed on the basis of ionospheric and tropospheric models, thus there are four unknowns left X, Y, Z and receiver clock error. These can be determined from four pseudo-ranges measured simultaneously to four GPS satellites.

5.2.2 Carrier Phase

The phase observable is the difference between the phase of the carrier signal of the satellite, measured at the receiver, and the phase of the local oscillator within the receiver at the epoch of measurement. This can be regarded as a biased range measurement of the satellite-receiver distance with the integer number of carrier waves being unknown. The wavelength of the L1 carrier is about 19cm. Because of the fraction of the carrier phase is measured, the term "interferometry" is often used to describe carrier phase techniques.

5.3 DIFFERENTIAL GPS (DGPS)

As the GPS is primarily a USA Defence system it can be expected that the navigation accuracy to the civil user will be degraded to about 100 metres standard deviation (Standard Position Service -SPS) as specified in the USA 1990 Federal Radio Navigation Plan. The means by which the USA Military degrade GPS is with the use of Selective Availability (SA) to control the accuracy of Pseudo-range measurements. Essentially, the user is given a false Pseudo-range for each satellite so that the resulting measurement is in error by a controlled amount.

DGPS is a means by which the civil user can overcome Selective Availability. It requires a receiver be located at a precisely known point from which Pseudo-range corrections for each satellite can be determined and monitored. These Pseudo-range corrections are then communicated by means of a telecommunications link to users at unknown locations. The DGPS technique has proven to be particularly effective and can improve the accuracy figure to 5 metres or better with or without Selective Availability activated. In the relative mode most of the important systematic errors common to the known station and at the unknown location cancel out to improve the accuracy of the computed position.

5.4 SKYFIX DIFFERENTIAL LINK

Racal Survey Australia Limited introduced its SkyFix Differential GPS System in Australia in January 1991, using the Inmarsat Pacific and Indian Ocean marine communications satellites as the differential data broadcast link. Extensive performance trials and projects undertaken to date have shown SkyFix to meet the best industry expectations in terms of quality of service and accuracy.

The system embodies the successful combination of data capacity, range and coverage with a flexible networked approach that lends itself to comprehensive performance and quality monitoring.

The link capacity of 1200 bits per second allows data from a number of networked reference stations to be sent simultaneously without introducing unacceptable delays between reference station and user. With four reference stations each generating correction data for ranges from eight satellites, an update rate of better than three seconds is achieved by the SkyFix system.

Satellite communications systems, particularly at the Inmarsat L-band frequencies of 1.5 GHz are reliable and free of the interference associated with the crowded M.F./H.F. bands. This high data integrity gives users confidence that the corrections will be continuously received without interference.

The SkyFix Australian network commenced operation in January 1991, and now comprises reference stations at Dampier, Broome, Perth, Adelaide, Sydney, Cairns and Darwin.

The differential corrections generated at each reference station are brought via landline links to the data hub and control centre in Singapore where the system is monitored for performance and quality. From there a composite message containing full RTCM 104 version 2 formatted data from all reference stations is sent via dual redundant links to satellite earth stations at Sentosa Island, Singapore and O.T.C. Perth, Western Australia for uplink and broadcast over the Inmarsat Pacific and Indian Ocean Region satellites.

The design of reference station networks provides a high quality service to major offshore hydrocarbons prospect areas, each of which, ideally will be within coverage of more than one reference station.

The system is easily expandable to provide new areas of coverage by the addition of further networked reference stations, with the correction data from these automatically included in the system performance and quality control function at the control centres.

Whilst the DGPS service provider has no control over the operation of the GPS system itself, performance can be monitored, quantified and reported to users. The functions of the SkyFix data hub and control centre in Singapore are of fundamental importance as its role is to guarantee the best possible system performance.

The SkyFix system includes a 24 hour monitoring facility to ensure the validity of data received at the control centre from the DGPS reference stations and that the same data is received over the SkyFix satellite data link.

The monitor system that has been developed by Racal Survey is designed to provide maximum system performance information availability whilst providing a rapid indication of performance or fault problems should they occur.

Monitoring and control functions therefore include extensive analysis and archiving of the reference corrections and the comparison of range rate corrections - arriving from different stations within the network. The system also receives the broadcast message from the satellite data link and applies this data to a monitor receiver at the control centre to verify positioning performance. Time series plots of this performance, in latitude, longitude, height, together with PDOP and HDOP figures are generated.

Monitoring the data on the link in this way also allows link performance to be appraised in terms of message success rate and in terms of overall system message delay.

Other functions include satellite status information, data recording, and a procedural approach to providing client information.

The SkyFix combination of the Inmarsat satellite communications links using the RTCM 104 Version 2 DGPS data protocol, the reference station, monitoring and user infrastructure has been shown through a growing body of project trials experience to provide a Differentially GPS operating environment consistently capable or providing position accuracy's of 5 metres or better.

The SkyFix scheme is a homogeneous network within the WGS 84 geodetic reference frame. The original network, prior to the Australian extension included ten primary triangulation stations for which the WGS 84 values were supplied. The vectors established during this build up create a network between the Far East, Australia and Europe. Purely for the purposes of testing the strength and internal consistency the network has been subjected to a least squares adjustment by variation of co-ordinates. In the final analysis two of the primary triangulation stations, Dongara 38 (W.A.) and Matera (Italy), were held fixed. The residual errors pertaining to the remaining eight primaries are listed below. For all stations included in the final analysis the mean semi-major axis of the twenty-nine 95% error ellipsoids is just over 0.6 metres. The total variation about this mean is contained within plus or minus 0.6 metres.

STATION	LATITUDE	LONGITUDE	HEIGHT	MISCLOSURE
Port Stanley (Hong Kong)	0.53m	- 1.56m	- 0.53m	1.73m
TC 58 (Abu Dhabi)	0.76m	- 0.97m	0.83m	1.49m
Station Hill(Broome W.A)	0.35m	0.50m	- 1.23m	1.95m
Gnangara (Perth W.A.)	1.04m	1.00m	- 1.82m	2.32m
Bologna (Italy)	- 0.14m	0.02m	0.39m	0.41m
Brimmond Hill (Scotland)	- 2.85m	0.32m	1.16m	3.09m
Dunnet Head (Scotland)	- 1.59m	1.50m	0.81m	2.04m
Tromso (Norway)	- 1.11m	2.25m	- 0.81m	2.64m

For the Australian extension to the network, two primary geodetic points were used at each site, together with the transportable laser ranging site, Gnangara 73 in Perth. Trimble 4000 SST geodetic receivers were used to simultaneously obtain phase data which was then post processed to derive the vectors between sites. The vector results were entered into "Geolab" 3D adjustment software, to obtain adjusted values for the reference stations.

5.5 TRIMBLE 4000DL GPS RECEIVER

The Trimble 4000DL GPS receiver is designed for moderate precision static and dynamic positioning applications. The GPS receiver provides time and three-dimensional station co-ordinates at a once-per-second update rate.

The receiver receives the civilian coded signal (C/A) from the GPS NAVSTAR satellites. The receiver automatically acquires and simultaneously tracks GPS satellites and precisely measures carrier and code phase and computes position and velocity.

Latitude, longitude and height values are output on the World Geodetic System (WGS 84) Earth-centred, Earth-fixed co-ordinate system.

The receiver is designed to measure the following observables:

- Coarse/Acquisition (C/A) code Pseudo-ranges
- Rate of change of Pseudo-range
- Integrated Carrier

C/A code correlation techniques measure the propagation time of the signal from the satellite to the antenna. Latitude, longitude, height and time can be determined from measurements made from at least 4 satellites, by a process similar to triangulation.

To determine speed and heading, the receiver calculates the rate of change of Range (the range-rate) by measuring the Doppler shift of the carrier.

It is capable of receiving and processing differential corrections from other reference sources using the standard format of the Radio Technical Commission for Maritime Services, Special Committee 104 (RTCM SC-104), Version 1.0 or 2.0 protocols.

The 4000DL has several options available, including internal data logging memory, event marker logging etc. and therefore may be used alone or as part of a more extensive navigation system.

5.6 DGPS OPERATION

During the acoustic net deployment and calibration the DGPS was operated using Trimble's DeltaNavN (DNAVN) 2.71 software in conjunction with a Toshiba T5200/100 computer. DNAVN controlled the Trimble GPS receiver and applied the RTCM 104 Version 2 differential corrections received from the SkyFix system to the observed GPS data. The computed DGPS position in WGS 84 was then output to the navigation computer and converted to AGD 84.

6 ACOUSTIC POSITIONING SYSTEM

6.1 SYSTEM DESCRIPTION

Sonardyne high precision acoustic technology incorporates COMPATT (Computing and Telemetering Transponder) and PAN (Programmable Acoustic Navigator). The system is available in low, medium and high frequency versions. This allows selection of the optimum frequency band to suit each requirement. Medium frequency equipment was used during rig move operations.

The microprocessor-controlled intelligent COMPATT makes direct measurements on the seabed to other Sonardyne transponders, and transmits this baseline data back to a ship or submersible via fast acoustic telemetry in order to calculate the relative position of each transponder.

In its interrogator mode the COMPATT will measure ranges to 8 individual transponders with just one single interrogation. This speeds up 'mobile' COMPATT operations such as ROV tracking and pipelaying.

The reply frequency of the COMPATT is selectable from 15 channels by acoustic command. This feature reduces the need for a large transponder stock and increases immunity to 'rogue' frequencies.

Other commands instruct sensors to measure parameters such as water temperature and pressure, and at the end of the mission another command will effect recovery. An automatic 'self-test' facility can be performed without opening the transponder.

The medium frequency version can give an optimum combination of 3km ranges and 20cm accuracy. This suits most sub-sea engineering operations including rig moves, pipelaying, jacket emplacement and ROV positioning.

6.2 ACOUSTIC VELOCITY PROFILE

An Applied Microsystems STD-12 acoustic velocity probe was used to determine the acoustic velocity of the water column at the MINERVA-2 location on the 10th of September, 1993. The probe was deployed over the stern of the "Pacific Marlin". Readings of the temperature and conductivity were recorded against pressure (depth) at 1 metre intervals as it was lowered to and then raised from the seabed.

The probe recorded a maximum depth of 61.86 metres.

A mean velocity of 1503.3 m/sec for the observed water column was obtained using the Chen and Milleros formula.

For the acoustic net calibration the following values were entered into the Oasis II software:

Depth	VP(ms^{-1})
0.31	1503.0
4.97	1502.9
9.89	1503.0
15.58	1503.1
20.65	1503.2
25.60	1503.3
30.79	1503.4
35.77	1503.5
40.81	1503.5
45.45	1503.4
50.34	1503.5
55.10	1503.6
61.86	1503.7

6.3 TRANSPONDER DEPLOYMENT AND CALIBRATION

Sonardyne acoustic transponders were deployed and calibrated from the M.V. "Pacific Marlin" on the 10th of September, 1993.

The transponders were deployed in a quadrilateral, approximately 600-825 metres from the intended location. Drop positions and telemetered depths were used as the basis of subsequent calibrations.

The absolute calibration of the acoustic array was by the Relative/Absolute method. This method required the survey vessel to steam around the acoustic array in a clover leaf pattern whilst the acoustic calibration software (Oasis) simultaneously gathered DGPS data and acoustic ranges to all four seabed transponders. On completion of the data gathering, the software first determined the positions of the transponders relative to each other (localised grid) and then using the relative positions of the transponders and the logged DGPS data determined their absolute positions in the chosen datum (AGD 84). During the relative calculation of the transponder positions the depths of the transponder transmission points were also determined.

As a confidence check on the Relative/Absolute determined positions of the acoustic array all four transponders were Boxed-In. Transponders were Boxed-In with a circle radius of 250 metres. The Box-In calibration required the survey vessel to steam a circle around the transponder whilst the acoustic calibration software gathered simultaneous DGPS and acoustic ranges to the selected transponder.

6.4 BOX-IN CALIBRATIONS

The results of the Box-In calibrations as carried out on the 10th of September, 1993 were:

Datum AGD 84
AMG Zone 54 CM 141° East

Tp	Code	Easting(m)	Northing(m)	Depth(m)	RMS
1	601	669 441.07	5 713 313.52	55.4	2.8
2	602	670 502.83	5 713 164.09	58.1	3.8
3	604	670 566.16	5 712 162.61	56.4	4.0
4	701	669 599.59	5 712 299.01	59.4	2.3

6.5 RELATIVE/ABSOLUTE CALIBRATIONS

The results of the Relative/Absolute calibrations as carried out on the 10th of September, 1993 were:

Relative

TP	Code	X Co-ord (m)	Y Co-ord (m)	Depth (m)
1	601	0.00	0.00	55.4
2	602	1070.55	0.00	58.1
3	604	1274.36	-985.45	56.4
4	701	296.02	-984.13	59.4

Fixed Depth
Standard Range Weighting

Means :	0.06	0.13	0.10	0.00
sd :	0.54	0.52	0.50	0.51

Total Solution Standard Error : 0.81

Absolute

TP	Code	Eastings (m)	Northings (m)	Depth (m)
1	601	669 440.81	5 713 314.43	55.4
2	602	670 501.02	5 713 166.03	58.1
3	604	670 566.27	5 712 161.85	56.4
4	701	669 597.55	5 712 298.76	59.4

Total Solution Standard Error : 4.42

Relative/Absolute and Box-In Position Comparisons

Tp	Code	delta Easting(m)	delta Northing(m)
1	601	-0.26	0.91
2	602	-1.81	1.94
3	604	0.11	-0.76
4	701	-2.04	-0.25

6.6 FINAL TRANSPONDER CO-ORDINATES

The final set of co-ordinates used during the MINERVA-2 project were as follows:

Datum AGD 84
AMG Zone 54 C.M. 141° East

Tp	Code	Easting(m)	Northing(m)	Depth(m)
1	601	669 440.81	5 713 314.43	55.4
2	602	670 501.02	5 713 166.03	58.1
3	604	670 566.27	5 712 161.85	56.4
4	701	669 597.55	5 712 298.76	59.4

7 FINAL DRILLSTEM POSITION

The final differential GPS position of the drillstem over the Minerva-2A location was determined using Racal's SkyFix/Trimble/DNAVN DGPS. A check was also carried out using BHPE's Del Norte 1008 GPS receiver with differential corrections from Racal's Adelaide reference station.

Observations from both DGPS systems were made simultaneously between 1640 and 1742 on the 22nd of September, 1993. The final fix analysis in the GNS Rigmove software was used to collect the DGPS observations and calculate the position of the Drillstem.

7.1 FINAL DIFFERENTIAL GPS POSITION - MINERVA-2A

The final co-ordinates for the Minerva-2A location were determined from observations made by Racal's SkyFix/Trimble/DNAVN DGPS, and are as follows :

Constellation	Samples	Satellites
A	156	02, 12, 13, 24, 07, 26, 09
B	36	02, 12, 13, 24, 07, 09
C	60	12, 13, 24, 07, 09

Total number of samples used = 252

The computed antenna position, with constellations given equal weights, was as follows:

Datum WGS 84

Latitude	:	38° 42' 59.641" South	(s.d. 0.37m)
Longitude	:	142° 57' 24.369" East	(s.d 0.43m)
Spheroidal Height	:	21.57m	(s.d. 0.42m)

Transforming the above WGS 84 co-ordinates to AGD 84 using the parameters in section 4, gives the following antenna co-ordinates:

Datum AGD 84

Latitude	:	38° 43' 04.957" South
Longitude	:	142° 57' 19.424" East
Spheroidal Height	:	38.33m

Applying the antenna to datum offsets to the above co-ordinates gives the following drillstem position, over the Minerva-2A location.

Datum AGD 84

Latitude	:	38° 43' 04.535" South
Longitude	:	142° 57' 20.800" East

AMG Zone 54 C.M. 141° East

Easting	:	670 032.46m
Northing	:	5 712 694.21m

Rig Heading	:	227.1° (T)

This position is 23.5 metres on a bearing of 105.6° (T) from the intended Minerva-2 location.

7.2 DIFFERENTIAL GPS POSITION CHECK - MINERVA-2A

A check on the final drillstrem derived position was carried out using BHPE's Del Norte GPS receiver.

The following data was observed :

Constellation	Samples	Satellites
A	214	02, 24, 07, 26, 12, 09, 13
B	5	24, 07, 26, 12, 09, 13
C	19	02, 24, 07, 12, 09, 13
D	14	24, 07, 12, 09, 13

Total number of samples used = 252

The computed antenna position, with constellations given equal weights, was as follows:

Datum WGS 84

Latitude	:	38° 42' 59.688" South	(s.d. 0.39m)
Longitude	:	142° 57' 24.454" East	(s.d. 0.46m)
Spheroidal Height	:	26.63m	(s.d. 0.96m)

Transforming the above WGS 84 co-ordinates to AGD 84 using the parameters in section 4, gives the following antenna co-ordinates:

Datum AGD 84

Latitude	:	38° 43' 05.003" South
Longitude	:	142° 57' 19.509" East
Spheroidal Height	:	43.39m

Applying the antenna to datum offsets to the above co-ordinates gives the following position, over the Minerva-2A location.

Datum AGD 84

Latitude	:	38° 43' 04.537" South
Longitude	:	142° 57' 20.831" East

AMG Zone 54 C.M. 141° East

Easting	:	670 033.22m
Northing	:	5 712 694.14m

Rig Heading : 227.1° (T)

This position is 24.2 metres on a bearing of 105.2° (T) from the intended Minerva-2 location.

The difference in position between the DNAVN and Del Norte derived co-ordinates are as follows :

ΔEasting	=	-0.76m
ΔNorthing	=	-0.07m

7.3 DIFFERENTIAL GPS POSITION - MINERVA-2

The differential GPS position of the drillstem over the Minerva-2 location was determined from observations between 1556 and 1706 on the 18th of September, 1993 on completion of the "Byford Dolphin's" move over the Minerva-2 location.

The Minerva-2 position was as follows:

Datum AGD 84

Latitude	:	38° 43' 04.165" South
Longitude	:	142° 57' 19.476" East

AMG Zone 54 C.M. 141° East

Easting	:	670 000.74m
Northing	:	5 712 706.29m

Rig Heading	:	225.2° (T)

This position was 10.7 metres on a bearing of 298.5° (T) from the intended Minerva-2 location.

The Minerva-2A well position is 33.9 metres on a bearing of 109.6° (T) from the abandoned Minerva-2 DGPS derived position.

8 LOCH ARD-1 ACOUSTIC ARRAY

On completion of the "Byford Dolphin" rig move to the MINERVA-2 location, Racal and BHPE personnel transferred to the "Pacific Marlin" and proceeded to the LOCH ARD-1 location to deploy and calibrate a 4 transponder Sonardyne acoustic array. The array was deployed for an intended 12 anchor spread by the "Byford Dolphin".

Proposed Location

The co-ordinates of the proposed location, LOCH ARD-1, were provided by BHPP as follows:

Datum AGD 84

Latitude	:	38° 55' 54.639" South
Longitude	:	143° 10' 55.169" East

AMG Zone 54 C.M. 141° E

Easting	:	689 134m
Northing	:	5 688 508m

Rig Heading	:	225°

8.1 ACOUSTIC VELOCITY PROFILE

An Applied Microsystems STD-12 acoustic velocity probe was used to determine the acoustic velocity of the water column at the LOCH ARD-1 location on the 10th of September, 1993. The probe was deployed over the stern of the "Pacific Marlin". Readings of the temperature and conductivity were recorded against pressure (depth) at 1 metre intervals as it was lowered to and then raised from the seabed.

The probe recorded a maximum depth of 76.77 metres.

A mean velocity of 1504.3 m/sec for the observed water column was obtained using the Chen and Milleros formula.

For the acoustic net calibration the following values were entered into the Oasis II software:

Depth	VP(ms^{-1})
1.09	1503.1
5.41	1503.2
10.98	1503.3
15.52	1503.4
20.12	1503.5
25.88	1503.6
30.82	1503.7
35.08	1503.8
40.97	1503.9
46.01	1503.9
51.24	1504.0
55.10	1504.1
60.08	1504.2
64.91	1504.3
70.89	1504.4
76.77	1504.5

8.2 TRANSPONDER DEPLOYMENT AND CALIBRATION

Sonardyne acoustic transponders were deployed and calibrated from the M.V. "Pacific Marlin" on the 19th of September, 1993.

The transponders were deployed in a quadrilateral, approximately 600-825 metres from the intended location. Drop positions and telemetered depths were used as the basis of subsequent calibrations.

The absolute calibration of the acoustic array was by the Relative/Absolute method. This method required the survey vessel to steam around the acoustic array in a clover leaf pattern whilst the acoustic calibration software (Oasis) simultaneously gathered DGPS data and acoustic ranges to all four seabed transponders. On completion of the data gathering, the software first determined the positions of the transponders relative to each other (localised grid) and then using the relative positions of the transponders and the logged DGPS data determined their absolute positions in the chosen datum (AGD 84). During the relative calculation of the transponder positions the depths of the transponder transmission points were also determined.

As a confidence check on the Relative/Absolute determined positions of the acoustic array three transponders were Boxed-In. Transponders 2/602, 3/604 and 4/701 were Boxed-In with a circle radius of 250 metres. The Box-In calibration required the survey vessel to steam a circle around the transponder whilst the acoustic calibration software gathered simultaneous DGPS and acoustic ranges to the selected transponder.

8.3 RELATIVE/ABSOLUTE CALIBRATIONS

The results of the Relative/Absolute calibrations as carried out on the 19th of September, 1993 were:

Relative

TP	Code	X Co-ord (m)	Y Co-ord (m)	Depth (m)
1	601	0.00	0.00	68.51
2	602	1066.39	0.00	68.50
3	604	1230.47	-975.93	67.55
4	701	256.52	-993.08	68.64

Calculated Depth
Standard Range Weighting

Means :	0.00	0.00	-0.01	-0.01
sd :	0.39	0.36	0.35	0.36

Total Solution Standard Error : 0.58

Absolute

Tp	Code	Easting (m)	Northing (m)	Depth (m)
1	601	688 562.17	5 689 085.18	68.51
2	602	689 620.64	5 688 955.49	68.50
3	604	689 664.82	5 687 966.85	67.55
4	701	688 696.01	5 688 068.28	68.64

Total Solution Standard Error : 4.48

8.4 BOX-IN CALIBRATIONS

The results of the Box-In calibrations as carried out on the 19th of September, 1993 were:

Datum AGD 84
AMG Zone 54 CM 141° East

Tp	Code	Easting (m)	Northing (m)	Depth (m)	RMS
2	602	689 621.11	5 688 952.97	72.2	3.1
3	604	689 666.43	5 687 669.15	72.1	3.5
4	701	688 697.44	5 688 068.82	72.7	3.8

Relative/Absolute and Box-In Position Comparisons

TP	Code	dEastings (m)	dNorthings (m)
2	602	-0.47	2.52
3	604	-1.61	-2.30
4	701	-1.43	-0.54

8.5 FINAL TRANSPONDER CO-ORDINATES

The final set of co-ordinates of the LOCH ARD-1 acoustic array are:

Datum AGD 84
AMG Zone 54 C.M. 141° East

Tp	Code	Reply Channel	Easting (m)	Northing (m)	Depth (m)
1	601	1	688 562.17	5 689 085.18	68.51
2	602	2	689 620.64	5 688 955.49	68.50
3	604	4	689 664.82	5 687 966.85	67.55
4	701	5	688 696.01	5 688 068.28	68.64

8.6 TRANSPONDER STATUS

On completion of the LOCH ARD-1 acoustic array calibration on the 19th of September, 1993 all transponder Battery Counts (BC) and voltages were obtained and then the transponders were Disabled.

Tp	Code	Reply Channel	Time	BC	Volts
1	601	1	1017	4	27.7
2	602	2	1021	4	27.0
3	604	4	1019	4	27.2
4	701	5	1011	4	27.5

9 PERSONNEL AND EQUIPMENT

9.1 PERSONNEL

The following personnel were employed on this project:

For : Racal Survey (Australia)

K. Eddy	-	Surveyor/Party Chief	8th - 23rd September
S. Kttat	-	Navigation Engineer	8th - 20th September
D. Bell	-	Navigation/Acoustic Engineer	8th - 20th September

For : BHPP Limited

B. Edmonds	-	Client Representative	

9.2 EQUIPMENT

The following equipment was supplied for use on this project:

1 x Trimble 4000DL Mk1 GPS Receiver, Cable and Antenna

2 x SkyFix Demodulators

1 x SkyFix Rig Portable

1 x Toshiba T5200/100 Computer (for DNAV-N)

2 x Sonardyne Pan Units

4 x Sonardyne Compatt Transponders

1 x Sonardyne Tow Fish

1 x Sonardyne Deck Winch

1 x Sonardyne Dunking Transducer

2 x HP 9000/320 Series Desktop Computers

1 x HP 9122D Dual Disk Drive

1 x HP 9122C Dual Disk Drive

2 x HP 35731B VDU's

2 x Barco Monitors

2 x HP Thinkjet Printers

1 x HP 2673A Thermal Printer

2 x Toshiba T5200/100 Computers (for GNS PC Software)

2 x VGA Monitors

1 x STD-12 Velocity Probe

1 x Arma Brown Gyro Compass

1 x SG Brown 1000A Gyro Compass

3 x Interface 80 Units

1 x Star LC-20 Printer

1 x Toshiba 1200 Computer (Velocity Probe)

2 x AC Voltage Stabilisers

1 x Golf Laser

plus all associated software (GNS Ver R2.06S, GNS Ver R2.06S PC, GNS Ver S2.40E, OASIS II Ver 1.7F), cables, manuals, etc.

10 DISTRIBUTION

Copies of this report have been distributed as follows:

BHP Engineering - Wollongong **Attn: Mr. S. Dykes**	: 1 copy
BHP Petroleum - Melbourne **Attn: Mr. R. Willmore**	: 2 copies
Racal Survey - Perth	: 1 copy

Ken Eddy
Surveyor

P P
Gareth Jones
Area Surveyor

POSITIONING REPORT

FOR

BHP PETROLEUM LTD

RIG MOVE OF THE

DRILLING RIG BYFORD DOLPHIN

LOCATION : **MINERVA-2A**

BLOCK / PERMIT : **OTWAY BASIN/VIC-P-31**

DATED : **8th of SEPTEMBER - 23rd of SEPTEMBER, 1993**

REPORT REF : **A2134**

RACAL SURVEY
STRALIA LIMITED
C.N. 000 601 909

RAPHIC HOUSE
ir Road
lcatta 6021
estern Australia

one (09) 344 7166
ile (09) 344 8783

R/P

MINERVA - 2

APPENDIX A

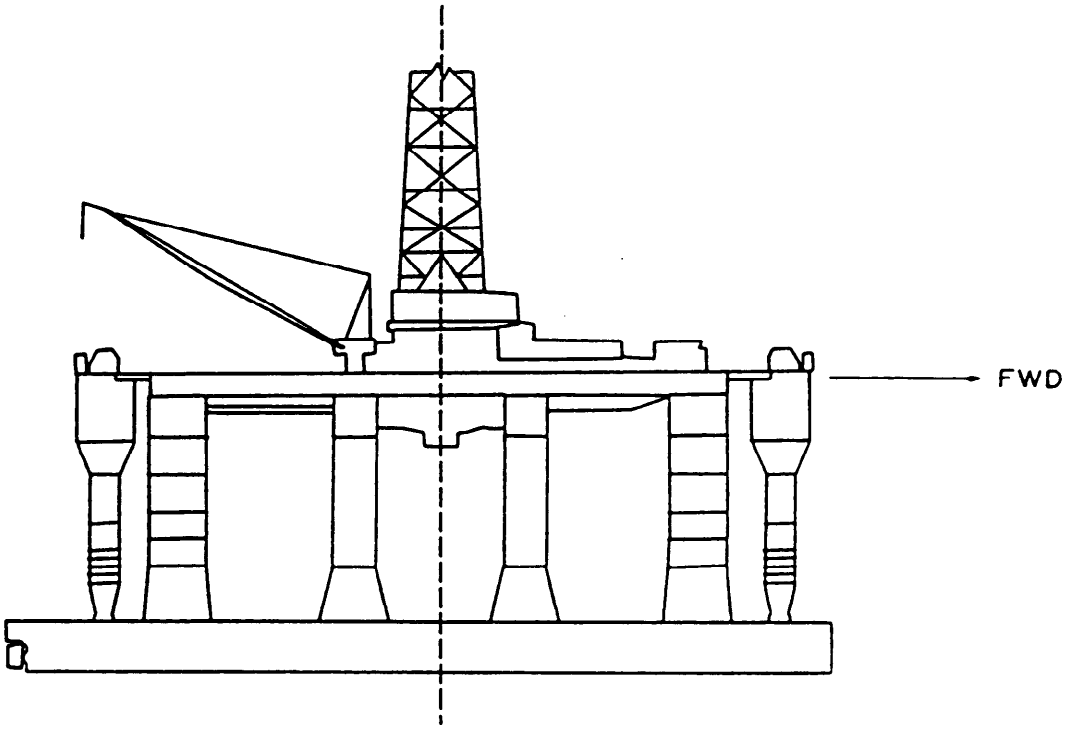
OFFSET DIAGRAMS - BYFORD DOLPHIN AND PACIFIC MARLIN

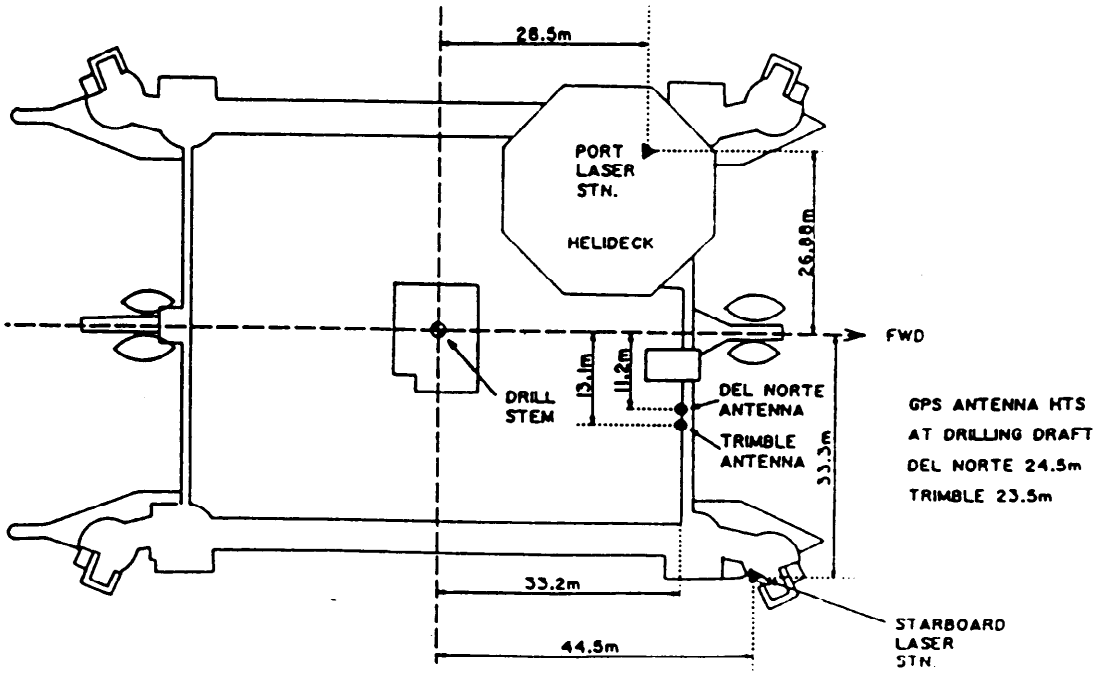
OFFSET DIAGRAM

APPENDIX A

BYFORD DOLPHIN

(NOT TO SCALE)

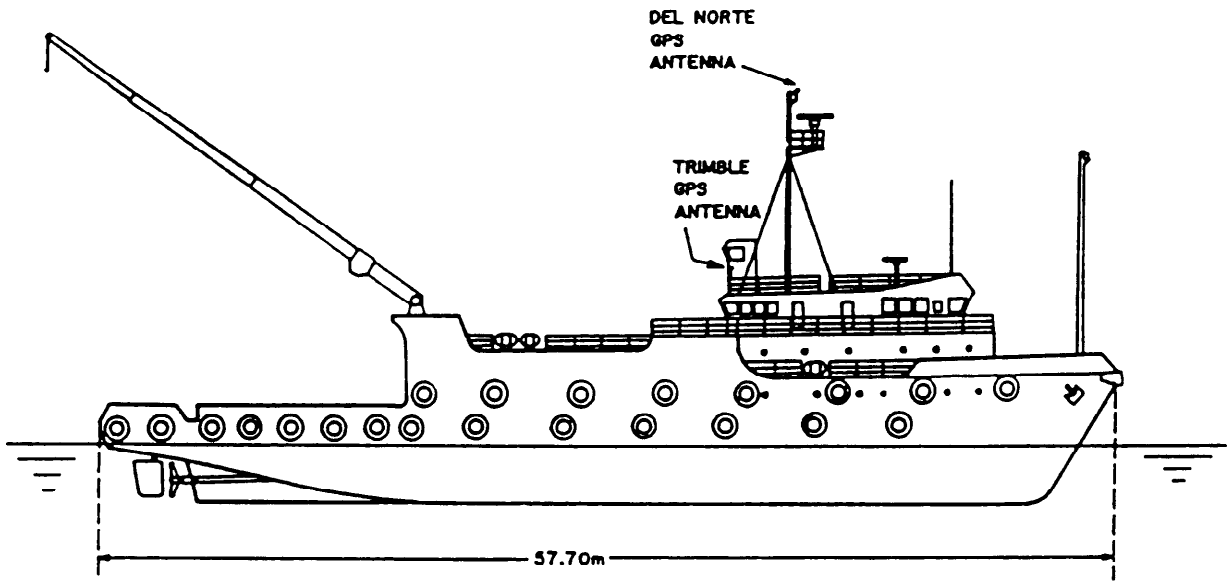


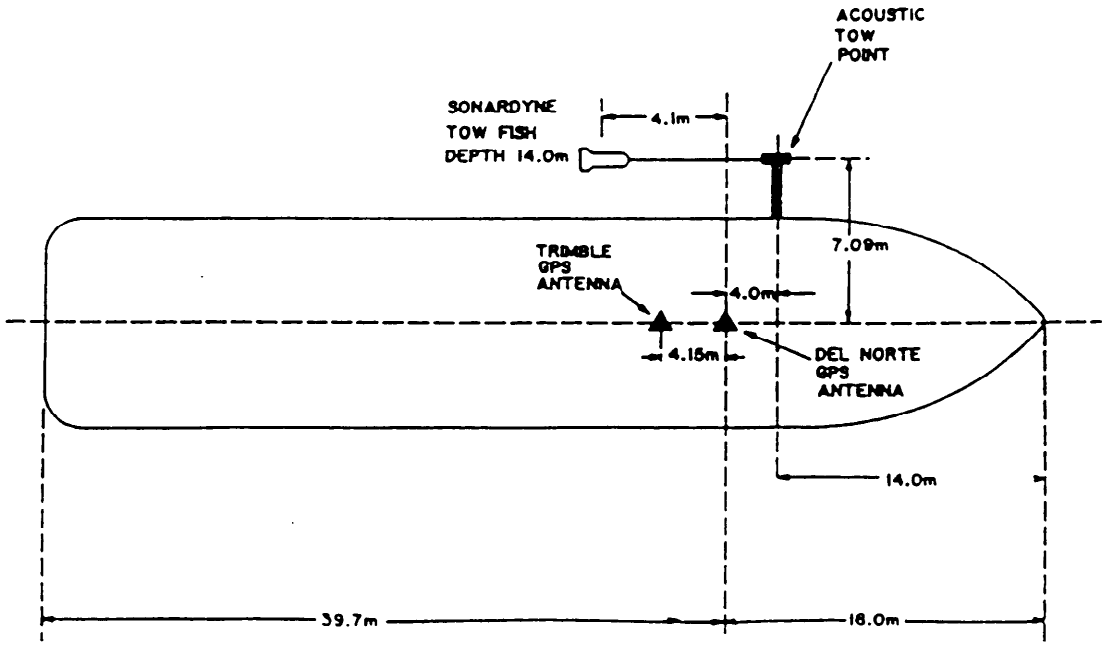


OFFSET DIAGRAM

PACIFIC MARLIN

(NOT TO SCALE)





APPENDIX B

VELOCITY PROFILE PRINTOUTS - MINERVA-2

Configuration File for APPLIED MICROSYSTEMS LTD. STD S/N 599.
SOFT-12.STD version 2.35

You have specified a CGA compatible monitor.

The communication parameters are 2400 baud, COM1:.

The REAL TIME DISPLAY SAMPLE RATE is set at 1 sample every 5 sec.

There is a PRESSURE sensor.

PRESSURE will be displayed in meters.

There is a CONDUCTIVITY sensor.

There is a TEMPERATURE sensor.

There is no DISSOLVED OXYGEN sensor.

DISSOLVED OXYGEN display units not applicable.

There is no PH sensor.

There is no TRANSMISSOMETER.

There is no REDOX sensor.

Water density will be displayed as Specific Gravity.

Data log time increment is one scan every 60 seconds.

Data log depth increment is one scan every 100 cm.

Sound velocity calculated using Chen & Milleros formula.

Sensor Coefficients

	A	B	C	D
Pressure	-6.086856E+02	2.999532E-02	1.225578E-08	0.000000E+0
Temperature	4.104309E+01	-1.478494E-03	1.807922E-08	-2.454137E-1
Conductivity	-1.588024E+00	7.944621E-05	0.000000E+00	0.000000E+0

STD-12 DATA PRINTOUT FACILITY File name - min2.rel
Created - 09-10-1993

Time sec.	Temp ½C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
1918	13.665	1.43	42.01	35.37	1.026500	1502.8
1920	13.702	0.31	42.06	35.38	1.026500	1503.0
1924	13.663	1.34	42.04	35.40	1.026600	1502.9
1927	13.665	2.52	42.05	35.41	1.026600	1502.9
1929	13.661	3.58	42.06	35.42	1.026600	1502.9
1932	13.657	4.97	42.06	35.42	1.026600	1502.9
1933	13.657	6.44	42.06	35.43	1.026600	1503.0
1934	13.658	7.68	42.07	35.43	1.026600	1503.0
1936	13.658	8.71	42.07	35.43	1.026600	1503.0
1939	13.658	9.89	42.08	35.44	1.026600	1503.0
1940	13.659	11.04	42.08	35.44	1.026600	1503.1
1940	13.660	12.22	42.08	35.44	1.026600	1503.1
1942	13.659	13.31	42.09	35.45	1.026600	1503.1
1945	13.660	14.40	42.09	35.45	1.026600	1503.1
1946	13.659	15.58	42.10	35.45	1.026600	1503.1
1946	13.662	16.95	42.09	35.45	1.026600	1503.2
1948	13.660	18.19	42.10	35.45	1.026600	1503.2
1949	13.659	19.28	42.10	35.45	1.026600	1503.2
1950	13.661	20.65	42.10	35.45	1.026600	1503.2
1951	13.659	21.74	42.10	35.46	1.026600	1503.2
1951	13.659	22.95	42.10	35.46	1.026600	1503.3
1952	13.660	24.26	42.10	35.45	1.026600	1503.3
1953	13.659	25.60	42.10	35.45	1.026600	1503.3
1953	13.656	26.96	42.11	35.46	1.026600	1503.3
1954	13.657	28.33	42.10	35.46	1.026600	1503.3
1954	13.656	29.61	42.10	35.46	1.026600	1503.4
1955	13.656	30.79	42.11	35.46	1.026600	1503.4
1956	13.655	31.91	42.11	35.46	1.026600	1503.4
1956	13.655	32.94	42.11	35.46	1.026600	1503.4
1957	13.654	34.40	42.11	35.46	1.026600	1503.4
1958	13.654	35.77	42.11	35.46	1.026600	1503.5
1959	13.653	36.95	42.11	35.46	1.026600	1503.5
1960	13.649	38.38	42.11	35.47	1.026600	1503.5
1960	13.644	39.63	42.10	35.46	1.026600	1503.5
1961	13.634	40.81	42.10	35.47	1.026600	1503.5
1961	13.627	41.99	42.07	35.45	1.026600	1503.5
1962	13.590	43.24	42.07	35.48	1.026600	1503.4
1963	13.586	44.30	42.07	35.48	1.026600	1503.4
1964	13.585	45.45	42.07	35.48	1.026600	1503.4
1965	13.584	46.60	42.07	35.48	1.026700	1503.4
1966	13.584	47.88	42.07	35.48	1.026600	1503.5
1966	13.583	49.15	42.07	35.48	1.026600	1503.5
1967	13.580	50.34	42.07	35.48	1.026600	1503.5
1968	13.579	51.52	42.07	35.48	1.026700	1503.5
1969	13.577	52.61	42.07	35.48	1.026700	1503.5
1970	13.577	54.04	42.07	35.49	1.026700	1503.5

STD-12 DATA PRINTOUT FACILITY
Created - 09-11-1993

File name - loch1.rel

Time sec.	Temp ½C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
1480	13.736	46.41	42.24	35.51	1.026600	1504.0
1482	13.736	45.32	42.24	35.50	1.026600	1503.9
1484	13.735	44.17	42.24	35.51	1.026600	1503.9
1486	13.736	43.02	42.24	35.51	1.026600	1503.9
1488	13.736	41.90	42.24	35.51	1.026600	1503.9
1489	13.735	40.84	42.24	35.51	1.026600	1503.9
1490	13.735	39.81	42.24	35.50	1.026600	1503.8
1496	13.736	38.63	42.24	35.50	1.026600	1503.8
1497	13.735	37.23	42.24	35.51	1.026600	1503.8
1498	13.735	35.99	42.24	35.51	1.026600	1503.8
1499	13.735	34.93	42.24	35.51	1.026600	1503.8
1502	13.733	33.78	42.23	35.50	1.026600	1503.7
1504	13.734	32.75	42.23	35.50	1.026600	1503.7
1509	13.733	31.60	42.23	35.51	1.026600	1503.7
1510	13.733	30.29	42.23	35.51	1.026600	1503.7
1513	13.733	29.24	42.23	35.51	1.026600	1503.7
1515	13.732	28.12	42.23	35.51	1.026600	1503.6
1519	13.733	27.00	42.23	35.50	1.026600	1503.6
1520	13.732	25.91	42.23	35.50	1.026600	1503.6
1521	13.728	24.79	42.22	35.50	1.026600	1503.6
1527	13.730	23.73	42.23	35.51	1.026600	1503.6
1528	13.730	22.61	42.23	35.51	1.026600	1503.6
1531	13.731	21.49	42.23	35.51	1.026600	1503.5
1533	13.732	20.43	42.23	35.51	1.026600	1503.5
1539	13.726	19.34	42.22	35.50	1.026600	1503.5
1540	13.728	18.10	42.22	35.50	1.026600	1503.5
1542	13.730	16.92	42.22	35.51	1.026600	1503.5
1543	13.729	15.83	42.22	35.51	1.026600	1503.4
1548	13.727	14.71	42.22	35.51	1.026600	1503.4
1551	13.726	13.65	42.22	35.50	1.026600	1503.4
1553	13.727	12.53	42.22	35.51	1.026600	1503.4
1555	13.727	11.47	42.22	35.51	1.026600	1503.4
1557	13.727	10.45	42.22	35.50	1.026600	1503.3
1560	13.727	9.30	42.22	35.50	1.026600	1503.3
1562	13.728	8.21	42.22	35.50	1.026600	1503.3
1564	13.728	7.12	42.22	35.50	1.026600	1503.3
1566	13.731	5.97	42.22	35.51	1.026600	1503.3
1568	13.731	4.76	42.22	35.50	1.026600	1503.3
1570	13.729	3.70	42.22	35.51	1.026600	1503.2
1572	13.729	2.58	42.22	35.51	1.026600	1503.2
1573	13.730	1.46	42.22	35.51	1.026600	1503.2
1576	13.725	0.37	42.21	35.50	1.026600	1503.2

STD-12 DATA PRINTOUT FACILITY File name - min2.rel
Created - 09-10-1993

Time sec.	Temp ½C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
2098	13.657	14.80	42.13	35.49	1.026600	1503.2
2099	13.664	13.74	42.14	35.49	1.026600	1503.2
2103	13.669	12.56	42.14	35.48	1.026600	1503.2
2104	13.668	11.47	42.14	35.49	1.026600	1503.1
2106	13.666	10.35	42.13	35.48	1.026600	1503.1
2108	13.666	9.33	42.13	35.48	1.026600	1503.1
2109	13.670	8.30	42.13	35.48	1.026600	1503.1
2112	13.670	7.24	42.13	35.48	1.026600	1503.1
2114	13.672	6.16	42.14	35.49	1.026600	1503.1
2115	13.669	5.07	42.13	35.48	1.026600	1503.0
2117	13.670	3.95	42.13	35.48	1.026600	1503.0
2119	13.671	2.92	42.13	35.48	1.026600	1503.0
2122	13.674	1.74	42.13	35.48	1.026600	1503.0
2124	13.676	0.72	42.13	35.48	1.026600	1503.0

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

Client : BHP			Job No : A2134			Date : 10-9-93	Vessel : PA
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consu
SKYFIX PRIC PORT	✓		STD 12 / VELOCITY PROBE	✓		K EDDY	ITEM
SYLEDIS			ECHO SOUNDER (20/~~25~~)	✓		S KITT-IT	SIDESC
MICROFIX			SIDESCAN (~~595~~/531/~~PINGER~~)	✓		D BELL	E/SOUNI
ARGO			BOOMER (~~DELPH~~ / EPC)	✓			ELICS I
GNS IID	✓		SPARKER (DELPH / EPC)				DISKS
GYRO MK 10	✓		CORING (GRAVITY / GRAB)				PRINTE
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC RC
TELEMETRY			UNDERWATER TRACKING			B EDMONDS.	
SONARDYNE COMPATTS x4	✓						
SONARDYNE PAN x 1	✓						
SONARDYNE (Dunker/Winch/Fish)	✓						

DIARY OF OPERATIONS :

1325 - Commenced Boat Calibration data collection of TP1 (601) C
Nav Skyfix/Trimble/DNAVN/Adelaide Ref. SV's 2, 16, 18, 19, 27, 31
1415 - Completed Boat calibration of TP1 (601) 290 Samples
Easting 669 441·07m Northing 5 713 313·52 RMS
1437 - Commenced Boat Calibration data collection of TP2 (602)
Nav Skyfix/Trimble/DNAVN/Adelaide Ref SV's 27, 16, ~~18~~ 19, 26, 2
1518 Completed Boat calibration of TP2 (602) 293 Samples
Easting 670 502·83m Northing 5 713 164·09 RMS
1543 Commenced Boat Calibration data collection of TP3 (604) Cir
Nav Skyfix/Trimble/DNAVN/Adelaide Ref SV's 2, 7, 19, 26, 27 1100
1625 - Completed Boat calibration of TP3 (604) 291 Samples
Easting 670 566·16m Northing 5 712 162·61m RMS: 4

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Su

Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature

MINV2-2A/PE900117/P616

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : A2134 | Date : 10/1/93 | Vessel : PACIFIC MARLIN | Anchors / Tpdrs

RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX PRIC PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/~~25~~)	✓		S KITTAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (~~595~~/531/PINGER)	✓		D BELL	E/SOUNDER PAPER				
ARGO			BOOMER (~~DELPH~~ / EPC)	✓			ELICS PAPER				
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS.					
SONARDYNE COMPATTS x4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1325 - Commenced Boxin Calibration data collection of TP1 (601) Circle Radius 250m
New SkyFix/Trimble/DNAVN/Adelaide Ref. SV's 2, 16, 18, 19, 27, 31 HDOP: 1.5 VDOP: 2.7 Thr 1.1m.
1415 - Completed Boxin calibration of TP1 (601) 290 Samples
E: 669 441.07m N: 5713 313.52 RMS 2.8 NIL EDITS
1437 - Commenced Boxin Calibration data collection of TP2 (602) Circle Radius 250m
New SkyFix/Trimble/DNAVN/Adelaide Ref SV's 2, 7, 16, 19, 26, 27, 31 HDOP 1.4 VDOP 1.6 Thr 1.1
1518 Completed Boxin calibration of TP2 (602) 293 Samples
E: 670 502.93m N: 5713 164.09 RMS: 3.8 NIL EDITS.
1543 Commenced Boxin Calibration data collection of TP3 (604) Circle Radius 250m
New SkyFix/Trimble/DNAVN/Adelaide Ref SV's 2, 7, 13, 19, 26, 27 HDOP: 1.6 VDOP 2.2 Thr: 1.7
1625 - Completed Boxin calibration of TP3 (604) 291 Samples
E: 670 566.16m N: 5712 162.61m RMS: 4.0

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K. Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature
CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/PI7

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX			WI
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 10-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/~~25~~)	✓		S KITTAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (~~595~~/531/PINGER)	✓		D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (~~DELRH~~ / EPC)	✓			ELICS PAPER				
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO MK10	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS x4	✓										
SONARDYNE PAN x1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1955 - Completed Absolute Calibration Calculation.

Results : TP	Addr	Channel	Easting	Northing	Depth
1	601	1	669 440·81	S 713 314·43	55·4
2	602	2	670 501·02	S 713 166·03	58·1
3	604	4	670 566·27	S 712 161·85	56·4
4	701	5	669 597·55	S 712 298·76	59·4

Total Solution Standard Error - 4·42

* Absolute Results - Basin Results : TP	dEing	dNing
1	-0·26	0·91
2	-1·81	1·94
3	0·11	-0·76
4	-2·04	-0·25

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial
BLUE : Operations
YELLOW : Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

MINV 2-2A/PE900117/P18

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Seastate	Swell	Wind	
0000	3/4	2	SW-12	kts
0600	"	2m	SW-S 12	kts
1200	3/4	2-3m	W x S 20	kts
1800	3/4	2-3	SW x S 25	kts

Client : BHP			Job No : A2135			Date : 11-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/26)	✓		S KITAI	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)	✓		D BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)	✓		~~B EDMONDS~~	ELICS PAPER				
GNS MP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY / GRAB)				PRINTER CART.	1			
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

0000 - Pacific Medina at Leach And 1 location.

0730 - Setting up underwater equipment for deploying

0815 - Setting up for Speed of Sound Profile.

0845 - Carried out Speed of Sound Profile at Leach And 1 location MEAN: 1504.3

0830 - Commenced deploying underwater equipment E/S, Hydrophones, Boomer & SSS.

0920 E/S, Boomer, Hydrophones deployed, Tuning Boomer

1030 - Still trying to tune Boomer, some problems with EPC paper drive, Boomer record noisy.

1115 - Commenced deploying SSS towfish. Boomer record improved slightly.

1132 - SSS towfish deployed.

1200 - Commenced running lines at Leach And 1 with E/S SSS & Boomer

Nav on SkyFix/Trimble/DNA/Adelaide Ref SV's 2, 16, 18, 19, 21, 28, 29, 31 HDOP 1.2 VDOP 1.6

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds
CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/P19

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2135			Date : 11-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. LOW	ITEM				
SYLEDIS			ECHO SOUNDER (20/~~25~~)	✓		S. KITAT	SIDESCAN PAPER	3			
MICROFIX			SIDESCAN (~~595~~/531/PINGER)	✓		D BELL	E/SOUNDER PAPER	2			
ARGO			BOOMER (~~DELRH~~ / EPC)	✓			ELICS PAPER				
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO HDG	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS	2			
TELEMETRY			UNDERWATER TRACKING			B EDMONDS	PAINT PAPER	1 roll			
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker / Winch / Fish)	✓										

DIARY OF OPERATIONS :

1205 hrs - E/S Digitising on Channel 2 210 KHz F.n Interval 40 secs

1515 - Passing Squalls - Wind Strs 25-30 knots Sea State 5 to 6 Sallely Swell 2-3 metres.

1546 - Line 2 Boomer data poor - Squalls.

2115 - Completed running survey lines at Loch Ard-1

2150 - Commenced recovering SSS, Hydrophones, Boomer & E/S transducer

2215 - All equipment recovered.

2230 - Pacific Marlin departed Loch Ard-1 for Portland

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Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

RACAL SURVEY AUSTRALIA PTY LTD

RACAL

DAILY RECORD SHEET

Client : BHP			Job No : A2135			Date : 12-9-93	Vessel :
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Co
SKYFIX BIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITE
SYLEDIS			ECHO SOUNDER (20/25)	✓		J KITTAT	SID
MICROFIX			SIDESCAN (595/531/PINGER)	✓		D BELL	E/S(
ARGO			BOOMER (DELPH / EPC)	✓			ELI
GNS HP	✓		SPARKER (DELPH / EPC)				DIS
GYRO MRU5	✓		CORING (GRAVITY / GRAB)				PR
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EP(
TELEMETRY			UNDERWATER TRACKING			B EDMONDS	
SONARDYNE COMPATTS x 4	✓						
SONARDYNE PAN x 1	✓						
SONARDYNE (Dunker/Winch/Fish)	✓						

DIARY OF OPERATIONS :

0730 - Pacific Marlin anchored off Portland Breakwater.

A.M. & P.M. Pack up underwater equipment ready for shipping to Perth a
ready for transfer to Byford Dolphin.

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Transponders to be listed by type and serial numbers Following codes to be used. L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature _____

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX			
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 13-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX R.A.C. POINT	S		STD 12 / VELOCITY PROBE	S		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			S. KITT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D. DELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS HP	S		SPARKER (DELPH / EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	S										
SONARDYNE (Dunker/Winch/Fish)	S										

DIARY OF OPERATIONS :

0900 - Pacific Marl - under way, medoc for Ldn. in Portland Harbour
0935 - Pacific Marl - berthed alongside Tanker Berth Portland.
1000 - All underwater equipment off loaded from Pacific Martin to K&S Freighters (x 4.)
1045 - Unload the pickup hire 8KVA generator from Pacific Martin.
1145 - Proceeded depart Pacific Martin for Richmond Heavy Metal.
1200 - Pacific Martin departs Tanker Berth.

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Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE - Commercial Ops
BLUE : Operations
YELLOW - Clients Representative

Signature W. Edmonds CLIENTS REPRESENTATIVE

MINV 2-2A / PE900117 / P22

RACAL SURVEY AUSTRALIA LIMITED

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2.34			Date : 14-9-93	Vessel :			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX P.C. PORT	S		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			S KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS	S		SPARKER (DELPH / EPC)				DISKS				
GYRO	S		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			R. EDMONDS					

SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	S										
SONARDYNE (Dunker/Winch/Fish)	S										

DIARY OF OPERATIONS:

Prepared in Portland waiting on helicopter flight to Byford Dolphin.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers. Following codes to be used: L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds.
CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/P24

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

W..	Last Stat...	Small	Remain.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 15.9.93	Vessel :			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX BIG PORT	S		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			S KITTAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS	S		SPARKER (DELPH / EPC)				DISKS				
GYRO	S		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x4	✓										
SONARDYNE PAN x1	S										
SONARDYNE (Dunker/Winch/Fish)	S										

DIARY OF OPERATIONS :

Personnel in Portland waiting on helicopter flight to Byford Dolphin.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds. CLIENTS REPRESENTATIVE

MINV2-2A / PE900117 / P25

RACAL

DAILY RECORD SHEET

0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 16.9.93	Vessel : Byford Dolphin			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX S.C. PORT	1420		STD 12 / VELOCITY PROBE	S		K. EDDY	ITEM			6	
SYLEDIS			ECHO SOUNDER (20/25)			S ~~KRALL~~ KITAT	SIDESCAN PAPER			12	
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL.	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER				
GNS			SPARKER (DELPH/EPC)				DISKS				
GYRO SC 1000	1230		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DL-I	1530		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS.					
SONARDYNE COMPATTS x 4	✓		Geo LASER	S							
SONARDYNE PAN x 1	S										
SONARDYNE (Dunker/Winch/Fish)	S										

DIARY OF OPERATIONS :

1030 - K Eddy departed Portland by helicopter for Byford Dolphin.
1103 K Eddy arrives Byford Dolphin.
1331 - S Kraft, D. Bell and B Edmonds arrive Byford Dolphin by helicopter.
1400 Survey equipment operational.
1535 - Byford Dolphin 9.7 nm from 3nm approach point
1730 - Byford Dolphin 2.2nm from 3nm approach point.
1800 - Byford Dolphin commencing run in to Minerva 2 location.
1833 - Byford Dolphin 1nm from Anchor #6 drop point.
1900 - Byford Dolphin Let Go Anchor #6, Ray continuing run in to location.
1930 - Byford Dolphin stopped paying out Anchor #6.
1945 - Byford Dolphin off loading cargo from Boom Vessel.
2035 Byford Dolphin passed Anchor #12 pennant.

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Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds
CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/P26

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 16.9.93	Vessel : BYFORD DOLPHIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX D.G. BOAT	✓		STD 12 / VELOCITY PROBE			K RILEY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			S ~~KSHEPT~~ KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS INC	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO SPERRY 1000	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DI-I	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDWARDS					
SONARDYNE COMPATTS x4	✓		GOLF LASER	✓							
SONARDYNE PAN x1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

2103 - Bona Vista commenced running anchor #12

2107 - Problems with anchor #12 winch broke.

2113 - Continuing to run anchor #12

2123 - Bona Vista commenced lowering anchor #12 to seabed.

2129 - Anchor #12 on the seabed. E.ing 669579m N.ing 5 711 883m

2223 - Bona Vista commenced running anchor #7.

2252 - Bona Vista unable to run anchor out far enough. Will recover to 300m and try again.

2345 - Problems with anchor #7 winch on recovery of anchor ~~chain~~ chain fouled on winch.

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K. Riley
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature W. Edwards.
CLIENTS REPRESENTATIVE

MINV2-2A / PE900117 / P27

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

W..	Sea State	Swell	Weather
0000	0	0	
0600	5		
1200			
1800			

Client : BHP			Job No : A2134			Date : 17-9-93	Vessel : BIFORD DOLPHIN			Anchors / Tails	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX BIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN	1	602.
SYLEDIS			ECHO SOUNDER (20/25)			S KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART				
TRIMBLE ~~SST's~~ DGPS	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY	✓		UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x4	✓		CALF LASER	✓							
SONARDYNE PAN x1	✓										
SONARDYNE (Dunker / Winch / Fish)	✓										

DIARY OF OPERATIONS :

0001 - Byford Dolphin still trying to clear parted chain on anchor #7 winch.
0008 Byford Dolphin recommenced recovering anchor #7
0015 - Bora Vista commenced running anchor #7
0125 - Anchor #7 chain parted whilst being run. 665 metres of chain out.
0150 approx - Bora Vista work wire parted, anchor #7 and chain on the seabed.
0334 - Far Sword commenced running anchor #1.
0354 - Far Sword commenced lowering anchor #1
0427 - Anchor #1 on the seabed. E. 669101m N. 5 712 344m
0445 - Bora Vista / Byford Dolphin starting up to try and grapnell for anchor #7 & chain.
0500 - Bora Vista continuing to grapnell for anchor #7 & chain.
0700 - Bora Vista has recovered a length of anchor #7 chain.
0745 - Release Compat 602 and unit recovered by the Pacific Marlin Rescue Boat

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Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds CLIENTS REPRESENTATIVE

MINV 2-24 / PE900117 / P28

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

Client : BHP			Job No : A2134			Date : 17-9-93	Vessel :
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	C
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	IT
SYLEDIS			ECHO SOUNDER (20/25)			S. KITAT	SI
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL	E/S
ARGO			BOOMER (DELPH / EPC)				EL
GNS	✓		SPARKER (DELPH / EPC)				DI
GYRO SPERRY	✓		CORING (GRAVITY / GRAB)				PI
TRIMBLE ~~SST's~~ DGI	✓		THEODOLITE / EDM			CLIENT Personnel	EF
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS	
SONARDYNE COMPATTS x #3	✓		GOAT LASER	✓			
SONARDYNE PAN x 1	✓						
SONARDYNE (Dunker/Winch/Freq)	✓						

DIARY OF OPERATIONS :

0836 - Anchor #11 pennant passed to Far Sword
0913 - Far Sword commenced running anchor #11.
0918 - Problems with anchor #11, anchor has turned.
0947 Far Sword continuing to run anchor #11.
1000 - Far Sword commenced lowering anchor #11.
1010 - Anchor #11 on the seabed. E.ing 669 910m N.ing 5711 530
1153 - Far Sword commenced running anchor #2
1215 - Far Sword commenced lowering anchor #2
1216 - Anchor #2 on the seabed E.ing 669 073m N.ing 5712 74[illegible]
1330 - WORKING ON #5 - ATTATCHING CHASER.
1503 - FAR SWORD RUNNING #5
1518 - FAR SWORD COMMENCED LOWERING #5

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Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed

Signature K. EDDY
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature

MINV2-2A / PE900117 / P29

RACAL

DAILY RECORD SHEET

0000	0	L	VAR-2 kts
0600	1	L	VAR-5 kts
1200	1	L	VAR-5 kts
1800	1	L	VAR-5 kts

Client : BHP			Job No : A2134			Date : 17-9-93	Vessel : BEDFORD DOLPHIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. ELDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			S KITAT	SIDESCAN PAPER			5	
MICROFIX			SIDESCAN (595/531/PINGER)			D BELL	E/SOUNDER PAPER			8	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			4	
GNS [illegible]	✓		SPARKER (DELPH / EPC)				DISKS			10	
GYRO [illegible]	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DLI	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 3	✓		Gulf Laser	✓							
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1525	ANCHOR #5 ON BOTTOM. E 570055 N 5713503
1632	FAR SWORD COMMENCE. RUNNING #8
1650	FAR SWORD COMMENCE LOWERING #8
1655	ANCHOR #8 ON BOTTOM E 670695 N 5712584
1747	FAR SWORD COMMENCE RUNNING #9
1801	FAR SWORD COMMENCE LOWERING #9
1807	ANCHOR #9 ON BOTTOM E 670555 N 5712224
1853	- Far Sword commenced running anchor #10
1911	- Far Sword commenced lowering anchor #10
1919	- Anchor #10 on the seabed E ing 670325 N ing 5711 853
2028	- Far Sword commenced running anchor #3
2042	- Far Sword commenced lowering anchor #3

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Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial
BLUE : Operations
YELLOW : Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

MINV 2-24 / PE900117 / P30

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

W..	[illegible]	[illegible]	[illegible]
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 17-9-93	Vessel : BYFORD DOLPHIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K EDDY	ITEM	USED	REMAIN	3	
SYLEDIS			ECHO SOUNDER (20/25)			S. KATAT	SIDESCAN PAPER			4	
MICROFIX			SIDESCAN (595/531/PINGER)			D BALL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO SG 1000	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DLI	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 3	✓		Gas LASER	✓							
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

2050 - Anchor #3 on the seabed. E inv 669 239 m N inv 5 713 200 m

2216 - Far Sword commenced running anchor #4

2230 - Far Sword commenced lowering anchor #4

2243 - Anchor #4 on the seabed E inv 669 573 m N inv 5713 424 m

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K. Eddy
SURVEYOR/ENGINEER

WHITE	: Commercial Office
BLUE	: Operations
YELLOW	: Clients Representative

Signature W. Edmonds.
CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/P31

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

	Sea	Swell	Dir.
0000	1	L	VAR. 5W
0600	3	L-J	330-15
1200			
1800			

Client : BHP			Job No : 4127			Date : 19-9-93	Vessel : BYFORD DOLPHIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX [illegible] PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN	7	
SYLEDIS			ECHO SOUNDER (20/25)			S. KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC			SPARKER (DELPH / EPC)				DISKS				
GYRO [illegible]	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DLI	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS x3	✓		GOLF LASER	✓							
SONARDYNE PAN > 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

0530 - Byford Dolphin preparing to run anchor #7

0605 - Far Sword commenced running anchor #7

0705 - Anchor #7 on the seabed. E ing 670749m N ing 5713020m

0730 - Byford Dolphin commencing to move towards Minerva-2 location (60 mtrs @ 065°)

0800 - D. Bell transferred to Pacific Merlin by basket.

0853 - Byford Dolphin commenced P.C. Tensioning anchors

1045 - Byford Dolphin completed P.C. Tensioning all anchors.

1130 - Byford Dolphin commenced ballasting down to drilling draught.

Byford Dolphin ~~commenced~~ completed ballasting down.

1554 - Commenced collecting DGPS data for final position of Byford Dolphin at Minerva-2.

1640 - 1752 - Pacific Merlin recovered all remaining Sonardyne Transponders at Minerva-2.

1726 Completed collecting DGPS data for final position.

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmond CLIENTS REPRESENTATIVE

MINV 2-2A/PE900117/P32

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

0000			
0600			
1200	3	Low	030-15 kts
1800			

Client : BHP			Job No : A2134			Date : 13-9-93	Vessel : Byford Dolphin			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM				601
SYLEDIS			ECHO SOUNDER (20/25)			D BELL	SIDESCAN PAPER				604
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				701
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO SG 1000	✓		CORING (GRAVITY / GRAB)				PRINTER CART.	1			
TRIMBLE ~~SST6~~ D.I.	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS	PRINT PAPER	1 ROLL			
SONARDYNE COMPATTS x4	S		GOLF LASER								
SONARDYNE PAN x2	S										
SONARDYNE (Dunker/Winch/Fish)	S										

DIARY OF OPERATIONS :

1105 - Final Position of Byford Dolphin at Minerva-2

Lat : 38° 43' 04.165" S Long : 142° 57' 19.476" E

E ing : 670 000.74 m N ing : 5 712 706.29 m

This places Minerva-2 well 10.65 metres on a bearing of 298.5° (T) from the intended location.

1140 - S Khat departs Byford Dolphin by helicopter for Portland.

1925 - K. Eddy & B. Edmonds basket transfer from Byford Dolphin to Pacific Martin.

1930 - Pacific Martin steaming overnight to Loch Ard-1 location.

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K Eddy SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature W. Edmonds CLIENTS REPRESENTATIVE

MINV2-2A / PE900117 / P 33

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 19.9.93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIC PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM			601	
SYLEDIS			ECHO SOUNDER (20/25)			D BELL	SIDESCAN PAPER			602	
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER			604	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			701	
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO MK.10	✓		CORING (GRAVITY / GRAB)				PRINTER CART				
TRIMBLE ~~SST's~~ DLI	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker / Winch / Fish)	✓										

DIARY OF OPERATIONS :

0100 - Pacific Marlin at Lock Ard-1 location.

0515 - Setting up to deploy Sonardyne transponders at Lock Ard-1

0624 - Deployed Sonardyne Transponder 601 S/N° 49412-01 BC 0 Volts 28.4 Offset 0
Easting 688 557.35m Northing 5 699 084.84 m Depth 111m

0936 - Deployed Sonardyne Transponder 602 S/N° 49412-02 BC 0 Volts 27.1 Offset 0
Easting 689 611.60 Northing 5 688 962.97 Depth 72.2m

0607 - Deployed Sonardyne Transponder 604 S/N° 49412-04 BC 0 Volts 27.6 Offset +0.3
Easting 689 674.97m Northing 5 687 960.96 m Depth 72.1m

0623 - Deployed Sonardyne Transponder 701 S/N° 49412-11 BC 0 Volts 28.0 Offset +0.4
Easting 688 688.02 Northing 5 699 033.54 Depth 72.7

0735 - Commenced Relative/Absolute Calibration data collection at Lock Ard-1 Acoustic Array
Now SkyFix/Trimble/DNAV's 1, 14, 15, 25, 26 HDOP 1.9 VDOP 2.6 THR 1.5

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K. Eddy
SURVEYOR/ENGINEER

WHITE : Comm... Office
BLUE : Operations

Signature M. Edmonds
CLIENTS REPRESENTATIVE

MINV2-2A / PE900117 / P34

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 19-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG ROAT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			L. BELL	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER				
GNS 1:P	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO MK 12	✓		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ D.F	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

0820 - Completed Relative/Absolute Calibration data collection of Loch Med 1 Acoustic Array - 1000 Samples
0830 - Commenced Box-In Calibration data collection of TP2/602 Radius 250m
0847 - Completed Box-In Calibration data collection of TP2/602
Ein 689 621.11m Nin 5688 952.97m Depth 72.2m RMS 3.1m. Nil Edits
0900 - Commenced Box-In Calibration data collection of TP3/604 Radius 250m
0942 - Completed Box-In Calibration data collection of TP3/604
Ein 689 666.43m Nin 5687 969.15m Depth 72.1 RMS 3.5m Nil Edits
0955 - Commenced Box-In Calibration data collection of TP4/701 Radius 250m
1003 - Completed Box-In Calibration data collection of TP4/701
Ein 688 697.44m Nin 5688 068.82 Depth 72.7 RMS 3.8m Nil Edits
1011 - Disabled Transponder TP4/701 B.C. 4 Volts 27.5 E=Ø
1017 - Disabled Transponder TP1/601 B.C. 4 Volts 27.7 E=Ø

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Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

ignature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

nature W. Edmonds. CLIENTS REPRESENTATIVE

MINV 2-24 /PE900117 /P35

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

	Sea	Swell	Tdir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2.314			Date : 19 9.93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIC PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EUDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			D BELL	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE ~~SST's~~ DL I	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS.					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (~~Dunker~~/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1019 - Disabled TP 3/604 B.C. 4 Volts 27.2 E:Ø

1021 - Disabled TP 2/602 B.C. 4 Volts 27.0 E:Ø

1026 - Sonardyne Tow Fish recovered.

1030 - Pacific Marlin departed work Area location for Portland.

1032 - Commenced Relative calibration calculation.

~~1130~~ 1130 - Completed Relative calibration calculation

Results	TP	Addr	Chan.	X Co-Ord	Y Co-Ord	Depth
	1	601	1	0.00	0.00	68.51
	2	602	2	1066.39	0.00	68.50
	3	604	4	1230.47	-975.93	67.55
	4	701	5	256.52	-993.09	69.64

Total Solution Standard Error 0.53

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K Eudy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature N. Edmonds
CLIENTS REPRESENTATIVE

MINV-2-2A / PE900117 / P36

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 19-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			D BELL	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER				
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY/GRAB)				PRINTER CART.	1			
TRIMBLE ~~SST's~~ DL I	✓		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS	PRINT PAPER	1 ROLL			
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1132 - Commenced Absolute calibration calculation

- Completed Absolute calibration calculation

Results TP	Addr	Chan	Easting	Northing	Depth	Box-In Result Difference dE	dN
1	601	1	688 562.17	5 699 035.18	68.51	N/A	N/A
2	602	2	689 620.64	5 688 955.49	66.50	-0.47	2.52
3	604	4	689 664.82	5 687 966.55	67.55	-1.61	-2.30
4	701	5	688 696.01	5 693 068.28	68.64	-1.43	-0.54

Total Solution Standard Error: 4.48

1930 - Pacific Marlin arrives Portland.

7

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature

MINV 2 - 2A / PE900117 / P37

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

	Wi.	Sea Sta.	Swell	Weather
0000				
0600				
1200				
1800				

Client : BHP			Job No : AZ124			Date : 20.9.93	Vessel :			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX			STD 12 / VELOCITY PROBE			K EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			D BELL	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			S KTTAT	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS			SPARKER (DELPH / EPC)				DISKS				
GYRO			CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

0720 - K. Eddy, D. Bell and B. Edmonds depart Portland Airport for Melbourne Airport

0810 - Personnel arrive Melbourne Airport

0850 - K. Eddy & S. Kttat depart Melbourne Airport for Perth Airport. D. Bell departs Melbourne

1043 - K. Eddy & S. Kttat arrive Perth.

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office

Transponders to be listed by type and serial numbers Following codes to be used L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface

Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial
BLUE : Operations
YELLOW : Clients Representative

Signature
CLIENTS REPRESENTATIVE

MINV2-2A / PE900117 / P38

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
06L			
1200			
1800			

Client : BHP			Job No : A2134			Date : 21-9-93	Vessel : BIRD DOLPHIN.			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX			STD 12 / VELOCITY PROBE			K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)				SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS			SPARKER (DELPH/EPC)				DISKS				
GYRO			CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

1125 - K. Eddy departs Perth for Melbourne
1615 - Arrive Melbourne
1955 - K. Eddy departs Melbourne for Portland.
1940 - Arrive Portland
2005 - Arrive Richmond Henty Motel.

Forms are to be completed daily in duplicate on all vessels Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature M. Edmonds
CLIENTS REPRESENTATIVE

MINV2-24 / PE900117 / P39

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind
0000			
0600			
1200			
1800			

Client: BHP			Job No: A213..			Date: 22-9-93	Vessel: BYFORD DOLPHIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	0930		*STD 12 / VELOCITY PROBE			K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)				SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER				
GNS	0930		SPARKER (DELPH/EPC)				DISKS				
GYRO	0930		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE SST's D. T.	0930		THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS:

0930 Vessel depart Rockwood Ship Yard for Esso Airport

0945 Depart Esso Airport for Byford Dolphin

1000 Arrive Byford Dolphin

1030 Survey equipment set up and operational. Instruments ready to run Zeroch reduction

Waiting final position.

1400 Commence collecting DGPS data in preparation for Position of Byford Dolphin at Mineral 2A

1500 Completed collecting DGPS data for Mineral 2A position

1600 Final Position of Byford Dolphin at Mineral 2A

Lat 38° 43' 04.935" South Long 142° 57' 20.800" East

E = 670 032.46 m N = 5 712 694.21 m Rig Heading 227.1°T

Rig placed Mineral 2A 235 m(s) on a bearing of 105.6° (T) from the intended position.

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Transponders to be listed by type and serial numbers. Following codes to be used: L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface

WHITE Commercial Office

Signature

CLIENTS REPRESENTATIVE

MINV2 - 24 / PE900117 / P40

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
060			
1200			
1800			

Client : BHP			Job No : A2[illegible]			Date : 28.9.93	Vessel :			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX			STD 12 / VELOCITY PROBE			P. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)				SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)				E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS			SPARKER (DELPH/EPC)				DISKS				
GYRO			CORING (GRAVITY / GRAB)				PRINTER CART				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDWARDS					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

12[illegible] K. Edd. & B Edwards depart Bydgal Dolphin for Portland Airport

[illegible] Personnel arrive Portland

[illegible] K.Edd. + B Edwards depart Portland for Melbourne Airport

[illegible] Personnel arrive Melbourne

[illegible] K.Edd. departs Melbourne Airport for Perth

[illegible] K.Eddy arrives Perth

Forms are to be completed daily in duplicate on all vessels Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office

Transponders to be listed by type and serial numbers Following codes to be used L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface

Signature _____ SURVEYOR/ENGINEER

WHITE - Commercial Office
BLUE - Operations
YELLOW - Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

APPENDIX I

ACOUSTIC NET DEPLOYMENT AND OASIS CALIBRATION PRINTOUTS - LOCH ARD-1

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : +0.0

System Status

HP330 computer
Acoustic System : Med Frequency Sonardyne (HPIB Addr. 2)
Reference System : Delta Nav (Interface 80 Port 2)
Interface 80 is available on HPIB Addr. 1.
Synchro Gyro Headings are entered via Interface 80, port 5.

Job Information

LOCH ARD-1 for BHP on PACIFIC MARLIN by Ken Eddy

Acoustic Net Definition

4 transponders at a max range of 2500m

Transponder		Code	Reply Frequency	Turn-around Delay
1	CPT7	601	1	125.00
2	CPT7	602	2	125.00
3	CPT7	604	4	125.00
4	CPT7	701	5	125.00

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	666554.74	5689105.16	72.00
2	669622.60	5688973.76	72.00
3	669651.60	5687965.10	72.00
4	666699.69	5688094.00	72.00

All metres

Speed of Sound

16 Depth Values entered Directly

Depth(m)	Speed of Sound(m/s)
1.00	1503.10
5.47	1503.20
10.98	1503.30
15.52	1503.40
20.12	1503.50
25.66	1503.60
30.92	1503.70
35.04	1503.80
40.47	1503.90
45.01	1503.90
51.31	1504.00
55.12	1504.10
60.08	1504.20
64.91	1504.30
70.69	1504.40
76.[illegible]	1504.50

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

Acoustic Transducer Offsets

Tow Point X : -7.09m.
Tow Point Y : 8.15m.
Tow Point Z : 5.00m.
Tow Length : 20.00m.
Tow Speed : 2.50Kts.

Fish Layback : 11.56m.
Fish Depth : 11.30m.

WAYPOINT MODE

Dropping Transponder 2

Depth Sounder - Comfort Recovered.

*** Spar 2 Dropped at 10:42:05 ***

DATUM GPS : E 670084.65 N 5713312.99
STERN GPS : E 670054.90 N 5713332.50

** Positions Used for Drop

Modified Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670054.40	5713332.50	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

Modified Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

WAYPOINT MODE

Dropping Transponder 1

••• Tpdr 1 Dropped at 05:24:29 •••

DATUM	GPS	:	E	688527.57	N	5689104.15
STERN	GPS	:	E	688557.35	N	5689084.84

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	688557.35	5689084.84	72.00
2	689622.60	5688973.76	72.00
3	689651.50	5687965.10	72.00
4	688699.69	5688094.00	72.00

(in metres)

WAYPOINT MODE

Dropping Transponder 2

••• Tpdr 2 Dropped at 05:56:24 •••

DATUM	GPS	:	E	689603.13	N	5688997.45
STERN	GPS	:	E	689611.60	N	5688962.97

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	688557.35	5689084.84	72.00
2	689611.60	5688962.97	72.00
3	689651.50	5687965.10	72.00
4	688699.69	5688094.00	72.00

(in metres)

WAYPOINT MODE

Dropping Transponder 3

••• Tpdr 3 Dropped at 06:03:21 •••

DATUM	GPS	:	E	689668.36	N	5687926.08
STERN	GPS	:	E	689674.97	N	5687960.35

GPS Position Used for Drop

WAYPOINT MODE

Dropping Transponder 2

*** Tpdr 2 Dropped at 11:52:33 ***

DATUM	GPS	:	E	670451.19	N	5713164.62
STERN	GPS	:	E	670486.79	N	5713164.78

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.40
2	670486.79	5713164.78	57.00
3	670556.60	5712156.73	56.40
4	669576.01	5712290.47	59.40

(in metres)

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : -35.8

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : +0.0

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
PAN at 1500m
[illegible] Firmware Version: [illegible] : MF [illegible]
[illegible] Telemetry Wait set to 4sec
[illegible] Window Width set to [illegible]

BOX IN TRANSPONDER 2

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
2	10.3	72.2	1503.9	1.00258

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(met
1	689728.73	5688684.54	285.67	298.1	0.8
2	689719.35	5688687.85	279.62	298.6	0.0
3	689709.84	5688690.85	273.59	298.1	0.0
4	689700.60	5688693.54	268.48	297.5	0.0
5	689691.66	5688696.84	263.04	296.5	0.0
6	689682.32	5688699.54	258.17	294.8	0.0
7	689673.04	5688702.25	253.27	292.7	0.0
8	689661.38	5688705.34	248.41	290.4	0.0
9	689653.17	5688707.41	245.86	289.1	0.0
10	689640.97	5688708.84	243.23	288.7	0.0
11	689628.78	5688710.76	240.99	288.2	0.0
12	689620.16	5688711.90	239.28	288.1	0.0
13	689609.38	5688713.71	238.79	287.9	0.0
14	689598.56	5688714.80	238.24	287.8	0.0
15	689587.78	5688717.00	237.46	287.9	0.0
16	689576.64	5688718.22	238.51	288.5	0.0
17	689565.56	5688720.00	239.05	288.9	0.0
18	689554.52	5688721.50	240.06	289.5	0.0
19	689541.57	5688723.05	243.36	290.5	0.0
20	689530.23	5688724.50	245.12	291.2	0.0
21	689519.42	5688726.04	247.63	291.8	0.0
22	689508.21	5688727.61	251.64	292.2	0.0
23	689496.98	5688729.31	254.78	292.5	0.0
24	689485.96	5688732.11	258.15	296.9	0.0
25	689474.62	5688735.05	261.72	301.0	0.0
26	689463.89	5688738.04	264.89	304.5	0.0
27	689453.67	5688743.10	267.19	307.5	0.0
28	689443.11	5688747.44	269.66	311.7	0.0
29	689431.86	5688754.41	271.82	316.1	0.0
30	689423.59	5688761.94	272.80	318.9	0.0
31	689416.01	5688768.41	273.11	321.	0.0
32	689408.61	5688776.24	272.93	327.0	0.0
33	689402.62	5688785.32	272.71	330.6	0.0
34	689397.12	5688793.74	272.98	334.2	0.0
35	689392.37	5688803.79	270.84	338.1	0.0
36	689387.62	5688813.81	270.06	342.1	0.0
37	689384.15	5688822.30	267.23	345.8	0.0
38	689381.53	5688834.23	263.84	349.2	0.0
39	689379.18	5688844.50	261.91	350.8	0.0
40	689377.67	5688855.13	257.42	351.5	0.0
41	689377.85	5688866.31	255.72	352.6	0.0
42	689377.22	5688878.36	253.21	352.3	0.0
43	689377.75	5688890.01	248.34	351.9	0.0
44	689377.84	5688899.44	245.97	350.6	0.0
45	689377.76	5688909.74	245.49	348.8	0.0

Solution

Easting	Northing	Depth
689621.11	5688952.97	72.20

RMS Residual : 3.1

Worst 8 Values:		
	79	6.36
:	71	6.30
:	144	5.87
:	143	5.71
:	142	5.55
:	78	5.45
:	87	5.38
:	141	5.26

BOX IN TRANSPONDER 3

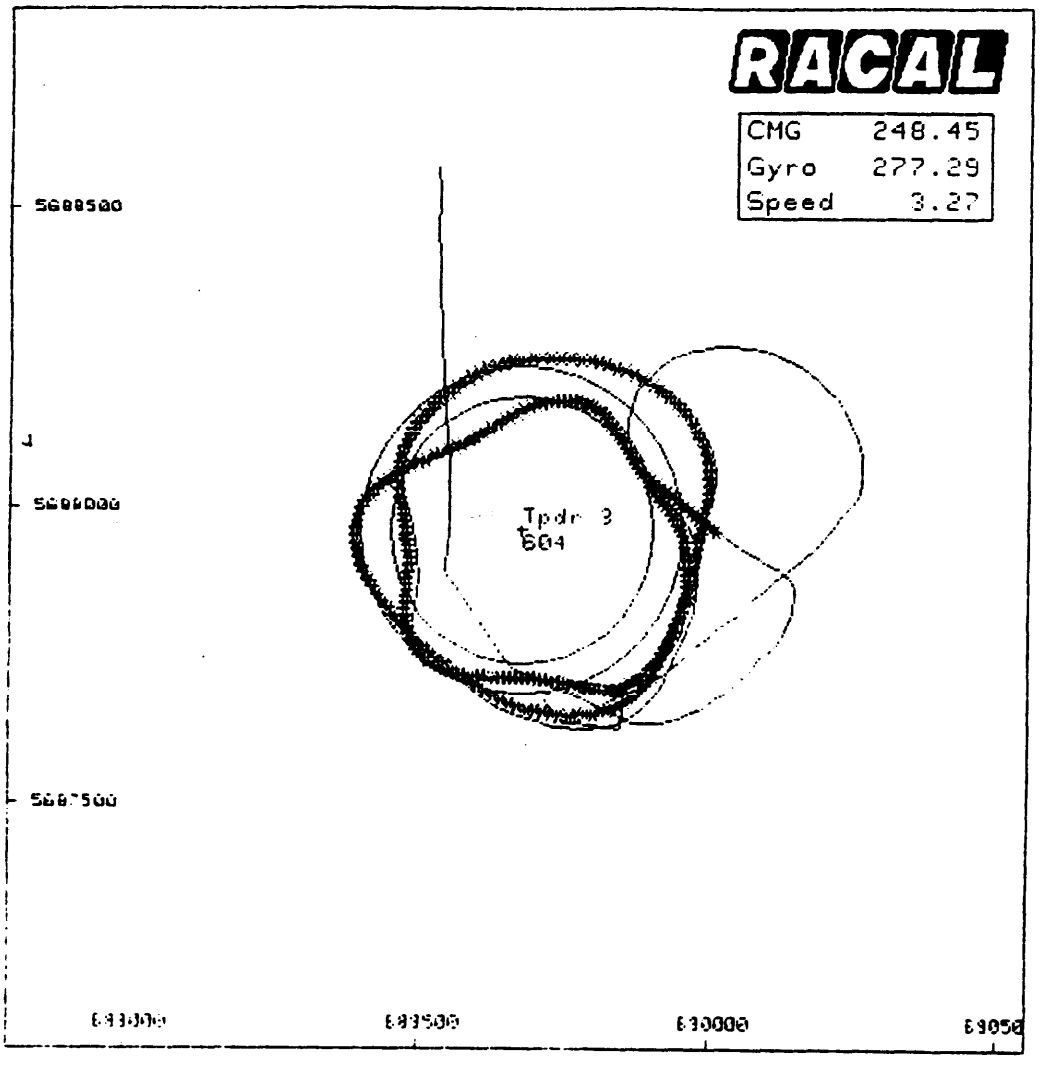
Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
3	10.3	72.1	1503.9	1.00258

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	690010.97	5687956.26	344.43	313.9	0.0
2	690002.76	5687962.92	335.65	313.5	0.0
3	689995.24	5687968.63	329.41	313.1	0.0
4	689987.95	5687974.04	321.10	312.7	0.0
5	689980.18	5687979.46	314.72	312.4	0.0
6	689972.47	5687985.79	307.15	311.7	0.0
7	689964.94	5687992.13	300.58	311.5	0.0
8	689956.96	5687998.79	292.68	311.0	0.0
9	689948.97	5688005.45	286.45	310.8	0.0
10	689941.21	5688011.49	278.38	310.4	0.0
11	689933.65	5688017.22	271.76	310.3	0.0
12	689925.72	5688023.30	264.67	311.3	0.0
13	689917.37	5688029.76	258.35	313.7	0.0
14	689907.25	5688035.68	250.82	316.6	0.0
15	689898.36	5688043.45	246.42	319.7	0.0
16	689889.23	5688049.38	241.23	322.5	0.0
17	689881.70	5688056.78	237.92	324.6	0.0
18	689876.40	5688065.35	236.21	326.2	0.0
19	689870.46	5688073.25	233.64	327.1	0.0
20	689865.39	5688081.41	231.78	327.2	0.0
21	689860.82	5688090.03	234.08	326.2	0.0
22	689855.71	5688098.17	232.17	324.8	0.0
23	689850.33	5688106.80	232.89	323.0	0.0
24	689844.89	5688115.29	231.77	320.2	0.0
25	689838.25	5688123.42	234.02	316.6	0.0
26	689832.65	5688132.04	234.26	313.3	0.0
27	689826.08	5688139.85	234.08	311.7	0.0
28	689817.57	5688147.71	232.82	310.0	0.0
29	689810.58	5688154.60	233.64	307.6	0.0
30	689803.09	5688160.56	233.87	303.6	0.0
31	689794.69	5688165.22	232.08	299.2	0.0
32	689787.19	5688169.22	231.73	294.6	0.0
33	689778.72	5688172.56	230.16	290.1	0.0
34	689769.51	5688174.73	227.44	285.6	0.0
35	689760.54	5688176.64	225.78	280.9	0.0
36	689750.72	5688177.36	222.09	276.9	0.0
37	689740.95	5688177.09	218.91	274.9	0.0
38	689730.90	5688175.68	214.43	273.2	0.0
39	689720.44	5688174.69	210.19	271.9	0.0
40	689709.90	5688172.61	206.63	269.1	0.0
41	689699.41	5688169.70	201.90	265.6	0.0
42	689687.32	5688166.17	196.26	263.1	0.0
43	689676.66	5688161.69	191.46	260.5	0.0
44	689666.46	5688156.90	186.24	258.0	0.0
45	689655.34	5688150.48	181.24	256.9	0.0

Fix Points for Box-in Calibration up to observation 156



Solution Residuals

No	Residual	Plan Range
1	.3	344.43
2	.0	335.65
3	.6	328.41
4	.5	321.10
5	.9	314.72
6	.7	307.15
7	1.2	300.58
8	.6	292.68
9	1.6	286.45
10	.4	278.38
11	.3	271.76
12	-.2	264.67
13	.2	256.35
14	1.0	250.82
15	2.9	246.42
16	4.4	241.23

Solution Residuals

No	Residual	Plan Range
282	2.3	321.42
283	2.3	322.46
284	2.4	322.90
285	2.1	323.85
286	1.1	324.61
287	1.0	326.89
288	-1.0	328.09
289	-2.1	328.42
290	-3.1	328.29
291	-2.0	330.12
292	-3.5	329.16
293	-3.2	329.19
294	-3.7	328.44
295	-3.9	327.62
296	-3.8	327.01
297	-4.2	325.46
298	-3.8	324.92
299	-3.2	324.31

Solution

Easting	Northing	Depth
589066.43	5637969.19	[illegible]

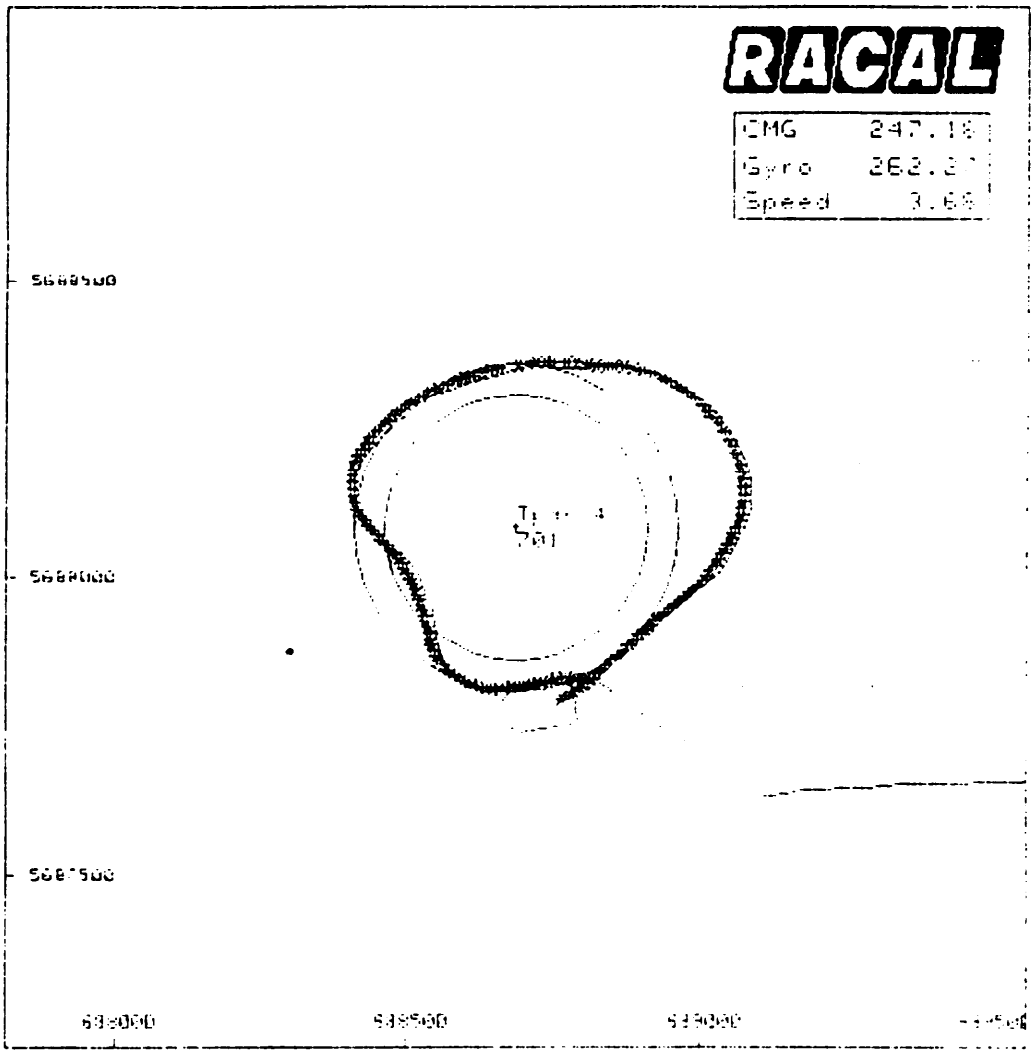
RMS Residual : 3.5

Worst 8 Values:		
	: 192	9.29
	: 191	8.05
	: 245	[illegible]
	: 183	7.24
	: 190	[illegible]
	: 245	6.72
	: 91	6.64
	: 90	6.56

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS ref
153	688828.21	5687836.36	261.97	249.3	0.0
154	688818.00	5687827.82	265.30	250.6	0.0
155	688808.39	5687820.07	267.01	253.4	0.0
156	688798.41	5687812.85	270.29	257.3	0.0
157	688786.58	5687804.86	272.71	260.3	0.0
158	688776.86	5687799.40	274.79	262.0	0.0
159	688766.54	5687794.04	277.81	262.7	0.0

Fix Points for Box-in Calibration



Solution Residuals

No	Residual	Plan Range
1	1.0	270.99
2	1.6	264.91
3	2.0	260.36
4	2.5	255.82
5	2.1	252.97

Solution

Easting	Northing	Depth
688697.44	5688068.82	72.70

RMS Residual : 3.8

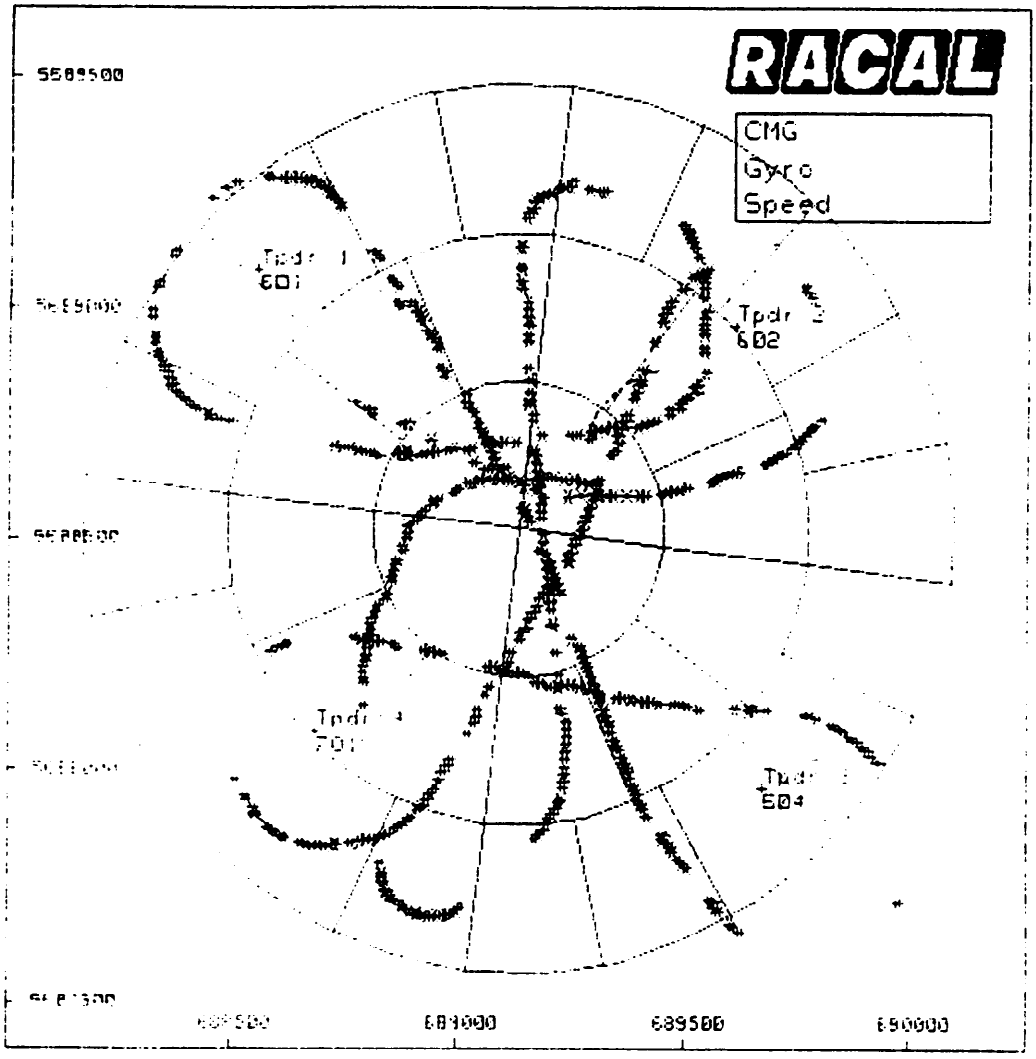
Worst 8 Values:		
	66	9.02
:	68	8.50
:	70	8.32
:	65	8.14
:	69	7.86
:	67	7.83
:	71	7.13
:	72	6.95

RELATIVE CALIBRATION (Calculation)

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
1	11.3	71.1	1503.9	1.00258
2	11.3	72.2	1503.9	1.00258
3	11.3	72.1	1503.9	1.00258
4	11.3	72.7	1503.9	1.00259

Fix Points for Relative Calibration



Range Residuals for Relative Calibration

No	Obs	Range Residuals				Residual
522	955	-.4	-.6	----	-.9	1.0
523	956	.2	.4	----	.5	.7
524	957	-.2	----	-.1	-.1	.3
525	958	.2	----	.1	.1	.2
526	960	-1.1	----	-.8	-.7	1.5
527	961	-.8	0.0	-.7	-.5	.9
528	962	-.6	1.1	-1.0	.6	1.2
529	963	----	-1.5	.8	-1.4	2.2
530	964	----	.5	-.3	.4	.7
531	965	.1	----	0.0	0.0	.1
532	966	----	-.2	.1	-.2	.3
533	967	.3	----	.2	.1	.4
534	968	-0.0	0.0	-0.0	0.0	0.0
536	970	.1	.3	-.1	.3	.4
537	971	-1.0	1.1	-1.5	.7	1.6
538	972	.1	.2	-0.0	.2	.2
539	973	.1	----	.1	0.2	.1
540	974	-1.1	1.0	-1.5	.7	1.6
541	975	-.1	-.3	0.0	-.3	.3
542	977	----	.1	-0.0	.1	.1
543	978	.2	-.1	.2	-.1	.2
544	979	.3	----	.2	0.0	.4
545	980	.2	.2	.1	.2	.3
546	981	-1.3	----	1.3	.1	1.8
547	982	.3	----	.3	-0.0	.4
548	983	.1	----	.1	-0.0	.2
549	984	.1	----	.1	-0.0	.2
550	987	----	-1.3	.4	-1.3	1.8
551	989	----	-1.0	.3	-1.0	1.4
552	990	----	.2	-0.0	.2	.2
553	991	-.5	-.1	-.5	.1	.5
554	992	.2	.3	.2	.3	.4
555	993	----	.4	-.1	.4	.5
556	995	.2	.1	.2	----	.3
557	996	.2	.1	.2	----	.2
558	997	.3	.1	.3	----	.4
Means	:	-0.00	-0.00	-.01	-.01	
sds	:	.39	.36	.35	.36	

Total Solution St.Err.: .58

Worst 8 Observations			
	:	13	2.48
	:	529	2.20
	:	267	2.08
	:	143	2.02
	:	144	2.00
	:	20	1.97
	:	465	1.89
	:	286	1.89

Acoustic Net Positions After Relative Calibration

Transponder	X coord	Y coord	Depth
1	0.00	0.00	68.51
2	1066.39	0.00	68.50
3	1230.47	-975.93	67.55
4	256.52	-993.08	68.64

(in metres)

Statistics for Transponder 1

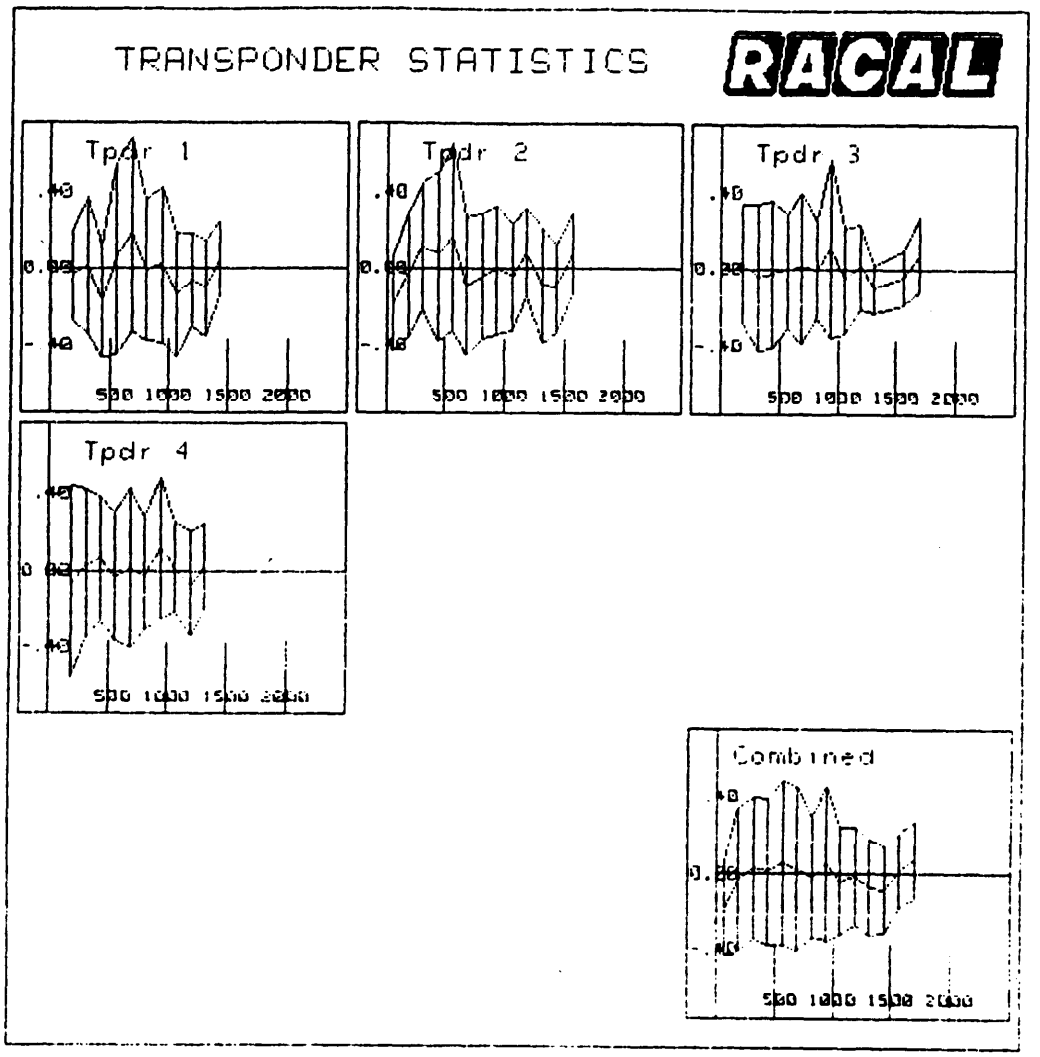
Interval	Count	Mean	Standard Error
125- 250	24	-.04	.24
250- 375	31	.01	.36
375- 500	19	-.18	.29
500- 625	30	.05	.50
625- 750	47	.19	.51
750- 875	51	-.01	.38
875-1000	63	.02	.41
1000-1125	17	-.14	.32
1125-1250	29	-.07	.24
1250-1375	23	-.10	.25
1375-1500	7	.05	.19

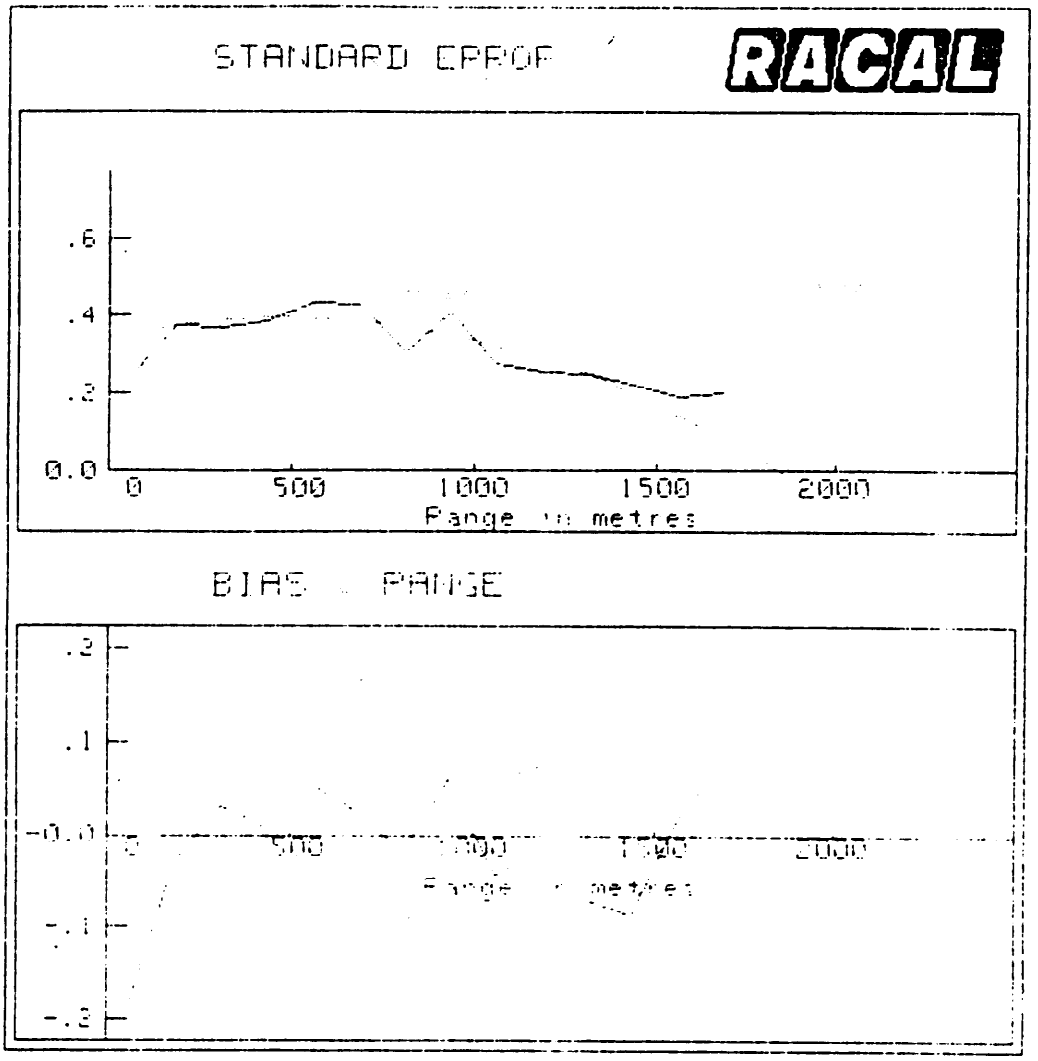
Statistics for Transponder 2

Interval	Count	Mean	Standard Error
0- 125	8	-.19	.25
125- 250	29	-.02	.32
250- 375	38	.11	.32
375- 500	41	.07	.45
500- 625	54	.17	.60
625- 750	49	-.09	.38
750- 875	63	-.04	.33
875-1000	57	.07	.34
1000-1125	39	-.04	.28
1125-1250	34	.07	.27
1250-1375	26	.13	.40
1375-1500	33	-.10	.22
1500-1625	6	.08	.21

Statistics for Transponder 3

Interval	Count	Mean	Standard Error
125- 250	10	-.27	.47
250- 375	35	.04	.36
375- 500	21	-.23	.36
500- 625	14	.07	.30
625- 750	3	.01	.43
750- 875	14	-.22	.24
875-1000	21	.08	.41
1000-1125	13	-.05	.24


TRANSPONDER STATISTICS
RACAL
Tpdr 1
Tpdr 2
Tpdr 3
Tpdr 4
Combined
500 1000 1500 2000

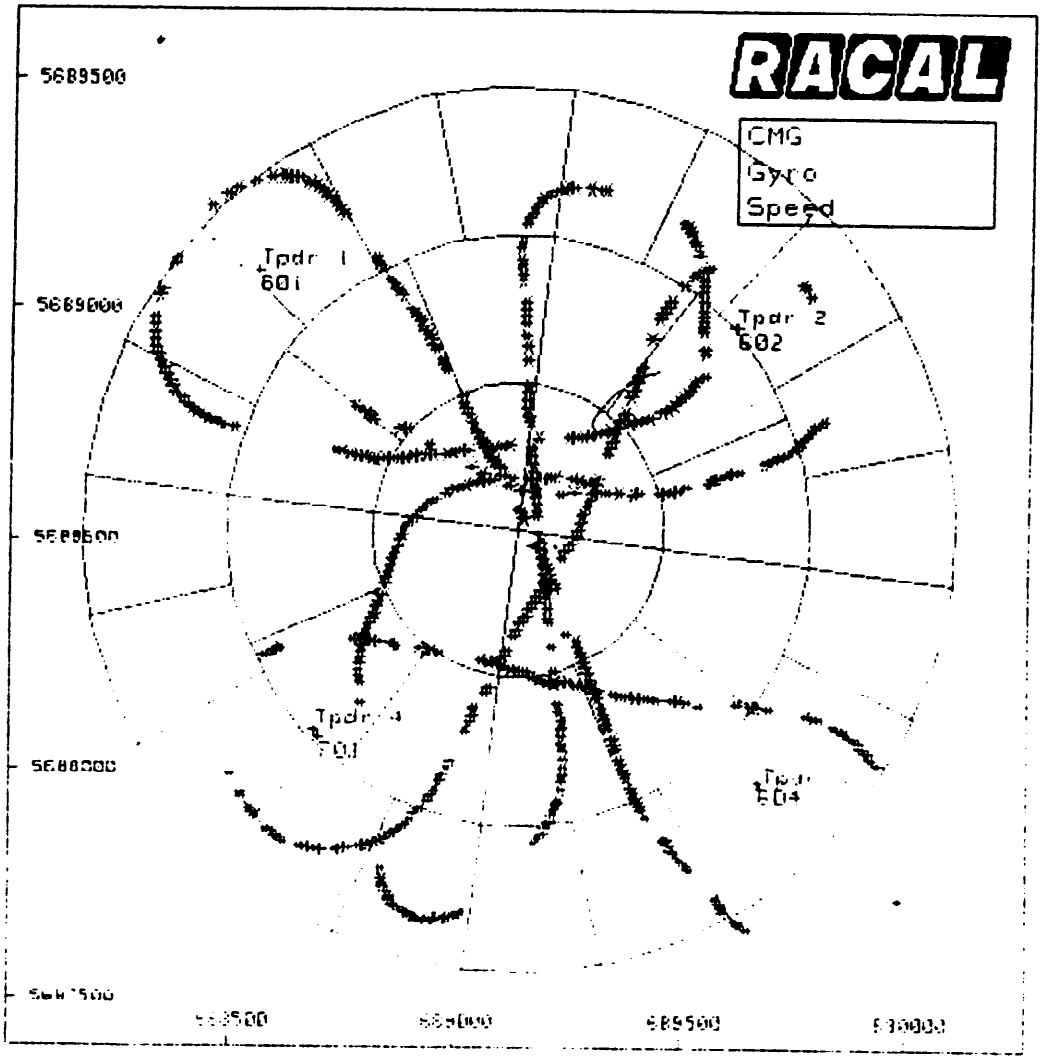

STANDARD ERROR
RACAL
.6
.4
.2
0.0
0
500
1000
1500
2000
Range in metres
BIAS - RANGE
.2
.1
-0.0
-.1
-.2
0
500
1000
1500
2000
Range in metres

ABSOLUTE CALIBRATION (Calculation)

Speed of Sound Corrections

Ix	Fish	IxDep	Vsnd	Vcor
1	11.3	68.5	1503.8	1.00256
2	11.3	68.5	1503.8	1.00256
3	11.3	67.5	1503.8	1.00256
4	11.3	68.6	1503.8	1.00256

Fix Points for Absolute Calibration



Fix Residuals For Absolute Calibration

No	Obs	dx	dy	Residual
499	992	.54	-.90	1.05
500	995	2.33	-1.75	2.92
501	996	2.36	-1.33	2.71
502	997	1.80	-2.15	2.80

Xdif Mean: 0.00 with se: 3.19
Xdif Mean: -0.00 with se: 3.13
Total Solution St.Err.= 4.48

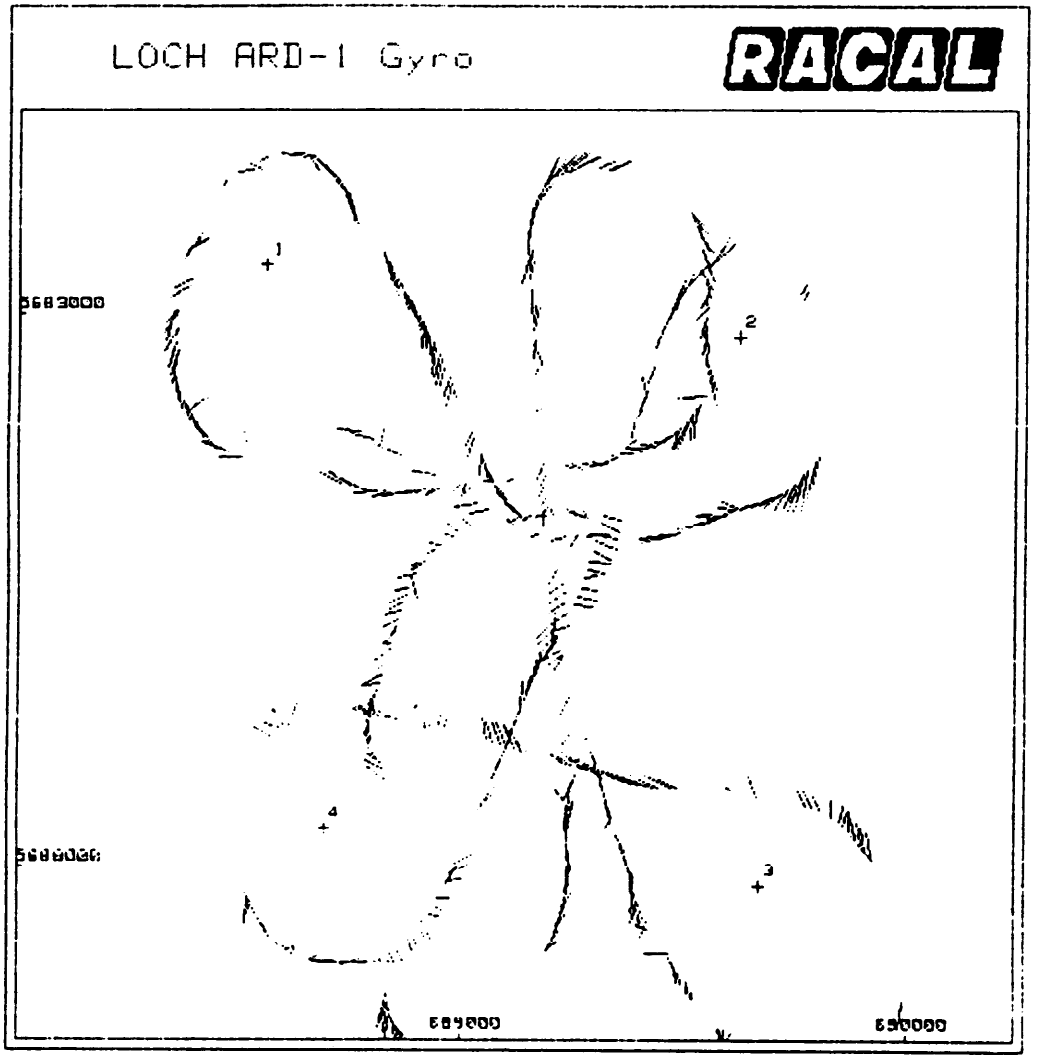
Worst 8 Observations :	439	7.94
:	443	7.92
:	446	7.91
:	438	7.86
:	5	7.80
:	442	7.79
:	381	7.74
:	163	7.72

Acoustic Net Positions After Absolute Calibration

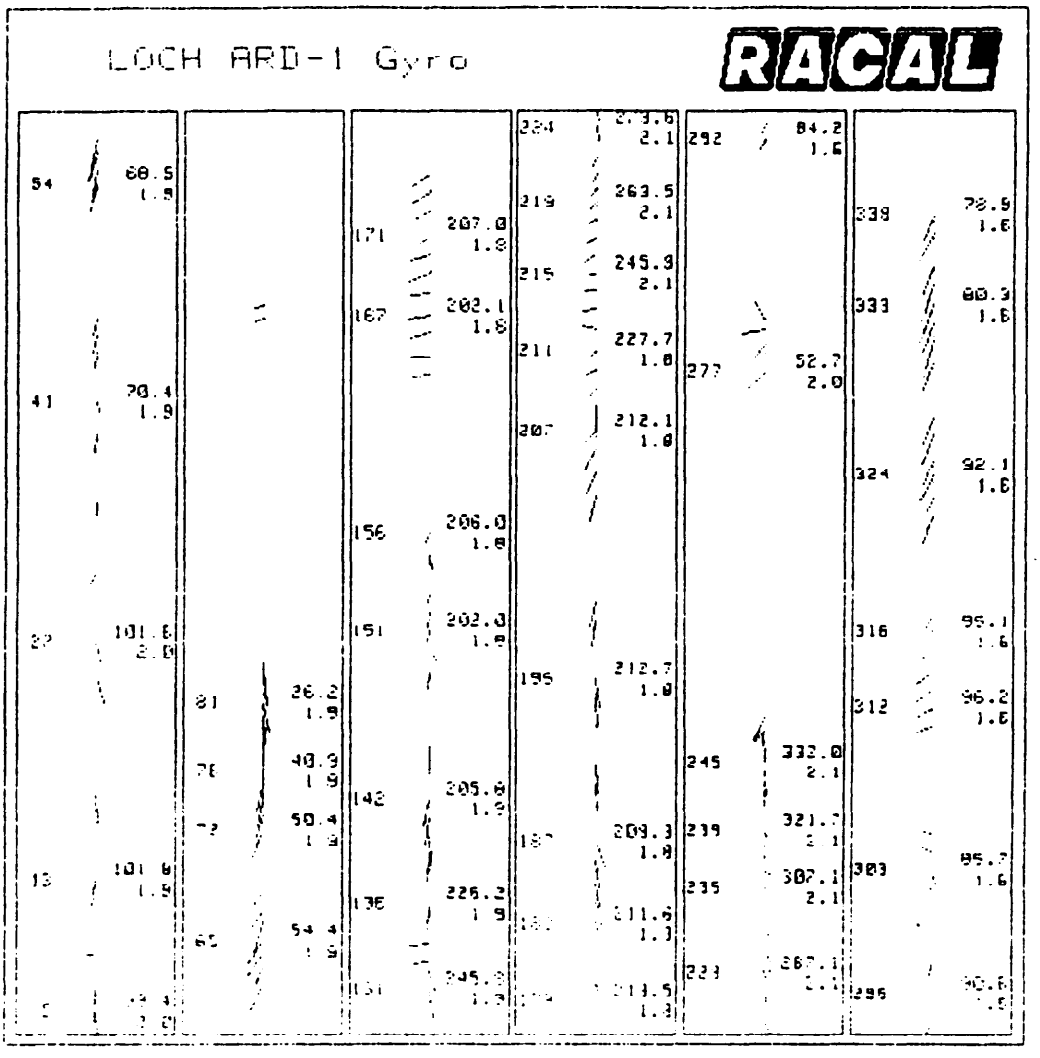
Transponder	Easting	Northing	Depth
1	688562.17	5689085.[illegible]	68.51
2	689520.64	5688955.49	68.50
3	689664.82	5687956.95	67.55
4	688695.01	5688068.28	68.64

(in metres)

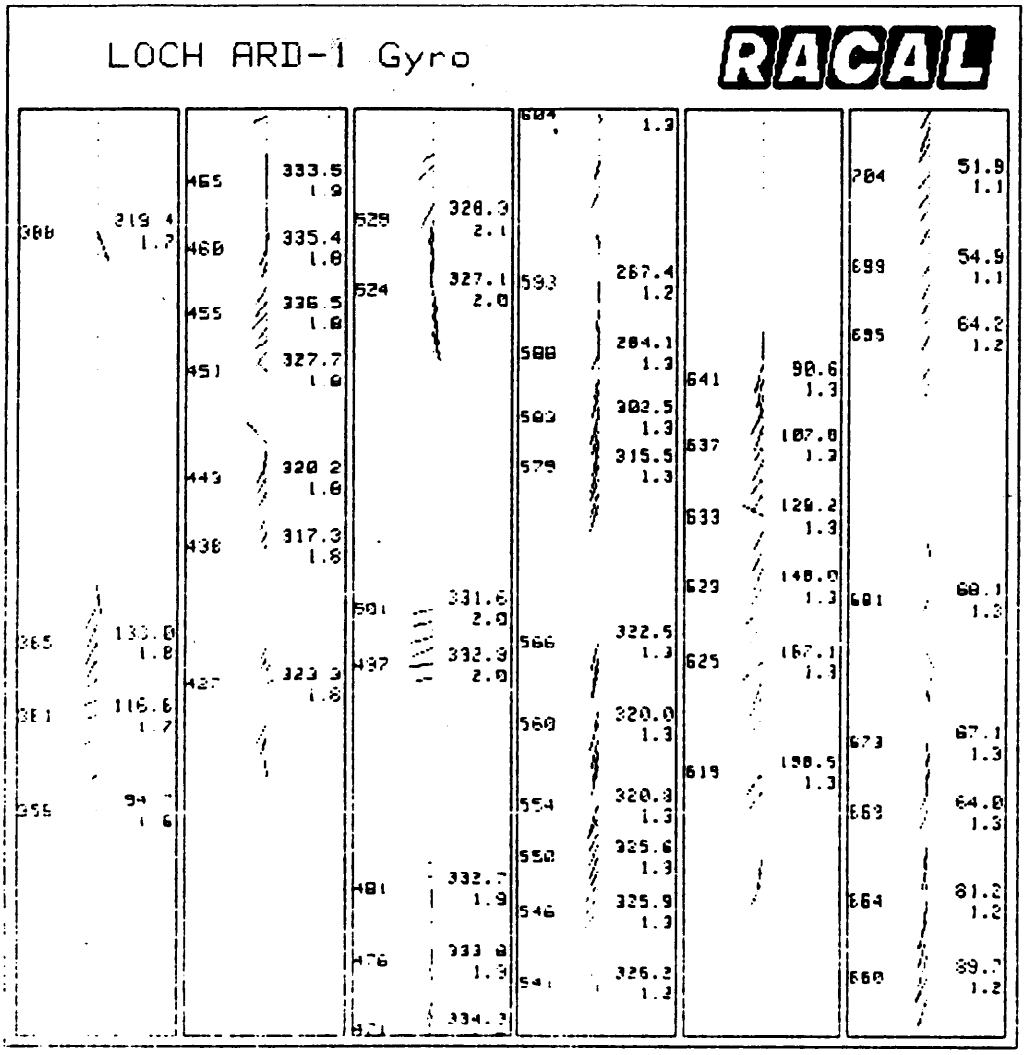
Fix Points for Absolute Calibration



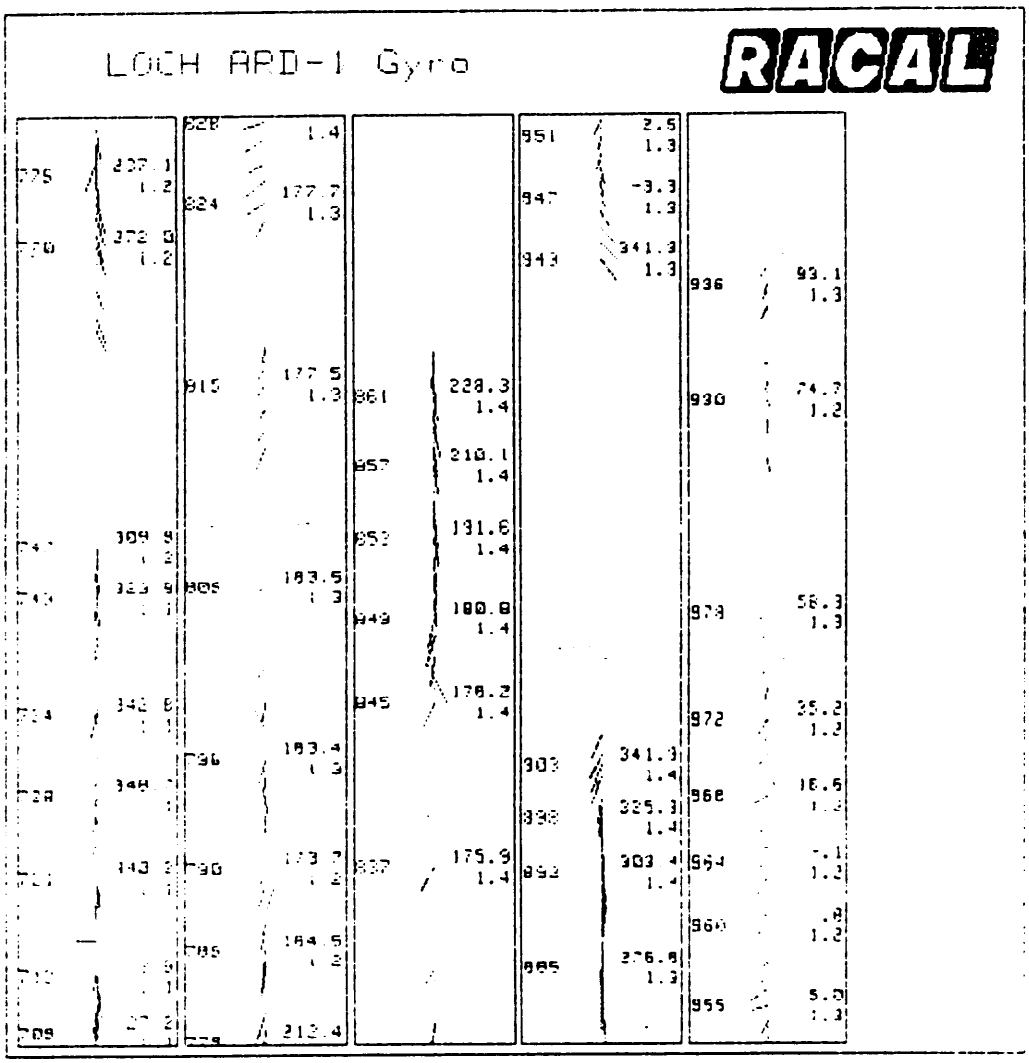
Fix Points for Absolute Calibration



Fix Points for Absolute Calibration



Fix Points for Absolute Calibration



APPENDIX J

VELOCITY PROFILE PRINTOUTS - LOCH ARD-1

Configuration File for APPLIED MICROSYSTEMS LTD. STD S/N 599.
SOFT-12.STD version 2.35

You have specified a CGA compatible monitor.

The communication parameters are 2400 baud, COM1:.

The REAL TIME DISPLAY SAMPLE RATE is set at 1 sample every 5 sec.

There is a PRESSURE sensor.

PRESSURE will be displayed in meters.

There is a CONDUCTIVITY sensor.

There is a TEMPERATURE sensor.

There is no DISSOLVED OXYGEN sensor.

DISSOLVED OXYGEN display units not applicable.

There is no PH sensor.

There is no TRANSMISSOMETER.

There is no REDOX sensor.

Water density will be displayed as Specific Gravity.

Data log time increment is one scan every 60 seconds.

Data log depth increment is one scan every 100 cm.

Sound velocity calculated using Chen & Milleros formula.

Sensor Coefficients

	A	B	C	D
Pressure	-6.086856E+02	2.999532E-02	1.225578E-08	0.000000E+0
Temperature	4.104309E+01	-1.478494E-03	1.807922E-08	-2.454137E-1
Conductivity	-1.588024E+00	7.944621E-05	0.000000E+00	0.000000E+0

STD-12 DATA PRINTOUT FACILITY File name - loch1.rel
Created - 09-11-1993

Time sec.	Temp ½C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
1303	12.651	-0.03	21.76	17.57	1.013000	1478.4
1307	13.722	1.09	42.12	35.43	1.026600	1503.1
1317	13.722	2.11	42.18	35.48	1.026600	1503.2
1319	13.728	3.20	42.19	35.48	1.026600	1503.2
1320	13.730	4.32	42.19	35.48	1.026600	1503.2
1322	13.730	5.41	42.20	35.48	1.026600	1503.2
1324	13.730	6.50	42.20	35.48	1.026600	1503.3
1325	13.730	7.68	42.20	35.49	1.026600	1503.3
1326	13.731	8.80	42.20	35.49	1.026600	1503.3
1327	13.732	9.92	42.20	35.49	1.026600	1503.3
1329	13.731	10.98	42.20	35.49	1.026600	1503.3
1330	13.731	12.10	42.20	35.49	1.026600	1503.4
1331	13.731	13.31	42.21	35.49	1.026600	1503.4
1332	13.732	14.33	42.21	35.49	1.026600	1503.4
1334	13.732	15.52	42.21	35.49	1.026600	1503.4
1335	13.731	16.70	42.21	35.49	1.026600	1503.4
1337	13.731	17.76	42.21	35.49	1.026600	1503.5
1338	13.731	19.06	42.21	35.49	1.026600	1503.5
1339	13.731	20.12	42.21	35.49	1.026600	1503.5
1340	13.731	21.27	42.22	35.50	1.026600	1503.5
1345	13.732	22.36	42.22	35.49	1.026600	1503.5
1347	13.733	23.60	42.22	35.49	1.026600	1503.6
1348	13.732	24.72	42.22	35.49	1.026600	1503.6
1349	13.731	25.88	42.22	35.50	1.026600	1503.6
1355	13.729	27.12	42.22	35.50	1.026600	1503.6
356	13.731	28.36	42.22	35.50	1.026600	1503.6
1357	13.731	29.52	42.22	35.50	1.026600	1503.7
1359	13.732	30.82	42.22	35.50	1.026600	1503.7
1360	13.731	31.91	42.22	35.50	1.026600	1503.7
1362	13.731	32.94	42.22	35.49	1.026600	1503.7
1364	13.731	34.06	42.23	35.50	1.026600	1503.7
1365	13.732	35.08	42.23	35.50	1.026600	1503.8
1366	13.733	36.36	42.23	35.50	1.026600	1503.8
1367	13.733	37.48	42.23	35.50	1.026600	1503.8
1369	13.733	38.63	42.23	35.50	1.026600	1503.8
1370	13.733	39.78	42.23	35.50	1.026600	1503.8
1372	13.733	40.97	42.23	35.50	1.026600	1503.9
1373	13.733	42.30	42.23	35.50	1.026600	1503.9
1375	13.733	43.52	42.23	35.50	1.026600	1503.9
1376	13.734	44.70	42.23	35.50	1.026600	1503.9
1378	13.734	46.01	42.24	35.50	1.026600	1503.9
1379	13.734	47.07	42.24	35.50	1.026600	1504.0
1384	13.735	48.34	42.24	35.50	1.026600	1504.0
1385	13.735	49.74	42.24	35.50	1.026600	1504.0
1386	13.735	51.24	42.24	35.50	1.026600	1504.0
1387	13.736	52.64	42.24	35.50	1.026600	1504.1

STD-12 DATA PRINTOUT FACILITY
Created - 09-11-1993

File name - loch1.rel

Time sec.	Temp ½C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
1388	13.735	53.95	42.24	35.50	1.026600	1504.1
1391	13.736	55.10	42.24	35.50	1.026600	1504.1
1392	13.736	56.16	42.24	35.50	1.026600	1504.1
1393	13.736	57.59	42.24	35.50	1.026600	1504.1
1394	13.736	58.96	42.25	35.50	1.026600	1504.2
1394	13.737	60.08	42.25	35.50	1.026600	1504.2
1396	13.738	61.39	42.25	35.50	1.026600	1504.2
1397	13.738	62.73	42.25	35.50	1.026600	1504.2
1398	13.738	63.82	42.25	35.50	1.026600	1504.2
1400	13.738	64.91	42.25	35.50	1.026600	1504.3
1401	13.738	66.03	42.25	35.50	1.026600	1504.3
1402	13.739	67.18	42.25	35.50	1.026600	1504.3
1403	13.739	68.36	42.25	35.50	1.026600	1504.3
1404	13.739	69.64	42.25	35.50	1.026600	1504.3
1406	13.739	70.89	42.25	35.50	1.026600	1504.4
1407	13.739	72.04	42.26	35.51	1.026600	1504.4
1408	13.739	73.25	42.26	35.51	1.026600	1504.4
1409	13.740	74.44	42.26	35.50	1.026600	1504.4
1412	13.740	75.68	42.26	35.50	1.026600	1504.4
1413	13.740	76.77	42.26	35.50	1.026600	1504.5
1438	13.740	75.71	42.26	35.50	1.026600	1504.4
1441	13.740	74.50	42.26	35.51	1.026600	1504.4
1443	13.740	73.16	42.26	35.51	1.026600	1504.4
1444	13.740	72.10	42.26	35.50	1.026600	1504.4
1445	13.739	70.98	42.26	35.51	1.026600	1504.4
1447	13.740	69.73	42.25	35.50	1.026600	1504.3
1448	13.739	68.64	42.26	35.51	1.026600	1504.3
1449	13.739	67.55	42.25	35.50	1.026600	1504.3
1450	13.739	66.37	42.25	35.50	1.026600	1504.3
1453	13.739	65.28	42.25	35.51	1.026600	1504.3
1455	13.739	64.10	42.25	35.51	1.026600	1504.3
1456	13.738	63.07	42.25	35.50	1.026600	1504.2
1457	13.738	61.95	42.25	35.50	1.026600	1504.2
1458	13.738	60.83	42.25	35.50	1.026600	1504.2
1459	13.738	59.64	42.25	35.51	1.026600	1504.2
1461	13.738	58.62	42.25	35.51	1.026600	1504.2
1463	13.738	57.37	42.25	35.50	1.026600	1504.1
1464	13.738	56.22	42.25	35.50	1.026600	1504.1
1466	13.737	55.07	42.25	35.51	1.026600	1504.1
1468	13.737	53.98	42.25	35.51	1.026600	1504.1
1470	13.736	52.95	42.25	35.51	1.026600	1504.1
1471	13.737	51.89	42.25	35.51	1.026600	1504.1
1473	13.736	50.71	42.25	35.51	1.026600	1504.0
1475	13.737	49.62	42.24	35.50	1.026600	1504.0
1476	13.736	48.53	42.24	35.51	1.026600	1504.0
1477	13.736	47.47	42.24	35.51	1.026600	1504.0

APPENDIX C

ACOUSTIC NET DEPLOYMENT AND OASIS CALIBRATION PRINTOUTS - MINERVA-2

Job No A2134
BHP
Byford Gold
Minerva
Acoustic Array Calibration

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : +0.0

System Status

HP330 computer
Acoustic System : Med Frequency Sonardyne (HPIB Addr. 2)
Reference System : Delta Nav (Interface 80 Port 2)
Interface 80 is available on HPIB Addr. 1.
Synchro Gyro Headings are entered via Interface 80, port 5.

Speed of Sound

13 Depth Values entered Directly

Depth(m.)	Speed of Sound(m./s.)
.31	1503.00
4.97	1502.90
9.89	1503.00
15.58	1503.10
20.65	1503.20
25.60	1503.30
30.79	1503.40
35.77	1503.50
40.81	1503.50
45.45	1503.40
50.34	1503.50
55.10	1503.60
61.86	1503.70

Gyro Offset : -8.00

Current Offset : TEMA
X Coordinate : +0.0
Y Coordinate : -35.6

WAYPOINT MODE

Dropping Transponder 1

*** Tsdr 1 dropped at 10:34:05 ***
DATUM GPS : E 669392.95 N 5713321.51
STERN GPS : E 669427.39 N 5713312.43

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

Acoustic Transducer Offsets

Tow Point X : -7.09m.
Tow Point Y : 8.15m.
Tow Point Z : 5.00m.
Tow Length : 20.00m.
Tow Speed : 2.50Kts.

Fish Layback : 11.56m.
Fish Depth : 11.32m.

WAYPOINT MODE

Dropping Transponder 2

Report Printed - Report Recovered.

*** Tnsr 2 Dropped at 10:42:05 ***

DATUM GPS : E 670084.65 N 5713312.95
STERN GPS : E 670054.90 N 5713332.50

GPS Position Used for Drop.

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670054.90	5713332.50	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670540.00	5712171.00	55.00
4	669586.00	5712277.00	57.00

(in metres)

WAYPOINT MODE

Dropping Transponder 3

*** Tpdr 3 Dropped at 11:16:23 ***

DATUM	GPS	:	E	670532.81	N	5712130.25
STERN	GPS	:	E	670556.60	N	5712156.73

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670556.60	5712156.73	55.00
4	669586.00	5712277.00	57.00

(in metres)

WAYPOINT MODE

Dropping Transponder 4

*** Tpdr 4 Dropped at 11:27:04 ***

DATUM	GPS	:	E	669541.61	N	5712281.30
STERN	GPS	:	E	669576.01	N	5712290.47

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.00
2	670487.00	5713178.00	57.00
3	670556.60	5712156.73	55.00
4	669576.01	5712290.47	57.00

(in metres)

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.40
2	670487.00	5713178.00	57.00
3	670556.60	5712156.73	56.40
4	669576.01	5712290.47	59.40

(in metres)

WAYPOINT MODE

Dropping Transponder 2

*** Tpdr 2 Dropped at 11:52:33 ***

DATUM	GPS	:	E	670451.19	N	5713164.62
STERN	GPS	:	E	670486.79	N	5713164.78

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.40
2	670486.79	5713164.78	57.00
3	670556.60	5712156.73	56.40
4	669576.01	5712290.47	59.40

(in metres)

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : -35.8

Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : +0.0

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.49	55.40
2	670486.79	5713164.78	57.00
3	670556.60	5712156.73	56.40
4	669576.01	5712290.47	59.40

(in metres)

Tpdr 1 : 28.60
Tpdr 2 : 27.80
Tpdr 3 : 28.00
Tpdr 4 : 25.60
PAN at 1500m
Fmb Firmware Version: 07.11 : MF,DS,XC,LB
Fmb Telemetry Wait set to 4sec
Fmb Window width set to 5sec

Acoustic Net Definition

4 transponders at a max range of 2500m

Transponder	Code	Reply Frequency	Turn-around Delay
1 CPT7	601	1	125.00
2 CPT7	602	2	125.00
3 CPT7	604	4	125.00
4 CPT7	701	5	125.00

System Status

HP330 computer
Acoustic System : Med Frequency Sonardyne (HPIB Addr. 2)
Reference System : Delta Nav (Interface 80 Port 2)
Interface 80 is available on HPIB Addr. 1.
Synchro Gyro Headings are entered via Interface 80, port 5.

Job Information

MINERVA for BHP on PACIFIC MARLIN by Ken Eddy

Acoustic Net Definition

4 transponders at a max range of 2500m

Transponder	Code	Reply Frequency	Turn-around Dela.
1 CPT7	601	1	125.00
2 CPT7	602	2	125.00
3 CPT7	604	4	125.00
4 CPT7	701	5	125.00

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669427.39	5713312.44	55.40
2	670486.79	5713164.[illegible]	59.10
3	670556.60	5712156.[illegible]	56.40
4	669576.01	5712240.[illegible]	54.40

(in metres)

Acoustic Transducer Offsets

Tow Point X : -7.09m.
Tow Point Y : 8.15m.
Tow Point Z : 5.00m.
Tow Length : 20.00m.
Tow Speed : 2.50Kts.

Fish Layback : 11.56m.
Fish Depth : 11.32m.

Speed of Sound

13 Depth Values entered Directly

Depth(m.)	Speed of Sound(m./s.)
.31	1503.00
4.97	1502.90
9.89	1503.00
15.58	1503.10
20.65	1503.20
25.60	1503.30
30.79	1503.40
35.77	1503.50
40.81	1503.50
45.45	1503.40
50.34	1503.50
55.10	1503.60
61.86	1503.70

Acoustic Noise

Normal Standard Error : .50m Maximum Range : 7502.00m

Range(m.) :	0	250	500	750	1000	1250	1500	1750	2000	2250	2500
Noise(m.) :	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50	.5

Tides

Time :	0000	0200	0400	0600	0800	1000	1200	1400	1600	1800	2000	2200
Height :	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

all Heights in metres

Reference System Antenna Offset

Antenna X : 0.00m
Antenna Y : 0.00m.
Antenna Z : 12.34m.

Spheroidal Information

Semi Major Axis: 6378160.000m
Inverse Flattening: 298.250000

Transformation from AGD84 to WGS84

Delta X (m): -116.00
Delta Y (m): -50.47
Delta Z (m): 141.69
X Rotation (secs): -.230
Y Rotation (secs): -.390
Z Rotation (secs): -.344
Scale (ppm): .0983

Projection : Universal Transverse Mercator Transverse Mercator
False Easting: 500000m. Latitude of Origin: 0 00'00.000"
False Northing: 10000000m. Central Meridian: 141 00'00.000"E
Grid Scale Constant:0.999600000

Gyro Offset : -8.00

BOX IN TRANSPONDER 4

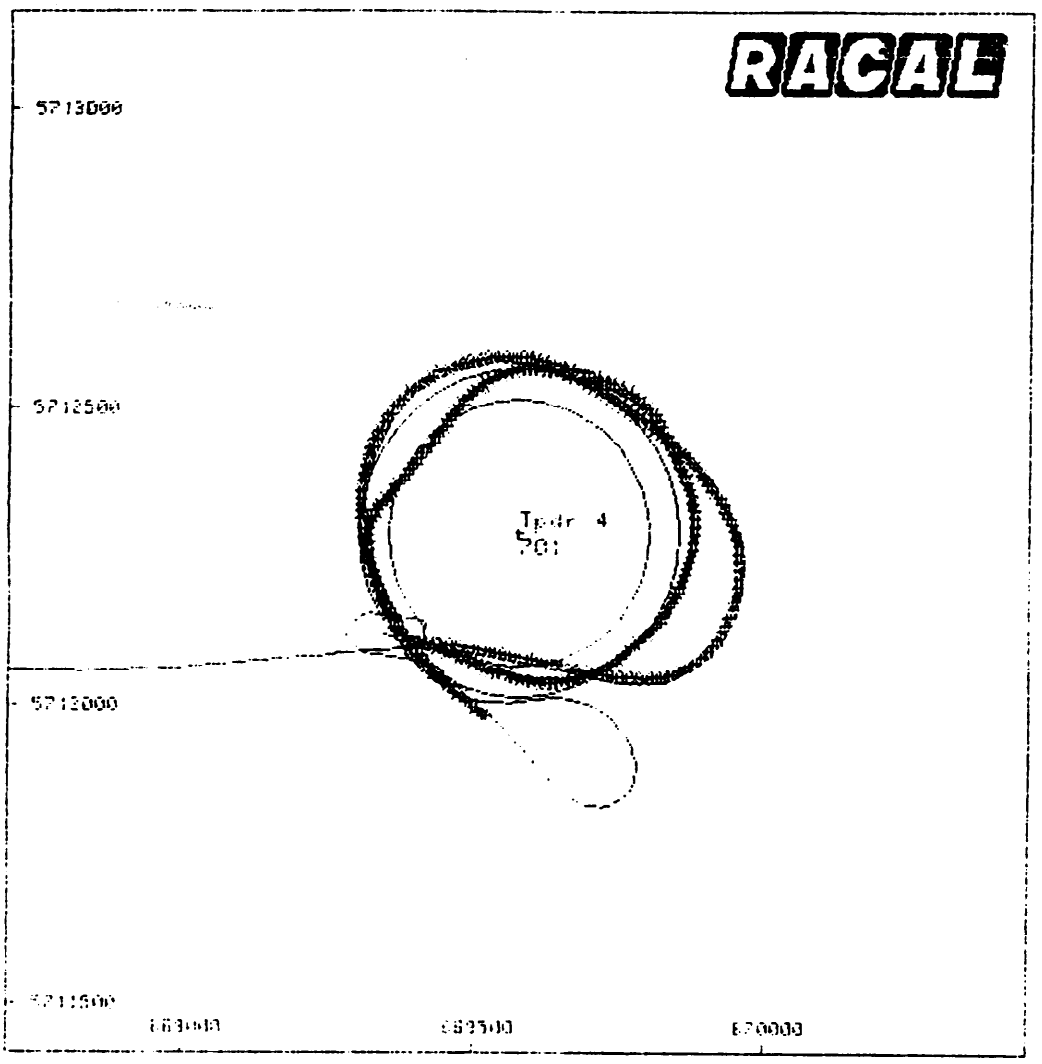
Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcorr
4	10.3	59.4	1503.4	1.00225

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS[illegible]
1	669392.72	5712104.67	283.13	96.7	0.0
2	669410.98	5712104.64	270.82	99.8	0.0
3	669429.10	5712103.10	260.55	101.9	0.0
4	669448.51	5712102.15	247.81	104.4	0.0
5	669466.68	5712100.55	238.42	105.0	0.0
6	669485.23	5712098.04	230.14	106.8	0.0
7	669503.48	5712095.52	223.93	108.2	0.0
8	669523.72	5712091.09	219.03	108.5	0.0
9	669542.04	5712087.97	216.52	[illegible]	[illegible]
10	669559.74	5712085.41	215.39	[illegible]	[illegible]
11	669577.53	5712081.6	217.05	[illegible]	[illegible]
12	669595.99	5712078.11	218.14	[illegible]	[illegible]
13	669613.52	5712073.76	220.10	[illegible]	[illegible]
14	669632.00	5712070.81	220.24	[illegible]	[illegible]
15	669649.34	5712067.17	220.32	[illegible]	[illegible]
16	669670.19	5712062.[illegible]	243.97	[illegible]	[illegible]
17	669697.46	5712058.[illegible]	253.19	[illegible]	[illegible]
18	669709.10	5712054.[illegible]	269.10	[illegible]	[illegible]
19	669726.09	5712051.9[illegible]	271.77	[illegible]	[illegible]
20	669744.21	5712047.[illegible]	287.65	[illegible]	[illegible]
21	669760.81	5712045.[illegible]	297.65	[illegible]	[illegible]
22	669778.94	5712045.[illegible]	308.04	[illegible]	[illegible]
23	669794.49	5712044.[illegible]	318.55	[illegible]	[illegible]
24	669811.59	5712045.9[illegible]	328.17	[illegible]	[illegible]
25	669826.76	5712047.4[illegible]	336.09	[illegible]	[illegible]
26	669840.97	5712051.6[illegible]	343.57	[illegible]	[illegible]
27	669855.56	5712057.9[illegible]	350.65	[illegible]	[illegible]
28	669868.63	5712063.[illegible]	356.77	[illegible]	[illegible]
29	669880.53	5712071.[illegible]	361.17	[illegible]	[illegible]
30	669893.63	5712081.[illegible]	364.17	[illegible]	[illegible]
31	669904.09	5712091.[illegible]	367.74	[illegible]	[illegible]
32	669914.71	5712102.[illegible]	370.13	[illegible]	[illegible]
33	669921.25	5712113.46	372.13	[illegible]	[illegible]
34	669929.30	5712125.9[illegible]	373.16	[illegible]	[illegible]
35	669934.70	5712137.3[illegible]	372.18	[illegible]	[illegible]
36	669940.36	5712150.[illegible]	373.87	[illegible]	[illegible]
37	669944.64	5712162.[illegible]	373.67	[illegible]	[illegible]
38	669949.40	5712174.[illegible]	373.64	[illegible]	[illegible]
39	669951.64	5712186.[illegible]	373.64	[illegible]	[illegible]
40	669955.21	5712200.[illegible]	364.90	[illegible]	[illegible]
41	669956.00	5712214.[illegible]	368.08	[illegible]	[illegible]
42	669957.81	5712227.[illegible]	366.01	[illegible]	[illegible]
43	669957.49	5712243.[illegible]	363.55	[illegible]	[illegible]
44	669956.68	5712255.[illegible]	360.85	[illegible]	[illegible]
45	669955.10	5712268.[illegible]	357.85	[illegible]	[illegible]

Fix Points for Box-in Calibration up to observation 146



Solution Residuals

No	Residual	Slant Range
1	[illegible]	[illegible]
2	[illegible]	[illegible]
3	[illegible]	[illegible]
4	[illegible]	[illegible]
5	[illegible]	[illegible]
6	-1.1	230.14
7	-1.1	223.93
8	-2.3	219.03
9	-2.3	216.52
10	-1.9	215.39
11	-1.4	217.05
12	-2.7	219.14
13	-2.6	223.10
14	-2.2	228.24
15	-1.8	235.32
16	-3.0	243.93

Solution Residuals

No	Residual	Plan Range
282	1.1	252.19
283	.5	251.53
284	.3	250.46
285	-0.0	249.25
286	.3	249.86
287	.5	251.11
288	-.7	251.82
289	-1.0	253.62
290	-.5	255.95
291	-2.3	256.20
292	-2.1	259.64
293	-.3	265.78
294	.1	271.48
295	.2	277.12

Solution

Easting	Northing	Depth
669599.59	5712299.01	59.40

RMS Residual : 2.3

Worst 8 Values:		
	82	7.54
:	143	6.77
:	81	6.63
:	84	6.39
:	83	6.22
:	86	6.00
:	85	5.61
:	88	5.33

BOX IN TRANSPONDER 1

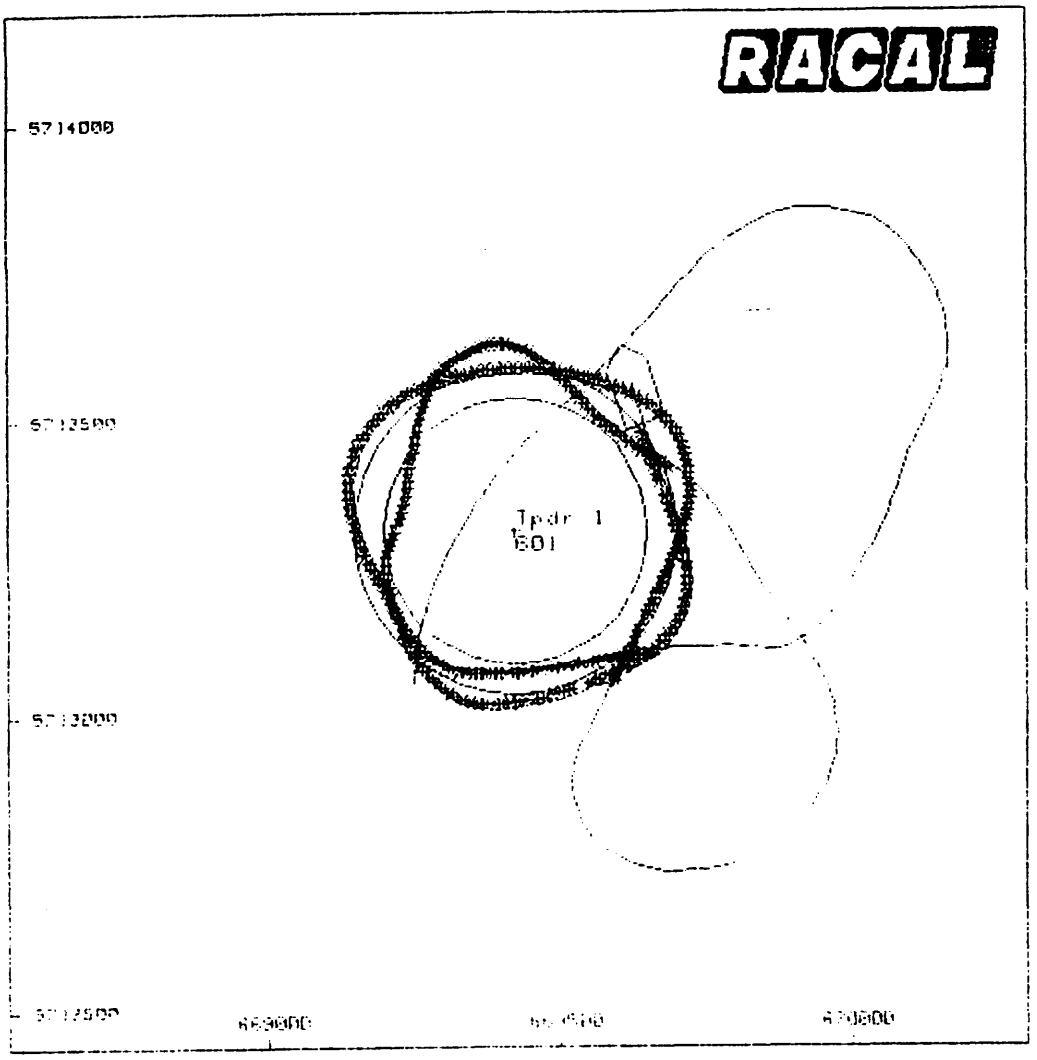
Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
1	10.3	55.4	1503.4	1.00224

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	669664.32	5713105.20	303.61	266.1	0.0
2	669653.56	5713104.28	295.92	265.0	0.0
3	669642.45	5713103.30	289.36	264.7	0.0
4	669632.15	5713102.66	282.69	263.8	0.0
5	669620.62	5713100.51	274.93	262.9	0.0
6	669609.98	5713099.21	270.16	262.7	0.0
7	669598.38	5713097.02	264.97	262.3	0.0
8	669587.43	5713094.47	260.53	262.4	0.0
9	669575.99	5713091.91	255.16	262.7	0.0
10	669564.63	5713088.81	250.26	262.2	0.0
11	669553.75	5713087.51	246.80	262.0	0.0
12	669540.12	5713085.30	246.37	262.4	0.0
13	669531.37	5713084.54	244.04	262.7	0.0
14	669518.05	5713082.67	242.12	262.6	0.0
15	669507.14	5713081.05	241.16	262.6	0.0
16	669495.91	5713079.74	237.95	263.1	0.0
17	669484.47	5713076.53	236.33	263.6	0.0
18	669472.70	5713075.14	236.44	264.3	0.0
19	669461.18	5713073.16	235.50	265.3	0.0
20	669449.75	5713071.53	233.25	266.1	0.0
21	669437.68	5713069.83	240.06	25[illegible]	0.0
22	669426.41	5713069.37	240.97	265.3	0.0
23	669411.93	5713067.91	241.82	266.5	0.0
24	669400.73	5713067.8	240.91	267.1	0.0
25	669388.63	5713067.96	245.21	270.2	0.0
26	669377.17	5713068.79	249.99	272.2	0.0
27	669365.34	5713069.25	251.41	271.3	0.0
28	669353.96	5713070.87	254.23	269.7	0.0
29	669341.72	5713071.79	255.79	268.4	0.0
30	669330.21	5713074.59	260.19	266.6	0.0
31	669318.79	5713076.67	264.58	267.9	0.0
32	669308.96	5713082.37	268.57	268.5	0.0
33	669299.07	5713087.24	264.73	302.7	0.0
34	669289.44	5713094.01	264.20	307.1	0.0
35	669280.00	5713101.14	262.40	311.9	0.0
36	669271.31	5713106.57	262.49	314.3	0.0
37	669262.59	5713116.37	262.19	318.2	0.0
38	669254.48	5713127.08	262.62	321.1	0.0
39	669247.18	5713135.69	261.44	323.0	0.0
40	669240.44	5713144.84	259.77	324.3	0.0
41	669233.72	5713155.71	258.89	325.6	0.0
42	669228.00	5713165.90	256.21	327.0	0.0
43	669222.11	5713176.61	255.97	327.7	0.0
44	669216.08	5713188.15	256.01	327.6	0.0
45	669210.50	5713199.34	255.50	327.7	0.0

Fix Points for Box-in Calibration up to observation 152



Solution Residuals

No	Residual	Fix Range
1	-1.7	301.51
2	-2.3	294.32
3	-1.8	284.05
4	1.9	281.69
5	-3.7	273.33
6	-2.7	270.16
7	-2.6	264.97
8	-2.9	260.53
9	-4.3	255.16
10	-6.2	250.25
11	-5.7	245.80
12	-2.4	241.37
13	-2.1	244.24
14	-1.2	24[illegible]
15	-.5	24[illegible].16
16	-3.1	23[illegible].35

Solution Residuals

No	Residual	Plan Range
282	-4.4	248.46
283	-1.7	248.60
284	2.2	249.97
285	.9	248.52
286	4.9	252.61
287	2.3	252.67
288	2.9	255.31
289	2.5	258.86
290	1.7	263.68

Solution

Easting	Northing	Depth
669441.07	5713313.52	55.40

RMS Residual : 2.8

Worst 8 Values:		
	: 273	8.02
	: 180	6.33
	: 191	6.30
	: 10	6.18
	: 155	6.15
	: 178	6.15
	: 192	6.10
	: 193	6.09

BOX IN TRANSPONDER 2

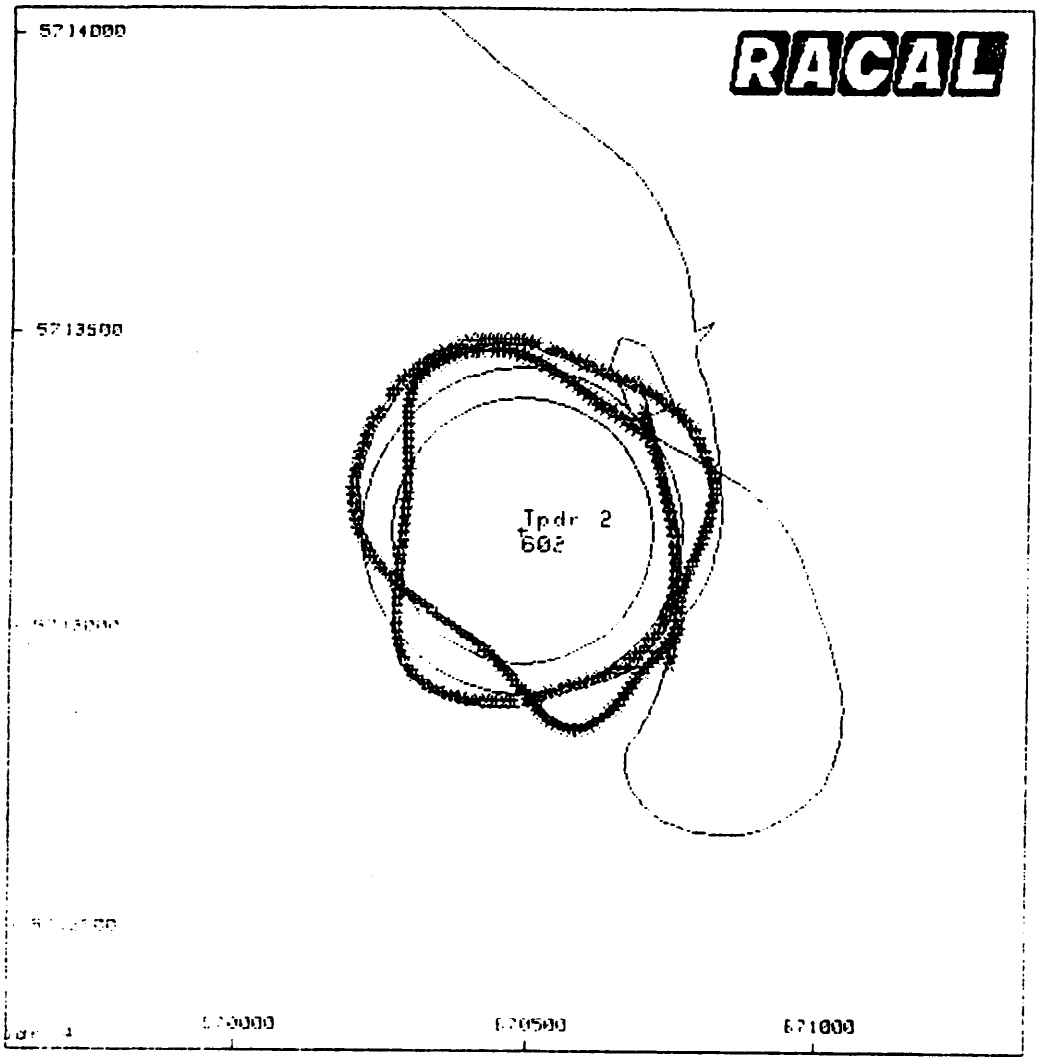
Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
2	10.3	58.1	1503.4	1.00225

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	670760.89	5713002.05	304.16	230.7	0.0
2	670753.63	5712992.25	302.57	231.4	0.0
3	670746.96	5712983.83	303.27	230.8	0.0
4	670739.50	5712975.29	306.51	231.3	0.0
5	670732.60	5712966.91	303.85	230.4	0.0
6	670725.20	5712958.80	303.28	230.0	0.0
7	670718.30	5712950.70	304.07	229.4	0.0
8	670711.19	5712942.99	306.36	228.2	0.0
9	670703.78	5712934.57	307.56	227.7	0.0
10	670697.34	5712926.47	308.70	227.4	0.0
11	670689.14	5712915.67	311.89	227.3	0.0
12	670682.37	5712906.[illegible]	314.17	228.3	0.0
13	670676.05	5712897.96	316.75	230.0	0.0
14	670668.24	5712889.40	322.29	232.5	0.0
15	670661.32	5712879.92	326.01	235.5	0.0
16	670652.98	5712871.15	328.13	238.2	0.0
17	670644.54	5712862.87	331.81	242.0	0.0
18	670636.00	5712855.44	335.79	246.9	0.0
19	670626.71	5712848.6[illegible]	337.91	251.7	0.0
20	670617.40	5712842.[illegible]	339.75	255.4	0.0
21	670607.42	5712836.4	338.69	257.5	0.0
22	670597.20	5712831.[illegible]	338.11	259.3	0.0
23	670585.25	5712827.9[illegible]	340.15	275.4	0.0
24	670575.03	5712830.41	339.21	282.9	0.0
25	670566.55	5712832.57	334.41	290.6	0.0
26	670556.63	5712834.89	329.78	296.4	0.0
27	670548.70	5712838.79	323.94	301.9	0.0
28	670539.33	5712842.49	319.11	307.4	0.0
29	670532.34	5712848.94	310.83	311.9	0.0
30	670525.80	5712859.9[illegible]	306.82	311.0	0.0
31	670518.69	5712862.6	299.65	314.1	0.0
32	670513.00	5712870.7[illegible]	291.04	315.6	0.0
33	670505.99	5712877.36	284.92	314.8	0.0
34	670499.43	5712885.64	276.33	314.6	0.0
35	670491.20	5712893.09	269.18	314.1	0.0
36	670485.31	5712901.17	261.79	312.5	0.0
37	670478.47	5712911.50	252.90	311.5	0.0
38	670469.93	5712920.31	247.03	309.4	0.0
39	670461.69	5712928.56	241.04	307.5	0.0
40	670453.89	5712936.87	236.12	305.6	0.0
41	670445.02	5712944.90	229.55	303.7	0.0
42	670437.09	5712953.14	224.84	302.0	0.0
43	670427.96	5712960.11	221.91	300.9	0.0
44	670419.11	5712968.07	217.93	299.7	0.0
45	670409.15	5712976.91	217.24	299.6	0.0

Fix Points for Box-in Calibration up to observation 161



Solution Residuals

No	Residual	Flan Range
	.5	304.16
	.5	304.57
	.4	305.27
4	.5	306.51
5	1.1	303.85
6	.6	303.28
	.8	304.07
8	.6	306.36
9	.5	307.56
10	1.6	308.70
11	1.5	311.89
12	.5	314.17
13	-.9	316.75
14	1.6	322.29
15	.6	326.01
16	-1.0	328.13

Solution Residuals

No	Residual	Plan Range
282	-.4	239.42
283	-1.5	238.40
284	.5	240.40
285	-.3	241.38
286	.3	244.48
287	-1.7	244.81
288	.4	250.18
289	-1.9	252.18
290	-.8	258.22
291	-1.9	263.89
292	.2	272.56
293	-1.1	278.09

Solution

Easting	Northing	Depth
670502.83	5713164.09	58.10

RMS Residual : 3.8

Worst 8 Values:	131	13.35
:	261	12.42
:	130	11.18
:	129	10.21
:	202	10.01
:	260	9.86
:	201	9.57
:	200	9.35

BOX IN TRANSPONDER 3

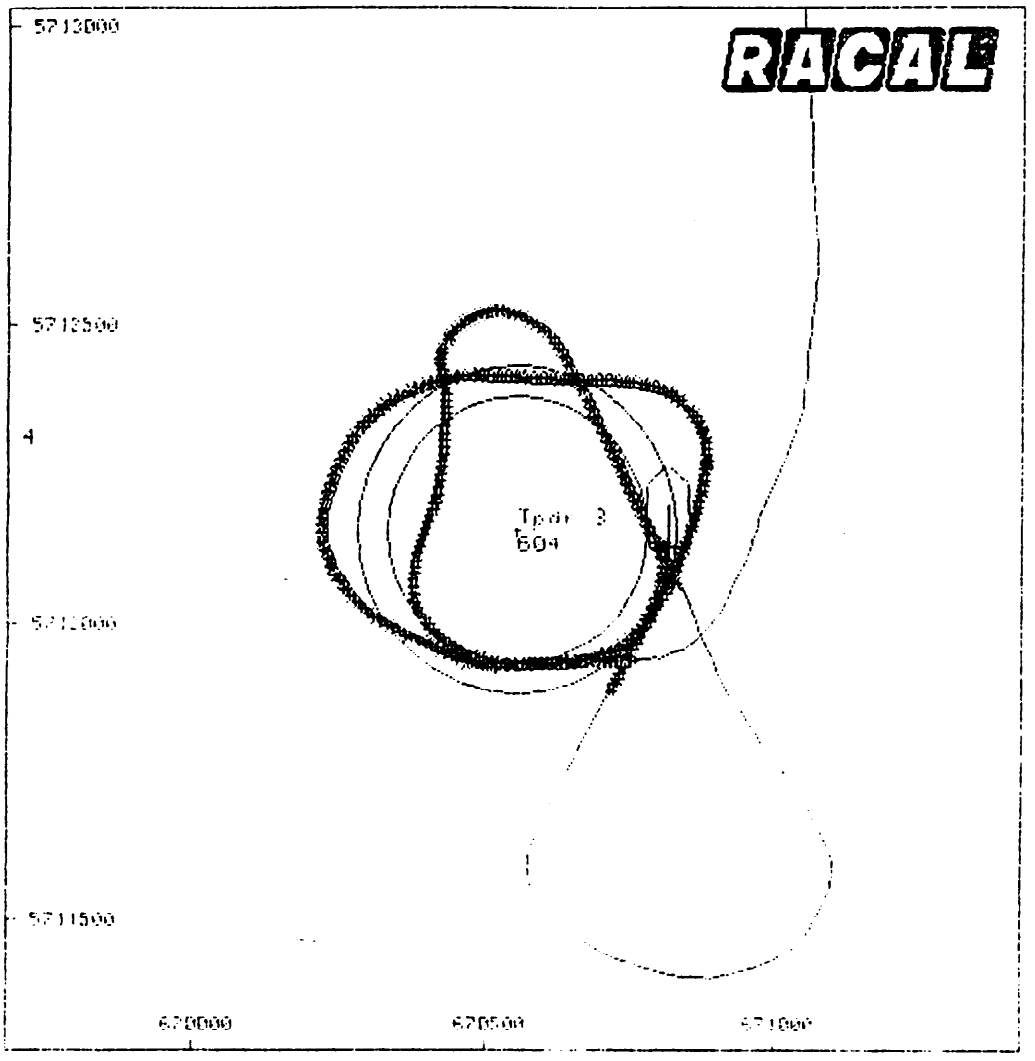
Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
3	10.3	56.4	1503.4	1.00224

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	670758.57	5711933.41	295.18	273.2	0.0
2	670747.33	5711933.71	284.39	272.3	0.0
3	670735.17	5711934.96	277.63	271.1	0.0
4	670724.61	5711935.04	272.08	268.6	0.0
5	670714.38	5711932.90	266.20	266.9	0.0
6	670704.61	5711933.49	261.14	265.9	0.0
7	670693.25	5711932.51	255.92	265.7	0.0
8	670683.90	5711933.05	250.85	265.3	0.0
9	670672.50	5711932.66	247.28	265.5	0.0
10	670661.97	5711933.29	244.19	264.7	0.0
11	670650.33	5711932.56	239.81	265.0	0.0
12	670640.00	5711932.81	237.65	264.6	0.0
13	670626.69	5711931.56	235.75	264.5	0.0
14	670615.58	5711931.49	232.72	264.5	0.0
15	670604.58	5711931.19	232.29	267.4	0.0
16	670592.96	5711930.51	231.03	268.5	0.0
17	670583.71	5711929.79	232.89	268.9	0.0
18	670572.13	5711929.91	232.48	269.7	0.0
19	670561.76	5711928.74	233.70	269.4	0.0
20	670550.57	5711927.37	236.00	268.9	0.0
21	670540.75	5711926.46	235.73	270.4	0.0
22	670526.33	5711924.24	237.10	270.4	0.0
23	670515.40	5711924.60	239.16	270.1	0.0
24	670503.14	5711925.29	240.96	269.9	0.0
25	670491.20	5711926.94	244.39	269.1	0.0
26	670480.35	5711929.67	246.37	268.4	0.0
27	670468.47	5711932.91	248.65	268.0	0.0
28	670457.77	5711937.44	248.43	268.2	0.0
29	670446.11	5711941.24	248.98	268.4	0.0
30	670435.26	5711946.61	252.06	268.2	0.0
31	670422.44	5711951.79	254.25	268.5	0.0
32	670411.94	5711957.49	255.85	268.4	0.0
33	670401.58	5711963.55	257.16	268.6	0.0
34	670391.27	5711969.32	259.06	268.9	0.0
35	670379.86	5711974.20	264.03	268.3	0.0
36	670369.07	5711979.09	268.29	268.5	0.0
37	670358.00	5711984.21	272.63	268.4	0.0
38	670347.76	5711990.91	275.26	268.7	0.0
39	670337.53	5711996.61	285.10	269.1	0.0
40	670326.05	5712002.49	289.93	269.4	0.0
41	670314.71	5712009.59	295.62	269.3	0.0
42	670303.17	5712016.37	300.17	269.7	0.0
43	670293.09	5712025.81	302.95	269.7	0.0
44	670281.32	5712036.61	310.26	269.7	0.0
45	670271.62	5712047.32	315.77	269.2	0.0

Fix Points for Box-in Calibration up to observation 159



Solution Residuals

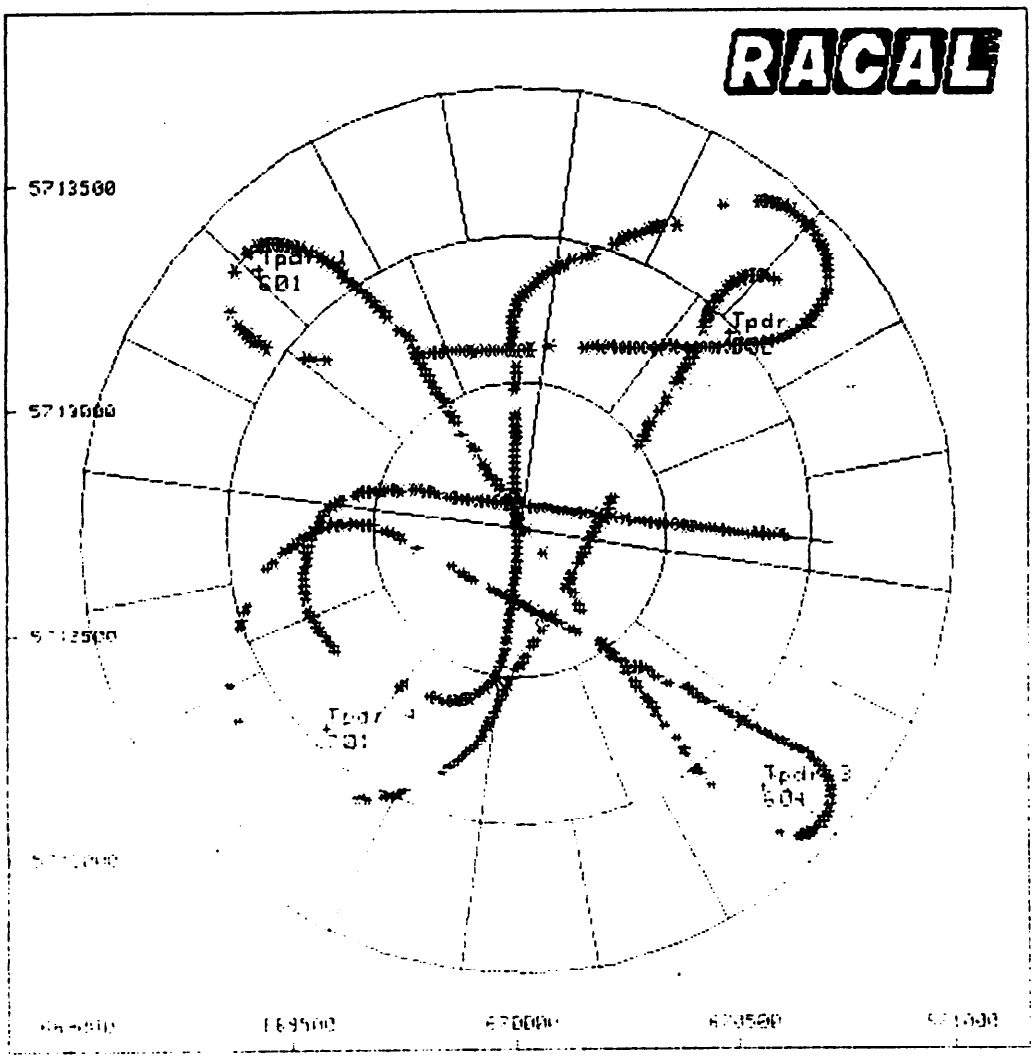
No	Residual	Plan Range
1	-4.1	295.18
2	-7.5	284.39
3	-5.9	277.63
4	-5.2	272.08
5	-7.2	266.20
6	-6.6	261.14
7	-6.9	255.92
8	-7.1	250.85
9	-6.1	247.28
10	-4.4	244.19
11	-5.2	239.81
12	-3.7	237.65
13	-3.1	235.75
14	-3.6	232.72
15	-2.3	232.25
16	-2.6	231.03

RELATIVE CALIBRATION (Calculation)

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
1	11.3	55.4	1503.4	1.00224
2	11.3	58.1	1503.4	1.00225
3	11.3	56.4	1503.4	1.00224
4	11.3	59.4	1503.4	1.00226

Fix Points for Relative Calibration



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Range Residuals for Relative Calibration

No Obs	Range Residuals				Residual
491 741	.2	.1	-0.0	.2	.2
492 742	.3	.1	.2	-.2	.3
493 743	-.4	----	-.3	-.1	.5
494 744	.3	.2	.1	.3	.3
495 745	.5	0.0	.4	.2	.5
496 746	.3	----	.3	.1	.4
497 748	-.1	----	-.1	-0.0	.1
499 750	.3	.4	----	.4	.6
503 754	-1.3	-.7	-.9	-.8	1.3
504 755	-.3	.7	-.7	.7	.9
505 756	.2	.1	.1	.1	.2
506 757	.3	.2	.3	.2	.4
507 758	0.0	-.1	.1	-.1	.1
508 759	.3	-.4	.4	-.4	.5
509 760	-0.0	.1	-.1	.1	.1
510 751	-.6	-.3	-.5	-.3	.6
513 763	-.3	.4	-.4	.4	.5
513 764	0.0	.1	0.0	.1	.1
514 765	.2	.2	.2	.3	.3
515 766	.3	.1	.4	-.2	.4
516 767	.2	-0.0	.2	0.0	.2
517 768	-.1	-1.5	-.1	----	.1
518 769	-.3	.2	-.3	-1.4	1.5
519 770	-.1	-.4	-.1	.2	.2
520 771	-.1	0.0	-2.0	-.4	.4
521 772	-2.1	.2	.3	.2	2.1
522 773	.3	----	.3	-.3	.3
525 [illegible]	.3	----	.5	.1	.4
526 [illegible]	.5	.5	.5	.3	3.9
527 778	.3	.4	0.0	.2	.5
528 780	.3	.1	.2	-0.0	.4
529 781	-0.0	.3	.5	.2	.3
530 782	.2	.3	.2	----	.5
531 783	.4	-.2	.2	.2	.2
532 784	-.1	.5	.3	.3	.9
534 786	.4	.3	.3	0.0	.4
537 789	----	----	0.0	.2	0.0
538 790	----	0.0	.4	----	.6
539 791	----	.4	.0	.2	1.4
540 792	----	-.1	.2	0.0	.3
541 793	----	.2	.2	0.0	.3
542 794	----	.2	.5	-0.0	.7
543 795	.1	.5	.3	-.1	.3
547 799	-.2	.3	.4	----	.6
548 800	-0.0		.3	.1	.3
549 801					
Means :	.06	.13	.10	0.00	
sds :	.54	.52	.50	.51	

Total Solution St.Err.: .81

Worst 8 Observations	:	526	3.85
	:	184	3.09
	:	335	3.01
	:	267	2.75
	:	196	2.68
	:	238	2.66
	:	189	2.66
	:	268	2.65

Acoustic Net Positions After Relative Calibration

Transponder	X coord	Y coord	Depth
1	0.00	0.00	55.40
2	1070.55	0.00	58.10
3	1274.36	-985.45	56.40
4	296.02	-984.13	59.40

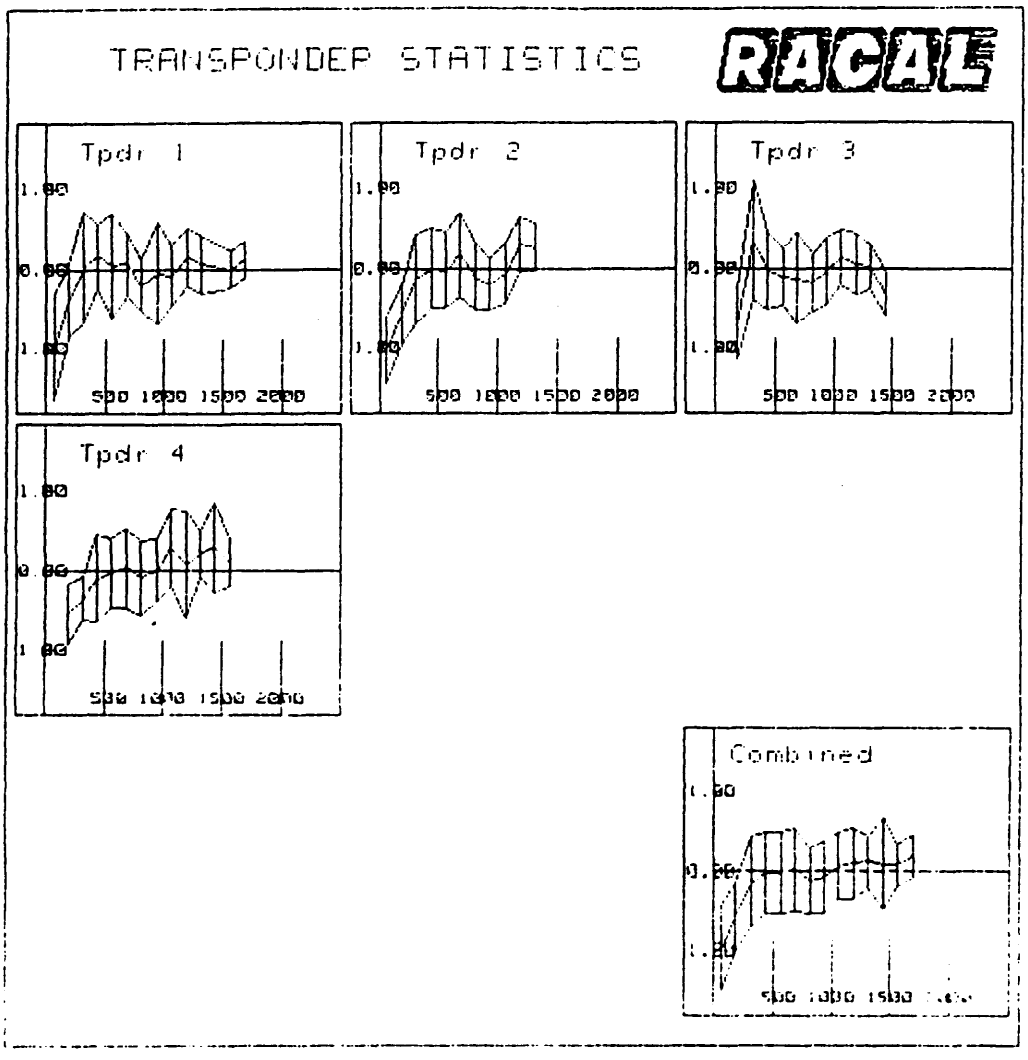
(in metres)

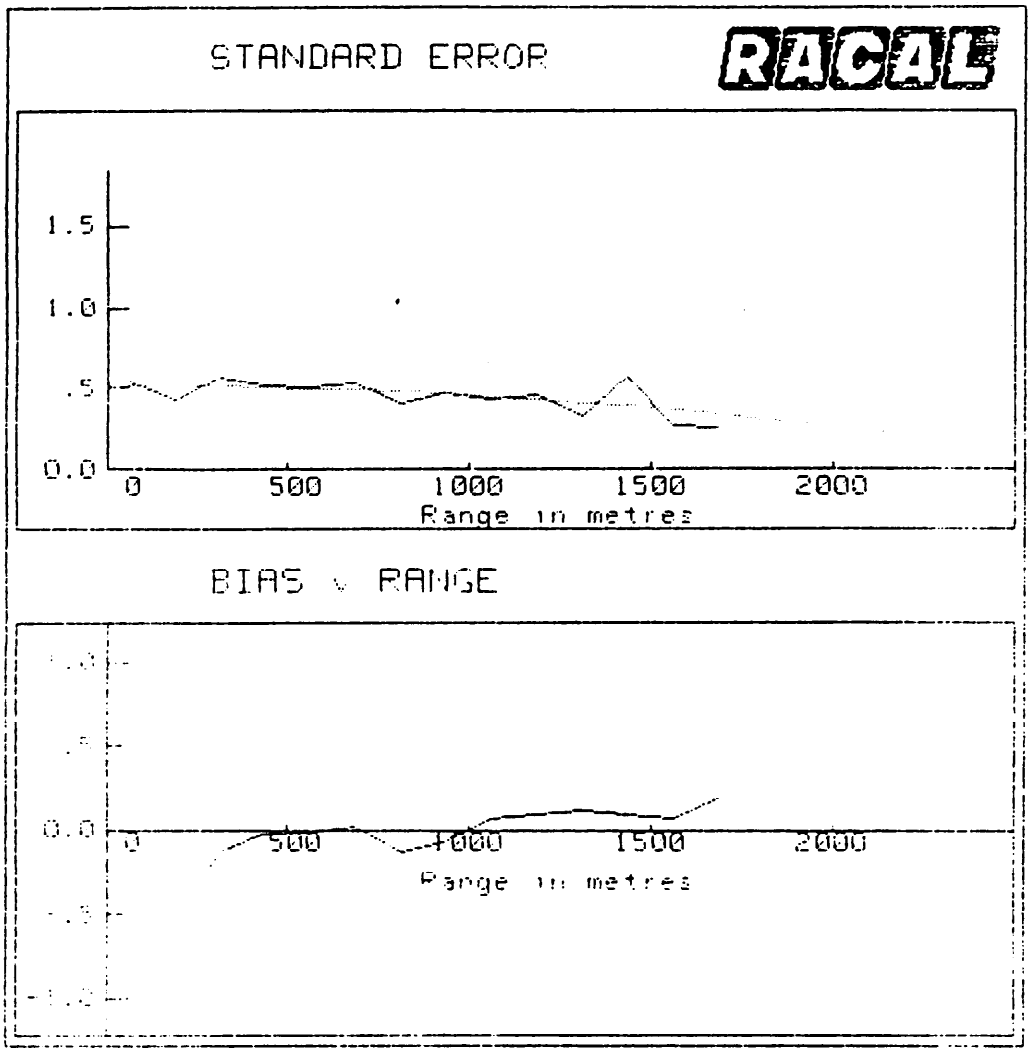
Statistics for Transponder 1

Interval	Count	Mean	Standard Error
0- 125	13	-.38	.68
125- 250	18	-.39	.47
250- 375	9	.01	.69
375- 500	14	.16	.40
500- 625	50	.04	.65
625- 750	43	.06	.40
750- 875	44	-.20	.31
875-1000	47	-.05	.65
1000-1125	46	-.09	.38
1125-1250	32	.15	.36
1250-1375	18	.06	.38
1500-1625	7	-.01	.23
1625-1750	6	.12	.24

Statistics for Transponder 2

Interval	Count	Mean	Standard Error
0- 125	23	-1.07	.43
125- 250	34	-.58	.37
250- 375	40	-.13	.57
375- 500	43	0.00	.50
500- 625	41	-.02	.47
625- 750	51	.16	.52
750- 875	61	-.10	.43
875-1000	53	.20	.32
1000-1125	56	.26	.29
1125-1250	31	.22	.33
1250-1375	10	.29	.23


TRANSPONDER STATISTICS
RACAL
Tpdr 1
Tpdr 2
Tpdr 3
Tpdr 4
Combined

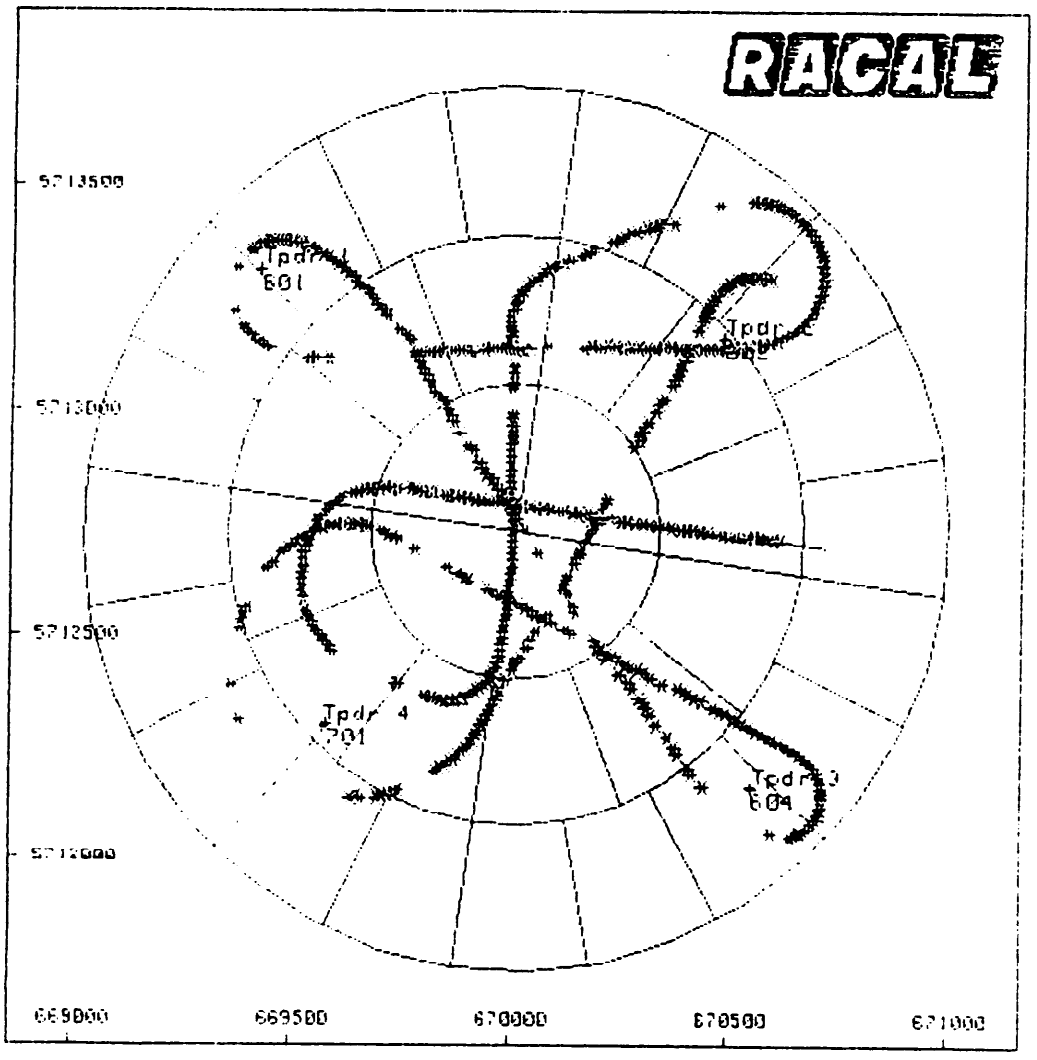

STANDARD ERROR
RACAL
1.5
1.0
.5
0.0
0
500
1000
1500
2000
Range in metres
BIAS v RANGE
0.0
0
500
1000
1500
2000
Range in metres

ABSOLUTE CALIBRATION (Calculation)

Speed of Sound Corrections

Tx	Fish	T-Dep	Vsnd	Vcor
1	11.3	55.4	1503.4	1.00224
2	11.3	58.1	1503.4	1.00225
3	11.3	56.4	1503.4	1.00224
4	11.3	59.4	1503.4	1.00226

Fix Points for Absolute Calibration



Fix Residuals For Absolute Calibration

No	Obs	dx	dy	Residual
467	764	.89	-3.54	3.65
468	765	.58	-4.42	4.45
469	766	2.11	-5.71	6.09
470	767	1.40	-6.24	6.39
472	769	3.49	-5.67	6.66
473	770	1.94	-6.90	7.17
474	771	3.60	-5.18	6.30
475	772	3.27	-6.84	7.58
476	773	3.58	-6.45	7.38
481	779	3.36	-3.68	4.98
482	780	3.72	-3.71	5.25
483	781	4.42	-3.83	5.85
484	782	5.15	-3.90	6.46
485	783	3.25	-4.00	5.15
486	784	4.21	-3.17	5.27
487	785	5.97	-1.78	6.23
488	786	2.93	-3.21	4.35
489	787	6.16	-3.94	7.31
490	788	4.00	-3.75	5.49
491	789	2.41	-.53	2.47
492	790	2.73	-.79	2.85
493	791	2.56	-.13	2.57
494	792	3.10	-1.10	3.29
495	793	2.72	-.07	2.72
496	794	2.29	.48	2.34
497	795	2.36	1.15	2.67
498	796	6.18	-1.10	6.28
499	797	7.42	2.53	7.84
501	799	1.99	-.05	2.00
502	800	1.74	-.24	1.76
503	801	1.66	.52	1.74

[illegible]	Mean:	-0.00	with se:	3.35
[illegible]	Mean:	0.00	with se:	2.67
[illegible]	[illegible] Std Err:		4.4	

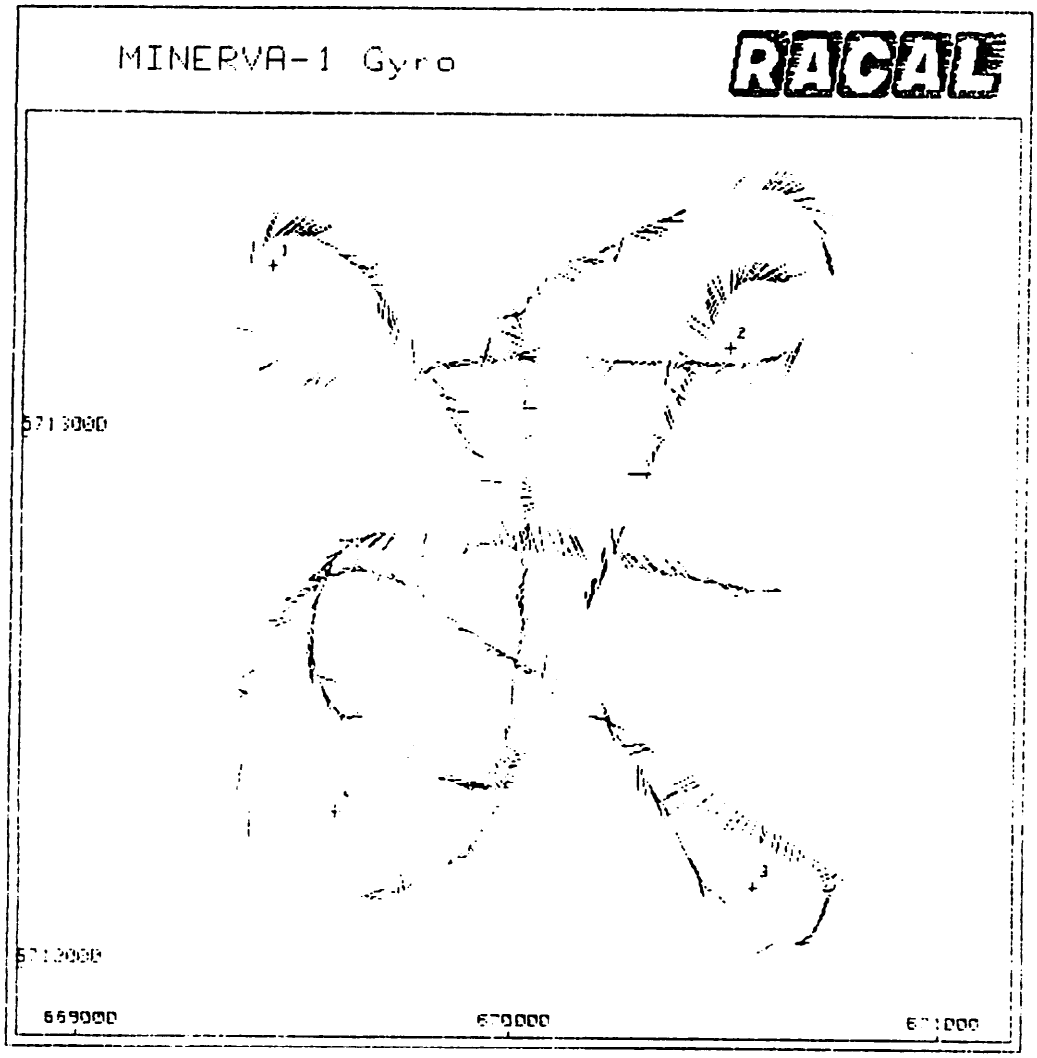
Worst 8 observations	:	409	9.44
	:	303	9.17
	:	133	8.12
	:	134	8.07
	:	312	8.06
	:	310	7.98
	:	499	7.84
	:	178	7.81

Acoustic Net Positions After Absolute Calibration

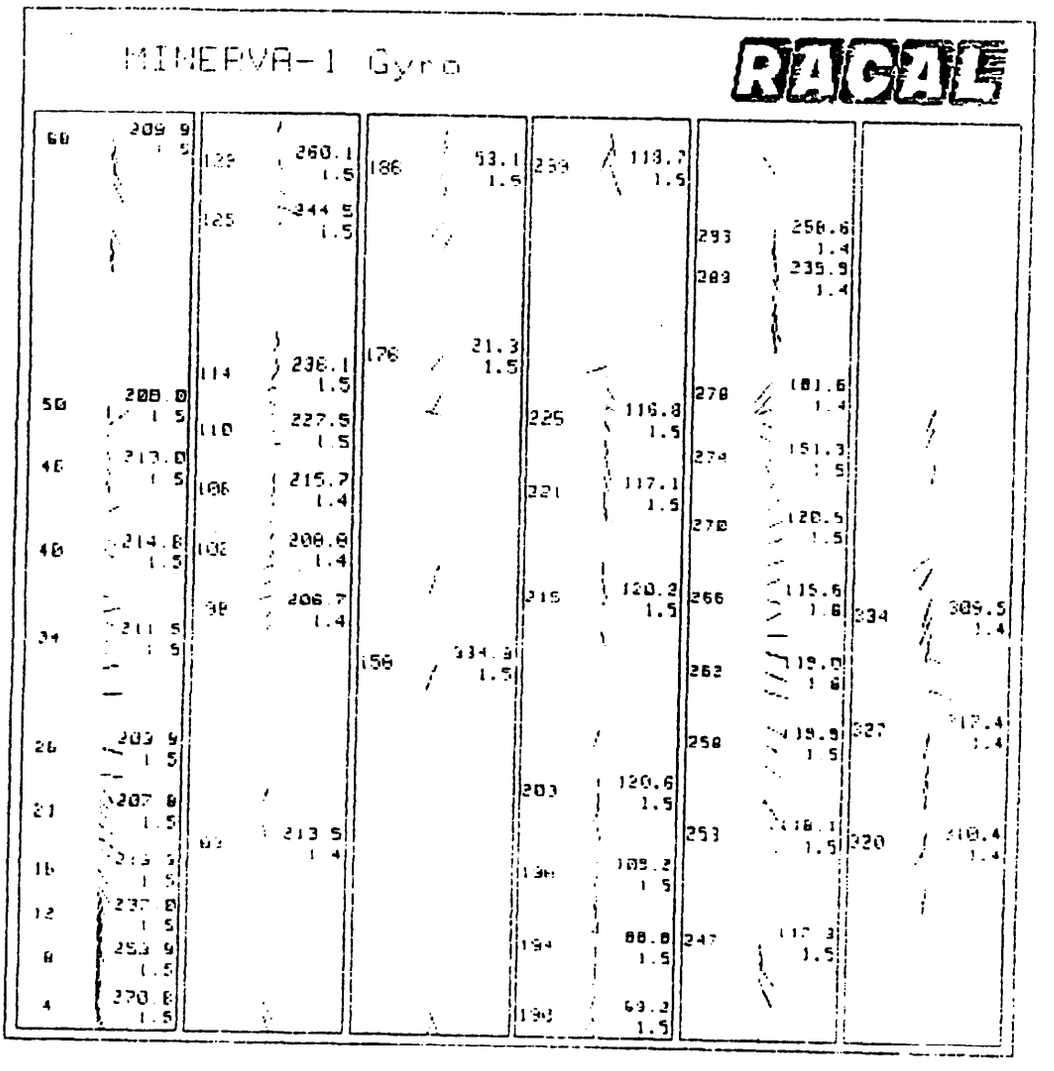
Transponder	Easting	Northing	Depth
1	669440.81	5713314.43	55.40
2	670501.02	5713166.03	58.10
3	670566.27	5712161.85	56.40
4	669597.55	5712298.76	59.40

(in metres)

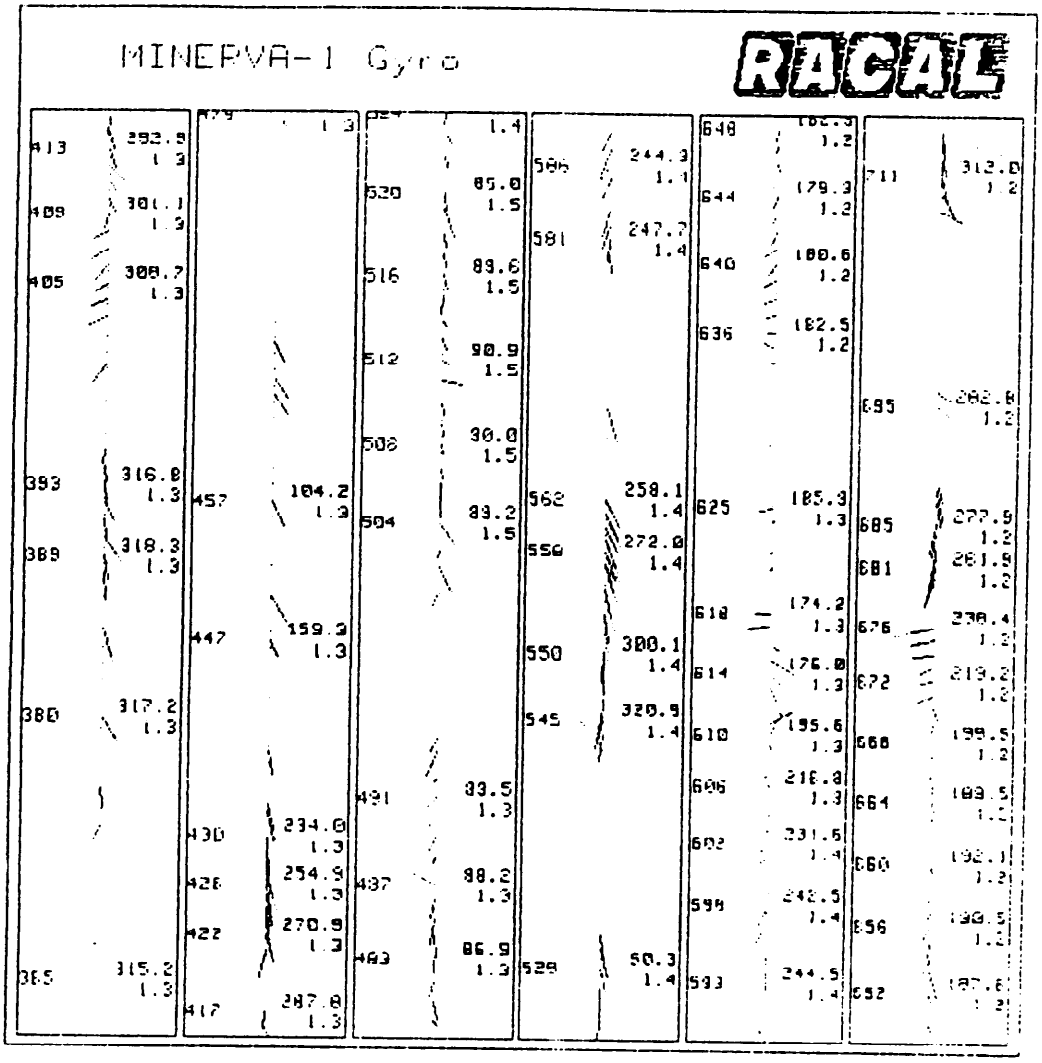
Fix Points for Absolute Calibration



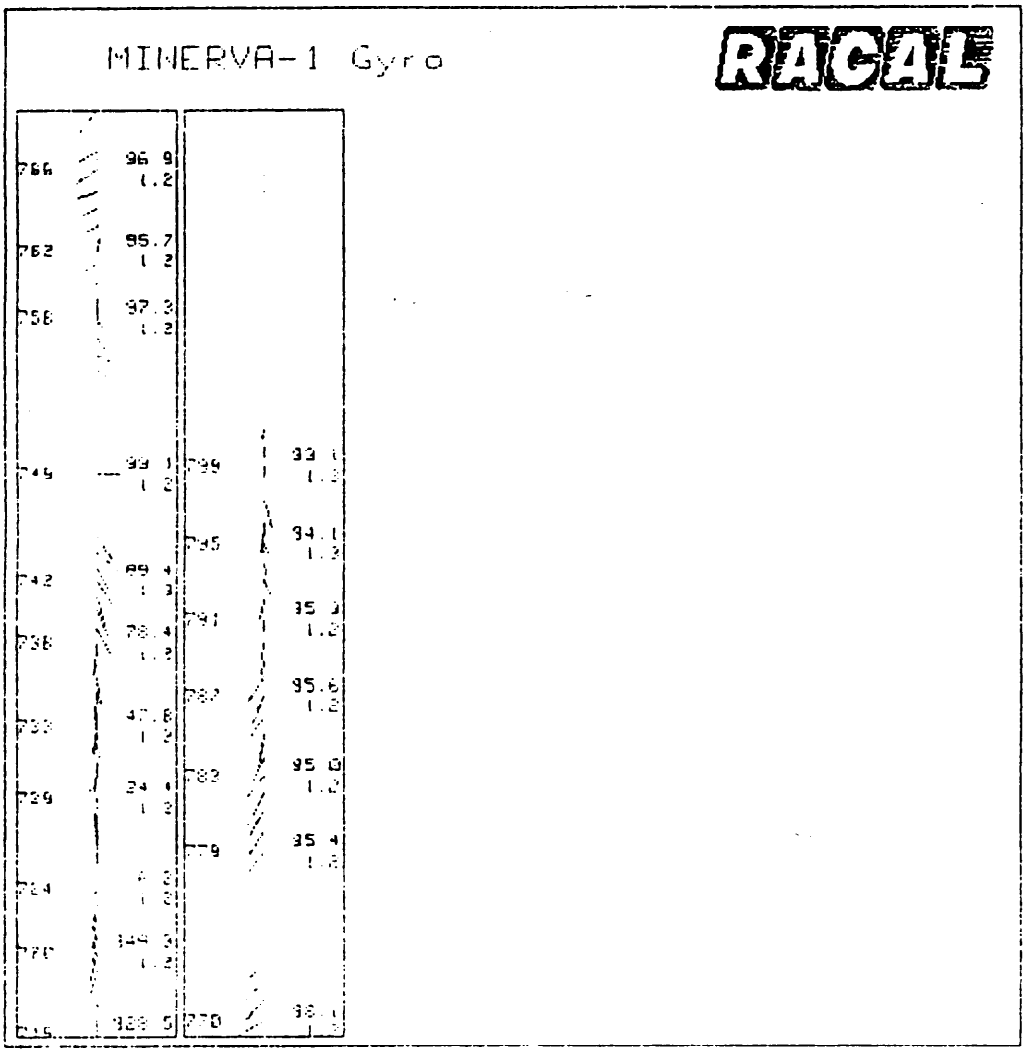
Fix Points for Absolute Calibration



Fix Points for Absolute Calibration

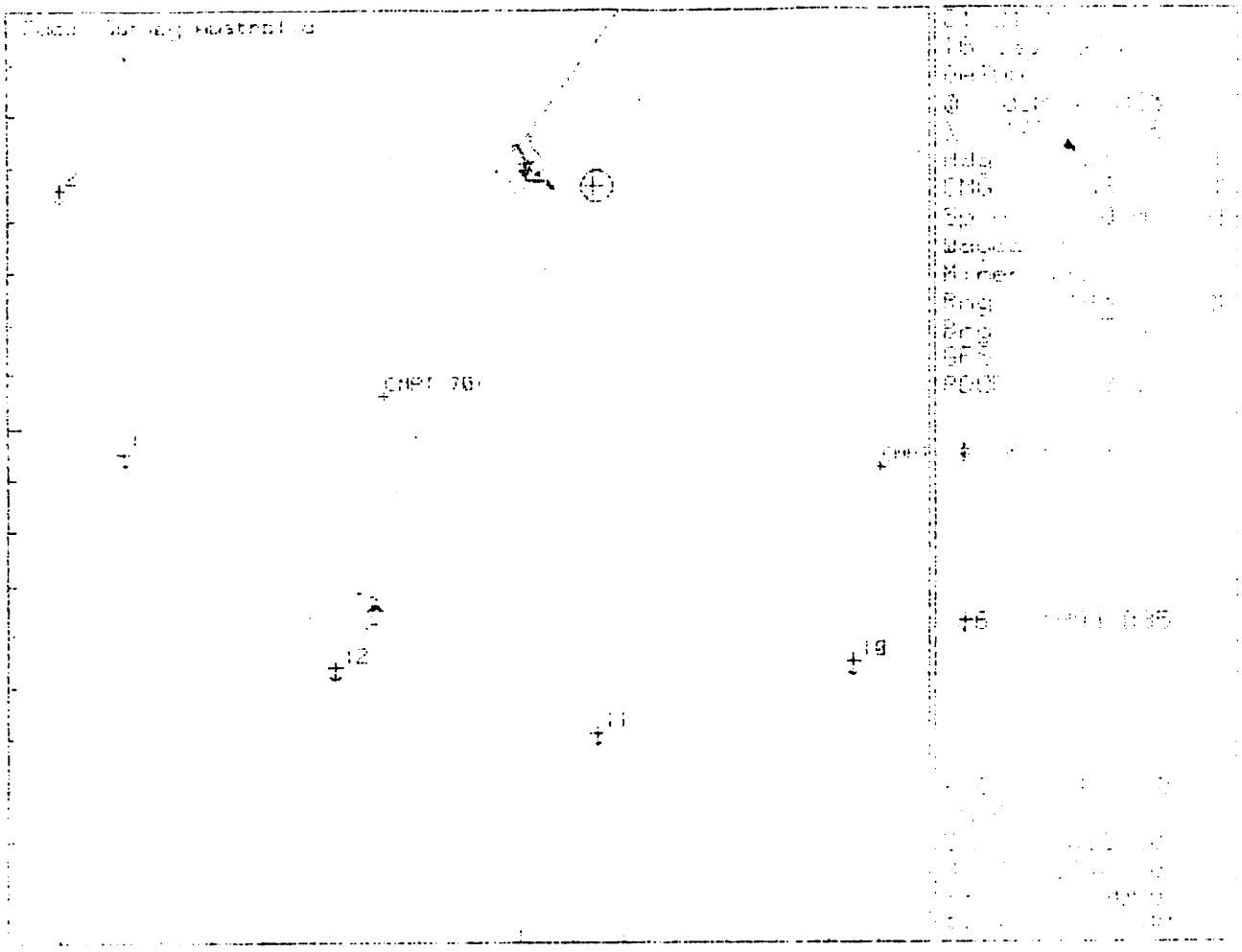


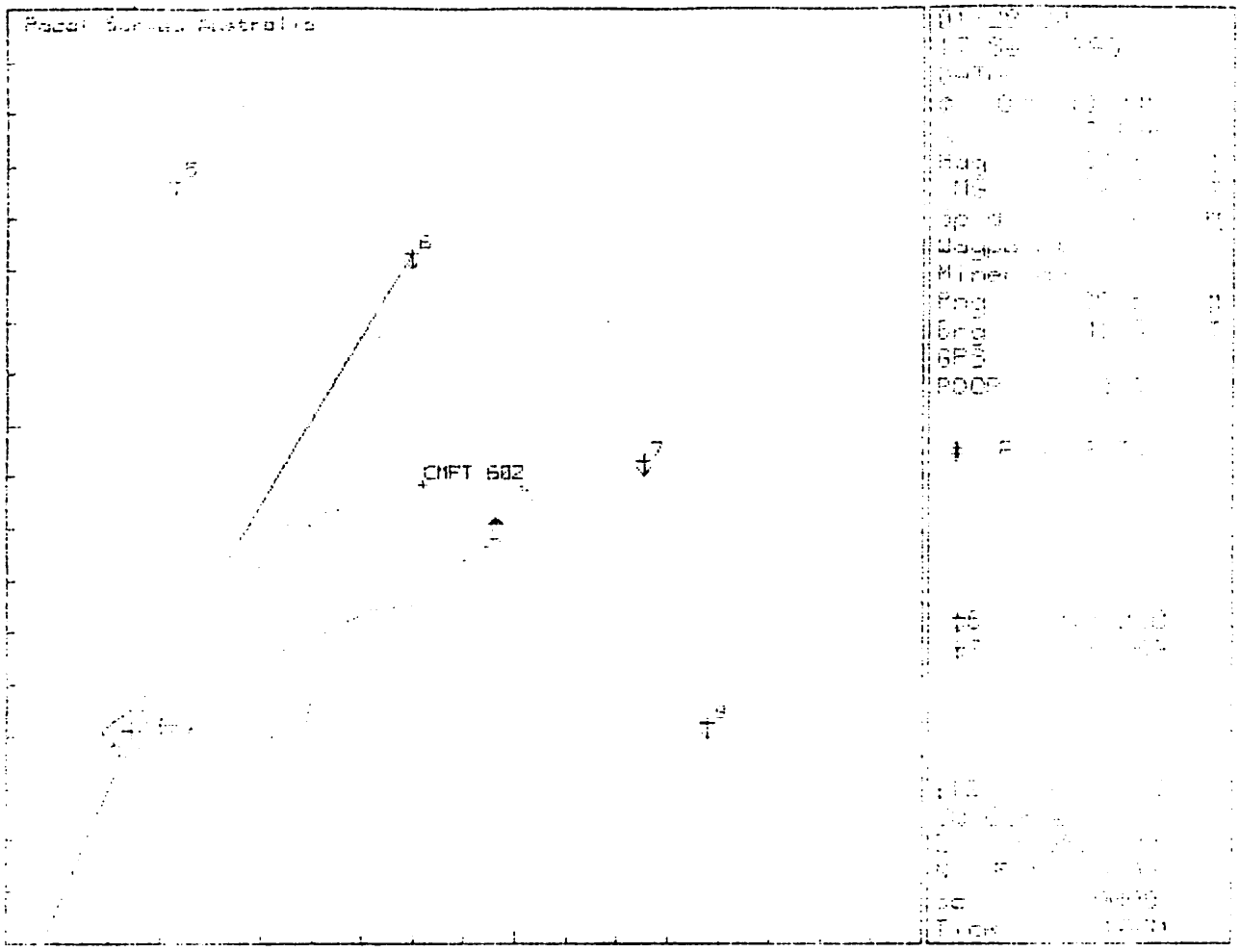
Fix Points for Absolute Calibration



APPENDIX D

GOLF LASER TRACKING PRINTOUTS





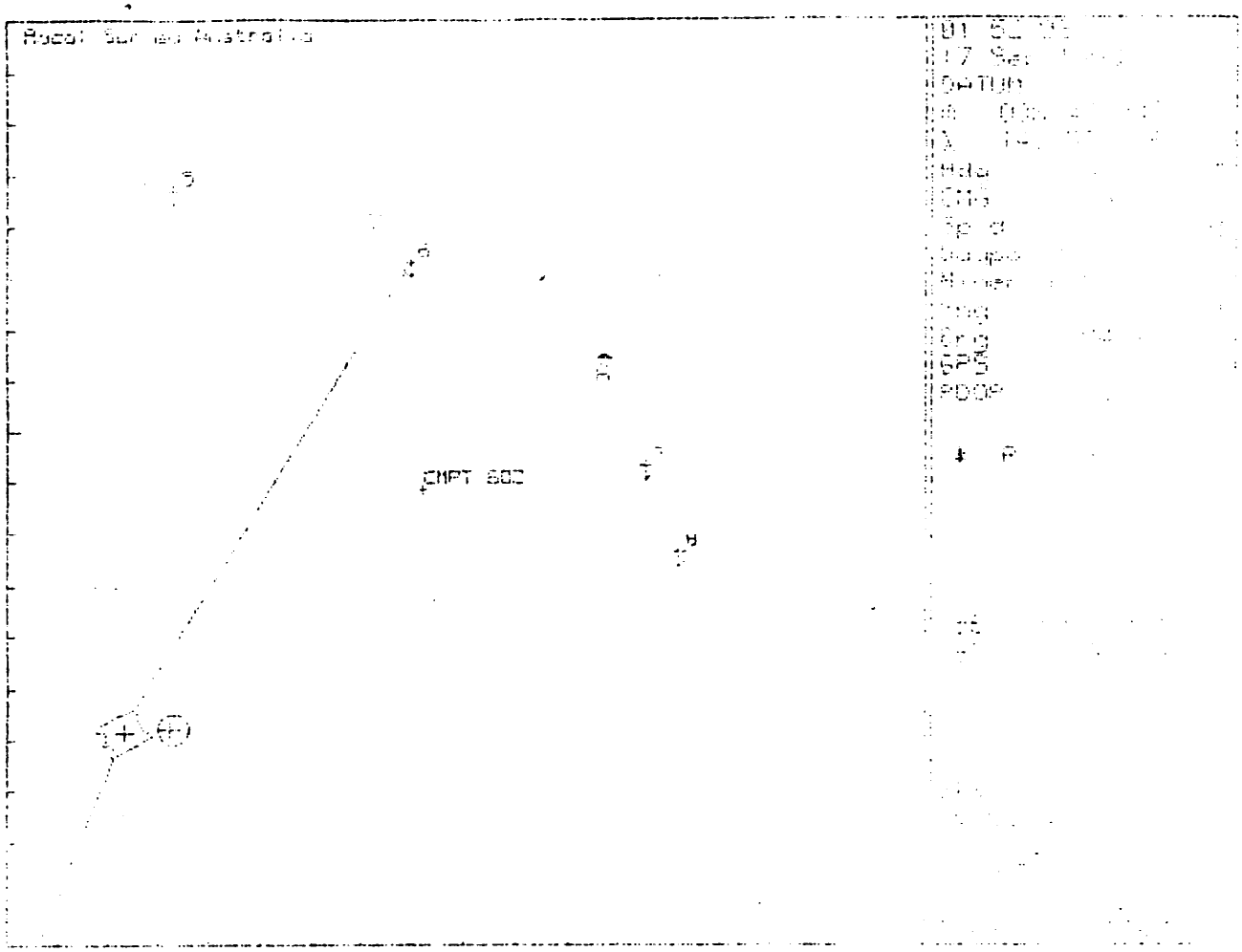
[illegible] TRACKING FIX # [illegible] 01:44:42 Ident : B
Current Anchor 6 : 7 Int. Location 670933E, 5713210N
Vessel Datum : 669904.09E, 5712700.64N Gyro : 241.50½T
Laser : MOF 669911.83E, 5712685.64N
Range [illegible] metres Bearing [illegible] Relative to Vessel Head
Tug Posn [illegible]E, [illegible]N
Rng & Brg : Intended drop 454.4 metres [illegible] deg. True

Bow Vista ... to recover ... and chain.

[illegible] TRACKING FIX # [illegible] 01:44:47 Ident : B
Current Anchor 6 : 7 Int. Location 670933E, 5713210N
Vessel Datum : 669902.91E, 5712701.98N Gyro : 241.50½T
Laser : MOF 669910.65E, 5712686.90N
Range [illegible] metres Bearing 177.10 Relative to Vessel Head
Tug Posn 670741E, 5713169N
Rng & Brg : Intended drop 196.8 metres 76.7 deg. True

100 TRACKING FIX # [illegible] 01:45:03 Ident : B
Current Anchor 6 : 7 Int. Location 670933E, 5713210N
Vessel Datum : 669901.69E, 5712701.00N Gyro : 241.50½T
Laser : MOF 669909.42E, 5712686.00N
Range [illegible] metres Bearing 177.20 Relative to Vessel Head
Tug Posn 670775E, 5713187N
Rng & Brg : Intended drop 160.0 metres 90.5 deg. True

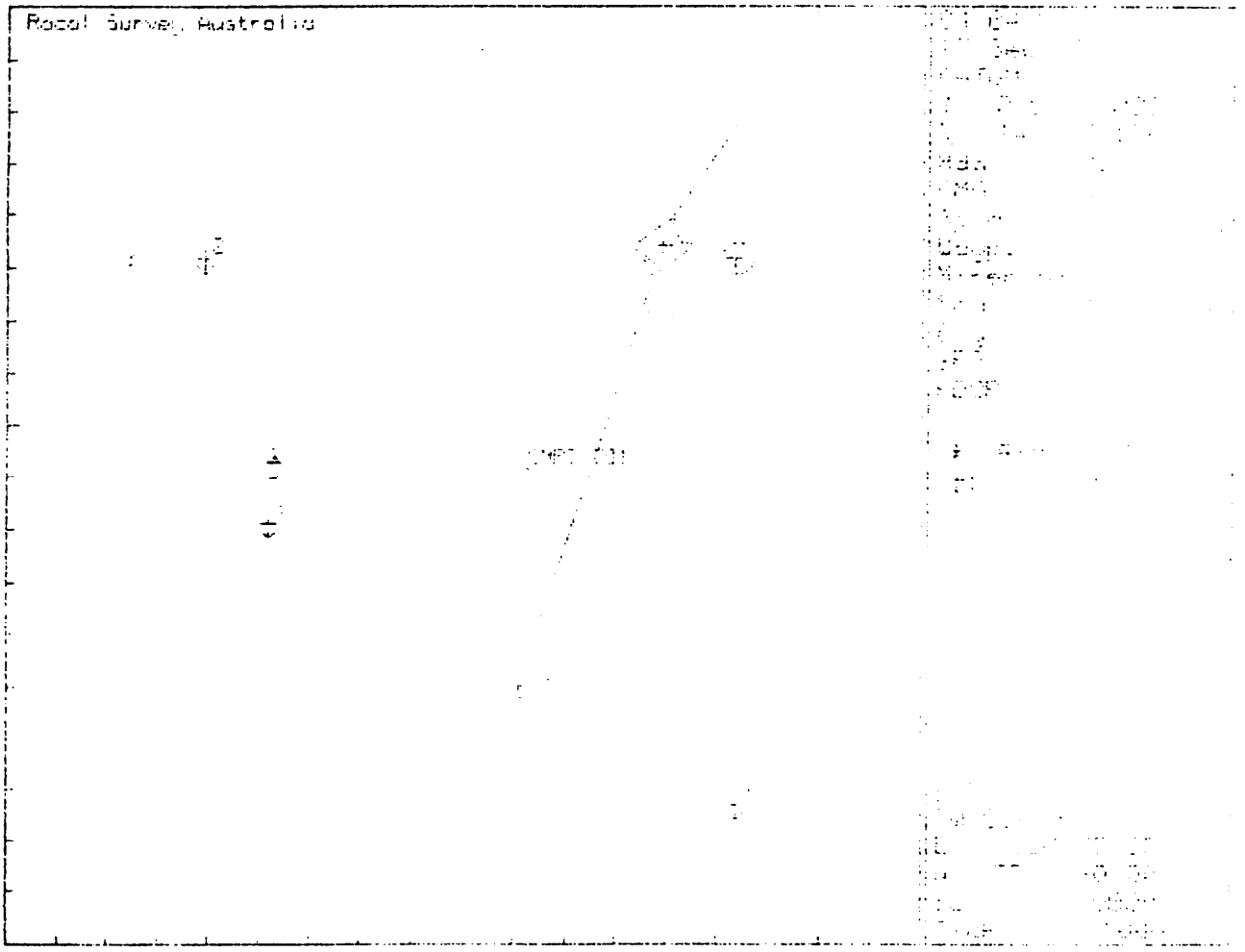
[illegible] TRACKING FIX # [illegible] 01:45:18 Ident : B
Current Anchor 6 : 7 Int. Location 670933E, 5713210N
Vessel Datum : 669901.42E, 5712700.85N Gyro : 241.50½T
Laser : MOF 669909.23E, 5712685.92N


Road Surface Material
CMPT 802

Range 965.60 metres Bearing 9.30 Relative to Vessel Head
Tug Posn 669066E, 5712320N
Rng & Brg to Intended drop 127.0 metres [illegible] deg. True

TUG [illegible] FIX @ TIME 04:02:40 Ident : A
Current Anchor # : Int. Location 669087E, 5712[illegible]N
Vessel Datum : 669876.62E, 5712718.77N Gyro : 244.50½T
Laser : HELIDECK 669868.21E, 5712680.51N
Range 945.00 metres Bearing 9.40 Relative to Vessel Head
Tug Posn 669102E, 5712325N
Rng & Brg to Intended drop 133.0 metres 165.3 deg. True

TUG [PACKING FIX @ TIME 04:02:40 Ident : A
Current Anchor # : Int. Location 669087E, 5712743N
Vessel Datum : 669871.95E, 5712729.90N Gyro : 236.70½T
Laser : HELIDECK 669864.03E, 5712682.52N
Range 965.60 metres Bearing 9.60 Relative to Vessel Head
Tug Posn 669092E, 5712318N
Rng & Brg to Intended drop 125.2 metres 181.0 deg. True



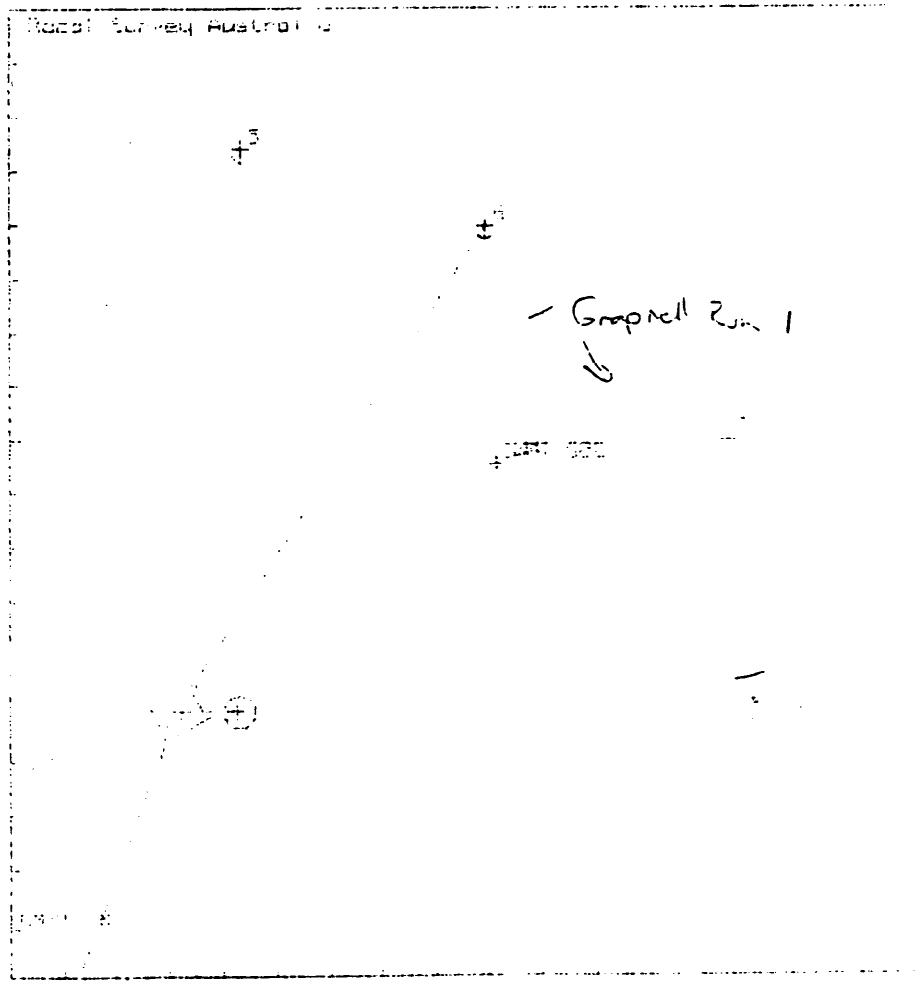
RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Actual Drop	Winch Offset
2	OFF	OFF
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF
6	Actual Drop	Winch Offset

	7	OFF	OFF	
	8	OFF	OFF	
	9	OFF	OFF	
	10	OFF	OFF	
	11	OFF	OFF	
	12	Actual Drop	12	Winch Offset 12

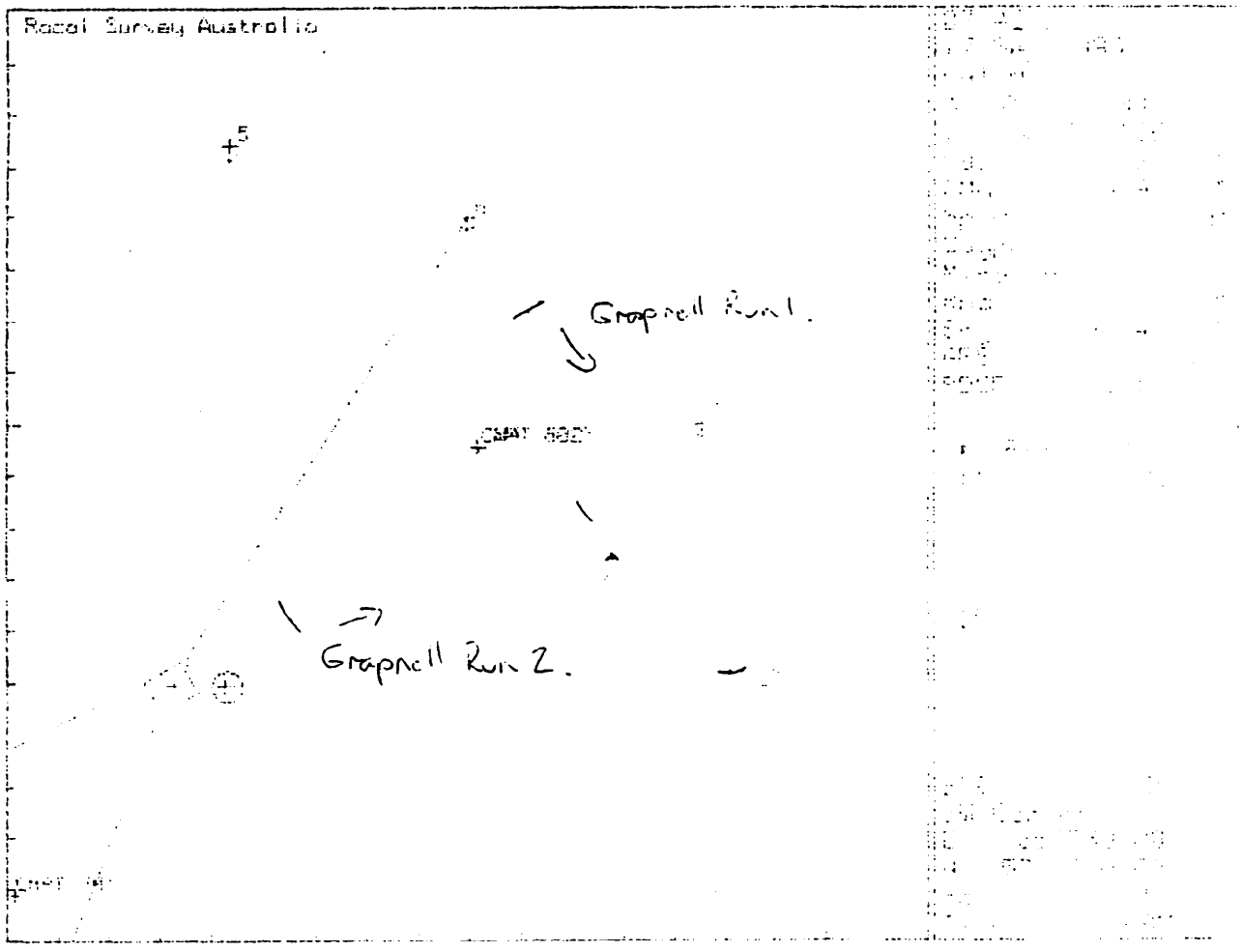
RANGE & BEARING DISPLAY TABLE

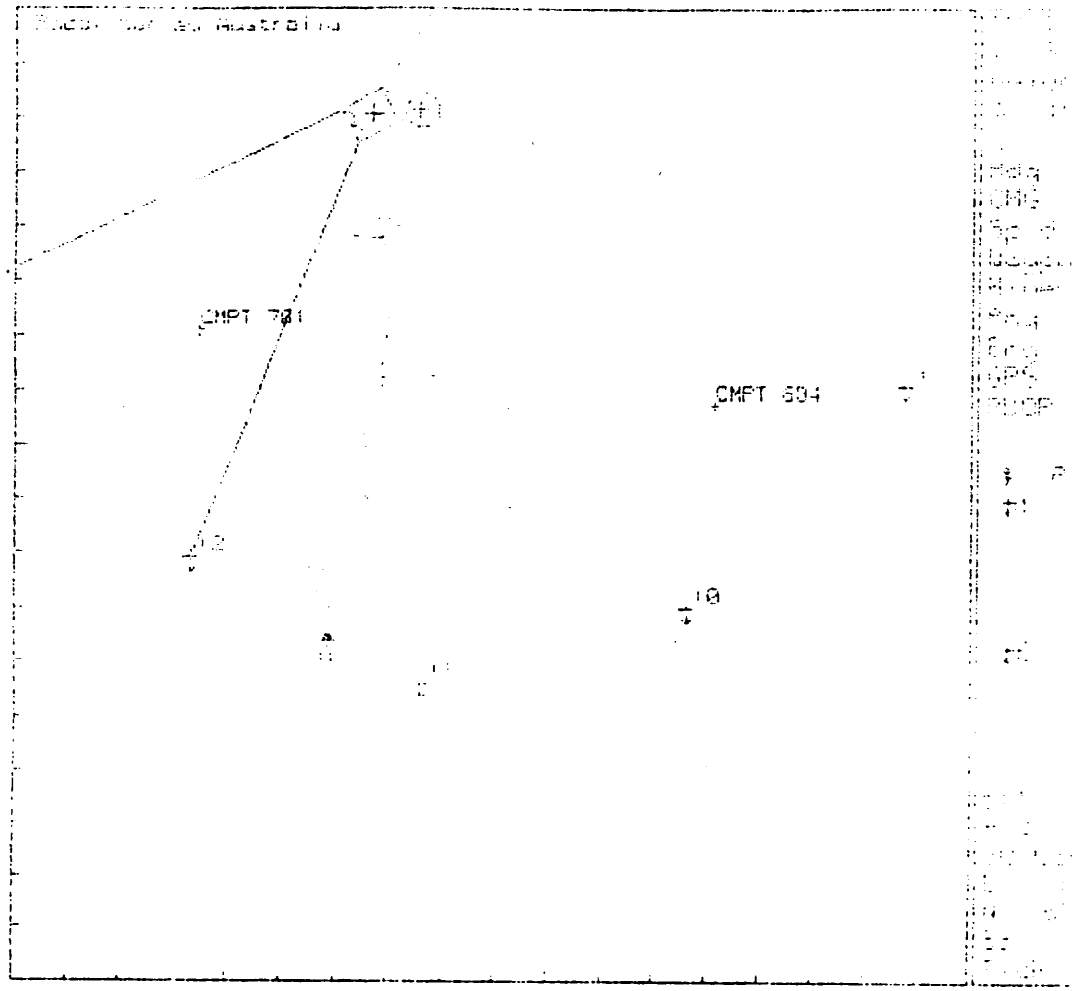
Slot	To		From	
1	Actual Drop	1	Winch Offset	1
2	OFF		OFF	
3	Waypoint	4	Laser Target	19
4	OFF		OFF	
5	OFF		OFF	
6	Actual Drop	6	Winch Offset	6
7	OFF		OFF	
8	OFF		OFF	
9	OFF		OFF	
10	OFF		OFF	
11	OFF		OFF	
12	Actual Drop	12	Winch Offset	12



RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Actual Drop 1	Winch Offset 1
2	OFF	OFF
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF
6	Actual Drop 6	Winch Offset 6
7	OFF	OFF
8	OFF	OFF
9	OFF	OFF
10	OFF	OFF
11	OFF	OFF
12	Actual Drop 12	Winch Offset 12

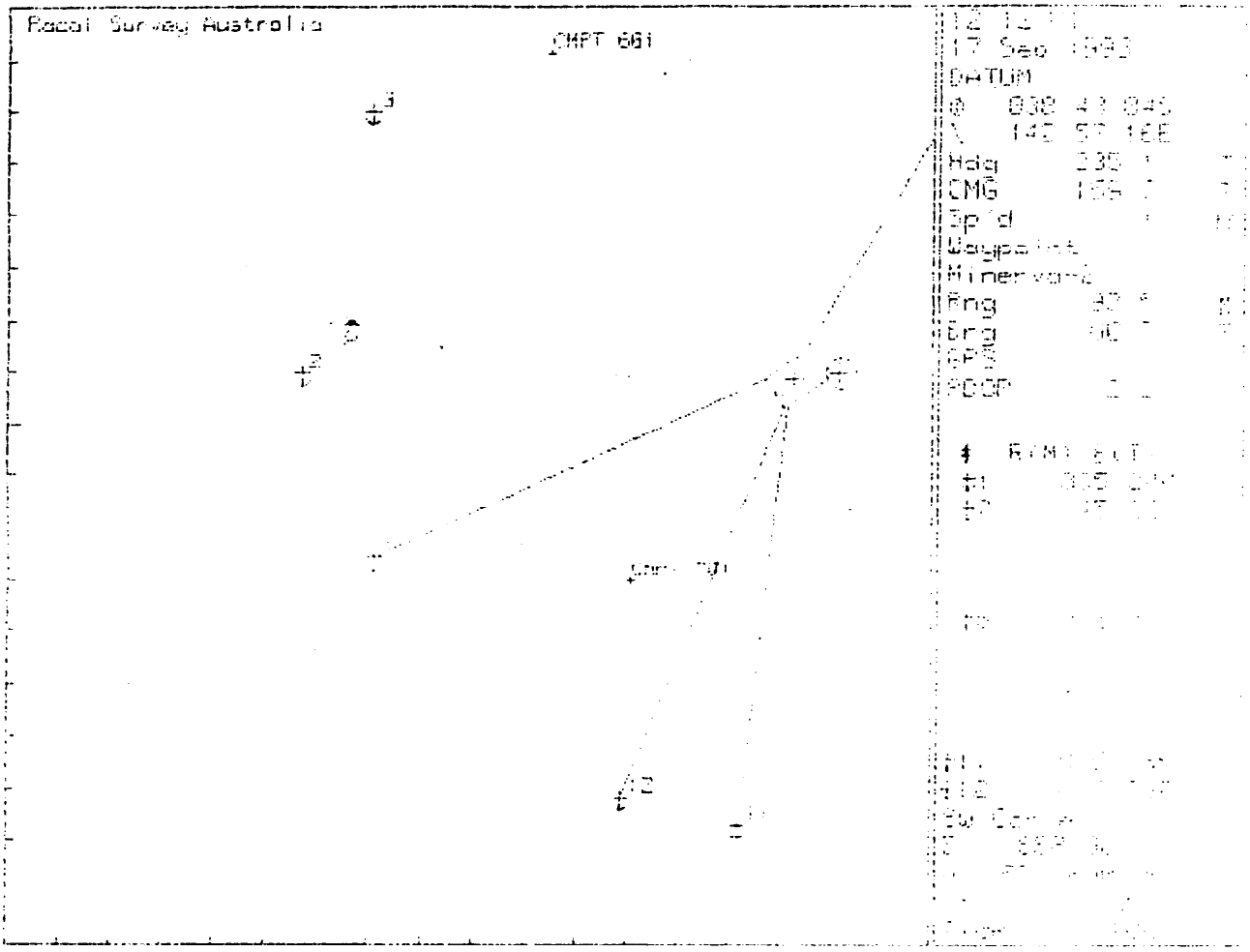




[illegible]	to	from
1	Actual brg,	Launch Offset
2	OFF	OFF
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF
6	Actual brg	Launch Offset
7	OFF	OFF
8	OFF	OFF
9	OFF	OFF
10	OFF	OFF
11	Actual brg	Launch Offset
12	Actual brg	Launch Offset

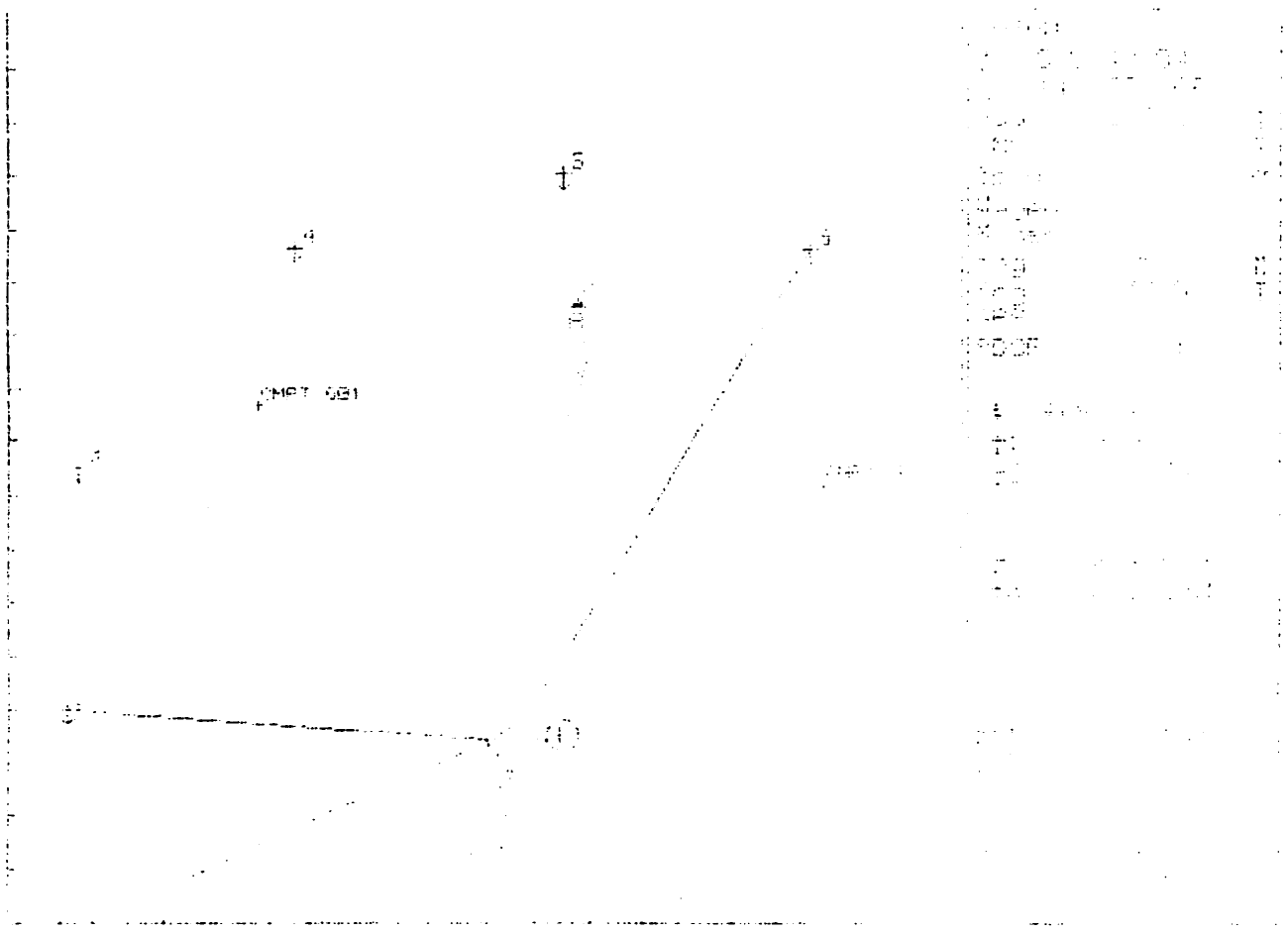
[illegible]	to	from
1	Actual brg	Launch Offset
2	OFF	OFF
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF
6	Actual brg	Launch Offset
7	OFF	OFF
8	OFF	OFF

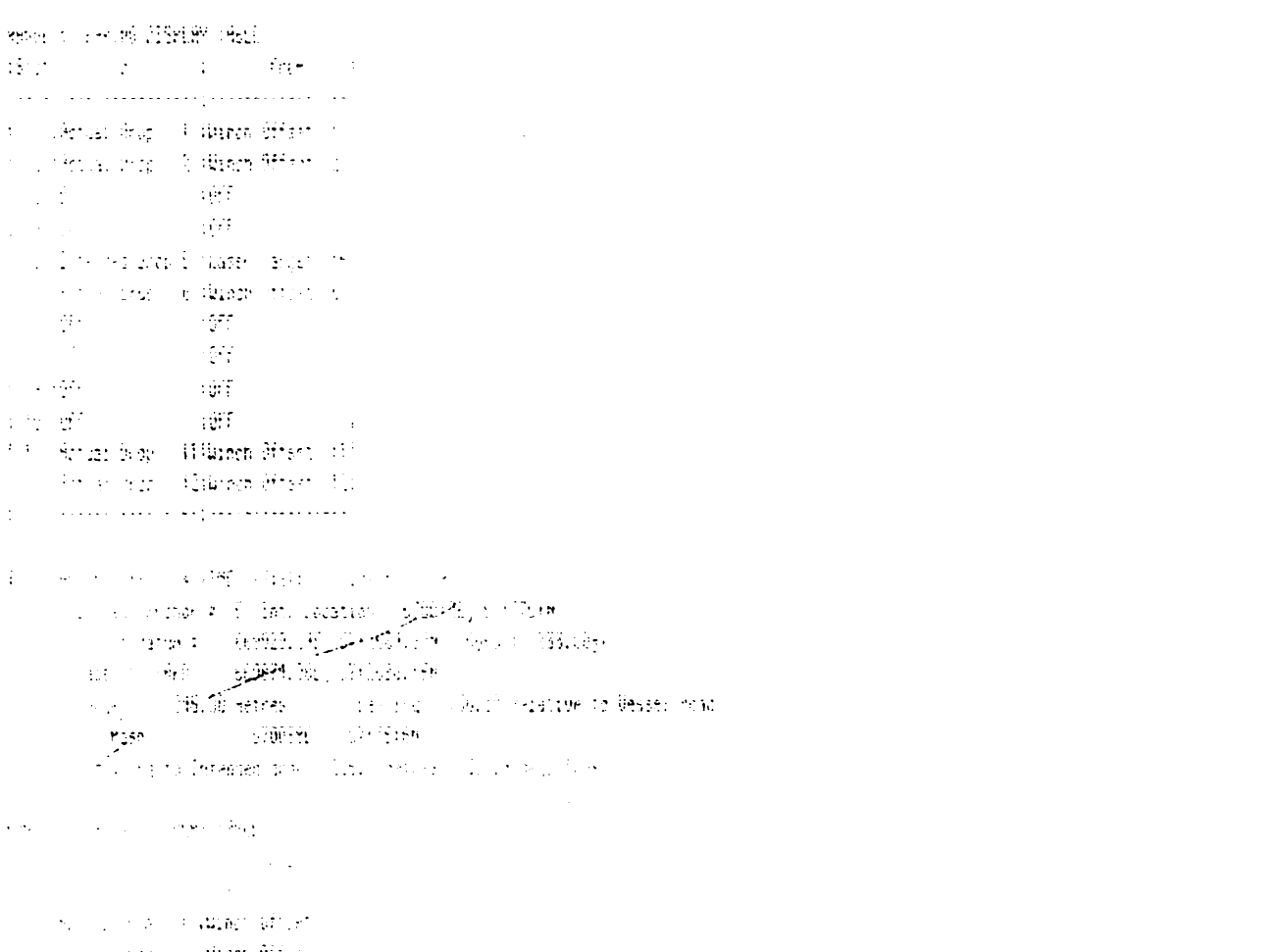
↓ Running Anchor #2



Slot		Freq
	Winch Offset	
	Winch Offset	
OFF	OFF	
OFF	OFF	
	OFF	
	Winch Offset	5
	OFF	
	OFF	
	OFF	
	OFF	
	OFF	
Actual Drop	Winch Offset	11
Winch Drop	Winch Offset	12

Slot		Freq
	Winch Offset	
	Winch Offset	
	OFF	
OFF	OFF	
Intended Drop	5 Winch Offset	5
Actual Drop	6 Winch Offset	6
OFF	OFF	
OFF	OFF	

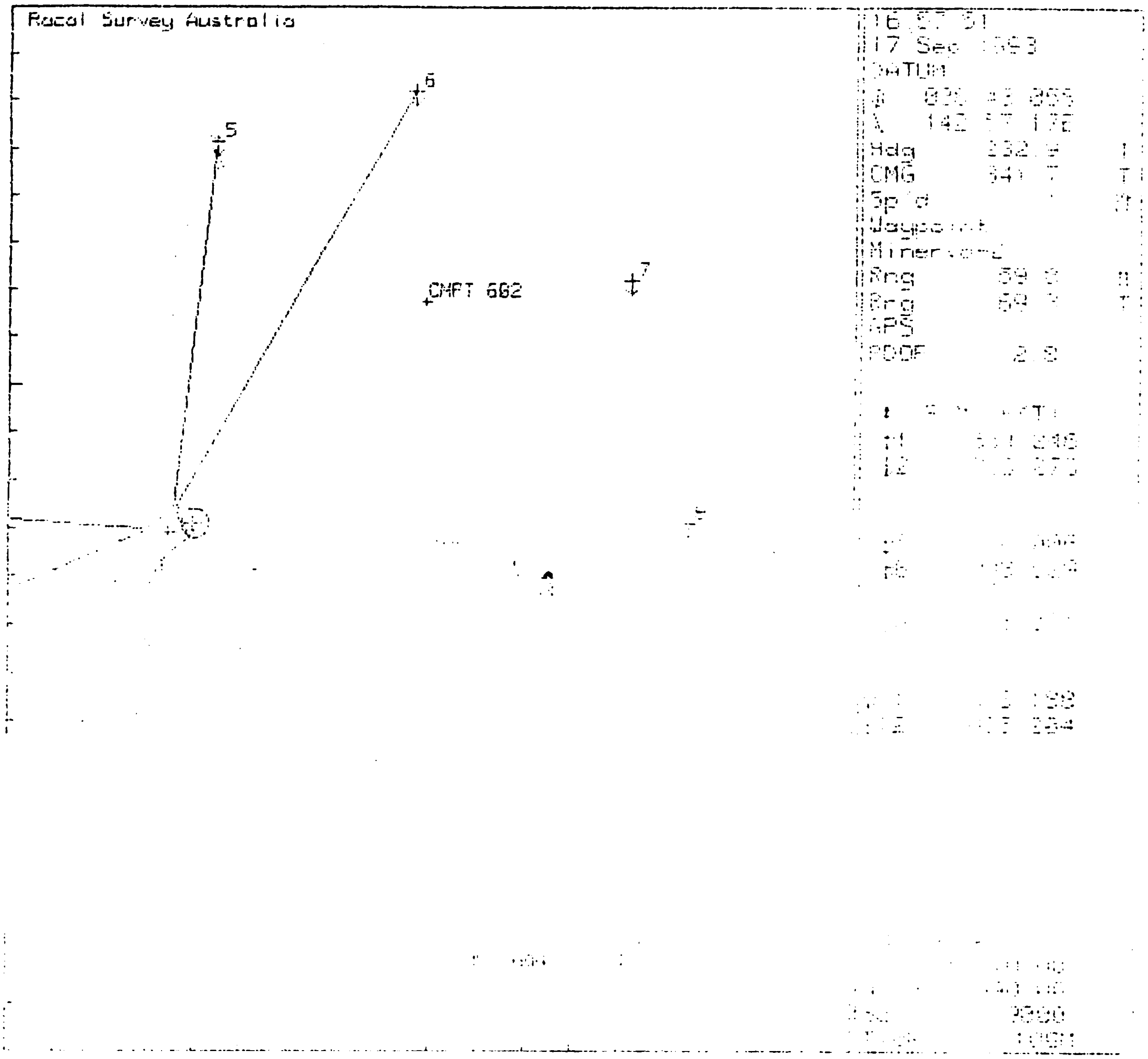




```
        Tug Posn          670751E,    5712006N
        Rng & Brg to Intended drop   325.5 metres    71.2 deg. True

TUG TRACKING FIX    9 TIME  16:56:18   Ident  1  8
        Current Anchor #  8  Int. Location   6710606E, 5712703N
        Vessel Datum :    669997.65E, 5712684.25N   Gyro :  234.10[illegible]
        Laser : HELIDECK  669990.10E, 5712699.79N
        Range      320.00 metres        Bearing   218.30 Relative to Vessel Head
        Tug Posn           670759E,   5712607N
        Rng & Brg to Intended drop   316.2 metres    71.2 deg. True
```

8 ON BOTTOM.



```
16 57 51
17 Sep 1993
DATUM
Hdg        232
CMG        341        T
Sp'd
Waypoint
Minervoml
Rng        59         M
Brg        69         T
GPS
PDOP          2.8
```

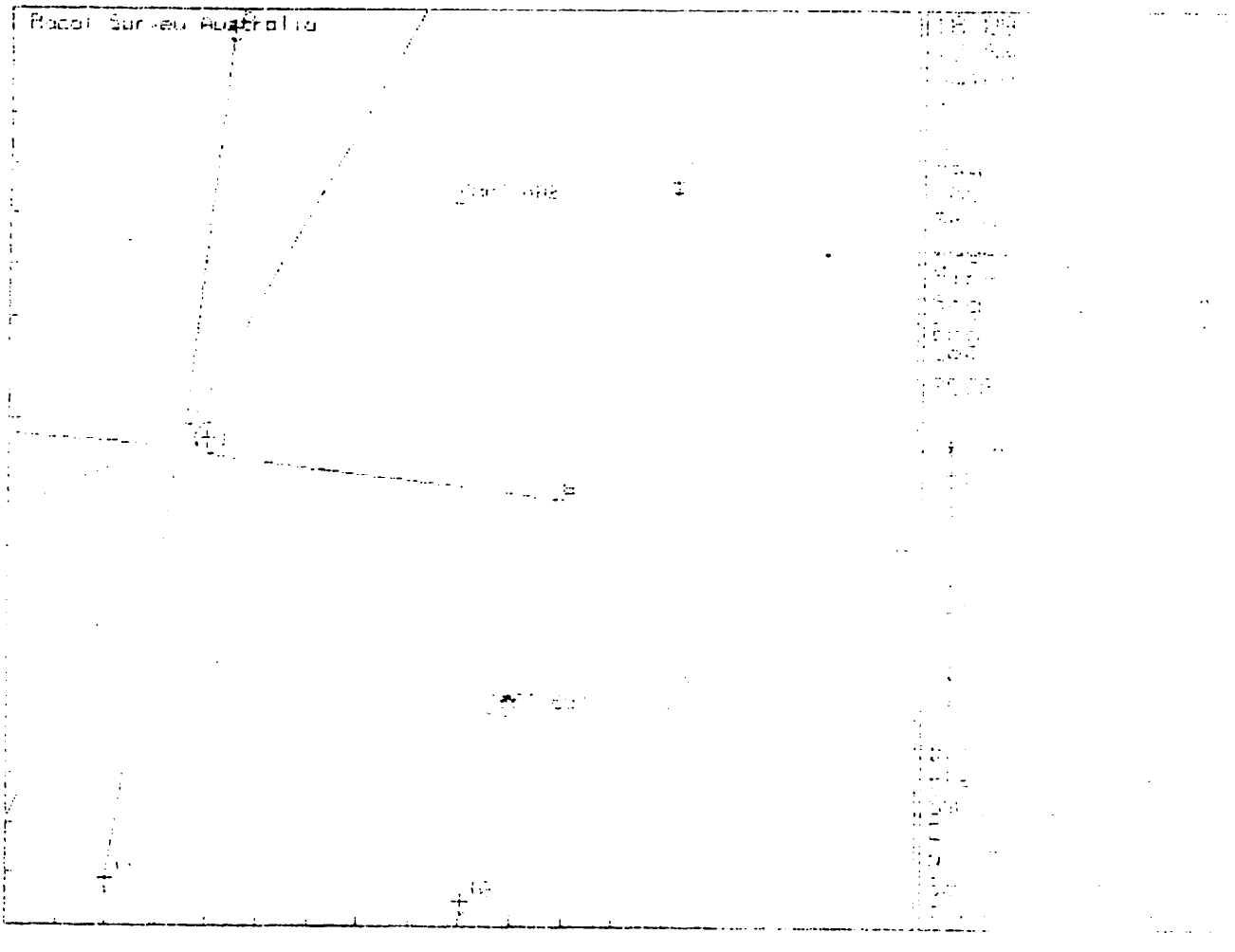
```
[illegible] TABLE  Page
Anchor Offset
Anchor Offset
Anchor Offset
TABLE
Page
```

Current Anchor # 9 Int. Location 670923E, 5712200N
Vessel Datum : 669946.70E, 5712678.80N Gyro : 235.20deg
Laser : HELIDECK 669938.02E, 5712640.14N
Range 796.00 metres Bearing 248.70 Relative to Vessel Head
Tug Posn 670580E, 5712186N
Xng & Brg to Intended drop 343.2 metres 86.4 deg. True

TUG TRACKING FIX 9 TIME 18:06:57 Ident : A
Current Anchor # 9 Int. Location 670923E, 5712200N
Vessel Datum : 669949.68E, 5712678.80N Gyro : 235.70deg
Laser : HELIDECK 669939.46E, 5712640.80N
Range 795.00 metres Bearing 248.70 Relative to Vessel Head
Tug Posn 670580E, 5712186N
Xng & Brg to Intended drop 343.2 metres 86.4 deg. True

TUG TRACKING FIX 9 TIME 18:06:57 Ident : A
Current Anchor # 9 Int. Location 670923E, 5712200N
Vessel Datum : 669950.63E, 5712680.07N Gyro : 235.70deg
Laser : HELIDECK 669941.42E, 5712641.99N
Range 785.00 metres Bearing 248.70 Relative to Vessel Head
Tug Posn 670580E, 5712186N
Xng & Brg to Intended drop 343.2 metres 86.4 deg. True

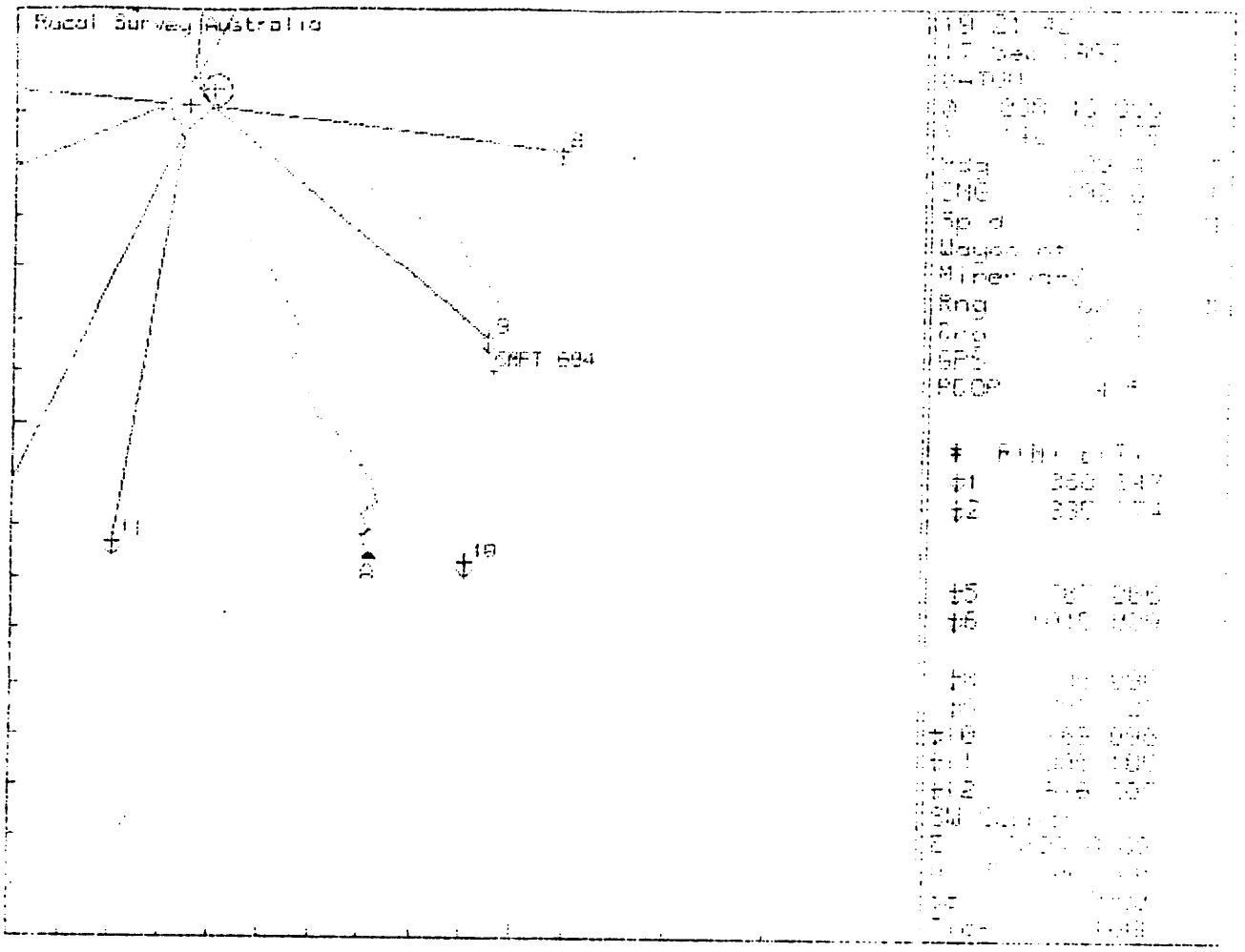
#9 ON BOTTOM



RANGE & BEARING DISPLAY TABLE

Vessel	To	From
Datum	Anchor #	Launch Offset

Vessel Datum	Launch Offset
OFF	OFF
OFF	OFF



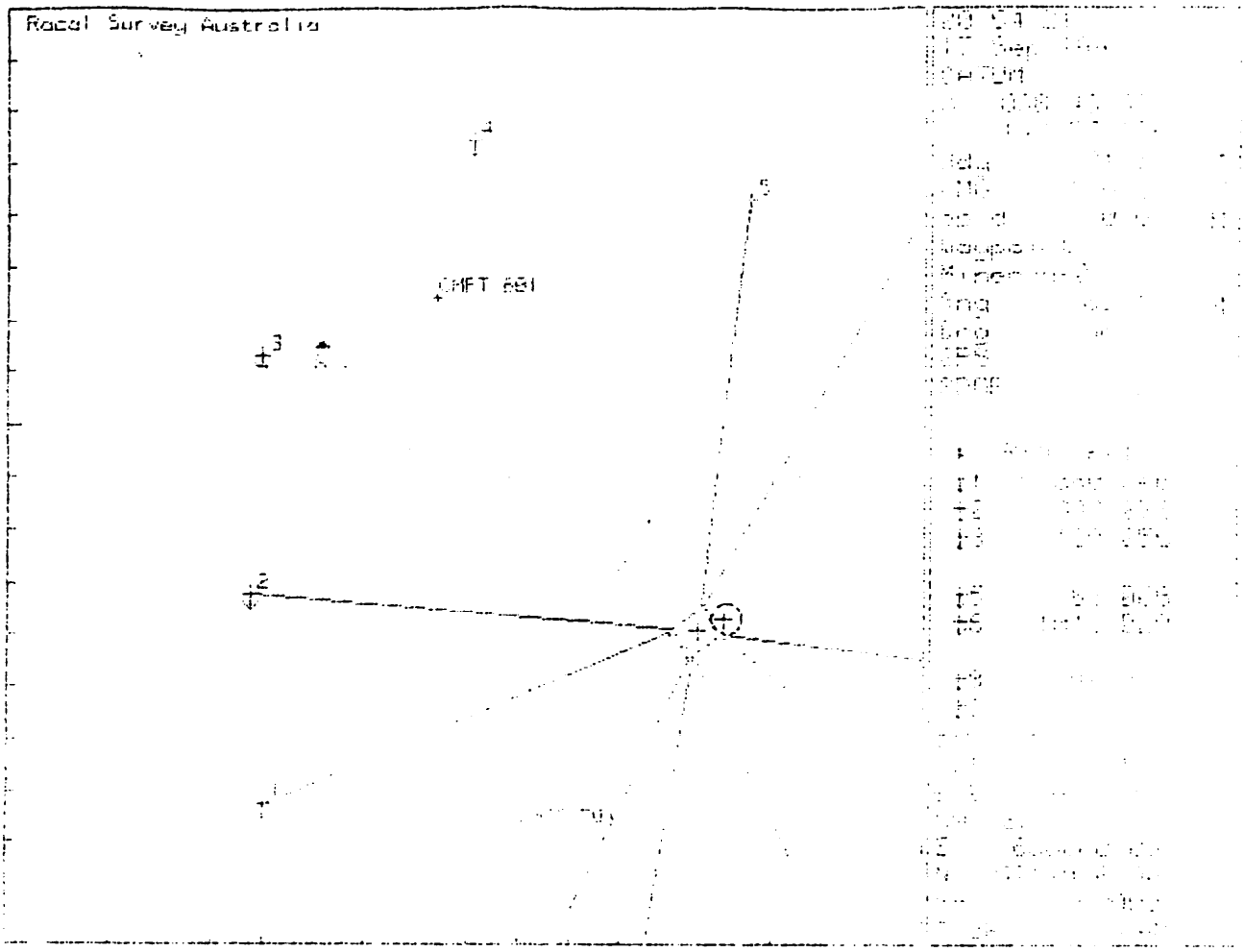
RANGE & BEARING DISPLAY TABLE

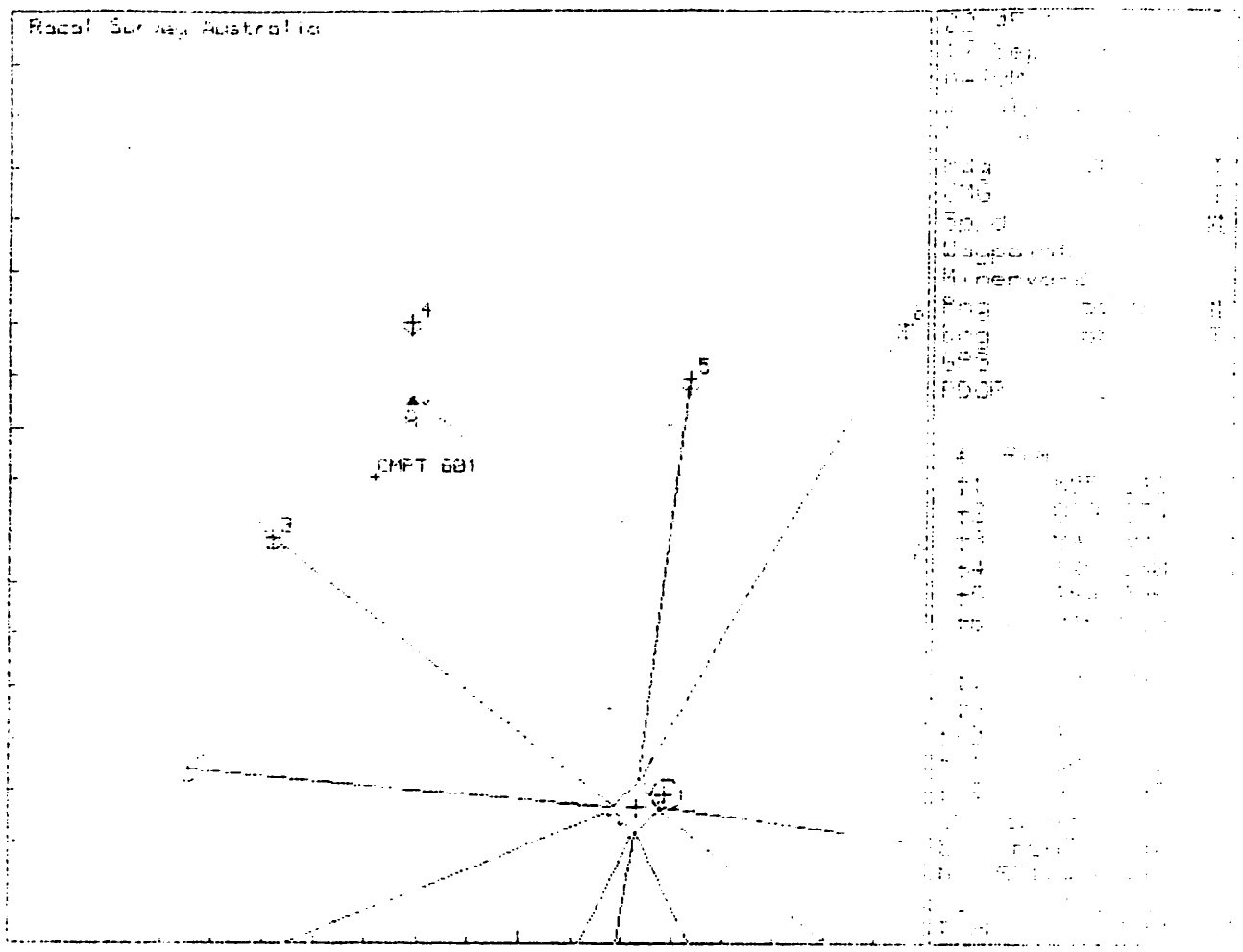
Start	To		From	
	Actual Drop	1	Winch Offset	1
	Actual Drop		Winch Offset	2
	OFF		OFF	
	OFF		OFF	
	Actual Drop		Winch Offset	5
	Actual Drop		Winch Offset	6
	OFF		OFF	
	Actual Drop		Winch Offset	9
	Actual Drop		Winch Offset	9
	Actual Drop		Winch Offset	10
	Actual Drop		Winch Offset	11
	Actual Drop	12	Winch Offset	12

RANGE & BEARING DISPLAY TABLE

Start	To		From	
	Actual Drop	1	Winch Offset	1
	Actual Drop		Winch Offset	2
	Intended Drop		Winch Offset	3
	OFF		OFF	
	Actual Drop	5	Winch Offset	5
	Actual Drop	6	Winch Offset	6
	OFF		OFF	
	Actual Drop	9	Winch Offset	9

Ancho- #3



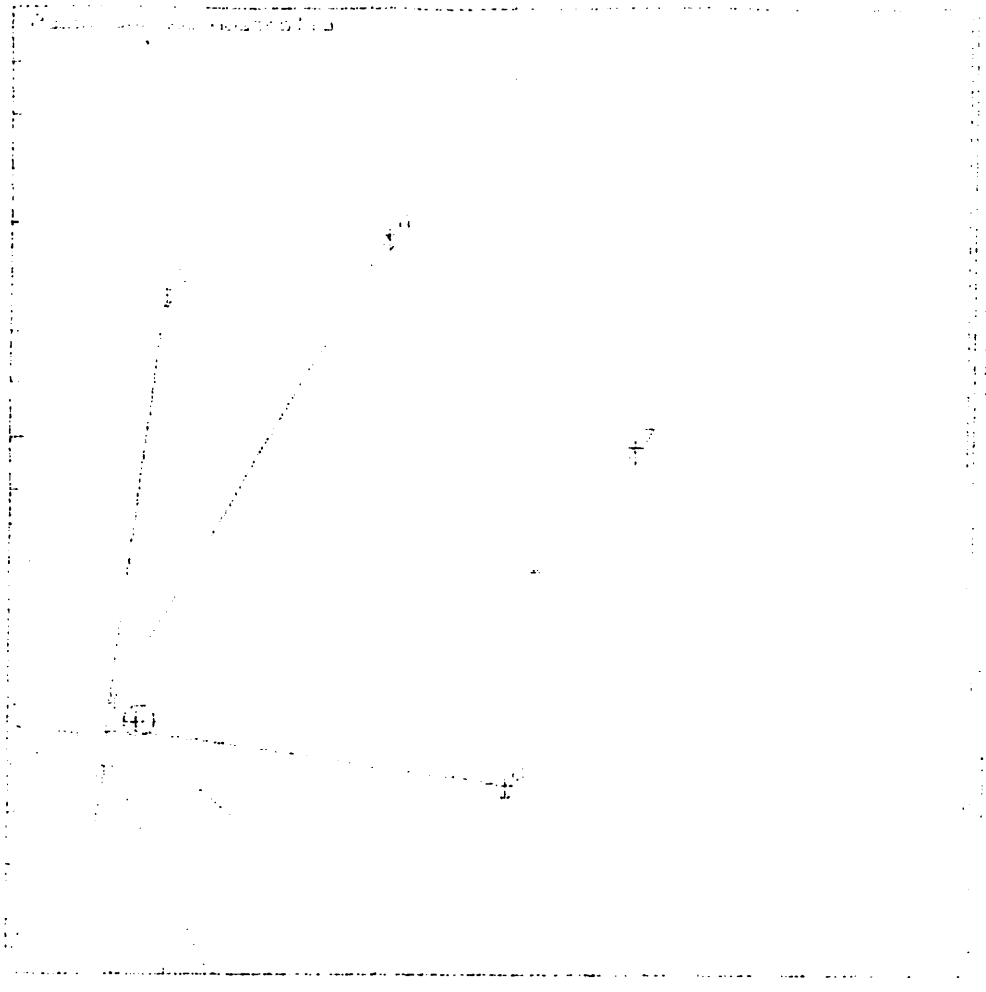


PHASE 4 BEARING DISPLAY TABLE

Stn	To	From
1	Actual Brg	Launch Offset 1
2	Actual Brg	Launch Offset 2
3	Actual Brg	Launch Offset 3
4	Actual Brg	Launch Offset 4
5	Actual Brg	Launch Offset 5
6	Actual Brg	Launch Offset 6
7	OFF	OFF
8	Actual Brg	Launch Offset 8
9	Actual Brg	Launch Offset 9
10	Actual Brg	Launch Offset 10
11	Actual Brg	Launch Offset 11
12	Actual Brg	Launch Offset 12

PHASE 5 BEARING DISPLAY TABLE

Stn	To	From
1	Actual Brg	Launch Offset 1
2	Actual Brg	Launch Offset 2
3	Actual Brg	Launch Offset 3
4	Actual Brg	Launch Offset 4
5	Actual Brg	Launch Offset 5
6	Actual Brg	Launch Offset 6
7	Intended Brg	Launch Offset 7
8	Actual Brg	Launch Offset 8

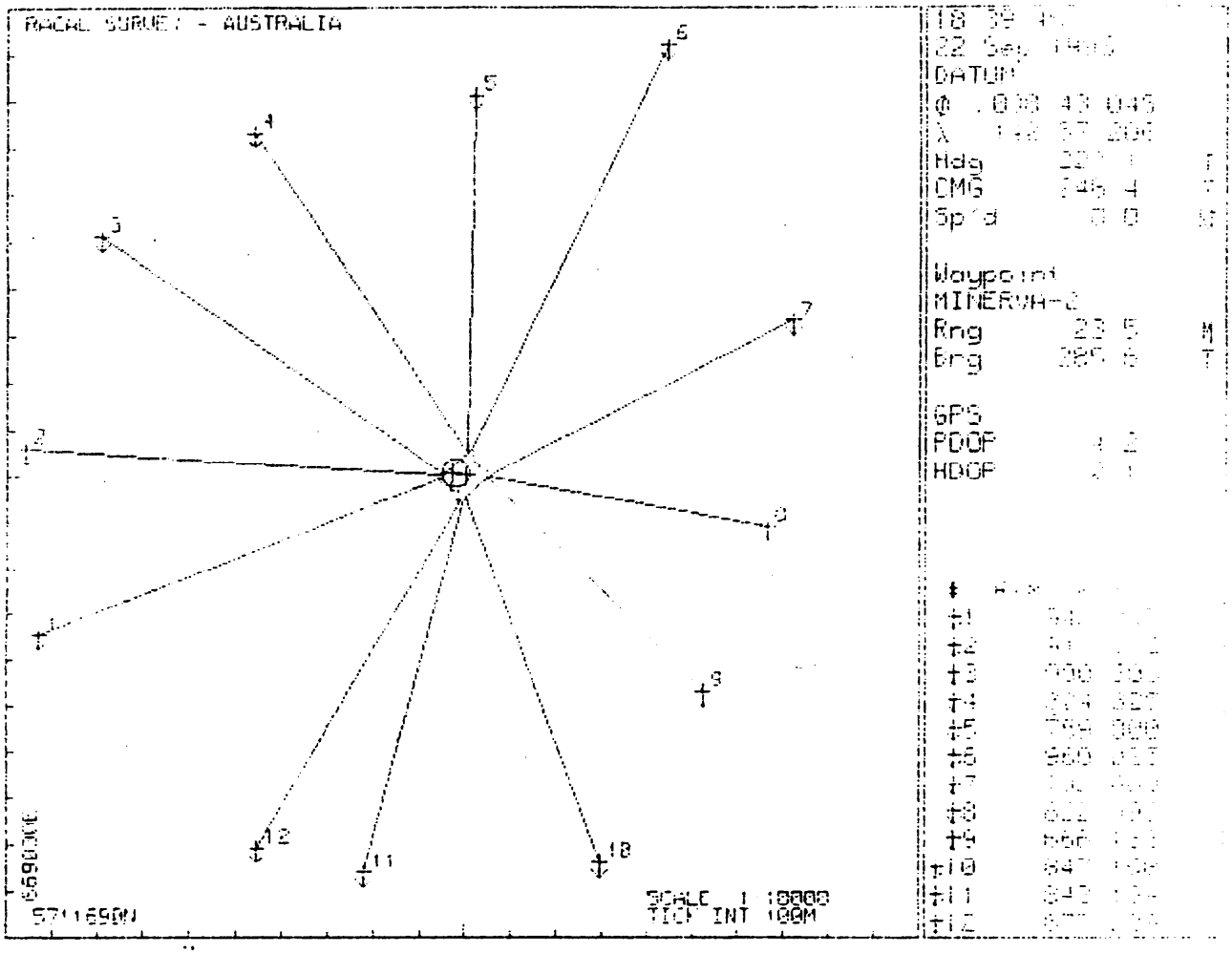


[illegible] LOOKING DISPLAY TABLE

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX E

ANCHOR PATTERN DIAGRAMS



Mark	INTENDED (E,N)	DROP Loca (E,N)
1	669967.4, 5712192.5	669101.0, 5712344.0
2	669960.1, 5712699.2	669073.0, 5712749.0
3	670096.2, 5713302.0	669239.0, 5713200.0
4	669559.0, 5713619.1	669573.0, 5713424.0
5	670011.8, 5713759.9	670055.0, 5713503.0
6	670519.2, 5713624.3	670475.0, 5713609.0
7	670933.3, 5713210.2	670749.0, 5713020.0
8	671059.9, 5712702.8	670695.0, 5712584.0
9	670923.1, 5712200.0	670555.0, 5712224.0
10	670511.0, 5711787.9	670325.0, 5711853.0
11	670002.2, 5711651.1	669810.0, 5711830.0
12	669561.5, 5711776.4	669579.0, 5711883.0

APPENDIX F

DGPS FINAL POSITION ANALYSIS PRINTOUTS - MINERVA-2A

FINAL POSITION ANALYSIS: MINCRUA-3A R/M
GMS v R2.0n 16:47:30 22 Sep 1993 to 17:41:33 22 Sep 1993
GPS Weighting Option - Constellations given equal weights
Mean Corrected Gyro...227.1 Gyro Correction... -.6
Mean Grid Heading.....228.3 Convergence..... -1.2

SECONDARY COMPUTATION - Del Norte

CONSTELLATIONS USED

Const.	# Samples	S.V.s
A	207	02,24,07,26,12,09,13
B	5	24,07,26,12,09,13
C	7	02,24,07,26,12,09,13
D	19	02,24,07,12,09,13
E	14	24,07,12,09,13

Total number of samples used = 252

COMPUTED FINAL ANTENNA POSITION
WGS 84 Spheroid
Latitude 38 DEG 42 MIN 59.688 SEC S (S.D. .39 Metres)
Longitude 142 DEG 57 MIN 24.454 SEC E (S.D. .46 Metres)
Height 26.63 Metres (S.D. .96 Metres)

AUSTRALIAN AGD 1984 Spheroid
Latitude 38 DEG 43 MIN 05.083 SEC S
Longitude 142 DEG 57 MIN 19.509 SEC E
Height 43.39 Metres
UTM/TM
Eastings 670000.98 Metres
Northings 5712680.43 Metres

COMPUTED FINAL DATUM POSITION
AUSTRALIAN AGD 1984 Spheroid
Latitude 38 DEG 43 MIN 04.537 SEC S
Longitude 142 DEG 57 MIN 20.831 SEC E
UTM/TM
Eastings 670033.22 Metres
Northings 5712694.14 Metres

ENTERED FINAL DATUM LOCATION
AUSTRALIAN AGD 1984 Spheroid
Latitude 38 DEG 43 MIN 04.330 SEC S
Longitude 142 DEG 57 MIN 19.864 SEC E
UTM/TM
Eastings 670009.99 Metres
Northings 5712701.01 Metres

Final Datum Position is 24.22 Metres (spheroidal distance) bearing 65°..3' from the Entered...

TERTIARY COMPUTATION - Tau

CONSTELLATIONS USED

Const.	# Samples	S.V.s
A	111 (102)	02,12,13,24,07,26,09
B	3	02,12,13,24,07,09

[illegible]

Total number of samples used = [illegible]

[illegible] denotes # of height samples used after adjustment for latitude aiding

COMPUTED FINAL ANTENNA POSITION

GRS 80 Spheroid

Latitude 38 DEG 42 MIN 59.641 SEC S [illegible] .57 Metres

Longitude 142 DEG 57 MIN 24.369 SEC E [illegible] .43 Metres

Height 21.57 Metres [illegible] .72 Metres

AUSTRALIAN NAT 1984 Spheroid

Latitude 38 DEG 43 MIN 04.[illegible] SEC S

Longitude 142 DEG 57 MIN 19.[illegible] SEC E

Height 28.32 Metres

UTM/TM

Eastings 669998.95 Metres

Northings 5712681.42 Metres

COMPUTED FINAL DATUM POSITION

AUSTRALIAN NAT 1984 Spheroid

Latitude 38 DEG 43 MIN 04.585 SEC S

Longitude 142 DEG 57 MIN 20.886 SEC E

UTM/TM

Eastings 670032.46 Metres

Northings 5712694.21 Metres

INTENDED FINAL DATUM LOCATION

AUSTRALIAN NAT 1984 Spheroid

Latitude 38 DEG 43 MIN 04.330 SEC S

Longitude 142 DEG 57 MIN 19.864 SEC E

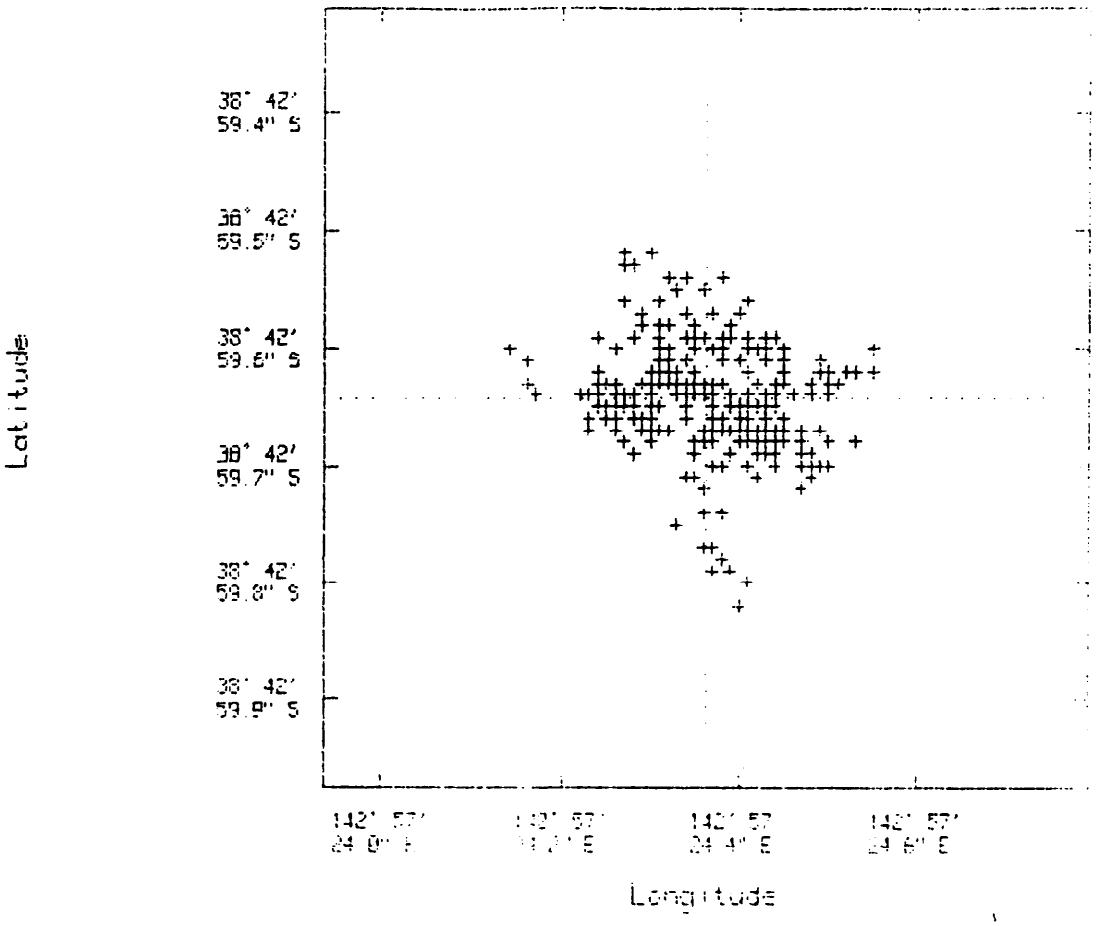
UTM/TM

Eastings 670009.99 Metres

Northings 5712701.01 Metres

Final Datum Position is 23.48 Metres (spheroidal distance) bearing 105.6[illegible] from the Intended Loc.

Tertiary Computation GPS Scatter Plot (1sd)

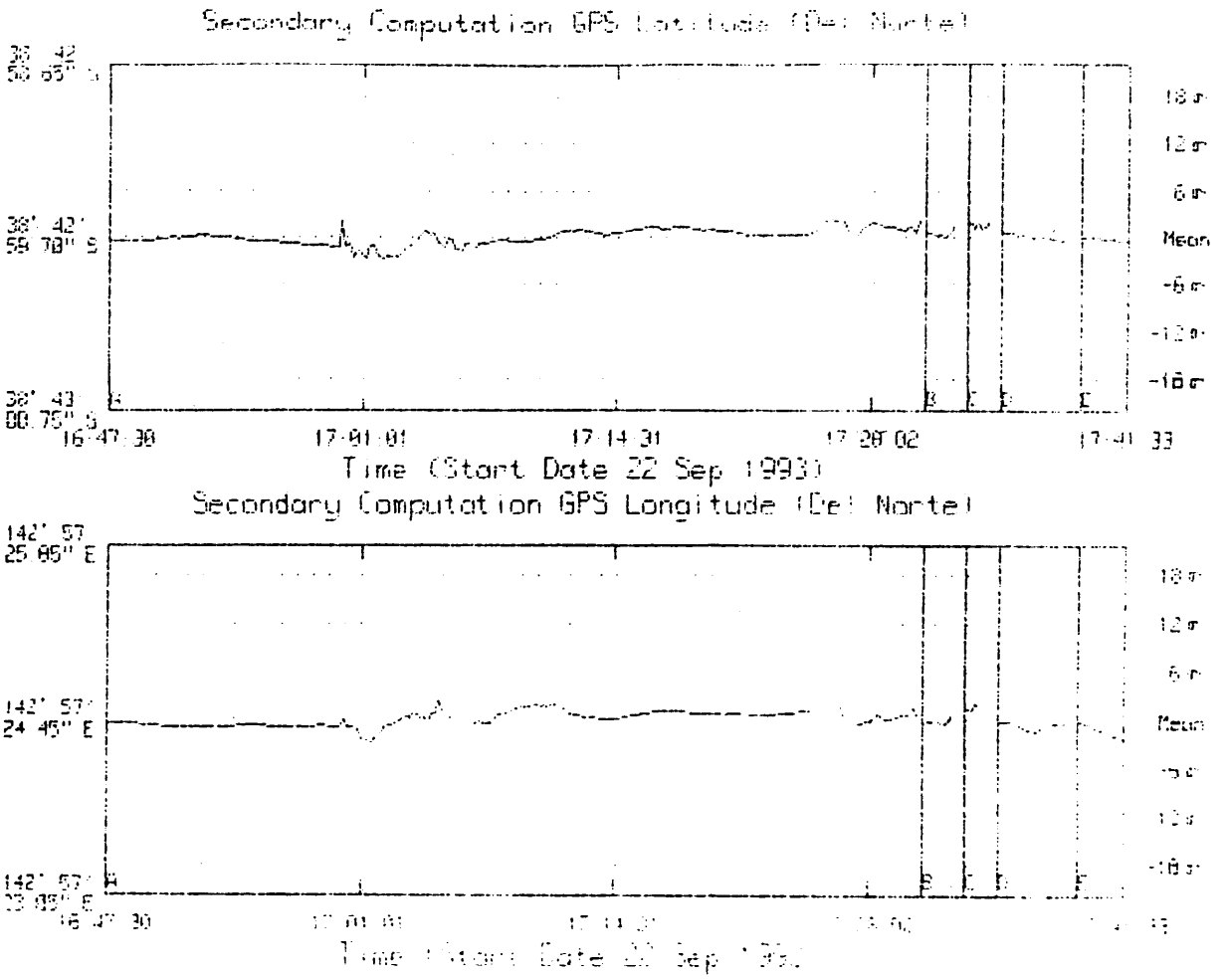


Centred on mean antenna position (passes 1 to 10).

WGS 84 Spheroid

Latitude -38 DEG 42 MIN 59.642 SEC S

Longitude 142 DEG 57 MIN 24.364 SEC E



Secondary Computation (WGS 84 - Del Norte)

Centred on mean of antenna position (passes 1 to 252).

Latitude 38 DEG 42 MIN 58.704 SEC S Sd 1.466 Metres

Longitude 142 DEG 57 MIN 24.454 SEC E Sd 1.557 Metres

[illegible]

Total number of samples used = [illegible]

* denotes # of height samples used after adjustment for latitude aiding

COMPUTED FINAL ANTENNA POSITION

GRS 80 Spheroid

Latitude 36 DEG 42 MIN 59.641 SEC S [illegible] .57 Metres*

Longitude 142 DEG 57 MIN 24.369 SEC E [illegible] .43 Metres*

Height 21.57 Metres [illegible] .51 Metres*

AUSTRALIAN NAT 1984 Spheroid

Latitude 36 DEG 43 MIN 04.335 SEC S

Longitude 142 DEG 57 MIN 19.424 SEC E

Height 68.33 Metres

UTM/TM

Eastings 669998.95 Metres

Northings 5712681.92 Metres

COMPUTED FINAL DATUM POSITION

AUSTRALIAN NAT 1984 Spheroid

Latitude 36 DEG 43 MIN 04.585 SEC S

Longitude 142 DEG 57 MIN 20.000 SEC E

UTM/TM

Eastings 670032.46 Metres

Northings 5712694.21 Metres

INTENDED FINAL DATUM LOCATION

AUSTRALIAN NAT 1984 Spheroid

Latitude 36 DEG 43 MIN 04.330 SEC S

Longitude 142 DEG 57 MIN 19.864 SEC E

UTM/TM

Eastings 670009.99 Metres

Northings 5712701.01 Metres

Final Datum Position is 23.48 Metres (spheroidal distance) bearing 105.61 ° from the Intended Loc.

Spheroidal Data

Spheroid :- AUSTRALIAN NAT 1984
Eccentricity **2= 0.006694542
Semi-major axis= 6378160.000 Metres

Projection Parameters UTM/TM

Grid scale const = 0.9996000
Unit Conv. Factor = 1.0000000
False Easting = 500000.00 Metres
False Northing = 10000000.00 Metres
Central Meridian =141 DEG 00 MIN 00.000 SEC E
Lat of Origin = 00 DEG 00 MIN 00.000 SEC

Station Data :- System 1 Sonardyne BORDA-1 Chain

CMPT 503	503	561557.46	6033679.95	155.95	S	Y	3	2
CMPT 1106	1106	562552.10	6033394.06	153.05	S	Y	6	2
CMPT 1109	1109	562543.31	6032431.32	155.54	S	Y	3	2
CMPT 1010	1010	719000.84	8659485.48	102.00	S	Y	10	2

Spheroid Data :- System 2 Del Norte
Name : WGS 84
Semi Axis : 6378137.00 metres
Eccentr**2 : .00669438
Parameter Shifts :- to AUSTRALIAN NAT 1984 Spheroid
DX : +116.00 in Metres
DY : +50.47 -"-
DZ : -141.69 -"-
Rotation X : +.2300 in seconds
Y : +.3400 in seconds
Z : +.3440 in seconds
Scaling Ppm : -.0983

Spheroid Data :- System 3 Iau
Name : WGS 84
Semi Axis : 6378137.00 metres
Eccentr**2 : .00669438
Parameter Shifts :- to AUSTRALIAN NAT 1984 Spheroid
DX : +116.00 in Metres
DY : +50.47 -"-
DZ : -141.69 -"-
Rotation X : +.2300 in seconds
Y : +.3400 in seconds
Z : +.3440 in seconds
Scaling Ppm : -.0983

Station Data :- System 4 Not defined No Station data

Receiver Pattern Codes

System 1	System 2	System 3	System 4	
Sonardyne	Del Norte	Iau	Not defined	
Receiver1	Receiver1	Receiver1	Receiver1	Receiver
ON	ON	ON	OFF	OFF
	Deugs 1	Deugs 1		

0503 R

1106 R

1109 R
1010 R

Pattern Corrections and Standard Deviations

System 1 Sonardyne				System 2 Del Norte	System 3 Tau
Compati	C-O	St.Dev	HRB	C-O Corrections :-	C-O Corrections :-
0503	+0.00	3.00	Rng	Latit. +0.000 Secs	Latit. +0.000 Secs
1106	+0.00	3.00	Rng	Long. +0.000 Secs	Long. +0.000 Secs
1109	+0.00	3.00	Rng	Height +0.000 M	Height +0.000 M
1010	+0.00	3.00	Rng		

Pattern Corrections and Standard Deviations

System 4 Not defined
No Data

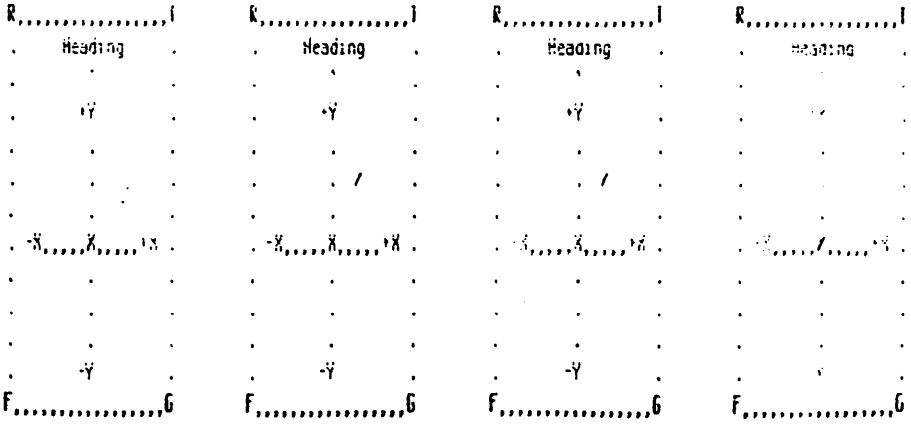
Computation Pattern Codes

Primary(OFF)				Secondary(ON)				Tertiary(ON)[TRACKING]				Quaternary(OFF)
LOF	Patt Code	SRC	HRB	LOF	Patt Code	SRC	HRB	LOF	Patt Code	SRC	HRB	No Data
1	0503	113	R	1	Geogs	211	1	1	Geogs	311	1	
2	1106	116	R									
3	1109	119	R									
4	1010	11A	R									

S=System R=Receiver C=Channel *=Pattern temporarily not used in computation

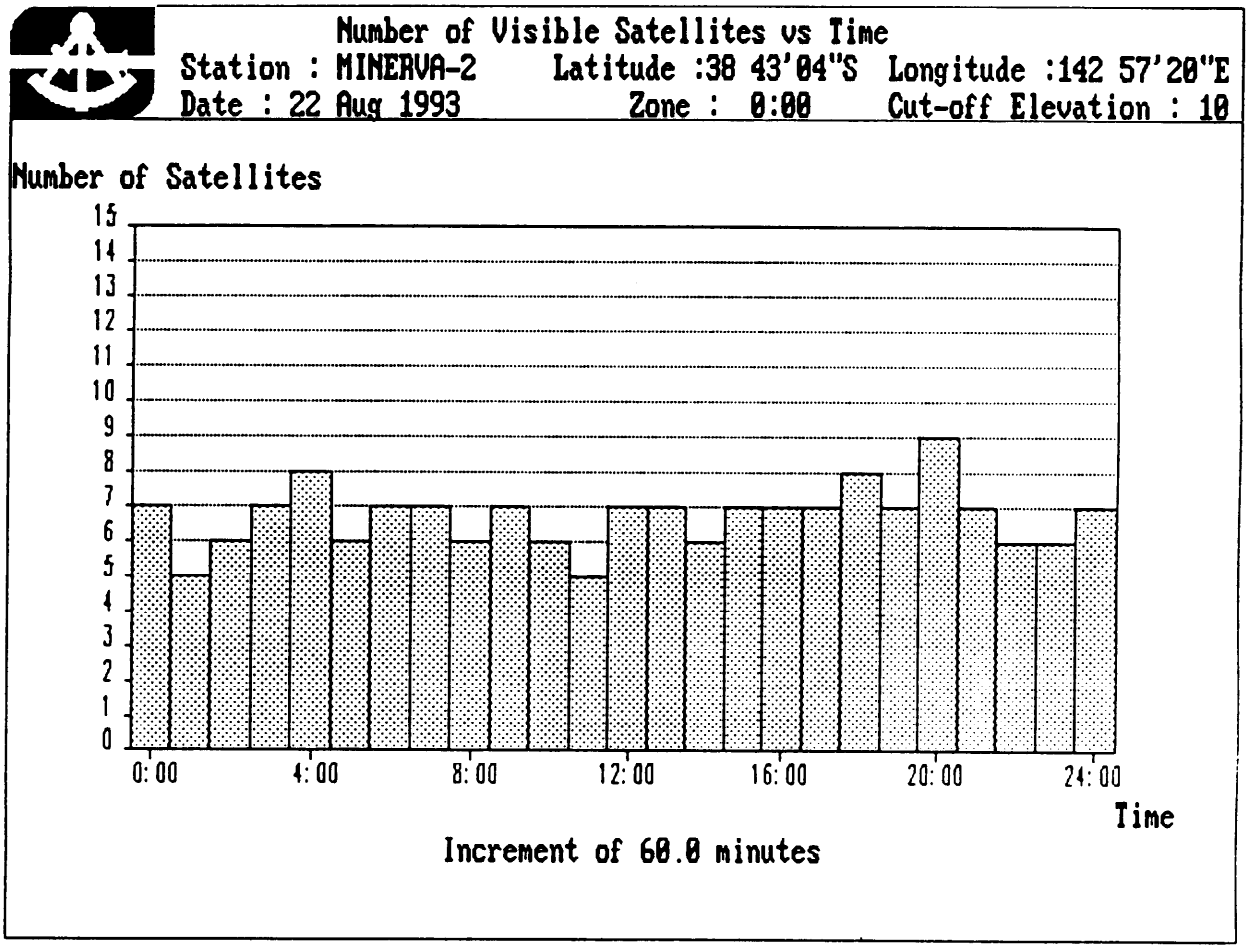
Antennas Transducer Offsets

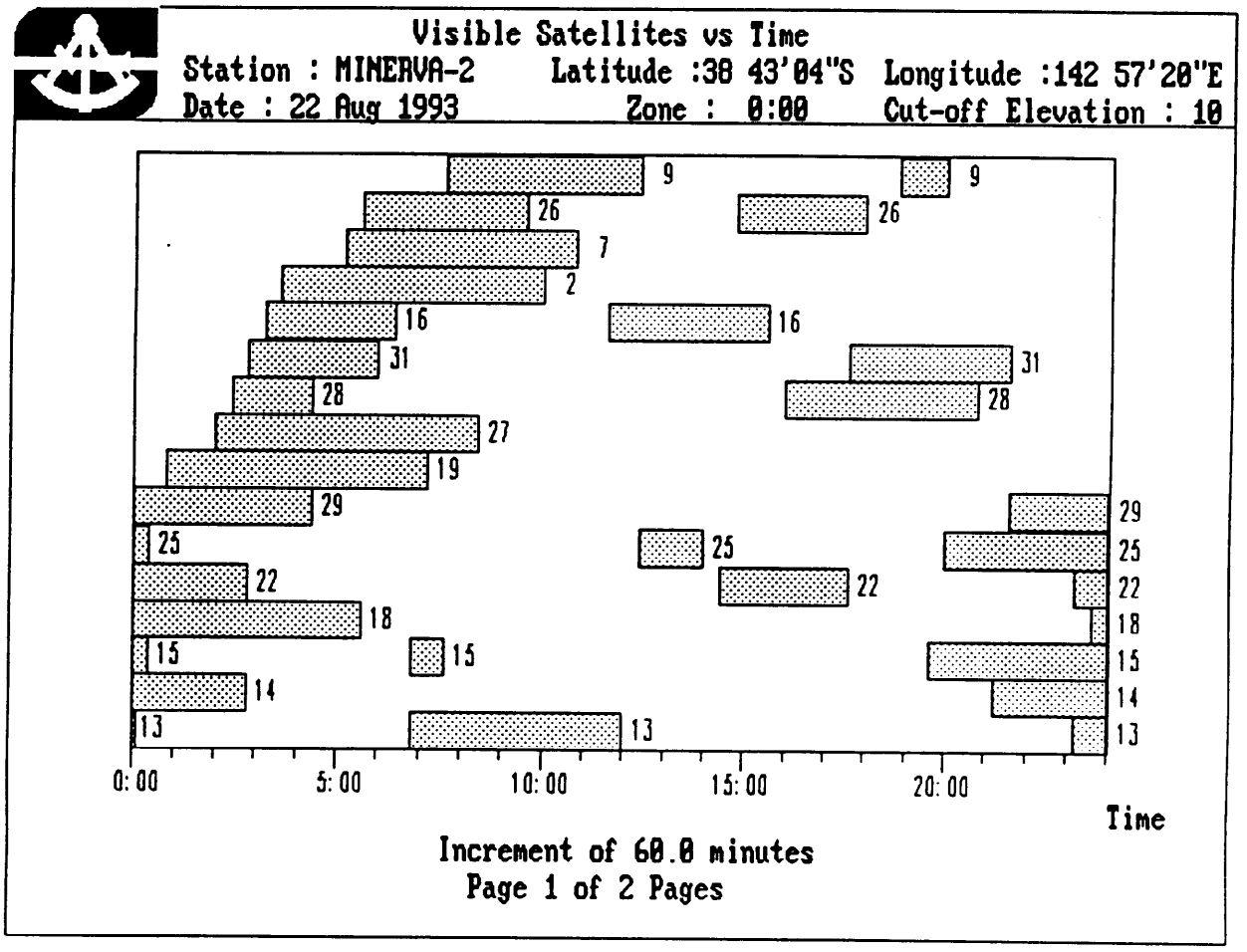
System 1 Sonardyne	System 2 Del Norte	System 3 Tau	System 4 Not defined
Transducer 1	Receiver 1	Receiver 1	Receiver 1
X Y Depth	X Y Height	X Y Height	X Y Height
+0.00 +0.00 +70.00	+11.20 +33.20 +25.00	+11.20 +33.20 +24.00	+0.00 +0.00 +0.00
Transducer 2	Receiver 2	Receiver 2	Receiver 2
X Y Depth	X Y Height	X Y Height	X Y Height
+0.00 +0.00 +0.00	+0.00 +0.00 +0.00	+0.00 +0.00 +0.00	+0.00 +0.00 +0.00

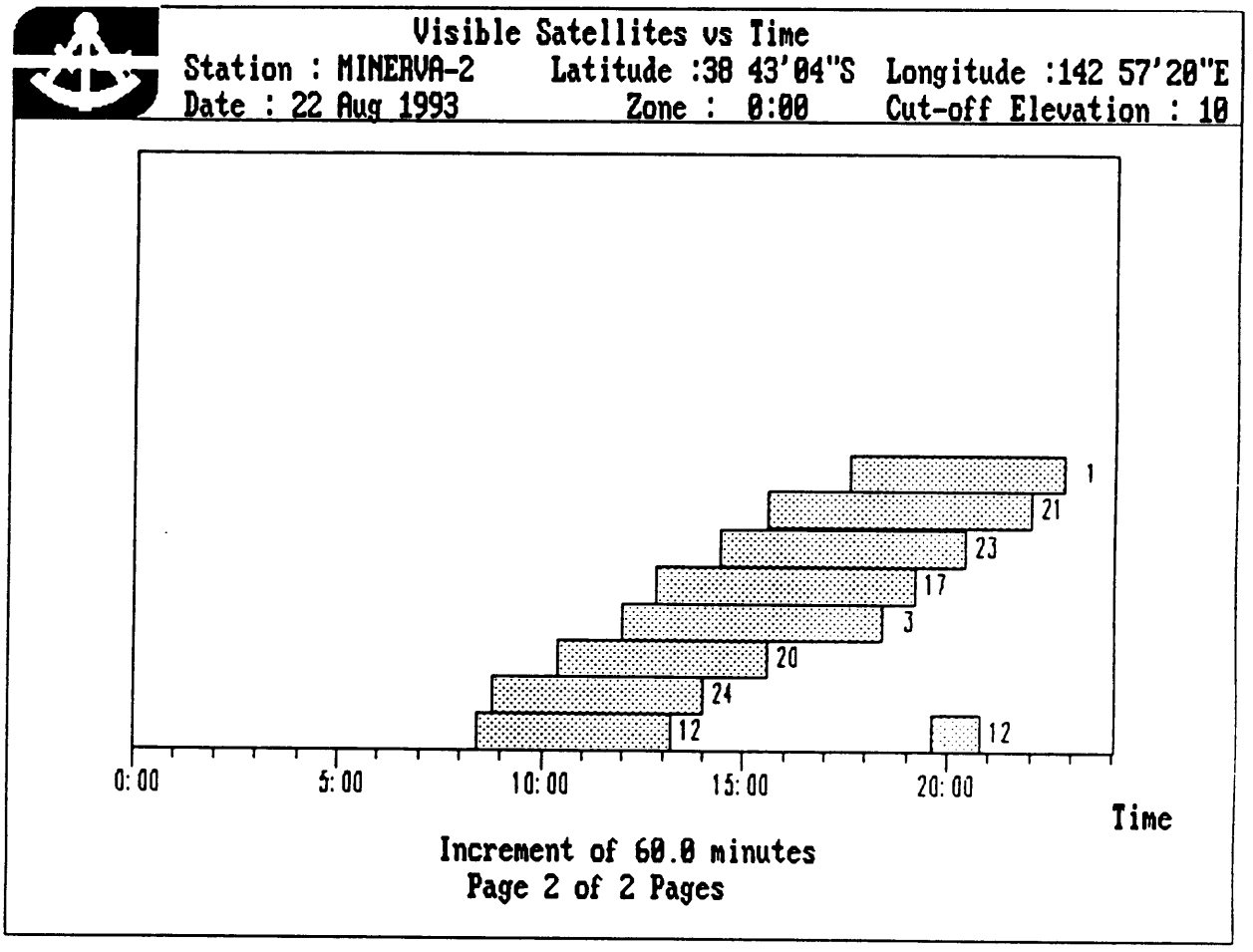


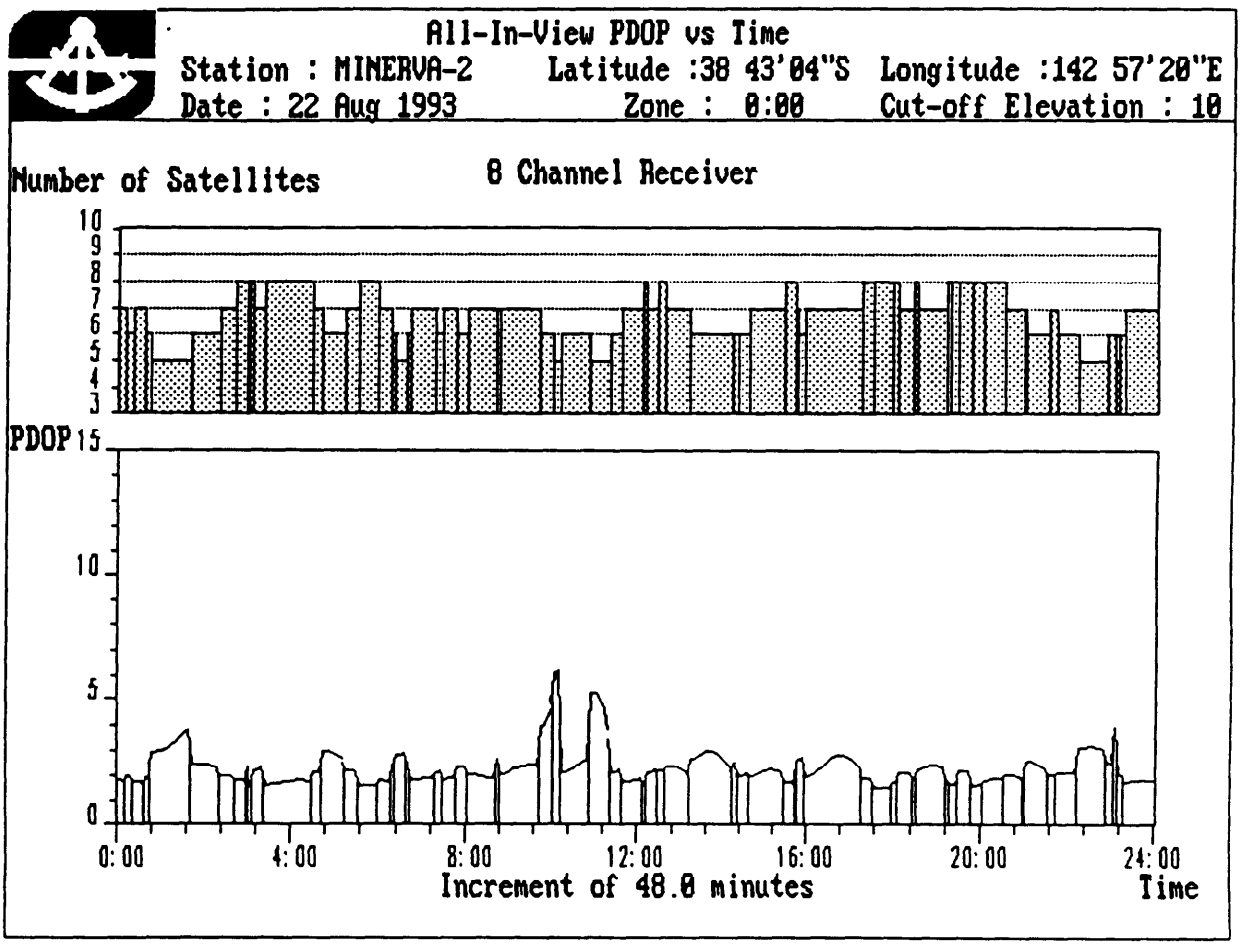
APPENDIX G

SATELLITE AVAILABILITY PREDICTIONS


Number of Visible Satellites vs Time
Station : MINERVA-2
Latitude :38 43'04"S
Longitude :142 57'20"E
Date : 22 Aug 1993
Zone : 0:00
Cut-off Elevation : 10
Number of Satellites
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
0:00
4:00
8:00
12:00
16:00
20:00
24:00
Time
Increment of 60.0 minutes


Visible Satellites vs Time
Station : MINERVA-2
Latitude :38 43'04"S
Longitude :142 57'20"E
Date : 22 Aug 1993
Zone : 0:00
Cut-off Elevation : 10
9
26
7
2
16
31
28
27
19
29
25
22
18
15
14
13
9
26
16
31
28
29
25
25
22
22
18
15
14
13
0:00
5:00
10:00
15:00
20:00
Time
Increment of 60.0 minutes
Page 1 of 2 Pages


Visible Satellites vs Time
Station : MINERVA-2
Latitude :38 43'04"S
Longitude :142 57'20"E
Date : 22 Aug 1993
Zone : 0:00
Cut-off Elevation : 10
1
21
23
17
3
20
24
12
12
0:00
5:00
10:00
15:00
20:00
Time
Increment of 60.0 minutes
Page 2 of 2 Pages


All-In-View PDOP vs Time
Station : MINERVA-2
Latitude :38 43'04"S
Longitude :142 57'20"E
Date : 22 Aug 1993
Zone : 0:00
Cut-off Elevation : 10
Number of Satellites
8 Channel Receiver
10
9
8
7
6
5
4
3
PDOP
15
10
5
0
0:00
4:00
8:00
12:00
16:00
20:00
24:00
Increment of 48.0 minutes
Time

All-In-View PDOP for MINERVA-2

.te : 22 Aug 1993
.ime : 0:00 -> 24:00
Cut-off Elevation : 10°

Latitude : 38° 43' 04" S
Longitude : 142° 57' 20" E
Zone : 0:00

Satellite Constellation	Time Rise	Time Set	dT	PDOP Rise	PDOP
13 14 15 18 22 25 29	0:00	0:12	0:12	1.8	1.7
14 15 18 22 25 29	0:12	0:22	0:10	2.0	2.0
14 15 18 19 22 25 29	0:22	0:37	0:15	1.8	1.7
14 18 19 22 25 29	0:37	0:47	0:10	1.9	1.9
14 18 19 22 29	0:47	1:42	0:55	2.9	3.9
14 18 19 22 27 29	1:42	2:22	0:40	2.5	2.3
14 18 19 22 27 28 29	2:22	2:42	0:20	2.0	1.9
14 18 19 22 27 28 29 31	2:42	2:57	0:15	1.8	1.8
14 18 19 27 28 29 31	2:57	3:02	0:05	2.4	2.4
14 16 18 19 27 28 29 31	3:02	3:07	0:05	1.6	1.6
16 18 19 27 28 29 31	3:07	3:22	0:15	2.2	2.4
2 16 18 19 27 28 29 31	3:22	4:27	1:05	1.6	1.8
2 16 18 19 27 28 31	4:27	4:42	0:15	2.1	2.1
2 16 18 19 27 31	4:42	5:12	0:30	3.0	2.6
7 16 18 19 27 31	5:12	5:32	0:20	2.2	2.1
2 7 16 18 19 26 27 31	5:32	5:57	0:25	1.6	1.6
2 7 16 19 26 27 31	5:57	6:17	0:20	1.8	1.7
2 7 16 19 26 27	6:17	6:22	0:05	2.4	2.4
2 7 19 26 27	6:22	6:37	0:15	2.8	2.9
2 7 15 19 26 27	6:37	6:42	0:05	2.5	2.5
2 7 13 15 19 26 27	6:42	7:17	0:35	1.8	2.0
2 7 13 15 26 27	7:17	7:27	0:10	2.2	2.2
2 7 9 13 15 26 27	7:27	7:47	0:20	1.8	2.0
2 7 9 13 26 27	7:47	8:02	0:15	2.4	2.4
2 7 9 12 13 26 27	8:02	8:42	0:40	2.1	1
2 7 9 12 13 26	8:42	8:47	0:05	2.7	2.7
2 7 9 12 13 24 26	8:47	9:42	0:55	2.1	2.4
2 7 9 12 13 24	9:42	10:02	0:20	4.0	4.9
7 9 12 13 24	10:02	10:12	0:10	6.1	6.2
7 9 12 13 20 24	10:12	10:52	0:40	2.1	2.7
9 12 13 20 24	10:52	11:22	0:30	5.3	3.5
9 12 13 16 20 24	11:22	11:37	0:15	2.1	2.3
3 9 12 13 16 20 24	11:37	12:07	0:30	1.8	1.9
3 9 12 13 16 20 24 25	12:07	12:12	0:05	1.7	1.7
3 9 12 16 20 24 25	12:12	12:27	0:15	2.2	2.3
3 9 12 16 17 20 24 25	12:27	12:37	0:10	2.2	2.3
3 12 16 17 20 24 25	12:37	13:12	0:35	2.4	2.1
3 16 17 20 24 25	13:12	14:12	1:00	2.7	2.2
3 16 17 20 22 25	14:12	14:22	0:10	2.5	2.4
3 16 17 20 22 23	14:22	14:37	0:15	2.0	2.2
3 16 17 20 22 23 26	14:37	15:27	0:50	2.0	2.1
3 16 17 20 21 22 23 26	15:27	15:42	0:15	1.8	1.7
3 17 20 21 22 23 26	15:42	15:47	0:05	2.6	2.6
3 17 21 22 23 26	15:47	15:57	0:10	2.7	2.8
3 17 21 22 23 26 28	15:57	17:17	1:20	2.0	2.3

All-In-View PDOP for MINERVA-2

Date : 22 Aug 1993
Time : 0:00 -> 24:00
Cut-off Elevation : 10°

Latitude : 38° 43' 04" S
Longitude : 142° 57' 20" E
Zone : 0:00

atellite Constellation	Time Rise	Time Set	dT	PDOP Rise	PDOP Set
1 3 17 21 22 23 26 28	17:17	17:32	0:15	1.9	1.9
1 3 21 22 23 26 28 31	17:32	17:57	0:25	1.6	1.5
1 3 17 21 23 26 28 31	17:57	18:07	0:10	1.7	1.7
1 3 17 21 23 28 31	18:07	18:27	0:20	2.1	2.2
1 3 9 17 21 23 28 31	18:27	18:32	0:05	1.9	1.9
1 9 17 21 23 28 31	18:32	19:12	0:40	2.3	2.3
1 9 15 17 21 23 28 31	19:12	19:17	0:05	1.7	1.7
1 9 12 15 17 21 23 28	19:17	19:27	0:10	1.7	1.7
1 9 12 15 21 23 28 31	19:27	19:47	0:20	2.2	2.2
1 9 12 15 21 25 28 31	19:47	20:02	0:15	1.6	1.7
1 12 15 21 23 25 28 31	20:02	20:32	0:30	1.8	1.9
1 12 15 21 25 28 31	20:32	20:57	0:25	2.1	1.9
1 12 14 15 21 25 31	20:57	21:02	0:05	1.9	1.9
1 14 15 21 25 31	21:02	21:32	0:30	2.6	2.2
1 14 15 21 25 29 31	21:32	21:42	0:10	2.1	2.
1 14 15 21 25 29	21:42	22:12	0:30	2.2	2..
1 14 15 25 29	22:12	22:52	0:40	3.1	3.0
1 14 15 22 25 29	22:52	23:02	0:10	2.5	2.7
14 15 22 25 29	23:02	23:07	0:05	4.0	4.0
13 14 15 22 25 29	23:07	23:17	0:10	2.0	2.1
13 14 15 18 22 25 29	23:17	24:00	0:43	1.8	1.8

APPENDIX H

DAILY LOG SHEETS

MINV2-24/PE900117/P732

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134/A2135			Date : 3-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX			STD 12 / VELOCITY PROBE			K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)			S KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			D BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS			SPARKER (DELPH / EPC)				DISKS				
GYRO			CORING (GRAVITY / GRAB)				PRINTER CART				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

1120 - K. Eddy & S Kittat depart Perth for Melbourne

1725 - Arrive Melbourne

1845 - K. Eddy & S. Kittat depart Melbourne for Portland

1945 - Arrive Portland. Met by Client Rep and D. Bell.

2020 - Arrive Pacific Marlin - Portland Harbour

Forms are to be completed daily in duplicate on all vessels. Each form should be countersigned by the Clients Representative, the original being retained on board until the next crew change or at the end of job, whichever is the earlier, when they should be returned to the PERTH office.

Transponders to be listed by type and serial numbers Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature _____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134/A2135			Date : 9.9.93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIC PORT	1030		STD 12 / VELOCITY PROBE	1030		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)	1925		S KITTAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)	1530		D BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)	1615			ELICS PAPER				
GNS H.P	1030		SPARKER (DELPH/EPC)				DISKS				
GYRO MK10	1030		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B EDMONDS					
SONARDYNE COMPATTS x 4	1030										
SONARDYNE PAN x 1	1030										
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

0930 - Equipment ex Perth arrives Pacific Marlin, off loaded onto vessel by vessel crane.

0650 - Commence setting up equipment, arrange for E/S pole extension and mounting to be manufactured by Prince Engineering.

1030 - Navigation equipment operational, continue setting up Underwater equipment.

1530 - SSS tested O.K.

1615 - Boomer and Hydrophones tested O.K.

1725 - E/S transducer installed.

1740 - Pacific Marlin departs Portland wharf.

1907 - Pacific Marlin anchored off Portland.

1925 - Atlas Deso 20 tested O.K.

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Transponders to be listed by type and serial numbers. Following codes to be used : L - Laid, R - Recovered, FR - Failed to Reply, FS - Failed to Surface.

Signature K. Eddy SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations
YELLOW : Clients Representative

Signature N. Edmonds CLIENTS REPRESENTATIVE

MINV2-2A/PE900117/P733

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

Wx	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : A2134			Date : 10-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM				
SYLEDIS			ECHO SOUNDER (20/25)	✓		S KITAT	SIDESCAN PAPER				
MICROFIX			SIDESCAN (585/531/PINGER)	✓		D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)	✓			ELICS PAPER				
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO MAN	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS x4	✓										
SONARDYNE PAN x1	✓										
SONARDYNE(Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

1633 - Commenced Relative/Absolute Calibration data collection of acoustic array
NAV SkyFix/Trimble/DNAVN/Adelaide Ref. SV's 2,7,9,13,26,27 HDOP: 1.5 VDOP: 2.1 Thr: 1.1
1755 - Completed Relative/Absolute data collection 804 Samples
1910 - Completed Relative calibration calculations

Results:	TP	Addr	Channel	X Co-ord	Y Co-ord	Depth
	1	601	1	0.00	0.00	55.4
	2	602	2	1070.55	0.00	58.1
	3	604	4	1274.36	-985.45	56.4
	4	701	5	296.02	-984.13	59.4

Total Solution Standard Error 0.81 - Fixed Depth (From Transponder Depth Sensors)

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Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commerial
BLUE : Operations

Signature N. Edmonds
CLIENTS REPRESENTATIVE

MINV 2-2A/PE900117/P734

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	DOKR		WI
0000	2		SWJ 15
0600	4	2-3	SWJ 15
1200	4	2-5	SWJ 15
1800	4	2-3	SWJ 15

Client : BHP			Job No : A2134/A2135			Date : 10-9-93	Vessel : PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM			601	
SYLEDIS			ECHO SOUNDER (20/~~25~~)	✓		S. KITAT	SIDESCAN PAPER			602	602
MICROFIX			SIDESCAN (~~595~~/531/PINGER)	✓		D. BELL	E/SOUNDER PAPER				
ARGO			BOOMER (~~DELPH~~/EPC)	✓			ELICS PAPER				
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO MK 10	✓		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			B. EDMONDS					
SONARDYNE COMPATTS x 4	✓										
SONARDYNE PAN x 1	✓										
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

0100 - Pacific Marlin departed anchorage off Portland for Minerva-2 location

0715 - Pacific Marlin arrives Minerva-2 location

0745 - Problems with Differential Link

0835 - Differentials received O.K. Problem traced to power output from Clauck Logic voltage stablisr. Unit only outputting 208 VAC from a 230 VAC input.

0915 - Setting up to carry out Speed of Sound profile at Minerva-2.

0945 - Carried out Speed of Sound profile with STD 12 S/N° 579

1020 - Setting up to deploy Sonardyne Compatts

1034 - Deployed Sonardyne Compatt 601 S/N° 49412:01 BC 0 Volts 27.9 CD 10 6

Easting 669 427.39 m Northing 5 713 312.49 m Depth: 55.4 m.

1042 - Compatt 602 deployed by accident in wrong position, rope parted.

1053 - Released compatt 602

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YELLOW : Clients Representative

Signature _____ CLIENTS REPRESENTATIVE

MINV2-2A / PE 900117 / P735