BHP Petroleum

13 JAN 1994

VIC/P31

MINERVA_1

WELL COMPLETION REPORT

BASIC DATA

BHP

MINERVA-1

PERMIT: VIC/P31

PREDICTED v ACTUAL

LINE : OE81A-2028
SP : 2232

LAT : 38°42'12.23"S
LONG : 142°57'12.34"E

ELEV : Rt : 25m
WATER DEPTH : 57m

SPUD : 8/3/93
RIG RELEASE : 17/4/93

STATUS : Gas Well- Cased & Suspended
RIG : Byford Dolphin

Depths (TVD): 0, 1000, 2000, 3000, 4000

T.W.T. msec	Tops mss (TVD)	STRATIGRAPHY System / Series	STRATIGRAPHY FM	PREDICTED LITHOLOGY	OBJECTIVES
72	56				
232	191	Rec.-Mioc	Port Campbell Limestone	Calcarenite with minor marl	
272	234	Late Eocene	Narrawaturk Marl	Marl	
322	290		Mepunga Sandstone	Medium to coarse sand	
	470	Mid Eocene to Late Paleocene	Dilwyn Sandstone	Medium to coarse sand with some siltstone	
	580		Pember Mudstone	Argillaceous siltstone and claystone	
612	615		PebblePoint Sst	Sandstone and siltstone	
708	760			FAULT	
		Maastrichtian to Mid Santonian	Sherbrook Group	Interbedded siltstone, claystone and sandstones	2°
944	1155	Mid Santonian to Coniacian	Upper Shipwreck Group	Claystone with minor siltstone and sandstone interbeds	
1230	1525	Turonian to Cenomanian	Lower Shipwreck Group	Sandstone with interbedded claystone, siltstone and minor coal	1°
1628	2260	Albian	Otway Group	Interbedded sandstone, claystone, siltstone	2°
	2400				

ACTUAL LITHOLOGY	STRATIGRAPHY FM	STRATIGRAPHY System / Series	Tops mss (TVD)	Thick-ness m	CSG mss
Seabed			57		
	Heytesbury/Nirranda Groups	Recent to Eocene	525	468	30" 90m
Silty Claystone	Pember Mudstone	Mid Eocene to Late Palaeocene	632	107	13 3/8" 525m
Medium to coarse sandstone	Pebble Point Sandstone		760	128	
Dark grey claystone with minor sandstones	Sherbrook Group	Maastrichtian to Mid Santonian	1448	688	9 5/8" 1165m
Argillaceous siltstone and claystone; Interbedded sandstone, conglomerate sandstone and claystone	Upper Shipwreck Group	Mid Santonian to Coniacian	2080	632	7" 2072m
Interbedded sandstone and silty claystone	Lower Shipwreck Group	Turonian to Cenomanian	2257	177	
Interbedded argillaceous claystones and coals lithic sandstones.	Otway Group	Albian	2385	128	

Date : May, 1994

F1161

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BHP PETROLEUM PTY LTD
ACN 006 918 832

VIC/P31

MINERVA-1

WELL COMPLETION REPORT

BASIC DATA

DECEMBER 1993

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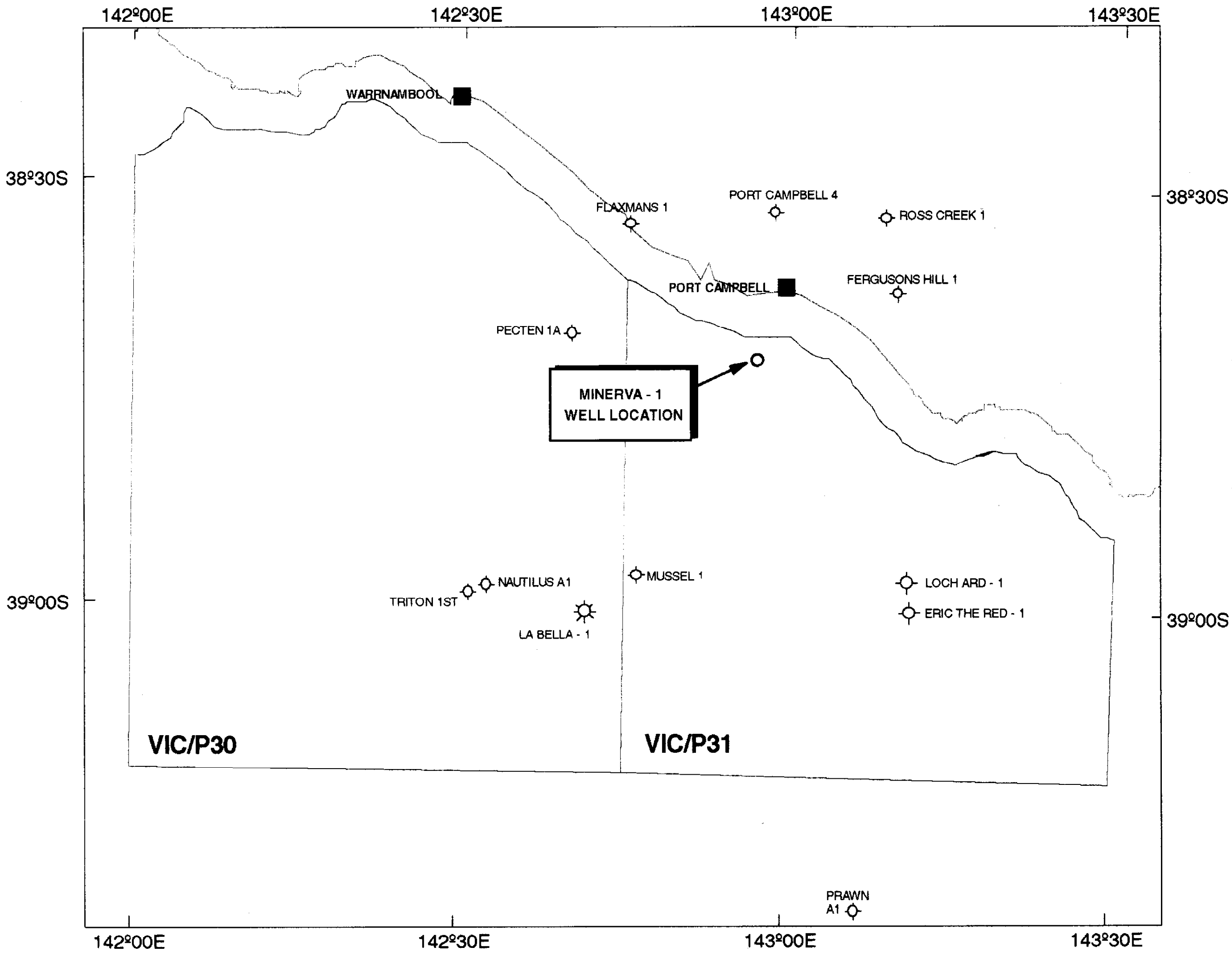
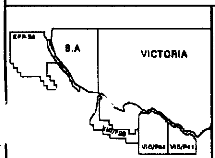
1. WELL SUMMARY SHEET

Well:	Minerva-1
Permit:	VIC/P31
District:	Otway Basin
Well Path:	Vertical
Planned Location:	Lat. 38° 42' 12.35" South Long. 142° 51' 12.64" East
Actual Location:	Lat. 38° 42' 12.23" South Long. 142° 57' 12.34" East East: 669 862.50 North : 5 714 311.00 AMG Zone 54, CM 141° East
Seismic Reference:	Line OE81A-2028 Shot Point 2232
Elevation:	RT to MSL 25.3 m
Water Depth:	56.7 m (MSL to seabed)
Total Depth:	2425 mRT
Departed Last Location:	06 March 1993 03:30 hours
Spud Date:	08 March 1993 12:00 hours
Total Depth Date:	04 April 1993 12:30 hours
Days from Spud to TD:	27 days 0.5 hours
Rig Release Date:	17 April 1993 16:00 hours
Total Days on Well:	42 days 12.5 hours
Operator:	BHP Petroleum Pty Ltd
Permit Interests:	BHP Petroleum Pty Ltd 90.00% BHP Petroleum Plaza 120 Collins Street MELBOURNE VIC 3000

	Bridge Oil Ltd 255 Elizabeth Street SYDNEY NSW 2000	10.00%
Drilling Contractor:	Dolphin Drilling	
Rig:	"Byford Dolphin" Semi Submersible	
Status:	Gas Well - Cased and Suspended	
Cost:	$ 6.401 M (from cost control)	





MINERVA - 1
LOCATION MAP

BHP Petroleum

OTWAY BASIN

ERIC THE RED_1
LOCATION MAP

AUTHOR:	DATE: 30/12/93
DRAWN BY: G.STONE	DWG NO: O2_GS

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2. FINAL DRILLING REPORT

FINAL DRILLING REPORT

BHP PETROLEUM PTY. LTD.

PERMIT: VIC-P31

MINERVA-1

AUGUST 1993

BHP Petroleum

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

CONTENTS

MINERVA-1

SECTION 1

Well	:	MINERVA-1
Permit	:	VIC/P31
Designation	:	EXPLORATION
Operator	:	BHPP PETROLEUM
Rig	:	BYFORD DOLPHIN
Type	:	SEMISUBMERSIBLE
Drilling Contractor	:	DOLPHIN DRILLING
Water Depth	:	56.7m
RT Elevation	:	25.3m
Total Depth	:	2425mMD 2425mTVD
Final Surface Location	:	Lat S 038° 42' 12.230" Long E 142° 57' 12.337" Easting 669 862.5 Northing 5 714 311.0
Location Reference Datum	:	AGD84, AMG ZONE 54 C.M. 141°E
Commencement Date	:	0330 hrs, 6 March 1993
Rig on Location	:	0852 hrs, 6 March 1993
Well Spudded	:	1200 hrs, 8 March 1993
TD Date	:	1230 hrs, 4 April 1993
Drilling Days to TD	:	27 Days, .5 hours
Rig Released	:	1600 hrs, 17 April 1993
Total Well Duration	:	42 Days, 12.5 hours
Status	:	SUSPENDED

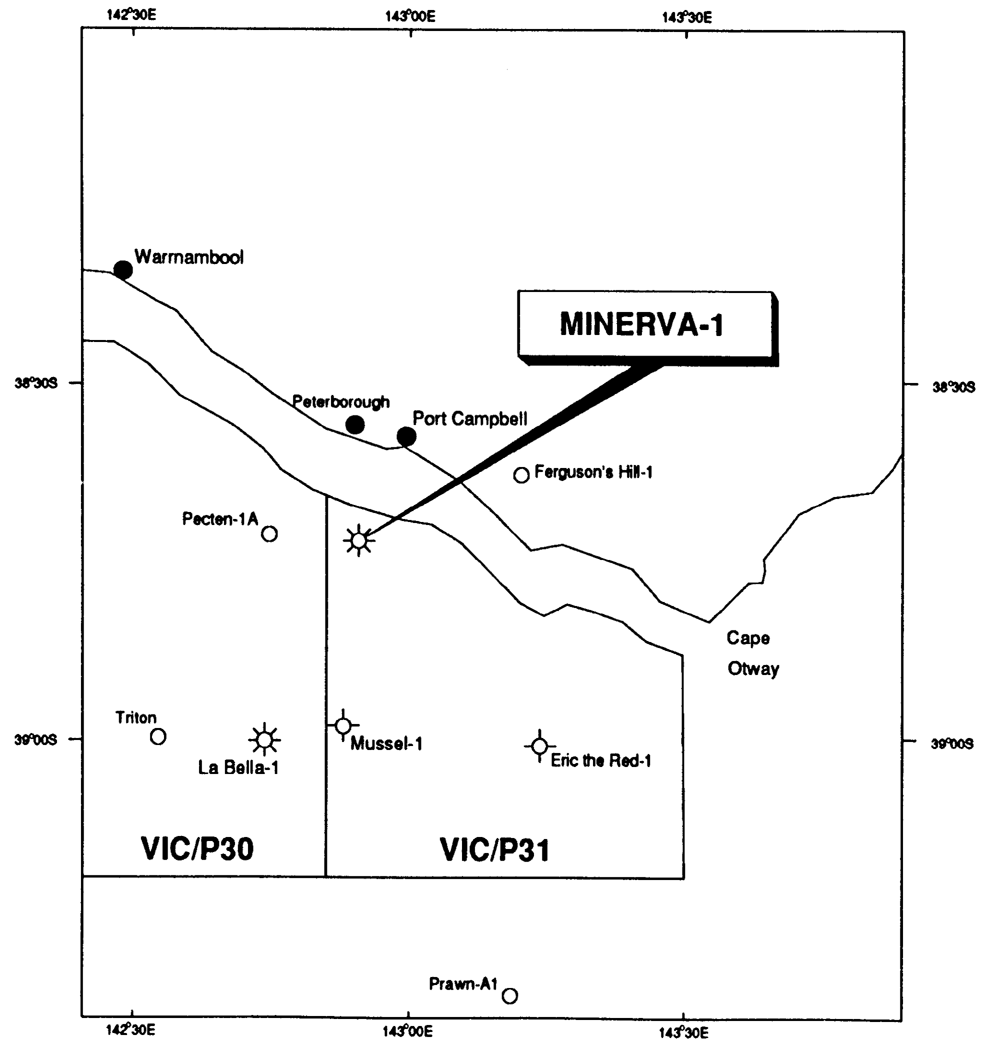
SERVICE	CONTRACTOR
CEMENT SUPPLY	HALLIBURTON
CEMENTING SERVICES	HALLIBURTON
CORING SERVICES	DIAMANT BOART
DIRECTIONAL	SMITH
DIVING/ROV	DRILLSUPPORT
DRILLING FLUIDS	MILPARK
HELICOPTERS	LLOYD HELICOPTERS
LOGGING	SCHLUMBERGER
MUD LOGGING	EXLOG
MWD	EASTMAN TELECO
ROLLER REAMERS	GEARHART UNITED
SOLIDS CONTROL	OILTOOLS
STANDBY VESSEL	SWIRE: "MARLIN"
SUPPLY VESSEL	AOS: "FAR SWORD"
SUPPLY VESSEL	T.W.: "BONAVISTA"
WEATHER	OCEAN ROUTES
WELL TESTING	HRS
WELLHEAD	VETCO
WELLHEAD SEVERANCE	AUSTOIL

BHP Petroleum

FINAL DRILLING REPORT

1.2 LOCATION MAP

WELL : MINERVA-1

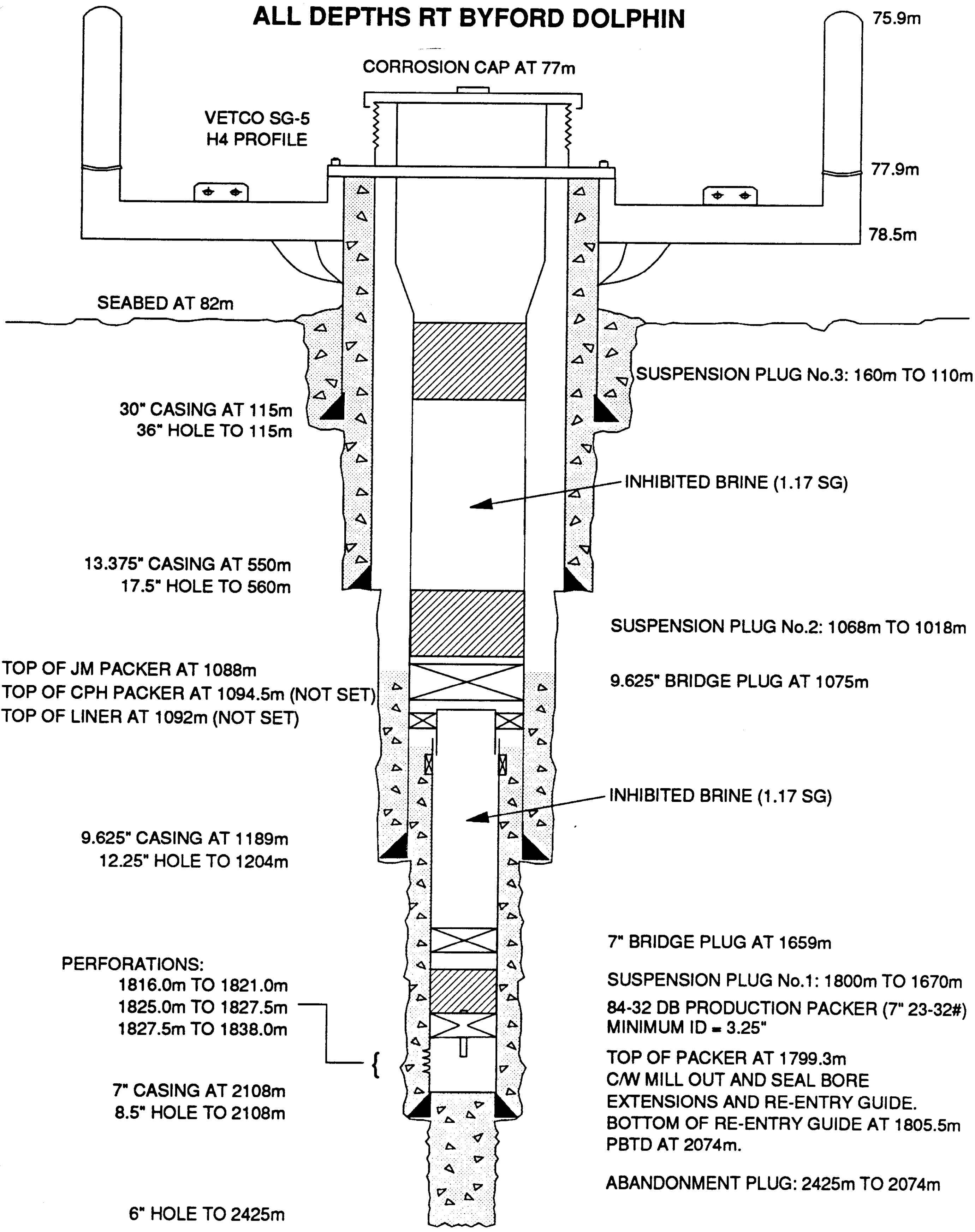


Permit No.	:	VIC/P31
Rig	:	BYFORD DOLPHIN
Latitude	:	38 °42' 12.23" S
Longitude	:	142° 57' 12.34" E

File: BWM VND MIN_LOC1		Checked:	Date: 1 SEP 93

1.3 WELL SCHEMATIC

MINERVA-1



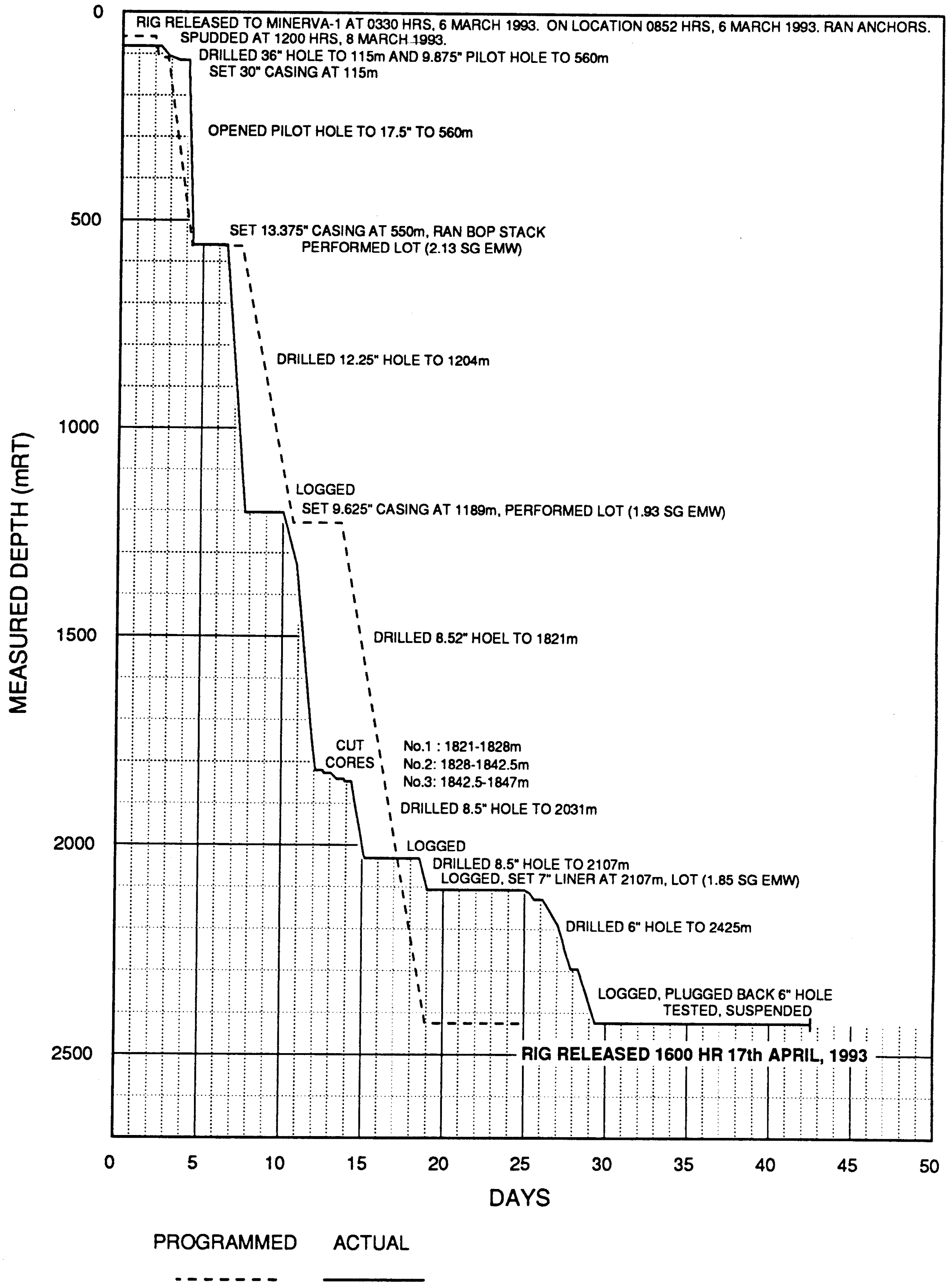
File: BM VND MIN_SS	**Well Status: SUSPENDED**	Checked:	Date: 1-SEP-93

BHP Petroleum

FINAL DRILLING REPORT

1.4 TIME vs DEPTH CURVE

MINERVA-1



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SECTION 2

The Byford Dolphin was released from Eric the Red-1 at 0330 hours, 6th March, 1993 and arrived at the Minerva-1 location at 0852 hours. Twelve anchors were run and pre-tensioned to 173t.

Minerva-1 was spudded at 1200 hours, 8th March 1993. The 36" hole was drilled from 82m to 105m and, following draw works electrical problems, the 9.875" shallow gas pilot hole was drilled to 560m during daylight hours. No shallow gas was encountered. The 9.875" pilot hole was then opened to 36" from 105 to 115m. The 30" casing was run and cemented to a depth of 115m.

The 9.875" pilot hole was opened to 17.5" to a depth of 560m. The 13.375" casing with crossover to the 18.75" wellhead was run and cemented to a depth of 550m.

The 18.75" BOP stack was run and tested. The 12.25" hole was drilled to 563m and a LOT to 2.13 SG EMW was conducted. The 12.25" hole was drilled to 1204m, with drilling fluid density increases from 1.09 to 1.13 SG due to connection gas from 1080 to 1169m. Suite No. 1 logs were run at 1204m and the 9.625" casing was run and cemented at 1189m.

The BOP stack was tested and 8.5" hole drilled to 1207m. A LOT to 1.94SG EMW was conducted at this depth. The 8.5" hole was drilled to 1821m with drilling fluid density increases from 1.12 to 1.16SG due to connection gases from a thin sand at 1648m. Three cores were cut from 1821 to 1847m with an overall recovery of 80%. Drilling in the 8.5" hole continued to 2031m at which point Suite No. 2 logs were run, including RFT's which indicated formation pressure at 1821m of 1.04 SG EMW and 1648m of 1.15 SG EMW. Drilling progressed to 2108m to obtain a suitable 7" casing seat and the logging programme was completed. A wiper trip was conducted prior to running the 7" liner. Following several unsuccessful attempts to set the liner hanger, the liner was set on bottom and cemented with the TOL at 1092m. A JM liner top packer was set and pressure tested to 3500 psi.

The BOP stack was tested and 6" hole drilled to 2111m. A LOT to 1.85 SG EMW was conducted and the 6" hole was drilled to final total depth of 2425m without problems. Suite No. 4 logs were run and the 6" hole was subsequently abandoned with a PBTD of 2074m.

Minerva-1 was displaced to brine and perforated from 1838.0 to 1825m and 1821 to 1816m. A permanent packer assembly was set at 1800m and a 3.5" test string was landed in same. Minerva-1 was opened to flow at 1515 hours, 10th April, 1993. A multi-rate test was conducted with a maximum flowrate of 28.1 MMSCF/D through a one inch choke. The test was completed 13th April, 1993 at which point the well was killed and the test string laid down.

Minerva-1 was suspended as a potential gas producer and the Byford Dolphin was rig released at 1600 hours, 17th April, 1993.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
06/03/93	1	0	03:30	08:52	5.37	ON TOW FROM ERIC THE RED-1.
			08:52	00:00	15.13	ANCHORS WERE RUN AS FOLLOWS: RIG - No. ON BOTTOM AT 0852HRS. FS - No.1 ON BOTTOM AT 1128HRS. No.9 ON BOTTOM AT 1423HRS. No.2 PENNANT PARTED No.3 ON BOTTOM AT 1713HRS. No.5 ON BOTTOM AT 1843HRS. BV - No.12 ON BOTTOM AT 1425HRS. No.11 PENNANT PARTED AT 1544HRS.
07/03/93	2		00:00	20:21	20.35	ANCHORS WERE RUN AS FOLLOWS: BV - No.11 ON BOTTOM AT 0545HRS. No.2 ON BOTTOM AT 1310HRS. No.3 ON BOTTOM AT 1515HRS. No.1RR ON BOTTOM AT 0125HRS. FS - No.10 ON BOTTOM AT 0330HRS. No.4 ON BOTTOM AT 0455HRS. No.7 ON BOTTOM AT 1231HRS. No.8 ON BOTTOM AT 1530HRS. No.10RR ON BOTTOM AT 2232HRS.
			20:21	00:00	3.65	ANCHOR HANDLING NON PRODUCTIVE TIME
08/03/93	3		00:00	02:30	2.50	COMPLETED ANCHOR HANDLING AND PRETENSIONED TO 380kips.
			02:30	07:30	5.00	BALLASTED DOWN TO DRILLING DRAFT.
			07:30	12:00	4.50	PICKED UP 6 x HWDP AND 6 x 8" DC AND RACKED BACK. MADE UP 36" BHA AND RIH. TAGGED SEABED AT 82m. WATER DEPTH 57m.
			12:00	13:00	1.00	DRILLED 36" HOLE FROM 82m TO 105m.
			13:00	13:15	0.25	SWEPT HOLE WITH 50bbl HI-VIS MUD.
			13:15	14:00	0.75	POH WITH 36" HOLE OPENER AND 26" BIT.
			14:00	14:45		PICKED UP HWDP AND RACKED IN DERRICK.
			14:45	15:45	1.00	MADE UP 9.875" BHA AND RIH.
			15:45	00:00	8.25	ELECTRICAL PROBLEM WITH DRAW-WORKS. TROUBLE SHOT SAME.
09/03/93	4	1	00:00	04:15	4.25	CONTINUED TROUBLE SHOOTING ELECTRICAL PROBLEM WITH DRAW-WORKS.
			04:15	05:30	1.25	RIH. STABBED INTO 36" HOLE WITH ROV ASSISTANCE. RIH TO 105m.
			05:30	12:15	6.75	DRILLED 9.875" PILOT HOLE FROM 105m TO 560m. SWEPT 15 bbl HI-VIS MUD/HALF STAND.
			12:15	12:30	0.25	SWEPT HOLE WITH 50 bbl HI-VIS MUD.
			12:30	13:00	0.50	DROPPED TOTCO SURVEY - 1°.
			13:00	14:30	1.50	POH WITH 9.875" ASSEMBLY.
			14:30	15:30	1.00	PICKED UP 36" BHA. RIH AND TAGGED AT 101m. 4m FILL.
			15:30	15:45	0.25	DRILLED 36" HOLE FROM 105m TO 115m.
			15:45	16:15	0.50	PUMPED 100 bbl HI-VIS MUD.SPOTTED 150 bbl

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
09/03/93	4	1	15:45	16:15		HI-VIS MUD ON BOTTOM.
			16:15	16:45	0.50	POH WITH 36" ASSEMBLY.
			16:45	17:30	0.75	RIGGED UP 30" RUNNING TOOL AND CEMENT HEAD. RACKED BACK SAME.
			17:30	20:30	3.00	RAN 3 JOINTS ST-2, 30" CASING. MADE UP RUNNING TOOL AND LANDED IN PGB.
			20:30	20:45	0.25	RIH TO SEALEVEL AND FILLED CASING.
			20:45	21:30	0.75	RIH TO MUD LINE AND STABBED INTO 36" HOLE. HUNG UP AT 102m. WORKED THROUGH.
			21:30	22:00	0.50	BROKE CIRCULATION WITH 200bbl SEAWATER.
			22:00	22:15	0.25	ROV CHECKED BULLSEYE - 1/2 TO 3/4 DEG.
			22:15	23:00	0.75	MIXED AND PUMPED 72 bbl CLASS 'G' 1.9SG SLURRY. (351 sx AND 42 bbl MIXWATER). DISPLACED WITH 15 bbl SEAWATER.
			23:00	00:00	1.00	POH WITH RUNNING TOOL AND LAID OUT SAME.
10/03/93	5	2	00:00	00:30	0.50	LOADED DART. MADE UP CEMENT HEAD. RACKED BACK
			00:30	01:45	1.25	MADE UP 20" RUNNING TOOL. LAID OUT SAME.
			01:45	02:15	0.50	BROKE OUT 26" BIT. LAID OUT 36" HOLE OPENER.
			02:15	04:45	2.50	MADE UP 17.5" BIT TO 9.5" DRILL COLLARS. ATTACHED GUIDE ROPES AND MADE UP STRING STAB. STABBED INTO WELLHEAD AND RIH TO 113m.
			04:45	05:00	0.25	DRILLED OUT CEMENT AND SHOE TO 115m.
			05:00	12:30	7.50	OPENED 9.875" PILOT HOLE TO 17.5" FROM 115m TO 560m.
			12:30	13:15	0.75	SWEPT HOLE WITH 250 bbl HI-VIS AND SPOTTED 450 bbl PHG ON BOTTOM.
			13:15	13:30	0.25	DROPPED TOTCO SURVEY.
			13:30	14:45	1.25	POH FROM 560m.
			14:45	15:15	0.50	RIGGED UP TO RUN 13.375" CASING.
			15:15	21:30	6.25	PICKED UP AND RAN 32 JOINTS 68 lb/ft N-80, 5 THREAD LOCKED JOINTS, FLOAT COLLAR, FLOAT SHOE, X/O AND 18 3/4" W/H. SHOE DEPTH 550m. FILLED AIR VOID ABOVE PLUGS AT SURFACE. LANDED W/H AND P/U 50kip OVERPULL.
			21:30	22:00	0.50	CIRCULATED CASING AT 80SPM, 350psi.
			22:00	00:00	2.00	PUMPED 5 bbl. TESTED LINES TO 2000psi. CEMENTED CASING AS FOLLOWS: LEAD - 635SX CLASS 'G' CMT. 190bbl MIXWATER. 1.5SG SLURRY. 0.45gps ECONOLITE. TAIL - 503SX CLASS 'G' CMT. 60bbl MIXWATER. 1.9SG SLURRY. DISPLACED WITH 220.5bbl SEAWATER. BUMPED PLUG ON TARGET TO 1500psi FOR 5min.
11/03/93	6	3	00:00	02:15	2.25	RIGGED DOWN CMT HOSE, BACKED OUT RT w/4 TURNS LAID OUT R/T, SERVICED HOWCO EQUALISER SUB AND LAID OUT. LAID OUT CEMENT HEAD.
			02:15	07:30	5.25	R/U TO RUN BOP - MADE UP DOUBLE OF RISER,

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
11/03/93	6	3	02:15	07:30		PICKED UP BOP, INSTALLED AX RING. MOVED BOP TO MOONPOOL SET ON BEAMS. PICKED UP LMRP, REMOVED TEST JOINT. CHANGED VX RING AND MOVED OVER BOP.
			07:30	08:30	1.00	RECTIFIED HYDRAULIC FAULT ON BOP CRANE.
			08:30	12:00	3.50	EXTENDED GUIDE POSTS,INSTALLED GUIDE LINES. FUNCTION TESTED BOP ON BLUE/YELLOW PODS, INSTALLED BEACON ON BOP. ATTACHED BULLSEYE.
			12:00	19:15	7.25	RAN BOP ON RISER, PICKED UP SLIP JOINT, INSTALLED C&K LINES, PICKED UP AND LATCHED TO TENSIONER RING, INSTALLED POD LINE SADDLES.
			19:15	20:45	1.50	LATCHED BOP. MADE O/P 50,000lb TO CHECK LATCH. STROKED OUT SLIP JT. LAID DOWN LANDING JTS. AND MADE UP DIVERTER.
			20:45	22:00	1.25	R/D RISER RUNNING EQUIPMENT & CLEARED FLOOR.
			22:00	22:30	0.50	M/U TEST PLUG & RIH.
			22:30	00:00	1.50	PRESSURE TESTED BOP: 500 /10,000psi ON VBR 500/3500psi ON MPR, UPR, ANNULARS & MANIFOLD.
12/03/93	7	4	00:00	03:30	3.50	CONTINUED TO TEST BOP - TESTED RAMS AND FAIL SAFES TO 500/3500psi, VBR & WH CONNECTOR TO 10,000psi.
			03:30	04:00	0.50	POH WITH TEST PLUG AND LAID OUT.
			04:00	04:45	0.75	RAN NOMINAL SEAT PROTECTOR
			04:45	05:15	0.50	SLIPPED AND CUT DRILL LINE.
			05:15	06:30	1.25	LAID OUT 17 1/2" BHA.
			06:30	07:45		MADE UP 12.25" BHA - DRESSED NB ROLLER REAMER. ORIGINAL NOT BORED TO RIGHT SIZE FOR FLOAT.
			07:45	08:00	0.25	TESTED MEMORY ON MWD.
			08:00	08:45	0.75	CONTINUED MAKING UP BHA.
			08:45	09:15	0.50	FLOW TESTED MWD IN ROTARY.
			09:15	12:00	2.75	CONTINUED TO MAKE UP BHA AND RIH.
			12:00	13:30	1.50	TAGGED PLUG AT 522.7m. DRILLED SHOETRACK.
			13:30	14:15	0.75	DISPLACED HOLE w/KCL MUD AND CLEANED OUT RAT HOLE TO 560m.
			14:15	14:45	0.50	TOOK SCR AND CHOKE LINE PRESSURE DROP.
			14:45	16:30	1.75	DRILLED 12.25" HOLE FROM 560m TO 563m
			16:30	18:00	1.50	POH INTO SHOE AND CIRCULATED HOLE CLEAN FOR LOT. PERFORMED LOT: 825psi w/1.08SG MW. EMW AT SHOE: 2.13SG.
			18:00	00:00	6.00	DRILLED 12.25" HOLE FROM 563m TO 765m.
13/03/93	8	5	00:00	20:30	20.50	DRILLED 12.25" HOLE FROM 765m TO 1204m, WASHED EA CONNECTION DOWN ONCE, FLOW CHECKED DRILLING BREAKS. INCREASED MUD WEIGHT FROM 1.09 TO 1.13 DUE TO CONNECTION GAS. C.G. @ 1081.5 = 0.19/0.08% @ 1110 = 0.68/0.025%

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
13/03/93	8	5	00:00	20:30		@ 1139.5 = 0.24/0.2% @ 1168.9 = 1.43/0.2% HOLE TIGHT @ 1023m
			20:30	22:00	1.50	CIRCULATED AND CONDITIONED FOR LOGGING.
			22:00	23:45	1.75	POH FROM 1204m TO 1084m, HOLE DRAG UP TO 50 kips, 2 bbl SWABBED IN. PUMPED OUT FROM 1024m TO 967m. POH TO 909m w/o PUMPS. RIH.
			23:45	00:00	0.25	CIRCULATED BOTTOMS UP.
14/03/93	9	6	00:00	00:45	0.75	CONTINUED CIRCULATING HOLE TO CLEAN AND TO CHECK GAS.
			00:45	03:45	3.00	POH TO LOG - SLM - FLOW CHECKED AT BTM.,SHOE AND BEFORE PULLING INTO BOP. NO OVERPULL.
			03:45	04:00	0.25	DUMPED MWD MEMORY.
			04:00	04:15		POH.
			04:15	22:00	17.75	RIGGED UP AND RAN SUITE #1 LOGS: RUN #1 DLL-MSFL-AS-GR-AMS. RUN #2 VSP RUN #3 CST- 46 SHOTS RUN, 100% RECOVERY N.B - 43 RINGS LEFT IN HOLE. RIGGED DOWN.
			22:00	22:45	0.75	MADE UP WEAR BUSHING R/T, RIH AND RETRIEVED WEAR BUSHING. SLM FOR HANGER INDEX MEASUREMENT.
			22:45	00:00	1.25	MADE UP CEMENT HEAD TO STD AND RACKED IN DERRICK. PICKED UP 9.625" HANGER AND R/T AND RACKED BACK.
15/03/93	10	7	00:00	02:30	2.50	R/U AND RAN 9.625" CSG.
			02:30	03:45	1.25	REPAIRED BLOWN HYDRAULIC LINE (NO SPARE) AND AND REFILLED HYDRAULIC TANK.
			03:45	07:45	4.00	CONTINUED TO RUN 9.625" CSG.
			07:45	08:30	0.75	PICKED UP CASING HANGER AND RAN CSG IN ON 5" DP. LANDED AT 0830hrs.
			08:30	09:30	1.00	RIGGED UP CEMENT LINES AND CIRCULATED CSG AT 70 SPM FOR 45min
			09:30	11:15	1.75	R/U TO CEMENT UNIT, PRESSURE TESTED SURFACE LINES TO 3500psi, MIXED/PUMPED 311sx CLASS "G" NEAT c/w 37bbl DRILL WATER. DISPLACED w/ 10bbl DW AND 260bbl MUD. BUMPED PLUG TO 3500 psi AT 1111hrs.
			11:15	12:00	0.75	SET SEAL ASSY w/10 TURNS AND 20000 ft-lb.
			12:00	15:00	3.00	PRESSURE TESTED SEAL ASSEMBLY & BOP TO 500/3500psi.
			15:00	16:00	1.00	POH W/RT AND LAID DOWN.
			16:00	16:15	0.25	TESTED SHEAR RAM/CSG TO 500/3500psi.
			16:15	18:15	2.00	MADE UP WEAR BUSHING R/T & RIH. COULD NOT SET, POH. WEAR BUSHING NOT ON TOOL. RIH & RETRIEVE RIH WITH WASH TOOL AND JET W/H. POH.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
15/03/93	10	7	16:15	18:15		RIH w/WEAR BUSHING, UNABLE TO RELEASE, TOOL JAMMED. POH, REMOVE W/B FROM TOOL.
			18:15	20:30	2.25	MADE UP TO 2ND TOOL AND RIH. SET WB AND POH w/RT.
			20:30	22:15	1.75	PICKED UP AND LAID OUT 12.25" BHA.
			22:15	00:00		PICKED UP 8.5" BHA AND RIH.
16/03/93	11	8	00:00	02:00	2.00	CONTINUED TO MAKE UP BHA. RIH. TAGGED @ 1162m
			02:00	04:15	2.25	DRILLED SHOETRACK AND CLEANED OUT RATHOLE.
			04:15	06:15	2.00	DRILLED FROM 1204m TO 1207m. WORKED JUNK SUB.
			06:15	07:00	0.75	CONDITIONED MUD FOR LOT.
			07:00	08:00	1.00	TESTED LINES TO 3500psi AND PERFORMED LOT. SURFACE PRESSURE - 1380psi: LOT 1.94SG EMW.
			08:00	08:15	0.25	RIH TO BOTTOM AND WORKED JUNK SUB.
			08:15	10:45	2.50	DRILLED 8.5" HOLE FROM 1207m TO 1209m.
			10:45	13:30	2.75	WORKED JUNK SUB, FLOWCHECKED, PUMPED SLUG AND POH TO CHANGE BIT AND BHA.
			13:30	14:00	0.50	SERVICED TDS.
			14:00	14:30		PICKED UP MWD AND ROLLER REAMERS, DUMPED MWD MEMORY.
			14:30	14:45	0.25	MADE UP NEW BIT. SURFACE TESTED MWD.
			14:45	19:00	4.25	CONTINUED TO MAKE UP BHA. PICKED UP 30 JTS DP. RIH.
			19:00	00:00	5.00	WASHED 17m TO BTM FOR MWD TO 1209m. DRILLED 8.5" HOLE FROM 1209m TO 1329m SURVEYING w/ MWD EACH 5th STAND. ANGLE BUILT: 2.5 TO 4°.
17/03/93	12	9	00:00	16:30	16.50	DRILLED 8.5" HOLE FROM 1329m TO 1654m DRILLING BREAK AT 1648m.
			16:30	18:15	1.75	FLOW CHECKED, CIRCULATED BOTTOM HOLE SAMPLE.
			18:15	00:00	5.75	DRILLED 8.5" HOLE FROM 1654m TO 1747m. FLOW CHECKED ALL DRILLING BREAKS. SURVEYED WITH MWD EACH 3rd CONNECTION.
18/03/93	13	10	00:00	03:30	3.50	DRILLED 8.5" HOLE FROM 1747m TO 1821m
			03:30	05:15	1.75	CIRCULATED SAMPLES
			05:15	08:45	3.50	PUMPED SLUG AND POH FOR CORE.
			08:45	09:00	0.25	DUMPED MWD MEMORY.
			09:00	12:00	3.00	MADE UP 27m CORE BARREL, INSTALLED INNER SLEEVE AND MADE UP CORE HEAD.
			12:00	16:30	4.50	RIH WITH CORE BARREL FOR CORE No.1. LAID OUT JARS. PICKED UP NEW JARS. RIH.
			16:30	16:45	0.25	REAMED/WASHED FROM 1707m TO 1821m.
			16:45	18:30	1.75	CUT CORE No.1 FROM 1821m TO 1828m. JAMMED OFF.
			18:30	21:45	3.25	PUMPED SLUG & POH W/CORE No.1.
			21:45	23:00	1.25	RECOVERED 3.04m. LAID OUT 9m SECTION OF BARREL.
			23:00	00:00	1.00	MADE UP NEW CORE HEAD TO 18m CORE BARREL, CHECK CATCHER GAP.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
19/03/93	14	11	00:00	01:30	1.50	MADE UP 18m CORE BARREL, LAID OUT TWO INNER BARREL- TOO SHORT PICKED UP TWO MORE AND MADE UP.
			01:30	04:15	2.75	RIH WITH CORE BARREL TO 1776m, HOLE GOOD.
			04:15	05:00	0.75	PRECAUTIONARY REAMED FROM 1796m TO 1828m, CIRC ON BOTTOM FOR 5min, DROPPED BALL.
			05:00	13:00	8.00	CUT CORE No.2 FROM 1828m TO 1842.5m. HIGH PRESSURE AND ZERO ROP: CORE JAMMED.
			13:00	16:15	3.25	PUMPED SLUG & POH; HOLE TIGHT AT 1660m, 70K O/P, FLOW CHECKED AT SHOE: STATIC.
			16:15	18:00	1.75	BROKE OFF CORE HEAD AND RECOVERED CORE: 13.2m/14.5 RECOVERY (92%). SERVICED BARREL.
			18:00	19:00	1.00	CHECKED CORE & CONTINUED TO SERVICE BARREL.
			19:00	19:30	0.50	SERVICED TDS.
			19:30	21:00	1.50	MADE UP CORE BBL AND CORE HEAD FOR CORE No.3.
			21:00	23:30	2.50	RIH TO CUT CORE No.3
			23:30	23:45	0.25	WASHED/REAMED TO BOTTOM. CIRC, DROPPED BALL.
			23:45	00:00		CUT CORE No.3 FROM 1842.5m TO 1844m.
20/03/93	15	12	00:00	01:00	1.00	CONTINUED TO CUT CORE No.3 FROM 1844m TO 1847m: STOPPED DRILLING.
			01:00	04:00	3.00	PUMPED SLUG. POH. HOLE GOOD.
			04:00	04:45	0.75	LAID DOWN CORE. RACKED BACK BARREL.
			04:45	05:15	0.50	MADE UP BIT AND MWD & TESTED MWD.
			05:15	07:45	2.50	RIH TO 1810m
			07:45	10:30	2.75	REAMED FOR MWD FROM 1810m TO 1847m.
			10:30	00:00	13.50	DRILLED 8.5" HOLE FROM 1847m TO 1970m. WASHED EACH CONNECTION AND SURVEYED.
21/03/93	16	13	00:00	08:15	8.25	DRILLED 8.5" HOLE FROM 1970m TO 2031m. SURVEYED AND WASHED EACH CONNECTION.
			08:15	08:30	0.25	CIRCULATED.
			08:30	13:30	5.00	FLOW CHECKED, PUMPED SLUG, POH. HOLE TIGHT FROM 1970m, BACKREAMED TO 1830m BRIEFLY STUCK AT 1880m, JARRED DOWN TO FREE.
			13:30	14:00	0.50	MADE UP BIT No.11 AND DUMPED MWD MEMORY.
			14:00	14:30		RIGGED UP SUITE No.2 LOGS.
			14:30	00:00	9.50	RUN No.1, DLL-MSFL-AS-GR-AMS RUN No.2, FMS-LDT-CNL-GR-AMS.
22/03/93	17	14	00:00	02:00	2.00	CONTINUED RUN No.2: FMS-LDT-CNT-GR-AMS.
			02:00	14:00	12.00	RUN No.3: VSP.
			14:00	00:00	10.00	RUN No.4: RFT-GR-AMS.
23/03/93	18	15	00:00	13:30	13.50	CONTINUED RUN No.4: RFT-GR-AMS. RECOVERED SAMPLE. RIGGED DOWN RFT No.1:0300hr RIGGED UP AND RAN RFT No.2: 0415 hrs. RECOVERED SAMPLE. RIGGED DOWN RFT No.2:0730hr RIGGED UP AND RAN RFT No.3: 0830 hrs. RECOVERED SAMPLE. RIGGED DOWN RFT No.3:1300hr
			13:30	14:00	0.50	RIGGED DOWN SCHLUMBERGER.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
23/03/93	18	15	14:00	14:45	0.75	RETRIEVED WEAR BUSHING.
			14:45	15:15	0.50	MADE UP TEST PLUG. RIH AND LANDED OUT.
			15:15	17:45	2.50	TESTED ALL RAMS, VALVES AND ANNULARS TO 500/3500 psi ON THE BLUE POD.
			17:45	18:15	0.50	POH WITH TEST PLUG.
			18:15	21:30	3.25	TESTED SURFACE EQUIPMENT TO 500/3500 psi.
			21:30	22:30	1.00	RAN AND SET WEAR BUSHING.
			22:30	23:30		MADE UP BIT No. 11. CALIBRATED AND TESTED MWD. INSTALLED HOWCO TEMPERATURE PROBE.
			23:30	00:00	0.50	RIH.
24/03/93	19	16	00:00	00:45	0.75	CONTINUED RIH TO SHOE.
			00:45	02:15	1.50	TOOK TEMPERATURE SURVEY AT 1187 m. RECORDED MWD TEMPERATURE READINGS AT START AND FINISH OF CIRCULATION.
			02:15	03:30	1.25	CONTINUED RIH TO 2017 m. HUNG UP ON PROBABLE UNDERGAUGE HOLE/FILL
			03:30	04:45	1.25	TOOK TEMPERATURE SURVEY AT 2017 m. RECORDED MWD TEMPERATURE READINGS AT START, MIDWAY AND FINISH CIRCULATING.
			04:45	06:45	2.00	FLOWCHECKED. PUMPED SLUG. POH TO SHOE.
			06:45	07:15	0.50	RIGGED UP AND RECOVERED HOWCO TEMPERATURE PROBE ON WIRELINE.
			07:15	08:45	1.50	RIH.
			08:45	10:00	1.25	TAGGED AT 1999 m AND REAMED TO 2031m.
			10:00	19:30	9.50	DRILLED 8.5" HOLE FROM 2031m TO 2107m.
			19:30	21:15	1.75	CIRCULATED SAMPLES.
			21:15	00:00	2.75	FLOWCHECKED AND POH. WORKED THROUGH TIGHT HOLE FROM 2072m TO 1940m. 100 kips OVERPULL. BACK REAMED LEDGE AT 1946m AND CONTINUED POH - HOLE CONDITION GOOD.
25/03/93	20	17	00:00	00:30	0.50	CONTINUED POH TO SHOE.
			00:30	01:45	1.25	RIH.
			01:45	02:00	0.25	MADE UP TOP DRIVE AND WASHED AND REAMED FROM 2093m TO 2107m.
			02:00	03:00	1.00	TAGGED BOTTOM AND CIRCULATED HOLE CLEAN.
			03:00	07:00	4.00	FLOWCHECKED, PUMPED SLUG AND POH. DUMPED MWD MEMORY AT SURFACE. BROKE OUT AND LAID DOWN MWD. HOLE CONDITION GOOD.
			07:00	07:30	0.50	RIGGED UP LOG SUITE No.3.
			07:30	10:45	3.25	RUN No.1: DLL-MSFL-AS-GR-AMS.
			10:45	11:15	0.50	RIGGED DOWN RUN No.1.
			11:15	11:45		RIGGED UP RUN No.2.
			11:45	14:30	2.75	RUN No.2: CST - SHOT 60, RECOVERED 57 BULLETS.
			14:30	15:00	0.50	RIGGED DOWN SCHLUMBERGER.
			15:00	16:00	1.00	SLIPPED AND CUT 100 ft OF DRILL LINE.
			16:00	16:30	0.50	SERVICED TOP DRIVE.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
25/03/93	20	17	16:30	18:00	1.50	BROKE OUT AND LAID DOWN CORE BARREL.
			18:00	22:00	4.00	MADE UP BIT No. 12 WITH JUNK SUB AND RIH TO 2097 m - ENCOUNTERED FILL
			22:00	23:15	1.25	WASHED AND LIGHT REAMED 10m OF FILL FROM 2097m TO 2107m - SURGED AND WORKED JUNK SUB. (MAXIMUM GAS: 8.34%).
			23:15	00:00	0.75	CIRCULATED BOTTOMS UP.
26/03/93	21	18	00:00	03:45	3.75	FLOWCHECKED, PUMPED SLUG AND POH. FLOWCHECKED AT SHOE. BROKE OUT BIT AND JUNK SUB.
			03:45	07:15	3.50	MADE UP 9.625" CASING SCRAPER WITH BIT No. 12 RERUN 1. DRIFTED HWDP PLUS 31 JOINTS OF DRILLPIPE ON RIH TO 1180m.
			07:15	08:00	0.75	CIRCULATED HOLE CLEAN AND WORKED SCRAPER.
			08:00	10:15	2.25	PUMPED SLUG AND POH.
			10:15	10:30	0.25	BROKE OUT BIT AND SCRAPER - LAID OUT SCRAPER.
			10:30	10:45		SERVICED RIG.
			10:45	11:15	0.50	PICKED UP 1 SINGLE OF DRILL PIPE AND MADE UP TO CEMENT HEAD. LAID DOWN ON PIPE DECK.
			11:15	13:45	2.50	PICKED UP AND RIH WITH 1 STAND OF 6.5" DRILL COLLARS. BROKE OUT FLOAT SUB. BROKE OUT AND LAID DOWN EXCESS 8" AND 6.5" DRILL COLLARS.
			13:45	14:45	1.00	PICKED UP 15 x 4.75" DRILL COLLARS.
			14:45	16:00	1.25	MADE UP BIT No.2 RERUN 2 COMPLETE WITH JUNK SUB AND RIH.
			16:00	16:30	0.50	REPAIRED BLOWN HYDRAULIC HOSE ON No.4 HYDRAULIC UNIT.
			16:30	16:45	0.25	CONTINUED RIH.
			16:45	18:30	1.75	REPAIRED BLOWN HYDRAULIC HOSE ON No.4 HYDRAULIC UNIT.
			18:30	20:45	2.25	CONTINUED RIH TO 2102m - FILL
			20:45	22:15	1.50	WASHED 5m FILL TO 2107m. SURGED FOR JUNK.
			22:15	23:00	0.75	CIRCULATED BOTTOMS UP (MAXIMUM GAS: 2.7 %).
			23:00	00:00	1.00	FLOWCHECKED, PUMPED SLUG AND POH.
27/03/93	22	19	00:00	02:00	2.00	CONTINUED POH. FLOWCHECKED AT SHOE - STATIC.
			02:00	02:30	0.50	RIGGED UP TO PICK UP AND RIH WITH 7" LINER.
			02:30	14:00	11.50	PICKED UP AND RAN 84 JOINTS OF 7" LINER - SHOE INITIALLY AT 2102m.
			14:00	15:30	1.50	BROKE CIRCULATION. HOLE PACKED OFF - WORKED CLEAR. CIRCULATED 1.5 TIMES CASING VOLUME.
			15:30	16:15	0.75	TESTED LINES TO 4000 psi. DROPPED BALL AND ATTEMPTED TO SET HANGER - UNSUCCESSFUL.
			16:15	17:30	1.25	ATTEMPTED TO SET HANGER- UNSUCCESSFUL. SHEARED BALL OUT AT 2200psi.
			17:30	19:30	2.00	CIRCULATED/WORKED STRING FROM 2102m TO 2107m.
			19:30	20:45	1.25	CEMENTED 7" LINER (RECIPROCATED WHILST PUMPING CEMENT)
			20:45	22:00	1.25	DROPPED DART AND PUMPED 60 bbl OF MUD - NO

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
27/03/93	22	19	20:45	22:00		PRESSURE INCREASE NOTED TO INDICATE PLUG HAD SHEARED OUT. PUMPED A FURTHER 120 bbl OF MUD WITHOUT BUMPING PLUG(180 bbl TOTAL). RECIPROCATED LINER DURING DISPLACEMENT. NO BACK FLOW. GOOD CEMENT RETURNS THROUGHOUT.
			22:00	22:45	0.75	SET CASING ON BOTTOM AT 2107m AND BACKED OUT LINER RUNNING TOOL WITH DIFFICULTY (CHP PACKER NOT SET DUE TO LACK OF TIME TO CEMENT SETTING).
			22:45	23:15	0.50	PICKED UP TO 2m ABOVE TOP OF LINER AND REVERSE CIRCULATED 2 x DRILL PIPE VOLUME (DUMPED CEMENT RETURNS).
			23:15	00:00	0.75	POH.
28/03/93	23	20	00:00	02:00	2.00	CONTINUED POH. LAID DOWN R/T AND CMT HEAD.
			02:00	04:15	2.25	MADE UP BIT No.5RR1 AND RIH TO 1084.5m.
			04:15	04:30	0.25	WASHED TO TOP OF LINER AT 1092m. DRESSED.
			04:30	05:15	0.75	CIRCULATED HOLE CLEAN - NO CEMENT RECORDED.
			05:15	06:15	1.00	PUMPED SLUG AND POH.
			06:15	09:15	3.00	LAID DOWN HWDP AND 6.5" DCs.
			09:15	10:00	0.75	RIGGED UP TO PICK UP 4.75" DCs AND 3.5" 'E' GRADE DP.
			10:00	13:00	3.00	PICKED UP 12 JOINTS 4.75" DCs. DRIFTED SAME AND RACKED BACK IN DERRICK. MADE UP BIT No.10, BIT SUB AND JUNK SUB AND RIH.
			13:00	18:00	5.00	CONTINUED RIH. PICKED UP 102 JOINTS 3.5" DP TO 1082m.
			18:00	18:30	0.50	FILLED PIPE. BROKE CIRCULATION AND WASHED DOWN THROUGH TOP OF LINER. TAGGED OFF AT PACK-OFF SUB AT 1094m.
			18:30	20:00	1.50	DRILLED ON PACK-OFF SUB.
			20:00	00:00	4.00	WORKED AND PUSHED INSERT DPOB/WIPER PLUG FROM 1094 TO 1109m.
29/03/93	24	21	00:00	02:15	2.25	CONTINUED TO RIH. PUSHED PACK-OFF SUB/PLUG FROM 1109m TO 2036m.
			02:15	03:30	1.25	TAGGED CEMENT AT 2036m. DRILLED TO 2045m - CEMENT IN RETURNS.
			03:30	05:30	2.00	PUMPED SLUG AND POH.
			05:30	06:00	0.50	RIGGED UP 3.5" DP GEAR WHILE SERVICING TDS.
			06:00	09:00	3.00	CONTINUED TO POH.
			09:00	13:30	4.50	MADE UP MILL TOOL AND 6 x 6.5" DC AND 15 HWDP. RIH TO 1092m. BROKE CIRCULATION AND WORKED TOOL.
			13:30	15:00	1.50	PUMPED SLUG AND POH.
			15:00	20:30	5.50	MADE UP JM PACKER AND RIH AT 3 STANDS/min TO TOL AT 1092m.
			20:30	00:00	3.50	SET JM PACKER WITH 20 kips AND TESTED SEALS TO 500psi. SET DOWN ON PACKER WITH 40 kips

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
29/03/93	24	21	20:30	00:00		AND HELD FOR 15min. PICKED UP WITH OVERPULL OF 10 kips TO CHECK SEATING. SET DOWN WITH 40 kips AND TESTED PACKER TO 3500psi.
30/03/93	25	22	00:00	05:00	5.00	CONTINUED POH AND LAID DOWN EXCESS DP & BHA.
			05:00	06:45	1.75	MADE UP WEAR BUSHING R/T AND RETRIEVED SAME. MADE UP AND RIH WITH BOP TEST TOOL.
			06:45	09:30	2.75	TESTED BOPs TO 500/3500 psi.
			09:30	10:30	1.00	POH WITH TEST PLUG. PICKED UP 3.5" DP ON TEST PLUG AND RIH. (TESTED SHEAR RAMS WHEN OUT OF HOLE).
			10:30	11:00	0.50	TESTED VBR ON 3.5"DP TO 500/3500psi.
			11:00	12:00	1.00	POH WITH TEST PLUG. LAID OUT 6 x HWDP.
			12:00	14:45	2.75	RIGGED UP AND TESTED SURFACE EQUIPMENT.
			14:45	15:30	0.75	RIH AND SET WEAR BUSHING.
			15:30	23:00	7.50	MADE UP 6" BHA. RIH AND TAGGED CEMENT AT 2045m. (PICKED UP 6 x 4.75"DC & 27x3.5" DP).
			23:00	00:00	1.00	DRILLED CEMENT FROM 2045m TO 2056m.
31/03/93	26	23	00:00	01:30	1.50	DRILLED CEMENT FROM 2056m TO FLOAT COLLAR.
			01:30	02:00	0.50	TROUBLE SHOT SURFACE PRESURE LOSS.
			02:00	08:30	6.50	CONTINUED DRILLING FLOAT COLLAR AND SHOETRACK TO 2108m. WORKED JUNK SUB.
			08:30	10:15	1.75	DRILLED 6" HOLE FROM 2108m TO 2111m.
			10:15	11:30	1.25	CIRCULATED BOTTOMS UP
			11:30	12:30	1.00	POH TO SHOE & PERFORMED LOT TO 1.85SG EMW.
			12:30	20:45	8.25	CONTINUED DRILLING 6" HOLE FROM 2111m TO 2131m. FLUSHED RISER EVERY 2HRS. FLOW CHECKED DRILLING BREAKS.
			20:45	21:00	0.25	WORKED JUNK BASKET AND CONTINUED TO FLUSH RISER.
			21:00	00:00	3.00	PUMPED SLUG AND POH.
01/04/93	27	24	00:00	02:00	2.00	CONTINUE POH. LAID OUT JUNK BASKET. MADE UP DS46HG PDC.
			02:00	05:30	3.50	RIH TO 7" SHOE AT 2108m.
			05:30	06:00	0.50	WASHED AND LIGHT REAMED TO BOTTOM AT 2131m.
			06:00	16:15	10.25	DRILLED 6" HOLE FROM 2131m TO 2209m. BOOSTED RISER EVERY HOUR.
			16:15	17:15	1.00	CIRCULATED HOLE CLEAN. BOOSTED RISER SIMULTANEOUSLY.
			17:15	17:45	0.50	DROPPED TOTCO AND PUMPED SLUG.
			17:45	22:15	4.50	POH FOR BIT AND BHA CHANGE. LAID OUT STRING STABILISERS AND ROLLER REAMER. RETRIEVED SURVEY - MISRUN.
			22:15	00:00	1.75	MADE UP 6" BIT, SHORT DC AND MONEL DC. RIH.
02/04/93	28	25	00:00	03:30	3.50	CONT. RIH WITH BHA. PICKED UP JARS AND 2 x 4 3/4"DC. RIH TO 2190m.
			03:30	04:15	0.75	WASHED AND LIGHT REAMED FROM 2190m TO 2209m.
			04:15	23:15	19.00	DRILLED 6" HOLE FROM 2209m TO 2295m. FLUSHED

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
02/04/93	28	25	04:15	23:15		RISER EVERY 3 HOURS.
			23:15	00:00	0.75	SURGED AND WORKED JUNK SUB. CIRCULATED AND FLUSHED RISER.
03/04/93	29	26	00:00	01:00	1.00	FLOW CHECKED, PUMPED SLUG AND POH. WIPED THROUGH TIGHT HOLE FROM 2237m TO 2190m (MAX. 30 kips). TIGHT HOLE AT 2184m - JARS FIRED. WASHED AND REAMED CLEAR. (MAXIMUM OVERPULL 50 kips).
			01:00	04:30	3.50	CONTINUED POH. LAID OUT JARS AND JUNK SUB.
			04:30	05:30	1.00	MADE UP BIT AND REDRESSED NB ROLLER REAMER.
			05:30	08:30	3.00	RIH TO 1460m.(PICKED UP NEW JARS). FILLED PIPE AND BROKE CIRCULATION.
			08:30	09:00	0.50	SERVICED TDS AND CHANGED SWIVEL PACKING.
			09:00	10:00	1.00	CONTINUED RIH TO 2277m.
			10:00	10:15	0.25	WASHED FROM 2277m TO 2295m.
			10:15	00:00	13.75	DRILLED 6" HOLE FROM 2295m TO 2362m. BOOSTED RISER EVERY 2 HOURS OR AS REQUIRED.
04/04/93	30	27	00:00	12:30	12.50	DRILLED 6" HOLE FROM 2362m TO 2425m. BOOSTED RISER AS REQUIRED. FLOW CHECKED BREAKS.
			12:30	13:30	1.00	CIRCULATED BOTTOMS UP.
			13:30	15:15	1.75	PERFORMED WIPER TRIP TO 7" SHOE. HOLE GOOD.
			15:15	16:30	1.25	CIRCULATED HOLE CLEAN. PUMPED SLUG.
			16:30	21:15	4.75	POH. STRAPPED PIPE.
			21:15	21:45	0.50	RIGGED UP SUITE #4 LOGS.
			21:45	00:00	2.25	RUN No.1 - DLL/MSFL/SDT/GR/SP/CAL/AMS.
05/04/93	31	28	00:00	15:30	15.50	CONTINUED SUITE No.4 LOGS AS FOLLOWS: RUN No.2 FMS/LDT/CNT/GR/AMS. RUN No.3 VSP. RUN No.4 21 SHOT CST.(FULL RECOVERY)
			15:30	00:00	8.50	RUN No.5 - CBL/VDL/USI.
06/04/93	32	29	00:00	05:00	5.00	RIH WITH OEDP (PICKED UP 13 x 3.5" DP) TO 2425m.
			05:00	06:15	1.25	CIRCULATED BOTTOMS UP.
			06:15	07:00	0.75	RIGGED UP HALLIBURTON AND SET STAGE No.1 CEMENT PLUG FROM 2425m TO 2225m WITH 110sx OF CLASS 'G' AND 5gal/10bbl SCR-100L. 13 bbl MIXWATER.
			07:00	07:30	0.50	PULLED BACK TO 2181m.
			07:30	08:00		REVERSE CIRCULATED AT 400psi.
			08:00	08:15	0.25	RIH TO 2225m.
			08:15	09:00	0.75	RIGGED UP HALLIBURTON AND SET STAGE No.2 CEMENT PLUG FROM 2225m TO 2058m WITH 94sx CLASS'G' CEMENT AND 4gal/10bbl SCR-100L. (11bbl MIXWATER).
			09:00	09:15	0.25	POH TO 2047m.
			09:15	09:45	0.50	REVERSE CIRCULATED.
			09:45	10:30	0.75	POH 10 STANDS.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
06/04/93	32	29	10:30	11:00	0.50	SLIPPED AND CUT DRILLING LINE.
			11:00	11:30		SERVICED TDS.
			11:30	14:30	3.00	POH TO SURFACE.
			14:30	15:15	0.75	RIGGED UP 5" DP AND MADE UP WEAR BUSHING TOOL. RIH AND RETRIEVED SAME.
			15:15	15:45	0.50	MADE UP TEST PLUG AND RIH. FILLED PIPE WITH SEAWATER.
			15:45	19:00	3.25	TESTED BOPs. UPPER AND MIDDLE PIPE RAMS, UPPER AND LOWER ANNULARS AND CHOKE AND KILL MANIFOLD TO 500/3500PSI.
			19:00	19:45	0.75	POH WITH 5" DP AND TEST PLUG. RIGGED UP AND RAN 3.5" DP.
			19:45	20:15	0.50	TESTED VARIABLE PIPE RAMS TO 500/3500psi.
			20:15	21:00	0.75	POH AND LAID OUT TEST PLUG. RIGGED UP 5" ELEVATORS.
			21:00	22:00	1.00	RIGGED UP TO TEST SURFACE EQUIPMENT AND TESTED IBOP AND LOWER IBOP AND STANDPIPE MANIFOLD TO 500/3500psi.
			22:00	22:45	0.75	RIGGED UP WEAR BUSHING RUNNING TOOL. RIH AND SET SAME. POH AND LAID OUT RUNNING TOOL.
			22:45	23:45	1.00	RIH WITH FLUTED HANGER AND FUNCTIONED 5" PIPE RAMS AND VARIABLE PIPE RAMS TO CONFIRM SPACE OUT. POH.
			23:45	00:00	0.25	RIGGED UP TO PICK UP 4.75" DC.
07/04/93	33	30	00:00	01:00	1.00	LAID DOWN EXCESS 4.75 DCs.
			01:00	06:15	5.25	MADE UP 6" BIT, 7" SCRAPER AND RIH. TAGGED CEMENT AT 2074m.
			06:15	08:00	1.75	PUMPED AND SWEPT HOLE WITH 10bbl XCD HI-VIS PILL.
			08:00	10:00	2.00	DISPLACED WELL TO BRINE.
			10:00	10:30	0.50	POH TO 1840m.
			10:30	10:45	0.25	SPOTTED HEC AND CLAY STABILISER ACROSS 1800 TO 1840m.
			10:45	14:15	3.50	CONTINUE POH. RACKED BACK 28STDS, LAID OUT 57JTS.
			14:15	15:30	1.25	SPOTTED 20 bbl HI-VIS AT 100m. POH ABOVE BOP AND FUNCTIONED ALL RAMS TWICE. RIH TO 113m FLUSHING BOP AND CIRCULATED HI-VIS OUT. BOOSTED RISER.
			15:30	15:45	0.25	CONTINUED POH.
			15:45	16:00		RIGGED UP SCHLUMBERGER ON COMPENSATOR LINE.
			16:00	16:30	0.50	TESTED SHEAR RAMS AND CASING TO 500/3500psi.
			16:30	18:30	2.00	RUN No.1 - GAUGE RING DOWN TO 2060m. POH. RIGGED DOWN SCHLUMBERGER.
			18:30	00:00	5.50	RIGGED UP AND PICKED UP SUBSEA TEST TREE AND MADE UP RETAINER VALVE AND SURFACE TEST TREE ASSEMBLIES. RACKED BACK SAME. PICKED UP 3.5"

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
07/04/93	33	30	18:30	00:00		RTS TUBING AND RACKED BACK.
08/04/93	34	31	00:00	02:45	2.75	CONTINUED PICKING UP 3.5" TUBING.
			02:45	04:30	1.75	POH WITH 3.5" TUBING AND RACKED BACK.
			04:30	05:00	0.50	RIGGED UP SCHLUMBERGER.
			05:00	07:30	2.50	RAN PERFORATING GUN No.1. RIH AT 0530HRS. FIRED AT 0700HRS. (PERFORATED FROM 1838m TO 1827.5m) STARTED POH WITH SCHLUMBERGER - GAINED 7 bbl. WELL STATIC WHEN STATIONARY. CLOSED UPPER ANNULAR AT 0717HRS.
			07:30	10:30	3.00	PUMPED 7 bbl - ANNULAR NOT HOLDING, TRIP TANK GAINED SAME AMOUNT. OPENED UPPER ANNULAR AND CLOSED LOWER ANNULAR AT 0735HRS. ATTEMPTED TO BULLHEAD - PUMPED 25 bbl, TRIP TANK GAINED SAME AMOUNT. CLOSED BOTH ANNULARS AT 0755HRS. PUMPED 10 bbl, 7 bbl RETURNED. MAXIMUM PRESSURE OF 2900psi. MONITORED WELL. PRESSURE BLED BACK TO 2100psi - STATIC. OPENED CHOKE AT 0830HRS AND BLED BACK TO 550psi. MONITORED WELL - STATIC. BLED PRESSURE OFF IN 100psi INCREMENTS AND MONITORED OVER 30min INTERVALS. PRESSURE 0psi AT 1005HRS. OPENED CHOKE FULLY - WELL STATIC. OPENED BOTH ANNULARS - WELL STATIC.
			10:30	13:00	2.50	POH WITH SCHLUMBERGER AT REDUCED SPEED (6000'/HR MAX. IN 9.625" CASING) - WELL STATIC. RIGGED DOWN.
			13:00	16:30	3.50	MADE UP BIT AND BHA. RIH TO 1815m. BROKE CIRCULATION AT 989m.
			16:30	19:15	2.75	CIRCULATED AND WEIGHTED UP TO 1.17 SG. SPOTTED HI-VIS HEC 20 bbl PILL AND FLOW CHECKED.
			19:15	21:30	2.25	POH. HOLE TOOK CORRECT FLUID.
			21:30	00:00	2.50	RIGGED UP AND RACKED BACK 3.5" TUBING.
09/04/93	35	32	00:00	03:30	3.50	CONTINUED TO MAKE UP AND RACK BACK TUBING.
			03:30	04:00	0.50	RIGGED UP SCHLUMBERGER.
			04:00	08:45	4.75	RAN PERFORATING GUN No.2 - FIRED AT 0631HRS (1827.5m TO 1825m AND 1821m TO 1816m). POH AND LAID DOWN GUNS.
			08:45	13:00	4.25	MADE UP BAKER DB PACKER ASSEMBLY. RIH AND SET PACKER AT 1800m. MONITORED HOLE ON TRIP OUT - LOSING AT 1 bbl/hr. LOST TOTAL OF 11 bbl BEFORE WELL BECAME STATIC.
			13:00	15:00	2.00	MADE UP TEST STRING AND RIH.
			15:00	16:45	1.75	PRESSURE TESTED HRS SURFACE EQUIPMENT AND TEST TOOLS TO 3500psi.
			16:45	19:00	2.25	CONTINUED RIH. MADE UP 3.5" TUBING TO 870m.
			19:00	19:30	0.50	RIGGED UP AND TESTED TUBING TO 3500psi.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
09/04/93	35	32	19:00	19:30		RIGGED DOWN.
			19:30	00:00	4.50	RIH. MADE UP 3.5" TUBING.
10/04/93	36	33	00:00	00:15	0.25	CONTINUED TO RIH AND MAKE UP 3.5" TUBING.
			00:15	01:00	0.75	PRESSURE TESTED TUBING, TST VALVE TO 3500psi
			01:00	02:00	1.00	PAINTED 3 LAND OUT JOINTS. CONT. RIH WITH 3.5" TUBING.
			02:00	03:00	1.00	INCREASED BACK FLOW FROM TUBING STRING. INSTALLED TIW VALVE AND MONITORED TRIP TANK - STILL LOSING.
			03:00	05:00	2.00	RIGGED UP TO REVERSE CIRCULATE. CLOSED ANNULAR AT 0317HRS. REVERSE CIRCULATED AT 50spm AND 850psi.(MAX GAS 18.4%). CONTINUED CIRCULATING UNTIL BRINE WEIGHT BALANCED TO 1.17 SG. OBSERVED WELL - STATIC.
			05:00	06:00	1.00	CONTINUED RIH. STABBED INTO PACKER.
			06:00	06:30	0.50	CLOSED ANNULAR. SHEARED TST VALVE AND CYCLED OMNI VALVE. TESTED PACKER TO 1300psi.
			06:30	07:00	0.50	POH FOR SPACE OUT CALCULATIONS.
			07:00	07:30		TRIPPED 3 STANDS TO CONFIRM SPACE OUT CALCULATIONS.
			07:30	11:00	3.50	RAN UPPER TEST STRING.
			11:00	11:30	0.50	PICKED UP EXTENDED BAILS.
			11:30	12:30	1.00	PICKED UP FLOW HEAD AND RIGGED UP COFLEX HOSE AND KILL LINE.
			12:30	00:00	11.50	RIGGED UP HRS ON RIG FLOOR. CLOSED UPPER TEST SURFACE EQUIPMENT. FUNCTIONED OMNI VALVE TO BLANK AND PRESSURE TESTED STRING. 1500HRS - FUNCTIONED OMNI TO WELL CIRCULATE POSITION AND DISPLACED STRING TO 29 bbl DEISEL AND 2 bbl SEAWATER. 1515HRS - FUNCTIONED OMNI TO WELL FLOW POSITION 1 AND SHEARED PINS ON LPR-N. 1545HRS - PRESSURED ANNULUS TO 1300psi TO FUNCTION OMNI AND OPEN LPR-N. WELL FLUIDS TO GAUGE TANKS. 1600HRS - GAS TO STB. SIDE BOOM. INCREASED TO 64/64" CHOKE. 1900HRS - SHUT IN WELL AND BLED OFF ANNULUS PRESSURE. LPR-N NOT CLOSING. PRESSURED UP TO 2500psi, HELD FOR 10min AND BLED OFF. 1935HRS - WELL SHUT IN. MONITORED TRIP TANK.
11/04/93	37	34	00:00		24.00	0000-0319: WELL SHUT IN ON BUILD UP. 0319-0920: OPENED WELL FOR FIRST MULTI-RATE TEST ON 20/64" CHOKE. 0920-1520: OPENED WELL TO 38/64" FIXED CHOKE AT 0959HRS. CHOKE CHANGE DELAYED DUE TO ICING OF VARIABLE CHOKE.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
11/04/93	37	34	00:00	00:00		1520-2120: OPENED WELL TO 48/64" CHOKE FOR THIRD MULTI-RATE TEST. 2120-2400: OPENED WELL TO 64/64" CHOKE FOR FINAL RATE.
12/04/93	38	35		03:30	3.50	CONTINUED TO FLOW WELL THROUGH 64/64" CHOKE. MAINTAINED 1300psi ON ANNULUS.
			03:30	00:00	20.50	SHUT IN WELL ON LPR-N VALVE FOR FINAL BUILD UP. MONITORED ANNULUS ON TRIP TANK. NO PRESSURE.
13/04/93	39	36	00:00	03:30	3.50	WELL SHUT IN FOR FINAL BUILD UP.
			03:30	04:15	0.75	CYCLED OMNI VALVE TO CIRC POSITION.
			04:15	04:30	0.25	REVERSE CIRC W/RIG PUMPS TO HRS CHOKE, SEPARATOR.
			04:30	05:00	0.50	R/U TO HALLIBURTON, OPEN RAMS, OBSERVE WELL, PUMP 10 bbl HEC AND 30 bbl MUD.
			05:00	05:15	0.25	CLOSED VBRs, CYCLED OMNI TO WELL TEST.
			05:15	06:00	0.75	BULL HEAD DOWN TUBING - PUMPED AWAY 12 bbl TO FORMATION. MAX PRESSURE 2000psi.
			06:00	07:00	1.00	CYCLED OMNI TO CIRC, PUMPED DOWN STRING TO CHECK OMNI OPEN.
			07:00	07:15	0.25	OPENED RAMS, STUNG OUT OF PACKER.
			07:15	08:00	0.75	OBSERVED WELL FOR FLOW.
			08:00	10:00	2.00	CIRC GAS OUT OF WELL, MAX GAS 1.55%.
			10:00	11:30	1.50	R/DOWN FLOW HEAD AND COFLEXIP HOSE.
			11:30	13:00		POH WITH LANDING STRING, SERVICE BREAK SSSV
			13:00	16:15	3.25	POH WITH 3.5" TUBING.
			16:15	18:00	1.75	BROKE OUT AND LAID DOWN LOWER TEST TOOLS AND RECOVER GAUGES.
			18:00	20:15	2.25	P/U BROKE AND LAY DOWN SST AND FLOW HEAD.
			20:15	00:00	3.75	R/U AND RIH W/ 3.5" TUBING FOR SUSPENSION PLUG.
14/04/93	40	37	00:00	00:30	0.50	RIH AND TAG TESTED PACKER AT 1800m, R/U CIRC HEAD.
			00:30	01:45	1.25	CIRC BOTTOMS UP, MAX GAS 0.86%
			01:45	02:15	0.50	R/U CEMENT LINE AND TEST. AND PUMP 150m BALLANCED CEMENT PLUG ON TOP OF PACKER W/100sx CLASS G.
			02:15	03:15	1.00	POH TO 1602m AND REVERSE CIRCULATED.
			03:15	03:30	0.25	CIRC LONG WAY TO CLEAR TUBING ID. OF CEMENT.
			03:30	10:00	6.50	POH. LAID DOWN 3.5" TUBING.
			10:00	16:15	6.25	R/U SCHLUMBERGER, RAN 7" BRIDGE PLUG. TAG TOP OF CEMENT AT 1670m AND SET PLUG AT 1659m, RAN 9.625" BRIDGE PLUG AND SET AT 1075m. POH AND R/DOWN SCHLUMBERGER.
			16:15	16:45	0.50	RIH WITH AND BROKE DOWN 5" TUBING AND LAID OUT SAME. MOVED 4.75" DCs IN DERRICK. LAID OUT WEATHERFORD EQUIPMENT.

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
14/04/93	40	37	16:45	19:30	2.75	RIH W/ 3.5" OEDP AND 5" DP AND TAGGED BRIDGE PLUG.
			19:30	19:45	0.25	R/U HALLIBURTON AND TESTED LINES TO 2500psi.
			19:45	20:00		PUMPED CEMENT PLUG No.2 W/ 60sx CLASS G FROM 1068m TO 1018m.
			20:00	21:00	1.00	POH AND REVERSE CIRCULATED, THEN PUMPED LONG WAY TO CLEAN OUT PIPE.
			21:00	00:00	3.00	POH AND LAID DOWN DRILL PIPE.
15/04/93	41	38	00:00	08:00	8.00	POH LAID DOWN 3.5", 5"DP AND 4.75" DCs.
			08:00	08:30	0.50	RIH TO 160m W/5"DP, R/U CIRC HEAD
			08:30	08:45	0.25	CIRCULATED TO SEAWATER.
			08:45	09:15	0.50	R/U CEMENT LINES AND TESTED. PUMPED PLUG No.3 w/60sx CLASS G AND SEA WATER. DISPLACED WITH 5 bbl SEA WATER. TOP OF CEMENT AT 110m.
			09:15	09:30	0.25	POH TO 78m
			09:30	09:45		CIRC PIPE CLEAN AND FLUSHED STACK.
			09:45	10:15	0.50	POH AND LAID DOWN PIPE.
			10:15	10:45		RIH AND RETRIEVED WEAR BUSHING.
			10:45	11:30	0.75	ATTEMPTED REMOVAL OF W/B FROM R/T. UNSUCCESSFUL, LAID DOWN W/B & TOOL.
			11:30	17:00	5.50	R/U TO PULL RISER AND BOP. PULLED DIVERTER. MU LANDING JT, PULLED SS CAMERA. UNLATCHED STACK.
			17:00	00:00	7.00	PULLED RISER AND STACK.
16/04/93	42	39	00:00	06:00	6.00	CONTINUED TO PULL RISER AND BOP. MOVED BOP & LMRP TO STUMPS AND LAID OUT HANDLING GEAR.
			06:00	08:30	2.50	R/U, RAN CORROSION CAP ON POD LINE. STABBED AND LATCHED TO WELL HEAD W/ ROV ASSISTANCE. CUT TWO GUIDELINES, ROV CUTTER BROKEN, RECOVERED ROV. REEL IN CUT LINES.
			08:30	10:00	1.50	DEBALLASTED RIG.
			10:00	13:45	3.75	STOPPED DEBALLASTING TO OFFLOAD FARSWORD. LAID OUT REMAINING 5" DRILL PIPE, JUMPED ROV AND CUT POD LINE AND 3rd GUIDELINE, THEN PULLED BACK TO SURFACE TO REPLACE CUTTER BLADE, WITH ONE GUIDELINE TO BE CUT. RAN BACK IN W/ ROV AND CUT REMAINING GUIDELINE.
			13:45	15:00	1.25	CONTINUED OFFLOADING FS. SURVEYED SEABED w/ROV, RECOVERED LOST TRANSPONDER.
			15:00	19:15	4.25	DEBALLASTED RIG.
			19:15	21:00	1.75	OFFLOADED BONAVISTA.
			21:00	00:00	3.00	PULLED ANCHORS.
17/04/93	43	40	00:00	16:00	16.00	CONTINUED TO PULL ANCHORS: No.10 MB RACKED @ 0037 No.4 FS RACKED @ 0155 No.9 MB PENNANT @ 0115, RACKED @ 0255 No.3 FS PENNANT @ 0212, RACKED @ 0454

Date	Day No.	Days From Spud	From	To	Hours	Daily Operations
17/04/93	43	40	00:00	16:00		No.11 MB PENNANT @ 0311, RACKED @ 0430 No.8 MB PENNANT @ 0443, RACKED @ 0631 No.5 FS PENNANT @ 0510, RACKED @ 0649 No.2 FS PENNANT @ 0704, RACKED @ 0839 No.1 FS PENNANT @ 0849, RACKED @ 1059 No.7 MB PENNANT @ 0859, RACKED @ 1110 1230 MB ON BRIDLE AND RIG FOR TOW No.12 FS PENNANT @ 1238, RACKED @ 1527 No.6 PULLED BY RIG, RACKED @ 1600 RIG RELEASED AT 1600hrs 17 APRIL 1993.

SECTION 3

BHP Petroleum

FINAL DRILLING REPORT

3.1 MUD PROPERTIES RECORD

MINERVA-1

Date	Depth (m)	Temp. (degC)	Density (S.G.)	Viscosity (sec/l)	PV (Cp)	YP (lb/100 ft^2)	Gels 0	Gels 10	API W.L. (ml)	HTHP W.L. (ml)	Filter Cake (1/32 in)	MBT (lb/bbl)	pH	%Solid	%H2O	%Sand	MF	Ca+ (mg/L)	Cl- (mg/L)	K+ (mg/L)	%KCl
08/03/93	106		1.03	100									9.0								
09/03/93	560		1.03	100									10.0					100			
10/03/93	560		1.03	100									10.0					2700			
11/03/93	517		1.03	100									10.0					40			0.0
12/03/93	765	34	1.09	50	17	19	5	12	6		1	8.0	9.1	5.5	94.5	0.25	0.30	120	31000	32000	6.1
12/03/93	563	27	1.08	50	17	18	3	4	6.2		1	10.0	9.2	4.5	95.5	0.01	0.60	120	29000	32400	6.1
13/03/93	1111	43	1.09	57	18	21	7	12	5.8		1	10.0	9.0	5.4	94.6	0.50	0.50	440	27000	27000	5.2
13/03/93	1204	48	1.13	48	18	21	6	14	5		1	12.0	9.0	6.5	93.5	0.50	0.60	160	27000	28000	5.4
13/03/93	1204	48	1.12	50	18	21	6	14	5		1	12.0	9.0	6.6	93.4	0.25	0.60	160	27000	28000	5.4
13/03/93	1113	45	1.1	58	18	22	8	14	5.5		1	10.0	9.0	6.0	94	0.50	0.50	200	25000	26400	5.0
14/03/93	1204		1.13	52	18	21	6	14	5		1	12.0	9.0	6.5	93.5	0.50	0.60	160	27000	28000	5.4
15/03/93	1204		1.12	51	19	20	5	10	5		1	12.0	8.9	6.5	93.5	0.01	0.50	160	26000	29000	5.5
16/03/93	1204	31	1.12	52	18	18	5	9	4.8		1	12.0	10.3	6.5	93.5	0.01	0.80	440	27000	29000	5.5
16/03/93	1320	37	1.12	48	16	18	5	8	4.8		1	12.0	9.7	6.8	93.2	0.01	0.80	400	27000	29600	5.6
17/03/93	1635	46	1.14	50	20	30	12	22	5		1	14.0	9.2	7.4	91.6	0.01	0.45	360	26000	25400	4.8
17/03/93	1747	47	1.16	48	19	24	7	26	5		1	15.0	9.0	8.5	91.5	0.01	0.70	280	34000	30500	5.8
17/03/93	1635	46	1.15	52	20	25	10	21	5		1	14.0	9.2	7.6	92.4	0.01	0.45	280	25000	25000	4.8
18/03/93	1828	47	1.16	50	20	20	4	20	6		2	17.5	9.0	9.9	90.9		0.90	230	35000	30000	5.7
19/03/93	1842	46	1.15	50	15	18	4	15	6		1	18.5	9.0	9.1	90.9		0.90	200	34000	23000	4.0
20/03/93	1970	54	1.15	46	15	18	5	25	5.5		1	15.0	9.5	9.4	90.6		0.90	120	45000	37000	7.1
21/03/93	2031		1.15	46	15	18	5	25	5.5		1	15.0	9.5	9.4	90.6		0.90	120	45000	34000	6.5
22/03/93	2031		1.15	45	14	14	3	20	5		1	14.0	8.8	8.5	91.5		0.90	120	50000	43000	8.3
23/03/93	2031		1.15	45	14	14	3	20	5		1	14.0	8.8	8.5	91.5		0.90	120	50000	43000	8.3
24/03/93	2107	52	1.15	45	17	20	4	14	4.6		1	13.0	9.4	8.5	91.5	0.10	0.70	320	49000	37000	7.1
25/03/93	2107		1.15	43	15	15	3	7	4.8		1	12.5	9.1	8.5	91.5		0.70	320	49000	37000	7.1
25/03/93	2107	45	1.16	54	18	22	4	10	5.8		1	12.5	9.0	9.0	91	0.20	0.70	360	49000	37000	7.1
26/03/93	2107		1.15	43	13	12	2	4	4.8		1	11.0	8.8	8.5	91.5		0.60	160	48000	37000	7.1
26/03/93	2107	45	1.16	51	18	22	4	10	5.2		1	11.5	8.6	9.0	91	0.20	0.70	200	48000	37000	7.0
27/03/93	2107		1.15	42	13	12	2	4	4.8		1	12.0	8.6	8.5	91.5		0.70	150	48000	37000	7.0
28/03/93	2107		1.16	43	13	12	2	4	4.8		1	12.0	8.6	9.0	91		0.70	150	48000	37000	7.0
29/03/93	2107		1.16	46	14	14	3	7	4.8		1	12.0	10.2	9.0	91		0.60	50	46000	37000	7.0
30/03/93	2108	38	1.15	45	14	14	3	7	4.8		1	12.0	10.2	9.0	91		0.60	50	46000	37000	7.0
31/03/93	2131	45	1.15	45	12	16	3	7	5		1	11.0	8.6	9.0	91		0.60	100	45000	34600	6.6
01/04/93	2208	44	1.16	45	15	17	4	6	4.8	15	1	10.0	9.2	5.2	94.8	0.01	0.50	320	48000	41000	7.8

File: MIN1_MUD

Checked:

Date: 02-Sep-93

BHP Petroleum

FINAL DRILLING REPORT

3.1 MUD PROPERTIES RECORD

MINERVA-1

01/04/93	2209	44	1.15	45	15	18	5	8	4.5	14	1	10.0	8.9	4.6	95.4	0.01	0.45	280	49000	43000	8.1
01/04/93	2140	41	1.15	43	14	15	3	7	4.8		1	10.0	9.4	9.0	91	0.01	0.65	180	46000	36000	6.8
02/04/93	2248	40	1.15	45	15	18	5	8	5.2	16	1	10.0	9.0	8.5	91.5	0.01	0.45	240	49000	41200	7.8
02/04/93	2295	42	1.15	45	14	17	4	6	5.2	18	1	10.0	9.0	8.6	91.4	0.01	0.40	240	49000	42000	7.8
02/04/93	2295	42	1.15	44	14	16	4	6	5.2	16	1	10.0	8.8	8.6	91.4	0.01	0.35	240	49000	41000	7.8
03/04/93	2308	41	1.15	45	14	17	4	6	5.4	18	1	10.0	9.2	8.6	91.4	0.10	0.50	240	49000	41000	7.8
03/04/93	2326	45	1.16	43	14	17	4	6	5.2		1	10.0	9.1	6.5	91.4	0.01	0.50	180	49000	39900	7.6
03/04/93	2362	47	1.15	46	15	19	5	8	5.2	20	1	11.0	9.1	8.4	91.6	0.01	0.50	140	49000	39000	7.5
04/04/93	2425	48	1.15	46	15	21	5	9	5.6	20	1	11.0	9.1	8.6	91.4	0.01	0.55	120	49000	36500	7.0
05/04/93	2425		1.15	48	15	21	5	9	5.6	20	1	11.0	9.0	9.0	91		0.50	120	49000	36000	6.9
06/04/93	2058	36	1.16	48	15	20	5	9	5.6	20	1	11.0	9.7	8.7	91.3	0.01	0.65	120	49000	36000	6.8
07/04/93	2047		1.12	26									8.3		100			40	96000	94500	18.0
08/04/93	2074		1.17	26									8.3		100			120	135000	148000	24.0
09/04/93	2074	20	1.17	26									8.3		100			160	135000	148000	24.0
10/04/93	2425		1.17	26									8.3		100			160	135000	148000	24.0
11/04/93	2074		1.17	26									8.3		100			160	135000	148000	24.0
12/04/93	2074		1.17	26									10.7		100				135000	148000	24.0
13/04/93	2074		1.17	26									10.4		100			160	135000	148000	24.0

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	105
BIOZAN	50.00	LB	12
CAUSTIC SODA	25.00	KG	32
CITRIC ACID	25.00	KG	6
CLABAN	19.00	LT	6
CONQOR 303	208.00	LT	9
HEC POLYMER	50.00	LB	6
LIME	25.00	KG	23
MICA (Coarse)	15.00	KG	4
MIL-BAR (Bulk)	100.00	LB	2128
MILBIO	5.00	GAL	19
MILGEL BULK	100.00	LB	967
MILGUAR	25.00	KG	10
MILGUAR-C	2.00	LB	8
MILPAC	25.00	KG	74
NOXYGEN	25.00	KG	102
POT CHLORIDE	1.00	MT	102
POT HYDROXIDE	25.00	KG	83
SODA ASH	25.00	KG	20
SODIUM BICARB	25.00	KG	50
UNICAL	25.00	KG	7
WO 30	25.00	KG	2
WO DEFOAM	20.00	LITRE	2
XCD POLYMER	25.00	KG	59

17.5" HOLE

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	6
LIME	25.00	KG	4
MILGEL BULK	100.00	LB	30
NOXYGEN	25.00	KG	5

12.25" HOLE

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	45
CAUSTIC SODA	25.00	KG	7
LIME	25.00	KG	2
MIL-BAR (Bulk)	100.00	LB	268
MILGEL BULK	100.00	LB	140
MILPAC	25.00	KG	55
NOXYGEN	25.00	KG	9
POT CHLORIDE	1.00	MT	18
POT HYDROXIDE	25.00	KG	14
XCD POLYMER	25.00	KG	22

BHP Petroleum

3.2 MATERIALS CONSUMPTION

MINERVA-1

8.5" HOLE

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	54
CITRIC ACID	25.00	KG	6
LIME	25.00	KG	13
MICA (Coarse)	15.00	KG	4
MIL-BAR (Bulk)	100.00	LB	969
MILBIO	5.00	GAL	10
MILPAC	25.00	KG	19
NOXYGEN	25.00	KG	46
POT CHLORIDE	1.00	MT	26
POT HYDROXIDE	25.00	KG	53
SODA ASH	25.00	KG	10
SODIUM BICARB	25.00	KG	35
WO 30	25.00	KG	2
WO DEFOAM	20.00	LITRE	1
XCD POLYMER	25.00	KG	34

6" HOLE

PRODUCT	UNIT SIZE		QUANTITY
ALCOMER 120	25.00	KG	6
BIOZAN	50.00	LB	12
CAUSTIC SODA	25.00	KG	10
CLABAN	19.00	LT	6
CONQOR 303	208.00	LT	9
HEC POLYMER	50.00	LB	6
LIME	25.00	KG	4
MIL-BAR (Bulk)	100.00	LB	341
MILBIO	5.00	GAL	9
NOXYGEN	25.00	KG	42
POT CHLORIDE	1.00	MT	58
POT HYDROXIDE	25.00	KG	16
SODA ASH	25.00	KG	10
SODIUM BICARB	25.00	KG	15
WO DEFOAM	20.00	LITRE	1
XCD POLYMER	25.00	KG	3

9.875" HOLE

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	4
MILGEL BULK	100.00	LB	334

SECTION 4

36" HOLE

PRODUCT	UNIT SIZE		QUANTITY
CAUSTIC SODA	25.00	KG	5
MIL-BAR (Bulk)	100.00	LB	550
MILGEL BULK	100.00	LB	463
MILGUAR	25.00	KG	10
MILGUAR-C	2.00	LB	8
UNICAL	25.00	KG	7

BHP Petroleum

FINAL DRILLING REPORT

3.0 MUD SUMMARY BY HOLE SECTION

MINERVA-1

Hole Size (in)	Interval (mRT)	Type	Density (S.G.)		Viscosity (sec/L)		PV (cp)		YP (lbs/100ft2)		Gels				KCl (%)	Fluid Loss (cc)
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.0	Max.0	Min. 10	Max. 10		
36"	105.0	SEAWATER+HI-VIS	1.03	1.03	100	100										
9.875"	560.0	SEAWATER+HI-VIS	1.03	1.03	100	100										
17.5"	560.0	SEAWATER+HI-VIS	1.03	1.03	100	100										
12.25"	1204.0	KCL PHPA	1.08	1.13	48	58	17	19	18	21	3	8	4	9	5.5	5.8
8.5"	2107.0	KCL PHPA	1.12	1.16	42	54	13	20	12	30	2	12	4	26	7	4.8
6"	2425.0	KCL PHPA	1.15	1.16	43	48	12	15	14	21	3	5	6	9	6.9 -8.1	5.6

BHP Petroleum

FINAL DRILLING REPORT

4.0 BIT RECORD

MINERVA-1

Bit No	Run No	Size / Make	Bit Type / Serial No.	Jets / TFA	Depth In / Out	Total Metres	Total Hours	ROP (m/hr)	WOB (Kips)	RPM	Pump gpm / psi	IADC Bit Grading / Comments
1RR	1	26	S3SJ	24 | 24 | 24 | - | - | -	82	23.0	1.00	23.0	5.0 / 10.0	20 / 75	1000 / 1050	2.2.NO.A.E.I.NO.TD
		SECURITY	595343	1.33	105							WITH 36" HO
2RR	2	9.875	S44GF	16 | 16 | 16 | - | - | -	105	455.0	6.75	67.4	5.0 / 10.0	120 / 120	780 / 1780	2.2.WT.A.E.I.NO.TD
		SECURITY	530370	0.59	560							PILOT HOLE
3RR1	3	26	S3SJ	24 | 24 | 24 | - | - | -	105	10.0	0.25	40.0	5.0 / 10.0	60 / 75	1000 / 1050	2.2.NO.A.E.I.NO.TD
		SECURITY	595343	1.33	115							
3	4	17.5	S44G	18 | 18 | 18 | - | - | -	115	445.0	7.50	59.3	5.0 / 10.0	120 / 120	1100 / 2650	1.1.NO.A.E.I.NO.TD
		SECURITY	500510	0.75	560							
4	5	12.25	ATM-11HG	18 | 16 | 13 | - | - | -	560	644.0	28.25	22.8	5.0 / 30.0	60 / 130	750 / 2900	2.3.FC.H.E.1.EC.TD
		HUGHES	M13BD	0.57	1204							
5	6	8.5	SS44G	32 | 32 | 32 | - | - | -	1204	5.0	4.50	1.1	25.0 / 25.0	80 / 80	480 / 2000	8.3.BC.N.1.I.BU.BHA
		SECURITY	572707	2.36	1209							
6	7	8.5	DS61H	12 | 12 | 12 | 11 | 10 | -	1209	612.0	30.75	19.9	5.0 / 10.0	130 / 180	500 / 2300	3.8.RO.N.D.I.FC.CP
		HYCALOG	13495	0.5	1821							
C1	8	8.5	CD93	- | - | - | - | - | -	1821	7.0	1.75	4.0	5.0 / 30.0	50 / 130	300 / 1300	4.4.BT.S.D.I.CT.PR
		DIAM BOART	7920485	0	1828							CORE: CONGLOMERATE
C2	9	8.5	CB303	- | - | - | - | - | -	1828	15.0	8.00	1.9	10.0 / 25.0	80 / 120	270 / 1500	0.8.RO.S.D.I.NO.PR
		DIAM BOART	7921166	0	1843							CORE: CONGLOMERATE
C3	10	8.5	CD502	- | - | - | - | - | -	1843	4.0	0.50	8.0	5.0 / 15.0	70 / 120	220 / 400	0.8.RO.S.E.I.CT.PR
		DIAM BOART	7910476	0	1847							CORE: CONGLOMERATE
7	11	8.5	ATM22	12 | 12 | 12 | - | - | -	1847	184.0	24.00	7.7	15.0 / 30.0	90 / 120	460 / 2500	4.7.WT.H.E.2.TR.PR
		HUGHES	K98BL	0.33	2031							
8	12	8.5	ATM 33	12 | 12 | 12 | - | - | -	2031	76.0	9.50	8.0	25.0 / 30.0	100 / 100	462 / 2550	1.1.HC.H.E.I.NO.FM
		HUGHES	F70BY	0.33	2107							
9	13	8.5	H77SG	32 | 32 | 32 | - | - | -	2107	0.0	0.00	0.0	5.0 / 5.0	70 / 70	650 / 900	0.0.NO.A.E.I.NO.CM
		SECURITY	560593	2.36	2107							CST CLEANOUT
9RR1	14	8.5	H77SG	32 | 32 | 32 | - | - | -	1180	0.0	0.00	0.0	/	/	/	0.0.NO.A.E.I.NO.TD
		SECURITY	560593	2.36	1180							CASING SCRAPER RUN
9RR2	15	8.5	H77SG	32 | 32 | 32 | - | - | -	2107	0.0	0.00	0.0	0.0 / 5.0	/	600 / 900	
		SECURITY	560593	2.36	2107							WIPER TRIP
5RR1	16	8.5	SS44G	12 | 14 | 32 | - | - | -	1092	0.0	8.75	0.0	2.0 / 3.0	50 / 60	450 / 850	8.3.BC.N.1.I.BU.BHA
		SECURITY	572707	1.05	1092							CLEANOUT LINER TOP
10	17	6	J3	12 | 12 | 12 | - | - | -	2036	9.0	1.25	7.2	2.0 / 10.0	30 / 45	380 / 2700	2.2.WT.A.1.I.NO.DP
		HUGHES	95ER	0.33	2045							CLEANOUT LINER

File: MIN1_BIT | Checked: | Date: 03-Sep-93

BHP Petroleum

FINAL DRILLING REPORT

4.0 BIT RECORD

MINERVA-1

10RR1	18	6	J3	12	12	12	-	-	-	2045	86.0	10.50	8.2	5.0 / 15.0	45 / 65	320 / 3800	8.8.WT.A.2.2.NO.TQ
		HUGHES	95ER	0.33						2131							CLEANOUT LINER, DRILL
11	19	6	DS46HG	11	11	11	-	-	-	2131	78.0	10.25	7.6	5.0 / 18.0	50 / 110	260 / 2700	8.8.LC.CT.D.I.BC.PR
		HYCALOG	613386	0.28						2209							
12	20	6	ATJ44C	12	12	12	-	-	-	2209	86.0	19.00	4.5	15.0 / 20.0	85 / 85	260 / 2700	4.5.WT.A.E.I.BT.HR
		HUGHES	T36PN	0.33						2295							
13	21	6	F3	11	11	11	-	-	-	2295	130.0	27.50	4.7	20.0 / 25.0	70 / 70	260 / 1850	4.4.WT.A.4.1.BT.TD
		SMITH	KV1638	0.28						2425							
13RR1	22	6	F3	11	11	11	-	-	-	2074	0.0	0.00	0.0	/	/	260 / 1500	4.4.WT.A.4.1.BT.CM
		SMITH	KV1638	0.28						2074							DISPLACE TO BRINE
13RR2	23	6	F3	11	11	11	-	-	-	2074	0.0	0.00	0.0	/	/	290 / 1700	4.4.WT.A.4.1.BT.CM
		SMITH	KV1638	0.28						2074							INCREASE BRINE TO 1.17 SG

4.1 BHA SUMMARY

MINERVA-1

BHA Name: 1. 36" BHA — Depth In: 0 m. — Depth Out: 116 m.

Purpose: 36" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	26.000	0.56
1	HOLE OPENER	36.000	1.89
1	FLOAT SUB	9.500	1.48
3	DRILL COLLAR 9.5"	9.500	27.49
1	CROSS OVER	8.000	1.08
3	DRILL COLLAR 8"	8.000	27.81
1	CROSS OVER	5.000	0.55
3	HEVI-WATE DRILL PIPE	5.000	26.81
		Total BHA Length :	**87.67**

BHA Name: 2. 9.625" PILOT BHA — Depth In: 105 m. — Depth Out: 560 m.

Purpose: SHALLOW GAS PILOT

Joints	BHA Item	O.D.	Length
1	BIT	9.875	0.27
1	FLOAT SUB	8.000	1.22
6	DRILL COLLAR 8"	8.000	55.22
1	CROSS OVER	5.000	0.55
13	HEVI-WATE DRILL PIPE	5.000	116.10
		Total BHA Length :	**173.36**

BHA Name: 3. 36" BHA — Depth In: 105 m. — Depth Out: 115 m.

Purpose: 36" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	26.000	0.56
1	HOLE OPENER	36.000	1.89
1	FLOAT SUB	9.500	1.48
3	DRILL COLLAR 9.5"	9.500	27.49
1	CROSS OVER	8.000	1.08
3	DRILL COLLAR 8"	8.000	27.81
1	CROSS OVER	5.000	0.55
3	HEVI-WATE DRILL PIPE	5.000	26.81
		Total BHA Length :	**87.67**

BHA Name: 4. 17.5" BHA — Depth In: 115 m. — Depth Out: 560 m.

Purpose: OPEN PILOT HOLE

Joints	BHA Item	O.D.	Length
1	BIT	17.500	0.44
1	FLOAT SUB	8.000	1.48
2	DRILL COLLAR 9.5"	9.500	18.21
1	STRING STABILIZER	9.500	1.80
1	DRILL COLLAR 9.5"	9.500	9.28
1	CROSS OVER	8.000	1.08
6	DRILL COLLAR 8"	8.000	55.22
1	CROSS OVER	8.000	0.55
9	HEVI-WATE DRILL PIPE	5.000	80.35
		Total BHA Length :	**168.41**

4.1 BHA SUMMARY

MINERVA-1

BHA Name: 5. 12.25" BHA   Depth In: 560 m.   Depth Out: 1204 m.

Purpose: DRILL 12.25" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	12.250	0.30
1	NEAR BIT ROLLER REAMER	12.250	2.45
1	SHOCK TOOL	7.938	3.44
1	STRING ROLLER REAMER	12.250	2.33
1	CROSS OVER	8.188	0.50
1	MWD TOOL	8.375	12.37
1	STRING STABILIZER	11.875	1.43
9	DRILL COLLAR 8"	8.000	82.69
1	PONY COLLAR	8.000	2.73
1	DRILLING JAR	7.938	5.76
2	DRILL COLLAR 8"	8.000	18.07
1	CROSS OVER	7.875	0.55
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**240.54**

BHA Name: 6. 8.5" DRILL OUT   Depth In: 1204 m.   Depth Out: 1209 m.

Purpose: DRILL 9.625" SHOE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.23
1	JUNK SUB	6.500	0.79
1	FLOAT SUB	6.375	0.90
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.40
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**275.87**

BHA Name: 7. 8.5" DRILL ASSY   Depth In: 1209 m.   Depth Out: 1821 m.

Purpose: DRILL STRAIGHT HOLE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.24
1	NEAR BIT ROLLER REAMER	8.500	1.84
1	CROSS OVER	6.375	0.35
1	MWD TOOL	6.500	12.70
1	STRING STABILIZER	8.500	1.86
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.375	3.07
1	DRILLING JAR	6.375	5.40
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**290.94**

4.1 BHA SUMMARY

MINERVA-1

BHA Name: 8. 8.5" CORE No.1 — Depth In: 1821 m. Depth Out: 1828 m.

Purpose: CORING

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.30
3	CORE BARREL	6.750	28.36
15	DRILL COLLAR 6.5"	6.375	138.92
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**275.50**

BHA Name: 9. 8.5" CORE No.2 — Depth In: 1828 m. Depth Out: 1842.5 m.

Purpose: CORE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.30
2	CORE BARREL	6.750	19.21
1	CROSS OVER	6.750	0.71
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.375	3.07
1	DRILLING JAR	6.500	5.20
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**293.97**

BHA Name: 10. 8.5" CORE No.3 — Depth In: 1842.5 m. Depth Out: 1847 m.

Purpose: CORE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.30
2	CORE BARREL	6.750	19.21
1	CROSS OVER	6.750	0.71
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.375	3.07
1	DRILLING JAR	6.500	5.20
2	DRILL COLLAR 6.5"	6.375	18.34
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**293.67**

BHA Name: 11. 8.5" DRILL ASSY — Depth In: 1847 m. Depth Out: 2031 m.

Purpose: DRILL 8.5" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.26
1	NEAR BIT ROLLER REAMER	8.500	1.84
1	CROSS OVER	6.375	0.35
1	MWD TOOL	6.500	12.70
1	STRING STABILIZER	8.500	1.86
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.500	3.07
2	DRILL COLLAR 6.5"	6.500	18.64

1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**285.56**

BHA Name: 12. 8.5" DRILL ASSY Depth In: 2031 m. Depth Out: 2107 m.

Purpose: DRILL 8.5" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.26
1	NEAR BIT ROLLER REAMER	8.500	1.84
1	CROSS OVER	6.375	0.35
1	MWD TOOL	6.500	12.70
1	STRING STABILIZER	8.500	1.86
15	DRILL COLLAR 6.5"	6.375	138.92
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.20
2	DRILL COLLAR 6.5"	6.500	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
11	HEVI-WATE DRILL PIPE	5.000	98.18
		Total BHA Length :	**290.76**

BHA Name: 13. 8.5in C/O BHA Depth In: 2107 m. Depth Out: 2107 m.

Purpose: CLEANOUT AFTER CST's

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.23
1	JUNK SUB	6.500	0.79
1	FLOAT SUB	6.375	0.90
15	DRILL COLLAR 6.5"	6.500	138.92
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.20
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
14	HEVI-WATE DRILL PIPE	5.000	124.98
		Total BHA Length :	**302.47**

BHA Name: 14. 8.5" + SCRAPER Depth In: 1180 m. Depth Out: 1180 m.

Purpose: SCRAPE 9.625" CSG

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.23
1	CASING SCRAPER	6.500	0.79
1	FLOAT SUB	6.375	0.90
15	DRILL COLLAR 6.5"	6.500	138.92
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.20
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
14	HEVI-WATE DRILL PIPE	5.000	124.98
		Total BHA Length :	**302.47**

4.1 BHA SUMMARY

MINERVA-1

BHA No./Description: 15. 8.5" WIPER TRIP Depth In: 2107 m. Depth Out: 2107 m.

Purpose: W/T AFTER CSG SCRAPE

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.23
1	JUNK SUB	6.500	0.79
1	FLOAT SUB	6.375	0.90
15	DRILL COLLAR 6.5"	6.500	138.92
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.20
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
14	HEVI-WATE DRILL PIPE	5.000	124.98
		Total BHA Length :	**302.47**

BHA No./Description: 16. 8.5" BHA Depth In: 1092 m. Depth Out: 1092 m.

Purpose: DRESS OFF LINER

Joints	BHA Item	O.D.	Length
1	BIT	8.500	0.23
1	JUNK SUB	6.500	0.79
1	FLOAT SUB	6.375	0.90
15	DRILL COLLAR 6.5"	6.375	83.78
1	PONY COLLAR	6.500	3.07
1	DRILLING JAR	6.375	5.20
2	DRILL COLLAR 6.5"	6.375	18.64
1	HEVI-WATE DRILL PIPE	5.000	9.05
1	DROP-IN DART SUB	5.000	0.69
14	HEVI-WATE DRILL PIPE	5.000	124.98
		Total BHA Length :	**247.33**

BHA No./Description: 17. 6" BHA Depth In: 1092 m. Depth Out: 2045 m.

Purpose: DRILL OUT LINER

Joints	BHA Item	O.D.	Length
1	BIT	6.000	0.19
1	JUNK SUB	6.000	0.91

Joints	BHA Item	O.D.	Length
1	FLOAT SUB	6.000	0.76
12	DRILL COLLAR 4.75"	4.750	110.22
1	DRILL PIPE	3.500	9.62
1	DROP-IN DART SUB	6.000	0.65
		Total BHA Length :	**122.35**

BHA Name: 18. 6" BHA | Depth In: 2045 m. | Depth Out: 2131 m.

Purpose: DRILL OUT LINER

Joints	BHA Item	O.D.	Length
1	BIT	6.000	0.19
1	JUNK SUB	6.000	0.91
1	NEAR BIT ROLLER REAMER	6.000	1.83
1	DRILL COLLAR 4.75"	4.750	9.24
1	STRING STABILIZER	6.000	0.96
1	DRILL COLLAR 4.75"	4.750	8.96
1	STRING STABILIZER	6.000	0.97
16	DRILL COLLAR 4.75"	4.750	148.64
		Total BHA Length :	**171.70**

BHA Name: 19. 6" BHA | Depth In: 2131 m. | Depth Out: 2209 m.

Purpose: DRILL 6" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	6.000	0.19
1	NEAR BIT ROLLER REAMER	6.000	1.83
1	DRILL COLLAR 4.75"	4.750	9.24
1	STRING STABILIZER	6.000	0.96
1	DRILL COLLAR 4.75"	4.750	8.96
1	STRING STABILIZER	6.000	0.97
16	DRILL COLLAR 4.75"	4.750	148.64
1	DRILL PIPE	3.500	9.62
1	DROP-IN DART SUB	4.750	0.65
		Total BHA Length :	**181.06**

BHA Name: 20. 6" BHA | Depth In: 2209 m. | Depth Out: 2295 m.

Purpose: DRILL 6" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	6.000	0.19
1	JUNK SUB	4.750	0.91
1	NEAR BIT ROLLER REAMER	6.000	1.83
1	PONY COLLAR	4.750	2.97
1	STRING ROLLER REAMER	6.000	1.73
1	P/P SUB	4.750	0.61
1	NON-MAG. DRILL COLLAR	4.750	9.29
1	STRING STABILIZER	6.000	0.97
17	DRILL COLLAR 4.75"	4.750	157.32
1	DRILLING JAR	4.750	3.86
3	DRILL COLLAR 4.75"	4.750	28.55
1	DRILL PIPE	3.500	9.62
1	DROP-IN DART SUB	3.500	0.65
		Total BHA Length :	**218.50**

4.1 BHA SUMMARY

MINERVA-1

BHA Name: 21. 6" BHA   Depth In: 2295 m.   Depth Out: 2425 m.

Purpose: DRILL 6" HOLE

Joints	BHA Item	O.D.	Length
1	BIT	6.000	0.21
1	NEAR BIT ROLLER REAMER	6.000	1.83
1	PONY COLLAR	4.750	2.97
1	STRING ROLLER REAMER	6.000	1.73
1	P/P SUB	4.750	0.61
1	NON-MAG. DRILL COLLAR	4.750	9.29
1	STRING STABILIZER	6.000	0.97
3	DRILL COLLAR 4.75"	4.750	27.25
1	DRILLING JAR	4.750	4.00
17	DRILL COLLAR 4.75"	4.750	158.62
1	DRILL PIPE	3.500	9.62
1	DROP-IN DART SUB	3.500	0.65
		Total BHA Length :	**217.75**

4.2 DEVIATION SURVEYS

MINERVA-1

Depth	Angle	Azimuth	Method	Missrun
560	1	0	Totco Punch	
572	0.6	265.8	MWD	
719	0.4	216.2	MWD	
863	0.6	202.9	MWD	
1038	1.5	214.1	MWD	
1180	2.5	201.8	MWD	
1265	3.7	203.6	MWD	
1296	4	211	MWD	
1385	4.8	200.8	MWD	
1385	4.8	200.8	MWD	
1473	5.4	206	MWD	
1559	6	216	MWD	
1671	6.8	196.6	MWD	
1733	7.4	192.7	MWD	
1791	7.6	187.8	MWD	
1791	7.6	187.8	MWD	
1880	7.6	185.7	MWD	
1908	7.6	183.2	MWD	
1937	7.6	182.1	MWD	
1966	8.2	177.6	MWD	
1995	8.6	175.5	MWD	
2022	8.8	173	MWD	
2050	8.9	170.5	MWD	
2081	9	165.3	MWD	
2209	0	0	Totco Punch	Yes

SECTION 5

BHP Petroleum

5.0 CASING REPORT - 30" CASING — MINERVA-1

Hole Size	:	36	in	Total Depth	:	115	m	Casing Flange / Wellhead			
Weight in Slips	:	39000	lbs	Time Landed	:	20:30	hrs	Type	:	W/H	
R.T. to Wellhead	:	79	m	Casing Shoe at	:	115	m	Manufacturer	:	VETCO	
R.T. to Mudline	:	82	m	Top of Casing	:	79	m	Model	:	SG5	
Water Depth	:	57	m	Casing Cut-Off	:		m	Size	:	18.75	in
Air Gap	:	25	m	Liner Overlap	:		m	Rating	:	10000	psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
HOUSING	VETCO	30	450	B	1	ST-2	1	12.4	79 - 91.4
CASING JOINT	VETCO	30	329	B	1	ST-2	1	11.78	91.4 - 103.18
CASING SHOE	VETCO	30	329		1	ST-2	1	12.05	103.18 - 115.23

Mud Type	:	SEAWATER+HI-VIS	Avg. Make Up Torque	:		ft lb	Avg. Drag	:	kips
Density	:	1.03 S.G.	Movement	:			Max. Drag	:	kips
Viscosity	:	100	RPM	:			Fluid Lost	:	No
PV / YP	:	0 / 90	Avg. Torque Rot.	:		ft lb	Percent Lost	:	%.
API W.L	:		Max. Torque Rot.	:		ft lb	Volume Lost	:	bbl
Filled Each	:	3 jts	Moved until Bumped	:	No				
Cementer	:	R. STRANGE							
Remarks	:	RAN 2JT. DP STINGER BELOW R/T.							

BHP Petroleum

5.0 CASING REPORT - 13.375" CASING — MINERVA-1

Hole Size	: 17.5 in	Total Depth	: 560 m	Casing Flange / Wellhead	
Weight in Slips	: 93000 lbs	Time Landed	: 21:30 hrs	Type	: W/H
R.T. to Wellhead	: 78 m	Casing Shoe at	: 550 m	Manufacturer	: VETCO
R.T. to Mudline	: 82 m	Top of Casing	: 78 m	Model	: SG5
Water Depth	: 57 m	Casing Cut-Off	: m	Size	: 18.75 in
Air Gap	: 25 m	Liner Overlap	: m	Rating	: 10000 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
HOUSING	VETCO	18.75	133	X-52	1	ALT-2	1	6.78	78 - 84.78
CASING CROSS OVER	VETCO	20	91.5	X-52	1	ALT2BTC	1	6.54	84.78 - 91.32
CASING JOINT	SUMITOMO	13.375	68	N-80	1	BTC	32	375.29	91.32 - 466.61
BAKER LOC	SUMITOMO	13.375	68	N-80	1	BTC	4	46.67	466.61 - 513.28
FLOAT	WEATHERFORD	13.375	68	N-80	1	BTC	1	12.12	513.28 - 525.4
BAKER LOC	SUMITOMO	13.375	68	N-80	1	BTC	1	11.63	525.4 - 537.03
CASING SHOE	WEATHERFORD	13.375	68	N-80	1	BTC	1	12.28	537.03 - 549.31

Mud Type	: SEAWATER+HI-VIS	Avg. Make Up Torque	: 9000 ft lb	Avg. Drag	: kips
Density	: 1.03 S.G.	Movement	:	Max. Drag	: kips
Viscosity	: 100	RPM	:	Fluid Lost	: No
PV / YP	: 0 / 90	Avg. Torque Rot.	: ft lb	Percent Lost	: %.
API W.L	:	Max. Torque Rot.	: ft lb	Volume Lost	: bbl
Filled Each	: 5 jts	Moved until Bumped	: No		
Cementer	: R. STRANGE				
Remarks	: FILLED AIR SPACE ABOVE PLUGS AT SURFACE. BUMPED PLUG.				

BHP Petroleum

5.0 CASING REPORT - 9.625" CASING — MINERVA-1

Hole Size	: 12.25 in	Total Depth	: 1204 m	Casing Flange / Wellhead	
Weight in Slips	: 145000 lbs	Time Landed	: 08:30 hrs	Type	: W/H
R.T. to Wellhead	: 78.3 m	Casing Shoe at	: 1189.37 m	Manufacturer	: VETCO
R.T. to Mudline	: 82 m	Top of Casing	: 79.4 m	Model	: SG5
Water Depth	: 57 m	Casing Cut-Off	: m	Size	: 18.75 in
Air Gap	: 25 m	Liner Overlap	: m	Rating	: 10000 psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
CASING SHOE	SUMITOMO	9.625	47	P110	1	NEW VAM	1	12.16	1189.4 - 1176.2
COLLAR JT.	SUMITOMO	9.625	47	P110	1	NEW VAM	1	12.16	1176.2 - 1165.1
CASING JOINT	SUMITOMO	9.625	47	N-80	1	NEW VAM	90	1080.8	1165 - 84.28
CASING PUP JOINT	SUMITOMO	9.625	53.5	P-110	1	NEW VAM	1	4.88	84.28 - 79.4

ACCESSORIES INFORMATION

Item	Type	Manufacturer	Number	Spacing	Interval
BAKER LOC			7		1189.37 - 1096.64
CENTRALIZER	BOWSPRING CENT.	WEATHERFORD	4		1189.37 - 1141.17

Mud Type	: KCL PHPA	Avg. Make Up Torque	: 16000 ft lb	Avg. Drag	: kips
Density	: 1.13 S.G.	Movement	: NONE	Max. Drag	: kips
Viscosity	: 51	RPM	:	Fluid Lost	: No
PV / YP	: 19 / 20	Avg. Torque Rot.	: ft lb	Percent Lost	: %.
API W.L	: 5	Max. Torque Rot.	: ft lb	Volume Lost	: bbl
Filled Each	: 5 jts	Moved until Bumped	: No		
Cementer	: DAVID WINN				

Remarks : 1.25hrs LOST REPAIRING WEATHERFORD'S HYDRAULIC HOSE
OTHERWISE JOB WENT SMOOTHLY.
AVERAGE RUN SPEED 13 JTS/HR.

BHP Petroleum

5.0 CASING REPORT - 7" CASING — MINERVA-1

Hole Size	:	8.5	in	Total Depth	:	2107	m	Casing Flange / Wellhead			
Weight in Slips	:	80000	lbs	Time Landed	:	07:30	hrs	Type	:	W/H	
R.T. to Wellhead	:	79	m	Casing Shoe at	:	2107	m	Manufacturer	:	VETCO	
R.T. to Mudline	:	82	m	Top of Casing	:	1088	m	Model	:	SG5	
Water Depth	:	57	m	Casing Cut-Off	:		m	Size	:	18.75	in
Air Gap	:	25	m	Liner Overlap	:	98	m	Rating	:	10000	psi

PIPE INFORMATION

Description	Manufacturer	Size	Weight	Grade	Cnd	Threads	Joints	Length	Interval
JM PACKER	BAKER	7	29	N-80	0		1	4	1084.8 - 1088.8
CPH PACKER	BAKER	7	29	N-80	0		1	3.17	1088.8 - 1092
LINER HANGER	BAKER	7	29	N-80	1	NEW VAM	1	2.05	1092 - 1094.1
LINER JOINT	SUMITOMO	7	29	N-80	1	NEW VAM	72	862.71	1094.1 - 1956.8
LINER PUP JOINT	SUMITOMO	7	29	N-80	1	NEW VAM	1	5	1956.8 - 1961.8
LINER JOINT	SUMITOMO	7	29	N-80	1	NEW VAM	9	109.2	1961.8 - 2071
LANDING COLLAR	BAKER	7	29	N-80	1	NEW VAM	1	12.01	2071 - 2083
BAKER LOC	SUMITOMO	7	29	N-80	1	NEW VAM	1	12.01	2083 - 2095
CASING SHOE	BAKER	7	29	N-80	1	NEW VAM	1	12.02	2095 - 2107

ACCESSORIES INFORMATION

Item	Type	Manufacturer	Number	Spacing	Interval
CENTRALIZER	BOWSPRING CENT.	WEATHERFORD	6	2	2107 - 1962.84
CENTRALIZER	BOWSPRING CENT.	WEATHERFORD	14	1	1962.84 - 1778.67
CENTRALIZER	TURBOLATOR RIGI	RAY OIL TOOLS	13	2	1778.67 - 1455.6
CENTRALIZER	TURBOLATOR RIGI	RAY OIL TOOLS	2	12	1455.6 - 1156.18

Mud Type	:	KCL PHPA	Avg. Make Up Torque	:	9400	ft lb	Avg. Drag	:	10	kips
Density	:	1.15 S.G.	Movement	:	RECIPROC		Max. Drag	:	15	kips
Viscosity	:	43	RPM	:			Fluid Lost	:	No	
PV / YP	:	13 / 12	Avg. Torque Rot.	:		ft lb	Percent Lost	:		%.
API W.L	:	4.8	Max. Torque Rot.	:		ft lb	Volume Lost	:		bbl
Filled Each	:	5 jts	Moved until Bumped	:	Yes					
Cementer	:	D. WINN								

Remarks : UNABLE TO SET LINER HANGER. CEMENTED ON BOTTOM. RECIPROCATED WHILE PUMPING CEMENT. NO INDICATION OF TOP PLUG RELEASE. PLUG NOT BUMPED.

File: MIN1_CSG		Checked: JM	Date: 06-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 30" CASING — MINERVA-1

Job Type	:	30" CASING	Started	:	22:15 Hrs, 09/03/93	Completed	:	23:00 Hrs, 09/03/93
Cementer	:	ROB STRANGE	CBL Log	:	No	Returns	:	Yes
			CET Run	:	No	Total No. of Stages	:	01
Cemented Interval	:	82 - 115 m.	BHT Log	:	No	Time WOC	:	0hrs, 0

HOLE DESCRIPTION

FROM	TO	SIZE	% OVER	DISP. EFF.
82	115	36	50	

LEAK OFF INFORMATION

Casing Test	:	psi	For	:	min.
Drilled	:	m	of New	:	in. hole
Leak Off Test	:	psi	with	:	SG mud
at a depth of	:	m	Equivalent Fluid Density	:	SG
			Pressure at Test Depth	:	psi

STAGE INFORMATION

Stage Number : 001 of 01 Stage Type : PRIMARY Planned Interval : 82 to 115 m.

Drill String Depth : 112 m. Tool Depth : m. Drill String Pressure Initial : psi. Final : psi.
Annular Pressure Initial : psi. Final : psi.

Started Mixing	: 22:15 Hrs.	Completed	:	23:00 Hrs.	Mixing Rate	:	260 gpm.	Mixing Pressure	:	400 psi.
Break Pressure	: psi.	Time Circ. at Btm.	:	.5 Hrs.	Circulat. Rate	:	280 gpm.	CirculatingPressure	:	150 psi.
Displaced with	: 15 bblSEAWATER	Fluid Wt.	:	1.03 S.G.	Top Plug	:	No	Bottom Plug	:	No
Plug Down	: 23:00 Hrs, 09/03/93	Bumped	:	No	Bled Off to	:	psi.			
Disp Rate Initial	: 295	Final	:	295	Min	:		Max	:	gpm
Disp Press Initial	: 200	Final	:	230	Min	:		Max	:	psi.

Lost Cir. : No % Lost : 0 Volume : 0 bbl. Foam Cmt : No N2 : 0 Start : 0 End : 0 scfn/bt Tot : 0 scf

Fluid Vol. Total : 87 Fluid Vol. Returned : Slurry Vol. Total : 72 Slurry Vol. Returned :

First Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Second Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Time stage Started : Time stage Completed : Hours Before Open : Circ. Btwn Stages :

Time Broke Cir. : Time Pipe Move Start : Time Pipe Move End : Time Release Plug :

COMMENTS

ADDED 2% BWOC CALCIUM CHLORIDE.

File: MIN1_CSG		Checked:	Date: 03-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 30" CASING

MINERVA-1

Stage Number	001
Fluid Number	001
Fluid Description	TAIL SLURRY
Fluid Type	LOW WATER LOSS
Fluid Class	CLASS G
Amount (sacks)	351
Volume (bbl)	72
Yield (ft3/sx)	1.15
Excess (%)	50
Caliper / Open Hole	O
From / To (m)	82 / 115
Designed Top (m)	82
Density	1.9
Thickening Time (hrs)	3
Water Req'd (bbl)	42
Water Used (gal/sack)	5
Water Source	SEAWATER
Total Vol. Mixed (bbl)	72
Volume Pumped (bbl)	72
Volume in Well (bbl)	72
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	
Outside Temp (°C)	

Additives	of
	of 2 % CALCIUM CHLORIDE
	of

File: MIN1_SLR		Checked: JM	Date: 03-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 13.375" CASING — MINERVA-1

Job Type	13.375" CASING	Started	22:20 Hrs, 10/03/93	Completed	00:00 Hrs, 10/03/93
Cementer	ROB STRANGE	CBL Log	No	Returns	Yes
		CET Run	No	Total No. of Stages	01
Cemented Interval	82 - 560 m.	BHT Log	No	Time WOC	0hrs, 0

HOLE DESCRIPTION

FROM	TO	SIZE	% OVER	DISP. EFF.
82	560	13.38	50	

LEAK OFF INFORMATION

Casing Test	1500 psi.	For	5 min.
Drilled	3 m.	of New	12.25 in. hole
Leak Off Test	825 psi.	with	1.08 SG mud
at a depth of	550 m.	Equivalent Fluid Density	2.13 SG
		Pressure at Test Depth	1662 psi.

STAGE INFORMATION

Stage Number : 001 of 01 Stage Type : PRIMARY Planned Interval : 82 to 550 m.

Drill String Depth : 92 m. Tool Depth : m. Drill String Pressure Initial : psi. Final : psi.
Annular Pressure Initial : psi. Final : psi.

Started Mixing : 22:20 Hrs. Completed : 23:25 Hrs. Mixing Rate : 330 gpm. Mixing Pressure : 450 psi.
Break Pressure : psi. Time Circ. at Btm. : .5 Hrs. Circulat. Rate : 430 gpm. CirculatingPressure : 350 psi.
Displaced with : 220.5 bblSEAWATER Fluid Wt. : 1.03 S.G. Top Plug : Yes Bottom Plug : Yes
Plug Down : 00:00 Hrs, 10/03/93 Bumped : Yes Bled Off to : psi.
Disp Rate Initial : 400 Final : Min : Max : gpm
Disp Press Initial : 340 Final : Min : Max : psi.

Lost Cir. : No % Lost : 0 Volume : 0 bbl. Foam Cmt : No N2 : 0 Start : 0 End : 0 scfn/bt Tot : 0 scf
Fluid Vol. Total : 570 Fluid Vol. Returned : Slurry Vol. Total : 350 Slurry Vol. Returned :
First Preflush Used : 245 bbls of LEAD SLURRY Fluid Wt. : 1.5 S.G. Additives : 0.45 gps ECONOLIT
Second Preflush Used : bbls of Fluid Wt. : S.G. Additives :
Time stage Started : Time stage Completed : Hours Before Open : Circ. Btwn Stages :
Time Broke Cir. : Time Pipe Move Start : Time Pipe Move End : Time Release Plug :

COMMENTS

50% EXCESS ON TAIL SLURRY VOLUME

File: MIN1_CSG		Checked:	Date: 03-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 13.375" CASING — MINERVA-1

Stage Number	001
Fluid Number	001
Fluid Description	TAIL SLURRY
Fluid Type	LOW WATER LOSS
Fluid Class	CLASS G
Amount (sacks)	503
Volume (bbl)	103
Yield (ft3/sx)	1.15
Excess (%)	50
Caliper / Open Hole	O
From / To (m)	400 / 550
Designed Top (m)	400
Density	1.9
Thickening Time (hrs)	3
Water Req'd (bbl)	60
Water Used (gal/sack)	5
Water Source	SEAWATER
Total Vol. Mixed (bbl)	103
Volume Pumped (bbl)	103
Volume in Well (bbl)	103
Comp. Strength (lbs)	0
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	
Outside Temp (°C)	
Additives	of

File: MIN1_SLR		Checked: JM	Date: 03-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 9.625" CASING — MINERVA-1

Job Type	9.625" CASING	Started	09:32 Hrs, 15/03/93	Completed	11:09 Hrs, 15/03/93
Cementer	DAVID WINN	CBL Log	No	Returns	Yes
		CET Run	No	Total No. of Stages	01
Cemented Interval	900 - 1189.7 m.	BHT Log	51°C	Time WOC	0hrs, 0

HOLE DESCRIPTION

FROM	TO	SIZE	% OVER	DISP. EFF.
550	560	17.5		
560	1204	12.25		

LEAK OFF INFORMATION

Casing Test	3500 psi.	For	15 min.
Drilled	3 m.	of New	8.5 in. hole
Leak Off Test	1380 psi.	with	1.13 SG mud
at a depth of	1189 m.	Equivalent Fluid Density	1.94 SG
		Pressure at Test Depth	3272 psi.

STAGE INFORMATION

Stage Number : 001 of 01 Stage Type : PRIMARY Planned Interval : 900 to 1187 m.

Drill String Depth : m. Tool Depth : m. Drill String Pressure Initial : psi. Final : psi.
Annular Pressure Initial : psi. Final : psi.

Started Mixing	09:32 Hrs.	Completed	11:09 Hrs.	Mixing Rate	294 gpm.	Mixing Pressure	350 psi.
Break Pressure	psi.	Time Circ. at Btm.	.75 Hrs.	Circulat. Rate	375 gpm.	CirculatingPressure	2000 psi.
Displaced with	270 bblMUD	Fluid Wt.	1.13 S.G.	Top Plug	Yes	Bottom Plug	Yes
Plug Down	11:09 Hrs, 15/03/93	Bumped	Yes	Bled Off to	0 psi.		
Disp Rate Initial	336	Final	252	Min	252	Max	336 gpm
Disp Press Initial	150	Final	550	Min	150	Max	550 psi.

Lost Cir. : No % Lost : 0 Volume : 0 bbl. Foam Cmt : No N2 : 0 Start : 0 End : 0 scfn/bt Tot : 0 scf

Fluid Vol. Total : 360 Fluid Vol. Returned : 360 Slurry Vol. Total : 70 Slurry Vol. Returned : 0

First Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Second Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Time stage Started : Time stage Completed : Hours Before Open : Circ. Btwn Stages :

Time Broke Cir. : Time Pipe Move Start : Time Pipe Move End : Time Release Plug :

File: MIN1_CSG		Checked: DM	Date: 03-Sep-93

BHP Petroleum

5.1 CEMENTING REPORT - 9.625" CASING

MINERVA-1

Stage Number	001
Fluid Number	001
Fluid Description	TAIL SLURRY
Fluid Type	NEAT
Fluid Class	CLASS G
Amount (sacks)	311
Volume (bbl)	70
Yield (ft3/sx)	1.15
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	900 / 1189.7
Designed Top (m)	900
Density	1.9
Thickening Time (hrs)	3
Water Req'd (bbl)	37
Water Used (gal/sack)	5
Water Source	FRESH
Total Vol. Mixed (bbl)	70
Volume Pumped (bbl)	70
Volume in Well (bbl)	70
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	58
BHCT (°C)	38
Outside Temp (°C)	25

Additives | of

BHP Petroleum

5.1 CEMENTING REPORT - 7" LINER — MINERVA-1

Job Type	7" LINER	Started	19:30 Hrs, 27/03/93	Completed	22:00 Hrs, 27/03/93
Cementer	D. WINN	CBL Log	Yes	Returns	Yes
Cemented Interval	1092 - 2108 m.	CET Run	Yes	Total No. of Stages	01
		BHT Log	93°C	Time WOC	0hrs, m

HOLE DESCRIPTION

FROM	TO	SIZE	% OVER	DISP. EFF.
1189	2108	8.5	20	95

LEAK OFF INFORMATION

Casing Test	3500 psi.	For	15 min.
Drilled	3 m.	of New	6 in. hole
Leak Off Test	2100 psi.	with	1.15 SG mud
at a depth of	2108 m.	Equivalent Fluid Density	1.85 SG
		Pressure at Test Depth	5514 psi.

STAGE INFORMATION

Stage Number : 001 of 01 Stage Type : 7" LINER Planned Interval : 1092 to 2108 m.

Drill String Depth : m. Tool Depth : m. Drill String Pressure Initial : psi. Final : psi.
Annular Pressure Initial : psi. Final : psi.

Started Mixing	19:51 Hrs.	Completed	20:43 Hrs.	Mixing Rate	160 gpm.	Mixing Pressure	100 psi.
Break Pressure	psi.	Time Circ. at Btm.	2 Hrs.	Circulat. Rate	gpm.	CirculatingPressure	psi.
Displaced with	180 bblMUD	Fluid Wt.	1.15 S.G.	Top Plug	Yes	Bottom Plug	Yes
Plug Down	22:00 Hrs, 27/03/93	Bumped	No	Bled Off to	psi.		
Disp Rate Initial	85	Final	85	Min	85	Max	85 gpm
Disp Press Initial	100	Final	100	Min	100	Max	100 psi.

Lost Cir. : No % Lost : 0 Volume : 0 bbl. Foam Cmt : No N2 : 0 Start : 0 End : 0 scfn/bt Tot : 0 scf

Fluid Vol. Total : 271 Fluid Vol. Returned : Slurry Vol. Total : 91 Slurry Vol. Returned :

First Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Second Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Time stage Started : Time stage Completed : Hours Before Open : Circ. Btwn Stages :

Time Broke Cir. : Time Pipe Move Start : Time Pipe Move End : Time Release Plug :

COMMENTS

WORKED PIPE WHILE DISPLACING. NO INDICATION OF TOP PLUG RELEASE, PLUG DID NOT BUMP. FLOATS HELD. LOG INDICATED GAS CONTAMINATION ABOVE 1600m, REASONABLE CEMENT QUALITY ACROSS ZONE OF INTEREST. CPH PACKER NOT SET. JM PACKER RUN AND SET FOLLOWING CLEANOUT- PRESSURE TESTED TO 3500psi.

Stage Number	001
Fluid Number	001
Fluid Description	TAIL SLURRY
Fluid Type	LOW WATER LOSS
Fluid Class	CLASS G
Amount (sacks)	132
Volume (bbl)	27
Yield (ft3/sx)	1.15
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	1700 / 2108
Designed Top (m)	1700
Density	1.9
Thickening Time (hrs)	20
Water Req'd (bbl)	15
Water Used (gal/sack)	5
Water Source	FRESH WATER
Total Vol. Mixed (bbl)	27
Volume Pumped (bbl)	27
Volume in Well (bbl)	27
Comp. Strength (lbs)	4937
Time (hrs)	12
Temp (°C)	93
Comp. Strength (lbs)	0
Time (hrs)	
Temp (°C)	
BHST (°C)	93
BHCT (°C)	57
Outside Temp (°C)	15
Additives	22 gal of 18 GAL/10 HALAD 322L

Stage Number	001
Fluid Number	002
Fluid Description	LEAD SLURRY
Fluid Type	GAS BLOCK CEMENT
Fluid Class	CLASS G
Amount (sacks)	173
Volume (bbl)	64
Yield (ft3/sx)	2.08
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	1092 / 1700
Designed Top (m)	1092
Density	1.58
Thickening Time (hrs)	20
Water Req'd (bbl)	50
Water Used (gal/sack)	8.5
Water Source	FRESH WATER
Total Vol. Mixed (bbl)	64
Volume Pumped (bbl)	64
Volume in Well (bbl)	64
Comp. Strength (lbs)	1821
Time (hrs)	15.3
Temp (°C)	93
Comp. Strength (lbs)	0
Time (hrs)	
Temp (°C)	
BHST (°C)	93
BHCT (°C)	57
Outside Temp (°C)	15
Additives	17 gal of 3.4 GAL/10 DEFOAMER
	75 gal of 15 GAL/10 HALAD 322L
	610 gal of 122 GAL/10 MICROBLOCK

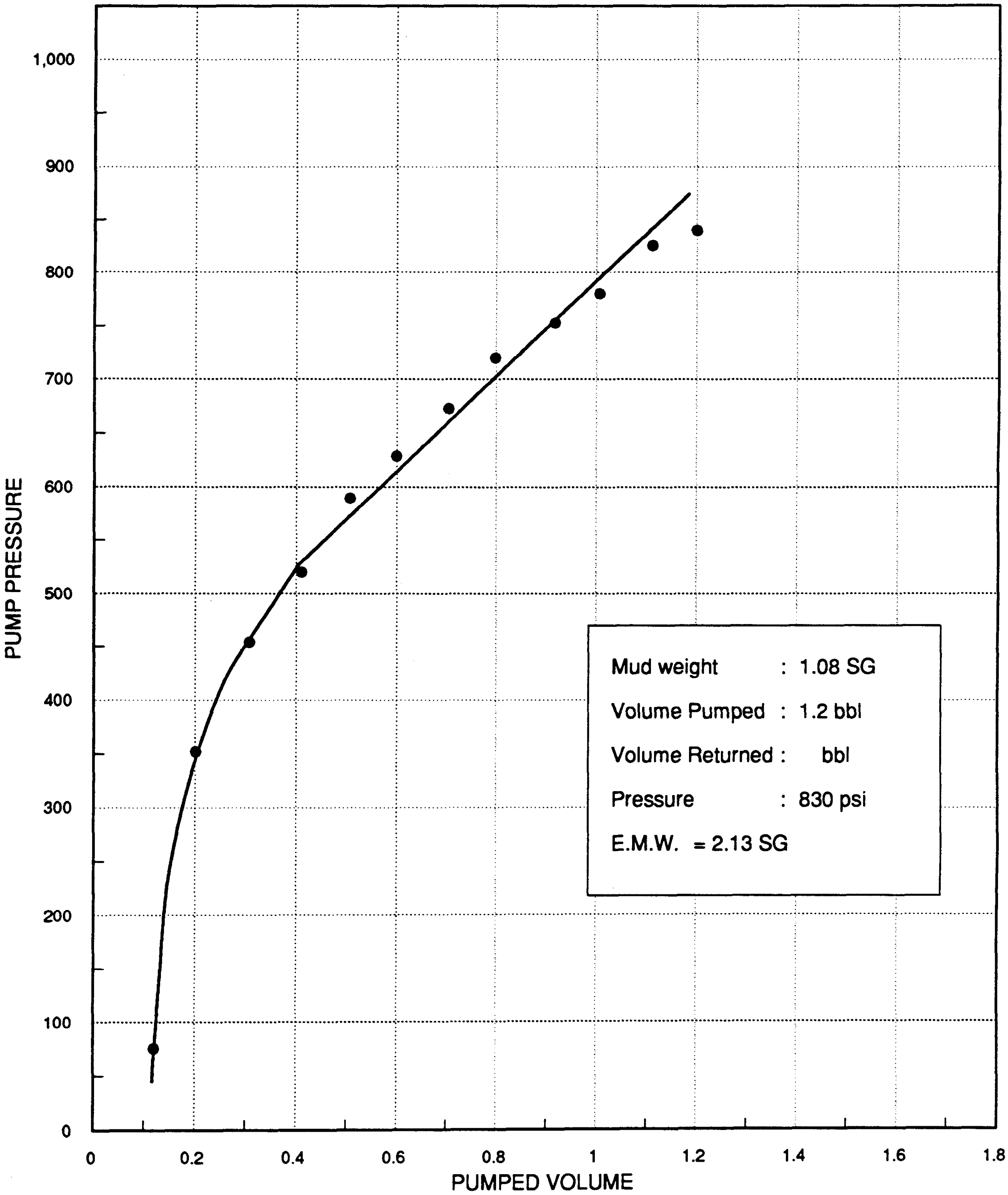
5.2.1 LEAK OFF TEST DIAGRAM

MINERVA-1

TVD : 563m

Casing Diameter : 13.375" 68 lb/ft

Shoe TVD : 550m

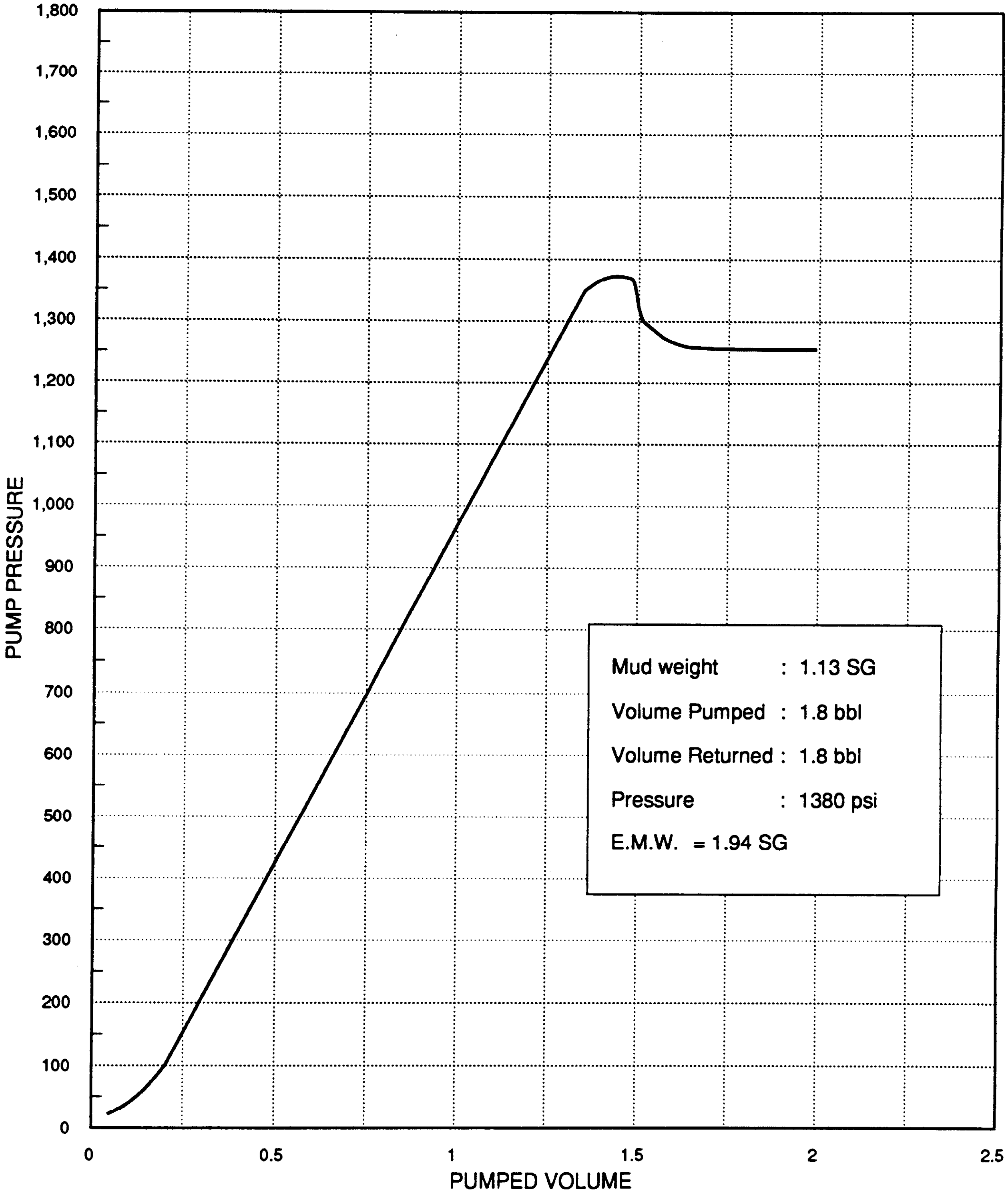


File: BM VND MIN_LOT2		Checked:	Date: 1-SEP-93

5.2.2 LEAK OFF TEST DIAGRAM

MINERVA-1

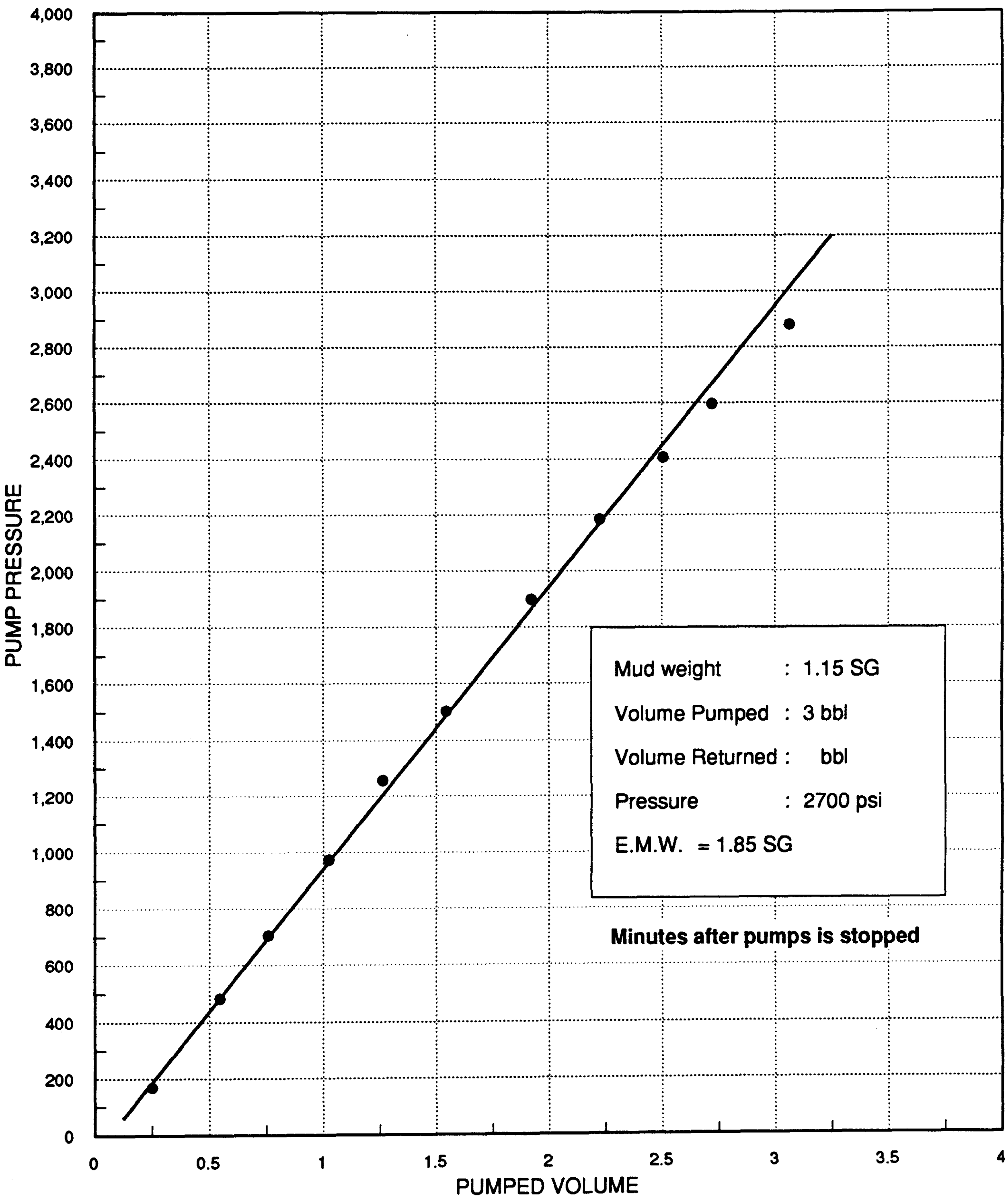
TVD	: 1207m
Casing Diameter	: 9.625" 47 lb/ft
Shoe TVD	: 1189m



5.2.3 LEAK OFF TEST DIAGRAM

MINERVA-1

TVD	: 2106m
Casing Diameter	: 7" 29 lb/ft
Shoe TVD	: 2103m



File: BM VND MIN_LOT2		Checked:	Date: 1-SEP-93

SECTION 6

BHP Petroleum

6.0 ABANDONMENT/SUSPENSION CEMENTING REPORT — MINERVA-1

Job Type	:	SUSPENSION PLUG	Started : 01:45 Hrs, 13/04/93	Completed	:	02:15 Hrs, 13/04/93	
Cementer	:	ROB STRANGE	CBL Log : No	Returns	:	Yes	
Cemented			CET Run : No	Total No. of Stages	:	01	
Interval	:	1650 - 1800 m.	BHT Log : No	Time WOC	:	7hrs, 4	

STAGE INFORMATION

Stage Number : 001 of 01   Stage Type : SUSPENSION   Planned Interval : 1650 to 1800 m.

Drill String Depth : 1800 m.   Tool Depth : m.   Drill String Pressure Initial : psi.   Final : psi.
Annular Pressure Initial : psi.   Final : psi.

Started Mixing : 01:45 Hrs.	Completed : 02:15 Hrs.	Mixing Rate : 200 gpm.	Mixing Pressure : 600 psi.
Break Pressure : psi.	Time Circ. at Btm. : 1.25 Hrs.	Circulat. Rate : gpm.	CirculatingPressure : psi.
Displaced with : 32 bblBRINE	Fluid Wt. : 1.17 S.G.	Top Plug : No	Bottom Plug : No
Plug Down : : Hrs,	Bumped : No	Bled Off to : psi.	
Disp Rate Initial : 300	Final : 250	Min : 250	Max : 300 gpm
Disp Press Initial : 250	Final : 500	Min : 250	Max : 900 psi.

Lost Cir. : No   % Lost : 0   Volume : 0 bbl.   Foam Cmt : No   N2 : 0   Start : 0   End : 0 scfn/bt   Tot : 0 scf

Fluid Vol. Total : 51   Fluid Vol. Returned : 51   Slurry Vol. Total : 19   Slurry Vol. Returned :

First Preflush Used : bbls of   Fluid Wt. : S.G.   Additives :

Second Preflush Used : bbls of   Fluid Wt. : S.G.   Additives :

Time stage Started :   Time stage Completed :   Hours Before Open :   Circ. Btwn Stages :

Time Broke Cir. :   Time Pipe Move Start :   Time Pipe Move End :   Time Release Plug :

COMMENTS

Balanced plug set on top of test packer at 1800m. Tagged top of cement plug at 1670m. Set 7" bridge plug at 1659m.

File: MIN1_CSG		Checked: ØM	Date: 08-Sep-93

BHP Petroleum

6.0 ABANDONMENT/SUSPENSION CEMENTING REPORT — MINERVA-1

Job Type	: SUSPENSION PLUG	Started	: 19:30 Hrs, 14/04/93	Completed	: 20:00 Hrs, 14/04/93
Cementer	: ROB STRANGE	CBL Log	: No	Returns	: Yes
		CET Run	: No	Total No. of Stages	: 01
Cemented Interval	: 1018 - 1068 m.	BHT Log	:	Time WOC	: hrs, mi

STAGE INFORMATION

Stage Number	: 001 of 01	Stage Type :	SUSPENSION	Planned Interval	: 1018 to 1068 m.

Drill String Depth	: 1068 m.	Tool Depth	: m.	Drill String Pressure Initial	: psi.	Final	: psi.
				Annular Pressure Initial	: psi.	Final	: psi.

Started Mixing	: 19:45 Hrs.	Completed	: 20:00 Hrs.	Mixing Rate	: 210 gpm.	Mixing Pressure	: 500 psi.
Break Pressure	: psi.	Time Circ. at Btm.	: 1.25 Hrs.	Circulat. Rate	: gpm.	CirculatingPressure	: psi.
Displaced with	: 32 bblBRINE	Fluid Wt.	: 1.17 S.G.	Top Plug	: No	Bottom Plug	: No
Plug Down	: : Hrs,	Bumped	: No	Bled Off to	: psi.		
Disp Rate Initial	: 120	Final	: 160	Min	: 160	Max	: 300 gpm
Disp Press Initial	: 150	Final	: 250	Min	: 150	Max	: 1000 psi.

Lost Cir. : No — % Lost : 0 — Volume : 0 bbl. — Foam Cmt : No — N2 : 0 — Start : 0 — End : 0 scfn/bt — Tot : 0 scf

Fluid Vol. Total	: 44	Fluid Vol. Returned	:	Slurry Vol. Total : 12	Slurry Vol. Returned :
First Preflush Used	: bbls of	Fluid Wt.	: S.G.	Additives :	
Second Preflush Used	: bbls of	Fluid Wt.	: S.G.	Additives :	
Time stage Started	:	Time stage Completed	:	Hours Before Open :	Circ. Btwn Stages :
Time Broke Cir.	:	Time Pipe Move Start	:	Time Pipe Move End :	Time Release Plug :

COMMENTS

Balanced cement plug set on top of 9.625" bridge plug at 1075m.

File: MIN1_CSG		Checked: [signature]	Date: 08-Sep-93

BHP Petroleum

6.0 ABANDONMENT/SUSPENSION CEMENTING REPORT — MINERVA-1

Job Type :	SUSPENSION PLUG	Started :	09:00 Hrs, 15/04/93	Completed :	09:05 Hrs, 15/04/93
Cementer :	ROB STRANGE	CBL Log :	No	Returns :	No
		CET Run :	No	Total No. of Stages :	01
Cemented Interval :	110 - 160 m.	BHT Log :		Time WOC :	hrs, mi

STAGE INFORMATION

Stage Number : 001 of 01 Stage Type : SUSPENSION Planned Interval : 110 to 160 m.

Drill String Depth :	160 m.	Tool Depth :	m.	Drill String Pressure Initial :	psi.	Final :	psi.
				Annular Pressure Initial :	psi.	Final :	psi.

Started Mixing :	09:00 Hrs.	Completed :	09:05 Hrs.	Mixing Rate :	170 gpm.	Mixing Pressure :	200 psi.
Break Pressure :	psi.	Time Circ. at Btm. :	Hrs.	Circulat. Rate :	gpm.	CirculatingPressure :	psi.
Displaced with :	6 bblSEAWATER	Fluid Wt. :	1.03 S.G.	Top Plug :	No	Bottom Plug :	No
Plug Down :	: Hrs,	Bumped :	No	Bled Off to :	psi.		
Disp Rate Initial :	60	Final :	40	Min :	40	Max :	210 gpm
Disp Press Initial :	150	Final :	100	Min :	100	Max :	200 psi.

Lost Cir. : No % Lost : 0 Volume : 0 bbl. Foam Cmt : No N2 : 0 Start : 0 End : 0 scfn/bt Tot : 0 scf

Fluid Vol. Total : 18 Fluid Vol. Returned : Slurry Vol. Total : 12 Slurry Vol. Returned :

First Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Second Preflush Used : bbls of Fluid Wt. : S.G. Additives :

Time stage Started : Time stage Completed : Hours Before Open : Circ. Btwn Stages :

Time Broke Cir. : Time Pipe Move Start : Time Pipe Move End : Time Release Plug :

File: MIN1_CSG		Checked:	Date: 08-Sep-93

BHP Petroleum

6.0 WELL SUSPENSION/ABANDONMENT CEMENTING REPORT MINERVA-1

Stage Number	001
Fluid Number	001
Fluid Description	SUSPENSION PLUG
Fluid Type	RETARDED
Fluid Class	CLASS G
Amount (sacks)	89
Volume (bbl)	19
Yield (ft3/sx)	1.18
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	1650 / 1800
Designed Top (m)	1650
Density	1.9
Thickening Time (hrs)	2.3
Water Req'd (bbl)	10.5
Water Used (gal/sack)	5
Water Source	FRESH
Total Vol. Mixed (bbl)	19
Volume Pumped (bbl)	19
Volume in Well (bbl)	19
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	
Outside Temp (°C)	15

Additives: 5 gal of 5 GAL/10 SCR-100L

Stage Number	001
Fluid Number	001
Fluid Description	SUSPENSION PLUG
Fluid Type	NEAT
Fluid Class	CLASS G
Amount (sacks)	60
Volume (bbl)	12
Yield (ft3/sx)	1.15
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	1018 / 1068
Designed Top (m)	1018
Density	1.9
Thickening Time (hrs)	
Water Req'd (bbl)	7
Water Used (gal/sack)	5
Water Source	SEAWATER
Total Vol. Mixed (bbl)	12
Volume Pumped (bbl)	12
Volume in Well (bbl)	12
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	
Outside Temp (°C)	15

Additives: of

BHP Petroleum

6.0 WELL SUSPENSION/ABANDONMENT CEMENTING REPORT MINERVA-1

Stage Number	001
Fluid Number	001
Fluid Description	SUSPENSION PLUG
Fluid Type	NEAT
Fluid Class	CLASS G
Amount (sacks)	60
Volume (bbl)	12
Yield (ft3/sx)	1.15
Excess (%)	20
Caliper / Open Hole	C
From / To (m)	110 / 160
Designed Top (m)	110
Density	1.9
Thickening Time (hrs)	
Water Req'd (bbl)	7
Water Used (gal/sack)	5
Water Source	SEAWATER
Total Vol. Mixed (bbl)	12
Volume Pumped (bbl)	12
Volume in Well (bbl)	12
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
Comp. Strength (lbs)	
Time (hrs)	
Temp (°C)	
BHST (°C)	
BHCT (°C)	
Outside Temp (°C)	15

Additives	
	of
	of

File: MIN1_SLR		Checked: JM	Date: 07-Sep-93

SECTION 7

BHP Petroleum

FINAL DRILLING REPORT

7.0 WEATHER DATA

MINERVA-1

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)
06/03/93	1	12	150	22	15	FINE	1.8	9	240	0.2	3	150	1	2	1.4	1019
07/03/93	2	16	150	22	15	FINE	1.8	9	240	0.3	3	150	1	1.5	1	1013
08/03/93	3	22	140	22	15	FINE	1.8	11	240	1.2	3	140	1	0.3	1	1018
09/03/93	4	20	160	21	15	FINE	2	9	240	0.5	3	160	1	0.4	0.5	1018
10/03/93	5	15	200	22	15	FINE	2.5	10	200	0.5	3	200	1	0.5	0.3	1020
11/03/93	6	15	110	18	15	FINE	2.5	10	200	0.5	3	200	1	0.8	0.3	1026
12/03/93	7	22	140	24	15	FINE	2	9	220	0.4	3	140	1.3	0.8	0.3	1023
13/03/93	8	16	150	32	15	FINE	1.8	9	220	0.4	2	150	1	0.4	0.3	1023
14/03/93	9	22	130	21	15	FINE	1.2	9	220	0.3	2	130	0.7	0.4	0.2	1014
15/03/93	10	16	200	26	15	FINE	1.2	9	230	0.3	3	200	0.7	0.4	0.2	1018
16/03/93	11			20	15	FINE							0.8	0.4	0.3	1023
17/03/93	12	24	130	20	15	FINE	1.6	10	240	0.7	3	130	1.2	0.6	0.4	1022
18/03/93	13	10	260	23	15	FINE	1.7	10	240	0.3	3	260	0.8	0.6	0.4	1021
19/03/93	14	16	100	24	15	RAIN	1.7	11	240	0.3	3	100	0.8	0.4	0.4	1021
20/03/93	15	21	135	26	15	FINE	1.4	10	240	0.8	3	135	0.8	0.4	0.3	1020
21/03/93	16	30	30	24	20	FINE	1.5	10	250	0.6	3	30	0.8	0.7	0.9	1020
22/03/93	17	30	320	24	15	FINE	1.5	10	230	0.8	3	320	1	0.6	0.6	1012
23/03/93	18	14	60	17	12	FINE/CLEAR	0.7	10	230	0.5	3	260	0.6	0.5	0.3	1020
24/03/93	19	8	130	18	12	FINE/CLEAR	1	10	230	0.5	3	130	1	0.4	0.4	1019
25/03/93	20	8	90	16	12	FINE/CLEAR	1	10	230	0.3	3	290	0.9	0.4	0.5	1012
26/03/93	21	15	290	19	6	FINE/CLEAR	1	10	210	0.5	3	290	0.5	0.2	0.2	1008
27/03/93	22	20	310	16	12	FINE/CLEAR	1.3	10	210	0.6	3	310	0.5	0.4	0.3	1010
28/03/93	23	25	230	16	12	FINE	1.5	10	210	1.2	3	230	1.5	1	0.6	1015
29/03/93	24	20	200	26	15	FINE	2.5	10	210	1.2	3	200	1.7	0.7	0.5	1022
30/03/93	25	15	50	19	15	FINE	1.7	10	210	0.3	3	50	0.5	0.4	0.3	1017
31/03/93	26	6	310	24	15	FINE	1.5	10	210	0.3	3	310	0.4	0.3	0.2	1013
01/04/93	27	16	200	20	15	FINE	2	10	230	1	3	200	1	0.3	0.2	1020
02/04/93	28	8	50	18	15	FINE	2	10	230	0.3	3	50	0.8	0.3	0.3	1023
03/04/93	29	18	60	31	15	FINE	1.5	10	220	0.3	3	60	1	0.3	0.2	1019
04/04/93	30	15	40	24	15	FINE	1.5	9	230	0.3	2	40	0.2	0.3	0.8	1013
05/04/93	31	38	250	18	15	FINE	4	8	250	2	4	250	1.3	0.8	0.4	1011
06/04/93	32	26	320	22	15	CLOUDY	3	9	250	1.3	3	320	1.2	0.3	0.3	1016
07/04/93	33	22	240	20	5	RAIN	4	9	240	1.3	3	240	1.7	0.8	0.2	1019

7.0 WEATHER DATA

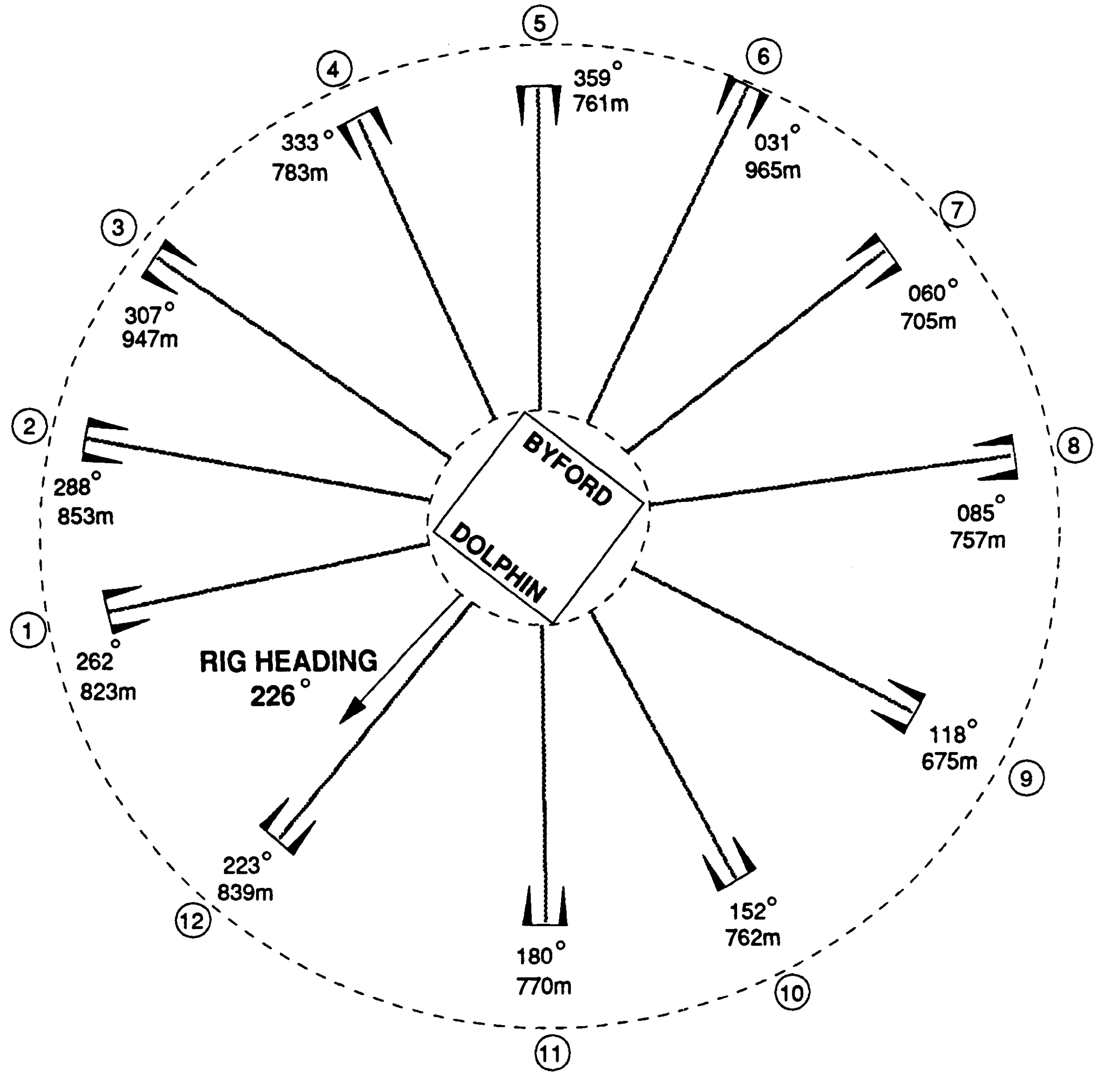
MINERVA-1

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)
08/04/93	34	5	50	28	15	FINE	3.3	10	240	1.3	3	240	2	0.4	0.3	1028
09/04/93	35	16	50	20	15	FINE	2	11	250	0.3	3	50	1	0.4	0.1	1026
10/04/93	36	20	20	28	15	FINE	1.3	12	250	1	3	20	0.3	0.2	0.1	1026
11/04/93	37	16	90	28	15	FINE	1	12	260	0.3	2	90	0.3	0.1	0.1	1020
12/04/93	38	24	350	28	5	FINE	1.5	11	260	1	3	350	0.6	0.2	0.1	1016
13/04/93	39	30	270	20	5	FINE	2	8	250	1.5	3	270	1.5	0.8	0.4	1021
14/04/93	40	24	250	22	10	FINE	4	11	240	2	4	250	2	0.8	0.7	1028
15/04/93	41	15	240	20	10	FINE	3.5	11	250	5	3	240	2.3	1.2	0.5	1031
16/04/93	42	20	30	20	10	FINE	3	11	240	0.7	3	30	1.5	4.5	1.5	1032

BHP Petroleum — FINAL DRILLING REPORT

7.1 MOORING DIAGRAM

MINERVA-1



File: DB VND MIN1_AL1		Checked:	Date: 1-SEP-93

BHP Petroleum

FINAL DRILLING REPORT

MINERVA-1

Compiled By: Vince N W Lewis
Technical Assistant | Date

Reviewed By:
Senior Drilling Engineer | 8/9/93
Date

R Bell
Drilling Superintendent | 8. 9. 93
Date

Approved By:
Manager Drilling | 8-9-93
Date

3

3. FORMATION SAMPLING

3.1 Ditch Cuttings

Cuttings were returned to the sea floor above 560 m. The 12.25" hole was drilled from 560 m to 1204 m, the 8.5" hole from 1204 m to 2107 m and the 6.0" hole from 2107 m to 2425 m (TD). Ditch cuttings were collected from the shakers at 5 m intervals between 560 m to 1100 m, except where high ROP necessitated increasing the sample interval to 10 m and at 3 m interval from 1100 m to 2425 m (TD), except where high ROP necessitated increasing the sample interval to 6 m.

Circulation times were checked periodically with carbide-acetylene gas samples and pump stroke counters. Calculated lag times were refined accordingly.

Table 1 presents the sampling program used in the drilling of Minerva-1. Washed and dried cuttings samples were prepared in five sample splits, one each being sent to Bridge Oil and the government bodies: the Bureau of Resource Sciences, Canberra, and the Victorian Department of Energy and Minerals, Melbourne. The two remaining splits were sent to BHP Petroleum, Melbourne. Two sets of unwashed samples and one set of Petrocraft sample vials were also sent to BHP Petroleum, Melbourne.

Table 1
Ditch Cuttings Samples

Treatment	Collection Interval	Distribution	Purpose of Sample
Washed	No samples: 84.3 m - 560 m 5 m samples: 560 m - 1100 m Except: 655, 680, 695, 710, 715, 725, 805, 815, 880, 895, 930. 3 m samples: 1800 m - 2735 m Except: 1256, 1268, 1274, 1280, 1295, 1304 and 1364. The sample at 2069 m was not collected due to the shaker screens being changed.	BHPP (2)* Bridge Oil (1) Vic DEM (1) BRS (1)	100 g split samples *1 for geochemistry

Treatment	Collection Interval	Distribution	Purpose of Sample
Unwashed	as above	BHPP (2)	1 for bulk storage and possible palaeontological/ palynological analysis. 1 for possible fission-track analysis.

3.1.1 Cuttings Description Summary

All depths are referenced to the rotary table (RT) which is 25.3 m above Mean Sea Level. Depths were determined by reference to lag time, ROP and MWD data.

Depth mRT	Description
82 - 560	Returns to seafloor
560 - 564	INTERBEDDED PEBBLY CONGLOMERATE, FERRUGINOUS SANDSTONE AND SILTY CLAYSTONE

PEBBLY CONGLOMERATE: (30%) off white to light grey to occasionally light yellow, extremely hard, medium to occasionally large pebble, subrounded to rounded (all broken by bit, and very angular), moderately sorted quartz, abundant very strong siliceous cement, trace moderately strong calcareous cement, trace to rare strong pyrite cement, rare rounded calcite pebbles, nil visual porosity.

FERRUGINOUS SANDSTONE: (30%) light brownish grey, occasionally medium brownish grey and light grey, moderately hard to hard, friable with loose grains in part, fine to coarse, dominantly medium to coarse, occasionally very fine and very coarse, dominantly subrounded, rarely subangular, very poorly sorted iron stained quartz, common medium to dark brown (chaomositic?) argillaceous matrix, trace strong pyrite and moderately weak calcareous cement, trace to rare moderately strong iron oxide/hydroxide cement, trace to occasionally common medium to coarse grained iron oxide/hydroxide pellets, trace pyrite nodules, occasionally replacing fossil fragments, trace medium grained glauconite pellets, rare foram and shell fragments, very poor visual porosity.

SILTY CLAYSTONE: (40%) medium to dark brown and brownish grey, soft, dispersive in part, sticky in part, abundantly silty and grading to argillaceous siltstone in part, rare medium grained glauconite pellets, rare carbonaceous flakes, non calcareous.

564 - 655 SILTY CLAYSTONE WITH MINOR INTERBEDDED SANDSTONE

SILTY CLAYSTONE GRADING TO ARENACEOUS CLAYSTONE: (20-100%) generally as above, becoming arenaceous below 610 mRT, firm in part with abundant silt to very fine and fine quartz grains, micromicaceous, rare carbonaceous flecks, minor disseminated microcrystalline pyrite, grades to

Depth mRT	Description
	argillaceous sandstone in part, minor pyrite nodules, minor interbeds of medium brown dolomite bands.
	<u>SANDSTONE</u> : (0-80%) clear, friable with loose grains, rare aggregates, fine/medium to coarse grained, occasionally very fine and very coarse grained, subrounded to rounded and occasionally very well rounded, moderately sorted quartz grains, aggregates typically very well cemented with very hard pyrite cement, no calcite cement, ?minor inferred dark brownish grey argillaceous matrix (generally washed out), rare nodular pyrite, very good inferred porosity.
655 - 666	<u>SANDSTONE WITH INTERBEDDED CLAYSTONE AND MINOR DOLOMITE</u>
	<u>SANDSTONE</u>: (70-85%) clear to opaque, light green in part, friable with loose grains, medium/coarse to very coarse grained, occasionally granule/pebble grade, subrounded to rounded, moderately well sorted quartz grains, ?minor medium brownish green argillaceous matrix (generally washed out), trace pyrite cement in part, rare glauconite, very good inferred porosity.
	Note: sandstone may be bimodal, with a medium/coarse fraction and a very coarse/pebble fraction, interbedded over the sample interval.
	<u>CLAYSTONE</u>: (10-20%) medium greyish brown to greyish green, soft, sticky, dispersive in part, micromicaceous, trace carbonaceous matter, trace glauconite pellets, trace to rare quartz silt and very fine sand grains.
	<u>DOLOMITE</u>: (5-10%) buff with peppery appearance, very hard, blocky, rare dispersed very fine glauconite pellets and trace carbonaceous specks giving a peppery effect. Interpreted as minor interbeds.
666-749	<u>SANDSTONE</u>
	<u>SANDSTONE</u>: (100%) dominantly orangey red grading in part to red and rust brown, becoming less red and more brown with depth, friable with loose grains, medium to very coarse grained, occasionally granule grade, subangular to subrounded, poorly to moderately sorted reddish stained quartz, common medium reddish brown dispersive argillaceous matrix (washed away), rare moderately strong siliceous cement in part, trace to rare fine to coarse dark brown iron oxide/hydroxide pellets, rare very coarse cherty and/or metamorphic lithics, rare limonitic argillaceous matrix in part, rare pyrite nodules/cement, rare mica, poor to fair

Depth mRT	Description
	inferred/visual porosity.
749 - 771	<u>SILTY ARENACEOUS CLAYSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>SILTY ARENACEOUS CLAYSTONE</u>: (40-80%) medium to dark grey, soft, sticky, abundantly silty, moderately finely arenaceous, rare carbonaceous flecks, rare fine glauconite pellets, in part grading to very fine silty sandstone.
	<u>SANDSTONE</u>: (20-60%) generally as above, becoming dominantly light to medium brown with depth, friable with loose grains, medium to very coarse grained, occasionally granule grade, subangular to subrounded, poorly to moderately sorted reddish stained quartz, common medium reddish brown dispersive argillaceous matrix (washed away), rare moderately strong siliceous cement in part, trace to rare fine to coarse dark brown iron oxide/hydroxide pellets, rare very coarse cherty and/or metamorphic lithics, rare limonitic argillaceous matrix in part, rare pyrite nodules/cement, rare mica, poor to fair inferred/visual porosity.
771 - 784	<u>CLAYSTONE</u>
	<u>CLAYSTONE:</u> (100%) medium to occasionally dark brownish grey, soft, dispersive in part, sticky in part, common micromica, trace to rare silt and very fine sand grains, non calcareous, rare carbonaceous flecks, rare fine glauconite pellets, grades to silty arenaceous claystone.
784 - 852	<u>SANDSTONE INTERBEDDED WITH CLAYSTONE</u>
	<u>SANDSTONE:</u> (50-100%) light grey to clear, occasionally very light greenish grey in part, friable with abundant loose grains, medium to granule grade, dominantly medium to coarse grained, subangular to dominantly subrounded, poorly sorted quartz, trace to common medium grey to brownish grey occasionally greenish grey dispersive argillaceous matrix, rare moderately weak siliceous cement in part, rare coarse to granule grade light yellow, grey, green and brown lithics, trace fine glauconite pellets, rare mica, trace to rare pyrite nodules, rare interbedded medium brown dolomitic bands with rare glauconite pellets, fair to occasionally good visual/inferred porosity.
	<u>CLAYSTONE:</u> (0-50%) generally as above, medium to dark brownish grey, soft, dispersive in part, sticky in part, common micromica, trace to rare silt and very fine sand grains, non calcareous, rare carbonaceous flecks, rare fine glauconite pellets,

Depth mRT	Description
	grades to silty arenaceous claystone.
852 - 903	<u>SANDSTONE INTERBEDDED WITH CLAYSTONE</u>
	<u>SANDSTONE:</u> (10-95%) light grey to medium greyish brown, slightly hard to friable with loose grains, fine/medium grained, rarely medium grained, subrounded to subangular, well sorted quartz grains, with light grey to medium greyish brown argillaceous matrix, minor calcareous/dolomitic cement, rare siliceous cement, trace coarse, coloured lithics, poor visual porosity.
	<u>CLAYSTONE:</u> (5-90%) medium greyish brown, soft, dispersive in part, sticky in part, with common silt and very fine quartz grains, micromicaceous, trace carbonaceous matter, trace glauconite.
903 - 915	<u>SANDSTONE</u>
	<u>SANDSTONE:</u> (100%) very light grey to clear, friable with abundant loose grains, moderately hard in part, dominantly medium, occasionally coarse to very coarse, dominantly subangular to occasionally subrounded, moderately sorted quartz grains, common light grey dispersive argillaceous matrix (mostly washed out), trace to rare moderately strong pyrite cement, trace detrital coal fragments, trace pyrite nodules, fair to good visual porosity.
915 - 945	<u>SANDSTONE INTERBEDDED WITH CLAYSTONE</u>
	<u>SANDSTONE:</u> (40-60%) very light grey to clear, friable with abundant loose grains, moderately hard in part, dominantly medium, occasionally coarse to very coarse, dominantly subangular to occasionally subrounded, moderately sorted quartz grains, common light grey dispersive argillaceous matrix (mostly washed out), trace to rare moderately strong pyrite cement, trace detrital coal fragments, trace pyrite nodules, fair to good visual porosity.
	<u>CLAYSTONE:</u> (40-60%) medium to occasionally dark grey and brownish grey, soft to firm, occasionally moderately hard, trace micromica, trace silt, rare fine quartz grains, trace to rare carbonaceous flecks, rare microcrystalline pyrite, non calcareous.
945 - 1022	<u>SILTY CLAYSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>SILTY CLAYSTONE:</u> (70-100%) medium to dark grey, occasionally light to medium grey in part, dominantly soft,

Depth mRT	Description
	abundantly silty, trace to rare carbonaceous flecks, moderately arenaceous in part, non calcareous.
	<u>SANDSTONE:</u> (0-30%) light to medium grey to light olive green, friable with abundant loose grains, very fine to dominantly fine, occasionally moderately hard, subangular to subrounded, well sorted quartz grains, trace to occasionally abundant light to medium grey argillaceous matrix, common moderately weak to moderately strong calcareous cement, rare mica, rare pyrite, rare carbonaceous detritus, rare coarse to very coarse yellow, red and reddish brown quartz grains (possibly cavings), poor to occasionally fair visual porosity.
1022 - 1028	<u>SANDSTONE</u>
	<u>SANDSTONE:</u> (100%) clear to light grey, hard to moderately hard, occasionally friable with common loose grains in part, medium to very coarse, dominantly coarse, dominantly subangular to occasionally subrounded, moderately sorted quartz grains, trace medium grey dispersive argillaceous matrix, common to occasionally abundant strong siliceous cement, trace strong calcareous cement, rare strong pyrite cement, trace glauconite pellets, rare carbonaceous detritus and laminae, rare pyrite nodules, very rare pyrite replacement of plant remnants, very rare dolomite band as above, very poor to poor visual porosity.
1028 - 1100	<u>CLAYSTONE INTERBEDDED WITH MINOR SANDSTONE</u>
	<u>CLAYSTONE:</u> (80-100%) light grey to medium brownish grey, soft, dispersive in part, sticky in part, moderately silty, trace micromica, trace fine carbonaceous flecks and laminae, trace very fine quartz grains, non calcareous.
	<u>SANDSTONE:</u> (0-20%) clear and off white to light grey, moderately hard and occasionally hard, rarely friable with loose grains, dominantly fine to occasionally medium, rarely coarse, subangular to subrounded, moderately sorted quartz grains, trace light grey dispersive argillaceous matrix, common strong siliceous cement, trace to occasionally abundant moderately strong calcareous cement, trace strong pyrite cement, rare very fine glauconite, trace grey lithics, poor to very poor but occasionally fair visual porosity.
1100 - 1123	<u>ARGILLACEOUS SILTSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>ARGILLACEOUS SILTSTONE:</u> (60-100%) light grey to medium brownish grey, soft, dispersive in part, abundantly

Depth mRT	Description
	argillaceous, trace micromica, trace fine carbonaceous flecks and laminae, trace very fine quartz grains, non calcareous.
	<u>SANDSTONE:</u> (0-40%) off-white to light grey, occasionally very light greenish grey, moderately hard to occasionally hard, rarely friable with trace loose grains, dominantly fine, occasionally medium in part, dominantly subrounded, well sorted quartz, trace light grey dispersive argillaceous matrix, common to occasionally abundant moderately weak to moderately strong calcareous cement, rare moderately strong siliceous cement, trace to common fine glauconite, trace mica, trace grey lithics, trace carbonaceous detritus, trace hard medium brown dolomite band, poor to very poor visual porosity.
1123 - 1148	<u>SILTY CLAYSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>SILTY CLAYSTONE:</u> (80-100%) medium to dark grey and brownish grey, occasionally off-white to light grey in part, soft, rarely firm, dominantly dispersive, occasionally sticky, commonly to occasionally abundantly silty, trace fine glauconite, trace carbonaceous flecks and laminae, trace micromica, non calcareous.
	<u>SANDSTONE:</u> (0-20%) generally as above, dominantly hard, common to abundant strong calcareous and siliceous cement, very poor visual porosity.
1148 - 1204	<u>CLAYSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>CLAYSTONE:</u> (85-100%) medium to dark grey and brownish grey, occasionally off-white to light grey in part, soft, rarely firm, dominantly dispersive, occasionally sticky, moderately silty, trace fine glauconite, trace carbonaceous flecks and laminae, trace micromica, non calcareous.
	<u>SANDSTONE:</u> (Tr-15%) clear, friable with abundant loose grains, fine to medium grained, becoming dominantly medium to coarse grained with depth, subangular, becoming dominantly subrounded with depth, poorly to moderately sorted quartz, no apparent matrix or cement at top, trace light grey argillaceous matrix at depth, good to very good inferred porosity.
1204 - 1208	<u>CLAYSTONE INTERBEDDED WITH PEBBLY CONGLOMERATE</u>
	<u>CLAYSTONE:</u> (80%) medium to dark grey, occasionally medium to dark brownish grey, firm, moderately hard in part, blocky, rarely subfissile in part, moderately silty, rare micromica, trace to rare glauconite and carbonaceous flecks and detritus,

Depth mRT	Description
	rarely finely arenaceous in part, non calcareous.
	<u>PEBBLY CONGLOMERATE:</u> (20%) light grey, clear to light yellowish brown in part, very hard, medium pebbles, rounded (all broken and angular), and common coarse to very coarse, subrounded to rounded sand grains, moderately sorted quartz with light yellowish brown staining in part, rare to common grey and light brown, very coarse to granule lithics, abundant strong siliceous and calcareous cement, rare to common strong pyrite cement, trace medium brown very hard dolomite band, rare very coarse pyrite nodules, nil visual porosity.
1208 - 1300	<u>SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE</u>
	<u>SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE</u>: (100%) medium/light to dark grey, occasionally medium to dark brownish grey and greenish grey, firm to moderately hard, blocky, rarely subfissile in part, moderately silty, common glauconite, rare micromica, trace to rare carbonaceous flecks and laminae, rarely finely arenaceous in part, slightly calcareous, rare bands of medium brown moderately hard dolomite (with trace glauconite), trace fractures filled with calcareous material, grades to argillaceous siltstone, trace moderately bright yellowish white mineral fluorescence.
1300 - 1309	<u>SANDSTONE</u>
	<u>SANDSTONE:</u> (100%) clear, translucent to very light grey in part, friable with common loose grains, dominantly fine to occasionally medium grained, trace very light grey to greenish grey dispersive argillaceous matrix, common medium grained glauconite, good to very good inferred porosity.
1309 - 1379	<u>SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE</u>
	<u>SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE</u>: (100%) generally as above, dominantly medium to dark brownish grey and greenish grey, firm to moderately hard, blocky, rarely subfissile in part, moderately silty, common glauconite, rare micromica, trace to rare carbonaceous flecks and laminae, rarely finely arenaceous in part, slightly calcareous, rare bands of medium brown moderately hard dolomite (with trace glauconite), trace fractures filled with calcareous material, grades to argillaceous siltstone, trace moderately bright yellowish white mineral fluorescence.

Depth mRT	Description
1379 - 1448	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE
	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: (100%) generally as above, medium to dark grey to brownish grey, firm to moderately hard, rarely hard in part, occasionally soft in part, dominantly blocky, rarely subfissile, abundantly silty, rarely micromicaceous and carbonaceous, very slightly carbonaceous in part, occasionally finely arenaceous in part, trace fracture filling calcareous material, trace light to dominantly medium brown hard dolomite band, rare glauconite, nil to trace pyrite nodules.
1448 - 1490	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE INTERBEDDED WITH TRACE SANDSTONE
	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: (100%) generally as above, dominantly medium grey, dark brownish grey in part, commonly light/medium greyish brown, light/medium greyish brown fraction is moderately calcareous.
	SANDSTONE: (Tr) clear to light grey, friable with predominantly loose grains, medium grained, subangular, moderately sorted quartz grains, minor fairly strong silica cement, rare light grey argillaceous matrix, ?fair inferred porosity.
1490 - 1563	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE
	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: (100%) generally as above, medium to medium/dark greyish brown to grey, firm to slightly hard, commonly moderately hard, subblocky to blocky, darker fraction generally blocky, occasionally subfissile, rare calcareous cement, trace ?siliceous cement, abundant medium/dark greyish brown slightly calcareous argillaceous matrix, commonly matrix supported and grading to silty claystone, rarely to commonly finely arenaceous, rare carbonaceous flecks, rare glauconite, common micromica and trace mica flakes, trace microcrystalline and fine grained cryptocrystalline pyrite, trace fossil fragments, trace medium brown moderately hard dolomite bands (with trace very fine grained glauconite, trace carbonaceous flecks).
1563 - 1649	ARGILLACEOUS SILTSTONE
	ARGILLACEOUS SILTSTONE: (100%) generally as above, dominantly medium to occasionally dark grey and brownish grey,

Depth mRT	Description
	firm to moderately hard, occasionally hard, subblocky to dominantly blocky, rarely subfissile, trace siliceous cement in part, abundantly argillaceous, rarely to commonly micromicaceous, trace to rare carbonaceous flecks, moderately finely arenaceous in part, trace pyrite and calcareous material fracture infill, trace to rare Inoceramus, nil to trace shell fragments, trace to rare glauconite, rare medium brown hard dolomite bands.
1649 - 1651	<u>SANDSTONE</u>
	<u>SANDSTONE:</u> (100%) light grey to clear, friable with common loose grains, moderately hard in part, fine to medium grained, very occasionally coarse grained in part, subangular to dominantly subrounded, moderate to well sorted quartz grains, rare to occasionally common moderately weak to moderately strong calcareous cement, nil to trace moderately strong siliceous cement, rare to occasionally common dominantly off white to occasionally light grey argillaceous matrix, trace carbonaceous detritus, trace to rare mica, nil to trace partially altered feldspar, trace to nil lithics, fair to poor visual porosity.
1651 - 1667	<u>SILTSTONE INTERBEDDED WITH CLAYSTONE AND RARE SANDSTONE</u>
	<u>SILTSTONE:</u> (10-100%) medium grey to occasionally medium brownish grey, firm to moderately hard, blocky, abundantly argillaceous, trace to rare moderately strong calcareous cement, trace to rare glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to fine argillaceous sandstone, nil to very poor visual porosity.
	<u>CLAYSTONE:</u> (0-80%) medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	<u>SANDSTONE:</u> (0-60%) two varieties: (i) clear to light grey to very light brownish grey, friable with abundant loose grains, dominantly medium to occasionally coarse, dominantly subrounded, moderately sorted quartz, trace light grey dispersive argillaceous matrix, good to very good inferred porosity. (ii) generally as above, hard to very hard, common to abundant strong calcareous siliceous and rare to common pyritic cement, nil to poor visual porosity.
1667 - 1693	<u>CLAYSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE/SILTSTONE</u>

Depth mRT	Description
	CLAYSTONE: (40-80%) medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: (20-60%) light to medium grey to occasionally medium brownish grey, moderately hard, rarely friable with rare to common loose sand grains, very fine to fine, silt size in part, rarely medium in part, dominantly subrounded, moderately well sorted quartz, abundant off-white to light grey argillaceous matrix, trace to rare moderately strong calcareous cement, trace to rare glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to argillaceous siltstone, poor to very poor visual porosity.
1693 - 1745	SILTY CLAYSTONE
	SILTY CLAYSTONE: (100%) medium to dark grey, occasionally medium to dark brownish grey, firm to moderately hard, dominantly blocky to occasionally subfissile, common to abundant silt in part, rarely very finely arenaceous in part, trace micromica and carbonaceous flecks, common fine to medium glauconite pellets, trace pyrite nodules, non calcareous.
1745 - 1816	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE
	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: (100%) medium to dark grey, occasionally medium to dark brownish grey and greenish grey, firm to moderately hard, occasionally hard in part, dominantly blocky to occasionally subfissile, common to abundant silt in part, rarely very finely arenaceous in part, trace micromica and carbonaceous flecks, common fine to medium glauconite pellets, trace pyrite nodules, non calcareous, grading in part to argillaceous siltstone.
1816 -1821	SANDSTONE
	SANDSTONE: (100%) clear to translucent, ?friable with abundant loose grains, moderately hard aggregates in part, medium to very coarse, dominantly coarse, subrounded to predominantly subangular (angularity due to fracturing from PDC bit cutting action) moderately sorted quartz grains, rare to occasionally common off white to light grey dispersive argillaceous matrix (washed away), rare to common moderately strong siliceous cement, trace mica, trace pyrite nodules and weak microcrystalline

Depth mRT	Description
	pyrite cement, fair to good inferred porosity.
1821 - 1847	<u>SANDSTONE INTERBEDDED WITH ARGILLACEOUS SILTSTONE AND MINOR CLAYSTONE</u>
	For description see section 3.3.1 "Core Description".
1847 - 1910	<u>SANDSTONE INTERBEDDED WITH RARE CLAYSTONE</u>
	<u>SANDSTONE:</u> (60-100%) clear to light grey, moderately hard to friable with abundant loose grains in part, medium to very coarse grained, occasionally fine grained and granule grade, subangular to subrounded (angular grains broken due to bit action), poorly to moderately sorted quartz grains, trace light grey dispersive argillaceous matrix (washed away), rare to common moderately strong siliceous cement, trace moderately strong pyrite cement, trace disseminated cryptocrystalline pyrite and pyritised plant fragments, trace coaly detritus, nil to trace lithics, nil to trace structural kaolinite, fair to occasionally good visual porosity in part.
	<u>CLAYSTONE:</u> (0-40%) medium to dark grey, firm to moderately hard, blocky to occasionally subfissile, slightly silty, non calcareous, rare carbonaceous flecks and micromica, trace coaly fragments.
1910 - 1944	<u>SANDSTONE INTERBEDDED WITH RARE CLAYSTONE</u>
	<u>SANDSTONE:</u> (80-100%) generally as above, clear to occasionally light grey, friable with abundant loose grains to moderately hard, medium to very coarse, dominantly coarse, occasionally fine, dominantly subrounded, moderately to well sorted quartz grains, rare off white kaolinitic and light grey dispersive argillaceous matrix (washed away), rare to occasionally common moderately weak to occasionally moderately strong siliceous cement, trace moderately strong pyrite cement, fine aggregates have no cement, trace coaly detritus, structural kaolinite grains and pyrite nodules, good inferred porosity.
	<u>CLAYSTONE:</u> (0-20%) medium to dark grey, occasionally medium brownish grey, firm to moderately hard, trace micromica and carbonaceous flecks, non calcareous, moderately silty, rarely finely arenaceous in part, grading in part to argillaceous siltstone.
1944 - 1948	<u>CLAYSTONE</u>
	<u>CLAYSTONE:</u> (100%) medium to occasionally dark grey, medium brownish grey in part, firm, rarely soft and sticky,

Depth mRT	Description
	occasionally subblocky, moderately silty, grading in part to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles.
1948 - 1995	<u>**SANDSTONE INTERBEDDED WITH CLAYSTONE**</u>
	<u>**SANDSTONE:**</u> (50-100%) clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse dominantly medium grained, occasionally very coarse, subangular to dominantly subrounded, poorly sorted quartz grains, rare to occasionally common light grey argillaceous matrix, rare moderately strong siliceous cement, nil to trace moderately strong pyrite cement, trace coaly particles, mica and lithics, trace rock flour, fair to good inferred porosity.
	<u>**CLAYSTONE:**</u> (0-50%) medium to occasionally dark grey, medium brownish grey in part, firm, rarely soft and sticky, occasionally subblocky, moderately silty, grading in part to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles.
1995 - 2004	<u>**CLAYSTONE INTERBEDDED WITH RARE SANDSTONE**</u>
	<u>**CLAYSTONE:**</u> (90-100%) two types (i) 70%: off white, soft, amorphous and dispersive in part, silty commonly finely arenaceous in part. (ii) 30%: medium to occasionally dark grey, firm to moderately hard in part, subblocky, rare micromica, trace disseminated microcrystalline pyrite, trace carbonaceous flecks, grades in part to argillaceous siltstone.
	<u>**SANDSTONE:**</u> (0-10%) clear to light grey, friable with abundant loose grains to moderately hard, predominantly fine to medium grained, rare coarse, trace granule (possibly cavings), subrounded to subangular, well sorted quartz grains, trace to rare off white kaolinite and light grey argillaceous matrix, nil to rare moderately strong siliceous cement in part, trace carbonaceous flecks, trace microcrystalline pyrite, fair visual porosity.
2004 - 2018	<u>**SANDSTONE INTERBEDDED WITH RARE CLAYSTONE**</u>
	<u>**SANDSTONE:**</u> (60-100%) clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse, dominantly medium/coarse grained, occasionally very coarse, subangular to subrounded, poorly sorted quartz grains, rare off white kaolinitic and light grey argillaceous matrix, rare moderately strong siliceous cement, nil to trace moderately strong pyrite cement, trace coaly particles, mica and lithics, fair to good inferred porosity.

Depth mRT	Description
	<u>CLAYSTONE:</u> (0-40%) medium to occasionally dark grey, medium brownish grey in part, firm and moderately hard in part, rarely soft and sticky, occasionally subblocky, moderately silty, grading in part to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles.
2018 - 2042	<u>CLAYSTONE INTERBEDDED WITH SANDSTONE</u>
	<u>CLAYSTONE:</u> (10-90%) two types, subequal (i) off white, soft to commonly firm, amorphous and dispersive in part, silty and commonly finely arenaceous in part, (ii) medium to occasionally dark grey, firm to moderately hard in part, subblocky, rare micromica, trace disseminated microcrystalline pyrite, trace to occasionally common carbonaceous flecks and grains, grades in part to argillaceous siltstone.
	<u>SANDSTONE:</u> (10-90%) clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse, dominantly medium/coarse grained, occasionally very coarse, subangular to subrounded, poorly sorted quartz grains, rare off white kaolinitic and light grey argillaceous matrix, rare moderately strong siliceous cement, nil to rare moderate to very strong pyrite cement, trace coaly particles, mica and lithics, fair to good inferred porosity.
2042 - 2059	<u>SANDSTONE INTERBEDDED WITH RARE CLAYSTONE</u>
	<u>SANDSTONE:</u> (80-100%) clear to light grey, slightly hard to friable with loose grains, medium/coarse grained, rare fine to medium and very coarse to granule grains, subangular to occasionally subrounded, generally well sorted quartz grains, rare to minor strong siliceous cement, occasional trace calcareous cement, occasional trace strong pyrite cement, rare light grey argillaceous matrix (commonly washed away), rare medium greyish green lithics and glauconite grains, trace carbonaceous detritus rarely as laminae, trace mica flakes within laminae, trace microcrystalline pyrite, fair to good inferred porosity.
	<u>CLAYSTONE:</u> (0-20%) two types: (i) 50-70%: medium to medium/dark brownish grey, soft and amorphous to dominantly firm to slightly hard and subblocky, silty, rare very fine glauconite grains, trace carbonaceous flecks, rare micromica, trace calcareous, trace finely arenaceous, trace microcrystalline pyrite, trace grey lithics; (ii) 30-50%: off white, subblocky, firm to slightly hard in part, silty, commonly finely arenaceous, very slightly calcareous in part, trace carbonaceous flecks.
2059 - 2066	<u>CLAYSTONE INTERBEDDED WITH SANDSTONE</u>

Depth mRT	Description
	CLAYSTONE: (50-100%) two types, subequal: (i) medium to medium/dark brownish grey, as above; (ii) off white, subblocky, soft to firm and slightly hard in part, silty, commonly finely arenaceous, very slightly calcareous in part, trace carbonaceous flecks.
	SANDSTONE: (0-50%) generally as above, predominantly fine to medium grained with abundant coarse grains and occasional very coarse/granule grade.
2066 - 2107	**CLAYSTONE INTERBEDDED WITH SANDSTONE**
	CLAYSTONE: (20-100%) two types: (i) 0-40%: off white, soft to firm, amorphous to subblocky, commonly finely arenaceous, trace carbonaceous specks, trace microcrystalline pyrite and cryptocrystalline pyritic nodules, (ii) 60-100%: medium brownish grey to dominantly greyish brown, grading to medium/dark in part, soft to firm, sticky in part, subblocky, silty, rarely finely arenaceous in part, trace carbonaceous flecks, trace coaly particles, trace glauconite, non calcareous, grades to silty arenaceous sandstone. Type (ii) becomes predominant below 2080 mRT.
	SANDSTONE: (0-80%) light to medium grey, friable to moderately hard, fine to medium grained, subangular to subrounded, well sorted quartz grains, rare moderately strong siliceous cement, rare to abundant off white kaolinitic and medium to dark grey to greyish brown argillaceous matrix, grades in part to arenaceous claystone, nil to rare carbonaceous material, trace lithics, trace pyrite nodules, very poor to rarely poor inferred porosity. Sandstone becomes less common and more argillaceous with depth.
2107 - 2113	**SANDSTONE**
	SANDSTONE: (100%) clear to light grey, friable with loose grains to moderately hard in part, fine/medium grained, subangular, well sorted quartz grains, trace to rare moderately weak siliceous cement, no calcareous cement, trace strongly pyrite cemented aggregates in part, trace to rare off white to light grey argillaceous matrix (commonly washed away), trace carbonaceous matter, trace fine grained lithics, fair visual porosity.
2113 - 2149	**SANDSTONE INTERBEDDED WITH CLAYSTONE**
	SANDSTONE: (30-80%) very light grey, clear to translucent grains, friable to moderately hard, common loose grains, fine to coarse grained, dominantly fine to medium, common coarse and occasional very coarse grains, subangular to subrounded,

Depth mRT	Description
	occasionally angular, moderately sorted quartz, common moderately strong silica cement, trace to occasional moderately strong pyrite cement, trace very light grey argillaceous matrix, common coaly fragments, rare coaly laminae, trace amber, rare lithic grains, poor to moderate visual porosity.
	CLAYSTONE: (20-70%) medium dark grey to dark grey, moderately hard, blocky to subfissile, trace silt, micromicaceous, rare coal fragments, rare pyrite, non calcareous.
2149 - 2167	CLAYSTONE INTERBEDDED WITH SANDSTONE AND RARE SILTSTONE AND COAL
	CLAYSTONE: (70-90%) medium grey to medium dark grey, soft to firm, common silt, abundant carbonaceous flecks, trace very fine sand, micromicaceous, blocky to subfissile, non calcareous.
	SANDSTONE: (10-20%) very light grey, clear to translucent grains, friable to moderately hard, abundant loose grains, very fine to medium grained, occasional coarse and rare very coarse grains, subangular to subrounded, occasionally angular, moderately well sorted quartz, common moderately strong silica cement, rare pyrite cement, trace to common very light grey argillaceous matrix, trace coal fragments, rare amber, trace to occasional lithic grains, rare feldspathic grains, poor inferred porosity, trace mineral fluorescence.
	SILTSTONE: (0-10%) medium dark grey, moderately hard, micromicaceous, trace carbonaceous flecks, grading to very fine grained sandstone in part, blocky, non calcareous.
	COAL: (Tr) greyish black to black, moderately hard, brittle, subvitreous lustre, subconchoidal fracture.
2167 - 2185	CLAYSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE AND TRACE SILTSTONE AND COAL
	CLAYSTONE (20-80%) medium to dark grey, brown grey in part, soft to moderately firm, micromicaceous, trace carbonaceous flecks, trace carbonaceous laminae, trace nodular pyrite.
	ARGILLACEOUS SANDSTONE: (20-80%) light grey, clear to translucent grains, friable to moderately hard, fine to medium grained, occasional coarse, subangular to subrounded, moderately sorted quartz grains, trace silica cement, abundant argillaceous matrix, trace amber, poor visual porosity.
	SILTSTONE: (Tr) medium dark grey, moderately hard,

Depth mRT	Description
	micromicaceous, trace carbonaceous flecks, grading to very fine grained sandstone in part, blocky, non calcareous.
	<u>COAL:</u> (Tr) greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, firm.
2185 - 2201	<u>SANDSTONE INTERBEDDED WITH CLAYSTONE</u>
	<u>SANDSTONE:</u> (70-90%) two subequal types: (i): light grey to translucent, friable to moderately hard, fine to medium grained, subangular to subrounded, moderately sorted quartz grains, abundant argillaceous matrix, common moderately hard silica cement, trace lithics, trace carbonaceous material, trace amber, poor inferred porosity, (ii): light grey to translucent, hard, blocky fracture, medium to coarse grained, subangular to subrounded, moderately sorted quartz grains, hard silica cement, nil inferred porosity.
	<u>CLAYSTONE:</u> (10-30%) medium dark grey, occasionally light brown grey, moderately hard, subfissile, trace silt, trace carbonaceous flecks, micromicaceous, trace pyrite nodules.
2201 - 2205	<u>CLAYSTONE</u>
	<u>CLAYSTONE:</u> (100%) medium to dark grey, commonly brown, soft to firm, hard in part, common firm silica cement, trace pyrite cement, rare carbonaceous specks, micromicaceous.
2205 - 2210	<u>SANDSTONE</u>
	<u>SANDSTONE:</u> (100%) two subequal types: (i): light grey to translucent, friable to moderately hard, fine to medium grained, subangular to subrounded, moderately sorted quartz grains, abundant argillaceous matrix, common moderately hard silica cement, trace lithics, trace carbonaceous material, trace amber, poor inferred porosity; (ii): light grey to translucent, hard, blocky fracture, medium to coarse grained, subangular to subrounded, moderately sorted quartz grains, hard silica cement, nil inferred porosity.
2210 - 2225	<u>CLAYSTONE INTERBEDDED WITH SANDSTONE & TRACE COAL</u>
	<u>CLAYSTONE:</u> (40-90%) medium dark grey, common brown grey, soft to commonly hard, silty, moderate firm silica cement, moderate hard pyrite cement, rare pyrite nodules.
	<u>SANDSTONE:</u> (10-60%) light grey to translucent, friable to hard

Depth mRT	Description
	in part, fine to medium grained, subangular to subrounded, moderately sorted quartz grains, common argillaceous matrix, common hard silica cement, trace carbonaceous flecks, common lithics, nil to poor visual porosity.
	COAL: (Tr) greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2225 - 2252	SANDSTONE INTERBEDDED WITH CLAYSTONE & TRACE COAL
	SANDSTONE: (60-95%) light grey to translucent, friable, medium grained, occasional coarse, subangular to subrounded, moderately sorted quartz grains, trace weak calcite cement, common argillaceous matrix, trace lithics, trace amber, poor inferred porosity.
	CLAYSTONE: (5-40%) two subequal types: (i): medium dark grey, common brown grey, soft to commonly hard, silty, trace firm silica cement, trace hard pyrite cement, trace pyrite nodules; (ii): pale yellowish brown, soft, massive, uncemented, dispersive, trace carbonaceous specks.
	COAL: greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2252 - 2293	ARGILLACEOUS SANDSTONE INTERBEDDED WITH CLAYSTONE
	ARGILLACEOUS SANDSTONE: (70-95%) light grey to translucent, friable to moderately hard, fine grained, common medium to coarse, subangular to subrounded, moderately sorted quartz and lithic grains, abundant argillaceous matrix, abundant firm calcite cement, abundant lithics (increasing with depth), common feldspar, common carbonaceous flecks, trace amber, nil visual porosity.
	CLAYSTONE: (5-30%) light grey, soft to firm, common weak calcite cement, abundant fine to very fine sand grains, trace carbonaceous flecks.
2293 - 2301	ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE
	ARGILLACEOUS LITHIC SANDSTONE: (60-90%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz, common moderately strong

Depth mRT	Description
	calcareous cement, trace very weak silica cement, abundant very light grey argillaceous matrix, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, rare pyrite, rare carbonaceous flecks, rare amber, poor inferred porosity.
	CLAYSTONE: (10-40%) 2 types (i): medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous; (ii): medium dark grey to brownish grey, moderately hard, micromicaceous, rare carbonaceous flecks, occasional quartz and lithic grains, blocky to subblocky, non calcareous.
2301 - 2336	ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE & TRACE COAL
	ARGILLACEOUS LITHIC SANDSTONE: (60-90%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, trace very weak silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, trace carbonaceous flecks, trace amber, trace biotite, poor visual porosity.
	CLAYSTONE: (10-40%) medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous.
	COAL: greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2336 - 2358	ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE
	ARGILLACEOUS LITHIC SANDSTONE: (80-95%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor inferred porosity.
	CLAYSTONE: (5-20%) light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous.

Depth mRT	Description
2358 - 2372	**ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE & TRACE COAL**
	ARGILLACEOUS LITHIC SANDSTONE: (60-90%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor inferred porosity.
	CLAYSTONE: (10-40%) light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous.
	COAL: (Tr) greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2372 - 2391	**ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE & TRACE COAL**
	ARGILLACEOUS LITHIC SANDSTONE: (80-90%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, trace moderately strong calcareous cement, trace moderately hard silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor visual porosity.
	CLAYSTONE: (10-20%) light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous, trace moderate silica cement.
	COAL: (Tr) greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2391 - 2400	**ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE & TRACE COAL**
	ARGILLACEOUS LITHIC SANDSTONE: (60-90%) light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, trace moderately hard silica cement,

Depth mRT	Description
	abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor visual porosity.
	CLAYSTONE: (10-40%) (i): light grey to light greenish grey, occasionally medium dark grey, soft, dispersive, trace carbonaceous flecks, non calcareous; (ii): medium grey to medium dark grey, moderately firm, blocky, trace silt, trace micromica, trace carbonaceous flecks, non calcareous.
	COAL: (Tr) greyish black to black, subvitreous lustre, subconchoidal fracture, brittle, moderately firm to hard.
2400 - 2425	ARGILLACEOUS LITHIC SANDSTONE INTERBEDDED WITH CLAYSTONE
	ARGILLACEOUS LITHIC SANDSTONE: (60-80%) generally as above, light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, subangular to subrounded, moderately well sorted quartz and lithics, rare moderately weak calcareous cement, trace moderately hard silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, poor visual porosity.
	CLAYSTONE: (20-40%) medium light grey to medium grey, moderately firm, occasional carbonaceous flecks and laminae, trace micro mica, subblocky, non calcareous.

3.1.2 Cuttings Descriptions

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
565	30	-	-	-	PEBBLY CONGLOMERATE: Off white to light grey to occasionally light yellow, extremely hard, medium to occasionally large pebble, subrounded to rounded (all broken by bit, and very angular), moderately sorted quartz, abundant very strong siliceous cement, trace moderately strong calcareous cement, rare to trace strong pyrite cement, rare rounded calcite pebbles, nil visual porosity. No shows.
	30	-	tr	-	FERRUGINOUS SANDSTONE: Light brownish grey, occasionally medium brownish grey and light grey, moderately hard to hard, friable with loose grains in part, fine to coarse dominantly medium to coarse, occasionally very fine and very coarse, dominantly subrounded, rarely subangular, very poorly sorted iron stained quartz, common medium to dark brown (chaomositic?) argillaceous matrix, trace strong pyrite and moderately weak calcareous cement, rare to trace moderately strong iron oxide/hydroxide cement, trace to occasionally common, medium to coarse grained iron oxide/hydroxide pellets, trace pyrite nodules, occasionally replacing fossil fragments, trace medium grained glauconite pellets, rare foram and shell fragments, very poor visual porosity. No shows.
	40	-	r	r	SILTY CLAYSTONE: Medium to dark brown and brownish grey, soft, dispersive in part and sticky in part, abundantly silty and grading to argillaceous siltstone in part, rare medium grained glauconite pellets, rare carbonaceous flakes, non calcareous.
					NOTE: The Ferruginous Sandstone resembles the Slope Bottom Laterite .

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
570	100	-	r	r	SILTY CLAYSTONE: As above, moderately hard in part, rare hard calcareous bands, trace pyrite nodules.
575	100	-	r	r	SILTY CLAYSTONE: As above.
580	100	-	r	r	SILTY CLAYSTONE: Generally as above, dominantly soft and dispersive.
585	80	-	tr	r	SILTY CLAYSTONE: As above
	20	-	-	-	SANDSTONE: Clear, friable with loose grains, rare aggregates, fine/medium to coarse grained, occasionally very fine and very coarse grained, subrounded to rounded and occasionally very well rounded, moderately sorted quartz grains, aggregates typically very well cemented with very hard pyrite cement, no calcite cement, ?minor inferred dark brownish grey argillaceous matrix (generally washed out, see note), rare nodular pyrite, very good inferred porosity. No shows. Note: remnants of argillaceous matrix observed within crevices of some sandstone grains, implying matrix within the friable sandstone.
590	20	-	tr	r	SILTY CLAYSTONE: As above, exaggerated proportion due to cavings.
	80	-	-	-	SANDSTONE: Generally as above, predominantly medium to coarse grained.
595	70	-	tr	r	SILTY CLAYSTONE: As above.
	30	-	-	-	SANDSTONE: Generally as above, ?trace light creamy grey non calcareous argillaceous matrix, plus ?minor dark brownish grey argillaceous matrix as above. Proportion exaggerated due to cavings.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
600	100	-	tr	r	SILTY CLAYSTONE: As above.
	tr	-	-	-	SANDSTONE: As above, cavings.
605	100	-	tr	r	SILTY CLAYSTONE: Generally as above, occasionally firm, micromicaceous.
610	100	-	tr	r	SILTY CLAYSTONE: Generally as above, becoming arenaceous with common fine quartz grains, with rare interbeds of hard dark brown dolomitic bands with trace black carbonaceous flecks.
615	90	-	tr	r	SILTY CLAYSTONE: Generally as above, with common interbedded dark brownish grey firm sublaminated silty claystone.
	10	-	-	-	SANDSTONE: Clear, slightly brown (iron stained) in part, friable with loose grains, medium to coarse grained, with minor fine grains and very coarse grains, moderately to well rounded, fair to moderately good sorting, rare aggregates contain very strong very hard pyrite cement, rare? dark greyish brown argillaceous matrix (commonly washed out), with minor to common coarse grained finely crystallised pyrite commonly replacing fossil fragments, good inferred porosity. No shows.
620	100	-	tr	r	ARENACEOUS CLAYSTONE: Medium to dark greyish brown, soft to firm in part, dispersive in part, sticky, with abundant silt to very fine and fine quartz grains, quartz grains generally well sorted, micromicaceous, rare carbonaceous flecks, minor disseminated microcrystalline pyrite. Grades to argillaceous sandstone in part. Minor pyrite nodules, minor interbeds of medium brown dolomite bands.
625	100	-	tr	r	ARENACEOUS CLAYSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
630	90	-	tr	r	ARENACEOUS CLAYSTONE: As above
	10	-	-	-	SILICEOUS ARGILLACEOUS SILTSTONE GRADING TO SANDSTONE: Medium to dark greyish brown, hard to very hard, subblocky, silt to very fine quartz grains, very well sorted, with abundant dark to medium greyish brown argillaceous matrix, common siliceous cement, trace to rare dolomite cement, nil visible porosity. No shows.
635	100	-	tr	r	ARENACEOUS CLAYSTONE: As above.
640	100	-	tr	r	ARENACEOUS CLAYSTONE: As above.
645	100	-	tr	r	ARENACEOUS CLAYSTONE: As above.
650	100	-	r	r	ARENACEOUS CLAYSTONE: Generally as above, with rare very fine to occasionally fine/medium glauconite pellets.
655					SAMPLE MISSED

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
660	70	-	-	-	SANDSTONE: Clear to opaque, light green in part, friable with loose grains, medium/coarse to very coarse grained, occasionally granule/pebble grade, subrounded to rounded, moderately well sorted quartz grains, ?minor medium browny green argillaceous matrix (generally washed out), trace pyrite cement in part, very good inferred porosity. No shows. Note: sandstone may be bimodal, with a medium/coarse fraction and a very coarse/pebble fraction, interbedded over the sample interval.
	20	-	tr	tr	CLAYSTONE: Medium greyish brown to grey/green, soft, sticky, dispersive in part, micromicaceous, trace carbonaceous matter, trace glauconite pellets, trace to rare quartz silt and very fine sand grains.
	10	-	r	tr	DOLOMITE: Buff with peppery appearance, very hard, blocky, with rare dispersed very fine glauconite pellets and trace carbonaceous specks giving a peppery effect.
665	85	-	r	tr	SANDSTONE: Generally as above, with common opaque to off white quartz grains. Grains commonly covered with patchy glauconite, medium/dark greyish green, and rare pyrite cement. Rare pyrite nodules.
	10	-	tr	r	CLAYSTONE: As above.
	5	-	tr	tr	DOLOMITE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
670	100	-	-	-	SANDSTONE: Dominantly orangey red, grading in part to red and rust brown, friable with loose grains, medium to very coarse grained, occasionally granule, subangular to subrounded, poorly to moderately sorted reddish stained quartz, common medium reddish brown dispersive argillaceous matrix (washed away), rare moderately strong siliceous cement in part, rare to trace fine to coarse dark brown iron oxide/hydroxide pellets, rare pyrite nodules/cement, rare mica, poor to fair inferred/visual porosity.
675	100	-	-	-	SANDSTONE: As above.
680					SAMPLE MISSED
685	100	-	-	-	SANDSTONE: Generally as above, dominantly medium brownish grey, dominantly medium grained.
690	100	-	-	-	SANDSTONE: As above.
695					SAMPLE MISSED
700	100	-	-	-	SANDSTONE: Generally as above, becoming light brownish grey to light yellowish brown, occasionally off white to clear, dominantly medium to very coarse.
705	100	-	-	-	SANDSTONE: As above.
710					SAMPLE MISSED
715					SAMPLE MISSED
720	100	-	-	-	SANDSTONE: Generally as above, with rare granule grade quartz grains.
725					SAMPLE MISSED

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
730	100	-	-	-	SANDSTONE: Generally as above, medium to granule, dominantly coarse to very coarse, rare very coarse cherty and/or metamorphic lithics, rare limonitic argillaceous matrix in part, rare to trace fine off white lithics in a dark grey to dark greenish grey argillaceous matrix.
735	100	-	-	-	SANDSTONE: Generally as above, dominantly very coarse to granule.
740	100	-	-	-	SANDSTONE: Generally as above, dominantly medium to very coarse.
745	100	-	-	-	SANDSTONE: Generally as above, dominantly medium with common very coarse to granule quartz grains.
750	60	-	-	-	SANDSTONE: As above.
	40	-	r	r	SILTY ARENACEOUS CLAYSTONE: Medium to dark grey, soft, sticky, abundantly silty, moderately finely arenaceous, rare carbonaceous flecks, rare fine glauconite pellets, in part grading to very fine silty sandstone.
755	50	-	-	-	SANDSTONE: As above.
	50	-	r	r	SILTY ARENACEOUS CLAYSTONE: As above.
760	30	-	-	-	SANDSTONE: As above.
	70	-	r	r	SILTY ARENACEOUS CLAYSTONE: As above.
765	20	-	-	-	SANDSTONE: As above.
	80	-	r	r	SILTY ARENACEOUS CLAYSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
770	100	-	r	r	CLAYSTONE: Medium to occasionally dark brownish grey, soft, dispersive in part, sticky in part, common micromica, rare to trace silt and very fine sand grains, non calcareous, rare carbonaceous flecks, rare fine glauconite pellets.
775	100	-	r	r	CLAYSTONE: Generally as above, with common to abundant silt and very fine quartz grains.
780	100	-	c	r	CLAYSTONE: Generally as above, medium greenish grey in part, trace to common fine glauconite pellets.
785	100	-	c	c	CLAYSTONE: As above.
790	100	-	-	-	SANDSTONE: Light grey to clear, occasionally very light greenish grey in part, friable with abundant loose grains, medium to very coarse dominantly coarse grained, occasionally granule grade, subangular to dominantly subrounded, poorly sorted quartz, trace to common medium grey to brownish grey occasionally greenish grey dispersive argillaceous matrix, rare moderately weak siliceous cement in part, trace fine glauconite pellets, rare mica, rare to trace pyrite nodules, fair to occasionally good visual/inferred porosity. No shows.
795	100	-	-	-	SANDSTONE: Generally as above, occasionally moderately hard, rare moderately strong pyrite, rare moderately coarse light yellow, grey, green and brown lithics, rare medium brown dolomitic band with rare glauconite pellets, poor to fair visual porosity. No shows.
800	90	-	-	-	SANDSTONE: As above.
	10	-	c	c	CLAYSTONE: As above
805					SAMPLE MISSED

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
810	70	-	-	-	SANDSTONE: Generally as above, fine to medium grained with rare coarse grained to pebble grade quartz grains, common to abundant medium grey to brownish grey argillaceous matrix.
	30	-	c	c	CLAYSTONE: Generally as above, predominantly medium/dark greyish brown.
815					SAMPLE MISSED
820	80	-	-	-	SANDSTONE: Generally as above, medium grained with common very coarse to granule grade quartz grains, rare to minor very strong pyrite cement.
	20	-	c	c	CLAYSTONE: Generally as above, commonly firm.
825	50	-	-	-	SANDSTONE: Generally as above, fine to medium grained, minor coarse to granule grade quartz grains, abundant medium grey and calcareous off white argillaceous matrix, rare pyrite cement and nodules, coloured lithics as above.
	50	-	c	c	CLAYSTONE: As above.
830	50	-	-	-	SANDSTONE: As above.
	50	-	c	c	CLAYSTONE: As above.
835	60	-	-	-	SANDSTONE: Generally as above, fine to medium grained, with common medium grey argillaceous matrix.
	40	-	r	r	CLAYSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
840	70	-	-	-	SANDSTONE: Generally as above, with abundant pyrite nodules and cement.
	30	-	r	r	CLAYSTONE: As above.
845	80	-	-	-	SANDSTONE: Generally as above, fine to medium grained with minor coarse to very coarse and granule grade quartz grains and coloured lithics.
	20	-	r	r	CLAYSTONE: As above.
850	50	-	-	-	SANDSTONE: As above, common pyrite cement and nodules, rare interbedded buff to medium brown dolomite bands,
	50	-	tr	tr	CLAYSTONE: As above
855	80	-	-	-	SANDSTONE: Generally as above, light grey, friable with common loose grains, medium grained with common coarse to granule grade quartz and coloured lithic grains, rare to minor light grey to greyish brown argillaceous matrix, rare siliceous cement, rare ?dolomitic cement, common very strong pyrite cement, minor pyrite nodules, poor to fair visual porosity. No shows.
	20	-	tr	tr	CLAYSTONE: As above.
860	95	-	-	-	SANDSTONE: Generally as above, subequal aggregates and loose grains, grades in part to a hard argillaceous siltstone/sandstone, light grey to medium greyish brown argillaceous matrix, trace calcareous cement, rare siliceous cement, common strong pyrite cement, as above, poor to fair visible porosity. No shows.
	5	-	r	r	CLAYSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
865	40	-	-	-	SANDSTONE: two members, subequal proportions: (i) Generally as above, medium to very coarse and granule grained. (ii) Light grey, friable, very fine to fine grained, subrounded to subangular well sorted quartz grains, common firm calcareous/dolomitic cement, trace siliceous cement, trace pyrite cement and nodules, common to abundant light grey argillaceous matrix, micromicaceous, poor visible porosity. No shows.
	60	-	tr	tr	CLAYSTONE: Two members, similar proportions: (i) Generally as above (ii) Medium greyish brown, hard and very hard in part, subblocky, with abundant silt to very fine quartz sand, comprising 30-40% microcrystalline pyrite, micromicaceous.
870	50	-	-	-	SANDSTONE: Light grey to medium greyish brown, slightly hard to friable with loose grains, fine/medium grained, rarely medium grained, subrounded to subangular well sorted quartz grains, with light grey to medium greyish brown argillaceous matrix, minor calcareous/dolomitic cement, rare siliceous cement, trace coarse, coloured lithics, poor visual porosity. No shows.
	50	-	tr	tr	CLAYSTONE: Medium greyish brown, soft, dispersive in part, sticky in part, with common silt and very fine quartz sand, micromicaceous, trace carbonaceous matter, trace glauconite.
875	50	-	-	-	SANDSTONE: As above.
	50	-	tr	tr	CLAYSTONE: As above.
880					SAMPLE MISSED

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
885	60	-	-	-	SANDSTONE: Generally as above, predominantly common to abundant medium greyish brown argillaceous matrix, sandstone grades in part to an arenaceous claystone.
	40	-	tr	tr	CLAYSTONE: Generally as above, with rare light brown and off white claystone (very calcareous), common to abundant fine quartz grains, grading to argillaceous sandstone.
890	10	-	-	-	SANDSTONE: Generally as above, pale green in part.
	90	-	tr	tr	CLAYSTONE: As above.
895					SAMPLE MISSED
900	20	-	-	-	SANDSTONE: Generally as above, with common medium to medium/coarse grains.
	80	-	tr	tr	CLAYSTONE: As above.
905	100	-	-	tr	SANDSTONE: very light grey to clear, friable with abundant loose grains, moderately hard in part, dominantly medium occasionally coarse to very coarse, dominantly subangular to occasionally subrounded, moderately sorted quartz grains, common light grey dispersive argillaceous matrix (mostly washed out), rare to trace moderately strong pyrite cement, trace detrital coal fragments, trace pyrite nodules, fair to good visual porosity. *
910	100	-	-	tr	SANDSTONE: As above *

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
915	100	-	-	tr	<u>SANDSTONE</u>: As above * * Note: These samples appear to be misrepresentative of the actual formation as indicated by MWD. Instead, sample from depth 920 mRT was used as a more representative lithology.
920	100	-	-	tr	<u>SANDSTONE</u>: As above
925	100	-	-	-	<u>SANDSTONE</u>: Generally as above, becoming dominantly clear, rare moderately weak calcareous cement.
930					SAMPLE MISSED
935	60	-	-	r	<u>SANDSTONE</u>: Very light grey to occasionally clear, moderately hard to hard, occasionally friable with trace to common loose grains, fine to occasionally medium, subangular to subrounded, moderately to well sorted quartz grains, common to occasionally abundant light grey partially dispersive argillaceous matrix, common to occasionally abundant moderately strong calcareous cement, rare to trace moderately strong pyrite cement and nodules, rare to trace quartz overgrowths and very coarse grey lithics, rare carbonaceous and coaly detritus, poor to very poor visual porosity. No shows.
	40	-	-	r	<u>CLAYSTONE</u>: Medium to occasionally dark grey and brownish grey, soft to firm and occasionally moderately hard, trace micromica, trace silt, rare fine quartz grains, rare to trace carbonaceous flecks, rare microcrystalline pyrite, non calcareous.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
940	40	-	-	r	SANDSTONE: Generally as above, dominantly friable with common loose grains, poor to fair inferred porosity.
	60	-	-	r	CLAYSTONE: As above.
945	40	-	-	r	SANDSTONE: As above.
	60	-	-	r	CLAYSTONE: As above.
950	80	-	-	r	SILTY CLAYSTONE: Generally as above, occasionally light to medium grey in part, dominantly soft, abundantly silty, rare to trace carbonaceous flecks, moderately arenaceous in part, non calcareous.
	20	-	-	r	SANDSTONE: Light to medium grey, friable with abundant loose grains, very fine to dominantly fine, occasionally moderately hard, subangular to subrounded, well sorted quartz grains, common to occasionally abundant light to medium grey argillaceous matrix, common moderately weak to moderately strong calcareous cement, rare mica, rare pyrite, rare carbonaceous detritus, poor visual porosity. No Shows.
955	80	-	-	r	SILTY CLAYSTONE: As above.
	20	-	-	r	SANDSTONE: As above.
960	90	-	-	r	SILTY CLAYSTONE: Generally as above, becoming dominantly medium to dark grey.
	10	-	-	r	SANDSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
965	90	-	tr	r	SILTY CLAYSTONE: Generally as above, trace glauconite.
	10	-	-	r	SANDSTONE: Generally as above, moderately hard to hard in part, common moderately strong calcareous cement, poor to very poor visual porosity. No shows.
970	70	-	tr	r	SILTY CLAYSTONE: As above.
	30	-	-	r	SANDSTONE: Generally as above, dominantly moderately hard to hard, common to abundant strong calcareous cement, rare to trace moderately strong siliceous cement, trace strong pyrite cement, very poor visual porosity. No shows.
975	100	-	tr	r	SILTY CLAYSTONE: As above.
980	70	-	tr	r	SILTY CLAYSTONE: As above.
	30	-	r	-	SANDSTONE: Generally as above, dominantly friable with common loose grains, occasionally moderately hard, trace moderately strong calcareous cement, rare strong pyrite cement, trace coarse to very coarse yellow, red and reddish brown stained quartz *, rare glauconite pellets, fair visual porosity. No shows.
985	70	-	tr	r	SILTY CLAYSTONE: As above
	30	-	r	-	SANDSTONE: Generally as above, dominantly moderately hard to hard, common to abundant strong calcareous cement, trace strong siliceous cement, trace strong pyrite cement, common coarse to very coarse yellow, red and reddish brown quartz grains *, very poor visual porosity. No Shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
990	80	-	tr	r	SILTY CLAYSTONE: As above.
	20	-	r	-	SANDSTONE: Generally as above, moderately hard to hard, occasionally friable with loose grains, common strong calcareous cement, trace moderately strong siliceous cement, rare coarse to very coarse yellow, red and reddish brown quartz grains *, poor to rarely fair visual porosity. No shows. * Coarse coloured quartz grains described in these samples are most likely cavings.
995	90	-	tr	r	SILTY CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: As above.
1000	90	-	tr	r	SILTY CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: As above.
1005	100	-	tr	r	SILTY CLAYSTONE: As above.
1010	100	-	tr	r	SILTY CLAYSTONE: As above.
1015	80	-	tr	r	SILTY CLAYSTONE: As above.
	20	-	r	-	SANDSTONE: Light grey to light olive green, friable with abundant loose grains, fine grained, subangular to subrounded, very well sorted quartz grains, trace light to medium grey dispersive argillaceous matrix, trace mica, trace grey lithics, rare carbonaceous detritus, fair to good inferred porosity. No shows.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1020	80	-	tr	r	SILTY CLAYSTONE: As above.
	20	-	r	-	SANDSTONE: As above.
	Tr	-	tr	-	DOLOMITE: Trace light to medium brown hard dolomite band, with trace fine grained quartz and glauconite pellets.
1025	100	-	tr	r	SANDSTONE: Clear to light grey, hard to moderately hard, occasionally friable with common loose grains in part, medium to very coarse dominantly coarse, dominantly subangular to occasionally subrounded, moderately sorted quartz grains, trace medium grey dispersive argillaceous matrix, common to occasionally abundant strong siliceous and trace strong calcareous cement, rare strong pyrite cement, trace glauconite pellets, rare carbonaceous detritus and laminae, rare pyrite nodules, very rare pyrite replacement of plant remnants, very rare dolomite band as above, very poor to poor porosity. No shows.
1030	100	-	tr	r	SANDSTONE: As above.
1035	100	-	-	tr	CLAYSTONE: Light grey to medium brownish grey, soft, dispersive in part, sticky in part, moderately silty, trace micromica, trace fine carbonaceous flecks and laminae, trace very fine quartz grains, non calcareous. *
1040	100	-	-	tr	CLAYSTONE: As above. * * Note: Lithology partly interpreted from MWD log which indicated high gamma response.

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1045	90	-	-	tr	CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: Clear to light grey, moderately hard occasionally hard, rarely friable with loose grains, dominantly fine to occasionally medium, rarely coarse, subangular to subrounded, moderately sorted quartz grains, trace light grey dispersive argillaceous matrix, common strong siliceous cement, trace strong calcareous cement, trace strong pyrite cement, rare very fine glauconite, poor to very poor visual porosity. No shows.
1050	90	-	-	tr	CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: As above.
1055	100	-	tr	tr	CLAYSTONE: Generally as above, trace fine grained glauconite, becoming commonly to abundantly silty, in part grading to argillaceous siltstone.
1060	100	-	tr	tr	CLAYSTONE: Generally as above, dominantly medium brownish grey.
1065	100	-	tr	tr	CLAYSTONE: As above, with rare hard dolomite band, as above.
1070	100	-	tr	tr	CLAYSTONE: As above.
1075	100	-	tr	tr	CLAYSTONE: As above, trace moderately hard dolomite band, as above.
1080	80	-	tr	tr	CLAYSTONE: As above.
	20	-	r	-	SANDSTONE: Generally as above, dominantly friable with common loose grains, trace moderately strong calcareous and siliceous cement, fair visual porosity. No shows.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1085	80	-	tr	tr	CLAYSTONE: As above.
	20	-	r	-	SANDSTONE: As above, trace moderately hard dolomite band, as above.
1090	90	-	tr	tr	CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: As above.
1095	90	-	tr	tr	CLAYSTONE: As above.
	10	-	r	-	SANDSTONE: As above.
1100	90	-	tr	tr	CLAYSTONE: As above, abundantly silty.
	10	-	r	-	SANDSTONE: As above.
					SAMPLING INTERVAL 3 m.
1103	100	-	tr	tr	SILTY CLAYSTONE: As above, grading to argillaceous siltstone.
1106	90	-	tr	tr	ARGILLACEOUS SILTSTONE: as above.
	10	-	r	-	SANDSTONE: As above.
1109	90	-	tr	tr	ARGILLACEOUS SILTSTONE: A above.
	10	-	r	-	SANDSTONE: As above.
1112	100	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1115	60	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.
	40	-	c	tr	SANDSTONE: Off-white to light grey, occasionally very light greenish grey, moderately hard to occasionally hard, rarely friable with trace loose grains, dominantly fine, occasionally medium in part, dominantly subrounded, well sorted quartz, trace light grey dispersive argillaceous matrix, common to occasionally abundant moderately weak to moderately strong calcareous cement, rare moderately strong siliceous cement, trace to common fine glauconite, trace mica, trace grey lithics, trace carbonaceous detritus, trace hard medium brown dolomite band, poor to very poor visual porosity. No shows. Note: Common rock flour and slickenside.
1118	60	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.
	40	-	c	tr	SANDSTONE: As above.
1121	60	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.
	40	-	c	tr	SANDSTONE: As above.
1124	100	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.
1127	100	-	tr	tr	ARGILLACEOUS SILTSTONE: As above.
1130	100	-	tr	tr	ARGILLACEOUS SILTSTONE: As above, grading to silty claystone.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1133	100	-	tr	tr	SILTY CLAYSTONE: Generally as above, medium to dark grey and brownish grey, occasionally off-white to light grey in part, soft, rarely firm, dominantly dispersive, occasionally sticky, commonly to occasionally abundantly silty, trace fine glauconite, trace carbonaceous flecks and laminae, trace micromica, non calcareous.
1136	100	-	tr	tr	SILTY CLAYSTONE: As above.
1139	100	-	tr	tr	SILTY CLAYSTONE: As above.
1142	80	-	tr	tr	SILTY CLAYSTONE: As above.
	20	-	tr	tr	SANDSTONE: As above, dominantly hard, common to abundant strong calcareous and siliceous cement, very poor visual porosity. No shows.
1145	100	-	tr	tr	SILTY CLAYSTONE: As above, dominantly medium to dark grey and brownish grey.
1148	100	-	tr	tr	SILTY CLAYSTONE: As above.
1151	100	-	tr	tr	CLAYSTONE: As above, moderately silty.
1154	100	-	-	tr	CLAYSTONE: As above.
1157	100	-	-	tr	CLAYSTONE: As above.
1160	100	-	-	tr	CLAYSTONE: As above.
1163	100	-	r	tr	CLAYSTONE: As above, dominantly dark grey and brownish grey, common silt, rare to trace glauconite.
1166	100	-	r	tr	CLAYSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1169	90	-	r	tr	CLAYSTONE: As above.
	10	-	-	-	SANDSTONE: clear, friable with abundant loose grains, fine to occasionally medium, dominantly subangular, moderately well sorted quartz, no apparent matrix or cement, good to very good inferred porosity. No shows.
1172	90	-	r	tr	CLAYSTONE: As above.
	10	-	-	-	SANDSTONE: As above.
1175	100	-	r	tr	CLAYSTONE: As above.
1178	90	-	r	tr	CLAYSTONE: As above.
	10	-	-	-	SANDSTONE: As above, occasionally coarse grained.
1181	100	-	r	tr	CLAYSTONE: As above.
1184	100	-	r	tr	CLAYSTONE: As above.
1187	85	-	r	tr	CLAYSTONE: As above.
	15	-	-	-	SANDSTONE: Clear, friable with abundant loose grains, fine to coarse, dominantly medium to coarse, dominantly subrounded, moderately sorted quartz, trace light grey argillaceous matrix, good inferred porosity. No shows.
1190	100	-	r	tr	CLAYSTONE: As above.
1193	100	-	r	tr	CLAYSTONE: As above, commonly silty, slightly finely arenaceous in part, trace hard dolomite band, as above.
1196	100	-	r	tr	CLAYSTONE: As above.
1199	100	-	r	tr	CLAYSTONE: As above.
	tr	-	-	-	SANDSTONE: As above, dominantly fine.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1202	100	-	r	tr	CLAYSTONE: As above.
1204	100	-	r	tr	CLAYSTONE: As above, trace hard dolomite band, as above.
1208	20	-	-	-	PEBBLY CONGLOMERATE: Light grey, clear to light yellowish brown in part, very hard, medium pebbles, rounded (all broken and angular), and common coarse to very coarse subrounded to rounded sand grains, moderately sorted quartz with light yellowish brown staining in part, rare to common grey and light brown, very coarse to granule lithics, abundant strong siliceous and calcareous cement, rare to common strong pyrite cement, trace medium brown very hard dolomite band, rare very coarse pyrite nodules, nil visual porosity. No shows.
	80	-	tr	tr	CLAYSTONE: Medium to dark grey, occasionally medium to dark brownish grey, firm, moderately hard in part, blocky, rarely subfissile in part, moderately silty, rare micromica, rare to trace glauconite and carbonaceous flecks and detritus, rarely finely arenaceous in part, non calcareous.
1211	100	-	c	tr	CLAYSTONE: As above, becoming dominantly silty, grading in part to Silty Claystone, common glauconite.
1214	100	-	c	tr	SILTY CLAYSTONE: Generally as above, becoming abundantly silty.
1217	100	-	c	tr	SILTY CLAYSTONE: As above, grading in part to Argillaceous Siltstone.
1220	100	-	c	tr	SILTY CLAYSTONE: As above, slightly calcareous in part, trace medium brown, very hard dolomite band.
1223	100	-	c	tr	SILTY CLAYSTONE: As above, trace dolomite band as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1226	100	-	c	tr	SILTY CLAYSTONE: Generally as above, occasionally medium greenish grey in part, slightly to occasionally moderately finely arenaceous in part, trace dolomite bands as above.
1229	100	-	c	tr	SILTY CLAYSTONE: As above, trace pyrite nodules.
1232	100	-	c	tr	SILTY CLAYSTONE: As above.
1235	100	-	c	tr	SILTY CLAYSTONE: Generally as above, medium to dark grey, medium to dark brownish grey in part, rarely medium greenish grey, dominantly firm, occasionally moderately hard, dominantly blocky, commonly to occasionally abundantly silty, slightly calcareous in part, common fine glauconite, trace fine quartz sand grains, trace carbonaceous flecks and laminae, trace medium brown moderately hard dolomitic band (with trace glauconite), trace pyrite nodules, grading to argillaceous siltstone in part.
1238	100	-	c	tr	SILTY CLAYSTONE: Generally as above, common to abundant hard dolomitic bands as above.
1241	100	-	c	tr	SILTY CLAYSTONE: Generally as above, dominantly medium grey, trace dolomite bands as above.
1244	100	-	c	tr	SILTY CLAYSTONE: As above.
1247	100	-	c	tr	SILTY CLAYSTONE: As above.
1250	100	-	r	tr	SILTY CLAYSTONE: Generally as above, light/medium to medium grey to brownish grey, dominantly firm, non calcareous, trace medium brown moderately hard dolomitic bands, trace pyrite nodules.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1253	100	-	r	tr	SILTY CLAYSTONE: Generally as above, medium to dark grey to brownish grey, dominantly firm, hard in part, minor to common glauconite, trace carbonaceous matter, grades to arenaceous claystone in part
1256					SAMPLE MISSED
1259	100	-	c	tr	SILTY CLAYSTONE: Generally as above, common glauconite, rare medium brown moderately hard dolomite bands.
1262	100	-	r	tr	SILTY CLAYSTONE: Generally as above, dominantly medium to dark grey, minor glauconite, rare to ?minor medium brown moderately hard dolomite bands.
1265	100	-	c	tr	SILTY CLAYSTONE: As above.
1268					SAMPLE MISSED
1271	100	-	r	tr	SILTY CLAYSTONE: Generally as above, dominantly medium to dark grey to greyish brown, rare light to light/medium greyish brown, lighter fraction contains common to abundant very fine quartz grains, grades to arenaceous claystone, trace nodular pyrite, trace medium brown slightly to moderately hard dolomite bands.
1274					SAMPLE MISSED
1277	100	-	r	tr	SILTY CLAYSTONE: As above.
1280					SAMPLE MISSED
1283	100	-	r	tr	SILTY CLAYSTONE: As above, trace microfracture filled calcareous material, trace moderately bright yellowish white mineral fluorescence.

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1286	100	-	r	tr	SILTY CLAYSTONE: As above, trace microfracture filled calcareous material, trace mineral fluorescence as above.
1289	90	-	c	tr	SILTY CLAYSTONE: As above, trace microfractured filled calcareous material, trace mineral fluorescence as above.
	10	-	-	-	SANDSTONE: Clear to translucent, friable with abundant loose grains, fine to medium, dominantly subrounded, moderate to well sorted quartz, no apparent matrix, very good inferred porosity. No shows.
1292	100	-	c	tr	SILTY CLAYSTONE: As above, dominantly medium to dark grey.
1295					SAMPLE MISSED
1298	90	-	c	tr	SILTY CLAYSTONE: As above, trace microfracture filled calcareous material, trace mineral fluorescence as above.
	10	-	tr	-	SANDSTONE: Clear, translucent to very light grey in part, friable with common loose grains, dominantly fine to occasionally medium grained, trace very light grey to greenish grey dispersive argillaceous matrix, common medium grained glauconite grains, good to very good inferred porosity.
1301	90	-	c	tr	SILTY CLAYSTONE: As above, microfracture filled calcareous material, trace mineral fluorescence as above.
	10	-	tr	-	SANDSTONE: As above.
1304					SAMPLE MISSED
1307	90	-	c	tr	SILTY CLAYSTONE: As above.
	10	-	tr	-	SANDSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1310	95	-	c	tr	SILTY CLAYSTONE: Generally as above, trace moderately soft.
	5	-	tr	-	SANDSTONE: As above.
1313	100	-	c	tr	SILTY CLAYSTONE: As above.
1316	100	-	c	tr	SILTY CLAYSTONE: As above, trace foram.
1319	100	-	c	tr	SILTY CLAYSTONE: Generally as above, dominantly medium/dark.
1322	100	-	c	tr	SILTY CLAYSTONE: Generally as above, medium to medium/dark grey.
1325	100	-	c	tr	SILTY CLAYSTONE: Generally as above, commonly grades to argillaceous sandstone, rare medium brown moderately hard arenaceous dolomite.
1328	100	-	c	tr	SILTY CLAYSTONE: As above.
1331	100	-	c	tr	SILTY CLAYSTONE: As above.
1334	100	-	r	tr	SILTY CLAYSTONE: As above.
1337	100	-	r	tr	SILTY CLAYSTONE: As above
	r	-	-	-	SANDSTONE: Clear, friable with loose grains, fine/medium grained, subangular, well sorted, good inferred porosity. No shows.
1340	100	-	r	tr	SILTY CLAYSTONE: As above
	r	-	-	-	SANDSTONE: As above.
1343	100				SILTY CLAYSTONE: As above
1346	100	-	r	tr	SILTY CLAYSTONE: Generally as above, typically medium to medium/dark grey and brownish grey, rarely light/medium grey and brownish grey, silty and moderately arenaceous.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1349	100	-	r	tr	SILTY CLAYSTONE: As above, grading to argillaceous siltstone.
1352	100	-	r	tr	SILTY CLAYSTONE: As above, grading to argillaceous siltstone.
1355	100	-	r	tr	SILTY CLAYSTONE: As above, grading to argillaceous siltstone.
1358	100	-	r	tr	SILTY CLAYSTONE: Generally as above, dominantly medium brownish grey, moderately arenaceous, grades to argillaceous siltstone.
1361	100	-	r	tr	SILTY CLAYSTONE: As above, grades to argillaceous siltstone.
1364					SAMPLE MISSED
1367	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, medium to medium/dark brownish grey, abundantly silty, grades to argillaceous siltstone, trace clear granules (igneous?) quartz lithics,
1370	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1373	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, trace fossil fragments, trace coarse pyrite nodules.
1376	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1379	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1382	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, medium to dark grey to brownish grey, firm to moderately hard, rarely hard in part, occasionally soft in part, dominantly blocky, rarely subfissile, abundantly silty, rarely micromicaceous and carbonaceous, very slightly carbonaceous in part, occasionally finely arenaceous in part, trace fracture filling calcareous material, trace light to dominantly medium brown hard dolomite band, rare glauconite, nil to trace pyrite nodules.
1385	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1388	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1391	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1394	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1397	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1400	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1403	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1406	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1409	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1412	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1415	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1418	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, with rare coarse cryptocrystalline pyrite.
1421	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1424	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above, rare dolomite bands as above.
1427	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1430	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1433	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1436	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1439	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1442	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1445	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1448	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1451	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1454	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1457	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1460	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
	r	-	-	-	SANDSTONE: Clear to light grey, friable with predominantly loose grains, medium grained, subangular, moderately sorted quartz grains, minor fairly strong silica cement, rare light grey argillaceous matrix, ?fair inferred porosity, no shows.
1463	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
	r	-	-	-	SANDSTONE: As above
1466	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, dominantly medium grey to dark brownish grey in part, commonly light/medium greyish brown, light/medium greyish brown fraction is moderately calcareous.
	r	-	-	-	SANDSTONE: As above
1469	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: Generally as above, dominantly medium to medium/dark grey and brownish grey.
	tr	-	-	-	SANDSTONE: As above
1472	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1475	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1478	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
	r	-	tr	r	SANDSTONE: Light grey, slightly hard to hard, subblocky, fine/medium grained, subangular to subrounded, well sorted, common fairly strong calcareous cement, rare siliceous cement, rare light grey argillaceous matrix, trace glauconite, rare carbonaceous flecks, rare micromica, very poor to nil visible porosity. No shows.
1481	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1484	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above, trace fossil (?Bryozoa) fragments.
1487	100	-	r	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above, trace foram fossil.
1490	100	-	r	r	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, medium to medium/dark greyish brown to grey, firm to slightly hard, commonly moderately hard, subblocky to blocky, darker fraction generally blocky, occasionally subfissile, rare calcareous cement, trace ?siliceous cement, abundant medium/dark greyish brown slightly calcareous argillaceous matrix, commonly matrix supported and grading to silty claystone, rarely to commonly finely arenaceous, rare carbonaceous flecks, rare glauconite, common micromica and trace mica flakes, trace microcrystalline and fine grained cryptocrystalline pyrite, trace fossil fragments, trace medium brown moderately hard dolomite bands (with trace very fine grained glauconite, trace carbonaceous flecks).

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1493	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, trace calcareous material infilling fracture.
1496	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1499	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, rare nodular and fine/medium microcrystalline pyrite.
1502	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1505	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1508	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1511	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1514	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1517	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, trace clear to off white calcite veins infilling fractures.
1520	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, trace thin (<0.5 mm) microcrystalline pyrite laminae.
1523	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1526	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above, trace framboidal pyrite.

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1529	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, rare medium brown to medium dark brown very hard dolomite.
1532	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, moderately micromicaceous, trace very fine grained glauconite, trace carbonaceous flecks, rare medium brown to medium dark brown very hard dolomite.
1535	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1538	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1541	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, trace pyritised coaly (plant) fragments
1544	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1547	100	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, dominantly medium grey to greyish brown, rarely medium/dark grey to greyish brown, trace Inoceramus bivalve fragment (positively identified).
1550	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, dominantly medium to medium/dark grey to brownish grey, trace Inoceramus fragment.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1553	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, with rare off white to light buff, amorphous, very soft to soft and commonly dispersive ?kaolinitic claystone (possibly rock flour?), trace orangey red loose very coarse/granule grade rounded quartz grains.
1556	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above, nil off white claystone.
1559	100	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, dominantly medium/dark grey to brownish grey, trace Inoceramus fragment.
1562	100	-	r	tr	ARGILLACEOUS SILTSTONE: Generally as above, dominantly medium to occasionally dark grey and brownish grey, firm to moderately hard, occasionally hard, subblocky to dominantly blocky, rarely subfissile, trace siliceous cement in part, abundantly argillaceous, rarely to commonly micromicaceous, rare to trace carbonaceous flecks, moderately finely arenaceous in part, trace pyrite and calcareous material fracture infill, rare to trace Inoceramus, nil to trace shell fragments, rare to trace glauconite, rare medium brown hard dolomite bands.
1565	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1568	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1571	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1574	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1577	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1580	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1583	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1586	100	-	r	tr	ARGILLACEOUS SILTSTONE: Generally as above, dominantly medium to occasionally dark grey and brownish grey, firm to moderately hard, occasionally hard, subblocky to dominantly blocky, rarely subfissile, trace siliceous cement in part, abundantly argillaceous, rarely to commonly micromicaceous, rare to trace carbonaceous flecks, moderately finely arenaceous in part, trace pyrite and calcareous material fracture infill, rare to trace Inoceramus, nil to trace shell fragments, rare to trace glauconite, rare medium brown hard dolomite bands.
1589	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1592	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1595	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1598	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1601	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1604	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1607	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1610	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1613	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1616	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1619	100	-	r	tr	ARGILLACEOUS SILTSTONE: Generally as above, dominantly medium to occasionally dark grey and brownish grey, firm to moderately hard, occasionally hard, subblocky to dominantly blocky, rarely subfissile, trace siliceous cement in part, abundantly argillaceous, rarely to commonly micromicaceous, rare to trace carbonaceous flecks, moderately finely arenaceous in part, trace pyrite and calcareous material fracture infill, rare to trace Inoceramus, nil to trace shell fragments, rare to trace glauconite, rare medium brown hard dolomite bands.
1622	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1625	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1628	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1631	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1634	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1637	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1640	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1643	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1646	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.
1647	100	-	r	tr	ARGILLACEOUS SILTSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1649	100	-	-	tr	SANDSTONE: Light grey to clear, friable with common loose grains to moderately hard in part, fine to medium grained, very occasionally coarse grained in part, subangular to dominantly subrounded, moderate to well sorted quartz grains, rare to occasionally common moderately weak to moderately strong calcareous cement, nil to trace moderately strong siliceous cement, rare to occasionally common dominantly off white to occasionally light grey argillaceous matrix, trace carbonaceous detritus, rare to trace mica, nil to trace partially altered feldspar, trace to nil lithics, fair to poor visual porosity. No shows.
1652	10	-	-	tr	SANDSTONE: As above. No shows.
	80	-	tr	tr	CLAYSTONE: Medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	10	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: Medium grey to occasionally medium brownish grey, firm to moderately hard, blocky, abundantly argillaceous, rare to trace moderately strong calcareous cement, rare to trace glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to fine argillaceous sandstone, nil to very poor visual porosity. No shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1655	100	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: Medium grey to occasionally medium brownish grey, firm to moderately hard, blocky, abundantly argillaceous, rare to trace moderately strong calcareous cement, rare to trace glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to fine argillaceous sandstone.
1658	30	-	tr	tr	CLAYSTONE: Medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	70	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: As above
1661	40	-	tr	tr	CLAYSTONE: As above.
	40	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: As above.
	20	-	tr	tr	SANDSTONE: Clear to light grey, occasionally light brownish grey. friable with common loose grains, hard in part, dominantly medium, occasionally coarse grain, dominantly subrounded, moderately well sorted quartz grains, rare to occasionally common off white to light grey argillaceous matrix, rare to common moderately strong calcareous and rare to trace moderately strong siliceous cement in part, trace glauconite, pyrite nodules, mica and carbonaceous detritus and laminae, trace medium brown very hard dolomite bands, good visual porosity in friable portion, poor to nil visual porosity in cemented fraction. No shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1664	20	-	tr	tr	CLAYSTONE: As above.
	20	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: as above.
	30	-	tr	tr	SANDSTONE: Clear to light grey to very light brownish grey, friable with abundant loose grains, dominantly medium to occasionally coarse, dominantly subrounded, moderately sorted quartz, trace light grey dispersive argillaceous matrix, good to very good inferred porosity. No shows.
	30	-	tr	tr	SANDSTONE: Generally as above, hard to very hard, common to abundant strong calcareous siliceous and rare to common pyritic cement, nil to poor visual porosity. No shows. NOTE: The porous sandstone described herein occurs at the base of this interval, below the more cemented sandstone variety.
1667	40	-	tr	tr	CLAYSTONE: As above.
	40	-	tr	tr	SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: as Above.
	10	-	tr	tr	SANDSTONE: Friable, as above.
	10	-	tr	tr	SANDSTONE: Hard, as above.
1670	40	-	tr	tr	CLAYSTONE: As above.
	60	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1673	40	-	tr	tr	CLAYSTONE: Medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	60	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: light to medium grey to occasionally medium brownish grey, moderately hard, rarely friable with rare to common loose sand grains, very fine to fine, silt size in part, rarely medium in part, dominantly subrounded, moderately well sorted quartz,abundant off-white to light grey argillaceous matrix, rare to trace moderately strong calcareous cement, rare to trace glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to argillaceous siltstone, poor to very poor visual porosity. No shows.
1676	40	-	tr	tr	CLAYSTONE: As above.
	60	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above, rare medium grained in part.
1679	50	-	tr	tr	CLAYSTONE: As above.
	50	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1682	50	-	tr	tr	CLAYSTONE: As above.
	50	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1685	50	-	tr	tr	CLAYSTONE: As above.
	50	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As Above, dominantly very fine, dominantly silty.
1688	50	-	tr	tr	CLAYSTONE: As above.
	50	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1691	70	-	tr	tr	CLAYSTONE: As above.
	30	-	tr	tr	ARGILLACEOUS SANDSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1694	80	-	tr	tr	CLAYSTONE: As above.
	20	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: As above.
1697	80	-	tr	tr	CLAYSTONE: Medium to dark grey, firm to moderately hard, subblocky to dominantly blocky, rarely to moderately silty in part, trace carbonaceous flecks, trace to rare glauconite, non calcareous.
	20	-	tr	tr	ARGILLACEOUS SILTSTONE GRADING TO ARGILLACEOUS SANDSTONE: Medium grey to occasionally medium brownish grey, firm to moderately hard, blocky, abundantly argillaceous, rare to trace moderately strong calcareous cement, rare to trace glauconite and carbonaceous flecks, trace mica, trace partially altered feldspar, commonly to abundantly finely arenaceous, grading in part to fine argillaceous sandstone.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1700	100	-	c	tr	SILTY CLAYSTONE: Medium to dark grey, occasionally medium to dark brownish grey, firm to moderately hard, dominantly blocky to occasionally subfissile, common to abundantly silty in part, rarely very finely arenaceous in part, trace micromica and carbonaceous flecks, common fine to medium glauconite pellets, trace pyrite nodules, non calcareous.
1703	100	-	c	tr	SILTY CLAYSTONE: As above.
1706	100	-	c	tr	SILTY CLAYSTONE: As above.
1709	100	-	c	tr	SILTY CLAYSTONE: As above.
1712	100	-	c	tr	SILTY CLAYSTONE: As above.
1715	100	-	c	tr	SILTY CLAYSTONE: As above.
1718	100	-	c	tr	SILTY CLAYSTONE: As above.
1721	100	-	c	tr	SILTY CLAYSTONE: As above.
1724	100	-	c	tr	SILTY CLAYSTONE: As above.
1727	100	-	c	tr	SILTY CLAYSTONE: As above.
1730	100	-	c	tr	SILTY CLAYSTONE: As above.
1733	100	-	c	tr	SILTY CLAYSTONE: As above.
1736	100	-	c	tr	SILTY CLAYSTONE: As above.
1739	100	-	c	tr	SILTY CLAYSTONE: As above.
1742	100	-	c	tr	SILTY CLAYSTONE: As above.
1745	100	-	c	tr	SILTY CLAYSTONE: As above, commonly hard.
1748	100	-	c	tr	SILTY CLAYSTONE: As above.
1751	100	-	c	tr	SILTY CLAYSTONE: As above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1754	100	-	c	tr	SILTY CLAYSTONE: As above, grading in part to argillaceous siltstone, trace fine to medium quartz sand grains.
1757	100	-	c	tr	SILTY CLAYSTONE: Medium to dark grey, occasionally medium to dark brownish grey and greenish grey, firm to moderately hard, occasionally hard in part dominantly blocky to occasionally subfissile, common to abundantly silty in part, rarely very finely arenaceous in part, trace micromica and carbonaceous flecks, common fine to medium glauconite pellets, trace pyrite nodules, non calcareous, grading in part to argillaceous siltstone.
1760	100	-	c	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1763	100	-	c	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1766	100		c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1769	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1772	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1775	100		c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1778	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1781	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1784	100	-	c	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1787	100	-	c	tr	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE: As above.
1790	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1793	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1799	100	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1802	80	-	r	tr	ARGILLACEOUS SANDSTONE: Light/medium grey to medium grey, friable to commonly slightly hard aggregates, subblocky, fine grained, subrounded to predominantly subangular, very well sorted, rare fairly strong siliceous cement, no calcareous cement, common to abundant light grey argillaceous matrix, common silt, rare to minor off white altered ?feldspar grains, trace medium brownish grey lithics, trace micromica, trace mica flakes, trace carbonaceous material, rare to minor glauconite grains and pellets, trace microcrystalline pyrite grains and ?cement, trace pyrite nodules, grades to arenaceous argillaceous siltstone, poor to ?fair visual porosity. No shows.
	20	-	c	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, commonly finely arenaceous.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1805	70	-	tr	tr	ARGILLACEOUS SANDSTONE: Generally as above, abundantly argillaceous, occasionally matrix supported, rare to minor glauconite grains, grades substantially to (and from) arenaceous argillaceous siltstone, very poor visual porosity. No shows.
	30	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, generally commonly to abundantly finely arenaceous, grading to argillaceous sandstone, very poor to nil visual porosity. No shows.
1808	80	-	tr	tr	ARGILLACEOUS SANDSTONE: Generally as above, trace loose coarse angular quartz grains, trace pyritised plant fragments.
	20	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: Generally as above, abundantly finely arenaceous.

BHP Petroleum

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1811	100	-	-	-	SANDSTONE: Clear to translucent, ?friable with abundant loose grains, moderately hard aggregates in part, medium to very coarse, dominantly coarse, subrounded to predominantly subangular (angularity due to fracturing from PDC bit cutting action) moderately sorted quartz grains, rare to occasionally common off white to light grey dispersive argillaceous matrix (washed away), rare to common moderately strong siliceous cement, trace mica, trace pyrite nodules and weak microcrystalline pyrite cement, fair to good inferred porosity. No shows. NOTE: It is interpreted that angularity of quartz grains could be partly due to PDC bit action rather than reflecting the hardness of the sandstone (and strength of cement).
	c	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above, interpreted as cavings.
1814	90	-	-	-	SANDSTONE: As above, fair to good interpreted porosity. No shows.
	10	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
1817	100	-	-	-	SANDSTONE: As above, trace Inoceramus fossil fragment, fair to good interpreted porosity. No shows.
	c	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1820	90	-	-	-	SANDSTONE: Generally as above, rare coarse to granule grade nodular and framboidal pyrite, fair to good visual porosity, no shows.
	10	-	r	tr	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE: As above.
Cut core # 1 from 1821-1828 mRT Cut core # 2 from 1828-1842.5 mRT Cut core # 3 from 1842.5-1847 mRT See section 3.3.1 "Core Description"					
1850	100	-	-	tr	SANDSTONE: Clear to light grey, moderately hard to occasionally friable with abundant loose grains, medium to coarse, abundantly coarse, rarely fine in part, subangular to subrounded (angular grains are due to bit action) poorly sorted quartz grains, rare light grey dispersive argillaceous matrix, rare to common moderately strong siliceous cement, trace carbonaceous detritus and mica, fair to occasionally good porosity. No shows.
1853	100	-	-	tr	SANDSTONE: As above. No shows.
1856	100	-	-	tr	SANDSTONE: As above. No shows.
1859	100	-	-	tr	SANDSTONE: Dominantly as above, very coarse grained. No shows.
1862	100	-	-	tr	SANDSTONE: As above. No shows.
1865	100	-	-	tr	SANDSTONE: As above.
1868	100	-	-	tr	SANDSTONE: As above.
1871	100	-	-	tr	SANDSTONE: As above.

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1874	70	-	-	tr	SANDSTONE: As above. No shows.
	30	-	-	tr-r	CLAYSTONE: Medium to dark grey, firm to moderately hard, blocky to occasionally subfissile, slightly silty, non calcareous, rare carbonaceous flecks and micromica, trace coaly fragments.
1877	100	-	-	tr	SANDSTONE: Generally as above, dominantly coarse. No shows.
1880	100	-	-	tr	SANDSTONE: Generally as above, trace disseminated pyrite/cement.
1883	100	-	-	tr	SANDSTONE: Generally as above, dominantly medium to coarse, with rare to common rock flour. Trace slickenside.
1886	100	-	-	tr	SANDSTONE: Clear to light grey, moderately hard to friable with abundant loose grains in part, medium to very coarse grained, occasionally fine grained and granule grade, subangular to subrounded (angular grains broken due to bit action), poorly to moderately sorted quartz, trace light grey dispersive argillaceous matrix (washed away), rare to common moderately strong siliceous cement, trace moderately strong pyrite cement, trace disseminated cryptocrystalline pyrite and pyritised plant fragments, trace coaly detritus, nil to trace lithics, nil to trace structural kaolinite, fair to occasionally good visual porosity in part. No shows.
1889	60	-	-	tr	SANDSTONE: As above.
	40	-	-	tr-r	CLAYSTONE: Medium to dark grey, firm to moderately hard, blocky to occasionally subfissile, slightly silty, non calcareous, rare carbonaceous flecks and micromica, trace coaly fragments.

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Well: MINERVA-1
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Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
1892	100	-	-	tr	SANDSTONE: As above.
1895	100	-	-	tr	SANDSTONE: Clear to occasionally light grey, friable with abundant loose grains to moderately hard, medium to very coarse, dominantly coarse, dominantly subrounded moderately to well sorted quartz grains, rare off white kaolinitic and light grey dispersive argillaceous matrix (washed away), rare to occasionally common moderately weak to occasionally moderately strong siliceous cement, trace moderately strong pyrite cement, trace coaly detritus, structural kaolinite grains and pyrite nodules, trace rock flour, good inferred visual porosity. No shows.
1898	100	-	-	tr	SANDSTONE: As above.
1901	100	-	-	tr	SANDSTONE: As above.
1094	100	-	-	tr	SANDSTONE: As above.
1907	100	-	-	tr	SANDSTONE: As above, with no direct or cut fluorescence, very weak very slow dull yellowish white crush cut, thin, dull, bluish white residual ring.
1910	80	-	-	tr	SANDSTONE: As above.
	20	-	-	tr	CLAYSTONE: Medium to dark grey, firm to moderately hard, trace micromica and carbonaceous flecks, non calcareous, moderately silty, rarely finely arenaceous in part, grading in part to argillaceous siltstone.
1913	80	-	-	tr	SANDSTONE: As above.
	20	-	-	tr	CLAYSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
1916	80	-	-	tr	SANDSTONE: Clear to occasionally light grey, friable with abundant loose grains to moderately hard, medium to very coarse, dominantly coarse, occasionally fine, dominantly subrounded moderately to well sorted quartz grains, rare off white kaolinitic and light grey dispersive argillaceous matrix (washed away), rare to occasionally common moderately weak to occasionally moderately strong siliceous cement, trace moderately strong pyrite cement, fine aggregates have no cement, trace coaly detritus, structural kaolinite grains and pyrite nodules, good inferred visual porosity. No direct or cut fluorescence, very weak, very slow, dull yellowish white crush cut and thin, dull bluish white residual ring.
	20	-	-	tr	CLAYSTONE: Medium to dark grey, occasionally medium brownish grey, firm to moderately hard, trace micromica and carbonaceous flecks, non calcareous, moderately silty, rarely finely arenaceous in part, grading in part to argillaceous siltstone.
1919	90	-	-	tr	SANDSTONE: As above.
	10	-	-	tr	CLAYSTONE: As above.
1922	90	-	-	tr	SANDSTONE: As above.
	10	-	-	tr	CLAYSTONE: As above.
1925	100	-	-	tr	SANDSTONE: As above.
1928	100	-	-	tr	SANDSTONE: As above.
1931	100	-	-	tr	SANDSTONE: As above, dominantly medium to coarse.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
1934	80	-	-	tr	SANDSTONE: As above.
	28	-	-	tr	CLAYSTONE: As above.
1937	90	-	-	tr	SANDSTONE: As above.
	10	-	-	tr	CLAYSTONE: As above.
1940	100	-	-	tr	SANDSTONE: As above, no direct or cut fluorescence, extremely weak extremely pale bluish white crush cut, moderately wide pale light greenish yellow residual ring fluorescence.
1943	100	-	-	tr	SANDSTONE: As above, no direct or cut fluorescence, extremely weak extremely pale bluish white crush cut, moderately wide pale light greenish yellow residual ring fluorescence.
1946	60	-	-	tr	SANDSTONE: Clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse dominantly medium grained, occasionally very coarse, subangular to dominantly subrounded poorly sorted quartz grains, rare to occasionally common light grey argillaceous matrix, rare moderately strong siliceous cement, nil to trace moderately strong pyrite cement, trace coaly particles, mica and lithics, trace rock flour, fair to good inferred/visual porosity, no direct or cut fluorescence, extremely weak extremely pale bluish white crush cut, moderately wide very pale light greenish yellow residual ring fluorescence.
	40	-	-	tr	CLAYSTONE: Medium to occasionally dark grey, medium brownish grey in part, firm, rarely soft and sticky, occasionally subblocky, moderately silty, grading in art to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles. No direct, cut or crush cut fluorescence, very thin moderately dull bluish white residual ring.

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1949	60	-	-	tr	SANDSTONE: As above. No shows.
	40	-	-	tr	CLAYSTONE: As above.
1952	100	-	-	tr	SANDSTONE: Generally as above, dominantly coarse, good inferred/visual porosity.
1955	80	-	-	tr	SANDSTONE: As above.
	20	-	-	tr	CLAYSTONE: Generally as above, dominantly firm.
1958	100	-	-	tr	SANDSTONE: Generally as above, dominantly medium.
1961	100	-	-	tr	SANDSTONE: Generally as above, dominantly medium to coarse.
1964	100	-	-	tr	SANDSTONE: Generally as above, dominantly coarse to very coarse.
1967	100	-	-	tr	SANDSTONE: Generally as above, dominantly coarse with trace coarse lithics.
1970	60	-	-	tr	SANDSTONE: As above.
	40	-	-	tr	CLAYSTONE: Dark grey, firm to moderately hard in part, blocky to subfissile in part, moderately silty grading in part to argillaceous siltstone, rare micromica and carbonaceous flecks, non calcareous.
1973	100	-	-	tr	SANDSTONE: Generally as above, predominantly clear, medium to very coarse grained, rare granules, dominantly medium/coarse grained, good to very good inferred porosity.
1976	100	-	-	tr	SANDSTONE: As above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1979	90	-	-	tr	SANDSTONE: Clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse dominantly medium/coarse grained, occasionally very coarse, subangular to subrounded poorly sorted quartz grains, rare off white kaolinitic and light grey argillaceous matrix, rare moderately strong siliceous cement, nil to trace moderately strong pyrite cement, trace coaly particles, mica and lithics, fair to good inferred/visual porosity.
	10	-	-	tr	CLAYSTONE: Medium to occasionally dark grey, medium brownish grey in part, firm and moderately hard in part, rarely soft and sticky, occasionally subblocky, moderately silty, grading in art to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles. No direct, cut or crush cut fluorescence, very thin moderately dull bluish white residual ring.
1982	100	-	-	tr	SANDSTONE: Generally as above, dominantly medium/coarse grained with rare strong pyrite cement, trace slightly hard calcareous cement in part, and trace pyrite nodules.
1985	100	-	-	tr	SANDSTONE: As above.
	c	-	-	tr	CLAYSTONE: As above.
1988	90	-	-	tr	SANDSTONE: Generally as above, dominantly coarse to very coarse grained, trace calcareous fossil fragments.
	10	-	-	tr	CLAYSTONE: As above.
1991	100	-	-	tr	SANDSTONE: Generally as above, dominantly medium/coarse, with minor granule grade quartz grains typically frosted in appearance due to rare quartz overgrowths.
	c	-	-	tr	CLAYSTONE: As above.

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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
1994	90	-	-	tr	SANDSTONE: Generally as above, fine/medium to very coarse grained with common granule grade quartz grains, dominantly subangular with common subrounded, poorly sorted quartz sand grains, rare to minor off white structural kaolinite, fair inferred porosity.
	10	-	-	tr	CLAYSTONE: As above, trace calcareous.
1997	50	-	-	tr	SANDSTONE: Generally as above, rare light grey fine grained well sorted aggregates, rare to common off white structural kaolinite.
	50	-	-	tr	CLAYSTONE: Generally as above, commonly off white and kaolinitic.
2000	100	-	-	tr	CLAYSTONE: Two types (i) 70%, Off white, soft, amorphous and dispersive in part, silty commonly finely arenaceous in part. (ii) 30%, Medium to occasionally dark grey, firm to moderately hard in part, subblocky, rare micromica, trace disseminated microcrystalline pyrite, trace carbonaceous flecks, grades in part to argillaceous siltstone.
	tr	-	-	tr	SANDSTONE: Clear to light grey, friable with abundant loose grains to moderately hard, predominantly fine, to medium grained, rare coarse and occasionally trace granule (possibly cavings), subrounded to subangular well sorted quartz grains, trace to rare off white kaolinite and light grey argillaceous matrix, nil to rare moderately strong siliceous cement in part, trace carbonaceous flecks, trace microcrystalline pyrite, fair visual porosity.

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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2003	90	-	-	tr	CLAYSTONE: Subequal (i) and (ii) As above.
	10	-	-	tr	SANDSTONE: Generally as above, both fine/medium and coarse grained aggregates, well sorted, fair visual porosity. No direct, cut or crush cut fluorescence. No residual ring.
2006	90	-	-	tr	SANDSTONE: Clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse dominantly medium/coarse grained, occasionally very coarse, subangular to subrounded poorly sorted quartz grains, rare off white kaolinitic and light grey argillaceous matrix, rare moderately strong siliceous cement, nil to trace moderately strong pyrite cement, trace coaly particles, mica and lithics, fair to good inferred/visual porosity.
	10	-	-	tr	CLAYSTONE: Medium to occasionally dark grey, medium brownish grey in part, firm and moderately hard in part, rarely soft and sticky, occasionally subblocky, moderately silty, grading in art to argillaceous siltstone, non calcareous, trace carbonaceous flecks, rare coaly particles. No direct, cut or crush cut fluorescence, very thin moderately dull bluish white residual ring.
2009	100	-	-	tr	SANDSTONE: As above.
	c	-	-	tr	CLAYSTONE: As above.
2012	100	-	-	tr	SANDSTONE: Generally as above, quartz grains typically show frosted surfaces due to quartz overgrowths.
2015	100	-	-	tr	SANDSTONE: Generally as above, very fine/fine to very coarse grained, rare granule grained, subangular, poorly sorted quartz grains displaying common quartz overgrowths.

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2018	60	-	-	tr	SANDSTONE: Clear to light grey, friable with abundant loose grains, moderately hard in part, fine to coarse dominantly medium/coarse grained, occasionally very coarse, subangular to subrounded poorly sorted quartz grains, rare off white kaolinitic and light grey argillaceous matrix, rare moderately strong siliceous cement, nil to rare moderately to very strong pyrite cement, trace coaly particles, mica and lithics, fair to good inferred/visual porosity.
	40	-	-	tr-c	CLAYSTONE: Two types, subequal (i) Off white, soft to commonly firm, amorphous and dispersive in part, silty and commonly finely arenaceous in part. (ii) Medium to occasionally dark grey, firm to moderately hard in part, subblocky, rare micromica, trace disseminated microcrystalline pyrite, trace to occasionally common carbonaceous flecks and grains, grades in part to argillaceous siltstone.
2021	50	-	-	tr	SANDSTONE: As above.
	50	-	-	tr	CLAYSTONE: Two types, as above.
2024	40	-	-	tr	SANDSTONE: As above.
	60	-	-	tr	CLAYSTONE: As above.
2027	40	-	-	tr	SANDSTONE: Generally as above, rare pyrite cement and nodules.
	60	-	-	tr	CLAYSTONE: As above.
2030	80	-	-	tr	SANDSTONE: Generally as above, fine/medium to coarse grained, with minor to common very coarse to granule grade quartz grains.
	20	-	-	tr	CLAYSTONE: Two types, as above.

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2033	90	-	r	tr	<u>CLAYSTONE</u>: Medium to medium/dark brownish grey, soft and amorphous to dominantly firm to slightly hard and subblocky, silty, rare very fine glauconite grains, trace carbonaceous flecks, rare micromica, very slightest trace calcareous, trace finely arenaceous, trace microcrystalline pyrite, trace grey lithics.
	10	-	tr	tr	<u>SANDSTONE</u>: Clear to light grey, friable with loose grains, very fine to fine grained, common coarse to very coarse grains in places, subrounded to subangular well sorted quartz grains, trace to rare moderately strong siliceous cement, trace weak calcareous cement, nil to rare light grey argillaceous matrix, trace very fine grained grey to reddish brown lithics, trace carbonaceous detritus and laminae in part, trace glauconite, trace off white altered feldspar grains, trace mica flakes, fair to good visual and inferred porosity. No shows.
2036	30	-	r	tr	<u>CLAYSTONE</u>: Two types: (i) 70% medium to medium/dark brownish grey as above; (ii) 30% Off white, subblocky, firm to slightly hard in part, silty, commonly finely arenaceous, very slightly calcareous in part, trace carbonaceous flecks.
	70	-	tr-r	tr	<u>SANDSTONE</u>: Clear to light grey, slightly hard to friable with loose grains, medium/coarse grained with rare fine to medium and very coarse to granule grains, subangular to occasionally subrounded generally well sorted quartz grains, rare to minor strong siliceous cement, no calcareous cement, rare light grey argillaceous matrix (commonly washed away), rare medium greyish green lithics and glauconite grains, trace carbonaceous detritus, trace microcrystalline pyrite, fair visual/inferred porosity. No shows.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
2039	60	-	r	tr	CLAYSTONE: Two types as above, dominantly (i).
	40	-	tr	tr	SANDSTONE: Generally as above, trace pyrite cement.
2042	90	-	tr	tr	SANDSTONE: Generally as above, trace carbonaceous laminae.
	10	-	r	tr	CLAYSTONE: As above, subequal (i) and (ii), trace pyritised plant fragments.
2045	90	-	tr	tr	SANDSTONE: Generally as above, predominantly medium to coarse grained.
	10	-	r	tr	CLAYSTONE: Generally as above, type (i) grades from medium greyish brown to medium brownish grey, to medium/dark brownish grey.
2048	100	-	r	tr	SANDSTONE: Clear to light grey, moderately hard to friable with abundant loose grains, medium to coarse grained with minor granule grade, subangular to subrounded moderately sorted quartz grains, rare moderately strong siliceous cement, trace strong pyrite cement in part, slight trace calcareous cement, rare to trace off white kaolinitic and light grey argillaceous matrix (dominantly washed away), trace carbonaceous detritus as laminae, trace mica flakes within laminae, trace pyrite replacement of plant fragments, fair visual to good inferred porosity. No shows.
	c	-	r	r	CLAYSTONE: Medium to medium/dark brownish grey, firm to slightly hard, subblocky, silty, rare very fine glauconite grains, trace carbonaceous flecks, rare micromica, very slightest trace calcareous, trace finely arenaceous, trace microcrystalline pyrite, trace grey lithics.

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
2051	100	-	r	r	SANDSTONE: As above.
	c	-	r	r	CLAYSTONE: As above.
2054	100	-	r	r	SANDSTONE: As above.
	c	-	r	r	CLAYSTONE: As above.
2057	80	-	tr	tr	SANDSTONE: As above.
	20	-	r	r	CLAYSTONE: Two types, subequal: (i) medium to medium/darl brownish grey, as above; (ii) 30% off white, subblocky, soft to firm and slightly hard in part, silty, commonly finely arenaceous, very slightly calcareous in part, trace carbonaceous flecks.
2060	60	-	tr	tr	SANDSTONE: As above.
	40	-	r	r	CLAYSTONE: As above.
2063	30	-	tr	tr	SANDSTONE: As above.
	70	-	r	r	CLAYSTONE: As above.
2066	80	-	tr	tr	SANDSTONE: Generally as above, predominantly fine to medium grained with abundant coarse grains and occasional very coarse/granule grade.
	20	-	r	r	CLAYSTONE: Two types, subequal as above.
2069					SAMPLE MISSED DUE TO SHAKER SCREEN CHANGE
2072	30	-	tr	tr	SANDSTONE: As above.
	70	-	tr	r	CLAYSTONE: As above, with subequal proportions type (i) and (ii).

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
2075	70	-	tr	tr	CLAYSTONE: Two types: (i) 40% Off white, soft to firm, amorphous to subblocky, commonly finely arenaceous, trace carbonaceous specks, trace microcrystalline pyrite and cryptocrystalline pyritic nodules. (ii) 60% Medium brownish grey to dominantly greyish brown, grading to medium/dark in part, fairly soft to firm, sticky in part, subblocky, silty, rarely finely arenaceous in part, trace carbonaceous flecks, trace coaly particles, trace glauconite, non calcareous.
	30	tr	-	tr	SANDSTONE: clear to very light grey, friable with loose grains, fine to medium/coarse grained, rare very coarse/granule grade, subangular fair sorted quartz grains, trace to rare moderately weak siliceous cement, slightest trace calcareous cement, trace light grey argillaceous matrix, trace carbonaceous matter, trace light grey lithics, good to very good visual and inferred porosity. No shows.
2078	50	-	tr	tr	CLAYSTONE: As above.
	50	-	-	tr	SANDSTONE: As above.
2081	70	-	tr	tr	CLAYSTONE: As above.
	30	-	-	tr	SANDSTONE: As above.
2084	100	-	tr	tr	CLAYSTONE: As above, dominantly (i).
	c	-	-	tr	SANDSTONE: As above.
2087	100	-	tr	tr	CLAYSTONE: Generally as above, (i) 95%, grading to silty claystone; (ii) 5%

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2090	100	-	tr	tr	CLAYSTONE: Generally type (i) as above, grading to silty arenaceous claystone, trace dark chocolate brown, trace type (ii).
	r	-	-	tr	SANDSTONE: Generally as above, predominantly fine/medium grained and very well sorted, trace very fine grained lithics, trace amber, very good visual porosity.
	tr	-	r	-	DOLOMITE: Light/medium brown, very hard, blocky, rare fine grained glauconite pellets.
2093	100	-	tr	tr	CLAYSTONE: Generally as above, grading to silty arenaceous claystone, rare pyrite nodules.
	r	-	-	tr	SANDSTONE: Generally as above, grades to argillaceous sandstone.
2096	100	-	tr	tr	CLAYSTONE: As above, grades to silty claystone.
2099	100	-	tr	tr	CLAYSTONE: As above, grades to silty claystone.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2102	100	-	tr	r	SILTY CLAYSTONE: Medium greyish brown to dark brownish grey, soft and firm to moderately hard, subblocky to blocky, silty, commonly to abundantly finely arenaceous, grades in part to argillaceous silty sandstone, rare carbonaceous matter, trace coaly fragments, trace glauconite pellets, rare micromica, trace pyrite nodules.
	c	-	-	r	SANDSTONE: Light to medium grey, friable to slightly hard, fine to medium grained, subangular to subrounded well sorted quartz grains, rare moderately strong siliceous cement, rare abundant off white kaolinitic and medium to dark grey to greyish brown argillaceous matrix, grades in part to arenaceous claystone, nil to rare carbonaceous material, trace lithics, trace pyrite nodules, very poor to rarely poor visual porosity. No shows.
2105	100	-	tr	r	CLAYSTONE: Generally as above, with rare off white, soft to firm kaolinitic claystone, commonly finely arenaceous.
	c	-	-	r	SANDSTONE: As above.
	tr	-	r	tr	DOLOMITE: Light/medium brown very hard, rare glauconite grains, trace carbonaceous matter.
2107	50	-	-	r	SANDSTONE: Clear to light grey, friable with loose grains to slightly hard in part, fine/medium grained, subangular, well sorted quartz grains, trace to rare moderately weak siliceous cement, no calcareous cement, trace pyrite cemented aggregates in part, trace to rare off white to light grey argillaceous matrix (commonly washed away), trace carbonaceous matter,trace fine grained lithics, fair visual porosity. No shows.
	50	-	tr	tr	CLAYSTONE: Generally as above, grading to argillaceous sandstone in part.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2111	100				CEMENT
2114	70	-	tr	-	CLAYSTONE: medium dark grey to predominantly dark grey, trace silt, micromicaceous, trace glauconite pellets, sub blocky to blocky, dispersive in part, non calcareous.
	30	-	-	r	SANDSTONE: clear to translucent, friable with abundant loose grains, predominantly medium to occasionally coarse grained, rare very coarse to granule sized grains, sub rounded to rounded, occasionally sub angular, well sorted quartz, trace moderately strong silica cement, trace amber, rare coal fragments, moderate inferred porosity, no shows. Note: sample is heavily contaminated with cement and metal shavings.
2117	50	-	tr	-	CLAYSTONE: as above
	50	-	-	r	SANDSTONE: as above Note: sample is also cement and metal contaminated.
2120	70	-	-	r	SANDSTONE: as above
	30	-	tr	-	CLAYSTONE: as above

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
2123	60	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, friable to moderately hard, common loose grains, fine to coarse grained, dominantly fine to medium, common coarse and occasional very coarse grains, sub angular to sub rounded, occasionally angular, moderately sorted quartz, common moderately strong silica cement, trace to occasional moderately strong pyrite cement, trace very light grey argillaceous matrix, common coaly fragments, rare coaly laminae, trace amber, rare lithic grains, poor to moderate visual porosity, no shows.
	40	-	-	r	CLAYSTONE: medium dark grey to dark grey, moderately hard, blocky to sub fissile, trace silt, micromicaceous, rare coal fragments, rare pyrite, non calcareous.
2126	80	-	-	tr	SANDSTONE: as above
	20	-	-	r	CLAYSTONE: as above
2129	80	-	-	tr	SANDSTONE: as above
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: greyish black to black, vitreous lustre, sub conchoidal fracture, brittle, moderately hard.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	Description
2132	80	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, friable to moderately hard, common loose grains, fine to coarse grained, dominantly fine to medium, common coarse and occasional very coarse grains, sub angular to sub rounded, occasionally angular, moderately sorted quartz, common moderately strong silica cement, trace to occasional moderately strong pyrite cement, trace very light grey argillaceous matrix, common coaly fragments, rare coaly laminae, trace amber, rare lithic grains, poor to moderate visual porosity, no shows.
	20	-	-	r	CLAYSTONE: medium dark grey to dark grey, moderately hard, blocky to sub fissile, trace silt, micromicaceous, rare coal fragments, rare pyrite, non calcareous.
2135	80	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, friable to moderately hard, abundant loose grains, fine to medium grained, occasional coarse and rare very coarse grains, sub angular to sub rounded, occasionally angular, moderately well sorted quartz, common moderately strong silica cement, rare pyrite cement, trace to common very light grey argillaceous matrix, trace coal fragments, rare amber, trace to occasional lithic grains, poor visual porosity, trace mineral fluorescence, no shows.
	20	-	-	r	CLAYSTONE: as above
2138	70	-	-	tr	SANDSTONE: as above
	30	-	-	r	CLAYSTONE: as above
2141	70	-	-	tr	SANDSTONE: as above
	30	-	-	r	CLAYSTONE: as above, becoming more silty.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2144	60	-	-	tr	SANDSTONE: as above
	40	-	-	r	CLAYSTONE: as above
2147	70	-	-	a	CLAYSTONE: medium grey to medium dark grey, soft to moderately firm, common silt, abundant carbonaceous flecks, trace very fine sand, micromicaceous, blocky to sub fissile, non calcareous.
	30	-	-	tr	SANDSTONE: very light grey, clear to translucent grains, friable to moderately hard, abundant loose grains, very fine to medium grained, occasional coarse and rare very coarse grains, sub angular to sub rounded, occasionally angular, moderately well sorted quartz, common moderately strong silica cement, rare pyrite cement, trace to common very light grey argillaceous matrix, trace coal fragments, rare amber, trace to occasional lithic grains, rare feldspathic grains, poor visual porosity, trace mineral fluorescence, no shows.
2150	70	-	-	a	CLAYSTONE: as above
	20	-	-	tr	SANDSTONE: as above
	10	-	-	tr	SILTSTONE: medium dark grey, moderately hard, micromicaceous, trace carbonaceous flecks, grading to very fine grained sandstone in part, blocky, non calcareous.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm.

CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2153	70	-	-	a	CLAYSTONE: as above
	20	-	-	tr	SANDSTONE: as above
	10	-	-	tr	SILTSTONE: as above
	tr	-	-		COAL: as above
2156	80	-	-	c	CLAYSTONE: as above
	20	-	-	tr	SANDSTONE: as above
	tr	-	-	a	COAL: as above
2159	80	-	-	c	CLAYSTONE: medium dark grey to brownish grey, soft to moderately firm, common carbonaceous flecks, occasional carbonaceous laminae, trace nodular pyrite, becoming silty in part, sub blocky to occasionally sub fissile, non calcareous
	20	-	-	tr	SANDSTONE: light grey, clear to translucent grains, friable to moderately hard, common loose grains, very fine to medium grained, occasional coarse to very coarse grains, sub angular to sub rounded, moderately sorted quartz, trace weak silica cement, occasional lithic grains, trace to common carbonaceous flecks, rare coaly laminae, rare amber, trace pyrite, poor visual porosity, no shows.
2162	90	-	-	c	CLAYSTONE: as above, trace nodular pyrite
	10	-	-	tr	SANDSTONE: as above
	tr	-	-	a	COAL: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2165	90	-	-	c	CLAYSTONE: as above.
	10	-	-	tr	SANDSTONE: light grey, clear to translucent grains, friable to moderately hard, medium to coarse grained, subangular to subrounded, moderately sorted quartz, trace weak to moderate quartz cement, moderate argillaceous matrix, trace carbonaceous flecks, trace amber, poor visual porosity, no shows.
	tr	-	-	a	COAL: as above
2168	80	-	-	tr	CLAYSTONE: medium to dark grey, brown grey in part, soft to moderately firm, micromicaceous, trace carbonaceous flecks, trace carbonaceous laminae, trace nodular pyrite.
	20	-	-	tr	SANDSTONE: as above
	tr	-	-	a	COAL: as above
2171	50	-	-	tr	CLAYSTONE: as above, race nodular pyrite.
	50	-	-	-	ARGILLACEOUS SANDSTONE: light grey, clear to translucent grains, friable to moderately hard, fine to medium grained, occasional coarse, subangular to subrounded, moderately sorted quartz grains, trace silica cement, abundant argillaceous matrix, trace amber, poor visual porosity, no shows.
	tr	-	-	a	COAL: as above.

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
2174	80	-	-	tr	ARGILLACEOUS SANDSTONE: light grey, clear to translucent grains, friable to moderately hard, fine to medium grained, occasional coarse, subangular to subrounded, moderately sorted quartz grains, trace moderately hard silica cement, abundant argillaceous matrix, trace lithics, trace amber, poor visual porosity, no shows.
	20	-	-	tr	CLAYSTONE: medium to dark grey, brown grey in part, soft to moderately firm, trace silt, micromicaceous, trace carbonaceous flecks, trace carbonaceous laminae, trace nodular pyrite.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm.
2177	90	-	-	tr	ARGILLACEOUS SANDSTONE: as above
	10	-	-	tr	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2180	90	-	-	tr	SANDSTONE:as above.
	10	-	-	tr	CLAYSTONE: as above
	tr	-	-	tr	SILTSTONE: medium dark grey, moderately hard, micromicaceous, trace carbonaceous flecks, grading to very fine grained sandstone in part, blocky, non calcareous.
2183	80	-	-	tr	SANDSTONE: as above, trace hard silica cement, trace weak calcite cement in argillaceous matrix.
	20	-	-	tr	CLAYSTONE: as above

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2186	80	-	-	tr	SANDSTONE: as above
	20	-	-	tr	CLAYSTONE: as above
2189	90	-	-	tr	SANDSTONE: as above
	10	-	-	tr	CLAYSTONE: as above
2192	80	-	-	tr	SANDSTONE: two subequal types: 1. light grey to translucent, friable to moderately hard, fine to medium grained, subangular to subrounded, moderately sorted quartz grains, abundant argillaceous matrix, common moderately hard silica cement, trace lithics, trace carbonaceous material, trace amber, poor inferred porosity, no shows. 2. light grey to translucent, hard, blocky fracture, medium to coarse grained, subangular to subrounded, moderately sorted quartz grains, hard silica cement, nil inferred porosity, no shows.
	20	-	-	tr	CLAYSTONE: medium dark grey, occasionally light brown grey, moderately hard, subfissile, trace silt, trace carbonaceous flecks, micromicaceous, trace pyrite nodules.
2195	70	-	-	tr	SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above.
2198	70	-	-	tr	SANDSTONE: as above, trace hard pyrite cement in type 1.
	30	-	-	tr	CLAYSTONE: as above
2201	70	-	-	tr	SANDSTONE: as above, predominantly type 2.
	30	-	-	tr	CLAYSTONE: as above.

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2204	50	-	-	tr	SANDSTONE: as above, subequal types 1 and 2.
	50	-	-	tr	CLAYSTONE: medium to dark grey, commonly brown, soft to firm, hard in part, common firm silica cement, trace pyrite cement, rare carbonaceous specks, micromicaceous.
2207	60	-	-	tr	SANDSTONE: as above, predominantly type 2.
	40	-	-	tr	CLAYSTONE: as above.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2210	70	-	-	tr	SANDSTONE: as above, predominantly type 2.
	30	-	-	tr	CLAYSTONE: as above, trace carbonaceous laminae.
2213	80	-	-	-	CLAYSTONE: medium dark grey, common brown grey, soft to commonly hard, silty, moderate firm silica cement, moderate hard pyrite cement, rare pyrite nodules.
	20	-	-	tr	SANDSTONE: light grey to translucent, friable to hard in part, medium to fine grained, subangular to subrounded, moderately sorted quartz grains, common argillaceous matrix, common hard silica cement, trace carbonaceous flecks, common lithics, nil to poor visual porosity, no shows.
2216	90	-	-	tr	CLAYSTONE: 2 types: type 1 (30%) as above. Type 2: massive claystone (70%): pale yellowish brown, soft, uncemented, trace carbonaceous specks.
	10	-	-	-	SANDSTONE: as above, common silica cement, trace amber.

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2219	90	-	-	tr	CLAYSTONE: as above, 90% massive type 2.
	10	-	-	-	SANDSTONE: as above.
2222	60	-	-	tr	SANDSTONE: as above, fine to common fine to medium grained.
	40	-	-	tr	CLAYSTONE: as above, subequal amounts types 1 and 2.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2225	50	-	-	tr	SANDSTONE: as above, fine to medium grained, rare dark green weathered feldspar, trace lithics.
	50	-	-	tr	CLAYSTONE: as above, trace pyrite nodules.
2228	60	-	-	tr	SANDSTONE: as above, fine grained, common fine to medium, rare coarse, abundant argillaceous matrix in part, trace weathered feldspar.
	40	-	-	tr	CLAYSTONE: as above.
2231	95	-	-	tr	SANDSTONE: light grey to translucent, friable, fine to medium grained, subangular to subrounded, moderately sorted quartz grains, trace calcite cement, common argillaceous matrix, trace lithics, trace amber, poor inferred porosity, no shows.
	5	-	-	tr	CLAYSTONE: as above, no pyrite.
2234	95	-	-	-	SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: as above

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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2237	90	-	-	-	SANDSTONE: light grey to translucent, friable, medium grained, occasional coarse, subangular to subrounded, moderately sorted quartz grains, trace weak calcite cement, common argillaceous matrix, trace lithics, trace amber, poor inferred porosity, no shows.
	10	-	-	tr	CLAYSTONE: two subequal types: type 1: medium dark grey, common brown grey, soft to commonly hard, silty, trace firm silica cement, trace hard pyrite cement, trace pyrite nodules; type 2: massive claystone: pale yellowish brown, soft, uncemented, dispersive, trace carbonaceous specks.
2240	90	-	-	-	SANDSTONE: as above, common coarse grained, common lithics.
	10	-	-	tr	CLAYSTONE: as above
2243	95	-	-	-	SANDSTONE: as above, trace feldspar, common lithics.
	5	-	-	tr	CLAYSTONE: as above.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2246	95	-	-	tr	SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: as above.
	tr	-	-	a	COAL: as above.
2249	90	-	-	-	SANDSTONE: as above, fine grained, common medium to coarse, no amber.
	10	-	-	tr	CLAYSTONE: as above

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2252	90	-	-	-	SANDSTONE: as above, fine to medium grained, common coarse, trace amber.
	10	-	-	tr	CLAYSTONE: as above.
2255	90	-	-	-	ARGILLACEOUS SANDSTONE: light grey to translucent, friable, fine to medium grained, common coarse, subangular to subrounded, moderately sorted quartz grains, minor weak calcite cement, abundant argillaceous matrix, common lithics, common dark green weathered feldspar, trace amber, poor inferred porosity, no shows.
	10	-	-	tr	CLAYSTONE: as above.
2258	90	-	-	-	ARGILLACEOUS SANDSTONE: light grey to translucent, friable, fine to medium grained, common coarse, subangular to subrounded, moderately sorted quartz grains, minor weak calcite cement, abundant argillaceous matrix, abundant lithics, common green weathered feldspar, trace amber, poor inferred porosity, no shows.
	10	-	-	tr	CLAYSTONE: dark grey to medium grey, firm to mod hard, common silica cement, silty, micromicaceous, trace carbonaceous flecks, trace pyrite nodules.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2261	95	-	-	-	SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: as above.

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Well: MINERVA-1
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Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2264	95	-	-	-	ARGILLACEOUS LITHIC SANDSTONE: as above, increase in lithic content.
	5	-	-	tr	CLAYSTONE: as above.
2267	95	-	-	c	ARGILLACEOUS LITHIC SANDSTONE: light grey to translucent, friable to moderately hard, fine grained, common medium to coarse, subangular to subrounded, moderately sorted quartz and lithic grains, abundant argillaceous matrix, abundant firm calcite cement, abundant lithics, common feldspar, common carbonaceous flecks, trace amber, nil visual porosity, no shows.
	5	-	-	tr	CLAYSTONE: as above
2270	95	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	5	-	-	tr	CLAYSTONE: as above.
2273	95	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above, coarse in part (including lithics).
	5	-	-	tr	CLAYSTONE: as above
2276	80	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above, fine to medium grained, trace calcite grains.
	20	-	-	tr	SANDY CLAYSTONE: light grey, soft to firm, common weak calcite cement, abundant fine to very fine sand grains, trace carbonaceous flecks.
2279	80	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	20	-	-	tr	SANDY CLAYSTONE: as above.

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
2282	80	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: light grey to translucent, friable to moderately hard, fine grained, common medium to coarse, subangular to subrounded, moderately sorted quartz and lithic grains, abundant argillaceous matrix, abundant firm calcite cement, abundant lithics, common feldspar, common carbonaceous flecks, trace amber, nil visual porosity, no shows.
	20	-	-	tr	SANDY CLAYSTONE: light grey, soft to firm, common weak calcite cement, abundant fine to very fine sand grains, trace carbonaceous flecks.
2285	70	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	30	-	-	tr	SANDY CLAYSTONE: as above.
2288	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	10	-	-	tr	SANDY CLAYSTONE: as above.
2291	80	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	20	-	-	tr	SANDY CLAYSTONE: as above.
	tr	-	-	-	MASSIVE CLAYSTONE: light brown, soft, dispersive.
2294	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	10	-	-	tr	SANDY CLAYSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2297	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz, common moderately strong calcareous cement, trace very weak silica cement, abundant very light grey argillaceous matrix, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, rare pyrite, rare carbonaceous flecks, rare amber, poor visual porosity, no shows.
	20	-	-	r	CLAYSTONE: 2 types (1) medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous, (2) medium dark grey to brownish grey, moderately hard, micromicaceous, rare carbonaceous flecks, occasional quartz and lithic grains, blocky to sub blocky, non calcareous.
2300	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	tr	CLAYSTONE: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2303	70	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz, common moderately strong calcareous cement, trace very weak silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, trace carbonaceous flecks, trace amber, poor visual porosity, no shows.
	30	-	-	r	CLAYSTONE: 2 types (1) medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous, (2) medium dark grey to brownish grey, moderately hard, micromicaceous, rare carbonaceous flecks, occasional quartz and lithic grains, blocky to sub blocky, non calcareous.
2306	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	tr	CLAYSTONE: as above
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2309	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	r	CLAYSTONE: as above, rare carbonaceous laminae in type 2.
2312	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above, common weathered green feldspar.
	40	-	-	r	CLAYSTONE: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
2315	70	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	30	-	-	r	CLAYSTONE: as above
2318	80	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2321	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2324	60	-	-	r	CLAYSTONE: medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous.
	40	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, trace very weak silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, trace carbonaceous flecks, trace amber, trace biotite, poor visual porosity, no shows.
2327	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	r	CLAYSTONE: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2330	60	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	40	-	-	r	CLAYSTONE: as above
2333	70	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	30	-	-	r	CLAYSTONE: two types (1) medium light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous; (2) medium dark grey to brownish grey, moderately hard, micromicaceous, rare carbonaceous flecks, occasional quartz and lithic grains, blocky to sub blocky, non calcareous.
2336	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above
2339	95	-	-	-	ARGILLACEOUS LITHIC SANDSTONE: as above
	5	-	-	-	CLAYSTONE: as above
2342	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above
2345	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above
2348	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2351	90	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above
2354	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor visual porosity, no shows.
	20	-	-	r	CLAYSTONE: light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous
2357	90	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above
	10	-	-	r	CLAYSTONE: as above
2360	90	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, trace coarse granitic-type lithics
	10	-	-	r	CLAYSTONE: as above, trace moderate silica cement.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2363	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, trace moderately strong calcite cement, rare coarse granitic-type lithics
	20	-	-	r	CLAYSTONE: as above
	Tr	-	-	a	COAL: as above
2366	60	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, trace moderately strong silica cement,
	40	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2369	60	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above,
	40	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2372	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above,
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	
2375	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz and lithics, trace moderately strong calcareous cement, trace moderately hard silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor visual porosity, no shows.
	20	-	-	r	CLAYSTONE: light grey to light greenish grey, soft, dispersive, rare carbonaceous flecks, non calcareous, trace moderate silica cement.
	tr	-	-	a	COAL: greyish black to black, sub vitreous lustre, sub conchoidal fracture, brittle, moderately firm to hard.
2378	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above,
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2381	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, uncemented.
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	% Fluor	Glauconite	Carb Matter	
2384	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, trace moderate silica and calcite cements, rare coarse grained.
	20	-	-	r	CLAYSTONE: as above, trace dark grey, firm, weakly silica cemented
	tr	-	-	a	COAL: as above
2387	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above,
	20	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above
2390	90	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above, trace weak silica and calcite cement.
	10	-	-	r	CLAYSTONE: as above
	tr	-	-	a	COAL: as above

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2393	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz and lithics, common moderately strong calcareous cement, trace moderately hard silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, trace biotite, poor visual porosity, no shows.
	20	-	-	tr	CLAYSTONE: light grey to light greenish grey, soft dispersive, trace carbonaceous flecks, non calcareous.
	tr	-	-	a	COAL: greyish black to black, sub vitreous to vitreous lustre, trace silt, blocky, brittle.
2396	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above
	20	-	-	tr	CLAYSTONE: light grey to medium dark grey, soft to moderately firm, dispersive in part, trace carbonaceous flecks, rare pyrite, sub blocky in part, non calcareous.
	tr	-	-	a	COAL: as above

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	BHP Petroleum CUTTINGS DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
2399	60	-	-	tr	CLAYSTONE: (1)light grey to light greenish grey, occasionally medium dark grey, soft, dispersive, trace carbonaceous flecks, non calcareous, (2) medium grey to medium dark grey, moderately firm, blocky, trace silt, trace micromica, trace carbonaceous flecks, non calcareous.
	40	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above.
	tr	-	-	a	COAL: as above
2402	70	-	-	tr	ARGILLACEOUS LITHIC SANDSTONE: as above.
	30	-	-	tr	CLAYSTONE: as above.
2405	60	-	-	tr	CLAYSTONE: as above.
	40	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above
2408	80	-	-	tr	CLAYSTONE: as above.
	20	-	-	r	SANDSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2411	70	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to medium light grey, friable to moderately hard, fine to medium grained, occasional coarse grains, sub angular to sub rounded, moderately well sorted quartz and lithics, rare moderately weak calcareous cement, trace moderately hard silica cement, abundant very light grey argillaceous matrix, common feldspar, abundant lithic grains, predominantly dark grey to greyish black, occasionally moderate reddish brown, trace pyrite, rare carbonaceous flecks and laminae, poor visual porosity, no shows.
	30	-	-	tr	CLAYSTONE: medium light grey to medium grey, moderately firm, occasional carbonaceous flecks and laminae, trace micro mica, sub blocky, non calcareous.
2414	80	-	-	tr	CLAYSTONE: very light grey to light greenish grey, soft, dispersive, non calcareous.
	20	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above.
2417	70	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: light grey to light greenish grey, friable to occasionally moderately hard, abundant loose grains, fine to medium grained, occasional coarse grains, sub rounded to occasionally sub angular, well sorted quartz with common to abundant lithic and feldspar grains, lithics predominantly greyish black, occasionally moderate reddish brown, common very weak calcite cement, abundant very light grey argillaceous matrix, rare pyrite, rare carbonaceous flecks and occasional laminae, poor visual porosity, no shows.
	30	-	-	r	CLAYSTONE: as above.

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CUTTINGS DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P31**
Geologist(s): **A. TABASSI/D. PICKAVANCE**

Depth (mRT)	Lithology (%)	%Fluor	Glauconite	Carb Matter	Description
2420	60	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above.
	40	-	-	r	CLAYSTONE: as above.
2423	70	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above.
	30	-	-	r	CLAYSTONE: as above.
2425	80	-	-	r	ARGILLACEOUS LITHIC SANDSTONE: as above with abundant greyish blue green lithic grains.
	20	-	-	r	CLAYSTONE: as above.

3.2 Sidewall Cores

3.2.1 CST

One 46 shot CST run was performed in Minerva-1 within the 12-1/4" section of the hole between 1193 m and 563 m. One 60 shot CST run was performed in Minerva-1 within the 8-1/2" hole section between 2101 m and 1195 m. One 21 shot CST run was also performed in the 6" hole section between 2420.5 m and 2120 m. Detailed wellsite descriptions of the recovered sidewall cores appear on the following pages.

Table 2 contains a summary of the CST runs.

The remains of the sidewall cores subsequent to palynological, geochemical and petrological analysis are stored by BHP Petroleum at Kestrel Management (Australia) Pty Ltd, Unit 58, Slough Estate, 170 Forster Road, Mt Waverley, Victoria, 3149.

Table 2
Sidewall Core Summary

Ste No.	Run No.	Bullets in Gun	Bullets Fired	Misfires	Bullets Lost	Bullets Empty	Rec. Cores	Int. (mRT)
1	1	46	46	-	-	-	46	1193.0 - 563.0
3	2	60	60	-	3	-	57	2101.0 - 1195.0
4	3	21	21	-	-	3	18	2420.5 - 2120.0
Total		127	127	-	3	3	121	2420.5 - 563.0

3.2.2 MSCT

No MSCTs were cut in Minerva-1.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
1	1193.0	3.0	<u>ARENACEOUS CLAYSTONE GRADING TO ARGILLACEOUS SANDSTONE</u> <u>ARENACEOUS CLAYSTONE</u>: Medium greyish brown, rarely light grey (argillaceous sandstone component), firm but sticky when wet, massive with inhomogeneities comprising more arenaceous patches, abundant silt and very fine to fine quartz grains, quartz grains typically subrounded with fair sorting, rare very fine glauconite pellets, trace to rare carbonaceous flecks, rare micromica and trace mica flakes, trace calcareous, grades in part to argillaceous sandstone, nil visual porosity. <u>FLUORESCENCE</u>: Nil
2	1186.0	2.8	<u>ARENACEOUS CLAYSTONE</u> <u>ARENACEOUS CLAYSTONE</u>: Medium greyish brown, firm but dispersive when wet, massive, common to abundant silt and very fine to fine quartz grains, rare carbonaceous flecks and fragments, micromicaceous, trace microcrystalline pyrite. <u>FLUORESCENCE</u>: No direct, no cut, no crush cut, thin dull bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
3	1179.0	3.0	ARENACEOUS CLAYSTONE WITH LENSES OF ARGILLACEOUS SANDSTONE ARENACEOUS CLAYSTONE: Medium to medium/dark greyish brown, firm to slightly hard in parts, massive with small lenses/patches of argillaceous sandstone (see below), common to abundant silt and very fine to predominantly fine quartz grains, rare to ?minor carbonaceous flecks, micromicaeous, rare mica flakes, trace glauconite pellets, non calcareous. ARGILLACEOUS SANDSTONE: Light grey, friable, occurring as 'patches' (2 mm x 10 mm) and thin discontinuous laminae within arenaceous claystone, very fine to fine grained, subangular, well sorted quartz grains, with abundant off white to light grey argillaceous matrix, rare weak siliceous cement often giving grains a frosted appearance, no calcareous cement, trace carbonaceous fragments, trace fine grained grey lithics, trace mica, trace to rare microcrystalline pyrite, very poor visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin dull bluish white residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
4	1174.0	4.5	<u>INTERBEDDED ARGILLACEOUS SANDSTONE AND ARENACEOUS CLAYSTONE</u> <u>ARGILLACEOUS SANDSTONE</u>: Light grey, very friable 10 mm interbeds, homogeneous, very fine to fine grained, subrounded, well sorted quartz grains, abundant light to light/medium grey argillaceous matrix (sandstone commonly matrix supported), no cement, micromicaceous, trace mica flakes, rare carbonaceous flecks, trace microcrystalline pyrite, occasionally fair to nil visual porosity. <u>ARENACEOUS CLAYSTONE</u>: Medium brownish grey, firm, dispersive when wet, massive, minor to common silt and very fine to fine quartz grains, trace medium quartz grains, rare dark greenish black glauconite pellets, rare microcrystalline and nodular pyrite, micromicaceous, rare mica flakes, trace carbonaceous flecks, two calcite ?bivalve fossils 2 x 6 mm in cross section. <u>FLUORESCENCE</u>: Nil
5	1173.0	3.5	<u>ARENACEOUS CLAYSTONE</u> <u>ARENACEOUS CLAYSTONE</u>: Medium to dark grey and brown in part, light grey to off white in part, firm to hard in part, minor to common silt and very fine quartz grains, trace to moderately calcareous, grades in part to calcareous claystone (hard, off white to medium brownish grey), trace micromica, rare carbonaceous flakes and laminae. <u>FLUORESCENCE</u>: No direct, no cut, no crush cut, very thin very dull bluish white residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
6	1170.0	2.0	ARENACEOUS CLAYSTONE GRADING TO ARGILLACEOUS SANDSTONE ARENACEOUS CLAYSTONE: Medium to medium/dark brownish grey, grading to light grey (argillaceous sandstone), firm to soft, dispersive when wet, common silt and very fine to occasionally medium quartz grains, micromicaceous, rare carbonaceous flecks, rare to occasionally minor disseminated microcrystalline pyrite, trace dark greenish black glauconite pellets, slightly calcareous grades in patches to: ARGILLACEOUS SANDSTONE: Off white to light grey, friable, fine to medium grained, subangular to subrounded, moderately sorted, abundant light grey argillaceous matrix, common off white weak calcareous cement, trace pyrite cement, rare nodular pyrite, trace carbonaceous fragments, poor to fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, moderately thick dull to moderately bright bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Geologist(s): A. TABASSI/D. PICKAVANCE
Date: 15/3/93

Core No.	Depth (mRT)	Recovery (mm)	Description
7	1166.0	2.5	ARENACEOUS CLAYSTONE WITH ARGILLACEOUS SANDSTONE ARENACEOUS CLAYSTONE: Medium greyish brown, firm, slightly dispersive in water, generally massive with patches (?intraclasts?) and rare discontinuous laminae of argillaceous sandstone, abundant silt and very fine quartz grains, micromicaceous, trace to rare mica flakes, rare to minor microcrystalline and nodular pyrite, trace fine grained pelletal glauconite, rare carbonaceous matter (flecks and grains), slightly calcareous, grades in part to: ARGILLACEOUS SANDSTONE: Light to light/medium brownish grey, friable, occurring as patches and rarely discontinuous laminae within the arenaceous claystone, very fine grained, very well sorted, abundant medium greyish brown argillaceous matrix, commonly matrix supported and grading to arenaceous claystone, rare off white calcareous cement, micromicaceous, trace mica flakes, trace to rare carbonaceous matter, rare to minor microcrystalline pyrite, poor visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very dull bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
8	1149.0	2.5	SILTY CLAYSTONE SILTY CLAYSTONE: Medium brown and medium to medium/dark greyish brown, firm (probably fairly hard but fractured by bullet), homogeneous with two distinct layers distinguished by colour: medium brown silty claystone is slightly calcareous, contains common silt, trace micromica, trace carbonaceous flecks, trace medium greyish green glauconite; medium to medium/dark greyish brown silty claystone is non calcareous, contains common silt and rare fine to medium quartz grains, micromicaceous, with trace mica flakes, trace carbonaceous flecks, and contains a minor intraclast of the medium brown claystone, rock is fractured, with fractures filled with off white calcite veins. FLUORESCENCE: Nil.
9	1139.0	2.5	SANDSTONE SANDSTONE: Light grey, friable, massive and homogeneous, very fine grained, subangular, well sorted quartz grains, rare light grey argillaceous matrix, trace weak siliceous cement, no calcite cement, rare fine grained medium to dark grey lithics, trace to rare very fine grained glauconite pellets, trace mica, trace pyrite, trace altered ?feldspar grains, trace microcrystalline pyrite, good to very good visual porosity. FLUORESCENCE: Nil.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
10	1130.0	3.0	ARENACEOUS CLAYSTONE ARENACEOUS CLAYSTONE: Medium brownish grey, firm, sticky when wet, massive, common to abundant silt and very fine to fine quartz grains, micromicaceous, trace mica flakes, rare to occasionally minor carbonaceous flecks and grains, trace microcrystalline pyrite. FLUORESCENCE: No direct, no cut, no crush cut, very thin very dull bluish white residual ring.
11	1125.0	3.5	INTERLAMINATED ARGILLACEOUS SANDSTONE AND CLAYSTONE ARGILLACEOUS SANDSTONE: Light grey, friable, very fine grained, subrounded, very well sorted quartz grains, abundant light grey argillaceous matrix, trace weak siliceous cement, trace micromica and mica flakes, trace carbonaceous detritus, trace glauconite, poor to fair visual porosity, grades to arenaceous claystone. CLAYSTONE: Medium greyish brown, firm, dispersive when wet, interbedded on a mm scale with sandstone, with common silt and very fine quartz grains, micromicaceous, trace mica flakes, rare carbonaceous flecks, trace fine/medium grained light greyish brown lithics, trace off white altered ?feldspar, grades in part to argillaceous sandstone. FLUORESCENCE: Nil.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
12	1115.0	2.8	SANDSTONE SANDSTONE: Light grey, friable, massive, fine grained, subangular to subrounded, very well sorted quartz grains, trace to rare light grey argillaceous matrix, trace weak siliceous cement, no calcite cement, trace carbonaceous matter, trace mica flakes, trace microcrystalline pyrite, trace fine grained light grey lithics, good to excellent visual porosity. FLUORESCENCE: Nil
13	1105.5	3.0	ARENACEOUS CLAYSTONE ARENACEOUS CLAYSTONE: Light/medium to medium brownish grey, mottled, firm, massive, patches of more arenaceous claystone with faint evidence of discontinuous laminations, abundant very fine to fine, subrounded, well sorted quartz grains, moderately micromicaceous, trace mica flakes, rare carbonaceous flecks, trace glauconite, trace pyrite infilling fractures, grades to very argillaceous sandstone in parts (lighter in colour). FLUORESCENCE: Nil
14	1100.0	2.5	ARGILLACEOUS SANDSTONE ARGILLACEOUS SANDSTONE: Medium to medium/light brownish grey, friable, subtly interbedded from more to less argillaceous sandstone, very fine grained, subrounded, very well sorted quartz grains, abundant argillaceous matrix, occasional laminae (1 mm) matrix supported, trace very weak siliceous cement, no calcareous cement, trace mica, trace carbonaceous matter, more argillaceous laminae contain rare to minor carbonaceous detritus and trace buff and medium grey lithics, trace off white altered ?feldspar, trace fine glauconite pellets, poor to fair visual porosity. FLUORESCENCE: Nil.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
15	1094.0	3.0	ARGILLACEOUS SANDSTONE ARGILLACEOUS SANDSTONE: Medium brownish grey, friable, massive, fine grained, subrounded, very well sorted, common to abundant medium brownish grey argillaceous matrix, trace siliceous matrix, no calcareous matrix, rare greenish black fine grained glauconite pellets, trace to rare mica flakes, fair visual porosity. FLUORESCENCE: Nil.
16	1090.0	3.8	ARGILLACEOUS SANDSTONE GRADING TO/INTERLAMINATED WITH ARENACEOUS CLAYSTONE ARGILLACEOUS SANDSTONE: Light brownish grey, friable, 10 mm layers interbedded with 5 mm arenaceous claystone laminae, very fine to fine grained, subrounded, well sorted quartz grains, abundant light/medium brownish grey argillaceous matrix, trace siliceous cement, no calcareous cement, moderately micromicaceous, trace mica flakes, rare carbonaceous detritus, grades to arenaceous claystone, fair to poor visual porosity. ARENACEOUS CLAYSTONE: Medium to medium/dark greyish brown, firm, internally microlaminated, abundant silt and very fine to fine quartz grains, rare to minor carbonaceous laminae and flakes, rare microcrystalline pyrite, moderately micromicaceous, rare mica flakes, trace yellowish grey fine grained lithics. FLUORESCENCE: Nil.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
17	1054.0	2.8	SILTY CLAYSTONE SILTY CLAYSTONE: Medium/dark greyish brown, firm, dispersive when wet, massive, common to abundant silt, rare very fine quartz grains, micromicaceous, rare mica flakes, rare carbonaceous detritus, trace fine glauconite grains. FLUORESCENCE: No direct, no cut, no crush cut, very thin dull bluish white residual ring.
18	1032.0	5.0	SANDSTONE SANDSTONE: Very light grey, friable, very fine to dominantly fine grained, subangular to occasionally subrounded, well sorted quartz, trace light grey dispersive slightly calcareous argillaceous matrix, no cement, rare mica, trace very fine carbonaceous detritus, good visual porosity. FLUORESCENCE: Nil.
19	1028.0	3.0	SANDSTONE SANDSTONE: Light grey (see note*), friable, fine to dominantly medium grained, subangular to subrounded, well sorted quartz grains, trace light grey to off white argillaceous matrix in part, trace mica, trace dark grey lithics, good to occasionally very good visual porosity. * Note: Sandstone is coloured light greyish brown due to mud filtrate invasion. FLUORESCENCE: Nil.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31
Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
20	1018.0	3.7	SILTY CLAYSTONE INTERLAMINATED WITH MINOR SANDSTONE SILTY CLAYSTONE: Medium grey to medium brownish grey, soft to firm, sticky in part, commonly silty, common micromica and carbonaceous flecks, rarely finely arenaceous in part, non calcareous, interlaminated with minor: SANDSTONE: Light to occasionally medium grey, friable to very occasionally moderately hard, fine grained, dominantly subangular, well sorted quartz grains, common light grey to occasionally medium grey argillaceous matrix, no cement, trace mica, trace dark grey lithics, trace carbonaceous detritus, trace glauconite, fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, Silty Claystone has very thin dull bluish white residual ring.
21	991.0	7.0	ARENACEOUS CLAYSTONE ARENACEOUS CLAYSTONE: Medium to dark grey to brownish grey, firm, abundantly finely arenaceous, moderately silty, rare to common micromica and carbonaceous matter, non calcareous, grading to argillaceous sandstone. FLUORESCENCE: Nil.
22	954.0	7.0	INTERLAMINATED SILTY CLAYSTONE INTERLAMINATED SILTY CLAYSTONE: Medium to dark grey interlaminated with light grey, firm to rarely moderately hard, abundantly silty, common micromica, rare glauconite and carbonaceous flecks and laminae, trace coarse quartz sand grains, trace burrows, non calcareous. FLUORESCENCE: Nil.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
23	918.5	7.0	<u>ARGILLACEOUS SANDSTONE</u> <u>ARGILLACEOUS SANDSTONE</u>: Light to medium grey to brownish grey, friable to rarely moderately hard, very fine to occasionally silt grade, subrounded, well sorted quartz, common to abundant light to medium grey argillaceous matrix, grading in part to arenaceous claystone, common fine mica flakes, rare to common carbonaceous laminae and flecks, rare fine glauconite, trace lithics, very poor visual porosity. <u>FLUORESCENCE</u>: No direct, no cut, no crush cut, very thin dull bluish white residual ring.
24	897.0	7.0	<u>CLAYSTONE</u> <u>CLAYSTONE</u>: Medium to occasionally dark brownish grey, moderately hard, rare micromica, rare fine carbonaceous flecks, non calcareous. <u>FLUORESCENCE</u>: No direct, no cut, no crush cut, very thin very dull bluish white residual ring.
25	862.5	4.0	<u>ARGILLACEOUS SANDSTONE</u> <u>ARGILLACEOUS SANDSTONE</u>: Medium grey, friable, fine, dominantly subrounded, very well sorted quartz, common to abundant medium to occasionally dark grey argillaceous matrix, common very fine mica flecks, trace fine carbonaceous detritus, trace partially altered feldspar, trace lithics, fair to poor visual porosity. <u>FLUORESCENCE</u>: Nil.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 15/3/93
Geologist(s): A. TABASSI/D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
26	838.5	4.0	MASSIVE CLAYSTONE MASSIVE CLAYSTONE: Dark grey to black, firm, very slightly dispersive, common disseminated pyrite crystals and pyrite nodules, trace micromica, commonly carbonaceous, rare glauconite, trace medium grained quartz sand, non calcareous. FLUORESCENCE: Nil.
27	810.0	4.5	ARGILLACEOUS SANDSTONE INTERLAMINATED WITH MINOR CLAYSTONE ARGILLACEOUS SANDSTONE: Light to medium grey, friable, fine grained, dominantly subrounded, very well sorted quartz grains, common to abundant light to medium grey argillaceous matrix, rare mica, trace glauconite and carbonaceous flecks, trace partially altered feldspar, fair to poor visual porosity, interlaminated with minor: CLAYSTONE: Dark grey, firm, sticky in part, common carbonaceous flecks, trace micromica, non calcareous. FLUORESCENCE: Nil.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 15/3/93 Geologist(s): A. TABASSI/D. PICKAVANCE
28	786.0	6.0	MASSIVE SANDSTONE MASSIVE SANDSTONE: Light yellowish brown, light grey to clear in part, friable, dominantly coarse to occasionally very coarse, rarely medium, dominantly subrounded, moderately sorted quartz, rare to occasionally common light grey to off white and occasionally light yellowish brown argillaceous matrix, trace partially altered feldspar, trace carbonaceous detritus, trace light red, medium grey and brown lithics, trace mica, trace medium pebble size quartz grains, good to fair visual porosity. FLUORESCENCE: Nil. Note: The colour of the sandstone appears to have been effected by mud filtrate.
29	783.0	5.5	CARBONACEOUS CLAYSTONE CARBONACEOUS CLAYSTONE: Dark grey to black, firm, slightly dispersive, rare to common micromica, common carbonaceous flecks and laminae, slightly to occasionally moderately silty, trace lithics and ?glauconite, non calcareous. FLUORESCENCE: Nil.
30	772.0	4.0	SILTY CLAYSTONE SILTY CLAYSTONE: Dark brownish grey to dark grey, firm, commonly to abundantly silty, rare to common micromica and medium grained mica flakes, rare to common disseminated pyrite crystals, nodules and pyritised fossil fragments, rare to trace fine dark green glauconite pellets, rare to trace carbonaceous flecks, non calcareous. FLUORESCENCE: Nil.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 15-03-93
Geologist(s): AHMAD TABASSI/DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
31	760.0	35	<u>ARENACEOUS CLAYSTONE</u> <u>ARENACEOUS CLAYSTONE</u>: Dark brownish grey to dark grey, firm to occasionally moderately hard, abundant very fine quartz grains, commonly silty, common micromica, trace coarse mica flakes, commonly carbonaceous, non calcareous, grading in part to Argillaceous Sandstone. <u>FLUORESCENCE</u>: Nil.
32	700.0	70	<u>MASSIVE SANDSTONE</u> <u>MASSIVE SANDSTONE</u>: Medium brownish grey to rusty brownish grey, friable, medium to very coarse, granule grade in part, dominantly coarse, subangular to rounded, dominantly rounded, moderately to poorly sorted quartz grains, dominantly brown, yellow and light-medium red stained, rare to occasionally common light to medium brown and occasionally yellowish brown argillaceous matrix, rare to common medium to very coarse, subrounded to rounded, well polished iron oxide/hydroxide pellets, poor to rarely fair visual porosity. <u>FLUORESCENCE</u>: Nil. Note: The iron oxide/hydroxide pellets do not appear to have been developed in situ.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 15-03-93
Geologist(s): AHMAD TABASSI/DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
44	572.0	65	SILTY CLAYSTONE INTERLAMINATED WITH MINOR SANDSTONE SILTY CLAYSTONE: Medium grey, occasionally medium brownish grey in part, firm to moderately hard, occasionally hard in part, commonly silty, rarely finely arenaceous in part, rare to common micromica, very slightly calcareous in part, nil to trace carbonaceous flecks, interlaminated (on mm scale) with minor: SANDSTONE: Very light brownish grey to very light grey, clear in part, friable, very fine, subrounded, very well sorted quartz, trace light grey argillaceous matrix, poor to fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very dull bluish white residual ring.
45	567.0	70	SILTY CLAYSTONE SILTY CLAYSTONE: Medium to dark grey to brownish grey, moderately hard to hard, commonly silty, rarely finely arenaceous in part, rare to common micromica, very slightly to moderately calcareous in part, nil to trace carbonaceous flecks. FLUORESCENCE: Nil.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 15-03-93
Geologist(s): AHMAD TABASSI/DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
46	563.0	50	SILTY CLAYSTONE INTERLAMINATED WITH MINOR SANDSTONE SILTY CLAYSTONE: Medium to dark grey, occasionally medium brownish grey, firm to moderately hard, commonly silty, common micromica, slightly finely arenaceous in part, nil to trace carbonaceous flecks, interlaminated (on mm scale) with minor: SANDSTONE: Off white to light grey, friable, very fine to fine grained, subrounded, well sorted quartz grains, rare light grey argillaceous matrix, trace fine mica flecks, fair visual porosity. FLUORESCENCE: Nil.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
47	2101	2.5	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey, firm, massive, silty, commonly to abundantly finely arenaceous, rare micromica, trace disseminated microcrystalline pyrite, rare very fine grained off white ?altered feldspar grains, trace grey lithics, trace carbonaceous material, trace fine glauconite grains, slightly calcareous, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.
48	2098	1.5	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey, firm, massive, silty, abundantly finely arenaceous, rare micromica and trace medium mica flakes, trace disseminated microcrystalline pyrite, rare very fine grained off white ?altered feldspar grains, trace grey lithics, trace carbonaceous material, trace fine glauconite grains, slightly calcareous, grades to argillaceous siltstone and silty argillaceous sandstone. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
49	2089	3.0	ARGILLACEOUS SANDSTONE GRADING TO ARENACEOUS CLAYSTONE ARGILLACEOUS SANDSTONE: Medium grey sublaminated with medium/dark grey, friable to slightly hard in part, very fine grained, subrounded, very well sorted quartz grains, abundant to 40% medium grey non calcareous argillaceous matrix, quartz grains commonly matrix supported, grades to arenaceous claystone, trace weak siliceous cement, rare off white altered feldspar grains, rare very fine carbonaceous matter rarely as thin laminae, trace to rare mica flakes within laminae, trace microcrystalline pyrite particularly within laminae, trace lithics, nil visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.
50	2084.5	2.5	ARGILLACEOUS SANDSTONE ARGILLACEOUS SANDSTONE: Interlaminated medium light greyish green to greenish grey, friable, very fine grained, subrounded, well sorted quartz grains, common to abundant medium/light greyish green to greenish grey chloritic argillaceous matrix, trace weak siliceous cement, rare off white altered feldspar grains, trace micromica, trace disseminated microcrystalline pyrite, trace very fine glauconite pellets in part, trace to rare light/medium greenish grey lithics, rare carbonaceous matter, repetitiously interlaminated colours give rock a semblance of 'varve' appearance, rock contains a single intraclast of claystone-coated sandstone of similar description, nil to very poor visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
51	2078	2.0	ARGILLACEOUS SANDSTONE ARGILLACEOUS SANDSTONE: Interlaminated light grey and medium greenish grey, friable, very fine grained, subrounded, well sorted quartz grains, with common to abundant light grey to medium greyish green argillaceous matrix, trace weak siliceous cement, rare off white altered feldspar grains, rare carbonaceous matter particularly in medium greenish grey laminations, trace micromica, trace disseminated microcrystalline pyrite, trace very fine glauconite pellets in part, trace to rare light/medium greenish grey lithics, nil to very poor visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.
52	2073	1.5	SILTY SANDSTONE SILTY SANDSTONE: Off white to translucent, friable, very fine to dominantly fine to medium grained, subrounded, poorly sorted quartz grains, rare off white kaolinitic argillaceous matrix, rare weak siliceous cement (possibly better cemented but fractured by coring process), common to abundant quartz silt, trace microcrystalline pyrite in part, fair to good visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P31** Date: 25/3/93
Geologist(s): **D. PICKAVANCE**

Core No.	Depth (mRT)	Recovery (mm)	Description
53	2066	2.0	<u>INTERLAMINATED ARGILLACEOUS SILTY SANDSTONE AND SILTY CLAYSTONE</u> <u>ARGILLACEOUS SILTY SANDSTONE</u>: Light greyish brown, friable, very fine grained subrounded very well sorted quartz grains, abundant light/medium greyish brown non calcareous argillaceous matrix, matrix commonly supports grains and rock grades to arenaceous claystone in part, trace siliceous cement, common to abundant quartz silt, rare very fine altered feldspar grains, rare micromica, trace carbonaceous matter, trace greenish grey lithics, nil visual porosity. <u>SILTY CLAYSTONE</u>: Medium/dark brownish grey, firm, subfissile, silty and commonly very finely arenaceous, grades to argillaceous arenaceous siltstone, common carbonaceous detritus, rare mica flakes and micromica giving a subfissililty to rock, trace to rare very fine off white altered feldspar grains, trace to rare disseminated microcrystalline pyrite. The argillaceous silty sandstone and silty claystone are laminated on a cm scale, with minor interlaminations on a mm scale within each lithology. Suggestions of current/ripple cross-laminations are evident. <u>FLUORESCENCE</u>: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
54	2061	2.5	SILTY CLAYSTONE WITH THIN LAMINAE OF KAOLINITIC SANDSTONE SILTY CLAYSTONE: Medium greyish brown, firm, silty, trace disseminated carbonaceous flecks and trace coaly fragments, trace to rare micromica, trace very fine off white altered feldspar, slightly calcareous. KAOLINITIC SANDSTONE: Off white, friable, medium grained, subangular to subrounded, well sorted quartz grains, rare moderately weak to slightly strong siliceous cement, trace microcrystalline pyrite cement, abundant off white kaolinite matrix, non calcareous, trace carbonaceous flecks, nil to very poor visual porosity. Kaolinitic sandstone occurs as a thin ~2 mm discontinuous laminae within the silty claystone. FLUORESCENCE: No direct, no cut, slow very pale light whitish yellow crush cut, thin pale yellowish white residual ring.
55	2046	2.0	SANDSTONE SANDSTONE: Off white, friable, fine to fine/medium grained, subangular, well sorted quartz grains, trace to rare moderately weak siliceous cement, common off white kaolinite matrix, trace carbonaceous fragments, trace glauconite pellets, fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, very thin very pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
56	2040	2.5	SANDSTONE WITH VERY THIN ARGILLACEOUS LAMINAE SANDSTONE: Off white, friable, fine grained, subrounded to subangular, well sorted quartz grains, common off white kaolinite matrix, trace siliceous cement, trace microcrystalline pyrite, trace carbonaceous silt, fair visual porosity, very thin laminae of: ARGILLACEOUS SANDSTONE: Medium grey, friable, generally as per sandstone description herein but with abundant medium grey argillaceous matrix (commonly matrix supported), common carbonaceous detritus, rare micromica and mica flakes, trace microcrystalline and nodular pyrite, nil visual porosity. Sandstone contains thin (<0.5 mm) argillaceous laminae on a 2-3 mm scale. FLUORESCENCE: No direct, no cut, slow pale bluish white crush cut, moderately wide pale bluish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
57	2035	2.5	INTERLAMINATED SILTY CLAYSTONE AND SANDSTONE SILTY CLAYSTONE: Medium brownish grey, firm, silty, common micromica and mica flakes, rare carbonaceous flecks and coaly fragments, trace off white very fine grained altered feldspar. SANDSTONE: Off white to light grey, friable, very fine grained, subrounded, well sorted quartz grains, abundant off white kaolinitic matrix, rare light to medium grey argillaceous matrix, trace weak siliceous cement, trace carbonaceous matter, trace micromica, trace fine grained altered feldspar grains, poor visual porosity. Silty claystone and sandstone are interlaminated on a mm scale, sample is dominated by claystone. FLUORESCENCE: No direct, no cut, moderately slow moderately pale yellowish white crush cut, moderately wide moderately pale whitish yellow residual ring.
58	2030.5	2.0	SANDSTONE SANDSTONE: Off white, friable, very fine to fine grained, occasional medium grained, subrounded, moderately sorted quartz grains, common to ?abundant off white kaolinite matrix, trace weak siliceous cement, trace microcrystalline pyrite, poor visual porosity. FLUORESCENCE: No direct, no cut, extremely pale whitish yellow crush cut, very thin very dull whitish yellow residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 25/3/93 Geologist(s): D. PICKAVANCE
59	2023	2.0	PYRITIC SANDSTONE AND KAOLINITIC SANDSTONE PYRITIC SANDSTONE: Bronze to brownish bronze, friable to slightly hard in part, very fine/fine grained, subrounded, very well sorted quartz grains, trace to rare moderately weak pyritic cement, ?rare medium grey argillaceous matrix, abundant (to 40%?) microcrystalline to very fine nodular pyrite, trace micromica, trace carbonaceous matter, poor visual porosity. KAOLINITIC SANDSTONE: Off white, friable, very fine/fine grained, subrounded well sorted quartz grains, abundant kaolinite matrix, trace weak siliceous cement (fractured by bullet impact), trace microcrystalline pyrite, trace very fine grained lithics, poor to ?fair visual porosity. It was not possible to determine the structural relationships between kaolinitic and pyritic sandstones within this crumbled sample. FLUORESCENCE: Nil.
60	2013	1.5	SANDSTONE SANDSTONE: Off white, friable, fine to coarse grained, subangular to subrounded, moderately poorly sorted quartz grains, common to abundant off white kaolinite matrix, ?trace weak siliceous cement (possibly stronger before fracturing by bullet), rare fine grained nodular pyrite, poor visual porosity. FLUORESCENCE: Nil.

SIDEWALL CORE DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P31** Date: 25/3/93
Geologist(s): **D. PICKAVANCE**

Core No.	Depth (mRT)	Recovery (mm)	Description
61	1996	2.0	KAOLINITIC SANDSTONE WITH THIN INTERLAMINATED CLAYSTONE KAOLINITIC SANDSTONE: Off white, friable, fine/medium grained, subrounded, very well sorted quartz grains, abundant off white non calcareous kaolinite matrix, trace weak siliceous cement, trace carbonaceous flecks, poor to fair visual porosity. CLAYSTONE: Medium/dark brownish grey, firm, silty and commonly finely arenaceous, common carbonaceous detritus, rare mica flakes and micromica, non calcareous. Rock comprises mostly sandstone with one thin (2 mm) claystone lamination towards top of core. FLUORESCENCE: Nil.
62	1982	2.0	SANDSTONE WITH INTERLAMINATED COAL SANDSTONE: Medium to light greyish brown, friable, very fine/fine grained, subrounded, well sorted quartz grains, common medium greyish brown argillaceous matrix, no cement obvious (possibly fractured due to bullet impact), common coaly fragments, trace amber fragments, trace mica and micromica, trace disseminated microcrystalline pyrite, trace bright orange mineral fluorescence. COAL: Black, vitreous, brittle, occurs as thin (1-2 mm) laminae within the sandstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately bright yellowish white residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
63	1969	2.0	SANDSTONE SANDSTONE: Off white with medium/dark grey laminae, friable, very fine to coarse grained, predominantly fine to medium grained, subangular, moderately poorly sorted quartz grains, abundant off white kaolinite matrix, trace carbonaceous matter, poor visual porosity, with rare very fine laminae of medium/dark grey silty claystone containing common carbonaceous matter and micromica. FLUORESCENCE: Trace to rare moderately bright yellow to yellowish orange direct pinpoint ?hydrocarbon fluorescence, no cut, very pale bluish white crush cut, thin moderately bright yellowish white residual ring.
64	1961	1.5	KAOLINITIC SANDSTONE KAOLINITIC SANDSTONE: Off white, friable, very fine grained to coarse and granule grade, subangular to subrounded, very poorly sorted quartz grains, abundant off white kaolinite matrix, trace carbonaceous flecks, very poor visual porosity. FLUORESCENCE: Nil.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 25/3/93 Geologist(s): D. PICKAVANCE
65	1947.5	2.5	<u>COAL GRADING TO CARBONACEOUS CLAYSTONE</u> <u>COAL</u>: Black, vitreous lustre in part, brittle, rare pyrite laminae and nodules, grades in part to: <u>CARBONACEOUS CLAYSTONE</u>: Very dark brownish grey, brittle, abundantly carbonaceous and grading to coal as above, commonly micromicaceous and micaceous, rare pyrite nodules and laminae, trace amber, trace bright orange mineral fluorescence from amber. Coal grades to and from carbonaceous claystone throughout the sample. <u>FLUORESCENCE</u>: No direct hydrocarbon fluorescence, slow bleeding moderately bright light yellowish white cut from coal, cut enhance on crushing, moderately wide pale whitish to brownish yellow residual ring.
66	1944.5	2.5	<u>INTERLAMINATED KAOLINITIC SANDSTONE AND SILTY CLAYSTONE</u> <u>KAOLINITIC SANDSTONE</u>: Off white, friable, very fine grained, subrounded, very well sorted quartz grains, abundant kaolinitic matrix, abundantly silty, commonly grading to kaolinitic siltstone, trace microcrystalline pyrite, trace carbonaceous flecks, nil to very poor visual porosity. <u>SILTY CLAYSTONE</u>: Medium/dark brownish grey, firm, silty and commonly finely arenaceous, rare carbonaceous detritus, rare micromica and mica flakes, trace kaolinite grains (altered feldspar), trace medium grey lithics. Kaolinitic sandstone and silty claystone interbedded on a mm scale. <u>FLUORESCENCE</u>: No direct, extremely slow weak pale bluish white cut, enhanced to pale on crushing, moderately thin pale yellowish white residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
67	1915	2.5	INTERLAMINATED SANDSTONE AND COALY CLAYSTONE SANDSTONE: Off white, friable, very fine grained, subrounded, very well sorted quartz grains, abundant kaolinitic matrix, abundantly silty, commonly grading to kaolinitic siltstone, trace microcrystalline pyrite, trace carbonaceous flecks, nil to very poor visual porosity. COALY CLAYSTONE: Medium dark to dark grey and black, firm to brittle in part, silty, commonly finely arenaceous in part, very carbonaceous, abundant (to 50%) black vitreous coal layers and fragments, rare to common amber, rare to common pyrite occasionally totally replacing carbonaceous layers, trace to rare very bright yellow and yellowish orange mineral fluorescence from amber. Sandstone and coaly claystone are interbedded on a sub-mm scale. FLUORESCENCE: No direct, slow bleeding moderately bright light yellowish white cut from amber, enhanced on crushing, moderately wide moderately bright bluish white residual ring.
68	1896	1.5	SANDSTONE SANDSTONE: Off white, friable, fine to medium grained occasional coarse grains, subrounded, moderately well sorted quartz grains, abundant off white kaolinite matrix, trace carbonaceous flecks, poor visual porosity. FLUORESCENCE: No direct, no cut, very weak pale bluish white crush cut, moderately wide extremely weak bluish white residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 25/3/93 Geologist(s): D. PICKAVANCE
69	1872.5	2.5	SILTY CLAYSTONE SILTY CLAYSTONE: Medium/dark brownish grey, firm, silty, rare micromica and mica flakes, trace carbonaceous flecks and fragments, trace amber, rare microcrystalline pyrite, occasionally replacing carbonaceous matter, trace bright yellow and yellowish orange direct from amber. FLUORESCENCE: No direct, slow bleeding moderately bright yellowish white cut from amber, enhanced on crushing, wide moderately bright to bright very light yellowish white to white residual ring.
70	1861	1.5	KAOLINITIC SANDSTONE: Off white, friable, fine to medium grained, subrounded, well sorted quartz grains, abundant kaolinitic matrix, commonly silty, commonly grading to kaolinitic siltstone, trace microcrystalline pyrite, trace carbonaceous flecks, nil to very poor visual porosity. FLUORESCENCE: No direct, slow bleeding moderately bright yellowish white cut, enhanced on crushing, moderately wide very pale bluish white residual ring.
71	1814	2.5	SILTY CLAYSTONE SILTY CLAYSTONE: Medium brownish grey, firm, silty, commonly finely arenaceous, trace coarse quartz grains, rare disseminated carbonaceous fragments and microcrystalline pyrite, trace to rare off white altered feldspar grains, trace to rare mica flakes and micromica, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, very pale bluish white crush cut, moderately wide extremely faint translucent bluish white residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
72	1805	2.5	SILTY CLAYSTONE SILTY CLAYSTONE: Medium brownish grey, firm, silty, commonly finely arenaceous, trace coarse quartz grains, trace disseminated carbonaceous detritus and microcrystalline pyrite, trace to rare off white altered feldspar grains, trace to rare mica flakes and micromica, grades to argillaceous siltstone. FLUORESCENCE: Nil.
73	1785	2.5	ARGILLACEOUS SILTSTONE ARGILLACEOUS SILTSTONE: Medium grey to brownish grey, firm to slightly hard, abundant medium grey to brownish grey argillaceous matter, rare disseminated carbonaceous flecks, rare to common micromica and trace mica flakes, grades to silty claystone in part. FLUORESCENCE: No direct, no cut, extremely pale bluish white crush cut, moderately wide very faint translucent bluish white to yellowish white residual ring.
74	1766	2.5	ARGILLACEOUS SILTSTONE ARGILLACEOUS SILTSTONE: Medium grey to brownish grey, firm, abundant medium grey to brownish grey argillaceous matter, rare disseminated carbonaceous flecks, rare to common micromica and trace mica flakes, grades to silty claystone in part. FLUORESCENCE: No direct, no cut, no crush cut, extremely thin very dull brownish yellow residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25/3/93
Geologist(s): D. PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
75	1747	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium greyish green, firm, silty, rare off white kaolinite (altered feldspar) grains, rare glauconite grains, trace to rare micromica and mica flakes, trace carbonaceous detritus, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, extremely thin very dull brownish yellow residual ring.
76	1723	2.5	SILTY CLAYSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, silty, rare off white kaolinite (altered feldspar) grains, trace glauconite grains, trace to rare micromica and mica flakes, trace carbonaceous detritus, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, extremely thin very dull brownish yellow residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
77	1690	3.0	ARGILLACEOUS SILTSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm, abundant medium/dark grey argillaceous matter, rare disseminated carbonaceous flecks and coaly fragments, rare to common micromica and trace mica flakes. Grades to silty claystone in part. FLUORESCENCE: No direct, no cut, no crush cut, extremely thin very dull brownish yellow residual ring.
78	1670	2.5	SANDSTONE SANDSTONE: Sublaminated to patchy medium to light grey, friable, very fine to fine grained, subrounded, well sorted quartz grains, trace to abundant medium grey argillaceous matrix in patches giving a sublaminar to patchy appearance, grades to arenaceous claystone in darker patches, rare off white kaolinite matrix in part, no cement obvious, trace to rare micromica and mica flakes, rare disseminated carbonaceous flecks, very poor to fair visual porosity. FLUORESCENCE: No direct, no cut, no crush cut, extremely thin very dull brownish yellow residual ring.
79	1663.5	-	BULLET LOST

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
80	1660	2.5	SANDSTONE GRADING TO ARENACEOUS CLAYSTONE SANDSTONE: Sublaminated to patchy, medium to light grey, friable, very fine to fine grained, subrounded, well sorted quartz grains, trace to abundant medium grey argillaceous matrix in patches giving a sublaminar to patchy appearance, grades to arenaceous claystone in darker patches, rare off white kaolinite matrix in part, no cement obvious, trace to rare micromica and mica flakes, rare disseminated carbonaceous flecks, trace microcrystalline pyrite, trace glauconite pellets, rare off white kaolinite (altered feldspar) grains, very poor to nil visual porosity. FLUORESCENCE: No direct, no cut, extremely weak extremely light bluish white crush cut, moderately wide dull yellowish brown to translucent bluish white residual ring.
81	1653	2.0	SANDSTONE GRADING TO ARENACEOUS CLAYSTONE SANDSTONE: Sublaminated to patchy medium to light grey, friable, very fine to fine grained, subrounded, well sorted quartz grains, trace to abundant medium grey slightly calcareous argillaceous matrix in patches giving a sublaminar to patchy appearance, grades to arenaceous claystone in darker patches, rare off white kaolinite matrix in part, no cement obvious, trace to rare micromica and mica flakes, rare disseminated carbonaceous flecks and occasional fragments, trace microcrystalline pyrite, trace glauconite pellets, rare off white kaolinite (altered feldspar) grains, very poor to nil visual porosity. FLUORESCENCE: Nil.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
82	1650	3.5	SANDSTONE SANDSTONE: Light grey (mud filtrate invasion superimposes a brownish hue), very friable, homogeneous, fine grained, subrounded to subangular, well sorted quartz grains, common strongly calcareous light grey argillaceous matrix, no cement apparent, trace carbonaceous flecks, trace microcrystalline pyrite, good to very good visual porosity. FLUORESCENCE: Trace patchy very dull orange direct, no cut, very slow faint bluish white crush cut, extremely thin very pale yellowish white residual ring.
83	1647	3.0	SILTY CLAYSTONE SILTY CLAYSTONE: Medium/dark greenish grey, firm, slightly sticky when wet, silty, rare very fine glauconite grains, trace carbonaceous flecks, trace micromica and fine mica flakes, non calcareous. FLUORESCENCE: No direct, no cut, no crush cut, moderately wide patchy pale yellowish white residual ring.
84	1629	3.8	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm, massive, abundant medium/dark grey argillaceous matrix, rare micromica and trace mica flakes, trace to rare carbonaceous matter, grades to silty claystone. FLUORESCENCE: No direct, no cut, no crush cut, moderately wide patchy pale yellowish white residual ring.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
85	1597	3.0	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm, massive, abundant medium/dark grey argillaceous matrix, rare micromica and trace mica flakes, trace to rare carbonaceous matter, grades to silty claystone. FLUORESCENCE: Nil.
86	1580	4.0	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm to slightly hard in part, massive, abundant medium/dark grey argillaceous matrix, rare micromica and trace mica flakes, trace to rare carbonaceous matter, grades to silty claystone. FLUORESCENCE: Nil.
87	1562	2.5	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark to dark grey, firm to slightly hard in part, massive, abundant medium/dark grey argillaceous matrix, rare micromica and trace mica flakes, trace to rare carbonaceous matter, grades to silty claystone. FLUORESCENCE: No direct, no cut, very slow extremely faint yellowish white crush cut, moderately wide slightly patchy pale whitish yellow residual ring.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P31 Date: 25-03-93 Geologist(s): DAVID PICKAVANCE
88	1545	3.5	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm to slightly hard in part, massive, abundant medium/dark grey argillaceous matrix, rare micromica and trace mica flakes, trace carbonaceous matter, slightly calcareous in part, grades to silty claystone. FLUORESCENCE: Nil.
89	1523	4.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey to greyish brown, firm to slightly hard, silty, rare micromica, trace disseminated carbonaceous flecks, moderately calcareous, grades to silty claystone. FLUORESCENCE: Nil.
90	1502	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey to greyish brown, firm to slightly hard, slightly sticky when wet, silty, rare micromica, trace disseminated carbonaceous flecks, slightly calcareous, grades to silty claystone. FLUORESCENCE: Nil.
91	1476	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey to greyish brown, firm to slightly hard, slightly sticky when wet, silty, rare micromica, trace disseminated carbonaceous flecks, trace calcareous matter, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, moderately thin faint whitish yellow residual ring.

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
92	1453	3.5	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey to greyish brown, firm to slightly hard, slightly sticky when wet, silty, rare micromica, trace disseminated carbonaceous flecks, trace calcareous matter, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, moderately thin faint whitish yellow residual ring.
93	1430	-	BULLET LOST
94	1398	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey to greyish brown, firm to slightly hard, slightly sticky when wet, massive, silty, rare micromica, trace disseminated carbonaceous flecks, trace calcareous matter, trace pyrite infill of ?burrow, single white calcareous fossil, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, moderately thin faint whitish yellow residual ring.
95	1387	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium brownish grey, firm to slightly hard, massive, silty, rare micromica, trace disseminated carbonaceous flecks, moderately calcareous, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately pale light whitish yellow residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
96	1374	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium grey, firm to slightly hard, massive, silty, rare micromica, trace disseminated carbonaceous flecks, slightly calcareous, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately pale light whitish yellow residual ring.
97	1363	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, rare micromica, trace disseminated carbonaceous flecks, slightly calcareous, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately pale light whitish yellow residual ring.
98	1351	3.5	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, rare micromica, trace disseminated carbonaceous flecks, slightly calcareous, trace microcrystalline and nodular pyrite, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately pale light whitish yellow residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
99	1341	4.5	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, rare micromica, trace disseminated carbonaceous flecks, very slightly calcareous, trace microcrystalline pyrite, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately bright light whitish yellow residual ring.
100	1331	-	BULLET LOST
101	1298	3.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, rare to common micromica, trace disseminated carbonaceous flecks, non calcareous, trace microcrystalline pyrite, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, very slow dull very light greenish white crush cut, thin moderately bright light whitish yellow residual ring.
102	1280	4.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, common micromica, trace disseminated carbonaceous flecks, slightly calcareous, trace microcrystalline pyrite, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately bright light whitish yellow residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	Description
103	1260	4.0	SILTY CLAYSTONE GRADING TO ARGILLACEOUS SILTSTONE SILTY CLAYSTONE: Medium/dark grey, firm to slightly hard, massive, silty, common micromica, trace disseminated carbonaceous flecks, slightly calcareous, rare to common microcrystalline pyrite infilling ?burrows, grades to argillaceous siltstone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately pale light whitish yellow residual ring.
104	1240	4.5	ARGILLACEOUS ARENACEOUS SILTSTONE GRADING TO ARGILLACEOUS SILTY SANDSTONE ARGILLACEOUS ARENACEOUS SILTSTONE: Medium/dark grey, firm to slightly hard, massive, abundant medium/dark grey argillaceous matrix, abundantly very finely arenaceous, grades in part to argillaceous silty fine grained sandstone, rare micromica, trace disseminated carbonaceous flecks and coaly fragments, slightly calcareous, trace microcrystalline pyrite. FLUORESCENCE: No direct, no cut, slow dull very light greenish white crush cut, thin moderately bright light whitish yellow residual ring.
105	1220	4.0	ARGILLACEOUS ARENACEOUS SILTSTONE ARGILLACEOUS ARENACEOUS SILTSTONE: Dark grey, firm to slightly hard, massive, abundant medium/dark grey argillaceous matrix, commonly to abundantly very finely arenaceous, rare to common dispersed microcrystalline pyrite, rare to common micromica, trace disseminated carbonaceous flecks and coaly fragments, trace glauconite, slightly calcareous. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately dull light whitish yellow residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P31 Date: 25-03-93
Geologist(s): DAVID PICKAVANCE

Core No.	Depth (mRT)	Recovery (mm)	
106	1195	3.0	ARGILLACEOUS SILTSTONE GRADING TO SILTY CLAYSTONE ARGILLACEOUS SILTSTONE: Medium/dark grey, firm to slightly hard, massive, abundant medium/dark grey argillaceous matrix, rarely finely arenaceous, rare micromica, trace disseminated carbonaceous flecks and coaly fragments, slightly calcareous, trace microcrystalline pyrite, grades to silty claystone. FLUORESCENCE: No direct, no cut, no crush cut, thin moderately dull light whitish yellow residual ring.

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SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 5-04-93
Geologist(s): CLIFF MENHENNITT, JON KEALL

Core No.	Depth (mRT)	Recovery (mm)	
107	2420.5	0.9	WEATHERED ARGILLACEOUS LITHIC SANDSTONE: pale green to light grey green, friable to moderately hard, medium grained, subangular to subrounded, moderately sorted quartz and lithic grains, abundant pale green (chloritic) argillaceous matrix, trace weak calcite cement, sand composed of: quartz (25%), light grey to translucent; weathered feldspar? (25%), pale green; lithics (50%), predominantly medium brown to dark brown and dark grey, common brown red; trace carbonaceous specks, nil to poor visual porosity. FLUORESCENCE: Nil.
108	2412	1.5	ARENACEOUS CLAYSTONE: grey green to dark green, firm to moderately hard, trace weak calcite cement, common moderately strong silica cement, estimated 40% medium to coarse sand composed of quartz (40%) light grey to translucent; lithics (30%) dark grey and light brown; weathered feldspar? (30%) light green to pale grey green, friable; trace biotite, alignment of sand grains produces a "semilaminated" texture.
109	2392.5	2.0	CLAYSTONE: medium dark grey, firm to moderately hard, subfissile, micromicaceous, rare carbonaceous flecks, massive.
110	2388	1.2	WEATHERED ARGILLACEOUS LITHIC SANDSTONE: pale grey green, friable to moderately hard, medium grained, subangular to subrounded, moderately sorted quartz and lithic grains, abundant moderately strong calcite cement, abundant light grey to pale grey green argillaceous matrix, sand composed of: quartz (40%) light grey to translucent; lithics (30%) light brown and dark grey; weathered feldspar (20%) pale green grey, friable; nil to poor visual porosity. FLUORESCENCE: Nil.
111	2360	2.0	SILTY CLAYSTONE: light grey, firm, sticky, contains 20% silt to very fine grained sand, micromicaceous, trace carbonaceous flecks, massive.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 5-04-93
Geologist(s): CLIFF MENHENNITT, JON KEALL

Core No.	Depth (mRT)	Recovery (mm)	Description
112	2359.5	1.5	CLAYSTONE: light grey, slightly mottled, firm to hard in part, subfissile, non calcareous, micromicaceous, trace carbonaceous flecks, massive.
113	2340	1.5	ARGILLACEOUS LITHIC SANDSTONE: pale green, friable to moderately hard, sticky in part, medium grained, subangular to subrounded, moderately sorted quartz and lithic grains, abundant weak calcite cement, abundant light grey to pale grey green argillaceous matrix, sand composed of: quartz (40%) light grey to translucent; lithics (30%) light brown and dark grey; weathered feldspar (20%) pale greenish grey, friable; trace carbonaceous flecks, nil to poor visual porosity. FLUORESCENCE: Nil.
114	2321	2.5	CLAYSTONE: medium dark grey, slightly mottled, firm to hard in part, subfissile to subblocky, non calcareous, common moderately hard silica cement, micromicaceous, trace carbonaceous flecks and laminae, massive.
115	2319	1.5	CLAYSTONE: medium dark grey, moderately hard to hard, subblocky, non calcareous, common hard silica cement, contains vein of white, soft, soapy non calcareous mineral which fluoresces white, micromicaceous, trace carbonaceous flecks and laminae, massive.
116	2304	1.7	ARGILLACEOUS SANDSTONE: medium light grey, moderately hard, fine to very fine grained, subangular to subrounded, moderately sorted quartz grains, common moderately strong silica cement, trace weak calcite cement, abundant light grey argillaceous matrix, common dark grey lithics, common carbonaceous flecks and lenses, nil to poor visual porosity. FLUORESCENCE: Nil

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: MINERVA-1
Permit: VIC/P 31 Date: 5-04-93
Geologist(s): CLIFF MENHENNITT, JON KEALL

Core No.	Depth (mRT)	Recovery (mm)	Description
117	2294	2.5	CLAYSTONE: medium dark grey, moderately firm to firm, trace silt, trace micromica, rare carbonaceous wisps, subblocky to subfissile, non calcareous. The orientation of the rare carbonaceous wisps are indicative of laminar deposition.
118	2277	-	BULLET EMPTY.
119	2274.5	-	BULLET EMPTY.
120	2259	2.0	ARGILLACEOUS LITHIC SANDSTONE: light bluish grey to light greenish grey, friable to moderately hard, fine to medium grained, occasional coarse grains, angular to subangular, occasionally subrounded, moderately well sorted quartz and lithic grains, massive, common feldspathic grains, common weak calcite cement, abundant very light grey argillaceous matrix, rare pyrite, lithic grains greyish black to black and pale to moderate reddish brown, very poor visual porosity. FLUORESCENCE: Nil
121	2215	1.0	CLAYSTONE: medium dark grey to dark grey, firm to moderately hard, massive, trace silt, trace micromica, subblocky fracture, non calcareous.
122	2212.5	0.5	CLAYSTONE: medium grey to medium dark grey, soft to moderately firm, dispersive, trace to common silt, trace micromica, rare disseminated pyrite, occasional carbonaceous flecks, subblocky to subfissile, non calcareous.
123	2157.5	2.5	COAL: greyish black to black, bright, subvitreous lustre, vitreous in part, predominantly blocky fracture, subconchoidal in part, brittle.

Core No.	Depth (mRT)	Recovery (mm)	BHP Petroleum SIDEWALL CORE DESCRIPTION SHEET Well: MINERVA-1 Permit: VIC/P 31 Date: 5-04-93 Geologist(s): CLIFF MENHENNITT, JON KEALL
124	2142	0.5	CLAYSTONE WITH INTERLAMINATED SANDSTONE CLAYSTONE: medium dark grey, moderately firm to firm, slightly dispersive, trace micromica, trace silt, rare carbonaceous flecks, subblocky to subfissile, non calcareous, with interlaminated: SANDSTONE: very light grey, friable to moderately hard, very fine grained, subangular to subrounded, well sorted quartz, abundant very light grey to white dispersive argillaceous matrix, occasional to common lithic grains, occasional carbonaceous fragments, rare pyrite, poor visual porosity. FLUORESCENCE: Nil
125	2129.5	1.5	CLAYSTONE: medium dark grey to dark grey, firm to very firm, dispersive, abundant amber, occasional coalified plant remnant, trace micromica, trace silt, occasional carbonaceous flecks, blocky to subfissile, non calcareous. The sample has a 5mm nodule of amber and further amber fragments throughout giving intense bluish white mineral fluorescence. The coalified plant remnants are present along horizontal bedding planes.

BHP Petroleum

SIDEWALL CORE DESCRIPTION SHEET

Well: **MINERVA-1**
Permit: **VIC/P 31** Date: 5-04-93
Geologist(s): CLIFF MENHENNITT, JON KEALL

Core No.	Depth (mRT)	Recovery (mm)	Description
126	2123	1.5	CLAYSTONE WITH INTERLAMINATED SANDSTONE CLAYSTONE: dark grey to occasionally greyish black, moderately firm to firm, very dispersive, trace micromica, trace very fine grained quartz, trace carbonaceous flecks, rare amber, rare pyrite nodules, subblocky to subfissile, non calcareous, with interbedded: SANDSTONE: very light grey, friable to moderately firm, very fine grained, angular to subangular, occasionally subrounded, well sorted quartz, abundant white to very light grey dispersive argillaceous matrix, common lithic grains, trace pyrite, trace coaly laminae, very poor visual porosity. FLUORESCENCE: Nil The laminae are parallel throughout the sample. The carbonaceous content of the claystone is greatest in proximity to the sandstone laminae. Traces of weak yellowish mineral fluorescence in the sample are caused by amber.
127	2120	-	BULLET EMPTY.

3.3 Conventional Cores

Three conventional cores were cut in the 8-1/2" hole section of Minerva-1 between 18 and 21 of March 1993. Details of the cored depths and recovery are given in Table 3. The fibreglass-sleeved cores were cut into 1 m lengths and marked accordingly before dispatch from the wellsite. One half of the slabbed cores are stored by BHP Petroleum at Kestrel Management (Australia) Pty Ltd, Unit 58, Slough Estate, 170 Forster Road, Mount Waverley, Victoria, 3149.

Table 3
Conventional Core Recovery

Core No.	Cored Interval (mRT)	Recovery (m)	Recovery (%)
1	1821.00 - 1828.00	3.04	43
2	1828.00 - 1842.50	13.30	92
3	1842.50 - 1847.00	4.50	100

3.3.1 Core Description

The following core descriptions sheets were prepared at the wellsite after evaluation of chip samples at 1 m intervals. Conventional core analyses were performed on the cores by ACS Laboratories Pty Ltd. The ACS report appears in this volume as Appendix 1 and the UV and white light core photographsare included in Enclosure 3.

Depth (mRT)	BHP Petroleum **CORE SAMPLE DESCRIPTION** **CORE #1** Well: **MINERVA-1** Permit: **VIC/P31** Geologist(s): **A. TABASSI/D. PICKAVANCE**
1821	SANDSTONE: Clear to translucent, off white speckling, friable to moderately hard in part, massive, fine/medium to occasionally granule grade, predominantly medium to coarse grained, subangular to subrounded, poorly sorted quartz grains, rare to common moderately strong siliceous cement with rare quartz overgrowths, trace pyrite cement, no calcareous cement, trace light grey argillaceous matrix in part, common off white very soft fine/medium grained kaolinite grains (altered feldspar?), trace medium grained glauconite, trace microcrystalline pyrite, trace carbonaceous silt, good visual porosity. FLUORESCENCE: No direct, no cut, dull yellowish white crush cut, trace very dull whitish yellow residual ring.
1822	PYRITIC SANDSTONE: Light grey and bronze with off white speckling, hard to very hard in part, massive, fine/medium to granule grade, predominantly medium/coarse to very coarse grained, subangular to generally subrounded, granules dominantly rounded, poorly sorted quartz grains, rare to common moderately strong siliceous cement with rare quartz overgrowths, abundant pyrite cement, no calcareous cement, trace light grey argillaceous matrix in part, rare to common off white very soft fine/medium grained kaolinite grains (altered feldspar?), trace medium grained glauconite, trace carbonaceous silt, fair visual porosity. FLUORESCENCE: No direct, fast streaming bright whitish yellow cut and crush cut, wide moderately bright yellowish white residual ring, fades fast to dull after drying.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE #1 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1823	PEBBLY/CONGLOMERATIC SANDSTONE: Light grey (see note*) to translucent in part, slightly hard to very hard, friable in part, massive, medium to granule grade with rare pebbles up to 20 mm diameter, subrounded to subangular, coarser fractions typically rounded and occasionally well rounded, poorly sorted quartz grains, rare strong siliceous cement, trace to rare pyrite cement, trace light grey argillaceous matrix, rare off white kaolinitic matrix (similar to kaolinite above except dispersed), trace off white soft fine grained kaolinite grains (altered feldspar?), trace fine grained glauconite, trace carbonaceous flecks, fair visual porosity. * Note: Sandstone has a light brownish grey colour, however flushing from drilling fluid is interpreted to have contaminated true light grey colour. FLUORESCENCE: No direct, no cut, very dull yellowish white crush cut, trace dull yellowish white residual ring.
1823.6	SANDSTONE: Very light grey, friable, fine to medium grained, subangular to dominantly subrounded, well sorted quartz grains, trace fairly weak siliceous cement, trace weak pyritic cement, common to rare off white kaolinitic matrix and very fine grains, trace light grey argillaceous matrix in part, trace fine/medium grained glauconite, trace carbonaceous flecks and discontinuous laminae, fair to good visual porosity. FLUORESCENCE: No direct, moderately slow dull yellowish white cut, dull yellowish white crush cut, moderately wide moderately bright yellowish white residual ring.
1824.0	SANDSTONE: Light grey, very friable, massive, very fine to fine and occasionally medium grained, subangular to subrounded, well sorted quartz grains, trace to rare pyrite cement, common to abundant light to medium/light fairly sticky very slightly calcareous argillaceous matrix, rare off white kaolinite grains occasionally dispersed as a matrix, trace glauconite grains, trace carbonaceous flecks, poor to possibly fair visual porosity. FLUORESCENCE: No direct, no cut, slow dull yellowish white crush cut, very dull thin yellowish white residual ring.

Depth (mRT)	BHP Petroleum CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1828.0	SANDSTONE: Light grey to clear, moderately hard to friable, occasionally hard, dominantly medium, occasionally coarse grained, subangular to subrounded, moderately well sorted quartz grains, rare to common light grey to off white kaolinitic (in part) argillaceous matrix, rare to occasionally common moderately strong siliceous cement in part, trace fine carbonaceous detritus, fair to good visual porosity. FLUORESCENCE: Nil.
1828.4	SANDSTONE: Light grey to clear, moderately hard to friable, occasionally hard, medium to coarse grained, subangular to subrounded, moderately well sorted quartz grains, rare to common light grey to off white kaolinitic (in part) argillaceous matrix, rare to occasionally common moderately strong siliceous cement in part, trace fine carbonaceous detritus, fair to good visual porosity. FLUORESCENCE: No direct, no cut, very slow very weak dull yellowish white crush cut.

Depth (mRT)	BHP Petroleum CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1829.3	<u>CONGLOMERATIC SANDSTONE WITH TRACE ARGILLACEOUS CARBONACEOUS LAMINAE</u> <u>CONGLOMERATIC SANDSTONE</u>: Light grey to off white, moderately hard to hard, rarely friable in part, coarse grained to small pebbles, subangular to dominantly subrounded, poorly sorted quartz grains, rare to common hard siliceous cement, no calcareous cement, rare to common off white to light grey kaolinitic argillaceous matrix, trace resin/amber, trace fine carbonaceous matter (trace solid oil, see comment in FLUORESCENCE), trace microcrystalline pyrite, fair visual porosity, with interbedded: <u>CARBONACEOUS LAMINAE</u>: Dark brown to dark brownish grey, firm, moderately argillaceous in part, trace silt. <u>FLUORESCENCE</u>: No direct, no cut, very slow very weak dull yellowish white crush cut, very thin dull bluish white residual ring. Trace black, vitreous, brittle to slightly rubbery ?solid oil (or ?carbonaceous matter) squeezed/migrated within pore spaces adjacent to/associated with carbonaceous/argillaceous laminae, gives brilliant orange to yellowish orange direct, moderately fast bright bluish white cut and crush cut, moderately thick, moderately dull brownish yellow residual ring.
1829.6	<u>CLAYSTONE</u> <u>CLAYSTONE</u>: Medium to dark brownish grey to grey, firm to moderately hard, rare micromica, non calcareous, common coarse coaly fragments and carbonaceous laminae, common brittle translucent brown amber nodules. <u>FLUORESCENCE</u>: (i) Amber: very bright bluish white direct, instant moderately dull to moderately bright yellowish white to bluish white cut. (ii) Claystone: No direct, no cut, very slow very weak dull yellowish brown crush cut, very thin very dull brownish yellow residual ring.

Depth (mRT)	BHP Petroleum CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1829.9	<u>CONGLOMERATIC SANDSTONE</u> <u>CONGLOMERATIC SANDSTONE</u>: Light grey, clear in part, moderately hard to hard, medium grained to small to medium pebble grade, subangular to subrounded, pebbles rounded in part, rare to occasionally common light grey argillaceous matrix, common moderately strong siliceous cement, rare fine carbonaceous detritus, fair to occasionally good visual porosity. <u>FLUORESCENCE</u>: No direct, very slow dull yellowish brown cut, moderately intensified on crushing, very thin, very dull brownish yellow residual ring.
1830.3	<u>CONGLOMERATIC SANDSTONE</u> <u>CONGLOMERATIC SANDSTONE</u>: Light grey, clear in part, moderately hard to hard, medium grained to small to medium pebble grade, subangular to subrounded, pebbles rounded in part, rare to occasionally common light grey argillaceous matrix, common moderately strong siliceous cement, rare fine carbonaceous detritus, fair to occasionally good visual porosity. <u>SHOWS</u>: No direct, very slow dull brownish yellow cut, no residual ring, common yellowish white residual fluorescence on sample when dry.
1831.0	<u>SANDSTONE</u> <u>SANDSTONE</u>: Clear to light grey, moderately hard to hard, medium to very coarse, dominantly coarse, rare medium rounded pebbles, subangular to subrounded, moderately sorted quartz grains, rare to occasionally common off white to light grey (kaolinitic in part) argillaceous matrix, rare to common moderately strong siliceous cement, trace light green lithics, trace carbonaceous detritus, poor to dominantly fair visual porosity. <u>FLUORESCENCE</u>: No direct, very slow light whitish blue cut and crush cut, moderately thin dull bluish white residual ring, common yellowish white residual fluorescence on sample when dry.

Depth (mRT)	BHP Petroleum CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1831.3	CONGLOMERATIC SANDSTONE CONGLOMERATIC SANDSTONE: Light grey, clear in part, moderately hard to hard, medium grained to small to medium pebble grade, subangular to subrounded, pebbles rounded in part, rare to occasionally common light grey argillaceous matrix, common moderately strong siliceous cement, rare fine carbonaceous detritus, fair to occasionally good visual porosity. FLUORESCENCE: No direct, slow to moderate dull greenish yellow cut, slightly intensified by crush cut, moderately thin dull bluish white residual ring, common yellowish white residual fluorescence on sample when dry.
1832.3	CONGLOMERATIC SANDSTONE CONGLOMERATIC SANDSTONE: Light grey, clear in part, moderately hard to hard, medium grained to small to medium pebble grade, subangular to subrounded, pebbles rounded in part, rare to occasionally common light grey argillaceous matrix, common moderately strong siliceous cement, rare fine carbonaceous detritus, minor medium to dark brownish grey to grey moderately silty claystone clasts with trace pyritised plant fragments, fair to occasionally good visual porosity. FLUORESCENCE: No direct, very slow very dull brownish yellow cut, very thin very dull bluish white residual ring.
1833.1	GRANULE SANDSTONE GRANULE SANDSTONE: Light grey to clear, moderately hard to occasionally friable in part, medium grained to granule grade, trace fine grained, subangular to subrounded, poorly sorted quartz, common off white kaolinitic argillaceous matrix, rare to common moderately strong siliceous cement, trace to rare carbonaceous and coaly fragments, laminae and streaks, trace structural kaolinite (altered feldspar), trace mica, fair to good visual porosity. FLUORESCENCE: No direct, very slow very dull brownish yellow cut, very thin very dull bluish white residual ring.

BHP Petroleum

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1833.3	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to hard, rarely friable, medium to very coarse, dominantly coarse, subangular to subrounded, moderately sorted, rare light grey and off white argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite, nil to trace lithics, trace carbonaceous detritus, very good to good visual porosity. FLUORESCENCE: No direct, moderately slow dull yellowish white cut, slight increase in intensity in crush cut, very thin very dull bluish white residual ring.
1834.0	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to hard, medium to very coarse, dominantly medium to coarse, subangular to subrounded, moderately sorted quartz, rare to common off white kaolinitic and light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace carbonaceous detritus, nil to trace mica and lithics, fair to good visual porosity, interlaminated with minor medium grey claystone laminae. FLUORESCENCE: No direct, slow weak whitish to greenish yellow cut, improves slightly on crush to moderate whitish to greenish yellow, very thin very dull bluish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.
1834.3	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to hard, medium to granule, dominantly coarse to very coarse, subangular to subrounded, moderately to poorly sorted quartz grains, rare to common light grey argillaceous matrix, common moderately strong siliceous cement, trace carbonaceous and coaly detritus, trace mica and lithics, fair to occasionally good visual porosity. FLUORESCENCE: No direct, moderately fast moderately bright light milky white cut, moderately thick dull yellowish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1834.8	SANDSTONE WITH MINOR INTERBEDDED CLAYSTONE SANDSTONE: Light grey to clear, moderately hard to hard, medium to occasionally very coarse, dominantly medium to coarse, subangular to subrounded, moderately sorted quartz grains, trace to occasionally common light grey to off white argillaceous matrix, rare to common moderately strong siliceous cement, trace carbonaceous and coaly detritus, trace mica and lithics, trace structural kaolinite grains, fair visual porosity, interlaminated with minor: CLAYSTONE: Medium brownish grey, firm, non calcareous, rarely silty, abundantly carbonaceous, common pyritised plant/wood fragments. FLUORESCENCE: No direct, moderately slow weak dull bluish white cut, thin to moderately thick moderately bright yellowish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.
1835.3	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to hard, medium grained to small rounded pebble grade, subangular to subrounded poorly sorted quartz grains, rare to common off white kaolinitic and light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace carbonaceous detritus, trace lithics, structural kaolinite, mica and cryptocrystalline pyrite, poor to good dominantly fair visual porosity. FLUORESCENCE: No direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring, fluorescence as above on dry samples.

BHP Petroleum

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1835.8	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to hard, medium to very coarse, dominantly medium to coarse, subangular to subrounded, moderately sorted quartz grains, rare to occasionally common off white kaolinitic and light grey argillaceous matrix, rare to occasionally common moderately strong siliceous cement, trace mica, lithics, structural kaolinite grains and carbonaceous detritus, fair to occasionally good visual porosity. FLUORESCENCE: No direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring, fluorescence of dry samples as above.
1836.1	SANDSTONE SANDSTONE: Light grey to clear, moderately hard, friable in part, medium to very coarse, dominantly coarse, subangular to subrounded, moderately sorted quartz grains, rare to occasionally common off white kaolinitic and light grey argillaceous matrix, rare to occasionally common moderately strong to moderately weak siliceous cement, trace lithics, mica, structural kaolinite, coaly fragments, disseminated cryptocrystalline pyrite, good visual porosity. FLUORESCENCE: No direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring, sample commonly has moderately bright bluish white residual fluorescence when dry.
1836.3	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally hard, rarely friable, dominantly medium to coarse grained, subangular to subrounded, well sorted quartz grains, rare off white kaolinitic argillaceous matrix, rare to occasionally common moderately strong siliceous cement, trace lithics, mica, structural kaolinite and coaly fragments, good visual porosity. FLUORESCENCE: No direct, slow weak dull bluish white cut, slight increase in intensity on crushing, thin moderately dull pale brownish yellow residual ring.

BHP Petroleum

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1837.0	SANDSTONE SANDSTONE: Light to medium grey, occasionally clear, hard, medium to very coarse, dominantly coarse grained, dominantly subangular, occasionally subrounded, moderate to well sorted quartz, trace light grey to off white argillaceous matrix, common strong siliceous cement, trace coaly particles, very poor to poor visual porosity. FLUORESCENCE: Nil direct, cut, no crush cut, very thin dull brownish yellow residual ring.
1837.3	CLAYSTONE CLAYSTONE: Medium brown to medium greyish brown, moderately hard, non calcareous, common plant fragments, leaves and carbonaceous matter, rare to common translucent golden brown brittle amber globules with conchoidal fracture. FLUORESCENCE: (i) Amber: very bright yellowish white direct, instantaneous bright yellowish white to bluish white cut. (ii) Claystone: No direct, no cut, slow weak dull brownish white to bluish white crush cut, very thin very dull brownish yellow residual fluorescence, moderately wide pale yellow residual ring.
1838.3	CLAYSTONE CLAYSTONE: Medium grey to brownish grey, moderately hard, non calcareous, common plant fragments, leaves and carbonaceous matter. SHOWS: (i) Amber: very bright yellowish white direct, instantaneous bright yellowish white to bluish white cut. (ii) Claystone: No direct, no cut, slow weak dull brownish white to bluish white crush cut, very thin very dull brownish yellow residual fluorescence, moderately wide pale yellow residual ring.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1839.3	CLAYSTONE CLAYSTONE: Medium grey to medium brownish grey, moderately hard to occasionally hard, moderately silty, non calcareous, rare micromica, trace medium grained mica flecks, rare to common carbonaceous flecks and laminae, trace coaly particles. FLUORESCENCE: No direct, no cut, very slow weak dull bluish white crush cut, moderately wide moderately dull to moderately bright brownish white residual ring.
1839.8	INTERLAMINATED SANDSTONE AND CLAYSTONE SANDSTONE: Light grey, moderately hard, fine to medium grained, dominantly subrounded, well sorted quartz grains, trace to rare light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace mica and carbonaceous flecks, poor visual porosity. CLAYSTONE: Medium to dark grey to brownish grey, moderately hard, common micromica, non calcareous, trace silt, common carbonaceous flakes. FLUORESCENCE: Trace to rare pinpoint to medium patchy dull pale orange direct (particularly associated with more argillaceous laminae), moderately fast bleeding moderately bright pale greenish yellow cut, moderately bright greenish yellow crush cut, moderately wide moderately bright greenish yellow residual ring.
1840.3	CLAYSTONE CLAYSTONE: Medium to dark grey to brownish grey, moderately hard, common micromica, non calcareous, trace silt, common carbonaceous flakes. FLUORESCENCE No direct, no cut, weak pale milky white crush cut, moderately wide moderately bright greenish white residual ring.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 2 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1840.8	SANDSTONE SANDSTONE: Light to occasionally medium grey, rarely clear, moderately hard to friable, medium grained, dominantly subrounded, well sorted quartz grains, trace to occasionally rare light grey to off white argillaceous matrix, rare to occasionally common moderately weak to moderately strong siliceous cement, trace carbonaceous and coaly detritus, trace structural kaolinite, fair to dominantly good visual porosity. FLUORESCENCE: No direct, very slow very weak pale bluish white cut, intensified to weak on crushing, very thin wispy pale greenish white residual ring.
1841.3	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally friable, medium to coarse grained, subangular to subrounded, well sorted quartz grains, trace light grey to off white argillaceous matrix, rare to common moderately strong siliceous cement, trace carbonaceous and coaly detritus, trace structural kaolinite, fair to occasionally good visual porosity. FLUORESCENCE: No direct, very slow moderately dull yellowish white to milky white cut, moderately dull to moderately bright yellowish white crush cut.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 3 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1842.5	SANDSTONE SANDSTONE: Light grey to clear, moderately hard, rarely friable in part, medium to very coarse, dominantly coarse, subangular to subrounded, poorly to moderately sorted quartz grains, rare light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite and coaly detritus, fair to occasionally good visual porosity. FLUORESCENCE: No direct, very slow very pale greenish white to milky white cut, improves to pale on crushing, thin faint pale greenish white residual ring.
1843.5	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally friable, dominantly coarse, occasionally medium and very coarse, subangular to dominantly subrounded, moderately sorted quartz grains, trace light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite, coaly particles and lithics, fair visual porosity. FLUORESCENCE: No direct, no cut, very pale greenish white to milky white crush cut, very thin very faint greenish white residual ring.
1844.5	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to friable in part, dominantly coarse to very coarse grained, occasionally medium grained, subangular to subrounded, moderately sorted quartz grains, trace very light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite and coaly detritus, fair visual porosity. FLUORESCENCE: No direct, very slow pale greenish white to milky white cut, improves to pale to moderately bright on crushing, medium wide dull greenish white residual ring.

Depth (mRT)	CORE SAMPLE DESCRIPTION CORE # 3 Well: MINERVA-1 Permit: VIC/P31 Geologist(s): A. TABASSI/D. PICKAVANCE
1845.5	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally friable, medium to very coarse, dominantly coarse, occasionally fine grained and granule grade, subangular to subrounded, poorly sorted quartz, trace light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite, coaly detritus and disseminated cryptocrystalline pyrite, fair to dominantly good visual porosity. FLUORESCENCE: No direct, very slow very pale greenish white to milky white cut, improves to pale on crushing, no residual ring.
1846.5	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally friable, medium to very coarse, dominantly coarse, subangular to subrounded, moderately sorted quartz grains, trace light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite, coaly particles, fair to dominantly good visual porosity. FLUORESCENCE: No direct, very slow pale greenish white to milky white cut, improves to pale to moderately bright on crushing, thin to medium thick very dull greenish white residual ring.
1847.0	SANDSTONE SANDSTONE: Light grey to clear, moderately hard to occasionally friable, medium to very coarse, dominantly coarse, subangular to subrounded, moderately sorted quartz grains, trace light grey argillaceous matrix, rare to common moderately strong siliceous cement, trace structural kaolinite, coaly particles, fair to dominantly good visual porosity. FLUORESCENCE: No direct, extremely slow very pale greenish white to milky white cut, improves to pale on crushing, no residual ring.

3.4 HYDROCARBON INDICATIONS

3.4.1 Cuttings Gas Summary

GAS READINGS (%):

DEPTH mRT	TG	C_1	C_2	C_3	iC_4	nC_4	C_5
Background Gas							
956-1204	0.040- 0.460	0.040- 0.300	0.000- 0.050	0.000- 0.020	0.000- 0.000	0.000- 0.000	0.000- 0.000
1204-1208	0.020-	0.020-	0.000-	0.000-	0.000-	0.000-	0.000-
1208-1413	0.060- 0.230	0.060- 0.230	0.000- 0.000	0.000- 0.000	0.000- 0.000	0.000- 0.000	0.000- 0.000
1413-1820	0.020- 0.200	0.020- 0.200	0.000- 0.020	0.000- 0.000	0.000- 0.000	0.000- 0.000	0.000- 0.000
1947-2006	0.030- 0.104	0.030- 0.090	0.000- 0.012	0.000- 0.000	0.000- 0.000	0.000- 0.000	0.000- 0.000
2006-2029	0.010- 0.078	0.010- 0.070	0.000- 0.004	0.000- 0.000	0.000- 0.000	0.000- 0.000	0.000- 0.000
2131-2144	0.115-	0.106-	0.000-	0.000-	0.000-	0.000-	0.000-
2144-2170	0.230-	0.194-	0.022-	0.000-	0.000-	0.000-	0.000-
2170-2196	0.100-	0.088-	0.011-	0.000-	0.000-	0.000-	0.000-
2196-2209	0.083-	0.074-	0.012-	0.000-	0.000-	0.000-	0.000-
2209-2213	0.051-	0.040-	0.010-	0.000-	0.000-	0.000-	0.000-
2228-2255	0.059-	0.051-	0.011-	0.000-	0.000-	0.000-	0.000-
2255-2295	0.076-	0.057-	0.011-	0.000-	0.000-	0.000-	0.000-
2295-2300	0.057-	0.050-	0.008-	0.000-	0.000-	0.000-	0.000-
2300-2336	0.237-	0.222-	0.018-	0.000-	0.000-	0.000-	0.000-
2336-2366	0.353-	0.328-	0.026-	0.000-	0.000-	0.000-	0.000-
2366-2372	0.080-	0.066-	0.007-	0.000-	0.000-	0.000-	0.000-

GAS READINGS (%):

DEPTH mRT	TG	C_1	C_2	C_3	iC_4	nC_4	C_5
2372-2391	0.261-	0.220-	0.026-	0.000-	0.000-	0.000-	0.000-
2391-2399	0.057-	0.056-	0.008-	0.000-	0.000-	0.000-	0.000-
2399-2425	0.302-	0.254-	0.024-	0.000-	0.000-	0.000-	0.000-
Peaks							
1171	0.846	0.677	0.047	0.025	0.000	0.000	0.000
1183	0.884	0.772	0.025	0.021	0.000	0.000	0.000
1649	2.760	2.600	0.030	0.017	0.009	0.003	0.000
1662	4.065	3.197	0.045	0.027	0.000	0.000	0.000
1802	0.470	0.460	0.005	0.003	0.000	0.000	0.000
1812	2.168	2.077	0.022	0.012	0.001	0.002	0.000
1824	0.721	0.420	0.092	0.039	0.000	0.000	0.000
1879	1.053	1.017	0.011	0.005	0.000	0.000	0.000
1890	1.197	1.143	0.012	0.008	0.002	0.000	0.000
1908	1.483	1.430	0.015	0.007	0.000	0.000	0.000
1937	0.937	0.901	0.010	0.005	0.000	0.000	0.000
2024	0.017	0.130	0.010	0.006	0.000	0.000	0.000
Wiper Trip Gas							
1204	1.530	n/a	n/a	n/a	n/a	n/a	n/a
2107*	7.626	7.260	0.081	0.044	0.010	0.008	0.000
2107#	2.393	2.310	0.017	0.011	0.001	0.002	0.000
2107@	3.415	3.200	0.043	0.026	0.005	0.006	0.002

GAS READINGS (%):

(*= WTG on 25-3-93, #= WTG on 26-3-93, @= TG circulated through casing, n/a= chromatograph not operational)

Connection Gas

DEPTH mRT	TG	C_1	C_2	C_3	iC_4	nC_4	C_5
1168	1.000	n/a	n/a	n/a	n/a	n/a	n/a
1335.1	0.190	0.190	0.000	0.000	0.000	0.000	0.000
1363.8	0.200	0.200	0.000	0.000	0.000	0.000	0.000
1393.1	0.150	0.150	0.000	0.000	0.000	0.000	0.000

3.4.2 Cuttings Hydrocarbon Fluorescence

Depth mRT	Description
1821.0*	(sandstone) no direct, no cut, dull yellowish white crush cut, trace very dull whitish yellow residual ring.
1822.0*	(sandstone) no direct, fast streaming bright whitish yellow cut and crush cut, wide moderately bright yellowish white residual ring, fades fast to dull after drying.
1823.0*	(sandstone) no direct, no cut, very dull yellowish white crush cut, trace dull yellowish white residual ring.
1823.6*	(sandstone) no direct, moderately slow dull yellowish white cut, dull yellowish white crush cut, moderately wide moderately bright yellowish white residual ring.
1824.0*	(sandstone) no direct, no cut, dull slow yellowish white crush cut, very dull thin yellowish white residual ring.
1828.4*	(sandstone) no direct, no cut, very slow very weak dull yellowish white crush cut.
1829.3*	(sandstone) no direct, no cut, very slow very weak dull yellowish white crush cut, very thin dull bluish white residual ring. Trace black, vitreous, brittle to slightly rubbery ?solid oil (or ?carbonaceous matter) squeezed/migrated within pore spaces adjacent to/associated with carbonaceous/argillaceous laminae, gives brilliant orange to yellowish orange direct, moderately fast bright bluish white cut and crush cut, moderately thick, moderately dull brownish yellow residual ring.
1829.6*	(amber) very bright bluish white direct, moderately instant moderately dull to moderately bright yellowish white to bluish white cut.
	(claystone) no direct, no cut, very slow very weak dull yellowish brown crush cut, very thin very dull brownish yellow residual ring.
1829.9*	(sandstone) no direct, very weak very slow dull yellowish brown cut, moderately intensified on crushing, very thin, very dull brownish yellow residual ring.
1830.3*	(sandstone) no direct, very weak very slow dull brownish yellow cut, no residual ring, common yellowish white residual fluorescence on sample when dry.

1831.0*	(sandstone) no direct, very slow light whitish blue cut and crush cut, moderately thin dull bluish white residual ring, common yellowish white residual fluorescence on sample when dry.
1831.3*	(sandstone) no direct, slow to moderate, dull greenish yellow cut, slightly intensified by crush cut, moderately thin dull bluish white residual ring, common yellowish white residual fluorescence on sample when dry.
1832.3*	(sandstone) no direct, very slow very dull brownish yellow cut, very thin very dull bluish white residual ring.
1833.1*	(sandstone) no direct, very slow very dull brownish yellow cut, very thin very dull bluish white residual ring.
1833.3*	(sandstone) no direct, moderately slow dull yellowish white cut, slight increase in intensity in crush cut, very thin very dull bluish white residual ring.
1834.0*	(sandstone) no direct, slow weak whitish to greenish yellow cut, moderate whitish to greenish yellow crush cut, very thin very dull bluish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.
1834.3*	(sandstone) no direct, moderately fast moderately bright light milky white cut, moderately thick, dull yellowish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.
1834.8*	(sandstone) no direct, moderately slow weak dull bluish white cut, thin to moderately thick moderately bright yellowish white residual ring, common moderately bright yellowish white residual fluorescence on sample when dry.
1835.3*	(sandstone) no direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring, fluorescence as above on dry samples.
1835.8*	(sandstone) no direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring, fluorescence of dry samples as above.
1836.1*	(sandstone) no direct, moderately slow moderately weak bluish white cut, improving in intensity when crushed, thin dull bluish white residual ring.
1836.3*	(sandstone) no direct, slow weak dull bluish white cut, slight increase in intensity on crushing, thin moderately dull pale brownish yellow residual ring.

1837.0*	(sandstone) no direct, no cut, no crush cut, very thin dull pale brownish yellow residual ring.
1837.3 - 1838.3*	(amber) very bright yellowish white direct, instantaneous bright yellowish white to bluish white cut.
	(claystone) no direct, no cut, slow weak dull brownish white to bluish white crush cut, moderately wide pale yellow residual ring.
1839.3*	(claystone) no direct, no cut, very slow weak dull bluish white crush cut, moderately wide moderately dull to moderately bright brownish white residual ring.
1839.8*	(sandstone) trace to rare pinpoint to medium patchy dull pale orange direct (particularly associated with more argillaceous laminae), moderately fast bleeding moderately bright pale greenish yellow cut, improving to moderately bright greenish yellow crush cut, moderately wide moderately bright greenish yellow residual ring.
1840.3*	(claystone) no direct, no cut, weak pale milky white crush cut, moderately wide moderately bright greenish white residual ring.
1840.8*	(sandstone) no direct, very slow very weak pale bluish white cut, intensified to weak on crushing, very thin wispy pale greenish white residual ring.
1841.3*	(sandstone) no direct, very slow moderately dull yellowish white to milky white cut, moderately dull to moderately bright yellowish white crush cut.
1842.5*	(sandstone) no direct, very slow very pale greenish white to milky white cut, improves to pale on crushing, thin faint pale greenish white residual ring.
1843.5*	(sandstone) no direct, no cut, very pale greenish white to milky white crush cut, very thin very faint greenish white residual ring.
1844.5*	(sandstone) no direct, very slow pale greenish white to milky white cut, improves to pale to moderately bright on crushing, medium wide dull greenish white residual ring.
1845.5*	(sandstone) no direct, very slow very pale greenish white to milky white cut, improves to pale on crushing, no residual ring.
1846.5*	(sandstone) no direct, very slow pale greenish white to milky white cut, improves to pale to moderately bright on crushing, thin to almost medium thick very dull greenish white residual ring.

1847.0*	(sandstone) no direct, extremely slow very pale greenish white to milky white cut, improves to pale on crushing, no residual ring.
1937-1946	(sandstone) no direct, no cut, extremely weak extremely pale bluish white crush cut, moderately wide light greenish yellow residual ring.
	(claystone) no direct, no cut, no crush cut, very thin moderately dull bluish white residual ring.
1976-1979	(claystone) no direct, no cut, no crush cut, very thin moderately dull bluish white residual ring.
2003-2015	(claystone) no direct, no cut, no crush cut, very thin moderately dull bluish white residual ring.

* Chips and cuttings from cores 1 to 3.

4

4. LOGGING AND SURVEYS

4.1 Mudlogging

Exlog provided conventional mudlogging services in conjunction with a computerised data logging and processing system (Drillbyte).

Gas detection equipment consisted of :

- Flame Ionisation Total Hydrocarbon Ditch Gas Detector.
- Flame Ionisation Chromatograph (continuous cycle-hydrocarbon detection C_1 through to C_5).
- Hydrogen Sulphide detector (continuous monitoring sensitive to 1 ppm).
- Infra red CO_2 detector.

The Exlog 'Drillbyte' monitoring system was utilised to measure, display and record conventional drilling data. Permanent storage of drilling data was made onto 3.5" floppy diskette. On-line and off-line plots of engineering parameters were made available when necessary.

Surveillance for potential abnormal pressure while drilling was assisted by the continuous computation of the D-Exponent and Pressure Logs.

The Exlog unit was operated continuously throughout the well. Once returns were achieved, routine analyses for fluorescence and cut in organic solvent were carried out on all ditch samples.

The Mudlog for Minerva-1 is included as Enclosure 1.

4.2 Wireline Logs

Four suites of wireline logs were run in Minerva-1. A list of the logs run in the well is included in Table 4.

Table 4
Wireline Logs

Suite No.	Run No.	Log Type	Depth Interval mRT	Date Run
1	1	DLL-MSFL-AS-GR-SP-CAL-AMS	1204-549 (GR to seafloor)	14/03/93
1	1	Zero Offset VSP	1189-150	14/03/93
1	1	CST-GR (46 shots)	1193-563	14/03/93
2	2	DLL-MSFL-AS-GR-SP-CAL-AMS	2024-1189	21/03/93
2	1	LDL-CNL-GR-AMS	2024-1189	21/03/93
2	1	FMS-GR-AMS	2024-1189	21/03/93
2	2	Zero Offset VSP	2017-920	22/03/93
2	1	RFTB-GR-HP-AMS	1992-1649	22/03/93
3	3	DLL-MSFL-AS-GR-SP-CAL-AMS	2103-1800	25/03/93
3	2	CST-GR (60 shots)	2101-1195	25/03/93
4	4	DLL-MSFL-AS-GR-SP-CAL-AMS	2424-2109.5	04/04/93
4	2	LDL-CNL-GR-AMS	2424-2109.5	05/04/93
4	2	FMS-GR-AMS	2424-2109.5	05/04/93
4	3	Zero Offset VSP	2420-1992	05/04/93
4	3	CST-GR (21 shots)	2420.5-2120	05/04/93
4	1	CBL-VLD-GR (7" liner)	2109-1088	05/04/93
4	1	USIT Cement Map	2109-1088	05/04/93
5	1	Perforating & packer Record	1838-1800	09/04/93

Processed Logs

2	1	MSD (wellsite)	2024-1189	21/03/93
4	2	MSD (wellsite)	2424-2109.5	05/04/93

4.3 Measurement While Drilling

Eastman Teleco Measurement While Drilling Services were utilised by BHP Petroleum during the drilling of Minerva-1. A dual propagation resistivity (DPR) log in both real time and recorded modes and directional surveys were provided in the 12-1/4" hole section from a bit depth of 540 m to 1204 m. Reliable DPR and directional data were provided in real time throughout this hole section and a DPR memory log was produced at the end of the hole section. One MWD tool was required for the one tool run in the 12-1/4" hole section.

A DPR log in both real time and recorded modes and directional surveys were provided in the 8-1/2" hole section from a bit depth of 1204 m to 2107 m. Reliable DPR and directional data were provided in real time throughout this hole section and a DPR memory log was produced at the end of each tool run. One MWD tool was required for the three tool runs in the 8-1/2" hole section.

The tools acquired a total of 111.5 circulating hours of data.

The Eastman Teleco logs are provided in this volume as Enclosure 2.

4.4 Velocity Surveys

Schlumberger Seaco Inc conducted a Zero Offset Vertical Seismic Profile Survey in the 12.25" hole section on Minerva-1 using a Combinable Seismic Imager (CSI). Three sleeve air guns were used as the energy source for the survey. The guns were suspended from the rig and located 7 m below mean water level and offset 47 m from the wellhead on an azimuth of 050°. The survey was acquired on 14 March 1993 and obtained VSP data from a depth of 1189 to 150 mRT. A total of 33 VSP levels were recorded at approximately 25 m shot spacing and 8 check shot levels were recorded at approximately 50 m shot spacing.

Schlumberger Seaco Inc conducted a second VSP Survey in the 8.5" hole section. Three sleeve air guns were used as the energy source for the survey. The guns were suspended from the rig and located 7 m below mean water level and offset 47 m from the wellhead on an azimuth of 050°. The survey was acquired on 22 March 1993 and obtained VSP data from a depth of 2017 to 920 mRT. A total of 42 VSP levels were recorded at approximately 20 m shot spacing.

Schlumberger Seaco Inc conducted a third VSP Survey in the 6" hole section at TD. Three sleeve air guns were used as the energy source for the survey. The guns were suspended from the rig and located 7 m below mean water level and offset 47 m from the wellhead on an azimuth of 050°. The survey was acquired on 5 April 1993 and obtained VSP data from a depth of 2420 to 1992 mRT. A total of 21 VSP levels were recorded at approximately 20 m shot spacing.

No VSP Quicklook processing was applied at the wellsite.

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5. RESERVOIR AND FLUID ANALYSIS

5.1 RFT

Three RFT runs were made in Minerva-1 on 22 and 23 March 1993. Thirty two pretests were attempted (of which 27 were successful) over the interval 1992.0 m to 1650.8 mRT. Pretest data are presented below.

A total of three segregated samples were collected over this interval:
Sample #1- Segregated (6 gallons and 1 gallon) was collected at 1931.0 mRT
Sample #2- Segregated (6 gallons and 1 gallon) was collected at 1942.5 mRT
Sample #3- Segregated (6 gallons and 1 gallon) was collected at 1649.8 mRT

The 6 gallon sample chamber of Sample #1 from 1931.0 m was opened at the wellsite and found to contain 113 SCF of gas, approximately 15 mL of condensate and 550 mL of water. The one gallon sample chamber from 1931.0 m was left sealed and sent for PVT analysis. Gas and water analyses were carried out on the fluids from the 6 gallon chamber at the wellsite and the results are reported below.

The 6 gallon sample chamber of Sample #2 from 1942.5 m was opened at the wellsite and found to contain 77.7 SCF of gas, approximately 20 mL of condensate and 830 mL of water. The one gallon sample chamber from 1942.5 m was left sealed and sent for PVT analysis. Gas and water analyses were carried out on the fluids from the 6 gallon chamber at the wellsite and the results are reported below.

The 6 gallon sample chamber of Sample #3 from 1649.8 m was opened at the wellsite and found to contain 77.7 SCF of gas, a scum of condensate and 7500 mL of water. The one gallon sample chamber from 1649.8 m was left sealed and sent for PVT analysis. Gas and water analyses were carried out on the fluids from the 6 gallon chamber at the wellsite and the results are reported below.

Figure 2

RFT Sample Data Sheet

Well: Minerva-1

Date: 22nd March 1993

KB: 25.0 m

Sample No: 1 **Depth:** 1931.0 mAHKB

Formation Pressure: 2743.36 psia

	Lower	Upper	
Chamber No:		RFS-1227	
Chamber Size:	6	1	gal
Flowing Pressure:	Approx 2500	Approx 2450	psig
Time To Fill:	25	6	minutes
Opening Pressure:	1850	1800	psig
Gas Volume:	113	Preserved for	ft^3
Total Liquids:	570	PVT Analysis	cc
Oil/Condensate Volume:	15		cc
Filtrate/Water Volume:	555		cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:	0.8		Stb/MMscf

Oil/Condensate Analysis

	Lower	Upper	
Specific Gravity:	Too small to measure		Air=1, Temp
Colour:	Too small to measure		
Fluorescence:	Bright Blue		

Gas Analysis:

	Lower	Upper	
C1:	90.55		%
C2:	3.72		%
C3:	3.27		%
iC4:	0.36		%
nC4:	0.37		%
C5+:	0.62		%
CO2:	1.70		%
H2S:	0		ppm
Specific Gravity	0.65		Air=1.0

Water/Filtrate Analysis:

	Lower	Upper	Filtrate Drilled	Filtrate Logged	
Rw:	0.134		0.084		
pH:			9.5		
Cl-:					mg/l
Total Hardness (Ca/Mg):					
KCl:	24000		25000		

Tritium Analysis:

	Lower	Upper	Filtrate Drilled	Filtrate Logged	
Average Activity:	N/A	N/A	N/A	N/A	Bq/cc
Returns:					Bq/cc
% Filtrate:					

Figure 3

RFT Sample Data Sheet

Well: Minerva-1

Date: 22nd March 1993

Sample Data

KB: 25.0 m

Sample No: 2 **Depth:** 1942.5 mAHKB

Formation Pressure: 2746.3 psia

Form Temp. oF

	Lower	Upper	
Chamber No:		RFS-1157	
Chamber Size:	6	1	gal
Flowing Pressure:	Aprox 2200	Aprox 2500	psig
Time To Fill:	50	10	minuites
Opening Pressure:	2050	2000	psig
Gas Volume:	78	Preserved for	ft^3
Total Liquids:	830	PVT Analysis	cc
Oil/Condensate Volume:	20		cc
Filtrate/Water Volume:	810		cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:	1.6		Stb/MMscf

Oil/Condensate Analysis

	Lower	Upper	
Specific Gravity:	Too small to measure		Air=1, Temp
Colour:	Too small to measure		
Fluorescence:	Bright Blue		

Heating Value BTU/cft

Gas Analysis:

	Lower	Upper	
C1:	90.35		%
C2:	3.70		%
C3:	3.11		%
iC4:	0.38		%
nC4:	0.62		%
C5+:	0.16		%
CO2:	1.7		%
H2S:	0		ppm
Specific Gravity	0.64		Air=1.0

Water/Filtrate Analysis:

	Lower	Upper	Filtrate Drilled	Filtrate Logged	
Rw:			0.084		
pH:	6.8		9.5		
Cl-:	42000				mg/l
Total Hardness (Ca/Mg):					
KCl:	38000		25000		

Tritium

~~Trituim~~ Analysis:

	Lower	Upper	Filtrate Drilled	Filtrate Logged	
Average Activity:	N/A	N/A	N/A	N/A	Bq/cc
Returns:					Bq/cc
% Filtrate:					

Figure 4

RFT Sample Data Sheet

Well: Minerva-1

Date: 23rd March 1993

KB: 25.0 m
Sample No: 3 **Depth:** 1649.8

Formation Pressure: 2694.59 psia

	Lower	Upper	
Chamber No:		RFS-AD-1123	
Chamber Size:	6	1	gal
Flowing Pressure:	Approx 2100	Approx 2500	psig
Time To Fill:	25	6	minuites
Opening Pressure:	2100	2100	psig
Gas Volume:	77.7	Preserved for	ft^3
Total Liquids:	7500	PVT Analysis	cc
Oil/Condensate Volume:	film		cc
Filtrate/Water Volume:	--		cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:	--		Stb/MMscf

Oil/Condensate Analysis

	Lower	Upper	
Specific Gravity:	Too small to measure		Air=1, Temp
Colour:	Too small to measure		
Fluorescence:	Blue/White		

Gas Analysis:

	Lower	Upper	
C1:	89.14		%
C2:	4.47		%
C3:	4.24		%
iC4:	0.65		%
nC4:	0.72		%
C5+:	0.19		%
CO2:	0.6		%
H2S:	0		ppm
Specific Gravity	0.65		Air=1.0

Water/Filtrate Analysis:

	Lower	Upper	Filtrate Drilled	Filtrate Logged	
Rw:	0.089		0.084		
pH:	6.4		9.5		
Cl-:	45000				mg/l
Total Hardness (Ca/Mg):					
KCl:	42000		25000		

Trituim Analysis:

Average Activity:	N/A	N/A	N/A	N/A	Bq/cc
Returns:					Bq/cc
% Filtrate:					

Table 5 MINERVA-1 OPEN HOLE RFT RESULTS

Test No.	Depth mTVDDF	Depth mTVDSS	Time hh:mm	Initial Hydrostatic Pressure Strain Gauge psig	Initial Hydrostatic Pressure HP Gauge psia	Formation Pressure Strain Gauge psig	Formation Pressure HP Gauge psia	Temperature DegC	Final Hydrostatic Pressure Strain Gauge psig	Final Hydrostatic Pressure HP Gauge psia	Mobility mD/cp	Permeability* mD	Comments
0	1161.7	1139.2	15:00	1933.2	1944.2	0		58.8	1931.0	1944.7			Good test on casing
1	1651.5	1624.6	15:37	2721.5	2736.4	0	13.0		2719.7	2736.8			Tight
2	1650.8	1623.9	15:43	2718.8	2733.8	--	--	79.8	2717.8	2734.0			Tight
3	1649.8	1623.0	15:55	2716.1	2731.8	2678.9	2694.59	80.2	2715.8	2731.6	12.3	30	Good Test
4	1662.8	1635.8	16:05	2736.5	2752.4	2689.8	2705.43	80.7	2736.2	2752.1	7.8	20	Good Test
5	1662.2	1635.2	16:23	2741.6	2757.5	2739.9	2755.80	81.0	2741.5	2757.3	1.3	5	Possible lost seal
6	1666.5	1639.5	16:37	2742.1	2758.1	2740.5	2756.55	81.3	2741.8	2757.8	1.1	5	Possible lost seal
7	1666.8	1639.8	16:52	2742.5	2758.6	--	--	81.4	2742.3	2759.2			Tight
8	1817.0	1788.7	17:17	2983.4	2998.9	2709.5	2725.09	87.1	2982.5	2999.0	9.2	20	Good Test
9	1829.5	1801.0	17:30	3002.2	3017.7	2711.5	2726.08	87.2	3002.0	3017.8	1565	1600	Good Test
10	1838.0	1809.5	17:43	3015.3	3031.7	2713.1	2728.28	87.5	3015.3	3031.3	66	150	Good Test
11	1845.0	1816.4	17:55	3026.4	3043.7	2714.3	2729.17	88.3	3026.2	3042.4	1040	1200	Good Test
12	1867.0	1838.2	18:20	3061.8	3079.5	2718.3	2733.38	89.6	3061.5	3077.9	876	1000	Good Test
13	1875.5	1846.6	18:44	3075.5	3093.0	2719.3	2733.96	90.4	3075.4	3091.2	815	900	Good Test
14	1884.5	1855.5	19:00	3089.7	3106.9	2721.2	2736.13	91.1	3089.5	3105.8	105	240	Good Test
15	1890.6	1861.6	19:30	3099.8	3116.1	2722.3	2737.20	91.9	3099.7	3115.8	91	210	Good Test
16	1906.5	1877.3	19:45	3125.4	3143.4	2724.5	2739.36	92.6	3125.2	3141.5	426	970	Good Test
17	1919.0	1889.7	20:05	3145.5	3162.5	2726.7	2741.91	93.3	3145.5	3161.9	21	50	Good Test
18	1923.8	1894.5	20:35	3154.0	3169.4	2727.7	2742.19	94.1	3153.7	3169.7	114	260	Good Test
19	1931.0	1901.6	20:50	3165.1	3181.5	2728.6	2743.36	94.0	3165.2	3181.7	116	260	Good Test
20	1935.7	1906.3	21:00	3172.9	3189.6	2729.9	2744.70	94.5	3172.7	3189.5	266	600	Good Test
21	1937.6	1908.2	21:17	3176.3	3193.2	2730.0	2744.80	94.4	3175.9	3192.5	460	1000	Good Test
22	1939.5	1910.1	21:30	3179.3	3196.0	2730.6	2745.70	94.7	3179.2	3195.7			Good Test
23	1942.8	1913.3	21:40	3184.9	3202.2	2730.3	2746.01	95.0	3184.7	3201.2	3.4	10	Good Test
24	1949.2	1919.7	22:01	3195.8	3211.8	2738.2	2752.48	95.6	3195.6	3211.5	557	1300	Good Test
25	1941.9	1912.4	22:20	3184.2	3200.0	2731.2	2745.86	95.6	3183.0	3200.2	268	610	Good Test
26	1939.5	1910.1	22:40	3180.2	3196.3	2730.9	2745.92	95.2	3180.2	3196.9	20	45	Good Test
27	1941.0	1911.5	23:00	3182.6	3199.0	2730.4	2745.22	95.4	3182.5	3199.0	39.7	90	Good Test
28	1951.5	1921.9	23:14	3199.4	3216.7	2741.0	2755.98	95.4	3199.3	3216.1			Good Test
29	1953.2	1923.6	23:33	3202.4	3219.1	2743.5	2758.30	95.6	3202.3	3218.8	270	610	Good Test
30	1959.2	1929.6	23:45	3212.0	3229.4	2751.9	2766.66	96.0	3212.0	3228.8		0	Good Test
31	1966.2	1936.5	00:15	3223.7	3239.9	2761.7	2775.91	96.4	3223.6	3239.6	580	1100	Good Test
32	1972.2	1942.5	00:33	3233.3	3249.9	2769.9	2784.55	96.6	3233.4	3249.7	220	500	Good Test
33	1992.0	1962.1	00:55	3265.5	3282.3	2797.2	2811.95	97.4	3265.5	3281.9			Good Test
34	1931.0	1901.6	01:25	3167.5	3182.2	2729.0	2743.36		3167.1	3183.9			Sample Taken
35	1942.5	1913.0	05:46	3187.6	3203.2	2731.9	2746.28		3185.4	3201.6			Sample Taken
36	1649.8	1623.0	10:37	2718.3	2733.9	2679.2	2694.70		2716.8	2732.6			Sample Taken

Filtrate:

Temp	194 Deg F
% NaCl	25000
Pressure	2700 psia
Viscosity	0.34

*N.B. Permeabilities rounded.
K(h)/k(v)=1
Filtrate Viscosity = 0.34 cP
k(rw)=0.15 for k<1000 mD
k(rw)=0.30 for k>1000 mD

5.2 DST

6

6. APPENDICES

1

Appendix 1 Amdel Core Analysis Reports

AMDEL

CORE

SERVICES

AMDEL
CORE
SERVICES

6 May 1993

BHP Petroleum Pty Ltd
GPO Box 1911R
MELBOURNE VIC 3001

Attention: Peter Mills

REPORT: HH/2313

CLIENT REFERENCE:	PM 93035
MATERIAL:	Natural Gas and Water
LOCALITY:	Minerva-1 Production Test
WORK REQUIRED:	Gas Quality Testing and Water Analysis

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

BRIAN L WATSON
Laboratory Supervisor
on behalf of Amdel Core Services Pty Ltd

MINERVA-1 GAS QUALITY TESTING

TABLE OF CONTENTS

1. SUMMARY

Quality testing was performed on gas from the wildcat well MINERVA-1 during a 24 hour production test on the 11th and 12th of April 1993. The methods used and results obtained are detailed in this report with a brief summary of results below. Water samples were also collected during the test and analysed for the parameters as reported.

1.1 OXYGEN

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Oxygen: <0.01 % Mol Vol

1.2 HELIUM

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Helium: 0.016 % Mol Vol

1.3 ARGON

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Argon: <0.01 % Mol Vol

1.4 RADIOACTIVE MATERIAL

1.4.1 Date: 11/04/93, Time: 1430 h, Flow: 17 MMCFD

Radioactivity: <8 Becquerels/m^3

1.4.2 Date: 11/04/93, Time: 2200 h, Flow: 28.8 MMCFD

Radioactivity: 15 Becquerels/m^3

1.5 HYDROGEN SULPHIDE

1.5.1 5.5 MMCFD, 0419-1027 h 11/4/93

Hydrogen Sulphide: 0.4 mg/m^3 (ppm w/v)
0.3 mL/m^3 (ppm v/v)

1.5 HYDROGEN SULPHIDE (cont.)

1.5.2 17 MMCFD, 1126-1519 h 11/4/93

Hydrogen Sulphide:	0.5 mg/m^3	(ppm w/v)
	0.4 mL/m^3	(ppm v/v)

1.5.3 23 MMCFD, 1611-2108 h 11/4/93

Hydrogen Sulphide:	0.5 mg/m^3	(ppm w/v)
	0.4 mL/m^3	(ppm v/v)

1.5.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Hydrogen Sulphide:	0.4 mg/m^3	(ppm w/v)
	0.3 mL/m^3	(ppm v/v)

1.6 CARBONYL SULPHIDE

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2258 h Cylinder #07

Carbonyl Sulphide: <0.1 ppm by vol

1.7 MERCAPTANS

1.7.1 5.5 MMCFD, 0419-1027 h 11/4/93

Mercaptans:	< 0.1 mg/m^3	(ppm w/v)
	< 0.1 mL/m^3	(ppm v/v)

1.7.2 17 MMCFD, 1126-1519 h 11/4/93

Mercaptans:	< 0.1 mg/m^3	(ppm w/v)
	< 0.1 mL/m^3	(ppm v/v)

1.7.3 23 MMCFD, 1611-2108 h 11/4/93

Mercaptans:	< 0.1 mg/m^3	(ppm w/v)
	< 0.1 mL/m^3	(ppm v/v)

1.7.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Mercaptans:	< 0.1 mg/m^3	(ppm w/v)
	< 0.1 mL/m^3	(ppm v/v)

1.8 TOTAL SULPHUR

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2256 h Cylinder #03

Total Sulphur: 0.5 mg/m^3 (ppm w/v)

1.9 MERCURY

1.9.1 Method A

Date: 11/04/93, Time: 1739-2108 h Flow: 23 MMCFD

Mercury: 0.8 $\mu g/m^3$ (0.8 $g/m^3 x10^6$)

1.9.2 Method B

Date: 11/04/93, Time: 2142-2234 h Flow: 28.8 MMCFD

Mercury: > 0.1 $\mu g/m^3$ NB: sample tubes overloaded

1.10 TRACE METALS

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2302 h Cylinder #04

Trace Metals: Ca, Mg, Na, K	< 0.001	mg/m^3
Cr, As, Sn, Mo, Cd, Pb, Ba, Co, V, Ni, Y, Sr, Bi, Se, Ag, Cu	< 0.01	mg/m^3
Zn	< 0.05	mg/m^3
Fe, SiO_2, P, Mn	< 0.1	mg/m^3

1.11 WATER ANALYSIS

See results in body of report, 13.

2. INTRODUCTION

Amdel Core Services Pty Ltd was requested to provide on-site testing, sampling and laboratory services to monitor the gas quality during production testing of the MINERVA-1 wildcat well.

The sampling and on-site testing was performed using a manifold located immediately downstream of the gas outlet from the HRS test separator.

The hydrogen sulphide determination was performed on-site in the mud logging unit.

The radioactive material determination was performed at Australian Radiation Laboratories in Melbourne.

The carbonyl sulphide determination was performed by SAGASCO in Adelaide.

All remaining tests were performed in the Frewville laboratories of Amdel Core Services Pty Ltd.

At the conclusion of the production test water samples were taken from the separator. These were analysed by Amdel Laboratories in Thebarton.

3. OXYGEN

3.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column and thermal conductivity detector.

3.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Oxygen: <u><0.01 % Mol Vol</u>

4. HELIUM

4.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column with argon carrier gas and a thermal conductivity detector.

4.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Helium: <u>0.016 % Mol Vol</u>

5. ARGON

5.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column at sub-ambient conditions and a thermal conductivity detector.

5.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Argon: <u><0.01 % Mol Vol</u>

6. RADIOACTIVE MATERIAL

6.1 METHOD

A measured volume of gas is passed through a copper tube containing activated charcoal. The radioactivity from adsorbed radon and its decay products is then measured by Australian Radiation Laboratories and this is then back-calculated to determine the activity of the original sample.

6.2 RESULTS

6.2.1 Date: 11/04/93, Time: 1430 h, Flow: 17 MMCFD

Radioactivity: < 8 Becquerels/m^3

6.2.2 Date: 11/04/93, Time: 2200 h, Flow: 28.8 MMCFD

Radioactivity: 15 Becquerels/m^3

7. HYDROGEN SULPHIDE

7.1 METHOD

Hydrogen sulphide is absorbed into cadmium sulphate solution on site by bubbling a measured volume of gas through an absorber train. The H_2S content is then determined by an Iodometric Titration of the solution. The method follows ASTM D2385.

7.2. RESULTS

7.2.1 5.5 MMCFD, 0419-1027 h 11/4/93

Hydrogen Sulphide: 0.4 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
0.3 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

7.2.2 17 MMCFD, 1126-1519 h 11/4/93

Hydrogen Sulphide: 0.5 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
0.4 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

7.2.3 23 MMCFD, 1611-2108 h 11/4/93

Hydrogen Sulphide: 0.5 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
0.4 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

7.2.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Hydrogen Sulphide: 0.4 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
0.3 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

8. CARBONYL SULPHIDE

8.1 METHOD

A sample of the gas is collected in a teflon lined stainless steel cylinder and analysed by gas chromatography in the laboratory.

8.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2258 h Cylinder #07

Carbonyl Sulphide: <0.1 ppm by vol

9. MERCAPTANS

9.1 METHOD

Mercaptans are absorbed into alkaline cadmium sulphate solution on site by bubbling a measured volume of gas through an absorber train. The mercaptan content is then determined by an Iodometric Titration of the solution. The method follows ASTM D2385.

9.2. RESULTS

9.2.1 5.5 MMCFD, 0419-1027 h 11/4/93

Mercaptans: < 0.1 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
< 0.1 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

9.2.2 17 MMCFD, 1126-1519 h 11/4/93

Mercaptans: < 0.1 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
< 0.1 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

9.2.3 23 MMCFD, 1611-2108 h 11/4/93

Mercaptans: < 0.1 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
< 0.1 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

9.2.4 28.8 MMCFD, 2232 0030 h + 0150-0330 h 11-12/4/93

Mercaptans: < 0.1 mg/m^3 (ppm w/v) (101.3 kPag @ 15°C)
< 0.1 mL/m^3 (ppm v/v) (101.3 kPag @ 20°C)

10. TOTAL SULPHUR

10.1 METHOD

A sample of gas is collected in a teflon-lined stainless steel cylinder and transported to the laboratory.
The sample is combusted and the waste gases absorbed into solution where oxides of sulphur are oxidised to sulphates as per ASTM D1072. The solution is then analysed by ion chromatography for sulphate concentration.

10.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2256 h Cylinder #03

Total Sulphur: 0.5 mg/m^3 (ppm w/v)

11. MERCURY

11.1A METHOD

A measured volume of gas is bubbled through acidified 0.5% potassium permanganate solution. The potassium permanganate is decolourised with 20% hydroxylamine hydrochloride and the mercury is evolved by reduction with stannous chloride and measured by cold vapour AAS (Atomic Absorption Spectrometry).

11.2A RESULT

Date: 11/04/93, Time: 1739-2108 h Flow: 23 MMCFD

Mercury: 0.8 $\mu g/m^3$ (0.8 $g/m^3 x10^6$)

11.1B METHOD

The mercury is trapped onto silver lint in a silica tube as the gas is passed through the tube within a stainless steel, high-pressure vessel. In the laboratory the mercury is released by heat and passed through a tube containing gold thread where it is trapped while other materials pass through. The mercury vapour is then released from the gold by heating and the concentration of mercury determined by absorption at 253.7 nm in the beam of a flameless atomic absorption spectrophotometer. This conforms to Standard ISO/DIS 6978 Method B.

11.2B RESULT

Date: 11/04/93, Time: 2142-2234 h Flow: 28.8 MMCFD

Mercury: > 0.1 $\mu g/m^3$ NB: sample tubes overloaded

12. TRACE METALS

12.1 METHOD

A sample of gas is collected in a teflon-lined stainless steel cylinder and transported to the laboratory.
The gas is bubbled through 1N nitric acid. The acid solution is then analysed by inductively coupled plasma (ICP) spectroscopy for the trace elements listed below.

12.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2302 h Cylinder #04

Trace Metals:	Calcium	< 0.001	mg/m^3
	Magnesium	< 0.001	"
	Sodium	< 0.001	"
	Potassium	< 0.001	"
	Chromium	< 0.01	mg/m^3
	Arsenic	< 0.01	"
	Tin	< 0.01	"
	Molybdenum	< 0.01	"
	Cadmium	< 0.01	"
	Lead	< 0.01	"
	Barium	< 0.01	"
	Cobalt	< 0.01	"
	Vanadium	< 0.01	"
	Nickel	< 0.01	"
	Yttrium	< 0.01	"
	Strontium	< 0.01	"
	Bismuth	< 0.01	"
	Selenium	< 0.01	"
	Silver	< 0.01	"
	Copper	< 0.01	"
	Zinc	< 0.05	mg/m^3
	Iron	< 0.1	mg/m^3
	Silica	< 0.1	"
	Phosphorous	< 0.1	"
	Manganese	< 0.1	"

13. WATER ANALYSIS

13.1 METHOD

Water samples were allowed to degas then split into three subsamples; one was left natural, one preserved at pH 2 with nitric acid and one preserved at pH 9 with sodium hydroxide.
The natural sample was used for the standard water analysis, pH, anions by ion chromatography and total dissolved solids at 180°C. The filtered natural sample was used for specific gravity and resistivity measurements.
The pH 2 sample was used for standard cations plus iron, strontium and barium by ICP.
The pH 9 sample was used for the sulphide determination.

13.2 RESULTS

Two sets of water samples were collected from the separator sight glass drain at 0220 and 0240 hours 12/4/93 near the end of the 24 hour production test.

The water results are presented on the following three pages.

amdel

Water Analysis Report   Job No. 3AD1425   Method WAT 2 Page W1

Sample ID. Minerva 0220 Hrs.

Chemical Composition

		mg/L	me/L
Cations			
Calcium	(Ca)	33.0	1.65
Magnesium	(Mg)	72.0	5.93
Sodium	(Na)	771.0	33.54
Potassium	(K)	17612.0	450.43
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3)	46.3	0.76
Sulphate	(SO4)	220.0	4.58
Chloride	(Cl)	15515	437.04
Nitrate	(NO3)	36.0	0.58

Other Analyses

Reaction - pH	6.2
Conductivity (E.C) (micro -S/cm at 25°C)	46200
Resistivity Ohm.M at 25°C	0.22

Derived Data

	mg/L
Total Dissolved Solids	
A. Based on E.C.	36712
B. Calculated (HCO3=CO3)	34282
Total Hardness	379
Carbonate Hardness	379
Non-Carbonate Hardness	
Total Alkalinity	407
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	491.5	Diff=	48.58
Anions (me/L)	443.0	Sum =	934.51

ION BALANCE (Diff*100/Sum) = 5.20%

Sodium / Total Cation Ratio 6.8%

Remarks

Note: mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: Paul Marty
Address: AMDEL Core Services
P.O. Box 338
Torrensville. SA.

Date Collected 12-04-93
Date Received 20-04-93
Collected by Client

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Water Analysis Report   Job No. 3AD1425   Method WAT 2 Page W2

Sample ID. Minerva 0240 Hrs.

Chemical Composition

		mg/L	me/L
Cations			
Calcium	(Ca)	11.0	0.55
Magnesium	(Mg)	19.0	1.56
Sodium	(Na)	361.0	15.70
Potassium	(K)	6958.0	177.95
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3)	59.8	0.98
Sulphate	(SO4)	120.0	2.50
Chloride	(Cl)	6626	186.65
Nitrate	(NO3)	15.0	0.24

Other Analyses

Reaction - pH	6.4
Conductivity (E.C) (micro -S/cm at 25°C)	21000
Resistivity Ohm.M at 25°C	0.48

Derived Data

	mg/L
Total Dissolved Solids	
A. Based on E.C.	13975
B. Calculated (HCO3=CO3)	14140
Total Hardness	106
Carbonate Hardness	106
Non-Carbonate Hardness	
Total Alkalinity	525
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	195.8	Diff=	5.40
Anions (me/L)	190.4	Sum =	386.14

ION BALANCE (Diff*100/Sum) = 1.40%

Sodium / Total Cation Ratio 8.0%

Remarks

Note: mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: Paul Marty
Address: AMDEL Core Services
P.O. Box 338
Torrensville. SA.

Date Collected 12-04-93
Date Received 20-04-93
Collected by Client

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Job No.3AD1425
Page W3

Sample	0220	0240	Method No.
TDS (180 Deg.C.)	36460	14645	WAT 2G
Specific Gravity (g/mL)	1.017	1.014	WAT 26
Sulphide (mg/L)	3.62	8.44	WAT 20
Iron as Fe (mg/L)	500	436	WAT 3E
Strontium as Sr (mg/L)	1.17	0.50	WAT 3M
Barium as Ba (mg/L)	2.49	2.53	WAT 3E

14. DISCUSSION and CONCLUSIONS

The results of the above tests on the Minerva-1 gas as sampled on the 11th and 12th April 1993 show a relatively high mercury content with the remainder of the components tested being low and within typically acceptable ranges. The water samples appear to be contaminated with KCl brine.

The concentration of both mercury and hydrogen sulphide may increase over a longer period of production as the reactive surfaces of the tubing and production train become saturated with these compounds.

OTW/1/MINERVA-1/004

(ENCLOSURE)

AMDEL

CORE

SERVICES

AMDEL CORE SERVICES

20 May 1993

BHP Petroleum Pty Ltd
GPO Box 1911R
MELBOURNE VIC 3001

Attention: Jim Phipps

REPORT: RG-205

CLIENT REFERENCE:	S/O No. 1632
MATERIAL:	Core - Minerva No. 1
LOCALITY:	Victoria
WORK REQUIRED:	Conventional Core Analysis

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

CHRIS GAUGHAN
on behalf of Amdel Core Services Pty Ltd

13 May 1993

BHP Petroleum Pty Limited
120 Collins Street
MELBOURNE VIC 3000

Attention: Jim Phipps

FINAL DATA REPORT - CONVENTIONAL CORE ANALYSIS

REPORT: RG202 - Minerva No.1

LOGISTICS

Three cores were collected from Portland, Victoria on May 20, 1993. Core intervals are as follows: Core 1, 1821.00 - 1824.04m (3.04m), core 2, 1828.00 - 1841.27m (13.27m) and core 3, 1842.50 - 1846.87m (4.37m).

INTRODUCTION

The following report includes tabular data of permeability to air, helium injection porosity, summation of fluids porosity, residual fluid saturations 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 quick (16 hour turnaround) air permeability, saturation, (So & Sw) and summation of fluids porosity data.

3. To provide 72 hour air permeability, helium injection porosity and density data.

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

5. To examine the effect of heterogeneities and 'scale' on measured air permeability and helium injection porosity data through determination of these properties on whole core sections. To identify and quantify vertical permeability barriers.

6. To confirm whether permeability is directionally controlled.

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

8. To provide quick API gravity measurements on retorted oil.

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 KCl brine as lubricant. The core was oriented such that the plugs were drilled parallel to the bedding. These plugs are designated as the 'regular' plugs.

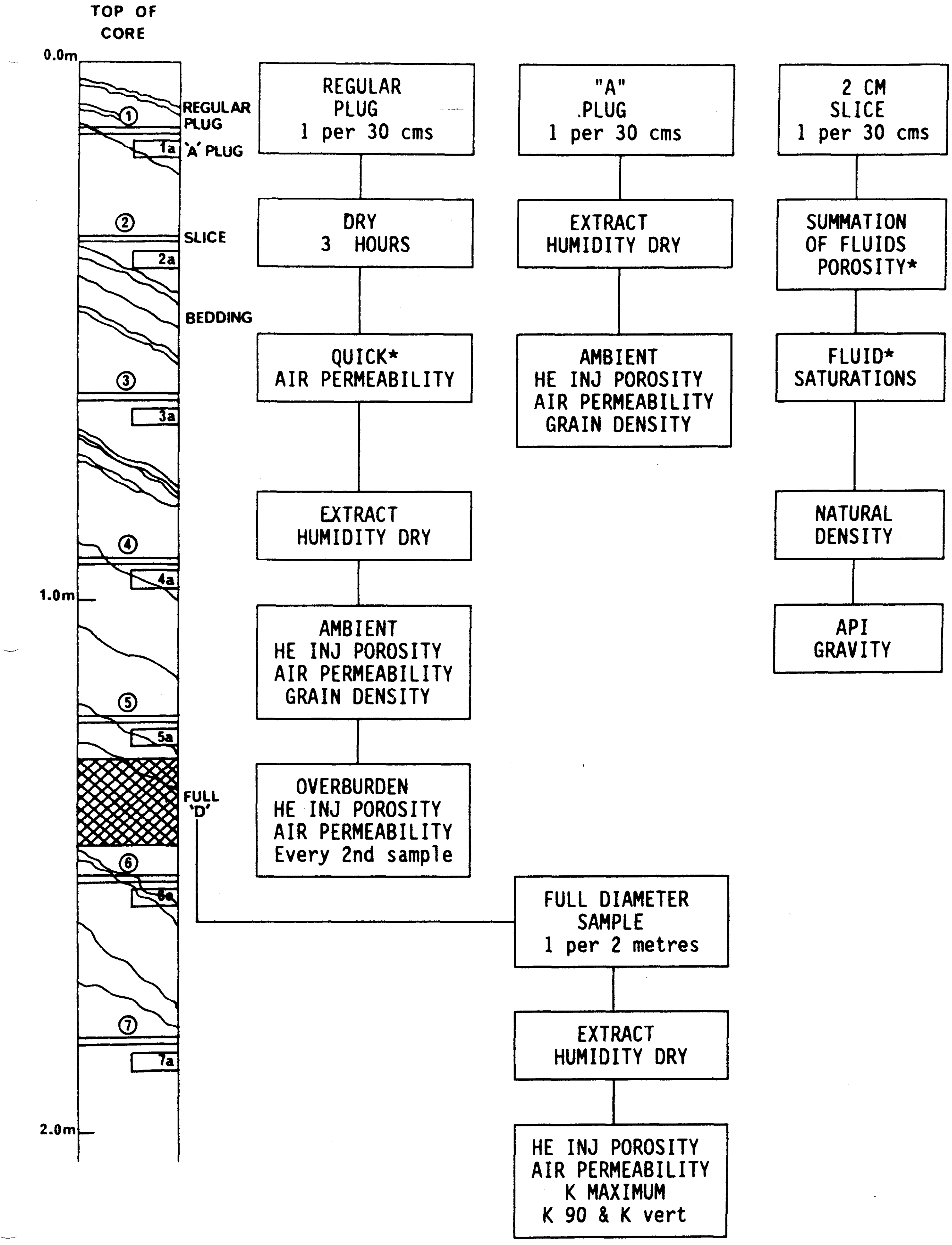
C. Further 1.5" diameter plugs were taken from the same intervals but with the core oriented such that the plugs were drilled perpendicular to the 'regular' plug. These plugs are designated as the 'A' plugs.

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 the 'regular' set of plugs were dried in an oven at 80°C for 3 hours. After the quick permeability measurement the 'regular' and 'A' plugs were placed in a soxhlet extractor to remove hydrocarbons. When the toluene in the Soxhlet is 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 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 plug 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.

9. BRINELL HARDNESS

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:

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

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

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

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:

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

The average at the final data point is obtained by:

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

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

<u>Data Key:</u>

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, Canberra. The remaining quarter was packed and shipped to the Victorian Department of Mines and Energy. The one half slab was photographed under both white light and ultra-violet light at a 5m format and under white light at a 30cm(1:1) format. This core 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.

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel : (07) 298-5272

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat   Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA   State : Victoria

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
1	1821.15	19.5	19.7	2.20	2.65	3839	3867	22.6	0.0	43.9	C#1
2	1821.37	20.1	19.3	2.16	2.65	3924	3303	26.1	0.0	51.2	
3	1821.67	17.5	18.4	2.43	2.71	2013	1525	17.6	0.0	42.7	
4	1821.97	18.6	17.5	2.57	2.94	340	724	15.0	0.0	36.0	
5	1822.27	15.4	16.3	2.49	2.70	1180	1224	14.8	0.0	43.6	
6	1822.57	15.9	14.9	2.26	2.66	4729	1327	21.2	0.0	43.6	SP
7	1822.87	12.4	13.4	2.45	2.65	117	682	12.7	0.0	36.7	
8	1823.17	12.8	13.5	2.34	2.65	3322	1211	16.0	0.0	33.6	
9	1823.47	15.8	16.2	2.30	2.65	1660	1562	17.3	0.0	30.5	
10	1823.77	20.4	19.1	2.22	2.65	651	633	21.0	0.0	39.2	
11	1824.00	19.6	19.8	2.15	2.64	229	516	23.8	0.0	34.4	SP B#1
12	1828.15	19.5	19.6	2.20	2.65	2076	1309	25.0	0.0	44.8	C#2
13	1828.37	19.7	19.3	2.18	2.65	2976	2106	22.4	0.0	38.9	
14	1828.67	18.1	18.2	2.24	2.65	1070	1624	19.9	0.0	38.3	
15	1828.97	16.7	16.8	2.25	2.65	2041	1703	19.3	0.0	32.7	
16	1829.27	15.8	15.2	2.30	2.65	1888	1922	17.1	0.0	33.6	
17	1829.57	12.3	12.7	2.44	2.66	1874	1458	11.1	0.0	39.6	
18	1829.87	10.3	10.4	2.37	2.65	681	1284	13.8	0.0	35.9	
19	1830.17	8.8	9.5	2.43	2.66	3128	1493	13.1	0.0	37.1	
20	1830.47	10.2	10.1	2.43	2.68	746	1445	12.3	0.0	33.7	
21	1830.77	11.3	12.3	2.30	2.65	2502	1301	17.3	0.0	39.9	
22	1831.10	16.5	13.9	2.29	2.65	613	881	18.0	0.0	35.5	
23	1831.40	11.4	12.8	2.31	2.65	641	595	17.5	0.0	34.3	
24	1831.70	11.8	11.9	2.36	2.65	496	577	15.0	0.0	31.5	
25	1832.00	12.6	12.0	2.39	2.66	701	564	14.3	0.0	35.0	
26	1832.30	10.9	11.4	2.34	2.66	416	478	16.3	0.0	32.9	
27	1832.60	11.1	10.6	2.40	2.66	432	202	13.1	0.0	34.7	
28	1832.90	9.3	10.4	2.39	2.68	21.3	70.9	14.4	0.0	34.9	VF
29	1833.20	11.9	10.6	2.37	2.65	129	22.5	15.3	0.0	43.2	
30	1833.50	9.4	11.4	2.40	2.66	0.72	6.3	10.9	0.0	44.1	
31	1833.80	14.7	14.1	2.25	2.65	23.3	15.3	21.3	0.0	47.4	
32	1834.10	17.7	16.7	2.26	2.65	139	107	20.3	0.0	46.7	
33	1834.40	16.6	16.1	2.22	2.65	288	216	22.0	0.0	43.3	
34	1834.70	13.5	15.0	2.28	2.65	188	410	19.8	0.0	43.9	
35	1835.00	16.3	15.1	2.27	2.65	2766	673	19.1	0.0	38.2	
36	1835.30	14.1	15.8	2.28	2.69	143	366	20.5	0.0	40.1	
37	1835.60	18.6	17.3	2.24	2.66	318	322	20.4	0.0	45.1	
38	1835.90	17.9	18.4	2.23	2.65	743	607	21.9	0.0	38.7	
39	1836.20	19.2	18.9	2.18	2.66	773	846	25.4	0.0	42.9	
40	1836.50	19.4	18.6	2.18	2.66	1154	927	22.9	0.0	38.0	

BHP PETROLEUM PTY LTD :
Minerva No.1 : Analysis by
Amdel Core Services

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
41	1836.80	16.4	13.6	2.42	2.66	716	167	12.6	0.0	40.3	
42	1837.15	2.2	5.5		2.54	1.31	2.67				NO SAMPLE
43	1838.10	1.1	1.4	2.38	2.45	0.04	0.08	5.1	0.0	46.7	
44	1839.10	1.2	2.2	2.50	2.54	0.02	0.03	7.5	0.0	70.2	
45	1839.40	5.2	4.4	2.47	2.56	0.07	0.11	7.9	0.0	72.2	
46	1839.70	6.0	4.8	2.48	2.53	1.14	0.43	9.1	0.0	70.5	
47	1840.00	1.8	5.8	2.43	2.49	0.37	1.81	8.0	0.0	76.1	
48	1840.30	13.4	11.3	2.29	2.65	68.1	13.1	16.5	0.0	23.6	SP
49	1840.60	16.4	16.2	2.26	2.65	17.2	50.3	20.3	0.0	44.5	
50	1840.90	18.7	17.7	2.30	2.65	318	129	19.1	0.0	57.8	
51	1841.20	16.8	16.3	2.25	2.66	157	273	17.5	0.0	38.6	B#2
52	1842.80	12.9	14.6	2.30	2.65	709	824	16.4	0.0	23.7	C#3
53	1843.10	15.7	15.3	2.25	2.65	5854	4200	20.5	0.0	36.2	
54	1843.40	17.0	15.8	2.34	2.65	12810	6113	16.3	0.0	32.9	
55	1843.70	13.4	14.8	2.30	2.65	1454	1817	16.0	0.0	27.3	
56	1844.05	15.2	14.0	2.24	2.65	402	306	19.8	0.0	36.2	
57	1844.30	12.1	13.8	2.28	2.65	37.1	138	17.2	0.0	30.5	
58	1844.60	15.8	15.4	2.26	2.65	647	397	17.2	0.0	27.6	
59	1844.90	17.7	16.2	2.22	2.65	1601	1199	18.8	0.0	29.5	
60	1845.22	13.5	15.1	2.29	2.65	1247	1936	17.8	0.0	36.2	
61	1845.52	15.7	15.6	2.30	2.65	5641	3676	16.5	0.0	39.0	
62	1845.82	17.6	16.5	2.28	2.65	4598	3863	17.1	0.0	38.6	
63	1846.12	15.1	16.4	2.24	2.65	1867	2563	19.3	0.0	37.1	
64	1846.42	17.7	16.2	2.23	2.65	2693	2076	20.7	0.0	37.6	
65	1846.72	14.4	15.5	2.29	2.65	1371	1717	17.1	0.0	36.1	B#3

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

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel : (07) 298-5272

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA
State : Victoria

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
1A	1821.15	19.7	19.2		2.65	2160	1929				C#1 SP
2A	1821.37	18.2	17.7		2.65	1539	1581				
3A	1821.67	14.6	14.8		2.84	1223	896				
4A	1821.97	11.6	12.7		2.79	280	407				
5A	1822.27	13.1	13.8		2.67	285	499				
6A	1822.57	17.4	15.0		2.69	2744	1389				
8A	1823.17	11.9	15.2		2.65	1736	2363				
12A	1828.15	19.5	17.5		2.65	3774	2442				C#2
13A	1828.37	19.0	18.9		2.65	1438	2051				
14A	1828.67	17.9	17.9		2.65	2267	2140				
15A	1828.97	16.7	16.5		2.65	2839	2443				
16A	1829.27	14.6	14.6		2.66	1950	2100				
17A	1829.57	12.4	12.6		2.65	1803	2028				
18A	1829.87	11.1	11.1		2.66	2670	1868				
19A	1830.17	9.9	10.2		2.66	948	1260				
20A	1830.47	9.7	10.9		2.69	1049	1255				
21A	1830.77	14.4	13.5		2.65	2380	1246				
22A	1831.10	15.3	14.6		2.65	406	756				
23A	1831.40	13.4	13.5		2.65	833	629				
24A	1831.70	12.0	12.2		2.66	558	581				
25A	1832.00	11.5	11.7		2.71	438	478				
26A	1832.30	11.6	11.5		2.66	488	473				
27A	1832.60	11.4	11.3		2.67	482	405				
28A	1832.90	10.8	12.0		2.67	239	355				
29A	1833.20	14.8	14.0		2.65	578	221				
30A	1833.50	15.6	16.2		2.65	29.9	102				
31A	1833.80	18.8	18.1		2.65	210	160				
32A	1834.10	19.0	19.4		2.66	498	535				
33A	1834.40	20.8	18.7		2.65	1568	795				
34A	1834.70	14.3	16.9		2.66	326	851				
35A	1835.00	18.3	17.3		2.66	3147	928				
36A	1835.30	18.3	18.3		2.66	230	386				
37A	1835.60	18.2	18.1		2.66	134	205				
38A	1835.90	17.7	18.3		2.66	426	388				
39A	1836.20	19.5	19.4		2.66	937	961				
40A	1836.50	20.7	18.6		2.65	2274	797				
41A	1836.80	13.4	12.4		2.68	83.1	115				
42A	1837.15	2.0	5.0		1.51	11.1	5.9				
43A	1838.10	2.6	2.2		2.52	0.12	0.47				

BHP PETROLEUM PTY LTD :
Minerva No.1 : Analysis by
Amdel Core Services

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
44A	1839.10	1.7	2.7		2.56	0.30	0.14				
45A	1839.40	4.8	3.5		2.57	0.04	0.18				
46A	1839.70	2.7	3.0		2.48	2.43	0.65				VF
47A	1840.00	1.8	3.1		2.53	0.81	1.27				
48A	1840.30	5.9	7.3		2.60	1.68	2.86				
49A	1840.60	15.7	12.5		2.63	29.6	8.3				
50A	1840.90	12.7	14.5		2.63	3.25	18.2				
51A	1841.20	16.9	15.5		2.66	347	154				B#2
52A	1842.80	15.3	15.4		2.65	1439	1381				C#3
53A	1843.10	14.2	15.0		2.65	5052	4792				
54A	1843.40	16.1	15.5		2.65	14362	8351				
55A	1843.70	15.7	15.4		2.65	4668	5502				
56A	1844.05	13.9	14.4		2.65	2929	3309				
57A	1844.30	14.0	14.7		2.65	2994	3207				
58A	1844.60	16.8	16.4		2.65	4031	3713				
59A	1844.90	18.0	16.5		2.65	3910	2500				
60A	1845.22	13.1	14.6		2.65	634	1308				
61A	1845.52	14.1	14.2		2.65	1865	1596				
62A	1845.82	15.3	15.1		2.65	2948	2781				
63A	1846.12	15.7	16.2		2.65	3695	4308				
64A	1846.42	18.2	16.9		2.65	8563	5365				
65A	1846.72	15.5	16.4		2.65	3058	4310				B#3

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

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel : (07) 298-5272

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA
State : Victoria

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
1	1821.15	19.5	19.5	2.20	2.65	3839	3867	22.6	0.0	43.9	C#1
1A	1821.15	19.7			2.65	2160					SP
2	1821.37	20.1	18.5	2.16	2.65	3924	3303	26.1	0.0	51.2	
2A	1821.37	18.2			2.65	1539					
3	1821.67	17.5	16.6	2.43	2.71	2013	1525	17.6	0.0	42.7	
3A	1821.67	14.6			2.84	1223					
4	1821.97	18.6	15.2	2.57	2.94	340	724	15.0	0.0	36.0	
4A	1821.97	11.6			2.79	280					
5	1822.27	15.4	15.1	2.49	2.70	1180	1224	14.8	0.0	43.6	
5A	1822.27	13.1			2.67	285					
6	1822.57	15.9	15.0	2.26	2.66	4729	1327	21.2	0.0	43.6	SP
6A	1822.57	17.4			2.69	2744					
7	1822.87	12.4	13.5	2.45	2.65	117	682	12.7	0.0	36.7	
8	1823.17	12.8	13.3	2.34	2.65	3322	1211	16.0	0.0	33.6	
8A	1823.17	11.9			2.65	1736					
9	1823.47	15.8	16.1	2.30	2.65	1660	1562	17.3	0.0	30.5	
10	1823.77	20.4	19.1	2.22	2.65	651	633	21.0	0.0	39.2	
11	1824.00	19.6	19.8	2.15	2.64	229	516	23.8	0.0	34.4	SP B#1
12	1828.15	19.5	19.5	2.20	2.65	2076	1309	25.0	0.0	44.8	C#2
12A	1828.15	19.5			2.65	3774					
13	1828.37	19.7	19.1	2.18	2.65	2976	2106	22.4	0.0	38.9	
13A	1828.37	19.0			2.65	1438					
14	1828.67	18.1	18.0	2.24	2.65	1070	1624	19.9	0.0	38.3	
14A	1828.67	17.9			2.65	2267					
15	1828.97	16.7	16.7	2.25	2.65	2041	1703	19.3	0.0	32.7	
15A	1828.97	16.7			2.65	2839					
16	1829.27	15.8	14.9	2.30	2.65	1888	1922	17.1	0.0	33.6	
16A	1829.27	14.6			2.66	1950					
17	1829.57	12.3	12.7	2.44	2.66	1874	1458	11.1	0.0	39.6	
17A	1829.57	12.4			2.65	1803					
18	1829.87	10.3	10.8	2.37	2.65	681	1284	13.8	0.0	35.9	
18A	1829.87	11.1			2.66	2670					
19	1830.17	8.8	9.9	2.43	2.66	3128	1493	13.1	0.0	37.1	
19A	1830.17	9.9			2.66	948					
20	1830.47	10.2	10.5	2.43	2.68	746	1445	12.3	0.0	33.7	
20A	1830.47	9.7			2.69	1049					
21	1830.77	11.3	12.9	2.30	2.65	2502	1301	17.3	0.0	39.9	
21A	1830.77	14.4			2.65	2380					
22	1831.10	16.5	14.3	2.29	2.65	613	881	18.0	0.0	35.5	
22A	1831.10	15.3			2.65	406					

BHP PETROLEUM PTY LTD :
Minerva No.1 : Analysis by
Amdel Core Services

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
23	1831.40	11.4	13.2	2.31	2.65	641	595	17.5	0.0	34.3	
23A	1831.40	13.4			2.65	833					
24	1831.70	11.8	12.1	2.36	2.65	496	577	15.0	0.0	31.5	
24A	1831.70	12.0			2.66	558					
25	1832.00	12.6	11.9	2.39	2.66	701	564	14.3	0.0	35.0	
25A	1832.00	11.5			2.71	438					
26	1832.30	10.9	11.5	2.34	2.66	416	478	16.3	0.0	32.9	
26A	1832.30	11.6			2.66	488					
27	1832.60	11.1	11.0	2.40	2.66	432	202	13.1	0.0	34.7	
27A	1832.60	11.4			2.67	482					
28	1832.90	9.3	11.2	2.39	2.68	21.3	70.9	14.4	0.0	34.9	VF
28A	1832.90	10.8			2.67	239					
29	1833.20	11.9	12.4	2.37	2.65	129	22.5	15.3	0.0	43.2	
29A	1833.20	14.8			2.65	578					
30	1833.50	9.4	13.8	2.40	2.66	0.72	6.3	10.9	0.0	44.1	
30A	1833.50	15.6			2.65	29.9					
31	1833.80	14.7	16.1	2.25	2.65	23.3	15.3	21.3	0.0	47.4	
31A	1833.80	18.8			2.65	210					
32	1834.10	17.7	18.1	2.26	2.65	139	107	20.3	0.0	46.7	
32A	1834.10	19.0			2.66	498					
33	1834.40	16.6	17.4	2.22	2.65	288	216	22.0	0.0	43.3	
33A	1834.40	20.8			2.65	1568					
34	1834.70	13.5	16.0	2.28	2.65	188	410	19.8	0.0	43.9	
34A	1834.70	14.3			2.66	326					
35	1835.00	16.3	16.2	2.27	2.65	2766	673	19.1	0.0	38.2	
35A	1835.00	18.3			2.66	3147					
36	1835.30	14.1	17.0	2.28	2.69	143	366	20.5	0.0	40.1	
36A	1835.30	18.3			2.66	230					
37	1835.60	18.6	17.7	2.24	2.66	318	322	20.4	0.0	45.1	
37A	1835.60	18.2			2.66	134					
38	1835.90	17.9	18.4	2.23	2.65	743	607	21.9	0.0	38.7	
38A	1835.90	17.7			2.66	426					
39	1836.20	19.2	19.2	2.18	2.66	773	846	25.4	0.0	42.9	
39A	1836.20	19.5			2.66	937					
40	1836.50	19.4	18.6	2.18	2.66	1154	927	22.9	0.0	38.0	
40A	1836.50	20.7			2.65	2274					
41	1836.80	16.4	13.0	2.42	2.66	716	167	12.6	0.0	40.3	
41A	1836.80	13.4			2.68	83.1					
42	1837.15	2.2	5.3		2.54	1.31	2.67				NO SAMPLE
42A	1837.15	2.0			1.51	11.1					
43	1838.10	1.1	1.9	2.38	2.45	0.04	0.08	5.1	0.0	46.7	
43A	1838.10	2.6			2.52	0.12					
44	1839.10	1.2	2.5	2.50	2.54	0.02	0.03	7.5	0.0	70.2	
44A	1839.10	1.7			2.56	0.30					
45	1839.40	5.2	4.0	2.47	2.56	0.07	0.11	7.9	0.0	72.2	
45A	1839.40	4.8			2.57	0.04					
46	1839.70	6.0	3.9	2.48	2.53	1.14	0.43	9.1	0.0	70.5	
46A	1839.70	2.7			2.48	2.43					VF
47	1840.00	1.8	4.4	2.43	2.49	0.37	1.81	8.0	0.0	76.1	
47A	1840.00	1.8			2.53	0.81					
48	1840.30	13.4	9.3	2.29	2.65	68.1	13.1	16.5	0.0	23.6	SP
48A	1840.30	5.9			2.60	1.68					
49	1840.60	16.4	14.4	2.26	2.65	17.2	50.3	20.3	0.0	44.5	
49A	1840.60	15.7			2.63	29.6					

BHP PETROLEUM PTY LTD :
Minerva No.1 : Analysis by
Amdel Core Services

Sample No.	Depth	Porosity HeInj	Porosity RollPor	Density Nat.	Density Grain	Permeability (md) KH	Permeability (md) Roll KH	Summation of Fluids Por	Summation of Fluids Oil	Summation of Fluids Water	Remarks See Below
50	1840.90	18.7	16.1	2.30	2.65	318	129	19.1	0.0	57.8	
50A	1840.90	12.7			2.63	3.25					
51	1841.20	16.8	15.9	2.25	2.66	157	273	17.5	0.0	38.6	
51A	1841.20	16.9			2.66	347					B#2
52	1842.80	12.9	15.0	2.30	2.65	709	824	16.4	0.0	23.7	C#3
52A	1842.80	15.3			2.65	1439					
53	1843.10	15.7	15.2	2.25	2.65	5854	4200	20.5	0.0	36.2	
53A	1843.10	14.2			2.65	5052					
54	1843.40	17.0	15.7	2.34	2.65	12810	6113	16.3	0.0	32.9	
54A	1843.40	16.1			2.65	14362					
55	1843.70	13.4	15.1	2.30	2.65	1454	1817	16.0	0.0	27.3	
55A	1843.70	15.7			2.65	4668					
56	1844.05	15.2	14.2	2.24	2.65	402	306	19.8	0.0	36.2	
56A	1844.05	13.9			2.65	2929					
57	1844.30	12.1	14.3	2.28	2.65	37.1	138	17.2	0.0	30.5	
57A	1844.30	14.0			2.65	2994					
58	1844.60	15.8	15.9	2.26	2.65	647	397	17.2	0.0	27.6	
58A	1844.60	16.8			2.65	4031					
59	1844.90	17.7	16.4	2.22	2.65	1601	1199	18.8	0.0	29.5	
59A	1844.90	18.0			2.65	3910					
60	1845.22	13.5	14.9	2.29	2.65	1247	1936	17.8	0.0	36.2	
60A	1845.22	13.1			2.65	634					
61	1845.52	15.7	14.9	2.30	2.65	5641	3676	16.5	0.0	39.0	
61A	1845.52	14.1			2.65	1865					
62	1845.82	17.6	15.8	2.28	2.65	4598	3863	17.1	0.0	38.6	
62A	1845.82	15.3			2.65	2948					
63	1846.12	15.1	16.3	2.24	2.65	1867	2563	19.3	0.0	37.1	
63A	1846.12	15.7			2.65	3695					
64	1846.42	17.7	16.6	2.23	2.65	2693	2076	20.7	0.0	37.6	
64A	1846.42	18.2			2.65	8563					
65	1846.72	14.4	16.0	2.29	2.65	1371	1717	17.1	0.0	36.1	
65A	1846.72	15.5			2.65	3058					B#3

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

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel : (07) 298-5272

OVERBURDEN ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA

Date : 21/03/93

State : Victoria

SAMPLE NUMBER	DEPTH	POROSITY at OVERBURDEN Pressures: Ambient Porosity	psi 2100	psi 0	psi 0	psi 0	Porosity Rolling Average 2100	PERMEABILITY at OVERBURDEN Pressures: Ambient Permeability	psi 2100	psi 0	psi 0	psi 0	PERM. Rolling Average 2100
1	1821.15	19.5	18.7					3839	2741				
7	1822.87	12.4	11.4					117	100				
10	1823.77	20.4	19.6					651	557				
15	1828.97	16.7	15.9					2041	1622				
17	1829.57	12.3	11.4					1874	1494				
21	1830.77	11.3	10.3					2502	1793				
25	1832.00	12.6	11.8					701	551				
31	1833.80	14.7	13.9					23.3	17.3				
34	1834.70	13.5	12.6					188	158				
37	1835.60	18.6	17.8					318	268				
40	1836.50	19.4	18.6					1154	947				
41	1836.80	16.4	15.7					716	592				
49	1840.60	16.4	15.6					17.2	12.3				
51	1841.20	16.8	16.2					157	141				
54	1843.40	17.0	15.9					12810	4118				
57	1844.30	12.1	11.5					37.1	8.6				
61	1845.52	15.7	15.0					5641	3145				
65	1846.72	14.4	13.8					1371	1133				

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel :   (07) 298-5272

FULL DIAMETER CORE ANALYSIS
FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat   Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA   State : Victoria

Sample No.	Depth From	Depth To	Porosity HeInj	Density Grain	Density Nat	KaH MAX	KaH 45	KaH 90	KaV Vert	Fluid Saturations %Oil	Fluid Saturations %Water
1	1832.39	1832.52	11.5	2.67	2.36	492		487	296		
2	1845.00	1845.15	14.6	2.65	2.26	899		529	96.2		

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

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat   Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA   State : Victoria

SUMMATION POROSITY Average sample 1 to 65 Sample Type : R
POROSITY Average : 17.0 over 65 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % WATER Average Sample 1 to 65 Sample Type : R
% WATER Average : 39.5 over 65 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 1 to 65 Sample Type : R
POROSITY Average : 14.1 over 65 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 1 to 65 Sample Type : R
PERMEABILITY Average : 1434 over 65 Samples
0 Samples with a ZERO Permeablity Value Ignored

OVERBURDEN POROSITY Average Sample 1 to 65 Sample Type : R
POROSITY Average : 14.8 over 18 Samples
0 Samples with a ZERO Porosity Value Ignored
OVERBURDEN PERMEABILITY Average Sample 1 to 65 Sample Type : R
PERMEABILITY Average : 1077.8 over 18 Samples
0 Samples with a ZERO Permeability Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company	: BHP PETROLEUM PTY LTD		
Well	: Minerva No.1		
Field	: Wildcat	Date	: 21/03/93
Core Interval	: Core 1: 1821.00 - 1824.04m		
Core Interval	: Core 2: 1828.00 - 1841.27m		
Core Interval	: Core 3: 1842.50 - 1846.87m		
File No.	: RG205		
Country	: AUSTRALIA	State	: Victoria

SUMMATION POROSITY Average sample 1 to 11 Sample Type : R
POROSITY Average : 18.9 over 11 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % WATER Average Sample 1 to 11 Sample Type : R
% WATER Average : 39.6 over 11 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 1 to 11 Sample Type : R
POROSITY Average : 17.1 over 11 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 1 to 11 Sample Type : R
PERMEABILITY Average : 2000 over 11 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company	: BHP PETROLEUM PTY LTD		
Well	: Minerva No.1		
Field	: Wildcat	Date	: 21/03/93
Core Interval	: Core 1: 1821.00 - 1824.04m		
Core Interval	: Core 2: 1828.00 - 1841.27m		
Core Interval	: Core 3: 1842.50 - 1846.87m		
File No.	: RG205		
Country	: AUSTRALIA	State	: Victoria

AMBIENT He POROSITY Average Sample 1 to 11 Sample Type : A
POROSITY Average : 15.2 over 7 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 1 to 11 Sample Type : A
PERMEABILITY Average : 1424 over 7 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat — Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA — State : Victoria

SUMMATION POROSITY Average sample 12 to 41 Sample Type : R
POROSITY Average : 17.7 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % WATER Average Sample 12 to 41 Sample Type : R
% WATER Average : 38.8 over 30 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 12 to 41 Sample Type : R
POROSITY Average : 14.4 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 12 to 41 Sample Type : R
PERMEABILITY Average : 989 over 30 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA
State : Victoria

AMBIENT He POROSITY Average Sample 12 to 41 Sample Type : A
POROSITY Average : 15.4 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 12 to 41 Sample Type : A
PERMEABILITY Average : 1167 over 30 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company	: BHP PETROLEUM PTY LTD		
Well	: Minerva No.1		
Field	: Wildcat	Date	: 21/03/93
Core Interval	: Core 1: 1821.00 - 1824.04m		
Core Interval	: Core 2: 1828.00 - 1841.27m		
Core Interval	: Core 3: 1842.50 - 1846.87m		
File No.	: RG205		
Country	: AUSTRALIA	State	: Victoria

SUMMATION POROSITY Average sample 42 to 47 Sample Type : R
POROSITY Average : 6.3 over 6 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % WATER Average Sample 42 to 47 Sample Type : R
% WATER Average : 56.0 over 6 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 42 to 47 Sample Type : R
POROSITY Average : 2.9 over 6 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 42 to 47 Sample Type : R
PERMEABILITY Average : 0.49 over 6 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company	: BHP PETROLEUM PTY LTD		
Well	: Minerva No.1		
Field	: Wildcat	Date	: 21/03/93
Core Interval	: Core 1: 1821.00 - 1824.04m		
Core Interval	: Core 2: 1828.00 - 1841.27m		
Core Interval	: Core 3: 1842.50 - 1846.87m		
File No.	: RG205		
Country	: AUSTRALIA	State	: Victoria

AMBIENT He POROSITY Average Sample 42 to 48 Sample Type : A
POROSITY Average : 3.1 over 7 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 42 to 48 Sample Type : A
PERMEABILITY Average : 2.4 over 7 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA
State : Victoria

SUMMATION POROSITY Average sample 52 to 65 Sample Type : R
POROSITY Average : 17.9 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % WATER Average Sample 52 to 65 Sample Type : R
% WATER Average : 33.5 over 14 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 52 to 65 Sample Type : R
POROSITY Average : 15.3 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 52 to 65 Sample Type : R
PERMEABILITY Average : 2924 over 14 Samples
0 Samples with a ZERO Permeablity Value Ignored

Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat
Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA
State : Victoria

AMBIENT He POROSITY Average Sample 52 to 65 Sample Type : A
POROSITY Average : 15.4 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 52 to 65 Sample Type : A
PERMEABILITY Average : 4296 over 14 Samples
0 Samples with a ZERO Permeablity Value Ignored

BRINELL HARDNESS DATA

Company: BHP PETROLEUM   Report: RG-205

Well: Minerva No.1

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
1	1821.15	11
2	1821.37	11
3	1821.67	14
4	1821.97	14
5	1822.27	15
6	1822.57	15
7	1822.87	11
8	1823.17	17
9	1823.47	13
10	1823.77	14
11	1824.00	14
12	1828.15	17
13	1828.37	13
14	1828.67	12
15	1828.97	13
16	1829.27	14
17	1829.57	17
18	1829.87	14
19	1830.17	15
20	1830.47	21
21	1830.77	14
22	1831.10	14
23	1831.40	14
24	1831.70	16
25	1832.00	16
26	1832.30	17
27	1832.60	13
28	1832.90	15
29	1833.20	16
30	1833.50	14
31	1833.80	13
32	1834.10	11
33	1834.40	8
34	1834.70	7
35	1835.00	11
36	1835.30	9
37	1835.60	8
38	1835.90	8
39	1836.20	7
40	1836.50	7

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
41	1836.80	10
42	1837.15	4
43	1838.10	9
44	1839.10	11
45	1839.40	11
46	1839.70	9
47	1840.00	8
48	1840.30	11
49	1840.60	8
50	1840.90	7
51	1841.20	10
52	1842.80	11
53	1843.10	11
54	1843.40	12
55	1843.70	11
56	1844.05	8
57	1844.30	11
58	1844.60	12
59	1844.90	12
60	1845.22	11
61	1845.52	10
62	1845.82	9
63	1846.12	11
64	1846.42	12
65	1846.72	12

CORE PLUG DESCRIPTION

Company: BHP PETROLEUM　　Report: RG-205

Well: Minerva No.1

Sample Number		Description
1	Sst	lt gry, med - crs gr, sb ang, mod srt, mod hd, wh Cl Mtrx, Qtz, bd
2	Sst	lt - med gry, crs - v crs gr, com v crs sbrndd Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, occ Qtz Pbl
3	Sst	med - dk gry, crs - v crs gr, com sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, pred Pyr Cmt, Sid Cmt I/P, occ Qtz Pbl
4	Sst	As in 3
5	Sst	As in 4 w/ less pyr cmt
6	Sst	As in 4 but with inc Qtz Pbl
7	Sst	lt brnish gry, f gr w/ Pbl upto 5 mm, sb rndd, w wl srt, wh Cl Mtrx, Qtz, Tr Musc/C/Pyr
8	Sst	lt gry, crs - v crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt,
9	Sst	lt gry, med - crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
10	Sst	lt gry, f - med gr, sb rndd, wl srt, mod hd, wh Cl Mtrx, Qtz, Tr Pyr/C, Occ Qtz Pbl
11	Sst	lt gry, f gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
12	Sst	lt gry, med - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
13 - 14	Sst	As in 12
15	Sst	lt gry, crs - v crs gr, sb rndd, mod srt, mod hd, wh Cl Mtrx, Qtz, Tr Pyr
16	Sst	lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
17	Sst	lt med gry, crs - v crs gr - gran, sb rndd - wl rndd, pr srt, hd, Cl Mtrx I.P., Qtz, Tr Pyr, Tr Cl Gr and carb Mat

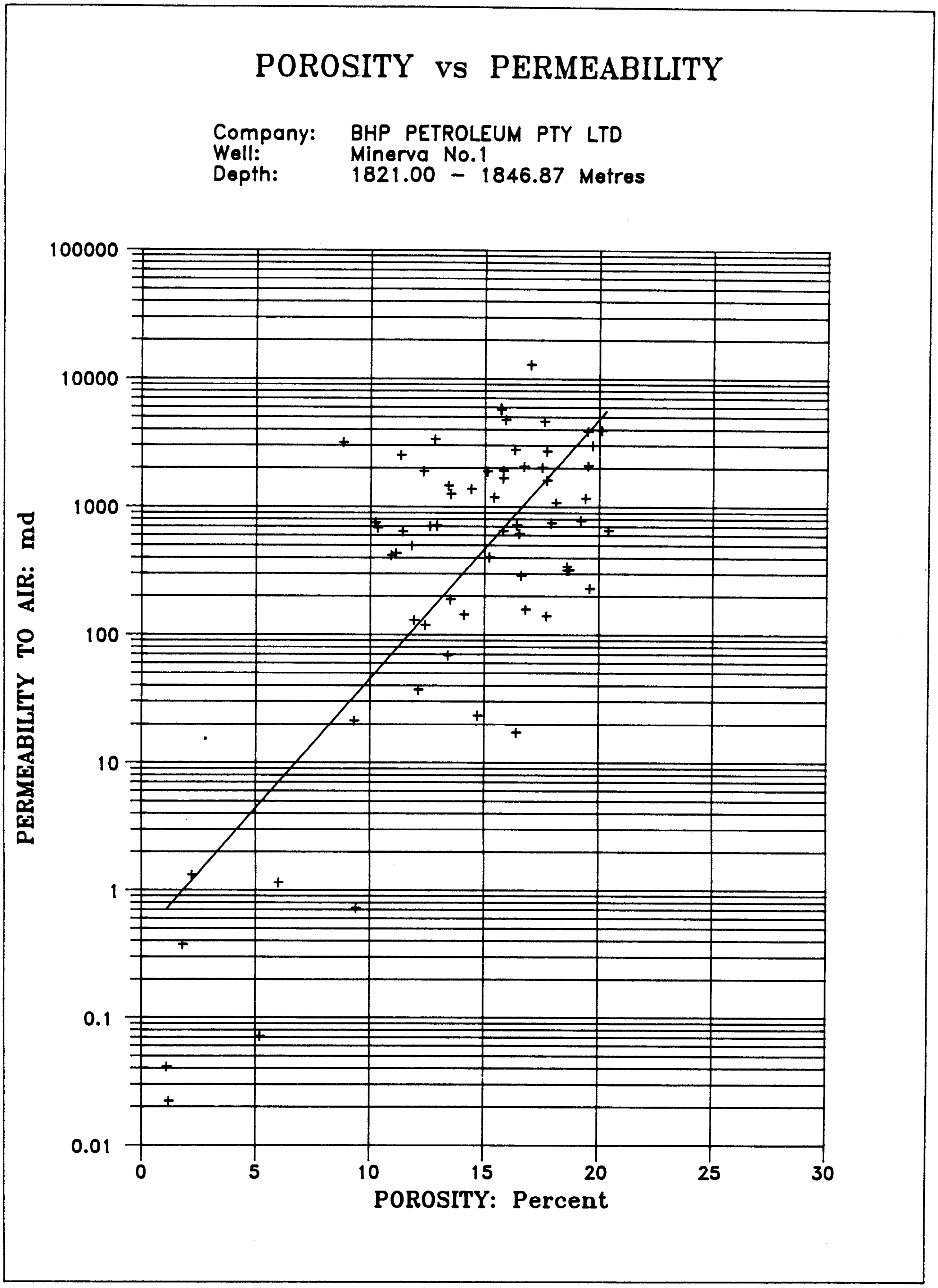
Sample Number		Description
18	Sst	lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
19	Sst	As in 18 w/ inc Qtz Pbl, conglomeritic
20	Sst	As in 19 w/ inc Pyr Cmt
21	Cgl	lt med gry, crs gr wl rndd wl srt Sd w/ rndd Qtz Pbls from 2-10mm, sm wh Cl Mtrx, Tr Pyr
22	Sst	lt gry, med gr, ang - sb rndd, mod wl srt, non calc, com Pyr Cmt, Qtz Cmt
23	Sst	lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
24	Sst	As in 23
25	Sst	lt med gry, f - v crs gr w/ Gran of 2-4mm, rndd, pr srt, mod hd, Cl Mtrx, Qtz, Tr Pyr
26 - 27	Sst	As in 23 w/ inc Pyr Cmt
28	Sst	lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, dk gry Clst I/P
29	Sst	lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
30	Sst	lt gry, f gr, com med gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, w/ Clst bnd
31	Sst	lt gry, f - med gr, sb ang - sb rndd, wl srt, mod hd, abd Cl Mtrx, Qtz, Tr Pyr/Mic/C, vague Lam
32	Sst	lt gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
33	Sst	As in 32
34	Sst	med gry, med - v crs gr, scatt Gran, rndd, mod srt, fri - mod hd, Cl Mtrx, Qtz, Tr C/Musc, bd
35	Sst	lt gry, med - v crs gr, com Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
36	Sst	As in 35 w/ lt gry, f - med gr, mod wl srt, ang - sbang Qtz Sd
37	Sst	lt gry, med - v crs gr, sb rndd, mod srt, Cl Mtrx, Qtz
38	Sst	lt - med gry, crs - v crs gr, com v crs sbrndd Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, rr Pyr Cmt, occ Qtz Pbl
39	Sst	As in 38

Sample Number	Description	
40-41	Sst	lt gry, crs - v crs gr, sb rndd - wl rndd, mod hd, var wh Cl Mtrx, Qtz Cmt, Qtz, Tr Pyr, often open framework
42 - 44	Clst	dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
45	Sltst	dk gry, v hd, non calc, sdy, cly Mtrx, bioturb
46	Sltst	med gry - dk gry, v hd, non calc, bndd, Tr Pyr Cmt, bioturb
47	Clst	dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
48	Sst	lt gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
49	Sst	med gry, f - med gr, sbrndd, wl srt, mod hd, wh - lt brn Cl Mtrx, Qtz, Tr Mic/C, Tr carb Lam
50	Sst	lt gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Pyr Bnd
51	Sst	lt gry, f - med gr, sb rndd, wl srt, mod hd, Qtz Cmt, var Cl Mtrx, Qtz
52	Sst	lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
53	Sst	lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
54	Sst	med gry, v crs gr - gran, rndd, pr - mod srt, mod hd, Qtz Cmt, Qtz, open framework
55	Sst	lt gry, med - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
56	Sst	As in 53
57	Sst	lt - med gry, med - v crs gr w/ comm Gran, rndd, hd, Qtz Cmt, Qtz, Tr Pyr
58	Sst	lt - med gry, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, Mnr Bioturb, cly I/P
59	Sst	As in 58
60	Sst	lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
61	Sst	lt med gry, med - v crs gr, rndd, hd, Qtz Cmt, sm Cl Mtrx, Qtz, Tr C
62	Sst	lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
63 - 64	Sst	lt - med gry, med - v crs, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, Mnr Bioturb, cly I/P

Sample Number		Description
65	Sst	lt med gry, med - v crs gr, slily gran, rndd, hd, Qtz Cmt, sm Cl Mtrx, Qtz, Tr C
1A	Sst	lt - med gry, crs - v crs gr, com v crs sbang Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt
2A	Sst	lt - med gry, crs - v crs gr, com v crs sbang Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, com lge Qtz Pbl
3A	Sst	med - dk gry, crs - v crs gr, com sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, pred Pyr Cmt, Sid Cmt I/P, occ Qtz Pbl
4A	Sst	As in 3A
5A	Sst	As in 4A w/ less pyr cmt
6A	Sst	As in 4A but with dec Qtz Pbl
7A	No plug	
8A	Sst	lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt,
9A	Sst	lt gry, med - crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
10A	No plug	
11A	No plug	
12A	Sst	lt gry, med - crs gr, pred med, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
13 - 14A	Sst	As in 12A
15A	Sst	lt - med gry, crs - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, occ Qtz Pbl
16A	Sst	lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
17A	Sst	As in 16A w/ abd v crs - lge Qtz Pbl, v prly srt
18 - 20A	Sst	As in 17A
21A	Sst	lt - med gry, crs - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, com rndd Qtz Pbl
22A	Sst	lt gry, f - crs gr, ang - sbrndd, prly srt, non calc, Qtz Cmt, occ Qtz Pbl
23A	Sst	As in 16A

Sample Number		Description
24 - 27A	Sst	lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
28A	Sst	As in 24A w/ inc Pyr Cmt
29A	Sst	As in 21A
30A	Sst	lt gry, f gr, com med gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, w/ Clst bnd
31 - 33A	Sst	lt gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
34A	Sst	lt - med gry, med - crs gr, pred med, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Org Mat, com lge Qtz Pbl
35 - 38A	Sst	lt gry, med - v crs gr, com Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
39 - 41A	Sst	lt gry, f - med gr, mod wl srt, ang - sbang, hd, Tr Pyr Cmt, Qtz Cmt
42A	Coal	blk - dk brn, hd, bndd, Pyr I/P
43A	Clst	dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
44 - 47A	Sltst	med gry - dk gry, v hd, non calc, bndd, Tr Pyr Cmt, bioturb, Org Mat
48A	Sst	lt gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Slsts asin 47A I/P
49 - 50A	Sst	lt - med gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz Cmt, Tr Mic, w/ Clst bnd
51A	Sst	lt - med gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
52A	Sst	lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
53A	Sst	lt - med gry, v crs - lge sbrndd Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, Qtz Cmt
54 - 57A	Sst	As in 53A w/ com Pyr Cmt
58A	Sst	lt - med gry, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, cly I/P
59A	Sst	lt - med gry, v crs - lge sbrndd Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, Qtz Cmt
60A	Sst	lt gry, med - v crs gr, occ sbang Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt, TR Pyr Cmt
61A	Sst	As in 60A

Sample Number		Description
62A	Sst	lt gry, med - v crs gr, com rndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
63 - 64A	Sst	As in 62A
65A	Sst	As in 60



POROSITY vs PERMEABILITY
Company: BHP PETROLEUM PTY LTD
Well: Minerva No.1
Depth: 1821.00 - 1846.87 Metres
100000
10000
1000
100
10
1
0.1
0.01
PERMEABILITY TO AIR: md
0
5
10
15
20
25
30
POROSITY: Percent

PE602758

This is an enclosure indicator page.
The enclosure PE602758 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602758 has the following characteristics:

ITEM-BARCODE =	PE602758
CONTAINER_BARCODE =	PE900064
NAME =	Minerva 1 Core Plot (1:200)
BASIN =	Otway
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	WELL-LOG
DESCRIPTION =	Minerva 1 Core Plot, Amdel Core Services, 1;200
REMARKS =	old barcode PE900066 replaced with PE602758
DATE-CREATED'=	*
DATE-RECEIVED =	13/01/94
W_NO =	W1079
WELL-NAME =	MINERVA 1
CONTRACTOR =	AMDEL CORE SERVICES
CLIENT_OP_CO =	BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602759

This is an enclosure indicator page.
The enclosure PE602759 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602759 has the following characteristics:

ITEM-BARCODE = PE602759
CONTAINER_BARCODE = PE900064
NAME = Minerva 1 Core Plot (1:200)
BASIN = Otway
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = WELL-LOG
DESCRIPTION = Minerva 1 Core Plot, Amdel Core Services, 1;200
REMARKS = old barcode PE900065 replaced with PE602759
DATE-CREATED = *
DATE-RECEIVED = 13/01/94
W_NO = W1079
WELL-NAME = MINERVA 1
CONTRACTOR = AMDEL CORE SERVICES
CLIENT_OP_CO = BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

2

Appendix 2 Exlog End of Well Report (Mudlogging)

FINAL WELL REPORT

BHP Petroleum Pty Ltd

Minerva - 1

Otway Basin, Victoria

March 1993 - April 1993

by

EXLOG Australia

CONTENTS

TABLES

APPENDICES

1. INTRODUCTION

a. Well & Rig Data

Company	:	BHP Petroleum Pty Ltd
Well Name	:	Minerva - 1
Location	:	Otway Basin, Victoria
Permit	:	VIC/P31
Latitude	:	38° 42' 12.35" South
Longitude	:	142° 51' 12.64" East
Field	:	Exploration
Rig	:	"Byford Dolphin" Semi-submersible
RT - MSL	:	25.00 metres
RT - Seabed	:	82.00 metres
Spud Date	:	8th March 1993
Total Depth	:	2425 metres
Total Depth Date	:	04th April 1993
Completion Status	:	Tested and Completed.
Exlog Unit No	:	503
Crew, DrillByte	:	M. Sale, A. Thangam, K. Clarke, S. Ong
Crew, Logging	:	S. Alexander, R. Tadiar, D. Alsop, V. Surla

b. Prognosis

The proposed location for Minerva-1 is in the Northwestern part of Vic/P31 in the eastern Otway Basin, approximately 35 km north northeast of Mussel-1. The well is designed to test a faulted rollover anticline with closure mapped at the Top Lower Shipwreck Group.

The Minerva Structure is a faulted hanging wall anticline that began to develop towards the end of the Early Cretaceous. The structure continued to develop slowly throughout the Late Cretaceous and experienced significant growth throughout the Tertiary, particularly after the late Eocene.

The structure has 250 metres of vertical relief in the most likely case, with the closing contour of 1775 mSS. Closure is mapped from within the Nirranda Group (approx 191 mSS) to TD.

EXLOG Australia provided a DrillByte Service on Minerva-1 from spud to a Total Depth of 2425 metres. 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. Continuous evaluation of pressures and drilling progress provided an aid in optimizing drilling costs and ensuring that drilling continued with 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 82 metres to 2425 metres TD.

Two sets of unwashed cuttings, five sets of washed and dried cuttings samples and one set of Petrocraft sample vials were prepared for distribution as follows:

▪ 2 sets 200 g unwashed ▪ 2 sets 200 g washed and dried ▪ Petrocraft sample vials	To: BHP Petroleum Pty Ltd BHP Core Store C/- Kestrel Management Unit 58 Slough Estate 170 Forester Road Mt Waverley Victoria
▪ 1 set 100 g washed and dried	To: Officer-in-Charge BMR Core & Cuttings Laboratory 80 Collins Street Fyshwick ACT 2609
▪ 1 set 100 g washed and dried	To: VIC DEM DMID Corelab 196 Turner Street Port Melbourne VIC 3207
▪ 1 set 100 g washed and dried	To: Bridge Oil Officer-in-Charge 255 Elizabeth Street NSW 2000 Attn. Mr G. Roder

- 1 set mud samples comprising of:
  2 x 200 g composite unwashed (100 m samples)
  1 x 1 Kg tin unwashed (100 m samples)

  To: BHPP Melbourne
  Attn. R. Craddock

- Mud samples were collected at the following depths:

  1822, 2121 and 2425 metres

Samples were collected and processed from the 13.375" casing shoe over the following intervals:

- 565 - 1000 m : 5 m samples
- 1000 - 2425 m : 3 m samples

The following samples were not collected due to excessively high rates of penetration, and the highly dispersive nature of clay formations:

- 655, 680, 695 metres
- 710, 715, 725 metres
- 805, 815, 880, 895 metres
- 930 metres
- 1256, 1268, 1274, 1280, 1295 metres
- 1304, 1364 metres

Samples from 2069 m were lost due to shaker screen changes.

2. DRILLING-ENGINEERING

a. Well History

The semi-submersible rig "Byford Dolphin" arrived at the Minerva-1 location on the 6th March 1993. The drill floor was 25 metres above sea level, and 82 metres above the sea-bed (water depth 57 metres).

36" Hole Section: 82 to 105 metres

After securing anchors and ballasting down, Minerva-1 was spudded at 12:00 hrs on the 8th March 1993.

NB#1, a 26.0" Security S3J (3x24 jets), run in tandem with a 36" hole-opener, spudded the well and drilled to a depth of 105 metres in 0.65 hrs (on-bottom) at an average rate of penetration of 35.38 m/hr and was graded 2-2-WT-A-1-I-NO-TD. Hi-Vis pills were spotted at every stand down and all returns were to the sea floor. At 105 metres, the bit was pulled out for a BHA and bit change. Typical drilling parameters used on this bit run were: WOB 0 - 10 klb, RPM 70 - 75 and pump pressure 1120 psi at 1050 gpm.

9.875" Pilot Hole Section: 105 to 560 metres

Due to the possibility of encountering shallow gas, a small (9.875") diameter hole section was first penetrated prior to being opened up to 36" and 17.5". This was completed during daylight hours so that ny gas could easily be seen.

NB#2, a 9.875" Security S44GF (3x16 jets), was made up on a new BHA and run into the hole to drill from 105 metres, using seawater as the drilling fluid (and Guar Gum Hi-Vis sweeps at every half and full stand drilled), with returns to the sea floor. At 560 metres, a survey was dropped (Dev = 1.0°), the hole circulated and conditioned and the bit pulled out of the hole for a BHA and bit change. This bit drilled 455 metres in 3.53 hrs (on-bottom) at an average rate of penetration of 128.89 m/hr and was graded 2-2-WT-A-E-I-NO-TD. Typical drilling parameters used on this bit run were: WOB 0 - 17 klb, RPM 110 - 120 and pump pressure 1770 psi at 760 gpm.

RR#1.1, a 26.0" Security S3J (3x24 jets), run in tandem with a 36" hole-opener, opened up the 9.875" hole from 105 to 115 metres, with Hi-Vis sweeps at each half stand. At 115 metres, 100 bbls of Hi-Vis mud was pumped prior to being displaced by 150 bbls of Hi-Vis mud. The bit was then tripped out to run casing. This bit drilled 10.0 metres in 0.28 hrs at an average penetration rate of 35.7 m/hr and was graded 2-2-NO-A-E-I-NO-TD. The drilling parameters used were: WOB 15-20 klb, RPM 120 and pump pressure 1250 psi at 1070 gpm.

Casing (three joints of Vetco, 310 lb/ft, B, 30.0") was then run, with the shoe set at 114 metres. The casing was cemented with 351 sx class "G" cement at 1.90 sg (15.8 ppg), with 2% $CaCl_2$, and displaced with 15 bbls seawater.

17.5" Hole Section: 115 to 560 metres

NB#3, a 17.5" Security SS44G (3x18 jets), was made up with a new BHA and run into the hole. The cement and casing shoe were drilled out and the 9.875" pilot-hole section was then opened to 17.5" from 115 metres to 560 metres. Hi-Vis pills (20 bbls) were pumped at every half stand and connection. At 560 metres, the hole was swept with 250 bbl of hi-vis mud followed by a further 630 bbl of weighted hi-vis mud being spotted on bottom. The bit was then pulled from the hole without drag.

Casing (39 joints of Sumiton, BTC, N80, 68 lb/ft, 13.375") was then run, with the shoe set at 549 metres. It was cemented with a lead slurry of 635 sacks class "G" cement at 1.50 sg (12.5 ppg) with 0.45 gal per sack Econolite, and a tail slurry of 502 sacks of class "G" cement at 1.90 sg (15.8 ppg), and displaced with 220 bbls of seawater.

The BOPs and riser were rigged up and run to the seafloor. The BOPs were then tested to BHPP specifications.

12.25" Hole Section: 560 - 1204 metres

NB#4, a 12.25" Hughes ATM11HG (13-16-18 jets), was made up on a MWD assembly and run into the hole tagging cement at 522.73 metres. This was subsequently drilled, together with the shoe at 549 metres. The 17.5" rathole was then reamed to 560 metres whilst displacing the hole and riser with a new KCL mud. Three metres of new hole was then drilled from 560-563 metres. The bit was then pulled back into the shoe and a Formation Integrity Test conducted. The results were as follows.

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Press (sg EMD)
563	549.0	12.25	1.08	2.13

After the FIT, the bit was run back to bottom and subsequently drilled ahead from 563 metres, reaming at every connection. Surveys were taken using the MWD at every 5th connection (≈ 145 metres). Drill rates were highly variable due to the formation alternating between loose sandstone, claystone, siltstone, and very hard pyrite and dolomite bands. Higher torque and off-bottom drag from 1056 metres prompted washing and reaming on subsequent connections. Connection gas was also seen at 1081.5, 1110.5, 1139.5, 1168.9 and 1198.1 metres, with values of 0.11, 0.43, 0.04, 1.23, 0.12 % respectively. In view of this, the mud density was raised from 1.09 sg to 1.13 sg from 1186 metres. At 1204 metres, having found a stable casing seat, it was decided to terminate this section.

The hole was circulated until the shakers were clean. Overpull of up to 40 klbs was recorded from 1204-1084 metres, and 2 bbls were swabbed into the well at 1084 metres. The bit was then washed back from 1084-967 metres before continuing to pull out of the hole to 909 metres. Running the bit back to bottom, bottoms-up was circulated with a wiper trip gas of 1.53% recorded. No swab gas was recorded. The bit was then tripped out of the hole without problem. This bit drilled 644 metres in 22.47 hrs (on-bottom) at an average rate of penetration of 28.66 m/hr and was graded 2-3-FC-H-E-1-EC-TD. The drilling parameters used on this bit run were: WOB 0 - 40 klb, RPM 120 - 140 and pump pressure 2850 psi at 755 gpm.

The wireline unit was then rigged up and the following logs were run:

Run	Log Type	Interval
1	DLL-MSFL-BHC-AS-GR-SP-CAL	549.0 - 1204 m
2	VSP	150.0 - 1189 m
3	CST (46 shot, 46 recovered)	563.0 - 1193 m

Casing (94 joints of 47 lb/ft, P110, 9.625") was then run, with the shoe set at 1189.37 metres. The casing was cemented with 311 sx class "G" cement Neat at 1.89 sg (15.8 ppg), and displaced with 37 bbls drill water and 260 bbls of mud.

8.5" Hole Section: 1204 - 2107 metres

NB#5, an 8.5" Security SS44G (open jets) was then made up and run into the hole. The top of the cement was tagged at 1162 metres. The float was then drilled together with the shoe and shoe track. The rathole was reamed and cleaned out to 1204 metres. New hole was drilled from 1204 to 1207 metres, and the bit surged for junk on bottom to recover lost CST bullets. Bottoms-up was circulated and the bit was then pulled back to the shoe to perform an FIT. The results were as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Press (sg EMD)
1207	1189	8.50	1.13	1.94

The bit was run back to bottom and surged for junk. Drilling continued from 1207-1209 metres where the junk sub was worked for 10 mins, a flow-check performed and a slug pumped before pulling out of the hole due to slow penetration rates. This bit drilled 5.0 metres in 3.35 hrs (on-bottom) at an average rate of penetration of 1.5 m/hr and was graded 6-2-BL-N-1-I-BU-PR. The drilling parameters used on this bit run were: WOB 20 - 25 klb, RPM 76 - 81 and pump pressure 650 psi at 430 gpm.

NB#6, an 8.5" Hycalog DS61H (14-10-10 jets) was then made up in combination with a Teleco MWD tool and run into the hole. The bit was washed down the last 17 metres to bottom in order to measure the MWD in this section. Drilling continued from 1209 metres, with surveys taken at each 5th stand, indicating that the angle was building from 2.5° to 4°. From 1379 metres, partial loss of returns were suspected and drilling was halted at 1383 metres and the well was monitored while circulating through the trip tank. With no losses registered, drilling continued with increased RPM from 140 to 150 in order to reduce hole deviation.

Connection gasses were noted in this section of the hole, and were recorded at 1364, 1393, 1422, 1451, 1481 metres with 0.08%, 0.05%, 0.08%, 0.04%, 0.06% respectively, above background. A drilling break at 1491 metres was flow-checked before drilling continued. More connection gases were noted at 1509, 1539, 1568, 1626 metres with 0.05%, 0.04%, 0.05%, and 0.07% respectively, above background. Another drilling break from 1648 to 1654 metres was flow-checked and the sample circulated up before resume drilling. Cavings were noted to have increased, and connection gases persisted at 1685, 1741, 1771, 1800 metres. A drilling break at 1821 metres was flow-checked and circulated up, with a maximum gas peak of 2.00% at 1811 metres. A decision was made to core and the bit was pulled. This bit drilled 612 metres in 24.23 hrs (on-bottom) at an average rate of penetration of 43.0 m/hr and was graded 3-8-RO-N-D-I-FC-CP. Typical drilling parameters used on this bit run were: WOB 0 - 18 klb, RPM 75 - 180 and pump pressure 2300 psi at 530 gpm.

CB#1, an 8.5" Diamant Boart Stratabit CD93 (9x9 jets: TFA 0.5591 in^2) was then made up to a 9 metre core barrel and run in to 1707 metres where it washed and reamed to bottom. It cored 7 metres, from 1821-1828 metres, before it was halted due to slow rates of penetration. Typical drilling parameters used on this bit run were: WOB 6 - 27 klb, RPM 70 - 144 and pump pressure 1160 psi at 345 gpm. The bit was graded 4-4-BT-S-D-I-CT-PR. Recovery was 43%.

CB#2, an 8.5" DBS CB303 (with an undetermined TFA), was made up and run in with an 18 metre core barrel to continue coring. It cored a total of 14.5 metres, from 1828-1842.5 metres. At 1842.5 metres there was high circulation pressure and the penetration rate dropped to zero indicating that the core had jammed. On pulling out of the hole, a tight spot was noted at 1660 metres with 70 klb overpull. Typical drilling parameters used on this bit run were: WOB 18 - 28 klb, RPM 110 - 150 and pump pressure 1150 psi at 304 gpm. The bit was graded 0-8-RO-S-D-1-NO-PR. Recovery was 91.7%

CB#3, an 8.5" DBS CD502 (TFA 0.5591 in^2), was made up and run in, and coring continued from 1842.5-1847 metres where it was halted because the penetration rate dropped to zero. A total of 4.5 metres were cored with a 100% recovery. Typical drilling parameters used on this bit run were: WOB 8 - 16 klb, RPM 72 - 114 and pump pressure 420 psi at 199 gpm. The bit was graded 0-8-RO-S-E-I-CT-PR.

NB#7, an 8.5" Hughes ATM22 (3x12 jets), in combination with a Teleco MWD tool, was run in and reamed down to bottom from 1810-1847 metres (the core rat-hole) in order to obtain MWD measurements in this section, before proceeding to drill ahead with surveys taken at every connection. Due to reducing penetration rates drilling was halted, a flow-check made and a slug pumped prior to pulling out of the hole. Tight hole conditions, believed to be caused by a good filter cake ayer across the sandstone, were noted at 1970 metres and the bit had to be back-reamed to 1830 metres with a maximum overpull of 70 klb at 1891 metres. Typical drilling parameters used on this bit run were: WOB 7 - 29 klb, RPM 90 - 140 and pump pressure 2500 psi at 458 gpm. The bit was graded 8-8-BT-H-8-2-FC-PR.

The wireline unit was then rigged up and the following logs were run:

Run	Log Type	Interval
1	DLL-MSFL-AS-GR-SP-AMS	2024 - 1189 m
2	FMS-CDT-CNT-GRMS	2024 - 1189 m
3	VSP	2017 - 920 m
4	RFT (4 Runs)	1790 - 1058 m

The BOPs were then tested to BHPP specification.

NB#8, an 8.5" Hughes ATM33 (3x12 jets), in combination with a Teleco MWD tool and a Howco temperature gauge, was run in to the shoe. Circulation was broken at the shoe and again just off-bottom in order to obtain temperature gauge readings. The bit was reamed down to bottom encountering 14 metres of fill. A flow-check was made and a lug pumped before pulling out of the shoe for a wiper trip as well as to retrieve the Halco temperature gauge. On running back in, a bridge was tagged at 1999 metres and reamed out to bottom. Drilling continued with surveys taken at every connections. At 2099 metres, a flow-check was made when a slight gain in the active pits was observed. An increase in rate of penetration at 2107 metres was also flow-checked.

With a suitable casing seat of about 30 metres of claystone drilled, it was decided that 7" liner should be run. At 2107 metres, a wiper trip to the shoe was made, with tight spots encountered from 2072 to 1940 metres. Maximum overpull of 100 klb was observed. A ledge at 1946 metres had to be back-reamed before the bit was pulled to the casing shoe. The bit was then run back in, washing and reaming from 2093 metres to bottom. After circulating the hole clean, the bit was pulled out to run the following wireline logs.

Run	Log Type	Interval
1	DLL-MSFL-AS-GR-SP-AMS	2103 - 1800 m
2	CST-GR	2101 - 1195 m

NB#9, an 8.5" Security H77SG (open jets), was run in for a wiper trip. The bit took weight from 2097 metres and had to be washed and reamed to bottom, where it was surged for junk. On circulating bottoms-up, with a recorded wiper trip gas of 8.34%, a plug was pumped and the bit pulled out of the hole. It was graded 4-5-WT-A-4-1-BT-TD.

RR#9.1, an 8.5" Security H77SG (open jets), was run in for a scraper run to the bottom of the casing shoe. At the shoe, the scraper was worked and bottoms-up was circulated prior to pulling the bit out of the hole. Another wiper trip was made with RR#9.2, encountering 5 metres of fill before tagging bottom at 2107 metres. The bit was surged for junk and bottoms-up was circulated up and a slug pumped prior to pulling out of the hole to run 7" liner. The bit was graded 4-5-WT-A-4-1-BT-TD

Liner (84 joints of 7") was run to 2102 metres, where an attempt to break circulation found the liner to be packed-off, requiring the liner to be worked clear before circulating 1.5 times its volume. After an unsuccessful attempt to set the hanger, the ball was sheared at 2200 psi. On cementing the liner, it was set on bottom and a number of attempts were required to back out the running tool.

RR5.1, an 8.5" Security SS44G (12-14-open jets), was run in to 1084.5 metres where it was washed to the top of the liner at 1092 metres. The hole was circulated clean until there was no more cement coming over the shakers, and a slug was pumped before pulling the bit out of the hole. This bit was graded 8-3-BC-N-1-I-BU-BHA.

NB#10, a 6.0" Hughes J3 (3x12 jets), was run on 4.75" drill collars and 3.5" drill-pipe, to 1082 metres where it broke circulation and washed through to the top of the liner and pack-off sub at 1094 metres. Attempts to drill the pack-off sub resulted in pushing the pack-off sub further down the hole to 2036 metres. The bit then drilled through the pack-off sub and into cement. Once it was proven that cement was in the returns sample, and that it was still soft, a slug was pumped and the bit was pulled out of the hole and graded 2-2-WT-A-1-I-NO-DP.

A JM Packer was run in and set at the top of the liner at 1092 metres and was pressure-tested to 3500 psi. The BOPs were then pressure-tested to BHPPs specifications.

6.0" Hole Section: 2108 - 2425 metres TD

RR#10.1, a 6.0" Hughes J3 (3x12 jets), was made up and run in to drill cement, float collar at 2060 metres and shoe track at 2108 metres. The junk sub was worked a number of time, before drilling new formation commenced. At 2111 metres, bottoms-up was circulated and the bit was pulled to the shoe for a Formation Integrity Test. The results were as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Press (sg EMD)
2111	2108	6.00	1.15	1.85

The bit was run back to bottom and drilling continued from 2111 metres, with the riser being flushed every 2 hours and flow-checks made at drilling breaks at 2117.7 and 2126 metres. At 2131 metres, the junk sub was worked a number of times and the riser was flushed along with a slug pumped before pulling out of the hole for a bit change. Typical drilling parameters used on this bit run were: WOB 10 - 17 klb, RPM 41 - 64 and pump pressure 2170 psi at 261 gpm. The bit was graded 8-8-WT-A-2-2-NO-TQ.

NB#11, a 6.0" Hycalog DS46HG6 (3x11 jets), was made up and run in. Bottom was tagged at 2108 metres and the hole was washed and lightly reamed to 2131 metres. New hole was drilled from 2131 to 2209 metres with the riser being boosted clean every hour. At 2209 metres, the bit was pulled due to the low penetration rate. The hole was circulated clean, a survey was dropped, and a slug was pumped, prior to pulling out of the hole for a bit change. Typical drilling parameters used on this bit run were: WOB 5 - 13 klb, RPM 75 - 110 and pump pressure 2700 psi at 268 gpm. The bit was graded 8-8-LC-NS-D-I-WC-PR.

NB#12, a 6.0" Hughes ATJ44C (3x11 jets), was run in and washed and reamed from 2190 to 2209 metres. New hole was drilled to 2218 metres with the riser being flushed every three hours. At 2218 metres a drill break was encountered and a flow-check was performed (static). Drilling then continued to 2362 metres at which stage it was decided to pull the bit due to a combination of low penetration rate and hours run. Tight hole was encountered from 2237 to 2190 metres, with maximum overpull of 30 klb. The string had to be jarred free at 2184 metres, with maximum overpull of 50 klb. It was washed clear and no other problems were encountered on the trip out. Typical drilling parameters used on this bit run were: WOB 22 -27 klb, RPM 71 and pump pressure 1800 psi at 242 gpm. The bit was graded 4-5-WT-A-E-I-PT-HR.

NB#13, a 6.0" Smith F3 (3x11 jets), was run in and washed and reamed from 2277 to 2295 metres. New hole was drilled from 2295 to 2425 metres, with the riser being flushed every three hours, or as necessary. At 2425 metres, the hole was circulated clean before a wiper trip to the shoe was made with no problem encountered. The bit was run in the hole and at 2424 metres, some fill was encountered and the hole was washed to bottom. Bottoms-up was circulated out before the bit was finally pulled out for the wireline logs. Typical drilling parameters used on this bit run were: WOB 20 -25 klb, RPM 71 and pump pressure 1800 psi at 255 gpm. The bit was graded 4-4-WT-A-4-1-BT-TD.

The following wireline logs were then run:

Run	Log Type	Interval
1	DLL-MSFL-AS-GR-SP-AMS	2224 - 2109.5 m
2	CNL-FMS-GR	2425 - 2109.5 m
3	VSP	2425 - 1992.0 m
4	CST-GR	2420 - 2120.0 m
5	CBL-VDC-USI	2106 - 1080.0 m

Minerva-1 was then tested according to the BHPP testing program (see Section 5: Testing and Evaluation [d] and [e] for further details).

b. Bit Optimisation

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

Minerva-1 was drilled using a total of 13 new bits and 5 re-run bits in 138.91 hrs (on-bottom) at an average rate of penetration of 16.68 m/hr. Three coring bits were also used (at 9.13 hrs on-bottom) at with an average penetration rate of 2.85 m/hr.

36" Hole Section: this section was drilled in two runs, using one new bit and one re-run bit.

NB#1, a 26.0" Security S3J (IADC 111), run in tandem with a 36" hole-opener, drilled 23 metres to a depth of 105 metres in 0.65 hrs (on-bottom) at penetration rates varying between 21 and 156 m/hr with an average of 35.38 m/hr. Drilling parameters used were: WOB 0-20 klb, RPM 70-75 and pump pressure 1120 psi at 1050 gpm. This bit performed well and showed only minor wear consistent with the small amount of new formation penetrated. It was graded 2-2-WT-A-1-I-NO-TD.

RR#1.1, again run in tandem with a 36" hole-opener, was used to extend the 36.0" hole section from 105-115 metres after the drilling of the 9.875" pilot hole. This bit drilled 10 metres in 0.28 hrs (on-bottom) at an average rate of penetration rate of 35.71 m/hr. Drilling parameters used were: WOB 15-20 klb, RPM 110-115 and pump pressure 1250 psi at 1070 gpm. This bit performed well and showed only minor wear consistent with the small amount of new formation penetrated. It was graded 2-2-WT-A-1-I-NO-TD.

9.875" Hole Section: this section was drilled using one new bit.

NB#2, a 9.875" Security S44GF (IADC 137), was used to drill the pilot hole for this section from 105-560 metres, a distance of 455 metres, in 3.53 hrs (on-bottom). Penetration rates varied from 27 to 550 m/hr with an average of 128.89 m/hr. It was graded 2-2-WT-A-E-I-NO-TD. The bit was pulled to allow the section to be opened out to 36.0" showing only minor wear. Typical drilling parameters used were: WOB 0-17 klb, RPM 120 and pump pressure 1750 psi at 760 gpm.

17.5" Hole Section: this section was drilled with one new bit.

NB#3, a 17.5" Security SS44G (IADC 135), was used to open the remaining 9.875" pilot hole section of the previous run from 115-560 metres, in 4.52 hours (on-bottom). Penetration rates averaged 98.45 m/hr. This bit was pulled to run 13.375" casing, showing only minor wear for the amount of formation drilled and was graded 1-1-NO-A-E-1-NO-TD. Typical drilling parameters used were: WOB 10-20 klb, RPM 120 and pump pressure 2700 psi at 1080 gpm.

12.25" Hole Section: this section was also drilled using one new bit.

NB#4, a Hughes ATM-11HG 12.25" (IADC 437), drilled the cement, shoe track, shoe and 644 metres of new hole from 560 metres to 1204 metres, in 22.47 hours (on bottom). Penetration rates averaged 28.66 m/hr over the hole section. This bit performed well and showed only moderate wear consistent with the amount of new formation penetrated. It was graded 2-3-FC-H-E-1-EC-TD. Typical drilling parameters were: WOB 10-35 klb, RPM 120-140, and pump pressure 2850 psi at 755 gpm.

8.5" Hole Section: this section was drilled using 4 new bits and 3 core bits, totalling 63.68 hours at an average penetration rate of 14.2 m/hr.

NB#5, a Security SS44G 8.5" (IADC 135), was used to drill the cement, shoe track, shoe and clean up 15 metres of 12.25" rathole to 1204 metres. New hole was drilled from 1204-1209 metres, in 3.35 hours (on -bottom). Penetration rates averaged a low 1.5 m/hr because of a well cemented sandstone with abundant pyrite aggregates encountered after drilling out the rathole. This bit did not perform well considering the amount of new formation drilled. It recorded extensive wear in all areas, notably teeth and gauge, and was graded 8-8-BT-A-F-24-WT-TQ. Typical drilling parameters were: WOB 5-35 klb, RPM 100-115, and pump pressure 2300 psi at 405 gpm.

NB#6, a Hycalog DS61H 8.5" (IADC not available), drilled new hole from 1209 to 1821 metres, in 24.23 hours (on-bottom). Penetration rates averaged 43.0 m/hr over the hole section. This bit performed moderately well and showed wear above what was expected for the amount of new formation penetrated, and was finally tripped to core. It was graded 3-8-RO-N-D-I-FC-CP. Typical drilling parameters were: WOB 0-18 klb, RPM 75-180, and pump pressure 2300 psi at 530 gpm.

CB#1, a DBS CD93 8.5", cored 7 metres in 1 hour with an average penetration rate of 7 m/hr. Drilling was halted due to slow rates of penetration. Typical drilling parameters used on this bit run were: WOB 6-27 klb, RPM 70-144 and pump pressure 1160 psi at 345 gpm. The bit was graded 4-4-BT-S-D-I-CT-PR.

CB#2, a DBS CB303 8.5", continued the coring. It cored 14.5 metres in 7 hours at an average penetration rate of 2.07 m/hr. It was pulled because of a jammed core indicated by a high circulation pressure and the penetration rate dropping to zero. Typical drilling parameters used on this bit run were: WOB 18-28 klb, RPM 110-150 and pump pressure 1150 psi at 304 gpm. The bit was graded 0-8-RO-S-D-1-NO-PR.

CB#3, a DBS CD502 8.5", cored a further total of 4.5 metres in 1.13 hours with an average penetration rate of 4 m/hr. It was pulled due to very low penetration rates. Typical drilling parameters used on this bit run were: WOB 8-16 klb, RPM 72-114 and pump pressure 420 psi at 199 gpm. The bit was graded 0-8-RO-S-E-I-CT-PR.

NB#7, a Hughes ATM22 8.5" (IADC 517), drilled 184 metres in 18.82 hours with an average rate of penetration of 9.8 m/hr. It drilled through a predominantly hard and siliceous cemented sandstone, and was pulled because the penetration rate dropped to zero. Typical lrilling parameters used on this bit run were: WOB 7-29 klb, RPM 90-140 and pump pressure 2500 psi at 458 gpm. The bit was graded 8-8-BT-H-8-2-FC-PR.

NB#8, a Hughes ATM33 8.5" (IADC 537), drilled 76 metres in 8.15 hours with an average rate of penetration of 9.3 m/hr through a massive sandstone formation and into a soft to firm claystone bed. It performed two wiper trips to the shoe and had to ream certain sections. Drilling was halted in order to run a 7" liner and the bit was graded 1-1-NO-A-E-I-NO-FM. Typical drilling parameters used on this bit run were: WOB 7-31 klb, RPM 97-103 and pump pressure 2600 psi at 468 gpm.

NB#9, a Security H77SG 8.5" (IADC 335), was run in for a wiper trip prior to running 7" liner, washing and reaming from 2097 to 2107 metres. It did not drill any formation but was again used on a scraper run, and another wiper trip prior to being pulled and was graded 4-5-WT-A-6-I-NO-TD

RR#5.1, a Security SS44G 8.5" (IADC 135), was run in to ream out cement and was graded 8-3-BC-N-1-I-BU-BHA.

6.0" Hole Section: this section was drilled with three new bits, in 4 runs, in 56.5 hours (on-bottom) at an average rate of penetration of 5.6 m/hr.

NB#10, a Hughes J3 6" (IADC 136), was run in to drill out cement and packer. It unfortunately only managed to push the packer further down the hole and was pulled out of the hole and graded 2-2-WT-A-1-I-BHA.

RR#10.1, a Hughes J3 6" (IADC 136), was rerun and completed drilling cement and the shoe track. New hole was drilled from 2107 to 2131 metres, drilling 24 metres in 8.08 hours with an average ROP of 3 m/hr. The bit was pulled due to a pump pressure increase, later found to be caused by a blocked jet. Typical drilling parameters were: WOB 10-17 klb, RPM 41-64 and pump pressure 2170 psi at 261 gpm. The bit was graded 8-6-WT-A-4-I-NO-PR.

NB#11, a Hycalog DS46H66 6" (IADC unknown), drilled new hole from 2131 to 2209 metres in 8.08 hours (on-bottom) with an average penetration rate of 9.6 m/hr. The initial drilling rate was typical for a PDC bit (10-20 m/hr), but the lower section of the hole was strongly cemented medium to coarse sandstone which proved very detrimental to the bit. ROP was drastically effected (0.1-1.0 m/hr) initiating a bit change. On surface the bit displayed sever damage to the cutting faces and was badly eroded. Typical drilling parameters were: WOB 5-13 klb, RPM 75-110 and pump pressure 2700 psi at 263 gpm. The bit was graded 8-8-LC-NS-D-1-WC-PR.

NB#12, a Hughes ATJ44C 6" (IADC 267), drilled new hole from 2209 to 2295 metres in 17.77 hours (on bottom), with an average penetration rate of 4.8 m/hr. The lithology drilled was interbedded claystone and well cemented sandstone resulting in a slow relatively consistent ROP. The bit was pulled on hours run combined with a gradually decreasing average ROP. Typical drilling parameters were: WOB 14-23 klb, RPM 67-87, and pump pressure 1500 psi at 242 gpm. The bit was graded 4-5-WT-A-E-I-PT-HR.

NB#13, a Smith F3 6" (IADC 537X), drilled new hole from 2295 to 2425 metres (TD) in 23.5 hours with an average penetration rate of 5.5 m/hr. The relatively low penetration rate was due to the nature of the sandstone, but the Smith J3 was more suited to the matrix than the Hughes ATJ44C or the Hycalog PDC bit.

c. Hydraulics Optimisation

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

The rig was equipped with two NATIONAL 12P 160 triplex pumps. A pump output of 5.38 gal/stk at 96% efficiency was utilized.

36" Hole Section: 82 to 105 metres

This section was drilled with returns to the sea floor using seawater with guar gum, hi-vis sweeps as the drilling fluid. Flow rates of 1050-1070 gpm were used giving turbulent flow regimes within all annular sections. The impact force and percentage pressure loss were low due to the presence of the 36" hole-opener. However the lithology penetrated was probably insufficiently consolidated for the poor hydraulics to significantly affect the rate of penetration.

9.875" Pilot Hole Section: 105 to 560 metres

This section was drilled using seawater with hi-vis gel sweeps as the drilling fluid at a flow rate of 760 gpm, producing excellent cuttings transport properties but turbulent flow regimes within the 9.875" annular section. Bit hydraulics were optimal with the percentage pressure loss at the bit being 74% of the surface pressure.

12.25" Hole Section: 560 to 1204 metres

This section was drilled using a closed KCL mud system. Adequate mud rheology and flow rates in the order of 750-770 gpm resulted in laminar flow regimes throughout all sections of the annulus whilst drilling this section, thus keeping well below critical annular velocities and therefore hole erosion to a minimum. Cuttings transport was also optimal with sufficient annular velocities in the largest annular section (riser) to maintain efficient hole cleaning. Adequate nozzles (13-16-18) and flow rates also produced optimal bit hydraulics, despite the use of a MWD tool with the associated "parasitic" pressure loss, with a typical bit pressure losses of between 53 and 55%, producing hydraulic power of between 630 and 660 hp, impact force of between 1500 and 1560 lbf and a jet velocities of 128 m/sec.

8.5" Hole Section: 1204 to 2107 metres

This section was drilled with a KCL-PHPA mud system. Flow rates were maintained between 460 to 530 gpm, with the exception of the 3 coring runs which utilized a flow rate ranging from 200 to 345 gpm in which case flow rates were adequate but below optimal. Combined with good mud properties, laminar flow regimes were encountered throughout all section of the annulus. Thus, hole erosion was minimised while maintaining adequate cuttings transport in the largest annular section (riser). Even with the "parasitic" pressure loss associated with the MWD tool, the bit hydraulics were also optimal with bit pressure losses between 40 and 67% of total losses. Hydraulic power was maintained between 228 and 451 hp, impact force between 730 and 1010 lbf and jet velocity ranged from 95 to 135 m/sec.

6.0" Hole Section: 2107 to 2425 metres

This section was also drilled with a KCL-PHPA mud system. Flow rates were maintained between 252 to 263 gpm which, combined with good mud properties, to provide laminar flow regimes throughout all sections of the annulus. Adequate cuttings transport was able to be maintained in the largest section of the annulus (riser), but a riser booster pump was also utilised every two to three hours to prevent any possibility of cuttings settling in the riser. Bit hydraulics were sub-optimal with pressure losses between 39% and 47% of total loss. Hydraulic power was maintained between 85 and 115 hp, impact force between 328 and 396 lbf, and jet velocity ranged from 78 to 92 m/sec.

d. Borehole Condition.

Borehole condition was monitored by observing rotary torque, overpull and cavings for indications of tight hole. Carbides were also run to check the lag and indicate the average hole size.

36" Hole Section: This was drilled with no hole problems.

9.875" Pilot Hole Section: The pilot hole was drilled to 560 metres with no hole problems. This was subsequently opened out to 36.0" to 115 metres without problems and the 30.0" casing run without drag. The remainder of the pilot hole section was then opened up to 17.5" and 13.375" casing run without problem.

12.25" Hole Section: This section recorded no hole problems whilst drilling until 1056 metres, where high torque and off-bottom drag on connections were first noted. Subsequently, connections were washed and reamed prior to making a connection. The attempted bit trip from 1204 metres showed overpull of 40 klb from 1204 to 1084 metres, swabbing in 2 bbls of formation fluid. However after a wiper trip to bottom, the hole condition stabilized resulting with no further overpull on pulling the bit. A carbide lag check at 1023 metres indicated that the sandstone sections may have been washed out to give an average hole size of 14.4". Wireline logs and 9.625" casing were then run without any problem.

8.5" Hole Section: This section was drilled without any hole problems to 1680 metres, even though certain pressure indicators such as the Dxc and resistivity readings indicated a possible over-pressuring from 1300 metres, with the subsequent raising of the mud density at 1450 metres from 1.12 to 1.15 sg. From 1680 metres, there was a slight increase in cavings to 20%. Although very few of these cavings were indicative of over-pressure, the mud density was increased again to 1.17 sg.

While making three coring runs, precautionary reaming was required, and tight hole was noted at 1660 metres with 70 klb overpull on the second coring run, which correlates with a porous sandstone. The hole was generally regarded as being in good condition. A carbide run at 2002 metres indicated an average hole size of 9.8", suggesting substantial hole erosion in the upper hole section. However, on pulling out, tight hole was noted at 1970 metres, requiring reaming at 1830 metres with a maximum overpull of 70 klb at 1891 metres. Wireline logs run at the end of this section showed certain upper sections of the hole to be washed out, with the basal interval generally close to in-gauge. The hole geometry itself appeared oblong rather than circular. The tight hole condition was thought to be caused by very porous sands with a good filter cake.

While running in with NB#8, 14 metres of fill were encountered, while a wiper trip after that noted a bridge at 1999 metres, requiring the bit to ream to bottom. A wiper trip with NB#9 also required reaming from 2097 metres to bottom.

6.0" Hole Section: This section encountered almost immediate problems. While running in with NB#11 (with only 24 metres of new formation having been drilled), 23 metres of fill and relatively tight hole were encountered, requiring the bit to be washed and reamed to bottom. Also, when tripping out with this bit at 2209 metres, tight hole was encountered from 2137-2190 metres (30 klb maximum overpull). The drill string had to be jarred and washed free at 2184 meters (maximum overpull of 50 klb). No other hole problems were encountered in this hole section.

The electric logs run over this section showed the hole to be relatively in-gauge. Only the basal 10 metres showed any significant erosion. During the running in of the VSP logging tool, tight hole, attributed to mud cake build-up, was encountered from 2230-2250 metres. Similar problems occurred during the retrieval of the CST tool, with tight hole at 2215 metres (maximum overpull 4 klb).

3. PRESSURE EVALUATION

a. Formation Fracture Pressure

Fracture pressures were calculated using the "Constant Effective Stress Ratio" method. This utilises leak-off data and allows 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 III, Pressure Gradient Analysis Plot.

Three Formation Integrity Tests were conducted during the drilling of Minerva-1 and the results were as follows:

Depth (m)	Casing Shoe (m)	Hole Size (inches)	Mud σ (sg)	Fracture Press (sg EMD)
560	550.0	12.25	1.09	2.13
1207	1189.0	8.50	1.13	1.94
2108	2108.0	6.00	1.15	1.85

No estimate can be made of the fracture pressure characteristics of the 36", 9.875" and 17.5" hole sections as there were no returns to surface.

Whilst drilling the 12.25" hole section, mud losses remained low and no partial or total loss of returns was encountered. The minimum fracture pressure of 2.13 sg was not exceeded at any time by the maximum circulating density of 1.14 sg. Some minor mud losses were encountered while running wireline logs in this section but were thought to be the product of mud invasion resulting from an overbalanced mud system.

The 8.5" hole section was drilled with no significant mud losses. At 1379 metres, a suspected partial loss of returns was flow-checked and circulation was made through the trip tank but it was found to be static. The minimum estimated fracture pressure of 1.72 sg EMD was never exceeded by the maximum equivalent circulating density of 1.20 sg.

The 6.0" hole section was drilled with no mud losses utilising a fluid density of 1.15 sg, with a maximum equivalent circulating density of 1.23 sg. This value was far below the minimum estimated fracture pressure of 1.85 sg EMD.

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. Plots of relevant pressure indicators and pressure estimates are detailed in the Drilling Data Pressure Plot in Appendix II and the Pressure Gradient Analysis Plot in Appendix III. Based on data from nearby wells, a normal pore pressure gradient of 1.03 sg EMD (8.6 ppg) was assumed for Minerva-1.

36.0", 9.875" and 17.5" Hole Sections

It was not possible to accurately monitor pore pressure through these sections as there were no returns to surface. However the DXC plot showed a normal trend through this interval and it is assumed that pore pressure remained normal at 1.03 sg EMD to 560 metres.

12.25" Hole Section

This section of the well showed a normal pore pressure regime to 1056 metres. Tight hole conditions were indicated with the presence of high torque and off-bottom drag, while connection gases appeared at 1081, 1110, 1139, 1168 and 1198 metres, with values of 0.19/0.08%, 0.68/0.25%, 0.24/0.2%, 1.43/0.2% and 0.33/0.21% respectively. The mud density was subsequently raised from 1.09 to 1.13 sg. On reaching casing point, overpull of 40 klb were noted and 2 bbls were swabbed. Dxc, temperature and resistivity values indicate a normally pressured regime existed. A slightly increasing background gas was noted. From the data obtained whilst drilling this hole section, the formation pressure was assumed to be normal. However, the electric logging runs over this interval (Sonic and resistivity) indicated the possibility of some over-pressuring.

8.5" Hole Section

The 8.5" hole section showed signs of over-pressuring with the occurrence of connection gases at 1363, 1393, 1422, 1452, 1481, 1509, 1539, 1568, 1626, 1685, 1742, 1771 and 1800 metres, with gas values of 0.04% to 0.1% above the background gas. Some overpressured and stress relief-type cavings were also seen at surface from 1680 metres. Indications of overpressure from the Dxc trend were visible but an attempt to quantify the pore pressure from the Dxc values was difficult as a PDC bit was being used. However, the pore pressure was estimated to be between 1.13 and 1.14+ sg EMD, and the mud density was initially raised to 1.17 sg. With the disappearance of connection gases and the stabilizing of the pressure indicators, the mud density was reduced to 1.15 sg. A return to normal pore pressure regime is believed to have occurred from 1941 to 2107 metres, based on the fact that the Dxc trend from a regular tri-cone bit showed a normal pressure trend while the background gas reduced significantly and remained low at around 0.08%, showing no increasing trend, coinciding with the absence of connection gases. Flow-checks made during drill breaks were static and there was no overpressured cavings present at the shakers. The temperature and resistivity readings also corroborated with this normal pressure trend.

From the RFT results, over-pressuring was indicated from 1650 to 1867 metres, with a maximum of 1.16 sg EMD, and reverting to a normal pore pressure regime from 1941 to 2107 metres.

6.0" Hole Section

The 6.0" hole section, from 2107 metres to 2425 metres TD, showed a normal pore pressure regime of 1.03 sg. Background gas was low at 0.05% and no connection gas was observed. The Dxc plot for this hole section generally showed a normal trend and deviations from the normal trend was mainly due to the bit type used e.g. PDC bit.

4. GEOLOGY AND SHOWS

Cuttings samples were collected at 5 metre intervals from the 13.375" casing shoe to the base of the 12.25" in hole section, from 565 to 1100 metres.

Cuttings were also collected at 3 metre intervals from 1100 to 2425 metres.

Samples from the following drilling depths were not collected due to excessively high drilling rates:

655, 680, 695, 710, 715, 725, 805, 815, 880, 895, 930, 1256, 1268, 1274, 1280, 1295, 1304, and 1364 metres.

The sample at 2069 metres was not collected due to the shaker screens being changed.

The lithologies seen in Minerva-1 are described below. For further descriptions see Appendix IX (Formation Evaluation Log).

Spud to 565.0 m: Returns to the sea floor

565-655 m: WANGERRIP GROUP
INTERBEDDED SANDSTONE AND MINOR CLAYSTONE

SANDSTONE: brown to dark brown and occasionally dark grey, friable with abundant loose grains, medium to coarse, occasionally very coarse, subrounded to rounded and moderately sorted. The grains are occasionally iron stained with trace amounts of a grey brown argillaceous matrix. Weak silica cement, common pyrite grains with occasional glauconite grains and fossil fragments. Visual porosity was poor.

CLAYSTONE: dark brown, soft to dispersive and was very arenaceous. Accessories included pyrite.

There were no oil shows in the Wangerrip Group. Maximum gas was 0.03%.

655-1816 m: SHERBROOK GROUP
INTERBEDDED SANDSTONE CLAYSTONE AND SILTSTONE

SANDSTONE 1: This upper sandstone was brown to reddish in colour and consisted of friable to loose, medium to very coarse quartz grains and very common red, brown, grey, and green lithics. It was poorly sorted with rounded to subangular grains with very rare red argillaceous matrix. There was very good visual porosity.

SANDSTONE 2: This middle to lower sandstone was light grey to grey with occasional grey and green grains. The sandstone consisted of friable to hard with depth, fine to medium and occasionally very fine to coarse grains of quartz with minor lithics. Many grains are loose, mostly subrounded to rounded and well sorted and have traces of silica and calcareous cement. There is trace to common white to grey very dispersive argillaceous matrix which is occasionally silty, trace to abundant glauconite grains and pellets, and trace to abundant pyrite aggregates. Poor to very poor porosity.

CLAYSTONE: light grey to dark grey to occasionally light grey brown to black. It was soft to firm, very dispersive, arenaceous and silty in part, common to trace black carbonaceous material and traces of light brown dolomite fragments in part.

SILTSTONE: dark grey to medium grey, moderately hard to hard, subfissile to massive with moderately strong siliceous cement. It was moderately arenaceous and moderately argillaceous in part with trace to common glauconite, trace dolomite, trace micromicaceous in part, and occasional fossil fragments in part.

Gas Peaks

Depth	Gas(%)	C1	C2	C3	IC4	NC4	C5
1649m	2.76	2.60	0.029	0.0178	0.0009	0.0026	-
1662m	4.06	3.20	0.045	0.0267	0	-	-
1811m	2.10	2.08	0.022	0.0116	0.0008	0.0019	-

There were no oil shows recorded in the Sherbrook Group. Maximum gas was 4.06%.

1816-2100 m: UPPER SHIPWRECK GROUP
SANDSTONE WITH MINOR INTERLAMINATED CLAYSTONE AND SILTSTONE

SANDSTONE: light grey to off-white with translucent to clear quartz grains. It consisted of friable to hard, very fine to very coarse grains which were dominantly medium to coarse. The grains are mostly subrounded to subangular and moderately to poorly sorted and have trace to common siliceous cement forming quartz overgrowths. There is trace to common very light grey argillaceous matrix, trace to common white kaolin, trace carbonaceous specks, and trace pyrite aggregates and cement. Fair to good inferred porosity.

CLAYSTONE: light grey to medium grey to occasionally dark grey. It was firm to moderately hard, massive to subblocky, very silty and arenaceous in part, trace to non-calcareous, common to trace black carbonaceous material and traces of pyrite.

SILTSTONE: dark grey to black, moderately hard to hard, subfissile to sub-blocky. There was traces of quartz sand, argillaceous in part with trace Carbonaceous specks.

Gas Peaks

Depth	Gas(%)	C1	C2	C3	IC4	NC4	C5
1823m	1.06	1.03	0.011	0.0049	0	-	-
1879m	1.02	1.017	0.011	0.0047	0	-	-
1883m	1.11	1.08	0.111	0.0071	0.0015	-	-
1890m	1.23	1.14	0.123	0.0075	0.0016	-	-
1908m	1.55	1.43	0.154	0.0074	0	-	-

No oil shows were recorded in the Upper Shipwreck Group. Maximum gas was 1.55%.

2100-2425 m: LOWER SHIPWRECK GROUP
INTERBEDDED SANDSTONE AND CLAYSTONE WITH MINOR SILTSTONE

ARGILLACEOUS SANDSTONE: light grey to off-white and occasionally light olive grey with translucent to clear quartz grains. The sandstone consisted of friable to hard, fine to coarse grains which were dominantly medium. The grains are mostly rounded to subangular and moderately to well sorted and have common to abundant white to light grey argillaceous matrix. There is trace to common pale green, brown, pale yellow, red, and black lithics, occasional siliceous and calcareous cement, trace to common white kaolin, trace carbonaceous specks, and trace pyrite aggregates and cement. Poor inferred porosity.

CLAYSTONE: light grey to medium grey. It was soft, amorphous, very dispersive, very arenaceous in part, common to trace black carbonaceous material, massive.

SILTSTONE: light to medium grey, moderately hard to hard, subfissile to blocky.

There were no oil or gas shows recorded in the Lower Shipwreck Group. Maximum gas was 0.35%.

Geology Summary: Minerva-1

DEPTH INTERVAL (mRT)	LITHOLOGY	ROP (m/hr)			TOTAL GAS (%)		CHROMATOGRAPH ANALYSIS (%)									
							C1 Methane		C2 Ethane		C3 Propane		C4 Butane		C5 Pentane	
		Min	Max	Avg	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
82 -?216	HEYTESBURY GROUP	20	352	138	0	0	-	-	-	-	-	-	-	-	-	-
?216 -?315	NIRRANDA GROUP	29	554	136	0	0	-	-	-	-	-	-	-	-	-	-
?315 - 655	WANGERRIP GROUP	3	580	188	0	0	-	-	-	-	-	-	-	-	-	-
655 - 1816	SHERBROOK GROUP	3	545	70	0	4.06	0	3.21	0	0.05	0	0.03	0	0.005	-	-
1816 - 2100	UPPER SHIPWRECK GROUP	1	53	11	0.19	1.55	0.12	1.43	0	0.02	0	0.008	0	0.002	-	-
2100 - 2425	LOWER SHIPWRECK GROUP	1	30	7	0.03	0.35	0.03	0.33	0	0.02	-	-	-	-	-	-

5. TESTING AND EVALUATION

a. Hydrocarbon Evaluation

Standard mudlogging techniques were utilized while drilling the Minerva-1 well. 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 and the data was continuously recorded on-line via the use of an Integrator. Carbon dioxide and hydrogen sulfide detectors were also run for the duration of the well. The drill cuttings, unwashed and washed were observed under ultra-violet light and cut with solvent to check for the presence of liquid hydrocarbons. Selected chromatograph data at certain depth intervals were used to produce gas ratio plots as an aid in interpreting any oil shows.

b. Wireline Logging

Depth (m)	Hole Diameter (inch)	LOGS
1204.0	12.25"	DLL-MSFL-BHC-SP-GR-CAL-AMS VSP CST (30 shot) (27 recovered)
2031.0	8.50"	DLL-MSFL-AS-AMS-GR-CAL FMS-CNL-LDL VSP RFT
2107.0	8.50"	DLL-MSFL-AS-AMS-GR-CAL CST (60 shots) (57 recovered)
2425.0	6.00"	DLL-MSFL-AS-AMS-GR-CAL FMS-CNL-LDL VSP RFT

c. Coring

Three successive fiberglass sleeved cores were cut in the 8.5" section of this well, from 1821 - 1847 metres.

CORE NUMBER	DEPTH INTERVAL (m)	RECOVERY (%)
1	1821.0 - 1828.0 m : 7.0 m	43
2	1828.0 - 1842.5 m : 14.5 m	92
3	1842.5 - 1847.0 m : 4.5 m	100

d. Measurement-While-Drilling (MWD).

MWD service was provided by Eastman-Teleco from 540-2107 metres. Data was regularly transferred to EXLOG's DrillByte computer and plotted against penetration rates. The data was submitted to BHPP on a daily basis. See Appendix IV for the MWD data plot.

e. Repeat Formation Testing

33 RFT pretests were performed in one run. Three (3) RFT samples were taken at 1649.8 metres, 1931.0 metres and 1942.5 metres.

Chromatograph analyses were performed on the gas samples and the results are tabulated in Table 6.

f. Drill Stem Test

Minerva-1 was tested using the Drill Stem Test (DST). The zone tested was from 1838-1816 metres.

DST-1 Chronology:

Time	Activity
08.04.93	
04:30	Rig up Wireline.
05:00	Prepare and run Perforating Gun #1.
07:03	Fire Perforating Gun (perforating 1838-1827 metres). POOH with wireline - 7 bbl gain.
07:17	Close upper annulars
07:30	Pump 7 bbls. Annular not closed. Gain in trip tank.
07:35	Open upper annular, close lower. Pumped 25 bbls - gained in trip tank.
08:12	Pump 10 bbls, gain 7 bbls in trip tank (2900 psi pump pressure). Bleed pressure from 2100 psi to 500 psi through choke.
08:30	Observe well.
09:22	Bleed pressure from 350 psi to 100 psi in 100 psi increments.
10:05	Pressure zero psi.
10:21	Open choke. Observe well.
10:23	Open upper annular.
10:24	Open lower annular. Observe well. Well static.
10:30	POOH with Schlumberger. Well static.
13:00	Make up bit and BHA and RIH to 1815 metres. Break circulation at 989 metres.
16:30	Circulate and increase mud density to 1.17 sg. Flow-check. Maximum gas 5.35%. Bottoms-up gas 1.14%. Spot 20 bbl hi-vis pill and flow-check - OK.
19:15	POOH. Hole took correct displacement.
21:30	Rig up and run 3.5" tubing.

09.03.93

00:00	Continue make up and rack back in derrick 3.5" tubing.
03:30	Rig up Schlumberger.
04:00	Prepare and run Perforating Gun #2.
06:31	Fired Perforating Gun #2 (perforations 1827.5 -1825 metres and 1821 - 1816 metres).
08:18	POOH with perforating guns and lay out same.
08:45	Prepare and run Baker Packer Assembly "A".
11:12	Set Baker Packer "A" at 1800 metres. Monitor hole on trip tank. Losses 1 bbl/hr.
12:00	POOH with wireline and rig down Schlumberger.
13:00	Make up test string and RIH.
15:30	Pressure test HRS surface equipment and test tools to 3500 psi for 10 minutes. OK.
16:45	Continue RIH whilst make up 3.5" tubing to 870 metres.
19:00	Rig up and test tubing to 3500 psi for 10 minutes.
19:30	Continue to RIH whilst making up 3.5" tubing.

10.04.93

00:15	Pressure-test tubing and test valve to 3500 psi.
01:00	Paint 3 joints. Continue to RIH with 3.5" tubing.
02:00	Increase flow from tubing string. Install TIW valve.
03:00	Rig up to reverse-circulate.
03:17	Close annular. Reverse-circulate - max gas 18.4%. Continue circulate for 300 stks until brine at 1.17 sg throughout hole. Shut down pump and observe well. Static.
05:00	Continue RIH. Stab into packer.
06:00	Close annular, shear TST, cycle OMNI valve and test packer to 1300 psi.
06:30	POOH for space out calculations.
07:00	Trip 3 stands to confirm space out calculations.
07:30	Run upper test string.
11:00	Rig up extended bails for lubricator.
11:30	Pick up flow head.
12:00	Rig up coflex hose and kill line.
12:30	Rig up HRS on rig floor and test shear rams. Close upper pipe rams. Test surface equipment. Function test OMNI valve to blank and pressure-test from OMNI to choke.
15:00	Function OMNI several times to circulate port and displace 20 bbls diesel.
15:15	Function OMNI to Position 1. Held safety meeting.
15:45	Open lower pipe rams and function OMNI pressure to 2300 psi to shear lower pipe ram pins. Bleed off pressure up annulus to 1300 psi and open well to flow to starboard side burner boom.
19:00	Shut in well. Bleed off. Lower pipe ram not closing. Pressure up to 2500 psi and hold for 10 minutes.
19:26	Bleed off. Well shut in. Monitor trip tank.

11.04.93

00:00 Well shut in. Continue monitor trip tank.
03:19 Open well to port side burner boom. Maintain 1300 psi on annulus.
15:40 Wind change. Change flow to starboard burner boom. Maintain 1300 psi annulus pressure.

12.04.93

03:20 Shut in well. Monitor well on trip tank. Monitor annulus pressure (0 psi).

13.04.93

03:30 Cycle OMNI valve
04:15 Reverse-circulate with rig pumps to HRS choke and separator.
04:30 Rig up Halliburton. Open variables. Pump 10 bbls mud.
05:00 Close variables. Cycle OMNI valve to well test position.
05:15 Bull head. Pump 12 bbl into formation. Maximum pressure 2000 psi.
06:00 Cycle OMNI valve. Pump down string to check that OMNI open.
07:00 Open variables.
07:15 Observe well.
08:00 Circulate bottoms-up. Maximum gas 1.55%
10:00 Rig down flow head, coflex hose and kill line.
10:30 Observe well for 10 minutes - OK. POOH with 3.5" tubing.

uring the testing gas was collected from the HRS separator and analysed. The averaged results were as follows:

Gas	ppm	%
C_1	190200	95.5
C_2	4281	2.1
C_3	3142	1.6
IC_4	606	0.3
NC_4	778	0.4
C_5	235	0.1

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

In addition, data was transmitted by modem, on a daily basis, to a Drillbyte system in BHPPs Melbourne office.

On completion of Minerva-1, all charts, worksheets, raw data and data disks were forwarded to EXLOG Australia. Four (4) copies of the Final Well Report were compiled, with EXLOG Australia retaining one (1) copy, as well as all relevant data.

EXLOG Australia will use all reasonable diligence to maintain and store the listed items in a manner to reasonably prevent damage or loss. Provided, however, EXLOG Australia 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 EXLOG Australia its employees.

TABLES

Table 1: Survey Data

Depth m	Inclination deg	Azimuth deg
560	1.0	-
572	0.6	265.8
719	0.4	216.2
863	0.6	202.9
1038	1.5	214.1
1180	2.5	201.8
1265	3.7	203.6
1296	4.0	211.0
1385	4.8	200.8
1473	5.4	206.0
1559	6.0	216.0
1671	6.8	196.0
1733	7.4	192.7
1791	7.6	187.8
1880	7.6	185.7
1908	7.6	183.2
1937	7.6	182.1
1966	8.2	177.6
1995	8.6	175.5
2020	8.8	173.0
2050	8.9	170.5
2081	9.0	165.3

Table 2: Casing and Cementing Summary

Hole Depth m	Hole Size in	Casing Size Nom in	ID in	Weight ppf	Shoe Depth m	Joints Run	Cement Details
115	36.00	30.000	29.000	310	114	3	351sx 'G' cement @ 1.89 sg (15.8 ppg) + 2% CaCl
560	17.50	13.375	12.347	68	549	39	Lead: 635 sx Class 'G' cement @ 1.50 sg (12.5 ppg) + 0.45 gal/sx Econolite Tail: 502 sx Class 'G' neat slurry @ 1.90 sg (15.8 ppg) Displaced with 220 bbl seawater
1204	12.25	9.375	8.681	47	1189	74	311 sx Class 'G' cement Neat @ 1.89 sg (15.8ppg) displaced with 10 bbl drilling water + 260 bbl drillmud
2108	8.50	7.000	6.184	29	2108	84	Lead: 173 sx Class 'G' cement @ 1.58 sg (13.2 ppg) + 16.8 gals DEFOAMER + 63 gals HALAD322L + 50 bbls mixwater Tail: 132 sx Class 'G' neat slurry @ 1.89 sg (15.7 ppg) + 15 bbls mixwater + 21.5 gals HALAD322L

Table 3: 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
560	1.03	Seawater with Guar Gum Hi-Vis sweeps used for the 36.0, 9.875, 17.5" hole sections															
748	1.09	50	17	19	5/12	6.0	1.0	5.5	-	0.25	8.0	9.1	31.0	120	32.0	6.1	0.99
1130	1.10	58	18	22	8/14	5.5	1.0	6.0	-	0.50	10.0	9.0	25.0	200	26.3	5.0	-
1203	1.13	50	18	21	6/14	5.0	1.0	6.6	-	0.25	12.0	9.0	27.0	160	27.7	5.4	-
1320	1.12	48	16	18	5/8	4.8	1.0	6.8	-	Tr	12.0	9.7	27.0	400	29.6	5.6	0.81
1635	1.15	52	20	25	10/21	5.0	1.0	7.6	-	Tr	14.0	9.2	25.0	320	25.0	4.8	0.81
1745	1.17	56	18	26	8/28	5.5	1.0	8.5	-	Tr	15.0	9.0	34.0	240	30.5	5.8	-
1828	1.16	50	20	20	4/20	6.0	-	9.9	-	Tr	17.5	9.0	35.0	230	30.0	5.7	0.81
1842	1.17	50	15	20	4/18	6.0	1.0	9.1	-	Tr	17.5	9.0	34.0	200	23.0	4.4	1.10
1921	1.15	46	12	16	4/25	5.5	1.0	9.4	-	Tr	15.0	9.0	45.0	170	36.0	6.9	1.10
1971	1.15	46	12	15	5/25	5.5	1.0	9.4	-	Tr	15.0	9.5	45.0	120	37.0	7.1	1.10
2031	1.13	45	12	18	5/25	5.5	1.0	8.0	-	-	15.0	9.5	45.0	120	34.0	6.5	1.10
2084	1.15	43	12	16	3/15	5.0	1.0	8.5	-	0.1	13.0	8.5	51.0	230	40.7	7.8	1.10
2107	1.15	45	17	20	4/14	4.6	1.0	8.5	-	0.1	13.0	9.4	49.0	120	37.0	7.1	1.10
2131	1.15	45	12	16	3/7	5.0	1.0	8.5	-	Tr	11.0	8.6	45.0	100	34.6	6.6	1.10
2140	1.15	43	14	16	3/7	4.8	1.0	8.5	-	Tr	11.0	9.4	45.0	180	36.0	6.8	1.20
2209	1.15	45	15	18	5/8	4.5	1.0	8.5	-	Tr	10.0	8.9	49.0	280	43.0	8.1	1.38
2248	1.16	45	15	18	5/8	5.2	1.0	8.5	-	Tr	10.0	9.0	49.0	240	41.2	7.8	1.38
2295	1.15	42	14	17	4/6	5.4	1.0	8.6	-	Tr	10.0	9.0	49.0	240	42.0	7.8	1.35
2362	1.15	46	15	19	5/9	5.0	1.0	8.6	-	Tr	11.0	9.2	49.0	240	39.0	7.5	1.33
2425	1.15	46	15	21	5/9		1.0	8.6	-	Tr	11.0	9.1	49.0	120	36.5	6.9	1.31

Table 4: Bit Record

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	NB1	Security H/O	S3J	26.00 36.00	111 111	24,24,24 CJx20,4x20	82.0	23.0	0.65	35.38	0-10	75-80	250-470	1150	1180	2-2-WT-A-1-I-NO-TD
2	NB2	Security	S44GF	9.875	137	3x16	105.0	455.0	3.53	128.9	0-17	100-120	40-119	1770	760	2-2-WT-A-E-I-NO-TD
3	RR1.1	Security H/O	S3J	26.00 36.00	111 111	24,24,24 CJx20,4x20	Open up 9.875" hole to 36.0" from 105-115m									2-2-WT-A-1-1-NO-TD
4	NB3	Security	SS44G	17.50	135	18,18,18	Open up 9.875" hole to 17.50" from 115-560m									1-1-NO-A-E-1-NO-TD
5	NB4	HTC	ATM11HG	12.25	437	13,16,18	560.0	644.0	22.47	28.66	10-40	120-140	200-450	2850	755	2-3-FC-H-E-1-EC-TD
6	NB5	Security	SS44G	8.50	135	OPEN	1204.0	5.0	3.35	1.5	20-25	76-81	75-152	650	430	6-2-BC-N-1-I-BU-PR
7	NB6	Hycalog	DS61H	8.50		3x12,11,10	1209.0	612.0	24.23	43.0	0-18	75-180	200-560	2300	530	3-8-RO-N-D-I-FC-CP
8	CB1	DBS	CD93	8.50		9x9	1821	7.0	1.0	7.0	6-27	70-144	158-421	750	274	4-4-BT-S-D I-CT-PR
9	CB2	DBS	CB303	8.50			1828	14.5	7.0	2.07	18-28	110-150	119-376	1100	304	0-8-RO-S-D I-NO-PR
10	CB3	DBS	CD502	8.5		9x9	1842.5	4.5	1.13	4.0	8-16	72-114	128-386	420	199	0-8-RO-S-E I-CT-PR
11	NB7	HTC	ATM22	8.5	517	3x12	1847	184.0	18.82	9.8	7-29	91-141	132-608	2500	458	8-8-BT-H-8 2-FC-PR
12	NB8	HTC	ATM33	8.5	537	3x12	2031	76.0	8.15	9.2	17-31	97-103	106-519	2600	467	1-1-NO-A-E-I-NO-FM
13	NB9	Security	H77SG	8.5	335	OPEN JETS WIPER TRIP										4-5-WT-A-6-I-NO-TD
14	RR9.1	Security	H77SG	8.5	335	SCRAPER RUN										4-5-WT-A-6-I-NO-TD
15	RR9.2	Security	H77SG	8.5	335	WIPER TRIP										4-5-WT-A-6-I-NO-TD
16	RR5.1	Security	SS44G	8.5	135	REAM OUT CEMENT										8-3-BC-N-1 I-BU-BHA
17	NB10	HTC	J3	6.0	136	DRILL CEMENT										2-2-WT-A-1 I-NO-DP

Table 4: Bit Record cont'd..

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
18	RR10.1	HTC	J3	6.0	136	3x12	2107	24.0	8.08	3.0	10-17	41-64	106-321	2170	261	8-8-WT-A-2 2-NO-TQ
19	NB11	Hycalog	DS46HG6	6.0	PDC	3x11	2131	78.0	8.08	9.6	5-13	75-110	100-240	2700	265	8-8-LC-NS-D -I-WC-PR
20	NB12	HTC	ATJ44C	6.0	627	3x11	2209	86.0	17.77	4.8	14-23	67-87	100-200	1500	242	4-5-WT-A-E -I-PT-HR
21	NB13	SMITH	F3	6.0	537X	3x11	2295	130.0	23.50	5.5	20-25	71	100-180	1800	255	4-4-WT-A-4- 1-BT-TD

Note : Gauge in 1/16"

Table 5: Hydraulics Summary

Bit #	Depth m	Hole Size in	Jets	MW sg	PV/YP	Flow Rate gpm	ECD sg	Annular Velocities m/min Min	DP	DC	Crit	Jet Vel m/sec	HHP hp	Impact Force lbf	Loss Bit psi	Pump Pres psi	%Bit Loss
NB2	560	9.875	16,16,16	1.03	1/1	760	1.06	5	80	170	27	126	584	1401	1317	1770	75
NB3	560	17.500	18,18,18	1.03	1/1	1080	1.03	11	29	37	26	142	1046	2235	1661	2700	62
NB4	765 1204	12.25	13,16,18	1.09 1.13	17/18 18/21	753 755	1.10 1.14	15 16	46 46	69 69	118 127	128 129	632 660	1492 1555	1439 1499	2600 2850	55 53
NB5	1208	8.50	Open	1.13	19/20	377	1.18	8	57	94	164	16	5	95	22	500	5
NB6	1329 1747	8.50	12,12,12 11,10	1.12 1.16	16/18 19/24	485 530	1.18 1.23	10 11	74 86	121 132	151 175	95 104	228 308	730 903	807 998	2000 2300	40 43
CB1	1828	8.50	9x9	1.17	18/26	274	1.22	5.6	44	65	171	48	334	216	602	750	29
CB2	1842	8.50	3x9,2x10	1.17	20/20	303	1.22	6.2	48	85	171	104	180	524	1019	1500	70
CB3	1847	8.50	9x9	1.15	15/18	108	1.17	2.2	17	27	153	19	2	33	33	200	17
NB7	1971	8.50	3x12	1.15	15/18	457	1.20	9.4	73	113	146	135	448	1005	1681	2500	67
NB7	2031	8.50	3x12	1.13	12/18	458	1.19	9.4	73	114	146	135	451	1010	1688	2500	68
NB8	2107	8.50	3x12	1.15	17/20	467	1.19	9.6	48	116	163	138	477	1050	1755	2600	68
R10.1	2131	6.0	3x12	1.15	12/16	261	1.20	5.4	40	145	155	77	83	328	548	2170	39
NB11	2209	6.0	3x11	1.15	12/16	263	1.22	5.4	40	146	155	92	121	396	788	1692	47
NB12	2295	6.0	3x11	1.15	14/16	242	1.22	5.0	37	134	163	85	92	335	667	1563	43
NB13	2362 2425	6.0	3x11	1.15 1.15	15/18 15/18	252 255	1.23 1.23	5.2 5.2	38 39	140 142	174 174	88 90	106 110	364 372	724 748	1722 1769	42 42

Table 6: Preliminary Open Hole RFT Results

KB: 25.0 m
Date: 23/3/1993

Test No.	Depth mTVDDF	Depth mTVDSS	Formation Pressure: Strain Gauge psig	Formation Pressure: HP Gauge psia	Temp. °C	Comments
	1161.7	1136.7	0		58.8	Good test on casing
1	1651.5	1626.5	0	13.0		Tight
2	1650.8	1625.8		--	79.8	Tight
3	1649.8	1624.8	2678.9	2694.59	80.2	Good Test
4	1662.8	1637.8	2689.8	2705.43	80.7	Good Test
5	1662.2	1637.2	2739.9	2755.80	81.0	Possible lost seal
6	1666.5	1641.5	2740.5	2756.55	81.3	Possible lost seal
7	1666.8	1641.8		--	81.4	Tight
8	1817.0	1792.0	2709.5	2725.09	87.1	Good Test
9	1829.5	1804.5	2711.5	2726.08	87.2	Good Test
10	1838.0	1813.0	2713.1	2728.28	87.5	Good Test
11	1845.0	1820.0	2714.3	2829.17	88.3	Good Test
12	1867.0	1842.0	2718.3	2733.38	89.6	Good Test
13	1875.5	1850.5	2719.3	2733.96	90.4	Good Test
14	1884.5	1859.5	2721.2	2736.13	91.1	Good Test
15	1890.6	1865.6	2722.3	2737.20	91.9	Good Test
16	1906.5	1881.5	2724.5	2739.36	92.6	Good Test
17	1919.0	1894.0	2726.7	2741.91	93.3	Good Test
18	1923.8	1898.8	2727.7	2742.19	94.1	Good Test
19	1931.0	1906.0	2728.6	2743.36	94.0	Good Test
20	1935.7	1910.7	2729.9	2744.70	94.5	Good Test
21	1937.6	1912.6	2730.0	2744.80	94.4	Good Test
22	1939.5	1914.5	2730.6	2745.70	94.7	Good Test
23	1942.8	1917.8	2730.3	2746.01	95.0	Good Test
24	1949.2	1924.2	2738.2	2752.48	95.6	Good Test
25	1941.9	1916.9	2731.2	2745.86	95.6	Good Test
26	1939.5	1914.5	2730.9	2745.92	95.2	Good Test
27	1941.0	1916.0	2730.4	2745.22	95.4	Good Test
28	1951.5	1926.5	2741.0	2755.98	95.4	Good Test
29	1953.2	1928.2	2743.5	2758.30	95.6	Good Test
30	1959.2	1934.2	2751.9	2766.66	96.0	Good Test
31	1966.2	1941.2	2761.7	2775.91	96.4	Good Test
32	1972.2	1947.2	2769.9	2784.55	96.6	Good Test
33	1992.0	1967.0	2797.2	2811.95	97.4	Good Test

RFT Sample Data Sheet (PRELIMINARY)

Well:	Minerva-1
Date:	21 March 1993
KB :	25.0 m
Sample No:	1
Depth :	1931.0 mAHKB
TVDSS :	1901.7 m
Formation Pressure:	2743.36 psia

Chamber No: RFS-1227	Lower	Upper	
Chamber Size:	6	1	gal
Time To Fill:	25	6	minutes
Opening Pressure:	1850	1800	psig
Gas Volume:	113		ft^3
Total Liquids:	570		cc
Oil/Condensate Volume:	15		cc
Filtrate/Water Volume:	555		cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:	0.8		Stb/MMscf
Oil/Condensate Analysis			
Specific Gravity:	Too small to measure		
Colour:	Too small to measure		
Fluorescence:	Bright Blue		

Gas Analysis:	
C1:	81.57 %
C2:	6.70 %
C3:	8.84 %
iC4:	1.31 %
nC4:	1.34 %
C5+:	0.230 %
CO2:	1.8 %
H2S:	0 ppm

Water/Filtrate Analysis:		
	Lower	
Rw:	0.134	
pH:Logged		
Cl-:		
Total Hardness (Ca/Mg):		
KCl:	24000	mg/l
Tritium Analysis:		
Average Activity:	N/A	Bq/cc
Returns:		
% Filtrate:		

RFT Sample Data Sheet (PRELIMINARY)

Well:	Minerva-1
Date:	22 March 1993
KB :	25.0 m
Sample No:	2
Depth:	1942.5 mAHKB
TVDSS:	1938.1 m
Formation Pressure:	2746.3 psia

Chamber No: RFS-1157	Lower	Upper	
Chamber Size:	6	1	gal
Time To Fill:	50	10	mins
Opening Pressure:	2050	2000	psig
Gas Volume:	78		ft^3
Total Liquids:	830		cc
Oil/Condensate Volume:	20		cc
Filtrate/Water Volume:	810		cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:	1.6		Stb/MMscf

Oil/Condensate Analysis

Specific Gravity:	Too small to measure
Colour:	Too small to measure
Fluorescence:	Bright Blue

Gas Analysis:

C1:	79.92 %
C2:	6.41 %
C3:	9.40 %
iC4:	1.35 %
nC4:	2.20 %
C5+:	0.71 %
CO2:	2.0 %
H2S:	0 ppm

Water/Filtrate Analysis:

	Lower	Drilled	
Rw:		0.084	
pH:	6.8		
Cl-:	42000		
Total Hardness (Ca/Mg):			
KCl:	38000	25000	mg/l

RFT Sample Data Sheet (PRELIMINARY)

Well:	Minerva-1
Date:	23 March 1993
KB :	25.0 m
Sample No:	3
Depth:	1649.8 mAHKB
TVDSS:	1647.9 m
Formation Pressure:	2694.59 psia

Chamber No: RFS-AD-11	Lower	Upper	
Chamber Size:	6	1	gal
Time To Fill:	25	6	minutes
Opening Pressure:	2100	2100	psig
Gas Volume:	77.7		ft^3
Total Liquids:	7500		cc
Oil/Condensate Volume:			cc
Filtrate/Water Volume:			cc
Gas Oil Ratio:	--		Scf/Stb
Condensate Gas Ratio:			Stb/MMscf

Oil/Condensate Analysis	
Specific Gravity:	Too small to measure
Colour:	Too small to measure
Fluorescence:	Blue/White

Gas Analysis:		
C1:	89.67	%
C2:	4.49	%
C3:	4.27	%
iC4:	0.65	%
nC4:	0.72	%
C5+:	0.190	%
CO2:	0.6	%
H2S:	0	ppm

Water/Filtrate Analysis:	Lower	
Rw	0.089	
pH:	6.4	
Cl-:	45000	
Total Hardness (Ca/Mg):		
KCl:	42000	mg/l

Tritium Analysis:

Average Activity:	N/A
% Filtrate:	

APPENDIX VI: Drilling Data Printout

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
8th March 1993																			
NB #1 SEC 26" with 36" H/O 3x24																			
12:10:06	84.0	23.6	0.2	47	187	234	495		1.03	0.00	17.4	0.0	82.0	668	2.0	0:06	1.03	0.35	0.00
12:26:34	85.0	26.7	0.1	69	302	290	472		1.03	0.00	17.4	0.0	82.0	670	3.0	0:08	1.03	0.42	0.00
12:27:12	86.0	88.3	1.4	74	273	290	492		1.03	0.00	17.4	0.0	82.1	670	4.0	0:09	1.03	0.44	0.00
12:28:15	87.0	55.5	2.0	75	300	294	518		1.03	0.00	17.4	0.0	82.1	670	5.0	0:10	1.03	0.43	0.00
12:29:08	88.1	74.6	1.0	75	351	980	1036		1.03	0.00	17.4	0.0	82.2	671	6.1	0:11	1.03	0.38	0.00
12:29:58	89.0	68.2	1.4	74	404	1113	1056		1.03	0.00	17.4	0.0	82.3	670	7.0	0:11	1.03	0.41	0.00
12:31:00	90.0	63.0	5.9	67	448	1120	1051		1.03	0.00	17.4	0.0	82.4	669	8.0	0:13	1.03	0.43	0.00
12:31:47	91.1	88.7	4.8	74	311	1122	1051		1.03	0.00	17.4	0.0	82.4	669	9.1	0:13	1.03	0.44	0.00
12:32:22	92.1	55.7	4.4	76	284	1120	1041		1.03	0.00	17.4	0.0	82.5	669	10.1	0:14	1.03	0.39	0.00
12:32:44	93.1	48.3	4.6	76	240	1120	1046		1.03	0.00	17.4	0.0	82.5	670	11.1	0:14	1.03	0.33	0.00
12:33:32	94.0	63.5	7.5	75	297	1118	1051		1.03	0.00	17.4	0.0	82.6	669	12.0	0:15	1.03	0.43	0.00
12:35:14	95.0	35.1	6.2	75	273	1120	1056		1.03	0.00	17.4	0.0	82.8	668	13.0	0:17	1.03	0.54	0.00
12:37:18	96.0	37.4	5.3	75	248	1120	1061		1.03	0.00	17.4	0.0	83.1	669	14.0	0:19	1.03	0.61	0.00
12:39:08	97.0	34.6	6.7	76	278	1119	1051		1.03	0.00	17.4	0.0	83.4	669	15.0	0:21	1.03	0.62	0.00
12:41:38	98.0	29.0	6.8	76	229	1120	1080		1.03	0.00	17.4	0.0	83.8	669	16.0	0:23	1.03	0.66	0.00
12:43:59	99.0	28.6	7.3	76	256	1120	1066		1.03	0.00	17.3	0.0	84.0	670	17.0	0:25	1.03	0.67	0.00
12:46:01	100.1	30.0	7.5	75	253	1120	1027		1.03	0.00	17.3	0.0	84.3	669	18.1	0:28	1.03	0.63	0.00
12:47:41	101.0	37.2	7.4	76	261	1120	1052		1.03	0.00	17.3	0.0	84.5	669	19.0	0:29	1.03	0.61	0.00
12:50:09	102.0	24.8	7.2	76	224	1120	1045		1.03	0.00	17.3	0.0	84.8	668	20.0	0:32	1.03	0.66	0.00
12:52:04	103.0	29.6	7.1	76	250	1120	1034		1.03	0.00	17.3	0.0	85.0	669	21.0	0:34	1.03	0.63	0.00
12:57:09	105.1	23.4	6.7	76	231	1120	1052		1.03	0.00	17.3	0.0	92.3	669	23.1	0:39	1.03	0.69	0.00

POOH. RIH and drill 9.875" pilot hole.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
9th March 1993																			
NB #2 SEC 9.875 3x16																			
05:46:38	107.0	135.6	6.6	51	50	1610	711		1.03	0.00	17.7	0.0	97.1	666	2.0	0:00	1.32	0.38	0.00
05:47:28	108.0	37.4	7.4	63	50	1617	730		1.03	0.00	17.7	0.0	97.3	666	3.0	0:01	1.48	0.51	0.00
05:49:15	109.1	32.8	6.3	72	48	1619	743		1.03	0.00	17.7	0.0	97.7	666	4.1	0:03	1.64	0.58	0.00
05:50:05	110.0	64.9	7.2	77	54	1623	762		1.03	0.00	17.7	0.0	97.9	665	5.0	0:04	1.79	0.45	0.00
05:51:22	111.0	47.7	8.1	77	50	1623	764		1.03	0.00	17.6	0.0	98.2	666	6.0	0:05	1.95	0.47	0.00
05:52:28	112.0	60.2	7.2	79	49	1630	775		1.03	0.00	17.6	0.0	98.5	665	7.0	0:06	2.12	0.40	0.00
05:54:14	113.0	52.5	7.0	118	48	1723	769		1.03	0.00	17.5	0.0	98.9	666	8.0	0:08	2.24	0.44	0.00
05:54:49	114.0	120.7	8.9	120	59	1755	763		1.03	0.00	17.5	0.0	99.0	667	9.0	0:09	2.34	0.34	0.00
05:55:11	115.1	174.6	13.1	121	66	1760	759		1.03	0.00	17.5	0.0	99.1	666	10.1	0:09	2.51	0.30	0.00
05:55:33	116.1	219.2	11.3	121	65	1760	764		1.03	0.00	17.5	0.0	99.2	666	11.1	0:09	2.65	0.25	0.00
05:55:58	117.1	142.6	10.9	121	53	1760	772		1.03	0.00	17.5	0.0	99.3	666	12.1	0:10	2.79	0.28	0.00
06:12:42	118.0	54.2	6.3	53	52	1780	783		1.03	0.00	17.5	0.0	102.5	657	13.0	0:12	3.11	0.24	0.00
06:13:45	119.0	78.9	4.7	115	59	1771	817		1.03	0.00	17.3	0.0	103.0	657	14.0	0:13	3.17	0.25	0.00
06:14:22	120.2	139.9	6.2	120	70	1777	817		1.03	0.00	17.3	0.0	103.3	656	15.2	0:13	3.29	0.22	0.00
06:14:43	121.1	181.0	9.5	120	77	1778	814		1.03	0.00	17.3	0.0	103.4	656	16.1	0:14	3.39	0.20	0.00
06:15:05	122.0	156.4	9.1	120	68	1773	810		1.03	0.00	17.3	0.0	103.6	657	17.0	0:14	3.51	0.21	0.00
06:15:27	123.1	243.4	10.5	120	78	1773	808		1.03	0.00	17.3	0.0	103.7	657	18.1	0:15	3.62	0.17	0.00
06:15:46	124.1	187.1	11.3	120	70	1770	808		1.03	0.00	17.3	0.0	103.9	657	19.1	0:15	3.76	0.19	0.00
06:16:08	125.1	206.6	8.9	120	68	1770	812		1.03	0.00	17.3	0.0	104.0	656	20.1	0:15	3.91	0.17	0.00
06:16:28	126.2	235.4	9.9	120	77	1770	816		1.03	0.00	17.3	0.0	104.2	657	21.2	0:15	4.04	0.15	0.00
06:16:55	127.1	352.0	8.8	120	66	1770	819		1.03	0.00	17.3	0.0	104.4	657	22.1	0:16	4.13	0.12	0.00
06:17:28	128.1	140.4	9.0	120	69	1770	808		1.03	0.00	17.3	0.0	104.6	657	23.1	0:16	4.20	0.18	0.00
06:17:44	129.1	231.5	12.3	120	79	1770	807		1.03	0.00	17.3	0.0	104.7	657	24.1	0:16	4.33	0.15	0.00
06:18:06	130.1	185.6	10.5	120	61	1767	813		1.03	0.00	17.3	0.0	104.9	657	25.1	0:17	4.50	0.15	0.00
06:18:26	131.0	166.2	9.7	120	71	1767	820		1.03	0.00	17.2	0.0	105.0	657	26.0	0:17	4.62	0.15	0.00
06:18:48	132.1	198.4	10.9	120	72	1766	822		1.03	0.00	17.3	0.0	105.2	657	27.1	0:17	4.77	0.14	0.00
06:19:10	133.0	207.4	10.7	120	72	1768	820		1.03	0.00	17.3	0.0	105.3	652	28.0	0:18	4.81	0.14	0.00
06:19:45	134.0	175.7	9.3	120	61	1772	811		1.03	0.00	17.2	0.0	105.6	650	29.0	0:18	4.87	0.14	0.00
06:20:13	135.1	152.8	10.6	120	67	1787	813		1.03	0.00	17.2	0.0	105.8	650	30.1	0:19	5.07	0.15	0.00
06:20:41	136.2	160.9	10.6	120	60	1764	822		1.03	0.00	17.2	0.0	106.0	650	31.2	0:19	5.26	0.14	0.00
06:21:02	137.0	138.3	11.1	120	71	1762	824		1.03	0.00	17.3	0.0	106.1	650	32.0	0:19	5.30	0.15	0.00
06:21:27	138.2	197.7	11.5	120	72	1765	817		1.03	0.00	17.2	0.0	106.3	650	33.2	0:20	5.27	0.13	0.00
06:21:49	139.0	121.4	11.2	120	63	1763	814		1.03	0.00	17.2	0.0	106.5	650	34.0	0:20	5.24	0.16	0.00
06:22:17	140.0	135.3	10.9	120	69	1760	819		1.03	0.00	17.3	0.0	106.7	650	35.0	0:21	5.31	0.15	0.00
06:22:47	141.0	192.6	8.3	120	63	1760	827		1.03	0.00	17.3	0.0	106.9	650	36.0	0:21	5.32	0.12	0.00
06:23:20	142.1	123.1	10.1	120	72	1757	830		1.03	0.00	17.2	0.0	107.1	648	37.1	0:22	5.32	0.15	0.00
06:23:49	143.1	119.7	8.4	120	59	1750	836		1.03	0.00	17.3	0.0	107.4	640	38.1	0:22	5.37	0.15	0.00
06:24:17	144.0	162.8	8.0	120	62	1773	841		1.03	0.00	17.2	0.0	107.5	639	39.0	0:22	5.35	0.13	0.00
06:35:32	145.1	135.3	6.5	117	58	1770	814		1.03	0.00	17.2	0.0	109.7	640	40.1	0:23	1.08	0.67	0.00
06:35:56	146.0	141.8	8.1	116	84	1779	776		1.03	0.00	17.2	0.0	110.0	639	41.0	0:24	1.08	0.67	0.00
06:36:18	147.1	178.7	11.0	116	95	1785	784		1.03	0.00	17.3	0.0	110.4	640	42.1	0:24	1.08	0.65	0.00
06:36:33	148.0	209.7	11.4	116	81	1789	785		1.03	0.00	17.3	0.0	110.6	640	43.0	0:24	1.08	0.61	0.00
06:36:55	149.2	218.2	10.4	116	85	1790	787		1.03	0.00	17.2	0.0	111.0	640	44.2	0:25	1.08	0.59	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg	deg	C	m	bbl	mts	hh:mm	sg		%
06:37:14	150.2	164.0	12.2	116	86	1796	797		1.03	0.00	17.2	0.0	111.3	640	45.2	0:25	1.09	0.68	0.00
06:37:35	151.1	137.0	8.9	116	76	1797	814		1.03	0.00	17.2	0.0	111.6	639	46.1	0:25	1.09	0.69	0.00
06:38:00	152.2	156.2	9.1	118	79	1794	831		1.03	0.00	17.2	0.0	112.1	641	47.2	0:26	1.09	0.66	0.00
06:38:20	153.1	164.0	10.7	119	80	1795	839		1.03	0.00	17.2	0.0	112.4	640	48.1	0:26	1.09	0.67	0.00
06:38:42	154.1	167.3	9.0	119	84	1792	839		1.03	0.00	17.2	0.0	112.8	639	49.1	0:26	1.09	0.64	0.00
06:39:07	155.2	201.5	9.5	119	73	1798	837		1.03	0.00	17.2	0.0	113.2	640	50.2	0:27	1.10	0.60	0.00
06:39:31	156.0	139.3	8.8	119	76	1800	838		1.03	0.00	17.2	0.0	113.6	640	51.0	0:27	1.10	0.68	0.00
06:39:50	157.0	169.7	10.8	119	81	1800	838		1.03	0.00	17.2	0.0	113.9	640	52.0	0:27	1.10	0.66	0.00
06:40:15	158.1	134.4	9.8	119	74	1799	832		1.03	0.00	17.2	0.0	114.3	640	53.1	0:28	1.10	0.70	0.00
06:40:49	159.1	126.4	8.1	119	65	1798	827		1.03	0.00	17.2	0.0	114.8	640	54.1	0:28	1.10	0.70	0.00
06:41:18	160.0	131.4	8.1	119	77	1800	833		1.03	0.00	17.2	0.0	115.3	640	55.0	0:29	1.10	0.69	0.00
06:41:44	161.1	129.7	7.9	119	63	1800	836		1.03	0.00	17.2	0.0	115.8	640	56.1	0:29	1.10	0.69	0.00
06:42:10	162.2	177.8	9.5	119	76	1799	832		1.03	0.00	17.2	0.0	116.2	638	57.2	0:30	1.10	0.63	0.00
06:42:31	163.0	158.7	9.3	119	85	1798	825		1.03	0.00	17.2	0.0	116.6	630	58.0	0:30	1.10	0.66	0.00
06:42:53	164.0	178.5	9.5	119	81	1798	821		1.03	0.00	17.2	0.0	116.9	623	59.0	0:30	1.10	0.63	0.00
06:43:20	165.1	328.4	8.4	119	66	1794	823		1.03	0.00	17.2	0.0	117.4	623	60.1	0:31	1.10	0.47	0.00
06:43:54	166.0	99.3	8.7	119	77	1792	806		1.03	0.00	17.2	0.0	117.9	622	61.0	0:31	1.09	0.77	0.00
06:44:25	167.1	147.7	10.5	119	89	1797	771		1.03	0.00	17.2	0.0	118.4	622	62.1	0:32	1.09	0.69	0.00
06:44:47	168.1	132.7	9.3	119	72	1794	769		1.03	0.00	17.2	0.0	118.7	622	63.1	0:32	1.09	0.70	0.00
06:45:12	169.0	143.5	10.2	119	83	1791	785		1.03	0.00	17.2	0.0	119.1	622	64.0	0:33	1.09	0.69	0.00
06:45:37	170.1	146.8	9.6	119	75	1794	797		1.03	0.00	17.2	0.0	119.5	622	65.1	0:33	1.09	0.68	0.00
06:46:07	171.0	103.4	7.8	119	69	1800	799		1.03	0.00	17.2	0.0	120.0	622	66.0	0:34	1.09	0.74	0.00
06:56:53	172.1	95.9	7.1	119	70	1789	779		1.03	0.00	17.2	0.0	124.0	622	67.1	0:34	1.09	0.76	0.00
06:57:12	173.1	201.9	10.6	119	93	1779	755		1.03	0.00	17.1	0.0	124.3	623	68.1	0:34	1.09	0.62	0.00
06:57:30	174.1	171.1	11.4	119	79	1779	767		1.03	0.00	17.2	0.0	124.7	620	69.1	0:35	1.09	0.67	0.00
06:57:52	175.1	179.9	9.9	119	80	1780	772		1.03	0.00	17.2	0.0	125.2	612	70.1	0:35	1.09	0.64	0.00
06:58:16	176.1	149.7	9.6	119	84	1780	775		1.03	0.00	17.1	0.0	125.7	613	71.1	0:35	1.09	0.68	0.00
06:58:38	177.1	159.7	11.4	120	88	1780	783		1.03	0.00	17.1	0.0	126.2	612	72.1	0:36	1.09	0.68	0.00
06:59:00	178.2	268.0	11.1	119	87	1783	779		1.03	0.00	17.2	0.0	126.6	613	73.2	0:36	1.09	0.55	0.00
06:59:25	179.1	148.3	10.0	120	77	1787	769		1.03	0.00	17.2	0.0	127.1	613	74.1	0:37	1.09	0.69	0.00
06:59:49	180.0	138.7	10.0	119	81	1790	761		1.03	0.00	17.1	0.0	127.6	613	75.0	0:37	1.09	0.71	0.00
07:00:16	181.2	155.5	11.6	119	74	1785	767		1.03	0.00	17.2	0.0	128.2	613	76.2	0:37	1.09	0.69	0.00
07:00:48	182.1	139.4	7.4	120	66	1789	772		1.03	0.00	17.2	0.0	128.8	613	77.1	0:38	1.09	0.67	0.00
07:01:25	183.0	98.0	4.6	120	63	1788	776		1.03	0.00	17.2	0.0	129.7	613	78.0	0:38	1.09	0.70	0.00
07:01:56	184.1	160.4	9.0	119	78	1790	778		1.03	0.00	17.2	0.0	130.3	613	79.1	0:39	1.09	0.66	0.00
07:02:18	185.1	157.0	9.2	119	70	1790	776		1.03	0.00	17.2	0.0	130.7	613	80.1	0:39	1.09	0.66	0.00
07:02:45	186.1	118.4	7.9	120	66	1785	775		1.03	0.00	17.1	0.0	131.3	613	81.1	0:40	1.09	0.72	0.00
07:03:13	187.2	152.8	9.5	120	75	1787	777		1.03	0.00	17.2	0.0	131.8	613	82.2	0:40	1.09	0.68	0.00
07:03:40	188.0	100.8	6.6	119	60	1784	780		1.03	0.00	17.2	0.0	132.5	607	83.0	0:41	1.09	0.73	0.00
07:04:11	189.1	165.5	9.6	119	83	1788	787		1.03	0.00	17.2	0.0	133.1	600	84.1	0:41	1.09	0.66	0.00
07:04:33	190.0	146.8	10.4	119	78	1781	789		1.03	0.00	17.2	0.0	133.6	599	85.0	0:42	1.09	0.70	0.00
07:04:57	191.1	158.8	10.7	119	78	1780	787		1.03	0.00	17.1	0.0	134.1	600	86.1	0:42	1.09	0.68	0.00
07:05:22	192.0	139.4	9.6	120	69	1780	777		1.03	0.00	17.1	0.0	134.6	599	87.0	0:42	1.09	0.70	0.00
07:05:50	193.1	138.3	10.7	119	77	1780	766		1.03	0.00	17.2	0.0	135.2	599	88.1	0:43	1.09	0.72	0.00
07:06:12	194.0	155.9	10.1	119	72	1780	768		1.03	0.00	17.2	0.0	135.7	599	89.0	0:43	1.09	0.68	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
07:06:40	195.1	150.0	9.4	119	72	1782	782		1.03	0.00	17.2	0.0	136.2	599	90.1	0:44	1.09	0.68	0.00
07:07:01	196.1	168.9	10.1	119	89	1778	794		1.03	0.00	17.1	0.0	136.7	599	91.1	0:44	1.09	0.66	0.00
07:07:20	197.0	156.2	12.0	119	81	1778	796		1.03	0.00	17.1	0.0	137.2	599	92.0	0:44	1.09	0.70	0.00
07:07:47	198.1	126.9	10.6	119	74	1776	790		1.03	0.00	17.2	0.0	137.7	599	93.1	0:45	1.09	0.74	0.00
07:08:18	199.0	118.6	8.2	120	61	1772	780		1.03	0.00	17.2	0.0	138.3	599	94.0	0:45	1.09	0.72	0.00
07:16:41	200.1	138.1	12.8	104	95	1770	637		1.03	0.00	17.2	0.0	141.9	600	95.1	0:46	1.08	0.71	0.00
07:17:07	201.2	136.1	12.3	111	88	1770	699		1.03	0.00	17.2	0.0	142.6	600	96.2	0:47	1.09	0.72	0.00
07:17:29	202.2	138.3	8.1	117	73	1770	791		1.03	0.00	17.2	0.0	143.2	600	97.2	0:47	1.09	0.68	0.00
07:17:54	203.1	155.6	9.8	118	87	1772	802		1.03	0.00	17.1	0.0	143.8	596	98.1	0:47	1.09	0.67	0.00
07:18:22	204.1	132.3	8.3	118	76	1777	806		1.03	0.00	17.2	0.0	144.6	587	99.1	0:48	1.09	0.69	0.00
07:18:47	205.1	150.7	10.9	118	89	1777	808		1.03	0.00	17.2	0.0	145.2	586	100.1	0:48	1.09	0.69	0.00
07:19:11	206.1	144.6	10.3	118	79	1772	806		1.03	0.00	17.2	0.0	145.8	587	101.1	0:49	1.09	0.70	0.00
07:19:36	207.0	146.9	10.2	118	78	1770	793		1.03	0.00	17.2	0.0	146.4	586	102.0	0:49	1.08	0.69	0.00
07:20:04	208.0	139.9	8.9	118	77	1774	773		1.03	0.00	17.2	0.0	147.0	586	103.0	0:50	1.08	0.69	0.00
07:20:31	209.0	130.6	10.6	118	77	1780	773		1.03	0.00	17.2	0.0	147.8	587	104.0	0:50	1.08	0.73	0.00
07:20:59	210.1	127.8	7.7	118	65	1780	789		1.03	0.00	17.2	0.0	148.4	587	105.1	0:51	1.09	0.69	0.00
07:21:39	211.2	84.3	9.2	118	76	1780	798		1.03	0.00	17.2	0.0	149.6	587	106.2	0:51	1.09	0.82	0.00
07:22:07	212.0	125.8	9.8	118	81	1780	795		1.03	0.00	17.2	0.0	150.2	587	107.0	0:52	1.08	0.73	0.00
07:22:29	213.0	166.6	9.6	118	77	1780	785		1.03	0.00	17.2	0.0	150.8	587	108.0	0:52	1.08	0.66	0.00
07:23:13	214.1	92.0	9.9	118	83	1781	773		1.03	0.00	17.2	0.0	151.9	587	109.1	0:53	1.08	0.81	0.00
07:23:52	215.0	85.5	7.1	118	62	1782	771		1.03	0.00	17.2	0.0	152.9	587	110.0	0:53	1.08	0.79	0.00
07:24:41	216.0	116.6	6.9	118	77	1780	770		1.03	0.00	17.2	0.0	154.1	587	111.0	0:54	1.08	0.71	0.00
07:25:06	217.1	131.5	8.6	118	81	1780	775		1.03	0.00	17.2	0.0	154.7	588	112.1	0:55	1.08	0.70	0.00
07:25:41	218.0	88.0	9.0	118	86	1781	780		1.03	0.00	17.2	0.0	155.6	587	113.0	0:55	1.08	0.81	0.00
07:26:09	219.1	147.4	10.7	118	81	1780	794		1.03	0.00	17.2	0.0	156.4	578	114.1	0:56	1.09	0.70	0.00
07:26:31	220.1	158.0	8.7	118	75	1780	805		1.03	0.00	17.2	0.0	156.9	573	115.1	0:56	1.09	0.66	0.00
07:26:54	221.0	145.1	10.6	118	80	1780	807		1.03	0.00	17.2	0.0	157.5	572	116.0	0:56	1.08	0.70	0.00
07:27:12	222.0	175.6	9.1	118	85	1780	801		1.03	0.00	17.2	0.0	157.9	572	117.0	0:57	1.08	0.63	0.00
07:27:41	223.1	113.2	9.9	118	82	1774	789		1.03	0.00	17.2	0.0	158.7	572	118.1	0:57	1.08	0.76	0.00
07:28:09	224.1	138.4	11.1	118	90	1775	782		1.03	0.00	17.2	0.0	159.4	572	119.1	0:58	1.08	0.72	0.00
07:28:24	225.1	203.0	11.1	118	94	1772	788		1.03	0.00	17.2	0.0	159.8	571	120.1	0:58	1.08	0.62	0.00
07:28:45	226.2	227.6	10.3	118	91	1772	797		1.03	0.00	17.2	0.0	160.3	572	121.2	0:58	1.08	0.58	0.00
07:29:04	227.1	162.0	11.0	118	89	1770	813		1.03	0.00	17.2	0.0	160.8	572	122.1	0:59	1.09	0.68	0.00
07:29:23	228.0	166.6	7.4	118	71	1770	823		1.03	0.00	17.2	0.0	161.4	571	123.0	0:59	1.09	0.62	0.00
07:40:35	229.0	177.4	4.4	118	57	1775	833		1.03	0.00	17.2	0.0	170.0	558	124.0	1:00	1.08	0.56	0.00
07:40:48	230.1	271.5	8.8	116	91	1779	792		1.03	0.00	17.2	0.0	170.3	558	125.1	1:00	1.08	0.52	0.00
07:41:06	231.4	258.9	8.1	116	79	1780	783		1.03	0.00	17.2	0.0	170.7	558	126.4	1:01	1.08	0.52	0.00
07:41:15	232.2	326.9	7.1	116	74	1780	782		1.03	0.00	17.3	0.0	170.9	558	127.2	1:01	1.08	0.45	0.00
07:41:28	233.1	258.7	7.5	116	75	1780	784		1.03	0.00	17.2	0.0	171.3	557	128.1	1:01	1.08	0.52	0.00
07:41:43	234.0	273.5	7.5	116	87	1780	789		1.03	0.00	17.2	0.0	171.7	557	129.0	1:01	1.08	0.50	0.00
07:42:02	235.1	181.1	7.5	116	95	1782	798		1.03	0.00	17.2	0.0	172.1	557	130.1	1:01	1.08	0.60	0.00
07:42:22	236.2	202.2	6.3	116	65	1780	812		1.03	0.00	17.2	0.0	172.6	557	131.2	1:02	1.08	0.56	0.00
07:42:47	237.0	109.7	7.5	116	76	1780	821		1.03	0.00	17.2	0.0	173.3	557	132.0	1:02	1.08	0.72	0.00
07:43:21	238.1	120.0	9.2	116	85	1780	832		1.03	0.00	17.2	0.0	174.2	558	133.1	1:03	1.09	0.73	0.00
07:44:02	239.1	93.4	9.4	116	92	1779	838		1.03	0.00	17.2	0.0	175.4	557	134.1	1:03	1.09	0.79	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
07:44:39	240.0	82.7	9.3	116	88	1778	841		1.03	0.00	17.3	0.0	176.4	558	135.0	1:04	1.09	0.82	0.00
07:45:13	241.1	110.2	10.2	116	85	1773	842		1.03	0.00	17.2	0.0	177.3	558	136.1	1:05	1.09	0.76	0.00
07:45:40	242.1	140.2	5.9	116	65	1777	842		1.03	0.00	17.3	0.0	178.1	558	137.1	1:05	1.09	0.64	0.00
07:46:14	243.1	90.8	7.4	116	81	1793	842		1.03	0.00	17.3	0.0	179.1	557	138.1	1:06	1.09	0.77	0.00
07:46:52	244.1	85.8	7.0	116	80	1679	845		1.03	0.00	17.2	0.0	180.1	557	139.1	1:06	1.09	0.77	0.00
07:47:32	245.0	90.2	8.4	116	81	1518	861		1.03	0.00	17.2	0.0	181.2	558	140.0	1:07	1.09	0.78	0.00
07:48:23	246.1	79.5	8.1	116	76	1623	870		1.03	0.00	17.2	0.0	182.6	557	141.1	1:08	1.09	0.81	0.00
07:49:01	247.0	80.9	8.5	116	84	1761	871		1.03	0.00	17.2	0.0	183.7	558	142.0	1:08	1.09	0.81	0.00
07:49:35	248.1	112.2	10.8	116	91	1768	862		1.03	0.00	17.2	0.0	184.7	557	143.1	1:09	1.09	0.76	0.00
07:50:06	249.1	115.7	10.9	116	90	1767	849		1.03	0.00	17.2	0.0	185.5	557	144.1	1:10	1.09	0.76	0.00
07:50:38	250.1	115.5	10.2	116	89	1767	842		1.03	0.00	17.2	0.0	186.4	558	145.1	1:10	1.08	0.75	0.00
07:51:08	251.0	135.1	10.0	119	90	1762	838		1.03	0.00	17.2	0.0	187.2	557	146.0	1:11	1.08	0.72	0.00
07:51:35	252.0	125.6	9.5	120	83	1763	837		1.03	0.00	17.2	0.0	187.9	558	147.0	1:11	1.08	0.73	0.00
07:52:03	253.0	153.8	9.7	121	90	1769	838		1.03	0.00	17.2	0.0	188.7	557	148.0	1:11	1.08	0.68	0.00
07:52:34	254.2	188.2	9.2	121	87	1770	839		1.03	0.00	17.2	0.0	189.5	557	149.2	1:12	1.08	0.62	0.00
07:53:03	255.0	108.3	7.3	121	81	1788	839		1.03	0.00	17.2	0.0	190.3	557	150.0	1:12	1.08	0.73	0.00
07:53:33	256.1	110.3	6.9	121	82	1675	845		1.03	0.00	17.2	0.0	191.2	557	151.1	1:13	1.09	0.72	0.00
08:02:10	257.2	100.5	1.8	121	70	1630	794		1.03	0.00	17.2	0.0	195.6	557	152.2	1:13	1.07	0.62	0.00
08:02:32	258.0	139.0	5.3	121	85	1759	748		1.03	0.00	17.2	0.0	196.1	557	153.0	1:13	1.08	0.64	0.00
08:02:57	259.0	136.6	8.9	121	100	1774	778		1.03	0.00	17.2	0.0	196.7	557	154.0	1:14	1.08	0.71	0.00
08:03:09	260.0	160.0	8.5	121	94	1780	780		1.03	0.00	17.2	0.0	196.9	557	155.0	1:14	1.08	0.66	0.00
08:03:35	261.5	128.7	3.0	121	64	1785	770		1.03	0.00	17.2	0.0	197.1	558	156.5	1:14	1.08	0.61	0.00
08:03:45	262.1	92.0	5.3	121	90	1780	762		1.03	0.00	17.2	0.0	197.4	557	157.1	1:15	1.07	0.74	0.00
08:04:16	263.0	105.7	4.9	121	84	1782	755		1.03	0.00	17.2	0.0	198.0	557	158.0	1:15	1.07	0.70	0.00
08:04:57	264.1	100.5	4.4	121	88	1783	746		1.03	0.00	17.2	0.0	199.0	557	159.1	1:16	1.07	0.70	0.00
08:05:28	265.1	115.4	7.6	121	100	1780	740		1.03	0.00	17.2	0.0	199.8	557	160.1	1:16	1.07	0.73	0.00
08:06:05	266.1	95.9	7.5	121	96	1780	755		1.03	0.00	17.2	0.0	200.8	557	161.1	1:17	1.08	0.78	0.00
08:06:39	267.0	104.5	4.8	121	89	1780	770		1.03	0.00	17.2	0.0	201.7	558	162.0	1:17	1.08	0.70	0.00
08:07:22	268.0	82.1	2.7	121	74	1782	773		1.03	0.00	17.2	0.0	202.9	557	163.0	1:18	1.08	0.69	0.00
08:07:56	269.0	96.6	4.6	121	90	1785	770		1.03	0.00	17.2	0.0	203.8	557	164.0	1:19	1.08	0.72	0.00
08:08:40	270.0	82.5	7.4	121	106	1781	774		1.03	0.00	17.2	0.0	205.0	557	165.0	1:19	1.08	0.81	0.00
08:09:16	271.1	106.6	5.2	121	94	1780	761		1.03	0.00	17.2	0.0	206.0	557	166.1	1:20	1.07	0.71	0.00
08:09:54	272.0	93.0	4.7	121	97	1774	753		1.03	0.00	17.2	0.0	207.0	557	167.0	1:21	1.07	0.73	0.00
08:10:36	273.0	96.4	5.0	121	96	1772	746		1.03	0.00	17.2	0.0	208.1	557	168.0	1:21	1.07	0.73	0.00
08:11:18	274.0	410.2	0.1	121	70	1774	752		1.03	0.00	17.2	0.0	209.2	558	169.0	1:22	1.07	0.23	0.00
08:11:42	275.0	200.2	1.1	121	77	1770	748		1.03	0.00	17.2	0.0	209.9	557	170.0	1:22	1.07	0.45	0.00
08:12:31	276.2	146.6	4.6	121	84	1782	762		1.03	0.00	17.2	0.0	211.2	557	171.2	1:23	1.07	0.62	0.00
08:12:57	277.4	353.0	0.0	121	56	1781	763		1.03	0.00	17.2	0.0	211.9	557	172.4	1:23	1.07	0.23	0.00
08:13:14	278.2	169.1	0.1	121	39	1746	759		1.03	0.00	17.2	0.0	212.3	558	173.2	1:23	1.07	0.38	0.00
08:13:36	279.1	143.3	0.5	121	38	1688	769		1.03	0.00	17.2	0.0	213.0	558	174.1	1:23	1.08	0.46	0.00
08:13:55	280.1	185.5	0.0	121	33	1770	798		1.03	0.00	17.2	0.0	213.6	557	175.1	1:24	1.08	0.31	0.00
08:14:09	281.2	248.3	4.8	121	121	1770	830		1.03	0.00	17.2	0.0	214.0	557	176.2	1:24	1.08	0.50	0.00
08:14:37	282.0	94.6	7.9	121	68	1770	843		1.03	0.00	17.2	0.0	214.7	557	177.0	1:24	1.08	0.78	0.00
08:15:24	283.2	223.0	10.1	121	66	1765	810		1.03	0.00	17.2	0.0	216.1	558	178.2	1:25	1.08	0.60	0.00
08:15:43	284.1	152.7	11.4	121	76	1770	785		1.03	0.00	17.2	0.0	216.6	557	179.1	1:25	1.07	0.71	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
08:16:54	285.0	35.3	15.0	121	80	1770	773		1.03	0.00	17.2	0.0	218.5	557	180.0	1:27	1.07	1.16	0.00
08:17:08	286.1	244.2	7.6	121	49	1800	768		1.03	0.00	17.2	0.0	218.9	558	181.1	1:27	1.07	0.55	0.00
08:17:21	287.1	273.1	9.7	121	75	1771	769		1.03	0.00	17.2	0.0	219.3	557	182.1	1:27	1.07	0.54	0.00
08:27:26	288.0	61.1	8.7	121	51	1769	766		1.03	0.00	17.2	0.0	226.2	558	183.0	1:27	1.07	0.91	0.00
08:27:41	289.3	342.9	4.3	121	40	1764	748		1.03	0.00	17.2	0.0	226.5	558	184.3	1:28	1.07	0.42	0.00
08:27:57	290.0	153.6	7.7	120	71	1766	750		1.03	0.00	17.1	0.0	226.9	558	185.0	1:28	1.07	0.66	0.00
08:29:04	291.0	45.5	14.2	121	89	1771	760		1.03	0.00	17.2	0.0	228.7	558	186.0	1:29	1.07	1.07	0.00
08:29:57	292.1	72.2	13.4	120	83	1770	764		1.03	0.00	17.2	0.0	230.0	557	187.1	1:30	1.07	0.94	0.00
08:31:03	293.0	49.1	13.0	120	82	1770	766		1.03	0.00	17.2	0.0	231.7	557	188.0	1:31	1.07	1.04	0.00
08:33:22	294.0	29.2	13.6	120	78	1770	767		1.03	0.00	17.2	0.0	235.2	557	189.0	1:33	1.07	1.19	0.00
08:35:01	295.0	37.9	13.5	120	95	1766	803		1.03	0.00	17.2	0.0	237.9	558	190.0	1:35	1.08	1.11	0.00
08:35:22	296.2	365.7	3.3	120	46	1763	809		1.03	0.00	17.2	0.0	238.4	558	191.2	1:35	1.08	0.39	0.00
08:35:35	297.1	228.3	0.2	120	68	1758	806		1.03	0.00	17.2	0.0	238.8	557	192.1	1:35	1.08	0.34	0.00
08:35:47	298.1	292.6	0.1	120	74	1760	802		1.03	0.00	17.2	0.0	239.1	557	193.1	1:36	1.08	0.27	0.00
08:36:00	299.2	286.5	0.1	120	32	1766	797		1.03	0.00	17.2	0.0	239.5	557	194.2	1:36	1.07	0.63	0.00
08:36:09	300.2	472.0	0.1	120	26	1761	794		1.03	0.00	17.2	0.0	239.7	558	195.2	1:36	1.07	0.21	0.00
08:36:20	301.4	380.1	0.4	120	28	1760	791		1.03	0.00	17.2	0.0	240.0	558	196.4	1:36	1.07	0.29	0.00
08:36:27	302.1	357.4	0.3	120	24	1763	788		1.03	0.00	17.1	0.0	240.1	558	197.1	1:36	1.07	0.29	0.00
08:36:36	303.1	554.3	0.5	120	28	1764	786		1.03	0.00	17.2	0.0	240.4	557	198.1	1:36	1.07	0.23	0.00
08:36:48	304.3	353.0	0.7	120	29	1761	785		1.03	0.00	17.2	0.0	240.7	557	199.3	1:37	1.07	0.32	0.00
08:36:58	305.1	288.3	1.0	120	30	1766	786		1.03	0.00	17.1	0.0	241.0	557	200.1	1:37	1.07	0.37	0.00
08:37:12	306.3	325.2	0.5	120	43	1766	788		1.03	0.00	17.2	0.0	241.4	558	201.3	1:37	1.07	0.33	0.00
08:37:22	307.1	271.0	0.2	120	96	1767	791		1.03	0.00	17.2	0.0	241.7	557	202.1	1:37	1.07	0.33	0.00
08:37:34	308.0	292.0	0.5	120	50	1764	791		1.03	0.00	17.2	0.0	241.9	557	203.0	1:37	1.07	0.35	0.00
08:37:49	309.3	309.1	0.1	120	47	1764	790		1.03	0.00	17.2	0.0	242.3	558	204.3	1:38	1.07	0.26	0.00
08:37:58	310.1	302.0	0.4	120	92	1764	787		1.03	0.00	17.2	0.0	242.5	557	205.1	1:38	1.07	0.33	0.00
08:38:09	311.2	339.4	0.2	119	110	1767	786		1.03	0.00	17.2	0.0	242.8	557	206.2	1:38	1.07	0.29	0.00
08:38:19	312.0	329.9	1.6	120	92	1761	783		1.03	0.00	17.2	0.0	243.1	558	207.0	1:38	1.07	0.37	0.00
08:38:31	313.1	317.0	1.5	120	126	1795	783		1.03	0.00	17.2	0.0	243.3	557	208.1	1:38	1.07	0.38	0.00
08:38:44	314.1	280.1	0.6	120	108	1788	784		1.03	0.00	17.2	0.0	243.7	557	209.1	1:39	1.07	0.36	0.00
08:38:59	315.0	207.4	0.6	120	113	1770	788		1.03	0.00	17.2	0.0	244.1	557	210.0	1:39	1.07	0.41	0.00
08:39:17	316.1	237.4	0.2	120	91	1760	793		1.03	0.00	17.2	0.0	244.6	557	211.1	1:39	1.07	0.35	0.00
08:39:39	317.1	166.7	0.8	120	106	1714	801		1.03	0.00	17.2	0.0	245.2	558	212.1	1:39	1.07	0.46	0.00
08:50:06	318.0	231.5	0.3	120	89	1750	755		1.03	0.00	17.1	0.0	251.8	557	213.0	1:40	1.07	0.36	0.00
08:50:21	319.3	349.3	0.4	121	98	1758	758		1.03	0.00	17.1	0.0	252.2	558	214.3	1:40	1.07	0.31	0.00
08:50:30	320.1	335.2	0.5	121	95	1759	760		1.03	0.00	17.2	0.0	252.3	557	215.1	1:41	1.07	0.32	0.00
08:50:36	321.1	544.8	0.8	120	133	1760	762		1.03	0.00	17.1	0.0	252.6	557	216.1	1:41	1.07	0.25	0.00
08:50:50	322.7	398.0	0.2	120	116	1760	764		1.03	0.00	17.2	0.0	252.9	558	217.7	1:41	1.07	0.26	0.00
08:50:57	323.3	312.0	0.4	120	92	1763	765		1.03	0.00	17.2	0.0	253.1	558	218.3	1:41	1.07	0.33	0.00
08:51:03	324.1	475.5	0.7	120	114	1764	765		1.03	0.00	17.2	0.0	253.3	558	219.1	1:41	1.07	0.27	0.00
08:51:12	325.1	422.7	0.3	120	107	1764	764		1.03	0.00	17.2	0.0	253.5	557	220.1	1:41	1.07	0.27	0.00
08:51:22	326.3	504.8	0.2	121	91	1762	763		1.03	0.00	17.1	0.0	253.8	558	221.3	1:41	1.07	0.22	0.00
08:51:28	327.1	482.8	0.0	121	104	1760	763		1.03	0.00	17.1	0.0	253.9	558	222.1	1:42	1.07	0.18	0.00
08:51:34	328.1	579.7	0.6	120	99	1767	763		1.03	0.00	17.2	0.0	254.0	558	223.1	1:42	1.07	0.23	0.00
08:51:43	329.0	370.6	1.0	120	92	1764	763		1.03	0.00	17.1	0.0	254.3	557	224.0	1:42	1.07	0.33	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
08:51:55	330.3	358.4	1.0	120	126	1766	764		1.03	0.00	17.2	0.0	254.7	557	225.3	1:42	1.07	0.34	0.00
08:52:01	331.1	492.0	2.0	120	136	1769	765		1.03	0.00	17.1	0.0	254.8	558	226.1	1:42	1.07	0.30	0.00
08:52:11	332.1	408.6	1.8	120	127	1768	766		1.03	0.00	17.2	0.0	255.1	557	227.1	1:42	1.07	0.34	0.00
08:52:20	333.1	393.3	2.1	120	119	1770	766		1.03	0.00	17.1	0.0	255.4	558	228.1	1:42	1.07	0.35	0.00
08:52:35	334.5	319.6	2.7	120	90	1770	765		1.03	0.00	17.2	0.0	255.8	558	229.5	1:43	1.07	0.41	0.00
08:52:50	335.1	145.9	3.0	120	109	1771	762		1.03	0.00	17.2	0.0	256.2	557	230.1	1:43	1.07	0.58	0.00
08:53:34	336.1	145.6	1.7	120	116	1771	754		1.03	0.00	17.1	0.0	257.2	557	231.1	1:44	1.07	0.54	0.00
08:54:26	337.1	110.1	1.9	120	108	1785	746		1.03	0.00	17.2	0.0	258.6	558	232.1	1:45	1.07	0.60	0.00
08:54:39	338.1	300.6	2.1	120	109	1775	752		1.03	0.00	17.2	0.0	258.9	557	233.1	1:45	1.07	0.41	0.00
08:54:50	339.1	308.3	3.0	120	112	1761	758		1.03	0.00	17.2	0.0	259.3	558	234.1	1:45	1.07	0.42	0.00
08:55:06	340.1	213.1	2.2	120	98	1704	772		1.03	0.00	17.2	0.0	259.7	558	235.1	1:45	1.07	0.48	0.00
08:55:25	341.1	181.4	2.8	120	123	1667	779		1.03	0.00	17.2	0.0	260.2	557	236.1	1:46	1.07	0.53	0.00
08:55:40	342.2	269.4	3.4	120	114	1729	785		1.03	0.00	17.1	0.0	260.7	558	237.2	1:46	1.07	0.46	0.00
08:55:50	343.0	297.3	2.9	120	109	1771	788		1.03	0.00	17.1	0.0	260.9	558	238.0	1:46	1.07	0.43	0.00
08:56:02	344.2	351.5	3.4	120	88	1774	793		1.03	0.00	17.1	0.0	261.2	557	239.2	1:46	1.07	0.40	0.00
08:56:17	345.1	217.6	4.0	120	92	1770	800		1.03	0.00	17.1	0.0	261.6	557	240.1	1:46	1.07	0.52	0.00
08:56:42	346.1	136.5	1.8	120	79	1769	801		1.03	0.00	17.2	0.0	262.3	557	241.1	1:47	1.07	0.55	0.00
09:07:01	347.1	226.1	1.8	120	86	1771	754		1.03	0.00	17.2	0.0	268.8	558	242.1	1:47	1.06	0.46	0.00
09:07:14	348.0	256.8	0.6	121	119	1770	719		1.03	0.00	17.2	0.0	269.2	558	243.0	1:47	1.06	0.38	0.00
09:07:26	349.0	335.2	1.7	121	125	1772	718		1.03	0.00	17.2	0.0	269.5	558	244.0	1:48	1.07	0.38	0.00
09:07:39	350.2	331.1	2.2	121	119	1770	723		1.03	0.00	17.2	0.0	270.0	558	245.2	1:48	1.07	0.39	0.00
09:07:47	351.3	444.9	2.1	121	118	1770	725		1.03	0.00	17.2	0.0	270.1	558	246.3	1:48	1.07	0.33	0.00
09:07:53	352.2	508.3	2.0	121	113	1774	733		1.03	0.00	17.2	0.0	270.4	558	247.2	1:48	1.07	0.30	0.00
09:07:59	353.0	503.0	2.8	121	110	1771	738		1.03	0.00	17.2	0.0	270.6	558	248.0	1:48	1.07	0.32	0.00
09:08:09	354.2	441.2	1.4	121	99	1770	744		1.03	0.00	17.2	0.0	270.9	558	249.2	1:48	1.07	0.31	0.00
09:08:18	355.3	376.7	1.0	121	107	1770	750		1.03	0.00	17.2	0.0	271.2	558	250.3	1:48	1.07	0.33	0.00
09:08:28	356.3	336.5	2.4	121	99	1770	756		1.03	0.00	17.2	0.0	271.5	558	251.3	1:49	1.07	0.39	0.00
09:08:39	357.6	438.9	2.1	121	97	1770	759		1.03	0.00	17.2	0.0	271.8	558	252.6	1:49	1.07	0.33	0.00
09:08:42	358.2	695.0	2.0	121	70	1770	764		1.03	0.00	17.2	0.0	271.8	557	253.2	1:49	1.07	0.24	0.00
09:09:00	359.4	173.7	2.3	121	96	1772	767		1.03	0.00	17.2	0.0	272.5	557	254.4	1:49	1.07	0.53	0.00
09:09:15	360.0	150.8	2.4	121	116	1777	773		1.03	0.00	17.2	0.0	272.9	558	255.0	1:49	1.07	0.56	0.00
09:10:05	361.0	77.2	2.4	121	85	1771	785		1.03	0.00	17.2	0.0	274.5	557	256.0	1:50	1.07	0.70	0.00
09:10:32	362.0	163.2	0.3	121	83	1764	794		1.03	0.00	17.2	0.0	275.5	558	257.0	1:51	1.07	0.42	0.00
09:10:45	363.1	336.9	1.3	121	59	1794	796		1.03	0.00	17.2	0.0	275.8	558	258.1	1:51	1.07	0.36	0.00
09:11:00	364.1	220.0	5.1	121	103	1818	796		1.03	0.00	17.2	0.0	276.3	558	259.1	1:51	1.07	0.54	0.00
09:11:22	365.0	174.4	12.7	121	139	1771	800		1.03	0.00	17.2	0.0	277.2	557	260.0	1:52	1.07	0.69	0.00
09:11:35	366.2	409.7	6.1	121	83	1758	809		1.03	0.00	17.2	0.0	277.5	557	261.2	1:52	1.07	0.40	0.00
09:11:51	367.4	286.0	2.9	121	65	1750	812		1.03	0.00	17.2	0.0	278.1	557	262.4	1:52	1.07	0.44	0.00
09:12:01	368.0	211.8	0.3	121	99	1713	818		1.03	0.00	17.2	0.0	278.5	558	263.0	1:52	1.07	0.38	0.00
09:12:16	369.2	289.6	0.1	121	73	1706	819		1.03	0.00	17.2	0.0	279.0	558	264.2	1:52	1.07	0.21	0.00
09:12:42	370.0	121.9	0.3	121	83	1756	823		1.03	0.00	17.2	0.0	279.8	558	265.0	1:53	1.07	0.47	0.00
09:12:54	371.1	378.7	0.4	121	72	1761	832		1.03	0.00	17.2	0.0	280.2	558	266.1	1:53	1.07	0.30	0.00
09:13:07	372.3	307.3	0.3	121	71	1763	836		1.03	0.00	17.2	0.0	280.7	558	267.3	1:53	1.07	0.32	0.00
09:13:16	373.2	337.6	0.2	121	74	1762	830		1.03	0.00	17.2	0.0	281.0	557	268.2	1:53	1.07	0.29	0.00
09:13:24	374.0	317.6	0.4	121	76	1761	825		1.03	0.00	17.2	0.0	281.1	557	269.0	1:54	1.07	0.33	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg		deg C	m	bbl	mts	hh:mm	sg		%
09:28:24	375.0	54.6	0.6	122	64	1765	714		1.03	0.00	17.2	0.0	286.9	557	270.0	1:55	1.06	0.65	0.00
09:28:51	376.0	124.8	0.6	121	62	1770	723		1.03	0.00	17.2	0.0	287.9	558	271.0	1:55	1.06	0.51	0.00
09:29:16	377.0	136.5	1.0	122	61	1771	737		1.03	0.00	17.2	0.0	288.7	557	272.0	1:55	1.07	0.52	0.00
09:29:55	378.0	82.9	2.2	122	93	1770	750		1.03	0.00	17.2	0.0	290.1	558	273.0	1:56	1.07	0.68	0.00
09:30:45	379.0	134.6	7.2	121	96	1770	751		1.03	0.00	17.2	0.0	291.8	557	274.0	1:57	1.07	0.69	0.00
09:31:09	380.1	160.8	1.1	122	83	1770	753		1.03	0.00	17.2	0.0	292.7	558	275.1	1:57	1.07	0.49	0.00
09:31:34	381.1	145.8	0.4	122	70	1770	754		1.03	0.00	17.2	0.0	293.5	558	276.1	1:58	1.07	0.45	0.00
09:31:59	382.0	125.3	1.4	121	84	1769	757		1.03	0.00	17.2	0.0	294.4	558	277.0	1:58	1.07	0.56	0.00
09:32:26	383.1	152.9	1.2	121	95	1771	756		1.03	0.00	17.2	0.0	295.2	558	278.1	1:59	1.07	0.51	0.00
09:32:54	384.0	116.6	1.1	122	89	1771	751		1.03	0.00	17.2	0.0	296.3	558	279.0	1:59	1.07	0.55	0.00
09:33:26	385.1	132.3	1.1	121	96	1770	753		1.03	0.00	17.2	0.0	297.3	557	280.1	1:60	1.07	0.53	0.00
09:34:05	386.0	96.2	1.5	121	118	1770	751		1.03	0.00	17.3	0.0	298.6	558	281.0	2:00	1.07	0.62	0.00
09:34:49	387.1	101.3	2.8	121	119	1770	740		1.03	0.00	17.2	0.0	300.2	557	282.1	2:01	1.06	0.66	0.00
09:35:29	388.1	88.2	5.8	122	140	1770	736		1.03	0.00	17.2	0.0	301.5	558	283.1	2:02	1.06	0.77	0.00
09:36:03	389.1	212.6	6.0	121	139	1770	731		1.03	0.00	17.2	0.0	302.6	557	284.1	2:02	1.06	0.56	0.00
09:36:21	390.0	173.8	0.2	122	124	1769	727		1.03	0.00	17.2	0.0	303.1	558	285.0	2:03	1.06	0.40	0.00
09:36:46	391.1	151.2	0.1	122	105	1766	726		1.03	0.00	17.2	0.0	304.0	557	286.1	2:03	1.06	0.39	0.00
09:37:04	392.0	206.3	0.1	122	109	1774	726		1.03	0.00	17.3	0.0	304.6	558	287.0	2:03	1.06	0.35	0.00
09:37:31	393.2	171.2	0.7	122	127	1775	728		1.03	0.00	17.2	0.0	305.5	558	288.2	2:04	1.06	0.46	0.00
09:37:50	394.0	176.6	0.9	121	134	1769	733		1.03	0.00	17.2	0.0	306.2	558	289.0	2:04	1.06	0.46	0.00
09:38:15	395.0	139.8	0.4	121	129	1721	750		1.03	0.00	17.2	0.0	307.0	558	290.0	2:04	1.07	0.46	0.00
09:38:45	396.1	169.9	0.6	122	128	1665	782		1.03	0.00	17.2	0.0	308.2	557	291.1	2:05	1.07	0.44	0.00
09:39:13	397.1	141.2	0.6	121	122	1756	815		1.03	0.00	17.2	0.0	309.3	557	292.1	2:05	1.07	0.48	0.00
09:39:44	398.1	124.4	0.5	121	113	1770	842		1.03	0.00	17.3	0.0	310.5	558	293.1	2:06	1.07	0.49	0.00
09:40:15	399.1	115.9	0.9	122	111	1770	834		1.03	0.00	17.2	0.0	311.6	558	294.1	2:06	1.07	0.54	0.00
09:40:51	400.1	100.8	0.0	122	116	1765	812		1.03	0.00	17.2	0.0	312.9	558	295.1	2:07	1.07	0.41	0.00
09:41:35	401.0	80.6	0.2	121	112	1769	798		1.03	0.00	17.2	0.0	314.5	558	296.0	2:08	1.07	0.50	0.00
09:42:47	402.0	47.9	1.4	121	127	1768	789		1.03	0.00	17.2	0.0	317.2	558	297.0	2:09	1.07	0.74	0.00
09:43:38	403.1	83.0	6.9	121	142	1715	801		1.03	0.00	17.2	0.0	319.0	558	298.1	2:10	1.07	0.80	0.00
09:55:47	404.1	54.0	7.4	121	135	1770	750		1.03	0.00	17.2	0.0	332.0	558	299.1	2:11	1.06	0.92	0.00
09:56:30	405.1	74.8	8.1	121	139	1771	748		1.03	0.00	17.3	0.0	333.1	558	300.1	2:12	1.06	0.86	0.00
09:57:14	406.0	76.5	7.0	120	131	1776	753		1.03	0.00	17.2	0.0	334.4	558	301.0	2:13	1.07	0.83	0.00
09:58:07	407.0	61.6	6.7	121	125	1780	770		1.03	0.00	17.2	0.0	335.9	558	302.0	2:14	1.07	0.87	0.00
09:58:22	408.2	335.7	0.5	120	83	1783	778		1.03	0.00	17.3	0.0	336.4	557	303.2	2:14	1.07	0.32	0.00
09:58:37	409.1	241.8	0.3	121	102	1780	781		1.03	0.00	17.2	0.0	336.8	558	304.1	2:14	1.07	0.36	0.00
09:58:59	410.1	170.8	0.4	121	94	1775	783		1.03	0.00	17.2	0.0	337.4	558	305.1	2:14	1.07	0.43	0.00
09:59:23	411.0	162.7	0.4	120	99	1779	778		1.03	0.00	17.2	0.0	338.1	558	306.0	2:15	1.07	0.43	0.00
09:59:54	412.0	110.9	0.7	121	107	1777	760		1.03	0.00	17.2	0.0	338.9	558	307.0	2:15	1.06	0.53	0.00
10:00:35	413.1	92.3	4.5	121	107	1779	743		1.03	0.00	17.2	0.0	340.1	557	308.1	2:16	1.06	0.73	0.00
10:01:02	414.0	133.3	4.5	120	118	1774	740		1.03	0.00	17.2	0.0	340.8	557	309.0	2:16	1.06	0.64	0.00
10:01:27	415.1	182.8	0.4	121	113	1777	740		1.03	0.00	17.2	0.0	341.5	557	310.1	2:17	1.06	0.42	0.00
10:01:54	416.3	174.3	0.9	120	114	1771	740		1.03	0.00	17.2	0.0	342.3	557	311.3	2:17	1.06	0.46	0.00
10:02:10	417.1	165.4	0.2	120	109	1770	739		1.03	0.00	17.2	0.0	342.7	558	312.1	2:18	1.06	0.41	0.00
10:02:31	418.1	183.4	0.1	121	134	1771	740		1.03	0.00	17.2	0.0	343.2	558	313.1	2:18	1.06	0.37	0.00
10:02:55	419.1	214.1	0.4	121	113	1769	742		1.03	0.00	17.2	0.0	343.9	558	314.1	2:18	1.06	0.39	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD IN	TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg	C	m	bbl	mts	hh:mm	sg		%
10:03:08	420.2	254.6	0.8	121	111	1772	738		1.03	0.00	17.2	0.0	344.2	558	315.2	2:19	1.06	0.39	0.00
10:03:20	421.1	274.5	0.8	120	106	1770	736		1.03	0.00	17.2	0.0	344.6	558	316.1	2:19	1.06	0.38	0.00
10:03:36	422.0	228.0	5.1	121	142	1770	734		1.03	0.00	17.2	0.0	345.0	558	317.0	2:19	1.06	0.53	0.00
10:04:10	423.1	116.4	6.7	120	141	1768	737		1.03	0.00	17.2	0.0	346.0	557	318.1	2:20	1.06	0.72	0.00
10:04:51	424.1	137.2	4.6	120	118	1773	741		1.03	0.00	17.2	0.0	347.0	558	319.1	2:20	1.06	0.64	0.00
10:05:17	425.0	112.8	1.2	121	103	1767	742		1.03	0.00	17.2	0.0	347.7	557	320.0	2:21	1.06	0.57	0.00
10:06:04	426.0	77.8	0.1	121	96	1753	761		1.03	0.00	17.2	0.0	349.2	558	321.0	2:22	1.07	0.49	0.00
10:06:41	427.1	118.4	0.1	121	96	1769	794		1.03	0.00	17.2	0.0	350.2	558	322.1	2:22	1.07	0.44	0.00
10:07:28	428.1	66.5	0.2	121	100	1771	825		1.03	0.00	17.2	0.0	351.6	558	323.1	2:23	1.07	0.54	0.00
10:07:47	429.0	172.0	0.8	121	95	1768	813		1.03	0.00	17.2	0.0	352.2	557	324.0	2:23	1.07	0.46	0.00
10:08:04	430.2	224.0	0.6	121	109	1769	802		1.03	0.00	17.2	0.0	352.7	558	325.2	2:24	1.07	0.40	0.00
10:08:22	431.1	200.2	0.3	121	125	1792	773		1.03	0.00	17.2	0.0	353.1	558	326.1	2:24	1.06	0.39	0.00
10:08:47	432.1	137.2	1.1	121	109	1823	756		1.03	0.00	17.2	0.0	353.8	558	327.1	2:24	1.06	0.52	0.00
10:18:31	433.2	135.1	5.1	118	125	1775	706		1.03	0.00	17.2	0.0	360.8	557	328.2	2:25	1.06	0.65	0.00
10:18:54	434.0	87.3	6.4	118	130	1776	706		1.03	0.00	17.2	0.0	361.3	558	329.0	2:25	1.06	0.78	0.00
10:19:13	435.2	136.9	4.2	118	115	1780	709		1.03	0.00	17.2	0.0	361.7	557	330.2	2:25	1.06	0.63	0.00
10:19:43	436.1	184.8	0.9	118	99	1781	713		1.03	0.00	17.2	0.0	362.2	558	331.1	2:26	1.06	0.46	0.00
10:20:08	437.2	173.5	0.0	118	95	1785	716		1.03	0.00	17.2	0.0	362.9	557	332.2	2:26	1.06	0.33	0.00
10:20:30	438.1	157.3	0.1	118	101	1780	713		1.03	0.00	17.2	0.0	363.4	558	333.1	2:27	1.06	0.39	0.00
10:20:51	439.0	154.6	0.2	118	106	1780	712		1.03	0.00	17.2	0.0	363.9	557	334.0	2:27	1.06	0.42	0.00
10:21:13	440.0	159.0	0.4	118	110	1779	712		1.03	0.00	17.2	0.0	364.6	558	335.0	2:27	1.06	0.44	0.00
10:21:32	441.0	163.1	0.7	118	108	1779	714		1.03	0.00	17.2	0.0	365.1	557	336.0	2:28	1.06	0.46	0.00
10:21:57	442.2	178.8	0.3	118	103	1780	718		1.03	0.00	17.3	0.0	365.8	557	337.2	2:28	1.06	0.41	0.00
10:22:16	443.1	160.1	0.3	118	107	1773	721		1.03	0.00	17.2	0.0	366.2	557	338.1	2:28	1.06	0.42	0.00
10:22:39	444.2	177.9	0.1	118	108	1771	725		1.03	0.00	17.2	0.0	366.9	558	339.2	2:29	1.06	0.45	0.00
10:23:00	445.2	157.2	1.5	118	126	1770	728		1.03	0.00	17.2	0.0	367.4	558	340.2	2:29	1.06	0.51	0.00
10:23:47	446.0	62.8	2.9	118	137	1767	730		1.03	0.00	17.2	0.0	368.7	558	341.0	2:30	1.06	0.76	0.00
10:24:15	447.0	142.6	3.8	118	136	1766	719		1.03	0.00	17.2	0.0	369.4	558	342.0	2:30	1.06	0.61	0.00
10:24:37	448.1	236.8	2.4	118	110	1833	714		1.03	0.00	17.2	0.0	370.1	557	343.1	2:31	1.06	0.46	0.00
10:24:58	449.1	188.2	0.3	118	104	1777	723		1.03	0.00	17.2	0.0	370.6	558	344.1	2:31	1.06	0.40	0.00
10:25:17	450.0	140.1	0.7	118	105	1766	744		1.03	0.00	17.2	0.0	371.2	558	345.0	2:31	1.06	0.49	0.00
10:25:42	451.1	213.4	1.2	118	104	1763	760		1.03	0.00	17.2	0.0	371.9	558	346.1	2:32	1.06	0.44	0.00
10:26:06	452.1	148.3	3.7	118	98	1744	751		1.03	0.00	17.2	0.0	372.6	557	347.1	2:32	1.06	0.60	0.00
10:26:25	453.1	182.6	3.8	118	111	1772	736		1.03	0.00	17.2	0.0	373.1	557	348.1	2:32	1.06	0.56	0.00
10:26:39	454.1	277.1	3.2	118	104	1776	741		1.03	0.00	17.3	0.0	373.6	558	349.1	2:33	1.06	0.45	0.00
10:26:52	455.1	304.4	2.9	118	75	1773	769		1.03	0.00	17.2	0.0	373.9	558	350.1	2:33	1.07	0.42	0.00
10:27:07	456.2	252.5	1.9	118	78	1772	790		1.03	0.00	17.2	0.0	374.3	557	351.2	2:33	1.07	0.43	0.00
10:27:51	457.1	67.3	2.0	118	81	1772	794		1.03	0.00	17.3	0.0	375.6	557	352.1	2:34	1.06	0.71	0.00
10:28:19	458.2	194.8	2.0	118	96	1765	767		1.03	0.00	17.2	0.0	376.5	558	353.2	2:34	1.06	0.49	0.00
10:28:37	459.1	189.2	1.8	118	112	1786	763		1.03	0.00	17.2	0.0	376.9	558	354.1	2:35	1.06	0.49	0.00
10:28:55	460.3	230.4	1.5	118	116	1791	765		1.03	0.00	17.2	0.0	377.5	558	355.3	2:35	1.06	0.44	0.00
10:29:07	461.1	241.5	1.6	118	109	1765	773		1.03	0.00	17.2	0.0	377.8	558	356.1	2:35	1.06	0.43	0.00
10:39:53	462.1	135.9	1.2	118	120	1764	747		1.03	0.00	17.3	0.0	384.6	557	357.1	2:36	1.06	0.53	0.00
10:40:40	463.0	91.9	0.0	119	118	1765	741		1.03	0.00	17.3	0.0	385.8	558	358.0	2:37	1.06	0.43	0.00
10:41:10	464.1	146.2	0.3	119	122	1769	734		1.03	0.00	17.2	0.0	386.6	557	359.1	2:37	1.06	0.43	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg	sg	deg C		m	bbl	mts	hh:mm	sg		%
10:41:31	465.1	160.1	0.8	119	125	1767	730		1.03	0.00	17.2	0.0	387.3	557	360.1	2:37	1.06	0.47	0.00
10:41:49	466.3	341.5	0.8	119	123	1768	731		1.03	0.00	17.3	0.0	387.7	558	361.3	2:38	1.06	0.34	0.00
10:42:03	467.1	228.7	2.7	119	128	1772	737		1.03	0.00	17.2	0.0	388.1	558	362.1	2:38	1.06	0.48	0.00
10:42:18	468.2	248.9	2.4	119	131	1770	740		1.03	0.00	17.3	0.0	388.5	558	363.2	2:38	1.06	0.45	0.00
10:42:27	469.1	294.0	2.2	119	135	1770	742		1.03	0.00	17.2	0.0	388.8	558	364.1	2:38	1.06	0.42	0.00
10:42:40	470.0	277.0	2.8	119	126	1764	744		1.03	0.00	17.3	0.0	389.2	558	365.0	2:39	1.06	0.44	0.00
10:42:54	471.0	343.2	2.6	119	122	1768	743		1.03	0.00	17.3	0.0	389.6	558	366.0	2:39	1.06	0.39	0.00
10:43:06	472.0	305.5	2.7	119	129	1770	740		1.03	0.00	17.3	0.0	389.9	558	367.0	2:39	1.06	0.42	0.00
10:43:19	473.1	283.6	3.2	119	137	1766	737		1.03	0.00	17.3	0.0	390.3	557	368.1	2:39	1.06	0.45	0.00
10:43:32	474.2	296.3	4.2	119	143	1766	735		1.03	0.00	17.2	0.0	390.6	558	369.2	2:39	1.06	0.45	0.00
10:43:46	475.1	229.6	0.9	119	146	1767	735		1.03	0.00	17.3	0.0	391.0	558	370.1	2:40	1.06	0.41	0.00
10:44:05	476.1	171.4	1.2	119	156	1770	739		1.03	0.00	17.3	0.0	391.5	558	371.1	2:40	1.06	0.49	0.00
10:44:44	477.0	76.0	0.4	119	148	1771	747		1.03	0.00	17.3	0.0	392.6	558	372.0	2:41	1.06	0.57	0.00
10:45:54	478.1	72.2	1.1	119	153	1778	747		1.03	0.00	17.3	0.0	394.7	558	373.1	2:42	1.06	0.65	0.00
10:47:42	479.1	28.7	3.7	119	163	1768	772		1.03	0.00	17.2	0.0	397.8	557	374.1	2:44	1.07	0.96	0.00
10:48:49	480.1	91.4	4.6	119	150	1779	807		1.03	0.00	17.3	0.0	399.9	558	375.1	2:45	1.07	0.73	0.00
10:49:49	481.0	48.5	3.0	119	138	1781	797		1.03	0.00	17.3	0.0	401.6	558	376.0	2:46	1.06	0.82	0.00
10:50:29	482.0	156.3	0.9	118	151	1779	770		1.03	0.00	17.3	0.0	402.8	557	377.0	2:46	1.06	0.48	0.00
10:50:54	483.1	170.1	6.8	118	129	1779	759		1.03	0.00	17.3	0.0	403.5	557	378.1	2:47	1.06	0.63	0.00
10:51:12	484.0	153.6	5.6	119	132	1779	751		1.03	0.00	17.3	0.0	404.0	557	379.0	2:47	1.06	0.63	0.00
10:51:33	485.1	220.5	6.5	119	131	1780	748		1.03	0.00	17.3	0.0	404.6	557	380.1	2:47	1.06	0.56	0.00
10:51:52	486.1	168.8	5.2	119	116	1780	748		1.03	0.00	17.3	0.0	405.1	557	381.1	2:48	1.06	0.60	0.00
10:52:11	487.2	175.2	4.1	119	119	1780	750		1.03	0.00	17.2	0.0	405.6	557	382.0	2:48	1.06	0.57	0.00
10:52:26	488.2	229.7	3.1	119	126	1776	757		1.03	0.00	17.3	0.0	406.1	558	383.2	2:48	1.06	0.49	0.00
10:52:42	489.1	238.9	3.1	119	130	1773	764		1.03	0.00	17.2	0.0	406.6	557	384.1	2:49	1.06	0.48	0.00
10:52:59	490.1	233.8	3.5	119	122	1770	769		1.03	0.00	17.3	0.0	407.0	558	385.1	2:49	1.06	0.49	0.00
11:03:03	491.1	108.3	2.4	119	118	1767	747		1.03	0.00	17.3	0.0	413.9	557	386.1	2:49	1.06	0.63	0.00
11:03:53	492.1	81.3	1.4	120	115	1772	729		1.03	0.00	17.3	0.0	415.2	558	387.1	2:50	1.06	0.64	0.00
11:04:25	493.1	98.8	1.4	121	112	1771	725		1.03	0.00	17.3	0.0	416.2	558	388.1	2:51	1.06	0.61	0.00
11:04:56	494.1	133.9	1.6	120	123	1770	721		1.03	0.00	17.2	0.0	417.0	558	389.1	2:51	1.06	0.56	0.00
11:05:19	495.0	144.3	1.3	120	120	1770	722		1.03	0.00	17.2	0.0	417.7	558	390.0	2:52	1.06	0.53	0.00
11:05:44	496.0	134.0	1.4	121	116	1769	732		1.03	0.00	17.3	0.0	418.3	557	391.0	2:52	1.06	0.55	0.00
11:06:12	497.2	177.0	1.0	121	110	1769	738		1.03	0.00	17.3	0.0	419.2	558	392.2	2:53	1.06	0.47	0.00
11:06:37	498.1	133.2	0.8	121	109	1770	734		1.03	0.00	17.3	0.0	419.8	557	393.1	2:53	1.06	0.51	0.00
11:07:02	499.0	128.3	1.2	120	107	1768	729		1.03	0.00	17.3	0.0	420.5	558	394.0	2:53	1.06	0.55	0.00
11:07:35	500.0	91.5	1.8	121	116	1770	733		1.03	0.00	17.3	0.0	421.5	558	395.0	2:54	1.06	0.64	0.00
11:08:21	501.3	91.0	4.4	121	141	1770	731		1.03	0.00	17.3	0.0	422.7	558	396.3	2:55	1.06	0.73	0.00
11:08:49	502.0	116.1	7.3	121	143	1770	728		1.03	0.00	17.2	0.0	423.5	558	397.0	2:55	1.06	0.73	0.00
11:09:11	503.1	170.1	3.9	120	128	1767	727		1.03	0.00	17.2	0.0	424.0	558	398.1	2:56	1.06	0.58	0.00
11:09:33	504.1	164.2	1.7	121	115	1766	727		1.03	0.00	17.3	0.0	424.6	558	399.1	2:56	1.06	0.52	0.00
11:10:00	505.0	131.7	1.3	121	115	1769	731		1.03	0.00	17.3	0.0	425.4	558	400.0	2:56	1.06	0.55	0.00
11:10:31	506.1	121.7	0.7	120	114	1770	737		1.03	0.00	17.2	0.0	426.2	558	401.1	2:57	1.06	0.52	0.00
11:11:03	507.1	105.1	0.1	121	112	1769	742		1.03	0.00	17.2	0.0	427.0	558	402.1	2:57	1.06	0.43	0.00
11:11:36	508.1	107.3	0.9	121	111	1779	731		1.03	0.00	17.3	0.0	428.0	558	403.1	2:58	1.06	0.56	0.00
11:12:13	509.1	106.6	1.1	121	97	1788	720		1.03	0.00	17.2	0.0	429.0	557	404.1	2:59	1.06	0.58	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
11:12:48	510.0	96.8	0.8	121	94	1774	748		1.03	0.00	17.3	0.0	430.1	558	405.0	2:59	1.06	0.57	0.00
11:13:30	511.0	83.6	0.3	120	102	1761	777		1.03	0.00	17.3	0.0	431.4	557	406.0	2:60	1.06	0.52	0.00
11:14:13	512.0	113.1	0.4	121	99	1776	790		1.03	0.00	17.2	0.0	432.6	557	407.0	3:01	1.07	0.50	0.00
11:14:48	513.1	103.5	0.2	121	102	1781	805		1.03	0.00	17.2	0.0	433.6	558	408.1	3:01	1.06	0.48	0.00
11:15:19	514.0	109.5	0.5	121	106	1783	763		1.03	0.00	17.2	0.0	434.5	557	409.0	3:02	1.06	0.52	0.00
11:15:58	515.0	141.0	0.5	121	105	1779	734		1.03	0.00	17.2	0.0	435.4	556	410.0	3:02	1.06	0.47	0.00
11:16:39	516.1	113.2	0.2	121	97	1778	717		1.03	0.00	17.3	0.0	436.8	556	411.1	3:03	1.06	0.45	0.00
11:17:22	517.1	105.9	0.1	121	93	1775	707		1.03	0.00	17.2	0.0	438.2	557	412.1	3:03	1.06	0.42	0.00
11:17:59	518.0	135.0	0.1	121	95	1773	707		1.03	0.00	17.2	0.0	439.6	557	413.0	3:04	1.06	0.42	0.00
11:18:31	519.0	127.2	0.5	121	94	1770	710		1.03	0.00	17.2	0.0	441.0	557	414.0	3:04	1.06	0.49	0.00
11:19:12	520.1	90.2	0.8	121	99	1772	719		1.03	0.00	17.3	0.0	443.1	557	415.1	3:05	1.06	0.59	0.00
11:29:29	521.4	197.6	1.7	121	96	1771	721		1.03	0.00	17.3	0.0	455.2	585	416.4	3:05	1.06	0.49	0.00
11:29:53	522.0	201.2	0.0	122	94	1770	711		1.03	0.00	17.3	0.0	456.0	584	417.0	3:05	1.06	0.31	0.00
11:30:28	523.2	298.7	0.0	122	104	1772	697		1.03	0.00	17.3	0.0	457.0	585	418.2	3:05	1.06	0.39	0.00
11:30:54	524.2	265.0	0.0	122	92	1772	690		1.03	0.00	17.3	0.0	457.9	585	419.2	3:06	1.06	0.39	0.00
11:31:12	525.0	282.8	0.0	122	103	1774	693		1.03	0.00	17.3	0.0	458.5	585	420.0	3:06	1.06	0.39	0.00
11:31:35	526.0	368.6	0.1	122	86	1772	706		1.03	0.00	17.2	0.0	459.5	584	421.0	3:06	1.06	0.27	0.00
11:32:03	527.0	250.3	0.0	122	92	1772	716		1.03	0.00	17.3	0.0	460.7	585	422.0	3:06	1.06	0.28	0.00
11:32:40	528.1	225.5	0.5	122	94	1771	725		1.03	0.00	17.3	0.0	461.4	585	423.1	3:07	1.06	0.40	0.00
11:33:12	529.0	139.7	0.3	122	94	1772	738		1.03	0.00	17.3	0.0	461.4	585	424.0	3:07	1.06	0.45	0.00
11:33:48	530.1	158.7	0.1	122	99	1770	741		1.03	0.00	17.3	0.0	461.4	585	425.1	3:07	1.06	0.39	0.00
11:34:16	531.0	183.5	0.7	122	101	1770	723		1.03	0.00	17.3	0.0	461.4	586	426.0	3:08	1.06	0.44	0.00
11:34:51	532.1	137.9	0.4	122	98	1771	721		1.03	0.00	17.3	0.0	461.4	585	427.1	3:08	1.06	0.47	0.00
11:35:23	533.0	164.2	0.5	122	103	1770	730		1.03	0.00	17.3	0.0	461.4	585	428.0	3:09	1.06	0.45	0.00
11:36:02	534.1	134.7	0.8	122	104	1767	731		1.03	0.00	17.3	0.0	461.9	585	429.1	3:09	1.06	0.51	0.00
11:36:49	535.0	108.3	0.1	122	103	1768	724		1.03	0.00	17.3	0.0	462.7	585	430.0	3:10	1.06	0.45	0.00
11:38:52	536.2	152.5	0.3	122	98	1770	740		1.03	0.00	17.3	0.0	468.4	585	431.2	3:10	1.06	0.44	0.00
11:39:38	537.0	95.8	0.1	122	99	1775	765		1.03	0.00	17.3	0.0	471.5	585	432.0	3:11	1.06	0.46	0.00
11:40:20	538.0	87.7	2.0	122	104	1778	782		1.03	0.00	17.3	0.0	474.7	585	433.0	3:12	1.06	0.66	0.00
11:40:59	539.1	105.1	3.3	122	112	1775	794		1.03	0.00	17.3	0.0	475.8	586	434.1	3:12	1.06	0.67	0.00
11:41:44	540.1	73.7	4.6	122	116	1771	796		1.03	0.00	17.3	0.0	477.3	585	435.1	3:13	1.07	0.78	0.00
11:42:40	541.1	60.9	4.1	122	114	1780	805		1.03	0.00	17.3	0.0	478.2	585	436.1	3:14	1.07	0.81	0.00
11:43:20	542.0	83.9	4.0	122	108	1774	806		1.03	0.00	17.3	0.0	478.7	585	437.0	3:15	1.07	0.74	0.00
11:44:04	543.0	95.3	2.4	122	107	1764	793		1.03	0.00	17.3	0.0	478.9	585	438.0	3:15	1.06	0.66	0.00
11:44:45	544.0	104.7	3.4	122	108	1760	788		1.03	0.00	17.3	0.0	479.1	585	439.0	3:16	1.06	0.67	0.00
11:45:43	545.1	72.1	3.8	122	108	1764	785		1.03	0.00	17.3	0.0	480.1	586	440.1	3:17	1.06	0.77	0.00
11:46:36	546.0	68.2	2.2	122	112	1764	766		1.03	0.00	17.3	0.0	481.0	585	441.0	3:18	1.06	0.72	0.00
11:47:42	547.0	57.7	2.6	122	99	1769	764		1.03	0.00	17.4	0.0	482.4	577	442.0	3:19	1.06	0.78	0.00
11:48:53	548.0	48.8	4.7	122	128	1765	760		1.03	0.00	17.4	0.0	485.8	568	443.0	3:20	1.06	0.89	0.00
11:50:51	549.0	27.3	2.5	122	109	1768	741		1.03	0.00	17.4	0.0	490.4	569	444.0	3:22	1.06	0.93	0.00
12:03:50	550.0	64.0	1.3	119	120	1763	774		1.03	0.00	17.4	0.0	496.7	568	445.0	3:24	1.06	0.68	0.00
12:04:51	551.1	76.1	6.0	118	147	1763	779		1.03	0.00	17.4	0.0	498.9	569	446.1	3:25	1.06	0.80	0.00
12:05:45	552.1	83.1	6.5	119	148	1761	779		1.03	0.00	17.4	0.0	500.4	569	447.1	3:26	1.06	0.79	0.00
12:06:35	553.0	71.6	6.3	118	144	1764	781		1.03	0.00	17.4	0.0	501.9	569	448.0	3:26	1.06	0.83	0.00
12:07:39	554.0	53.7	3.9	119	122	1763	773		1.03	0.00	17.4	0.0	504.6	569	449.0	3:27	1.06	0.83	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT	DEPTH						
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
12:08:50	555.0	53.6	4.0	118	117	1760	759		1.03	0.00	17.4	0.0	506.8	569	450.0	3:29	1.06	0.84	0.00
12:09:55	556.0	61.4	3.9	119	120	1762	757		1.03	0.00	17.4	0.0	508.5	569	451.0	3:30	1.06	0.80	0.00
12:10:51	557.0	73.4	4.6	119	117	1761	747		1.03	0.00	17.5	0.0	510.0	570	452.0	3:31	1.06	0.78	0.00
12:12:00	558.0	54.5	5.3	118	123	1765	738		1.03	0.00	17.5	0.0	511.5	570	453.0	3:32	1.06	0.87	0.00

POOH. Run 30" casing

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
12th March 1993																			
NB #4 HTC ATM11HG 12.25" with 13,16,18 jets																			
15:19:48	561.0	3.0	20.2	63	96	1827	645	564	1.08	1.03	28.6	23.8	560.4	556	1.0	0:27	1.08	1.34	0.00
15:48:29	562.0	3.5	24.5	53	97	1868	661	588	1.08	1.03	30.1	31.7	561.2	563	2.0	0:55	1.08	1.57	0.00
16:19:45	563.0	4.9	21.2	53	99	1885	667	605	1.08	1.03	30.8	32.6	562.2	552	3.0	1:26	1.08	1.54	0.00
18:11:20	564.0	10.3	20.2	55	124	2078	690	624	1.07	1.03	31.5	31.1	563.0	624	4.0	1:40	1.08	0.91	0.00
18:18:32	565.1	9.5	19.2	55	126	2036	670	644	1.07	1.03	31.2	33.2	563.0	621	5.1	1:47	1.08	1.15	0.00
18:23:23	566.0	12.4	18.5	55	112	2055	682	682	1.07	1.03	31.3	33.7	563.2	616	6.0	1:52	1.08	1.06	0.01
18:28:35	567.0	12.3	19.3	54	115	2055	663	678	1.07	1.03	31.5	33.7	564.0	617	7.0	1:57	1.08	1.08	0.03
18:33:39	568.0	11.7	21.1	55	126	2047	675	674	1.08	1.03	31.8	34.1	564.6	617	8.0	2:02	1.08	1.10	0.03
18:38:27	569.0	12.1	22.6	55	123	2043	695	667	1.08	1.03	32.0	34.3	565.3	615	9.0	2:07	1.08	1.10	0.03
18:43:48	570.0	13.1	19.4	61	118	2215	715	744	1.08	1.03	32.3	34.3	566.2	613	10.0	2:12	1.08	1.12	0.03
18:46:53	571.0	24.3	18.9	121	130	2285	731	752	1.08	1.03	32.4	34.5	566.9	713	11.0	2:15	1.08	1.11	0.03
18:49:29	572.0	21.2	20.8	131	138	2396	718	802	1.08	1.03	32.5	34.5	567.3	722	12.0	2:18	1.08	1.14	0.03
18:52:23	573.0	18.2	20.3	129	130	2407	752	814	1.08	1.03	32.6	34.5	567.9	723	13.0	2:21	1.08	1.14	0.03
18:55:03	574.1	28.1	20.3	129	134	2418	747	797	1.08	1.03	32.7	34.5	568.5	723	14.1	2:24	1.08	1.13	0.03
18:57:17	575.0	24.1	24.2	129	148	2375	762	812	1.08	1.03	32.8	34.5	568.9	727	15.0	2:26	1.08	1.14	0.03
18:59:54	576.1	22.0	21.9	129	142	2387	783	825	1.08	1.03	32.9	34.6	569.4	727	16.1	2:28	1.08	1.15	0.03
19:02:39	577.0	25.6	21.1	128	140	2405	797	845	1.08	1.03	32.9	34.8	569.9	714	17.0	2:31	1.08	1.15	0.03
19:05:18	578.0	26.2	22.0	129	138	2408	780	845	1.08	1.03	33.0	34.9	570.6	724	18.0	2:34	1.08	1.15	0.03
19:08:03	579.0	21.5	22.4	129	131	2404	790	830	1.08	1.03	33.0	35.1	571.6	728	19.0	2:37	1.08	1.17	0.03
19:10:52	580.0	21.7	23.9	129	142	2400	785	855	1.08	1.03	33.1	35.3	572.7	725	20.0	2:39	1.08	1.17	0.03
19:13:29	581.0	23.0	21.3	129	131	2394	772	851	1.08	1.03	33.2	35.4	573.3	746	21.0	2:42	1.08	1.15	0.02
19:16:10	582.0	20.6	21.9	129	135	2412	769	868	1.08	1.03	33.3	35.5	574.5	739	22.0	2:45	1.08	1.16	0.20
19:18:28	583.0	26.9	23.1	129	138	2405	766	869	1.08	1.03	33.4	35.6	575.3	727	23.0	2:47	1.08	1.14	0.30
19:21:41	584.0	19.3	23.2	129	137	2401	735	863	1.08	1.03	33.5	35.7	576.3	734	24.0	2:50	1.08	1.22	0.30
19:23:28	585.0	35.9	22.3	129	130	2415	717	862	1.08	1.03	33.6	35.8	576.8	732	25.0	2:52	1.08	1.05	0.25
19:25:52	586.0	22.1	22.9	129	139	2431	720	842	1.08	1.03	33.7	35.9	577.5	731	26.0	2:54	1.08	1.14	0.02
19:28:14	587.1	20.2	22.1	128	133	2411	727	853	1.08	1.03	33.8	36.0	578.2	736	27.1	2:57	1.08	1.19	0.02
19:44:01	588.0	39.4	28.6	130	156	2537	794	877	1.08	1.03	34.2	36.0	585.1	731	28.0	2:60	1.09	1.29	0.03
19:46:15	589.1	23.2	26.3	130	160	2530	800	908	1.08	1.03	34.2	36.2	586.5	724	29.1	3:02	1.08	1.16	0.03
19:48:51	590.1	24.0	28.3	131	164	2548	811	890	1.08	1.03	34.3	36.4	587.1	733	30.1	3:05	1.08	1.23	0.03
19:51:37	591.0	18.6	26.8	130	163	2568	815	909	1.08	1.04	34.4	36.6	587.1	733	31.0	3:07	1.08	1.23	0.03
19:55:18	592.0	18.3	22.6	130	145	2536	817	882	1.08	1.08	34.5	36.7	587.1	740	32.0	3:11	1.08	1.25	0.03
19:58:45	593.0	16.8	25.0	131	160	2564	822	894	1.08	1.08	34.7	36.7	587.5	748	33.0	3:15	1.09	1.27	0.03
20:01:56	594.0	17.3	24.4	131	154	2554	829	899	1.08	1.08	34.8	36.7	588.9	749	34.0	3:18	1.09	1.23	0.03
20:04:48	595.0	26.3	24.3	130	157	2578	826	890	1.08	1.08	34.9	37.0	589.9	750	35.0	3:21	1.09	1.20	0.03
20:08:15	596.0	17.1	24.5	130	151	2551	827	878	1.08	1.08	35.0	37.1	591.0	750	36.0	3:24	1.09	1.26	0.04
20:11:30	597.0	18.7	25.6	131	152	2587	829	886	1.08	1.08	35.1	37.3	591.8	743	37.0	3:27	1.09	1.24	0.04
20:15:43	598.1	15.2	22.0	131	126	2593	822	890	1.08	1.08	35.3	37.4	592.8	740	38.1	3:31	1.09	1.26	0.04
20:18:54	599.0	18.9	24.0	131	139	2571	823	895	1.08	1.08	35.4	37.5	593.6	741	39.0	3:35	1.09	1.24	0.04
20:22:49	600.0	16.4	22.1	131	128	2565	800	879	1.08	1.08	35.6	37.7	594.7	743	40.0	3:39	1.09	1.25	0.04
20:25:41	601.0	22.5	24.9	131	140	2606	807	805	1.08	1.08	35.7	37.8	595.5	744	41.0	3:41	1.09	1.23	0.04
20:29:03	602.0	18.6	23.8	131	145	2617	804	787	1.08	1.08	35.8	37.9	596.6	744	42.0	3:45	1.09	1.24	0.04
20:32:17	603.0	19.9	25.7	131	145	2604	812	786	1.08	1.08	35.9	38.0	597.2	747	43.0	3:48	1.09	1.25	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT- mts	-BIT- hh:mm	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
20:35:37	604.0	16.7	26.2	131	140	2598	804	786	1.08	1.08	36.0	38.1	598.0	743	44.0	3:51	1.09	1.27	0.04
20:39:01	605.0	19.6	27.3	131	148	2616	806	784	1.08	1.08	36.1	38.2	598.8	740	45.0	3:55	1.09	1.30	0.04
20:42:52	606.0	15.2	27.7	130	147	2609	811	789	1.08	1.08	36.3	38.3	599.7	736	46.0	3:59	1.09	1.31	0.04
20:46:12	607.0	18.2	26.9	131	137	2621	806	780	1.08	1.08	36.4	38.4	600.6	743	47.0	4:02	1.09	1.28	0.03
20:49:50	608.0	17.2	27.5	131	153	2655	811	783	1.08	1.08	36.5	38.5	601.6	716	48.0	4:06	1.09	1.31	0.30
20:53:26	609.0	16.6	27.4	131	144	2653	807	784	1.08	1.08	36.6	38.7	602.6	723	49.0	4:09	1.09	1.31	0.30
20:56:43	610.0	17.4	30.9	130	151	2652	799	779	1.08	1.08	36.7	38.8	603.5	725	50.0	4:12	1.09	1.33	0.32
21:00:47	611.0	15.4	27.1	130	143	2633	817	777	1.08	1.08	36.9	38.9	604.5	722	51.0	4:17	1.09	1.32	0.00
21:04:25	612.0	16.1	27.9	131	149	2653	809	785	1.08	1.08	37.0	39.0	605.5	691	52.0	4:20	1.09	1.32	0.00
21:07:29	613.0	17.2	28.8	130	150	2631	821	793	1.08	1.08	37.1	39.1	606.5	684	53.0	4:23	1.09	1.28	0.00
21:10:02	614.0	20.6	24.8	130	141	2635	821	789	1.08	1.08	37.2	39.2	607.0	692	54.0	4:26	1.09	1.17	0.00
21:11:58	615.0	27.4	27.0	130	168	2630	809	799	1.08	1.08	37.3	39.3	607.4	696	55.0	4:28	1.09	1.14	0.00
21:15:34	616.0	14.5	25.8	130	160	2615	809	790	1.08	1.08	37.4	39.3	608.3	698	56.0	4:31	1.09	1.29	0.00
21:26:27	617.0	19.0	29.5	132	164	2512	823	944	1.08	1.08	37.5	39.4	610.7	687	57.0	4:35	1.09	1.29	0.04
21:30:03	618.0	22.5	28.3	133	153	2456	800	776	1.08	1.08	37.6	39.1	612.3	706	58.0	4:38	1.09	1.26	0.04
21:31:42	619.0	36.8	24.6	133	150	2497	783	789	1.08	1.08	37.7	39.4	612.9	705	59.0	4:40	1.09	1.08	0.04
21:33:19	620.1	38.0	25.1	134	151	2461	758	787	1.08	1.08	37.7	39.5	613.6	707	60.1	4:42	1.09	1.06	0.04
21:34:44	621.0	41.1	24.5	133	155	2484	744	784	1.08	1.08	37.7	39.5	614.1	711	61.0	4:43	1.09	1.04	0.04
21:36:10	622.1	84.5	24.7	133	143	2496	735	785	1.08	1.08	37.7	39.6	614.7	712	62.1	4:45	1.09	1.01	0.04
21:38:12	623.1	24.8	22.1	133	143	2467	727	795	1.08	1.08	37.8	39.6	615.5	709	63.1	4:47	1.09	1.10	0.04
21:40:04	624.0	26.5	21.6	133	150	2506	718	782	1.08	1.08	37.8	39.7	616.2	712	64.0	4:49	1.09	1.08	0.04
21:42:09	625.0	27.8	21.9	133	164	2466	710	776	1.08	1.08	37.8	39.9	616.8	712	65.0	4:51	1.09	1.10	0.07
21:43:52	626.1	34.3	22.6	133	146	2488	715	790	1.08	1.08	37.9	39.8	617.3	709	66.1	4:52	1.09	1.06	0.06
21:45:57	627.0	29.1	22.9	133	147	2483	710	778	1.08	1.08	37.9	39.9	617.7	712	67.0	4:54	1.09	1.11	0.05
21:47:49	628.1	43.8	25.1	133	151	2485	703	779	1.08	1.08	38.0	39.9	618.1	717	68.1	4:56	1.09	1.11	0.04
21:49:11	629.0	42.1	26.4	133	159	2508	703	792	1.08	1.08	38.0	39.9	618.9	720	69.0	4:58	1.09	1.06	0.04
21:51:00	630.1	45.0	22.4	133	142	2651	733	817	1.08	1.08	38.1	39.9	619.8	770	70.1	4:59	1.09	1.06	0.04
21:52:50	631.1	37.4	22.5	133	155	2451	742	792	1.08	1.08	38.1	40.0	620.9	747	71.1	5:01	1.09	1.08	0.04
21:54:09	632.0	49.2	23.1	134	159	2417	708	768	1.08	1.08	38.1	40.0	621.9	768	72.0	5:03	1.09	1.01	0.04
21:55:33	633.0	38.8	22.2	133	153	2445	717	773	1.08	1.08	38.2	40.2	622.3	777	73.0	5:04	1.09	1.00	0.04
21:57:26	634.0	31.5	23.3	133	167	2434	728	773	1.08	1.08	38.2	40.2	623.2	767	74.0	5:06	1.09	1.10	0.04
22:00:03	635.1	28.6	24.8	133	155	2435	725	772	1.08	1.08	38.3	40.3	624.4	774	75.1	5:08	1.09	1.19	0.04
22:02:27	636.1	40.6	27.0	133	172	2414	704	775	1.08	1.08	38.3	40.3	625.4	782	76.1	5:11	1.09	1.20	0.04
22:03:50	637.0	36.6	33.9	133	187	2459	701	768	1.08	1.08	38.4	40.4	626.0	756	77.0	5:12	1.09	1.12	0.04
22:05:32	638.1	36.2	29.4	133	168	2407	701	766	1.08	1.08	38.4	40.4	626.7	754	78.1	5:14	1.09	1.13	0.04
22:07:59	639.0	30.9	28.6	133	167	2447	728	775	1.08	1.08	38.5	40.4	628.0	761	79.0	5:16	1.09	1.21	0.04
22:09:49	640.1	36.3	28.2	133	180	2409	772	771	1.08	1.08	38.5	40.5	629.1	762	80.1	5:18	1.09	1.13	0.04
22:11:42	641.0	29.3	28.0	133	176	2456	734	780	1.08	1.08	38.6	40.6	630.0	762	81.0	5:20	1.09	1.15	0.04
22:13:40	642.1	35.2	28.5	133	178	2443	719	775	1.08	1.08	38.6	40.6	631.1	763	82.1	5:22	1.09	1.14	0.04
22:15:34	643.0	29.6	28.5	133	188	2461	737	781	1.08	1.08	38.6	40.6	632.5	762	83.0	5:24	1.09	1.16	0.04
22:17:21	644.0	33.1	30.0	133	197	2473	737	780	1.08	1.08	38.7	40.7	633.3	758	84.0	5:26	1.09	1.16	0.04
22:19:17	645.0	29.8	29.2	133	190	2495	727	773	1.08	1.08	38.7	40.7	634.2	759	85.0	5:28	1.09	1.15	0.04
22:30:24	646.1	36.4	25.5	134	167	2512	731	765	1.08	1.08	38.8	40.7	638.2	734	86.1	5:30	1.09	1.10	0.04
22:31:44	647.0	35.1	24.1	134	180	2513	789	755	1.08	1.08	39.0	40.5	639.1	752	87.0	5:31	1.09	1.02	0.04
22:33:09	648.0	42.7	24.4	134	200	2544	798	771	1.08	1.08	39.0	40.1	639.4	757	88.0	5:32	1.09	1.04	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
22:34:08	649.0	52.7	25.0	134	213	2556	797	780	1.08	1.08	39.0	40.4	639.9	764	89.0	5:33	1.09	0.95	0.04
22:35:17	650.0	48.8	25.0	135	196	2531	786	777	1.08	1.08	39.0	40.6	640.5	761	90.0	5:35	1.09	0.98	0.04
22:36:23	651.0	52.3	26.7	134	186	2555	801	776	1.08	1.08	39.0	40.8	641.0	759	91.0	5:36	1.09	1.00	0.04
22:36:58	652.1	110.0	20.6	134	168	2570	769	782	1.08	1.08	39.0	40.9	641.3	756	92.1	5:36	1.09	0.71	0.04
22:37:30	653.1	101.7	19.1	135	162	2573	757	779	1.08	1.08	39.0	40.8	641.6	752	93.1	5:37	1.09	0.73	0.04
22:38:14	654.1	79.5	18.7	135	170	2540	765	781	1.08	1.08	39.0	40.8	642.0	755	94.1	5:38	1.09	0.81	0.04
22:38:51	655.1	81.8	19.7	134	179	2500	762	788	1.08	1.08	39.0	40.9	642.3	756	95.1	5:38	1.09	0.78	0.04
22:39:29	656.1	118.7	20.9	134	186	2566	750	778	1.08	1.08	39.0	40.9	642.6	757	96.1	5:39	1.09	0.72	0.04
22:39:56	657.1	113.7	21.2	134	186	2554	753	774	1.08	1.08	39.0	41.0	642.8	756	97.1	5:39	1.09	0.72	0.04
22:40:30	658.1	108.6	19.9	134	175	2560	758	789	1.08	1.08	39.0	41.0	643.0	754	98.1	5:40	1.09	0.74	0.04
22:40:58	659.1	183.6	19.3	134	174	2567	750	782	1.08	1.08	39.0	41.0	643.3	751	99.1	5:40	1.09	0.69	0.04
22:41:23	660.1	156.4	17.4	134	177	2569	742	795	1.08	1.08	39.0	41.0	643.5	754	100.1	5:41	1.09	0.68	0.04
22:41:49	661.1	139.3	17.1	134	160	2573	740	781	1.08	1.08	39.0	41.0	643.7	755	101.1	5:41	1.09	0.61	0.04
22:42:09	662.0	180.6	17.7	135	157	2465	741	780	1.08	1.08	39.0	41.0	643.9	754	102.0	5:41	1.09	0.62	0.04
22:42:31	663.2	204.7	27.2	134	214	2585	746	775	1.08	1.08	39.1	41.0	644.1	751	103.2	5:42	1.09	0.69	0.04
22:42:44	664.2	238.1	29.7	134	187	2583	748	774	1.08	1.08	39.0	41.0	644.2	748	104.2	5:42	1.09	0.56	0.04
22:42:56	665.1	306.9	19.3	134	134	2573	749	783	1.08	1.08	39.0	41.1	644.3	749	105.1	5:42	1.09	0.45	0.04
22:43:26	667.0	418.0	11.8	134	102	2570	750	785	1.08	1.08	39.0	41.1	644.5	750	107.0	5:42	1.09	0.30	0.04
22:43:40	668.1	251.8	18.7	135	157	2583	756	768	1.08	1.08	39.0	41.1	644.6	752	108.1	5:43	1.09	0.56	0.04
22:43:51	669.2	310.0	15.6	135	148	2545	756	746	1.08	1.08	39.0	41.1	644.7	752	109.2	5:43	1.09	0.36	0.04
22:44:05	670.3	390.1	8.9	135	107	2590	755	768	1.08	1.08	39.1	41.1	644.8	750	110.3	5:43	1.09	0.43	0.04
22:44:36	672.7	544.7	6.0	135	93	2585	751	757	1.08	1.08	39.1	41.1	645.1	749	112.7	5:43	1.09	0.31	0.04
22:51:18	673.8	479.8	5.5	135	116	2611	738	710	1.08	1.08	39.1	41.1	645.9	730	113.8	5:43	1.09	0.32	0.04
22:51:27	674.4	445.8	5.1	102	106	2655	686	691	1.09	1.08	39.1	40.7	645.9	729	114.4	5:43	1.09	0.33	0.04
22:51:39	675.3	399.1	6.2	116	103	2671	676	719	1.08	1.08	39.2	40.8	645.9	727	115.3	5:43	1.09	0.37	0.04
22:51:48	676.2	358.4	6.6	122	106	2692	678	614	1.08	1.08	39.2	40.9	645.9	726	116.2	5:43	1.09	0.41	0.04
22:51:57	677.2	304.8	8.6	126	119	2683	668	733	1.08	1.08	39.2	40.9	645.9	725	117.2	5:44	1.09	0.46	0.04
22:52:14	678.5	279.9	25.2	130	137	2657	685	485	1.08	1.08	39.2	41.0	646.4	724	118.5	5:44	1.09	0.51	0.04
22:52:23	679.2	255.7	22.3	129	146	2686	672	590	1.08	1.08	39.2	41.0	646.7	727	119.2	5:44	1.09	0.46	0.04
22:52:29	680.1	180.9	20.9	130	153	2706	683	665	1.08	1.08	39.2	41.0	646.9	730	120.1	5:44	1.09	0.59	0.04
22:52:45	681.2	227.1	19.5	130	142	2697	689	735	1.08	1.08	39.2	41.0	647.0	737	121.2	5:44	1.09	0.56	0.04
22:53:01	682.0	185.1	15.9	130	128	2700	694	767	1.08	1.08	39.2	40.9	647.5	741	122.0	5:45	1.09	0.54	0.04
22:53:21	683.5	275.1	26.8	130	167	2714	702	752	1.08	1.08	39.2	40.8	648.1	747	123.5	5:45	1.09	0.54	0.04
22:53:31	684.1	208.5	27.7	130	155	2716	709	726	1.08	1.08	39.2	40.6	648.4	748	124.1	5:45	1.09	0.46	0.04
22:53:47	685.1	286.9	14.9	130	154	2623	715	790	1.08	1.08	39.2	40.5	649.0	750	125.1	5:45	1.09	0.51	0.04
22:54:08	686.2	174.9	12.9	130	128	2619	718	769	1.08	1.08	39.2	40.4	649.6	756	126.2	5:46	1.09	0.54	0.04
22:54:27	687.2	212.1	8.5	130	104	2671	721	773	1.08	1.08	39.2	40.3	650.2	761	127.2	5:46	1.09	0.47	0.04
22:54:51	688.1	133.6	8.4	130	114	2680	724	768	1.08	1.08	39.2	40.2	651.0	761	128.1	5:46	1.09	0.56	0.04
22:55:15	689.0	143.1	7.3	130	111	2697	732	787	1.09	1.08	39.2	40.3	651.8	760	129.0	5:47	1.09	0.55	0.04
22:55:40	690.1	176.0	7.9	130	116	2711	744	794	1.09	1.08	39.2	40.4	652.6	757	130.1	5:47	1.09	0.54	0.04
22:56:05	691.2	237.7	9.3	130	119	2670	756	785	1.08	1.08	39.2	40.5	653.4	757	131.2	5:48	1.09	0.53	0.04
22:56:20	692.1	233.0	9.8	130	100	2694	761	787	1.08	1.08	39.2	40.6	653.9	755	132.1	5:48	1.09	0.45	0.04
22:56:36	693.1	240.2	7.1	130	96	2686	765	768	1.08	1.08	39.2	40.7	654.4	757	133.1	5:48	1.09	0.42	0.04
22:56:54	694.2	186.1	8.8	130	98	2711	767	781	1.08	1.08	39.2	40.8	655.1	757	134.2	5:49	1.09	0.49	0.04
22:57:06	695.1	234.1	13.2	130	130	2681	768	772	1.08	1.08	39.2	40.9	655.4	758	135.1	5:49	1.09	0.48	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
22:57:19	696.0	230.2	20.1	130	137	2717	770	763	1.08	1.08	39.2	40.9	655.9	756	136.0	5:49	1.09	0.53	0.04
22:57:36	697.3	221.1	20.7	130	159	2531	771	775	1.09	1.08	39.2	40.9	656.4	756	137.3	5:49	1.09	0.51	0.04
22:57:49	698.1	207.3	23.8	130	179	2669	773	773	1.08	1.08	39.2	40.9	656.9	756	138.1	5:49	1.09	0.55	0.04
22:58:01	699.1	296.6	24.4	130	189	2707	774	770	1.09	1.08	39.2	40.9	657.2	756	139.1	5:50	1.09	0.50	0.04
22:58:16	700.2	299.5	14.7	131	110	2673	773	779	1.08	1.08	39.2	40.9	657.7	755	140.2	5:50	1.09	0.43	0.04
22:58:28	701.1	279.2	11.2	131	91	2694	771	774	1.08	1.08	39.2	40.9	658.2	756	141.1	5:50	1.09	0.40	0.04
22:58:47	702.1	184.3	2.9	131	82	2709	766	791	1.09	1.08	39.2	41.0	658.8	756	142.1	5:50	1.09	0.41	0.04
22:59:06	703.0	186.5	6.9	130	99	2707	759	787	1.09	1.08	39.2	41.0	659.3	755	143.0	5:51	1.09	0.52	0.04
23:05:29	704.2	222.4	7.2	128	95	2674	665	755	1.09	1.08	39.2	41.0	665.4	729	144.2	5:51	1.09	0.44	0.04
23:05:38	705.0	312.3	6.8	131	115	2636	666	734	1.08	1.08	39.2	40.9	665.7	729	145.0	5:51	1.09	0.34	0.04
23:05:50	706.1	448.5	2.6	134	119	2646	668	464	1.08	1.08	39.2	41.0	666.1	728	146.1	5:51	1.09	0.30	0.04
23:06:07	707.4	363.1	3.7	134	116	2632	676	612	1.09	1.08	39.2	41.0	666.6	727	147.4	5:52	1.09	0.36	0.04
23:06:17	708.2	307.1	3.8	135	102	2629	686	748	1.09	1.08	39.2	41.1	666.9	726	148.2	5:52	1.09	0.40	0.04
23:06:29	709.0	297.6	10.7	135	132	2647	691	748	1.09	1.08	39.2	41.1	667.2	729	149.0	5:52	1.09	0.45	0.04
23:06:44	710.1	249.5	8.9	135	137	2629	703	648	1.09	1.08	39.2	41.0	667.8	733	150.1	5:52	1.09	0.43	0.04
23:06:59	711.2	320.4	4.4	135	108	2645	708	755	1.09	1.08	39.2	41.0	668.2	736	151.2	5:52	1.09	0.32	0.04
23:07:24	712.7	453.9	1.9	136	103	2639	713	768	1.09	1.08	39.2	40.9	669.0	742	152.7	5:53	1.09	0.29	0.04
23:07:36	713.2	361.7	0.7	136	105	2629	724	773	1.09	1.08	39.2	40.7	669.3	742	153.2	5:53	1.09	0.33	0.04
23:07:46	714.0	232.9	2.1	136	121	2585	728	759	1.09	1.08	39.2	40.6	669.7	743	154.0	5:53	1.09	0.38	0.04
23:08:07	715.3	230.5	3.3	136	111	2569	735	769	1.08	1.08	39.2	40.4	670.3	746	155.3	5:53	1.09	0.40	0.04
23:08:19	716.2	266.7	4.4	136	128	2654	744	782	1.08	1.08	39.2	40.3	670.8	745	156.2	5:53	1.09	0.36	0.04
23:08:35	717.2	254.9	8.2	134	158	2637	750	781	1.09	1.08	39.2	40.2	671.2	748	157.2	5:54	1.09	0.52	0.04
23:08:46	718.1	300.6	16.7	135	180	2631	753	768	1.09	1.08	39.2	40.1	671.6	750	158.1	5:54	1.09	0.46	0.04
23:09:02	719.3	264.6	14.0	135	162	2633	754	780	1.09	1.08	39.2	40.1	672.2	751	159.3	5:54	1.09	0.47	0.04
23:09:20	720.4	220.6	12.1	135	153	2658	753	795	1.09	1.08	39.2	40.1	672.7	746	160.4	5:54	1.09	0.49	0.04
23:09:29	721.0	250.0	13.6	135	186	2661	748	819	1.08	1.08	39.2	40.1	673.0	744	161.0	5:54	1.09	0.49	0.04
23:09:45	722.2	224.5	35.4	135	239	2664	743	798	1.09	1.08	39.2	40.1	673.5	745	162.2	5:55	1.09	0.63	0.04
23:10:00	723.1	205.7	32.6	135	253	2656	740	802	1.09	1.08	39.2	40.2	673.9	746	163.1	5:55	1.09	0.64	0.04
23:10:19	724.1	209.4	25.3	135	197	2634	739	820	1.09	1.08	39.2	40.4	674.5	745	164.1	5:55	1.09	0.61	0.04
23:10:35	725.0	191.3	19.1	135	180	2626	737	831	1.09	1.08	39.2	40.5	675.0	747	165.0	5:56	1.09	0.55	0.04
23:10:52	726.1	231.6	14.9	135	170	2627	732	800	1.09	1.08	39.2	40.7	675.6	742	166.1	5:56	1.09	0.44	0.04
23:11:11	727.0	165.9	15.0	135	185	2636	727	808	1.09	1.08	39.2	40.8	676.2	743	167.0	5:56	1.09	0.58	0.04
23:11:29	728.0	171.8	16.6	135	286	2477	724	798	1.09	1.08	39.2	41.0	676.7	742	168.0	5:56	1.09	0.47	0.04
23:11:51	729.1	158.4	16.0	135	323	2640	724	785	1.09	1.08	39.2	41.2	677.5	739	169.1	5:57	1.09	0.58	0.04
23:12:11	730.1	174.3	15.0	135	322	2619	725	772	1.09	1.08	39.2	41.3	678.1	741	170.1	5:57	1.09	0.56	0.04
23:12:30	731.1	194.7	15.6	135	326	2644	727	771	1.09	1.08	39.2	41.4	678.7	743	171.1	5:57	1.09	0.59	0.04
23:12:52	732.1	164.9	17.8	135	275	2630	729	770	1.09	1.08	39.2	41.5	679.3	747	172.1	5:58	1.09	0.63	0.04
23:13:14	733.1	145.7	15.1	135	200	2628	731	782	1.09	1.08	39.2	41.5	680.1	750	173.1	5:58	1.09	0.58	0.04
23:24:28	734.1	160.0	10.4	130	150	2669	736	802	1.09	1.08	39.2	41.0	703.3	714	174.1	5:59	1.09	0.70	0.04
23:24:51	735.2	196.4	13.8	133	164	2652	738	820	1.09	1.08	39.3	41.0	703.5	713	175.2	5:59	1.09	0.54	0.04
23:25:15	736.2	153.2	13.1	136	162	2672	754	805	1.09	1.08	39.2	41.1	703.6	714	176.2	5:60	1.09	0.57	0.04
23:25:33	737.1	193.2	15.8	136	186	2672	761	815	1.09	1.08	39.3	41.2	703.6	713	177.1	6:00	1.09	0.59	0.04
23:25:55	738.0	125.5	17.7	136	191	2677	767	803	1.09	1.08	39.2	41.3	703.6	711	178.0	6:00	1.09	0.65	0.04
23:26:20	739.1	133.5	19.5	136	194	2552	764	800	1.09	1.08	39.3	41.4	703.6	713	179.1	6:01	1.09	0.66	0.04
23:26:41	740.0	163.6	16.5	136	167	2660	755	800	1.09	1.08	39.3	41.6	703.6	714	180.0	6:01	1.09	0.61	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT- mts	-BIT- hh:mm	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
23:27:03	741.1	165.9	16.6	136	165	2663	745	807	1.09	1.08	39.2	41.7	703.6	715	181.1	6:01	1.09	0.61	0.04
23:27:24	742.1	156.4	17.1	136	181	2655	738	805	1.09	1.08	39.3	41.8	703.7	714	182.1	6:02	1.09	0.61	0.04
23:27:46	743.0	224.3	17.3	136	177	2672	734	803	1.09	1.08	39.3	41.8	704.0	698	183.0	6:02	1.09	0.63	0.04
23:28:11	744.1	202.3	14.4	136	171	2661	734	812	1.09	1.08	39.3	41.8	704.9	661	184.1	6:03	1.09	0.60	0.04
23:28:47	745.1	96.4	15.4	136	170	2682	736	800	1.09	1.08	39.3	41.8	707.9	660	185.1	6:03	1.09	0.70	0.04
23:29:15	746.1	204.7	11.9	136	153	2655	734	809	1.09	1.08	39.3	41.6	709.6	667	186.1	6:04	1.09	0.65	0.04
23:29:49	747.0	171.0	11.6	136	143	2559	728	815	1.09	1.08	39.3	41.4	712.1	753	187.0	6:04	1.09	0.65	0.04
23:30:23	748.0	100.1	11.0	136	157	2612	726	833	1.09	1.08	39.3	41.4	715.5	751	188.0	6:05	1.09	0.65	0.04
23:31:00	749.0	100.0	10.6	136	145	2629	728	821	1.09	1.08	39.3	41.5	717.4	761	189.0	6:05	1.09	0.65	0.04
23:31:45	750.1	108.6	13.9	136	165	2635	730	846	1.09	1.08	39.3	41.6	718.1	758	190.1	6:06	1.09	0.76	0.04
23:32:29	751.1	84.0	14.5	136	144	2627	728	835	1.09	1.08	39.4	41.7	719.9	747	191.1	6:07	1.09	0.76	0.04
23:33:13	752.0	65.5	15.3	136	152	2614	722	844	1.09	1.08	39.4	41.8	722.2	741	192.0	6:08	1.09	0.78	0.04
23:34:05	753.0	64.2	17.2	136	157	2545	710	826	1.09	1.08	39.4	41.9	724.9	745	193.0	6:09	1.09	0.83	0.04
23:35:07	754.0	50.5	18.6	136	144	2613	700	827	1.09	1.08	39.4	42.1	727.6	748	194.0	6:10	1.09	0.89	0.04
23:37:04	755.0	52.3	22.7	136	151	2592	706	821	1.09	1.08	39.5	42.2	732.2	740	195.0	6:12	1.10	1.09	0.04
23:37:56	756.0	66.4	21.9	136	169	2595	709	819	1.09	1.08	39.5	42.4	733.1	758	196.0	6:12	1.10	0.87	0.04
23:38:40	757.0	76.9	26.8	136	193	2592	716	799	1.09	1.08	39.5	42.5	733.1	760	197.0	6:13	1.10	0.89	0.04
23:39:43	758.0	53.3	27.8	136	198	2614	710	793	1.09	1.08	39.5	42.6	733.1	760	198.0	6:14	1.10	1.00	0.04
23:40:48	759.0	57.0	28.5	136	195	2563	716	774	1.09	1.08	39.6	42.6	733.1	759	199.0	6:15	1.10	0.99	0.04
23:41:40	760.0	70.1	24.9	136	178	2598	721	770	1.09	1.08	39.7	42.6	733.1	747	200.0	6:16	1.10	0.91	0.04
23:42:52	761.0	45.4	24.4	136	171	2591	720	772	1.09	1.08	39.7	42.5	733.1	742	201.0	6:17	1.10	0.98	0.04
00:00:40	762.1	24.8	24.7	135	170	2583	714	761	1.09	1.08	39.8	42.4	748.9	698	202.1	6:20	1.10	1.14	0.04
00:02:08	763.1	48.0	22.7	131	175	2496	711	759	1.09	1.08	40.2	42.1	750.5	709	203.1	6:21	1.10	1.00	0.04
00:03:08	764.0	52.7	22.1	131	173	2558	715	766	1.09	1.08	40.2	42.2	751.7	709	204.0	6:22	1.10	0.91	0.04
00:04:58	765.0	34.2	22.1	131	174	2570	716	753	1.09	1.08	40.2	42.3	753.7	722	205.0	6:24	1.10	1.05	0.04
00:06:54	766.0	32.2	22.6	131	177	2554	710	749	1.09	1.08	40.2	42.3	754.3	726	206.0	6:26	1.10	1.07	0.04
00:09:08	767.1	29.4	21.2	131	169	2551	718	764	1.09	1.08	40.3	42.6	756.8	713	207.1	6:28	1.10	1.06	0.04
00:11:31	768.0	25.1	23.4	131	184	2594	721	756	1.09	1.08	40.3	42.8	758.9	649	208.0	6:30	1.10	1.13	0.04
00:13:59	769.1	26.1	22.0	131	179	2551	723	750	1.09	1.08	40.4	42.8	761.0	641	209.1	6:33	1.10	1.13	0.04
00:16:15	770.0	22.6	21.6	131	180	2581	723	754	1.09	1.08	40.5	42.9	761.9	640	210.0	6:35	1.10	1.11	0.04
00:19:04	771.0	18.7	21.7	131	188	2597	726	751	1.09	1.08	40.6	43.0	761.9	640	211.0	6:38	1.10	1.15	0.04
00:22:09	772.0	17.5	21.7	131	181	2589	727	741	1.09	1.08	40.7	42.9	761.9	640	212.0	6:41	1.10	1.19	0.04
00:24:55	773.0	19.4	20.3	131	181	2601	722	749	1.09	1.08	40.8	42.9	761.9	640	213.0	6:44	1.10	1.13	0.04
00:28:21	774.0	18.6	18.1	131	170	2603	726	742	1.09	1.08	40.9	43.0	763.4	639	214.0	6:47	1.10	1.15	1.09
00:31:49	775.0	15.9	20.3	131	179	2582	729	749	1.09	1.08	41.0	43.2	765.4	639	215.0	6:51	1.10	1.19	0.02
00:33:26	776.0	50.3	19.7	131	179	2607	731	748	1.09	1.08	41.0	43.3	766.1	640	216.0	6:52	1.10	0.98	0.01
00:36:31	777.0	16.9	21.2	131	174	2598	726	760	1.09	1.08	41.1	43.3	767.3	639	217.0	6:55	1.10	1.19	0.01
00:38:08	778.0	41.0	21.9	131	187	2592	707	750	1.09	1.08	41.2	43.3	767.9	638	218.0	6:57	1.10	1.03	0.19
00:39:47	779.0	30.7	23.3	131	186	2630	697	746	1.09	1.08	41.2	43.4	768.5	638	219.0	6:59	1.10	1.03	0.69
00:41:39	780.1	33.5	26.1	131	153	2607	707	736	1.09	1.08	41.3	43.5	779.8	638	220.1	7:01	1.10	1.07	0.08
00:43:15	781.0	31.0	29.5	131	190	2637	717	742	1.09	1.08	41.3	43.5	779.9	637	221.0	7:02	1.10	1.12	0.07
00:45:02	782.0	32.2	30.2	131	173	2627	717	735	1.09	1.08	41.3	43.6	779.9	636	222.0	7:04	1.10	1.15	0.07
00:46:48	783.1	47.8	28.7	131	165	2640	727	729	1.09	1.08	41.4	43.7	779.9	638	223.1	7:06	1.10	1.11	0.07
00:47:06	784.2	228.5	15.4	131	90	2630	722	732	1.09	1.08	41.4	43.7	779.9	639	224.2	7:06	1.10	0.48	0.07
00:47:27	785.5	240.0	5.2	131	69	2602	718	719	1.09	1.08	41.4	43.7	779.9	639	225.5	7:06	1.10	0.41	0.07

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
00:47:40	786.1	172.2	4.7	131	71	2497	719	692	1.09	1.08	41.4	43.7	779.9	639	226.1	7:07	1.10	0.39	0.07
00:48:02	787.1	146.9	4.9	131	85	2648	721	714	1.09	1.08	41.4	43.7	779.9	640	227.1	7:07	1.10	0.52	0.07
00:48:55	788.0	58.7	9.6	130	94	2650	727	742	1.09	1.08	41.5	43.7	779.9	640	228.0	7:08	1.10	0.72	0.07
00:49:48	789.0	62.3	9.3	131	97	2636	723	746	1.09	1.08	41.5	43.8	779.9	641	229.0	7:09	1.10	0.73	0.07
00:50:37	790.0	61.9	10.1	132	91	2644	728	726	1.09	1.08	41.5	43.8	779.9	640	230.0	7:10	1.10	0.71	0.07
01:04:24	791.0	78.8	12.9	132	87	2564	737	730	1.09	1.08	41.5	43.8	779.9	613	231.0	7:10	1.10	0.72	0.07
01:04:49	792.0	154.8	8.6	134	77	2586	742	746	1.09	1.08	41.6	43.3	779.9	614	232.0	7:11	1.10	0.50	0.07
01:05:21	793.1	109.4	3.2	133	98	2725	745	761	1.09	1.08	41.6	43.0	779.9	621	233.1	7:11	1.10	0.51	0.07
01:05:46	794.0	156.7	4.5	135	95	2699	750	758	1.09	1.08	41.6	43.0	779.9	625	234.0	7:12	1.10	0.51	0.07
01:06:16	795.0	122.1	7.5	135	103	2706	757	765	1.09	1.08	41.6	43.0	779.9	630	235.0	7:12	1.10	0.61	0.07
01:06:41	796.0	160.4	11.1	135	132	2705	757	769	1.09	1.08	41.6	43.0	779.9	634	236.0	7:13	1.10	0.60	0.07
01:06:59	797.2	249.9	18.8	135	136	2742	754	747	1.09	1.08	41.6	43.0	779.9	638	237.2	7:13	1.10	0.51	0.07
01:07:12	798.1	251.3	13.6	135	118	2739	752	740	1.09	1.08	41.6	43.0	779.9	639	238.1	7:13	1.10	0.47	0.07
01:07:25	799.0	219.4	8.2	135	100	2749	755	741	1.09	1.08	41.6	43.0	779.9	640	239.0	7:13	1.10	0.44	0.07
01:07:45	800.2	208.4	10.2	135	113	2718	765	746	1.09	1.08	41.6	43.1	779.9	641	240.2	7:14	1.10	0.48	0.07
01:08:01	801.2	212.9	17.3	135	167	2730	773	773	1.09	1.08	41.5	43.1	779.9	642	241.2	7:14	1.10	0.52	0.07
01:08:13	802.1	248.1	26.7	135	198	2581	777	781	1.09	1.08	41.6	43.1	779.9	641	242.1	7:14	1.10	0.60	0.07
01:08:38	803.0	132.4	30.1	135	197	2760	777	771	1.09	1.08	41.6	43.1	779.9	636	243.0	7:15	1.10	0.74	0.07
01:09:07	804.1	133.4	21.2	135	175	2747	768	785	1.09	1.08	41.6	43.2	779.9	627	244.1	7:15	1.10	0.68	0.07
01:09:37	805.0	95.8	25.5	135	187	2750	763	790	1.09	1.08	41.5	43.2	779.9	619	245.0	7:16	1.10	0.81	0.07
01:10:27	806.0	64.7	27.0	135	189	2765	767	783	1.09	1.08	41.5	43.3	779.9	605	246.0	7:16	1.10	0.91	0.07
01:10:58	807.2	192.5	27.8	135	193	2765	777	775	1.09	1.08	41.5	43.4	779.9	612	247.2	7:17	1.10	0.71	0.07
01:11:23	808.1	152.7	27.4	135	185	2757	790	775	1.09	1.08	41.5	43.5	785.4	648	248.1	7:17	1.09	0.70	0.01
01:11:47	809.1	167.6	27.0	135	180	2652	802	771	1.09	1.08	41.5	43.5	785.8	677	249.1	7:18	1.09	0.63	0.00
01:12:11	810.0	168.6	27.4	135	232	2711	805	768	1.09	1.08	41.5	43.6	786.3	678	250.0	7:18	1.09	0.73	0.00
01:12:30	811.1	211.9	27.3	135	204	2762	804	760	1.09	1.08	41.5	43.6	786.7	676	251.1	7:18	1.09	0.66	0.00
01:12:45	812.1	232.7	31.9	135	208	2764	800	741	1.09	1.08	41.6	43.7	787.0	677	252.1	7:19	1.09	0.59	0.00
01:13:01	813.1	220.6	24.9	135	167	2761	798	765	1.09	1.08	41.5	43.7	787.3	679	253.1	7:19	1.09	0.60	0.00
01:13:20	814.1	172.8	21.1	135	154	2772	792	782	1.09	1.08	41.5	43.8	787.7	681	254.1	7:19	1.09	0.60	0.00
01:13:40	815.2	218.4	19.7	135	152	2753	782	774	1.09	1.08	41.5	43.8	788.1	680	255.2	7:20	1.09	0.57	0.00
01:13:59	816.0	186.3	16.6	135	144	2769	776	789	1.09	1.08	41.5	43.8	788.5	679	256.0	7:20	1.09	0.59	0.00
01:14:27	817.0	112.2	13.4	135	127	2783	773	795	1.09	1.08	41.5	43.9	788.9	676	257.0	7:20	1.09	0.65	0.00
01:15:02	818.1	109.0	11.4	135	112	2801	762	797	1.09	1.08	41.5	43.9	789.6	675	258.1	7:21	1.09	0.64	0.00
01:15:45	819.1	81.0	8.1	135	86	2755	750	796	1.09	1.08	41.4	43.9	790.5	681	259.1	7:22	1.09	0.64	0.00
01:33:17	820.0	25.5	22.6	131	162	2778	754	758	1.09	1.08	41.5	43.6	802.1	657	260.0	7:24	1.09	1.14	0.00
01:33:51	821.0	109.8	25.1	129	180	2751	744	769	1.09	1.08	41.5	43.5	802.7	642	261.0	7:24	1.10	0.79	0.00
01:35:03	822.0	43.4	30.0	129	194	2746	751	771	1.09	1.08	41.5	43.4	804.1	651	262.0	7:26	1.10	1.05	0.00
01:36:05	823.0	74.9	28.0	129	191	2715	754	799	1.09	1.08	41.5	43.1	805.2	652	263.0	7:27	1.10	0.97	0.00
01:37:32	824.0	96.1	27.5	129	162	2692	763	797	1.09	1.08	41.5	43.3	806.9	660	264.0	7:28	1.10	1.01	0.00
01:38:09	825.0	98.3	21.8	129	157	2693	766	799	1.09	1.08	41.5	43.5	807.4	635	265.0	7:29	1.10	0.78	0.00
01:39:31	826.2	50.2	30.1	129	211	2653	785	798	1.09	1.08	41.5	43.8	809.4	628	266.2	7:30	1.10	0.95	0.00
01:40:22	827.1	72.7	27.1	129	199	2680	792	813	1.09	1.08	41.5	43.9	811.5	637	267.1	7:31	1.10	0.93	0.00
01:41:34	828.0	47.3	28.2	129	186	2668	793	812	1.09	1.08	41.5	44.0	815.3	614	268.0	7:32	1.10	1.01	0.00
01:42:49	829.1	67.6	26.8	129	171	2591	761	813	1.09	1.08	41.5	44.2	817.6	610	269.1	7:33	1.10	1.03	0.00
01:43:25	830.1	92.3	23.6	129	202	2661	749	815	1.09	1.08	41.5	44.2	818.4	607	270.1	7:34	1.10	0.82	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT	DEPTH						
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
01:43:59	831.0	95.3	26.0	129	183	2668	745	816	1.09	1.08	41.5	44.3	819.0	607	271.0	7:35	1.10	0.80	0.00
01:44:43	832.1	79.5	30.0	129	184	2667	753	796	1.09	1.08	41.4	44.4	819.2	607	272.1	7:35	1.10	0.87	0.00
01:45:27	833.0	77.2	30.6	129	185	2681	788	808	1.10	1.08	41.5	44.4	819.2	723	273.0	7:36	1.10	0.90	0.00
01:46:29	834.0	70.7	28.9	129	177	2601	797	768	1.09	1.08	41.5	44.6	819.2	725	274.0	7:37	1.10	0.97	0.00
01:47:09	835.0	93.7	29.6	129	185	2653	791	760	1.09	1.08	41.5	44.6	819.2	709	275.0	7:38	1.10	0.87	0.00
01:48:02	836.0	62.3	30.1	129	177	2656	775	768	1.10	1.08	41.5	44.6	819.2	712	276.0	7:39	1.10	0.95	0.00
01:50:10	837.0	25.7	33.2	129	188	2641	766	762	1.10	1.08	41.6	44.7	819.3	723	277.0	7:41	1.10	1.21	0.00
01:51:51	838.1	51.4	34.8	129	202	2655	768	745	1.10	1.08	41.7	44.7	819.3	727	278.1	7:42	1.10	1.12	0.00
01:52:13	839.0	136.4	26.7	129	197	2688	746	754	1.10	1.08	41.7	44.7	819.3	727	279.0	7:43	1.10	0.67	0.00
01:52:30	840.1	224.5	18.5	128	147	2679	741	771	1.10	1.08	41.7	44.7	819.3	728	280.1	7:43	1.10	0.53	0.00
01:52:55	841.3	192.9	12.5	129	96	2680	743	753	1.10	1.08	41.8	44.7	819.4	687	281.3	7:43	1.10	0.53	0.00
01:53:20	842.1	111.8	11.4	129	103	2664	745	768	1.10	1.08	41.8	44.7	819.6	713	282.1	7:44	1.10	0.60	0.00
01:53:58	843.1	88.9	16.0	130	126	2629	748	769	1.10	1.08	41.8	44.6	820.0	733	283.1	7:45	1.10	0.75	0.00
01:54:22	844.2	184.0	27.2	129	210	2694	751	761	1.10	1.08	41.9	44.6	820.2	704	284.2	7:45	1.10	0.59	0.00
01:54:34	845.2	353.4	15.2	129	146	2701	748	753	1.10	1.08	41.9	44.6	820.3	690	285.2	7:45	1.10	0.44	0.00
01:55:07	846.1	93.2	14.2	129	132	2716	745	732	1.10	1.08	41.9	44.6	820.3	697	286.1	7:46	1.10	0.68	0.00
01:57:44	847.1	15.9	17.6	129	120	2699	747	711	1.10	1.08	41.9	44.6	822.5	700	287.1	7:48	1.10	1.09	0.00
01:58:40	848.1	97.3	18.5	129	119	2714	755	746	1.10	1.08	42.1	44.7	823.1	687	288.1	7:49	1.10	0.77	0.00
02:13:16	849.0	45.6	18.3	130	117	2676	773	740	1.10	1.08	41.9	44.3	832.3	643	289.0	7:51	1.10	0.93	0.00
02:14:30	850.0	63.6	28.5	131	170	2697	767	731	1.10	1.08	41.6	43.6	833.4	645	290.0	7:52	1.10	1.01	0.00
02:15:45	851.0	41.6	26.7	131	187	2684	751	756	1.10	1.08	41.5	43.7	834.8	651	291.0	7:53	1.10	1.02	0.00
02:16:34	852.0	129.2	24.5	131	184	2645	739	748	1.10	1.08	41.4	44.0	835.8	675	292.0	7:54	1.10	0.86	0.00
02:17:13	853.3	294.9	21.1	131	167	2609	734	751	1.10	1.08	41.4	44.0	836.2	680	293.3	7:54	1.10	0.53	0.00
02:17:47	854.1	135.1	3.1	131	192	2638	733	735	1.10	1.08	41.3	44.1	836.4	679	294.1	7:55	1.10	0.40	0.00
02:19:19	855.0	28.9	3.6	131	180	2639	746	749	1.10	1.08	41.3	44.2	837.0	694	295.0	7:56	1.10	0.71	0.00
02:26:51	856.0	12.5	14.1	131	151	2547	747	754	1.10	1.08	41.2	44.5	846.9	717	296.0	8:02	1.10	1.23	0.00
02:29:37	857.0	21.9	30.4	131	169	2509	735	746	1.10	1.08	41.2	44.7	848.5	685	297.0	8:05	1.10	1.23	0.00
02:30:02	858.0	122.6	23.4	131	173	2537	734	750	1.10	1.08	41.2	44.9	848.5	683	298.0	8:06	1.10	0.70	0.00
02:35:37	859.0	4.8	31.6	131	210	2521	737	741	1.10	1.08	41.2	44.9	848.6	703	299.0	8:11	1.10	1.46	0.00
02:38:12	860.0	21.3	28.6	131	196	2523	737	757	1.10	1.08	41.4	44.9	848.6	681	300.0	8:14	1.10	1.21	0.00
02:41:51	861.0	9.9	26.9	131	132	2513	731	750	1.10	1.08	41.5	44.9	850.9	736	301.0	8:17	1.10	1.29	0.00
02:42:22	862.1	127.6	22.6	131	133	2505	726	755	1.10	1.08	41.5	44.9	851.6	711	302.1	8:18	1.10	0.69	0.00
02:42:47	863.1	134.3	22.0	131	159	2508	725	753	1.10	1.08	41.5	44.9	852.2	683	303.1	8:18	1.10	0.66	0.00
02:43:12	864.1	176.8	23.4	131	168	2529	730	751	1.10	1.08	41.5	44.9	852.4	690	304.1	8:19	1.10	0.70	0.00
02:44:16	865.1	85.0	24.6	131	135	2522	739	739	1.10	1.08	41.5	44.9	852.9	699	305.1	8:20	1.10	0.94	0.00
02:44:41	866.0	138.3	25.0	131	160	2521	735	718	1.10	1.08	41.6	44.9	853.5	723	306.0	8:20	1.10	0.71	0.00
02:45:13	867.0	120.0	24.0	131	152	2406	735	735	1.10	1.08	41.6	44.9	854.1	746	307.0	8:21	1.10	0.73	0.00
02:47:07	868.0	25.5	26.5	131	132	2514	738	737	1.10	1.08	41.6	45.0	855.0	697	308.0	8:23	1.10	1.13	0.00
02:48:51	869.0	51.0	29.1	131	167	2475	757	717	1.10	1.08	41.6	45.0	855.1	690	309.0	8:24	1.10	1.11	0.00
02:49:43	870.0	72.6	28.1	131	178	2533	755	723	1.10	1.08	41.6	45.0	855.2	691	310.0	8:25	1.10	0.93	0.00
02:50:24	871.0	84.0	29.0	131	164	2519	750	730	1.10	1.08	41.7	45.0	855.2	721	311.0	8:26	1.10	0.83	0.00
02:51:11	872.0	77.4	29.8	131	194	2548	757	720	1.10	1.08	41.7	45.0	855.4	714	312.0	8:27	1.10	0.91	0.00
02:52:10	873.0	51.4	29.7	131	232	2541	763	739	1.10	1.08	41.7	45.0	855.6	716	313.0	8:28	1.10	0.98	0.00
02:53:47	874.1	36.9	31.8	131	182	2486	774	726	1.10	1.08	41.7	44.9	855.8	676	314.1	8:29	1.10	1.10	0.00
02:54:17	875.0	125.1	23.9	131	166	2556	760	729	1.10	1.08	41.7	44.9	855.9	682	315.1	8:30	1.10	0.71	0.00

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
02:54:45	876.0	116.3	18.9	131	102	2549	775	748	1.10	1.08	41.8	44.9	856.0	681	316.0	8:30	1.10	0.63	0.00
02:55:36	877.0	66.0	15.1	131	78	2541	776	736	1.10	1.08	41.7	44.9	856.4	687	317.0	8:31	1.10	0.68	0.00
03:12:19	878.1	58.4	21.2	127	62	2476	756	717	1.10	1.08	41.6	44.7	860.1	646	318.1	8:33	1.11	0.69	0.00
03:12:50	879.1	126.9	28.0	131	92	2513	761	687	1.10	1.08	41.5	44.6	860.6	655	319.1	8:34	1.11	0.90	0.00
03:15:41	880.1	15.9	36.6	132	151	2544	783	702	1.10	1.08	41.4	44.4	863.2	700	320.1	8:36	1.11	1.24	0.00
03:16:09	881.1	170.6	30.6	132	121	2601	805	731	1.09	1.08	41.4	44.1	863.7	709	321.1	8:37	1.11	0.91	0.00
03:16:31	882.0	149.2	28.0	132	111	2608	810	724	1.09	1.08	41.4	44.1	864.0	720	322.0	8:37	1.11	0.84	0.00
03:16:59	883.0	117.8	29.9	132	135	2616	812	717	1.09	1.08	41.4	44.2	864.4	712	323.0	8:38	1.11	0.90	0.00
03:17:43	884.1	78.5	33.1	132	153	2619	811	721	1.10	1.08	41.4	44.3	865.1	714	324.1	8:38	1.11	1.08	0.00
03:20:17	885.0	55.2	36.3	132	175	2595	806	726	1.10	1.08	41.4	44.5	867.5	750	325.0	8:41	1.11	1.55	0.00
03:21:02	886.0	75.2	30.6	132	143	2599	803	742	1.10	1.09	41.4	44.6	868.2	744	326.0	8:42	1.11	1.09	0.00
03:22:16	887.0	44.2	32.8	132	162	2563	807	716	1.09	1.09	41.4	44.6	869.3	737	327.0	8:43	1.11	1.26	0.00
03:24:26	888.0	25.6	35.3	132	215	2614	815	728	1.09	1.09	41.4	44.8	871.3	742	328.0	8:45	1.11	1.51	0.00
03:26:41	889.0	27.0	33.1	132	186	2599	824	727	1.09	1.09	41.5	44.9	873.4	743	329.0	8:47	1.11	1.51	0.00
03:30:40	890.0	7.7	31.5	132	170	2623	808	719	1.09	1.09	41.6	45.0	877.1	737	330.0	8:51	1.11	1.71	0.00
03:32:45	891.0	28.8	30.8	132	182	2597	759	703	1.09	1.09	41.6	45.1	877.7	741	331.0	8:53	1.11	1.19	0.00
03:33:57	892.0	50.7	23.3	132	157	2616	756	701	1.09	1.09	41.7	45.1	879.3	750	332.0	8:55	1.11	0.94	0.00
03:35:41	893.0	30.6	30.4	132	208	2617	758	692	1.09	1.09	41.7	45.0	879.8	762	333.0	8:56	1.11	1.14	0.00
03:38:57	894.0	18.4	30.6	132	211	2600	756	693	1.09	1.09	41.8	45.0	883.6	770	334.0	8:60	1.11	1.30	0.00
03:54:24	895.0	9.6	29.9	132	136	2594	759	715	1.09	1.09	42.3	45.1	889.9	769	335.0	9:15	1.10	1.71	0.00
03:56:35	896.0	28.5	28.2	132	220	2678	773	743	1.09	1.09	42.7	45.1	890.8	754	336.0	9:17	1.10	1.17	0.00
03:58:29	897.0	32.4	29.5	132	242	2690	786	784	1.09	1.09	42.8	45.1	892.3	744	337.0	9:19	1.10	1.14	0.00
04:00:26	898.0	26.5	30.2	132	221	2725	781	796	1.09	1.09	42.9	45.3	893.1	743	338.0	9:21	1.10	1.16	0.00
04:02:57	899.0	24.4	29.4	132	213	2711	773	790	1.09	1.09	43.0	45.4	893.9	752	339.0	9:24	1.10	1.21	0.00
04:03:55	900.0	70.3	27.8	132	201	2669	788	773	1.09	1.09	43.0	45.4	894.0	748	340.0	9:25	1.10	0.95	0.00
04:04:45	901.0	70.8	25.4	132	181	2663	780	746	1.09	1.09	43.0	45.4	894.1	744	341.0	9:25	1.10	0.90	0.00
04:06:22	902.0	34.0	29.4	132	189	2704	769	720	1.09	1.09	43.1	45.4	894.2	738	342.0	9:27	1.10	1.09	0.00
04:10:26	903.0	7.7	30.1	132	214	2717	784	699	1.09	1.09	43.2	45.5	894.3	740	343.0	9:31	1.10	1.35	0.00
04:11:01	904.1	144.8	24.9	132	250	2804	775	692	1.09	1.09	43.2	45.5	894.4	700	344.1	9:32	1.10	0.75	0.00
04:11:18	905.0	176.4	17.6	132	142	2588	773	677	1.09	1.09	43.3	45.5	894.4	709	345.0	9:32	1.10	0.55	0.00
04:11:37	906.1	184.7	8.4	133	85	2724	772	664	1.09	1.09	43.2	45.5	894.4	708	346.1	9:32	1.10	0.47	0.00
04:12:05	907.0	107.9	8.1	132	82	2749	773	670	1.09	1.09	43.3	45.5	894.4	711	347.0	9:33	1.10	0.56	0.00
04:13:05	908.0	53.3	5.4	133	55	2739	777	680	1.09	1.09	43.3	45.5	894.5	714	348.0	9:34	1.10	0.66	0.00
04:27:33	909.1	106.6	5.0	132	61	2750	787	675	1.09	1.09	43.4	45.4	895.9	644	349.1	9:36	1.10	0.75	0.00
04:27:57	910.1	159.5	7.7	132	89	2730	769	668	1.09	1.09	43.4	45.2	896.1	641	350.1	9:36	1.10	0.49	0.00
04:28:15	911.2	201.2	6.3	132	102	2744	775	677	1.09	1.09	43.4	45.1	896.2	640	351.2	9:36	1.10	0.43	0.00
04:28:34	912.0	157.5	2.8	133	75	2747	779	682	1.09	1.09	43.4	45.0	896.4	637	352.0	9:37	1.10	0.42	0.00
04:29:09	913.0	108.2	6.4	132	86	2629	780	687	1.09	1.09	43.4	44.9	896.7	635	353.0	9:37	1.10	0.59	0.00
04:31:02	914.1	24.0	23.5	132	153	2785	781	708	1.09	1.09	43.4	44.9	897.6	640	354.1	9:39	1.10	0.78	0.01
04:47:02	915.1	18.7	30.4	133	125	2719	799	720	1.09	1.09	43.4	45.6	908.5	646	355.1	9:55	1.10	1.72	0.01
04:47:37	916.1	123.0	21.5	135	152	2752	809	726	1.09	1.09	43.4	45.9	908.5	647	356.1	9:56	1.10	0.78	0.01
04:48:14	917.1	103.1	22.0	136	150	2768	795	718	1.09	1.09	43.5	45.9	908.5	645	357.1	9:56	1.10	0.77	0.01
04:48:58	918.0	96.0	27.1	136	165	2774	782	723	1.09	1.09	43.5	46.0	908.5	644	358.0	9:57	1.10	0.89	0.01
04:49:36	919.2	177.0	23.4	136	167	2787	777	723	1.09	1.09	43.5	46.0	908.5	644	359.2	9:58	1.10	0.69	0.01
04:49:53	920.1	163.6	17.1	136	124	2782	780	719	1.09	1.09	43.5	46.0	908.5	643	360.1	9:58	1.10	0.56	0.01

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD	TEMP	RETURNS	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT	DEPTH						
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
04:50:28	921.1	96.4	18.0	136	136	2785	785	712	1.09	1.09	43.5	46.0	908.5	649	361.1	9:58	1.10	0.74	0.01
04:50:50	922.2	203.4	17.4	136	174	2668	783	718	1.09	1.09	43.5	46.0	908.5	642	362.2	9:59	1.10	0.56	0.01
04:51:08	923.1	189.4	13.1	136	121	2786	778	724	1.09	1.09	43.6	46.0	908.5	650	363.1	9:59	1.10	0.54	0.01
04:51:27	924.1	217.7	11.1	136	110	2802	774	724	1.09	1.09	43.5	46.0	908.5	651	364.1	9:59	1.10	0.52	0.01
04:51:48	925.2	162.4	9.9	136	108	2796	772	733	1.09	1.09	43.5	46.0	908.5	655	365.2	9:60	1.10	0.51	0.01
04:52:07	926.2	168.7	9.2	136	98	2802	774	729	1.09	1.09	43.6	46.0	908.5	652	366.2	10:00	1.10	0.52	0.01
04:52:32	927.2	136.3	11.5	136	129	2810	776	728	1.09	1.09	43.6	46.0	908.5	652	367.2	10:01	1.10	0.58	0.01
04:53:00	928.1	145.8	10.6	135	107	2821	778	743	1.09	1.09	43.6	46.0	908.5	635	368.1	10:01	1.10	0.61	0.01
04:53:34	929.1	120.5	8.6	136	90	2707	779	746	1.09	1.09	43.6	46.0	908.5	654	369.1	10:02	1.10	0.59	0.01
04:54:14	930.0	75.4	7.9	135	101	2797	775	727	1.09	1.09	43.6	46.0	908.5	677	370.0	10:02	1.10	0.62	0.01
04:54:54	931.0	93.5	9.7	136	106	2817	777	733	1.09	1.09	43.6	46.0	908.5	675	371.0	10:03	1.10	0.67	0.01
04:56:08	932.1	52.4	5.1	136	81	2804	795	722	1.09	1.09	43.7	46.1	910.5	646	372.1	10:04	1.10	0.68	0.01
04:57:36	933.0	44.0	13.3	136	119	2786	795	710	1.09	1.09	43.7	46.1	913.2	680	373.0	10:06	1.10	0.93	0.01
05:08:11	934.0	77.3	14.0	134	128	2793	776	710	1.09	1.09	43.9	46.3	914.3	718	378.7	10:16	1.10	0.76	0.01
05:08:11	935.0	84.0	14.9	134	128	2793	776	710	1.09	1.09	43.9	46.3	914.3	718	378.7	10:16	1.10	0.78	0.01
05:08:11	936.0	88.0	15.4	134	128	2793	776	710	1.09	1.09	43.9	46.3	914.3	718	378.7	10:16	1.10	0.63	0.01
05:08:11	937.0	69.0	15.7	134	128	2793	776	710	1.09	1.09	43.9	46.3	914.3	718	378.7	10:16	1.10	0.78	0.01
05:08:11	938.0	77.3	14.9	134	128	2793	776	710	1.09	1.09	43.9	46.3	914.3	718	378.7	10:16	1.10	0.69	0.01
05:10:13	939.0	32.9	14.0	133	147	2828	802	711	1.09	1.09	44.1	46.3	915.1	731	379.0	10:17	1.10	0.77	0.00
05:11:39	940.0	68.9	12.5	133	131	2777	787	732	1.09	1.09	44.1	46.3	916.7	728	380.0	10:18	1.10	0.83	0.00
05:12:42	941.1	55.4	8.4	134	105	2807	799	742	1.09	1.09	44.1	46.3	917.9	725	381.1	10:19	1.10	0.72	0.01
05:30:04	942.1	58.8	12.1	135	142	2709	746	691	1.09	1.09	44.2	46.0	930.2	702	382.1	10:21	1.10	0.89	0.02
05:30:31	943.1	133.6	10.8	136	137	2712	742	675	1.09	1.09	44.1	45.9	930.7	701	383.1	10:21	1.10	0.60	0.02
05:31:11	944.0	84.9	11.2	136	137	2693	745	677	1.09	1.09	44.1	46.1	931.4	699	384.0	10:22	1.10	0.69	0.01
05:35:02	945.0	7.6	20.6	136	144	2688	746	693	1.09	1.09	44.1	46.3	935.5	701	385.0	10:26	1.10	0.85	0.01
05:39:52	946.0	55.8	27.4	136	165	2694	760	708	1.09	1.09	44.1	46.3	939.2	683	386.0	10:31	1.10	1.34	0.01
05:40:46	947.0	84.5	21.9	136	170	2658	752	701	1.09	1.09	44.2	46.4	939.8	675	387.0	10:32	1.10	0.88	0.01
05:41:19	948.0	97.8	21.5	136	160	2715	757	699	1.09	1.09	44.2	46.5	940.4	677	388.0	10:32	1.10	0.75	0.01
05:42:30	949.0	43.5	19.6	135	209	2716	759	698	1.09	1.09	44.2	46.5	941.0	681	389.0	10:33	1.10	0.92	0.01
05:44:19	950.0	31.1	23.0	135	198	2689	770	718	1.09	1.09	44.2	46.6	941.2	698	390.0	10:35	1.10	1.07	0.01
05:45:53	951.0	42.7	22.0	134	179	2718	774	721	1.09	1.09	44.2	46.6	941.2	733	391.0	10:37	1.10	1.01	0.01
05:47:24	952.0	30.6	23.4	130	173	2699	776	719	1.09	1.09	44.3	46.7	941.2	740	392.0	10:38	1.10	1.02	0.01
05:48:24	953.0	52.5	23.2	130	188	2746	789	719	1.09	1.09	44.3	46.7	941.2	718	393.0	10:39	1.10	0.91	0.01
05:49:53	954.0	39.2	24.0	130	196	2744	787	709	1.09	1.09	44.3	46.7	941.2	727	394.0	10:41	1.10	1.02	0.01
05:51:30	955.0	35.3	23.8	130	240	2743	773	725	1.09	1.09	44.3	46.8	941.2	723	395.0	10:42	1.10	1.03	0.01
05:53:26	956.0	47.2	23.6	130	178	2739	762	707	1.09	1.09	44.4	46.8	941.4	757	396.0	10:44	1.10	1.08	0.01
05:55:19	957.0	28.8	22.1	130	180	2719	780	723	1.09	1.09	44.4	46.7	944.4	677	397.0	10:46	1.10	1.05	0.01
05:58:39	958.0	14.2	28.8	130	225	2741	770	731	1.09	1.09	44.5	46.8	944.9	713	398.0	10:49	1.10	1.28	0.02
06:00:26	959.0	35.5	27.5	130	160	2744	755	730	1.09	1.09	44.6	46.9	945.1	728	399.0	10:51	1.10	1.10	0.02
06:02:38	960.0	27.1	30.8	130	210	2732	749	711	1.09	1.09	44.6	47.0	945.2	723	400.0	10:53	1.10	1.20	0.02
06:04:30	961.0	30.0	31.4	130	182	2752	753	713	1.09	1.09	44.6	47.0	945.6	721	401.0	10:55	1.10	1.16	0.01
06:06:23	962.0	38.6	30.9	130	178	2711	759	725	1.09	1.09	44.7	46.9	947.6	705	402.0	10:57	1.10	1.15	0.02
06:08:32	963.0	24.0	31.4	130	202	2743	776	730	1.09	1.09	44.7	46.9	949.3	707	403.0	10:59	1.10	1.20	0.03
06:10:50	964.0	29.0	32.3	130	178	2745	756	739	1.09	1.09	44.7	47.0	950.5	715	404.0	11:02	1.10	1.23	0.04
06:31:22	965.0	36.7	26.3	130	198	2753	758	733	1.09	1.09	45.1	47.3	960.2	687	405.0	11:22	1.10	1.08	0.08

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
06:33:39	966.0	24.8	25.7	130	226	2737	758	719	1.09	1.09	45.1	47.4	960.6	666	406.0	11:24	1.10	1.14	0.08
06:53:44	967.0	2.9	26.3	134	167	2817	759	718	1.09	1.09	45.2	47.2	963.1	708	407.0	11:30	1.10	1.38	0.08
06:58:35	968.1	66.9	27.7	135	172	2772	754	714	1.09	1.09	45.1	47.1	964.0	709	408.1	11:35	1.10	1.23	0.09
07:00:04	969.1	38.2	24.8	135	185	2784	754	723	1.09	1.09	45.1	47.2	964.2	694	409.1	11:37	1.10	1.05	0.08
07:02:05	970.0	28.0	26.0	135	180	2746	752	730	1.09	1.09	45.1	47.4	965.3	678	410.0	11:39	1.10	1.13	0.06
07:04:07	971.0	25.7	29.2	135	184	2773	764	722	1.09	1.09	45.1	47.4	966.1	662	411.0	11:41	1.10	1.17	0.11
07:06:44	972.0	21.1	28.9	135	200	2790	776	733	1.09	1.09	45.1	47.5	966.4	646	412.0	11:43	1.10	1.23	0.13
07:09:08	973.0	26.2	27.8	135	203	2778	760	724	1.09	1.09	45.1	47.6	966.4	650	413.0	11:46	1.10	1.19	0.13
07:11:31	974.0	25.7	28.7	135	222	2779	767	722	1.09	1.09	45.2	47.7	966.5	655	414.0	11:48	1.10	1.20	0.13
07:14:14	975.0	24.3	25.1	135	207	2815	767	714	1.09	1.09	45.2	47.8	966.5	675	415.0	11:51	1.10	1.17	0.13
07:16:44	976.0	21.9	28.9	135	268	2794	764	731	1.09	1.09	45.3	47.8	966.9	670	416.0	11:53	1.10	1.22	0.13
07:18:49	977.0	34.5	27.8	135	224	2786	756	709	1.09	1.09	45.4	47.8	967.0	661	417.0	11:55	1.10	1.16	0.14
07:21:22	978.0	22.6	27.1	135	217	2809	749	711	1.09	1.09	45.4	47.8	967.1	611	418.0	11:58	1.10	1.19	0.13
07:24:20	979.0	39.4	25.5	135	214	2788	789	712	1.09	1.09	45.5	47.8	968.2	629	419.0	12:01	1.10	1.21	0.08
07:25:38	980.1	48.3	24.6	135	230	2747	785	729	1.09	1.09	45.5	47.8	969.0	626	420.1	12:02	1.10	0.99	0.10
07:26:59	981.0	51.8	24.6	135	258	2822	777	736	1.09	1.09	45.5	47.8	969.6	613	421.0	12:04	1.10	1.01	0.15
07:27:40	982.0	103.6	24.4	135	230	2801	776	738	1.09	1.09	45.6	47.8	969.9	612	422.0	12:04	1.10	0.84	0.18
07:28:20	983.0	79.2	27.9	135	215	2792	775	727	1.09	1.09	45.6	47.9	970.3	611	423.0	12:05	1.10	0.87	0.18
07:39:29	984.0	3.3	29.9	135	160	2773	774	711	1.09	1.09	45.7	48.0	974.5	620	424.0	12:16	1.10	1.62	0.19
07:52:58	985.0	5.7	28.5	135	120	2777	755	724	1.09	1.09	45.9	47.9	979.5	619	425.0	12:30	1.10	1.66	0.33
08:13:34	986.4	32.6	16.2	136	127	2737	721	701	1.09	1.09	45.7	47.6	983.5	596	426.4	12:36	1.10	1.57	0.49
08:14:16	987.0	73.5	2.0	138	89	2646	720	649	1.09	1.09	45.2	47.1	983.6	590	427.0	12:37	1.10	0.69	0.45
08:17:18	988.8	36.0	10.4	138	122	2661	736	648	1.09	1.09	45.2	47.1	983.9	618	428.8	12:40	1.10	0.62	0.27
08:17:45	989.0	34.7	27.8	135	188	2684	756	544	1.09	1.09	44.9	47.4	984.0	624	429.0	12:40	1.10	0.74	0.25
08:19:58	990.6	33.4	25.2	137	177	2660	762	626	1.09	1.09	44.8	47.7	984.2	650	430.6	12:42	1.10	1.04	0.20
08:20:45	991.0	31.8	22.7	138	154	2926	767	832	1.09	1.09	44.8	47.9	984.3	653	431.0	12:43	1.10	0.89	0.19
08:23:30	992.0	26.9	24.5	139	168	2900	786	763	1.09	1.09	44.7	47.5	984.6	660	432.0	12:46	1.10	1.19	0.14
08:26:22	993.0	18.9	24.4	138	174	2888	793	735	1.09	1.09	44.7	47.6	984.9	701	433.0	12:49	1.10	1.20	0.10
08:43:05	994.0	23.2	12.4	137	121	2815	777	737	1.09	1.09	44.8	47.5	986.2	680	434.0	12:51	1.10	1.19	0.10
08:46:19	995.9	24.5	16.9	137	147	2752	780	730	1.09	1.09	44.9	47.4	987.2	694	435.9	12:55	1.10	0.93	0.32
08:46:25	996.1	24.5	29.7	137	158	2702	784	692	1.09	1.09	44.9	47.7	987.3	695	436.1	12:55	1.10	0.98	0.32
08:48:05	997.1	27.2	25.9	137	171	2730	783	726	1.09	1.09	45.0	47.8	987.8	683	437.1	12:56	1.10	1.06	0.31
08:49:39	998.1	38.1	23.5	137	163	2698	777	757	1.09	1.09	45.0	47.8	988.3	643	438.1	12:58	1.10	1.05	0.29
08:51:11	999.0	39.6	23.2	137	165	2701	772	761	1.09	1.09	45.1	47.6	988.8	629	439.0	12:60	1.10	1.03	0.27
08:52:54	1000.0	39.1	25.9	137	183	2675	773	746	1.09	1.09	45.2	47.8	989.4	631	440.0	13:01	1.10	1.06	0.30
08:54:43	1001.0	32.6	26.0	137	177	2724	774	735	1.09	1.09	45.2	48.0	990.0	627	441.0	13:03	1.10	1.10	0.35
08:56:16	1002.0	39.8	26.8	137	219	2692	774	729	1.09	1.09	45.3	48.2	990.5	626	442.0	13:05	1.10	1.08	0.33
08:58:18	1003.0	26.9	25.1	137	260	2759	765	722	1.09	1.09	45.3	48.3	991.2	624	443.0	13:07	1.10	1.13	0.27
09:01:25	1004.0	19.8	25.4	137	276	2737	772	734	1.09	1.09	45.4	48.3	992.2	623	444.0	13:10	1.10	1.23	0.22
09:04:29	1005.0	20.3	26.5	137	253	2768	769	726	1.09	1.09	45.6	48.3	993.2	622	445.0	13:13	1.10	1.24	0.21
09:06:59	1006.1	39.1	24.4	137	226	2737	762	728	1.09	1.09	45.7	48.3	994.1	621	446.1	13:15	1.10	1.14	0.16
09:09:33	1007.0	19.4	25.9	137	243	2802	762	725	1.09	1.09	45.8	48.3	994.8	620	447.0	13:18	1.10	1.21	0.15
09:11:55	1008.0	21.6	26.1	137	203	2825	763	721	1.09	1.09	45.9	48.2	996.7	619	448.0	13:20	1.10	1.17	0.24
09:15:31	1009.0	19.7	25.4	137	194	2881	771	716	1.09	1.09	46.0	48.2	998.8	618	449.0	13:24	1.10	1.24	0.30

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
09:18:25	1010.1	19.7	23.3	137	202	2866	758	734	1.09	1.09	46.0	48.2	1000.3	620	450.1	13:27	1.10	1.18	0.27
09:21:29	1011.0	20.1	24.4	137	211	2888	761	724	1.09	1.09	45.9	48.2	1002.0	629	451.0	13:30	1.10	1.22	0.27
09:24:18	1012.0	21.2	23.9	137	252	2867	770	723	1.09	1.09	45.8	48.2	1003.4	627	452.0	13:33	1.10	1.17	0.27
09:26:54	1013.0	24.8	24.4	137	241	2845	767	737	1.09	1.09	45.7	48.4	1003.9	626	453.0	13:35	1.10	1.18	0.27
09:29:48	1014.0	24.3	23.7	137	204	2799	783	724	1.09	1.09	45.6	48.5	1004.8	627	454.0	13:38	1.10	1.18	0.23
09:32:58	1015.1	19.8	23.3	137	188	2760	786	729	1.09	1.09	45.6	48.6	1005.9	630	455.1	13:41	1.10	1.19	0.20
09:36:22	1016.0	19.6	23.4	137	172	2752	792	718	1.09	1.09	45.6	48.6	1007.3	631	456.0	13:45	1.10	1.23	0.22
09:39:45	1017.0	17.6	24.2	137	180	2736	791	716	1.09	1.09	45.6	48.7	1008.3	633	457.0	13:48	1.10	1.23	0.23
09:43:09	1018.0	15.3	23.1	137	220	2736	797	722	1.09	1.09	45.6	48.7	1009.4	633	458.0	13:52	1.10	1.24	0.21
09:46:30	1019.0	18.6	23.3	137	196	2711	775	726	1.09	1.09	45.6	48.8	1010.4	635	459.0	13:55	1.10	1.22	0.19
09:50:51	1020.3	67.3	23.6	137	226	2687	750	724	1.09	1.09	45.6	48.8	1011.8	636	460.3	13:57	1.10	0.93	0.18
09:54:19	1021.0	11.8	14.5	137	277	2652	751	714	1.09	1.09	45.7	49.0	1012.9	637	461.0	14:01	1.10	1.25	0.18
10:02:02	1022.0	5.8	28.9	137	192	2637	752	700	1.09	1.09	45.8	49.0	1015.2	640	462.0	14:09	1.10	1.35	0.14
10:03:35	1023.0	79.2	23.3	137	204	2671	740	693	1.09	1.09	45.8	49.0	1015.6	643	463.0	14:10	1.10	1.02	0.14
10:31:04	1024.0	13.8	22.2	137	120	2674	749	694	1.09	1.09	45.9	48.9	1020.9	750	464.0	14:14	1.10	0.98	0.10
10:32:25	1025.1	75.6	25.6	137	181	2776	780	700	1.09	1.09	46.0	48.7	1021.0	724	465.1	14:16	1.10	1.01	0.10
10:32:53	1026.1	125.4	17.8	137	150	2794	781	692	1.09	1.09	46.0	48.7	1021.1	750	466.1	14:16	1.10	0.68	0.10
10:33:25	1027.0	96.4	12.2	140	128	2771	778	687	1.09	1.09	46.0	48.7	1021.2	754	467.0	14:17	1.10	0.66	0.10
10:34:30	1028.1	66.5	24.2	143	181	2704	773	698	1.09	1.09	46.0	48.7	1021.3	747	468.1	14:18	1.10	0.95	0.10
10:35:16	1029.0	80.9	22.5	143	177	2788	779	711	1.09	1.09	46.0	48.7	1021.4	730	469.0	14:19	1.10	0.84	0.11
10:35:54	1030.1	98.2	17.6	143	166	2768	783	698	1.09	1.09	45.9	48.6	1021.5	730	470.1	14:19	1.10	0.74	0.11
10:36:25	1031.0	104.5	19.5	143	154	2772	779	706	1.09	1.09	45.9	48.4	1021.6	733	471.0	14:20	1.10	0.75	0.11
10:41:51	1032.0	5.9	27.6	143	189	2773	781	708	1.09	1.09	45.9	48.3	1022.2	811	472.0	14:25	1.10	1.42	0.11
10:42:41	1033.1	80.6	30.2	143	228	2786	773	698	1.09	1.09	45.7	48.9	1022.4	796	473.1	14:26	1.10	0.91	0.11
10:43:20	1034.1	90.4	23.1	143	189	2778	774	727	1.09	1.09	45.7	48.9	1022.4	723	474.1	14:27	1.10	0.82	0.11
10:44:17	1035.0	59.6	25.4	143	278	2795	776	746	1.09	1.09	45.7	48.9	1022.6	804	475.0	14:28	1.10	0.96	0.11
10:46:38	1036.0	23.0	27.3	142	288	2756	781	718	1.09	1.09	45.7	48.9	1022.9	769	476.0	14:30	1.10	1.19	0.11
10:48:52	1037.0	35.6	25.3	142	298	2746	777	703	1.09	1.09	45.7	49.0	1023.1	812	477.0	14:32	1.10	1.16	0.11
10:50:58	1038.0	26.8	28.7	143	226	2784	784	688	1.09	1.09	45.7	49.0	1023.4	736	478.0	14:34	1.10	1.18	0.11
10:52:37	1039.0	43.7	25.6	143	229	2712	784	690	1.09	1.09	45.8	49.1	1023.6	721	479.0	14:36	1.10	1.08	0.11
10:54:11	1040.0	34.6	27.3	143	281	2755	793	702	1.09	1.09	45.8	49.1	1023.8	739	480.0	14:37	1.10	1.10	0.11
10:56:22	1041.0	24.7	22.7	143	225	2705	795	693	1.09	1.09	45.8	49.1	1024.9	742	481.0	14:40	1.10	1.11	0.10
10:59:17	1042.1	29.1	20.7	143	223	2697	791	711	1.09	1.09	45.8	49.0	1028.5	737	482.1	14:43	1.10	1.14	0.19
11:01:33	1043.0	34.1	27.1	141	272	2789	782	713	1.09	1.09	46.0	49.0	1031.4	731	483.0	14:45	1.10	1.18	0.14
11:02:35	1044.0	58.2	20.7	141	226	2694	772	717	1.09	1.09	46.0	49.0	1031.7	728	484.0	14:46	1.10	0.91	0.14
11:03:31	1045.0	60.9	24.1	143	257	2725	768	712	1.09	1.09	46.1	49.1	1031.8	742	485.0	14:47	1.10	0.94	0.14
11:04:15	1046.0	85.9	28.1	142	314	2750	770	704	1.09	1.09	46.1	49.1	1031.8	773	486.0	14:48	1.10	0.90	0.14
11:05:17	1047.0	51.4	25.1	142	285	2759	772	732	1.09	1.09	46.1	49.1	1031.9	752	487.0	14:49	1.10	0.97	0.14
11:06:36	1048.0	41.2	27.2	142	292	2752	776	716	1.09	1.09	46.1	49.1	1032.1	711	488.0	14:50	1.10	1.03	0.14
11:08:24	1049.0	30.9	22.1	142	275	2746	771	775	1.09	1.09	46.1	49.1	1033.9	745	489.0	14:52	1.10	1.06	0.12
11:10:41	1050.0	25.0	26.8	143	240	2725	769	801	1.09	1.09	46.0	48.5	1035.8	762	490.0	14:54	1.10	1.19	0.10
11:13:14	1051.0	22.6	27.5	143	242	2778	770	809	1.09	1.09	45.9	48.6	1036.5	678	491.0	14:56	1.10	1.22	0.11
11:15:44	1052.0	19.9	28.0	143	258	2786	770	710	1.09	1.09	45.8	49.3	1037.2	697	492.0	14:59	1.10	1.22	0.11
11:18:37	1053.0	21.0	24.5	143	235	2782	775	701	1.09	1.09	45.7	49.3	1038.9	690	493.0	15:02	1.10	1.21	0.10
11:55:41	1054.1	23.9	22.8	136	194	2696	781	669	1.09	1.09	45.5	48.9	1053.0	693	494.1	15:05	1.10	1.21	0.10

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
11:58:14	1055.0	21.8	25.1	135	261	2676	774	676	1.09	1.09	45.4	49.3	1053.1	693	495.0	15:08	1.10	1.19	0.10
12:00:48	1056.0	24.1	23.9	135	245	2712	765	659	1.09	1.09	45.5	49.1	1053.1	800	496.0	15:10	1.10	1.16	0.10
12:03:52	1057.0	19.1	23.7	136	184	2712	739	671	1.09	1.09	45.5	49.1	1053.1	786	497.0	15:13	1.10	1.21	0.10
12:05:48	1058.0	49.1	22.7	136	156	2686	749	658	1.09	1.09	45.5	49.2	1053.1	794	498.0	15:15	1.10	1.08	0.10
12:08:33	1059.0	20.3	24.3	136	192	2739	762	654	1.09	1.09	45.5	49.2	1053.1	791	499.0	15:18	1.10	1.19	0.10
12:11:44	1060.0	16.5	25.2	136	197	2768	754	661	1.09	1.09	45.5	49.2	1053.1	791	500.0	15:21	1.10	1.24	0.10
12:13:49	1061.0	29.2	23.6	136	205	2723	756	842	1.09	1.09	45.5	48.9	1053.1	797	501.0	15:23	1.10	1.10	0.10
12:16:16	1062.0	23.5	24.4	136	203	2728	768	777	1.09	1.09	45.5	48.6	1053.1	787	502.0	15:26	1.10	1.16	0.10
12:18:22	1063.0	36.4	23.8	136	183	2735	758	677	1.09	1.09	45.5	48.8	1053.1	782	503.0	15:28	1.10	1.11	0.10
12:20:51	1064.0	21.3	26.7	136	211	2720	752	664	1.09	1.09	45.5	48.9	1053.1	784	504.0	15:30	1.10	1.19	0.10
12:23:56	1065.0	18.5	26.7	136	190	2775	753	667	1.09	1.09	45.5	49.0	1053.1	783	505.0	15:34	1.10	1.25	0.10
12:27:50	1066.0	14.3	24.1	136	173	2769	772	656	1.09	1.09	45.5	49.1	1054.2	728	506.0	15:37	1.10	1.27	0.10
12:31:16	1067.0	25.2	24.1	136	171	2741	760	663	1.09	1.09	45.5	49.2	1055.4	809	507.0	15:41	1.10	1.23	0.03
12:33:28	1068.0	29.2	24.1	136	191	2734	751	662	1.09	1.09	45.5	49.2	1056.2	726	508.0	15:43	1.10	1.11	0.02
12:36:12	1069.0	23.5	24.9	136	190	2780	736	664	1.09	1.09	45.5	49.2	1057.0	727	509.0	15:46	1.10	1.20	0.02
12:39:08	1070.0	20.0	27.7	136	211	2679	726	662	1.09	1.09	45.5	49.2	1058.4	722	510.0	15:49	1.10	1.25	0.10
12:41:35	1071.1	26.5	25.2	136	182	2706	738	666	1.09	1.09	45.5	49.2	1059.1	725	511.1	15:51	1.10	1.17	0.12
12:44:11	1072.1	28.0	24.6	136	193	2726	731	671	1.09	1.09	45.6	49.2	1059.9	724	512.1	15:54	1.10	1.18	0.14
12:46:31	1073.0	24.9	25.6	136	185	2769	715	667	1.09	1.09	45.7	49.2	1060.7	718	513.0	15:56	1.10	1.17	0.14
12:49:29	1074.0	17.7	26.8	136	191	2716	716	676	1.09	1.09	45.9	49.3	1061.8	715	514.0	15:59	1.10	1.25	0.14
12:52:15	1075.0	20.9	28.8	136	213	2790	725	677	1.09	1.09	46.1	49.3	1062.9	716	515.0	16:02	1.10	1.25	0.12
12:56:09	1076.0	19.5	25.8	136	169	2775	704	675	1.09	1.09	46.1	49.3	1064.2	716	516.0	16:06	1.10	1.30	0.11
12:59:07	1077.0	21.9	23.9	136	217	2751	726	670	1.09	1.09	46.3	49.3	1065.1	717	517.0	16:09	1.10	1.21	0.11
13:01:32	1078.0	26.9	24.1	136	217	2720	726	681	1.09	1.09	46.5	49.4	1065.7	717	518.0	16:11	1.10	1.18	0.13
13:03:57	1079.0	26.6	25.9	136	211	2745	736	679	1.09	1.09	46.6	49.4	1066.2	716	519.0	16:14	1.10	1.19	0.14
13:05:12	1080.0	53.3	24.6	136	193	2710	735	688	1.09	1.09	46.6	49.4	1066.5	716	520.0	16:15	1.10	0.99	0.14
13:06:24	1081.0	67.9	21.5	136	161	2753	742	671	1.09	1.09	46.7	49.4	1067.2	716	521.0	16:16	1.10	0.94	0.14
13:23:48	1082.1	30.9	24.6	136	180	2750	725	674	1.09	1.09	46.7	49.3	1071.5	715	522.1	16:18	1.10	1.09	0.08
13:24:44	1083.0	87.3	24.4	136	181	2670	729	645	1.09	1.09	46.7	49.1	1071.8	720	523.0	16:19	1.10	0.92	0.08
13:25:27	1084.1	78.6	27.7	136	219	2681	728	648	1.09	1.09	46.6	49.1	1072.1	720	524.1	16:19	1.10	0.87	0.09
13:36:45	1085.0	4.1	30.6	136	140	2704	734	651	1.09	1.09	46.7	48.9	1075.8	716	525.0	16:31	1.10	1.64	0.17
13:38:07	1086.0	48.5	25.2	136	178	2712	711	658	1.09	1.09	46.8	49.1	1076.2	716	526.0	16:32	1.10	1.01	0.19
13:39:16	1087.0	47.9	27.8	136	189	2703	702	644	1.09	1.09	46.8	49.1	1076.5	716	527.0	16:33	1.10	1.01	0.21
13:41:02	1088.1	33.9	26.0	136	188	2721	712	662	1.09	1.09	46.8	49.3	1077.0	715	528.1	16:35	1.10	1.07	0.26
13:43:15	1089.0	23.1	25.2	136	223	2724	707	662	1.09	1.09	46.9	49.3	1077.9	714	529.0	16:37	1.10	1.15	0.24
13:45:49	1090.0	23.2	24.4	136	251	2758	709	664	1.09	1.09	46.9	49.3	1078.8	714	530.0	16:40	1.10	1.15	0.19
13:47:13	1091.0	41.5	15.9	136	171	2714	722	680	1.09	1.09	46.9	49.3	1079.7	715	531.0	16:41	1.10	0.92	0.16
13:48:24	1092.1	105.7	19.5	136	191	2763	703	668	1.09	1.09	47.0	49.3	1080.5	715	532.1	16:42	1.10	0.82	0.14
13:49:02	1093.0	94.2	10.9	136	115	2770	692	677	1.09	1.09	47.0	49.3	1081.0	714	533.0	16:43	1.10	0.63	0.13
13:50:06	1094.0	46.9	15.0	136	148	2678	680	668	1.09	1.09	46.9	49.3	1081.5	715	534.0	16:44	1.10	0.84	0.13
13:51:21	1095.0	50.1	25.2	136	284	2783	700	649	1.09	1.09	46.9	49.2	1081.5	716	535.0	16:45	1.10	1.00	0.13
13:52:27	1096.0	58.0	20.5	136	215	2798	708	665	1.09	1.09	46.8	49.2	1081.5	716	536.0	16:46	1.10	0.92	0.13
13:54:11	1097.0	65.0	23.9	136	254	2792	712	688	1.09	1.09	46.8	49.3	1081.5	716	537.0	16:48	1.10	1.05	0.13
13:55:23	1098.0	50.5	17.6	136	150	2794	707	696	1.09	1.09	46.7	49.4	1081.5	716	538.0	16:49	1.10	0.90	0.13
13:56:49	1099.1	41.2	25.3	136	232	2783	687	663	1.09	1.09	46.7	49.4	1081.5	717	539.1	16:51	1.10	1.05	0.13

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT- mts	-BIT- hh:mm	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
13:58:45	1100.1	34.7	26.3	136	174	2786	688	676	1.09	1.09	46.6	49.4	1081.5	719	540.1	16:53	1.10	1.11	0.13
14:00:22	1101.0	30.8	21.3	136	167	2793	693	670	1.09	1.09	46.6	49.5	1081.5	720	541.0	16:54	1.10	1.02	0.13
14:01:56	1102.1	49.2	23.8	136	254	2792	688	669	1.09	1.09	46.6	49.5	1081.5	721	542.1	16:56	1.10	1.04	0.13
14:03:58	1103.0	27.4	26.5	136	205	2770	692	663	1.09	1.09	46.5	49.5	1082.7	721	543.0	16:58	1.10	1.14	0.10
14:06:24	1104.1	28.7	29.0	136	244	2784	698	671	1.09	1.09	46.6	49.4	1084.5	722	544.1	17:00	1.10	1.19	0.10
14:08:42	1105.1	27.1	27.1	136	244	2729	678	678	1.09	1.09	46.7	49.3	1084.6	721	545.1	17:03	1.10	1.18	0.11
14:11:03	1106.0	22.6	27.5	136	231	2760	688	693	1.09	1.09	46.7	49.4	1084.7	721	546.0	17:05	1.10	1.20	0.13
14:13:30	1107.0	41.2	25.2	136	253	2759	685	690	1.09	1.09	46.8	49.5	1084.8	721	547.0	17:07	1.10	1.18	0.14
14:14:45	1108.0	58.4	23.9	136	250	2711	688	691	1.09	1.09	46.9	49.5	1084.8	721	548.0	17:09	1.10	1.07	0.14
14:16:05	1109.0	39.0	26.3	136	291	2771	704	691	1.09	1.09	46.9	49.5	1084.9	721	549.0	17:10	1.10	1.04	0.16
14:17:32	1110.0	39.3	25.6	136	220	2768	708	692	1.09	1.09	46.9	49.5	1085.7	720	550.0	17:11	1.10	1.04	0.27
14:32:06	1111.0	21.6	28.5	136	226	2733	693	679	1.09	1.09	47.0	49.4	1090.5	719	551.0	17:14	1.10	1.19	0.19
14:33:29	1112.1	62.6	29.3	137	209	2721	658	653	1.09	1.09	47.1	49.0	1091.3	719	552.1	17:15	1.10	1.13	0.23
14:34:18	1113.0	80.4	26.1	138	196	2741	657	666	1.09	1.09	47.1	48.8	1092.2	716	553.0	17:16	1.10	0.89	0.29
14:34:57	1114.1	103.7	25.8	138	228	2764	645	664	1.09	1.09	47.1	48.9	1092.9	716	554.1	17:17	1.10	0.82	0.30
14:35:38	1115.1	87.0	25.0	137	218	2743	655	674	1.09	1.09	47.1	49.0	1093.4	716	555.1	17:17	1.10	0.85	0.30
14:36:25	1116.1	83.7	26.6	137	196	2705	655	685	1.09	1.09	47.1	49.2	1094.1	715	556.1	17:18	1.10	0.88	0.29
14:37:15	1117.0	56.3	22.5	137	215	2742	643	677	1.09	1.09	47.1	49.3	1094.7	716	557.0	17:19	1.10	0.86	0.28
14:39:38	1118.0	17.7	20.8	138	177	2757	660	658	1.09	1.09	47.1	49.4	1096.3	716	558.0	17:21	1.10	1.12	0.24
14:49:15	1119.1	30.2	30.0	138	161	2770	734	658	1.09	1.09	47.2	49.5	1102.5	712	559.1	17:31	1.10	1.57	0.34
14:49:59	1120.0	81.6	25.3	138	190	2807	737	669	1.09	1.09	47.2	49.6	1102.8	712	560.0	17:32	1.10	0.87	0.37
14:50:47	1121.1	77.8	27.0	137	186	2750	734	661	1.09	1.09	47.2	49.6	1103.1	712	561.1	17:32	1.10	0.85	0.39
14:52:10	1122.0	39.6	27.0	138	192	2791	732	686	1.09	1.09	47.2	49.6	1103.8	712	562.0	17:34	1.10	1.07	0.38
14:54:15	1123.0	26.8	26.9	137	264	2839	733	681	1.09	1.09	47.3	49.6	1104.6	709	563.0	17:36	1.10	1.14	0.30
14:56:15	1124.0	29.0	26.2	137	215	2815	740	678	1.09	1.09	47.3	49.6	1105.6	707	564.0	17:38	1.10	1.15	0.20
14:58:30	1125.1	26.2	28.8	137	253	2823	748	658	1.09	1.09	47.3	49.6	1106.4	705	565.1	17:40	1.10	1.17	0.16
15:00:35	1126.0	29.3	30.1	137	232	2846	756	660	1.09	1.09	47.3	49.6	1107.7	705	566.0	17:42	1.10	1.19	0.14
15:02:34	1127.0	35.9	28.8	137	251	2826	756	676	1.09	1.09	47.4	49.5	1109.3	703	567.0	17:44	1.10	1.16	0.20
15:04:41	1128.0	30.8	27.0	137	222	2825	737	678	1.09	1.09	47.4	49.6	1110.4	701	568.0	17:46	1.10	1.16	0.37
15:06:42	1129.0	27.7	31.1	137	285	2880	721	677	1.09	1.09	47.4	49.7	1110.5	700	569.0	17:48	1.10	1.18	0.42
15:09:06	1130.0	30.9	30.0	137	258	2855	735	672	1.09	1.09	47.4	49.7	1110.5	700	570.0	17:51	1.10	1.23	0.42
15:10:37	1131.0	38.8	30.8	137	262	2908	745	666	1.09	1.09	47.4	49.8	1110.5	699	571.0	17:52	1.10	1.12	0.42
15:12:30	1132.0	30.8	29.7	137	214	2863	749	661	1.09	1.09	47.4	49.8	1110.5	700	572.0	17:54	1.10	1.16	0.42
15:15:03	1133.0	27.6	28.9	137	269	2905	742	658	1.09	1.09	47.5	49.8	1111.2	700	573.0	17:57	1.10	1.23	0.28
15:18:34	1134.0	25.3	25.7	137	222	2895	730	666	1.09	1.09	47.5	49.7	1115.7	699	574.0	18:00	1.10	1.28	0.13
15:20:08	1135.1	42.0	29.3	137	257	2861	725	668	1.09	1.09	47.6	49.7	1117.3	699	575.1	18:02	1.10	1.09	0.23
15:22:22	1136.0	33.2	29.1	137	246	2861	735	680	1.09	1.09	47.6	49.8	1118.0	699	576.0	18:04	1.10	1.20	0.34
15:24:31	1137.0	26.1	29.9	137	240	2893	737	683	1.09	1.09	47.6	49.9	1118.2	697	577.0	18:06	1.10	1.20	0.35
15:27:10	1138.0	20.7	30.0	138	200	2881	720	695	1.09	1.09	47.6	49.9	1118.3	697	578.0	18:09	1.10	1.26	0.34
15:29:42	1139.0	23.7	29.7	138	205	2899	728	671	1.09	1.09	47.7	50.0	1118.4	697	579.0	18:11	1.10	1.24	0.34
15:56:29	1140.0	5.7	27.9	136	160	2744	703	651	1.09	1.09	47.7	49.5	1126.8	698	580.0	18:20	1.10	1.53	0.25
16:09:01	1141.0	14.5	30.0	133	174	2718	716	619	1.09	1.09	47.4	50.0	1132.4	695	581.0	18:32	1.10	1.66	0.22
16:12:03	1142.1	19.6	23.4	133	167	2743	724	619	1.09	1.09	47.5	50.4	1133.3	694	582.1	18:36	1.10	1.17	0.22
16:14:05	1143.1	34.0	29.4	133	215	2768	727	628	1.09	1.09	47.6	50.4	1134.0	693	583.1	18:38	1.10	1.14	0.21
16:16:08	1144.0	28.3	30.8	133	220	2745	733	640	1.09	1.09	47.6	50.4	1135.1	694	584.0	18:40	1.10	1.19	0.20

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
16:18:41	1145.0	22.0	28.6	133	206	2746	733	623	1.09	1.09	47.7	50.4	1136.2	694	585.0	18:42	1.10	1.21	0.17
16:21:05	1146.0	27.0	30.3	133	232	2781	736	626	1.09	1.09	47.8	50.4	1137.3	693	586.0	18:45	1.10	1.20	0.18
16:23:26	1147.0	26.9	26.8	133	182	2739	730	631	1.09	1.09	47.9	50.5	1138.1	695	587.0	18:47	1.10	1.18	0.21
16:26:24	1148.0	20.5	29.2	133	220	2768	738	637	1.09	1.09	47.9	50.4	1139.1	695	588.0	18:50	1.10	1.24	0.16
16:28:43	1149.1	27.1	29.5	133	211	2786	733	640	1.09	1.09	47.9	50.4	1139.5	696	589.1	18:52	1.10	1.18	0.14
16:31:32	1150.0	21.7	29.0	133	213	2772	730	639	1.09	1.09	47.9	50.4	1139.5	697	590.0	18:55	1.10	1.26	0.14
16:34:43	1151.0	17.4	27.3	133	190	2766	731	639	1.09	1.09	47.8	50.4	1139.5	700	591.0	18:58	1.10	1.26	0.14
16:36:39	1152.0	32.9	30.8	133	227	2735	741	642	1.09	1.09	47.7	50.4	1139.6	701	592.0	19:00	1.10	1.16	0.14
16:38:38	1153.0	31.9	28.7	133	207	2697	741	632	1.09	1.09	47.6	50.4	1139.7	705	593.0	19:02	1.10	1.16	0.13
16:41:19	1154.0	30.4	27.8	133	185	2669	739	641	1.09	1.09	47.6	50.3	1139.9	705	594.0	19:05	1.10	1.23	0.12
16:43:33	1155.0	25.3	30.3	133	206	2655	753	636	1.09	1.09	47.6	50.4	1140.0	707	595.0	19:07	1.10	1.20	0.12
16:46:41	1156.0	21.6	26.7	133	223	2641	755	646	1.09	1.09	47.5	50.4	1140.2	710	596.0	19:10	1.10	1.24	0.13
16:50:23	1157.0	15.7	28.3	133	285	2631	748	636	1.09	1.09	47.4	50.4	1140.3	713	597.0	19:14	1.10	1.31	0.15
16:54:09	1158.0	18.4	28.7	133	257	2646	752	653	1.09	1.09	47.4	50.5	1140.7	715	598.0	19:18	1.10	1.32	0.19
16:57:03	1159.0	19.5	31.3	133	257	2619	758	655	1.09	1.09	47.4	50.5	1141.8	717	599.0	19:21	1.10	1.29	0.22
16:59:46	1160.0	23.0	32.2	133	238	2589	763	668	1.09	1.09	47.4	50.5	1143.4	720	600.0	19:23	1.10	1.29	0.22
17:03:50	1161.0	13.8	31.0	133	205	2626	766	651	1.09	1.09	47.4	50.6	1144.5	724	601.0	19:27	1.10	1.37	0.22
17:08:28	1162.0	12.3	31.3	133	207	2646	767	659	1.09	1.09	47.4	50.6	1146.4	726	602.0	19:32	1.10	1.41	0.23
17:12:01	1163.1	20.7	30.3	133	210	2625	757	656	1.09	1.09	47.4	50.6	1147.7	729	603.1	19:35	1.10	1.31	0.26
17:16:00	1164.0	14.0	28.6	133	179	2611	742	674	1.09	1.09	47.4	50.6	1149.2	732	604.0	19:39	1.10	1.34	0.26
17:19:23	1165.0	18.6	32.0	133	194	2626	755	654	1.09	1.09	47.4	50.6	1150.4	733	605.0	19:43	1.10	1.33	0.22
17:24:14	1166.0	11.0	31.6	133	176	2640	776	644	1.09	1.09	47.4	50.6	1152.3	734	606.0	19:48	1.10	1.43	0.19
17:30:32	1167.0	9.4	30.2	133	154	2662	778	623	1.09	1.09	47.5	50.6	1155.0	736	607.0	19:54	1.10	1.48	0.20
17:36:52	1168.0	10.1	31.2	133	147	2647	761	623	1.09	1.09	47.9	50.6	1156.8	736	608.0	20:00	1.10	1.48	0.18
17:58:57	1169.1	13.0	30.9	133	169	2636	720	624	1.09	1.09	48.0	50.5	1161.2	734	609.1	20:06	1.10	1.43	0.21
18:01:17	1170.1	24.5	31.2	134	190	2673	680	624	1.09	1.09	48.1	50.2	1161.7	735	610.1	20:08	1.10	1.22	0.20
18:04:41	1171.1	19.6	30.0	134	183	2697	703	638	1.09	1.09	48.1	50.2	1162.4	733	611.1	20:11	1.10	1.31	0.20
18:07:21	1172.1	33.6	28.5	134	189	2701	723	634	1.09	1.09	48.2	50.3	1163.2	733	612.1	20:14	1.10	1.22	0.19
18:09:29	1173.1	31.1	28.1	134	195	2702	744	639	1.09	1.09	48.2	50.2	1163.6	733	613.1	20:16	1.10	1.17	0.18
18:11:46	1174.0	22.4	28.0	134	183	2729	727	630	1.09	1.09	48.2	50.3	1164.2	732	614.0	20:18	1.10	1.18	0.18
18:14:13	1175.0	22.2	27.5	134	204	2695	721	642	1.09	1.09	48.2	50.2	1164.9	732	615.0	20:21	1.10	1.20	0.18
18:16:48	1176.0	24.3	29.3	134	238	2725	740	643	1.09	1.09	48.2	50.2	1165.5	731	616.0	20:23	1.10	1.23	0.28
18:19:34	1177.0	26.0	26.6	133	281	2763	759	642	1.09	1.09	48.2	50.3	1165.9	731	617.0	20:26	1.10	1.22	0.49
18:22:48	1178.0	21.5	28.9	133	307	2800	754	653	1.09	1.09	48.2	50.5	1166.4	731	618.0	20:29	1.10	1.27	0.44
18:26:23	1179.0	19.6	28.1	133	289	2816	742	639	1.09	1.09	48.3	50.4	1166.9	731	619.0	20:33	1.10	1.30	0.28
18:30:59	1180.0	11.8	27.1	133	271	2825	754	640	1.09	1.09	48.3	50.4	1167.6	730	620.0	20:38	1.10	1.35	0.53
18:35:28	1181.0	13.7	28.0	133	297	2855	786	652	1.09	1.09	48.3	50.3	1168.4	733	621.0	20:42	1.10	1.36	0.65
18:39:59	1182.0	15.4	27.2	134	219	2848	791	646	1.09	1.09	48.4	50.5	1170.6	731	622.0	20:47	1.10	1.35	0.61
18:42:53	1183.0	23.2	29.9	133	276	2834	786	653	1.09	1.09	48.4	50.6	1171.7	731	623.0	20:50	1.10	1.31	0.72
18:46:42	1184.0	13.4	26.1	134	200	2828	783	653	1.09	1.09	48.4	50.6	1173.1	731	624.0	20:53	1.10	1.29	0.52
18:54:08	1185.1	13.5	24.2	134	209	2816	746	664	1.09	1.09	48.4	50.8	1175.8	729	625.1	21:01	1.10	1.44	0.44
18:58:31	1186.0	15.5	28.8	133	263	2808	736	662	1.09	1.09	48.5	50.7	1177.4	729	626.0	21:05	1.10	1.36	0.32
19:02:13	1187.0	15.5	30.2	133	289	2845	736	655	1.09	1.09	48.5	50.8	1178.7	729	627.0	21:09	1.10	1.34	0.33
19:06:07	1188.0	15.5	29.0	134	247	2851	743	644	1.09	1.09	48.6	51.0	1180.1	728	628.0	21:13	1.10	1.32	0.30
19:10:04	1189.0	15.1	29.5	133	251	2864	745	656	1.09	1.09	48.6	51.0	1181.3	727	629.0	21:17	1.10	1.35	0.28

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
19:14:14	1190.0	14.7	29.0	134	220	2834	740	656	1.09	1.09	48.6	51.0	1182.2	736	630.0	21:21	1.10	1.36	0.44
19:18:37	1191.0	12.9	32.1	134	211	2778	724	650	1.09	1.09	48.7	51.0	1183.5	717	631.0	21:25	1.10	1.41	0.98
19:23:28	1192.0	12.4	31.3	133	245	2850	723	660	1.09	1.09	48.7	51.1	1184.3	717	632.0	21:30	1.10	1.42	0.53
19:30:24	1193.0	7.8	30.1	134	213	2861	731	648	1.09	1.09	48.7	51.1	1185.2	715	633.0	21:37	1.10	1.50	0.27
19:36:41	1194.0	10.3	30.0	134	216	2874	747	647	1.09	1.09	48.8	51.2	1186.7	715	634.0	21:43	1.10	1.47	0.29
19:41:48	1195.0	12.1	30.5	134	232	2858	772	647	1.09	1.09	48.9	51.3	1188.0	715	635.0	21:48	1.10	1.43	0.32
19:46:52	1196.0	12.0	31.7	134	224	2871	772	644	1.09	1.09	48.9	51.3	1189.2	715	636.0	21:53	1.10	1.44	0.30
19:52:20	1197.0	12.4	31.7	134	217	2861	766	646	1.09	1.09	49.0	51.3	1190.5	715	637.0	21:59	1.10	1.46	0.26
19:58:07	1198.0	11.7	30.7	134	197	2869	742	649	1.09	1.09	49.0	51.4	1191.7	713	638.0	22:05	1.10	1.45	0.22
20:18:29	1199.0	14.3	29.2	137	185	2814	764	618	1.09	1.09	49.0	51.4	1194.2	712	639.0	22:10	1.10	1.42	0.20
20:21:43	1200.1	21.4	31.0	137	205	2828	762	625	1.09	1.09	49.0	51.5	1194.7	712	640.1	22:13	1.10	1.30	0.20
20:24:41	1201.0	21.4	30.1	137	217	2834	761	624	1.09	1.09	49.1	51.4	1195.3	712	641.0	22:16	1.10	1.27	0.20
20:28:04	1202.0	17.2	27.8	137	250	2813	759	636	1.09	1.09	49.1	51.4	1195.9	711	642.0	22:20	1.10	1.29	0.20
20:33:21	1203.0	8.9	27.0	138	165	2826	765	636	1.09	1.09	49.1	51.5	1196.8	710	643.0	22:25	1.10	1.32	0.19

POOH to change bit.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT- mts	-BIT- hh:mm	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
16th March 1993																			
MB #5 SEC SS44G 8.5" 3x32																			
04:09:46	1205.0	31.6	14.0	81	66	509	350	271	1.09	1.09	35.8	35.7	1182.7	727	1.0	0:02	1.14	1.78	0.58
05:15:44	1206.0	6.3	23.9	78	93	526	375	316	1.09	1.09	35.9	37.7	1205.4	736	2.0	0:45	1.14	1.85	0.07
06:09:06	1207.0	2.5	21.8	77	78	536	408	378	1.13	1.13	36.3	38.2	1206.4	733	3.0	1:34	1.18	1.76	0.02
Drilled out shoe and 3m formation. Performed LOT. Drill Ahead.																			
09:14:44	1208.0	1.7	25.2	79	92	510	415	387	1.13	1.13	35.6	37.0	1207.5	733	4.0	2.29	1.19	1.92	0.01
10:11:34	1209.0	2.8	23.8	80	55	504	412	383	1.13	1.13	35.6	37.1	1208.4	686	5.0	3:21	1.18	1.82	0.01
POOH due to slow ROP. Bit balled-up.																			

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
NB#6 8.5" HYCALOG DS61H 10x11x12x12x12 with MWD assembly.																			
19:28:35	1210.0	18.9	3.9	75	60	1849	483	330	1.13	1.13	30.6	38.3	1209.0	705	1.0	0:05	1.19	0.79	0.02
19:31:00	1211.0	29.8	3.8	109	103	1823	484	372	1.13	1.13	30.7	39.4	1209.0	707	2.0	0:07	1.19	0.74	0.03
19:32:55	1212.1	33.1	4.5	120	97	1833	486	369	1.13	1.13	30.9	39.6	1209.0	706	3.1	0:09	1.19	0.71	0.05
19:34:04	1213.0	52.8	6.2	121	103	1833	484	370	1.13	1.13	31.2	39.7	1209.0	706	4.0	0:10	1.19	0.69	0.06
19:35:54	1214.0	33.8	4.7	121	86	1803	475	345	1.13	1.13	31.4	39.5	1209.0	706	5.0	0:12	1.19	0.72	0.06
19:38:35	1215.0	27.0	5.5	120	94	1836	484	348	1.13	1.13	31.8	39.1	1209.0	712	6.0	0:15	1.19	0.84	0.07
19:40:19	1216.0	36.1	7.0	120	101	1840	475	345	1.13	1.13	32.1	38.7	1209.0	708	7.0	0:17	1.19	0.78	0.07
19:41:59	1217.0	38.5	7.3	120	120	1818	475	351	1.13	1.13	32.4	38.2	1209.0	705	8.0	0:18	1.19	0.77	0.08
19:43:27	1218.0	46.5	7.9	122	142	1855	483	347	1.13	1.13	32.6	37.9	1209.0	704	9.0	0:20	1.19	0.78	0.08
20:12:25	1219.0	51.7	5.6	118	155	1873	476	356	1.13	1.13	33.9	36.4	1217.3	667	10.0	0:22	1.19	0.80	0.09
20:13:49	1220.0	46.4	3.6	118	136	1834	476	362	1.13	1.13	34.2	36.1	1218.1	663	11.0	0:24	1.19	0.64	0.08
20:15:32	1221.0	37.3	6.7	119	99	1846	476	360	1.13	1.13	34.2	36.2	1218.1	662	12.0	0:25	1.19	0.78	0.08
20:18:01	1222.0	27.8	7.8	118	138	1849	476	374	1.13	1.13	34.2	36.4	1218.1	662	13.0	0:28	1.19	0.85	0.08
20:20:02	1223.0	33.9	7.6	118	107	1852	481	376	1.13	1.13	34.2	36.6	1218.1	664	14.0	0:30	1.19	0.82	0.08
20:22:18	1224.0	24.4	8.0	119	114	1844	478	373	1.13	1.13	34.3	36.7	1218.1	667	15.0	0:32	1.19	0.86	0.08
20:24:56	1225.0	21.6	8.3	119	70	1875	478	325	1.13	1.13	34.4	36.7	1218.1	695	16.0	0:34	1.19	0.87	0.08
20:27:27	1226.0	27.2	7.7	119	94	1863	483	337	1.13	1.13	34.5	36.8	1218.1	700	17.0	0:37	1.19	0.86	0.08
20:28:48	1227.0	51.0	9.3	120	106	1853	476	329	1.13	1.13	34.6	36.8	1218.1	700	18.0	0:38	1.19	0.78	0.08
20:30:13	1228.0	41.0	9.7	118	125	1865	477	334	1.13	1.13	34.6	36.9	1218.2	699	19.0	0:40	1.19	0.79	0.07
20:32:02	1229.0	40.8	8.7	119	109	1855	484	352	1.13	1.13	34.7	36.9	1218.2	698	20.0	0:41	1.19	0.81	0.07
20:33:29	1230.1	39.6	10.0	119	111	1893	485	333	1.13	1.13	34.7	36.9	1218.2	698	21.1	0:43	1.19	0.77	0.07
20:35:09	1231.0	48.8	9.6	119	113	1880	481	338	1.13	1.13	34.8	36.9	1218.2	696	22.0	0:44	1.19	0.83	0.07
20:36:27	1232.0	41.1	10.3	119	123	1893	472	352	1.13	1.13	34.9	36.9	1218.2	697	23.0	0:46	1.19	0.80	0.07
20:38:10	1233.1	45.4	8.6	119	95	1859	470	358	1.13	1.13	34.9	36.8	1218.4	698	24.1	0:47	1.19	0.80	0.07
20:40:05	1234.0	31.9	9.4	119	104	1896	470	375	1.13	1.13	35.0	36.9	1219.7	698	25.0	0:49	1.19	0.84	0.08
20:43:15	1235.1	28.3	9.1	118	102	1878	477	323	1.13	1.13	35.0	36.9	1221.3	699	26.1	0:52	1.19	0.90	0.06
20:44:30	1236.0	41.1	9.8	119	114	1902	476	349	1.13	1.13	35.1	36.9	1221.9	699	27.0	0:54	1.19	0.77	0.06
20:46:29	1237.0	34.5	9.0	119	144	1881	470	343	1.13	1.13	35.1	37.0	1222.8	700	28.0	0:56	1.19	0.84	0.07
20:48:25	1238.0	25.8	8.9	119	123	1891	468	367	1.13	1.13	35.2	37.0	1223.6	699	29.0	0:57	1.19	0.84	0.07
20:49:48	1239.0	53.5	9.1	118	132	1888	462	341	1.13	1.13	35.2	37.1	1224.2	699	30.0	0:59	1.19	0.77	0.06
20:51:46	1240.0	32.6	8.3	119	76	1898	472	342	1.13	1.13	35.3	37.1	1224.8	698	31.0	1:01	1.19	0.83	0.05
20:54:28	1241.0	20.6	7.5	119	60	1870	461	341	1.13	1.13	35.3	37.2	1225.6	699	32.0	1:03	1.19	0.86	0.06
20:56:24	1242.0	35.9	8.0	119	109	1873	465	345	1.13	1.13	35.4	37.2	1227.4	700	33.0	1:05	1.19	0.82	0.08
20:58:48	1243.0	24.0	7.7	119	70	1900	468	352	1.13	1.13	35.4	37.2	1228.8	699	34.0	1:08	1.19	0.85	0.08
21:01:23	1244.0	24.5	7.4	119	70	1886	466	335	1.13	1.13	35.5	37.3	1229.7	699	35.0	1:10	1.19	0.86	0.08
21:03:52	1245.0	25.1	8.0	118	95	1877	462	357	1.13	1.13	35.5	37.4	1231.0	699	36.0	1:13	1.19	0.86	0.08
21:07:13	1246.0	19.2	7.4	119	59	1869	478	336	1.13	1.13	35.6	37.5	1233.1	698	37.0	1:16	1.19	0.91	0.07
21:09:42	1247.0	24.6	7.6	118	95	1879	457	341	1.13	1.13	35.7	37.6	1234.2	698	38.0	1:18	1.19	0.85	0.08
21:23:23	1248.0	43.7	7.6	118	112	1861	464	351	1.13	1.13	35.9	37.3	1238.0	698	39.0	1:21	1.19	0.94	0.10
21:26:18	1249.1	23.8	8.1	120	87	1854	465	360	1.13	1.13	36.0	37.1	1239.6	698	40.1	1:24	1.19	0.99	0.10
21:27:57	1250.0	45.8	8.7	120	128	1861	470	362	1.13	1.13	36.0	37.3	1240.4	699	41.0	1:25	1.19	0.90	0.11
21:29:15	1251.0	53.8	9.4	120	124	1837	470	353	1.13	1.13	36.1	37.5	1240.8	698	42.0	1:26	1.19	0.84	0.12
21:30:36	1252.0	45.1	9.9	120	140	1861	469	359	1.13	1.13	36.1	37.6	1241.3	699	43.0	1:28	1.19	0.86	0.12
21:32:01	1253.0	49.4	9.4	121	102	1874	468	314	1.13	1.13	36.1	37.7	1242.1	699	44.0	1:29	1.19	0.86	0.10

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
21:33:29	1254.0	38.1	10.0	119	139	1850	468	345	1.13	1.13	36.1	37.8	1242.6	700	45.0	1:31	1.19	0.88	0.10
21:35:17	1255.0	36.2	9.6	120	141	1890	471	353	1.13	1.13	36.1	37.9	1243.3	699	46.0	1:32	1.19	0.92	0.09
21:36:41	1256.0	43.0	9.9	120	95	1857	465	340	1.13	1.13	36.1	37.9	1243.8	699	47.0	1:34	1.19	0.86	0.10
21:38:17	1257.0	39.3	9.5	120	116	1890	467	336	1.13	1.13	36.2	38.0	1244.4	699	48.0	1:35	1.19	0.89	0.10
21:39:45	1258.0	37.3	10.5	120	134	1898	468	322	1.13	1.13	36.2	38.0	1245.0	700	49.0	1:37	1.19	0.88	0.10
21:41:39	1259.0	28.1	9.9	124	133	1872	470	336	1.13	1.13	36.2	38.0	1245.5	699	50.0	1:39	1.19	0.94	0.11
21:43:23	1260.0	31.4	10.1	133	130	1884	465	350	1.13	1.13	36.2	38.1	1246.0	700	51.0	1:41	1.19	0.94	0.11
21:45:03	1261.1	40.5	9.9	134	121	1862	465	347	1.13	1.13	36.3	38.1	1246.7	700	52.1	1:42	1.19	0.93	0.10
21:46:59	1262.0	37.4	9.8	133	119	1875	458	358	1.13	1.13	36.3	38.0	1247.2	700	53.0	1:44	1.19	0.97	0.09
21:48:39	1263.0	32.2	9.7	132	153	1898	464	350	1.13	1.13	36.3	38.0	1247.2	699	54.0	1:46	1.19	0.92	0.09
21:50:29	1264.0	34.0	9.5	133	106	1869	460	343	1.13	1.13	36.4	38.1	1247.2	699	55.0	1:48	1.19	0.95	0.09
21:52:08	1265.0	46.7	10.1	133	132	1889	465	321	1.13	1.13	36.4	38.1	1247.2	699	56.0	1:49	1.19	0.92	0.09
21:53:42	1266.1	41.2	9.9	133	131	1897	462	327	1.13	1.13	36.5	38.0	1247.3	698	57.1	1:51	1.19	0.92	0.10
21:55:00	1267.1	60.5	10.2	134	131	1876	457	328	1.13	1.13	36.5	38.0	1248.0	698	58.1	1:52	1.19	0.87	0.13
21:56:34	1268.0	35.7	9.9	134	93	1900	454	326	1.13	1.13	36.5	38.1	1248.5	699	59.0	1:54	1.19	0.90	0.14
21:57:59	1269.0	41.9	10.3	133	178	1905	462	324	1.13	1.13	36.5	38.1	1249.1	698	60.0	1:55	1.19	0.90	0.15
21:59:27	1270.0	38.1	10.1	134	149	1935	467	329	1.13	1.13	36.5	38.2	1250.4	699	61.0	1:56	1.19	0.91	0.16
22:00:39	1271.0	47.9	11.2	133	165	1939	464	367	1.13	1.13	36.6	38.2	1251.2	698	62.0	1:58	1.19	0.89	0.16
22:01:42	1272.0	50.6	12.6	134	177	1888	463	347	1.13	1.13	36.6	38.2	1252.0	698	63.0	1:59	1.19	0.87	0.16
22:02:47	1273.1	64.7	11.7	132	219	1931	465	343	1.13	1.13	36.6	38.2	1252.6	698	64.1	1:60	1.19	0.84	0.16
22:04:09	1274.0	39.0	11.3	133	176	1944	461	353	1.13	1.13	36.6	38.3	1252.9	698	65.0	2:01	1.19	0.91	0.16
22:05:38	1275.0	44.0	11.1	133	171	1915	460	353	1.13	1.13	36.7	38.3	1253.9	699	66.0	2:03	1.19	0.92	0.16
22:06:49	1276.1	55.1	11.6	132	179	1935	466	343	1.13	1.13	36.7	38.3	1254.5	698	67.1	2:04	1.19	0.88	0.16
22:23:04	1277.1	60.3	8.5	131	203	1949	467	361	1.13	1.13	36.9	38.0	1260.8	695	68.1	2:05	1.19	0.77	0.16
22:23:48	1278.0	75.4	9.2	130	218	1936	461	329	1.13	1.13	36.9	38.0	1261.3	694	69.0	2:06	1.19	0.67	0.17
22:25:31	1279.1	29.6	6.5	130	151	1932	453	350	1.13	1.13	36.9	38.2	1262.0	694	70.1	2:08	1.19	0.77	0.19
22:26:29	1280.1	60.2	8.8	130	202	1925	454	361	1.13	1.13	36.9	38.5	1262.6	695	71.1	2:09	1.19	0.74	0.20
22:27:38	1281.0	47.9	7.5	131	209	1961	459	381	1.13	1.13	36.9	38.5	1263.2	695	72.0	2:10	1.19	0.73	0.19
22:28:34	1282.0	67.5	8.2	129	202	1957	464	348	1.13	1.13	36.9	38.6	1263.6	696	73.0	2:11	1.19	0.71	0.18
22:29:39	1283.2	66.4	8.2	130	189	1924	458	350	1.13	1.13	36.9	38.6	1264.2	696	74.2	2:12	1.19	0.72	0.18
22:30:35	1284.0	55.4	8.9	130	207	1988	454	354	1.13	1.13	36.9	38.7	1264.8	696	75.0	2:13	1.19	0.72	0.19
22:31:49	1285.0	40.3	8.0	131	215	1980	454	347	1.13	1.13	36.9	38.7	1265.6	696	76.0	2:14	1.19	0.76	0.20
22:33:14	1286.0	38.5	7.7	130	212	1953	451	374	1.13	1.13	36.9	38.7	1266.4	696	77.0	2:15	1.19	0.78	0.21
22:34:16	1287.0	51.4	7.9	130	195	1970	454	356	1.13	1.13	36.9	38.7	1267.2	696	78.0	2:16	1.19	0.74	0.20
22:36:41	1288.0	40.0	7.5	130	176	1962	450	368	1.13	1.13	37.0	38.6	1268.6	697	79.0	2:19	1.19	0.87	0.22
22:37:58	1289.0	47.3	8.3	129	195	2003	449	359	1.13	1.13	37.0	38.7	1269.3	696	80.0	2:20	1.19	0.76	0.23
22:39:15	1290.1	43.8	9.0	130	202	2012	454	359	1.13	1.13	37.0	38.8	1270.3	696	81.1	2:21	1.19	0.78	0.23
22:40:27	1291.1	49.4	8.8	129	212	1983	452	375	1.13	1.13	37.0	38.8	1271.4	697	82.1	2:23	1.19	0.77	0.19
22:41:51	1292.0	39.5	8.7	129	231	2024	450	369	1.13	1.13	37.0	38.8	1272.6	698	83.0	2:24	1.19	0.80	0.15
22:43:25	1293.0	33.7	8.1	131	188	2024	453	392	1.13	1.13	37.1	38.8	1273.9	698	84.0	2:26	1.19	0.79	0.11
22:45:33	1294.0	27.8	7.4	131	142	2006	454	375	1.13	1.13	37.1	38.9	1275.3	697	85.0	2:28	1.19	0.84	0.11
22:46:50	1295.0	47.0	8.7	129	204	1993	453	367	1.13	1.13	37.1	38.8	1276.1	699	86.0	2:29	1.19	0.79	0.13
22:47:40	1296.0	72.9	9.7	129	210	2029	454	336	1.13	1.13	37.1	38.8	1276.1	700	87.0	2:30	1.19	0.71	0.13
22:49:08	1297.0	39.4	8.7	129	218	2040	454	412	1.13	1.13	37.1	38.8	1276.1	699	88.0	2:31	1.19	0.80	0.13
22:51:50	1298.0	19.9	9.2	131	225	2020	457	360	1.13	1.13	37.1	38.8	1276.1	700	89.0	2:34	1.19	0.94	0.13

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg	deg C		m	bbl	mts	hh:mm	sg		%
22:53:12	1299.0	44.1	9.0	130	213	2030	458	356	1.13	1.13	37.1	38.9	1276.1	701	90.0	2:35	1.19	0.80	0.13
22:55:44	1300.0	25.9	9.3	130	206	1989	458	373	1.13	1.13	37.1	38.9	1276.1	700	91.0	2:38	1.19	0.92	0.13
22:57:28	1301.0	32.9	8.5	130	192	2014	457	349	1.13	1.13	37.1	38.9	1276.8	700	92.0	2:40	1.19	0.83	0.19
22:58:58	1302.0	48.6	9.1	127	244	2019	457	402	1.13	1.13	37.1	38.9	1278.2	700	93.0	2:41	1.19	0.83	0.21
23:00:47	1303.0	31.2	8.5	130	177	2030	456	385	1.13	1.13	37.1	39.0	1279.4	701	94.0	2:43	1.19	0.83	0.19
23:02:20	1304.0	39.7	9.0	130	227	2009	458	359	1.13	1.13	37.1	39.1	1280.8	702	95.0	2:44	1.19	0.81	0.17
23:03:50	1305.0	39.8	9.9	130	192	2067	457	353	1.13	1.13	37.1	39.1	1282.3	701	96.0	2:46	1.19	0.82	0.18
23:18:17	1306.1	41.8	7.1	124	251	1982	458	355	1.13	1.13	37.1	38.7	1289.0	701	97.1	2:47	1.19	0.82	0.17
23:19:50	1307.1	64.4	6.2	127	197	1989	455	353	1.13	1.13	37.1	38.6	1290.1	700	98.1	2:49	1.19	0.78	0.17
23:20:43	1308.0	61.9	8.4	126	209	2008	455	357	1.13	1.13	37.1	38.8	1290.7	700	99.0	2:50	1.19	0.69	0.17
23:22:11	1309.1	43.9	7.0	126	199	1997	457	355	1.13	1.13	37.1	38.9	1291.8	700	100.1	2:51	1.19	0.75	0.17
23:23:53	1310.0	32.4	6.4	127	164	2001	454	319	1.13	1.13	37.1	39.1	1292.9	701	101.0	2:53	1.19	0.77	0.16
23:25:17	1311.0	49.1	7.2	127	206	1999	455	337	1.13	1.13	37.1	39.2	1293.9	700	102.0	2:54	1.19	0.76	0.15
23:26:38	1312.1	44.7	6.9	126	191	2012	457	330	1.13	1.13	37.0	39.3	1294.8	700	103.1	2:55	1.19	0.74	0.13
23:28:46	1313.0	23.5	6.0	127	162	2002	455	358	1.13	1.13	37.1	39.4	1296.3	700	104.0	2:58	1.19	0.75	0.14
23:30:20	1314.0	42.6	7.3	127	190	2025	455	374	1.13	1.13	37.0	39.4	1297.3	699	105.0	2:59	1.19	0.78	0.15
23:32:57	1315.0	16.9	6.6	126	177	2029	452	381	1.13	1.13	37.1	39.4	1299.3	699	106.0	3:02	1.19	0.86	0.16
23:34:34	1316.0	37.4	6.5	127	196	2021	455	325	1.13	1.13	37.1	39.3	1300.5	699	107.0	3:03	1.19	0.77	0.19
23:36:21	1317.0	31.0	6.8	126	203	2003	454	354	1.13	1.13	37.1	39.3	1301.7	700	108.0	3:05	1.19	0.80	0.20
23:38:29	1318.0	40.3	6.7	126	180	2033	456	389	1.13	1.13	37.1	39.5	1303.3	701	109.0	3:07	1.19	0.83	0.16
23:40:39	1319.0	28.5	7.2	126	166	2030	459	366	1.13	1.13	37.1	39.6	1304.9	701	110.0	3:09	1.19	0.85	0.12
23:43:06	1320.0	27.0	6.7	126	151	2013	460	346	1.13	1.13	37.2	39.6	1306.0	700	111.0	3:12	1.19	0.85	0.14
23:45:26	1321.0	22.7	7.1	127	174	2029	459	343	1.13	1.13	37.2	39.5	1307.9	700	112.0	3:14	1.19	0.86	0.17
23:47:30	1322.0	28.3	7.5	127	189	2035	463	344	1.13	1.13	37.2	39.5	1309.3	700	113.0	3:16	1.19	0.84	0.17
23:49:26	1323.1	31.3	7.1	127	177	2035	466	346	1.13	1.13	37.3	39.6	1310.5	700	114.1	3:18	1.19	0.81	0.17
23:51:16	1324.0	41.5	7.2	126	186	2051	463	345	1.13	1.13	37.3	39.6	1311.8	700	115.0	3:20	1.19	0.82	0.16
23:53:48	1325.0	26.5	7.4	127	183	2053	463	367	1.13	1.13	37.3	39.6	1313.2	698	116.0	3:23	1.19	0.86	0.17
23:55:49	1326.0	37.8	7.3	127	194	2051	466	338	1.13	1.13	37.4	39.7	1314.4	699	117.0	3:25	1.19	0.82	0.15
23:58:20	1327.0	22.5	7.4	127	188	2050	462	357	1.13	1.13	37.4	39.7	1315.1	699	118.0	3:27	1.19	0.87	0.15
16th March 1993																			
00:01:14	1328.0	35.6	7.5	127	166	2061	467	349	1.13	1.13	37.5	39.8	1317.2	699	119.0	3:30	1.19	0.91	0.15
00:03:44	1329.0	21.9	7.7	127	176	2063	469	349	1.13	1.13	37.6	39.8	1318.4	699	120.0	3:33	1.19	0.88	0.16
00:06:42	1330.0	20.0	7.2	127	183	2040	470	361	1.13	1.13	37.6	39.8	1319.1	699	121.0	3:36	1.19	0.90	0.16
00:09:00	1331.0	36.3	8.1	127	177	2076	470	351	1.13	1.13	37.7	39.8	1320.1	699	122.0	3:38	1.19	0.86	0.15
00:11:12	1332.0	33.2	8.5	127	185	2057	470	342	1.13	1.13	37.8	39.8	1320.9	699	123.0	3:40	1.19	0.88	0.15
00:14:23	1333.0	18.3	8.1	126	164	2062	468	346	1.13	1.13	37.8	39.9	1322.6	701	124.0	3:43	1.19	0.94	0.15
00:17:27	1334.0	19.5	7.7	128	146	2061	470	333	1.13	1.13	37.8	39.9	1323.9	702	125.0	3:46	1.19	0.92	0.16
00:21:45	1335.0	16.0	7.6	127	157	2040	470	353	1.13	1.13	37.9	40.0	1325.7	703	126.0	3:51	1.19	0.98	0.15
00:35:11	1336.0	40.2	8.2	128	204	2034	451	356	1.13	1.13	37.9	39.6	1328.8	707	127.0	3:53	1.19	0.93	0.14
00:36:41	1337.0	33.5	9.4	130	203	2034	446	347	1.13	1.13	37.9	39.3	1329.3	707	128.0	3:55	1.19	0.81	0.14
00:38:15	1338.0	39.2	8.9	131	175	2062	451	306	1.13	1.13	37.9	39.5	1329.6	708	129.0	3:56	1.19	0.82	0.14
00:40:36	1339.0	29.8	10.3	131	176	2082	452	326	1.13	1.13	37.8	39.7	1330.3	711	130.0	3:59	1.19	0.93	0.14
00:43:40	1340.0	17.5	9.2	131	156	2060	449	337	1.13	1.13	37.8	39.8	1331.6	712	131.0	4:02	1.19	0.96	0.15
00:46:22	1341.0	26.4	8.8	131	156	2049	442	348	1.13	1.13	37.8	40.0	1332.5	713	132.0	4:05	1.19	0.92	0.14
00:47:56	1342.0	35.1	10.7	131	211	2059	447	364	1.13	1.13	37.7	40.1	1332.9	714	133.0	4:06	1.19	0.87	0.13

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
00:49:58	1343.0	26.1	10.1	131	171	2085	446	327	1.13	1.13	37.7	40.1	1333.4	716	134.0	4:08	1.19	0.89	0.13
00:53:02	1344.0	25.4	9.7	131	156	2082	448	341	1.13	1.13	37.7	40.2	1334.2	716	135.0	4:11	1.19	0.98	0.12
00:56:15	1345.0	22.4	10.5	131	164	2084	452	343	1.13	1.13	37.7	40.2	1334.8	716	136.0	4:14	1.19	1.01	0.14
01:00:01	1346.0	17.8	10.2	131	149	2071	448	341	1.13	1.13	37.8	40.2	1335.1	717	137.0	4:18	1.19	1.02	0.14
01:02:46	1347.0	23.1	10.6	130	152	2058	458	320	1.13	1.13	37.8	40.4	1335.1	720	138.0	4:21	1.19	0.97	0.14
01:05:54	1348.0	20.1	10.2	130	157	2044	458	331	1.13	1.13	37.8	40.4	1336.0	722	139.0	4:24	1.19	0.99	0.17
01:09:18	1349.0	17.0	10.0	131	154	2062	452	343	1.13	1.13	37.8	40.4	1338.0	725	140.0	4:27	1.19	1.00	0.13
01:12:23	1350.0	17.3	10.1	130	169	2074	454	388	1.13	1.13	37.9	40.4	1339.3	726	141.0	4:31	1.19	0.99	0.13
01:16:21	1351.0	11.6	10.0	131	140	2057	460	354	1.13	1.13	37.9	40.4	1340.6	727	142.0	4:35	1.19	1.03	0.13
01:18:14	1352.0	30.4	10.3	131	162	2025	459	339	1.13	1.13	38.0	40.4	1341.4	727	143.0	4:36	1.19	0.88	0.13
01:21:16	1353.0	24.6	10.3	131	165	2040	449	364	1.13	1.13	38.0	40.5	1342.9	729	144.0	4:39	1.19	0.98	0.13
01:23:05	1354.0	28.9	9.8	131	166	2049	459	343	1.13	1.13	38.1	40.5	1343.4	730	145.0	4:41	1.19	0.87	0.12
01:25:36	1355.1	22.8	8.9	131	148	2059	462	365	1.13	1.13	38.1	40.6	1344.3	730	146.1	4:44	1.19	0.91	0.13
01:28:54	1356.0	23.8	9.0	130	160	2028	456	390	1.13	1.13	38.2	40.6	1345.3	730	147.0	4:47	1.19	0.98	0.13
01:30:34	1357.0	34.4	9.5	130	173	2018	455	343	1.13	1.13	38.2	40.6	1345.8	731	148.0	4:49	1.19	0.84	0.13
01:32:08	1358.0	36.4	10.1	131	180	2068	453	328	1.13	1.13	38.3	40.6	1346.1	731	149.0	4:50	1.19	0.84	0.13
01:34:00	1359.0	30.9	10.2	130	201	2067	462	348	1.13	1.13	38.3	40.7	1346.7	731	150.0	4:52	1.19	0.89	0.12
01:36:45	1360.0	18.2	9.6	131	163	2058	454	345	1.13	1.13	38.3	40.7	1347.7	731	151.0	4:55	1.19	0.95	0.12
01:38:57	1361.0	27.5	9.5	130	157	2072	458	346	1.13	1.13	38.4	40.8	1348.3	732	152.0	4:57	1.19	0.91	0.12
01:42:03	1362.0	20.0	9.1	130	165	2056	446	345	1.13	1.13	38.4	40.8	1349.1	733	153.0	5:00	1.19	0.96	0.12
01:44:27	1363.0	25.6	9.3	130	181	2067	457	360	1.13	1.13	38.5	40.8	1349.9	735	154.0	5:03	1.19	0.92	0.12
02:11:02	1364.1	12.7	9.1	130	173	2051	449	314	1.13	1.13	38.5	40.8	1355.1	742	155.1	5:08	1.18	1.05	0.10
02:12:07	1365.1	74.5	8.0	131	204	1979	449	326	1.13	1.13	38.6	40.3	1355.6	741	156.1	5:09	1.18	0.74	0.11
02:13:15	1366.0	48.6	9.7	131	224	2003	448	316	1.13	1.13	38.6	40.4	1356.3	743	157.0	5:10	1.18	0.77	0.12
02:14:37	1367.0	39.1	9.6	130	220	2018	453	318	1.13	1.13	38.6	40.4	1357.1	745	158.0	5:11	1.18	0.81	0.12
02:16:26	1368.0	31.6	8.1	132	184	2024	451	303	1.13	1.13	38.6	40.2	1358.2	744	159.0	5:13	1.18	0.84	0.12
02:18:32	1369.0	29.6	7.6	132	171	2000	448	301	1.13	1.13	38.5	40.0	1358.5	743	160.0	5:15	1.18	0.86	0.12
02:20:21	1370.1	35.2	8.4	131	191	2030	447	309	1.13	1.13	38.5	40.2	1359.3	745	161.1	5:17	1.18	0.83	0.12
02:22:14	1371.0	28.2	8.3	131	196	2029	446	327	1.12	1.12	38.5	40.5	1359.9	744	162.0	5:19	1.18	0.85	0.12
02:25:50	1372.0	26.5	7.4	131	181	2022	449	311	1.12	1.12	38.5	40.7	1361.2	744	163.0	5:23	1.18	0.95	0.11
02:28:39	1373.0	25.7	7.5	132	166	2049	454	340	1.12	1.12	38.5	40.8	1362.3	745	164.0	5:25	1.18	0.92	0.11
02:30:32	1374.0	41.2	7.5	131	217	2018	450	316	1.12	1.12	38.6	40.8	1362.9	745	165.0	5:27	1.18	0.82	0.10
02:32:39	1375.0	29.0	7.5	131	183	2044	456	315	1.12	1.12	38.6	40.8	1363.5	745	166.0	5:29	1.18	0.85	0.09
02:34:19	1376.0	34.8	8.7	131	215	2067	453	313	1.12	1.12	38.6	40.9	1363.7	746	167.0	5:31	1.18	0.85	0.09
02:36:53	1377.1	26.6	9.6	131	206	2059	457	310	1.12	1.12	38.6	40.9	1363.8	744	168.1	5:34	1.18	0.93	0.09
02:39:01	1378.0	30.7	9.2	132	167	2048	458	289	1.12	1.12	38.7	40.8	1363.8	743	169.0	5:36	1.18	0.92	0.09
02:40:50	1379.0	32.9	9.4	130	181	2041	452	267	1.12	1.12	38.7	40.9	1363.8	741	170.0	5:38	1.18	0.88	0.09
02:42:45	1380.0	35.2	9.7	130	199	2092	453	245	1.12	1.12	38.7	41.1	1363.8	739	171.0	5:40	1.18	0.88	0.09
02:44:54	1381.0	23.4	9.6	131	189	2114	459	254	1.12	1.12	38.7	41.1	1363.8	739	172.0	5:42	1.18	0.92	0.10
02:49:19	1382.0	14.3	9.3	130	155	2094	455	258	1.12	1.12	38.8	41.1	1366.6	740	173.0	5:46	1.18	1.05	0.11
02:51:58	1383.0	24.5	9.9	130	173	2103	452	244	1.12	1.12	38.8	41.2	1368.1	740	174.0	5:49	1.18	0.95	0.10
03:08:54	1384.0	14.5	9.6	123	152	2085	453	294	1.12	1.12	38.9	41.0	1371.4	752	175.0	5:54	1.17	1.08	0.09
03:15:15	1385.0	2.6	11.1	129	160	2096	458	315	1.12	1.12	38.9	40.7	1373.8	751	176.0	6:00	1.17	1.18	0.14
03:29:46	1386.0	6.7	13.0	126	141	2196	454	308	1.12	1.12	38.9	41.4	1381.1	752	177.0	6:14	1.17	1.39	0.11
03:39:23	1387.0	6.4	12.8	128	127	2091	455	285	1.12	1.12	39.1	41.6	1383.3	754	178.0	6:23	1.17	1.30	0.09

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
03:51:09	1388.0	12.5	11.5	105	142	2171	452	285	1.12	1.12	39.3	41.8	1384.9	754	179.0	6:33	1.17	1.24	0.08
03:54:05	1389.0	24.0	11.8	110	181	2067	452	296	1.12	1.12	39.4	42.1	1385.0	755	180.0	6:36	1.17	1.00	0.08
03:56:34	1390.0	24.0	11.6	119	167	1986	450	282	1.12	1.12	39.5	42.0	1385.0	755	181.0	6:38	1.17	0.96	0.08
03:58:30	1391.0	30.3	11.5	131	193	2127	449	322	1.12	1.12	39.5	42.0	1385.1	754	182.0	6:40	1.17	0.93	0.08
04:00:51	1392.0	26.1	10.2	131	196	2122	448	308	1.12	1.12	39.6	42.0	1385.2	755	183.0	6:43	1.17	0.95	0.08
04:02:53	1393.0	28.9	10.2	131	198	2097	448	333	1.12	1.12	39.7	41.9	1385.5	755	184.0	6:45	1.17	0.91	0.09
04:19:00	1394.0	62.1	8.7	130	230	2072	452	364	1.12	1.12	39.8	42.2	1386.6	755	185.0	6:46	1.18	0.85	0.08
04:20:48	1395.0	28.4	6.5	132	198	2108	452	339	1.12	1.12	39.8	42.0	1386.7	755	186.0	6:48	1.18	0.80	0.08
04:22:38	1396.0	29.7	6.3	132	219	2092	452	337	1.12	1.12	39.8	41.7	1386.9	754	187.0	6:50	1.18	0.81	0.08
04:25:33	1397.0	37.1	6.3	132	191	2124	454	352	1.12	1.12	39.9	41.6	1387.2	756	188.0	6:53	1.17	0.89	0.08
04:26:38	1398.0	68.2	8.1	131	242	2124	454	332	1.12	1.12	39.9	41.7	1387.3	757	189.0	6:54	1.17	0.74	0.09
04:28:34	1399.0	40.2	7.1	131	216	2153	452	345	1.12	1.12	39.9	41.7	1387.5	756	190.0	6:56	1.17	0.83	0.09
04:29:51	1400.0	45.1	7.5	131	247	2141	453	340	1.12	1.12	39.9	41.9	1387.6	756	191.0	6:57	1.17	0.76	0.09
04:32:46	1401.0	20.2	5.9	134	192	2149	447	353	1.12	1.12	39.9	42.0	1387.7	756	192.0	7:00	1.17	0.88	0.10
04:34:26	1402.0	34.3	6.6	138	174	2113	447	363	1.12	1.12	39.9	42.0	1387.8	757	193.0	7:02	1.17	0.81	0.10
04:37:32	1403.0	16.8	6.1	143	160	2147	452	366	1.12	1.12	39.9	42.0	1388.7	757	194.0	7:05	1.17	0.85	0.11
04:39:26	1404.0	34.8	6.6	149	203	2149	452	367	1.12	1.12	40.0	42.1	1389.5	758	195.0	7:07	1.17	0.85	0.10
04:41:42	1405.0	24.3	6.4	150	170	2127	449	343	1.12	1.12	40.0	42.1	1390.8	757	196.0	7:09	1.17	0.88	0.08
04:44:03	1406.0	28.4	6.1	149	162	2140	445	355	1.12	1.12	40.0	42.1	1392.3	756	197.0	7:12	1.17	0.87	0.10
04:46:05	1407.0	32.1	6.3	149	165	2140	445	338	1.12	1.12	40.0	42.0	1393.0	756	198.0	7:14	1.17	0.85	0.14
04:48:32	1408.1	25.6	6.0	149	183	2142	448	353	1.12	1.12	40.0	42.0	1393.1	754	199.1	7:16	1.17	0.86	0.14
04:50:25	1409.0	29.3	6.9	149	170	2166	450	363	1.12	1.12	40.1	41.9	1393.1	755	200.0	7:18	1.17	0.86	0.14
04:52:48	1410.1	30.4	7.1	150	172	2158	449	337	1.12	1.12	40.1	42.0	1393.1	755	201.1	7:20	1.17	0.89	0.14
04:56:43	1411.0	15.2	6.2	150	127	2138	448	348	1.12	1.12	40.1	42.0	1393.1	754	202.0	7:24	1.17	0.96	0.14
04:59:04	1412.0	27.7	6.4	149	196	2129	447	355	1.12	1.12	40.2	42.2	1393.6	755	203.0	7:27	1.17	0.88	0.13
05:01:17	1413.1	27.3	6.5	150	156	2150	443	340	1.12	1.12	40.2	42.2	1394.9	754	204.1	7:29	1.17	0.86	0.12
05:12:26	1415.9	26.1	5.7	149	156	2122	444	380	1.12	1.12	40.3	42.5	1400.2	754	206.9	7:39	1.17	0.84	0.12
05:12:53	1416.0	24.9	5.6	150	155	2126	444	379	1.12	1.12	40.3	42.5	1400.4	755	207.0	7:40	1.17	0.85	0.12
05:15:01	1417.0	23.5	5.6	149	165	2157	442	355	1.12	1.12	40.4	42.4	1401.3	754	208.0	7:42	1.17	0.84	0.12
05:17:38	1418.0	19.2	6.2	149	185	2139	445	342	1.12	1.12	40.4	42.4	1402.4	755	209.0	7:44	1.17	0.89	0.12
05:20:52	1419.0	18.0	5.3	149	174	2135	443	358	1.12	1.12	40.4	42.5	1403.5	755	210.0	7:47	1.17	0.91	0.12
05:26:15	1420.0	10.3	4.9	149	148	2129	446	365	1.12	1.12	40.5	42.5	1405.9	755	211.0	7:53	1.17	0.98	0.12
05:28:58	1421.0	21.0	5.8	149	174	2134	440	359	1.12	1.12	40.6	42.7	1407.1	755	212.0	7:56	1.17	0.87	0.12
05:33:17	1422.0	12.6	4.7	149	135	2117	442	334	1.12	1.12	40.6	42.6	1409.0	754	213.0	7:60	1.17	0.93	0.09
05:51:24	1423.0	48.8	6.8	146	167	2033	438	316	1.12	1.12	40.8	42.7	1412.4	756	214.0	8:04	1.17	1.01	0.09
05:52:27	1424.0	77.6	8.5	154	195	2067	443	277	1.12	1.12	40.8	42.9	1412.8	758	215.0	8:05	1.17	0.79	0.10
05:54:12	1425.0	29.5	9.0	155	186	2085	444	289	1.12	1.12	40.8	42.9	1413.1	754	216.0	8:07	1.17	0.88	0.11
05:55:49	1426.0	35.3	7.6	156	163	2111	444	300	1.12	1.12	40.8	42.2	1413.3	754	217.0	8:09	1.17	0.86	0.11
05:57:14	1427.0	50.3	8.5	149	200	2165	448	341	1.12	1.12	40.8	41.9	1413.4	748	218.0	8:10	1.17	0.82	0.11
05:59:24	1428.0	24.2	8.5	147	182	2178	455	346	1.12	1.12	40.8	42.1	1413.6	717	219.0	8:12	1.17	0.91	0.11
06:01:57	1429.0	20.3	7.8	149	161	2143	459	334	1.12	1.12	40.8	42.4	1414.7	726	220.0	8:15	1.17	0.93	0.10
06:04:01	1430.0	27.6	7.6	149	197	2157	462	352	1.12	1.12	40.8	42.6	1415.7	727	221.0	8:17	1.17	0.88	0.10
06:06:40	1431.0	31.1	7.0	150	175	2163	459	353	1.12	1.12	40.8	42.7	1417.1	727	222.0	8:19	1.17	0.91	0.10
06:08:17	1432.0	34.1	5.8	150	166	2167	452	327	1.12	1.12	40.8	42.7	1418.0	727	223.0	8:21	1.17	0.79	0.10
06:11:03	1433.0	20.0	5.1	149	162	2155	461	412	1.12	1.12	40.9	42.9	1418.8	727	224.0	8:24	1.17	0.87	0.10

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
06:12:42	1434.0	34.8	6.0	148	191	2190	455	337	1.12	1.12	40.8	43.0	1419.3	727	225.0	8:25	1.17	0.80	0.10
06:15:02	1435.0	30.6	5.7	150	179	2208	459	355	1.12	1.12	40.9	43.1	1419.5	728	226.0	8:28	1.17	0.86	0.10
06:18:47	1436.0	14.3	5.0	150	161	2187	458	338	1.12	1.12	40.9	43.0	1420.2	728	227.0	8:32	1.17	0.91	0.11
06:20:46	1437.0	25.9	5.7	149	213	2183	465	358	1.12	1.12	40.9	43.1	1420.9	730	228.0	8:34	1.17	0.83	0.14
06:22:58	1438.0	25.0	5.2	150	166	2204	454	334	1.12	1.12	40.9	43.2	1421.5	730	229.0	8:36	1.17	0.83	0.16
06:25:25	1439.0	21.1	5.5	149	166	2196	457	316	1.12	1.12	40.9	43.3	1422.0	731	230.0	8:38	1.17	0.86	0.16
06:28:19	1440.0	18.5	5.4	150	160	2206	456	325	1.12	1.12	41.0	43.3	1422.2	731	231.0	8:41	1.17	0.88	0.15
06:30:50	1441.0	27.9	5.1	150	187	2200	454	329	1.12	1.12	41.0	43.4	1422.2	732	232.0	8:44	1.17	0.85	0.15
06:32:49	1442.0	30.8	5.9	149	175	2195	457	338	1.12	1.12	41.0	43.5	1422.2	732	233.0	8:46	1.17	0.83	0.15
06:35:13	1443.0	24.7	5.2	149	169	2186	451	324	1.12	1.12	41.1	43.5	1423.0	732	234.0	8:48	1.17	0.84	0.11
06:38:13	1444.0	25.5	4.8	149	153	2192	459	331	1.12	1.12	41.1	43.5	1425.1	734	235.0	8:51	1.17	0.87	0.11
06:40:11	1445.0	27.6	5.8	150	193	2203	455	324	1.12	1.12	41.2	43.6	1426.4	734	236.0	8:53	1.17	0.83	0.11
06:43:03	1446.0	20.5	4.7	150	165	2207	459	330	1.12	1.12	41.3	43.6	1427.9	733	237.0	8:56	1.17	0.87	0.11
06:46:16	1447.0	16.9	4.7	149	163	2197	453	340	1.12	1.12	41.3	43.6	1429.3	735	238.0	8:59	1.17	0.88	0.11
06:49:24	1448.1	20.1	5.0	150	201	2197	455	344	1.12	1.12	41.4	43.7	1430.4	736	239.1	9:02	1.17	0.87	0.11
06:51:20	1449.0	32.0	5.5	150	217	2198	453	345	1.12	1.12	41.4	43.7	1431.3	736	240.0	9:04	1.17	0.82	0.11
06:54:33	1450.0	16.2	4.9	149	162	2225	460	346	1.12	1.12	41.4	43.7	1432.7	736	241.0	9:07	1.17	0.89	0.11
06:58:20	1451.0	21.7	4.8	149	168	2218	461	356	1.12	1.12	41.5	43.8	1434.4	738	242.0	9:11	1.17	0.90	0.11
07:12:09	1452.0	19.2	4.7	144	165	2202	463	324	1.12	1.12	41.5	43.9	1437.9	749	243.0	9:14	1.17	0.85	0.10
07:13:52	1453.0	39.3	4.2	153	218	2200	459	327	1.12	1.12	41.5	43.9	1438.5	749	244.0	9:16	1.17	0.76	0.11
07:15:39	1454.0	38.5	4.2	151	202	2166	459	323	1.12	1.12	41.5	43.6	1439.1	747	245.0	9:18	1.17	0.76	0.11
07:17:01	1455.0	55.7	3.7	151	223	2184	459	346	1.12	1.12	41.5	43.5	1439.5	745	246.0	9:19	1.17	0.73	0.11
07:18:47	1456.0	34.4	4.3	150	214	2170	459	370	1.12	1.12	41.5	43.5	1440.2	747	247.0	9:21	1.18	0.78	0.11
07:21:40	1457.0	16.2	4.8	150	216	2160	460	313	1.12	1.12	41.6	43.5	1441.5	745	248.0	9:24	1.17	0.87	0.11
07:24:10	1458.0	25.3	4.6	150	213	2137	460	324	1.12	1.12	41.6	43.7	1442.6	758	249.0	9:26	1.17	0.82	0.11
07:26:03	1459.1	32.0	4.4	150	215	2142	452	335	1.12	1.12	41.6	43.8	1443.3	779	250.1	9:28	1.17	0.78	0.11
07:28:43	1460.0	24.1	4.9	150	215	2170	454	381	1.12	1.12	41.6	43.9	1444.3	789	251.0	9:31	1.17	0.87	0.10
07:31:04	1461.0	25.5	4.7	150	182	2166	454	359	1.12	1.12	41.6	43.9	1445.5	788	252.0	9:33	1.17	0.84	0.11
07:33:22	1462.0	30.6	5.1	151	219	2140	453	337	1.12	1.12	41.6	43.9	1446.6	788	253.0	9:35	1.17	0.84	0.11
07:35:49	1463.0	24.7	5.2	151	197	2152	455	316	1.12	1.12	41.7	44.0	1447.3	788	254.0	9:38	1.17	0.85	0.11
07:38:23	1464.1	24.2	4.4	150	184	2152	449	331	1.12	1.12	41.7	44.1	1447.7	788	255.1	9:40	1.17	0.84	0.10
07:40:45	1465.0	31.5	4.9	150	174	2179	454	365	1.12	1.12	41.7	44.0	1448.5	789	256.0	9:43	1.17	0.83	0.11
07:44:21	1466.0	15.6	4.4	152	158	2177	454	427	1.12	1.12	41.8	43.9	1449.9	791	257.0	9:46	1.17	0.88	0.15
07:47:06	1467.0	17.8	4.1	153	163	2183	457	494	1.12	1.12	41.8	44.2	1450.5	791	258.0	9:49	1.17	0.84	0.14
07:49:46	1468.0	19.8	4.1	153	180	2204	454	448	1.12	1.12	41.9	44.2	1451.2	789	259.0	9:52	1.17	0.83	0.12
07:52:35	1469.0	22.6	4.8	153	188	2214	450	433	1.12	1.12	41.9	44.2	1451.5	789	260.0	9:55	1.17	0.85	0.12
07:54:55	1470.0	27.3	5.1	153	175	2230	457	409	1.12	1.12	42.0	44.3	1451.5	787	261.0	9:57	1.17	0.83	0.12
07:58:15	1471.0	16.4	4.4	153	171	2224	459	411	1.12	1.12	42.0	44.3	1452.1	787	262.0	10:00	1.17	0.88	0.10
08:01:04	1472.0	23.6	4.6	153	166	2318	463	438	1.12	1.12	42.0	44.4	1453.6	787	263.0	10:03	1.17	0.86	0.09
08:03:46	1473.0	21.5	4.9	152	199	2306	465	446	1.12	1.12	42.0	44.5	1455.2	787	264.0	10:06	1.17	0.86	0.08
08:07:00	1474.0	19.9	4.7	152	196	2289	462	441	1.12	1.12	42.0	44.7	1456.8	786	265.0	10:09	1.17	0.87	0.11
08:09:01	1475.0	26.3	4.8	152	222	2298	460	463	1.12	1.12	42.1	44.8	1457.2	785	266.0	10:11	1.17	0.81	0.10
08:12:03	1476.0	25.0	4.0	152	179	2274	465	430	1.12	1.12	42.1	44.8	1458.6	784	267.0	10:14	1.17	0.85	0.05
08:13:57	1477.0	30.0	5.1	152	215	2272	457	412	1.12	1.12	42.1	44.9	1459.4	783	268.0	10:16	1.17	0.80	0.05
08:16:43	1478.0	22.5	4.4	152	203	2284	465	398	1.12	1.12	42.2	45.0	1460.5	782	269.0	10:19	1.17	0.84	0.04

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg	deg C		m	bbl	mts	hh:mm	sg		%
08:19:39	1479.0	28.8	3.2	152	178	2292	461	409	1.12	1.12	42.3	45.0	1461.6	783	270.0	10:22	1.17	0.82	0.04
08:22:42	1480.0	18.9	3.2	152	186	2304	464	447	1.12	1.12	42.3	44.9	1462.8	782	271.0	10:25	1.17	0.83	0.04
08:41:05	1481.1	17.7	3.3	153	169	2288	469	583	1.12	1.12	42.5	44.9	1467.2	770	272.1	10:28	1.17	0.81	0.04
08:43:17	1482.1	33.9	4.9	154	200	2256	470	588	1.12	1.12	42.7	44.7	1468.0	775	273.1	10:30	1.17	0.83	0.04
08:44:29	1483.0	50.1	4.9	153	218	2237	469	271	1.12	1.12	42.7	44.4	1468.5	777	274.0	10:31	1.18	0.72	0.05
08:46:39	1484.0	30.0	4.2	168	198	2270	470	257	1.12	1.12	42.7	44.3	1469.4	778	275.0	10:33	1.18	0.82	0.04
08:48:43	1485.1	33.5	3.7	177	205	2249	475	267	1.12	1.12	42.7	44.4	1470.2	779	276.1	10:35	1.18	0.80	0.04
08:50:45	1486.1	32.1	4.8	180	221	2331	476	290	1.12	1.12	42.7	44.5	1470.9	780	277.1	10:37	1.18	0.84	0.08
08:52:19	1487.1	63.6	4.3	180	232	2297	477	300	1.12	1.12	42.7	44.7	1471.2	780	278.1	10:39	1.18	0.80	0.09
08:53:22	1488.1	69.8	5.6	178	241	2321	476	281	1.12	1.12	42.7	44.7	1471.6	781	279.1	10:40	1.18	0.73	0.10
08:55:24	1489.1	29.3	4.5	182	210	2325	476	279	1.12	1.12	42.7	44.8	1472.4	778	280.1	10:42	1.18	0.83	0.11
08:56:32	1490.0	69.1	4.8	181	203	2347	480	289	1.12	1.12	42.6	44.8	1472.9	778	281.0	10:43	1.18	0.74	0.12
08:57:44	1491.0	54.5	4.9	180	232	2360	479	279	1.12	1.12	42.6	44.8	1473.3	778	282.0	10:44	1.18	0.76	0.12
09:14:53	1492.0	45.7	4.3	165	208	2308	476	254	1.12	1.12	42.6	44.4	1475.3	780	283.0	10:46	1.17	0.77	0.05
09:16:33	1493.1	35.3	3.7	156	224	2304	473	239	1.12	1.12	42.6	43.9	1476.4	782	284.1	10:48	1.17	0.73	0.07
09:17:39	1494.0	54.4	4.3	162	235	2318	477	261	1.12	1.12	42.4	44.0	1476.9	782	285.0	10:49	1.17	0.71	0.09
09:19:24	1495.0	30.2	3.2	178	205	2322	480	258	1.12	1.12	42.4	44.0	1477.3	783	286.0	10:51	1.17	0.77	0.10
09:20:24	1496.1	74.1	4.7	181	237	2353	477	255	1.12	1.12	42.3	44.1	1477.3	783	287.1	10:52	1.17	0.68	0.10
09:21:42	1497.0	40.6	5.3	179	241	2367	473	277	1.12	1.12	42.3	44.1	1477.6	783	288.0	10:53	1.17	0.79	0.11
09:23:07	1498.0	38.0	5.3	180	210	2360	476	258	1.12	1.12	42.2	44.0	1478.1	783	289.0	10:54	1.18	0.79	0.12
09:24:44	1499.0	33.8	5.2	181	204	2375	479	248	1.12	1.12	42.2	44.2	1478.6	784	290.0	10:56	1.18	0.81	0.12
09:26:15	1500.0	38.3	5.4	180	207	2331	478	285	1.12	1.12	42.2	44.4	1479.3	785	291.0	10:58	1.17	0.82	0.12
09:28:27	1501.1	38.3	5.0	180	222	2350	471	259	1.12	1.12	42.2	44.6	1480.0	784	292.1	10:60	1.17	0.86	0.12
09:29:26	1502.0	58.9	7.0	179	241	2369	475	259	1.12	1.12	42.2	44.6	1480.5	784	293.0	11:01	1.17	0.77	0.12
09:32:12	1503.0	29.7	5.2	180	207	2343	472	257	1.12	1.12	42.2	44.9	1480.7	784	294.0	11:03	1.17	0.90	0.12
09:33:45	1504.0	31.2	5.7	180	203	2325	474	238	1.12	1.12	42.3	45.1	1480.7	784	295.0	11:05	1.17	0.81	0.12
09:35:19	1505.0	32.5	5.1	181	205	2368	476	237	1.12	1.12	42.2	45.2	1480.7	784	296.0	11:07	1.17	0.78	0.12
09:36:31	1506.0	50.0	5.0	181	236	2361	475	276	1.12	1.12	42.3	45.2	1480.7	784	297.0	11:08	1.17	0.79	0.12
09:37:52	1507.0	40.8	7.0	180	266	2379	471	259	1.12	1.12	42.3	45.2	1480.7	784	298.0	11:09	1.17	0.82	0.12
09:40:02	1508.0	26.2	6.0	181	217	2386	478	245	1.14	1.13	42.4	45.3	1480.7	784	299.0	11:11	1.17	0.88	0.12
09:42:34	1509.0	27.6	5.6	180	190	2367	478	245	1.15	1.14	42.4	45.5	1481.8	784	300.0	11:14	1.17	0.90	0.13
09:58:34	1510.0	15.8	4.6	180	162	2354	477	265	1.15	1.14	42.5	45.4	1486.4	782	301.0	11:18	1.18	0.94	0.06
10:00:02	1511.0	33.2	3.0	181	210	2257	478	239	1.15	1.14	42.9	45.2	1487.3	781	302.0	11:19	1.18	0.71	0.10
10:01:36	1512.0	36.1	2.7	180	206	2286	479	248	1.15	1.14	42.9	45.5	1488.4	781	303.0	11:21	1.18	0.72	0.13
10:02:54	1513.1	54.0	3.1	180	213	2287	482	252	1.15	1.14	42.9	45.1	1488.9	780	304.1	11:22	1.18	0.68	0.13
10:04:27	1514.0	46.7	3.0	181	198	2293	480	270	1.15	1.14	42.9	44.6	1490.0	781	305.0	11:24	1.18	0.72	0.12
10:06:21	1515.0	33.7	2.9	181	213	2291	482	243	1.15	1.14	43.0	44.7	1491.2	781	306.0	11:25	1.18	0.75	0.13
10:07:58	1516.1	41.7	3.4	181	231	2322	483	231	1.15	1.14	43.0	44.8	1491.6	780	307.1	11:27	1.18	0.73	0.13
10:09:23	1517.0	43.1	3.8	181	230	2326	483	241	1.15	1.14	43.0	45.0	1491.8	779	308.0	11:28	1.18	0.73	0.14
10:11:03	1518.0	57.8	3.5	181	221	2319	483	247	1.15	1.14	43.0	45.1	1492.4	780	309.0	11:30	1.19	0.73	0.15
10:13:21	1519.0	23.9	2.9	181	205	2321	485	236	1.15	1.14	43.0	45.2	1493.9	780	310.0	11:32	1.19	0.76	0.17
10:15:55	1520.1	27.4	2.7	181	161	2323	490	255	1.15	1.14	43.0	45.3	1495.7	780	311.1	11:35	1.19	0.76	0.16
10:17:38	1521.0	43.9	2.7	180	188	2307	491	241	1.15	1.14	43.0	45.4	1496.9	763	312.0	11:37	1.19	0.71	0.14
10:19:34	1522.0	30.6	2.6	181	211	2346	490	259	1.15	1.14	43.1	45.4	1498.2	767	313.0	11:39	1.19	0.74	0.13
10:21:13	1523.0	31.0	2.8	179	232	2316	494	225	1.15	1.14	43.1	45.5	1499.2	767	314.0	11:40	1.19	0.71	0.13

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
10:22:47	1524.0	35.0	3.2	180	235	2357	494	237	1.15	1.14	43.1	45.6	1499.9	767	315.0	11:42	1.19	0.71	0.13
10:24:54	1525.0	25.7	2.4	181	188	2321	496	239	1.15	1.14	43.2	45.6	1500.9	767	316.0	11:44	1.19	0.71	0.11
10:27:09	1526.0	23.7	2.6	180	178	2368	495	255	1.15	1.14	43.2	45.6	1502.2	767	317.0	11:46	1.19	0.76	0.12
10:29:33	1527.0	23.0	2.6	180	170	2382	497	255	1.15	1.14	43.3	45.7	1503.3	767	318.0	11:49	1.20	0.79	0.15
10:31:34	1528.0	32.4	3.7	181	193	2350	498	259	1.15	1.14	43.3	45.7	1504.5	766	319.0	11:51	1.20	0.79	0.17
10:33:55	1529.1	46.2	2.8	182	187	2346	498	225	1.15	1.14	43.4	45.7	1505.9	767	320.1	11:53	1.20	0.75	0.14
10:35:06	1530.0	45.5	3.5	182	217	2319	504	245	1.15	1.14	43.4	45.8	1506.8	767	321.0	11:54	1.20	0.71	0.14
10:39:47	1531.0	9.7	5.1	181	181	2348	505	244	1.15	1.14	43.5	45.8	1508.7	766	322.0	11:59	1.20	0.98	0.14
10:42:22	1532.0	30.2	2.8	180	163	2334	500	240	1.15	1.14	43.6	46.0	1509.5	766	323.0	12:01	1.20	0.76	0.13
10:44:21	1533.0	27.9	3.5	180	210	2376	507	247	1.15	1.14	43.6	46.0	1509.8	767	324.0	12:03	1.21	0.76	0.12
10:47:20	1534.0	17.7	3.5	180	177	2364	509	246	1.15	1.14	43.7	46.0	1510.1	766	325.0	12:06	1.21	0.83	0.12
10:49:36	1535.0	29.1	3.0	180	187	2359	512	240	1.15	1.14	43.7	46.0	1512.0	764	326.0	12:09	1.21	0.75	0.13
10:52:35	1536.0	17.3	3.1	181	178	2382	511	277	1.15	1.14	43.8	46.1	1513.8	760	327.0	12:12	1.21	0.82	0.13
10:57:19	1537.0	11.9	2.9	181	151	2340	518	249	1.15	1.14	43.8	46.0	1516.4	756	328.0	12:16	1.21	0.83	0.14
11:00:40	1538.0	19.9	2.9	181	191	2349	516	507	1.15	1.14	43.9	45.8	1537.0	759	329.0	12:20	1.21	0.81	0.14
11:13:18	1539.1	14.3	3.9	175	187	2325	515	322	1.15	1.14	43.9	45.8	1524.4	763	330.1	12:24	1.19	0.83	0.06
11:14:54	1540.0	30.9	3.5	170	207	2366	515	237	1.15	1.14	44.0	46.7	1525.7	764	331.0	12:25	1.19	0.74	0.11
11:17:40	1541.0	29.9	3.1	177	184	2365	515	248	1.15	1.14	44.0	46.7	1528.0	764	332.0	12:28	1.19	0.80	0.13
11:19:54	1542.0	33.5	3.2	177	202	2357	515	251	1.15	1.14	44.0	46.1	1529.9	764	333.0	12:30	1.19	0.77	0.13
11:22:09	1543.1	26.9	3.6	178	181	2344	515	248	1.15	1.14	44.1	46.0	1531.8	764	334.1	12:32	1.20	0.78	0.13
11:24:17	1544.0	27.5	3.4	177	204	2349	515	261	1.15	1.14	44.1	46.2	1533.6	765	335.0	12:35	1.20	0.78	0.12
11:26:24	1545.0	27.0	3.3	179	166	2371	515	258	1.15	1.14	44.2	46.4	1535.3	765	336.0	12:37	1.20	0.75	0.11
11:28:52	1546.0	26.5	2.5	180	186	2354	515	259	1.15	1.14	44.2	46.5	1537.4	766	337.0	12:39	1.20	0.76	0.11
11:31:03	1547.0	31.6	2.9	180	214	2390	515	255	1.15	1.14	44.2	46.6	1538.7	765	338.0	12:41	1.20	0.77	0.11
11:34:20	1548.0	25.6	2.2	181	180	2384	516	258	1.15	1.14	44.2	46.6	1538.8	765	339.0	12:45	1.20	0.79	0.11
11:37:00	1549.0	21.6	2.1	181	186	2376	513	251	1.15	1.14	44.3	46.5	1538.8	766	340.0	12:47	1.21	0.75	0.11
11:39:45	1550.0	18.2	2.1	180	183	2363	516	239	1.15	1.14	44.3	46.6	1540.0	766	341.0	12:50	1.21	0.74	0.12
11:46:06	1551.0	28.5	2.8	178	186	2340	515	240	1.15	1.14	44.4	46.9	1542.3	766	342.0	12:54	1.21	0.86	0.16
11:47:49	1552.0	40.0	2.8	178	203	2368	519	243	1.15	1.14	44.4	47.2	1542.9	765	343.0	12:56	1.21	0.71	0.14
11:49:20	1553.1	45.6	3.0	178	204	2370	519	248	1.15	1.14	44.5	47.4	1543.5	766	344.1	12:58	1.21	0.68	0.14
11:51:35	1554.0	24.6	2.8	176	194	2412	519	266	1.15	1.14	44.5	47.1	1544.9	766	345.0	12:60	1.21	0.77	0.13
11:53:57	1555.0	32.3	2.4	178	201	2381	517	247	1.15	1.14	44.6	47.1	1545.9	765	346.0	13:02	1.21	0.76	0.13
11:55:50	1556.0	30.4	3.1	177	203	2425	519	241	1.15	1.14	44.6	47.1	1546.6	765	347.0	13:04	1.21	0.73	0.12
11:58:04	1557.1	30.9	2.7	177	204	2401	522	260	1.15	1.14	44.7	47.1	1547.1	766	348.1	13:06	1.21	0.76	0.12
11:59:57	1558.1	33.1	3.1	177	233	2427	524	248	1.15	1.14	44.7	47.1	1547.6	765	349.1	13:08	1.21	0.74	0.12
12:01:27	1559.0	39.4	3.5	177	223	2447	523	261	1.15	1.14	44.7	47.3	1548.0	766	350.0	13:10	1.21	0.71	0.12
12:03:47	1560.0	22.3	1.9	176	202	2435	524	252	1.15	1.14	44.8	47.3	1549.0	766	351.0	13:12	1.21	0.71	0.12
12:06:08	1561.0	25.0	1.8	177	214	2435	524	248	1.15	1.14	44.8	47.2	1549.8	766	352.0	13:14	1.21	0.71	0.12
12:07:45	1562.0	33.1	2.3	176	232	2407	523	246	1.15	1.14	44.9	47.2	1550.1	766	353.0	13:16	1.21	0.68	0.12
12:09:41	1563.1	28.4	2.6	176	219	2427	522	253	1.15	1.14	44.9	47.2	1550.4	766	354.1	13:18	1.21	0.73	0.12
12:11:18	1564.0	34.1	2.7	177	208	2430	522	241	1.15	1.14	45.0	47.3	1550.4	766	355.0	13:19	1.21	0.71	0.12
12:12:38	1565.0	44.8	3.7	176	246	2446	522	239	1.15	1.14	45.0	47.4	1550.6	765	356.0	13:21	1.21	0.69	0.12
12:14:31	1566.0	31.7	3.6	177	223	2451	522	248	1.15	1.14	45.1	47.4	1551.5	765	357.0	13:23	1.21	0.76	0.12
12:24:12	1567.0	28.9	1.8	176	188	2432	523	239	1.15	1.14	45.1	47.9	1556.1	766	358.0	13:25	1.21	0.71	0.14
12:36:37	1568.0	38.8	1.0	176	102	2503	522	274	1.15	1.14	45.4	48.2	1560.6	762	359.0	13:27	1.19	0.67	0.13

MINV1 / PE900064 / P435

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
12:37:37	1569.0	53.3	2.6	175	194	2321	519	335	1.15	1.14	45.4	48.5	1560.9	763	360.0	13:28	1.19	0.63	0.13
12:39:28	1570.0	39.4	1.7	179	207	2349	518	343	1.15	1.14	45.4	48.5	1561.5	764	361.0	13:30	1.19	0.68	0.14
12:41:27	1571.0	25.9	1.5	179	177	2336	518	331	1.15	1.14	45.4	48.2	1562.0	763	362.0	13:32	1.19	0.69	0.14
12:42:30	1572.0	61.7	3.1	180	208	2354	517	342	1.15	1.14	45.5	47.5	1562.3	763	363.0	13:33	1.19	0.65	0.15
12:44:35	1573.0	23.6	1.8	180	190	2345	518	361	1.15	1.14	45.5	47.4	1562.9	764	364.0	13:35	1.19	0.73	0.15
12:45:40	1574.1	58.2	2.6	180	222	2361	517	348	1.15	1.14	45.6	47.5	1563.2	764	365.1	13:36	1.19	0.63	0.16
12:47:34	1575.0	27.0	2.5	178	187	2380	518	365	1.15	1.14	45.6	47.5	1563.8	764	366.0	13:38	1.19	0.71	0.16
12:49:08	1576.0	34.3	2.6	179	188	2348	517	368	1.15	1.14	45.6	47.3	1564.2	765	367.0	13:40	1.19	0.71	0.16
12:51:14	1577.0	27.0	1.9	178	172	2374	518	379	1.15	1.14	45.6	47.3	1564.8	764	368.0	13:42	1.19	0.73	0.18
12:53:06	1578.1	33.2	2.2	180	188	2370	518	343	1.15	1.14	45.6	47.5	1565.4	763	369.1	13:44	1.20	0.69	0.19
12:54:43	1579.1	36.3	2.6	178	197	2403	517	339	1.15	1.14	45.6	47.8	1565.8	764	370.1	13:45	1.20	0.70	0.20
12:56:32	1580.0	30.0	2.4	179	175	2399	517	332	1.15	1.14	45.5	47.9	1566.4	764	371.0	13:47	1.20	0.71	0.18
12:58:31	1581.0	29.4	3.1	179	184	2429	518	359	1.15	1.14	45.5	47.9	1566.9	765	372.0	13:49	1.20	0.75	0.16
13:00:42	1582.1	33.4	2.6	179	211	2423	518	360	1.15	1.14	45.5	48.0	1567.6	766	373.1	13:51	1.20	0.73	0.14
13:02:53	1583.0	26.0	2.7	179	192	2413	518	357	1.15	1.14	45.5	48.0	1568.6	766	374.0	13:53	1.20	0.73	0.11
13:05:11	1584.0	4.3	2.8	179	213	2434	518	374	1.15	1.14	45.6	48.1	1569.9	766	375.0	13:56	1.20	0.78	0.12
13:07:55	1585.0	24.6	4.0	179	242	2440	518	354	1.15	1.14	45.6	48.0	1571.5	766	376.0	13:58	1.21	0.85	0.16
13:12:36	1586.0	14.3	3.2	179	157	2450	518	365	1.15	1.14	45.6	48.0	1574.5	766	377.0	14:03	1.21	0.88	0.14
13:15:03	1587.0	24.8	2.9	180	175	2416	518	340	1.15	1.14	45.7	48.1	1575.8	767	378.0	14:06	1.21	0.84	0.14
13:17:52	1588.0	24.5	2.6	179	176	2433	518	356	1.15	1.14	45.7	48.1	1577.2	766	379.0	14:08	1.21	0.79	0.13
13:20:06	1589.0	32.7	3.3	179	183	2447	518	348	1.15	1.14	45.7	48.2	1578.2	766	380.0	14:11	1.21	0.77	0.13
13:22:22	1590.0	28.0	4.1	178	201	2456	518	375	1.15	1.14	45.8	48.2	1580.0	766	381.0	14:13	1.21	0.80	0.14
13:25:43	1591.0	32.4	3.0	179	171	2452	518	358	1.15	1.14	45.8	48.4	1581.5	766	382.0	14:16	1.21	0.82	0.14
13:28:04	1592.0	24.6	3.3	179	175	2418	518	354	1.15	1.14	45.9	48.3	1582.2	766	383.0	14:19	1.21	0.78	0.14
13:30:49	1593.0	19.4	3.4	179	169	2469	518	347	1.15	1.14	45.9	48.4	1583.2	766	384.0	14:21	1.21	0.82	0.13
13:33:00	1594.0	27.1	3.5	178	208	2474	518	354	1.15	1.14	45.9	48.5	1584.1	766	385.0	14:24	1.21	0.77	0.13
13:35:20	1595.0	27.4	3.3	179	183	2467	518	361	1.15	1.14	46.0	48.6	1584.8	766	386.0	14:26	1.21	0.80	0.12
13:37:28	1596.0	30.4	4.2	179	189	2472	518	352	1.15	1.14	46.0	48.6	1585.4	766	387.0	14:28	1.21	0.78	0.12
13:39:33	1597.0	32.0	4.2	179	197	2473	518	363	1.15	1.14	46.0	48.5	1585.7	766	388.0	14:30	1.21	0.82	0.12
13:54:30	1598.0	34.7	3.7	180	177	2276	496	286	1.15	1.14	46.2	49.1	1589.1	764	389.0	14:33	1.19	0.82	0.08
13:57:00	1599.1	25.8	2.3	180	177	2253	494	292	1.15	1.14	46.2	49.2	1590.0	764	390.1	14:36	1.19	0.75	0.13
13:59:23	1600.0	19.6	2.8	181	197	2251	495	296	1.15	1.14	46.2	48.8	1590.9	763	391.0	14:38	1.19	0.76	0.15
14:01:00	1601.0	31.4	3.5	181	194	2277	495	299	1.15	1.14	46.2	48.1	1591.5	763	392.0	14:40	1.19	0.75	0.15
14:03:05	1602.0	34.5	3.4	180	195	2279	495	301	1.15	1.14	46.3	48.1	1592.2	764	393.0	14:42	1.19	0.80	0.14
14:06:40	1603.0	17.1	2.8	181	167	2268	496	300	1.15	1.14	46.3	48.4	1593.5	765	394.0	14:45	1.19	0.84	0.14
14:08:14	1604.1	39.6	3.8	180	228	2267	496	317	1.15	1.14	46.3	48.5	1594.0	765	395.1	14:47	1.19	0.74	0.14
14:10:27	1605.0	27.6	3.4	180	216	2305	495	324	1.15	1.14	46.3	48.5	1594.8	765	396.0	14:49	1.20	0.78	0.14
14:12:45	1606.0	24.4	2.9	181	200	2277	495	320	1.15	1.14	46.3	48.5	1595.6	765	397.0	14:51	1.20	0.78	0.13
14:15:34	1607.0	25.5	3.1	181	182	2309	496	331	1.15	1.14	46.3	48.5	1596.6	765	398.0	14:54	1.20	0.80	0.12
14:18:42	1608.0	14.7	3.0	181	176	2289	496	325	1.15	1.14	46.3	48.4	1597.1	765	399.0	14:57	1.20	0.83	0.13
14:20:19	1609.1	38.5	4.0	181	228	2289	495	307	1.15	1.14	46.3	48.4	1597.2	765	400.1	14:59	1.20	0.75	0.13
14:23:00	1610.0	19.1	2.9	181	199	2260	494	328	1.15	1.14	46.3	48.6	1598.4	765	401.0	15:02	1.20	0.80	0.14
14:26:45	1611.0	20.2	3.4	181	186	2269	494	307	1.15	1.14	46.4	48.8	1599.8	765	402.0	15:05	1.21	0.87	0.16
14:29:25	1612.0	22.9	2.6	181	194	2271	495	350	1.15	1.14	46.4	48.9	1601.1	765	403.0	15:08	1.21	0.79	0.19
14:32:14	1613.0	19.7	2.8	180	226	2282	495	357	1.15	1.14	46.4	48.9	1602.2	766	404.0	15:11	1.21	0.81	0.17

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
14:34:56	1614.0	29.6	3.9	179	193	2267	495	314	1.15	1.14	46.4	48.7	1603.2	766	405.0	15:14	1.21	0.84	0.15
14:37:22	1615.0	27.2	3.3	180	217	2262	495	332	1.15	1.14	46.5	48.9	1604.3	765	406.0	15:16	1.21	0.79	0.15
14:40:07	1616.0	26.1	2.4	181	183	2283	495	330	1.15	1.14	46.5	49.0	1606.0	765	407.0	15:19	1.21	0.79	0.15
14:42:25	1617.0	30.2	3.2	180	194	2289	495	308	1.15	1.14	46.5	49.1	1606.8	766	408.0	15:21	1.21	0.77	0.16
14:44:56	1618.0	27.4	3.1	180	170	2288	494	313	1.15	1.14	46.5	49.1	1607.6	766	409.0	15:24	1.21	0.79	0.15
14:47:20	1619.0	22.1	3.7	180	218	2322	496	333	1.15	1.14	46.5	49.2	1607.9	767	410.0	15:26	1.21	0.80	0.15
14:53:45	1620.0	55.0	1.1	181	197	2395	509	337	1.15	1.14	46.4	49.2	1610.3	765	411.0	15:27	1.21	0.45	0.14
14:55:29	1621.0	39.2	0.8	180	212	2410	513	330	1.15	1.14	46.5	49.4	1610.6	766	412.0	15:28	1.21	0.61	0.14
14:57:31	1622.0	33.0	2.1	179	234	2390	513	350	1.15	1.14	46.7	49.4	1611.4	766	413.0	15:30	1.21	0.71	0.14
14:58:40	1623.0	49.5	2.7	178	264	2417	513	335	1.15	1.14	46.7	49.4	1611.8	766	414.0	15:32	1.21	0.64	0.14
15:00:45	1624.0	31.0	1.9	181	201	2399	513	353	1.15	1.14	46.7	49.3	1612.7	766	415.0	15:34	1.21	0.69	0.14
15:01:59	1625.0	55.9	3.4	179	238	2417	513	361	1.15	1.14	46.8	49.3	1613.0	767	416.0	15:35	1.21	0.65	0.14
15:03:32	1626.0	32.9	3.3	179	242	2429	513	332	1.15	1.14	46.8	49.3	1613.5	766	417.0	15:36	1.21	0.71	0.14
15:21:06	1627.0	23.0	3.2	171	217	2403	511	326	1.15	1.14	46.8	49.5	1617.6	765	418.0	15:39	1.21	0.73	0.15
15:23:35	1628.0	27.6	3.3	171	178	2334	509	330	1.15	1.14	46.9	49.3	1618.8	764	419.0	15:41	1.21	0.76	0.19
15:26:55	1629.0	24.3	2.8	171	234	2343	509	328	1.15	1.14	46.9	48.9	1619.9	765	420.0	15:44	1.19	0.78	0.19
15:28:53	1630.0	32.9	3.7	170	231	2361	509	344	1.15	1.14	46.9	48.9	1620.6	765	421.0	15:46	1.19	0.77	0.18
15:30:49	1631.0	29.9	3.8	171	232	2326	509	329	1.15	1.14	46.9	49.1	1621.2	765	422.0	15:48	1.19	0.78	0.17
15:33:19	1632.0	22.5	3.5	173	240	2350	508	354	1.15	1.14	46.9	49.1	1622.1	765	423.0	15:51	1.19	0.82	0.17
15:35:36	1633.0	30.0	4.0	173	230	2340	508	325	1.15	1.14	46.9	49.1	1622.9	764	424.0	15:53	1.19	0.81	0.18
15:37:09	1634.0	40.1	4.2	173	280	2339	508	307	1.15	1.14	46.9	49.1	1623.4	763	425.0	15:55	1.19	0.75	0.19
15:39:00	1635.0	36.8	4.3	174	268	2366	508	321	1.15	1.14	46.9	49.1	1624.1	763	426.0	15:56	1.19	0.78	0.21
15:40:31	1636.0	41.5	4.8	173	317	2386	508	319	1.15	1.14	47.0	49.0	1624.6	764	427.0	15:58	1.19	0.76	0.21
15:42:27	1637.0	27.6	4.6	176	273	2351	508	348	1.15	1.14	47.0	49.1	1625.2	765	428.0	15:60	1.19	0.80	0.21
15:45:32	1638.0	25.4	4.8	179	241	2368	508	327	1.15	1.14	47.0	49.1	1626.3	766	429.0	16:03	1.20	0.89	0.16
15:47:04	1639.0	38.1	5.5	176	269	2409	508	323	1.15	1.14	47.0	49.2	1626.8	767	430.0	16:04	1.20	0.78	0.14
15:50:22	1640.0	15.4	4.7	177	240	2383	509	348	1.15	1.14	47.0	49.3	1627.9	766	431.0	16:08	1.20	0.88	0.18
15:52:04	1641.0	47.2	6.3	177	248	2376	509	329	1.15	1.14	47.1	49.4	1628.4	766	432.0	16:09	1.20	0.84	0.19
15:53:57	1642.0	27.8	5.8	177	238	2432	508	329	1.15	1.14	47.1	49.2	1629.0	766	433.0	16:11	1.20	0.82	0.17
15:55:56	1643.0	33.1	5.1	177	270	2422	509	343	1.15	1.14	47.1	49.2	1630.0	765	434.0	16:13	1.20	0.82	0.16
15:58:45	1644.0	23.5	4.8	178	246	2411	509	319	1.15	1.14	47.1	49.2	1631.4	766	435.0	16:16	1.21	0.88	0.17
16:00:18	1645.0	40.0	4.7	178	281	2393	509	313	1.15	1.14	47.1	49.3	1631.9	766	436.0	16:18	1.21	0.77	0.18
16:01:48	1646.0	40.0	5.1	175	253	2382	509	322	1.15	1.14	47.2	49.2	1632.5	766	437.0	16:19	1.21	0.78	0.17
16:03:34	1647.0	34.5	5.2	174	273	2377	509	332	1.15	1.14	47.2	49.1	1633.3	766	438.0	16:21	1.21	0.79	0.16
16:09:12	1648.0	5.9	7.4	177	245	2360	509	322	1.15	1.14	47.3	49.3	1636.6	766	439.0	16:27	1.21	1.09	0.17
16:23:22	1649.0	10.7	9.5	167	210	2318	508	326	1.15	1.14	47.3	49.5	1642.4	767	440.0	16:39	1.21	1.29	0.18
16:24:27	1650.0	50.6	10.7	141	318	2351	507	313	1.15	1.14	47.4	49.3	1642.9	767	441.0	16:40	1.21	0.78	0.19
16:25:28	1651.0	59.8	9.6	139	295	2357	507	322	1.15	1.14	47.4	49.5	1643.3	767	442.0	16:41	1.21	0.73	0.19
16:26:40	1652.0	49.2	8.3	140	289	2334	507	316	1.15	1.14	47.4	49.5	1643.6	767	443.0	16:42	1.21	0.75	0.19
16:28:11	1653.0	37.5	8.1	135	269	2341	507	334	1.15	1.14	47.4	49.6	1644.3	767	444.0	16:44	1.21	0.80	0.19
16:29:17	1654.1	61.1	10.6	136	353	2369	508	326	1.15	1.14	47.4	49.8	1644.9	767	445.1	16:45	1.21	0.76	0.20
18:17:57	1655.0	41.7	3.3	131	242	2247	507	358	1.15	1.14	48.2	50.4	1654.3	761	446.0	16:47	1.19	0.76	0.13
18:19:12	1656.0	44.5	4.6	140	336	2229	502	348	1.15	1.14	48.6	50.4	1654.3	761	447.0	16:48	1.19	0.74	0.13
18:20:12	1657.0	62.4	4.6	140	288	2207	501	340	1.15	1.14	48.6	50.1	1654.3	761	448.0	16:49	1.19	0.65	0.13
18:21:08	1658.0	64.3	5.2	141	335	2224	501	313	1.15	1.14	48.6	49.8	1654.3	761	449.0	16:50	1.19	0.65	0.13

MINV1 / PE900064/P436

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg	deg C		m	bbl	mts	hh:mm	sg		%
18:22:04	1659.0	69.8	4.6	141	300	2186	501	300	1.15	1.14	48.6	49.6	1654.3	762	450.0	16:51	1.19	0.64	0.13
18:23:18	1660.0	47.5	4.3	140	273	2241	500	294	1.15	1.14	48.6	49.6	1654.3	762	451.0	16:52	1.19	0.67	0.13
18:24:16	1661.0	83.0	1.8	139	299	2230	502	317	1.15	1.14	48.6	49.7	1654.3	761	452.0	16:53	1.19	0.52	0.13
18:25:58	1662.0	1.8	2.5	141	230	2191	501	316	1.15	1.14	48.6	49.9	1654.3	761	453.0	16:54	1.20	0.67	0.13
19:08:40	1663.0	1.6	11.4	100	153	2218	506	316	1.15	1.14	48.6	50.6	1662.3	761	454.0	17:35	1.21	1.49	3.25
19:13:16	1664.0	28.4	14.4	85	269	2256	510	319	1.15	1.14	48.9	51.7	1662.5	759	455.0	17:39	1.21	0.96	2.70
19:14:58	1665.0	32.4	11.5	88	251	2235	510	304	1.15	1.14	49.0	51.7	1662.5	760	456.0	17:41	1.21	0.80	2.44
19:16:48	1666.0	36.1	9.8	98	200	2243	509	302	1.15	1.14	49.0	51.7	1662.6	759	457.0	17:43	1.21	0.80	2.21
19:25:02	1667.0	15.1	15.0	90	216	2248	509	304	1.15	1.14	49.2	51.6	1662.8	759	458.0	17:51	1.21	1.21	1.20
19:26:54	1668.0	31.3	13.4	81	232	2250	512	271	1.15	1.14	49.3	51.7	1662.8	759	459.0	17:53	1.21	0.83	1.18
19:28:47	1669.0	33.1	13.1	81	248	2291	513	270	1.15	1.14	49.3	51.8	1662.9	757	460.0	17:55	1.21	0.81	1.14
19:30:38	1670.0	30.4	15.4	81	274	2259	512	300	1.15	1.14	49.3	51.9	1662.9	759	461.0	17:57	1.21	0.85	1.10
19:32:28	1671.0	34.9	14.5	81	282	2269	513	294	1.15	1.14	49.4	52.0	1662.9	759	462.0	17:59	1.21	0.83	1.05
19:34:14	1672.0	31.4	14.8	81	294	2289	513	281	1.15	1.14	49.4	52.0	1662.9	759	463.0	18:00	1.21	0.84	1.03
19:36:07	1673.0	32.1	15.1	81	304	2288	512	301	1.15	1.14	49.5	52.0	1662.9	758	464.0	18:02	1.21	0.85	0.86
19:38:00	1674.0	30.7	14.9	81	284	2294	513	290	1.15	1.14	49.5	51.8	1662.9	758	465.0	18:04	1.21	0.85	0.78
19:39:54	1675.0	26.6	15.4	81	300	2281	512	289	1.15	1.14	49.6	51.8	1663.0	760	466.0	18:06	1.21	0.86	0.58
20:10:42	1676.1	34.3	16.0	84	272	2271	512	305	1.15	1.14	49.3	51.0	1668.1	762	467.1	18:10	1.19	0.93	1.38
20:12:31	1677.0	31.5	17.1	85	273	2294	513	295	1.15	1.14	49.3	50.8	1668.6	761	468.0	18:12	1.19	0.90	1.26
20:14:33	1678.0	29.4	17.5	85	290	2280	513	325	1.15	1.14	49.2	50.5	1669.2	758	469.0	18:14	1.19	0.94	1.02
20:16:26	1679.0	30.8	17.2	85	277	2304	514	292	1.15	1.14	49.2	50.8	1669.7	755	470.0	18:16	1.19	0.90	0.78
20:18:27	1680.0	28.0	17.4	85	275	2290	514	306	1.15	1.14	49.2	51.2	1670.3	756	471.0	18:18	1.19	0.93	0.60
20:20:29	1681.0	31.2	17.4	85	264	2298	514	344	1.15	1.14	49.1	51.3	1670.9	755	472.0	18:20	1.19	0.94	0.49
20:22:41	1682.0	24.6	17.9	85	254	2289	514	312	1.15	1.14	49.1	51.5	1671.5	755	473.0	18:22	1.19	0.95	0.43
20:24:21	1683.1	37.1	18.2	85	286	2310	514	307	1.15	1.14	49.1	51.7	1672.0	755	474.1	18:23	1.19	0.88	0.41
20:30:58	1684.0	20.4	16.6	82	200	2268	513	311	1.15	1.14	49.2	51.9	1673.9	756	475.0	18:30	1.20	1.17	0.34
20:34:04	1685.0	21.8	13.6	80	205	2280	513	308	1.15	1.14	49.3	52.2	1674.7	755	476.0	18:33	1.20	0.95	0.29
20:47:51	1686.0	43.3	11.9	83	263	2298	515	300	1.15	1.14	49.5	52.2	1678.4	752	477.0	18:35	1.21	0.84	0.31
20:49:43	1687.0	29.6	10.6	83	281	2309	515	299	1.15	1.14	49.6	52.0	1679.3	752	478.0	18:37	1.21	0.79	0.31
20:51:42	1688.1	29.0	10.3	84	254	2274	513	330	1.15	1.14	49.6	51.9	1680.2	754	479.1	18:39	1.21	0.79	0.30
20:53:41	1689.0	30.0	10.3	83	257	2305	512	335	1.15	1.14	49.6	51.9	1681.2	752	480.0	18:41	1.21	0.80	0.29
20:55:52	1690.0	24.5	10.1	82	251	2290	513	334	1.15	1.14	49.6	52.0	1682.1	753	481.0	18:43	1.21	0.82	0.29
20:58:27	1691.0	23.6	9.2	83	219	2299	512	312	1.15	1.14	49.7	52.2	1683.3	755	482.0	18:46	1.21	0.82	0.27
21:00:14	1692.0	29.3	10.7	83	268	2326	513	310	1.15	1.14	49.7	52.3	1683.5	754	483.0	18:48	1.21	0.78	0.27
21:02:31	1693.1	29.9	11.2	83	233	2313	513	291	1.15	1.14	49.8	52.4	1683.8	754	484.1	18:50	1.21	0.83	0.24
21:04:43	1694.0	29.7	11.3	83	244	2322	513	308	1.15	1.14	49.8	52.5	1684.4	753	485.0	18:52	1.21	0.84	0.22
21:06:56	1695.0	25.0	10.8	83	259	2303	512	330	1.15	1.14	49.9	52.5	1685.0	754	486.0	18:54	1.21	0.84	0.22
21:09:05	1696.0	29.9	10.8	83	241	2311	513	314	1.15	1.14	49.9	52.4	1685.1	754	487.0	18:56	1.21	0.82	0.22
21:11:29	1697.0	29.6	10.6	83	219	2339	512	294	1.15	1.14	49.9	52.4	1685.1	754	488.0	18:59	1.21	0.84	0.22
21:14:21	1698.0	17.4	10.7	83	214	2303	512	300	1.15	1.14	50.0	52.5	1685.1	754	489.0	19:02	1.21	0.88	0.22
21:16:11	1699.0	29.9	11.8	83	248	2307	513	304	1.15	1.14	50.0	52.6	1685.4	753	490.0	19:04	1.21	0.85	0.23
21:18:55	1700.0	22.0	11.5	83	233	2348	513	301	1.15	1.14	50.1	52.5	1686.9	753	491.0	19:06	1.21	0.88	0.32
21:21:04	1701.1	27.8	11.7	84	241	2327	512	327	1.15	1.14	50.1	52.6	1687.9	753	492.1	19:08	1.21	0.83	0.30
21:37:18	1702.0	30.8	10.4	119	213	2255	506	315	1.15	1.14	50.3	52.4	1694.9	756	493.0	19:23	1.21	1.28	0.20
21:39:36	1703.0	26.8	10.5	150	225	2274	502	297	1.15	1.14	50.4	52.4	1695.8	756	494.0	19:25	1.21	0.96	0.20

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
21:42:07	1704.0	26.9	10.6	148	205	2269	502	294	1.15	1.14	50.4	52.3	1696.9	755	495.0	19:27	1.21	0.97	0.19
21:44:17	1705.0	28.3	10.6	149	200	2231	502	289	1.15	1.14	50.4	52.3	1697.7	755	496.0	19:30	1.21	0.94	0.18
21:46:33	1706.0	31.3	9.8	149	210	2252	502	287	1.15	1.14	50.4	52.4	1698.5	756	497.0	19:32	1.21	0.94	0.18
21:49:38	1707.0	32.2	9.9	148	210	2262	502	285	1.15	1.14	50.4	52.3	1699.5	755	498.0	19:35	1.19	0.92	0.18
21:52:24	1708.0	31.0	10.0	149	206	2261	502	286	1.15	1.14	50.4	52.4	1700.1	756	499.0	19:38	1.19	0.92	0.16
21:54:51	1709.0	30.4	10.0	149	207	2275	502	290	1.15	1.14	50.4	52.6	1700.8	753	500.0	19:40	1.19	0.96	0.15
21:58:10	1710.0	29.7	9.3	149	198	2270	502	296	1.15	1.14	50.5	52.6	1701.6	755	501.0	19:43	1.19	0.92	0.12
21:59:51	1711.0	36.3	9.8	149	230	2248	502	326	1.15	1.14	50.5	52.5	1702.1	755	502.0	19:45	1.19	0.90	0.11
22:01:43	1712.0	36.1	9.7	149	215	2233	502	295	1.15	1.14	50.5	52.5	1702.7	756	503.0	19:47	1.19	0.90	0.11
22:13:37	1713.0	28.0	9.3	150	200	2251	500	284	1.15	1.14	50.5	52.8	1704.9	760	504.0	19:50	1.19	0.95	0.11
22:15:51	1714.0	26.1	7.9	150	210	2235	500	300	1.15	1.14	50.6	52.8	1705.5	754	505.0	19:52	1.19	0.90	0.14
22:17:27	1715.1	43.0	9.0	151	248	2228	499	280	1.15	1.14	50.6	52.4	1706.0	754	506.1	19:53	1.19	0.85	0.17
22:19:20	1716.0	30.9	8.9	150	248	2243	499	309	1.15	1.14	50.6	52.2	1706.5	755	507.0	19:55	1.19	0.89	0.18
22:21:13	1717.1	33.2	9.1	151	230	2242	500	295	1.15	1.14	50.6	52.2	1707.1	754	508.1	19:57	1.20	0.89	0.19
22:23:09	1718.0	26.3	9.0	151	238	2244	500	300	1.15	1.14	50.6	52.3	1707.6	754	509.0	19:59	1.20	0.89	0.19
22:29:06	1720.0	14.2	9.3	150	227	2247	500	301	1.15	1.14	50.7	52.4	1709.3	753	511.0	20:05	1.20	0.99	0.20
22:31:33	1721.0	21.6	9.5	151	229	2250	500	286	1.15	1.14	50.7	52.4	1710.5	753	512.0	20:07	1.20	0.95	0.20
22:34:29	1722.1	26.6	9.3	151	214	2245	500	310	1.15	1.14	50.7	52.4	1712.0	753	513.1	20:10	1.20	0.96	0.22
22:36:22	1723.1	33.3	10.4	151	254	2264	500	291	1.15	1.14	50.7	52.4	1712.4	753	514.1	20:12	1.21	0.89	0.22
22:39:11	1724.1	21.5	9.4	151	238	2271	500	320	1.15	1.14	50.7	52.4	1712.4	751	515.1	20:15	1.21	0.98	0.22
22:40:46	1725.0	33.6	10.0	152	229	2248	501	267	1.15	1.14	50.7	52.5	1712.4	749	516.0	20:17	1.21	0.87	0.22
22:42:49	1726.0	29.2	10.4	150	246	2255	500	277	1.15	1.14	50.7	52.5	1713.0	748	517.0	20:19	1.21	0.92	0.20
22:44:49	1727.1	30.5	9.4	152	223	2177	493	273	1.15	1.14	50.7	52.8	1713.9	749	518.1	20:21	1.20	0.89	0.19
22:47:00	1728.0	24.2	9.3	151	223	2188	492	266	1.15	1.14	50.7	52.8	1715.2	751	519.0	20:23	1.20	0.92	0.28
22:49:02	1729.0	28.1	9.8	152	201	2183	493	289	1.15	1.14	50.7	52.9	1716.1	753	520.0	20:25	1.20	0.91	0.28
22:51:00	1730.0	27.5	9.2	151	233	2205	492	268	1.15	1.14	50.7	53.0	1717.8	754	521.0	20:27	1.20	0.90	0.22
22:53:19	1731.0	23.5	9.2	151	232	2195	492	283	1.15	1.14	50.8	53.0	1718.4	753	522.0	20:29	1.20	0.91	0.21
22:54:47	1732.0	44.6	10.0	152	224	2208	492	267	1.15	1.14	50.8	52.8	1718.9	753	523.0	20:31	1.20	0.85	0.20
22:56:15	1733.0	38.1	10.7	151	249	2187	492	266	1.15	1.14	50.8	52.8	1719.6	752	524.0	20:32	1.20	0.87	0.19
22:58:45	1734.1	33.7	10.2	151	209	2194	492	270	1.15	1.14	50.8	52.7	1719.9	752	525.1	20:35	1.20	0.95	0.19
23:00:33	1735.0	27.7	10.3	150	237	2220	493	266	1.15	1.14	50.8	52.9	1720.5	752	526.0	20:36	1.20	0.90	0.18
23:02:26	1736.0	30.3	10.2	151	219	2202	493	257	1.15	1.14	50.8	52.9	1721.1	752	527.0	20:38	1.20	0.90	0.18
23:08:43	1737.0	21.6	11.4	151	224	2208	496	263	1.15	1.14	50.9	53.0	1723.5	752	528.0	20:44	1.21	1.16	0.18
23:11:19	1738.0	26.2	9.7	152	239	2249	497	253	1.15	1.14	50.9	53.2	1724.7	751	529.0	20:47	1.21	0.96	0.19
23:13:40	1739.0	25.5	10.1	151	223	2238	497	267	1.15	1.14	51.0	53.1	1725.8	751	530.0	20:49	1.21	0.95	0.19
23:17:06	1740.0	14.6	9.2	151	204	2240	498	272	1.15	1.14	51.0	53.2	1727.5	751	531.0	20:53	1.21	1.01	0.19
23:24:04	1741.1	15.8	10.0	151	211	2211	498	259	1.15	1.14	51.1	53.4	1730.7	747	532.1	20:60	1.21	1.16	0.19
23:43:17	1742.1	30.1	7.8	152	240	2249	501	259	1.15	1.14	51.1	53.6	1736.3	745	533.1	21:03	1.21	0.94	0.15
23:46:22	1743.0	27.4	7.0	151	243	2292	504	265	1.15	1.14	51.3	54.4	1737.3	745	534.0	21:06	1.21	0.93	0.16
23:49:04	1744.0	22.3	5.6	152	217	2288	505	275	1.15	1.14	51.4	53.8	1738.4	745	535.0	21:09	1.21	0.86	0.17
23:51:24	1745.0	20.8	7.5	152	227	2283	505	267	1.15	1.14	51.4	53.4	1739.3	745	536.0	21:11	1.21	0.89	0.15
23:53:13	1746.1	42.3	7.8	153	227	2236	508	277	1.15	1.14	51.5	53.2	1739.8	745	537.1	21:13	1.21	0.81	0.14
23:54:56	1747.0	34.2	6.8	152	219	2303	507	273	1.15	1.14	51.5	52.8	1740.2	746	538.0	21:15	1.21	0.83	0.14
23:57:11	1748.1	32.1	6.0	152	226	2326	508	258	1.15	1.14	51.5	52.7	1740.4	746	539.1	21:17	1.21	0.83	0.13
23:59:26	1749.0	24.1	6.4	152	216	2298	507	267	1.15	1.14	51.5	52.4	1740.8	746	540.0	21:19	1.21	0.85	0.14

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
17th March 1993																			
00:04:49	1750.0	21.8	8.0	153	222	2288	508	263	1.15	1.14	51.5	52.8	1741.6	746	541.0	21:24	1.21	1.06	0.14
00:06:51	1751.0	30.8	6.5	152	233	2311	508	266	1.15	1.14	51.6	53.3	1741.6	746	542.0	21:26	1.21	0.83	0.14
00:11:17	1752.0	7.5	8.1	152	242	2305	508	273	1.15	1.14	51.6	53.5	1741.6	746	543.0	21:31	1.21	1.02	0.14
00:14:06	1753.0	26.4	7.2	151	234	2318	509	258	1.15	1.14	51.6	53.1	1741.6	744	544.0	21:34	1.21	0.88	0.14
00:15:59	1754.0	46.6	6.9	152	240	2316	508	278	1.15	1.14	51.6	53.1	1741.8	746	545.0	21:36	1.21	0.84	0.15
00:17:41	1755.0	35.6	7.4	153	272	2329	508	269	1.15	1.14	51.6	53.4	1742.2	745	546.0	21:37	1.21	0.81	0.16
00:19:28	1756.0	37.8	6.9	153	236	2297	508	279	1.15	1.14	51.6	53.6	1742.9	744	547.0	21:39	1.21	0.83	0.17
00:21:07	1757.0	35.7	7.5	152	232	2329	508	266	1.15	1.14	51.6	53.6	1743.5	746	548.0	21:41	1.21	0.82	0.18
00:22:56	1758.0	35.8	7.3	152	247	2307	508	264	1.15	1.14	51.6	53.7	1744.1	745	549.0	21:43	1.21	0.84	0.19
00:24:43	1759.0	30.7	8.5	151	260	2342	508	272	1.15	1.14	51.6	53.7	1744.8	744	550.0	21:44	1.21	0.86	0.21
00:27:18	1760.0	22.7	7.7	152	223	2319	508	274	1.15	1.14	51.6	53.8	1746.1	746	551.0	21:47	1.21	0.92	0.22
00:29:51	1761.0	32.7	7.5	151	237	2330	509	266	1.15	1.14	51.6	53.8	1747.4	746	552.0	21:49	1.21	0.94	0.20
00:32:17	1762.0	27.4	7.6	152	226	2319	508	275	1.15	1.14	51.6	53.7	1748.5	746	553.0	21:52	1.21	0.88	0.17
00:34:01	1763.0	30.6	7.8	151	249	2336	508	278	1.16	1.16	51.6	53.7	1749.1	746	554.0	21:54	1.21	0.84	0.16
00:36:40	1764.0	30.5	7.1	152	229	2308	508	260	1.16	1.16	51.6	53.9	1749.4	746	555.0	21:56	1.21	0.89	0.16
00:38:57	1765.0	25.2	7.4	152	242	2338	509	271	1.16	1.16	51.7	53.9	1749.8	746	556.0	21:59	1.21	0.88	0.17
00:41:58	1766.0	17.7	7.2	151	239	2332	509	292	1.16	1.16	51.7	54.0	1751.3	745	557.0	22:02	1.21	0.93	0.16
00:44:09	1767.0	26.8	7.3	151	249	2330	508	273	1.16	1.16	51.8	54.0	1751.8	745	558.0	22:04	1.21	0.87	0.17
00:48:29	1768.0	23.9	8.2	152	210	2326	509	270	1.16	1.16	51.8	54.1	1752.8	744	559.0	22:08	1.21	1.03	0.20
00:51:52	1769.0	15.0	7.6	151	219	2321	509	273	1.16	1.16	51.8	54.3	1754.5	742	560.0	22:11	1.21	0.95	0.21
00:54:36	1770.0	26.5	7.7	151	229	2316	509	284	1.16	1.16	51.9	54.5	1756.0	743	561.0	22:14	1.21	0.90	0.21
01:17:36	1771.0	13.2	6.6	152	216	2335	510	260	1.16	1.16	51.8	54.3	1763.2	671	562.0	22:18	1.21	0.96	0.11
01:19:54	1772.0	21.6	6.3	152	226	2347	514	191	1.16	1.16	51.5	53.6	1763.5	679	563.0	22:20	1.22	0.84	0.13
01:22:00	1773.0	29.9	8.1	153	246	2365	514	201	1.16	1.16	51.4	53.2	1764.3	676	564.0	22:23	1.22	0.85	0.16
01:23:46	1774.0	34.6	6.9	152	250	2355	514	210	1.16	1.16	51.2	53.2	1765.1	667	565.0	22:24	1.22	0.82	0.16
01:25:50	1775.0	28.0	7.5	152	250	2371	515	177	1.16	1.16	51.0	53.3	1765.8	662	566.0	22:26	1.22	0.84	0.15
01:28:02	1776.0	25.7	7.3	152	244	2343	515	180	1.16	1.16	50.7	53.5	1766.6	661	567.0	22:29	1.22	0.86	0.15
01:30:13	1777.0	25.4	7.9	150	253	2342	515	204	1.16	1.16	50.5	53.6	1767.3	663	568.0	22:31	1.22	0.86	0.15
01:32:18	1778.0	29.8	8.0	151	260	2307	510	236	1.16	1.16	50.4	53.6	1767.6	664	569.0	22:33	1.22	0.88	0.15
01:34:35	1779.0	28.9	8.6	151	259	2272	508	199	1.16	1.16	50.3	53.6	1768.5	666	570.0	22:35	1.22	0.89	0.15
01:37:04	1780.0	20.2	8.3	152	213	2286	508	199	1.16	1.16	50.3	53.4	1769.2	667	571.0	22:38	1.22	0.92	0.14
01:40:24	1781.0	32.8	8.8	152	232	2233	507	206	1.16	1.16	50.2	53.2	1770.3	671	572.0	22:41	1.22	0.98	0.12
01:42:36	1782.1	26.0	8.9	152	241	2240	507	207	1.16	1.16	50.1	53.1	1770.6	673	573.1	22:43	1.22	0.89	0.12
01:45:47	1783.0	20.0	9.2	152	212	2200	508	203	1.16	1.16	50.0	52.2	1770.7	675	574.0	22:46	1.22	0.99	0.12
01:49:35	1784.0	14.7	8.4	152	207	2187	508	189	1.16	1.16	50.0	52.8	1770.7	677	575.0	22:50	1.22	0.99	0.12
01:51:40	1785.0	29.4	8.9	152	244	2170	507	201	1.16	1.16	50.0	53.7	1770.7	679	576.0	22:52	1.22	0.88	0.12
01:54:13	1786.0	29.6	9.1	152	266	2179	507	202	1.16	1.16	50.0	54.2	1770.7	681	577.0	22:55	1.22	0.94	0.12
01:55:56	1787.0	36.2	10.0	152	243	2147	507	219	1.16	1.16	50.0	54.4	1771.5	681	578.0	22:56	1.22	0.87	0.16
01:57:46	1788.0	26.4	9.5	152	249	2182	507	209	1.16	1.16	50.0	54.4	1772.1	684	579.0	22:58	1.22	0.88	0.18
01:59:23	1789.0	37.5	9.8	152	252	2142	507	210	1.16	1.16	50.1	54.4	1772.9	684	580.0	22:60	1.22	0.85	0.17
02:01:44	1790.0	21.4	9.0	151	234	2174	507	234	1.16	1.16	50.1	54.4	1774.0	686	581.0	23:02	1.22	0.92	0.17
02:04:12	1791.0	32.1	8.6	153	247	2154	507	230	1.16	1.16	50.1	54.3	1775.2	688	582.0	23:05	1.22	0.91	0.17
02:06:17	1792.0	27.2	10.1	152	272	2170	508	254	1.16	1.16	50.1	54.3	1776.1	689	583.0	23:07	1.22	0.91	0.17
02:09:28	1793.0	17.0	8.5	152	211	2191	513	217	1.16	1.16	50.2	54.2	1777.5	692	584.0	23:10	1.22	0.96	0.15

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg	deg C		m	bbl	mts	hh:mm	sg		%
02:11:38	1794.1	27.7	9.1	152	246	2197	513	216	1.16	1.16	50.1	54.0	1778.3	694	585.1	23:12	1.22	0.89	0.16
02:14:14	1795.0	24.9	9.6	152	217	2200	513	226	1.16	1.16	50.2	54.0	1779.5	695	586.0	23:15	1.22	0.95	0.16
02:17:40	1796.0	29.0	10.5	152	244	2202	514	231	1.16	1.16	50.2	54.0	1780.3	698	587.0	23:18	1.22	1.01	0.16
02:20:11	1797.0	20.6	10.1	152	245	2165	514	248	1.16	1.16	50.3	54.0	1781.5	698	588.0	23:21	1.22	0.95	0.15
02:22:16	1798.0	33.6	9.4	152	255	2167	513	240	1.16	1.16	50.5	53.9	1782.3	698	589.0	23:23	1.22	0.90	0.15
02:24:20	1799.0	27.8	9.3	152	258	2149	513	227	1.16	1.16	50.5	53.9	1783.5	699	590.0	23:25	1.22	0.89	0.16
02:42:04	1800.1	16.4	8.4	152	236	2179	512	240	1.16	1.16	50.4	52.7	1788.5	705	591.1	23:28	1.22	0.94	0.16
02:45:40	1801.0	14.4	6.8	151	218	2133	510	218	1.16	1.16	50.2	50.4	1790.1	707	592.0	23:31	1.22	0.93	0.16
02:48:20	1802.1	21.6	6.2	152	254	2129	510	252	1.16	1.16	50.3	53.7	1791.3	709	593.1	23:34	1.22	0.87	0.16
02:49:35	1803.0	48.6	7.9	151	256	2125	510	261	1.16	1.16	50.3	53.8	1791.8	709	594.0	23:35	1.22	0.76	0.15
02:51:31	1804.0	36.3	6.7	151	267	2110	510	259	1.16	1.16	50.3	54.0	1792.5	710	595.0	23:37	1.22	0.80	0.15
02:53:25	1805.0	31.3	6.7	152	252	2151	512	249	1.16	1.16	50.3	54.1	1793.0	711	596.0	23:39	1.22	0.81	0.15
02:55:17	1806.1	33.3	6.7	150	255	2147	515	261	1.16	1.16	50.3	54.2	1793.8	712	597.1	23:41	1.22	0.81	0.15
02:57:44	1807.0	23.7	7.1	151	240	2157	514	282	1.16	1.16	50.4	54.1	1794.6	712	598.0	23:43	1.22	0.86	0.16
02:59:40	1808.0	32.4	5.9	151	218	2139	514	272	1.16	1.16	50.4	54.0	1795.3	713	599.0	23:45	1.22	0.79	0.16
03:02:07	1809.0	23.5	7.5	151	254	2153	514	266	1.16	1.16	50.4	53.9	1796.1	714	600.0	23:48	1.22	0.88	0.16
03:04:30	1810.0	25.6	6.3	151	239	2132	514	249	1.16	1.16	50.4	53.6	1797.0	717	601.0	23:50	1.22	0.86	0.13
03:07:24	1811.0	18.4	5.9	152	247	2152	514	252	1.16	1.16	50.5	54.0	1798.3	717	602.0	23:53	1.22	0.88	0.10
03:10:10	1812.0	18.4	6.0	152	201	2138	514	232	1.16	1.16	50.6	54.1	1799.5	717	603.0	23:56	1.22	0.86	0.10
03:13:49	1813.0	17.7	6.2	153	218	2133	513	225	1.16	1.16	50.8	54.1	1799.7	717	604.0	23:59	1.22	0.92	0.12
03:16:07	1814.0	25.3	5.3	153	182	2133	513	235	1.16	1.16	50.9	54.0	1799.7	717	605.0	24:02	1.22	0.82	0.12
03:17:50	1815.0	35.2	5.8	153	189	2140	514	211	1.16	1.16	50.9	54.0	1799.7	717	606.0	24:03	1.22	0.77	0.12
03:20:36	1816.0	19.6	5.2	153	179	2134	514	231	1.16	1.16	51.0	54.0	1799.7	717	607.0	24:06	1.22	0.85	0.12
03:22:44	1817.1	35.0	7.1	153	203	2138	514	257	1.16	1.16	51.1	53.9	1799.9	717	608.1	24:08	1.22	0.83	0.14
03:24:43	1818.0	53.2	7.4	153	201	2125	513	294	1.16	1.16	51.1	53.8	1800.6	718	609.0	24:10	1.22	0.84	0.18
03:26:55	1819.0	28.5	7.0	153	191	2139	513	287	1.16	1.16	51.1	53.7	1801.0	718	610.0	24:13	1.22	0.85	0.22
03:28:40	1820.0	33.1	7.7	152	194	2131	513	274	1.16	1.16	51.1	53.8	1801.7	718	611.0	24:14	1.22	0.82	0.32

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT	DEPTH						
h:mm:sec	m	m/hr	klb		amp	psi	gpm			sg		deg C	m	bbl	mts	hh:mm	sg		%
03:32:40	1821.0	33.1	7.7	152	194	2131	513	274	1.16	1.16	51.1	53.8	1801.7	718	612.0	25:00	1.22	0.82	0.32
POOH NB#6 at 1821 m for coring.																			
RIH CB#1 8.5" DBS CD93 9x9 jets with 29 m core barrel.																			
16:53:42	1821.5	21.3	8.5	146	171	2062	495	263	1.16	1.16	50.8	53.2	1820.9	700	0.5	0:00	1.20	0.31	0.01
16:58:31	1822.0	20.3	7.0	100	240	1065	232	345	1.16	1.17	41.0	47.6	1820.9	700	1.0	0:05	1.20	0.90	0.01
17:11:41	1823.0	32.2	7.7	93	417	1161	237	344	1.16	1.17	41.2	47.5	1820.9	694	2.0	0:10	1.20	0.66	0.01
17:20:27	1824.0	9.0	6.0	110	385	1059	274	308	1.16	1.17	42.0	46.6	1820.9	693	3.0	0:17	1.20	1.09	0.01
17:35:46	1825.0	18.0	6.9	116	421	831	274	278	1.16	1.17	42.5	46.3	1820.9	700	4.0	0:25	1.20	1.11	0.01
18:09:29	1827.0	0.9	26.5	128	223	873	256	282	1.16	1.17	43.1	45.5	1823.4	699	6.0	0:52	1.20	1.50	0.56
18:21:18	1828.0	2.3	27.0	128	213	876	263	284	1.16	1.17	43.1	45.5	1824.3	699	7.0	1:00	1.20	1.94	0.78
POOH at 1828 m due to very slow penetration rate.																			
Cored 7.0 m. Recovery 43.4%.																			
19th March 1993																			
RIH CB#2 8.5" DBS CD-93 9x9 jets with 18 m core barrel.																			
05:49:10	1829.0	3.2	8.9	100	182	598	245	245	1.16	1.17	37.7	44.3	1828.0	700	1.0	0:35	1.20	1.45	0.17
06:10:08	1830.0	3.6	17.6	108	218	644	243	246	1.16	1.17	39.5	43.6	1828.0	701	2.0	0:56	1.20	1.51	0.17
06:26:12	1831.0	4.3	19.1	110	257	634	244	241	1.16	1.17	40.0	43.8	1828.3	700	3.0	1:12	1.20	1.54	0.16
06:46:09	1832.0	2.7	18.8	110	250	732	244	244	1.16	1.17	40.5	43.9	1828.8	701	4.0	1:32	1.20	1.56	0.13
07:03:34	1833.0	6.2	20.7	110	253	716	244	243	1.16	1.17	40.9	43.9	1829.6	700	5.0	1:49	1.20	1.51	0.14
07:18:36	1834.0	2.9	23.3	111	315	860	244	244	1.16	1.17	41.1	43.9	1830.4	700	6.0	2:05	1.20	1.61	0.18
07:36:54	1835.0	2.2	18.9	129	214	897	241	242	1.16	1.17	41.4	43.8	1831.4	703	7.0	2:23	1.20	1.60	0.18
09:00:14	1838.0	1.6	16.2	126	134	976	241	241	1.16	1.16	41.6	44.3	1835.5	664	10.0	3:37	1.20	1.47	0.20
09:30:27	1839.0	1.4	21.3	121	152	1117	278	261	1.16	1.16	41.9	44.6	1837.4	659	11.0	4:07	1.20	1.81	0.18
10:00:57	1840.0	2.5	26.1	122	177	1256	300	295	1.16	1.16	42.8	46.0	1838.2	662	12.0	4:38	1.20	1.74	0.14
10:27:57	1841.0	4.1	25.2	121	196	1178	302	301	1.16	1.16	43.3	45.9	1839.1	661	13.0	5:05	1.20	1.58	0.11
11:18:13	1842.0	1.0	25.0	121	226	1190	304	300	1.16	1.16	43.6	46.3	1841.1	670	14.0	5:55	1.20	1.96	0.13
POOH CB#2 at 1842.5 m. Cored 14.5 m. Rec 92.0%																			
RIH CB#3 8.5" DBS CD-502 9x9 jets.																			
20th March 1993																			
00:00:23	1843.0	13.8	4.9	51	171	234	119	262	1.17	1.18	35.2	35.2	1842.5	659	0.5	0:03	1.21	0.94	0.28
00:05:26	1844.0	22.1	10.0	86	228	410	198	259	1.17	1.18	35.0	43.3	1842.5	697	1.5	0:08	1.21	0.99	0.28
00:08:53	1845.0	16.6	11.7	109	256	404	199	257	1.17	1.18	35.3	43.8	1842.5	700	2.5	0:12	1.21	1.01	0.28
00:13:28	1846.0	7.2	12.4	112	307	390	199	259	1.17	1.18	35.7	43.9	1842.5	701	3.5	0:16	1.21	1.18	0.28
01:19:50	1847.0	1.8	12.3	100	256	476	184	264	1.17	1.18	36.5	43.6	1844.3	728	4.5	1:08	1.17	1.31	0.42
POOH CB#3 due to very slow penetration rate.																			
Cored 4.5 m. Recovery 100%.																			

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT	MUD DENSITY IN sg	MUD DENSITY OUT	MUD TEMP IN deg C	MUD TEMP OUT	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
NB#7 8.5" HTC ATM22 3x12 jets with MWD assembly.																			
10:52:27	1848.0	8.1	7.3	110	137	2461	414	219	1.17	1.18	45.0	48.6	1847.0	722	1.0	0:10	1.23	0.79	0.03
10:58:27	1849.0	13.1	13.6	110	137	2461	414	219	1.17	1.18	45.4	48.8	1847.0	722	2.0	0:16	1.23	1.11	0.03
11:03:27	1850.0	13.6	17.1	110	137	2461	414	219	1.17	1.18	45.8	48.8	1847.0	722	3.0	0:22	1.23	1.18	0.03
11:08:27	1851.0	15.2	17.8	110	137	2461	414	219	1.17	1.18	45.8	48.8	1847.0	722	4.0	0:26	1.23	1.15	0.03
11:12:27	1852.0	15.2	15.2	110	137	2461	414	219	1.17	1.18	45.8	48.9	1847.0	722	5.0	0:31	1.23	1.09	0.03
11:18:27	1853.0	11.5	15.4	110	137	2461	414	219	1.17	1.18	45.7	49.0	1847.2	722	6.0	0:36	1.23	1.15	0.03
11:23:45	1854.0	11.4	17.0	110	136	2460	415	225	1.17	1.18	45.8	49.0	1847.5	722	7.0	0:42	1.23	1.17	0.06
11:29:54	1855.0	11.7	16.1	110	132	2461	415	224	1.17	1.18	46.0	49.1	1848.2	722	8.0	0:48	1.23	1.18	0.12
11:34:36	1856.0	12.6	16.9	110	142	2467	415	232	1.17	1.18	45.9	49.1	1849.0	724	9.0	0:52	1.23	1.15	0.21
11:38:53	1857.0	13.6	16.3	110	139	2460	415	305	1.17	1.18	46.1	49.0	1849.7	724	10.0	0:57	1.23	1.10	0.24
11:43:28	1858.0	13.2	16.4	110	137	2468	415	358	1.17	1.18	46.2	47.9	1850.5	724	11.0	1:01	1.23	1.11	0.26
12:05:31	1859.0	7.8	17.4	110	153	2466	435	382	1.17	1.18	46.3	46.0	1854.2	716	12.0	1:08	1.23	1.22	0.31
12:09:08	1860.0	16.5	19.5	111	165	2451	460	461	1.15	1.16	46.1	48.1	1854.9	716	13.0	1:11	1.23	1.12	0.34
12:13:39	1861.1	22.4	19.1	111	153	2472	461	465	1.15	1.16	46.1	48.7	1855.9	714	14.1	1:16	1.23	1.16	0.43
12:18:26	1862.0	14.1	18.8	111	158	2465	461	541	1.15	1.16	46.1	48.7	1857.2	714	15.0	1:21	1.23	1.19	0.54
12:23:42	1863.0	12.4	18.6	111	170	2476	461	538	1.15	1.16	46.2	48.9	1858.6	715	16.0	1:26	1.22	1.20	0.49
12:28:13	1864.0	14.2	19.0	111	196	2481	460	470	1.15	1.16	46.3	48.9	1858.9	714	17.0	1:30	1.22	1.18	0.50
12:32:58	1865.0	12.9	20.2	111	191	2492	461	468	1.15	1.16	46.4	48.8	1858.9	714	18.0	1:35	1.22	1.22	0.50
12:37:53	1866.0	12.9	20.9	110	202	2491	461	470	1.15	1.16	46.5	49.0	1859.2	715	19.0	1:40	1.21	1.22	0.43
12:42:53	1867.0	11.6	20.0	111	196	2503	461	466	1.15	1.16	46.4	49.2	1860.3	720	20.0	1:45	1.21	1.23	0.32
12:47:41	1868.0	10.2	19.9	111	199	2496	461	466	1.15	1.16	46.4	49.0	1861.4	724	21.0	1:50	1.21	1.21	0.56
12:52:46	1869.0	13.4	19.8	111	183	2499	461	446	1.15	1.16	46.3	49.2	1862.4	729	22.0	1:55	1.21	1.22	0.58
12:58:12	1870.0	10.8	20.6	110	195	2490	461	542	1.15	1.16	46.3	49.4	1863.7	732	23.0	2:00	1.21	1.25	0.51
13:05:26	1871.0	9.0	22.7	101	182	2504	461	416	1.15	1.16	46.2	49.2	1864.9	736	24.0	2:08	1.21	1.34	0.49
13:10:05	1872.0	12.0	23.9	93	240	2493	461	446	1.15	1.16	46.2	49.4	1865.8	739	25.0	2:12	1.21	1.23	0.50
13:15:47	1873.0	10.4	19.6	109	201	2473	461	465	1.15	1.16	46.3	49.7	1866.9	743	26.0	2:18	1.21	1.25	0.52
13:20:38	1874.0	12.5	20.5	111	220	2471	461	493	1.15	1.16	46.3	49.6	1868.0	747	27.0	2:23	1.21	1.22	0.43
13:25:58	1875.0	8.7	19.7	110	226	2474	461	500	1.15	1.16	46.3	49.4	1868.9	749	28.0	2:28	1.21	1.23	0.51
13:31:11	1876.0	11.7	23.0	96	215	2472	461	465	1.15	1.16	46.3	49.5	1869.9	751	29.0	2:33	1.21	1.26	0.49
13:35:50	1877.0	13.2	23.9	91	264	2470	461	466	1.15	1.16	46.3	50.0	1870.6	756	30.0	2:38	1.21	1.21	0.47
13:40:03	1878.0	15.4	22.7	91	278	2467	461	466	1.15	1.16	46.4	49.7	1871.0	759	31.0	2:42	1.21	1.18	0.43
13:47:16	1879.0	11.6	18.3	112	185	2479	461	490	1.15	1.16	46.6	49.9	1872.0	761	32.0	2:47	1.21	1.00	0.73
13:52:30	1880.0	10.3	18.5	110	187	2482	461	475	1.15	1.16	46.8	49.7	1873.3	762	33.0	2:52	1.21	1.20	0.88
13:56:43	1881.0	12.7	19.3	110	206	2478	461	478	1.15	1.16	46.9	49.8	1874.2	759	34.0	2:56	1.21	1.19	0.99
14:01:41	1882.0	13.4	20.5	110	217	2484	460	477	1.15	1.16	47.0	49.7	1875.3	759	35.0	3:01	1.21	1.23	0.84
14:07:19	1883.0	12.1	19.6	110	230	2490	460	485	1.15	1.16	47.1	49.7	1876.5	759	36.0	3:07	1.21	1.24	0.76
14:12:40	1884.0	10.2	19.8	110	194	2481	460	466	1.15	1.16	47.2	50.1	1877.7	758	37.0	3:12	1.21	1.23	0.69
14:18:08	1885.0	11.4	23.1	97	225	2493	460	464	1.15	1.16	47.3	50.1	1878.8	758	38.0	3:18	1.21	1.27	0.86
14:25:19	1886.0	7.7	26.0	91	208	2494	460	467	1.15	1.16	47.4	50.2	1879.9	756	39.0	3:25	1.21	1.37	0.98
14:33:12	1887.0	11.2	26.6	92	352	2507	460	468	1.15	1.16	47.4	50.5	1881.5	754	40.0	3:33	1.21	1.39	0.96
14:52:49	1888.0	10.4	21.7	109	165	2471	460	395	1.15	1.16	46.8	50.7	1884.3	751	41.0	3:38	1.21	1.41	0.98
14:57:30	1889.0	10.8	23.4	109	197	2506	460	407	1.15	1.16	46.9	49.6	1884.8	753	42.0	3:43	1.21	1.26	0.86
15:01:44	1890.0	14.8	21.8	109	188	2506	460	411	1.15	1.16	47.0	49.8	1885.2	750	43.0	3:47	1.21	1.21	0.73
15:06:44	1891.0	12.3	19.9	109	173	2509	460	392	1.15	1.16	47.1	50.1	1885.8	749	44.0	3:52	1.21	1.21	0.50

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
15:11:32	1892.0	21.7	21.1	109	192	2513	460	400	1.15	1.16	47.2	50.1	1886.3	749	45.0	3:57	1.21	1.24	0.35
15:16:52	1893.0	10.6	23.9	108	232	2513	460	393	1.15	1.16	47.3	50.2	1886.9	749	46.0	4:02	1.21	1.29	0.46
15:22:56	1894.0	10.3	19.9	109	202	2525	460	397	1.15	1.16	47.4	50.2	1887.6	748	47.0	4:08	1.21	1.28	0.54
15:29:43	1895.0	9.7	22.2	109	197	2518	460	394	1.15	1.16	47.5	50.3	1888.8	748	48.0	4:15	1.21	1.34	0.33
15:37:30	1896.0	7.6	24.4	103	203	2540	460	400	1.15	1.16	47.7	50.4	1890.4	745	49.0	4:23	1.21	1.39	1.16
15:45:26	1897.0	8.6	24.7	98	196	2523	460	402	1.15	1.16	47.7	50.6	1891.9	745	50.0	4:31	1.21	1.39	1.14
15:50:50	1898.0	11.8	24.1	101	238	2523	460	410	1.15	1.16	47.8	50.5	1893.2	742	51.0	4:36	1.21	1.29	0.90
15:55:55	1899.1	13.7	23.8	101	190	2533	460	389	1.15	1.16	47.9	50.7	1893.9	743	52.1	4:41	1.21	1.26	0.96
16:02:17	1900.0	10.3	25.3	101	228	2527	460	400	1.15	1.16	48.0	50.7	1894.6	742	53.0	4:48	1.21	1.35	0.74
16:09:07	1901.0	7.5	25.6	99	202	2529	460	404	1.15	1.16	48.1	50.9	1895.6	745	54.0	4:55	1.21	1.37	0.57
16:15:24	1902.0	8.8	25.9	103	212	2533	460	461	1.15	1.16	59.1	50.9	1896.3	743	55.0	5:01	1.21	1.37	0.46
16:22:08	1903.0	9.4	25.6	103	171	2525	460	446	1.15	1.16	48.7	50.9	1897.1	740	56.0	5:08	1.21	1.37	0.26
16:27:10	1904.0	14.5	25.7	103	231	2521	460	433	1.15	1.16	48.5	51.0	1898.0	739	57.0	5:13	1.21	1.30	0.38
16:31:58	1905.1	11.2	24.9	103	230	2520	460	429	1.15	1.16	48.5	50.8	1899.0	737	58.1	5:18	1.21	1.26	0.71
16:37:28	1906.0	10.5	25.7	103	209	2513	460	446	1.15	1.16	48.5	50.8	1905.0	737	59.0	5:23	1.21	1.33	0.37
16:42:45	1907.0	13.0	26.0	102	236	2516	460	441	1.15	1.16	48.6	51.0	1901.6	736	60.0	5:28	1.21	1.31	0.37
16:46:50	1908.0	13.9	26.0	103	213	2506	460	430	1.15	1.16	48.6	51.2	1903.0	740	61.0	5:32	1.21	1.25	0.32
16:52:55	1909.0	9.3	26.0	103	206	2511	460	429	1.15	1.16	48.6	51.4	1905.1	740	62.0	5:38	1.21	1.35	0.32
17:01:32	1910.0	7.4	26.4	102	166	2521	460	437	1.15	1.16	48.7	51.3	1908.3	739	63.0	5:47	1.21	1.45	0.29
17:08:16	1911.0	8.0	26.2	92	183	2542	460	451	1.15	1.16	48.8	51.5	1908.8	739	64.0	5:54	1.21	1.35	0.97
17:15:31	1912.0	8.6	26.3	92	177	2539	460	438	1.15	1.16	48.8	51.5	1909.7	734	65.0	6:01	1.21	1.38	0.81
17:22:30	1913.0	9.7	26.3	95	199	2549	460	426	1.15	1.16	48.8	51.6	1911.0	733	66.0	6:08	1.21	1.38	0.64
17:31:23	1914.0	6.5	26.4	96	169	2552	460	400	1.15	1.16	48.9	51.8	1913.2	733	67.0	6:17	1.21	1.44	0.48
17:36:52	1915.0	12.2	26.3	96	220	2538	460	394	1.15	1.16	49.0	51.9	1913.2	715	68.0	6:22	1.21	1.30	0.48
17:43:42	1916.0	9.3	26.3	96	201	2534	460	403	1.15	1.16	48.9	51.9	1913.2	724	69.0	6:29	1.21	1.37	0.48
17:49:36	1917.0	12.2	25.4	96	229	2542	460	412	1.15	1.16	49.1	52.0	1913.5	731	70.0	6:35	1.21	1.33	0.46
18:15:36	1918.0	16.2	25.4	96	229	2542	460	412	1.15	1.16	49.1	52.0	1913.5	731	71.0	6:44	1.21	1.27	0.50
18:23:36	1919.0	9.4	23.0	96	199	2542	460	412	1.15	1.16	49.5	52.0	1915.0	731	72.0	6:49	1.21	1.30	0.55
18:28:36	1920.0	10.0	21.0	96	167	2542	460	412	1.15	1.16	49.5	52.0	1917.5	731	73.0	6:56	1.21	1.33	0.58
18:33:31	1921.0	12.7	21.7	110	224	2495	460	389	1.15	1.16	49.5	51.8	1918.8	727	74.0	7:01	1.21	1.25	0.67
18:38:09	1922.0	13.3	21.7	109	231	2485	461	385	1.15	1.16	49.5	52.0	1920.1	728	75.0	7:06	1.21	1.23	0.32
18:42:51	1923.0	11.7	22.4	109	227	2493	461	391	1.15	1.16	49.5	51.9	1920.0	728	76.0	7:11	1.21	1.25	0.15
18:49:02	1924.0	9.7	22.1	109	261	2488	461	402	1.15	1.16	49.6	51.9	1921.2	727	77.0	7:17	1.21	1.31	0.27
18:54:56	1925.0	9.9	22.3	110	181	2491	460	384	1.15	1.16	49.6	51.9	1922.2	727	78.0	7:23	1.21	1.31	0.49
19:00:34	1926.0	10.7	21.6	110	211	2483	460	398	1.15	1.16	49.7	51.9	1922.1	727	79.0	7:28	1.21	1.28	0.55
19:05:57	1927.0	12.9	21.6	110	209	2485	461	391	1.15	1.16	49.7	51.9	1923.4	727	80.0	7:34	1.21	1.27	0.43
19:11:16	1928.0	13.5	22.5	109	205	2483	460	393	1.15	1.16	49.7	52.1	1924.6	726	81.0	7:39	1.21	1.28	0.68
19:16:24	1929.0	12.4	23.3	110	199	2486	460	428	1.15	1.16	49.8	52.0	1925.8	726	82.0	7:44	1.21	1.29	0.87
19:21:12	1930.0	12.8	22.4	110	231	2478	460	426	1.15	1.16	49.8	52.2	1927.3	725	83.0	7:49	1.21	1.26	0.99
19:27:03	1931.0	9.4	24.3	109	231	2479	460	433	1.15	1.16	49.8	52.4	1929.4	723	84.0	7:55	1.21	1.34	0.59
19:33:54	1932.0	6.2	24.7	109	226	2481	460	406	1.15	1.16	49.9	52.1	1925.8	721	85.0	8:02	1.21	1.38	0.43
19:38:45	1933.0	11.9	25.5	109	258	2475	459	421	1.15	1.16	49.9	52.3	1927.5	721	86.0	8:06	1.21	1.30	0.47
19:45:48	1934.0	9.2	25.5	109	267	2478	458	436	1.15	1.16	49.9	52.2	1930.0	721	87.0	8:14	1.21	1.39	0.53
19:52:42	1935.0	9.5	25.2	109	235	2484	458	431	1.15	1.16	49.9	52.2	1932.5	721	88.0	8:20	1.21	1.40	0.54
19:59:57	1936.0	9.2	25.6	110	192	2478	458	425	1.15	1.16	49.9	52.3	1934.7	720	89.0	8:28	1.21	1.41	0.57

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
20:04:50	1937.0	12.8	25.7	110	255	2481	458	411	1.15	1.16	50.0	52.6	1935.7	720	90.0	8:33	1.21	1.31	0.67
20:11:25	1938.0	11.4	25.8	109	211	2481	458	419	1.15	1.16	50.0	52.3	1935.7	718	91.0	8:39	1.21	1.39	0.67
20:17:43	1939.0	10.5	26.5	109	229	2475	458	404	1.15	1.16	50.1	52.5	1935.6	716	92.0	8:45	1.21	1.39	0.59
20:23:07	1940.0	12.7	26.4	109	259	2485	458	424	1.15	1.16	50.1	52.6	1937.7	716	93.0	8:51	1.21	1.35	0.39
20:28:46	1941.0	10.7	26.3	109	267	2478	458	427	1.15	1.16	50.1	52.6	1938.9	716	94.0	8:56	1.21	1.35	0.33
20:34:35	1942.0	10.3	24.8	109	270	2474	458	422	1.15	1.16	50.1	52.4	1941.0	716	95.0	9:02	1.21	1.34	0.32
20:41:09	1943.0	6.6	25.0	110	165	2489	458	440	1.15	1.16	50.2	52.6	1939.3	716	96.0	9:09	1.21	1.24	0.38
20:50:19	1944.0	8.9	25.6	109	208	2470	458	403	1.15	1.16	50.3	52.8	1942.6	714	97.0	9:18	1.21	1.47	0.49
21:03:50	1945.0	4.1	26.5	110	165	2484	453	453	1.15	1.16	50.3	52.8	1943.1	711	98.0	9:29	1.21	1.25	0.54
21:29:39	1946.0	10.9	24.7	108	165	2462	453	256	1.15	1.16	50.4	53.4	1943.9	706	99.0	9:37	1.21	1.43	0.19
21:35:38	1947.0	13.6	25.2	110	189	2424	452	354	1.15	1.16	50.4	52.0	1945.3	708	100.0	9:43	1.21	1.36	0.18
21:42:28	1948.0	8.7	23.5	110	218	2437	453	280	1.15	1.16	50.4	51.9	1945.1	707	101.0	9:50	1.21	1.37	0.11
21:48:51	1949.0	9.4	23.5	110	194	2449	455	323	1.15	1.16	50.4	52.6	1945.6	706	102.0	9:56	1.21	1.35	0.10
21:56:56	1950.0	6.8	23.9	110	193	2471	456	418	1.15	1.16	50.4	52.9	1946.2	706	103.0	10:04	1.21	1.41	0.09
22:05:50	1951.0	9.3	22.9	110	200	2477	457	434	1.15	1.16	50.5	52.8	1947.0	705	104.0	10:13	1.21	1.41	0.07
22:15:34	1952.0	5.9	24.5	110	201	2475	458	437	1.15	1.16	50.6	53.0	1947.8	703	105.0	10:23	1.21	1.48	0.26
22:21:42	1953.0	10.4	25.3	110	235	2477	458	440	1.15	1.16	50.7	53.0	1948.7	703	106.0	10:29	1.21	1.36	0.22
22:26:49	1954.0	12.7	23.9	110	226	2480	458	466	1.15	1.16	50.7	53.0	1949.5	701	107.0	10:34	1.21	1.30	0.13
22:32:04	1955.0	12.1	24.5	110	223	2470	458	456	1.15	1.16	50.7	53.1	1950.1	702	108.0	10:39	1.21	1.32	0.09
22:36:22	1956.0	13.0	24.4	110	225	2481	458	454	1.15	1.16	50.8	53.2	1950.5	701	109.0	10:44	1.21	1.26	0.08
22:41:47	1957.0	11.1	24.5	110	222	2473	458	455	1.15	1.16	50.8	53.3	1951.1	701	110.0	10:49	1.21	1.33	0.06
22:47:42	1958.0	12.7	24.8	110	248	2484	458	459	1.15	1.16	50.8	53.2	1951.9	709	111.0	10:55	1.21	1.35	0.04
22:53:55	1959.0	10.3	23.7	110	198	2486	458	458	1.15	1.16	50.8	53.1	1952.4	708	112.0	11:01	1.21	1.34	0.04
22:59:05	1960.0	11.1	24.7	111	233	2483	458	461	1.15	1.16	50.8	53.4	1953.3	707	113.0	11:06	1.21	1.32	0.05
23:02:43	1961.0	17.5	27.4	120	214	2493	458	442	1.15	1.16	50.9	53.3	1954.0	707	114.0	11:10	1.21	1.27	0.09
23:06:49	1962.0	13.7	28.4	120	272	2468	458	454	1.15	1.16	50.9	53.2	1954.7	707	115.0	11:14	1.21	1.33	0.09
23:11:52	1963.0	10.8	28.6	120	270	2487	458	451	1.15	1.16	50.9	53.3	1955.9	706	116.0	11:19	1.21	1.39	0.11
23:16:15	1964.0	14.2	27.8	119	290	2466	458	437	1.15	1.16	51.0	53.4	1956.7	708	117.0	11:24	1.21	1.33	0.13
23:20:41	1965.0	14.4	28.1	120	290	2460	458	442	1.15	1.16	51.0	53.2	1957.3	708	118.0	11:28	1.21	1.35	0.10
23:27:39	1966.0	13.2	25.9	119	288	2450	458	455	1.15	1.16	51.0	53.4	1958.5	707	119.0	11:33	1.21	1.32	0.05
23:32:12	1967.0	12.5	27.4	118	338	2453	458	469	1.15	1.16	51.0	53.5	1959.3	706	120.0	11:37	1.21	1.34	0.05
23:39:13	1968.0	7.4	23.7	118	239	2461	458	469	1.15	1.16	51.0	53.4	1960.7	705	121.0	11:44	1.21	1.39	0.05
23:45:29	1969.0	8.2	22.5	119	254	2450	458	462	1.15	1.16	51.1	53.3	1962.2	704	122.0	11:50	1.21	1.34	0.07
23:52:09	1970.0	7.6	22.7	119	208	2462	458	475	1.15	1.16	51.1	53.5	1963.5	704	123.0	11:57	1.21	1.36	0.06
23:59:16	1971.0	7.8	23.6	119	239	2463	458	446	1.15	1.16	51.1	53.7	1965.3	703	124.0	12:04	1.21	1.39	0.05
21st March 1993																			
00:05:27	1972.0	11.0	22.7	118	254	2457	458	449	1.15	1.16	51.2	53.6	1965.9	702	125.0	12:10	1.21	1.33	0.05
00:10:37	1973.0	12.5	23.2	119	276	2454	458	467	1.15	1.16	51.2	53.6	1966.9	703	126.0	12:16	1.21	1.29	0.05
00:16:31	1974.0	9.3	22.9	119	243	2454	458	454	1.15	1.16	51.2	53.8	1967.8	701	127.0	12:22	1.21	1.34	0.05
00:22:41	1975.0	9.4	23.0	118	264	2453	458	444	1.15	1.16	51.3	53.8	1968.7	700	128.0	12:28	1.21	1.35	0.07
00:47:24	1976.0	13.8	24.4	114	296	2462	456	441	1.15	1.16	51.3	53.5	1970.9	695	129.0	12:34	1.21	1.35	0.06
00:51:47	1977.0	13.9	24.6	109	306	2443	457	439	1.15	1.16	51.3	53.3	1971.6	696	130.0	12:38	1.21	1.27	0.05
00:56:32	1978.0	13.1	21.7	109	264	2454	457	443	1.15	1.16	51.3	53.6	1972.4	695	131.0	12:43	1.21	1.24	0.06
01:01:54	1979.0	11.4	20.9	110	236	2456	458	450	1.15	1.16	51.3	53.8	1973.4	694	132.0	12:48	1.21	1.26	0.06
01:07:48	1980.0	10.1	22.1	110	234	2462	458	448	1.15	1.16	51.4	53.8	1974.4	695	133.0	12:54	1.21	1.30	0.05

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
01:14:42	1981.1	11.4	24.4	110	248	2469	458	451	1.15	1.16	51.4	53.9	1975.4	696	134.1	13:01	1.21	1.37	0.05
01:19:55	1982.0	12.7	25.2	110	284	2457	458	441	1.15	1.16	51.5	54.0	1975.5	695	135.0	13:06	1.21	1.33	0.04
01:25:18	1983.0	12.4	25.2	110	266	2467	459	436	1.15	1.16	51.5	54.1	1975.6	694	136.0	13:12	1.21	1.33	0.05
01:30:37	1984.0	11.4	24.8	110	220	2474	459	454	1.15	1.16	51.6	54.1	1976.7	694	137.0	13:17	1.21	1.31	0.07
01:35:03	1985.0	14.5	24.8	110	336	2459	459	444	1.15	1.16	51.6	54.0	1977.4	693	138.0	13:21	1.21	1.27	0.08
01:39:07	1986.0	12.7	24.3	110	188	2472	459	435	1.15	1.16	51.6	54.0	1978.2	694	139.0	13:25	1.21	1.25	0.09
01:44:26	1987.0	9.4	24.3	109	288	2461	459	445	1.15	1.16	51.6	54.2	1979.1	694	140.0	13:31	1.21	1.31	0.08
01:49:11	1988.0	13.2	24.2	109	328	2458	459	433	1.15	1.16	51.6	53.8	1979.9	694	141.0	13:35	1.21	1.29	0.11
01:53:52	1989.0	14.5	23.7	108	323	2474	459	430	1.15	1.16	51.6	54.2	1980.5	693	142.0	13:40	1.21	1.27	0.12
02:00:10	1990.0	9.7	23.6	109	317	2473	459	437	1.15	1.16	51.7	54.1	1981.6	693	143.0	13:46	1.21	1.34	0.08
02:06:28	1991.0	9.9	25.5	110	236	2465	459	426	1.15	1.16	51.7	54.2	1982.7	693	144.0	13:53	1.21	1.37	0.05
02:12:34	1992.0	8.2	27.0	109	314	2464	459	432	1.15	1.16	51.7	54.3	1983.9	692	145.0	13:59	1.21	1.39	0.05
02:18:00	1993.0	12.0	26.8	109	292	2461	459	448	1.15	1.16	51.7	54.2	1985.0	693	146.0	14:04	1.21	1.36	0.07
02:22:59	1994.0	13.7	26.3	109	307	2462	459	425	1.15	1.16	51.7	54.1	1986.1	692	147.0	14:09	1.21	1.32	0.05
02:27:51	1995.0	15.6	26.3	110	277	2474	459	442	1.15	1.16	51.7	54.2	1987.0	692	148.0	14:14	1.21	1.32	0.04
02:32:28	1996.0	14.8	25.8	109	315	2454	459	443	1.15	1.16	51.7	54.4	1987.9	693	149.0	14:19	1.21	1.30	0.08
02:36:20	1997.0	16.6	26.2	109	288	2467	459	455	1.15	1.16	51.8	54.3	1988.6	693	150.0	14:23	1.21	1.26	0.09
02:40:37	1998.0	13.3	25.5	109	288	2469	459	437	1.15	1.16	51.8	54.4	1989.5	693	151.0	14:27	1.21	1.28	0.06
02:45:14	1999.0	11.9	25.6	107	339	2441	459	457	1.15	1.16	51.9	54.4	1990.1	693	152.0	14:32	1.21	1.30	0.04
02:49:50	2000.0	13.1	24.8	109	258	2452	459	437	1.15	1.16	51.9	54.3	1991.1	693	153.0	14:36	1.21	1.28	0.04
02:53:50	2001.0	14.5	24.4	108	287	2455	459	452	1.15	1.16	51.9	54.5	1991.8	693	154.0	14:40	1.21	1.24	0.04
02:59:37	2002.0	8.9	21.9	108	279	2460	459	449	1.15	1.16	51.9	54.5	1992.4	691	155.0	14:46	1.21	1.29	0.04
03:04:41	2003.0	11.6	23.8	109	273	2472	459	451	1.15	1.16	51.9	54.4	1993.3	693	156.0	14:51	1.21	1.30	0.07
03:10:07	2004.0	14.7	25.2	109	267	2473	459	443	1.15	1.16	51.9	54.5	1994.3	692	157.0	14:56	1.21	1.33	0.09
03:38:16	2005.0	9.6	18.5	130	187	2539	457	429	1.15	1.16	51.9	54.4	1999.6	687	158.0	15:06	1.21	1.22	0.11
03:45:06	2006.0	9.8	20.9	137	220	2554	457	444	1.15	1.16	51.8	53.7	2001.4	688	159.0	15:12	1.21	1.38	0.09
03:50:47	2007.0	11.6	21.0	137	255	2552	457	449	1.15	1.16	51.8	54.2	2002.9	688	160.0	15:18	1.21	1.32	0.07
04:00:14	2008.0	9.1	20.6	137	231	2560	457	454	1.15	1.16	51.8	54.4	2004.4	688	161.0	15:28	1.21	1.34	0.06
04:08:24	2009.0	9.0	21.3	137	203	2561	457	450	1.15	1.16	51.8	54.3	2005.2	689	162.0	15:36	1.21	1.42	0.05
04:14:58	2010.0	10.1	21.6	137	225	2560	457	454	1.15	1.16	51.8	54.6	2005.8	688	163.0	15:42	1.19	1.39	0.16
04:28:41	2011.0	7.1	21.4	138	247	2529	457	460	1.15	1.16	51.9	54.5	2005.4	687	164.0	15:56	1.19	1.48	0.04
04:35:22	2012.0	10.4	21.5	141	196	2534	457	450	1.15	1.16	52.0	54.5	2006.4	686	165.0	16:03	1.19	1.40	0.06
04:40:54	2013.0	12.8	21.1	141	235	2525	457	487	1.15	1.16	52.0	54.5	2007.3	689	166.0	16:08	1.19	1.35	0.05
04:46:42	2014.0	12.3	21.7	141	223	2515	457	482	1.15	1.16	52.0	54.4	2008.1	688	167.0	16:14	1.19	1.36	0.04
04:51:58	2015.0	11.0	21.4	141	252	2523	457	469	1.15	1.16	52.0	54.5	2009.0	688	168.0	16:19	1.19	1.34	0.04
04:58:49	2016.0	6.9	22.1	141	253	2524	458	477	1.15	1.16	52.0	54.6	2010.0	687	169.0	16:26	1.19	1.41	0.04
05:04:42	2017.0	10.6	21.6	141	237	2532	457	480	1.15	1.16	52.0	54.8	2010.5	687	170.0	16:32	1.19	1.38	0.04
05:10:52	2018.0	9.1	21.5	141	247	2520	457	469	1.15	1.16	52.1	54.8	2011.2	688	171.0	16:38	1.19	1.39	0.03
05:20:05	2019.0	6.9	22.8	141	215	2513	457	479	1.15	1.16	52.1	54.8	2012.6	686	172.0	16:47	1.19	1.51	0.05
05:29:07	2020.0	4.6	22.8	141	192	2527	457	475	1.15	1.16	52.2	54.7	2014.1	685	173.0	16:56	1.19	1.51	0.07
05:46:21	2021.0	3.5	22.5	141	175	2525	457	465	1.15	1.16	52.2	54.5	2016.8	683	174.0	17:14	1.19	1.66	0.07
05:56:35	2022.0	9.7	21.2	141	218	2509	457	498	1.15	1.16	52.1	53.7	2018.3	684	175.0	17:24	1.19	1.51	0.03
06:03:43	2023.0	6.9	21.7	141	201	2509	457	488	1.15	1.16	52.1	54.6	2019.0	684	176.0	17:31	1.19	1.43	0.05
06:14:11	2024.0	10.1	21.6	141	250	2530	459	467	1.15	1.16	52.1	55.0	2020.1	683	177.0	17:42	1.19	1.41	0.08
06:20:21	2025.0	11.4	20.9	140	245	2500	459	481	1.15	1.16	52.2	55.0	2020.7	684	178.0	17:48	1.19	1.37	0.07

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
06:25:55	2026.0	11.6	20.5	140	244	2488	459	479	1.15	1.16	52.2	55.2	2021.2	683	179.0	17:53	1.19	1.34	0.07
06:32:51	2027.0	8.7	21.4	141	203	2505	459	463	1.15	1.16	52.3	55.2	2021.8	683	180.0	18:00	1.19	1.41	0.08
06:40:25	2028.0	7.9	21.3	141	225	2475	459	456	1.15	1.16	52.3	55.1	2022.5	682	181.0	18:08	1.19	1.42	0.11
06:47:50	2029.0	12.0	20.6	141	188	2446	458	425	1.15	1.16	52.4	55.1	2023.2	680	182.0	18:15	1.19	1.41	0.10
06:54:56	2030.0	7.4	21.2	141	211	2417	458	424	1.15	1.16	52.4	54.9	2023.9	678	183.0	18:22	1.19	1.42	0.13
07:27:20	2031.0	1.6	22.2	141	159	2373	457	414	1.15	1.16	52.4	55.0	2028.5	669	184.0	18:49	1.19	1.72	0.05

POOH NB#7 due to very slow penetration rate at 2031 m.
Run E-Logs.
1) DLL-MSFL-SAS-AMS-GR-CAL
2) FMS-CDT-CNT-GRMS
22nd March 1993
3) VSP
23rd March 1993
4) RFT (3 Runs)

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
NB#8 8.5" HTC ATJ-33 3x12 jets with MWD assembly.																			
10:31:54	2033.0	7.0	24.0	102	128	2540	462	443	1.16	1.15	40.6	44.8	2031.4	724	2.0	0:20	1.20	1.44	0.02
10:36:54	2034.0	12.0	28.0	102	157	2540	462	443	1.16	1.15	41.0	45.4	2031.4	724	3.0	0:26	1.20	1.36	0.02
10:41:54	2035.0	12.0	25.0	102	168	2540	462	443	1.16	1.15	41.2	45.5	2031.4	724	4.0	0:31	1.20	1.30	0.02
10:45:54	2036.0	17.5	24.4	102	138	2540	462	443	1.16	1.15	41.5	45.7	2031.4	724	5.0	0:35	1.20	1.20	0.02
10:50:54	2037.0	14.1	25.3	102	138	2540	462	443	1.16	1.15	41.6	45.9	2031.4	724	6.0	0:40	1.20	1.31	0.02
10:55:54	2038.0	11.0	25.3	102	148	2540	462	443	1.16	1.15	41.8	46.0	2031.4	724	7.0	0:45	1.20	1.31	0.02
10:59:52	2039.0	15.2	27.9	101	148	2540	462	458	1.16	1.15	42.1	46.2	2031.6	726	8.0	0:49	1.20	1.28	0.02
11:03:03	2040.0	18.7	28.3	101	161	2542	462	460	1.16	1.15	42.2	46.3	2031.9	725	9.0	0:52	1.20	1.21	0.03
11:06:11	2041.0	18.8	28.1	101	155	2540	463	459	1.16	1.15	42.4	46.4	2032.2	725	10.0	0:55	1.20	1.22	0.03
11:09:49	2042.0	18.2	28.5	101	175	2530	464	463	1.16	1.15	42.5	46.4	2032.6	723	11.0	0:59	1.20	1.27	0.03
11:13:25	2043.0	21.2	28.8	101	186	2532	463	454	1.16	1.15	42.7	46.5	2033.0	724	12.0	1:02	1.20	1.26	0.03
11:16:45	2044.0	18.4	28.3	101	200	2533	462	450	1.16	1.15	42.8	46.6	2033.9	725	13.0	1:06	1.20	1.22	0.04
11:20:06	2045.0	17.0	27.8	100	197	2532	462	463	1.16	1.15	42.8	46.6	2034.5	726	14.0	1:09	1.20	1.23	0.04
11:23:17	2046.0	17.2	28.7	101	228	2526	463	464	1.16	1.15	42.9	46.8	2035.0	724	15.0	1:12	1.20	1.24	0.04
11:27:38	2047.0	13.8	28.1	101	146	2537	462	493	1.16	1.15	43.0	46.8	2035.8	724	16.0	1:17	1.20	1.29	0.03
11:31:14	2048.0	16.9	28.3	101	149	2536	462	481	1.16	1.15	43.2	46.7	2036.6	722	17.0	1:20	1.20	1.29	0.02
11:34:09	2049.0	20.2	28.6	101	150	2540	462	452	1.16	1.15	43.2	46.8	2037.2	723	18.0	1:23	1.20	1.21	0.01
11:38:00	2050.0	16.9	28.4	101	149	2538	463	459	1.17	1.15	43.3	46.9	2037.8	722	19.0	1:27	1.20	1.27	0.01
11:41:52	2051.0	16.0	28.2	101	160	2529	463	459	1.16	1.15	43.5	47.0	2038.8	722	20.0	1:31	1.20	1.27	0.01
11:45:39	2052.0	16.6	28.2	101	157	2542	464	457	1.16	1.15	43.5	47.1	2039.8	722	21.0	1:35	1.20	1.27	0.01
11:49:28	2053.0	15.8	28.3	101	143	2534	463	454	1.16	1.15	43.7	47.3	2040.9	720	22.0	1:38	1.20	1.27	0.01
11:52:47	2054.0	19.2	27.4	101	162	2529	463	449	1.16	1.15	43.7	47.3	2041.8	719	23.0	1:42	1.21	1.22	0.01
11:56:08	2055.0	18.7	29.2	101	153	2534	463	453	1.16	1.15	43.9	47.4	2042.7	572	24.0	1:45	1.21	1.23	0.01
11:59:08	2056.0	18.6	27.9	101	156	2528	463	452	1.17	1.15	44.0	47.5	2043.6	574	25.0	1:48	1.21	1.20	0.01
12:02:56	2057.0	18.4	27.7	101	142	2522	463	455	1.17	1.15	44.1	47.6	2044.8	574	26.0	1:52	1.21	1.26	0.02
12:06:22	2058.0	19.3	28.5	101	140	2510	463	472	1.17	1.15	44.2	47.7	2045.7	574	27.0	1:55	1.21	1.23	0.03
12:12:43	2059.0	12.7	29.7	101	134	2483	464	464	1.17	1.15	44.4	47.8	2047.2	573	28.0	2:02	1.21	1.42	0.03
12:29:12	2060.0	21.1	27.6	101	152	2516	465	429	1.17	1.15	44.7	48.3	2050.4	579	29.0	2:05	1.21	1.21	0.03
12:34:39	2061.0	7.1	27.5	101	147	2523	464	414	1.17	1.15	44.9	47.8	2051.8	571	30.0	2:10	1.21	1.35	0.04
12:45:10	2062.0	5.3	25.3	102	127	2548	465	419	1.16	1.15	45.1	47.8	2055.3	564	31.0	2:21	1.21	1.49	0.01
12:55:00	2063.0	10.0	26.0	102	125	2541	463	424	1.15	1.15	45.4	48.3	2057.5	559	32.0	2:31	1.21	1.48	0.01
13:02:09	2064.0	13.6	27.3	102	138	2540	463	414	1.15	1.15	45.6	48.4	2058.8	559	33.0	2:38	1.21	1.42	0.02
13:09:02	2065.0	8.4	25.2	102	131	2533	462	418	1.15	1.15	45.7	48.6	2059.3	559	34.0	2:45	1.20	1.38	0.02
13:14:41	2066.0	10.5	24.4	102	141	2534	462	415	1.15	1.15	45.9	48.6	2059.8	557	35.0	2:50	1.20	1.32	0.03
13:19:21	2067.0	14.0	24.3	102	149	2535	461	411	1.15	1.15	46.0	48.7	2060.8	558	36.0	2:55	1.20	1.27	0.03
13:23:37	2068.0	10.9	25.2	102	150	2533	462	408	1.15	1.15	46.1	48.8	2061.2	558	37.0	2:59	1.20	1.26	0.03
13:27:38	2069.0	17.5	24.7	102	145	2512	462	406	1.15	1.15	46.2	48.8	2061.6	557	38.0	3:03	1.20	1.25	0.02
13:32:39	2070.0	13.1	24.9	102	151	2519	462	416	1.16	1.15	46.2	48.9	2062.0	556	39.0	3:08	1.20	1.29	0.02
13:38:14	2071.0	10.4	24.6	102	147	2529	462	416	1.16	1.15	46.3	49.0	2062.6	556	40.0	3:14	1.20	1.33	0.02
13:44:47	2072.0	9.7	24.0	102	165	2523	462	419	1.16	1.15	46.4	49.1	2063.3	555	41.0	3:20	1.20	1.35	0.02
13:53:17	2073.0	8.0	24.5	102	122	2513	462	426	1.16	1.15	46.5	49.2	2064.5	555	42.0	3:29	1.20	1.44	0.04
13:58:33	2074.0	12.9	24.1	102	129	2521	463	424	1.16	1.15	46.6	49.3	2065.4	554	43.0	3:34	1.20	1.29	0.03
14:03:36	2075.0	12.5	23.4	102	125	2508	463	420	1.16	1.15	46.7	49.4	2066.3	552	44.0	3:39	1.20	1.28	0.04
14:06:47	2076.0	18.4	25.0	102	139	2517	463	426	1.16	1.15	46.7	49.4	2066.9	553	45.0	3:42	1.20	1.17	0.05

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME h:mm:sec	DEPTH m	ROP m/hr	WOB klb	RPM	TRQ amp	SPP psi	FLOW IN gpm	FLOW OUT gpm	MUD DENSITY IN sg	MUD DENSITY OUT sg	MUD TEMP IN deg C	MUD TEMP OUT deg C	RETURNS DEPTH m	PVT bbl	-BIT- mts	-BIT- hh:mm	ECD sg	DXC	GAS %
14:10:49	2077.0	16.7	24.4	102	147	2522	463	439	1.16	1.15	46.8	49.5	2067.9	549	46.0	3:46	1.20	1.21	0.03
14:15:25	2078.0	14.4	22.3	102	113	2521	463	458	1.16	1.15	46.8	49.5	2069.2	547	47.0	3:51	1.20	1.24	0.01
14:21:21	2079.0	11.3	24.3	102	106	2528	463	440	1.16	1.15	46.9	49.6	2070.3	540	48.0	3:57	1.20	1.33	0.01
14:27:10	2080.0	13.7	23.6	102	109	2524	463	411	1.16	1.15	47.0	49.8	2071.1	535	49.0	4:03	1.20	1.31	0.04
14:31:58	2081.0	13.4	23.7	102	131	2523	462	412	1.16	1.15	47.0	49.9	2071.8	533	50.0	4:07	1.20	1.26	0.05
14:44:02	2082.0	3.1	22.7	102	119	2539	463	410	1.15	1.15	46.8	50.1	2073.3	679	51.0	4:20	1.20	1.48	0.08
14:54:32	2083.0	5.5	23.4	102	120	2541	463	418	1.15	1.15	46.9	50.0	2075.5	676	52.0	4:30	1.20	1.47	0.03
15:06:50	2084.0	4.9	23.3	102	116	2542	463	437	1.15	1.15	47.0	50.1	2078.2	675	53.0	4:42	1.20	1.49	0.03
15:38:59	2086.0	6.0	23.4	102	115	2541	463	455	1.15	1.15	47.1	50.1	2082.4	679	55.0	5:13	1.20	1.48	0.04
15:40:09	2087.0	7.6	26.4	97	112	2547	463	401	1.15	1.15	47.2	50.4	2082.5	679	56.0	5:14	1.20	1.48	0.04
15:45:09	2088.0	6.2	27.9	97	117	2542	463	402	1.15	1.15	47.2	50.4	2083.1	678	57.0	5:19	1.20	1.48	0.05
15:54:11	2089.0	7.3	29.1	98	127	2546	465	419	1.15	1.15	47.3	50.5	2084.3	680	58.0	5:28	1.20	1.50	0.05
16:26:08	2090.0	6.4	28.1	102	129	2540	463	409	1.15	1.15	47.3	50.2	2086.8	681	59.0	5:38	1.19	1.49	0.05
16:37:26	2091.0	6.7	29.7	101	152	2549	461	401	1.15	1.15	47.4	50.8	2087.6	678	60.0	5:46	1.19	1.49	0.05
16:45:59	2092.0	7.8	30.2	103	131	2551	462	398	1.15	1.15	47.5	50.8	2088.2	679	61.0	5:54	1.19	1.53	0.06
16:54:07	2093.0	8.7	30.0	103	133	2570	461	391	1.15	1.15	47.7	50.9	2088.8	681	62.0	6:02	1.19	1.52	0.05
17:03:31	2094.0	7.5	30.2	103	138	2577	462	396	1.15	1.15	47.8	51.0	2089.6	680	63.0	6:12	1.19	1.56	0.04
17:14:28	2095.0	4.8	28.7	102	128	2576	462	394	1.15	1.15	47.9	51.1	2090.3	680	64.0	6:23	1.19	1.58	0.04
17:23:45	2096.0	8.7	30.5	102	132	2567	462	393	1.15	1.15	48.0	51.1	2091.4	683	65.0	6:32	1.20	1.55	0.03
17:33:50	2097.0	7.1	28.4	102	131	2559	462	399	1.15	1.15	48.1	50.9	2092.7	684	66.0	6:42	1.20	1.53	0.03
17:43:17	2098.0	7.1	29.4	102	135	2564	462	402	1.16	1.15	48.2	51.1	2093.6	684	67.0	6:52	1.20	1.55	0.03
17:52:24	2099.0	7.7	30.2	102	135	2559	462	419	1.16	1.15	48.3	51.1	2094.5	686	68.0	7:01	1.20	1.55	0.04
FLC at 2099 m. (-ve)?																			
18:16:37	2100.1	7.9	29.9	100	130	2639	470	415	1.16	1.15	48.1	50.7	2096.0	695	69.1	7:10	1.20	1.52	0.04
18:27:53	2101.0	4.5	28.1	100	125	2577	463	402	1.16	1.15	48.0	50.8	2097.1	690	70.0	7:21	1.20	1.55	0.04
18:38:48	2102.0	6.2	27.8	100	128	2592	463	391	1.16	1.15	48.2	51.3	2098.2	691	71.0	7:32	1.20	1.54	0.04
18:48:59	2103.0	6.6	28.0	100	129	2591	463	396	1.16	1.15	48.4	51.3	2099.1	691	72.0	7:42	1.20	1.53	0.05
18:59:22	2104.0	6.1	28.5	100	131	2594	463	401	1.16	1.15	48.6	51.6	2099.6	691	73.0	7:53	1.20	1.54	0.04
19:09:55	2105.0	6.5	28.8	100	130	2574	463	393	1.16	1.15	48.7	51.3	2100.8	693	74.0	8:03	1.20	1.55	0.03
FLC at 2106 m. (-ve)																			
19:15:39	2106.0	12.7	26.6	100	144	2575	462	396	1.16	1.15	48.9	51.4	2101.1	692	75.0	8:09	1.20	1.35	0.03
19:33:34	2107.0	18.7	30.2	100	160	2540	458	351	1.16	1.15	48.7	51.1	2101.8	712	76.0	8:12	1.20	1.26	0.03

CBU at 2107 m. Wiper trip to casing shoe.
24th March 1993
RIH, CBU and POOH for E-Logs.
The following E-Logs were ran:
1) DLL-MSFL-AS-GR-SP-AMS
2) CST-GR
25th - 29th March 1993
Run 2 wiper trips before running 7" liner with shoe set at 2108 m.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
30th - 31st March 1993																			
RB#10 6" HTC J3 3x12 jets.																			
08:34:45	2108.0	2.8	8	43	110	1590	214	185	1.15	1.15	41.2	43.6	2095.5	387.0	1.0	0:00	1.15	1.40	0.01
09:47:38	2109.0	3.6	13	42	132	1615	216	195	1.15	1.15	41.5	43.8	2108.1	390.0	2.0	1:07	1.21	1.54	0.01
10:00:06	2110.0	4.3	13	41	138	1619	217	196	1.15	1.15	41.7	43.6	2108.2	387.7	3.0	1:19	1.21	1.18	0.01
10:14:55	2111.0	3.4	14	41	137	1620	217	202	1.15	1.15	41.7	43.7	2108.3	387.5	4.0	1:34	1.21	1.24	0.01
CBU at 2111 m. Pull bit into casing and perform L.O.T. with 1.15 sg mud.																			
EMW = 1.85 sg.																			
13:17:45	2112.0	2.0	9	44	107	1537	208	172	1.15	1.15	41.0	40.4	2111.0	329.0	5.0	2:07	1.21	1.30	0.03
13:57:13	2113.0	1.2	11	46	111	1733	233	173	1.15	1.15	40.7	44.4	2111.2	341.8	6.0	2:39	1.22	1.33	0.02
14:48:13	2114.0	2.1	11	46	106	1932	259	190	1.15	1.15	42.4	45.3	2112.3	320.5	7.0	3:10	1.22	1.32	0.01
15:09:21	2115.0	3.3	14	58	113	2050	269	502	1.15	1.14	42.4	42.9	2114.0	333.0	8.0	3:31	1.22	1.40	0.01
15:28:01	2116.0	3.2	15	61	114	2050	267	332	1.15	1.15	41.9	45.3	2114.0	340.0	9.0	3:50	1.22	1.40	0.01
15:43:19	2117.0	6.1	16	61	119	2043	267	334	1.15	1.15	42.4	45.7	2114.4	342.9	10.0	4:05	1.22	1.38	0.01
15:58:46	2118.0	8.1	16	62	132	2050	264	339	1.15	1.15	42.7	45.5	2114.7	355.8	11.0	4:12	1.22	1.19	0.01
16:08:47	2119.0	5.5	15	64	129	2050	259	329	1.15	1.15	42.9	44.7	2115.1	547.5	12.0	4:22	1.22	1.27	0.02
16:20:57	2120.0	4.0	15	63	118	2050	259	328	1.15	1.15	43.0	44.4	2115.5	348.3	13.0	4:34	1.22	1.32	0.02
16:30:36	2121.0	4.1	16	62	116	2050	259	288	1.15	1.15	43.1	45.0	2116.2	347.0	14.0	4:44	1.22	1.26	0.03
16:55:26	2122.0	2.3	17	62	114	2050	259	286	1.15	1.15	43.3	45.5	2118.8	352.3	15.0	5:09	1.22	1.53	0.04
17:38:28	2123.0	2.7	16	66	122	2110	263	512	1.15	1.14	43.1	43.5	2120.7	318.0	16.0	5:29	1.22	1.10	0.02
17:51:17	2124.0	4.9	15	61	116	2131	262	461	1.15	1.14	42.9	44.0	2121.6	314.2	17.0	5:41	1.22	1.01	0.01
18:03:31	2125.0	7.8	16	61	114	2100	261	376	1.15	1.14	42.6	44.1	2122.2	339.4	18.0	5:53	1.22	1.32	0.01
18:30:56	2126.0	9.1	17	59	133	2100	262	263	1.15	1.14	42.4	44.9	2123.0	359.4	19.0	6:01	1.20	0.96	0.01
18:45:10	2127.0	3.3	16	62	113	2151	264	249	1.15	1.14	42.5	44.7	2123.8	355.3	20.0	6:16	1.22	1.37	0.02
19:04:15	2128.0	1.6	17	62	112	2170	260	265	1.15	1.14	42.7	45.6	2124.8	357.3	21.0	6:35	1.22	1.46	0.02
19:34:57	2129.0	2.5	17	62	109	2177	261	275	1.15	1.14	43.3	46.1	2126.7	358.8	22.0	7:05	1.22	1.58	0.04
19:59:08	2130.0	2.4	17	62	108	2175	263	272	1.15	1.14	43.6	46.2	2128.0	357.9	23.0	7:30	1.22	1.53	0.08
20:37:31	2131.0	1.5	18	63	110	2434	272	314	1.15	1.14	43.9	46.4	2129.4	340.0	24.0	7:54	1.22	1.50	0.02
POOH RB#10 for bit change.																			

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT							
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	ppg		%
1st April 1993																			
NB#11 6" HYCALOG DS46HG6 3X11 jets.																			
06:07:13	2132.0	7.3	1	47	109	2484	264	303	1.15	1.15	33.4	40.6	2131.0	380.2	1.0	0:06	1.22	0.55	0.00
06:21:20	2133.0	7.7	3	57	172	2506	267	273	1.15	1.15	34.6	42.5	2131.0	494.5	2.0	0:20	1.22	0.91	0.00
06:28:23	2134.0	9.7	4	75	157	2523	268	309	1.15	1.15	35.8	43.5	2131.0	496.2	3.0	0:27	1.23	0.91	0.00
06:33:20	2135.0	15.0	4	79	169	2518	268	316	1.15	1.15	36.7	41.2	2131.0	498.9	4.0	0:32	1.23	0.82	0.00
06:36:27	2136.0	18.2	5	79	199	2518	269	268	1.15	1.15	37.1	40.9	2131.0	495.3	5.0	0:35	1.23	0.82	0.01
06:39:54	2137.0	20.2	6	79	192	2523	263	433	1.15	1.15	37.4	37.8	2131.0	507.6	6.0	0:39	1.22	0.84	0.01
06:44:51	2138.0	10.0	7	79	189	2529	261	275	1.15	1.15	37.5	40.7	2131.0	515.0	7.0	0:44	1.22	0.95	0.01
06:48:24	2139.0	17.5	5	79	193	2545	261	253	1.15	1.15	37.5	42.5	2131.0	515.9	8.0	0:47	1.22	0.83	0.01
07:21:38	2140.0	13.9	6	79	173	2562	265	261	1.15	1.15	37.9	42.1	2132.5	517.4	9.0	0:53	1.23	0.91	0.01
07:29:22	2141.0	9.8	5	82	164	2585	268	277	1.15	1.15	38.3	40.9	2133.5	513.8	10.0	1:00	1.23	0.99	0.03
07:34:51	2142.0	12.5	6	82	189	2621	269	265	1.15	1.15	38.5	41.1	2134.3	517.6	11.0	1:06	1.23	0.94	0.04
07:39:51	2143.0	12.9	7	88	167	2626	269	284	1.15	1.15	38.6	41.5	2135.0	516.0	12.0	1:11	1.23	0.98	0.06
07:44:17	2144.0	15.5	6	90	184	2615	269	290	1.15	1.15	38.7	41.8	2135.7	511.3	13.0	1:15	1.23	0.93	0.06
07:49:36	2145.0	8.6	8	90	169	2628	269	272	1.15	1.15	38.9	42.0	2136.4	511.2	14.0	1:21	1.23	1.01	0.07
07:53:14	2146.0	19.5	5	90	172	2657	269	255	1.15	1.15	39.1	42.2	2136.9	510.4	15.0	1:24	1.23	0.84	0.08
07:58:05	2147.0	13.2	8	90	174	2671	268	276	1.15	1.15	39.2	42.2	2137.6	512.0	16.0	1:29	1.23	1.02	0.08
08:02:46	2148.0	11.8	9	90	173	2685	269	285	1.15	1.15	39.4	42.5	2138.3	512.9	17.0	1:34	1.23	1.03	0.08
08:07:40	2149.0	15.0	10	90	172	2688	269	285	1.15	1.15	39.6	42.1	2139.0	512.9	18.0	1:39	1.23	1.05	0.06
08:10:48	2150.0	21.4	8	90	156	2686	268	283	1.15	1.15	39.7	42.5	2139.4	517.7	19.0	1:42	1.23	0.93	0.06
08:48:44	2152.0	13.6	8	94	165	2607	267	520	1.15	1.15	40.2	41.8	2144.1	511.1	21.0	1:54	1.23	1.10	0.11
08:55:00	2153.0	10.0	9	93	162	2610	267	561	1.15	1.15	40.2	41.9	2147.1	500.4	22.0	1:60	1.23	1.10	0.11
08:58:00	2154.0	19.7	8	92	185	2610	268	612	1.15	1.15	40.2	40.5	2148.7	496.2	23.0	2:03	1.23	0.93	0.08
09:03:20	2155.0	15.2	8	92	176	2610	268	610	1.15	1.15	40.1	40.9	2148.9	492.4	24.0	2:08	1.23	1.03	0.08
09:08:13	2156.0	15.5	8	92	166	2610	268	608	1.15	1.15	39.9	40.9	2148.9	500.7	25.0	2:13	1.23	1.00	0.08
09:14:03	2157.0	7.5	7	92	163	2610	267	527	1.15	1.15	39.8	40.9	2148.9	519.2	26.0	2:19	1.23	1.01	0.08
09:19:54	2158.0	10.3	7	92	165	2610	267	430	1.15	1.15	39.7	40.8	2150.3	522.2	27.0	2:25	1.23	1.02	0.14
09:24:58	2159.0	13.4	8	92	173	2610	268	283	1.15	1.15	39.6	41.2	2151.1	521.4	28.0	2:30	1.23	1.02	0.12
09:29:08	2160.0	15.2	8	92	180	2610	268	279	1.15	1.15	39.5	42.4	2151.1	522.4	29.0	2:34	1.23	1.00	0.12
09:33:36	2161.0	15.3	8	92	179	2610	268	276	1.15	1.15	39.6	43.1	2151.1	522.7	30.0	2:39	1.23	0.99	0.12
09:37:35	2162.0	15.4	9	92	185	2610	268	284	1.15	1.15	39.6	43.3	2151.1	523.9	31.0	2:43	1.23	0.98	0.12
09:44:06	2163.0	6.1	8	95	171	2610	268	274	1.15	1.15	39.8	43.4	2151.4	524.8	32.0	2:49	1.23	1.05	0.13
09:49:19	2164.1	12.4	6	99	180	2610	268	274	1.15	1.15	40.0	43.7	2152.3	525.2	33.1	2:54	1.23	0.98	0.15
09:53:33	2165.1	14.9	7	98	184	2610	268	272	1.15	1.15	40.2	43.8	2153.0	524.5	34.1	2:59	1.23	0.96	0.16
09:58:00	2166.0	14.8	6	98	171	2610	269	269	1.15	1.15	40.3	43.6	2154.1	525.1	35.0	3:03	1.23	0.95	0.13
10:03:50	2167.0	12.3	7	103	171	2610	268	267	1.15	1.15	40.5	43.8	2155.3	524.0	36.0	3:09	1.23	1.04	0.19
10:09:12	2168.0	10.8	7	108	164	2610	270	313	1.15	1.15	40.7	43.8	2158.2	514.1	37.0	3:14	1.23	1.02	0.14
10:14:53	2169.0	13.9	7	108	160	2610	271	351	1.15	1.15	40.9	43.2	2160.8	506.1	38.0	3:20	1.23	1.02	0.06
10:26:07	2170.0	13.2	5	93	167	2637	267	271	1.15	1.15	41.0	41.3	2162.9	527.2	39.0	3:25	1.23	0.90	0.06
10:30:15	2171.0	17.1	6	99	171	2655	266	263	1.15	1.15	41.0	41.1	2163.6	528.1	40.0	3:29	1.23	0.92	0.06
10:33:57	2172.0	16.5	7	108	178	2663	266	263	1.15	1.15	40.9	40.9	2164.5	530.7	41.0	3:33	1.23	0.94	0.06
10:39:57	2173.0	10.3	6	101	166	2670	267	267	1.15	1.15	40.8	41.9	2166.1	530.1	42.0	3:39	1.23	1.00	0.06
10:43:58	2174.0	15.2	7	97	191	2684	267	267	1.15	1.15	40.7	42.7	2166.8	528.3	43.0	3:43	1.23	0.94	0.06
10:48:56	2175.0	14.7	7	97	177	2686	268	257	1.15	1.15	40.6	43.1	2167.5	529.6	44.0	3:48	1.23	1.00	0.06

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT	DEPTH						
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
10:52:21	2176.0	17.7	7	97	187	2694	268	260	1.15	1.15	40.6	43.0	2167.5	529.7	45.0	3:51	1.23	0.91	0.06
10:56:28	2177.0	15.4	6	97	175	2688	267	272	1.15	1.15	40.7	43.1	2167.5	529.6	46.0	3:55	1.23	0.94	0.06
11:00:16	2178.0	21.5	6	97	174	2699	268	269	1.15	1.15	40.8	43.3	2167.5	529.5	47.0	3:59	1.23	0.91	0.06
11:02:50	2179.0	21.8	7	97	176	2702	268	264	1.15	1.15	40.8	43.4	2167.5	530.3	48.0	4:01	1.23	0.85	0.06
11:19:26	2180.1	21.7	8	96	197	2706	268	254	1.15	1.15	40.9	43.3	2168.2	527.9	49.1	4:04	1.23	0.89	0.06
11:21:47	2181.0	30.3	6	95	196	2746	270	250	1.15	1.15	41.1	43.3	2168.5	527.9	50.0	4:07	1.23	0.79	0.05
11:24:54	2182.0	15.7	6	96	189	2743	270	264	1.15	1.15	41.1	43.2	2169.1	529.8	51.0	4:10	1.23	0.85	0.05
11:33:31	2183.0	30.0	6	87	206	2749	263	274	1.15	1.15	41.3	43.7	2169.8	529.2	52.0	4:13	1.23	0.85	0.06
11:35:33	2184.0	26.6	8	98	194	1585	262	254	1.15	1.15	41.3	43.6	2170.2	529.8	53.0	4:15	1.23	0.84	0.06
11:38:53	2185.0	17.4	7	98	208	2708	264	263	1.15	1.15	41.3	43.2	2171.0	527.4	54.0	4:18	1.23	0.92	0.07
11:41:22	2186.0	21.2	9	98	218	2710	265	268	1.15	1.15	41.4	43.4	2171.7	527.8	55.0	4:21	1.23	0.91	0.06
11:44:02	2187.0	21.2	10	98	235	2710	267	269	1.15	1.15	41.4	43.6	2172.2	530.9	56.0	4:23	1.23	0.94	0.06
11:55:42	2188.0	22.5	9	96	207	2710	266	262	1.15	1.15	41.5	43.7	2174.1	526.7	57.0	4:27	1.23	0.97	0.06
11:59:12	2189.0	17.3	9	96	194	2710	268	270	1.15	1.15	41.5	43.7	2174.7	528.4	58.0	4:30	1.23	0.96	0.06
12:07:23	2190.0	23.0	10	94	205	2710	263	256	1.15	1.15	41.5	43.9	2176.7	530.9	59.0	4:34	1.23	0.95	0.06
12:11:01	2191.0	18.1	8	94	196	2670	263	251	1.15	1.15	41.6	44.2	2177.6	526.4	60.0	4:37	1.23	0.95	0.06
12:14:02	2192.0	22.0	9	94	209	2670	263	251	1.15	1.15	41.6	44.3	2178.3	524.7	61.0	4:40	1.23	0.95	0.06
12:17:00	2193.0	26.4	9	94	209	2673	263	247	1.15	1.15	41.6	44.3	2178.9	526.7	62.0	4:43	1.23	0.94	0.07
12:19:12	2194.0	26.8	8	94	195	2692	263	253	1.15	1.15	41.7	44.4	2179.3	527.0	63.0	4:45	1.23	0.87	0.07
12:34:23	2195.0	7.3	10	91	161	2673	261	249	1.15	1.15	41.8	44.2	2181.8	526.7	64.0	4:56	1.23	1.25	0.08
12:45:34	2196.0	4.9	10	97	167	2680	255	299	1.15	1.15	42.0	44.0	2187.4	510.2	65.0	5:08	1.23	1.24	0.04
12:56:13	2197.0	5.1	9	92	156	2680	262	318	1.15	1.15	42.0	42.5	2187.4	386.7	66.0	5:18	1.23	1.19	0.04
13:04:27	2198.0	8.7	10	84	171	2680	265	313	1.15	1.15	41.7	43.0	2189.9	392.5	67.0	5:26	1.23	1.14	0.03
13:10:09	2199.0	11.8	9	84	171	2680	263	247	1.15	1.15	41.6	42.9	2191.5	406.9	68.0	5:32	1.23	1.06	0.04
13:14:58	2200.0	12.4	10	84	183	2680	263	243	1.15	1.15	41.6	42.6	2193.3	403.9	69.0	5:37	1.23	1.03	0.06
13:24:56	2201.0	11.6	9	77	172	2687	263	244	1.15	1.15	41.5	43.9	2194.9	406.1	70.0	5:44	1.23	1.06	0.05
13:32:36	2202.0	7.6	10	75	164	2659	266	234	1.15	1.15	41.6	44.7	2195.6	403.5	71.0	5:51	1.23	1.10	0.05
13:40:16	2203.1	8.6	10	78	181	2664	266	233	1.15	1.15	41.7	45.0	2196.2	401.4	72.1	5:59	1.23	1.12	0.05
13:45:02	2204.0	13.1	10	81	178	2678	266	233	1.15	1.15	41.9	45.1	2196.5	399.0	73.0	6:04	1.23	1.03	0.04
13:51:04	2205.0	9.7	8	95	161	2679	265	243	1.15	1.15	42.0	45.3	2197.1	400.3	74.0	6:10	1.23	1.07	0.04
13:56:54	2206.0	10.8	9	80	164	2677	265	231	1.15	1.15	42.2	45.3	2198.0	400.5	75.0	6:15	1.23	1.05	0.04
14:28:53	2207.0	9.4	10	79	165	2684	266	228	1.15	1.15	42.6	45.3	2203.0	400.1	76.0	6:40	1.23	1.36	0.04
14:34:17	2208.0	11.1	11	79	186	2698	266	241	1.15	1.15	43.0	45.3	2203.9	398.8	77.0	6:46	1.23	1.07	0.04
15:23:43	2209.0	1.6	13	81	165	2706	264	251	1.15	1.15	42.9	45.0	2208.4	397.6	78.0	7:15	1.23	1.49	0.03

CBU at 2209 m. POOH NB#11 due to very slow ROP.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	m	hh:mm	sg		%
2nd April 1993																			
NB#12 6.0" HTC ATJ44C 3x11 jets.																			
05:15:34	2210.0	5.2	12.3	62	109	1601	242	257	1.15	1.15	35.3	41.3	2209.2	370	1.0	1:06	1.23	1.41	0.00
05:50:05	2211.0	3.8	22.3	69	126	1494	242	251	1.15	1.15	38.2	41.9	2209.7	371	2.0	1:40	1.23	1.79	0.01
06:32:36	2212.0	1.2	26.0	78	137	1500	243	267	1.15	1.15	39.3	41.7	2211.1	334	3.0	2:23	1.23	1.97	0.02
07:24:08	2213.0	1.8	22.1	85	122	1500	242	242	1.15	1.15	39.3	41.2	2212.2	346	4.0	3:15	1.23	1.94	0.02
07:59:29	2214.0	3.3	22.4	85	127	1520	242	238	1.15	1.15	39.8	42.5	2212.7	353	5.0	3:50	1.23	1.85	0.02
08:36:37	2215.0	1.3	23.1	85	125	1520	242	242	1.15	1.15	40.0	42.5	2213.6	367	6.0	4:27	1.23	1.87	0.02
09:28:15	2216.0	1.1	22.4	85	122	1520	242	244	1.15	1.15	40.2	42.6	2215.0	377	7.0	5:19	1.23	1.95	0.02
10:00:57	2217.0	6.2	22.5	85	127	1507	243	244	1.15	1.16	40.2	42.7	2215.6	387	8.0	5:51	1.23	1.83	0.02
10:40:14	2218.0	5.6	15.3	42	140	1505	244	241	1.15	1.16	40.2	42.7	2216.4	430	9.0	5:56	1.23	1.77	0.02
10:46:11	2219.0	8.4	17.7	86	141	1505	247	313	1.15	1.16	40.1	42.5	2216.8	392	10.0	6:02	1.23	1.27	0.02
10:48:24	2220.0	17.2	16.9	86	135	1505	246	328	1.15	1.15	40.2	42.7	2217.0	389	11.0	6:04	1.23	1.24	0.02
10:52:35	2221.0	16.3	19.3	86	146	1505	241	327	1.15	1.15	40.2	40.6	2217.6	391	12.0	6:08	1.23	1.20	0.02
10:57:48	2222.0	12.5	19.4	86	143	1505	240	333	1.15	1.15	40.2	40.2	2218.1	388	13.0	6:13	1.23	1.27	0.02
11:07:21	2223.0	4.4	18.4	86	143	1505	237	266	1.15	1.16	40.1	40.4	2218.7	408	14.0	6:23	1.23	1.40	0.02
11:18:51	2224.0	7.8	19.8	86	136	1470	236	243	1.15	1.16	39.7	40.7	2219.2	411	15.0	6:34	1.23	1.49	0.02
11:26:05	2225.0	11.4	18.4	86	141	1450	237	254	1.15	1.16	39.4	42.0	2219.6	415	16.0	6:42	1.23	1.33	0.03
11:32:21	2226.0	11.9	16.3	86	136	1450	237	251	1.15	1.16	39.4	42.2	2219.9	417	17.0	6:48	1.23	1.26	0.03
11:36:50	2227.0	14.2	17.9	86	136	1450	239	252	1.15	1.16	39.4	42.3	2220.1	415	18.0	6:52	1.23	1.21	0.03
11:42:26	2228.0	9.9	18.5	86	140	1450	239	252	1.15	1.16	39.5	42.3	2220.8	416	19.0	6:58	1.23	1.28	0.03
11:47:44	2229.0	11.8	17.9	86	139	1450	239	251	1.15	1.15	39.5	42.5	2221.7	418	20.0	7:03	1.23	1.24	0.03
11:54:36	2230.0	6.0	18.0	86	137	1450	239	252	1.15	1.16	39.6	42.6	2222.9	418	21.0	7:10	1.23	1.31	0.03
12:01:11	2231.0	14.4	18.0	86	139	1450	240	235	1.15	1.16	39.8	42.6	2223.4	413	22.0	7:17	1.23	1.26	0.03
12:07:23	2232.0	9.4	17.2	86	134	1450	243	233	1.15	1.16	39.9	42.4	2223.8	413	23.0	7:23	1.23	1.27	0.02
12:13:25	2233.0	10.9	17.2	86	132	1450	243	230	1.15	1.16	40.0	42.6	2224.4	412	24.0	7:29	1.23	1.26	0.02
12:28:05	2234.0	3.3	17.7	86	127	1457	243	235	1.15	1.16	40.1	42.7	2227.2	415	25.0	7:44	1.23	1.51	0.03
12:38:48	2235.0	10.7	17.4	86	125	1499	243	232	1.15	1.16	40.3	42.7	2229.1	394	26.0	7:54	1.23	1.42	0.05
12:42:58	2236.0	19.2	16.7	86	133	1500	243	227	1.15	1.16	40.4	42.6	2229.8	394	27.0	7:58	1.23	1.17	0.05
12:50:35	2237.0	17.2	16.9	86	134	1500	243	234	1.15	1.16	40.4	42.6	2230.7	402	28.0	8:06	1.23	1.32	0.04
13:00:26	2238.0	7.8	17.1	86	136	1500	245	287	1.15	1.16	40.5	42.7	2234.3	398	29.0	8:16	1.23	1.39	0.05
13:06:20	2239.0	8.8	17.0	86	146	1500	246	309	1.15	1.16	40.5	40.7	2236.6	394	30.0	8:22	1.23	1.25	0.04
13:13:21	2240.1	9.6	16.8	86	167	1500	246	312	1.15	1.16	40.5	40.9	2238.7	393	31.1	8:29	1.23	1.27	0.04
13:21:22	2241.0	4.6	16.6	86	140	1500	244	271	1.15	1.16	40.3	41.1	2239.7	416	32.0	8:37	1.23	1.33	0.03
13:36:02	2242.0	4.7	17.9	86	127	1500	242	232	1.15	1.16	40.1	41.2	2239.7	419	33.0	8:52	1.23	1.41	0.03
13:46:03	2243.0	7.4	17.9	86	128	1500	242	251	1.15	1.16	40.0	42.6	2239.7	417	34.0	9:02	1.23	1.41	0.03
13:53:28	2244.0	10.8	17.8	86	152	1500	242	233	1.15	1.16	40.1	42.8	2239.7	420	35.0	9:09	1.23	1.32	0.03
14:03:22	2245.0	2.8	18.7	86	142	1500	242	235	1.15	1.16	40.0	43.0	2240.9	425	36.0	9:19	1.23	1.43	0.05
14:07:48	2246.0	15.2	15.8	86	134	1500	242	233	1.15	1.16	40.0	42.9	2241.3	425	37.0	9:23	1.23	1.16	0.05
14:11:51	2247.0	12.8	17.5	86	145	1500	242	234	1.15	1.16	40.1	43.0	2241.7	428	38.0	9:27	1.23	1.17	0.05
14:20:15	2248.0	6.6	17.0	86	145	1500	242	237	1.15	1.16	40.2	42.8	2242.5	427	39.0	9:36	1.23	1.35	0.05
14:49:27	2249.0	8.3	16.2	85	132	1500	244	235	1.15	1.16	40.5	42.3	2245.3	423	40.0	9:50	1.23	1.46	0.05
14:56:44	2250.0	10.9	15.6	85	132	1500	243	226	1.15	1.16	40.6	42.3	2246.2	424	41.0	9:58	1.23	1.25	0.05
15:04:21	2251.1	10.0	16.6	85	131	1500	242	230	1.15	1.16	40.6	42.8	2247.3	421	42.1	10:05	1.23	1.31	0.06
15:11:27	2252.0	8.4	17.4	85	134	1500	242	230	1.15	1.17	40.7	43.0	2248.1	417	43.0	10:12	1.23	1.31	0.05

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	m	hh:mm	sg		%
15:19:26	2253.0	4.7	17.4	85	137	1500	242	228	1.15	1.17	40.7	43.1	2248.5	416	44.0	10:20	1.23	1.34	0.06
15:26:41	2254.0	11.3	16.8	85	138	1500	242	231	1.15	1.16	40.8	43.0	2248.7	415	45.0	10:28	1.23	1.29	0.06
15:32:58	2255.0	14.0	16.0	85	142	1500	242	233	1.15	1.16	40.9	42.9	2249.4	415	46.0	10:34	1.23	1.25	0.05
15:39:47	2256.0	11.2	16.6	85	140	1500	243	262	1.15	1.16	40.9	43.0	2250.6	398	47.0	10:41	1.23	1.27	0.04
15:47:52	2257.0	8.9	15.9	85	160	1500	244	289	1.15	1.16	41.0	42.4	2253.0	406	48.0	10:49	1.23	1.30	0.05
15:55:19	2258.0	9.7	15.5	85	171	1500	245	285	1.15	1.16	41.0	41.2	2255.2	410	49.0	10:56	1.23	1.28	0.04
16:01:04	2259.0	12.2	16.0	85	135	1500	244	280	1.15	1.16	40.8	41.3	2257.0	413	50.0	11:02	1.23	1.23	0.04
16:09:48	2260.0	5.2	17.6	85	134	1500	242	233	1.15	1.16	40.6	41.5	2258.0	431	51.0	11:11	1.23	1.36	0.04
16:19:00	2261.0	6.9	16.7	85	130	1500	242	235	1.15	1.16	40.5	41.6	2258.8	431	52.0	11:20	1.23	1.36	0.04
16:26:56	2262.0	8.2	17.3	85	134	1500	242	232	1.15	1.17	40.3	42.9	2258.8	432	53.0	11:28	1.23	1.33	0.04
16:36:03	2263.0	7.8	17.0	85	132	1500	242	235	1.15	1.17	40.3	43.1	2259.1	424	54.0	11:37	1.23	1.35	0.04
16:44:52	2264.0	7.4	17.4	85	135	1500	242	230	1.15	1.17	40.5	43.0	2260.1	419	55.0	11:46	1.23	1.36	0.05
16:51:52	2265.0	3.5	17.4	85	135	1500	242	230	1.15	1.17	40.5	43.0	2260.1	419	56.0	11:58	1.23	1.36	0.05
17:07:53	2266.0	8.4	17.3	85	127	1500	242	222	1.15	1.17	40.7	43.1	2261.5	418	57.0	12:07	1.23	1.44	0.06
17:14:25	2267.0	10.7	15.6	85	128	1500	242	231	1.15	1.17	40.8	43.1	2262.0	419	58.0	12:13	1.23	1.25	0.06
17:20:06	2268.0	9.4	16.4	85	132	1500	242	226	1.15	1.17	40.8	43.1	2262.3	419	59.0	12:19	1.23	1.23	0.05
17:27:05	2269.0	7.3	16.3	85	132	1500	242	230	1.15	1.17	40.8	43.1	2262.8	423	60.0	12:26	1.23	1.28	0.05
17:37:46	2270.0	9.1	17.4	85	132	1500	242	223	1.15	1.17	40.6	43.2	2263.5	425	61.0	12:37	1.23	1.41	0.05
17:42:34	2271.0	13.2	15.5	85	128	1500	242	221	1.15	1.17	40.5	43.2	2263.8	425	62.0	12:42	1.23	1.16	0.05
17:48:05	2272.0	10.8	16.4	85	130	1500	242	232	1.15	1.17	40.5	43.2	2264.2	425	63.0	12:47	1.23	1.23	0.05
17:54:58	2273.0	10.0	17.9	85	133	1500	242	227	1.15	1.17	40.6	43.2	2264.9	425	64.0	12:54	1.23	1.30	0.05
18:05:56	2274.0	6.0	18.1	85	128	1500	242	224	1.15	1.17	40.7	43.3	2265.6	426	65.0	13:05	1.23	1.43	0.05
18:32:48	2275.0	2.0	17.2	85	124	1500	244	267	1.15	1.16	40.9	42.7	2271.5	422	66.0	13:32	1.23	1.63	0.05
18:53:12	2276.0	5.3	17.6	85	123	1500	243	253	1.15	1.16	40.2	41.5	2272.5	443	67.0	13:52	1.23	1.58	0.05
19:28:27	2277.0	4.8	17.7	87	119	1500	242	242	1.15	1.16	40.3	42.7	2274.2	445	68.0	14:07	1.23	1.58	0.03
19:43:26	2278.0	4.9	21.0	86	131	1500	245	226	1.15	1.16	40.3	42.2	2274.9	436	69.0	14:22	1.23	1.59	0.04
20:04:25	2279.0	3.2	20.0	86	128	1500	244	228	1.15	1.16	40.4	42.4	2275.8	435	70.0	14:43	1.23	1.66	0.04
20:13:57	2280.0	10.7	18.8	86	128	1500	244	226	1.15	1.16	40.5	42.7	2276.2	434	71.0	14:52	1.23	1.39	0.04
20:21:13	2281.0	8.7	18.9	86	129	1500	244	228	1.15	1.16	40.6	42.9	2276.5	432	72.0	14:59	1.23	1.34	0.04
20:28:24	2282.0	8.7	18.8	86	132	1500	242	233	1.15	1.16	40.7	42.9	2276.9	433	73.0	15:07	1.23	1.34	0.04
20:35:51	2283.0	10.7	18.7	86	130	1500	242	230	1.15	1.15	40.8	42.9	2277.4	433	74.0	15:14	1.23	1.34	0.04
20:47:16	2284.0	10.7	18.7	86	126	1500	242	223	1.15	1.16	40.9	42.9	2278.1	432	75.0	15:22	1.23	1.34	0.05
20:56:23	2285.1	9.1	19.3	86	130	1484	244	270	1.15	1.16	41.0	43.1	2280.0	412	76.1	15:31	1.23	1.40	0.05
21:07:03	2286.0	9.1	20.2	86	131	1500	244	270	1.15	1.16	41.0	41.3	2282.2	406	77.0	15:42	1.23	1.47	0.04
21:14:23	2287.0	9.2	19.7	86	132	1500	244	270	1.15	1.16	40.8	41.3	2283.4	406	78.0	15:49	1.23	1.37	0.05
21:22:35	2288.0	11.1	20.3	86	132	1500	243	231	1.15	1.16	40.5	41.5	2284.8	419	79.0	15:57	1.23	1.41	0.05
21:31:42	2289.0	7.3	20.0	86	128	1500	242	223	1.15	1.16	40.4	41.1	2285.5	427	80.0	16:06	1.23	1.43	0.05
21:39:41	2290.0	8.8	21.4	86	131	1500	242	221	1.15	1.16	40.3	42.2	2286.8	428	81.0	16:14	1.23	1.41	0.05
21:48:16	2291.0	8.4	20.2	86	131	1500	242	226	1.15	1.16	40.2	43.0	2287.5	428	82.0	16:23	1.23	1.42	0.05
21:57:49	2292.0	4.5	20.3	86	129	1500	242	222	1.15	1.16	40.2	42.9	2287.5	429	83.0	16:32	1.23	1.45	0.05
22:07:38	2293.0	7.7	20.1	86	128	1500	242	222	1.15	1.16	40.4	43.1	2288.3	429	84.0	16:42	1.23	1.42	0.05
22:20:10	2294.0	4.4	20.5	86	128	1500	242	223	1.15	1.16	40.5	43.0	2289.8	429	85.0	16:55	1.23	1.52	0.05
22:36:07	2295.0	4.7	20.5	86	129	1500	242	219	1.15	1.16	40.7	43.1	2291.6	428	86.0	17:11	1.23	1.58	0.05

CBU at 2295 m. POOH for bit change.

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL . : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-	-BIT-	ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm	gpm	sg	sg	deg C	deg C	m	bbl	mts	hh:mm	sg		%
3rd April 1993																			
NB #13 Smith F3 6" 3x11																			
10:30:19	2296.0	3.8	8.0	62	128	1800	248	250	1.15	1.16	31.7	35.0	2295.0	455	1.0	0:10	1.22	1.50	0.02
10:45:14	2297.0	8.2	22.9	66	152	1800	249	258	1.15	1.15	32.0	38.5	2295.0	456	2.0	0:25	1.22	1.56	0.03
10:59:45	2298.0	3.9	22.8	71	148	1800	250	257	1.15	1.16	32.8	40.1	2295.0	456	3.0	0:40	1.22	1.57	0.03
11:13:46	2299.0	3.2	24.0	71	150	1800	250	276	1.15	1.15	34.0	40.4	2295.0	460	4.0	0:54	1.22	1.58	0.03
11:30:15	2300.0	3.1	24.3	71	142	1800	250	256	1.15	1.15	35.3	41.2	2296.1	454	5.0	1:10	1.22	1.63	0.03
11:44:54	2301.0	4.0	23.6	71	139	1800	251	246	1.15	1.16	36.7	41.5	2297.0	453	6.0	1:25	1.22	1.59	0.03
12:00:24	2302.0	4.3	25.2	71	143	1800	251	253	1.15	1.16	37.7	41.7	2298.1	452	7.0	1:40	1.22	1.64	0.04
12:14:08	2303.0	3.7	24.9	71	143	1800	251	258	1.15	1.16	38.4	41.8	2299.2	454	8.0	1:54	1.22	1.61	0.04
12:28:22	2304.0	3.9	25.1	71	146	1800	251	255	1.15	1.16	38.9	41.8	2299.9	453	9.0	2:08	1.22	1.61	0.04
13:09:09	2305.0	4.3	23.1	72	135	1800	251	241	1.15	1.17	39.6	41.9	2301.9	447	10.0	2:25	1.22	1.34	0.04
13:22:52	2306.0	5.9	24.3	72	141	1800	250	233	1.15	1.17	39.9	42.4	2302.6	445	11.0	2:39	1.22	1.60	0.04
13:43:10	2307.0	3.2	24.0	72	136	1800	250	239	1.15	1.17	40.0	43.0	2303.7	432	12.0	2:59	1.22	1.69	0.04
13:57:27	2308.0	5.1	23.5	72	135	1800	253	290	1.15	1.16	40.4	41.4	2305.5	418	13.0	3:13	1.22	1.59	0.04
14:10:24	2309.0	4.8	23.6	72	136	1800	252	287	1.15	1.16	40.4	41.2	2307.3	418	14.0	3:26	1.22	1.56	0.04
14:23:52	2310.0	5.2	23.9	72	137	1800	250	235	1.15	1.16	40.1	41.3	2307.6	443	15.0	3:40	1.22	1.58	0.04
14:35:12	2311.0	5.0	25.1	71	143	1800	250	225	1.15	1.17	39.7	42.8	2307.6	446	16.0	3:51	1.22	1.56	0.04
14:45:25	2312.0	6.1	24.3	71	141	1800	250	227	1.15	1.17	39.9	43.6	2307.6	446	17.0	4:01	1.22	1.51	0.04
14:55:48	2313.0	7.2	24.5	71	141	1800	250	230	1.15	1.17	40.3	43.8	2307.8	445	18.0	4:11	1.22	1.52	0.04
15:05:48	2314.0	6.6	24.1	71	140	1800	250	227	1.15	1.17	40.7	43.7	2308.5	446	19.0	4:21	1.22	1.49	0.04
15:17:20	2315.0	5.4	24.2	71	140	1800	250	230	1.15	1.17	41.1	43.8	2309.3	445	20.0	4:33	1.22	1.54	0.04
15:29:11	2316.0	5.5	23.9	71	136	1800	250	224	1.15	1.17	41.4	43.9	2310.3	446	21.0	4:45	1.22	1.55	0.04
15:41:05	2317.0	5.7	25.3	71	143	1800	250	220	1.15	1.17	41.6	44.0	2311.4	447	22.0	4:57	1.22	1.56	0.04
15:47:35	2318.0	9.0	22.7	71	143	1800	250	220	1.15	1.17	41.8	44.0	2312.1	449	23.0	5:03	1.22	1.35	0.04
16:00:15	2319.0	2.6	24.0	71	141	1800	250	225	1.15	1.17	42.0	43.9	2313.3	446	24.0	5:16	1.22	1.56	0.04
16:25:26	2320.0	2.7	24.4	71	134	1800	250	227	1.15	1.17	42.3	44.1	2315.6	439	25.0	5:41	1.22	1.76	0.04
16:44:00	2321.0	4.8	24.2	71	136	1800	250	224	1.15	1.17	42.4	44.3	2317.1	437	26.0	5:60	1.22	1.67	0.06
17:01:10	2322.0	3.2	23.9	71	136	1800	250	228	1.15	1.17	42.5	44.5	2318.3	437	27.0	6:17	1.22	1.65	0.08
17:19:55	2323.0	5.7	23.6	71	131	1800	250	227	1.15	1.17	42.7	44.6	2319.6	437	28.0	6:36	1.22	1.66	0.04
17:31:07	2324.0	6.1	23.9	71	137	1800	250	223	1.15	1.17	42.8	44.8	2320.1	436	29.0	6:47	1.22	1.52	0.04
17:44:24	2325.0	6.8	24.3	71	137	1800	250	223	1.15	1.17	43.0	44.8	2320.7	437	30.0	7:00	1.22	1.58	0.04
17:51:33	2326.0	9.1	23.4	71	141	1800	250	224	1.15	1.17	43.0	44.8	2321.2	435	31.0	7:07	1.22	1.39	0.04
18:01:28	2327.0	5.5	24.3	71	141	1800	250	230	1.15	1.17	43.1	44.9	2321.8	431	32.0	7:17	1.22	1.50	0.04
18:13:15	2328.0	3.7	24.0	71	135	1800	250	228	1.15	1.17	43.1	45.1	2322.6	432	33.0	7:29	1.22	1.54	0.04
18:26:10	2329.0	5.2	24.6	71	136	1800	250	229	1.15	1.17	43.2	45.2	2323.5	429	34.0	7:42	1.22	1.58	0.05
18:41:06	2330.0	7.8	24.5	71	136	1800	250	228	1.15	1.17	43.4	45.3	2324.5	429	35.0	7:57	1.22	1.61	0.05
18:49:45	2331.0	10.5	24.1	71	139	1800	250	230	1.15	1.17	43.5	45.4	2325.2	428	36.0	8:05	1.22	1.45	0.06
18:57:57	2332.0	9.8	24.3	71	140	1800	250	227	1.15	1.17	43.6	45.3	2326.3	428	37.0	8:14	1.22	1.44	0.06
19:05:53	2333.0	7.6	23.6	71	140	1800	250	227	1.15	1.17	43.6	45.5	2327.0	427	38.0	8:22	1.22	1.42	0.06
19:47:40	2334.0	11.8	23.3	71	149	1800	250	230	1.15	1.17	43.8	45.7	2329.9	431	39.0	8:30	1.22	1.43	0.05
19:52:32	2335.0	12.2	24.1	70	163	1800	250	232	1.15	1.17	44.1	45.6	2330.4	426	40.0	8:35	1.22	1.30	0.05
19:58:26	2336.0	15.6	24.6	70	164	1800	250	230	1.15	1.17	44.1	45.5	2330.9	422	41.0	8:41	1.22	1.36	0.06
20:17:23	2337.0	15.5	24.5	70	159	1800	250	228	1.15	1.17	44.1	45.5	2331.3	435	42.0	8:44	1.22	1.36	0.06
20:19:02	2338.0	16.5	23.0	71	157	1800	245	238	1.15	1.17	44.2	44.7	2331.7	432	43.0	8:45	1.22	1.18	0.06

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW IN	FLOW OUT	MUD DENSITY IN	MUD DENSITY OUT	MUD TEMP IN	MUD TEMP OUT	RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
20:22:50	2339.0	17.2	23.7	71	159	1800	247	227	1.15	1.17	44.1	44.4	2332.1	425	44.0	8:49	1.22	1.22	0.06
20:27:38	2340.0	13.5	25.6	71	166	1800	247	227	1.15	1.17	44.0	44.4	2332.7	422	45.0	8:54	1.22	1.32	0.06
20:32:39	2341.0	12.0	23.1	71	153	1800	247	227	1.15	1.17	43.9	44.4	2333.4	420	46.0	8:59	1.22	1.28	0.06
20:36:21	2342.0	14.3	24.5	71	159	1800	247	227	1.15	1.17	43.8	44.8	2333.5	419	47.0	9:03	1.22	1.23	0.06
20:41:19	2343.0	12.0	23.7	71	156	1800	247	226	1.15	1.17	43.8	45.3	2333.5	419	48.0	9:08	1.22	1.30	0.06
20:48:26	2344.0	10.9	25.2	71	156	1800	247	225	1.15	1.17	43.5	45.8	2333.5	417	49.0	9:15	1.22	1.43	0.06
20:53:46	2345.0	11.4	25.9	71	162	1800	247	229	1.15	1.17	43.4	46.1	2333.5	419	50.0	9:20	1.22	1.35	0.06
21:01:42	2346.0	9.4	25.2	71	153	1800	247	224	1.15	1.17	43.3	46.2	2333.5	420	51.0	9:28	1.22	1.45	0.06
21:11:23	2347.0	4.7	24.4	71	152	1800	248	233	1.15	1.17	43.4	46.0	2336.9	414	52.0	9:38	1.22	1.49	0.28
21:21:20	2348.0	5.4	25.1	71	150	1800	251	232	1.15	1.17	43.6	46.4	2340.7	411	53.0	9:48	1.22	1.52	0.31
21:30:32	2349.0	7.3	26.6	71	152	1800	251	230	1.15	1.17	43.8	46.5	2344.0	410	54.0	9:57	1.22	1.51	0.16
21:41:52	2350.0	4.9	25.3	71	147	1800	251	225	1.15	1.17	44.0	46.5	2346.7	409	55.0	10:08	1.22	1.55	0.11
21:51:33	2351.0	4.5	24.1	71	145	1800	251	229	1.15	1.17	44.2	46.5	2348.3	413	56.0	10:18	1.22	1.48	0.09
22:01:12	2352.0	6.1	24.8	71	149	1800	251	226	1.15	1.17	44.4	46.3	2349.9	411	57.0	10:28	1.22	1.50	0.08
22:09:01	2353.0	6.6	24.9	71	147	1800	251	230	1.15	1.17	44.5	46.2	2349.9	408	58.0	10:35	1.22	1.44	0.08
22:18:08	2354.0	7.9	24.0	71	144	1800	251	222	1.15	1.17	44.7	46.5	2349.9	404	59.0	10:44	1.22	1.46	0.08
22:36:06	2355.0	6.8	25.3	71	140	1800	251	225	1.15	1.17	45.0	46.8	2350.1	404	60.0	10:52	1.22	1.39	0.06
22:38:58	2356.0	11.4	20.9	71	141	1800	251	221	1.15	1.17	45.0	46.8	2350.3	405	61.0	10:55	1.22	1.31	0.06
22:47:07	2357.0	6.0	23.1	71	143	1800	251	223	1.15	1.17	45.1	46.9	2351.1	403	62.0	11:03	1.22	1.41	0.06
22:57:19	2358.0	4.3	24.7	71	150	1800	251	231	1.15	1.17	45.2	47.0	2352.1	403	63.0	11:13	1.22	1.51	0.06
23:10:49	2359.0	4.7	25.7	71	147	1800	251	226	1.15	1.17	45.4	47.1	2353.4	401	64.0	11:27	1.22	1.61	0.06
23:23:49	2360.0	6.0	24.1	71	139	1800	251	225	1.15	1.17	45.5	47.0	2355.0	399	65.0	11:40	1.22	1.59	0.07
23:36:21	2361.0	3.4	25.2	71	141	1800	251	230	1.15	1.17	45.6	47.1	2357.6	397	66.0	11:52	1.22	1.58	0.08
4th April 1993																			
00:07:43	2362.1	4.0	22.7	63	129	1752	247	213	1.15	1.17	45.8	47.2	2359.8	382	67.1	12:06	1.22	1.52	0.08
00:22:55	2363.0	4.3	25.6	66	142	1751	247	221	1.15	1.17	45.8	46.9	2360.3	386	68.0	12:17	1.23	1.52	0.06
00:35:20	2364.0	5.8	25.8	71	142	1848	255	227	1.15	1.16	45.7	46.6	2360.9	382	69.0	12:29	1.23	1.59	0.06
00:48:07	2365.0	6.7	26.0	71	140	1844	255	225	1.15	1.17	45.6	46.9	2361.5	383	70.0	12:42	1.23	1.60	0.06
01:01:48	2366.0	3.6	24.7	71	139	1846	255	228	1.15	1.17	45.5	47.5	2362.1	382	71.0	12:56	1.23	1.60	0.06
01:13:50	2367.0	5.1	25.1	71	141	1843	255	231	1.15	1.16	45.5	47.7	2362.6	384	72.0	13:08	1.23	1.57	0.05
01:24:07	2368.0	5.3	24.1	71	139	1847	255	235	1.15	1.16	45.6	47.6	2363.2	383	73.0	13:18	1.23	1.50	0.05
01:30:25	2369.0	10.2	24.4	71	142	1849	255	244	1.15	1.16	45.7	47.5	2363.7	383	74.0	13:24	1.23	1.38	0.05
01:40:25	2370.0	5.8	24.3	71	141	1850	256	240	1.15	1.16	45.7	47.8	2364.5	382	75.0	13:34	1.23	1.50	0.05
01:50:23	2371.0	8.7	25.6	71	143	1851	256	238	1.15	1.16	45.8	47.9	2365.3	384	76.0	13:44	1.23	1.53	0.06
01:58:49	2372.0	7.8	26.7	71	154	1852	256	243	1.15	1.16	45.9	47.8	2365.9	382	77.0	13:53	1.23	1.50	0.06
02:04:12	2373.0	12.3	24.8	71	129	1847	256	239	1.15	1.16	45.9	47.8	2366.5	380	78.0	13:58	1.23	1.32	0.06
02:08:38	2374.0	12.5	26.2	71	141	1849	256	246	1.15	1.16	46.0	47.8	2366.9	378	79.0	14:02	1.23	1.31	0.06
02:17:11	2375.0	6.6	25.4	71	132	1849	256	252	1.15	1.16	45.9	47.9	2367.6	378	80.0	14:11	1.23	1.47	0.06
02:27:49	2376.0	6.5	23.6	71	124	1847	256	260	1.15	1.16	45.5	47.9	2368.7	376	81.0	14:22	1.23	1.51	0.06
02:37:17	2377.0	5.3	24.7	71	130	1846	256	257	1.15	1.16	45.6	47.9	2369.8	379	82.0	14:31	1.23	1.49	0.07
02:46:40	2378.0	7.5	23.4	71	124	1845	256	255	1.15	1.16	45.8	48.0	2370.6	378	83.0	14:40	1.23	1.46	0.06
02:56:19	2379.0	7.9	22.8	71	122	1841	255	261	1.15	1.16	45.9	47.9	2371.7	377	84.0	14:50	1.23	1.45	0.10
03:05:46	2380.0	8.1	23.6	71	127	1840	256	260	1.15	1.16	46.0	47.9	2373.6	376	85.0	14:60	1.23	1.48	0.23
03:15:49	2381.0	7.0	26.8	71	136	1841	256	263	1.15	1.16	46.0	47.9	2374.9	391	86.0	15:10	1.23	1.55	0.13
03:24:25	2382.0	8.0	27.0	71	136	1840	256	261	1.15	1.16	46.0	47.9	2375.7	394	87.0	15:18	1.23	1.51	0.09

DrillByte Drilling Data Printout
COMPANY : BHP PETROLEUM
WELL : MINERVA 1

TIME	DEPTH	ROP	WOB	RPM	TRQ	SPP	FLOW		MUD DENSITY		MUD TEMP		RETURNS DEPTH	PVT	-BIT-		ECD	DXC	GAS
							IN	OUT	IN	OUT	IN	OUT							
h:mm:sec	m	m/hr	klb		amp	psi	gpm		sg		deg C		m	bbl	mts	hh:mm	sg		%
03:37:03	2383.0	4.9	25.2	71	126	1838	256	259	1.15	1.16	46.1	48.0	2377.0	394	88.0	15:31	1.23	1.58	0.06
03:46:36	2384.0	6.3	22.5	71	113	1785	252	259	1.15	1.16	46.1	48.0	2378.0	394	89.0	15:40	1.22	1.45	0.06
03:55:46	2385.0	6.3	23.3	71	112	1764	249	262	1.15	1.16	46.1	48.0	2379.2	399	90.0	15:50	1.22	1.45	0.06
04:05:12	2386.0	7.0	24.1	71	120	1767	250	270	1.15	1.16	46.1	48.0	2380.2	400	91.0	15:59	1.22	1.48	0.06
04:13:26	2387.0	7.8	23.8	71	126	1769	250	260	1.15	1.16	46.1	47.9	2380.6	400	92.0	16:07	1.22	1.43	0.06
04:26:00	2388.0	6.7	23.9	71	122	1768	250	260	1.15	1.16	46.1	48.0	2382.0	398	93.0	16:20	1.22	1.55	0.06
04:37:40	2389.0	4.7	23.4	71	119	1770	250	265	1.15	1.16	46.1	48.1	2382.9	394	94.0	16:31	1.22	1.52	0.06
04:49:38	2390.0	2.2	24.2	71	119	1775	250	272	1.15	1.16	46.1	48.1	2384.2	393	95.0	16:43	1.22	1.54	0.06
05:02:32	2391.0	4.6	24.1	71	120	1776	249	267	1.15	1.17	46.1	48.2	2385.5	393	96.0	16:56	1.22	1.56	0.06
05:12:53	2392.0	5.4	25.3	71	125	1774	249	268	1.15	1.17	46.2	48.2	2386.7	393	97.0	17:07	1.22	1.53	0.06
05:44:30	2393.0	6.4	25.7	70	136	1861	257	270	1.15	1.17	46.3	47.9	2388.5	392	98.0	17:17	1.23	1.50	0.06
05:51:53	2394.0	9.5	26.0	71	140	1831	253	270	1.15	1.17	46.2	47.3	2389.1	391	99.0	17:25	1.23	1.45	0.06
06:00:42	2395.0	6.3	26.7	71	139	1842	253	270	1.15	1.17	46.1	47.7	2389.7	391	100.0	17:34	1.23	1.51	0.06
08:12:49	2396.0	5.7	27.0	71	131	1850	253	256	1.15	1.17	45.8	48.2	2390.7	391	101.0	17:44	1.23	1.59	0.07
08:12:49	2397.0	4.9	25.0	70	125	1830	253	248	1.15	1.17	45.9	48.2	2391.9	392	102.0	17:58	1.23	1.59	0.06
08:12:50	2398.0	4.4	22.0	71	116	1830	253	253	1.15	1.17	45.1	47.7	2393.4	398	103.0	18:14	1.23	1.61	0.07
08:12:51	2399.0	4.6	26.0	71	149	1830	253	248	1.15	1.17	44.7	47.4	2394.3	406	104.0	18:24	1.23	1.53	0.06
08:12:52	2400.0	7.1	25.0	71	128	1830	254	244	1.15	1.17	44.7	48.2	2395.2	412	105.0	18:35	1.23	1.50	0.05
08:12:53	2401.0	6.1	25.0	71	128	1830	253	250	1.15	1.17	44.6	48.2	2396.2	419	106.0	18:46	1.23	1.53	0.05
08:12:53	2402.0	6.5	22.0	71	125	1840	253	248	1.15	1.17	44.6	48.2	2397.0	426	107.0	18:57	1.23	1.49	0.05
08:12:54	2403.0	4.4	24.0	71	128	1850	253	244	1.15	1.17	44.6	48.0	2397.7	446	108.0	19:07	1.23	1.48	0.05
08:07:59	2404.0	4.7	22.7	71	122	1828	250	258	1.15	1.17	44.2	47.9	2399.9	447	109.8	19:34	1.22	1.55	0.06
08:11:12	2405.0	3.7	22.4	71	121	1822	249	256	1.15	1.17	44.2	47.9	2400.2	447	110.0	19:37	1.22	1.57	0.06
08:11:12	2406.0	3.7	22.4	71	121	1822	249	256	1.15	1.17	44.2	47.9	2400.2	447	110.0	19:37	1.22	1.57	0.06
08:32:52	2407.0	4.0	23.0	71	126	1821	249	254	1.15	1.18	44.9	46.7	2402.1	445	112.0	19:59	1.22	1.51	0.05
08:41:16	2408.0	8.0	22.9	71	124	1820	249	249	1.15	1.18	45.1	45.6	2402.9	446	113.0	20:07	1.22	1.42	0.05
08:53:53	2409.0	4.4	23.6	71	125	1818	249	257	1.15	1.18	45.1	45.2	2403.7	447	114.0	20:20	1.22	1.55	0.05
09:02:33	2410.0	6.1	24.1	71	132	1818	250	250	1.15	1.18	45.2	45.8	2404.3	446	115.0	20:29	1.22	1.45	0.05
09:10:08	2411.0	6.7	23.5	71	130	1816	250	249	1.15	1.18	45.2	46.9	2404.8	445	116.0	20:36	1.22	1.41	0.05
09:16:50	2412.0	10.6	23.6	71	133	1814	250	251	1.15	1.18	45.3	47.6	2405.4	445	117.0	20:43	1.22	1.38	0.05
09:27:42	2413.0	5.7	24.1	71	129	1813	249	250	1.15	1.18	45.4	47.8	2406.4	445	118.0	20:54	1.22	1.52	0.07
09:39:36	2414.0	4.5	24.5	71	135	1815	250	262	1.15	1.18	45.5	47.8	2407.6	447	119.0	21:06	1.22	1.56	0.12
09:51:20	2415.0	4.1	25.3	71	140	1819	250	265	1.15	1.18	45.5	47.7	2408.7	449	120.0	21:17	1.22	1.57	0.12
10:03:14	2416.0	5.1	24.3	71	136	1821	250	266	1.15	1.18	45.6	47.7	2410.1	445	121.0	21:29	1.22	1.55	0.15
10:18:31	2417.0	3.4	25.4	71	133	1822	250	254	1.15	1.18	45.7	47.7	2411.9	439	122.0	21:44	1.22	1.64	0.30
10:30:41	2418.0	5.9	25.9	71	137	1823	250	251	1.15	1.18	45.8	48.2	2413.4	440	123.0	21:57	1.22	1.59	0.16
10:44:28	2419.0	4.6	26.7	71	134	1828	250	253	1.15	1.18	46.0	48.3	2415.5	439	124.0	22:10	1.22	1.64	0.08
10:59:02	2420.0	5.0	25.5	71	129	1826	250	255	1.15	1.18	46.1	48.4	2417.6	439	125.0	22:25	1.22	1.63	0.06
11:30:06	2421.0	2.0	25.7	71	129	1826	250	257	1.15	1.18	46.2	48.4	2419.6	455	126.0	22:35	1.23	1.58	0.06
11:40:37	2422.0	6.1	21.5	71	128	1757	245	251	1.15	1.18	46.2	47.7	2420.1	438	127.0	22:46	1.22	1.06	0.05
11:51:48	2423.0	5.6	21.2	72	128	1757	244	250	1.15	1.18	46.1	47.3	2420.5	436	128.0	22:57	1.22	1.47	0.05
12:02:58	2424.0	5.6	23.6	72	131	1758	244	257	1.15	1.18	46.0	47.9	2420.9	434	129.0	23:08	1.22	1.53	0.05
12:15:02	2425.0	4.5	23.5	72	129	1763	244	257	1.15	1.18	46.1	48.2	2422.5	433	130.0	23:20	1.22	1.53	0.05

TD Minerva POOH. Run E-Logs

APPENDIX VII: Bit Hydraulics Printouts

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Tue Mar 9 20:19:37 1993

INPUT DATA

Hydraulics Model	BINGHAM	Casing Shoe Depth	105.0 m	Jet 1	16 in/32
Depth	560.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	16 in/32
Vertical Depth	560.0 m	Mud Density	1.03 sg	Jet 3	16 in/32
Flow Rate	760 gpm	300 rpm viscometer	2	Total Fluid Area	0.5890 in^2
Average ROP	60.0 m/hr	600 rpm viscometer	3		
Cuttings Density	2.60 spc gr	Plastic Viscosity	1.00 cP		
tings Diameter	0.200 in	Yield Point	1.00 #/100ft^2		
ings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.58496		

CALCULATED RESULTS

Section		Hole	Pipe		Volumes & Capacities			Mud Velocity			Flow
Top	Length	Size	OD	ID	Hole	Pipe	Annulus	Pipe	Annulus	Critical	Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	80.5	20.000	5.000	4.276	103	5	96	310.5	15.2	25.3	LAMINAR
82.0	23.0	36.000	5.000	4.276	95	1	93	310.5	4.5	25.2	LAMINAR
105.0	290.5	9.875	5.000	4.276	90	17	67	310.5	78.9	25.8	TURBULENT
395.5	107.2	9.875	5.000	3.000	33	3	24	630.9	79.9	25.8	TURBULENT
502.7	57.3	9.875	8.000	2.875	18	2	6	686.9	169.4	27.0	TURBULENT

Hydrostatic Pressure	818 psi		
Annular Volume	286 bbl	2235 strokes	16 mins
Pipe Capacity	28 bbl	215 strokes	2 mins
Circulating Volume	314 bbl	2450 strokes	17 mins
Pipe Displacement	25 bbl		
Total Hole Volume	339 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	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB
Jet Velocity	m/sec :	109.6	112.9	116.2	119.5	122.9	126.2	129.5	132.8	136.1	139.5	142.8
Impact Force	lbf :	1056.4	1121.4	1188.4	1257.2	1328.1	1400.8	1475.5	1552.2	1630.7	1711.3	1793.7
Hydraulic Power	hhp :	382.2	418.1	456.0	496.3	538.8	583.7	631.0	680.7	733.1	788.0	845.7
Bit Loss	psi :	993	1054	1117	1182	1249	1317	1387	1459	1533	1609	1687
% Bit Loss	:	72.0	72.6	73.2	73.7	74.2	74.6	75.0	75.4	75.8	76.1	76.4
Pipe Loss	psi :	262	275	289	302	316	331	345	360	375	390	405
Annular Loss	psi :	19	20	21	22	23	24	25	26	27	28	30
Cuttings Loss	psi :	89	85	82	79	76	73	71	68	66	64	62
Surface Loss	psi :	15	16	17	18	19	20	21	22	23	24	25
Total Loss	psi :	1379	1451	1526	1604	1683	1765	1849	1935	2024	2115	2208
Circ Pressure	psi :	926	924	921	919	917	916	914	913	912	911	910
ECD @ TD	sg :	1.05	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.07	1.07
ECD @ Shoe	sg :	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
ECD @ Weakest Depth	sg :	1.10	1.11	1.11	1.12	1.12	1.12	1.13	1.13	1.14	1.14	1.14
ECD @ TD (cuttings)	sg :	1.17	1.16	1.16	1.16	1.16	1.15	1.15	1.15	1.15	1.15	1.15

Recommended Minimum Flow to maintain cuttings transport in top section is 458 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 121 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Mar 11 01:16:36 1993

INPUT DATA

Hydraulics Model	BINGHAM	Casing Shoe Depth	114.0 m	Jet 1	18 in/32
Depth	560.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	18 in/32
Vertical Depth	560.0 m	Mud Density	1.03 sg	Jet 3	18 in/32
Flow Rate	1080 gpm	300 rpm viscometer	2	Total Fluid Area	0.7455 in^2
Average ROP	120.0 m/hr	600 rpm viscometer	3		
Cuttings Density	2.60 spc g	Plastic Viscosity	1.00 cP		
Cuttings Diameter	0.200 in	Yield Point	1.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.05412 #sec^n/100ft^2		
Cuttings Thickness	0.100 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	80.5	20.000	5.000	4.276	103	5	96	441.3	21.6	25.3	LAMINAR
82.0	32.0	28.000	5.000	4.276	80	2	77	441.3	10.6	25.2	LAMINAR
114.0	277.6	17.500	5.000	4.276	271	16	248	441.3	28.8	25.3	TURBULENT
391.6	80.4	17.500	5.000	3.000	78	2	72	896.5	28.8	25.3	TURBULENT
471.9	55.8	17.500	8.000	2.875	54	1	43	976.1	33.3	25.4	TURBULENT
527.7	32.3	17.500	9.500	3.063	32	1	22	860.0	37.4	25.5	TURBULENT

Hydrostatic Pressure	818 psi		
Annular Volume	559 bbl	4361 strokes	22 mins
Pipe Capacity	27 bbl	214 strokes	1 mins
Circulating Volume	586 bbl	4576 strokes	23 mins
Pipe Displacement	32 bbl		
Total Hole Volume	618 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130
Flow Regime at TD	:	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB	TURB
Jet Velocity	m/sec :	135.1	136.4	137.7	139.0	140.4	141.7	143.0	144.3	145.6	146.9	148.2
Impact Force	lbf :	2032.9	2072.6	2112.7	2153.1	2193.9	2235.1	2276.7	2318.7	2361.0	2403.7	2446.9
Hydraulic Power	hhp :	907.0	933.7	960.9	988.6	1016.8	1045.6	1074.9	1104.8	1135.2	1166.2	1197.7
Bit Loss	psi :	1510	1540	1570	1600	1630	1661	1691	1723	1754	1786	1818
% Bit Loss	:	65.4	65.7	65.9	66.2	66.4	66.6	66.9	67.1	67.3	67.5	67.7
Pipe Loss	psi :	546	554	563	572	581	590	599	609	618	627	636
Annular Loss	psi :	1	1	1	1	1	1	1	1	1	1	1
Cuttings Loss	psi :	217	214	211	208	205	202	199	196	194	191	188
Surface Loss	psi :	35	35	36	36	37	38	38	39	40	40	41
Total Loss	psi :	2309	2344	2381	2417	2454	2492	2529	2568	2606	2645	2685
Circ Pressure	psi :	1036	1033	1030	1027	1024	1021	1018	1015	1013	1010	1008
ECD @ TD	sg :	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
ECD @ Shoe	sg :	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
ECD @ Weakest Depth	sg :	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
ECD @ TD (cuttings)	sg :	1.30	1.30	1.30	1.29	1.29	1.29	1.28	1.28	1.28	1.27	1.27

Recommended Minimum Flow to maintain cuttings transport in top section is 552 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 737 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sat Mar 13 03:23:27 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	549.0 m	Jet 1	18 in/32
Depth	765.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	16 in/32
Vertical Depth	765.0 m	Mud Density	1.09 sg	Jet 3	13 in/32
Flow Rate	753 gpm	300 rpm viscometer	35	Total Fluid Area	0.5745 in^2
Average ROP	50.0 m/hr	600 rpm viscometer	52		
Cuttings Density	2.60 spc g	Plastic Viscosity	17.00 cP		
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.03145 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.57116		

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	80.5	19.750	5.000	4.276	100	5	94	307.7	15.4	69.0	LAMINAR
82.0	443.0	12.347	5.000	4.276	215	26	179	307.7	44.3	92.3	LAMINAR
525.0	24.0	12.347	5.000	3.000	12	1	10	625.0	44.6	92.8	LAMINAR
549.0	83.9	12.250	5.000	3.000	40	2	33	625.0	45.5	93.3	LAMINAR
632.9	109.8	12.250	8.000	2.875	53	3	30	680.6	65.4	115.3	LAMINAR
742.7	22.3	12.250	8.250	2.875	11	1	6	680.6	68.6	118.2	LAMINAR

Hydrostatic Pressure	1183 psi		
Annular Volume	351 bbl	2743 strokes	20 mins
Pipe Capacity	37 bbl	289 strokes	2 mins
Circulating Volume	388 bbl	3033 strokes	22 mins
Pipe Displacement	42 bbl		
Total Hole Volume	430 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	653	673	693	713	733	753	773	793	813	833	853
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	111.2	114.6	118.0	121.4	124.8	128.2	131.6	135.0	138.4	141.8	145.2
Impact Force	lbf :	1122.2	1191.9	1263.8	1337.8	1413.9	1492.2	1572.5	1654.9	1739.4	1826.1	1914.8
Hydraulic Power	hhp :	411.9	450.9	492.3	536.2	582.6	631.6	683.3	737.7	794.9	855.1	918.1
Bit Loss	psi :	1082	1149	1219	1290	1363	1439	1516	1596	1677	1761	1846
% Bit Loss	:	63.9	64.3	64.8	65.2	65.6	66.0	66.3	66.6	67.0	67.3	67.6
Pipe Loss	psi :	523	549	575	602	629	656	684	713	742	771	801
Annular Loss	psi :	14	14	15	15	15	15	16	16	16	16	16
Cuttings Loss	psi :	60	58	56	54	52	51	49	48	47	45	44
Surface Loss	psi :	16	17	17	18	19	20	21	22	24	25	26
Total Loss	psi :	1694	1786	1881	1979	2079	2181	2287	2394	2505	2618	2733
Circ Pressure	psi :	1257	1255	1254	1252	1251	1249	1248	1247	1246	1245	1244
ECD @ TD	sg :	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.11
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 :	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
ECD @ TD (cuttings)	sg :	1.16	1.16	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

Recommended Minimum Flow to maintain cuttings transport in top section is 158 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1297 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sun Mar 14 03:33:55 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1024.0 m	Jet 1	18 in/32
Depth	1204.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	16 in/32
Vertical Depth	1203.9 m	Mud Density	1.13 sg	Jet 3	13 in/32
Flow Rate	755 gpm	300 rpm viscometer	39	Total Fluid Area	0.5745 in^2
Average ROP	32.0 m/hr	600 rpm viscometer	57		
Cuttings Density	2.60 spc gr	Plastic Viscosity	18.00 cP		
Cuttings Diameter	0.200 in	Yield Point	21.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.33017 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.54749		

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	80.5	19.750	5.000	4.276	100	5	94	308.5	15.5	76.6	LAMINAR
82.0	467.0	12.347	5.000	4.276	227	27	189	308.5	44.4	100.8	LAMINAR
549.0	415.0	14.400	5.000	4.276	274	24	241	308.5	31.0	91.5	LAMINAR
964.0	60.0	14.400	5.000	3.000	40	2	35	626.7	31.2	91.9	LAMINAR
1024.0	47.9	12.250	5.000	3.000	23	1	19	626.7	45.6	101.8	LAMINAR
1071.9	109.8	12.250	8.000	2.875	53	3	30	682.4	65.5	124.3	LAMINAR
1181.7	22.3	12.250	8.250	2.875	11	1	6	682.4	68.8	127.2	LAMINAR

Hydrostatic Pressure	1932 psi		
Annular Volume	612 bbl	4781 strokes	34 mins
Pipe Capacity	63 bbl	489 strokes	3 mins
Circulating Volume	675 bbl	5270 strokes	38 mins
Pipe Displacement	52 bbl		
Total Hole Volume	727 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	705	715	725	735	745	755	765	775	785	795	805
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	120.0	121.7	123.4	125.1	126.8	128.5	130.2	131.9	133.6	135.3	137.0
Impact Force	lbf :	1356.0	1394.7	1434.0	1473.8	1514.2	1555.1	1596.6	1638.6	1681.2	1724.3	1767.9
Hydraulic Power	hhp :	537.4	560.6	584.4	608.9	634.1	660.0	686.6	713.9	741.9	770.6	800.0
Bit Loss	psi :	1307	1345	1383	1421	1460	1499	1539	1580	1621	1662	1705
% Bit Loss	:	60.5	60.8	61.0	61.1	61.3	61.5	61.7	61.9	62.1	62.2	62.4
Pipe Loss	psi :	756	773	790	807	825	843	860	878	896	914	932
Annular Loss	psi :	21	22	22	22	22	22	22	23	23	23	23
Cuttings Loss	psi :	56	55	54	53	53	52	51	50	50	49	48
Surface Loss	psi :	19	19	20	20	21	21	22	22	23	23	24
Total Loss	psi :	2159	2213	2268	2324	2380	2437	2495	2553	2612	2672	2732
Circ Pressure	psi :	2009	2009	2008	2007	2007	2006	2005	2005	2004	2004	2003
ECD @ TD	sg :	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
ECD @ Shoe	sg :	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
ECD @ Weakest Depth	sg :	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
ECD @ TD (cuttings)	sg :	1.18	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17

Recommended Minimum Flow to maintain cuttings transport in top section is 126 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 1396 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Tue Mar 16 09:31:49 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	32 in/32
Depth	1208.2 m	Weakest Fmtn Depth	1007.0 m	Jet 2	32 in/32
Vertical Depth	1208.1 m	Mud Density	1.13 sg	Jet 3	32 in/32
Flow Rate	377 gpm	300 rpm viscometer	39	Total Fluid Area	2.3562 in^2
Average ROP	1.1 m/hr	600 rpm viscometer	58		
Cuttings Density	2.60 spc g	Plastic Viscosity	19.00 cP		
Cuttings Diameter	0.200 in	Yield Point	20.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.13928 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.57258		

CALCULATED RESULTS

Section Top m	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	80.5	19.750	5.000	4.276	100	5	93	154.0	7.7	72.4	LAMINAR
82.0	850.3	8.681	5.000	4.276	204	50	135	154.0	56.6	129.0	LAMINAR
932.3	107.9	8.681	5.000	3.000	26	3	17	312.9	57.3	129.8	LAMINAR
1040.2	148.8	8.681	6.500	2.813	36	4	16	355.9	85.1	158.4	LAMINAR
1189.0	19.2	8.500	6.500	2.813	4	0	2	355.9	93.9	164.0	LAMINAR

Hydrostatic Pressure	1939 psi		
Annular Volume	263 bbl	2051 strokes	29 mins
Pipe Capacity	62 bbl	481 strokes	7 mins
Circulating Volume	324 bbl	2532 strokes	36 mins
Pipe Displacement	46 bbl		
Total Hole Volume	370 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	327	337	347	357	367	377	387	397	407	417	427
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	13.6	14.0	14.4	14.8	15.2	15.6	16.1	16.5	16.9	17.3	17.7
Impact Force	lbf :	71.1	75.5	80.1	84.8	89.6	94.5	99.6	104.8	110.2	115.7	121.3
Hydraulic Power	hhp :	3.2	3.5	3.8	4.1	4.5	4.9	5.3	5.7	6.1	6.6	7.1
Bit Loss	psi :	17	18	19	20	21	22	23	25	26	27	29
% Bit Loss	:	4.6	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.3	5.3	5.4
Pipe Loss	psi :	257	270	283	296	309	323	337	351	365	379	394
Annular Loss	psi :	82	83	85	86	87	89	90	91	93	94	95
Cuttings Loss	psi :	2	2	2	2	2	2	2	2	2	2	2
Surface Loss	psi :	4	5	5	5	6	6	6	6	7	7	7
Total Loss	psi :	363	378	393	409	425	442	458	475	492	509	527
Circ Pressure	psi :	2023	2024	2025	2027	2028	2029	2031	2032	2033	2034	2036
ECD @ TD	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	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 :	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
ECD @ TD (cuttings)	sg :	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19	1.19

Recommended Minimum Flow to maintain cuttings transport in top section is 105 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 659 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Wed Mar 17 02:15:52 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	12 in/32
Depth	1329.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	12 in/32
Vertical Depth	1328.7 m	Mud Density	1.12 sg	Jet 3	12 in/32
Flow Rate	485 gpm	300 rpm viscometer	33	Jet 4	11 in/32
Average ROP	30.0 m/hr	600 rpm viscometer	49	Jet 5	10 in/32
Cuttings Density	2.80 spc gr	Plastic Viscosity	16.00 cP	Total Fluid Area	0.5008 in^2
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.09759 #sec^n/100ft^2		
Cuttings Thickness	0.100 in	Power Law n	0.55639		

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	80.5	19.750	5.000	4.276	100	5	94	198.2	9.9	68.7	LAMINAR
82.0	956.1	8.681	5.000	4.276	230	56	152	198.2	72.7	119.6	LAMINAR
1038.1	107.9	8.681	5.000	3.000	26	3	17	402.6	73.9	120.7	LAMINAR
1146.0	43.0	8.681	6.500	2.813	10	1	5	457.9	109.4	145.9	LAMINAR
1189.0	140.0	8.500	6.500	2.813	32	4	13	457.9	120.8	150.8	LAMINAR

Hydrostatic Pressure	2114 psi		
Annular Volume	280 bbl	2187 strokes	24 mins
Pipe Capacity	68 bbl	532 strokes	6 mins
Circulating Volume	348 bbl	2719 strokes	30 mins
Pipe Displacement	50 bbl		
Total Hole Volume	398 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	435	445	455	465	475	485	495	505	515	525	535
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	84.9	86.9	88.8	90.8	92.7	94.7	96.6	98.6	100.6	102.5	104.5
Impact Force	lbf :	586.9	614.2	642.1	670.6	699.8	729.6	760.0	791.0	822.6	854.9	887.8
Hydraulic Power	hhp :	164.6	176.2	188.4	201.1	214.3	228.1	242.6	257.6	273.2	289.4	306.2
Bit Loss	psi :	649	679	710	742	774	807	840	875	910	945	982
% Bit Loss	:	53.1	53.6	54.0	54.5	54.9	55.3	55.7	56.1	56.5	56.8	57.1
Pipe Loss	psi :	411	426	441	457	472	488	504	520	537	554	570
Annular Loss	psi :	98	99	101	102	103	104	105	107	108	109	110
Cuttings Loss	psi :	57	55	54	52	51	50	49	48	47	46	45
Surface Loss	psi :	8	8	8	9	9	9	10	10	10	11	11
Total Loss	psi :	1222	1267	1314	1361	1409	1458	1508	1559	1611	1664	1718
Circ Pressure	psi :	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268
ECD @ TD	sg :	1.17	1.17	1.17	1.17	1.17	1.18	1.18	1.18	1.18	1.18	1.18
ECD @ Shoe	sg :	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.17	1.17	1.17	1.17
ECD @ Weakest Depth	sg :	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16
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 141 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 606 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Mar 18 02:39:50 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	12 in/32
Depth	1747.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	12 in/32
Vertical Depth	1745.6 m	Mud Density	1.16 sg	Jet 3	12 in/32
Flow Rate	530 gpm	300 rpm viscometer	42	Jet 4	11 in/32
Average ROP	25.1 m/hr	600 rpm viscometer	61	Jet 5	10 in/32
Cuttings Density	2.80 spc gr	Plastic Viscosity	19.00 cP	Total Fluid Area	0.5008 in^2
Cuttings Diameter	0.200 in	Yield Point	24.00 #/100ft^2		
tings Shape	SPHERICAL	Power Law k	1.65480 #sec^n/100ft^2		
tings Thickness	0.000 in	Power Law n	0.52793		

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	80.5	19.750	5.000	4.276	100	5	94	216.5	10.9	83.9	LAMINAR
82.0	1107.0	8.681	5.000	4.276	266	65	176	216.5	79.4	140.6	LAMINAR
1189.0	267.1	8.500	5.000	4.276	62	16	40	216.5	84.7	143.3	LAMINAR
1456.1	107.9	8.500	5.000	3.000	25	3	16	439.9	86.2	144.5	LAMINAR
1564.0	183.0	8.500	6.500	2.813	42	5	17	500.4	132.0	174.5	LAMINAR

Hydrostatic Pressure	2877 psi		
Annular Volume	342 bbl	2673 strokes	27 mins
Pipe Capacity	92 bbl	722 strokes	7 mins
Circulating Volume	435 bbl	3395 strokes	34 mins
Pipe Displacement	60 bbl		
Total Hole Volume	494 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	480	490	500	510	520	530	540	550	560	570	580
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	93.7	95.7	97.6	99.6	101.5	103.5	105.4	107.4	109.3	111.3	113.2
Impact Force	lbf :	740.1	771.3	803.1	835.5	868.6	902.4	936.7	971.7	1007.4	1043.7	1080.6
Hydraulic Power	hhp :	229.1	243.7	258.9	274.8	291.2	308.4	326.1	344.6	363.7	383.6	404.1
Bit Loss	psi :	818	853	888	924	961	998	1036	1075	1114	1154	1195
% Bit Loss	:	49.9	50.3	50.7	51.1	51.5	51.8	52.2	52.5	52.9	53.2	53.5
Pipe Loss	psi :	589	608	628	648	668	688	709	729	750	772	793
Annular Loss	psi :	175	177	179	181	182	184	186	188	190	191	193
Cuttings Loss	psi :	48	47	46	45	44	43	42	42	41	40	39
Surface Loss	psi :	9	10	10	11	11	11	12	12	13	13	13
Total Loss	psi :	1640	1695	1751	1808	1866	1925	1985	2046	2107	2170	2234
Circ Pressure	psi :	3100	3101	3102	3103	3103	3104	3105	3106	3107	3108	3109
ECD @ TD	sg :	1.23	1.23	1.23	1.23	1.23	1.23	1.24	1.24	1.24	1.24	1.24
ECD @ Shoe	sg :	1.21	1.21	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
ECD @ Weakest Depth	sg :	1.21	1.21	1.21	1.21	1.22	1.22	1.22	1.22	1.22	1.22	1.22
ECD @ TD (cuttings)	sg :	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

Recommended Minimum Flow to maintain cuttings transport in top section is 100 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 701 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Mar 19 00:41:59 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	9 in/32
Depth	1828.0 m	Weakest Fmtn Depth	1007.0 m	Jet 2	9 in/32
Vertical Depth	1825.0 m	Mud Density	1.16 sg	Jet 3	9 in/32
Flow Rate	274 gpm	300 rpm viscometer	41	Jet 4	9 in/32
Average ROP	7.0 m/hr	600 rpm viscometer	57	Jet 5	9 in/32
Cuttings Density	2.80 spc g	Plastic Viscosity	16.00 cP	Jet 6	9 in/32
Cuttings Diameter	0.200 in	Yield Point	26.00 #/100ft^2	Jet 7	9 in/32
Cuttings Shape	SPHERICAL	Power Law k	2.37410 #sec^n/100ft^2	Jet 8	9 in/32
Cuttings Thickness	0.050 in	Power Law n	0.46566	Jet 9	9 in/32
				Total Fluid Area	0.5591 in^2

CALCULATED RESULTS

Section		Hole	Pipe		Volumes & Capacities			Mud Velocity			Flow
Top	Length	Size	OD	ID	Hole	Pipe	Annulus	Pipe	Annulus	Critical	Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	80.5	19.750	5.000	4.275	100	5	94	112.0	5.6	93.6	LAMINAR
82.0	1107.0	8.681	5.000	4.275	266	64	176	112.0	41.1	145.1	LAMINAR
1189.0	335.9	8.500	5.000	4.275	77	20	50	112.0	43.8	147.4	LAMINAR
1524.9	107.9	8.500	5.000	3.000	25	3	16	227.4	44.6	148.5	LAMINAR
1632.8	166.5	8.500	6.375	2.812	38	4	17	258.9	64.8	171.1	LAMINAR
1799.3	28.7	8.500	6.750	5.375	7	3	2	70.9	76.7	181.5	LAMINAR

Hydrostatic Pressure	3008 psi		
Annular Volume	354 bbl	2767 strokes	54 mins
Pipe Capacity	99 bbl	770 strokes	15 mins
Circulating Volume	453 bbl	3537 strokes	69 mins
Pipe Displacement	60 bbl		
Total Hole Volume	513 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	264	266	268	270	272	274	276	278	280	282	284
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	46.2	46.5	46.9	47.2	47.6	47.9	48.3	48.6	49.0	49.3	49.7
Impact Force	lbf :	200.5	203.6	206.7	209.8	212.9	216.0	219.2	222.4	225.6	228.8	232.1
Hydraulic Power	hhp :	30.6	31.3	32.0	32.7	33.4	34.2	34.9	35.7	36.5	37.3	38.1
Bit Loss	psi :	199	202	205	208	211	214	217	220	223	227	230
% Bit Loss	:	34.4	34.6	34.9	35.1	35.3	35.5	35.7	36.0	36.2	36.4	36.6
Pipe Loss	psi :	206	208	209	211	212	214	216	217	219	220	222
Annular Loss	psi :	143	144	144	145	145	146	146	147	147	148	148
Cuttings Loss	psi :	26	26	26	26	26	25	25	25	25	25	24
Surface Loss	psi :	3	3	3	3	3	3	3	3	3	3	4
Total Loss	psi :	578	582	587	592	597	602	607	613	618	623	628
Circ Pressure	psi :	3177	3178	3178	3178	3178	3179	3179	3179	3180	3180	3180
ECD @ TD	sg :	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
ECD @ Shoe	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ Weakest Depth	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ TD (cuttings)	sg :	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23

Recommended Minimum Flow to maintain cuttings transport in top section is 55 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 648 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sat Mar 20 01:58:35 1993

INPUT DATA

raulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	9 in/32
pth	1846.5 m	Weakest Fmtn Depth	1189.0 m	Jet 2	9 in/32
Vertical Depth	1843.5 m	Mud Density	1.15 sg	Jet 3	9 in/32
Flow Rate	108 gpm	300 rpm viscometer	33	Jet 4	9 in/32
Average ROP	2.0 m/hr	600 rpm viscometer	48	Jet 5	9 in/32
Cuttings Density	2.60 spc gr	Plastic Viscosity	15.00 cP	Jet 6	9 in/32
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2	Jet 7	9 in/32
Cuttings Shape	SPHERICAL	Power Law k	1.17465 #sec^n/100ft^2	Jet 8	9 in/32
Cuttings Thickness	0.000 in	Power Law n	0.54057	Jet 9	9 in/32
				Total Fluid Area	0.5591 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	80.5	19.750	5.000	4.275	100	5	94	44.1	2.2	68.5	LAMINAR
82.0	1107.0	8.681	5.000	4.275	266	64	176	44.1	16.2	116.8	LAMINAR
1189.0	363.5	8.500	5.000	4.275	84	21	54	44.1	17.3	119.1	LAMINAR
1552.5	107.9	8.500	5.000	3.000	25	3	16	89.6	17.6	120.2	LAMINAR
1660.5	165.8	8.500	6.500	2.812	38	4	16	102.0	26.9	146.0	LAMINAR
1826.3	20.2	8.500	6.750	5.375	5	2	2	27.9	30.2	153.4	LAMINAR

Hydrostatic Pressure	3012 psi		
Annular Volume	357 bbl	2786 strokes	139 mins
Pipe Capacity	99 bbl	777 strokes	39 mins
Circulating Volume	456 bbl	3562 strokes	177 mins
Pipe Displacement	61 bbl		
Total Hole Volume	517 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	88	92	96	100	104	108	112	116	120	124	128
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0	21.7	22.4
Impact Force	lbf :	22.1	24.1	26.3	28.5	30.9	33.3	35.8	38.4	41.1	43.9	46.7
Hydraulic Power	hhp :	1.1	1.3	1.5	1.6	1.9	2.1	2.3	2.6	2.8	3.1	3.5
Bit Loss	psi :	22	24	26	28	31	33	35	38	41	43	46
% Bit Loss	:	13.0	13.9	14.9	15.8	16.8	17.7	18.6	19.5	20.4	21.1	21.9
Pipe Loss	psi :	60	62	63	65	66	67	69	70	72	75	78
Annular Loss	psi :	56	58	59	60	62	63	64	65	67	68	69
Cuttings Loss	psi :	30	28	26	25	24	22	21	20	19	18	18
Surface Loss	psi :	0	0	0	1	1	1	1	1	1	1	1
al Loss	psi :	169	172	175	179	182	186	190	195	200	205	212
: Pressure	psi :	3098	3098	3098	3097	3097	3097	3098	3098	3098	3098	3099
@ TD	sg :	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.18	1.18	1.18
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 :	1.18	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 60 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 548 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sun Mar 21 01:44:43 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	12 in/32
Depth	1985.2 m	Weakest Fmtn Depth	1189.0 m	Jet 2	12 in/32
Vertical Depth	1980.9 m	Mud Density	1.15 sg	Jet 3	12 in/32
Flow Rate	457 gpm	300 rpm viscometer	33	Total Fluid Area	0.3313 in^2
Average ROP	15.5 m/hr	600 rpm viscometer	48		
Cuttings Density	2.60 spc g	Plastic Viscosity	15.00 cP		
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17465 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.54057		

CALCULATED RESULTS

Section		Hole	Pipe		Volumes & Capacities			Mud Velocity			Flow
Top	Length	Size	OD	ID	Hole	Pipe	Annulus	Pipe	Annulus	Critical	Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	80.5	19.750	5.000	4.275	100	5	94	186.8	9.4	68.5	LAMINAR
82.0	1107.0	8.681	5.000	4.275	266	64	176	186.8	68.5	116.8	LAMINAR
1189.0	505.5	8.500	5.000	4.275	116	29	75	186.8	73.1	119.1	LAMINAR
1694.5	107.9	8.500	5.000	3.000	25	3	16	379.3	74.5	120.2	LAMINAR
1802.4	182.8	8.500	6.500	2.812	42	5	17	431.8	113.8	146.0	LAMINAR

Hydrostatic Pressure	3237 psi		
Annular Volume	378 bbl	2950 strokes	35 mins
Pipe Capacity	106 bbl	830 strokes	10 mins
Circulating Volume	484 bbl	3780 strokes	44 mins
Pipe Displacement	65 bbl		
Total Hole Volume	549 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	437	441	445	449	453	457	461	465	469	473	477
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	129.0	130.2	131.3	132.5	133.7	134.9	136.1	137.2	138.4	139.6	140.8
Impact Force	lbf :	919.3	936.2	953.3	970.5	987.9	1005.4	1023.0	1040.9	1058.9	1077.0	1095.3
Hydraulic Power	hhp :	391.5	402.4	413.4	424.7	436.1	447.8	459.7	471.7	484.0	496.5	509.2
Bit Loss	psi :	1537	1565	1593	1622	1651	1681	1710	1740	1770	1800	1831
% Bit Loss	:	68.9	69.0	69.2	69.3	69.4	69.6	69.7	69.9	70.0	70.1	70.2
Pipe Loss	psi :	512	519	527	534	542	550	557	565	573	580	588
Annular Loss	psi :	142	142	143	144	144	145	146	146	147	148	148
Cuttings Loss	psi :	33	33	32	32	32	31	31	31	31	30	30
Surface Loss	psi :	8	8	8	8	8	9	9	9	9	9	9
Total Loss	psi :	2231	2267	2304	2341	2378	2415	2453	2491	2529	2568	2607
Circ Pressure	psi :	3411	3412	3412	3413	3413	3413	3414	3414	3414	3415	3415
ECD @ TD	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
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 :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21

Recommended Minimum Flow to maintain cuttings transport in top section is 114 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 586 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Mon Mar 22 01:11:44 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	1189.0 m	Jet 1	12 in/32
›pth	2031.0 m	Weakest Fmtn Depth	1189.0 m	Jet 2	12 in/32
›rtical Depth	2025.8 m	Mud Density	1.15 sg	Jet 3	12 in/32
Flow Rate	458 gpm	300 rpm viscometer	33	Total Fluid Area	0.3313 in^2
Average ROP	10.0 m/hr	600 rpm viscometer	48		
Cuttings Density	2.60 spc g	Plastic Viscosity	15.00 cP		
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17465 #sec^n/100ft^2		
Cuttings Thickness	0.000 in	Power Law n	0.54057		

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	80.5	19.750	5.000	4.275	100	5	94	187.2	9.4	68.5	LAMINAR
82.0	1107.0	8.681	5.000	4.275	266	64	176	187.2	68.7	116.8	LAMINAR
1189.0	551.3	8.500	5.000	4.275	127	32	82	187.2	73.2	119.1	LAMINAR
1740.3	107.9	8.500	5.000	3.000	25	3	16	380.2	74.6	120.2	LAMINAR
1848.2	182.8	8.500	6.500	2.812	42	5	17	432.7	114.1	146.0	LAMINAR

Hydrostatic Pressure	3310 psi		
Annular Volume	385 bbl	3003 strokes	35 mins
Pipe Capacity	109 bbl	851 strokes	10 mins
Circulating Volume	494 bbl	3854 strokes	45 mins
Pipe Displacement	66 bbl		
Total Hole Volume	560 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	438	442	446	450	454	458	462	466	470	474	478
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	129.3	130.4	131.6	132.8	134.0	135.2	136.4	137.5	138.7	139.9	141.1
Impact Force	lbf :	923.5	940.5	957.6	974.8	992.2	1009.8	1027.5	1045.4	1063.4	1081.6	1099.9
Hydraulic Power	hhp :	394.2	405.1	416.2	427.5	439.0	450.7	462.7	474.8	487.1	499.6	512.4
Bit Loss	psi :	1544	1572	1601	1630	1659	1688	1718	1747	1778	1808	1839
% Bit Loss	:	68.9	69.1	69.2	69.4	69.5	69.6	69.7	69.9	70.0	70.1	70.2
Pipe Loss	psi :	521	529	536	544	551	559	567	575	582	590	598
Annular Loss	psi :	145	146	146	147	148	148	149	150	150	151	152
Cuttings Loss	psi :	22	21	21	21	21	21	20	20	20	20	20
Surface Loss	psi :	8	8	8	8	8	9	9	9	9	9	9
Total Loss	psi :	2239	2276	2312	2349	2387	2425	2463	2501	2539	2578	2617
Circ Pressure	psi :	3477	3477	3478	3478	3479	3479	3480	3480	3481	3481	3482
ECD @ TD	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
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
~CD @ 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
D @ TD (cuttings)	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21

Recommended Minimum Flow to maintain cuttings transport in top section is 114 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 586 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Mar 25 02:54:49 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2002.0 m		Jet 1		12 in/32
Depth	2107.0 m	Weakest Fmtn Depth	1189.0 m		Jet 2		12 in/32
Vertical Depth	2101.2 m	Mud Density	1.15 sg		Jet 3		12 in/32
Flow Rate	467 gpm	300 rpm viscometer	36		Total Fluid Area	0.3313 in^2	
Average ROP	6.0 m/hr	600 rpm viscometer	53				
Cuttings Density	2.50 spc g	Plastic Viscosity	17.00 cP				
Cuttings Diameter	0.200 in	Yield Point	20.00 #/100ft^2				
Cuttings Shape	SPHERICAL	Power Law k	1.27805 #sec^n/100ft^2				
Cuttings Thickness	0.000 in	Power Law n	0.54543				

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	80.5	19.750	5.000	4.275	100	5	94	190.9	9.6	73.3	LAMINAR
82.0	1107.0	8.681	5.000	4.275	266	64	176	190.9	70.0	125.8	LAMINAR
1189.0	627.3	9.880	5.000	4.275	195	37	144	190.9	48.4	112.8	LAMINAR
1816.3	107.9	9.880	5.000	3.000	34	3	24	387.6	49.0	113.6	LAMINAR
1924.2	77.8	9.880	6.500	2.812	24	2	14	441.2	63.0	129.3	LAMINAR
2002.0	88.0	8.500	6.500	2.812	20	2	8	441.2	116.3	157.6	LAMINAR
2090.0	17.0	8.500	6.500	2.812	4	0	2	441.2	116.3	157.6	LAMINAR

Hydrostatic Pressure	3434 psi		
Annular Volume	462 bbl	3605 strokes	42 mins
Pipe Capacity	113 bbl	885 strokes	10 mins
Circulating Volume	575 bbl	4490 strokes	52 mins
Pipe Displacement	68 bbl		
Total Hole Volume	643 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	447	451	455	459	463	467	471	475	479	483	487
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	131.9	133.1	134.3	135.5	136.6	137.8	139.0	140.2	141.4	142.6	143.7
Impact Force	lbf :	961.9	979.1	996.6	1014.2	1031.9	1049.9	1067.9	1086.1	1104.5	1123.0	1141.7
Hydraulic Power	hhp :	419.0	430.4	441.9	453.7	465.7	477.8	490.2	502.8	515.6	528.7	541.9
Bit Loss	psi :	1608	1637	1666	1695	1725	1755	1785	1816	1846	1877	1908
% Bit Loss	:	69.0	69.2	69.3	69.4	69.5	69.6	69.7	69.9	70.0	70.1	70.2
Pipe Loss	psi :	572	580	588	596	605	613	621	630	638	646	655
Annular Loss	psi :	128	128	129	130	130	131	132	132	133	133	134
Cuttings Loss	psi :	13	13	13	13	13	13	13	13	12	12	12
Surface Loss	psi :	8	8	8	9	9	9	9	9	9	9	10
Total Loss	psi :	2329	2367	2405	2443	2482	2520	2560	2599	2639	2679	2719
Circ Pressure	psi :	3575	3575	3576	3576	3577	3577	3578	3578	3579	3579	3580
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	1.20	1.20	1.20	1.20
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 98 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 633 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Wed Mar 31 01:07:06 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	12 in/32
Depth	2060.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	12 in/32
tical Depth	2054.2 m	Mud Density	1.15 sg	Jet 3	12 in/32
ow Rate	321 gpm	300 rpm viscometer	28	Total Fluid Area	0.3313 in^2
Average ROP	1.2 m/hr	600 rpm viscometer	42		
Cuttings Density	2.50 spc g	Plastic Viscosity	14.00 cP		
Cuttings Diameter	0.200 in	Yield Point	14.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.75774 #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	80.5	13.750	5.000	4.275	100	5	93	131.2	6.6	55.1	LAMINAR
82.0	581.3	8.681	5.000	4.275	140	34	91	131.2	48.9	100.5	LAMINAR
663.3	428.7	8.681	3.500	2.750	103	10	86	317.1	38.1	85.7	LAMINAR
1092.0	796.4	6.184	3.500	2.750	97	19	65	317.1	93.1	113.3	LAMINAR
1888.4	171.6	6.184	4.750	2.500	21	3	9	383.7	152.9	146.5	TRANSITIONAL

Hydrostatic Pressure	3357 psi		
Annular Volume	344 bbl	2686 strokes	45 mins
Pipe Capacity	71 bbl	558 strokes	9 mins
Circulating Volume	416 bbl	3244 strokes	54 mins
Pipe Displacement	45 bbl		
Total Hole Volume	461 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	301	305	309	313	317	321	325	329	333	337	341
Flow Regime at TD	:	LAM	LAM	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS	TRANS
Jet Velocity	m/sec :	88.8	90.0	91.2	92.4	93.6	94.7	95.9	97.1	98.3	99.5	100.6
Impact Force	lbf :	436.1	447.8	459.6	471.6	483.7	496.0	508.5	521.1	533.8	546.7	559.8
Hydraulic Power	hhp :	127.9	133.1	138.4	143.9	149.5	155.2	161.1	167.1	173.2	179.6	186.0
Bit Loss	psi :	729	749	768	788	809	829	850	871	892	914	936
% Bit Loss	:	40.2	40.3	40.5	40.7	40.8	41.0	41.1	41.2	41.4	41.5	41.6
Pipe Loss	psi :	920	940	960	980	1000	1020	1040	1061	1082	1102	1123
Annular Loss	psi :	159	160	162	163	166	168	170	172	175	178	180
Cuttings Loss	psi :	3	3	3	3	3	3	3	3	3	3	3
Surface Loss	psi :	4	4	4	4	4	4	5	5	5	5	5
Total Loss	psi :	1815	1856	1897	1939	1981	2024	2068	2112	2157	2202	2247
Circ Pressure	psi :	3519	3520	3521	3523	3525	3527	3530	3532	3535	3537	3540
ECD @ TD	sg :	1.20	1.20	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21
ECD @ Shoe	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.22	1.22
ECD @ Weakest Depth	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.22	1.22
@ TD (cuttings)	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21

Recommended Minimum Flow to maintain cuttings transport in top section is 133 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 307 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Wed Mar 31 21:18:28 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	12 in/32
Depth	2131.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	12 in/32
Vertical Depth	2125.2 m	Mud Density	1.15 sg	Jet 3	12 in/32
Flow Rate	261 gpm	300 rpm viscometer	28	Total Fluid Area	0.3313 in^2
Average ROP	3.0 m/hr	600 rpm viscometer	40		
Cuttings Density	2.45 spc g	Plastic Viscosity	12.00 cP		
Cuttings Diameter	0.200 in	Yield Point	16.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17019 #sec^n/100ft^2		
Cuttings Thickness	0.050 in	Power Law n	0.51457		

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	80.5	19.750	5.000	4.275	100	5	93	106.7	5.4	65.1	LAMINAR
82.0	652.3	8.681	5.000	4.275	157	38	102	106.7	39.8	107.9	LAMINAR
734.3	357.7	8.681	3.500	2.750	86	9	72	257.8	31.0	94.4	LAMINAR
1092.0	867.4	6.184	3.500	2.750	106	21	71	257.8	75.7	119.4	LAMINAR
1959.4	148.6	6.184	4.750	2.500	18	3	7	312.0	124.4	148.1	LAMINAR
2108.0	23.0	6.000	4.750	2.500	3	0	1	312.0	145.1	155.3	LAMINAR

Hydrostatic Pressure	3473 psi		
Annular Volume	347 bbl	2706 strokes	56 mins
Pipe Capacity	76 bbl	590 strokes	12 mins
Circulating Volume	422 bbl	3296 strokes	68 mins
Pipe Displacement	47 bbl		
Total Hole Volume	469 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	251	253	255	257	259	261	263	265	267	269	271
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	74.1	74.7	75.3	75.8	76.4	77.0	77.6	78.2	78.8	79.4	80.0
Impact Force	lbf :	303.3	308.1	313.0	318.0	322.9	327.9	333.0	338.1	343.2	348.3	353.5
Hydraulic Power	hhp :	74.2	76.0	77.8	79.6	81.5	83.4	85.3	87.3	89.3	91.3	93.4
Bit Loss	psi :	507	515	523	531	540	548	557	565	574	582	591
% Bit Loss	:	38.5	38.6	38.7	38.8	39.0	39.1	39.2	39.3	39.4	39.6	39.7
Pipe Loss	psi :	637	645	653	661	669	677	686	694	702	710	719
Annular Loss	psi :	162	163	163	164	165	165	166	166	167	168	168
Cuttings Loss	psi :	9	9	9	9	9	9	9	9	8	8	8
Surface Loss	psi :	3	3	3	3	3	3	3	3	3	3	3
Total Loss	psi :	1318	1335	1351	1368	1385	1402	1420	1437	1454	1472	1489
Circ Pressure	psi :	3644	3644	3645	3645	3646	3647	3647	3648	3648	3649	3650
ECD @ TD	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.21	1.21	1.21	1.21
ECD @ Shoe	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ Weakest Depth	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ TD (cuttings)	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21

Recommended Minimum Flow to maintain cuttings transport in top section is 82 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 279 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Thu Apr 1 21:51:27 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	11 in/32
Depth	2209.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	11 in/32
Vertical Depth	2203.2 m	Mud Density	1.15 sg	Jet 3	11 in/32
Flow Rate	263 gpm	300 rpm viscometer	28	Total Fluid Area	0.2784 in^2
Average ROP	9.6 m/hr	600 rpm viscometer	40		
Cuttings Density	2.45 spc gr	Plastic Viscosity	12.00 cP		
Cuttings Diameter	0.200 in	Yield Point	16.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17019 #sec^n/100ft^2		
Cuttings Thickness	0.050 in	Power Law n	0.51457		

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	80.5	13.750	5.000	4.275	100	5	93	107.5	5.4	65.1	LAMINAR
82.0	730.6	8.681	5.000	4.275	175	43	114	107.5	40.1	107.9	LAMINAR
812.6	279.4	8.681	3.500	2.750	67	7	56	259.8	31.2	94.4	LAMINAR
1092.0	946.2	6.184	3.500	2.750	115	23	78	259.8	76.2	119.4	LAMINAR
2038.2	69.8	6.184	4.750	2.500	9	1	3	314.4	125.3	148.1	LAMINAR
2108.0	101.0	6.000	4.750	2.500	12	2	4	314.4	146.2	155.3	LAMINAR

Hydrostatic Pressure	3600 psi		
Annular Volume	349 bbl	2725 strokes	56 mins
Pipe Capacity	80 bbl	626 strokes	13 mins
Circulating Volume	429 bbl	3351 strokes	69 mins
Pipe Displacement	49 bbl		
Total Hole Volume	478 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	243	247	251	255	259	263	267	271	275	279	283
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	TRANS
Jet Velocity	m/sec :	85.4	86.8	88.2	89.6	91.0	92.4	93.8	95.2	96.6	98.0	99.4
Impact Force	lbf :	338.3	349.5	360.9	372.5	384.3	396.3	408.4	420.7	433.2	445.9	458.8
Hydraulic Power	hhp :	95.3	100.1	105.1	110.2	115.4	120.9	126.5	132.2	138.2	144.3	150.6
Bit Loss	psi :	673	695	718	741	765	788	812	837	862	887	913
% Bit Loss	:	45.2	45.5	45.7	46.0	46.3	46.6	46.9	47.1	47.4	47.7	47.9
Pipe Loss	psi :	607	624	642	658	674	690	707	724	740	757	774
Annular Loss	psi :	175	176	178	179	181	182	183	185	186	188	189
Cuttings Loss	psi :	31	30	30	29	29	28	28	27	27	26	26
Surface Loss	psi :	3	3	3	3	3	3	3	3	3	3	3
Total Loss	psi :	1488	1529	1570	1610	1651	1692	1733	1776	1818	1862	1906
Circ Pressure	psi :	3806	3807	3808	3809	3809	3810	3811	3812	3813	3814	3815
ECD @ TD	sg :	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21
ECD @ Shoe	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ Weakest Depth	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ TD (cuttings)	sg :	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22

commended Minimum Flow to maintain cuttings transport in top section is 82 gpm
commended Maximum Flow to maintain laminar flow in lowest section is 279 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Fri Apr 2 23:24:45 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	11 in/32
Depth	2295.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	11 in/32
Vertical Depth	2289.2 m	Mud Density	1.15 sg	Jet 3	11 in/32
Flow Rate	242 gpm	300 rpm viscometer	30	Total Fluid Area	0.2784 in^2
Average ROP	4.8 m/hr	600 rpm viscometer	44		
Cuttings Density	2.45 spc gr	Plastic Viscosity	14.00 cP		
Cuttings Diameter	0.200 in	Yield Point	16.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	0.99177 #sec^n/100ft^2		
Cuttings Thickness	0.050 in	Power Law n	0.55254		

CALCULATED RESULTS

Section		Hole	Pipe		Volumes & Capacities			Mud Velocity			Flow
Top	Length	Size	OD	ID	Hole	Pipe	Annulus	Pipe	Annulus	Critical	Regime
m	m	in	in	in	bbl	bbl	bbl	m/min	m/min	m/min	
Surface	80.5	19.750	5.000	4.275	100	5	93	98.9	5.0	62.6	LAMINAR
82.0	778.3	8.681	5.000	4.275	187	45	122	98.9	36.9	109.1	LAMINAR
860.3	231.7	8.681	3.500	2.750	56	6	46	239.1	28.7	94.1	LAMINAR
1092.0	994.8	6.184	3.500	2.750	121	24	82	239.1	70.2	121.9	LAMINAR
2086.8	21.2	6.184	4.750	2.500	3	0	1	289.3	115.3	154.5	LAMINAR
2108.0	187.0	6.000	4.750	2.500	21	4	8	289.3	134.5	162.8	LAMINAR

Hydrostatic Pressure	3741 psi		
Annular Volume	352 bbl	2749 strokes	61 mins
Pipe Capacity	84 bbl	654 strokes	15 mins
Circulating Volume	436 bbl	3403 strokes	76 mins
Pipe Displacement	52 bbl		
Total Hole Volume	488 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm	:	232	234	236	238	240	242	244	246	248	250	252
Flow Regime at TD		:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec	:	81.5	82.2	82.9	83.6	84.3	85.0	85.7	86.4	87.1	87.8	88.5
Impact Force	lbf	:	308.4	313.7	319.1	324.5	330.0	335.5	341.1	346.7	352.4	358.1	363.8
Hydraulic Power	hhp	:	83.0	85.1	87.3	89.6	91.9	94.2	96.5	98.9	101.4	103.8	106.3
Bit Loss	psi	:	613	624	635	646	656	667	679	690	701	712	724
% Bit Loss		:	42.1	42.2	42.3	42.5	42.6	42.7	42.8	43.0	43.1	43.2	43.3
Pipe Loss	psi	:	623	632	641	651	660	670	679	689	699	709	718
Annular Loss	psi	:	202	203	204	205	206	207	208	209	210	211	212
Cuttings Loss	psi	:	17	17	16	16	16	16	16	16	16	15	15
Surface Loss	psi	:	2	2	2	3	3	3	3	3	3	3	3
Total Loss	psi	:	1458	1478	1499	1520	1541	1563	1584	1606	1628	1650	1671
Circ Pressure	psi	:	3960	3961	3961	3962	3963	3964	3965	3965	3966	3967	3968
ECD @ TD	sg	:	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.22
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	:	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22

Recommended Minimum Flow to maintain cuttings transport in top section is 90 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 293 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sat Apr 3 23:36:01 1993

UT DATA

raulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	11 in/32
Depth	2362.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	11 in/32
Vertical Depth	2356.2 m	Mud Density	1.15 sg	Jet 3	11 in/32
Flow Rate	252 gpm	300 rpm viscometer	33	Total Fluid Area	0.2784 in^2
Average ROP	5.1 m/hr	600 rpm viscometer	48		
Cuttings Density	2.45 spc g	Plastic Viscosity	15.00 cP		
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17465 #sec^n/100ft^2		
Cuttings Thickness	0.050 in	Power Law n	0.54057		

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	80.5	19.750	5.000	4.275	100	5	93	103.0	5.2	68.7	LAMINAR
82.0	835.0	8.681	5.000	4.275	201	49	131	103.0	38.4	117.8	LAMINAR
917.0	175.0	8.681	3.500	2.750	42	4	35	248.9	29.9	102.1	LAMINAR
1092.0	1016.0	6.184	3.500	2.750	124	24	83	248.9	73.1	131.2	LAMINAR
2108.0	35.4	6.000	3.500	2.750	4	1	3	248.9	80.0	134.8	LAMINAR
2143.4	218.6	6.000	4.750	2.500	25	4	9	301.2	140.1	173.8	LAMINAR

Hydrostatic Pressure	3851 psi		
Annular Volume	354 bbl	2766 strokes	59 mins
Pipe Capacity	87 bbl	681 strokes	15 mins
Circulating Volume	442 bbl	3447 strokes	74 mins
Pipe Displacement	54 bbl		
Total Hole Volume	496 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	242	244	246	248	250	252	254	256	258	260	262
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	85.0	85.7	86.4	87.1	87.8	88.5	89.2	89.9	90.6	91.3	92.0
Impact Force	lbf :	335.5	341.1	346.7	352.4	358.1	363.8	369.6	375.4	381.3	387.3	393.3
Hydraulic Power	hhp :	94.2	96.5	98.9	101.4	103.8	106.3	108.9	111.5	114.1	116.8	119.5
Bit Loss	psi :	667	679	690	701	712	724	735	747	759	770	782
% Bit Loss	:	41.4	41.5	41.7	41.8	41.9	42.0	42.2	42.3	42.4	42.5	42.6
Pipe Loss	psi :	682	691	701	710	720	730	740	750	760	770	780
Annular Loss	psi :	244	245	246	247	248	249	251	252	253	254	255
Cuttings Loss	psi :	17	17	16	16	16	16	16	16	16	15	15
Surface Loss	psi :	3	3	3	3	3	3	3	3	3	3	3
Total Loss	psi :	1613	1634	1656	1678	1700	1722	1744	1767	1789	1812	1835
c Pressure	psi :	4111	4112	4113	4114	4115	4116	4117	4118	4119	4120	4121
@ TD	sg :	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.23	1.23	1.23	1.23
@ Shoe	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ Weakest Depth	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ TD (cuttings)	sg :	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23

Recommended Minimum Flow to maintain cuttings transport in top section is 78 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 313 gpm

EXLOG DRILLBYTE EAP : MUD HYDRAULICS ANALYSIS

Data Printed on : Sun Apr 4 18:26:05 1993

INPUT DATA

Hydraulics Model	POWER LAW	Casing Shoe Depth	2108.0 m	Jet 1	11 in/32
Depth	2425.0 m	Weakest Fmtn Depth	2108.0 m	Jet 2	11 in/32
Vertical Depth	2419.2 m	Mud Density	1.15 sg	Jet 3	11 in/32
Flow Rate	255 gpm	300 rpm viscometer	33	Total Fluid Area	0.2784 in^2
Average ROP	5.5 m/hr	600 rpm viscometer	48		
Cuttings Density	2.45 spc g	Plastic Viscosity	15.00 cP		
Cuttings Diameter	0.200 in	Yield Point	18.00 #/100ft^2		
Cuttings Shape	SPHERICAL	Power Law k	1.17465 #sec^n/100ft^2		
Cuttings Thickness	0.050 in	Power Law n	0.54057		

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	80.5	19.750	5.000	4.275	100	5	93	104.2	5.2	68.7	LAMINAR
82.0	898.0	8.681	5.000	4.275	216	52	140	104.2	38.8	117.8	LAMINAR
980.0	112.0	8.681	3.500	2.750	27	3	22	251.9	30.3	102.1	LAMINAR
1092.0	1016.0	6.184	3.500	2.750	124	24	83	251.9	73.9	131.2	LAMINAR
2108.0	98.4	6.000	3.500	2.750	11	2	7	251.9	81.0	134.8	LAMINAR
2206.4	218.6	6.000	4.750	2.500	25	4	9	304.8	141.8	173.8	LAMINAR

Hydrostatic Pressure	3954 psi		
Annular Volume	356 bbl	2782 strokes	59 mins
Pipe Capacity	91 bbl	710 strokes	15 mins
Circulating Volume	447 bbl	3491 strokes	74 mins
Pipe Displacement	56 bbl		
Total Hole Volume	503 bbl		

HYDRAULICS RESULTS AT VARIOUS FLOW RATES

Flow Rate	gpm :	245	247	249	251	253	255	257	259	261	263	265
Flow Regime at TD	:	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM	LAM
Jet Velocity	m/sec :	86.1	86.8	87.5	88.2	88.9	89.6	90.3	91.0	91.7	92.4	93.1
Impact Force	lbf :	343.9	349.5	355.2	360.9	366.7	372.5	378.4	384.3	390.3	396.3	402.3
Hydraulic Power	hhp :	97.7	100.1	102.6	105.1	107.6	110.2	112.8	115.4	118.1	120.9	123.7
Bit Loss	psi :	684	695	707	718	730	741	753	765	776	788	800
% Bit Loss	:	41.2	41.4	41.5	41.6	41.8	41.9	42.0	42.1	42.2	42.3	42.5
Pipe Loss	psi :	699	709	719	728	738	748	758	769	779	789	800
Annular Loss	psi :	254	256	257	258	259	260	261	262	263	264	266
Cuttings Loss	psi :	18	18	18	17	17	17	17	17	17	17	16
Surface Loss	psi :	3	3	3	3	3	3	3	3	3	3	3
Total Loss	psi :	1659	1680	1702	1725	1747	1769	1792	1815	1838	1862	1885
Circ Pressure	psi :	4226	4227	4228	4229	4230	4231	4232	4233	4234	4235	4236
ECD @ TD	sg :	1.22	1.22	1.22	1.22	1.23	1.23	1.23	1.23	1.23	1.23	1.23
ECD @ Shoe	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ Weakest Depth	sg :	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ECD @ TD (cuttings)	sg :	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23

Recommended Minimum Flow to maintain cuttings transport in top section is 79 gpm
Recommended Maximum Flow to maintain laminar flow in lowest section is 313 gpm

APPENDIX VIII: Geological-Engineering Morning Reports

DRILLBYTE MORNING REPORT NO 1

EXLOG A Baker Hughes company

COMPANY	BHP Petroleum	WELL	MINERVA - 1
DATE	08.03.93	TIME	24:00hrs
DEPTH	105m.	LAST REPORT DEPTH	-
RIG OPERATIONS	Trouble shoot electrical fault.		
REPORT BY	Matt Sale	REPORT RECEIVED BY	J.Dickson/J.Boorman (OPTR)

DRILLING REPORT

Bit No.	NB#1	Type	Sec S3J	Size	36" in	Jets	2x24,HO 5x20		
On Bit: Distance	23.0 m	Hours	0:39 hh:mm	ROP	21 - 156 m/hr	WOB	0 - 10 klb	RPM	75 - 80
Pump Press	1120 psi	SPM	200	Torque	250-470	TBR	2804	CP I:#	-
CP B:#	-								

HYDRAULICS REPORT

Mud Density In	1.03 sg	Mud Density out	- sg	ECD	1.03 sg	PV/YP	1/1
Gels	-	Salinity	800 PPM Cl	Solids	-		
Hole Volume	95 bbl	Annular Volume	90 bbl	Tubing Volume	3 bbl	Displaced Volume	13 bbl
Carbide Lag-Calculated Lag	703 stks	Flowrate	1050 gpm				
DrillPipe Annular Vel (Max. Dia. Sec.)	3.2 m/min	DrillPipe Annular Vel (Open Hole)	-				
Drill Collar Annular Vel (Open Hole)	6.4 m/min	Critical Vel	25.2 m/min				
Pressure Loss System	1150 psi	Pressure Loss Bit	-	% Pressure Loss	-		
Nozzle Vel	-	Jet Impact Force	-	HHP	-		

PRESSURE PARAMETERS

Drilling Exponent	0.30 - 0.67	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	Min. Estimated Pore Pressure (Open Hole)	1.03	@	-
Max. Estimated Pore Pressure (Open Hole)	1.03 sg	@	TD	Estimated Fracture Pressure at TD	-

COMMENTS Spud Minerva -1 at 11:58 hrs.
Drill 36.0" hole from 82 - 105m.
Sweep hole with 50 bbls hi-vis.
POOH with 26.0" bit and 36.0" hole opener
M/up 9.875" bit and RIH.
Electrical fault with drawworks - trouble shoot same.

EXLOG
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DRILLBYTE MORNING REPORT NO 2

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 09.03.93 TIME 24:00 hrs

DEPTH 560m LAST REPORT DEPTH 105m

RIG OPERATIONS Cmt 30" casing.

REPORT BY M.Sale REPORT RECEIVED BY G.Howard/J.Boorman (OPTR)

DRILLING REPORT

Bit No. NB#2 (pilot hole) Type Sec S33GF Size 9.875 in Jets 3 x 16

On Bit: Distance 455 m Hours 3:32 hh:mm ROP 27 - 550 m/hr WOB 0 - 15 RPM 120

Pump Press 1750 psi SPM 150 Torque 100-200 TBR 25,298 CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.03 sg Mud Density out - sg ECD 1.06 sg PV/YP 1/1

Gels - Salinity 800 PPM Cl Solids -

Hole Volume 236 bbl Annular Volume 190 bbl Tubing Volume 28 bbl Displaced Volume 25 bbl

Carbide Lag-Calculated Lag 1483 stks Flowrate 760 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 4.5 m/min DrillPipe Annular Vel (Open Hole) 79.9 m/min

Drill Collar Annular Vel (Open Hole) 169.4 m/min Critical Vel 27.0 m/min

Pressure Loss System 1750 psi Pressure Loss Bit 1317 psi % Pressure Loss 75.25

Nozzle Vel 126.2 m/sec Jet Impact Force 1400.8 lbf HHP 583.7 hp

PRESSURE PARAMETERS

Drilling Exponent 0.28 - 1.19 Flowline Temp -

Shale Density - Shale Factor -

Background Gas - Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill 4m (see below) 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 Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD -

COMMENTS RIH & stabbed into 36" hole w/ROV aid. RIH to 105m.
Drill 9.875" hole f/105 - 551m - sweep 15 bbl hi-vis on half & full stds.
Drill 551 - 560m. pump 50 bbl hi-vis sweep. Drop survey.
POOH.
P/up 36" BHA & RIH - tag at 101m (4m fill)
Drill 36" f/ 105 - 114m & 26" hole to 115m. Sweep pills.
Pump 100 bbl hi-vis & spot 150 bbl hi-vis on btm. POOH f/ 114m.
M/up 30" R/tool. Run 30" csg - hang up at 102m - work thru same. Land csg.
Cmt as per programme.

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DRILLBYTE MORNING REPORT NO 3

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 10.03.93 TIME 24:00hrs

DEPTH 560m LAST REPORT DEPTH 560m

RIG OPERATIONS Cmt 13.375" csg.

REPORT BY Matt Sale REPORT RECEIVED BY G.Howard/J.Boorman (OPTR)

DRILLING REPORT

Bit No. NB#3 Type Sec SS44G Size 17.500 in Jets 3 x 18

On Bit: Distance 445.0 m Hours 3:01 hh:mm ROP 10 - 350 m/hr WOB 10 - 20 klb RPM 120

Pump Press 2700 psi SPM 200 Torque 100-600 TBR - CP I:$ - CP B:$ -

HYDRAULICS REPORT

Mud Density In 1.03 sg Mud Density out 0.00 sg ECD 1.03 sg PV/YP 1/1

Gels - Salinity 800 PPM Cl Solids -

Hole Volume 515 bbl Annular Volume 423 bbl Tubing Volume 27 bbl Displaced Volume 32 bbl

Carbide Lag-Calculated Lag 3302 stks Flowrate 1080 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 10.6 m/min DrillPipe Annular Vel (Open Hole) 28.8 m/min

Drill Collar Annular Vel (Open Hole) 37.4 m/min Critical Vel 25.5 m/min

Pressure Loss System 2700 psi Pressure Loss Bit 1661 psi % Pressure Loss 62

Nozzle Vel 141.7 m/sec Jet Impact Force 2235.1 lbf HHP 1045.6 hp

PRESSURE PARAMETERS

Drilling Exponent - Flowline Temp -

le 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 Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD -

COMMENTS M/up 17.5" bit to 9.5" DC's - attach guide ropes and stab
into wellhead. ROV observe same. Drill shoe & cmt from 114 - 115m.
Open 9.875" pilot hole to 17.5" f/ 115 - 517m. Pump 20 bbls hi-vis at
half & full std. Cont open hole to 560m. Sweep w/250bbl hi-vis & spot
630 bbl hi-vis & wt mud on btm. Drop survey. POOH w/ no drag.
R/up & run 13.375" csg. Land same.
Circ hole @ 80 spm (350 psi) for 30 mins.
Cmt as per programme. Bump plug w/ 1500 psi

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DRILLBYTE MORNING REPORT NO 4

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 11.03.93 TIME 24:00 hrs

DEPTH 560m LAST REPORT DEPTH 560m

RIG OPERATIONS Testing BOP's

REPORT BY Matt Sale REPORT RECEIVED BY G.Howard/T.How (OPTR)

DRILLING REPORT

Bit No. - Type - Size - in Jets -

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In - sg Mud Density out - 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 Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD -

COMMENTS

Disconnect cmt hose & back out r/tool.
POOH.
R/up and install BOP's and riser.
Install choke & kill lines.
M/up test plug & RIH.
Test BOP's to BHP specification.

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DRILLBYTE MORNING REPORT NO 5

COMPANY	BHP Petroleum	WELL	MINERVA - 1
DATE	12.03.93	TIME	24:00 hrs
DEPTH	765m	LAST REPORT DEPTH	560m
RIG OPERATIONS	Drilling ahead.		
REPORT BY	Matt Sale	REPORT RECEIVED BY	G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#4 Type HTC ATM11HG Size 12.250 in Jets 13, 16, 18

On Bit: Distance 205m m Hours 6:24 hh:mm ROP 3 - 545 m/hr WOB 10 - 30 klb RPM 120-140

Pump Press 2600 psi SPM 140 Torque 150-370 TBR 44,613 CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.09 sg Mud Density out 1.09 sg ECD 1.10 sg PV/YP 17/18

Gels 5/12 Salinity 31000 PPM Cl Solids 5.5

Hole Volume 430 bbl Annular Volume 351 bbl Tubing Volume 37 bbl Displaced Volume 42 bbl

Carbide Lag-Calculated Lag 2743 stks Flowrate 753 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 15.4 m/min DrillPipe Annular Vel (Open Hole) 45.5 m/min

Drill Collar Annular Vel (Open Hole) 68.6 m/min Critical Vel 118.2 m/min

Pressure Loss System 2600 psi Pressure Loss Bit 1439 psi % Pressure Loss 55

Nozzle Vel 128.2 m/sec Jet Impact Force 1492.2 lbf HHP 631.6 hp

PRESSURE PARAMETERS

Drilling Exponent 0.10 - 1.33 Flowline Temp 42.2 deg C

Shale Density - Shale Factor -

Background Gas Nil Max. Formation Gas - @ - Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.746 sg Min. Estimated Fracture Pressure (Open Hole) 1.875 sg at 651m

Estimated Pore Pressure 1.03 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD 1.913 sg

COMMENTS

All pore pressure indicators remain normal.
Continue BOP test. POOH w/ test plug & l/out same.
L/out 17.5" bit & BHA, p/up 12.25" BHA & bit.
Test rwd memory. Test mwd on rig pumps.
Continue RIH and tag TOC @ 522.73m. Drill out same w/flt & shoe at 549m.
Displace hole w/KCL mud. Drill out rathole 549 - 560m.
Sweep hole clean. Drill new 12.25" hole f/ 560 - 563m.
Pump back inside shoe, circ intil mud weight balanced.
Perform LOT - Applied 825psi, MW = 1.08sg, Frac Grad = 2.13 sg EQMW.

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DRILLBYTE MORNING REPORT NO 6

COMPANY BHP Petroluem WELL MINERVA - 1

DATE 13.03.93 TIME 24:00 hrs

DEPTH 1204m LAST REPORT DEPTH 765m

RIG OPERATIONS Circ BU.

REPORT BY Matt Sale REPORT RECEIVED BY G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#4 Type HTC ATM11HG Size 12.250 in Jets 13,16,18

On Bit: Distance 644m m Hours 22:28 hh:mm ROP 6 - 353 m/hr WOB 10 - 35 klbs RPM 140

Pump Press 2850 psi SPM 140 Torque 200 - 450 TBR 173,938 CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.13 sg Mud Density out 1.13 sg ECD 1.14 PV/YP 18/21

Gels 6/14 Salinity 27000 PPM Cl Solids 6.6%

Hole Volume 727 bbl Annular Volume 612 bbl Tubing Volume 63 bbl Displaced Volume 52 bbl

Carbide Lag-Calculated Lag 4781 stks (carbide) Flowrate 755 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 15.5 m/min DrillPipe Annular Vel (Open Hole) 45.6 m/min

Drill Collar Annular Vel (Open Hole) 68.8 m/min Critical Vel 127.2 m/min

Pressure Loss System 2850 psi Pressure Loss Bit 1499 psi % Pressure Loss 53

Nozzle Vel 128.5 m/sec Jet Impact Force 1555.1 lbf HHP 660.0 hp

PRESSURE PARAMETERS

Drilling Exponent 0.4 - 1.66 Flowline Temp 51.6 deg C

Shale Density - Shale Factor -

Background Gas 0.20 % Max. Formation Gas 1.13 % @ 1183m Trip Gas - @ -

Other Gas Connx gases @ 1081.5,1110.5,1139.5,1168.9,1198.1m of 0.11,0.43,0.04,1.23,0.12% respectively

Fill - Tight Hole See below.

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.40 sg Min. Estimated Fracture Pressure (Open Hole) 1.875 sg at 651m

Estimated Pore Pressure 1.03 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ 549m

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD 2.006 sg

COMMENTS

All pore pressure parameters remain normal.
Cont drill 765 - 1056m. Wash connxs - FLC drill breaks.
Cont drill 1056 - 1204m. Wash/ream ea connx & FLC.
Incr Mud weight to 1.13sg at 19:00hrs.
Circ & cond mud until hole clean. POOH f/ 1204 - 1084m
w/ overpull 10 - 40 klbs. Swab 2 bbls @ 1084m.
RIH & pump 1084 - 967m. Cont POOH to 909m - ok.
RIH. CBU.

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DRILLBYTE MORNING REPORT NO 7

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 14.03.93 TIME 24:00hrs

DEPTH 1204m LAST REPORT DEPTH 1204m

RIG OPERATIONS Prepare to run 9.625" csg.

REPORT BY Matt Sale REPORT RECEIVED BY G.Howard (OPTR)

DRILLING REPORT

Bit No. - 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:0 - CP B:0 -

HYDRAULICS REPORT

Mud Density In 1.13 sg Mud Density out 0.00 sg ECD - PV/YP 18/21

Gels 6/14 Salinity 27000 PPM Cl Solids 6.50%

Hole Volume 727 bbl 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 WTG =1.53% @ 1204m

Other Gas Nil

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.40 sg Min. Estimated Fracture Pressure (Open Hole) 1.875 sg at 651m

Estimated Pore Pressure 1.03 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD 2.006 sg

COMMENTS

Continue CBU. WTG = 1.53%.
POOH to log. Hole ok.
Dump memory on mwd.
R/up Schlumberger Log#1 DLL-MSFL-AS-GR-AMS
Log#2 VSP
Log#3 CST (100% recovery)
Retrieve wear bushing.
M/up 9.625" hanger and cmt head.

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DRILLBYTE MORNING REPORT NO 8

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 15.03.93 TIME 24:00 hrs

DEPTH 1204m LAST REPORT DEPTH 1204m

RIG OPERATIONS M/up 8.5" BHA.

REPORT BY Matt Sale REPORT RECEIVED BY G. Howard (OPTR)

DRILLING REPORT

Bit No. - Type - Size - in Jets -

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:8 - CP B:8 -

HYDRAULICS REPORT

Mud Density In 1.12 sg Mud Density out - sg ECD - PV/YP 19/20

Gels 5/10 Salinity 26000 PPM Cl Solids 6.50%

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 0.41 Min. Estimated Fracture Pressure (Open Hole) 1.875 sg at 651m

Estimated Pore Pressure 1.03 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.03sg @ TD Estimated Fracture Pressure at TD 2.006 sg

COMMENTS

R/up and run 9.625" casing.
Land same.
Connect up cmt line.
Circ prior to cmt job.
R/up and test cmt lines.
Cmt casing.
Break down 12.25" BHA.

EXLOG
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DRILLBYTE MORNING REPORT NO 9

COMPANY: BHP Petroleum — WELL: MINERVA - 1

DATE: 16.03.93 — TIME: 24:00 hrs

DEPTH: 1329m — LAST REPORT DEPTH: 1204m

RIG OPERATIONS: Drilling ahead 8.5" hole.

REPORT BY: Matt Sale — REPORT RECEIVED BY: G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#6 — Type: Hycalog DS61H — Size: 8.500 in — Jets: 3x12,11,10

On Bit: Distance: 120 m — Hours: 3:33 hh:mm — ROP: 2 - 75 m/hr — WOB: 5 - 30 klb — RPM: 75 - 135

Pump Press: 2000 psi — SPM: 90 — Torque: 200-450 — TBR: - — CP I:$: - — CP B:$: -

HYDRAULICS REPORT

Mud Density In: 1.12 sg — Mud Density out: 1.12 sg — ECD: 1.18 sg — PV/YP: 16/18

Gels: 5/8 — Salinity: 27000 PPM Cl — Solids: 6.8%

Hole Volume: 398 bbl — Annular Volume: 280 bbl — Tubing Volume: 68 bbl — Displaced Volume: 50 bbl

Carbide Lag-Calculated Lag: 2187 stks (calc) — Flowrate: 485 gpm

DrillPipe Annular Vel (Max. Dia. Sec.): 9.9 m/min — DrillPipe Annular Vel (Open Hole): -

Drill Collar Annular Vel (Open Hole): 120.8 m/min — Critical Vel: 150.8 m/min

Pressure Loss System: 2000 psi — Pressure Loss Bit: 807 psi — % Pressure Loss: 40

Nozzle Vel: 94.7 m/sec — Jet Impact Force: 729.6 lbf — HHP: 228.1 hp

PRESSURE PARAMETERS

Drilling Exponent: 0.69 - 1.85 — Flowline Temp: 39.8 deg C

Shale Density: - — Shale Factor: -

Background Gas: 0.15 % — Max. Formation Gas: 0.24 % @ 1270m — Trip Gas: 0.20% @ 1209m

Other Gas: Nil

Fill: Nil — Tight Hole: -

Cavings Est %: - — Average Size: -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance: 0.73 sg — Min. Estimated Fracture Pressure (Open Hole): 1.94 sg at shoe

Estimated Pore Pressure: 1.03 sg — Min. Estimated Pore Pressure (Open Hole): 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole): 1.03 sg @ TD — Estimated Fracture Pressure at TD: 1.964 sg

COMMENTS

All pore pressure indicators are normal.

Cont m/up 8.5" BHA & RIH. Tag TOC @ 1162m.

Drill same w/ flt, frm cmt & shoe. Clean out rathole.

Drill 3 m new hole f/1204-1207m. Work sunk sub. CBU.

Perform LOT - 1.94sg EQMD. RIH to 1207m. Work junk sub.

Drill new hole f/1207-1209m. Work junk sub.

FLC, pump slug, POOH.

M/up NB#6 & BHA and RIH to bottom.

Drill ahead new hole from 1209 - 1329m.

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DRILLBYTE MORNING REPORT NO 10

COMPANY: BHP Petroleum
WELL: MINERVA - 1
DATE: 17.03.93
TIME: 24:00 hrs
DEPTH: 1747m
LAST REPORT DEPTH: 1329m
RIG OPERATIONS: Drilling ahead.
REPORT BY: Matt Sale
REPORT RECEIVED BY: G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#6 | Type: Hycalog DS61H | Size: 8.500 in | Jets: 3x12,11,10
On Bit: Distance: 538 m | Hours: 21:15 hh:mm | ROP: 2 - 83 m/hr | WOB: 2 - 18 klb | RPM: 80 - 180
Pump Press: 2300 psi | SPM: 98 | Torque: 225-560 | TBR: - | CP I:0: - | CP B:0: -

HYDRAULICS REPORT

Mud Density In: 1.16 sg | Mud Density out: 1.16 sg | ECD: 1.23 | PV/YP: 19/24
Gels: 7/26 | Salinity: 34000 | PPM Cl | Solids: 7.6%
Hole Volume: 494 bbl | Annular Volume: 342 bbl | Tubing Volume: 92 bbl | Displaced Volume: 60 bbl
Carbide Lag-Calculated Lag: 2673 stks (calc) | Flowrate: 530 gpm
DrillPipe Annular Vel (Max. Dia. Sec.): 10.9 m/min | DrillPipe Annular Vel (Open Hole): 86.2 m/min
Drill Collar Annular Vel (Open Hole): 132.0 m/min | Critical Vel: 174.5 m/min
Pressure Loss System: 2300 psi | Pressure Loss Bit: 998 psi | % Pressure Loss: 43.4%
Nozzle Vel: 103.5 m/sec | Jet Impact Force: 902.4 lbf | HHP: 308.4 hp

PRESSURE PARAMETERS

Drilling Exponent: 0.45 - 1.49 | Flowline Temp: 52.6 deg C
Shale Density: - | Shale Factor: -
Background Gas: 0.15% | Max. Formation Gas: 4.5% @ 1659m | Trip Gas: - @ -
Other Gas: Connx gas recorded from 1364m to max of 0.08% above background
Fill: - | Tight Hole: -
Cavings Est %: Tr to 20% | Average Size: 20x10mm

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance: 0.71 sg | Min. Estimated Fracture Pressure (Open Hole): 1.909 sg at 1648m
Estimated Pore Pressure: 1.14 sg | Min. Estimated Pore Pressure (Open Hole): 1.03 sg @ shoe
Max. Estimated Pore Pressure (Open Hole): 1.14+ sg @ TD | Estimated Fracture Pressure at TD: 1.996 sg

COMMENTS: Indications of overpressure from DXC (unreliable with PDC bit), some overpressure & stress relief-type cavings seen at shakers, plus the occurance of connx gases.
Qualification of pore pressure difficult, but estimated to be between 1.13 and 1.14 sg.
New minimum fracture gradient recorded on entering sandstone at 1648m of 1.909sg.
Drill ahead from 1329-1559m - FLC connx & drilling breaks.
Drill 1559-drill break at 1648m. Drill 6m to 1654m.FLC & CBU sample.
Drill ahead from 1654-1747m. - Survey every 3rd connx.

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DRILLBYTE MORNING REPORT NO 11

COMPANY	BHP Petroleum	WELL	MINERVA - 1
DATE	18.03.93	TIME	24:00 hrs
DEPTH	1828 m	LAST REPORT DEPTH	1747m
RIG OPERATIONS	Making up Core barrel + RIH.		
REPORT BY	Andre Thangam	REPORT RECEIVED BY	G. Howard (OPTR)

DRILLING REPORT

Bit No. CB#1 Type DBS CD93 Size 8.500 in Jets 9x9

On Bit: Distance 7.1 m Hours 0:59 hh:mm ROP 7 m/hr WOB 6-27 klb RPM 93-146

Pump Press 750 psi SPM 42-51 Torque 158-421 TBR 7044 CP I:# 5145 CP B:# 11534

HYDRAULICS REPORT

Mud Density In 1.17 sg Mud Density out 1.17 sg ECD 1.22 sg PV/YP 18/26

Gels 8/28 Salinity 34000 PPM Cl Solids 8.5%

Hole Volume 513 bbl Annular Volume 354 bbl Tubing Volume 99 bbl Displaced Volume 60 bbl

Carbide Lag-Calculated Lag 2767 stk Flowrate 274 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5.6 m/min DrillPipe Annular Vel (Open Hole) 44 m/min

Drill Collar Annular Vel (Open Hole) 65 m/min Critical Vel 171 m/min

Pressure Loss System 602 psi Pressure Loss Bit 214 psi % Pressure Loss 29%

Nozzle Vel 48 m/sec Jet Impact Force 216 lbf HHP 34 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.31-1.94 Flowline Temp 45.5 deg C

Shale Density - Shale Factor -

Background Gas 0.5% Max. Formation Gas 0.9% @ 1824m Trip Gas @

Other Gas CG @ 1771m & 1800m, with 0.08% above background gas. Max Gas @ 1811m = 2.00%.

Fill - Tight Hole

Cavings Est % Average Size

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.62 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg at 1811m

Estimated Pore Pressure 1.14 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.14+ sg @ TD Estimated Fracture Pressure at TD 1.803 sg

COMMENTS

Cont drill f/ 1747m-1821m. FLC, Circ BU.
Pump slug. POOH.
M/u core barrel + RIH to cut core.
Wash + ream f/ 1707m to 1821m.
Pump slug + POOH to change bit + BHA
Break off bit, core barrel, L/d 9m barrel.
M/u CB#2 onto 18m core barrel.
RIH.

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DRILLBYTE MORNING REPORT NO 12

COMPANY: BHP Petroleum — WELL: MINERVA - 1

DATE: 19.03.93 — TIME: 0130hr

DEPTH: 1847m — LAST REPORT DEPTH: 1828m

RIG OPERATIONS: Coring run #3

REPORT BY: Andre Thangam — REPORT RECEIVED BY: G. Howard (OPTR)

DRILLING REPORT

Bit No. CB#3 — Type DBS CD502 — Size 8.500 in — Jets 9x9

On Bit: Distance 4.5 m — Hours 0:08 hh:mm — ROP 3.98 m/hr — WOB 9-20 — RPM 72-114

Pump Press 200-740psi — SPM 36 — Torque 122-385amp — TSR 6100 — CP I:6 4755 — CP B:6 18253

HYDRAULICS REPORT

Mud Density In 1.15 sg — Mud Density out 1.16 sg — ECD 1.17 — PV/YP 15/18

Gels 4/15 — Salinity 34000 PPM Cl — Solids 9.1%

Hole Volume 517 bbl — Annular Volume 357 bbl — Tubing Volume 99 bbl — Displaced Volume 61 bbl

Carbide Lag-Calculated Lag 3012 stk — Flowrate 108 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 2.2 m/min — DrillPipe Annular Vel (Open Hole) 17 m/min

Drill Collar Annular Vel (Open Hole) 27 m/min — Critical Vel 153 m/min

Pressure Loss System 186 psi — Pressure Loss Bit 33 psi — % Pressure Loss 17 %

Nozzle Vel 19 m/sec — Jet Impact Force 33 lbf — HHP 2 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.9-1.44 — Flowline Temp 43.6 deg C

Shale Density - — Shale Factor -

Background Gas 0.3% — Max. Formation Gas 0.7% @ 1843m — Trip Gas 1.03% @ 1842.5m

Other Gas TG @ 1828m=0.31%

Fill - — Tight Hole -

Cavings Est % - — Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.61 sg — Min. Estimated Fracture Pressure (Open Hole) 1.803 sg @ 1811m

Estimated Pore Pressure 1.14 sg — Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.14+ sg @ TD — Estimated Fracture Pressure at TD 1.803 sg

COMMENTS

RIH w/ CB#2. Hole in Good cond. Precautionary ream f/ 1796 to 1828m.
Torq increase f/ 1821m. Circ 5 min. Drop ball.
Cut core#2 f/ 1828-1842.5M. Pump slug + POOH. Tight hole @ 1660m. 70 klb o/p.
Flow check @ shoe. Hole good. Cont. POOH.
Recover core. service TDS. M/up core barrel + RIH w/ CB#3
Wash + reqm to bottom, circ for 5 min.
Drop ball + cut core#3 from 1842.5m to 1847m (0119hrs). Midnight depth=1843m

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DRILLBYTE MORNING REPORT NO 13

COMPANY BHP Petroleum WELL MINERVA - 1

ATE 20.03.93 TIME 2400hr

DEPTH 1971m LAST REPORT DEPTH 1847m

RIG OPERATIONS Drilling Ahead

REPORT BY Andre Thangam REPORT RECEIVED BY G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#7 Type HTC ATM22 Size 8.500 in Jets 3x12

On Bit: Distance 124 m Hours 12:04 hh:mm ROP 10.3 m/hr WOB 10-28 klb RPM 81-121

Pump Press 2500 psi SPM 85 Torque 119-608 TBR 91349 CP I:# 1015 CP B:# 1360

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.16 sg ECD 1.20 PV/YP 15/18

Gels 5/25 Salinity 45000 PPM Cl Solids 9.4%

Hole Volume 549 bbl Annular Volume 378 bbl Tubing Volume 106 bbl Displaced Volume 65 bbl

Carbide Lag-Calculated Lag 2950 stk Flowrate 457 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 9.4 m/min DrillPipe Annular Vel (Open Hole) 73 m/min

Drill Collar Annular Vel (Open Hole) 113 m/min Critical Vel 146 m/min

Pressure Loss System 2415 psi Pressure Loss Bit 1681 psi % Pressure Loss 67 %

Nozzle Vel 135 m/sec Jet Impact Force 1005 lbf HHP 448 hhp

PRESSURE PARAMETERS

Drilling Exponent 1-1.48 Flowline Temp 54.6 deg C

Shale Density - Shale Factor -

Background Gas 0.04% Max. Formation Gas 1.55% @ 1908m Trip Gas 0.62% @ 1847m

Other Gas

Fill - Tight Hole -

Cavings Est % Average Size

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.60 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg @ 1811m

Estimated Pore Pressure 1.14sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.14+ @ TD Estimated Fracture Pressure at TD 1.81sg

COMMENTS Cont cut Core#3 to 1847m. Bit stopped drilling.
Pump slug + POOH. Hole Good. Taking Good mud.
Recover core.
M/u NB#7. RIH to 1810m. Ream while taking MWD from 1810-1847m
Drill f/ 1847m to 1971m.
Survey each connection.

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DRILLBYTE MORNING REPORT NO 14

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 21.03.93 TIME 2400hr

DEPTH 2031m LAST REPORT DEPTH 1971m

RIG OPERATIONS Run E-Logs.

REPORT BY Andre Thangam REPORT RECEIVED BY G. Howard (OPTR)

DRILLING REPORT

Bit No. NB#7 Type HTC ATM22 Size 8.500 in Jets 3x12

On Bit: Distance 184.0 m Hours 18:49 hh:mm ROP 9.8 m/hr WOB 18-27 klb RPM 107-141

Pump Press 2500 psi SPM 85 Torque 159-602 TBR 142963 CP I:$ 3124 CP B:$ 1237

HYDRAULICS REPORT

Mud Density In 1.13 sg Mud Density out 1.15 sg ECD 1.19 PV/YP 12/18

Gels 5/25 Salinity 45000 PPM Cl Solids 8.0%

Hole Volume 560 bbl Annular Volume 385 bbl Tubing Volume 109 bbl Displaced Volume 66 bbl

Carbide Lag-Calculated Lag 3003 stk Flowrate 458 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 9.4 m/min DrillPipe Annular Vel (Open Hole) 73 m/min

Drill Collar Annular Vel (Open Hole) 114m/min Critical Vel 146 m/min

Pressure Loss System 2425 psi Pressure Loss Bit 1688 psi % Pressure Loss 67.5 %

Nozzle Vel 135 m/sec Jet Impact Force 1010 lbf HHP 451 hhp

PRESSURE PARAMETERS

Drilling Exponent 1.22 - 1.72 Flowline Temp 55.2 deg C

Shale Density - Shale Factor -

Background Gas 0.06% Max. Formation Gas 0.14% @ 2024m Trip Gas - @ -

Other Gas

Fill - Tight Hole -

Cavings Est % Average Size

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.58 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg @ 1811m

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.14 sg @ 1800m Estimated Fracture Pressure at TD 1.84sg

COMMENTS Drill to 2031m.
Survey + wash each connection. Flow check, pump slug.
POOH. (Tight @ 1970m, backream to 1830m. Max o/p 70 klb @ 1891m.)
Cont POOH - Flow check @ shoe, cont POOH.
Run wireline logs. Log#1: DLL, MSFL, SAS, GR, AMS
Run log#2: FMS,LDT,CNT,GRMS

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DRILLBYTE MORNING REPORT NO 15

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 22.03.93 TIME 2400 hr

DEPTH 2031m LAST REPORT DEPTH 2031 m

RIG OPERATIONS Runing RFTs

REPORT BY Andre Thangam REPORT RECEIVED BY G. Howard (OPTR)

DRILLING REPORT

Bit No. - Type - Size 8.5 in Jets -

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:# - CP B:# -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out sg ECD PV/YP 15/18

Gels 5/25 Salinity 45000 PPM Cl Solids 9.4%

Hole Volume 560 bbl 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 0.58 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.14 @ 1800m Estimated Fracture Pressure at TD 1.84 sg

COMMENTS

Cont run Logs#2: FMS-LDT-CNT-GRMS

Logs#2: VSP

Logs#4: RFT-GR-AMS

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DRILLBYTE MORNING REPORT NO 16

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 23.03.93 TIME 2400 hr

DEPTH 2031 m LAST REPORT DEPTH 2031 m

RIG OPERATIONS RIH

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#8 Type HT ATM33 Size 8.500 in Jets 3x12

On Bit: Distance 0.0 m Hours 1:00 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:6 - CP B:6 -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 0.00 sg ECD - PV/YP 14/14

Gels 3/20 Salinity 50000 PPM Cl Solids 8.5%

Hole Volume 560 bbl Annular Volume 385 bbl Tubing Volume 109 bbl Displaced Volume 66 bbl

Carbide Lag-Calculated Lag 3003 stk 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 0.58 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850 m Estimated Fracture Pressure at TD 1.84 sg

COMMENTS

Cont. Log#4; RFT-GR-AMS
RFT#2
RFT#3
RFT#4
R/d wireline. Retrieve w/bushing. M/u test plug + RIH + L/o.
Test all rams, valve + ann. to 500/3500 psi. POOH w/ test plug.
Test surface equip. to 500/3500 psi
Set w/bushing. M/u Bit#8. Calibrate + test MWD. Install Howco temp.guage.
RIH.

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DRILLBYTE MORNING REPORT NO 17

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 24.03.93 TIME 2400 hr

DEPTH 2107m LAST REPORT DEPTH 2031m

RIG OPERATIONS Wiper trip

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#8 Type HTC ATM33 Size 8.500 in Jets 3x12

On Bit: Distance 76.0 m Hours 8:09 hh:mm ROP 9.2 m/hr WOB 17-31 RPM 97-103

Pump Press 2600 psi SPM 85-87 Torque 106-519 TBR 56810 CP I:# 810 CP B:# 1852

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.19 PV/YP 17/20

Gels 4/14 Salinity 49000 PPM Cl Solids 8.5 %

Hole Volume 643 bbl Annular Volume 462 bbl Tubing Volume 113 bbl Displaced Volume 68 bbl

Carbide Lag-Calculated Lag 3605 stk Flowrate 467 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 9.6 m/min DrillPipe Annular Vel (Open Hole) 48.4 m/min

Drill Collar Annular Vel (Open Hole) 116 m/min Critical Vel 163 m/min

Pressure Loss System 2520psi Pressure Loss Bit 1755psi % Pressure Loss 67.5 %

Nozzle Vel 138 m/sec Jet Impact Force 1050 lbf HHP 477 hhp

PRESSURE PARAMETERS

Drilling Exponent 1.03-1.58 Flowline Temp 51.4 deg C

Shale Density - Shale Factor -

Background Gas 0.042% Max. Formation Gas 0.085% @ 2074m Trip Gas 1.73% @ 2031m

Other Gas WTG:2.85% @ 2031m

Fill 14m Tight Hole 2072m-1940m

Cavings Est % Average Size

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850m Estimated Fracture Pressure at TD 1.848 sg

COMMENTS Cont RIH to shoe. Circ MWD survey @ start+finish of circ. Circ for halco temp gauge reading.
Cont to 2017, 14m fill. Circ for halco temp guage reading, MWD survey at start, mid, end of circ.
Flow check hole, pump slug + pull back to shoe. R/u + recover temp guage on wireline. RIH.
Cont. drill 8.5" hole from 2031. Flowcheck @ 2099m b/c gain in pits. Flowcheck @ 2106m due to incre ROP.
Circ BU @ 2107m. Flowcheck + POOH. Work thru tight hole f/ 2072-1940m.
Max o/p 100k. (backream ledge @ 1946m)
Cont. POOH. Hole Good Cond.

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DRILLBYTE MORNING REPORT NO 18

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 25.03.93 TIME 2400 hr

DEPTH 2107 m LAST REPORT DEPTH 2107 m

RIG OPERATIONS Pump slug and POOH.

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#9 Type SEC H77SG Size 8.500 in Jets open

On Bit: Distance 0.0 m Hours 0 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:0 - CP B:0 -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.19 PV/YP 18/22

Gels 4/10 Salinity 49000 PPM Cl Solids 9.0%

Hole Volume 643 bbl Annular Volume 462 bbl Tubing Volume 113 bbl Displaced Volume 68 bbl

Carbide Lag-Calculated Lag 3605 stk 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 47.1 deg C

Shale Density - Shale Factor -

Background Gas 0.15 % Max. Formation Gas - @ - Trip Gas 1.78% @ 2107m

Other Gas WTG 8.34% @2107m

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850 m Estimated Fracture Pressure at TD 1.848 sg

COMMENTS Cont. POOH to shoe. RIH to circ. Wash + ream f/ 2093-2107m. Tag bottom.
Circ. hole clean. Flow check,pump slug + POOH. Hole good. R/u wireline.
Log#1 DLL-MSFL-AS-GR-AMS
Log#2 CST
R/d wireline. Slip+cut line. service T/d. M/u BHA. RIH to 2097m-took weight.
Wash+ream to 2107m. Surge for junk.
Circ BU. pump slug, POOH.

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DRILLBYTE MORNING REPORT NO 19

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 27.03.93 TIME 2400 hr

DEPTH 2107 m LAST REPORT DEPTH 2107m

RIG OPERATIONS POOH (wiper trip)

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. RR#9.2 Type SEC H77SG Size 8.500 in Jets Open

On Bit: Distance 0.0 m Hours 0 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:4 - CP B:4 -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.16 sg ECD 1.19 PV/YP 18/22

Gels 4/10 Salinity 48000 PPM Cl Solids 9.0%

Hole Volume 643 bbl Annular Volume 462 bbl Tubing Volume 113 bbl Displaced Volume 68 bbl

Carbide Lag-Calculated Lag 3605 stk 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 46.1 deg C

Shale Density - Shale Factor -

Background Gas 0.28% Max. Formation Gas - @ - Trip Gas 2.7% @ 2107m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850 Estimated Fracture Pressure at TD 1.848 sg

COMMENTS Flow check, POOH, clean out junk sub. M/u 9.625" csg. Scraper RIH to 1180m.
Circ. hole clean, work scraper. POOH. M/u brown cmt head. L/o 6.5" + 8" DC.
M/u BHA, RIH. Fix hydraulic unit for top arm. Cont RIH. Fix hydraulic leak on top arm. Cont RIH t
Wash 5m fill to 2107m, surge for junk. Circ btm up.
Pump slug, POOH.

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DRILLBYTE MORNING REPORT NO 20

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 27.03.93 TIME 2400 hr

DEPTH 2107 m LAST REPORT DEPTH 2107 m

RIG OPERATIONS POOH

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. - 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 1.15 sg Mud Density out 1.15 sg ECD - PV/YP 13/12

Gels 2/4 Salinity 48000 PPM Cl Solids 8.5 %

Hole Volume 466 bbl Annular Volume Tubing Volume Displaced Volume

Carbide Lag-Calculated Lag 3638 stk 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 44.2 deg C

Shale Density - Shale Factor -

Background Gas 0.08% Max. Formation Gas @ Trip Gas 0.5% @ 2102m

Other Gas Circ BU prior to cmt. WTG= 3.64%

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850m Estimated Fracture Pressure at TD 1.848 sg

COMMENTS Cont POOH, FLC @ shoe. Hole Good. R/u, RIH 7" liner to 2102m. Break circ. Packed off. Worked clear. Circ 1.5 times vol. Test lines to 4000psi. Drop ball + attempt to set hanger-unsuccesful. Sheared out ball @ 2200 psi. Circ + work string f/ 2102 to 2107m. Cmt casing while reciprocating pipe. Drop dart + displace cmt while reciprocating. Set casing on bottom @ 2107m. Backed out R/tool. P/u 2m above T.O.L. @ 1090m. Rev circ. 2xDP vol. Dump cmt returns. Pump slug + POOH.

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DRILLBYTE MORNING REPORT NO 21

COMPANY: BHP Petroleum WELL: MINERVA - 1

DATE: 28.03.93 TIME: 2400 hr

DEPTH: 2107 m LAST REPORT DEPTH: 2107 m

RIG OPERATIONS: RIH + drill on Pack off sub.

REPORT BY: Andre Thangam REPORT RECEIVED BY: M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB10 Type HTC J3 Size 6.000 in Jets 3x12

On Bit: Distance 0.0 m Hours 0:00 hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:8 - CP B:8 -

HYDRAULICS REPORT

Mud Density In 1.16 sg Mud Density out 1.16 sg ECD - PV/YP 13/12

Gels 2/4 Salinity 48000 PPM Cl Solids 9 %

Hole Volume 466 bbl 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 42.1 deg C

Shale Density - Shale Factor -

Background Gas Max. Formation Gas @ Trip Gas 0.28% @ 1088 m

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850m Estimated Fracture Pressure at TD 1.848 sg

COMMENTS

Cont. POOH. L/o R/t. B/d + L/o cmt head. M/u RR#10. RIH to 1084.5m. Took weight.
Wash to top of liner at 1092m. Circ hole clean. No cmt. Pump slug POOH.
L/d HWDP & 6.5" DC. R/u and p/u 12x4.75"DC, rack/back in drk.
Rack 4.75" DC & m/u NB#11. RIH, p/u 102 jnt 3.5"d/p to 1082m.
Break circ & wash thru T.O.L. p/off sub at 1094m.
Drill on pack off sub work & push same from 1094 to 1109m.

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DRILLBYTE MORNING REPORT NO 22

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 29.03.93 TIME 2400 hr

DEPTH 2107 m LAST REPORT DEPTH 2107 m

RIG OPERATIONS Set packer + test to 3500 psi., POOH.

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. - Type - Size - in Jets -

On Bit: Distance - m Hours - hh:mm ROP - WOB - RPM -

Pump Press - SPM - Torque - TBR - CP I:0 - CP B:0 -

HYDRAULICS REPORT

Mud Density In 1.16 sg Mud Density out 1.16 sg ECD - PV/YP 14/14

Gels 3/7 Salinity 46000 PPM Cl Solids 9 %

Hole Volume 466 bbl 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 0.56 sg Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850m Estimated Fracture Pressure at TD 1.848 sg

COMMENTS Cont. RIH, pushed p/off sub f/ 1109-2036m. Tag cmt @ 2036m, drill to 2045m to prove cmt in returns. cmt soft, pump slug. POOH. R/up 3.5"DP gear+service TDS. Cont POOH.
R/u + RIH w/ mill tool to TOL @ 1092m. Clean up + work mill on top of liner. Pump slug + POOH.
M/u JM Packer + RIH @ 3min/stand to TOL @ 1092m.
Set JM Packer + test to 3500 psi.

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DRILLBYTE MORNING REPORT NO 23

COMPANY: BHP Petroleum
WELL: MINERVA - 1
DATE: 30.03.93
TIME: 2400 hr
DEPTH: 2107 m
LAST REPORT DEPTH: 2107 m
RIG OPERATIONS:
REPORT BY: Andre Thangam
REPORT RECEIVED BY: M. Imbert (OPTR)

DRILLING REPORT

Bit No. RR10.1 | Type HTC J3 | Size 6.000 in | Jets 3x12

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 1.15 sg | Mud Density out 1.15 sg | ECD 1.21 sg | PV/YP 14/14

Gels 3/7 | Salinity 46000 | PPM Cl | Solids 9 %

Hole Volume 461 bbl | Annular Volume 344 bbl | Tubing Volume 71 bbl | Displaced Volume 45 bbl

Carbide Lag-Calculated Lag 2686 stk | Flowrate 321 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 6.6 m/min | DrillPipe Annular Vel (Open Hole) 49 m/min

Drill Collar Annular Vel (Open Hole) 153 m/min | Critical Vel 146 m/min

Pressure Loss System 2024 psi | Pressure Loss Bit 829 psi | % Pressure Loss 41%

Nozzle Vel 95 m/sec | Jet Impact Force 496 lbf | HHP 155 hhp

PRESSURE PARAMETERS

Drilling Exponent - | Flowline Temp 36.6 degC

Shale Density - | Shale Factor -

Background Gas 0.02% | Max. Formation Gas | @ | Trip Gas 7.14% @ 2108m

Other Gas -

Fill - | Tight Hole -

Cavings Est % - | Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.56 sg | Min. Estimated Fracture Pressure (Open Hole) 1.803 sg

Estimated Pore Pressure 1.10 sg | Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.13 sg @ 1850m | Estimated Fracture Pressure at TD 1.848 sg

COMMENTS

Pump slug while r/up to l/d DP on POOH. POOH.
R/u + RIH w/ w/b R/T. POOH w/b. R/up + RIH w/ BOP T/tool. Test BOP.
POOH w/ test plug. R/u + test surface equipment. Set w/b. M/u 6" BHA.
RIH + Tag @ 2045m.
Drill cmt f/ 2045-2056m.

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DRILLBYTE MORNING REPORT NO 24

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 31.03.93 TIME 2400 hr

DEPTH 2131 m LAST REPORT DEPTH 2107 m

RIG OPERATIONS POOH for bit change.

REPORT BY Andre Thangam REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. RR10.1 Type HTC J3 Size 6.000 in Jets 3x12

On Bit: Distance 24.0 m Hours 8:08 hh:mm ROP 3 m/hr WOB 10-17 klb RPM 41-64

Pump Press 2170 psi SPM 40-51 Torque 106-138 TBR 45289 CP I:# 3449 CP B:# 5727

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.20 sg PV/YP 12/16

Gels 3/7 Salinity 45000 PPM Cl Solids 8.5 %

Hole Volume 469 bbl Annular Volume 347 bbl Tubing Volume 76 bbl Displaced Volume 47 bbl

Carbide Lag-Calculated Lag 2706 stk Flowrate 261 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5.4 m/min DrillPipe Annular Vel (Open Hole) 40 m/min

Drill Collar Annular Vel (Open Hole) 145 m/min Critical Vel 155 m/min

Pressure Loss System 1402 psi Pressure Loss Bit 548 psi % Pressure Loss 39 %

Nozzle Vel 77 m/sec Jet Impact Force 328 lbf HHP 83 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.96 - 1.58 Flowline Temp 46.2 degC

Shale Density - Shale Factor -

Background Gas 0.04% Max. Formation Gas 0.14 % @ 2127 m Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.69 sg Min. Estimated Fracture Pressure (Open Hole) 1.85 sg

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.10 sg @ shoe Estimated Fracture Pressure at TD 1.85 sg

COMMENTS Drill cmt f/ 2056 to 2060m, float collar. Trouble shoot surf press loss.
Cont. drill f/c + shoe track to 2108m. Work junksub. Drill 6" hole f/2108 to 2111m.
Circ BU. Pull back to shoe , Perform LOT, EMW=15.41 ppg (1.85 sg)
Drill 6" hole f/ 2111m to 2131m. Flush riser every two hrs w/ rig pumps down choke.
Flow check on drilling break. Work junk basket.
Cont flush riser. slug pipe.
POOH.

NB. Possible one blocked jet.

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DRILLBYTE MORNING REPORT NO 25

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 01.04.93 TIME 2400 hr

DEPTH 2209 m LAST REPORT DEPTH 2131 m

RIG OPERATIONS RIH after bit change

REPORT BY Kieran Clarke REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#11 Type HYCALOG Size 6.000 in Jets 3x11

On Bit: Distance 78.0 m Hours 6:00 hh:mm ROP 9.6 m/hr WOB 5-13 klb RPM 75-110

Pump Press 2700 psi SPM 50 Torque 100-240 TBR 42500 CP I:# CP B:#

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.23 sg PV/YP 15/18

Gels 5/8 Salinity 49000 PPM Cl Solids 8.5 %

Hole Volume 478 bbls Annular Volume 349 bbls Tubing Volume 80 bbls Displaced Volume 49 bbls

Carbide Lag-Calculated Lag 2725 stks Flowrate 263 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5.4 m/min DrillPipe Annular Vel (Open Hole) 40 m/min

Drill Collar Annular Vel (Open Hole) 146 m/min Critical Vel 155 m/min

Pressure Loss System 1692 psi Pressure Loss Bit 788 psi % Pressure Loss 46.6%

Nozzle Vel 92 m/sec Jet Impact Force 396 lbf HHP 121 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.82- 1.36 Flowline Temp 45.4 degC

Shale Density - Shale Factor -

Background Gas 0.05% Max. Formation Gas 0.19 % @ 2155 m Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.64 sg Min. Estimated Fracture Pressure (Open Hole) 1.85 sg

Estimated Pore Pressure 1.10 sgn Min. Estimated Pore Pressure (Open Hole) 1.04 sg @ shoe

Max. Estimated Pore Pressure (Open Hole) 1.10 sg @ shoe Estimated Fracture Pressure at TD 1.86 sg

COMMENTS

Continued to POOH
Make up and RIH with NB#11 to 2108m.
Ream and wash from 2108-2131m.
Drill 6" hole from 2131-2209m, boosting the riser every hour.
Circulate hole clean, drop survey, pump slug.
POOH for bit and BHA change.

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DRILLBYTE MORNING REPORT NO 26

COMPANY BHP Petroleum WELL MINERVA - 1

DATE 02.04.93 TIME 2400 hr

DEPTH 2295 m LAST REPORT DEPTH 2209 m

RIG OPERATIONS POOH to change bit.

REPORT BY Kieran Clarke REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#12 Type HTC ATJ44C Size 6.000 in Jets 3x11

On Bit: Distance 86.0 m Hours 17:46 hh:mm ROP 4.8 m/hr WOB 14-23 klb RPM 67-87

Pump Press 1500 psi SPM 50 Torque 100-200 TBR 88526 CP I:0 - CP B:0 -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.22 sg PV/YP 14/16

Gels 4/6 Salinity 49000 PPM Cl Solids 8.6%

Hole Volume 488 bbls Annular Volume 352 bbls Tubing Volume 84 bbls Displaced Volume 52 bbls

Carbide Lag-Calculated Lag 2749 stks Flowrate 242 gpm

DrillPipe Annular Vel (Max. Dia. Sec.) 5.0 m/min DrillPipe Annular Vel (Open Hole) 36.9 m/min

Drill Collar Annular Vel (Open Hole) 134.5m/min Critical Vel 162.8 m/min

Pressure Loss System 1563 psi Pressure Loss Bit 667 psi % Pressure Loss 42.7%

Nozzle Vel 85 m/sec Jet Impact Force 335 lbf HHP 94 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.98-1.85 Flowline Temp 42 degC

Shale Density - Shale Factor -

Background Gas 0.04% Max. Formation Gas 0.076 % @ 2290m Trip Gas - @ -

Other Gas -

Fill - Tight Hole -

Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.63 sg Min. Estimated Fracture Pressure (Open Hole) 1.85 sg @ 2111m

Estimated Pore Pressure 1.10 sg Min. Estimated Pore Pressure (Open Hole) 1.04 sg @ 2195m

Max. Estimated Pore Pressure (Open Hole) 1.10 sg @ TD Estimated Fracture Pressure at TD 1.86 sg

COMMENTS

Finish RIH.
Wash and lightly ream from 2190-2209m.
Drill 6" hole from 2209m to 2295m.
Flush riser every three hours. Flow Check at 2218m (static).
Surge and work junk sub.
Circulate and flush riser.

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DRILLBYTE MORNING REPORT NO 27

COMPANY BHP Petroleum WELL MINERVA - 1
DATE 03.04.93 TIME 2400 hr
DEPTH 2362 m LAST REPORT DEPTH 2295 m
RIG OPERATIONS Drilling ahead.
REPORT BY Kieran Clarke REPORT RECEIVED BY M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#13 Type HTC ATJ44C Size 6.000 in Jets 3x11
On Bit: Distance 67.0 m Hours 12:06 hh:mm ROP 5.5 m/hr WOB 22-27 klb RPM 71
Pump Press 1800 psi SPM 48 Torque 137-170 TBR 51543 CP I:€ - CP R:€ -

HYDRAULICS REPORT

Mud Density In 1.15 sg Mud Density out 1.15 sg ECD 1.23 sg PV/YP 15/19
Gels 5/8 Salinity 49000 PPM Cl Solids 8.6%
Hole Volume 496 bbls Annular Volume 354 bbls Tubing Volume 87 bbls Displaced Volume 54 bbls
Carbide Lag-Calculated Lag 2766 stks Flowrate 251 gpm
DrillPipe Annular Vel (Max. Dia. Sec.) 5.2 m/min DrillPipe Annular Vel (Open Hole) 38.4 m/min
Drill Collar Annular Vel (Open Hole) 140.1 m/min Critical Vel 173.8 m/min
Pressure Loss System 1722 psi Pressure Loss Bit 724 psi % Pressure Loss 42.0 %
Nozzle Vel 88.5 m/sec Jet Impact Force 364 lbf HHP 106 hhp

PRESSURE PARAMETERS

Drilling Exponent 0.82-1.68 Flowline Temp 47.5 degC
Shale Density - Shale Factor -
Background Gas 0.05% Max. Formation Gas 0.35 % @ 2342 m Trip Gas - @ -
Other Gas -
Fill - Tight Hole -
Cavings Est % - Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.62 sg Min. Estimated Fracture Pressure (Open Hole) 1.85 sg @ 2111m
Estimated Pore Pressure 1.03 sg Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ 2162m
Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD Estimated Fracture Pressure at TD 1.87 sg

COMMENTS Flowcheck (static), pump slug and POOH.
Wipe through tight hole from 2237-2190m (max O/P 30klb).
Continued POOH, jarred free @ 2184m, washed clear (max O/P 50 klb).
Continuued POOH. Layed out junk sub and jars.
M/U NB#13 and RIH with same.
Washed from 2277-2295m.
Drilled 6" hole from 2295-2362m. Flow check @ 2336.7m (static).
Boosted riser every two hours or as needed.

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DRILLBYTE MORNING REPORT NO 28

COMPANY: BHP Petroleum | WELL: MINERVA - 1
DATE: 04.04.93 | TIME: 2400 hr
DEPTH: 2425 m TD | LAST REPORT DEPTH: 2362 m
RIG OPERATIONS: Run E-Logs.
REPORT BY: Kieran Clarke | REPORT RECEIVED BY: M. Imbert (OPTR)

DRILLING REPORT

Bit No. NB#13 | Type HTC ATJ44C | Size 6.000 in | Jets 3x11
On Bit: Distance 130.0 m | Hours 22:30 hh:mm | ROP 5.5 m/hr | WOB 20-25 klb | RPM 71
Pump Press 1800 psi | SPM 48 | Torque 100-180 | TBR 100252 | CP I:# - | CP B:# -

HYDRAULICS REPORT

Mud Density In 1.15 sg | Mud Density out 1.15 sg | ECD 1.23 sg | PV/YP 15/21
Gels 5/9 | Salinity 49000 | PPM Cl | Solids 8.6%
Hole Volume 503 bbls | Annular Volume 356 bbls | Tubing Volume 91 bbls | Displaced Volume 56 bbls
Carbide Lag-Calculated Lag 2782 stks | Flowrate 255 gpm
DrillPipe Annular Vel (Max. Dia. Sec.) 5.2 m/min | DrillPipe Annular Vel (Open Hole) 81.0 m/min
Drill Collar Annular Vel (Open Hole) 141.8 m/min | Critical Vel 173.8 m/min
Pressure Loss System 1769 psi | Pressure Loss Bit 741 psi | % Pressure Loss 41.9 %
Nozzle Vel 89.6 m/sec | Jet Impact Force 372 lbf | HHP 110 hhp

PRESSURE PARAMETERS

Drilling Exponent 1.20-1.70 | Flowline Temp 48.6 degC
Shale Density - | Shale Factor -
Background Gas 0.05% | Max. Formation Gas 0.33 % @ 2411 m | Trip Gas - @ -
Other Gas Gas peaks @ 2372m=0.29%, @2408m=0.15%
Fill - | Tight Hole -
Cavings Est % - | Average Size -

ESTIMATED PORE AND FRACTURE PRESSURE

Kick Tolerance 0.61 sg | Min. Estimated Fracture Pressure (Open Hole) 1.85 sg @ 2111m
Estimated Pore Pressure 1.03 sg | Min. Estimated Pore Pressure (Open Hole) 1.03 sg @ shoe
Max. Estimated Pore Pressure (Open Hole) 1.03 sg @ TD | Estimated Fracture Pressure at TD 1.87 sg

COMMENTS

Drilled to 2425 m TD. CBU at 2425 m.
Wiper trip to casing shoe.
RIH to bottom at 2425 m TD.
CBU and POOH for E-Logs.
Rig up Schlumberger.
Run wireline logs.

Boosted riser every two hours or as needed.

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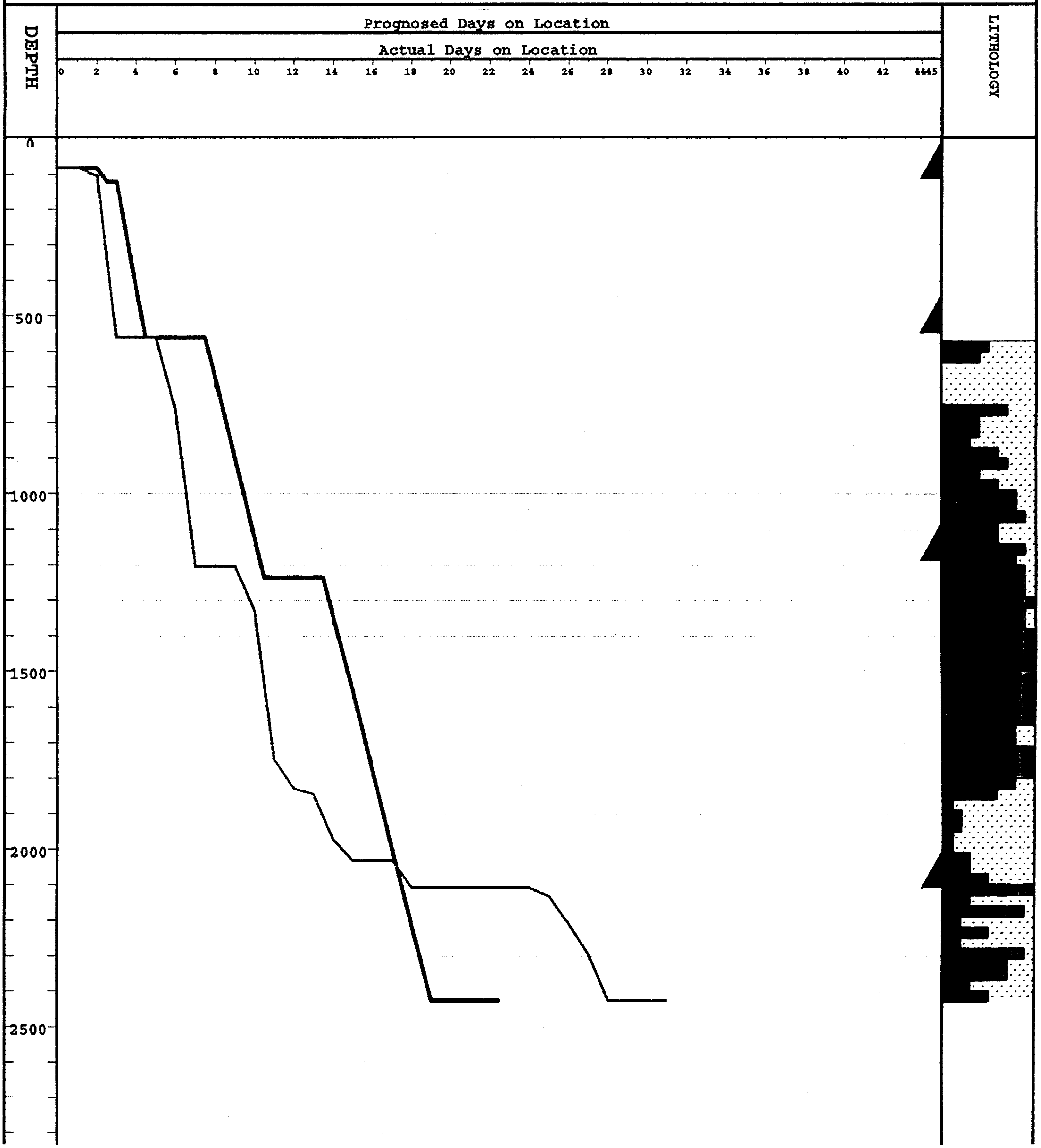
B H P PETROLEUM

MINERVA - 1

Well Progress Plot



PE602760

This is an enclosure indicator page.
The enclosure PE602760 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602760 has the following characteristics:

ITEM-BARCODE =	PE602760
CONTAINER_BARCODE =	PE900064
NAME =	Minerva 1 Exlog Drilling Data Plot (1:2500)
BASIN =	Otway
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	WELL-LOG
DESCRIPTION =	Minerva 1 Exlog Drilling Data Plot (1:2500), Appendix 2
REMARKS =	old barcode PE900067 replaced with PE602760
DATE-CREATED =	*
DATE-RECEIVED =	13/01/94
W_NO =	W1079
WELL-NAME =	MINERVA 1
CONTRACTOR =	EXLOG (BAKER HUGHES)
CLIENT_OP_CO =	BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602761

This is an enclosure indicator page.
The enclosure PE602761 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602761 has the following characteristics:

ITEM-BARCODE = PE602761
CONTAINER_BARCODE = PE900064
NAME = Minerva 1 Exlog Pressure Data Plot (1:2500)
BASIN = Otway
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = WELL-LOG
DESCRIPTION = Minerva 1 Exlog Pressure Data Plot (1:2500), Appendix 2
REMARKS = old barcode PE900070 replaced with PE602761
DATE-CREATED = *
DATE-RECEIVED = 13/01/94
W_NO = W1079
WELL-NAME = MINERVA 1
CONTRACTOR = EXLOG (BAKER HUGHES)
CLIENT_OP_CO = BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602762

This is an enclosure indicator page.
The enclosure PE602762 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602762 has the following characteristics:

ITEM-BARCODE =	PE602762
CONTAINER_BARCODE =	PE900064
NAME =	Minerva 1 Exlog Pressure Gradient Plot (1:5000)
BASIN =	Otway
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	WELL-LOG
DESCRIPTION =	Minerva 1 Exlog Pressure Gradient Plot (1:5000), Appendix 2
REMARKS =	old barcode PE900068 replaced with PE602762
DATE-CREATED =	*
DATE-RECEIVED =	13/01/94
W_NO =	W1079
WELL-NAME =	MINERVA 1
CONTRACTOR =	EXLOG (BAKER HUGHES)
CLIENT_OP_CO =	BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602763

This is an enclosure indicator page.
The enclosure PE602763 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602763 has the following characteristics:

ITEM-BARCODE = PE602763
CONTAINER_BARCODE = PE900064
NAME = Minerva 1 Exlog Drillbyte MWD Log (1:500)
BASIN = Otway
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = WELL-LOG
DESCRIPTION = Minerva 1 Exlog Drillbyte MWD Log (1:500), Appendix 2
REMARKS = old barcode PE900069 replaced with PE602763'
DATE-CREATED = *
DATE-RECEIVED = 13/01/94
W_NO = W1079
WELL-NAME = MINERVA 1
CONTRACTOR = EXLOG (BAKER HUGHES)
CLIENT_OP_CO = BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

3

Appendix 3 Eastman Teleco End of Well Report (MWD)

BHP PETROLEUM

MINERVA-1

VICTORIA - OTWAY BASIN

MARCH 1993

END OF WELL REPORT

EASTMAN TELECO

FIELD SERVICE ENGINEERS

A. FELL

A. SOMOFF

DISCLAIMER

Eastman Teleco does not guarantee the accuracy or correctness of interpretation provided in or from this report. Since all interpretations are opinions based on measurements 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 Teleco's terms and conditions.

CONTENTS

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-1 well in the VIC/P31 Permit, offshore Victoria.

MINERVA-1 was spudded on March 8th, 1993 and Eastman Teleco's MWD services were utilized on the well from March 12th from a depth of 560m.

The 12 1/4" hole section was drilled from 560m to 1204m where wireline logs were run and the 9 5/8" casing was set.

The 8 1/2" hole section was drilled from 1204m to 2107m.

Eastman Teleco services were completed on March 24th, 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, M. Imbert
Well Name	: MINERVA-1
Well Type	: EXPLORATION
Well Permit	: VIC/P31
Area	: OTWAY BASIN
D.F. Elevation	: 25.0m
Water Depth	: 57.0m
Spud Date	: 8th MARCH 1993
Teleco Comencement Date	: 12th MARCH 1993
Teleco Completion Date	: 24th MARCH 1993
Completion Depth	: 2107 m
Drilling Contractor	: DOLPHIN DRILLING
Rig Name	: BYFORD DOLPHIN
Rig Type	: SEMI-SUBMERSIBLE
Teleco Services	: DPR
Teleco Job Number	: ETAU 235
Teleco Personnel	: A. Fell, A. Somoff

Section 3

TOOL SUMMARY

3. MWD TOOL SUMMARY

Two tools were used over 4 runs to drill from 560m to 2107m.

Run #	Tool Size	Serial No	Tool Type	DPR Hours	Drilled Interval	Failure Type
1	8 1/4"	8447-02	DPR	35.00	560 - 1204	-
2	6 3/4"	1674-09	DPR	35.00	1209 - 1821	-
3	6 3/4"	1674-09	DPR	24.00	1821 - 2031	-
4	6 3/4"	1674-09	DPR	18.50	2031 - 2107	-

Interval Drilled: 560 - 2107m - 1547m
Interval Logged: Gamma Ray - 100 %
Resistivity - 100 %

Failure Statistics

Total DPR hours	112.5
DPR failures	0
Mean Time Between Failures	N/A

Section 4

MWD RUN SUMMARIES

RUN SUMMARY
No.1

Hole Size: 12 1/4"

Tool Type & No: DPR TF4 B8447-02

Time & Date in the Hole: 08:30 hrs 12th March 1993

Time & Date out of Hole: 04:30 hrs 14th March 1993

Depth Range: 560m - 1204m

Circulating Hours for Run: 35.0

Operating Hours for Run: 35.0

Comments.

The Teleco tool was run in an assembly with a HTC ATM 11HG bit. The assembly was locked up with a near bit roller reamer, shock sub, string roller reamer, x/o, MWD and a stabilizer located above the Teleco tool.

No operational problems were seen with the tool performing to specifications throughout the run.

A high resistivity sand was encountered over the interval 660m to 880m. The values for the amplitude ratio over this interval were without the tool specification range for amplitude ratio, resulting in no data over the interval. The phase difference was still within specification over this interval. The sand drilled at between 20 and 1000 m/hr, averaging 125 m/hr. This resulted in a paucity of gamma ray and resistivity, transmitted data, especially between 660m - 750m and 790m - 820m where the ROP was averaging above 175 m/hr.

The hole was drilled from 560m to 1204m with inclination building from 0.6 degrees at 572m to 2.5 degrees at 1180m. The azimuth turned from 265.8 degrees to 201.8 degrees.

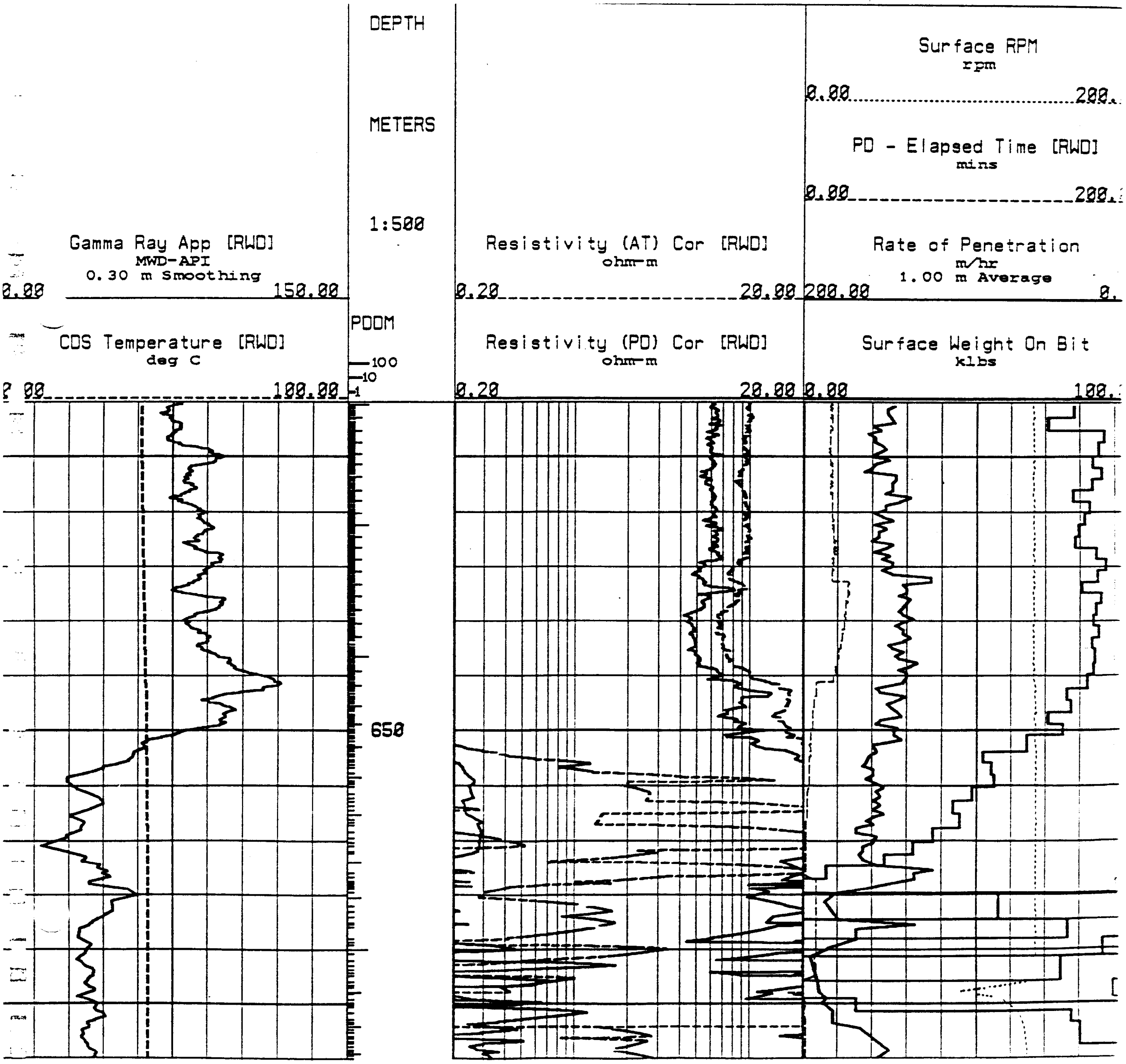
Drilling parameters while drilling were: WOB 0 to 35 klbs, RPM 130 to 135, Flow rate 700 to 750 g/min giving a Pump Pressure of 2100 to 2760 Psi. Rate of penetration ranged from 1 to 1000 m/hr.

Geology

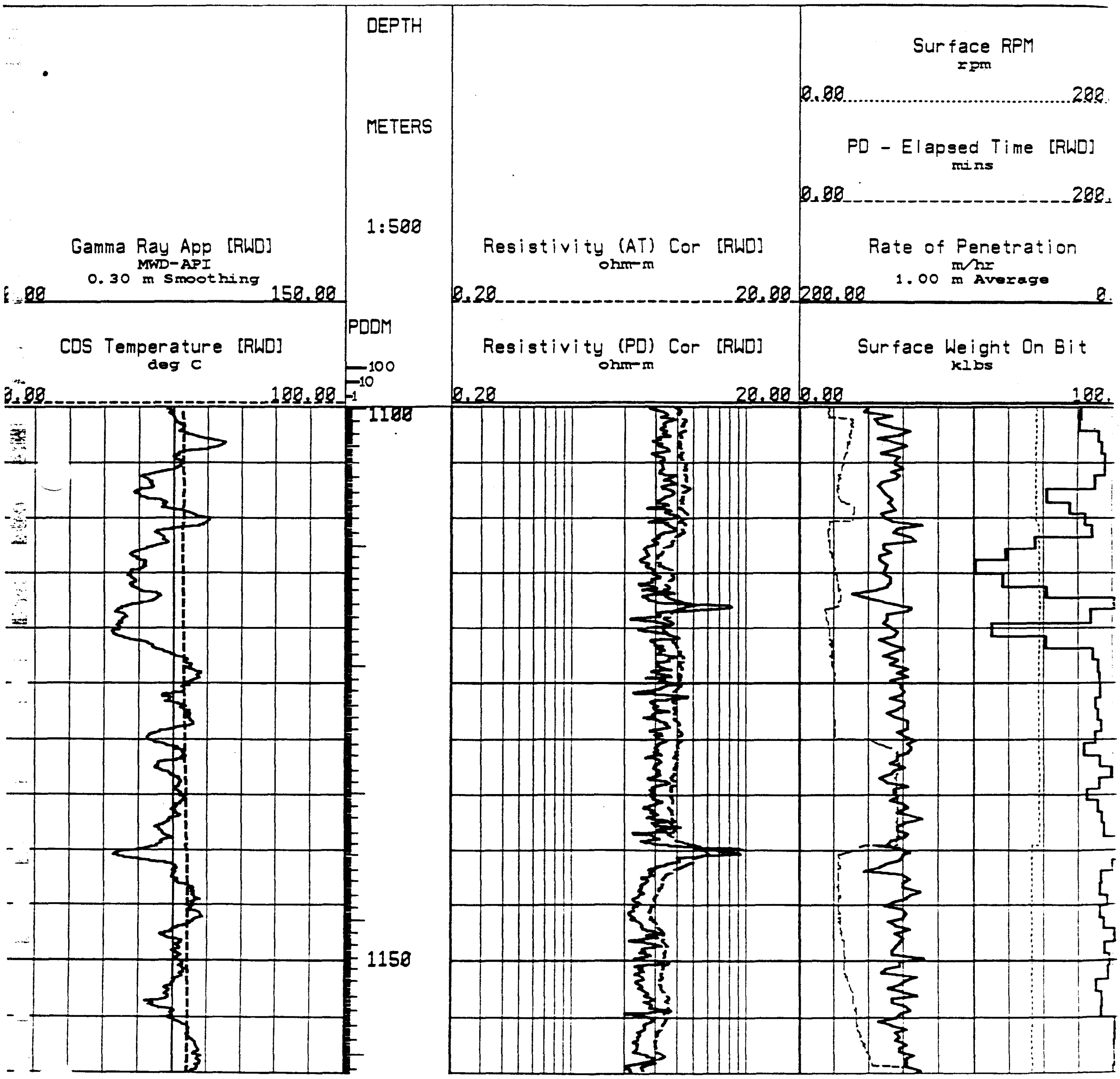
The following formation tops were picked using the MWD log and other drilling parameters. They were proposed tops only, picked at the time of drilling.

Formation	MWD pick (MDmRT)
SHERBROOK GP	650
SHIPWRECK GP -Upper	1123

The **Sherbrook Group** was picked at 650m on a sharp gamma ray decrease from an increasing trend. The gamma ray established a flatter trend at a much lower value. Resistivity increased sharply and established a more erratic higher trend.



The **Upper Shipwreck** was picked at 1123m on an increase in gamma ray of 30 API. The trend that developed after this increase was flatter in nature than the trend before the shift. There was no discernable change in the resistivity.



RUN SUMMARY
No.2

Hole Size: 8 1/2"

Tool Type & No: DPR / DHE 1674-09

Time & Date in the Hole: 15:30 hrs 16th March 1993

Time & Date out of Hole: 08:30 hrs 18th March 1993

Depth Range: 1209m - 1821m

Circulating Hours for Run: 35.0

Operating Hours for Run: 35.0

Comments.

The Teleco tool was run in an assembly with a HYCALOG DS61H bit. The assembly was locked up with a near bit roller reamer, x/o, an integral blade stabiliser on the MWD and a stabiliser located above the Teleco tool.

The 9 5/8" casing shoe was tagged and drilled at 1194.0m on the previous bit run using a rock bit. New hole was drilled to 1209m where the bit was pulled to run the PDC bit.

Drilling continued at between 15 and 75 m/hr to 1647.5m where the ROP slowed from 40m/hr to 2m/hr. This was perceived to be the cemented top of a sand. This proved correct as a sharp drop in gamma ray indicated sand and the resistivity gave an indication of hydrocarbons. Returns were circulated. The decision was made to drill ahead. Another hard streak followed by a sand was seen at 1662m. Once again there was a sharp drop in gamma ray and a sharp rise in resistivity. The formation changed back to siltstone at 1667. Drilling continued at 20 to 40 m/hr to 1812.5m where a clean sand was indicated by a sharp drop in gamma ray. The resistivity once again sharply increased. The MWD tool gave the only indication of the sand. There was no change in the ROP to indicate the change in lithology. This lack of a drill break can be attributed to the PDC bit. Returns were circulated and the decision made to POOH and cut core #1.

Inclination built throughout the run from 3.7 degrees at 1265m to 7.6 degrees at 1791m. The azimuth turned from 203.6 degrees to 187.8 degrees over the same interval.

Drilling parameters through the run were: WOB 1 to 15 klbs, RPM 80 to 180, pump flow of 440 to 500 gpm giving a pressure of 1900 to 2280 psi. Rate of penetration ranged from 1 to 75 m/hr.

RUN SUMMARY
No.3

Hole Size:	8 1/2"
Tool Type & No:	DPR / DHE 1674-09
Time & Date in the Hole:	04:30 hrs 20th March 1993
Time & Date out of Hole:	13:30 hrs 21st March 1993
Depth Range:	1821m - 2031m
Circulating Hours for Run:	24.00
Operating Hours for Run:	24.00

Comments.

The Teleco tool was re-run in an assembly with a HTC ATM 22 bit. The assembly was locked up with a near bit roller reamer, x/o, an integral blade stabiliser on the MWD and a stabiliser located above the Teleco tool.

The cored section, 1821m - 1847m, was reamed for MWD data. Drilling continued from 1847m at 10-20 m/hr through sand. The MWD tool indicated that the sand was hydrocarbon bearing. The hydrocarbon - water transition zone was picked at 1942m - 1945m, this was indicated by a fall in the resistivity whilst still drilling a sandstone as indicated by the low gamma ray. The WOB was increased after entering the water wet zone, in an attempt to increase the ROP. This resulted in an increase in the level of drilling torque causing some loss of transmitted data. Drilling continued on to 2031m, where, due slow ROP, it was decided to POOH.

The decision was made to run intermediate wireline logs at 2031m.

Inclination remained steady at 7.6 degrees from 1880m to 1937m but then built to be 8.8 degrees at 2022m. The azimuth turned from 185.7 degrees to 173.0 degrees over the same interval.

Drilling parameters through the run were: WOB 20 to 35 klbs, RPM 110 to 115, pump flow of 340 to 410 gpm giving a pressure of 2100 to 2300 psi. Rate of penetration ranged from 8 to 45 m/hr.

RUN SUMMARY
No.4

Hole Size: 8 1/2"

Tool Type & No: DPR / DHE 1674-09

Time & Date in the Hole: 23:15 hrs 24th March 1993

Time & Date out of Hole: 06:30 hrs 25th March 1993

Depth Range: 2031m - 2107m

Circulating Hours for Run: 18.50

Operating Hours for Run: 18.50

Comments.

The Teleco tool was re-run in an assembly with a HTC ATMJ 33 bit. The assembly was locked up with a near bit roller reamer, x/o, an integral blade stabiliser on the MWD and a stabiliser located above the Teleco tool.

Drilling continued from 2031m at 5 - 20 m/hr through sandstone and minor claystone. Claystone was entered at 2077m and drilling continued to 2106m where a drill break occurred. Drilling continued to 2107m where returns were circulated. The formation was a sand and it was decided to POOH and run the 7" liner.

Inclination built slowly from 8.9 degrees at 2050m to 9.0 degrees at 2081m. The azimuth turned from 170.5 degrees to 165.3 degrees over the same interval.

Drilling parameters through the run were: WOB 20 to 35 klbs, RPM 100 to 110, pump flow of 450 to 460 gpm giving a pressure of 2270 to 2450 psi. Rate of penetration ranged from 3 to 20 m/hr.

Section 5

MWD TOOL PERFORMANCE REPORT

PERFORMANCE REPORT NO.1

TOOL DHB 8447-02

Equipment Description:	8 1/4" DPR
	Serial No. B8447-02 TF4 X4 Split Phase
Teleco Run No.:	1
Total Circulating Hours:	35.00
Non Operating Hours:	
Resistivity:	0.0
Gamma Ray:	0.0
Directional:	0.0
Interval Drilled:	560m - 1204m

Operational Problems

No operational problems were seen with the tool performing to specifications throughout the run.

PERFORMANCE REPORT NO.2

TOOL DHE 1647-09

Equipment Description:	6 3/4" DPR
	Serial No. E1674-09 TF4 X4 Split Phase
Teleco Run No.:	2 - 3 - 4
Total Circulating Hours:	77.50
Non Operating Hours:	
Resistivity:	00.00
Gamma Ray:	00.00
Directional:	00.00
Interval Drilled:	1204m - 2107m

Operational Problems

Very high erratic torque at the beginning of Run 2 resulted in some loss of MWD and RWD data from 1209m to 1217m. High and erratic torque caused a paucity of data over the following intervals in the RWD log, 1652m to 1655m, 1672m to 1676m, 1782m to 1784m, 1785m to 1787m.

High, erratic torque on Run 3 caused the loss of, or paucity of, MWD and RWD data. This is most obvious on the 1:200 log by looking in the PDDM track over the interval 1942m to 1947m.

No problems were encountered on Run 4.

Section 6

SENSOR VERIFICATION DATA

6.1 FORMATION EVALUATION SENSOR VERIFICATION DATA

Teleco Run No:	Pre 1	Pre 2	Pre 3	Pre 4
DPR Sub No:	8107	6029	6029	6029
PDBV deg:	10.408	8.463	8.463	8.463
PDOV deg:	9.924	8.339	8.379	8.202
PDCV +/- deg:	-0.484	-0.124	-0.084	-0.261
ATBV dB:	6.243	5.539	5.539	5.539
ATOV dB:	6.477	5.980	6.213	5.665
ATCV +/- dB:	0.234	0.441	0.674	0.126
STEEL m:	1.5	1.5	1.5	1.5
TCDV deg C:	16.3	21.2	20.1	17.4
GR Detector No:	442-4	413-8	413-8	413-8
Background cps:	3.5	3.4	4.2	3.7

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
Resistivity	9.60	3.00	3.02	3.02
Gamma Ray	11.05	4.78	4.80	4.80
Directional	13.70	7.39	7.41	7.41

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.

LOG CORRECTIONS

Date	Time	Depth m	Chloride ppm	Resist.(Rm) ohm.m / deg C	KCL %	M.W. sg
12-03-93	14:53	550	29000	0.1183 / 31	3.04	1.10
12-03-93	21:00	615	29000	0.1047 / 38	3.04	1.09
13-03-93	00:48	780	31000	0.0913 / 43	3.04	1.09
13-03-93	06:55	960	31000	0.0861 / 47	3.04	1.09
13-03-93	10:54	1030	31000	0.0825 / 50	3.04	1.09
13-03-93	14:23	1110	31000	0.0803 / 52	3.04	1.09
13-03-93	19:41	1194	27000	0.0892 / 53	2.58	1.12
16-03-93	20:05	1280	30000	0.1028 / 41	2.86	1.11
17-03-93	00:05	1325	28000	0.0982 / 44	2.86	1.11
17-03-93	01:00	1345	27000	0.1013 / 44	2.82	1.13
17-03-93	06:20	1436	27000	0.0969 / 47	2.82	1.12
17-03-93	11:29	1520	27000	0.0929 / 50	2.82	1.14
17-03-93	17:57	1654	27000	0.0892 / 53	2.82	1.14
17-03-93	21:47	1705	27000	0.0869 / 55	2.82	1.14
17-03-93	22:35	1723	27000	0.0837 / 58	2.82	1.14
18-03-93	02:15	1784	34000	0.0679 / 59	2.87	1.16
20-03-93	06:37	1821	34000	0.0723 / 54	2.21	1.15
20-03-93	11:35	1855	40000	0.0615 / 56	2.68	1.15
20-03-93	20:02	1936	45000	0.0525 / 61	3.41	1.15
20-03-93	02:06	1990	45000	0.0507 / 64	3.50	1.15
24-03-93	05:00	2031	50000	0.0447 / 62	4.04	1.15
24-03-93	10:36	2034	50000	0.0513 / 56	4.04	1.15
24-03-93	14:36	2081	50000	0.0488 / 60	4.04	1.15
24-03-93	18:36	2101	51000	0.0475 / 61	4.41	1.15

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-1
FIELD VIC/P31
COUNTY ..... OTWAY BASIN
STATE ...... VICTORIA
COUNTRY .... AUSTRALIA

WELL LOCATION : LATITUDE 38° 42′ 12.23"S LONGITUDE 143° 57′ 12.34"E

DRILLING COMPANY : DOLPHIN DRILLING RIG : BYFORD

PERMANENT DEPTH DATUM : MSLT ELEV. : 57M
SURVEYS MEAS. FROM : ROTARY TABLE, LOCATED 25M ABOVE PERM. DATUM.

SPUD DATE .... 08-03-93 PROP. AZIMUTH ...... N.A.
MWD STARTED .. 12-03-93 TOTAL DEPTH .... N.A.
MWD ENDED .... 24-03-93 TELECO JOB ID .. ETAU 235

COORD. GRID SYSTEM :
GRID ORIGIN : GRID CORR. : 0
MAGNETIC DECL. CORR. : 11.28 GRID DECL. CORR. : 11.28

MINIMUM CURVATURE METHOD USED FOR SURVEY CALCULATIONS.
VERTICAL WELL : CLOSURE CALCULATED AT EACH SURVEY STATION.
INITIAL TIE-IN TO SEABED.

COMPANY PERSONNEL ..... G. HOWARD, M. IMBERT

DIRECTIONAL COMPANY ... N.A.
DIRECTIONAL DRILLER ... N.A.
TELECO PERSONNEL ...... A. FELL, A. SOMOFF

REMARKS :

EASTMAN TELECO
A Baker Hughes company

TELECO DIRECTIONAL SURVEY LISTING

Company...................... BHP PETROLEUM
Well.......................... MINERVA-1
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 235
Grid Correction: 0
Mag. Decl. Corr.: 11.28
Grid Decl. Corr.: 11.28

M.DPTH 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					
57.0		0.000	0.000	57.00	0.00	0.00	0.00	
572.0	515.0	0.600	265.800	571.99	2.70	-0.20	-2.69	0.035
719.0	147.0	0.400	216.200	718.99	3.82	-0.67	-3.76	0.093
863.0	144.0	0.600	202.900	862.98	4.70	-1.77	-4.35	0.048
1038.0	175.0	1.500	214.100	1037.95	7.50	-4.51	-5.99	0.158
1180.0	142.0	2.500	201.800	1179.86	12.11	-8.92	-8.18	0.229
1265.0	85.0	3.700	203.600	1264.74	16.51	-13.16	-9.97	0.425
1296.0	31.0	4.000	211.000	1295.67	18.56	-15.00	-10.93	0.561
1385.0	89.0	4.800	200.800	1384.40	25.27	-21.14	-13.85	0.376
1473.0	88.0	5.400	206.000	1472.06	33.00	-28.31	-16.97	0.258
1559.0	86.0	6.000	216.600	1557.63	41.51	-35.55	-21.42	0.422
1671.0	112.0	6.800	196.600	1668.95	53.77	-46.61	-26.81	0.631
1733.0	62.0	7.400	192.700	1730.47	61.19	-54.02	-28.74	0.372
1791.0	58.0	7.600	187.800	1787.98	68.43	-61.46	-30.08	0.346
1880.0	89.0	7.600	185.700	1876.19	79.63	-73.15	-31.46	0.094
1908.0	28.0	7.600	183.200	1903.95	83.14	-76.84	-31.75	0.354
1937.0	29.0	7.600	182.100	1932.69	86.76	-80.67	-31.93	0.150
1966.0	29.0	8.200	177.600	1961.42	90.47	-84.66	-31.91	0.891
1995.0	29.0	8.600	175.500	1990.11	94.35	-88.88	-31.65	0.521
2022.0	27.0	8.800	173.000	2016.80	98.06	-92.95	-31.24	0.475
2050.0	28.0	8.900	170.500	2044.46	101.92	-97.21	-30.62	0.426
2081.0	31.0	9.000	165.300	2075.09	106.13	-101.92	-29.61	0.789

PROJECTED BOTTOM-HOLE LOCATION
(Extrapolated from last two survey stations)

M.DPTH	CRS LEN	INCLINATION	AZIMUTH	T.V.D.	CLOSURE	NORTH/SOUTH	EAST/WEST
2107.0	26.0	9.084	160.939	2100.76	109.58	-105.83	-28.43

CLOSURE AZIMUTH = 195.036

EASTMAN TELECO
A Baker Hughes company

Section 10

BOTTOM HOLE ASSEMBLY RECORDS

MWD Run #1

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	12 1/4	-	0.30	HTC ATM 11HG
NB ROLLER REAMER	12 1/4	3	2.45	WITH FLOAT
SHOCK SUB	8	2 13/16	3.44	
STRING R/R	12 1/4	2 7/8	2.33	
X / O	8 1/4	2 3/4	0.50	TSI-23
TELECO MWD	8 3/4	-	12.37	B8447-02 DPR
STABILIZER	12 1/4	2 7/8	1.43	
DC	7 5/8	2 29/32	9.52	
DC	7 5/8	2 15/16	9.13	
DC	7 13/16	3	9.16	
DC	7 3/4	2 13/16	9.04	
DC	7 5/8	2 7/8	9.33	
DC	7 3/4	2 7/8	9.19	
DC	7 5/8	2 15/16	9.17	
DC	7 5/8	2 13/16	9.33	
DC	7 5/8	2 29/32	9.26	
PONY DC	7 13/16	2 13/16	2.73	
JARS	8 1/16	2 7/8	5.76	
DC	7 15/16	2 7/8	9.21	
DC	7 7/8	2 13/16	8.86	
X/O	8 1/8	3 3/8	0.55	
1 X HWDP	5	3	9.05	
DART SUB	6 7/16	2 3/4	0.69	
11 X HWDP	5	3	98.18	
TOTAL BHA			240.98	

BIT RUN #4 HTC ATM 11HG, 12 1/4" 1 X 18,16,13 JETS.
DRILLED FROM 550m TO 1204m. BIT GRADED 2-3-FC-H-E-1-EC-TD

TELECO MWD DHB 8447-02 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 425 - 900 gpm. VALVE GAP 1.00".

MWD Run #2

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	8 1/2	-	0.24	HYCALOG DS61H
NB ROLLER REAMER	8 1/2	1 7/8	1.84	
X / O	6 3/4	2 13/16	0.35	6750-049
TELECO MWD	6 3/4	-	12.70	E1674-09 DPR
STAB	8 3/8	3	1.86	
DC	6 5/16	2 7/8	9.23	
DC	6 5/16	3	9.16	
DC	6 5/16	2 7/8	9.02	
DC	6 5/16	2 7/8	9.21	
DC	6 1/4	2 7/8	9.16	
DC	6 1/4	2 13/16	9.36	
DC	6 1/4	2 15/16	9.03	
DC	6 5/16	2 15/16	9.39	
DC	6 3/8	2 15/16	9.33	
DC	6 1/4	2 7/8	9.35	
DC	6 1/4	2 29/32	9.14	
DC	6 1/4	2 29/32	9.39	
DC	6 5/16	2 7/8	9.41	
DC	6 5/16	2 7/8	9.36	
DC	6 1/4	2 7/8	9.38	
PONY DC	6 1/2	2 7/8	3.07	
JARS	6 3/8	2 5/16	5.40	
DC	6 1/4	2 13/16	9.35	
DC	6 1/2	2 29/32	9.29	
1 X HWDP	5	3	9.05	
DIDS	6 7/16	2 3/4	0.69	
14 X HWDP	5	3	98.18	
TOTAL BHA			290.94	

BIT RUN #6 HYCALOG DS61H 8 1/2" 3 X 12, 1 X 10, 1 X 11 JETS.
DRILLED FROM 1209m TO 1821m. BIT GRADED 3-8-R0-N-D-I-FC-CP

TELECO MWD DHE 1674-09 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 250 - 500 gpm. VALVE GAP 0.90".

MWD Run #3

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	8 1/2	-	0.26	HUGHES ATM22
NB ROLLER REAMER	8 1/2	1 7/8	1.84	
X / O	6 3/4	2 13/16	0.35	6750-049
TELECO MWD	6 3/4	-	12.83	E1644-09 DPR
STAB	8 3/8	3	1.77	
DC	6 5/16	2 7/8	9.23	
DC	6 5/16	3	9.13	
DC	6 5/16	2 7/8	9.02	
DC	6 5/16	2 7/8	9.02	
DC	6 1/4	2 7/8	9.05	
DC	6 1/4	2 13/16	9.28	
DC	6 1/4	2 15/16	9.16	
DC	6 5/16	2 15/16	9.19	
DC	6 3/8	2 15/16	9.19	
DC	6 1/4	2 7/8	9.35	
DC	6 1/4	2 29/32	9.29	
DC	6 1/4	2 29/32	9.39	
DC	6 5/16	2 7/8	9.36	
DC	6 5/16	2 7/8	9.39	
DC	6 1/4	2 7/8	9.02	
PONY DC	6 1/2	2 7/8	3.07	
JARS	6 3/8	2 5/16	5.20	
DC	6 1/4	2 13/16	9.28	
DC	6 1/2	2 29/32	9.07	
1 X HWDP	5	3	8.84	
DIDS	6 7/16	2 3/4	0.69	
14 X HWDP	5	3	125.12	
TOTAL BHA			290.76	

BIT RUN #10 HUGHES ATM22 8 1/2" 3 X 12 JETS.
DRILLED FROM 1821m TO 2031m. BIT GRADED 8-8-BT-H-8-2-FC-PR

TELECO MWD DHE 1674-09 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 250 - 500 gpm. VALVE GAP 0.90".

MWD Run #4

ITEM	OD (ins.)	ID (ins.)	LENGTH (m)	REMARKS
BIT	8 1/2	-	0.26	HUGHES ATM 33J
NB ROLLER REAMER	8 1/2	1 7/8	1.84	
X / O	6 3/4	2 13/16	0.35	6750-049
TELECO MWD	6 3/4	-	12.83	E1644-09 DPR
STAB	8 3/8	3	1.77	
DC	6 5/16	2 7/8	9.23	
DC	6 5/16	3	9.13	
DC	6 5/16	2 7/8	9.02	
DC	6 5/16	2 7/8	9.02	
DC	6 1/4	2 7/8	9.05	
DC	6 1/4	2 13/16	9.28	
DC	6 1/4	2 15/16	9.16	
DC	6 5/16	2 15/16	9.19	
DC	6 3/8	2 15/16	9.19	
DC	6 1/4	2 7/8	9.35	
DC	6 1/4	2 29/32	9.29	
DC	6 1/4	2 29/32	9.39	
DC	6 5/16	2 7/8	9.36	
DC	6 5/16	2 7/8	9.39	
DC	6 1/4	2 7/8	9.02	
PONY DC	6 1/2	2 7/8	3.07	
JARS	6 3/8	2 5/16	5.20	
DC	6 1/4	2 13/16	9.28	
DC	6 1/2	2 29/32	9.07	
1 X HWDP	5	3	8.84	
DIDS	6 7/16	2 3/4	0.69	
14 X HWDP	5	3	125.12	
TOTAL BHA			290.76	

BIT RUN #11 HUGHES ATM 33J 8 1/2" 3 X 12 JETS.
DRILLED FROM 2031m TO 2107m. BIT GRADED 3-3-RO-N-D-I-FC-TD

TELECO MWD DHE 1674-09 DPR TF4, DATA RATE X4SP
TURBINE FLOW RANGE 250 - 500 gpm. VALVE GAP 0.90".

Section 11

DRILLING DIARY

DRILLING DIARY

Date	Time	Operation
12-03-93		**Teleco Run #1**
	06:30	Make up 12 1/4" BHA, dress roller reamers.
	07:45	Test RWD memory on MWD.
	08:00	Continue making up 12 1/4" BHA.
	08:45	Test MWD with rig pumps.
	09:15	Continue make up BHA and RIH.
	12:00	Tag plug at 522.73m. Drill out plug, float, cement and shoe from 522m to 549m.
	13:00	Displace hole with KCl mud and drill out rathole from 549m to 560m, sweep clean.
	14:15	Take SCR and choke line pressure drop.
	14:45	Drill 12 1/4" hole from 560m to 563m.
	16:30	Pull back inside shoe, circulate until balance mud weight and rig up to perform FIT. Leak off pressure 825 psi, MW 8.9 ppg, shoe at 549m.
	18:00	Continue drilling 12 1/4" hole from 563m to 765m.
13-03-93	00:00	Drill 12 1/4" hole from 765m to 1056m. Wash down each connection. Flow check drill breaks.
	12:00	Continue drilling 12 1/4" hole from 1056m to 1204m. Wash and ream each connection and flow check. Bring mud weight up from 1.09 to 1.12 S.G. @ 19:00 hrs
	20:30	Circulate and condition mud until hole clean.
	22:00	POOH from 1204m to 1084m, drag 10 - 40 klbs, 1084m swab 2 barrels RIH and pump out from 1084m to 967m. Continue pull with out pumps to 909m O.K. RIH.
	23:45	Circulate bottoms up.
14-03-93	00:00	Continue circulating bottoms up.
	00:45	POOH to log. SLM - Flow check before POOH @ shoe and with pipe in BOP. Hole took good mud.
	03:45	Dump memory on MWD.
	04:00	Continue POOH, rack MWD in derrick.
	04:15	Rig up schlumberger run #1 DLL-MSFL-AS-GR-AMS. in @ 05:21 hrs - out 08:50 hrs. Lay out tools and make up Run #2 VSP in @ 10:00 hrs.
	12:00	Continue wireline logging schlumberger, run #2 VSP out @ 18:10 hrs. Run #3 CST in hole @ 18:45 hrs out @ 21:40 hrs 100% recovery, rig down.
	22:00	Make up wear bushing rig tool RIH. SLM and retrieve wear bushing POOH lay out same.
	22:45	Make up 9 5/8" hanger and rack in derrick and cement head same.
15-03-93	00:00	Rig up and run 9 5/8" casing, fill every 5 joints.
	02:30	Weatherford blew hydraulic line on their unit, repair same, fill hydraulic tank.
	03:45	Continue running 9 5/8" casing.
	07:45	Pick up casing hanger continue RIH with 9 5/8"casing on drill pipe, land. Out @ 08:30 hrs, connect up cement lines.
	08:30	Circulate prior to cement job.
	09:30	Rig up to Halliburton, test cement line to 3000 psi. Mix and pump slurry to BHP spec.

DRILLING DIARY

Date	Time	Operation
5-03-93	09:30	Bump plug with 3500 psi, cement in place 11:11 hrs, break off cement line.
	11:15	Set seal assembly and pressure test same.
	12:00	Continue pressure testing seal assembly. Test BOP's ram, annular to 3000 psi.
	15:30	POOH with running tool, lay out same.
	16:00	Test shear ram.
	16:15	Make up wear bushing and running tool, RIH wear bushing won't J in. POOH wear bushing not on running tool, RIH and retrieve, POOH. RIH to 1715m with washing tool and wash W.H. POOH. Pick up running tool and wear bushing RIH and J in O.K, unable to release wear bushing POOH. Tool jammed, lay out and pick up #2 running tool and wear bushing, RIH and set O.K. POOH.
	20:30	Pick up and lay out 12 1/4" BHA.
	23:30	Make up 8 1/2" BHA.
16-02-93	00:00	Continue make up 8 1/2" BHA and RIH, tag cement at 1162m.
	02:00	Drill cement, float, firm cement, shoe and clean out rat hole.
	04:15	Drill 3m of new hole from 1204m to 1207m. Work junk sub.
	06:15	Circulate bottoms up prior to leak off test.
	07:00	Test lines - 3000 psi, perform leak off test - EMW 16.1 ppg.
	08:00	RIH to 1207m (work junk sub).
	08:15	Drill 8 1/2" hole from 1207m to 1209m.
	10:45	Work junk sub, flow check, pump slug and POOH.
	12:00	Continue POOH. Took good mud.
	13:30	Service top drive.
		Teleco Run #2
	14:00	Pick up and make up MWD and roller reamer, dump memory on MWD.
	14:30	Make up bit #6 PDC, surface test MWD.
	14:45	Continue making up BHA, pick up 30 joints of drill pipe and continue to run in with care.
	19:00	Fill pipe and wash 17m to bottom at 1209m. Break bit in and drill new 8 1/2" hole from 1209m to 1329m.
17-03-93	00:00	Drill 8 1/2" hole from 1329m to 1559m, flow check connections and drill breaks.
	12:00	Continue to drill 8 1/2" hole from 1559m to drill break at 1648m. Drill 6m to 1654m.
	16:30	Flow check and circulate sample up.
	18:15	Continue to drill from 1654m to 1747m. Survey every 3rd connection.
18-03-93	00:00	Continue drilling 8 1/2" hole from 1747m to 1821m.
	03:30	Circulate sample up at geologist's request.
	05:15	Pump slug POOH.
	08:45	Dump memory on MWD and rack back same.

DRILLING DIARY

Date	Time	Operation
	09:00	Pick up 27m core assembly, make up outer barrels and stabilisers. Make up inner barrels and check catcher gap. No good. Install extra shims and make up core head.
18-03-93	12:00	RIH, lay out jars and pick up new jars. Continue to RIH to cut core.
	16:30	Wash and ream from 1707m to bottom at 1821m.
	16:45	Cut core #1 from 1821m to 1828m.
	18:30	Pump slug and POOH to change bit and BHA.
	21:45	Break off bit and break down core barrel to recover core, lay down 9m of barrel.
	23:00	Make up bit #8 onto 18m of core barrel and check catcher gap.
19-03-93	00:00	Continue, gap no good. Lay out inner barrels (to short) pick up 2 more inner barrels. Stand off good.
	01:30	RIH to 1796m. Hole good.
	04:15	Precautionary ream from 1796m to 1828m (torque increase from 1821m). Circulate 5 minutes, drop ball.
	05:00	Cut core #2 from 1828m to 1841m.
	12:00	Continue to cut core #2 from 1841m to 1842.5m.
	13:00	Pump slug and POOH. Tight hole @ 1660m, 70K overpull. Flow check @ shoe. Hole good.
	16:15	Break off bit and breakdown core barrel, recover core.
	18:00	Service core barrel and check core.
	19:00	Service TDS.
	19:30	Make up core barrel and make up bit #9.
	21:00	RIH to cut core #3.
	23:30	Wash and ream to bottom @ 1842.5m, circulate 5 min.
	23:45	Drop ball and cut core #3 from 1842.5m to 1844m.
20-03-93	00:00	Continue cut core #3 from 1844m to 1847m. Bit stopped drilling.
	01:00	Pump slug and POOH. Hole good, took good mud.
	04:00	Broke off bit and recovered core. Racked back core barrel in derrick.
		Teleco Run #3
	04:45	Make up bit #10 perform memory verification on MWD and test same.
	05:15	RIH to 1810m (filled pipe at shoe).
	07:45	Ream for MWD from 1810m to 1847m.
	10:30	Drill 8 1/2" hole from 1847m to 1859m.
	12:00	Continue to drill 8 1/2" hole from 1859m to 1970m. Survey and wash each connection.
21-03-93	00:00	Drill 8 1/2" hole from 1970m to 2031m. Survey and wash each connection.
	08:15	Circulate.
	08:30	Flowcheck, pump slug, POOH (tight @ 1970m backream to 1830m. Maximum overpull 70 Klbs @ 1891m).
	12:00	Continue to POOH, flowcheck at shoe.
	13:30	Break off bit #10. Make up bit #11. Dump MWD memory.
	14:00	Rig up to run Schlumberger.

DRILLING DIARY

Date	Time	Operation
`1-03-93	14:30	Rig up Log #1 DLL, MSFL, SAS, GR, AMS. Run log #1, rig down log #1. Rig up log #2 FMS, LDT, CNT, GRMS. Run log #2.
22-03-93	00:00	Continue run log #2 FMS, LDT, CNT, GRMS.
	02:00	Prepare and run log #3, VSP.
	12:00	Continue with log #3, rig down log #3 and rig up log #4 RFT, GR, AMS. Run log #4.
23-03-93	00:00	Continue log #4 RFT, GR, AMS, recover sample and rig down RFT #1 . Rig up and run RFT #2, recover sample and rig down RFT #2, rig up and run RFT #3.
	12:00	Continue to run log #4, RFT #3, recover sample.
	13:30	Rig down Schlumberger.
	14:00	Retrieve wear bushing.
	14:45	Make up test plug and RIH and land out.
	15:15	Test BOP's.
	17:45	POOH with test plug.
	18:15	Test surface equipment to 3500psi.
	21:30	Set wearbushing.
		Teleco Run #4
	04:45	Make up bit #11 calibrate and test MWD. Install Howco temperature.
	23:30	RIH.
24-03-93	00:00	Continue to RIH to shoe.
	00:45	Circulate MWD @ start and finish circulation. Circulate for Halco temperature gauge.
	02:15	Continue to RIH to 2017m, 14m of fill.
	03:30	Circulate for Halco temp gauge reading MWD survey @ start, mid and finish of circulation.
	04:45	Flow check hole pump slug and pull back to shoe.
	06:45	Rig up and recover Halco temp gauge on wireline.
	07:15	RIH.
	08:45	Tag bridge @ 1999m and ream to bottom @ 2031m.
	10:00	Continue to drill 8 1/2" hole from 2031m to 2056m.
	12:00	Drill 8 1/2" hole from 2056m and 2107m.
	19:30	Circulate.
	21:15	Flow check and POOH. Worked through tight hole from 2072m to 1940m. Maximum overpull 100Klbs (backream ledge @ 1946m). Continue POOH, hole good.
25-03-93	00:00	POOH to shoe. RIH to bottom, circulate bottoms up, repeat same.
	03:15	POOH.

SECTION 12

MUD RECORD

MUD REPORTS

TELECO RUN #	1	1	2	2	2	3	3
HOLE SIZE ins	12.25	12.25	8.50	8.50	8.50	8.50	8.50
DATE	12-03	13-03	16-03	17-03	17-03	20-03	20-03
TIME	22:00	20:00	23:00	15:30	23:00	12:30	24:00
DEPTH m	748	1203	1320	1635	1745	1864	1971
WEIGHT sg	1.09	1.12	1.12	1.14	1.16	1.15	1.15
VISCOSITY sec	50	50	48	50	48	45	46
PV cp	17	18	16	20	19	15	15
YP lb/100 sq ft	19	21	18	30	24	25	18
GELS 10s/10min	5/12	6/14	5/8	12/22	7/26	4/25	5/25
FILTRATE cc/30 min	6.2	5.0	4.8	5.0	5.0	6.0	5.5
HPHT FILTRATE cc/30 min	-	-	-	-	-	-	-
CAKE 32nd	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SOLIDS % by vol	4.50	6.60	6.80	7.40	8.50	9.40	9.40
WATER CONTENT % by volume	95.5	93.40	93.20	92.60	91.50	90.60	90.60
SAND % by vol	Tr	0.25	Tr	Tr	Tr	Tr	Tr
PH	9.2	9.0	9.7	9.2	9.0	9.0	9.5
CHLORIDES Kppm	31	27	27	26	34	40	45
CALCIUM mg/l	240	160	400	360	280	230	120
POTASSIUM Kmg/l % WT KCl	32.0 6.10	27.7 5.30	29.6 5.60	25.3 4.80	30.1 5.70	34.0 6.50	37.0 7.10

TELECO RUN #	4	4
HOLE SIZE ins	8.50	8.50
DATE	24-03	24-03
TIME	15:00	21:00
DEPTH m	2084	2107
WEIGHT sg	1.15	1.15
VISCOSITY sec	43	45
PV cp	12	17
YP lb/100 sq ft	16	20
GELS 10s/10min	3/15	4/14
FILTRATE cc/30 min	4.6	4.6
HPHT FILTRATE cc/30 min	-	-
CAKE 32nd	1.0	1.0
SOLIDS % by vol	8.50	8.50
WATER CONTENT . % by volume	91.50	91.50
SAND % by vol	0.1	0.1
PH	9.0	9.4
CHLORIDES Kppm	51	49
CALCIUM mg/l	230	120
POTASSIUM Kmg/l % WT KCl	40.7 7.82	37.0 7.11

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Appendix 4 Micropalaeontology: Basic Data and Range Charts

No micropalaeontological analyses were performed on Minerva-1 samples.

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Appendix 5 Palynology: Basic Data and Range Charts

Morgan Palaeo Associates performed palynological analyses on 28 cuttings samples, 50 sidewall core samples and 4 core samples from Minerva-1. The range charts appear on the following pages.

MINERVA #1 - palynological data -

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PH.(088)322795 FAX.(088)322798

C L I E N T: BHPP

W E L L: MINERVA #1

F I E L D / A R E A: OTWAY

A N A L Y S T: ROGER MORGAN   D A T E : JULY 1992

N O T E S: ALL DEPTHS ARE IN METRES
FIGURES REPRESENT PERCENTAGES BASED ON 100 SPECIMEN COUNT
"x" INDICATES RARE PRESENCE OUTISDE THE COUNT

RANGE CHART OF OCCURRENCES BY LOWEST APP: Algae, Dinos, S/P

Sample	1 DINOFLAGELLATE CONTENT	2 SCHIZOSPORIS RETICULATUS	3 BOTRYOCOCCUS	4 FROMEA FRAGILIS	5 NUMMUS MONOCULATUS	6 SCHIZOSPORIS PARVUS	7 SCHIZOSPORIS	8 SCHIZOSPORIS PSILATA	9 PALAMBAGES	10 PARALECANIELLA	11 CRASSOSPHAERA CONCINNA	12 HETEROSPHAERIDIUM HETEROCANTHUM	13 HETEROSPHAERIDIUM SOLIDA	14 ISABELIDINIUM CRETACEUM	15 OLIGOSPHAERIDIUM COMPLEX	16 CONOSPHAERIDIUM STRIATOCONUS	17 CRIBROPERIDINIUM SP	18 PALAEOPERIDINIUM CRETACEUM	19 CIRCULODINIUM DEFLANDREI	20 EXOCHOSPHAERIDIUM PHRAGMITES	21 ODONTOCHITINA OPERCULATA	22 ODONTOCHITINA PORIFERA	23 OVOIDINIUM VERRUCOSUM	24 TRITHYRODINIUM GLABRUM	25 CHLAMYDOPHORELLA NYEI	26 HETEROSPHAERIDIUM CONJUNCTUM	27 SPINIFERITES FURCATUS/RAMOSUS	28 TRITHYRODINIUM MARSHALLII PSILATE	29 HYSTRICHODINIUM PULCHRUM	30 ODONTOCHITINA COSTATA	31 CLEISTOSPHAERIDIUM	32 FLORENTINIA DEANEI	33 KIOKANSIUM POLYPES	34 OLIGOSPHAERIDIUM PULCHERRIMUM	35 CALLAIOSPHAERIDIUM ASYMMETRICUM	36 MICRODINIUM ORNATUM	37 ODONTOCHITINA STUBBY	38 PALAEOHYSTRICHOSPHORA INFUSORIOIDES
0563.0 SWC	1	X	6	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	3	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
0617.0 SWC	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
0627.0 SWC	10	.	2	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.
0651.0 SWC	4	.	3	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.
0760.0 SWC	3	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
0783.0 SWC	42	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.
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0838.5 SWC	6	.	3	.	7	.	.	.	.	1	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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0954.0 SWC	2	X	4	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	14	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	2
1054.0 SWC	4	X	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	1
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1149.0 SWC	8	.	2	.	.	.	.	.	.	.	.	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.
1166.0 SWC	13	.	1	.	.	.	.	.	.	.	.	6	4	.	.	.	X	.	.	.	1	.	.	.	.	.	.	1	.	.	1	.	X	.	.	.	.	1
1179.0 SWC	7	.	3	1	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
1193.0 SWC	17	.	.	.	1	.	.	.	.	.	.	4	1	.	X	.	.	.	.	1	X	X	.	.	.	.	.	5	.	1	.	.	.	.	.	.	.	1
1220.0 SWC	12	.	2	.	.	.	.	.	.	.	.	3	X	.	.	.	X	.	.	.	1	1	.	.	.	.	1	1	.	.	1	.	.	.	.	.	.	X
1260.0 SWC	16	.	1	.	2	.	.	.	.	.	.	2	1	.	.	.	.	.	.	X	1	1	.	.	.	.	1	2	.	.	.	.	1	.	1	.	.	.
1271 CUTTS	19	.	3	.	.	.	.	.	.	.	.	1	4	3	.	.	.	.	.	X	X	X	.	.	.	.	.	X	.	1	.	.	X	.	.	.	.	4
1298.0 SWC	21	.	1	.	.	.	.	.	.	.	.	7	.	X	.	.	.	.	.	.	3	1	.	.	.	.	1	1	.	.	1	.	.	.	.	.	.	1
1325 CUTTS	15	.	1	.	.	.	.	.	.	.	.	2	12	X	.	.	.	.	.	.	X	1	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	X
1351.0 SWC	18	.	4	.	.	.	.	.	.	.	.	6	2	X	.	.	.	.	.	.	1	.	.	3	.	.	1	1	.	.	.	.	.	.	.	.	4	X
1398.0 SWC	13	.	1	1	.	.	.	.	.	.	.	5	X	1	.	.	.	.	.	X	.	.	.	X	.	.	1	X	.	.	1	1	.	.	1	.	.	.
1410 CUTTS	24	.	1	.	X	.	.	.	.	.	.	1	4	X	1	.	.	.	.	1	1	1	.	X	.	.	2	.	.	2	.	.	.	.	.	.	.	1
1453.0 SWC	8	.	1	.	.	.	.	.	.	.	.	1	2	?	.	.	.	.	.	.	.	X	.	.	.	.	1	2	.	.	.	.	.	.	.	.	.	.
1502.0 SWC	16	.	.	.	.	.	.	.	.	.	.	6	1	.	1	.	.	.	.	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.
151[illegible] [illegible]TTS	31	.	3	.	.	.	.	.	.	.	.	8	5	X	.	.	.	.	X	.	1	1	.	1	.	.	2	X	.	2	.	.	.	.	1	.	3	.
15[illegible] SWC	8	.	.	.	.	.	.	.	.	.	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	X	.	.	.	.	1	.	.	.	.	.
1597.0 SWC	8	.	1	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	X	.	1	.	.	.	.	.	2	2	.	.	.	.	.	.	.	.	.	.
1616 CUTTS	26	.	2	.	X	.	.	.	.	.	.	8	2	.	X	1	.	.	1	X	1	X	.	X	.	.	7	.	X	.	.	.	.	.	.	.	.	X
1629.0 SWC	12	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.	.	.	2	1	X	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.
1647.0 SWC	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	7	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	X	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2
1690.0 SWC	14	.	.	.	3	.	.	.	.	.	.	8	X	.	1	.	.	.	1	X	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	1
1699 CUTTS	24	.	.	.	1	.	.	.	.	.	.	5	3	?	X	.	.	.	2	.	2	.	.	.	.	.	6	1	1	.	.	.	1	.	.	.	X	X
1723.0 SWC	12	.	1	.	1	.	.	.	.	.	.	2	X	.	1	.	1	.	1	X	X	.	.	.	.	.	3	1	.	.	.	.	1	.	X	.	.	.
1747.0 SWC	14	.	1	.	1	.	.	X	.	X	.	3	1	.	X	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	X	X	1	.	.	.
1766.0 SWC	14	.	3	.	X	.	.	.	.	.	.	3	.	.	1	.	X	.	1	1	X	.	.	.	.	X	4	.	.	.	.	.	1	.	.	.	.	1
1790 CUTTS	22	.	.	.	2	.	.	.	.	.	.	1	4	.	.	X	.	.	.	.	1	.	.	.	1	.	1	X	1	.	.	.	2	X	1	X	.	.
1805.0 SWC	15	.	.	.	X	.	.	.	.	.	.	8	X	.	2	.	.	.	.	X	1	.	.	.	1	.	X	.	X	.	.	.	X	.	.	.	.	.
1820 CUTTS	17	.	.	.	.	.	.	.	.	.	.	X	4	.	.	X	X	.	.	.	4	X	.	X	.	.	1	X	.	X	.	.	X	X	X	.	X	X
1837.3 CORE	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	3	.	8	.	X	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	16	.	8	.	1	.	.	.	.	.	.	11	.	.	X	.	.	1	X	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	13	.	5	.	2	.	.	.	.	.	.	5	2	.	3	.	X	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	2	.	4	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X
1886-89 CUTTS	5	.	3	.	2	.	.	.	.	.	.	X	X	.	.	.	.	.	X	.	X	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	13	.	5	.	2	.	.	.	.	.	.	7	1	.	X	.	.	.	1	.	1	.	.	X	.	.	X	.	.	.	.	.	1	.	X	.	.	.
1943-49 CUTTS	4	.	6	.	.	.	.	.	.	.	.	1	.	X	.	.	X	.	X	.	X	.	.	X	.	X	1	.	.	1	.	.	.	.	.	.	X	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	11	.	6	.	X	.	.	.	.	.	.	2	3	.	.	.	1	.	.	X	X	.	.	X	.	.	1	.	1	1	.	.	.	.	X	.	1	.
2021-27 CUTTS	14	.	10	.	.	.	.	.	.	.	.	9	1	.	1	.	.	.	2	.	X	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.	.
2035.0 SWC	33	.	X	.	X	.	.	1	.	.	.	17	.	.	3	.	.	3	X	2	.	.	.	.	X	2	2	.	X	.	.	.	3	.	X	.	.	X
2061.0 SWC	12	.	.	.	X	.	.	.	.	.	.	2	.	.	X	.	.	X	X	2	X	.	.	.	1	.	.	.	.	.	.	1	1	.	.	.	.	.
2084 CUTTS	5	.	5	.	.	.	.	.	.	.	.	2	1	.	X	.	.	.	.	.	1	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	17	.	5	.	X	.	.	.	.	.	.	3	2	1	5	.	X	.	.	1	.	X	.	X	.	.	2	.	.	2	.	.	.	.	X	X	X	1
2098.0 SWC	1	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	16	.	1	.	X	.	.	.	.	.	.	X	.	.	1	.	.	.	X	X	.	.	.	.	5	X	6	.	.	.	2	X	X	X	.	.	.	.
2102 CUTTS	15	.	7	.	.	.	.	.	.	.	.	3	2	.	X	.	2	.	.	X	X	.	.	.	.	X	1	.	.	X	.	.	.	.	.	.	.	.
2105 CUTTS	15	.	4	.	.	.	.	.	.	.	.	3	4	.	2	.	.	.	.	1	X	.	.	.	.	.	3	.	1	X	.	.	.	.	.	.	.	.
2117 CUTTS	15	.	12	.	.	.	.	.	.	.	.	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	5	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	0	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	4	.	4	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	~~X~~	1	2	1	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2261 CUTTS	2	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2270 [illegible]TTS	0	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	X	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
229[illegible] SWC	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
231[illegible] [illegible]TTS	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	1	X	1	.	.	.	.	.	.	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	0	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	5	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	39 ISABELIDINIUM COOKSONAE	40 CYMATIOSPHAERA	41 MILLIOUDIDINIUM	42 PTEROSPERMELLA AUSTRALIENSIS	43 XIPHOPHORIDIUM ALATUM	44 APTEODINIUM GRANULATUM	45 CADDASPHAERA HALOSA	46 MICRODINIUM SP	47 NELSONIELLA ACERAS	48 ODONTOCHITINA NO HORNS	49 CYCLONEPHELIUM COMPACTUM	50 ISABELIDINIUM BELFASTENSE	51 ODONTOCHITINA CRIBROPODA	52 CASSIDIUM SP	53 OCCISUCYSTA SP	54 ODONTOCHITINA VERY STUBBY	55 TRITHYRODINIUM RETIC "THICK"	56 APTEA SP	57 ISABELIDINIUM RECTANGULARE	58 AMPHIDIADEMA DENTICULATA	59 CHLAMYDOPHORELLA AMBIGUA	60 CIRCULODINIUM SOLIDA	61 CORONIFERA	62 ISABELIDINIUM KOROJONENSE	63 TRITHYRODINIUM SUSPECTUM	64 TRITHYRODINIUM THICK VERMIC	65 OLIGOSPHAERIDIUM DICTYOPHORUM	66 CANNINGIA SPINOSA	67 ODONTOCHITINA OBESA	68 ESCHARISPHAERIDIUM SP	69 ISABELIDINIUM SP	70 TRICHODINIUM	71 HYSTRICHODINIUM FURCATUM	72 ISABELIDINIUM BALMEI	73 TRITHYRODINIUM FINE GRANULATE	74 XENASCUS CERATOIDES	75 CHATANGIELLA SVERDRUPIANA	76 DISPHAERIA MACROPYLA
0563.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0617.0 SWC	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
0627.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
0760.0 SWC	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	?	.	.	.	.	.	.	X	.	.	.	.	.	.
0897.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	.	.	.	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1166.0 SWC	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1179.0 SWC	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220.0 SWC	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
1260.0 SWC	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.
1271 CUTTS	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
1298.0 SWC	.	1	.	.	.	.	.	.	1	.	.	.	X	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1325 CUTTS	.	.	.	.	.	.	.	.	4	.	.	X	4	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
1351.0 SWC	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	.	.	.	.	.	.	1	.	.	4	1	.	.	.	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1453.0 SWC	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1502.0 SWC	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1510 CUTTS	.	.	.	.	.	.	.	.	1	.	.	X	1	.	.	.	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
1562.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.
1616 CUTTS	.	.	.	.	.	X	.	.	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	.	X	.	.	.	.	.	.	1	.	.	.	X	.	.
[illegible].0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	X	.	.	.
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1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	?
1699 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	1	X	X	X	1	.	.
1723.0 SWC	.	.	1	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.
1766.0 SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	1	2	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.
1805.0 SWC	.	.	X	.	.	.	.	.	.	.	1	.	.	.	.	.	.	X	.	.	.	4	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	?	X	.	X	3	X	?	X	X	.	.	.	.	.	.	.	.	.	.	.	.
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	.	.	.	.	.	.	.	.	X	.	.	.	.	1	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	.	.	1	.	1	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	.	.	X	.	X	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	.	1	X	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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2270 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2294.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	77 CONOSPHAERIDIUM TUBULOSUM	78 XENIKOON AUSTRALIS	79 CHATANGIELLA TRIPARTITA	80 CHATANGIELLA VICTORIENSIS	81 SPINIDINIUM SP	82 ISABELIDINIUM RECTANGULARE CONTRACTUM	83 TANYOSPHAERIDIUM SALPINX	84 GILLINIA HYMENOPHORA	85 HETEROSPHAERIDIUM LATEROBRACHIUS cf	86 TRITHYRODINIUM PUNCTATE	87 ISABELIDINIUM THOMASII	88 ISABELIDINIUM TRIPARITA	89 ODONTOCHITINA OBESOPORIFERA	90 DICONODINIUM PUSILLUM	91 DINOGYMNIUM ACUMINATUM	92 TRITHYRODINIUM	93 AREOSPHAERIDIUM SUGGESTIUM	94 MADURADINIUM PENTAGONUM	95 EUCLADINIUM MADURENSE	96 NELSONIELLA TUBERCULATA	97 NELSONIELLA SEMIRETICULATA	98 AREOLIGERA SP	99 ISABELIDINIUM PELLUCIDUM	100 KIOKANSIUM SP	101 MANUMIELLA CORONATA	102 MANUMIELLA DRUGGII	103 TANYOSPHAERIDIUM "GRANULATUM"	104 CORDOSPHAERIDIUM INODES	105 DEFLANDREA DILWYNENSIS	106 DEFLANDREA SPECIOSA	107 EOCLADOPYXIS PENICULATA	108 HAFNIACYSTA SEPTATA	109 OPERCULODINIUM	110 THALASSIPHORA DELICATA	111 DEFLANDREA TRUNCATA	112 GLAPHYROCYSTA DIVARICATUM	113 ALISOCYSTA MARGARITA	114 DIPHYES COLLIGERUM
0563.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
0617.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	1	.	X	.	.	.
0627.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	1	.	.	.	.	.
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	1	3	.	X	.	X	X
0760.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	X	X	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	1	?	1	1	X	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	30	1	X	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0897.0 SWC	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	3	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1166.0 SWC	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1179.0 SWC	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	1	.	.	.	?	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220.0 SWC	.	.	.	.	X	.	.	.	?	.	.	.	X	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1260.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1271 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1351.0 SWC	.	.	.	X	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	.	.	.	.	.	1	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1629.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Sample	115 FIBROCYSTA VECTENSE	116 GLAPHYROCYSTA cf MEDUSETTIFORMIS	117 APECTODINIUM HOMOMORPHUM	118 DEFLANDREA OBLIQUIPES	119 FIBROCYSTA BIPOLARIS	120 HYSTRICHOSPHAERIDIUM TUBIFERUM	121 DEFLANDREA PACHYCERAS	122 APTEODINIUM AUSTRALENSE	123 AREOSPHAERIDIUM CAPRICORNUM	124 VERYHACHIUM	125 CAUCA SP	126 MICRHYSTRIDIUM	127 AEQUITRIRADITES VERRUCOSUS	128 ARAUCARIACITES AUSTRALIS	129 CALLIALASPORITES DAMPIERI	130 CALLIALASPORITES TURBATUS	131 CICATRICOSISPORITES LUDBROOKIAE	132 CRYBELOSPORITES STRIATUS	133 CYATHIDITES AUSTRALIS	134 CYATHIDITES MINOR	135 FALCISPORITES GRANDIS	136 FALCISPORITES SIMILIS	137 KLUKISPORITES SCABERIS	138 MICROCACHRYIDITES ANTARCTICUS	139 OSMUNDACIDITES WELLMANII	140 PEROTRILETES JUBATUS MORGANII	141 PODOSPORITES MICROSACCATUS	142 RETITRILETES AUSTROCLAVATIDITES	143 TRILOBOSPORITES TRIORETICULOSUS	144 TRIPOROLETES RETICULATUS	145 VELOSPORITES TRIQUETRUS	146 AEQUITRIRADITES SPINULOSUS	147 BALMEISPORITES HOLODICTYUS	148 BIRETRISPORITES	149 CICATRICOSISPORITES AUSTRALIENSIS	150 CONTIGNISPORITES COOKSONIAE	151 COPTOSPORA WRINKLY	152 COROLLINA TOROSUS
0563.0 SWC	.	.	.	X	.	.	.	X	X	.	.	.	.	.	.	.	.	.	3	4	1	14	.	.	.	.	4	1	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	2	1	3	17	.	7	2	.	6	1	.	.	.	.	.	.	.	.	.	1
0617.0 SWC	.	.	X	X	2	1	.	.	.	.	.	.	.	1	.	.	.	.	2	5	2	11	.	3	.	.	4	X	.	.	.	.	.	.	.	.	.	.
0627.0 SWC	X	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	7	2	9	.	2	.	.	3	1	.	.	.	.	.	.	.	.	.	.
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	2	3	4	14	.	6	2	.	2	1	.	.	.	.	.	.	.	.	.	X
0760.0 SWC	.	.	.	.	.	.	.	.	.	X	.	.	.	4	.	.	.	.	1	4	3	23	.	2	2	.	4	1	.	.	.	.	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	4	.	.	.	X	1	.	.	.	2	2	X	9	.	2	2	.	2	1	.	.	.	.	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	3	7	12	17	.	.	4	.	.	3	.	.	.	.	.	.	.	.	.	5
0838.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	4	5	2	13	.	6	2	.	4	2	.	.	.	.	.	.	.	.	.	X
0897.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	2	2	7	15	.	2	3	.	3	4	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	2	5	3	15	.	9	1	.	7	3	.	.	.	X	.	.	X	.	.	1
0991.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	3	15	.	12	1	.	4	2	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	3	11	4	16	.	11	2	.	.	1	.	1	.	.	.	.	X	X	.	1
1105.5 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	3	6	5	11	1	3	1	.	5	X	.	.	.	.	.	.	1	.	.	.
1149.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	4	5	21	.	6	1	1	10	1	.	.	.	.	.	.	1	.	.	1
1166.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	3	9	2	20	.	7	3	.	4	1	.	.	.	.	.	.	.	.	.	1
1179.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	9	3	20	.	9	1	.	3	4	.	.	.	.	.	.	1	.	.	1
1193.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	5	3	18	.	9	2	.	3	1	.	.	.	.	.	.	1	.	.	1
1220.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	1	X	.	.	.	6	8	4	15	.	12	1	.	2	2	.	.	.	.	.	.	2	.	.	.
1260.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	8	3	15	.	8	4	.	5	2	.	.	.	.	.	.	X	.	.	1
1271 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	5	12	1	10	.	7	1	1	11	2	.	1	.	.	.	.	1	.	.	.
1298.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	6	2	11	.	8	1	.	5	1	.	.	.	.	.	.	X	1	.	.
1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.	5	3	4	11	.	11	1	.	2	3	.	.	.	.	.	.	.	.	.	1
1351.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	1	7	3	15	.	8	2	1	7	2	.	.	.	.	.	.	1	.	.	1
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	3	12	1	16	.	5	2	.	6	1	.	1	.	1	.	.	.	.	.	1
1410 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	2	11	3	18	.	6	X	.	8	1	.	.	.	.	.	.	.	.	.	1
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	5	19	.	11	1	1	11	2	.	.	.	1	.	.	.	.	.	1
1502.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	3	5	1	13	.	11	1	.	2	4	.	.	.	1	.	.	1	1	.	1
15[illegible] CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	4	12	1	5	.	9	3	.	3	4	.	.	.	.	.	.	.	.	.	.
15[illegible] SWC	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	2	14	3	13	.	13	3	.	2	1	.	.	.	.	.	.	1	.	.	1
1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	1	8	3	26	.	12	2	.	4	1	.	.	.	X	.	.	.	.	.	1
1616 CUTTS	.	.	.	.	.	.	.	.	.	1	.	.	.	4	3	.	.	.	5	26	.	27	.	23	5	.	6	4	.	1	.	.	.	.	1	.	.	X
1629.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	X	2	.	2	.	.	1	5	3	28	.	15	2	1	2	1	.	.	.	.	.	.	.	.	.	.
1647.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	5	2	19	.	14	1	.	2	1	.	.	.	.	.	.	1	.	.	1
1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	7	1	17	.	21	.	.	1	2	.	.	.	.	.	.	X	X	.	1
1690.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	2	.	.	2	.	3	6	3	24	.	10	2	.	.	1	.	.	.	.	.	.	1	.	.	1
1699 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	4	10	2	15	.	11	2	X	2	.	.	.	.	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	.	.	X	2	5	4	16	.	17	2	.	4	1	.	.	.	.	.	.	1	.	.	1
1747.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	4	.	.	.	.	3	10	4	15	.	7	2	.	2	1	.	.	.	.	.	.	1	.	.	X
1766.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	X	.	2	6	8	20	.	12	1	.	.	1	.	.	.	.	X	.	X	1	.	X
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	3	10	1	11	.	13	2	.	2	.	.	X	.	.	.	.	X	.	.	.
1805.0 SWC	.	.	.	.	.	.	.	.	.	X	.	.	.	1	X	.	.	.	X	1	2	15	.	8	1	.	.	X	.	.	.	.	.	.	.	.	.	X
1820 CUTTS	.	.	.	.	.	.	.	.	.	X	.	1	.	1	.	.	.	.	4	6	.	15	.	16	.	.	3	.	X	.	.	X	X	.	X	.	.	.
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	11	1	17	.	17	X	.	27	1	.	.	.	.	.	.	.	.	.	2
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	7	.	.	5	9	2	13	.	11	1	.	9	1	.	.	.	.	.	.	1	.	.	1
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	14	3	15	.	15	1	.	5	1	.	.	.	.	.	.	.	.	.	1
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	3	X	2	.	.	4	5	2	20	.	14	2	.	10	X	.	.	.	X	X	.	.	.	.	X
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	2	8	27	.	6	2	.	3	X	.	.	.	.	.	.	.	.	.	1
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	6	4	8	.	.	4	8	1	11	.	15	3	.	11	X	.	.	.	.	.	.	.	.	.	X
1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	3	.	.	3	2	1	13	.	14	9	.	4	X	.	.	.	.	.	.	.	1	.	1
1943-49 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	?	.	6	8	3	17	.	19	1	.	8	1	.	.	.	.	.	.	X	.	.	X
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	3	31	3	5	.	8	.	.	6	1	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	4	6	1	14	.	10	2	.	7	.	.	2	.	.	.	.	.	.	.	X
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	4	2	1	.	.	4	4	2	13	.	13	2	.	4	X	.	.	.	.	X	.	.	.	.	2
2035.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	1	.	.	2	3	4	12	.	9	1	X	9	1	.	X	.	.	X	.	2	X	.	.
2061.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	2	1	.	4	11	2	10	.	18	.	.	4	2	.	X	.	.	.	.	3	.	.	.
2084 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	3	7	1	25	1	17	1	.	2	.	.	X	.	.	X	.	1	.	.	1
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	5	13	1	19	.	17	3	.	3	X	.	X	.	.	.	.	.	.	.	1
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	.	X	11	17	9	25	.	12	5	.	.	1	1	.	.	.	X	.	.	X	.	2
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	1	.	.	5	7	3	20	.	7	X	.	3	X	.	.	.	.	.	.	X	.	.	X
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	3	.	.	7	6	6	12	.	13	1	.	2	X	.	1	.	.	.	.	X	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	2	3	.	.	.	7	11	2	19	.	12	3	.	.	.	.	.	.	.	.	.	1	X	.	1
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	X	.	11	12	8	16	1	5	.	.	4	1	.	.	.	.	.	.	1	X	.	X
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	9	1	1	1	.	4	6	4	21	.	16	3	.	4	1	.	.	.	.	.	.	3	.	.	2
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	15	6	6	4	X	10	2	X	2	5	.	.	.	.	.	.	.	.	.	3
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1	4	.	.	12	10	11	30	1	5	1	.	.	1	.	.	.	.	.	.	.	.	.	1
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	1	.	5	7	8	18	.	6	2	.	.	1	.	.	.	.	.	.	.	.	.	2
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	6	1	.	6	10	13	21	.	14	3	.	1	.	X	.	X	.	.	.	2	.	.	2
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	3	.	.	11	10	8	31	.	4	10	.	.	2	.	1	.	.	.	.	X	1	X	.
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	4	X	.	9	13	12	32	.	12	6	.	1	X	.	.	.	.	.	.	.	.	.	.
227[illegible] CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	1	3	1	8	.	.	8	5	6	35	.	8	2	.	2	2	.	.	.	.	.	.	1	.	.	1
22[illegible] SWC	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	X	9	27	8	30	X	15	5	1	.	1	X	.	.	.	.	.	.	.	.	.
23[illegible] CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	4	.	.	7	3	5	10	.	2	1	.	.	4	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	X	.	X	5	.	.	.	1	7	29	1	2	.	3	16	1	1	1	X	2	.	.	X	2	23	.	X	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	1	X	1	5	.	3	6	X	9	16	6	10	.	11	7	X	.	9	X	11	.	.	X	.	5	X	X	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	X	1	1	2	2	.	8	13	4	16	1	12	8	X	.	4	1	10	.	.	X	X	12	.	X	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	6	2	.	7	12	11	16	.	10	11	.	.	2	.	9	.	.	.	.	2	.	.	3
2360.0 SWC	.	.	.	.	.	.	.	.	.	X	.	.	.	1	1	X	.	.	3	2	14	47	.	18	4	.	2	1	.	.	.	.	.	.	.	.	.	2
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	X	10	15	.	1	.	.	12	32	.	1	.	X	.	.	.	.	10	.	.	1
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	X	1	1	2	5	X	6	22	1	11	.	16	13	X	.	3	X	4	.	X	X	X	10	X	X	2
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	2	3	X	22	25	7	15	1	7	4	X	1	2	1	5	X	.	.	.	.	.	.	.

	153 DICTYOPHYLLIDITES	154 DILWYNITES GRANULATUS	155 FORAMINISPORIS ASYMMETRICUS	156 FORAMINISPORIS WONTHAGGIENSIS	157 PEROTRILETES WHITFORDENSIS	158 SENECTOTETRADITES VARIRETICULATUS	159 TRILOBOSPORITES TRIBOTRYS	160 TRIPOROLETES SIMPLEX	161 BALMEISPORITES TRIDICTYUS	162 CERATOSPORITES EQUALIS	163 COPTOSPORA PARADOXA	164 CYCADOPITES FOLLICULARIS	165 FOVEOTRILETES PARVIRETUS	166 LEPTOLEPIDITES VERRUCATUS	167 TRIPOROLETES BIRETICULATUS	168 TRIPOROLETES RADIATUS	169 DICTYOTOSPORITES COMPLEX	170 GLEICHENIIDITES	171 ISCHYOSPORITES PUNCTATUS	172 VITREISPORITES PALLIDUS	173 APPENDICISPORITES DISTOCARINATUS cf	174 AEQUITRIRADITES TILCHAENESIS	175 LYCOPODIACIDITES ASPERATUS	176 CICATRICOSISPORITES FOVEOAUSTRALIENSIS	177 PILOSISPORITES NOTENSIS	178 CONCAVISSIMISPORITES PENOLAENSIS	179 CINGUTRILETES CLAVUS	180 FORAMINISPORIS DAILYI	181 LEPTOLEPIDITES MAJOR	182 PEROTRILETES MAJUS	183 RETITRILETES FACETUS	184 STERIESPORITES ANTIQUASPORITES	185 AMOSOPOLLIS CRUCIFORMIS	186 CALLIALASPORITES TRILOBATUS	187 LAEVIGATOSPORITES OVATUS	188 PHYLLOCLADIDITES EUNUCHUS	189 APPENDICISPORITES TRICORNITATUS	190 CRIBROPERIDINIUM EDWARDSII
0563.0 SWC	.	12	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	3	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	5	.	.	.
0594.0 SWC	.	17	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0617.0 SWC	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	1	.	.	.
0627.0 SWC	.	20	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	2	.	.	.
0651.0 SWC	.	19	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	2	.	.	.
0760.0 SWC	.	21	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	1	.	.	.
0783.0 SWC	.	3	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
0810.0 SWC	.	9	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
0838.5 SWC	.	6	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.
0897.0 SWC	.	9	.	.	.	.	.	.	.	3	.	1	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	X	1	.	.	.
0954.0 SWC	.	4	.	.	.	.	.	X	.	3	.	.	.	.	.	.	.	5	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.
0991.0 SWC	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	6	X	.	.	.	.	.	.	.	X	.	.	.	.	X	2	.	.	.	.	.
1054.0 SWC	.	2	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	6	.	1	.	.	.	.	.	.	1	X	.	.	.	X	1	.	1	.	.	.
1105.5 SWC	.	4	.	.	.	.	.	.	.	3	.	2	1	1	.	.	1	3	.	.	.	.	.	.	.	.	X	.	.	.	.	X	1	.	.	.	.	.
1149.0 SWC	.	6	.	.	.	.	.	.	.	3	.	1	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.
1166.0 SWC	.	5	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	6	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	X	.	.	.
1179.0 SWC	.	11	.	.	.	.	.	.	.	.	.	1	.	X	.	X	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.
1193.0 SWC	.	15	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.
1220.0 SWC	.	10	.	.	.	.	.	.	.	2	.	.	.	1	.	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.
1260.0 SWC	.	7	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.
1271 CUTTS	.	4	X	.	.	.	.	.	.	2	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.
1298.0 SWC	.	8	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.	.	.
1325 CUTTS	.	6	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3	.	1	.	.	.	.	.	.	X	.	.	1	.	3	1	.	.	.	.	.
1351.0 SWC	.	11	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3	.	3	.	.	.	.	.	.	1	.	.	.	.	.	X	.	.	.	.	.
1398.0 SWC	.	10	.	1	.	.	.	.	.	2	.	2	.	.	.	.	.	5	.	1	.	.	1	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.
1410 CUTTS	.	9	.	.	.	.	.	.	.	1	.	X	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	X	.	.	.	1	3	.	.	.	.	.
1[illegible]0 SWC	.	13	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	5	.	1	.	.	.	.	.	.	1	1	.	.	.	.	X	.	.	.	.	.
1[illegible]0 SWC	.	20	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	3	.	4	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
1510 CUTTS	.	7	.	X	.	.	.	.	.	X	.	1	.	.	.	.	.	4	.	.	.	.	.	.	.	.	X	.	.	.	.	.	4	.	.	.	.	.
1562.0 SWC	.	12	.	.	.	.	.	.	.	2	.	2	.	.	.	.	.	11	.	2	.	.	.	.	.	.	.	X	.	.	.	4	4	.	1	.	.	.
1597.0 SWC	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	1	.	.	.	.	.	.	1	1	.	.	.	.	4	.	.	.	.	.
1616 CUTTS	.	14	.	.	.	.	.	.	.	3	.	1	.	.	.	.	.	12	.	.	.	.	2	.	.	.	X	.	.	.	.	2	11	.	.	.	.	.
1629.0 SWC	.	12	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	3	.	1	.	.	.	.	.	.	1	.	.	.	.	1	4	.	.	.	.	.
1647.0 SWC	.	13	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	1	.	.	.	.	1	9	.	.	.	.	X
1660.0 SWC	.	14	.	.	.	.	.	.	.	2	.	1	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	3	8	.	1	.	.	.
1690.0 SWC	.	8	.	.	.	.	.	.	.	2	.	.	.	1	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.	1	.	.	.
1699 CUTTS	.	5	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15	.	.	.	.	.
1723.0 SWC	1	7	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3	.	1	.	.	1	.	.	.	X	.	.	.	.	1	3	.	.	.	.	.
1747.0 SWC	.	24	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	X	.	.	.	1	1	.	2	.	.	X
1766.0 SWC	.	23	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.	.	X	9	.	.	.	.	.
1790 CUTTS	.	12	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	12	.	.	.	.	.
1805.0 SWC	.	40	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	X	.	.	.	.	.	.	.	.	.	.	X	8	.	X	.	.	.
1820 CUTTS	.	22	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	2	.	1	X	.	.	.	.	.	.	.	.	.	.	.	8	.	.	1	.	?
1837.3 CORE	.	11	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
1838.1 CORE	.	12	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	4	.	.	X	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.
1839.7 CORE	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	5	.	1	.	.	.	.	.	.	.	.	.	.	.	1	4	.	.	.	.	.
1840.3 CORE	1	6	.	.	.	.	.	.	.	X	.	2	.	X	.	.	.	2	.	X	X	.	2	.	.	.	.	.	.	.	.	X	2	.	.	1	.	?
1872.5 SWC	.	29	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	2	.	1	1	.	1	.	.	.	X	.	.	.	.	X	5	.	.	X	X	.
1886-89 CUTTS	1	6	.	.	.	.	.	.	.	X	.	2	.	.	.	.	.	2	.	.	X	.	X	.	.	.	.	.	.	.	.	1	6	.	.	.	.	.
1910-16 CUTTS	.	5	.	1	.	.	.	.	.	1	.	2	.	.	.	.	.	1	.	.	.	.	1	.	.	.	X	.	.	.	.	.	13	.	.	.	.	.
1943-49 CUTTS	.	7	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	4	.	.	?	.	1	X	.	.	X	.	.	.	.	.	1	.	2	.	.	.
1947.5 SWC	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.
1997-03 CUTTS	.	9	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	7	.	1	X	.	1	.	.	.	.	.	.	.	.	1	3	.	.	.	.	.
2021-27 CUTTS	.	5	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	3	.	.	2	.	.	.	.	.	X	.	.	.	.	X	2	.	.	.	.	.
2035.0 SWC	.	5	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	7	.	.	X	.	X	1	.	.	.	.	.	.	.	1	.	.	1	1	.	.
2061.0 SWC	.	8	.	.	.	.	.	.	.	1	.	.	.	X	.	.	.	3	.	.	X	.	2	.	.	.	1	.	.	.	.	.	.	.	5	2	X	.
2084 CUTTS	3	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	3	.	X	.	1	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X
2093 CUTTS	.	6	.	.	.	.	.	.	.	.	X	.	.	X	.	X	.	3	X	.	X	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	X
2098.0 SWC	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	X	.	1	.	X	.	1	.	.	.	.	.	.	.	.	X	X	X
2101.0 SWC	.	23	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	X	.	X	1	.	.	.	.	1	.	.	.	X	2
2102 CUTTS	.	13	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	7
2105 CUTTS	.	6	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	2	.	.	2	.	1	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1
2117 CUTTS	3	9	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	6	.	.	3	.	1	.	.	X	.	.	.	.	.	.	.	.	1	X	.	.
2123.0 SWC	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	3	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
2142.0 SWC	.	9	.	.	.	.	.	.	.	1	.	3	.	.	.	1	.	4	.	.	X	.	1	.	.	.	.	.	.	.	X	.	.	.	4	X	X	.
2150 CUTTS	.	4	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	X	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	15	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	11	2	.	.
2180 CUTTS	1	1	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	4	1	.	1	.	.	.	X	.	.	.	.	.	.	.	.	.	1	X	X	X
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22[illegible] CUTTS	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	?	1	X	1	.	.
2[illegible] CUTTS	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22[illegible] CUTTS	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.
2294.0 SWC	.	.	X	.	.	.	.	.	.	X	X	.	X	1	.	.	.	1	X	.	.	.	.	.	.	.	1	X	X	1	X	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	3	.	.	.	X	2	.	1	X	.	.	1	.	X	.	.	1	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	1	.	.	.	.	.	.	2	?	X	.	.	.	1	.	X	1	.	X	1	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	1	.	.	.	.	.	.	2	?	.	.	.	.	.	.	X	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	2	.	.	.	3	.	.	.	1	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	X	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	1	X	.	.	.	.	X	X	X	X	2	3	1	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	1	1	1	X	X	?	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	191 CAMEROZONOSPORITES ROBUSTA	192 LILIACIDITES KAITANGATAENSIS	193 PHYLLOCLADIDITES MAWSONII	194 CYATHEACIDITES TECTIFERA	195 PERINOPOLLENITES ELATOIDES	196 CAMEROZONOSPORITES SP	197 DENSOISPORITES VELATUS	198 FOVEOGLEICHENIIDITES	199 PROTEACIDITES SP	200 CLAVIFERA TRIPLEX	201 AUSTRALOPOLLIS OBSCURIS	202 CAMEROZONOSPORITES OHAIENSIS	203 COPTOSPORA PILEOSA	204 NEVESISPORITES	205 SPINOZONOCOLPITES PROMINATUS	206 NEORAISTRICKIA	207 PHIMOPOLLENITES PANNOSUS	208 TRICOLPITES VARIVERRUCATUS	209 CONTIGNISPORITES GLEBULENTUS	210 NOTHOFAGIDITES SENECTUS	211 CICATRICOSISPORITES MEGA AUSTRALIENSIS	212 DICTYOTOSPORITES SPECIOSUS	213 RETITRILETES CIRCOLUMENUS	214 TRICOLPITES SP	215 ASTEROPOLLIS ASTEROIDES	216 ORNAMENTIFERA SENTOSA	217 TRICOLPORITES APOXYEXINUS	218 TRICOLPITES GILLII	219 INTERULOBITES INTRAVERRUCATUS	220 NOTHOFAGIDITES PROTO SENECTUS	221 ORNAMENTIFERA MINIMA	222 PROTEACIDITES LARGE	223 DILWYNITES TUBERCULATUS	224 CICATRICOSISPORITES RADIATUS	225 LYGISTIPOLLENITES FLORINII	226 TRICOLPITES CONFESSUS	227 PERIPOROPOLLENITES POLYORATUS	228 PHYLLOCLADIDITES VERRUCATUS
0563.0 SWC	.	.	1	.	.	.	.	.	9	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	3	.	4	.	.	.
0594.0 SWC	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	.	9	.	.	.
0617.0 SWC	.	.	1	.	.	.	.	.	22	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	.	1	.	1	.
0627.0 SWC	.	.	3	.	.	.	.	1	6	1	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	1	.
0651.0 SWC	.	.	1	.	.	.	.	.	7	1	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	.	1	.	1	.
0760.0 SWC	.	.	4	.	.	.	.	.	7	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	3	.	1	.	.	.
0783.0 SWC	.	.	1	.	.	.	.	.	20	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	.	.	.	.	.
0810.0 SWC	.	.	1	.	.	.	.	.	6	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	1	.	.	.	.	.
0838.5 SWC	.	.	2	.	.	.	.	.	7	.	1	1	.	.	.	.	.	.	.	X	.	.	.	.	.	1	.	.	.	.	.	2	2	.	.	.	2	.
0897.0 SWC	.	.	1	.	.	.	.	.	14	.	1	.	.	.	.	.	.	.	.	4	.	.	.	.	.	X	X	2	.	.	.	3	1	.	.	1	.	.
0954.0 SWC	.	.	3	.	.	.	.	.	16	X	X	X	.	.	.	.	.	.	.	3	.	X	.	.	.	.	.	X	.	.	.	1	2	.	X	2	.	.
0991.0 SWC	.	.	4	.	.	.	.	.	4	X	1	1	X	.	.	.	.	.	.	1	.	X	.	.	.	1	.	X	.	.	.	4	.	.	.	.	.	.
1054.0 SWC	.	.	7	.	.	.	X	.	7	3	1	1	.	.	.	.	.	.	.	X	.	.	.	.	.	2	.	X	.	.	.	2	2	.	.	1	X	.
1105.5 SWC	.	.	5	.	1	.	.	.	10	1	3	1	.	.	.	.	.	.	.	?	.	X	.	.	.	1	.	.	.	.	.	1	5	.	X	.	1	.
1149.0 SWC	.	.	.	.	.	.	.	.	6	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	1	.	.	.	2	2	.	.	?	1	.
1166.0 SWC	.	.	1	.	.	.	.	.	2	1	3	X	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	1	2	.	.	.	.	1	1
1179.0 SWC	.	.	2	1	.	.	.	.	3	1	2	1	1	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	X	2	.	.	.	X	.
1193.0 SWC	.	.	3	.	.	.	.	.	3	.	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	5	.	.	.	.	.
1220.0 SWC	.	.	1	.	.	.	.	.	6	1	1	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	X	1	1	.	.	.	2	1
1260.0 SWC	.	.	2	.	.	.	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	4	.	.	.	1	.
1271 CUTTS	.	.	9	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	X	1	1	.	.
1298.0 SWC	.	.	4	1	.	.	.	.	5	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	1	.	.	.	.	.
1325 CUTTS	.	.	4	.	.	.	.	.	5	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	X	.	.	.	.	.	.
1351.0 SWC	.	.	3	.	.	.	.	.	4	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	7	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	2	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	1	.	.	.	.	.	4	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.
153.0 SWC	.	.	4	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
502.0 SWC	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
1510 CUTTS	.	.	5	.	.	.	.	.	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.
1562.0 SWC	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1597.0 SWC	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1616 CUTTS	.	.	4	.	2	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1629.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1647.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	.	.	3	2	.	.	.	.	.	4	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	.	.	2	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699 CUTTS	.	.	1	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	.	.	1	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1766.0 SWC	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1790 CUTTS	.	.	3	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1805.0 SWC	.	.	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.	X	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1837.3 CORE	.	.	2	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	.	?	.	2	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	.	.	2	.	.	.	.	.	2	.	1	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	1	.	4	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	X	.	2	.	.	.	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	7	.	.	.	.	.	1	1	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	1	.	5	.	.	.	.	.	.	X	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	X	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	.	.	X	.	.	.	.	.	.	X	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	.	.	X	.	.	.	.	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	1	X	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	3	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	X	X	.	.	X	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	2	?	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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2294.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	229 LILIACIDITES	230 NOTHOFAGIDITES PROTO ENDURUS	231 TRICOLPITES SABULOSUS	232 GAMBIERINA TWISTED	233 NOTHOFAGIDITES ENDURUS	234 SESTROSPORITES PSEUDOALVEOLATUS	235 ERICIPITES SCABRATUS	236 TRICOLPITES "MINOR"	237 HERKOSPORITES ELLIOTTI	238 DICTYOTOSPORITES FILOSUS	239 GAMBIERINA RUDATA	240 GAMBIERINA EDWARDSI	241 LYGISTIPOLLENITES BALMEI	242 NOTHOFAGIDITES FLEMINGII	243 TETRACOLPORITES VERRUCOSUS	244 TRICOLPITES LONGUS	245 TRICOLPORITES LILLIEI	246 TRIPOROPOLLENITES SECTILIS	247 PROTEACIDITES HAPUKUI	248 PROTEACIDITES RETICULOCONCAVUS	249 STERIESPORITES PUNCTATUS	250 TRILETES TUBERCULIFORMIS	251 ANACOLOSADITES ACUTULLUS	252 CYATHIDITES GIGANTIS	253 NOTHOFAGIDITES BRACHYSPINOLOSUS	254 TRICOLPITES WAIPAWAENSIS	255 VERRUCOSISPORITES KOPUKUENSIS	256 CAMEROZONOSPORITES BULLATUS	257 HALORAGACIDITES HARRISII	258 NOTHOFAGIDITES EMARCIDUS	259 PROTEACIDITES ANNULARIS	260 PROTEACIDITES GRANDIS	261 CAMEROZONOSPORITES LATROBENSIS	262 MALVACIPOLLIS SUBTILIS	263 PROTEACIDITES BUN GRANDIS	264 PROTEACIDITES OTWAYENSIS	265 TETRACOLPORITES OAMARUENSIS	266 MALVACIPOLLIS DIVERSUS
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0594.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	.	X	.	4	.	X	X	.	X	.	.	1	1
0617.0 SWC	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	.	2	.	X	.	1	.	1	1	.	3	.	.	.	X
0627.0 SWC	.	.	.	.	.	.	1	.	.	.	X	X	X	X	.	.	.	.	.	.	1	1	.	X	2	.	.	.	1	1	1	1	X	3	1	1	1	.
0651.0 SWC	.	.	.	.	.	.	1	.	.	.	1	.	3	1	.	.	.	.	.	.	X	X	X	.	1	.	X	X	1	1	X	X	.	.	.	.	.	.
0760.0 SWC	.	.	.	.	.	.	1	.	1	.	1	X	X	.	.	.	.	.	.	.	1	.	X	X	2	X	X	.	.	.	.	.	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	X	.	2	.	X	X	.	.	.	.	.	.	X	X	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	.	.	.	.	4	.	1	.	.	.	1	X	.	1	X	X	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0897.0 SWC	.	.	X	.	9	.	.	.	X	.	2	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	.	.	X	.	4	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	.	6	.	4	.	1	2	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	.	X	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	.	.	4	.	X	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1193.0 SWC	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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[illegible]8 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
[illegible]1.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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0594.0 SWC	.	X	.	.	1	X	1	1	X	.	.	.	0594.0 SWC
0617.0 SWC	1	1	1	1	.	.	.	.	.	.	.	.	0617.0 SWC
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168	TRIPOROLETES RADIATUS
144	TRIPOROLETES RETICULATUS
160	TRIPOROLETES SIMPLEX
275	TRIPOROPOLLENITES AMGIBUUS
246	TRIPOROPOLLENITES SECTILIS
92	TRITHYRODINIUM
73	TRITHYRODINIUM FINE GRANULATE
24	TRITHYRODINIUM GLABRUM
28	TRITHYRODINIUM MARSHALLII PSILATE
86	TRITHYRODINIUM PUNCTATE
55	TRITHYRODINIUM RETIC "THICK"
63	TRITHYRODINIUM SUSPECTUM
64	TRITHYRODINIUM THICK VERMIC
145	VELOSPORITES TRIQUETRUS
255	VERRUCOSISPORITES KOPUKUENSIS
124	VERYHACHIUM
172	VITREISPORITES PALLIDUS
74	XENASCUS CERATOIDES
78	XENIKOON AUSTRALIS
43	XIPHOPHORIDIUM ALATUM

6

Appendix 6 Rig Positioning Report

POSITIONING REPORT

FOR

BHP PETROLEUM LTD

RIG MOVE OF THE

DRILLING RIG BYFORD DOLPHIN

LOCATION	**:**	**MINERVA-1**
BLOCK	**:**	**VIC P31**
DATED	**:**	**1ST of March - 9th of March, 1993**
REPORT REF	**:**	**2058**

RACAL

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F	-	DGPS FINAL POSITION ANALYSIS PRINTOUTS - MINERVA-1
G	-	SATELLITE AVAILABILITY PREDICTIONS
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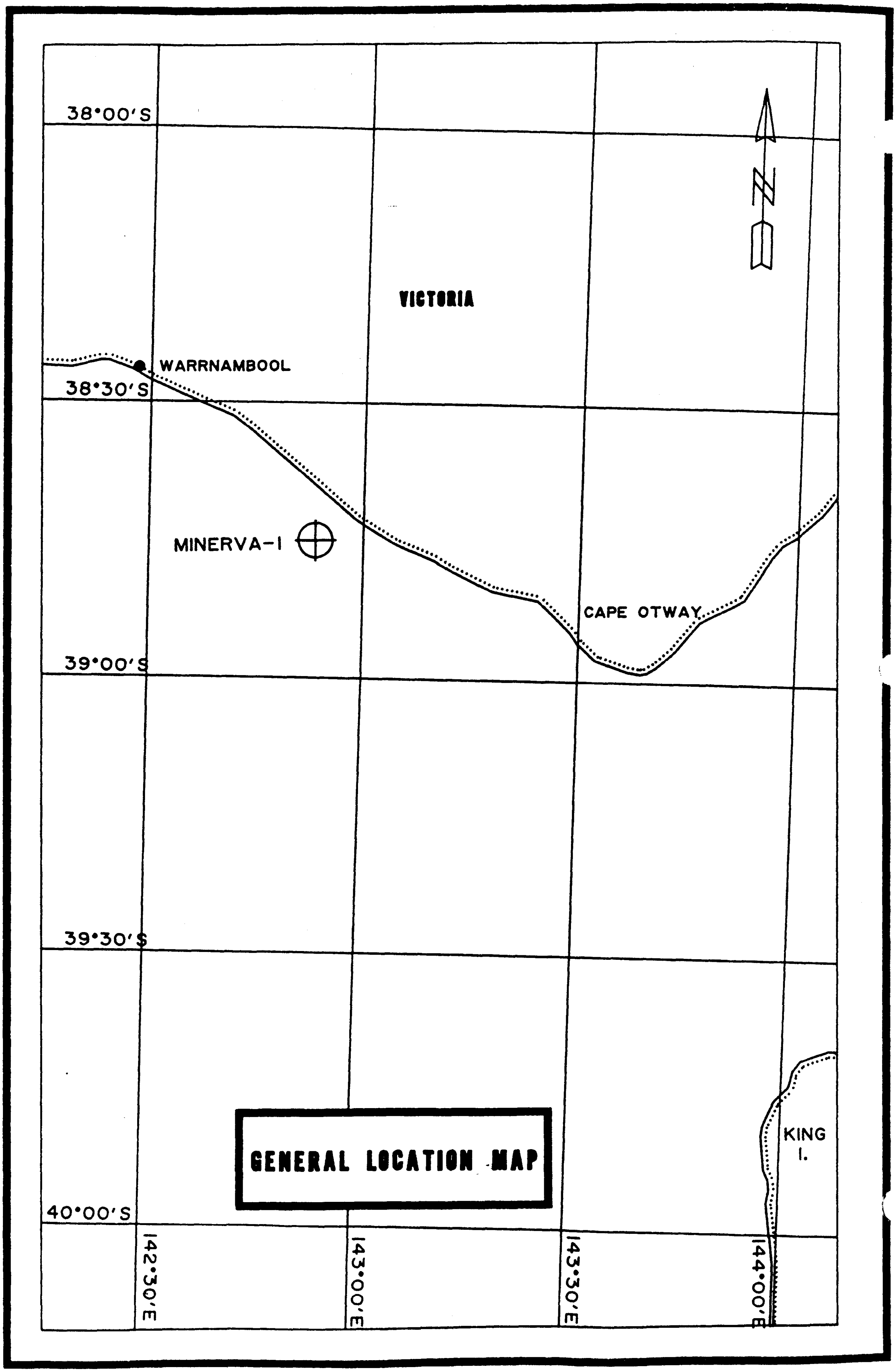


38°00'S
38°30'S
39°00'S
39°30'S
40°00'S
142°30'E
143°00'E
143°30'E
144°00'E
N
VICTORIA
WARRNAMBOOL
MINERVA-1
CAPE OTWAY
KING I.
GENERAL LOCATION MAP

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-1 location in the Otway Basin, offshore Victoria, for BHP Petroleum Limited (BHPP).

Personnel and equipment mobilised to Portland on the 1st of March, 1993. The BHPP supplied Standby/Survey vessel M.V. "PACIFIC MARLIN" was mobilised with the survey equipment on the 2nd of March. On the 2nd of March, a four transponder acoustic net was deployed and calibrated around the MINERVA-1 location. Positioning equipment was set up on the "Byford Dolphin" on the 3rd of March, 1993.

The "Byford Dolphin" was positioned over the MINERVA-1 location, on the 6th of March, 1993.

A final Differential GPS position was obtained, after the "Byford Dolphin" had ballasted down to drilling draught, during the morning of the 8th of March, 1993.

Proposed Location

The co-ordinates of the proposed location, MINERVA-1, were provided by BHPP as follows:

Datum AGD 84

Latitude	:	38° 42' 12.35" South
Longitude	:	142° 57' 12.64" East

AMG Zone 54 C.M. 141° E

Easting	:	669 869m
Northing	:	5 714 307m

Rig Heading	:	230°

Final Differential GPS Position - MINERVA-1

The final DGPS position of the "Byford Dolphin" was derived between 0928 and 1032 hours on the 8th March, 1993. The final DGPS position was as follows:

Datum AGD 84

Latitude	:	38° 42' 12.230" South
Longitude	:	142° 57' 12.337" East

AMG Zone 54 C.M. 141° E

Easting	:	669 862.5m
Northing	:	5 714 311.0m

Rig Heading	:	228.5°

The final position is 8.2 metres on a bearing of 296.8° (T) from the intended MINERVA-1 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-1 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 were requested to provide the "SkyFix" Differential GPS as back-up to the Del Norte GPS receivers. 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-1 location.

b. To provide real-time positioning for the semi-submersible drilling rig "Byford Dolphin" during the tow and onto the MINERVA-1 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-1 well.

3. SUMMARY OF EVENTS

Racal Survey personnel J. Tighe (Surveyor) and K. Perry (Engineer) departed Perth for Melbourne on the 1st of March, 1993. Racal Surveyor, K. Eddy arrived in Melbourne the same afternoon.

The Racal personnel departed Melbourne for Portland on the 1st of March, arriving in Portland at 1955 hours. The Racal personnel met up with BHPE representative, P. Riley at the Richmond Henty Motel at 2015 hours. The M.V. "Pacific Marlin" was at anchor off Portland. All personnel boarded the M.V. "Pacific Marlin" at 0015 hours on 2nd of March, departing Portland at 0035 hours.

The M.V. "Pacific Marlin" arrived at MINERVA-1 location at 0700 hours. Racal equipment was installed and fully operational by 0930 hours.

A STD-12 velocity profile was commenced at 1120 hours. Results are located in Appendix B. Between 1350 and 1651 hours on the 2nd of March, 1993, four Sonardyne Compatts were deployed in the area around the MINERVA-1 location.

Between 1759 hours and 2104 hours on the 2nd of March, 1993, the calibration of the acoustic net was carried out. The Sonardyne towfish was recovered at 2120 hours. Acoustic/DGPS positioning comparisons were completed at 2145 hours. Due to the unfavourable sea conditions the "Pacific Marlin" remained at the MINERVA-1 location awaiting instructions from "Byford Dolphin" on how personnel were to transfer to the rig.

At 0820 hours on 3rd of March, 1993, the "Pacific Marlin" was instructed by "Byford Dolphin" to proceed to the rig at ERIC THE RED-1, arriving at 1110 hours on the 3rd of March.

At 1540 hours, all personnel and equipment were transferred to the "Byford Dolphin".

By 1800 hours on the 3rd of March, 1993, the GNS was fully operational and interfaced to the all navigation systems.

At 1436 hours on the 4th of March, 1993, "Byford Dolphin" began recovery of anchors.

The run-in to the MINERVA-1 location commenced at 0330 hours on the 6th of March, 1993. Anchor handling operations commenced at 0852 hours with anchor No. 6 being set on the seabed. Anchor handling operations were completed at 0125 hours on the 8th of March, 1993, with the final anchor No. 1 being set on the bottom. Pre-tensioning operations commenced at 0130 hours. The "Byford Dolphin" moved over the MINERVA-1 location at 0130 hours, and ballasting of the rig commenced at 0135 hours.

Ballasting operations were completed at 0930 hours on the 8th of March, 1993. The final DGPS position observation commenced at 0930 hours and was completed at 1100 hours. The Sonardyne Compatts were released between 1400 hours and 1450 hours, and retrieved by the fast standby boat of the "Pacific Marlin" .

The "Pacific Marlin" departed MINERVA-1 for Portland at 1500 hours on the 8th of March, 1993, arriving at 2130 hours.

All personnel departed Portland at 0720 hours on the 9th of March, arriving in Melbourne at 0830 hours.

Racal Personnel J. Tighe and K. Perry departed Melbourne at 0840 hours to arrive in Perth at 1040 (WST) hours. K. Eddy departed Melbourne for Barrys Beach.

All times, except where stated, are Eastern Standard Time (EST).

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). It was determined that the difference between AGD 84 and AGD 66 for the MINERVA-1 location was negligible.

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:

GNS Version R2.06A and R2.06D(PC) Oasis II Version 1.7C.

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 Geoid/Spheroid separation value (N) at the MINERVA-1 location is -1.77m. 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, 11, 12, and 13. The current Block II satellites are SV's 1, 2, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27 and 28. 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 gives the 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-1 location on the 2nd of March, 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 58.21 metres.

A mean velocity of 1513.7 m/sec for the entire water column was obtained using the Chen and Milleros formula.

For the acoustic net calibration the following values from the observed profile were entered into the Oasis II software:

Depth	VP(ms^{-1})
0.09	1513.3
5.90	1513.2
10.44	1513.3
15.05	1513.3
20.95	1513.5
25.47	1513.5
30.10	1513.6
35.86	1513.7
40.37	1513.8
45.10	1503.9
50.11	1503.9
55.96	1504.0
58.21	1504.1

6.3 TRANSPONDER DEPLOYMENT AND CALIBRATION

Sonardyne acoustic transponders were deployed and calibrated from the M.V. "Pacific Marlin" on the 2nd of March, 1993.

The transponders were deployed in a quadrilateral, approximately 700-900 metres from the intended location. Drop positions and telemetered depths were used as the basis of subsequent calibrations.

The calibration of the acoustic array was initially to be by the Relative/Absolute method. However, due too the prevailing sea state/swell (sea state 6-7, 4-5m swell) and problems experienced on previous rig moves with acoustic noise interference from the "Pacific Marlin" it was decided that the acoustic array would be calibrated by seabed baseline measurements and Boxing-In of two transponders.

The results from the seabed baseline calibration were considered to be marginal because of the sea state/swell and the ambient noise within the water column, possibly due too the shallowness of the location (56m).

Subsequently all transponders were Boxed-In to determine their absolute positions with regards to the chosen datum. All transponders were Boxed-In with a circle radius of 300 metres.

6.4 SEABED CALIBRATION

A seabed calibration was carried out on the 2nd of March, 1993. TP1 and TP3, co-ordinated by a Box-In calibration were fixed in this calculation.

Acoustic Net Relative Positions After Seabed Calibration

Transponder	Easting (m)	Northing (m)	Depth (m)
1	0.00	-0.00	48.10
2	1150.04	-5.81	55.80
3	1239.70	-1054.90	51.00
4	230.57	-103.41	54.70

6.5 'BOX-IN' CALIBRATIONS

The results of the Box-In calibrations as carried out on the 2nd of March, 1993 were:

Datum AGD 84
AMG Zone 54 CM 141° East

Tp	Code	Easting(m)	Northing(m)	Depth	RMS
1	503	669 332.62	5 714 943.89	48.10	3.1
2	1106	670 447.32	5 714 736.21	55.80	3.4
3	1109	670 353.60	5 713 683.17	51.00	3.8
4	1010	669 369.40	5 713 887.06	54.70	3.4

6.6 FINAL TRANSPONDER CO-ORDINATES

The final set of co-ordinates used during the MINERVA-1 project were as follows:

Datum AGD 84
AMG Zone 54 C.M. 141° East

Transponder		Easting (m)	Northing (m)	Depth (m)
1	503	669 322.62	5 714 943.89	48.10
2	1106	670 447.32	5 714 736.21	55.80
3	1109	670 353.60	5 713 683.17	51.00
4	1010	669 369.40	5 713 887.06	54.70

7. FINAL DRILLSTEM POSITION

7.1 FINAL DIFFERENTIAL GPS POSITION - MINERVA-1

The "Byford Dolphin" was positioned over the MINERVA-1 location on the 8th of March, 1993.

A final position of the "Byford Dolphin" was determined using Racal's "SkyFix" Differential GPS between 0930 and 1045 on the 8th of March, 1993. A total of 221 samples from 8 constellations were observed.

CONSTELLATION	SAMPLES	SATELLITES
A	38	26, 16, 12, 24, 03
B	2	20, 16, 12, 24, 03, 25
C	48	20, 16, 12, 24, 25
D	4	20, 16, 12, 24, 17, 25
E	8	20, 16, 24, 17, 25
F	1	20, 16, 24, 25
G	46	20, 24, 17, 25
H	74	20, 12, 24, 25

Total number of samples used = 221 .

The computed Antenna position, with constellations given equal weights, was as follows:

Datum WGS 84

Latitude	:	38° 42' 07.310" South	(s.d. 0.18m)
Longitude	:	142° 57' 15.893" East	(s.d 0.27m)
Spheroidal Height	:	24.94m	(s.d. 0.36m)

Transforming the above WGS 84 co-ordinates to AGD 84 using the parameters in section 4, gives the following co-ordinates:

Datum AGD 84

Latitude	:	38° 42' 12.626" South
Longitude	:	142° 57' 10.949" East
Spheroidal Height	:	41.67m

Applying the antenna to datum offsets to the above co-ordinates gives the following drillstem position, over the MINERVA-1 location.

Datum AGD 84

Latitude	:	38° 42' 12.230" South
Longitude	:	142° 57' 12.337" East

AMG Zone 54 C.M. 141° East

Easting	:	669 862.46m
Northing	:	5 714 311.03m

Rig Heading	:	228.5°

This position is 8.21 metres on a bearing of 296.83° True from the intended MINERVA-1 location.

This final position as obtained using the Trimble GPS receiver and SkyFix was confirmed by the Del Norte GPS receiver of BHPE which gave the following final position::

Datum AGD 84

Latitude	:	38° 42' 12.178" South
Longitude	:	142° 57' 12.434" East

AMG Zone 54 C.M. 141° East

Easting	:	669 864.83m
Northing	:	5 714 312.058

This position is 7.27 metres on a bearing or 316.8° from the inteded MINERVA-1 location.

8. PERSONNEL AND EQUIPMENT

8.1 PERSONNEL

The following personnel were employed on this project:

For : Racal Survey (Australia)

K. Eddy	-	Surveyor/Party Chief
J. Tighe	-	Surveyor
K. Perry	-	Navigation/Acoustic Engineer

For : BHPP Limited

P. Riley	-	Client Representative

8.2 EQUIPMENT

The following equipment was supplied for use on this project:

1 x Trimble 4000DL GPS Receiver, Cable and Antenna

1 x "SkyFix" Demodulator

1 x "SkyFix" Rig Portable

1 x Toshiba T5200/100 Computer (for DNAV-N)

2 x Sonardyne Pan Units

5 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

1 x HP Quietjet Plus Printer

1 x HP Thinkjet Printer

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

2 x Arma Brown Gyro Compasses

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 R2.06A, GNS Ver R2.06D PC, OASIS II Ver 1.7C), cables, manuals, etc.

9. 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

pp

Gareth Jones
Area Surveyor

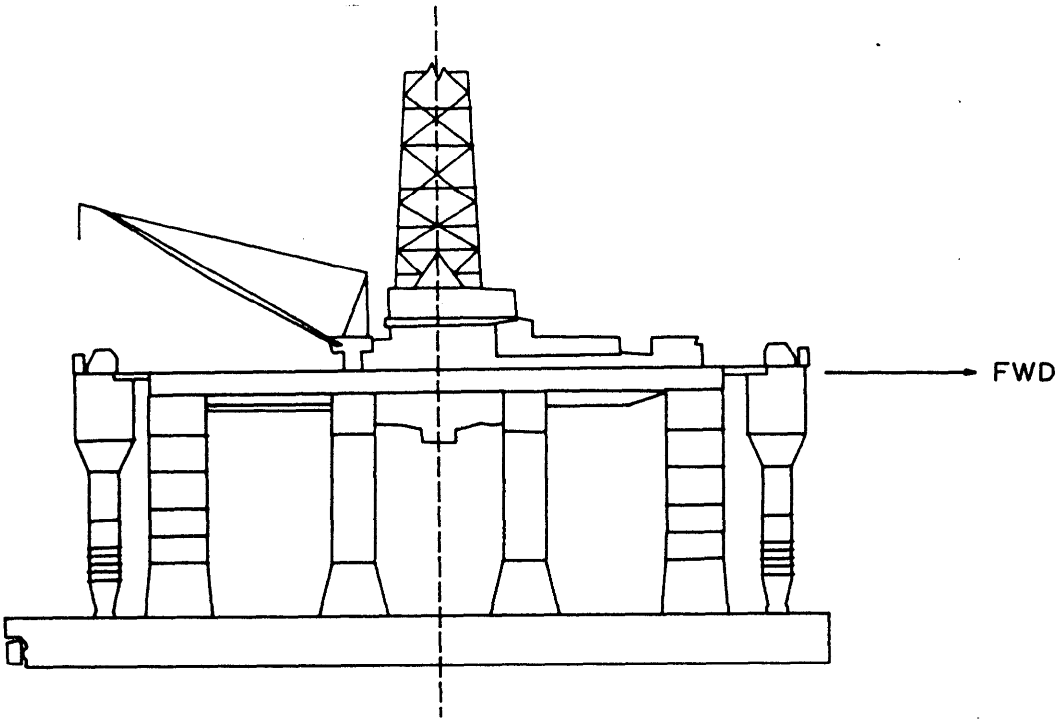
APPENDIX A

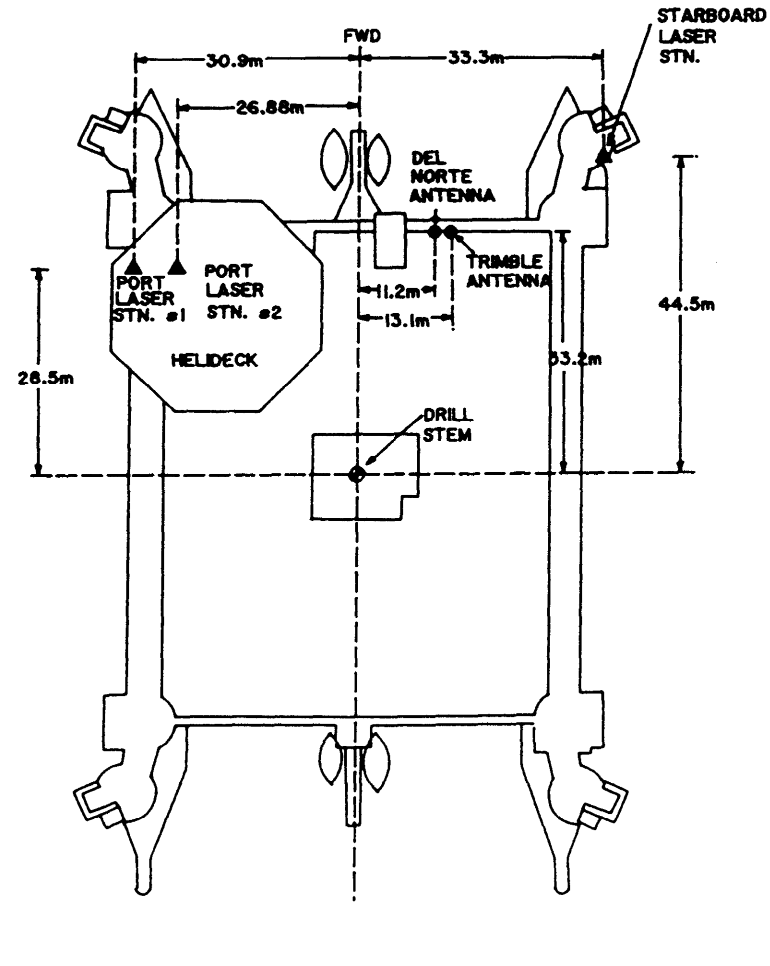
OFFSET DIAGRAMS - BYFORD DOLPHIN AND PACIFIC MARLIN

OFFSET DIAGRAM APPENDIX A

BYFORD DOLPHIN

(NOT TO SCALE)

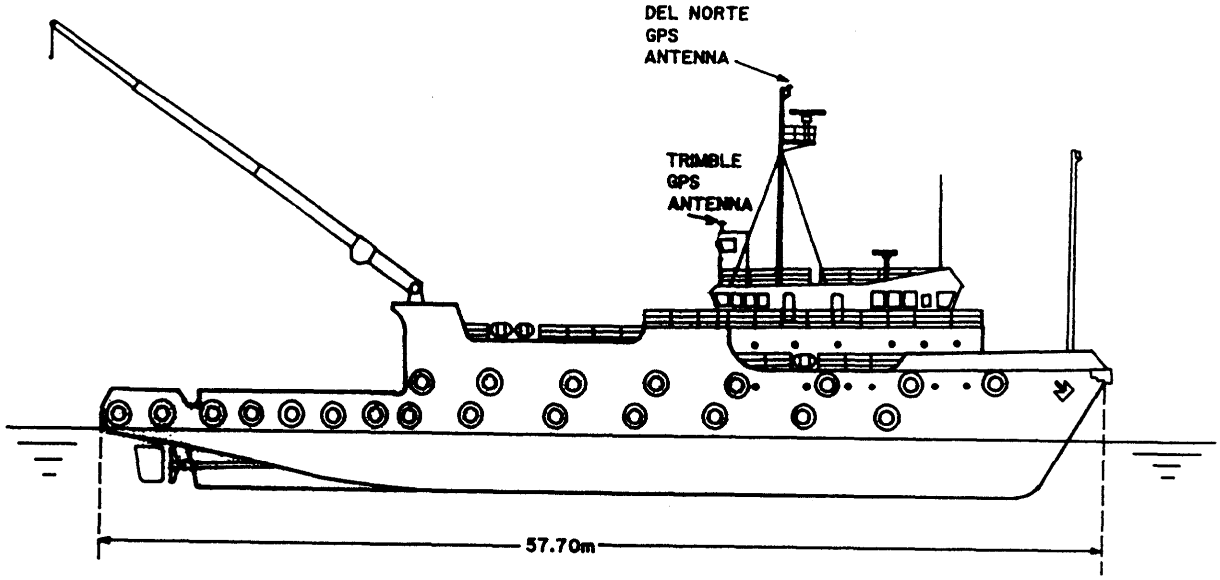


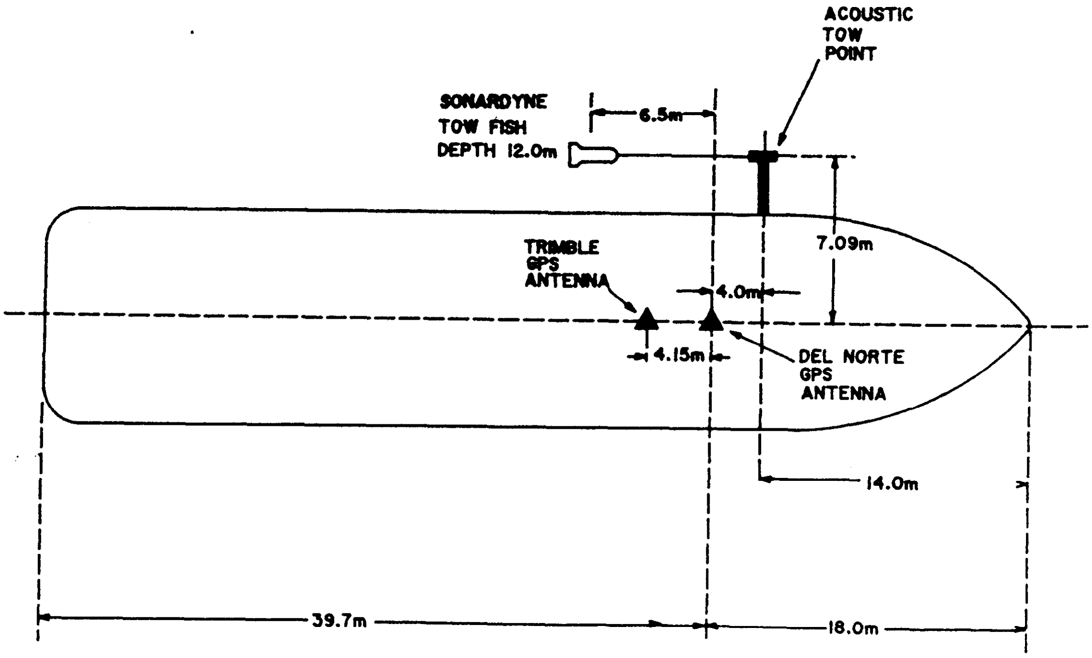


OFFSET DIAGRAM

PACIFIC MARLIN

(NOT TO SCALE)





APPENDIX B

VELOCITY PROFILE PRINTOUT

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+00
Temperature	4.104309E+01	-1.478494E-03	1.807922E-08	-2.454137E-13
Conductivity	-1.588024E+00	7.944621E-05	0.000000E+00	0.000000E+00

STD-12 DATA PRINTOUT FACILITY File name [illegible]
Created - ~~03-02-1993~~ 02-03-93

Time sec.	Temp °C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
720	17.318	0.09	44.77	34.61	1.025100	1513.3
726	16.975	1.21	45.21	35.29	1.025700	1513.1
737	16.975	2.26	45.25	35.33	1.025800	1513.2
741	16.976	3.38	45.26	35.33	1.025800	1513.2
744	16.977	4.63	45.26	35.33	1.025800	1513.2
746	16.974	5.90	45.26	35.33	1.025800	1513.2
747	16.974	6.96	45.26	35.33	1.025800	1513.2
748	16.975	8.23	45.26	35.34	1.025800	1513.3
749	16.976	9.29	45.26	35.33	1.025800	1513.3
751	16.984	8.02	45.27	35.33	1.025800	1513.3
54	16.974	9.14	45.26	35.33	1.025800	1513.3
55	16.973	10.44	45.26	35.34	1.025800	1513.3
757	16.974	11.81	45.27	35.34	1.025800	1513.3
759	16.974	12.99	45.27	35.34	1.025800	1513.3
766	16.970	14.02	45.26	35.33	1.025800	1513.3
767	16.967	15.05	45.26	35.33	1.025800	1513.3
768	16.969	16.35	45.26	35.34	1.025800	1513.4
770	16.967	17.56	45.26	35.34	1.025800	1513.4
771	16.971	18.75	45.26	35.34	1.025800	1513.4
773	16.973	19.83	45.27	35.34	1.025800	1513.4
7	16.971	20.95	45.26	35.33	1.025800	1513.5
777	16.966	22.11	45.26	35.34	1.025800	1513.5
779	16.969	23.16	45.27	35.34	1.025800	1513.5
781	16.967	24.44	45.26	35.34	1.025800	1513.5
782	16.969	25.47	45.27	35.34	1.025800	1513.5
783	16.971	26.62	45.27	35.34	1.025800	1513.5
784	16.971	27.77	45.27	35.34	1.025800	1513.6
785	16.970	28.92	45.27	35.34	1.025800	1513.6
790	16.969	30.10	45.27	35.34	1.025800	1513.6
?1	16.970	31.25	45.27	35.33	1.025800	1513.6
93	16.970	32.31	45.27	35.34	1.025800	1513.6
795	16.970	33.62	45.27	35.34	1.025800	1513.7
796	16.969	34.67	45.27	35.34	1.025800	1513.7
796	16.970	35.86	45.27	35.34	1.025800	1513.7
803	16.969	37.07	45.27	35.34	1.025800	1513.7
804	16.966	38.13	45.27	35.34	1.025800	1513.7
814	16.969	39.16	45.27	35.34	1.025800	1513.7
815	16.969	40.37	45.27	35.34	1.025800	1513.8

[illegible]TOUT FACILITY   File name - min.rel
Created - 03-02-1993

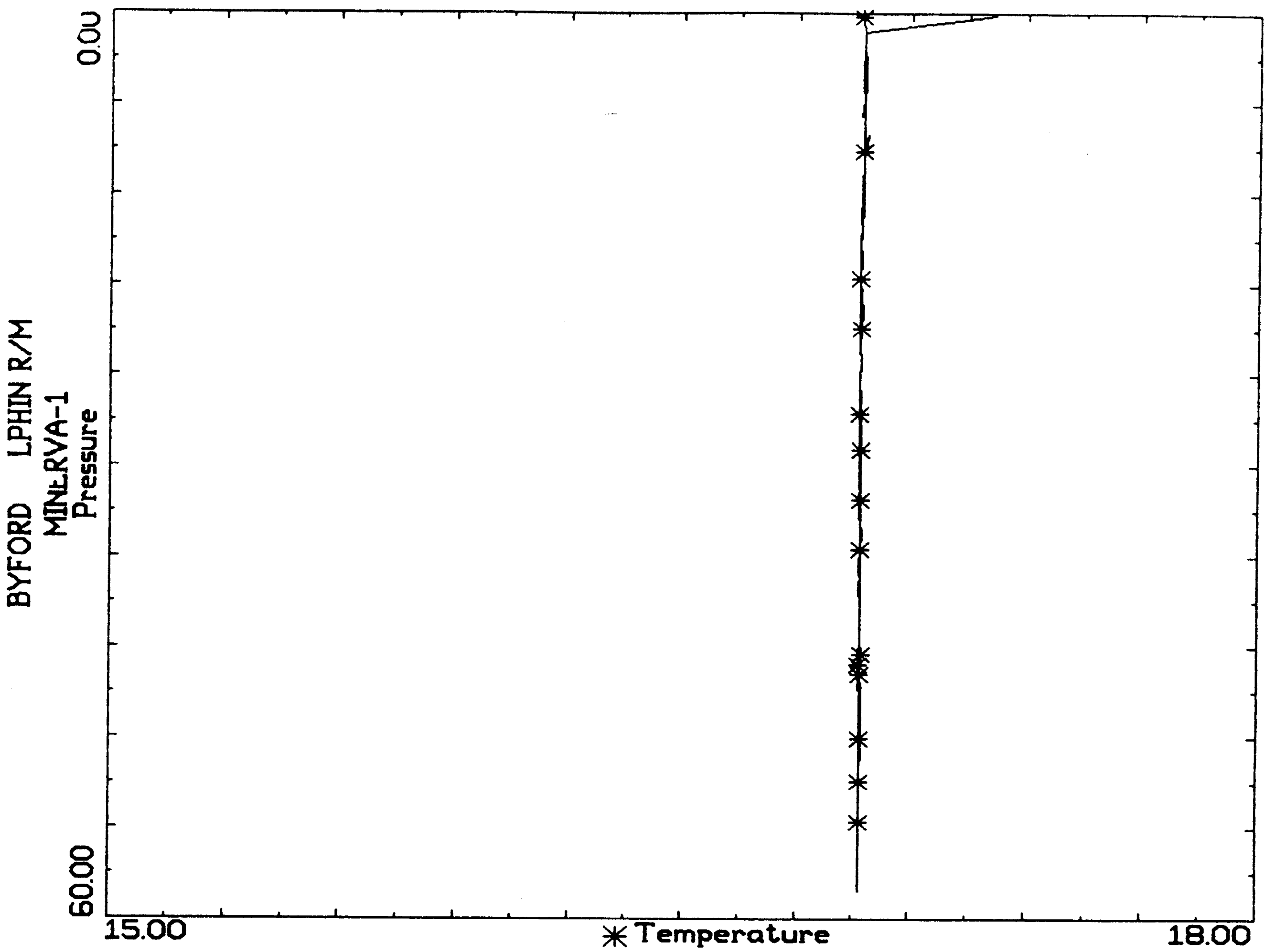
Time sec.	Temp °C	Depth m	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
834	16.97[illegible]	48.74	45.28	35.34	1.025800	1513.9
835	16.97[illegible]	50.11	45.28	35.34	1.025800	1513.9
842	16.970	51.20	45.28	35.34	1.025800	1513.9
844	16.97[illegible]	52.51	45.28	35.34	1.025800	1514.0
845	16.970	53.66	45.28	35.34	1.025800	1514.0
847	16.970	54.81	45.28	35.34	1.025800	1514.0
848	16.971	55.96	45.29	35.34	1.025800	1514.0
[illegible]50	16.971	57.12	45.28	35.34	1.025800	1514.0
[illegible]51	16.971	58.21	45.28	35.34	1.025800	1514.1
857	16.970	57.12	45.27	35.33	1.025800	1514.0
859	16.970	55.87	45.27	35.33	1.025800	1514.0
864	16.971	54.78	45.29	35.34	1.025800	1514.0
869	16.970	53.54	45.28	35.34	1.025800	1514.0
870	16.970	52.20	45.28	35.34	1.025800	1514.0
871	16.970	50.95	45.28	35.34	1.025800	1513.9
874	16.969	49.86	45.28	35.34	1.025800	1513.9
880	16.970	50.89	45.28	35.34	1.025800	1513.9
883	16.970	49.61	45.28	35.34	1.025800	1513.9
885	16.970	48.46	45.28	35.34	1.025800	1513.9
897	16.972	49.55	45.29	35.35	1.025800	1513.9
900	16.974	48.18	45.29	35.35	1.025800	1513.9
901	16.975	46.81	45.29	35.34	1.025800	1513.9
902	16.974	45.69	45.29	35.34	1.025800	1513.9
907	16.970	46.94	45.28	35.34	1.025800	1513.9
908	16.970	48.12	45.28	35.34	1.025800	1513.9
913	16.970	46.91	45.29	35.35	1.025800	1513.9
[illegible]4	16.972	45.69	45.28	35.34	1.025800	1513.9
[illegible]4	16.972	44.35	45.28	35.34	1.025800	1513.8
917	16.969	45.60	45.28	35.34	1.025800	1513.9
920	16.967	44.23	45.28	35.34	1.025800	1513.8
925	16.970	45.47	45.28	35.34	1.025800	1513.9
930	16.967	44.29	45.28	35.34	1.025800	1513.8
931	16.967	43.14	45.28	35.34	1.025800	1513.8
934	16.967	44.29	45.28	35.34	1.025800	1513.8
937	16.967	43.23	45.28	35.34	1.025800	1513.8
940	16.967	42.11	45.28	35.34	1.025800	1513.8
946	16.967	43.26	45.28	35.34	1.025800	1513.8
947	16.970	44.32	45.28	35.34	1.025800	1513.8
951	16.970	43.11	45.28	35.34	1.025800	1513.8
952	16.971	41.65	45.28	35.34	1.025800	1513.8
953	16.970	40.43	45.29	35.34	1.025800	1513.8
960	16.97[illegible]	39.41	45.28	35.34	1.025800	1513.8
965	16.96[illegible]	[illegible]	45.28	35.34	1.025800	1513.8
966	[illegible]	[illegible]	45.28	35.35	1.025800	1513.8
968	16.972	[illegible]	45.28	35.34	1.025800	1513.8
[illegible]	[illegible]	[illegible]	45.28	35.34	1.025800	1513.8

STD-12 DATA PRINTOUT FACILITY File name - [illegible]
Created - 03-02-1993

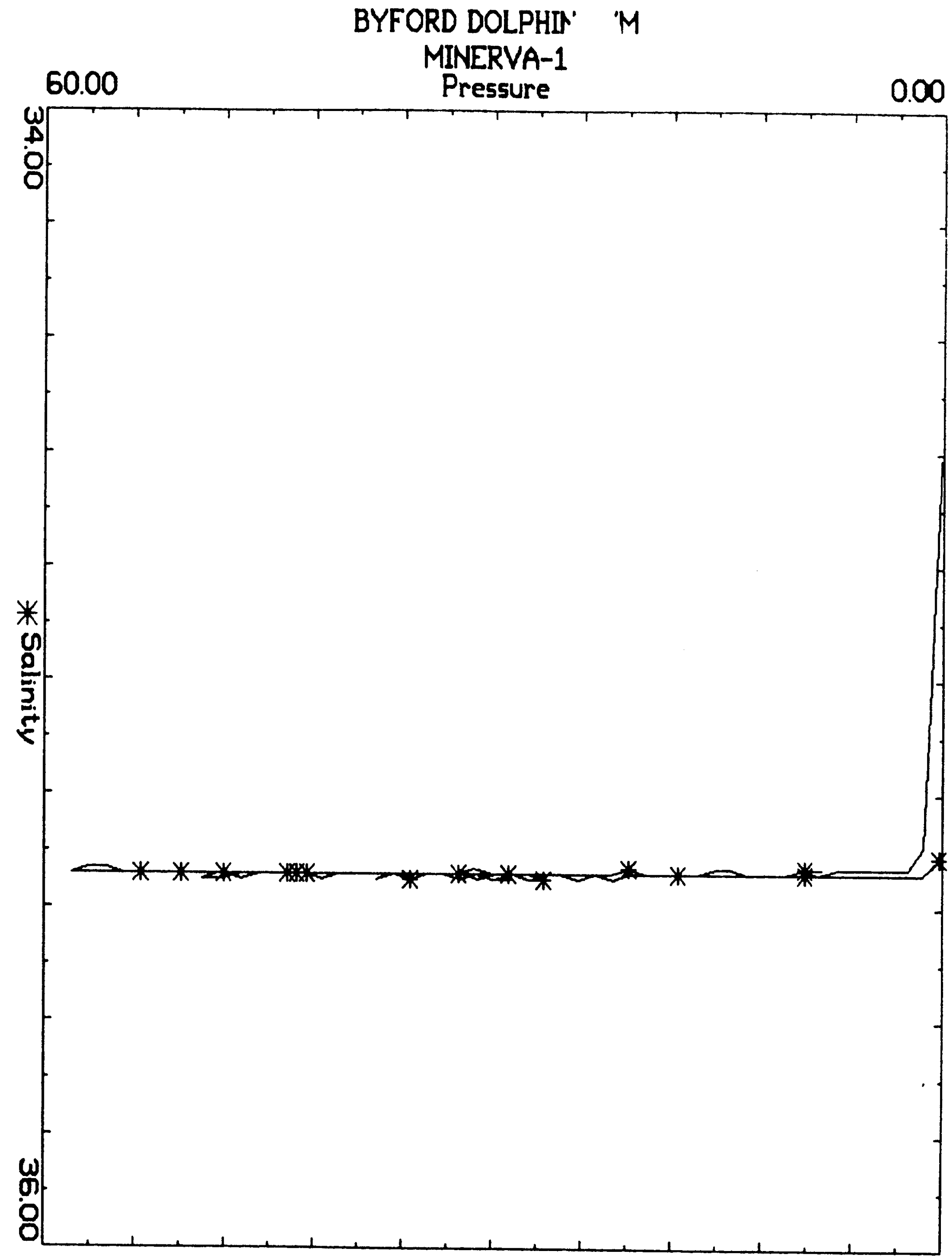
Time sec.	Temp °C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
970	16.970	40.15	45.28	35.34	1.025800	1513.8
971	16.970	38.88	45.28	35.34	1.025800	1513.8
972	16.969	37.85	45.28	35.34	1.025800	1513.7
73	16.969	36.60	45.28	35.34	1.025800	1513.7
.75	16.971	35.55	45.28	35.34	1.025800	1513.7
978	16.969	36.76	45.28	35.34	1.025800	1513.7
980	16.969	37.85	45.28	35.35	1.025800	1513.7
991	16.967	36.57	45.28	35.34	1.025800	1513.7
992	16.970	35.52	45.28	35.35	1.025800	1513.7
993	16.975	34.43	45.28	35.34	1.025800	1513.7
1007	16.967	33.31	45.27	35.34	1.025800	1513.7
1010	16.967	32.22	45.28	35.35	1.025800	1513.6
10?3	16.969	31.13	45.28	35.34	1.025800	1513.6
1C	16.967	30.07	45.28	35.35	1.025800	1513.6
1025	16.969	28.79	45.28	35.35	1.025800	1513.6
1035	16.969	29.85	45.28	35.35	1.025800	1513.6
1038	16.967	28.64	45.27	35.34	1.025800	1513.6
1039	16.966	27.61	45.28	35.35	1.025800	1513.6
1041	16.965	26.59	45.27	35.35	1.025800	1513.5
1047	16.967	27.61	45.27	35.34	1.025800	1513.6
1053	16.967	28.79	45.27	35.34	1.025800	1513.6
1054	16.966	29.82	45.27	35.34	1.025800	1513.6
56	16.967	31.03	45.28	35.35	1.025800	1513.6
..57	16.969	32.06	45.28	35.34	1.025800	1513.6
1059	16.969	33.09	45.28	35.34	1.025800	1513.7
1062	16.969	32.06	45.28	35.34	1.025800	1513.6
1063	16.969	31.03	45.28	35.34	1.025800	1513.6
1067	16.969	30.01	45.27	35.34	1.025800	1513.6
1069	16.969	28.98	45.27	35.34	1.025800	1513.6
1075	16.969	27.83	45.27	35.34	1.025800	1513.6
1077	16.970	26.65	45.27	35.34	1.025800	1513.6
1083	16.966	25.47	45.27	35.34	1.025800	1513.5
1084	16.967	24.22	45.27	35.35	1.025800	1513.5
1086	16.969	23.16	45.27	35.34	1.025800	1513.5
1093	16.965	21.95	45.27	35.35	1.025800	1513.5
1094	16.966	20.92	45.27	35.34	1.025800	1513.4
1098	16.966	19.83	45.27	35.34	1.025800	1513.4
1101	16.965	18.65	45.27	35.34	1.025800	1513.4
11[illegible]	16.966	[illegible]	45.27	35.34	1.025800	1513.4
11.	16.964	[illegible]	45.26	35.34	1.025800	1513.4
1116	16.967	[illegible]	45.27	35.34	1.025800	1513.4
1 18	16.970	[illegible]	45.27	35.34	1.025800	1513.4
[illegible]	16.970	[illegible]	45.26	35.34	1.025800	1513.3
1123	16.971	[illegible]	45.27	35.34	1.025800	1513.4
1128	16.967	[illegible]	45.26	35.34	1.025800	1513.3
1133	16.969	[illegible]	45.26	35.34	1.025800	1513.3

STD 12 DATA PRINTOUT FACILITY   File name - min.rel
Created - 03-02-1993

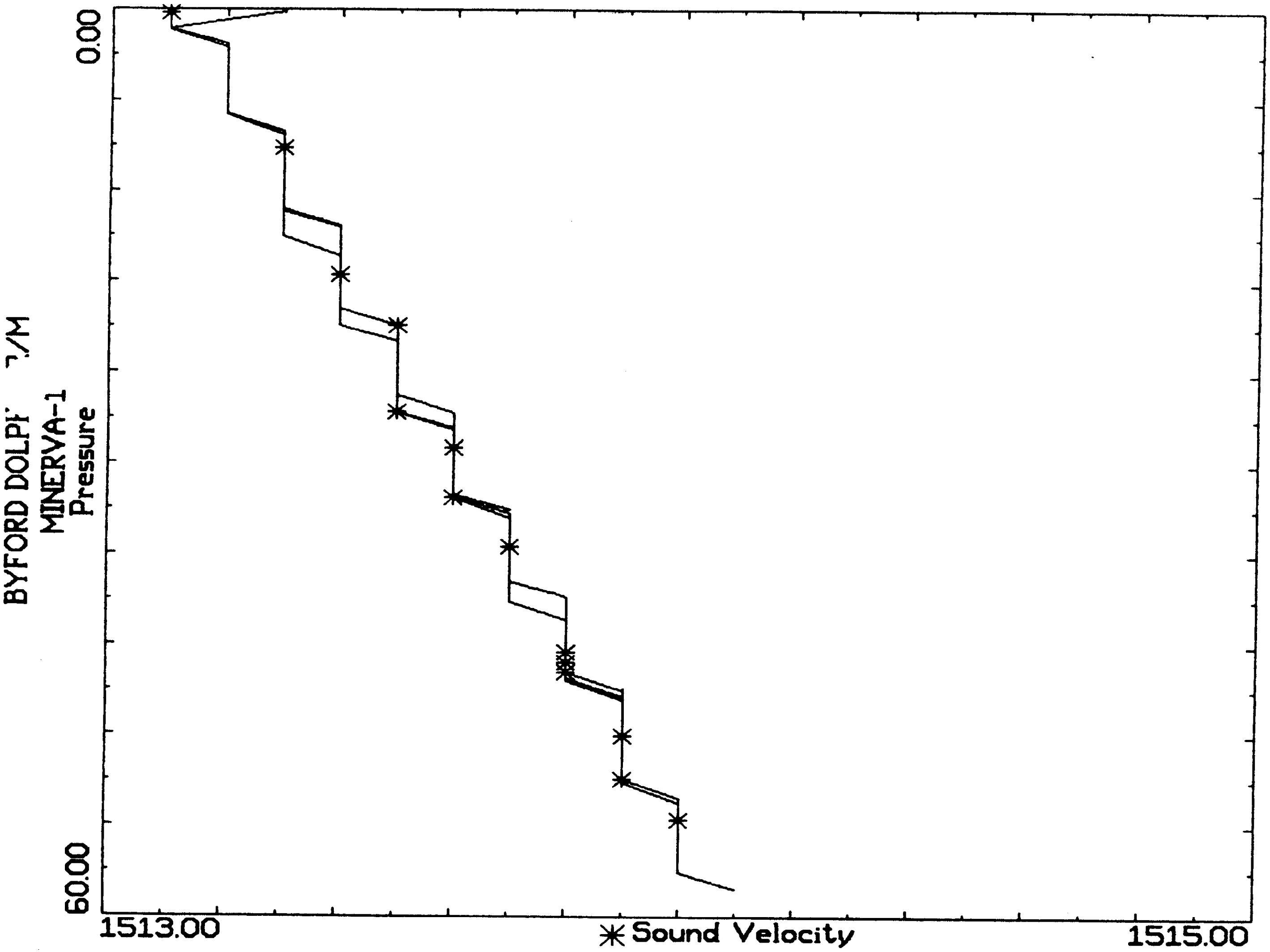
Time sec.	Temp °C	Depth m.	Cond mS/cm	Salin ppt	Sp Grav	Snd Vel m/s
[illegible]	16.969	11.16	45.26	35.34	1.025800	1513.3
1149	16.973	10.13	45.27	35.34	1.025800	1513.3
1151	16.972	9.11	45.26	35.34	1.025800	1513.3
1166	16.974	8.05	45.27	35.34	1.025800	1513.3
1177	16.972	6.84	45.26	35.34	1.025800	1513.2
1179	16.974	5.75	45.26	35.34	1.025800	1513.2
1182	16.966	6.87	45.26	35.34	1.025800	1513.2
1186	16.972	5.72	45.26	35.34	1.025800	1513.2
1191	16.969	4.66	45.26	35.34	1.025800	1513.2
1195	16.970	3.60	45.26	35.34	1.025800	1513.2
1198	16.972	2.48	45.26	35.34	1.025800	1513.2
1199	16.972	1.30	45.26	35.34	1.025800	1513.1
1204	16.969	0.24	45.23	35.31	1.025800	1513.1



BYFORD LPHIN R/M
MINERVA-1
Pressure
0.00
60.00
15.00
Temperature
18.00



BYFORD DOLPHIN 'M
MINERVA-1
Pressure
60.00
0.00
34.00
Salinity
36.00



BYFORD DOLPI ?/M
MINERVA-1
Pressure
0.00
60.00
1513.00
Sound Velocity
1515.00

APPENDIX C

ACOUSTIC NET DEPLOYMENT AND

OASIS SEA-BED AND BOX-IN CALIBRATION PRINTOUTS

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.

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-1 R/M 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	503	3	125.00
2	CPT7	1106	6	125.00
3	CPT7	1109	9	125.00
4	CPT7	1010	10	125.00

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669323.00	5714958.00	51.00
2	670406.00	5714757.00	51.00
3	670348.00	5713694.00	51.00
4	669372.00	5713889.00	51.00

(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 : 2.00Kts.

Fis Layback : 10.47m.
Fish Depth : 12.04m.

Speed of Sound

13 Depth Values entered Directly

Depth(m.)	Speed of Sound(m./s.)
.10	1513.30
5.90	1513.20
10.40	1513.30
15.10	1513.30
21.00	1513.50
25.50	1513.50
30.10	1513.60
35.90	1513.70
40.40	1513.80
45.10	1513.90
50.10	1513.90
56.00	1514.00
58.20	1514.10

Acoustic Noise

Normal Standard Error : .50m. Maximum Range : 2500.00m.

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	.50

Tides

Time :	0000	0200	0400	0600	0800	1000	1200	1400	1600	1800	2000	200
Height :	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.C

all Heights in metres

Reference System Antenna Offset

Antenna X : 0.00m.
Antenna Y : 0.00m.
Antenna Z : 0.00m.

Spheroidal Information

Semi-Major Axis: 6378160.000m.
Inverse Flattening: 298.25000

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

Gy Offset : -7.00

WAYPOINT MODE

Dropping Transponder 1

Current Offset : STERN
X Coordinate : +0.0
Y Coordinate : +35.6

Current Offset : STERN
X Coordinate : +0.0
Y Coordinate : -35.6

*** Tpdr 1 Dropped at 14:33:54 ***

DATUM	GPS	:	E	669273.43	N	5714923.07
STERN	GPS	:	E	669307.16	N	5714934.44

GPS Position Used for Drop

Acoustic Net Drop Positions

Tra ponder	Easting	Northing	Depth
1	669307.16	5714934.44	51.00
2	670406.00	5714757.00	51.00
3	670348.00	5713694.00	51.00
4	669372.00	5713889.00	51.00

(in metres)

WAYPOINT MODE

opping Transponder 2

*** Tpdr 2 Dropped at 14:53:53 ***

DATUM	GPS	:	E	670452.78	N	5714771.57
STERN	GPS	:	E	670435.80	N	5714740.28

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669307.16	5714934.44	51.00
2	670435.80	5714740.28	51.00
3	670348.00	5713694.00	51.00
4	669372.00	5713889.00	51.00

(in metres)

WAYPOINT MODE

Dropping Transponder 3

WAYPOINT MODE

Dropping Transponder 3

*** Tpdr 3 Dropped at 16:29:04 ***

DATUM	GPS	:	E	670305.96	N	5713675.52
STERN	GPS	:	E	670341.04	N	5713681.61

GPS Position Used for Drop

/ oustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669307.16	5714934.44	51.00
2	670435.80	5714740.28	51.00
3	670341.04	5713681.61	51.00
4	669372.00	5713889.00	51.00

(in metres)

WAYPOINT MODE

Dropping Transponder 4

*** Tpdr 4 Dropped at 16:51:42 ***

DATUM	GPS	:	E	669334.24	N	5713870.36
STERN	GPS	:	E	669366.61	N	5713885.19

GPS Position Used for Drop

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669307.16	5714934.44	51.00
2	670435.80	5714740.28	51.00
3	670341.04	5713681.61	51.00
4	669366.61	5713885.19	51.00

(in metres)

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669307.16	5714934.44	48.10
2	670435.80	5714740.28	55.80
3	670341.04	5713681.61	51.00
4	669366.61	5713885.19	54.70

(in metres)

TA3,125.86
T[illegible],125.86
T[illegible],125.86

TA10,125.86
PA at 1500m/s
PAN Firmware Version: V7.11 : MF,DS,XC,LB
PAN Telemetry Wait set to 4sec
PAN 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	503	3	125.00
2	CPT7	1106	6	125.00
3	CPT7	1109	9	125.00
4	CPT7	1010	10	125.00

BOX IN TRANSPONDER 1

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
1	12.0	48.1	1513.6	1.00907

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	669057.66	5714759.64	312.74	325.8	0.0
2	669047.40	5714777.44	312.53	333.2	0.0
3	669039.49	5714792.31	311.32	338.6	0.0
4	669034.17	5714808.96	311.54	346.4	0.0
5	669030.38	5714824.56	313.19	350.1	0.0
6	669027.92	5714860.10	304.81	355.5	0.0
7	669027.47	5714878.65	304.90	353.2	0.0
8	669030.67	5714896.47	299.97	350.5	0.0
9	669028.07	5714911.58	306.11	347.3	0.0
10	669029.25	5714932.76	306.21	343.7	0.0

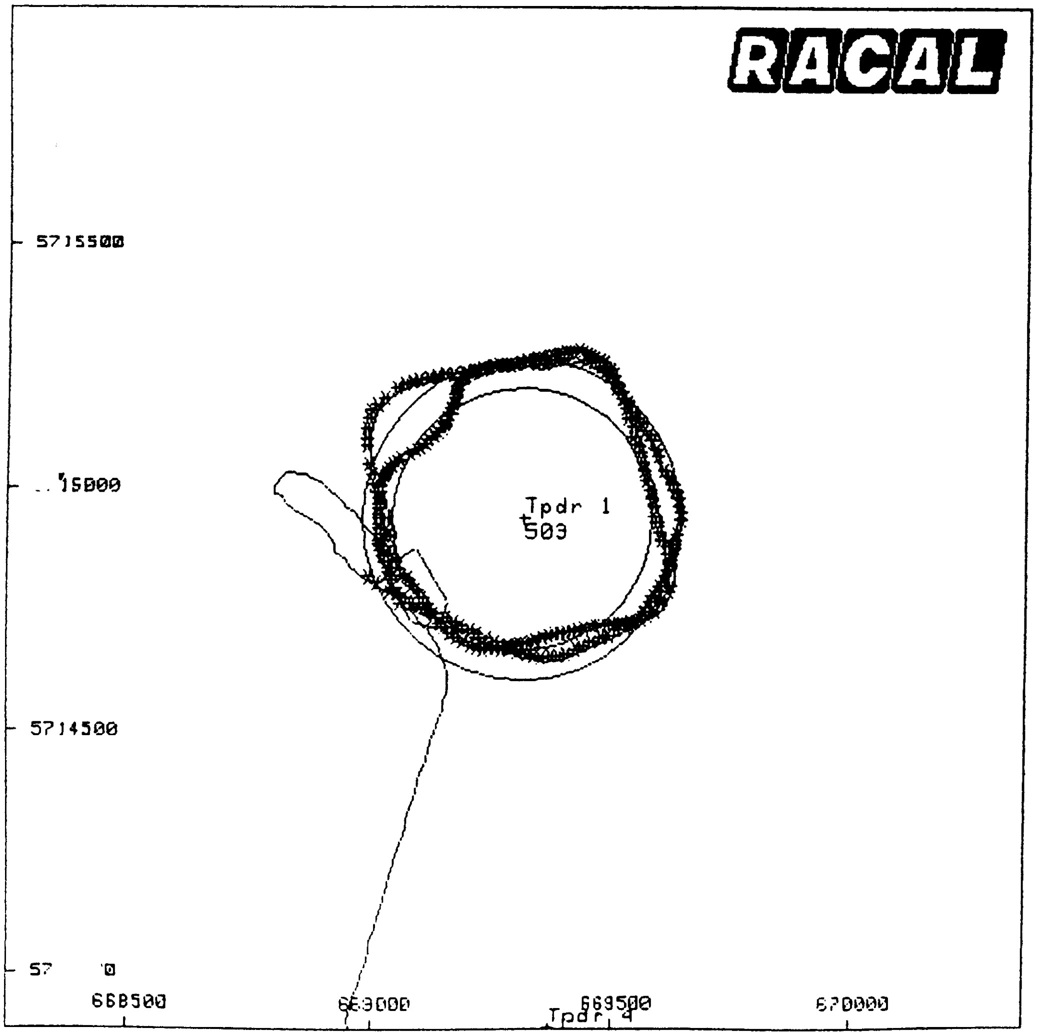
Current Offset : DATUM
X Coordinate : +0.0
Y Coordinate : +0.0

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
11	669013.81	5714972.68	309.92	341.9	0.0
12	669008.43	5714987.15	318.66	340.5	0.0
13	669004.30	5715005.97	324.14	339.7	0.0
14	669000.72	5715024.69	335.28	341.1	0.0
15	668992.10	5715043.81	343.72	345.2	0.0
16	668987.44	5715083.39	360.30	1.1	0.0
17	668986.54	5715099.66	367.93	10.1	0.0
18	668987.14	5715120.91	375.53	19.5	0.0
19	668991.27	5715139.36	378.06	29.3	0.0
20	668996.86	5715157.27	383.89	40.3	0.0
21	669009.36	5715166.70	381.99	52.0	0.0
22	669022.65	5715182.64	379.19	62.8	0.0
23	669047.94	5715201.18	371.89	77.3	0.0
24	669064.98	5715210.12	364.95	83.1	0.0
25	669079.60	5715215.28	358.25	87.2	0.0
26	669094.74	5715219.39	349.86	89.7	0.0
27	669112.35	5715222.77	342.29	90.9	0.0
28	669129.08	5715226.41	335.85	90.6	0.0
29	669148.80	5715230.02	329.34	91.1	0.0
30	669163.69	5715228.37	321.41	88.7	0.0
31	669185.96	5715233.51	314.54	90.1	0.0
32	669206.58	5715238.82	311.58	87.8	0.0
33	669222.25	5715238.48	304.40	87.5	0.0
34	669247.65	5715244.98	305.72	86.6	0.0
35	669269.39	5715249.10	304.08	85.7	0.0
36	669287.95	5715250.52	303.36	85.0	0.0
37	669311.49	5715254.54	309.93	89.1	0.0
38	669331.87	5715249.06	311.29	86.7	0.0
39	669348.99	5715252.84	315.33	89.6	0.0
40	669371.12	5715259.01	324.40	93.6	0.0

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
253	669016.14	5715000.88	304.55	192.5	0.0
254	669013.71	5714987.76	305.19	194.2	0.0
255	669012.77	5714976.65	306.55	196.8	0.0
256	669011.56	5714964.79	308.34	200.4	0.0
257	669010.34	5714952.97	310.14	201.4	0.0
258	669012.56	5714943.79	309.15	200.5	0.0
259	669012.83	5714933.48	312.31	199.1	0.0
260	669012.36	5714923.24	313.26	197.2	0.0
261	669011.86	5714913.09	314.34	192.4	0.0
262	669011.22	5714902.29	315.19	185.3	0.0
263	669011.13	5714890.97	316.85	177.1	0.0
264	669012.04	5714880.32	318.24	167.7	0.0
265	669014.68	5714868.95	314.32	161.0	0.0
266	669018.72	5714856.76	311.33	152.1	0.0
267	669027.16	5714844.52	303.35	144.9	0.0
268	669036.15	5714833.21	301.19	140.9	0.0

Fix Points for Box-in Calibration up to observation 144



Solution Residuals

No	Residual	Plan Range
1	-9.8	312.74
2	-8.9	312.53
3	-9.6	311.32
4	-6.7	311.54
5	-2.3	313.19
6	-1.4	304.81
7	2.8	304.90
8	4.4	299.97
9	10.0	306.11
10	12.8	306.21
11	-0.0	309.92
12	1.7	318.66
13	0.0	324.14
14	3.6	335.28
15	-1.4	343.72
16	-2.6	360.30
17	-2.3	367.93
18	-3.6	375.53
19	-6.5	378.06
20	-5.4	383.89
21	-2.3	381.99
22	-4.1	379.19
23	-4.3	371.89
24	-5.4	364.95
25	-5.9	358.25
26	-7.6	349.86
27	-6.9	342.29
28	-6.5	335.85
29	-5.4	329.34
30	-4.4	321.41
31	-5.6	314.54
32	-5.3	311.58
33	-6.8	304.40
34	-4.5	305.72
35	-5.7	304.08
36	-5.2	303.36
37	-.9	309.93
38	5.9	311.29
39	5.2	315.33
40	5.5	324.40
41	3.3	329.15
42	1.4	335.33
43	1.4	336.84
44	.5	334.00
45	2.0	332.84
46	.7	326.35
47	2.1	324.34
48	-.1	314.85
49	1.0	311.81
50	-.6	305.98
51	-.6	304.31
52	-1.8	300.70
53	.7	301.71

Solution Residuals

No	Residual	Plan Range
266	-4.6	311.33
267	-8.2	303.35
268	-5.7	301.19

Solution

Easting	Northing	Depth
669322.43	5714943.87	48.10

RMS Residual : 4.0

Worst 8 Values:	10	12.83
:	9	9.99
:	1	9.81
:	240	9.71
:	3	9.65
:	128	8.99
:	241	8.95
:	2	8.93

Solution Residuals

No	Residual	Plan Range
[illegible]	-2.5	313.19
[illegible]	-1.6	304.81
7	2.6	304.90
8	4.2	299.97
11	-.2	309.92
12	1.5	318.66
13	-.2	324.14
14	3.4	335.28
15	-1.6	343.72
16	-2.7	360.30
17	-2.5	367.93
18	-3.8	375.53
19	-6.6	378.06
20	-5.5	383.89
21	-2.4	381.99
22	-4.2	379.19
23	-4.5	371.89
24	-5.5	364.95
25	-6.0	358.25
29	-5.5	329.34
30	-4.4	321.41
31	-5.7	314.54
32	-5.4	311.58
33	-6.8	304.40
34	-4.6	305.72
35	-5.7	304.08
3	-5.2	303.36
3.	-.9	309.93
38	6.0	311.29
39	5.3	315.33
40	5.6	324.40

Solution Residuals

No	Residual	Plan Range
213	-1.4	312.43
214	1.0	311.45
215	1.7	310.79
216	3.4	311.86
217	3.2	311.34
218	-1.0	311.15
219	1.4	313.46
220	1.6	314.53
221	-1.3	313.54
222	.6	315.70
223	-.7	313.95
224	-1.6	313.22
225	-1.9	312.59
226	-.4	311.81
227	-1.4	309.05
228	-2.2	302.35
229	-.1	301.02
230	-2.3	293.15
231	2.3	290.56
232	3.5	285.93
233	2.1	277.70
234	3.0	272.70
235	2.9	266.06
236	2.4	260.93
237	4.6	259.68
238	4.1	257.33
239	4.1	257.35
242	6.3	263.68
243	6.3	268.13
244	6.7	273.72
245	5.2	279.56
246	3.1	291.25
247	2.2	296.93
248	1.1	300.81
249	-.9	303.30
250	-1.0	306.68
251	-3.4	306.38
255	-5.0	306.55
256	-3.4	308.34
257	-2.3	310.14
258	-.9	309.15
259	2.3	312.31
260	2.3	313.26
261	2.1	314.34
262	1.0	315.19
263	.9	316.85
264	1.2	318.24
265	-2.6	314.32
266	-4.8	311.33
268	-5.9	301.19

Sq tion

Easting	Northing	Depth
669322.62	5714943.89	48.10

RMS Residual :	3.1	
Worst 8 Values:	33	6.81
:	244	6.73
:	126	6.69
:	19	6.65
:	171	6.57
:	242	6.28
:	243	6.26
:	91	6.24

Job Information

M'NERVA-1 R/M for BHP on PACIFIC MARLIN by Ken Eddy

Acoustic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669322.62	5714943.89	48.10
2	670435.80	5714740.28	55.80
3	670341.04	5713681.61	51.00
4	669366.61	5713885.19	54.70

(in metres)

BOX IN TRANSPONDER 3

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
3	12.0	51.0	1513.6	1.00909

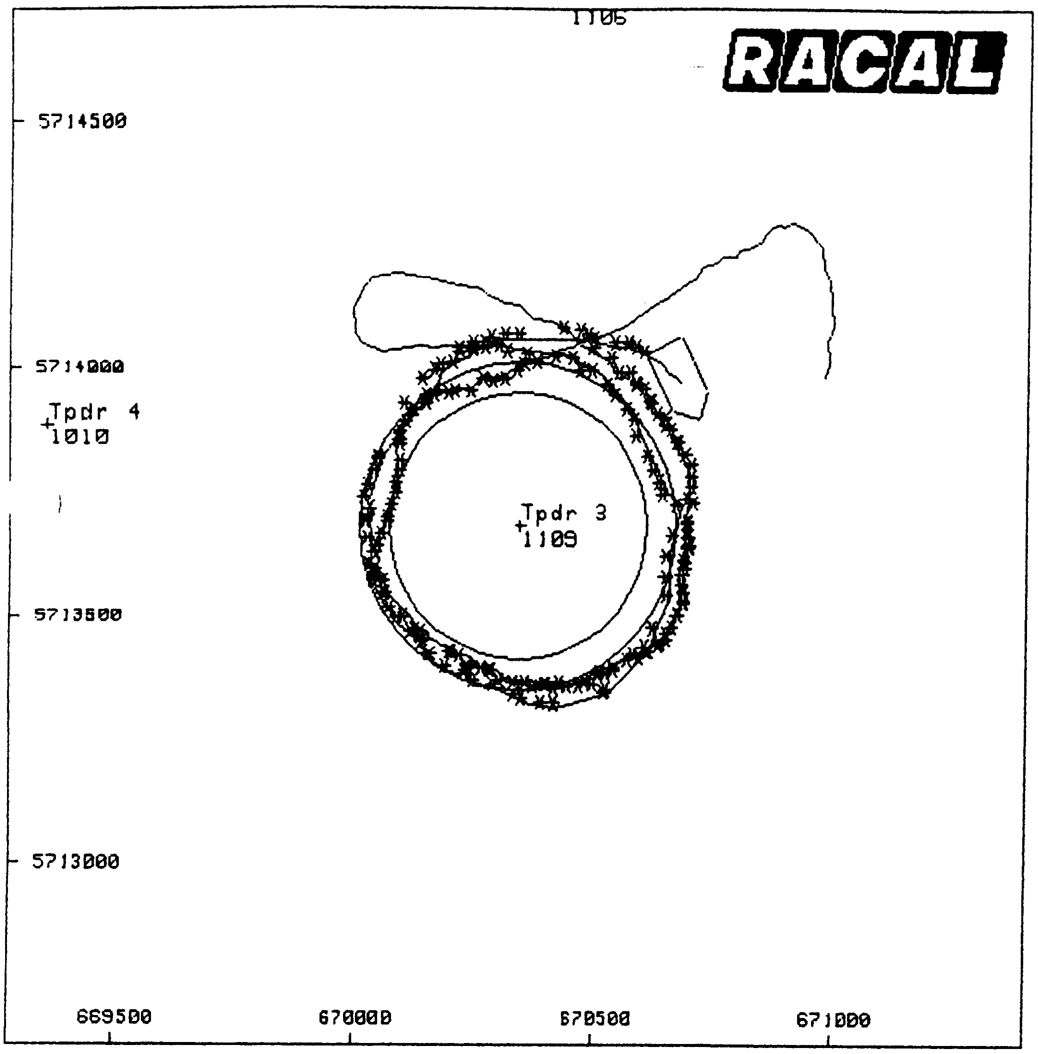
Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	670373.52	5714012.04	319.31	249.8	0.0
2	670347.14	5714006.64	310.25	250.4	0.0
3	670333.51	5713995.53	303.77	247.1	0.0
4	670307.02	5713977.59	299.62	246.4	0.0
5	670282.09	5713973.72	295.74	249.8	0.0
6	670263.84	5713975.79	295.82	253.7	0.0
7	670238.52	5713953.71	304.56	257.7	0.0
8	670203.69	5713954.05	311.64	255.4	0.0
9	670191.32	5713947.60	314.58	249.3	0.0
10	670164.49	5713944.04	322.83	240.7	0.0
11	670148.27	5713945.88	327.48	231.6	0.0
12	670124.58	5713916.71	330.69	222.5	0.0
13	670120.13	5713915.66	330.60	211.6	0.0
14	670105.40	5713892.45	326.05	201.8	0.0
15	670093.06	5713870.64	315.60	193.6	0.0
16	670092.35	5713852.84	305.50	191.8	0.0
17	670093.06	5713845.15	295.93	195.9	0.0
18	670096.17	5713812.61	286.15	199.2	0.0
19	670093.59	5713793.09	278.09	200.0	0.0
20	670086.44	5713768.14	272.74	204.2	0.0
21	670087.13	5713747.54	273.70	209.3	0.0
22	670078.89	5713722.63	273.83	211.0	0.0
23	670069.14	5713696.54	279.22	210.1	0.0
24	670069.85	5713691.22	287.01	210.3	0.0
25	670059.01	5713664.28	297.79	212.0	0.0
26	670048.82	5713640.01	309.12	207.3	0.0
27	670040.38	5713586.35	331.08	181.8	0.0
28	670040.06	5713571.91	337.61	168.4	0.0
30	670075.25	5713516.53	329.28	149.2	0.0
31	670089.19	5713496.17	331.13	143.8	0.0
32	670121.05	5713468.32	325.16	143.1	0.0
33	670140.28	5713445.31	322.62	144.2	0.0
34	670158.04	5713424.36	331.32	140.9	0.0
35	670188.36	5713397.23	334.52	134.2	0.0
36	670229.31	5713389.27	335.12	124.0	0.0
37	670244.77	5713367.71	344.66	116.1	0.0
38	670288.78	5713360.72	346.48	115.8	0.0
39	670330.71	5713341.41	353.84	115.9	0.0
40	670346.56	5713334.14	365.32	108.2	0.0
41	670388.13	5713323.80	371.06	96.2	0.0
42	670414.54	5713322.21	379.45	87.8	0.0
45	670527.38	5713350.72	381.56	49.4	0.0
46	670521.93	5713345.79	373.81	37.1	0.0
47	670610.04	5713436.86	354.58	27.9	0.0
48	670625.44	5713474.11	346.37	20.0	0.0

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
168	670064.15	5713546.13	315.92	327.4	0.0
169	670062.88	5713547.60	318.07	333.6	0.0
170	670061.56	5713568.88	320.14	336.4	0.0
171	670046.00	5713578.13	320.00	338.4	0.0
172	670044.91	5713593.72	319.72	339.9	0.0
173	670032.48	5713604.14	320.82	344.3	0.0
174	670041.01	5713627.44	324.44	347.8	0.0
176	670027.49	5713657.90	324.25	354.7	0.0
177	670022.95	5713690.02	325.12	356.6	0.0
178	670022.88	5713692.97	327.86	359.6	0.0
179	670032.32	5713716.46	328.77	1.5	0.0
180	670019.29	5713739.88	330.90	6.1	0.0
181	670030.39	5713763.74	332.29	9.9	0.0
33	670040.25	5713793.41	335.45	21.6	0.0
J4	670049.05	5713818.48	334.03	24.6	0.0
185	670048.31	5713822.14	337.04	28.1	0.0
190	670101.05	5713926.57	347.83	39.1	0.0
191	670146.58	5713927.93	349.25	44.2	0.0
194	670138.05	5713979.02	354.21	53.8	0.0
195	670163.01	5713995.88	362.19	56.0	0.0
196	670177.40	5714006.32	363.22	55.6	0.0
197	670202.66	5714009.83	367.66	60.5	0.0
19	670215.63	5714032.66	373.15	60.4	0.0
19.	670241.16	5714034.97	376.83	66.6	0.0
200	670244.32	5714049.57	381.08	71.3	0.0
201	670268.16	5714052.44	384.09	74.1	0.0
202	670281.26	5714061.69	386.77	80.2	0.0
203	670307.71	5714066.92	391.99	86.0	0.0
204	670336.15	5714067.21	393.35	89.0	0.0
209	670430.21	5714080.66	404.18	110.6	0.0
211	670469.79	5714074.23	403.81	113.0	0.0
212	670484.22	5714066.60	407.32	113.1	0.0
3	670498.50	5714059.67	409.80	109.9	0.0
5	670543.92	5714049.55	416.93	109.4	0.0
216	670570.78	5714051.10	420.73	113.9	0.0
217	670572.59	5714049.33	425.40	119.4	0.0
218	670587.29	5714041.09	429.35	122.0	0.0
219	670605.29	5714031.72	430.47	126.8	0.0

Fix Points for Box-in Calibration up to observation 79



lution Residuals

No	Residual	Plan Range
1	-9.6	319.31
2	-12.6	310.25
3	-8.5	303.77
4	2.4	299.62
5	-2.5	295.74
6	-9.2	295.82
7	11.7	304.56
8	3.3	311.64
9	5.6	314.58
10	2.0	322.83
11	-4.6	327.48
12	5.0	330.69
13	2.5	330.60
14	2.9	326.05
15	-3.9	315.60
16	-4.5	305.50

Solution Residuals

No	Residual	Plan Range
17	-9.4	295.93
18	-.5	286.15
19	-2.7	278.09
20	-6.1	272.74
21	1.0	273.70
22	-2.3	273.83
23	-4.2	279.22
24	4.5	287.01
25	3.9	297.79
26	2.6	309.12
27	4.3	331.08
28	6.0	337.61
30	5.7	329.28
31	8.0	331.13
32	9.1	325.16
33	3.5	322.62
34	7.2	331.32
35	4.4	334.52
36	16.0	335.12
37	10.8	344.66
38	17.2	346.48
39	10.8	353.84
40	15.6	365.32
41	9.3	371.06
42	12.5	379.45
45	5.2	381.56
46	-4.4	373.81
47	-2.4	354.58
48	2.0	346.37
50	-4.9	326.94
51	1.2	318.93
52	1.8	310.14
53	-11.7	302.78
54	-24.6	301.24
55	-.1	300.59
56	1.1	299.47
57	7.8	302.85
58	9.5	303.30
59	12.1	308.71
60	2.4	314.41
61	3.3	320.85
62	5.1	327.83
63	-2.1	329.78
64	-7.7	333.88
65	5.0	337.81
66	-6.4	342.43
67	1.8	345.35
69	7.8	349.31
70	4.6	355.80
71	1.2	363.50
72	2.3	369.06
73	5.2	377.42
74	4.2	384.53

Solution Residuals

No	Residual	Plan Range
200	-.3	381.08
201	6.0	384.09
202	2.3	386.77
203	6.3	391.99
204	9.6	393.35
209	-.3	404.18
211	-3.9	403.81
212	2.4	407.32
213	6.5	409.80
215	4.0	416.93
216	-6.7	420.73
217	-1.4	425.40
218	1.7	429.35
?19	.3	430.47

Solution

Easting	Northing	Depth
670352.24	5713683.82	51.00

RMS Residual : 7.0

Worst 8 Values:	191	30.06
:	54	24.59
:	38	17.21
:	36	15.95
:	40	15.59
:	147	14.81
:	108	14.80
:	150	14.39

Solution Residuals

No	Residual	Plan Range
4	1.7	299.62
5	-3.2	295.74
8	2.7	311.64
9	5.0	314.58
10	1.4	322.83
11	-5.2	327.48
12	4.5	330.69
13	2.0	330.60
14	2.4	326.05
15	-4.3	315.60
16	-4.9	305.50
18	-.8	286.15
19	-3.0	278.09
20	-6.4	272.74
21	.9	273.70
22	-2.4	273.83
23	-4.2	279.22
24	4.5	287.01
25	3.9	297.79
26	2.6	309.12

Solution Residuals

No	Residual	Plan Range
212	1.8	407.32
213	5.9	409.80
215	3.4	416.93
216	-7.2	420.73
217	-2.0	425.40
218	1.2	429.35
219	-.2	430.47

Solution

Easting	Northing	Depth
670352.28	5713683.15	51.00

RMS Residual : 3.9

W'rst 8 Values:	204	8.94
:	216	7.21
:	66	7.03
:	116	6.91
:	180	6.89
:	20	6.35
:	151	6.26
:	133	6.17

Aco stic Net Drop Positions

Transponder	Easting	Northing	Depth
1	669322.62	5714943.89	48.10
2	670435.80	5714740.28	55.80
3	670352.28	5713683.15	51.00
4	669366.61	5713885.19	54.70

(in metres)

SEABED CALIBRATION

Seabed Speed of Sound

Tx1	Tx2	Dep1	Dep2	Vsnd
1	2	48.10	55.80	1513.94
1	3	48.10	51.00	1513.90
1	4	48.10	54.70	1513.93
2	1	55.80	48.10	1513.94
2	3	55.80	51.00	1513.96
2	4	55.80	54.70	1513.99
3	1	51.00	48.10	1513.90
3	2	51.00	55.80	1513.96
3	4	51.00	54.70	1513.95
4	1	54.70	48.10	1513.93
4	2	54.70	55.80	1513.99
4	3	54.70	51.00	1513.95

Cycle 1

```
CI6,503 C: 503 2WAY MS=    .00 E: 0
CI9,503 C: 503 2WAY MS=    .00 E: 0
CI10,503 C: 503 2WAY MS=1418.71 E: 0
From  1 to  4  Range=  1073.9

CI3,1106 C:1106 2WAY MS=    .00 E: 0
CI9,1106 C:1106 2WAY MS=1391.44 E: 0
From  2 to  3  Range=  1053.3
CI10,1106 C:1106 2WAY MS=4139.93 E:10

CI3,1109 C:1109 2WAY MS=2148.91 E: 0
From  3 to  1  Range=  1626.6
CI6,1109 C:1109 2WAY MS=1390.19 E: 0
From  3 to  2  Range=  1052.3
CI10,1109 C:1109 2WAY MS=1333.18 E:12

CI3,1010 C:1014 2WAY MS=1400.27 E: 1
CI6,1010 C: 810 2WAY MS=    .00 E: 1
CI9,1010 C:1010 2WAY MS=1327.64 E:10
```

Cycle 2

```
CI6,503 C: 503 2WAY MS=1520.77 E: 0
From  1 to  2  Range=  1151.2
CI9,503 C: 503 2WAY MS=    .00 E: 0
CI10,503 C: 503 2WAY MS=1408.58 E: 0
From  1 to  4  Range=  1066.2

CI3,1106 C:1106 2WAY MS=1532.05 E: 0
From  2 to  1  Range=  1159.7
C  ,1106 C:2706 2WAY MS=1391.83 E: 1
```

Cyc 13

CI6,503 C: 503 2WAY MS= .00 E: 0
CI9,503 C: 503 2WAY MS= .00 E: 0
CI10,503 C: 503 2WAY MS=1403.11 E: 0
From 1 to 4 Range= 1062.1

CI3,1106 C:1106 2WAY MS= .00 E: 0
CI9,1106 C:1106 2WAY MS=1391.10 E: 0
From 2 to 3 Range= 1053.0
CI10,1106 C:1106 2WAY MS= .00 E:12

CI3,1109 C:1109 2WAY MS= .00 E: 0
CI6,1109 C:1109 2WAY MS=1389.41 E: 0
From 3 to 2 Range= 1051.8
CI10,1109 C:1109 2WAY MS=1330.77 E: 0
F om 3 to 4 Range= 1007.4

CI3,1010 C:1010 2WAY MS= .00 E: 0
CI6,1010 C:1010 2WAY MS= .00 E: 0
CI9,1010 C:1010 2WAY MS= .00 E: 0

Cycle 14

CI6,503 C: 503 2WAY MS= .00 E: 0
CI9 503 C: 503 2WAY MS= .00 E: 0
CI1 503 C: 503 2WAY MS= .00 E: 0

CI3,1106 C:1106 2WAY MS=1518.33 E: 0
From 2 to 1 Range= 1149.3
CI9,1106 C:1106 2WAY MS=1392.05 E: 0
From 2 to 3 Range= 1053.8
CI10,1106 C:1106 2WAY MS= .00 E: 0

CI3,1109 C:1109 2WAY MS= .00 E: 0
C ,1109 C:1111 2WAY MS= .00 E:11
C 0,1109 C: 909 2WAY MS=1331.89 E: 1

CI3,1010 C:1010 2WAY MS= .00 E: 0
CI6,1010 C:1010 2WAY MS= .00 E: 0
CI9,1010 C:1010 2WAY MS=1335.67 E: 0
From 4 to 3 Range= 1011.1

Cycle 15

CI6,503 C: 503 2WAY MS=1519.68 E: 0
From 1 to 2 Range= 1150.3
CI9,503 C: 503 2WAY MS= .00 E: 0
CI10,503 C: 503 2WAY MS=1398.67 E: 0
From 1 to 4 Range= 1058.7

CI3 106 C:1106 2WAY MS=1522.17 E: 0
From 2 to 1 Range= 1152.2
CI9,1106 C:1106 2WAY MS=1391.02 E: 0
From 2 to 3 Range= 1053.0
C 0,1106 C:1106 2WAY MS=1823.30 E:10

```
CI3,1109 C:1109 2WAY MS=    .00 E: 0
CI6,1109 C:1513 2WAY MS=2001.51 E:13
CI10,1109 C:1109 2WAY MS=    .00 E: 0

CI3,1010 C:1010 2WAY MS=    .00 E: 0
CI6,1010 C:1010 2WAY MS=    .00 E: 0
CI9,1010 C:1010 2WAY MS=    .00 E: 0
```

Statistics for each Range

```
Seabed range statistics from Tx1 to Tx2
 4 ranges. Mean= 1150.04  Se=   .7976
Seabed range statistics from Tx1 to Tx4
 7 ranges. Mean= 1063.38  Se=  4.8717  Edit  1/   10.532
 6 ranges. Mean= 1061.63  Se=  2.4744

Seabed range statistics from Tx2 to Tx1
 4 ranges. Mean= 1155.06  Se=  4.4135
Seabed range statistics from Tx2 to Tx3
12 ranges. Mean= 1052.78  Se=   .6637
Seabed range statistics from Tx2 to Tx4
 1 ranges. Mean= 1381.68  Se=  0.0000

Seabed range statistics from Tx3 to Tx1
 1 ranges. Mean= 1626.62  Se=  0.0000
Seabed range statistics from Tx3 to Tx2
11 ranges. Mean= 1053.21  Se=   .7629
Seabed range statistics from Tx3 to Tx4
 3 ranges. Mean= 1008.95  Se=  1.2168

Seabed range statistics from Tx4 to Tx1
 5 ranges. Mean= 1061.29  Se=  1.5699
Seabed range statistics from Tx4 to Tx3
 4 ranges. Mean= 1013.08  Se=  4.5939

TRANSPONDER 1 HELD FIXED

TRANSPONDER 3 HELD FIXED


PING-AROUND SOLUTION SUCCESSFUL
 1     0.00   0.00       0.00  0.00      48.10   0.00
 2  1150.04    .54      -5.81   .52      55.80   0.00
 3  1239.70   0.00   -1054.90  0.00      51.00   0.00
 4   230.57    .65   -1036.41  1.95      54.70   0.00
```

Range Residuals

Cyc	1-2	1-3	1-4
1	-----	-----	-----
2	1.093	-----	4.476
3	-----	-----	-----
4	-----	-----	-----
5	-----	-----	-1.436

Range Residuals

Cyc	1-2	1-3	1-4
6	-----	-----	-----
7	-----	-----	-----
8	-----	-----	-2.148
9	-.542	-----	-----
10	-----	-----	-----
11	-----	-----	.941
12	-.997	-----	-----
13	-----	-----	.335
14	-----	-----	-----
15	.268	-----	-3.026

Range Residuals

Cyc	2-1	2-3	2-4
1	-----	.359	-----
2	9.631	-----	-----
3	-----	.525	-----
4	-----	-1.314	-----
5	-----	-----	.532
6	-----	-----	-----
7	-----	.571	-----
8	-----	-1.026	-----
9	-----	-.292	-----
10	-----	-.996	-----
11	8.905	-.095	-----
12	-----	-.534	-----
13	-----	.101	-----
14	-.754	.821	-----
15	2.152	.041	-----

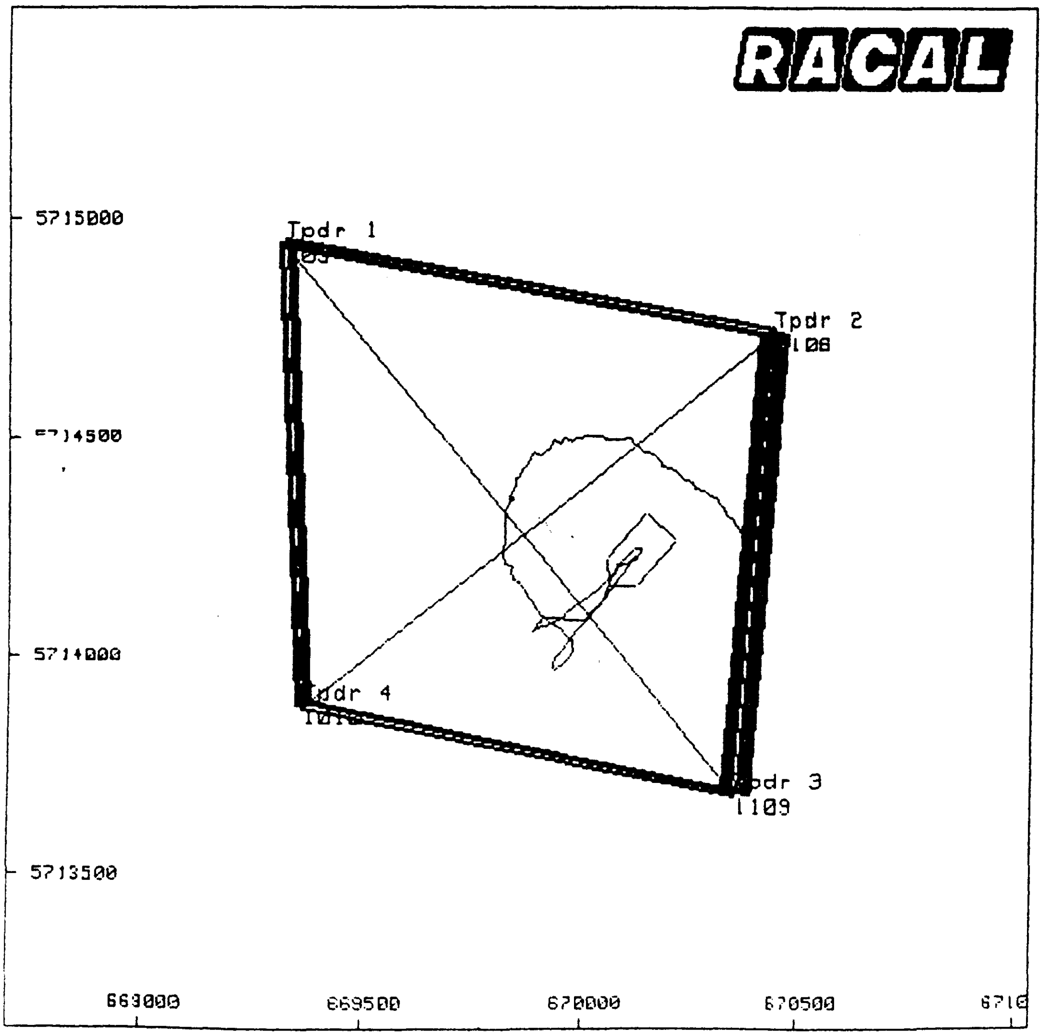
Range Residuals

Cyc	3-1	3-2	3-4
1	-1.162	-.587	-----
2	-----	-.254	-----
3	-----	.230	-----
4	-----	.374	-----
5	-----	1.199	-----
6	-----	.291	-----
7	-----	.026	-.112
8	-----	-----	-----
9	-----	1.585	-----
10	-----	1.063	-----
11	-----	.329	1.008
12	-----	-----	-----
13	-----	-1.178	-1.944
14	-----	-----	-----
15	-----	-----	-----

Range Residuals

Cyc	4-1	4-2	4-3
1	-----	-----	-----
2	-----	-----	-----
3	-2.337	-----	-----
4	-----	-----	-----
5	-----	-----	-----
6	1.682	-----	-----
7	.706	-----	-----
8	-.293	-----	-2.239
9	-----	-----	-----
10	-2.140	-----	5.376
11	-----	-----	-----
12	-----	-----	*****
13	-----	-----	-----
[illegible]	-----	-----	1.765
[illegible]	-----	-----	-----

Ping Around



BOX IN TRANSPONDER 2

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
2	12.0	55.8	1513.7	1.00911

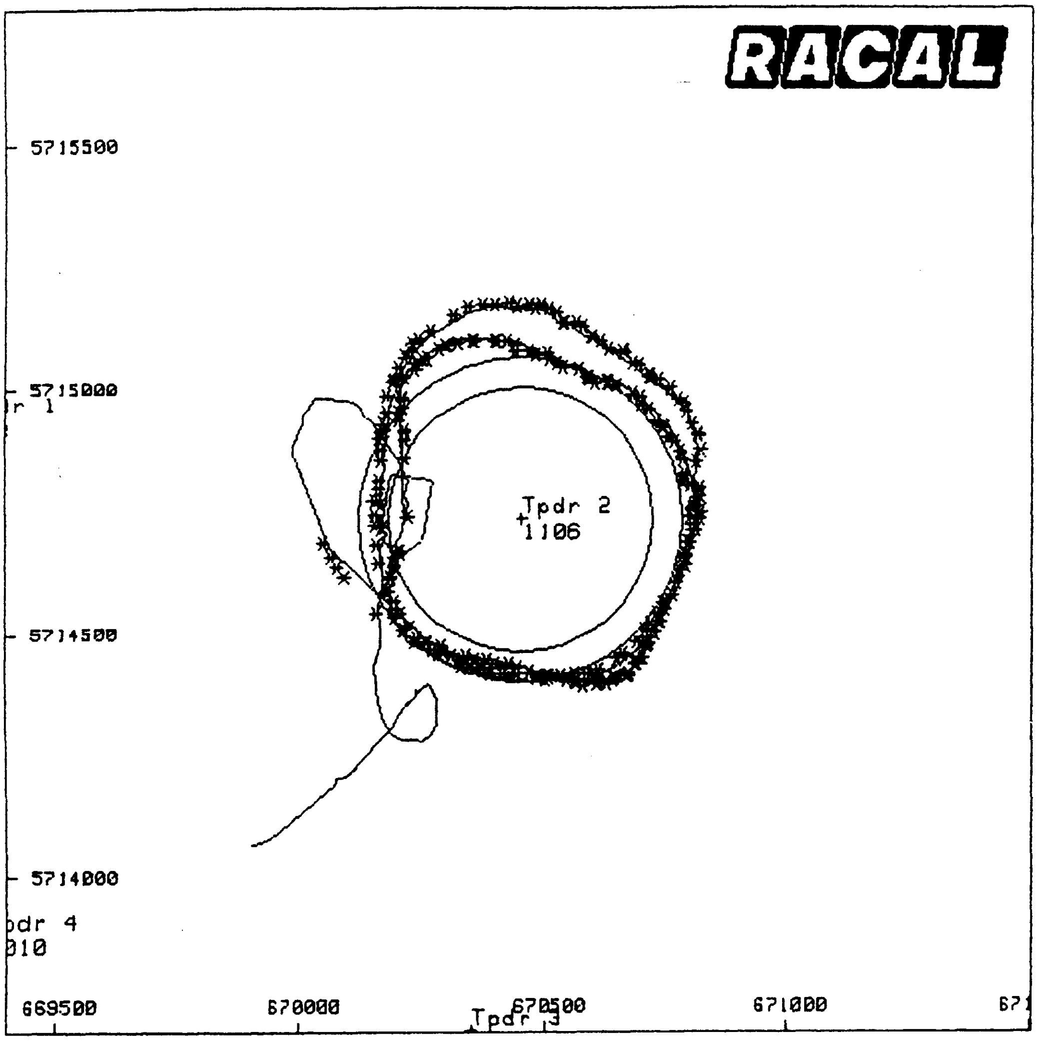
Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	670165.47	5714639.70	298.56	1.8	0.0
3	670160.05	5714676.75	288.67	3.1	0.0
4	670171.21	5714712.82	284.84	.5	0.0
5	670157.80	5714720.69	285.02	1.7	0.0
6	670158.81	5714738.68	285.05	1.8	0.0
7	670168.01	5714760.00	286.94	356.7	0.0
8	670155.21	5714769.94	289.26	1.0	0.0
9	670164.84	5714791.94	293.06	.6	0.0
10	670164.15	5714809.80	300.05	4.5	0.0
12	670167.87	5714850.64	308.98	10.1	0.0
13	670167.83	5714869.22	315.10	10.3	0.0
14	670165.19	5714897.34	321.67	8.4	0.0
15	670175.43	5714911.19	331.88	6.9	0.0
16	670175.04	5714926.27	341.23	10.3	0.0
[illegible]	670183.48	5714949.18	350.16	10.7	0.0
[illegible]	670181.31	5714981.58	357.53	17.6	0.0
20	670195.37	5715011.78	377.10	24.3	0.0
21	670196.68	5715016.09	386.51	30.5	0.0
22	670206.85	5715039.49	394.27	34.9	0.0
23	670218.37	5715061.93	400.53	40.7	0.0
24	670231.93	5715073.20	406.69	46.1	0.0
25	670234.82	5715086.90	413.26	51.5	0.0
26	670248.09	5715096.19	416.15	55.2	0.0
27	670272.00	5715111.88	420.22	57.0	0.0
30	670317.49	5715144.87	433.98	69.6	0.0
31	670344.91	5715161.48	438.08	76.6	0.0
32	670347.37	5715162.32	438.52	78.8	0.0
33	670374.51	5715165.67	440.89	84.1	0.0
34	670400.89	5715167.18	440.66	88.9	0.0
36	670426.56	5715170.53	439.79	103.1	0.0
37	670443.44	5715164.60	435.86	107.1	0.0
38	670468.37	5715166.74	435.00	114.9	0.0
39	670482.35	5715160.44	430.27	114.9	0.0
40	670493.69	5715167.25	426.88	120.8	0.0
41	670510.16	5715158.43	421.25	124.7	0.0
42	670525.34	5715150.33	417.21	128.6	0.0
43	670540.30	5715131.21	411.62	130.4	0.0
44	670543.43	5715131.10	406.97	130.1	0.0
45	670566.48	5715131.06	406.49	132.2	0.0
46	670581.88	5715121.62	397.72	129.7	0.0
	670598.81	5715102.01	399.37	130.7	0.0
48	670601.49	5715101.22	405.11	130.1	0.0
49	670617.19	5715093.85	393.35	130.8	0.0
50	670634.52	5715075.22	397.31	130.3	0.0
51	670663.10	5715072.45	395.72	130.1	0.0

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
248	670540.68	5715039.07	322.70	287.7	0.0
249	670525.40	5715047.54	320.50	288.3	0.0
250	670511.14	5715054.53	327.90	289.1	0.0
251	670507.48	5715066.64	331.02	290.7	0.0
252	670483.46	5715065.79	335.84	290.3	0.0
253	670468.63	5715073.31	343.76	292.4	0.0
254	670441.68	5715072.40	348.51	290.1	0.0
255	670441.44	5715085.83	354.62	284.7	0.0
256	670425.11	5715092.80	357.67	276.2	0.0
257	670402.30	5715091.25	362.13	270.8	0.0
258	670400.85	5715091.29	365.13	266.1	0.0
261	670356.62	5715093.64	369.49	253.1	0.0
262	670353.00	5715093.03	371.81	252.4	0.0
263	670326.55	5715089.25	375.61	251.1	0.0
264	670303.01	5715086.19	374.11	250.5	0.0
265	670301.14	5715084.46	377.08	247.4	0.0
266	670288.77	5715075.54	375.77	242.6	0.0
268	670262.21	5715058.07	375.20	233.1	0.0
269	670257.15	5715056.81	369.47	223.5	0.0
270	670244.77	5715047.77	368.20	217.6	0.0
271	670241.00	5715035.64	362.16	211.3	0.0
272	670219.21	5715021.03	356.32	205.3	0.0
273	670219.32	5715019.70	352.93	201.6	0.0
276	670214.26	5714975.91	329.47	187.8	0.0
277	670214.07	5714974.26	321.28	184.8	0.0
278	670213.80	5714959.22	310.66	186.9	0.0
279	670205.19	5714947.73	305.30	187.1	0.0
280	670206.84	5714932.80	295.96	186.0	0.0
281	670218.44	5714912.16	282.54	186.0	0.0
282	670218.21	5714909.74	276.71	187.8	0.0
283	670218.12	5714893.25	268.04	188.0	0.0
285	670217.57	5714856.25	254.53	191.1	0.0
286	670217.87	5714853.99	247.97	192.0	0.0

Fix Points for Box-in Calibration up to observation 161



ution Residuals

No	Residual	Plan Range
1	1.0	298.56
3	-4.3	288.67
4	8.2	284.84
5	-4.5	285.02
6	-3.0	285.05
7	7.1	286.94
8	-4.3	289.26
9	5.6	293.06
10	8.0	300.05
12	7.5	308.98
13	6.1	315.10
14	-2.7	321.67
1	9.1	331.88
16	9.7	341.23
17	11.6	350.16
8	-3.8	357.53

Solution Residuals

No	Residual	Plan Range
277	-11.5	321.28
278	-11.7	310.66
279	-15.7	305.30
280	-14.1	295.96
281	-5.6	282.54
282	-10.1	276.71
283	-9.2	268.04
285	-4.1	254.53
286	-9.4	247.97

Solution

Easting	Northing	Depth
670446.87	5714736.52	55.80

R s Residual : 5.6

Worst 8 Values:	279	15.66
:	280	14.11
:	254	12.59
:	135	11.93
:	278	11.70
:	17	11.64
:	277	11.46
:	198	11.37

Acoustic Transducer Offsets

Tow Point X : -7.09m.
Tow Point Y : 4.00m.
Tow Point Z : 5.00m.
Tow Length : 20.00m.
Tow Speed : 2.00Kts.

F sh Layback : 10.47m.
F sh Depth : 12.04m.

BOX IN TRANSPONDER 4

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
4	12.0	54.7	1513.7	1.00910

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)

Data for Calculation

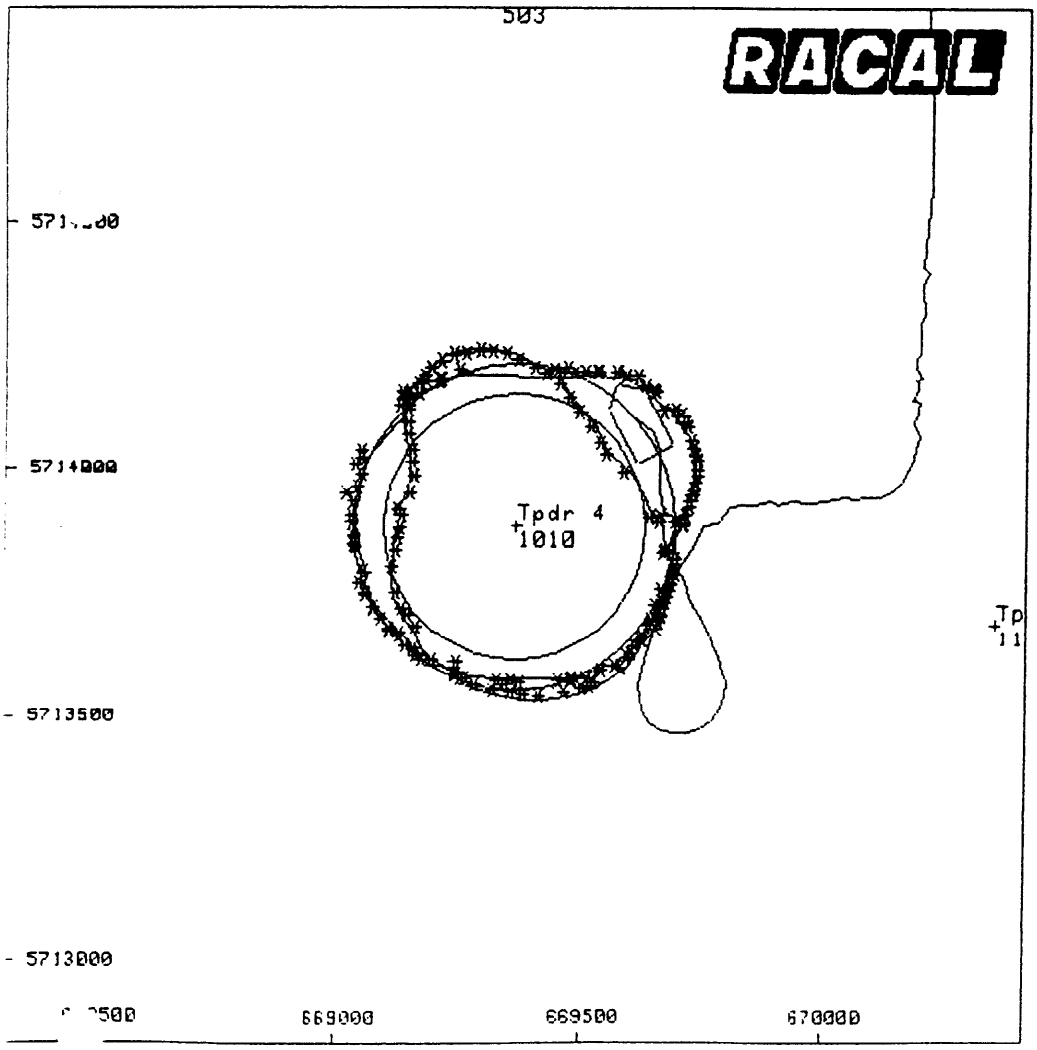
No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
1	669659.37	5713704.68	338.10	223.3	0.0
2	669644.26	5713680.45	340.24	221.1	0.0
3	669628.54	5713655.05	344.56	221.1	0.0
4	669614.18	5713641.47	347.27	229.6	0.0
5	669597.38	5713617.54	350.99	238.1	0.0
6	669572.36	5713597.97	350.37	246.7	0.0
7	669542.98	5713591.20	348.63	255.2	0.0
8	669527.83	5713567.54	344.81	257.9	0.0
9	669513.11	5713574.75	343.48	258.6	0.0
10	669481.25	5713574.68	343.66	258.7	0.0
11	669482.38	5713573.98	340.79	257.3	0.0
12	669481.46	5713572.31	339.18	259.1	0.0
13	669478.30	5713570.64	333.51	264.6	0.0
14	669452.73	5713568.52	334.50	266.6	0.0
20	669371.98	5713565.80	322.93	272.2	0.0
21	669356.33	5713570.67	324.04	275.1	0.0
22	669343.98	5713562.65	322.32	278.2	0.0
23	669326.16	5713569.70	324.26	278.6	0.0
27	669261.92	5713573.46	327.75	280.7	0.0
28	669244.22	5713581.79	330.27	284.9	0.0
29	669240.70	5713582.36	330.82	290.0	0.0
33	669175.38	5713613.65	333.23	304.4	0.0
34	669160.63	5713621.67	335.30	303.9	0.0
35	669158.09	5713634.70	336.75	306.7	0.0
36	669142.40	5713642.15	335.58	309.3	0.0
37	669127.12	5713663.11	338.59	311.7	0.0
38	669109.91	5713670.60	340.53	316.5	0.0
39	669107.63	5713672.44	338.99	319.7	0.0
40	669092.62	5713692.74	339.92	325.6	0.0
41	669076.49	5713716.49	343.45	330.1	0.0
42	669075.15	5713718.49	337.14	333.2	0.0
43	669059.72	5713742.02	334.53	340.4	0.0
44	669059.16	5713745.36	339.22	343.3	0.0
45	669046.65	5713767.49	334.89	341.5	0.0
46	669056.62	5713790.26	335.05	340.8	0.0
49	669037.09	5713843.38	342.01	345.1	0.0
50	669035.78	5713845.56	343.19	351.7	0.0
51	669034.87	5713861.11	343.05	354.0	0.0
52	669030.90	5713889.25	345.73	3.3	0.0
53	669030.85	5713904.51	345.45	6.1	0.0
54	669020.00	5713949.34	345.98	5.4	0.0
55	669032.48	5713932.31	346.78	10.7	0.0
56	669043.55	5713959.84	346.41	14.9	0.0
57	669051.75	5713984.32	346.27	16.3	0.0
58	669037.78	5714006.50	347.47	24.0	0.0
59	669049.44	5714017.77	347.83	27.8	0.0

183	669607.04	5713624.60	349.95	29.3	0.0
184	669624.56	5713653.59	344.24	28.3	0.0
5	669644.94	5713692.82	338.31	21.5	0.0
186	669656.94	5713721.62	332.30	12.0	0.0
187	669666.09	5713754.99	326.42	4.7	0.0
188	669694.08	5713816.01	318.22	.9	0.0
189	669675.47	5713832.39	312.00	351.0	0.0

Data for Calculation

No	Easting(GPS)	Northing(GPS)	Plan Range	Gyro	RMS(ref)
190	669694.68	5713890.54	304.94	345.1	0.0
1	669665.04	5713904.48	299.94	342.7	0.0

Fix Points for Box-in Calibration up to observation 134



Solution Residuals

No	Residual	Plan Range
1	-4.2	338.10
2	-3.4	340.24
3	-3.0	344.56

[illegible]	[illegible]	[illegible]
5	1.7	350.99
6	-2.6	350.37
7	5.9	348.63
8	-11.5	344.81
9	0.0	343.48
10	12.2	343.66

Solution Residuals

No	Residual	Plan Range
11	8.3	340.79
2	5.4	339.18
13	-.8	333.51
14	5.6	334.50
20	2.0	322.93
21	7.7	324.04
22	-2.8	322.32
23	4.3	324.26
27	-3.5	327.75
28	.6	330.27
29	.3	330.82
33	-1.8	333.23
34	-2.1	335.30
35	7.8	336.75
36	1.9	335.58
37	8.9	338.59
38	2.8	340.53
39	.7	338.99
40	1.9	339.92
41	4.6	343.45
.2	-1.8	337.14
43	-7.3	334.53
44	-1.7	339.22
45	-9.2	334.89
46	7.7	335.05
49	6.8	342.01
50	7.0	343.19
51	7.5	343.05
52	7.2	345.73
53	6.4	345.45
54	-9.0	345.98
55	6.7	346.78
56	12.4	346.41
57	13.9	346.27
58	-5.2	347.47
59	2.0	347.83
60	-2.9	348.04
66	-4.4	335.93
67	-3.8	334.32
18	-12.9	332.15
69	1.9	334.33
70	-9.0	335.04
71	2.3	333.81
72	3.2	335.89
74	-1.7	334.74
[illegible]	[illegible]	[illegible]

138	-5.6	302.60
139	-.6	317.77
0	-3.4	331.23
141	-4.1	343.08
142	-3.1	349.40
1[illegible]	-2.4	358.31
144	-.2	362.72

Solution Residuals

No	Residual	Plan Range
145	-3.5	364.59
16	-3.1	363.82
147	-2.3	361.18
148	-5.2	351.61
149	-2.1	348.01
150	-15.0	343.16
151	-3.0	331.59
152	-6.0	317.94
153	-3.0	302.36
154	-1.8	285.10
15[illegible]	5.6	266.44
15[illegible]	1.1	249.37
157	4.1	237.29
158	-.8	229.38
159	-14.7	232.62
160	3.2	239.26
161	4.0	246.31
162	2.8	250.48
163	5.4	259.28
164	-1.8	268.69
5	-2.6	283.14
166	-6.1	285.90
167	.7	292.48
168	6.2	302.61
170	-16.2	311.77
171	11.0	319.46
172	-9.8	323.26
173	-6.9	329.49
174	-4.2	335.40
175	-3.5	339.41
176	-1.6	344.28
177	-2.1	347.88
178	-1.9	349.91
179	-4.2	353.65
180	-5.2	355.84
182	-5.1	354.90
18	-3.8	349.95
184	-1.4	344.24
185	1.4	338.31
6	.8	332.30
187	1.8	326.42
188	-14.0	318.22
189	1.2	312.00
190	-20.3	304.94
191	3.8	299.94

Solution

Easting	Northing	Depth
669369.44	5713886.73	54.70

Residual :	5.9	
Worst 8 Values:	190	20.33
:	98	20.30
:	170	16.16
:	150	15.00
:	159	14.68
:	188	14.03
:	57	13.93
:	68	12.94

Solution Residuals

No	Residual	Plan Range
1	-4.5	338.10
2	-3.6	340.24
3	-3.3	344.56
4	.5	347.27
5	-2.0	350.99
6	-2.8	350.37
7	5.6	348.63
9	-.3	343.48
12	5.1	339.18
13	-1.1	333.51
14	5.2	334.50
20	1.7	322.93
22	-3.1	322.32
23	4.0	324.26
27	-3.8	327.75
28	.3	330.27
29	.1	330.82
33	-2.0	333.23
34	-2.4	335.30
36	1.7	335.58
38	2.6	340.53
39	.5	338.99
40	1.7	339.92
41	4.5	343.45
42	-2.0	337.14
44	-1.8	339.22
58	-5.0	347.47
59	2.2	347.83
60	-2.7	348.04
66	-4.1	335.93
[illegible]	[illegible]	334.32

139	-.3	317.77
140	-3.0	331.23
1	-3.7	343.08
142	-2.7	349.40
143	-2.0	358.31
14	.2	362.72
145	-3.2	364.59

Solution Residuals

No	Residual	Plan Range
146	-2.8	363.82
7	-1.9	361.18
148	-4.8	351.61
149	-1.8	348.01
151	-2.8	331.59
152	-5.7	317.94
153	-2.7	302.36
154	-1.6	285.10
155	5.8	266.44
156	1.3	249.37
15	4.3	237.29
158	-.6	229.38
160	3.3	239.26
161	4.1	246.31
162	2.8	250.48
163	5.3	259.28
164	-1.9	268.69
165	-2.8	283.14
166	-6.3	285.90
167	.5	292.48
.8	6.0	302.61
174	-4.5	335.40
175	-3.8	339.41
176	-2.0	344.28
177	-2.4	347.88
178	-2.3	349.91
179	-4.5	353.65
180	-5.5	355.84
182	-5.4	354.90
183	-4.1	349.95
184	-1.6	344.24
185	1.2	338.31
186	.6	332.30
187	1.7	326.42
189	1.1	312.00
191	3.8	299.94

Solution

Easting	Northing	Depth
669369.40	5713887.06	54.70

RMS Residual : 3.4

Worst 8 Values:	87	7.65
:	97	7.12
:	88	6.38

:	[illegible]	[illegible]
:	107	6.19
:	168	5.95
:	128	5.94
:	92	5.80

BOX IN TRANSPONDER 3 (Calculation)

Speed of Sound Corrections

Tx	Fish	TxDep	Vsnd	Vcor
3	12.0	51.0	1513.6	1.00909

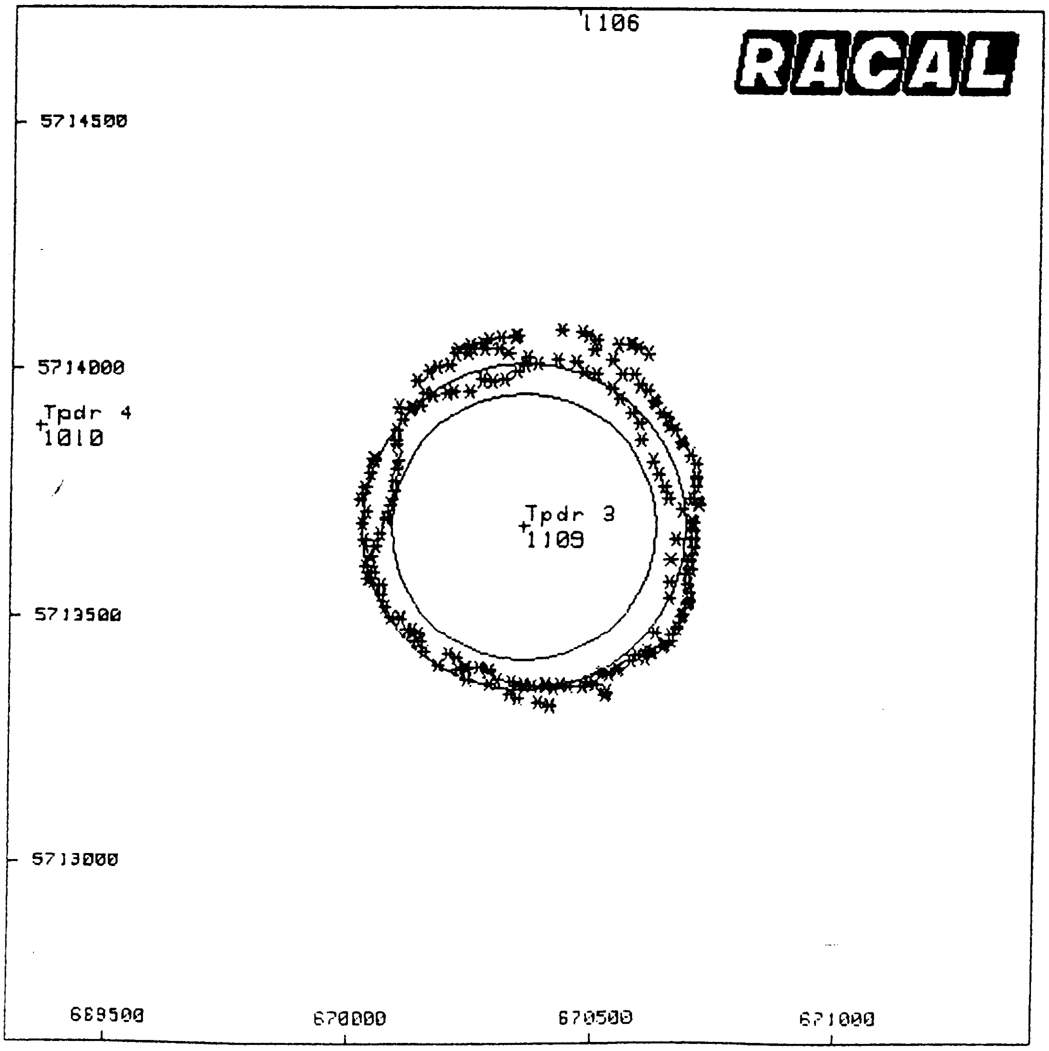
Data for Calculation

No	Easting(ref)	Northing(ref)	Plan Range	Gyro	RMS(ref)
1	670377.41	5714013.48	319.31	249.8	0.0
2	670351.05	5714008.03	310.25	250.4	0.0
3	670337.33	5713997.15	303.77	247.1	0.0
4	670310.82	5713979.25	299.62	246.4	0.0
5	670285.99	5713975.16	295.74	249.8	0.0
6	670267.83	5713976.95	295.82	253.7	0.0
7	670242.57	5713954.59	304.56	257.7	0.0
8	670207.71	5713955.09	311.64	255.4	0.0
9	670195.20	5713949.07	314.58	249.3	0.0
10	670168.11	5713946.07	322.83	240.7	0.0
11	670151.52	5713948.46	327.48	231.6	0.0
12	670127.38	5713919.77	330.69	222.5	0.0
13	670122.30	5713919.19	330.60	211.6	0.0
14	670106.94	5713896.30	326.05	201.8	0.0
[illegible]	670094.04	5713874.67	315.60	193.6	0.0
16	670093.19	5713856.90	305.50	191.8	0.0
17	670094.19	5713849.14	295.93	195.9	0.0
18	670097.54	5713816.53	286.15	199.2	0.0
19	670095.01	5713797.00	278.09	200.0	0.0
20	670088.14	5713771.93	272.74	204.2	0.0
21	670089.16	5713751.16	273.70	209.3	0.0
22	670081.02	5713726.19	273.83	211.0	0.0
23	670071.21	5713700.14	279.22	210.1	0.0
24	670071.95	5713694.80	287.01	210.3	0.0
25	670061.21	5713667.80	297.79	212.0	0.0
26	670050.73	5713643.70	309.12	207.3	0.0
27	670040.51	5713590.49	331.08	181.8	0.0
28	670039.23	5713575.98	337.61	168.4	0.0
29	670037.56	5713576.95	334.19	156.9	0.0
30	670073.13	5713520.10	329.28	149.2	0.0
31	670086.74	5713499.52	331.13	143.8	0.0
32	670118.56	5713471.64	325.16	143.1	0.0
33	670137.86	5713448.67	322.62	144.2	0.0
34	670155.42	5713427.58	331.32	140.9	0.0
35	670185.39	5713400.12	334.52	134.2	0.0
36	670225.87	5713391.59	335.12	124.0	0.0
37	670241.05	5713369.53	344.66	116.1	0.0
38	670285.04	5713362.52	346.48	115.8	0.0
39	670326.98	5713343.23	353.84	115.9	0.0
40	670342.62	5713335.44	365.32	108.2	0.0
4	670384.01	5713324.25	371.06	96.2	0.0
42	670410.40	5713322.05	379.45	87.8	0.0
43	670409.02	5713320.33	383.00	74.6	0.0
44	670408.22	5713318.77	387.99	64.2	0.0
45	670524.23	5713348.02	381.56	49.4	0.0

Data for Calculation

No	Easting(ref)	Northing(ref)	Plan Range	Gyro	RMS(ref)
205	670332.14	5714067.27	392.17	90.2	0.0
206	670332.81	5714067.83	395.55	95.4	0.0
207	670333.79	5714068.48	395.64	102.4	0.0
208	670334.26	5714068.73	394.99	105.6	0.0
209	670426.33	5714082.12	404.18	110.6	0.0
210	670426.51	5714082.19	401.32	111.7	0.0
211	670465.97	5714075.85	403.81	113.0	0.0
212	670480.41	5714068.23	407.32	113.1	0.0
213	670494.60	5714061.08	409.80	109.9	0.0
214	670494.52	5714061.05	410.12	109.3	0.0
215	670540.01	5714050.93	416.93	109.4	0.0
216	670566.99	5714052.78	420.73	113.9	0.0
[illegible]17	670568.97	5714051.37	425.40	119.4	0.0
[illegible]8	670583.77	5714043.28	429.35	122.0	0.0
219	670601.97	5714034.21	430.47	126.8	0.0

Box Tx: 3



Solution Residuals

No	Residual	Plan Range
1	-11.7	319.31
2	-14.5	310.25
3	-10.5	303.77
4	.6	299.62
5	-3.8	295.74
6	-10.0	295.82
7	11.5	304.56
8	3.3	311.64
9	5.3	314.58
10	1.3	322.83
11	-5.8	327.48
12	3.6	330.69
13	.4	330.60
4	.3	326.05
15	-6.7	315.60
16	-7.3	305.50
17	-11.8	295.93
18	-2.3	286.15
19	-4.2	278.09
20	-6.9	272.74
21	.9	273.70
22	-1.9	273.83
2	-3.4	279.22
24	5.3	287.01
25	5.2	297.79
26	3.9	309.12
27	4.7	331.08
28	5.6	337.61
29	.9	334.19
30	5.0	329.28
31	7.3	331.13
32	9.0	325.16
3	4.0	322.62
34	7.9	331.32
35	5.2	334.52
36	16.7	335.12
37	11.4	344.66
38	18.5	346.48
39	12.7	353.84
40	17.3	365.32
41	10.7	371.06
42	13.7	379.45
43	15.8	383.00
44	19.3	387.99
45	5.2	381.56
46	-5.3	373.81
47	-2.4	354.58
48	1.9	346.37
4	.7	346.40
50	-4.9	326.94
51	1.3	318.93
2	1.7	310.14
53	-11.3	302.78

Solution Residuals

No	Residual	Plan Range
213	6.5	409.80
214	6.9	410.12
215	4.7	416.93
216	-6.0	420.73
217	-1.2	425.40
218	2.0	429.35
219	.4	430.47

Solution

Easting	Northing	Depth
670353.38	5713683.32	51.00

RMS Residual : 7.7

rst 8 Values:	191	29.32
:	192	29.07
:	193	28.25
:	54	23.30
:	44	19.34
:	38	18.49
:	40	17.27
:	36	16.75

Solution Residuals

No	Residual	Plan Range
4	.5	299.62
5	-4.0	295.74
8	3.1	311.64
9	5.1	314.58
10	1.1	322.83
11	-6.0	327.48
12	3.4	330.69
13	.1	330.60
14	.1	326.05
18	-2.6	286.15
19	-4.4	278.09
21	.7	273.70
22	-2.1	273.83
23	-3.7	279.22
24	5.1	287.01
25	5.0	297.79
26	3.7	309.12
27	4.6	331.08
28	5.5	337.61
29	.8	334.19
30	4.8	329.28
33	4.0	322.62
35	5.3	334.52
45	5.5	381.56
46	-5.1	373.81
47	-2.2	354.58
48	2.2	346.37

Sol ion Residuals

No	Residual	Plan Range
202	1.3	386.77
203	5.3	391.99
209	-1.3	404.18
210	-4.3	401.32
211	-4.6	403.81
212	1.9	407.32
213	6.5	409.80
214	6.8	410.12
215	4.6	416.93
216	-6.1	420.73
217	-1.2	425.40
218	2.0	429.35
9	.5	430.47

Solution

Easting	Northing	Depth
670353.60	5713683.17	51.00

RMS Residual : 3.8

Worst 8 Values:	57	8.21
:	111	6.96
:	75	6.93
:	214	6.83
:	115	6.75
:	170	6.66
:	213	6.45
:	133	6.42

BOX IN TRANSPONDER 2 (Calculation)

Solution

Easting	Northing	Depth
670447.85	5714736.97	55.80

RMS Residual : 6.3

Worst 8 Values:	279	18.44
:	280	16.88
:	275	14.86
:	278	14.60
:	277	14.54
:	254	14.49
:	274	13.70
:	17	13.09

Solution

Easting	Northing	Depth
670447.74	5714736.53	55.80

RMS Residual : 4.0

Worst 8 Values:	163	8.22
:	253	7.65
:	45	7.33
:	137	7.28
:	185	7.18
:	65	7.13
:	145	7.10
:	238	6.99

Solution

Easting	Northing	Depth
670447.32	5714736.21	55.80

RMS Residual : 3.4

Worst 8 Values:	253	7.30
:	61	6.44
:	164	6.32
:	42	6.16
:	9	5.86
:	142	5.80
:	170	5.74
:	99	5.69

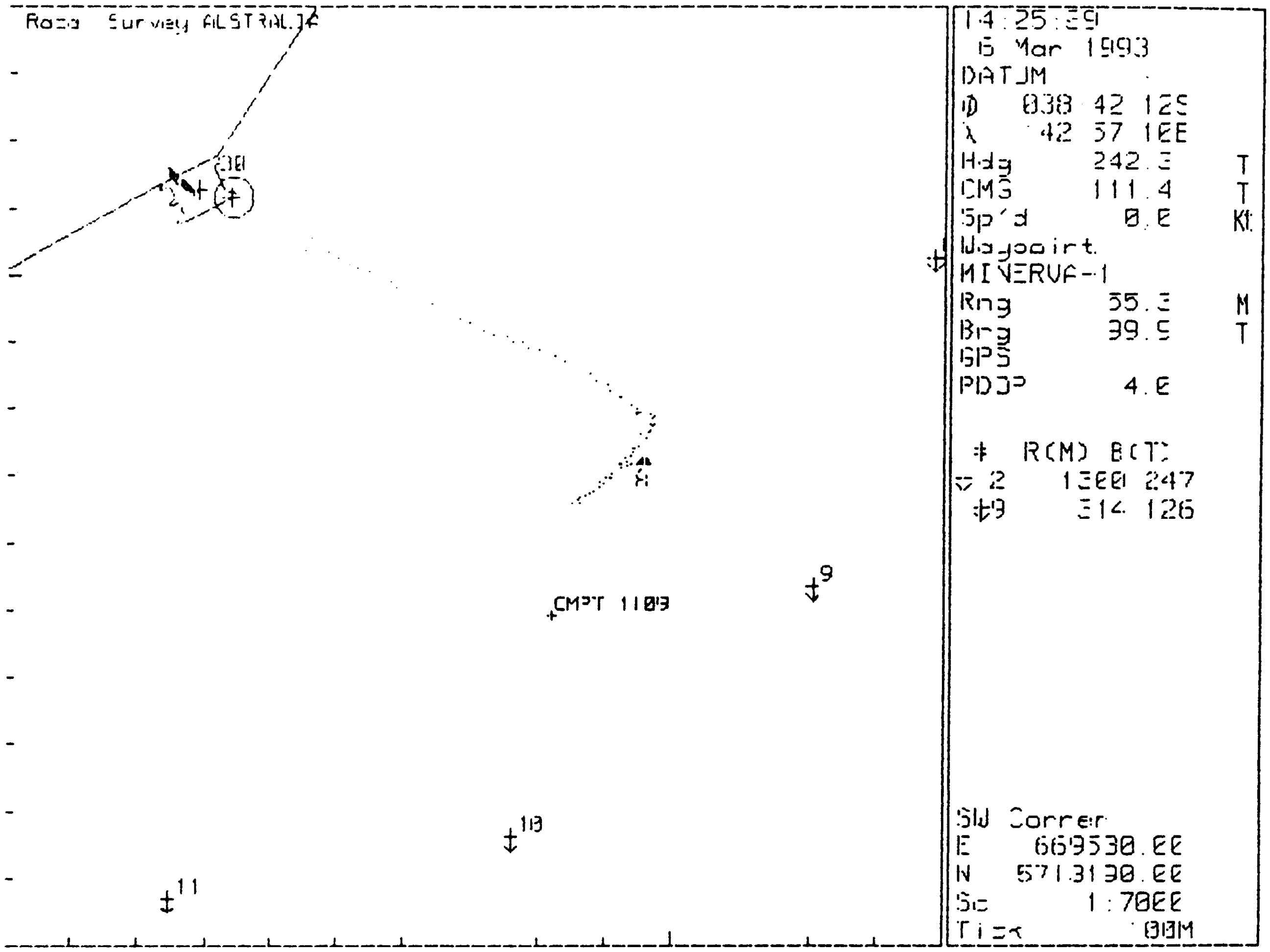
APPENDIX D

GOLF LASER TRACKING PRINTOUTS

Tug Posn 670468E, 5713908N
Rng & Brg to Intended drop 322.3 metres 122.7 deg. True

TUG TRACKING FIX @ TIME 14:25:25 Ident 1 A
Current Anchor # 9 Int. Location 670736E, 5713728N
Vessel Datum : 669814.18E, 5714316.62N Gyro : 242.30xT
Laser : HELIDECK 669800.66E, 5714279.86N
Range 775.00 metres Bearing 234.10 Relative to Vessel Head
Tug Posn 670487E, 5713920N
Rng & Brg to Intended drop 314.3 metres 126.5 deg. True

Anchor #9 on the Seabed.



TUG TRACKING FIX @ TIME 14:27:59 Ident 1 A
Current Anchor # 12 Int. Location 669283E, 5713432N
Vessel Datum : 669814.32E, 5714310.08N Gyro : 242.90xT
Laser : HELIDECK 669800.41E, 5714273.46N
Range 870.00 metres Bearing 337.50 Relative to Vessel Head
Tug Posn 669222E, 5713623N
Rng & Brg to Intended drop 200.5 metres 161.2 deg. True

Lowering Anchor #12 to the Seabed.

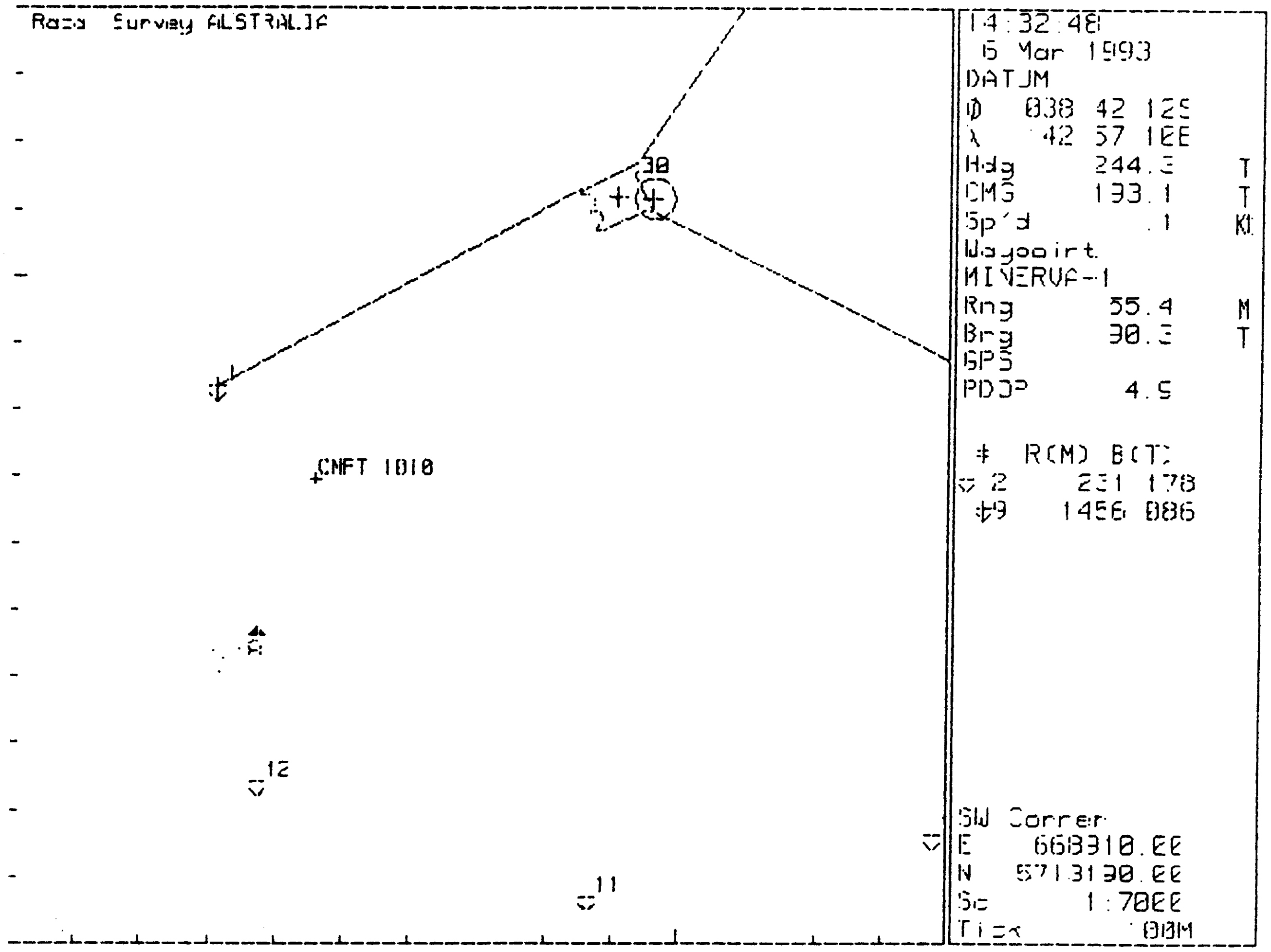
TUG TRACKING FIX @ TIME 14:29:38 Ident 1 A
Current Anchor # 12 Int. Location 669283E, 5713432N
Vessel Datum : 669815.26E, 5714309.69N Gyro : 242.50xT
Laser : HELIDECK 669801.60E, 5714272.97N
Range 910.00 metres Bearing 337.90 Relative to Vessel Head
Tug Posn 669196E, 5713591N
Rng & Brg to Intended drop 181.4 metres 150.1 deg. True

TUG TRACKING FIX @ TIME 14:29:57 Ident 1 A
Current Anchor # 12 Int. Location 669283E, 5713432N

Vessel Datum :   669815.43E, 5714309.32N   Gyro : 241.60xT
Laser : HELIDECK 669802.35E, 5714272.39N
Range   870.00 metres   Bearing   338.90 Relative to Vessel Head
Tug Posn   669220E,   5713625N
Rng & Brg to Intended drop   202.6 metres   160.8 deg. True

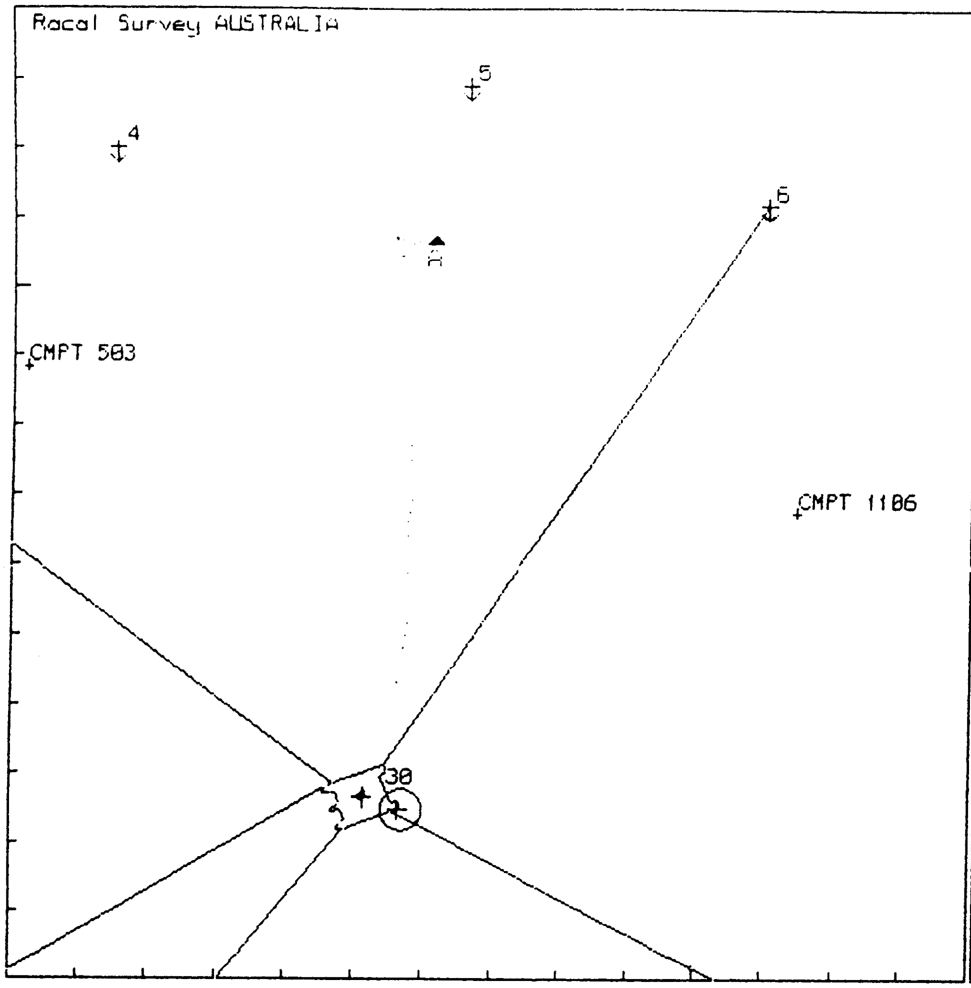
TUG TRACKING FIX   @ TIME 14:31:17   Ident 1 A
Current Anchor # 12 Int. Location   669283E, 5713432N
Vessel Datum :   669812.20E, 5714308.02N   Gyro : 244.80xT
Laser : HELIDECK 669797.08E, 5714271.88N
Range   865.00 metres   Bearing   334.70 Relative to Vessel Head
Tug Posn   669233E,   5713616N
Rng & Brg to Intended drop   191.0 metres   163.5 deg. True

find position #12



RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Intended Drop 3	Winch Offset 3
2	Intended Drop 9	Laser Target 1A
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF
6	OFF	OFF
7	OFF	OFF
8	OFF	OFF
9	OFF	OFF
10	OFF	OFF
11	OFF	OFF
12	OFF	OFF



18:42:20
6 Mar 1993
DATUM
Φ 038 42 11S
λ 142 57 10E
Hdg 247.5 T
CMG 236.8 T
Sp'd 0.0 Kt
Waypoint
MINERVA-1
Rng 59.5 M
Brg 106.7 T
GPS
PDOP 2.0

⚓	R(M)	B(T)
⚓2	945	272
⚓5	227	012

SW Corner
E 669300.00
N 5714060.00
Sc 1:7000
Tick 100M

TUG TRACKING FIX @ TIME 18:47:21 Ident 1 A
Current Anchor # 5 Int. Location 669963E, 5715353N
Vessel Datum : 669815.35E, 5714332.82N Gyro : 244.00½T
Laser : STARB 669760.99E, 5714344.40N
Range 845.00 metres Bearing 125.50 Relative to Vessel Head
Tug Posn 669915E, 5715175N
Rng & Brg to Intended drop 184.5 metres 13.8 deg. True

TUG TRACKING FIX @ TIME 18:48:02 Ident 1 A
Current Anchor # 5 Int. Location 669963E, 5715353N
Vessel Datum : 669815.36E, 5714333.93N Gyro : 243.70½T
Laser : STARB 669760.94E, 5714345.23N
Range 855.00 metres Bearing 125.40 Relative to Vessel Head
Tug Posn 669913E, 5715186N
Rng & Brg to Intended drop 174.1 metres 15.5 deg. True

TUG TRACKING FIX @ TIME 18:49:27 Ident 1 A
Current Anchor # 5 Int. Location 669963E, 5715353N
Vessel Datum : 669815.09E, 5714332.82N Gyro : 243.50½T
Laser : STARB 669760.63E, 5714343.93N
Range 810.00 metres Bearing 124.60 Relative to Vessel Head
Tug Posn 669892E, 5715143N
Rng & Brg to Intended drop 221.4 metres 17.5 deg. True

TUG TRACKING FIX @ TIME 18:49:58 Ident 1 A
Current Anchor # 5 Int. Location 669963E, 5715353N
Vessel Datum : 669814.37E, 5714332.65N Gyro : 243.80½T
Laser : STARB 669759.97E, 5714344.05N
Range 795.00 metres Bearing 124.30 Relative to Vessel Head
Tug Posn 669889E, 5715129N
Rng & Brg to Intended drop 236.3 metres 17.0 deg. True

TUG TRACKING FIX @ TIME 04:55:23 Ident 1 A

Current Anchor # 4 Int. Location 669450E, 5715260N
Vessel Datum : 669815.13E, 5714323.99N Gyro : 235.80½T
Laser : STARB 669759.67E, 5714327.70N
Range 760.00 metres Bearing 106.40 Relative to Vessel Head
Tug Posn 669543E, 5715056N
Rng & Brg to Intended drop 224.0 metres 334.3 deg. True

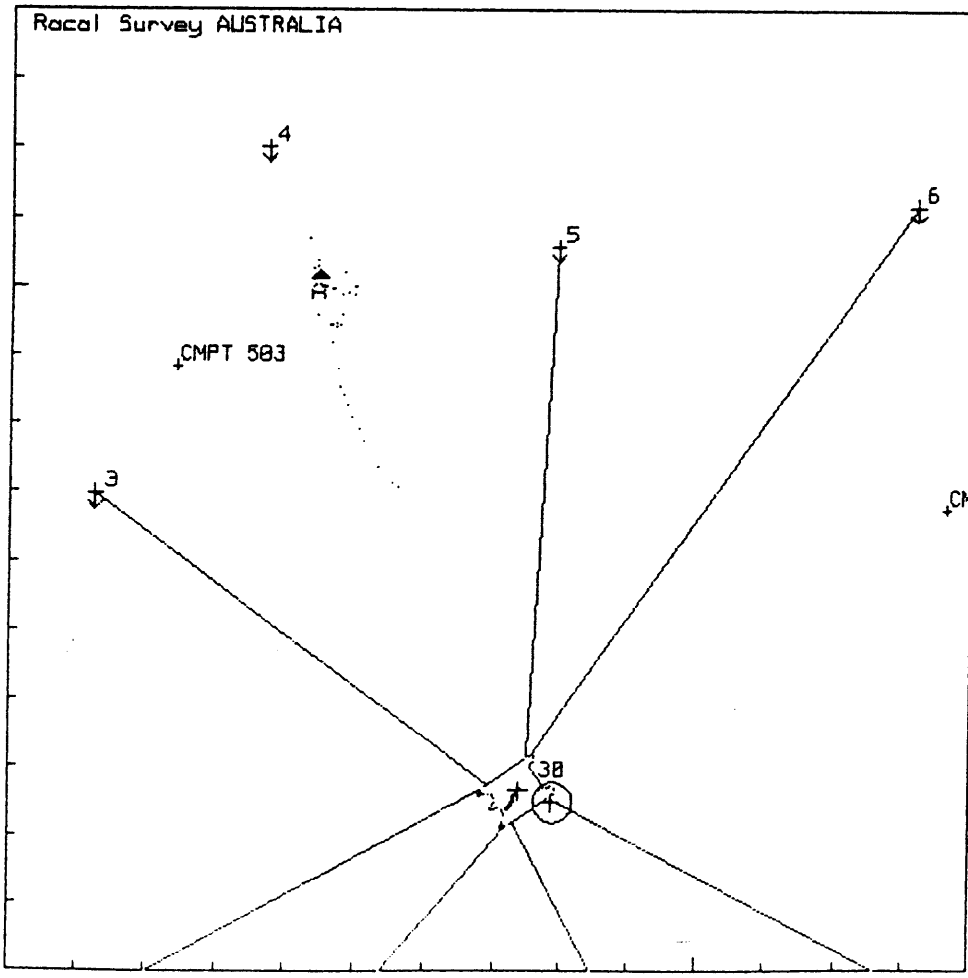
TUG TRACKING FIX @ TIME 04:56:29 Ident 1 A

Current Anchor # 4 Int. Location 669450E, 5715260N
Vessel Datum : 669816.03E, 5714326.31N Gyro : 235.00½T
Laser : STARB 669760.53E, 5714329.24N
Range 765.00 metres Bearing 106.40 Relative to Vessel Head
Tug Posn 669532E, 5715059N
Rng & Brg to Intended drop 216.8 metres 336.5 deg. True

Anchor on bottom

TUG TRACKING FIX @ TIME 04:57:29 Ident 1 A

Current Anchor # 4 Int. Location 669450E, 5715260N
Vessel Datum : 669816.22E, 5714327.22N Gyro : 234.50½T
Laser : STARB 669760.69E, 5714329.67N
Range 790.00 metres Bearing 106.30 Relative to Vessel Head
Tug Posn 669518E, 5715081N
Rng & Brg to Intended drop 191.3 metres 337.9 deg. True



04:59:34
7 Mar 1993
DATUM
Φ 038 42 11S
λ 142 57 10E
Hdg 234.6 T
CMG 334.4 T
Sp'd .1 Kt
Waypoint
MINERVA-1
Rng 56.3 M
Brg 106.9 T
GPS
PDOP 2.9

‡ R(M) B(T)
‡11 1015 180
‡4 192 336

SW Corner
E 669080.00
N 5714060.00
Sc 1:7000
Tick 100M

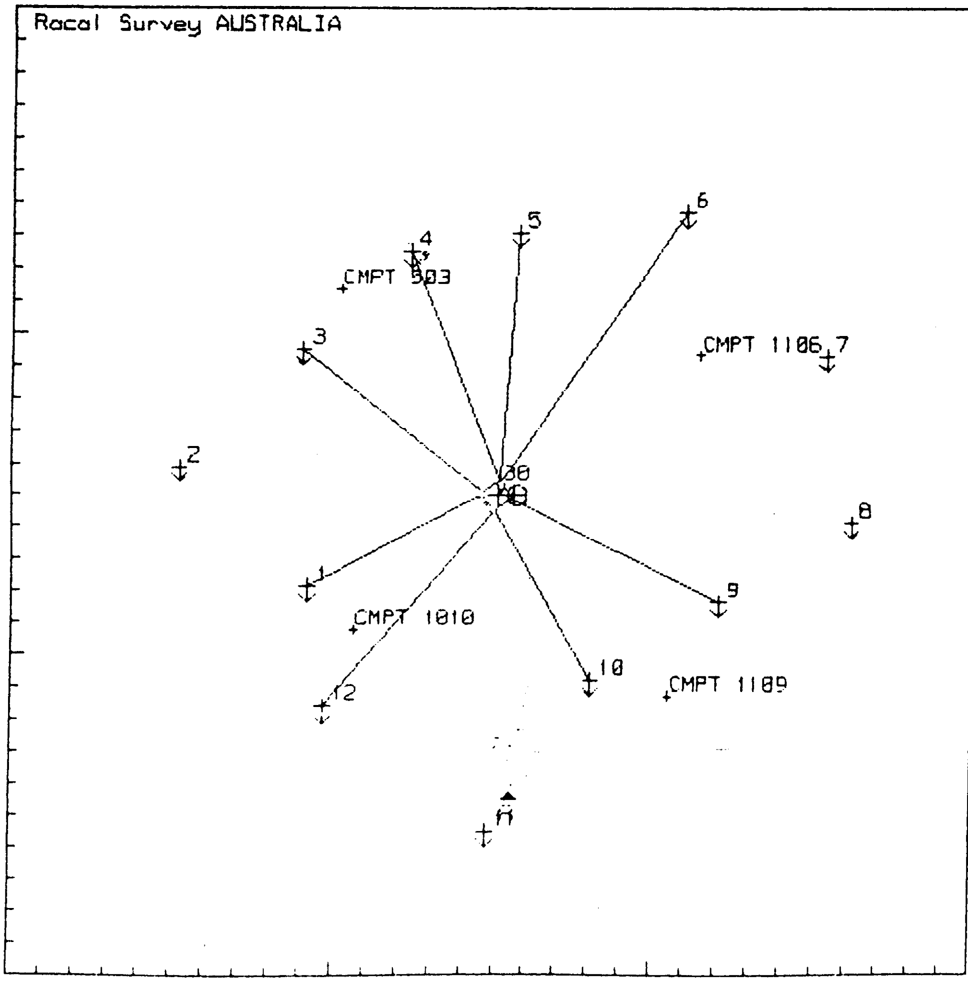
Tug Posn 669836E, 5713417N
Rng & Brg to Intended drop 197.1 metres 216.2 deg. True

TUG TRACKING FIX @ TIME 05:46:30 Ident 1 A
Current Anchor # 11 Int. Location 669776E, 5713261N
Vessel Datum : 669814.65E, 5714315.30N Gyro : 235.40½T
Laser : HELIDECK 669805.64E, 5714277.17N
Range 830.00 metres Bearing 298.50 Relative to Vessel Head
Tug Posn 669878E, 5713450N
Rng & Brg to Intended drop 215.1 metres 207.1 deg. True

TUG TRACKING FIX @ TIME 05:47:40 Ident 1 A
Current Anchor # 11 Int. Location 669776E, 5713261N
Vessel Datum : 669811.77E, 5714311.96N Gyro : 234.40½T
Laser : HELIDECK 669803.43E, 5714273.68N
Range 865.00 metres Bearing 300.50 Relative to Vessel Head
Tug Posn 669862E, 5713410N
Rng & Brg to Intended drop 171.7 metres 208.7 deg. True

TUG TRACKING FIX @ TIME 05:48:01 Ident 1 A
Current Anchor # 11 Int. Location 669776E, 5713261N
Vessel Datum : 669810.78E, 5714310.74N Gyro : 234.40½T
Laser : HELIDECK 669802.43E, 5714272.47N
Range 870.00 metres Bearing 300.50 Relative to Vessel Head
Tug Posn 669862E, 5713405N
Rng & Brg to Intended drop 167.6 metres 209.5 deg. True

TUG TRACKING FIX @ TIME 05:49:04 Ident 1 A
Current Anchor # 11 Int. Location 669776E, 5713261N
Vessel Datum : 669809.50E, 5714309.04N Gyro : 234.20½T
Laser : HELIDECK 669801.29E, 5714270.74N
Range 885.00 metres Bearing 301.30 Relative to Vessel Head
Tug Posn 669852E, 5713387N
Rng & Brg to Intended drop 147.8 metres 209.9 deg. True



05:49:56
7 Mar 1993
DATUM
Φ 038 42 12S
λ 142 57 10E
Hdg 234.5 T
CMG 245.5 T
Sp'd .1 Kt
Waypoint
MINERVA-1
Rng 62.6 M
Brg 88.7 T
GPS
PDOP 3.5

‡ R(M) B(T)
‡11 148 210
‡4 1915 347

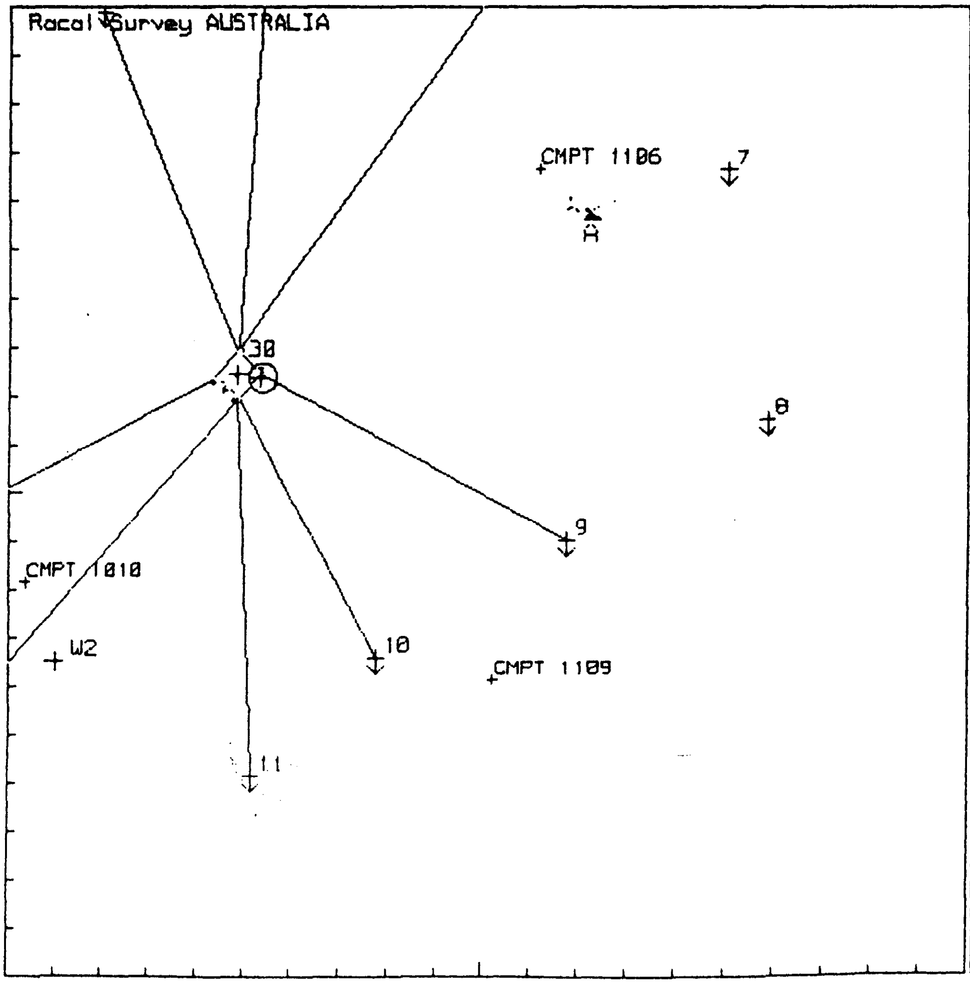
SW Corner
E 668300.00
N 5712810.00
Sc 1:15000
Tick 100M

Range 885.00 metres Bearing 197.50 Relative to Vessel Head
Tug Posn 670599E, 5714668N
Rng & Brg to Intended drop 243.7 metres 73.1 deg. True

TUG TRACKING FIX @ TIME 12:30:54 Ident 1 A
Current Anchor # 7 Int. Location 670834E, 5714734N
Vessel Datum : 669811.35E, 5714311.85N Gyro : 224.10½T
Laser : HELIDECK 669809.98E, 5714272.70N
Range 835.00 metres Bearing 198.00 Relative to Vessel Head
Tug Posn 670556E, 5714648N
Rng & Brg to Intended drop 291.3 metres 71.5 deg. True

TUG TRACKING FIX @ TIME 12:31:16 Ident 1 A
Current Anchor # 7 Int. Location 670834E, 5714734N
Vessel Datum : 669811.81E, 5714312.77N Gyro : 223.00½T
Laser : HELIDECK 669811.19E, 5714273.60N
Range 845.00 metres Bearing 198.90 Relative to Vessel Head
Tug Posn 670565E, 5714655N
Rng & Brg to Intended drop 280.6 metres 72.5 deg. True

TUG TRACKING FIX @ TIME 12:31:23 Ident 1 A
Current Anchor # 7 Int. Location 670834E, 5714734N
Vessel Datum : 669812.90E, 5714312.35N Gyro : 222.60½T
Laser : HELIDECK 669812.56E, 5714273.18N
Range 825.00 metres Bearing 199.00 Relative to Vessel Head
Tug Posn 670547E, 5714648N Anchor #7 Seabed Position.
Rng & Brg to Intended drop 299.9 metres 72.1 deg. True



12:32:30
7 Mar 1993
DATUM
Φ 038 42 12S
λ 142 57 10E
Hdg 222.5 T
CMG 250.2 T
Sp'd .2 Kt
Waypoint
MINERVA-1
Rng 53.7 M
Brg 95.0 T
GPS
PDOP 8.1

‡ R(M) B(T)
‡7 294 071

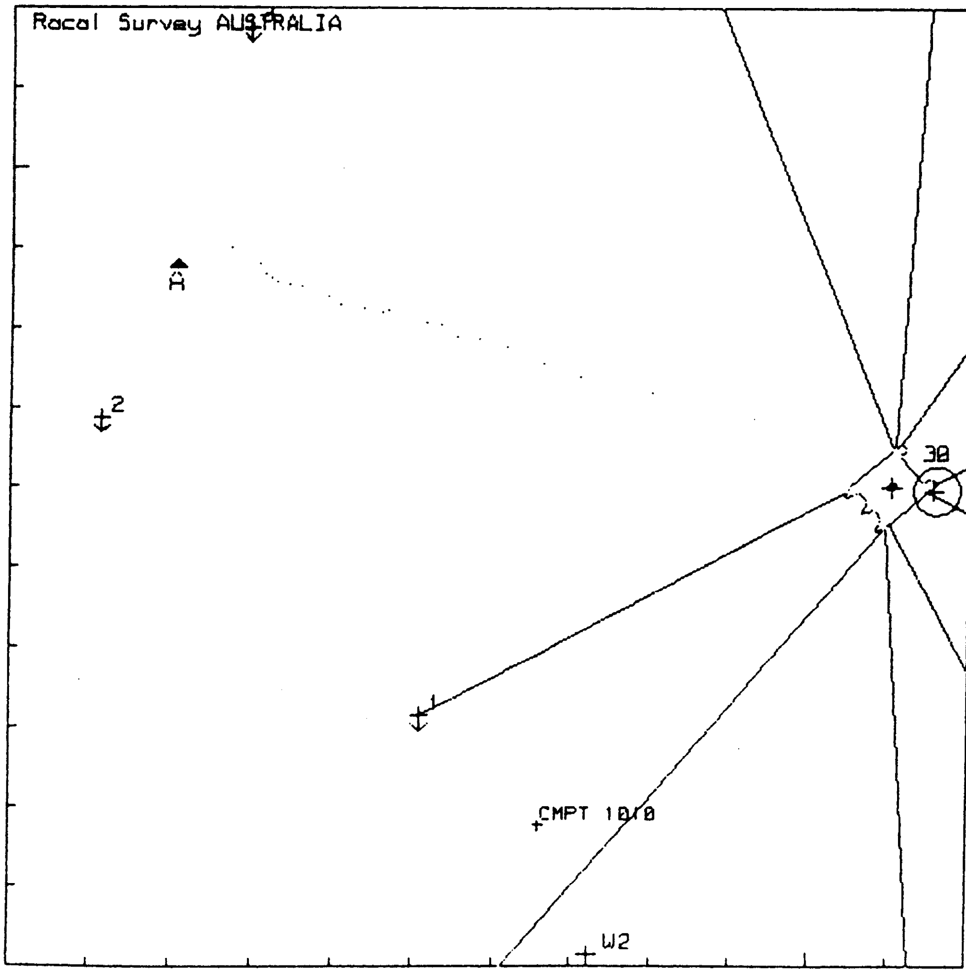
SW Corner
E 669330.00
N 5713070.00
Sc 1:10000
Tick 100M

RANGE & BEARING DISPLAY TABLE

Laser : HELIDECK 669808.38E, 5714272.05N
Range 855.00 metres Bearing 62.90 Relative to Vessel Head
Tug Posn 669015E, 5714590N
Rng & Brg to Intended drop 271.6 metres 223.5 deg. True ← Anchor Seabed Position
Anchor #2

TUG TRACKING FIX @ TIME 13:06:27 Ident 1 A
Current Anchor # 2 Int. Location 668824E, 5714397N
Vessel Datum : 669814.99E, 5714314.46N Gyro : 228.00½T
Laser : HELIDECK 669810.97E, 5714275.49N
Range 895.00 metres Bearing 62.30 Relative to Vessel Head
Tug Posn 668980E, 5714608N
Rng & Brg to Intended drop 263.0 metres 215.3 deg. True

TUG TRACKING FIX @ TIME 13:11:25 Ident 1 A
Current Anchor # 2 Int. Location 668824E, 5714397N
Vessel Datum : 669809.94E, 5714312.15N Gyro : 229.50½T
Laser : HELIDECK 669804.90E, 5714273.30N
Range 945.00 metres Bearing 58.90 Relative to Vessel Head
Tug Posn 668916E, 5714593N ← Anchor on Seabed.
Rng & Brg to Intended drop 216.9 metres 203.9 deg. True



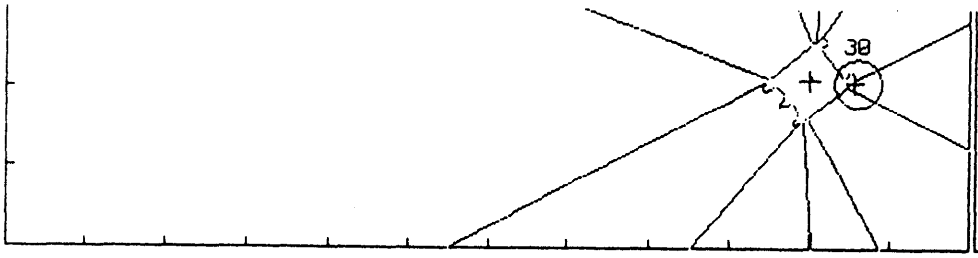
13:11:56
7 Mar 1993
DATUM
Ø 038 42 12S
λ 142 57 10E
Hdg 228.4 T
CMG 209.5 T
Sp'd .2 Kt
Waypoint
MINERVA-1
Rng 58.2 M
Brg 92.5 T
GPS
PDOP 4.0

‡ R(M) B(T)
‡2 217 204

SW Corner
E 668710.00
N 5713710.00
Sc 1:6000
Tick 100M

RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Intended Drop 8	Winch Offset 8
2	OFF	OFF
3	OFF	OFF
4	OFF	OFF
5	OFF	OFF



SW Corner
E 668810.00
N 5714100.00
Sc 1:6000
Tick 100M

RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Actual Drop 1	Winch Offset 1
2	OFF	OFF
3	Actual Drop 3	Winch Offset 3
4	OFF	OFF
5	OFF	OFF
6	OFF	OFF
7	OFF	OFF
8	Intended Drop 8	Laser Target 1A
9	OFF	OFF
10	OFF	OFF
11	OFF	OFF
12	OFF	OFF

#8

TUG TRACKING FIX @ TIME 15:08:19 Ident 1 A
Current Anchor # 8 Int. Location 670915E, 5714217N
Vessel Datum : 669808.78E, 5714313.34N Gyro : 232.20½T
Laser : HELIDECK 669801.91E, 5714274.77N
Range 385.00 metres Bearing 222.50 Relative to Vessel Head
Tug Posn 670185E, 5714238N
Rng & Brg to Intended drop 730.6 metres 90.5 deg. True

TUG TRACKING FIX @ TIME 15:08:48 Ident 1 A
Current Anchor # 8 Int. Location 670915E, 5714217N
Vessel Datum : 669808.85E, 5714313.41N Gyro : 232.60½T
Laser : HELIDECK 669801.72E, 5714274.89N
Range 380.00 metres Bearing 222.50 Relative to Vessel Head
Tug Posn 670180E, 5714233N
Rng & Brg to Intended drop 735.4 metres 90.1 deg. True

TUG TRACKING FIX @ TIME 15:10:23 Ident 1 A
Current Anchor # 8 Int. Location 670915E, 5714217N
Vessel Datum : 669808.50E, 5714312.57N Gyro : 233.50½T
Laser : HELIDECK 669800.76E, 5714274.17N
Range 380.00 metres Bearing 221.90 Relative to Vessel Head
Tug Posn 670178E, 5714230N
Rng & Brg to Intended drop 737.0 metres 89.8 deg. True

TUG TRACKING FIX @ TIME 15:10:35 Ident 1 A
Current Anchor # 8 Int. Location 670915E, 5714217N
Vessel Datum : 669808.24E, 5714313.31N Gyro : 233.30½T
Laser : HELIDECK 669800.64E, 5714274.88N
Range 410.00 metres Bearing 222.90 Relative to Vessel Head
Tug Posn 670207E, 5714220N
Rng & Brg to Intended drop 708.2 metres 89.0 deg. True

TUG TRACKING FIX @ TIME 15:10:44 Ident 1 A
Current Anchor # 8 Int. Location 670915E, 5714217N

Laser : STARB 669755.24E, 5714312.04N
Range 875.00 metres Bearing 81.00 Relative to Vessel Head
Tug Posn 669108E, 5714900N
Rng & Brg to Intended drop 105.0 metres 260.9 deg. True

TUG TRACKING FIX @ TIME 14:55:00 Ident 1 A
Current Anchor # 3 Int. Location 669004E, 5714886N
Vessel Datum : 669811.42E, 5714313.35N Gyro : 229.50½T
Laser : STARB 669755.89E, 5714310.95N
Range 880.00 metres Bearing 81.00 Relative to Vessel Head
Tug Posn 669099E, 5714896N
Rng & Brg to Intended drop 95.4 metres 262.6 deg. True

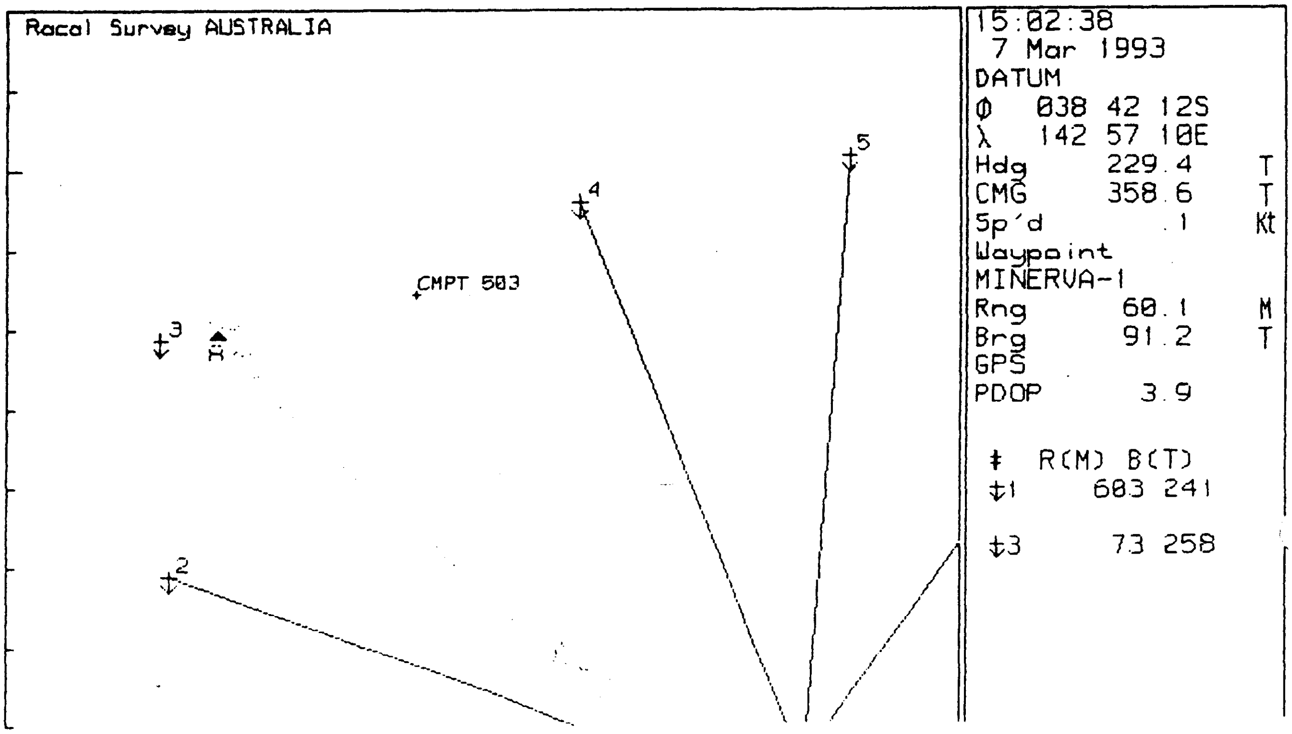
TUG TRACKING FIX @ TIME 14:55:11 Ident 1 A
Current Anchor # 3 Int. Location 669004E, 5714886N
Vessel Datum : 669811.49E, 5714313.11N Gyro : 229.90½T
Laser : STARB 669755.95E, 5714311.10N
Range 885.00 metres Bearing 81.10 Relative to Vessel Head
Tug Posn 669097E, 5714901N
Rng & Brg to Intended drop 93.9 metres 259.4 deg. True

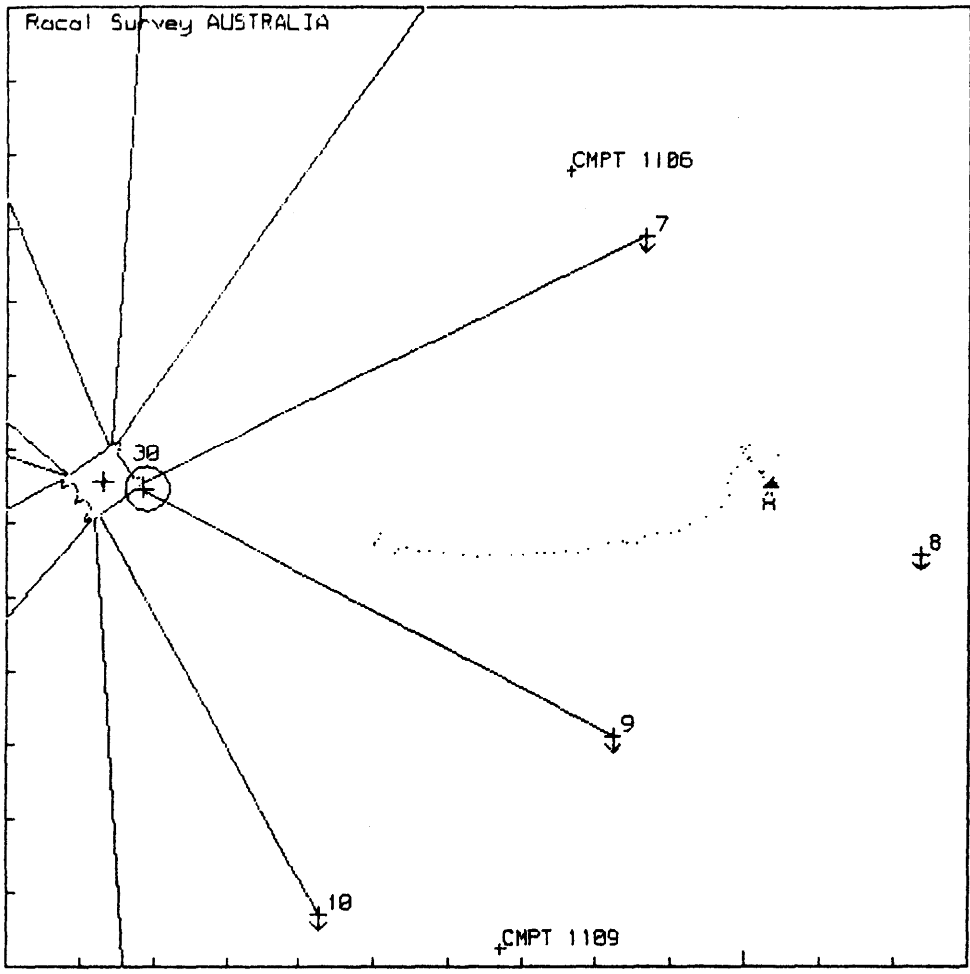
Commenced lowering Anchor #3 to seabed.

TUG TRACKING FIX @ TIME 14:56:28 Ident 1 A
Current Anchor # 3 Int. Location 669004E, 5714886N
Vessel Datum : 669810.93E, 5714312.37N Gyro : 229.60½T
Laser : STARB 669755.40E, 5714310.08N
Range 895.00 metres Bearing 80.70 Relative to Vessel Head
Tug Posn 669083E, 5714901N
Rng & Brg to Intended drop 80.9 metres 257.9 deg. True

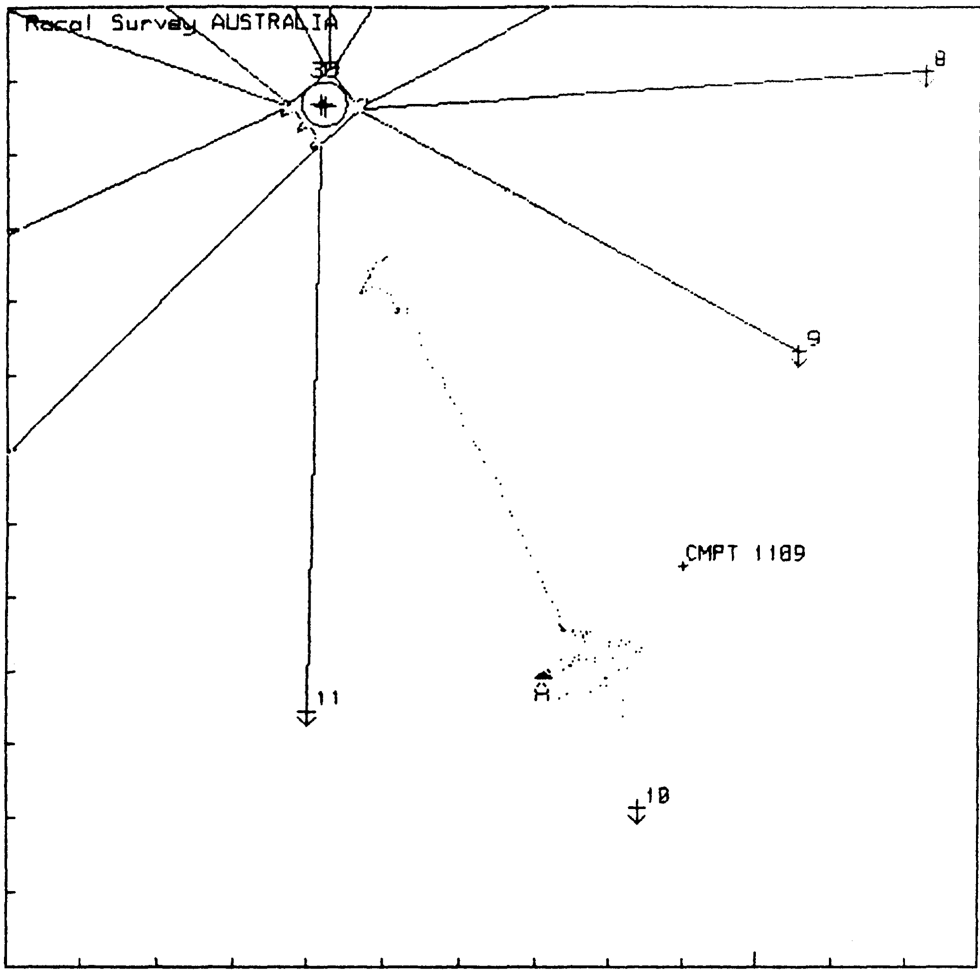
Seabed Position Anchor #4 ?

TUG TRACKING FIX @ TIME 14:56:43 Ident 1 A
Current Anchor # 3 Int. Location 669004E, 5714886N
Vessel Datum : 669810.45E, 5714311.40N Gyro : 229.70½T
Laser : STARB 669754.91E, 5714309.20N
Range 900.00 metres Bearing 80.50 Relative to Vessel Head
Tug Posn 669080E, 5714905N
Rng & Brg to Intended drop 78.4 metres 254.6 deg. True





15:28:24		
7 Mar 1993		
DATUM		
Φ	038 42 12S	
λ	142 57 10E	
Hdg	233.3	T
CMG	358.6	T
Sp'd	0.0	Kt
Waypoint		
MINERVA-1		
Rng	60.1	M
Brg	98.5	T
GPS		
PDOP	2.3	
⚓	R(M) B(T)	
⚓1	609 240	
⚓3	891 309	
⚓8	226 115	
SW Corner		
E	669680.00	
N	5713660.00	
Sc	1:6500	
Tick	100M	



22 32 31
7 Mar 1993
DATUM
Φ 038 42 12S
λ 142 57 12E
Hdg 227.1 T
CMG 9.4 T
Sp'd .1 Kt
Waypoint
MINERVA-1
Rng 3.4 M
Brg 342.7 T
GPS
PDOP 24.7

⚓	R(M)	B(T)
⚓1	655	244
⚓2	855	288
⚓3	949	307
⚓4	786	333
⚓5	763	358
⚓6	965	031
⚓7	705	060
⚓8	755	085
⚓9	672	118
⚓10	226	144
⚓11	768	180
⚓12	837	223

SW Corner
E 669450.00
N 5713140.00
Sc 1:6500
Tick 100M

RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Actual Drop 1	Winch Offset 1
2	Actual Drop 2	Winch Offset 2
3	Actual Drop 3	Winch Offset 3
4	Actual Drop 4	Winch Offset 4
5	Actual Drop 5	Winch Offset 5
6	Actual Drop 6	Winch Offset 6
7	Actual Drop 7	Winch Offset 7
8	Actual Drop 8	Winch Offset 8
9	Actual Drop 9	Winch Offset 9
10	Actual Drop 10	Winch Offset 10
11	Actual Drop 11	Winch Offset 11
12	Actual Drop 12	Winch Offset 12

RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Intended Drop 1	Laser Target 1A
2	Actual Drop 2	Winch Offset 2
3	Actual Drop 3	Winch Offset 3
4	Actual Drop 4	Winch Offset 4
5	Actual Drop 5	Winch Offset 5
6	Actual Drop 6	Winch Offset 6
7	Actual Drop 7	Winch Offset 7
8	Actual Drop 8	Winch Offset 8

↓ Re-Run Anchor #1

Rng & Brg to Intended drop 2382.8 metres   92.7 deg. True

TUG TRACKING FIX   @ TIME 01:25:29 Ident 1 A

Current Anchor # 1 Int. Location 668906E, 5713881N

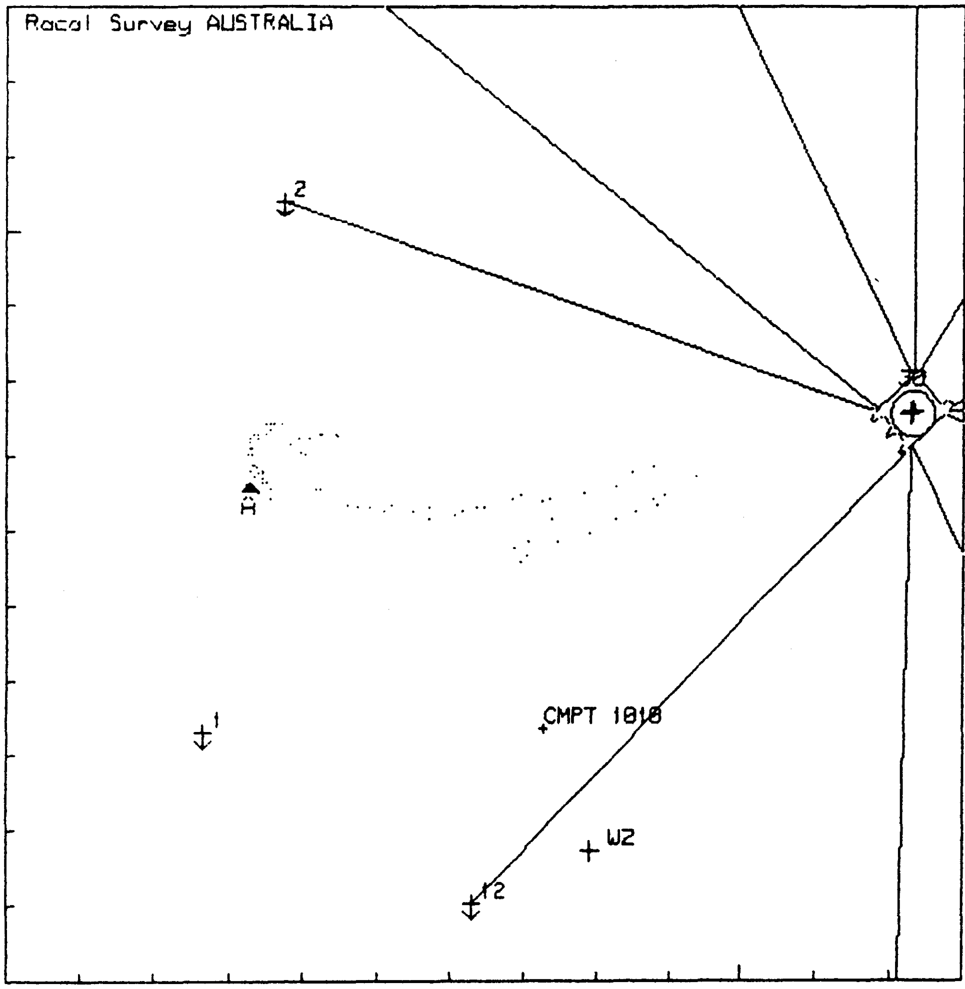
Vessel Datum : 669869.08E, 5714309.78N Gyro : 226.10½T

Laser : HELIDECK 669866.35E, 5714270.70N

Range 900.00 metres Bearing 39.00 Relative to Vessel Head

Tug Posn 668968E, 5714214N

Rng & Brg to Intended drop 338.9 metres 189.3 deg. True



01:26:02
8 Mar 1993
DATUM
Ø 038 42 12S
λ 142 57 12E
Hdg 226.2 T
CMG 353.9 T
Sp'd 0.0 Kt
Waypoint
MINERVA-1
Rng 2.9 M
Brg 171.8 T
GPS
PDOP 2.2

#	R(M)	B(T)
1	339	189
2	852	288
3	945	307
4	779	333
5	757	359
6	961	031
7	703	061
8	756	086
9	676	118
10	765	152
11	774	180
12	841	223

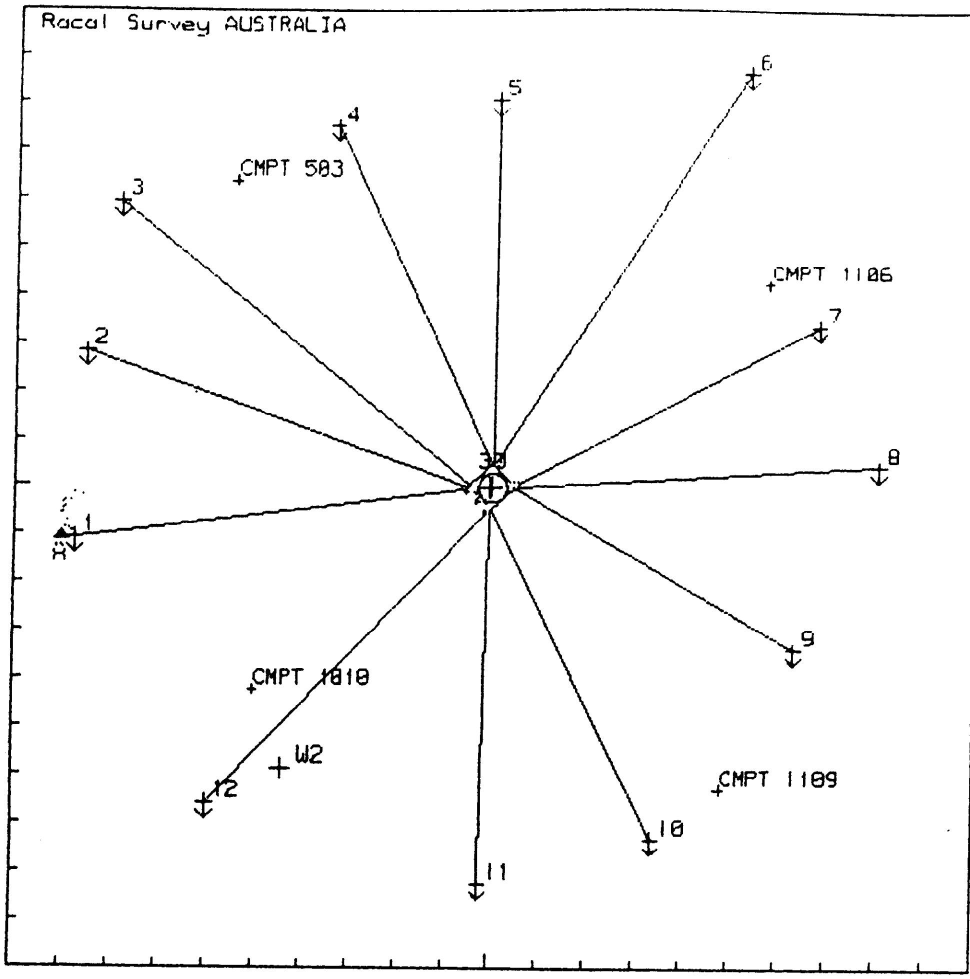
SW Corner
E 668640.00
N 5713550.00
Sc 1:6500
Tick 100M

RANGE & BEARING DISPLAY TABLE

Slot	To	From
1	Actual Drop 1	Winch Offset 1
2	Actual Drop 2	Winch Offset 2
3	Actual Drop 3	Winch Offset 3
4	Actual Drop 4	Winch Offset 4
5	Actual Drop 5	Winch Offset 5
6	Actual Drop 6	Winch Offset 6
7	Actual Drop 7	Winch Offset 7
8	Actual Drop 8	Winch Offset 8
9	Actual Drop 9	Winch Offset 9
10	Actual Drop 10	Winch Offset 10
11	Actual Drop 11	Winch Offset 11
12	Actual Drop 12	Winch Offset 12

APPENDIX E

ANCHOR PATTERN DIAGRAM



01 29 47
8 Mar 1993
DATUM
Φ 038 42 12S
λ 142 57 12E
Hdg 225 8 T
CMG 353.9 T
Sp'd 0.0 Kt
Waypoint
MINERVA-1
Rng 3 1 M
Brg 141.5 T
GPS
PDOP 2.2

ǂ	R(M)	B(T)
ǂ1	821	262
ǂ2	850	288
ǂ3	944	307
ǂ4	779	333
ǂ5	758	359
ǂ6	962	031
ǂ7	704	061
ǂ8	757	086
ǂ9	678	118
ǂ10	765	152
ǂ11	774	180
ǂ12	040	223

SW Corner
E 668870.00
N 5713310.00
Sc 1:10000
Tick 100M

APPENDIX F

DGPS FINAL POSITION ANALYSIS PRINTOUTS - MINERVA-1

FINAL POSITION ANALYSIS: BYFORD DOLPHIN R/M MINERVA - 1
GNS v R2.06 09:28:21 8 Mar 1993 to 10:32:22 8 Mar 1993
GPS Weighting Option - Constellations given equal weights
Mean Corrected Gyro...228.5 Gyro Correction... +0.0
Mean Grid Heading.....229.7 Convergence....... -1.221

SECONDARY COMPUTATION - Del Norte

CONSTELLATIONS USED

Const.	# Samples	S.V.s
A	6	24,20,12,16,03
B	4	24,20,12,13,16,03
C	2	24,20,12,16,03
D	3	24,20,12
E	36	24,20,12,16,03
F	31	24,20,12,16,03,25
G	1	20,12,16,25
H	2	20,12,16,03
I	6	20,12,16,03,25
J	17	24,20,12,03,25
K	111	24,20,12,03,25,17
L	2	24,20,12,03

Total number of samples used = 221

COMPUTED FINAL ANTENNA POSITION
WGS 84 Spheroid
Latitude 38 DEG 42 MIN 07.304 SEC S (S.D. 1.09 Metres)
Longitude 142 DEG 57 MIN 16.042 SEC E (S.D. 1.00 Metres)
Height 24.10 Metres (S.D. 0.00 Metres)

AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.620 SEC S
Longitude 142 DEG 57 MIN 11.098 SEC E
Height 40.82 Metres
UTM/TM
Eastings 669832.27 Metres
Northings 5714299.63 Metres

COMPUTED FINAL DATUM POSITION
AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.178 SEC S
Longitude 142 DEG 57 MIN 12.434 SEC E
UTM/TM
Eastings 669864.83 Metres
Northings 5714312.58 Metres

INTENDED FINAL DATUM LOCATION
AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.350 SEC S
Longitude 142 DEG 57 MIN 12.640 SEC E
UTM/TM
Eastings 669869.70 Metres
Northings 5714307.17 Metres

Final Datum Position is 7.27 Metres (spheroidal distance) bearing 316.79 T from the Intended Loc.

TERTIARY COMPUTATION - Tau

CONSTELLATIONS USED

Const.	# Samples	S.V.s
A	38	20,16,12,24,03
B	2	20,16,12,24,03,25
C	48	20,16,12,24,25
D	4	20,16,12,24,17,25
E	1	20,16,24,17,25
F	1	20,16,24,25
G	5	20,16,24,17,25
H	1	20,24,17,25
I	1	20,16,24,17,25
J	1	20,24,17,25
K	1	20,16,24,17,25
L	44	20,24,17,25
M	74	20,12,24,25

(13)

Total number of samples used = 221

COMPUTED FINA[redacted]SITION
WGS 84 Spheroid
Latitude 38 DEG 42 MIN 07.310 SEC S (S.D. .18 Metres)
Longitude 142 DEG 57 MIN 15.893 SEC E (S.D. .27 Metres)
Height 24.94 Metres (S.D. .36 Metres)

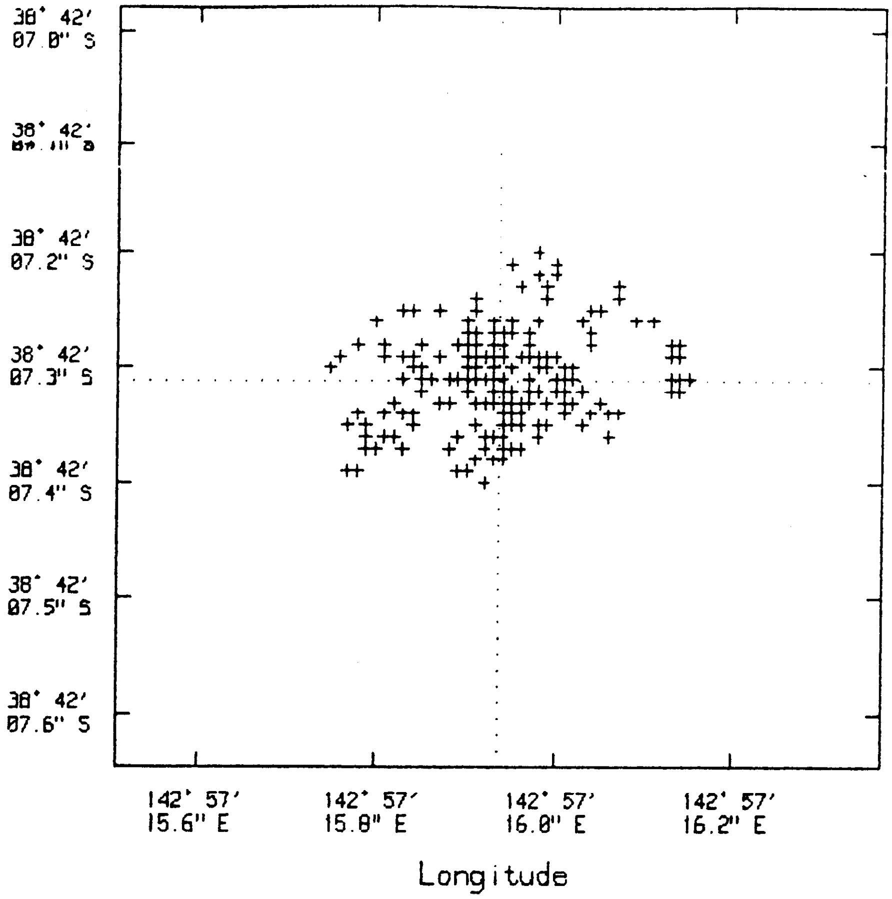
AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.626 SEC S
Longitude 142 DEG 57 MIN 10.949 SEC E
Height 41.67 Metres
UTM/TM
Eastings 669828.67 Metres
Northings 5714299.54 Metres

COMPUTED FINAL DATUM POSITION
AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.230 SEC S
Longitude 142 DEG 57 MIN 12.337 SEC E
UTM/TM
Eastings 669862.46 Metres
Northings 5714311.03 Metres

INTENDED FINAL DATUM LOCATION
AUSTRALIAN NAT 1984 Spheroid
Latitude 38 DEG 42 MIN 12.350 SEC S
Longitude 142 DEG 57 MIN 12.640 SEC E
UTM/TM
Eastings 669869.70 Metres
Northings 5714307.17 Metres

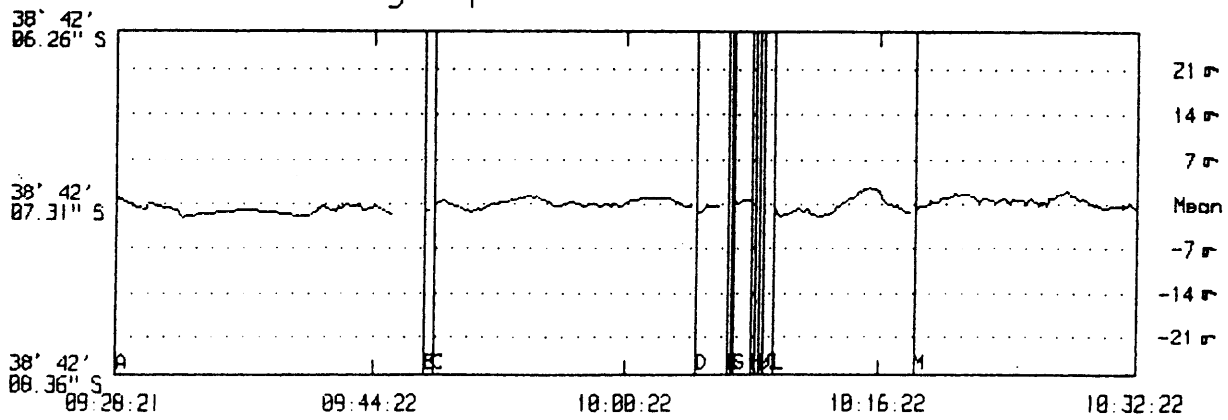
Final Datum Position is 8.21 Metres (spheroidal distance) bearing 296.83 T from the Intended Loc.

Tertiary Computation GPS Scatter Plot (Tau)

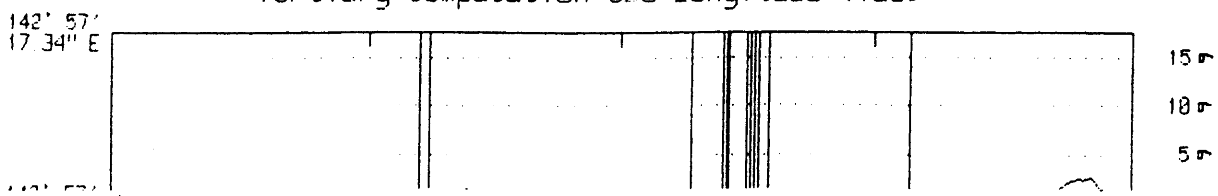


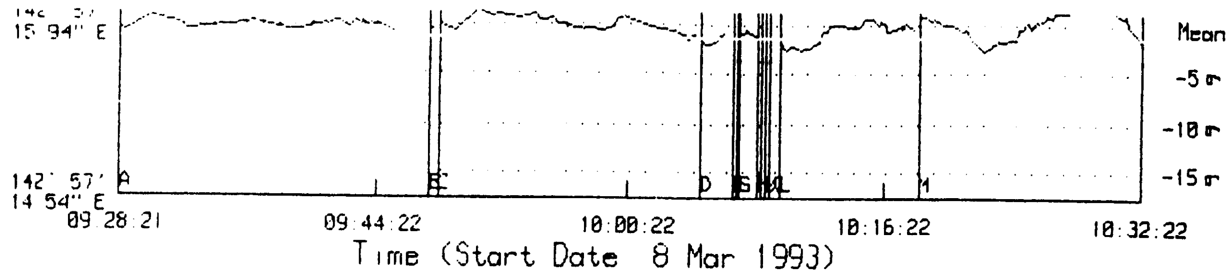
Centred on mean antenna position (passes 1 to 221).
WGS 84 Spheroid
Latitude 38 DEG 42 MIN 07.312 SEC S
Longitude 142 DEG 57 MIN 15.937 SEC E

Tertiary Computation GPS Latitude (Tau)



Tertiary Computation GPS Longitude (Tau)





Tertiary Computation (WGS 84 - Tau)

Centred on mean of antenna position (passes 1 to 221).

Latitude 38 DEG 42 MIN 07.312 SEC S Sd 1.205 Metres

Longitude 142 DEG 57 MIN 15.937 SEC E Sd 1.922 Metres

Analysis data stored to file ANALYSIS1

APPENDIX G

SATELLITE AVAILABILITY PREDICTIONS

For a mobile location of LATITUDE [illegible]
LONGITUDE [illegible]

The vectors to the INMARSAT geostationary satellites are :-

Satellite	Position	Elevation	Azimuth (TRUE)
I.O.R	64° 30' 0"	0° 15' 51"	277° 16' 46"
P.O.R	180° 0' 0"	31° 3' 42"	50° 21' 45"
A.O.R (WEST)	-55° 0' 0"	-53° 9' 12"	307° 23' 33"
A.O.R (EAST)	-15° 30' 0"	-51° 54' 30"	212° 16' 15"

Inmarsat Elevations in RED are below the horizon
Inmarsat Elevations in BLUE may be difficult to track reliably
< Any Key To Continue, SHIFT PrtSc to Print or Q to Quit >

For a mobile location of LATITUDE -38° 42' 12" Mineva-1
LONGITUDE 142° 57' 12"

The distances to the RACAL SKY-FIX reference stations are :-

Ref. Stn.	ID	Latitude	Longitude	Kmtrs.	Nmls.
ADELAIDE	205	-35° 13' 52"	138° 52' 3"	530	286
DNEY	206	-33° 59' 12"	151° 14' 24"	908	490
IRNS	201	-16° 54' 22"	145° 45' 36"	2439	1316
PERTH	204	-31° 48' 32"	115° 52' 47"	2564	1384
BROOME	208 7	-17° 53' 36"	122° 15' 34"	3060	1651
DARWIN	202	-12° 25' 59"	130° 50' 27"	3156	1703
DAMPIER	203	-20° 39' 46"	116° 42' 17"	3212	1733
MIRI	102	4° 23' 51"	113° 59' 28"	5641	3044
SINGAPORE	100	1° 17' 47"	103° 47' 29"	5980	3227
MANILA	110	14° 36' 0"	121° 0' 0"	6352	3428
TERENGGANU	101	5° 20' 0"	103° 8' 55"	6381	3444
HONG KONG	120	22° 18' 29"	114° 10' 19"	7416	4002
SAPPORO	140	43° 4' 47"	141° 23' 22"	9094	4908

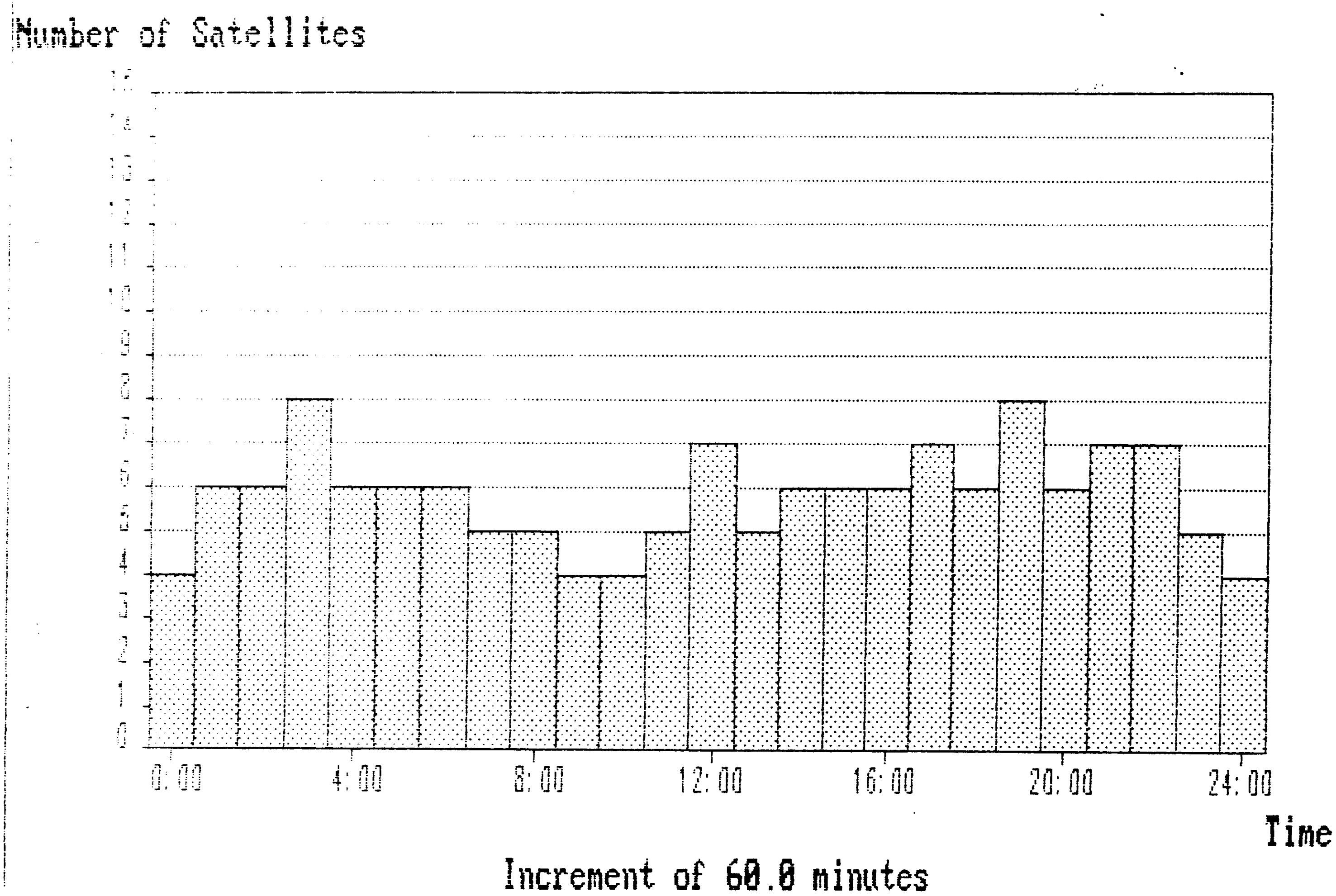
YELLOW - Up to 1500 km BLUE - 1500-2000 km RED - Over 2000 km

Any Key For New Point, SHIFT PrtSc to PRINT or Q to QUIT

Number of Visible Satellites vs Time

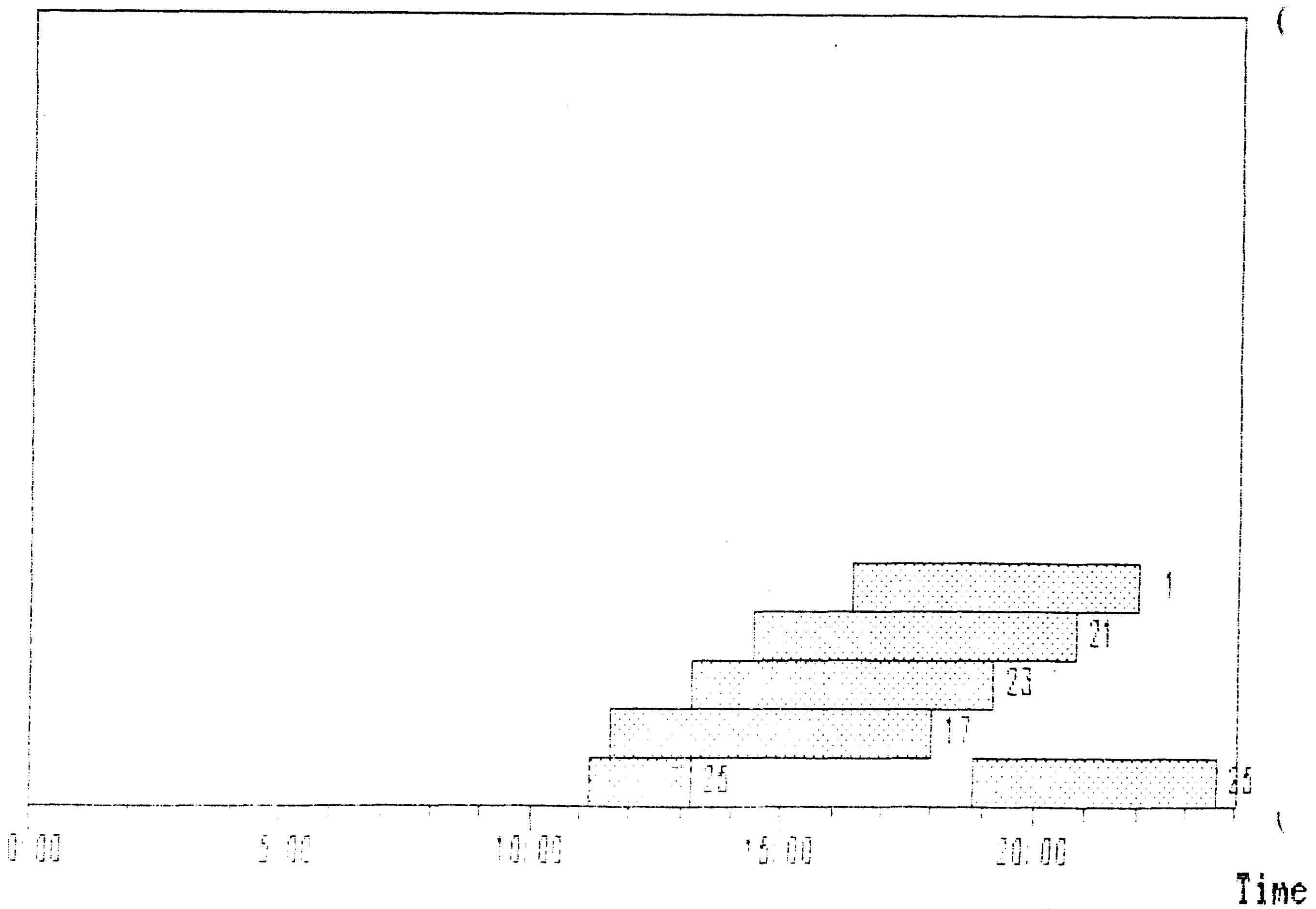
Station : MINERVA-1 Latitude :38 42'12"S Longitude :142 57'12"E

Date : 2 Mar 1993 Zone : 11:00 Cut-off Elevation : 1[illegible]



Visible Satellites vs Time

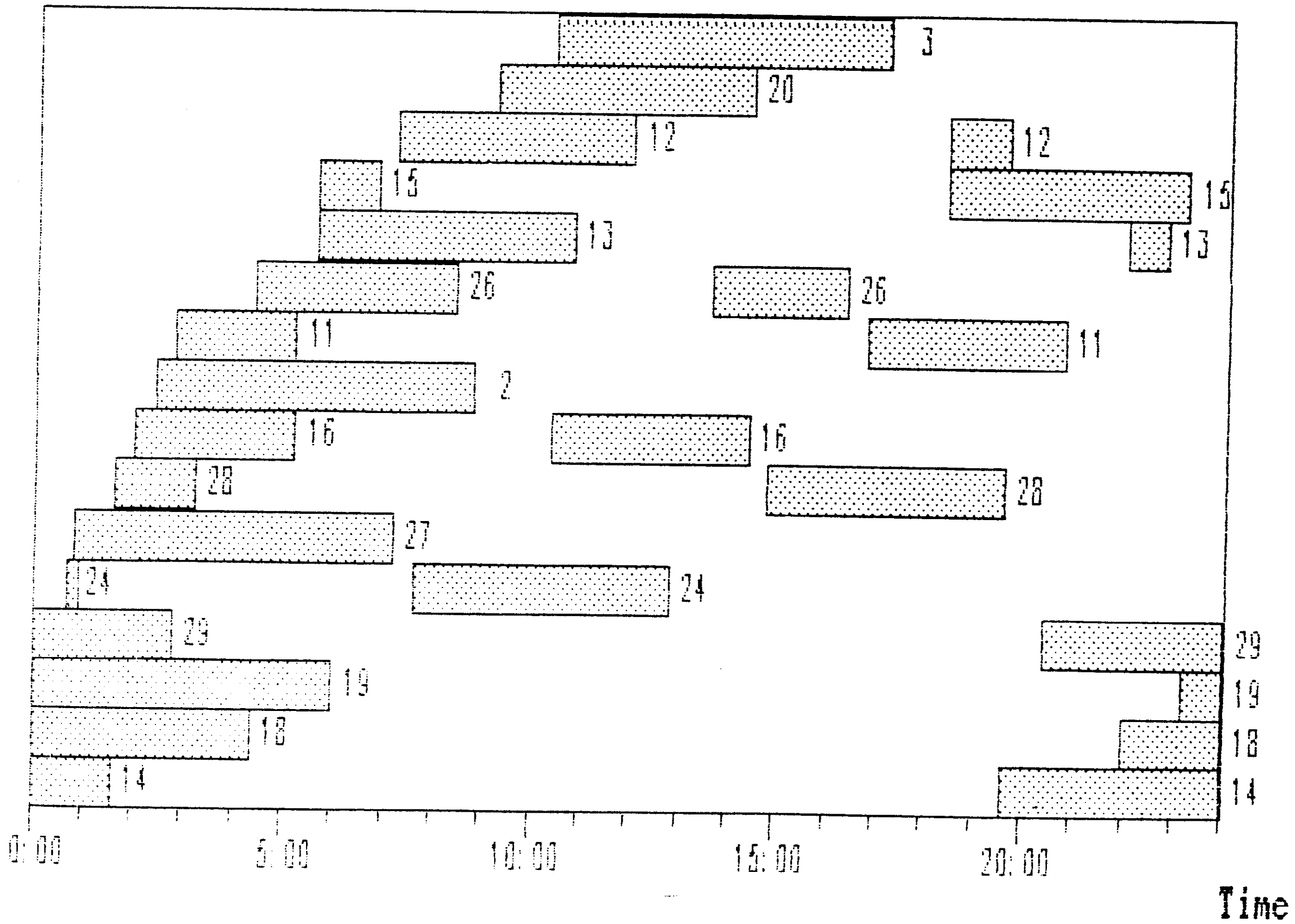
Station : MINERVA-1 Latitude :38 42'12"S Longitude :142 57'12"E
Date : 2 Mar 1993 Zone : 11:00 Cut-off Elevation : 10



Increment of 60.0 minutes

Visible Satellites vs Time

Station : MINERVA-1 Latitude :38 42'12"S Longitude :142 57'12"E
Date : 2 Mar 1993 Zone : 11:00 Cut-off Elevation : 1

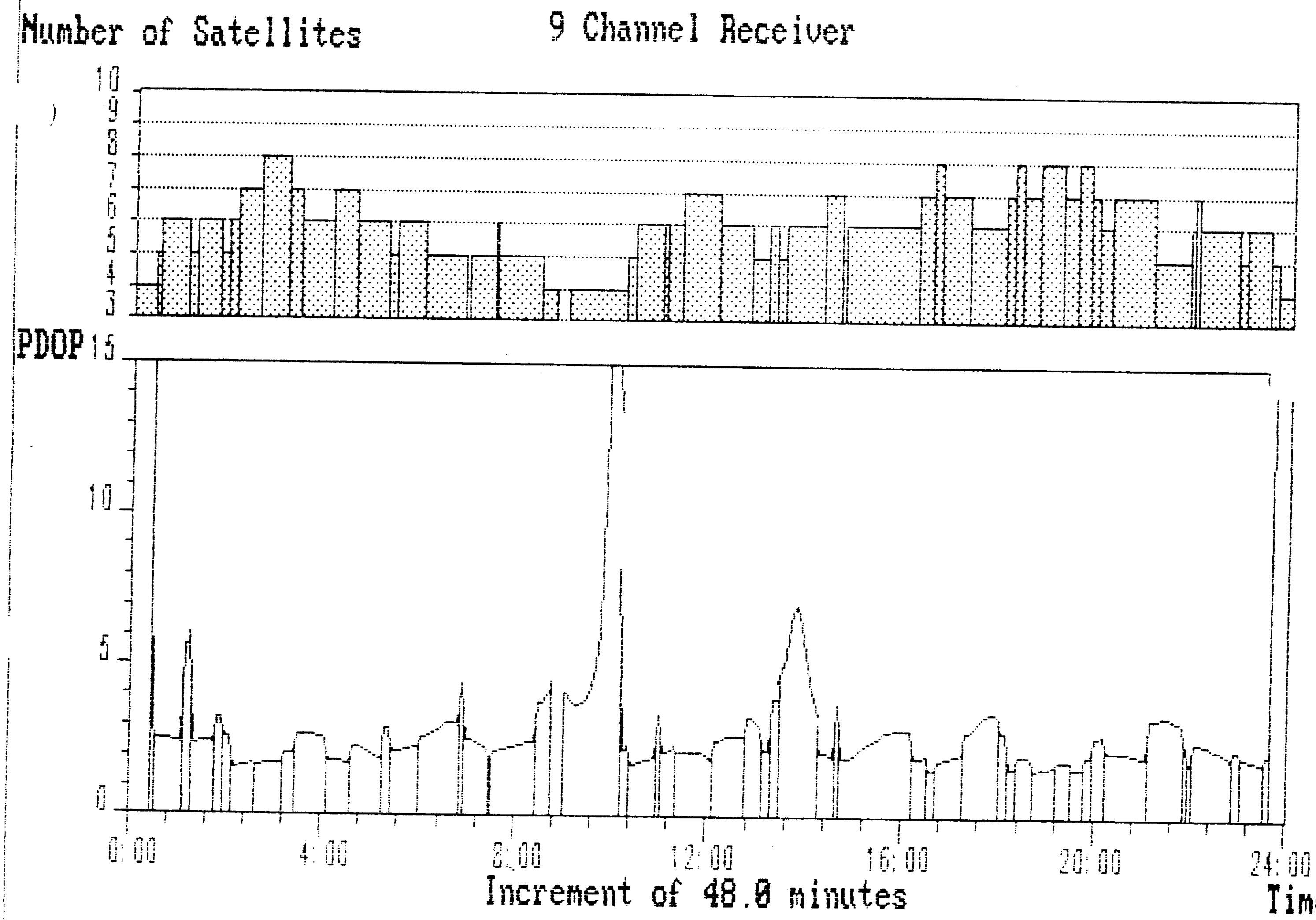


Increment of 60.0 minutes
Page 1 of 2 Pages

All-In-View PDOP vs Time

Station : MINERVA-1 Latitude :38 42'12"S Longitude :142 57'12"

Date : 2 Mar 1993 Zone : 11:00 Cut-off Elevation : 1



All-In-View PDOF for MINERVA-1

Date : 2 Mar 1993
Time : 0:00 - 24:00
Cut-off Elevation : 10°

Latitude : 38° 42' 12" S
Longitude : 142° 57' 12" E
Zone : 11:00

Satellite Constellation	Time Rise	Time Set	dT	PDOP Rise	PDOP Set
14 18 19 29	0:00	0:27	0:27	28.0	99.9
14 18 19 24 29	0:27	0:32	0:05	2.9	2.9
14 18 19 24 27 29	0:32	1:07	0:35	2.6	2.4
14 18 19 27 29	1:07	1:17	0:10	5.7	6.1
14 18 19 27 28 29	1:17	1:47	0:30	2.4	2.4
18 19 27 28 29	1:47	1:57	0:10	3.3	3.2
16 18 19 27 28 29	1:57	2:07	0:10	2.6	2.6
2 16 18 19 27 28 29	2:07	2:37	0:30	1.6	1.8
2 11 16 18 19 27 28 29	2:37	3:12	0:35	1.7	1.8
2 11 16 18 19 27 28	3:12	3:27	0:15	2.1	2.1
11 16 18 19 27	3:27	4:07	0:40	2.7	2.5
2 11 16 18 19 26 27	4:07	4:37	0:30	1.8	1.8
2 11 16 19 26 27	4:37	5:17	0:40	2.3	1.8
2 11 19 26 27	5:17	5:27	0:10	2.9	2.8
2 13 15 19 26 27	5:27	6:02	0:35	2.1	2.4
2 13 15 26 27	6:02	6:52	0:50	2.6	3.0
2 13 26 27	6:52	6:57	0:05	4.4	4.4
2 12 13 26 27	6:57	7:27	0:30	2.6	2.1
2 12 13 24 26 27	7:27	7:32	0:05	1.9	1.9
2 12 13 24 26	7:32	8:27	0:55	2.2	2.5
2 12 13 24	8:27	8:45	0:18	3.8	4.5
12 13 20 24	9:00	10:12	1:12	4.1	8.3
12 13 16 20 24	10:12	10:22	0:10	2.2	2.3
3 12 13 16 20 24	10:22	10:57	0:35	1.8	2.0
3 12 16 20 24	10:57	11:02	0:05	3.4	3.4
3 12 16 20 24 25	11:02	11:22	0:20	2.2	2.3
3 12 16 17 20 24 25	11:22	12:07	0:45	2.2	1.9
3 16 17 20 24 25	12:07	12:47	0:40	2.5	2.5
3 16 17 20 25	12:47	13:07	0:20	3.3	2.9
3 16 17 20 23 25	13:07	13:17	0:10	2.2	2.2
3 16 17 20 23	13:17	13:27	0:10	3.9	4.5
3 16 17 20 23 26	13:27	14:17	0:50	5.1	3.1
3 16 17 20 21 23 26	14:17	14:37	0:20	2.1	2.0
3 17 21 23 26	14:37	14:42	0:05	3.8	3.8
3 17 21 23 26 28	14:42	16:12	1:30	2.0	2.9
3 17 21 23 26 28	16:12	16:32	0:20	2.0	2.1
3 11 17 21 23 26 28	16:32	16:42	0:10	1.6	1.6
1 3 11 17 21 23 28	16:42	17:17	0:35	1.9	2.2
1 11 17 21 23 28	17:17	18:02	0:45	2.8	3.3
1 11 12 17 21 23 28	18:02	18:12	0:10	2.8	2.8
1 11 12 15 17 21 23 28	18:12	18:22	0:10	1.7	1.6
1 11 12 15 21 23 28	18:22	18:42	0:20	[illegible]	2.0
1 11 12 15 21 23 25 28	18:42	19:12	0:30	1.8	1.8
1 11 12 15 21 25 28	19:12	19:32	0:20	1.9	1.9
1 11 12 14 15 21 25 28	19:32	19:47	0:15	1.7	1.7

All-In-View PDOP for MINERVA-1

Date : 2 Mar 1993
Time : 0:00 -> 24:00
Cut-off Elevation : 10°

Latitude : 38° 42' 12" S
Longitude : 142° 57' 12" E
Zone : 11:00

Satellite Constellation	Time Rise	Time Set	dT	PDOP Rise	PDOP Set
1 11 12 14 15 21 25	19:47	19:57	0:10	2.1	2.1
1 11 14 15 21 25	19:57	20:12	0:15	2.7	2.7
1 11 14 15 21 25 29	20:12	21:07	0:55	2.2	2.0
1 14 15 25 29	21:07	21:52	0:45	3.3	3.1
1 13 14 15 25 29	21:52	21:57	0:05	2.3	2.3
1 13 14 15 18 25 29	21:57	22:02	0:05	1.8	[illegible]
13 14 15 18 25 29	22:02	22:52	0:50	2.5	[illegible]
14 15 18 25 29	22:52	23:02	0:10	2.3	2.3
14 15 18 19 25 29	23:02	23:32	0:30	2.0	1.9
14 18 19 25 29	23:32	23:42	0:10	2.2	2.2
14 18 19 29	23:42	24:00	0:18	21.5	32.6

APPENDIX H

DAILY LOG SHEETS

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
00			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 9.3.93	Vessel : BYFORD DOLPHIN PACIFIC MARLIN			Anchors / Tpdrs	
RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Laid	Recovered
SKYFIX			STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	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			P. RILEY					
SONARDYNE COMPATTS											
SONARDYNE PAN											
SONARDYNE (Dunker / Winch / Fish)											

DIARY OF OPERATIONS :

0630 : RACAL personnel depart Pacific Marlin for Portland airport. ETD 0720hrs.
0800 : " " arrived Melbourne airport from Portland.
0840 : J. TIGHE, K. PERRY depart Melbourne for Perth ETA 1040 (WST)
K. EDDY departs Melbourne for Barrys Beach.

MINV1/PE900064/P676

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.

20.

Signature ______ SURVEYOR/~~ENGINEER~~

WHITE	: Commercial Office
BLUE	: Operations
YELLOW	: Clients Representative

Signature ______ CLIENTS REPRESENTATIVE

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2058 | Date : 8-3-93 | Vessel : BYFORD DOLPHIN PACIFIC MARLIN

RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables	USED	REMAIN	~~Anchors~~ / Tpdrs Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM				503
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				1106
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				1109
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				1010
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

** 1100: Find DGPS position of Byford Dolphin over Minerva-1 derived from Skyfix/Trimble/DNAVN.
Lat: 38° 42' 12.23" S Long: 142° 57' 12.337" E Eing 669 862.46m Nings 5 714 311.03m
this placed the drillstem 8.2m on a bearing of 205.8°(T) from the intended location.
1330: Personnel and survey equipment transfer to the Pacific Marlin by basket.
1420: Commenced recovering Sonardyne Compatts at Minerva-1 location.
1450: All Sonardyne Compatts recovered.
1500: Pacific Marlin departs Minerva-1 location for Portland. ETA 2130.

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.

Transpo[illegible] 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.

19.

[Sig]nature ____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

[Signa]ture ____ CLIENTS REPRESENTATIVE

MINV1/PE900064/P677

RACAL

RACAL SURVEY AUSTRALIA LIMITED

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 8-3-93	Vessel : BYFORD DOLPHIN			Anchors / Trans	
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	1	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

MINV 1 / PE 900064 / P678

DIARY OF OPERATIONS :

0028: Commenced running anchor #1 - Bonavista
0035: Problem running anchor #1, recovering to re-run
0059: Re-commenced running anchor #1
0111: Anchor #1 over stern roller and going to seabed.
0125: Anchor #1 on the seabed.
0130: Byford Dolphin completed pre-tensioning all anchors.
Drillstem to ~~location~~ location 2.2ms @ 140°
0135: Byford Dolphin commenced ballasting down.
0930: Commenced collecting DGPS data from SkyFix and Del Norte 1008 - SkyFix Ref Station - Adelaide.
1045 - Completed logging DGPS data.

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.

18.

...ature [signature]
SURVEYOR / ENGINEER

WHITE : Commercial Office
BLUE : Operations

...ure [signature]

RACAL

RACAL SURVEY AUSTRALIA LIMITED

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 8-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Trans~~	
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	1	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

0028: Commenced running anchor #1 - Bonavista
0035: Problem running anchor #1, recovering to re-run
0059 : Re-commenced running anchor #1
0111 : Anchor #1 over stern roller and going to seabed.
0125: Anchor #1 on the seabed.
0130: Byford Dolphin completed pre-tensioning all anchors.
Drillstem to ~~design~~ location 2.2ms @ 140°
0135: Byford Dolphin commenced ballasting down.
0930: Commenced collecting DGPS data from SkyFix and Del Norte 1008 - Skyfix Ref Station - Adelaide.
1045- Completed logging DGPS data.

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.

18.

Signature ______ SURVEYOR / ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature ______

MINV 1 / PE900064 / P678

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	SeaState	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 7-3-93	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	10	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

1920 - Recovering anchor #10 - not holding.
2045 - Anchor #1 to be recovered - not holding.
2121 - Anchor #10 ready to be re-run.
2204 - Commenced Re-Re-Running Anchor #10 - Far Sword.
2216 - Anchor #10 going over roller and into water.
2231 - Anchor #10 on the seabed

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.

17.

Signature ________ SURVEYOR / ENGINEER

WHITE	: Commercial Office
BLUE	: Operations

Signature ________ CLIENTS REPRESENTATIVE

MINV1/PE900064/P679

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000	MOD	1-2	120-25 knts
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 7-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Trans~~	
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	6	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			9	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			12	
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS			5	
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.			10	
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS			4	
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY				11	
SONARDYNE COMPATTS	4									~~8~~ 7	
SONARDYNE PAN	✓									2	
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS:

1100 - Byford Dolphin preparing to run anchor #2
1225 - Byford Dolphin running anchor #7 - Far Sword.
1231 - Anchor #7 on the seabed
1250 - Commenced running anchor #2 - Bonavista.
1305 - Anchor #2 going over stern roller.
1311 - Anchor #2 on the seabed
1406 - Commenced running anchor #8 - Far Sword.
1420 - Pause in running anchor #8 - anchor turned.
1428 - Commenced running anchor #3 - Bonavista.
1455 - Commenced lowering anchor #3 to the seabed
1510 - Re-commenced running anchor #8
1512 - Anchor #3 on the seabed ~~Rest~~ ~~1700~~ ~~6/3~~

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.

Transpo[rders] to be listed by type and serial numbers. Following codes to be used: L - Laid, F[R] Recovered, FR - Failed to Reply, FS - Failed to Surface.

15

[Sign]ature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

[Signat]ure Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000	–		
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 7-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Trans~~	
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	6	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			9	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			12	
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS			3	3
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.			5	
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS			10	
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY	PRINTER PAP	0.5		4	
SONARDYNE COMPATTS	4									11	
SONARDYNE PAN	✓										
SONARDYNE (Dunker/Winch/Fish)	✓										

DIARY OF OPERATIONS :

0240 : Changed Computer time to E.S.T.
0308 : Running #10 Anchor F/Sword.
0320 : #10 Anchor at end of run, lowering to seabed.
0333 : #10 Anchor on bottom. Rerun 1820 hrs, 7/3
0441 : Start to run Anchor # 4
0456 : #4 Anchor on bottom
0510 : #11 anchor run out start.
0549 : Anchor #11 on the seabed
0711 : Byford Dolphin to recover anchor #3 and rack it as it is crossing over anchor #2 chain which has to be chased out with Shepards Hook. - Pennant parted yesterday.
0858 : Anchor #3 recovered and on ~~to~~ to bolster.

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.

14.

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 Riley
CLIENTS REPRESENTATIVE

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 6-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Tows~~	
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	6	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			9	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			12	
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS			3	
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.			5	
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

2338 - Byford Dolphin commenced moving back towards Minerva location, before running anchor #11

7-3-93 (END OF Summer Time)

0002 - Problems with brake on anchor #5 windlass. Rig unable to move back to location
Drillstem to location 173m @ 133°.

0020 - Brake on anchor #5 windlass has to be ~~p~~ replaced.
- Commenced winching by anchor #9 only to Minerva - 1 site

0103 - Commenced running #11 anchor

0114 - #11 turned, raised for re-lowering.

0124 - #11 to be re-run, ~~commenced~~ winch #11, burst hydraulic hose (30mins + repair)

0215 - #10 anchor to be run next on Far Sword; B/Vista working on anchor cable/chain

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.

Transpo[r]... to be listed by type and serial numbers. Following codes to be used : L - Laid, F... [R]ecovered, FR - Failed to Reply, FS - Failed to Surface.

13.

[Sign]ature K Eddy
SURVEYOR / ENGINEER

WHITE	: Commercial Office
BLUE	: Operations

[Sign]ure R Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 6-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Trans~~	
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	6	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			9	
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER			12	
GNS PC	✓		SPARKER (DELPH/EPC)				DISKS			3	
GYRO	✓		CORING (GRAVITY/GRAB)				PRINTER CART.			5	
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS:

1408 - Commenced lowering anchor #9 to the seabed
1425 - Anchor #9 on the seabed.
1427 - Commenced lowering anchor #12 to the seabed again
1431 - Anchor #12 on the seabed.
1615 - In attempting to run anchors 11 + 2 both pennant wires parted.
1700 - Commenced running anchor #3 - Far Sword.
1713 - Commenced lowering anchor #3 to the seabed
1716 - Anchor #3 on the seabed. Rerun 15/2hrs, 7/3
1824 - Commenced running anchor #5 - Far Sword
1840 - Anchor #5 on the seabed. E 669871 N. 5715117
1923 - Byford Dolphin skidding over to starboard to try and recover anchor #11 with Shepards Hook.
2100 - Bonavista trying to grapel anchor 11 chain.

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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.

12

Signature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature P Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 6-3-93	Vessel : BYFORD DOLPHIN			Anchors / ~~Tows~~	
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	#6	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			#1	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO	✓		CORING (GRAVITY/GRAB)				PRINTER CART.	1	1		
TRIMBLE SST'S			THEODOLITE/EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

0330 - Anchor #7 racked, underway to Minerva 1.
0743 - Byford Dolphin 3.8nm from Minerval location and commencing approach to location.
0756 - Byford Dolphin has a problem with anchor #7, will drop anchor #6 on " run in.
0846 - Byford Dolphin 1400 metres from Minerva-1 location. On approach to deploy Anchor #6
0852 - Anchor #6 deployed. E'ing 670 398m N'ing 5 715 177m
0914 - Byford Dolphin near Minerva-1 location (113m - 131°) preparing to run anchor #1.
1105 - Commenced running Anchor #1. Far Sword.
1127 - Far Sword lowering Anchor #1 to seabed
1132 - Anchor #1 on the seabed. Recov 0125 hrs, 8/3
1326 - Commenced running anchor #12 - Bona Vista
1343 - Anchor #12 being lowered to the seabed to seabed @ 1431 hrs.
1355 - Commenced running anchor #9 - Far Sword

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Transpor to be listed by type and serial numbers. Following codes to be used : L - Laid, R ecovered, FR - Failed to Reply, FS - Failed to Surface.

11.

ature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

S ure Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000	SLt	1-2	VAR- 10 Knts
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 5-3-93	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		
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. ~~X~~PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

0830 - Byford Dolphin at Eric The Red location. Two anchors recovered overnight, anchor #2 in the process of being recovered.
1330 - Byford Dolphin at Eric The Red, still playing with anchors. 5 anchors to be recovered.
1700 - Byford Dolphin recovered anchor 11. Rig still has 4 primaries to recover.
2300 - Byford Dolphin has recovered all anchors except 1 & 7.

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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.

10

..ature [signature] SURVEYOR/ENGINEER

WHITE : Commercial Office

..ure [signature]

RACAL

RACAL SURVEYS AUSTRALIA LIMITED

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2058 | Date : 7-3-93 | Vessel : BYFORD DOLPHIN

RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Anchors / ~~Tracks~~ Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN	3	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			8	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				10
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			10	
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				10
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			**CLIENT Personnel**	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

1522 - Commenced lowering anchor #8 to the seabed.
1527 - Anchor #8 on the seabed.
1528 - All anchors run.
1545 - Byford Dolphin moving towards Minerva-1 location. Drillstem to location 57m @ 98°
1630 - Byford Dolphin within 10metres of Minerva 1 location.
1630 - Anchor #10 requires to be re-run. Not enough chain out.
1805 - Anchor #10 recovered to a position to be re-run.
1821 - Commenced re-running anchor #10
1832 - Anchor #10 over stern roller - lowering to the seabed.
1840 - Anchor #10 on the seabed. Rerun, 2204, 7/3
1850 - Byford Dolphin commenced pre-tensioning anchors.
1910 - Problems with anchor #10 holding - unable to run back chaser.

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16.

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 R Riley
CLIENTS REPRESENTATIVE

MINV1/PE900064/P680

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2058 | Date : 4-3-93 | Vessel : BYFORD DOLPHIN

RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Anchors / Tpdrs Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE			K. EDDY	ITEM	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

2045 - Byford recovering anchor #3. Rig will recover some anchors and replace anchors onto chains that have no anchors.

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Transpon[ders] to be listed by type and serial numbers. Following codes to be used : L - Laid, R[e]covered, FR - Failed to Reply, FS - Failed to Surface.

9.

[Sign]ature K Eddy SURVE~~YOR~~/ENGINEER

WHITE	: Commercial Office
BLUE	: Operations

[Signat]ure P Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600	Slight	1-2	Var-10 knts
1200			
1800			

Client : BHP			Job No : 2058			Date : 4-3-93	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		
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS PC	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
~~TELEMETRY~~ GOLF LASER	✓		UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	4										
SONARDYNE PAN	✓										
SONARDYNE (Dunker/~~Winch~~/~~Fish~~)	✓										

DIARY OF OPERATIONS :

0001 - Byford Dolphin still moving to a position 200 metres aft of Eric The Red location.
0145 - Byford Dolphin completed moving 200 metres aft of Eric The Red
0155 - Explosive charge detonated.
0205 - Byford Dolphin commenced moving back to Eric The Red
0315 - Byford Dolphin completed moving back over Eric The Red.
Explosive device was not successful.
0955 - Byford Dolphin commenced moving 200 metres aft of Eric The Red location to
have a second attempt with explosive device.
1206 - Byford Dolphin 200 metres aft of Eric The Red
1212 - Explosive charge detonated
1300 - Byford Dolphin commenced moving back towards Eric The Red location.
1436 - Byford Dolphin completed moving back over Eric The Red.

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.

8.

Signature ____ SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature ____

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600	6	4-5	SW-5
1200	3	3-4	SE-3
1800			

Client : BHP — Job No : 2058 — Date : 3-3-93 — 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	USED	REMAIN		
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER				
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER				
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER				
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS		6		
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.		3		
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			P. RILEY	PRINT PAPER	0.5	0.75		
SONARDYNE COMPATTS	5										
SONARDYNE PAN	✓										
SONARDYNE (~~Dunker~~/Winch/Fish)	✓										

DIARY OF OPERATIONS :

0820 - Pacific Marlin instructed by Byford Dolphin to proceed to the rig at Eric-The-Red-1

1110 - Pacific Marlin arrived Byford Dolphin at Eric The Red-1. On Stand By Duties.

1540 - K. Eddy, J. Tighe, K. Perry & P. Riley and rig equipment transfer to the Byford Dolphin.
Commence setting up equipment.

1800 - All equipment set up and operational.

1830 - Byford Dolphin de-ballasting before 200 metres aft of Eric The Red-1 location.

2130 - Byford Dolphin completed de-ballasting.

2150 - Byford Dolphin commenced moving 200 metres aft of Eric The Red-1 location.

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.

Transpor[ders] to be listed by type and serial numbers. Following codes to be used : L - Laid, R[ecovered], FR - Failed to Reply, FS - Failed to Surface.

7.

[Signa]ture K. Eddy
SURVEYOR / ENGINEER

WHITE : Commercial Office
BLUE : Operations

S[ignat]ure Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2058 | Date : 2-3-99 | Vessel : PACIFIC MARLIN

RACAL Equipment on Board	Op	NonOp	RACAL Equipment on Board	Op	NonOp	RACAL Personnel	Consummables			Anchors / Tpdrs Laid	Recovered
SKYFIX RIG PORT	✓		STD 12 / VELOCITY PROBE	✓		K. EDDY	ITEM	USED	REMAIN	503	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1106	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			1109	
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER			1010	
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO	✓		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	5										
SONARDYNE PAN	✓										
SONARDYNE (~~Dunker~~/Winch/Fish)	✓										

DIARY OF OPERATIONS:

** 2155 - Results of Box-In Calibrations of Minerva-1 Acoustic array

TP	Addr	Reply Freq	Easting	Northing	Depth	RMS.
1	503	3	669 322·62m	5 714 943·89m	48·10m	3·1
2	1106	6	670 447·32m	5 714 736·21m	55·8m	3·4
3	1109	9	670 353·60m	5 713 683·17m	51·00m	3·8
4	1010	10	669 369·40m	5 713 887·06	54·7m	3·4

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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.

6.

Signature KEdd
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

Signature

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP			Job No : 2058			Date : 2-3-93	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	503	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1106	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			1109	
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER			1010	
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO	✓		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	5										
SONARDYNE PAN	✓										
SONARDYNE (~~Dunker~~/Winch/Fish)	✓										

DIARY OF OPERATIONS :

2017 - Completed Box-In Data Collection of TP 2/1106 ; R/S.
× 2030 - Commenced Box-In Data Collection of TP 3 / 1109 ; Del Norte NAV., Radius 300m ;
× 2045 - Completed " " " TP 3 1109 ;
2050 - Commenced " " " " " TP4 / 1010 ; Del Norte Nav. Radius 300m ; HDOP 1.7, VDOP 2.6
2104 - Completed " " " " " TP4 / 1010 ; SV. 29, 14, 25, 15, 1
2120 - Sonardyne fish inboard.
2130 - Commenced Box-In calculations
2145 - Completed Box-In re-calculations
2150 - Pacific Marlin ~~around~~ steaming around Minerva location, awaiting instructions from Byford Dolphin on how we transfer to rig.

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.

Transpor to be listed by type and serial numbers. Following codes to be used : L - Laid, R ecovered, FR - Failed to Reply, FS - Failed to Surface.

…ature K Eddy
SURVEYOR/ENGINEER

WHITE : Commercial Office
BLUE : Operations

S…ure P Riley

5.

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2058 | Date : 2-3-93 | 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	503	
SYLEDIS			ECHO SOUNDER (20/25)			J. TIGHE	SIDESCAN PAPER			1106	
MICROFIX			SIDESCAN (595/531/PINGER)			K. PERRY	E/SOUNDER PAPER			1109	
ARGO			BOOMER (DELPH / EPC)				ELICS PAPER			1010	
GNS HP	✓		SPARKER (DELPH / EPC)				DISKS				
GYRO	✓		CORING (GRAVITY / GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	5										
SONARDYNE PAN	✓										
SONARDYNE (~~Docker~~/Winch / Fish)	✓										

DIARY OF OPERATIONS :

1732 - Completed Box-In Calibration Data Collection of TP1/503
1745 - Box-In result of TP1/503
E'ing 669 322.62m - 5 714 943.89m N'ing Depth 48.10m.
1801 - Commenced Box-In Calibration Data Collection of TP3/1109 Circle Radius 300m
Nav on Del Norte / Direct Injection / Del Norte Ref S.V's 23, 17, 1, 21, 28, 11 HDOP 1.5 VDOP 2.9
1837 - Completed Box-In Calibration Data Collection of TP3/1109
1852 - Commenced Seabed Pingaround Baseline measurements of acoustic array - 15 cycles.
1938 - Completed Seabed Pingaround data collection.
Results were poor due sea state and noise in the water column - shallow water
Will Box-In remaining two TP's 2 & 4.
1944 - Commenced Box-In Calibration data collection of TP 2/1106 - Circle Radius 300m
Nav on Del Norte Direct Injection S.V's 12, 14, 25, 15, 1, 21, 11. HDOP 1.2 VDOP 2.4

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 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 P Riley

RACAL SURVEY AUSTRALIA LIMITED

RACAL

DAILY RECORD SHEET

WX	Sea State	Swell	Wind Dir.
0000			
0600			
1200			
1800			

Client : BHP | Job No : 2050 | Date : 2-3-93 | 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			503	
SYLEDIS			ECHO SOUNDER (20/25)			J.TIGHE	SIDESCAN PAPER			1106	
MICROFIX			SIDESCAN (595/531/PINGER)			K.PERRY	E/SOUNDER PAPER			1109	
ARGO			BOOMER (DELPH/EPC)				ELICS PAPER			1010	
GNS HP	✓		SPARKER (DELPH/EPC)				DISKS				
GYRO	✓		CORING (GRAVITY/GRAB)				PRINTER CART.				
TRIMBLE SST'S			THEODOLITE / EDM			CLIENT Personnel	EPC ROLLS				
TELEMETRY			UNDERWATER TRACKING			P. RILEY					
SONARDYNE COMPATTS	5										
SONARDYNE PAN											
SONARDYNE (Dunker/Winch/Fish)											

DIARY OF OPERATIONS :

1453 - Deployed Sonardyne Compatt 1106
670 435.8m 5 714 740.3m Depth TX Point 55.8m
1513 - Informed by BHP-E Reference Station that we may have been provided with the wrong location co-ords.
1536 - Co-ordinates provided on Well location sheet are correct
Minerva-1 38° 42' 12.35" S 142° 57' 12.64" E E'ing 669 869.702m N'ing 5 714 307.169m
1629 - Deployed Sonardyne Compatt 1109
670 347.0m 5713 681.6m Depth TX Point
1651 - Deployed Sonardyne Compatt 1010
669 366.6m 5 713 885.2 m. Depth Tx Point 54.7
1759 - Commenced Boxin Calibration Data Collection of TP1/503 Circle Radius 300m
Nav on Trimble/SkyFix/DNAVN - Adelaide Ref - SV's 1, 11, 17, 21, 3 HDOP 1.4 VDOP 2.0 Thr 1.

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.

Transpor[ders] 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 Riley

3

7

7. ENCLOSURES

Enclosure 1 Exlog Mudlog

PE602754

This is an enclosure indicator page.
The enclosure PE602754 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602754 has the following characteristics:

ITEM-BARCODE	=	PE602754
CONTAINER_BARCODE	=	PE900064
NAME	=	Minerva 1 Exlog Mud Log
BASIN	=	Otway
PERMIT	=	VIC/P31
TYPE	=	WELL
SUBTYPE	=	MUD_LOG
DESCRIPTION	=	Minerva 1 Exlog mud log
REMARKS	=	old barcode PE900073 replaced with PE602754
DATE-CREATED	=	4/04/93
DATE-RECEIVED	=	13/01/94
W_NO	=	W1079
WELL-NAME	=	MINERVA 1
CONTRACTOR	=	EXLOG (BAKER HUGHES)
CLIENT_OP_CO	=	BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

Enclosure 2 Teleco MWD Log

PE602755

This is an enclosure indicator page.
The enclosure PE602755 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602755 has the following characteristics:

ITEM-BARCODE = PE602755
CONTAINER_BARCODE = PE900064
NAME = Minerva 1 Teleco MWD log (1:1000)
BASIN = Otway
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = WELL-LOG
DESCRIPTION = Minerva 1 MWD log. Dual Propagation Resistivity, Gamma Ray, 1:1000
REMARKS = old barcode PE900071 replaced with PE602755
DATE-CREATED = 24/03/93
DATE-RECEIVED = 13/01/94
W_NO = W1079
WELL-NAME = MINERVA 1
CONTRACTOR = EASTMAN TELECO (BAKER HUGHES)
CLIENT_OP_CO = BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602756

This is an enclosure indicator page.
The enclosure PE602756 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602756 has the following characteristics:

ITEM-BARCODE =	PE602756
CONTAINER_BARCODE =	PE900064
NAME =	Minerva 1 Teleco MWD log (1:500)
BASIN =	Otway
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	WELL-LOG
DESCRIPTION =	Minerva 1 MWD log. Dual Propagation Resistivity, Gamma Ray, 1:500
REMARKS =	old barcode PE900072 replaced with PE602756
DATE-CREATED =	24/03/93
DATE-RECEIVED =	13/01/94
W_NO =	W1079
WELL-NAME =	MINERVA 1
CONTRACTOR =	EASTMAN TELECO (BAKER HUGHES)
CLIENT_OP_CO =	BHP AUSTRALIA

(Inserted by DNRE - Vic Govt Mines Dept)

PE602757

This is an enclosure indicator page.
The enclosure PE602757 is enclosed within the container PE900064 at this location in this document.

The enclosure PE602757 has the following characteristics:

ITEM-BARCODE =	**PE602757**
CONTAINER_BARCODE =	PE900064
NAME =	**Minerva 1 Teleco MWD log** (1:200)
BASIN =	**Otway**
PERMIT =	VIC/P31
TYPE =	**WELL**
SUBTYPE =	**WELL-LOG**
DESCRIPTION =	**Minerva 1 MWD log. Dual Propagation Resistivity, Gamma Ray,** 1:200
REMARKS =	
DATE-CREATED =	24/03/93
DATE-RECEIVED =	2/06/93
W_NO =	W1079
WELL-NAME =	**MINERVA 1**
CONTRACTOR =	**EASTMAN TELECO (BAKER HUGHES)**
CLIENT_OP_CO =	**BHP AUSTRALIA**

(Inserted by DNRE – Vic **Govt Mines Dept)**

Enclosure 3 Core Photographs - UV and White Light

PE905190

This is an enclosure indicator page.
The enclosure PE905190 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905190 has the following characteristics:

```
     ITEM_BARCODE = PE905190
CONTAINER_BARCODE = PE900064
             NAME = Core Photos Under UV Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Core Photo taken under UV
                    light for depths 1821.00 - 1828.00 m.
                    From enclosure 3 of WCR (Basic Data)
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905191

This is an enclosure indicator page.
The enclosure PE905191 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905191 has the following characteristics:

ITEM_BARCODE = PE905191
CONTAINER_BARCODE = PE900064
NAME = Core Photos Under UV Light
BASIN = OTWAY
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Minerva-1 Core Photo taken under UV light for depths 1829.00 - 1833.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS = This item is in colour.
DATE_CREATED =
DATE_RECEIVED = 13/01/1994
W_NO = W1079
WELL_NAME = Minerva-1
CONTRACTOR =
CLIENT_OP_CO = BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905192

This is an enclosure indicator page.
The enclosure PE905192 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905192 has the following characteristics:

ITEM_BARCODE =	PE905192
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under UV Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under UV light for depths 1834.00 - 1838.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905193

This is an enclosure indicator page.
The enclosure PE905193 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905193 has the following characteristics:

ITEM_BARCODE =	PE905193
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under UV Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under UV light for depths 1839.00 - 1843.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905194

This is an enclosure indicator page.
The enclosure PE905194 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905194 has the following characteristics:

ITEM_BARCODE =	PE905194
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under UV Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under UV light for depths 1844.00 - 1846.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905195

This is an enclosure indicator page.
The enclosure PE905195 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905195 has the following characteristics:

ITEM_BARCODE =	PE905195
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under White light for depths 1821.00 - 1828.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905196

This is an enclosure indicator page.
The enclosure PE905196 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905196 has the following characteristics:

ITEM_BARCODE =	PE905196
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under White light for depths 1829.00 - 1833.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905197

This is an enclosure indicator page.
The enclosure PE905197 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905197 has the following characteristics:

ITEM_BARCODE =	PE905197
CONTAINER_BARCODE =	PE900064
NAME =	Core Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Core Photo taken under White light for depths 1834.00 - 1838.00 m. From enclosure 3 of WCR (Basic Data)
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905198

This is an enclosure indicator page.
The enclosure PE905198 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905198 has the following characteristics:

```
     ITEM_BARCODE = PE905198
CONTAINER_BARCODE = PE900064
             NAME = Core Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Core Photo taken under White
                    light for depths 1839.00 - 1843.00 m.
                    From enclosure 3 of WCR (Basic Data)
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905199

This is an enclosure indicator page.
The enclosure PE905199 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905199 has the following characteristics:

```
     ITEM_BARCODE = PE905199
CONTAINER_BARCODE = PE900064
             NAME = Core Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Core Photo taken under White
                    light for depths 1844.00 - 1846.00 m.
                    From enclosure 3 of WCR (Basic Data)
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905200

This is an enclosure indicator page.
The enclosure PE905200 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905200 has the following characteristics:

ITEM_BARCODE =	PE905200
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 71 at 1814.0 m and SWC 70 at 1861.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

PE905201

This is an enclosure indicator page.
The enclosure PE905201 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905201 has the following characteristics:

ITEM_BARCODE =	PE905201
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 69 at 1872.5 m and SWC 68 at 1896.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905202

This is an enclosure indicator page.
The enclosure PE905202 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905202 has the following characteristics:

ITEM_BARCODE = PE905202
CONTAINER_BARCODE = PE900064
NAME = SWC Photos Under White Light
BASIN = OTWAY
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Minerva-1 Side Wall Core Photos under White light. SWC 67 at 1915.0 m and SWC 66 at 1944.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS = This item is in colour.
DATE_CREATED =
DATE_RECEIVED = 13/01/1994
W_NO = W1079
WELL_NAME = Minerva-1
CONTRACTOR =
CLIENT_OP_CO = BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905203

This is an enclosure indicator page.
The enclosure PE905203 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905203 has the following characteristics:

ITEM_BARCODE =	PE905203
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 65 at 1947.5m and SWC 64 at 1961.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905204

This is an enclosure indicator page.
The enclosure PE905204 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905204 has the following characteristics:

ITEM_BARCODE	=	PE905204
CONTAINER_BARCODE	=	PE900064
NAME	=	SWC Photos Under White Light
BASIN	=	OTWAY
PERMIT	=	VIC/P31
TYPE	=	WELL
SUBTYPE	=	CORE_PHOTOS
DESCRIPTION	=	Minerva-1 Side Wall Core Photos under White light. SWC 63 at 1969.0 m and SWC 62 at 1982.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS	=	This item is in colour.
DATE_CREATED	=	
DATE_RECEIVED	=	13/01/1994
W_NO	=	W1079
WELL_NAME	=	Minerva-1
CONTRACTOR	=	
CLIENT_OP_CO	=	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905205

This is an enclosure indicator page.
The enclosure PE905205 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905205 has the following characteristics:

ITEM_BARCODE =	PE905205
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 61 at 1996.0 m and SWC 60 at 2013.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905206

This is an enclosure indicator page.
The enclosure PE905206 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905206 has the following characteristics:

ITEM_BARCODE =	PE905206
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 59 at 2023.0 m and SWC 58 at 2030.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905207

This is an enclosure indicator page.
The enclosure PE905207 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905207 has the following characteristics:

ITEM_BARCODE =	PE905207
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 57 at 2035.0 m and SWC 56 at 2040.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905208

This is an enclosure indicator page.
The enclosure PE905208 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905208 has the following characteristics:

ITEM_BARCODE =	PE905208
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 55 at 2046.0 m and SWC 54 at 2061.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905209

This is an enclosure indicator page.
The enclosure PE905209 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905209 has the following characteristics:

ITEM_BARCODE =	PE905209
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 53 at 2066.0 m and SWC 52 at 2073.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905210

This is an enclosure indicator page.
The enclosure PE905210 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905210 has the following characteristics:

ITEM_BARCODE = PE905210
CONTAINER_BARCODE = PE900064
NAME = SWC Photos Under White Light
BASIN = OTWAY
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Minerva-1 Side Wall Core Photos under White light. SWC 51 at 2078.0 m and SWC 50 at 2084.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS = This item is in colour.
DATE_CREATED =
DATE_RECEIVED = 13/01/1994
W_NO = W1079
WELL_NAME = Minerva-1
CONTRACTOR =
CLIENT_OP_CO = BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905211

This is an enclosure indicator page.
The enclosure PE905211 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905211 has the following characteristics:

ITEM_BARCODE =	PE905211
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 49 at 2089.0 m and SWC 48 at 2098.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905212

This is an enclosure indicator page.
The enclosure PE905212 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905212 has the following characteristics:

```
     ITEM_BARCODE = PE905212
CONTAINER_BARCODE = PE900064
             NAME = SWC Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Side Wall Core Photos under
                    White light. SWC 47 at 2101.0 m and SWC
                    126 at 2123.0 m. From enclosure 3 of
                    WCR (Basic Data).
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905213

This is an enclosure indicator page.
The enclosure PE905213 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905213 has the following characteristics:

```
     ITEM_BARCODE = PE905213
CONTAINER_BARCODE = PE900064
             NAME = SWC Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Side Wall Core Photos under
                    White light. SWC 125 at 2129.5 m and
                    SWC 124 at 2142.0 m. From enclosure 3
                    of WCR (Basic Data).
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905214

This is an enclosure indicator page.
The enclosure PE905214 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905214 has the following characteristics:

ITEM_BARCODE = PE905214
CONTAINER_BARCODE = PE900064
NAME = SWC Photos Under White Light
BASIN = OTWAY
PERMIT = VIC/P31
TYPE = WELL
SUBTYPE = CORE_PHOTOS
DESCRIPTION = Minerva-1 Side Wall Core Photos under White light. SWC 123 at 2157.5 m and SWC 122 at 2212.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS = This item is in colour.
DATE_CREATED =
DATE_RECEIVED = 13/01/1994
W_NO = W1079
WELL_NAME = Minerva-1
CONTRACTOR =
CLIENT_OP_CO = BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905215

This is an enclosure indicator page.
The enclosure PE905215 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905215 has the following characteristics:

ITEM_BARCODE =	PE905215
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 121 at 2215.0 m and SWC 120 at 2259.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905216

This is an enclosure indicator page.
The enclosure PE905216 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905216 has the following characteristics:

ITEM_BARCODE =	PE905216
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 117 at 2294.0 m and SWC 116 at 2304.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905217

This is an enclosure indicator page.
The enclosure PE905217 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905217 has the following characteristics:

ITEM_BARCODE =	PE905217
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 115 at 2319.0 m and SWC 114 at 2321.0 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905218

This is an enclosure indicator page.
The enclosure PE905218 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905218 has the following characteristics:

ITEM_BARCODE =	PE905218
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photos under White light. SWC 113 at 2340.0 m and SWC 112 at 2359.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE905219

This is an enclosure indicator page.
The enclosure PE905219 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905219 has the following characteristics:

```
     ITEM_BARCODE = PE905219
CONTAINER_BARCODE = PE900064
             NAME = SWC Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Side Wall Core Photos under
                    White light. SWC 111 at 2360.0 m and
                    SWC 110 at 2388.0 m. From enclosure 3
                    of WCR (Basic Data).
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905220

This is an enclosure indicator page.
The enclosure PE905220 is enclosed within the container PE900064 at this location in this document.

The enclosure PE905220 has the following characteristics:

```
     ITEM_BARCODE = PE905220
CONTAINER_BARCODE = PE900064
             NAME = SWC Photos Under White Light
            BASIN = OTWAY
           PERMIT = VIC/P31
             TYPE = WELL
          SUBTYPE = CORE_PHOTOS
      DESCRIPTION = Minerva-1 Side Wall Core Photos under
                    White light. SWC 109 at 2392.5 m and
                    SWC 108 at 2412.0 m. From enclosure 3
                    of WCR (Basic Data).
          REMARKS = This item is in colour.
     DATE_CREATED =
    DATE_RECEIVED = 13/01/1994
             W_NO = W1079
        WELL_NAME = Minerva-1
       CONTRACTOR =
     CLIENT_OP_CO = BHP Petroleum Pty Ltd
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE905221

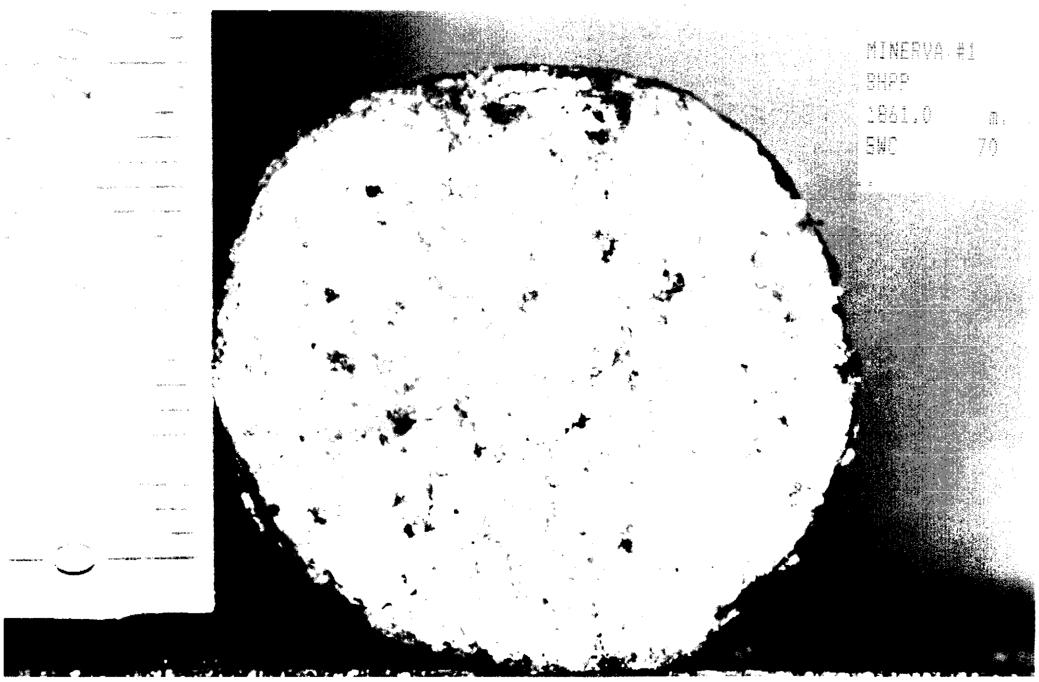
This is an enclosure indicator page.
The enclosure PE905221 is enclosed within the container PE900064 at this location in this document.

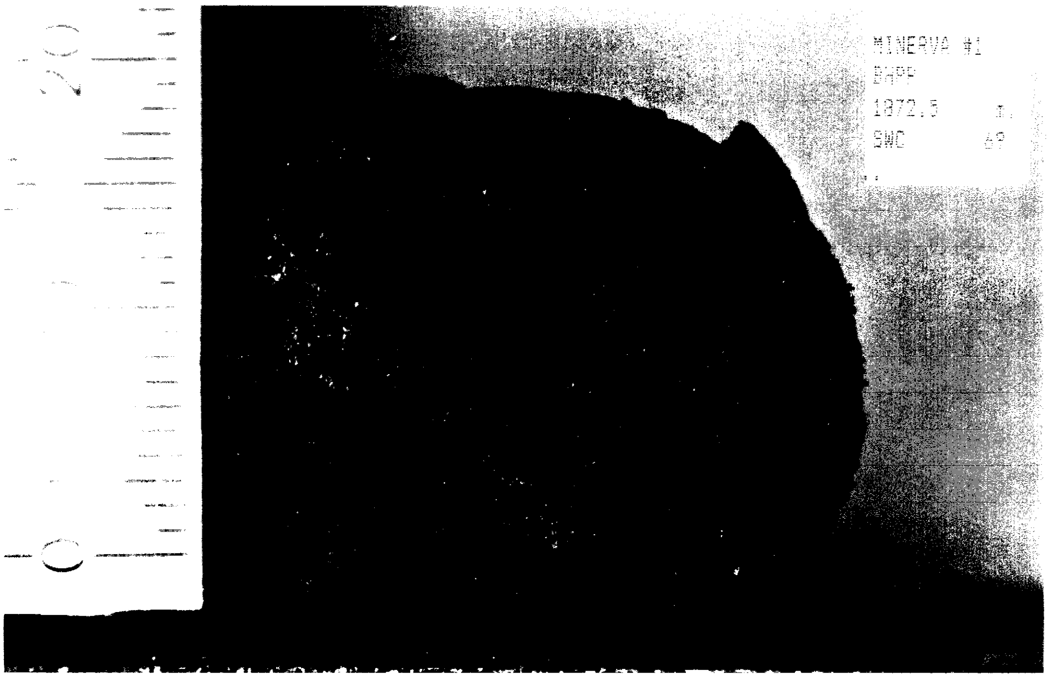
The enclosure PE905221 has the following characteristics:

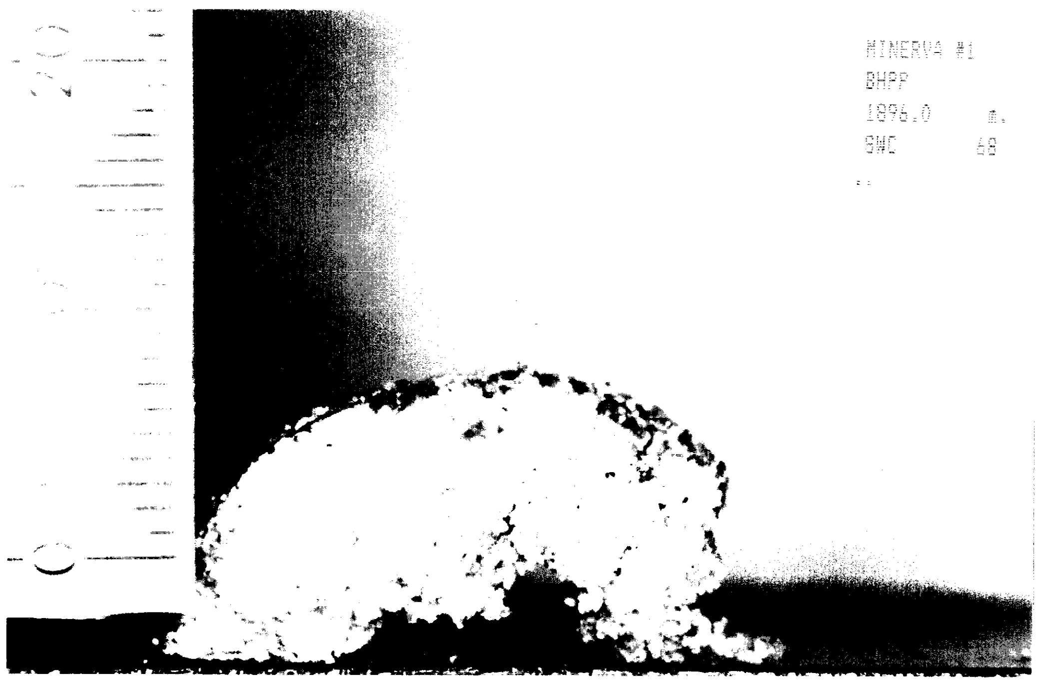
ITEM_BARCODE =	PE905221
CONTAINER_BARCODE =	PE900064
NAME =	SWC Photos Under White Light
BASIN =	OTWAY
PERMIT =	VIC/P31
TYPE =	WELL
SUBTYPE =	CORE_PHOTOS
DESCRIPTION =	Minerva-1 Side Wall Core Photo under White light. SWC 107 at 2420.5 m. From enclosure 3 of WCR (Basic Data).
REMARKS =	This item is in colour.
DATE_CREATED =	
DATE_RECEIVED =	13/01/1994
W_NO =	W1079
WELL_NAME =	Minerva-1
CONTRACTOR =	
CLIENT_OP_CO =	BHP Petroleum Pty Ltd

(Inserted by DNRE - Vic Govt Mines Dept)


MINERVA #1
BHPP
1814.0 m.
SWC 71

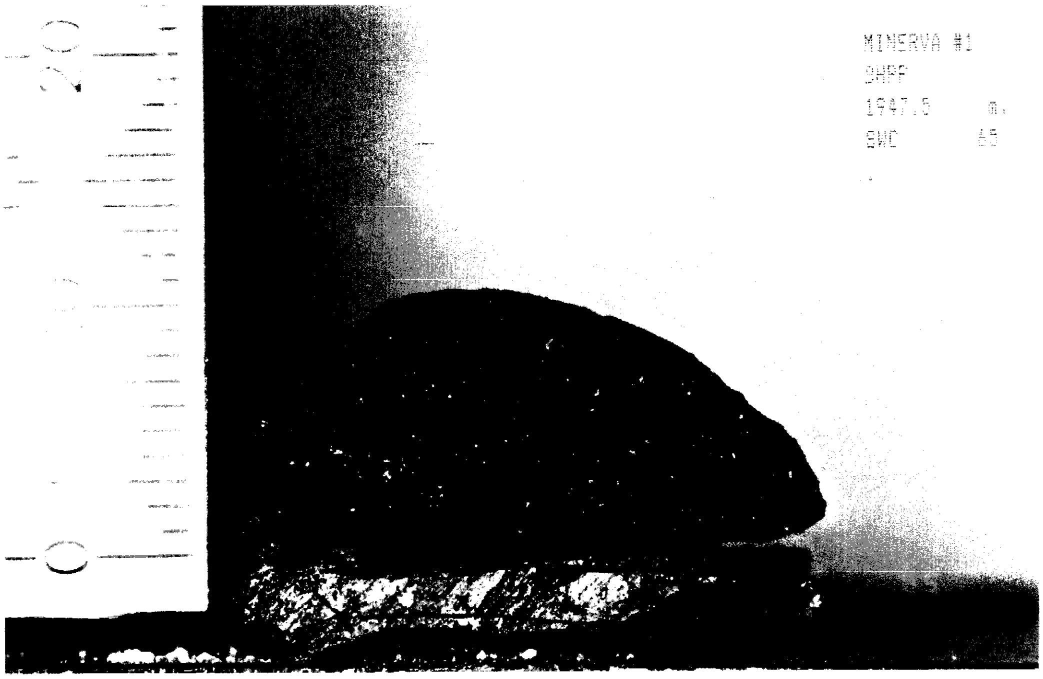

MINERVA #1
BHPP
1861.0 m.
SWC 70


MINERVA #1
BHPP
1872.5 m.
SWC 69

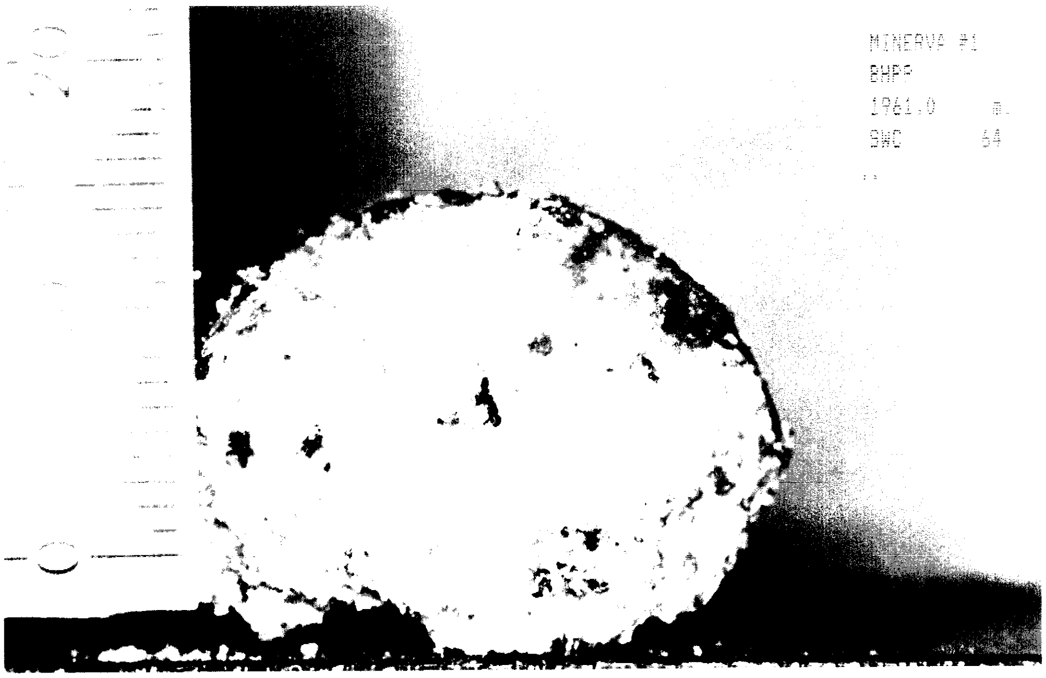

MINERVA #1
BHPP
1896.0 m.
SWC 68


MINERVA #1
BHPP
1915.0 m.
SWC 67

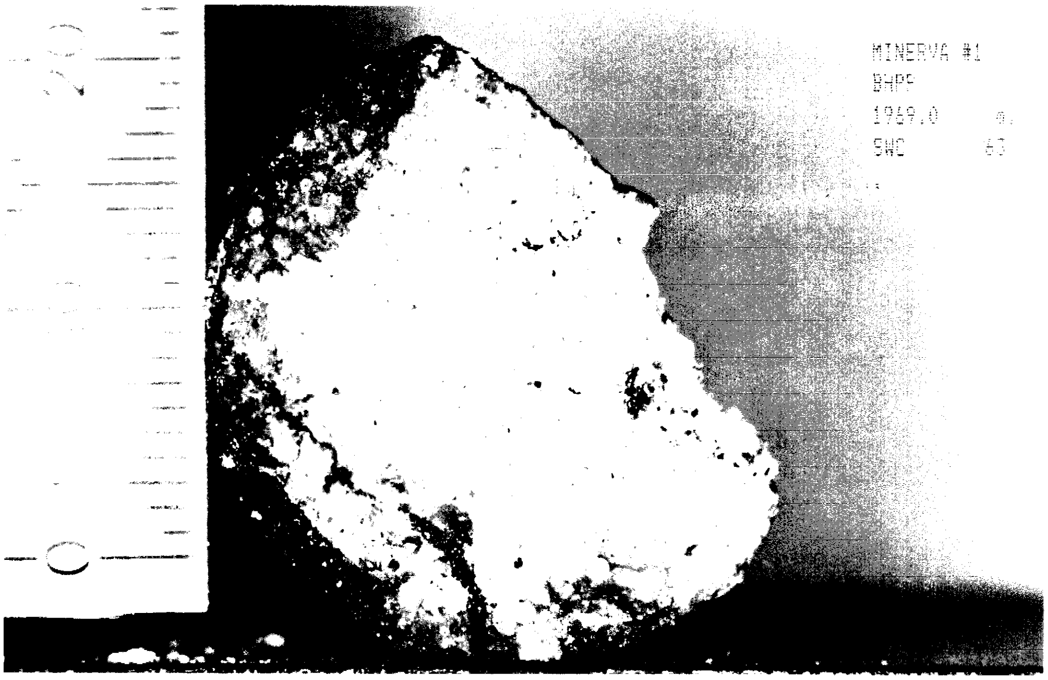

MINERVA #1
BHPP
1944.5 m.
SWC 66



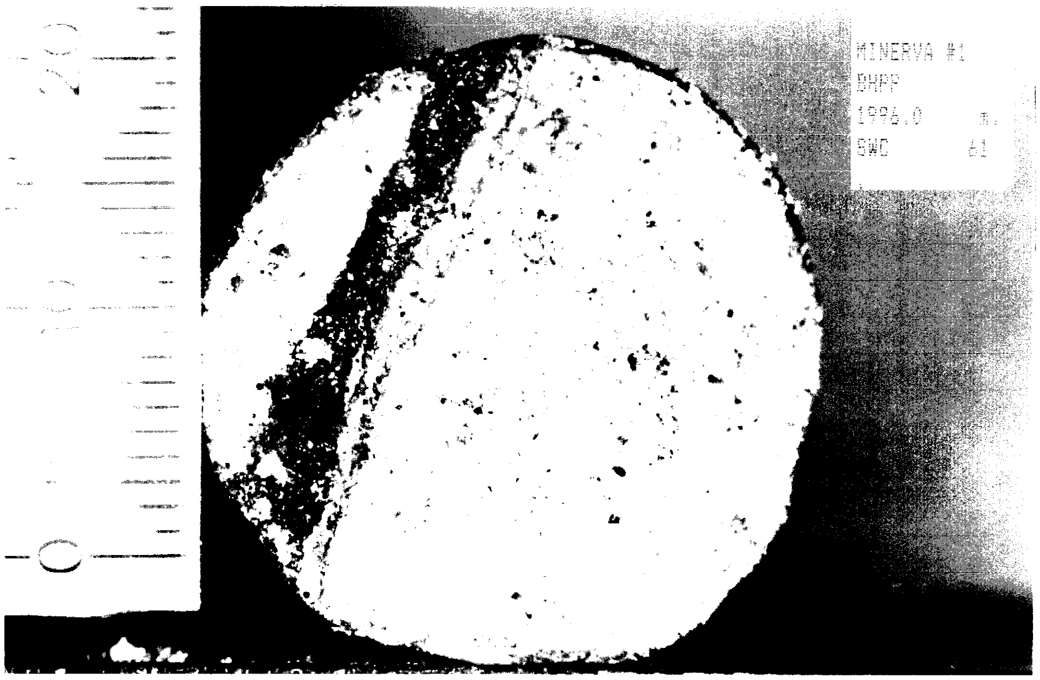
20
0
MINERVA #1
BHPP
1947.5 m.
SWC 65

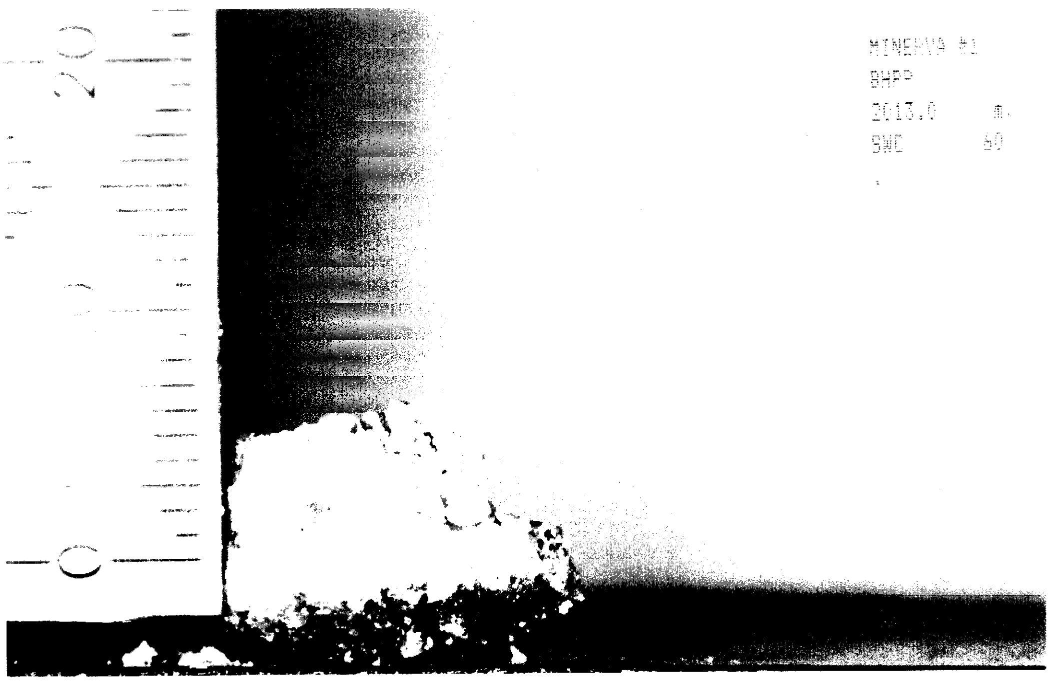


20
0
MINERVA #1
BHPP
1961.0 m.
SWC 64


MINERVA #1
BHPP
1969.0 m.
SWC 63


MINERVA #1
BHPP
1982.0 m.
SWC 62

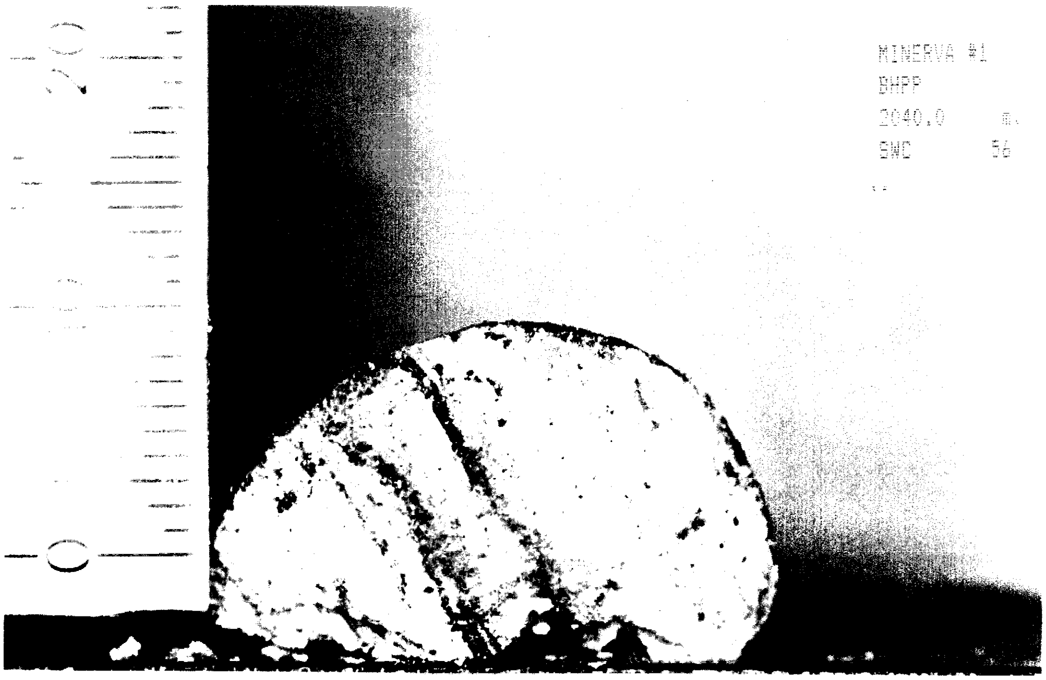

MINERVA #1
BHPP
1996.0 m.
SWC 61

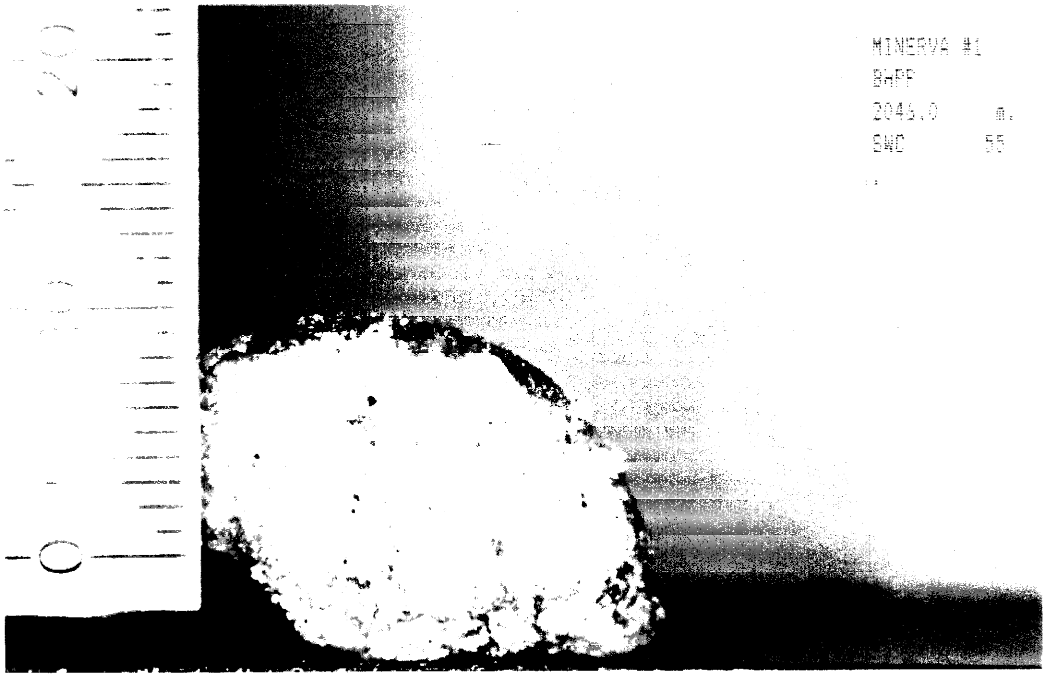

MINERVA #1
BHPP
2013.0 m.
SWC 60

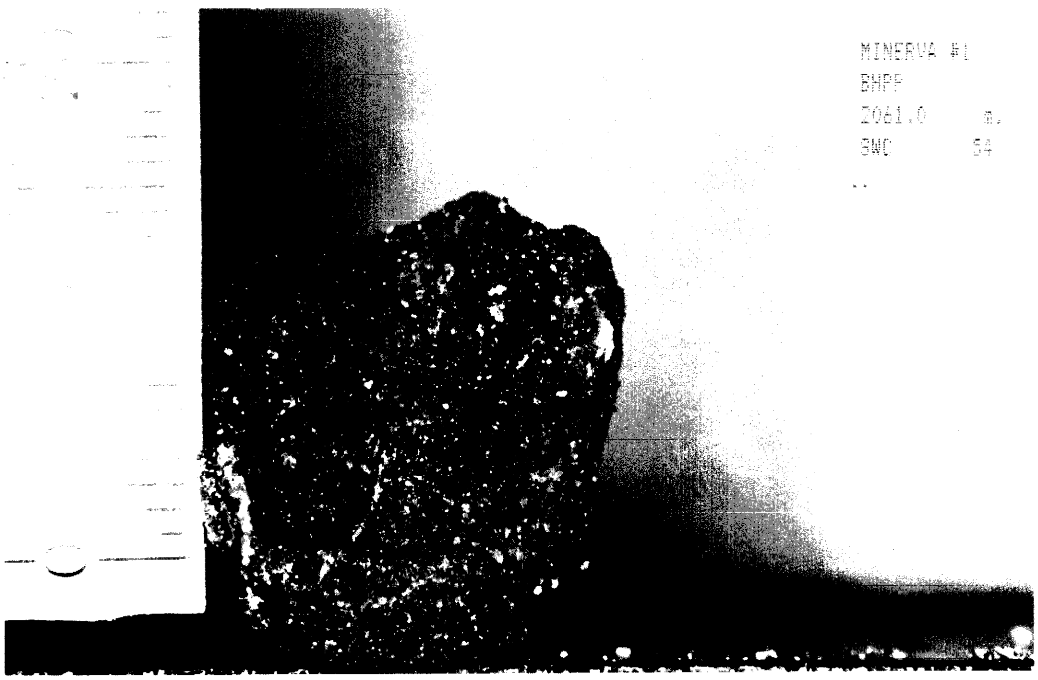
20
10
0
MINERVA #1
BHPP
2023.0 m.
SWC 58

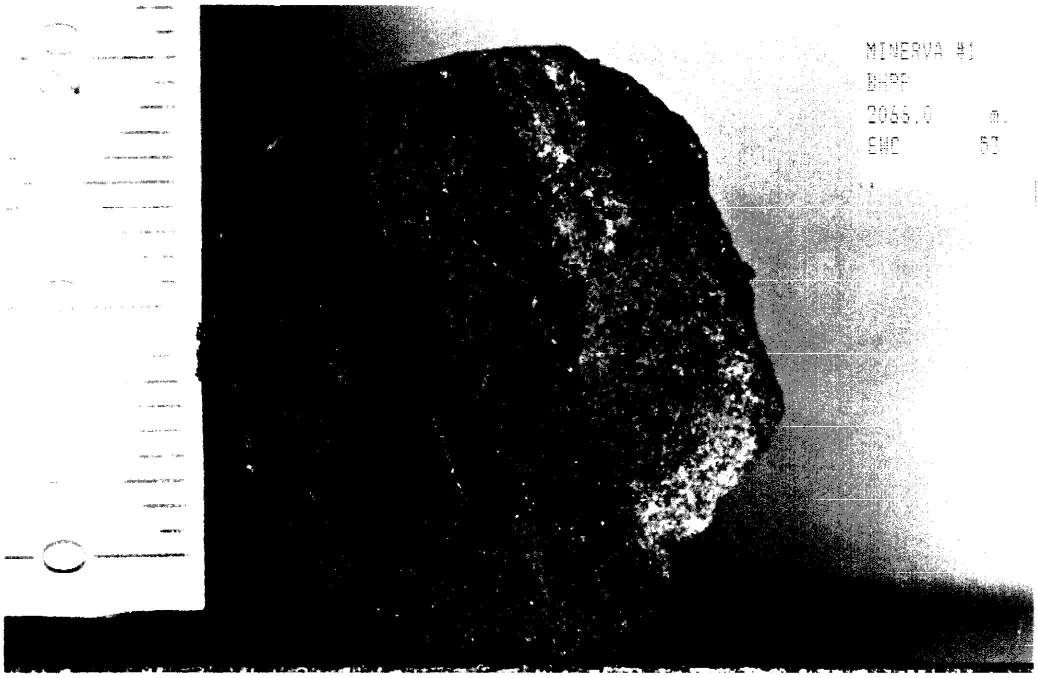
20
10
0
MINERVA #1
BHPP
2030.5 m.
SWC 58

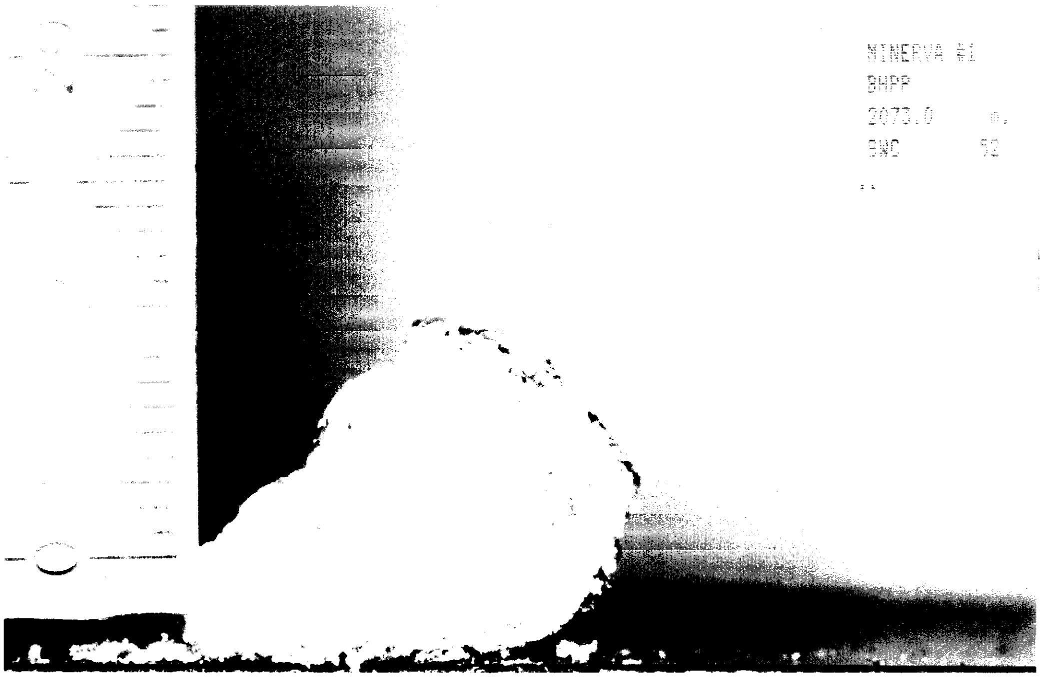

MINERVA #1
BHPP
2035.0 m.
SWC 57

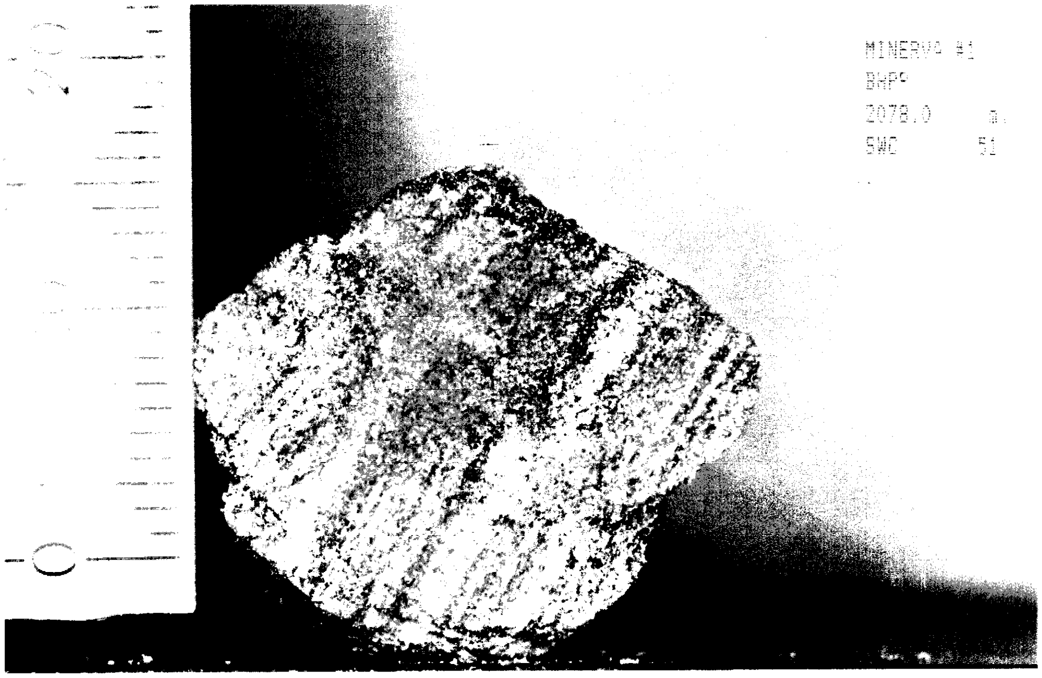

MINERVA #1
BHPP
2040.0 m.
SWC 56

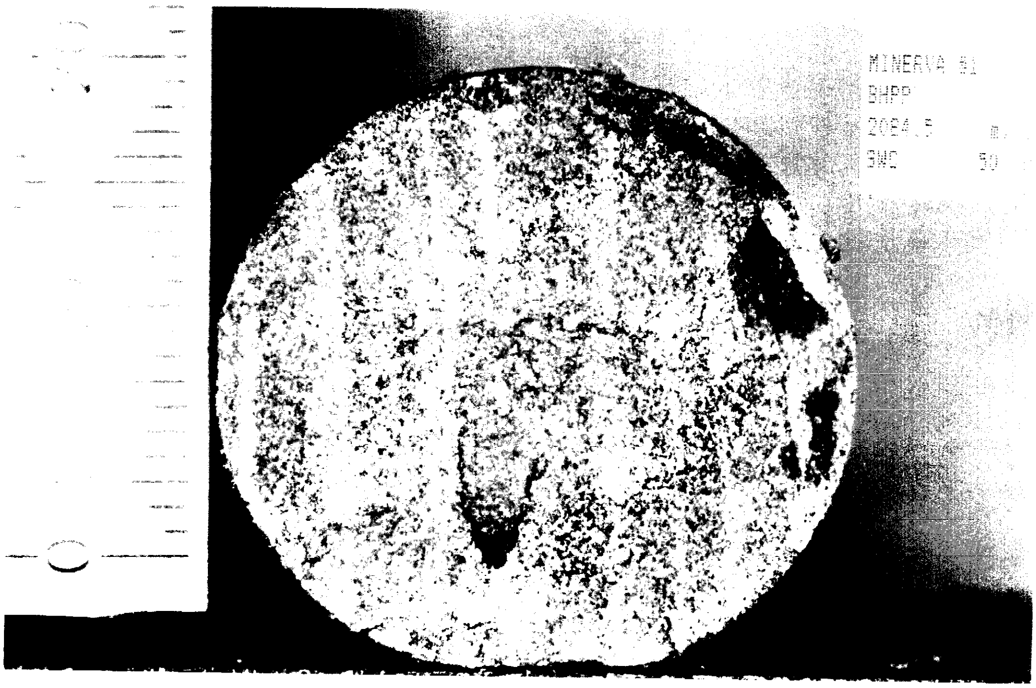

MINERVA #1
BHPP
2045.0 m.
SWC 55

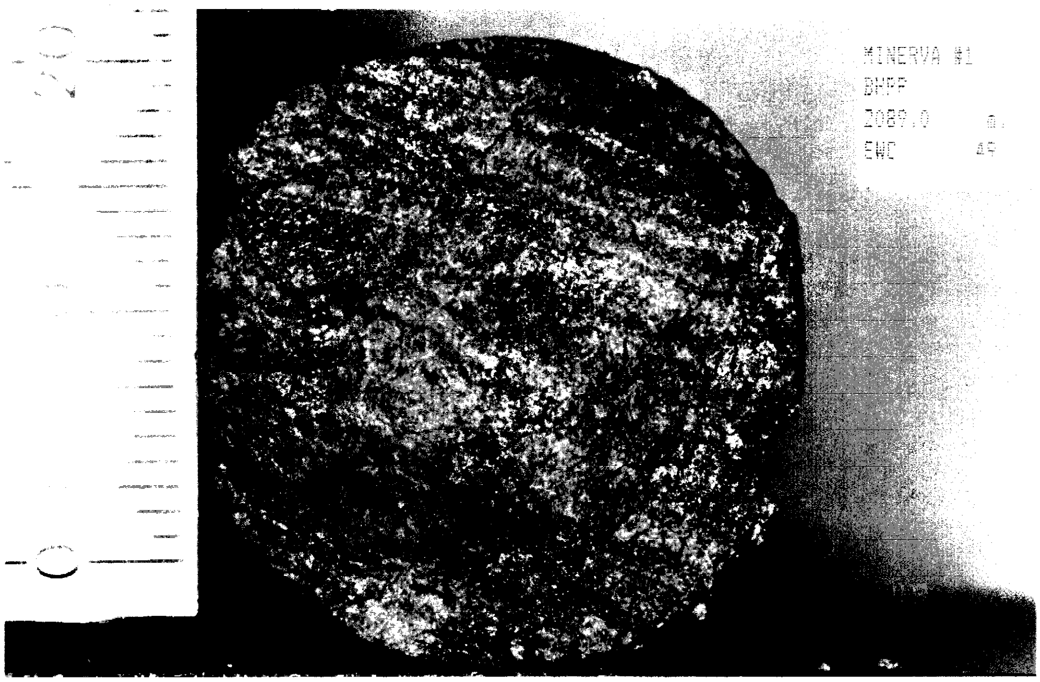

MINERVA #1
BHPP
2061.0 m.
SWC 54

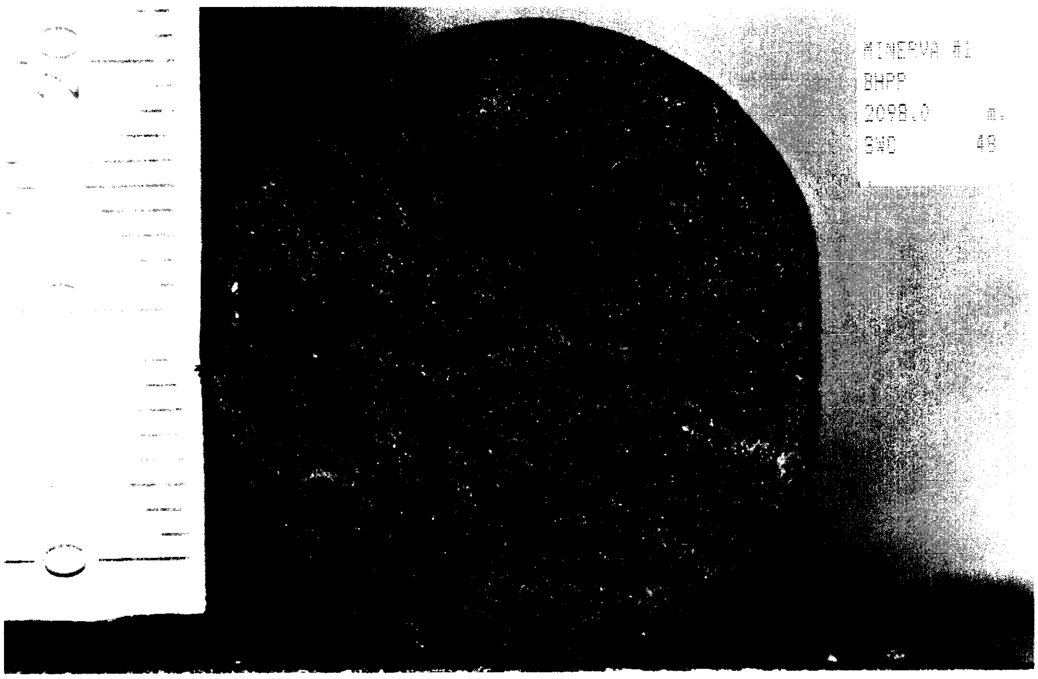

MINERVA #1
BHPP
2066.0 m.
SWC 53

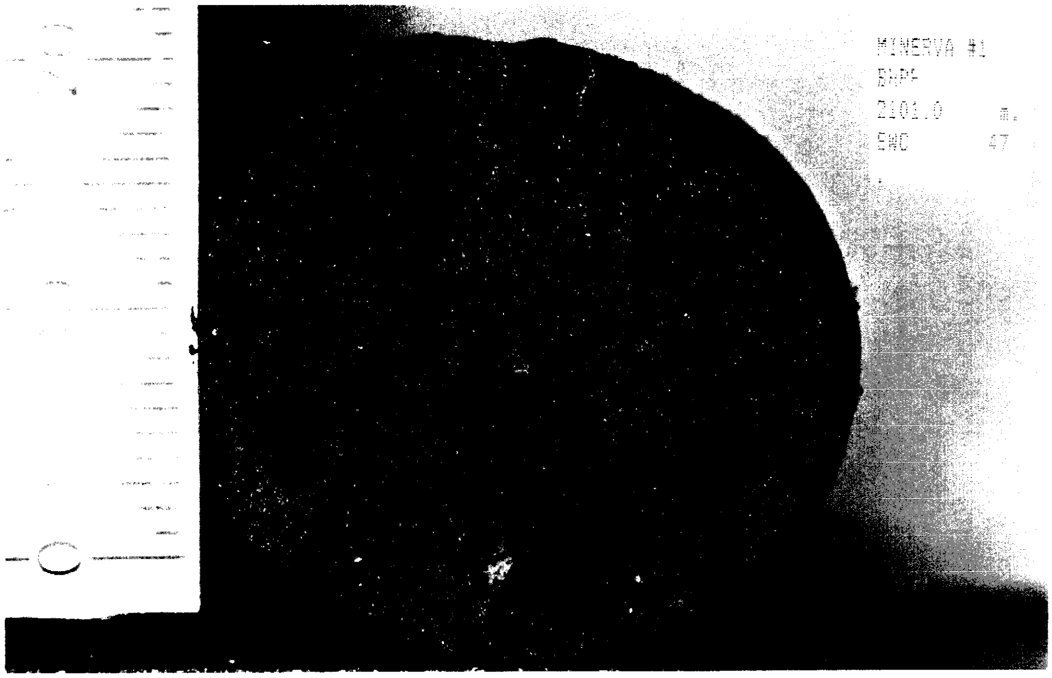

MINERVA #1
BHPP
2073.0 m.
SWC 52

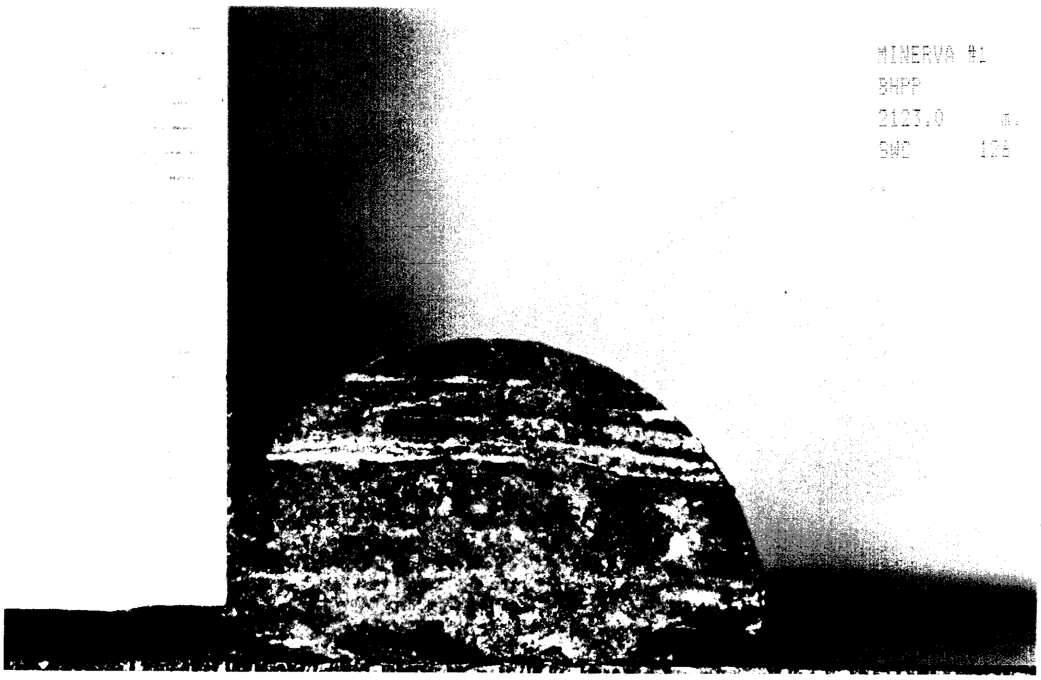

MINERVA #1
BHPP
2078.0 m.
SWC 51

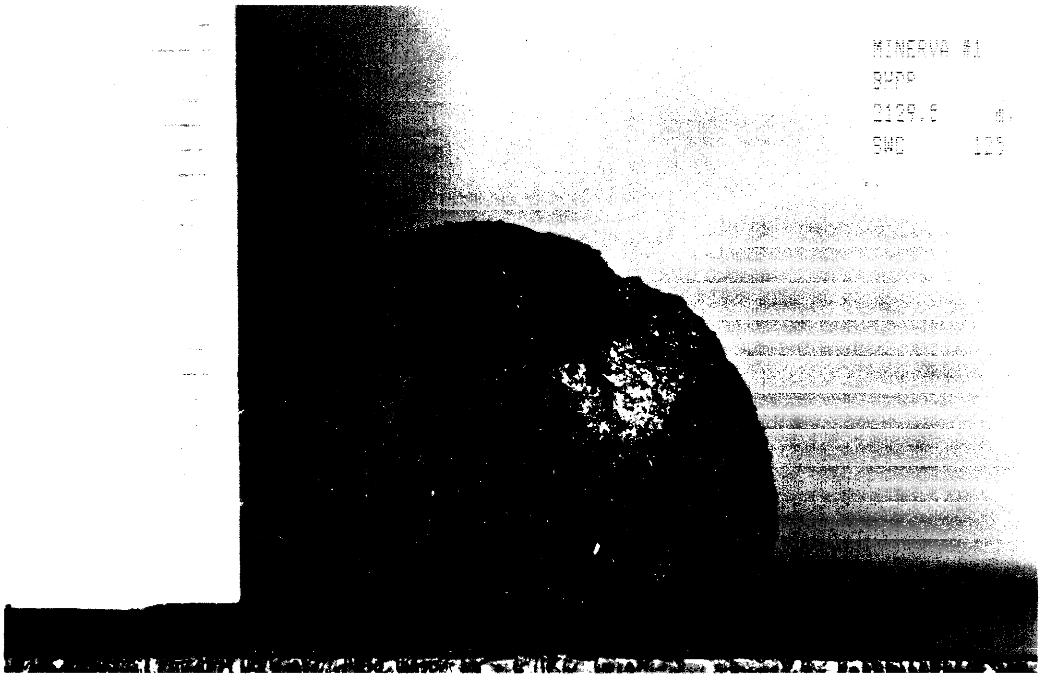

MINERVA #1
BHPP
2084.5 m.
SWC 50


MINERVA #1
BHPP
2089.0 m.
EWC 48

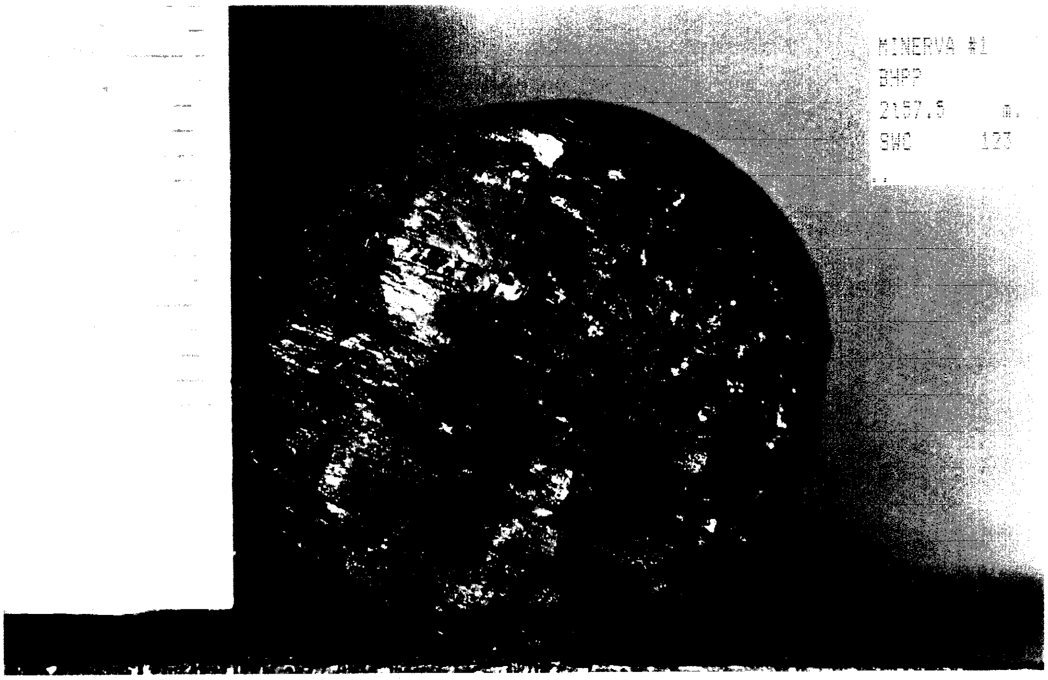

MINERVA #1
BHPP
2098.0 m.
SWC 48

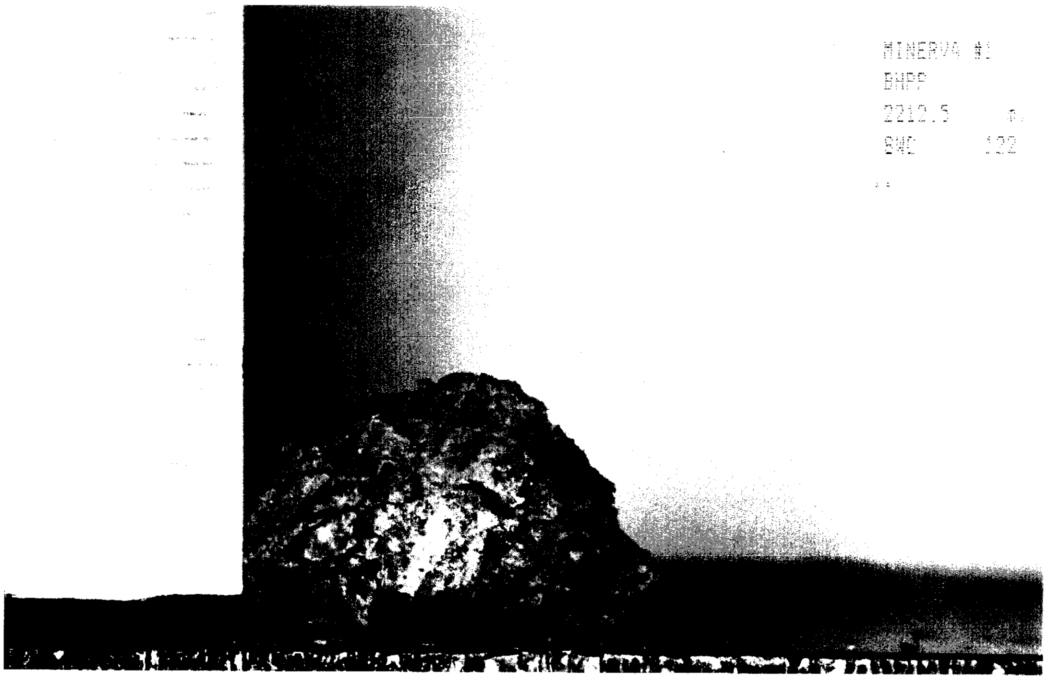

MINERVA #1
BHPP
2101.0 m.
SWC 47

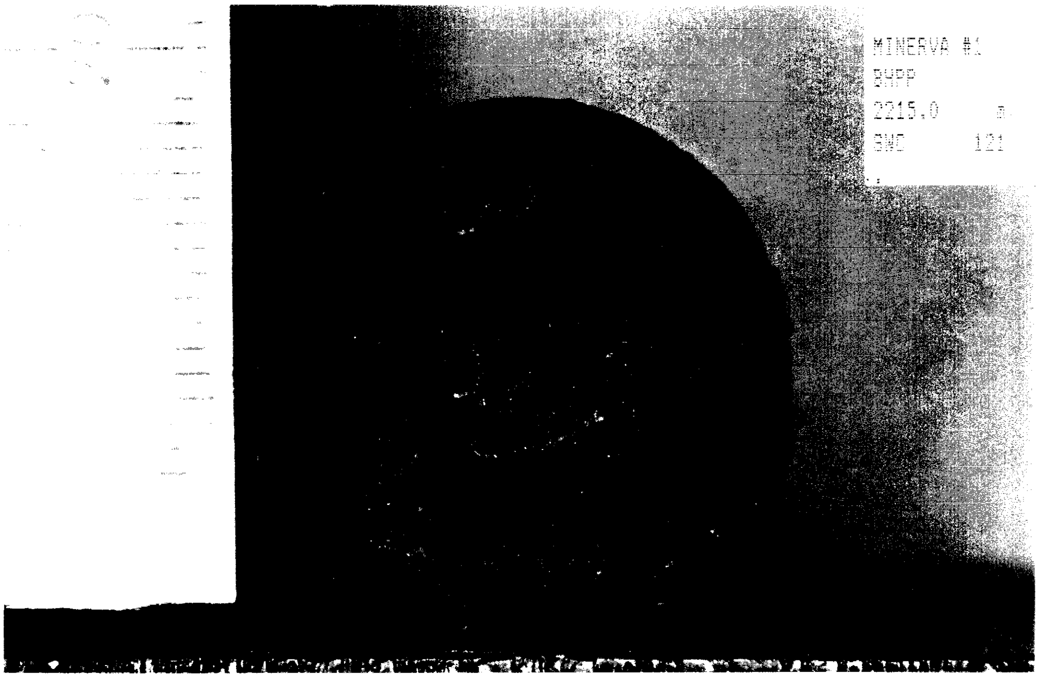

MINERVA #1
BHPP
2123.0 m.
SWC 126

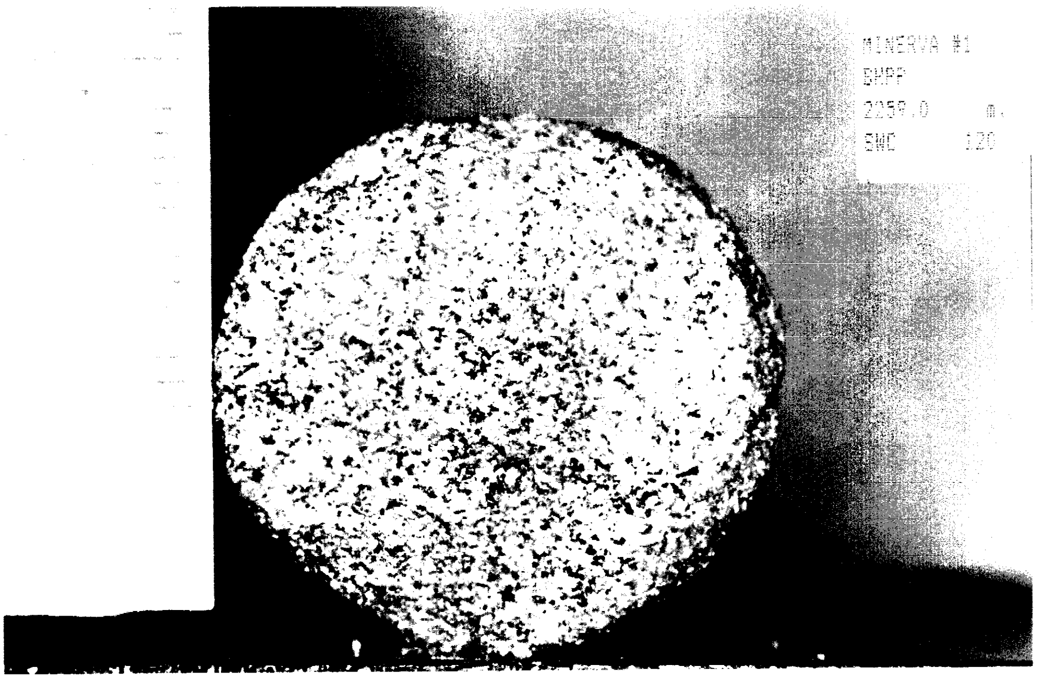

MINERVA #1
BHPP
2129.5 m.
SWC 125

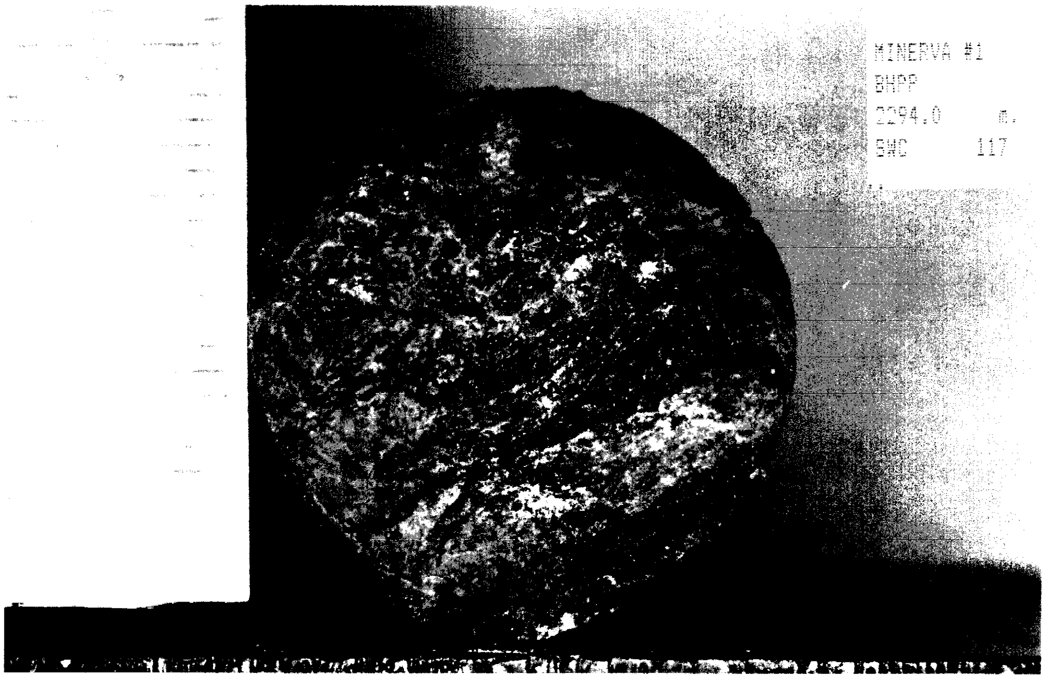

MINERVA #1
BHPP
2142.0 m.
SWC 124

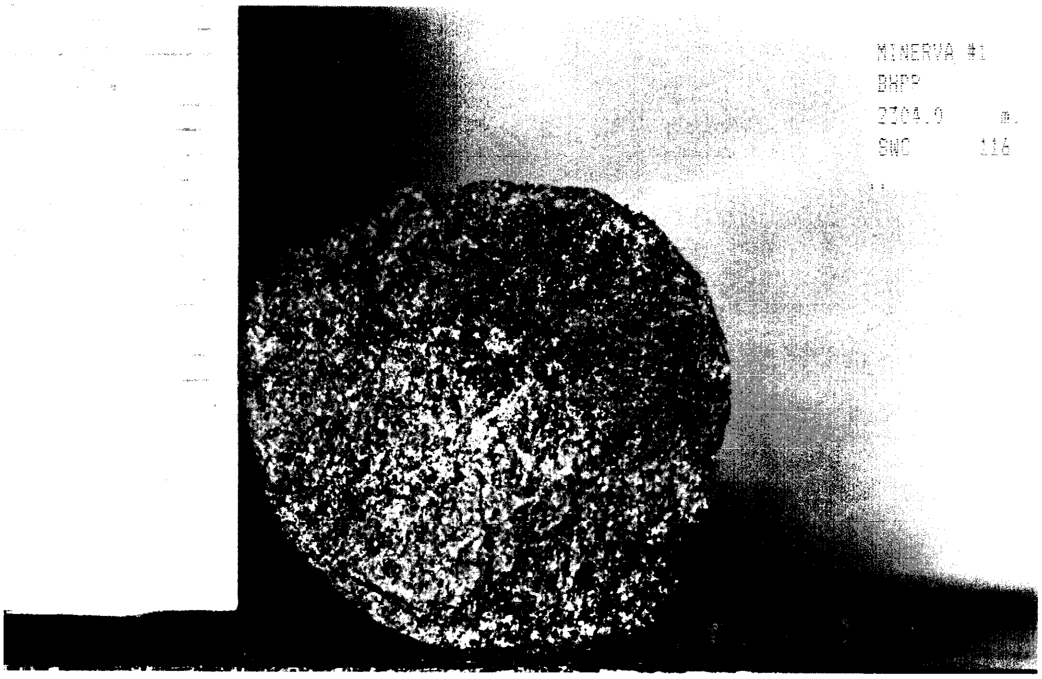

MINERVA #1
BHPP
2157.5 m.
SWC 123

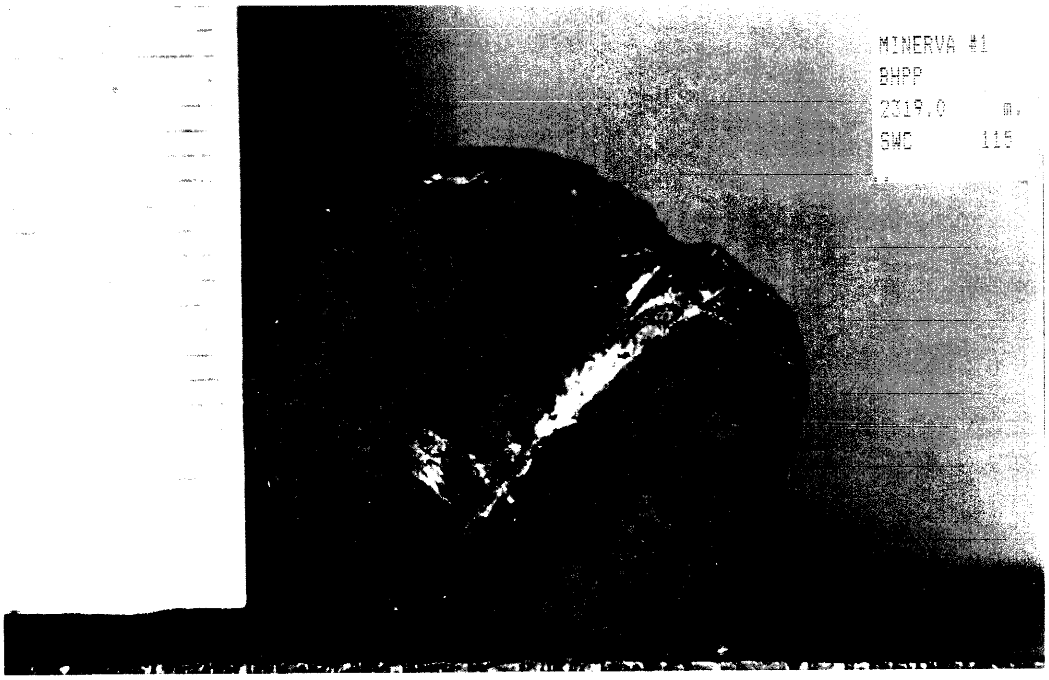

MINERVA #1
BHPP
2212.5 m.
SWC 122

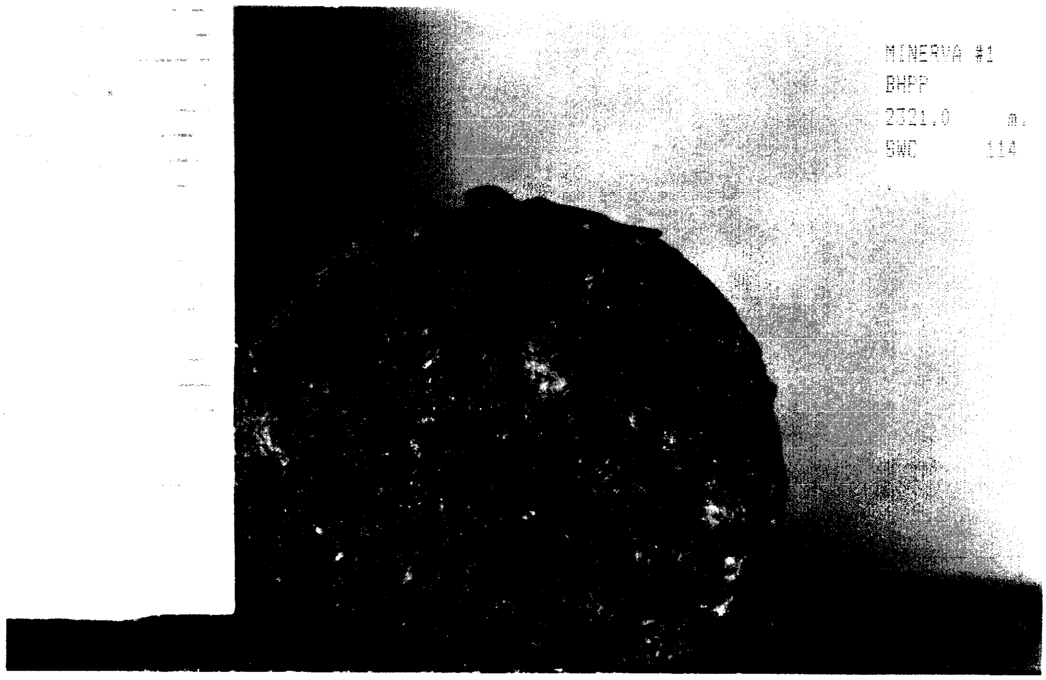

MINERVA #1
BHPP
2215.0 m
SWC 121

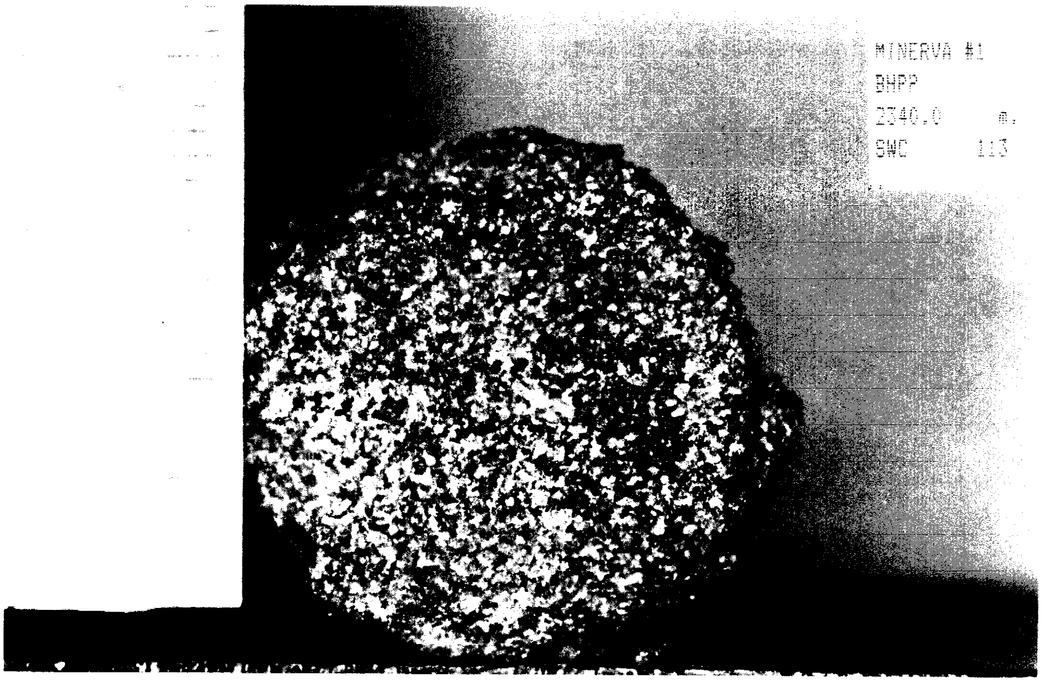

MINERVA #1
BHPP
SWC 120

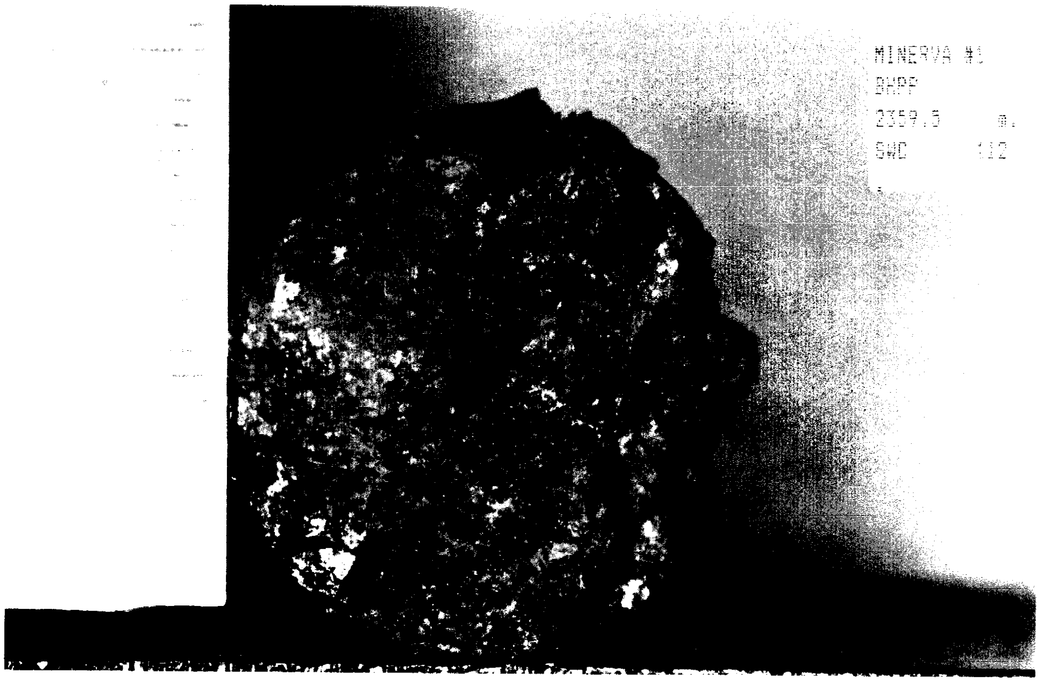

MINERVA #1
BHPP
2294.0 m.
SWC 117

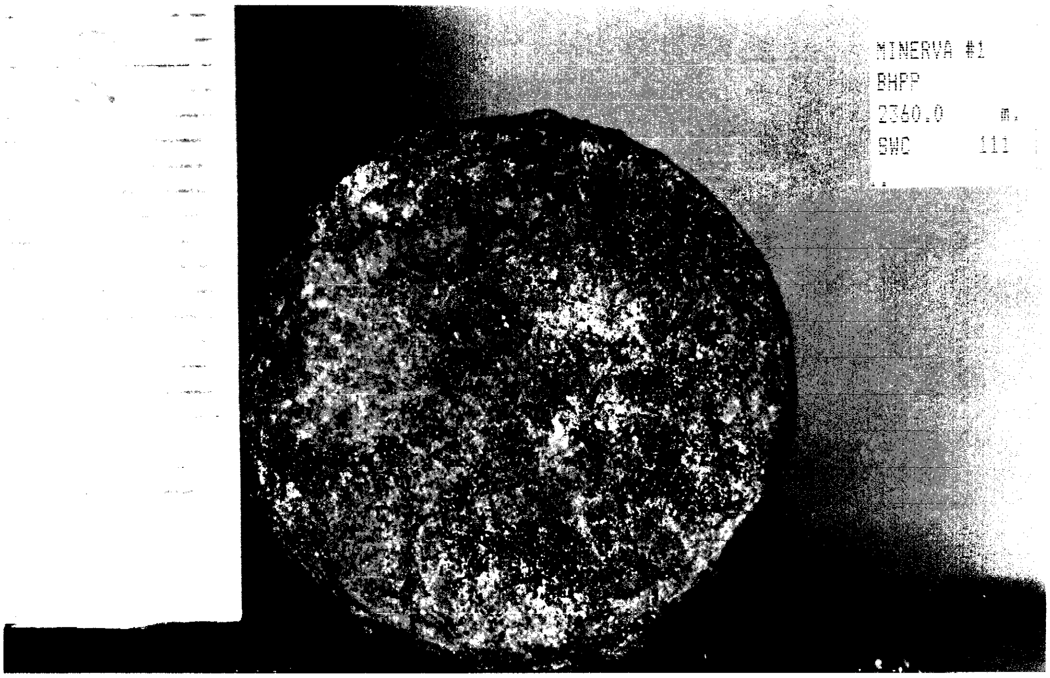

MINERVA #1
BHPP
2204.0 m.
SWC 116

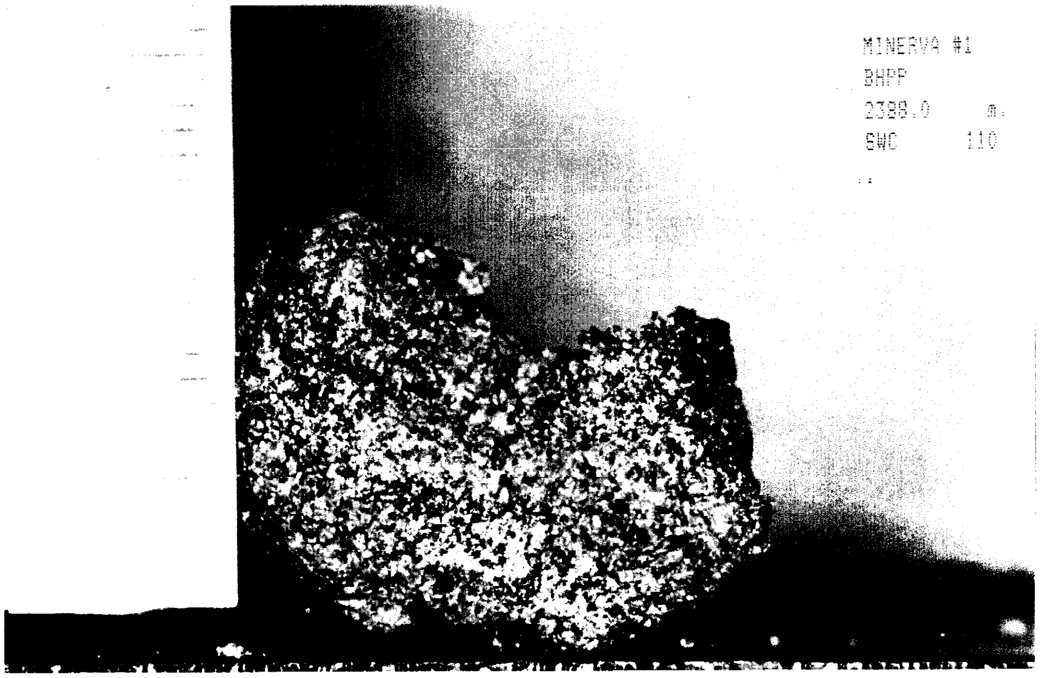

MINERVA #1
BHPP
2319.0 m.
SWC 115

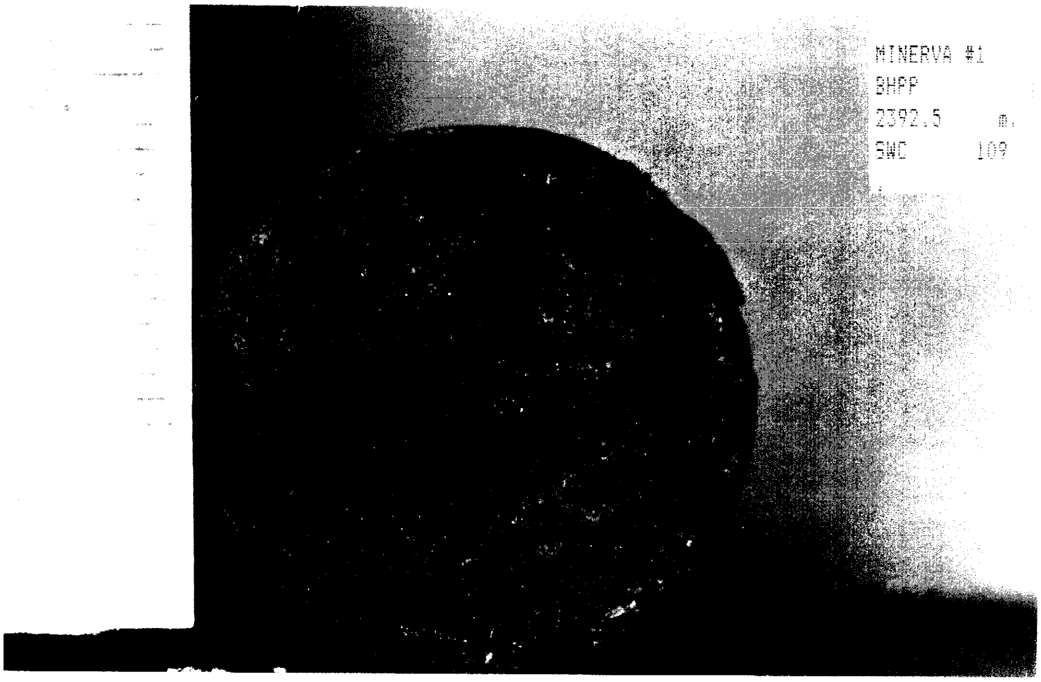

MINERVA #1
BHPP
2321.0 m.
SWC 114

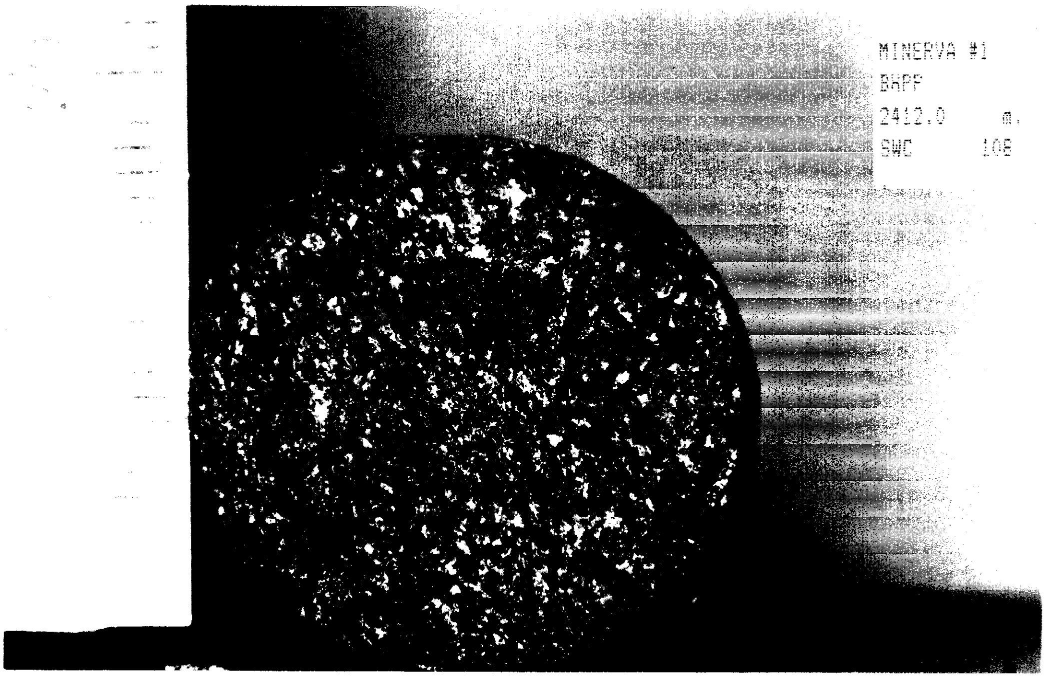

MINERVA #1
BHPP
2340.0 m.
SWC 113

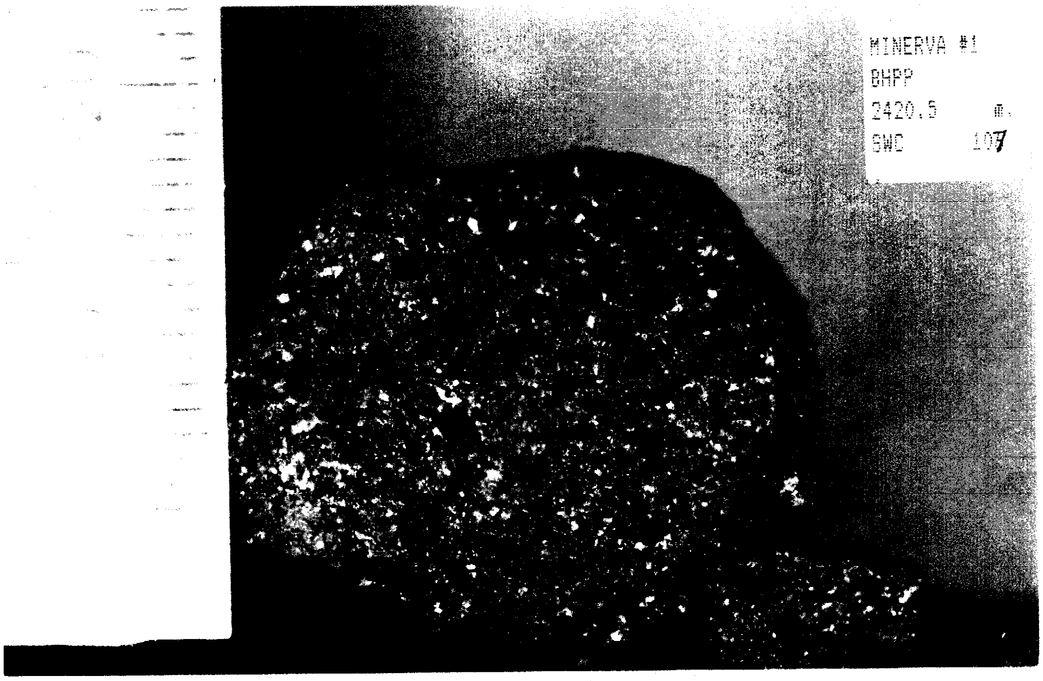

MINERVA #1
BHPP
2359.5 m.
SWC 112


MINERVA #1
BHPP
2360.0 m.
SWC 111


MINERVA #1
BHPP
2388.0 m.
SWC 110


MINERVA #1
BHPP
2392.5 m.
SWC 109


MINERVA #1
BHPP
2412.0 m.
SWC 108


MINERVA #1
BHPP
2420.5 m.
SWC 107