

DEPT. NAT. RES & ENV



PE906907

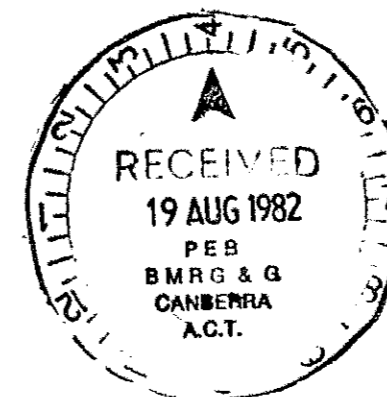
82/986

# APPENDIX 6.9 SECTION 2

SHELL DEVELOPMENT (AUSTRALIA)  
HAMMERHEAD 1  
GEOSERVICES OVERSEAS S.A.  
FINAL WELL REPORT (SECTION II)

## CONTENTS

- Real Time Plots
- Bit Performance Plots
- Bit Cost Plots
- Real Time Print-Out  
(including Bit Reports and  
Daily Hydraulics Reports)



REAL TIME DEPTH PLOTS

GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

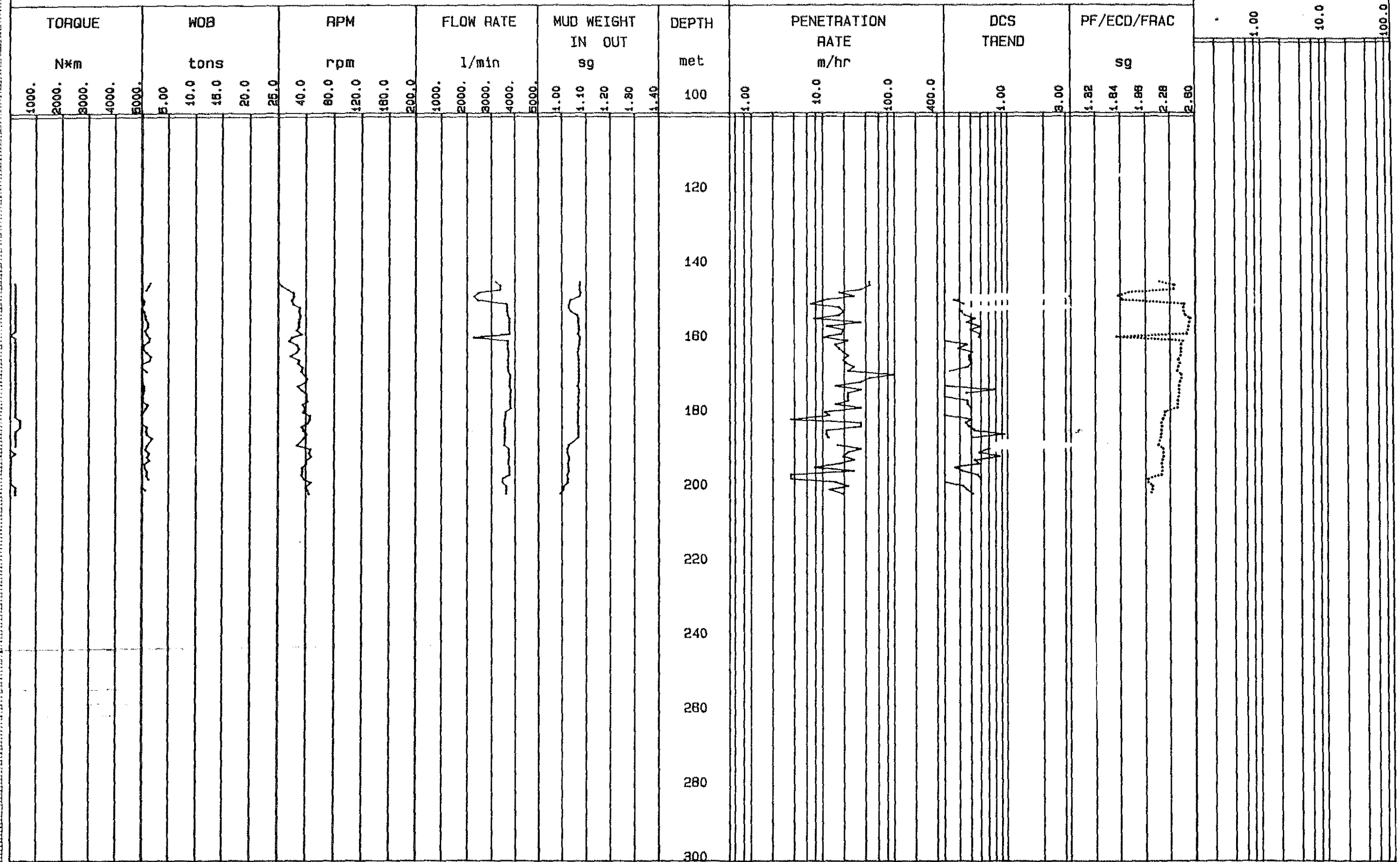
SCALE 1/ 1000

TOTAL GAS

16/ 4/ 82

HAMMERHEAD #1

units



Geoservices

ZERO



GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

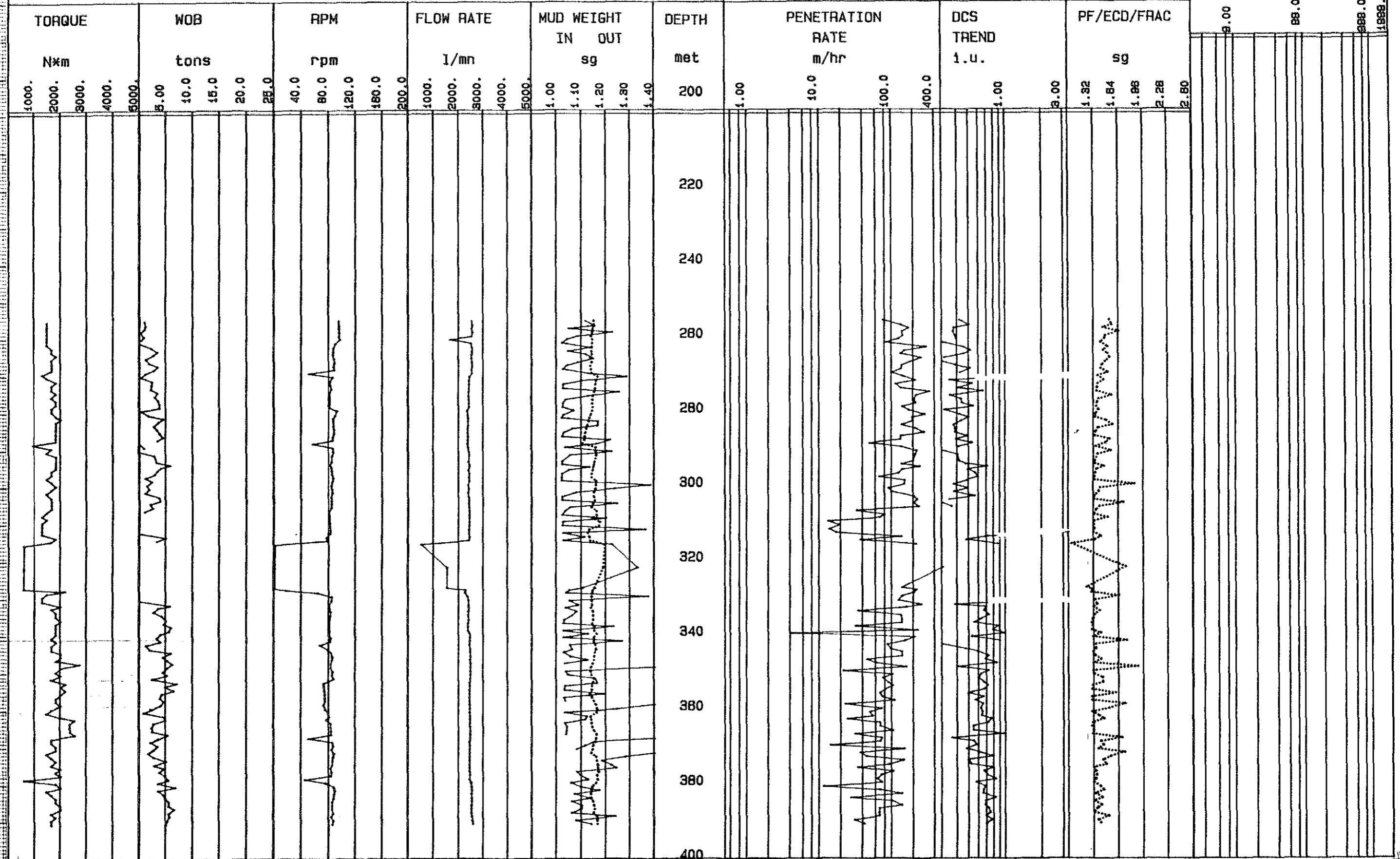
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19/ 5/ 82

HAMMERHEAD #1

TOTAL GAS

units



Geoservices

ZERO

REAL TIME DEPTH PLOT

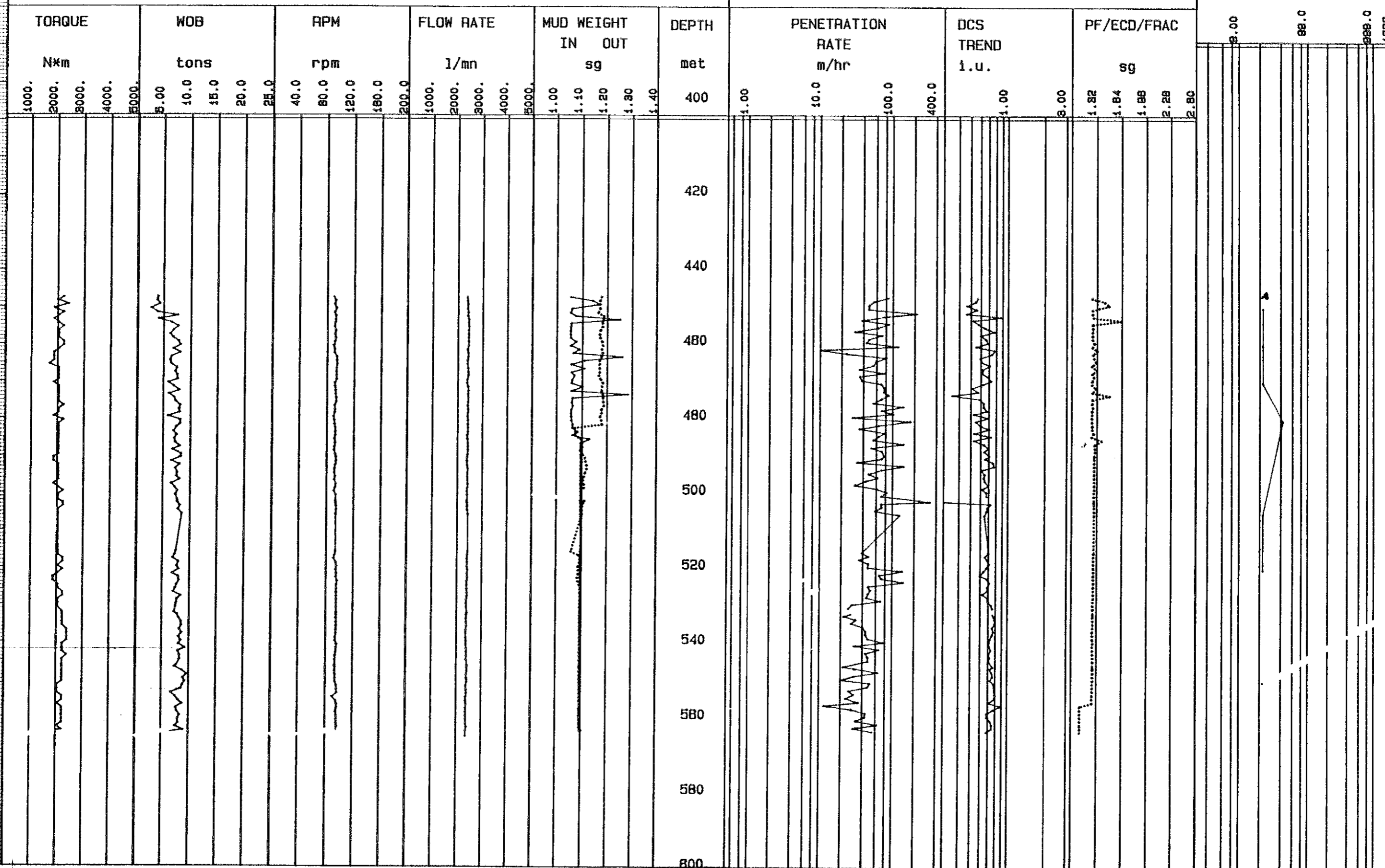
SCALE 1/ 1000

19/ 5/ 82

HAMMERHEAD #1

TOTAL GAS

units



Geoservices  
ERO



GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

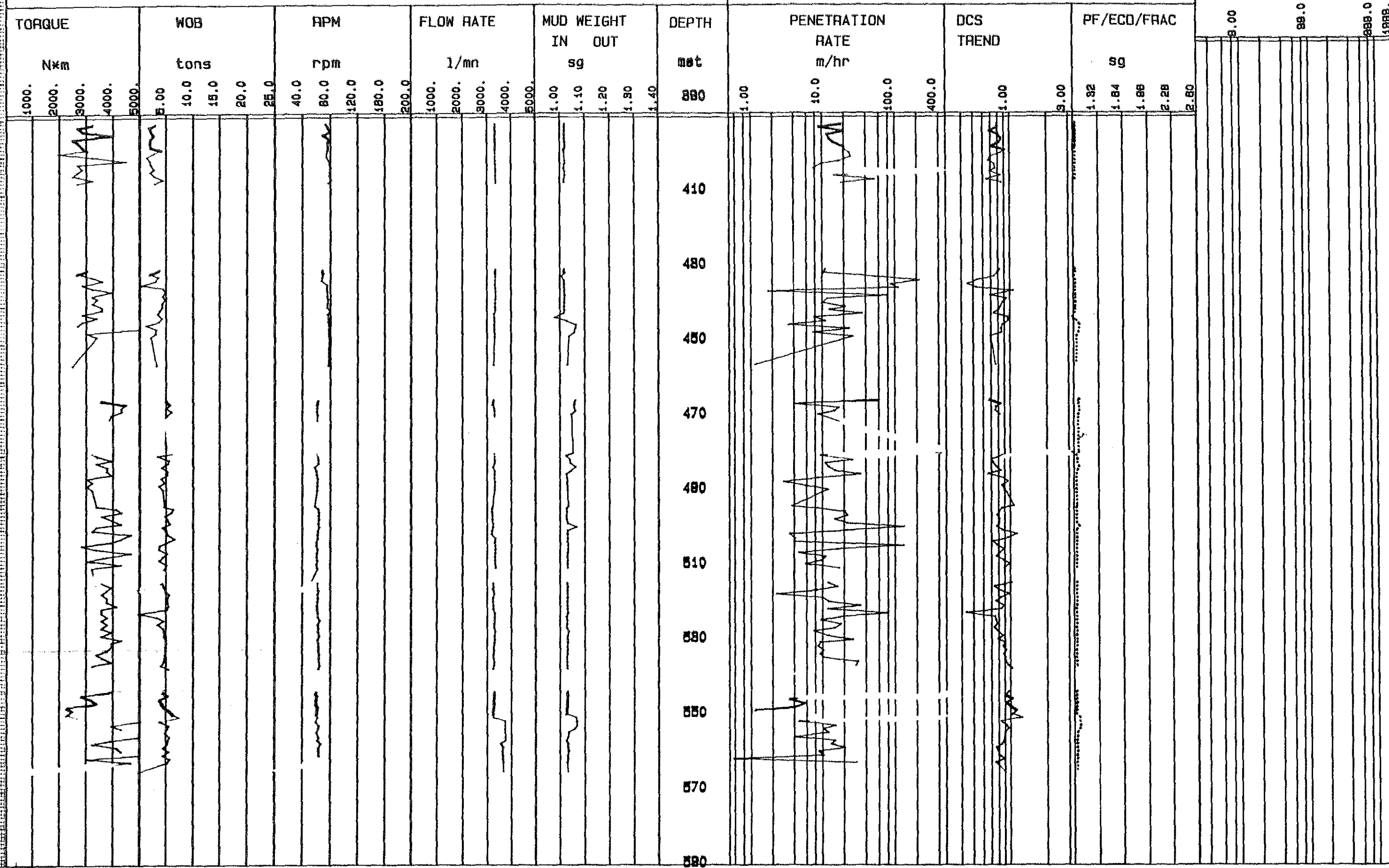
SCALE 1/ 1000

TOTAL GAS

24/ 5/ 82

HAMMERHEAD #1

units



ermes

ERO

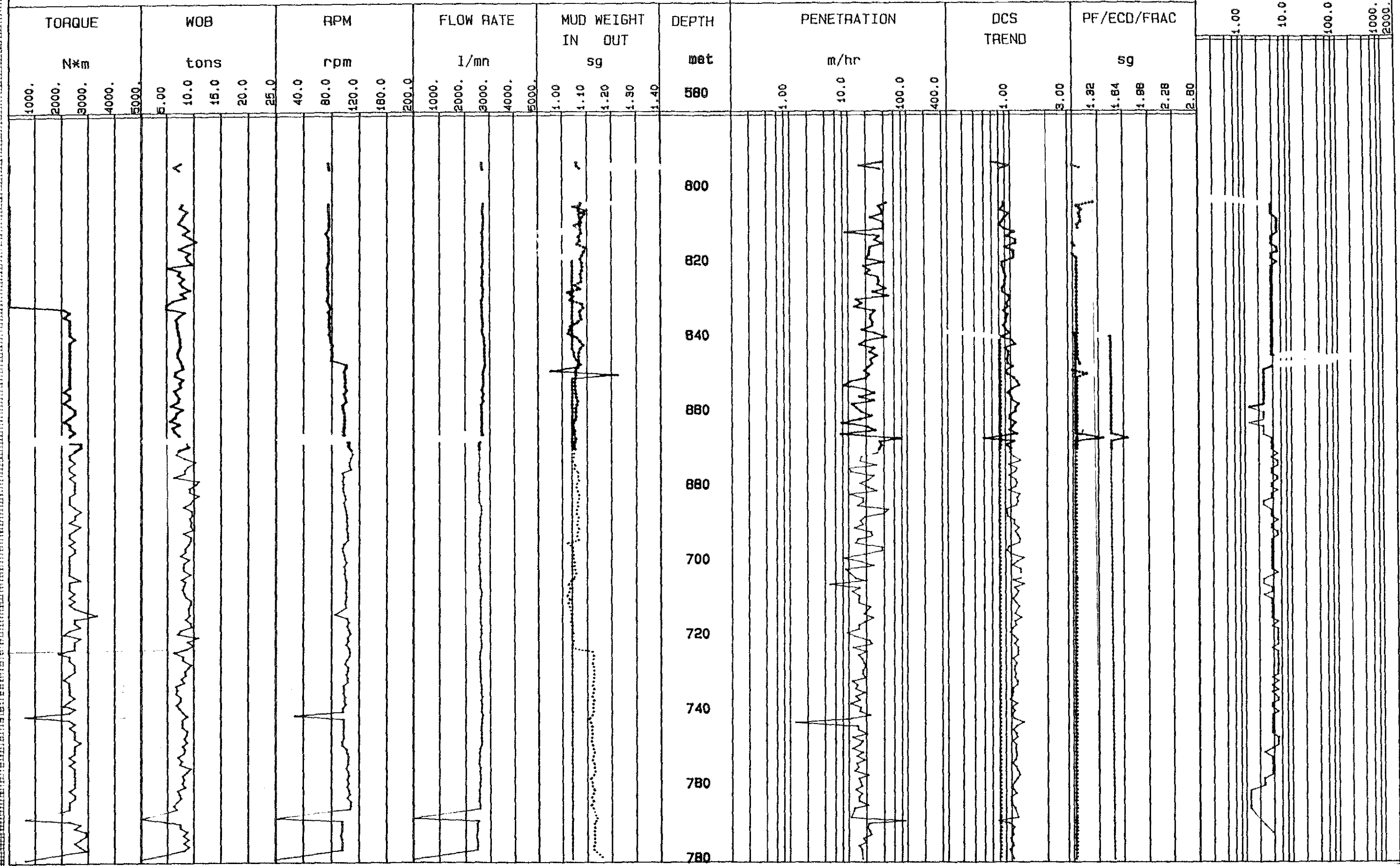
GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

SCALE 1/ 1000

3/ 8/ 82

HAMMERHEAD #1



geoservices

ZERO



GEOSERVICES  
ON-LINE TDC

3/ 8/ 82

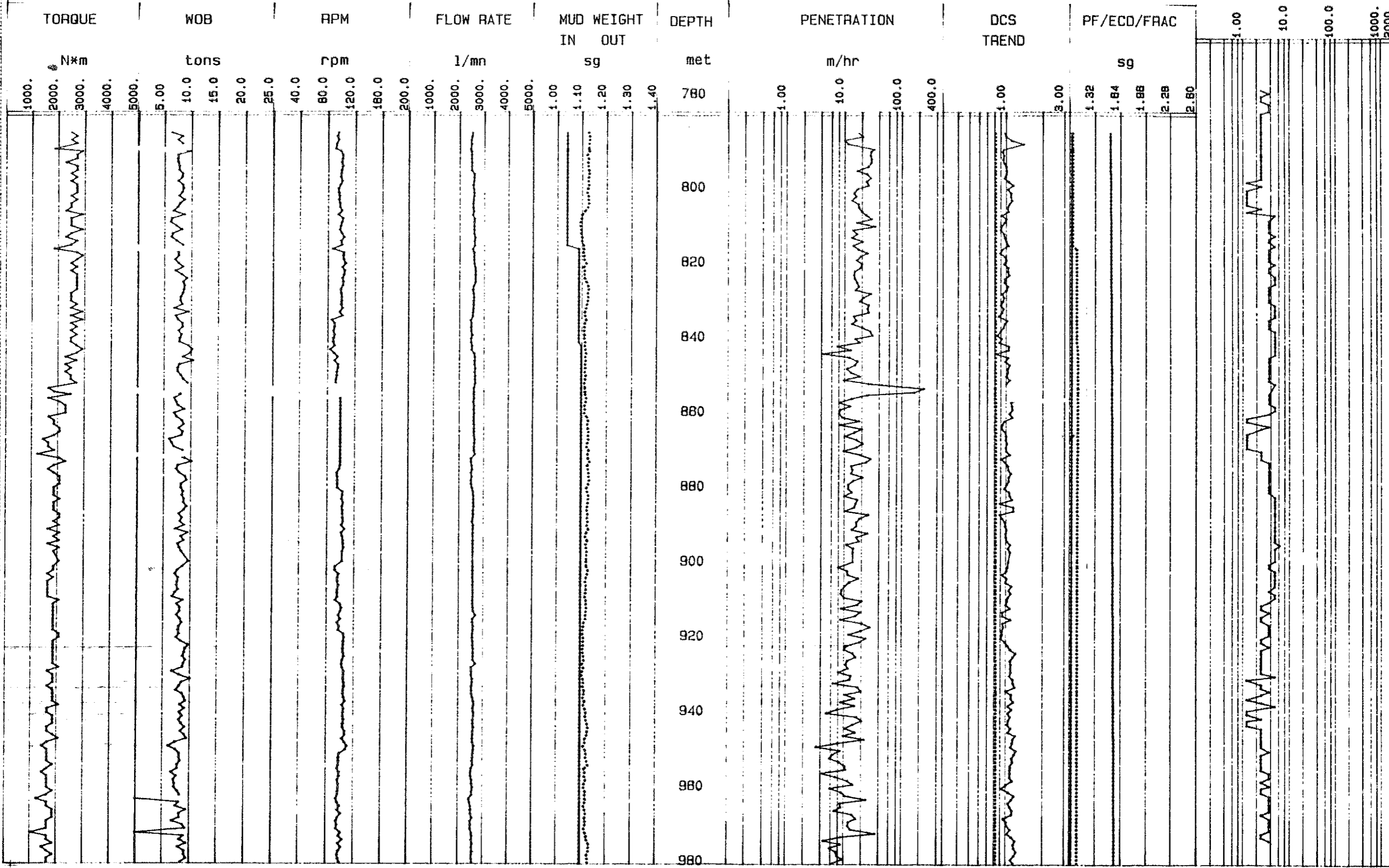
REAL TIME DEPTH PLOT

HAMMERHEAD #1

SCALE 1/ 1000

TOTAL

units



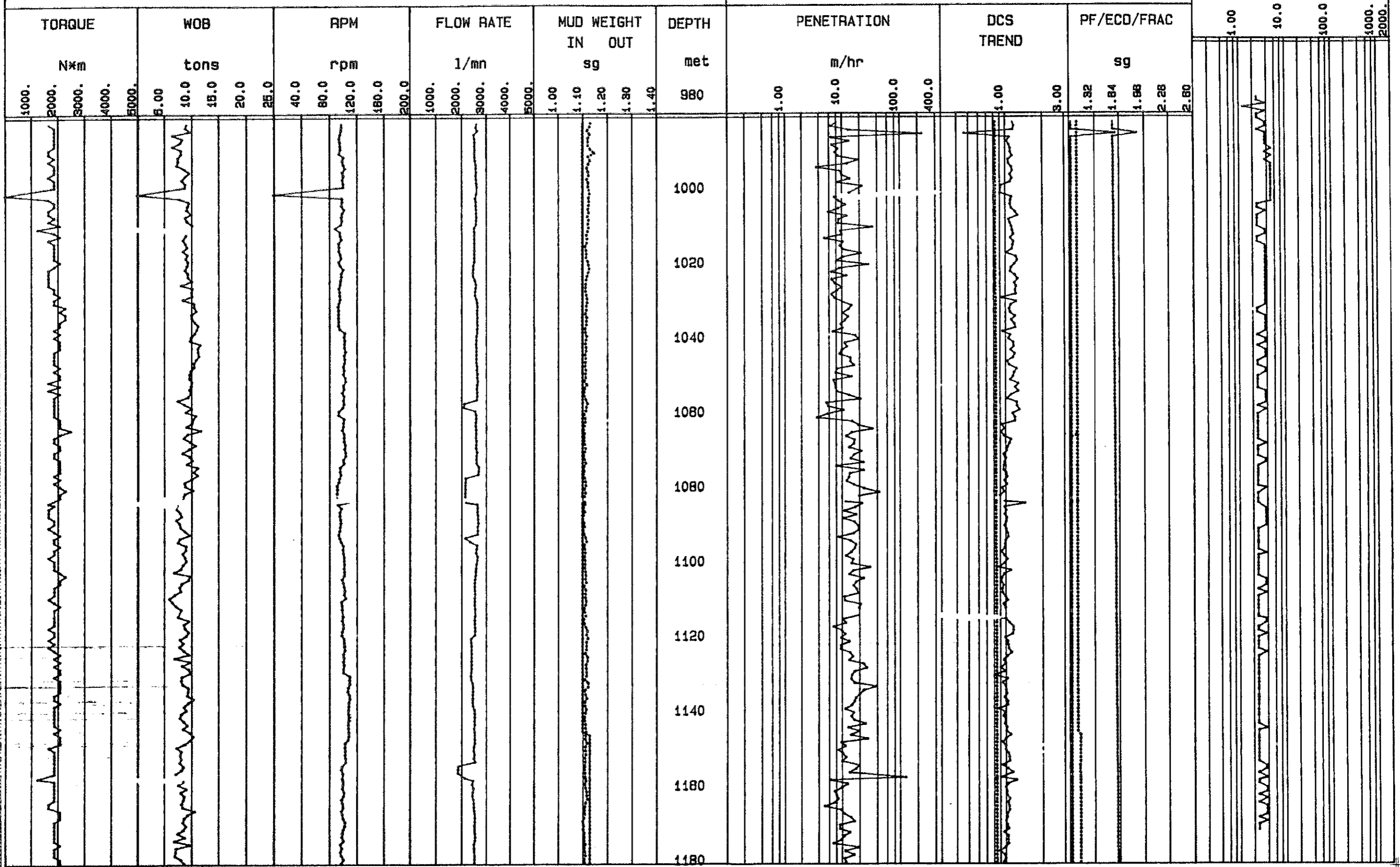
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REAL TIME DEPTH PLOT

SCALE 1/ 1000

4/ 8/ 82

HAMMERHEAD #1



GEO-SERVICES

ERO





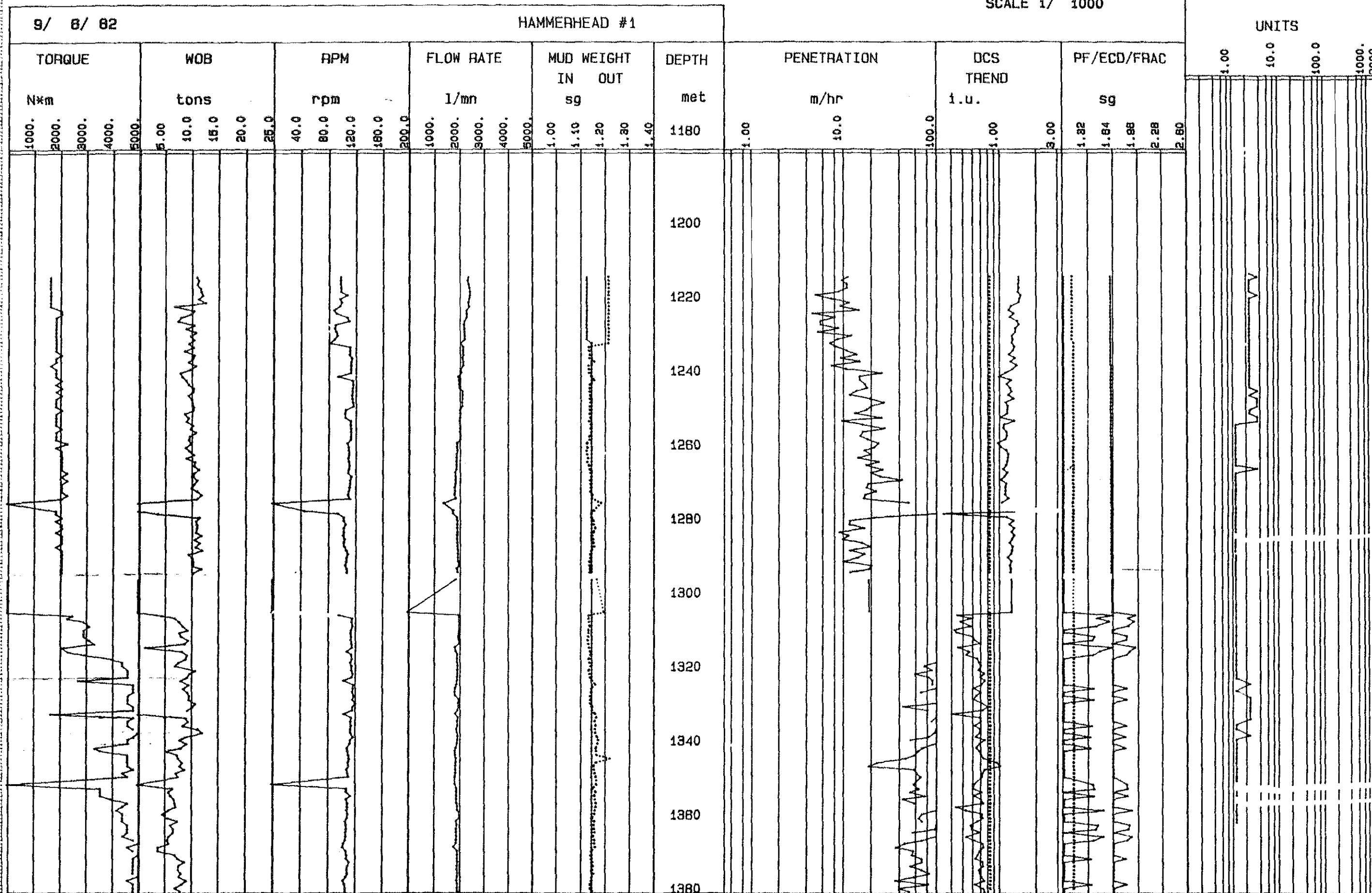
GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

SCALE 1/ 1000

TOTAL GAS

UNITS



Geoservices

ERO

GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

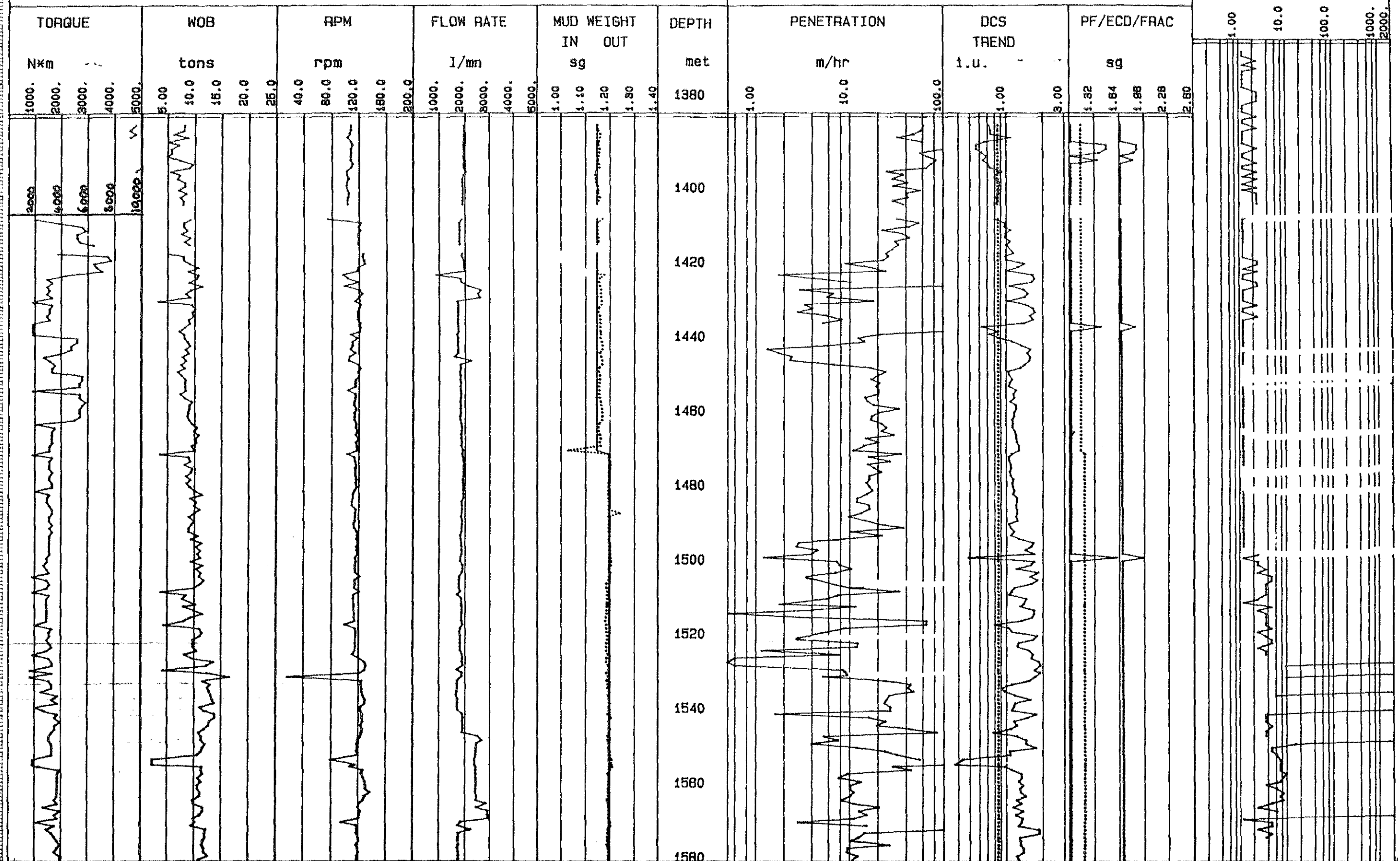
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TOTAL GAS

UNITS

10/ 8/ 82

HAMMERHEAD #1



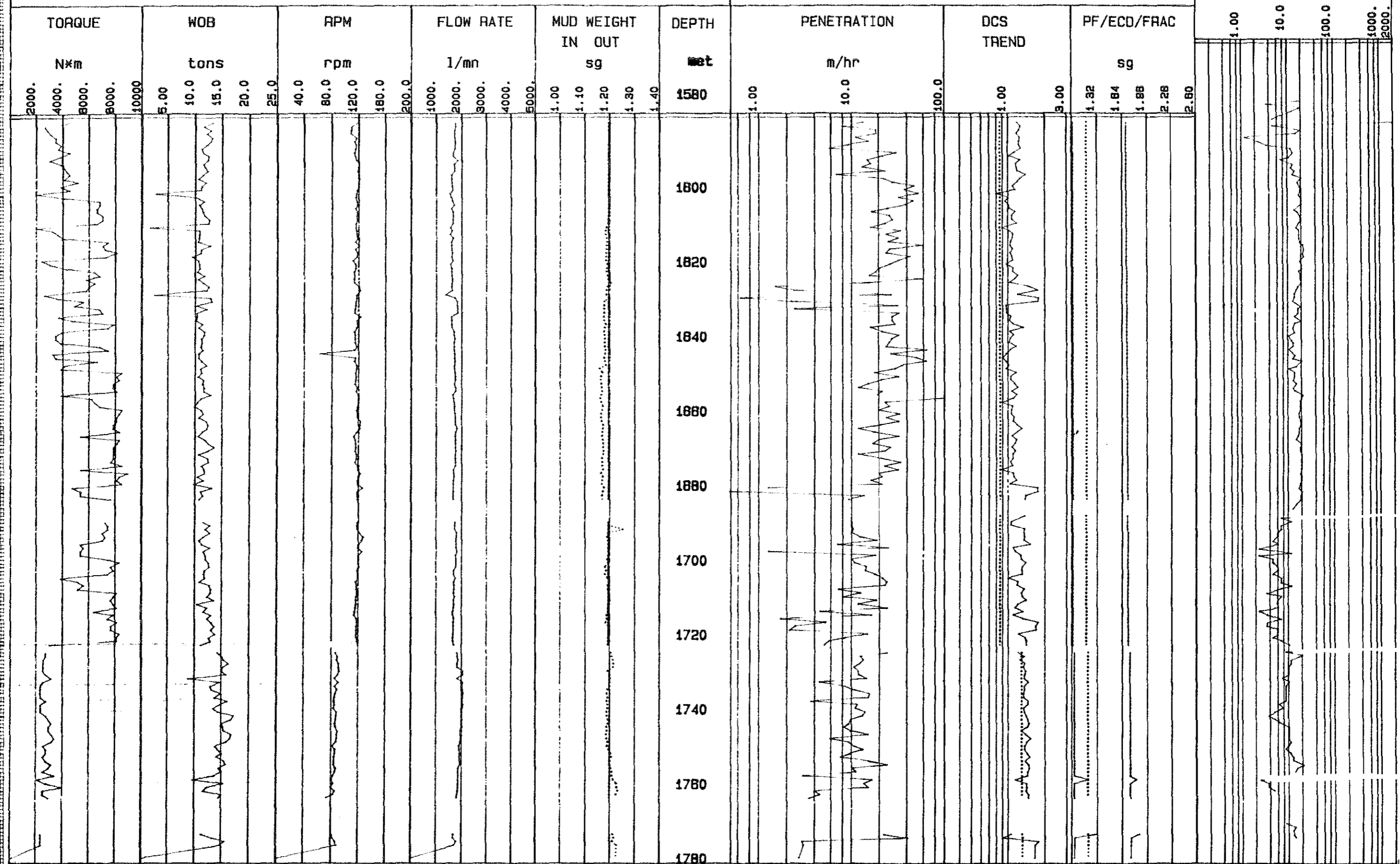
GEOSERVICES  
ON-LINE TDC

REAL TIME DEPTH PLOT

SCALE 1/ 1000

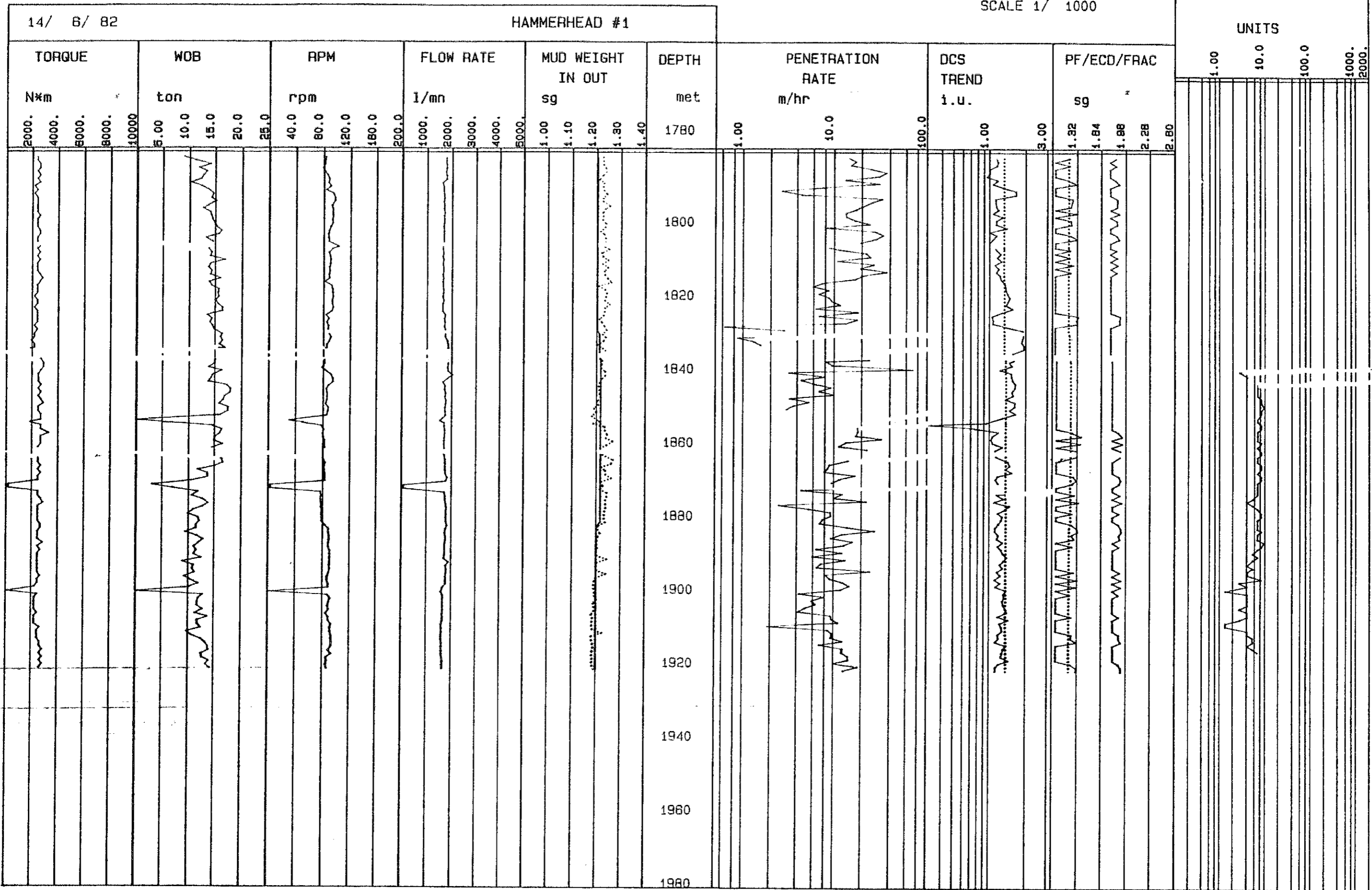
12/ 8/ 82

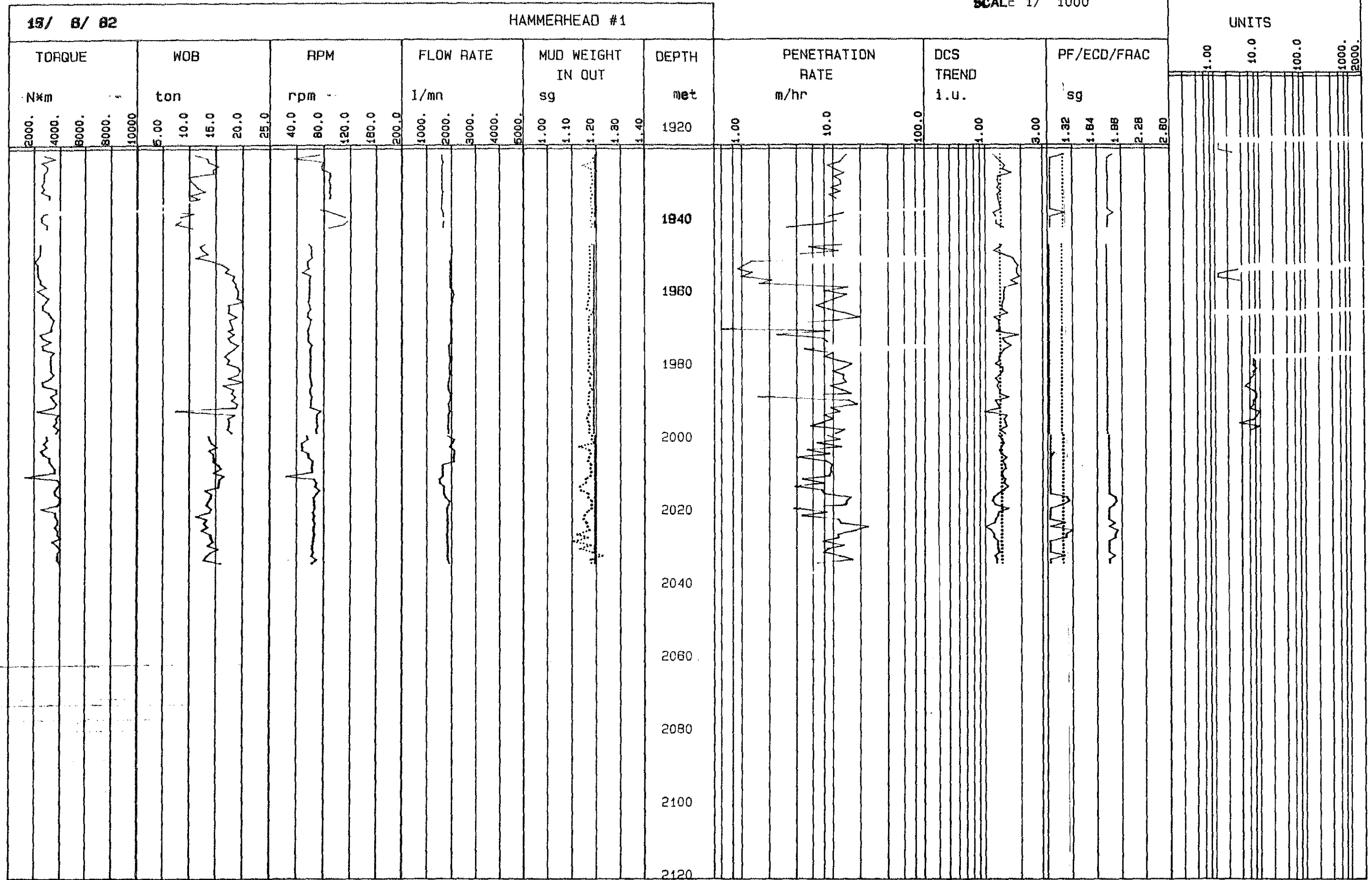
HAMMERHEAD #1



Services

ERO





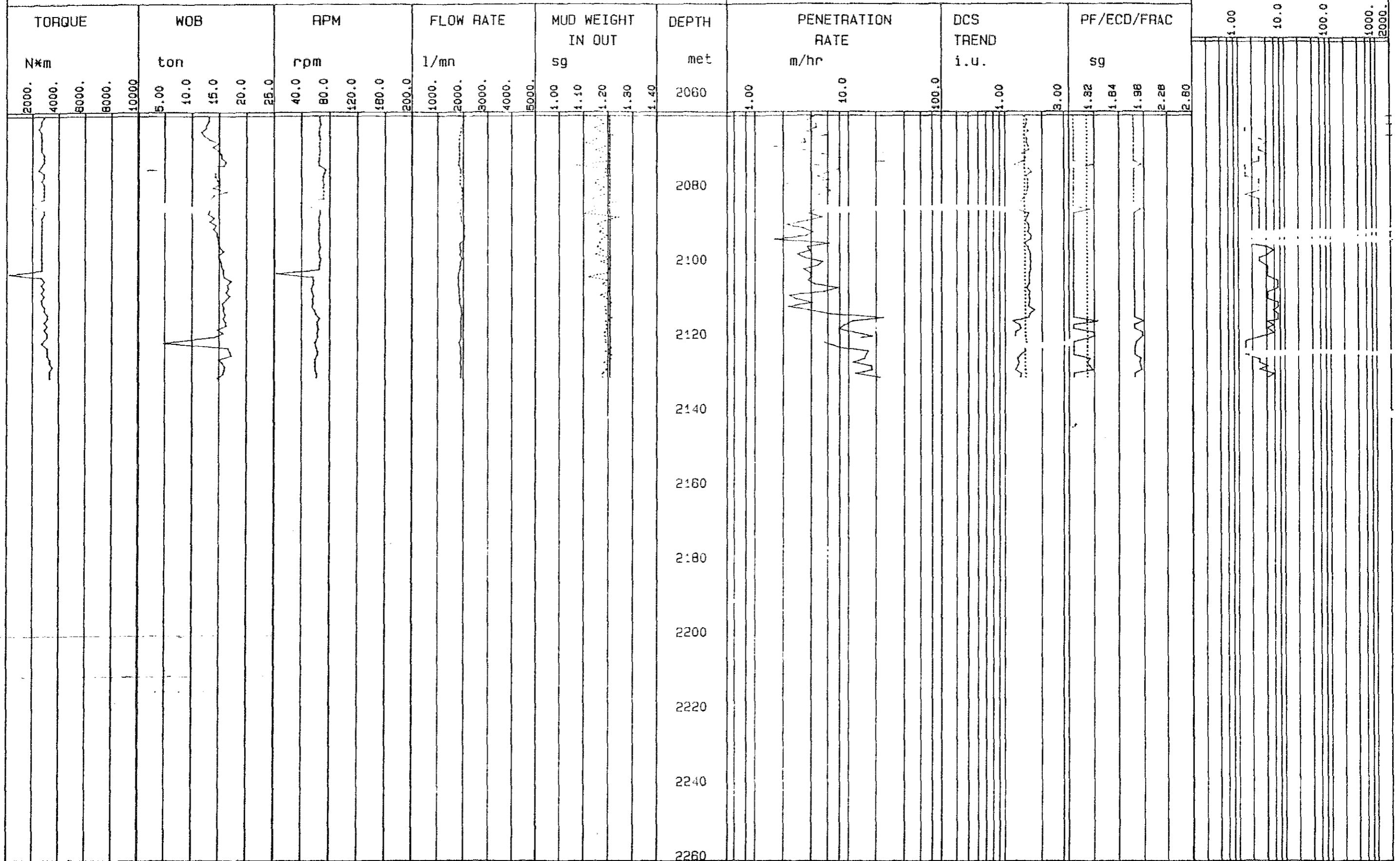


17/ 6/ 82

HAMMERHEAD #1

TOTAL GAS

UNITS



BIT PERFORMANCE PLOTS

GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

17/ 4/ 82

HAMMERHEAD #1

SCALE : 1 / 500

WEIGHT ON BIT tons					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr					TORQUE N*m					SPP kPa				
1.00	2.00	3.00	4.00	5.00	40.0	60.0	120.0	160.0	200.0	1000.	2000.	3000.	4000.	5000.	1.20	1.40	1.60	1.80	2.00				1.00	10.0	100.0	1000.	2000.	3000.	4000.	5000.	5000.	10000	15000	20000	25000		
																				1:00		140															
																				2:00		150															
																				3:00		160															
																				4:00		170															
																				5:00		180															
																				6:00		190															
																				7:00		200															

Geoservices

ZERO



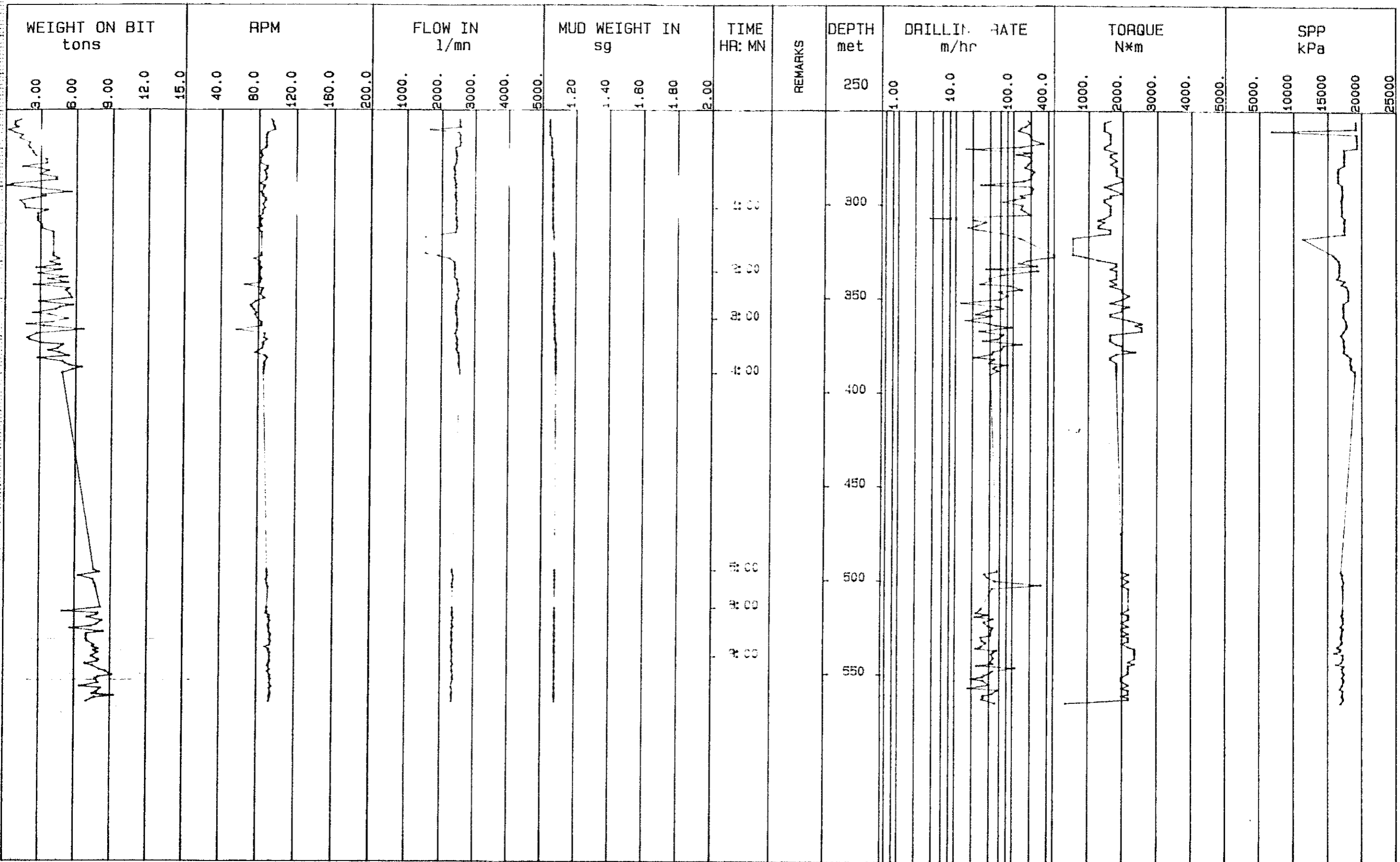
GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

19/ 5/ 82

HAMMERHEAD #1

SCALE : 1 / 2000



GEO SERVICES

ZERO



8/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 5000

WEIGHT ON BIT ton		RPM		FLOW IN l/mn		MUD WEIGHT IN sg		TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr			TORQUE N*m					SPP KPA																					
3.00	6.00	9.00	12.0	15.0	30.0	60.0	90.0	120.0	150.0	600.0	1200.	1800.	2400.	3000.	1.20	1.40	1.60	1.80	2.00		600	1.00	10.0	40.0	1000.	2000.	3000.	4000.	5000.	4800.	9600.	14400	19200	24000						
								00:00																																
								01:00																																
								02:00																																
								03:00																																
								04:00																																
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								09:00																																
								10:00																																
								11:00																																
								12:00																																

GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

10/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 2000

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr				TORQUE N*m				SPP KPA					
3.00	6.00	9.00	12.0	15.0	30.0	60.0	90.0	120.0	150.0	500.0	1200.	1800.	2400.	3000.	1.00	1.10	1.20	1.30	1.40				1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				08:00		1200	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				08:30		1250	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				09:00		1300	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				09:30		1350	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				10:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				10:30		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				11:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				11:30		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				12:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				12:30		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				13:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				13:30		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				14:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				14:30		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000
																				15:00		1400	1.00	10.0	100.0	200.0	2000.	4000.	5000.	6000.	10000	5000.	10000	15000	20000	25000

12/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 2000

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr				TORQUE N*m					SPP KPA				
5.00	10.0	15.0	20.0	25.0	40.0	80.0	120.0	160.0	200.0	1000.	2000.	3000.	4000.	5000.	1.10	1.20	1.30	1.40	1.50			1400	1.00	10.0	100.0	200.0	2000.	4000.	6000.	8000.	10000	5000.	10000	15000	20000	25000
																				1:00		1400														
																				3:00		1450														
																				5:00		1500														
																				7:00		1550														
																				9:00		1600														
																				11:00		1650														
																				13:00		1700														
																				15:00																
																				17:00																
																				19:00																
																				21:00																
																				23:00																
																				25:00																

13/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 300

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr			TORQUE N*m					SPP KPA				
5.00	10.0	15.0	20.0	25.0	40.0	80.0	120.0	160.0	200.0	1000.	2000.	3000.	4000.	5000.	1.08	1.16	1.24	1.32	1.40			1.00	10.0	20.0	2000.	4000.	6000.	8000.	10000	5000.	10000	15000	20000	25000	

GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

13/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 300

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr			TORQUE N*m					SPP KPA				
5.00	10.0	15.0	20.0	25.0	40.0	80.0	120.0	160.0	200.0	1000.	2000.	3000.	4000.	5000.	1.08	1.16	1.24	1.32	1.40			1760	1.00	10.0	40.0	2000.	4000.	6000.	8000.	10000	5000.	10000	15000	20000	25000
																				1:00		1765													
																				2:00		1770													
																				3:00		1775													

14/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 500

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr					TORQUE N*m					SPP KPA						
5.00	10.0	15.0	20.0	25.0	40.0	80.0	120.0	160.0	200.0	1000.	2000.	3000.	4000.	5000.	1.00	1.10	1.20	1.30	1.40				10.0	20.0	30.0	40.0	50.0	1000.	2000.	3000.	4000.	5000.	5000.	10000	15000	20000	25000		





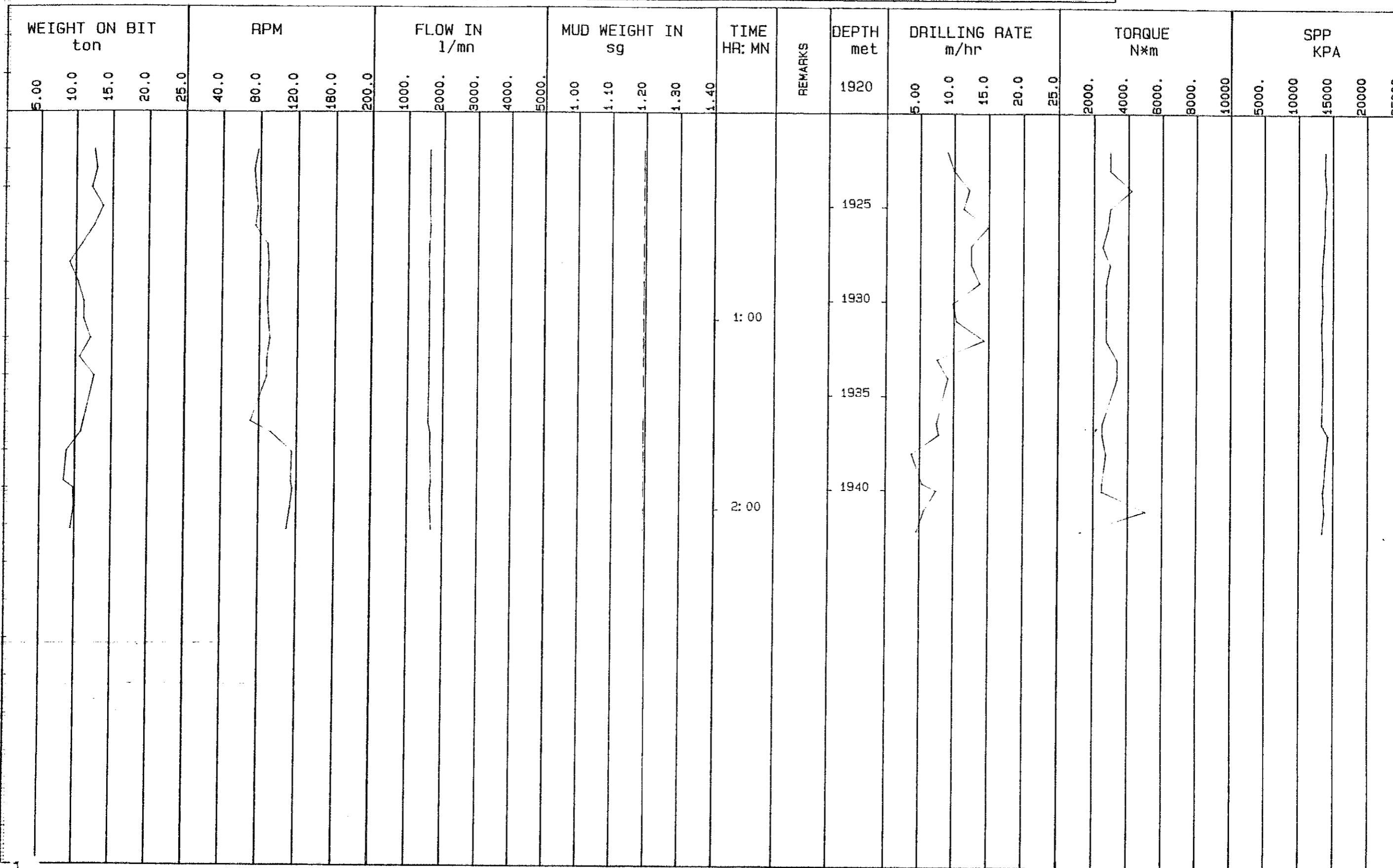
GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

15/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 200



Geoservices Overseas S.A.

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GEOSERVICES  
ON-LINE TDC

BIT PERFORMANCE VERSUS DEPTH

16/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 500

WEIGHT ON BIT ton					RPM					FLOW IN l/mn					MUD WEIGHT IN sg					TIME HR: MN	REMARKS	DEPTH met	DRILLING RATE m/hr			TORQUE N*m					SPP KPA				
5.00	10.0	15.0	20.0	25.0	40.0	80.0	120.0	180.0	200.0	1000.	2000.	3000.	4000.	5000.	1.08	1.16	1.24	1.32	1.40				1.00	10.0	100.0	1000.	2000.	3000.	4000.	5000.	5000.	10000	15000	20000	25000
																				1:00		1950													
																				2:00															
																				3:00		1980													
																				7:00		1970													
																				8:00															
																				9:00		1980													
																				10:00		1990													



BIT COST PLOTS

GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

17/ 4/ 82

HAMMERHEAD #1

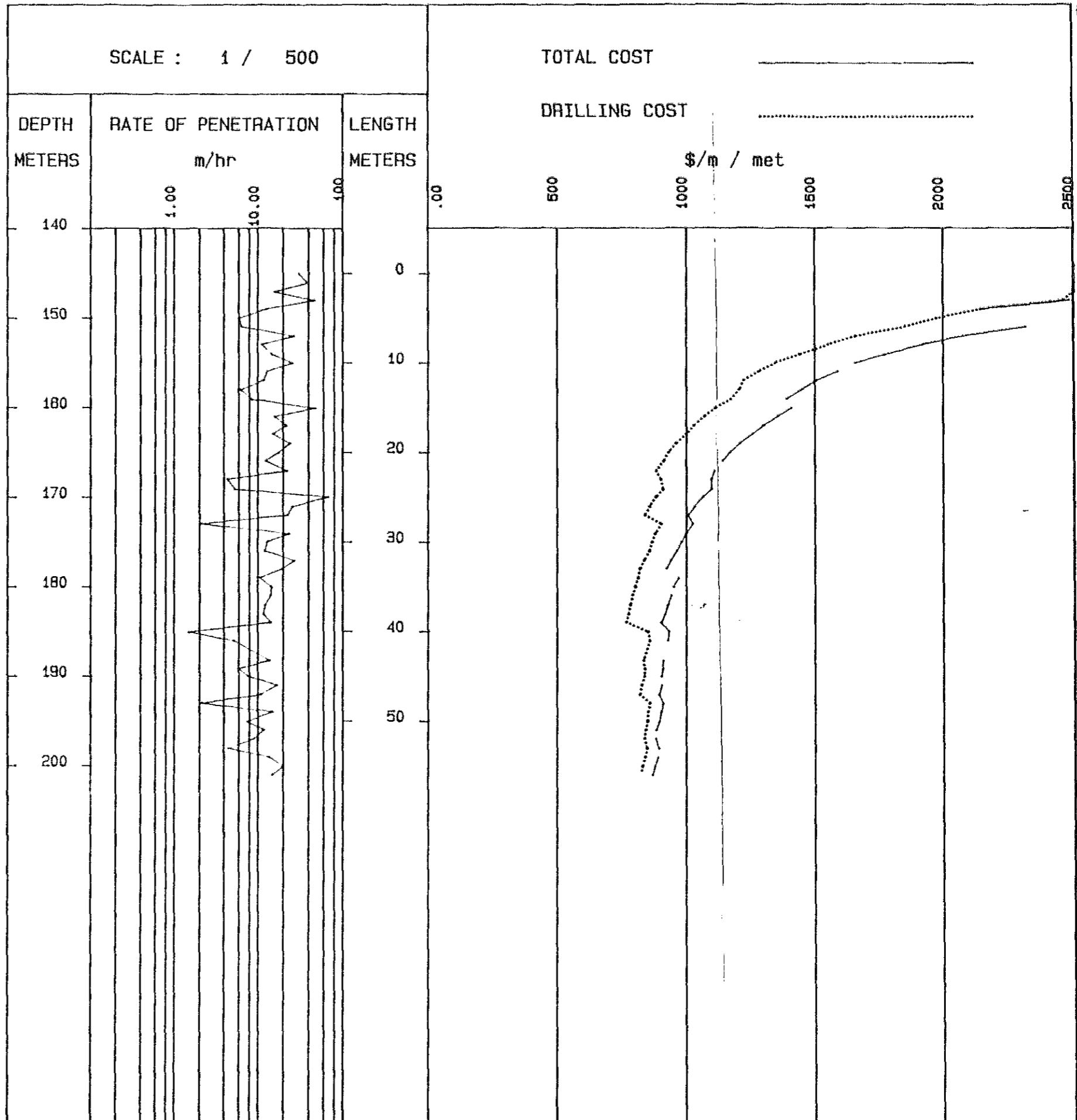
SCALE : 1 / 500

TOTAL COST \_\_\_\_\_

DRILLING COST \_\_\_\_\_

BIT TYPE	:	TOOTH
BIT IDENTITY	:	RD BIT &HO
BIT SIZE	:	36.00 INCHES
BIT COST	:	0 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	2.0 HRS
STARTED AT	:	143.0 met

ENDED AT	:	202.0 met
TOTAL BIT TIME	:	8.6 HRS
BOTTOM TIME	:	6.6 HRS
MINIMUM DRILLING COST		
- HOUR	:	3.4 HRS
- DEPTH	:	184.0 met
- COST	:	768.9 \$/m / met
FINAL TOTAL COST	:	869.0 \$/m / met



ZERO

GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

19/ 5/ 82

HAMMERHEAD #1

SCALE : 1 / 2000

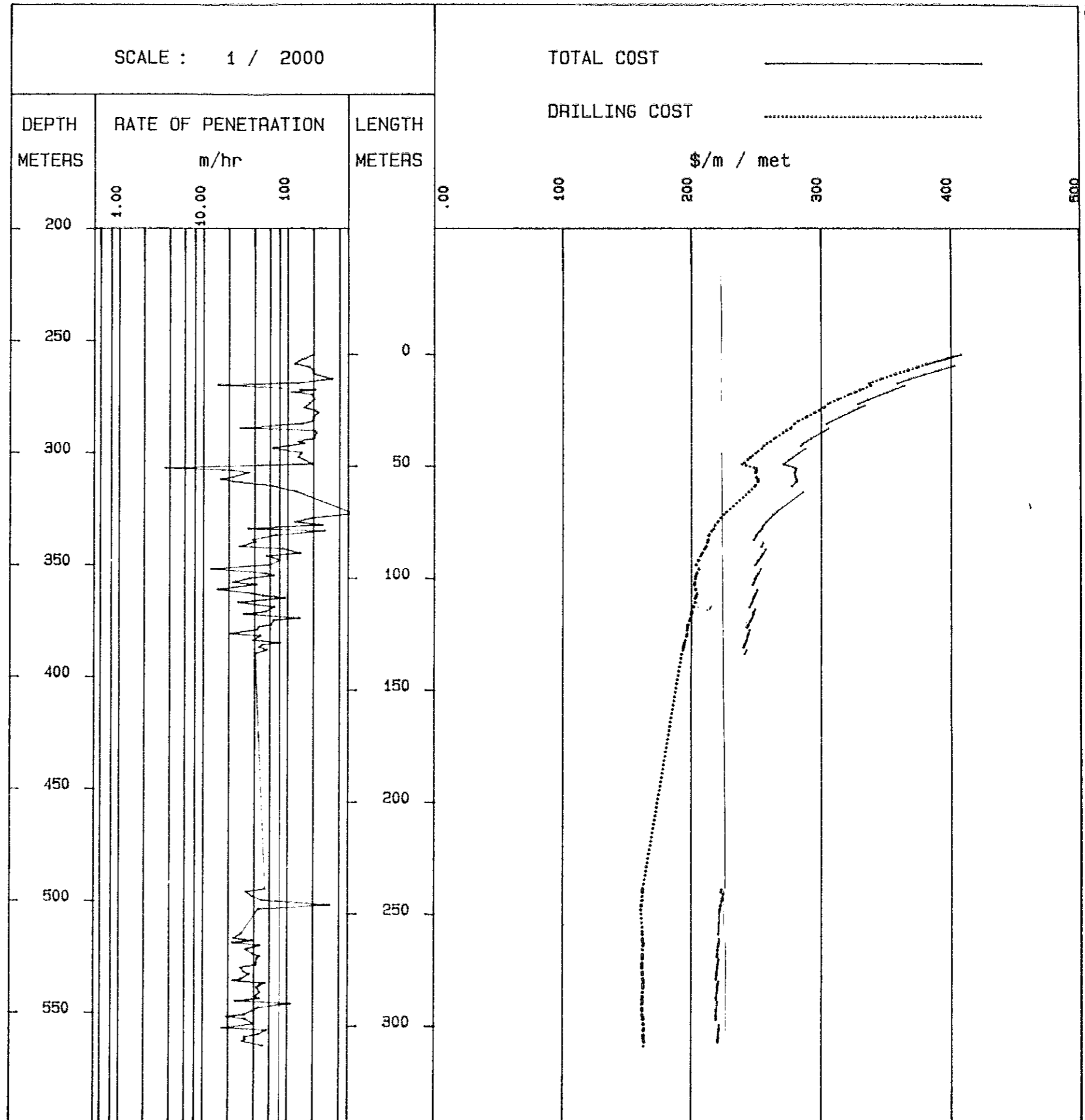
TOTAL COST \_\_\_\_\_

DRILLING COST \_\_\_\_\_

\$/m / met

BIT TYPE	:	TOOTH
BIT IDENTITY	:	RD FP 12
BIT SIZE	:	12.25 INCHES
BIT COST	:	10000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	2.0 HRS
STARTED AT	:	203.0 met

ENDED AT	:	565.0 met
TOTAL BIT TIME	:	12.0 HRS
BOTTOM TIME	:	10.0 HRS
MINIMUM DRILLING COST		
- HOUR	:	4.6 HRS
- DEPTH	:	505.1 met
- COST	:	161.3 \$/m / met
FINAL TOTAL COST	:	220.7 \$/m / met



GEOservices

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GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

8/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 5000

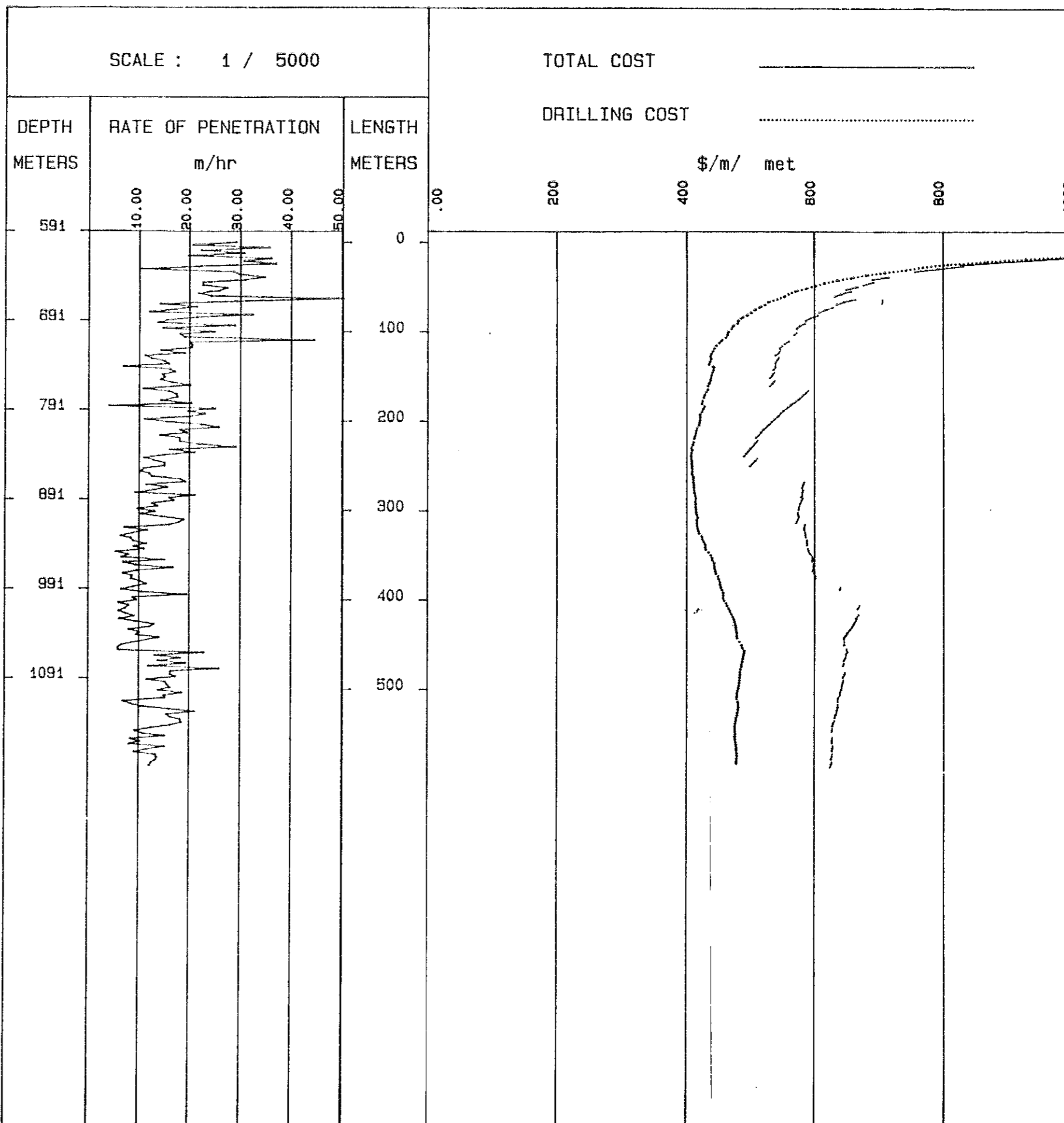
TOTAL COST \_\_\_\_\_

DRILLING COST \_\_\_\_\_

\$/m/ met

BIT TYPE	:	M/T00T
BIT IDENTITY	:	HTC J1
BIT SIZE	:	12.25 INCHES
BIT COST	:	7500 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	3.0 HRS
STARTED AT	:	591.0 met

ENDED AT	:	1200 met
TOTAL BIT TIME	:	62.8 HRS
BOTTOM TIME	:	59.8 HRS
- MINIMUM DRILLING COST		
- HOUR	:	13.1 HRS
- DEPTH	:	840.0 met
- COST	:	406.2 \$/m/ met
FINAL TOTAL COST	:	624.5 \$/m/ met





GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

10/ 6/ 82

HAMMERHEAD #1

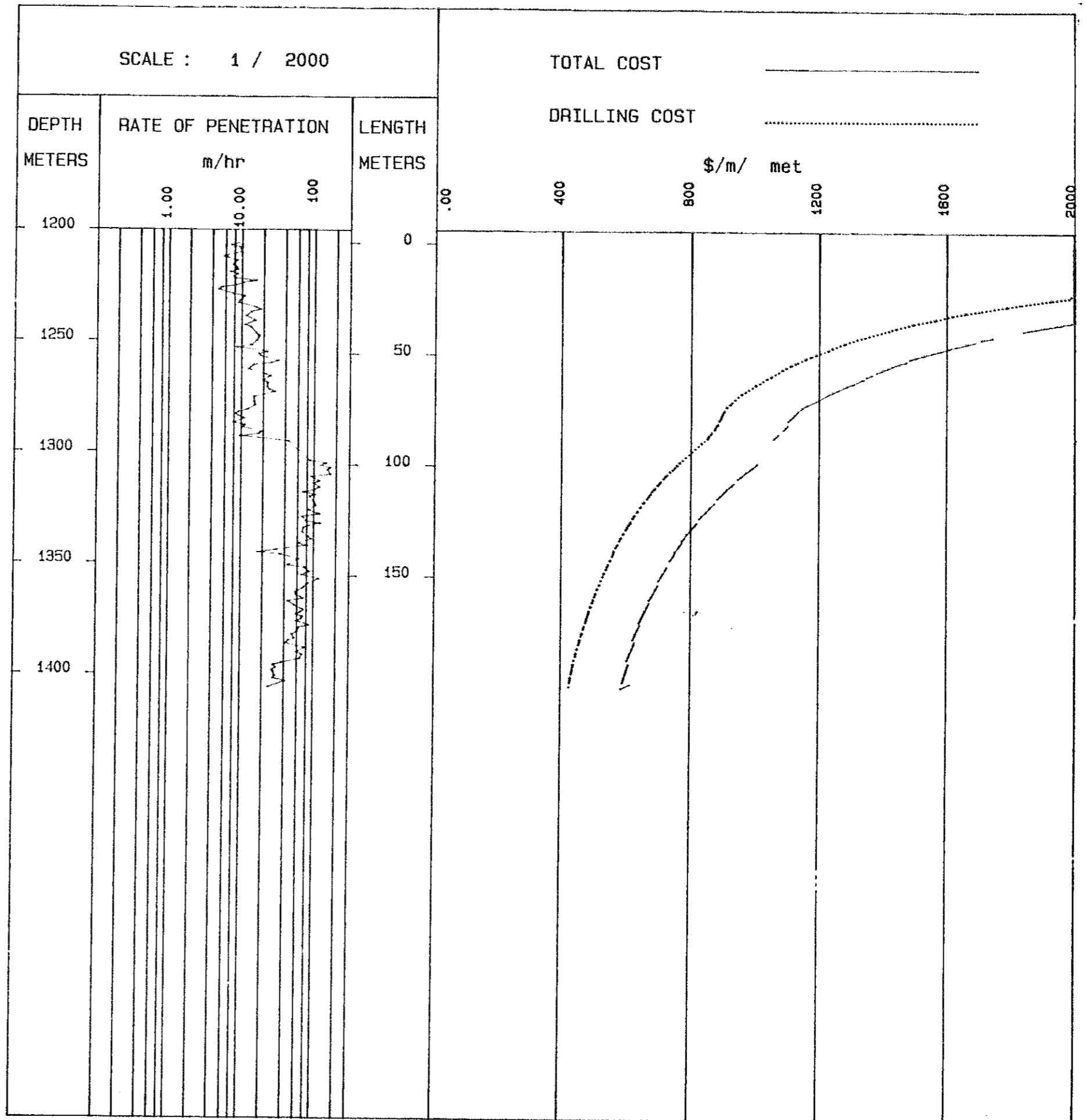
SCALE : 1 / 2000

TOTAL COST \_\_\_\_\_

DRILLING COST \_\_\_\_\_

BIT TYPE	:	TOOTH
BIT IDENTITY	:	REED S13
BIT SIZE	:	8.50 INCHES
BIT COST	:	7000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	4.0 HRS
STARTED AT	:	1204.5 met

ENDED AT	:	1406.0 met
TOTAL BIT TIME	:	19.1 HRS
BOTTOM TIME	:	15.1 HRS
MINIMUM DRILLING COST		
- HOUR	:	9.6 HRS
- DEPTH	:	1406.0 met
- COST	:	428.0 \$/m/ met
FINAL TOTAL COST	:	588.8 \$/m/ met



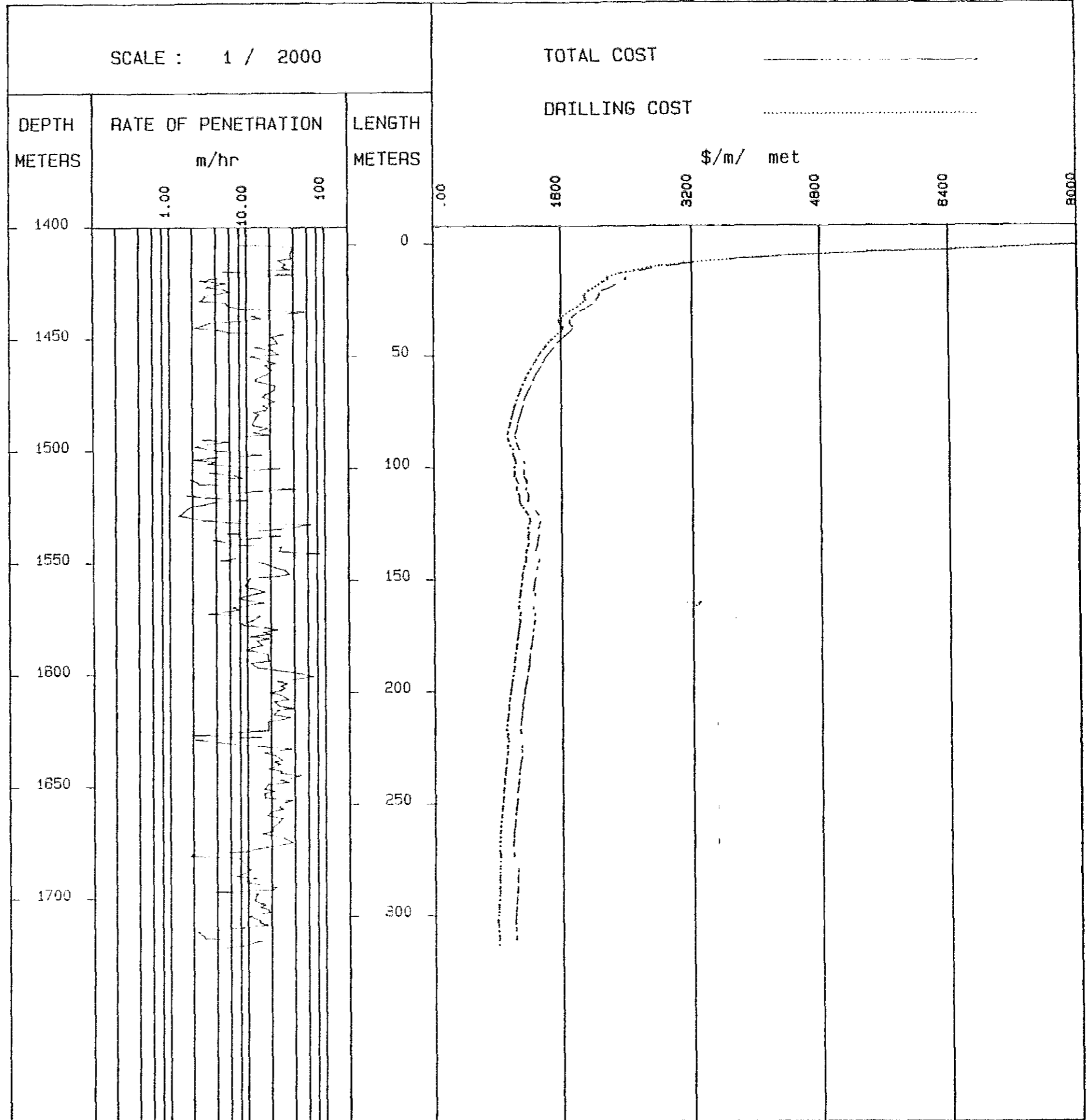
GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

13/ 6/ 82                      HAMMERHEAD #1

BIT TYPE	:	INSERT
BIT IDENTITY	:	REED HSS1
BIT SIZE	:	8.50 INCHES
BIT COST	:	8000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	4.0 HRS
STARTED AT	:	1406.0 met

ENDED AT	:	1722.5 met
TOTAL BIT TIME	:	54.0 HRS
BOTTOM TIME	:	50.0 HRS
MINIMUM DRILLING COST		
- HOUR	:	36.7 HRS
- DEPTH	:	1714.1 met
- COST	:	796.1 \$/m/ met
FINAL TOTAL COST	:	1022.1 \$/m/ met



GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

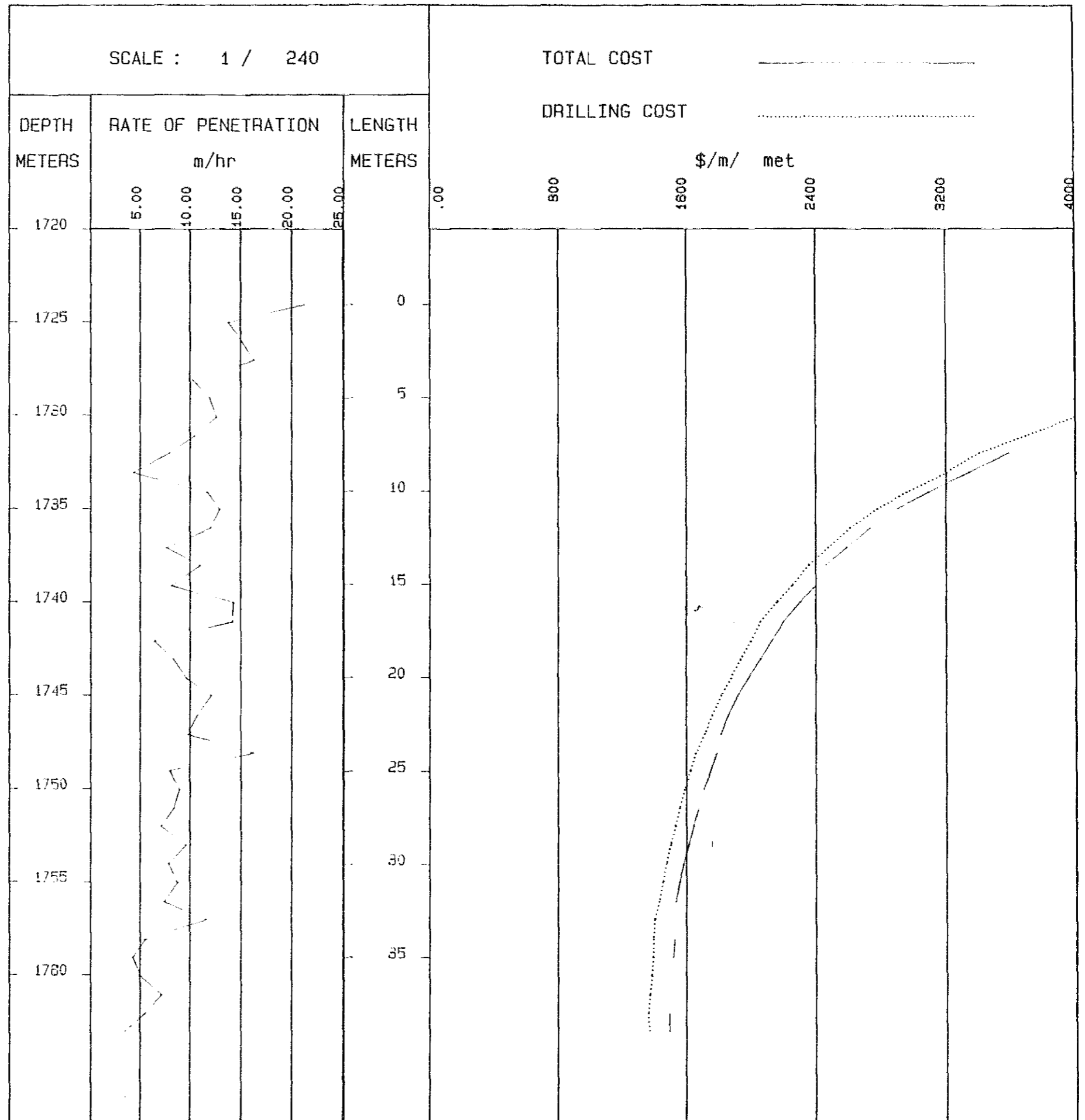
13/ 6/ 82

HAMMERHEAD #1

BIT TYPE	:	T00TH
BIT IDENTITY	:	SEC S11
BIT SIZE	:	8.50 INCHES
BIT COST	:	5000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	4.0 HRS
STARTED AT	:	1722.5 met

ENDED AT	:	1763.2 met
TOTAL BIT TIME	:	9.5 HRS
BOTTOM TIME	:	5.5 HRS
MINIMUM DRILLING COST		
- HOUR	:	4.4 HRS
- DEPTH	:	1762.1 met
- COST	:	1365.7 \$/m/ met
FINAL TOTAL COST	:	1495.4 \$/m/ met

SCALE : 1 / 240



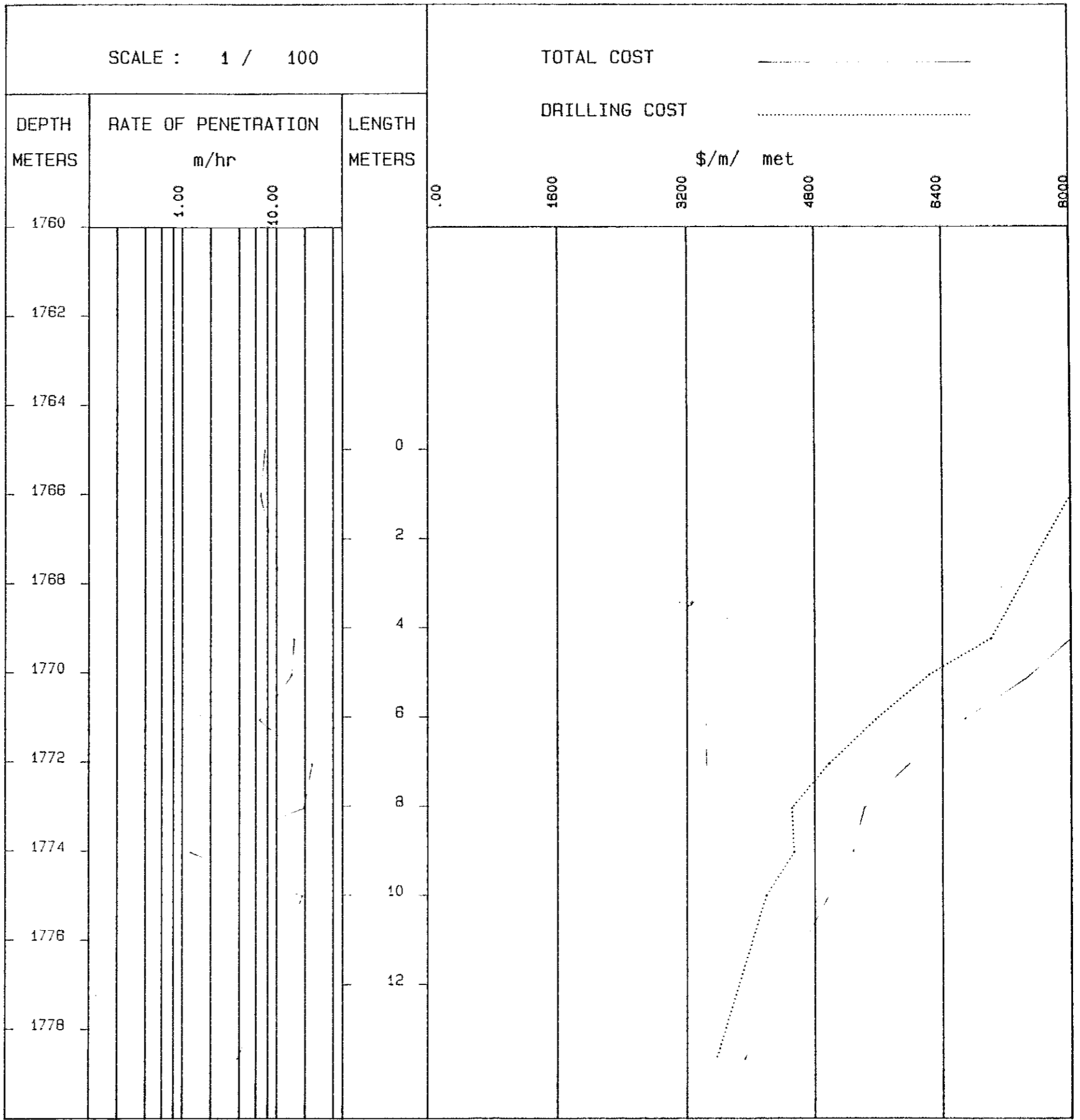
GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

13/ 6/ 82                      HAMMERHEAD #1

BIT TYPE	:	T00TH
BIT IDENTITY	:	HTC JDB
BIT SIZE	:	8.50 INCHES
BIT COST	:	5000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1763.2 met

ENDED AT	:	1778.7 met
TOTAL BIT TIME	:	9.6 HRS
BOTTOM TIME	:	3.6 HRS
MINIMUM DRILLING COST		
- HOUR	:	2.6 HRS
- DEPTH	:	1778.7 met
- COST	:	3560.7 \$/m/ met
FINAL TOTAL COST	:	3912.5 \$/m/ met



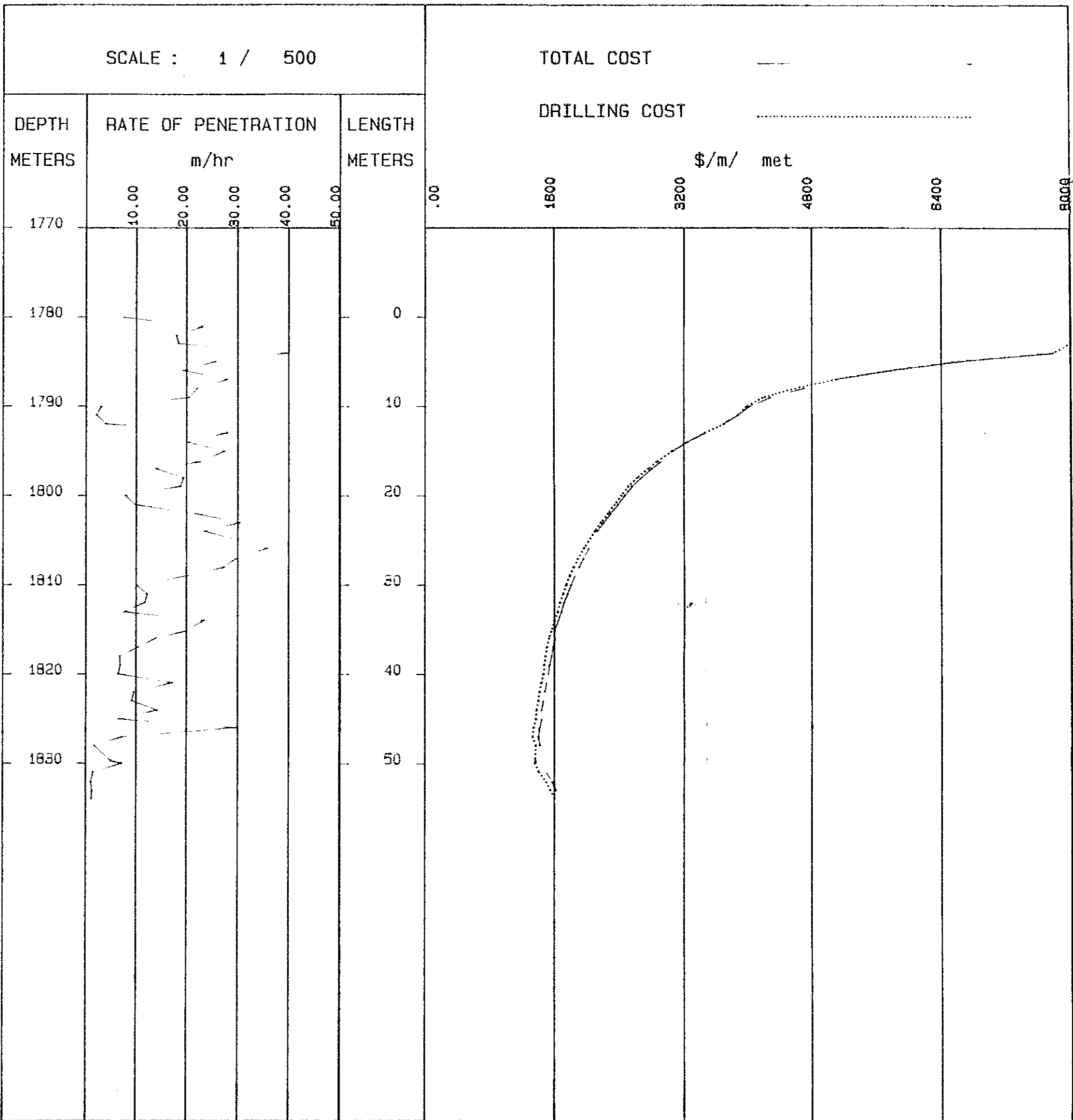
GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

14/ 6/ 82                      HAMMERHEAD #1

BIT TYPE	:	TOOTH
BIT IDENTITY	:	HTC J7
BIT SIZE	:	8.50 INCHES
BIT COST	:	5000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1778.7 met

ENDED AT	:	1834.7 met
TOTAL BIT TIME	:	15.2 HRS
BOTTOM TIME	:	9.2 HRS
MINIMUM DRILLING COST		
- HOUR	:	4.2 HRS
- DEPTH	:	1827.1 met
- COST	:	1335.2 \$/m/ met
FINAL TOTAL COST	:	1697.1 \$/m/ met



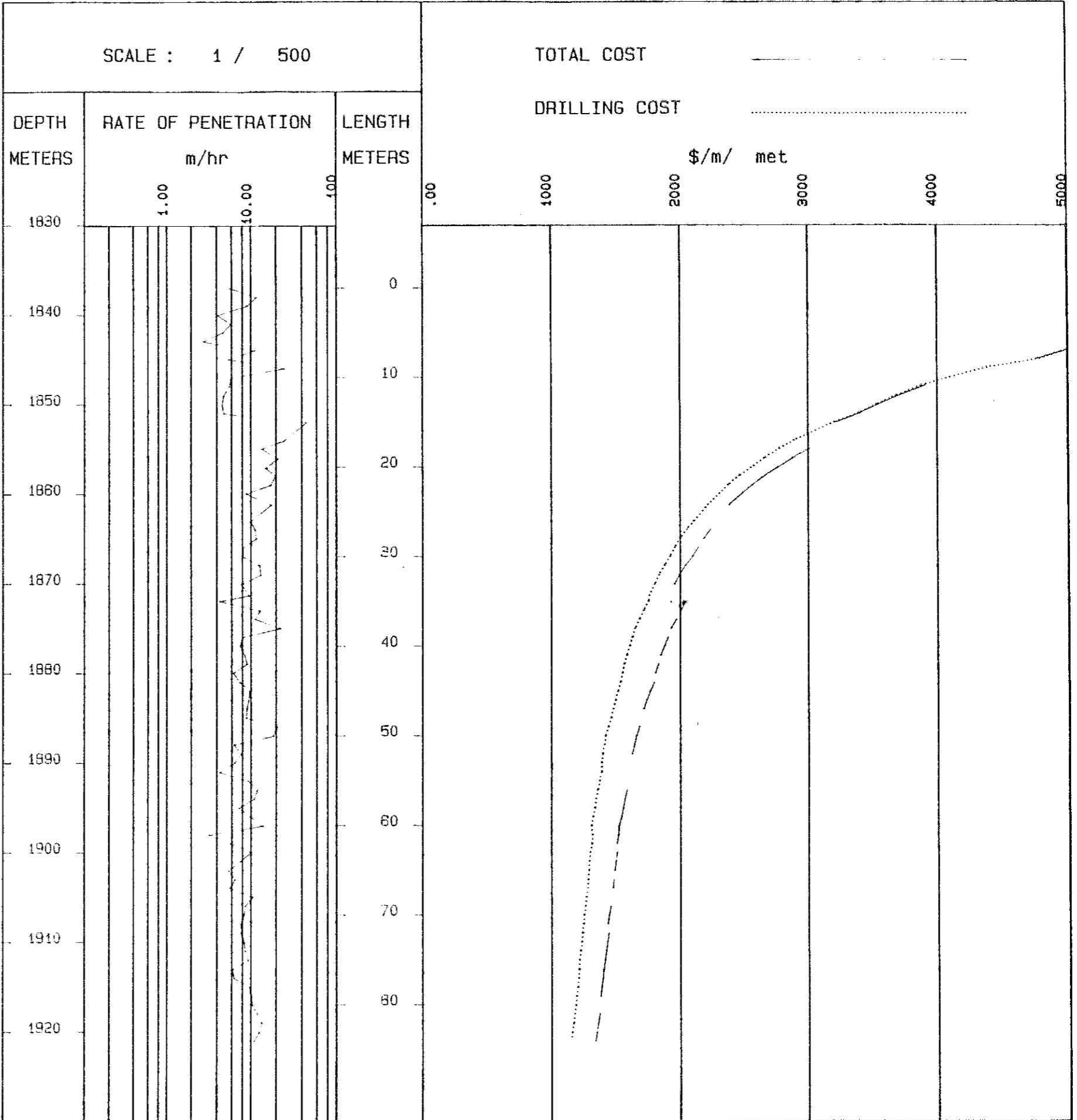
GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

15/ 6/ 82                      HAMMERHEAD #1

BIT TYPE	:	TOOTH
BIT IDENTITY	:	HTC J3
BIT SIZE	:	8.50 INCHES
BIT COST	:	5000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1834.7 met

ENDED AT	:	1921.2 met
TOTAL BIT TIME	:	19.0 HRS
BOTTOM TIME	:	13.0 HRS
MINIMUM DRILLING COST		
- HOUR	:	10.3 HRS
- DEPTH	:	1921.0 met
- COST	:	1155.9 \$/m/ met
FINAL TOTAL COST	:	1341.6 \$/m/ met



GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

15/ 6/ 82

HAMMERHEAD #1

SCALE : 1 / 200

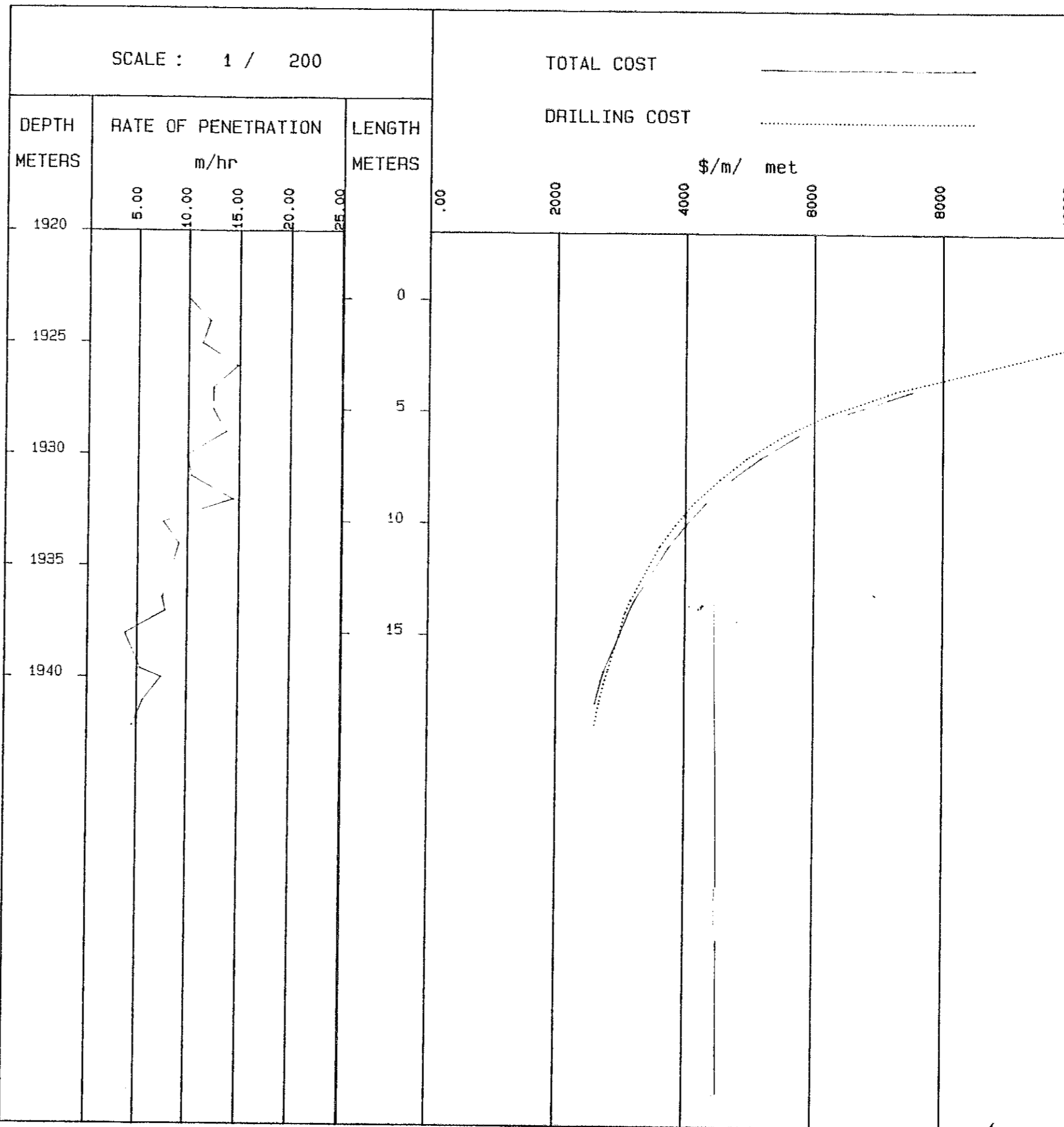
TOTAL COST

DRILLING COST

\$/m/ met

BIT TYPE	:	TOOTH
BIT IDENTITY	:	HTC J3
BIT SIZE	:	8.50 INCHES
BIT COST	:	5000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1921.2 met

ENDED AT	:	1942.2 met
TOTAL BIT TIME	:	8.9 HRS
BOTTOM TIME	:	2.9 HRS
MINIMUM DRILLING COST		
- HOUR	:	2.5 HRS
- DEPTH	:	1942.2 met
- COST	:	2605.1 \$/m/ met
FINAL TOTAL COST	:	2726.5 \$/m/ met



ZERO



GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

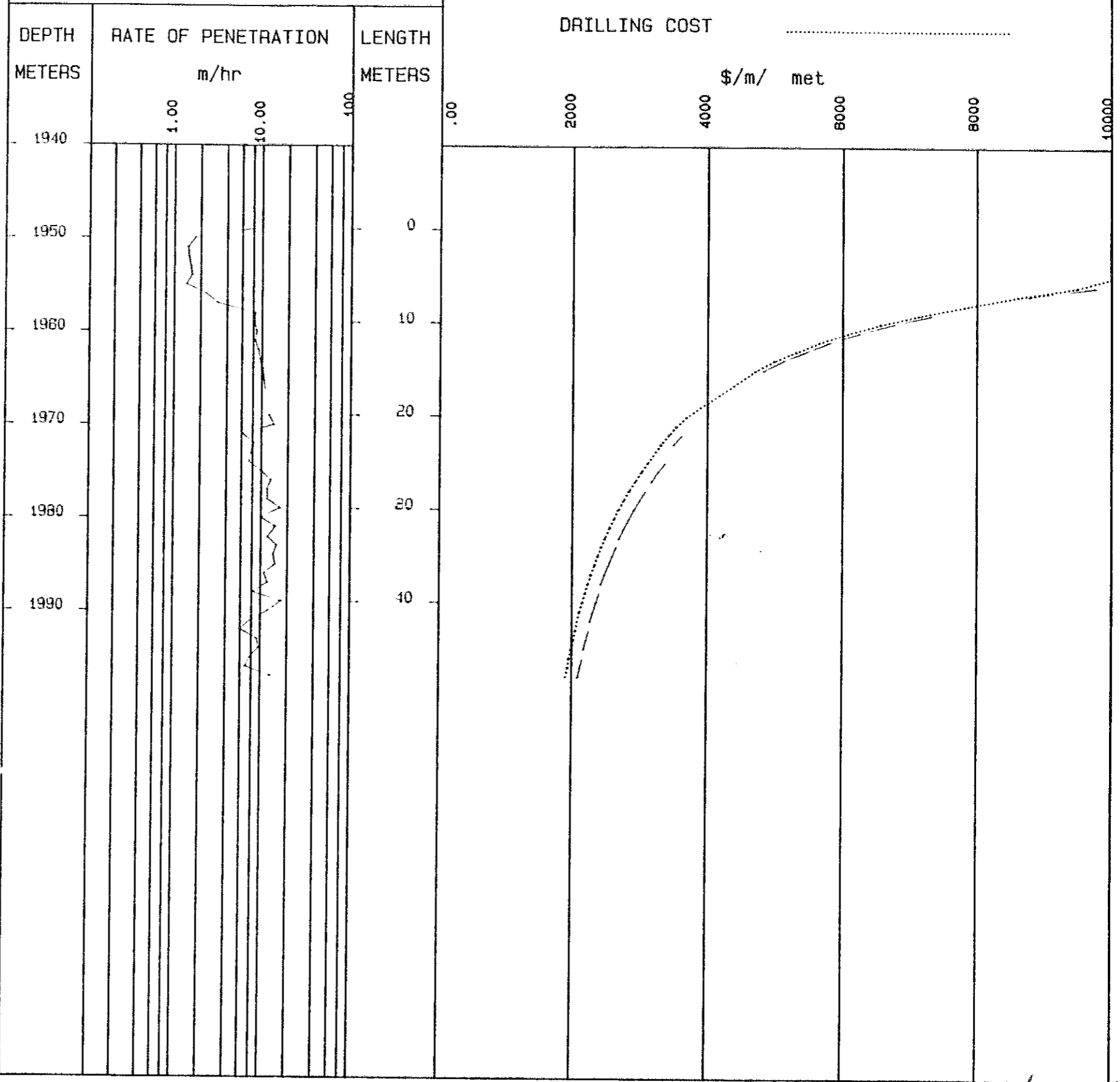
16/ 6/ 82                      HAMMERHEAD #1

SCALE : 1 / 500

TOTAL COST

DRILLING COST

BIT TYPE	:	INSERT
BIT IDENTITY	:	HTC J33
BIT SIZE	:	8.50 INCHES
BIT COST	:	8000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1948.0 met



ENDED AT	:	1997.9 met
TOTAL BIT TIME	:	16.2 HRS
BOTTOM TIME	:	10.2 HRS
MINIMUM DRILLING COST		
- HOUR	:	8.7 HRS
- DEPTH	:	1997.0 met
- COST	:	1918.1 \$/m/ met
FINAL TOTAL COST	:	2093.0 \$/m/ met

Geoservices Overseas S.A.

ERO

GEOSERVICES  
ON-LINE TDC

BIT COST REPORT

17/ 6/ 82

HAMMERHEAD #1

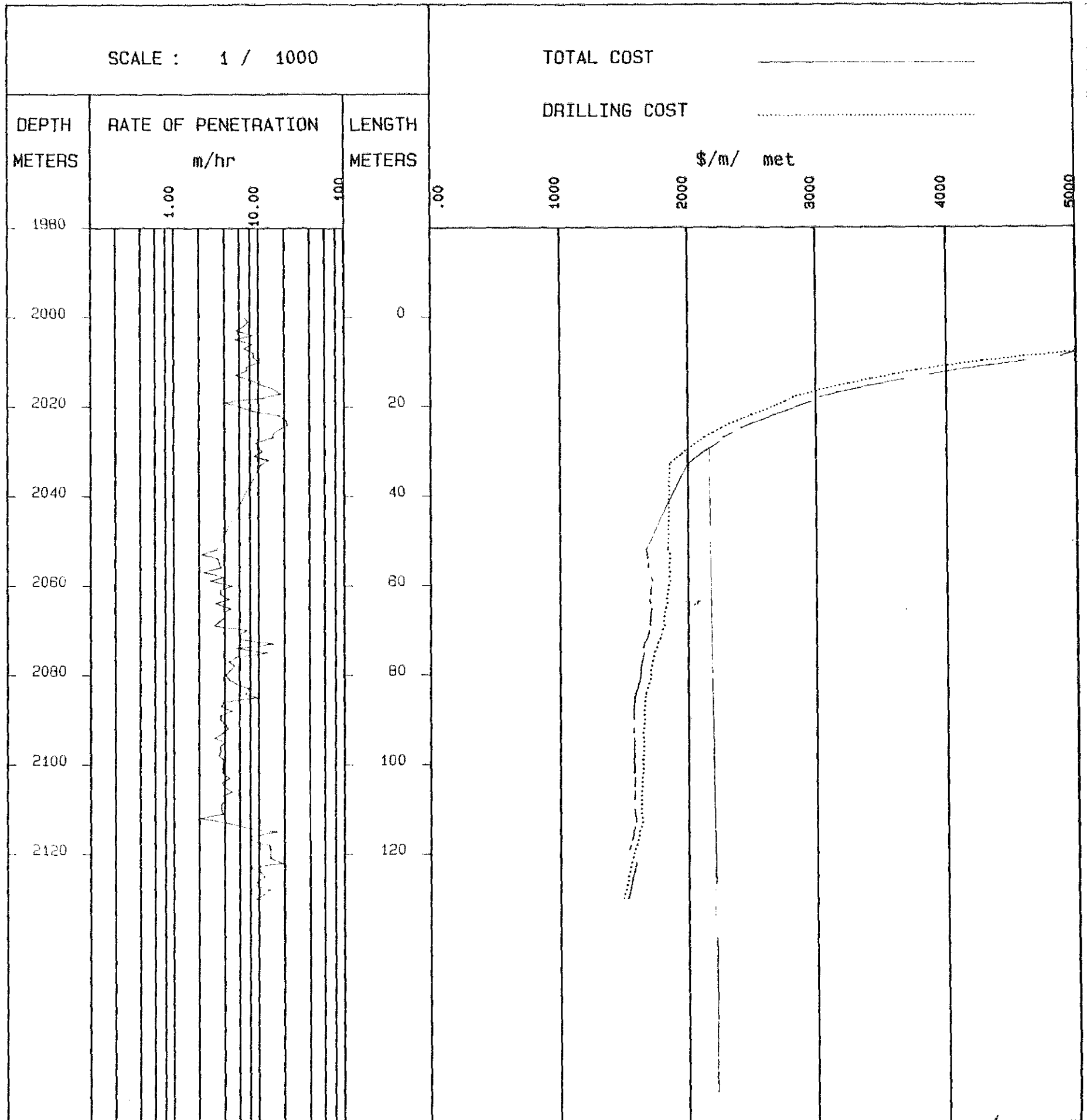
SCALE : 1 / 1000

TOTAL COST

DRILLING COST

BIT TYPE	:	INSERT
BIT IDENTITY	:	HTC J22
BIT SIZE	:	8.50 INCHES
BIT COST	:	8000 \$/m
RIG COST	:	5833 \$/m (PER HOUR)
TRIP TIME	:	6.0 HRS
STARTED AT	:	1997.9 met

ENDED AT	:	2131.0 met
TOTAL BIT TIME	:	33.2 HRS
BOTTOM TIME	:	27.2 HRS
MINIMUM DRILLING COST		
- HOUR	:	26.5 HRS
- DEPTH	:	2130.1 met
- COST	:	1493.0 \$/m/ met
FINAL TOTAL COST	:	1525.6 \$/m/ met



GEOSERVICES OVERSEAS S.A.

ZERO

REAL TIME PRINT - OUT  
(including Bit Reports  
and Daily Hydraulic Reports)

\*\*\*\*\*  
# 17/ 4/82  
\*\*\*\*\*  
# 17/ 4/82  
\*\*\*\*\*

\*\*\*\*\*  
# BIT #1 RUN #1 SEQ NBR: 0  
\*\*\*\*\*

\*\*\*\*\*  
# STARTING DEPTH 143.00 METERS  
\*\*\*\*\*

\*\*\*\*\*  
# BIT DATA SIZE 36.00  
# TOOTH REED BIT &  
# LES 28 28 28 @ 95 % EFFICIENCY  
\*\*\*\*\*

DRILL STRING SECTION	TYPE	NDR	LENGTH METERS	ID INCHES	OD INCHES	NOMINAL LINEAR WEIGHT (KG/M)
1	DRILL PIPE	5	9.22	4.28	5.00	29.02
2	DRILL COLLAR	1	56.60	2.81	7.75	207.00
3	DRILL COLLAR	1	33.24	3.00	9.50	322.90

\*\*\*\*\*  
# HOLE ID DEPTH (METERS)  
# INCHES TOP BOTTOM  
\*\*\*\*\*

\*\*\*\*\*  
# RISER 17.37 \* .00 143.00  
# OPEN HOLE 1 \* 36.00 \* 143.00 143.00  
\*\*\*\*\*

\*\*\*\*\*  
# COST DATA BIT COST 0 \$ RIG COST 5033 \$/HR  
# TRIP TIME 2.00 HRS  
\*\*\*\*\*

\*\*\*\*\*  
# WEIGHTS HOOK LOAD OFF BOTTOM 60.6 TONS  
# STRING WEIGHT IN AIR 23.8 TONS  
\*\*\*\*\*

\*\*\*\*\*  
# VOLUMES ANNULUS 10.0 M3 IN PIPES .9 M3  
\*\*\*\*\*

\*\*\*\*\*  
# DEVIATION .0 DEG .000 M / 100 M  
\*\*\*\*\*

\*\*\*\*\*  
# HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 392 KPA  
\*\*\*\*\*

\*\*\*\*\*  
# BIT WEAR TYPE EXPONENT .6  
# EXPECTED: RUN LENGTH 57 METERS TEETH WEAR 0 /OTH  
\*\*\*\*\*

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 17/ 4/82

\* BIT #1 RUN #1 RD BIT BIT DIAMETER : 36.00 inch NOZZ 20/20/20

MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

* TIME	* DEPTHS			* DRILLING PARAMETERS						* MUD PARAMETERS				* GAS				* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT		
	* MEASURED	* VERTCL	* LAGGED	* ROP	* WOB	* RPM	* TORQ	* PRESS	* FLOW	* PIT	* DENSITY	* TEMPERATURE		* RESISTIVITY		* DCS	* NORH	* PF	* ECD	* FRAC	* METER	* TIME	* COST	
* Hr:mn	* met	* met	* met	* m/hr	* tons	* rpm	* Nm	* kPa	* l/m	* m3	* IN	* OUT	* IN	* OUT	* ohm	* unit	* sq	* sq	* sq	* met	* Dhr	* \$/m		
D * 3: 0	143.9	143.9	95.0	7.9	-2.1	0	181	4552	3481	101.1	1.80	19.2	18.2	.19	-.19	2.0	-.16	.00	.00	2.16	.53	43.9	.11	280
D * 5: 3	144.9	144.6	95.0	30.3	1.2	6	181	4582	3383	44.7	1.07	18.3	18.6	.19	.00	2.0	-.20	.00	.00	2.32	.53	1.6	1.66	13659
D * 5: 5	146.0	145.5	95.0	38.1	.6	15	181	4532	3400	45.5	1.08	18.4	18.6	.19	.00	1.0	.07	.00	.00	2.33	.53	2.5	1.69	8472
D * 5: 7	147.0	146.6	95.0	46.2	.2	19	181	2426	2754	45.5	1.07	18.4	18.6	.19	.00	2.0	.24	.00	.00	2.05	.53	3.6	1.72	5959
D * 5:11	148.0	147.6	95.0	9.9	-.5	22	181	1007	2258	45.3	1.08	18.6	18.6	.19	.00	2.0	.00	.00	.00	1.02	.53	4.6	1.79	4817
D * 5:13	148.9	148.5	95.0	20.6	.1	20	181	1007	2250	45.3	1.07	18.6	18.8	.19	.00	1.0	.00	.00	.00	1.02	.53	5.5	1.83	4807
D * 5:25	150.0	149.6	95.0	5.9	-.1	23	181	2276	2466	41.1	1.03	18.5	18.7	.19	.00	2.0	.52	.00	.00	1.03	.53	6.6	2.03	3488
D * 6:12	151.0	150.5	95.0	6.4	.1	29	181	5420	3682	43.5	1.03	18.3	18.6	.19	.00	3.0	.46	.00	.00	2.05	.53	7.5	2.18	3195
D * 6:15	152.0	151.6	95.0	19.7	.7	28	181	5420	3682	40.2	1.04	18.2	18.6	.19	.00	4.0	.34	.00	.00	2.05	.53	8.6	2.22	2854
D * 6:19	153.0	152.6	95.0	11.2	1.4	29	181	5390	3665	53.6	1.07	18.4	18.6	.19	.00	3.0	.49	.00	.00	2.46	.53	9.6	2.29	2606
D * 6:22	154.0	153.6	95.0	14.5	1.2	29	181	5540	3758	51.8	1.06	18.2	18.6	.19	.00	3.0	.51	.00	.00	2.42	.53	10.6	2.34	2379
D * 6:26	154.9	154.6	95.0	15.7	1.7	29	181	5660	3793	50.4	1.06	18.4	18.6	.19	.00	3.0	.48	.00	.00	2.53	.53	11.6	2.41	2216
D * 6:34	156.0	155.5	95.0	12.7	1.2	29	181	5660	3776	47.8	1.07	18.3	18.6	.19	.00	3.0	.54	.00	.00	2.51	.53	12.5	2.54	2070
D * 6:38	157.0	156.5	95.0	11.6	1.4	28	181	5660	3776	46.8	1.07	18.3	18.6	.19	.00	4.0	.54	.00	.00	2.50	.53	13.5	2.61	1977
D * 6:43	158.0	157.6	95.0	14.0	.2	21	362	5670	3793	46.1	1.07	18.4	18.6	.19	.00	4.0	.49	.00	.00	2.51	.53	14.6	2.68	1859
D * 6:51	159.0	158.6	95.0	14.9	.4	36	181	5630	3756	44.3	1.07	18.3	18.6	.19	.00	4.0	.53	.00	.00	2.47	.53	15.6	2.82	1779
D * 7: 9	160.0	159.5	95.0	10.2	1.6	14	181	5540	3729	50.6	1.07	18.3	18.6	.19	.00	1.0	.49	.00	.00	2.44	.53	16.5	2.87	1717
D * 7:12	161.0	160.6	95.0	13.3	1.2	24	181	5510	3717	49.2	1.07	18.2	18.6	.19	.00	1.0	.44	.00	.00	2.43	.53	17.6	2.93	1627
D * 7:15	161.9	161.7	95.0	21.6	1.7	24	181	5510	3717	48.2	1.07	18.2	18.6	.19	.00	1.0	.48	.00	.00	2.42	.53	18.7	2.98	1550
D * 7:19	163.0	163.0	95.0	14.9	1.8	22	181	5510	3736	47.4	1.07	18.3	18.6	.19	.00	1.0	.51	.00	.00	2.42	.53	20.0	3.05	1471
D * 7:22	164.0	163.6	95.0	23.9	1.3	22	181	5510	3704	47.0	1.07	18.2	18.6	.19	.00	1.0	.41	.00	.00	2.39	.53	20.6	3.09	1436
D * 7:25	164.9	164.6	95.0	24.3	.4	40	181	5400	3717	46.5	1.07	18.3	18.6	.19	.00	1.0	.40	.00	.00	2.39	.53	21.6	3.15	1387
D * 7:31	166.0	166.0	95.0	12.2	.3	39	181	5450	3699	46.5	1.07	18.3	18.6	.19	.00	1.0	.50	.00	.00	2.38	.53	23.0	3.23	1327
D * 7:34	167.0	166.5	95.0	11.2	1.0	34	181	5400	3707	46.5	1.07	18.4	18.6	.19	.00	1.0	.49	.00	.00	2.38	.53	23.5	3.30	1310
D * 7:42	167.9	167.6	95.0	4.3	.1	41	181	5400	3724	46.5	1.07	18.3	18.6	.19	.00	2.0	.64	.00	.00	2.39	.53	24.6	3.43	1285
D * 7:56	169.2	169.0	95.0	5.3	-1.4	45	181	5779	3793	48.4	1.07	18.5	18.6	.19	.00	2.0	-.00	.00	.00	2.42	.53	26.0	3.56	1244
D * 7:57	170.0	170.0	95.0	66.8	1.2	36	181	5809	3795	46.1	1.07	18.5	18.6	.19	.00	2.0	.26	.00	.00	2.41	.53	27.0	3.57	1203
D * 7:58	171.0	170.6	95.0	37.2	-.6	44	181	5749	3793	44.7	1.07	18.5	18.6	.19	.00	2.0	.30	.00	.00	2.40	.53	27.6	3.60	1180
D * 8: 1	171.9	171.6	95.0	22.3	-.1	26	181	5809	3795	44.1	1.07	18.3	18.6	.19	.00	2.0	.00	.00	.00	2.39	.53	28.6	3.64	1148
D * 8:17	172.9	172.5	95.0	16.7	1.4	32	181	5839	3813	39.7	1.07	18.4	18.6	.19	.00	2.0	.00	.00	.00	2.40	.53	29.5	3.90	1121
D * 8:20	174.0	173.6	95.0	16.7	.8	33	181	5809	3810	38.7	1.07	18.4	18.6	.19	.00	2.0	.47	.00	.00	2.39	.53	30.6	3.96	1133
D * 8:24	174.9	174.6	95.0	12.7	-.5	41	181	5809	3793	37.7	1.07	18.3	18.6	.19	.00	2.0	.50	.00	.00	2.37	.53	31.6	4.03	1109
D * 8:28	175.9	175.5	95.0	12.1	1.2	37	181	5809	3813	37.3	1.07	18.3	18.6	.19	.00	2.0	.46	.00	.00	2.38	.53	32.5	4.00	1088
D * 8:30	177.0	176.5	95.0	26.7	.6	40	181	5809	3830	37.3	1.07	18.4	18.6	.19	.00	2.0	.41	.00	.00	2.37	.53	33.5	4.12	1063
D * 8:34	177.9	177.6	95.0	15.7	1.2	37	181	5809	3793	37.7	1.07	18.3	18.6	.19	.00	2.0	.53	.00	.00	2.35	.54	34.6	4.18	1039
D * 8:59	178.9	178.5	95.0	26.5	-.2	40	181	5151	3574	46.5	1.07	18.3	18.6	.19	.00	3.0	.45	.00	.00	2.29	.54	35.5	4.22	1018
D * 9: 3	180.0	179.5	95.0	38.1	.7	35	181	5151	3574	46.3	1.07	18.5	18.6	.19	.00	3.0	.34	.00	.00	2.19	.54	36.5	4.29	1000
D * 9: 8	180.9	180.6	95.0	14.1	-.1	42	181	5151	3576	45.7	1.07	18.3	18.6	.19	.00	3.0	.00	.00	.00	2.19	.54	37.6	4.38	983
D * 9:14	182.0	182.0	95.0	12.1	.1	42	362	5151	3596	45.7	1.07	18.5	18.6	.19	.00	3.0	.45	.00	.00	2.19	.54	39.0	4.48	970
D * 9:19	183.0	182.6	95.0	11.5	.1	45	362	5151	3596	45.7	1.07	18.4	18.6	.19	.00	3.0	.50	.00	.00	2.18	.54	39.6	4.56	962
D * 9:22	183.9	183.6	95.0	29.7	1.4	35	181	5100	3576	45.7	1.07	18.3	18.6	.19	.00	3.0	.39	.00	.00	2.17	.54	40.6	4.60	946
D * 9:44	185.0	184.5	95.0	11.2	1.4	41	181	5151	3596	46.1	1.07	18.6	18.6	.19	.00	1.0	.56	.00	.00	2.17	.54	41.5	4.97	935
D * 9:52	186.0	185.5	95.0	5.2	-.1	44	181	5151	3576	46.3	1.07	18.3	18.6	.19	.00	1.0	.72	.00	.00	2.16	.54	42.5	5.10	969
D * 10: 6	188.3	186.6	95.0	13.7	.9	23	181	5100	3559	51.2	1.03	18.3	18.6	.19	.00	1.0	.55	.00	.00	2.12	.54	43.6	5.14	955
D * 10:13	189.1	189.1	95.0	5.9	1.2	43	362	5630	3757	43.9	1.02	18.5	18.6	.19	.00	1.0	.70	.00	.00	2.20	.55	46.1	5.26	918
D * 10:18	189.9	189.6	95.0	7.6	1.2	42	362	5660	3752	48.6	1.02	18.4	18.6	.19	.00	1.0	.66	.00	.00	2.18	.55	46.6	5.33	916
D * 10:27	190.9	190.5	95.0	16.7	1.2	48	0	5670	3737	49.6	1.03	18.5	18.6	.19	.00	1.0	.59	.00	.00	2.19	.55	47.5	5.50	904
D * 10:33	192.0	191.5	95.0	14.9	-.1	53	0	5670	3757	49.2	1.03	18.3	18.6	.19	.00	1.0	.57	.00	.00	2.19	.55	48.5	5.59	906
D * 10:50	192.9	192.6	95.0	2.1	.5	34	0	5720	3757	48.6	1.03	18.5	18.6	.19	.00	1.0	.78	.00	.00	2.19	.55	49.6	5.85	919

\* BIT #1 ROW #1 RD BIT & H BIT DIAMETER : 36.00 inch NOZZ 28/28/28 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0  
 \*\*\*\*\*

* TIME	* DEPTHS			* DRILLING PARAMETERS							* MUD PARAMETERS				* GAS				* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT	
	* MEASURED	* VERTCL	* LAGGED	* ROP	* WOB	RPM	TORQ	PRESS	FLOW	* PIT	DENSITY	TEMPERATURE		RESISTIVITY		* GAS	* DCS	NORM	PF	ECD	FPA	METER	TIME	COST
* Hr:mn	* met	* met	* met	* m/hr	* tons	rpm	Nm	kPa	l/mn	* m3	IN	OUT	IN	OUT	IN	OUT	* unit	* sg	sg	sg	* met	DHr	\$/H	
D * 10:54	193.9	193.5	.0	14.9	-.1	38	0	5720	3737	40.2	1.03	.00	18.5	.0	.19	.00	.51	.00	.00	2.17	.55	50.5	5.91	910
D * 10:59	195.0	194.6	.0	7.4	.5	39	0	5720	3737	47.6	1.03	.00	18.3	.0	.19	.00	.63	.00	.00	2.16	.55	51.6	6.00	904
D * 11: 3	195.9	195.6	.0	30.9	.6	39	0	5749	3747	47.4	1.03	.00	18.6	.0	.19	.00	.43	.00	.00	2.16	.55	52.6	6.05	890
D * 11:12	197.0	197.0	.0	8.9	.2	39	0	5720	3770	47.4	1.03	.00	18.5	.0	.19	.00	1.0	.60	.00	2.13	.56	54.0	6.21	887
D * 11:27	198.0	197.6	.0	4.5	-.6	46	0	4911	3478	43.0	1.02	.00	18.4	.0	.19	.00	1.0	.60	.00	1.99	.56	54.6	6.37	891
D * 11:33	198.9	198.6	.0	7.4	-.3	45	0	5390	3576	50.4	1.01	.00	18.6	.0	.19	.00	1.0	-.00	.00	2.03	.56	55.6	6.47	886
D * 11:36	200.0	199.5	.0	22.3	.5	44	181	5390	3646	40.6	1.01	.00	18.6	.0	.19	.00	1.0	.39	.00	2.06	.56	56.5	6.52	877
D * 11:40	200.9	200.6	.0	15.0	.4	44	181	5420	3628	44.1	1.00	.00	18.4	.0	.19	.00	1.0	.54	.00	2.04	.56	57.6	6.58	867
D * 11:44	202.0	201.5	.0	16.0	.2	44	181	5420	3646	41.9	.99	.00	18.5	.0	.19	.00	2.0	.48	.00	2.03	.56	58.5	6.65	859

\* 17/ 4/82 TIME 12.22

HAMMERHEAD #1

\* DEPTH OF EXECUTION 201.99 METERS  
\* FLOW RATE 3500 L/MN POWER LAW

\* MUD DATA WEIGHT 1.07 SG  
\* PV 3 CPS  
\* YP .10 LB/FT2  
\* GEL .10 LB/100 FT2  
\* H 1.000  
\* K .0059 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 57.42 M3  
\* WITHOUT PIPES 60.60 M3  
\* ANNULAR 55.93 M3  
\* INSIDE PIPES 1.49 M3

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	W.P. LOSSES	H.P	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
METERS		INCH	INCH	INCH	KPA				L/MN	M/MN
*SURF. EQPT*					704	55				
*DR. STRING*	.00	119.86	4.28	5.00	306	24				
*DR. STRING*	119.86	176.54	2.81	7.75	1004	85				
*DR. STRING*	176.54	209.78	3.00	9.50	464	36				
*BIT					1407	116	M/S		50.2	
*ANNULUS	201.99	168.75		9.50	36.00	0	TU	430.7	5.7	-1.4
*ANNULUS	168.75	143.00		7.75	36.00	0	TU	414.1	5.6	-1.5
*ANNULUS	143.00	112.07		7.75	17.37	0	TU	237.0	28.6	21.5
*ANNULUS	112.07	-0.00		5.00	17.37	1	TU	211.7	25.0	17.9
* TOTAL*					4046	317				

\* ANNULAR PRESSURE LOSSES 1 KPA

\* EQUIV. CIRCULATING DENSITY 1.07 SG  
\* MAX DEPTH 2668.14

\* MUD LAG TIMES S -> B .43 MN  
\* B -> S 15.98 MN

\* CUTTINGS DATA SIZE .20 CM  
\* DENSITY 2.40 SG  
\* LAG TIME -33.4 MN  
\* MAX SLIP VELOCITY 7.11 M/MN

\* BIT DATA SIZE 36.00 INCH  
\* NOZZLES 20 20 20 /32NDS  
\* NOZZLES EFFICIENCY 95 %  
\* BIT P. LOSSES 1407 KPA  
\* H.H.P RATIO 36.76 %  
\* BIT H.H.P .114  
\* BIT VELOCITY 50.16 M/S





GEOSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\*\*\*\*\*

\* 19/ 5:82

HAMMERHEAD #1

\*\*\*\*\*

\*\*\*\*\*

\* BIT #3 RUN #1 SEQ NBR: 0 \*

\*\*\*\*\*

\* STARTING DEPTH 203.00 METERS

\*\*\*\*\*

\* BIT DATA SIZE 12.25

\* TOOTH RD FP 12

\* NOZZLES 13 13 13 @ 95 % EFFICIENCY

\*\*\*\*\*

\* DRILL STRING# TYPE # NBR # LENGTH # ID OD # NOMINAL LINEAR #

\* SECTION # # METERS # INCHES # WEIGHT (KG/M) #

\*\*\*\*\*

\* 1 \* DRILL PIPE \* 12 \* 9.20 \* 4.28 5.00 \* 29.02 \*

\* 2 \* DRILL COLLAR \* 1 \* 56.68 \* 2.81 7.75 \* 207.00 \*

\* 3 \* DRILL COLLAR \* 1 \* 30.40 \* 3.00 9.50 \* 322.99 \*

\*\*\*\*\*

\* HOLE # ID # DEPTH (METERS) #

\* # INCHES # TOP BOTTOM #

\*\*\*\*\*

\* RISER # 16.75 # .00 143.00 #

\* CASING # 28.00 # 143.00 194.00 #

\* OPEN HOLE 1 # 12.25 # 194.00 203.00 #

\*\*\*\*\*

\* COST DATA BIT COST 10000 \$ RIG COST 5033 \$/HR

\* TRIP TIME 2.00 HRS

\*\*\*\*\*

\* WEIGHTS HOOK LOAD OFF BOTTOM 65.0 TONS

\* STRING WEIGHT IN AIR 24.8 TONS

\*\*\*\*\*

\* VOLUMES ANNULUS 36.7 M3 IN PIPES 1.4 M3

\*\*\*\*\*

\* DEVIATION .0 DEG .000 M / 100 M

\*\*\*\*\*

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 392 KPA

\*\*\*\*\*

\* BIT WEAR TYPE EXPONENT .6

\* EXPECTED: RUN LENGTH 347 METERS TEETH WEAR 0 /8TH

\*\*\*\*\*

# BIT #3 RUN #3 RD FP 12 BIT DIAMETER : 12.25 inch NOZZ 13/13/13  
 # MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 8 GEL = 8 #

#	TIME	DEPTHS		DRILLING PARAMETERS						MUD PARAMETERS		GAS		OVERPRESSURE SURVEY				ACCUMULATED							
		MEASURED	VERTCL	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	FORM	PF	ECD	FRAC	METER	TIME					
#	HR:MM	FEET	FEET	W/HR	TONS	PPH	HPA	L/HR	ACS	SG	IN	OUT	IN	OUT	UNIT	PSI	SG	SG	FEET	MIN					
D	5:46	256.3	254.8	197.	.8	93	1446	19135	2520	97.9	1.07	1.15	16.5	.8	.19	.00	-.3	.33	.00	.00	1.47	.68	53.3	.04	411
D	5:46	257.0	255.1	82.0	.4	94	1446	19105	2525	97.5	1.08	1.15	16.6	.8	.19	.00	-.3	.49	.00	.00	1.54	.68	53.6	.05	410
D	5:47	257.9	256.2	158.	.4	94	1446	19105	2500	97.3	1.04	1.1	16.6	19.3	.19	.21	-.3	.37	.00	.00	1.43	.68	54.7	.06	402
D	5:47	258.9	257.1	133.	.8	95	1446	19105	2544	96.9	1.23	1.1	16.7	19.4	.19	.21	-.2	.36	.00	.00	1.62	.68	55.6	.07	396
D	5:48	259.8	258.3	146.	.8	95	1446	19135	2500	96.5	1.04	1.1	16.7	19.4	.19	.21	-.2	.38	.00	.00	1.44	.68	56.8	.07	389
D	5:48	260.5	259.0	121.	.2	96	1446	6678	1637	96.3	1.03	1.15	16.7	19.4	.19	.20	-.2	.39	.00	.00	1.44	.68	57.5	.08	385
D	6:4	261.8	260.2	98.6	.4	89	1446	19235	2485	106.	1.02	1.10	17.0	19.1	.19	.21	-.1	.40	.00	.00	1.39	.68	58.7	.10	379
D	6:4	263.0	261.4	158.	1.7	86	1627	19255	2539	105.	1.03	1.10	17.1	19.1	.19	.21	-.1	.34	.00	.00	1.52	.62	60.2	.11	371
D	6:5	263.8	262.2	139.	3.2	87	1627	19205	2532	105.	1.04	1.10	17.2	19.1	.19	.20	-.1	.51	.00	.00	1.44	.62	60.7	.12	368
D	6:5	264.9	263.1	130.	2.2	85	1627	19205	2517	105.	1.08	1.14	17.1	19.2	.19	.20	-.1	.46	.00	.00	1.50	.62	61.6	.12	363
D	6:5	265.8	264.4	220.	1.9	88	1627	19205	2502	104.	1.09	1.14	17.1	19.2	.19	.20	-.1	.40	.00	.00	1.52	.62	62.0	.13	356
D	6:6	267.2	265.6	324.	2.0	87	1627	19205	2539	104.	1.05	1.04	17.1	19.3	.19	.21	-.1	.39	.00	.00	1.46	.62	64.1	.13	350
D	6:6	268.0	266.0	253.	2.9	87	1627	19205	2539	104.	1.03	1.03	17.2	19.3	.19	.21	-.1	.38	.00	.00	1.42	.62	64.5	.14	348
D	6:6	268.8	267.0	131.	2.4	88	1627	19205	2502	104.	1.10	1.14	17.1	19.3	.19	.21	-.1	.50	.00	.00	1.40	.62	65.5	.14	343
D	6:7	269.7	268.2	74.1	.7	50	1085	19255	2520	103.	1.10	1.04	17.1	19.4	.19	.21	-.1	.41	.00	.00	1.39	.62	66.7	.15	338
D	6:14	270.7	269.0	130.	.2	85	1446	17338	2412	107.	1.29	1.06	17.4	19.6	.19	.22	-.9	.40	.00	.00	1.37	.62	67.5	1.25	429
D	6:15	271.9	270.2	206.	2.3	81	1088	17396	2395	106.	1.10	1.06	17.4	19.6	.19	.22	-.9	.34	.00	.00	1.44	.62	68.6	1.26	422
D	6:15	272.9	271.1	110.	2.8	82	1627	17360	2395	106.	1.03	1.06	17.4	19.6	.19	.21	-.9	.52	.00	.00	1.36	.62	69.6	1.26	417
D	6:15	274.1	272.1	192.	2.5	83	1627	17360	2410	105.	1.02	1.05	17.5	19.4	.19	.21	-.1	.40	.00	.00	1.36	.62	70.6	1.27	411
D	6:16	275.0	273.1	74.7	3.2	81	1627	17360	2393	105.	1.26	1.05	17.4	19.4	.19	.21	-.1	.28	.00	.00	1.38	.63	72.1	1.27	403
D	6:16	276.1	274.2	160.	2.8	81	1088	17360	2393	105.	1.13	1.05	17.4	19.3	.19	.21	-.1	.39	.00	.00	1.45	.63	73.1	1.28	398
D	6:16	277.2	275.3	195.	3.4	82	1627	17338	2410	104.	1.03	1.05	17.6	19.3	.19	.21	-.1	.44	.00	.00	1.37	.63	74.2	1.28	393
D	6:17	277.9	276.1	206.	3.7	81	1627	17338	2395	104.	1.03	1.04	17.5	19.3	.19	.21	-.1	.43	.00	.00	1.35	.63	74.6	1.29	391
D	6:17	278.7	277.2	130.	3.6	81	1085	17129	2393	104.	1.02	1.05	17.6	19.2	.19	.21	-.1	.53	.00	.00	1.35	.63	75.7	1.30	386
D	6:24	280.1	278.4	154.	1.4	89	1088	16300	2339	106.	1.04	1.04	17.7	20.6	.19	.33	1.0	.31	.00	.00	1.37	.63	76.9	1.32	382
D	6:24	281.2	279.5	204.	2.9	88	1088	16470	2339	106.	1.02	1.03	17.8	20.6	.19	.33	1.0	.41	.00	.00	1.33	.63	78.0	1.32	377
D	6:24	281.9	280.2	185.	4.4	86	1989	16470	2358	105.	1.02	1.03	17.7	20.6	.19	.32	1.0	.49	.00	.00	1.33	.63	79.1	1.33	372
D	6:24	282.9	281.3	199.	3.2	87	1088	16470	2358	105.	1.32	1.03	17.8	20.5	.19	.32	1.0	.41	.00	.00	1.40	.63	79.8	1.33	369
D	6:25	284.0	282.2	178.	2.6	87	1088	16440	2350	105.	1.17	1.02	17.8	20.5	.19	.32	1.0	.38	.00	.00	1.40	.63	81.0	1.34	364
D	6:25	284.9	283.3	199.	3.4	87	1088	16470	2339	104.	1.04	1.02	17.8	20.4	.19	.31	1.0	.42	.00	.00	1.37	.63	81.0	1.34	361
D	6:25	286.0	284.5	195.	4.3	87	1989	16470	2341	104.	1.03	1.01	17.8	20.3	.19	.31	1.0	.47	.00	.00	1.33	.63	83.0	1.35	356
D	6:26	287.0	285.3	146.	4.3	87	1989	16440	2350	104.	1.20	1.01	17.7	20.3	.19	.31	1.0	.54	.00	.00	1.33	.64	83.0	1.35	353
D	6:26	287.9	286.3	161.	3.7	86	1088	16410	2358	103.	1.13	1.01	17.8	20.1	.20	.31	1.0	.39	.00	.00	1.32	.64	84.8	1.36	349
D	6:27	288.5	287.1	60.9	.7	38	1085	15961	2341	103.	1.10	1.00	17.8	19.9	.19	.30	1.0	.53	.00	.00	1.46	.64	85.5	1.37	347
D	6:34	290.0	288.1	142.	1.0	85	1627	17039	2376	103.	1.03	1.06	18.1	19.7	.20	.23	1.0	.40	.00	.00	1.34	.64	86.6	1.39	344
D	6:34	291.0	289.4	160.	1.3	86	1627	17069	2395	104.	1.13	1.05	18.0	19.6	.20	.23	1.0	.28	.00	.00	1.33	.64	87.9	1.40	339
D	6:35	292.0	290.1	203.	3.2	83	1088	17069	2395	104.	1.03	1.06	18.0	19.6	.20	.23	1.0	.39	.00	.00	1.36	.64	88.6	1.40	337
D	6:35	293.7	291.1	213.	3.1	84	1088	17069	2376	103.	1.02	1.05	18.1	19.6	.20	.23	1.0	.46	.00	.00	1.33	.64	90.7	1.41	329
D	6:36	295.0	293.5	130.	3.0	84	1627	17009	2376	103.	1.12	1.04	18.0	19.6	.20	.22	1.0	.47	.00	.00	1.34	.64	92.0	1.42	325
D	6:36	295.9	294.0	133.	3.2	84	1627	17039	2376	102.	1.03	1.04	18.0	19.6	.20	.22	1.0	.48	.00	.00	1.35	.64	92.5	1.42	324
D	6:36	296.7	295.1	103.	2.0	85	1446	16979	2412	102.	1.02	1.04	18.0	19.6	.20	.22	1.0	.56	.00	.00	1.33	.64	93.6	1.43	321
D	6:38	297.6	296.1	65.7	.9	89	904	16739	2393	101.	1.02	1.04	18.1	19.6	.20	.21	1.0	.50	.00	.00	1.32	.64	94.6	1.45	318
D	6:44	298.6	297.1	147.	2.3	84	1627	17009	2388	103.	1.02	1.06	18.3	20.1	.20	.22	1.0	.47	.00	.00	1.33	.64	95.6	1.47	316
D	6:45	300.1	298.0	143.	1.6	84	1627	16979	2395	103.	1.22	1.06	18.3	20.0	.20	.23	1.0	.37	.00	.00	1.40	.65	96.5	1.48	314
D	6:45	301.0	299.5	206.	1.5	84	1627	16979	2385	103.	1.23	1.06	18.3	19.9	.20	.23	1.0	.31	.00	.00	1.34	.65	98.0	1.49	310
D	6:46	301.7	300.0	132.	1.1	85	1446	17009	2375	102.	1.05	1.05	18.3	19.8	.20	.22	1.0	.37	.00	.00	1.30	.65	98.5	1.50	308
D	6:46	303.0	301.1	126.	3.6	84	1088	17039	2393	102.	1.02	1.05	18.3	19.8	.20	.22	1.0	.55	.00	.00	1.32	.65	99.6	1.50	306
D	6:46	303.8	302.3	326.	3.6	84	1627	17009	2395	101.	1.02	1.05	18.3	19.8	.20	.22	1.0	.34	.00	.00	1.32	.65	100.8	1.51	302
D	6:47	305.0	303.1	195.	2.7	84	1627	17009	2395	101.	1.25	1.04	18.3	19.8	.20	.22	1.0	.29	.00	.00	1.54	.65	101.6	1.52	300

BEGINNING OF WELL  
 NOT REID SELECTED  
 FOR DCS  
 PF = 1.03

1.04 1.05

1.04

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 197 5/82

\* BIT #3 RUN #8 RD FP 12 BIT DIAMETER : 12.25 inch NOZZ 13/13/13

MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *							* MUD PARAMETERS *		* GAS *		* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *					
		VERTCL	LAGGED	ROP	WOB	RPM	TDR0	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* tons *	* rpm *	* rpm *	* kPa *	* l/min *	* m3 *	* sq *	* degC *	* ohm *	* psi *	* sq *	* sq *	* sq *	* ret *	* Dhr *	* \$/hr *					
D # 6:47	* 305.7	304.1	200.0	* 231.0	* 2.3	83	1085	6049	2393	* 101.0	* 1.03	1.13	10.3	19.0	.20	.22	* -2.0	* .36	.00	* .00	1.34	.65	* 102.6	1.52	298
D # 7: 2	* 306.0	305.1	200.0	* 3.5	* .0	80	1446	17428	2412	* 107.0	* 1.03	1.16	18.6	20.6	.20	.23	* 1.0	* -.00	.00	* .00	1.33	.65	* 103.6	1.60	304
D # 7: 4	* 307.7	306.2	200.0	* 21.0	* -.5	81	1265	17330	2412	* 105.0	* 1.02	1.14	10.6	20.1	.20	.22	* .0	* -.00	.00	* .00	1.32	.65	* 104.7	1.72	303
D # 7: 6	* 308.5	307.0	200.0	* 33.5	* -1.4	81	1265	17368	2410	* 104.0	* 1.12	1.14	10.6	20.1	.20	.21	* .0	* .00	.00	* .00	1.50	.65	* 105.5	1.75	302
D # 7: 9	* 309.5	308.0	300.0	* 14.4	* -.1	82	1265	17330	2412	* 103.0	* 1.03	1.10	18.7	20.7	.20	.23	* .0	* -.00	.00	* .00	1.32	.65	* 106.5	1.80	302
D # 7:12	* 310.5	309.0	300.0	* 22.2	* .1	81	1446	17368	2412	* 103.0	* 1.02	1.17	18.8	20.5	.20	.22	* 1.0	* -.00	.00	* .00	1.32	.65	* 107.5	1.85	302
D # 7:16	* 311.6	310.1	300.0	* 15.9	* -.8	83	1265	17398	2412	* 102.0	* 1.36	1.13	18.9	21.1	.20	.31	* 1.0	* -.00	.00	* .00	1.66	.66	* 108.6	1.91	302
D # 7:19	* 312.5	311.0	300.0	* 22.2	* -1.0	82	1265	17368	2393	* 103.0	* 1.02	1.13	19.1	20.3	.20	.23	* 1.0	* -.00	.00	* .00	1.31	.66	* 109.5	1.96	302
D # 7:21	* 314.0	312.1	300.0	* 40.9	* 4.6	76	1627	17398	2430	* 102.0	* 1.07	1.13	19.1	20.6	.21	.22	* 1.0	* .70	.00	* .00	1.41	.66	* 110.6	1.99	301
D # 7:22	* 314.7	313.2	300.0	* 63.6	* 3.2	77	1627	17398	2393	* 102.0	* 1.03	1.14	19.1	20.7	.21	.22	* 1.0	* .65	.00	* .00	1.32	.66	* 111.7	2.00	298

\* 19/ 5/82 TIME 7:35

HAMMERHEAD #1

\* DEPTH OF EXECUTION 315.30 METERS \*  
\* FLOW RATE 2400 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.05 SG \*  
\* PV 3 CPS \*  
\* YP .10 LM/FT2 \*  
\* GEL .10 LB/100 FT2 \*  
\* N 1.0000 \*  
\* K .0059 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 46.30 M3 \*  
\* WITHOUT PIPES 49.81 M3 \*  
\* ANNULAR 43.81 M3 \*  
\* INSIDE PIPES 2.50 M3 \*

\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
\* ID OD DIAM \* FLOW \* VELOCITY VELOCITY \*  
\* METERS \* INCH INCH INCH \* KPA \* L/MN \* M/MN M/MN \*

*SURF. EQPT*	FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES KPA	H.P	TYPE	CRITICAL	MUD FLOW L/MN	CUTTINGS VELOCITY M/MN
*DR. STRING*	.00	230.00	4.28	5.00		293	16				
*DR. STRING*	230.00	286.60	2.81	7.75		542	29				
*DR. STRING*	286.60	317.00	3.00	9.50		212	11				
*BIT *						14790	793	M/S		159.5	
*ANNULUS *	315.30	284.90		9.50	12.25	0	0	TU	209.5	79.2	72.0
*ANNULUS *	284.90	228.22		7.75	12.25	4	0	TU	192.7	52.6	45.4
*ANNULUS *	228.22	194.00		5.00	12.25	1	0	TU	166.2	37.9	30.7
*ANNULUS *	194.00	143.00		5.00	28.00	0	0	TU	317.9	6.2	-1.0
*ANNULUS *	143.00	.00		5.00	16.75	0	0	TU	209.5	18.5	11.3
* TOTAL *						16202	869				

\* ANNULAR PRESSURE LOSSES 13 KPA \*

\* EQUIV. CIRCULATING DENSITY 1.05 SG \*  
\* MAX DEPTH 3093.60 \*

\* MUD LAG TIMES S -> B 1.04 MN \*  
\* B -> S 18.25 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME -37.0 MN \*  
\* MAX SLIP VELOCITY 7.21 M/MN \*

\* BIT DATA SIZE 12.25 INCH \*  
\* NOZZLES 13 13 13 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 14790 KPA \*  
\* H.H.P RATIO 91.28 % \*  
\* BIT H.H.P 6.732 \*  
\* BIT VELOCITY 159.55 M/S \*

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\*\*\*\*\*  
\* 19/ 5/82 HARBORHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
#BIT HEADING :BIT #3 RUN #3  
#BIT TYPE :TOOTH  
#BIT IDENTITY :RD FP 12  
\*\*\*\*\*  
#BIT SIZE : 12.25 INCH  
#BIT COST : 10000. \$ RIG COST/HR: 5833.  
\*\*\*\*\*  
#NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY  
\*\*\*\*\*  
#DEPTH IN : 203.24 METERS 19/ 5/82  
#DEPTH OUT : 315.30 METERS 19/ 5/82  
#METRAGE : 112.06 METERS  
#TOTAL REVOLUTIONS : 4  
\*\*\*\*\*  
#DRILLING TIME: 2: 1 HR AVERAGE ROP: 55.66 M/HR  
#TIME IN HOLE : 1:45 HR AVERAGE ROP: 64.25 M/HR  
#TRIP TIME : 2: 0 HR  
\*\*\*\*\*  
#DRILLING COST STANDARD : 284.1 \$/MET  
#DRILLING COST ON BOTTOM : 298.1 \$/MET  
#DRILLING COST MINIMUM : 297.7 \$/MET  
\*\*\*\*\*  
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS  
#WEIGHT ON BIT : 1.53 TONS NOZZLES SPEED : 157.46 M/S  
#ROTATION : 81.88 RPM PRESSURE DROP : 14404 KPA  
#FLOW RATE : 2368.55 L/MN HYDRAULIC POWER: 762.64 H.P  
#STAND PIPE PRESSURE: 17203 KPA  
\*\*\*\*\*

BIT #3 RUN #3 RD FP 12 BIT DIAMETER : 12.25 inch HOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT				
		VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	WORM	PF	ECD	FRAC	METER	TIME	COST			
Hr:mn	met	met	met	m/hr	tons	rpm	Nww	kPa	l/min	m3	sg	degC	shwn	unit	sg	sg	sg	met	Dhr	\$/m					
D * 7:39	317.5	315.6	300.0	120.0	1.0	0	542	11209	1108	105.0	1.07	1.10	19.3	20.7	.21	.21	1.0	-.00	.00	.00	1.94	.66	114.1	2.02	293
D * 7:39	326.0	323.8	300.0	215.4	-1.0	0	542	14803	1519	106.0	1.33	1.10	19.3	20.8	.21	.22	1.0	-.00	.00	.00	1.44	.47	122.3	2.03	274
D * 7:39	327.4	325.6	300.0	939.0	-3.0	1	904	16000	1903	106.0	1.07	1.04	19.3	20.8	.21	.22	1.0	-.00	.00	.00	1.22	.47	124.1	2.03	270
D * 7:40	328.1	326.1	300.0	131.0	-2.7	54	1808	16230	2239	105.0	1.04	1.14	19.3	21.0	.21	.22	1.0	-.00	.00	.00	1.29	.47	124.6	2.03	269
D * 7:40	329.0	327.2	300.0	195.0	-2.7	75	1265	16500	2234	105.0	1.10	1.14	19.3	21.0	.21	.22	1.0	-.00	.00	.00	1.28	.47	125.7	2.04	267
D * 7:40	329.8	328.2	300.0	137.0	-4.0	84	1265	16560	2339	105.0	1.21	1.14	19.3	21.0	.21	.22	1.0	-.00	.00	.00	1.64	.47	126.7	2.04	265
D * 7:41	330.6	329.1	300.0	120.0	1.0	84	1627	16560	2376	104.0	1.04	1.04	19.4	20.9	.21	.22	1.0	-.00	.00	.00	1.32	.47	127.6	2.05	263
D * 7:42	332.2	330.6	300.0	252.0	4.6	80	1808	16649	2376	103.0	1.06	1.14	19.3	20.8	.21	.22	1.0	.38	.00	.00	1.35	.47	129.1	2.07	261
D * 7:42	332.5	331.0	300.0	60.0	3.2	82	1627	16649	2393	103.0	1.03	1.14	19.4	20.8	.21	.22	.0	.68	.00	.00	1.31	.47	129.5	2.00	261
D * 7:44	333.8	332.0	300.0	33.3	2.6	03	1627	16649	2376	102.0	1.10	1.15	19.4	20.8	.21	.22	.0	.65	.00	.00	1.35	.47	130.5	2.11	260
D * 7:45	334.9	333.2	300.0	44.2	4.7	82	1989	16629	2339	101.0	1.14	1.14	19.5	20.8	.21	.22	.0	.72	.00	.00	1.32	.47	131.6	2.12	259
D * 7:46	336.4	334.3	300.0	96.6	4.5	81	1808	16590	2393	101.0	1.03	1.15	19.5	20.8	.21	.22	.0	.62	.00	.00	1.30	.47	132.8	2.13	257
D * 7:46	336.7	335.1	300.0	132.0	4.2	80	1808	16590	2356	101.0	1.03	1.14	19.5	20.9	.21	.22	.0	.55	.00	.00	1.39	.47	133.6	2.14	256
D * 7:48	337.9	336.1	300.0	28.3	5.9	81	1808	16620	2359	101.0	1.23	1.15	19.5	21.1	.21	.22	.0	.85	.00	.00	1.49	.48	134.6	2.17	255
D * 7:49	339.0	337.4	300.0	37.7	5.2	81	1808	16290	2358	100.0	1.03	1.15	19.6	21.1	.21	.22	.0	.78	.00	.00	1.39	.48	135.9	2.19	253
D * 8: 1	339.7	338.2	300.0	6.1	3.7	82	1808	17390	2429	99.7	1.00	1.16	19.8	21.1	.21	.23	3.0	.97	.00	.00	1.40	.48	136.7	2.21	253
D * 8: 2	340.7	339.0	300.0	131.0	2.4	83	1627	17368	2429	99.7	1.02	1.15	19.8	21.2	.21	.23	3.0	.52	.00	.00	1.38	.48	137.5	2.22	252
D * 8: 4	341.5	340.0	300.0	26.4	3.2	82	1808	17330	2412	99.3	1.26	1.15	19.8	21.6	.21	.23	2.0	.88	.00	.00	1.54	.48	138.5	2.26	251
D * 8:12	342.8	341.0	300.0	55.7	4.8	66	1808	17608	2405	102.0	1.05	1.15	19.9	21.6	.21	.23	1.0	.80	.00	.00	1.53	.48	139.5	2.28	251
D * 8:13	343.8	342.1	300.0	80.0	2.4	87	1627	17967	2449	101.0	1.04	1.16	20.0	21.5	.21	.23	2.0	.46	.00	.00	1.54	.48	140.6	2.29	249
D * 8:14	344.6	343.0	300.0	139.0	5.2	83	1989	17967	2454	101.0	1.03	1.15	20.0	21.3	.21	.23	2.0	.58	.00	.00	1.50	.48	141.5	2.31	248
D * 8:15	345.6	344.1	300.0	53.3	4.5	85	1808	17937	2466	99.9	1.04	1.15	20.1	21.2	.21	.23	2.0	.71	.00	.00	1.53	.48	142.6	2.33	247
D * 8:16	346.6	345.1	300.0	66.5	5.4	84	1808	17937	2449	99.5	1.08	1.15	20.1	21.3	.21	.23	2.0	.67	.00	.00	1.48	.48	143.8	2.35	246
D * 8:17	347.5	346.0	300.0	49.7	7.1	81	2531	17967	2466	99.5	1.03	1.14	20.1	21.4	.21	.23	2.0	.83	.00	.00	1.51	.48	144.5	2.36	245
D * 8:18	348.9	347.1	300.0	146.0	3.0	84	1989	17937	2458	99.3	1.37	1.14	20.1	21.5	.21	.23	2.0	.40	.00	.00	1.57	.48	145.6	2.37	244
D * 8:19	349.8	348.2	300.0	33.4	5.1	85	1989	17907	2466	99.1	1.03	1.14	20.1	21.0	.21	.22	1.0	.71	.00	.00	1.31	.48	146.7	2.39	243
D * 8:20	350.5	349.1	300.0	99.0	4.6	85	1627	17937	2449	98.9	1.04	1.14	20.1	22.0	.21	.23	1.0	.62	.00	.00	1.32	.48	147.5	2.40	242
D * 8:21	351.5	350.0	300.0	69.0	2.3	80	1627	17077	2466	98.7	1.15	1.15	20.2	22.1	.21	.23	1.0	.59	.00	.00	1.42	.48	148.5	2.43	241
D * 8:31	352.9	351.5	300.0	67.0	6.0	72	2169	17210	2412	99.7	1.10	1.15	20.3	21.7	.21	.23	2.0	.65	.00	.00	1.42	.48	149.8	2.40	241
D * 8:32	353.5	352.0	300.0	66.2	4.5	72	1989	17210	2440	99.3	1.03	1.14	20.3	21.7	.21	.23	2.0	.70	.00	.00	1.30	.48	150.5	2.49	240
D * 8:33	354.8	353.1	300.0	80.7	6.4	72	1989	17100	2412	98.9	1.03	1.14	20.4	21.6	.21	.23	2.0	.65	.00	.00	1.29	.48	151.6	2.51	239
D * 8:34	355.6	354.1	300.0	66.5	4.0	73	1808	17100	2412	98.7	1.19	1.13	20.4	21.0	.21	.22	2.0	.48	.00	.00	1.45	.48	152.6	2.52	238
D * 8:35	356.6	355.1	300.0	69.7	3.4	74	1627	17210	2412	98.3	1.03	1.14	20.3	22.0	.21	.23	1.0	.65	.00	.00	1.29	.48	153.6	2.54	238
D * 8:37	357.8	356.2	300.0	114.0	3.9	74	1808	17240	2425	98.3	1.03	1.15	20.4	22.3	.21	.23	1.0	.56	.00	.00	1.29	.48	154.7	2.57	237
D * 8:38	358.5	357.0	300.0	44.7	5.9	72	1808	17240	2442	98.1	1.20	1.16	20.5	22.3	.21	.23	1.0	.64	.00	.00	1.71	.48	155.5	2.59	237
D * 8:40	359.7	358.1	300.0	44.6	2.6	75	1627	17069	2430	97.7	1.10	1.16	20.5	22.5	.21	.23	2.0	.61	.00	.00	1.50	.48	156.6	2.62	236
D * 8:41	360.6	359.1	300.0	46.3	.7	79	1446	17129	2444	97.3	1.00	1.16	20.5	22.5	.21	.23	2.0	.64	.00	.00	1.29	.48	157.6	2.64	235
D * 8:51	361.8	360.3	300.0	60.2	4.8	80	1989	17570	2449	99.3	1.00	1.14	20.7	22.1	.21	.22	2.0	.63	.00	.00	1.30	.48	158.8	2.69	235
D * 8:52	362.5	361.0	300.0	37.5	4.7	76	2712	17600	2441	98.3	1.01	1.14	20.8	22.1	.21	.22	1.0	.75	.00	.00	1.37	.48	159.5	2.72	235
D * 8:53	363.7	362.0	300.0	50.1	2.4	83	2350	17608	2449	97.7	1.03	1.14	20.8	22.2	.21	.23	.0	.70	.00	.00	1.29	.48	160.5	2.73	234
D * 8:54	364.5	363.0	300.0	92.1	1.9	83	2350	17608	2432	97.5	1.14	1.14	20.8	22.2	.21	.22	.0	.53	.00	.00	1.30	.48	161.5	2.75	233
D * 8:55	365.7	364.1	300.0	99.0	2.6	83	2350	17570	2449	97.3	1.14	1.15	20.8	22.5	.21	.23	.0	.54	.00	.00	1.30	.70	162.6	2.77	232
D * 8:58	366.5	365.0	300.0	25.5	5.1	83	2531	17608	2449	97.1	1.03	1.16	20.9	22.6	.21	.23	1.0	.94	.00	.00	1.29	.70	163.5	2.80	232
D * 8:59	367.7	366.2	300.0	85.6	3.6	46	1989	16350	2436	97.1	1.00	1.16	20.8	22.6	.21	.23	2.0	.36	.00	.00	1.67	.70	164.7	2.82	231
D * 9: 0	368.7	367.1	300.0	66.8	2.3	85	1627	16859	2417	97.1	1.10	1.15	20.8	22.6	.21	.23	2.0	.54	.00	.00	1.40	.70	165.6	2.83	231
D * 9:10	369.6	367.7	300.0	57.3	3.3	87	1808	17240	2437	97.7	1.11	1.15	21.1	22.4	.21	.23	2.0	.64	.00	.00	1.37	.70	166.6	2.87	230
D * 9:10	370.6	369.1	300.0	77.6	2.7	84	1627	17210	2437	97.1	1.00	1.14	21.1	22.4	.21	.23	2.0	.47	.00	.00	1.33	.70	167.6	2.88	230
D * 9:12	371.5	370.0	300.0	39.6	.3	80	1446	17210	2435	96.7	1.17	1.14	21.1	22.6	.21	.22	1.0	.60	.00	.00	1.70	.70	168.5	2.90	229
D * 9:14	372.5	371.0	300.0	25.0	3.3	85	1808	17308	2435	95.9	1.17	1.16	21.2	22.9	.21	.23	.0	.78	.00	.00	1.53	.70	169.5	2.94	229

BEGINNING OF WELL  
 NO TREND SELECTED FOR DCS  
 PFS 1.03



\* BIT #3 RUN #3 RD FP 12 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0 \*

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				GAS			OVERPRESSURE SURVEY			ACCUMULATED ON BIT						
		VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST			
hr:mn	net	net	net	m/hr	tons	rpm	Nm	KPa	L/mn	m3	IN	OUT	IN	OUT	ohm	unit	sq	sq	sq	met	Dhr	1/n			
D 9:15	373.6	372.0	100.0	137.0	4.3	86	1627	17248	2435	96.1	1.18	1.18	21.2	22.9	.21	.23	1.0	.49	.00	.00	1.30	.70	170.5	2.96	228
D 9:16	374.7	373.1	300.0	103.0	1.9	86	1446	17300	2435	95.7	1.14	1.14	21.2	22.9	.21	.23	1.0	.51	.00	.00	1.47	.70	171.6	2.97	227
D 9:17	375.8	374.1	300.0	44.4	4.9	83	1989	17300	2437	95.9	1.24	1.17	21.2	23.0	.21	.23	1.0	.70	.00	.00	1.49	.70	172.6	2.99	227
D 9:18	376.7	375.2	300.0	60.9	4.0	84	1808	17300	2435	95.5	1.22	1.17	21.3	23.0	.21	.24	1.0	.65	.00	.00	1.33	.70	173.7	3.00	226
D 9:19	377.6	376.1	300.0	59.8	4.6	82	2169	17248	2435	95.3	1.18	1.18	21.3	23.0	.21	.24	1.0	.69	.00	.00	1.34	.70	174.6	3.02	225
D 9:20	378.6	377.1	300.0	40.3	4.8	80	542	17129	2415	95.3	1.12	1.16	21.3	22.9	.21	.23	2.0	.81	.00	.00	1.37	.71	175.6	3.04	224
D 9:26	379.7	378.2	300.0	88.0	3.3	75	1627	18147	2469	97.9	1.35	1.16	21.4	22.8	.21	.23	1.0	.56	.00	.00	1.11	.71	176.7	3.06	224
D 9:28	380.7	378.5	300.0	49.9	6.7	87	1808	18326	2503	95.7	1.30	1.14	21.5	22.6	.21	.23	2.0	.96	.00	.00	1.36	.70	177.7	3.10	224
D 9:29	381.6	380.1	300.0	53.3	3.4	89	1446	18147	2523	95.3	1.31	1.14	21.5	22.6	.21	.23	2.0	.65	.00	.00	1.34	.70	178.6	3.11	223
D 9:30	382.8	381.0	300.0	66.8	4.6	88	1627	18296	2501	94.7	1.16	1.14	21.5	22.8	.21	.23	1.0	.64	.00	.00	1.33	.71	179.5	3.13	222
D 9:32	383.6	382.1	300.0	37.9	4.9	87	1627	18296	2523	94.3	1.14	1.14	21.5	22.9	.21	.22	1.0	.82	.00	.00	1.30	.71	180.6	3.15	222
D 9:34	384.6	383.1	300.0	60.0	5.5	84	1808	18326	2523	94.1	1.11	1.15	21.6	23.2	.21	.23	1.0	.68	.00	.00	1.32	.71	181.6	3.16	222
D 9:35	385.7	384.1	300.0	66.5	5.9	85	1808	18306	2503	94.3	1.10	1.15	21.6	23.2	.21	.23	1.0	.67	.00	.00	1.41	.71	182.6	3.20	221
D 9:36	386.5	385.0	300.0	58.2	7.0	84	1909	18356	2503	94.1	1.10	1.15	21.5	23.2	.21	.23	1.0	.71	.00	.00	1.36	.71	183.5	3.22	220
D 9:37	387.6	386.1	300.0	55.1	5.2	87	1627	18356	2503	94.1	1.11	1.15	21.6	23.3	.21	.23	1.0	.74	.00	.00	1.32	.71	184.6	3.24	220
D 9:44	388.7	387.1	300.0	65.3	4.9	84	1808	18925	2540	97.7	1.21	1.16	21.7	23.4	.21	.24	1.0	.60	.00	.00	1.50	.71	185.6	3.26	219
D 9:46	389.7	388.1	300.0	40.3	5.3	86	1627	18925	2540	96.3	1.10	1.16	21.8	22.9	.21	.24	3.0	.76	.00	.00	1.30	.71	186.6	3.28	219
D 9:46	390.8	389.2	300.0	55.2	4.2	85	1627	18955	2560	95.3	1.12	1.17	21.8	22.8	.21	.24	3.0	.68	.00	.00	1.40	.71	187.7	3.30	218

1.05 1.06

1.05

BEGINNING OF WELL  
 NO TREND SELECTED  
 FOR DCS  
 PF = 1.03

\* BIT #1 RUN #1 RD BIT & H BIT DIAMETER : 36.00 inch NOZZ 20/20/20 \*  
 \* MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0 \*

TIME	DEPTHS			DRILLING PARAMETERS							MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT		
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST			
#	met	met	met	m/hr	tons	rpm	Nm	kPa	L/min	m3	sg	degC	ohm	unit	sg	sg	sg	sg	met	Dhr	\$/A				
D * 11:43	447.4	446.0		68.6	3.6	88	1989	16440	2319	90.7	1.05	1.17	23.6	24.7	.22	.24	1.0	.55	.00	.00	1.24	.75	244.2	6.71	825
D * 11:44	448.2	447.1		52.0	3.8	89	1989	16530	2337	90.7	1.05	1.17	23.8	24.6	.22	.24	1.0	.58	.00	.00	1.24	.75	245.3	6.73	287
D * 11:45	449.3	448.0		57.7	3.6	89	1989	16739	2356	90.5	1.11	1.17	23.8	24.5	.22	.24	2.0	.44	.00	.00	1.31	.75	246.2	6.74	287
D * 11:46	450.2	449.1		53.3	2.7	91	1989	16799	2356	90.5	1.19	1.17	23.7	24.3	.22	.24	1.0	.51	.00	.00	1.51	.75	247.3	6.76	287
D * 11:47	451.2	450.1		39.7	3.6	89	2169	16709	2356	90.5	1.05	1.16	23.8	24.3	.22	.24	1.0	.61	.00	.00	1.28	.75	248.3	6.78	286
D * 11:55	452.4	451.0		4.0	7.8	92	1989	16709	2356	90.1	1.13	1.18	23.9	24.8	.22	.24	.0	1.85	.00	.00	1.32	.75	249.2	6.90	208
D * 12: 1	453.3	452.0		36.6	4.4	86	1808	17069	2373	90.7	1.09	1.18	23.9	25.1	.22	.24	1.0	.62	.00	.00	1.25	.75	250.2	6.92	288
D * 12: 2	454.3	453.0		46.2	5.7	90	1989	17069	2373	90.7	1.05	1.18	23.9	24.8	.22	.24	1.0	.59	.00	.00	1.25	.75	251.2	6.94	288
D * 12: 3	455.3	454.1		59.9	7.4	89	2169	17188	2373	90.7	1.05	1.18	23.9	24.7	.22	.24	1.0	.62	.00	.00	1.29	.75	252.3	6.95	287
D * 12: 5	456.4	455.0		44.4	7.5	89	1888	17188	2373	90.5	1.05	1.17	23.9	24.7	.22	.24	1.0	.53	.00	.00	1.25	.75	253.2	6.98	287
D * 12: 6	457.3	456.0		68.7	6.2	90	1989	17188	2393	90.3	1.05	1.17	23.9	24.7	.22	.24	1.0	.58	.00	.00	1.25	.75	254.2	7.00	286
D * 12: 7	458.3	457.0		42.7	6.6	90	1989	17039	2373	90.3	1.05	1.17	23.9	24.8	.22	.24	1.0	.68	.00	.00	1.25	.75	255.2	7.01	286
D * 12: 8	459.2	458.2		47.1	7.5	89	1989	17218	2373	90.3	1.07	1.18	24.0	24.9	.22	.24	1.0	.57	.00	.00	1.31	.75	256.4	7.04	286
D * 12:10	460.6	459.5		99.0	8.1	88	1989	17188	2373	90.1	1.06	1.18	24.0	25.0	.22	.24	.0	.53	.00	.00	1.24	.75	257.7	7.06	285
D * 12:10	461.3	460.0		77.0	6.1	98	1989	16919	2371	90.3	1.05	1.18	24.0	25.1	.22	.24	1.0	.56	.00	.00	1.24	.75	258.2	7.07	285
D * 12:17	462.2	461.1		57.4	6.6	88	1888	16889	2356	90.7	1.35	1.18	24.1	24.7	.22	.24	1.0	.54	.00	.00	1.39	.75	259.3	7.11	285
D * 12:19	463.3	462.0		71.1	6.8	91	1989	17809	2356	90.1	1.13	1.17	24.0	24.6	.22	.24	1.0	.52	.00	.00	1.30	.75	260.2	5.11	159
D * 12:20	464.2	463.0		46.2	5.2	93	1888	16739	2356	89.9	1.36	1.17	24.1	24.7	.22	.24	1.0	.56	.00	.00	1.47	.75	261.2	5.13	159
D * 12:22	465.3	464.0		39.3	4.9	93	1888	16949	2356	89.9	1.05	1.16	24.1	24.9	.22	.24	1.0	.68	.00	.00	1.24	.75	262.2	5.15	159
D * 12:23	466.3	465.0		32.3	6.2	90	1989	16799	2356	89.9	1.59	1.16	24.1	24.9	.22	.24	.0	.70	.00	.00	1.35	.75	263.2	5.18	159
D * 12:24	467.4	466.0		66.5	7.3	91	1989	16979	2357	89.9	1.05	1.16	24.1	25.0	.22	.24	.0	.59	.00	.00	1.34	.75	264.2	5.20	159
D * 12:26	468.2	467.0		31.7	6.9	92	1989	16859	2356	89.7	1.12	1.17	24.1	25.1	.22	.24	.0	.74	.00	.00	1.37	.75	265.2	5.23	159
D * 12:28	469.3	468.0		32.1	7.2	98	1989	16919	2356	89.7	1.16	1.16	24.1	25.1	.22	.24	1.0	.65	.00	.00	1.25	.77	266.2	5.25	159
D * 12:34	470.3	469.0		27.6	4.7	88	1888	17039	2312	86.1	1.05	1.18	24.2	25.4	.22	.24	1.0	.73	.00	.00	1.23	.77	267.2	5.28	159
D * 12:35	471.3	470.0		66.8	6.7	90	1989	17129	2358	85.7	1.20	1.18	24.2	25.4	.22	.24	.0	.48	.00	.00	1.38	.77	268.2	5.30	159
D * 12:36	472.3	471.0		53.1	7.9	98	1989	17089	2356	84.3	1.05	1.18	24.2	25.3	.22	.24	1.0	.64	.00	.00	1.24	.77	269.2	5.31	158
D * 12:36	473.3	472.2		82.8	5.7	98	1989	17039	2364	83.5	1.80	1.18	24.2	25.2	.22	.24	1.0	.51	.00	.00	1.38	.77	270.4	5.32	158
D * 12:37	474.3	473.0		66.2	6.6	91	1989	17129	2356	83.3	1.06	1.18	24.2	25.1	.22	.24	2.0	.53	.00	.00	1.25	.77	271.2	5.34	158
D * 12:38	475.3	474.0		50.1	7.1	91	1989	17809	2356	82.7	1.05	1.18	24.1	25.1	.22	.24	1.0	.66	.00	.00	1.24	.77	272.2	5.35	158
D * 12:39	476.3	475.0		61.0	7.8	90	2169	17069	2373	82.1	1.00	1.18	24.2	25.0	.22	.24	1.0	.48	.00	.00	1.30	.77	273.2	5.37	157
D * 12:40	477.2	476.1		141.	7.3	89	2169	17039	2366	82.1	1.06	1.18	24.2	25.0	.22	.24	2.0	.45	.00	.00	1.24	.77	274.3	5.38	157
D * 12:41	478.3	477.1		88.4	7.6	90	2169	17039	2376	81.9	1.05	1.17	24.2	25.0	.22	.24	2.0	.55	.00	.00	1.24	.77	275.2	5.39	157
D * 12:46	479.2	478.0		99.0	-7	92	1265	17039	2339	84.9	1.05	1.17	24.2	25.4	.22	.24	.0	.49	.00	.00	1.24	.77	276.2	5.41	156
D * 12:48	480.3	479.0		31.8	8.1	89	1989	17039	2344	83.1	1.05	1.17	24.3	25.5	.22	.24	.0	.74	.00	.00	1.23	.77	277.2	5.63	161
D * 12:49	481.3	480.0		27.2	8.8	89	1989	17039	2339	82.1	1.18	1.17	24.2	25.4	.22	.24	1.0	.67	.00	.00	1.28	.77	278.2	5.66	160
D * 12:50	482.3	481.0		59.9	7.5	90	1989	17039	2339	81.7	1.05	1.06	24.2	25.4	.22	.24	1.0	.63	.00	.00	1.23	.77	279.2	5.67	160
D * 12:51	483.2	482.1		55.2	5.4	98	1989	17069	2357	81.7	1.19	1.06	24.2	25.4	.22	.24	1.0	.55	.00	.00	1.49	.77	280.3	5.69	160
D * 12:53	484.3	483.2		37.8	6.8	90	1989	16979	2339	81.5	1.04	1.07	24.3	25.3	.22	.24	1.0	.68	.00	.00	1.25	.78	281.4	5.72	160
D * 12:54	485.2	483.5		37.7	7.5	90	1989	17039	2339	81.7	1.43	1.08	24.3	25.4	.22	.24	2.0	.70	.00	.00	1.23	.78	281.7	5.73	160
D * 12:55	486.2	485.0		68.7	6.7	90	1989	16889	2344	81.5	1.06	1.10	24.3	25.4	.22	.24	1.0	.57	.00	.00	1.24	.78	283.2	5.75	160
D * 12:56	487.3	486.0		28.6	7.8	98	2169	17039	2339	81.3	1.09	1.10	24.4	25.4	.22	.24	1.0	.74	.00	.00	1.27	.78	284.2	5.78	159
D * 13: 2	488.2	487.0		32.2	4.8	87	1888	17408	2393	86.1	1.09	1.09	24.5	25.4	.22	.24	.0	.67	.00	.00	1.27	.78	285.2	5.80	159
D * 13: 4	489.3	488.2		40.7	7.4	90	2169	17089	2376	84.3	1.09	1.10	24.4	25.2	.22	.24	.0	.68	.00	.00	1.27	.78	286.3	5.83	159
D * 13: 5	490.3	489.0		57.9	7.7	98	1989	16979	2356	82.7	1.09	1.10	24.5	25.3	.22	.25	1.0	.62	.00	.00	1.29	.78	287.2	5.84	159
D * 13: 7	491.3	490.1		32.4	7.4	98	1989	16919	2356	82.1	1.09	1.11	24.4	25.4	.22	.25	1.0	.73	.00	.00	1.27	.78	288.3	5.87	159
D * 13: 9	492.2	491.0		65.8	8.5	92	1989	16889	2358	81.3	1.09	1.11	24.6	25.4	.22	.25	2.0	.57	.00	.00	1.27	.78	289.2	5.90	159
D * 13:10	493.3	492.0		36.5	8.5	98	1989	16889	2356	81.3	1.09	1.12	24.5	25.4	.22	.25	3.0	.69	.00	.00	1.27	.78	290.2	5.93	159
D * 13:11	494.3	493.0		44.3	7.8	89	2169	16889	2337	81.3	1.09	1.11	24.5	25.4	.22	.25	3.0	.66	.00	.00	1.26	.78	291.2	5.94	159
D * 13:12	495.2	494.1		35.8	7.6	98	1989	16829	2337	80.9	1.09	1.10	24.5	25.4	.22	.24	3.0	.78	.00	.00	1.26	.78	292.2	5.97	159

BEGINNING OF WELL  
 NO TREND SELECTED FOR DCS  
 PF = 1.02

\* BIT #3 RUN #1 RD BIT & H BIT DIAMETER : 36.00 inch NOZZ 20/28/23 \*  
 \* MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0 \*

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT		
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST
hr:mn	net	net	net	m/hr	tons	rpm	Nm	kPa	l/mn	m3	sq	degC	ohm	unit	sq	sq	sq	sq	net	Dir	\$/m	
D * 13:14	496.4	495.0	470.0	31.0	7.7	89	1989	16568	2337	80.3	1.09	24.6	25.4	.22	.24	2.0	.73	.00	.00	293.2	5.99	159
D * 13:21	497.2	496.1	478.0	23.9	6.2	90	1989	17839	2373	82.9	1.09	24.6	25.6	.22	.24	1.0	.73	.00	.00	294.3	6.02	159
D * 13:22	498.2	497.1	478.0	36.1	6.6	90	1989	17069	2376	81.1	1.09	24.6	25.4	.22	.25	2.0	.68	.00	.00	295.3	6.05	159
D * 13:24	499.3	498.0	470.0	46.3	7.3	89	2169	17129	2356	80.7	1.09	24.6	25.5	.22	.25	2.0	.65	.00	.00	296.2	6.07	159
D * 13:25	500.3	499.1	480.0	48.6	7.0	91	2169	17069	2356	80.3	1.09	24.6	25.6	.22	.25	2.0	.64	.00	.00	297.3	6.09	159
D * 13:26	502.2	501.1	480.0	38.8	7.6	90	1989	17069	2339	80.1	1.09	24.6	25.4	.22	.25	2.0	.29	.00	.00	299.3	6.11	158
D * 13:26	502.3	501.1	480.0	38.8	7.8	92	1989	17039	2376	80.1	1.09	24.6	25.4	.22	.24	2.0	.29	.00	.00	299.3	6.11	158
D * 13:28	503.3	502.0	480.0	64.0	7.1	91	1989	17129	2356	79.9	1.09	24.6	25.5	.22	.24	2.0	.59	.00	.00	300.2	6.13	158
D * 13:29	504.3	503.1	480.0	44.1	7.4	91	1989	17129	2341	80.1	1.09	24.7	25.6	.22	.24	2.0	.67	.00	.00	301.3	6.15	158
D * 13:30	505.3	504.1	480.0	64.2	7.6	91	1989	17099	2337	80.1	1.09	24.6	25.7	.22	.24	1.0	.60	.00	.00	302.3	6.17	158
D * 13:50	515.1	513.5	505.0	27.8	8.1	90	2169	17099	2356	79.1	1.09	24.9	25.8	.22	.24	1.0	.76	.00	.00	311.7	6.31	155
D * 13:51	516.1	515.1	505.0	53.2	6.7	90	1989	17218	2366	78.9	1.09	24.9	25.8	.22	.25	1.0	.62	.00	.00	313.2	6.34	155
D * 13:57	517.1	515.5	505.0	46.3	4.2	90	1808	17089	2354	81.7	1.09	24.9	26.1	.23	.25	1.0	.63	.00	.00	313.7	6.37	155
D * 13:59	518.1	516.5	505.0	30.8	7.9	89	2169	16949	2356	79.9	1.09	24.9	25.9	.23	.25	1.0	.66	.00	.00	314.7	6.40	155
D * 14: 1	519.1	518.0	505.0	22.1	7.8	93	2169	17129	2337	78.7	1.09	25.0	25.7	.23	.25	1.0	.81	.00	.00	316.2	6.43	155
D * 14: 2	520.1	518.5	505.0	46.3	7.8	92	2169	17129	2376	78.3	1.09	24.9	25.6	.23	.24	1.0	.66	.00	.00	316.7	6.45	155
D * 14: 3	521.0	520.0	505.0	72.3	6.9	91	2169	17089	2344	78.1	1.09	24.9	25.6	.23	.25	1.0	.56	.00	.00	318.2	6.46	155
D * 14: 4	522.1	521.0	505.0	31.9	8.3	93	1989	17159	2356	77.9	1.09	25.0	25.7	.23	.25	1.0	.73	.00	.00	319.2	6.49	155
D * 14: 6	523.0	521.5	505.0	44.4	7.7	91	2169	17218	2376	78.1	1.09	25.0	25.0	.23	.25	1.0	.66	.00	.00	319.7	6.50	155
D * 14: 8	524.0	522.5	505.0	38.8	7.8	92	2169	16829	2356	77.9	1.09	25.0	25.9	.23	.24	.0	.69	.00	.00	320.7	6.54	155
D * 14: 9	525.1	524.0	505.0	45.9	7.4	92	1989	17129	2376	77.9	1.09	25.0	25.9	.23	.24	.0	.65	.00	.00	322.2	6.57	155
D * 14:16	526.1	524.6	505.0	42.9	5.6	93	1989	17039	2341	80.7	1.09	25.1	26.1	.23	.24	.0	.66	.00	.00	322.0	6.60	155
D * 14:18	527.1	526.0	505.0	44.2	6.4	94	1989	17089	2337	79.5	1.09	25.0	25.9	.23	.25	.0	.65	.00	.00	324.2	6.62	155
D * 14:19	528.0	526.6	505.0	41.8	8.4	93	2169	16979	2337	78.5	1.09	25.1	25.9	.23	.25	1.0	.67	.00	.00	324.8	6.64	155
D * 14:20	529.0	527.5	505.0	46.1	6.9	94	1989	16949	2337	77.9	1.09	25.1	25.8	.23	.25	1.0	.67	.00	.00	326.2	6.66	155
D * 14:22	530.1	529.0	505.0	27.8	7.0	94	2169	16859	2337	77.8	1.09	25.1	25.6	.23	.25	1.0	.74	.00	.00	327.2	6.70	155
D * 14:24	532.0	529.5	505.0	30.1	7.0	93	2169	17009	2356	77.6	1.09	25.1	25.8	.23	.25	1.0	.73	.00	.00	327.7	6.72	155
D * 14:26	533.1	532.0	505.0	34.8	7.1	94	1989	16949	2344	77.6	1.09	25.1	25.9	.23	.25	1.0	.71	.00	.00	330.2	6.76	155
D * 14:28	534.0	532.5	505.0	25.1	8.4	92	2169	16979	2337	77.4	1.09	25.1	26.0	.23	.25	1.0	.77	.00	.00	330.7	6.79	155
D * 14:30	535.0	533.5	520.0	28.4	7.6	93	2169	16320	2337	77.2	1.09	25.2	26.0	.23	.25	1.0	.77	.00	.00	331.7	6.82	155
D * 14:30	536.0	535.0	520.0	22.8	7.5	89	2350	16799	2319	80.3	1.09	25.1	25.9	.23	.25	.0	.75	.00	.00	333.2	6.86	155
D * 14:39	537.0	536.0	520.0	53.1	7.9	92	2350	16679	2337	78.7	1.09	25.1	25.6	.23	.25	1.0	.64	.00	.00	334.2	6.89	155
D * 14:41	538.0	537.0	520.0	46.2	7.6	92	2350	16530	2337	77.4	1.09	25.2	25.6	.23	.25	2.0	.66	.00	.00	335.2	6.91	155
D * 14:42	539.0	538.0	520.0	42.7	7.9	93	2350	17099	2356	76.4	1.09	25.1	25.6	.23	.25	1.0	.67	.00	.00	336.2	6.93	155
D * 14:44	540.0	539.0	520.0	42.2	8.5	92	2350	16829	2337	76.0	1.09	25.2	25.6	.23	.25	1.0	.69	.00	.00	337.2	6.96	155
D * 14:46	541.1	540.0	530.0	46.4	7.4	93	2350	17100	2356	75.8	1.09	25.2	25.7	.23	.25	.0	.66	.00	.00	338.2	6.99	155
D * 14:47	542.0	541.0	530.0	39.7	8.0	94	1989	17069	2356	75.6	1.09	25.1	25.9	.23	.25	.0	.70	.00	.00	339.2	7.01	155
D * 14:48	543.0	541.5	530.0	41.1	8.0	93	2169	16949	2337	75.2	1.09	25.2	25.9	.23	.25	.0	.68	.00	.00	339.7	7.04	155
D * 14:50	544.1	543.0	530.0	45.8	7.4	93	2169	16200	2341	74.0	1.09	25.2	25.9	.23	.25	.0	.65	.00	.00	341.2	7.06	155
D * 14:56	545.1	544.1	530.0	23.7	6.9	92	2169	17270	2376	78.1	1.09	25.2	26.1	.23	.25	.0	.74	.00	.00	342.3	7.10	155
D * 14:57	546.2	545.1	.0	11.0	7.5	92	2169	17839	2337	77.9	1.09	25.2	26.1	.23	.25	.0	.49	.00	.00	343.3	7.10	155
D * 14:58	547.0	546.0	.0	36.2	9.6	92	2169	17248	2376	77.2	1.09	25.2	25.9	.23	.25	1.0	.71	.00	.00	344.2	7.13	155
D * 15: 0	548.1	547.0	.0	44.3	8.1	93	2169	17129	2356	76.6	1.09	25.2	25.8	.23	.25	1.0	.67	.00	.00	345.2	7.16	155
D * 15: 2	549.1	548.1	.0	39.7	8.6	91	2169	17330	2349	76.6	1.09	25.2	25.7	.23	.25	1.0	.70	.00	.00	346.3	7.18	155
D * 15: 3	550.1	548.6	.0	26.5	8.3	92	2169	17248	2376	76.0	1.09	25.2	25.8	.23	.25	1.0	.77	.00	.00	346.7	7.21	155
D * 15: 6	551.0	549.5	.0	30.5	9.1	94	1989	17009	2371	76.4	1.09	25.3	25.8	.23	.25	1.0	.75	.00	.00	347.7	7.25	155
D * 15: 9	552.1	551.1	.0	19.0	8.0	93	1989	17248	2350	75.6	1.09	25.2	25.9	.23	.25	1.0	.85	.00	.00	349.3	7.30	155
D * 15:11	553.1	552.1	.0	31.1	7.7	94	1989	17218	2373	75.4	1.09	25.2	25.9	.23	.25	1.0	.74	.00	.00	350.3	7.33	155
D * 15:13	554.0	552.5	.0	23.2	6.9	94	1989	17248	2368	75.4	1.09	25.2	25.9	.23	.25	1.0	.78	.00	.00	350.7	7.36	156

BEGINNING OF WELL  
 NOT TREND SELECTED FOR DCL  
 PF = 1.03

\* BIT #3 RUN #1 RD BIT & H BIT DIAMETER : 36.00 inch NOZZ 20/20/20 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0 \*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *							* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *	
		VERTCL	LAGGED	* ROP *	* WOB *	RPM	TORQ	PRESS	FLOW	* PIT *	DENSITY	TEMPERATURE		RESISTIVITY		* DCS *	NORM	PF	ECD	FRAC	* METER *	TIME	COST		
* Hr:mn *	* net *	* net *	* net *	* ft/hr *	* tons *	rpm	lbfm	kPa	l/min	* NS *	sg	degC	IN	OUT	IN	OUT	* unit *	sg	sg	sg	* net *	DHr	\$/m		
D * 15:24	* 555.2	554.0		* 39.6 *	* 8.0 *	93	2169	17039	2339	* 76.6 *	1.09	25.3	26.0	.23	.25	* 1.0 *	.60	.00	.00	1.05	.82	* 352.2 *	7.42	156	
D * 15:25	* 556.1	554.6		* 43.1 *	* 7.8 *	94	2169	17039	2356	* 76.2 *	1.09	25.2	25.8	.23	.26	* 1.0 *	.69	.00	.00	1.25	.82	* 353.2 *	7.44	156	
D * 15:28	* 557.0	553.5	557.0	* 17.0 *	* 6.4 *	95	1989	16679	2319	* 75.8 *	1.09	25.2	25.5	.23	.25	* 1.0 *	.86	.00	.00	1.09	.82	* 353.7 *	7.48	156	
D * 15:29	* 558.1	557.1		* 55.0 *	* 8.2 *	93	2169	17129	2337	* 74.6 *	1.09	25.3	25.5	.23	.25	* 1.0 *	.63	.00	.00	1.09	.82	* 355.3 *	7.51	156	
D * 15:31	* 559.0	558.0		* 35.0 *	* 8.3 *	94	2169	17129	2337	* 74.2 *	1.09	25.2	25.7	.23	.25	* 1.0 *	.72	.00	.00	1.09	.82	* 356.2 *	7.53	156	
D * 15:32	* 560.0	558.5		* 44.4 *	* 7.8 *	94	2169	17069	2356	* 74.4 *	1.09	25.3	25.8	.23	.25	* 1.0 *	.67	.00	.00	1.09	.82	* 356.7 *	7.56	156	
D * 15:34	* 561.0	560.0		* 38.9 *	* 7.5 *	94	1989	17039	2337	* 74.6 *	1.09	25.3	25.0	.23	.25	* 1.0 *	.73	.00	.00	1.09	.82	* 358.2 *	7.59	156	
D * 15:36	* 562.1	560.6		* 31.2 *	* 9.3 *	93	2169	17159	2337	* 73.8 *	1.09	25.2	25.9	.23	.25	* 1.0 *	.74	.00	.00	1.09	.82	* 358.8 *	7.61	156	
D * 15:38	* 563.1	562.0		* 29.3 *	* 7.7 *	93	2169	17186	2337	* 74.0 *	1.09	25.2	25.9	.23	.25	* 1.0 *	.74	.00	.00	1.09	.82	* 360.2 *	7.64	156	
D * 15:44	* 565.0	562.5		* 49.9 *	* 0 *	0	362	16829	2337	* 73.2 *	1.09	25.3	26.5	.23	.25	* 1.0 *	.66	.00	.00	1.09	.82	* 360.7 *	7.68	156	
T * 16:22	* 565.0	562.5	9907.4			0	362	17240	2337	* 74.0 *	1.09	25.6	27.2	.23	.25	* 1.0 *									

BEGINNING OF WELL  
 NO TREND SELECTED  
 FOR DCS  
 PF = 1.03

1.03

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\*\*\*\*\*  
# 19/ 5/82  
\*\*\*\*\*  
HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT #3 RUN #1  
#BIT TYPE :TOOTH  
#BIT IDENTITY :RD FP 12  
\*\*\*\*\*  
#BIT SIZE : 12.25 INCH  
#BIT COST : 10000. \$ RIG COST/HR: 5033.  
\*\*\*\*\*  
#NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY  
\*\*\*\*\*  
#DEPTH IN : 203.24 METERS 19/ 5/82  
#DEPTH OUT : 565.00 METERS 19/ 5/82  
#METRAGE : 361.76 METERS  
#TOTAL REVOLUTIONS : 26  
\*\*\*\*\*  
#DRILLING TIME: 7:41 HR AVERAGE ROP: 47.10 M/HR  
#TIME IN HOLE : 12:16 HR AVERAGE ROP: 29.50 M/HR  
#TRIP TIME : 2: 0 HR  
\*\*\*\*\*  
#DRILLING COST STANDARD : 257.6 \$/MET  
#DRILLING COST ON BOTTOM : 183.7 \$/MET  
#DRILLING COST MINIMUM : 154.8 \$/MET  
\*\*\*\*\*  
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS  
#WEIGHT ON BIT : 6.22 TONS NOZZLES SPEED : 156.09 M/S  
#ROTATION : 89.94 RPM PRESSURE DROP : 14695 KPA  
#FLOW RATE : 12348.00 L/MN HYDRAULIC POWER: 771.27 H.P  
#STAND PIPE PRESSURE: 17102 KPA  
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\* BIT #3 RUN #2 FP 12+OH BIT DIAMETER : 26.00 inch HQZZ 32/32/32

TIME	MEASURED	DEPTH			DRILLING PARAMETERS							NUD PARAMETERS		RESISTIVITY		OVERPRESSURE SURVEY				ACCUMULATED ON BIT					
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	IN	OUT	IN	OUT	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
Hr:mn	net	net	net	m/hr	tons	rpm	Nm	kPa	l/mn	m3	sg	degC	ohm	unit	sg	sg	sg	sg	net	Dhr	\$/m				
D # 0:39	290.3	146.9	95.0	52.0	.2	75	2531	3083	3381	27.5	1.02	.00	14.7	.0	.19	.00	.46	.00	.00	1.03	.53	95.2	.00	159	
D # 0:40	291.0	147.6	95.0	112.	.6	75	2531	3713	3324	26.9	1.02	.00	14.8	.0	.19	.00	.33	.00	.00	1.03	.53	96.0	.09	159	
D # 1:10	300.5	290.6	95.0	19.2	.0	79	2169	3923	3342	46.8	1.02	.00	14.7	.0	.19	.00	.59	.00	.00	1.04	.64	96.5	3.90	387	
D # 1:11	301.1	300.1	95.0	66.3	-.3	77	1989	3923	3361	45.7	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.04	.65	106.0	3.92	354	
D # 1:12	302.0	300.7	95.0	33.3	-.4	75	2531	3923	3381	44.3	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.04	.65	106.6	3.93	353	
D # 1:13	303.4	302.2	95.0	30.2	1.2	75	2092	3923	3361	42.9	1.02	.00	14.7	.0	.19	.00	.47	.00	.00	1.04	.65	100.1	3.95	349	
D # 1:14	304.1	303.1	95.0	30.3	-.5	78	2169	3923	3369	41.9	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.03	.65	109.8	3.97	347	
D # 1:17	305.1	303.5	95.0	36.5	.7	75	2531	3923	3381	38.9	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.04	.65	109.5	4.02	346	
D # 1:18	306.1	304.7	95.0	88.0	-.4	74	2712	3923	3361	38.3	1.02	.00	14.8	.0	.19	.00	.35	.00	.00	1.03	.65	110.7	4.03	345	
D # 1:20	307.1	305.6	95.0	69.3	.8	74	2712	3923	3361	36.3	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.03	.65	111.5	4.07	343	
D # 1:21	308.1	307.1	95.0	88.5	.3	75	3435	3923	3381	35.9	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.03	.65	113.0	4.09	341	
D # 1:23	309.1	307.7	95.0	40.6	.5	77	1989	3953	3361	34.7	1.02	.00	14.8	.0	.19	.00	.53	.00	.00	1.03	.65	113.6	4.11	340	
D # 1:30	310.1	308.9	95.0	49.4	1.1	74	2712	3953	3378	39.7	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.04	.65	114.9	4.13	337	
D # 1:33	311.1	309.5	95.0	20.2	-1.8	76	2169	3953	3378	39.1	1.02	.00	14.8	.0	.19	.00	.55	.00	.00	1.04	.65	115.5	4.17	337	
D # 1:35	312.1	310.5	305.0	15.1	.9	74	3073	3953	3378	38.1	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.03	.66	116.5	4.21	336	
D # 1:38	313.1	312.1	305.0	88.4	1.0	74	3073	3953	3393	37.1	1.02	.00	14.8	.0	.19	.00	.37	.00	.00	1.04	.66	118.0	4.25	334	
D # 1:41	314.1	313.1	305.0	23.1	.8	74	3073	3953	3381	36.3	1.02	.00	14.8	.0	.19	.00	.00	.00	.00	1.04	.66	119.1	4.30	334	
D # 1:47	315.2	314.0	305.0	16.8	3.8	74	3073	3953	3378	34.5	1.02	.00	14.8	.0	.19	.00	.77	.00	.00	1.04	.66	120.0	4.36	334	
D # 1:48	316.2	315.0	305.0	66.8	2.8	75	2092	3953	3378	34.3	1.02	.00	14.8	.0	.19	.00	.52	.00	.00	1.03	.66	121.0	4.30	332	
D # 2: 8	317.0	315.6	305.0	3.2	3.8	75	2712	3923	3413	33.7	1.02	.00	14.8	.0	.19	.00	.0	1.11	.00	.00	1.04	.66	121.6	4.59	339
D # 2:14	318.1	316.6	305.0	114.	.0	82	1808	3923	3381	43.9	1.02	.00	14.8	.0	.19	.00	.41	.00	.00	1.04	.66	122.6	4.60	338	
D # 2:15	319.2	317.5	305.0	103.	1.1	75	2350	3893	3361	43.7	1.02	.00	14.8	.0	.19	.00	.41	.00	.00	1.03	.66	123.5	4.61	336	
D # 2:17	320.1	319.1	305.0	29.3	1.8	75	2531	3893	3361	42.9	1.02	.00	14.8	.0	.19	.00	.65	.00	.00	1.03	.66	125.1	4.64	334	
D # 2:19	321.1	319.6	305.0	69.3	1.1	78	1989	3923	3381	42.1	1.02	.00	14.8	.0	.19	.00	.48	.00	.00	1.04	.66	125.6	4.67	333	
D # 2:20	322.0	321.0	305.0	27.6	4.4	74	3073	3923	3381	41.5	1.02	.00	14.8	.0	.19	.00	.69	.00	.00	1.04	.66	127.0	4.69	331	
D # 2:21	323.0	321.5	305.0	66.0	2.3	79	2092	3953	3381	41.1	1.02	.00	14.8	.0	.19	.00	.52	.00	.00	1.04	.66	127.5	4.71	330	
D # 2:22	324.1	323.1	305.0	82.5	3.9	78	3073	3953	3381	40.7	1.02	.00	14.8	.0	.19	.00	.49	.00	.00	1.03	.67	129.1	4.73	327	
D # 2:24	325.0	324.0	305.0	18.1	5.0	79	3254	3983	3398	39.9	1.02	.00	14.8	.0	.19	.00	.81	.00	.00	1.03	.67	130.0	4.76	326	
D # 2:25	326.0	324.6	305.0	66.6	3.8	78	3435	3983	3381	39.5	1.02	.00	14.8	.0	.19	.00	.55	.00	.00	1.04	.67	130.6	4.77	325	
D # 2:31	327.1	326.0	305.0	88.7	3.3	76	2531	3953	3398	37.7	1.02	.00	14.8	.0	.19	.00	.46	.00	.00	1.03	.67	132.0	4.87	326	
D # 2:42	328.2	327.2	305.0	16.5	1.6	81	2092	4013	3488	44.3	1.02	.00	14.8	.0	.19	.00	.72	.00	.00	1.04	.67	133.1	4.94	327	
D # 2:45	329.1	327.6	305.0	9.2	1.6	82	2092	4013	3398	42.7	1.02	.00	14.8	.0	.19	.00	.86	.00	.00	1.04	.67	133.5	4.99	327	
D # 2:50	330.3	329.3	305.0	17.5	3.4	81	2712	4013	3400	41.1	1.02	.00	14.8	.0	.19	.00	.79	.00	.00	1.04	.67	135.2	5.06	327	
D # 2:52	331.1	329.7	305.0	20.3	3.4	81	2092	4013	3398	40.5	1.02	.00	14.8	.0	.19	.00	.73	.00	.00	1.04	.67	135.6	5.09	327	
D # 2:53	332.0	330.5	305.0	49.7	2.7	80	3435	4013	3415	39.5	1.02	.00	14.8	.0	.19	.00	.55	.00	.00	1.04	.67	136.5	5.12	325	
D # 3: 2	333.1	332.1	305.0	17.0	3.3	79	3073	4013	3398	36.5	1.02	.00	14.8	.0	.19	.00	.79	.00	.00	1.03	.67	130.1	5.27	329	
D # 3: 8	334.0	333.0	305.0	5.7	3.4	76	2092	3863	3361	34.5	1.02	.00	14.8	.0	.19	.00	.98	.00	.00	1.03	.67	139.0	5.36	330	
D # 3:15	335.1	334.1	305.0	5.1	2.8	76	2350	3863	3330	32.3	1.02	.00	14.8	.0	.19	.00	.96	.00	.00	1.03	.67	140.0	5.47	333	
D # 3:18	336.3	334.5	305.0	15.1	3.6	74	3073	3863	3327	31.1	1.02	.00	14.8	.0	.19	.00	.70	.00	.00	1.03	.67	140.5	5.52	333	
D # 3:28	337.1	335.6	305.0	87.3	2.7	74	2092	3893	3342	37.1	1.02	.00	14.8	.0	.19	.00	.45	.00	.00	1.04	.67	141.5	5.59	331	
D # 3:35	338.1	336.6	305.0	44.3	2.6	68	2092	3863	3387	35.1	1.02	.00	14.8	.0	.19	.00	.55	.00	.00	1.03	.68	142.5	5.70	332	
D # 3:39	339.1	338.1	305.0	17.1	1.7	72	2092	3893	3349	33.9	1.02	.00	14.8	.0	.19	.00	.67	.00	.00	1.03	.68	144.1	5.78	336	
D # 3:46	340.1	338.5	305.0	6.1	3.2	75	3073	3923	3361	31.5	1.02	.00	14.8	.0	.19	.00	.92	.00	.00	1.03	.68	144.5	5.89	337	
D # 3:49	341.1	339.7	305.0	21.6	1.8	76	2531	3923	3361	30.9	1.02	.00	14.8	.0	.19	.00	.60	.00	.00	1.03	.68	145.7	5.93	338	
D # 3:52	342.0	341.0	305.0	29.6	3.0	76	2531	3923	3359	29.9	1.02	.00	14.8	.0	.19	.00	.64	.00	.00	1.03	.68	147.0	5.90	337	
D # 4: 1	343.0	341.5	305.0	4.1	2.6	75	2531	3923	3371	29.3	1.02	.00	14.8	.0	.19	.00	1.02	.00	.00	1.03	.68	147.5	6.13	341	
D # 4: 4	344.0	342.5	305.0	19.9	2.0	77	2350	3953	3361	29.5	1.02	.00	14.7	.0	.19	.00	.72	.00	.00	1.03	.68	148.5	6.19	341	
D # 4: 7	345.2	343.7	305.0	38.9	2.3	76	2092	3953	3361	30.3	1.02	.00	14.7	.0	.19	.00	.61	.00	.00	1.04	.68	149.7	6.23	340	
D # 4:21	346.1	345.1	305.0	35.9	2.8	78	3073	3773	3290	42.9	1.02	.00	14.8	.0	.19	.00	.59	.00	.00	1.03	.68	151.1	6.33	341	



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 \* GEOSERVICES HAMMERHEAD #1 DATE : 24/ 5/82  
 \* ON-LINE TDC

\* BIT #3 RUN #2 FP 12+0H BIT DIAMETER : 26.00 inch NOZZ 32/32/32 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

* TIME	* MEASURED	* DEPTHS			* DRILLING PARAMETERS						* MUD PARAMETERS		* GAS		* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT						
		* Hrs:mn	* net	* net	* net	* ROP	* WOB	RPM	TORQ	PRESS	FLOW	* PIT	DENSITY	TEMPERATURE	RESISTIVITY	* GAS	DCS	MORN	PF	CCD	FRAC	* METER	TIME	COST	
					* n/hr	* tons	rpm	Nm	kPa	l/mn	* m3	sg	degC	ohm	* unit		sq	sq	sq	sq	* net	Dhr	\$/m		
D # 4:26	# 347.0	346.0	385.0	# 11.2	# 2.9	71	2350	3803	3308	# 41.7	# 1.02	.00	14.8	.0	.19	.00	.0	.81	.00	.00	1.03	.00	152.0	6.42	343 #
D # 4:31	# 348.3	347.1	385.0	# 3.4	# 3.2	71	3873	3803	3308	# 40.5	# 1.02	.00	14.8	.0	.19	.00	.0	1.00	.00	.00	1.03	.00	153.0	6.49	343 #
D # 4:35	# 349.1	348.1	385.0	# 11.0	# 3.6	72	2712	3803	3325	# 39.5	# 1.02	.00	14.7	.0	.19	.00	.0	.84	.00	.00	1.03	.00	154.1	6.56	344 #
D # 4:39	# 350.0	349.0	385.0	# 28.9	# 1.7	72	2531	3803	3344	# 39.5	# 1.02	.00	14.6	.0	.19	.00	.0	.62	.00	.00	1.04	.00	155.0	6.62	344 #
D # 4:43	# 351.0	349.6	385.0	# 74.2	# 3.9	73	3873	3833	3325	# 38.1	# 1.02	.00	14.7	.0	.19	.00	.0	.44	.00	.00	1.03	.00	155.5	6.69	343 #
D # 4:49	# 352.2	351.1	385.0	# 8.0	# 3.6	74	2531	3833	3325	# 36.5	# 1.02	.00	14.6	.0	.19	.00	.0	.87	.00	.00	1.03	.00	157.1	6.79	345 #
D # 4:50	# 353.0	352.0	385.0	# 46.5	# 2.9	74	3873	3773	3315	# 35.9	# 1.02	.00	14.6	.0	.19	.00	.0	.53	.00	.00	1.03	.00	158.0	6.81	344 #
D # 5: 5	# 354.0	352.5	385.0	# 3.9	# 4.0	72	2892	3773	3313	# 33.3	# 1.02	.00	14.6	.0	.19	.00	.0	1.06	.00	.00	1.03	.00	158.5	7.04	348 #
D # 5:18	# 355.1	354.1	385.0	# 8.0	# 2.7	74	2712	4132	3418	# 42.1	# .99	.00	14.6	.0	.19	.00	.0	.91	.00	.00	.99	.00	160.0	7.14	352 #
D # 5:20	# 356.0	354.5	385.0	# 21.3	# 2.6	74	2531	4102	3418	# 40.9	# .98	.00	14.6	.0	.19	.00	.0	.72	.00	.00	.99	.00	161.0	7.18	351 #
D # 5:29	# 357.0	355.5	385.0	# 13.3	# 3.3	75	2712	4132	3438	# 37.3	# .99	.00	14.6	.0	.19	.00	.0	.83	.00	.00	1.00	.00	161.5	7.32	352 #
D # 5:35	# 358.0	356.6	385.0	# 15.6	# 2.2	78	1989	4132	3438	# 35.3	# 1.02	.00	14.7	.0	.19	.00	.0	.77	.00	.00	1.03	.00	162.5	7.42	354 #
D # 5:40	# 359.3	358.1	.0	# 10.0	# 3.2	75	2892	4132	3418	# 33.3	# 1.02	.00	14.7	.0	.19	.00	.0	.82	.00	.00	1.03	.00	164.1	7.50	356 #
D # 5:44	# 360.0	359.0	.0	# 13.4	# 3.0	74	2892	4132	3438	# 32.3	# 1.01	.00	14.6	.0	.19	.00	.0	.81	.00	.00	1.02	.00	165.0	7.56	356 #
D # 5:47	# 361.2	360.1	.0	# 18.0	# 2.6	75	3435	4132	3435	# 31.1	# .99	.00	14.6	.0	.19	.00	.0	.77	.00	.00	1.00	.00	166.1	7.62	356 #
D # 5:53	# 362.1	361.1	.0	# 8.7	# 3.7	75	2892	4132	3428	# 29.3	# .99	.00	14.6	.0	.19	.00	.0	.89	.00	.00	1.00	.00	167.0	7.72	358 #
D # 5:56	# 363.1	362.1	.0	# 26.3	# 3.8	73	2892	4102	3411	# 28.5	# .98	.00	14.6	.0	.19	.00	.0	.71	.00	.00	1.00	.00	168.1	7.77	357 #

ON-LINE TDC  
GEOSERVICES

HYDRAULIC REPORT

\* 24/ 5/82 TIME 6:12

HAMMERHEAD #1

\* DEPTH OF EXECUTION 363.97 METERS  
\* FLOW RATE 3483 L/MH POWER LAW

\* MUD DATA WEIGHT 1.02 SG  
\* PV 3 CPS  
\* YP .10 LB/FT2  
\* GEL .10 LB/100 FT2  
\* N 1.0000  
\* K .0059 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 93.01 M3  
\* WITHOUT PIPES 98.01 M3  
\* ANNULAR 92.06 M3  
\* INSIDE PIPES 2.95 M3

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES	H.P	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
METERS		INCH	INCH	INCH	KPA				L/MH	M/MH
*SURF.EDPT*					644	49				
*DR.STRING*	.00	276.60	4.28	5.00	645	49				
*DR.STRING*	276.60	333.28	2.81	7.75	986	75				
*DR.STRING*	333.28	367.49	3.00	9.50	437	33				
*BIT					785	60	M/S			37.3
*ANNULUS	363.97	329.76		9.50	26.00	0	TU	352.7		11.5
*ANNULUS	329.76	273.08		7.75	26.00	0	TU	335.3		10.9
*ANNULUS	273.08	194.00		5.00	28.00	0	TU	308.0		10.3
*ANNULUS	194.00	143.00		5.00	28.00	0	TU	327.9		8.8
*ANNULUS	143.00	.00		5.00	16.75	1	TU	216.1		26.3
* TOTAL*					3498	266				

\*ANNULAR PRESSURE LOSSES 1 KPA

\*EQUIV.CIRCULATING DENSITY 1.02 SG  
\* MAX DEPTH 4478.61

\* MUD LAG TIMES S -> B .87 MH  
\* B -> S 27.05 MH

\* CUTTINGS DATA SIZE .28 CM  
\* DENSITY 2.48 SG  
\* LAG TIME 94.63 MH  
\* MAX SLIP VELOCITY 7.48 M/MH

\* BIT DATA SIZE 26.00 INCH  
\* NOZZLES 32 32 32 /32NDS  
\* NOZZLES EFFICIENCY 95 %  
\* BIT P. LOSSES 785 KPA  
\* H.H.P RATIO 22.45 %  
\* BIT H.H.P .113  
\* BIT VELOCITY 37.34 M/S

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 24/ 5/82

HAMMERHEAD #1

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*****
#BIT HEADING :BIT #3 RUN #2
#BIT TYPE :TOOTH
#BIT IDENTITY :FP 12+OH
*****
#BIT SIZE : 26.00 INCH
#BIT COST : 3000. $ RIG COST/HR: 5833.
*****
#NOZZLES : 32 32 32 /32MDS @ 95 % EFFICIENCY
*****
#DEPTH IN : 195.46 METERS 24/ 5/82
#DEPTH OUT : 363.97 METERS 24/ 5/82
#METRAGE : 168.51 METERS
#TOTAL REVOLUTIONS : 19
*****
#DRILLING TIME: 7:53 HR AVERAGE ROP: 21.39 M/HR
#TIME IN HOLE : 5:29 HR AVERAGE ROP: 30.75 M/HR
#TRIP TIME : 2: 0 HR
*****
#DRILLING COST STANDARD : 276.7 $/MET
#DRILLING COST ON BOTTOM : 359.7 $/MET
#DRILLING COST MINIMUM : 158.6 $/MET
*****
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS
#WEIGHT ON BIT : 3.38 TONS NOZZLES SPEED : 36.91 M/S
#ROTATION : 75.00 RPM PRESSURE DROP : 767 KPA
#FLOW RATE :3363.96 L/MN HYDRAULIC POWER: 57.70 H.P
#STAND PIPE PRESSURE: 3844 KPA
*****
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# BIT #3 RUN #2 FP 12\*OH BIT DIAMETER : 26.00 inch NOZZ 32/32/32 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

#	TIME	DEPTHS			DRILLING PARAMETERS					MUD PARAMETERS				GAS			OVERPRESSURE SURVEY			ACCUMULATED ON BIT						
		MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
#	hr:mn	net	net	net	m/hr	tons	rpm	lPa	l/mn	m3	sq	degC	ohm	unit	sq	sq	sq	net	Dhr	\$/m						
D	6:18	368.5	367.5	.0	22.4	3.1	75	2350	4132	3420	41.5	1.02	.00	14.6	.0	.19	.00	.0	.70	.00	.00	1.03	.70	173.5	7.92	351
D	6:20	369.1	368.1	.0	15.7	3.1	74	3073	4132	3403	41.5	1.02	.00	14.6	.0	.19	.00	.0	.75	.00	.00	1.03	.70	174.1	7.96	351
D	6:26	370.1	368.5	.0	37.0	3.5	74	2892	4132	3437	41.7	1.02	.00	14.6	.0	.19	.00	.0	.59	.00	.00	1.03	.70	174.5	8.05	350
D	6:30	371.1	369.5	.0	9.5	2.2	73	2531	4132	3403	41.9	1.02	.00	14.6	.0	.19	.00	.0	.80	.00	.00	1.03	.70	175.5	8.12	353
D	6:33	372.0	370.5	.0	24.5	2.7	73	2712	4132	3403	41.9	1.02	.00	14.6	.0	.19	.00	.0	.66	.00	.00	1.03	.70	176.5	8.16	352
D	6:36	373.0	372.0	.0	12.1	3.4	73	3073	4132	3403	42.1	1.02	.00	14.6	.0	.19	.00	.0	.82	.00	.00	1.03	.70	178.0	8.21	351
D	6:42	374.0	373.0	.0	11.3	3.2	73	2712	4132	3420	41.9	1.02	.00	14.6	.0	.19	.00	.0	.83	.00	.00	1.04	.70	179.0	8.30	353
D	6:50	375.1	374.1	.0	19.0	3.0	75	2712	4013	3364	47.8	1.02	.00	14.6	.0	.19	.00	.0	.70	.00	.00	1.04	.70	180.1	8.36	352
D	6:54	376.1	375.1	.0	10.4	2.4	76	3796	4013	3303	46.5	1.02	.00	14.6	.0	.19	.00	.0	.80	.00	.00	1.04	.70	181.0	8.44	353
D	7: 1	377.1	375.6	.0	13.3	3.3	76	3073	4013	3366	43.1	1.02	.00	14.5	.0	.19	.00	.0	.76	.00	.00	1.03	.70	181.5	8.55	353
D	7: 6	378.2	377.1	.0	14.0	1.3	75	2350	4013	3347	43.3	1.02	.00	14.5	.0	.19	.00	.0	.73	.00	.00	1.03	.70	183.0	8.63	355
D	7: 8	379.1	378.1	.0	10.0	3.4	76	2092	4013	3349	42.5	1.02	.00	14.5	.0	.19	.00	.0	.70	.00	.00	1.03	.70	184.1	8.67	354
D	7:12	380.1	379.1	.0	15.2	1.9	75	3977	4013	3366	41.7	1.02	.00	14.6	.0	.19	.00	.0	.74	.00	.00	1.03	.70	185.1	8.74	355
D	7:16	381.2	379.5	.0	11.1	1.9	75	2531	4013	3349	41.7	1.02	.00	14.6	.0	.19	.00	.0	.79	.00	.00	1.03	.70	185.5	8.81	355
D	7:23	382.0	380.5	.0	7.1	2.2	75	3073	4013	3349	42.9	1.02	.00	14.6	.0	.19	.00	.0	.89	.00	.00	1.03	.70	186.5	8.91	356
D	7:27	383.1	381.6	.0	11.5	1.8	76	2531	4013	3349	43.9	1.02	.00	14.6	.0	.19	.00	.0	.80	.00	.00	1.03	.70	187.6	8.98	357
D	7:39	384.2	382.5	.0	11.7	2.4	74	4519	4073	3383	45.5	1.02	.00	14.6	.0	.19	.00	.0	.42	.00	.00	1.03	.70	188.5	9.06	357
D	7:40	385.1	384.1	.0	7.1	2.7	76	2712	4102	3306	43.7	1.02	.00	14.6	.0	.19	.00	.0	.88	.00	.00	1.03	.70	190.0	9.22	360
D	7:52	386.2	385.1	.0	19.3	2.5	75	2892	4102	3383	44.5	1.02	.00	14.6	.0	.19	.00	.0	.70	.00	.00	1.03	.70	191.1	9.28	360
D	7:55	387.2	386.2	.0	19.4	2.9	77	3073	4102	3383	44.9	1.02	.00	14.6	.0	.19	.00	.0	.70	.00	.00	1.03	.70	192.1	9.33	360
D	8: 2	388.0	386.5	.0	5.6	3.0	77	2712	4102	3366	43.5	1.02	.00	14.6	.0	.19	.00	.0	.93	.00	.00	1.03	.70	192.5	9.44	361
D	8: 5	389.1	387.7	.0	22.3	2.0	77	3073	4102	3383	43.9	1.02	.00	14.6	.0	.19	.00	.0	.68	.00	.00	1.03	.70	193.7	9.50	361
D	8: 0	390.0	389.0	.0	17.4	3.1	76	2531	4102	3400	44.1	1.02	.00	14.6	.0	.19	.00	.0	.69	.00	.00	1.05	.70	195.0	9.55	361
D	8:13	391.1	390.1	.0	16.4	2.8	75	2092	4132	3306	42.1	1.02	.00	14.6	.0	.19	.00	.0	.73	.00	.00	1.03	.70	196.1	9.63	361
D	8:17	392.1	390.6	.0	11.0	.0	76	2092	4102	3303	41.9	1.02	.00	14.6	.0	.19	.00	.0	.80	.00	.00	1.03	.70	197.1	9.69	361
D	8:31	393.0	392.0	.0	11.6	2.0	82	2531	4132	3303	44.7	1.02	.00	14.6	.0	.19	.00	.0	.73	.00	.00	1.03	.72	198.0	9.80	363
D	8:37	394.1	392.6	.0	17.7	3.0	74	5705	4073	3366	42.9	1.02	.00	14.6	.0	.19	.00	.0	.70	.00	.00	1.03	.72	198.5	9.89	363
D	8:43	395.0	393.6	.0	10.7	2.9	75	3073	4102	3383	43.9	1.02	.00	14.6	.0	.19	.00	.0	.81	.00	.00	1.03	.72	199.5	9.99	364
D	8:48	396.1	395.1	.0	26.6	2.7	76	2092	4132	3373	44.5	1.02	.00	14.6	.0	.19	.00	.0	.65	.00	.00	1.03	.72	201.1	10.00	365
D	8:54	397.1	396.1	.0	12.3	2.2	78	2712	4132	3383	43.7	1.02	.00	14.6	.0	.19	.00	.0	.78	.00	.00	1.03	.72	202.1	10.10	366
D	8:58	398.0	396.7	.0	10.6	1.8	77	2712	4102	3303	43.5	1.02	.00	14.6	.0	.19	.00	.0	.71	.00	.00	1.03	.72	202.7	10.24	366
D	9: 5	399.0	398.0	.0	13.1	3.0	78	2531	4102	3383	44.1	1.02	.00	14.6	.0	.19	.00	.0	.80	.00	.00	1.03	.72	204.0	10.36	368
D	9:10	400.0	399.0	.0	16.4	2.9	75	3435	4132	3366	43.9	1.02	.00	14.6	.0	.19	.00	.0	.73	.00	.00	1.03	.72	205.0	10.45	369
D	9:23	401.2	400.1	.0	14.6	3.1	76	3977	4192	3400	45.9	1.02	.00	14.6	.0	.19	.00	.0	.64	.00	.00	1.03	.72	206.1	10.52	369
D	9:27	402.2	400.6	.0	21.4	2.6	80	2092	4222	3396	44.9	1.02	.00	14.6	.0	.19	.00	.0	.60	.00	.00	1.03	.72	206.5	10.58	369
D	9:31	403.1	402.0	.0	9.3	3.5	79	2892	4222	3415	44.5	1.02	.00	14.6	.0	.19	.00	.0	.88	.00	.00	1.03	.72	208.0	10.66	369
D	9:35	404.0	402.6	.0	14.2	2.3	80	3435	4222	3383	44.5	1.02	.00	14.6	.0	.19	.00	.0	.77	.00	.00	1.03	.72	208.6	10.71	369
D	9:40	405.1	403.6	.0	7.7	2.2	79	3616	4222	3383	43.9	1.02	.00	14.6	.0	.19	.00	.0	.89	.00	.00	1.03	.72	209.5	10.81	370
D	9:47	406.0	404.6	.0	7.0	2.7	80	3073	4222	3400	43.5	1.02	.00	14.6	.0	.19	.00	.0	.85	.00	.00	1.03	.72	210.5	10.91	371
D	9:51	407.1	405.6	.0	32.4	2.9	81	3073	4222	3383	43.7	1.02	.00	14.6	.0	.19	.00	.0	.65	.00	.00	1.03	.72	212.1	10.90	371

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 \* GEOSERVICES  
 \* ON-LINE TDC  
 \* DATE : 24/ 5/02  
 \* \*\*\*\*\*

HAMMERHEAD #1

\* BIT #3 RUN #2 FP 12+0H BIT DIAMETER : 26.00 inch NOZZ 32/32/32

MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 1

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT									
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW IN	PIT VOL	DENSITY IN	TEMPERATURE IN	TEMPERATURE OUT	RESISTIVITY IN	RESISTIVITY OUT	GAS DCS	NORM	PF	CCD	FRAC	METER	TIME	COST		
Hr:mn	met	met	met	m/hr	tons	rpm	Nm	kPa	l/mn	m3	sg	degC	degC	ohm	unit	sg	sg	sg	sg	met	DHr	\$/m			
D * 13:35	430.2	145.2	.0	10.6	4.1	70	3254	4252	3303	45.1	1.02	.00	14.8	.0	.19	.00	.0	.94	.00	.00	1.03	.53	232.2	12.81	385
D * 13:39	431.0	146.1	.0	15.9	4.1	69	3073	4282	3393	44.9	1.02	.00	14.8	.0	.19	.00	.0	.81	.00	.00	1.03	.53	233.1	12.87	385
D * 13:42	432.0	147.1	.0	21.4	4.3	68	3435	4252	3400	44.5	1.02	.00	14.8	.0	.19	.00	.0	.75	.00	.00	1.03	.53	234.1	12.92	385
D * 13:58	433.0	147.7	.0	16.7	2.8	70	3435	4282	3381	43.9	1.02	.00	14.8	.0	.19	.00	.0	.00	.00	.00	1.03	.53	237.8	13.00	385
D * 14:15	434.1	149.1	.0	24.9	1.4	73	2169	4312	3364	45.7	1.02	.00	14.8	.0	.19	.00	.0	.65	.00	.00	1.03	.53	239.3	13.03	379
D * 14:16	435.1	149.7	.0	47.7	2.3	77	3254	4312	3383	45.1	1.02	.00	14.8	.0	.19	.00	.0	.45	.00	.00	1.03	.53	239.9	13.05	378
D * 14:17	436.1	150.9	.0	74.4	3.7	76	3616	4312	3383	44.5	1.02	.00	14.8	.0	.19	.00	.0	.59	.00	.00	1.03	.53	241.3	13.07	377
D * 14:25	437.0	151.6	.0	5.4	3.8	77	3435	4312	3393	43.9	1.02	.00	14.8	.0	.19	.00	.0	1.07	.00	.00	1.03	.53	241.8	13.19	378
D * 14:28	438.0	152.8	.0	30.8	3.8	75	3616	4312	3383	43.5	1.02	.00	14.8	.0	.19	.00	.0	.69	.00	.00	1.03	.53	243.0	13.24	378
D * 14:33	439.1	154.2	.0	13.5	3.9	78	3435	4342	3388	43.7	1.02	.00	14.8	.0	.19	.00	.0	.07	.00	.00	1.03	.53	244.3	13.33	378
D * 14:38	440.0	155.1	.0	12.9	4.6	75	3435	4342	3381	43.7	1.02	.00	14.8	.0	.19	.00	.0	.00	.00	.00	1.03	.53	245.2	13.40	379
D * 14:42	441.1	156.1	.0	16.6	4.0	78	3073	4342	3381	43.1	1.02	.00	14.8	.0	.19	.00	.0	.82	.00	.00	1.03	.53	246.3	13.46	378
D * 14:57	442.1	156.6	.0	16.7	2.1	75	3435	4073	3293	47.6	1.02	.00	14.8	.0	.19	.00	.0	.82	.00	.00	1.03	.53	246.8	13.53	378
D * 15: 3	443.0	158.1	.0	7.8	3.5	79	2892	4222	3325	47.0	1.02	.00	14.9	.0	.19	.00	.0	.97	.00	.00	.99	.53	248.2	13.63	379
D * 15: 8	444.0	158.6	.0	16.9	3.7	78	2892	4222	3347	46.8	1.02	.00	14.9	.0	.19	.00	.0	.83	.00	.00	.99	.53	248.8	13.71	379
D * 15:16	445.0	159.7	.0	7.4	3.0	79	2892	4222	3344	47.0	1.03	.00	14.9	.0	.19	.00	.0	.98	.00	.00	1.04	.53	250.2	13.84	381
D * 15:24	446.0	161.1	.0	5.5	2.7	81	3073	4222	3324	44.9	1.07	.00	14.8	.0	.19	.00	.0	.92	.00	.00	1.00	.53	251.2	13.98	383
D * 15:33	447.0	161.6	.0	7.3	2.4	80	3073	4222	3327	44.9	1.07	.00	14.8	.0	.19	.00	.0	.85	.00	.00	1.00	.53	251.8	14.12	384
D * 15:40	448.1	163.1	.0	11.4	3.8	77	3073	4222	3339	44.7	1.05	.00	14.9	.0	.19	.00	.0	.85	.00	.00	1.06	.53	253.3	14.23	386
D * 15:43	449.1	164.1	.0	19.7	3.5	77	2712	4222	3327	45.1	1.03	.00	14.9	.0	.19	.00	.0	.77	.00	.00	1.04	.53	254.3	14.27	385
D * 15:46	456.6	164.1	.0	19.7	3.3	79	2531	4222	3310	44.9	1.03	.00	14.9	.0	.19	.00	.0	.77	.00	.00	1.04	.53	254.3	14.32	385

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT								
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST		
Hr:mn	net	net	net	n/hr	tons	rpm	Nm	kPa	l/mn	m3	sq	degC	ohm	unit	sq	sq	sq	net	Dhr	\$/m				
D * 17:42	465.2	462.4	.0	16.4	5.5	65	3977	4162	3310	44.1	1.06	14.9	.0	.19	.00	.0	.74	.00	.00	1.07	.70	269.8	17.06	423
D * 17:45	466.1	462.9	.0	21.4	5.5	64	4081	4162	3293	43.9	1.06	14.9	.0	.19	.00	.0	.60	.00	.00	1.00	.70	270.3	17.11	423
D * 18: 3	467.1	464.5	.0	6.6	4.9	63	3616	4202	3344	46.7	1.06	14.9	.0	.19	.00	.0	.87	.00	.00	1.00	.70	271.8	17.24	424
D * 18: 7	468.0	465.0	.0	13.4	6.3	62	5062	4252	3312	45.5	1.06	14.9	.0	.19	.00	.0	.77	.00	.00	1.07	.70	272.3	17.30	424
D * 18:11	469.2	466.0	.0	16.1	5.1	62	3616	4202	3327	44.5	1.06	14.9	.0	.19	.00	.0	.76	.00	.00	1.07	.70	273.3	17.37	424
D * 18:17	470.0	467.0	.0	10.0	5.0	61	3977	4252	3329	44.3	1.04	14.9	.0	.19	.00	.0	.83	.00	.00	1.05	.70	274.3	17.47	424
D * 18:18	479.0	477.2	.0	3940	6.1	61	4150	4202	3329	44.3	1.06	14.9	.0	.19	.00	.0	.29	.00	.00	1.07	.70	284.6	17.49	418
D * 19:24	480.0	480.2	.0	10.8	4.8	64	3254	4312	3327	47.0	1.03	14.9	.0	.19	.00	.0	.00	.00	.00	1.04	.70	284.6	17.00	415
D * 19:30	481.1	481.7	.0	11.9	3.7	65	3073	4312	3327	45.9	1.03	14.9	.0	.19	.00	.0	.81	.00	.00	1.04	.70	286.1	17.91	416
D * 19:34	482.0	482.2	.0	19.3	5.4	65	3616	4312	3327	45.5	1.04	14.9	.0	.19	.00	.0	.71	.00	.00	1.05	.70	286.6	17.96	416
D * 19:39	483.1	483.7	.0	10.2	3.0	65	3796	4312	3347	45.1	1.05	14.9	.0	.19	.00	.0	.81	.00	.00	1.06	.70	288.1	18.04	416
D * 19:51	484.0	484.1	.0	9.5	4.8	64	4081	4312	3347	46.3	1.06	14.9	.0	.19	.00	.0	.70	.00	.00	1.07	.70	288.5	18.13	417
D * 19:57	485.1	485.1	.0	9.5	3.7	64	3616	4342	3347	45.5	1.03	14.9	.0	.19	.00	.0	.84	.00	.00	1.04	.70	289.5	18.23	417
D * 20: 1	486.1	486.2	.0	28.4	4.6	62	3616	4342	3344	45.1	1.03	14.9	.0	.19	.00	.0	.66	.00	.00	1.04	.70	290.5	18.31	417
D * 20: 7	487.1	487.7	.0	14.3	4.8	62	3796	4342	3327	45.1	1.03	14.9	.0	.19	.00	.0	.76	.00	.00	1.04	.70	292.0	18.41	418
D * 20:16	488.0	488.2	.0	5.3	.0	62	2892	4342	3347	45.1	1.03	14.9	.0	.19	.00	.0	.96	.00	.00	1.04	.70	292.5	18.55	419
D * 20:23	489.2	489.9	.0	19.0	4.1	63	3254	4372	3329	44.9	1.03	14.9	.0	.19	.00	.0	.70	.00	.00	1.04	.70	294.2	18.67	420
D * 20:37	490.1	487.0	.0	6.5	4.6	62	3435	3983	2092	45.9	1.04	14.9	.0	.19	.00	.0	.91	.00	.00	1.04	.70	294.6	18.80	421
D * 20:46	494.0	490.1	.0	2.0	4.0	59	3435	4192	3261	40.0	1.04	14.9	.0	.19	.00	.0	1.00	.00	.00	1.05	.70	299.0	18.93	418
D * 20:53	495.1	495.1	.0	10.7	7.1	65	3796	4162	3265	46.8	1.03	14.9	.0	.19	.00	.0	.86	.00	.00	1.04	.70	300.1	19.03	419
D * 20:56	496.0	495.5	.0	14.6	6.0	64	4150	4132	3258	46.7	1.03	14.9	.0	.19	.00	.0	.70	.00	.00	1.04	.70	301.0	19.09	419
D * 21: 1	497.1	497.1	.0	13.6	6.9	64	4339	4162	3260	44.3	1.03	14.9	.0	.19	.00	.0	.82	.00	.00	1.04	.70	302.0	19.17	419
D * 21: 7	498.0	498.1	.0	9.4	6.4	65	4339	4192	3255	40.3	1.03	14.9	.0	.19	.00	.0	.90	.00	.00	1.04	.70	303.0	19.20	419
D * 21:12	499.1	499.1	.0	12.6	4.5	65	3977	4162	3255	37.1	1.06	14.9	.0	.19	.00	.0	.80	.00	.00	1.07	.70	304.1	19.36	420
D * 21:18	500.1	499.6	.0	11.2	5.0	64	3616	4192	3275	34.5	1.03	14.9	.0	.19	.00	.0	.79	.00	.00	1.04	.70	304.5	19.45	420
D * 21:26	501.1	500.6	.0	9.2	5.9	65	3254	4192	3275	34.9	1.03	14.9	.0	.19	.00	.0	.80	.00	.00	1.04	.70	305.5	19.50	420
D * 21:39	502.0	501.5	.0	2.0	5.0	63	4700	4282	3260	44.9	1.03	14.9	.0	.19	.00	.0	1.13	.00	.00	1.04	.70	306.5	19.80	423
D * 21:54	503.1	503.1	.0	17.0	7.7	52	4339	4502	3300	45.5	1.03	14.9	.0	.19	.00	.0	.73	.00	.00	1.04	.70	308.1	19.92	425
D * 22: 1	504.1	503.7	.0	9.8	4.3	65	4519	4502	3392	44.7	1.03	14.8	.0	.19	.00	.0	.80	.00	.00	1.04	.70	308.6	20.03	425
D * 22: 7	505.0	505.1	.0	7.7	4.3	63	3616	4502	3366	44.3	1.03	14.9	.0	.19	.00	.0	.86	.00	.00	1.04	.70	310.0	20.13	426
D * 22:19	506.0	506.0	.0	4.5	5.9	62	3616	4552	3340	44.5	1.03	14.9	.0	.19	.00	.0	.99	.00	.00	1.04	.70	311.0	20.32	428
D * 22:24	507.2	506.6	.0	11.1	5.4	62	4150	4552	3371	44.3	1.03	14.9	.0	.19	.00	.0	.83	.00	.00	1.04	.70	311.5	20.41	428
D * 22:30	508.1	508.1	.0	7.4	4.4	65	2712	4502	3366	44.7	1.03	14.9	.0	.19	.00	.0	.89	.00	.00	1.04	.70	313.0	20.50	429
D * 22:37	509.0	508.5	.0	7.0	5.6	62	3073	4502	3300	45.1	1.03	14.9	.0	.19	.00	.0	.87	.00	.00	1.04	.70	313.5	20.63	429
D * 22:47	510.0	509.6	.0	5.0	4.4	63	3435	4502	3361	45.1	1.03	14.9	.0	.19	.00	.0	.99	.00	.00	1.04	.70	314.5	20.77	431
D * 23: 1	516.3	516.3	.0	490	4.4	52	3254	4202	3258	40.4	1.03	14.9	.0	.19	.00	.0	.10	.00	.00	1.04	.00	321.3	20.07	425
D * 23: 7	513.0	512.2	.0	15.4	4.6	63	3073	4202	3295	46.7	1.03	14.9	.0	.19	.00	.0	.74	.00	.00	1.04	.70	317.2	20.90	430
D * 23:20	514.2	513.2	.0	4.9	5.4	64	3254	4342	3290	45.5	1.03	14.9	.0	.19	.00	.0	.96	.00	.00	1.04	.70	318.2	21.11	430
D * 23:28	515.1	514.7	.0	17.0	4.9	64	3977	4342	3276	45.5	1.03	14.9	.0	.19	.00	.0	.74	.00	.00	1.04	.70	319.7	21.23	433
D * 23:33	516.0	515.7	.0	7.9	4.6	63	3796	4342	3293	45.5	1.03	14.9	.0	.19	.00	.0	.88	.00	.00	1.04	.70	320.7	21.31	433
D * 23:37	517.0	516.7	.0	13.3	5.2	64	3977	4342	3295	45.5	1.03	14.9	.0	.19	.00	.0	.80	.00	.00	1.04	.00	321.7	21.39	434
D * 23:42	518.0	517.2	.0	4.9	5.6	63	3796	4372	3295	44.3	1.03	14.9	.0	.19	.00	.0	.99	.00	.00	1.04	.00	322.2	21.63	435
D * 23:50	519.1	518.2	.0	11.2	5.3	64	3977	4342	3295	44.1	1.03	14.9	.0	.19	.00	.0	.84	.00	.00	1.04	.00	323.2	21.74	437
D * 0: 3	520.0	519.2	.0	15.0	4.9	64	3796	4372	3270	44.1	1.03	14.9	.0	.19	.00	.0	.77	.00	.00	1.04	.00	324.2	21.81	437
D * 0:10	521.1	520.7	.0	7.4	5.4	63	3616	4372	3295	43.5	1.03	14.9	.0	.19	.00	.0	.93	.00	.00	1.04	.00	325.7	21.93	438
D * 0:25	522.0	521.2	.0	10.7	.0	64	3254	4552	3347	44.1	1.03	14.9	.0	.19	.00	.0	.85	.00	.00	1.04	.00	326.2	21.98	438
D * 0:29	523.0	522.3	.0	51.2	4.2	64	3435	4552	3329	43.5	1.03	14.9	.0	.19	.00	.0	.53	.00	.00	1.04	.00	327.3	22.04	437
D * 0:33	524.0	523.6	.0	19.2	4.9	64	3435	4552	3329	43.3	1.03	14.9	.0	.19	.00	.0	.60	.00	.00	1.04	.00	328.6	22.10	437
D * 0:37	525.1	524.7	.0	19.5	4.5	63	3616	4552	3312	43.1	1.03	14.9	.0	.19	.00	.0	.70	.00	.00	1.04	.00	329.7	22.17	437



\* GEOSERVICES  
 \* ON-LINE TDC

HAMMERHEAD #1

DATE : 25/ 5/82

\* BIT #3 RUN #2 FP 12+0H BIT DIAMETER : 26.00 Inch NOZZ 32/32/32

MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 0 GEL = 0

TIME	DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS				GAS			OVERPRESSURE SURVEY			ACCUMULATED ON BIT					
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER TIME	COST					
Hr:mn	net	net	net	m/hr	tens	rpm	Nm	kPa	l/mn	m3	sg	degC	IN	OUT	unit	sg	sg	sg	net	Dhr	\$/m				
D # 0:44	526.2	525.0	.0	8.6	4.1	64	3616	4552	3346	43.1	1.03	.00	15.0	.0	.19	.00	.0	.86	.00	.00	1.04	.80	330.8	22.20	437
D # 0:53	527.0	526.2	.0	15.4	5.3	64	3977	4552	3383	42.9	1.03	.00	15.0	.0	.19	.00	.1	.74	.00	.00	1.04	.80	331.2	22.45	432
D # 0:58	528.1	527.1	.0	13.3	4.2	66	4158	4552	3329	42.9	1.03	.00	14.9	.0	.19	.00	.0	.80	.00	.00	1.04	.80	332.1	22.52	439
D # 1: 5	529.1	528.4	.0	8.4	4.7	64	3977	4552	3329	42.9	1.03	.00	14.9	.0	.19	.00	.0	.80	.00	.00	1.04	.80	333.4	22.64	439
D # 1:11	530.1	529.7	.0	7.7	4.9	64	3977	4552	3347	42.9	1.03	.00	15.0	.0	.19	.00	.0	.89	.00	.00	1.04	.80	334.7	22.74	440
D # 1:29	531.1	530.2	.0	7.9	4.1	65	3977	4432	3276	45.7	1.03	.00	14.9	.0	.19	.00	.0	.91	.00	.00	1.04	.80	335.2	22.89	441
D # 1:35	532.0	531.2	.0	8.1	4.2	65	3073	4432	3298	44.1	1.03	.00	14.9	.0	.19	.00	.0	.88	.00	.00	1.04	.80	336.6	23.00	442
D # 1:43	533.1	532.2	.0	6.7	4.2	65	3254	4462	3310	43.7	1.03	.00	14.9	.0	.19	.00	.0	.92	.00	.00	1.04	.80	337.7	23.12	443
D # 1:49	534.0	533.7	.0	9.4	4.6	65	3616	4462	3276	43.1	1.03	.00	14.9	.0	.19	.00	.0	.85	.00	.00	1.04	.80	338.7	23.23	443
D # 1:58	535.1	534.2	.0	6.7	4.6	65	2531	4492	3293	43.1	1.03	.00	14.9	.0	.19	.00	.0	.87	.00	.00	1.04	.80	339.7	23.37	444
D # 2: 0	536.1	535.7	.0	5.3	4.7	65	3073	4522	3325	43.3	1.03	.00	14.9	.0	.19	.00	.0	.96	.00	.00	1.04	.80	340.7	23.54	446
D # 2:17	537.0	536.2	.0	9.7	4.9	65	3254	4522	3293	43.3	1.03	.00	14.9	.0	.19	.00	.0	.84	.00	.00	1.04	.80	341.2	23.69	446





\* 25/ 5/82 TIME 6:35

HAMMERHEAD #1

\* DEPTH OF EXECUTION 549.86 METERS  
\* FLOW RATE 3366 L/HH POWER LAW

\* MUD DATA WEIGHT 1.02 SG  
\* PV 3 CPS  
\* YP .10 LB/FT2  
\* GEL .10 LB/100 FT2  
\* N 1.0000  
\* K .0059 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 157.77 M3  
\* WITHOUT PIPES 162.21 M3  
\* ANNULAR 153.11 M3  
\* INSIDE PIPES 4.65 M3

	FROM	TO	PIPE ID	PIPE OD	HOLE DIAH	ANNULAR P.LOSSES	H.P	TYPE	CRITICAL	MUD FLOW	MUD VELOCITY	CUTTINGS VELOCITY
	METERS		INCH	INCH	INCH	KPA				L/HH	M/HH	M/HH
* SURF. EQPT						632	40					
* DR. STRING	.00	461.00	4.20	5.00		1055	79					
* DR. STRING	461.00	517.68	2.81	7.75		989	73					
* DR. STRING	517.68	551.89	3.00	9.50		429	32					
* BIT						770	50	M/S			36.9	
* ANNULUS	549.86	514.85		9.50	26.00	0	0	TU		352.0	11.3	3.9
* ANNULUS	514.85	458.17		7.75	26.00	0	0	TU		334.7	10.8	3.4
* ANNULUS	458.17	194.00		5.00	26.00	0	0	TU		307.4	10.2	2.8
* ANNULUS	194.00	143.00		5.00	26.00	0	0	TU		327.2	9.8	1.4
* ANNULUS	143.00	.00		5.00	16.75	1	0	TU		215.7	26.0	18.6
* TOTAL						3056	290					

\* ANNULAR PRESSURE LOSSES 1 KPA

\* EQUIV. CIRCULATING DENSITY 1.02 SG  
\* MAX DEPTH 5775.90

\* MUD LAG TIMES S -> B 1.38 HH  
\* B -> S 45.49 HH

\* CUTTINGS DATA SIZE .20 CM  
\* DENSITY 2.40 SG  
\* LAG TIME 164.5 HH  
\* MAX SLIP VELOCITY 7.39 M/HH

\* BIT DATA SIZE 26.00 INCH  
\* NOZZLES 32 32 32 /32NDS  
\* NOZZLES EFFICIENCY 95 %  
\* BIT P. LOSSES 770 KPA  
\* H.H.P RATIO 19.8 %  
\* BIT H.H.P .109  
\* BIT VELOCITY 36.93 M/S

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 25/ 5/82

HAMMERHEAD #1

\*BIT HEADING :BIT #3 RUN #2

\*BIT TYPE :TOOTH

\*BIT IDENTITY :FP 12\*ON

\*BIT SIZE : 26.00 INCH

\*BIT COST : 3000. \$

RIG COST/HR: 5833.

\*NOZZLES : 32 32 32 /32NDS @ 95 % EFFICIENCY

\*DEPTH IN : 193.98 METERS

23/ 4/82

\*DEPTH OUT : 549.86 METERS

25/ 5/82

\*METRAGE : 355.88 METERS

\*TOTAL REVOLUTIONS : 8

\*DRILLING TIME: 30:14 HR

AVERAGE ROP: 11.74 M/HR

\*TIME IN HOLE : 35:52 HR

AVERAGE ROP: 9.90 M/HR

\*TRIP TIME : 2: 0 HR

\*DRILLING COST STANDARD : 630.5 \$/MET

\*DRILLING COST ON BOTTOM : 538.1 \$/MET

\*DRILLING COST MINIMUM : 335.5 \$/MET

\* AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

\*WEIGHT ON BIT : 4.89 TONS

NOZZLES SPEED : 36.43 M/S

\*ROTATION : 66.80 RPM

PRESSURE DROP : 749 KPA

\*FLOW RATE : 3320.63 L/MIN

HYDRAULIC POWER: 55.61 H.P

\*STAND PIPE PRESSURE: 4262 KPA

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 25/ 5/02

\* BIT #3 RUN #2 FP 12+0H BIT DIAMETER : 26.00 inch NOZZ 32/32/32

MUD RHEOLOGICAL PARAMETERS : PV = 3 TP = 0 GEL = 0

* TIME *	* DEPTHS *			* DRILLING PARAMETERS *							* MUD PARAMETERS *		* GAS *		* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *							
	* MEASURED *	* VERTCL *	* LAGGED *	* ROP *	* WOB *	* RPH *	* TORQ *	* PRESS *	* FLOW IN *	* PIT VOL *	* DENSITY IN *	* TEMPERATURE IN *	* RESISTIVITY IN *	* RESISTIVITY OUT *	* DCS *	* NORM *	* PF *	* ECD *	* FRAC *	* METER *	* TIME *	* COST *				
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* tons *	* rpm *	* Nm *	* kPa *	* l/mn *	* m3 *	* sg *	* degC *	* ohm *	* unit *	* sg *	* sg *	* sg *	* net *	* Dhr *	* \$/H *						
D * 7: 5 *	550.1	548.9	.0	1.8	6.9	62	2531	4402	3270	47.6	1.03	.00	14.8	.0	.19	.00	.0	1.26	.00	.00	1.04	.81	356.1	30.52	541	
T * 7:35 *	550.5	549.4	.0			61	2169	4402	3290	45.3	1.07	.00	14.8	.0	.19	.00	.0									
T * 8: 5 *	550.5	549.4	.0			58	2531	5720	3749	42.1	1.07	.00	14.8	.0	.19	.00	.0									
D * 8:21 *	551.1	549.9	.0	.6	3.8	63	4081	5839	3739	39.3	1.05	.00	14.8	.0	.19	.00	.0	1.30	.00	.00	1.06	.81	357.0	31.62	557	
D * 8:45 *	552.1	550.9	.0	1.9	4.0	67	2350	5839	3771	35.3	1.06	.00	14.8	.0	.19	.00	.0	.81	.00	.00	1.07	.82	358.0	31.94	561	
D * 8:56 *	553.1	551.9	.0	4.9	5.3	64	4519	5839	3793	33.1	1.07	.00	14.8	.0	.19	.00	.0	.97	.00	.00	1.08	.82	359.1	32.13	562	
D * 9: 4 *	554.1	552.5	.0	6.8	4.8	63	5243	5839	3766	31.9	1.04	.00	14.8	.0	.19	.00	.0	.99	.00	.00	1.04	.82	359.6	32.26	563	
D * 9:10 *	555.1	553.9	.0	7.5	5.7	63	4081	5839	3776	30.9	1.03	.00	14.8	.0	.19	.00	.0	.91	.00	.00	1.05	.82	361.0	32.35	563	
D * 9:19 *	556.2	555.0	.0	6.2	5.7	64	4081	5869	3756	29.5	1.03	.00	14.8	.0	.19	.00	.0	.94	.00	.00	1.05	.82	362.1	32.50	564	
D * 9:25 *	557.2	555.9	.0	8.7	6.0	65	4519	5869	3793	28.7	1.03	.00	14.8	.0	.19	.00	.0	.87	.00	.00	1.04	.82	363.0	32.60	564	
D * 9:39 *	558.2	557.0	.0	5.7	4.0	65	5423	5600	3678	39.3	1.04	.00	14.8	.0	.19	.00	.0	.97	.00	.00	1.04	.82	364.1	32.77	565	
D * 9:43 *	559.2	558.0	.0	13.8	5.0	64	4700	5600	3700	39.1	1.04	.00	14.8	.0	.19	.00	.0	.77	.00	.00	1.04	.82	365.1	32.83	565	
D * 9:48 *	560.3	558.9	.0	13.2	4.6	64	5243	5630	3665	38.7	1.03	.00	14.8	.0	.19	.00	.0	.80	.00	.00	1.04	.82	366.1	32.92	564	
D * 9:53 *	561.1	559.9	.0	11.1	4.5	65	3977	5630	3663	38.3	1.03	.00	14.8	.0	.19	.00	.0	.82	.00	.00	1.04	.82	367.1	33.00	564	
D * 10: 3 *	562.1	561.0	.0	5.0	5.2	65	3977	5630	3600	37.7	1.03	.00	14.8	.0	.19	.00	.0	1.01	.00	.00	1.04	.82	368.1	33.17	565	
D * 10:10 *	563.1	561.9	.0	7.1	5.7	65	4158	5630	3665	37.3	1.03	.00	14.8	.0	.19	.00	.0	.92	.00	.00	1.04	.82	369.1	33.30	566	
T * 10:40 *	563.4	561.9	.0			63	2169	5600	3663	34.9	1.07	.00	14.8	.0	.19	.00	.0									
T * 11:10 *	563.4	561.9	.0			0	542	5540	3665	32.5	1.08	.00	14.8	.0	.19	.00	.0									
D * 11:17 *	565.0	561.9	.0	7.1	.0	0	542	5570	3700	32.3	1.04	.00	14.8	.0	.19	.00	.0	.92	.00	.00	1.04	.82	369.1	33.89	566	

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 25/ 5/82

HANNERHEAD #1

```
*****
#BIT HEADING :BIT #3 RUN #2
#BIT TYPE :TOOTH
#BIT IDENTITY :FP-12+OH
*****
#BIT SIZE : 26.00 INCH
#BIT COST : 3000. $ RIG COST/HR: 5033.
*****
#NOZZLES : 32 32 32 /32NDS @ 95 % EFFICIENCY
*****
#DEPTH IN : 194.00 METERS 23/ 4/82
#DEPTH OUT : 565.00 METERS 25/ 5/82
#METRAGE : 371.00 METERS
#TOTAL REVOLUTIONS : 22
*****
#DRILLING TIME: 33:54 HR AVERAGE ROP: 10.95 M/HR
#TIME IN HOLE : 40:39 HR AVERAGE ROP: 9.13 M/HR
#TRIP TIME : 2: 0 HR
*****
#DRILLING COST STANDARD : 678.7 $/NET
#DRILLING COST ON BOTTOM : 572.4 $/NET
#DRILLING COST MINIMUM : 335.5 $/NET
*****
# AVERAGE OVER THE RUN # AVERAGE HYDRAULICS
#WEIGHT ON BIT : 5.10 TONS NOZZLES SPEED : 36.37 M/S
#ROTATION : 66.33 RPM PRESSURE DROP : 755 KPA
#FLOW RATE : 3315.37 L/MN HYDRAULIC POWER: 55.95 H.P
#STAND PIPE PRESSURE: 4288 KPA
*****
```

\* 25/ 5/02 TIME 11:55

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 565.00 METERS \*  
\* FLOW RATE 3340 L/MN POWER LAW \*

\* MUD DATA \*  
WEIGHT 1.02 SG \*  
PV 3 CPS \*  
YP .10 LB/FT2 \*  
GEL .10 LB/100 FT2 \*  
N 1.0000 \*  
K .0059 LB/100 FT2 \*

\* HOLES VOLUMES \*  
WITH PIPES 163.20 M3 \*  
WITHOUT PIPES 167.67 M3 \*  
ANNULAR 158.37 M3 \*  
INSIDE PIPES 4.83 M3 \*

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	ANNULAR LOSSES	H.P.	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
METERS	METERS	INCH	INCH	INCH	KPA				L/MN	M/MN
*SURF.COPT*					623	47				
*DR.STRING*	.00	479.44	4.28	5.00	1002	81				
*DR.STRING*	479.44	536.12	2.81	7.75	955	71				
*DR.STRING*	536.12	570.33	3.00	9.50	423	32				
*BIT					750	57	M/S			36.6
*ANNULUS	565.00	530.79		9.50	26.00	0	TU	352.0	11.3	3.9
*ANNULUS	530.79	474.11		7.75	26.00	0	TU	334.7	10.7	3.3
*ANNULUS	474.11	194.00		5.00	26.00	0	TU	307.4	10.1	2.7
*ANNULUS	194.00	143.00		5.00	28.00	0	TU	327.2	8.7	1.3
*ANNULUS	143.00	.00		5.00	16.75	1	TU	215.7	25.6	18.4
* TOTAL					3843	297				

\*ANNULAR PRESSURE LOSSES 1 KPA\*

\*EQUIV.CIRCULATING DENSITY 1.02 SG \*  
\* MAX DEPTH 5929.06 \*

\* MUD LAG TIMES \*  
S -> B 1.44 MN \*  
B -> S 47.42 MN \*

\* CUTTINGS DATA \*  
SIZE .20 CM \*  
DENSITY 2.40 SG \*  
LAG TIME 175.7 MN \*  
MAX SLIP VELOCITY 7.39 M/MN \*

\* BIT DATA \*  
SIZE 26.00 INCH \*  
NOZZLES 32 32 32 /32NDS \*  
NOZZLES EFFICIENCY 75 % \*  
BIT P. LOSSES 758 KPA \*  
H.H.P RATIO 19.72 % \*  
BIT H.H.P .107 \*  
BIT VELOCITY 36.64 M/S \*

GEOSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\* 31/ 5/82

HAMMERHEAD 1

\* BIT RUN # 11

SEQ NBR: 7

\* STARTING DEPTH 582.00 METERS

\* BIT DATA SIZE 12.25

\* TOOTH HTC J4

\* NOZZLES 13 13 13 @ 95 % EFFICIENCY

\* DRILL STRING TYPE # NBR \* LENGTH \* ID OD \* NOMINAL LINEAR

\* SECTION \* \* METERS \* INCHES \* WEIGHT (KG/M)

\* 1 \* DRILL PIPE \* 54 \* 9.20 \* 4.28 5.40 \* 29.02

\* 2 \* DRILL COLLAR \* 1 \* 59.40 \* 2.81 7.75 \* 207.60

\* HOLE \* ID \* DEPTH (METERS)

\* \* INCHES \* TOP BOTTOM

\* RISER \* 16.75 \* .00 143.00

\* CASING \* 18.75 \* 143.00 554.00

\* OPEN HOLE 1 \* 12.25 \* 554.00 594.64

\* COST DATA BIT COST 3500 \$ RIG COST 5833 \$/HR

\* TRIP TIME 4.00 HRS

\* WEIGHTS HOOK LOAD OFF BOTTOM 66.6 TONS

\* STRING WEIGHT IN AIR 26.6 TONS

\* VOLUMES ANNULUS 87.2 M3 IN PIPES 5.1 M3

\* DEVIATION .5 DEG .873 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 10 BBL/MN : 4.0 KG/CM2

\* BIT WEAR TYPE EXPONENT 5.0

\* EXPECTED: RUN LENGTH 120 METERS TEETH WEAR 4 /8TH



T #	-15:30 #	582.0	579.0	571.0	*472.7 #	.0	0	53	-0	0	89 #	68.1 #	.98	1.03	.65	27.6	27.9	15.0	.30	.29	2.95 #	3.6 #	-1.94	.82	.24	1.03	.98	1.46 #	.0	.0	2115.7 #
#	15:40 #	585.6	579.0	581.9	*472.7 #	.0	60	178	168	2789	2789 #	62.3 #	1.07	1.03	1.34	20.8	20.8	25.8	.30	.29	.30 #	4.8 #	-1.94	.82	.24	1.03	1.27	1.46 #	.0	.0	2115.7 #
#	15:44 #	586.1	583.1	566.0	# 6.3 #	1.5	67	178	170	2711	5288 #	65.1 #	1.07	1.05	1.31	20.8	20.8	25.6	.30	.30	.31 #	4.8 #	.65	.82	.32	1.30	1.27	1.62 #	4.1	.0	6675.2 #
#	15:47 #	587.1	584.1	566.0	# 23.3 #	6.7	67	178	169	2714	3425 #	65.7 #	1.04	1.05	1.29	21.0	20.8	25.7	.30	.30	.31 #	3.6 #	.59	.82	.44	1.39	1.24	1.68 #	5.1	.1	5407.6 #
#	15:52 #	588.1	584.5	566.3	# 15.1 #	5.2	67	176	167	2696	1364 #	65.9 #	1.05	1.05	1.31	21.1	20.8	25.3	.31	.30	.31 #	3.6 #	.67	.82	.47	1.27	1.25	1.61 #	5.5	.2	4980.6 #
#	16: 6 #	591.0	585.5	566.6	# 11.9 #	.0	64	143	170	2734	247 #	68.7 #	1.02	1.05	1.33	21.4	20.8	26.2	.31	.30	.31 #	4.8 #	.24	.82	.35	1.03	1.22	1.46 #	9.0	.3	3151.8 #
T #	16:26 #	591.3	588.0	567.8	# 38.7 #	3.7	65	143	170	2752	2663 #	65.3 #	1.05	1.05	1.32	22.0	20.9	27.1	.30	.30	.31 #	3.6 #	.24	.82	.35	1.03	1.25	1.46 #	9.0	.6	3151.8 #
T #	16:46 #	591.4	588.0	578.9	# 38.7 #	10.6	20	125	171	2752	1597 #	64.7 #	1.05	1.05	1.31	22.6	21.0	27.4	.31	.30	.31 #	4.8 #	.24	.82	.35	1.03	1.26	1.46 #	9.0	.9	3151.8 #
T #	17: 6 #	591.5	588.0	573.9	# 38.7 #	-1.7	28	107	172	2742	3453 #	64.1 #	1.06	1.05	1.32	23.1	21.3	28.4	.31	.30	.30 #	4.8 #	.24	.82	.35	1.03	1.26	1.46 #	9.0	1.2	3151.8 #
T #	17:26 #	591.5	588.0	591.3	# 38.7 #	-2.4	29	107	166	2747	1948 #	64.3 #	1.06	1.05	1.30	23.0	22.6	29.0	.30	.30	.31 #	4.8 #	.24	.82	.35	1.03	1.25	1.46 #	9.0	1.5	3151.8 #
T #	17:46 #	591.5	588.5	591.3	# .4 #	5.4	33	125	171	2752	2752 #	64.1 #	1.05	1.05	1.31	24.3	23.2	29.6	.31	.30	.30 #	4.8 #	1.20	.82	.80	1.03	1.25	1.46 #	9.5	1.8	3847.2 #
T #	18: 6 #	591.5	588.5	591.3	# .4 #	.0	29	107	106	2134	4267 #	66.3 #	1.02	1.05	1.30	24.7	23.8	29.5	.31	.30	.31 #	6.0 #	1.20	.82	.80	1.03	1.14	1.46 #	9.5	2.1	3847.2 #
T #	18:26 #	591.6	588.5	591.3	# .4 #	7.0	64	160	171	2770	5782 #	66.5 #	1.00	1.05	.65	25.0	24.3	25.8	.31	.30	2.95 #	4.8 #	1.20	.82	.80	1.03	1.21	1.46 #	9.5	2.3	3847.2 #
T #	18:46 #	592.0	588.5	591.3	# .4 #	7.5	58	143	165	2697	2963 #	65.9 #	1.00	1.05	1.30	25.4	24.7	29.7	.30	.30	.30 #	6.0 #	1.20	.82	.80	1.03	1.20	1.46 #	9.5	2.7	3847.2 #
#	18:51 #	592.0	589.0	591.3	# .4 #	6.8	58	143	165	2735	2735 #	65.7 #	1.00	1.05	1.30	25.4	24.7	30.1	.30	.30	.30 #	4.8 #	1.20	.82	.80	1.03	1.20	1.46 #	10.0	2.7	4277.9 #
T #	19:11 #	592.0	589.0	591.6	# .4 #	.0	0	53	-7	0	4444 #	67.5 #	.85	1.00	1.28	25.4	25.0	30.9	.30	.30	.30 #	4.8 #	1.20	.82	.80	1.03	.85	1.46 #	10.0	2.9	4277.9 #

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 31/ 5/82

HANMERHEAD 1

\*BIT HEADING :BIT RUN # 11

\*BIT TYPE :TOOTH

\*BIT IDENTITY :NYC J4

\*BIT SIZE : 12.25 INCH

\*BIT COST : 3500. \$

RIG COST/HR: 5033.

\*NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY

\*DEPTH IN : 582.88 METERS

31/ 5/82

\*DEPTH OUT : 592.81 METERS

31/ 5/82

\*METRAGE : 10.01 METERS

\*TOTAL REVOLUTIONS : 0

\*DRILLING TIME: 2:53 HR

AVERAGE ROP: 3.40 m/hr

\*TIME IN HOLE : 3:35 HR

AVERAGE ROP: 2.79 m/hr

\*TRIP TIME : 4: 0 HR

\*DRILLING COST STANDARD : 4773.1 \$/MET

\*DRILLING COST ON BOTTOM : 4358.7 \$/MET

\*DRILLING COST MINIMUM : 3151.8 \$/MET

\* AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

\*WEIGHT ON BIT : 6.15 TONS

NOZZLES SPEED : 167.26 M/S

\*ROTATION : 55.99 RPM

PRESSURE DROP : 167.31 K/CM2

\*FLOW RATE : 2515.96 L/MIN

HYDRAULIC POWER: 922.79 H.P

\*STAND PIPE PRESSURE: 155.32 K/CM2



GES SERVICES ON-LINE TDC

BIT RUN INITIALISATION

\*\*\*\*\*  
\* 3/ 6/82  
\*\*\*\*\*

HAMMERHEAD #1

\*\*\*\*\*  
\* BIT#12 RUN#25 SED NBR: 0 \*  
\*\*\*\*\*

\* STARTING DEPTH 591.00 METERS

\* BIT DATA SIZE 12.25  
\* M/TOOT HTC J1  
\* NOZZLES 13 13 13 @ 95 % EFFICIENCY

* DRILL STRING * * SECTION *	TYPE	* NBR *	LENGTH * * METERS *	ID * * INCHES *	OD * * INCHES *	* NOMINAL LINEAR * * WEIGHT (KG/M) *
* 1	* DRILL PIPE	* 54 *	9.20 * * METERS *	4.28 * * INCHES *	5.00 * * INCHES *	29.02 *
* 2	* DRILL COLLAR	* 1 *	88.88 * * METERS *	2.81 * * INCHES *	7.75 * * INCHES *	207.00 *

* HOLE *	* ID * * INCHES *	DEPTH (METERS) * TOP * * BOTTOM *
* RISER	* 16.75 *	.00 143.00
* CASING	* 18.73 *	143.00 554.00
* OPEN HOLE 1	* 12.25 *	554.00 591.50

\* COST DATA BIT COST 7500 \$ RIG COST 5833 \$/HR  
\* TRIP TIME 3.00 HRS

\* WEIGHTS HOOK LOAD OFF BOTTOM 72.1 TONS  
\* STRING WEIGHT IN AIR 32.8 TONS

\* VOLUMES ANNULUS 87.1 M3 IN PIPES 5.8 M3

\* DEVIATION 4.0 DEG 7.00 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA

\* BIT WEAR TYPE EXPONENT .5  
\* EXPECTED: RUN LENGTH 300 METERS TECTH WEAR 2 /0TH  
\*\*\*\*\*

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 4 YP = 6 GEL = 3 \*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *					* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *			* ACCUMULATED ON BIT *				
		* HOURS *	* MIN *	* NET *	* ROP *	* WOB *	* RPM *	* TORQ *	* PRESS *	* FLOW *	* PIT *	* DENSITY *	* TEMP *	* RESIST *	* IN *	* OUT *	* IN *	* OUT *	* DCS *	* NORM *	* PF *	* ECD *	* FAC *	* METER *	* TIME *
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* ton *	* rpm *	* Nm *	* KPA *	* l/mn *	* m3 *	* sg *	* degC *	* ohm *	* *	* *	* *	* *	* *	* sq *	* sq *	* sq *	* net *	* Dir *	* \$/m *	
D * 4: 6 *	603.1	609.6	557.8	26.9	8.1	76	11.8	17214	2749	46.8	1.07	1.07	23.2	22.2	.29	.30	.84	.00	.00	.00	1.07	.26	20.1	.34	1342 *
D * 4: 8 *	604.2	603.1	557.8	31.9	8.2	75	12.7	17075	2729	44.2	1.11	1.07	23.3	22.0	.29	.30	.85	.00	.00	.00	1.12	.26	21.1	.37	1287 *
D * 4:10 *	605.1	604.0	557.8	30.2	7.6	76	12.7	16992	2749	42.8	1.06	1.07	23.3	21.9	.29	.30	.85	.00	.00	.00	1.09	.25	22.0	.40	1241 *
D * 4:11 *	606.1	605.0	557.8	30.2	8.4	75	12.7	16936	2744	42.2	1.06	1.05	23.3	22.3	.29	.30	.88	.00	.00	.00	1.08	.25	23.1	.42	1177 *
D * 4:14 *	607.1	606.0	591.9	28.6	9.2	75	13.7	16825	2747	42.6	1.06	1.05	23.4	22.7	.29	.30	1.01	.00	.00	.00	1.06	.25	24.0	.47	1111 *
D * 4:16 *	608.1	607.0	593.1	33.4	7.2	77	12.7	16992	2749	42.6	1.06	1.07	23.3	22.8	.29	.30	.85	.00	.00	.00	1.06	.25	25.1	.58	1113 *
D * 4:17 *	609.1	608.0	593.8	41.3	7.8	76	12.7	16741	2749	42.4	1.05	1.07	23.4	22.9	.29	.30	.88	.00	.00	.00	1.06	.25	26.0	.52	1078 *
D * 4:19 *	610.2	609.2	594.1	41.9	7.7	75	12.7	16797	2749	43.2	1.06	1.07	23.4	23.1	.29	.30	.82	.00	.00	.00	1.06	.25	27.3	.55	1463 *
D * 4:21 *	611.1	610.0	602.6	25.2	8.3	76	12.7	17047	2734	43.0	1.07	1.07	23.5	23.2	.29	.30	.96	.00	.00	.00	1.07	.25	28.1	.59	1410 *
D * 4:22 *	612.1	611.0	602.6	28.5	7.4	75	11.8	16490	2711	46.2	1.12	1.06	23.6	23.1	.29	.30	.88	.00	.00	.00	1.14	.25	29.1	.61	1359 *
D * 4:33 *	613.2	612.0	602.6	42.4	9.8	74	14.7	16100	2711	45.2	.93	1.07	23.7	23.1	.29	.30	.97	.00	.00	.00	.93	.25	30.1	.61	1305 *
D * 4:36 *	614.2	613.0	602.6	28.0	8.9	76	10.8	16462	2732	44.6	1.15	1.07	23.8	23.3	.29	.30	1.10	.00	.00	.00	.95	.25	31.1	.71	1258 *
D * 4:37 *	615.1	614.0	602.6	66.0	8.5	74	12.7	16510	2732	44.6	1.04	1.07	23.8	23.5	.29	.30	.59	.00	.00	.00	1.04	.25	32.1	.73	1210 *
D * 4:39 *	616.2	615.0	602.6	30.7	8.4	75	12.7	16435	2732	44.2	.90	1.08	23.9	23.6	.29	.30	.92	.00	.00	.00	.90	.25	33.1	.76	1170 *
D * 4:41 *	617.1	616.1	602.6	37.9	7.2	76	11.8	16657	2711	44.2	.89	1.08	24.0	23.7	.29	.30	1.01	.00	.00	.00	.90	.25	34.1	.79	1128 *
D * 4:44 *	618.1	617.0	602.6	17.0	8.7	76	11.8	16510	2711	44.6	1.04	1.08	24.1	23.7	.29	.30	3.7	1.16	.00	.00	1.05	.25	35.1	.83	1099 *
D * 4:47 *	619.1	618.0	604.1	21.2	8.5	75	12.7	16462	2732	44.6	1.04	1.08	24.2	24.0	.29	.30	3.7	1.01	.00	.00	1.05	.25	36.1	.87	1070 *
D * 4:55 *	620.3	619.2	605.9	40.8	.5	70	8.82	16908	2732	63.2	1.04	1.08	24.5	23.7	.29	.30	3.7	.81	.00	.00	1.05	.25	37.1	.90	1030 *
D * 4:57 *	621.2	619.9	606.9	32.9	7.5	73	12.7	16574	2711	75.1	1.04	1.08	24.5	23.7	.29	.30	3.7	.85	.00	.00	1.05	.25	38.1	.93	1010 *
D * 4:59 *	622.1	621.0	608.1	36.1	7.7	74	11.8	16518	2694	73.5	1.04	1.08	24.6	23.8	.29	.30	5.0	.86	.00	.00	1.05	.25	39.1	.96	982 *
D * 5: 1 *	623.1	621.9	608.7	31.5	7.2	74	12.7	16462	2709	72.7	1.04	1.08	24.6	23.9	.29	.30	5.0	.91	.00	.00	1.05	.25	40.1	.99	959 *
D * 5: 3 *	624.2	623.0	609.9	35.2	8.0	75	12.7	16407	2694	72.5	1.04	1.07	24.6	24.0	.29	.30	5.0	.85	.00	.00	1.05	.25	41.1	1.03	935 *
D * 5: 5 *	625.1	623.9	611.1	30.7	7.9	75	11.8	16462	2694	72.1	1.04	1.07	24.7	24.1	.29	.30	3.7	.90	.00	.00	1.05	.25	42.1	1.06	913 *
D * 5: 7 *	626.2	624.9	611.1	33.3	7.4	74	11.8	16379	2694	72.3	1.04	1.10	24.8	24.1	.30	.30	5.0	.87	.00	.00	1.05	.25	43.1	1.09	893 *
D * 5: 9 *	627.2	626.0	611.4	32.4	7.7	75	11.8	16407	2694	72.1	1.04	1.06	24.8	24.3	.30	.30	5.0	.88	.00	.00	1.05	.25	44.1	1.12	872 *
D * 5:10 *	628.2	626.9	612.3	30.5	8.6	75	12.7	16435	2704	71.9	1.04	1.04	24.9	24.2	.30	.30	3.7	.84	.00	.00	1.05	.25	45.1	1.15	853 *
D * 5:13 *	629.1	628.0	613.0	26.5	8.4	74	12.7	16017	2694	72.1	1.04	1.08	24.9	24.4	.30	.30	5.0	.93	.00	.00	1.05	.25	46.1	1.18	836 *
D * 5:22 *	630.1	628.9	615.7	17.9	7.5	76	11.8	15265	2694	75.5	1.04	1.08	25.2	24.1	.30	.31	5.0	1.00	.00	.00	1.05	.25	47.1	1.24	824 *
D * 5:25 *	631.2	630.0	616.9	28.4	5.3	77	10.8	15292	2786	73.9	1.04	1.07	25.3	24.2	.31	.30	5.0	.87	.00	.00	1.05	.25	48.1	1.29	809 *
D * 5:28 *	632.2	630.9	618.1	15.9	7.3	76	2520	15571	2711	73.3	1.04	1.08	25.4	24.5	.30	.30	3.7	.96	.00	.00	1.05	.25	49.1	1.34	798 *
D * 5:31 *	633.2	632.0	619.7	21.3	6.8	76	2310	15655	2689	72.7	1.04	1.03	25.4	24.7	.31	.30	5.0	.96	.00	.00	1.05	.25	50.1	1.38	784 *
D * 5:35 *	634.1	632.9	620.3	10.4	6.7	77	2310	15543	2694	72.9	1.04	1.05	25.5	24.9	.31	.30	3.7	1.13	.00	.00	1.05	.25	51.1	1.45	776 *
D * 5:38 *	635.1	634.0	621.5	20.1	7.6	76	2310	15292	2694	72.3	1.04	1.06	25.7	25.0	.31	.30	3.7	.96	.00	.00	1.05	.25	52.1	1.47	763 *
D * 5:40 *	636.1	634.9	622.7	25.1	7.2	77	2310	15070	2674	71.9	1.04	1.06	25.7	25.0	.31	.30	3.7	.91	.00	.00	1.05	.25	53.1	1.53	752 *
D * 5:42 *	637.2	635.9	623.9	25.5	7.0	77	2310	14986	2701	72.3	1.04	1.04	25.8	25.0	.31	.30	3.7	.91	.00	.00	1.05	.25	54.1	1.57	740 *
D * 5:46 *	638.2	636.9	625.8	15.0	7.4	77	2310	15125	2711	72.5	1.04	1.03	26.0	24.8	.31	.31	3.7	1.04	.00	.00	1.05	.25	55.1	1.63	731 *
D * 5:54 *	639.2	637.9	628.2	22.9	7.6	77	2520	15655	2767	75.9	1.04	1.06	26.2	24.6	.32	.32	3.7	.95	.00	.00	1.05	.25	56.1	1.67	722 *
D * 5:57 *	640.1	639.0	629.1	29.8	7.2	83	2100	15905	2707	73.9	1.04	1.08	26.2	24.3	.31	.31	3.7	.88	.01	1.03	1.05	1.48	57.1	1.70	710 *
D * 6: 1 *	641.1	639.9	629.7	10.4	7.2	79	2310	15432	2707	72.1	1.04	1.08	26.2	24.6	.32	.32	3.7	1.14	.01	1.03	1.05	1.48	58.1	1.78	705 *
D * 6: 4 *	642.1	640.9	631.2	22.9	7.2	81	2520	15460	2705	72.5	1.04	1.07	26.3	24.6	.32	.33	3.7	.94	.01	1.03	1.05	1.48	59.1	1.83	698 *
D * 6: 6 *	643.2	641.9	631.9	34.7	7.5	81	2310	15627	2767	72.1	1.04	1.07	26.3	24.6	.32	.34	3.7	.84	.01	1.03	1.05	1.48	60.1	1.87	688 *
D * 6: 9 *	644.2	642.9	632.8	23.0	7.2	79	2310	15655	2705	72.3	1.05	1.07	26.3	24.6	.32	.33	3.7	.92	.01	1.03	1.06	1.48	61.1	1.91	679 *
D * 6:13 *	645.4	643.9	634.0	10.6	7.1	79	2310	15766	2707	71.3	1.06	1.07	26.4	24.5	.32	.33	3.7	1.00	.01	1.03	1.05	1.48	62.1	1.97	672 *
D * 6:14 *	646.2	644.9	634.6	30.9	7.9	79	2310	15579	2707	70.9	1.04	1.07	26.4	24.6	.31	.32	3.7	.87	.01	1.03	1.05	1.48	63.1	1.99	664 *
D * 6:17 *	647.1	645.9	635.0	18.1	7.7	101	2310	16295	2707	70.5	1.05	1.06	26.4	24.6	.31	.34	3.7	1.05	.01	1.03	1.06	1.48	64.1	2.04	657 *

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\*\*\*\*\*  
\* 3/ 6/82 HANMERHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
#BIT HEADING :BIT#12 RUN#25  
#BIT TYPE :M/TOOT \*  
#BIT IDENTITY :HTC J1 \*  
\*\*\*\*\*  
#BIT SIZE : 12.25 INCH \*  
#BIT COST : 7500. \$ RIG COST/HR: 5033. \*  
\*\*\*\*\*  
#NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY \*  
\*\*\*\*\*  
#DEPTH IN : 591.20 METERS 3/ 6/82 \*  
#DEPTH OUT : 647.02 METERS 3/ 6/82 \*  
#METRAGE : 56.62 METERS \*  
#TOTAL REVOLUTIONS : 8 \*  
\*\*\*\*\*  
#DRILLING TIME: 2: 5 HR AVERAGE ROP: 27.28 M/HR \*  
#TIME IN HOLE : 2:17 HR AVERAGE ROP: 24.71 M/HR \*  
#TRIP TIME : 3: 0 HR \*  
\*\*\*\*\*  
#DRILLING COST STANDARD : 677.6 \$/MET \*  
#DRILLING COST ON BOTTOM : 655.4 \$/MET \*  
#DRILLING COST MINIMUM : 653.7 \$/MET \*  
\*\*\*\*\*  
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS \*  
#WEIGHT ON BIT : 7.70 TONS NOZZLES SPEED : 182.15 M/S \*  
#ROTATION : 97.00 RPM PRESSURE DROP : 19093 KPA \*  
#FLOW RATE :2740.00 L/MN HYDRAULIC POWER:1169.42 H.P \*  
#STAND PIPE PRESSURE: 16800 KPA \*  
\*\*\*\*\*

000

\* 3/ 6/82 TIME 6:31

HAMMERHEAD #1

\*\*\*\*\*  
DEPTH OF EXECUTION 647.82 METERS

\* FLOW RATE 2740 L/MN BINGHAM \*

\* MUD DATA WEIGHT 14 SG  
PV 0 CPS  
YP 21.00 LB/FT2  
GEL 6.00 LB/100 FT2  
W .3626  
K 2.1889 LB/100 FT2

\* MOLES VOLUMES WITH PIPES 96.28 M3  
WITHOUT PIPES 100.51 M3  
ANNULAR 90.72 M3  
INSIDE PIPES 5.56 M3

\*\*\*\*\*  
\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES\* H.P \*TYPE\* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAM \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* L/MN \* M/MN M/MN \*

\*SURF.EOPT\* \* 502 31 \* \* \* \*  
\*DR.STRING\* .00 561.20 \* 4.28 5.00 \* 1109 68 \* \* \* \*  
\*DR.STRING\* 561.20 650.00 \* 2.81 7.75 \* 1315 01 \* \* \* \*  
\*BIT \* \* 19093 1169 \* M/S \* 182.1 \* \* \* \*  
\*ANNULUS \* 647.82 559.02 \* 7.75 12.25 \* 33 2 \* LA 4413.3 \* 60.1 57.5 \*  
\*ANNULUS \* 559.02 554.00 \* 5.10 12.25 \* 1 0 \* LA 6057.8 \* 43.2 41.8 \*  
\*ANNULUS \* 554.00 143.00 \* 5.10 18.73 \* 48 3 \* LA 15629. \* 16.6 15.9 \*  
\*ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 19 1 \* LA 12284. \* 21.2 20.3 \*  
\* TOTAL\* \* \* 22120 1355 \* \* \* \*

\*\*\*\*\*  
\*ANNULAR PRESSURE LOSSES 101 KPA

\*EQUIV.CIRCULATING DENSITY 1.06 SG  
\* MAX DEPTH 1941.11

\* MUD LAG TIMES S -> B 2.03 MN  
B -> S 33.11 MN

\* CUTTINGS DATA SIZE .20 CM  
DENSITY 2.40 SG  
LAG TIME 34.64 MN  
MAX SLIP VELOCITY 2.57 M/MN

\* BIT DATA SIZE 12.25 INCH  
NOZZLES 13 13 13 /32NDS  
NOZZLES EFFICIENCY 95 %  
BIT P. LOSSES 19093 KPA  
H.H.P RATIO 86.32 %  
BIT H.H.P 9.922  
BIT VELOCITY 182.15 M/S



* GEOSERVICES															HAMMERHEAD #1										DATE: 3/6/82 *																																												
* ON-LINE TDC																																																																					
* BIT#12 RUN#25 HTC J1 BIT DIAMETER: 12.25 inch NOZ: 13/13															MUD RHEOLOGICAL PARAMETERS: PV = 6 YP = 21 GEL = 6 *																																																						
* DEPTHS															* DRILLING PARAMETERS										* MUD PARAMETERS					* GAS					* OVERPRESSURE SURVEY					* ACCUMULATED ON BIT																													
* TIME MEASURED															* WOB RPH TORQ PRESS FLOW * PIT * DENSITY										* TEMPERATURE					* RESISTIVITY					* DCS					* ECD					* FRAC					* METER					* TIME					* COST									
* Hr:mn															* ton rpm Nm KPA L/mn * m3 *										* degC					* ohm					* unit *					* sq					* sq					* sq					* net					* Dhr					* \$/m				
* net net net																																																																					
D * 6:36 * 648.2 * 647.8 * 637.6 * 5.2 * 92 * 2100 * 19334 * 2749 * 70.3 * 1 * 1.06 * 26.4 * 23.5 * .30 * .33 * 3.7 * .90 * .81 * 1.03 * 1.11 * 1.48 * 57.2 * 2.08 * 648 *																																																																					
D * 6:39 * 649.2 * 647.9 * 640.4 * 6.0 * 100 * 2310 * 19241 * 2714 * 60.3 * 1 * 1.06 * 26.4 * 24 * .30 * .33 * 3.7 * .80 * .81 * 1.03 * 1.12 * 1.48 * 58.1 * 2.12 * 643 *																																																																					
D * 6:42 * 650.2 * 648.9 * 641.3 * 7.0 * 100 * 2310 * 19272 * 2749 * 67.2 * 1.04 * 1.05 * 26.3 * 24 * .30 * .33 * 2.5 * 1.00 * .81 * 1.03 * 1.05 * 1.48 * 59.1 * 2.18 * 637 *																																																																					
D * 6:46 * 651.1 * 649.9 * 643.1 * 7.4 * 100 * 2310 * 19210 * 2732 * 66.4 * 1.04 * 1.05 * 26.3 * 24.5 * .30 * .33 * 3.7 * 1.16 * .81 * 1.03 * 1.05 * 1.48 * 60.1 * 2.25 * 635 *																																																																					
D * 6:50 * 652.2 * 650.9 * 644.3 * 6.9 * 100 * 2310 * 19117 * 2714 * 66.0 * 1.04 * 1.05 * 26.3 * 25.0 * .30 * .33 * 3.7 * .98 * .81 * 1.03 * 1.05 * 1.48 * 61.2 * 2.32 * 629 *																																																																					
D * 6:54 * 653.1 * 651.9 * 645.9 * 6.2 * 101 * 2100 * 19210 * 2749 * 66.2 * 1.04 * 1.05 * 26.4 * 25.0 * .29 * .32 * 17.5 * 1.05 * .81 * 1.03 * 1.05 * 1.48 * 62.1 * 2.38 * 626 *																																																																					
D * 6:57 * 654.1 * 652.9 * 646.8 * 7.3 * 99 * 2310 * 19117 * 2711 * 65.8 * 1.04 * 1.06 * 26.4 * 25.0 * .30 * .32 * 5.0 * .96 * .81 * 1.03 * 1.05 * 1.48 * 63.2 * 2.43 * 620 *																																																																					
D * 7:0 * 655.1 * 653.9 * 647.4 * 7.0 * 100 * 2100 * 19148 * 2694 * 66.0 * 1.04 * 1.06 * 26.4 * 25.0 * .30 * .32 * 3.7 * 1.01 * .81 * 1.03 * 1.05 * 1.48 * 64.1 * 2.47 * 615 *																																																																					
D * 7:3 * 656.1 * 654.9 * 648.0 * 7.0 * 99 * 2310 * 19148 * 2732 * 66.0 * 1.04 * 1.06 * 26.5 * 24.8 * .30 * .32 * 3.7 * 1.07 * .81 * 1.03 * 1.05 * 1.48 * 65.1 * 2.53 * 610 *																																																																					
D * 7:6 * 657.1 * 655.9 * 648.0 * 6.3 * 102 * 2100 * 19210 * 2732 * 66.6 * 1.04 * 1.06 * 26.5 * 24.6 * .30 * .32 * 2.5 * .93 * .81 * 1.03 * 1.05 * 1.48 * 66.1 * 2.58 * 605 *																																																																					
D * 7:22 * 658.1 * 656.9 * 648.9 * 5.7 * 99 * 2100 * 18559 * 2678 * 67.4 * 1.04 * 1.05 * 26.5 * 23.6 * .30 * .31 * 2.5 * .92 * .81 * 1.03 * 1.05 * 1.48 * 67.1 * 2.65 * 602 *																																																																					
D * 7:25 * 659.1 * 657.9 * 650.1 * 7.9 * 97 * 2310 * 18403 * 2678 * 66.6 * 1.04 * 1.05 * 26.5 * 24.8 * .30 * .30 * 2.5 * 1.03 * .81 * 1.03 * 1.05 * 1.48 * 68.1 * 2.71 * 599 *																																																																					
D * 7:28 * 660.1 * 658.9 * 650.7 * 7.1 * 90 * 2310 * 18124 * 2676 * 66.4 * 1.04 * 1.05 * 26.4 * 25.0 * .30 * .30 * 2.5 * .89 * .81 * 1.03 * 1.05 * 1.48 * 69.1 * 2.76 * 594 *																																																																					
D * 7:31 * 661.1 * 659.9 * 651.1 * 7.0 * 100 * 2310 * 18466 * 2691 * 66.2 * 1.04 * 1.06 * 26.4 * 25.0 * .30 * .30 * 2.5 * .97 * .81 * 1.03 * 1.05 * 1.48 * 70.1 * 2.80 * 589 *																																																																					
D * 7:34 * 662.2 * 660.9 * 652.0 * 5.9 * 99 * 2100 * 18434 * 2696 * 66.6 * 1.04 * 1.05 * 26.4 * 24.9 * .30 * .31 * 2.5 * .97 * .81 * 1.03 * 1.05 * 1.48 * 71.1 * 2.85 * 585 *																																																																					
D * 7:40 * 663.1 * 661.9 * 653.8 * 6.8 * 97 * 2310 * 18000 * 2696 * 66.2 * 1.04 * 1.05 * 26.4 * 25.0 * .30 * .31 * 2.5 * 1.19 * .81 * 1.03 * 1.05 * 1.48 * 72.2 * 2.95 * 585 *																																																																					
D * 7:43 * 664.2 * 662.9 * 654.7 * 6.7 * 99 * 2310 * 18497 * 2676 * 66.2 * 1.04 * 1.04 * 26.5 * 25.0 * .30 * .31 * 2.5 * .95 * .81 * 1.03 * 1.05 * 1.48 * 73.1 * 3.00 * 581 *																																																																					
D * 7:46 * 665.1 * 663.8 * 655.9 * 6.5 * 90 * 2310 * 18372 * 2696 * 66.2 * 1.04 * 1.05 * 26.5 * 25.0 * .30 * .32 * 2.5 * .98 * .81 * 1.03 * 1.05 * 1.48 * 74.1 * 3.04 * 577 *																																																																					
D * 7:50 * 666.1 * 664.9 * 657.2 * 5.9 * 100 * 2100 * 18559 * 2676 * 67.0 * 1.04 * 1.05 * 26.5 * 24.9 * .29 * .31 * 1.2 * 1.04 * .81 * 1.03 * 1.05 * 1.48 * 75.2 * 3.12 * 574 *																																																																					
T * 8:10 * 666.9 * 665.6 * 657.2 * 6.30 * -1148 * 0 * 76.7 * 1.04 * 1.06 * 26.5 * 24.5 * .29 * .29 * 3.7 * 1.00 * .81 * 1.03 * 1.05 * 1.48 * 76.1 * 3.30 * 581 *																																																																					
D * 8:27 * 667.1 * 665.9 * 657.8 * 9.2 * 105 * 2730 * 17379 * 2590 * 70.1 * 1.04 * 1.05 * 26.4 * 19.0 * .29 * .34 * 2.5 * 1.20 * .81 * 1.03 * 1.05 * 1.48 * 76.1 * 3.30 * 581 *																																																																					
D * 8:30 * 668.1 * 666.8 * 658.1 * 9.1 * 105 * 2730 * 17472 * 2618 * 67.6 * 1.04 * 1.06 * 26.3 * 20.3 * .29 * .34 * 1.2 * .96 * .81 * 1.03 * 1.05 * 1.48 * 77.1 * 3.34 * 577 *																																																																					
D * 8:32 * 669.2 * 667.9 * 658.7 * 8.2 * 107 * 2520 * 17534 * 2590 * 66.6 * 1.04 * 1.05 * 26.3 * 23.5 * .29 * .31 * 1.2 * 1.00 * .81 * 1.03 * 1.05 * 1.48 * 78.1 * 3.37 * 571 *																																																																					
D * 8:34 * 670.1 * 668.9 * 659.0 * 7.0 * 100 * 2310 * 17379 * 2580 * 66.2 * 1.04 * 1.06 * 26.2 * 24.5 * .30 * .30 * 1.2 * .93 * .81 * 1.03 * 1.05 * 1.48 * 79.1 * 3.41 * 567 *																																																																					
D * 8:35 * 671.1 * 669.8 * 659.9 * 8.6 * 100 * 2520 * 17379 * 2598 * 66.2 * 1.04 * 1.05 * 26.1 * 24.8 * .30 * .31 * 2.5 * .89 * .81 * 1.03 * 1.05 * 1.48 * 80.1 * 3.44 * 562 *																																																																					
D * 8:40 * 672.1 * 670.9 * 661.1 * 9.4 * 107 * 2520 * 17379 * 2580 * 65.6 * 1.04 * 1.05 * 25.9 * 25.0 * .30 * .32 * 1.2 * 1.22 * .81 * 1.03 * 1.05 * 1.48 * 81.1 * 3.50 * 560 *																																																																					
D * 8:43 * 673.1 * 671.9 * 662.3 * 9.6 * 108 * 2520 * 17472 * 2598 * 65.8 * 1.04 * 1.05 * 25.8 * 25.0 * .29 * .32 * 1.2 * 1.16 * .81 * 1.03 * 1.05 * 1.48 * 82.2 * 3.57 * 557 *																																																																					
D * 8:46 * 674.2 * 672.9 * 662.6 * 7.0 * 109 * 2310 * 17620 * 2560 * 65.2 * 1.04 * 1.05 * 25.8 * 25.0 * .29 * .32 * 1.2 * 1.00 * .81 * 1.03 * 1.05 * 1.48 * 83.2 * 3.60 * 553 *																																																																					
D * 8:48 * 675.1 * 673.8 * 662.9 * 0.2 * 110 * 2310 * 17472 * 2598 * 65.6 * 1.04 * 1.05 * 25.8 * 25.1 * .29 * .31 * 2.5 * 1.02 * .81 * 1.03 * 1.05 * 1.48 * 84.1 * 3.65 * 550 *																																																																					
D * 8:58 * 676.2 * 674.8 * 665.1 * 6.5 * 102 * 2100 * 16417 * 2406 * 66.6 * 1.04 * 1.06 * 26.0 * 24.4 * .29 * .32 * 2.5 * 1.01 * .81 * 1.03 * 1.04 * 1.48 * 85.1 * 3.71 * 547 *																																																																					
D * 9:0 * 677.1 * 675.8 * 665.4 * 8.8 * 97 * 2520 * 17286 * 2580 * 65.6 * 1.04 * 1.06 * 26.0 * 24.9 * .29 * .32 * 2.5 * .96 * .81 * 1.03 * 1.05 * 1.48 * 86.1 * 3.74 * 544 *																																																																					
D * 9:4 * 678.2 * 676.8 * 666.3 * 9.7 * 98 * 2520 * 17286 * 2580 * 64.6 * 1.04 * 1.06 * 26.1 * 25.2 * .30 * .32 * 3.7 * 1.23 * .81 * 1.03 * 1.05 * 1.48 * 87.1 * 3.81 * 541 *																																																																					
D * 9:7 * 679.1 * 677.8 * 666.9 * 10.4 * 99 * 2520 * 17286 * 2600 * 64.4 * 1.04 * 1.06 * 26.2 * 25.1 * .30 * .32 * 2.5 * 1.09 * .81 * 1.03 * 1.05 * 1.48 * 88.1 * 3.86 * 539 *																																																																					
D * 9:10 * 680.1 * 678.8 * 667.2 * 9.2 * 98 * 2520 * 17193 * 2560 * 65.0 * 1.04 * 1.06 * 26.2 * 25.0 * .30 * .32 * 3.7 * .97 * .81 * 1.03 * 1.05 * 1.48 * 89.1 * 3.90 * 536 *																																																																					
D * 9:13 * 681.1 * 679.8 * 667.8 * 10.7 * 98 * 2520 * 17069 * 2582 * 64.6 * 1.04 * 1.06 * 26.2 * 25.1 * .30 * .32 * 3.7 * 1.03 * .81 * 1.03 * 1.05 * 1.48 * 90.1 * 3.95 * 532 *																																																																					
D * 9:17 * 682.1 * 680.8 * 670.9 * 9.7 * 99 * 2310 * 17173 * 2580 * 65.0 * 1.04 * 1.07 * 26.3 * 25.0 * .30 * .32 * 5.0 * 1.24 * .81 * 1.03 * 1.05 * 1.48 * 91.1 * 4.02 * 531 *																																																																					
D * 9:21 * 683.2 * 681.8 * 671.8 * 0.0 * 98 * 2310 * 17224 * 2600 * 64.4 * 1.04 * 1.06 * 26.5 * 25.0 * .30 * .31 * 3.7 * 1.15 * .81 * 1.03 * 1.05 * 1.48 * 92.2 * 4.08 * 529 *																																																																					
D * 9:25 * 684.1 * 682.9 * 672.7 * 10.0 * 99 * 2310 * 17224 * 2600 * 64.2 * 1.04 * 1.06 * 26.5 * 25.8 * .30 * .32 * 3.7 * 1.11 * .81 * 1.03 * 1.05 * 1.48 * 93.2 * 4.14 * 527 *																																																																					
D * 9:35 * 685.2 * 683.8 * 675.1 * 9.2 * 104 * 2520 * 18106 * 2673 * 65.6 * 1.04 * 1.06 * 26.6 * 24.0 * .30 * .32 * 5.0 * .96 * .81 * 1.03 * 1.05 * 1.48 * 94.1 * 4.19 * 525 *																																																																					
D * 9:36 * 686.1 * 684.8 * 675.1 * 9.3 * 103 * 2520 * 18240 * 2655 * 64.6 * 1.04 * 1.06 * 26.6 * 24.3 * .30 * .32 * 5.0 * 1.01 * .81 * 1.03 * 1.05 * 1.48 * 95.2 * 4.21 * 521 *																																																																					
D * 9:38 * 687.2 * 685.9 * 675.4 * 9.4 * 105 * 2520 * 17317 * 2655 * 64.2 * 1.04 * 1.06 * 26.6 * 25.0 * .30 * .31 * 3.7 * .95 * .81 * 1.03 * 1.05 * 1.48 * 96.2 * 4.25 * 517 *																																																																					
D * 9:41 * 688.2 * 686.8 * 676.4 * 8.5 * 103 * 2520 * 17131 * 2620 * 64.4 * 1.04 * 1.06 * 26.6 * 25.1 * .30 * .31 * 3.7 * 1.07 * .81 * 1.03 * 1.05 * 1.48 * 97.1 * 4.29 * 515 *																																																																					
D * 9:45 * 689.2 * 687.8 * 677.6 * 9.7 * 105 * 2520 * 17162 * 2580 * 63.8 * 1.04 * 1.07 * 26.6 * 25.1 * .30 * .31 * 3.7 * 1.15 * .81 * 1.03 * 1.05 * 1.48 * 98.1 * 4.35 * 513 *																																																																					
D * 9:48 * 690.1 * 688.8 * 678.5 * 9.6 * 102 * 2730 * 17255 * 2580 * 63.4 * 1.04 * 1.07 * 26.6 * 25.1 * .30 * .31 * 3.7 * 1.15 * .81 * 1.03 * 1.05 * 1.48 * 99.1 * 4.40 * 511 *																																																																					
D * 9:52 * 691.2 * 689.8 * 680.3 * 9.6 * 104 * 2310 * 17100 * 2680 * 63.4 * 1.04 * 1.07 * 26.7 * 25.2 * .30 * .31 * 5.0 * 1.21 * .81 * 1.03 * 1.05 * 1.48 * 100.1 * 4.47 * 510 *																																																																					
D * 9:56 * 692.1 * 690.8 * 681.2 * 9.4 * 104 * 2520 * 16603 * 2597 * 63.6 * 1.04 * 1.05 * 26.7 * 25.1 * .30 * .32 * 3.7 * 1.21 * .81 * 1.03 * 1.05 * 1.48 * 101.1 * 4.54 * 507 *																																																																					
D * 10:0 * 693.2 * 691.8 * 682.4 * 9.6 * 102 * 2520 * 17317 * 2597 * 63.4 * 1.04 * 1.07 * 24.0 * 25.0 * .30 * .32 * 3.7 * 1.14 * .81 * 1.03 * 1.05 * 1.48 * 102.1 * 4.61 * 507 *																																																																					
D * 10:10 * 694.1 * 692.8 * 684.0 * 9.8 * 99 * 2310 * 17162 * 2680 * 66.0 * 1.04 * 1.06 * 24.4 * 24.5 * .30 * .33 * 3.7 * 1.11 * .81 * 1.03 * 1.05 * 1.48 * 103.1 * 4.67 * 506 *																																																																					
D * 10:14 * 695.1 * 693.9 * 684.3 * 8.0 * 97 * 2310 * 17255 * 2597 * 63.6 * 1.04 * 1.02 * 24.4 * 24.8 * .30 * .33 * 3.7 * 1.03 * .81 * 1.03 * 1.05 * 1.48 * 104.2 * 4.73 * 504 *																																																																					

\* BIT#12 RQ#45 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 \* HUD RHEOLOGICAL PARAMETERS : PV = 6 YP = 21 GEL = 6 \*

* TIME *	DEPTHS			DRILLING PARAMETERS						HUD PARAMETERS		OVERPRESSURE SURVEY				ACCUMULATED ON BIT									
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NGRM	PF	ECD	FRAC	METER	TIME	COST			
* Hr:mn *	* net	* net	* net	* ft/hr	* ton	* rpm	* N.m	* KPA	* l/min	* m3	* g/cc	* IN	* OUT	* IN	* OUT	* %	* sq	* sq	* sq	* net	* Hr	* \$/m			
D * 10:16	696.3	694.0	685.2	31.2	7.7	97	2520	16945	2500	63.0	1.04	1.00	24.4	25.3	.30	.32	2.5	.93	.01	1.03	1.05	1.49	105.1	4.76	502
D * 10:18	697.1	695.0	685.8	28.9	7.9	98	2310	17317	2615	62.0	1.04	1.05	24.4	25.6	.30	.32	3.7	.95	.01	1.03	1.05	1.49	106.1	4.77	499
D * 10:22	698.1	696.0	687.6	15.9	9.1	102	2310	17317	2595	63.0	1.04	1.05	24.3	25.6	.30	.33	3.7	1.11	.01	1.03	1.05	1.49	107.1	4.06	497
D * 10:27	699.2	697.0	689.2	11.7	8.0	102	2310	17628	2615	62.6	1.04	1.05	24.4	25.5	.30	.32	3.7	1.19	.01	1.03	1.05	1.49	108.1	4.95	498
D * 10:31	700.2	698.0	690.1	20.1	8.9	99	2310	17206	2590	63.0	1.04	1.05	24.4	25.7	.30	.33	3.7	1.05	.01	1.03	1.05	1.49	109.2	5.01	496
D * 10:34	701.1	699.0	690.7	16.9	9.4	99	2310	17379	2598	62.8	1.04	1.05	24.4	25.7	.30	.32	5.0	1.10	.01	1.03	1.05	1.49	110.2	5.06	495
D * 10:39	702.1	700.0	691.9	13.7	8.5	102	2310	17340	2610	62.0	1.04	1.05	24.5	25.6	.30	.32	3.7	1.16	.01	1.03	1.05	1.49	111.1	5.14	494
D * 10:54	704.0	702.0	693.7	24.9	9.2	101	2730	17566	2623	65.2	1.04	1.05	24.5	24.1	.30	.33	2.5	.97	.01	1.03	1.05	1.50	113.1	5.24	491
D * 10:54	704.1	702.0	693.7	24.9	8.6	101	2520	17566	2630	65.0	1.04	1.04	24.5	24.1	.30	.34	2.5	.97	.01	1.03	1.05	1.50	113.1	5.24	491
D * 10:57	705.3	703.0	694.6	16.6	8.8	103	2520	17752	2615	63.0	1.04	1.04	24.6	25.1	.30	.32	3.7	1.07	.01	1.03	1.05	1.50	114.1	5.29	489
D * 11: 3	706.1	704.0	697.4	12.2	7.9	100	2520	17752	2635	62.4	1.04	1.04	24.5	25.9	.30	.32	3.7	1.10	.01	1.03	1.05	1.50	115.2	5.39	490
D * 11: 7	707.1	705.3	698.3	18.1	8.3	107	2310	17628	2635	62.2	1.04	1.03	24.5	25.9	.30	.32	3.7	1.07	.01	1.03	1.05	1.50	116.2	5.46	489
D * 11:11	708.1	706.0	698.9	15.8	6.8	103	2100	16976	2635	62.0	1.04	1.03	24.5	26.0	.30	.32	3.7	1.10	.01	1.03	1.05	1.50	117.2	5.52	488
D * 11:16	709.1	707.0	700.1	9.4	6.7	105	2100	17534	2625	62.2	1.04	1.02	24.6	25.9	.30	.32	3.7	1.20	.01	1.03	1.05	1.50	118.1	5.60	488
D * 11:19	710.1	708.9	701.0	17.4	8.3	102	2310	17410	2656	62.4	1.04	1.03	24.6	25.0	.30	.33	3.7	1.10	.01	1.03	1.05	1.50	119.2	5.66	487
D * 11:23	711.1	709.0	702.0	13.7	8.5	102	2520	17340	2674	62.0	1.04	1.03	24.7	26.0	.30	.32	3.7	1.17	.01	1.03	1.05	1.50	120.2	5.72	485
D * 11:34	713.4	712.2	702.6	44.5	9.6	80	2520	17503	2637	64.8	1.04	1.04	24.8	25.4	.30	.34	2.5	.86	.01	1.03	1.05	1.50	122.5	5.70	479
D * 11:38	714.1	712.9	704.4	10.9	9.6	101	2730	18031	2655	62.4	1.04	1.05	24.8	25.2	.30	.33	3.7	1.21	.01	1.03	1.05	1.50	123.2	5.84	479
D * 11:41	715.2	713.8	705.3	20.6	9.5	105	2940	17930	2637	61.6	1.04	1.05	24.8	26.0	.30	.32	3.7	1.07	.01	1.03	1.05	1.50	124.1	5.89	478
D * 11:44	716.1	714.0	705.3	22.8	7.9	105	2520	17597	2637	61.0	1.04	1.04	24.8	26.1	.30	.32	3.7	1.03	.01	1.03	1.05	1.50	125.2	5.94	476
D * 11:47	717.1	715.0	706.2	24.9	9.0	105	2310	17930	2675	61.6	1.04	1.04	24.8	26.2	.30	.32	2.5	1.02	.01	1.03	1.05	1.50	126.2	5.99	475
D * 11:50	718.1	716.0	707.1	27.2	7.8	100	2310	17534	2620	61.6	1.04	1.04	24.8	26.1	.30	.32	3.7	.98	.01	1.03	1.05	1.50	127.1	6.04	473
D * 11:54	719.1	717.8	708.1	20.5	9.7	107	2520	17224	2652	61.4	1.04	1.04	24.8	26.1	.30	.32	3.7	1.05	.01	1.03	1.05	1.50	128.1	6.10	473
D * 11:57	720.1	718.0	708.7	22.0	9.1	105	2520	18000	2652	61.2	1.04	1.04	24.9	26.2	.30	.33	3.7	1.06	.01	1.03	1.05	1.50	129.1	6.15	471
D * 12: 0	721.1	719.0	709.6	18.7	7.9	105	2310	18031	2637	61.0	1.04	1.04	24.9	26.2	.30	.32	3.7	1.07	.01	1.03	1.05	1.50	130.1	6.21	470
D * 12: 3	722.1	720.0	710.2	20.3	9.1	103	2520	17076	2652	61.0	1.04	1.04	25.0	26.2	.30	.33	3.7	1.07	.01	1.03	1.05	1.50	131.1	6.26	469
D * 12:15	723.1	721.0	711.7	13.1	7.5	111	2310	17193	2617	63.0	1.04	1.12	25.1	25.2	.30	.34	3.7	1.14	.01	1.03	1.04	1.50	132.1	6.33	468
D * 12:18	724.1	722.9	713.2	25.2	9.1	105	2520	17441	2615	61.6	1.04	1.13	25.1	25.4	.30	.33	3.7	.90	.01	1.03	1.04	1.50	133.2	6.30	467
D * 12:22	725.2	723.0	714.1	14.7	9.2	107	2520	16052	2617	61.2	1.04	1.12	25.1	26.3	.31	.32	3.7	1.12	.01	1.03	1.04	1.50	134.1	6.44	466
D * 12:25	726.1	724.0	715.1	16.0	8.3	103	2520	17100	2597	61.4	1.04	1.13	25.0	26.3	.30	.32	5.0	1.10	.01	1.03	1.04	1.50	135.1	6.49	465
D * 12:28	727.2	725.0	716.3	19.6	8.6	103	2310	17162	2650	61.0	1.04	1.13	25.0	26.3	.30	.33	3.7	1.06	.01	1.03	1.05	1.50	136.2	6.54	464
D * 12:32	728.1	726.9	717.5	19.0	8.0	106	2310	17193	2615	61.2	1.04	1.13	25.0	26.3	.31	.33	5.0	1.06	.01	1.03	1.04	1.50	137.2	6.59	462
D * 12:35	729.1	727.0	718.4	17.0	9.5	103	2520	17410	2502	61.2	1.04	1.13	25.1	26.3	.30	.32	5.0	1.09	.01	1.03	1.04	1.50	138.2	6.65	461
D * 12:39	730.1	728.0	719.3	16.9	6.9	103	2100	17193	2620	61.2	1.04	1.13	25.1	26.3	.31	.33	5.0	1.07	.01	1.03	1.04	1.50	139.1	6.71	461
D * 12:43	731.1	729.0	720.5	16.2	7.1	105	2100	16976	2599	61.4	1.04	1.13	25.2	26.5	.30	.33	5.0	1.07	.01	1.03	1.04	1.50	140.1	6.70	460
D * 12:50	732.1	730.0	722.7	6.4	7.2	99	2520	18031	2668	61.0	1.04	1.12	25.2	25.4	.30	.33	5.0	1.23	.01	1.03	1.05	1.50	141.2	6.90	462
D * 13: 2	733.1	731.0	723.9	15.8	6.9	98	2310	18124	2656	60.0	1.04	1.13	25.2	26.5	.31	.32	5.0	1.03	.02	1.03	1.05	1.50	142.1	6.97	462
D * 13: 6	734.1	732.0	725.4	16.3	7.2	98	2310	18031	2673	60.6	1.04	1.13	25.2	26.5	.31	.33	5.0	1.03	.02	1.03	1.05	1.50	143.1	7.04	461
D * 13:10	735.2	733.0	726.0	14.1	6.0	100	2310	18093	2650	60.6	1.04	1.13	25.2	26.5	.31	.33	5.0	1.07	.02	1.03	1.05	1.50	144.1	7.10	461
D * 13:13	736.2	734.0	727.3	20.3	6.7	99	2310	17076	2673	60.6	1.04	1.12	25.2	26.7	.30	.33	6.2	.90	.02	1.03	1.05	1.50	145.1	7.16	460
D * 13:17	737.1	735.0	728.5	14.1	7.7	100	2310	17045	2650	60.4	1.04	1.13	25.3	26.6	.30	.33	5.0	1.00	.02	1.03	1.05	1.51	146.1	7.22	459
D * 13:22	738.1	736.0	730.0	13.5	8.0	97	2310	17930	2694	60.4	1.04	1.12	25.3	26.5	.31	.34	5.0	1.10	.02	1.03	1.05	1.51	147.2	7.30	459
D * 13:26	739.1	737.0	730.6	13.8	7.7	100	2310	18062	2676	60.4	1.04	1.12	25.4	26.6	.30	.32	5.0	1.10	.02	1.03	1.05	1.51	148.1	7.36	459
D * 13:29	740.1	738.0	731.5	17.9	7.5	98	2310	18031	2650	60.2	1.04	1.13	25.4	26.5	.31	.34	5.0	1.03	.02	1.03	1.04	1.51	149.2	7.42	458
D * 13:41	741.1	739.0	732.1	10.9	6.5	101	2100	18031	2655	60.0	1.04	1.13	25.5	25.0	.30	.34	3.7	1.14	.02	1.03	1.04	1.51	150.1	7.50	458
D * 13:45	742.2	740.0	732.7	17.2	7.2	100	2310	18124	2650	60.0	1.04	1.12	25.5	26.7	.30	.34	5.0	1.03	.02	1.03	1.04	1.51	151.1	7.57	457
D * 13:51	743.1	741.7	734.6	17.2	8.5	99	2310	17721	2650	60.4	1.04	1.12	25.4	26.9	.31	.33	3.7	1.07	.02	1.03	1.04	1.51	152.1	7.62	456
D * 13:54	744.1	742.0	735.2	17.4	8.9	96	2520	17814	2635	60.4	1.04	1.12	25.4	26.9	.31	.33	3.7	1.03	.02	1.03	1.04	1.51	153.1	7.60	456
D * 13:58	745.1	743.0	736.7	15.5	9.7	97	2730	17534	2650	60.0	1.04	1.12	25.5	26.9	.31	.33	5.0	1.11	.02	1.03	1.04	1.51	154.1	7.75	455

\*\*\*\*\*  
 \* GEOSERVICES  
 \* ON-LINE TDC  
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HAMMERHEAD #1

DATE : 3/ 6/82 \*

\* BIT#12 RUN#25 HTC J1 DIT DIAMETER : 12.25 inch NOZZ 13/13/13  
 \*\*\*\*\* MUD RHEOLOGICAL PARAMETERS : PV = 6 YP = 21 GEL = 6 \*\*\*\*\*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *									* MUD PARAMETERS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *			
* Hr:mn *	* met *	* met *	* met *	* ROP *	* WOB *	RPH	TORQ	PRESS	FLOW	* PIT *	* DENSITY *		* TEMPERATURE *		* RESISTIVITY *		* GAG *	* DCS *	NORM	* PF *	ECD	FRAC	* METER *	TIME	COST *
				* m/hr *	* ton *	rpm	Nm	KPA	l/min	* m3 *	IN	OUT	IN	OUT	OHM	* unit *			sq	sq	sq	sq	met	DHr	\$/m
D * 14: 2	* 746.2	744.8	737.0	* 10.2 *	* 8.2	99	2310	17597	2660	* 59.8 *	1.04	1.12	25.5	26.0	.31	.33	* 3.7 *	1.06	.82	* 1.03	1.05	1.51	* 155.1	7.81	455 *
D * 14: 6	* 747.1	745.8	737.9	* 15.6 *	* 8.9	100	2520	17876	2655	* 60.0 *	1.04	1.12	25.6	26.9	.31	.33	* 3.7 *	1.10	.82	* 1.03	1.04	1.51	* 156.2	7.88	454 *
D * 14: 9	* 748.1	746.8	739.1	* 15.0 *	* 8.5	96	2310	17628	2655	* 60.0 *	1.04	1.12	25.6	27.0	.31	.33	* 3.7 *	1.09	.82	* 1.03	1.04	1.51	* 157.2	7.93	453 *
D * 14:21	* 749.2	747.0	740.4	* 13.8 *	* 9.5	101	2730	16697	2620	* 62.0 *	1.04	1.12	25.7	26.0	.31	.34	* 3.7 *	1.07	.82	* 1.03	1.04	1.51	* 158.1	7.99	453 *
D * 14:24	* 750.1	748.0	740.7	* 21.0 *	* 8.3	102	2520	16945	2579	* 60.4 *	1.04	1.13	25.7	26.1	.30	.34	* 3.7 *	1.02	.82	* 1.03	1.04	1.51	* 159.1	8.05	452 *
D * 14:27	* 751.1	749.7	741.3	* 24.8 *	* 8.6	104	2520	16572	2595	* 59.8 *	1.04	1.13	25.7	26.8	.31	.33	* 3.7 *	1.00	.82	* 1.03	1.04	1.51	* 160.1	8.10	451 *
D * 14:31	* 752.1	750.8	742.2	* 19.8 *	* 8.3	103	2310	17100	2592	* 59.6 *	1.04	1.13	25.6	27.1	.31	.33	* 3.7 *	1.03	.82	* 1.03	1.04	1.51	* 161.1	8.16	450 *
D * 14:34	* 753.1	751.7	742.5	* 21.5 *	* 9.1	102	2520	16697	2637	* 59.4 *	1.04	1.13	25.7	27.0	.31	.34	* 3.7 *	1.02	.82	* 1.03	1.04	1.51	* 162.1	8.21	450 *
D * 14:38	* 754.1	752.8	743.4	* 18.0 *	* 8.3	104	2520	16541	2594	* 59.2 *	1.04	1.13	25.7	27.1	.31	.33	* 3.7 *	1.05	.82	* 1.03	1.04	1.51	* 163.2	8.28	449 *
D * 14:42	* 755.1	753.8	744.3	* 13.6 *	* 7.4	104	2310	16821	2600	* 59.0 *	1.04	1.13	25.7	27.0	.30	.32	* 5.0 *	1.13	.82	* 1.03	1.04	1.51	* 164.1	8.34	449 *
D * 14:46	* 756.2	754.7	745.8	* 10.8 *	* 8.4	105	2310	16821	2617	* 58.8 *	1.04	1.13	25.8	26.8	.31	.34	* 5.0 *	1.17	.82	* 1.03	1.04	1.51	* 165.1	8.42	449 *
D * 14:52	* 757.1	755.3	747.4	* 12.7 *	* 8.4	102	2520	16666	2579	* 58.6 *	1.04	1.10	25.8	27.0	.31	.33	* 5.0 *	1.14	.82	* 1.03	1.04	1.51	* 165.6	8.49	449 *
D * 15:11	* 758.1	756.8	750.7	* 19.3 *	* 7.7	106	2730	16790	2579	* 61.4 *	1.04	1.13	25.9	27.1	.30	.34	* 2.5 *	.99	.82	* 1.03	1.04	1.51	* 167.1	8.56	448 *
D * 15:14	* 759.2	757.7	751.3	* 19.6 *	* 7.8	107	2520	16759	2615	* 60.2 *	1.04	1.12	25.9	26.7	.30	.34	* 3.7 *	1.05	.82	* 1.03	1.04	1.51	* 168.1	8.61	447 *
D * 15:18	* 760.2	758.8	752.6	* 15.2 *	* 6.8	106	2310	17087	2577	* 59.8 *	1.04	1.11	25.9	27.2	.30	.33	* 3.7 *	1.08	.82	* 1.03	1.04	1.51	* 169.1	8.67	447 *
D * 15:22	* 761.1	759.8	753.8	* 16.5 *	* 8.6	106	2520	16914	2600	* 59.8 *	1.04	1.12	26.0	27.2	.30	.33	* 3.7 *	1.05	.82	* 1.03	1.04	1.51	* 170.2	8.73	446 *
D * 15:25	* 762.1	760.8	754.4	* 14.4 *	* 6.6	104	2520	16479	2579	* 59.8 *	1.04	1.12	26.0	27.1	.30	.34	* 3.7 *	1.08	.82	* 1.03	1.04	1.51	* 171.1	8.79	446 *
D * 15:29	* 763.2	761.7	755.3	* 17.7 *	* 6.8	105	2520	16479	2620	* 59.4 *	1.04	1.12	26.0	27.2	.30	.34	* 3.7 *	1.02	.82	* 1.03	1.04	1.51	* 172.1	8.85	445 *
D * 15:32	* 764.1	762.8	755.9	* 18.2 *	* 7.8	107	2520	16803	2600	* 59.4 *	1.04	1.12	26.1	27.2	.31	.33	* 3.7 *	1.02	.82	* 1.03	1.04	1.51	* 173.2	8.89	444 *
D * 15:36	* 765.2	763.8	756.5	* 13.6 *	* 8.2	106	2520	17087	2617	* 59.8 *	1.04	1.12	26.1	27.1	.31	.33	* 3.7 *	1.06	.82	* 1.03	1.04	1.51	* 174.1	8.97	444 *
D * 15:41	* 766.1	764.8	757.4	* 18.8 *	* 7.9	105	2520	16976	2620	* 59.2 *	1.04	1.13	26.1	27.0	.31	.33	* 2.5 *	1.14	.82	* 1.03	1.04	1.51	* 175.2	9.04	444 *
T * 16: 1	* 766.4	764.8	758.3	* --- *	* --- *	0	630.	-1179	0	* 65.2 *	1.04	1.11	26.2	28.0	.30	.29	* 2.5 *								
T * 16:21	* 766.4	764.8	758.3	* --- *	* --- *	0	630.	-1177	0	* 66.3 *	1.04	1.15	26.2	27.8	.31	.30	* 2.5 *								
D * 17:47	* 768.0	764.8	760.2	* 10.8 *	* .8	3	1680	8317	1149	* 58.8 *	1.04	1.14	25.5	20.8	.30	.36	* 1.2 *	1.14	.82	* 1.03	1.04	1.51	* 175.2	9.07	444 *
D * 17:50	* 768.8	766.8	766.3	* 47.4 *	* .8	97	2310	17807	2563	* 53.4 *	1.04	1.14	25.4	18.4	.31	.37	* 1.2 *	.70	.82	* 1.03	1.04	1.51	* 177.2	9.08	440 *
D * 17:51	* 769.2	767.8	766.3	* 15.2 *	* 7.2	96	2520	15540	2544	* 52.8 *	1.04	1.14	25.2	19.3	.30	.34	* 1.2 *	.98	.82	* 1.03	1.04	1.51	* 178.2	9.09	438 *
D * 17:54	* 770.2	768.7	766.3	* 16.2 *	* 7.8	96	2730	15703	2506	* 56.6 *	1.04	1.13	25.8	26.5	.30	.29	* .8 *	1.05	.82	* 1.03	1.04	1.51	* 179.1	9.15	437 *
D * 17:58	* 771.2	769.8	755.3	* 16.4 *	* 8.8	97	2730	15703	2488	* 57.4 *	1.04	1.13	24.6	26.5	.31	.31	* .8 *	1.04	.82	* 1.03	1.04	1.51	* 180.2	9.21	437 *
D * 18: 1	* 772.1	770.8	755.3	* 15.4 *	* 8.4	97	2730	16045	2499	* 57.2 *	1.04	1.13	24.4	26.7	.31	.32	* 2.5 *	1.87	.82	* 1.03	1.04	1.51	* 181.2	9.26	436 *
D * 18: 4	* 773.2	771.8	755.3	* 22.9 *	* 8.4	96	2520	15579	2491	* 57.2 *	1.04	1.13	24.3	26.5	.31	.32	* 2.5 *	.99	.82	* 1.03	1.04	1.52	* 182.2	9.31	435 *
D * 18: 7	* 774.1	772.8	755.3	* 19.1 *	* 7.8	97	2520	16045	2506	* 57.8 *	1.04	1.13	24.3	26.5	.31	.33	* 2.5 *	1.02	.82	* 1.03	1.04	1.52	* 183.2	9.36	434 *
D * 18:10	* 775.1	773.7	755.3	* 19.2 *	* 7.7	96	2730	15517	2476	* 57.8 *	1.04	1.13	24.4	26.5	.30	.33	* 2.5 *	1.01	.82	* 1.03	1.04	1.52	* 184.1	9.40	434 *
D * 18:14	* 776.1	774.8	755.3	* 16.3 *	* 8.6	98	2520	15610	2504	* 57.4 *	1.04	1.13	24.5	26.6	.30	.33	* 2.5 *	1.07	.82	* 1.03	1.04	1.52	* 185.2	9.46	433 *
D * 18:19	* 777.4	775.8	755.6	* 17.6 *	* .8	0	630.	16231	2584	* 57.2 *	1.04	1.13	24.6	26.5	.30	.34	* 2.5 *	1.04	.82	* 1.03	1.04	1.52	* 186.1	9.53	432 *
D * 18:25	* 779.8	775.8	772.8	* 17.6 *	* .8	0	630.	-1210	0	* 62.8 *	1.04	1.17	24.8	26.5	.30	.32	* 5.0 *	1.04	.82	* 1.03	1.04	1.52	* 186.1	9.53	432 *
D * 18:29	* 779.5	777.8	755.6	* 25.8 *	* -6	82	1890	15734	2451	* 60.8 *	1.04	1.13	24.8	26.8	.30	.37	* 5.0 *	.80	.82	* 1.03	1.04	1.52	* 188.2	9.53	428 *
D * 18:32	* 780.2	778.0	755.6	* 17.8 *	* 7.5	93	2730	15859	2409	* 58.6 *	1.04	1.14	24.8	25.9	.30	.39	* 7.5 *	1.02	.82	* 1.03	1.04	1.52	* 189.2	9.58	427 *
D * 18:36	* 781.1	779.7	756.5	* 14.3 *	* 6.8	96	2520	15230	2409	* 57.0 *	1.04	1.13	24.9	26.3	.31	.35	* 5.0 *	1.06	.82	* 1.03	1.04	1.52	* 190.1	9.65	427 *
D * 18:39	* 782.2	780.7	768.1	* 19.7 *	* 7.8	93	2730	15540	2524	* 57.0 *	1.04	1.13	25.0	26.5	.31	.34	* 3.7 *	.99	.82	* 1.03	1.04	1.52	* 191.1	9.70	427 *
D * 18:43	* 783.1	781.2	769.6	* 15.9 *	* 6.8	96	2310	15362	2489	* 57.0 *	1.04	1.14	25.1	26.5	.31	.33	* 3.7 *	1.06	.82	* 1.03	1.04	1.52	* 191.6	9.76	426 *
D * 18:46	* 784.1	782.8	778.5	* 20.4 *	* 7.4	95	2520	15287	2587	* 57.8 *	1.04	1.13	25.2	26.5	.31	.33	* 3.7 *	.98	.82	* 1.03	1.04	1.52	* 193.2	9.81	425 *
D * 18:48	* 785.1	783.8	771.1	* 26.6 *	* 7.5	95	2520	15388	2489	* 56.4 *	1.04	1.14	25.3	26.5	.31	.33	* 3.7 *	.93	.82	* 1.03	1.04	1.52	* 194.2	9.85	425 *
D * 18:52	* 786.1	784.8	772.7	* 14.9 *	* 8.6	94	2520	14276	2587	* 56.4 *	1.04	1.13	25.3	26.5	.32	.33	* 3.7 *	1.05	.82	* 1.03	1.04	1.52	* 195.2	9.91	424 *
D * 19: 3	* 787.1	785.7	775.7	* 4.1 *	* 8.4	97	2730	15145	2507	* 55.8 *	1.04	1.13	25.5	26.4	.31	.34	* 2.5 *	1.40	.82	* 1.03	1.04	1.52	* 196.1	10.09	427 *
D * 19: 7	* 788.1	786.7	777.2	* 12.8 *	* 7.7	96	2520	14959	2489	* 55.2 *	1.04	1.13	25.6	26.4	.31	.33	* 2.5 *	1.10	.82	* 1.03	1.04	1.52	* 197.1	10.18	428 *
D * 19:10	* 789.1	787.7	788.0	* 26.2 *	* 7.8	95	2940	15114	2506	* 56.2 *	1.04	1.13	25.6	26.0	.31	.34	* 2.5 *	.85	.82	* 1.03	1.04	1.52	* 198.1	10.22	427 *
D * 19:20	* 790.1	788.7	788.6	* 25.1 *	* 7.6	101	2730	15424	2526	* 55.8 *	1.04	1.13	25.6	26.1	.31	.33	* 2.5 *	.97	.82	* 1.03	1.04	1.52	* 199.1	10.25	426 *
D * 19:23	* 791.2	789.7	781.5	* 24.9 *	* 7.7	100	2730	15486	2506	* 54.8 *	1.04	1.13	25.7	26.7	.31	.33	* 2.5 *	.94	.82	* 1.03	1.04	1.52	* 200.1	10.30	425 *
D * 19:26	* 792.2	790.8	782.1	* 22.6 *	* 6.9	101	2520																		

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 6 YP = 21 GEL = 6 \*

		DEPTH			DRILLING PARAMETERS							MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT	
TIME	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		GAS		DCS	NORM	PF	ECD	FRAC	METER	TIME	COST
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	cu3	sq	IN	OUT	IN	OUT	ohm	unit		sq	sq	sq		net	DHr	\$/H
D * 19:29	793.1	791.8	783.0	19.4	7.8	99	2520	15424	2544	57.8	1.84	1.13	25.2	26.8	.37	.34	2.5	1.01	.82	1.83	1.84	1.52	202.2	10.39	423
D * 19:32	794.1	792.8	783.9	17.8	8.4	101	2520	14859	2521	65.8	1.84	1.13	24.9	26.8	.41	.34	2.5	1.04	.82	1.83	1.84	1.52	203.2	10.44	423
D * 19:35	795.1	793.8	784.9	22.8	8.2	99	2520	15083	2617	73.9	1.84	1.13	24.7	26.5	.43	.34	2.5	.99	.82	1.83	1.84	1.52	204.2	10.49	422
D * 19:38	796.2	794.7	785.0	23.8	8.4	99	2520	14883	2597	82.3	1.84	1.13	24.5	26.5	.44	.34	2.5	.98	.82	1.83	1.84	1.52	205.2	10.54	421
D * 19:41	797.1	795.7	786.4	16.7	7.9	101	2520	14710	2612	85.3	1.84	1.13	24.8	26.4	.42	.34	2.5	1.05	.82	1.83	1.84	1.52	206.2	10.59	421
D * 19:52	798.1	796.7	786.7	18.6	8.4	96	2730	11669	2592	88.5	1.84	1.13	25.2	25.8	.39	.34	2.5	1.14	.82	1.83	1.84	1.52	207.1	10.66	421
D * 19:55	799.1	797.7	787.3	20.8	8.7	97	2730	11234	2579	85.9	1.84	1.13	25.2	26.2	.39	.34	2.5	.99	.82	1.83	1.84	1.52	208.1	10.71	420
D * 19:59	800.2	798.7	787.9	17.8	9.1	97	2940	14586	2600	85.1	1.84	1.13	25.3	26.4	.39	.34	2.5	1.06	.82	1.83	1.84	1.52	209.2	10.77	420
D * 20: 3	801.1	799.3	788.2	14.1	9.0	97	2730	14555	2579	83.7	1.84	1.13	25.3	26.5	.30	.34	2.5	1.10	.82	1.83	1.84	1.52	209.7	10.84	420
D * 20: 8	802.2	800.7	790.7	11.1	6.6	101	2310	13866	2579	84.7	1.84	1.13	25.3	26.5	.37	.33	2.5	1.13	.82	1.83	1.84	1.52	211.1	10.92	420
D * 20:12	803.1	801.7	792.2	17.8	8.4	98	2520	14214	2579	83.7	1.84	1.13	25.4	26.6	.36	.33	2.5	1.06	.82	1.83	1.84	1.52	212.1	10.98	420
D * 20:15	804.1	802.8	793.1	16.5	7.3	98	2520	14772	2582	83.1	1.84	1.13	25.5	26.6	.36	.33	2.5	1.03	.82	1.83	1.84	1.52	213.2	11.04	419
D * 20:19	805.1	803.7	794.3	15.5	8.8	97	2730	14834	2549	82.9	1.84	1.12	25.5	27.2	.35	.40	2.5	1.05	.82	1.83	1.84	1.52	214.1	11.11	419
D * 20:23	806.1	804.7	795.0	15.5	7.4	97	2730	14679	2582	82.9	1.84	1.11	25.6	27.5	.35	.45	2.5	1.01	.82	1.83	1.84	1.52	215.2	11.17	419
D * 20:36	807.1	805.7	797.4	16.6	7.3	101	2730	14897	2676	83.7	1.84	1.10	25.6	27.5	.34	.49	1.2	1.08	.82	1.83	1.84	1.52	216.2	11.22	418
D * 20:39	808.1	806.8	797.7	22.4	7.2	101	2520	16386	2617	88.9	1.84	1.10	25.7	27.3	.34	.49	1.2	.97	.82	1.83	1.84	1.52	217.2	11.26	417
D * 20:42	809.1	807.7	798.6	27.4	6.6	101	2520	16603	2625	88.9	1.84	1.10	25.7	27.6	.34	.48	2.5	.91	.82	1.83	1.84	1.53	218.1	11.31	417
D * 20:44	810.1	808.8	799.5	25.4	6.3	101	2520	15641	2630	88.3	1.84	1.10	25.7	27.5	.34	.47	2.5	.91	.82	1.83	1.84	1.53	219.2	11.35	416
D * 20:47	811.2	809.7	800.1	25.8	7.8	101	2730	16107	2655	79.7	1.84	1.10	25.7	27.5	.35	.46	1.2	.95	.82	1.83	1.84	1.53	220.2	11.39	415
D * 20:50	812.2	810.7	800.7	17.7	7.8	101	2520	16572	2637	80.7	1.84	1.10	25.8	27.3	.35	.46	1.2	1.02	.82	1.83	1.84	1.53	221.2	11.44	415
D * 20:53	813.1	811.2	801.3	20.3	7.6	101	2520	16666	2635	81.3	1.84	1.10	25.9	27.1	.35	.45	1.2	.98	.82	1.83	1.84	1.53	221.7	11.49	415
D * 20:56	814.1	812.7	802.2	18.2	7.3	100	2520	16945	2655	82.3	1.84	1.11	26.0	27.0	.35	.42	1.2	1.04	.82	1.83	1.84	1.53	223.1	11.55	414
D * 21: 0	815.1	813.7	803.5	15.2	7.1	102	2310	16697	2617	83.1	1.84	1.11	26.0	27.1	.36	.42	1.2	1.05	.82	1.83	1.84	1.53	224.1	11.61	414
D * 21:11	816.1	814.7	804.7	17.6	6.9	91	2940	16634	2600	86.9	1.89	1.11	26.2	27.0	.36	.41	2.5	.88	.82	1.83	1.89	1.53	225.1	11.65	413
D * 21:14	817.1	815.7	805.3	19.5	7.5	102	2730	17224	2620	83.5	1.89	1.11	26.2	27.0	.36	.41	2.5	.98	.82	1.83	1.89	1.53	226.1	11.69	412
D * 21:16	818.1	816.7	806.2	25.5	8.6	103	2730	17869	2638	83.3	1.89	1.12	26.2	27.2	.36	.39	3.7	.90	.82	1.83	1.89	1.53	227.2	11.73	411
D * 21:20	819.2	817.7	806.5	20.1	9.2	103	2730	16976	2638	82.7	1.89	1.12	26.2	27.4	.36	.39	5.8	.97	.82	1.83	1.89	1.53	228.2	11.79	411
D * 21:23	820.1	818.8	807.1	14.1	8.7	107	2730	17193	2638	82.3	1.89	1.11	26.2	27.5	.36	.38	3.7	1.04	.82	1.83	1.89	1.53	229.2	11.85	411
D * 21:26	821.1	819.8	808.3	16.7	8.4	106	2520	16683	2656	82.7	1.89	1.11	26.2	27.5	.37	.39	3.7	1.01	.82	1.83	1.89	1.53	230.2	11.91	410
D * 21:30	822.1	820.7	809.9	14.5	8.1	106	2520	16852	2676	82.5	1.89	1.12	26.3	27.4	.37	.38	5.8	1.06	.82	1.83	1.89	1.53	231.1	11.97	410
D * 21:34	823.1	821.7	811.1	18.8	8.5	103	2730	16914	2638	82.1	1.89	1.12	26.3	27.2	.36	.38	3.7	.97	.82	1.83	1.89	1.53	232.2	12.03	410
D * 21:38	824.1	822.7	812.3	15.9	8.8	103	2730	17721	2656	82.1	1.89	1.12	26.3	27.2	.36	.38	3.7	1.03	.82	1.83	1.89	1.53	233.1	12.09	410
D * 21:50	825.1	823.7	814.7	15.2	8.3	101	2730	16448	2598	83.3	1.89	1.13	26.4	26.4	.36	.38	5.8	1.03	.82	1.83	1.89	1.53	234.1	12.17	409
D * 21:54	826.1	824.7	815.3	16.2	7.8	103	2520	16666	2600	81.3	1.89	1.14	26.4	27.1	.35	.38	5.8	1.00	.82	1.83	1.89	1.53	235.2	12.23	410
D * 21:57	827.1	825.7	816.3	18.8	9.7	108	2730	16790	2618	88.7	1.89	1.13	26.4	27.3	.35	.38	3.7	.99	.82	1.83	1.89	1.53	236.1	12.28	409
D * 21:59	828.1	826.7	817.5	20.5	8.5	101	2730	16976	2600	88.7	1.89	1.13	26.3	27.5	.35	.39	3.7	.97	.82	1.83	1.89	1.53	237.1	12.33	409
D * 22: 2	829.1	827.7	818.4	21.5	6.5	103	2520	15455	2598	88.7	1.89	1.13	26.4	27.5	.35	.38	3.7	.93	.82	1.83	1.89	1.53	238.2	12.38	408
D * 22: 5	830.1	828.7	819.3	21.9	7.7	102	2520	16976	2600	88.7	1.89	1.13	26.4	27.6	.35	.39	3.7	.93	.82	1.83	1.89	1.53	239.2	12.42	407
D * 22: 8	831.2	829.7	819.9	20.7	7.9	100	2730	16293	2598	88.5	1.89	1.12	26.4	27.5	.35	.39	5.8	.95	.82	1.83	1.89	1.53	240.1	12.47	407
D * 22:10	832.1	830.7	820.2	22.6	7.2	102	2520	17472	2595	79.7	1.89	1.12	26.4	27.6	.35	.40	3.7	.92	.82	1.83	1.89	1.53	241.2	12.50	406
D * 22:12	833.1	831.8	821.1	29.9	8.8	101	2730	16683	2615	79.3	1.89	1.12	26.4	27.7	.35	.40	3.7	.87	.82	1.83	1.89	1.53	242.2	12.54	405
D * 22:25	834.1	832.7	823.8	6.6	9.1	86	2940	16876	2514	81.9	1.89	1.12	26.5	27.0	.35	.42	5.8	1.23	.82	1.83	1.89	1.53	243.1	12.63	406
D * 22:29	835.2	833.7	823.9	16.3	7.6	88	2940	16518	2524	88.9	1.89	1.12	26.5	27.8	.35	.40	3.7	.98	.82	1.83	1.89	1.53	244.2	12.70	406
D * 22:33	836.1	834.7	824.8	16.2	8.7	91	2730	16138	2489	88.9	1.89	1.12	26.5	27.9	.35	.40	3.7	.97	.82	1.83	1.89	1.53	245.2	12.76	406
D * 22:36	837.1	835.7	824.8	22.5	9.8	89	2730	15517	2522	88.9	1.89	1.12	26.5	28.1	.35	.40	3.7	.92	.82	1.83	1.89	1.53	246.2	12.81	405
D * 22:39	838.1	836.7	825.1	18.6	7.2	92	2730	15890	2524	81.1	1.89	1.12	26.5	28.2	.35	.41	3.7	.94	.82	1.83	1.89	1.53	247.1	12.85	404
D * 22:41	839.2	837.7	825.7	21.2	7.7	92	2520	15579	2586	88.9	1.89	1.11	26.5	28.3	.35	.40	3.7	.92	.82	1.83	1.89	1.53	248.2	12.90	404
D * 22:44	840.1	838.7	826.6	24.4	9.5	88	2730	15579	2522	88.9	1.89	1.11	26.6	28.2	.35	.40	3.7	.88	.82	1.83	1.89	1.53	249.2	12.94	403
D * 22:48	841.1	839.7	828.1	12.6	9.8	91	2730	15287	2524	81.5	1.89	1.12	26.6	28.2	.36	.40	3.7	1.06	.82	1.83	1.89	1.53	250.1	13.01	403



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 \* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 3 YP = 4 GEL = 3  
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TIME	DEPTHS		ROP		WOB		DRILLING PARAMETERS					MUD PARAMETERS		GAS		OVERPRESSURE SURVEY				ACCUMULATED ON BIT							
	MEASURED	VERTCL	LAGGED	n/hr	ton	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NGR	PF	ECD	FRAC	METER	TIME	COST						
	Hr:mn	net	net	net	net	net	net	KPA	l/min	m3	sq	degC	ohm	unit	sq	sq	sq	net	Dir	\$/m							
D	22:54	842.1	840.7	830.3	15.5	9.1	92	2730	16306	2506	81.1	1.10	1.11	26.8	20.3	.35	.40	3.7	1.02	.02	1.03	1.10	1.53	251.2	13.10	4	
D	23: 4	843.2	841.2	832.4	13.7	.0	76	1890	18124	2610	86.9	1.10	1.12	26.9	20.2	.36	.40	5.0	1.05	.02	1.03	1.10	1.53	251.6	13.15	40	
D	23: 9	844.1	842.7	833.3	14.9	9.6	95	2520	16945	2656	81.9	1.10	1.12	26.9	20.0	.36	.39	3.7	1.03	.02	1.03	1.10	1.53	253.2	13.24	404	
D	23:14	845.1	843.7	834.5	10.7	6.7	97	2310	17317	2658	81.7	1.10	1.12	27.1	20.4	.36	.40	3.7	1.06	.02	1.03	1.10	1.53	254.2	13.32	404	
D	23:18	846.1	844.7	835.5	13.5	8.9	96	2520	17969	2676	81.1	1.10	1.12	27.0	20.4	.36	.40	3.7	1.07	.02	1.03	1.10	1.54	255.2	13.30	404	
D	23:23	847.1	845.7	837.3	12.5	8.3	93	2520	17659	2676	81.7	1.10	1.12	27.1	20.4	.36	.40	5.0	1.04	.02	1.03	1.10	1.54	256.1	13.47	404	
D	23:28	848.1	846.7	839.4	12.0	7.0	97	2520	17193	2661	81.9	1.10	1.12	27.2	20.5	.36	.41	5.0	1.03	.02	1.03	1.10	1.54	257.2	13.55	404	
D	23:38	849.1	847.7	840.6	15.3	10.1	93	2520	17030	2650	81.3	1.10	1.12	27.3	20.4	.36	.41	5.0	1.01	.02	1.03	1.10	1.54	258.1	13.62	405	
D	23:42	850.2	848.7	841.2	12.0	8.9	93	2520	17100	2650	81.3	1.10	1.12	27.3	20.5	.36	.40	5.0	1.07	.02	1.03	1.10	1.54	259.2	13.69	405	
D	23:46	851.1	849.7	842.5	15.6	8.8	93	2730	17410	2670	80.9	1.10	1.11	27.4	20.5	.36	.41	5.0	1.00	.02	1.03	1.10	1.54	260.2	13.76	405	
T	0: 6	851.9	850.2	842.0	---	---	0	630	-1179	0	91.9	1.10	1.17	27.5	20.4	.35	.35	6.2	---	---	---	---	---	---	---	---	---
D	0:15	852.4	851.0	844.0	9.0	-3	0	1680	17340	2617	81.7	1.10	1.12	27.5	20.4	.36	.40	3.7	.60	.02	1.03	1.10	1.73	261.5	13.80	405	
D	0:15	853.3	851.9	844.0	239.	-8	0	1680	17597	2635	81.3	1.10	1.12	27.5	20.6	.36	.40	3.7	.00	.02	1.03	1.10	1.54	262.3	13.80	404	
D	0:16	854.2	852.8	844.3	185.	-9	0	1470	17045	2637	81.1	1.10	1.12	27.5	20.7	.36	.40	3.7	.00	.02	1.03	1.10	1.54	263.3	13.89	403	
D	0:18	855.1	853.7	844.9	20.8	7.8	0	2730	16790	2650	79.9	1.10	1.12	27.5	29.1	.36	.40	3.7	-.60	.02	1.03	1.10	1.54	264.2	13.93	402	
D	0:23	856.1	854.7	845.8	9.9	8.0	100	2520	15921	2599	79.5	1.10	1.12	27.4	29.0	.36	.40	3.7	1.10	.02	1.03	1.10	1.54	265.2	14.01	402	
D	0:30	857.1	855.7	847.3	10.0	7.2	100	2310	17577	2620	77.5	1.10	1.12	27.4	29.4	.36	.40	3.7	1.13	.02	1.03	1.10	1.54	266.2	14.12	403	
D	0:35	858.1	856.2	848.0	13.0	7.7	100	2310	18590	2643	76.5	1.10	1.11	27.4	29.3	.35	.40	3.7	1.04	.02	1.03	1.10	1.54	266.7	14.20	403	
D	0:40	859.2	857.7	849.2	11.5	6.7	100	2520	18240	2650	75.9	1.10	1.12	27.5	29.2	.35	.41	3.7	1.07	.02	1.03	1.10	1.54	268.2	14.30	404	
T	1: 0	860.0	858.2	851.9	---	---	100	630	17907	2500	75.1	1.10	1.12	27.7	30.6	.34	.40	3.7	---	---	---	---	---	---	---	---	---
T	1:20	860.0	858.2	856.2	---	---	0	000	6300	1610	76.5	1.10	1.13	29.1	30.0	.34	.40	3.7	---	---	---	---	---	---	---	---	---
T	1:40	860.0	858.2	858.6	---	---	0	000	6455	1615	76.5	1.10	1.13	29.4	30.3	.34	.39	3.7	---	---	---	---	---	---	---	---	---
T	2: 0	860.0	858.2	859.0	---	---	0	000	6672	1638	77.1	1.10	1.13	29.7	29.2	.34	.39	3.7	---	---	---	---	---	---	---	---	---
T	2:20	860.0	858.2	859.0	---	---	0	000	6610	1630	76.1	1.10	1.14	28.8	29.5	.34	.39	5.0	---	---	---	---	---	---	---	---	---
T	2:41	860.0	858.2	859.0	---	---	100	1890	18590	1309	74.3	1.10	1.12	28.7	29.4	.34	.39	2.5	---	---	---	---	---	---	---	---	---
D	2:41	860.2	858.7	859.0	6.4	9.8	100	2520	10520	2610	74.3	1.10	1.12	28.6	29.3	.34	.40	1.2	1.13	.02	1.03	1.10	1.54	269.1	14.42	405	
D	2:45	861.1	859.2	859.0	13.1	8.4	100	1890	18776	2610	74.1	1.10	1.13	28.6	28.5	.34	.40	1.2	1.05	.02	1.03	1.10	1.54	269.6	14.40	405	
D	2:48	862.2	860.7	859.0	20.6	8.9	100	1090	18745	2635	74.1	1.10	1.12	28.6	28.6	.34	.40	2.5	.93	.02	1.03	1.10	1.54	271.2	14.54	405	
D	2:53	863.1	861.6	859.0	13.0	8.8	100	1090	18931	2675	74.1	1.10	1.13	28.6	28.5	.34	.40	1.2	1.05	.02	1.03	1.10	1.54	272.1	14.61	405	
D	3: 6	864.1	862.7	859.0	5.7	8.5	100	1090	19117	2640	73.9	1.10	1.12	28.5	28.6	.34	.39	1.2	1.16	.02	1.03	1.10	1.54	273.1	14.65	404	
D	3:10	865.1	863.7	859.0	17.9	9.1	100	2100	18993	2620	73.7	1.10	1.13	28.4	28.4	.34	.40	1.2	1.00	.02	1.03	1.10	1.54	274.2	14.71	404	
D	3:15	866.1	864.7	859.0	14.4	6.6	100	1680	19006	2630	73.9	1.10	1.12	28.2	28.6	.34	.40	.0	1.00	.02	1.03	1.10	1.54	275.1	14.79	404	
D	3:19	867.1	865.7	859.0	13.0	8.3	100	2100	19117	2656	74.1	1.10	1.13	28.1	28.9	.34	.40	.0	1.02	.02	1.03	1.10	1.54	276.2	14.87	405	
D	3:23	868.1	866.7	859.0	15.8	7.9	100	1890	19117	2630	74.1	1.10	1.13	28.1	29.1	.34	.40	1.2	1.00	.02	1.03	1.10	1.54	277.1	14.93	405	
D	3:27	869.2	867.7	860.1	13.0	6.1	100	1680	19140	2656	74.1	1.10	1.12	28.0	29.4	.35	.41	.0	1.00	.02	1.03	1.10	1.54	270.1	15.00	404	
D	3:32	870.1	868.7	861.4	10.9	7.6	100	1890	18069	2635	74.7	1.10	1.12	27.9	29.4	.34	.41	1.2	1.07	.02	1.03	1.10	1.54	279.1	15.00	405	
D	3:51	871.1	869.6	863.5	14.5	5.7	100	1680	17503	2524	75.7	1.10	1.13	27.9	28.0	.34	.41	1.2	.96	.02	1.03	1.10	1.54	280.1	15.15	405	
D	3:55	872.2	870.7	863.0	15.6	6.6	100	1680	17317	2524	74.7	1.10	1.13	27.9	29.4	.34	.40	1.2	.99	.02	1.03	1.10	1.54	281.2	15.22	404	
D	3:59	873.2	871.7	864.1	12.7	9.0	100	2310	17410	2524	74.5	1.10	1.13	28.0	29.0	.34	.40	1.2	1.02	.02	1.03	1.10	1.54	282.1	15.29	405	
D	4: 3	874.1	872.7	865.0	16.2	8.3	97	1890	17193	2524	74.9	1.10	1.13	27.9	29.9	.34	.41	2.5	1.00	.02	1.03	1.10	1.54	283.2	15.36	404	
D	4:10	875.1	873.7	866.2	7.8	8.4	96	2100	17193	2524	75.3	1.10	1.13	28.1	29.0	.35	.41	1.2	1.10	.02	1.03	1.10	1.54	284.2	15.46	405	
D	4:14	876.1	874.7	867.5	12.1	10.5	95	2310	17255	2542	75.1	1.10	1.13	28.1	29.0	.35	.41	1.2	1.06	.02	1.03	1.10	1.54	285.1	15.53	405	
D	4:18	877.1	875.7	868.4	13.0	8.6	95	2310	17162	2524	75.3	1.10	1.13	28.2	29.9	.35	.41	1.2	1.05	.02	1.03	1.10	1.54	286.1	15.60	405	
D	4:23	878.2	876.7	869.0	15.5	8.1	94	2100	17069	2539	74.9	1.10	1.13	28.3	29.0	.35	.40	1.2	1.01	.02	1.03	1.10	1.54	287.2	15.67	405	
D	4:26	879.1	877.7	869.9	18.4	8.9	96	2100	17193	2542	75.1	1.10	1.13	28.4	29.6	.35	.40	2.5	.97	.02	1.03	1.10	1.54	288.2	15.73	405	
D	4:41	880.1	878.7	870.0	13.8	8.6	101	2100	18106	2599	75.9	1.10	1.13	28.4	29.7	.35	.40	1.2	1.02	.02	1.03	1.10	1.54	289.1	15.80	405	
D	4:46	881.1	879.6	872.0	12.4	9.0	104	1890	18155	2599	76.1	1.10	1.13	28.5	29.0	.35	.40	3.7	1.00	.02	1.03	1.10	1.54	290.1	15.00	405	
D	4:52	882.2	880.6	873.6	10.3	9.4	104	1890	17690	2597	76.1	1.10	1.13	28.5	30.1	.35	.40	3.7	1.12	.02	1.03	1.10	1.54	291.1	15.90	406	
D	4:55	883.1	881.2	874.2	15.8	9.6	102	1890	17969	2620	76.3	1.10	1.13	28.5	29.9	.35	.41	3.7	1.03	.02	1.03	1.10	1.54	292.2	16.03	405	

\*\*\*\*\*  
 \* -GEOSERVICES  
 \* ON-LINE TDC  
 \* DATE : 4/ 6/02 \*  
 \* \*\*\*\*\*

HAMMERHEAD #1

\*\*\*\*\*  
 \* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 5 YP = 4 GEL = 2 \*  
 \* \*\*\*\*\*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *							* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *		
		VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	IN	OUT	IN	OUT	IN	OUT	DCS	NORM	PF	ECD	FRAC	METER	TIME
* Hr:mn *	* met *	* met *	* met *	* m/hr *	* ton *	* rpm *	* N/m *	* KPA *	* l/mn *	* m3 *	* sq *	* degC *	* g/mn *	* unit *	* sq *	* sq *	* sq *	* sq *	* sq *	* sq *	* sq *	* sq *	* sq *	* net *	* Dhr *	* \$/m *
D * 5: 1 *	884.2	882.7	875.4	9.3	9.0	103	2100	18000	2599	75.9	1.10	1.13	20.7	30.0	.35	.42	2.5	1.15	.02	1.03	1.10	1.55	293.2	16.14	406	
D * 5: 7 *	885.2	883.7	876.6	9.4	9.3	103	1890	17721	2617	75.9	1.10	1.13	20.6	30.0	.35	.41	3.7	1.15	.02	1.03	1.10	1.55	294.2	16.23	407	
D * 5:12 *	886.1	884.6	877.8	27.3	8.9	102	2100	18124	2600	75.5	1.10	1.12	20.8	30.1	.35	.41	3.7	.90	.02	1.03	1.10	1.55	295.1	16.31	407	
D * 5:14 *	887.1	885.7	878.4	22.3	9.0	104	2100	18093	2630	75.7	1.10	1.13	20.8	30.4	.35	.41	3.7	.94	.02	1.03	1.10	1.55	296.2	16.35	406	
D * 5:18 *	888.1	886.7	879.3	10.2	9.0	103	1890	18031	2617	75.5	1.10	1.13	20.8	30.1	.35	.42	3.7	.90	.02	1.03	1.10	1.55	297.2	16.41	406	
D * 5:32 *	889.1	887.6	880.6	17.3	9.0	102	2100	18031	2617	75.7	1.10	1.13	20.8	30.4	.35	.41	3.7	.99	.02	1.03	1.10	1.55	298.1	16.49	406	
D * 5:36 *	890.1	888.6	881.5	16.0	8.4	104	1890	18031	2600	75.7	1.10	1.13	20.8	30.2	.35	.42	5.0	1.02	.02	1.03	1.10	1.55	299.1	16.56	406	
D * 5:48 *	891.1	889.7	881.8	16.8	9.3	102	2310	17814	2600	75.7	1.10	1.13	20.8	30.5	.35	.43	3.7	1.00	.02	1.03	1.10	1.55	300.2	16.62	406	
D * 5:43 *	892.1	890.6	882.7	17.6	9.0	103	2100	17907	2577	75.3	1.10	1.12	20.9	30.4	.35	.43	3.7	1.00	.02	1.03	1.10	1.55	301.1	16.68	406	
D * 5:47 *	893.2	891.7	883.6	10.7	9.3	103	2100	17814	2600	75.5	1.10	1.12	29.0	30.3	.35	.41	3.7	.99	.02	1.03	1.10	1.55	302.2	16.74	406	
D * 5:51 *	894.1	892.7	883.9	16.7	8.8	103	1890	17752	2597	75.3	1.10	1.12	29.0	30.4	.35	.42	5.0	1.00	.02	1.03	1.10	1.55	303.2	16.80	406	
D * 5:55 *	895.1	893.7	884.8	13.7	8.4	104	1890	17930	2610	75.1	1.10	1.13	29.0	30.4	.35	.41	5.0	1.05	.03	1.03	1.10	1.55	304.2	16.87	406	
D * 6: 0 *	896.1	894.7	886.1	11.2	9.8	103	1890	17814	2597	75.5	1.10	1.12	29.1	30.7	.35	.42	5.0	1.00	.03	1.03	1.10	1.55	305.2	16.95	406	

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\*\*\*\*\*  
\* 4/ 6/82 HANMERHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
\*BIT HEADING :BIT#12 RUN#25  
\*BIT TYPE :M/TOOT \*  
\*BIT IDENTITY :HTC J1 \*  
\*\*\*\*\*  
\*BIT SIZE : 12.25 INCH \*  
\*BIT COST : 7500. \$ RIG COST/HR: 5033. \*  
\*\*\*\*\*  
\*NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY \*  
\*\*\*\*\*  
\*DEPTH IN : 591.02 METERS 3/ 6/82 \*  
\*DEPTH OUT : 896.68 METERS 4/ 6/82 \*  
\*METRAGE : 305.66 METERS \*  
\*TOTAL REVOLUTIONS : 96 \*  
\*\*\*\*\*  
\*DRILLING TIME: 17: 0 HR AVERAGE ROP: 17.98 M/HR \*  
\*TIME IN HOLE : 24: 3 HR AVERAGE ROP: 12.71 M/HR \*  
\*TRIP TIME : 3: 0 HR \*  
\*\*\*\*\*  
\*DRILLING COST STANDARD : 540.6 \$/MET \*  
\*DRILLING COST ON BOTTOM : 486.2 \$/MET \*  
\*DRILLING COST MINIMUM : 482.1 \$/MET \*  
\*\*\*\*\*  
\* AVERAGE OVER THE RUN AVERAGE HYDRAULICS \*  
\*WEIGHT ON BIT : 7.84 TONS NOZZLES SPEED : 171.96 M/S \*  
\*ROTATION : 97.85 RPM PRESSURE DROP : 17998 KPA \*  
\*FLOW RATE :2586.66 L/MN HYDRAULIC POWER:1040.63 H.P \*  
\*STAND PIPE PRESSURE: 16722 KPA \*  
\*\*\*\*\*



ON-LINE TDC  
GEOSERVICES

HYDRAULIC REPORT

\*\*\*\*\*  
\* 4/ 6/82 TIME 8: 7  
\*\*\*\*\*

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 394.68 METERS \*  
\* FLOW RATE 2597 L/MN BINGHAM \*  
\*\*\*\*\*

\* MUD DATA WEIGHT 1.10 SG \*  
\* PV 5 CPS \*  
\* YP 4.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N 7776 \*  
\* K .8540 LB/100 FT2 \*  
\*\*\*\*\*

\* HOLES VOLUMES WITH PIPES 114.35 M3 \*  
\* WITHOUT PIPES 119.43 M3 \*  
\* ANNULAR 106.49 M3 \*  
\* INSIDE PIPES 7.86 M3 \*  
\*\*\*\*\*

\*\*\*\*\*  
\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES\* H.P \*TYPE\* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAM \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* \* L/MN \* M/MN M/MN \*  
\*\*\*\*\*  
\*SURF. EQPT\* \* \* \* \* 461 27 \* \* \* \*  
\*DR. STRING\* .00 809.60 \* 4.28 5.00 \* \* 1467 85 \* \* \* \*  
\*DR. STRING\* 809.60 898.40 \* 2.01 7.75 \* \* 1207 70 \* \* \* \*  
\*BIT \* \* \* \* 18144 1053 \* M/S \* \* 172.7 \* \*  
\*ANNULUS \* 896.60 807.00 \* 7.75 12.25 \* 11 1 \* TU 1925.5 \* 57.0 52.4 \*  
\*ANNULUS \* 807.00 554.00 \* 5.00 12.25 \* 11 1 \* LA 2615.3 \* 41.0 36.7 \*  
\*ANNULUS \* 554.00 143.00 \* 5.00 18.73 \* 9 1 \* LA 6693.1 \* 15.7 12.0 \*  
\*ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 4 0 \* LA 5260.6 \* 20.1 16.2 \*  
\* TOTAL \* \* \* \* 21315 1237 \* \* \* \*  
\*\*\*\*\*

\*\*\*\*\*  
\*ANNULAR PRESSURE LOSSES 35 KPA \*  
\*\*\*\*\*

\*EQUIV. CIRCULATING DENSITY 1.10 SG \*  
\* MAX DEPTH 2878.56 \*  
\*\*\*\*\*

\* MUD LAG TIMES S -> B 3.03 MN \*  
\* B -> S 41.00 MN \*  
\*\*\*\*\*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 51.84 MN \*  
\* MAX SLIP VELOCITY 4.52 M/MN \*  
\*\*\*\*\*

\* BIT DATA SIZE 12.25 INCH \*  
\* NOZZLES 13 13 13 /32NDS \*  
\* NOZZLES EFFICIENCY 75 % \*  
\* BIT P. LOSSES 18144 KPA \*  
\* H.H.P RATIO 85.13 % \*  
\* BIT H.H.P 8.938 \*  
\* BIT VELOCITY 172.66 M/S \*  
\*\*\*\*\*

* GEOSERVICES																		* ON-LINE TDC						* HAMMERHEAD #1										DATE
* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13																		* MUD RHEOLOGICAL PARAMETERS : PV = 5 YP =																
* TIME	* DEPTHS			* DRILLING PARAMETERS								* MUD PARAMETERS				* GAS		* OVERPRESSURE SURVEY				* ACCU												
	* MEASURED	* VERTCL	* LAGGED	* ROP	* WOB	* RPM	* TORQ	* PRESS	* FLOW	* PIT	* DENSITY	* TEMPERATURE		* RESISTIVITY		* DCS	* NORM	* PF	* ECD	* FRAC	* METER													
* Hr:Am	* net	* net	* net	* ft/hr	* ton	* rpm	* Nm	* KPA	* l/min	* m3	* IN	* OUT	* IN	* OUT	* IN	* OUT	* unit	* sq	* sq	* sq	* net													
D * 6:14	* 899.3	897.8	887.9	* 13.6	* 9.5	91	2310	17503	2562	* 77.9	* 1.10	1.13	29.1	30.3	.35	.42	* 5.0	* 1.06	.83	* 1.03	1.10	1.55	* 308.3											
D * 6:18	* 900.2	890.6	889.4	* 11.6	* 6.9	93	1680	17340	2600	* 75.3	* 1.10	1.13	29.1	30.4	.35	.42	* 5.0	* 1.03	.83	* 1.03	1.10	1.55	* 309.2											
D * 6:23	* 901.2	899.6	890.9	* 12.9	* 6.9	95	1680	17703	2582	* 75.1	* 1.10	1.12	29.1	30.5	.35	.41	* 5.0	* 1.01	.83	* 1.03	1.10	1.55	* 310.2											
D * 6:28	* 902.1	900.7	892.2	* 15.4	* 6.8	98	1680	17657	2597	* 74.9	* 1.10	1.12	29.2	30.9	.35	.42	* 5.0	* .97	.83	* 1.03	1.10	1.55	* 311.2											
D * 6:33	* 903.1	901.6	893.4	* 10.2	* 5.0	101	1470	17379	2620	* 75.3	* 1.10	1.13	29.3	30.7	.35	.43	* 5.0	* 1.02	.83	* 1.03	1.10	1.55	* 312.1											
D * 6:37	* 904.1	902.6	894.3	* 12.0	* 7.1	97	1890	17014	2600	* 75.3	* 1.10	1.13	29.3	30.9	.35	.42	* 5.0	* 1.00	.83	* 1.03	1.10	1.55	* 313.1											
D * 6:43	* 905.1	903.6	895.5	* 7.8	* 8.8	95	2100	17628	2600	* 75.1	* 1.10	1.12	29.3	31.1	.35	.42	* 5.0	* 1.12	.83	* 1.03	1.10	1.55	* 314.1											
D * 6:49	* 906.1	904.2	898.9	* 10.3	* 7.9	96	1890	17577	2620	* 75.1	* 1.10	1.13	29.4	30.9	.35	.41	* 3.7	* 1.07	.83	* 1.03	1.10	1.55	* 314.7											
D * 6:55	* 907.1	905.6	898.9	* 8.3	* 6.6	100	1680	17566	2617	* 75.1	* 1.10	1.13	29.5	31.0	.36	.42	* 3.7	* 1.10	.83	* 1.03	1.10	1.55	* 316.2											
D * 7: 1	* 908.1	906.6	899.8	* 10.3	* 7.6	96	1890	17317	2600	* 74.9	* 1.10	1.12	29.5	31.1	.36	.42	* 5.0	* 1.00	.83	* 1.03	1.10	1.55	* 317.1											
D * 7:12	* 909.1	907.6	901.3	* 25.9	* 8.7	96	2100	17690	2600	* 75.9	* 1.10	1.13	29.6	30.9	.35	.42	* 5.0	* .76	.83	* 1.03	1.10	1.55	* 318.1											
D * 7:17	* 910.1	908.6	902.2	* 14.0	* 8.1	96	1890	17845	2597	* 75.1	* 1.10	1.12	29.7	30.8	.36	.42	* 5.0	* 1.01	.83	* 1.03	1.10	1.55	* 319.2											
D * 7:21	* 911.1	909.7	903.4	* 14.8	* 8.4	101	2100	17620	2620	* 74.7	* 1.10	1.12	29.8	31.1	.35	.42	* 5.0	* 1.01	.83	* 1.03	1.10	1.55	* 320.2											
D * 7:25	* 912.1	910.6	904.0	* 19.4	* 7.9	98	1890	17566	2607	* 74.1	* 1.10	1.12	29.7	31.0	.36	.42	* 3.7	* .94	.83	* 1.03	1.10	1.55	* 321.2											
D * 7:28	* 913.2	911.6	904.6	* 17.8	* 7.0	101	1680	17690	2597	* 74.3	* 1.10	1.13	29.8	30.8	.36	.43	* 3.7	* .95	.83	* 1.03	1.10	1.55	* 322.1											
D * 7:33	* 914.1	912.6	905.3	* 9.5	* 8.0	97	2100	17193	2615	* 74.1	* 1.10	1.12	29.8	31.0	.36	.42	* 3.7	* 1.10	.83	* 1.03	1.10	1.55	* 323.1											
D * 7:39	* 915.1	913.6	906.5	* 10.3	* 8.4	101	1890	17441	2600	* 73.9	* 1.10	1.11	29.8	31.0	.36	.43	* 5.0	* 1.10	.83	* 1.03	1.10	1.55	* 324.2											
D * 7:42	* 916.1	914.6	906.0	* 21.1	* 8.2	101	2100	17100	2600	* 73.5	* 1.10	1.11	29.8	31.0	.36	.43	* 5.0	* .91	.83	* 1.03	1.10	1.55	* 325.2											
D * 7:45	* 917.1	915.7	907.4	* 20.2	* 8.3	98	1890	17659	2600	* 74.1	* 1.10	1.11	29.8	31.2	.36	.43	* 5.0	* .93	.83	* 1.03	1.10	1.55	* 326.2											
D * 7:48	* 918.1	916.7	907.7	* 19.4	* 8.0	102	1890	17620	2600	* 74.3	* 1.10	1.11	29.8	30.9	.36	.43	* 5.0	* .94	.83	* 1.03	1.10	1.55	* 327.2											
T * 8:10	* 917.6	916.7	909.2	* ----	* ----	0	.000	-1241	0	* 79.3	* 1.10	1.16	29.8	32.9	.36	.37	* 6.2	* ----	* ----	* ----	* ----	* ----	* ----											
T * 8:30	* 918.0	916.7	910.4	* ----	* ----	106	1680	18559	2600	* 74.5	* 1.10	1.11	29.7	27.9	.35	.46	* 2.5	* ----	* ----	* ----	* ----	* ----	* ----											
D * 8:42	* 919.1	917.6	911.4	* 9.5	* 8.4	105	1890	18372	2620	* 74.1	* 1.10	1.11	29.8	31.2	.35	.41	* 2.5	* 1.07	.83	* 1.03	1.10	1.55	* 328.1											
D * 8:45	* 920.1	918.6	912.6	* 15.9	* 7.8	105	1890	18062	2620	* 73.5	* 1.10	1.11	29.8	31.5	.36	.42	* 2.5	* 1.00	.83	* 1.03	1.10	1.55	* 328.6											
D * 8:49	* 921.1	920.1	913.5	* 13.9	* 7.6	107	1680	17969	2617	* 73.9	* 1.10	1.11	29.8	31.6	.36	.42	* 2.5	* 1.04	.83	* 1.03	1.10	1.55	* 330.1											
D * 8:55	* 922.1	921.2	914.4	* 12.0	* 8.4	106	1890	18000	2610	* 73.9	* 1.10	1.12	29.7	31.4	.36	.44	* 2.5	* 1.09	.83	* 1.03	1.10	1.56	* 331.1											
D * 9: 3	* 923.1	922.1	916.0	* 7.2	* 8.2	106	1890	18000	2635	* 73.7	* 1.10	1.11	29.7	31.2	.36	.44	* 3.7	* 1.21	.83	* 1.03	1.10	1.56	* 332.1											
D * 9: 9	* 924.1	923.1	918.1	* 9.9	* 8.6	105	1890	16976	2641	* 73.7	* 1.10	1.11	29.8	31.3	.36	.44	* 2.5	* 1.14	.83	* 1.03	1.10	1.56	* 333.1											
D * 9:14	* 925.1	924.1	918.1	* 11.0	* 8.4	105	1890	18000	2635	* 73.7	* 1.10	1.11	29.8	31.2	.36	.43	* 2.5	* 1.09	.83	* 1.03	1.10	1.56	* 334.1											
D * 9:19	* 926.1	925.2	917.4	* 11.3	* 9.4	105	1890	17930	2620	* 73.5	* 1.10	1.11	29.9	31.2	.36	.43	* 3.7	* 1.10	.83	* 1.03	1.10	1.56	* 335.1											
D * 9:33	* 927.1	926.1	920.2	* 10.1	* 8.3	106	1890	17131	2562	* 73.1	* 1.10	1.11	30.0	31.7	.36	.44	* 3.7	* 1.10	.83	* 1.03	1.10	1.56	* 336.0											
D * 9:38	* 928.1	927.1	921.1	* 9.7	* 7.3	100	1680	16697	2562	* 75.5	* 1.10	1.11	30.0	31.8	.36	.44	* 2.5	* 1.11	.83	* 1.03	1.10	1.56	* 337.1											
D * 9:44	* 929.2	928.1	922.3	* 10.0	* 8.9	107	1890	15952	2600	* 75.7	* 1.10	1.12	30.0	31.5	.37	.43	* 2.5	* 1.00	.83	* 1.03	1.10	1.56	* 338.0											
D * 9:51	* 930.1	928.6	922.9	* 12.1	* 8.2	106	1890	15207	2600	* 75.9	* 1.10	1.11	30.1	31.6	.37	.43	* 3.7	* 1.07	.83	* 1.03	1.10	1.56	* 338.6											
D * 9:59	* 931.2	930.1	924.5	* 9.0	* 7.8	107	1680	15052	2600	* 76.7	* 1.10	1.11	30.2	31.5	.37	.44	* 3.7	* 1.16	.83	* 1.03	1.10	1.56	* 340.1											
D * 10: 7	* 932.1	931.1	926.0	* 7.7	* 7.7	106	1890	15672	2562	* 76.3	* 1.10	1.12	30.3	31.4	.37	.44	* 2.5	* 1.20	.83	* 1.03	1.10	1.56	* 341.0											
D * 10:11	* 933.1	932.1	926.0	* 16.5	* 8.1	105	1890	16014	2562	* 76.1	* 1.10	1.12	30.3	31.5	.37	.44	* 2.5	* 1.00	.83	* 1.03	1.10	1.56	* 342.0											
D * 10:16	* 934.1	932.6	926.9	* 15.6	* 9.6	106	1890	15734	2500	* 75.1	* 1.10	1.12	30.3	31.4	.36	.44	* 2.5	* 1.01	.83	* 1.03	1.10	1.56	* 342.6											
D * 10:23	* 935.1	934.1	928.1	* 10.3	* 8.6	110	1890	16790	2577	* 75.1	* 1.10	1.12	30.3	31.4	.36	.44	* 3.7	* 1.11	.83	* 1.03	1.10	1.56	* 344.1											
D * 10:37	* 936.1	935.1	929.6	* 7.5	* 9.3	100	1890	18000	2630	* 75.1	* 1.10	1.11	30.4	31.6	.35	.45	* 2.5	* 1.16	.83	* 1.03	1.10	1.56	* 345.1											
D * 10:42	* 937.1	935.6	930.6	* 9.7	* 8.7	107	1890	17721	2658	* 74.7	* 1.10	1.11	30.4	31.9	.35	.44	* 2.5	* 1.14	.83	* 1.03	1.10	1.56	* 345.6											
D * 10:49	* 938.1	936.7	931.2	* 9.0	* 9.1	106	1680	17076	2630	* 73.9	* 1.10	1.12	30.5	31.6	.35	.43	* 1.2	* 1.14	.83	* 1.03	1.10	1.56	* 346.6											
D * 10:55	* 939.1	938.2	932.1	* 13.5	* 8.7	105	2100	17534	2630	* 73.3	* 1.10	1.12	30.5	31.5	.36	.43	* 2.5	* 1.05	.83	* 1.03	1.10	1.56	* 340.1											
D * 11: 2	* 940.1	939.2	933.6	* 9.6	* 8.6	107	1890	17534	2676	* 74.1	* 1.10	1.12	30.5	31.4	.36	.42	* 2.5	* 1.12	.83	* 1.03	1.10	1.56	* 349.1											
D * 11: 7	* 941.1	940.1	934.5	* 13.1	* 7.9	106	1890	17534	2630	* 74.1	* 1.10	1.13	30.5	31.3	.35	.42	* 2.5	* 1.06	.83	* 1.03	1.10	1.56	* 350.0											
D * 11:11	* 942.2	941.1	935.1	* 13.9	* 8.6	106	1890	17577	2650	* 74.1	* 1.10	1.13	30.5	31.6	.35	.42	* 2.5	* 1.04	.83	* 1.03	1.10	1.56	* 351.0											
D * 11:15	* 943.1	942.2	935.4	* 11.6	* 8.9	108	1680	17577	2643	* 74.1	* 1.10	1.13	30.6	31.6	.35	.42	* 2.5	* 1.10	.83	* 1.03	1.10	1.56	* 352.1											
D * 11:21	* 944.2	943.1	936.0	* 10.1	* 9.2	106	1890	17614	2670	* 73.3	* 1.10	1.13	30.5	31.4	.35	.41	* 2.5	* 1.12	.83	* 1.03	1.10	1.56	* 353.1											
D * 11:35	* 945.1	944.1	937.9	* 7.2	* 8.6	109	1680	17206	2676	* 73.1	* 1.10	1.13	30.5	31.3	.35	.42	* 2.5	* 1.20	.83	* 1.03	1.10	1.56	* 354.0											

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 \* GEOSERVICES HAMMERHEAD #1 DATE : 4/ 6/82 \*  
 \* ON-LINE TDC \*  
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\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 7 YP = 7 GEL = 3 \*  
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* Hr:mn	* DEPTHS			* DRILLING PARAMETERS							* MUD PARAMETERS				* GAS				* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT		
	* MEASURED	* VERTCL	* LAGGED	* ROP	* WOB	RPM	TORQ	PRESS	FLOW	* PIT	* DENSITY		* TEMPERATURE		* RESISTIVITY		* DCS	* NORM	* PF	* CCD	* FRAC	* METER	* TIME	* COST	
	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	* VOL	IN	OUT	IN	OUT	IN	OUT	ohm	* unit	* sq	sq	sq	* net	DHr	\$/m	
D * 11:43	946.1	945.2	939.1	7.2	10.9	106	2310	17340	2638	72.1	1.10	1.12	30.5	31.9	.35	.39	1.2	1.23	.83	1.03	1.10	1.56	355.1	21.17	418
D * 11:48	947.1	946.1	940.0	10.3	8.6	107	1680	17045	2615	73.7	1.10	1.12	30.5	32.0	.35	.41	1.2	1.14	.83	1.03	1.10	1.56	356.1	21.25	418
D * 11:56	948.1	947.1	941.5	9.4	7.2	110	1680	17783	2638	71.9	1.10	1.12	30.5	32.0	.34	.40	1.2	1.11	.83	1.03	1.10	1.56	357.1	21.39	419
D * 12: 6	949.1	948.1	943.7	5.8	6.5	111	1470	17907	2623	72.9	1.10	1.12	30.7	32.2	.34	.40	2.5	1.21	.83	1.03	1.10	1.56	358.1	21.56	421
D * 12:16	950.1	949.1	944.6	6.4	7.0	101	1470	17410	2656	72.1	1.10	1.13	30.7	32.0	.35	.40	1.2	1.10	.83	1.03	1.10	1.56	359.1	21.72	422
D * 12:25	951.1	950.1	945.0	8.1	8.0	101	1680	17566	2638	71.3	1.10	1.12	30.8	31.9	.35	.39	1.2	1.13	.83	1.03	1.10	1.56	360.1	21.87	423
D * 12:34	952.1	951.1	947.3	7.6	8.0	100	1680	17566	2635	71.1	1.10	1.12	30.7	32.0	.35	.39	2.5	1.15	.83	1.03	1.10	1.56	361.0	22.02	425
D * 12:40	953.1	952.1	947.9	9.9	8.4	99	1680	17441	2638	70.7	1.10	1.13	30.7	32.1	.35	.39	2.5	1.10	.83	1.03	1.10	1.56	362.0	22.12	425
D * 12:54	954.1	953.1	949.1	8.6	6.9	100	1680	16293	2546	70.9	1.10	1.12	30.8	31.9	.35	.39	2.5	1.09	.83	1.03	1.10	1.56	363.1	22.22	426
D * 13: 1	955.1	954.1	949.5	9.7	7.5	97	1090	15952	2577	70.9	1.10	1.12	30.7	32.5	.35	.39	3.7	1.09	.83	1.03	1.10	1.56	364.1	22.32	426
D * 13: 9	956.1	955.1	950.7	9.3	7.6	98	1090	16045	2561	70.5	1.10	1.12	30.8	32.2	.35	.39	2.5	1.09	.83	1.03	1.10	1.56	365.0	22.46	427
D * 13:16	957.1	956.1	951.3	8.4	8.9	97	1090	16200	2564	72.9	1.10	1.12	30.8	32.2	.35	.39	2.5	1.14	.83	1.03	1.10	1.56	366.1	22.57	428
D * 13:22	958.1	957.1	951.9	12.7	8.0	97	1090	17069	2617	72.5	1.10	1.12	30.9	32.1	.35	.39	2.5	1.01	.83	1.03	1.10	1.56	367.1	22.67	428
D * 13:25	959.1	957.6	952.5	15.0	7.3	100	1680	16914	2599	72.7	1.10	1.12	30.9	32.3	.35	.39	2.5	.99	.83	1.03	1.10	1.56	367.6	22.73	428
D * 13:31	960.1	959.1	953.4	12.2	8.5	99	1680	16945	2599	73.9	1.10	1.12	30.9	32.2	.35	.39	2.5	1.05	.83	1.03	1.10	1.56	369.1	22.83	428
D * 13:38	961.1	960.1	954.0	8.1	8.6	97	1680	17193	2582	73.5	1.10	1.12	31.0	32.1	.35	.40	2.5	1.13	.83	1.03	1.10	1.56	370.1	22.94	429
D * 13:46	962.1	961.1	954.9	8.5	8.4	97	1680	16803	2599	73.1	1.10	1.12	30.9	32.1	.35	.41	3.7	1.12	.83	1.03	1.10	1.57	371.1	23.07	430
D * 13:58	963.2	962.1	956.2	10.1	8.1	94	1090	15983	2562	73.5	1.10	1.12	30.9	32.1	.35	.39	3.7	1.07	.83	1.03	1.10	1.57	372.1	23.15	430
D * 14: 3	964.1	963.1	957.1	10.3	8.1	98	1680	16417	2557	73.3	1.10	1.12	30.9	32.4	.35	.40	3.7	1.09	.83	1.03	1.10	1.57	373.1	23.24	430
D * 14:10	965.1	964.1	958.0	10.1	8.6	98	1680	16076	2554	73.3	1.10	1.12	30.9	32.7	.35	.40	2.5	1.09	.83	1.03	1.10	1.57	374.0	23.34	431
D * 14:17	966.2	964.6	959.5	8.8	8.0	102	1680	16306	2592	73.1	1.10	1.13	30.9	32.4	.35	.40	3.7	1.14	.83	1.03	1.10	1.57	374.6	23.45	431
D * 14:21	967.1	966.1	960.1	16.5	8.4	98	1090	16479	2524	72.9	1.10	1.12	30.9	32.4	.34	.39	3.7	.98	.83	1.03	1.10	1.57	376.1	23.52	431
D * 14:24	968.2	966.7	960.7	16.7	8.0	96	1090	17503	2541	70.7	1.10	1.13	31.0	32.4	.33	.39	2.5	.97	.83	1.03	1.10	1.57	376.6	23.50	431
D * 14:30	969.2	968.1	961.3	12.1	8.6	96	1680	17441	2544	71.3	1.10	1.12	31.0	32.2	.33	.39	3.7	1.03	.83	1.03	1.10	1.57	378.1	23.67	431

\* 4/ 6/82 TIME 14:33

HAMMERHEAD #1

\* DEPTH OF EXECUTION 969.67 METERS \*  
\* FLOW RATE 2551 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.10 SG \*  
\* PV 7 CPS \*  
\* YP 7.00 LB/FT2 \*  
\* GEL 3.00 LB/100 FT2 \*  
\* N .7105 \*  
\* K .1309 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 119.66 M3 \*  
\* WITHOUT PIPES 124.98 M3 \*  
\* ANNULAR 111.12 M3 \*  
\* INSIDE PIPES 8.54 M3 \*

* FROM	TO	* PIPE ID	* PIPE OD	* HOLE DIAH	* P.LOSSES KPA	* H.P.	* TYPE	* CRITICAL	* MUD FLOW L/MN	* VELOCITY M/MN	* CUTTINGS VELOCITY M/MN
* SURF. EQPT *					443	25					
* DR. STRING *	.00	883.20	4.20	5.00	1545	88					
* DR. STRING *	883.20	972.00	2.81	7.75	1160	66					
* BIT *					17511	999	M/S			169.6	
* ANNULUS *	969.67	888.87		7.75	12.25	8	TU	1413.2		55.9	52.2
* ANNULUS *	888.87	554.88		5.00	12.25	10	TU	1510.0		40.3	36.8
* ANNULUS *	554.88	143.88		5.00	18.75	8	LA	2766.5		15.5	12.5
* ANNULUS *	143.88	.00		5.00	16.75	1	TU	2364.8		19.7	16.6
* TOTAL *					20686	1100					

\* ANNULAR PRESSURE LOSSES 27 KPA \*

\* EQUIV. CIRCULATING DENSITY 1.10 SG \*  
\* MAX DEPTH 3328.36 \*

\* MUD LAG TIMES S -> B 3.35 MN \*  
\* B -> S 43.55 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 52.02 MN \*  
\* MAX SLIP VELOCITY 3.72 M/MN \*

\* BIT DATA SIZE 12.25 INCH \*  
\* NOZZLES 13 13 13 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 17511 KPA \*  
\* H.H.P RATIO 84.65 % \*  
\* BIT H.H.P 8.474 \*  
\* BIT VELOCITY 169.61 M/S \*

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE: 4/ 6/02

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER: 12.25 inch NOZZ 13/13/13

MUD RHEOLOGICAL PARAMETERS: PV = 7 YP = 7 GEL = 3

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS					MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				* ACCUMULATED ON BIT			
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST			
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPa	l/mn	AL	sq	degC	ohm	unit	sq	sq	sq	sq	net	Dhr	\$/h				
D * 14:35	970.2	969.1	962.3	10.4	9.6	97	1680	17100	2542	71.7	1.10	1.13	31.0	32.4	.34	.39	3.7	1.09	.83	1.03	1.10	1.57	379.1	23.76	431
D * 14:43	971.4	970.1	963.2	9.8	.0	0	-210	15952	2562	71.7	1.10	1.13	31.1	32.4	.34	.40	3.7	1.11	.83	1.03	1.10	1.57	380.1	23.88	432
D * 14:55	972.2	971.1	964.1	17.8	8.4	100	1870	17162	2597	70.3	1.10	1.12	31.1	32.1	.34	.40	3.7	.95	.83	1.03	1.10	1.57	381.1	23.92	432
D * 15: 2	973.1	972.2	965.3	7.0	8.8	100	1680	17628	2582	69.9	1.10	1.13	31.1	32.8	.34	.39	3.7	1.20	.83	1.03	1.10	1.57	382.1	24.04	432
D * 15:10	974.2	973.1	966.8	8.2	8.4	101	1680	17472	2599	71.1	1.10	1.13	31.1	32.9	.34	.39	3.7	1.16	.83	1.03	1.10	1.57	383.1	24.17	433
D * 15:18	975.1	974.1	968.7	7.7	9.6	100	1680	17783	2582	70.5	1.10	1.14	31.3	32.9	.33	.39	3.7	1.18	.83	1.03	1.10	1.57	384.1	24.30	434
D * 15:29	976.2	975.1	970.8	6.1	9.5	101	1600	17534	2579	70.7	1.10	1.13	31.4	32.9	.33	.38	3.7	1.23	.83	1.03	1.10	1.57	385.1	24.40	436
D * 15:36	977.1	976.1	971.1	7.9	9.3	100	1680	17577	2600	70.7	1.10	1.13	31.4	32.8	.33	.38	3.7	1.19	.83	1.03	1.10	1.57	386.1	24.60	436
D * 15:42	978.1	977.1	972.3	9.2	8.4	101	1680	17503	2617	70.7	1.10	1.13	31.5	32.9	.33	.38	3.7	1.12	.83	1.03	1.10	1.57	387.1	24.70	437
D * 15:49	979.2	978.1	973.2	7.3	9.0	101	1680	17162	2582	70.3	1.10	1.13	31.5	33.0	.34	.38	3.7	1.20	.83	1.03	1.10	1.57	388.1	24.82	437
D * 15:56	980.2	979.1	974.1	9.8	9.4	100	1680	17255	2617	70.3	1.10	1.13	31.5	33.0	.34	.39	3.7	1.15	.83	1.03	1.10	1.57	389.1	24.93	438
D * 16: 9	981.1	979.6	975.1	10.4	8.8	96	1680	17628	2599	70.3	1.10	1.14	31.5	32.4	.33	.38	3.7	1.13	.83	1.03	1.10	1.57	389.6	25.04	438
D * 16:17	982.2	981.1	976.8	7.5	8.9	100	1870	17379	2620	70.3	1.10	1.13	31.5	33.5	.34	.38	3.7	1.19	.83	1.03	1.10	1.57	391.1	25.17	439
D * 16:23	983.1	982.2	976.6	8.8	9.6	97	1890	17379	2599	70.3	1.10	1.12	31.5	33.2	.34	.39	3.7	1.16	.83	1.03	1.10	1.57	392.1	25.27	440
T * 16:43	983.7	982.6	979.6			0	-210	17039	2599	70.1	1.10	1.12	31.5	34.7	.33	.39	3.7								
T * 18:26	983.7	982.6	980.8			0	-210	-1117	0	69.1	1.10	1.14	31.8	35.3	.33	.37	3.7								
D * 18:31	984.2	982.6	982.1	12.1	.0	96	1680	18000	2526	76.9	1.10	1.13	31.5	27.6	.32	.38	3.7	1.08	.83	1.03	1.10	1.57	392.6	25.32	440
D * 18:37	985.1	984.1	982.7	8.0	7.4	94	1890	17286	2524	76.5	1.10	1.12	31.2	32.2	.32	.36	3.7	1.09	.83	1.03	1.10	1.57	394.1	25.41	439
D * 18:44	986.1	985.1	983.6	11.5	7.9	94	1890	16697	2549	76.3	1.10	1.12	30.6	32.8	.33	.38	3.7	1.04	.83	1.03	1.10	1.57	395.1	25.52	440
D * 18:50	987.1	986.1	983.6	9.2	7.7	94	1890	17038	2544	74.3	1.10	1.12	30.3	32.8	.32	.39	3.7	1.08	.83	1.03	1.10	1.57	396.1	25.62	440
D * 18:57	988.1	986.6	983.6	8.9	7.6	96	1890	17131	2562	74.7	1.10	1.12	30.1	32.4	.32	.38	3.7	1.11	.83	1.03	1.10	1.57	397.1	25.74	441
D * 19: 4	989.1	988.1	983.6	8.7	7.3	96	1680	17255	2542	73.1	1.10	1.16	30.2	33.7	.32	.41	3.7	1.11	.83	1.03	1.10	1.57	398.1	25.86	442
D * 19:20	990.1	987.1	983.9	6.8	8.3	103	1680	17597	2575	66.8	1.10	1.14	30.4	31.4	.32	.40	3.7	1.14	.83	1.03	1.10	1.57	399.1	25.99	443
D * 19:25	991.1	989.6	984.8	10.0	8.7	99	1890	17410	2580	62.6	1.10	1.13	30.5	31.9	.33	.38	3.7	1.08	.83	1.03	1.10	1.57	399.6	26.09	443
D * 19:30	992.1	991.1	985.4	15.3	8.6	100	1890	17193	2600	61.8	1.10	1.12	30.6	32.1	.34	.38	3.7	.98	.83	1.03	1.10	1.57	401.1	26.16	443
D * 19:36	993.1	992.1	986.3	8.7	9.1	100	1890	17007	2600	62.6	1.10	1.12	30.6	32.8	.34	.38	3.7	1.13	.83	1.03	1.10	1.57	402.1	26.25	443
D * 19:44	994.1	993.1	987.6	7.5	8.5	101	1680	16479	2600	62.2	1.10	1.13	30.6	31.8	.34	.39	3.7	1.17	.83	1.03	1.10	1.57	403.1	26.39	444
D * 19:51	995.1	994.2	988.5	10.4	8.2	101	1890	16697	2600	62.4	1.10	1.13	30.6	31.8	.34	.37	3.7	1.10	.83	1.03	1.10	1.57	404.1	26.50	444
D * 19:57	996.1	995.1	989.4	8.7	8.8	101	1890	16759	2620	62.2	1.10	1.12	30.6	31.7	.34	.37	3.7	1.14	.83	1.03	1.10	1.57	405.0	26.61	445
D * 20: 3	997.1	996.2	989.7	10.7	9.3	100	1890	16728	2580	61.8	1.10	1.12	30.5	31.7	.34	.37	3.7	1.10	.83	1.03	1.10	1.57	406.1	26.71	445
D * 20: 9	998.2	997.2	990.6	19.5	9.2	101	1890	16293	2603	61.4	1.10	1.13	30.4	31.8	.34	.40	3.7	.93	.83	1.03	1.10	1.57	407.1	26.79	445
D * 20:13	1000.4	997.7	991.8	22.4	.0	0	.000	434	2618	61.0	1.10	1.13	30.3	31.7	.34	.39	3.7	.92	.83	1.03	1.10	1.57	407.6	26.83	445
D * 20:26	1001.1	1000.1	993.3	8.8	9.8	100	1680	17255	2584	60.8	1.10	1.13	30.2	31.9	.32	.39	3.7	1.13	.83	1.03	1.10	1.57	410.1	26.95	444
D * 20:35	1002.1	1001.1	994.3	6.1	10.0	98	1890	16728	2602	60.8	1.10	1.13	30.2	32.4	.33	.39	3.7	1.26	.83	1.03	1.10	1.58	411.1	27.10	445
D * 20:40	1003.1	1002.1	995.2	10.4	10.2	97	2100	16324	2602	60.6	1.10	1.13	30.2	32.3	.33	.39	3.7	1.18	.83	1.03	1.10	1.58	412.1	27.19	446
D * 20:47	1004.1	1003.2	996.1	9.5	10.8	101	1890	16448	2582	60.8	1.10	1.12	30.3	32.1	.34	.40	3.7	1.13	.83	1.03	1.10	1.58	413.1	27.30	446
D * 20:55	1005.1	1004.1	997.3	7.8	10.1	100	1890	15300	2620	60.8	1.10	1.13	30.4	32.1	.34	.39	3.7	1.21	.83	1.03	1.10	1.58	414.1	27.43	447
D * 21: 4	1006.1	1005.1	1000.4	5.9	9.6	101	1680	15486	2620	60.8	1.10	1.12	30.5	31.7	.34	.39	3.7	1.26	.83	1.03	1.10	1.58	415.1	27.59	448
D * 21:11	1007.1	1005.6	1001.8	6.1	9.7	98	1890	15852	2617	60.8	1.10	1.13	30.5	31.8	.34	.38	3.7	1.26	.83	1.03	1.10	1.58	415.6	27.70	448
D * 21:18	1008.1	1007.1	1001.6	9.4	8.5	100	1890	15114	2620	60.6	1.10	1.12	30.4	31.9	.34	.37	3.7	1.14	.83	1.03	1.10	1.58	417.0	27.81	449
D * 21:33	1009.5	1008.1	1003.1	9.9	11.9	86	3570	15672	2526	65.0	1.10	1.13	30.1	31.8	.32	.39	3.7	1.13	.83	1.03	1.10	1.58	418.1	27.91	449
D * 21:39	1010.1	1009.1	1004.8	8.8	8.8	96	1890	16386	2544	64.8	1.10	1.12	29.7	31.8	.32	.38	3.7	1.14	.83	1.03	1.10	1.58	419.1	28.01	449
D * 21:46	1011.1	1010.1	1004.9	7.6	8.8	96	1890	16169	2544	65.4	1.10	1.12	29.8	32.0	.32	.38	3.7	1.17	.83	1.03	1.10	1.58	420.1	28.13	450
D * 21:55	1012.1	1011.1	1005.8	5.9	7.2	97	1680	16355	2544	65.8	1.10	1.12	29.6	32.8	.31	.38	3.7	1.21	.83	1.03	1.10	1.58	421.1	28.27	451
D * 22: 3	1013.1	1012.1	1006.8	7.4	8.5	101	1890	16479	2564	63.2	1.10	1.12	29.4	32.8	.31	.39	3.7	1.17	.83	1.03	1.10	1.58	422.1	28.37	451
D * 22: 9	1014.1	1013.1	1007.7	7.9	8.4	97	1680	16603	2562	64.6	1.10	1.12	29.4	32.1	.30	.39	3.7	1.15	.83	1.03	1.10	1.58	423.1	28.51	452
D * 22:17	1015.1	1014.1	1008.9	9.8	9.4	96	1890	16821	2544	65.4	1.10	1.11	29.4	31.9	.30	.39	3.7	1.14	.83	1.03	1.10	1.58	424.1	28.63	453
D * 22:23	1016.1	1015.1	1009.8	10.9	9.2	95	1890	17224	2544	66.2	1.10	1.11	29.5	31.9	.30	.38	3.7	1.10	.83	1.03	1.10	1.58	425.1	28.73	453
D * 22:30	1017.1	1016.1	1010.4	6.0	8.9	96	1890	17007	2544	66.8	1.10	1.11	29.5	31.7	.30	.37	3.7	1.23	.83	1.03	1.10	1.58	426.1	28.85	454



\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 4/ 6/82

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13

MUD RHEOLOGICAL PARAMETERS : PV = 10 YP = 8 GEL = 3

TIME	DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS		GAS		OVERPRESSURE SURVEY				ACCUMULATED ON BIT							
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	L/mn	IN	OUT	IN	OUT	ohm	unit	sq	sq	sq	net	DHr	\$/m				
D * 22:39	1010.1	1017.1	1011.6	5.5	8.9	97	1680	16045	2562	66.8	1.10	1.12	29.8	31.7	.31	.36	2.5	1.25	.83	1.03	1.10	1.50	427.1	29.00	455
D * 22:53	1019.1	1018.1	1012.9	7.5	9.4	97	1890	16014	2488	67.6	1.10	1.13	30.1	31.4	.31	.35	2.5	1.10	.83	1.03	1.10	1.58	420.1	29.13	455
D * 22:58	1020.1	1019.2	1013.0	10.4	8.9	98	1890	15952	2493	66.4	1.10	1.12	30.2	31.6	.31	.35	3.7	1.12	.83	1.03	1.10	1.58	429.1	29.21	455
D * 23: 4	1021.1	1019.6	1014.4	8.1	9.3	97	1890	15921	2526	66.2	1.10	1.13	30.3	31.8	.31	.34	3.7	1.16	.83	1.03	1.10	1.58	429.6	29.31	456
D * 23:15	1022.1	1020.6	1015.9	7.8	8.9	100	1680	15828	2506	66.4	1.10	1.12	30.4	31.9	.31	.36	3.7	1.10	.83	1.03	1.10	1.58	430.6	29.44	456
D * 23:24	1023.1	1021.7	1016.8	9.1	10.4	96	1890	16852	2562	66.2	1.10	1.12	30.5	32.0	.31	.35	3.7	1.14	.83	1.03	1.10	1.58	431.6	29.58	457
D * 23:33	1024.1	1023.1	1017.7	8.7	9.5	98	1680	17087	2562	65.8	1.10	1.12	30.5	32.0	.31	.36	3.7	1.16	.83	1.03	1.10	1.58	433.1	29.73	458
D * 23:42	1025.1	1024.2	1018.6	6.2	9.5	95	1890	17069	2546	65.8	1.10	1.12	30.6	32.1	.31	.36	3.7	1.23	.83	1.03	1.10	1.58	434.1	29.80	459
D * 23:50	1026.1	1025.1	1020.2	8.0	10.7	95	2100	17038	2582	65.6	1.10	1.12	30.7	32.3	.31	.37	3.7	1.20	.83	1.03	1.10	1.58	435.1	30.00	460
D * 23:58	1027.2	1026.1	1021.4	6.9	10.2	97	1890	16821	2562	65.4	1.10	1.12	30.8	32.1	.31	.37	3.7	1.22	.83	1.03	1.10	1.58	436.1	30.14	460
D * 0:12	1028.1	1026.7	1022.6	9.2	.2	102	1260	18000	2617	60.5	1.10	1.12	30.9	31.9	.31	.39	3.7	1.16	.83	1.03	1.10	1.58	436.6	30.22	461
D * 0:20	1029.1	1028.1	1023.5	6.7	10.4	95	2100	18434	2678	65.6	1.10	1.12	30.9	32.3	.31	.37	3.7	1.23	.83	1.03	1.10	1.58	438.1	30.35	461
D * 0:25	1030.1	1028.6	1024.1	11.0	11.2	97	2100	18372	2658	65.2	1.10	1.11	31.0	32.6	.31	.36	3.7	1.11	.83	1.03	1.10	1.58	438.6	30.44	461
D * 0:31	1031.1	1030.1	1024.7	13.3	13.0	95	2100	18372	2671	65.2	1.10	1.12	31.0	32.4	.31	.37	3.7	1.00	.83	1.03	1.10	1.58	440.1	30.52	461
D * 0:35	1032.1	1031.1	1025.3	12.8	10.1	96	1890	18155	2678	65.4	1.10	1.11	31.0	32.5	.31	.38	3.7	1.10	.83	1.03	1.10	1.58	441.1	30.60	461
D * 0:41	1033.1	1032.1	1026.3	7.8	10.4	95	2100	18372	2678	65.2	1.10	1.11	31.1	32.7	.31	.36	2.5	1.20	.83	1.03	1.10	1.58	442.1	30.70	462
D * 0:46	1034.1	1033.1	1026.9	12.2	10.5	93	2100	18477	2676	65.0	1.10	1.11	31.1	32.6	.31	.35	3.7	1.12	.83	1.03	1.10	1.58	443.1	30.78	462
D * 0:52	1035.1	1034.2	1027.5	9.7	11.5	94	2100	18031	2678	65.2	1.10	1.11	31.1	32.0	.31	.36	3.7	1.10	.83	1.03	1.10	1.58	444.1	30.87	462
D * 0:59	1036.1	1035.1	1028.1	8.6	10.7	96	1890	18466	2678	64.8	1.10	1.11	31.3	32.6	.31	.37	3.7	1.19	.83	1.03	1.10	1.58	445.1	30.99	462
D * 1:11	1037.1	1035.6	1029.3	8.8	4.5	109	1890	18477	2617	68.3	1.10	1.12	31.3	33.2	.31	.36	3.7	1.21	.83	1.03	1.10	1.58	445.6	31.07	462
D * 1:17	1038.1	1037.2	1030.5	11.7	9.8	104	2100	18600	2635	65.6	1.10	1.12	31.4	32.9	.31	.36	3.7	1.10	.83	1.03	1.10	1.58	447.1	31.17	463
D * 1:21	1039.1	1038.1	1031.1	14.2	10.1	102	2100	18031	2638	65.2	1.10	1.11	31.4	32.9	.31	.37	2.5	1.07	.83	1.03	1.10	1.58	448.1	31.24	462
D * 1:26	1040.1	1039.1	1032.1	10.4	10.0	103	2100	18000	2615	64.6	1.10	1.12	31.4	33.0	.31	.37	3.7	1.16	.83	1.03	1.10	1.58	449.1	31.32	462
D * 1:31	1041.1	1040.1	1033.3	10.9	11.1	105	1890	17876	2635	64.6	1.10	1.11	31.5	33.3	.31	.38	3.7	1.17	.83	1.03	1.10	1.58	450.1	31.41	463
D * 1:36	1042.1	1041.1	1034.2	13.6	11.0	103	2100	18062	2638	64.6	1.10	1.11	31.6	33.1	.31	.37	3.7	1.11	.83	1.03	1.10	1.58	451.1	31.49	463
D * 1:43	1043.1	1042.1	1035.4	9.5	11.2	103	2100	17876	2676	64.6	1.10	1.12	31.7	33.1	.31	.36	3.7	1.19	.83	1.03	1.10	1.59	452.1	31.61	463
D * 1:49	1044.1	1043.1	1036.0	11.0	10.7	104	2100	17907	2638	64.6	1.10	1.12	31.7	33.2	.31	.38	3.7	1.15	.83	1.03	1.10	1.59	453.1	31.70	463
D * 1:56	1045.1	1044.1	1036.9	6.6	10.9	102	2100	18073	2635	64.2	1.10	1.11	31.8	33.2	.31	.37	3.7	1.29	.83	1.03	1.10	1.59	454.1	31.82	464
D * 2: 0	1046.1	1045.2	1037.5	14.1	10.4	105	2100	18031	2638	64.4	1.10	1.11	31.8	33.2	.31	.36	3.7	1.08	.83	1.03	1.10	1.59	455.1	31.88	464
D * 2:16	1047.1	1046.1	1040.3	7.8	9.4	102	1890	18155	2658	65.2	1.10	1.12	31.9	33.2	.31	.37	3.7	1.24	.83	1.03	1.10	1.59	456.1	32.01	464
D * 2:24	1048.2	1047.1	1041.5	7.4	10.1	102	2100	18031	2641	64.4	1.10	1.12	31.9	33.7	.31	.36	2.5	1.22	.83	1.03	1.10	1.59	457.1	32.14	465
D * 2:30	1049.1	1048.1	1042.7	9.6	9.2	100	1890	18031	2641	64.2	1.10	1.12	32.0	33.4	.31	.36	3.7	1.16	.83	1.03	1.10	1.59	458.1	32.24	465
D * 2:34	1050.1	1049.1	1043.3	11.3	9.5	101	2100	18277	2641	64.8	1.10	1.11	32.1	33.9	.31	.36	3.7	1.10	.83	1.03	1.10	1.59	459.1	32.32	465
D * 2:45	1051.1	1050.1	1045.2	5.8	9.9	101	1890	17938	2640	63.8	1.10	1.11	32.2	33.8	.31	.38	3.7	1.27	.83	1.03	1.10	1.59	460.1	32.51	466
D * 2:53	1052.1	1051.2	1046.4	7.5	10.0	101	1890	17814	2641	64.0	1.10	1.11	32.3	33.7	.31	.38	3.7	1.20	.83	1.03	1.10	1.59	461.1	32.64	467
D * 3: 1	1053.1	1052.1	1047.0	9.5	11.3	102	1890	17752	2641	69.5	1.10	1.11	32.4	33.7	.31	.36	3.7	1.17	.83	1.03	1.10	1.59	462.1	32.76	467
D * 3: 7	1054.1	1053.1	1047.9	11.8	9.7	102	2100	17628	2656	71.7	1.10	1.11	32.3	33.8	.31	.36	3.7	1.11	.84	1.03	1.10	1.59	463.1	32.87	468
D * 3:20	1055.2	1054.1	1049.4	11.5	.1	105	1260	16107	2681	73.9	1.10	1.12	32.2	34.2	.31	.38	2.5	1.03	.84	1.03	1.10	1.59	464.1	32.97	468
D * 3:27	1056.1	1055.1	1050.3	6.3	9.6	100	1890	17969	2678	71.7	1.10	1.11	32.3	33.8	.31	.37	2.5	1.23	.84	1.03	1.10	1.59	465.1	33.08	469
D * 3:42	1057.2	1056.1	1051.3	5.7	9.6	102	1890	11824	2118	70.5	1.10	1.11	32.4	33.8	.31	.37	2.5	1.25	.84	1.03	1.10	1.59	466.1	33.25	470
D * 3:52	1058.1	1057.1	1052.2	5.3	9.6	101	1890	11979	2115	71.3	1.10	1.11	32.5	33.8	.31	.37	2.5	1.30	.84	1.03	1.10	1.59	467.1	33.42	471
D * 4: 0	1059.1	1058.2	1053.1	9.2	10.9	95	1890	16852	2602	70.9	1.10	1.11	32.5	34.1	.31	.38	2.5	1.15	.84	1.03	1.10	1.59	468.1	33.56	472
D * 4: 9	1060.1	1058.6	1054.6	6.1	10.1	93	2310	16976	2600	72.1	1.10	1.11	32.5	34.3	.31	.38	3.7	1.20	.84	1.03	1.10	1.59	468.6	33.71	472
D * 4:17	1061.2	1060.1	1055.5	8.1	8.9	102	1890	17100	2610	72.1	1.10	1.11	32.6	34.0	.31	.39	2.5	1.20	.84	1.03	1.10	1.59	470.1	33.83	473
D * 4:20	1062.1	1061.1	1055.8	22.9	9.1	101	2100	17100	2620	72.1	1.10	1.11	32.7	34.1	.31	.39	3.7	.93	.84	1.03	1.10	1.59	471.1	33.88	473
D * 4:23	1063.2	1062.1	1056.1	18.4	9.4	102	2100	17317	2610	72.1	1.10	1.10	32.7	34.3	.31	.37	3.7	.98	.84	1.03	1.10	1.59	472.1	33.93	472
D * 4:32	1064.1	1062.7	1056.4	20.6	-3	108	1470	17721	2580	74.1	1.10	1.11	32.7	34.0	.31	.38	2.5	.91	.84	1.03	1.10	1.59	472.6	33.97	472
D * 4:35	1065.2	1064.1	1056.7	18.6	8.2	103	2100	17721	2638	71.7	1.10	1.11	32.7	33.7	.31	.38	3.7	.98	.84	1.03	1.10	1.59	474.1	34.03	471
D * 4:40	1066.2	1065.1	1057.4	11.5	10.2	103	2100	17752	2638	72.1	1.10	1.11	32.8	34.2	.31	.37	2.5	1.10	.84	1.03	1.10	1.59	475.1	34.10	471

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS : PV = 9 YP = 7 GEL = 4

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT		
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
hr:min	met	met	met	m/hr	ton	rpm	Nm	KPA	l/min	m <sup>3</sup>	sg	degC	ohm	unit	sg	sq	sq	sq	met	DHr	\$/m				
D 4:44	1067.1	1066.1	1058.0	12.4	8.9	104	1890	17566	2635	72.9	1.10	1.11	32.0	34.2	.31	.38	2.5	1.00	.84	1.03	1.10	1.59	476.1	34.18	471
D 4:48	1068.1	1067.1	1058.3	15.5	10.8	102	2100	17752	2617	72.5	1.10	1.11	32.0	34.1	.31	.38	2.5	1.04	.84	1.03	1.10	1.59	477.1	34.24	471
D 4:52	1069.1	1067.7	1058.9	18.2	9.8	103	2100	17907	2638	72.7	1.10	1.11	32.9	33.9	.31	.37	2.5	.99	.84	1.03	1.10	1.59	477.6	34.30	471
D 4:55	1070.2	1069.2	1059.2	19.1	8.8	103	2100	17628	2620	72.9	1.10	1.11	32.9	34.0	.31	.37	2.5	.97	.84	1.03	1.10	1.59	479.1	34.35	470
D 4:58	1071.1	1069.6	1059.5	17.9	9.2	102	2100	17752	2638	72.9	1.10	1.11	32.9	34.2	.31	.37	2.5	.98	.84	1.03	1.10	1.59	479.6	34.40	470
D 5: 2	1072.1	1071.1	1060.1	17.9	9.5	102	2100	17566	2638	72.9	1.10	1.11	32.9	34.3	.31	.38	2.5	.99	.84	1.03	1.10	1.59	481.1	34.47	470
D 5: 5	1073.2	1072.1	1060.4	19.7	10.2	102	2100	17703	2648	70.3	1.10	1.11	32.9	34.3	.31	.37	2.5	.97	.84	1.03	1.10	1.59	482.1	34.51	469
D 5:17	1074.1	1073.2	1062.5	18.6	9.7	98	1890	18931	2711	67.2	1.10	1.11	32.9	34.5	.31	.38	3.7	.98	.84	1.03	1.10	1.59	483.1	34.58	469
D 5:20	1075.1	1073.7	1063.8	19.3	9.8	98	1680	19148	2716	66.0	1.10	1.11	32.9	34.6	.31	.38	2.5	.97	.84	1.03	1.10	1.59	483.6	34.64	469
D 5:24	1076.1	1075.2	1064.7	14.3	8.7	98	1680	19498	2716	65.6	1.10	1.11	33.0	34.3	.31	.40	2.5	1.03	.84	1.03	1.10	1.59	485.1	34.70	469
D 5:31	1077.2	1075.6	1065.9	9.7	9.6	94	1890	13686	2182	67.0	1.10	1.11	33.1	34.0	.31	.38	2.5	1.06	.84	1.03	1.10	1.59	485.6	34.78	469
D 5:36	1078.1	1077.1	1066.5	13.4	9.9	93	2100	13593	2198	66.8	1.10	1.12	33.1	34.8	.31	.37	2.5	1.03	.84	1.03	1.10	1.59	487.1	34.86	469
D 5:39	1079.2	1078.1	1067.4	20.9	7.4	93	2100	13438	2178	66.6	1.10	1.11	33.1	34.7	.30	.38	3.7	.93	.84	1.03	1.10	1.59	488.1	34.92	468
D 5:42	1080.2	1079.1	1068.3	17.6	8.8	95	1890	13314	2170	66.6	1.10	1.11	33.0	35.0	.31	.38	2.5	.97	.84	1.03	1.10	1.59	489.1	34.97	468
D 5:45	1081.1	1080.2	1068.6	23.3	9.2	93	1890	13376	2190	66.8	1.10	1.11	33.1	35.0	.31	.38	2.5	.98	.84	1.03	1.10	1.59	490.1	35.01	468



ON-LINE TDC  
GEOSERVICES

BIT REPORT

\*\*\*\*\*  
# 5/ 6/82

HAMMERHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
#BIT HEADING :DIT#12 RUN#25

#BIT TYPE :H/T00T

#BIT IDENTITY :HTC J1

\*\*\*\*\*  
#BIT SIZE : 12.25 INCH

#BIT COST : 7500. \$

RIG COST/HR: 5833.

\*\*\*\*\*  
#NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY

#DEPTH IN : 591.20 METERS

3/ 6/82

#DEPTH OUT : 1081.89 METERS

5/ 6/82

#METRAGE : 490.62 METERS

#TOTAL REVOLUTIONS : 204

\*\*\*\*\*  
#DRILLING TIME: 35: 4 HR

AVERAGE ROP: 13.99 M/HR

#TIME IN HOLE : 45:35 HR

AVERAGE ROP: 10.76 M/HR

#TRIP TIME : 3: 0 HR

\*\*\*\*\*  
#DRILLING COST STANDARD : 593.0 \$/MET

#DRILLING COST ON BOTTOM : 467.9 \$/MET

#DRILLING COST MINIMUM : 402.1 \$/MET

\*\*\*\*\*  
# AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

#WEIGHT ON BIT : 8.20 TONS

NOZZLES SPEED : 171.11 M/S

#ROTATION : 98.19 RPM

PRESSURE DROP : 17821 KPA

#FLOW RATE :2573.97 L/MIN

HYDRAULIC POWER:1025.39 H.P

#STAND PIPE PRESSURE: 16756 KPA

\*\*\*\*\*

ON-LINE TDC  
GEOSERVICES

HYDRAULIC REPORT

\* 5/ 6/82 TIME 5:55

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1081.89 METERS

\* FLOW RATE 2580 L/MN

POWER LAW

\* MUD DATA WEIGHT 1.10 SG  
PV 9 CPS  
YP 7.00 LB/FT2  
GEL 4.80 LB/100 FT2  
N .8074  
K .0781 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 127.79 M3  
WITHOUT PIPES 133.51 M3  
ANNULAR 118.23 M3  
INSIDE PIPES 9.56 M3

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES KPA	H.P	TYPE	CRITICAL	MUD FLOW L/MN	CUTTINGS VELOCITY M/MN
* SURF. EQPT *					476	27				
* DR. STRING *	.00	993.60	4.28	5.00	1865	108				
* DR. STRING *	993.60	1082.40	2.81	7.75	1244	72				
* BIT *					17905	1033	M/S		171.5	
* ANNULUS *	1081.89	993.09		7.75	12.25	9	1	TU	1236.8	56.6
* ANNULUS *	993.09	554.00		5.00	12.25	14	1	TU	1244.5	40.7
* ANNULUS *	554.00	143.00		5.00	18.73	1	0	TU	2183.9	15.6
* ANNULUS *	143.00	.00		5.00	16.75	1	0	TU	1834.0	19.9
* TOTAL *						21514	1241			

\* ANNULAR PRESSURE LOSSES 24 KPA

\* EQUIV. CIRCULATING DENSITY 1.10 SG

\* MAX DEPTH 3232.09

\* MUD LAG TIMES S -> B 3.71 MN

\* B -> S 45.83 MN

\* CUTTINGS DATA SIZE .20 CM

\* DENSITY 2.40 SG

\* LAG TIME 55.50 MN

\* MAX SLIP VELOCITY 3.85 M/MN

\* BIT DATA SIZE 12.25 INCH

\* NOZZLES 13 13 13 /32NOS

\* NOZZLES EFFICIENCY 95 %

\* BIT P. LOSSES 17905 KPA

\* H.H.P RATIO 83.22 %

\* BIT H.H.P 8.761

\* BIT VELOCITY 171.51 M/S

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER: 12.25 inch NOZZ 13/13/13 MUD RHEOLOGICAL PARAMETERS: PV = 9 YP = 7 GEL = 4 \*

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS				OVERPRESSURE SURVEY					ACCUMULATED ON BIT					
		VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
		met	met	met	m/hr	ton	rpa	psi	l/min	m3	sq	IN	OUT	IN	OUT	ohm	unit	sq	sq	sq	met	DHr	\$/m		
D 6:1	1083.0	1080.7	1070.8	15.4	.0	.000	3600	2019	69.3	1.10	1.12	33.1	34.4	.31	.36	2.5	.98	.84	1.03	1.10	1.59	490.6	35.07	468	
T 6:21	1083.0	1080.7	1075.9			.000	1955	332	71.7	1.10	1.12	32.9	35.7	.31	.36	2.5									
D 6:28	1083.1	1082.1	1077.2	48.9	7.5	94	2100	17379	2637	69.7	1.10	1.11	33.2	35.4	.31	.38	2.5	.60	.84	1.03	1.10	1.59	492.1	35.09	467
D 6:32	1084.1	1083.1	1078.4	15.3	8.7	93	1890	16603	2655	68.5	1.10	1.11	33.2	35.1	.31	.38	2.5	.98	.84	1.03	1.10	1.60	493.1	35.16	467
D 6:37	1085.1	1084.1	1080.2	13.4	8.1	96	1890	16790	2673	67.6	1.10	1.11	33.3	35.2	.31	.38	2.5	1.01	.84	1.03	1.10	1.60	494.1	35.24	467
D 6:41	1086.1	1085.1	1082.7	14.7	8.3	96	1890	17597	2711	66.6	1.10	1.11	33.4	35.2	.31	.37	2.5	.99	.84	1.03	1.10	1.60	495.1	35.31	467
D 6:46	1087.1	1086.1	1082.7	12.2	6.5	97	1890	16510	2713	67.4	1.10	1.11	33.4	35.3	.31	.37	2.5	1.03	.84	1.03	1.10	1.60	496.1	35.30	466
D 6:50	1088.1	1087.1	1082.7	13.5	8.1	96	1890	16803	2675	67.2	1.10	1.11	33.5	34.8	.31	.38	2.5	1.01	.84	1.03	1.10	1.60	497.1	35.46	466
D 6:54	1089.1	1088.2	1083.0	14.3	8.9	97	1890	16510	2650	67.2	1.10	1.10	33.5	34.7	.31	.37	2.5	.98	.84	1.03	1.10	1.60	498.1	35.52	466
D 6:58	1090.1	1089.7	1083.0	17.2	8.2	96	1890	16803	2686	67.4	1.10	1.10	33.5	34.5	.31	.38	3.7	.95	.84	1.03	1.10	1.60	498.6	35.59	466
D 7:3	1091.1	1090.2	1083.0	12.7	8.1	96	2310	16728	2693	67.6	1.10	1.11	33.5	34.3	.31	.37	2.5	1.04	.84	1.03	1.10	1.60	500.1	35.67	466
D 7:7	1092.1	1091.1	1083.0	11.1	8.3	97	1890	16893	2675	67.4	1.10	1.11	33.6	34.3	.31	.37	2.5	1.05	.84	1.03	1.10	1.60	501.1	35.74	466
D 7:21	1093.1	1092.1	1083.0	13.3	8.5	98	1890	12445	2156	69.5	1.10	1.11	33.5	33.7	.31	.37	2.5	1.02	.84	1.03	1.10	1.60	502.1	35.83	466
D 7:26	1094.1	1093.1	1083.6	10.8	7.3	102	1890	17441	2600	69.1	1.10	1.11	33.4	34.2	.31	.37	2.5	.99	.84	1.03	1.10	1.60	503.1	35.91	466
D 7:30	1095.2	1094.1	1084.5	15.8	8.9	109	1890	17162	2618	67.6	1.10	1.11	33.4	34.3	.31	.37	2.5	.98	.84	1.03	1.10	1.60	504.1	35.97	466
D 7:34	1096.1	1095.1	1085.4	19.9	7.8	101	1890	16355	2618	67.9	1.10	1.12	33.2	34.5	.31	.37	3.7	.93	.84	1.03	1.10	1.60	505.1	36.03	466
D 7:37	1097.1	1096.2	1086.0	15.9	9.8	102	2100	16440	2648	67.6	1.10	1.11	33.3	34.4	.31	.36	3.7	.98	.84	1.03	1.10	1.60	506.1	36.09	465
D 7:41	1098.1	1096.7	1087.2	13.8	8.1	102	1890	16876	2650	67.7	1.10	1.11	33.2	34.7	.32	.36	3.7	1.02	.84	1.03	1.10	1.60	506.6	36.16	465
D 7:45	1099.1	1097.7	1087.8	15.6	8.7	100	1890	15921	2620	67.4	1.10	1.11	33.1	34.7	.32	.36	3.7	1.00	.84	1.03	1.10	1.60	507.6	36.23	465
D 7:49	1100.1	1099.1	1088.7	18.7	7.9	102	1890	16572	2638	67.0	1.10	1.12	33.1	34.7	.32	.36	3.7	.95	.84	1.03	1.10	1.60	509.1	36.29	465
D 8:0	1101.1	1100.2	1090.9	9.3	6.9	102	1890	16541	2600	68.1	1.10	1.12	33.2	34.5	.31	.36	2.5	1.10	.84	1.03	1.10	1.60	510.1	36.37	465
D 8:4	1102.1	1101.2	1091.5	14.7	5.7	106	1890	16541	2600	64.8	1.10	1.12	33.2	34.6	.31	.36	2.5	.97	.84	1.03	1.10	1.60	511.1	36.43	465
D 8:8	1103.1	1102.1	1092.1	16.8	8.2	105	2100	17131	2580	64.8	1.10	1.12	33.2	34.7	.30	.36	3.7	.99	.84	1.03	1.10	1.60	512.1	36.49	464
D 8:11	1104.1	1103.2	1092.7	20.6	8.6	103	1890	17583	2600	65.8	1.10	1.11	33.2	34.7	.30	.36	3.7	.92	.84	1.03	1.10	1.60	513.1	36.54	464
D 8:15	1105.2	1104.1	1093.3	17.2	8.0	101	1890	17876	2572	65.2	1.10	1.12	33.2	35.0	.30	.36	2.5	.96	.84	1.03	1.10	1.60	514.1	36.60	464
D 8:18	1106.1	1105.2	1094.2	18.4	8.7	101	2100	18093	2562	65.0	1.10	1.11	33.2	34.8	.29	.36	3.7	.94	.84	1.03	1.10	1.60	515.1	36.66	464
D 8:22	1107.1	1106.1	1095.1	14.8	8.5	103	2100	18310	2524	64.6	1.10	1.12	33.3	34.9	.29	.35	2.5	.97	.84	1.03	1.10	1.60	516.1	36.72	463
D 8:25	1108.1	1106.6	1096.4	18.5	6.3	102	1890	18603	2544	64.2	1.10	1.11	33.2	35.1	.29	.37	2.5	.94	.84	1.03	1.10	1.60	516.6	36.78	463
D 8:37	1109.1	1107.7	1098.5	13.8	6.8	99	1890	19210	2500	66.2	1.10	1.12	33.3	34.8	.29	.36	2.5	.98	.84	1.03	1.10	1.60	517.6	36.80	463
D 8:42	1110.1	1109.1	1099.7	14.6	8.2	99	1890	19272	2560	64.2	1.10	1.11	33.4	35.0	.29	.35	2.5	.95	.84	1.03	1.10	1.60	519.1	36.95	463
D 8:46	1111.1	1110.1	1100.3	13.2	7.8	98	1890	19210	2544	64.8	1.10	1.11	33.4	35.0	.29	.35	2.5	1.00	.84	1.03	1.10	1.60	520.1	37.02	463
D 8:48	1113.5	1110.6	1100.3	15.2	7.6	101	1890	19210	2500	64.2	1.10	1.11	33.3	35.0	.29	.35	2.5	.97	.84	1.03	1.10	1.60	520.6	37.05	463
D 8:51	1114.2	1113.1	1100.6	14.4	9.2	100	1890	19179	2562	64.2	1.10	1.11	33.4	35.2	.28	.36	2.5	1.00	.84	1.03	1.10	1.60	523.1	37.11	461
D 8:56	1115.2	1114.1	1101.9	11.7	9.2	99	1890	19241	2562	64.4	1.10	1.12	33.4	35.4	.29	.35	3.7	1.07	.84	1.03	1.10	1.60	524.1	37.19	462
D 9:3	1116.1	1115.1	1104.4	8.7	9.1	101	1890	19241	2574	64.4	1.10	1.11	33.5	35.3	.29	.35	3.7	1.15	.84	1.03	1.10	1.60	525.1	37.31	462
D 9:11	1117.2	1116.1	1106.4	9.6	10.2	100	1890	19241	2579	64.6	1.10	1.12	33.5	35.8	.28	.35	2.5	1.15	.84	1.03	1.10	1.60	526.1	37.43	462
D 9:16	1118.1	1117.2	1107.6	10.3	10.2	101	1890	19210	2562	65.0	1.10	1.11	33.7	35.7	.28	.34	3.7	1.13	.84	1.03	1.10	1.60	527.1	37.52	463
D 9:27	1119.2	1117.6	1108.6	10.5	-1	119	1470	15766	2347	67.7	1.10	1.12	33.8	35.6	.29	.35	2.5	1.11	.84	1.03	1.10	1.60	527.6	37.60	463
D 9:33	1120.1	1118.6	1109.8	8.5	7.7	102	1890	16728	2420	67.4	1.10	1.12	33.8	35.6	.29	.35	2.5	1.13	.84	1.03	1.10	1.60	528.6	37.70	463
D 9:38	1121.1	1120.1	1111.8	10.7	7.5	104	1890	16324	2420	67.6	1.10	1.12	33.9	35.8	.29	.35	2.5	1.07	.84	1.03	1.10	1.60	530.1	37.78	463
D 9:44	1122.1	1121.1	1114.8	10.4	8.7	101	1890	16076	2415	67.4	1.10	1.12	34.0	35.9	.29	.35	3.7	1.06	.84	1.03	1.10	1.60	531.1	37.87	463
D 9:50	1123.1	1122.1	1115.3	8.4	7.4	104	1890	15952	2433	66.8	1.10	1.12	34.1	35.9	.29	.34	2.5	1.11	.84	1.03	1.10	1.60	532.1	37.98	463
D 9:55	1124.1	1123.1	1115.6	12.8	9.3	101	2100	15952	2433	66.4	1.10	1.12	34.1	35.6	.29	.35	3.7	1.03	.84	1.03	1.10	1.60	533.1	38.05	463
D 9:58	1125.1	1124.2	1116.2	15.6	7.8	103	1890	16231	2415	66.8	1.10	1.11	34.1	35.7	.29	.35	2.5	.96	.84	1.03	1.10	1.60	534.1	38.11	463
D 10:2	1126.1	1125.2	1116.5	15.3	9.2	103	1890	16355	2433	65.8	1.10	1.11	34.2	36.0	.29	.35	3.7	1.00	.84	1.03	1.10	1.61	535.1	38.17	463
D 10:5	1127.1	1126.2	1117.1	22.7	9.8	101	2100	16572	2397	65.6	1.10	1.12	34.2	35.9	.29	.35	3.7	.91	.84	1.03	1.10	1.61	536.1	38.22	463
D 10:8	1128.2	1127.1	1117.7	16.8	8.7	102	1890	16666	2433	65.6	1.10	1.12	34.2	35.9	.29	.35	2.5	.99	.84	1.03	1.10	1.61	537.1	38.27	462
D 10:17	1129.1	1127.7	1110.6	21.1	9.8	102	2310	16572	2453	68.7	1.10	1.11	34.3	35.7	.29	.35	3.7	.95	.84	1.03	1.10	1.61	537.6	38.31	462
D 10:21	1130.1	1129.2	1118.9	12.2	6.9	112	1890	16187	2415	67.7	1.10	1.12	34.2	35.8	.29	.36	2.5	1.03	.84	1.03	1.10	1.61	539.1	38.39	462

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 5/ 6/82

\* BIT#12 RUN#25 HTC J1 BIT DIAMETER : 12.25 inch HOZZ 13/13/13

MUD RHEOLOGICAL PARAMETERS : PV = 9 YP = 7 GEL = 4 \*

TIME	DEPTHIS			DRILLING PARAMETERS				MUD PARAMETERS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT								
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST		
hr:min	net	net	net	m/hr	ton	rpm	Nm	KPA	l/min	m <sup>3</sup>	sg	degC	ohm	unit	sg	sg	sg	net	Dhr					
D * 10:25	1131.1	1130.2	1119.2	19.5	9.0	111	2100	16945	2453	67.9	1.10	1.12	34.3	35.5	.29	.35	1.2	.95	.84	1.03	1.10	1.61	540.1 38.45	462
D * 10:29	1132.2	1131.2	1119.8	16.2	8.3	110	2100	16683	2453	67.6	1.10	1.12	34.3	35.8	.29	.35	2.5	1.00	.84	1.03	1.10	1.61	541.2 38.51	461
D * 10:32	1133.2	1132.1	1120.8	17.0	9.3	108	2100	16510	2488	67.9	1.10	1.12	34.4	35.6	.30	.36	2.5	1.00	.84	1.03	1.10	1.61	542.1 38.56	461
D * 10:35	1134.1	1133.1	1121.4	17.2	9.4	109	1890	16666	2471	67.9	1.10	1.11	34.4	35.7	.30	.36	2.5	1.00	.84	1.03	1.10	1.61	543.1 38.61	461
D * 10:38	1135.1	1133.6	1122.0	16.1	10.5	110	2100	16728	2453	68.1	1.10	1.12	34.4	35.7	.30	.35	2.5	1.02	.84	1.03	1.10	1.61	543.6 38.67	461
D * 10:42	1136.1	1135.2	1122.6	15.8	9.4	110	1890	16262	2471	68.1	1.10	1.12	34.4	35.7	.30	.36	3.7	1.04	.84	1.03	1.10	1.61	545.1 38.72	460
D * 10:45	1137.1	1136.1	1123.2	16.2	9.5	110	1890	16231	2480	68.1	1.10	1.12	34.4	35.8	.30	.36	3.7	1.04	.84	1.03	1.10	1.61	546.1 38.78	460
D * 10:58	1138.1	1137.2	1125.3	22.2	1.1	111	1680	17255	2506	70.5	1.10	1.11	34.4	35.9	.30	.36	2.5	.89	.84	1.03	1.10	1.61	547.1 38.83	460
D * 11: 1	1139.1	1137.6	1126.2	12.8	9.4	108	2100	17286	2561	72.1	1.10	1.11	34.4	36.3	.30	.37	2.5	1.06	.84	1.03	1.10	1.61	547.6 38.89	460
D * 11: 5	1140.1	1139.2	1127.5	20.8	8.9	110	2100	17162	2541	74.9	1.10	1.11	34.3	36.8	.30	.35	2.5	.96	.84	1.03	1.10	1.61	549.1 38.95	459
D * 11: 8	1141.1	1139.7	1128.4	18.4	9.1	108	1890	17193	2541	75.3	1.10	1.11	34.4	36.2	.30	.35	2.5	.98	.84	1.03	1.10	1.61	549.6 39.00	459
D * 11:12	1142.1	1141.1	1129.0	18.0	8.4	109	2100	16479	2559	74.9	1.10	1.11	34.4	36.1	.30	.35	2.5	.98	.84	1.03	1.10	1.61	551.1 39.07	459
D * 11:15	1143.1	1142.2	1129.9	16.6	9.2	111	1890	16572	2544	74.9	1.10	1.11	34.4	36.1	.30	.35	2.5	1.02	.84	1.03	1.10	1.61	552.1 39.12	459
D * 11:19	1144.1	1142.7	1130.8	16.2	8.9	108	2100	16448	2554	75.1	1.10	1.11	34.5	36.2	.30	.36	2.5	1.01	.84	1.03	1.10	1.61	552.6 39.19	459
D * 11:23	1145.1	1144.1	1132.3	10.7	9.5	108	1890	16448	2562	75.7	1.13	1.12	34.5	36.4	.30	.36	2.5	1.10	.84	1.03	1.13	1.61	554.1 39.25	458
D * 11:27	1146.1	1145.1	1133.6	16.2	9.2	108	2100	16541	2546	75.9	1.13	1.11	34.6	36.3	.30	.36	2.5	1.00	.84	1.03	1.13	1.61	555.1 39.32	458
D * 11:38	1147.1	1146.2	1135.7	15.8	9.4	101	2100	16666	2524	76.9	1.13	1.11	34.8	36.5	.30	.35	2.5	.95	.84	1.03	1.13	1.61	556.1 39.39	458
D * 11:43	1148.1	1147.1	1137.2	11.9	8.2	105	1680	16510	2544	75.3	1.13	1.11	34.8	36.4	.30	.36	2.5	1.00	.84	1.03	1.13	1.61	557.1 39.40	458
D * 11:49	1149.2	1148.1	1137.8	12.0	8.2	103	1890	16417	2524	75.3	1.13	1.11	34.8	36.3	.30	.36	2.5	1.00	.84	1.03	1.13	1.61	558.1 39.56	458
D * 11:55	1150.2	1149.2	1139.8	9.4	8.4	105	1890	15059	2526	75.3	1.13	1.11	34.9	36.4	.30	.36	2.5	1.06	.84	1.03	1.13	1.61	559.2 39.67	459
D * 12: 1	1151.1	1149.6	1140.6	10.7	8.9	103	1890	16876	2544	75.3	1.13	1.11	34.9	36.5	.30	.37	2.5	1.04	.84	1.03	1.13	1.61	559.6 39.76	459
D * 12: 7	1152.1	1150.6	1142.7	10.3	7.1	106	1890	12383	2544	73.9	1.13	1.11	34.9	36.6	.30	.36	2.5	1.07	.84	1.03	1.13	1.61	560.6 39.87	459
D * 12:18	1153.1	1152.2	1144.2	9.4	7.6	98	2100	18024	1873	80.5	1.13	1.12	34.8	35.3	.30	.36	2.5	1.02	.84	1.03	1.13	1.61	562.1 39.97	459
D * 12:23	1154.1	1153.1	1145.1	10.1	7.1	100	1890	9087	1891	76.1	1.13	1.11	34.9	35.7	.30	.38	2.5	1.04	.84	1.03	1.13	1.61	563.1 40.05	459
D * 12:29	1155.1	1153.7	1146.4	12.9	8.2	102	1890	9559	1891	73.7	1.13	1.11	35.0	35.7	.30	.37	2.5	.99	.84	1.03	1.13	1.61	563.6 40.16	459
D * 12:42	1156.3	1154.7	1147.3	11.2	-7	77	1470	10303	2172	75.5	1.13	1.12	34.8	36.2	.30	.36	2.5	.92	.84	1.03	1.13	1.61	565.3 40.25	460
D * 12:44	1157.1	1156.1	1147.6	5.6	8.6	97	2100	14003	2450	74.1	1.13	1.11	34.7	36.3	.30	.37	2.5	1.22	.84	1.03	1.13	1.61	566.1 40.28	459
D * 12:51	1158.1	1156.6	1148.8	9.6	8.8	103	1890	15393	2471	73.5	1.13	1.11	34.8	36.3	.30	.37	2.5	1.07	.84	1.03	1.13	1.61	566.6 40.39	459
D * 12:56	1159.2	1158.1	1149.7	13.4	8.2	106	1890	15059	2450	73.7	1.13	1.11	34.7	36.8	.30	.37	2.5	.99	.84	1.03	1.13	1.61	568.1 40.47	460
D * 13: 1	1160.1	1159.1	1150.6	11.6	7.9	100	1890	15703	2468	73.9	1.13	1.11	34.7	36.4	.30	.37	2.5	1.02	.84	1.03	1.13	1.61	569.1 40.57	460
D * 13: 7	1161.1	1160.2	1151.5	11.8	8.8	102	1890	15393	2471	74.1	1.13	1.12	34.8	36.2	.30	.37	3.7	1.02	.84	1.03	1.13	1.61	570.1 40.66	460
D * 13:13	1162.1	1160.7	1152.1	10.3	8.5	101	1890	15269	2465	74.3	1.13	1.12	34.9	35.8	.30	.37	3.7	1.04	.84	1.03	1.13	1.61	570.6 40.76	460
D * 13:19	1163.1	1162.1	1153.4	10.3	8.3	100	1890	16572	2541	74.5	1.13	1.12	34.9	35.9	.30	.36	2.5	1.04	.84	1.03	1.13	1.61	572.1 40.86	460
D * 13:26	1164.1	1163.1	1154.6	9.4	7.6	98	1680	16440	2526	73.9	1.13	1.12	35.0	36.3	.31	.36	2.5	1.07	.84	1.03	1.13	1.61	573.1 40.97	461
D * 13:33	1165.1	1164.1	1155.8	9.1	9.3	97	1890	16231	2541	73.7	1.13	1.11	34.9	36.4	.31	.37	3.7	1.07	.84	1.03	1.13	1.61	574.1 41.09	461
D * 13:46	1166.2	1165.1	1157.9	10.3	7.4	102	1680	16976	2525	73.9	1.13	1.10	34.9	36.8	.30	.37	3.7	1.02	.84	1.03	1.13	1.61	575.1 41.19	461
D * 13:51	1167.2	1166.1	1159.2	11.9	8.8	101	1890	16759	2563	73.9	1.13	1.11	34.9	36.8	.30	.38	2.5	1.02	.84	1.03	1.13	1.61	576.1 41.28	461
D * 13:56	1168.2	1167.2	1159.8	12.9	8.8	101	1890	16852	2574	74.1	1.13	1.10	35.0	36.7	.30	.37	3.7	1.00	.84	1.03	1.13	1.62	577.2 41.35	461
D * 14: 1	1169.1	1168.1	1160.7	12.5	8.6	102	1890	16821	2563	74.1	1.13	1.11	35.0	37.0	.30	.37	3.7	1.02	.84	1.03	1.13	1.62	578.1 41.44	461
D * 14: 7	1170.1	1169.1	1161.6	10.8	8.8	102	1890	16803	2551	74.1	1.13	1.10	35.1	37.2	.30	.37	2.5	1.05	.84	1.03	1.13	1.62	579.1 41.54	462
D * 14:12	1171.1	1170.1	1162.5	15.5	8.3	101	1890	16876	2561	74.1	1.13	1.11	35.2	37.8	.30	.38	2.5	.96	.84	1.03	1.13	1.62	580.1 41.61	462
D * 14:17	1172.1	1171.2	1163.4	10.8	8.5	101	1890	16914	2563	73.9	1.13	1.11	35.3	37.0	.30	.37	2.5	1.04	.84	1.03	1.13	1.62	581.1 41.70	462
D * 14:22	1173.1	1172.1	1164.8	10.6	7.7	102	1890	16799	2546	73.9	1.13	1.11	35.4	37.1	.31	.38	3.7	1.04	.84	1.03	1.13	1.62	582.1 41.80	462
D * 14:29	1174.1	1173.1	1165.3	9.9	9.8	100	1890	16759	2553	73.9	1.13	1.11	35.4	37.8	.30	.37	3.7	1.05	.84	1.03	1.13	1.62	583.1 41.90	462
D * 14:40	1175.1	1173.7	1166.2	9.2	8.8	98	1890	16759	2524	73.7	1.13	1.11	35.4	37.5	.30	.37	2.5	1.07	.84	1.03	1.13	1.62	583.6 41.99	462
D * 14:45	1176.1	1175.2	1166.8	19.3	7.7	98	1890	16572	2539	73.9	1.13	1.11	35.5	37.9	.31	.37	3.7	.89	.84	1.03	1.13	1.62	585.1 42.06	462
D * 14:49	1177.1	1176.2	1168.8	13.7	9.2	97	2100	16634	2524	74.1	1.13	1.11	35.5	38.1	.31	.38	3.7	.97	.84	1.03	1.13	1.62	586.1 42.13	462
D * 14:53	1178.1	1177.2	1168.6	12.8	6.7	100	1890	16572	2541	73.9	1.13	1.11	35.7	38.1	.31	.37	3.7	.99	.84	1.03	1.13	1.62	587.1 42.21	462
D * 14:58	1179.1	1177.7	1169.5	12.8	8.1	98	2100	16288	2541	73.7	1.13	1.11	35.7	37.9	.31	.38	3.7	.99	.84	1.03	1.13	1.62	587.6 42.20	462



ON-LINE TDC  
GEO SERVICES

BIT REPORT

\*\*\*\*\*  
\* 5/ 6/82 HAMMERHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
\*BIT HEADING :BIT#12 RUN#25  
\*BIT TYPE :H/TOOT \*  
\*BIT IDENTITY :HTC J1 \*  
\*\*\*\*\*  
\*BIT SIZE : 12.25 INCH \*  
\*BIT COST : 7500. \$ RIG COST/HR: 5033. \*  
\*\*\*\*\*  
\*NOZZLES : 13 13 13 /32NDS @ 95 % EFFICIENCY \*  
\*\*\*\*\*  
\*DEPTH IN : 591.42 METERS 3/ 6/82 \*  
\*DEPTH OUT : 1200.00 METERS 5/ 6/82 \*  
\*METRAGE : 608.58 METERS \*  
\*TOTAL REVOLUTIONS : 258 \*  
\*\*\*\*\*  
\*DRILLING TIME: 43:52 HR AVERAGE ROP: 13.07 M/HR \*  
\*TIME IN HOLE : 57: 5 HR AVERAGE ROP: 10.66 M/HR \*  
\*TRIP TIME : 3: 0 HR \*  
\*\*\*\*\*  
\*DRILLING COST STANDARD : 588.2 \$/MET \*  
\*DRILLING COST ON BOTTOM : 461.5 \$/MET \*  
\*DRILLING COST MINIMUM : 402.1 \$/MET \*  
\*\*\*\*\*  
\* AVERAGE OVER THE RUN AVERAGE HYDRAULICS \*  
\*WEIGHT ON BIT : 8.23 TONS NOZZLES SPEED : 170.44 M/S \*  
\*ROTATION : 98.79 RPM PRESSURE DROP : 18163 KPA \*  
\*FLOW RATE :2563.82 L/MN HYDRAULIC POWER:1040.94 H.P \*  
\*STAND PIPE PRESSURE: 16671 KPA \*  
\*\*\*\*\*

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ON-LINE TDC  
GCSERVICES

HYDRAULIC REPORT

5/ 6/82 TIME 23:50

HAMMERHEAD #1

DEPTH OF EXECUTION 1200.00 METERS  
FLOW RATE 2526 L/MN POWER LAW

MUD DATA WEIGHT 1.12 SG  
PV 10 CPS  
YP 12.00 LB/FT<sup>2</sup>  
GEL 5.00 LB/100 FT<sup>2</sup>  
N .6674  
K .2647 LB/100 FT<sup>2</sup>

HOLES VOLUMES WITH PIPES 136.38 M<sup>3</sup>  
WITHOUT PIPES 142.49 M<sup>3</sup>  
ANNULAR 125.71 M<sup>3</sup>  
INSIDE PIPES 10.67 M<sup>3</sup>

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P. LOSSES KPA	H.P.	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
METERS	METERS	INCH	INCH	INCH	KPA				L/MN	M/MN
*SURF. EGPT*					475	27				
*DR. STRING*	.00	1113.20	4.28	5.00	2084	118				
*DR. STRING*	1113.20	1202.00	2.01	7.75	1241	70				
*BIT					17475	987	M/S			167.9
*ANNULUS	1200.00	1111.20		7.75	12.25	9	TU		2097.1	55.4
*ANNULUS	1111.20	554.00		5.00	12.25	17	TU		2294.9	39.9
*ANNULUS	554.00	143.00		5.00	18.73	14	LA		4341.5	15.3
*ANNULUS	143.00	.00		5.00	16.75	6	LA		3682.2	19.5
*TOTAL*					21321	1204				

ANNULAR PRESSURE LOSSES 46 KPA

EQUIV. CIRCULATING DENSITY 1.12 SG  
MAX DEPTH 3569.53

MUD LAG TIMES S -> B 4.22 MN  
B -> S 49.77 MN

CUTTINGS DATA SIZE .20 CM  
DENSITY 2.40 SG  
LAG TIME 56.86 MN  
MAX SLIP VELOCITY 3.07 M/MN

BIT DATA SIZE 12.25 INCH  
NOZZLES 13 13 13 /32NDS  
NOZZLES EFFICIENCY 95 %  
BIT P. LOSSES 17475 KPA  
H.H.P RATIO 81.96 %  
BIT H.H.P 8.372  
BIT VELOCITY 167.92 M/S



GEOSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\*\*\*\*\*  
\* 8/ 6/82  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*

\* BIT#13 RUN#28 SEQ NDR: 0

\* STARTING DEPTH 1200.00 METERS

\* BIT DATA SIZE 0.50  
\* TOOTH RECD S11  
\* NOZZLES 12 12 12 @ 95 % EFFICIENCY

* DRILL STRING*	TYPE	* NBR *	LENGTH *	ID	OD	* NOMINAL LINEAR *
* SECTION *		* METERS *	INCHES			* WEIGHT (KG/M) *
* 1	* DRILL PIPE	* 110 *	9.20 *	4.28	5.80 *	29.00 *
* 2	* HEAVY WGT DP	* 1 *	55.70 *	3.00	5.00 *	73.00 *
* 3	* DRILL COLLAR	* 1 *	115.00 *	2.61	6.50 *	136.40 *

* HOLE	* ID *	DEPTH (METERS)
	* INCHES *	TOP BOTTOM
* RISER	* 16.75 *	.00 143.00
* CASING	* 6.69 *	143.00 1184.00
* OPEN HOLE 1	* 12.25 *	1184.00 1200.00

* COST DATA	BIT COST	5000 \$	RIG COST	5833 \$/HR
* TRIP TIME	3.00 HRS			

* WEIGHTS	HOOK LOAD OFF BOTTOM	88.1 TONS
* STRING WEIGHT IN AIR	49.1 TONS	

* VOLUMES	ANNULUS	45.2 M3	IN PIPES	10.3 M3
-----------	---------	---------	----------	---------

\* DEVIATION .0 DEG .000 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MH : 13 KPA

\* BIT WEAR TYPE EXPONENT .5  
\* EXPECTED: RUN LENGTH 300 METERS TEETH WEAR 4 /8TH

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\*\*\*\*\*  
 # GEOSERVICES  
 # ON-LINE TDC  
 # DATE : 9/ 6/82  
 #

HAMMERHEAD #1

# BIT#13 RUN#20 REED S11 BIT DIAMETER : 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS : PV = 10 YP = 12 GEL = 5 #

#	TIME	#	DEPTHS			DRILLING PARAMETERS							MUD PARAMETERS		GAS		OVERPRESSURE SURVEY			ACCUMULATED ON BIT							
			MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
#	#	#	met	met	met	m/hr	ton	rpm	Nm	KPa	L/m	m3	sg	degC	ohm	unit	sg	sg	sg	net	DHr	\$/m					
T	0:42	*	1200.0	1198.6	1177.1	*	---	96	1470	15870	2170	* 66.8	* 1.40	1.22	31.1	34.0	.31	.31	* 3.7	*	*	*	*				
D	0:57	*	1201.3	1198.6	1186.3	* 140.	* .0	93	1680	16759	2213	* 65.6	* 2.10	1.22	31.7	35.2	.30	.36	* 3.7	* .42	* .84	* 1.03	1.42	1.62	* .0	.00	460
T	1:17	*	1201.7	1200.1	1186.6	*	---	74	1680	20277	2345	* 65.2	* 1.26	1.22	32.3	35.7	.31	.36	* 2.5	*	*	*	*				
D	1:28	*	1202.1	1200.6	1201.2	* 2.5	* 16.5	61	1680	17379	2329	* 64.8	* 1.21	1.22	32.0	35.5	.32	.35	* 2.5	* 1.60	* .84	* 1.03	1.21	1.62	* 2.0	.34	11856
T	1:48	*	1202.9	1201.1	1201.8	*	---	82	1680	16510	2311	* 65.4	* 1.13	1.22	33.5	36.6	.32	.36	* 2.5	*	*	*	*				
D	1:52	*	1203.1	1201.6	1202.4	* 1.7	* 17.5	83	1470	16852	2332	* 65.8	* 1.13	1.22	33.7	36.5	.32	.37	* 2.5	* 2.05	* .84	* 1.03	1.13	1.62	* 3.0	.73	8790
T	2:12	*	1203.8	1202.2	1203.0	*	---	51	1680	13997	2311	* 62.0	* 1.13	1.22	34.4	36.4	.32	.37	* 2.5	*	*	*	*				
D	2:28	*	1204.2	1202.6	1203.4	* 1.3	* 17.0	36	1470	12972	2040	* 63.0	* 1.13	1.22	34.8	37.5	.32	.36	* 2.5	* 2.04	* .84	* 1.03	1.13	1.62	* 4.0	1.33	7463
T	2:40	*	1204.5	1203.1	1204.0	*	---	0	.000	13834	2871	* 63.4	* 1.13	1.22	35.2	37.8	.32	.37	* 2.5	*	*	*	*				

DN-LINE TDC  
GEOSERVICES

BIT REPORT

\* 9/ 6/82

HAMMERHEAD #1

```
*****
#BIT HEADING :BIT#13 RUN#20
#BIT TYPE :TOOTH
#BIT IDENTITY :REED S11
#BIT SIZE : 8.50 INCH
#BIT COST : 5000. $ RIG COST/HR: 5833.
#NOZZLES : 12 12 12 /32NDS @ 95 % EFFICIENCY
#DEPTH IN : 1200.00 METERS 8/ 6/82
#DEPTH OUT : 1204.50 METERS 9/ 6/82
#METRAGE : 4.50 METERS
#TOTAL REVOLUTIONS : 7
#DRILLING TIME: 1:36 HR AVERAGE ROP: 2.01 M/HR
#TIME IN HOLE : 6:38 HR AVERAGE ROP: .68 M/HR
#TRIP TIME : 3: 0 HR
#DRILLING COST STANDARD :13579.5 $/MET
#DRILLING COST ON BOTTOM : 7068.2 $/MET
#DRILLING COST MINIMUM : 7038.3 $/MET
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS
#WEIGHT ON BIT : 12.28 TONS NOZZLES SPEED : 176.32 M/S
#ROTATION : 98.00 RPM PRESSURE DROP : 19440 KPA
#FLOW RATE :2260.00 L/MN HYDRAULIC POWER: 982.86 H.P
#STAND PIPE PRESSURE: 17500 KPA
*****
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ON-LINE TDC  
GEOSERVICES

HYDRAULIC REPORT

\* 9/ 6/82 TIME 5: 2

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1204.50 METERS

\* FLOW RATE 2260 L/MH

POWER LAW

\* MUD DATA

WEIGHT 1.13 SG  
PV 15 CPS  
YP 8.00 LB/FT2  
GEL 2.00 LB/100 FT2  
N .7776  
K .1645 LB/100 FT2

\* HOLES VOLUMES

WITH PIPES 55.80 M3  
WITHOUT PIPES 61.72 M3  
ANNULAR 45.46 M3  
INSIDE PIPES 10.35 M3

\* \* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAM \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* L/MH \* M/MH M/MH \*

\*SURF.EQPT\* \* \* \* 424 21 \* \* \* \*  
\*DR.STRING\* .00 1039.60 \* 4.20 5.00 \* 1740 80 \* \* \* \*  
\*DR.STRING\* 1039.60 1095.30 \* 3.00 5.00 \* 511 26 \* \* \* \*  
\*DR.STRING\* 1095.30 1210.30 \* 2.01 6.50 \* 1437 73 \* \* \* \*  
\*BIT \* \* \* \* 19440 202 \* M/S \* \* 176.3 \* \*  
\*ANNULUS \* 1204.50 1104.00 \* 6.50 12.25 \* 1 0 \* TU 2092.2 \* 41.4 38.4 \*  
\*ANNULUS \* 1104.00 1089.50 \* 6.50 8.69 \* 120 6 \* TU 1193.0 \* 134.1 130.6 \*  
\*ANNULUS \* 1089.50 1033.00 \* 5.00 8.69 \* 10 1 \* TU 1299.9 \* 80.3 85.1 \*  
\*ANNULUS \* 1033.00 143.00 \* 5.00 8.69 \* 206 14 \* TU 1277.7 \* 80.3 85.1 \*  
\*ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 3 0 \* LA 3147.7 \* 17.5 14.8 \*  
\* TOTAL \* \* \* \* 23979 1211 \* \* \* \*

\* ANNULAR PRESSURE LOSSES 420 KPA

\* EQUIV.CIRCULATING DENSITY 1.17 SG

\* MAX DEPTH 2570.19

\* MUD LAG TIMES S -> B 4.50 MN

\* B -> S 20.11 MN

\* CUTTINGS DATA SIZE .20 CM

\* DENSITY 2.40 SG

\* LAG TIME 22.01 MN

\* MAX SLIP VELOCITY 3.44 M/MH

\* BIT DATA SIZE 8.50 INCH

\* NOZZLES 12-12-12 /32NDS

\* NOZZLES EFFICIENCY 95 %

\* BIT P. LOSSES 19440 KPA

\* H.H.P RATIO 81.07 %

\* BIT H.H.P 17.306

\* BIT VELOCITY 176.32 M/S

\* 9/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
# BIT#14 RUN#29 SEQ NBR: 0 #

\*\*\*\*\*  
# STARTING DEPTH 1204.50 METERS

# BIT DATA SIZE 8.50  
# TOOTH REED S13  
# NOZZLES 12 12 12 @ 95 % EFFICIENCY

# DRILL STRING#	TYPE	# NBR	LENGTH	ID	OD	NOMINAL LINEAR
# SECTION		#	METERS	INCHES		WEIGHT (KG/M)
# 1	# DRILL PIPE	# 106	# 9.20	# 4.20	# 5.00	# 29.02
# 2	# HEAVY WGT DP	# 1	# 55.70	# 3.00	# 5.00	# 73.00
# 3	# DRILL COLLAR	# 1	# 171.60	# 2.01	# 6.50	# 136.40

\*\*\*\*\*  
# HOLE # ID # DEPTH (METERS)  
# # INCHES # TOP BOTTOM

# RISER	# 16.75	# .00	# 143.00
# CASING	# 8.67	# 143.00	# 1104.00
# OPEN HOLE 1	# 8.50	# 1104.00	# 1204.50

\*\*\*\*\*  
# COST DATA BIT COST 7000 \$ RIG COST 5833 \$/HR  
# TRIP TIME 4.00 HRS

# WEIGHTS HOOK LOAD OFF BOTTOM 91.4 TONS  
# STRING WEIGHT IN AIR 55.0 TONS

# VOLUMES ANNULUS 44.1 M3 IN PIPES 10.0 M3

# DEVIATION .0 DEG .000 M / 100 M

# HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA

# BIT WEAR TYPE EXPONENT .5  
# EXPECTED: -- RUN LENGTH 300 METERS TEETH WEAR 3 /8TH

\*\*\*\*\*

HAMMERHEAD #1

\* BIT#14 RUN#29 REED S13 BIT DIAMETER: 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS: PV = 15 YP = 8 GEL = 2 \*

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS		GAS	OVERPRESSURE SURVEY			ACCUMULATED ON BIT											
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW		PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORN	PF	ECD	FRAC	METER	TIME	COST			
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m <sup>3</sup>	sg	degC	ohm	unit	sg	sg	sg	net	DH	\$/m					
T * 10:13	1204.5	1203.1	1204.0	---	---	0	.000	16510	1205	58.0	1.13	1.22	31.5	24.0	.32	.33	1.2								
T * 10:33	1204.5	1203.1	1204.3	---	---	91	1600	19334	2364	53.6	1.13	1.22	29.5	32.0	.31	.49	1.2								
D * 10:46	1205.1	1203.6	1204.3	4.0	8.7	115	1600	15114	2382	51.4	1.13	1.22	29.9	34.4	.32	.38	1.2	1.63	.04	1.03	1.13	1.62	.5	.11	61857
D * 10:54	1206.1	1204.6	1204.6	6.9	10.7	114	1890	12352	2421	52.4	1.13	1.22	30.0	34.0	.33	.38	1.2	1.50	.04	1.03	1.13	1.62	1.5	.25	20962
D * 11:2	1207.1	1205.6	1204.6	7.9	10.8	111	1600	12383	2674	52.0	1.13	1.22	31.0	34.2	.33	.37	2.5	1.46	.04	1.03	1.13	1.62	2.5	.38	12911
D * 11:9	1208.1	1206.6	1205.0	7.0	10.7	105	3300	14121	2692	51.2	1.13	1.22	32.0	34.3	.33	.37	2.5	1.51	.04	1.03	1.13	1.62	3.5	.49	9471
D * 11:16	1209.1	1207.6	1206.4	9.6	10.8	106	3570	13717	2684	50.0	1.13	1.22	32.4	34.6	.34	.36	2.5	1.40	.04	1.03	1.13	1.62	4.5	.60	7446
D * 11:23	1210.1	1206.7	1207.3	7.4	10.9	105	3570	14057	2715	49.0	1.13	1.22	32.6	34.0	.33	.37	2.5	1.49	.04	1.03	1.13	1.62	5.5	.73	6223
D * 11:30	1211.2	1209.6	1206.2	9.5	10.1	105	3570	14070	2646	48.8	1.13	1.22	32.7	34.0	.33	.37	2.5	1.38	.04	1.03	1.13	1.62	6.5	.04	5377
D * 11:39	1212.2	1210.7	1209.0	8.3	10.9	105	3700	15579	2692	48.6	1.13	1.22	32.0	34.0	.33	.37	2.5	1.40	.05	1.03	1.13	1.63	7.6	.99	4767
T * 11:59	1212.7	1211.1	1211.9	---	---	102	1470	14214	2412	46.6	1.13	1.22	33.4	35.1	.31	.37	2.5								
D * 12:0	1213.1	1211.6	1212.5	2.0	10.7	102	1600	12600	2412	42.2	1.13	1.22	33.2	35.5	.31	.37	3.7	1.05	.05	1.03	1.13	1.63	8.5	1.30	4443
D * 12:16	1214.1	1212.6	1212.5	8.7	11.5	100	1600	14121	2412	43.4	1.13	1.22	33.5	35.0	.32	.36	2.5	1.46	.05	1.03	1.13	1.63	9.5	1.42	4846
D * 12:23	1215.1	1213.6	1212.5	8.5	12.2	100	1600	14330	2395	42.0	1.13	1.22	33.0	36.0	.32	.36	2.5	1.46	.05	1.03	1.13	1.63	10.5	1.54	3727
D * 12:30	1216.1	1214.6	1213.4	7.6	11.2	99	1600	12220	2412	42.0	1.13	1.22	33.0	35.0	.33	.37	2.5	1.48	.05	1.03	1.13	1.63	11.5	1.65	3472
D * 12:37	1217.1	1215.6	1214.3	6.8	11.4	100	1600	12755	2445	42.4	1.13	1.22	33.9	35.0	.34	.36	2.5	1.45	.05	1.03	1.13	1.63	12.5	1.70	3247
D * 12:44	1218.1	1216.6	1215.2	9.6	12.3	101	1600	11390	2408	41.6	1.13	1.22	34.0	35.9	.34	.36	2.5	1.42	.05	1.03	1.13	1.63	13.5	1.80	3053
D * 12:55	1219.1	1217.6	1216.0	4.7	11.3	102	1600	12352	2433	40.0	1.13	1.22	34.1	35.6	.34	.37	2.5	1.63	.05	1.03	1.13	1.63	14.5	2.06	2913
D * 13:3	1220.2	1218.6	1218.0	8.7	12.3	100	1600	12755	2412	41.6	1.13	1.22	34.1	35.0	.33	.37	2.5	1.47	.05	1.03	1.13	1.63	15.5	2.20	2773
D * 13:11	1221.2	1219.1	1218.6	7.0	10.4	102	1600	11773	2433	41.4	1.13	1.22	34.1	35.0	.34	.36	3.7	1.52	.05	1.03	1.13	1.63	16.0	2.34	2708
T * 13:31	1221.5	1220.1	1220.4	---	---	0	.000	-1366	0	44.0	1.13	1.22	34.1	36.3	.34	.37	2.5								
T * 13:51	1221.5	1220.1	1221.3	---	---	0	.000	10676	2447	41.0	1.13	1.22	34.0	35.9	.34	.37	375								
T * 14:11	1221.5	1220.1	1179.6	---	---	0	.000	-1521	0	41.6	1.13	1.22	33.0	35.0	.35	.35	2.5								
T * 14:31	1221.5	1220.1	1179.6	---	---	0	.000	-1490	0	43.6	1.13	1.22	33.5	35.0	.35	.35	2.5								
T * 14:52	1221.5	1220.1	1179.6	---	---	0	.000	-1241	934	43.4	1.13	1.22	33.0	35.5	.36	.35	2.5								
T * 15:12	1221.5	1220.1	1179.6	---	---	0	.000	-1377	0	44.6	1.13	1.22	32.7	34.9	.36	.32	2.5								
T * 15:32	1221.5	1220.1	1177.1	---	---	0	.000	403	1449	42.0	1.13	1.22	32.0	23.9	.36	.37	2.5								
D * 15:41	1222.1	1220.6	1213.4	4.8	9.1	90	1890	15517	2319	42.0	1.13	1.22	31.2	35.0	.36	.36	2.5	1.22	.05	1.03	1.13	1.63	17.5	2.50	2561
D * 15:45	1223.1	1221.6	1213.7	15.0	11.4	92	1890	16417	2357	42.0	1.13	1.22	31.3	35.3	.36	.37	3.7	1.22	.05	1.03	1.13	1.63	18.5	2.56	2441
D * 15:51	1224.2	1222.6	1219.2	9.9	7.0	111	1890	17659	2347	55.0	1.13	1.22	31.6	35.3	.35	.38	2.5	1.32	.05	1.03	1.13	1.63	19.5	2.66	2348
D * 15:59	1225.1	1223.6	1221.6	8.4	7.3	112	1890	16510	2230	54.4	1.13	1.22	32.0	34.3	.34	.39	2.5	1.31	.05	1.03	1.13	1.63	20.5	2.78	2264
D * 16:0	1226.1	1224.6	1223.2	7.8	8.4	112	1890	17379	2233	54.0	1.13	1.22	32.4	34.4	.35	.39	2.5	1.33	.05	1.03	1.13	1.63	21.5	2.74	2202
D * 16:17	1227.2	1225.7	1224.7	8.5	10.0	89	1890	16945	2230	53.0	1.13	1.22	32.7	34.9	.35	.38	2.5	1.36	.05	1.03	1.13	1.63	22.6	3.09	2142
D * 16:23	1228.1	1226.6	1225.3	13.2	10.6	92	1890	15766	2236	53.0	1.13	1.22	32.7	35.2	.35	.38	2.5	1.25	.05	1.03	1.13	1.63	23.5	3.19	2079
D * 16:30	1229.1	1227.6	1226.2	8.0	10.9	92	1890	16355	2236	53.0	1.13	1.22	33.0	35.6	.35	.39	2.5	1.37	.05	1.03	1.13	1.63	24.5	3.32	2023
D * 16:35	1230.1	1228.7	1226.5	16.6	10.0	91	1890	14920	2236	53.6	1.13	1.22	33.2	35.6	.35	.38	2.5	1.20	.05	1.03	1.13	1.63	25.6	3.39	1959
D * 16:51	1231.1	1229.6	1228.3	7.5	10.3	86	2100	15020	2070	52.6	1.13	1.22	33.3	35.4	.34	.39	2.5	1.34	.05	1.03	1.13	1.63	26.5	3.50	1913
D * 16:56	1232.1	1230.6	1229.0	11.9	9.3	105	1890	17659	2100	52.2	1.15	1.15	33.5	35.7	.34	.39	2.5	1.23	.05	1.03	1.15	1.63	27.5	3.59	1863
D * 17:3	1233.1	1231.7	1230.2	11.1	8.9	115	1890	17930	2190	51.0	1.15	1.15	33.6	35.0	.34	.39	2.5	1.31	.05	1.03	1.15	1.63	28.6	3.69	1816
D * 17:8	1234.1	1232.6	1230.8	12.7	10.5	115	1890	17620	2243	52.0	1.15	1.14	33.7	36.0	.34	.39	2.5	1.26	.05	1.03	1.15	1.63	29.5	3.70	1773
D * 17:12	1235.1	1233.6	1230.0	16.1	9.9	117	1890	17969	2203	52.0	1.15	1.14	33.9	35.9	.34	.38	2.5	1.22	.05	1.03	1.15	1.63	30.5	3.84	1727
D * 17:17	1236.2	1234.6	1231.7	10.3	10.7	114	1890	17936	2200	52.2	1.15	1.14	34.0	36.0	.34	.39	3.7	1.16	.05	1.03	1.15	1.63	31.5	3.93	1687
D * 17:20	1237.1	1235.7	1232.3	19.9	10.0	115	1890	17907	2200	52.2	1.15	1.14	34.1	36.3	.34	.39	2.5	1.17	.05	1.03	1.15	1.63	32.6	3.98	1644
D * 17:27	1238.1	1236.6	1233.5	8.6	8.0	116	1890	16440	2109	52.2	1.15	1.14	34.2	36.4	.34	.38	2.5	1.36	.05	1.03	1.15	1.63	33.5	4.10	1610
D * 17:33	1239.1	1237.7	1234.4	14.6	8.5	115	1890	16541	2109	51.6	1.15	1.14	34.4	36.4	.34	.38	2.5	1.22	.05	1.03	1.15	1.63	34.6	4.19	1582
D * 17:46	1240.1	1238.6	1236.3	22.0	7.7	94	2100	14990	2010	50.6	1.15	1.15	34.2	36.3	.34	.39	2.5	1.01	.05	1.03	1.15	1.63	35.5	4.23	1549
D * 17:51	1241.2	1239.7	1237.2	15.3	10.0	119	2100	15641	2012	50.0	1.15	1.15	34.4	36.4	.34	.39	2.5	1.21	.05	1.03	1.15	1.63	36.6	4.31	1515
D * 17:54	1242.1	1240.7	1237.5	20.0	9.1	117	1890	15610	2012	50.0	1.15	1.15	34.4	36.1	.34	.38	2.5	1.12	.05	1.03	1.15	1.63	37.6	4.36	1483
D * 17:59	1243.1	1241.6	1238.4	11.1	10.0	117	1890	15579	1995	50.2	1.15	1.14	34.5	36.1	.34	.39	2.5	1.32	.05	1.03	1.15	1.63	38.5	4.44	1457

\* 9/ 6/82 19:26

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1263.92 METERS \*  
\* FLOW RATE 1939 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.15 KG/L \*  
\* PV 15 CPS \*  
\* YP 0.00 \*  
\* GEL 2.00 \*  
\* N .7776 \*  
\* K .1645 \*

\* HOLES VOLUMES WITH PIPES 56.15 M3 \*  
\* WITHOUT PIPES 63.89 M3 \*  
\* ANNULAR 45.50 M3 \*  
\* INSIDE PIPES 10.57 M3 \*

\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES\* H.P \* TYPE\* CRITICAL \* MUD \* CUTTINGS \*  
\* ID OD DIAM \* FLOW \* VELOCITY VELOCITY \*  
\* METERS \* INCH INCH INCH \* K/C \* L/MN \* M/MN M/MN \*

*SURF.COPT*											
*DR.STRING*	.00	1039.60	4.28	5.00		1339.3	50				
*DR.STRING*	1039.60	1095.30	3.00	5.00		393.3	17				
*DR.STRING*	1095.30	1266.90	2.01	6.50		1650.1	72				
*BIT						1456.4	631	M/S		151.3	
*ANNULUS	1263.92	1104.00		6.50	8.50	105.1	5	TU	1123.5	127.6	124.2
*ANNULUS	1184.00	1092.32		6.50	8.69	89.8	4	TU	1176.0	115.0	111.7
*ANNULUS	1092.32	1036.62		5.00	8.69	13.7	1	TU	1281.4	75.8	72.6
*ANNULUS	1036.62	143.00		5.00	8.69	228.6	10	TU	1281.4	75.8	72.6
*ANNULUS	143.00	.00		5.00	16.75	2.8	0	LA	3102.9	15.0	12.4
* TOTAL*						10705.0	811				

\* ANNULAR PRESSURE LOSSES 432.0 K/C \*

\* EQUIV.CIRCULATING DENSITY 1.10 KG/L \*  
\* MAX DEPTH 4434.34 METERS \*

\* MUD LAG TIMES S -> B 5.45 MN \*  
\* B -> S 23.50 MN \*

\* CUTTINGS DATA SIZE 20 CM \*  
\* DENSITY 2.40 KG/L \*  
\* LAG TIME 26.03 MN \*  
\* MAX SLIP VELOCITY 3.39 M/MN \*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 12 12 12 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* P. LOSSES 1456.4 K/C \*  
\* POWERS RATIO 77.06 \*  
\* H.P/SQ.INCHES 11.124 \*  
\* MUD VELOCITY 151.20 M/S \*



\* GEOSERVICES  
 \* ON-LINE TDC

HAMMERHEAD #1

DATE : 9/ 6/82

\* BIT#14 RUN#29 REED S13 BIT DIAMETER : 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 8 GEL = 2 \*

* TIME *	* DEPTHS *			* DRILLING PARAMETERS *							* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *		
	* MEASURED *	* VERTCL *	* LAGGED *	* ROP *	* WOB *	* RPM *	* TORQ *	* PRESS *	* FLOW *	* PIT *	* DENSITY *		* TEMPERATURE *		* RESISTIVITY *		* DC *	* NORH *	* PF *	* ECD *	* FRAC *	* METER *	* TIME *	* COST *	
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* ton *	* rpm *	* Nm *	* KPA *	* l/mn *	* m3 *	* IN *	* OUT *	* IN *	* OUT *	* IN *	* OUT *	* unit *	* *	* sg *	* sg *	* sg *	* met *	* Dhr *	* \$/m *	
D * 18: 3 *	1244.1	1242.7	1239.3	18.2	10.7	117	2100	15406	2812	50.2	1.15	1.14	34.5	36.4	.33	.39	2.5	1.16	.85	1.83	1.15	1.63	39.6	4.51	1430
D * 18: 7 *	1245.1	1243.7	1239.6	12.9	10.7	121	1890	17721	2164	50.2	1.15	1.15	34.5	36.4	.35	.39	2.5	1.27	.85	1.83	1.15	1.63	40.6	4.58	1485
D * 18:13 *	1246.2	1244.7	1240.8	8.3	10.4	119	1890	17597	2167	50.0	1.15	1.14	34.6	36.5	.34	.39	2.5	1.38	.85	1.83	1.15	1.63	41.6	4.67	1384
D * 18:17 *	1247.1	1245.6	1242.1	16.3	9.6	118	1890	16883	2167	50.2	1.15	1.14	34.6	36.6	.34	.40	2.5	1.19	.85	1.83	1.15	1.63	42.5	4.74	1363
D * 18:20 *	1248.1	1246.1	1242.7	20.4	9.5	119	1890	17472	2167	50.2	1.15	1.14	34.6	36.8	.34	.38	2.5	1.14	.85	1.83	1.15	1.63	43.6	4.79	1337
D * 18:28 *	1249.2	1247.8	1243.9	66.8	.3	110	1680	16759	2033	56.2	1.15	1.14	34.1	36.5	.34	.39	3.7	.67	.85	1.83	1.15	1.63	44.7	4.83	1309
D * 18:31 *	1250.1	1248.7	1244.5	18.6	10.1	106	1890	17807	2033	59.2	1.15	1.14	33.8	36.8	.34	.38	2.5	1.14	.85	1.83	1.15	1.63	45.5	4.88	1290
D * 18:35 *	1251.3	1249.6	1245.7	17.3	10.6	105	2100	16790	2033	61.0	1.15	1.14	33.3	37.0	.34	.39	2.5	1.15	.85	1.83	1.15	1.63	46.5	4.94	1271
D * 18:39 *	1252.1	1250.6	1246.8	13.9	10.8	115	1890	17969	2066	64.0	1.15	1.14	33.8	37.1	.34	.39	2.5	1.19	.85	1.83	1.15	1.63	47.5	5.00	1251
D * 18:44 *	1253.1	1251.7	1246.9	17.2	9.3	114	1890	18155	2053	69.3	1.15	1.14	32.6	37.2	.34	.39	3.7	1.18	.85	1.83	1.15	1.63	48.6	5.08	1233
D * 18:47 *	1254.1	1252.7	1247.9	18.1	11.2	114	2100	18652	2033	71.7	1.15	1.14	32.3	37.4	.34	.39	3.7	1.16	.85	1.83	1.15	1.63	49.6	5.13	1214
D * 18:50 *	1255.2	1253.7	1248.5	22.9	9.9	114	1890	18714	2061	73.1	1.15	1.14	32.0	37.3	.34	.39	2.5	1.13	.85	1.83	1.15	1.63	50.6	5.18	1196
D * 18:53 *	1256.2	1254.7	1249.4	18.0	10.6	113	2100	18887	2071	76.1	1.15	1.14	31.7	37.3	.34	.40	3.7	1.16	.85	1.83	1.15	1.63	51.6	5.23	1179
D * 18:56 *	1257.1	1255.7	1250.3	18.4	9.9	114	1890	18776	2050	76.9	1.15	1.14	31.5	37.2	.34	.40	2.5	1.15	.85	1.83	1.15	1.64	52.6	5.29	1163
D * 19: 5 *	1258.1	1256.6	1252.1	16.4	10.4	98	2310	18434	1994	69.7	1.15	1.14	31.2	36.4	.34	.41	2.5	1.15	.85	1.83	1.15	1.64	53.5	5.34	1149
D * 19: 8 *	1259.2	1257.6	1252.4	18.0	10.4	111	2100	18945	1939	70.3	1.15	1.13	31.0	36.2	.34	.42	2.5	1.13	.85	1.83	1.15	1.64	54.5	5.39	1132
D * 19:11 *	1260.2	1258.6	1253.3	17.2	10.4	112	2100	18976	1921	72.3	1.15	1.13	30.6	35.1	.34	.40	1.2	1.15	.85	1.83	1.15	1.64	55.5	5.44	1117
D * 19:15 *	1261.1	1259.6	1254.6	14.8	11.0	115	2100	17472	1921	75.7	1.15	1.13	30.2	34.7	.34	.40	1.2	1.21	.85	1.83	1.15	1.64	56.5	5.49	1103
D * 19:19 *	1262.1	1260.6	1255.5	13.4	10.1	112	2100	17628	1921	78.5	1.15	1.14	29.9	34.8	.34	.40	1.2	1.26	.85	1.83	1.15	1.64	57.5	5.56	1091
D * 19:23 *	1263.1	1261.7	1256.7	12.6	10.1	113	2100	17534	1921	81.7	1.15	1.13	29.3	33.4	.34	.40	1.2	1.25	.85	1.83	1.15	1.64	58.6	5.63	1079

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 \* GEOSERVICES  
 \* ON-LINE TDC  
 \* DATE : 9/ 6/82 \*  
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HAMMERHEAD #1

\* BIT#14 RUN#29 REED S13 BIT DIAMETER : 8.50 inch NOZZ 12/12/12  
 \* MUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 8 CEL = 2 \*

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT									
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST			
hr:mn	met	met	met	m/hr	ton	rpm	Nm	KPa	l/mn	m3	IN	OUT	IN	OUT	unit	sg	sg	sg	net	Dhr	\$/m				
D * 19:29	1264.2	1262.7	1257.9	7.3	12.0	115	2100	17969	1939	73.3	1.15	1.14	28.9	32.6	.34	.40	1.2	1.39	.05	1.03	1.15	1.64	59.6	5.69	1066
D * 19:32	1265.1	1263.7	1258.8	20.0	11.4	113	2100	17845	1939	70.7	1.15	1.14	28.8	32.5	.34	.39	1.2	1.15	.05	1.03	1.15	1.64	60.6	5.73	1053
D * 19:41	1266.2	1264.7	1260.7	16.9	10.4	111	2100	16021	1904	70.7	1.15	1.15	20.5	32.4	.34	.38	1.2	1.13	.05	1.03	1.15	1.64	61.5	5.79	1041
D * 19:43	1267.2	1265.7	1261.0	22.8	10.6	112	2100	16603	1866	70.3	1.15	1.14	20.6	31.8	.34	.39	1.2	1.10	.05	1.03	1.15	1.64	62.6	5.03	1029
D * 19:47	1268.2	1266.7	1261.9	24.8	10.3	112	2100	16634	1863	70.1	1.15	1.15	28.6	31.7	.33	.39	1.2	1.09	.05	1.03	1.15	1.64	63.6	5.00	1016
D * 19:49	1269.2	1267.7	1262.2	23.1	10.5	116	2100	17007	1866	70.1	1.15	1.14	20.6	31.3	.33	.39	1.2	1.11	.05	1.03	1.15	1.64	64.6	5.92	1004
D * 19:52	1270.2	1268.7	1262.8	23.9	11.2	114	2100	16083	1869	70.1	1.15	1.15	20.7	31.2	.33	.38	1.2	1.10	.05	1.03	1.15	1.64	65.6	5.97	993
D * 19:55	1271.2	1269.7	1263.7	22.8	11.4	115	2310	17007	1869	70.3	1.15	1.14	20.8	31.0	.33	.38	1.2	1.11	.05	1.03	1.15	1.64	66.6	6.02	983
D * 19:57	1272.1	1270.7	1264.0	24.6	11.6	112	2100	16976	1846	70.5	1.15	1.15	28.9	30.8	.33	.38	1.2	1.10	.05	1.03	1.15	1.64	67.6	6.06	972
D * 19:59	1273.1	1271.7	1264.6	29.2	12.7	112	2310	16976	1869	70.3	1.15	1.15	29.0	30.5	.33	.39	1.2	1.07	.05	1.03	1.15	1.64	68.6	6.10	960
D * 20: 3	1274.2	1272.7	1265.5	18.6	11.4	111	2100	17069	1869	71.9	1.15	1.15	29.2	30.4	.33	.38	1.2	1.10	.05	1.03	1.15	1.64	69.6	6.15	951
D * 20: 9	1275.5	1273.8	1265.8	94.3	-2	11	1470	16014	1501	73.9	1.15	1.16	29.3	30.3	.33	.37	1.2	.00	.05	1.03	1.15	1.64	70.7	6.18	939
D * 20: 9	1277.4	1275.7	1265.8	767.	-3	56	1680	17379	1775	73.7	1.15	1.16	29.3	30.3	.33	.37	1.2	.00	.05	1.03	1.15	1.64	72.6	6.19	914
D * 20:12	1278.2	1276.6	1266.8	15.2	10.5	90	1890	16341	1941	71.9	1.15	1.15	29.4	30.5	.33	.39	1.2	1.20	.05	1.03	1.15	1.64	73.5	6.23	906
D * 20:15	1279.1	1277.7	1268.0	28.4	11.1	105	1890	16248	1959	71.5	1.15	1.16	29.5	30.3	.33	.38	1.2	1.05	.05	1.03	1.15	1.64	74.6	6.28	897
D * 20:20	1280.2	1278.6	1269.8	11.7	10.8	105	2100	18279	1921	71.3	1.15	1.16	29.6	30.3	.33	.37	1.2	1.27	.05	1.03	1.15	1.64	75.5	6.36	893
D * 20:25	1281.1	1279.6	1271.6	12.4	12.3	105	2100	18186	1941	71.3	1.15	1.16	29.6	30.4	.33	.37	1.2	1.27	.05	1.03	1.15	1.64	76.5	6.45	887
D * 20:30	1282.1	1280.2	1273.8	9.2	10.5	105	2100	18031	1959	71.1	1.15	1.16	29.8	30.2	.34	.37	1.2	1.35	.05	1.03	1.15	1.64	77.1	6.54	885
D * 20:37	1283.1	1281.6	1277.7	8.4	11.3	105	2100	17597	1954	70.7	1.15	1.16	29.8	30.2	.34	.37	2.5	1.37	.05	1.03	1.15	1.64	78.5	6.64	879
D * 20:42	1284.2	1282.7	1279.2	15.5	12.3	103	2100	17703	1941	70.3	1.15	1.16	29.8	30.1	.34	.37	1.2	1.21	.05	1.03	1.15	1.64	79.6	6.73	874
D * 20:48	1285.1	1283.7	1280.5	8.9	12.0	105	2100	17703	1961	70.1	1.15	1.16	29.8	30.4	.34	.37	1.2	1.35	.05	1.03	1.15	1.64	80.6	6.83	870
D * 20:53	1286.2	1284.7	1281.4	12.0	11.0	107	2100	17752	1941	69.9	1.15	1.16	29.8	30.2	.34	.38	1.2	1.20	.05	1.03	1.15	1.64	81.6	6.91	865
D * 21:10	1287.1	1285.7	1283.8	7.9	10.5	111	1890	18248	1977	68.9	1.15	1.15	29.7	30.9	.34	.38	1.2	1.35	.05	1.03	1.15	1.64	82.6	7.02	863
D * 21:16	1288.2	1286.7	1284.7	11.2	10.2	100	2100	18217	1941	68.7	1.15	1.14	29.6	30.9	.34	.37	1.2	1.28	.05	1.03	1.15	1.64	83.6	7.12	860
D * 21:20	1289.2	1287.7	1286.0	10.3	10.6	100	2100	17969	1961	68.3	1.15	1.15	29.7	31.0	.34	.38	1.2	1.26	.05	1.03	1.15	1.64	84.6	7.21	855
D * 21:24	1290.1	1288.6	1286.6	16.6	11.3	110	2100	18062	1979	68.1	1.15	1.14	29.7	30.7	.34	.38	1.2	1.17	.05	1.03	1.15	1.64	85.5	7.27	850
D * 21:29	1291.2	1289.6	1286.6	19.1	10.6	111	1890	15903	1919	68.1	1.15	1.14	29.8	30.9	.35	.38	1.2	1.14	.05	1.03	1.15	1.64	86.5	7.35	845
D * 21:33	1292.1	1290.6	1286.6	17.4	11.7	112	2100	16759	1981	67.9	1.15	1.14	29.8	31.1	.34	.38	1.2	1.19	.05	1.03	1.15	1.64	87.5	7.41	840
D * 21:39	1293.1	1291.7	1287.5	7.7	11.6	107	2100	17317	1981	68.1	1.15	1.14	29.8	30.9	.34	.38	1.2	1.34	.05	1.03	1.15	1.64	88.6	7.51	836

D * 21:51	* 1295.3	1292.6	1288.7	* 11.6	* .0	0	.000	-683	1886	* 67.7	* 1.15	1.17	29.9	30.9	.35	.38	* 1.2	* 1.28	.05	* 1.03	1.15	1.64	* 89.5	7.60	832	*	
D * 22: 3	* 1304.0	1292.6	1290.8	* 11.6	* .0	0	.000	-1366	0	* 68.3	* 1.15	1.20	29.9	30.8	.35	.35	* 1.2	* 1.28	.05	* 1.03	1.15	1.64	* 89.5	7.60	832	*	
T * 22:23	* 1304.0	1292.6	1294.2	* ---	* ---	0	.000	17441	1982	* 64.8	* 1.15	1.14	30.0	33.0	.35	.38	* 1.2	* ---	* ---	* ---	* ---	* ---	* ---	* ---	* ---	* ---	*
T * 22:43	* 1304.0	1292.6	1303.9	* ---	* ---	0	.210	17566	1994	* 64.4	* 1.15	1.14	30.5	33.3	.35	.38	* 1.2	* ---	* ---	* ---	* ---	* ---	* ---	* ---	* ---	* ---	*
D * 22:50	* 1304.5	1302.6	1303.9	* 437.	* 4.4	98	1070	18217	1994	* 65.4	* 1.15	1.13	30.6	33.3	.35	.40	* 1.2	* .29	.05	* 1.03	1.15	1.65	* 99.5	7.60	750	*	
D * 22:50	* 1305.1	1303.4	1303.9	* 144.	* 5.6	115	2100	18310	1997	* 65.2	* 1.15	1.14	30.6	33.3	.35	.39	* 1.2	* .46	.05	* 1.05	1.15	1.74	* 100.3	7.60	744	*	
D * 22:51	* 1306.2	1304.3	1303.9	* 121.	* 7.1	117	2520	18279	2014	* 65.0	* 1.15	1.13	30.6	33.2	.35	.39	* 1.2	* .59	.05	* 1.44	1.15	1.84	* 101.2	7.61	739	*	
D * 22:51	* 1307.2	1305.8	1303.9	* 164.	* 8.1	115	3150	18248	2014	* 64.8	* 1.15	1.14	30.7	33.0	.35	.39	* 1.2	* .53	.05	* 1.54	1.15	1.89	* 102.7	7.62	728	*	
D * 22:52	* 1308.1	1306.2	1303.9	* 127.	* 9.0	118	3360	18590	2012	* 64.6	* 1.15	1.14	30.7	32.9	.35	.40	* 1.2	* .59	.05	* 1.44	1.15	1.84	* 103.1	7.62	725	*	
D * 22:52	* 1309.1	1307.3	1303.9	* 261.	* 7.9	115	2940	18590	2032	* 64.6	* 1.15	1.14	30.7	32.8	.35	.39	* 1.2	* .43	.05	* 1.03	1.15	1.65	* 104.2	7.63	718	*	
D * 22:52	* 1310.2	1308.7	1303.9	* 167.	* 8.8	115	2940	18714	1999	* 64.4	* 1.15	1.14	30.8	32.6	.35	.39	* 1.2	* .53	.05	* 1.55	1.15	1.89	* 105.6	7.64	709	*	
D * 22:53	* 1311.1	1309.7	1303.9	* 92.0	* 8.9	115	3150	17814	1994	* 64.2	* 1.15	1.14	30.7	32.1	.35	.40	* 1.2	* .67	.05	* 1.03	1.15	1.65	* 106.6	7.64	703	*	
D * 22:53	* 1312.0	1310.1	1303.9	* 123.	* 8.9	115	3360	18714	2014	* 64.0	* 1.15	1.14	30.7	31.7	.35	.40	* 1.2	* .63	.05	* 1.39	1.15	1.82	* 107.0	7.65	700	*	
D * 22:59	* 1313.1	1311.1	1303.9	* 83.2	* -.6	100	1690	16666	1828	* 64.4	* 1.15	1.14	30.8	31.3	.34	.40	* 2.5	* .71	.05	* 1.03	1.15	1.65	* 108.0	7.66	694	*	
D * 22:59	* 1314.0	1312.3	1303.9	* 161.	* 8.8	110	2520	16976	1848	* 64.4	* 1.15	1.14	30.8	31.4	.34	.40	* 2.5	* .46	.05	* 1.64	1.15	1.94	* 109.2	7.67	687	*	
D * 23: 0	* 1315.0	1313.6	1303.9	* 151.	* 8.7	113	2520	17783	1886	* 64.2	* 1.15	1.14	30.8	31.4	.34	.39	* 2.5	* .54	.05	* 1.53	1.15	1.89	* 110.5	7.68	680	*	
D * 23: 0	* 1316.1	1314.3	1303.9	* 119.	* 9.6	117	3780	17907	1939	* 64.0	* 1.15	1.14	30.9	31.4	.34	.39	* 2.5	* .63	.05	* 1.39	1.15	1.82	* 111.2	7.68	676	*	
D * 23: 1	* 1317.0	1315.1	1303.9	* 98.4	* 8.3	116	4200	18031	1939	* 63.8	* 1.15	1.14	30.8	31.4	.34	.39	* 1.2	* .67	.05	* 1.03	1.15	1.65	* 112.0	7.69	671	*	
D * 23: 2	* 1318.1	1316.2	1303.9	* 83.3	* 9.2	116	4620	17938	1939	* 63.6	* 1.15	1.14	30.9	31.4	.34	.40	* 1.2	* .69	.05	* 1.03	1.15	1.65	* 113.1	7.71	666	*	
D * 23: 2	* 1319.3	1317.7	1303.9	* 104.	* 9.5	116	4410	18124	1939	* 63.6	* 1.15	1.14	30.9	31.1	.34	.40	* 2.5	* .64	.05	* 1.37	1.15	1.81	* 114.6	7.72	657	*	

HAMMERHEAD #1

\* BIT#14 RUN#29 REED S13 BIT DIAMETER : 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 8 GEL = 2 \*

TIME	DEPTHS			DRILLING PARAMETERS								MUD PARAMETERS				GAS		OVERPRESSURE SURVEY				ACCUMULATED ON BIT			
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		DCS	NORM	PF	ECD	FRAC	METER	TINC	COST		
hr:mn	met	met	met	m/hr	ton	rpm	Nm	KPA	L/hr	m3	IN	OUT	IN	OUT	ohm	unit	sg	sg	sg	met	Dir	\$/m			
D * 23: 3	1320.3	1318.8	1303.9	87.6	9.2	119	4620	10031	1939	63.4	1.15	1.14	30.9	30.9	.34	.40	2.5	.75	.85	1.03	1.15	1.65	115.7	7.73	652
D * 23: 4	1321.1	1319.3	1303.9	68.2	8.7	116	4620	10124	1749	63.4	1.15	1.14	30.8	30.8	.34	.40	1.2	.77	.85	1.03	1.15	1.65	116.2	7.74	650
D * 23: 4	1322.1	1320.1	1303.9	84.2	8.9	117	4410	17907	1939	63.2	1.15	1.15	30.9	30.8	.34	.40	2.5	.71	.85	1.03	1.15	1.65	117.8	7.75	645
D * 23:10	1323.1	1321.1	1303.9	41.6	8.6	108	3760	15921	1936	64.0	1.15	1.15	30.9	30.7	.34	.39	1.2	.77	.85	1.03	1.15	1.65	118.0	7.77	641
D * 23:10	1324.1	1322.2	1303.9	83.1	9.6	119	4030	16169	1068	64.0	1.15	1.15	31.0	30.8	.35	.40	1.2	.72	.85	1.03	1.15	1.65	119.1	7.78	635
D * 23:11	1325.1	1323.2	1303.9	118.	9.6	121	4620	16107	1828	63.8	1.15	1.15	30.9	30.8	.34	.39	1.2	.62	.85	1.40	1.15	1.83	120.1	7.78	638
D * 23:12	1326.1	1324.3	1303.9	84.8	9.6	119	4620	16045	1840	63.4	1.15	1.15	30.8	30.8	.35	.39	1.2	.72	.85	1.03	1.15	1.65	121.2	7.80	625
D * 23:12	1327.1	1325.7	1303.9	102.	8.5	117	4620	10466	1869	63.2	1.15	1.15	30.9	30.9	.35	.39	1.2	.65	.85	1.03	1.15	1.65	122.6	7.81	619
D * 23:13	1328.0	1326.2	1303.9	119.	10.1	121	4620	10683	2015	63.2	1.15	1.14	30.9	30.9	.35	.39	1.2	.62	.85	1.40	1.15	1.83	123.1	7.81	617
D * 23:14	1329.3	1327.7	1303.9	69.1	10.0	121	4830	16003	1975	63.0	1.15	1.15	30.9	30.7	.35	.41	1.2	.77	.85	1.03	1.15	1.65	124.6	7.83	610
D * 23:14	1330.1	1328.2	1303.9	61.3	10.5	119	4830	17876	2012	62.8	1.15	1.15	30.9	30.6	.35	.39	1.2	.82	.85	1.03	1.15	1.65	125.8	7.84	608
D * 23:19	1331.0	1329.2	1303.9	79.7	-7	84	1680	17100	1630	63.6	1.15	1.17	30.9	30.0	.35	.39	1.2	.74	.85	1.03	1.15	1.65	126.1	7.85	604
D * 23:20	1332.0	1330.3	1303.9	126.	9.2	102	2520	16945	1866	63.4	1.15	1.17	30.7	30.2	.35	.39	1.2	.41	.85	1.03	1.15	1.65	127.2	7.86	599
D * 23:21	1333.2	1331.6	1303.9	85.3	8.1	116	4620	17224	1921	63.2	1.15	1.17	30.9	30.2	.35	.38	1.2	.66	.85	1.03	1.15	1.65	128.7	7.87	593
D * 23:21	1334.0	1332.2	1303.9	72.8	9.4	114	4830	17162	1939	63.0	1.15	1.16	30.8	30.2	.35	.38	1.2	.72	.85	1.03	1.15	1.65	129.1	7.88	591
D * 23:22	1335.1	1333.7	1303.9	100.	9.3	115	4620	17255	1921	62.8	1.15	1.16	30.8	30.2	.35	.38	1.2	.66	.85	1.03	1.15	1.65	130.6	7.89	585
D * 23:23	1336.2	1334.2	1303.9	91.1	9.3	115	4830	17224	1921	62.6	1.15	1.16	30.8	29.9	.35	.39	1.2	.76	.85	1.03	1.15	1.65	131.7	7.91	580
D * 23:23	1337.1	1335.7	1305.5	93.8	9.3	115	4620	17286	1954	62.6	1.15	1.17	30.8	29.9	.35	.39	1.2	.68	.85	1.03	1.15	1.65	132.6	7.92	577
D * 23:24	1338.1	1336.7	1305.5	83.7	9.6	115	4836	17131	1921	62.4	1.15	1.17	30.8	30.2	.35	.40	1.2	.74	.85	1.03	1.15	1.65	133.6	7.93	573
D * 23:25	1339.0	1337.2	1307.9	56.3	7.8	116	4620	17224	1939	62.4	1.15	1.18	30.8	30.1	.35	.41	1.2	.77	.85	1.03	1.15	1.65	134.1	7.94	572
D * 23:26	1340.1	1338.7	1310.3	75.3	8	100	16417	1924	62.2	1.15	1.18	30.8	29.7	.35	.41	1.2	.75	.85	1.03	1.15	1.65	135.6	7.96	566	
D * 23:31	1341.1	1339.7	1312.8	60.0	6.2	111	3360	15952	1886	62.8	1.15	1.17	30.8	29.8	.35	.39	1.2	.72	.85	1.03	1.15	1.65	136.6	7.97	563
D * 23:32	1342.1	1340.7	1313.4	81.9	7.3	111	4200	16076	1866	62.4	1.15	1.17	30.7	29.6	.35	.39	1.2	.65	.85	1.36	1.45	1.81	137.6	7.99	559
D * 23:33	1343.0	1341.2	1315.2	63.3	7.9	113	4620	16107	1886	62.0	1.15	1.17	30.6	30.1	.35	.40	1.2	.72	.85	1.03	1.15	1.65	138.1	8.00	557
D * 23:35	1344.1	1342.1	1318.3	57.7	8.1	111	4830	16814	1886	61.6	1.15	1.17	30.6	30.2	.35	.40	1.2	.75	.85	1.03	1.15	1.65	139.0	8.03	554
D * 23:38	1345.0	1343.2	1321.0	24.5	8.7	114	4620	15952	1904	61.2	1.15	1.16	30.5	29.9	.35	.40	1.2	.97	.85	1.03	1.15	1.65	140.1	8.08	552
D * 23:40	1346.0	1344.6	1322.2	36.1	8.4	112	4620	15859	1886	60.6	1.15	1.16	30.5	29.9	.35	.38	1.2	.87	.85	1.03	1.15	1.65	141.5	8.12	549
D * 23:41	1347.0	1345.1	1323.4	54.4	7.8	111	4620	15859	1889	60.4	1.15	1.16	30.5	29.8	.35	.39	2.5	.77	.85	1.03	1.15	1.65	142.0	8.14	547
D * 23:42	1348.0	1346.2	1325.3	61.1	8.1	111	4620	16076	1886	60.4	1.15	1.16	30.4	30.0	.36	.39	1.2	.73	.85	1.03	1.15	1.66	143.1	8.15	544
D * 23:43	1349.2	1347.6	1325.3	87.5	7.5	111	4620	15921	1906	60.4	1.15	1.17	30.4	30.1	.35	.39	2.5	.63	.85	1.39	1.15	1.83	144.5	8.16	539
D * 23:46	1350.5	1347.6	1329.8	87.5	8	100	3567	1866	60.8	1.15	1.17	30.3	30.0	.36	.39	1.2	.63	.85	1.39	1.15	1.83	144.5	8.17	539	
D * 23:51	1351.0	1349.1	1331.4	223.	5.9	90	2310	16720	1995	60.6	1.15	1.16	30.2	30.1	.35	.39	1.2	.41	.85	1.03	1.15	1.66	146.0	8.18	534
D * 23:52	1352.1	1350.2	1331.4	77.1	8.3	110	3570	16790	1919	60.0	1.15	1.16	30.2	30.0	.35	.39	1.2	.62	.85	1.41	1.15	1.84	147.1	8.20	531
D * 23:53	1353.1	1351.2	1332.9	52.4	7.0	110	3570	16759	1939	59.6	1.15	1.16	30.1	30.4	.35	.40	1.2	.73	.85	1.03	1.15	1.66	148.1	8.21	528
D * 23:54	1354.1	1352.4	1334.4	66.5	7.0	110	3570	16720	1927	59.2	1.15	1.16	30.1	30.6	.35	.39	1.2	.62	.85	1.40	1.15	1.83	149.3	8.22	524
D * 23:55	1355.4	1353.7	1335.6	69.0	7.8	111	4410	16821	1919	59.2	1.15	1.17	30.1	30.4	.36	.40	1.2	.60	.85	1.03	1.15	1.66	150.6	8.24	521
D * 23:55	1356.1	1354.1	1337.5	50.9	7.7	110	4620	16821	1939	59.0	1.15	1.16	30.1	30.3	.36	.39	1.2	.75	.85	1.03	1.15	1.66	151.6	8.25	518
D * 23:56	1357.0	1355.3	1337.5	107.	5.4	110	3970	16803	1939	59.2	1.15	1.17	30.1	30.3	.36	.40	1.2	.44	.85	1.03	1.15	1.66	152.2	8.26	515
D * 23:56	1358.0	1356.2	1338.4	107.	6.3	107	4410	16914	1937	59.0	1.15	1.17	30.1	30.2	.36	.40	1.2	.54	.85	1.53	1.15	1.89	153.1	8.27	513
D * 0: 0	1359.2	1357.8	1343.6	85.1	6.5	109	4620	16931	2033	57.2	1.15	1.16	29.9	31.0	.35	.40	1.2	.61	.85	1.42	1.15	1.84	154.7	8.29	509
D * 0: 0	1360.1	1358.2	1344.2	46.5	5.5	107	4200	16262	1980	57.0	1.15	1.16	29.8	31.1	.36	.39	1.2	.74	.85	1.03	1.15	1.66	155.1	8.30	508
D * 0: 9	1361.0	1359.2	1344.5	73.2	7.5	110	4410	16231	1884	56.8	1.15	1.16	29.9	31.0	.36	.39	1.2	.67	.85	1.03	1.15	1.66	156.1	8.31	505
D * 0:10	1362.1	1360.2	1344.8	91.6	7.3	108	4620	16169	1864	56.6	1.15	1.16	29.8	30.9	.36	.39	1.2	.59	.85	1.46	1.15	1.86	157.1	8.33	502
D * 0:11	1363.0	1361.2	1345.1	87.5	7.5	107	4620	16076	1882	56.4	1.15	1.16	29.8	30.9	.36	.39	1.2	.60	.85	1.43	1.15	1.85	158.1	8.34	499
D * 0:12	1364.1	1362.2	1345.4	59.6	8.0	108	4620	16107	1884	56.2	1.15	1.16	29.8	30.9	.36	.39	1.2	.70	.85	1.03	1.15	1.66	159.1	8.36	497
D * 0:13	1365.2	1363.3	1345.4	116.	7.2	108	4620	15921	1924	56.2	1.15	1.16	29.8	30.6	.36	.41	1.2	.63	.85	1.40	1.15	1.83	160.7	8.37	493
D * 0:14	1366.0	1364.2	1346.3	72.9	7.7	107	5670	16076	1884	56.0	1.15	1.16	29.8	30.4	.36	.41	1.2	.63	.85	1.40	1.15	1.83	161.1	8.39	492
D * 0:21	1367.1	1365.1	1349.4	45.4	9	101	3150	14330	1810	56.2	1.15	1.16	29.7	30.2	.36	.41	1.2	.74	.85	1.03	1.15	1.66	162.0	8.41	489
D * 0:23	1368.1	1366.7	1349.7	52.0	6.3	108	5040	16021	1921	55.6	1.15	1.21	29.7	30.2	.36	.41	1.2	.70	.86	1.03	1.15	1.66	163.6	8.43	486



DN-LINE TDC  
GEOSERVICES

BIT REPORT

\* 10/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT#14 RUN#29

#BIT TYPE :TOOTH

#BIT IDENTITY :REED S13

\*\*\*\*\*  
#BIT SIZE : 8.50 INCH

#BIT COST : 7000. \$ RIG COST/HR: 5833.

\*\*\*\*\*  
#NOZZLES : 12 12 12 /32NDS @ 95 % EFFICIENCY

\*\*\*\*\*  
#DEPTH IN : 1204.50 METERS 9/ 6/82

#DEPTH OUT : 1406.00 METERS 10/ 6/82

#METRAGE : 201.50 METERS

#TOTAL REVOLUTIONS : 59

\*\*\*\*\*  
#DRILLING TIME: 9:22 HR AVERAGE ROP: 21.52 M/HR

#TIME IN HOLE : 16:31 HR AVERAGE ROP: 12.20 M/HR

#TRIP TIME : 4: 0 HR

\*\*\*\*\*  
#DRILLING COST STANDARD : 620.5 \$/MET

#DRILLING COST ON BOTTOM : 421.5 \$/MET

#DRILLING COST MINIMUM : 421.3 \$/MET

\*\*\*\*\*  
# AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

#WEIGHT ON BIT : 8.30 TONS NOZZLES SPEED : 150.58 M/S

#ROTATION : 106.00 RPM PRESSURE DROP : 14420 KPA

#FLOW RATE : 1930.00 L/MN HYDRAULIC POWER: 622.45 H.P

#STAND PIPE PRESSURE: 16400 KPA

\*\*\*\*\*



\* 10/ 6/82 TIME 3:44

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 1406.00 METERS \*  
\* FLOW RATE 1930 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.15 SG \*  
\* PV 10 CPS \*  
\* YP 10.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N .6374 \*  
\* K .3379 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 60.92 M3 \*  
\* WITHOUT PIPES 60.29 M3 \*  
\* ANNULAR 48.98 M3 \*  
\* INSIDE PIPES 11.94 M3 \*

\*\*\*\*\*  
\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES\* H.P \* TYPE\* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAM \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* L/MN \* M/MN M/MN \*

* SURF. EQPT *												
* DR. STRING *	.00	1186.80	4.28	5.00		1398	60					
* DR. STRING *	1186.80	1242.50	3.00	5.00		360	16					
* DR. STRING *	1242.50	1414.10	2.81	6.50		1509	65					
* BIT *						14428	622	M/S		150.6		
* ANNULUS *	1406.00	1234.40		6.50	8.50	286	9	TU	1094.7	127.0	123.4	
* ANNULUS *	1234.40	1184.00		5.00	8.50	14	1	TU	1327.1	80.6	77.5	
* ANNULUS *	1184.00	1178.70		5.00	8.69	1	0	TU	1384.2	75.4	72.3	
* ANNULUS *	1178.70	143.00		5.00	8.69	234	10	TU	1384.2	75.4	72.3	
* ANNULUS *	143.00	.00		5.00	16.75	3	0	LA	4073.2	14.9	12.7	
* TOTAL *						18451	776					

\*\*\*\*\*  
\* ANNULAR PRESSURE LOSSES 458 KPA \*

\* EQUIV. CIRCULATING DENSITY 1.18 SG \*  
\* MAX DEPTH 5069.28 \*

\* MUD LAG TIMES S -> B 6.19 MN \*  
\* B -> S 25.30 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 27.60 MN \*  
\* MAX SLIP VELOCITY 3.52 M/MN \*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 12 12 12 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 14428 KPA \*  
\* H.H.P. RATIO 78.19 % \*  
\* BIT H.H.P. 10.969 \*  
\* BIT VELOCITY 150.58 M/S \*



GEOSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\*\*\*\*\*

\* 10/6/82

HAMMERHEAD #1

\*\*\*\*\*

\*\*\*\*\*  
\* BIT#15 RUN#30 SEQ NBR: 0 \*

\* STARTING DEPTH 1406.00 METERS \*

\* BIT DATA SIZE 0.50 \*

\* INSERT REED HSS1 \*

\* NOZZLES 11 11 11 @ 95 % EFFICIENCY \*

\*\*\*\*\*  
\* DRILL STRING\* TYPE \* NBR \* LENGTH \* ID OD \* NOMINAL LINEAR \*

\* SECTION \* \* METERS \* INCHES \* WEIGHT (KG/M) \*

\* 1 \* DRILL PIPE \* 127 \* 9.20 \* 4.20 5.00 \* 29.02 \*

\* 2 \* HEAVY WGT DP \* 1 \* 55.70 \* 3.00 5.00 \* 73.00 \*

\* 3 \* DRILL COLLAR \* 1 \* 173.34 \* 2.01 6.50 \* 136.40 \*

\*\*\*\*\*  
\* HOLE \* ID \* DEPTH (METERS) \*

\* \* INCHES \* TOP BOTTOM \*

\* RISER \* 16.75 \* .00 143.00 \*

\* CASING \* 8.67 \* 143.00 1104.00 \*

\* OPEN HOLE 1 \* 0.50 \* 1104.00 1406.00 \*

\*\*\*\*\*  
\* COST DATA BIT COST 0000 \$ RIG COST 5033 \$/HR \*

\* TRIP TIME 4.00 HRS \*

\* WEIGHTS HOOK LOAD OFF BOTTOM 96.3 TONS \*

\* STRING WEIGHT IN AIR 81.7 TONS \*

\* VOLUMES ANNULUS 49.0 M3 IN PIPES 11.9 M3 \*

\* DEVIATION 1.5 DEG 2.61 M / 100 M \*

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/HN : 13 KPA \*

\* BIT WEAR TYPE EXPONENT .2 \*

\* EXPECTED: RUN LENGTH 300 METERS TEETH WEAR 3 /0TH \*

\*\*\*\*\*

\* BIT#15 RUN#30 REED HSSI BIT DIAMETER : 0.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS : PV = 10 YP = 10 GEL = 2 \*

TIME	DEPTH			DRILLING PARAMETERS							MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT			
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		GAS		DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
	Net	Net	Net	m/hr	ton	rpm	Nm	KPA	l/min	m <sup>3</sup>	sq	IN	OUT	IN	OUT	shar	unit		sq	sq	sq	met	Dhr	\$/m		
T 9:56	1406.0	1404.5	1403.6			71	1890	17224	1517	47.2	1.15	1.17	27.3	18.8	.39	.41	-1.2									
D 9:57	1407.2	1407.5	1403.6	43.7	8.9	69	2100	16634	1903	47.8	1.15	1.17	27.2	19.7	.40	.40	-1.2	.01	.86	1.03	1.15	1.67	3.8	.01	10394	
D 10: 7	1408.2	1408.5	1405.7	8.2	7.7	123	2310	18106	1792	45.6	1.15	1.15	25.3	20.2	.38	.39	.0	1.31	.86	1.03	1.15	1.67	4.0	.05	7914	
D 10: 8	1409.1	1409.0	1405.7	39.9	9.3	121	5670	18310	1775	45.2	1.15	1.15	25.2	20.7	.38	.39	.0	.98	.86	1.03	1.15	1.67	4.5	.06	7050	
D 10:10	1410.2	1410.5	1405.7	36.5	8.3	122	5670	18341	1792	45.0	1.15	1.15	25.2	20.7	.38	.39	.0	1.03	.86	1.03	1.15	1.67	6.0	.10	5300	
D 10:12	1411.2	1411.5	1406.0	37.6	9.7	120	5460	18106	1792	45.2	1.15	1.16	25.3	20.7	.38	.39	.0	1.00	.86	1.03	1.15	1.67	7.0	.13	4580	
D 10:14	1412.2	1412.5	1406.0	36.6	8.8	123	5250	17930	1810	45.0	1.15	1.16	25.3	20.8	.39	.40	1.2	1.02	.86	1.03	1.15	1.67	8.0	.16	4024	
D 10:15	1413.2	1413.5	1406.0	38.5	10.2	120	5040	17721	1810	45.0	1.15	1.16	25.4	20.9	.39	.41	.0	1.07	.86	1.03	1.15	1.67	9.0	.19	3601	
D 10:17	1414.2	1414.5	1406.0	37.5	8.9	122	6890	17441	1790	44.8	1.15	1.16	25.5	20.0	.38	.40	.0	1.01	.86	1.03	1.15	1.67	10.0	.22	3263	
D 10:31	1416.8	1417.2	1406.7	45.2	10.5	127	4200	16076	1806	48.4	1.15	.98	26.1	20.3	.39	.54	1.2	.42	.86	1.03	1.15	1.67	12.7	.27	2580	
D 10:32	1417.2	1417.5	1406.7	37.3	9.4	129	5800	15059	1866	48.2	1.15	.99	26.1	20.8	.39	.53	1.2	1.00	.86	1.03	1.15	1.67	13.0	.28	2538	
D 10:35	1418.1	1418.0	1407.3	29.0	6.9	129	7770	17224	1886	47.2	1.15	1.01	26.1	20.6	.39	.43	1.2	1.00	.86	1.03	1.15	1.67	13.5	.32	2441	
D 10:39	1419.1	1419.5	1407.6	8.4	9.8	128	7350	16945	1975	46.8	1.15	1.03	26.3	20.3	.39	.42	1.2	1.42	.86	1.03	1.15	1.67	13.8	.39	2582	
D 10:47	1420.2	1420.5	1408.2	14.8	11.1	123	6930	12617	1992	50.2	1.15	1.03	26.4	20.7	.40	.42	1.2	1.35	.86	1.03	1.15	1.67	14.0	.53	2454	
D 10:49	1421.2	1421.6	1408.2	39.9	8.7	119	7140	14462	1987	50.2	1.15	1.03	26.3	20.6	.40	.42	2.5	1.01	.86	1.03	1.15	1.67	15.1	.56	2294	
D 10:58	1422.1	1420.6	1409.4	4.1	11.1	127	7140	9240	2063	48.8	1.15	1.17	26.3	20.6	.40	.41	1.2	1.67	.86	1.03	1.15	1.67	16.0	.70	2212	
T 11:10	1422.6	1421.1	1419.8			31	1470	9277	465	50.8	1.15	1.20	26.2	20.2	.39	.39	2.5									
D 11:36	1423.2	1421.6	1422.2	2.6	10.4	107	2940	13810	2197	39.7	1.15	1.17	26.4	20.4	.39	.41	1.2	1.71	.86	1.03	1.15	1.67	17.0	1.03	2186	
T 11:56	1424.0	1422.1	1422.5			103	2940	10614	1836	43.2	1.15	1.16	27.5	20.0	.40	.42	2.5									
D 11:58	1424.1	1422.6	1422.5	3.8	10.3	106	2940	11514	1853	43.4	1.15	1.16	27.5	20.0	.40	.40	1.2	1.63	.86	1.03	1.15	1.67	18.0	1.34	2172	
T 12:18	1424.8	1423.1	1423.1			0	.000	8534	1563	48.8	1.15	1.17	27.5	20.0	.42	.39	1.2									
D 12:18	1425.1	1423.1	1423.4	5.3	2.8	106	1890	11359	1941	47.4	1.15	1.17	27.5	20.3	.42	.41	1.2	1.51	.86	1.03	1.15	1.67	18.5	1.55	2144	
D 12:24	1426.1	1424.1	1423.9	23.9	8.1	122	3360	11762	2214	45.8	1.15	1.16	27.5	20.2	.41	.40	1.2	1.07	.86	1.03	1.15	1.67	19.5	1.65	2073	
D 12:39	1427.1	1425.6	1424.6	5.2	8.2	125	3360	13500	2568	49.8	1.15	1.16	27.8	20.8	.40	.42	2.5	1.50	.86	1.03	1.15	1.67	21.0	1.90	2018	
D 12:51	1428.1	1426.6	1426.5	6.5	9.2	120	3150	14959	2637	54.6	1.15	1.16	27.7	20.9	.38	.42	2.5	1.42	.86	1.03	1.15	1.67	22.0	2.10	1970	
D 12:56	1429.1	1427.2	1426.5	6.8	7.6	124	3150	15207	2619	54.6	1.15	1.16	27.8	20.9	.38	.42	1.2	1.47	.86	1.03	1.15	1.67	22.6	2.17	1946	
D 13: 8	1430.2	1428.6	1427.1	5.8	9.4	122	3150	16479	1728	54.6	1.15	1.17	28.1	20.7	.38	.43	1.2	1.45	.86	1.03	1.15	1.67	24.0	2.29	1857	
D 13:28	1431.2	1429.6	1428.6	3.5	10.9	122	3150	16262	1728	55.8	1.15	1.16	28.4	20.4	.39	.43	1.2	1.67	.86	1.03	1.15	1.67	25.0	2.61	1855	
D 13:44	1432.2	1430.7	1430.1	4.7	10.1	122	3360	16510	1745	56.4	1.15	1.16	28.7	20.8	.39	.41	1.2	1.59	.86	1.03	1.15	1.67	26.1	2.82	1831	
D 14: 0	1433.1	1431.6	1431.8	4.6	10.2	121	3150	16440	1745	56.2	1.15	1.16	28.9	20.6	.39	.43	2.5	1.58	.86	1.03	1.15	1.67	27.0	3.09	1827	
D 14:14	1434.1	1432.6	1432.0	3.8	10.9	121	3150	16541	1745	57.8	1.15	1.18	29.0	20.9	.39	.43	1.2	1.66	.86	1.03	1.15	1.67	28.0	3.32	1808	
D 14:31	1435.1	1433.6	1432.6	6.7	9.3	119	1890	16169	1780	56.6	1.15	1.17	29.1	21.5	.40	.43	1.2	1.43	.86	1.03	1.15	1.67	29.0	3.48	1779	
D 14:40	1436.4	1434.8	1433.5	7.2	9.0	122	1890	17038	1745	58.2	1.15	1.17	29.3	21.3	.39	.44	1.2	1.42	.86	1.03	1.15	1.67	30.2	3.64	1740	
D 14:42	1437.1	1435.1	1433.5	16.2	8.6	122	1890	17193	1745	58.4	1.15	1.16	29.3	21.4	.39	.43	1.2	1.18	.86	1.03	1.15	1.67	31.1	3.68	1697	
D 14:43	1438.2	1436.6	1433.5	9.4	7.6	121	1470	17224	1745	58.4	1.15	1.17	29.3	21.3	.39	.43	1.2	.73	.86	1.03	1.15	1.67	32.0	3.69	1650	
D 14:48	1439.3	1437.6	1433.8	45.8	9.4	117	2100	17038	1730	58.6	1.15	1.17	29.4	21.4	.39	.45	2.5	.90	.86	1.03	1.15	1.67	33.0	3.73	1608	
D 14:53	1440.2	1438.6	1434.1	11.4	7.2	111	4030	17869	1745	59.4	1.15	1.17	29.4	21.4	.39	.43	1.2	1.25	.86	1.03	1.15	1.68	34.0	3.81	1575	
D 14:58	1441.1	1439.6	1434.4	12.1	8.6	113	5040	17162	1763	59.8	1.15	1.17	29.5	21.5	.39	.43	1.2	1.26	.86	1.03	1.15	1.68	35.0	3.89	1542	
D 15:10	1442.1	1440.6	1435.6	4.8	9.4	113	4620	16790	1740	60.6	1.15	1.17	29.5	21.2	.39	.44	1.2	1.55	.86	1.03	1.15	1.68	36.0	4.08	1530	
D 15:27	1443.1	1441.6	1440.5	3.7	8.2	117	4410	16852	1761	61.2	1.15	1.18	29.7	21.1	.39	.45	1.2	1.49	.86	1.03	1.15	1.68	37.0	4.36	1534	
T 15:47	1444.0	1442.1	1442.3			116	4410	16866	1756	61.4	1.15	1.16	29.8	21.3	.40	.44	1.2									
D 15:50	1444.1	1442.6	1442.3	3.4	9.0	109	4200	16634	1766	61.4	1.15	1.16	29.9	21.5	.40	.44	1.2	1.58	.86	1.03	1.15	1.68	38.0	4.76	1545	
T 16:11	1444.8	1443.1	1443.2			106	2730	14420	1597	62.6	1.15	1.17	29.8	21.4	.39	.44	1.2									
D 16:16	1445.1	1443.6	1443.5	3.1	8.7	103	2940	13740	2276	62.6	1.15	1.17	29.9	21.7	.40	.44	1.2	1.56	.86	1.03	1.15	1.68	39.0	5.09	1562	
D 16:32	1446.1	1444.6	1444.1	5.3	7.9	121	3360	17887	1939	63.4	1.15	1.17	30.1	21.8	.39	.45	1.2	1.44	.86	1.03	1.15	1.68	40.0	5.31	1554	
D 16:40	1447.1	1445.7	1444.5	9.1	8.3	122	3360	16510	1853	63.8	1.15	1.16	30.1	21.7	.39	.45	1.2	1.33	.86	1.03	1.15	1.68	41.1	5.44	1535	
D 16:43	1448.1	1446.6	1444.8	29.8	8.4	122	3570	17869	1838	64.8	1.15	1.16	30.2	21.6	.39	.45	1.2	1.03	.86	1.03	1.15	1.68	42.1	5.49	1505	
D 16:46	1449.1	1447.2	1445.1	21.4	7.6	122	3360	17038	1848	64.2	1.15	1.16	30.2	21.5	.39	.44	1.2	1.89	.86	1.03	1.15	1.68	42.6	5.53	1489	
D 16:48	1450.1	1448.6	1445.1	18.4	8.4	116	5670	17100	1848	64.2	1.15	1.16	30.3	21.5	.39	.43	1.2	1.13	.86	1.03	1.15	1.68	44.0	5.57	1451	







\* 11/ 6/82 TIME 5:14

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1524.16 METERS  
\* FLOW RATE 1900 L/MN POWER LAW

\* MUD DATA WEIGHT 1.20 SG  
\* PV 18 CPS  
\* YP 29.00 LB/FT2  
\* GEL 2.00 LB/100 FT2  
\* N .4054  
\* K 2.1801 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 64.76 M3  
\* WITHOUT PIPES 72.62 M3  
\* ANNULAR 51.79 M3  
\* INSIDE PIPES 12.97 M3

\* \* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAH \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* \* L/MN \* M/MN M/MN \*

\*SURF. EQPT\* \* 338 14 \* \* \* \*  
\*DR.STRING\* .00 1297.20 \* 4.28 5.00 \* 1729 73 \* \* \* \*  
\*DR.STRING\* 1297.20 1352.90 \* 3.00 5.00 \* 487 17 \* \* \* \*  
\*DR.STRING\* 1352.90 1526.24 \* 2.81 6.50 \* 1724 73 \* \* \* \*  
\*BIT \* \* \* \* 20665 878 \* M/S \* 176.4 \* \*  
\*ANNULUS \* 1524.16 1350.82 \* 6.50 8.50 \* 348 15 \* LA 2117.9 \* 125.0 122.5 \*  
\*ANNULUS \* 1350.82 1295.12 \* 5.00 8.50 \* 40 2 \* LA 2788.0 \* 79.4 77.8 \*  
\*ANNULUS \* 1295.12 1184.00 \* 5.00 8.50 \* 80 3 \* LA 2788.0 \* 79.4 77.8 \*  
\*ANNULUS \* 1184.00 143.00 \* 5.00 8.69 \* 670 28 \* LA 2930.6 \* 74.2 72.8 \*  
\*ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 9 0 \* LA 10229. \* 14.7 14.1 \*  
\* TOTAL \* \* \* \* 20809 1185 \* \* \* \*

\*ANNULAR PRESSURE LOSSES 1146 KPA

\*EQUIV.CIRCULATING DENSITY 1.28 SG  
\* MAX DEPTH 2579.86

\* MUD LAG TIMES S -> D 6.82 MN  
\* D -> S 27.26 MN

\* CUTTINGS DATA SIZE .20 CM  
\* DENSITY 2.40 SG  
\* LAG TIME 28.00 MN  
\* MAX SLIP VELOCITY 2.45 M/MN

\* BIT DATA SIZE 8.50 INCH  
\* NOZZLES 11 11 11 /32NDS  
\* NOZZLES EFFICIENCY 95 %  
\* BIT P. LOSSES 20665 KPA  
\* H.H.P RATIO 79.45 %  
\* BIT H.H.P 15.467  
\* BIT VELOCITY 176.41 M/S



\* BIT#15 RUN#30 REED HSG1 BIT DIAMETER : 8.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS : PV = 18 YP = 29 GEL = 2 \*

TIME	DEPTH			DRILLING PARAMETERS							MUD PARAMETERS				OVERPRESSURE SURVEY					ACCUMULATED ON BIT					
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		GAC	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
	hr:min	net	net	net	m/hr	ton	rpm	Nm	KPA	L/min	m3	IN	OUT	IN	OUT	ohm	unit	sg	sg	sg	sg	net	Dhr	\$/hr	
T 5:27	1524.2	1522.6	1523.1			0	.000	-1428	0	53.2	1.20	1.22	33.2	35.1	.41	.41	8.7								
T 5:47	1524.8	1523.0	1523.7			114	1680	16231	1941	50.6	1.20	1.19	32.9	35.1	.43	.45	2.5								
D 6:0	1525.1	1523.5	1524.0	1.7	0.5	120	1890	15952	1926	50.4	1.20	1.19	33.0	35.5	.43	.46	3.7	1.61	.87	1.03	1.20	1.69	119.0	17.01	1894
T 6:20	1525.7	1524.1	1524.6			123	3150	15610	1931	49.8	1.20	1.19	33.3	35.7	.44	.46	5.0								
D 6:36	1526.1	1524.5	1525.2	1.7	12.7	129	3150	15952	1906	49.4	1.20	1.19	33.7	35.4	.43	.47	2.5	1.79	.87	1.03	1.20	1.69	120.0	17.60	1115
T 6:56	1526.8	1525.0	1525.5			131	3360	15734	1918	49.0	1.20	1.19	33.9	35.6	.44	.47	.0								
T 7:0	1527.2	1525.6	1526.1	1.7	13.0	131	3360	15540	1941	48.6	1.20	1.19	33.9	35.5	.44	.47	-1.2	1.91	.87	1.03	1.20	1.69	121.0	18.14	1132
T 7:28	1527.6	1526.0	1526.7			133	3360	15145	1934	47.6	1.20	1.19	34.1	35.8	.44	.47	-1.2								
D 7:44	1528.1	1526.6	1527.1	1.9	12.1	132	3360	14640	1924	46.6	1.20	1.19	34.0	36.0	.45	.47	-2.5	1.86	.87	1.03	1.20	1.69	122.0	18.74	1151
T 8:4	1528.5	1526.6	1527.4			0	.000	-1428	0	42.2	1.20	1.22	34.1	36.1	.42	.44	10.0								
D 8:23	1529.2	1527.5	1528.0	1.3	14.2	125	3150	16003	1889	42.0	1.20	1.19	34.2	36.2	.43	.46	-2.5	1.93	.87	1.03	1.20	1.69	123.0	19.25	1165
T 8:43	1529.7	1528.0	1528.6			124	3150	15579	1906	42.4	1.20	1.21	34.4	36.3	.43	.47	-1.2								
D 8:56	1530.1	1528.5	1529.2	1.9	11.0	122	2940	14959	1921	42.0	1.20	1.21	34.6	36.4	.43	.45	3.7	1.03	.87	1.03	1.20	1.69	124.0	19.80	1182
T 9:16	1531.0	1529.0	1529.8			125	3360	14617	1921	43.0	1.20	1.20	34.9	36.3	.43	.46	1.2								
D 9:18	1531.1	1529.5	1529.8	2.6	11.9	126	3150	14617	1921	42.6	1.20	1.20	34.8	36.4	.43	.46	.0	1.71	.87	1.03	1.20	1.69	125.0	20.16	1190
D 9:29	1532.1	1530.6	1530.1	29.9	13.5	126	3570	15393	1710	43.0	1.20	1.20	34.8	36.6	.43	.46	-1.2	1.87	.87	1.03	1.20	1.69	126.1	20.25	1185
D 9:31	1533.1	1531.6	1530.1	65.2	13.6	126	3150	15236	1728	43.0	1.20	1.19	34.8	36.3	.43	.46	-2.5	.92	.87	1.03	1.20	1.69	127.0	20.28	1178
D 9:40	1534.1	1532.1	1530.1	42.9	10.5	127	1890	15269	1810	42.6	1.20	1.20	34.7	36.4	.43	.47	5.0	1.01	.87	1.03	1.20	1.69	127.6	20.31	1173
D 9:42	1535.1	1533.6	1530.4	26.7	13.0	126	3700	14524	1673	42.6	1.20	1.19	34.7	36.4	.43	.46	.0	1.15	.87	1.03	1.20	1.69	129.1	20.34	1162
T 10:2	1535.6	1534.0	1531.0			129	3700	15406	1728	41.0	1.20	1.19	34.4	35.9	.43	.47	-1.2								
D 10:13	1536.1	1534.5	1531.9	2.6	13.7	130	3360	14183	1728	41.8	1.20	1.20	34.4	35.8	.43	.46	-5.0	1.70	.87	1.03	1.20	1.70	130.0	20.58	1163
D 10:21	1537.2	1535.6	1534.1	7.5	13.0	129	3700	13345	1728	42.4	1.20	1.20	34.2	35.5	.46	.47	-2.5	1.54	.87	1.03	1.20	1.70	131.0	20.71	1161
D 10:26	1538.1	1536.6	1535.3	0.3	12.9	61	2100	4120	1253	42.2	1.20	1.22	34.3	35.3	.44	.45	5.0	1.37	.87	1.03	1.20	1.70	132.1	20.79	1155
D 10:29	1539.1	1537.5	1535.6	33.9	12.5	123	2310	14369	1655	41.8	1.20	1.20	34.3	34.9	.44	.46	5.0	1.05	.87	1.03	1.20	1.70	133.0	20.84	1149
D 10:38	1540.1	1538.5	1535.6	3.7	14.9	123	3360	15703	1693	42.6	1.20	1.20	34.2	34.4	.44	.47	-6.2	1.74	.87	1.03	1.20	1.70	134.0	21.00	1147
D 10:52	1541.2	1539.6	1536.5	0.3	13.6	127	3570	14121	1921	45.4	1.20	1.20	34.0	34.3	.45	.47	.0	1.49	.87	1.03	1.20	1.70	135.1	21.22	1148
D 10:56	1542.1	1540.0	1537.4	0.0	12.6	125	3990	13252	1921	45.0	1.20	1.20	33.7	34.3	.45	.47	-1.2	1.50	.87	1.03	1.20	1.70	135.5	21.29	1147
D 10:59	1543.1	1541.0	1538.3	27.0	13.4	125	3570	13159	1921	45.6	1.20	1.20	33.7	34.2	.45	.46	-1.2	1.16	.87	1.03	1.20	1.70	136.5	21.34	1140
D 11:1	1544.1	1542.5	1539.2	29.4	11.0	126	3570	12840	1939	46.6	1.20	1.20	33.7	34.1	.45	.47	-1.2	1.10	.87	1.03	1.20	1.70	138.0	21.30	1131
D 11:3	1545.2	1543.0	1539.5	25.8	12.4	127	3360	13314	1939	46.4	1.20	1.20	33.4	34.1	.45	.40	1.2	1.12	.87	1.03	1.20	1.70	130.5	21.40	1127
T 11:23	1545.7	1544.1	1541.1			49	1470	13252	1921	40.4	1.20	1.19	33.4	37.0	.45	.45	5.0								
T 11:43	1545.7	1544.1	1545.6			0	.000	13500	1886	40.2	1.20	1.19	33.8	38.0	.45	.47	1.2								
T 12:3	1545.7	1544.1	1545.6			47	1470	-155	1636	47.0	1.20	1.21	34.7	37.1	.44	.44	7.5								
D 12:11	1546.2	1544.6	1545.6	10.0	11.9	125	3150	14307	2582	47.2	1.20	1.20	34.7	35.4	.44	.47	-3.7	1.23	.87	1.03	1.20	1.70	140.0	21.47	1117
D 12:24	1547.2	1545.5	1545.6	4.3	11.4	125	3360	12476	2638	50.2	1.20	1.20	35.5	34.4	.44	.46	1.2	1.59	.87	1.03	1.20	1.70	141.0	21.67	1119
D 12:41	1548.1	1546.6	1546.3	6.1	11.0	120	3360	13003	2439	49.2	1.20	1.20	33.0	34.4	.44	.46	1.2	1.47	.87	1.03	1.20	1.70	142.1	21.84	1117
D 13:0	1549.2	1547.5	1547.8	2.2	12.6	122	3150	12352	2477	52.2	1.20	1.20	33.3	33.7	.43	.45	5.0	1.77	.87	1.03	1.20	1.70	143.0	22.17	1123
D 13:4	1550.2	1548.5	1548.1	16.0	9.0	126	3150	12352	2485	52.4	1.20	1.20	33.1	33.0	.44	.45	7.5	1.18	.87	1.03	1.20	1.70	144.0	22.23	1118
D 13:6	1551.2	1549.0	1548.1	28.4	10.0	120	3360	12290	2477	52.6	1.20	1.20	33.1	33.0	.44	.45	8.7	1.00	.87	1.03	1.20	1.70	144.5	22.27	1115
D 13:14	1552.3	1550.1	1540.4	23.0	.0	0	.000	-1366	0	55.2	1.20	1.22	33.0	33.7	.43	.44	15.0	1.10	.87	1.03	1.20	1.70	145.6	22.32	1108
D 13:16	1553.4	1551.7	1548.4	31.0	2.0	99	1890	11141	2422	55.0	1.20	1.21	32.9	33.6	.43	.44	17.5	.23	.87	1.03	1.20	1.70	147.1	22.33	1098
D 13:16	1554.3	1552.6	1548.4	20.0	3.7	116	2100	11328	2457	55.0	1.20	1.21	33.0	33.6	.43	.44	17.5	.38	.87	1.03	1.20	1.70	148.1	22.33	1091
D 13:19	1555.2	1553.6	1548.7	15.0	11.3	120	3700	11024	2447	57.0	1.20	1.20	32.0	34.1	.43	.44	10.0	1.20	.87	1.03	1.20	1.70	149.1	22.38	1086
D 13:24	1556.1	1554.6	1548.7	7.6	10.6	127	3700	11630	2457	59.2	1.20	1.21	32.0	33.7	.43	.46	11.3	1.43	.87	1.03	1.20	1.70	150.0	22.47	1082
D 13:31	1557.2	1555.6	1550.2	7.4	10.1	126	3700	11483	2442	59.6	1.20	1.20	32.5	33.4	.44	.46	3.7	1.41	.87	1.03	1.20	1.70	151.0	22.58	1079
D 13:38	1558.1	1556.6	1551.7	10.3	10.9	132	3700	11266	2462	59.6	1.20	1.20	31.9	33.3	.43	.45	6.2	1.34	.87	1.03	1.20	1.70	152.1	22.69	1076
D 13:43	1559.1	1557.6	1555.1	10.2	10.0	131	3700	11110	2488	59.8	1.20	1.20	31.6	33.3	.43	.45	7.5	1.35	.87	1.03	1.20	1.70	153.1	22.70	1073
D 13:49	1560.1	1558.5	1556.3	12.2	10.3	144	3570	10955	2475	60.0	1.20	1.20	31.6	32.0	.43	.45	11.3	1.30	.87	1.03	1.20	1.70	154.0	22.87	1069
D 13:54	1561.2	1559.6	1556.9	11.9	11.0	130	3570	10986	2470	60.2	1.20	1.19	32.1	32.5	.43	.45	8.7	1.33	.87	1.03	1.20	1.70	155.1	22.97	1066

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE: 11/ 6/82

\* BIT#15 RUN#30 REED HSS1 BIT DIAMETER: 8.50 inch NOZZ 11/11/11

MUD RHEOLOGICAL PARAMETERS: PV = 10 YP = 29 GEL = 2

TIME	DEPTHS			DRILLING PARAMETERS							MUD PARAMETERS				GAS			OVERPRESSURE SURVEY			ACCUMULATED ON BIT				
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	WORN	PF	ECD	FRAC	METER	TIME	COST			
	Hr:mn	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sg	degC	ohm	unit	sg	sg	sg	net	Dhr	\$/m					
D * 14: 2	1562.2	1560.5	1558.1	7.2	12.5	131	3570	10862	2490	60.2	1.20	1.20	32.1	32.2	.44	.45	7.5	1.46	.87	1.03	1.20	1.70	156.0	23.89	1864
D * 14: 5	1563.2	1561.6	1558.0	18.7	18.8	128	3780	10769	2508	60.4	1.20	1.20	32.1	32.2	.44	.45	6.2	1.16	.87	1.03	1.20	1.70	157.0	23.14	1859
T * 14:25	1563.6	1562.1	1561.2			31	1260	10855	2452	60.4	1.20	1.19	31.7	34.6	.44	.45	8.7								
T * 14:45	1563.6	1562.1	1563.6			5	1260	10179	2490	60.2	1.20	1.19	31.8	36.2	.44	.44	7.5								
D * 14:58	1564.1	1562.5	1563.6	13.1	10.4	127	3780	9962	2696	59.8	1.20	1.20	32.4	36.2	.44	.44	8.7	1.20	.87	1.03	1.20	1.70	158.0	23.21	1855
D * 15:11	1565.1	1563.5	1563.6	14.2	10.0	119	2730	11421	2543	58.0	1.20	1.20	34.2	34.0	.44	.46	11.3	1.18	.87	1.03	1.20	1.70	159.0	23.31	1852
D * 15:17	1566.1	1564.5	1563.6	7.8	11.5	121	3780	9683	2920	58.2	1.20	1.20	34.3	34.3	.44	.44	6.2	1.39	.87	1.03	1.20	1.70	160.0	23.40	1849
D * 15:23	1567.2	1565.5	1564.5	10.3	10.6	127	3990	9030	2971	57.6	1.20	1.20	34.1	33.6	.44	.45	5.0	1.33	.87	1.03	1.20	1.70	161.0	23.51	1846
D * 15:29	1568.1	1566.5	1564.8	8.4	10.5	126	3570	8255	3089	57.4	1.20	1.20	33.5	33.5	.44	.45	2.5	1.37	.87	1.03	1.20	1.70	162.0	23.60	1843
D * 15:35	1569.1	1567.5	1565.8	10.2	10.6	124	3780	9683	2999	57.0	1.20	1.20	33.2	33.0	.44	.45	2.5	1.31	.87	1.03	1.20	1.70	163.0	23.71	1840
D * 15:47	1570.2	1568.5	1567.3	11.5	9.5	121	3570	14121	1891	54.6	1.20	1.20	33.1	33.2	.43	.46	.0	1.27	.87	1.03	1.20	1.70	164.0	23.82	1838
D * 15:54	1571.1	1569.6	1567.9	7.9	11.6	117	3360	12786	1871	54.6	1.20	1.20	32.5	33.7	.43	.45	1.2	1.39	.87	1.03	1.20	1.70	165.1	23.93	1835
T * 16:14	1571.6	1570.8	1569.7			117	3150	13810	2257	53.4	1.20	1.20	32.6	34.0	.44	.45	5.0								
T * 16:34	1571.9	1570.8	1571.2			119	3150	12321	1757	52.2	1.20	1.20	32.7	33.7	.44	.45	6.2								
D * 16:47	1572.2	1570.6	1571.6	1.3	12.2	120	3150	12103	1774	51.2	1.20	1.20	32.8	33.0	.44	.45	2.5	1.90	.87	1.03	1.20	1.70	166.1	24.76	1856
D * 17: 3	1573.2	1571.6	1571.6	13.4	11.3	122	3570	12879	1757	50.0	1.20	1.19	32.5	33.4	.44	.45	16.2	1.26	.87	1.03	1.20	1.70	167.1	24.89	1856
D * 17: 7	1574.1	1572.5	1571.6	14.4	11.8	122	3360	12220	1774	49.4	1.20	1.20	32.8	33.5	.44	.45	2.5	1.24	.87	1.03	1.20	1.70	168.0	24.96	1853
D * 17:13	1575.1	1573.5	1571.9	8.5	11.7	119	3570	13221	1774	49.2	1.20	1.22	32.5	33.6	.44	.46	1.2	1.41	.87	1.03	1.20	1.70	169.0	25.06	1850
D * 17:21	1576.1	1574.1	1571.9	11.5	12.2	120	3780	13469	1632	47.4	1.20	1.20	32.4	33.7	.44	.45	20.0	1.33	.87	1.03	1.20	1.70	169.6	25.15	1848
D * 17:28	1577.2	1575.6	1572.2	10.0	12.6	120	3990	11855	1774	47.4	1.20	1.20	32.4	33.1	.44	.46	6.2	1.35	.87	1.03	1.20	1.70	171.1	25.26	1844
D * 17:34	1578.2	1576.5	1572.8	10.1	11.5	123	3780	13779	1777	47.8	1.20	1.20	32.4	33.4	.44	.46	5.0	1.36	.87	1.03	1.20	1.70	172.0	25.36	1842
D * 17:38	1579.1	1577.6	1573.4	11.8	12.8	121	3990	12476	1774	46.0	1.20	1.20	32.4	33.3	.44	.46	2.5	1.31	.87	1.03	1.20	1.70	173.0	25.43	1838
D * 17:42	1580.1	1578.6	1574.3	23.9	11.4	123	4620	10986	1786	45.4	1.20	1.22	32.5	33.5	.43	.47	7.5	1.13	.87	1.03	1.20	1.70	174.1	25.50	1834
D * 17:46	1581.2	1579.6	1574.9	18.7	12.0	121	3990	10707	1791	45.4	1.20	1.20	32.6	33.7	.43	.46	2.5	1.20	.87	1.03	1.20	1.70	175.0	25.55	1830
D * 17:58	1582.1	1580.8	1576.1	19.8	13.3	111	2520	13190	1811	44.4	1.20	1.20	32.4	33.4	.43	.47	17.5	1.20	.87	1.03	1.20	1.70	175.5	25.61	1828
D * 18:16	1583.2	1581.6	1578.6	10.7	12.3	111	2310	14462	1774	41.0	1.20	1.20	32.1	33.1	.42	.45	12.5	1.29	.87	1.03	1.20	1.70	177.1	25.71	1823
D * 18:19	1584.2	1582.6	1579.2	10.8	11.4	111	2730	14493	1755	40.8	1.20	1.21	32.1	32.7	.42	.45	7.5	1.19	.87	1.03	1.20	1.70	178.1	25.76	1820
D * 18:23	1585.1	1583.1	1580.1	10.6	12.2	117	3360	14400	1774	40.3	1.20	1.20	32.4	33.3	.41	.45	6.2	1.20	.87	1.03	1.20	1.71	179.1	25.82	1816
D * 18:27	1586.2	1584.5	1581.3	12.5	13.2	116	3780	15548	1772	40.1	1.20	1.20	32.0	34.2	.40	.45	1.2	1.32	.87	1.03	1.20	1.71	180.0	25.90	1813
D * 18:31	1587.1	1585.5	1581.9	14.8	11.2	118	3570	13487	1777	40.1	1.20	1.20	32.0	34.3	.39	.45	3.7	1.25	.87	1.03	1.20	1.71	181.0	25.96	1810
D * 18:37	1588.2	1586.5	1582.2	13.3	12.6	117	3990	13717	1794	40.3	1.20	1.20	32.1	34.2	.37	.46	5.0	1.30	.87	1.03	1.20	1.71	182.0	26.05	1807
D * 18:43	1589.1	1587.5	1582.8	9.7	11.5	116	4200	16634	1707	39.3	1.20	1.20	32.4	34.0	.35	.47	6.2	1.26	.87	1.03	1.20	1.71	183.0	26.15	1804
D * 18:45	1590.2	1588.6	1582.8	38.4	10.5	118	3570	16728	1724	38.9	1.20	1.21	32.5	34.1	.35	.47	7.5	1.04	.87	1.03	1.20	1.71	184.1	26.19	1800
D * 18:59	1591.2	1589.6	1584.4	32.6	12.7	119	2940	13655	1821	41.2	1.20	1.20	32.2	34.7	.35	.44	17.5	.93	.87	1.03	1.20	1.71	185.1	26.24	996
D * 19: 4	1592.1	1590.5	1585.6	11.8	10.5	122	3990	19383	1770	45.2	1.20	1.20	31.8	33.8	.34	.43	3.7	1.31	.87	1.03	1.20	1.71	186.0	26.31	993
D * 19: 7	1593.2	1591.5	1586.2	13.8	11.1	123	3570	19272	1767	47.8	1.20	1.20	31.6	34.6	.34	.41	5.0	1.27	.87	1.03	1.20	1.71	187.0	26.37	990
D * 19:11	1594.1	1592.5	1587.4	19.8	12.1	122	4200	19334	1767	51.4	1.20	1.20	31.4	35.0	.34	.43	7.5	1.21	.87	1.03	1.20	1.71	188.0	26.43	986
D * 19:17	1595.2	1593.5	1588.3	8.2	11.6	122	4200	16852	1662	58.6	1.20	1.20	31.1	35.1	.32	.42	3.7	1.42	.87	1.03	1.20	1.71	189.0	26.53	984
D * 19:23	1596.2	1594.6	1589.2	12.5	11.2	123	4410	17783	1681	63.2	1.20	1.20	30.9	35.1	.29	.42	12.5	1.31	.87	1.03	1.20	1.71	190.1	26.63	982
D * 19:27	1597.2	1595.5	1590.4	16.3	11.7	124	5250	18080	1681	67.9	1.20	1.20	30.5	34.6	.29	.43	11.3	1.24	.87	1.03	1.20	1.71	191.0	26.70	979
D * 19:30	1598.2	1596.5	1590.4	22.3	12.6	122	5250	17845	1662	69.9	1.20	1.20	30.4	34.8	.29	.41	12.5	1.13	.87	1.03	1.20	1.71	192.0	26.74	975
D * 19:32	1599.2	1597.5	1590.4	39.3	11.8	123	4200	18776	1767	69.9	1.20	1.20	30.3	34.8	.29	.39	12.5	1.00	.87	1.03	1.20	1.71	193.0	26.78	971
D * 19:34	1600.2	1598.5	1591.4	26.9	11.4	121	3360	17845	1734	69.5	1.20	1.20	30.4	34.7	.29	.39	7.5	1.88	.87	1.03	1.20	1.71	194.0	26.82	968
D * 19:40	1601.1	1599.6	1591.7	68.7	12.1	115	2940	15176	1659	66.8	1.20	1.20	30.4	34.7	.29	.38	21.2	.80	.87	1.03	1.20	1.71	195.1	26.83	963
D * 19:42	1602.2	1600.5	1592.0	28.1	11.2	119	6300	16759	1655	66.8	1.20	1.20	30.3	34.9	.29	.39	17.5	1.89	.87	1.03	1.20	1.71	196.0	26.87	959
D * 19:43	1603.2	1601.5	1592.3	24.3	9.9	120	6720	15176	1679	67.4	1.20	1.20	30.4	34.6	.29	.38	13.7	1.80	.87	1.03	1.20	1.71	197.0	26.90	955
D * 19:45	1604.2	1602.5	1593.2	29.3	11.6	119	7140	17969	1751	68.1	1.20	1.20	30.5	34.8	.29	.38	11.3	1.84	.87	1.03	1.20	1.71	198.0	26.93	951
D * 19:48	1605.2	1603.5	1593.8	26.6	11.8	120	6510	17869	1734	68.3	1.20	1.20	30.6	34.8	.29	.38	12.5	1.89	.87	1.03	1.20	1.71	199.0	26.97	948
D * 19:58	1606.2	1604.5	1594.4	29.0	10.9	120	7140	17845	1734	68.3	1.20	1.20	30.6	34.8	.30	.37	13.7	1.87	.87	1.03	1.20				

TIME	DEPTH			DRILLING PARAMETERS						MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT			
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		GAS		DCS	NORW	PF	ECD	FRAC	METER	TIME	COST
hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	L/m	m <sup>3</sup>	sq	degC	IN	OUT	ohm	unit	sq	sq	sq	sq	net	DHr	\$/m		
D * 19:53	1607.2	1605.5	1594.7	20.5	11.5	121	7140	17224	1724	68.1	1.20	1.20	30.8	34.7	.30	.37	13.7	1.16	.87	1.03	1.20	1.71	201.0	27.05	941
D * 19:56	1608.2	1606.5	1595.3	19.4	11.7	119	6510	17255	1681	68.1	1.20	1.20	30.9	34.6	.30	.37	15.0	1.10	.87	1.03	1.20	1.71	202.0	27.11	937
D * 19:58	1609.1	1607.6	1595.6	26.1	10.5	122	6930	18093	1681	68.1	1.20	1.20	31.0	34.7	.30	.37	13.7	1.09	.87	1.03	1.20	1.71	203.1	27.14	934
D * 20:10	1610.2	1608.5	1597.2	27.6	11.5	119	2730	18124	1662	65.0	1.20	1.19	31.4	35.2	.30	.34	18.7	1.03	.87	1.03	1.20	1.71	204.0	27.18	931
D * 20:13	1611.2	1609.6	1598.4	26.0	10.2	120	4410	16883	1621	65.0	1.20	1.19	31.5	35.6	.30	.34	18.7	1.08	.87	1.03	1.20	1.71	205.1	27.22	927
D * 20:15	1612.1	1610.8	1599.0	22.3	10.0	121	3990	17410	1695	65.2	1.20	1.19	31.5	35.0	.31	.34	20.0	1.11	.87	1.03	1.20	1.71	205.5	27.26	925
D * 20:18	1613.2	1611.6	1600.2	16.6	9.9	123	7140	17317	1650	65.4	1.20	1.19	31.7	34.5	.31	.35	18.7	1.19	.87	1.03	1.20	1.71	207.1	27.31	920
D * 20:20	1614.1	1612.6	1601.1	20.2	10.0	118	7140	17317	1643	65.2	1.20	1.19	31.8	35.1	.31	.35	20.0	1.06	.87	1.03	1.20	1.71	208.1	27.34	917
D * 20:22	1615.2	1613.5	1602.6	23.8	10.9	119	7980	17206	1626	64.8	1.20	1.19	31.9	35.1	.31	.36	21.2	1.11	.87	1.03	1.20	1.71	209.0	27.38	914
D * 20:25	1616.1	1614.6	1603.6	23.7	9.7	117	8190	17286	1645	64.6	1.20	1.19	31.9	35.0	.31	.35	20.0	1.07	.87	1.03	1.20	1.71	210.1	27.42	910
D * 20:27	1617.2	1615.5	1604.5	40.2	11.0	122	7770	17317	1698	64.6	1.20	1.19	32.1	35.0	.31	.36	15.0	.94	.87	1.03	1.20	1.71	211.0	27.45	907
D * 20:29	1618.2	1616.5	1605.7	22.9	10.9	119	8190	17317	1645	64.2	1.20	1.19	32.2	35.2	.31	.35	17.5	1.12	.87	1.03	1.20	1.71	212.1	27.50	904
D * 20:40	1619.2	1617.5	1607.0	34.0	10.6	116	2940	16510	1607	64.2	1.20	1.19	32.4	35.3	.31	.36	20.0	.99	.87	1.03	1.20	1.71	213.0	27.53	901
D * 20:42	1620.1	1618.5	1608.7	27.6	11.1	117	4200	17441	1662	64.6	1.20	1.19	32.6	35.5	.31	.35	20.0	1.05	.87	1.03	1.20	1.71	214.0	27.57	898
D * 20:45	1621.2	1619.5	1609.3	18.1	10.6	120	6510	17534	1645	64.6	1.20	1.20	32.6	35.5	.31	.35	17.5	1.15	.87	1.03	1.20	1.71	215.1	27.62	895
D * 20:49	1622.2	1620.6	1609.3	12.7	11.0	116	6510	17255	1645	64.6	1.20	1.19	32.9	35.3	.31	.36	16.2	1.23	.87	1.03	1.20	1.71	216.1	27.69	892
D * 20:53	1623.1	1621.5	1611.2	18.5	11.2	117	6300	17038	1677	65.0	1.20	1.20	32.9	35.5	.31	.37	21.2	1.15	.87	1.03	1.20	1.71	217.1	27.75	890
D * 20:55	1624.1	1622.5	1612.4	27.6	11.1	118	6720	17007	1643	65.0	1.20	1.20	33.0	35.3	.31	.36	17.5	1.05	.87	1.03	1.20	1.71	218.0	27.79	887
D * 21: 3	1625.2	1623.5	1615.1	5.0	10.6	115	5460	16572	1645	64.6	1.20	1.20	33.3	35.2	.31	.37	23.7	1.49	.87	1.03	1.20	1.71	219.0	27.91	886
T * 21:23	1625.0	1624.0	1621.5	---	---	120	5080	15207	1679	64.0	1.20	1.19	33.4	35.5	.33	.37	18.7	---	---	---	---	---	---	---	---
D * 21:31	1626.1	1624.5	1623.7	2.3	13.0	124	5080	15083	1681	64.6	1.20	1.19	33.4	35.7	.33	.36	20.0	1.78	.87	1.03	1.20	1.71	220.0	28.30	893
T * 21:51	1626.0	1625.1	1625.5	---	---	123	6990	14369	1665	66.2	1.20	1.19	33.2	35.5	.33	.36	18.7	---	---	---	---	---	---	---	---
D * 21:58	1627.2	1625.5	1625.8	2.0	12.6	123	6300	13041	1665	66.0	1.20	1.19	33.1	35.3	.34	.36	16.2	1.00	.87	1.03	1.20	1.71	221.1	28.84	903
T * 22:18	1628.1	1626.5	1626.1	---	---	117	3570	12910	1592	60.1	1.20	1.19	32.4	35.4	.33	.37	17.5	---	---	---	---	---	---	---	---
D * 22:19	1628.2	1626.5	1626.1	3.6	12.0	121	3700	12879	1590	60.1	1.20	1.19	32.4	35.4	.34	.37	17.5	1.63	.87	1.03	1.20	1.71	222.0	29.01	903
T * 22:39	1628.7	1627.0	1626.7	---	---	118	3570	15610	1823	73.7	1.20	1.19	32.6	34.0	.34	.39	15.0	---	---	---	---	---	---	---	---
D * 22:53	1629.1	1627.5	1627.9	2.0	12.6	120	5250	15455	1791	76.9	1.20	1.19	32.7	34.6	.34	.38	13.7	1.82	.87	1.03	1.20	1.71	223.0	29.53	911
D * 23:11	1630.2	1628.5	1628.5	3.9	11.9	119	5250	16945	1906	69.7	1.20	1.18	32.4	33.7	.34	.38	15.0	1.64	.87	1.03	1.20	1.71	224.0	29.82	916
D * 23:13	1631.2	1629.5	1628.5	40.5	11.5	119	7770	17224	1878	66.2	1.20	1.18	32.3	33.9	.34	.37	15.0	.90	.87	1.03	1.20	1.71	225.0	29.85	913
D * 23:21	1632.1	1630.5	1628.9	13.7	12.1	121	7140	16845	1871	64.4	1.20	1.18	32.1	33.4	.35	.38	11.3	1.27	.87	1.03	1.20	1.71	226.0	29.99	913
D * 23:23	1633.2	1631.5	1628.9	34.6	11.5	117	7560	16187	1871	64.4	1.20	1.18	32.0	33.5	.34	.38	13.7	.99	.87	1.03	1.20	1.71	227.1	30.02	909
D * 23:29	1634.2	1632.6	1629.2	34.4	12.0	119	4830	12183	1649	65.6	1.20	1.18	31.8	33.9	.34	.37	15.0	1.82	.87	1.03	1.20	1.71	228.1	30.06	906
D * 23:32	1635.1	1633.6	1629.2	16.3	10.9	120	5040	12872	1662	65.6	1.20	1.18	31.8	34.2	.34	.37	12.5	1.21	.87	1.03	1.20	1.72	229.1	30.10	903
D * 23:37	1636.1	1634.6	1629.5	8.3	10.1	122	7770	12134	1659	66.4	1.20	1.19	31.8	33.8	.34	.38	12.5	1.36	.87	1.03	1.20	1.72	230.1	30.20	902
D * 23:52	1637.2	1635.0	1630.4	13.2	3.3	118	2520	14431	1753	69.5	1.20	1.18	31.6	34.0	.34	.38	21.2	1.24	.87	1.03	1.20	1.72	230.5	30.25	901
D * 23:54	1638.2	1636.0	1631.3	27.1	12.0	116	3780	14245	1770	68.1	1.20	1.18	31.5	34.1	.34	.38	16.2	1.05	.87	1.03	1.20	1.72	231.6	30.29	898
D * 23:57	1639.2	1637.5	1631.3	28.0	10.5	120	3570	14121	1753	67.7	1.20	1.18	31.5	34.6	.34	.38	15.0	1.06	.87	1.03	1.20	1.72	233.1	30.34	894
D * 23:59	1640.2	1638.5	1631.6	25.4	11.1	117	3570	13872	1770	67.6	1.20	1.18	31.5	34.6	.34	.38	17.5	1.09	.87	1.03	1.20	1.72	234.0	30.37	891
D * 0: 1	1641.2	1639.5	1632.2	21.1	11.1	119	3780	13810	1753	67.6	1.20	1.18	31.5	34.3	.34	.38	16.2	1.13	.87	1.03	1.20	1.72	235.0	30.41	888
D * 0: 5	1642.2	1640.5	1633.1	19.0	11.1	119	7980	14070	1770	67.6	1.20	1.18	31.5	33.7	.34	.38	16.2	1.15	.87	1.03	1.20	1.72	236.1	30.47	886
D * 0: 6	1643.2	1641.5	1633.4	35.6	11.5	120	7980	14276	1770	68.5	1.20	1.18	31.5	33.5	.34	.39	15.0	.99	.87	1.03	1.20	1.72	237.0	30.50	883
D * 0:15	1644.2	1642.5	1635.6	28.7	11.3	115	3570	14990	1751	71.3	1.20	1.18	31.5	33.6	.34	.38	13.7	1.05	.87	1.03	1.20	1.72	238.0	30.53	880
D * 0:16	1645.2	1643.6	1635.9	42.4	10.6	118	6510	15207	1751	71.5	1.20	1.19	31.5	33.7	.34	.38	15.0	.95	.87	1.03	1.20	1.72	239.1	30.55	876
D * 0:19	1646.2	1644.5	1636.2	20.1	11.2	119	7770	15145	1767	71.5	1.20	1.19	31.5	33.8	.34	.38	12.5	1.16	.87	1.03	1.20	1.72	240.1	30.60	874
D * 0:31	1647.2	1645.6	1636.8	37.1	10.3	120	3990	15859	1770	70.5	1.20	1.18	31.7	34.3	.34	.38	17.5	.98	.87	1.03	1.20	1.72	241.1	30.63	871
D * 0:33	1648.1	1646.6	1636.8	33.5	11.6	122	6930	15859	1786	70.1	1.20	1.17	31.8	34.3	.34	.37	15.0	1.03	.87	1.03	1.20	1.72	242.1	30.66	868
D * 0:37	1649.1	1647.6	1638.3	18.0	10.6	119	8400	15828	1883	68.9	1.20	1.17	31.8	33.7	.34	.38	11.3	1.17	.87	1.03	1.20	1.72	243.1	30.72	866
D * 0:39	1650.2	1648.6	1639.5	27.6	11.6	117	8400	16510	1787	68.9	1.20	1.17	31.9	33.5	.33	.38	11.3	1.08	.87	1.03	1.20	1.72	244.2	30.76	863
D * 0:42	1651.2	1649.5	1640.7	15.6	12.5	122	7560	15393	1779	69.3	1.20	1.17	31.9	33.3	.33	.39	15.0	1.22	.87	1.03	1.20	1.72	245.1	30.81	861





ON-LINE TDC  
GEOSERVICES

BIT REPORT

12/ 6/82

HAMMERHEAD #1

```
*****
#BIT HEADING :BIT#15 RUN#30
#BIT TYPE :INSERT
#BIT IDENTITY :REED HSS1
*****
#BIT SIZE : 8.50 INCH
#BIT COST : 8000. $ RIG COST/HR: 5833.
*****
#NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY
*****
#DEPTH IN : 1485.99 METERS 10/ 6/82
#DEPTH OUT : 1683.49 METERS 12/ 6/82
#METRAGE : 277.50 METERS
#TOTAL REVOLUTIONS : 239
*****
#DRILLING TIME: 33:38 HR AVERAGE ROP: 8.25 M/HR
#TIME IN HOLE : 43:18 HR AVERAGE ROP: 6.41 M/HR
#TRIP TIME : 4: 0 HR
*****
#DRILLING COST STANDARD : 1023.2 $/MET
#DRILLING COST ON BOTTOM : 824.8 $/MET
#DRILLING COST MINIMUM : 818.2 $/MET
*****
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS
#WEIGHT ON BIT : 18.59 TONS NOZZLES SPEED : 174.00 M/S
#ROTATION : 118.32 RPM PRESSURE DROP : 20102 KPA
#FLOW RATE :1873.96 L/MN HYDRAULIC POWER: 842.07 H.P
#STAND PIPE PRESSURE: 15388 KPA
*****
```

111

\* 12/ 6/82 TIME 6:12

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1683.49 METERS \*  
\* FLOW RATE 1870 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.28 SG \*  
\* PV 18 CPS \*  
\* YP 29.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N .4954 \*  
\* K 2.1901 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 70.11 M3 \*  
\* WITHOUT PIPES 78.45 M3 \*  
\* ANNULAR 55.61 M3 \*  
\* INSIDE PIPES 14.50 M3 \*

\* FROM TO PIPE PIPE HOLE P.LOSSES H.P TYPE CRITICAL MUD CUTTINGS \*  
\* ID OD DIAM \* FLOW VELOCITY VELOCITY \*  
\* METERS INCH INCH INCH KPA L/MN M/MN M/MN \*

*SURF.EGPT*	FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES KPA	H.P	TYPE	CRITICAL	MUD	CUTTINGS
*DR.STRING*	.00	1462.00	4.28	5.00		335	14				
*DR.STRING*	1462.00	1518.50	3.00	5.00		1931	82				
*DR.STRING*	1518.50	1691.84	2.81	6.50		403	17				
*BIT *						20448	864	M/S		175.5	
*ANNULUS *	1683.49	1510.15		6.50	8.50	347	15	LA	2117.9	124.3	121.9
*ANNULUS *	1510.15	1454.45		5.00	8.50	40	2	LA	2788.0	78.9	77.4
*ANNULUS *	1454.45	1184.00		5.00	8.50	193	8	LA	2788.0	78.9	77.4
*ANNULUS *	1184.00	143.00		5.00	8.69	669	28	LA	2930.6	73.8	72.4
*ANNULUS *	143.00	.00		5.00	16.75	9	0	LA	10229.	14.6	14.0
* TOTAL*						26882	1182				

\*ANNULAR PRESSURE LOSSES 1250 KPA \*

\*EQUIV.CIRCULATING DENSITY 1.28 SG \*  
\* MAX DEPTH 2853.73 \*

\* MUD LAG TIMES S -> B 7.67 MN \*  
\* B -> S 29.42 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 30.21 MN \*  
\* MAX SLIP VELOCITY 2.44 M/MN \*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 11 11 11 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 20448 KPA \*  
\* H.H.P RATIO 73.40 X \*  
\* BIT H.H.P 15.224 \*  
\* BIT VELOCITY 175.49 M/S \*





ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 12/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
\*BIT HEADING :BIT#15 RUN#30

\*BIT TYPE :INSERT

\*BIT IDENTITY :REED HSS1

\*\*\*\*\*  
\*BIT SIZE : 8.50 INCH

\*BIT COST : 8000. \$

RIG COST/HR: 5833.

\*\*\*\*\*  
\*NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY

\*DEPTH IN : 1405.83 METERS

10/ 6/82

\*DEPTH OUT : 1722.50 METERS

12/ 6/82

\*METRAGE : 316.67 METERS

\*TOTAL REVOLUTIONS : 270

\*\*\*\*\*  
\*DRILLING TIME: 37:56 HR

AVERAGE ROP: 0.35 M/HR

\*TIME IN HOLE : 48:51 HR

AVERAGE ROP: 6.40 M/HR

\*TRIP TIME : 4: 0 HR

\*\*\*\*\*  
\*DRILLING COST STANDARD : 998.7 \$/MET

\*DRILLING COST ON BOTTOM : 797.8 \$/MET

\*DRILLING COST MINIMUM : 794.7 \$/MET

\*\*\*\*\*  
# AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

\*WEIGHT ON BIT : 10.78 TONS

NOZZLES SPEED : 172.66 M/S

\*ROTATION : 118.52 RPM

PRESSURE DROP : 19794 KPA

\*FLOW RATE : 1859.53 L/MIN

HYDRAULIC POWER: 822.77 H.P

\*STAND PIPE PRESSURE: 15424 KPA

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\*\*\*\*\*

\* 12/ 6/82

HAMMERHEAD #1

\*\*\*\*\*

\*\*\*\*\*

\* BIT#16 RUN#31 SEQ NBR: 0

\*\*\*\*\*

\* STARTING DEPTH 1722.50 METERS

\*

\*

\* BIT DATA SIZE 8.50

\* TOOTH SEC 511

\* NOZZLES 12 12 12 @ 95 % EFFICIENCY

\*\*\*\*\*

\* DRILL STRING# TYPE # NBR # LENGTH # ID OD # NOMINAL LINEAR #

\* SECTION # # METERS # INCHES # WEIGHT (KG/M) #

\*\*\*\*\*

\* 1 # DRILL PIPE # 160 # 9.20 # 4.20 5.00 # 29.02 #

\* 2 # HEAVY WGT DP # 1 # 55.70 # 3.00 5.00 # 73.00 #

\* 3 # DRILL COLLAR # 1 # 173.34 # 2.81 6.50 # 136.40 #

\*\*\*\*\*

\* HOLE # ID # DEPTH (METERS)

\* # INCHES # TOP BOTTOM

\*\*\*\*\*

\* RISER # 16.75 # .00 143.00

\* CASING # 8.69 # 143.00 1184.00

\* OPEN HOLE 1 # 8.50 # 1184.00 1722.17

\*\*\*\*\*

\* COST DATA BIT COST 5000 \$ RIG COST 5833 \$/HR

\* TRIP TIME 4.00 HRS

\*

\* WEIGHTS HOOK LOAD OFF BOTTOM 103.4 TONS

\* STRING WEIGHT IN AIR 70.5 TONS

\*

\* VOLUMES ANNULUS 56.5 M3 IN PIPES 14.8 M3

\*

\*

\* DEVIATION 1.5 DEG 2.61 M / 100 M

\*

\*

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA

\*

\*

\* BIT WEAR TYPE EXPONENT .5

\* EXPECTED: RUN LENGTH 300 METERS TEETH WEAR 3 /8TH

\*\*\*\*\*

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 12/ 6/82

\* BIT#16 RUN#31 SEC S11 BIT DIAMETER : 0.50 inch NOZZ 12/12/12

MUD RHEOLOGICAL PARAMETERS : PV = 14 YP = 8 GEL = 2

TIME	DEPTHS			DRILLING PARAMETERS				MUD PARAMETERS				OVERPRESSURE SURVEY					ACCUMULATED ON BIT						
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
Hr:mn	met	met	met	m/hr	ton	rpm	Nm	KPA	L/mn	in	degC	in	out	unit	sg	sg	sg	sg	met	DHr	\$/m		
T * 19: 0	1722.5	1720.6	1721.8	—	—	96	2100	8620	1099	45.0	1.20	1.22	27.3	21.9	.34	.37	8.7	—	—	—	—	—	
D * 19:24	1723.3	1721.5	1722.4	9.2	14.3	91	2520	13203	1837	42.4	1.20	1.20	26.0	31.8	.36	.36	-3.7	1.24	1.20	1.03	1.20	1.73	.9 .88 31407
D * 19:27	1724.2	1722.5	1722.4	13.7	14.9	87	2730	13190	1849	42.4	1.20	1.20	25.8	32.5	.36	.36	-7.5	1.33	1.20	1.03	1.20	1.73	1.9 .13 15138
D * 19:31	1725.2	1723.6	1722.4	19.0	15.2	92	2730	13190	1854	42.6	1.20	1.21	26.1	32.0	.36	.38	-2.5	1.24	1.20	1.03	1.20	1.73	3.0 .20 9936
D * 19:35	1726.2	1724.6	1722.4	13.5	15.1	87	2520	13066	1856	43.0	1.20	1.21	26.4	33.0	.35	.37	.0	1.36	1.20	1.03	1.20	1.73	4.0 .26 7552
D * 19:39	1727.1	1725.5	1722.4	16.3	15.5	89	2520	13066	1856	42.8	1.20	1.21	26.8	33.2	.35	.38	.0	1.32	1.20	1.03	1.20	1.73	4.9 .33 6143
D * 19:45	1728.2	1726.6	1722.4	10.2	15.0	92	2520	16324	1962	43.0	1.20	1.20	27.5	31.8	.35	.41	1.2	1.41	1.20	1.03	1.20	1.73	5.9 .43 5174
D * 19:50	1729.1	1727.6	1722.7	11.9	15.2	87	2520	16541	2053	42.2	1.20	1.22	28.1	32.5	.35	.38	-10.	1.36	1.20	1.03	1.20	1.73	7.8 .51 4499
D * 19:55	1730.3	1728.6	1722.7	13.1	14.6	88	2520	16479	2034	42.2	1.20	1.20	28.6	32.4	.34	.38	5.0	1.35	1.20	1.03	1.20	1.73	8.0 .58 3987
D * 20: 0	1731.2	1729.6	1726.1	10.3	14.6	91	2520	16479	2034	42.6	1.20	1.20	29.5	33.5	.35	.38	11.3	1.32	1.20	1.03	1.20	1.73	9.0 .68 3599
D * 20:26	1732.2	1730.6	1729.4	3.3	15.0	91	2310	16076	2034	42.2	1.20	1.20	30.8	34.2	.35	.39	10.0	1.42	1.20	1.03	1.20	1.73	9.9 .90 3374
D * 20:36	1733.2	1731.5	1730.7	10.1	13.9	84	2310	16231	2053	43.0	1.20	1.20	31.4	34.7	.35	.39	8.7	1.33	1.20	1.03	1.20	1.73	10.9 1.06 3162
D * 20:42	1734.2	1732.8	1731.6	9.9	14.7	89	2310	16306	2050	43.0	1.20	1.19	31.8	34.5	.35	.39	10.0	1.35	1.20	1.03	1.20	1.73	11.4 1.15 3050
D * 20:47	1735.2	1733.6	1731.6	10.8	14.6	86	2520	16306	2053	43.0	1.20	1.19	32.0	35.1	.36	.37	8.7	1.30	1.20	1.03	1.20	1.73	13.0 1.24 2742
D * 20:54	1736.2	1734.6	1731.9	8.6	14.0	88	2310	16541	2050	42.8	1.20	1.19	32.3	35.1	.36	.38	8.7	1.42	1.20	1.03	1.20	1.74	14.0 1.34 2590
D * 21: 1	1737.2	1735.6	1732.2	8.5	15.0	83	2310	16200	2034	43.0	1.20	1.19	32.5	35.3	.36	.39	8.7	1.43	1.20	1.03	1.20	1.74	14.9 1.46 2466
D * 21: 6	1738.2	1736.1	1733.1	11.0	15.5	83	2310	15020	2009	43.2	1.20	1.19	32.8	35.4	.36	.38	6.2	1.34	1.20	1.03	1.20	1.74	16.0 1.55 2336
D * 21:23	1739.2	1737.6	1735.2	8.1	13.0	88	2310	15393	2016	41.6	1.20	1.19	33.1	35.8	.36	.39	8.7	1.35	1.20	1.03	1.20	1.74	17.0 1.66 2236
D * 21:27	1740.1	1738.5	1736.1	10.2	16.7	87	2310	16169	2036	41.0	1.20	1.19	33.4	35.6	.36	.39	10.0	1.40	1.20	1.03	1.20	1.74	17.9 1.73 2144
D * 21:33	1741.2	1739.6	1736.8	14.1	16.2	88	2940	16541	2036	40.3	1.20	1.19	33.5	35.7	.35	.39	8.7	1.34	1.20	1.03	1.20	1.74	18.9 1.82 2052
D * 21:40	1742.2	1740.6	1738.0	6.4	15.0	88	2940	16634	2036	39.5	1.20	1.19	33.7	35.7	.34	.39	7.5	1.58	1.20	1.03	1.20	1.74	20.0 1.92 1977
D * 21:48	1743.2	1741.6	1738.9	8.4	16.8	86	3150	17069	2016	39.1	1.20	1.19	33.9	35.8	.34	.39	6.2	1.46	1.20	1.03	1.20	1.74	20.9 2.03 1918
D * 21:53	1744.2	1742.6	1739.2	15.5	17.3	86	3150	14431	1943	39.3	1.20	1.19	33.8	35.8	.34	.38	5.0	1.27	1.20	1.03	1.20	1.74	22.0 2.12 1851
D * 21:57	1745.2	1743.5	1739.8	11.6	16.7	88	2940	16262	1962	39.5	1.20	1.19	33.8	35.8	.34	.39	5.0	1.30	1.20	1.03	1.20	1.74	22.9 2.19 1794
D * 22: 3	1746.2	1744.6	1741.0	11.2	15.7	87	3150	16697	1978	39.5	1.20	1.19	33.9	36.1	.33	.38	.0	1.37	1.20	1.03	1.20	1.74	24.0 2.29 1739
D * 22:10	1747.2	1745.6	1741.9	9.8	15.0	87	3570	16666	1901	39.3	1.20	1.19	34.0	36.4	.34	.39	5.0	1.42	1.20	1.03	1.20	1.74	25.0 2.41 1697
D * 22:23	1748.2	1746.6	1743.2	13.4	16.0	70	4410	15021	1806	39.1	1.20	1.19	34.1	37.1	.33	.38	13.7	1.20	1.20	1.03	1.20	1.74	26.0 2.48 1646
D * 22:29	1749.2	1747.6	1744.4	10.2	15.4	87	2730	16231	1909	30.3	1.20	1.19	34.5	37.6	.33	.38	10.0	1.36	1.20	1.03	1.20	1.74	27.0 2.59 1608
D * 22:36	1750.1	1748.5	1745.9	9.7	15.6	86	2520	16231	1911	30.3	1.20	1.21	35.0	38.2	.32	.38	10.0	1.37	1.20	1.03	1.20	1.74	27.9 2.71 1576
D * 22:44	1751.2	1749.5	1746.8	5.9	14.0	87	2520	16603	1926	36.9	1.20	1.21	35.4	38.6	.32	.38	10.0	1.50	1.20	1.03	1.20	1.74	28.9 2.84 1550
D * 22:51	1752.2	1750.5	1747.7	10.8	14.4	86	2520	16697	1943	35.9	1.20	1.20	35.6	38.0	.32	.38	11.3	1.34	1.20	1.03	1.20	1.74	29.9 2.95 1521
D * 23: 0	1753.2	1751.5	1748.6	7.0	14.0	88	2520	16945	1926	36.1	1.20	1.20	36.2	39.3	.32	.38	12.5	1.46	1.20	1.03	1.20	1.74	30.9 3.09 1495
D * 23: 6	1754.2	1752.5	1749.9	6.8	14.0	86	2520	17014	1942	37.9	1.20	1.20	35.7	39.3	.31	.38	8.7	1.40	1.20	1.03	1.20	1.74	31.9 3.21 1473
D * 23:14	1755.2	1753.5	1750.0	7.1	14.1	85	2940	16945	1854	40.3	1.20	1.21	35.2	39.0	.31	.37	12.5	1.44	1.20	1.03	1.20	1.74	32.9 3.34 1451
D * 23:23	1756.2	1754.5	1752.0	6.6	16.1	87	2730	17534	1873	43.2	1.20	1.21	34.8	39.7	.30	.37	12.5	1.43	1.20	1.03	1.20	1.74	33.9 3.48 1433
D * 23:39	1757.2	1755.5	1753.5	11.6	.0	0	.000	-1055	.0	50.4	1.20	1.21	35.0	39.4	.30	.36	17.5	1.30	1.29	1.03	1.20	1.74	34.9 3.65 1420
D * 23:55	1758.2	1756.6	1755.3	5.5	10.9	84	2310	16107	1854	52.4	1.20	1.23	34.7	39.5	.30	.34	13.7	1.39	1.29	1.03	1.20	1.74	35.9 3.84 1400
D * 0: 4	1759.2	1757.5	1756.3	5.6	12.3	82	2730	15983	1873	54.6	1.20	1.23	34.8	39.6	.30	.33	22.5	1.47	1.29	1.03	1.20	1.74	36.9 3.99 1395
D * 0:20	1760.2	1758.5	1757.5	3.1	11.0	84	2730	15952	1854	54.4	1.20	1.23	35.0	39.7	.30	.33	2.5	1.49	1.29	1.03	1.20	1.74	37.9 4.25 1397
D * 0:29	1761.2	1759.5	1758.1	7.2	14.3	81	3360	15952	1854	53.6	1.20	1.23	36.3	39.7	.30	.33	3.7	1.34	1.29	1.03	1.20	1.74	38.9 4.41 1385
D * 0:43	1762.2	1760.5	1759.6	3.0	11.6	77	2940	15090	1854	52.2	1.20	1.23	37.1	40.0	.30	.33	3.7	1.44	1.29	1.03	1.20	1.74	39.9 4.62 1382
D * 0:56	1763.2	1761.6	1760.5	6.8	13.8	0	-210	16262	1873	50.8	1.20	1.23	37.7	40.1	.29	.34	3.7	1.30	1.29	1.03	1.20	1.74	40.9 4.84 1380

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 13/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT#16 RUN#31  
#BIT TYPE :TOOTH \*  
#BIT IDENTITY :SEC S11 \*  
\*\*\*\*\*  
#BIT SIZE : 8.50 INCH \*  
#BIT COST : 5000. \$ RIG COST/HR: 5033. \*  
\*\*\*\*\*  
#NOZZLES : 12 12 12 /32NDS @ 95 % EFFICIENCY \*  
\*\*\*\*\*  
#DEPTH IN : 1722.21 METERS 12/ 6/82 \*  
#DEPTH OUT : 1763.15 METERS 13/ 6/82 \*  
#METRAGE : 40.94 METERS \*  
#TOTAL REVOLUTIONS : 23 \*  
\*\*\*\*\*  
#DRILLING TIME: 4:51 HR AVERAGE ROP: 0.44 M/HR \*  
#TIME IN HOLE : 6: 0 HR AVERAGE ROP: 6.82 M/HR \*  
#TRIP TIME : 4: 0 HR \*  
\*\*\*\*\*  
#DRILLING COST STANDARD : 1547.4 \$/MET \*  
#DRILLING COST ON BOTTOM : 1383.2 \$/MET \*  
#DRILLING COST MINIMUM : 1380.5 \$/MET \*  
\*\*\*\*\*  
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS \*  
#WEIGHT ON BIT : 14.53 TONS NOZZLES SPEED : 151.38 M/S \*  
#ROTATION : 83.15 RPM PRESSURE DROP : 15217 KPA \*  
#FLOW RATE :1940.34 L/MN HYDRAULIC POWER: 660.00 H.P \*  
#STAND PIPE PRESSURE: 15764 KPA \*  
\*\*\*\*\*

6/82

13/ 6/82 TIME 2: 9

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 1763.15 METERS \*  
\* FLOW RATE 1948 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.20 SG \*  
\* PV 15 CPS \*  
\* YP 15.00 LB/FT2 \*  
\* GEL 3.00 LB/100 FT2 \*  
\* N .6374 \*  
\* K .5869 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 72.70 M3 \*  
\* WITHOUT PIPES 81.36 M3 \*  
\* ANNULAR 57.51 M3 \*  
\* INSIDE PIPES 15.18 M3 \*

\*\*\*\*\*  
\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID OD DIAM \* \* FLOW \* VELOCITY VELOCITY \*  
\* \* METERS \* INCH INCH INCH \* KPA \* \* L/MN \* M/MN M/MN \*

\* SURF. EQPT \* \* \* \* 338 15 \* \* \* \*  
\* DR.STRING \* .00 1536.40 \* 4.28 5.00 \* 2850 89 \* \* \* \*  
\* DR.STRING \* 1536.40 1592.10 \* 3.00 5.00 \* 407 18 \* \* \* \*  
\* DR.STRING \* 1592.10 1765.44 \* 2.81 6.59 \* 1726 75 \* \* \* \*  
\* BIT \* \* \* \* 15212 660 \* M/S \* 151.4 \* \*  
\* ANNULUS \* 1763.15 1589.81 \* 6.59 8.50 \* 236 18 \* TU 1428.8 \* 127.6 124.7 \*  
\* ANNULUS \* 1589.81 1534.11 \* 5.00 8.50 \* 17 1 \* TU 1732.1 \* 81.0 78.4 \*  
\* ANNULUS \* 1534.11 1184.00 \* 5.00 8.50 \* 188 5 \* TU 1732.1 \* 81.0 78.4 \*  
\* ANNULUS \* 1184.00 143.00 \* 5.00 8.69 \* 266 12 \* TU 1886.6 \* 75.8 73.2 \*  
\* ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 5 0 \* LA 5316.2 \* 15.0 13.8 \*  
\* TOTAL \* \* \* \* 28365 883 \* \* \* \*

\* ANNULAR PRESSURE LOSSES 632 KPA \*

\* EQUIV. CIRCULATING DENSITY 1.24 SG \*  
\* MAX DEPTH 5029.93 \*

\* MUD LAG TIMES S -> B 7.83 MN \*  
\* B -> S 29.65 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 31.17 MN \*  
\* MAX SLIP VELOCITY 2.95 M/MN \*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 12 12 12 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 15212 KPA \*  
\* H.H.P RATIO 74.78 % \*  
\* BIT H.H.P 11.625 \*  
\* BIT VELOCITY 151.36 M/S \*



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\* 13/ 6/82

HAMMER HEAD #1

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\*\*\*\*\*

\* BIT#17 RUN#33 SEQ NBR: 0 \*

\*\*\*\*\*

\* STARTING DEPTH 1763.15 METERS \*

\*\*\*\*\*

\*\*\*\*\*

\* BIT DATA SIZE 0.50

\* TOOTH HTC JDB

\* NOZZLES 11 11 11 @ 95 % EFFICIENCY

\*\*\*\*\*

\* DRILL STRING\* TYPE \* NBR \* LENGTH \* ID OD \* NOMINAL LINEAR \*

\* SECTION \* \* \* METERS \* INCHES \* WEIGHT (KG/M) \*

\*\*\*\*\*

\* 1 \* DRILL PIPE \* 164 \* 9.20 \* 4.28 5.00 \* 29.02 \*

\* 2 \* HEAVY WGT DP \* 1 \* 55.70 \* 3.00 5.00 \* 73.00 \*

\* 3 \* DRILL COLLAR \* 1 \* 174.38 \* 2.81 6.50 \* 136.40 \*

\*\*\*\*\*

\* HOLE \* ID \* DEPTH (METERS) \*

\* \* INCHES \* TOP BOTTOM \*

\*\*\*\*\*

\* RISER \* 16.75 \* .00 143.00 \*

\* CASING \* 8.69 \* 143.00 1104.00 \*

\* OPEN HOLE 1 \* 8.50 \* 1104.00 1763.11 \*

\*\*\*\*\*

\* COST DATA BIT COST 5000 \$ RIG COST 5833 \$/HR \*

\* TRIP TIME 6.00 HRS \*

\*\*\*\*\*

\* WEIGHTS HOOK LOAD OFF BOTTOM 104.4 TONS \*

\* STRING WEIGHT IN AIR 71.7 TONS \*

\*\*\*\*\*

\* VOLUMES ANNULUS 57.5 M3 IN PIPES 15.2 M3 \*

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\*\*\*\*\*

\* DEVIATION .5 DEG .873 M / 100 M \*

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\*\*\*\*\*

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA \*

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\*\*\*\*\*

\* BIT WEAR TYPE EXPONENT .5 \*

\* EXPECTED: RUN LENGTH 150 METERS TEETH WEAR 3 /8TH \*

\*\*\*\*\*

\* BIT#17 RUN#33 HTC JOB BIT DIAMETER : 8.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 15 GEL = 3 \*

		DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT		
* TIME *	* MEASURED *	* VERTCL *	* LAGGED *	* ROP *	* WOB *	* RPH *	* TORQ *	* PRESS *	* FLOW IN *	* PIT VOL *	* DENSITY IN *	* TEMPERATURE OUT *	* RESISTIVITY IN *	* RESISTIVITY OUT *	* GAS *	* DCS *	* NDRH *	* PF *	* ECD *	* FRAC *	* METER *	* TIME *	* COST *		
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* ton *	* rpm *	* Nm *	* KPA *	* l/mn *	* m3 *	* sg *	* degC *	* ohm *	* unit *	* unit *	* unit *	* unit *	* unit *	* unit *	* unit *	* unit *	* unit *	* unit *		
T * 14:12 *	1763.2	1761.6	1761.1	---	---	0	.000	-1521	0	62.0	1.20	1.26	34.2	20.1	.30	.33	1.2	---	---	---	---	---	---	---	
D * 14:16 *	1764.5	1762.6	1761.4	15.5	3.2	0	.000	14276	1734	60.8	1.20	1.23	34.1	21.4	.31	.34	2.5	-.38	1.29	1.03	1.20	1.74	1.0	.04	39892
D * 14:17 *	1767.1	1764.9	1761.4	244.	4.5	27	1890	15207	1716	60.4	1.20	1.23	34.0	22.1	.30	.33	2.5	.86	1.29	1.03	1.20	1.74	4.0	.05	9968
D * 14:17 *	1768.2	1766.1	1761.4	286.	4.5	20	1680	17472	1716	60.6	1.20	1.23	33.9	22.3	.31	.33	2.5	.10	1.29	1.03	1.20	1.74	4.6	.06	8809
T * 14:57 *	1763.8	1761.1	1763.0	---	---	84	2940	15083	1830	60.4	1.20	1.24	33.9	30.5	.31	.35	6.2	---	---	---	---	---	---	---	
T * 15:17 *	1764.3	1761.1	1763.0	---	---	89	2310	16697	1810	67.7	1.20	1.22	35.3	34.0	.30	.34	7.5	---	---	---	---	---	---	---	
D * 15:34 *	1765.1	1763.1	1763.9	3.3	14.6	80	2520	18031	1772	68.1	1.20	1.23	36.4	34.3	.30	.34	2.5	1.55	1.29	1.03	1.20	1.74	7.5	.67	5855
D * 15:44 *	1766.1	1764.1	1764.2	6.5	14.0	81	2520	17969	1774	68.9	1.20	1.20	37.1	34.5	.30	.35	5.0	1.46	1.29	1.03	1.20	1.74	8.5	.84	5246
D * 16: 2 *	1797.0	1764.6	1764.2	5.7	.0	0	.000	-1583	0	80.7	1.20	1.25	37.6	34.6	.30	.33	11.3	1.49	1.29	1.03	1.20	1.74	9.0	.92	5819
D * 16:17 *	1769.3	1767.2	1765.1	15.3	14.7	76	2520	15641	1567	75.5	1.20	1.22	37.3	34.7	.29	.35	8.7	1.21	1.29	1.03	1.20	1.74	11.6	1.10	4884
D * 16:21 *	1770.2	1768.2	1765.4	26.9	13.3	80	2520	16355	1661	76.1	1.20	1.23	37.3	34.6	.29	.35	8.7	1.86	1.29	1.29	1.20	1.85	12.6	1.16	3712
D * 16:30 *	1771.1	1769.2	1766.3	40.4	15.5	80	2310	16262	1661	76.1	1.20	1.24	37.5	35.3	.29	.34	11.3	.90	1.29	1.03	1.20	1.74	13.6	1.30	3495
D * 16:34 *	1772.1	1770.0	1766.6	23.4	12.4	82	2520	16324	1650	75.5	1.20	1.20	37.6	35.5	.29	.34	12.5	1.89	1.29	1.25	1.20	1.84	14.4	1.36	3314
D * 16:36 *	1773.2	1771.3	1766.6	47.3	13.4	82	2310	16293	1661	74.9	1.20	1.27	37.7	35.4	.29	.34	12.5	.80	1.29	1.03	1.20	1.74	15.7	1.39	3874
T * 16:56 *	1773.5	1771.6	1769.7	---	---	80	2520	15952	1661	74.9	1.20	1.22	38.4	35.5	.29	.34	8.7	---	---	---	---	---	---	---	
T * 17:16 *	1774.1	1772.0	1773.0	---	---	89	2310	16014	1661	77.5	1.20	1.21	39.0	34.5	.29	.35	13.7	---	---	---	---	---	---	---	
D * 17:17 *	1774.1	1772.0	1773.0	1.2	15.4	89	2520	15952	1661	77.7	1.20	1.22	39.0	34.6	.30	.34	13.7	1.93	1.29	1.03	1.20	1.74	16.4	1.05	3869
D * 17:35 *	1775.2	1772.8	1773.3	18.8	15.1	86	2520	18497	1774	77.7	1.20	1.20	39.1	35.1	.29	.34	13.7	1.19	1.29	1.03	1.20	1.74	17.2	2.09	2992
D * 17:50 *	1778.7	1773.3	1773.6	3.0	.0	0	.000	-1614	0	79.3	1.20	1.23	39.1	35.3	.29	.33	13.7	1.64	1.29	1.03	1.20	1.74	17.7	2.22	2957

DN-LINE TDC  
GEDSERVICES

BIT REPORT

\* 13/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT#17 RUN#33  
#BIT TYPE :TOOTH \*  
#BIT IDENTITY :HTC JDB \*  
\*\*\*\*\*  
#BIT SIZE : 8.50 INCH \*  
#BIT COST : 5000. \$ RIG COST/HR: 5033. \*  
\*\*\*\*\*  
#NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY \*  
\*\*\*\*\*  
#DEPTH IN : 1761.02 METERS 13/ 6/82 \*  
#DEPTH OUT : 1778.68 METERS 13/ 6/82 \*  
#METRAGE : 17.65 METERS \*  
#TOTAL REVOLUTIONS : 10 \*  
\*\*\*\*\*  
#DRILLING TIME: 2:13 HR AVERAGE ROP: 7.94 M/HR \*  
#TIME IN HOLE : 2:48 HR AVERAGE ROP: 6.30 M/HR \*  
#TRIP TIME : 6: 0 HR \*  
\*\*\*\*\*  
#DRILLING COST STANDARD : 3191.2 \$/NET \*  
#DRILLING COST ON BOTTOM : 2999.8 \$/NET \*  
#DRILLING COST MINIMUM : 2956.9 \$/NET \*  
\*\*\*\*\*  
\* AVERAGE OVER THE RUN AVERAGE HYDRAULICS \*  
#WEIGHT ON BIT : 11.68 TONS NOZZLES SPEED : 156.52 M/S \*  
#ROTATION : 62.93 RPM PRESSURE DROP : 16267 KPA \*  
#FLOW RATE : 1685.72 L/MN HYDRAULIC POWER: 612.95 H.P \*  
#STAND PIPE PRESSURE: 16017 KPA \*  
\*\*\*\*\*

\*\*\*\*\*  
\* 13/ 6/82 HAMMERHEAD #1  
\*\*\*\*\*

\*\*\*\*\*  
\* BIT#18 RUN#34 SEQ NBR: 0 \*  
\*\*\*\*\*

\* STARTING DEPTH 1778.60 METERS \*

\* BIT DATA SIZE 8.50  
\* TOOTH HTC J7  
\* NOZZLES 11 11 11 @ 95 % EFFICIENCY

* DRILL STRING * SECTION	* TYPE *	* NBR *	* LENGTH * METERS	* ID * INCHES	* OD * INCHES	* NOMINAL LINEAR * WEIGHT (KG/M)
* 1	* DRILL PIPE	* 165	* 9.20	* 4.28	* 5.00	* 29.02
* 2	* HEAVY WGT DP	* 1	* 55.70	* 3.00	* 5.00	* 73.00
* 3	* DRILL COLLAR	* 1	* 174.30	* 2.81	* 6.50	* 136.40

\*\*\*\*\*  
\* HOLE \* ID \* DEPTH (METERS)  
\* INCHES \* TOP BOTTOM \*

* RISER	* 16.75	* .00	143.00
* CASING	* 8.69	* 143.00	1184.00
* OPEN HOLE 1	* 8.50	* 1184.00	1775.16

\*\*\*\*\*  
\* COST DATA BIT COST 5000 \$ RIG COST 5033 \$/HR  
\* TRIP TIME 6.00 HRS \*

\* WEIGHTS HOOK LOAD OFF BOTTOM 104.6 TONS  
\* STRING WEIGHT IN AIR 72.0 TONS

\* VOLUMES ANNULUS 57.9 M3 IN PIPES 15.3 M3

\* DEVIATION .5 DEG .873 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/HN : 13 KPA

\* BIT WEAR TYPE EXPONENT .5  
\* EXPECTED: RUN LENGTH 150 METERS TEETH WEAR 3 70TH

\*\*\*\*\*

\* BIT#18 RUN#34 HTC J7 BIT DIAMETER: 8.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS: PV = 14 YP = 20 GEL = 3 \*

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS					MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT				
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		DCS	NORM	PF	ECD	FRAC	METER	TIME	COST			
		net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sq	degC	IN	OUT	ahm	unit	sq	sq	sq	net	Dhr	\$/m			
T	0:22	1778.7	1773.3	1773.6	0	0	84	2730	18279	1734	71.1	1.20	1.22	33.1	29.1	.30	.35	-2.5	1.01	1.29	1.34	1.20	1.87	3.9	.07	10413
D	0:37	1779.1	1777.1	1778.5	21.5	11.1	81	2520	18031	1716	69.7	1.20	1.21	32.9	30.4	.30	.34	-1.2	1.01	1.29	1.34	1.20	1.87	4.6	.10	8811
D	0:43	1780.1	1777.9	1778.5	7.5	12.5	80	2520	18031	1744	67.6	1.20	1.21	32.6	31.9	.30	.33	-1.2	1.39	1.29	1.03	1.20	1.74	5.5	.21	7499
D	0:45	1781.1	1778.7	1778.5	23.1	11.6	82	2310	18000	1716	66.2	1.20	1.22	32.6	32.2	.30	.33	-1.2	1.05	1.29	1.38	1.20	1.86	6.7	.27	6220
D	0:49	1782.1	1779.9	1778.5	17.9	12.9	82	2520	18000	1716	62.4	1.20	1.23	32.6	33.0	.30	.34	-2.5	1.06	1.29	1.29	1.20	1.85	7.8	.32	5326
D	0:52	1783.1	1781.1	1778.5	18.4	11.1	66	2520	16510	1809	61.6	1.20	1.23	32.6	32.4	.30	.37	-1.2	1.16	1.29	1.03	1.20	1.74	8.8	.36	4795
D	0:54	1784.2	1782.0	1778.8	39.8	12.2	80	2520	18000	1716	67.4	1.20	1.22	32.8	31.4	.30	.36	.0	.92	1.29	1.03	1.20	1.74	9.9	.40	4290
D	0:57	1785.1	1783.1	1778.8	25.5	11.6	79	2310	18031	1734	74.1	1.20	1.22	32.9	31.9	.30	.35	-2.5	1.02	1.29	1.33	1.20	1.87	10.7	.44	3977
D	0:59	1786.1	1783.9	1778.8	19.2	11.5	86	2310	18000	1749	77.3	1.20	1.21	33.1	32.5	.30	.35	-3.7	1.11	1.29	1.24	1.20	1.83	11.9	.47	3601
D	1:1	1787.1	1785.1	1779.1	27.0	10.7	86	2310	18062	1746	76.1	1.20	1.23	33.2	32.6	.30	.35	-5.0	1.01	1.29	1.34	1.20	1.88	13.1	.54	3306
D	1:16	1788.2	1786.3	1779.7	24.5	11.5	87	2520	15883	1569	80.3	1.20	1.22	33.8	30.5	.30	.34	-1.2	1.05	1.29	1.30	1.20	1.86	13.9	.58	3123
D	1:19	1789.1	1787.1	1779.7	20.3	12.2	86	2310	15883	1587	77.3	1.20	1.23	33.8	30.4	.30	.35	-1.2	1.11	1.29	1.23	1.20	1.83	14.7	.82	3022
D	1:32	1790.1	1787.9	1780.0	3.1	14.2	82	2310	17410	1681	73.7	1.20	1.24	34.5	31.9	.30	.33	-2.5	1.64	1.29	1.03	1.20	1.75	15.9	1.21	2955
T	1:52	1790.9	1788.7	1788.0			93	2100	15486	1625	73.3	1.20	1.23	35.3	32.2	.30	.34	-1.2								
D	1:56	1791.1	1789.1	1788.9	2.1	14.5	91	2310	15983	1625	73.1	1.20	1.23	35.4	32.4	.30	.35	-1.2	1.73	1.29	1.03	1.20	1.75	16.6	1.43	2892
D	2:10	1792.1	1789.9	1790.1	4.0	14.0	91	2100	15983	1660	72.5	1.20	1.22	35.0	32.3	.30	.35	-1.2	1.64	1.29	1.03	1.20	1.75	17.9	1.48	2723
D	2:13	1793.1	1791.1	1790.1	20.4	15.4	93	2520	15238	1640	72.7	1.20	1.23	35.8	32.3	.30	.34	-1.2	1.19	1.30	1.03	1.20	1.75	18.7	1.53	2615
D	2:16	1794.2	1791.9	1790.1	20.1	13.2	94	2310	15783	1660	72.1	1.20	1.21	35.9	32.1	.30	.35	-1.2	1.10	1.30	1.03	1.20	1.75	19.9	1.58	2470
D	2:18	1795.1	1793.2	1790.4	27.3	12.3	93	2310	15766	1660	71.9	1.20	1.23	36.0	32.3	.30	.34	-1.2	1.05	1.30	1.30	1.20	1.86	21.1	1.63	2349
D	2:30	1796.2	1794.3	1790.7	22.5	4.1	91	2100	16417	1643	75.3	1.20	1.26	36.1	31.9	.30	.35	.0	1.05	1.30	1.30	1.20	1.86	21.8	1.69	2277
D	2:33	1797.1	1795.1	1790.7	31.4	13.6	88	2310	16479	1643	73.5	1.20	1.24	36.2	31.0	.30	.35	-2.5	1.00	1.30	1.36	1.20	1.80	22.7	1.74	2208
D	2:36	1798.2	1795.9	1791.0	19.4	15.3	92	2520	16231	1643	72.1	1.20	1.23	36.2	32.0	.30	.35	-1.2	1.15	1.30	1.03	1.20	1.75	23.9	1.79	2112
D	2:39	1799.1	1797.1	1791.0	18.7	15.1	87	2310	16293	1663	71.9	1.20	1.23	36.3	32.2	.30	.34	-1.2	1.17	1.30	1.03	1.20	1.75	24.7	1.93	2055
D	2:40	1800.2	1798.0	1791.6	7.9	14.7	88	2310	16107	1643	71.7	1.20	1.23	36.4	32.3	.30	.34	-1.2	1.43	1.30	1.03	1.20	1.75	25.9	2.02	1997
D	2:53	1801.2	1799.2	1792.8	15.6	14.1	87	2310	15859	1713	71.7	1.20	1.24	36.4	32.2	.30	.35	-1.2	1.22	1.30	1.03	1.20	1.75	26.6	2.06	1948
D	2:56	1802.1	1799.9	1793.8	21.0	14.4	90	2310	16231	1660	71.5	1.20	1.23	36.5	32.1	.30	.35	-1.2	1.15	1.30	1.03	1.20	1.75	27.9	2.09	1870
D	2:58	1803.2	1801.2	1794.4	30.4	15.1	86	2310	15828	1643	71.3	1.20	1.24	36.5	32.3	.30	.35	-1.2	1.02	1.30	1.34	1.20	1.80	28.7	2.09	1870
D	3:0	1804.1	1801.9	1795.0	23.3	12.6	89	2310	15331	1643	71.7	1.20	1.23	36.5	32.5	.30	.35	-1.2	1.09	1.30	1.27	1.20	1.85	29.7	2.13	1826
D	3:12	1805.9	1804.0	1796.5	35.0	14.1	98	2520	15579	1623	72.7	1.20	1.23	36.7	32.4	.30	.35	-1.2	.94	1.30	1.03	1.20	1.75	30.8	2.19	1714
D	3:13	1806.2	1804.0	1796.8	35.8	13.6	97	2310	14710	1643	72.3	1.20	1.23	36.7	32.5	.30	.35	-1.2	.94	1.30	1.03	1.20	1.75	30.8	2.20	1714
D	3:16	1807.1	1805.2	1797.7	29.5	14.4	89	2310	14586	1625	71.3	1.20	1.25	36.7	32.7	.30	.35	-1.2	1.00	1.30	1.03	1.20	1.75	31.9	2.25	1663
D	3:19	1808.1	1806.0	1798.6	27.1	14.6	89	2310	15455	1640	70.9	1.20	1.25	36.7	32.7	.31	.35	-1.2	1.06	1.30	1.29	1.20	1.86	32.7	2.30	1629
D	3:23	1809.1	1807.1	1799.5	10.4	14.5	99	2100	14772	1625	70.7	1.20	1.23	36.7	32.9	.30	.35	-3.7	1.29	1.30	1.03	1.20	1.75	33.9	2.37	1587
D	3:27	1810.1	1807.9	1799.8	10.1	13.7	89	2310	14617	1625	70.3	1.20	1.22	36.8	32.5	.30	.35	-1.2	1.35	1.30	1.03	1.20	1.75	34.7	2.44	1562
D	3:31	1811.1	1809.2	1800.2	12.2	13.7	88	2310	15176	1625	70.3	1.20	1.23	36.8	32.7	.30	.35	-2.5	1.27	1.30	1.03	1.20	1.75	35.9	2.50	1519
D	3:35	1812.2	1810.0	1801.7	11.7	13.1	87	2310	14214	1625	70.1	1.20	1.22	36.9	32.0	.30	.36	-1.2	1.27	1.30	1.03	1.20	1.75	36.8	2.57	1494
D	3:40	1813.1	1811.1	1803.5	7.6	14.5	88	2310	14617	1620	69.7	1.20	1.23	36.9	32.5	.30	.35	-2.5	1.40	1.30	1.03	1.20	1.75	37.9	2.65	1464
D	3:44	1814.1	1811.9	1804.7	23.3	15.6	90	2310	15021	1607	69.9	1.20	1.24	37.0	33.0	.30	.34	-1.2	1.06	1.30	1.29	1.20	1.86	38.7	2.72	1441
D	3:47	1815.3	1813.3	1804.7	19.6	13.5	85	1470	14338	1615	69.7	1.20	1.22	37.0	33.0	.30	.35	-1.2	1.11	1.30	1.24	1.20	1.84	40.1	2.77	1408
D	4:4	1816.1	1813.9	1808.1	13.8	13.1	92	2310	14617	1625	69.9	1.20	1.26	37.1	32.3	.30	.36	-2.5	1.17	1.30	1.03	1.20	1.75	40.7	2.87	1388
D	4:11	1817.1	1815.1	1809.3	10.4	13.8	92	2310	14648	1595	65.6	1.20	1.24	37.1	33.2	.30	.35	-2.5	1.33	1.30	1.03	1.20	1.75	41.9	2.98	1368
D	4:19	1818.1	1815.9	1811.4	6.0	15.5	92	2310	13438	1625	64.2	1.20	1.23	37.1	33.6	.31	.35	-1.2	1.46	1.30	1.03	1.20	1.75	42.7	3.10	1356
D	4:27	1819.1	1817.1	1813.0	6.9	14.9	91	2310	14066	1590	64.2	1.20	1.23	37.2	33.5	.31	.34	-1.2	1.43	1.30	1.03	1.20	1.75	43.9	3.23	1340
D	4:35	1820.1	1817.9	1815.1	6.4	15.3	94	2100	14369	1607	63.6	1.20	1.23	37.4	33.2	.31	.35	-1.2	1.45	1.30	1.03	1.20	1.75	44.7	3.37	1332
D	4:40	1821.1	1819.1	1815.7	17.2	15.1	92	2310	14990	1607	63.6	1.20	1.21	37.4	33.0	.31	.35	-1.2	1.17	1.30	1.03	1.20	1.75	45.9	3.46	1310
D	4:47	1822.1	1819.9	1816.3	9.6	16.1	92	2310	14431	1625	64.0	1.20	1.23	37.5	33.2	.31	.35	-3.7	1.35	1.30	1.03	1.20	1.75	46.7	3.57	1298
D	4:54	1823.1	1821.1	1817.5	9.2	14.3	91	2310	14431	1607	64.2	1.20	1.23	37.6	33.5	.31	.35	-2.5	1.35	1.30	1.03	1.20	1.75	47.9	3.70	1285
D	4:58	1824.1	1821.9	1818.1	14.2	14.2	90	2310	14028	1607	66.0	1.20	1.23	37.6	33.5	.31	.35	-3.7	1.25	1.30	1.03	1.20	1.75	48.7	3.75	1270
D	5:14	1825.1	1823.2	1819.4	21																					





ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 14/ 6/82

HAMMERHEAD #1

\*BIT HEADING :BIT#18 RUN#34

\*BIT TYPE :TOOTH

\*BIT IDENTITY :MTC J7

\*BIT SIZE : 8.50 INCH

\*BIT COST : 5000. \$

RIG COST/HR: 5033.

\*NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY

\*DEPTH IN : 1778.49 METERS

13/ 6/82

\*DEPTH OUT : 1828.71 METERS

14/ 6/82

\*METRAGE : 50.22 METERS

\*TOTAL REVOLUTIONS : 26

\*DRILLING TIME: 4:53 HR

AVERAGE ROP: 10.28 M/HR

\*TIME IN HOLE : 5:43 HR

AVERAGE ROP: 8.79 M/HR

\*TRIP TIME : 6: 0 HR

\*DRILLING COST STANDARD : 1460.1 \$/MET

\*DRILLING COST ON BOTTOM : 1364.1 \$/MET

\*DRILLING COST MINIMUM : 1249.2 \$/MET

\* AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

\*WEIGHT ON BIT : 14.31 TONS

NOZZLES SPEED : 151.67 M/S

\*ROTATION : 87.99 RPM

PRESSURE DROP : 15402 KPA

\*FLOW RATE : 1633.50 L/MH

HYDRAULIC POWER: 562.38 H.P

\*STAND PIPE PRESSURE: 15444 KPA

# 14/ 6/82 TIME 6:23

HAMMERHEAD #1

\*\*\*\*\*  
# DEPTH OF EXECUTION 1828.71 METERS \*  
# FLOW RATE 1716 L/MN POWER LAW \*

# MUD DATA WEIGHT 1.21 SG \*  
# PV 14 CPS \*  
# YP 16.00 LB/FT2 \*  
# GEL 2.00 LB/100 FT2 \*  
# N .5050 \*  
# K .7292 LB/100 FT2 \*

# HOLES VOLUMES WITH PIPES 74.86 M3 \*  
# WITHOUT PIPES 83.76 M3 \*  
# ANNULAR 59.07 M3 \*  
# INSIDE PIPES 15.70 M3 \*

\*\*\*\*\*

	FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	ANNULAR LOSS	H.P.	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
	METERS	METERS	INCH	INCH	INCH	KPA				L/MN	M/MN
*SURF. EQPT*						269	10				
*DR. STRING*	.00	1600.00	4.28	5.00		1700	65				
*DR. STRING*	1600.00	1656.50	3.00	5.00		324	12				
*DR. STRING*	1656.50	1830.80	2.81	6.50		1382	53				
*BIT						16997	652	M/S			159.3
*ANNULUS	1828.71	1654.33		6.50	8.50	189	7	TU		1489.2	112.9
*ANNULUS	1654.33	1598.63		5.00	8.50	22	1	LA		1861.0	71.7
*ANNULUS	1598.63	1184.00		5.00	8.50	162	6	LA		1861.0	69.2
*ANNULUS	1184.00	143.00		5.00	8.69	363	14	LA		1946.7	67.0
*ANNULUS	143.00	.00		5.00	16.75	5	0	LA		6101.2	13.3
* TOTAL*						21413	821				

\*\*\*\*\*

\*ANNULAR PRESSURE LOSSES 740 KPA \*

# EQUIV. CIRCULATING DENSITY 1.25 SG \*  
# MAX DEPTH 4975.26 \*

# MUD LAG TIMES S -> B 9.20 MN \*  
# B -> S 34.43 MN \*

# CUTTINGS DATA SIZE .20 CM \*  
# DENSITY 2.40 SG \*  
# LAG TIME 36.14 MN \*  
# MAX SLIP VELOCITY 2.83 M/MN \*

# BIT DATA SIZE 8.50 INCH \*  
# NOZZLES 11 11 11 /32NDS \*  
# NOZZLES EFFICIENCY 95 % \*  
# BIT P. LOSSES 16997 KPA \*  
# H.H.P RATIO 77.30 % \*  
# BIT H.H.P 11.489 \*  
# BIT VELOCITY 159.33 M/S \*

\*\*\*\*\*





\* 14/ 6/82 TIME 10:53

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 1834.66 METERS \*  
\* FLOW RATE 1680 L/MN POWER LAW \*  
\* MUD DATA WEIGHT 1.21 SG \*  
\* PV 14 CPS \*  
\* YP 16.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N .5850 \*  
\* K .7292 LB/100 FT2 \*  
\*\*\*\*\*

\* HOLES VOLUMES WITH PIPES 75.09 M3 \*  
\* WITHOUT PIPES 83.90 M3 \*  
\* ANNULAR 59.22 M3 \*  
\* INSIDE PIPES 15.07 M3 \*  
\*\*\*\*\*

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES KPA	H.P	TYPE	CRITICAL	MUD FLOW L/MN	CUTTINGS VELOCITY M/MN
* SURF. EOPT *					259	10				
* DR. STRING *	.00	1610.00	4.20	5.00	1646	62				
* DR. STRING *	1610.00	1665.70	3.00	5.00	312	12				
* DR. STRING *	1665.70	1840.00	2.81	6.50	1331	50				
* BIT *					16291	612	M/S		156.0	
* ANNULUS *	1834.66	1660.28		6.50	8.50	102	7	TU	1489.2	110.5
* ANNULUS *	1660.28	1604.58		5.00	8.50	22	1	LA	1061.0	70.2
* ANNULUS *	1604.58	1184.00		5.00	8.50	163	6	LA	1061.0	70.2
* ANNULUS *	1184.00	143.00		5.00	8.69	359	13	LA	1946.7	65.6
* ANNULUS *	143.00	.00		5.00	16.75	5	0	LA	6101.2	13.0
* TOTAL *						20560	772			

\* ANNULAR PRESSURE LOSSES 729 KPA \*  
\*\*\*\*\*

\* EQUIV. CIRCULATING DENSITY 1.25 SG \*  
\* MAX DEPTH 5415.03 \*  
\*\*\*\*\*

\* MUD LAG TIMES S -> B 9.45 MN \*  
\* B -> S 35.25 MN \*  
\*\*\*\*\*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 37.04 MN \*  
\* MAX SLIP VELOCITY 2.02 M/MN \*  
\*\*\*\*\*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 11 11 11 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 16291 KPA \*  
\* H.H.P RATIO 79.20 % \*  
\* BIT H.H.P 10.701 \*  
\* BIT VELOCITY 155.97 M/S \*  
\*\*\*\*\*

\* 14/ 6/82 TIME 17: 9

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1841.13 METERS

\* FLOW RATE 1830 L/MN

POWER LAW

\* MUD DATA WEIGHT 1.21 SG  
 \* PV 15 CPS  
 \* YP 15.09 LB/FT2  
 \* GEL 2.00 LB/100 FT2  
 \* N .6189  
 \* K .5900 LB/100 FT2

\* HOLES VOLUMES WITH PIPES 75.33 M3  
 \* WITHOUT PIPES 04.22 M3  
 \* ANNULAR 59.37 M3  
 \* INSIDE PIPES 15.95 M3

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	P.LOSSES	H.P	TYPE	CRITICAL	MUD	CUTTINGS
METERS		INCH	INCH	INCH	KPA				L/MN	M/MN

*SURF.EQPT*						307	13			
*DR.STRING*	.00	1619.20	4.20	5.00		1958	80			
*DR.STRING*	1619.20	1674.90	3.00	5.00		369	15			
*DR.STRING*	1674.90	1849.28	2.01	6.50		1574	64			
*BIT						19335	791	M/S		169.9
*ANNULUS	1841.13	1666.75		6.50	8.50	215	9	TU	1469.7	120.4
*ANNULUS	1666.75	1611.05		5.00	8.50	16	1	TU	1801.3	76.4
*ANNULUS	1611.05	1184.00		5.00	8.50	119	5	TU	1801.3	76.4
*ANNULUS	1184.00	143.00		5.00	8.69	359	15	LA	1800.7	71.5
*ANNULUS	143.00	.00		5.00	16.75	4	0	LA	5662.1	14.1
* TOTAL*						24256	992			

\* ANNULAR PRESSURE LOSSES 713 KPA

\* EQUIV.CIRCULATING DENSITY 1.25 SG  
 \* MAX DEPTH 3755.47

\* MUD LAG TIMES S -> B 8.72 MN  
 \* B -> S 32.44 MN

\* CUTTINGS DATA SIZE .20 CM  
 \* DENSITY 2.4 SG  
 \* LAG TIME 34.07 MN  
 \* MAX SLIP VELOCITY 2.86 M/MN

\* BIT DATA SIZE 8.50 INCH  
 \* NOZZLES 11 11 11 /32NDS  
 \* NOZZLES EFFICIENCY 95 %  
 \* BIT P. LOSSES 19335 KPA  
 \* H.H.P RATIO 79.71 %  
 \* BIT H.H.P 13.940  
 \* BIT VELOCITY 169.94 M/S



\*\*\*\*\*  
 \* GEOSERVICES  
 \* ON-LINE TDC  
 \* HAMMERHEAD #1  
 \* DATE : 14/ 6/82 \*  
 \*\*\*\*\*

\* BIT#19 RUN#35 HTC J3 BIT DIAMETER : 8.50 inch NOZZ 11/11/11  
 \* MUD RHEOLOGICAL PARAMETERS : PV = 14 YP = 16 GEL = 2 \*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *								* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *	
		VERTCL	LAGGED	* ROP *	* WOB *	RPM	TORQ	PRESS	FLOW	* PIT *	DENSITY	TEMPERATURE	RESISTIVITY	* DCS *	NORM	PT	ECD	FRAC	* METER *	TIME	COST					
* Hr:mn *	* net *	* net *	* net *	* m/hr *	* ton *	rpm	Km	KPA	l/mn	* m3 *	sg	degC	ghm	* unit *	* sg *	* sg *	* sg *	* net *	DHr	\$/m						
D * 16:26	* 1836.0	1834.1	1833.7	* 189. *	* 48.2	79	2940	15052	1868	* 63.2 *	1.21	1.22	35.1	22.5	.33	.34	* .0 *	.25	1.31	* 1.03	1.21	1.75	* 1.3	.00	29856	
D * 16:28	* 1836.1	1834.1	1834.0	* 189. *	* 16.5	79	2730	15052	1774	* 63.8 *	1.21	1.23	35.0	23.3	.33	.33	* 2.5 *	.25	1.31	* 1.03	1.21	1.75	* 1.3	.02	29856	
D * 16:37	* 1837.1	1835.1	1835.8	* 5.6 *	* 14.8	80	2520	14710	1785	* 64.6 *	1.21	1.21	34.8	31.6	.33	.34	* 3.7 *	1.56	1.31	* 1.03	1.21	1.75	* 2.4	.17	17221	
D * 16:42	* 1838.2	1835.9	1835.8	* 11.7 *	* 15.4	79	2520	14003	1762	* 64.0 *	1.21	1.21	33.6	33.7	.33	.37	* 1.2 *	1.31	1.31	* 1.03	1.21	1.75	* 3.2	.26	13111	
D * 16:46	* 1839.1	1837.1	1836.1	* 9.0 *	* 15.5	79	2730	14928	1774	* 64.2 *	1.21	1.23	33.6	33.8	.33	.35	* 3.7 *	1.37	1.31	* 1.03	1.21	1.75	* 4.4	.33	9614	
D * 16:58	* 1840.2	1837.9	1836.1	* 4.1 *	* 16.1	79	2520	14003	1795	* 68.3 *	1.21	1.23	34.2	34.5	.33	.36	* 3.7 *	1.62	1.31	* 1.03	1.21	1.75	* 5.2	.52	8299	
D * 17: 8	* 1841.1	1839.2	1836.1	* 5.0 *	* 13.2	91	2310	10714	1830	* 67.0 *	1.21	1.22	35.1	33.9	.31	.37	* 5.0 *	1.53	1.31	* 1.03	1.21	1.76	* 6.4	.68	6849	

* GEOSERVICES		HAMMERHEAD #1										DATE : 14/ 6/82													
* ON-LINE TDC																									
* BIT#19 RUM#35 HTC J3		BIT DIAMETER : 8.50 inch NOZZ 11/11/11										MUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 15 GEL = 2													
* TIME	* MEASURED	* DEPTHS			* ROP		* DRILLING PARAMETERS			* DENSITY		* TEMPERATURE		* RESISTIVITY		* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT					
		* VERTCL	* LAGGED	* ROP	* WOB	* RPM	* TORQ	* PRESS	* FLOW	* PIT	* IN	* OUT	* IN	* OUT	* IN	* OUT	* DCS	* NORM	* PF	* CCD	* FRAC	* METER	* TIME	* COST	
* Hr:mn	* net	* net	* net	* m/hr	* ton	* rpm	* Nm	* KPA	* l/mn	* m3	* sg	* degC	* ohm	* unit	* sq	* sq	* sq	* sq	* sq	* sq	* net	* DR	* \$/M		
D * 17:21	1842.2	1839.9	1838.9	4.7	14.5	92	2310	18186	1737	74.5	1.21	1.22	36.1	33.9	.31	.36	.0	1.55	1.31	1.03	1.21	1.76	7.2	.90	6237
T * 17:41	1843.0	1840.7	1840.1			83	2310	15517	1734	85.5	1.21	1.20	36.3	33.6	.31	.37	10.0								
D * 17:47	1843.1	1841.1	1840.7	2.7	16.8	86	2310	16728	1683	83.5	1.21	1.20	36.3	33.4	.30	.37	-3.7	1.75	1.31	1.03	1.21	1.76	8.4	1.15	5569
D * 17:54	1844.1	1842.0	1841.0	11.2	17.9	82	2310	16138	1662	84.7	1.21	1.20	36.3	34.3	.30	.37	-2.5	1.30	1.31	1.03	1.21	1.76	9.3	1.26	5892
D * 18: 5	1845.1	1843.1	1841.9	6.8	17.0	83	2310	16479	1662	84.7	1.21	1.20	36.5	34.3	.30	.36	6.2	1.55	1.31	1.03	1.21	1.76	10.4	1.44	4656
D * 18: 8	1846.1	1843.9	1842.2	25.2	17.0	84	2310	16448	1662	83.9	1.21	1.20	36.6	34.1	.30	.37	7.5	1.12	1.31	1.24	1.21	1.84	11.2	1.50	4360
D * 18:21	1847.1	1845.2	1842.8	4.2	15.9	82	2310	15983	1663	82.5	1.21	1.21	37.1	33.5	.30	.36	7.5	1.62	1.31	1.03	1.21	1.76	12.4	1.70	4920
D * 18:33	1848.1	1845.9	1844.3	5.6	15.3	86	2730	15424	1662	82.7	1.21	1.21	37.6	33.3	.30	.35	7.5	1.52	1.31	1.03	1.21	1.76	13.2	1.91	3853
D * 18:45	1849.1	1847.1	1845.9	4.8	16.1	83	2310	15579	1660	83.1	1.21	1.19	38.0	33.7	.29	.35	7.5	1.55	1.31	1.03	1.21	1.76	14.4	2.11	3633
D * 18:58	1850.1	1847.9	1846.0	4.6	16.0	83	2310	15734	1660	82.3	1.21	1.20	38.2	34.0	.29	.35	7.5	1.58	1.31	1.03	1.21	1.76	15.2	2.31	3498
D * 19: 9	1851.1	1849.2	1848.0	4.8	16.7	89	2310	15783	1662	82.5	1.21	1.21	38.4	34.9	.29	.37	6.2	1.58	1.31	1.03	1.21	1.76	16.4	2.51	3326
D * 19:11	1852.1	1850.0	1848.0	45.4	15.1	86	2520	15610	1662	82.1	1.21	1.24	38.4	35.0	.29	.35	7.5	.90	1.31	1.03	1.21	1.76	17.3	2.53	3172
D * 19:24	1854.1	1851.8	1848.3	148.	6.6	49	1680	14928	1625	85.3	1.21	1.23	38.6	34.0	.29	.37	7.5	.31	1.31	1.03	1.21	1.76	19.0	2.55	2886
D * 19:25	1854.1	1852.2	1848.6	238.	16.6	0	-210	14897	1625	84.7	1.21	1.20	38.5	35.0	.29	.36	6.2	.21	1.31	1.03	1.21	1.76	19.4	2.55	2821
T * 19:45	1853.0	1852.5	1850.1			1	1260	14400	1624	79.9	1.21	1.18	39.0	37.2	.28	.34	7.5								
T * 20: 5	1854.9	1854.1	1853.2			21	840.	15883	1621	81.5	1.21	1.23	39.9	37.1	.27	.35	6.2								
D * 20: 6	1855.1	1854.5	1854.1	13.5	14.4	77	2310	14772	1624	81.3	1.21	1.22	40.0	37.0	.27	.33	7.5	1.00	1.31	1.03	1.21	1.76	21.7	2.68	2557
D * 20: 9	1856.2	1855.3	1852.9	21.0	14.1	84	2310	15114	1658	81.3	1.21	1.17	40.1	37.0	.27	.34	6.2	1.09	1.31	1.20	1.21	1.86	22.5	2.73	2477
D * 20:12	1857.1	1856.6	1852.9	15.1	14.0	79	2310	15145	1624	81.7	1.21	1.21	40.3	36.9	.27	.35	5.8	1.16	1.31	1.20	1.21	1.83	23.8	2.70	2338
D * 20:15	1858.1	1857.3	1852.9	19.9	14.7	78	2520	15247	1607	81.3	1.21	1.25	40.3	36.9	.28	.35	3.7	1.07	1.31	1.30	1.21	1.87	24.5	2.83	2299
D * 20:18	1859.2	1858.5	1852.9	23.9	14.5	80	2520	15238	1644	81.7	1.21	1.19	40.4	36.8	.27	.35	5.0	1.05	1.31	1.32	1.21	1.88	25.8	2.80	2202
D * 20:23	1860.1	1859.3	1852.9	8.9	15.4	76	2730	15300	1624	81.7	1.21	1.21	40.5	37.4	.28	.34	7.5	1.31	1.31	1.03	1.21	1.76	26.5	2.96	2155
D * 20:27	1861.3	1860.7	1852.9	17.7	13.2	75	.000	15145	1624	81.9	1.21	1.24	40.7	37.4	.27	.34	6.2	1.08	1.31	1.29	1.29	1.86	28.0	3.02	2060
D * 20:30	1862.2	1860.7	1852.9	17.7	.0	0	-210	14866	1624	81.3	1.21	1.16	40.6	37.3	.27	.35	6.2	1.08	1.31	1.29	1.21	1.86	28.0	3.02	2060
D * 20:43	1863.1	1862.5	1853.5	18.0	15.1	80	2520	16448	1731	81.5	1.21	1.23	41.1	36.0	.27	.34	5.0	1.23	1.32	1.03	1.21	1.76	29.0	3.11	1951
D * 20:51	1864.1	1863.3	1855.9	11.3	15.0	75	2310	16355	1681	79.1	1.21	1.25	41.1	37.3	.27	.33	7.5	1.23	1.32	1.03	1.21	1.76	30.6	3.24	1916
D * 20:57	1865.2	1864.5	1858.1	10.3	15.6	78	2520	16262	1681	80.3	1.21	1.25	41.2	37.6	.27	.32	7.5	1.26	1.32	1.03	1.21	1.76	31.7	3.34	1871
D * 21: 6	1866.2	1865.3	1860.5	8.1	14.9	79	2310	16107	1681	80.9	1.21	1.24	41.3	37.8	.27	.32	6.2	1.33	1.32	1.03	1.21	1.76	32.6	3.48	1841
D * 21:12	1867.1	1866.5	1862.0	14.8	13.6	79	2520	16200	1698	80.1	1.21	1.26	41.4	37.8	.27	.32	6.2	1.11	1.32	1.25	1.21	1.85	33.8	3.58	1801
D * 21:16	1868.1	1867.3	1862.0	12.7	13.6	78	2310	16169	1711	78.7	1.21	1.23	41.4	37.5	.28	.32	7.5	1.15	1.32	1.22	1.21	1.84	34.5	3.64	1771
D * 21:21	1869.1	1868.5	1862.9	13.3	12.2	79	2520	16076	1711	79.5	1.21	1.21	41.5	37.6	.28	.33	6.2	1.13	1.32	1.24	1.21	1.85	35.8	3.73	1725
D * 21:28	1870.1	1869.3	1863.9	7.8	10.9	80	2310	15952	1693	79.1	1.21	1.20	41.5	37.7	.28	.32	6.2	1.17	1.32	1.03	1.21	1.76	36.5	3.84	1701
T * 21:48	1879.2	1869.3	1865.7			0	.000	-1787	0	81.5	1.21	1.24	41.7	38.2	.27	.29	10.0								
D * 21:49	1871.4	1870.8	1865.7	360.	3.0	0	.000	-1769	0	80.9	1.21	1.22	41.7	38.2	.27	.29	10.0	-.87	1.32	1.03	1.21	1.76	38.1	3.85	1641
T * 22: 9	1871.5	1870.9	1865.7			0	.000	-1738	0	78.7	1.21	1.16	41.5	38.2	.27	.27	10.0								
T * 22:29	1871.5	1870.9	1865.7			0	.000	-1730	0	79.7	1.21	1.27	41.3	38.8	.27	.27	10.0								
D * 22:41	1872.1	1871.3	1866.0	4.3	10.7	75	2520	14400	1678	81.1	1.21	1.24	41.2	38.2	.27	.35	6.2	.94	1.32	1.03	1.21	1.76	38.6	3.98	1635
D * 22:47	1873.2	1872.5	1867.2	12.9	11.7	75	2520	15841	1643	81.7	1.21	1.24	41.1	31.4	.27	.30	7.5	1.07	1.32	1.31	1.21	1.87	39.8	4.07	1601
D * 22:53	1874.1	1873.3	1868.7	11.3	14.2	76	2520	16231	1676	81.3	1.21	1.23	40.8	35.2	.27	.29	7.5	1.09	1.32	1.20	1.21	1.86	40.5	4.18	1584
D * 22:57	1875.1	1874.5	1869.0	19.9	13.6	75	2730	16355	1681	80.9	1.21	1.24	40.5	35.6	.28	.31	6.2	.98	1.32	1.03	1.21	1.76	41.8	4.23	1547
D * 23: 6	1876.1	1875.3	1870.8	8.1	12.0	76	2520	16355	1681	81.1	1.21	1.23	40.1	36.5	.27	.31	5.8	1.24	1.32	1.03	1.21	1.76	42.5	4.38	1536
D * 23:13	1877.1	1876.5	1870.3	10.2	10.5	77	2310	16324	1699	79.3	1.21	1.23	39.9	36.7	.27	.32	6.2	1.14	1.32	1.23	1.21	1.84	43.7	4.50	1515
D * 23:21	1878.1	1877.3	1872.4	8.6	10.4	76	2310	16417	1714	79.1	1.21	1.22	39.9	37.6	.27	.32	6.2	1.17	1.32	1.03	1.21	1.76	44.6	4.63	1498
D * 23:32	1879.2	1878.5	1873.6	9.0	12.0	76	2310	16138	1684	78.9	1.21	1.22	40.1	37.6	.27	.33	3.7	1.15	1.32	1.22	1.21	1.84	45.7	4.76	1480
D * 23:40	1880.1	1879.3	1875.1	6.3	10.4	70	2310	16231	1699	75.5	1.21	1.23	40.3	37.8	.27	.33	3.7	1.25	1.32	1.03	1.21	1.76	46.5	4.90	1469
D * 23:53	1881.4	1880.8	1876.0	53.6	2.4	86	2100	16479	1736	76.7	1.19	1.20	40.5	37.6	.27	.32	8.7	.63	1.32	1.03	1.20	1.76	48.0	4.98	1436
D * 23:57	1882.1	1881.3	1877.0	9.8	10.5	88	2310	17131	1754	74.1	1.19	1.20	40.5	37.5	.27	.33	6.2	1.14	1.32	1.23	1.20	1.84	48.5	5.05	1428
D * 0: 3	1883.1	1882.5	1877.9	9.5	10.5	86	2310	15424	1691	73.9	1.19	1.20	40.9	37.2	.27	.32	6.2	1.16	1.32	1.21	1.20	1.84	49.0	5.15	1406
D * 0: 9	1884.2	1883.3	1878.5	9.0	10.9	87	2310	15424	1681	73.3	1.19	1.20	41.1	37.9	.28	.32	7.5	1.16	1.32	1.20	1.20	1.83	50.5	5.25	1394

\* GEOSERVICES  
 \* ON-LINE TDC

HAMMERHEAD #1

DATE : 15/ 6/82

\* BIT#19 RUN#35 MTC J3 BIT DIAMETER : 8.50 inch NOZZ 11/11/11

HUD RHEOLOGICAL PARAMETERS : PV = 15 YP = 15 GEL = 2

TIME	DEPTHS			DRILLING PARAMETERS							DENSITY		TEMPERATURE		RESISTIVITY		GAS		OVERPRESSURE SURVEY			ACCUMULATED ON BIT			
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	IN	OUT	IN	OUT	IN	OUT	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST	
Hr:mn	met	met	met	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sg	degC	ohm	unit	sg	sg	sg	sg	sg	sg	met	Dhr	\$/m		
D * 0:21	1885.1	1884.5	1888.0	2.9	12.4	86	2310	14431	1661	72.9	1.19	1.20	41.4	38.2	.20	.32	6.2	1.50	1.32	1.03	1.20	1.76	51.7	5.45	1385
D * 0:26	1886.1	1885.3	1888.6	20.5	12.4	87	2310	14617	1666	72.7	1.19	1.20	41.6	38.0	.20	.32	7.5	.98	1.32	1.03	1.20	1.76	52.5	5.53	1372
D * 0:30	1887.1	1886.5	1888.9	19.6	11.2	87	2310	14710	1678	72.3	1.19	1.20	41.7	38.1	.20	.32	7.5	1.00	1.32	1.03	1.20	1.76	53.7	5.59	1350
D * 0:38	1888.1	1887.3	1882.4	6.3	13.1	87	2310	14506	1678	72.5	1.19	1.20	41.8	38.2	.28	.33	6.2	1.31	1.32	1.03	1.20	1.76	54.5	5.73	1342
D * 0:47	1889.2	1888.5	1884.0	7.8	11.1	87	2310	14462	1668	73.7	1.19	1.19	41.9	38.5	.28	.33	6.2	1.22	1.32	1.03	1.20	1.76	55.8	5.87	1329
D * 0:58	1890.2	1889.3	1884.9	6.4	8.7	86	2310	12941	1696	72.9	1.19	1.20	42.1	38.4	.28	.33	6.2	1.27	1.32	1.03	1.20	1.76	56.5	6.05	1326
D * 1:16	1891.1	1890.6	1887.3	19.3	9.2	87	2310	13872	1678	73.5	1.19	1.20	42.4	38.0	.29	.33	5.0	1.14	1.32	1.24	1.20	1.85	57.8	6.20	1317
D * 1:25	1892.2	1891.3	1888.5	9.4	9.9	88	2100	14524	1732	73.5	1.19	1.23	42.4	38.5	.29	.33	5.0	1.13	1.32	1.24	1.20	1.85	58.6	6.34	1309
D * 1:31	1893.2	1892.5	1889.2	12.1	9.5	88	2310	13934	1757	73.5	1.19	1.19	42.5	38.7	.29	.33	6.2	1.09	1.32	1.29	1.20	1.87	59.8	6.44	1296
D * 1:36	1894.1	1893.3	1889.0	11.0	11.3	88	2310	14214	1727	73.5	1.19	1.20	42.6	38.5	.29	.33	6.2	1.12	1.32	1.26	1.20	1.86	60.6	6.52	1286
D * 1:44	1895.1	1894.5	1890.1	9.6	11.9	82	3570	14400	1737	73.1	1.19	1.19	42.7	38.7	.29	.33	5.0	1.17	1.32	1.20	1.20	1.83	61.8	6.65	1274
D * 1:50	1896.1	1895.3	1890.1	19.0	11.7	86	2310	15021	1737	73.1	1.19	1.19	42.7	38.9	.29	.33	3.7	1.11	1.32	1.26	1.20	1.86	62.6	6.76	1266

\* BIT#19 RUN#35 HTC J3 BIT DIAMETER : 8.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS : PV = 16 YP = 15 GEL = 2 \*

		DEPTHS			DRILLING PARAMETERS							MUD PARAMETERS				GAS			OVERPRESSURE SURVEY				ACCUMULATED ON BIT				
TIME	MEASURED	VERTCL	LACGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE		RESISTIVITY		DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	L/mn	m3	sg	IN	OUT	IN	OUT	ohm	unit	sg	sg	sg	net	Dhr	\$/m				
D	2: 8	1898.2	1897.7	1892.8	4.8	10.4	87	2310	13003	1569	72.3	1.19	1.19	42.8	36.5	.28	.33	3.7	1.33	1.33	1.03	1.20	1.77	64.9	7.84	1248	
D	2:15	1899.1	1898.5	1894.0	5.9	10.6	88	2310	13190	1569	72.7	1.19	1.20	42.8	36.3	.28	.33	5.0	1.27	1.33	1.03	1.20	1.77	65.0	7.16	1243	
D	2:32	1900.2	1899.3	1895.9	10.0	12.7	86	2310	13717	1587	76.9	1.19	1.19	42.5	36.3	.28	.34	5.0	.89	1.33	1.03	1.20	1.77	66.5	7.29	1236	
D	2:41	1901.1	1900.5	1897.1	6.5	11.2	87	2310	13717	1607	74.5	1.19	1.19	42.3	35.2	.28	.32	3.7	1.20	1.33	1.03	1.20	1.77	67.7	7.42	1228	
D	2:50	1902.1	1901.3	1897.7	5.5	11.6	87	2100	13438	1615	74.3	1.19	1.10	42.0	35.4	.28	.31	2.5	1.31	1.33	1.03	1.20	1.77	68.5	7.58	1225	
D	3: 1	1903.2	1902.5	1899.2	6.6	11.7	87	2100	13376	1625	75.5	1.19	1.10	41.5	35.4	.28	.32	3.7	1.20	1.33	1.03	1.20	1.77	69.8	7.76	1220	
D	3:11	1904.2	1903.3	1899.8	5.7	11.7	88	2100	13003	1623	76.3	1.19	1.19	41.2	35.4	.28	.32	3.7	1.32	1.33	1.03	1.20	1.77	70.5	7.93	1218	
D	3:19	1905.2	1904.5	1900.7	10.6	11.6	84	2310	12134	1607	78.1	1.19	1.10	41.8	35.5	.28	.32	3.7	1.15	1.33	1.22	1.20	1.85	71.7	8.06	1213	
D	3:26	1906.1	1905.3	1902.0	8.6	13.0	87	2310	13003	1607	76.5	1.19	1.10	40.9	35.4	.28	.33	2.5	1.23	1.33	1.03	1.20	1.77	72.5	8.22	1206	
D	3:35	1907.1	1906.5	1902.3	10.2	13.4	85	2310	13376	1590	73.1	1.19	1.10	40.7	35.0	.28	.33	2.5	1.20	1.33	1.03	1.20	1.77	73.7	8.32	1200	
D	3:42	1908.2	1907.3	1903.2	7.7	12.1	86	2310	12879	1607	72.1	1.19	1.10	40.7	35.7	.28	.32	3.7	1.24	1.33	1.03	1.20	1.77	74.5	8.45	1194	
T	4: 2	1909.1	1908.5	1904.7	---	---	91	2100	13872	1570	68.1	1.19	1.10	40.5	35.3	.28	.33	3.7	---	---	---	---	---	---	---	---	---
D	4: 3	1909.2	1908.5	1904.7	7.8	11.0	91	2100	13872	1562	68.1	1.19	1.10	40.5	35.3	.28	.33	3.7	1.22	1.33	1.03	1.20	1.77	75.7	8.65	1192	
D	4: 9	1910.1	1909.3	1905.6	8.4	11.6	89	2310	14245	1542	68.3	1.19	1.10	40.4	35.4	.28	.33	3.7	1.22	1.33	1.03	1.20	1.77	76.5	8.76	1187	
D	4:15	1911.1	1910.5	1906.2	9.9	11.6	89	3150	13655	1560	71.1	1.19	1.17	40.3	35.2	.28	.34	2.5	1.19	1.33	1.03	1.20	1.77	77.7	8.85	1178	
D	4:21	1912.2	1911.3	1907.4	9.3	11.6	89	2520	13810	1542	71.3	1.19	1.18	40.3	35.1	.28	.33	1.2	1.16	1.33	1.22	1.20	1.84	78.6	8.96	1173	

\*\*\*\*\*  
\* 15/ 6/82 TIME 4:24  
\*\*\*\*\*

HAMMERHEAD #1

\*\*\*\*\*  
\* DEPTH OF EXECUTION 1912.49 METERS \*  
\* FLOW RATE 1542 L/MN POWER LAW \*  
\* \*  
\* MUD DATA WEIGHT 1.19 SG \*  
\* PV 16 CPS \*  
\* YP 15.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N .6339 \*  
\* K .5567 LB/100 FT2 \*  
\* \*  
\*\*\*\*\*

\* HOLES VOLUMES WITH PIPES 77.63 M3 \*  
\* WITHOUT PIPES 86.03 M3 \*  
\* ANNULAR 61.00 M3 \*  
\* INSIDE PIPES 16.55 M3 \*  
\* \*  
\*\*\*\*\*

* FROM	TO	* PIPE ID	* PIPE OD	* HOLE DIAH	* P.LOSSES KPA	* H.P	* TYPE	* CRITICAL	* MUD FLOW L/MN	* VELOCITY M/MN	* CUTTINGS VELOCITY M/MN
* SURF. EQPT *					226	8					
* DR. STRING *	.00	1603.60	4.20	5.00	1500	52					
* DR. STRING *	1603.60	1739.30	3.00	5.00	272	9					
* DR. STRING *	1739.30	1913.68	2.01	6.50	1160	40					
* BIT *					13555	467	H/S			143.2	
* ANNULUS *	1912.49	1730.11		6.50	8.50	159	5	TU	1512.5	101.4	98.6
* ANNULUS *	1730.11	1602.41		5.00	8.50	20	1	LA	1037.4	64.4	61.9
* ANNULUS *	1602.41	1104.00		5.00	8.50	178	6	LA	1037.4	64.4	61.9
* ANNULUS *	1104.00	143.00		5.00	8.69	330	11	LA	1916.8	60.2	57.8
* ANNULUS *	143.00	.00		5.00	16.75	4	0	LA	5665.7	11.9	10.8
* TOTAL *					17404	600					

\* ANNULAR PRESSURE LOSSES 691 KPA \*  
\* \*  
\*\*\*\*\*

\* EQUIV. CIRCULATING DENSITY 1.23 SG \*  
\* MAX DEPTH 7496.67 \*  
\* \*  
\*\*\*\*\*

\* MUD LAG TIMES S -> B 10.73 MN \*  
\* B -> S 39.61 MN \*  
\* \*  
\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 41.94 MN \*  
\* MAX SLIP VELOCITY 2.01 M/MN \*  
\* \*  
\*\*\*\*\*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 11 11 11 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 13555 KPA \*  
\* H.H.P. RATIO 77.89 % \*  
\* BIT H.H.P. 8.234 \*  
\* BIT VELOCITY 143.18 M/S \*  
\* \*  
\*\*\*\*\*

\*\*\*\*\*  
 \* GEOSERVICES  
 \* ON-LINE TDC  
 HAMMERHEAD #1  
 DATE : 15/ 6/82  
 \*

\* BIT#19 RUN#35 HTC JJ BIT DIAMETER : 8.50 inch NOZZ 11/11/11 MUD RHEOLOGICAL PARAMETERS : PV = 16 YP = 15 GEL = 2 \*

* TIME *	* MEASURED *	* DEPTHS *			* DRILLING PARAMETERS *						* MUD PARAMETERS *				* GAS *				* OVERPRESSURE SURVEY *				* ACCUMULATED ON BIT *		
		VERTCL	LAGGED	ROP	ROP	MOB	RPM	TORQ	PRCS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST		
* Hr:mn *	* met *	* met *	* met *	* m/hr *	* ton *	* rpm *	* Nm *	* KPA *	* l/mn *	* m3 *	* sg *	* degC *	* IN *	* OUT *	* IN *	* OUT *	* unit *	* sg *	* sg *	* sg *	* met *	* Dia *	* \$/m *		
D * 4:29	* 1913.1	1912.6	1988.1	* 6.1	* 12.3	89	2100	13686	1560	* 68.9	* 1.19	1.10	48.2	35.3	.28	.33	* 2.5	* 1.33	1.33	* 1.83	1.20	1.77	* 79.8	9.09	1165
D * 4:38	* 1914.2	1913.3	1988.4	* 6.4	* 11.5	89	2730	12228	1560	* 69.7	* 1.19	1.10	48.1	35.0	.28	.34	* 3.7	* 1.33	1.33	* 1.83	1.20	1.77	* 88.5	9.24	1163
D * 4:44	* 1915.1	1914.5	1989.8	* 9.9	* 11.6	89	2520	12631	1560	* 70.1	* 1.19	1.10	48.1	35.0	.28	.33	* 3.7	* 1.20	1.33	* 1.83	1.20	1.77	* 81.8	9.34	1155
D * 4:58	* 1916.2	1915.3	1909.9	* 10.3	* 12.5	89	2730	12841	1562	* 70.1	* 1.19	1.10	48.1	34.8	.28	.32	* 3.7	* 1.20	1.33	* 1.83	1.20	1.77	* 82.6	9.44	1150
D * 5: 6	* 1917.2	1916.6	1911.7	* 13.6	* -2	62	1890	13531	1569	* 72.3	* 1.19	1.18	48.0	34.6	.28	.33	* 6.2	* 1.09	1.33	* 1.29	1.20	1.80	* 83.9	9.54	1140
D * 5:13	* 1918.2	1917.3	1912.9	* 11.9	* 14.6	83	2940	13934	1598	* 69.7	* 1.19	1.18	48.0	35.0	.28	.33	* 5.0	* 1.15	1.33	* 1.23	1.20	1.85	* 84.5	9.67	1138
D * 5:18	* 1919.2	1918.5	1913.5	* 13.8	* 13.2	87	2730	13624	1587	* 69.3	* 1.19	1.18	48.0	35.1	.29	.33	* 5.0	* 1.13	1.33	* 1.25	1.20	1.86	* 85.8	9.75	1129
D * 5:22	* 1920.1	1919.3	1913.8	* 12.6	* 13.3	85	2520	13469	1597	* 69.3	* 1.19	1.18	39.9	35.0	.28	.34	* 5.0	* 1.16	1.33	* 1.22	1.20	1.85	* 86.5	9.82	1123
D * 5:27	* 1921.1	1920.5	1914.5	* 11.8	* 12.8	87	3150	13430	1587	* 69.1	* 1.19	1.18	48.0	34.8	.28	.33	* 5.0	* 1.16	1.33	* 1.22	1.20	1.84	* 87.8	9.90	1113



ON-LINE TDC  
GEOGERSVICES

BIT REPORT

\* 15/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT#19 RUN#35

#BIT TYPE :TOOTH

#BIT IDENTITY :HTC J3

\*\*\*\*\*  
#BIT SIZE : 8.50 INCH

#BIT COST : 5000. \$ RIG COST/HR: 5833.

\*\*\*\*\*  
#NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY

#DEPTH IN : 1833.45 METERS 14/ 6/82

#DEPTH OUT : 1921.20 METERS 15/ 6/82

#METRAGE : 87.75 METERS

#TOTAL REVOLUTIONS : 49

\*\*\*\*\*  
#DRILLING TIME: 9:55 HR AVERAGE ROP: 8.05 M/HR

#TIME IN HOLE : 13: 6 HR AVERAGE ROP: 6.78 M/HR

#TRIP TIME : 6: 0 HR

\*\*\*\*\*  
#DRILLING COST STANDARD : 1326.7 \$/MET

#DRILLING COST ON BOTTOM : 1114.7 \$/MET

#DRILLING COST MINIMUM : 1113.4 \$/MET

\*\*\*\*\*  
\* AVERAGE OVER THE RUN AVERAGE HYDRAULICS

#WEIGHT ON BIT : 12.70 TONS NOZZLES SPEED : 152.27 M/S

#ROTATION : 82.00 RPM PRESSURE DROP : 15332 KPA

#FLOW RATE :1640.00 L/MN HYDRAULIC POWER: 562.07 H.P

#STAND PIPE PRESSURE: 15550 KPA

UN

\* 15/ 6/82

HAMMERHEAD #1

\* BIT#20 RUN#36 SEQ NBR: 0

\* STARTING DEPTH 1921.20 METERS

\* BIT DATA SIZE 8.50  
\* TOOTH HTC J3  
\* NOZZLES 11 11 11 @ 95 % EFFICIENCY

* DRILL STRING * * SECTION *	TYPE	* NBR *	* LENGTH * * METERS *	ID * INCHES *	OD * INCHES *	* NOMINAL LINEAR * * WEIGHT (KG/M) *
* 1	* DRILL PIPE	* 183 *	* 9.20 *	* 4.28	* 5.00 *	* 29.02 *
* 2	* HEAVY WGT DP	* 1 *	* 55.70 *	* 3.00	* 5.00 *	* 73.00 *
* 3	* DRILL COLLAR	* 1 *	* 174.38 *	* 2.81	* 6.50 *	* 136.40 *

* HOLE	* ID	* DEPTH (METERS)
* INCHES	* TOP	* BOTTOM
* RISER	* 16.75 *	* .00 143.00
* CASING	* 8.69 *	* 143.00 1104.00
* OPEN HOLE 1	* 8.50 *	* 1104.00 1921.04

\* COST DATA BIT COST 5000 \$ RIG COST 5833 \$/HR  
\* TRIP TIME 6.00 HRS

\* WEIGHTS HOOK LOAD OFF BOTTOM 108.7 TONS  
\* STRING WEIGHT IN AIR 76.8 TONS

\* VOLUMES ANNULUS 61.3 M3 IN PIPES 16.6 M3

\* DEVIATION 1.0 DEG 1.75 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA

\* BIT WEAR TYPE EXPONENT .5  
\* EXPECTED: RUN LENGTH 150 METERS TEETH WEAR 3 /8TH

\* BIT#20 RUN#36 HTC J3 BIT DIAMETER : 8.50 inch NOZZ 11/11/11 \* \* \* \* \*  
 \* \* \* \* \* MUD RHEOLOGICAL PARAMETERS : PV = 16 YP = 15 GEL = 2 \* \* \* \* \*

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS							MUD PARAMETERS		GAS		OVERPRESSURE SURVEY			ACCUMULATED ON BIT						
		VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m3	IN	OUT	IN	OUT	ohm	unit	sg	sg	sg	net	DH	\$/m			
T * 11:53	* 1921.2	1920.5	1915.7	* ---	* ---	0	-210	11940	967	* 67.9	* 1.19	1.19	34.2	30.9	.30	.32	* 0	* ---	* ---	* ---	* ---	* ---	* ---		
T * 12:13	* 1922.0	1921.4	1855.9	* ---	* ---	77	2730	13810	1607	* 67.4	* 1.19	1.19	33.6	33.3	.30	.33	* 3.7	* ---	* ---	* ---	* ---	* ---	* ---		
D * 12:14	* 1922.2	1921.4	1856.2	* 9.1	* 13.4	76	2730	13810	1607	* 67.2	* 1.19	1.19	33.6	33.3	.30	.33	* 2.5	* 1.35	* 1.33	* 1.03	1.20	1.77	* .9	.09	46524
D * 12:19	* 1923.2	1922.6	1856.8	* 11.3	* 15.0	72	2730	13072	1605	* 67.9	* 1.19	1.19	33.6	33.8	.30	.34	* 0	* 1.29	* 1.33	* 1.03	1.20	1.77	* 2.1	.18	19520
D * 12:25	* 1924.1	1923.4	1857.5	* 12.2	* 15.2	72	4200	14059	1625	* 68.7	* 1.19	1.10	33.9	33.5	.30	.35	* -1.2	* 1.31	* 1.33	* 1.03	1.20	1.77	* 2.9	.27	14220
D * 12:33	* 1925.1	1924.6	1859.0	* 12.6	* 12.7	77	2730	13810	1607	* 69.5	* 1.19	1.16	34.4	32.7	.30	.37	* -2.1	* 1.28	* 1.33	* 1.03	1.20	1.77	* 4.1	.39	18346
D * 12:50	* 1926.1	1925.5	1864.2	* 14.9	* 15.1	79	2940	13010	1605	* 69.9	* 1.19	1.10	35.5	33.1	.30	.34	* -2.5	* 1.25	* 1.33	* 1.03	1.20	1.77	* 5.0	.52	8514
D * 12:56	* 1927.1	1926.6	1869.6	* 10.5	* 11.5	89	3150	13779	1595	* 69.7	* 1.19	1.10	35.0	33.1	.30	.35	* -1.2	* 1.28	* 1.33	* 1.03	1.20	1.77	* 6.1	.60	7131
D * 13: 1	* 1928.1	1927.4	1922.7	* 12.5	* 11.2	93	2730	13593	1607	* 70.1	* 1.19	1.10	36.2	32.0	.30	.34	* -2.5	* 1.20	* 1.33	* 1.03	1.20	1.77	* 6.9	.70	6375
D * 13: 7	* 1929.1	1928.6	1923.6	* 8.2	* 11.1	89	2730	13593	1605	* 70.3	* 1.19	1.20	36.4	32.4	.30	.35	* 0	* 1.31	* 1.33	* 1.03	1.20	1.77	* 8.1	.79	5522
D * 13:13	* 1930.1	1929.4	1924.2	* 9.9	* 10.9	89	2520	13531	1597	* 70.9	* 1.19	1.10	36.8	32.1	.30	.35	* -1.2	* 1.28	* 1.33	* 1.03	1.20	1.77	* 8.9	.89	5043
D * 13:20	* 1931.1	1930.6	1925.4	* 7.3	* 12.1	91	2730	13562	1625	* 70.9	* 1.19	1.10	37.0	32.4	.30	.35	* -1.2	* 1.37	* 1.33	* 1.03	1.20	1.77	* 10.1	1.01	4551
D * 13:25	* 1932.1	1931.4	1926.0	* 14.4	* 11.3	89	2520	13469	1643	* 71.1	* 1.19	1.10	37.0	32.3	.30	.35	* -1.2	* 1.21	* 1.34	* 1.03	1.20	1.77	* 10.9	1.09	4233
D * 13:32	* 1933.1	1932.6	1926.3	* 8.5	* 12.2	87	3150	13500	1622	* 71.1	* 1.19	1.10	37.2	32.4	.30	.36	* -1.2	* 1.31	* 1.34	* 1.03	1.20	1.77	* 12.1	1.21	3893
D * 13:38	* 1934.1	1933.4	1927.6	* 9.2	* 10.8	88	3360	13531	1638	* 71.5	* 1.19	1.10	37.3	32.5	.30	.36	* -2.5	* 1.33	* 1.34	* 1.03	1.20	1.77	* 12.9	1.30	3687
D * 13:47	* 1936.4	1933.8	1928.5	* 7.5	* 8	71	2520	13376	1584	* 73.7	* 1.19	1.10	37.3	32.6	.30	.35	* 1.2	* 1.34	* 1.34	* 1.03	1.20	1.77	* 13.3	1.35	3595
D * 13:52	* 1937.2	1936.6	1929.1	* 7.8	* 10.4	93	2520	14400	1643	* 71.9	* 1.19	1.10	32.0	32.7	.30	.36	* -2.5	* 1.33	* 1.34	* 1.03	1.20	1.77	* 16.1	1.42	3004



ON-LINE TDC  
GEO SERVICES

BIT REPORT

# 15/ 6/82

HAMMERHEAD #1

\*\*\*\*\*  
#BIT HEADING :BIT#20 RUN#36

#BIT TYPE :TOOTH

#BIT IDENTITY :HTC J3

\*\*\*\*\*  
#BIT SIZE : 8.50 INCH

#BIT COST : 5000. \$

RIG COST/HR: 5033.

\*\*\*\*\*  
#NOZZLES : 11 11 11 /32NDS @ 95 % EFFICIENCY

#DEPTH IN : 1921.28 METERS

15/ 6/82

#DEPTH OUT : 1942.18 METERS

15/ 6/82

#METRAGE : 20.90 METERS

#TOTAL REVOLUTIONS : 12

\*\*\*\*\*  
#DRILLING TIME: 2:28 HR

AVERAGE ROP: 0.49 M/HR

#TIME IN HOLE : 4:21 HR

AVERAGE ROP: 4.00 M/HR

#TRIP TIME : 6: 0 HR

\*\*\*\*\*  
#DRILLING COST STANDARD : 3128.7 \$/MET

#DRILLING COST ON BOTTOM : 2600.8 \$/MET

#DRILLING COST MINIMUM : 2402.2 \$/MET

\*\*\*\*\*  
# AVERAGE OVER THE RUN

AVERAGE HYDRAULICS

#WEIGHT ON BIT : 11.80 TONS

NOZZLES SPEED : 150.42 M/S

#ROTATION : 89.00 RPM

PRESSURE DROP : 14960 KPA

#FLOW RATE : 1620.00 L/MIN

HYDRAULIC POWER: 541.75 H.P

#STAND PIPE PRESSURE: 13700 KPA

\*\*\*\*\*

ON-LINE TDC  
GEOSERVICES

HYDRAULIC REPORT

# 15/ 6/82 TIME 17:55

HAMMERHEAD #1

# DEPTH OF EXECUTION 1742.18 METERS \*  
# FLOW RATE 1620 L/MN POWER LAW \*

# MUD DATA WEIGHT 1.19 SG \*  
# PV 16 CPS \*  
# YP 9.00 LB/FT2 \*  
# GEL 2.00 LB/100 FT2 \*  
# N .7618 \*  
# K .1988 LB/100 FT2 \*

# HOLES VOLUMES WITH PIPES 78.68 M3 \*  
# WITHOUT PIPES 87.92 M3 \*  
# ANNULAR 61.79 M3 \*  
# INSIDE PIPES 16.89 M3 \*

# FROM TO # PIPE # PIPE # HOLE # P.LOSSES # H.P # TYPE # CRITICAL # MUD # CUTTINGS \*  
# # # ID OD DIAM # # FLOW # VELOCITY VELOCITY \*  
# # METERS # INCH INCH INCH # KPA # # L/MN # M/MN M/MN \*

#SURF.EQPT\* # 247 9 \* \* \* \*  
#DR.STRING\* .00 1720.40 # 4.20 5.00 # 1675 61 \* \* \* \*  
#DR.STRING\* 1720.40 1776.10 # 3.00 5.00 # 297 11 \* \* \* \*  
#DR.STRING\* 1776.10 1950.40 # 2.01 6.50 # 1267 46 \* \* \* \*  
#BIT # # # 14960 542 # M/S # 158.4 \*  
#ANNULUS # 1942.18 1767.00 # 6.50 8.50 # 173 6 # TU 1185.2 # 106.6 103.5 \*  
#ANNULUS # 1767.00 1712.10 # 5.00 8.50 # 12 0 # TU 1322.9 # 67.7 64.8 \*  
#ANNULUS # 1712.10 1184.00 # 5.00 8.50 # 118 4 # TU 1322.9 # 67.7 64.8 \*  
#ANNULUS # 1184.00 143.00 # 5.00 8.69 # 174 7 # TU 1369.1 # 63.3 68.4 \*  
#ANNULUS # 143.00 .00 # 5.00 16.75 # 3 0 # LA 3396.2 # 12.5 10.2 \*  
# TOTAL # # # 18948 686 # \* \*

#ANNULAR PRESSURE LOSSES 501 KPA \*

#EQUIV.CIRCULATING DENSITY 1.22 SG \*  
# MAX DEPTH 6714.05 \*

# MUD LAG TIMES S -> B 10.43 MN \*  
# B -> S 38.14 MN \*

# CUTTINGS DATA SIZE .20 CM \*  
# DENSITY 2.40 SG \*  
# LAG TIME 41.91 MN \*  
# MAX SLIP VELOCITY 3.12 M/MN \*

# BIT DATA SIZE 8.50 INCH \*  
# NOZZLES 11 11 11 /32NDS \*  
# NOZZLES EFFICIENCY 95 % \*  
# BIT P. LOSSES 14960 KPA \*  
# H.H.P RATIO 70.95 % \*  
# BIT H.H.P 9.547 \*  
# BIT VELOCITY 150.42 M/S \*



GEDSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\* 15/ 6/82

HAMMERHEAD #1

\* BIT#21 RUN#37 SEQ NBR: 0 \*

\* STARTING DEPTH 1942.18 METERS

\* BIT DATA SIZE 8.50  
\* INSERT HTC J33  
\* NOZZLES 1& 1& 1& @ 95 % EFFICIENCY

* DRILL STRING#	* TYPE	* NBR	* LENGTH	* ID	* OD	* NOMINAL LINEAR
* SECTION			* METERS	* INCHES		* WEIGHT (KG/M)
* 1	* DRILL PIPE	* 186	* 9.20	* 4.20	* 5.00	* 29.02
* 2	* HEAVY WGT DP	* 1	* 55.70	* 3.00	* 5.00	* 73.00
* 3	* DRILL COLLAR	* 1	* 174.30	* 2.81	* 6.50	* 136.40

* HOLE	* ID	* DEPTH (METERS)
	* INCHES	* TOP
		* BOTTOM
* RISER	* 16.75	* .00 143.00
* CASING	* 8.69	* 143.00 1184.00
* OPEN HOLE 1	* 8.50	* 1184.00 1942.20

\* COST DATA BIT COST 8000 \$ RIG COST 5833 \$/HR  
\* TRIP TIME 6.00 HRS

\* WEIGHTS HOOK LOAD OFF BOTTOM 189.4 TONS  
\* STRING WEIGHT IN AIR 77.6 TONS

\* VOLUMES ANNULUS 61.8 M3 IN PIPES 16.8 M3

\* DEVIATION 1.0 DEG 1.75 M / 100 M

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA

\* BIT WEAR TYPE EXPONENT .2  
\* EXPECTED: RUN LENGTH 150 METERS TEETH WEAR 3 /0TH

\* BIT#21 RUN#37 HTC J33 BIT DIAMETER: 8.50 inch NOZZ 12/12/12 \* MUD RHEOLOGICAL PARAMETERS: PV = 16 YP = 9 GEL = 2 \*

TIME	MEASURED	DEPTH			DRILLING PARAMETERS					MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT				
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST				
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m <sup>3</sup>	sq	degC	ohm	unit	sq	sq	sq	sq	net	Dhr	\$/m					
D * 22:39	1948.8	1947.4	1941.9	38.9	.0	56	2738	10521	1868	67.9	1.19	1.18	27.7	32.8	.32	.37	-6.2	.72	1.34	1.83	1.20	1.78	.0	.00	7230	
D * 23: 0	1944.1	1943.8	1946.8	5.9	13.5	57	2528	12587	1939	66.2	1.19	1.17	28.7	32.9	.32	.37	-21.	1.39	1.34	1.83	1.20	1.77	1.8	.20	24641	
D * 23: 6	1945.9	1943.0	1946.5	5.9	13.1	59	2520	15176	2817	67.8	1.19	1.18	29.1	33.3	.32	.37	-15.	1.39	1.34	1.83	1.20	1.77	1.8	.38	24641	
D * 23: 7	1946.1	1945.8	1946.5	16.8	12.8	62	2520	14741	2852	66.2	1.19	1.18	29.2	33.2	.32	.36	-11.	1.13	1.34	1.26	1.20	1.87	3.8	.33	11776	
D * 23:15	1947.1	1946.8	1946.5	7.2	12.8	62	2318	14121	2837	65.8	1.19	1.17	29.9	33.2	.32	.37	-7.5	1.36	1.34	1.83	1.20	1.78	4.0	.46	9492	
D * 23:21	1948.1	1947.8	1946.5	9.9	13.5	63	2318	13469	2817	64.6	1.19	1.18	30.4	33.3	.32	.39	-6.2	1.28	1.34	1.83	1.20	1.78	5.8	.56	7932	
D * 23:31	1949.1	1948.0	1946.5	8.1	13.6	63	2318	13997	2852	64.8	1.19	1.18	31.8	33.4	.33	.37	-2.5	1.35	1.34	1.83	1.20	1.78	6.8	.71	6987	
T * 23:51	1949.6	1948.5	1947.7			62	2318	3383	2345	65.2	1.19	1.18	31.8	33.8	.33	.36	-5.8									
T * 0:11	1950.0	1948.5	1949.2			69	2318	13997	2825	64.8	1.19	1.18	32.8	33.6	.34	.37	-5.8									
D * 0:29	1950.1	1949.8	1949.5	.9	12.4	61	2188	12414	1975	63.6	1.19	1.18	32.3	34.3	.33	.38	-3.7	1.87	1.34	1.83	1.20	1.78	7.8	1.62	6636	
T * 0:49	1950.6	1949.5	1949.8			58	2318	12918	1995	62.6	1.19	1.17	32.6	35.0	.33	.37	-5.8									
D * 1: 0	1951.1	1950.8	1950.1	1.5	17.4	58	2318	12298	1975	63.8	1.19	1.18	33.1	35.4	.34	.38	-8.7	1.98	1.34	1.83	1.20	1.78	8.8	2.27	6344	
T * 1:28	1951.6	1950.5	1950.7			57	2318	14493	1975	61.8	1.19	1.18	33.5	35.9	.32	.38	-8.7									
D * 1:40	1952.1	1951.8	1951.8	2.5	16.7	56	2318	13376	1995	62.8	1.19	1.17	33.7	35.9	.33	.36	-6.2	1.76	1.34	1.83	1.20	1.78	9.9	2.81	5997	
T * 2: 0	1952.8	1951.5	1951.3			51	2188	12445	1982	62.8	1.19	1.20	34.1	36.3	.34	.38	-7.5									
D * 2:14	1953.1	1952.8	1951.9	1.6	17.4	51	2188	12872	2013	63.8	1.19	1.17	34.3	36.8	.34	.38	1.2	1.89	1.34	1.83	1.20	1.78	10.8	3.38	5774	
T * 2:34	1953.6	1952.5	1952.6			49	2318	11979	2887	63.8	1.19	1.17	34.6	37.8	.34	.37	3.7									
T * 2:54	1954.1	1953.8	1953.2			49	2318	8659	1995	62.8	1.19	1.17	34.9	36.7	.34	.38	2.5									
D * 2:57	1954.1	1953.8	1953.2	1.4	17.4	49	2318	12618	1985	62.8	1.19	1.17	34.9	37.8	.34	.38	2.5	1.91	1.34	1.83	1.20	1.78	11.8	4.89	5615	
T * 3:17	1954.4	1953.8	1953.5			58	2318	13128	1977	59.6	1.19	1.18	35.8	36.2	.33	.38	1.2									
T * 3:37	1954.8	1953.5	1954.1			61	2318	12631	1957	59.8	1.19	1.17	34.9	37.4	.33	.39	1.2									
D * 3:44	1955.1	1954.8	1954.1	1.5	18.3	68	2318	12228	1975	59.8	1.19	1.17	35.8	37.2	.33	.38	.8	1.99	1.34	1.83	1.20	1.78	12.8	4.72	5494	
T * 4: 4	1956.1	1955.8	1954.4			68	2528	11576	1977	60.2	1.19	1.18	35.2	37.3	.35	.38	.8									
D * 4: 5	1956.1	1955.8	1954.7	2.3	18.4	65	2528	11297	1995	60.2	1.19	1.22	35.2	37.4	.34	.38	1.2	1.85	1.34	1.83	1.20	1.78	13.8	5.88	5227	
T * 4:25	1957.8	1956.8	1955.6			65	2318	11452	1977	60.2	1.19	1.18	35.3	37.5	.34	.37	1.2									
D * 4:27	1957.1	1956.8	1955.6	3.2	20.5	61	2528	11788	1995	60.2	1.19	1.17	35.3	37.4	.34	.37	1.2	1.76	1.34	1.83	1.20	1.78	14.8	5.43	5836	
D * 4:35	1958.1	1957.8	1955.9	7.3	19.2	68	2528	14276	2853	68.8	1.19	1.17	35.4	37.5	.33	.38	1.2	1.51	1.34	1.83	1.20	1.78	15.8	5.55	4753	
D * 4:42	1959.1	1958.8	1956.2	8.2	19.3	68	2738	13655	2878	59.8	1.19	1.17	35.5	37.8	.32	.37	1.2	1.48	1.34	1.83	1.20	1.78	16.8	5.67	4518	
D * 4:48	1960.1	1959.8	1956.2	8.9	19.3	61	2738	12166	2888	68.8	1.19	1.17	35.6	37.4	.32	.38	.9	1.44	1.34	1.83	1.20	1.78	17.8	5.77	4303	
D * 4:56	1961.1	1960.8	1956.5	8.4	18.8	68	3158	13966	2871	59.8	1.19	1.17	35.7	37.8	.32	.38	-1.2	1.45	1.34	1.83	1.20	1.78	18.8	5.98	4185	
D * 5: 3	1962.2	1961.8	1957.4	7.4	18.3	61	2738	18862	2812	59.6	1.19	1.17	35.7	37.7	.32	.38	-1.2	1.58	1.34	1.83	1.20	1.78	19.8	6.81	3938	
D * 5: 8	1963.1	1962.8	1958.8	12.7	18.2	58	3158	12918	2887	59.6	1.19	1.17	35.7	37.6	.32	.38	.8	1.31	1.34	1.83	1.20	1.78	20.8	6.18	3769	
T * 5:28	1964.8	1963.8	1968.2			58	2738	11328	1949	68.2	1.19	1.17	35.7	37.2	.33	.37	.8									
D * 5:31	1964.1	1963.8	1968.8	18.2	18.2	57	2738	9993	2814	59.6	1.19	1.17	35.7	36.7	.34	.37	-1.2	1.35	1.34	1.83	1.20	1.78	21.8	6.24	3629	
D * 5:38	1965.1	1964.8	1961.7	11.9	17.9	57	3368	11328	2812	68.8	1.19	1.17	35.6	38.8	.34	.36	-1.2	1.38	1.34	1.83	1.20	1.78	22.8	6.35	3584	
D * 5:41	1966.2	1965.8	1962.8	15.7	18.7	58	3578	12228	2832	59.6	1.19	1.17	35.6	38.8	.34	.36	.8	1.26	1.34	1.83	1.20	1.78	23.8	6.41	3374	
D * 5:47	1969.1	1965.5	1962.9	12.4	18.4	59	3368	12298	2858	59.6	1.19	1.19	35.6	38.2	.33	.36	-2.5	1.32	1.34	1.83	1.20	1.78	24.3	6.45	3318	
D * 5:47	1969.2	1968.8	1963.2	48.9	18.8	57	3368	12841	2817	59.6	1.19	1.18	35.6	38.2	.33	.36	-2.5	.94	1.35	1.83	1.20	1.78	26.9	6.46	3883	

\* 16/ 6/82 TIME 5:51

HAMMERHEAD #1

\* DEPTH OF EXECUTION 1969.66 METERS \*  
\* FLOW RATE 1994 L/MN POWER LAW \*

\* MUD DATA WEIGHT 1.19 SG \*  
\* PV 16 CPS \*  
\* YP 9.00 LB/FT2 \*  
\* GEL 2.00 LB/100 FT2 \*  
\* N .7618 \*  
\* K .1938 LB/100 FT2 \*

\* HOLES VOLUMES WITH PIPES 79.60 M3 \*  
\* WITHOUT PIPES 88.92 M3 \*  
\* ANNULAR 62.45 M3 \*  
\* INSIDE PIPES 17.15 M3 \*

\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
\* \* \* ID \* OD \* DIAM \* \* \* FLOW \* VELOCITY \* VELOCITY \*  
\* \* METERS \* INCH \* INCH \* INCH \* KPA \* \* L/MN \* M/MN \* M/MN \*

\*SURF.CQPT\* \* 359 16 \* \* \* \*  
\*DR.STRING\* .00 1740.00 \* 4.20 5.00 \* 2474 110 \* \* \* \*  
\*DR.STRING\* 1740.00 1803.70 \* 3.00 5.00 \* 432 19 \* \* \* \*  
\*DR.STRING\* 1803.70 1970.00 \* 2.81 6.50 \* 1042 82 \* \* \* \*  
\*BIT \* \* \* 16000 714 \* M/S \* 155.6 \* \* \* \*  
\*ANNULUS \* 1969.66 1795.20 \* 6.50 8.50 \* 252 11 \* TU 1185.2 \* 131.2 128.0 \* \* \* \*  
\*ANNULUS \* 1795.20 1739.50 \* 5.00 8.50 \* 18 1 \* TU 1322.9 \* 83.3 80.4 \* \* \* \*  
\*ANNULUS \* 1739.50 1184.00 \* 5.00 8.50 \* 181 8 \* TU 1322.9 \* 83.3 80.4 \* \* \* \*  
\*ANNULUS \* 1184.00 143.00 \* 5.00 8.69 \* 282 13 \* TU 1369.1 \* 77.9 75.0 \* \* \* \*  
\*ANNULUS \* 143.00 .00 \* 5.00 16.75 \* 3 0 \* LA 3396.2 \* 15.4 13.1 \* \* \* \*  
\* TOTAL \* \* \* 21853 974 \* \* \* \* \*

\* ANNULAR PRESSURE LOSSES 737 KPA \*

\* EQUIV.CIRCULATING DENSITY 1.23 SG \*  
\* MAX DEPTH 4806.77 \*

\* MUD LAG TIMES S -> B 8.60 MN \*  
\* B -> S 31.31 MN \*

\* CUTTINGS DATA SIZE .20 CM \*  
\* DENSITY 2.40 SG \*  
\* LAG TIME 33.78 MN \*  
\* MAX SLIP VELOCITY 3.17 M/MN \*

\* BIT DATA SIZE 8.50 INCH \*  
\* NOZZLES 12 12 12 /32NDS \*  
\* NOZZLES EFFICIENCY 95 % \*  
\* BIT P. LOSSES 16000 KPA \*  
\* H.H.P RATIO 73.26 % \*  
\* BIT H.H.P 12.576 \*  
\* BIT VELOCITY 155.60 M/S \*

\* BIT#21 RUN#37 HTC J33 BIT DIAMETER : 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS : IV = 16 YP = 9 GEL = 2 \*

TIME	DEPTHS			DRILLING PARAMETERS							DENSITY		MUD PARAMETERS		RESISTIVITY		OVERPRESSURE SURVEY				ACCUMULATED ON BIT				
	MEASURED	VERTCL	LAGGED	ROP	WOB	RPM	TORG	PRESS	FLOW	PIT	IN	OUT	IN	OUT	IN	OUT	DCS	MORM	PF	ECD	FRAC	METER	TIME	COST	
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sq	degC	ohm	unit	sq	sq	sq	sq	sq	sq	net	Dhr	\$/m		
D * 5:55	1970.1	1969.0	1963.0	5.4	17.9	60	2310	9434	1977	59.2	1.19	1.17	35.7	38.3	.32	.37	-2.5	1.54	1.35	1.03	1.20	1.70	27.8	6.59	2922
T * 6:15	1970.6	1969.5	1966.3			58	2730	13252	2012	58.0	1.19	1.18	35.8	30.2	.31	.37	-2.5								
D * 6:18	1971.1	1970.0	1966.6	6.1	18.6	58	2940	12600	2012	58.2	1.19	1.17	35.8	30.2	.31	.37	-2.5	1.52	1.35	1.03	1.20	1.70	28.8	6.97	2899
D * 6:26	1972.1	1971.0	1969.9	8.2	19.0	50	3150	13097	2032	58.8	1.19	1.17	35.8	37.9	.32	.37	.0	1.41	1.35	1.03	1.20	1.70	29.0	7.09	2825
D * 6:33	1973.1	1972.0	1969.9	7.9	18.6	58	3360	10490	2032	58.0	1.19	1.17	35.8	37.8	.32	.37	-1.2	1.43	1.35	1.03	1.20	1.70	30.8	7.22	2758
T * 6:53	1973.4	1972.0	1970.2			0	.000	-31	544	61.8	1.19	1.19	35.8	36.6	.30	.35	-1.2								
D * 7: 3	1974.2	1973.0	1971.1	8.4	20.2	62	2940	12879	1939	61.0	1.19	1.17	35.7	36.7	.30	.35	-3.7	1.45	1.35	1.03	1.20	1.70	31.8	7.40	2709
D * 7:10	1975.2	1974.0	1972.1	10.1	18.2	62	3360	13034	1975	61.6	1.19	1.18	35.5	37.7	.30	.35	-1.2	1.30	1.35	1.03	1.20	1.70	32.8	7.52	2645
D * 7:15	1976.2	1975.0	1972.7	13.8	18.5	61	3570	13686	1957	61.2	1.19	1.18	35.5	37.9	.30	.35	-1.2	1.30	1.35	1.03	1.20	1.70	33.8	7.61	2582
D * 7:23	1977.1	1976.0	1973.3	5.7	18.0	61	3360	13221	1939	61.4	1.19	1.18	35.5	38.2	.31	.36	1.2	1.57	1.35	1.03	1.20	1.70	34.8	7.73	2530
D * 7:28	1978.1	1977.0	1973.3	9.6	18.6	61	3360	12817	1957	61.2	1.19	1.17	35.5	38.3	.31	.35	1.2	1.41	1.35	1.03	1.20	1.70	35.8	7.83	2473
D * 7:33	1979.1	1978.0	1973.3	12.5	20.1	61	3360	12817	1972	61.4	1.19	1.17	35.6	38.1	.32	.35	1.2	1.32	1.35	1.03	1.20	1.70	36.8	7.91	2418
D * 7:39	1980.1	1979.0	1974.2	10.0	20.6	60	3780	12879	1975	61.4	1.19	1.17	35.7	38.0	.32	.36	1.2	1.40	1.35	1.03	1.20	1.70	37.8	8.00	2369
D * 7:44	1981.2	1980.0	1974.8	14.6	18.9	60	3570	11793	1962	61.2	1.19	1.18	35.7	36.2	.32	.37	.0	1.29	1.35	1.03	1.20	1.70	38.8	8.09	2320
D * 7:49	1982.1	1981.1	1976.0	10.7	18.4	61	3360	13593	1939	60.2	1.19	1.18	35.7	38.3	.30	.37	3.7	1.37	1.35	1.03	1.20	1.70	39.9	8.17	2272
D * 8: 0	1983.2	1982.0	1976.9	17.2	17.1	64	2520	13686	1904	60.4	1.19	1.18	35.7	38.2	.31	.35	6.2	1.15	1.35	1.03	1.20	1.70	40.8	8.23	2229
D * 8: 5	1984.1	1983.0	1978.2	11.4	19.0	61	2730	12879	1922	60.2	1.19	1.18	35.7	37.8	.32	.35	6.2	1.37	1.35	1.03	1.20	1.70	41.8	8.31	2186
D * 8:10	1985.1	1984.0	1979.1	13.8	18.4	62	3570	12910	1904	60.4	1.19	1.18	35.7	38.2	.32	.34	8.7	1.32	1.35	1.03	1.20	1.70	42.9	8.39	2144
D * 8:15	1986.1	1985.0	1979.7	11.1	19.0	62	3570	13120	1939	61.0	1.19	1.17	35.8	38.3	.32	.34	10.0	1.39	1.35	1.03	1.20	1.70	43.8	8.48	2108
D * 8:20	1987.2	1986.0	1980.9	11.1	18.7	62	3570	12941	1995	61.8	1.19	1.17	35.8	38.2	.32	.35	8.7	1.30	1.35	1.03	1.20	1.70	44.8	8.56	2072
D * 8:29	1988.1	1987.0	1982.7	8.2	19.5	61	3570	15052	1975	60.2	1.19	1.17	35.9	38.4	.30	.35	6.2	1.47	1.35	1.03	1.20	1.70	45.8	8.71	2047
D * 8:34	1989.1	1988.0	1983.8	10.3	18.9	62	3570	14338	1992	59.6	1.19	1.17	36.0	38.6	.31	.36	7.5	1.40	1.35	1.03	1.20	1.70	46.8	8.79	2013
D * 8:39	1990.1	1989.0	1983.9	12.0	19.7	61	3780	13283	1919	60.4	1.19	1.17	36.0	38.4	.31	.35	5.0	1.35	1.35	1.03	1.20	1.70	47.8	8.87	1979
D * 8:55	1991.2	1990.0	1986.4	7.2	.0	63	2100	14462	1977	62.2	1.19	1.18	36.1	37.8	.30	.36	8.7	1.51	1.35	1.03	1.20	1.70	48.8	9.01	1955
D * 8:59	1992.1	1991.0	1987.0	6.0	19.7	76	3360	13120	1924	61.2	1.19	1.17	36.0	37.8	.30	.37	10.0	1.60	1.35	1.03	1.20	1.70	49.8	9.06	1923
D * 9: 6	1993.1	1992.0	1987.6	9.2	17.8	71	3780	13159	1921	60.6	1.19	1.22	36.0	38.2	.33	.36	7.5	1.45	1.35	1.03	1.20	1.70	50.8	9.19	1899
D * 9:13	1994.1	1993.0	1989.1	9.6	19.0	71	3990	12507	1986	61.0	1.19	1.17	35.9	38.5	.33	.36	7.5	1.41	1.35	1.03	1.20	1.70	51.8	9.29	1875
D * 9:22	1995.1	1994.0	1990.7	5.2	18.5	73	3570	12103	1921	58.6	1.19	1.21	35.9	37.9	.33	.36	6.2	1.59	1.35	1.03	1.20	1.70	52.8	9.46	1858
D * 9:29	1996.1	1995.0	1991.0	14.3	18.5	71	3990	11421	1921	57.8	1.19	1.18	35.9	37.8	.33	.35	8.7	1.31	1.35	1.03	1.20	1.70	53.8	9.56	1835
D * 9:34	1997.1	1996.0	1991.9	13.3	17.8	71	3780	12103	1957	57.4	1.19	1.18	35.8	37.5	.34	.35	10.0	1.31	1.35	1.03	1.20	1.70	54.8	9.65	1809



# 16/ 6/82 TIME 9:42

HAMMERHEAD #1

```
*****
# DEPTH OF EXECUTION 1997.66 METERS *
# FLOW RATE 1921 L/MN POWER LAW *
#
# MUD DATA WEIGHT 1.19 SG *
# PV 16 CPS *
# YP 14.00 LB/FT2 *
# GEL 2.00 LB/100 FT2 *
# N .6521 *
# K .4798 LB/100 FT2 *
#
# HOLES VOLUMES WITH PIPES 80.52 M3 *
# WITHOUT PIPES 89.95 M3 *
# ANNULAR 63.12 M3 *
# INSIDE PIPES 17.40 M3 *
*****
```

```
*****
# FROM TO # PIPE # PIPE # HOLE #P.LOSSES# H.P #TYPE# CRITICAL # MUD # CUTTINGS *
# # # ID OD DIAM # # FLOW # VELOCITY VELOCITY *
# # METERS # INCH INCH INCH # KPA # # L/MN # M/MN M/MN *
*****
#SURF.EQPT# # # # 336 14 # # #
#DR.STRING# .00 1775.60 # 4.20 5.00 # 2351 101 # # #
#DR.STRING# 1775.60 1831.30 # 3.00 5.00 # 404 17 # # #
#DR.STRING# 1831.30 2005.68 # 2.01 6.50 # 1723 74 # # #
#BIT # # # 14060 630 # M/S # 149.9 #
#ANNULUS # 1997.66 1023.28 # 6.50 8.50 # 236 10 # TU 1463.0 # 126.4 123.5 #
#ANNULUS # 1823.28 1767.58 # 5.00 8.50 # 17 1 # TU 1757.8 # 80.3 77.7 #
#ANNULUS # 1767.58 1184.00 # 5.00 8.50 # 170 8 # TU 1757.8 # 80.3 77.7 #
#ANNULUS # 1184.00 143.00 # 5.00 8.69 # 264 11 # TU 1831.8 # 75.1 72.5 #
#ANNULUS # 143.00 .00 # 5.00 16.75 # 4 0 # LA 5291.9 # 14.8 13.6 #
# TOTAL# # # 20373 075 # # #
*****
```

# ANNULAR PRESSURE LOSSES 699 KPA

# EQUIV.CIRCULATING DENSITY 1.23 SG  
# MAX DEPTH 5575.84

# MUD LAG TIMES S -> B 9.06 MN  
# B -> S 32.85 MN

# CUTTINGS DATA SIZE .20 CM  
# DENSITY 2.40 SG  
# LAG TIME 34.52 MN  
# MAX SLIP VELOCITY 2.93 M/MN

# BIT DATA SIZE 8.50 INCH  
# NOZZLES 12 12 12 /32NDS  
# NOZZLES EFFICIENCY 95 %  
# BIT P. LOSSES 14060 KPA  
# H.H.P RATIO 72.94 %  
# BIT H.H.P 11.240  
# BIT VELOCITY 149.91 M/S



GEOSSERVICES ON-LINE TDC

BIT RUN INITIALISATION

\*\*\*\*\*

\* 16/ 6/82

HAMMERHEAD #1

\*\*\*\*\*

\*\*\*\*\*

\* BIT#22 RUN#38 SEQ NBR: 0 \*

\*\*\*\*\*

\* STARTING DEPTH 1997.98 METERS \*

\*\*\*\*\*

\* BIT DATA SIZE 8.50 \*

\* INSERT HTC J22 \*

\* NOZZLES 12 12 12 @ 95 % EFFICIENCY \*

\*\*\*\*\*

\* DRILL STRING# TYPE \* NBR \* LENGTH \* ID OD \* NOMINAL LINEAR \*

\* SECTION \* \* METERS \* INCHES \* WEIGHT (KG/M) \*

\*\*\*\*\*

\* 1 \* DRILL PIPE \* 192 \* 9.28 \* 4.20 5.00 \* 29.02 \*

\* 2 \* HEAVY WGT DP \* 1 \* 55.70 \* 3.00 5.00 \* 73.00 \*

\* 3 \* DRILL COLLAR \* 1 \* 174.30 \* 2.01 6.50 \* 136.40 \*

\*\*\*\*\*

\* HOLE \* ID \* DEPTH (METERS) \*

\* \* INCHES \* TOP BOTTOM \*

\*\*\*\*\*

\* RISER \* 16.75 \* .00 143.00 \*

\* CASING \* 8.69 \* 143.00 1184.00 \*

\* OPEN HOLE 1 \* 8.50 \* 1184.00 1997.95 \*

\*\*\*\*\*

\* COST DATA BIT COST 8000 \$ RIG COST 5833 \$/HR \*

\* TRIP TIME 6.00 HRS \*

\*\*\*\*\*

\* WEIGHTS HOOK LOAD OFF BOTTOM 110.8 TONS \*

\* STRING WEIGHT IN AIR 79.2 TONS \*

\*\*\*\*\*

\* VOLUMES ANNULUS 63.1 M3 IN PIPES 17.3 M3 \*

\*\*\*\*\*

\* DEVIATION 1.0 DEG 1.75 M / 100 M \*

\*\*\*\*\*

\* HYDRAULICS NOMINAL ANNULUS PRESSURE LOSSES AT 1600 L/MN : 13 KPA \*

\*\*\*\*\*

\* BIT WEAR TYPE EXPONENT .2 \*

\* EXPECTED: RUN LENGTH 150 METERS TEETH WEAR 3 /8TH \*

\*\*\*\*\*

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 16/ 6/82

\* BIT#22 RUN#38 HTC J22 BIT DIAMETER : 8.50 inch NOZZ 12/12/12

MUD RHEOLOGICAL PARAMETERS : PV = 19 YP = 14 GEL = 2

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS						MUD PARAMETERS				GAS				OVERPRESSURE SURVEY				ACCUMULATED ON BIT	
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	GAS	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST		
Hr:mn	net	net	net	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sq	degC	ohm	unit	sq	sq	sq	sq	net	DHr	\$/m			
T 16:57	1997.9	1996.5	1997.4			42	2730	14152	1747	48.8	1.19	1.19	26.8	21.1	.32	.34	-16.							
D 16:58	1998.1	1997.0	1997.4	20.9	12.0	49	2730	13407	1827	48.4	1.19	1.19	26.8	22.0	.33	.33	-15.	.98	1.35	1.03	1.20	1.78	.5 .01 92503	
D 17: 6	1999.2	1998.0	1997.7	7.8	13.4	55	2730	9683	1839	47.0	1.19	1.19	26.8	30.1	.34	.32	-20.	1.30	1.35	1.03	1.20	1.78	1.5 .15 29500	
T 17:26	2000.1	1999.0	1998.0			0	.000	7200	1306	40.4	1.19	1.20	25.5	31.4	.34	.34	-16.							
D 17:43	2000.1	1999.0	1998.0	5.3	12.8	48	2730	10862	2036	39.5	1.19	1.20	26.0	31.4	.32	.34	-12.	1.44	1.35	1.03	1.20	1.70	2.5 .34 18128	
D 17:51	2001.1	2000.0	1998.0	7.6	14.3	50	2730	13041	1941	36.5	1.19	1.17	27.1	33.3	.32	.37	-20.	1.31	1.36	1.03	1.20	1.79	3.5 .48 13198	
D 17:59	2002.1	2001.0	1998.3	7.4	13.1	51	2730	11452	2103	36.1	1.19	1.12	28.7	31.7	.33	.45	-29.	1.32	1.36	1.03	1.20	1.79	4.5 .61 10422	
D 18:12	2003.1	2002.0	1999.8	4.0	15.2	57	2940	10303	2107	39.9	1.19	1.10	29.9	33.6	.34	.35	-8.7	1.53	1.36	1.03	1.20	1.79	5.5 .83 8699	
D 18:19	2004.1	2003.0	2000.7	7.6	15.2	56	2730	9931	2100	43.8	1.19	1.17	29.6	33.2	.33	.36	-10.	1.36	1.36	1.03	1.20	1.79	6.5 .95 7488	
D 18:31	2005.1	2004.0	2001.9	5.4	15.0	64	3570	11320	2120	50.4	1.19	1.17	29.4	33.3	.30	.36	-11.	1.48	1.36	1.03	1.20	1.79	7.5 1.14 6649	
D 18:39	2006.1	2005.0	2002.5	6.2	14.9	62	3570	12631	1628	53.4	1.19	1.17	29.5	33.3	.29	.37	-11.	1.30	1.36	1.03	1.20	1.79	8.5 1.20 5956	
D 18:48	2007.1	2006.0	2003.1	7.1	16.1	62	3360	12507	1615	58.2	1.19	1.10	29.3	33.3	.29	.36	-7.5	1.43	1.36	1.03	1.20	1.79	9.5 1.43 5415	
D 18:56	2008.1	2007.0	2003.0	8.9	15.0	63	3570	12010	1615	63.6	1.19	1.17	29.2	32.8	.29	.30	-10.	1.36	1.36	1.03	1.20	1.79	10.5 1.55 4978	
D 19: 2	2009.2	2008.0	2004.4	11.9	16.1	63	3700	12166	1636	71.7	1.19	1.10	29.1	33.5	.29	.37	-11.	1.29	1.36	1.03	1.20	1.79	11.5 1.66 4581	
D 19:19	2010.1	2009.0	2005.3	4.5	15.2	68	3570	10397	1523	76.3	1.19	1.15	29.2	31.5	.20	.37	-11.	1.58	1.36	1.03	1.20	1.79	12.5 1.81 4295	
D 19:28	2011.1	2010.0	2006.2	6.6	15.0	67	3700	10179	1544	77.1	1.19	1.14	29.4	31.0	.20	.37	-6.2	1.47	1.36	1.03	1.20	1.79	13.5 1.97 4035	
D 19:36	2012.1	2011.0	2007.1	7.2	15.9	69	3570	12259	1449	77.9	1.19	1.16	29.5	31.3	.29	.37	-5.0	1.42	1.36	1.03	1.20	1.79	14.5 2.09 3805	
D 19:45	2013.1	2012.0	2008.3	7.7	16.0	68	3700	12445	1674	80.1	1.17	1.17	29.6	31.7	.29	.35	-2.5	1.41	1.36	1.03	1.20	1.79	15.5 2.24 3620	
D 19:54	2014.1	2013.0	2009.6	6.2	13.7	66	3700	12290	1674	80.5	1.19	1.16	29.8	31.3	.30	.34	-2.5	1.40	1.36	1.03	1.20	1.79	16.5 2.38 3449	
D 19:59	2015.2	2014.0	2009.9	11.8	12.7	69	3570	0472	1674	80.5	1.19	1.17	29.9	31.3	.30	.34	-1.2	1.25	1.36	1.03	1.20	1.79	17.5 2.47 3280	
D 20: 3	2016.1	2015.0	2010.2	14.5	12.4	66	3990	11940	1772	80.1	1.19	1.19	30.0	31.1	.30	.33	-1.2	1.17	1.36	1.24	1.20	1.87	18.5 2.53 3125	
D 20: 6	2017.1	2016.1	2010.0	15.3	13.5	66	3700	13252	1903	80.1	1.19	1.17	30.1	31.4	.30	.33	-2.5	1.18	1.36	1.23	1.20	1.82	19.5 2.59 2976	
D 20:11	2018.2	2017.0	2011.7	11.5	13.4	67	3990	12569	1868	78.9	1.19	1.17	30.2	31.9	.30	.32	-2.5	1.25	1.36	1.03	1.20	1.79	20.5 2.67 2858	
D 20:28	2019.1	2018.0	2013.2	9.9	14.9	64	3360	13469	1812	84.7	1.19	1.17	29.8	32.5	.29	.34	-1.2	1.30	1.36	1.03	1.20	1.79	21.5 2.85 2771	
D 20:37	2020.2	2019.0	2014.4	5.9	12.5	65	3570	14152	1810	84.9	1.19	1.15	29.3	32.1	.20	.35	-2.5	1.41	1.36	1.03	1.20	1.79	22.5 2.98 2684	
D 20:43	2021.1	2020.0	2016.8	8.8	13.0	64	3570	14431	1812	86.9	1.19	1.12	29.0	32.8	.28	.35	-2.5	1.30	1.36	1.03	1.20	1.79	23.5 3.09 2599	
D 20:48	2022.1	2021.0	2016.9	17.4	12.9	65	3700	14998	1830	90.3	1.19	1.15	28.8	32.3	.27	.36	-2.5	1.12	1.36	1.29	1.20	1.89	24.5 3.16 2507	
D 20:51	2023.1	2022.0	2017.5	21.3	13.3	67	3570	15145	1812	90.5	1.19	1.16	28.7	32.0	.27	.36	-3.7	1.87	1.36	1.34	1.20	1.91	25.5 3.22 2426	
D 20:53	2024.1	2023.1	2018.1	22.1	13.1	65	3700	15852	1823	90.3	1.19	1.16	28.7	32.2	.27	.37	-3.7	1.84	1.36	1.03	1.20	1.79	26.5 3.26 2339	
D 20:57	2025.2	2024.0	2018.1	19.8	12.7	65	3700	15269	1830	90.3	1.19	1.12	28.8	31.7	.27	.36	-3.7	1.89	1.36	1.32	1.20	1.98	27.5 3.32 2268	
D 21: 2	2026.2	2025.0	2018.4	7.9	13.6	66	3700	15821	1830	90.1	1.19	1.17	29.0	31.9	.27	.35	-5.0	1.34	1.36	1.03	1.20	1.79	28.5 3.41 2207	
D 21: 6	2027.1	2026.0	2019.3	15.6	12.3	64	3700	15852	1792	89.9	1.19	1.14	29.1	32.1	.27	.35	-3.7	1.15	1.36	1.26	1.20	1.88	29.5 3.47 2143	
D 21:18	2028.1	2026.5	2019.9	9.3	12.9	65	3700	14710	1845	88.7	1.19	1.15	29.4	31.1	.27	.35	-2.5	1.27	1.36	1.03	1.20	1.79	30.8 3.56 2119	
D 21:24	2029.2	2028.0	2020.8	12.1	14.3	64	3700	14369	1837	84.3	1.19	1.17	29.8	31.0	.28	.34	-3.7	1.21	1.36	1.03	1.20	1.79	31.5 3.65 2041	
D 21:29	2030.1	2029.1	2022.0	14.8	13.9	65	3700	13717	1832	83.9	1.19	1.17	30.0	31.0	.28	.32	-2.5	1.18	1.36	1.22	1.20	1.87	32.5 3.73 1990	
D 21:35	2031.1	2030.0	2023.9	8.9	14.3	63	3700	13283	1832	83.5	1.19	1.17	30.2	31.0	.28	.32	-1.2	1.30	1.36	1.03	1.20	1.79	33.5 3.83 1951	
D 21:40	2032.1	2031.0	2025.1	12.5	14.2	64	3990	13436	1832	83.1	1.19	1.17	30.3	30.7	.29	.32	.0	1.21	1.36	1.19	1.20	1.85	34.5 3.92 1908	
D 21:45	2033.3	2032.0	2026.3	12.6	13.1	62	3700	13190	1832	82.7	1.19	1.17	30.4	30.4	.29	.31	.0	1.21	1.36	1.19	1.20	1.85	35.5 4.00 1868	

\* BIT#22 RUN #38 HTC J22 BIT DIAMETER : 8.50 inch NOZZ 12/12/12 MUD RHEOLOGICAL PARAMETERS : PV = 14 YP = 20 GEL = 3

TIME	MEASURED	DEPTHS			DRILLING PARAMETERS					MUD PARAMETERS				GAS			OVERPRESSURE SURVEY				ACCUMULATED ON BIT		
		VERTCL	LAGGED	ROP	WOB	RPM	TORQ	PRESS	FLOW	PIT	DENSITY	TEMPERATURE	RESISTIVITY	DCS	NORM	PF	ECD	FRAC	METER	TIME	COST		
Hr:mn	met	met	met	m/hr	ton	rpm	Nm	KPA	l/mn	m3	sg	degC	ohm	unit	sg	sq	sq	sq	met	DHr	\$/m		
T * 23:37	* 2050.9	1764.6	1764.2	* ---	* ---	0	.000	-1831	0	* 78.1	* 1.20	1.18	37.4	32.7	.29	.30	* 1.2						
T * 23:57	* 2051.0	1764.6	1764.2	* ---	* ---	0	.000	279	579	* 84.3	* 1.20	1.19	31.5	30.3	.29	.31	* 5.0						
T * 0:17	* 2051.0	2049.7	1765.7	* ---	* ---	0	.000	16728	1868	* 75.9	* 1.20	1.15	31.4	34.7	.29	.32	* -2.5						
T * 0:37	* 2051.0	2049.7	2050.7	* ---	* ---	0	.000	-2079	432	* 75.7	* 1.20	1.21	32.0	35.5	.29	.31	* -3.7						
T * 0:57	* 2051.2	2049.7	2050.7	* ---	* ---	74	2520	12569	1869	* 66.6	* 1.20	1.17	32.6	33.1	.30	.33	* .0						
T * 1:17	* 2052.1	2335.1	2050.7	* ---	* ---	75	2730	12352	1869	* 71.9	* 1.20	1.17	32.4	33.4	.30	.33	* .0						
D * 1:18	* 2052.1	2335.1	2050.7	* 610.	* 15.5	73	2730	12079	1804	* 71.9	* 1.20	1.17	32.4	33.5	.30	.34	* .0	1.13	1.46	* 1.03	1.20	1.84 * 338.3 6.14 232	
D * 1:36	* 2053.2	2336.0	2051.3	* 3.4	* 15.9	73	2730	13120	1869	* 72.3	* 1.20	1.17	32.1	33.1	.29	.33	* .0	1.62	1.46	* 1.03	1.20	1.84 * 339.3 6.45 237	
D * 1:54	* 2054.1	2337.0	2052.2	* 5.0	* 15.0	76	2520	13376	1804	* 72.3	* 1.20	1.20	32.3	33.6	.29	.34	* .0	1.53	1.46	* 1.03	1.20	1.84 * 340.3 6.72 240	
D * 2:14	* 2055.1	2338.0	2053.1	* 3.5	* 15.7	64	2520	11762	1921	* 72.5	* 1.20	1.17	32.5	33.8	.31	.34	* .0	1.58	1.46	* 1.03	1.20	1.84 * 341.3 7.04 246	
T * 2:34	* 2056.1	2339.0	2054.1	* ---	* ---	0	.000	-1955	0	* 72.5	* 1.20	1.25	32.7	33.9	.31	.30	* .0						
D * 2:43	* 2056.1	2339.0	2054.7	* 3.9	* 10.5	62	2520	13376	1961	* 70.9	* 1.20	1.17	32.7	33.6	.30	.34	* .0	1.45	1.46	* 1.03	1.20	1.84 * 342.3 7.30 250	
T * 3: 3	* 2057.0	2055.0	2055.9	* ---	* ---	62	2520	13606	1961	* 70.3	* 1.20	1.18	32.8	34.3	.30	.34	* .0						
D * 3: 5	* 2057.1	2055.0	2055.9	* 2.3	* 11.1	62	2520	13841	1921	* 70.5	* 1.20	1.18	32.8	34.6	.30	.34	* .0	1.53	1.37	* 1.03	1.20	1.80 * 343.3 7.75 256	
D * 3:21	* 2058.1	2056.1	2056.2	* 3.9	* 12.7	61	2520	14524	1959	* 69.3	* 1.20	1.18	33.0	34.9	.29	.33	* -1.2	1.43	1.37	* 1.03	1.20	1.80 * 344.3 8.01 260	

D * 3:41	* 2059.1	2057.0	2057.4	* 2.8	* 12.7	64	2520	12352	1961	* 69.7	* 1.20	1.19	33.2	34.9	.30	.33	* .0	* 1.53	1.37	* 1.03	1.20	1.00	* 345.3	0.27	264
D * 3:54	* 2060.1	2058.1	2058.0	* 4.9	* 13.7	61	2520	12569	1957	* 70.5	* 1.20	1.15	33.4	35.4	.30	.34	* .0	* 1.30	1.37	* 1.03	1.20	1.00	* 346.4	0.47	267
D * 4: 9	* 2061.1	2059.0	2058.9	* 3.5	* 13.4	62	2520	13190	1961	* 69.1	* 1.20	1.17	33.6	35.6	.29	.33	* .0	* 1.45	1.37	* 1.03	1.20	1.00	* 347.3	0.71	270
D * 4:27	* 2062.1	2060.0	2060.1	* 3.6	* 12.8	61	2520	13593	1954	* 68.7	* 1.20	1.10	33.9	35.0	.29	.33	* 1.2	* 1.43	1.37	* 1.03	1.20	1.00	* 348.3	0.92	274
D * 4:42	* 2063.1	2061.0	2061.1	* 4.5	* 12.2	62	2520	13376	1033	* 67.9	* 1.20	1.13	34.1	35.9	.20	.34	* .0	* 1.40	1.37	* 1.03	1.20	1.00	* 349.3	0.26	277
D * 5: 0	* 2064.1	2062.0	2062.0	* 3.3	* 12.7	64	2520	13159	1040	* 67.7	* 1.20	1.17	34.2	36.4	.29	.33	* .0	* 1.47	1.37	* 1.03	1.20	1.00	* 350.3	0.55	282
T * 5:20	* 2064.0	2062.5	2063.2	* ---	* ---	11	2940	-1986	0	* 68.1	* 1.20	1.20	34.5	36.2	.29	.31	* 1.2	* ---	* ---	* ---	* ---	* ---	* ---	* ---	* ---
D * 5:25	* 2065.1	2063.1	2063.2	* 4.7	* 3.9	67	2310	12290	1772	* 69.1	* 1.20	1.16	34.5	36.3	.20	.32	* 2.5	* 1.35	1.37	* 1.03	1.20	1.00	* 351.4	0.00	285
D * 5:40	* 2066.1	2064.0	2064.1	* 3.9	* 13.1	62	2520	11979	1757	* 67.7	* 1.20	1.16	34.6	36.1	.29	.33	* 1.2	* 1.43	1.37	* 1.03	1.20	1.00	* 352.3	10.05	288
D * 5:54	* 2067.1	2065.0	2064.7	* 4.2	* 13.0	62	2520	11979	1772	* 67.6	* 1.20	1.12	34.7	36.7	.29	.33	* .0	* 1.43	1.37	* 1.03	1.20	1.00	* 353.3	10.29	291

17/ 6/82 TIME 6: 8

HAMMERHEAD 01

DEPTH OF EXECUTION 2067.93 METERS  
FLOW RATE 1772 L/MN POWER LAW

MUD DATA WEIGHT 1.20 SG  
PV 12 CPS  
YP 12.00 LB/FT2  
GEL 3.00 LB/100 FT2  
N .6521  
K .3598 LB/100 FT2

HOLES VOLUMES WITH PIPES 82.09 M3  
WITHOUT PIPES 92.52 M3  
ANNULAR 64.00 M3  
INSIDE PIPES 10.00 M3

FROM	TO	PIPE ID	PIPE OD	HOLE DIAM	W.P. LOSSES	H.P.	TYPE	CRITICAL	MUD FLOW	CUTTINGS VELOCITY
METERS	METERS	INCH	INCH	INCH	KPA				L/MN	M/MN
*SURF. EQPT*					275	11				
*DR. STRING*	.00	1040.00	4.28	5.00	1994	79				
*DR. STRING*	1040.00	1095.70	3.00	5.00	331	13				
*DR. STRING*	1095.70	2070.00	2.01	6.50	1411	56				
*BIT					12609	503	M/S		130.2	
*ANNULUS	2067.93	1093.55	6.50	8.50	193	0	TU	1178.2	116.6	113.4
*ANNULUS	1093.55	1037.85	5.00	8.50	14	1	TU	1415.6	74.0	71.2
*ANNULUS	1037.85	1184.00	5.00	8.50	163	6	TU	1415.6	74.0	71.2
*ANNULUS	1184.00	143.00	5.00	8.69	216	9	TU	1475.2	69.2	66.4
*ANNULUS	143.00	.00	5.00	16.75	4	0	LA	4261.7	13.7	12.2
* TOTAL*					17290	685				

ANNULAR PRESSURE LOSSES 590 KPA

EQUIV. CIRCULATING DENSITY 1.23 SG  
MAX DEPTH 7538.17

MUD LAG TIMES S -> B 10.16 MN  
B -> S 36.57 MN

CUTTINGS DATA SIZE .20 CM  
DENSITY 2.40 SG  
LAG TIME 38.00 MN  
MAX SLIP VELOCITY 3.18 M/MN

BIT DATA SIZE 0.50 INCH  
NOZZLES 12 12 12 /32NDS  
NOZZLES EFFICIENCY 95 %  
BIT P. LOSSES 12609 KPA  
H.H.P. RATIO 73.39 %  
BIT H.H.P. 0.857  
BIT VELOCITY 130.24 M/S

\* GEOSERVICES  
\* ON-LINE TDC

HAMMERHEAD #1

DATE : 17/ 6/82

\* BIT#22 RUN #38 HTC J22 BIT DIAMETER : 0.50 inch NOZZ 12/12/12

MUD RHEOLOGICAL PARAMETERS : PV = 12 YP = 12 GEL = 3

* TIME	* DEPTHS			* DRILLING PARAMETERS						* MUD PARAMETERS		* GAS		* OVERPRESSURE SURVEY				* ACCUMULATED ON BIT							
	* MEASURED	* VERTCL	* LAGGED	* ROP	* WOB	RPM	TORQ	PRESS	FLOW	* PIT	DENSITY	TEMPERATURE	RESISTIVITY	* DCS	NORM	PF	ECD	FRAC	METER TIME	COST					
* Hr:mn	* met	* met	* met	* m/hr	* ton	rpm	Nm	KPA	L/hr	* m3	sg	degC	sham	* unit	* sg	sg	sg	* met	DHr	\$/m					
D * 6:27	2069.1	2067.0	2066.9	4.4	15.3	62	2520	11545	1702	66.8	1.20	1.10	34.8	36.7	.29	.33	2.5	1.50	1.37	1.03	1.20	1.00	355.3	10.03	298
D * 6:38	2070.1	2068.0	2067.5	7.4	16.2	62	2730	11545	1772	66.8	1.20	1.10	34.9	36.8	.29	.33	2.5	1.32	1.38	1.03	1.20	1.00	356.3	11.00	300
D * 6:48	2071.1	2069.0	2068.1	5.7	16.6	61	2730	11607	1772	66.8	1.20	1.09	35.0	36.5	.29	.33	3.7	1.41	1.38	1.03	1.20	1.00	357.3	11.17	302
D * 6:56	2072.1	2070.0	2068.7	7.2	16.1	61	2730	11403	1777	66.6	1.20	1.19	35.0	36.8	.29	.32	2.5	1.36	1.30	1.03	1.20	1.00	358.3	11.31	304
D * 7: 1	2073.1	2071.1	2069.0	14.8	15.0	62	2730	11234	1751	66.4	1.20	1.10	35.0	37.1	.29	.33	2.5	1.14	1.38	1.03	1.20	1.00	359.3	11.39	304
D * 7:12	2074.2	2072.0	2069.9	4.8	15.4	61	2730	11297	1772	66.0	1.20	1.20	35.1	37.2	.29	.34	2.5	1.50	1.38	1.03	1.20	1.00	360.3	11.50	307
D * 7:32	2075.1	2073.0	2071.4	3.3	15.2	67	2730	12134	1809	65.6	1.20	1.23	35.2	36.3	.29	.33	2.5	1.57	1.38	1.03	1.20	1.00	361.3	11.77	309
D * 7:44	2076.1	2074.0	2073.3	6.1	15.1	67	2730	11762	1810	65.6	1.20	1.19	35.2	36.6	.30	.33	2.5	1.42	1.38	1.03	1.20	1.00	362.3	11.96	311
D * 7:55	2077.1	2075.0	2074.2	4.8	14.9	69	2730	11452	1789	65.4	1.20	1.14	35.1	37.0	.30	.33	0	1.47	1.38	1.03	1.20	1.00	363.3	12.16	313
D * 8: 7	2078.1	2076.1	2075.1	5.2	15.8	66	2940	11203	1789	65.4	1.20	1.19	35.2	36.8	.30	.33	2.5	1.46	1.38	1.03	1.20	1.00	364.3	12.36	316
D * 8:20	2079.1	2077.0	2076.3	4.6	14.4	69	2730	10000	1789	65.0	1.20	1.10	35.2	37.2	.30	.33	1.2	1.46	1.38	1.03	1.20	1.00	365.3	12.56	318
D * 8:34	2080.1	2078.0	2077.5	4.6	13.4	68	2520	11979	1886	65.0	1.20	1.15	35.3	36.8	.30	.33	2.5	1.44	1.38	1.03	1.20	1.00	366.3	12.80	321
D * 8:46	2081.1	2079.0	2078.4	5.0	13.1	68	2730	13430	1886	64.4	1.20	1.17	35.3	36.9	.30	.35	2.5	1.43	1.38	1.03	1.20	1.00	367.3	13.00	323
D * 8:56	2082.1	2080.0	2079.0	6.5	13.4	70	2730	12290	1866	64.4	1.20	1.08	35.3	37.6	.30	.34	1.2	1.36	1.38	1.03	1.20	1.00	368.3	13.17	325
D * 9: 4	2083.1	2081.0	2080.0	7.0	14.7	67	2940	12072	1886	64.4	1.20	1.19	35.4	37.3	.31	.34	2.5	1.29	1.38	1.03	1.20	1.00	369.3	13.30	326
D * 9:11	2084.3	2081.0	2080.0	7.0	-1.7	49	1890	18676	1696	66.0	1.20	1.22	35.4	36.9	.30	.34	3.7	.65	1.38	1.03	1.20	1.00	370.6	13.32	326
D * 9:16	2085.1	2083.0	2080.3	9.7	12.4	63	2520	11979	1846	64.2	1.20	1.19	35.4	36.9	.30	.34	1.2	1.19	1.38	1.03	1.20	1.00	371.3	13.39	326
D * 9:32	2086.1	2084.0	2081.8	3.6	13.1	64	2730	11421	1828	63.4	1.20	1.17	35.4	37.4	.31	.34	2.5	1.40	1.38	1.03	1.20	1.00	372.3	13.66	329
D * 9:47	2087.1	2085.1	2084.8	4.5	14.2	64	2520	11638	1830	64.2	1.20	1.18	35.5	37.3	.30	.34	2.5	1.43	1.38	1.03	1.20	1.00	373.3	13.91	332
D * 9:58	2088.1	2086.0	2085.4	4.8	13.4	61	2520	11514	1830	64.2	1.20	1.16	35.6	37.3	.30	.33	2.5	1.39	1.38	1.03	1.20	1.00	374.3	14.10	334
D * 10:16	2089.1	2087.0	2086.7	3.6	12.5	62	2520	13003	1961	62.2	1.20	1.19	35.6	37.6	.31	.34	2.5	1.47	1.38	1.03	1.20	1.00	375.3	14.39	338
D * 10:32	2090.1	2088.0	2087.9	3.6	14.0	61	2520	12041	1952	60.6	1.20	1.21	35.6	38.0	.31	.34	2.5	1.50	1.38	1.03	1.20	1.00	376.3	14.65	341
D * 10:47	2091.1	2089.0	2088.0	4.2	13.9	60	2520	11390	1939	59.6	1.20	1.23	35.7	37.9	.32	.34	1.2	1.46	1.38	1.03	1.20	1.00	377.3	14.91	344
D * 11: 3	2092.1	2090.0	2090.0	3.3	15.0	60	2520	11979	1941	58.8	1.20	1.13	35.9	37.9	.32	.35	1.2	1.56	1.38	1.03	1.20	1.00	378.3	15.10	347
D * 11:20	2093.1	2091.0	2090.9	3.5	15.3	62	2520	12134	1951	56.0	1.20	1.13	35.9	37.9	.32	.35	1.2	1.54	1.38	1.03	1.20	1.00	379.3	15.45	351
T * 11:40	2093.9	2091.5	2092.2			2	210	14555	1809	54.6	1.20	1.10	36.1	37.6	.28	.36	2.5								
D * 11:41	2094.1	2092.1	2092.2	5.9	12.3	53	2310	14617	1773	54.4	1.20	1.18	36.1	37.3	.28	.34	2.5	1.37	1.38	1.03	1.20	1.00	380.4	15.69	354
D * 11:55	2095.1	2093.0	2092.8	4.5	14.6	65	2520	12228	1809	53.2	1.20	1.10	36.1	38.4	.29	.35	1.2	1.47	1.38	1.03	1.20	1.00	381.3	15.92	356
D * 12:11	2096.1	2094.0	2093.2	4.0	15.0	64	2520	12538	1809	52.4	1.20	1.20	36.3	38.6	.30	.35	0	1.50	1.38	1.03	1.20	1.00	382.3	16.19	359
D * 12:27	2097.1	2095.0	2094.9	3.6	15.4	61	2520	11452	1791	52.0	1.20	1.19	36.4	38.2	.30	.35	1.2	1.53	1.38	1.03	1.20	1.00	383.3	16.46	362
D * 12:45	2098.1	2096.0	2095.8	3.6	15.5	61	2520	12755	1834	51.2	1.20	1.19	36.4	38.5	.29	.34	5.0	1.52	1.38	1.03	1.20	1.00	384.3	16.75	366
D * 13: 1	2099.2	2097.0	2096.7	3.9	15.5	62	2520	13655	1791	52.0	1.20	1.10	36.4	38.1	.29	.34	3.7	1.54	1.38	1.03	1.20	1.00	385.3	17.02	369
D * 13:16	2100.1	2098.0	2097.6	3.9	15.1	61	2520	12259	1791	50.4	1.20	1.15	36.3	38.6	.29	.35	2.5	1.53	1.38	1.03	1.20	1.00	386.3	17.26	372
D * 13:32	2101.1	2099.0	2098.6	3.8	14.8	62	2520	10093	1771	50.0	1.20	1.10	36.4	38.4	.29	.34	2.5	1.53	1.38	1.03	1.20	1.00	387.3	17.53	375
D * 13:47	2102.1	2100.0	2099.8	4.0	15.2	62	2520	10986	1773	50.4	1.20	1.20	36.6	38.5	.29	.35	2.5	1.51	1.38	1.03	1.20	1.00	388.3	17.78	377
T * 14: 7	2102.9	2100.5	2100.7			52	2520	13717	1756	73.9	1.20	1.19	32.7	38.4	.26	.34	5.0								
D * 14:10	2103.1	2101.0	2101.0	3.1	15.9	52	2520	13997	1693	75.1	1.20	1.18	32.2	38.5	.26	.35	3.7	1.50	1.39	1.03	1.20	1.00	389.3	18.05	381
D * 14:26	2104.1	2102.0	2101.9	3.6	15.8	52	2520	13740	1721	77.5	1.20	1.19	32.7	37.6	.26	.35	3.7	1.51	1.39	1.03	1.20	1.00	390.3	18.32	384
D * 14:41	2105.1	2103.0	2102.5	3.9	15.4	51	2730	13097	1716	81.5	1.20	1.19	33.4	37.1	.26	.35	3.7	1.49	1.39	1.03	1.20	1.00	391.3	18.55	386
D * 14:55	2106.1	2104.0	2103.4	4.9	15.8	52	2730	11793	1754	82.5	1.20	1.20	34.1	37.2	.27	.33	3.7	1.43	1.39	1.03	1.20	1.00	392.3	18.80	389
D * 15:11	2107.2	2105.0	2104.6	3.9	16.0	54	2520	12041	1774	83.3	1.20	1.22	34.6	36.6	.27	.29	6.2	1.50	1.39	1.03	1.20	1.00	393.3	19.05	391
D * 15:25	2108.1	2106.0	2105.6	4.0	15.1	52	2520	12321	1771	83.9	1.20	1.07	34.8	36.9	.27	.29	6.2	1.49	1.39	1.03	1.20	1.00	394.3	19.29	394
D * 15:43	2109.1	2107.0	2106.8	3.6	15.0	54	2520	12941	1771	82.7	1.20	1.14	35.0	38.4	.27	.32	5.0	1.51	1.39	1.03	1.20	1.00	395.3	19.59	397
D * 16: 0	2110.1	2108.0	2108.0	3.6	16.1	52	2520	13003	1809	82.7	1.20	1.19	35.3	39.3	.26	.33	3.7	1.50	1.39	1.03	1.20	1.00	396.3	19.88	401
D * 16:17	2111.1	2109.0	2108.9	3.9	15.4	56	2520	12910	1771	83.5	1.20	1.19	35.7	39.1	.26	.34	3.7	1.48	1.39	1.03	1.20	1.00	397.3	20.16	404
T * 16:37	2111.6	2109.5	2109.8			53	2520	13686	1827	83.3	1.20	1.18	36.2	37.8	.27	.33	5.0								
D * 16:46	2112.1	2110.0	2110.4	2.1	15.4	53	2730	13430	1864	83.7	1.20	1.18	36.4	39.0	.27	.32	5.0	1.65	1.39	1.03	1.20	1.00	398.3	20.52	408
D * 17: 0	2113.1	2111.0	2111.4	4.1	16.5	53	2730	13120	1847	83.5	1.20	1.19	36.6	38.8	.27	.32	5.0	1.51	1.39	1.03	1.20	1.01	399.3	20.75	411
D * 17: 9	2114.1	2112.0	2111.4	5.0	16.1	61	2940	13314	1824	83.3	1.20	1.19	36.8	38.9	.27	.33	6.2	1.48	1.39	1.03	1.20	1.0			





\*\*\*\*\*  
 \* 17/ 6/82 TIME 21:51 \*  
 \* \*\*\*\*\*  
 \* HAMMERHEAD 01 \*  
 \* \*\*\*\*\*

\*\*\*\*\*  
 \* DEPTH OF EXECUTION 2131.00 METERS \*  
 \* FLOW RATE 1810 L/MN POWER LAW \*  
 \* \*\*\*\*\*

\* MUD DATA \*  
 \* WEIGHT 1.20 SG \*  
 \* PV 12 CPS \*  
 \* YP 12.00 LB/FT2 \*  
 \* GEL 3.00 LB/100 FT2 \*  
 \* W .6521 \*  
 \* K .3598 LB/100 FT2 \*  
 \* \*\*\*\*\*

\* HOLES VOLUMES \*  
 \* WITH PIPES 84.91 M3 \*  
 \* WITHOUT PIPES 94.83 M3 \*  
 \* ANNULAR 66.31 M3 \*  
 \* INSIDE PIPES 10.60 M3 \*  
 \* \*\*\*\*\*

\* FROM TO \* PIPE \* PIPE \* HOLE \* P.LOSSES \* H.P \* TYPE \* CRITICAL \* MUD \* CUTTINGS \*  
 \* ID OD DIAM \* FLOW \* VELOCITY VELOCITY \*  
 \* METERS \* INCH INCH INCH \* KPA \* L/MN \* M/MN \* M/MN \*

* SURF. EQPT *											
* DR. STRING *	.00	1904.40	4.28	5.00		2145	87				
* DR. STRING *	1904.40	1960.10	3.00	5.00		344	14				
* DR. STRING *	1960.10	2134.40	2.81	6.50		1466	59				
* BIT *						13241	536	M/S		141.2	
* ANNULUS *	2131.00	1956.62		6.50	8.50	200	8	TU	1170.2	119.1	115.9
* ANNULUS *	1956.62	1900.92		5.00	8.50	14	1	TU	1415.6	75.6	72.8
* ANNULUS *	1900.92	1184.00		5.00	8.50	106	8	TU	1415.6	75.6	72.8
* ANNULUS *	1184.00	143.00		5.00	8.69	225	9	TU	1475.2	70.7	67.9
* ANNULUS *	143.00	.00		5.00	16.75	4	0	LA	4261.7	14.0	12.5
* TOTAL *						18110	733				

\* ANNULAR PRESSURE LOSSES 630 KPA \*  
 \* \*\*\*\*\*

\* EQUIV. CIRCULATING DENSITY 1.23 SG \*  
 \* MAX DEPTH 7194.37 \*  
 \* \*\*\*\*\*

\* MUD LAG TIMES S -> B 10.27 MN \*  
 \* B -> S 36.64 MN \*  
 \* \*\*\*\*\*

\* CUTTINGS DATA \*  
 \* SIZE .20 CM \*  
 \* DENSITY 2.40 SG \*  
 \* LAG TIME 38.88 MN \*  
 \* MAX SLIP VELOCITY 3.19 M/MN \*  
 \* \*\*\*\*\*

\* BIT DATA \*  
 \* SIZE 8.50 INCH \*  
 \* NOZZLES 12 12 12 /32NDS \*  
 \* NOZZLES EFFICIENCY 95 % \*  
 \* BIT P. LOSSES 13241 KPA \*  
 \* H.H.P. RATIO 23.11 % \*  
 \* BIT H.H.P. 9.441 \*  
 \* BIT VELOCITY 141.21 M/S \*  
 \* \*\*\*\*\*

ON-LINE TDC  
GEOSERVICES

BIT REPORT

\* 17/ 6/82

HAMMERHEAD #1

```
*****  
#BIT HEADING :BIT#22 RUN #38  
#BIT TYPE :INSERT  
#BIT IDENTITY :HTC J22  
*****  
#BIT SIZE : 0.50 INCH  
#BIT COST : 8888. $ RIG COST/HR: 5833.  
*****  
#NOZZLES : 12 12 12 /32NDS @ 95 % EFFICIENCY  
*****  
#DEPTH IN : 1997.90 METERS 16/ 6/82  
#DEPTH OUT : 2131.80 METERS 17/ 6/82  
#METRAGE : 133.10 METERS  
#TOTAL REVOLUTIONS : 62  
*****  
#DRILLING TIME: 22:24 HR AVERAGE ROP: 5.94 M/HR  
#TIME IN HOLE : 28: 4 HR AVERAGE ROP: 4.74 M/HR  
#TRIP TIME : 6: 0 HR  
*****  
#DRILLING COST STANDARD : 1553.3 $/MET  
#DRILLING COST ON BOTTOM : 1384.8 $/MET  
#DRILLING COST MINIMUM : 231.6 $/MET  
*****  
# AVERAGE OVER THE RUN AVERAGE HYDRAULICS  
#WEIGHT ON BIT : 14.18 TONS NOZZLES SPEED : 141.21 M/S  
#ROTATION : 61.38 RPM PRESSURE DROP : 13241 KPA  
#FLOW RATE : 1810.80 L/MN HYDRAULIC POWER: 535.74 H.P.  
#STAND PIPE PRESSURE: 12900 KPA  
*****
```