AUTHORITY TO DRILL A WELL

CANADA

Exploratory ☒
Development ☐
Delineation ☐
Service ☐

AUTHORITY TO DRILL A WELL

APPLICATION

This application is submitted with Section 82 of the Canada Oil and Gas Drilling Regulations. When approved under Section 83 of the Regulations, it is the requisite authority for the commencement of drilling operations.

Well Name in Full: RANGER NOTA CREEK C-17

Operator: Ranger Oil Limited
Drilling Program No.: --
Contractor: Shehtah Drilling Limited
Permit or Lease No.: EL-390
Drilling Rig or Unit: Rig #1
Estimated Well Cost: $2,900,000
Location-Unit: C
Section: 17
Grid Area: 65° 10', 126° 00'
Coordinates: Lat.: 65° 06' 01"
Long.: 126° 02' 56"
Area: Tulita (Fort Norman)
Field/Pool: New Exploration
Elevation-~~RT~~/KB: 172 m (ASL)
Seafloor: -- (BRT)
Approx. Spud Date: December 16, 1997
Estimated Days on Location: 30
Anticipated Total Depth: 1940 m
Target Horizon(s) Mount Clark

EVALUATION PROGRAM

Ten-metre sample intervals None
Five-metre sample intervals 22 mKB to total depth, 2 vials and 1 bagged
Canned sample intervals None
Conventional cores at Possible 18 m core in Mount Clark
Logs and Tests Log and tests as per program

CASING AND CEMENTING PROGRAM

O.D.	Weight:	Grade:	Setting Depth Below Seafloor:	Cementing Program (Volumes):
508 mm	139.8 kg/m	K-55	22 m	Piledrive, Artic set cement to surfac if drilled
339.7 mm	81.1 kg/m	K-55	170 m	Artic set cement to surface
244.4 mm	53.6 kg/m	J-55	670 m	670 - 140 m, RFC
139.7 mm	23.0 kg/m	K-55	1940 m	TD - 640 m, 1:1:2 fill, RFC tailin

B.O.P. Equipment: 540 mm, 14 MPa diverter system on conductor pipe
346 mm, 21 MPa, 2 pipe rams, 1 blind ram, annular preventor

Other Information: Gel Chem mud surface to 670 m
Invert mud 670 m to total depth

Signed:
Title: Drilling & Completions Superintendent
Date: October 14, 1997
Company: Ranger Oil Limited

APPROVAL

An approved copy of this notice is to be posted at each wellsite.

Signed: Jerry Baker
Chief Conservation Officer
Date: Dec 4/97
File: 9211-R36-2-1, WID 1831
UWI 300C176510126000

Canada

APPROVAL TO ALTER CONDITION OF A WELL

National Energy Board | Office national de l'énergie

CANADA

APPROVAL TO ALTER CONDITION OF A WELL

This application is to be submitted to the Chief Conservation Officer at least 45 days before commencement of operations.

Well Name: Ranger Nota Creek C-17

Area: Norman Wells

Operator: Ranger Oil Limited

Contractor: Shehtah Drilling Limited

Drilling Rig or Unit: Rig #4

Depth: 1953 m

Coordinates: Lat: 65° 06' 01" Long: 126° 02' 56"

Date ADW Issued: December 4, 1997

Date of last Operation: On-going

Elevation-KB/RT: 172 (ASL)

GL/Seafloor:

TYPE OF OPERATION

Initial Completion

SUMMARY OF PROPOSED OPERATIONS

See Attached Program for Completion Details

Signed: JL Brown
Responsible Officer

Title: Senior Completions Engineer

Name: J. Leroy Brown

Company: Ranger Oil Limited

Date: February 17, 1998

Phone: 2[illegible]2-5218

APPROVAL

An approved copy of this notice is to be posted at each wellsite.

Date: Feb 20/98

Signed:
Chief Conservation Officer

File: 9211-R36-2-1

WID: 1831 UWI: 300C176510126000

Well Status

Suspended ☐

Completed ☐

Abandoned ☐

WELL TERMINATION RECORD (with attachment)

CANADA

WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations.

WELL DATA

Well Name: RANGER NOTA CREEK C-17 Area: Tulita

Grid Area: 65° 10' 126° 00' Field/Pool: New Exploration

Permit or Lease No.: EL-390 Final Coordinates: Lat.: 65° 06' 01" Long: 126° 02' 56"

Drilling Unit: Shehtah Rig #1 Elevations ~~RT~~/KB: 172.22 ~~SB~~GL: 166.22

Spud Date: 11:30 hrs 97-12-24 Rig Released: 23:59 hrs 98-02-14 Total Depth: 1953 m KB

CASING AND CEMENTING

O.D.:	Weight:	Grade:	Depth Set:	Cement and Additives:
508 mm	139.8 kg/m	J-55	8 m GL	Driven
339.7 mm	81.1 kg/m	K-55	164 m KB	29T Artic set + 7.4% D71 + 0.5% D65 + 0.5% B71
244.5 mm	53.6 kg/m	J-55	589 m KB	18.9T RFC + 1% $CaCl_2$ + 0.2% D46 + F52-1
177.8 mm	34.2 kg/m	K-55	1929 mKB	25.7T 1:1:2 + 18% D44 + 0.1% B71 3.2T RFC + 1% B30 + 0.3% B71 + 0.2% D

PLUGGING PROGRAM

Approval of the following program was obtained by (person) N/A from

(person) by means of

on 19

Type of Plug:	Interval:	Felt:	Cement and Additives:
No plugs			

Lost Circulation/Overpressure Zones: Water flow 186 m, minor losses 1552 - 1578 m, 1936 - 1944 m, higher losses 1950 - 1953 mKB.

Equipment left on Seafloor (Describe): N/A

Provision for Re-entry (Describe and attach sketch): Wellhead installed Chained and locked

Cores: Type: No cores Intervals:

No DST's

Other Downhole Completion/Suspension Equipment: ECP @ 1911.45 mKB

Stage cementer at 404.95 mKB

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed:

Title: Drilling & Completions Superintendent

Name: Don Sorkilmo

Date: March 31, 1998

Acknowledged by: Terry Baker

Engineering Branch

Date: Apr. 29/98

File: 9211-R36-2-1, WID 1831

UWI 300C176510126000

Well Status

Suspended ☒

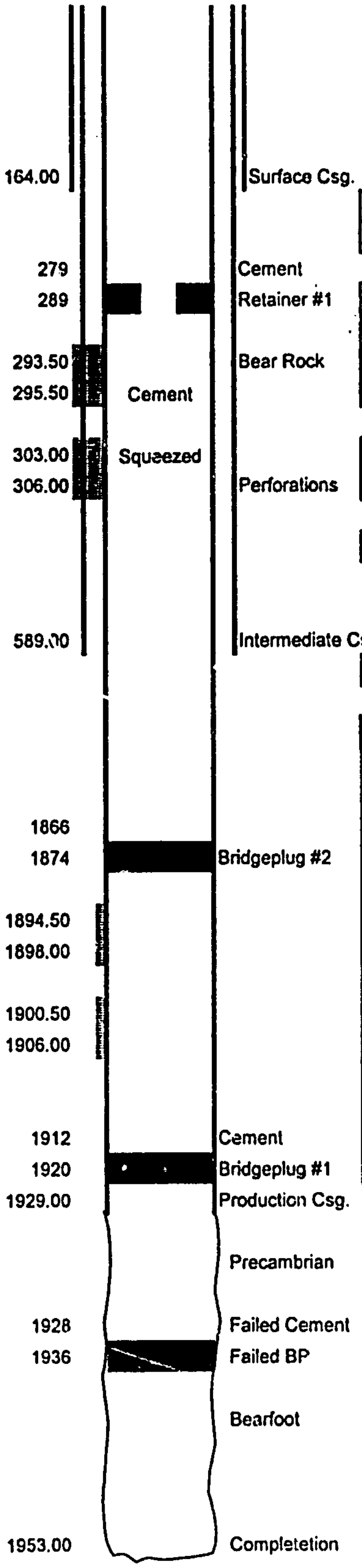
Completed ☐

Abandoned ☐

Canada

RANGER OIL LIMITED

DOWNHOLE WELL PROFILE



Location: Ranger Nota Creek C-17 Date: 31-Mar-98

KB (m) 172.22 GL (m) 166.72 KB to CF: 5.15 KB to THF (est.) 5.28

	No. Joints	Size OD mm	Weight kg/m	Thread Collar	Grade	Landed @ mKB	Top @ mKB
Surface Casing:	14	339.70	81.40	8rd. ST&C	K-55	164.00	Surface
Cement: Stage 1	29t Arctic Set +7.4% D-71+.5% D-65+.5% B-71+33kg Celloflake w/.6m^3 cement returns.						
	Cement fell back out of sight while WOC						
Interm. Casing:	45	244.50	53.60	8rd. ST&C	J-55	589.00	Surface
Stage 1	19t RFC +1% $CaCl_2$ +.2% D-46+ 5 l/t F52.1 w/continuous retumes. Est cement top @ 77m						
Production Casing:	137	177.80	34.23	LT & C	K-55	1929.00	Surface
Cement: Stage 1	25m^3 1:1:2 'G' + 18% D-44 + .1% B-71fill cement						
	tail w/3m3 RFC + 1% B-30 + .3% B-71 + .2% D-46 w/Calculated cement top @ 1750m						
Stage 2	6.1m3 RFC + .1% B-30 + .3% B-71 + .2% D-46 w/.5m3 cement returns						
Production Tubing:	nil						

Perforated Interval:	Bear Rock/Amika	293.50	to	295.50
		303.00	to	306.00
	Mt. Clark	1894.50	to	1898.00
		1900.50	to	1906.00
Bearfoot Open Hole	Precambrian	1929.00	to	1953.00

FINAL WELLBORE CONFIGURATION (Bottom Up)		Top
Item	Description	mKB
BP #1	Set @ 1920m & pressure tested to 7MPa for 15min. OK. Dumped 8vm cement on top of plug.	1920.00
BP #2	Set @ 1874m & pressure tested to 7MPa for 15min. OK. Dumped 8vm cement on top of plug.	1874.00
Ret.	Set @ 289m & stage cement squeezed w/1.6m^3 Class 'G' + .8% B-30 + 2% $CaCl_2$ + .11% D-46	289.00
	Pumped 10vm of above class cement on top of retainer.	279.00

Wellhead	Make:	Barber	W.P	35MPa	Type:	Flanged
Master Valve	Make:	ABB	W.P.	35MPa	Type:	Flanged
	Size:	65.08mm	Trim	T-37		
Casing Valves	Make:	Rector	W.P.	35MPa	Type:	Flanged
	Size:	52.4mm	Trim	T-37		

FINAL WELL REPORT

1831
9211-R36-2-1

FINAL WELL REPORT

RANGER NOTA CREEK C -17

Tulita Area, NT

Prepared by Ken Kindjerski
November 1998

NATIONAL [illegible] BOARD
EN[illegible] [illegible]CH
DEC 15 1998

INTRODUCTION

1. Program Summary

Ranger Oil Limited programmed to drill a 1953 m deep exploration well to evaluate hydrocarbon production potential from the Mount Clark formation.

Shehtah Drilling Rig #1E was contracted to drill the well. Drilling equipment was mobilized and demobilized using the "Winter Road". Early work on the winter road and into various creek crossings allowed Ranger Oil to begin the drilling operations in mid December.

2. Location Map

Attached is a topographic map (1:50,000) showing the 0-20 well location and its relationship to geographic features, the winter road and the IPL pipeline.

GENERAL DATA

Well Name: Ranger Nota Creek C-17

Exploration Licence: EL 390

Location: Unit C, Section 17
Grid Area: 65 ° 06' 01", 126° 02' 56"

Well Location: See attached well plan.

Unique Well Identifier: 300C176510126000

Operator: Ranger Oil Limited
1600, 321 – 6th Avenue S.W.
Calgary, Alberta
T2P 3H3

Drilling Contractor: Shehtah Drilling Limited
Suite 277, 200 Rivercrest Drive S.E.
Calgary, Alberta
T2C 2X5

Drilling Rig: Shehtah Rig #1
Troy Model 600 (triple)

Position Keeping/Support Craft: N/A.

Difficulties & Delays:

The 508 mm conductor pipe was set at 12.5 m and had become egged through the process. The conductor pipe had to be milled out from 12.17 to 12.63 meters. Magnet runs were done to pick up chunks of milled up conductor barrel. Start drilling 444.5 mm hole down to 96 m K.B. cannot keep the hole straight drifted out to 2.1 degrees. Ran 311 mm bit to drill pilot hole down to 162 m K.B. Ream hole out to 444.5 mm and continue drilling down to total depth at 164 m K.B.

The well-developed hole cleaning problems due to pressured shale formation from 1230 – 1235 m KB, increased the invert mud density from 960 to 1225 kg/m3. There were problems with Shetah Drilling mixing capabilities trying to get a high enough shear rate for invert mixing. Rigged in Dowell C&A pumper to obtain a high enough rate to properly mix and shear the invert mud.

Total Well Costs: $3,556,000

SUMMARY OF DRILLING OPERATIONS

Elevations: GL 166.22 m
KB 172.22 m

Total Depth: 1953 m KB

Spud Date: 1997-12-24 @ 11:30 Hrs.

Rig Release Date: 1998-02-14 @ 23:59 Hrs.

Well Status: Standing Cased

Hole Sizes:
444 mm to 164 m KB
311 mm to 589 m KB
222 mm to 1953 m KB

Casing Strings:

Conductor - 1 jt, 508 mm, 139.8 kg/m, J55, driven landed at 12.5 m GL.

Surface - 14 jts, 339.7 mm, 81.1 kg/m, K55, ST&C landed at 164 m KB Cemented with 29.0 tonnes Arctic Set + 7.4 D71 + 0.5%D65 + 0.5%B71. Cemented to surface with .6 m^3 good cement returns.

Intermediate - 45 jts, 244.5 mm, 53.6 kg/m, K55, LT&C, landed at 589 m KB. Cemented with 18.9 tonnes RFC + 1 % $CaCl_2$ + .2% D46 + .5 liter/tonne F52-1.

Production - 137 jts, 177.8 mm, 34.2 kg/m, K55, LT&C, landed at 1929 m KB. Cemented with 25.7 tonnes 1-1-2 + 18%D44 + 0.1%B71, second stage cement 3.2 tonnes RFC + 1%B30 + .3%B71 + 0.2%D46. ECP run at 1911.45 m KB, stage tool set at 404.95 m KB.

Casing Bowl: Barber Type ODSO, 352.4 mm x 339.7 mm, 21 MPa, LPSO

Drilling Fluid: see attached fluid summary for details.

Sidetracks/Fishing: None

Well Kicks: None

Formation Fluids/Gas: Drilled down to 181 to 186 m KB, stopped and performed a flow check. The well was flowing from 1.3 to 2.2 m^3/hour. The mud viscosity was raised and barite mixed to bring the density up to 1250 kg/m^3, and continue drilling to intermediate casing point at 589 m KB.

Formation Leak-off Test: Leak off test was run at 171 m KB. The leak off test was run at 10 liters a minute with no formation leak off at 23 kPa/m. Terminated the test.

Another leak off test was conducted at 592 m KB. The leak off gradient was 24.19 kPa/m.

Deviation Surveys: TOTCO surveys were taken see attached for deviation surveys.

Time Distribution:

Drilling	503.00 hours
Tripping	128.75 hours
Rig Service	22.00 hours
Surveys	36.50 hours
Fishing Operations	7.50 hours
Circulate & Condition Mud	145.75 hours
Handle Tools	36.50 hours
Reaming Hole Clean	18.50 hours
Running Casing	18.75 hours
Cementing	8.00 hours
Waiting on Cement	5.25 hours
Nipple Up/Pressure Test	166.75 hours
Rig Repairs	41.50 hours
Logging (Wireline Work)	19.25 hours
Waiting on Services	9.50 hours
Other	38.50 hours
Rig up/out	54.50 hours
TOTAL	**1260.50 hours**

Abandonment Plugs: None

GEOLOGY

Drill Cuttings:	Five meter drill samples were taken from 25 m to 245 m KB. No sample was obtained from 249 m T.D. due to lost circulation. Vial samples from the above were sent to Ranger Oil Limited Calgary office. Bagged samples were sent to the Institute of Sedimentary and Petroleum Geology, Core & Sample Lab in Calgary, Alberta.
Formation Tops:	See the attached summary.
Lithology:	See the attached lithology report for sample description.
Cores:	No cores were taken.
Open Hole Logs:	No open hole logs were run due to the difficulties experienced on the main hole interval.
Formation Tests:	No drill stem tests were run. A sample of the formation water from the Hume was recovered from the sump and the analysis is attached.

APPENDICIES TO WELL HISTORY REPORT

1. Area Topographic Map
2. Well Survey Plan
3. Serval Drilling Fluid Summary
4. Formation Tops
5. Lithology Report
6. Geological Sample Log
7. Composite Well Record
8. Directional Surveys

GEOLOGICAL
REPORT

1831
9211-R36-2-1

RANGER OIL

Ranger et al NOTA CREEK C-17
65° 06' 01' / 126° 02' 56"

File No. 97x-1001

Geological Report

NATIONAL [illegible]
EN[illegible]
DEC 15 1998

RANGER OIL et al Nota Creek C-17

RANGER OIL

65 deg. 06' 01" / 126 deg. 02' 56"

File No.: 97x-1001

Prepared by:

H. Wennekers
Geological Wellsite Consultant

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SYNOPSIS

OPERATOR: Ranger Oil Limited

WELL NAME: ROL et al Nota Creek C-17

LOCATION: 65 deg. 06' 01" / 126 deg. 02' 56"
Tulita area (Fort Norman)

FIELD: Undefined

PROVINCE: N.W.T.

ELEVATION: G.L.: 168.22 m K.B.: 172.22 m

SPUD DATE: December 24, 1997 11:30 hrs

T.D. DATE: February 9, 1998 08:22 hrs

CONTRACTOR: Shehtah Drilling Rig: #1

HOLE SIZE: Surface: 444.5 mm Pilot: 311mm To F.T.D.: 222mm

COLLARS: 171mm

MUD COMPANY: Midas Drilling Fluids

MUD TYPE: Gel chem to first intermediate casing. Invert to F.T.D.

LOG RECORD: 13-01-1998 Run #1

1) Borehole Compensated Sonic Delta-T (DT) - Long Arm Caliper (LA) - Gamma Ray (GR) .... 574.60 m - 25 m
2) Phasor Induction SFL - Gamma Ray (GR) - Spontaneous Potential (SP) .... 585.05 m -163 m
3) Compensated Neutron Litho Density - Gamma Ray (GR) - Caliper .... 587.90 m -163 m

LOG RECORD: 10-02-1998 Run #1

1) Borehole Compensated Sonic Delta-T (DT) - Long Arm Caliper (LA) - Gamma Ray (GR) ....1934.40 m - 589 m
2) Phasor Induction SFL - Gamma Ray (GR) - Spontaneous Potential (SP) ....1945.80 m - 589 m
3) Compensated Neutron Litho Density - Gamma Ray (GR) - Caliper .... 587.90 m - 163 m

SYNOPSIS (cont.)

TESTING COMPANY:	Baker Tools
DRILLING SUPERVISION :	Jack Brazel and Lee Brazel
GEOLOGICAL SUPERVISION:	Henri Wennekers
TOTAL DEPTH:	1953 meters

FORMATION TOPS (m)

PERIOD GROUP FORMATION (LOCAL UNITS)		PROGNOSIS		SAMPLES		LOGS	
	(subsea)	(KB) (177m)	(driller) (172.22m)	(KB)	(subsea)	(KB)	(Subsea)
Imperial	spud	Surface	Surface	Surface	Surface	Surface	
Canol/Hare Indian	102	75	70.22	54	118.22	..	- ..
Hume	2	175	170.22	147	25.22	147	- ..
Headless	- 83	260	255.22	208	- 35.78	..	- ..
Landry	- 148	325	320.22	NR on samples		..	- ..
Arnica	- 173	350	345.22	290	- 117.78	..	- ..
Bear Rock	- 208	385	380.22	315	- 142.78	315	- 142.78
Franklin Mountain	- 473	650	645.22	525	- 452.78	565	- 492.78
Saline River	- 733	910	905.22	915	- 742.78	849	- 676.78
Evaporite Member *				915	- 742.78	849	- 676.78
Shale cycle or Lower Clastic Member				1418	-1244.78	1435	-1262.78
Mount Cap	- 1573	1750	1745.22	1759	-1586.78	1759	-1586.78
Mount Clark **	- 1723	1900	1895.22	1879	-1706.78	1879	-1706.78
Unnamed Shale Fm.				1889	-1716.78	1906	-1833.78
Precambrian	- 1753	1930	1925.22	1908	or 1930(?)	1929	-1756.78
Final Total Depth	- 1763	1940	1935.22	1953	-1780.78	1949	-1776.78

*Note: This unit seems to consist of approximately 99% rock salt (halite). From time to time there is an excellent sample recovery of rock salt cuttings, but these cuttings dissolve during water-washing, resulting in no sample for the plastic veils. Reducing the water wash temperature and using carbon based liquid soap occasionally preserved salt cuttings, which after drying were placed in the appropriate veils.

**Note: A fining-up sedimentary cycle covers the 1906m to 1889m interval. A second fining-up sedimentary cycle might be present between 1934m and 1903m.

ROL et al NOTA CREEK C-17
65 deg 06' 01"/126 deg 02' 56"

DEVIATION SURVEY RECORD

Measurements by Halliburton Directional survey instrument. Computations courtesy L. BRAZEL OILFIELD CONSULTING INC.

Measurement	Depth	Inclination	Azimuth	TVD	North	East No.
(m)	Degrees	Degrees	(m)	(m) (m)		
# 0	0.00	0.00	0.00	0.00	0.00	0.00
# 1	40.50	0.70	339.00	40.50	0.23	-0.09
# 2	68.90	1.20	337.00	68.90	0.67	-0.27
# 3	95.50	2.80	333.00	95.48	1.50	-0.67
# 4	124.40	2.00	341.00	124.35	2.61	-1.16
# 5	152.60	2.10	337.00	152.53	3.55	-1.52
# 6	238.00	1.20	329.00	237.90	5.76	-2.59
# 7	351.00	0.40	347.00	350.89	7.15	-3.29
# 8	455.00	0.50	12.00	454.88	7.95	-3.28
# 9	568.00	0.70	62.00	567.88	8.76	-2.56

Closure is 9.1254 Meters on an azimuth of 343.6879 degrees.

#10	604.00	0.20	148.00	603.88	8.81	-2.34
#11	662.00	0.60	42.00	661.88	8.95	-2.08
#12	706.00	1.20	12.00	705.87	9.57	-1.83
#13	727.00	0.90	357.00	726.87	9.95	-1.79
#14	773.00	1.00	47.00	772.86	10.58	-1.52
#15	824.00	1.60	49.00	823.85	11.35	-0.65
#16	839.00	1.20	72.00	838.84	11.54	-0.35
#17	868.00	1.50	37.00	867.84	11.94	0.17
#18	891.00	1.80	57.00	890.83	12.37	0.65
#19	912.00	1.80	57.00	911.82	12.73	1.21
#20	940.00	2.00	47.00	939.80	13.31	1.93
#21	959.00	1.80	52.00	958.79	13.72	2.41
#22	993.00	1.20	49.00	992.78	14.28	3.10
#23	1021.00	1.00	12.00	1020.77	14.71	3.37
#24	1081.00	1.00	17.00	1080.76	15.72	3.64
#25	1145.00	1.80	27.00	1144.74	17.15	4.25
#26	1190.00	1.50	7.00	1189.73	18.37	4.65
#27	1209.00	2.00	357.00	1208.72	18.95	4.66
#28	1287.00	2.70	357.00	1286.65	22.14	4.49
#29	1345.00	2.90	17.00	1344.58	24.91	4.85
#30	1525.00	5.40	35.00	1524.10	36.20	11.04
#31	1535.00	5.40	35.00	1534.06	36.97	11.58
#32	1565.00	6.10	40.00	1563.91	39.35	13.41

Closure is 41.5731 meters on an Azimuth of 18.8253 degrees.

#33	1591.00	6.60	44.00	1589.75	41.48	15.34
#34	1629.00	6.70	45.00	1627.49	44.62	18.43
#35	1667.00	6.80	43.00	1665.49	47.83	21.53
#36	1704.00	7.80	42.00	1701.93	51.30	24.70
#37	1741.00	7.00	47.0	1736.62	54.70	26.03
#39	1864.00	6.90	27.00	--	--	--

BIT RECORD

#	Type	Size (mm)	In	Out	Total (m)	Hrs drilled	FOB (daN)	RPM	Cond. T B G
1ART	13 J	444.5	0	12.14	12.14	8.25	2000	110	2-4-BT
2A	Enterra	457.2	12.14	12.63	0.49	13.5	2300	0/90	Worn 10mm
3ARR	13 J	444.5	12.63	28.00	15.37	11.5	2500	110	4-3-BT
4A	PG 3	444.5	28	96.00	78	13.25	2-8000	110	2-2-WT
5A	J-2	311	96	162.00	66	33.5	1-8000	110/150	2-2-WT
6ARR4	PG 3	444.5	96	164.00	68	25	1-8000	160	3-3-WT
1RR	J 2	311	164	285.00	121	43.5	9-15000	90/140	6-6-WT
2	GT28	311	285	586.00	301	100	9-20000	30/70	8-8-WT
3	GT28	311	586	589.00	3	3	9000	45	
4	JCT 35C	222	589	916.00	329	61.75	15000	50	5-5-WT E-BT-Hrs
5	ATJ33	222	916	1383.00	467		2-6000	50-55	2-2-WT
6	PDC	222	1383	1903.00	530		2-10000	70	SL W
7	J55	222	1903	1953.00	50		15-20000	50	--

BIT CONDITION		SCALE	
Tooth Wear	(T)	0 - 8	
Bearing Wear	(B)	0 - 8	
Gauge	(G)	in or (mm) under	
New Bit	T=0	B=0	G=in

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
97-12-23	0	0	--	Rigged up Shehtah rig no. 1 to spud. Installed deverter system on conductor pipe, spool and hydril. Installed Tarps on mud tanks. Problems with water truck and hauler truck.
97-12-24	0	0	--	Rigged up Shehtah rig #1 to spud. Run in hole. Bottom portion of conductor pipe buckled. Bit could not pass.
97-12-25	0	0	--	Continued to drill bottom portion of conductor pipe. Searched for milling tool. Located on in Fort Saint John. Flown in to Norman Wells by chartered plane.
97-12-26	12.5	12.5	20	The hole in the conductor pipe, driven into the ground, was 12.14m deep. The base of the conductor pipe buckled inward. This prevented drilling to progress. As a result, a mill was flown in. Milling proceeded, but it made very slow progress. When 12.56m depth was reached, the mill was hoisted and a 444.5mm bit and BHA made up. R.I.H. and drill. Drill bit is still grabbing conductor pipe. at 09:15 hours.
97-12-27	27	15	6:05	Dismantle flow and mill. Install flow nipple. Make up bit and B.H.A. R.I.H. with 444.5mmm bit. Tag bottom at 12.56m. Bit still grabbing conductor pipe. Circulate and wait on magnet. Make up magnet. Fish with magnet. Retrieve some large pieces of conductor pipe and many small pieces. Clean conductor pipe pieces out of bit. Rig up magnet again on two singles of pipe. Hole

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				depth now 14.50m. Fish with magnet. Run magnet several times. Hole depth changed to 15.36m. Rig out magnet. Run in with bit and drill 444.5mm hole from 15.36m-27.76m.
97-12-28	96	69	16	Trip for bit. R.I.H. with bit #4A. Drill 444.5mm hole from 27m-96m.
97-12-29	152	56	20	Drill 311mm pilot hole. Drilling rate slowed when limestone penetrated.
97-12-30	164	12	--	Power out low on fuel. Revise K.B. Limestone 27m high to prognosis. Revise surface casing TD. Revision of ground elevation and K.B. Revise again TD surface casing. Drill to 164m in limestone.
97-12-31	164	--	--	Drill out 311mm hole with 444.5mm bit from 96m-164.26m with surveys. Condition hole. Trip out of hole. Run surface casing and cement. W.O.C.
98-01-01	164	--	--	Nipple up BOP's.
98-01-02	164	--	--	Nipple up BOP's. Pressure test at 1400Kpa at 10 minutes. 14000 Kpa at 10 minutes. Manifold vales, chokes, HCV, deflange leaks. Repairs to remote choke activator and pressure gauge. Repairs to HCV. Repairs to pressure test hose. BOP's very scaled up and corroded. Blind rams changed from top to middle. Pressure test blind rams. Change gate seals. Work rams retest. Change ram rubbers. Insulate and heat trace all mud lines. Repairs to blocks. (The crews were steam heating the block

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				swivel to turn) Pick up drilling BHA and trip in hole with 311mm bit.
98-01-03	165m	1	1.00	Pick up drilling BHA and trip in hole with 311mm bit. Pressure test at 1400Kpa at 10 minutes, 14000Kpa at 10 minutes. Lower pipe rams, stabbing valve (unthaw kill lines. Pressure test upper pipe rams. Inside BOP (Dismantle and clean), Mud line valves (Remove check Valve and clean). Hydril pressure tested at 1500 Kpa for 10 minutes. Pressure test Hydril, Check valve (Failed test. Parts ordered from Edmonton) Lower kelly cock (Failed test. Replaced with spare one) and pressure tested. Pressure test Hydril, Upper Kelly Valve (Failed test). Replaced with spare and pressure tested. Pick up drill collar and drill mouse hole. Unthaw steam tracing and reinsulate mud lines (Valves were shut off). Drill out rubber, float and shoe. Drill 311mm 164m-165m.
98-01-04	190	26	15.25	Drill 311mm from 165m-171m. Leak off test at 171m. Leak off test was run at 10 litre a minute with no formation leak off at 23 kpa/min. Terminated test. Displace hole and condition mud. DRILL 311mm 171m-181m. Circulate and survey. Drill 181m to 186m. Very rough drilling. Flow checked (light flow). 10 minute flow check produced 550 units of gas readings. Light flow while drilling ahead. with volume increase with low gas readings (Water flow was 2.2m3 per hour). Circulate and weight up drilling mud. Drill 311mm hole 186m-187m.

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				Repairs to kelly spinner (Kelly spinner fell off swivel while drilling) Drill 311mm hole from 187m-190m.

The drilling report numbering changed. Drilling report # 13 is dated 97-01-06, whereas drilling report # 12 is dated 97-01-04. The AM reports of the wellsite geologist changed on 98-01-10.

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
98-01-06	258	68	22.75	Drill 191m-203m. Rig service and function test hydril. Drill 203m-209m. Circulate and survey as required. Drill 209m-238m. Rig service and function test pipe rams. Circulate and survey. Drill 238m-258m.
98-01-07	301	43	15.00	Drill 311mm 258m-276m. Circulate and survey as required. Rig and function test Hydril. BOP drill. Accumulator function test. Drill 276m-285m. Trip for bit. Drill 285m-286m. Rig service and function test hydril. Drill 286m-301m. Circulate and survey as required.
98-01-08	364	63	18.50	Drill 311mm 301m-333m. Circulate and condition mud as required to combat anhydrite and flip mud system. Surveyed at 330m. Drill 333m-342m. Rig serviced and function pipe rams. Drill 311mm 342m-364m.
98-01-09	435	71	18.25	Clean out suction lines. Circulate and survey. Drill 311mm 365m-379m. Rig service. Function tested annular. Repairs to mud pump. Drill 311mm 379m-423m. Repairs to mud pump, Rig serviced. Function test pipe rams. Drill 311mm 423m-435m.

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
98-01-10	510	75	22.25	Drill 311mm hole from 435m to 510m with surveys and rig service.
98-01-11	560	50	21.50	Drill 311mm hole from 510m to 560m with rig service and surveys.
98-01-12	586	26	22.00	Drill 311mm hole with rig service and surveys from 560m to 586m.
98-01-13	589	3	3	Drill 311mm hole from 586m to 589m. Directional surveys. Condition hole for wire line logging. Rig in Schlumberger wireline loggers. Commence logging at 06:00hrs. Complete wireline logging operations by 18:00hrs. Tear out loggers. Rig to trip in and trip in to clean hole. Circulate and condition hole. Trip out of hole.
98-01-14	589	-	-	Schlumberger wireline loggers rigged in at 06:00hrs. Complete logging by 18:00hrs. Commenced preparations for landing casing and cementing. Run in casing.
98-01-15	589	-	-	Finish run in casing. Cement casing with Dowell. Wait on cement. Commence to nipple up.
98-01-16	589	-	-	Continue to nipple up. Rig repairs. Mud tank repairs.
98-01-17	589	-	-	Continue nipple up.
98-01-18	589	-	-	Continue nipple up.
98-01-19	589	-	-	Complete nipple up. Prepare mud tanks and mud system for invert. Prepare to trip in hole. Trip in open ended and pressure test stack. Pressure test pipe rams and stabbing valves, inside BOP, kill line valves HCR, check valve, kelly

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				valves. Pressure testing at 2000 Kpa for 15 minutes, 19000 Kpa at 15 minutes. Annular was high pressure checked at 14500 Kpa. Clean ice out of mud tanks and gel gates. Tripped out of hole to pick up BHA and 222mm Bit # 4. Rig service and safety meeting. Picked up BHA. Tripped in hole. Repairs to kelly spinner (Install proper bolts.) Reseal mud tank gates.
98-01-20	592.50	3.5	3.00	Drill 222mm hole from 589m to 598.5m.
98-01-21	693	101	22.50	Drill 222mm hole with rig service and survey from 592.50m to 693m.
98-01-22	784	91	21.00	Drill 222mm hole with circulation, rig services and surveys from 693m to 784m.
98-01-23	890	106	21.00	Drill 222mm hole with circulation, surveys, and rig service from 784m to 916m.
98-01-24	982	92	10.50	Drill 222mm hole to 916mKB and survey as required. Circulate and condition hole, clean flow line and shaker boxes. Water wet drill cuttings. Tripped out of hole. Changed bit and serviced float. Tripped in hole to 380m. Slipped and cut drill line. Tripped in hole. Broke circulation at 680m and 905m. Washed 11m to bottom. No fill. Circulated sample bottoms up and conditioned mud. Added Chemwet CM and hot lime. Drilled 222mm hole to 982m and survey as required. Fann hole, weight on bit 8000 Dan from 899m to 954mKB, weight on bit 2000 Dan from 954m to 982mKB. Functioned Hydril, pipe

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				rams and blind rams.
98-01-25	1136	154	21.50	Drill 222mm hole to 988m and survey as required. Rig service and function HCR. Drill 222mm hole to 1029mKB and survey as required. Rig service and function pipe rams. Drill 22mm hole to 1102mKB and survey as required. Rig service and function annular. Drill 222mm hole to 1136mKB. Fann hole, wait on bit 3000 Dan from 982m KB to 1001mKB. Weight on bit 5-6000 Dan from 1001m-1136mKB.
97-01-26	1240	104	17.00	Drill 222mm hole to 1166mKB and survey as required. Rig serviced and function pipe rams. Drill 222mm hole to 1198mKB and survey as required. Rig serviced and function HCR. Drill 222mm hole to 1240mKB and survey as required. Rig service and Hydril. Note: Problems with pressurized medium gray salty shale, depth 1230mKB to 1235mKB. Circulated and mixed invert product to increase yield and viscosity. Fan hole , weight on bit 3-5000 Dan from 1136mKB to 1171mKB. Weight on bit 2-3000 Dan from 1171mKB to 1240 mKB. Note: Gas monitor alarm went off in cellar. Masked Shehtqh personnel and checked for H2S and gas. None fond. Crews followed proper procedure for situation (Monitor was wet)
98-01-27	1249	9	2.00	Condition mud. Drill 222mm hole from 1240m to 1249m. Sloughing shale unloading. Pull bit up into dolomite layer at 1230m. Condition mud, run in, 4.5m bottom fill. Pull up into 1230m dolomite.

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				Condition mud. Run in 2.5m bottom fill.
98-01-28	1249	0	0:00	Circulated at 1240mKB and increased density to 1080kg/m3, viscosity 45 S/L. Pulled up to 1228m, waited 5 minutes, ran bit into 1238mKB (2m fill) washed to 1240KB. Circulated at 1240mKB and increased density to 1105kg/m3, viscosity 47S/L. Pulled up to 1228mKB, waited 5 minutes, ran bit into 1238mKB (2m fill) washed to 1240mKB. Changed shaker screens to 84x84. Had safety and well control meeting with Shehtah crew. Circulated at 1240mKB and increased density to 1118kg/m3, viscosity 45 S/L. Problems with water-wet barite, shaker screens were plugging up. Bypass shakers, positioned bit at 1229mKB (a dolomite bed). Electric stability dropped 200. Rigged pump #2 and circulated through bleed off line to shear invert. Circulated ad sheared mud, added 8m3 of water, increased oil/water ratio to 80/20. (Should be diesel/water ratio.) Electric stability increased to 720. Density dropped to 1100kg/m3. Circulated and mixed one circulation of 32 sacks hot lime. Ran bit into depth of 1238mKB, 1.5m fill, cleaned to 1240mKB> Circulated at 1240mKB and mixed 70 sks Barite, 20 Liters each of Chem (1), (11) and Chemwet CM. Density increased to 1109kg/m3. Electric stability dropped to 420. Problems with water-wet barite plugging shaker screens. Circulated at 1240mKB and mixed OMV-100 and hot lime 5 minutes a sack. Rig

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				inspection by Ed Reyvan N.E.B.
98-01-29	1249	0	0:00	Circulated at 1240mKB and mixed 16sks hot lime and 16 sks OMV-100, 5 minutes a sack. Problem with shaker screens plugging with barite and gel. (Inmature unsheared Invert.) Circulated at 1229mKB, bypassed shakers, mixed 16 sks hot lime. Note: Electric stability dropped to 200. Circulated at 1229mKB and mixed 100 L chem (1), 100 L chem (11) and 100 L chemwet CM over to circulations. 15 hours later electric stability was 300. Had safety meeting with Dowell and Shehtah personnel. Rigged in Dowell C&A Pumper to shear invert, hopper pressure 10500 kPa, rate 0.84m3/min. Circulated at 1240mKB and shear mud. Worked pipe above 1230mKB and back to 1240mKB. (1.5m bottom fill) After two circulations electric stability was 460. Circulated at 1240mKB, sheared and mixed 205L Chem (1), 205 L Chem (11), 205 L Chem wet CM, 15 sks OMV-100. After two circulations electric stability was 1020. Circulated at 1240mKB, sheared and mixed 15 sks OMV-100, electric stability 1200.
98-01-30	1282	33	0:00	Circulated and cleaned to bottom 1249mKB. Ran in and checked for fill (6 m). Circulated and worked hole from 1229mKB to 1240mKB, mixed barite at 2 minutes a sack for one circulation. Chem (1) and chem (11). Dowell pump was shearing the drilling fluid. Density increased to 1118kg/m3. Continued to work hole and mix barite, OMV-100, Chem (1), Chem (11) until hole stabilized. Density of 1185kg/m3,

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				viscosity 60 S/L. Plastic 22, Yield 14, electric stability 1180. Fill on bottom decreased as mud density increased. Rig serviced and functioned HCR and Hydril. Drilled 222mm hole to 1259mKB. Rig serviced and Functioned Pipe Rams. Drilled 222mm hole to 1282mKB. Rigged in Wadeco Hopper and rigged into pump # 2 to shear mud. Pump rate 1m3/min. 6500kPa. Released Dowell at18:45 kg/m3.
98-01-31	1344	63	21.00	Rig serviced and functioned Hydril. Drill 222mm hole to 1296mKB. Circulated hole , rig service, functioned pipe rams and ran survey at 1287mKB. Drilled 222mm hole to 1315mKB. Rig serviced and functioned pipe rams. Drilled hole to 1344mKB. Fann hole from 1282mKB to 1344mKB. Tight hole prior to connection at 1296mKB.
98-02-01	1382	38	20.00	Drilled 222mm hole to 1365mKB. Circulated hole and ran survey at 1345mKB. Drilled 222mm hole to 1363mKB. Rig service and function pipe rams. Drill 222mm hole to 1384mKB. Circulated bottom sample. Set up brakes, rig service and function hydril and pumped survey. Hoisted out of hole to 1219mKB. Pumped pill. Hoisted out of hole. Handled bottom B.H.A., picked up and made up teledrift. Dropped survey on trip, missrun. Fan hole from 1344mKB to 1384mKB. Tight hole prior to making connection.

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
98-02-03	1546	61	21.25	Drilled 222mm hole to1495mKB. Survey as required. Rig service and function Hydril and HCR. Drill 222mm hole to 1505mKB. Survey. Drill 222mm hole to 1533mKB and survey. Rig service and function test Hydril. Drill 22mm hole to 1546mKB and survey as required. Fann hole at 25 minutes per meter 1480mKB to 1505mKB and 15 minutes from 1505mKB to 1546mKB.
98-02-04	1634	88	18.25	Repairs and drill 222mm hole to 1558mKB. Circulate up samples. Drill 222mm hole with surveys and rig service from 1558mKB to 1634mKB. Gas 380 units over background of 20 units at 1552m. 50 units at 1559m, gas 97 units at 1571m, and 209 units at 1578m. Losses 6m3 to formation. Control drill at 6 to 7 m per hour using at least 1 dan to max 6 dan.
98-02-05	1758	124	20.00	Circulate and survey. Drill 222mm hole from 1646mKB to 1758mKB with survey, rig service and function Hydril, pipe rams, and BOP drill, well secure in 1.5 minutes.
98-02-06	1890	132	21.75	Drilled 222mm hole from 1758mKB to 1890mKB with survey, rig service and function pipe rams and hydril. Background gas 11 to 22 units with peak of 27 units.
98-02-07	1906	16	9.00	Repairs to rotary chain and clean pump suctions. Drilled 222mm hole from 1890mKB to 1900mKB with rig service, survey, and function tested pipe rams. Pump pill and trip out drill collars. Slipped and cut drilling line. Tripped out and laid down bit. Layed down

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				teledrift assembly. Rig to pressure test and tested BOP's and valves, manifold valves and chokes. Hydril and chokes at 1500 kpa at 10 minutes and all other valves. All other tests at 1500 kpa at 10 minutes, 18000kpa at 10 minutes. Pressure tested with test plug. Picked up B.H.A. and tripped in to hole.
98-02-08	1926	10	18.50	Tripped in hole. Broke circulation 1300mKB. Washed to bottom 3m fill. Rig serviced. Function tested hydril. Drilled 222mm hole with rig service and change oil in swivel from 1906mKB to 1926mKB.
98-02-09	1950	24	20.00	Rig serviced. Function tested pipe rams. Cleaned suction screens. Drill 222mm hole from 1926mKB to 1950mKB with rig service, function tests hydril and pipe rams and flow check. Losses to formation of 1m3 per hour. Mixed LCM pill and spot at 1944 to 1860mKB. Losses while drilling ahead aprox. 3m3 per hour.
98-02-10	1953	3	2.50	Drill 222mm hole from 1950mKB to 1953mKB. Flow check. Losses 4m3 per hour in static condition. Mix a LCM pill of prima seal, Cellophane. Circulation Plus and Bore. Spotted at 1953 to 1900mKB. Pulled up to 1930mKB and condition mud with LCM. On the circulation of bottoms up mud came around with the LCM and at an 1190 mud weight. with gas peaks of 600 units over background of 10 units. Circulated and conditioned mud. Rig

DAILY DRILLING CHRONOLOGY

Date	Depth 24:00	Progress (24 hrs)	Drilling (hrs)	Rig activity 00:00 - 24:00
				service. Function tested Hydril, HCR. Circulated and conditioned mud to 1235kg/m3 and 80 viscosity.
98-02-11	1953	TD		Circulated and conditioned mud to 1235kg/m3 and 80 viscosity at 1931mKB. Flow check and rig service. Function test pipe rams. Tripped out to log. Strapped out. Rig service. Function test blind rams. Rigged up to log and log with Schlumberger. Drillers Depth 1953mKb. Loggers Depth 1948.9mKB. Log run #1 DISFL BHCS. Log run #2 CNL-LDT-XY Cal.

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
Imperial (Surface)	
10 - 25	**SHALE** - black, hard, blocky, platy in part, common pyrite disseminated and streaks, slightly silty;
25 - 35	**SHALE** - black, platy, trace pyrite, common bitumen;
35 - 54	**SHALE** - black, hard, blocky, platy in part, common pyrite disseminated and streaks, slightly silty; **SILTSTONE** - light tan, blocky, splintery, frig, No show, trace micromicaceous, common pyrite disseminated and streak, fair intergranular porosity;
Canol/Hare Indian (54m from samples)	
54 - 75	**SHALE** - black, platy, trace pyrite, common bitumen;
75 - 96	**SHALE** - black, platy, trace pyrite, common bitumen;
96 - 126	**SHALE** - black, platy, trace pyrite, common bitumen;
126 - 147	**SHALE** - black, platy, trace pyrite, common bitumen;
Hume	(147m from samples and electric logs)
147 - 150	**LIMESTONE** - light tan - white, blocky, platy in part, microcrystalline, fair intercrystalline porosity, light blue fluorescence and specks bright yellow cut, trace pyrite;
150 - 155	**LIMESTONE** - light tan - white, marbled in part, blocky, platy in part, hard, microcrystalline, fair intercrystalline porosity, No show, white calcite crystals fill fossil molds, trace pyrite;
155 - 164	**LIMESTONE** - light tan - white, marbled in part, blocky, platy in part, hard, microcrystalline, fair intercrystalline porosity, No show, white calcite crystals fill fossil molds, trace pyrite; **DOLOMITE** - light brown - green, hard, blocky, microcrystalline, fair intercrystalline porosity, No show; stylolitic.

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
164 - 170	**LIMESTONE** - light tan - white, marbled in part, blocky, platy in part, hard, microcrystalline, fair intercrystalline porosity, No show, white calcite crystals fill fossil molds, trace pyrite; **DOLOMITE** - light brown - green, hard, blocky, microcrystalline, fair intercrystalline porosity, No show;
170 - 180	**LIMESTONE** - light tan - white, marbled in part, blocky, platy in part, hard, stylolitic, microcrystalline, fair intercrystalline porosity, trace yellow cut, trace blue fluorescence, clear and white calcite crystals fill fossil molds, trace pyrite, common calcite clear crystal micro fracture fill; **DOLOMITE** - light brown - green, hard, stylolitic, blocky, dense, microcrystalline, No show, trace porosity;
180 - 181	**DOLOMITE** - light brown - green, hard, blocky, dense, stylolitic, microcrystalline, No show, trace porosity;
181 - 190	**LIMESTONE** - light tan - white - dark brown, marbled in part, blocky, platy in part, very hard, dense, stylolitic, microcrystalline, No show, clear and white calcite crystals fill micro fractures and fossil molds, trace pyrite, some calcite micro fracture fill, clear and white;
190 - 205	**LIMESTONE** - light tan - white - dark brown, marbled in part, blocky, platy in part, very hard, stylolitic, microcrystalline, No show, clear and white calcite crystals fill micro fractures and fossil molds, trace pyrite, some calcite micro fracture fill, clear and white;
205 - 208	**LIMESTONE** - light tan - white - dark brown, marbled in part, blocky, platy in part, very hard, stylolitic, microcrystalline, No show, clear and white calcite crystals fill micro fractures and fossil molds, trace pyrite, some calcite micro fracture fill, clear and white;
Headless	(208m from samples)
208 - 225	**LIMESTONE** - medium gray, platy, microcrystalline, abundant argillaceous 35-40%, scattered calcite crystals, clear and white, in micro fracture fill and fossil mold; **SHALE** - medium gray, platy, abundant calcareous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
225 - 230	**LIMESTONE** - medium gray, platy, soft to hard, microcrystalline, abundant argillaceous 35-40%, scattered clear and white opaque calcite crystals in micro fracture fill and fossil molds, trace pyrite;
230 - 240	**LIMESTONE** - tan - white - dark brown, marbled in part, blocky, platy in part, very hard, stylolitic, trace pyrite. No show. Clear and white calcite crystals fill micro fossil molds.
240 - 258	**LIMESTONE** - medium grey, soft - hard, platy. No show.
258 - 270	**DOLOMITE** - light brown - green, hard, blocky, dense, microcrystalline, No show, trace porosity; **LIMESTONE** - medium gray, platy, microcrystalline, abundant argillaceous 35-40%, scattered calcite crystals, clear and white, in micro fracture fill and fossil mold;
270 - 280	**DOLOMITE** - light brown - green, hard, blocky, dense, microcrystalline, No show, trace porosity; **LIMESTONE** - medium gray, platy, microcrystalline, abundant argillaceous 35-40%, scattered calcite crystals, clear and white, in micro fracture fill and fossil mold;
280 - 290	**LIMESTONE** - medium gray, platy, microcrystalline, abundant argillaceous 35-40%, scattered calcite crystals, clear and white, in micro fracture fill and fossil mold; **SHALE** - medium gray, platy, abundant calcareous; **SILTSTONE** - black, platy - blocky, soft, abundant quartz clear rounded grains, trace pyrite, common calcareous, some bitumen dead;
Arnica	(290m from samples)
290 - 305	**DOLOMITE** - light brown - tan, hard, blocky, microcrystalline, dense, No show, white calcite crystals fill fossil molds.
305 - 310	**DOLOMITE** - light brown - grayish, hard, blocky, dense, microcrystalline, fair intercrystalline porosity, LIVE OIL in cuttings, strong yellow cut and fluorescence, common stylolits;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
310 - 315	**DOLOMITE** - light brown - tan, hard, blocky, dense, microcrystalline, No show, white calcite crystals fill fossil molds, slightly calcareous, trace pyrite;
Bear Rock	(315m from samples and electric logs)
315 - 345	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
345 - 365	**ANHYDRITE** -white -light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
365 - 380	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
380 - 400	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
400 - 415	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
415 - 430	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
430 - 435	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline;
435 - 445	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
445 - 455	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
455 - 465	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
465 - 475	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
475 - 495	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
495 - 510	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite;
510 - 520	**ANHYDRITE** - white - light tan, blocky, microcrystalline to fine crystalline; **DOLOMITE** - light gray, platy, hard, opaque - translucent, microcrystalline to medium crystalline, trace pyrite, trace calcareous in part;
Franklin Mountain	(520m from samples)
520 - 525	**ANHYDRITE** - white - light tan, blocky - platy, clear - translucent, soft, microcrystalline; **DOLOMITE** - dark brown - light brown - light tan, hard, brittle, microcrystalline, poor vuggy porosity, clear euhedral crystals in micro vugs;
525 - 540	**DOLOMITE** - dark brown - light brown - light tan, platy - blocky, hard, microcrystalline, poor vuggy porosity, clear euhedral dolomite crystals in micro vugs;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
540 - 555	DOLOMITE - dark brown - light brown - light tan, platy - blocky, hard, microcrystalline, poor vuggy porosity, clear euhedral dolomite crystals in micro vugs;
555 - 565	DOLOMITE - dark brown - light brown - light tan, platy - blocky, hard, microcrystalline, poor vuggy porosity, clear euhedral dolomite crystals in micro vugs;
Franklin Mountain	(565m from electric logs)
560 - 575	DOLOMITE - dark brown - light brown - light tan, platy - blocky, hard, microcrystalline to fine crystalline, trace clear euhedral dolomite crystals in rare micro vugs, trace pyrite, slightly calcareous;
575 - 580	DOLOMITE - dark brown - light brown - light tan, platy - blocky, hard, microcrystalline to fine crystalline, trace clear euhedral dolomite crystals in rare micro vugs, trace pyrite, slightly calcareous;
580 - 585	DOLOMITE - light tan, platy, brittle, microcrystalline to very fine crystalline, fair intercrystalline porosity, No show, clear crystal grains throughout;
585 - 589	DOLOMITE - light brown - light tan, platy - blocky, hard, microcrystalline to very fine crystalline, No show;
589 - 610	DOLOMITE - light brown - light tan, platy - blocky, hard, microcrystalline to very fine crystalline, No show; DOLOMITE - light tan, platy, brittle, microcrystalline to very fine crystalline, fair intercrystalline porosity, No show, clear crystal grains throughout;
610 - 635	DOLOMITE - light brown - light tan, platy - blocky, hard, microcrystalline to very fine crystalline, No show; DOLOMITE - light tan, platy, brittle, microcrystalline to very fine crystalline, fair intercrystalline porosity, No show, clear crystal grains throughout;
635 - 650	DOLOMITE - It brown - light tan, platy - blocky, hard, microcrystalline to very fine crystalline, No show; DOLOMITE - light gray, platy, microcrystalline, trace intercrystalline porosity;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
650 - 655	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity;
655 - 675	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity; **DOLOMITE** - white, platy, microcrystalline, thin bedded;
675 - 695	**DOLOMITE** - light brown - light tan, platy - blocky, hard, microcrystalline to very fine crystalline, No show; **DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity;
695 - 710	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity; **DOLOMITE** - white, platy, microcrystalline, thin bedded;
710 - 725	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity; **DOLOMITE** - white, platy, microcrystalline, thin bedded;
725 - 730	**DOLOMITE** - white, platy, microcrystalline, thin bedded;
730 - 736	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity;
736 - 755	**DOLOMITE** - white, platy, microcrystalline, thin bedded;
755 - 775	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity; **DOLOMITE** - white, platy, microcrystalline, thin bedded;
775 - 784	**DOLOMITE** - white, platy, microcrystalline, thin bedded;
784 - 790	**DOLOMITE** - white, platy, microcrystalline, thin bedded;
790 - 796	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity;
796 - 805	**DOLOMITE** - light gray, platy, microcrystalline, trace intercrystalline porosity, trace pyrite thin streaks; **DOLOMITE** - white, platy, microcrystalline, thin bedded;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
805 - 815	**DOLOMITE** - white, platy, dense, microcrystalline, thin bedded, trace pyrite thin streaks, trace calcareous;
815 - 825	**DOLOMITE** - light gray, platy, brittle, dense in part, microcrystalline, trace intercrystalline porosity, rare stylolites, trace pyrite thin streaks, trace calcareous; **DOLOMITE** - white, platy, dense, microcrystalline, thin bedded, trace pyrite thin streaks, trace calcareous;
825 - 835	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous;
835 - 845	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous;
845 - 849	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous;
Saline River Evaporite Member (849m from samples and electric logs)	
849 - 880	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink;
880 - 900	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink;
900 - 915	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink; **SHALE** - green and red, platy, slightly dolomite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
915 - 920	**DOLOMITE** - light gray, platy, brittle, dense in part, microcrystalline, trace intercrystalline porosity, rare stylolites, trace pyrite thin streaks, trace calcareous; **DOLOMITE** - white, platy, dense, microcrystalline, thin bedded, trace pyrite thin streaks, trace calcareous; **DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink; **SHALE** - green and red, platy, slightly dolomite;
920 - 945	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrite thin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink;
945 - 950	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - green and red, platy, slightly dolomite;
950 - 955	**SALT** - soft, pink, clear, cryptocrystalline;
955 - 975	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - green and red, platy, slightly dolomite;
975 - 995	**DOLOMITE** - medium gray - dark gray, light brown - dark brown in part, platy, hard to dense in part, microcrystalline, trace pyrthin streaks, trace calcareous, moderately argillaceous; **SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - green and red, platy, slightly dolomite;
995 - 1025	**SALT** - soft, pink, clear, cryptocrystalline;
1025 - 1055	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** - light green, platy, hard, dense in part, microcrystalline;
1055 - 1085	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** - light green, platy, hard, dense in part, microcrystalline;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1085 - 1105	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** -light green, platy, hard, dense in part, microcrystalline;
1105 - 1135	**SALT** - soft, pink, clear, cryptocrystalline;
1135 - 1165	**SALT** - soft, pink, clear, cryptocrystalline;
1165 - 1170	**SALT** - soft, pink, clear, cryptocrystalline;
1170 - 1195	**SALT** - soft, pink, clear, cryptocrystalline; **DOLOMITE** - light tan, brittle, honeycombed, microcrystalline and some coarse crystalline, excellent vuggy porosity;
1195 - 1200	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** - light green, platy, hard, dense in part, microcrystalline; **DOLOMITE** - light tan, brittle, honeycombed, microcrystalline and some coarse crystalline, excellent vuggy porosity;
1200 - 1215	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** - light green, platy, hard, dense in part, microcrystalline; **SHALE** - light - medium gray brown, platy, soft, slightly calcareous;
1215 - 1240	**SALT** - soft, pink, clear, cryptocrystalline; **DOLOMITE** - light green, platy, hard, dense in part, microcrystalline; **DOLOMITE** - light tan, brittle, microcrystalline and some coarse crystalline; **SHALE** -light - medium gray brown, platy, soft, contains water as it explodes when heated, slightly calcareous;
1240 - 1249	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light - medium gray brown, platy, soft, contains water as it explodes when heated, slightly calcareous;
1249 - 1265	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **SHALE** - medium gray - brown, blocky, slightly calcareous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1265 - 1270	**SALT** - soft, pink, clear, cryptocrystalline;
1270 - 1275	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light -m gray brown, platy, soft, contains water as it explodes when heated, slightly calcareous;
1275 - 1280	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - medium gray - brown, blocky, slightly calcareous;
1280 - 1285	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic;
1285 - 1295	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - medium gray - brown, blocky, slightly calcareous;
1295 - 1315	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic;
1315 - 1325	**SALT** - soft, pink, clear, some brown, cryptocrystalline, some large crystals; **SHALE** - medium gray - brown, blocky, slightly calcareous; **DOLOMITE** - white, rare thin beds in shale, microcrystalline, trace ironstone concretion, trace pyrite thin streaks;
1325 - 1335	**SALT** - soft, pink, clear, abundant brown, crypto - crystalline, some large crystals; **SHALE** - medium gray, light gray in part, soft, platy, waxy in part, slightly calcareous;
1335 - 1345	**SALT** - soft, pink, clear, abundant brown, crypto - crystalline, some large crystals; **SHALE** - medium gray - brown, blocky, slightly calcareous; **DOLOMITE** - white, rare thin beds in shale, microcrystalline, trace ironstone concretion, trace pyrite thin streaks; **SHALE** - medium gray, light gray in part, soft, platy, waxy in part, slightly calcareous;
1345 - 1355	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - light green, soft, platy, slightly dolomitic; **DOLOMITE** - white, rare thin beds in shale, microcrystalline, trace ironstone concretion, trace pyrite thin streaks; **SHALE** - medium gray, light gray in part, soft, platy, waxy in part, slightly calcareous;

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Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1355 - 1365	**SALT** - soft, pink, clear, cryptocrystalline; **SHALE** - medium gray, light gray in part, soft, platy, waxy in part, slightly calcareous;
1365 - 1370	**SALT** - soft, pink, clear, cryptocrystalline;
1370 - 1380	**SALT** - brown, soft, clear, cryptocrystalline; **SHALE** - medium gray - brown, blocky, slightly calcareous;
1380 - 1384	**SALT** - brown, soft, clear, cryptocrystalline;
1384 - 1405	**SALT** - brown, soft, clear, cryptocrystalline, some mega crystals; **SHALE** - medium gray, platy, blocky in part, hard, trace pyrite, trace calcareous; **SHALE** - dark gray, platy - blocky, soft - hard, trace pyrite; **DOLOMITE** - dark brown, blocky, microcrystalline, trace calcareous; **SHALE** - light green, platy, soft, trace calcareous; **SHALE** - red, platy, trace calcareous, trace dolomite; **CHERT** - dark brown, shards, sharp, very hard, thin beds and irregular lenses, trace pyrite tiny crystals;
1405 - 1406	**CHERT** - dark brown, shards, sharp, very hard, thin beds and irregular lenses, trace pyrite tiny crystals;
1406 - 1418	**SALT** - brown, soft, clear, cryptocrystalline, some mega crystals; **SHALE** - medium gray, platy, blocky in part, hard, trace pyrite, trace calcareous; **SHALE** - dark gray, platy - blocky, soft - hard, trace pyrite; **DOLOMITE** - dark brown, blocky, microcrystalline, trace calcareous; **SHALE** - light green, platy, soft, trace calcareous; **SHALE** - red, platy, trace calcareous, trace dolomite; **CHERT** - dark brown, shards, sharp, very hard, thin beds and irregular lenses, trace pyrite tiny crystals;
Saline River Lower Clastic Member (1418m from samples and electric logs)	
1418 - 1430	**SALT** - brown, soft, translucent to clear, some mega crystals, generally cryptocrystalline; **SHALE** - medium gray, platy, blocky in part, hard, trace pyrite, trace calcareous; **SHALE** - dark gray, platy - blocky, soft - hard, trace pyrite; **DOLOMITE** - dark brown, blocky, microcrystalline, trace calcareous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1430 - 1450	**SALT** - brown, clear, soft; **SHALE** - dark gray, platy - blocky, soft - hard, trace pyrite;
1450 - 1480	**SHALE** - light green - medium gray, platy, soft;
1480 - 1485	**SHALE** - light green - medium gray, platy, soft;
1485 - 1495	**SHALE** - light green - medium gray, platy, soft;
1495 - 1500	**SHALE** - light green - medium gray, platy, soft;
1500 - 1510	**SHALE** - light green - medium gray, platy, soft;
1510 - 1515	**SHALE** - light green - medium gray, platy, soft;
1515 - 1540	**SHALE** - light green - medium gray, platy, soft;
1540 - 1545	**SHALE** - light green - medium gray, platy, soft;
1545 - 1560	**SHALE** - light green - medium gray, platy, soft; **DOLOMITE** - light brown, possible oil stained, blocky, microcrystalline, fair intercrystalline porosity, gas, bluish to purple, minor yellow mineral fluorescence, trace dark yellow cut, abundant silty, some quartz clear subrounded grains, slightly dolomitic, slightly calcareous, some pyrite spheroids of small crystals; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite; **SANDSTONE** - light brown - tan, blocky, brittle, medium hard, very fine grained to fine grained, subrounded, moderately sorted, fair intergranular porosity, gas, oil stained?, blue - purple fluorescence, trace dark yellow cut, trace pyrite, slightly calcareous, abundant dolomitic;
1560 - 1570	**SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;

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Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1570 - 1580	**DOLOMITE** - light brown, possible oil stained, blocky, microcrystalline, fair intercrystalline porosity, gas, bluish to purple, minor yellow mineral fluorescence, trace dark yellow cut, abundant silty, some quartz clear subrounded grains, slightly dolomitic, slightly calcareous, some pyrite shperoids of small crystals; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite; **SANDSTONE** - light brown - tan, blocky, brittle, medium hard, very fine grained to fine grained, subrounded, moderately sorted, fair intergranular porosity, gas, oil stained?, blue - purple fluorescence, trace dark yellow cut, trace pyrite, slightly calcareous, abundant dolomitic;
1580 - 1581	**LIMESTONE** - light tan - light gray, blocky, medium hard, microcrystalline, slightly dolomitic;
1581 - 1595	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1595 - 1600	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1600 - 1620	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1620 - 1630	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1630 - 1635	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1635 - 1650	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1650 - 1675	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1675 - 1700	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1700 - 1710	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1710 - 1720	**SHALE** - light green - medium gray, platy, soft; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1730 - 1740	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1740 - 1750	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite;
1750 - 1755	**SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty;
1755 - 1759	**SHALE** - medium gray, platy, splintery, hard, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty;
Mount Cap	(1759m from electric logs and samples)
1759 - 1775	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous;
1775 - 1780	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1780 - 1810	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous;
1810 - 1820	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous;
1820 - 1830	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous;
1830 - 1840	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous;
1840 - 1850	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous;
1850 - 1855	**SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous;
1855 - 1860	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous;
1860 - 1865	**SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous;

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Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1865 - 1870	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous;
1870 - 1879	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous;
Mount Clark	(1879m from samples and electric logs)
1879 - 1885	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SILTSTONE** - tan - light brown, very hard, blocky, slightly calcareous, slightly argillaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous;
1885 - 1890	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous; **SANDSTONE** - bright red - orange, hard, blocky, fine grained to medium grained and some coarse grained, rounded, moderately sorted, rare intergranular porosity, trace pyrite, trace calcareous, some siliceous;
1890 - 1900	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous; **SANDSTONE** - white, hard, brittle, siliceous cement, very fine grained to fine grained and some medium grained, rounded, well sorted, silty to very fine matrix with rounded frosted clear quartz grains, trace pyrite, trace calcareous, trace dolomite, trace intergranular porosity:

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Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1900 - 1905	**SHALE** - light green - medium gray, platy, soft, trace calcareous; **SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous; **SANDSTONE** - white, hard, brittle, siliceous cement, very fine grained to fine grained and some medium grained, rounded, well sorted, silty to very fine matrix with rounded frosted clear quartz grains, trace pyrite, trace calcareous, trace dolomite;
1905 - 1906	**SANDSTONE** - white, hard, brittle, siliceous cement, very fine grained to fine grained and some medium grained, rounded, well sorted, silty to very fine matrix with rounded frosted clear quartz grains, trace pyrite, trace calcareous, trace dolomite;
Unnamed Shale	(1906m from electric logs. Some indication from samples.)
1906 - 1910	**SHALE** - medium gray, platy, splintery, hard, brittle, slightly calcareous, slightly dolomitic, trace pyrite, slightly silty, some micromicaceous; **SHALE** - light gray - medium gray in part, medium hard, platy, flaky, splintery, abundant micromicaceous, trace pyrite, rare calcareous; **SANDSTONE** - white, hard, brittle, siliceous cement, very fine grained to fine grained and some medium grained, rounded, well sorted, silty to very fine matrix with rounded frosted clear quartz grains, trace pyrite, trace calcareous, trace dolomite; **SANDSTONE** - whitish grey, blocky, friable, clear quartz grains, very fine grained to fine grained and some medium grained, subangular to rounded, poorly to moderately sorted, fair intergranular porosity, brownish bitumen stain;
1910 - 1920	**SHALE** - dark gray, hard, platy, blocky in part, some pyrite disseminated; **SANDSTONE** - gray - brown, very hard, friable, very fine grained to fine grained, subangular to rounded, poorly sorted, abundant pyrite crystals;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1920 - 1929	**SHALE** - dark gray, hard, platy, blocky in part, some pyrite disseminated; **SANDSTONE** - gray - brown, very hard, friable, very fine grained to fine grained, subangular to rounded, poorly sorted, abundant pyrite crystals; **SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals;

Precambrian/Proterozoic sedimentary strata (1929m from electric logs)

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1929 - 1935	**SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals; **DOLOMITE** - dark brown, blocky, hard, microcrystalline to fine crystalline, some intercrystalline porosity, fractures:
1935 - 1940	**SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals; **DOLOMITE** - dark brown, blocky, hard, microcrystalline to fine crystalline, fair intercrystalline porosity, fractures, abundant calcareous, trace pyrite;
1940 - 1945	**SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals; **DOLOMITE** - dark brown, blocky, hard, microcrystalline to fine crystalline, fair intercrystalline porosity, abundant calcareous, trace pyrite;
1945 - 1950	**SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals; **DOLOMITE** - dark brown, blocky, hard, microcrystalline to fine crystalline, tight, abundant calcareous, trace pyrite;

LITHOLOGY

Formation tops Sample interval (in meters)	SAMPLE DESCRIPTION
1950 - 1953	**SANDSTONE** - tan, hard, blocky, coarse grained to very coarse grained and some medium grained, rounded, poorly sorted, rock is ground to sand, abundant pyrite euhedral crystals; **DOLOMITE** - dark brown, blocky, hard, microcrystalline to fine crystalline, no apparent porosity and/or permeability, formation takes drilling fluid suggesting fractures, abundant calcareous, trace pyrite;

Final Total Depth is 1953m @ 08:22hrs February 9, 1998.

GEOLOGICAL SUMMARY AND CONCLUSIONS

The Nota Creek prospect is a well defined four-way closed tilted graben flank structure cored by Proterozoic sedimentary rocks that are unconformably overlain by a series of Cambrian sandstones - the primary objective - of the Mount Clark Formation. Drilling identified an unnamed 20 metre shale section with minor sandstone beds between the Proterozoic rocks and the Mount Clark Sandstones. The Mount Clark is overlain by a thick succession of Cambrian shales of the Mount Cap formation and of the Lower Clastic Member of the Saline River Formation. A thick evaporite section, mainly composed of halite, overlies the shales. The shallower section is composed of Cambrian-Ordovician dolomites unconformably overlain by Lower Devonian dolomites, anhydrites, and limestones, in turn overlain by Middle Devonian limestones, and Upper Devonian shales with minor sandstones.

The prospect was tested with well Ranger et al Nota Creek C-17. The primary target for voth oil and gas is placed in sandstones of the Cambrian Mount Clark Formation. A secondary target for oil is placed in dolomites of the Bear Rock Formation. The primary target was identified, but not the secondary target. Instead, an additional four hydrocarbon-bearing zones were discovered. A brief review of the hydrocarbon-bearing intervals in well Nota Creek C-17 follows below.

The first show of hydrocarbon was at 183m KB, in the Middle Devonian Hume Formation, which came in 27 metres high to prognosis. A drilling break was followed by water influx into the well bore and gas readings increased from a background of 10 units to 600 units. Increased mud weight to 1250kg/m3. It stemmed the water flow of the aquifer and cut off the gas production. Gas did not enter the well bore on subsequent connections.

The second indication of hydrocarbons was from a porosity zone at 305m KB in the Lower/Middle Devonian Arnica Formation. Well cuttings from this zone have a strong mineral fluorescence and a small fast bright yellow cut.

No hydrocarbons were detected in the secondary target - the Bear Rock Formation. The top of this formation came in 70m high to prognosis.

The third indication of hydrocarbons came from the 1550m KB to 1557m KB interval in the Lower Clastic Member of the Cambrian Saline River Formation. The top of this formation came in very close to prognosis and it was marked by a change in drilling penetration rate from 4m/hour to over 20m/hour. The hydrocarbon zone contains porous and permeable dolomites and possibly some sandstone beds as well.

RANGER OIL

SERVAL
DRILLING
FLUID
SUMMARY

SERVAL DRILLING FLUIDS SERVICES

SERVAL DRILLING FLUID SUMMARY

RANGER OIL LIMITED.
1600, 321-6th Avenue S.W.
Calgary, Alberta

RANGER et al NOTA CREEK (Shehtah #1)

Lat:65° 06’ 01.5 N
Long: 126° 02’ 55.0 W

NATIONAL ENERGY BOARD
ENGINEERING BRANCH
DEC 15 1998

WELL INFORMATION SYNOPSIS

OPERATOR: ***RANGER OIL LIMITED.***

WELL NAME: ***RANGER et al NOTA CREEK***

LOCATION: ***Lat: 65o 06'01.5 N, Long: 126o 02' 55.0 W***

CONTRACTOR AND RIG NO: ***SHEHTAH RIG# 1***

SPUD DATE / TIME: ***12-23-98***

RIG RELEASE DATE / TIME:

TOTAL DEPTH (feet): ***1929***

OPERATOR'S REPRESENTATIVE: ***Jack Brazel/Lee Brazel***

CONTRACTOR'S REPRESENTATIVE: ***Tom Carriere/Neil Spears/Dale Baxandall/ Doug Roudie***

FIELD REPRESENTATIVE: ***Randy Cox/Udo Zeidler/Jim Weiler***

HOLE SIZE (inches)	CASING SIZE (inches)	DEPTH (feet)	FLUID TYPE	TIME	COST
444.5	229	162	Gel/ Caustic slurry	6	$\$2,163.^{12}$
			Gel/Chem	21	$\$22,883.^{28}$
			Invert emulsion	24	$\$165,964.^{53}$
				TOTAL:	$\$191,010.^{93}$

10/5/98

SURFACE HOLE SUMMARY

SPUD DATE:	12-24-97	SPUD TIME:	
SPUD MUD TYPE:	Gel/ Caustic slurry		
SURFACE CASING DEPTH (meters):	162	DATE / TIME CEMENTED:	
CASING OD (mm):		WEIGHT (kg/m3):	
PROBLEMS RUNNING CASING:	.		

COMMENTS, OBSERVATIONS, RECOMMENDATIONS

(12-24-97) - Spud with water, mixing Soda ash and Caustic slowly while mixing Gel to a viscosity of 38-42 s/L and maintained at this level.
Ran in 444.5mm bit. Drilled to bottom of conductor bbl, attempt to drill through conductor. Conductor bbl collapsed, attempted to drill, no progress.
(12-25-97) - Waited on mill. Circulate W.O. mill, mill conductor.
(12-26-97) - Mill conductor, attempted to drill and run magnet all day with bit on bottom. Lots of torque and bouncing encountered.
(12-27-97) - Drill 444.5mm hole. Bit trip, drill and survey.
(12-28-97) - Drill and survey 444.5mm. Surveyed as far out as 2-4° @ 113m.
Ran 311mm, drill pilot and survey.
(12-29-97) - Fan 311mm due to 2° deviation to surface casing. TD=162m.
Circulate 0.5 hrs. Ran in 444.5mm. Drill and fan due to 1.9° deviation.
(12-30-97) - Fan and survey 444.5mm hole (opened from 311mm) to surface TD.
Pulled out of hole, run monels, directional survey.

INTERIM SECTION

INTERVAL:	162-520m	DRILL OUT DATE / TIME:	
FLUID TYPE:	Gel/Chem system		
MUD UP DEPTH:	520m	MUD UP DATE TIME:	01-06-98

COMMENTS, OBSERVATIONS, RECOMMENDATIONS

(01-05-98) - Water flowing into wellbore at approximately 1.3-1.6 m3/hr.
(01-06-98) - Raised viscosity to 85-90 t support additions of Barite to suppress water flowing from well. Gained from 1-2 m3/hr.
(01-07-98) - Drilled 311mm, was still flowing until density of 1310 kg/m3.
Trip for bit, mud thinned to 63 viscosity and 1250 kg/m3 density.
(01-08-97) - Drill 311mm. Massive anhydrite at approximately 218m encountered.
First couple of meters 10-12% encountered and then 20-40%.
(01-09-98) - Drilled ahead with no problems.
(01-10-98) - Drilled 311mm hole in massive anhydrite.
(01-11-98) - Drilled and surveyed 311mm hole in anhydrite -100%.
(01-12-98) - Drilled 311mm hole in 100% anhydrite to 520m, then Dolomite (Franklin mtn.).
Trip for bit.
(01-13-98) - Ran in bit #3. Drilled 311mm hole to intermediate casing depth.
Circulate and condition, log.
(01-14-98) - Logged with Schlumberger, no problems. Hole in good condition.
Ran in , circulate and condition mud. Puled out of hole, ran intermediate casing.
No problems, prepared cement. Ran and cement 244mm casing.
Nippled up, ready for invert, pressure test.

MAIN HOLE SUMMARY

(INVERT SECTION)

MUD UP DEPTH:	520m	MUD UP DATE:	01-20-98
FLUID TYPE:	Invert emulsion		
TOTAL DEPTH:	1953m	DATE @ T.D.:	02-09-98

COMMENTS, OBSERVATIONS, RECOMMENDATIONS

(01-19-98) - Ran in and displaced the mud system from water to diesel.
Drilled out the float and shoe at 16:00 hours.
NOTE: Water wet cuttings were blinding the screens.
Drilled to 591m. The pipe was pulled to unplug the bit jets.
Ran back to bottom and circulated. Hot lime was mixed to dry the cuttings.
The flowline was cleaned of water wet cuttings.
(01-20-98) - Drilled from 591-593m and performed a leak off test.
Drilled ahead mudding up to a 90/10 invert on the fly.
NOTE: Cuttings dried up.
(01-21-98) - Drilled to 763m.
(01-22-98) - Drilled to 862m.
The ratio of Chlorides to Calcium indicated that another Chloride source, possibly Halite (NaCl) was being drilled.
(01-23-98) - Drilled to 916m. Salt was drilled from 905m.
The screens blinded off and the flowline plugged.
Chemwet was added to the system to dry the cuttings.
(01-24-98) - Drilled from 941-1092m.
Drilled salt with thin shale and dolomite stringers.
(01-25-98) - Drilled from 1092-1228 meters.
(01-26-98) - Drilled from 1228-1240m. Shale sloughed on a connection.
The oil/water ration was lowered, a viscosifier was added and the density was increased to 980 kg/m3.
The density of the shale was 2.4 kg/m3, it was 7% reactive and highly dispersible.
(01-27-98) - Conditioned the mud to combat sloughing shale.
Reached the threshold limit for Barite in fresh, low shear invert.
The Barite, when mixed , became water wet. (Density = 1125 kg/m3).
A high shear mixer was used after the electrical stability dropped from 420V-20V.
It increased to 720 after 2 circulations.
(01-28-98) - Circulated and sheared the mud using Dowell blender (C&A unit).
Drilled ahead from 1249-1265m.
(01-30-98) - Drilled from 1265-1325m. Had tight connection which required 30 minutes

per connection.
Drilled salt and shale (more like mud stone).
NOTE: The flowline temperature increased 4°C.

(01-31-98) - Drilled from 1325-1383m. Had to work tight connections.
Tripped for a bit. There was a sudden reduction in the electrical stability (940-460V)
The electrical stability was increased to +1000 with Chem II and Chemul OM additions
The sudden drop in electrical stability was attributed to undissolved salt in the mud from the formations which included Mg present in the salt drilled.

(02-01-98) - Tripped for a bit a t 1383m.
Had to ream from 1277-1297m and from 1362-1383m.
Drilled ahead conditioning the mud with emulsifiers and wetting agents to increase the electrical stability and reduce screen blinding.

(02-02-98) - Drilled form 1425-1495m. Time drilled @ 20 min/m for deviation.
The actual cutting discharge at the suction was 1020 kg/h compared to 300 kg/h as per the R.O.P.
Raised the density for wellbore stability. Drilled out of the salt and into shale.

(02-03-98) - Drilled from 1524-1608m. Controlled R.O.P. due to deviation problems.

(02-04-98) - Drilled from 1608-1732m. The hole was caving (soft, silty shale).
Made new invert on the fly with diesel and water from the shale pit.
The water was high in formation salts which reduced the Aw , reacted and precipitated Hot Lime.

(02-05-98) - Drilled from 1732-1872m.

(02-06-98) - Drilled from 1872-1906m.

(02-07-98) - Changed the bit and drilled ahead to 1918m.

(02-08-98) - Drilled from 1918-1944m. Did a flow check for seepage.
Mixed Circulation Plus and Mica Fine at a 2:1 ratio.
Spotted the pill at 1865m. Did a flow check, no losses.
Moved the pill slowly and drilled ahead.
NOTE: The seepage rate was the same as the fresh volume being built.

(02-09-98) - Mixed LCM for seepage. Did a flow check and drilled to 1953m(TD).
Built volume while drilling. The seepage rate was greater than the addition rate.
Reduced the ECD by reducing the pump rate (1267 kg/m3 @ 90 SPM).
Started to build volume. Conditioned mud to log.

CONCLUSION ON ELECTRICAL STABILITY DECREASE

Analysis on the salt cuttings taken from the well bore (off of the shakers), showed that in the white salt crystal, the (soluble) magnesium was 11,010 ppm and the orange salt crystal contained 13,550 ppm soluble magnesium. The excessive amount of magnesium in the salt caused the electrolytes in the water phase to react chemically and therefore, produce an unstable emulsion, corrected by adding Chemul I & II. Normally in raw salt, Magnesium usually is in the 8-12 ppm range.

SURFACE HOLE

PRODUCT & COST SUMMARY

INTERVAL FROM (m):	0-162
DAYS TO DRILL:	6
TOTAL INTERVAL COST:	$\$2{,}163.^{12}$
COST PER METER:	$\$13.^{35}$

PRODUCT	AMOUNT	UNIT COST	TOTAL COST
Bentonite	210	$\$15.^{00}$	$\$3{,}150.^{00}$
Caustic soda	3	$\$77.^{00}$	$\$231.^{00}$
Soda ash	2	$\$40.^{00}$	$\$80.^{00}$
		TOTAL PRICE:	$\$3{,}461.^{00}$
		(LESS 37.5% DISCOUNT):	$\$1{,}297.^{88}$
		TOTAL BID PRICE:	$\$2{,}163.^{12}$

10/5/98

INTERMEDIATE HOLE SECTION

PRODUCT & COST SUMMARY

INTERVAL FROM (m):	162-520
DAYS TO DRILL:	21
TOTAL INTERVAL COST:	$22,883.28
COST PER METER:	$63.92

PRODUCT	AMOUNT	UNIT COST	TOTAL COST
Aquapac	6	$390.00	$2,340.00
Barite	1674	$18.00	$30,132.00
Soda ash	17	$40.00	$680.00
Bentonite	380	$15.00	$5,700.00
Kelzan XCD	5	$845.00	$4,225.00
Caustic soda	29	$77.00	$2,233.00
Desco	38	$112.00	$4,256.00
Lignite	51	$15.25	$777.75
Sawdust	20	$7.25	$145.00
Defoamer TDL	2	$262.25	$524.50
		TOTAL PRICE:	$36,613.25
		(LESS 37.5% DISCOUNT):	$13,729.97
		TOTAL BID PRICE:	$22,883.28

10/5/98

MAIN HOLE SECTION

PRODUCT & COST SUMMARY

INTERVAL FROM (m):	520-1934
DAYS TO DRILL:	24
TOTAL INTERVAL COST:	$165,964.53
COST PER METERS:	$117.37

PRODUCT	AMOUNT	UNIT COST	TOTAL COST
Calcium chloride	317	$95.00	$30,115.00
Chemul I	17	$1,900.00	$32,300.00
Chemul II	19	$2,750.00	$52,250.00
Hot lime	616	$27.00	$16,632.00
Chemwet OM	8	$2,400.00	$19,200.00
OMV 100	240	$175.00	$4,200.00
Barite	858	$18.00	$15,444.00
Mica	214	$35.25	$7,543.00
Circ. plus	20	$141.00	$2,820.00
Bore jacket	132	$141.00	$18,612.00
Cellophane	18	$46.00	$828.00
Hydrated lime	17	$17.00	$170.00
Sawdust	15	$7.25	$108.75
Calcium carbonate	10	$10.00	$660.00
Primaseal	47	$47.00	$3,760.00
		TOTAL BOOK PRICE:	$265,543.25
		(LESS 37.5% DISCOUNT):	$99,578.72
		TOTAL WELL BID PRICE:	$165,964.53

10/5/98

WATER ANALYSIS FROM AGAT LABORATORIES

AGAT® Laboratories

WF
cc PETER GOETZ
PARTNERS

WATER ANALYSIS

CONTAINER IDENTIFICATION: PB 1A

LABORATORY NUMBER: WE24615A

OPERATOR NAME: RANGER OIL LIMITED

UNIQUE WELL IDENTIFIER:

WELL NAME: C-17 NORMAN WELLS NOTA CREEK

ELEVATIONS KB m:

ELEVATIONS GRD m:

FIELD OR AREA: NOTA CREEK

POOL OR ZONE: MOUNT CLARK

NAME OF SAMPLER:

COMPANY: BAKER

TEST TYPE:

NO:

TEST RECOVERY:

SAMPLING POINT:

AMT & TYPE OF CUSHION:

MUD RESISTIVITY/Ω m: @ 25° C

TEST INTERVAL OR PERFS:

TYPE OF PRODUCTION

PUMPING	FLOWING	GAS LIFT	SWAB

PRODUCTION RATES

WATER m³/d	OIL m³/d	GAS 10³ m³/d

	SEPARATOR	TREATER	RESERVOIR	SOURCE	SAMPLED	RECEIVED
GAUGE PRESSURE kPa						
TEMPERATURE ° C						

DATE SAMPLED (Y-M-D): 98-03-14

DATE RECEIVED (Y-M-D): 98-03-26

DATE REPORTED (Y-M-D): 98-03-31

ANALYST: LN NCO

OTHER INFORMATION:

ION	mg/L	MASS FRACTION	mmol/L
Na	69200.0	0.301	3010.0
K	2110.0	0.009	53.9
Ca	16500.0	0.072	412.0
Mg	1850.0	0.008	76.0
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	148.0	0.001	2.7

ION	mg/L	MASS FRACTION	mmol/L
Cl	140000.0	0.608	3950.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO_3	NIL	NIL	NIL
SO_4	361.0	0.002	3.8
CO_3	NIL	NIL	NIL
OH	NIL	NIL	NIL
H_2S	N.D.	N.D.	N.D.

DISSOLVED
TOTAL SOLIDS mg/L

EVAPORATED AT 110° C:

EVAPORATED AT 180° C:

AT IGNITION:

CALCULATED: 230000.0

RELATIVE DENSITY: 1.155 @ 25° C

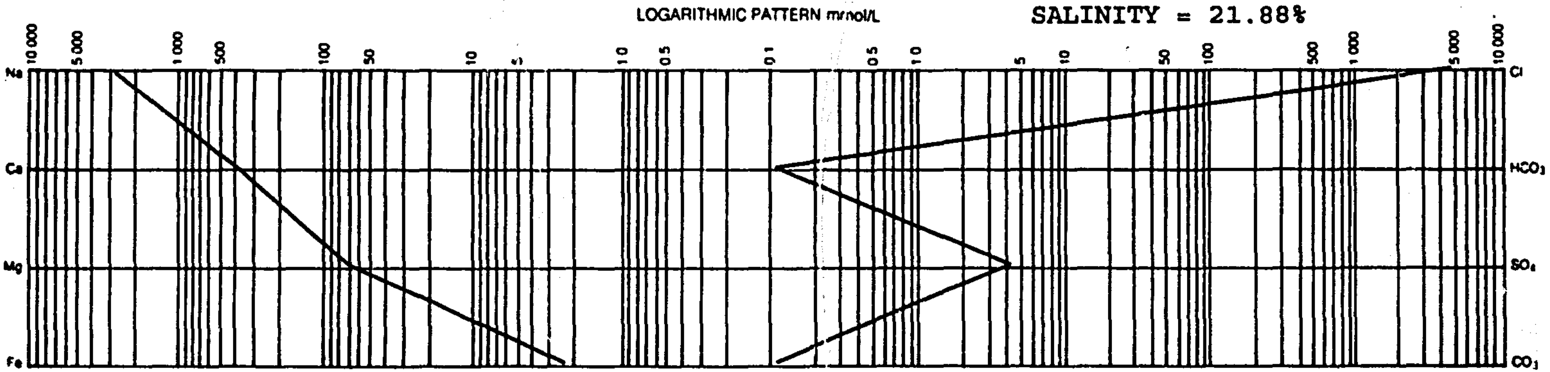
REFRACTIVE INDEX: N.A. @ 25° C

OBSERVED pH: 4.20 @ 25° C

RESISTIVITY/OHM •m: 0.05 @ 25° C

LOGARITHMIC PATTERN mmol/L

SALINITY = 21.88%



REMARKS:
TRC+= LESS THAN 0.1 N.D.= NOT DETECTED NIL= 0.0 TRC*= LESS THAN 0.001 N.A.= NOT ANALYZED
MINERAL ACID ACIDITY IS EQUAL TO 1.8 G/M3 AS CALCIUM CARBONATE

AGAT® Laboratories

WATER ANALYSIS

CONTAINER IDENTIFICATION: PB 2B

LABORATORY NUMBER: WE24615B

OPERATOR NAME: RANGER OIL LIMITED

UNIQUE WELL IDENTIFIER:

WELL NAME: C-17 NORMAN WELLS NOTA CREEK

ELEVATIONS KB m: GRD m:

FIELD OR AREA: NOTA CREEK

POOL OR ZONE: MOUNT CLARK

NAME OF SAMPLER:

COMPANY: BAKER

TEST TYPE: NO:

TEST RECOVERY:

SAMPLING POINT: SWAB

AMT & TYPE OF CUSHION:

MUD RESISTIVITY/Ω m @ 25° C

TEST INTERVAL OR PERFS: 1898.0-1900.0 mKB

TYPE OF PRODUCTION: PUMPING FLOWING GAS LIFT SWAB

PRODUCTION RATES: WATER m³/d OIL m³/d GAS 10³ m³/d

	SEPARATOR	TREATER	RESERVOIR	SOURCE	SAMPLED	RECEIVED
GAUGE PRESSURE kPa						
TEMPERATURE ° C						

DATE SAMPLED (Y-M-D): 98-03-14

DATE RECEIVED (Y-M-D): 98-03-26

DATE REPORTED (Y-M-D): 98-03-31

ANALYST: LN NCO

OTHER INFORMATION:

ION	mg/L	MASS FRACTION	mmol/L
Na	70800.0	0.303	3080.0
K	2260.0	0.010	57.7
Ca	17400.0	0.074	433.0
Mg	1720.0	0.007	70.7
Ba	N.A.	N.A.	N.A.
Sr	N.A.	N.A.	N.A.
Fe	70.0	TRC*	1.3

ION	mg/L	MASS FRACTION	mmol/L
Cl	141000.0	0.603	3980.0
Br	N.A.	N.A.	N.A.
I	N.A.	N.A.	N.A.
HCO_3	3.8	TRC*	0.1
SO_4	395.0	0.002	4.1
CO_3	NIL	NIL	NIL
OH	NIL	NIL	NIL
H_2S	N.D.	N.D.	N.D.

DISSOLVED

TOTAL SOLIDS mg/L

EVAPORATED AT 110° C:

EVAPORATED AT 180° C:

AT IGNITION:

CALCULATED: 234000.0

RELATIVE DENSITY: 1.155 @ 25° C

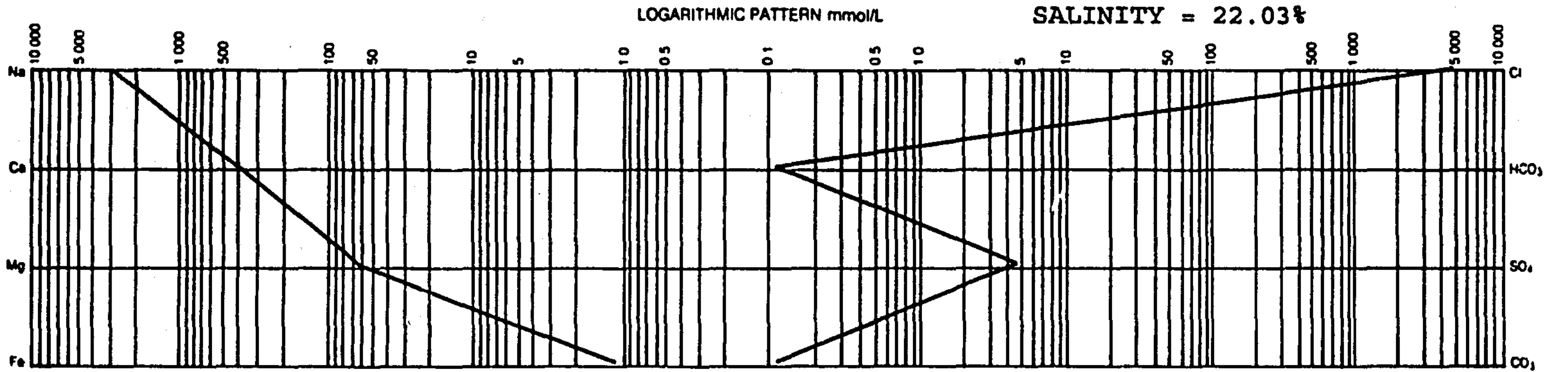
REFRACTIVE INDEX: N.A. @ 25° C

OBSERVED pH: 4.84 @ 25° C

RESISTIVITY/OHM •m: 0.05 @ 25° C

LOGARITHMIC PATTERN mmol/L

SALINITY = 22.03%



REMARKS:

TRC+= LESS THAN 0.1 N.D.= NOT DETECTED NIL= 0.0 TRC*= LESS THAN 0.001 N.A.= NOT ANALYZED

**NOTE: RESISTIVITY IS 0.053 OHM.m

AGAT® Laboratories

WATER ANALYSIS

CONTAINER IDENTIFICATION: PB 3C

LABORATORY NUMBER: WE24615C

OPERATOR NAME: RANGER OIL LIMITED

UNIQUE WELL IDENTIFIER:

WELL NAME: C-17 NORMAN WELLS NOTA CREEK

ELEVATIONS KB m: GRD m:

FIELD OR AREA: NOTA CREEK

POOL OR ZONE: BEAR ROCK

NAME OF SAMPLER:

COMPANY: BAKER

TEST TYPE: NO:

TEST RECOVERY:

SAMPLING POINT:

AMT & TYPE OF CUSHION:

MUD RESISTIVITY/Ω m: @ 25° C

TEST INTERVAL OR PERFS: 303.0-395.0 mKB

TYPE OF PRODUCTION: PUMPING ☐ FLOWING ☐ GAS LIFT ☐ SWAB ☐

PRODUCTION RATES: WATER m³/d OIL m³/d GAS 10³ m³/d

	SEPARATOR	TREATER	RESERVOIR	SOURCE	SAMPLED	RECEIVED
GAUGE PRESSURE kPa						
TEMPERATURE °C						

DATE SAMPLED (Y-M-D): 98-03-14

DATE RECEIVED (Y-M-D): 98-03-26

DATE REPORTED (Y-M-D): 98-03-31

ANALYST: LN NCO

OTHER INFORMATION: ZONE #3

ION	mg/L	MASS FRACTION	mmol/L	ION	mg/L	MASS FRACTION	mmol/L
Na	12400.0	0.281	538.0	Cl	26000.0	0.589	733.0
K	397.0	0.009	10.2	Br	N.A.	N.A.	N.A.
Ca	3910.0	0.089	97.6	I	N.A.	N.A.	N.A.
Mg	531.0	0.012	21.8	HCO_3	206.0	0.005	3.4
Ba	N.A.	N.A.	N.A.	SO_4	390.0	0.009	4.1
Sr	N.A.	N.A.	N.A.	CO_3	NIL	NIL	NIL
Fe	343.0	0.008	6.1	OH	NIL	NIL	NIL
				H_2S	N.D.	N.D.	N.D.

DISSOLVED

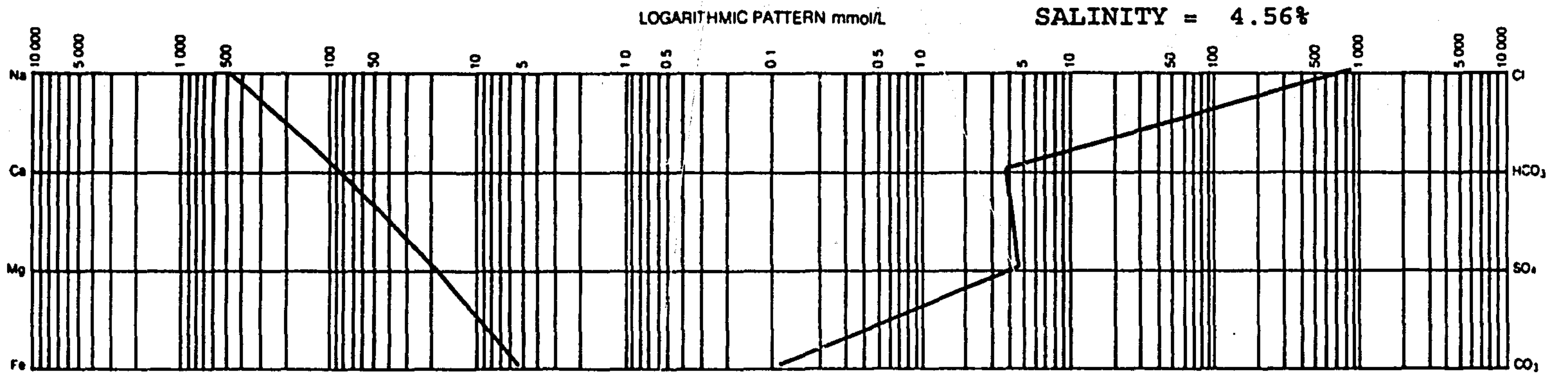
TOTAL SOLIDS mg/L

EVAPORATED AT 110° C	EVAPORATED AT 180° C
AT IGNITION	**CALCULATED**
	44200.0

RELATIVE DENSITY	REFRACTIVE INDEX
1.030 @ 25° C	N.A. @ 25° C
OBSERVED pH	**RESISTIVITY/OHM •m**
6.23 @ 25° C	0.18 @ 25° C

LOGARITHMIC PATTERN mmol/L

SALINITY = 4.56%



REMARKS

TRC+= LESS THAN 0.1 N.D.= NOT DETECTED NIL= 0.0 TRC*= LESS THAN 0.001 N.A.= NOT ANALYZED

AGAT® Laboratories

3801 - 21st STREET N.E. CALGARY, ALBERTA T2E 6T5
TEL: (403) 299-2000 FAX: (403) 299-2010

RANGER OIL LTD.

Date Sampled : 98-03-14
Date Received: 98-03-26
Date Reported: 98-04-02
File Number : E24615.A

ATTN: MR. LEROY BROWN

C30+ HYDROCARBON ANALYSIS (GC/FID) - SOLID

LAB NUMBER: Box A
SAMPLE ID : C-17 Norman Well Notacreek Mt. Clark (off swab on MT Clark Zone)

PARAMETER		CONCENTRATION (µg/g)
Hexanes	C6	N.D.
Heptanes	C7	208
Octanes	C8	2020
Nonanes	C9	11300
Decanes	C10	14900
Uncecanes	C11	12600
Dodecanes	C12	12100
Tridecanes	C13	11400
Tetradecanes	C14	7650
Pentadecanes	C15	5780
Hexadecanes	C16	4170
Heptadecanes	C17	2450
Octadecanes	C18	2990
Nonadecanes	C19	774
Eicosanes	C20	549
Heneicosanes	C21	1570
Docosanes	C22	1630
Tricosanes	C23	1590
Tetracosanes	C24	2550
Pentacosanes	C25	1820
Hexacosanes	C26	3670
Heptacosanes	C27	3200
Octacosanes	C28	2980
Nonacosanes	C29	N.D.
Tricontanes plus	C30+	4140
Total		112000

NOTE: Calculations based on appropriate n-alkane response factors.
N.D. - Not Detected.

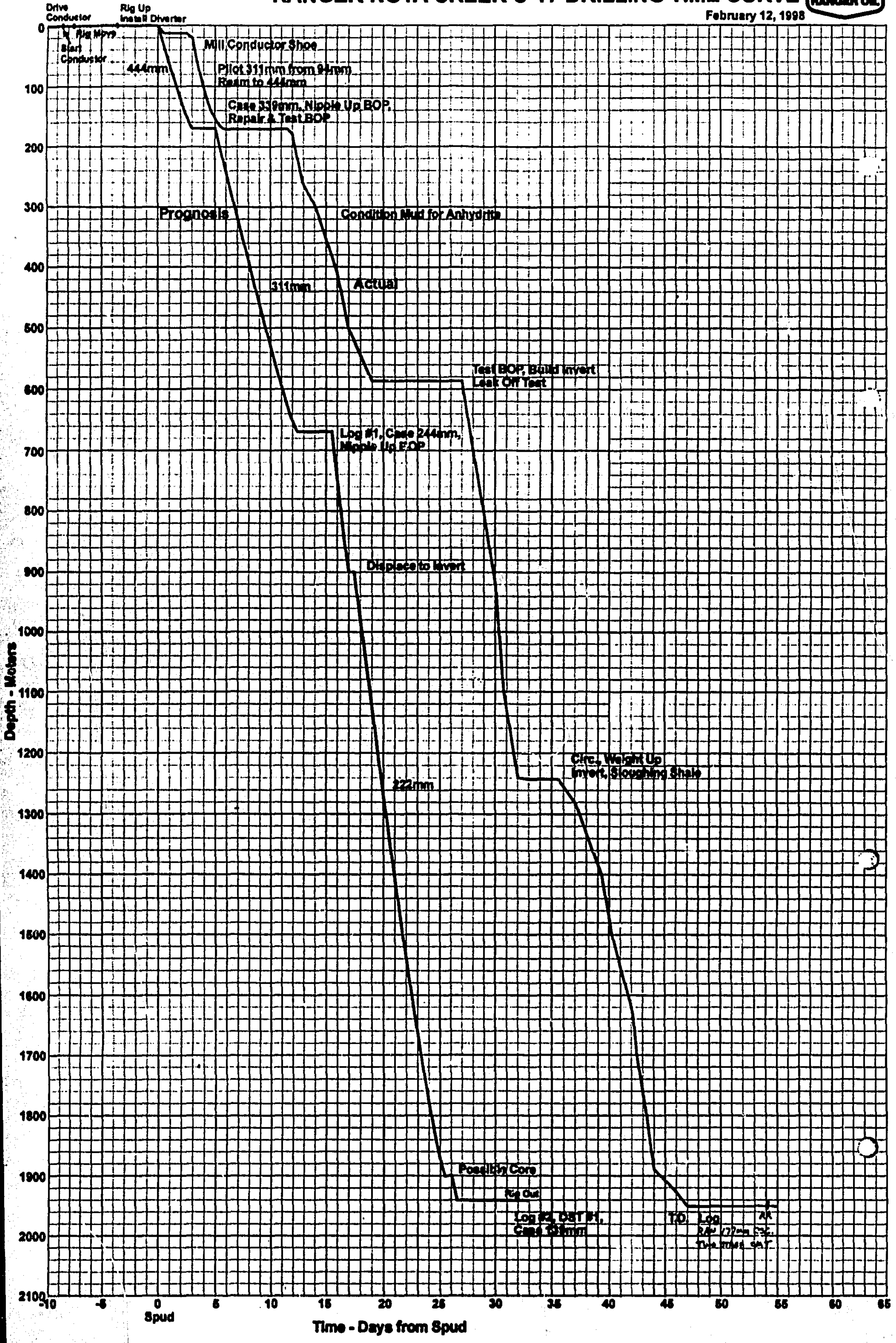
CERTIFIED BY

Accredited by the American Industrial Hygiene Association (AIHA)
Accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL)

DRILLING TIME CURVE SPREADSHEET

RANGER NOTA CREEK C-17 DRILLING TIME CURVE

February 12, 1998

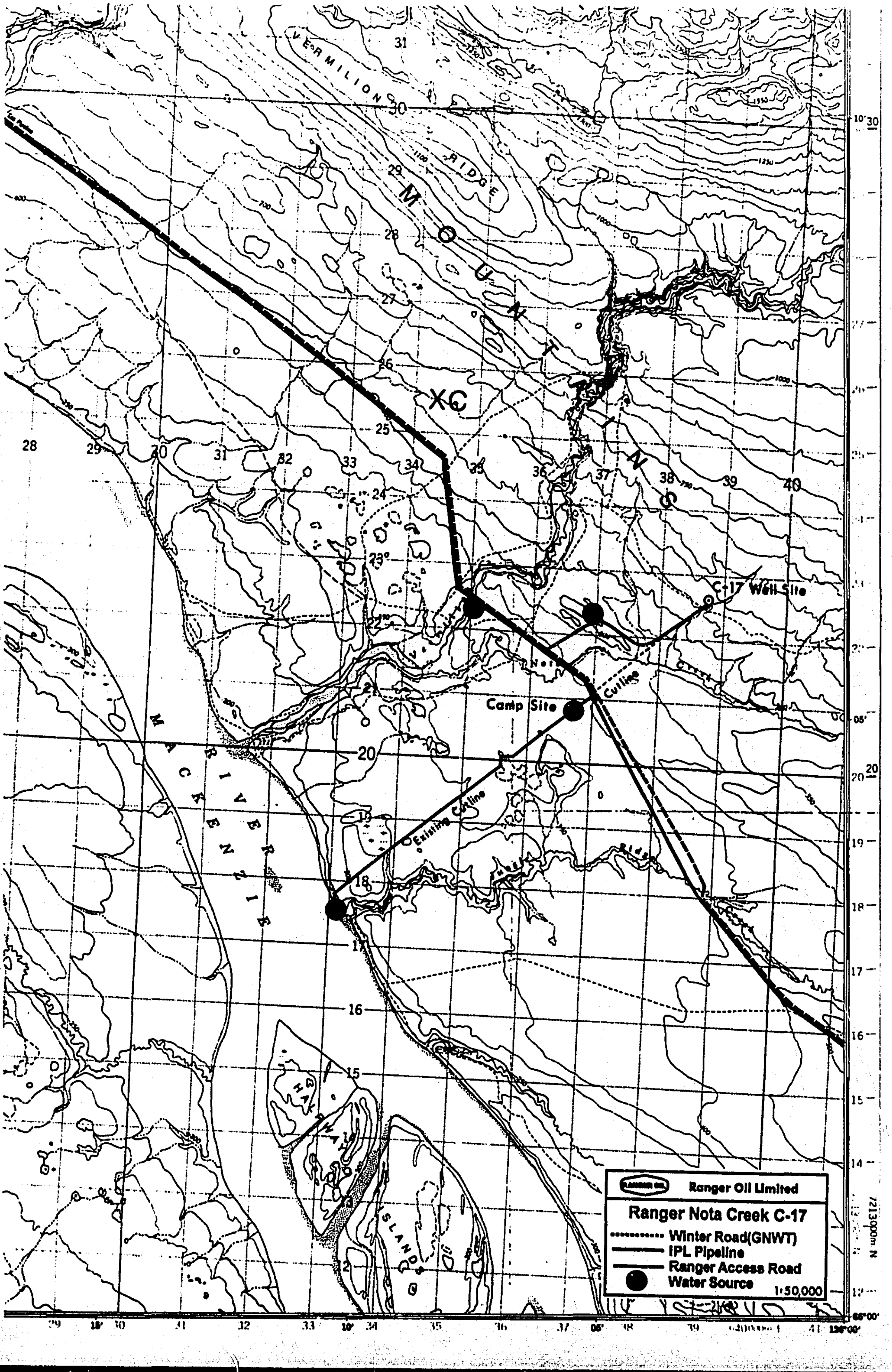


SURVEY PLAN

Summary of Nota Creek C-17 Surveys

Depth (m)	Inclination (degrees)	Azimuth (degrees	Depth (m)	Inclination (degrees)	Azimuth (degrees
19	1	—	824	1.6	49
29	0.9	—	839	1.2	72
37	0.9	—	868	1.5	37
46	0.1	—	891	1.8	57
56	0.9	—	912	1.8	57
74	0.9	—	940	2	47
84	1.1	—	959	1.8	52
94	2.1	—	993	1.2	49
103.5	2.2	—	1021	1	12
113	2.3	—	1081	1	17
122	1.5	—	1287	2.7	357
131	1.5	—	1345	2.9	17
140	2	—	1381	2.5	—
150	1	—	1390	2.5	—
156	2.1	—	1402	2	—
177	1.75	—	1411	2	—
234	0.5	—	1429	2	—
263	0.6	—	1457	2.5	—
292	0.5	—	1475	3.5	—
330	1	—	1493	4.5	—
370	0.5	—	1502	4.5	—
396	0.5	—	1513	4.5	—
432	0.5	—	1522	4.5	—
460	1	—	1535	5.4	35
489	0.6	—	1565	6.1	40
519	1	—	1591	6.6	44
546	0.5	—	1629	6.7	45
573	0.5	—	1667	6.8	43
604	0.2	148	1704	7.8	42
662	0.6	42	1741	7	47
706	1.2	12	1808	6.8	37
727	0.9	357	1864	6.9	27
773	1	47			

LOCALITY MAP


Ranger Oil Limited
Ranger Nota Creek C-17
Winter Road(GNWT)
IPL Pipeline
Ranger Access Road
Water Source
1:50,000
VERMILION RIDGE
MOUNTAINS
MACKENZIE RIVER
C-17 Well Site
Camp Site
Existing Cutline
Cutline
XC
721300m N
10'30
05'
65°00'
130°00'
10'

OVERSIZED DOCUMENT FILMED ON 35mm

RESISTIVITY/ CONDUCTIVITY

1831

N.E.B. COPY

COMPANY: RANGER OIL LIMITED
WELL RANGER NOTA CREEK C-17
FIELD NOTA CREEK
TERRITORY N.W.T.

TERRITORY N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

9211-R6-2-1

Schlumberger

PHASOR INDUCTION SFL

LOCATION
C-17-65-10-126

Elev.: K.B. 172.22 M
G.L. 168.22 M
D.F. 171.92 M

Permanent Datum: GROUND LEVEL Elev.: 168.22 M
Log Measured From: KELLY BUSHING 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

CORRECTED LOG

Logging Date	13-JAN-1998			
Run Number	1			
Depth Driller	589 M			
Schlumberger Depth	588.2			
Bottom Log Interval	585.05 M			
Top Log Interval	163 M			
Casing Driller Size @ Depth	339.000 MM @ 164 M		@	
Casing Schlumberger	163 M			
Bit Size	311.000 MM			
Type Fluid In Hole	GEL CHEM			
MUD Density / Viscosity	1320 K/M3	65 S		
MUD Fluid Loss / PH	12 C3	9		
MUD Source Of Sample	FLOWLINE			
RM @ Measured Temperature	1.310 OHMM @ 2 DEGC		@	
RMF @ Measured Temperature	0.750 OHMM @ 10 DEGC		@	
RMC @ Measured Temperature	0.380 OHMM @ 7 DEGC		@	
Source RMF / RMC	PRESS	PRESS		
RM @ MRT / RMF @ MRT	0.598 @ 30	0.459 @ 30	@	@
Maximum Recorded Temperatures	30 DEGC			
Circulation Stopped / Time	13-JAN-1998	3:00		
Logger On Bottom / Time	13-JAN-1998	09:00		
Unit Number / Location	2	NORMAN WELLS		
Recorded By	GREG MCISAAC			
Witnessed By	HENRI WENNEKERS			

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth			@	@
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density / Viscosity				
MUD Fluid Loss / PH				
MUD Source Of Sample				
RM @ Measured Temperature			@	@
RMF @ Measured Temperature			@	@
RMC @ Measured Temperature			@	@
Source RMF / RMC				
RM @ MRT / RMF @ MRT			@ @	@ @
Maximum Recorded Temperatures				
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location				
Recorded By				
Witnessed By				

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1: BHC SONIC	OS1:
OS2: NEUTRON-DENSITY	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
INDUCTION SONIC COMBINATION	
38 MM STANDOFFS USED ON DITE	
CME=Z CENTRALIZERS USED ON SONIC	

RUN 1			RUN 2		
SERVICE ORDER #:	1210868		SERVICE ORDER #:		
PROGRAM VERSION:	8C1-205		PROGRAM VERSION:		
FLUID LEVEL:	0 M		FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

RUN 2

SURFACE EQUIPMENT

SLM-EB 1372
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT

TCC-B
ECH-KC 2319
TCC-B 319
22.23

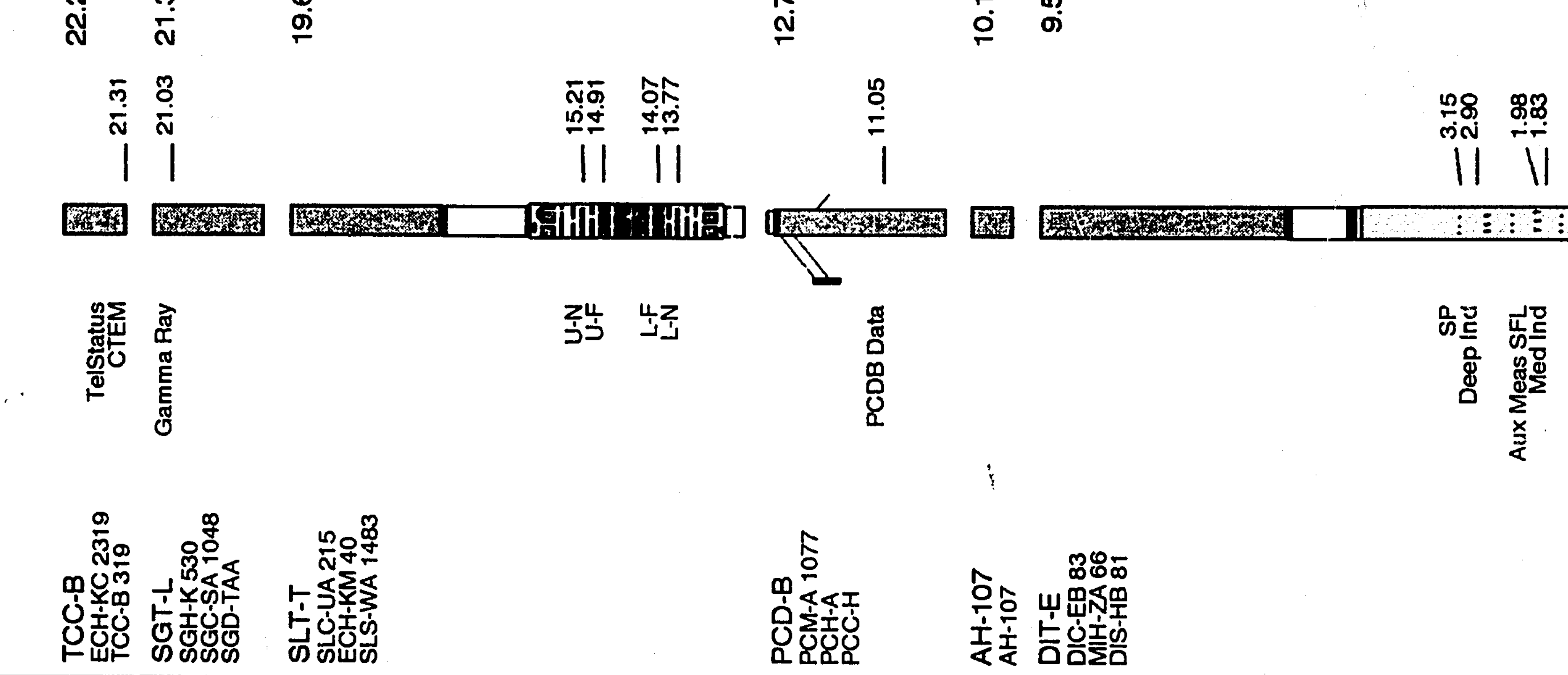
SGT-L
SGH-K 530
SGC-SA 1048
SGD-TAA
21.31

SLT-T
SLC-UA 215
ECH-KM 40
SLS-WA 1483
19.63

PCD-B
PCM-A 1077
PCH-A
PCC-H
12.73

AH-107
AH-107
10.13

DIT-E
DIC-EB 83
MIH-ZA 66
DIS-HB 81
9.52



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Input DLIS Files

DEFAULT DITE .009 FN:7 FIELD 13-Jan-1998 09:58 590.5 M 22.3 M

Output DLIS Files

DEFAULT DITE .053 FN:49 FIELD 15-Jan-1998 16:15 590.5 M 22.3 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

Time Mark Every 60 S

Deep Induction Phasor-processed Resistivity (IDPH)
0 (OHMM) 50

SFL Averaged (SFLA)
0 (OHMM) 50

Gamma Ray (GR)
0 (GAPI) 150

Deep Induction Phasor-processed Conductivity (CIDP)
1000 (MM/M) 0

Gamma Ray (GR)
0 (GAPI) 150

Deep Induction Phasor-processed Conductivity (CIDP)
1000 (MM/M) 0

SFL Averaged (SFLA)
0 (OHMM) 50

Deep Induction Phasor-processed Resistivity (IDPH)
0 (OHMM) 50

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	100	DEGC
DFD	Drilling Fluid Density	1320.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.015	
DO	Depth Offset	0.0	M
DPH2	Deep 20 kHz Phase Shift	0.02012	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.22	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	75.18	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.022	
MPH2	Medium 20 kHz Phase Shift	-0.8239	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	19.56	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	24.19	MM/M
PP	Playback Processing	RECOMPUTE	
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	20	DEGC
TD	Total Depth	589	M

Format: DITE_LinPhasor Vertical Scale: 1:600 Graphics File Created: 15-Jan-1998 16:15

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT DITE .009 FN:7 FIELD 13-Jan-1998 09:58 590.5 M 22.3 M

Output DLIS Files

DEFAULT DITE .053 FN:49 FIELD 15-Jan-1998 16:15

Input DLIS Files

DEFAULT DITE .009 FN:7 FIELD 13-Jan-1998 09:58 590.5 M 22.3 M

Output DLIS Files

DEFAULT DITE .053 FN:49 FIELD 15-Jan-1998 16:15 590.5 M 22.3 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

SFL_QUAL From D3T to SFQF

SFL Unaveraged (SFLU)
0.2 (OHMM) 2000

Tension (TENS)
0 (LBF) 4000

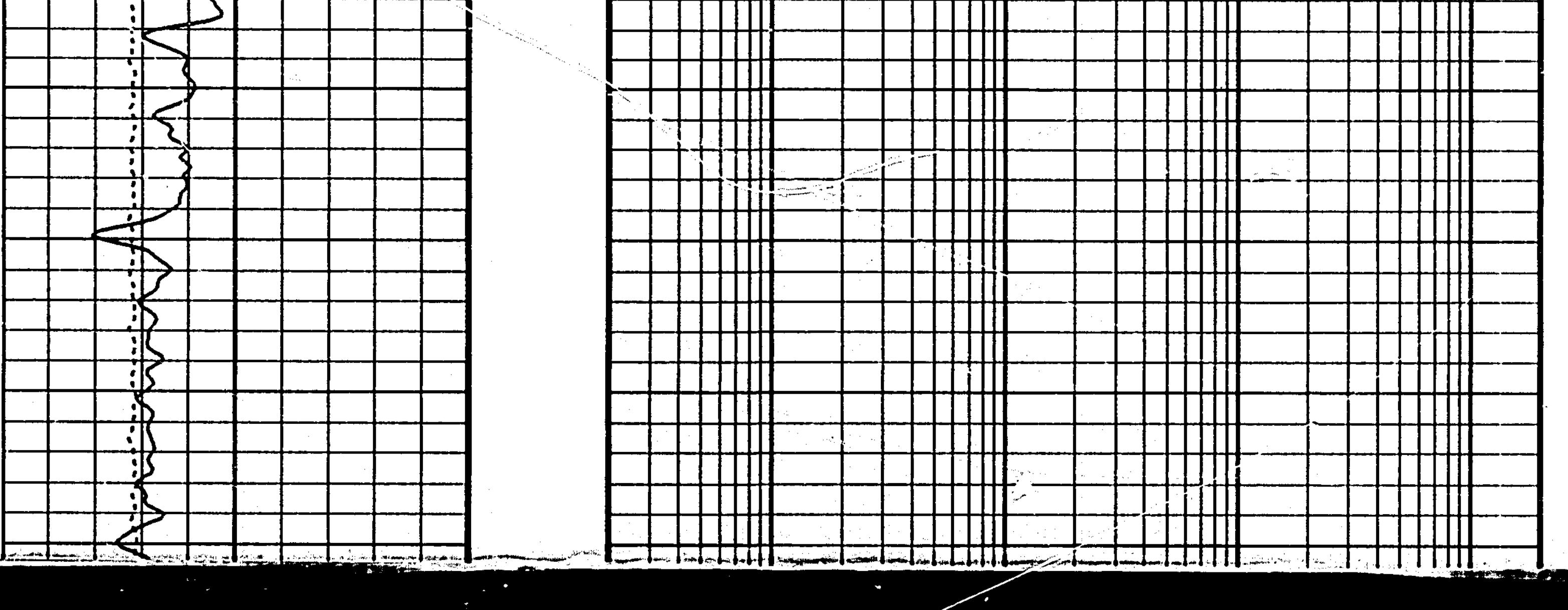
IM_QUAL From SFQF to IMQF

Medium Induction Phasor-processed Resistivity (IMPH)
0.2 (OHMM) 2000

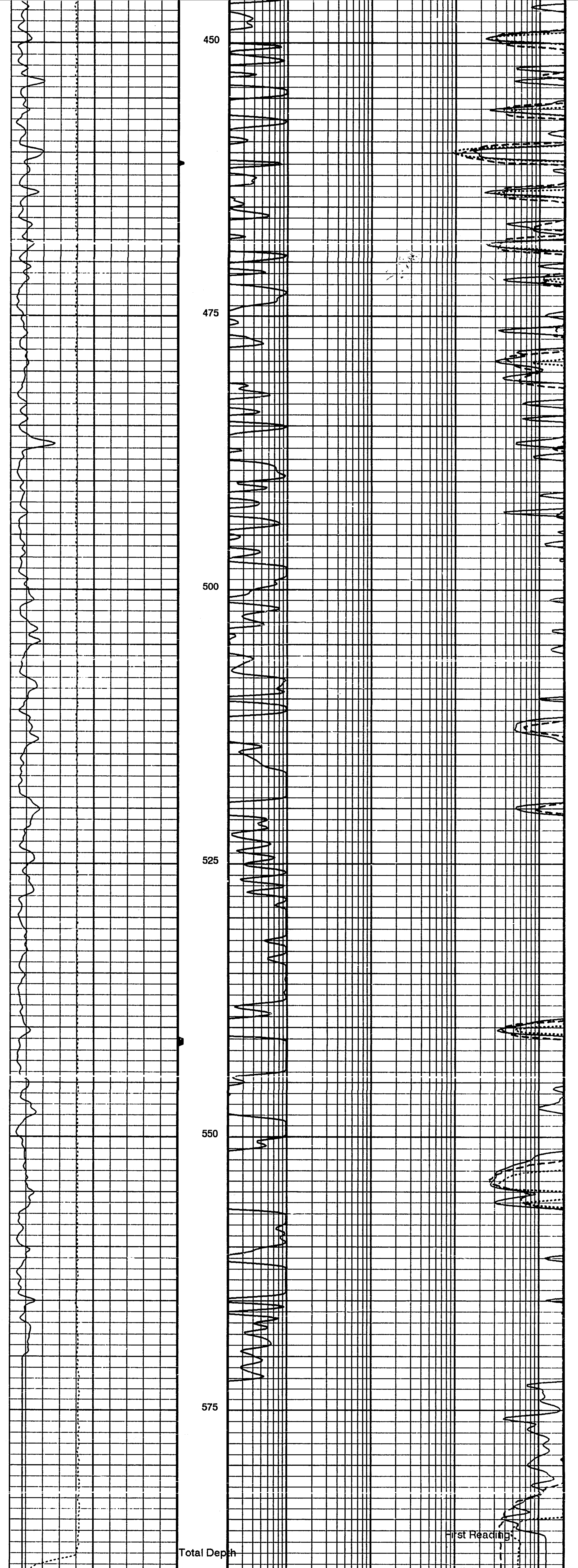
Gamma Ray (GR)
0 (GAPI) 150

ID_QUAL From IMQF to IDQF

Deep Induction Phasor-processed Resistivity (IDPH)
0.2 (OHMM) 2000



50
75
100
125
150
Casing
175
200
225
250
275
300
325
350
375
400
425



Gamma Ray (GR) 0 (GAPI) 150	ID_QUAL From IMQF to IDQF	Deep Induction Phasor-processed Resistivity (IDPH) 0.2 (OHMM) 2000
Tension (TENS) 0 (LBF) 4000	IM_QUAL From SFQF to IMQF	Medium Induction Phasor-processed Resistivity (IMPH) 0.2 (OHMM) 2000
	SFL_QUAL From D3T to SFQF	SFL Unaveraged (SFLU) 0.2 (OHMM) 2000

Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	100	DEGC
DFD	Drilling Fluid Density	1320.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.015	
DO	Depth Offset	0.0	M
DPH2	Deep 20 kHz Phase Shift	0.02012	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.22	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	75.18	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.022	
MPH2	Medium 20 kHz Phase Shift	-0.8239	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	19.56	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	24.19	MM/M
PP	Playback Processing	RECOMPUTE	
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	20	DEGC
TD	Total Depth	589	M

Format: DITE_LogPhasor Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 16:15

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT DITE .009 FN:7 FIELD 13-Jan-1998 09:58 590.5 M 22.3 M

Output DLIS Files

DEFAULT DITE .053 FN:49 FIELD 15-Jan-1998 16:15

Input DLIS Files

DEFAULT DITE .008 FN:6 FIELD 13-Jan-1998 09:41 589.5 M 482.5 M

Output DLIS Files

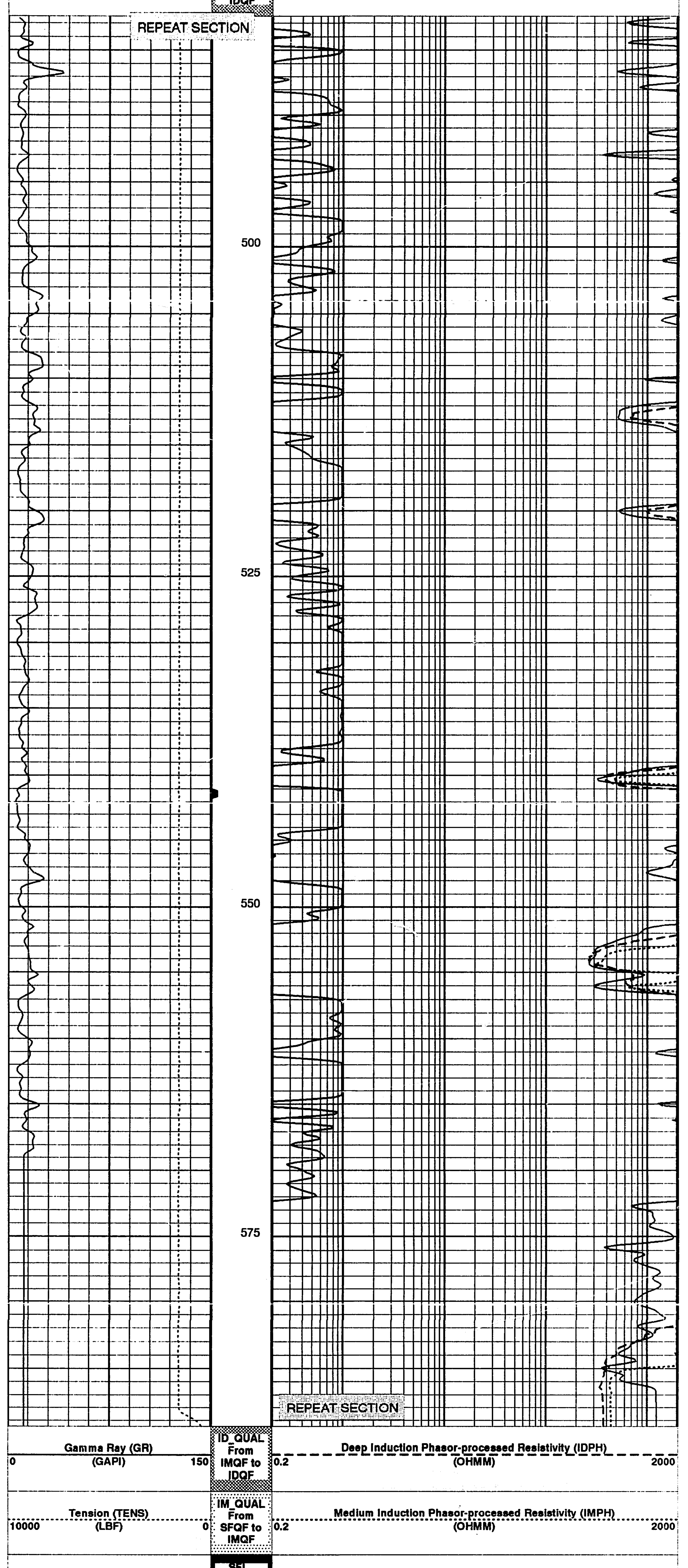
DEFAULT DITE .050 FN:46 FIELD 15-Jan-1998 15:59 589.5 M 482.5 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

	SFL_QUAL From D3T to SFQF	SFL Unaveraged (SFLU) 0.2 (OHMM) 2000
Tension (TENS) 10000 (LBF) 0	IM_QUAL From SFQF to IMQF	Medium Induction Phasor-processed Resistivity (IMPH) 0.2 (OHMM) 2000
Gamma Ray (GR) 0 (GAPI) 150	ID_QUAL From IMQF to IDQF	Deep Induction Phasor-processed Resistivity (IDPH) 0.2 (OHMM) 2000



Gamma Ray (GR) 0 (GAPI) 150	ID_QUAL From IMQF to IDQF	Deep Induction Phasor-processed Resistivity (IDPH) 0.2 (OHMM) 2000
Tension (TENS) 10000 (LBF) 0	IM_QUAL From SFQF to IMQF	Medium Induction Phasor-processed Resistivity (IMPH) 0.2 (OHMM) 2000
	SFL_QUAL From D3T to SFQF	SFL Unaveraged (SFLU) 0.2 (OHMM) 2000

Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	100	DEGC
DFD	Drilling Fluid Density	1320.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.015	
DO	Depth Offset	0.0	M
DPH2	Deep 20 kHz Phase Shift	0.02012	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.22	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	75.18	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.022	
MPH2	Medium 20 kHz Phase Shift	-0.8239	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	19.56	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	24.19	MM/M
PP	Playback Processing	RECOMPUTE	
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	20	DEGC
TD	Total Depth	589	M

Format: DITE_LogPhasor Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 15:59

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT DITE .008 FN:6 FIELD 13-Jan-1998 09:41 589.5 M 482.5 M

Output DLIS Files

DEFAULT DITE .050 FN:46 FIELD 15-Jan-1998 15:59

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Powered Caliper Device - B Wellsite Calibration - Large Arm Calibration Before: Jan 05 15:49 1998							
Large Arm Small Ring	203.2	N/A	180.3	N/A	N/A	N/A	MM
Large Arm Large Ring	304.8	N/A	279.5	N/A	N/A	N/A	MM

Powered Caliper Device - B Wellsite Calibration - Small Arm Calibration
Before: Calibration not done

Small Arm Small Gauge	25.40	N/A	N/A	N/A	N/A	N/A	MM
Small Arm Large Gauge	127.0	N/A	N/A	N/A	N/A	N/A	MM

Powered Caliper Device - B Wellsite Calibration - Micro Inverse Calibration
Before: Calibration not done

Micro Inverse Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Inverse Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM

Powered Caliper Device - B Wellsite Calibration - Micro Normal Calibration
Before: Calibration not done

Micro Normal Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Normal Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM

Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration
Before: Jan 05 16:45 1998

Gamma Ray Background	30.00	N/A	95.65	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	159.6	N/A	159.6	N/A	N/A	14.51	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

Dual Induction - E / Equipment Identification

Primary Equipment:

Dual Induction Sonde	DIS - HB	81
Dual Induction Cartridge	DIC - EB	83

Auxiliary Equipment:

Mass Isolated Housing	MIH - ZA	66

Dual Induction - E Wellsite Calibration
Induction Electronics (10 kHz)

Phase	ID Elect Real Offset 10 kHz MM/M	Value	Phase	ID Elect Real Gain 10 kHz	Value	Phase	ID Elect Phase 10 kHz DEG	Value
Before		36.37	Before		0.9816	Before		9.415
	-275.3 (Minimum) 24.74 (Nominal) 324.7 (Maximum)			0.8019 (Minimum) 0.9519 (Nominal) 1.132 (Maximum)			-2.516 (Minimum) 7.484 (Nominal) 17.48 (Maximum)	
Phase	ID Elect Quad Offset 10 kHz MM/M	Value	Phase	ID Elect Quad Gain 10 kHz	Value	Phase	IM Elect Phase 10 kHz DEG	Value
Before		37.00	Before		0.9885	Before		9.526
	-269.5 (Minimum) 30 50 (Nominal) 330.5 (Maximum)			0.8091 (Minimum) 0.9591 (Nominal) 1.142 (Maximum)			0.2584 (Minimum) 10 26 (Nominal) 20.26 (Maximum)	
Phase	IM Elect Real Offset 10 kHz MM/M	Value	Phase	IM Elect Real Gain 10 kHz	Value			
Before		98.36	Before		0.9745			
	-514.7 (Minimum) 35.32 (Nominal) 585.3 (Maximum)			0.7631 (Minimum) 0.9131 (Nominal) 1.077 (Maximum)				
Phase	IM Elect Quad Offset 10 kHz MM/M	Value	Phase	IM Elect Quad Gain 10 kHz	Value			
Before		100.3	Before		0.9803			
	-466.5 (Minimum) 83.45 (Nominal) 633.5 (Maximum)			0.7816 (Minimum) 0.9316 (Nominal) 1.103 (Maximum)				

Before: Calibration out of date Sep 09 13:41 1993

Dual Induction - E Wellsite Calibration
Induction Electronics (20 kHz)

Phase	ID Elect Real Offset 20 kHz MM/M	Value	Phase	ID Elect Real Gain 20 kHz	Value	Phase	ID Elect Phase 20 kHz DEG	Value
Before		14.18	Before		0.9955	Before		7.643
	-115.6 (Minimum) 9.365 (Nominal) 134.4 (Maximum)			0.8002 (Minimum) 0.9502 (Nominal) 1.130 (Maximum)			-10.55 (Minimum) 4.449 (Nominal) 19.45 (Maximum)	
Phase	ID Elect Quad Offset 20 kHz MM/M	Value	Phase	ID Elect Quad Gain 20 kHz	Value	Phase	IM Elect Phase 20 kHz DEG	Value
Before		14.73	Before		1.002	Before		9.197
	-113.1 (Minimum) 11.92 (Nominal) 136.9 (Maximum)			0.8073 (Minimum) 0.9573 (Nominal) 1.140 (Maximum)			-7.205 (Minimum) 7.795 (Nominal) 22.80 (Maximum)	
Phase	IM Elect Real Offset 20 kHz MM/M	Value	Phase	IM Elect Real Gain 20 kHz	Value			
Before		39.45	Before		0.9969			
	-210.6 (Minimum) 14.36 (Nominal) 239.4 (Maximum)			0.7942 (Minimum) 0.9442 (Nominal) 1.121 (Maximum)				
Phase	IM Elect Quad Offset 20 kHz MM/M	Value	Phase	IM Elect Quad Gain 20 kHz	Value			
Before		40.40	Before		1.003			
	-190.8 (Minimum) 34.17 (Nominal) 259.2 (Maximum)			0.8135 (Minimum) 0.9635 (Nominal) 1.148 (Maximum)				

Before: Calibration out of date Sep 09 13:42 1993

Dual Induction - E Wellsite Calibration
Induction Electronics (40 kHz)

Phase	ID Elect Real Offset 40 kHz MM/M	Value	Phase	ID Elect Real Gain 40 kHz	Value	Phase	ID Elect Phase 40 kHz DEG	Value
Before		9.186	Before		0.9707	Before		23 26
	-78.99 (Minimum) 6.012 (Nominal) 91.01 (Maximum)			0.7797 (Minimum) 0.9297 (Nominal) 1.101 (Maximum)			-2.895 (Minimum) 17.11 (Nominal) 37.11 (Maximum)	
Phase	ID Elect Quad Offset 40 kHz MM/M	Value	Phase	ID Elect Quad Gain 40 kHz	Value	Phase	IM Elect Phase 40 kHz DEG	Value
Before		9 658	Before		0.9765	Before		26.41
	-77.16 (Minimum) 7.836 (Nominal) 92.84 (Maximum)			0.7862 (Minimum) 0.9362 (Nominal) 1.110 (Maximum)			0.1917 (Minimum) 20.19 (Nominal) 40.19 (Maximum)	
Phase	IM Elect Real Offset 40 kHz MM/M	Value	Phase	IM Elect Real Gain 40 kHz	Value			
Before		25.34	Before		0.9954			
	-120.7 (Minimum) 9.331 (Nominal) 139.3 (Maximum)			0.8021 (Minimum) 0.9521 (Nominal) 1.132 (Maximum)				
Phase	IM Elect Quad Offset 40 kHz MM/M	Value	Phase	IM Elect Quad Gain 40 kHz	Value			
Before		25.98	Before		1.001			
	-107.7 (Minimum) 22.25 (Nominal) 152.3 (Maximum)			0.8213 (Minimum) 0.9713 (Nominal) 1.159 (Maximum)				

Before: Calibration out of date Sep 09 13:43 1993

Dual Induction - E Wellsite Calibration
SFL Electronics

Phase	SFL Voltage Offset MV	Value	Phase	SFL Voltage Gain	Value
Before		-0.3485	Before		1.007
	-15.00 (Minimum) 0 (Nominal) 15.00 (Maximum)			0.8500 (Minimum) 1.000 (Nominal) 1.200 (Maximum)	
Phase	SFL Current Offset MA	Value	Phase	SFL Current Gain	Value
Before		2.589E-00	Before		0.9897
	-0.6000 (Minimum) 0 (Nominal) 0.6000 (Maximum)			0.8500 (Minimum) 1.000 (Nominal) 1.200 (Maximum)	

Before: Calibration out of date Sep 09 13:44 1993

Dual Induction - E Wellsite Calibration
Electronics Calibration Changes

epth Intervals: 5: 182.0 - 110.0 6: 269.7 - 549.2 7: 269.7 - 549.2 1: 298.2 - 276.6 8: 589.5 - 482.5 9: 590.5 - 22.3 11: 590.5 - 22.3 12: 589.5 - 482.5

Phase	ID (R > 27 OHM-M) MM/M	Value	Phase	ID (R < 27 OHM-M) %	Value	Phase	SFL (R < 1 OHM-M) OHMM	Value
After		0.03052	After		0.001013	After		0
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)			0 (Minimum) 0 (Nominal) 0.02000 (Maximum)	
Phase	IM (R > 27 OHM-M) MM/M	Value	Phase	IM (R < 27 OHM-M) %	Value			
After		0.03970	After		0.001077			
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)				
Phase	SFL (R > 27 OHM-M) MM/M	Value	Phase	SFL (R < 27 OHM-M) %	Value			
After		0.001063	After		0.0002492			
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)				

After: Jan 13 11:26 1998

Dual Induction - E Master Calibration
Test Loop Calibration: Calibration of Internal Reference to Test Loop Standard

Phase	Deep 10 kHz Gain Factor	Value	Phase	Deep 20 kHz Gain Factor	Value	Phase	Deep 40 kHz Gain Factor	Value
Master		1.008	Master		1.015	Master		1.040
	0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)			0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)			0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)	
Phase	Medium 10 kHz Gain Factor	Value	Phase	Medium 20 kHz Gain Factor	Value	Phase	Medium 40 kHz Gain Factor	Value
Master		1.013	Master		1.022	Master		1.058
	0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)			0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)			0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)	
Phase	Deep 10 kHz Phase Shift	Value	Phase	Deep 20 kHz Phase Shift	Value	Phase	Deep 40 kHz Phase Shift	Value
Master		-0.02870	Master		0.02012	Master		-1.089
	-1.500 (Minimum) 0 (Nominal) 1.500 (Maximum)			-2.000 (Minimum) 0 (Nominal) 2.000 (Maximum)			-4.000 (Minimum) -1.000 (Nominal) 2.000 (Maximum)	
Phase	Medium 10 kHz Phase Shift	Value	Phase	Medium 20 kHz Phase Shift	Value	Phase	Medium 40 kHz Phase Shift	Value
Master		-0.3951	Master		-0.8239	Master		-2.246
	-1.500 (Minimum) 0 (Nominal) 1.500 (Maximum)			-3.000 (Minimum) -1.000 (Nominal) 1.000 (Maximum)			-5.000 (Minimum) -2.000 (Nominal) 1.000 (Maximum)	

Master: Calibration out of date Jan 27 15:18 1996

Dual Induction - E Master Calibration
Sonde Error Corrections: Correction for sonde response in zero conductivity environment. (Normalized to 25C).

Phase	Real Deep 10 kHz S.E. Corr.	Value	Phase	Real Deep 20 kHz S.E. Corr.	Value	Phase	Real Deep 40 kHz S.E. Corr.	Value
Master		35.12	Master		14.22	Master		3.738
	-50.00 (Minimum) 0 (Nominal) 125.0 (Maximum)			-30.00 (Minimum) 0 (Nominal) 30.00 (Maximum)			-15.00 (Minimum) 0 (Nominal) 15.00 (Maximum)	
Phase	Quad Deep 10 kHz S.E. Corr.	Value	Phase	Quad Deep 20 kHz S.E. Corr.	Value	Phase	Quad Deep 40 kHz S.E. Corr.	Value
Master		125.1	Master		75.18	Master		53.01
	-250.0 (Minimum) 0 (Nominal) 350.0 (Maximum)			-125.0 (Minimum) 0 (Nominal) 200.0 (Maximum)			-75.00 (Minimum) 0 (Nominal) 125.0 (Maximum)	
Phase	Real Medium 10 kHz S.E. Corr.	Value	Phase	Real Medium 20 kHz S.E. Corr.	Value	Phase	Real Medium 40 kHz S.E. Corr.	Value
Master		79.50	Master		19.56	Master		3.595
	-50.00 (Minimum) 0 (Nominal) 140.0 (Maximum)			-50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)			-30.00 (Minimum) 0 (Nominal) 30.00 (Maximum)	
Phase	Quad Medium 10 kHz S.E. Corr.	Value	Phase	Quad Medium 20 kHz S.E. Corr.	Value	Phase	Quad Medium 40 kHz S.E. Corr.	Value
Master		24.08	Master		24.19	Master		36.82
	-1300 (Minimum) 0 (Nominal) 1300 (Maximum)			-650.0 (Minimum) 0 (Nominal) 650.0 (Maximum)			-350.0 (Minimum) 0 (Nominal) 350.0 (Maximum)	

Master: Calibration out of date Jan 27 15:12 1996

Powered Caliper Device - B / Equipment Identification

Primary Equipment:

Powered Caliper Cartridge - H	PCC - H	
Powered Caliper Mechanical (sonde) - A	PCM - A	1077

Auxiliary Equipment:

Powered Caliper Housing - A	PCH - A	

Powered Caliper Device - B Wellsite Calibration
Micro Inverse Calibration

Phase	Micro Inverse Zero OHMM	Value	Phase	Micro Inverse Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Powered Caliper Device - B Wellsite Calibration
Micro Normal Calibration

Phase	Micro Normal Zero OHMM	Value	Phase	Micro Normal Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Scintillation Gamma Ray - L / Equipment Identification

Primary Equipment:

Scintillation Gamma Cartridge	SGC - SA	1048
Scintillation Gamma Detector	SGD - TAA	

Auxiliary Equipment:

Scintillation Gamma Housing	SGH - K	530
Gamma Source Radioactive	GSR - U/Y	

Scintillation Gamma-Ray - L Wellsite Calibration
Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		95.65	Before		159.6	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			145.1 (Minimum) 159.6 (Nominal) 174.1 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: Jan 05 16:45 1998

NATIONAL ENERGY BOARD
ENGINEERING BRANCH
JAN 2 3 1998

COMPANY	RANGER OIL LIMITED	BOTTOM LOG INTERVAL	585.05 M
		SCHLUMBERGER DEPTH	586 2
WELL	RANGER NOTA CREEK C-17	DEPTH DRILLER	589 M
FIELD	NOTA CREEK	KELLY BUSHING	172.22 M
TERRITORY	N.W.T.	DRILL FLOOR	171.92 M
		GROUND LEVEL	168.22 M

Schlumberger

PHASOR INDUCTION SFL

N.E.B. COPY 1831

COMPANY RANGER OIL LIMITED

WELL RANGER NOTA CREEK C-17

FIELD NOTA CREEK

TERRITORY N.W.T.

TERRITORY N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

Schlumberger

PHASOR INDUCTION SFL

LOCATION

C-17-65-10-126

Elev.: K.B. 172.22 M
G.L. 168.22 M
D.F. 171.92 M

Permanent Datum: GROUND LEVEL Elev.: 168.22 M
Log Measured From: KELLY BUSHING 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date		10-FEB-1998		
Run Number		2		
Depth Driller		1953 M		
Schlumberger Depth		1949 M		
Bottom Log Interval		1945.8 M		
Top Log Interval		589 M		
Casing Driller Size @ Depth		244.500 MM @ 589 M		@
Casing Schlumberger		589 M		
Bit Size		222.000 MM		
Type Fluid In Hole		INVERT		
MUD Density	Viscosity	1240 K/M3	80 S	
Fluid Loss	PH			
Source Of Sample				
RM @ Measured Temperature		@		@
RMF @ Measured Temperature		@		@
RMC @ Measured Temperature		@		@
Source RMF	RMC			
RM @ MRT	RMF @ MRT	@ 53	@ 53	@ @
Maximum Recorded Temperatures		53		
Circulation Stopped	Time	10-FEB-1998	13:00	
Logger On Bottom	Time	10-FEB-1998	22:30	
Unit Number	Location	2	NORMAN WELLS	
Recorded By		GREG MCISAAC		
Witnessed By		HENRI WENNEKERS		

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@		@	
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density / Viscosity				
Fluid Loss / PH				
Source Of Sample				
RM @ Measured Temperature	@		@	
RMF @ Measured Temperature	@		@	
RMC @ Measured Temperature	@		@	
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@	@	@	@
Maximum Recorded Temperatures				
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location				
Recorded By				
Witnessed By				

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1: BHC SONIC	OS1:
OS2: NEUTRON-DENSITY	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
INDUCTION SONIC COMBINATION	
38 MM STANDOFFS USED ON DITE	
CME-Z CENTRALIZERS USED ON SONIC	
CEMENT VOL. BASED ON 177.8 MM PRODUCTION CASING	
CORRELATED TO RUN 1 SONIC LOG DATED 13-JAN-1998	
NO SP, SFL CURVES DUE TO INVERT MUD	

RUN 1
SERVICE ORDER #: 1210876
PROGRAM VERSION: 8C1-205
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

RUN 2
SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

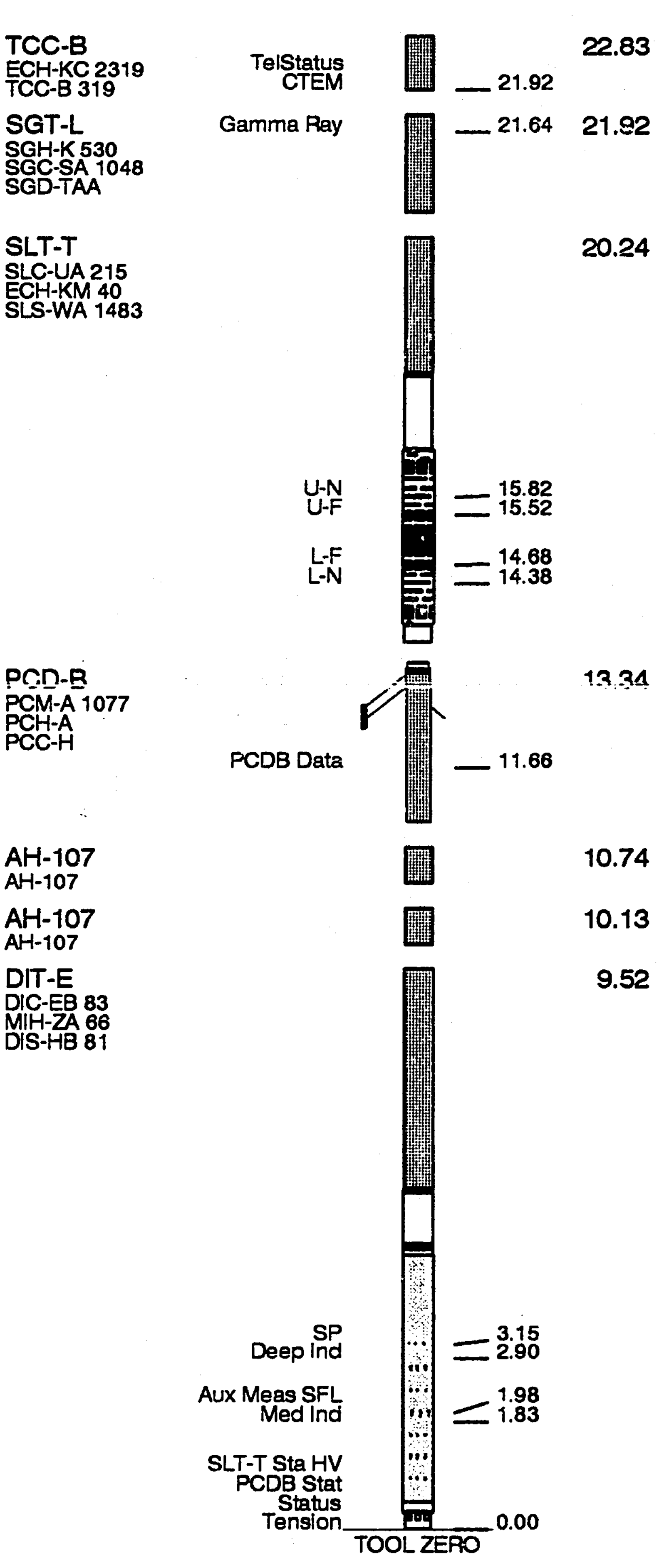
EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

SLM-EB 1372
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

RUN 2

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25	1950.4 M	453.7 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	53	DEGC
DFD	Drilling Fluid Density	1240.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.008	
DO	Depth Offset	0.0	M
DPH2	Deep 20 kHz Phase Shift	0.1545	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.27	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	77.45	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.038	
MPH2	Medium 20 kHz Phase Shift	-0.8105	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	20.21	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	29.41	MM/M
PP	Playback Processing	RECOMPUTE	
SHT	Surface Hole Temperature	5	DEGC
TD	Total Depth	1949	M

Format: DITE_LinPhasor Vertical Scale: 1:600 Graphics File Created: 11-Feb-1998 00:25

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25	1950.4 M	453.7 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205

SLT-T
TCC-B
8C1-205
8C1-205
SGT-L
8C1-205
Tension (TENS)
(LBF)
10000
0
Gamma Ray (GR)
(GAPI)
0
150
IM_QUAL
From
SFQF to
IMQF
ID_QUAL
From
IMQF to
IDQF
Medium Induction Phasor-processed Resistivity (IMPH)
(OHMM)
0.2
2000
Deep Induction Phasor-processed Resistivity (IDPH)
(OHMM)
0.2
2000
MAIN PASS
475
500
525
550
575
CASING
600
625
SFQF
IMQF
IDQF
650
675
700
725
750
775
800
825
IDPH
TENS
GR

850
875
900
925
950
975
1000
1025
1050
1075
1100
1125
1150
SFQF
1175
IMQF
IDQF
1200
1225
IMPH
IDPH
TENS
GR

1250
1275
1300
1325
1350
1375
1400
1425
1450
1475
1500
1525
1550
1575
1600
1625
TENS

Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	53	DEGC
DFD	Drilling Fluid Density	1240.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.008	
DO	Depth Offset	0.0	M
DPH2	Deep 20 kHz Phase Shift	0.1545	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.27	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	77.45	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.038	
MPH2	Medium 20 kHz Phase Shift	-0.8105	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	20.21	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	29.41	MM/M
PP	Playback Processing	RECOMPUTE	
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	5	DEGC
TD	Total Depth	1949	M

Format: DITE_LogPhasor Vertical Scale: 1:240 Graphics File Created: 11-Feb-1998 00:25

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25

Output DLIS Files

DEFAULT	DITE .009	FN:6	FIELD	10-Feb-1998 22:36	1951.2 M	1857.0 M

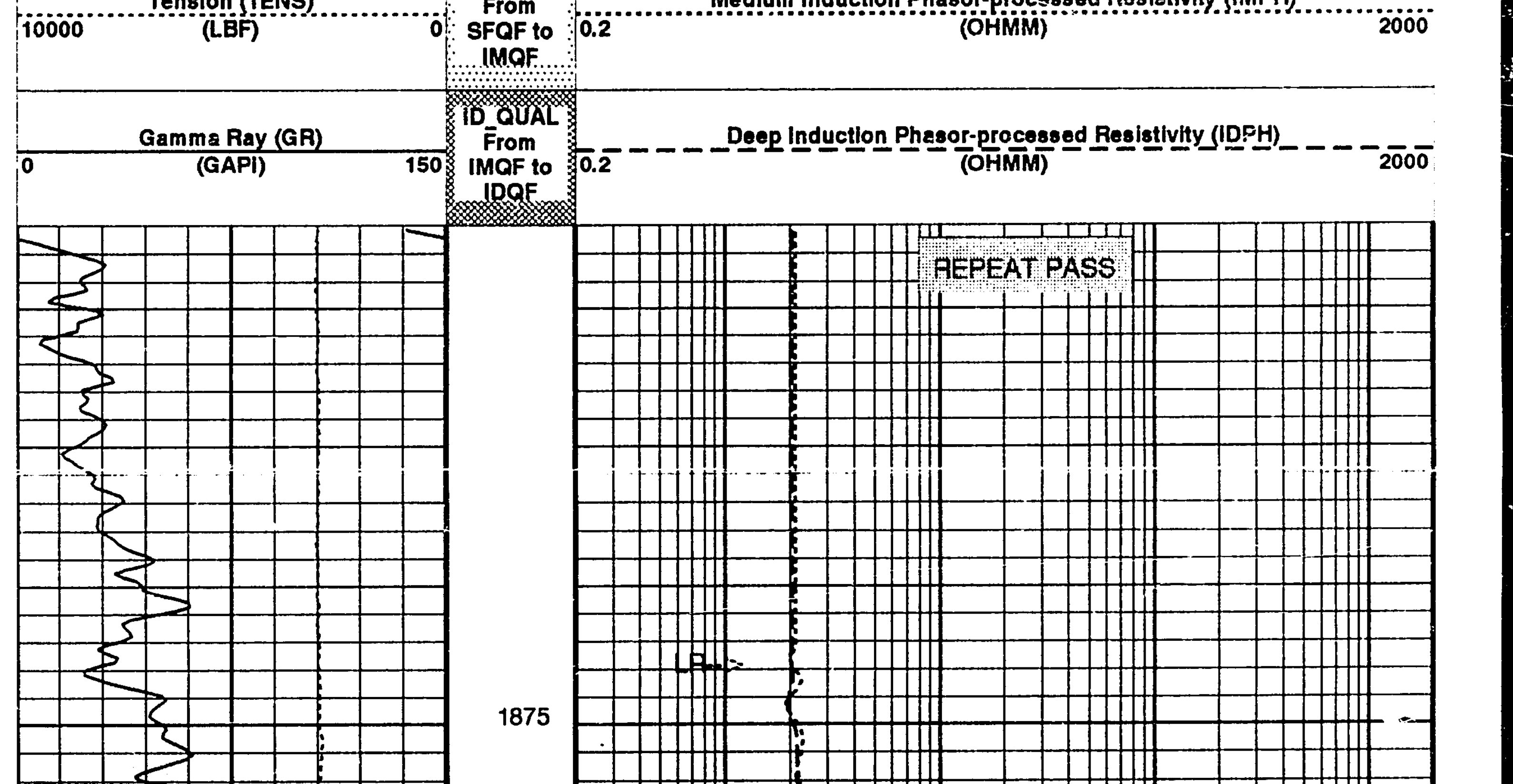
OP System Version: 8C1-205

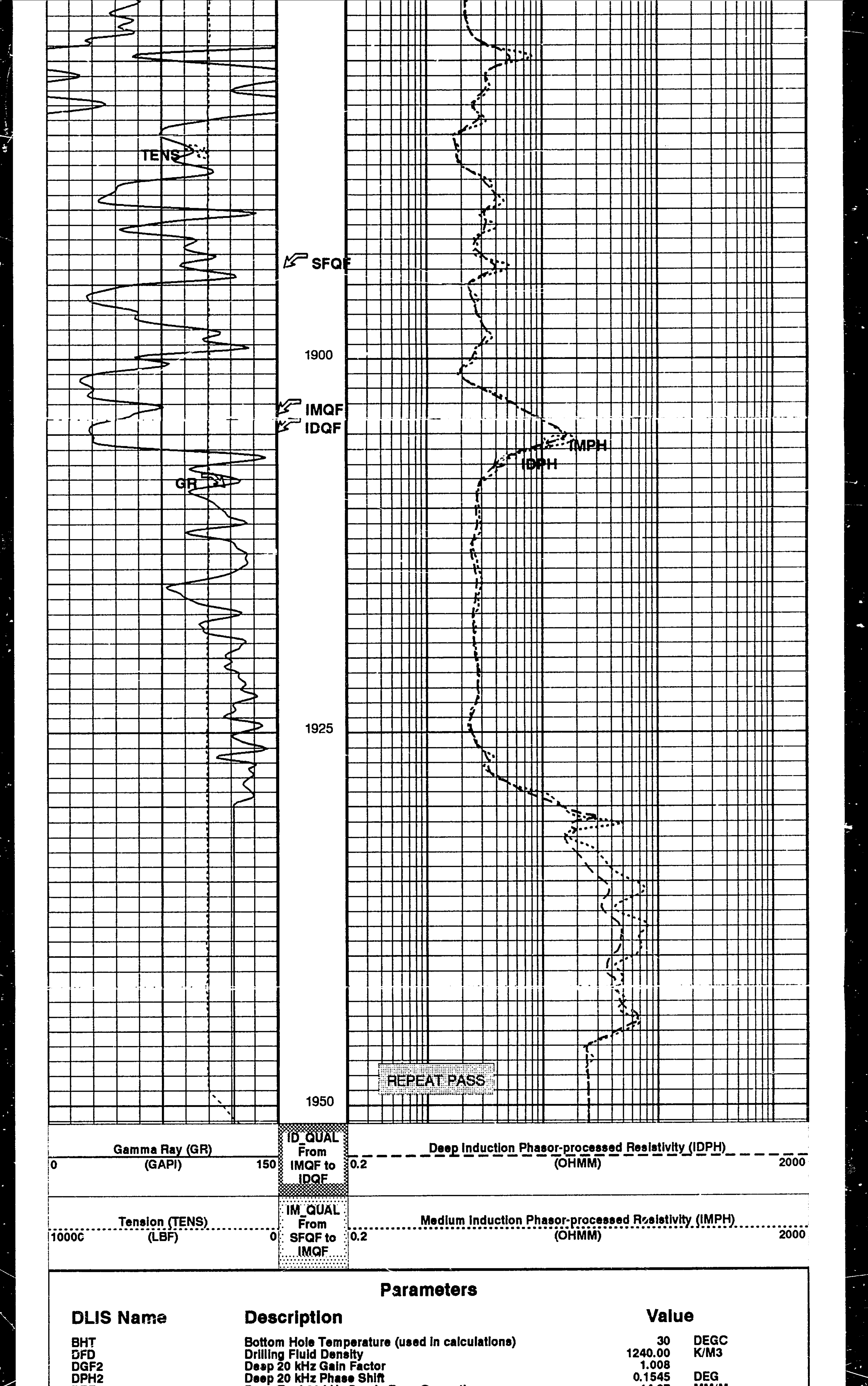
MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
BHT	49 DEGC	30 DEGC	1944.5 22:39:05





Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	30	DEGC
DFD	Drilling Fluid Density	1240.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.008	
DPH2	Deep 20 kHz Phase Shift	0.1545	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.27	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	77.45	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.038	
MPH2	Medium 20 kHz Phase Shift	-0.8105	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	20.21	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	29.41	MM/M
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	5	DEGC
TD	Total Depth	1949	M

Format: DITE_LogPhasor Vertical Scale: 1:240 Graphics File Created: 10-Feb-1998 22:36

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Output DLIS Files

DEFAULT DITE .009 FN:6 FIELD 10-Feb-1998 22:36

Output DLIS Files

DEFAULT DITE .008 FN:5 FIELD 10-Feb-1998 22:27 1951.0 M 1855.9 M

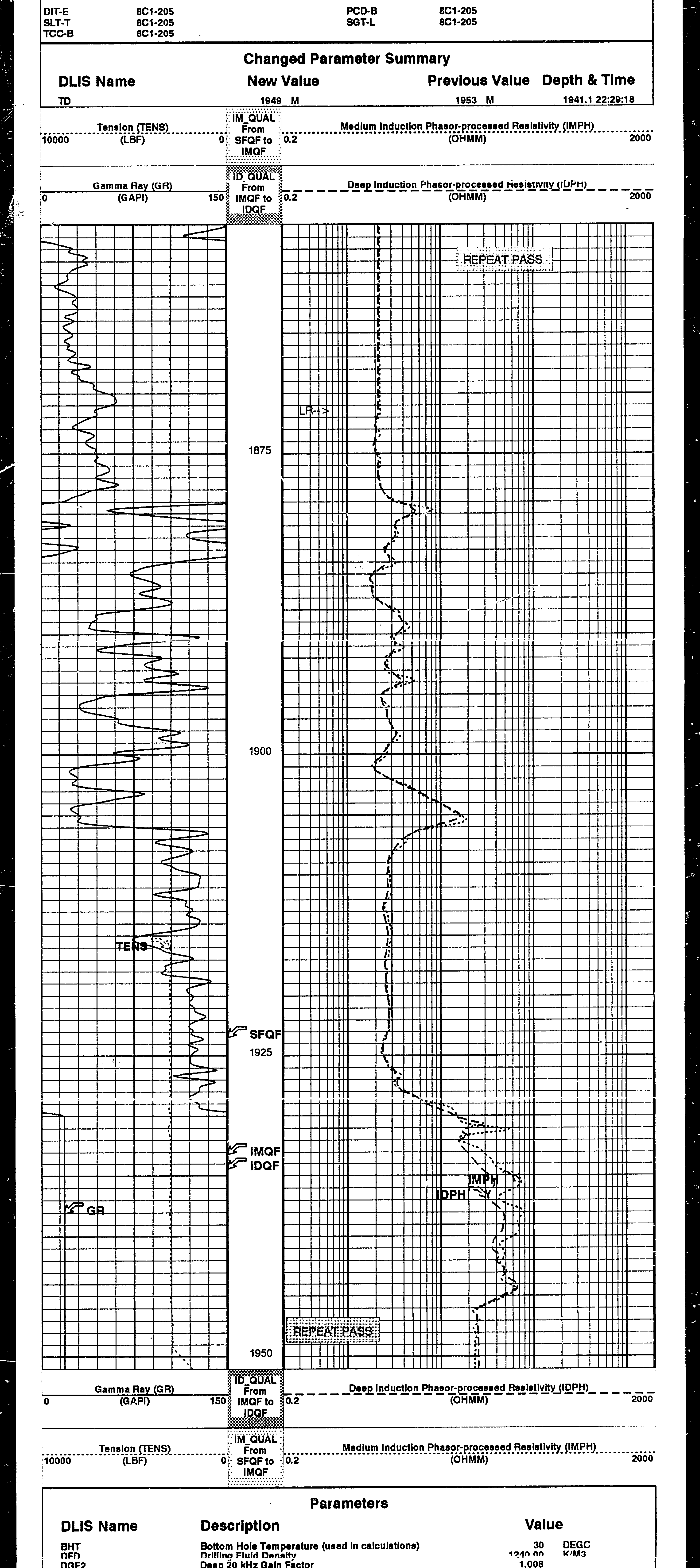
OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
TD	1949 M	1953 M	1941.1 22:29:18



Parameters

DLIS Name	Description	Value	
BHT	Bottom Hole Temperature (used in calculations)	30	DEGC
DFD	Drilling Fluid Density	1240.00	K/M3
DGF2	Deep 20 kHz Gain Factor	1.008	
DPH2	Deep 20 kHz Phase Shift	0.1545	DEG
DRE2	Deep Real 20 kHz Sonde Error Correction	14.27	MM/M
DSR2	Deep Sigma Reference (20 kHz)	1843	MM/M
DXE2	Deep Quad 20 kHz Sonde Error Correction	77.45	MM/M
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
IFRS	DIT-E Induction Frequency Selector	20	
IPHA	DIT-E Phasor Processing Mode	ALL	
IPRO	DIT-E Induction Processing Selector	PHASOR	
ITEN	DIT-E Temperature Enable	ENABLE	
MGF2	Medium 20 kHz Gain Factor	1.038	
MPH2	Medium 20 kHz Phase Shift	-0.8105	DEG
MRE2	Medium Real 20 kHz Sonde Error Correction	20.21	MM/M
MSR2	Medium Sigma Reference (20 kHz)	3250	MM/M
MXE2	Medium Quad 20 kHz Sonde Error Correction	29.41	MM/M
SFCR	SFL Channel Ratio	1000	
SHT	Surface Hole Temperature	5	DEGC
TD	Total Depth	1953	M

Format: DITE_LogPhasor Vertical Scale: 1:240 Graphics File Created: 10-Feb-1998 22:27

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Output DLIS Files

DEFAULT DITE .008 FN:5 FIELD 10-Feb-1998 22:27

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Powered Caliper Device - B Wellsite Calibration - Large Arm Calibration							
Before: Feb 09 08:46 1998							
Large Arm Small Ring	203.2	N/A	182.8	N/A	N/A	N/A	MM
Large Arm Large Ring	304.8	N/A	277.7	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Small Arm Calibration							
Before: Calibration not done							
Small Arm Small Gauge	25.40	N/A	N/A	N/A	N/A	N/A	MM
Small Arm Large Gauge	127.0	N/A	N/A	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Micro Inverse Calibration							
Before: Calibration not done							
Micro Inverse Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Inverse Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM
Powered Caliper Device - B Wellsite Calibration - Micro Normal Calibration							
Before: Calibration not done							
Micro Normal Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Normal Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM
Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration							
Before: Feb 09 07:59 1998							
Gamma Ray Background	30.00	N/A	18.24	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	150.9	N/A	150.9	N/A	N/A	13.72	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

Dual Induction - E / Equipment Identification

Primary Equipment:		
Dual Induction Sonde	DIS - HB	81
Dual Induction Cartridge	DIC - EB	83
Auxiliary Equipment:		
Mass Isolated Housing	MIH - ZA	66

Dual Induction - E Wellsite Calibration

Induction Electronics (10 kHz)

Phase	Measurement	Value	(Minimum)	(Nominal)	(Maximum)
Before	ID Elect Real Offset 10 kHz MM/M	27.21	-275.3	24.74	324.7
Before	ID Elect Real Gain 10 kHz	1.009	0.8019	0.9519	1.132
Before	ID Elect Phase 10 kHz DEG	-1.157	-2.516	7.484	17.48
Before	ID Elect Quad Offset 10 kHz MM/M	30.50	-269.5	30.50	330.5
Before	ID Elect Quad Gain 10 kHz	1.016	0.8091	0.9591	1.142
Before	IM Elect Phase 10 kHz DEG	1.503	0.2584	10.26	20.26
Before	IM Elect Real Offset 10 kHz MM/M	38.55	-514.7	35.32	585.3
Before	IM Elect Real Gain 10 kHz	0.9550	0.7631	0.9131	1.077
Before	IM Elect Quad Offset 10 kHz MM/M	91.15	-466.5	83.45	633.5
Before	IM Elect Quad Gain 10 kHz	0.9790	0.7816	0.9316	1.103

Before: Feb 10 21:36 1998

Dual Induction - E Wellsite Calibration

Induction Electronics (20 kHz)

Phase	Measurement	Value	(Minimum)	(Nominal)	(Maximum)
Before	ID Elect Real Offset 20 kHz MM/M	10.35	-115.6	9.365	134.4
Before	ID Elect Real Gain 20 kHz	1.004	0.8002	0.9502	1.130
Before	ID Elect Phase 20 kHz DEG	-10.30	-10.55	4.449	19.45
Before	ID Elect Quad Offset 20 kHz MM/M	12.00	-113.1	11.92	136.9
Before	ID Elect Quad Gain 20 kHz	1.011	0.8073	0.9573	1.140
Before	IM Elect Phase 20 kHz DEG	-7.044	-7.205	7.795	22.80
Before	IM Elect Real Offset 20 kHz MM/M	15.63	-210.6	14.36	239.4
Before	IM Elect Real Gain 20 kHz	0.9896	0.7942	0.9442	1.121
Before	IM Elect Quad Offset 20 kHz MM/M	37.20	-190.8	34.17	259.2
Before	IM Elect Quad Gain 20 kHz	1.014	0.8135	0.9635	1.148

Before: Feb 10 21:37 1998

Dual Induction - E Wellsite Calibration

Induction Electronics (40 kHz)

Phase	Measurement	Value	(Minimum)	(Nominal)	(Maximum)
Before	ID Elect Real Offset 40 kHz MM/M	6.817	-78.99	6.012	91.01
Before	ID Elect Real Gain 40 kHz	0.9958	0.7797	0.9297	1.101
Before	ID Elect Phase 40 kHz DEG EXCEEDS LIMIT	-9.239	-2.895	17.11	37.11
Before	ID Elect Quad Offset 40 kHz MM/M	8.131	-77.16	7.836	92.84
Before	ID Elect Quad Gain 40 kHz	1.002	0.7862	0.9362	1.110
Before	IM Elect Phase 40 kHz DEG EXCEEDS LIMIT	-6.227	0.1917	20.19	40.19
Before	IM Elect Real Offset 40 kHz MM/M	10.38	-120.7	9.331	139.3
Before	IM Elect Real Gain 40 kHz	1.018	0.8021	0.9521	1.132
Before	IM Elect Quad Offset 40 kHz MM/M	24.72	-107.7	22.25	152.3
Before	IM Elect Quad Gain 40 kHz	1.043	0.8213	0.9713	1.159

Before: Feb 10 21:38 1998

Dual Induction - E Wellsite Calibration

SFL Electronics

Phase	Measurement	Value	(Minimum)	(Nominal)	(Maximum)
Before	SFL Voltage Offset MV	1.123	-15.00	0	15.00
Before	SFL Voltage Gain	0.9855	0.8500	1.000	1.200
Before	SFL Current Offset MA	0.03893	-0.6000	0	0.6000
Before	SFL Current Gain	0.9826	0.8500	1.000	1.200

Before: Feb 10 21:39 1998

Dual Induction - E Wellsite Calibration

Electronics Calibration Changes

Files/Depth Intervals: 1: 156.5 - 606.2 7: 628.2 - 517.7 1: 1067.6 - 1923.9 8: 1951.0 - 1855.9 9: 1951.2 - 1857.0 10: 1950.4 - 453.7

Phase	ID (R > 27 OHM-M) MM/M	Value	Phase	ID (R < 27 OHM-M) %	Value	Phase	SFL (R < 1 OHM-M) OHMM	Value
After		0.05337	After		0.0004305	After		0
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)			0 (Minimum) 0 (Nominal) 0.02000 (Maximum)	
Phase	IM (R > 27 OHM-M) MM/M	Value	Phase	IM (R < 27 OHM-M) %	Value			
After		0.07583	After		[illegible]			
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)				
Phase	SFL (R > 27 OHM-M) MM/M	Value	Phase	SFL (R < 27 OHM-M) %	Value			
After	EXCEEDS LIMIT	1.020	After	EXCEEDS LIMIT	3.309			
	0 (Minimum) 0 (Nominal) 0.7500 (Maximum)			0 (Minimum) 0 (Nominal) 2.000 (Maximum)				

After: Feb 11 00:23 1998

Powered Caliper Device - B / Equipment Identification

Primary Equipment:		
Powered Caliper Cartridge - H	PCC - H	
Powered Caliper Mechanical (sonde) - A	PCM - A	1077
Auxiliary Equipment:		
Powered Caliper Housing - A	PCH - A	

Powered Caliper Device - B Wellsite Calibration

Micro Inverse Calibration

Phase	Micro Inverse Zero OHMM	Value	Phase	Micro Inverse Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Powered Caliper Device - B Wellsite Calibration

Micro Normal Calibration

Phase	Micro Normal Zero OHMM	Value	Phase	Micro Normal Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Scintillation Gamma-Ray - L / Equipment Identification

Primary Equipment:		
Scintillation Gamma Cartridge	SGC - SA	1048
Scintillation Gamma Detector	SGD - TAA	
Auxiliary Equipment:		
Scintillation Gamma Housing	SGH - K	530
Gamma Source Radioactive	GSR - U/Y	

Scintillation Gamma-Ray - L Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		18.24	Before		150.9	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			137.2 (Minimum) 150.9 (Nominal) 164.7 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: Feb 09 07:59 1998

COMPANY	RANGER OIL LIMITED	BOTTOM LOG INTERVAL	1945.8 M
		SCHLUMBERGER DEPTH	1949 M
WELL	RANGER NOTA CREEK C-17	DEPTH DRILLER	1953 M
FIELD	NOTA CREEK	KELLY BUSHING	172.22 M
TERRITORY	N.W.T.	DRILL FLOOR	171.92 M
		GROUND LEVEL	168.22 M

Schlumberger

PHASOR INDUCTION SFL

Source Reference: CALGARY DATA COMMUNICATION CENTER (10FEB98.106)
Software Version:
Distribution of this LOGNET Product:

SCHLUMBERGER OF CANADA
23 FLOOR COMPUTER ROOM
801 6 AVE S.W.
CALGARY, ALBERTA
PHONE: 509-4050
Attn:
PETER GOETZ OFFICE:403 232 5291

NATIONAL ENERGY BOARD
[illegible]

LOG - **SCHLUMBERGER LOGNET**
COMPANY - **RANGER OIL (CANADA) LTD**
WELL - **RANGER NOTA CREEK C-17**

LOGNET
Communications Network

Schlumberger

SONIC
NEUTRON
DENSITY

1831

N.E.B. COPY

COMPANY: RANGER OIL LIMITED
WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

9211-R6-2-1

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

TERRITORY: N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

LOCATION: C-17-65-10-126

Elev.: K.B. 172.22 M
G.L. 168.22 M
D.F. 171.92 M

Permanent Datum: GROUND LEVEL — Elev.: 168.22 M
Log Measured From: KELLY BUSHING — 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	13-JAN-1998			
Run Number	1			
Depth Driller	589 M			
Schlumberger Depth	588.2 M			
Bottom Log Interval	574.6 M			
Top Log Interval	163 M			
Casing Driller Size @ Depth	339.000 MM	@ 164 M	@	
Casing Schlumberger	163 M			
Bit Size	311.000 MM			
Type Fluid In Hole	GEL CHEM			
MUD Density / Viscosity	1320 K/M3	65 S		
Fluid Loss / PH	12 C3	9		
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	1.310 OHMM	@ 2 DEGC	@	
RMF @ Measured Temperature	0.750 OHMM	@ 10 DEGC	@	
RMC @ Measured Temperature	0.380 OHMM	@ 7 DEGC	@	
Source RMF / RMC	PRESS	PRESS		
RM @ MRT / RMF @ MRT	0.598 @ 30	0.459 @ 30	@	@
Maximum Recorded Temperatures	30 DEGC			
Circulation Stopped / Time	13-JAN-1998	3:00		
Logger On Bottom / Time	13-JAN-1998	09:00		
Unit Number / Location	2	NORMAN WELLS		
Recorded By	GREG MCISAAC			
Witnessed By	HENRI WENNEKERS			

CORRECTED LOG

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@	@	@	@
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density / Viscosity				
Fluid Loss / PH				
Source Of Sample				
RM @ Measured Temperature	@	@	@	@
RMF @ Measured Temperature	@	@	@	@
RMC @ Measured Temperature	@	@	@	@
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@	@	@	@
Maximum Recorded Temperatures				
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location				
Recorded By				
Witnessed By				

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1
OS1: PHSFL
OS2: NEUTRON-DENSITY
OS3:
OS4:
OS5:

OTHER SERVICES2
OS1:
OS2:
OS3:
OS4:
OS5:

REMARKS: RUN NUMBER 1
INDUCTION SONIC COMBINATION
38 MM STANDOFFS USED ON DITE
CME=Z CENTRALIZERS USED ON SONIC

REMARKS: RUN NUMBER 2

RUN 1
SERVICE ORDER #: 1210868
PROGRAM VERSION: 8C1-205
FLUID LEVEL: 0 M

LOGGED INTERVAL	START	STOP

RUN 2
SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

RUN 2

SURFACE EQUIPMENT

SLM-EB 1372
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT

TCC-B
ECH-KC 2319
TCC-B 319

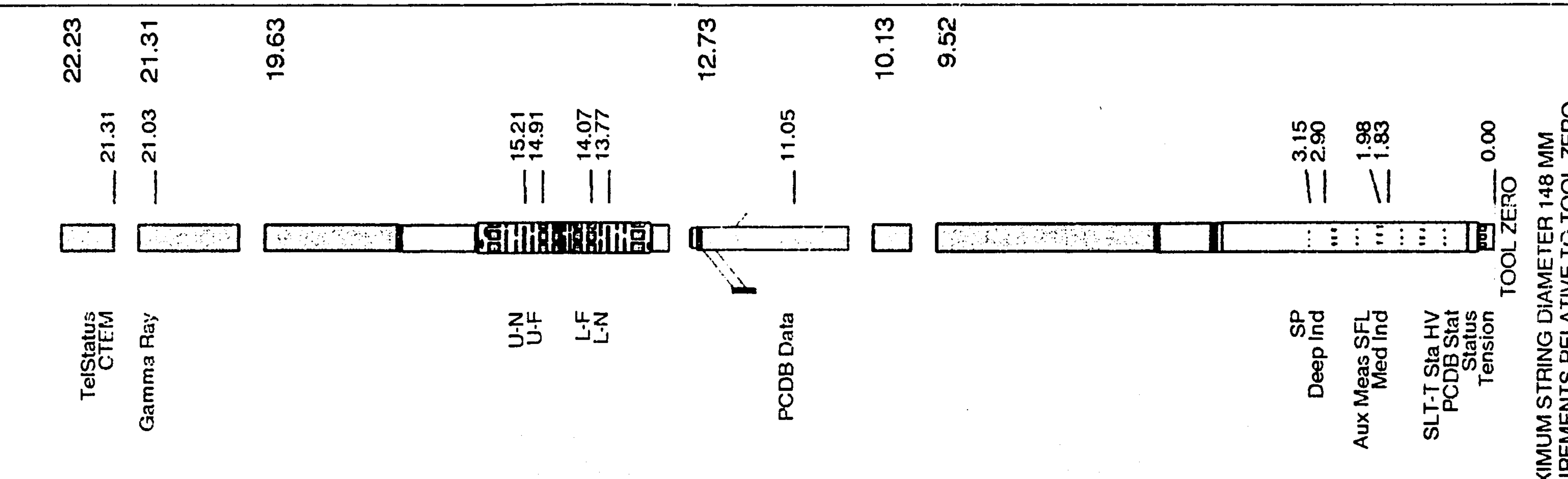
SGT-L
SGH-K 530
SGC-SA 1048
SGD-TAA

SLT-T
SLC-UA 215
ECH-KM 40
SLS-WA 1483

PCD-B
PCM-A 1077
PCH-A
PCC-H

AH-107
AH-107

DIT-E
DIC-EB 83
MIH-ZA 66
DIS-HB 81



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Input DLIS Files

DEFAULT	DITE .009	FN:7	FIELD	13-Jan-1998 09:58	590.5 M	22.3 M

Output DLIS Files

DEFAULT	DITE .053	FN:49	FIELD	15-Jan-1998 16:15	590.5 M	22.3 M

Integrated Hole/Cement Volume Summary

Hole Volume = 51.73 M3
Cement Volume = 31.73 M3 (assuming 244.50 MM casing O.D.)
Computed from 588.9 M to 163.1 M using data channel(s) HDIA

OP System Version: 8C1-205

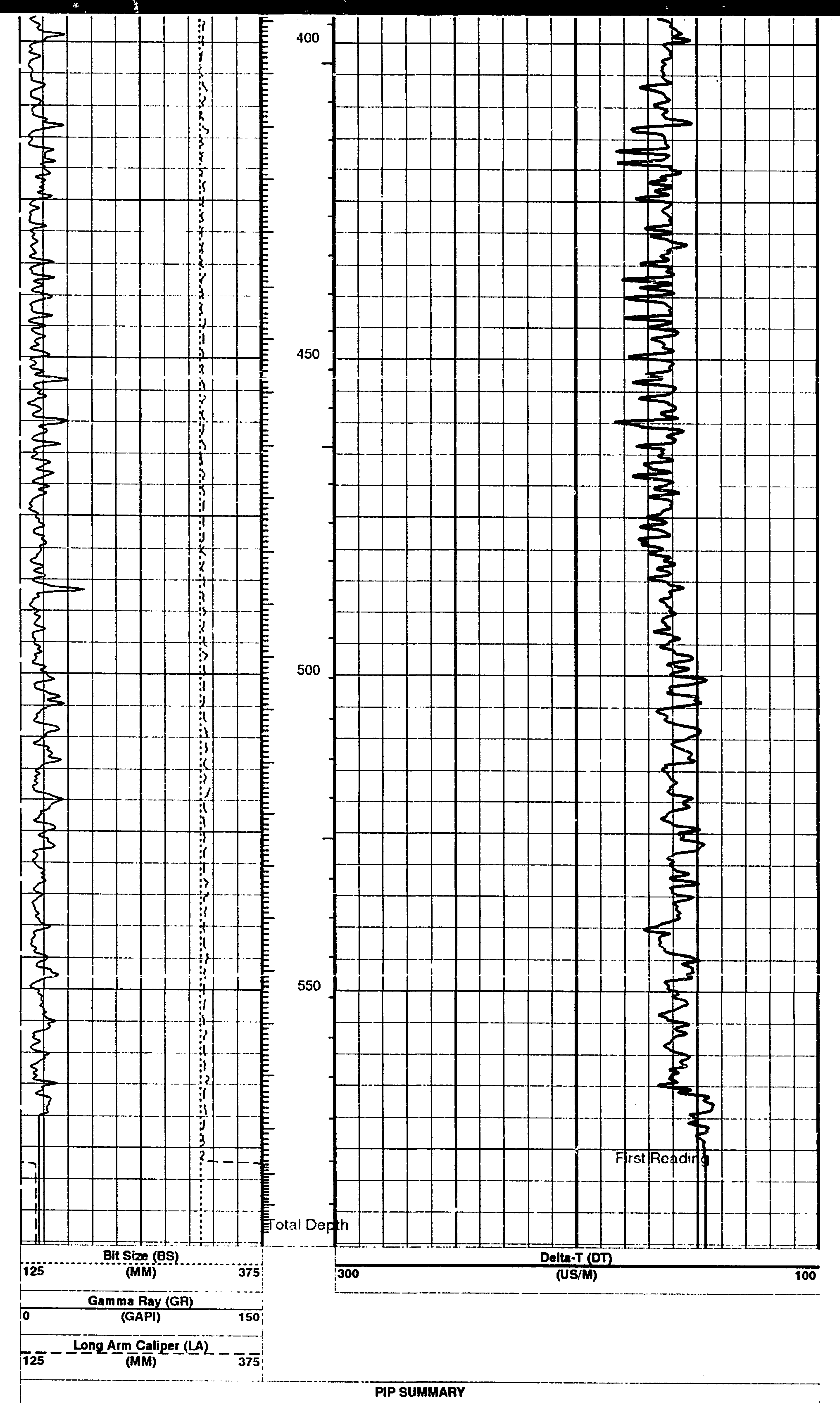
MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S



PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	311.000	MM
DO	Depth Offset	0.0	M
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	
PP	Playback Processing	RECOMPUTE	

Format: SONI_1 Vertical Scale: 1:600 Graphics File Created: 15-Jan-1998 16:15

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	DITE .009	FN:7	FIELD	13-Jan-1998 09:58	590.5 M	22.3 M

Output DLIS Files

DEFAULT	DITE .053	FN:49	FIELD	15-Jan-1998 16:15

Input DLIS Files

DEFAULT	DITE .009	FN:7	FIELD	13-Jan-1998 09:58	590.5 M	22.3 M

Output DLIS Files

DEFAULT	DITE .053	FN:49	FIELD	15-Jan-1998 16:15	590.5 M	22.3 M

Integrated Hole/Cement Volume Summary

Hole Volume = 51.73 M3

Cement Volume = 31.73 M3 (assuming 244.50 MM casing O.D.)

Computed from 588.9 M to 163.1 M using data channel(s) HDIA

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	311.000	MM
DO	Depth Offset	0.0	M
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	
PP	Playback Processing	RECOMPUTE	

Format: SONI Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 16:15

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT DITE .009 FN:7 FIELD 13-Jan-1998 09:58 590.5 M 22.3 M

Output DLIS Files

DEFAULT DITE .053 FN:49 FIELD 15-Jan-1998 16:15

Input DLIS Files

DEFAULT DITE .008 FN:6 FIELD 13-Jan-1998 09:41 589.5 M 482.5 M

Output DLIS Files

DEFAULT DITE .050 FN:46 FIELD 15-Jan-1998 15:59 589.5 M 482.5 M

Integrated Hole/Cement Volume Summary

Hole Volume = 13.79 M3

Cement Volume = 8.79 M3 (assuming 244.50 MM casing O.D.)

Computed from 588.9 M to 482.5 M using data channel(s) HDIA

OP System Version: 8C1-205

MCM

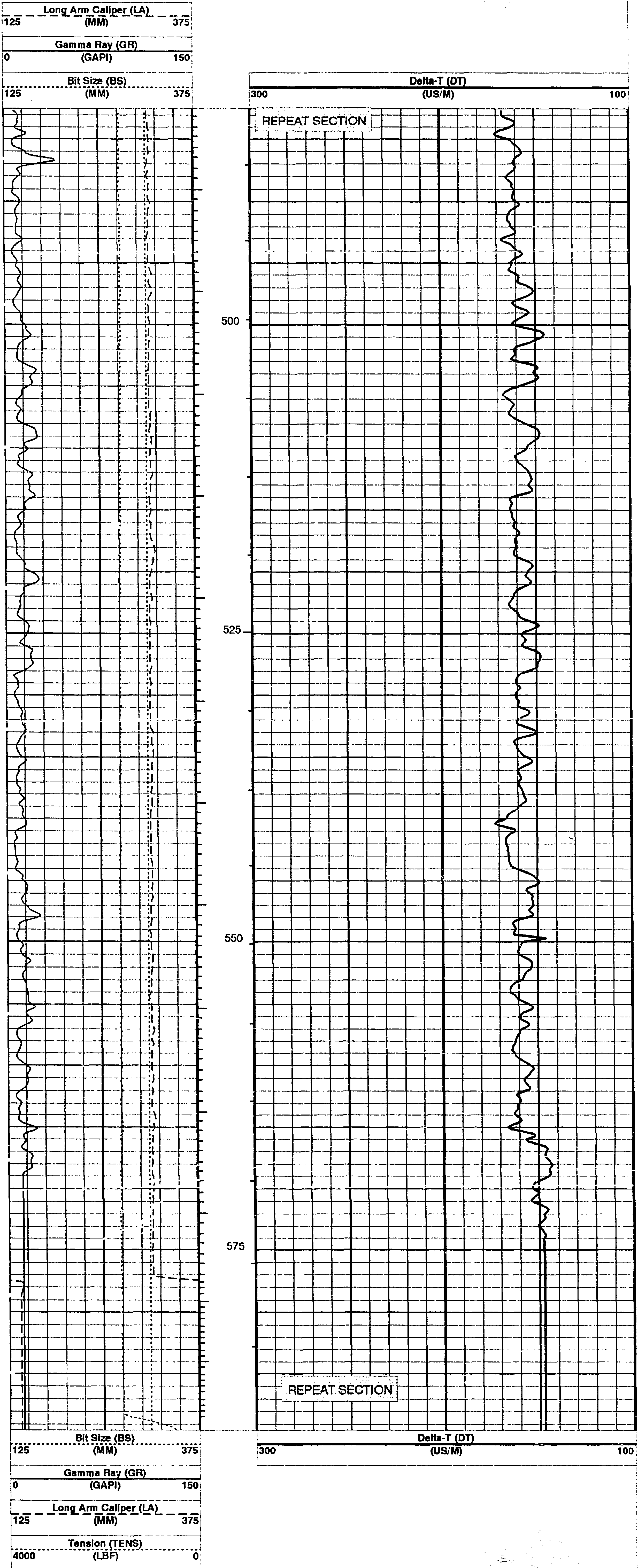
DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Tension (TENS)
4000 (LBF) 0



PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

■ Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	311.000	MM
DO	Depth Offset	0.0	M
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	
PP	Playback Processing	RECOMPUTE	

Format: SONI Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 15:59

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

NATIONAL ENE[illegible]
ENGI[illegible]
JAN 29 [illegible]

Input DLIS Files

DEFAULT	DITE .008	FN:6	FIELD	13-Jan-1998 09:41	589.5 M	482.5 M

Output DLIS Files

DEFAULT	DITE .050	FN:46	FIELD	15-Jan-1998 15:59

COMPANY RANGER OIL LIMITED
WELL RANGER NOTA CREEK C-17
FIELD NOTA CREEK
TERRITORY N.W.T.

BOTTOM LOG INTERVAL	574.6 M
SCHLUMBERGER DEPTH	588.2 M
DEPTH DRILLER	589 M
KELLY BUSHING	172.22 M
DRILL FLOOR	171.92 M
GROUND LEVEL	168.22 M

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

N.E.B. COPY

1831

COMPANY: RANGER OIL LIMITED
WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

TERRITORY: N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

LOCATION	C-17-65-10-126	Elev.:	K.B. 172.22 M G.L. 168.22 M D.F. 171.92 M
Permanent Datum:	GROUND LEVEL	Elev.:	168.22 M
Log Measured From:	KELLY BUSHING	4.0 M	above Perm. Datum
Drilling Measured From:	KELLY BUSHING		

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	10-FEB-1998			
Run Number	2			
Depth Driller	1953 M			
Schlumberger Depth	1949 M			
Bottom Log Interval	1934.4 M			
Top Log Interval	589 M			
Casing Driller Size @ Depth	244.500 MM	@ 589 M		@
Casing Schlumberger	589 M			
Bit Size	222.000 MM			
Type Fluid In Hole	INVERT			
MUD Density | Viscosity	1240 K/M3	80 S		
Fluid Loss | PH				
Source Of Sample				
RM @ Measured Temperature		@		@
RMF @ Measured Temperature		@		@
RMC @ Measured Temperature		@		@
Source RMF | RMC				
RM @ MRT | RMF @ MRT	@ 53	@ 53	@	@
Maximum Recorded Temperatures	53			
Circulation Stopped | Time	10-FEB-1998	13:00		
Logger On Bottom | Time	10-FEB-1998	22:30		
Unit Number | Location	2	NORMAN WELLS		
Recorded By	GREG MCISAAC			
Witnessed By	HENRI WENNEKERS			

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@	@	@	@
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density | Viscosity				
Fluid Loss | PH				
Source Of Sample				
RM @ Measured Temperature	@	@	@	@
RMF @ Measured Temperature	@	@	@	@
RMC @ Measured Temperature	@	@	@	@
Source RMF | RMC				
RM @ MRT | RMF @ MRT	@	@	@	@
Maximum Recorded Temperatures				
Circulation Stopped | Time				
Logger On Bottom | Time				
Unit Number | Location				
Recorded By				
Witnessed By				

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OTHER SERVICES1	OTHER SERVICES2
OS1: DISFL	OS1:
OS2: NEUTRON-DENSITY	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
INDUCTION SONIC COMBINATION	
38 MM STANDOFFS USED ON DITE	
CME-Z CENTRALIZERS USED ON SONIC	
CEMENT VOL. BASED ON 177.8 MM PRODUCTION CASING	
CORRELATED TO RUN 1 SONIC LOG DATED 13-JAN-1998	
NO SP, SFL CURVES DUE TO INVERT MUD	
NO MUD SAMPLES DUE TO INVERT MUD	
WASHOUTS RESPONSIBLE FOR SPIKES ON LOG 1184 1225 1235 M	

RUN 1
SERVICE ORDER #: 1210876
PROGRAM VERSION: 8C1-205
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

RUN 2
SERVICE ORDER #:
PROGRAM VERSION:
FLUID LEVEL:

LOGGED INTERVAL	START	STOP

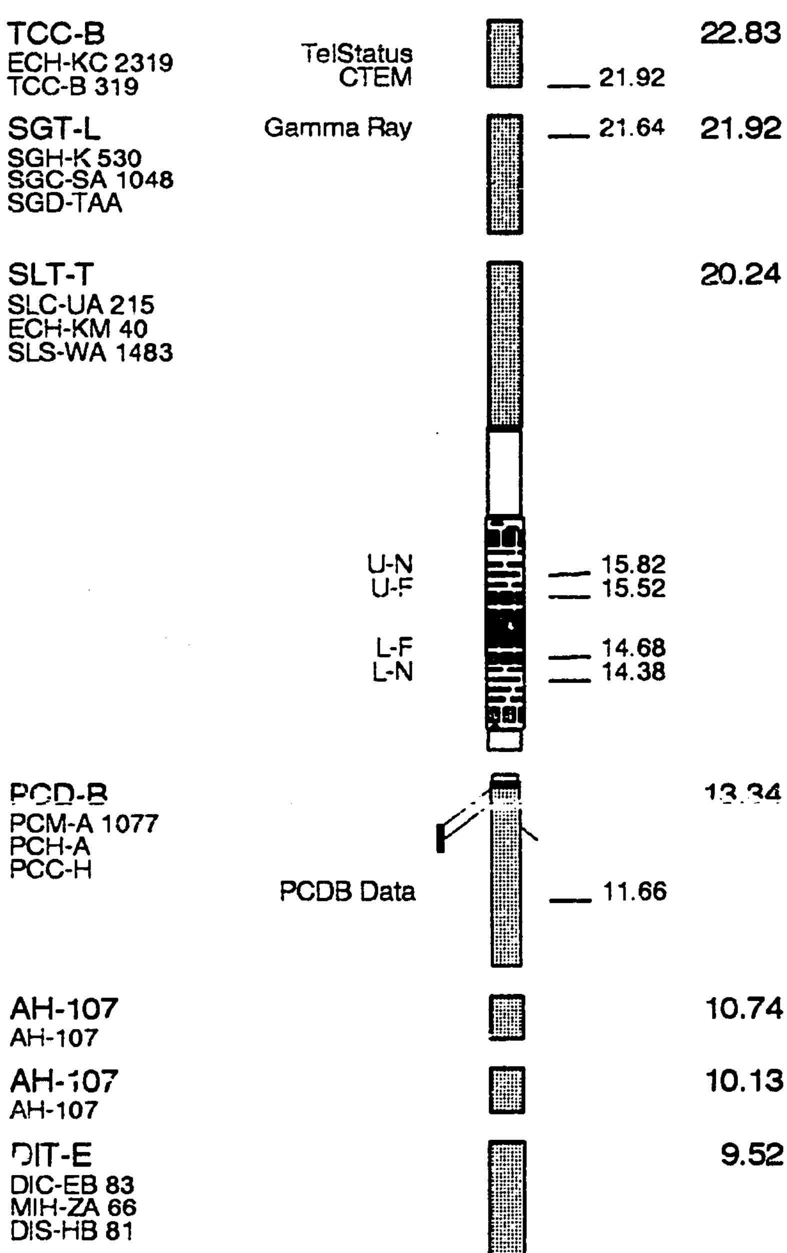
EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

SLM-EB 1372
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

RUN 2

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25	1950.4 M	453.7 M

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

PIP SUMMARY

⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

▶ Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DO	Depth Offset	0.0	M
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	
PP	Playback Processing	RECOMPUTE	

Format: SONI_1 Vertical Scale: 1:600 Graphics File Created: 11-Feb-1998 00:25

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25	1950.4 M	453.7 M

Integrated Hole/Cement Volume Summary

Hole Volume = 70.16 M3

Cement Volume = 36.40 M3 (assuming 177.80 MM casing O.D.)

Computed from 1948.9 M to 589.0 M using data channel(s) HDIA

OP System Version: 8C1-205

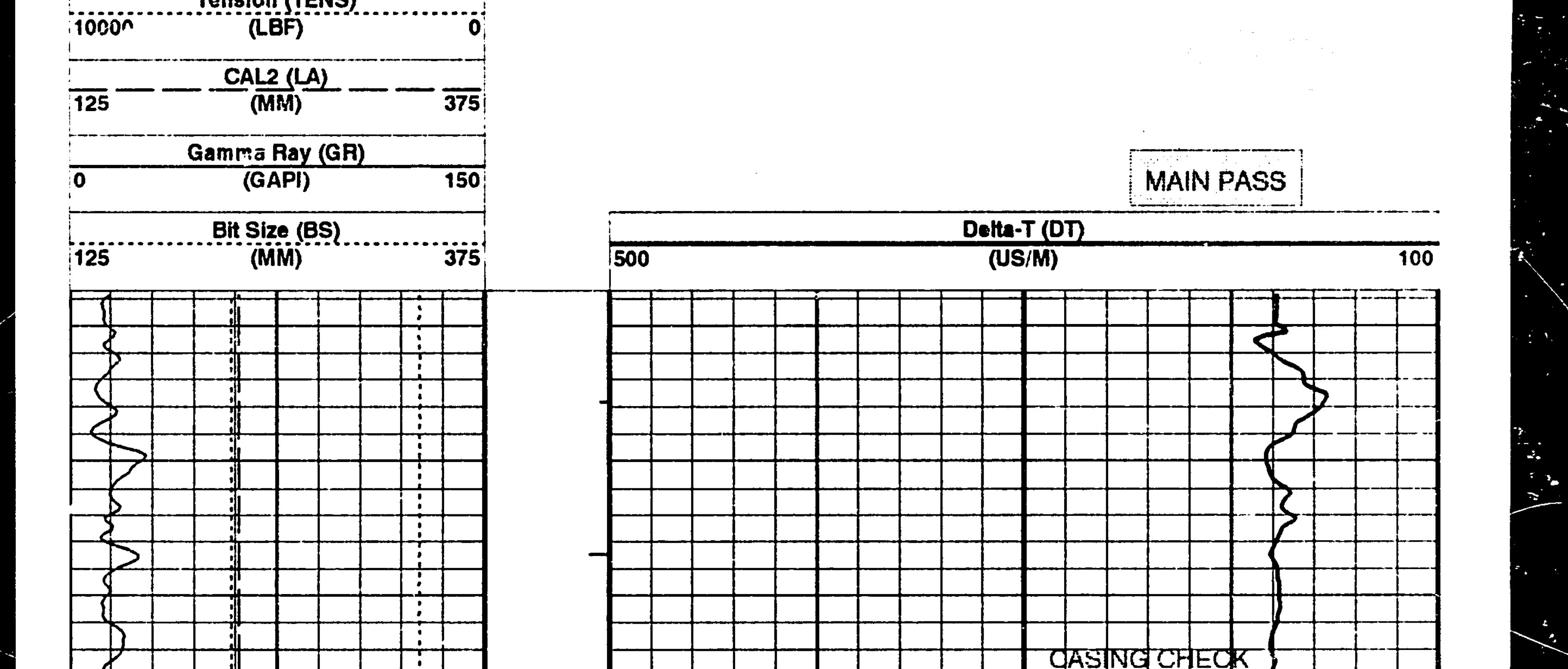
MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

▶ Time Mark Every 60 S



CASING CHECK
DT
475
500
525
550
575
CASING
600
625
650
675
700
725
750
775
800
825
850
TENS
LA
GR
BS

875
900
925
950
975
1000
1025
1050
1075
1100
1125
1150
1175
1200
1225
1250
DT
TENS
LA
GR
BS

1275
1300
1325
1350
1375
1400
1425
1450
1475
1500
1525
1550
1575
1600
1625
1650
D
TENS
LA
GR
BS

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

■ Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DO	Depth Offset	0.0	M
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	
PP	Playback Processing	RECOMPUTE	

Format: SONI Vertical Scale: 1:240 Graphics File Created: 11-Feb-1998 00:25

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	DITE .010	FN:7	FIELD	10-Feb-1998 22:46	1950.4 M	453.7 M

Output DLIS Files

DEFAULT	DITE .013	FN:10	FIELD	11-Feb-1998 00:25

Output DLIS Files

DEFAULT	DITE .009	FN:6	FIELD	10-Feb-1998 22:36	1951.2 M	1857.0 M

Integrated Hole/Cement Volume Summary

Hole Volume = 6.40 M3

Cement Volume = 4.11 M3 (assuming 177.80 MM casing O.D.)

Computed from 1948.9 M to 1857.0 M using data channel(s) HDIA

OP System Version: 8C1-205

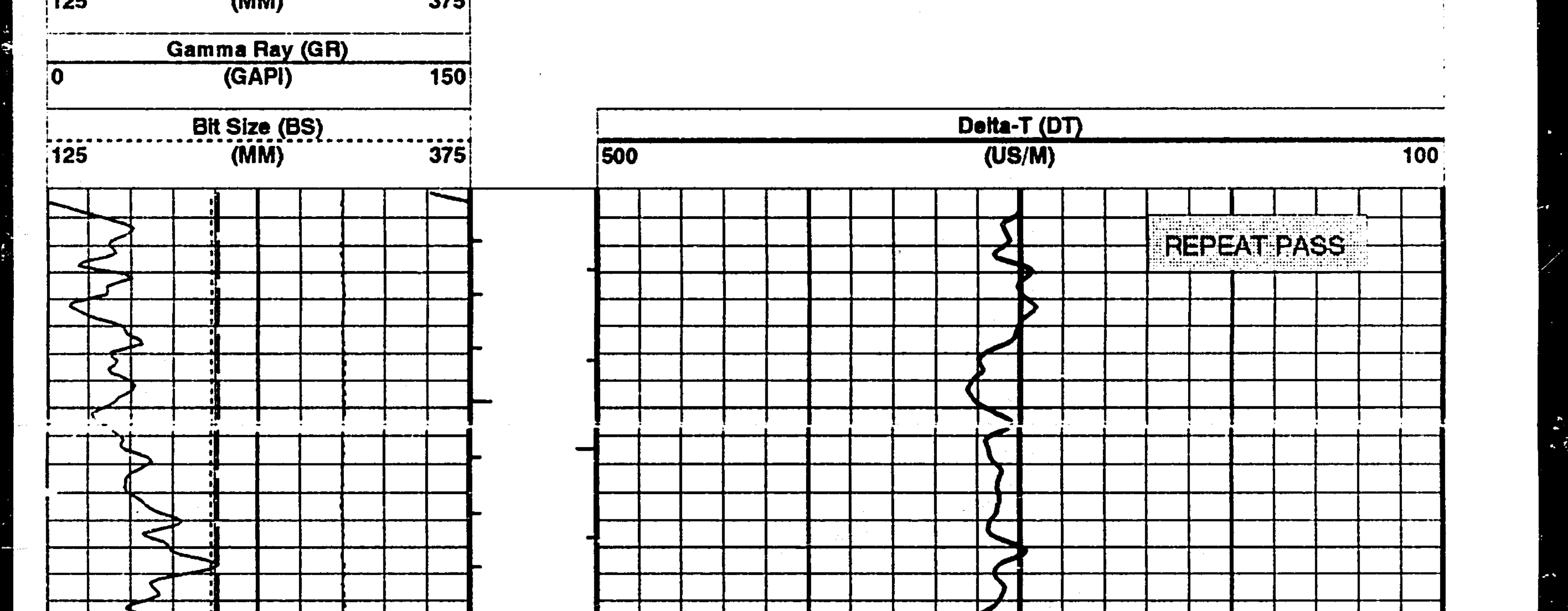
MCM

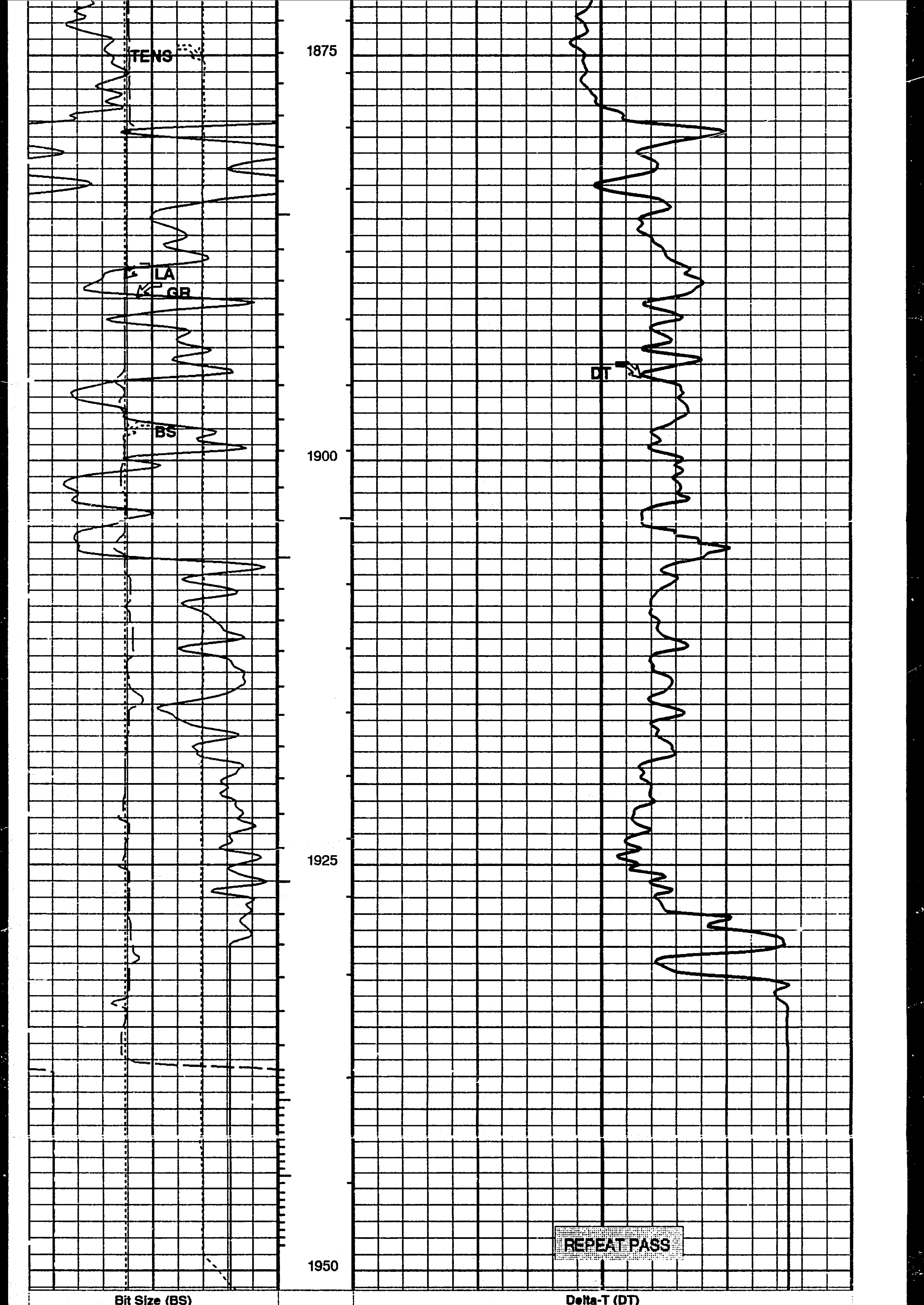
DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

■ Time Mark Every 60 S





Bit Size (BS)		
125	(MM)	375

Gamma Ray (GR)		
0	(GAPI)	150

CAL2 (LA)		
125	(MM)	375

Tension (TENS)		
10000	(LBF)	0

Delta-T (DT)		
500	(US/M)	100

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	

Format: SONI Vertical Scale: 1:240 Graphics File Created: 10-Feb-1998 22:36

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Output DLIS Files

DEFAULT DITE .009 FN:6 FIELD 10-Feb-1998 22:36

Output DLIS Files

DEFAULT DITE .008 FN:5 FIELD 10-Feb-1998 22:27 1951.0 M 1855.9 M

Integrated Hole/Cement Volume Summary

Hole Volume = 6.88 M3
Cement Volume = 4.51 M3 (assuming 177.80 MM casing O.D.)
Computed from 1951.0 M to 1855.9 M using data channel(s) HDIA

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Tension (TENS)		
10000	(LBF)	0

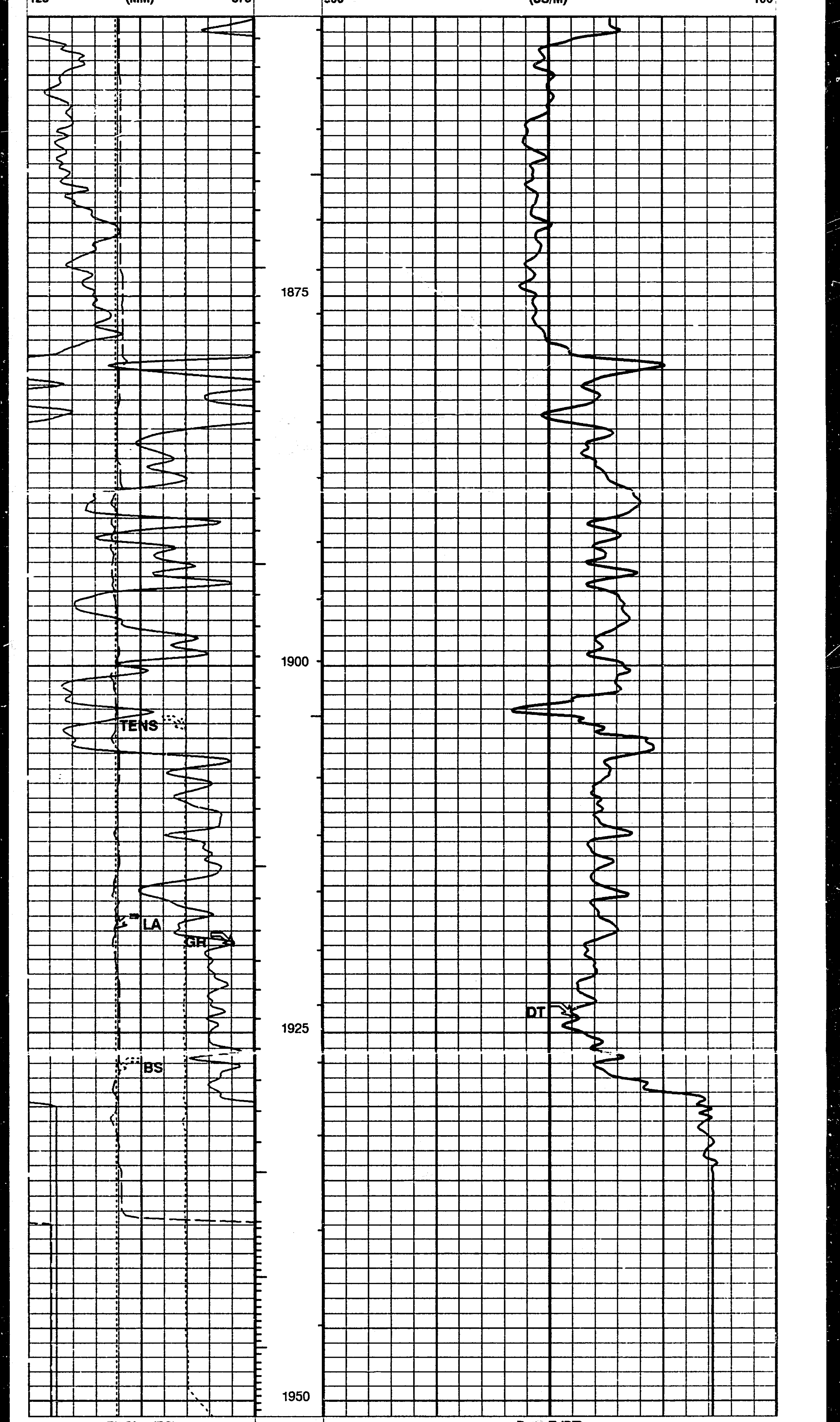
CAL2 (LA)		
125	(MM)	375

Gamma Ray (GR)		
0	(GAPI)	150

Bit Size (BS)		
125	(MM)	375

REPEAT PASS

Delta-T (DT)		
500	(US/M)	100



Bit Size (BS)		
125	(MM)	375

Gamma Ray (GR)		
0	(GAPI)	150

CAL2 (LA)		
125	(MM)	375

Tension (TENS)		
10000	(LBF)	0

Delta-T (DT)		
500	(US/M)	100

REPEAT PASS

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DTCM	Delta-T Computation Mode	FULL	
MODE	Firing Mode	DT	

Format: SONI Vertical Scale: 1:240 Graphics File Created: 10-Feb-1998 22:27

OP System Version: 8C1-205

MCM

DIT-E	8C1-205	PCD-B	8C1-205
SLT-T	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Output DLIS Files

DEFAULT DITE .008 FN:5 FIELD 10-Feb-1998 22:27

COMPANY: RANGER OIL LIMITED

WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

BOTTOM LOG INTERVAL	1334.4 M
SCHLUMBERGER DEPTH	1949 M
DEPTH DRILLER	1953 M
KELLY BUSHING	172.22 M
DRILL FLOOR	171.92 M
GROUND LEVEL	168.22 M

Schlumberger

BOREHOLE COMPENSATED SONIC LOG

Source Reference: CALGARY DATA COMMUNICATION CENTER (10FEB98.107)
Software Version:
Distribution of this LOGNET Product:

SCHLUMBERGER OF CANADA
23 FLOOR COMPUTER ROOM
801 6 AVE S.W.
CALGARY, ALBERTA
PHONE: 509-4050
Attn:
PETER GOETZ OFFICE:403 232 5291

[illegible]
FEB 1 3 [illegible]

LOG - SCHLUMBERGER LOGNET
COMPANY - RANGER OIL (CANADA) LTD
WELL - RANGER NOTA CREEK C-17

LOGNET
Communications Network

Schlumberger

1831

N.E.B. COPY

COMPANY: RANGER OIL LIMITED
WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

TERRITORY: N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

9211-R6-2-1

Schlumberger

COMPENSATED NEUTRON LITHO DENSITY

LOCATION			
C-17-65-10-126	Elev.:	K.B.	172.22 M
		G.L.	168.22 M
		D.F.	171.92 M

Permanent Datum: GROUND LEVEL Elev.: 168.22 M
Log Measured From: KELLY BUSHING 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

CORRECTED LOG

Logging Date		13-JAN-1998			
Run Number		1			
Depth Driller		589 M			
Schlumberger Depth		588.2 M			
Bottom Log Interval		587.9 M			
Top Log Interval		163 M			
Casing Driller Size @ Depth		339.700 MM	@ 164 M	@	
Casing Schlumberger		163 M			
Bit Size		311.000 MM			
Type Fluid In Hole		GEL CHEM			
MUD Density	Viscosity	1320 K/M3	65 S		
MUD Fluid Loss	PH	12 C3	9		
MUD Source Of Sample		FLOWLINE			
RM @ Measured Temperature		1.310 OHMM	@ 2 DEGC	@	
RMF @ Measured Temperature		0.750 OHMM	@ 10 DEGC	@	
RMC @ Measured Temperature		0.380 OHMM	@ 7 DEGC	@	
Source RMF	RMC	PRESS	PRESS		
RM @ MRT	RMF @ MRT	0.576 @ 32	0.442 @ 32	@	@
Maximum Recorded Temperatures		30 DEGC	32		
Circulation Stopped	Time	13-JAN-1998	3:00		
Logger On Bottom	Time	13-JAN-1998	12:45		
Unit Number	Location	2	NORMAN WELLS		
Recorded By		GREG MCISAAC			
Witnessed By		HENRI WENNEKERS			

		Run 1	Run 2	Run 3	Run 4
Logging Date					
Run Number					
Depth Driller					
Schlumberger Depth					
Bottom Log Interval					
Top Log Interval					
Casing Driller Size @ Depth		@	@	@	@
Casing Schlumberger					
Bit Size					
Type Fluid In Hole					
MUD Density	Viscosity				
MUD Fluid Loss	PH				
MUD Source Of Sample					
RM @ Measured Temperature		@	@	@	@
RMF @ Measured Temperature		@	@	@	@
RMC @ Measured Temperature		@	@	@	@
Source RMF	RMC				
RM @ MRT	RMF @ MRT	@	@	@	@
Maximum Recorded Temperatures					
Circulation Stopped	Time				
Logger On Bottom	Time				
Unit Number	Location				
Recorded By					
Witnessed By					

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1: BHC SONIC	OS1:
OS2: PHSFL	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
BOWSPRING USED ON CNT	
90 DEG OFFSETS USED ON LDT	
CEMENT VOL. BASED ON 244.5 MM CASING	

RUN 1		RUN 2	
SERVICE ORDER #:	1210868	SERVICE ORDER #:	
PROGRAM VERSION:	8C1-205	PROGRAM VERSION:	
FLUID LEVEL:	0 M	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

RUN 2

SURFACE EQUIPMENT

NCT-B
CNB-AB
NCS-VB
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT

TCC-B
ECH-KC 2319
TCC-B 319

SGT-L
SGH-K 530
SGC-SA 1048
SGD-TAA

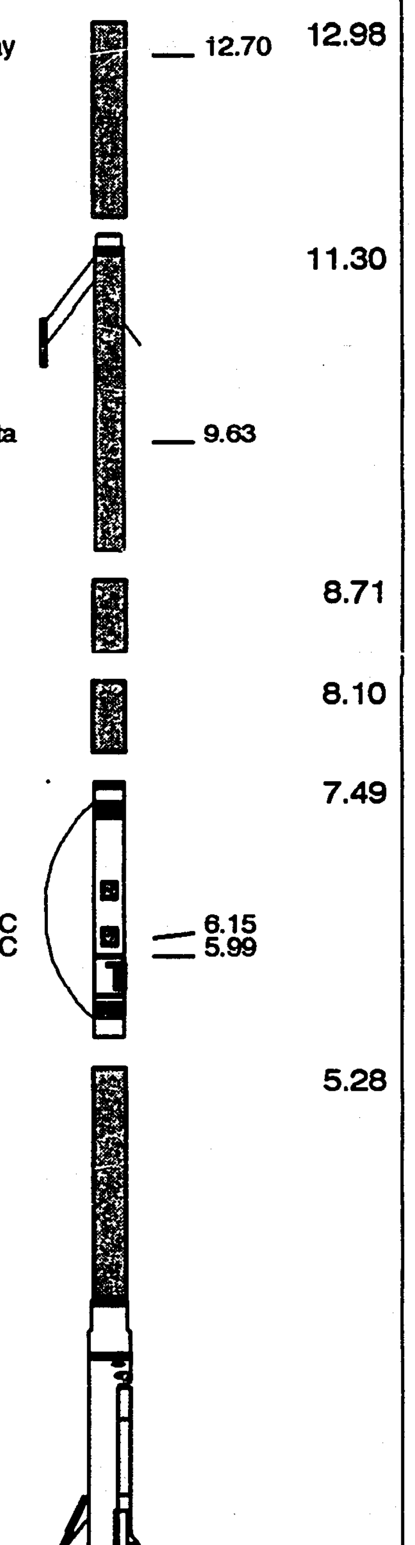
PCD-B
PCM-A 1077
PCH-A
PCC-H

AH-107
AH-107

AH-107
AH-107

CNT-H
NLS-KL
NSR-F 1491
CND-A 1257
CNC-HA
CNH-A 4465
BOW-SPR
NPV-N

LDT-D
GSR-J 2043
PGD-G 2721
NSC-E 1868
ECH-MKA
DRS-C 723
PDH-L 2980



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Input DLIS Files

DEFAULT	LDTD .018	FN:16	FIELD	13-Jan-1998 13:02	588.9 M	22.1 M

Output DLIS Files

DEFAULT	LDTD .048	FN:44	FIELD	15-Jan-1998 15:39	588.7 M	21.9 M

Integrated Hole/Cement Volume Summary

Hole Volume = 32.94 M3
Cement Volume = 12.95 M3 (assuming 244.50 MM casing O.D.)
Computed from 588.7 M to 163.1 M using data channel(s) CALI LA

OP System Version: 8C1-205

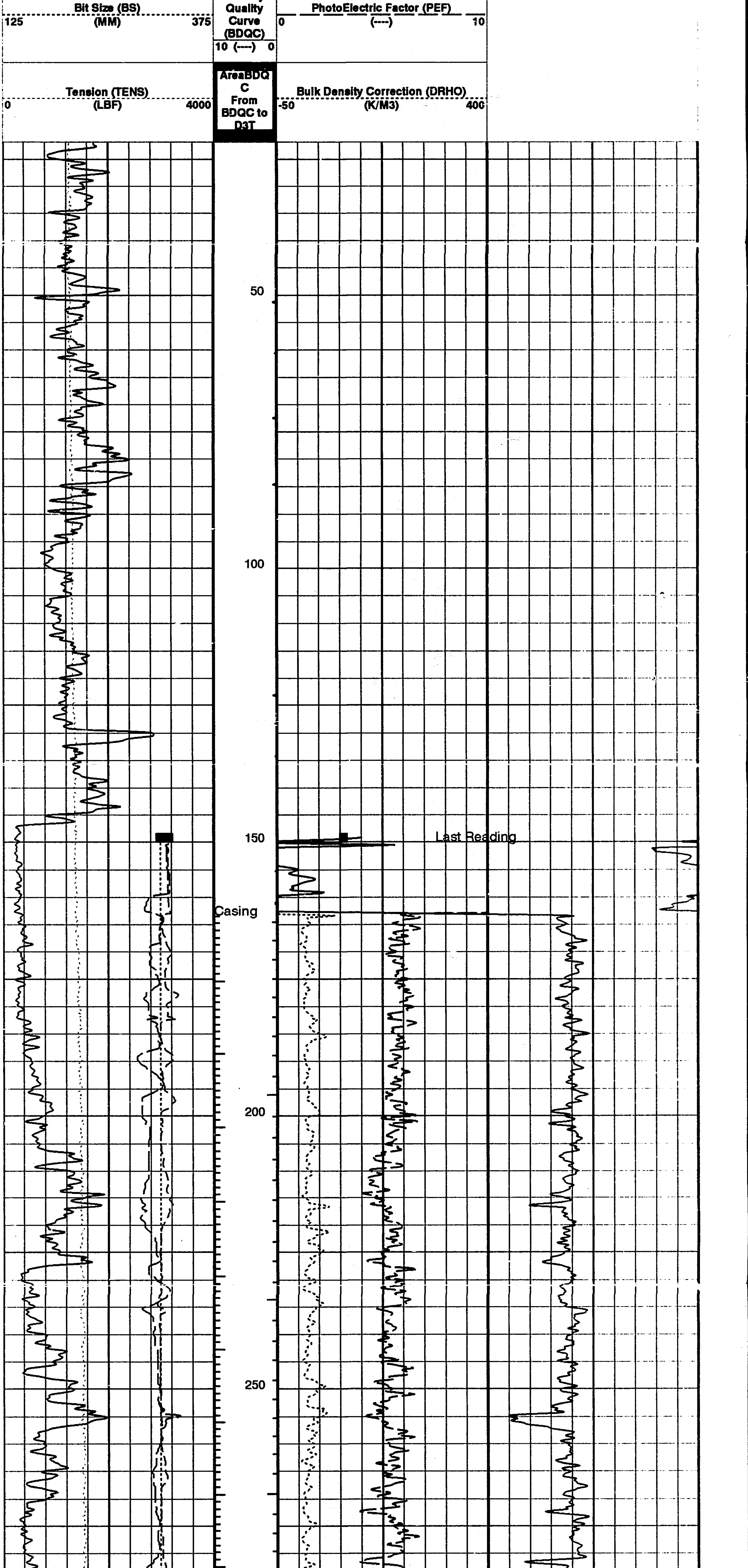
MCM

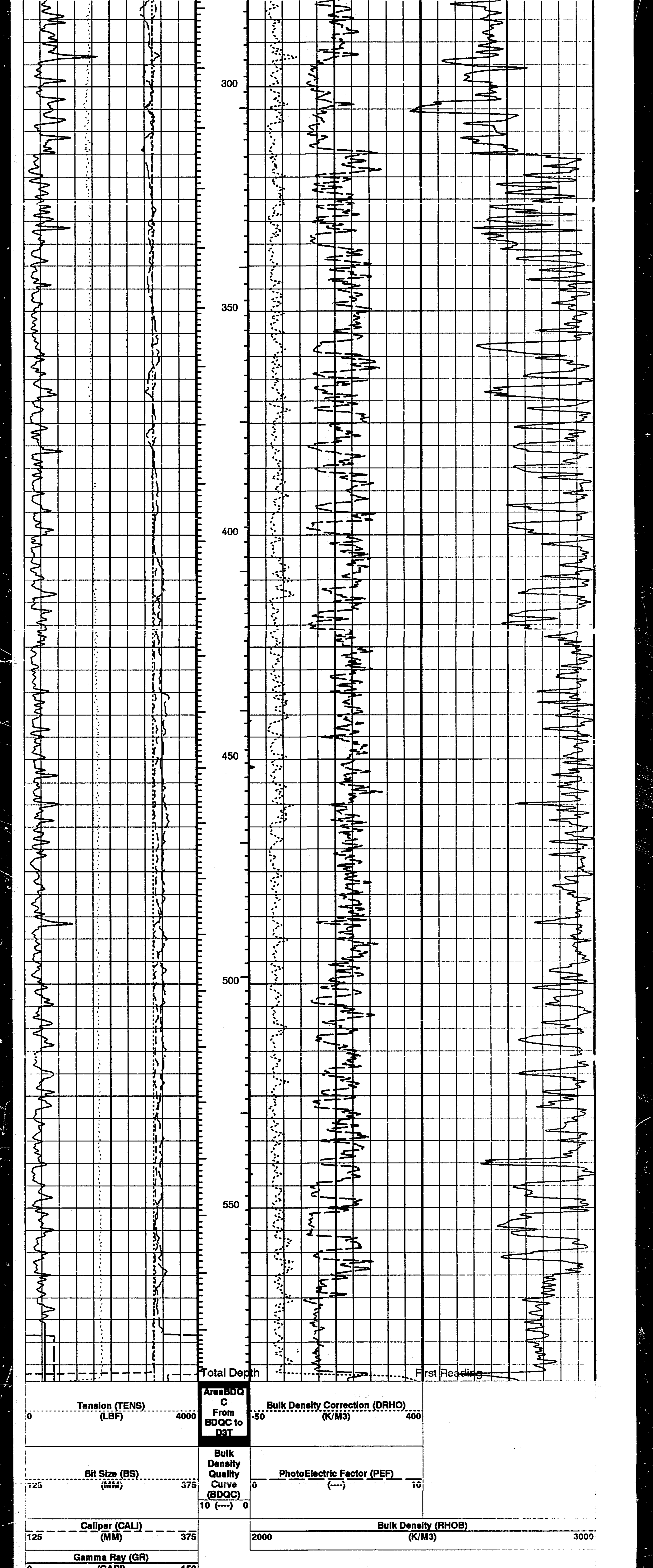
LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

CALIPER (LA) 125 (MM) 375		
Gamma Ray (GR) 0 (GAPI) 150		
Caliper (CALI) 125 (MM) 375		Bulk Density (RHOB) 2000 (K/M3) 3000
Bit Size (BS) 125 (MM) 375	Bulk Density Quality Curve (BDQC) 10 (----) 0	PhotoElectric Factor (PEF) 0 (----) 10
Tension (TENS) 0 (LBF) 4000	AreaBDQC From BDQC to D3T	Bulk Density Correction (DRHO) -50 (K/M3) 400





PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BS	Bit Size	311.000	MM
DHC	Density Hole Correction	BS	
DO	Depth Offset	-0.1	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
MDEN	Matrix Density	2710	K/M3
PP	Playback Processing	RECOMPUTE	
WMUD	Mud Weight	1320	K/M3

Format: DENS Vertical Scale: 1:600 Graphics File Created: 15-Jan-1998 15:39

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	LDTD .018	FN:16	FIELD	13-Jan-1998 13:02	588.9 M	22.1 M

Output DLIS Files

DEFAULT	LDTD .048	FN:44	FIELD	15-Jan-1998 15:39		

Input DLIS Files

DEFAULT	LDTD .018	FN:16	FIELD	13-Jan-1998 13:02	588.9 M	22.1 M

Output DLIS Files

DEFAULT	LDTD .048	FN:44	FIELD	15-Jan-1998 15:39	588.7 M	21.9 M

Integrated Hole/Cement Volume Summary

Hole Volume = 32.94 M3

Cement Volume = 12.95 M3 (assuming 244.50 MM casing O.D.)

Computed from 588.7 M to 163.1 M using data channel(s) CALI LA

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

225
250
275
300
325
350
375
400
425
450
475
500
525
550
575
TD
First Reading
LIMESTONE MDEN=2719
Bulk Density Correction (DRHO) (K/M3) -50 400
Density Porosity (DPHI) (V/V) 0.45 -0.15
Alpha Processed Neutron Porosity (NPOR) (V/V) 0.45 -0.15
PhotoElectric Factor (PEF) (----) 0 10
Tension (TENS) (LBF) 0 4000
Bit Size (BS) (MM) 125 375
Caliper (CALI) (MM) 125 375
Gamma Ray (GR) (GAPI) 0 150
CALIPER (LA) (MM) 125 375

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	311.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	81.00	KG/M
DFD	Drilling Fluid Density	1320.00	K/M3
DHC	Density Hole Correction	BS	
DO	Depth Offset	-0.1	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	2.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	0.7500	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	588.20	M
WMUD	Mud Weight	1320	K/M3

Format: PORO Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 15:39

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT LDTD .018 FN:16 FIELD 13-Jan-1998 13:02 588.9 M 22.1 M

Output DLIS Files

DEFAULT LDTD .048 FN:44 FIELD 15-Jan-1998 15:39

Input DLIS Files

DEFAULT LDTD .017 FN:15 FIELD 13-Jan-1998 12:47 589.3 M 480.5 M

Output DLIS Files

DEFAULT LDTD .045 FN:41 FIELD 15-Jan-1998 15:34 589.2 M 480.4 M

Integrated Hole/Cement Volume Summary

Hole Volume = 8.82 M3
Cement Volume = 3.71 M3 (assuming 244.50 MM casing O.D.)
Computed from 588.9 M to 480.4 M using data channel(s) CALI LA

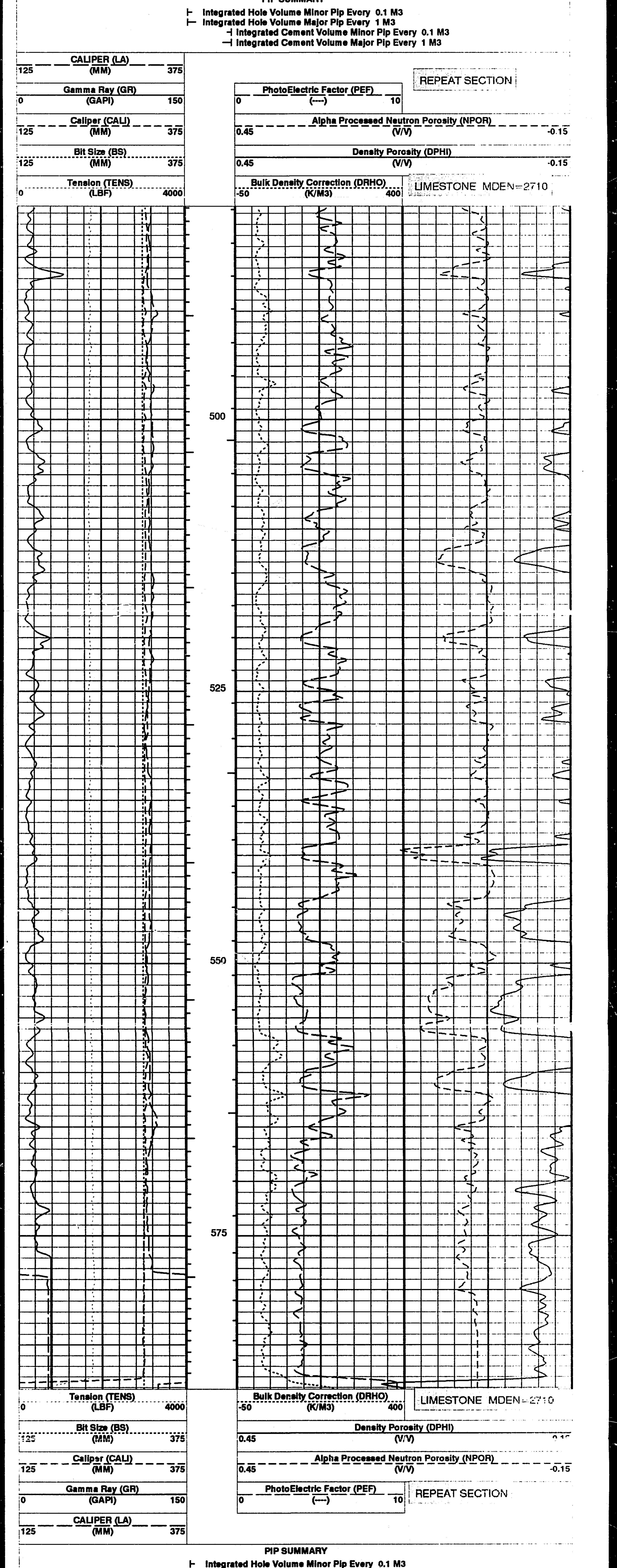
OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3



PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	311.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	81.00	KG/M
DFD	Drilling Fluid Density	1320.00	K/M3
DHC	Density Hole Correction	BS	
DO	Depth Offset	-0.1	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	2.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	0.7500	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	588.20	M
WMUD	Mud Weight	1320	K/M3

Format: PORO Vertical Scale: 1:240 Graphics File Created: 15-Jan-1998 15:34

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT LDTD .017 FN:15 FIELD 13-Jan-1998 12:47 589.3 M 480.5 M

Output DLIS Files

DEFAULT LDTD .045 FN:41 FIELD 15-Jan-1998 15:34

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Litho Density - D Wellsite Calibration - Background Measurement Master: Calibration out of date Dec 06 16:37 1997 Before: Jan 13 12:04 1998 After: Jan 13 14:08 1998							
LL Background	20.00	15.47	15.51	15.41	-0.09605	1.000	CPS
LU Background	76.00	57.26	57.37	56.96	-0.4077	1.000	CPS
LS Background	57.00	44.10	44.19	43.89	-0.2999	1.000	CPS
LITH Background	5.500	4.320	4.320	4.286	-0.03339	0.3000	CPS
SS1 Background	16.00	12.81	12.84	12.80	-0.04659	0.5000	CPS
SS2 Background	11.00	8.898	8.856	8.836	-0.02018	0.5000	CPS
Litho Density - D Wellsite Calibration - Tool Quality Control Information HV Master: Calibration out of date Dec 06 16:37 1997 Before: Jan 13 12:04 1998 After: Jan 13 14:08 1998							
LSHV Background	1500	1337	1344	1335	-8.980	N/A	V
SSHV Background	1500	1327	1344	1327	-16.17	N/A	V
Litho Density - D Wellsite Calibration - Detectors Resolution From BKG Measurments Master: Calibration out of date Dec 06 16:37 1997 Before: Jan 13 12:04 1998 After: Jan 13 14:08 1998							
LS Resolution Background	8.000	8.404	8.449	8.404	-0.04469	N/A	
SS Resolution Background	8.000	8.557	8.610	8.652	0.04282	N/A	
Litho Density - D Wellsite Calibration - Caliper Calibration Before: Jan 13 12:09 1998							
Caliper Small Ring	203.2	N/A	189.1	N/A	N/A	N/A	MM
Caliper Large Ring	304.8	N/A	301.2	N/A	N/A	N/A	MM
Compensated Neutron - H Wellsite Calibration - Zero Measurement Master: Jan 07 14:38 1998 Before: Jan 13 12:03 1998 After: Jan 13 14:02 1998							
CNTC Background	26.73	26.73	27.22	25.77	-1.444	0.1500	CPS
CFTC Background	36.02	36.02	29.79	31.37	1.583	0.1500	CPS
Powered Caliper Device - B Wellsite Calibration - Large Arm Calibration Before: Jan 05 15:49 1998							
Large Arm Small Ring	203.2	N/A	180.3	N/A	N/A	N/A	MM
Large Arm Large Ring	304.8	N/A	279.5	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Small Arm Calibration Before: Calibration not done							
Small Arm Small Gauge	25.40	N/A	N/A	N/A	N/A	N/A	MM
Small Arm Large Gauge	127.0	N/A	N/A	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Micro Inverse Calibration Before: Calibration not done After: Calibration not done							
Micro Inverse Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Inverse Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM
Powered Caliper Device - B Wellsite Calibration - Micro Normal Calibration Before: Calibration not done After: Calibration not done							
Micro Normal Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Normal Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM
Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration Before: Jan 05 16:45 1998 After: Calibration not done							
Gamma Ray Background	30.00	N/A	95.65	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	159.6	N/A	159.6	N/A	N/A	0.09091	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

The CNT Master Calibration Was Done With The Following Parameters :

NCT-B Water Temperature	23.9	DEGC.
Thermal Housing Size	85.725	MM.

Litho Density - D / Equipment Identification

Primary Equipment:		
Nuclear Services Cartridge	NSC - E	1868
Powered Gamma Detector	PGD - G	2721
Gamma Source Radioactive	GSR - J	2043
Auxiliary Equipment:		
Density Resistivity Sonde	DRS - C	723
Electronics Cartridge Housing	ECH - MKA	
Powered Detector Housing	PDH - L	2980

Compensated Neutron - H / Equipment Identification

Primary Equipment:		
Compensated Neutron Cartridge	CNC - HA	
Neutron Detector with Alpha Source	CND - A	1257
Neutron Logging Source	NLS - KL	
Neutron Source Radioactive	NSR - F	1491
Compensated Neutron Box	CNB - AB	
Auxiliary Equipment:		
Compensated Neutron Housing	CNH - A	4465
Neutron Calibration Tank	NCT - B	

Powered Caliper Device - B / Equipment Identification

Primary Equipment:		
Powered Caliper Cartridge - H	PCC - H	
Powered Caliper Mechanical (sonde) - A	PCM - A	1077
Auxiliary Equipment:		
Powered Caliper Housing - A	PCH - A	

Scintillation Gamma-Ray - L / Equipment Identification

Primary Equipment:		
Scintillation Gamma Cartridge	SGC - SA	1048
Scintillation Gamma Detector	SGD - TAA	
Auxiliary Equipment:		
Scintillation Gamma Housing	SGH - K	530
Gamma Source Radioactive	GSR - U/Y	

NATIONAL ENERGY BOARD
ENGINEERING BRANCH
[illegible]

COMPANY	RANGER OIL LIMITED	BOTTOM LOG INTERVAL	587.9 M
		SCHLUMBERGER DEPTH	588.2 M
WELL	RANGER NOTA CREEK C-17	DEPTH DRILLER	589 M
FIELD	NOTA CREEK	KELLY BUSHING	172 22 M
TERRITORY	N.W.T.	DRILL FLOOR	171.92 M
		GROUND LEVEL	168 22 M

Schlumberger

COMPENSATED NEUTRON LITHO DENSITY

N.E.B. COPY 1831

COMPANY: **RANGER OIL LIMITED**
WELL: **RANGER NOTA CREEK C-17**
FIELD: **NOTA CREEK**
TERRITORY: **N.W.T.**

TERRITORY N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

Schlumberger

COMPENSATED NEUTRON LITHO DENSITY

LOCATION
C-17-65-10-126
9211-R6-2-1

Elev.: K.B. 172.22 M
G.L. 168.22 M
D.F. 171.92 M

Permanent Datum: GROUND LEVEL Elev.: 168.22 M
Log Measured From: KELLY BUSHING 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	10-FEB-1998			
Run Number	2			
Depth Driller	1953 M			
Schlumberger Depth	1949 M			
Bottom Log Interval	1948 M			
Top Log Interval	589 M			
Casing Driller Size @ Depth	244.500 MM	@ 589 M		@
Casing Schlumberger	589 M			
Bit Size	222.000 MM			
Type Fluid In Hole	INVERT			
MUD Density / Viscosity	1240 K/M3	80 S		
Fluid Loss / PH				
Source Of Sample				
RM @ Measured Temperature		@		@
RMF @ Measured Temperature		@		@
RMC @ Measured Temperature		@		@
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@ 53	@ 53	@	@
Maximum Recorded Temperatures	53 DEGC			
Circulation Stopped / Time	10-FEB-1998	13:00		
Logger On Bottom / Time	11-FEB-1998	02:45		
Unit Number / Location	2	NORMAN WELLS		
Recorded By	GREG MCISAAC			
Witnessed By	HENRI WENNEKERS			

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@	@	@	@
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density / Viscosity				
Fluid Loss / PH				
Source Of Sample				
RM @ Measured Temperature	@	@	@	@
RMF @ Measured Temperature	@	@	@	@
RMC @ Measured Temperature	@	@	@	@
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@	@	@	@
Maximum Recorded Temperatures				
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location				
Recorded By				
Witnessed By				

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1: DISFL	OS1:
OS2: BHC SONIC	OS2:
OS3: LOGNET	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
CORRELATED TO BHC SONIC DATED 10-FEB-1998	
CNL BOWSPRING AND LDT 90 DEG OFFSETS RUN	
CEMENT VOL. BASED ON 177.8 MM PRODUCTION CASING	
INVERT MUD SYSTEM WITH BARITE ADDED.	

RUN 1		RUN 2	
SERVICE ORDER #:	1210876	SERVICE ORDER #:	
PROGRAM VERSION:	8C1-205	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

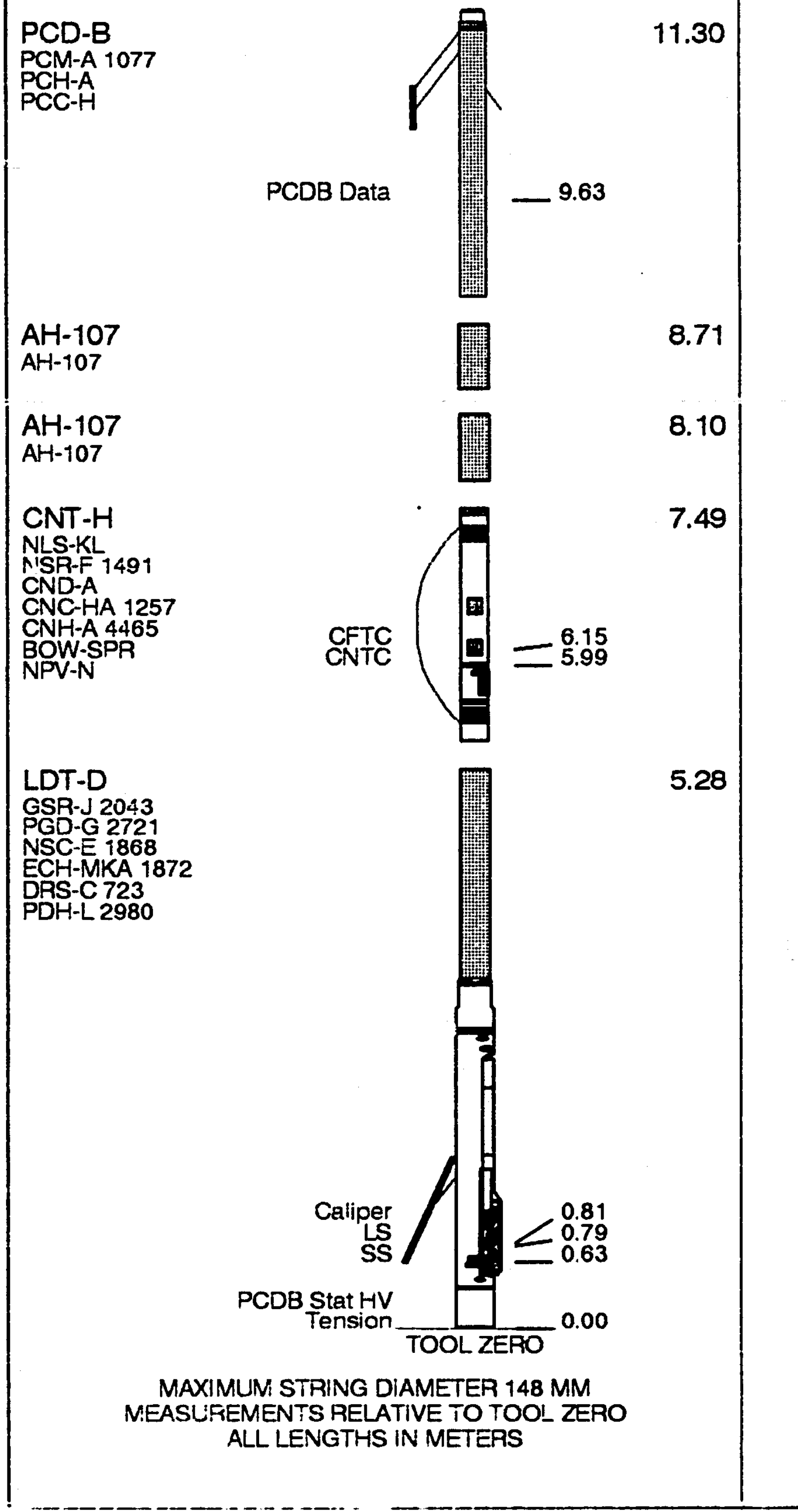
EQUIPMENT DESCRIPTION

RUN 1 RUN 2

SURFACE EQUIPMENT

NCT-B
NCS-VB
GSR-U/Y
TCM-AB

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 148 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Input DLIS Files

DEFAULT	LDTD .022	FN:18	FIELD	11-Feb-1998 05:19	1949.8 M	565.9 M

Output DLIS Files

DEFAULT	LDTD .023	FN:19	FIELD	11-Feb-1998 05:25	1949.8 M	565.9 M

Integrated Hole/Cement Volume Summary

Hole Volume = 52.87 M3
Cement Volume = 19.11 M3 (assuming 177.80 MM casing O.D.)
Computed from 1948.9 M to 589.0 M using data channel(s) CALI LA

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

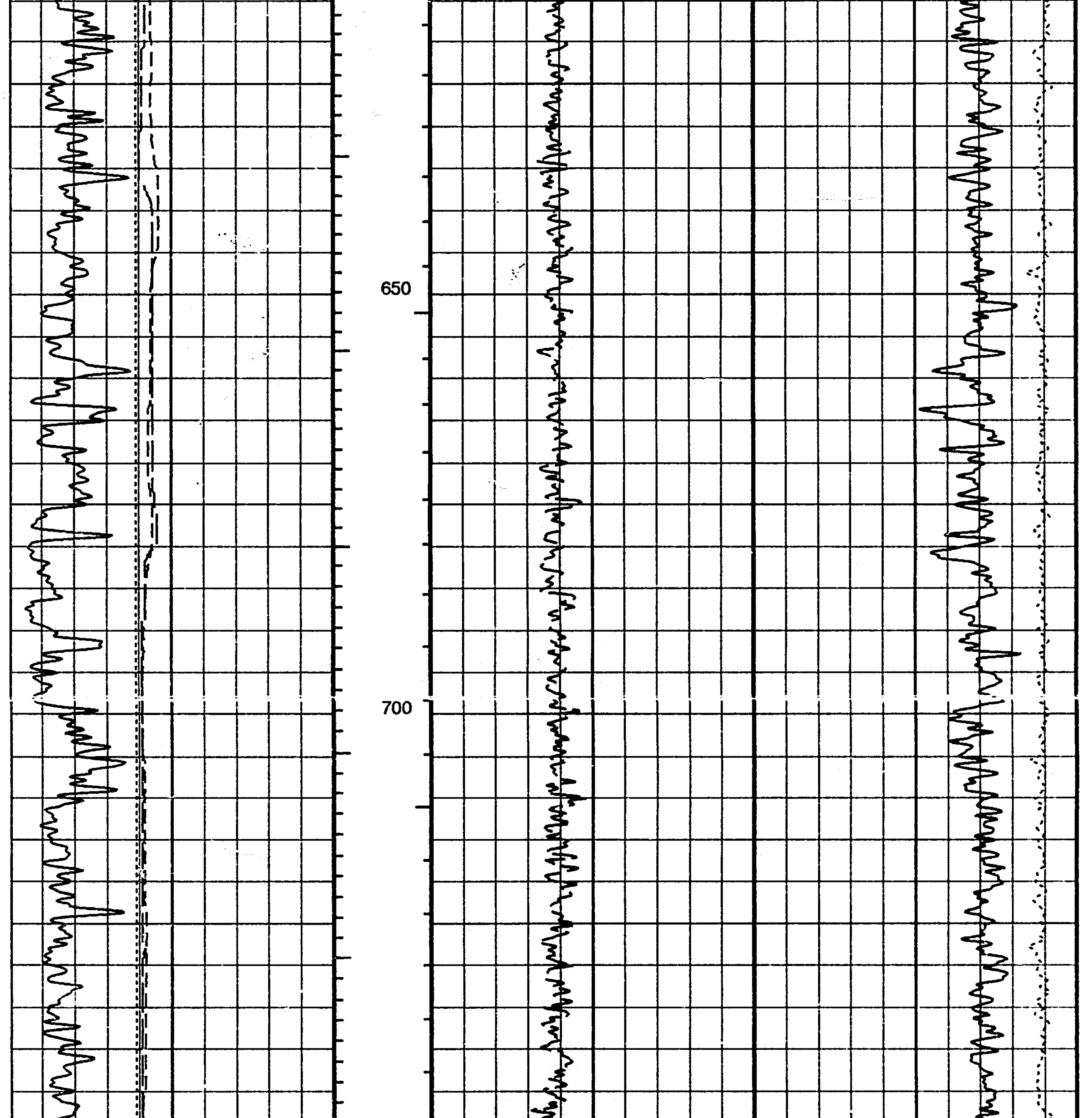
⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

CAL2 (LA) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150

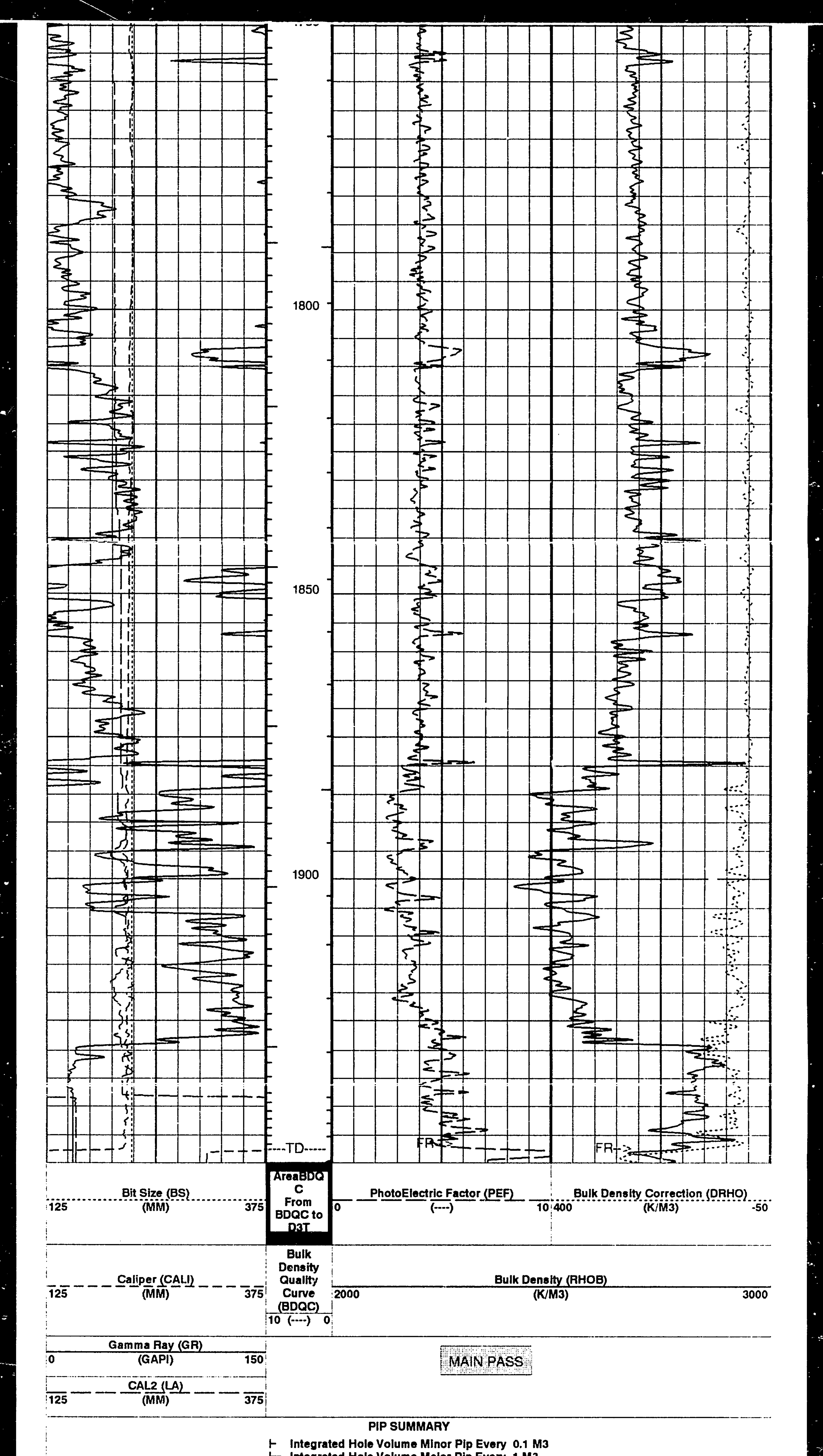
MAIN PASS

Caliper (CALI) 125 (MM) 375
Bulk Density Quality Curve (BDQC) 10 (----) 0
Bulk Density (RHOB) 2000 (K/M3) 3000

Bit Size (BS) 125 (MM) 375
AreaBDQC From BDQC to D3T
PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50



750
800
850
900
950
1000
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
RHOB
PEF
DRHO
BDQC
CA
GR
CALI
BS



PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BS	Bit Size	222.000	MM
DHC	Density Hole Correction	BS	
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
MDEN	Matrix Density	2710	K/M3
PP	Playback Processing	NORMAL	
WMUD	Mud Weight	1320	K/M3

Format: DENS Vertical Scale: 1:600 Graphics File Created: 11-Feb-1998 05:25

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT	LDTD .022	FN:18	FIELD	11-Feb-1998 05:19	1949.8 M	565.9 M

Output DLIS Files

DEFAULT	LDTD .023	FN:19	FIELD	11-Feb-1998 05:25		

Input DLIS Files

DEFAULT	LDTD .022	FN:18	FIELD	11-Feb-1998 05:19	1949.8 M	565.9 M

Output DLIS Files

DEFAULT	LDTD .023	FN:19	FIELD	11-Feb-1998 05:25	1949.8 M	565.9 M

Integrated Hole/Cement Volume Summary

Hole Volume = 52.87 M3

Cement Volume = 19.11 M3 (assuming 177.80 MM casing O.D.)

Computed from 1948.9 M to 589.0 M using data channel(s) CALI LA

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

NROR
DRHO
PEF
800
825
850
875
900
925
950
975
1000
1025
1050
1075
1100
1125
1150
1175
TENS
LA
GR
CALI
BS

1200
1225
1250
1275
1300
1325
1350
1375
1400
1425
1450
1475
1500
1525
1550
1575

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	53.60	KG/M
DFD	Drilling Fluid Density	1240.00	K/M3
DHC	Density Hole Correction	BS	
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	-50000.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PP	Playback Processing	NORMAL	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	1949.00	M

WMUD	Mud Weight	1320	K/M3

Format: PORO Vertical Scale: 1:240 Graphics File Created: 11-Feb-1998 05:25

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT LDTD .022 FN:18 FIELD 11-Feb-1998 05:19 1949.8 M 565.9 M

Output DLIS Files

DEFAULT LDTD .023 FN:19 FIELD 11-Feb-1998 05:25

Output DLIS Files

DEFAULT LDTD .018 FN:15 FIELD 11-Feb-1998 04:52 953.0 M 842.5 M

Integrated Hole/Cement Volume Summary

Hole Volume = 4.68 M3

Cement Volume = 1.93 M3 (assuming 177.80 MM casing O.D.)

Computed from 953.0 M to 842.5 M using data channel(s) CALI LA

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

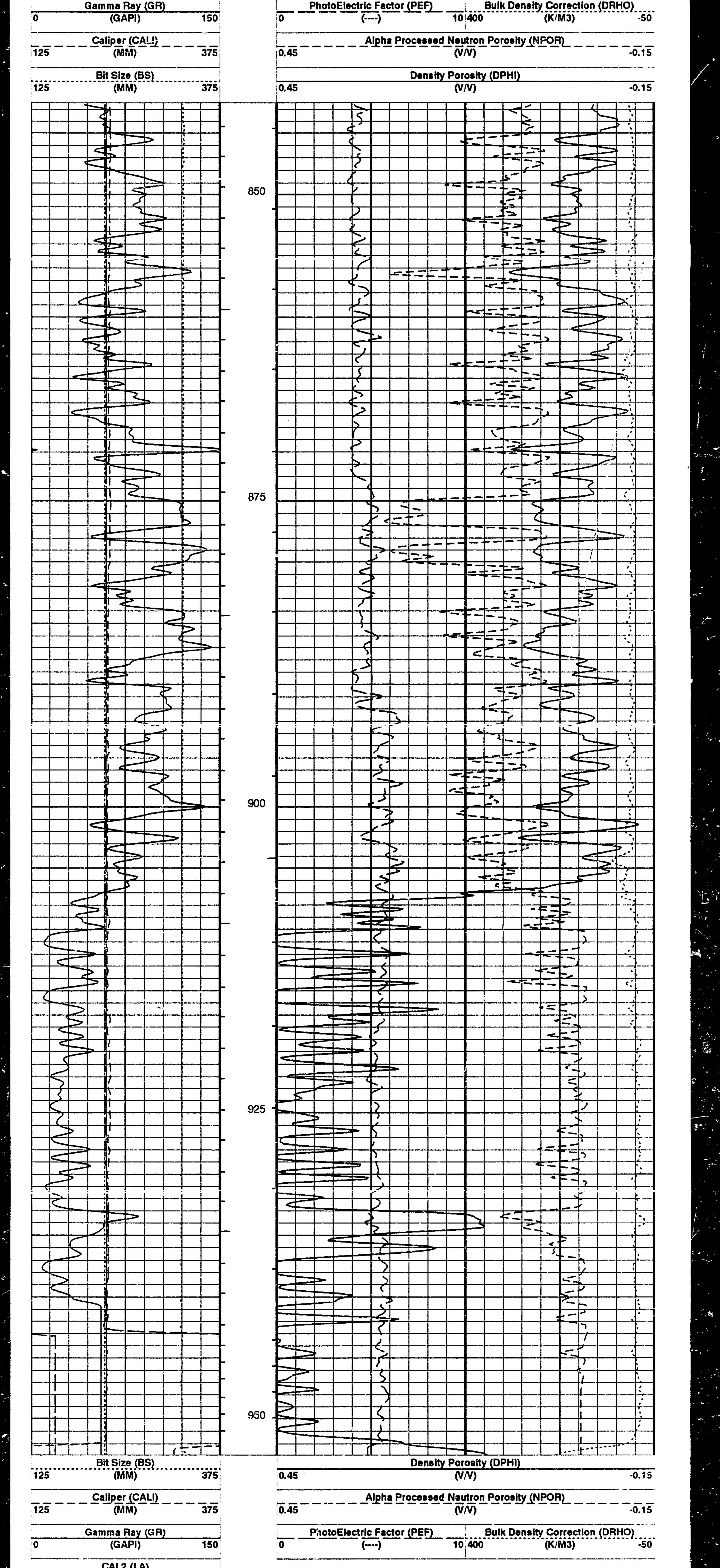
PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Tension (TENS) 10000 (LBF) 0
CAL2 (LA) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
Caliper (CALI) 125 (MM) 375
Bit Size (BS) 125 (MM) 375

REPEAT SECTION LIMESTONE, MDEN=2710

PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
Density Porosity (DPHI) 0.45 (V/V) -0.15



Bit Size (BS) 125 (MM) 375
Caliper (CALI) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
CAL2 (LA) 125 (MM) 375
Tension (TENS) 10000 (LBF) 0

Density Porosity (DPHI) 0.45 (V/V) -0.15
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50

REPEAT SECTION LIMESTONE, MDEN=2710

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	53.60	KG/M
DFD	Drilling Fluid Density	1240.00	K/M3
DHC	Density Hole Correction	BS	
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	-50000.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	1949.00	M
WMUD	Mud Weight	1320	K/M3

Format: PORO Vertical Scale: 1:240 Graphics File Created: 11-Feb-1998 04:52

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Output DLIS Files

DEFAULT LDTD .018 FN:15 FIELD 11-Feb-1998 04:52

Input DLIS Files

DEFAULT LDTD .016 FN:13 FIELD 11-Feb-1998 03:01 1949.7 M 1870.3 M

Output DLIS Files

DEFAULT LDTD .021 FN:17 FIELD 11-Feb-1998 05:17 1949.8 M 1870.4 M

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

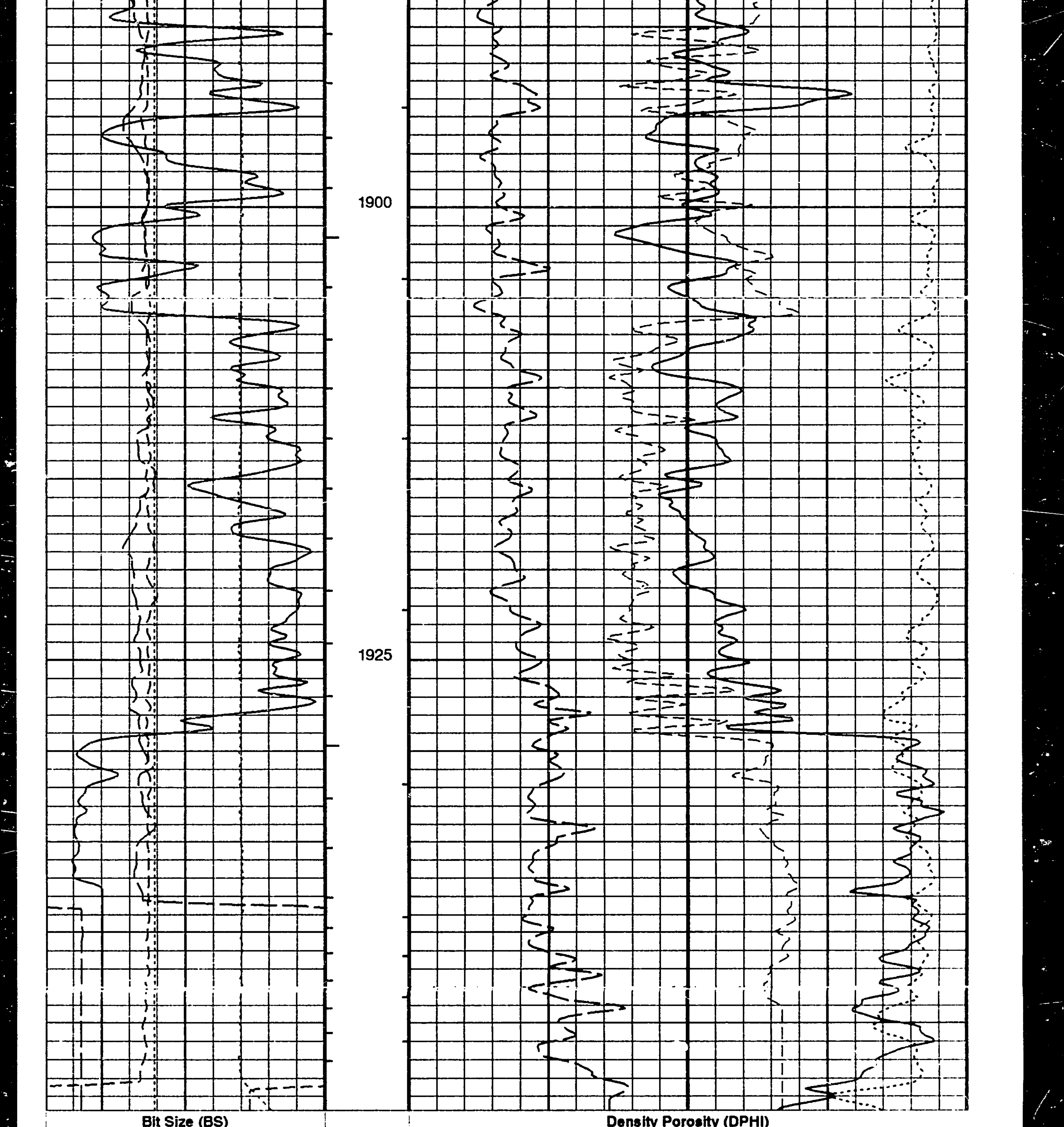
PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Tension (TENS) 10000 (LBF) 0
CAL2 (LA) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
Caliper (CALI) 125 (MM) 375
Bit Size (BS) 125 (MM) 375

REPEAT SECTION LIMESTONE MDEN=2710

PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
Density Porosity (DPHI) 0.45 (V/V) -0.15



Bit Size (BS) 125 (MM) 375
Caliper (CALI) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
CAL2 (LA) 125 (MM) 375
Tension (TENS) 10000 (LBF) 0

Density Porosity (DPHI) 0.45 (V/V) -0.15
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50

REPEAT SECTION LIMESTONE MDEN=2710

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	53.60	KG/M
DFD	Drilling Fluid Density	1240.00	K/M3
DHC	Density Hole Correction	BS	
DO	Depth Offset	0.2	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	-50000.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	NO	

PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	1949.00	M
WMUD	Mud Weight	1320	K/M3

Format: PORO   Vertical Scale: 1:240   Graphics File Created: 11-Feb-1998 05:17

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT   LDTD .016   FN:13   FIELD   11-Feb-1998 03:01   1949.7 M   1870.3 M

Output DLIS Files

DEFAULT   LDTD .021   FN:17   FIELD   11-Feb-1998 05:17

Input DLIS Files

DEFAULT   LDTD .015   FN:12   FIELD   11-Feb-1998 02:51   1950.4 M   1870.6 M

Output DLIS Files

DEFAULT   LDTD .020   FN:16   FIELD   11-Feb-1998 05:15   1950.1 M   1870.3 M

Integrated Hole/Cement Volume Summary

Hole Volume = 3.14 M3

Cement Volume = 1.19 M3 (assuming 177.80 MM casing O.D.)

Computed from 1948.9 M to 1870.3 M using data channel(s) CALI LA

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

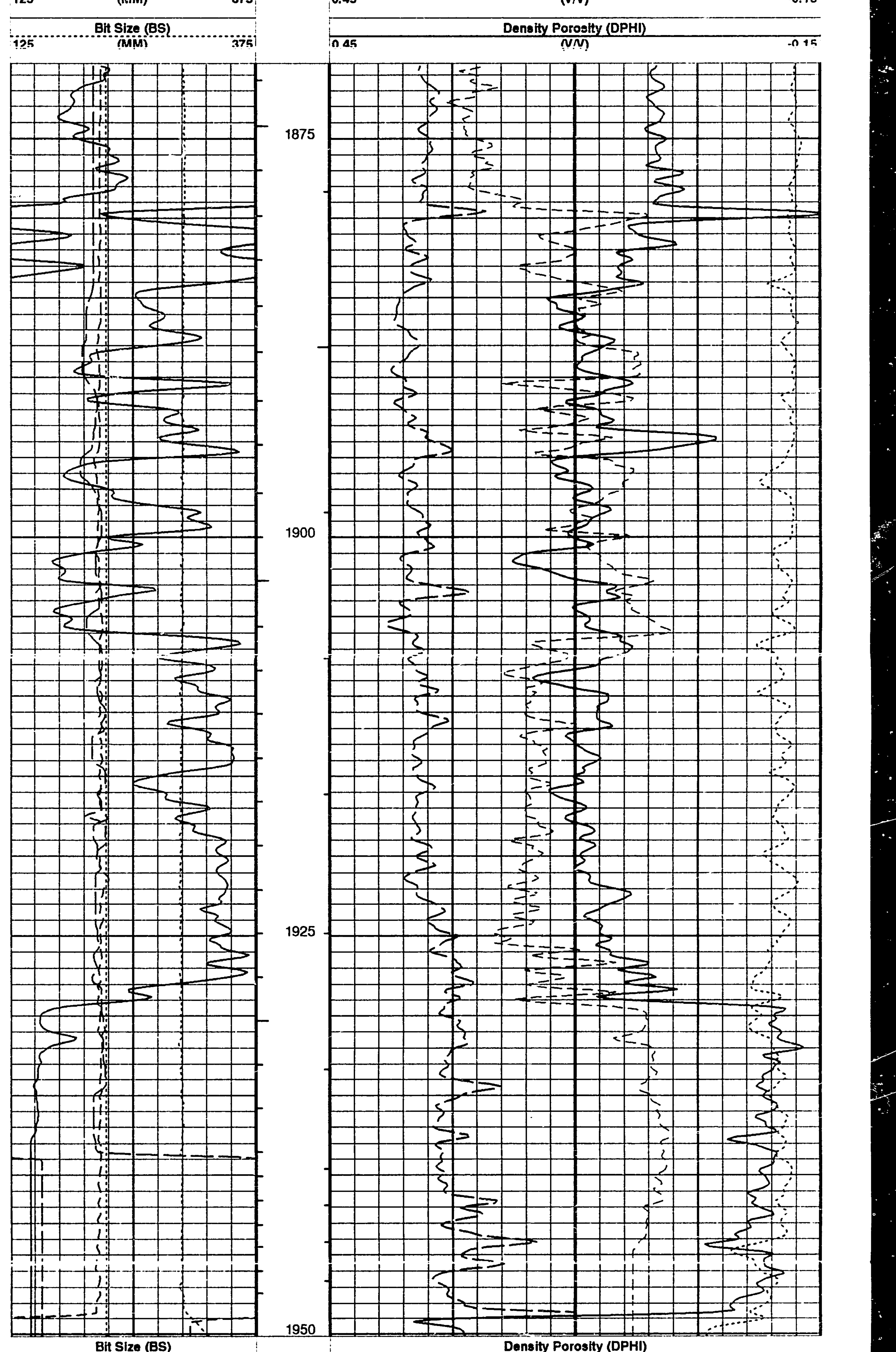
PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

REPEAT SECTION LIMESTONE MDEN=2710

Tension (TENS) 10000 (LBF) 0
CAL2 (LA) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
Caliper (CALI) 125 (MM) 375
Bit Size (BS) 125 (MM) 375

PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
Density Porosity (DPHI) 0.45 (V/V) -0.15



Bit Size (BS) 125 (MM) 375
Caliper (CALI) 125 (MM) 375
Gamma Ray (GR) 0 (GAPI) 150
CAL2 (LA) 125 (MM) 375
Tension (TENS) 10000 (LBF) 0

Density Porosity (DPHI) 0.45 (V/V) -0.15
Alpha Processed Neutron Porosity (NPOR) 0.45 (V/V) -0.15
PhotoElectric Factor (PEF) 0 (----) 10
Bulk Density Correction (DRHO) 400 (K/M3) -50

REPEAT SECTION LIMESTONE MDEN=2710

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 0.1 M3
⊢ Integrated Hole Volume Major Pip Every 1 M3
⊣ Integrated Cement Volume Minor Pip Every 0.1 M3
⊣ Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	53.60	KG/M
DFD	Drilling Fluid Density	1240.00	K/M3
DHC	Density Hole Correction	BS	
DO	Depth Offset	-0.3	M
DPPM	Density Porosity Processing Mode	STAN	
FD	Fluid Density	1320	K/M3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2710	K/M3
MST	Mud Sample Temperature	-50000.00	DEGC
MWCO	Mud Weight Correction Option	NO	
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	12.7	MM
SOCO	Standoff Correction Option	NO	
TDL	Total Depth - Logger	1949.00	M
WMUD	Mud Weight	1320	K/M3

Format: PORO   Vertical Scale: 1:240   Graphics File Created: 11-Feb-1998 05:15

OP System Version: 8C1-205

MCM

LDT-D	8C1-205	CNT-H	8C1-205
PCD-B	8C1-205	SGT-L	8C1-205
TCC-B	8C1-205		

Input DLIS Files

DEFAULT   LDTD .015   FN:12   FIELD   11-Feb-1998 02:51   1950.4 M   1870.6 M

Output DLIS Files

DEFAULT   LDTD .020   FN:16   FIELD   11-Feb-1998 05:15

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Litho Density - D Wellsite Calibration - Background Measurement							
Master: Calibration out of date Dec 06 16.37 1997 Before: Feb 09 07:50 1998 After: Feb 11 05:43 1998							
LL Background	20.00	15.47	15.42	15.43	0.006004	1.000	CPS
LU Background	76.00	57.26	57.20	57.00	-0.2069	1.000	CPS
LS Background	57.00	44.10	44.02	43.92	-0.09745	1.000	CPS
LITH Background	5.500	4.320	4.249	4.315	0.06626	0.3000	CPS
SS1 Background	16.00	12.81	12.88	12.99	0.1068	0.5000	CPS
SS2 Background	11.00	8 898	8.884	8.839	-0.04535	0.5000	CPS
Litho Density - D Wellsite Calibration - Tool Quality Control Information HV							
Master. Calibration out of date Dec 06 16:37 1997 Before: Feb 09 07:50 1998 After: Feb 11 05:43 1998							
LSHV Background	1500	1337	1344	1338	-6.197	N/A	V
SSHV Background	1500	1327	1345	1338	-6.459	N/A	V
Litho Density - D Wellsite Calibration - Detectors Resolution From BKG Measurments							
Master: Calibration out of date Dec 06 16:37 1997 Before: Feb 09 07:50 1998 After: Feb 11 05:43 1998							
LS Resolution Background	8.000	8.404	8.432	8.418	-0.01365	N/A	
SS Resolution Background	8.000	8.557	8.669	8 641	-0.02782	N/A	
Litho Density - D Wellsite Calibration - Caliper Calibration							
Before: Feb 09 07:49 1998							
Caliper Small Ring	203.2	N/A	184.4	N/A	N/A	N/A	MM
Caliper Large Ring	304.8	N/A	284.4	N/A	N/A	N/A	MM
Compensated Neutron - H Wellsite Calibration - Zero Measurement							
Master: Jan 07 14:38 1998 Before: Feb 09 07:52 1998 After: Feb 11 05:41 1998							
CNTC Background	26.73	26.73	26.58	26.76	0.1781	4.010	CPS
CFTC Background	36.02	36.02	34.10	31.05	-3.056	5.403	CPS
Powered Caliper Device - B Wellsite Calibration - Large Arm Calibration							
Before: Feb 09 08:46 1998							
Large Arm Small Ring	203.2	N/A	182.8	N/A	N/A	N/A	MM
Large Arm Large Ring	304.8	N/A	277.7	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Small Arm Calibration							
Before: Calibration not done							
Small Arm Small Gauge	25.40	N/A	N/A	N/A	N/A	N/A	MM
Small Arm Large Gauge	127.0	N/A	N/A	N/A	N/A	N/A	MM
Powered Caliper Device - B Wellsite Calibration - Micro Inverse Calibration							
Before: Calibration not done							
Micro Inverse Zero	0	N/A	N/A	N/A	N/A	0.1000	OHMM
Micro Inverse Plus	5.000	N/A	N/A	N/A	N/A	0 2000	OHMM
Powered Caliper Device - B Wellsite Calibration - Micro Normal Calibration							
Before: Calibration not done							
Micro Normal Zero	0	N/A	N/A	N/A	N/A	0 1000	OHMM
Micro Normal Plus	5.000	N/A	N/A	N/A	N/A	0.2000	OHMM
Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration							
Before: Feb 09 07:59 1998							
Gamma Ray Background	30.00	N/A	18 24	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	150.9	N/A	150.9	N/A	N/A	13.72	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

The CNT Master Calibration Was Done With The Following Parameters :

NCT-B Water Temperature 23.9 DEGC.
Thermal Housing Size 85.725 MM.

Litho Density - D / Equipment Identification

Primary Equipment:		
Nuclear Services Cartridge	NSC - E	1868
Powered Gamma Detector	PGD - G	2721
Gamma Source Radioactive	GSR - J	2043
Auxiliary Equipment:		
Density Resistivity Sonde	DRS - C	723
Electronics Cartridge Housing	ECH - MKA	1872
Powered Detector Housing	PDH - L	2980

Litho Density - D Wellsite Calibration
Background Measurement

Phase	LL Background CPS	Value	Phase	LU Background CPS	Value	Phase	LS Background CPS	Value
Master		15.47	Master	EXCEEDS LIMIT	57.26	Master		44.10
Before		15.42	Before	EXCEEDS LIMIT	57.20	Before		44.02
After		15.43	After	EXCEEDS LIMIT	57.00	After		43.92
	15.00 (Minimum) 20.00 (Nominal) 25.00 (Maximum)			58.00 (Minimum) 76.00 (Nominal) 94.00 (Maximum)			43.00 (Minimum) 57.00 (Nominal) 72.00 (Maximum)	
Phase	LITH Background CPS	Value	Phase	SS1 Background CPS	Value	Phase	SS2 Background CPS	Value
Master		4.320	Master		12.81	Master		8.898
Before		4.249	Before		12.88	Before		8.884
After		4.315	After		12.99	After		8.839
	4.000 (Minimum) 5.500 (Nominal) 7.000 (Maximum)			12.00 (Minimum) 16.00 (Nominal) 19.50 (Maximum)			8.000 (Minimum) 11.00 (Nominal) 13.50 (Maximum)	

Master: Calibration out of date Dec 06 16:37 1997   Before: Feb 09 07:50 1998   After: Feb 11 05:43 1998

Litho Density - D Wellsite Calibration
Detectors Resolution From BKG Measurments

Phase	LS Resolution Background	Value	Phase	SS Resolution Background	Value
Master		8.404	Master		8.557
Before		8.432	Before		8.669
After		8.418	After		8.641
	5.000 (Minimum) 8.000 (Nominal) 11.50 (Maximum)			5.000 (Minimum) 8.000 (Nominal) 11.50 (Maximum)	

Master: Calibration out of date Dec 06 16:37 1997   Before: Feb 09 07:50 1998
After: Feb 11 05:43 1998

Compensated Neutron - H / Equipment Identification

Primary Equipment:		
Compensated Neutron Cartridge	CNC - HA	1257
Neutron Detector with Alpha Source	CND - A	
Neutron Logging Source	NLS - KL	
Neutron Source Radioactive	NSR - F	1491
Auxiliary Equipment:		
Compensated Neutron Housing	CNH - A	4465
Neutron Calibration Tank	NCT - B	

Compensated Neutron - H Wellsite Calibration
Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		26.73	Master		36.02
Before		26.58	Before		34.10
After		26.76	After		31.05
	5.000 (Minimum) 26.73 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 36.02 (Nominal) 40.00 (Maximum)	

Master: Jan 07 14:38 1998   Before: Feb 09 07:52 1998
After: Feb 11 05:41 1998

Powered Caliper Device - B / Equipment Identification

Primary Equipment:		
Powered Caliper Cartridge - H	PCC - H	
Powered Caliper Mechanical (sonde) - A	PCM - A	1077
Auxiliary Equipment:		
Powered Caliper Housing - A	PCH - A	

Powered Caliper Device - B Wellsite Calibration
Micro Inverse Calibration

Phase	Micro Inverse Zero OHMM	Value	Phase	Micro Inverse Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Powered Caliper Device - B Wellsite Calibration
Micro Normal Calibration

Phase	Micro Normal Zero OHMM	Value	Phase	Micro Normal Plus OHMM	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A
	-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)			4.250 (Minimum) 5.000 (Nominal) 5.750 (Maximum)	

Before: Calibration not done

Scintillation Gamma-Ray - L / Equipment Identification

Primary Equipment:		
Scintillation Gamma Cartridge	SGC - SA	10[illegible]8
Scintillation Gamma Detector	SGD - TAA	
Auxiliary Equipment:		
Scintillation Gamma Housing	SGH - K	530
Gamma Source Radioactive	GSR - U/Y	

Scintillation Gamma-Ray - L Wellsite Calibration
Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		18.24	Before		150.9	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			137.2 (Minimum) 150.9 (Nominal) 164.7 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: Feb 09 07:59 1998

COMPANY **RANGER OIL LIMITED**
WELL: **RANGER NOTA CREEK C-17**
FIELD: **NOTA CREEK**
TERRITORY: **N.W.T.**

BOTTOM LOG INTERVAL	1948 M
SCHLUMBERGER DEPTH	1949 M
DEPTH DRILLER	1953 M
KELLY BUSHING	172 22 M
DRILL FLOOR	171.92 M
GROUND LEVEL	168.22 M

Schlumberger

COMPENSATED NEUTRON LITHO DENSITY

Source Reference: CALGARY DATA COMMUNICATION CENTER (10FEB98.108)
Software Version:
Distribution of this LOGNET Product:

SCHLUMBERGER OF CANADA
23 FLOOR COMPUTER ROOM
801 6 AVE S W.
CALGARY, ALBERTA
PHONE: 509-4050
Attn:
PETER GOETZ OFFICE 403 232 5291

NATIONAL ENERGY BOARD
ENGINEERING BRANCH
FEB 12 [illegible]

LOG - **SCHLUMBERGER LOGNET**
COMPANY - **RANGER OIL (CANADA) LTD**
WELL - **RANGER NOTA CREEK C-17**

LOGNET
Communications Network

Schlumberger

COMPLETION

N.E.B. COPY

1831

COMPANY: RANGER OIL LIMITED
WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

9211-R36-2-1

Schlumberger

COMPENSATED CEMENT BOND LOG

TERRITORY:N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

LOCATION			
C-17-65-10-126	Elev.:	K.B.	172.22 M
		G.L.	168.22 M
		D.F.	

Permanent Datum: GROUND LEVEL Elev.: 168.22 M
Log Measured From: KELLY BUSHING 4.0 M above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	25-FEB-1998	
Run Number	1	
Depth Driller	1926 M	
Schlumberger Depth	1923 M	
Bottom Log Interval	1921 M	
Top Log Interval	1700 M	
Casing Fluid Type	WATER	
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size	222.000 MM	
From		
To		
Casing/Tubing Size	177.800 MM	
Weight	34.2 KG/M	
Grade		
From	0 M	
To	1929 M	
Maximum Recorded Temperatures		
Logger On Bottom / Time	25-FEB-1998 / 3:35	
Unit Number / Location	2 / NORMAN WELLS	
Recorded By	GREG MCISAAC	
Witnessed By	ANDY GORUK	

	Run 1	Run 2	Run 3	Run 4
PVT DATA: Oil Density				
Water Salinity				
Gas Gravity				
Bo				
Bw				
1/Bg				
Bubble Point Pressure				
Bubble Point Temperature				
Solution GOR				
Maximum Deviation				
CEMENTING DATA				
Primary/Squeeze	Primary			
Casing String No				
Lead Cement Type				
Volume				
Density				
Water Loss				
Additives				
Tail Cement Type				
Volume				
Density				
Water Loss				
Additives				
Expected Cement Top				

Logging Date		
Run Number		
Depth Driller		
Schlumberger Depth		
Bottom Log Interval		
Top Log Interval		
Casing Fluid Type		
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size		
From		
To		
Casing/Tubing Size		
Weight		
Grade		
From		
To		
Maximum Recorded Temperatures		
Logger On Bottom / Time		
Unit Number / Location		
Recorded By		
Witnessed By		

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1:	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
CORRELATED TO SOC NEUTRON DENSITY DATED 10-FEB-1998	

RUN 1		RUN 2	
SERVICE ORDER #:	1210881	SERVICE ORDER #:	
PROGRAM VERSION:	8C0-609	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

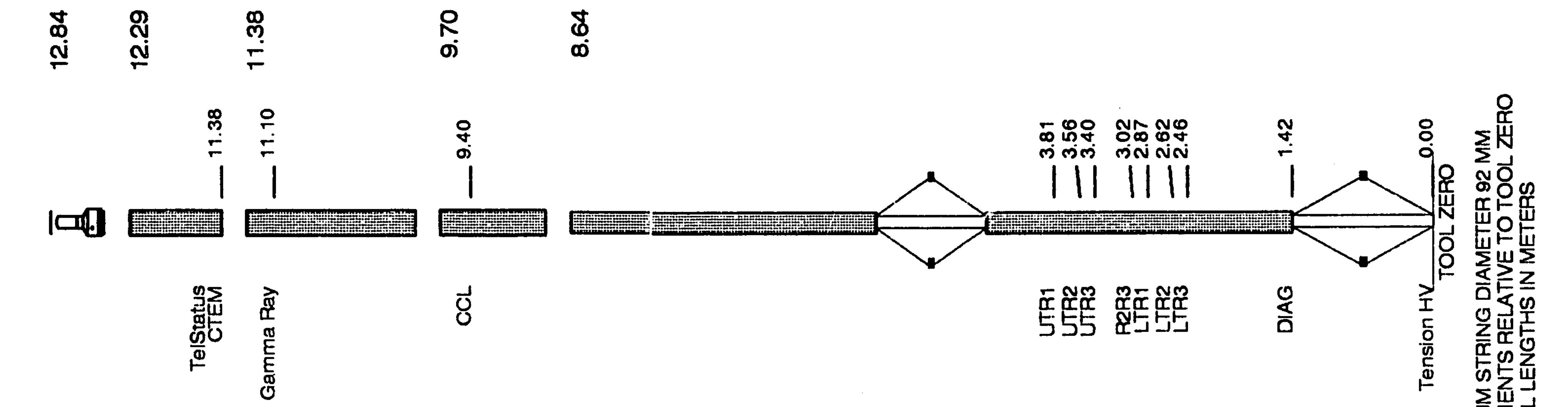
RUN 1

RUN 2

SURFACE EQUIPMENT

WDM-AB 122
STM-C 20
TCM-AB 302
GSR-U/Y

DOWNHOLE EQUIPMENT



PEH-A
PEH-A

TCC-B
ECH-KC 2319
TCC-B

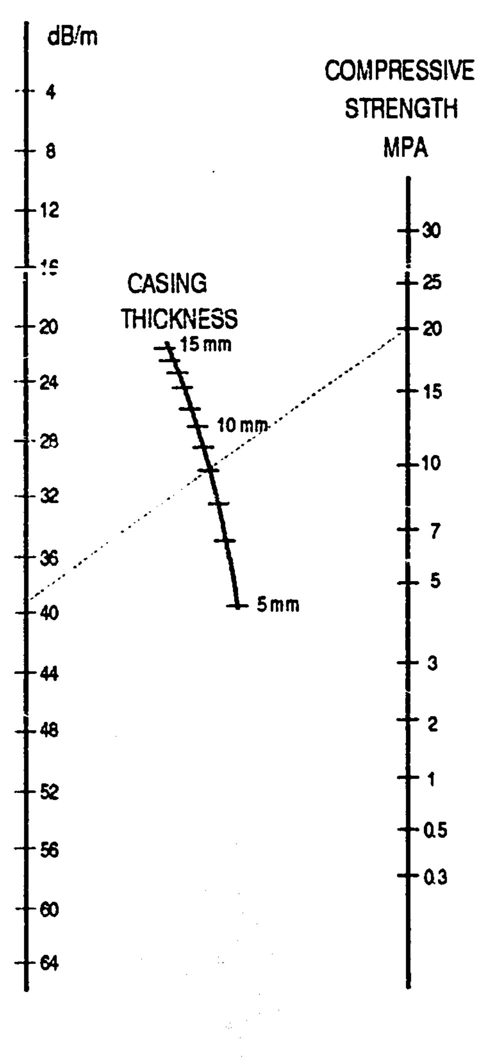
SGT-L
SGH-K 530
SGC-SA 1078
SGD-TAA

CAL-Y
CAL-Y 68

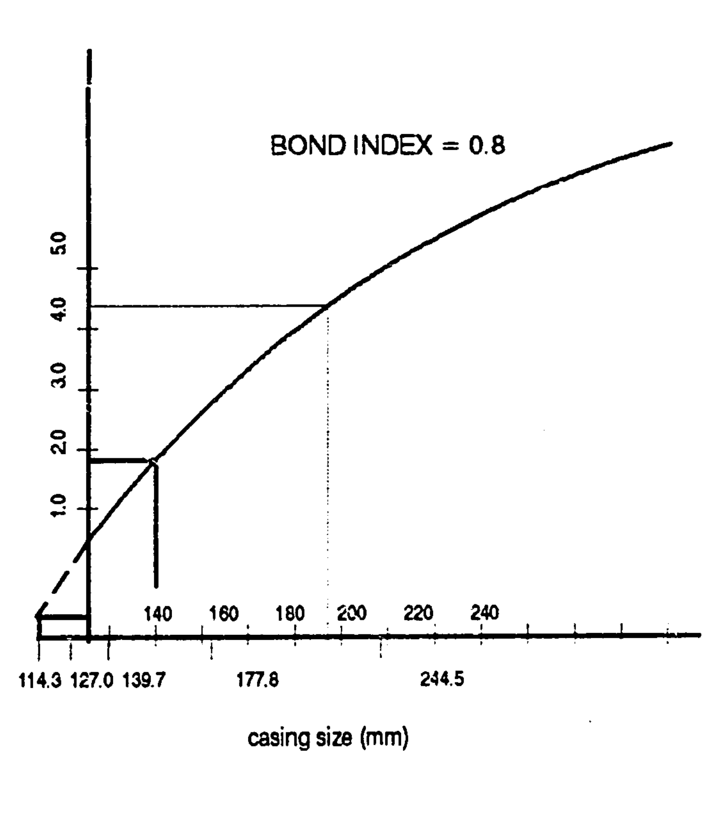
CBT-EB
CBC-EB 89
ECH-VC 70
CME-AU
CBS-DA 66
CME-AT

MAXIMUM STRING DIAMETER 92 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

FIELD INTERPRETATION



MINIMUM CEMENTED INTERVAL



BOND INDEX = $\frac{\text{ATTENUATION IN ZONE OF INTEREST (dB/m)}}{\text{ATTENUATION IN WELL CEMENTED ZONE (dB/m)}}$

1.0 BOND INDEX ⟹ 38 30 dB/m

0.8 BOND INDEX ⟹ ______ dB/m

HYDRAULIC ISOLATION IN : 177.8 mm CASING

REQUIRES: 3.0 METERS OF 0.8 BOND INDEX

INTERPRETATION:

SURFACE: 339.7MM 81.1 KG/M CEMENTED WITH 29 T ARCTIC SET +7.4% D71 + .5% D65 + .5% B71 + 33KG CELLOFLAKE. 6 M3 RETURNS

INTERMEDIATE: 19 T RFC + 1% CACL2 + .2% D46 + 5 L/T F52.1 WITH CONT. RETURNS THROUGHOUT

PRODUCTION: STAGE 1: 25 M3 1:1:2 G + 18 % D44 + .1 % D71 FILL CEMENT AND TAILED IN WITH 3 M3 RFC + 1% B30 + .3 % B71 + .2 % D46

STAGE 2: 6.1 M3 RFC + .3 % B71 + .1 % B30 + .2 % D46 WITH 5 M3 CEMENT RETURNS

STAGE COLLAR AT 405 M KB

STAGE 2 CEMENT TOP AT APPROX 17 33 MKB

STAGE 1 CEMENT TOP AT APPROX 1373 MKB

CASING APPEARS TO BE WELL BONDED OVER LOWER LOGGED INTERVAL FROM PBTD-1750

TOOLS CAME OUT OF WELL COATED IN MUD

Input DLIS Files

DEFAULT	CBTE .024	FN:20	FIELD	25-Feb-1998 06:32	1924.4 M	1740.1 M

Output DLIS Files

DEFAULT	CBTE .031	FN:27	FIELD	25-Feb-1998 06:41	1924.4 M	1740.1 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S

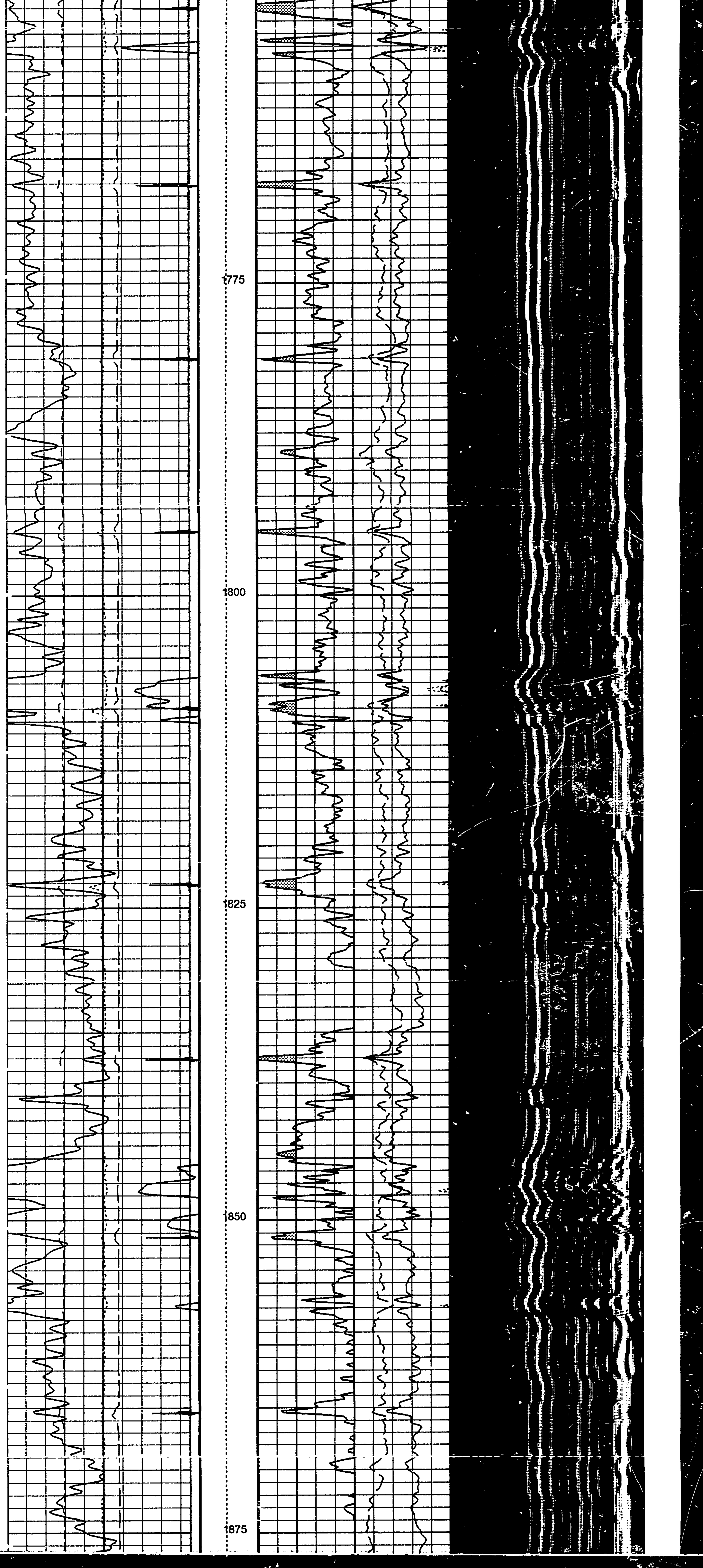
DBI > 80% BOND

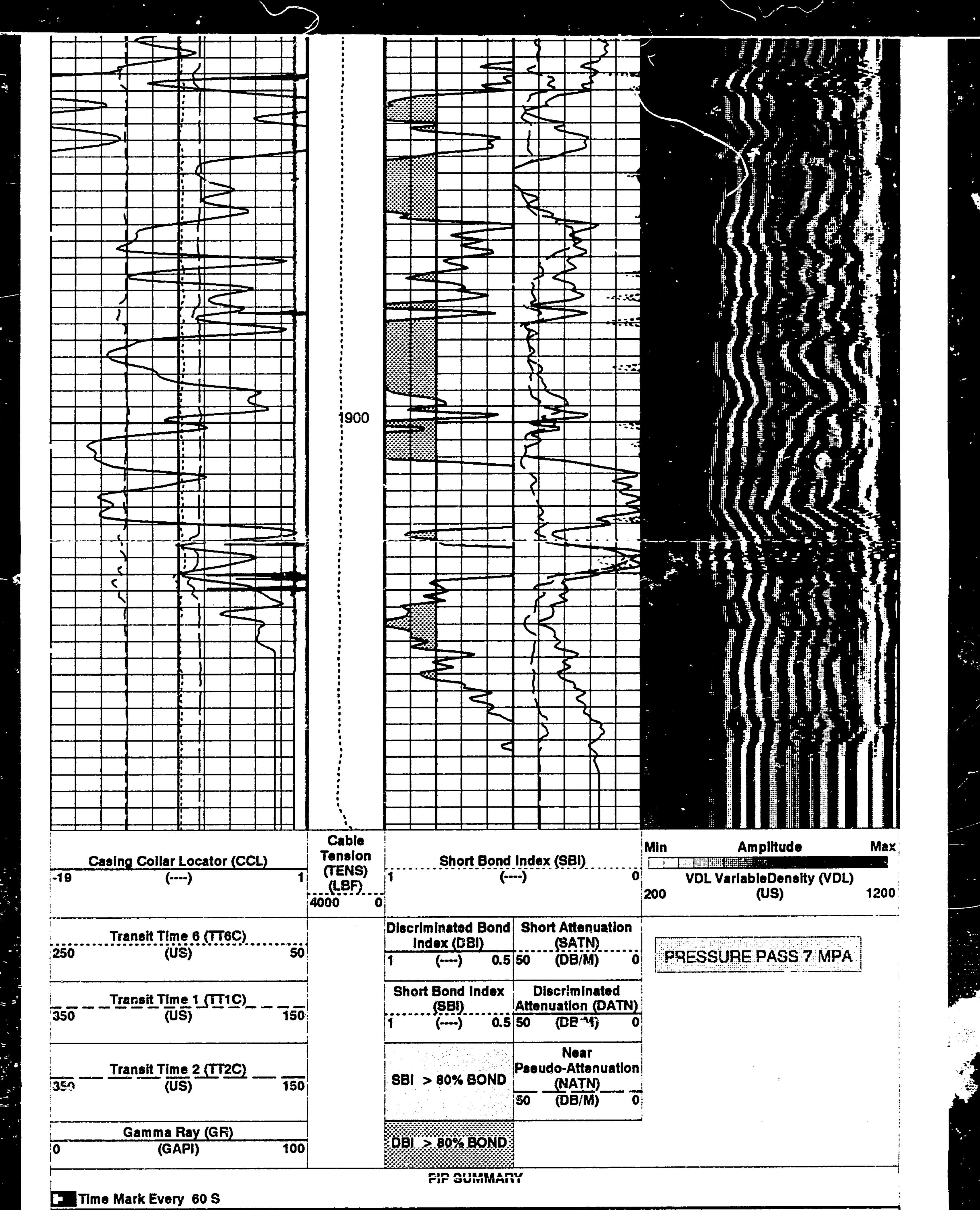
SBI > 80% BOND

PRESSURE PASS 7 MPA

Curve	Left	Unit	Right
Gamma Ray (GR)	0	(GAPI)	100
Transit Time 2 (TT2C)	350	(US)	150
Transit Time 1 (TT1C)	350	(US)	150
Transit Time 6 (TT6C)	250	(US)	50
Casing Collar Locator (CCL)	-19	(----)	1
Cable Tension (TENS)	4000	(LBF)	0
Near Pseudo-Attenuation (NATN)	50	(DB/M)	0
Short Bond Index (SBI)	1	(----)	0.5
Discriminated Attenuation (DATN)	50	(DB/M)	0
Discriminated Bond Index (DBI)	1	(----)	0.5
Short Attenuation (SATN)	50	(DB/M)	0
Short Bond Index (SBI)	1	(----)	0
VDL VariableDensity (VDL)	200	(US)	1200

Min Amplitude Max





Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	NORMAL	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:41

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .024 FN:20 FIELD 25-Feb-1998 06:32 1924.4 M 1740.1 M

Output DLIS Files

DEFAULT CBTE .031 FN:27 FIELD 25-Feb-1998 06:41

Input DLIS Files

DEFAULT CBTE .013 FN:9 FIELD 25-Feb-1998 03:42 1923.6 M 1842.8 M

Output DLIS Files

DEFAULT CBTE .023 FN:19 FIELD 25-Feb-1998 06:30 1923.7 M 1843.1 M

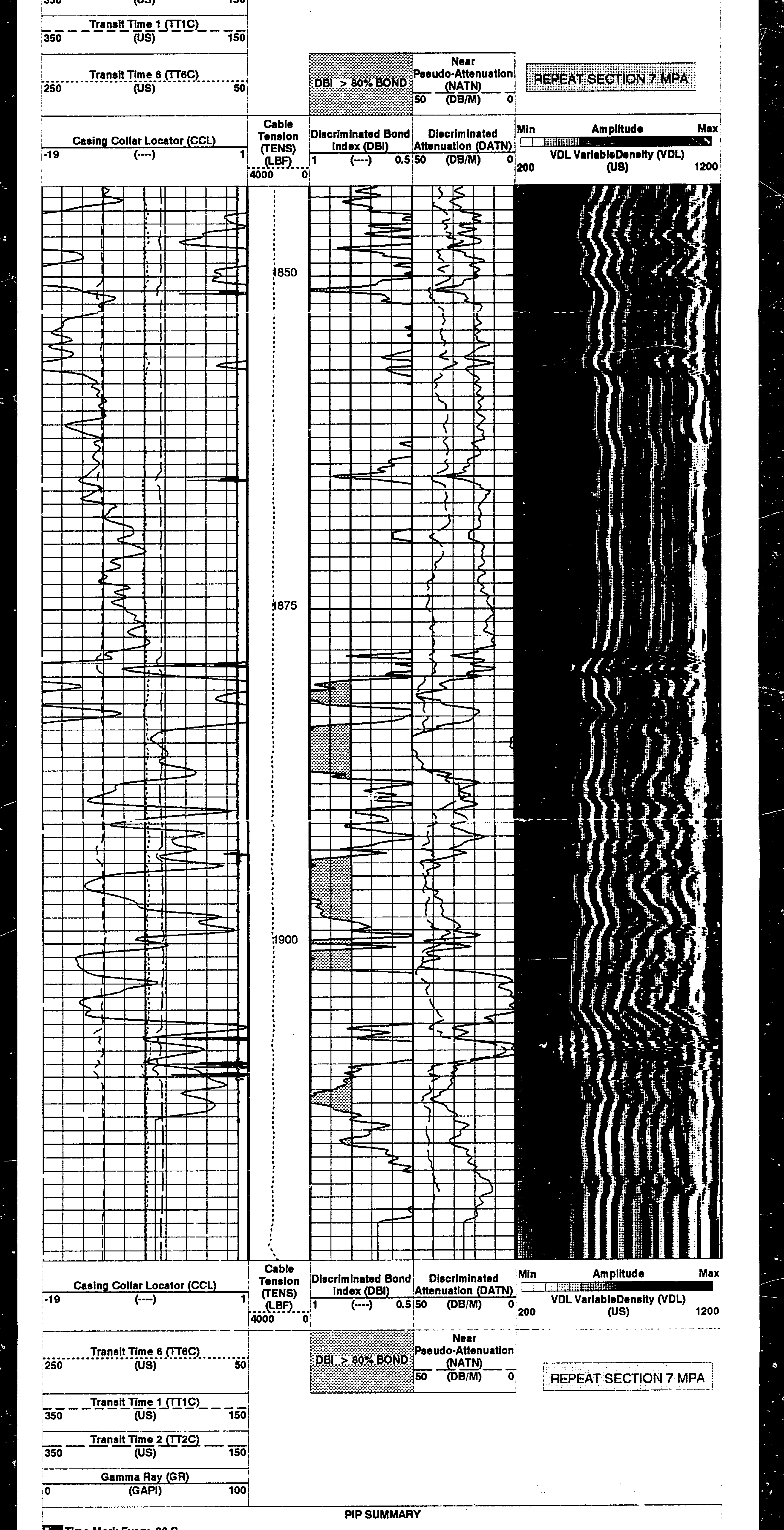
OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S



Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.2	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	RECOMPUTE	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:30

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .013 FN:9 FIELD 25-Feb-1998 03:42 1923.6 M 1842.8 M

Output DLIS Files

DEFAULT CBTE .023 FN:19 FIELD 25-Feb-1998 06:30

Input DLIS Files

DEFAULT CBTE .012 FN:8 FIELD 25-Feb-1998 03:31 1923.7 M 1834.0 M

Output DLIS Files

DEFAULT CBTE .022 FN:18 FIELD 25-Feb-1998 06:05 1924.2 M 1834.4 M

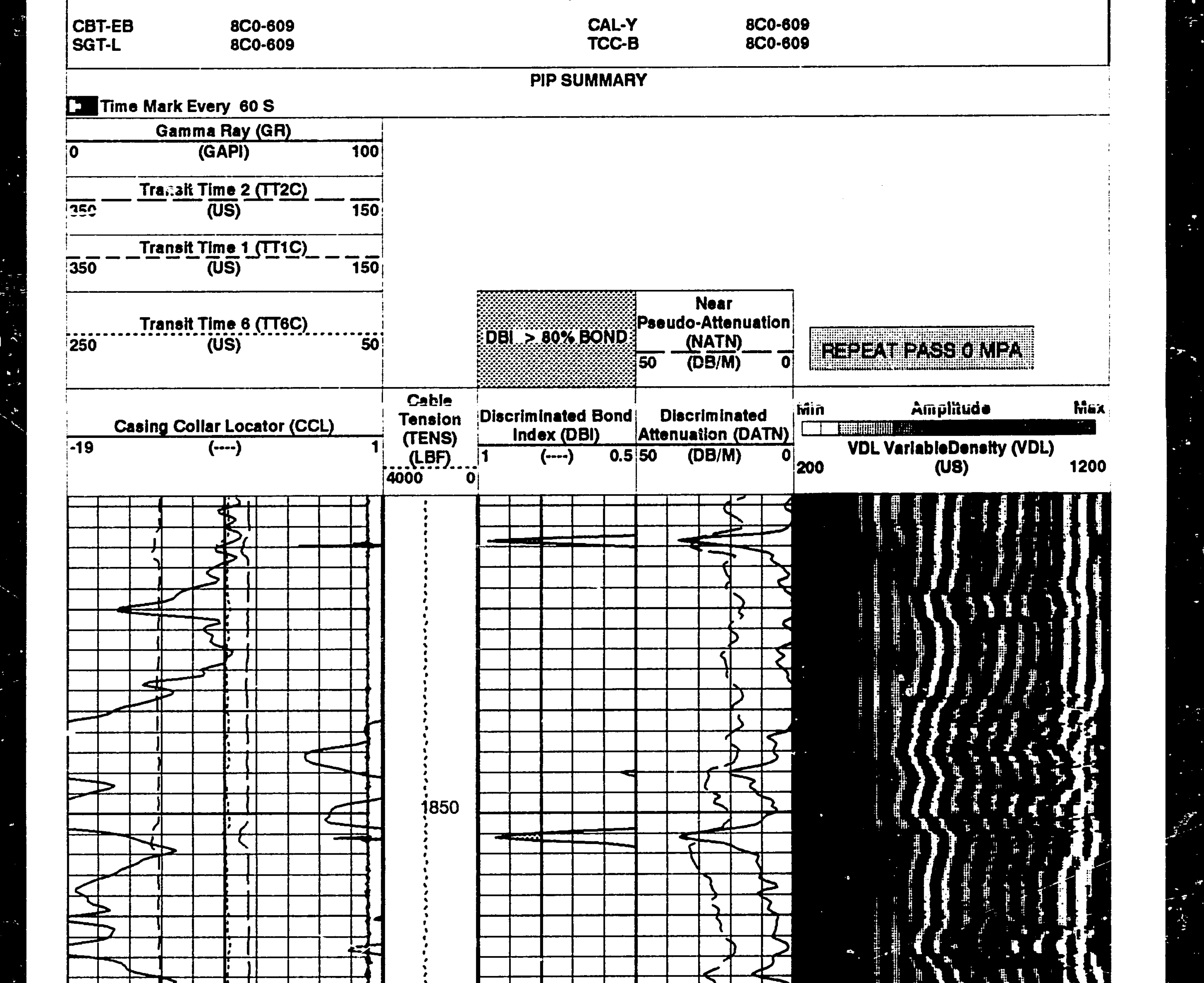
OP System Version: 8C0-609

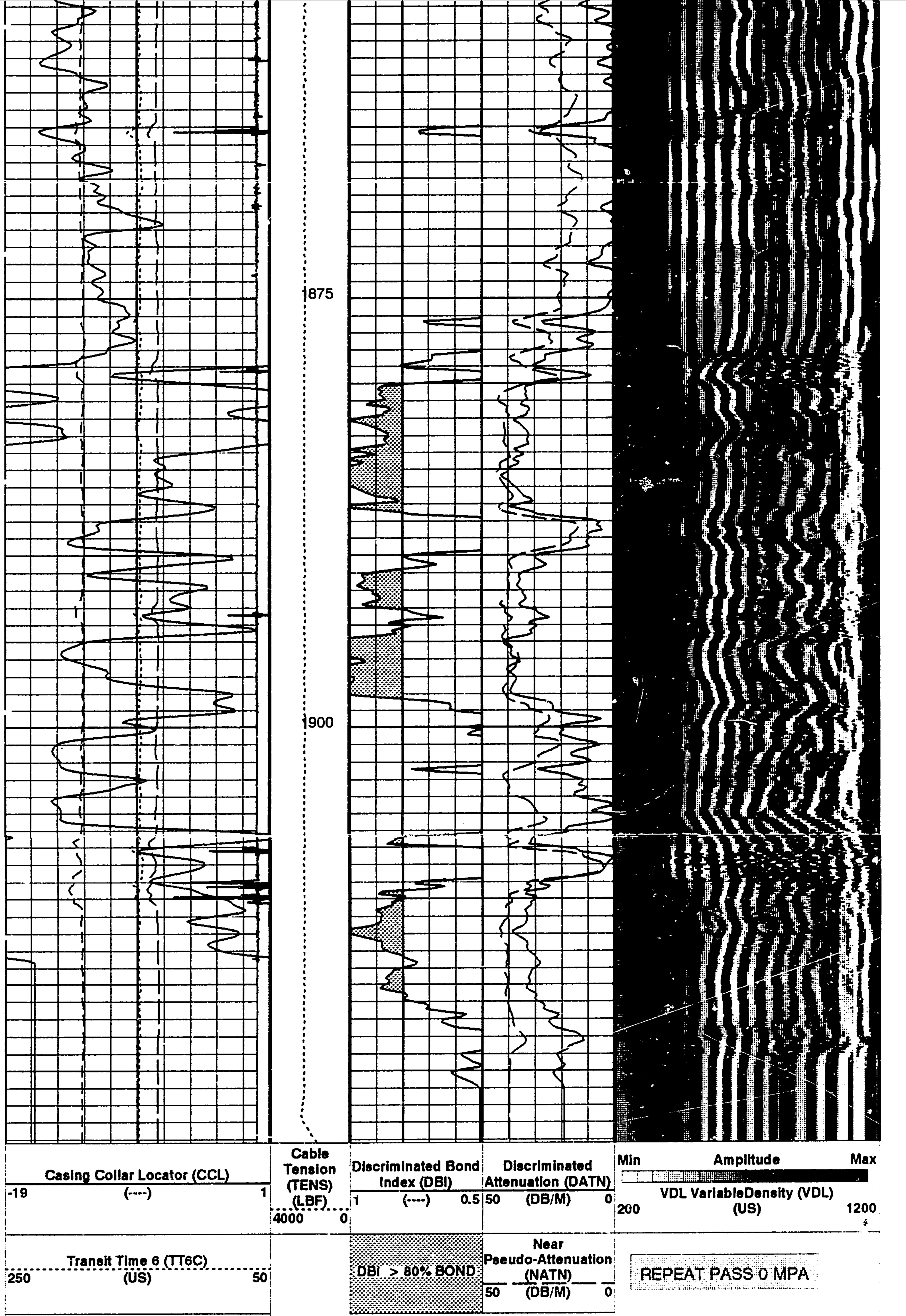
MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S





Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Discriminated Bond Index (DBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Min Amplitude Max
VDL VariableDensity (VDL) (US)
200 1200

Transit Time 6 (TT6C)
250 (US) 50

DBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

REPEAT PASS 0 MPA

Transit Time 1 (TT1C)
350 (US) 150

Transit Time 2 (TT2C)
350 (US) 150

Gamma Ray (GR)
0 (GAPI) 100

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.5	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	RECOMPUTE	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:05

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .012 FN:8 FIELD 25-Feb-1998 03:31 1923.7 M 1834.0 M

Output DLIS Files

DEFAULT CBTE .022 FN:18 FIELD 25-Feb-1998 06:05

Input DLIS Files

DEFAULT CBTE .017 FN:13 FIELD 25-Feb-1998 04:51 1750.9 M 1690.3 M

Output DLIS Files

DEFAULT CBTE .025 FN:21 FIELD 25-Feb-1998 06:33 1751.2 M 1690.6 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 100

Transit Time 2 (TT2C)
350 (US) 150

STAGE 2 CEMENT TOP NO PRESSURE]

Transit Time 1 (TT1C)
350 (US) 150

Transit Time 6 (TT6C)
250 (US) 50

DBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

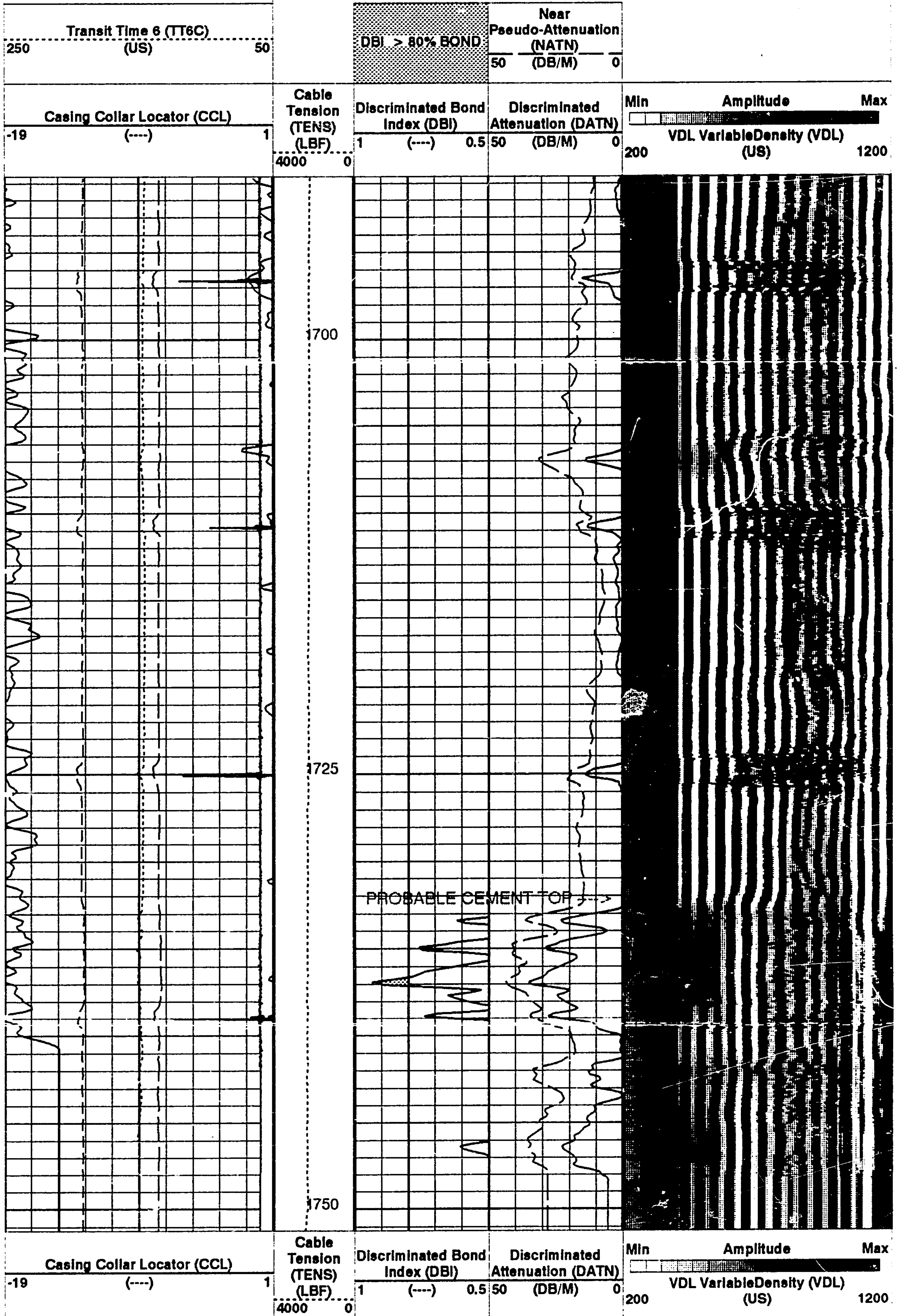
Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Discriminated Bond Index (DBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Min Amplitude Max
VDL VariableDensity (VDL) (US)
200 1200



Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Discriminated Bond Index (DBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Min Amplitude Max
VDL VariableDensity (VDL) (US)
200 1200

Transit Time 6 (TT6C)
250 (US) 50

DBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

STAGE 2 CEMENT TOP NO PRESSURE

Transit Time 1 (TT1C)
350 (US) 150

Transit Time 2 (TT2C)
350 (US) 150

Gamma Ray (GR)
0 (GAPI) 100

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.3	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	RECOMPUTE	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:33

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .017 FN:13 FIELD 25-Feb-1998 04:51 1750.9 M 1690.3 M

Output DLIS Files

DEFAULT CBTE .025 FN:21 FIELD 25-Feb-1998 06:33

Input DLIS Files

DEFAULT CBTE .026 FN:22 FIELD 25-Feb-1998 06:34 1403.6 M 1296.5 M

Output DLIS Files

DEFAULT CBTE .033 FN:29 FIELD 25-Feb-1998 06:59 1403.6 M 1296.5 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

NO PRESSURE

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

Short Attenuation (SATN)
50 (DB/M) 0

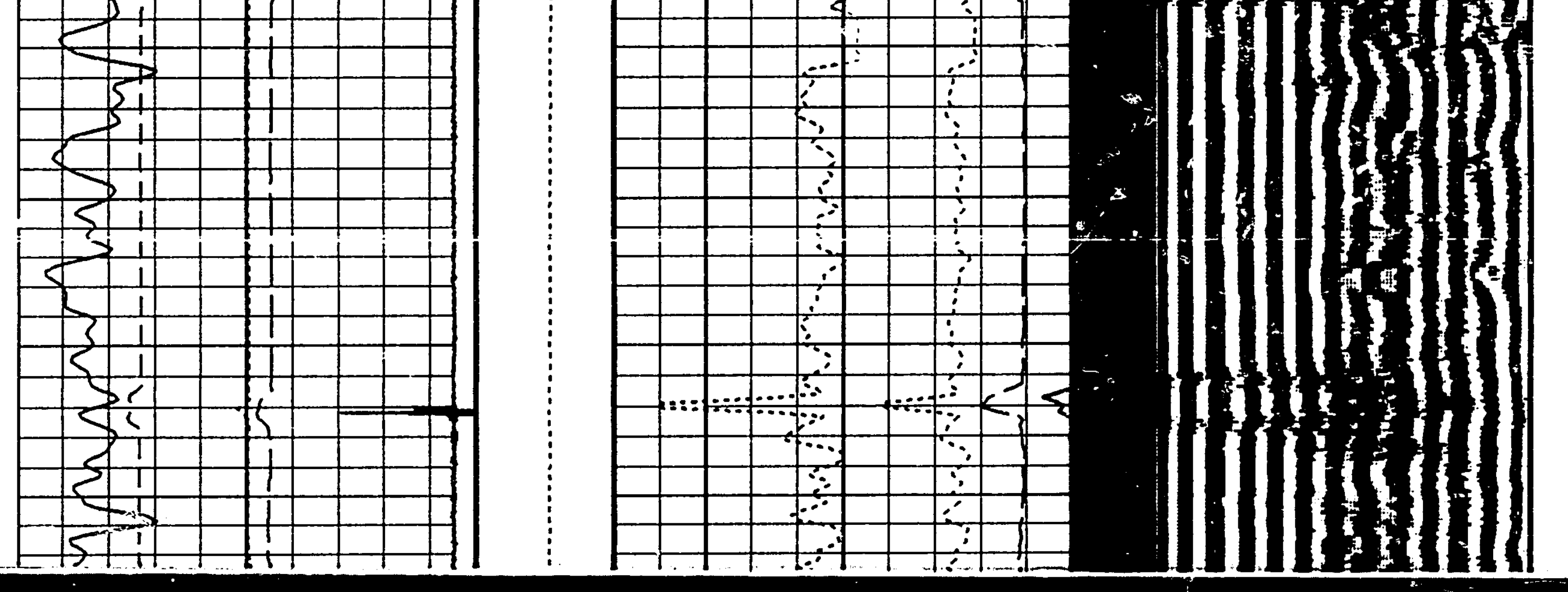
STAGE 1 CEMENT TOP

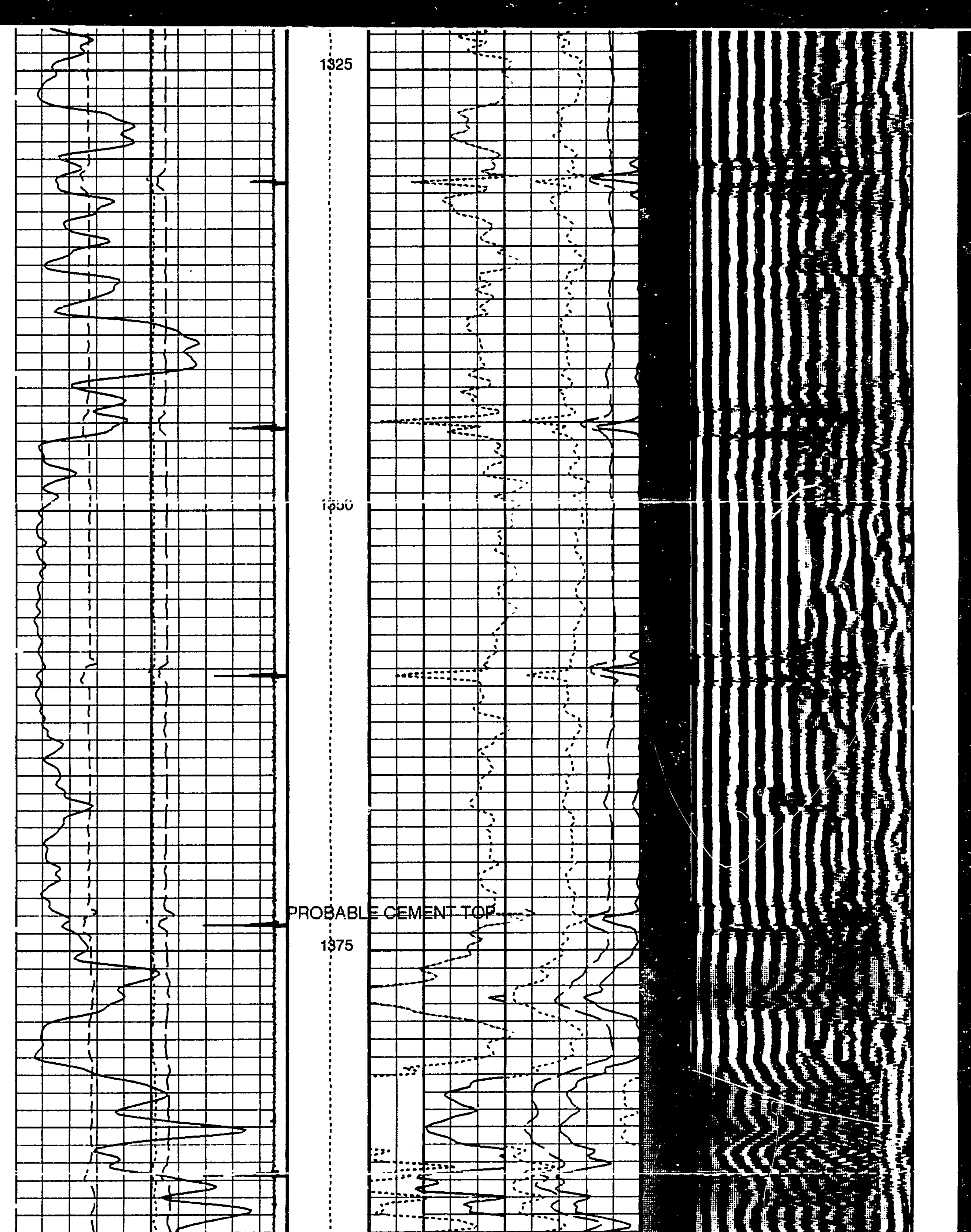
Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL) (US)
200 1200





Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

Short Attenuation (SATN)
50 (DB/M) 0

STAGE 1 CEMENT TOP

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

NO PRESSURE

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	NORMAL	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:59

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .026 FN:22 FIELD 25-Feb-1998 06:34 1403.6 M 1296.5 M

Output DLIS Files

DEFAULT CBTE .033 FN:29 FIELD 25-Feb-1998 06:59

Input DLIS Files

DEFAULT CBTE .027 FN:23 FIELD 25-Feb-1998 06:36 601.8 M 546.2 M

Output DLIS Files

DEFAULT CBTE .034 FN:30 FIELD 25-Feb-1998 07:00 601.8 M 546.2 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

INT CASING SHOE NO PRESSURE

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

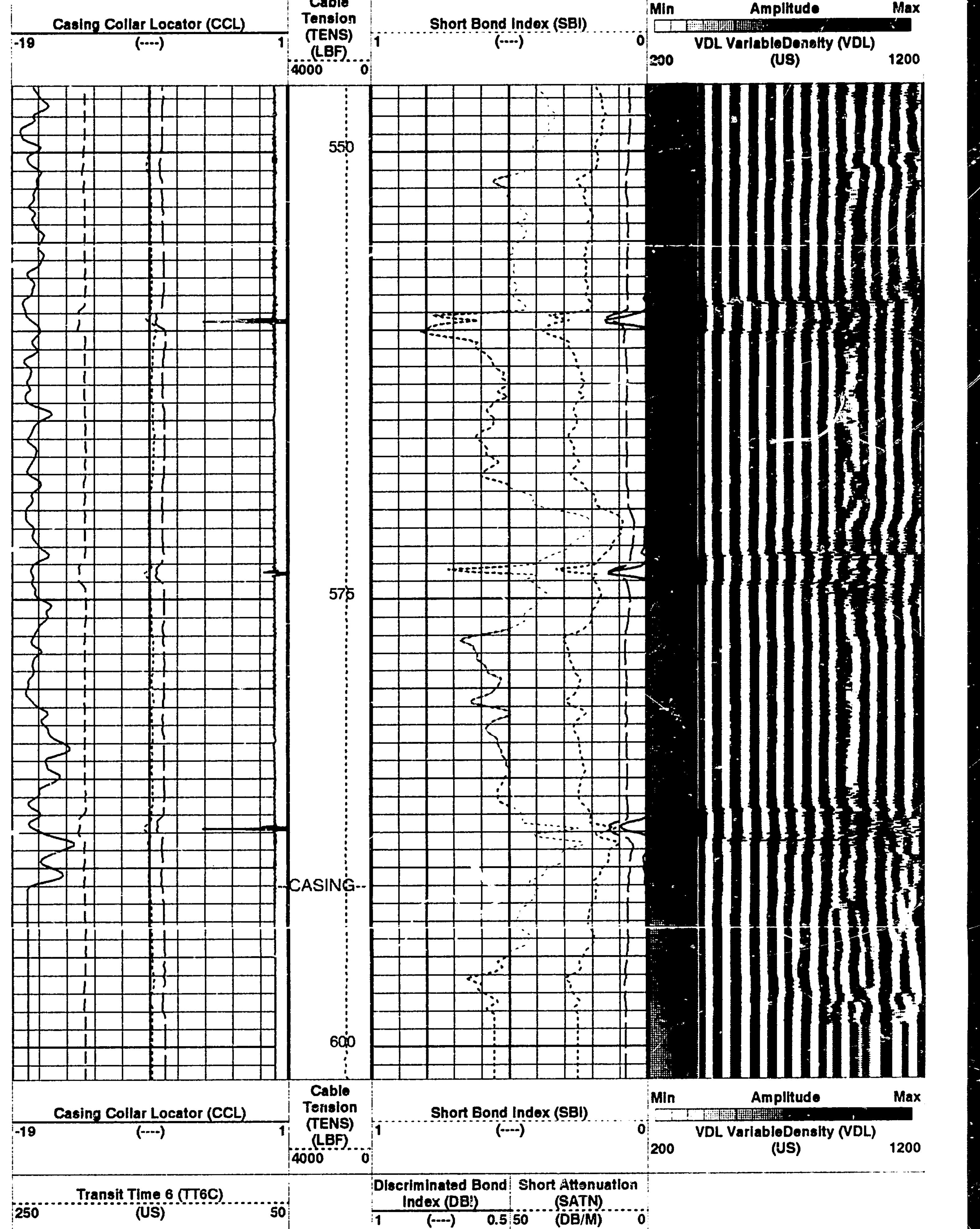
Short Attenuation (SATN)
50 (DB/M) 0

Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200



Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

Short Attenuation (SATN)
50 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

INT CASING SHOE NO PRESSURE

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	NORMAL	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 07:00

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .027 FN:23 FIELD 25-Feb-1998 06:36 601.8 M 546.2 M

Output DLIS Files

DEFAULT CBTE .034 FN:30 FIELD 25-Feb-1998 07:00

Input DLIS Files

DEFAULT CBTE .028 FN:24 FIELD 25-Feb-1998 06:37 411.3 M 294.3 M

Output DLIS Files

DEFAULT CBTE .035 FN:31 FIELD 25-Feb-1998 07:01 411.3 M 294.3 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

Short Attenuation (SATN)
50 (DB/M) 0

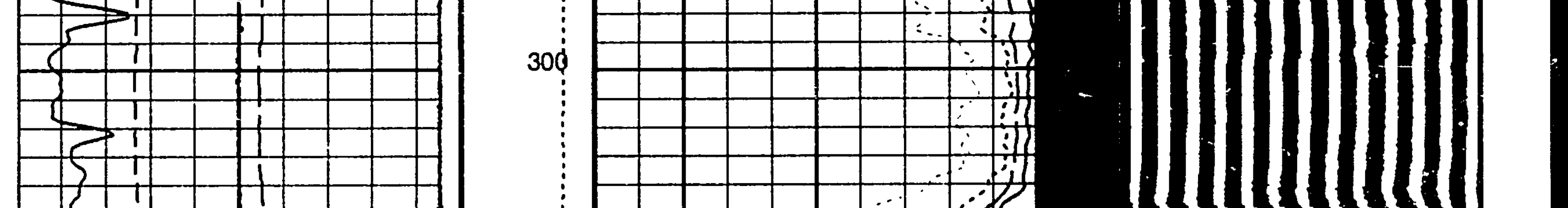
STAGE COLLAR NO PRESSURE

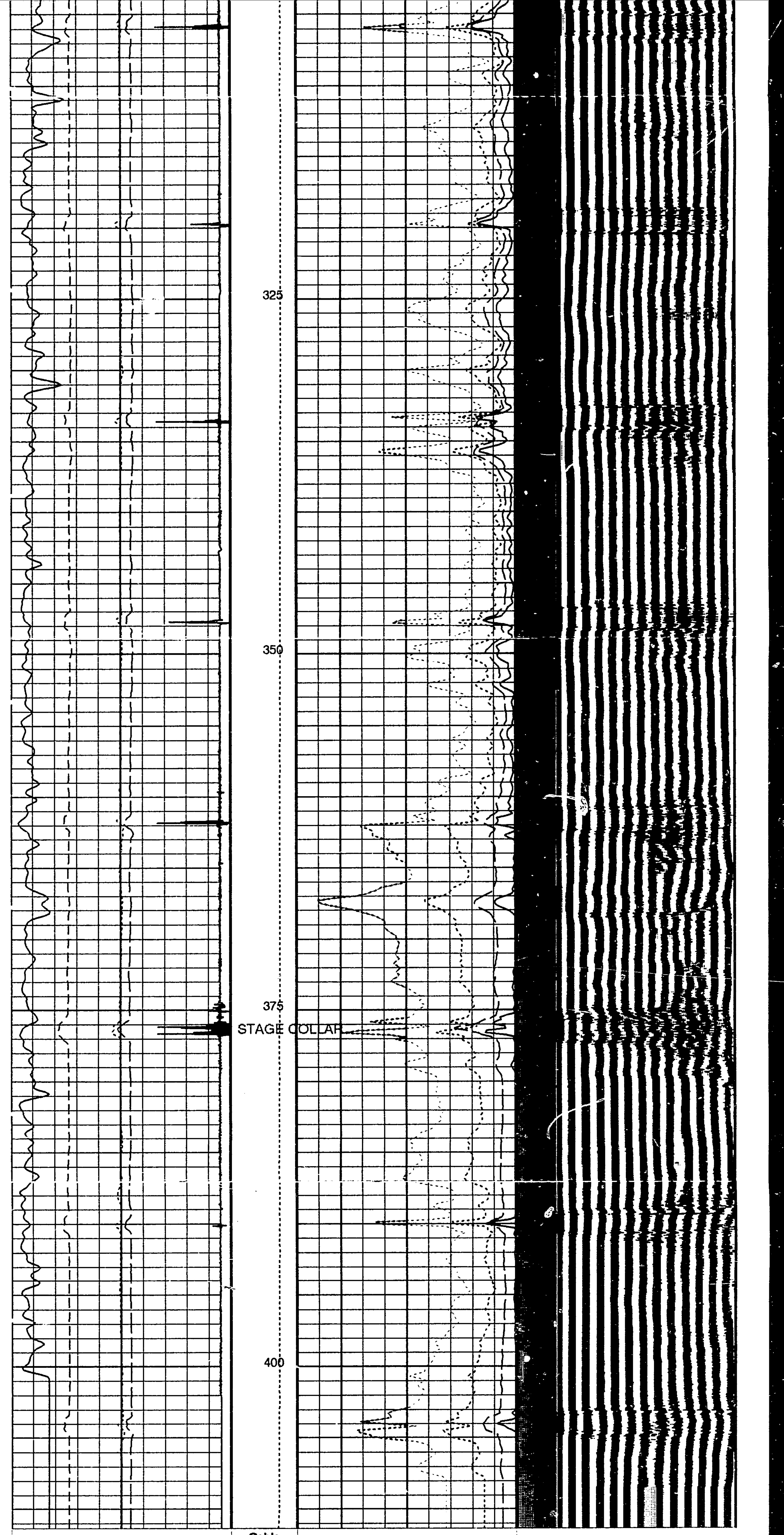
Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200





Casing Collar Locator (CCL)
-19 (----) 1

Cable Tension (TENS) (LBF)
4000 0

Short Bond Index (SBI)
1 (----) 0

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Discriminated Bond Index (DBI)
1 (----) 0.5

Short Attenuation (SATN)
50 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Short Bond Index (SBI)
1 (----) 0.5

Discriminated Attenuation (DATN)
50 (DB/M) 0

Transit Time 2 (TT2C)
350 (US) 150

SBI > 80% BOND

Near Pseudo-Attenuation (NATN)
50 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

DBI > 80% BOND

STAGE COLLAR NO PRESSURE

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AGC	Automatic Gain Control	ON	
AGPD	Amplitude Gate Past Detection	25	US
ALTDPCHAN	Alternate depth channel name	TVDE	
BILI	Bond Index Level of Zone Isolation	0.8	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CCLD	CCL reset delay	305	MM
CCLG	CBT CCL Gain	X1	
CCLT	CCL detection level	0.3	V
CMPM	Computation Mode	ALL	
CSRL	Cycle Skip Recovery Logic Algorithm	OFF	
CWEI	Casing Weight	34.20	KG/M
DDEL	Digitizing Delay	200	US
DFD	Drilling Fluid Density	-50000.00	K/M3
DO	Depth Offset	0.0	M
DPPM	Density Porosity Processing Mode	STAN	
DSIN	Digitizer Sample Interval	4	US
DTMD	Delta-T Mud	660	US/M
DWCO	Digitizer Word Count	250	
DWF	Digitized Waveforms	OFF	
FMSG	Far Minimum Sliding Gate	279	US
FTTM	Far Transit Time Minimum	289.899	US
GAI	Manual Gain	200	
GOBO	Good Bond	2	MV
LQMS	LQMS Coverage	NONE	
MATS	Maximum Attenuation Short	46	DB/M
MATT	Maximum Attenuation	38	DB/M
MCS	Mean Casing Slowness	187.008	US/M
MGAI	Maximum Gain	4000	
MODE	Firing Mode	ALL	
MST	Mud Sample Temperature	-50000.00	DEGC
MUXI	Multiplexor Input	RCVR	
NFPI	Near Free Pipe Sonic Amplitude	75	MV
NMSG	Near Minimum Sliding Gate	222	US
NTTM	Near Transit Time Minimum	232.899	US
PBVSADP	Alternate depth channel playback enabled	NO	
PP	Playback Processing	NORMAL	
R32R	R3 to R2 Sensitivity Ratio	0	DB/M
RATE	Firing Rate	R15	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
SALL	Sonic Amplitude Lower Limit	0.5	MV
SFPI	Short Free Pipe Sonic Amplitude	80	MV
SGAD	Sliding Gate	OFF	
SLEV	Signal Level for AGC	5000	MV
SMSG	Short Minimum Sliding Gate	131	US
T0CA	T0 Correction	ON	
TD	Total Depth	1923	M
TDD	Total Depth - Driller	1926.00	M
TDL	Total Depth - Logger	1923.00	M
TRAN	Transmitter	ON	
TTFF	Transit Time Correction Factor	15	US
TVCA	Transmitter Voltage Correction Algorithm	ON	
TWS	Temperature of Connate Water Sample	37.78	DEGC
UGAI	Uphole Gain	G3	
VDLG	VDL Manual Gain	200	
VDLM	VDL Firing Mode	LTR1	
VMSG	Very Far Minimum Sliding Gate	371	US
WERA	Wrong Echo Rejection Algorithm	ON	

Format: CBT_VDL Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 07:01

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT	CBTE .028	FN:24	FIELD	25-Feb-1998 06:37	411.3 M	294.3 M

Output DLIS Files

DEFAULT	CBTE .035	FN:31	FIELD	25-Feb-1998 07:01		

Input DLIS Files

DEFAULT	CBTE .024	FN:20	FIELD	25-Feb-1998 06:32	1924.4 M	1740.1 M

Output DLIS Files

DEFAULT	CBTE .031	FN:27	FIELD	25-Feb-1998 06:41	1924.4 M	1740.1 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Gamma Ray (GR)
0 (GAPI) 100

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

PRESSURE PASS 7 MPA

Transit Time 6 (TT6C)
250 (US) 50

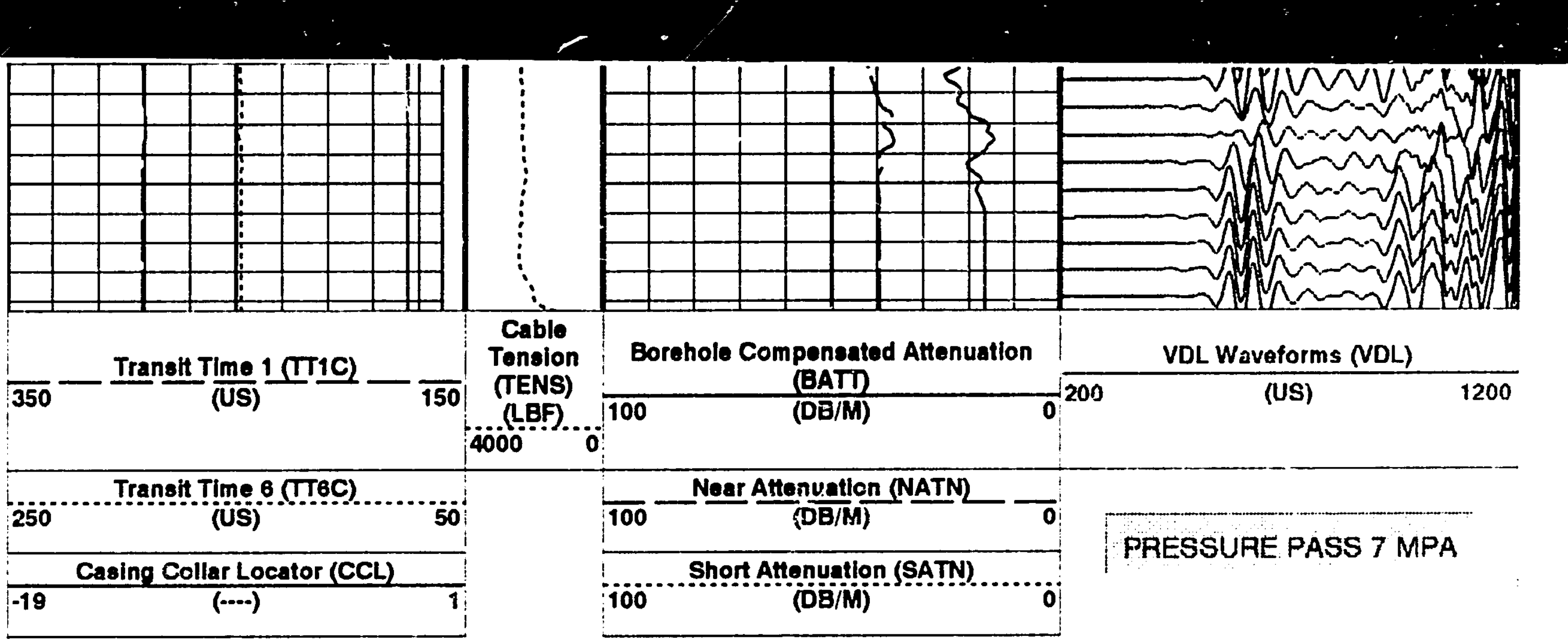
Near Attenuation (NATN)
100 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200



Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Near Attenuation (NATN)
100 (DB/M) 0

PRESSURE PASS 7 MPA

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:41

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Input DLIS Files

DEFAULT CBTE .024 FN:20 FIELD 25-Feb-1998 06:32 1924.4 M 1740.1 M

Output DLIS Files

DEFAULT CBTE .031 FN:27 FIELD 25-Feb-1998 06:41

Input DLIS Files

DEFAULT CBTE .013 FN:9 FIELD 25-Feb-1998 03:42 1923.6 M 1842.8 M

Output DLIS Files

DEFAULT CBTE .023 FN:19 FIELD 25-Feb-1998 06:30 1923.7 M 1843.1 M

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Gamma Ray (GR)
0 (GAPI) 100

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

Transit Time 6 (TT6C)
250 (US) 50

Near Attenuation (NATN)
100 (DB/M) 0

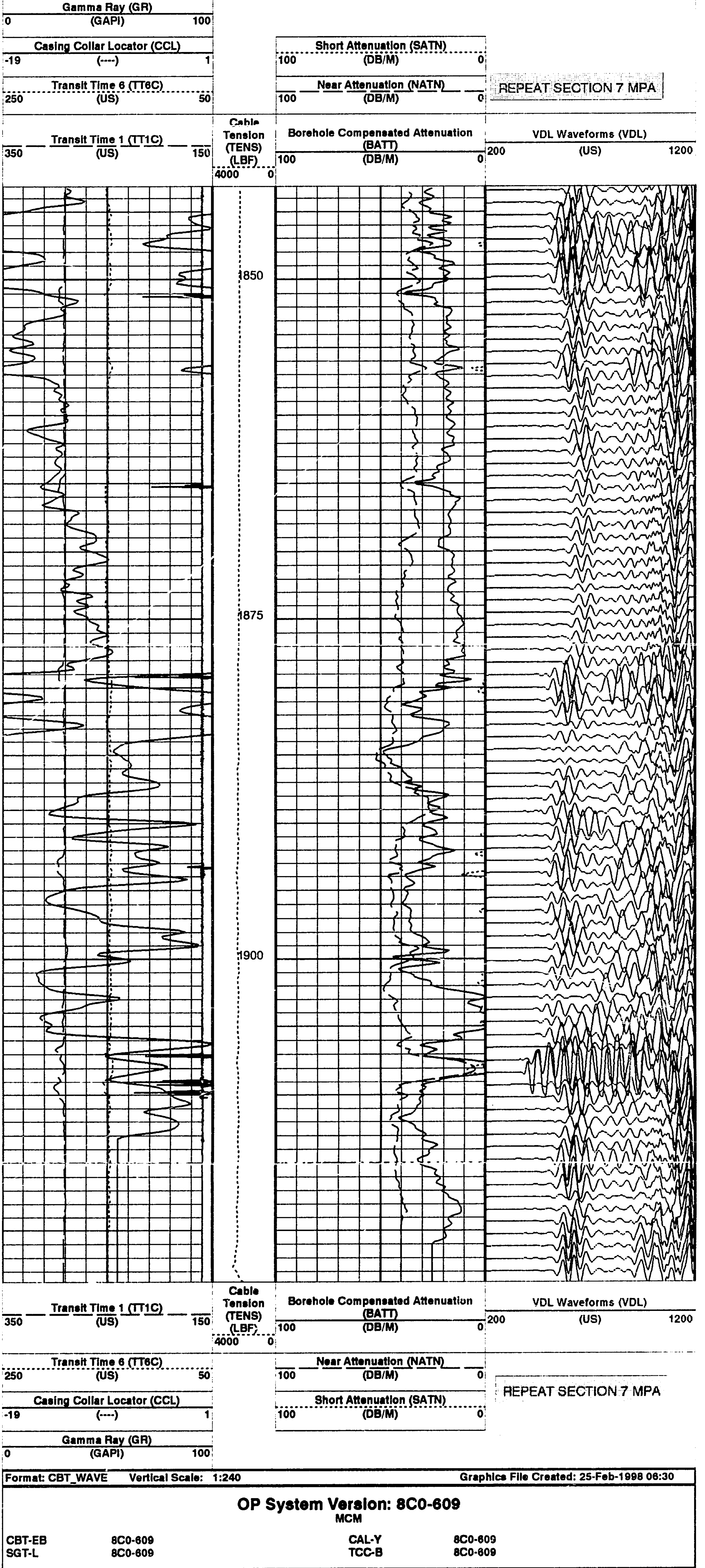
REPEAT SECTION 7 MPA

Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200



Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Near Attenuation (NATN)
100 (DB/M) 0

REPEAT SECTION 7 MPA

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:30

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Input DLIS Files

DEFAULT CBTE .013 FN:9 FIELD 25-Feb-1998 03:42 1923.6 M 1842.8 M

Output DLIS Files

DEFAULT CBTE .023 FN:19 FIELD 25-Feb-1998 06:30

Input DLIS Files

DEFAULT CBTE .012 FN:8 FIELD 25-Feb-1998 03:31 1923.7 M 1834.0 M

Output DLIS Files

DEFAULT CBTE .022 FN:18 FIELD 25-Feb-1998 06:05 1924.2 M 1834.4 M

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Gamma Ray (GR)
0 (GAPI) 100

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

REPEAT PASS 0 MPA

Transit Time 6 (TT6C)
250 (US) 50

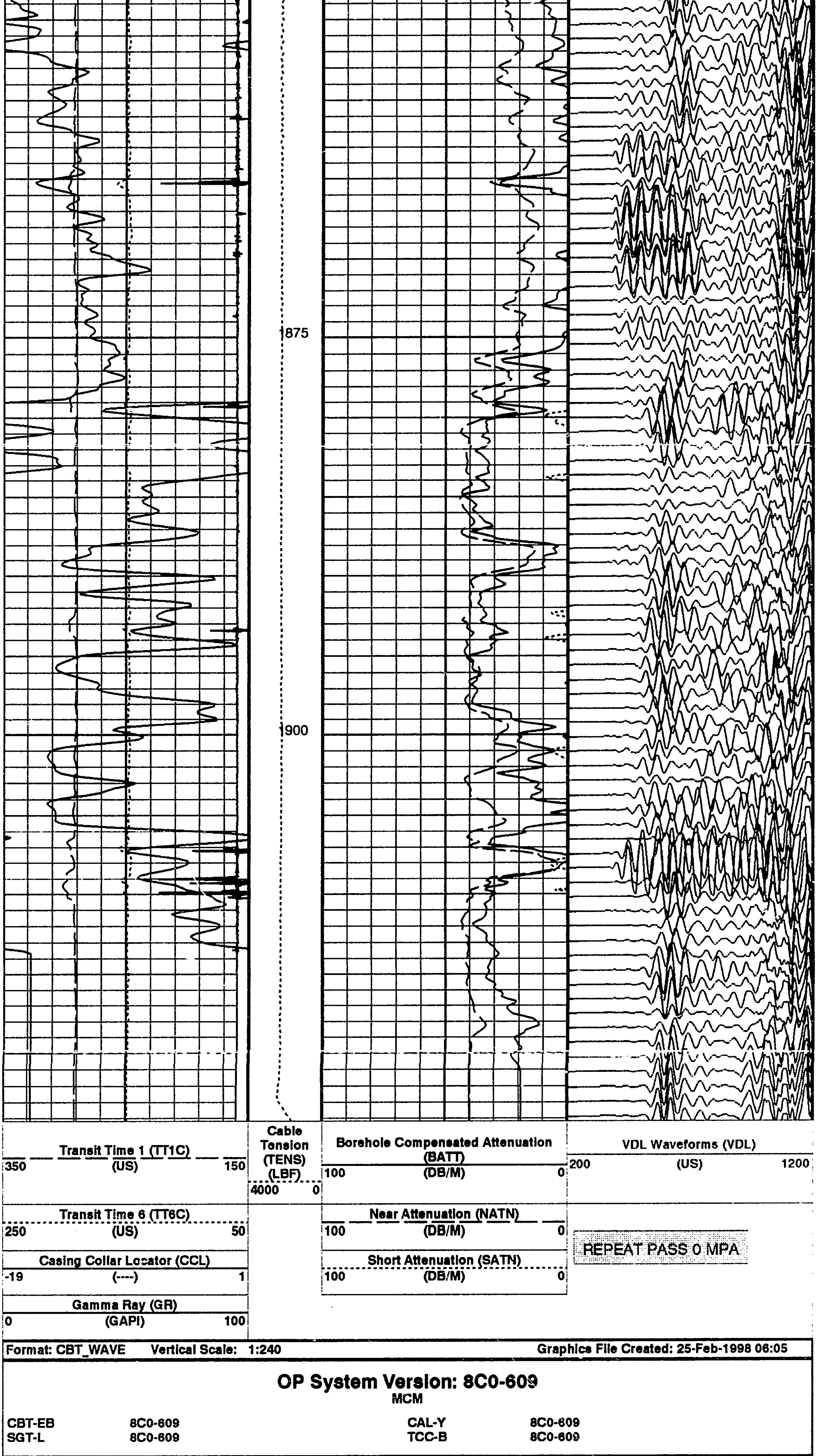
Near Attenuation (NATN)
100 (DB/M) 0

Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200



Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200

Transit Time 6 (TT6C)
250 (US) 50

Near Attenuation (NATN)
100 (DB/M) 0

REPEAT PASS 0 MPA

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

Gamma Ray (GR)
0 (GAPI) 100

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:05

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Input DLIS Files

DEFAULT CBTE .012 FN:8 FIELD 25-Feb-1998 03:31 1923.7 M 1834.0 M

Output DLIS Files

DEFAULT CBTE .022 FN:18 FIELD 25-Feb-1998 06:05

Input DLIS Files

DEFAULT CBTE .017 FN:13 FIELD 25-Feb-1998 04:51 1750.9 M 1690.3 M

Output DLIS Files

DEFAULT CBTE .025 FN:21 FIELD 25-Feb-1998 06:33 1751.2 M 1690.6 M

OP System Version: 8C0-609

MCM

CBT-EB 8C0-609 CAL-Y 8C0-609
SGT-L 8C0-609 TCC-B 8C0-609

Gamma Ray (GR)
0 (GAPI) 100

NO PRESSURE

Casing Collar Locator (CCL)
-19 (----) 1

Short Attenuation (SATN)
100 (DB/M) 0

Transit Time 6 (TT6C)
250 (US) 50

Near Attenuation (NATN)
100 (DB/M) 0

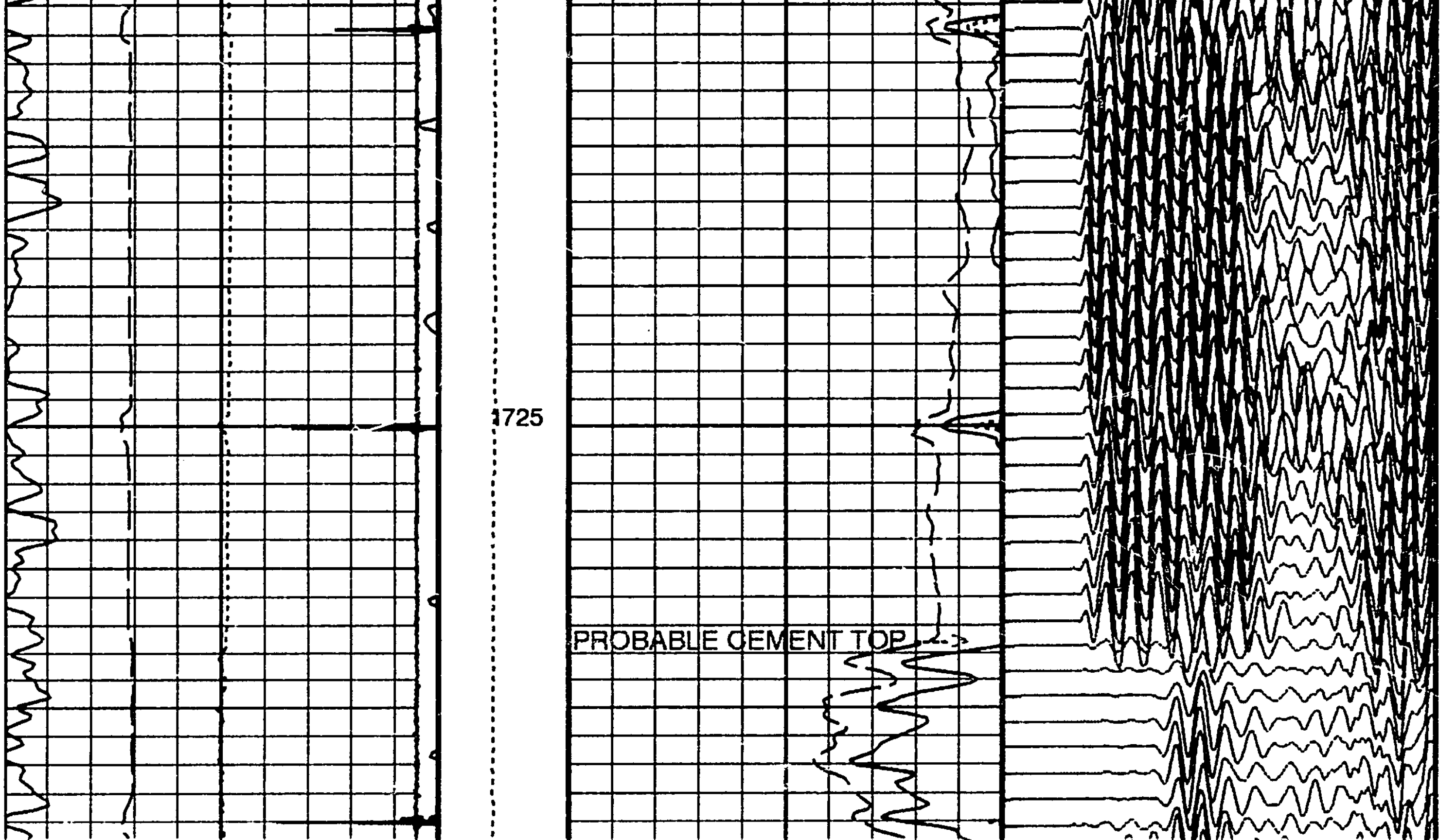
STAGE 2 CEMENT TOP

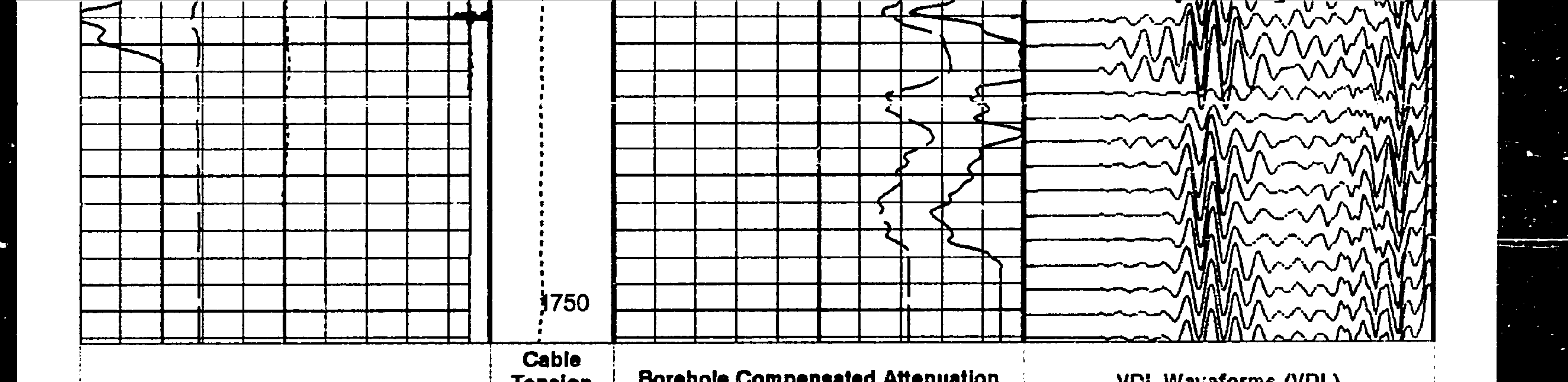
Transit Time 1 (TT1C)
350 (US) 150

Cable Tension (TENS) (LBF)
4000 0

Borehole Compensated Attenuation (BATT)
100 (DB/M) 0

VDL Waveforms (VDL)
200 (US) 1200





Transit Time 1 (TT1C) 350 (US) 150
Cable Tension (TENS) (LBF) 4000 0
Borehole Compensated Attenuation (BATT) 100 (DB/M) 0
VDL Waveforms (VDL) 200 (US) 1200
Transit Time 6 (TT6C) 250 (US) 50
Near Attenuation (NATN) 100 (DB/M) 0
STAGE 2 CEMENT TOP
Casing Collar Locator (CCL) -19 (----) 1
Short Attenuation (SATN) 100 (DB/M) 0
NO PRESSURE
Gamma Ray (GR) 0 (GAPI) 100

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:33

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .017 FN:13 FIELD 25-Feb-1998 04:51 1750.9 M 1690.3 M

Output DLIS Files

DEFAULT CBTE .025 FN:21 FIELD 25-Feb-1998 06:33

Input DLIS Files

DEFAULT CBTE .026 FN:22 FIELD 25-Feb-1998 06:34 1403.6 M 1296.5 M

Output DLIS Files

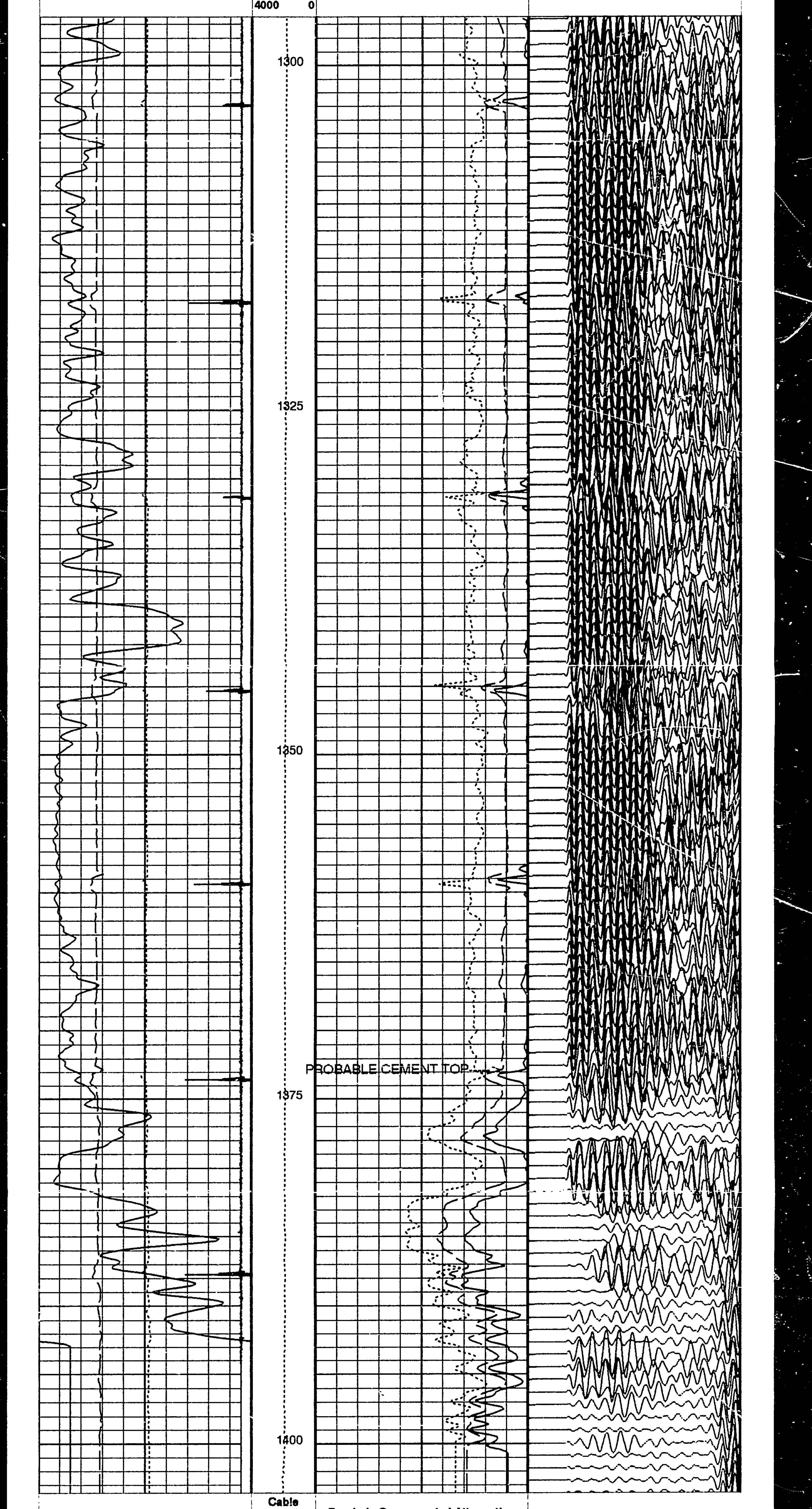
DEFAULT CBTE .033 FN:29 FIELD 25-Feb-1998 06:59 1403.6 M 1296.5 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Gamma Ray (GR) 0 (GAPI) 100
STAGE 1 CEMENT TOP NO PRESSURE
Casing Collar Locator (CCL) -19 (----) 1
Short Attenuation (SATN) 100 (DB/M) 0
Transit Time 6 (TT6C) 250 (US) 50
Near Attenuation (NATN) 100 (DB/M) 0
Transit Time 1 (TT1C) 350 (US) 150
Cable Tension (TENS) (LBF) 4000 0
Borehole Compensated Attenuation (BATT) 100 (DB/M) 0
VDL Waveforms (VDL) 200 (US) 1200



Transit Time 1 (TT1C) 350 (US) 150
Cable Tension (TENS) (LBF) 4000 0
Borehole Compensated Attenuation (BATT) 100 (DB/M) 0
VDL Waveforms (VDL) 200 (US) 1200
Transit Time 6 (TT6C) 250 (US) 50
Near Attenuation (NATN) 100 (DB/M) 0
Casing Collar Locator (CCL) -19 (----) 1
Short Attenuation (SATN) 100 (DB/M) 0
Gamma Ray (GR) 0 (GAPI) 100
STAGE 1 CEMENT TOP NO PRESSURE

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:59

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .026 FN:22 FIELD 25-Feb-1998 06:34 1403.6 M 1296.5 M

Output DLIS Files

DEFAULT CBTE .033 FN:29 FIELD 25-Feb-1998 06:59

Input DLIS Files

DEFAULT CBTE .027 FN:23 FIELD 25-Feb-1998 06:36 601.8 M 546.2 M

Output DLIS Files

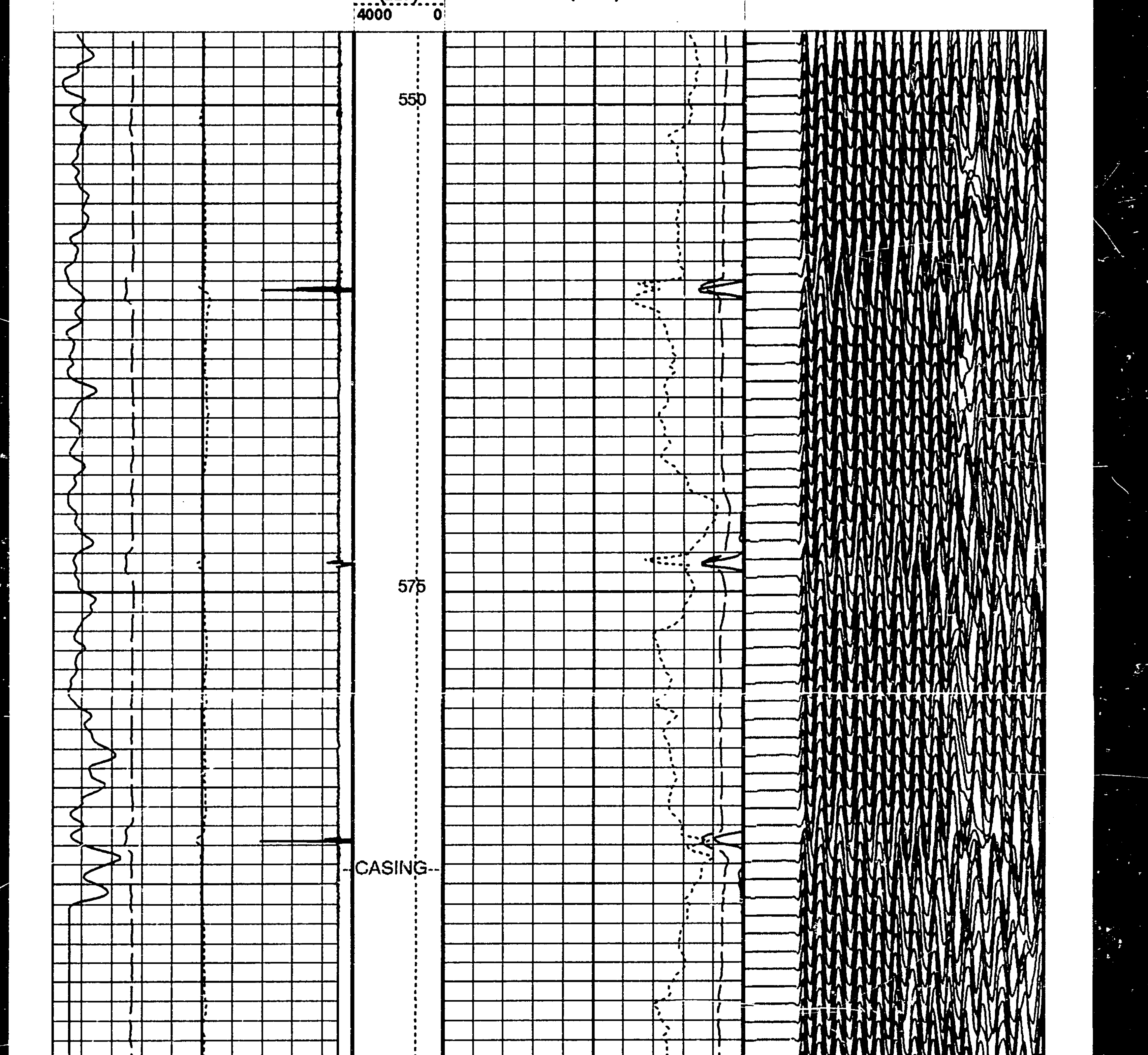
DEFAULT CBTE .034 FN:30 FIELD 25-Feb-1998 07:00 601.8 M 546.2 M

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Gamma Ray (GR) 0 (GAPI) 100
INT CASING SHOE NO PRESSURE
Casing Collar Locator (CCL) -19 (----) 1
Short Attenuation (SATN) 100 (DB/M) 0
Transit Time 6 (TT6C) 250 (US) 50
Near Attenuation (NATN) 100 (DB/M) 0
Transit Time 1 (TT1C) 350 (US) 150
Cable Tension (TENS) (LBF) 4000 0
Borehole Compensated Attenuation (BATT) 100 (DB/M) 0
VDL Waveforms (VDL) 200 (US) 1200



Transit Time 1 (TT1C) 350 (US) 150
Cable Tension (TENS) (LBF) 4000 0
Borehole Compensated Attenuation (BATT) 100 (DB/M) 0
VDL Waveforms (VDL) 200 (US) 1200
Transit Time 6 (TT6C) 250 (US) 50
Near Attenuation (NATN) 100 (DB/M) 0
Casing Collar Locator (CCL) -19 (----) 1
Short Attenuation (SATN) 100 (DB/M) 0
INT CASING SHOE NO PRESSURE
Gamma Ray (GR) 0 (GAPI) 100

Format: CBT_WAVE Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 07:00

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .027 FN:23 FIELD 25-Feb-1998 06:36 601.8 M 546.2 M

Output DLIS Files

DEFAULT CBTE .034 FN:30 FIELD 25-Feb-1998 07:00

Input DLIS Files

DEFAULT CBTE .024 FN:20 FIELD 25-Feb-1998 06:32 1924.4 M 1740.1 M

Output DLIS Files

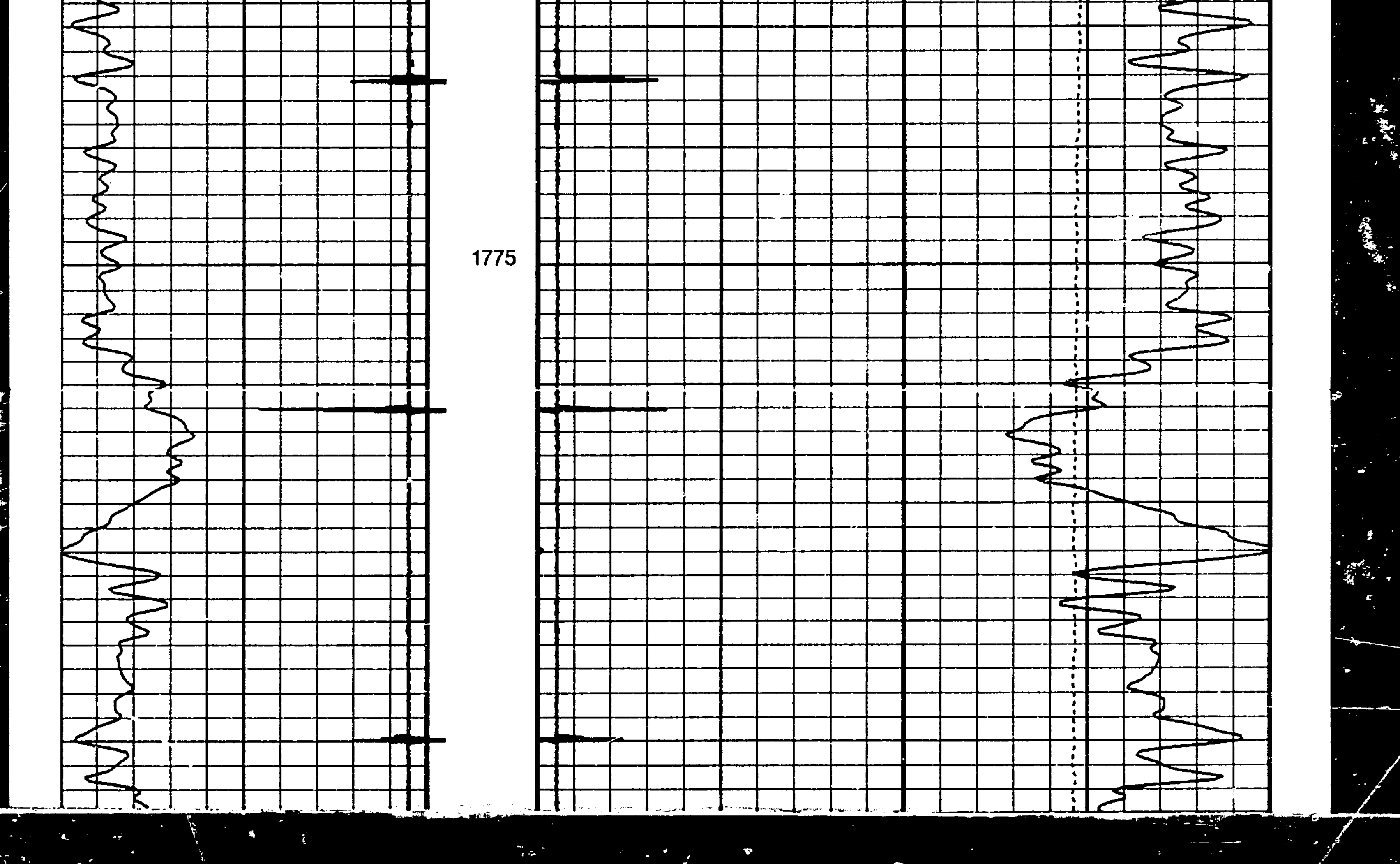
DEFAULT CBTE .031 FN:27 FIELD 25-Feb-1998 06:41 1924.4 M 1740.1 M

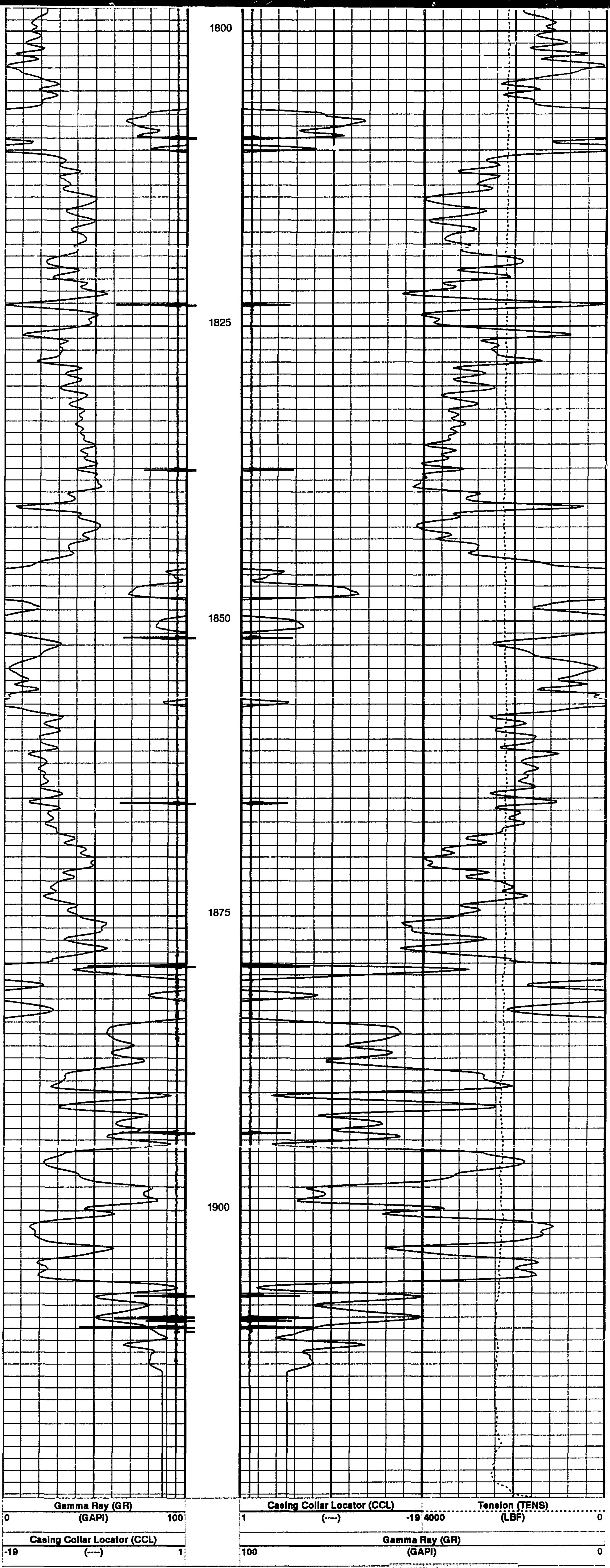
OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

PIP SUMMARY
CORRELATION PASS
⊢ Casing Collars
Casing Collar Locator (CCL) -19 (----) 1
Gamma Ray (GR) 100 (GAPI) 0
Gamma Ray (GR) 0 (GAPI) 100
Casing Collar Locator (CCL) 1 (----) -19
Tension (TENS) 4000 (LBF) 0





PIP SUMMARY

⊢ Casing Collars

CORRELATION PASS

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V
DO	Depth Offset	0.0	M
PP	Playback Processing	NORMAL	

Format: CORRELATION Vertical Scale: 1:240 Graphics File Created: 25-Feb-1998 06:41

OP System Version: 8C0-609

MCM

CBT-EB	8C0-609	CAL-Y	8C0-609
SGT-L	8C0-609	TCC-B	8C0-609

Input DLIS Files

DEFAULT CBTE .024 FN:20 FIELD 25-Feb-1998 06:32 1924.4 M 1740.1 M

Output DLIS Files

DEFAULT CBTE .031 FN:27 FIELD 25-Feb-1998 06:41

COMPANY	RANGER OIL LIMITED	BOTTOM LOG INTERVAL	1921 M
		SCHLUMBERGER DEPTH	1923 M
WELL	RANGER NOTA CREEK C-17	DEPTH DRILLER	1926 M
FIELD	NOTA CREEK	KELLY BUSHING	172.22 M
TERRITORY	N.W.T.	DRILL FLOOR	
		GROUND LEVEL	168.22 M

Schlumberger

COMPENSATED CEMENT BOND LOG

N.E.B. COPY *NEB/* *1831*

COMPANY: RANGER OIL LIMITED

WELL: RANGER NOTA CREEK C-17

FIELD: NOTA CREEK

TERRITORY: N.W.T.

9211-R36-2-1

Schlumberger

COMPLETION RECORD
GUN - PLUG

TERRITORY: N.W.T.
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

LOCATION	C-17-65-10-126	Elev.	K.B	172.22 M
			G.L	168.22 M
			D.F.	

Permanent Datum:	GROUND LEVEL	Elev.:	168.22 M
Log Measured From:	KELLY BUSHING	4.0 M	above Perm Datum
Drilling Measured From:	KELLY BUSHING		

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	4-MAR-1998	
Run Number	1	
Depth Driller	1953 M	
Schlumberger Depth		
Bottom Log Interval	1925 M	
Top Log Interval	275 M	
Casing Fluid Type	WATER	
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size	222.000 MM	
From		
To		
Casing/Tubing Size	177.800 MM	
Weight	34.2 KG/M	
Grade		
From		
To	1953 M	
Maximum Recorded Temperatures		
Logger On Bottom Time	3-MAR-1998 21:00	
Unit Number Location	2 NORMAN WELLS	
Recorded By	GREG MCISAAC	
Witnessed By	ANDY GORUK	

	Run 1	Run 2	Run 3	Run 4
PVT DATA				
Oil Density				
Water Salinity				
Gas Gravity				
Bo				
Bw				
1/Bg				
Bubble Point Pressure				
Bubble Point Temperature				
Solution GOR				
Maximum Deviation				
CEMENTING DATA				
Primary/Squeeze	Primary			
Casing String No				
Lead Cement Type				
Volume				
Density				
Water Loss				
Additives				
Tail Cement Type				
Volume				
Density				
Water Loss				
Additives				
Expected Cement Top				

Logging Date		
Run Number		
Depth Driller		
Schlumberger Depth		
Bottom Log Interval		
Top Log Interval		
Casing Fluid Type		
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size		
From		
To		
Casing/Tubing Size		
Weight		
Grade		
From		
To		
Maximum Recorded Temperatures		
Logger On Bottom Time		
Unit Number Location		
Recorded By		
Witnessed By		

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1
OS1: CEMENT
OS2:
OS3:
OS4:
OS5:

OTHER SERVICES2
OS1:
OS2:
OS3:
OS4:
OS5:

REMARKS: RUN NUMBER 1
CORRELATED TO SOC NEUTRON DENSITY DATED 13-JAN-98 AND 10-FEB-1998
DID NOT GO TO PBTD
SET PLUG AT .25
DUMPED 8 M CEMENT, BUT PLUG DID NOT HOLD PRESSURE
SET PLUG AT 20. DUMPED 4 M OF CEMENT
SHOT 303-305, 3 5-295.5 M KB, WITH 114 3MM GUN 37 g CHARGE

REMARKS: RUN NUMBER 2

	RUN 1	RUN 2
SERVICE ORDER #:	1210882	
PROGRAM VERSION:	8C0-609	
FLUID LEVEL:		
LOGGED INTERVAL	START / STOP	START / STOP

EQUIPMENT DESCRIPTION

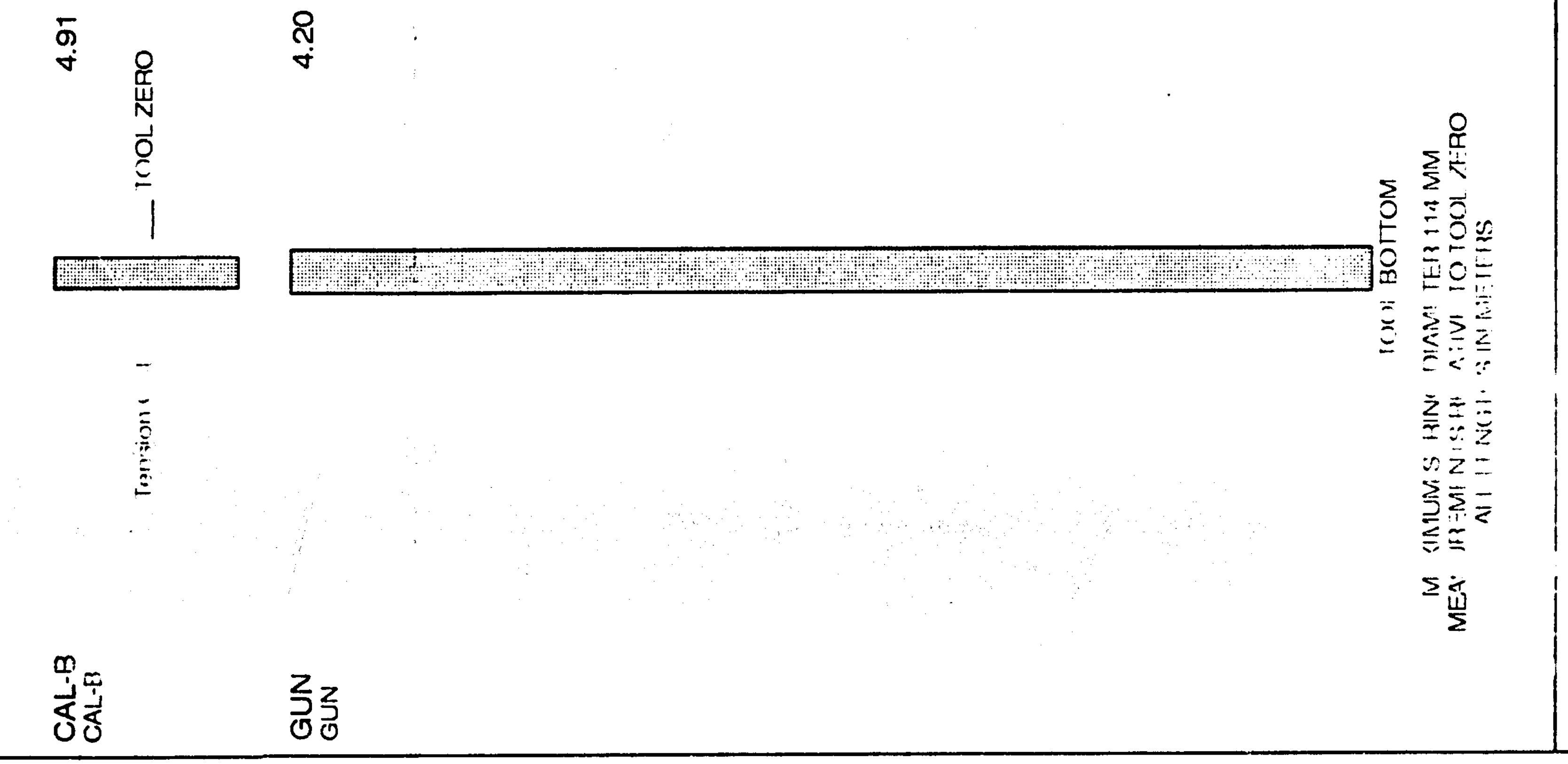
RUN 1

SURFACE EQUIPMENT

SHM-EA

DOWNHOLE EQUIPMENT

RUN 2



Output DLIS Files

DEFAUL GUN .057 FN:48 FIELD 04-Mar-1998 17:19 325.5 M 267.0 M

OP System Version: 8C0-609

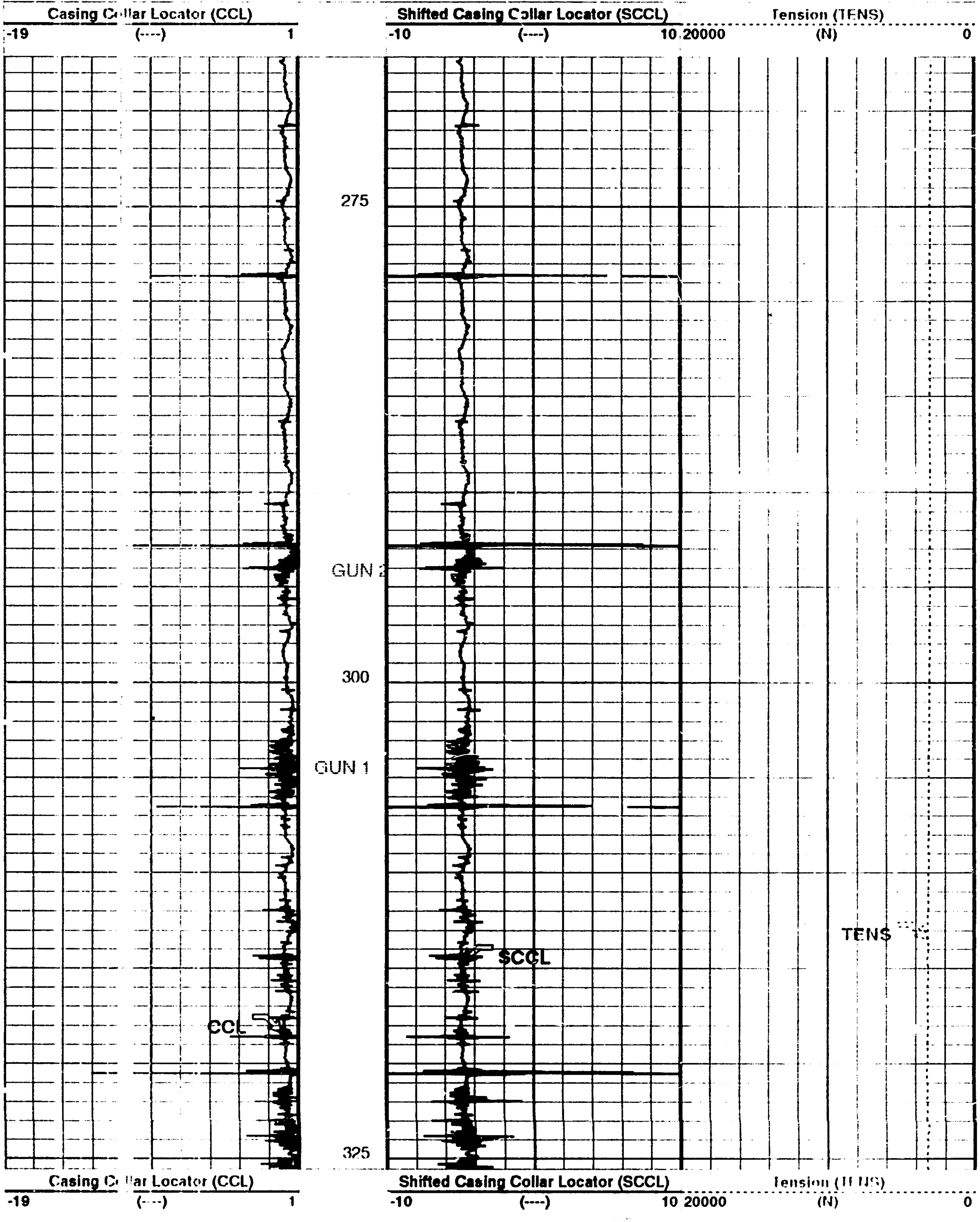
MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY

AFTER PERF LOG

Time Mark Every 60 S



PIP SUMMARY

AFTER PERF LOG

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFC Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 17:19

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

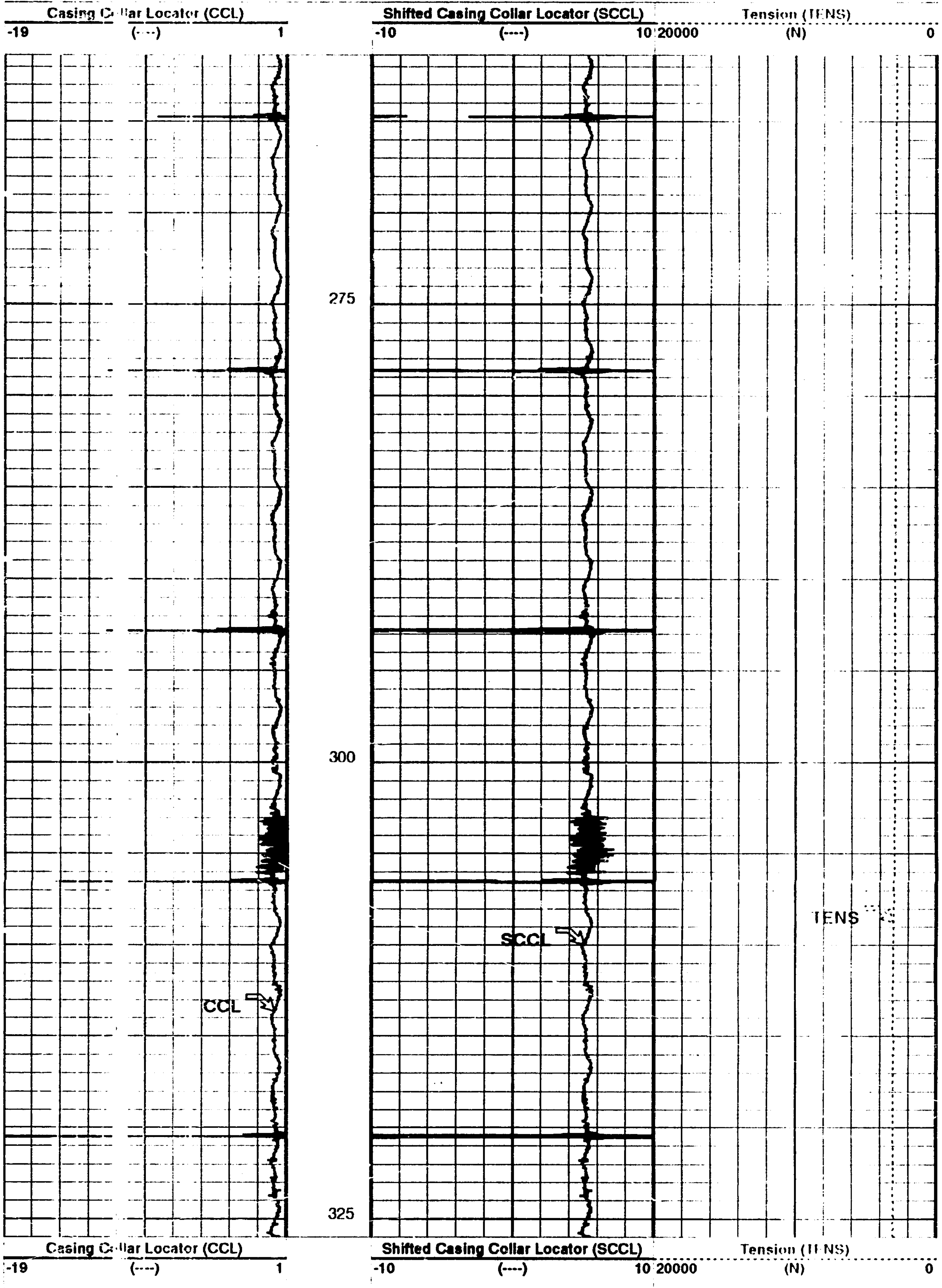
Output DLIS Files

DEFAUL GUN .057 FN:48 FIELD 04-Mar-1998 17:19

PIP SUMMARY

TIE IN GUN 2

Time Mark Every 60 S



PIP SUMMARY

TIE IN GUN 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Output DLIS Files

DEFAUL GUN .056 FN:47 FIELD 04-Mar-1998 17:14 325.1 M 272.7 M

OP System Version: 8C0-609

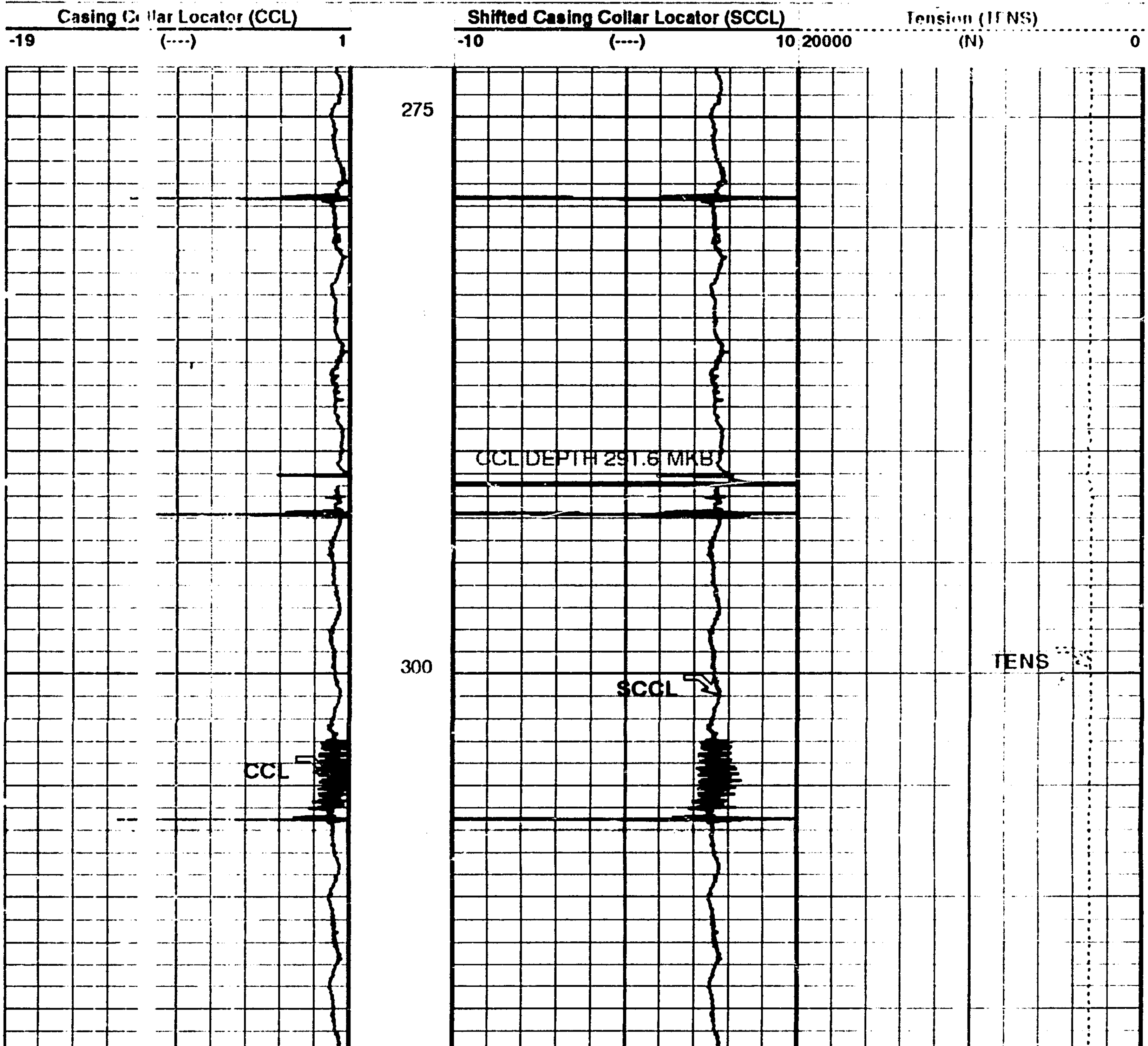
MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY

POSITION AND SHOOT GUN 2

Time Mark Every 60 S



PIP SUMMARY

POSITION AND SHOOT GUN 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFC Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 17:14

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

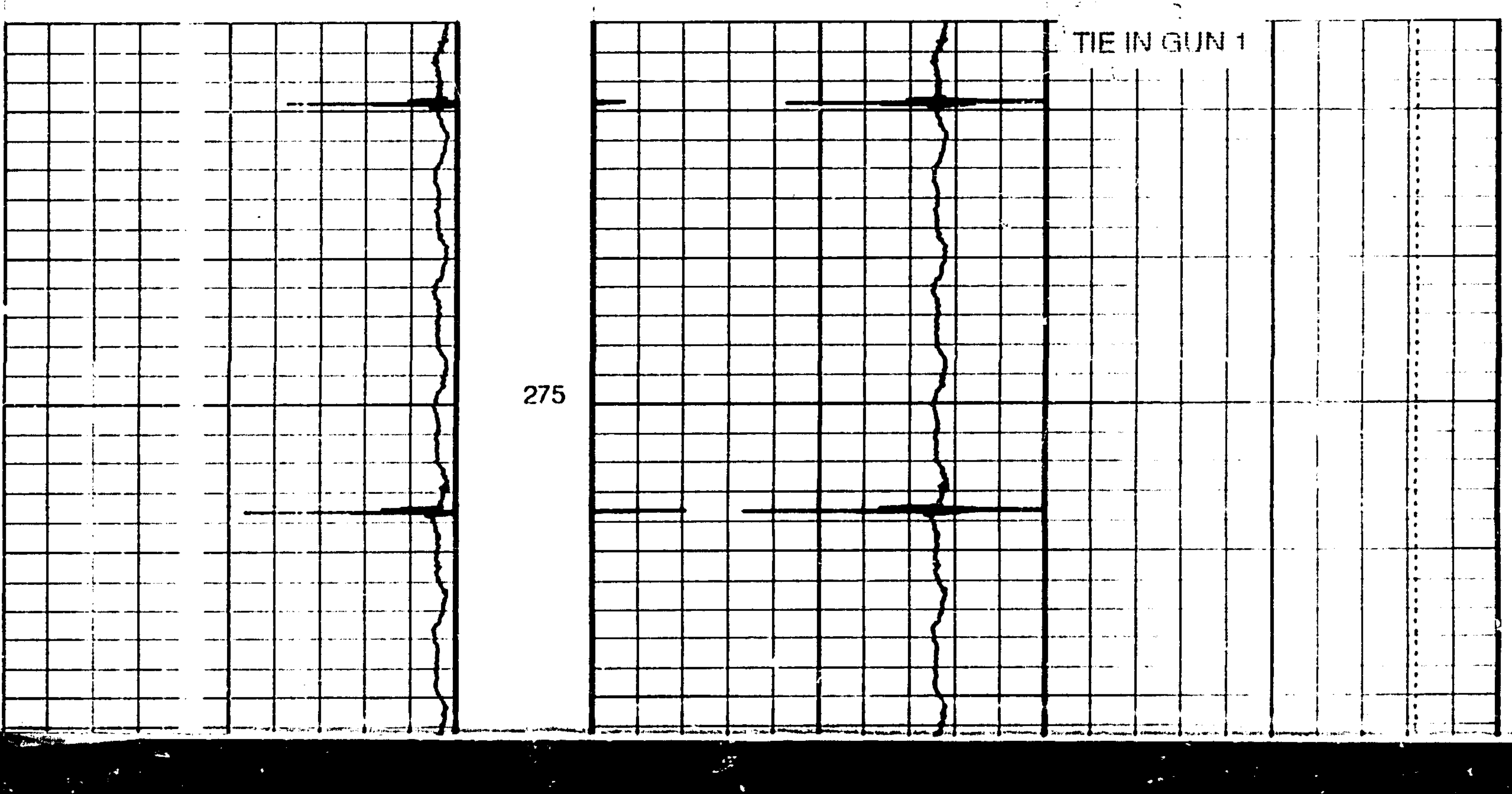
DEFAUL GUN .056 FN:47 FIELD 04-Mar-1998 17:14

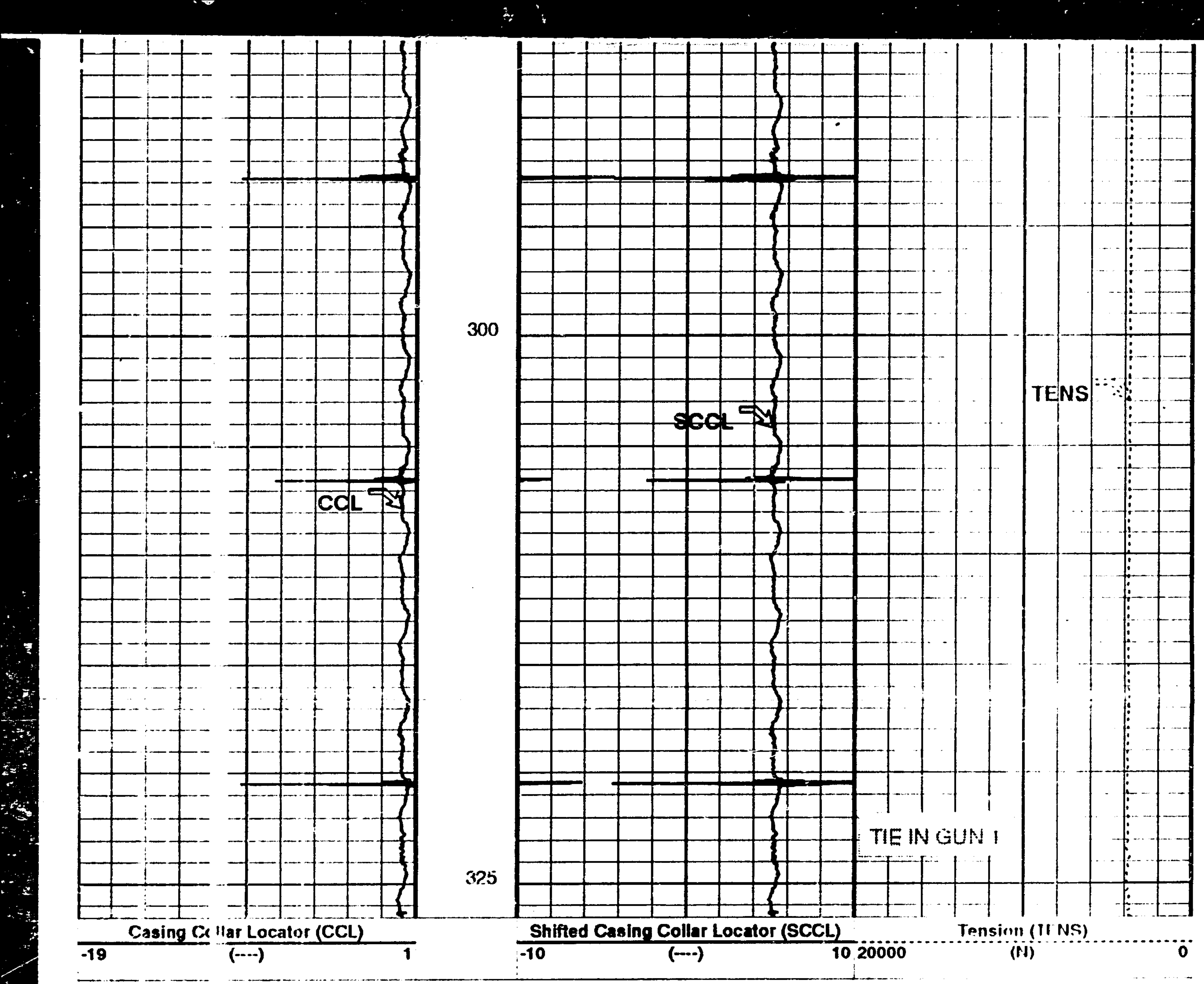
```
PERFO2 Operational Summary Listing

Devic  Status  Req Depth ( M)  Obs Depth ( M)  Time Used
-----  ------  --------------  --------------  ------------------------
GUN1   Used             293.5           293.5  Wed Mar 04 17:17:44 1998
51B H  II 37g CHARGES
2.0 M LOADED INTERVAL
1.9 M FROM CC TO TOP SHOT
```

PIP SUMMARY

Time Mark Every 60 S





PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Output DLIS Files

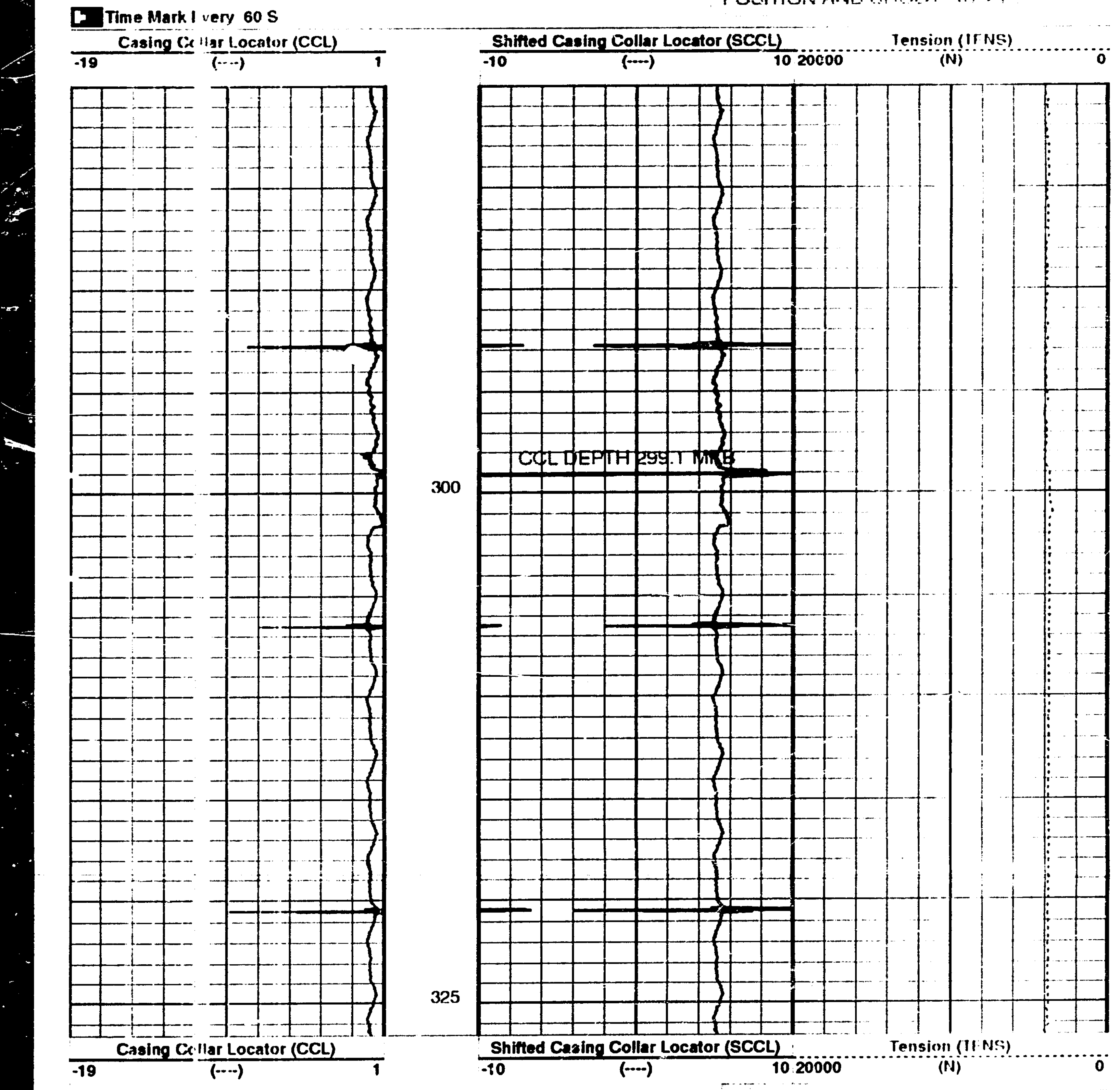
DEFAULT	GUN .054	FN:46	FIELD	04-Mar-1998 16:33	326.6 M	280.0 M

OP System Version: 8C0-609
MCM

GUN	8C0-609	CAL-B	8C0-609

PIP SUMMARY POSITION AND SHOOT GUN 1

Time Mark Every 60 S



PIP SUMMARY POSITION AND SHOOT GUN 1

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 16:33

OP System Version: 8C0-609
MCM

GUN	8C0-609	CAL-B	8C0-609

Output DLIS Files

DEFAULT	GUN .054	FN:46	FIELD	04-Mar-1998 16:33

```
                PERFO2 Operational Summary Listing

Devic   Status  Req Depth ( M)  Obs Depth ( M)  Time Used
-----   ------  --------------  --------------  ---------------------
GUN1    Used             303.0           303.0  Wed Mar 04 16:36:09 1998
3.9 M FROM CCL TO TOP SHOT
51B HJ II 37g CHARGES
3.0 M LOADED INTERVAL
```

Output DLIS Files

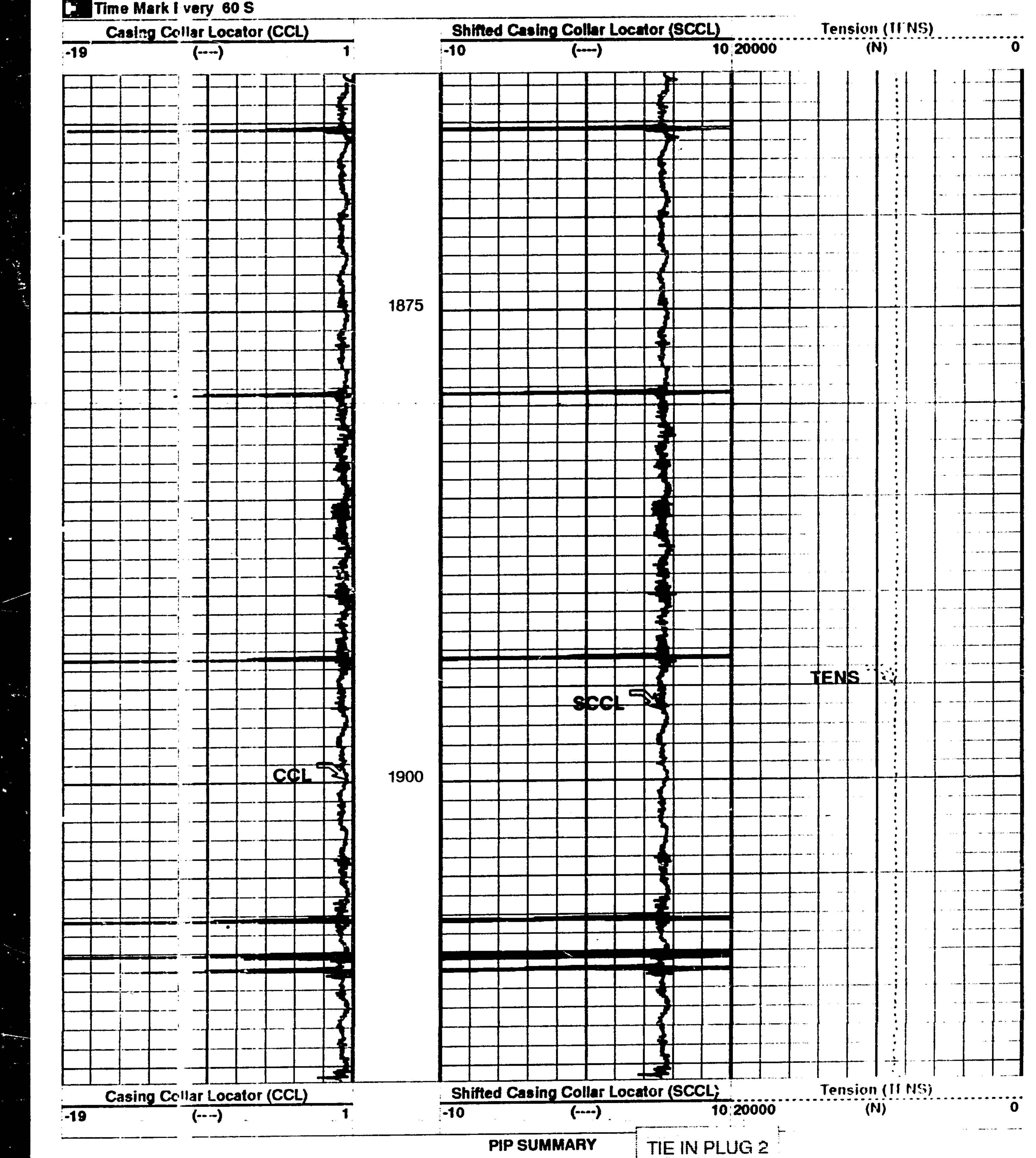
DEFAULT	PLUG .051	FN:44	FIELD	04-Mar-1998 13:26	1915.8 M	1862.3 M

OP System Version: 8C0-609
MCM

PLUG	8C0-609	CAL-B	8C0-609

PIP SUMMARY TIE IN PLUG 2

Time Mark Every 60 S



PIP SUMMARY TIE IN PLUG 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 13:26

OP System Version: 8C0-609
MCM

PLUG	8C0-609	CAL-B	8C0-609

Output DLIS Files

DEFAULT	PLUG .051	FN:44	FIELD	04-Mar-1998 13:26

Output DLIS Files

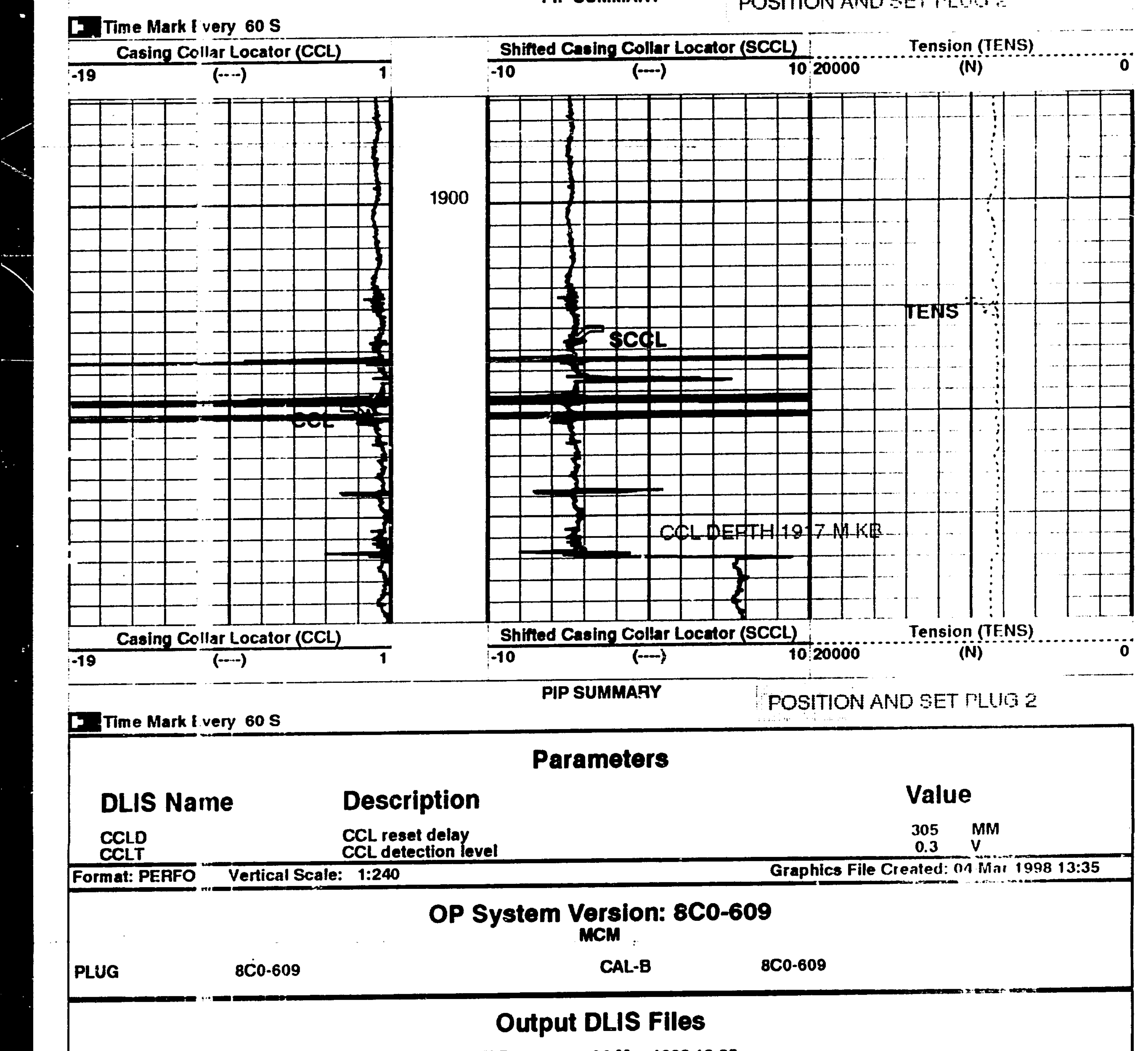
DEFAULT	PLUG .052	FN:45	FIELD	04-Mar-1998 13:35	1919.9 M	1894.8 M

OP System Version: 8C0-609
MCM

PLUG	8C0-609	CAL-B	8C0-609

PIP SUMMARY POSITION AND SET PLUG 2

Time Mark Every 60 S



PIP SUMMARY POSITION AND SET PLUG 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 13:35

OP System Version: 8C0-609
MCM

PLUG	8C0-609	CAL-B	8C0-609

Output DLIS Files

DEFAULT	PLUG .052	FN:45	FIELD	04-Mar-1998 13:35

Output DLIS Files

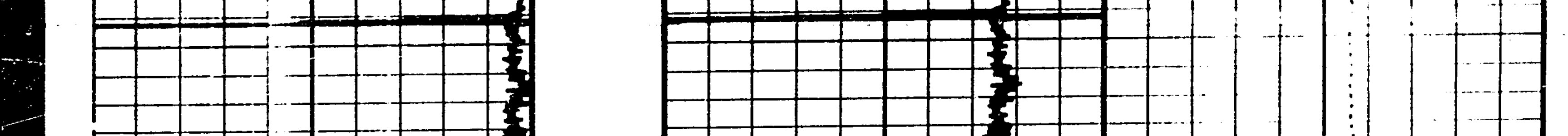
DEFAULT	PLUG .039	FN:34	FIELD	03-Mar-1998 20:54	1912.9 M	1863.5 M

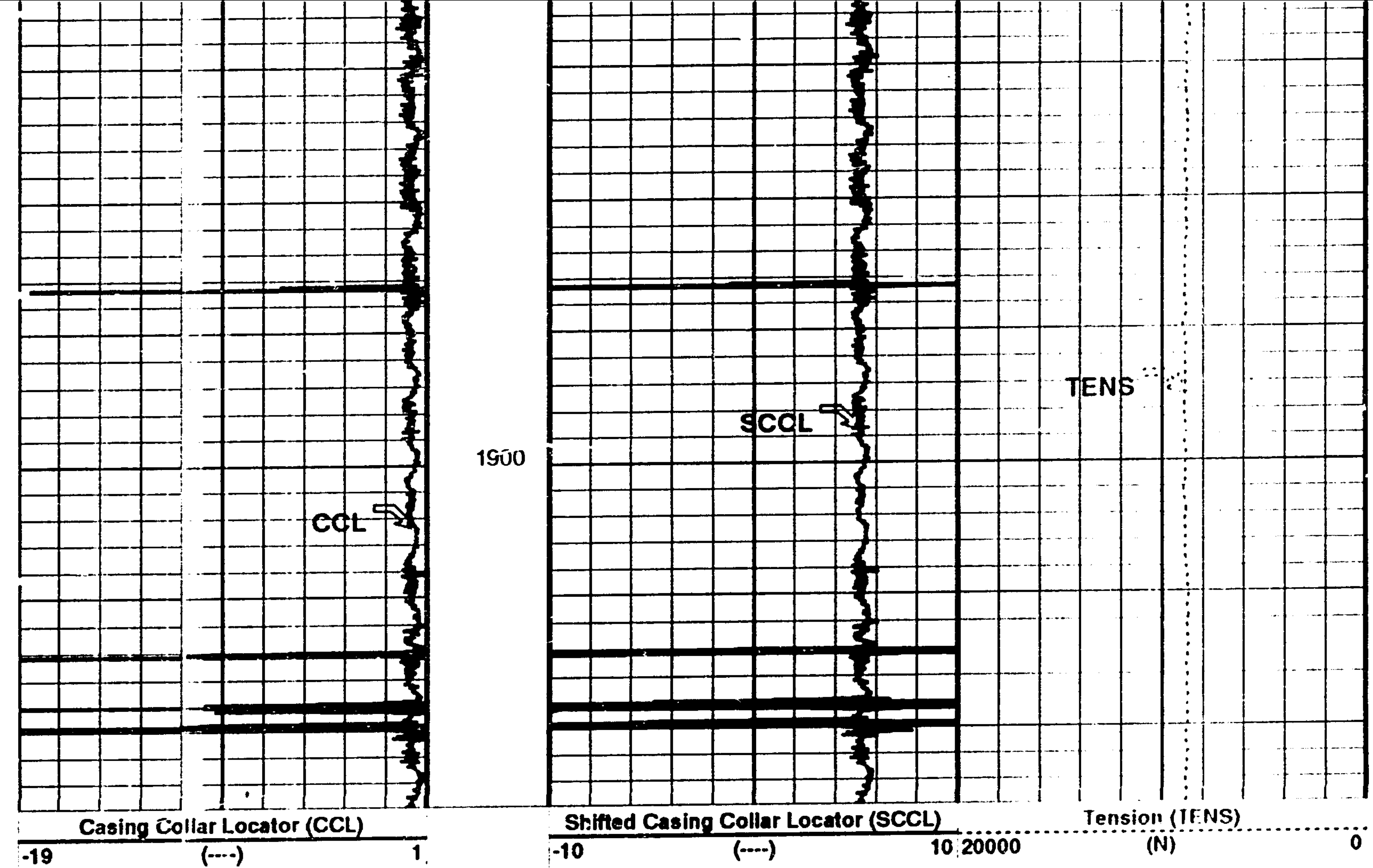
OP System Version: 8C0-609
MCM

PLUG	8C0-609	CAL-B	8C0-609

PIP SUMMARY TIE IN PLUG

Time Mark Every 60 S





PIP SUMMARY TIE IN PLUG

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 03 Mar 1998 20:54

OP System Version: 8C0-609

MCM

PLUG 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT PLUG .039 FN:34 FIELD 03-Mar-1998 20:54

Output DLIS Files

DEFAULT PLUG .040 FN:35 FIELD 03-Mar-1998 21:02 1924.2 M 1871.0 M

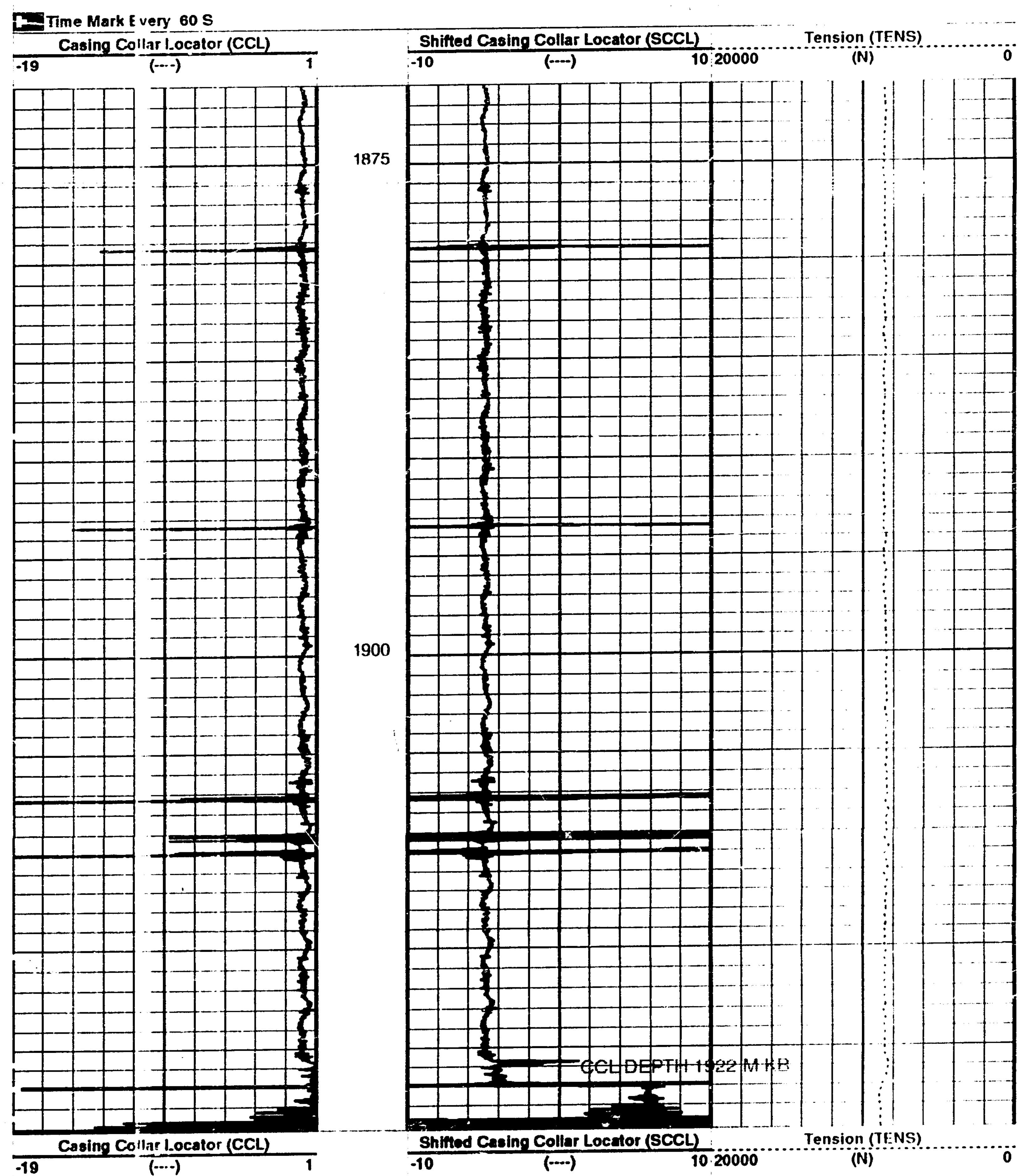
OP System Version: 8C0-609

MCM

PLUG 8C0-609 CAL-B 8C0-609

PIP SUMMARY POSITION AND SET PLUG

Time Mark Every 60 S



PIP SUMMARY POSITION AND SET PLUG

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 03 Mar 1998 21:02

OP System Version: 8C0-609

MCM

PLUG 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT PLUG .040 FN:35 FIELD 03-Mar-1998 21:02

```
                PERFO2 Operational Summary Listing

Device  Status  Req Depth ( M)  Obs Depth ( M)  Time Used
------  ------  --------------  --------------  ------------------------
PLUG1   Used            1925.0          1925.0  Tue Mar 03 21:05:59 1998
BAKER PLUG SET AT 1925 MKB
3.0 M FROM CCL TO CENTER OF ELEMENT

PLUG 2 SET AT 1920 MKB
CCL TO MIDDLE OF ELEMENT WAS 3.0 M

PLUG 1 DID NOT HOLD PRESSURE. SET PLUG 2 AT 1920 AND DUMPED 4 M CEMENT ON TOP
```

Input DLIS Files

DEFAULT ATTB .044 FN:38 FIELD 04-Mar-1998 10:19 351.1 M 238.7 M

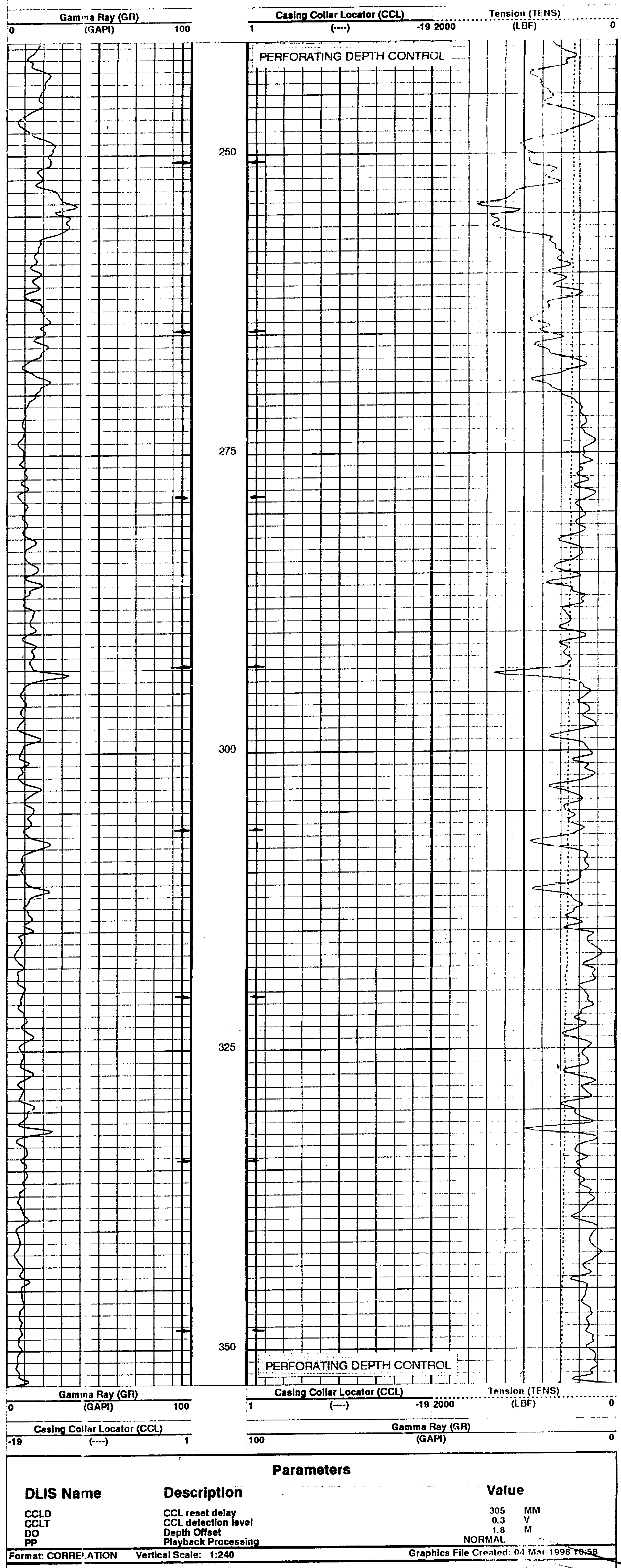
Output DLIS Files

DEFAULT ATTB .047 FN:41 FIELD 04-Mar-1998 10:58 353.0 M 240.5 M

OP System Version: 8C0-609

MCM

ATT-B 8C0-609 CAL-U 8C0-609



Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V
DO	Depth Offset	1.8 M
PP	Playback Processing	NORMAL

Format: CORRELATION Vertical Scale: 1:240 Graphics File Created: 04 Mar 1998 10:58

BOARD
CH
MAR 2 3 1998

OP System Version: 8C0-609

MCM

ATT-B 8C0-609 CAL-U 8C0-609

Input DLIS Files

DEFAULT ATTB .044 FN:38 FIELD 04-Mar-1998 10:19 351.1 M 238.7 M

Output DLIS Files

DEFAULT ATTB .047 FN:41 FIELD 04-Mar-1998 10:58

COMPANY RANGER OIL LIMITED

WELL RANGER NOTA CREEK C-17
FIELD NOTA CREEK
TERRITORY N.W.T.

BOTTOM LOG INTERVAL	1925 M
SCHLUMBERGER DEPTH	
DEPTH DRILLER	1953 M
KELLY BUSHING	172.22 M
DRILL FLOOR	
GROUND LEVEL	169.22 M

Schlumberger

COMPLETION RECORD
GUN - PLUG

NEB 1831

COMPANY: RANGER OIL LIMITED.
WELL: RANGER NOTA CREEK C-17
FIELD: NOTA CREEK
TERRITORY: N.W.T.

TERRITORY: **N.W.T.**
Field: NOTA CREEK
Location: C-17-65-10-126
Well: RANGER NOTA CREEK C-17
Company: RANGER OIL LIMITED

9211-R36-2-1

Schlumberger

COMPLETION RECORD
GUN

LOCATION	C-17-65-10-126	Elev.:	K.B.	172.22 M
			G.L.	168.22 M
			D.F.	
	Permanent Datum: GROUND LEVEL	Elev.:	168.22 M	
	Log Measured From: KELLY BUSHING	4.0 M	above Perm. Datum	
	Drilling Measured From: KELLY BUSHING			

API Serial No.	SECTION	TOWNSHIP	RANGE

Logging Date	8-MAR-1998	
Run Number	1	
Depth Driller	1920 M	
Schlumberger Depth	1915.6 M	
Bottom Log Interval	1915 M	
Top Log Interval	1850 M	
Casing Fluid Type	WATER	
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size	222.000 MM	
From		
To		
Casing/Tubing Size	177.800 MM	
Weight	34.2 KG/M	
Grade		
To	1929 M	
Maximum Recorded Temperatures		
Logger On Bottom Time	8-MAR-1998	15:00
Unit Number Location	2 NORMAN WELLS	
Recorded By	GREG MCISAAC	
Witnessed By	ANDY GORUK	

NATI[illegible]ARD
E[illegible]CH
MAR 3 1 1998

	Run 1	Run 2	Run 3	Run 4
Oil Density				
Water Salinity				
Gas Gravity				
Bo				
Rs				
TBg				
Bubble Point Pressure				
Bubble Point Temperature				
Solution GOR				
Maximum Deviation				
CEMENTING DATA				
Primary/Squeeze	Primary			
Casing String No				
Lead Cement Type				
Volume				
Density				
Water Loss				
Additives				
Tail Cement Type				
Volume				
Density				
Water Loss				
Additives				
Expected Cement Top				

Logging Date		
Run Number		
Depth Driller		
Schlumberger Depth		
Bottom Log Interval		
Top Log Interval		
Casing Fluid Type		
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size		
From		
To		
Casing/Tubing Size		
Weight		
Grade		
To		
Maximum Recorded Temperatures		
Logger On Bottom Time		
Unit Number Location		
Recorded By		
Witnessed By		

L INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER ASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF Y INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILFUL GLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR PENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY Y OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO AUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE

OTHER SERVICES1	OTHER SERVICES2
OS1:	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1
CORRELATED TO SOC BOND LOG DATED 25-FEB-1998
PERFORATED 1[illegible]6-1900.5, 19898-1894.5 MKB WITH 114.3 MM GUN 37 g CHARGE
3 GUN RUNS

REMARKS: RUN NUMBER 2

RUN 1			RUN 2		
SERVICE ORDER #:	1210884		SERVICE ORDER #:		
PROGRAM VERSION:	8C0-609		PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

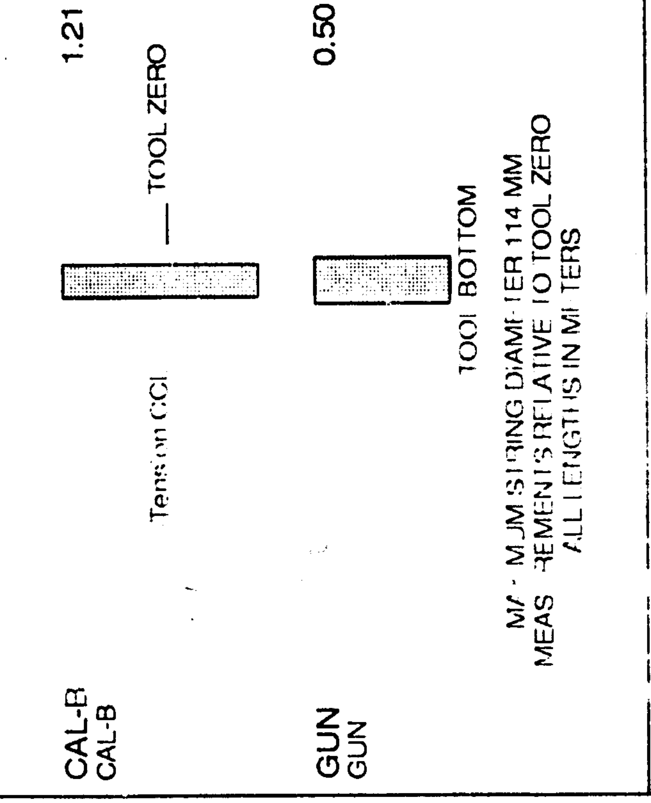
RUN 1

RUN 2

SURFACE EQUIPMENT

SHM-EA

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 114 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Output DLIS Files

DEFAULT GUN .016 FN:11 FIELD 08-Mar-1998 17:32 1914.3 M 1871.8 M

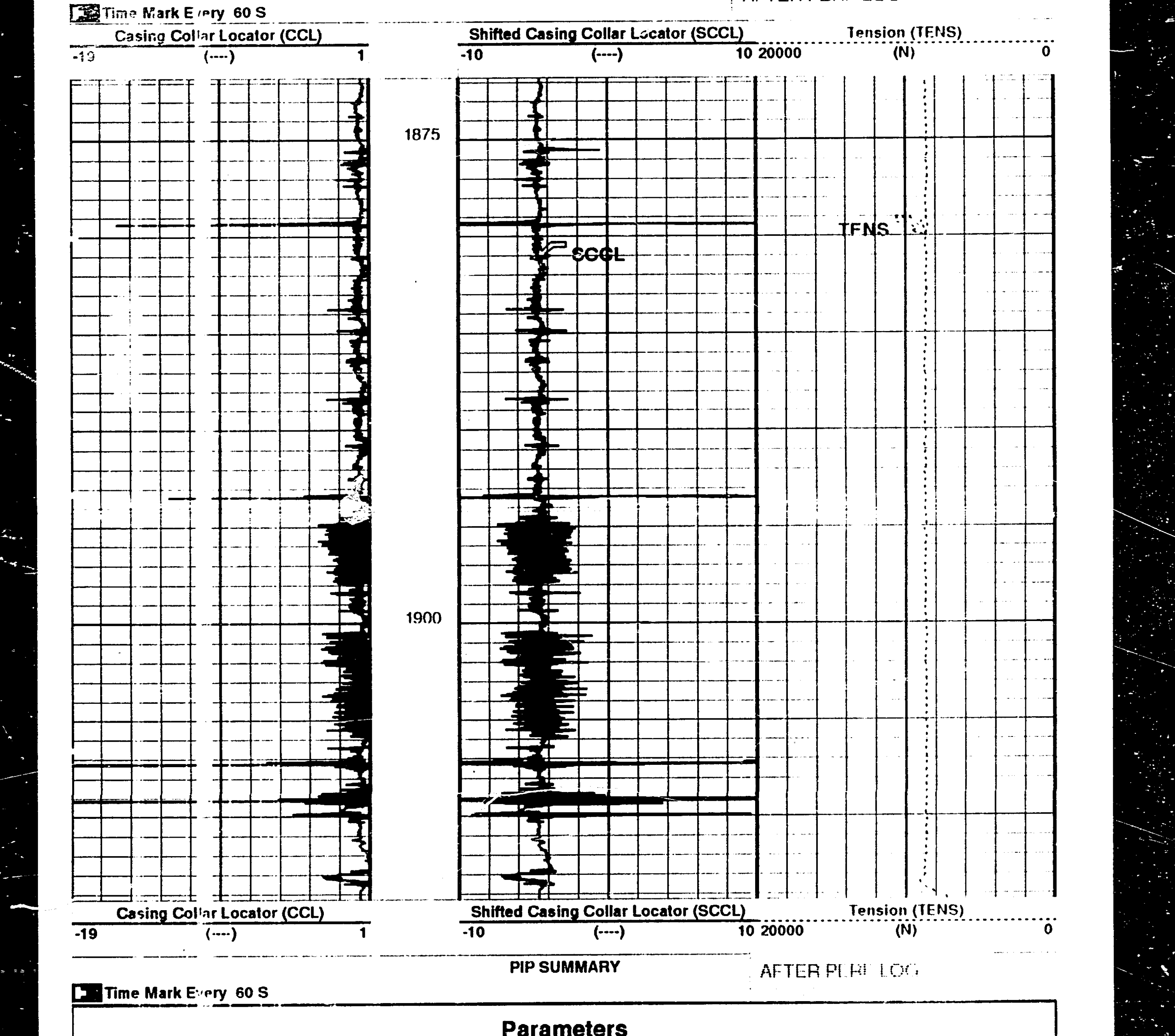
OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY AFTER PERF LOG

Time Mark Every 60 S



PIP SUMMARY AFTER PERF LOG

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 17:32

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT GUN .016 FN:11 FIELD 08-Mar-1998 17:32

Output DLIS Files

DEFAULT GUN .012 FN:8 FIELD 08-Mar-1998 17:15 1912.3 M 1871.8 M

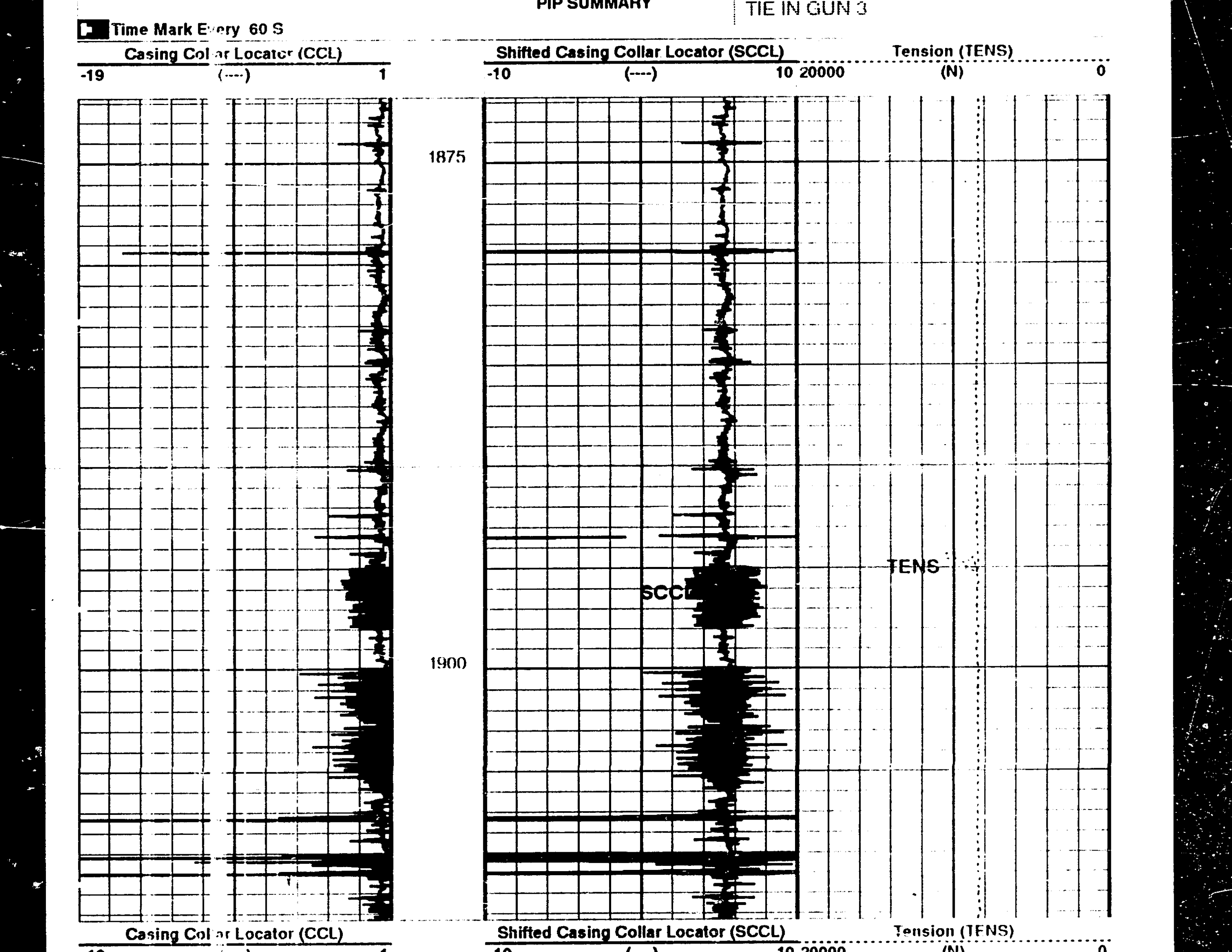
OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY TIE IN GUN 3

Time Mark Every 60 S



PIP SUMMARY TIE IN GUN 3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 17:15

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT GUN .012 FN:8 FIELD 08-Mar-1998 17:15

Output DLIS Files

DEFAULT GUN .015 FN:10 FIELD 08-Mar-1998 17:28 1907.1 M 1876.2 M

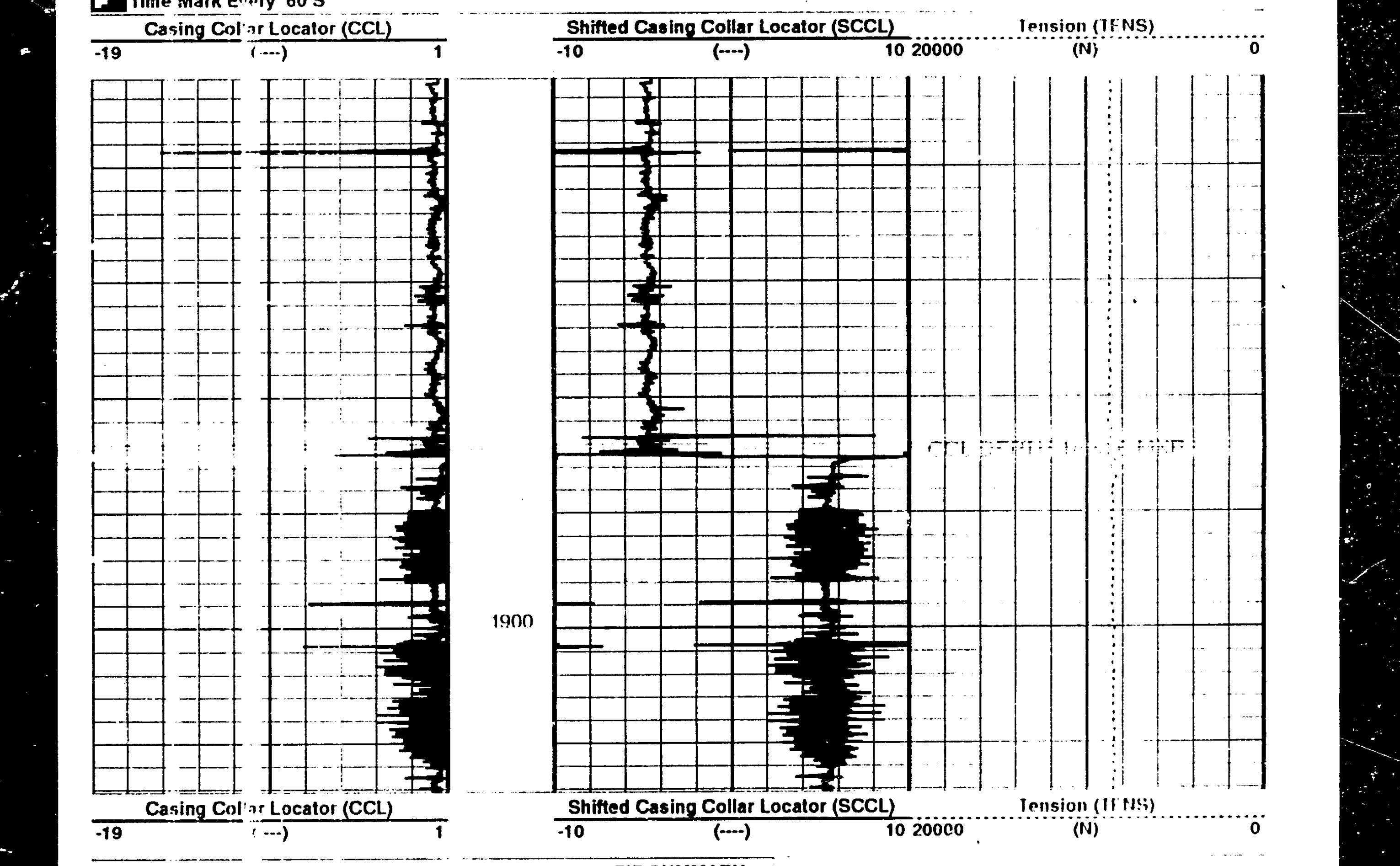
OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY POSITION AND SHOOT GUN 3

Time Mark Every 60 S



PIP SUMMARY POSITION AND SHOOT GUN 3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 17:28

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT GUN .015 FN:10 FIELD 08-Mar-1998 17:28

```
                PERFO2 Operational Summary Listing

Device  Status  Req Depth ( M)  Obs Depth ( M)  Time Used
------  ------  --------------  --------------  ------------------------
GUN1    Used            1894.5          1894.5  Sun Mar 08 17:31:10 1998
1.9 m from ccl to top shot
0.5 M LOADED
114.3 MM GUN 37 g CHARGE
```

Output DLIS Files

DEFAULT GUN .009 FN:6 FIELD 08-Mar-1998 16:07 1910.8 M 1872.1 M

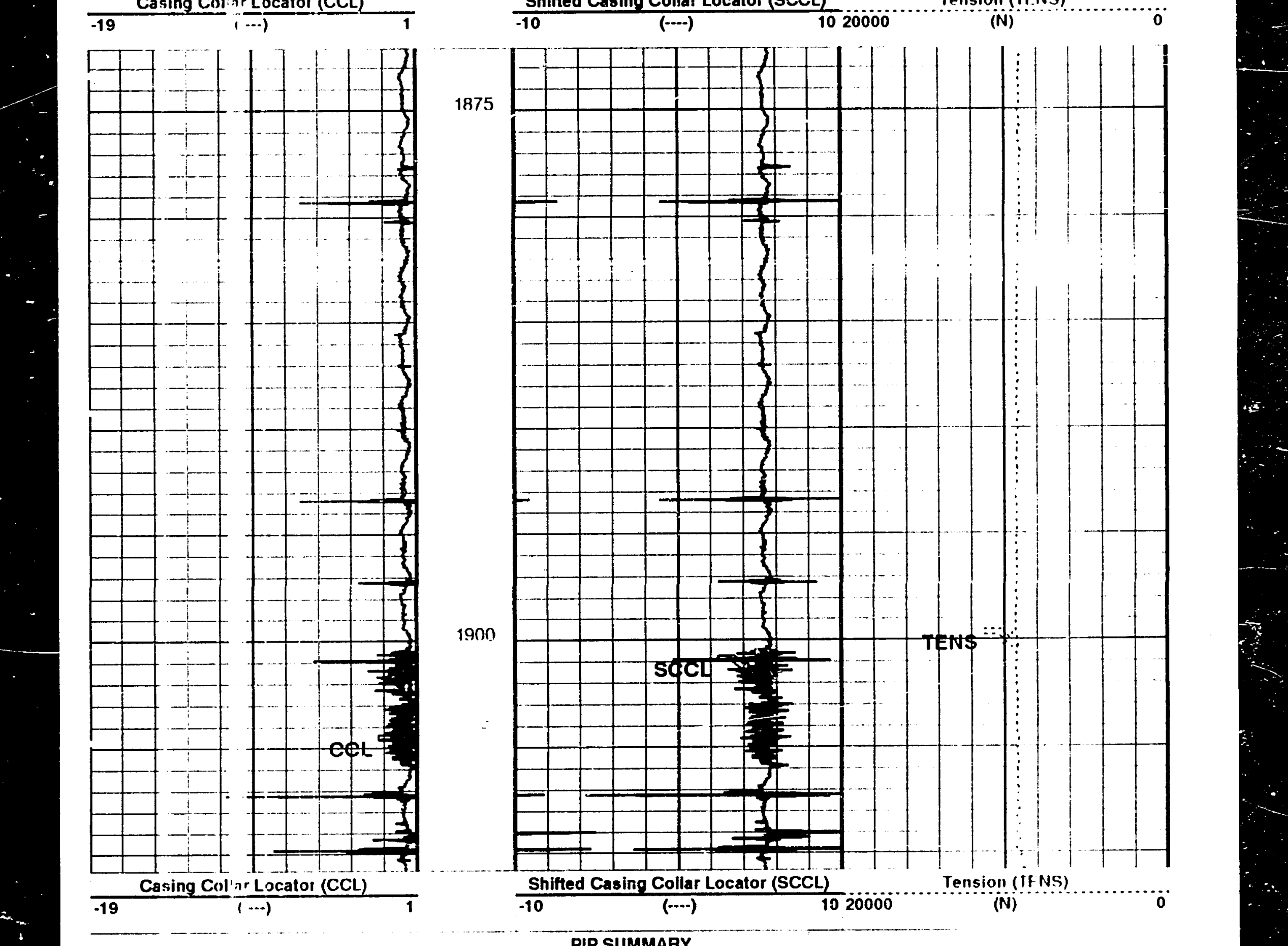
OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY TIE IN GUN 2

Time Mark Every 60 S



PIP SUMMARY TIE IN GUN 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 16:07

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT GUN .009 FN:6 FIELD 08-Mar-1998 16:07

Output DLIS Files

DEFAULT GUN .010 FN:7 FIELD 08-Mar-1998 16:12 1911.2 M 1841.8 M

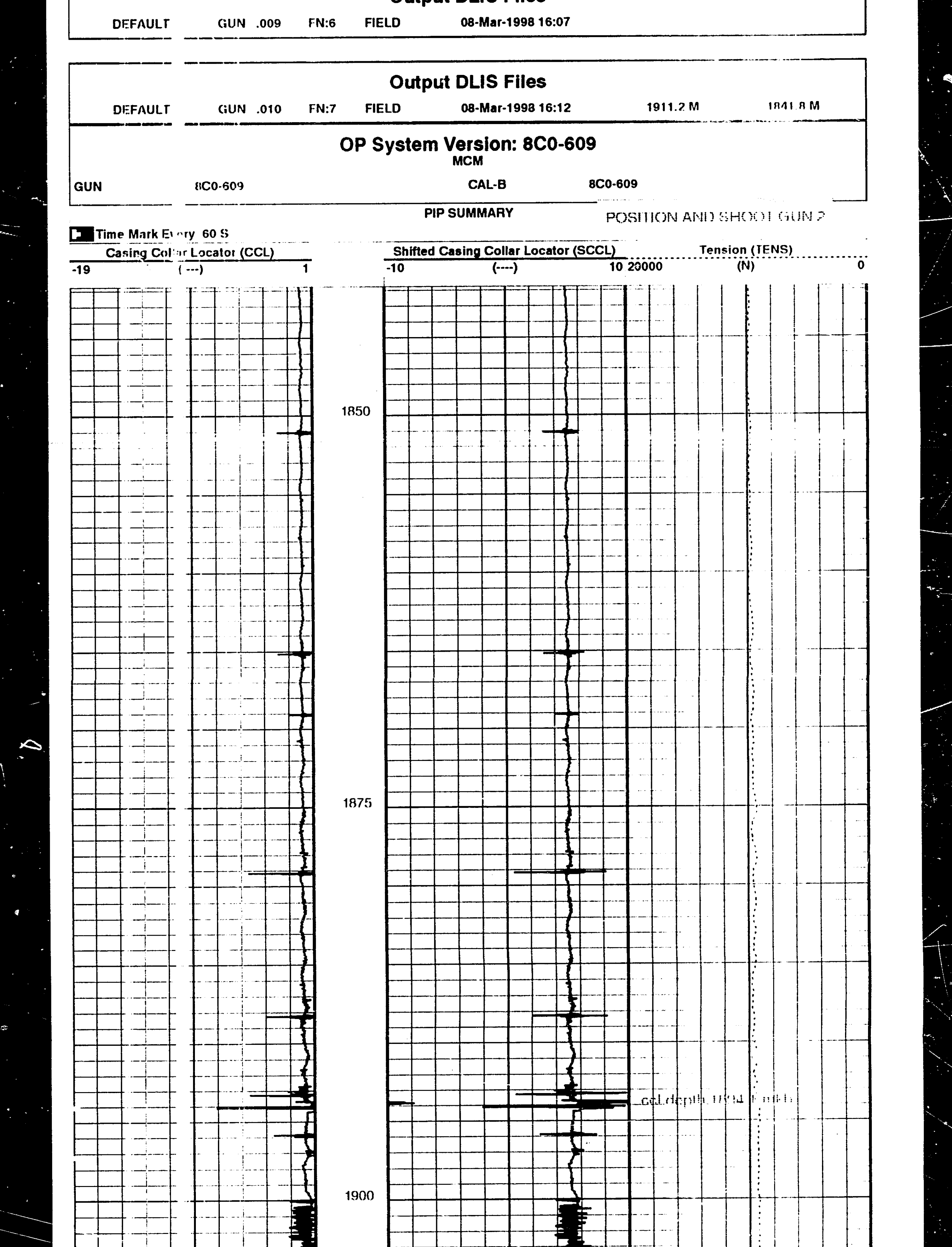
OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY POSITION AND SHOOT GUN 2

Time Mark Every 60 S



PIP SUMMARY POSITION AND SHOOT GUN 2

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	305 MM
CCLT	CCL detection level	0.3 V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 16:12

OP System Version: 8C0-609

MCM

GUN 8C0-609 CAL-B 8C0-609

Output DLIS Files

DEFAULT GUN .010 FN:7 FIELD 08-Mar-1998 16:12

```
                PERFO2 Operational Summary Listing

Device  Status  Req Depth ( M)  Obs Depth ( M)  Time Used
------  ------  --------------  --------------  ------------------------
GUN1    Used            1895.0          1895.0  Sun Mar 08 16:14:38 1998
0.9 M FROM CCL TO TOP SHOT
3.0 M LOADED
114.3 MM GUN 37g CHARGE
```

Output DLIS Files

DEFAULT GUN .005 FN:3 FIELD 08-Mar-1998 14:59 1909.7 M 1847.1 M

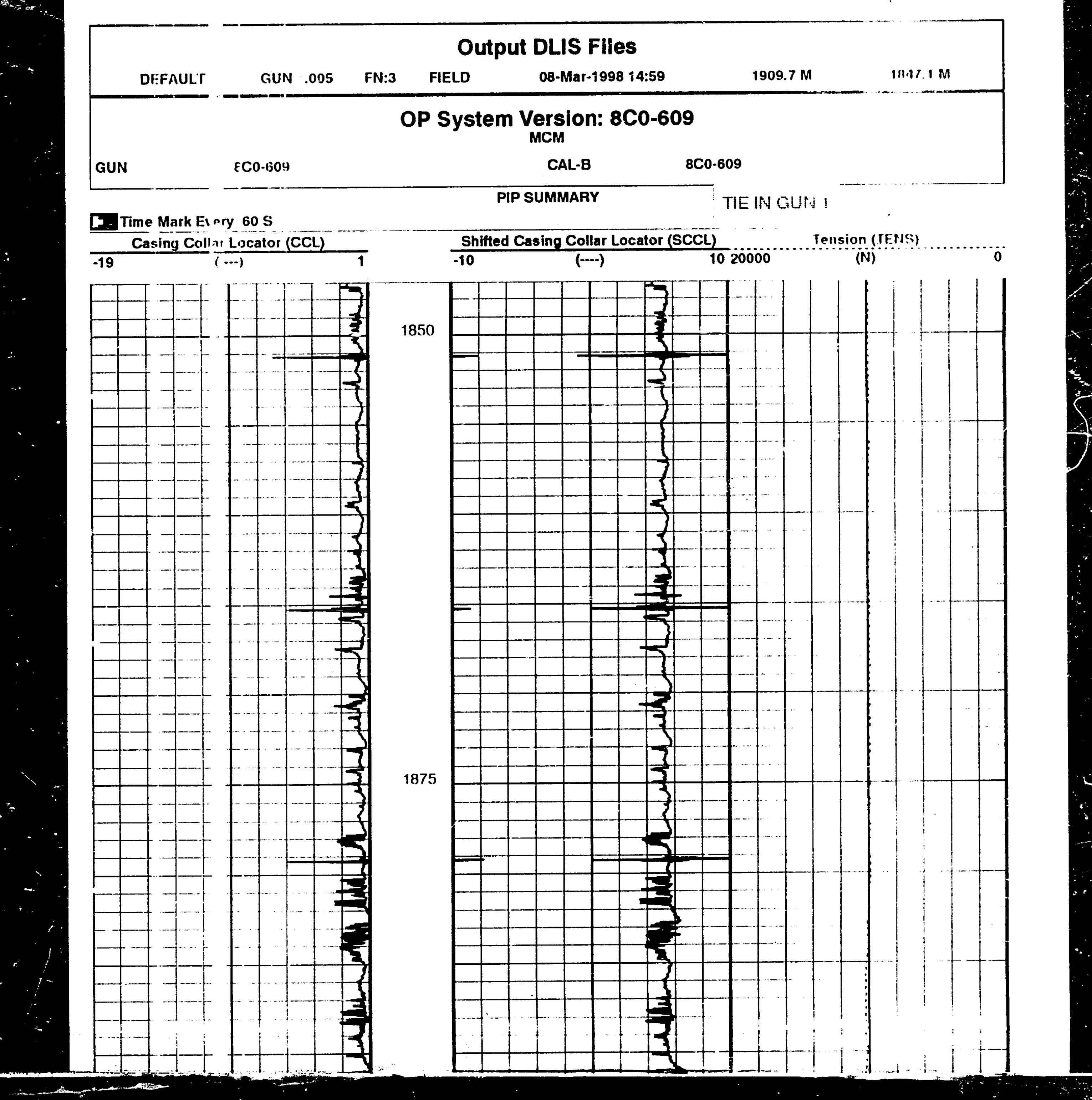
OP System Version: 8C0-609

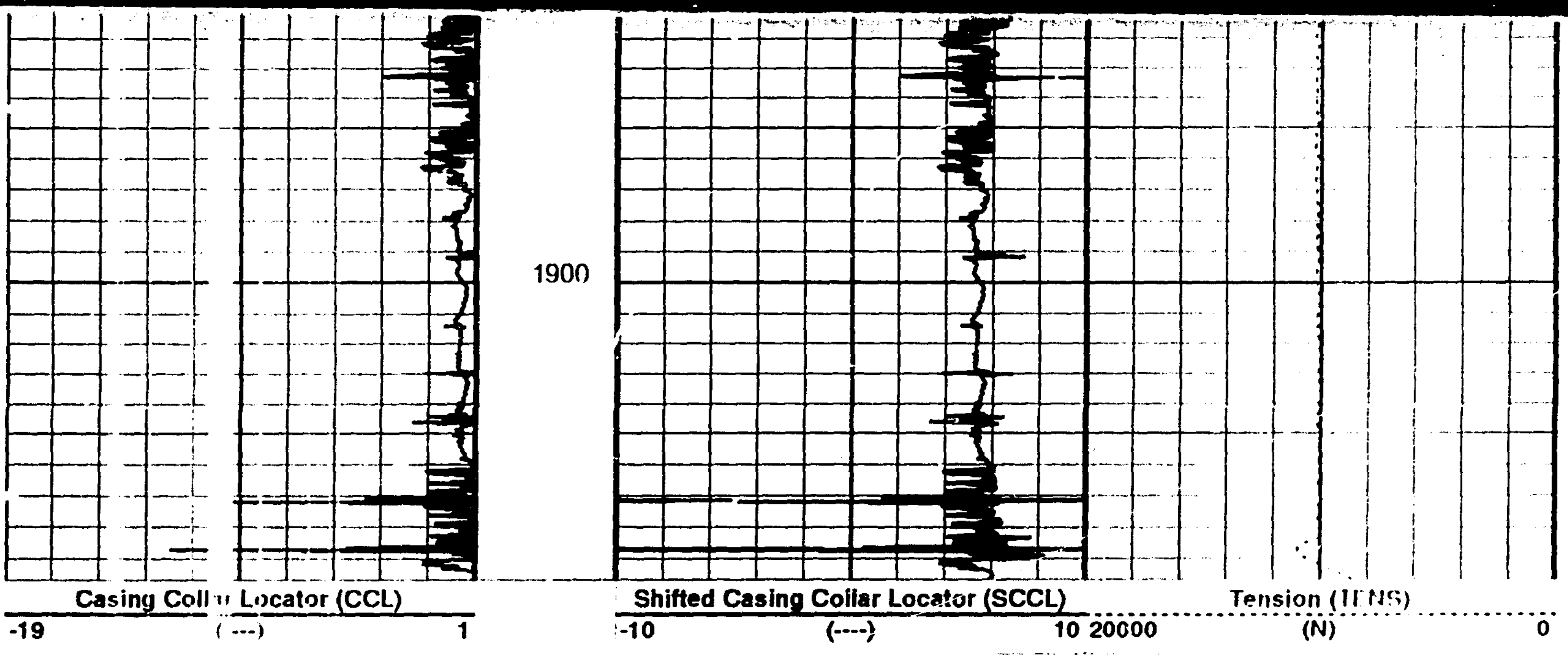
MCM

GUN 8C0-609 CAL-B 8C0-609

PIP SUMMARY TIE IN GUN 1

Time Mark Every 60 S





PIP SUMMARY TIE IN GUN 1

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 14:59

OP System Version: 8C0-609

MCM

GUN	8C0-609	CAL-B	8C0-609

Output DLIS Files

DEFAULT GUN .005 FN:3 FIELD 08-Mar-1998 14:59

Output DLIS Files

DEFAULT GUN .007 FN:5 FIELD 08-Mar-1998 15:08 1909.7 M 1851.8 M

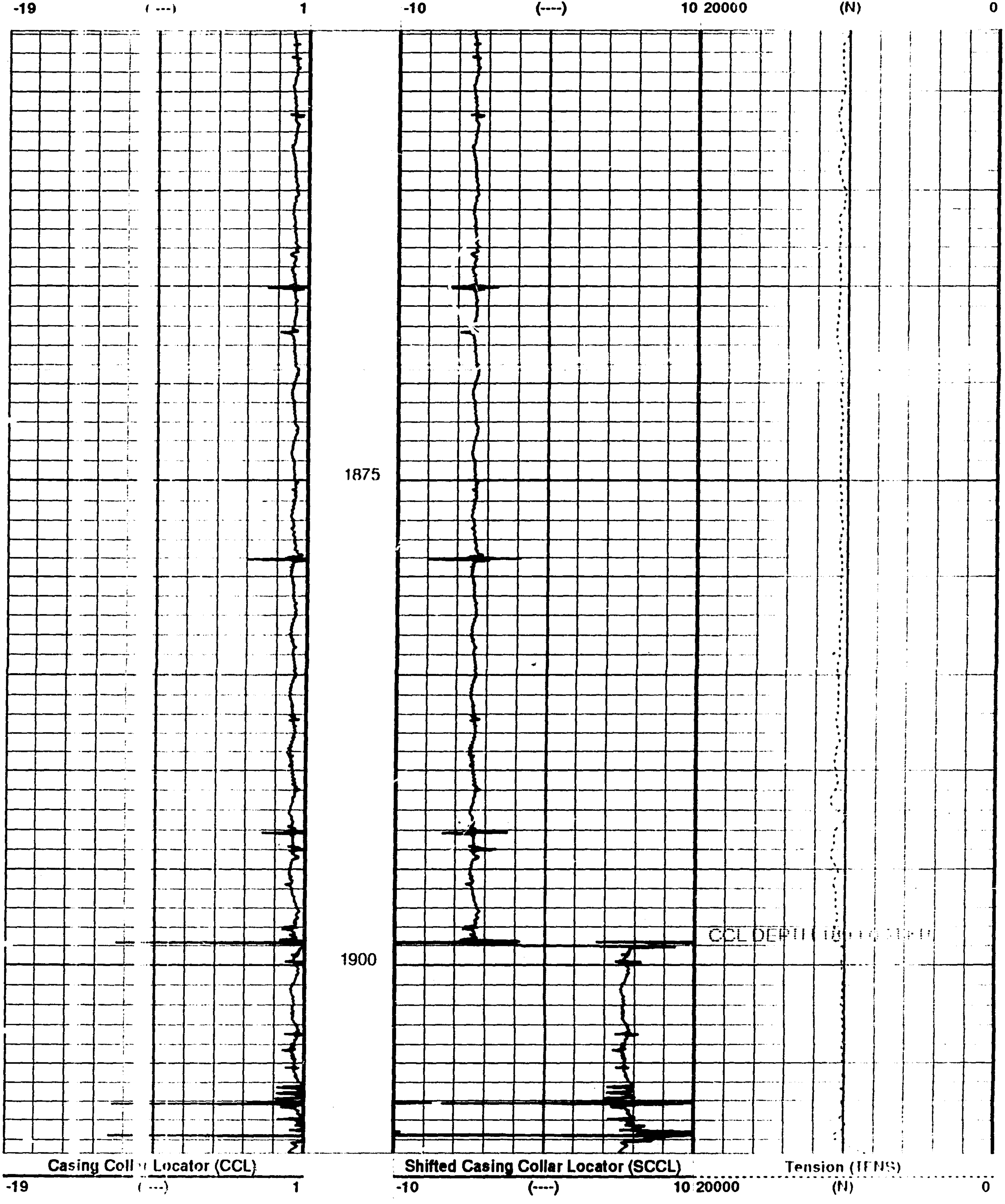
OP System Version: 8C0-609

MCM

GUN	8C0-609	CAL-B	8C0-609

PIP SUMMARY POSITION AND SHOOT GUN 1

Time Mark Every 60 S



PIP SUMMARY POSITION AND SHOOT GUN

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	305	MM
CCLT	CCL detection level	0.3	V

Format: PERFO Vertical Scale: 1:240 Graphics File Created: 08 Mar 1998 15:08

OP System Version: 8C0-609

MCM

GUN	8C0-609	CAL-B	8C0-609

Output DLIS Files

DEFAULT GUN .007 FN:5 FIELD 08-Mar-1998 15:08

```
                    PERFO2 Operational Summary Listing

    Device  Status  Req Depth ( M)  Obs Depth ( M)  Time Used
    ------  ------  --------------  --------------  ------------------------
    GUN1    Used            1900.5          1900.5  Sun Mar 08 15:09:54 1998
    CCL - IS IS 1.5 M
    114.3 MM GUN 37 g CHARGE 5.5 M LOADED INTERVAL
```

COMPANY:	RANGER OIL LIMITED		
		SCHLUMBERGER	
WELL:	RANGER NOTA CREEK C-17	DEPTH DRILLER	
FIELD:	NOTA CREEK	KELLY BUSHING	M
TERRITORY:	N.W.T.	DRILL FLOOR	
		GROUND LEVEL	

Schlumberger

COMPLETION RECORD
GUN