

Schlumberger

Company: PETRO-CANADA

Well: PETRO-CANADA BLACKWATER KWIJIKA M-59

Field: KWIJIKA

Province: NORTHWEST TERRITORIES *** MD ***

CEMENT VOLUME LOG

NEB COPY

Province: NORTHWEST TERRITORIES
 Field: KWIJIKA
 Location: LSD: M-59
 Well: PETRO-CANADA BLACKWATER KWIJIKA M-59
 Company: PETRO-CANADA

LOCATION			
LSD: M-59		Elev.:	K.B. 252.1 m
UWID: 300M59640122300			G.L. 245.9 m
			D.F. 251.8 m
Permanent Datum:	GROUND LEVEL	Elev.:	245.9 m
Log Measured From:	KELLY BUSHING	6.2 m	above Perm. Datum
Drilling Measured From:	KELLY BUSHING		

API Serial No.
1165

Logging Date: 23-Feb-2008

Run Number	ONE
Depth Driller	1200 m
Schiumberger Depth	1201 m
Bottom Log Interval	1175.4 m
Top Log Interval	347.5 m
Casing Driller Size @ Depth	244.500 mm @ 348 m
Casing Schiumberger	347.5 m
Bit Size	222.000 mm
Type Fluid In Hole	KCL POLYMER
Density	1180 kg/m ³
Viscosity	47 s
Fluid Loss	7 cm ³
PH	10
Source Of Sample	FLOWLINE

RMF @ Measured Temperature	0.117 ohm.m	@	20 degC
RMF @ Measured Temperature	0.103 ohm.m	@	20 degC
RMF @ Measured Temperature	0.228 ohm.m	@	20 degC
Source RMF	PRESSED	PRESSED	

RM @ MRT	RMF @ MRT	0.100 @ 27	0.088 @ 27	@	@
Maximum Recorded Temperatures	27 degC				

Circulation Stopped	Time	7:15
Logger On Bottom	Time	22:05

Unit Number	Location	4301	NORMAN WELLS
Recorded By	J.FOLLINGS / R. JACOBS		
Witnessed By	G. TIMMONS / G. DEON		

[illegible]

DEPTH SUMMARY LISTING

Date Created: 23-FEB-2008 23:31:57

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-46A XXS
Serial Number:	6423	Serial Number:	2565	Serial Number:	6199
Calibration Date:	15-FEB-2008	Calibration Date:	15-FEB-2008	Length:	7800.14 M
Calibrator Serial Number:	4	Calibrator Serial Number:	-999	Conveyance Method: Wireline Rig Type: Land	
Calibration Cable Type:	7-46P	Calibration Gain:	0.88		
Wheel Correction 1:	-4	Calibration Offset:	336.00		
Wheel Correction 2:	-5				

Depth Control Parameters

Log Sequence:	Subsequent Log In the Well
Reference Log Name:	PLATFORM EXPRESS COMPENSATED NEUTRON DUAL LITHO-DENSITY LOG
Reference Log Run Number:	ONE
Reference Log Date:	23-FEB-2008

Depth Control Remarks

1. IDW IS PRIMARY DEPTH MEASUREMENT 2. Z-CHART USED AS A SECONDARY DEPTH MEASUREMENTS 3. 4. 5. 6.
--

DISCLAIMER

DISCLAIMER

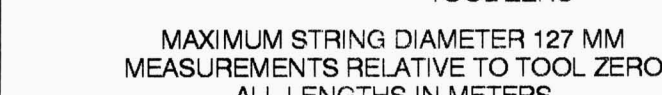
THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

OTHER SERVICES1	OTHER SERVICES2
OS1: PEX-HRLA-TLD2-HNGS	OS1:
OS2: FMI-DSI-EMS	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
ALL PRESENTATIONS AS PER LOGGING PROGRAM DATED FEB 6, 2008	
INTERVALS CONFIRMED ON LOCATION BY WELLSITE GEOLOGIST	
RUN 1: TLD-HGNS-HRLA-TLD2-HNGS-SP	
RUN 2: FMI-DSI-EMS-EMA-GR-SAH-F	
MAXIMUM TEMPERATURE TAKEN FROM HEAD THERMOMETER COMPARED TO EMA	
DIPOLE RAN IN P&S, LOWER & UPPER DIPOLE MODE	
FMI & DSI INTERVAL: TD-CS	
SWIVEL RAN DUE TO NEW CABLE	
RELABELLED DSI IN FIELD	
EMS CALIPERS USED TO COMPUTE HOLE & CEMENT VOLUME	
MUD RESISTIVITY PRESENTED ON EMS PRESENTATION	
GR NOT REPEATED FROM 1160-1165M DUE TO TELEMETRY ISSUE ON REPEAT	
PULLED TIGHT OFF BOTTOM ON REPEAT PASS	
C2 FMI CALIPER SENSOR DAMAGED AT 640M, INTERMITTENTLY WORKING TO CS	
FMI IMAGES NOT AFFECTED ONLY C2 SENSORS	
RIG: AKITA 51	
CREW: BILLY LIAM, LARRY DUDUS	

RUN 1 SERVICE ORDER #: 11958995 PROGRAM VERSION: 15C0-309 FLUID LEVEL:			RUN 2 SERVICE ORDER #: PROGRAM VERSION: FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1		RUN 2	
SURFACE EQUIPMENT			
GSR-U/Y 1237 WITM (DTS)-A			
DOWNHOLE EQUIPMENT			
LEH-QT 2657			32.89
LEH-QT 2657			
DTC-H	CTEM	31.72	
ECH-KC 10485	TelStatus	31.09	32.00
	ToolStatu		
SAH-F 1874			31.09
SAH-F 1874			
SGT-N	Gamma Ray	29.32	29.60
SGH-K 3169			
SGC-TB 10388			
SGD-TAB 10388			
EMS-B	Mud Resis	27.75	
EMA-B 8018	Mud Tempe	27.50	27.93
RES			
EMC-B 8035			
ECH-KH 8045			
EMM-B 8052	Calipers	24.61	
DSST-B			23.59
SPAC-B 8321			
ECH-SD 8308			
SMDR-BD 8400			
SSIJ-BA 8317			
SMDX-AA 8315			



Output DLIS Files						
DEFAULT	FMI_DSI_EMS_031PUP	FN:48	PRODUCER	24-Feb-2008 01:17	1202.1 M	298.6 M
BACKUP	FMI_DSI_EMS_031PUP	FN:49	PRODUCER	24-Feb-2008 01:17	1202.1 M	298.6 M
IMAGE	FMI_DSI_EMS_031PUP	FN:50	PRODUCER	24-Feb-2008 01:17	1202.1 M	298.6 M
REDUCED	FMI_DSI_EMS_031PUP	FN:51	PRODUCER	24-Feb-2008 01:17	1202.1 M	298.6 M

Hole Volume = 34.48 M3
Cement Volume = 13.30 M3 (assuming 177.80 MM casing O.D.)
Computed from 1200.9 M to 348.1 M using data channel(s) RD1 RD2 RD3 RD4 RD5 RD6

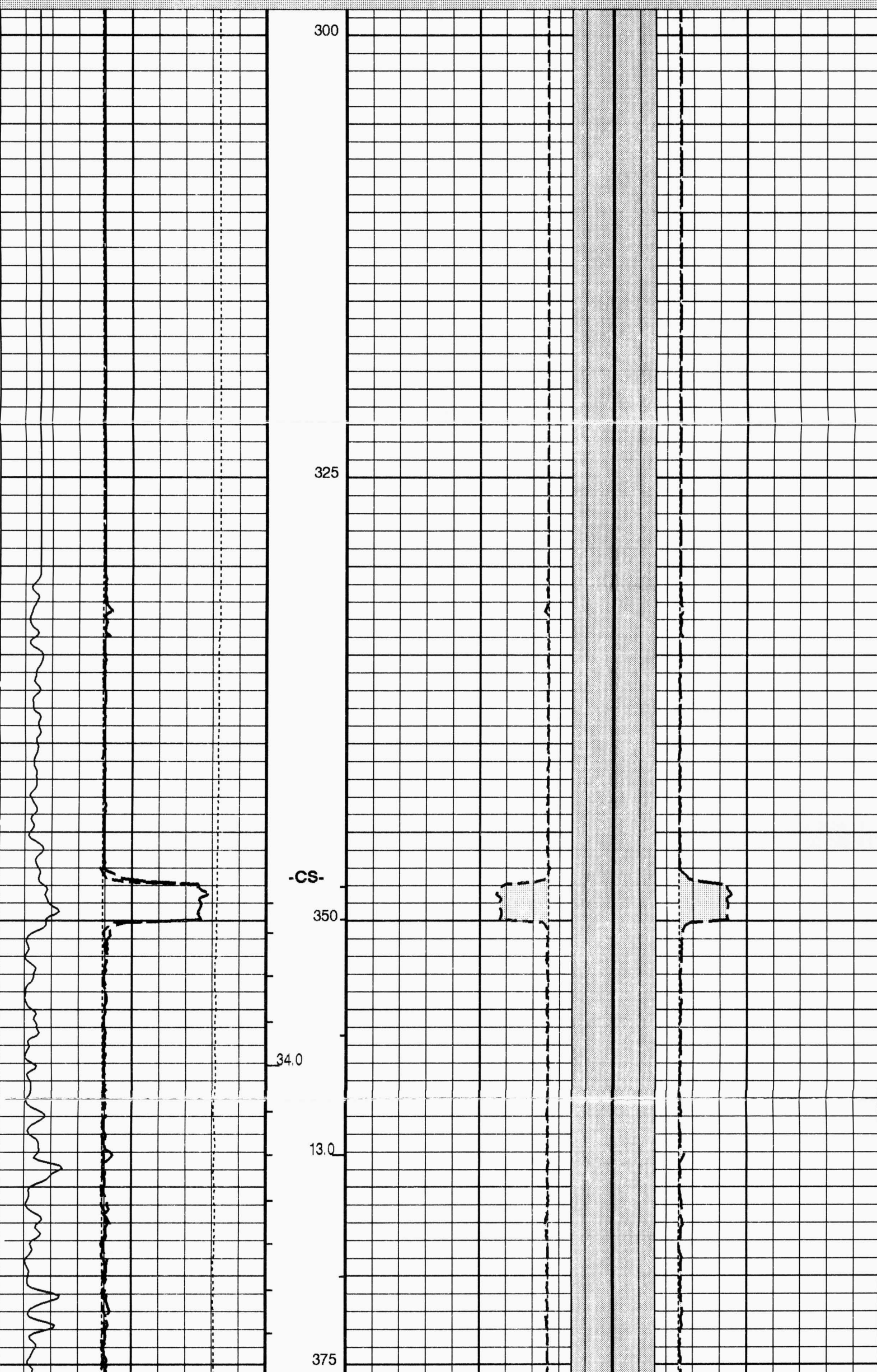
versi
MCM

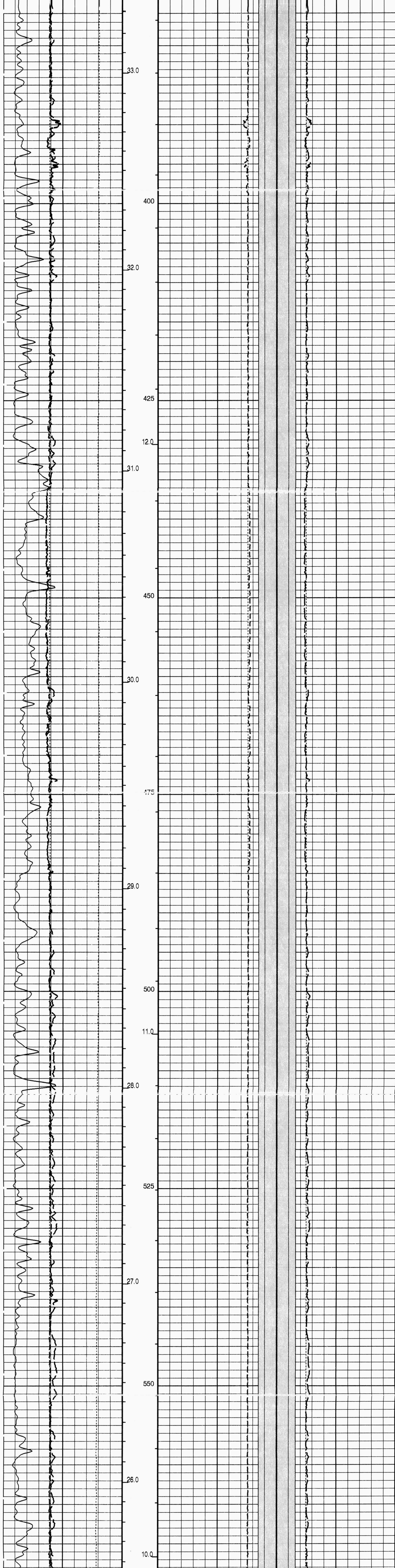
BLOCK: _____ **ISSN:** 0000-0000

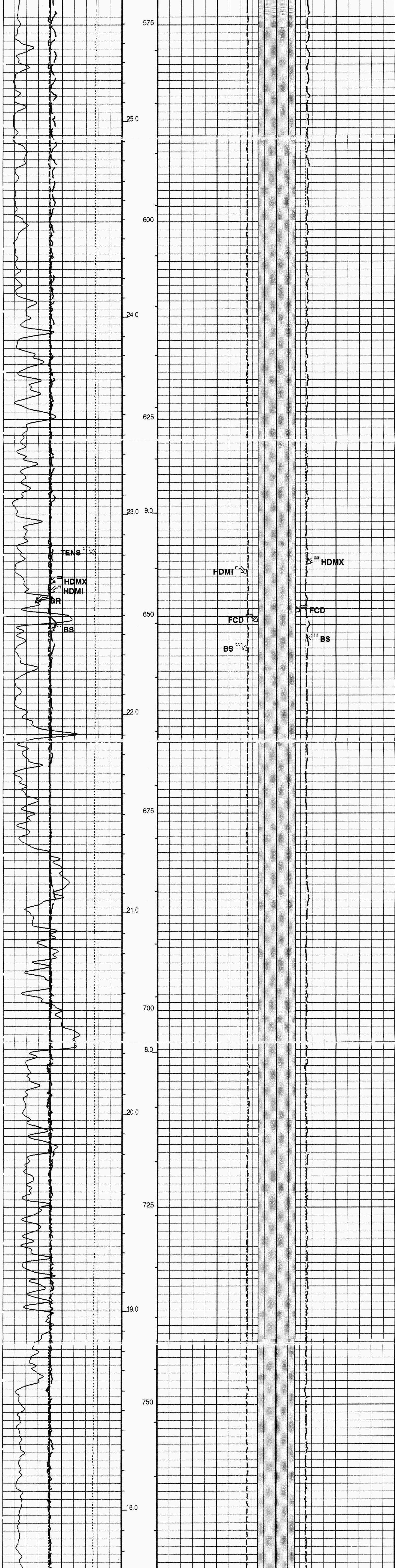
- └ Integrated Hole Volume Minor Pip Every 0.1 M3
- └ Integrated Hole Volume Major Pip Every 1 M3
 - └ Integrated Cement Volume Minor Pip Every 0.1 M3
 - └ Integrated Cement Volume Major Pip Every 1 M3

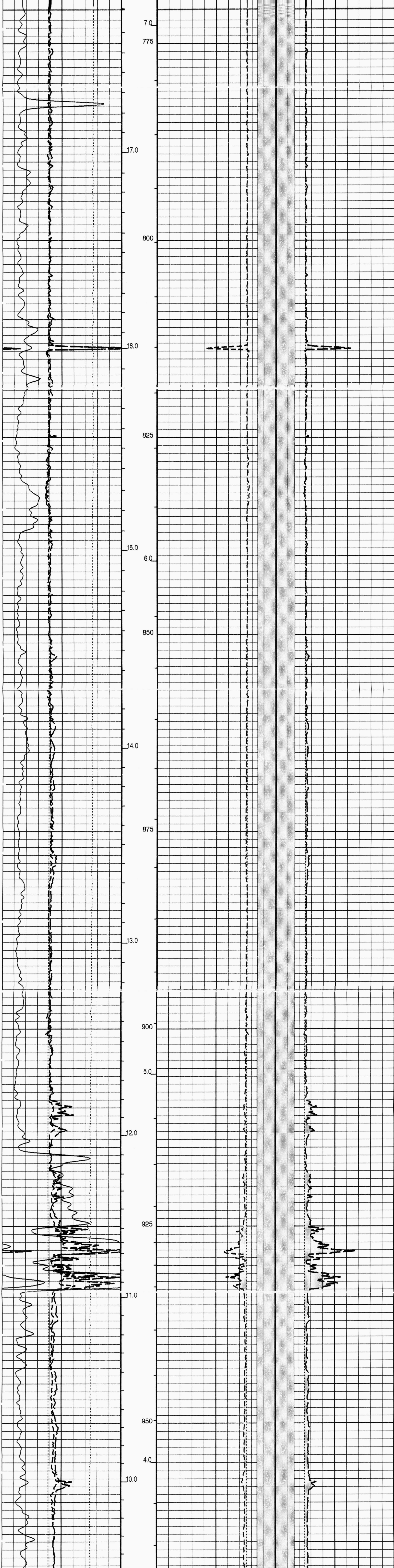
Tension (TENS) 25000 (N) 0			Washout From HDMI_1 to BS2			Tight Spot From HDMX_1 to BS3					
Hole Diameter Maximum (HDMX) 125 (MM) 375			Production Casing From FCD2 to FCD3								
Hole Diameter Minimum (HDMI) 125 (MM) 375			Hole Diameter Minimum (HDMI) 600 (MM) 100			Hole Diameter Maximum (HDMX) 100 (MM) 600					
Gamma Ray (GR) 0 (GAPI) 150			CEMENT VOLUME - RIGHT (ICV) (M3)			Future Casing (FCD) 600 (MM) 100			Future Casing (FCD) 100 (MM) 600		
Bit Size (BS) 125 (MM) 375			HOLE VOLUME - LEFT (IHV)			Bit Size (BS) 600 (MM) 100			Bit Size (BS) 100 (MM) 600		

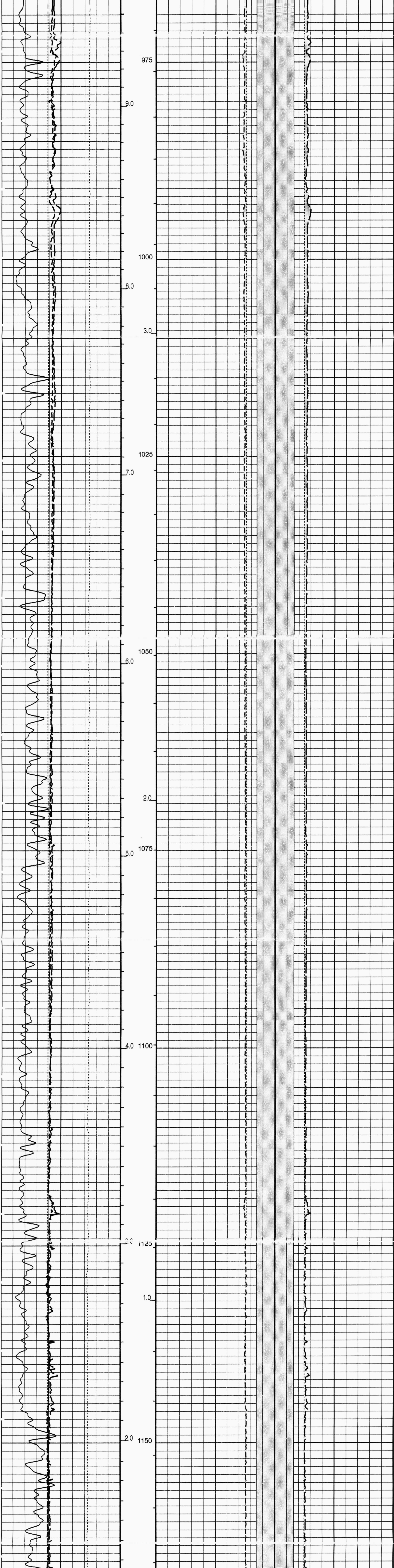
CEMENT VOLUME LOG

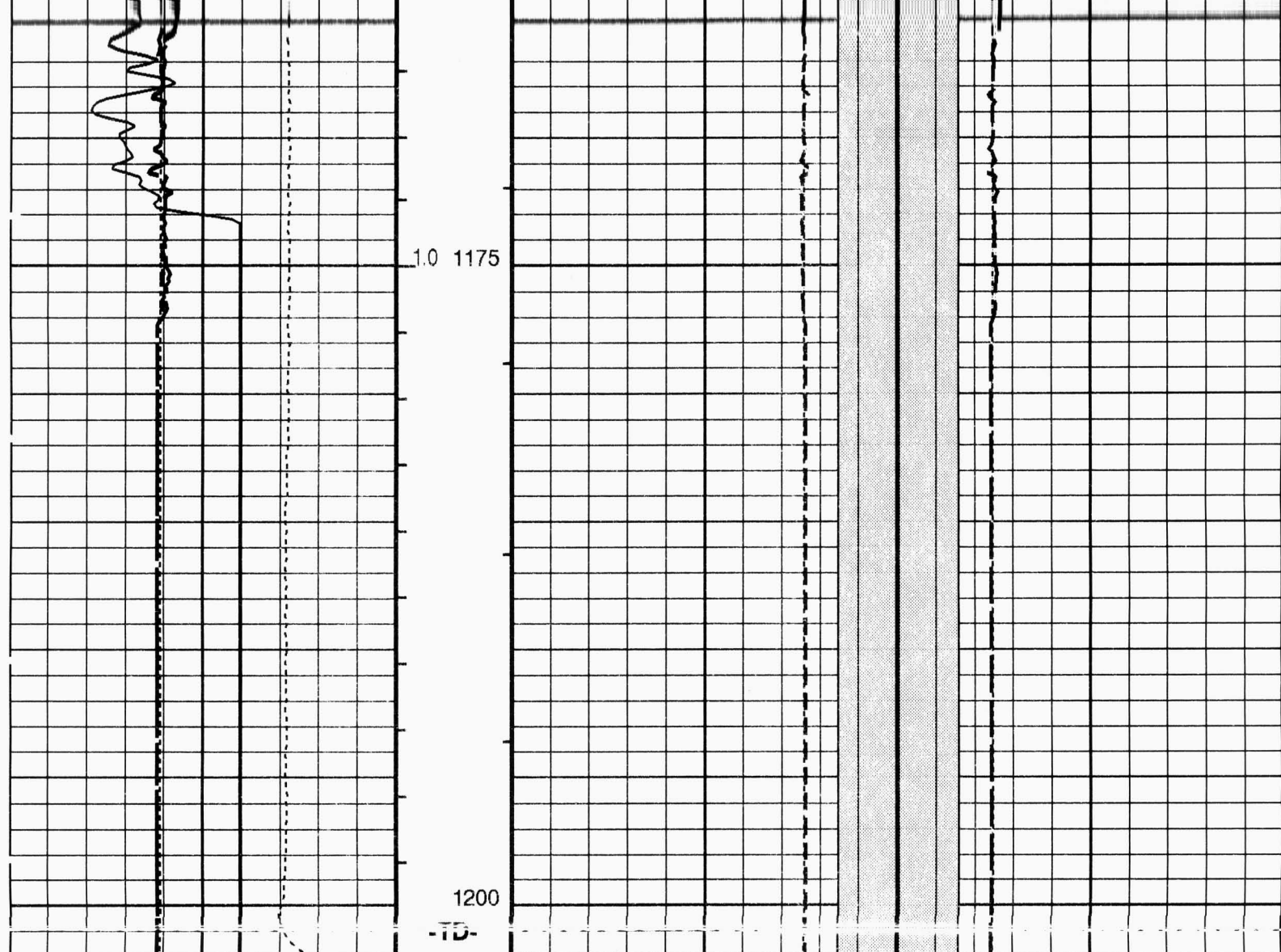












CEMENT VOLUME LOG								
Bit Size (BS) 125 (MM) 375		HOLE VOLUME - LEFT (IHV) (M3) CEMENT VOLUME - RIGHT (ICV) (M3)	Bit Size (BS) 600 (MM) 100		Bit Size (BS) 100 (MM) 600			
Gamma Ray (GR) 0 (GAPI) 150			Future Casing (FCD) 600 (MM) 100		Future Casing (FCD) 100 (MM) 600			
Hole Diameter Minimum (HDMI) 125 (MM) 375			Hole Diameter Minimum (HDMI) 600 (MM) 100		Hole Diameter Maximum (HDMX) 100 (MM) 600			
Hole Diameter Maximum (HDMX) 125 (MM) 375			Production Casing From FCD2 to FCD3					
Tension (TENS) 25000 (N) 0								
			Washout From HDMI_1 to BS2		Tight Spot From HDMX_1 to BS3			
			Tight Spot From BS2 to HDMI_1		Washout From BS3 to HDMX_1			

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					
Time Mark Every 60 S					

Parameters				
DLIS Name	Description	Value		
	EMS-B: Environment Measurement Sonde			
ECOF	EMS Caliper Offset	50.8	MM	
EFC	EMS Fixed Caliper Operation	OFF		
FCD	Future Casing (Outer) Diameter	177.8	MM	
HVCS	Integrated Hole Volume Caliper Selection	EMS_Calipers		
	DIR: Directional Survey Computation			
SPVD	TVD of Starting Point	0	M	
TIMD	Along-hole depth of Tie-in Point	348	M	
TIVD	TVD of Tie-in Point	348	M	
	HOLEV: Integrated Hole/Cement Volume			
FCD	Future Casing (Outer) Diameter	177.8	MM	
HVCS	Integrated Hole Volume Caliper Selection	EMS_Calipers		
	System and Miscellaneous			
BS	Bit Size	222.000	MM	
DO	Depth Offset for Playback	0.0	M	
PP	Playback Processing	RECOMPUTE		
TD	Total Depth	1201	M	
Format: CVL HD MIN MAX		Vertical Scale: 1:240		Graphics File Created: 24-Feb-2008 01:17

OP System Version: 15C0-309					
MCM					
FBST-B	15C0-309	DSST-B	15C0-309		
EMS-B	15C0-309	SGT-N	15C0-309		
DTC-H	15C0-309				

Input DLIS Files					
DEFAULT	FMI_DSI_EMS_029LUP	FN:44	PRODUCER	23-Feb-2008 22:29	1202.1 M 278.4 M
Output DLIS Files					
DEFAULT	FMI_DSI_EMS_031PUP	FN:48	PRODUCER	24-Feb-2008 01:17	
BACKUP	FMI_DSI_EMS_031PUP	FN:49	PRODUCER	24-Feb-2008 01:17	
IMAGE	FMI_DSI_EMS_031PUP	FN:50	PRODUCER	24-Feb-2008 01:17	
REDUCED	FMI_DSI_EMS_031PUP	FN:51	PRODUCER	24-Feb-2008 01:17	

Calibration and Check Summary							
Measurement	Nominal	Master	Before	After	Change	Limit	Units
Full-Bore Scanner - B Wellsite Calibration - Caliper Calibration							
Before: 16-Feb-2008 16:45							
Caliper 1 Small Jig	203.2	N/A	201.5	N/A	N/A	N/A	MM
Caliper 2 Small Jig	203.2	N/A	208.6	N/A	N/A	N/A	MM
Caliper 1 Large Jig	304.8	N/A	300.9	N/A	N/A	N/A	MM
Caliper 2 Large Jig	304.8	N/A	302.1	N/A	N/A	N/A	MM
Full-Bore Scanner - B Wellsite Calibration - CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY							
Before: 23-Feb-2008 21:08							
TEMPERATURE REFERENCE :	N/A	N/A	20	N/A	N/A	N/A	DEGC
YEAR OF CALIBRATION :	N/A	N/A	6	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	11	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	1067	N/A	N/A	N/A	
Full-Bore Scanner - B Wellsite Calibration - CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY							
Before: 23-Feb-2008 21:08							
TEMPERATURE REFERENCE :	N/A	N/A	17	N/A	N/A	N/A	DEGC
YEAR OF CALIBRATION :	N/A	N/A	6	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	10	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	751	N/A	N/A	N/A	
Environment Measurement Sonde Wellsite Calibration - EMS Caliper Calibration							
Before: 16-Feb-2008 15:25							
Radius 1 Short Radius	101.6	N/A	81.34	N/A	N/A	5.080	MM
Radius 1 Long Radius	203.2	N/A	187.4	N/A	N/A	5.080	MM
Radius 2 Short Radius	101.6	N/A	79.42	N/A	N/A	5.080	MM
Radius 2 Long Radius	203.2	N/A	184.6	N/A	N/A	5.080	MM
Radius 3 Short Radius	101.6	N/A	79.37	N/A	N/A	5.080	MM
Radius 3 Long Radius	203.2	N/A	184.5	N/A	N/A	5.080	MM
Radius 4 Short Radius	101.6	N/A	87.87	N/A	N/A	5.080	MM
Radius 4 Long Radius	203.2	N/A	190.2	N/A	N/A	5.080	MM
Radius 5 Short Radius	101.6	N/A	83.27	N/A	N/A	5.080	MM
Radius 5 Long Radius	203.2	N/A	186.9	N/A	N/A	5.080	MM
Radius 6 Short Radius	101.6	N/A	78.00	N/A	N/A	5.080	MM
Radius 6 Long Radius	203.2	N/A	183.6	N/A	N/A	5.080	MM
Scintillation Gamma Ray Tool - N Wellsite Calibration - Detector Calibration							
Before: 22-Feb-2008 14:45							
Gamma Ray (Jig - Bkg)	169.1	N/A	169.1	N/A	N/A	15.37	GAPI
Gamma Ray (Calibrated)	167.0	N/A	167.0	N/A	N/A	15.00	GAPI

Full-Bore Scanner - B / Equipment Identification	
Primary Equipment:	
FullBore Scanner Sonde	FBSS - B
FullBore Scanner Sonde Upper part	FBSH - A
FullBore Scanner Sonde Cartridge	FBSC - B
GPIT Cartridge - C	GPIC - C
Insulating Sub	AH - 185
Flex Joint	AH - 184
FullBore Scanner Control Cartridge	FBCC - A
Auxiliary Equipment:	
Electronics Cartridge Housing	ECH - MRA

Full-Bore Scanner - B Wellsite Calibration					
Caliper Calibration					
Phase	Caliper 1 Small Jig MM	Value	Phase	Caliper 2 Small Jig MM	Value
Before		201.5	Before		208.6
	172.7 (Minimum) 203.2 (Nominal) 233.7 (Maximum)			172.7 (Minimum) 203.2 (Nominal) 233.7 (Maximum)	
Phase	Caliper 1 Large Jig MM	Value	Phase	Caliper 2 Large Jig MM	Value
Before		300.9	Before		302.1
	259.1 (Minimum) 304.8 (Nominal) 350.5 (Maximum)			259.1 (Minimum) 304.8 (Nominal) 350.5 (Maximum)	
Before: 16-Feb-2008 16:45					

Environment Measurement Sonde / Equipment Identification	
Primary Equipment:	
EMS Mechanical	EMM - B
EMS Cartridge	EMC - B
EMS Adaptor	EMA - B
Resistivity Meter	RES -
Auxiliary Equipment:	
Electronics Cartridge Housing	ECH - KH

Environment Measurement Sonde Wellsite Calibration					
EMS Caliper Calibration					
Phase	Radius 1 Short Radius MM	Value	Phase	Radius 1 Long Radius MM	Value
Before		81.34	Before		187.4
	76.20 (Minimum) 101.6 (Nominal) 127.0 (Maximum)			177.8 (Minimum) 203.2 (Nominal) 228.6 (Maximum)	
Phase	Radius 2 Short Radius MM	Value	Phase	Radius 2 Long Radius MM	Value
Before		79.42	Before		184.6
	76.20 (Minimum) 101.6 (Nominal) 127.0 (Maximum)			177.8 (Minimum) 203.2 (Nominal) 228.6 (Maximum)	
Phase	Radius 3 Short Radius MM	Value	Phase	Radius 3 Long Radius MM	Value
Before		79.37	Before		184.5
	76.20 (Minimum) 101.6 (Nominal) 127.0 (Maximum)			177.8 (Minimum) 203.2 (Nominal) 228.6 (Maximum)	

Phase	Radius 4 Short Radius MM	Value	Phase	Radius 4 Long Radius MM	Value
Before		87.87	Before		190.2
	76.20 (Minimum)	101.6 (Nominal)		177.8 (Minimum)	203.2 (Nominal)
		127.0 (Maximum)			228.6 (Maximum)
Phase	Radius 5 Short Radius MM	Value	Phase	Radius 5 Long Radius MM	Value
Before		93.27	Before		186.9
	76.20 (Minimum)	101.6 (Nominal)		177.8 (Minimum)	203.2 (Nominal)
		127.0 (Maximum)			228.6 (Maximum)
Phase	Radius 6 Short Radius MM	Value	Phase	Radius 6 Long Radius MM	Value
Before		78.00	Before		183.6
	76.20 (Minimum)	101.6 (Nominal)		177.8 (Minimum)	203.2 (Nominal)
		127.0 (Maximum)			228.6 (Maximum)

Before: 16-Feb-2008 15:25

Scintillation Gamma Ray Tool - N / Equipment Identification

Primary Equipment:

Scintillation Gamma Cartridge
Scintillation Gamma Detector

SGC - TB
SGD - TAB

Auxiliary Equipment:

Scintillation Gamma Housing
Gamma Source Radioactive

SGH - K
GSR - U/Y

Scintillation Gamma Ray Tool - N Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		10.18	Before		169.1	Before		167.0
	0 (Minimum)	30.00 (Nominal)		153.7 (Minimum)	169.1 (Nominal)		152.0 (Minimum)	167.0 (Nominal)
		120.0 (Maximum)			184.4 (Maximum)			182.0 (Maximum)

Before: 22-Feb-2008 14:45

DTS Telemetry Tool / Equipment Identification

Primary Equipment:

DTC-H Auxiliary Cartridge
DTC-H Telemetry Cartridge

DTCH - A 9397
DTCH - A 9397

Auxiliary Equipment:

DTCH Telemetry Cartridge Housing

ECH - KC 10485

Company: **PETRO-CANADA**

Well: **PETRO-CANADA BLACKWATER KWIJKA M-59**

Field: **KWIJKA**

Province: **NORTHWEST TERRITORIES**

MD

Schlumberger

MD

CEMENT VOLUME LOG