



**Weatherford**

**COMPACT TRIPLE COMBO  
QUICKLOOK  
LOGS**

COMPANY EAST CHEYENNE GAS STORAGE LLC

WELL ECGS No 6-19D WPD003-1

FIELD PEETZ WEST

PROVINCE/COUNTY LOGAN

COUNTRY/STATE USA/COLORADO

LOCATION SESE 653' FSL AND 716' FEL

SEC

TWP 6 11N

RGE 52W

Other Services

API Number 05-075-09409

Permit Number

Permanent Datum GL, Elevation 4553 feet

Log Measured From KB

Drilling Measured From KB

Date 28-OCT-2012

Run Number ONE

Depth Driller 5285.00

Depth Logger 5288.00

First Reading 5285.00

Last Reading 4200.00

Casing Driller 1220.00

Casing Logger 1216.00

Bit Size 8.750

Hole Fluid Type WBM

Density / Viscosity 9.90 lb/USg

PH / Fluid Loss 7.50

Sample Source FLOWLINE

Rm @ Measured Temp 3.33 @ 62.7

Rmf @ Measured Temp 2.664 @ 62.7

Rmc @ Measured Temp 3.996 @ 62.7

Source Rmf / Rmc

Rm @ BHT 1.401 @153.0

Time Since Circulation 4 HOURS

Max Recorded Temp 153.00

Equipment Name COMPACT

Equipment / Base 13144

Recorded By T. BENICH

Witnessed By J. ASHBY

Elevations:  
KB 4566.00  
DF 4565.00  
GL 4553.00

**BOREHOLE RECORD**

Last Edited: 28-OCT-2012 21:23

Bit Size  
inches

8.750

Depth From  
feet

1216.00

Depth To  
feet

5288.00

**CASING RECORD**

Type

Size  
inches

9.625

Depth From  
feet

0.00

Shoe Depth  
feet

1216.00

Weight  
pounds/ft

36.00

**REMARKS**

SOFTWARE VERSION 13.03.7779

TOOLS RUN: SHA, MCG, MDN, MPD, MIS-D, SKJ, MIS-E, SKJ, SHA, MIM, MIE, SKJ, MFE, MAI RUN IN COMBINATION.

HARDWARE:

MPD: 8" PROFILE PLATE USED.

MAI: TWO 1 INCH STANDOFFS USED.

MDN: DUAL BOWSPRING USED.

MIM: ONE NONMETALIC CENTRALIZING BASKET USED.

MIE: ONE 1 INCH STANDOFF USED

2.65 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY FROM TD TO BOTTOM OF FORT HAYES FORMATION(5288FT TO 4700FT).

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY IN FORT HAYES AND NIOBRARA FORMATION (4700 FT TO 4200 FT).

TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT REPEATABILITY AND DATA QUALITY.

IMAGER PAD 3 APPEARED TO HAVE COMMS PROBLEMS FROM 5170 FT TO 4890 FT.

PAD 6 APPEARS TO HAVE BAD BUTTONS.

CALIPERS WERE CLOSED AND REOPENED AT 4795 TO TRY TO REMOVE MUDCAKE

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

LAT/ LONG: 40.95080 N / 103.21282 W

TOTAL HOLE VOLUME FROM TD TO SURFACE CASING =1800 CUBIC FEET

ANNULAR VOLUME WITH 7 INCH PRODUCTION CASING FROM TD TO SURFACE CASING = 730 CUBIC FEET

TOTAL VOLUME FROM TD TO 4200 FT =440 CUBIC FEET

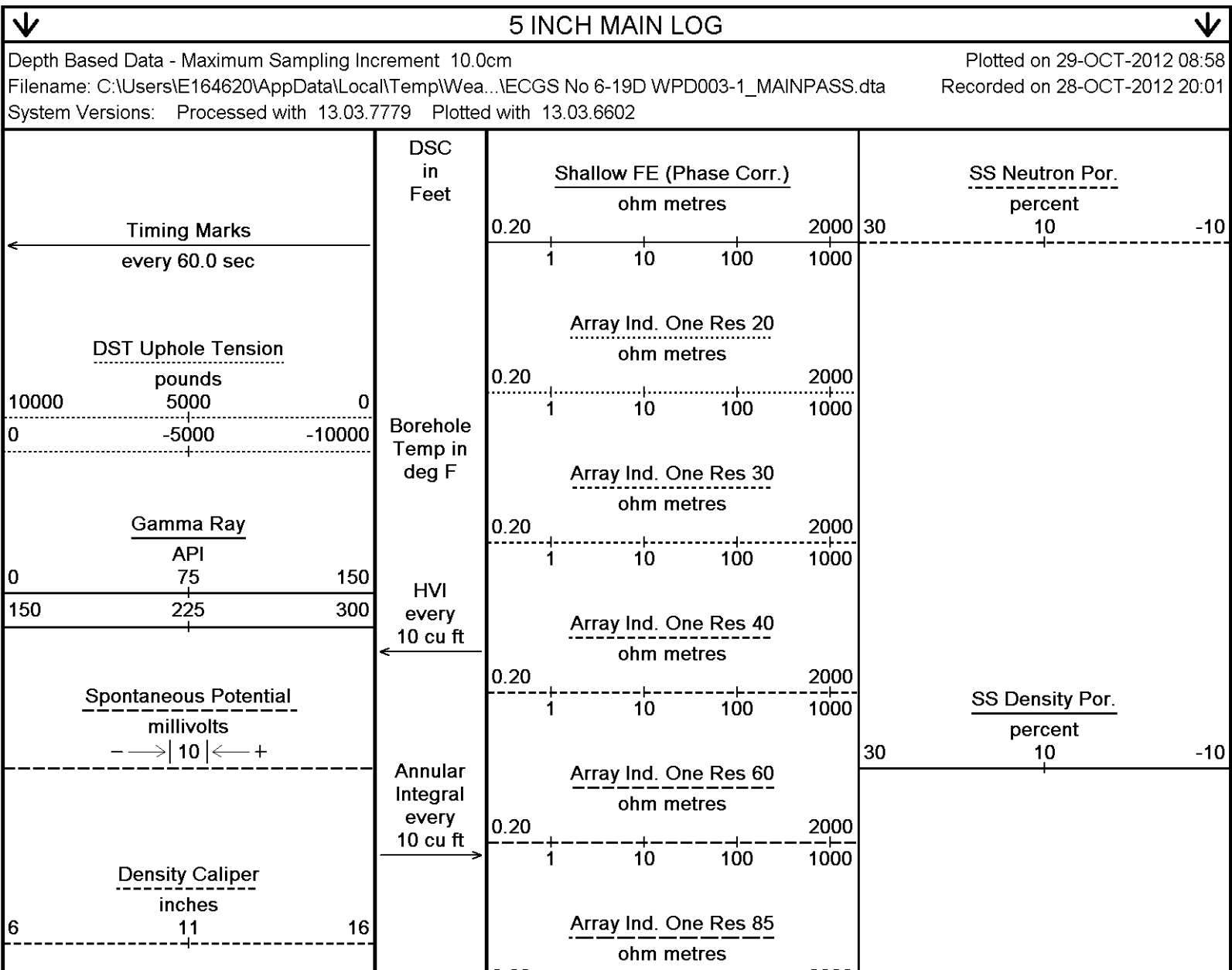
ANNULAR VOLUME WITH 7 INCH PRODUCTION CASING FROM TD TO 4200 FT = 160 CUBIC FEET

SERVICE ORDER: 3531933

OPERATOR: B. PECK

RIG: CADE 22

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 our general terms and conditions in our price schedule.



Bit Size  
inches  
11

6

16

Replay  
Scale  
1:240

4200

141°

4250

141°

400

4300

141°

4350

4440

Array Ind. One Res Rt  
ohm metres

0.20

2000

1

10

100

1000

0.20

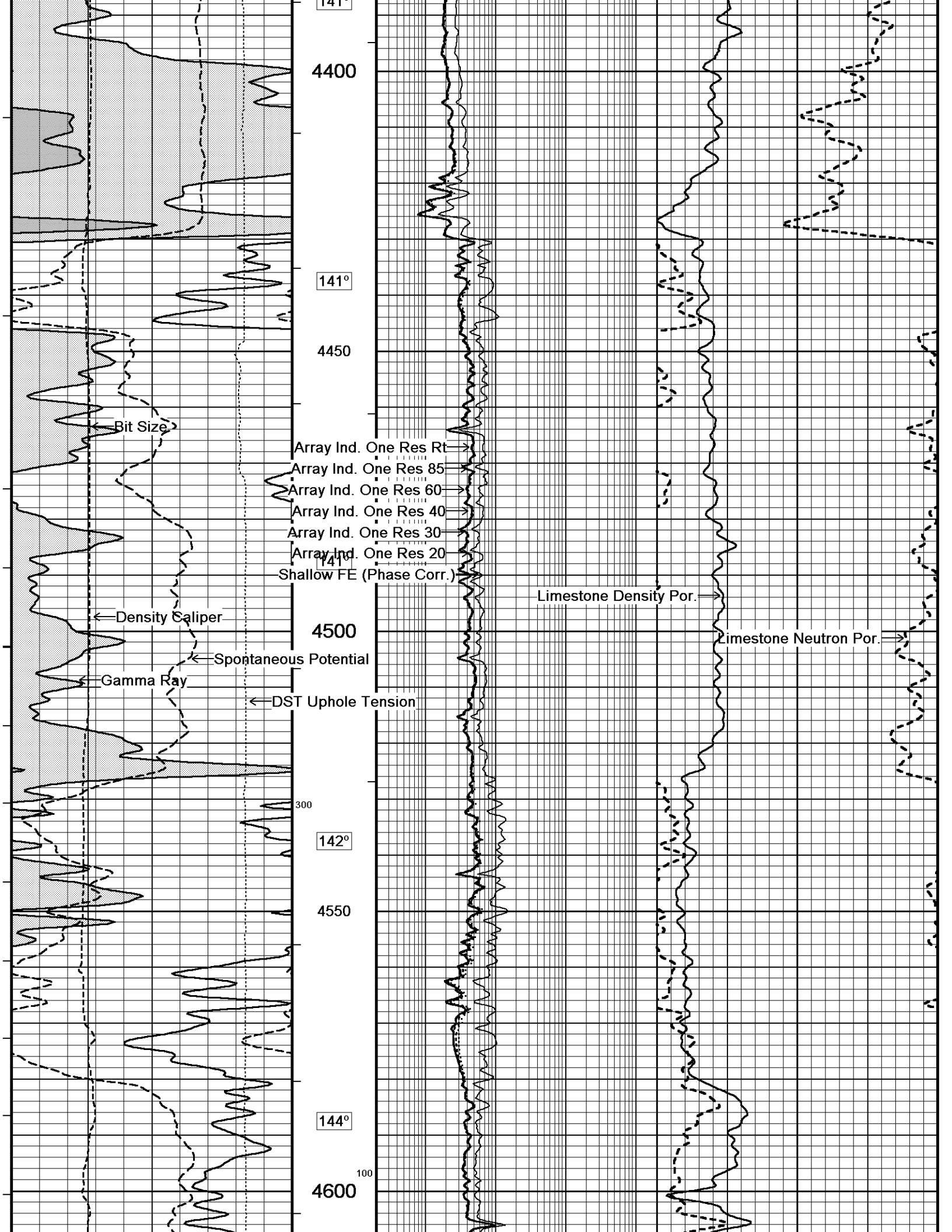
1

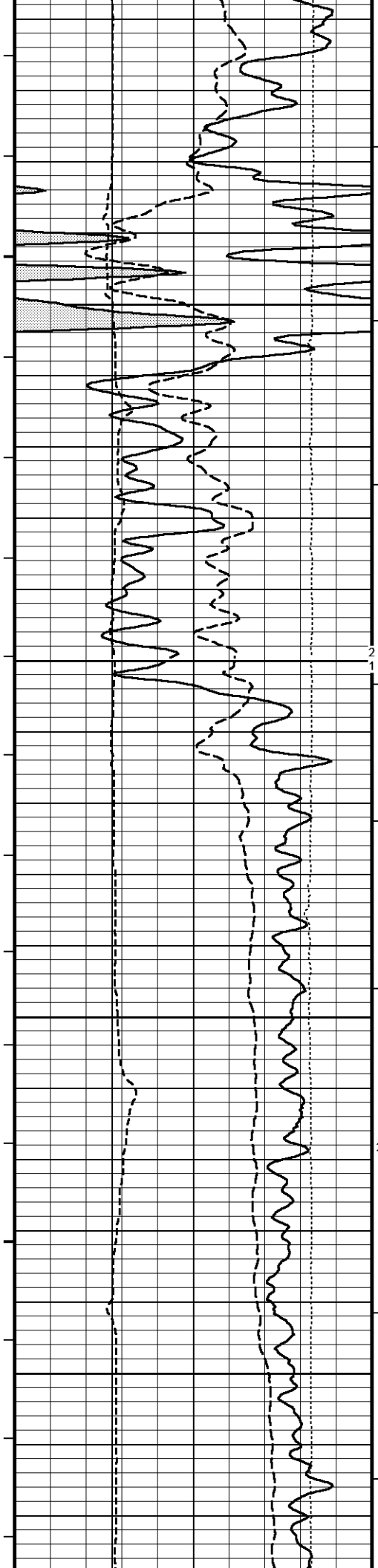
10

100

1000

2000





146°

4650

148°

4700

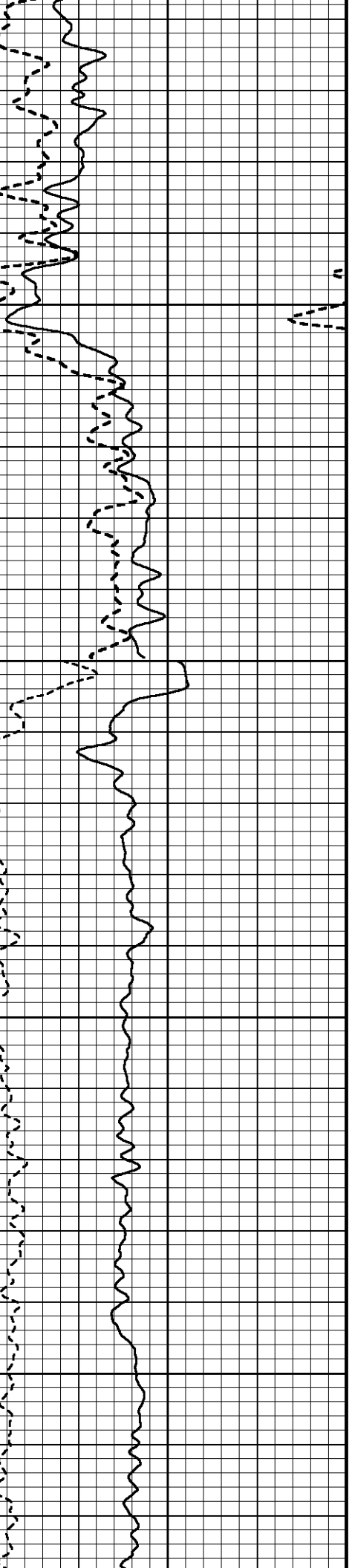
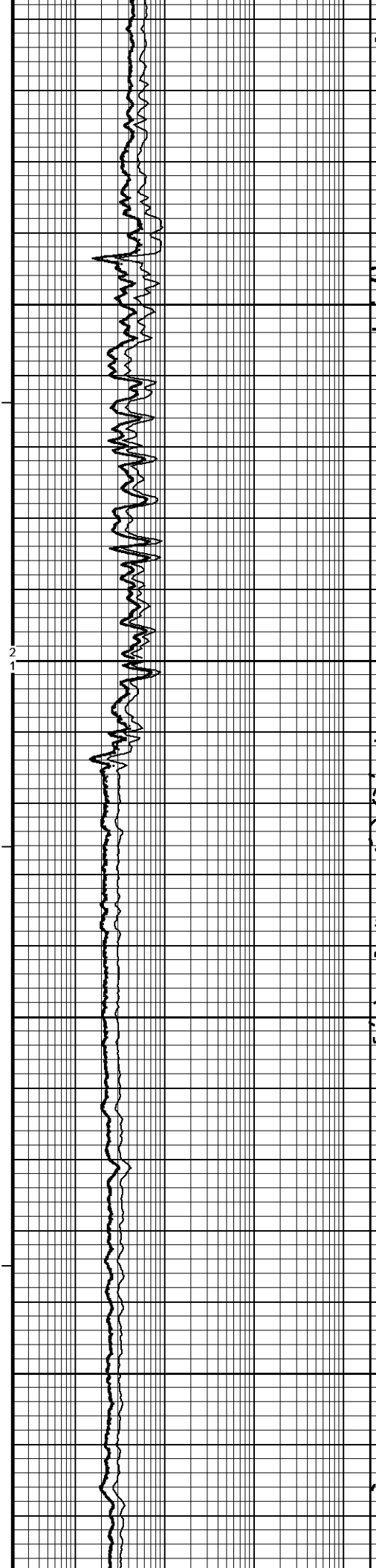
148°

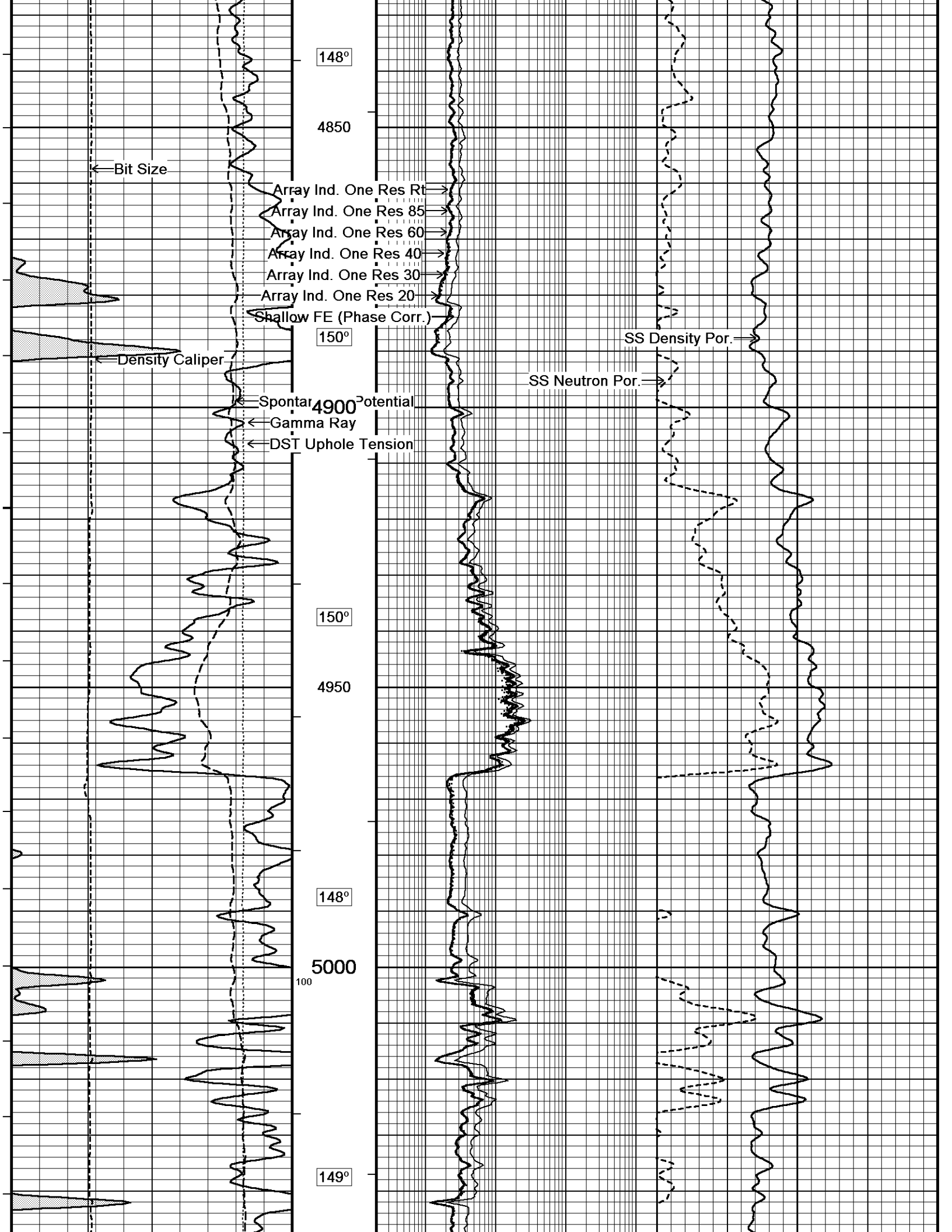
4750

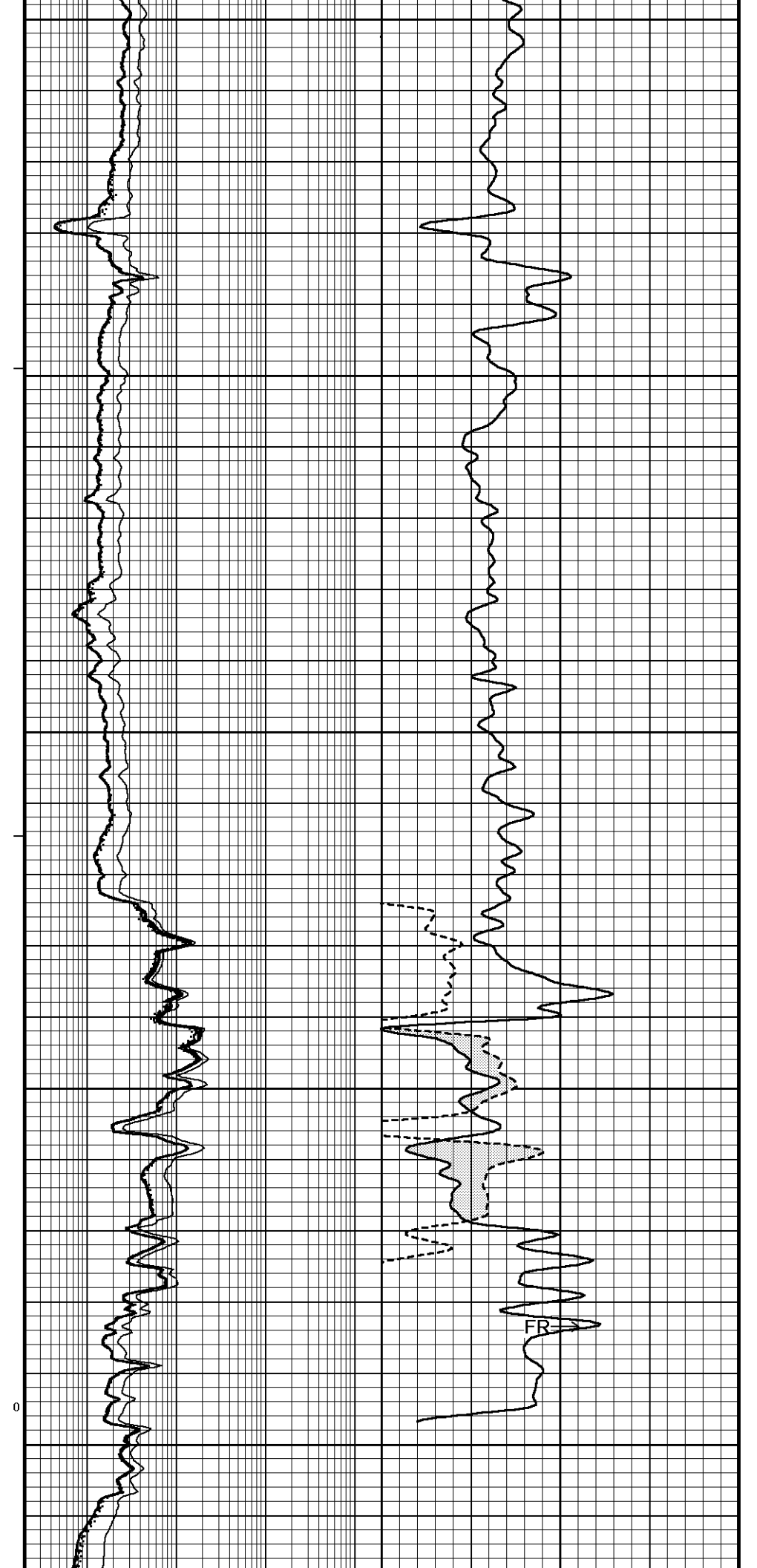
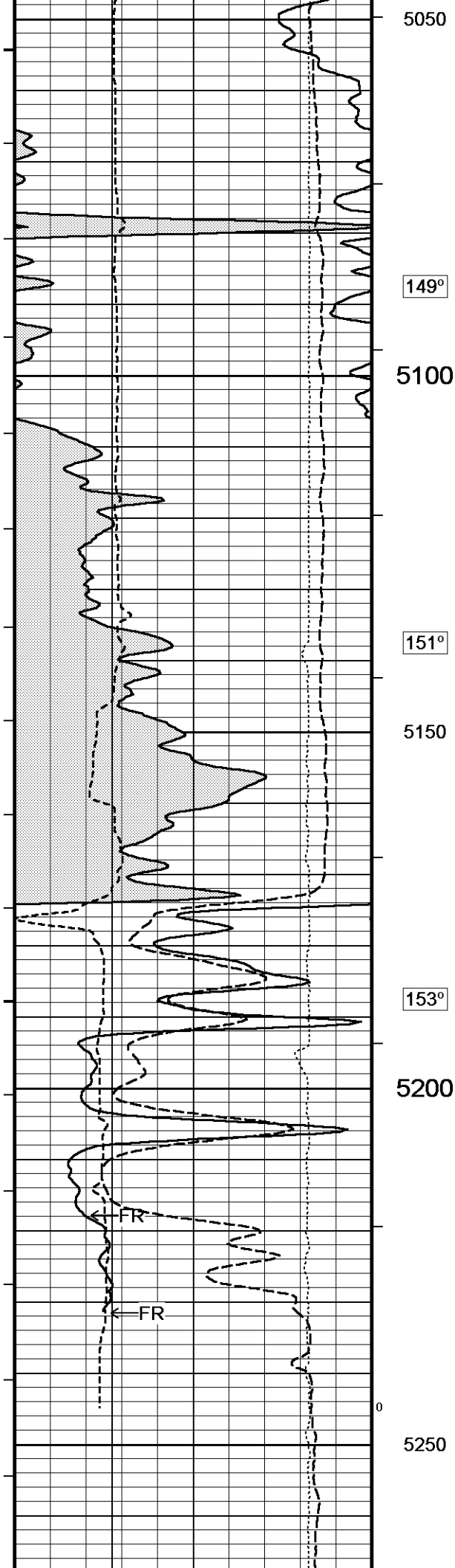
200

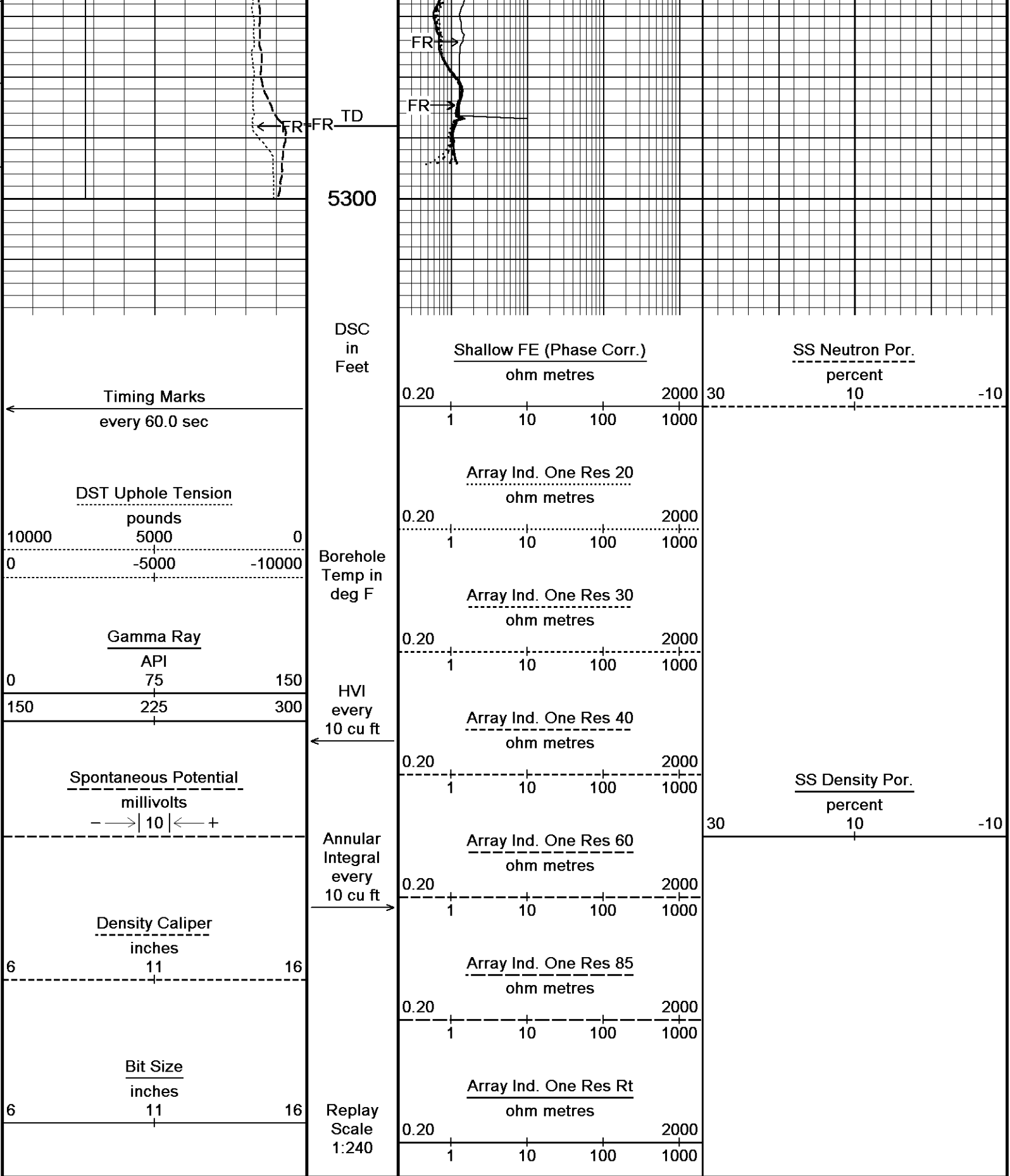
148°

4800











## Down-hole Tension Calibration All 000

Field Calibration on 24-OCT-2010 03:34

Reading No	Measured	0
1	15659.85	0.00
2	15734.68	370.00

## General Constants All 000

Last Edited on 28-OCT-2012,19:11

## General Parameters

Mud Resistivity	3.330	ohm-metres
Mud Resistivity Temperature	62.700	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	

## Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	7.000	inches
Caliper for Differential Caliper	Density Caliper	

## Rwa Parameters

Porosity used	Base Density Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150

## Down-hole Tension Calibration SMS 0

Field Calibration on 28-OCT-2012 18:35

Reading No	Measured	Calibrated (lbs)
1	15363.35	0.00
2	16651.73	510.00

## Gamma Calibration MCG-D.K 483

Field Calibration on 28-OCT-2012 08:43

	Measured	Calibrated (API)
Background	74	50
Calibrator (Gross)	832	569
Calibrator (Net)	758	519

## Gamma Constants MCG-D.K 483

Last Edited on 05-OCT-2012,14:10

Gamma Calibrator Number	GRCC119	
Mud Density	1.00	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

## SP Calibration MCG-D.K 483

Field Calibration on 23-SEP-2012,10:15

	Measured	Calibrated (mV)
Reference 1	100.0	100.0
Reference 2	-100.0	-100.0

## High Resolution Temperature Calibration MCG-D.K 483

Field Calibration on 30-SEP-2012,04:09

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

## High Resolution Temperature Constants MCG-D.K 483

Last Edited on 02-OCT-2012,09:19

Pre-filter Length	11
-------------------	----

## Neutron Calibration MDN-B.J 372

Base Calibration on 09-OCT-2012 10:28

Field Check on 28-OCT-2012 09:04

## Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2898	88	3714	110
Ratio	32.889		33.764	

Field Calibrator at Base	Calibrated (cps)	
	2351	3475
Ratio	0.677	
Field Check	Calibrated (cps)	
	0	0
Ratio	0.000	

Neutron Constants MDN-B.J 372			Last Edited on 28-OCT-2012,16:55		
Neutron Source Id	P31115B				
Neutron Jig Number	NJ5299				
Epithermal Neutron	No				
Caliper Source for Processing	Density Caliper				
Stand-off	0.00	inches			
Mud Density	1.00	gm/cc			
Limestone Sigma	7.10	cu			
Sandstone Sigma	7.00	cu			
Dolomite Sigma	4.70	cu			
Formation Pressure Source	None				
Formation Pressure	N/A	kpsi			
Temperature Source	None				
Temperature	N/A	degrees F			
Mud Salinity	0.00	kppm			
Salinity Correction	Not Applied				
Formation Fluid Salinity Source	None				
Formation Fluid Salinity	N/A	kppm			
Barite Mud Correction	Not Applied				

Navigation Constants MIE-A.A 207			Last Edited on 28-OCT-2012,16:53		
Magnetic Declination	7.96	degrees	East		

Magnetometer Parameters MIE-A.A 207				
Date Of Last Magnetometer Calibration		3-OCT-2012,17:23		
	X Magnetometer	Y Magnetometer	Z Magnetometer	
Slope	-1.000000	-1.000965	-0.989937	
Offset	0.014422	-0.012785	0.011064	

Magnetometer Constants MIE-A.A 207		Last Edited on
Magnetometer Calibrator Number	000	

Accelerometer Parameters MIE-A.A 207				
Date Of Last Accelerometer Calibration		28-OCT-2012,16:53		
	X Accelerometer	Y Accelerometer	Z Accelerometer	
Slope	-1.112364	-1.102657	-1.101773	
Offset	0.011564	0.008310	0.010144	

Accelerometer Constants MIE-A.A 207			Last Edited on 17-AUG-2011,09:33		
Accelerometer Calibrator Number		000			
Accelerometer Temperature Characterisation					
X Accelerometer					
Serial Number		818			
Calibration Date		10-Mar-2009			
	B0	B1	B2	B3	
Bias(g)	0.00000e+000	-9.54720e-006	-3.37284e-009	2.77661e-012	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.89756e-004	3.97830e-007	3.83291e-010	
Y Accelerometer					
Serial Number		808			
Calibration Date		25-Feb-2009			
	B0	B1	B2	B3	
Bias(g)	0.00000e+000	-2.75932e-006	-2.07753e-008	1.48470e-010	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.72438e-004	2.93457e-007	8.36055e-010	
Z Accelerometer					

Z Accelerometer		835			
Serial Number	19-Mar-2009	B0	B1	B2	B3
Calibration Date					
Bias(g)	0.00000e+000	-9.62639e-006	-1.21867e-008	9.07240e-011	
	SF0	SF1	SF2	SF3	
Scale Factor(mA/g)	3.00000e+000	2.81882e-004	3.88354e-007	7.48706e-010	
Caliper Calibration MIE-A.A 207			Base Calibration on 28-OCT-2012 09:19 Field Calibration on 28-OCT-2012 09:22		
Base Calibration					
Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)		
1	26888	26971	5.97		
2	37117	37129	7.96		
3	47211	46396	9.87		
4	58796	57746	11.92		
5	0	0	0.00		
Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	24831	25507	24808	25761	5.97
2	33668	34186	33550	34279	7.96
3	41838	42174	42148	42696	9.87
4	51734	51950	51983	52871	11.92
5	0	0	0	0	0.00
Field Calibration					
	Measured	Measured	Actual		
	Pads 1-5 Caliper(in)	Pads 3-7 Caliper(in)	Caliper(in)		
	7.96	7.91	7.96		
	Measured	Measured	Measured	Measured	Actual
	Pad 2 Caliper(in)	Pad 4 Caliper(in)	Pad 6 Caliper(in)	Pad 8 Caliper(in)	Caliper(in)
	3.96	3.96	4.00	4.00	7.96
Caliper Constants MIE-A.A 207			Last Edited on 12-OCT-2011,10:05		
Caliper Difference for BRKT		0.120	inches		
Imager Pad Check MIE-A.A 207			Field Check on		
Pad 1	Pad Not Tested	Pad 5	Pad Not Tested		
Pad 2	Pad Not Tested	Pad 6	Pad Not Tested		
Pad 3	Pad Not Tested	Pad 7	Pad Not Tested		
Pad 4	Pad Not Tested	Pad 8	Pad Not Tested		
Compact Micro Imager Constants MIE-A.A 207			Last Edited on 28-OCT-2012,09:23		
Sonde Configuration	Imager Mode	degrees			
Arm-Pad Kit	Normal Pads (12.25 in)				
Centre Pad 1 Rotational Offset	0.00				
Image/Borehole Ovality Reference	Azimuth of Pad 1	degrees			
Non Active Buttons	Omit	feet			
Search Angle	0.00	feet			
Correlation Interval	3.28	mAmp			
Correlation Step	1.64	mAmp			
Current Offset	0.0000				
Squasher Start	0.0500				
Image Processing	Enabled				
FE Calibration MFE-A.A 76			Base Calibration on 08-OCT-2012 10:03 Field Check on 28-OCT-2012 05:48		
Base Calibration					
	Measured	Calibrated (ohm-m)			
Reference 1	0.0	0.0			
Reference 2	965.4	126.8			
Base Check		279.7			
Field Check		279.8			
FE Constants MFE-A.A 76			Last Edited on 28-OCT-2012,16:57		
Running Mode		No Sleeve			
MFE K Factor		0.1268			

Caliper Source for FE correction		Density Caliper	
Caliper Value for FE correction		N/A	inches
Rm Source for FE correction		Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature		
Stand-off	1.0		inches

High Resolution Temperature Calibration MAI-B.A 219			Field Calibration on 10-AUG-2011,00:10	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	75.00	75.00		

High Resolution Temperature Constants MAI-B.A 219			Last Edited on 30-SEP-2012,04:08	
Pre-filter Length	11			

Induction Calibration MAI-B.A 219			Base Calibration on 08-MAY-2012,15:56		
			Field Check on 28-OCT-2012 05:39		
Base Calibration					
Test Loop Calibration		Measured	Calibrated (mmho/m)		
Channel	Low	High	Low	High	
1	17.4	478.1	9.3	966.2	
2	5.8	380.3	7.6	821.4	
3	3.5	258.5	5.2	566.0	
4	1.9	136.0	2.6	279.2	
Array Temperature		77.2	Deg F		
Channel		Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High	
1	0.0	0.0	12.4	3793.5	
2	0.0	0.0	30.9	3537.3	
3	0.0	0.0	28.6	3056.1	
4	0.0	0.0	19.3	2028.4	
Deep	0.0	0.0	16.5	1948.6	
Medium	0.0	0.0	42.7	4088.7	
Shallow	0.0	0.0	47.6	5283.8	
Array Temperature		0.0	68.4	Deg F	

Induction Constants MAI-B.A 219			Last Edited on 28-OCT-2012,16:58	
Induction Model		RtAP-WBM		
Caliper for Borehole Corr.		Density Caliper		
Hole Size for Borehole Correction		N/A	inches	
Tool Centred		No		
Stand-off Type		Fins		
Stand-off		1.00	inches	
Number of Fins on Stand-off		6.0000		
Stand-off Fin Angle		60.00	degrees	
Stand-off Fin Width		0.5000	inches	
Borehole Corr. Rm Source		Temperature Corr		
Temp. for Rm Corr.		MCG External Temperature		
Squasher Start		0.0020	mhos/metre	
Squasher Offset		N/A	mhos/metre	
Borehole Normalisation				
DRM1	0.0000	DRC1	0.0000	
DRM2	0.0000	DRC2	0.0000	
MRM1	0.0000	MRC1	0.0000	
MRM2	0.0000	MRC2	0.0000	
SRM1	0.0000	SRC1	0.0000	
SRM2	0.0000	SRC2	0.0000	
Calibration Site Corrections				
Channel 1	0.00		mmhos/metre	
Channel 2	0.00		mmhos/metre	
Channel 3	0.00		mmhos/metre	
Channel 4	0.00		mmhos/metre	
Apparent Porosity and Water Saturation Constants				
Archie Constant (A)		1.00		

Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

### Caliper Calibration MPD-B 183

Base Calibration on 18-OCT-2012 14:40  
Field Calibration on 28-OCT-2012 06:03

#### Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17392	3.99
2	25904	5.97
3	34387	7.96
4	42672	9.87
5	52112	11.92
6	N/A	N/A

#### Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.86	7.96

### Photo Density Calibration MPD-B 183

Base Calibration on 18-OCT-2012 14:23  
Field Check on 28-OCT-2012 06:00

#### Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	39817	13046	52994	19123
Reference 2	18730	1788	25185	2558

#### Field Check at Base

639.0 756.5

#### Field Check

640.8 751.3

#### PE Calibration

Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	118	573		
Reference 1	13710	39721	0.347	0.309
Reference 2	5433	18657	0.294	0.274

#### Field Check at Base

117.9 572.8

#### Field Check

117.6 578.7

### Density Constants MPD-B 183

Last Edited on 28-OCT-2012,16:56

Density Source Id	P15771B
Nylon Calibrator Number	527
Aluminium Calibrator Number	527
Density Shoe Profile	8 inch
Caliper Source for Processing	Density Caliper
PE Correction to Density	Not Applied
Mud Density	1.19 gm/cc
Mud Density Z/A Multiplier	1.11
Mud Filtrate Density	1.00 gm/cc
Dry Hole Mud Filtrate Density	1.00 gm/cc
DNCT	0.00 gm/cc
CRCT	0.00 gm/cc
Density Z/A Correction	Hybrid

Matrix Density (gm/cc)	Depth (ft)
2.68	
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

0.00  
0.00  
0.00

0.00  
0.00  
0.00

## DOWNHOLE EQUIPMENT

C:\Users\E164620\AppData\Local\Temp\Weatherford PreView\5\ECGS No 6-19D WPD003-1\_MAINPASS.dta

3/8" Triple Cone Cable Head (MCB C A)

MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

SHA-H Compact Swivel Head Adaptor

SHA-H 142 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

Compact Comms Gamma

MCG-D.K 483 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Neutron

MDN-B.J 372 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper

MPD-B 183 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

MIS-D.B Compact Inline Bowspring sub

MIS-D.B 660 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint

SKJ-D.A 112 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-E.A Compact Inline Standoff sub

MIS-E.A 334 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint

SKJ-D.A 143 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor

SHA-J.B 574 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

Compact MMI Memory Section

MIM-A.A 207 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

Compact MMI Electrode Section

MIE-A.A 207 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

SKJ-E.B Compact Knuckle Joint

SKJ-E.B 583 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

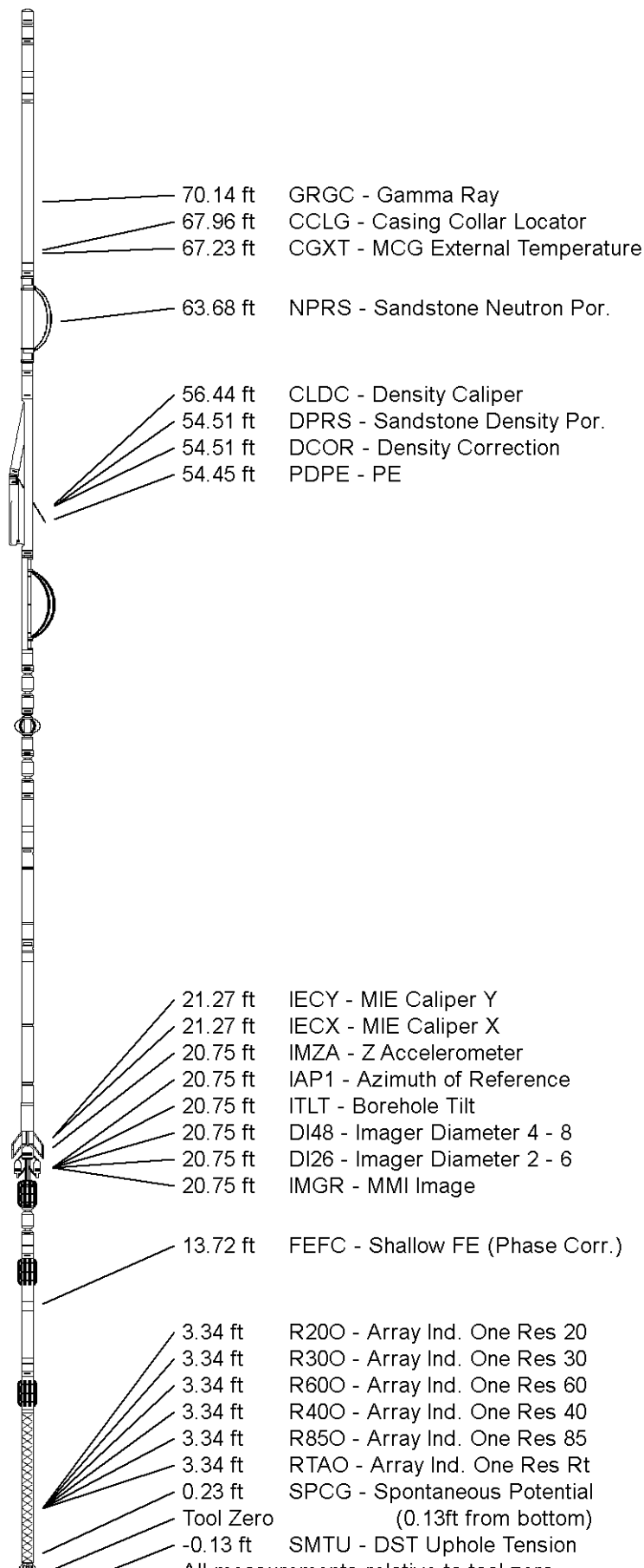
Compact Focussed Electric

MFE-A.A 76 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction


MAI-B.A 219 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 79.30 ft Weight: 608.5 lb





All measurements relative to tool zero.

COMPANY	EAST CHEYENNE GAS STORAGE LLC				
WELL	ECGS No 6-19D WPD003-1				
FIELD	PEETZ WEST				
PROVINCE/COUNTY	LOGAN				
COUNTRY/STATE	USA/COLORADO				
Elevation Kelly Bushing	4566.00	feet	First Reading	5285.00	feet
Elevation Drill Floor	4565.00	feet	Depth Driller	5285.00	feet
Elevation Ground Level	4553.00	feet	Depth Logger	5288.00	feet
<div><div><div>COMPACT TRIPLE COMBO</div><div>QUICKLOOK</div><div>LOGS</div></div><div><b>Weatherford</b><sup>®</sup></div></div>					