



Weatherford[®]

**COMPACT TRIPLE COMBO
QUICKLOOK
LOGS**

COMPANY EAST CHEYENNE GAS STORAGE LLC
WELL ECGS No 6-18 WPD011-2
FIELD PEETZ WEST
PROVINCE/COUNTY LOGAN
COUNTRY/STATE US/COLORADO
LOCATION NESE 2372' FSL AND 1539' FEL

SEC TWP RGE Other Services
6 11N 52W
API Number 05-075-09406
Permit Number

Permanent Datum GL, Elevation 4550 feet
Log Measured From KB Elevations: KB 4564.00
Drilling Measured From KB DF 4563.00
GL 4550.00

Date	12-OCT-2012	
Run Number	ONE	
Depth Driller	5260.00	feet
Depth Logger	5264.00	feet
First Reading	5261.00	feet
Last Reading	4200.00	feet
Casing Driller	1215.00	feet
Casing Logger	1214.00	feet
Bit Size	8.750	inches
Hole Fluid Type	WBM	
Density / Viscosity	9.80 lb/USg	38.00 CP
PH / Fluid Loss	9.00	7.40 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	3.75 @ 80.0	ohm-m
Rmf @ Measured Temp	3.0 @ 80.0	ohm-m
Rmc @ Measured Temp	4.50 @ 80.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	2.115 @ 144.0	ohm-m
Time Since Circulation	4 HOURS	
Max Recorded Temp	144.00	deg F
Equipment Name	COMPACT	
Equipment / Base	13144	RK SPR
Recorded By	J. LIU	T. BENICH
Witnessed By	A. ASHBY	L. CARRASCO

BOREHOLE RECORD

Last Edited: 12-OCT-2012 07:18

Bit Size inches	Depth From feet	Depth To feet
8.750	1214.00	5260.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	9.625	0.00	1214.00	36.00

REMARKS

SOFTWARE VERSION 13.03.7779

TOOLS RUN: SHA, MCG, MDN, MPD, MIS-A, 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(5264FT TO 4700FT)

77001 1/.

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

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

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

LAT/ LONG: 40.95546 N / 103.21529 W

TOTAL HOLE VOLUME FROM TD TO SURFACE CASING =1770 CUBIC FEET

ANNULAR VOLUME WITH 7 INCH PRODUCTION CASING FROM TD TO SURFACE CASING = 700 CUBIC FEET

TOTAL VOLUME FROM TD TO 4200 FT = 410 CUBIC FEET

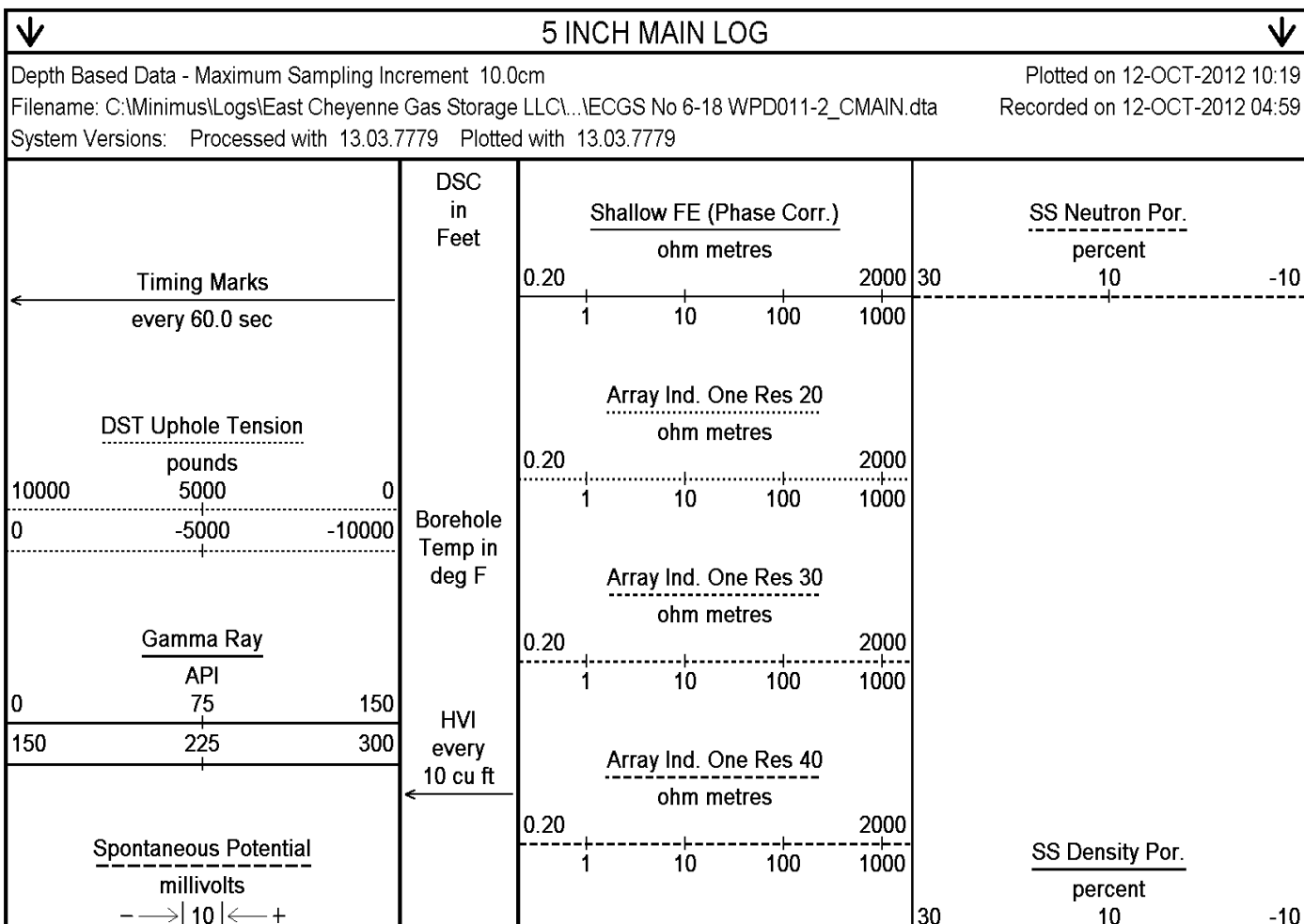
ANNULAR VOLUME WITH 7 INCH PRODUCTION CASING FROM TD TO 4200 FT = 140 CUBIC FEET

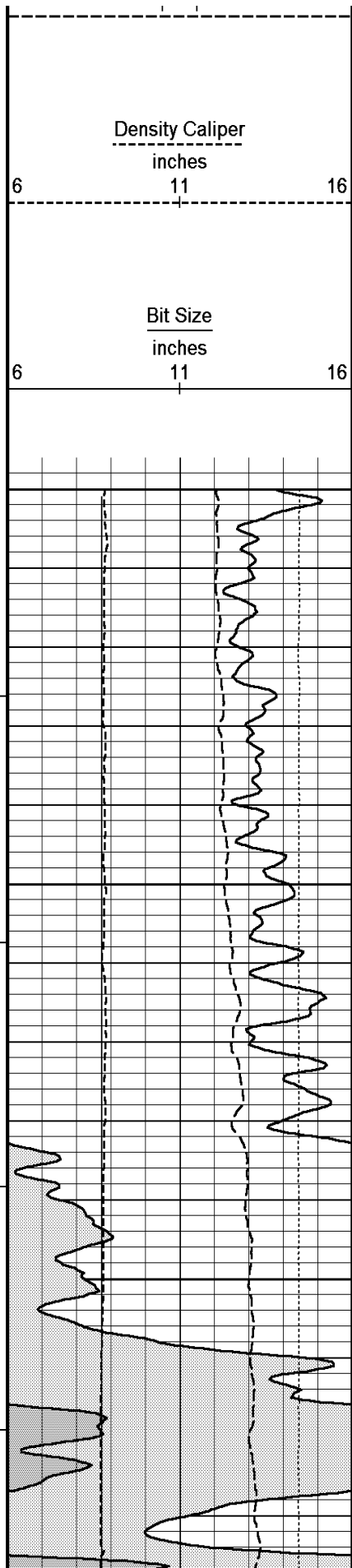
SERVICE ORDER: 3531931

OPERATOR: D. SMITH
J. BAASSIRI

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.





Annular
Integral
every
10 cu ft

Replay
Scale
1:240

4200

400

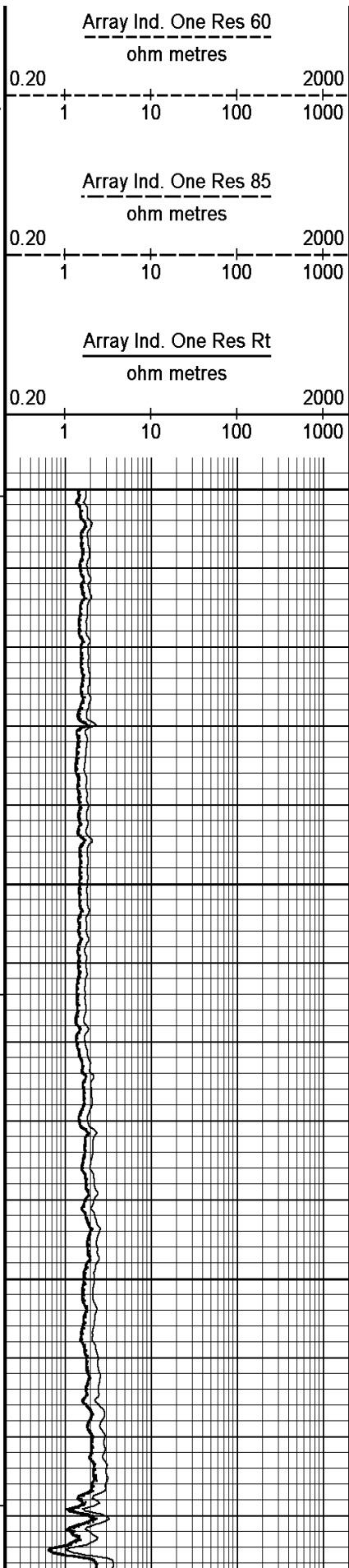
143°

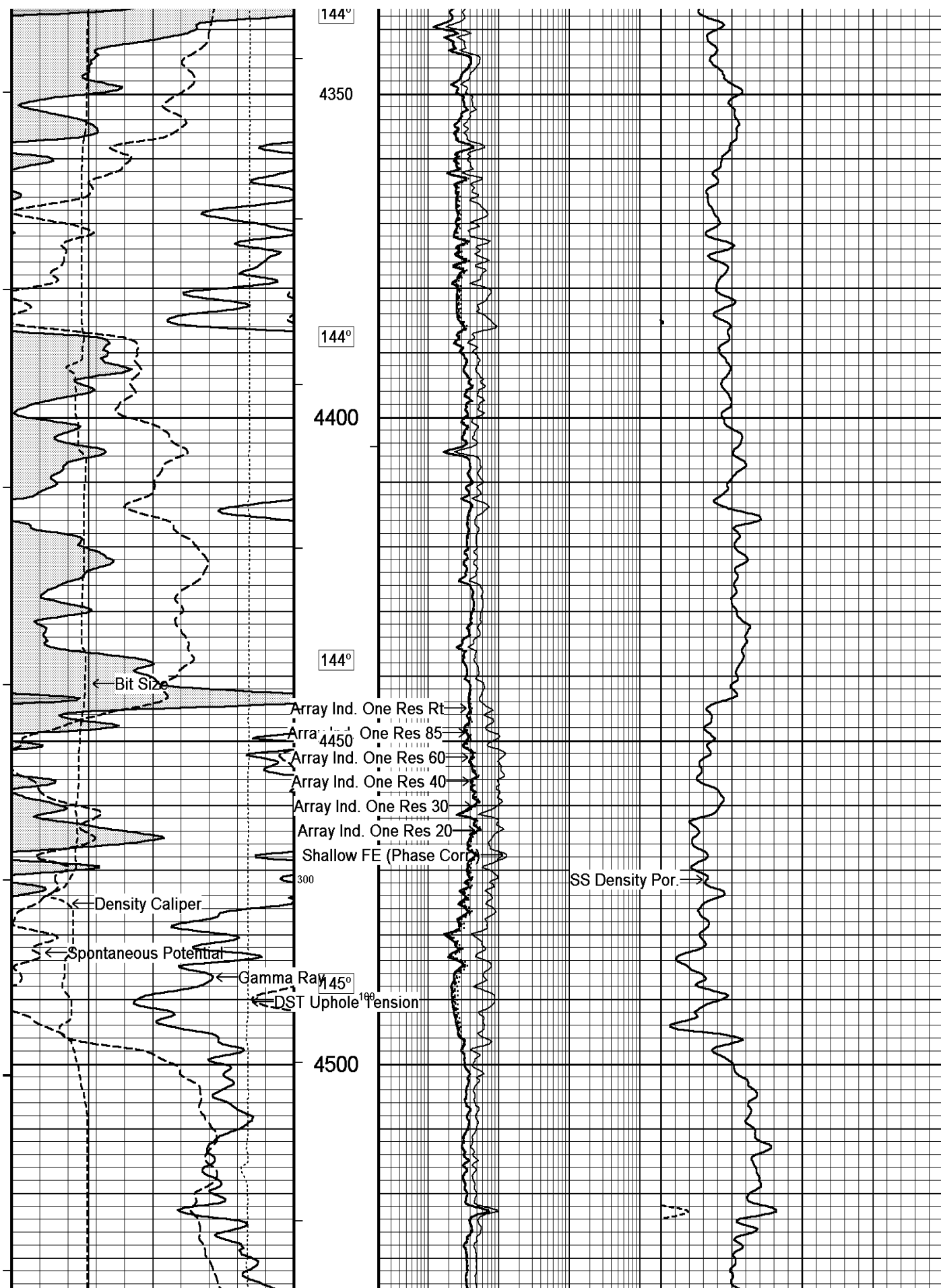
4250

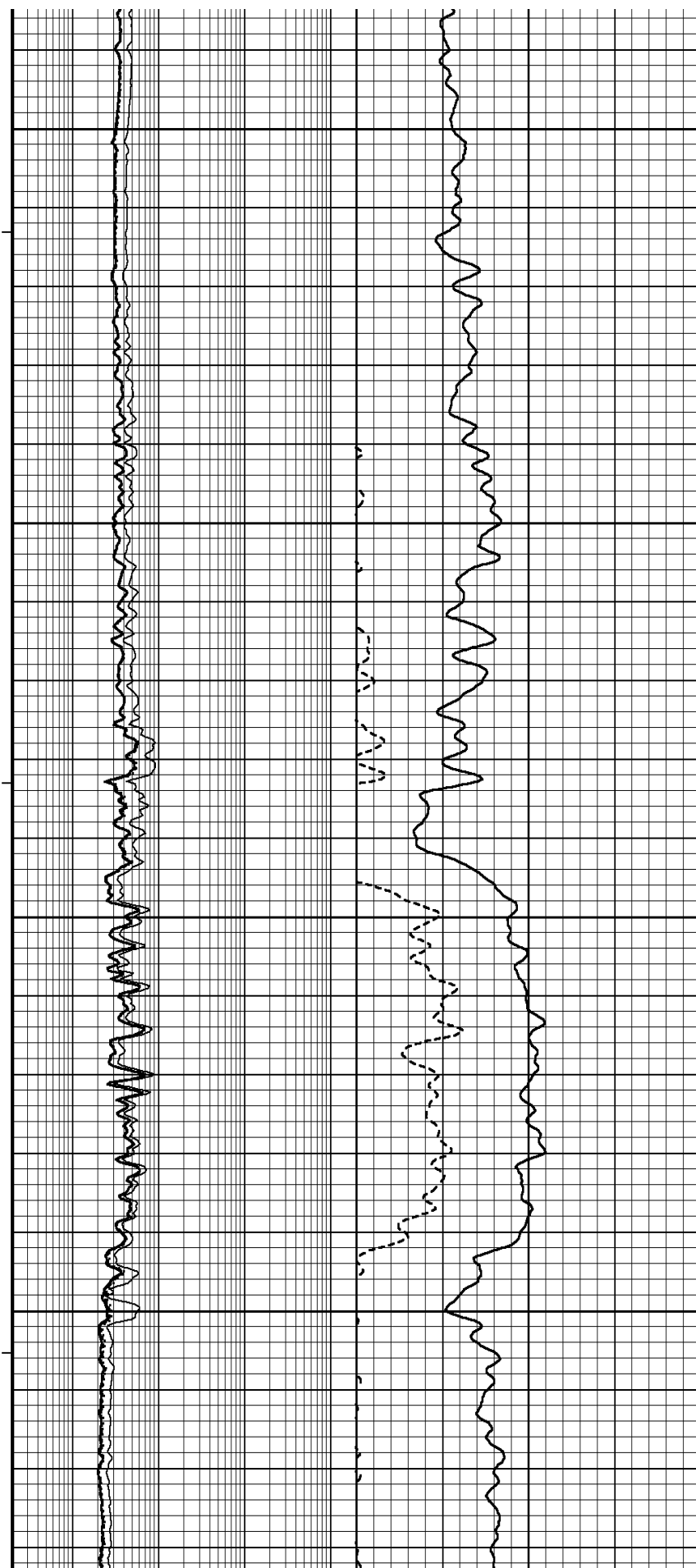
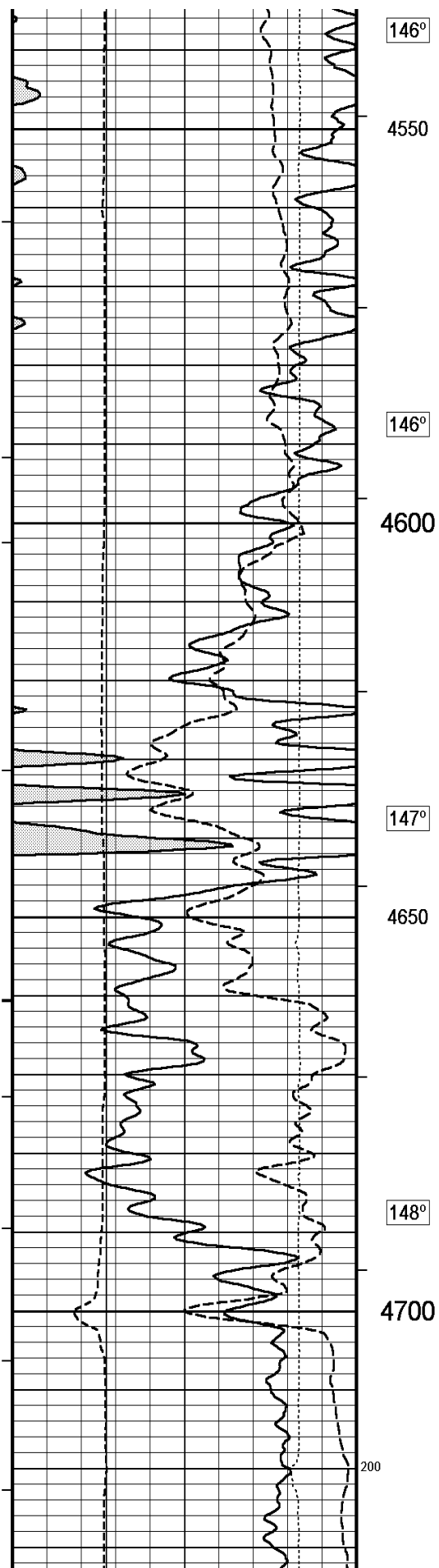
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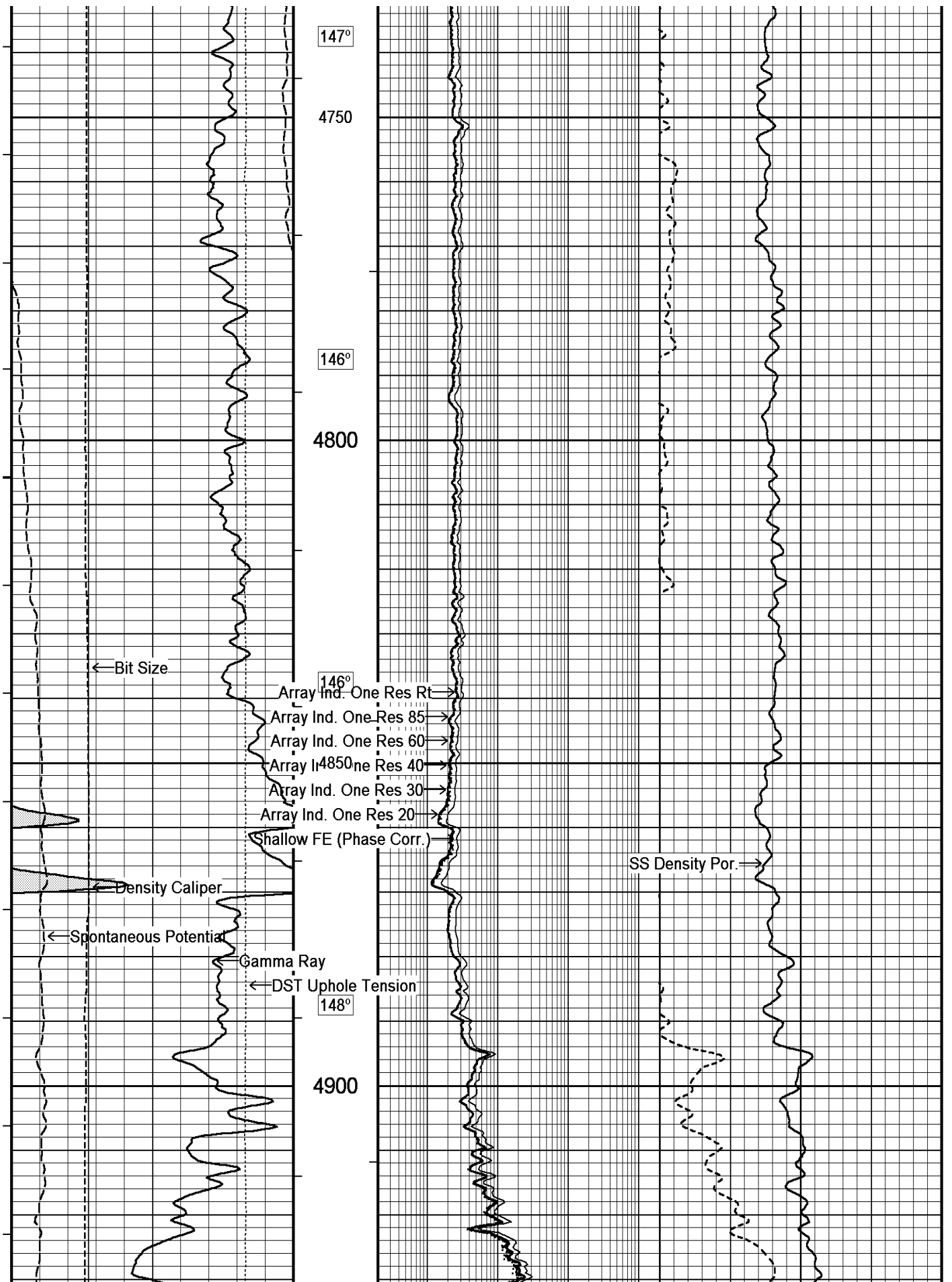
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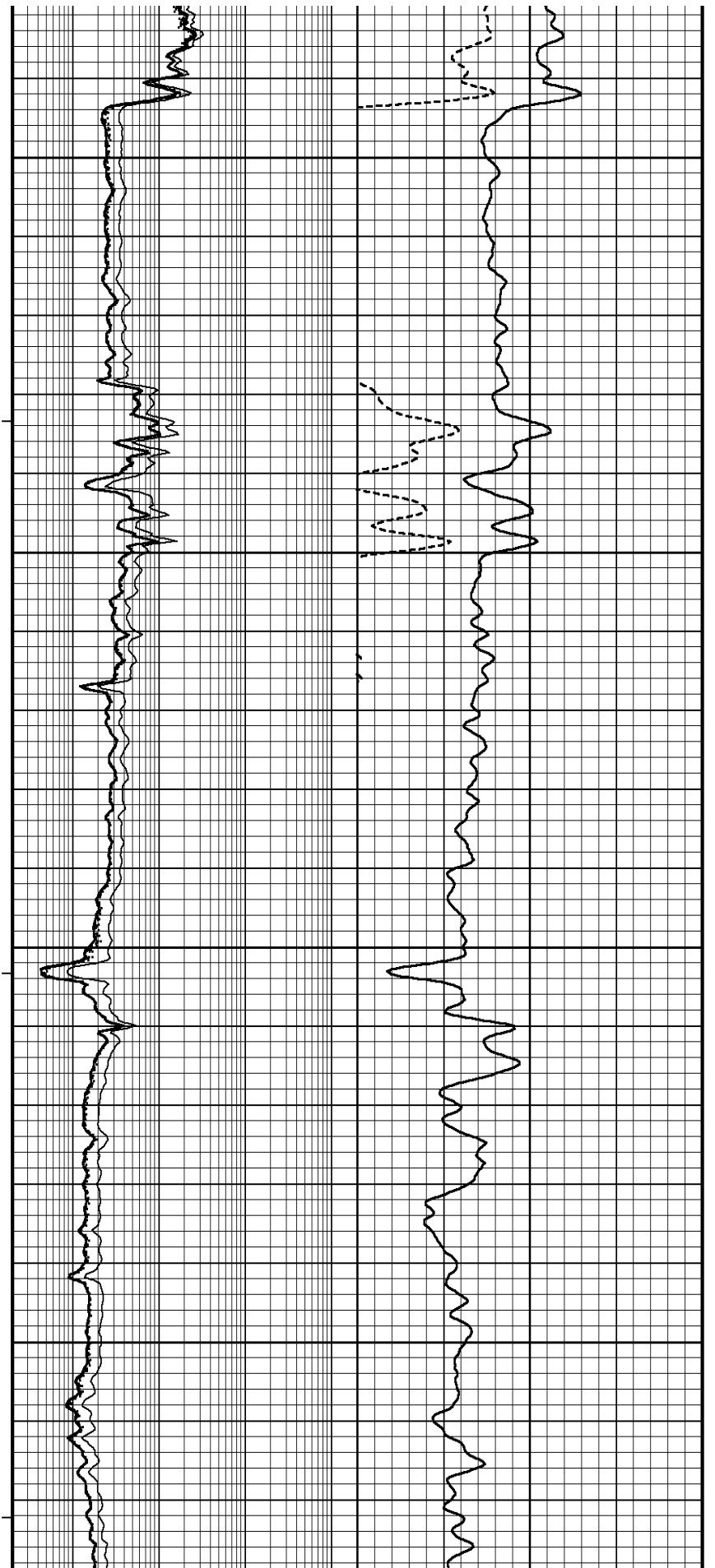
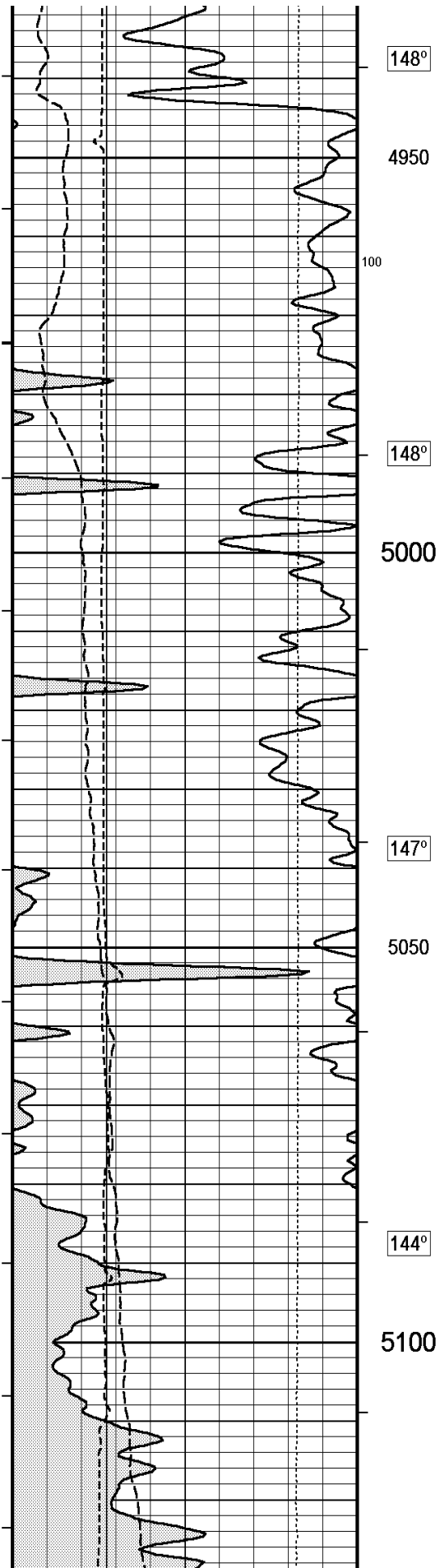
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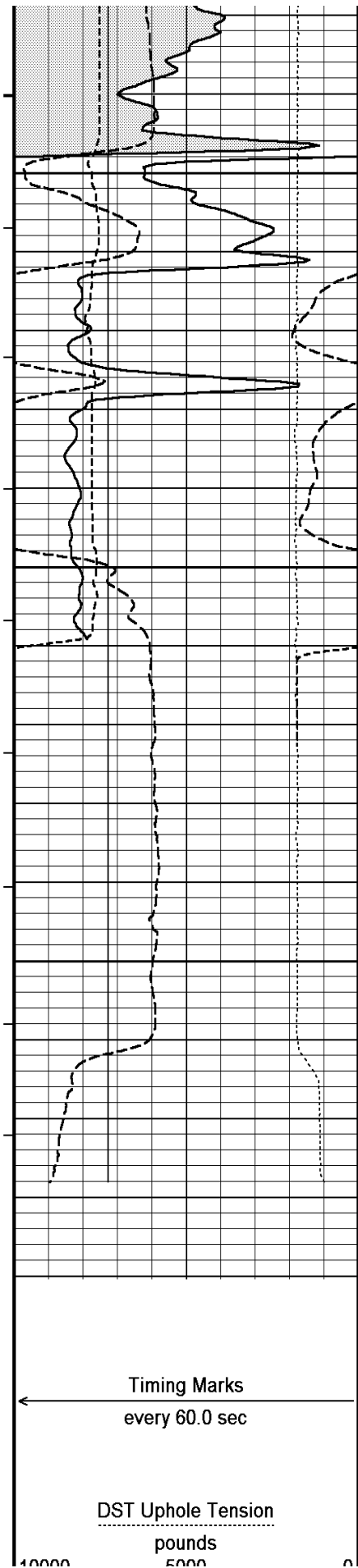












138°

5150

144°

5200

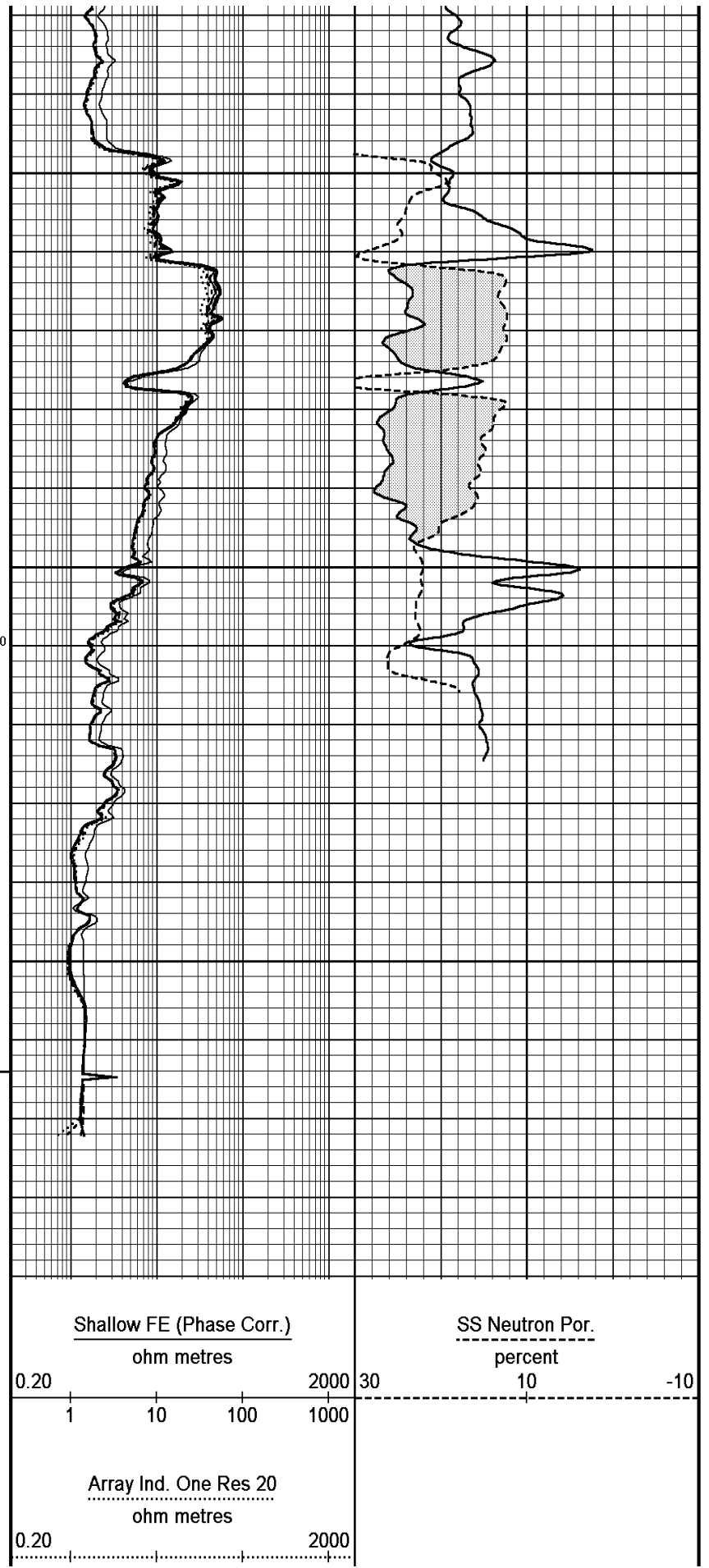
5250

TD

DSC
in
Feet

Timing Marks
every 60.0 sec

DST Uphole Tension
pounds



Shallow FE (Phase Corr.)

ohm metres

0.20 1 10 100 1000 2000

Array Ind. One Res 20

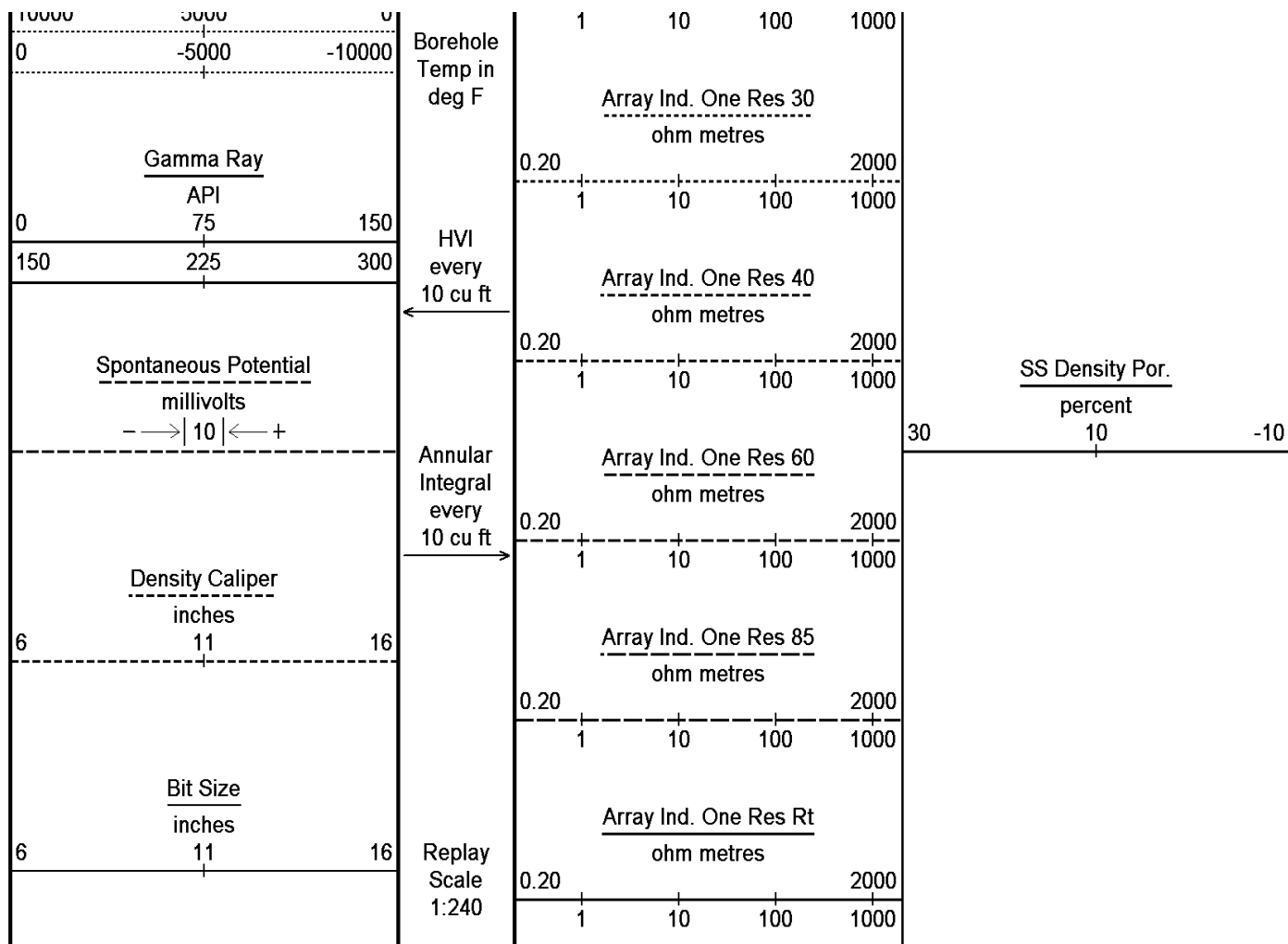
ohm metres

0.20 2000

SS Neutron Por.

percent

30 10 -10



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 12-OCT-2012 10:19

Filename: C:\Minimus\Logs\East Cheyenne Gas Storage LLC\IECGS No 6-18 WPD011-2_CMAIN.dta

Recorded on 12-OCT-2012 04:59

System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

↑ 5 INCH MAIN LOG ↑

BEFORE SURVEY CALIBRATION

C:\Minimus\Logs\East Cheyenne Gas Storage LLC\IECGS No 6-18 WPD011-2\IECGS No 6-18 WPD011-2_CMAIN.dta

Down-hole Tension Calibration All 000

Field Calibration on 24-OCT-2010 03:34

Reading No	Measured	
1	15659.85	0.00
2	15734.68	370.00

General Constants All 000

Last Edited on 12-OCT-2012,04:36

General Parameters

Mud Resistivity	3.750	ohm-metres
Mud Resistivity Temperature	80.000	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	

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 12-OCT-2012 03:42			
Reading No	Measured	Calibrated (lbs)	
1	15453.02	0.00	
2	16669.25	532.00	
Gamma Calibration MCG-D.K 483			
Field Calibration on 10-OCT-2012 11:48			
	Measured	Calibrated (API)	
Background	71	48	
Calibrator (Gross)	839	567	
Calibrator (Net)	767	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 10-OCT-2012 11:57			
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)
Ratio			
Neutron Constants MDN-B.J 372			
Last Edited on 12-OCT-2012,01:28			
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	MCG External Temperature		
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.J 244		Last Edited on 12-OCT-2012,01:34	
Magnetic Declination	7.96	degrees	East
Accelerometer Parameters MIE-A.J 244			
Date Of Last Accelerometer Calibration	11-OCT-2012,10:31		
	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.102009	-1.105650	-1.102611
Offset	-0.007164	0.006376	-0.004580
Accelerometer Constants MIE-A.J 244		Last Edited on 16-FEB-2012,08:51	
Accelerometer Calibrator Number	000		
Accelerometer Temperature Characterisation			
X Accelerometer			
Serial Number	1016		
Calibration Date	12-Apr-2011		
	B0	B1	B2
Bias(g)	0.00000e+000	1.93698e-005	-7.60293e-010
	SF0	SF1	SF2
Scale Factor(mA/g)	3.00000e+000	2.59257e-004	6.13375e-007
			-3.90888e-010
Y Accelerometer			
Serial Number	973		
Calibration Date	19-Jan-2011		
	B0	B1	B2
Bias(g)	0.00000e+000	1.95276e-005	-1.88058e-008
	SF0	SF1	SF2
Scale Factor(mA/g)	3.00000e+000	2.75268e-004	3.53140e-007
			7.52116e-010
Z Accelerometer			
Serial Number	1032		
Calibration Date	18-Apr-2011		
	B0	B1	B2
Bias(g)	0.00000e+000	-1.14960e-005	3.94288e-009
	SF0	SF1	SF2
Scale Factor(mA/g)	3.00000e+000	2.88058e-004	2.44833e-007
			8.38007e-010
Imager Pad Check MIE-A.J 244		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.J 244		Last Edited on 11-OCT-2012,10:00	
Sonde Configuration	Imager Mode		
Arm Pad Kit	Normal Pads (12.25 in)		

Arm-Pad Kit Serial Number		Normal Pads (12.25 in)			
Centre Pad 1 Rotational Offset	0.00	degrees			
Image/Borehole Ovality Reference	Azimuth of Pad 1				
Non Active Buttons	Omit				
Search Angle	0.00	degrees			
Correlation Interval	3.28	feet			
Correlation Step	1.64	feet			
Current Offset	0.0000	mAmp			
Squasher Start	N/A	mAmp			
Image Processing	Enabled				
Caliper Calibration MIE-A.J 244		Base Calibration on 11-OCT-2012 10:08 Field Calibration on 11-OCT-2012 10:27			
Base Calibration					
Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)		
1	26777	25896	5.97		
2	36873	36467	7.96		
3	45055	46131	9.87		
4	50842	56738	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	24919	26114	24194	25099	5.97
2	34321	34565	32478	34129	7.96
3	41481	44009	41829	41403	9.87
4	47591	57263	54975	47514	11.92
5	0	0	0	0	0.00
Field Calibration					
	Measured Pads 1-5 Caliper(in)	Measured Pads 3-7 Caliper(in)	Actual Caliper(in)		
	7.87	7.93	7.96		
	Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
	3.93	4.02	4.01	3.93	7.96
Caliper Constants MIE-A.J 244		Last Edited on 11-OCT-2012,09:58			
Caliper Difference for BRKT		0.120	inches		
Magnetometer Parameters MIE-A.J 244					
Date Of Last Magnetometer Calibration		12-OCT-2012,01:37			
	X Magnetometer	Y Magnetometer	Z Magnetometer		
Slope	-1.000000	-1.000925	-0.993497		
Offset	0.008903	-0.008749	0.009457		
Magnetometer Constants MIE-A.J 244		Last Edited on			
Magnetometer Calibrator Number		000			
FE Calibration MFE-A.A 76		Base Calibration on 08-OCT-2012 10:03 Field Check on 10-OCT-2012 12:57			
Base Calibration					
	Measured	Calibrated (ohm-m)			
Reference 1	0.0	0.0			
Reference 2	965.4	126.8			
Base Check		279.7			
Field Check		279.9			
FE Constants MFE-A.A 76		Last Edited on 12-OCT-2012,01:38			
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 248			Field Calibration on 04-DEC-2010,07:58	
	Measured	Calibrated(Deg C)		
Lower	10.00	10.00		
Upper	100.00	100.00		

High Resolution Temperature Constants MAI-B.A 248			Last Edited on	
Pre-filter Length	11			

Induction Calibration MAI-B.A 248			Base Calibration on 04-DEC-2010,07:57	
			Field Check on 10-OCT-2012 11:18	
Base Calibration				
Test Loop Calibration		Measured	Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	16.8	468.4	9.3	966.2
2	5.9	377.9	7.6	821.4
3	3.4	262.7	5.2	566.0
4	1.4	135.2	2.6	279.2
Array Temperature		23.8	Deg F	
Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	13.6	3891.2	13.7	3892.5
2	30.9	3583.5	31.0	3583.8
3	28.6	3026.5	28.6	3026.4
4	20.3	2044.8	20.3	2044.9
Deep	17.4	1910.3	17.4	1910.2
Medium	41.3	4021.3	41.3	4021.0
Shallow	46.4	5394.9	46.5	5395.5
Array Temperature		63.5	65.5	Deg F

Induction Constants MAI-B.A 248			Last Edited on 12-OCT-2012,10:14	
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-C.J 378				
			Base Calibration on 08-OCT-2012 11:28	
			Field Calibration on 10-OCT-2012 11:35	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	14064	3.99		
2	22752	5.97		
3	31206	7.96		
4	39310	9.87		
5	48416	11.92		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	7.90	7.96		
Photo Density Calibration MPD-C.J 378				
			Base Calibration on 08-OCT-2012 11:54	
			Field Check on 10-OCT-2012 11:42	
Density Calibration				
Base Calibration		Measured		Calibrated (sdu)
	Near	Far	Near	Far
Reference 1	39256	12407	52994	19128
Reference 2	18793	2214	25185	2558
Field Check at Base				
	1202.8	1285.3		
Field Check				
	1197.1	1283.5		
PE Calibration				
Base Calibration		Measured		Calibrated
	WS	WH	Ratio	Ratio
Background	217	1077		
Reference 1	13471	39095	0.349	0.309
Reference 2	5343	18659	0.292	0.274
Field Check at Base				
	217.1	1076.8		
Field Check				
	220.8	1070.2		
Density Constants MPD-C.J 378				
			Last Edited on 12-OCT-2012,01:29	
Density Source Id	P15771B			
Nylon Calibrator Number	DNC-D-527			
Aluminium Calibrator Number	DAC-D-527			
Density Shoe Profile	8 inch			
Caliper Source for Processing	Density Caliper			

Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.17	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)
2.65	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	0.00

DOWNHOLE EQUIPMENT

C:\Minimus\Logs\East Cheyenne Gas Storage LLC\IECGS No 6-18 WPD011-2\IECGS No 6-18 WPD011-2_CMAIN.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-C.J 378 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

MIS-A.A Compact Inline Bowspring sub

MIS-A.A 70 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

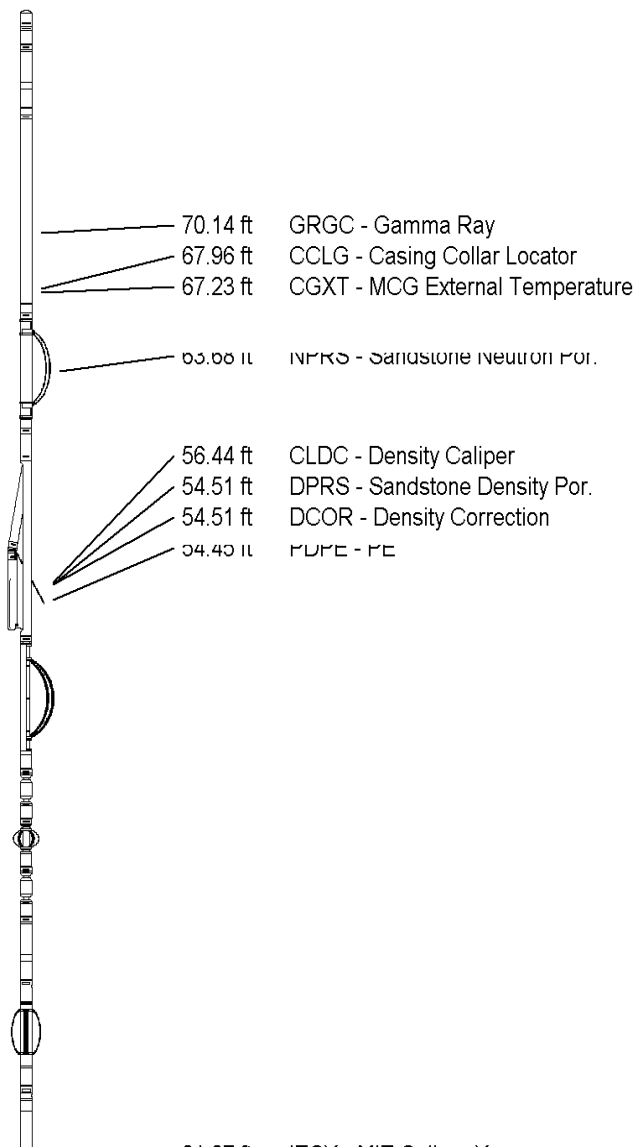
SHA-J.B Compact Swivel Head Adaptor

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

Compact MMI Memory Section

MIM-A.J 244 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

Compact MMI Electrode Section



34.37 ft IEFG - MIF Caliper

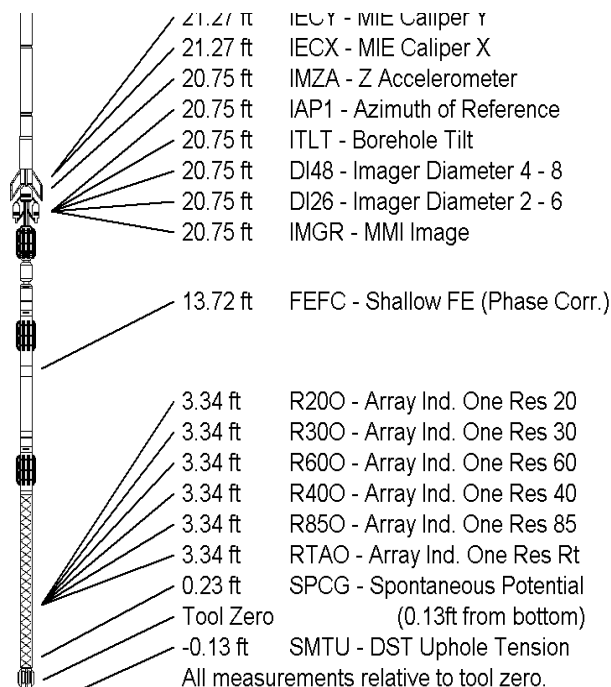
Compact MVII Electrode Section
MIE-A.J 244 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

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 248 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 79.30 ft Weight: 608.5 lb



COMPANY	EAST CHEYENNE GAS STORAGE LLC
WELL	ECGS No 6-18 WPD011-2
FIELD	PEETZ WEST
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	USA/COLORADO

Elevation Kelly Bushing	4564.00	feet	First Reading	5261.00	feet
Elevation Drill Floor	4563.00	feet	Depth Driller	5260.00	feet
Elevation Ground Level	4550.00	feet	Depth Logger	5264.00	feet



Weatherford®

COMPACT TRIPLE COMBO
QUICKLOOK
LOGS