

HALLIBURTON

COMPENSATED SPECTRAL
NATURAL GAMMA

COMPANY		PDC ENERGY INC	
WELL		WASTE MANAGEMENT 2i-401	
FIELD/BLOCK		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		27-May-13	
Run No.		ONE	
Depth - Driller		7453.00 ft	
Depth - Logger		6936.0 ft	
Bottom - Logged Interval		6853 ft	
Top - Logged Interval		CASING	
Casing - Driller		9.625 in @ 952.0 ft	
Casing - Logger		952.0 ft	
Bit Size		8.750 in @	
Type Fluid in Hole		WATER BASED MUD	
Density		9.9 ppq @ 43.00 s/qt	
PH		8.00 pH @ 4.8 cphm	
Source of Sample		MUD CELL	
Rm @ Meas. Temperature		0.820 ohmm @ 131.40 degF @	
Rmf @ Meas. Temperature		1.20 ohmm @ 75.00 degF @	
Rmc @ Meas. Temperature		1.211 ohmm @ 75.00 degF @	
Source Rmf		CHART	
Rm @ BHT		0.58 ohmm @ 188.0 degF @	
Time Since Circulation		8.0 hr	
Time on Bottom		27-May-13 14:50	
Max. Rec. Temperature		188.0 degF @ 6936.0 ft @	
Equipment		11454566 BRIGHTON	
Recorded By		J. SCHMIDT	
Witnessed By		R. JEVNE	

COMPANY		PDC ENERGY INC	
WELL		WASTE MANAGEMENT 2i-401	
FIELD/BLOCK		WATTENBERG	
COUNTY		WELD	
STATE		CO	
API No.		05123369540000	
Location		SHL: 230' FSL & 620' FWL SMSW	
LAT: 40.160850°		LONG: -104.526060°	
Sect. 2		Twp. 2N	
Rge. 64W		Elev. 4939.0 ft	
Other Services:		RWCH	
DSNT		D.F.	
SDLT		4953.0 ft	
WSTT		4938.0 ft	
ACRT		G.L.	

Fold here

Service Ticket No.: 900466315				API Serial No.: 05123369540000				PGM Version: WL INSITE R3.8.4 (Build 5)							
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE						RESISTIVITY SCALE CHANGES									
Date		Sample No.				Type Log		Depth		Scale Up Hole		Scale Down Hole			
Depth-Driller															
Type Fluid in Hole															
Density		Viscosity													
Ph		Fluid Loss													
Source of Sample						RESISTIVITY EQUIPMENT DATA									
Rm @ Meas. Temp		@		@		Run No.		Tool Type & No.		Pad Type		Tool Pos.		Other	
Rmf @ Meas. Temp.		@		@		ONE		ACRT		N/A		CENT		N/A	
Rmc @ Meas. Temp.		@		@				11294352							
Source Rmf		Rmc													
Rm @ BHT		@		@											
Rmf @ BHT		@		@											
Rmc @ BHT		@		@											
EQUIPMENT DATA															
GAMMA				ACOUSTIC				DENSITY				NEUTRON			
Run No.		ONE		Run No.		ONE		Run No.		ONE		Run No.		ONE	
Serial No.		11812883		Serial No.		90296671		Serial No.		11795867		Serial No.		11812167	
Model No.		GTET		Model No.		WSTT		Model No.		SDLT		Model No.		DSNT	
Diameter		3.625 in.		No. of Cent.		2		Diameter		4.5 in.		Diameter		3.625 in.	
Detector Model No.		GTET		Spacing		6 in.		Log Type		GAM-GAM		Log Type		NEU-NEU	
Type		SCINT						Source Type		Cs-137		Source Type		Am241Be	
Length		8 in.		LSA [Y/N]		YES		Serial No.		5471GW		Serial No.		DSN434	
Distance to Source		9 ft.		FWDA [Y/N]		YES		Strength		1.78 Ci		Strength		15 Ci	
LOGGING DATA															

Depth (ft))	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	8.750	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.900	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	SHARED	BSAL	Borehole salinity	1300.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.820	ohmm
	SHARED	TRM	Temperature of Mud	131.4	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	7.000	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	6936.00	ft
	SHARED	BHT	Bottom Hole Temperature	188.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GRSO	Gamma Tool Standoff	0.000	in
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	

CSNG	CGOK	Process CSNG Data?	Yes	
CSNG	CENT	Is Tool Centralized?	No	
CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
CSNG	BARF	Barite Correction Factor	1.00	
CSNG	ORDG	Use Fixed Gain	No	
CSNG	ORDO	Use Fixed Offset	No	
CSNG	ORDR	Use Fixed Resolution Degradation Factor	No	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
Wavesonic-I	WSOK	Process WSTT?	Yes	
Wavesonic-I	AFIL	Adaptive Filtering?	No	
Wavesonic-I	PINT	Process 1 Sample and Skip	0	
Wavesonic-I	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
Wavesonic-I	DTSH	Delta -T Shale	100.00	uspf
Wavesonic-I	DTMT	Delta -T Matrix Type	User define	
Wavesonic-I	DTMA	Delta -T Matrix	47.60	uspf
Wavesonic-I	DTFL	Delta -T Fluid	189.00	uspf
Wavesonic-I	RHOM	Matrix Density	2.7100	g/cc
Wavesonic-I	RHOF	Fluid Density	1.0000	g/cc
Wavesonic-I	SMTH	Semblance Threshold	0.25	
Wavesonic-I	VPVS	VPVS Ratio for Porosity	1.40	
Wavesonic-I	APEQ	Acoustic Porosity Equation	Wylie	
Wavesonic-I	NAVS	Navigation Source Tool	NONE	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.25	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Centered	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm

BOTTOM

Data: WASTEMGMT2I-401\0001 TRIPLE_RED_CSNG_WSTT_BLACK ACRT\005.01 27-May-13 16:10 Up

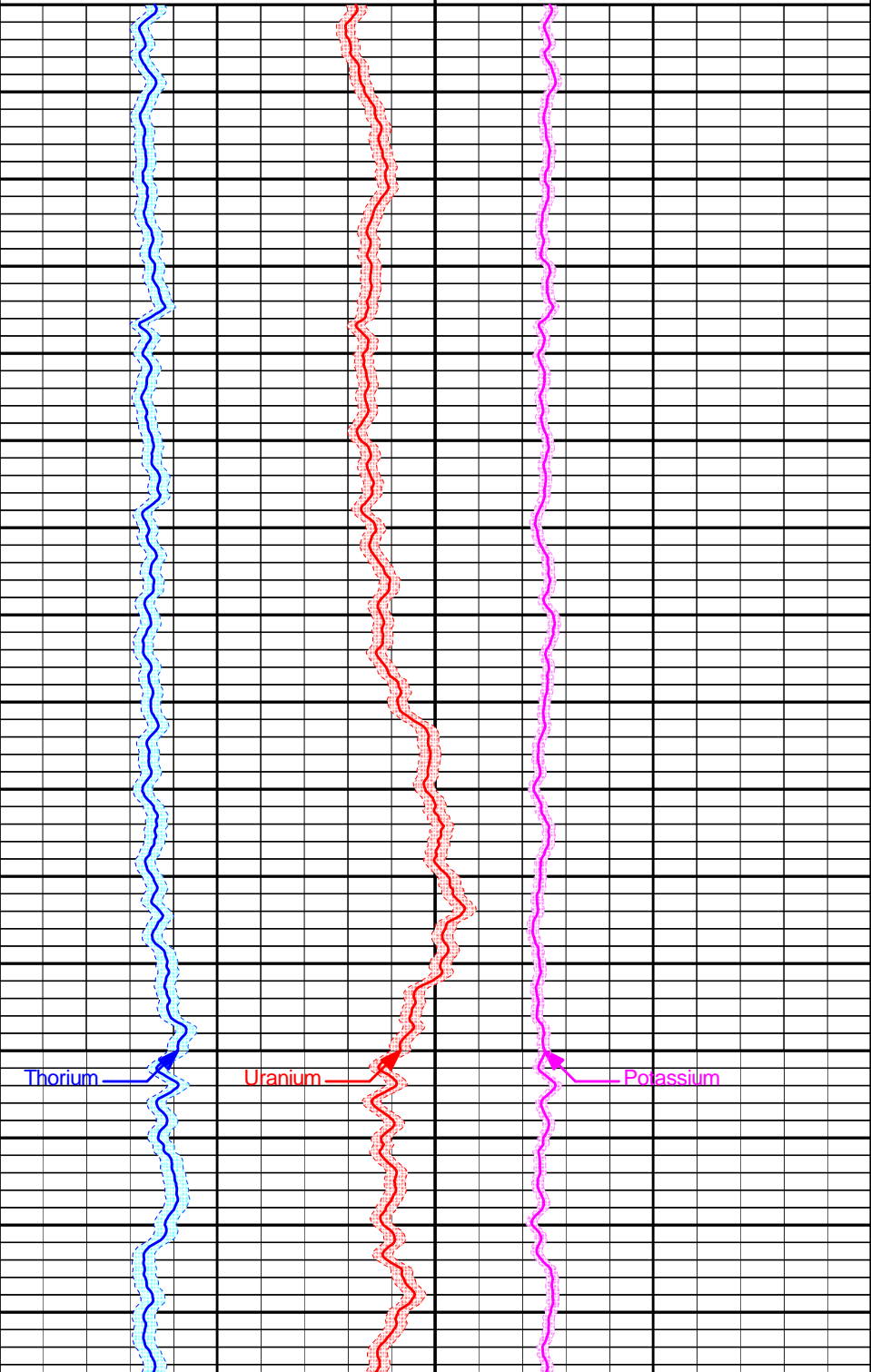
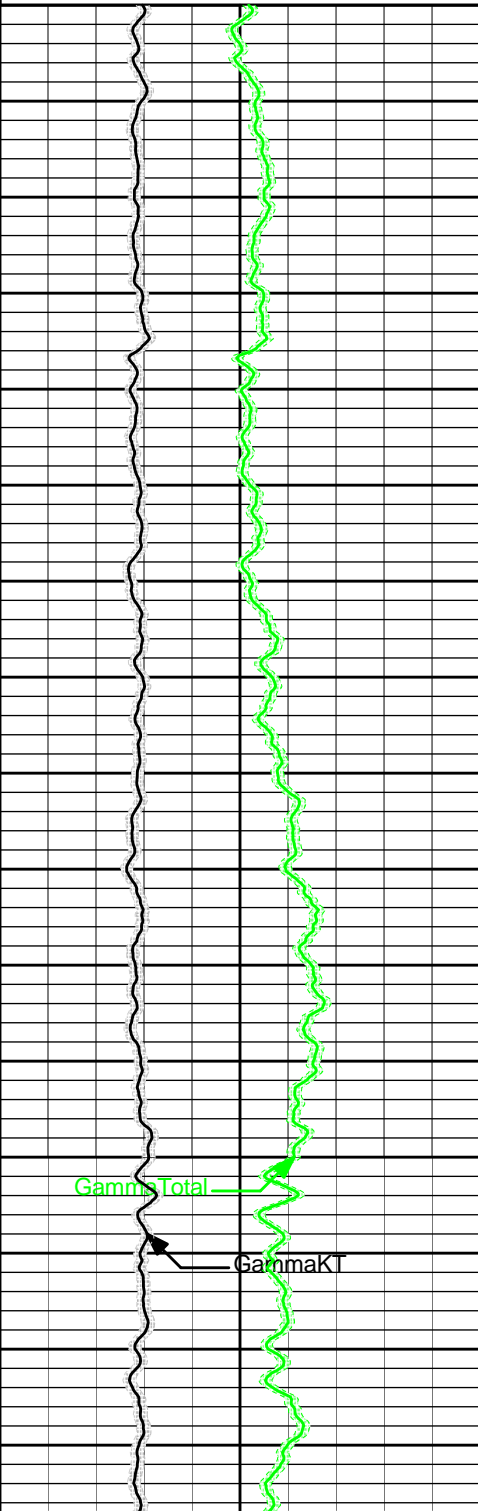
Date: 27-May-13 16:13:05

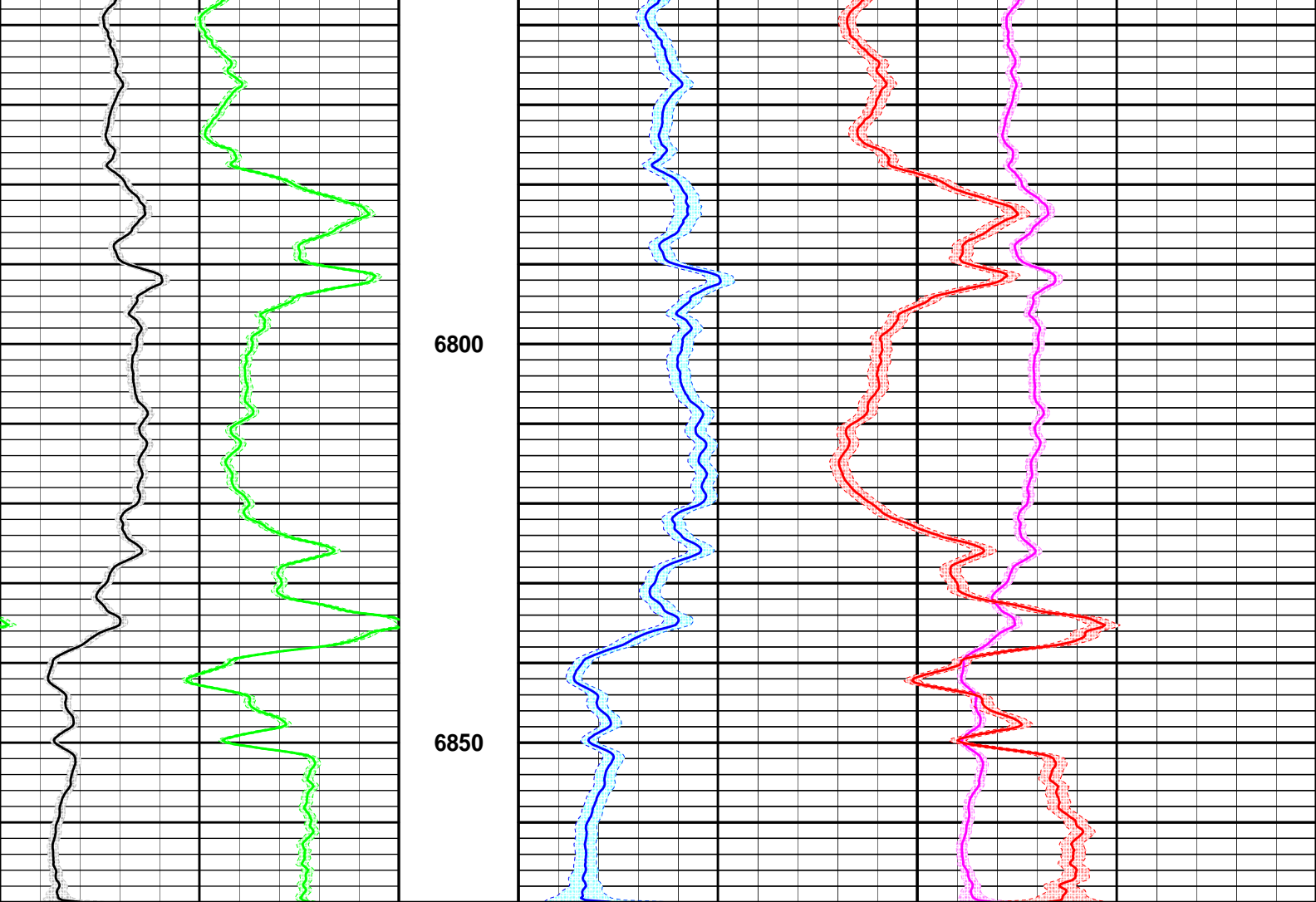


Plot Time: 27-May-13 18:33:52
Plot Range: 6600 ft to 6870 ft
Data: WASTEMGMT2I-401\Well Based\CSNG\
Plot File: \\CSNG\CSNG-FS - Primary 1_240

Gamma KT Err		
0	GammaKT	250
api		
Gamma Total Err		
0	GammaTotal	250
api		

Uranium Err		
-10	Uranium	30
parts per mil		
Thorium Err		Potassium Err
0	Thorium	30
0	Potassium	10
parts per mil		percent





0	GammaTotal	250	1 : 240 MD	0	Thorium	30	0	Potassium	10
	api				parts per mil			percent	
	Gamma Total Err				Thorium Err			Potassium Err	
0	GammaKT	250		-10	Uranium	30			
	api				parts per mil				
	Gamma KT Err				Uranium Err				

HALLIBURTON

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Plot File: \\CSNG\CSNG-FS - Primary 1_240

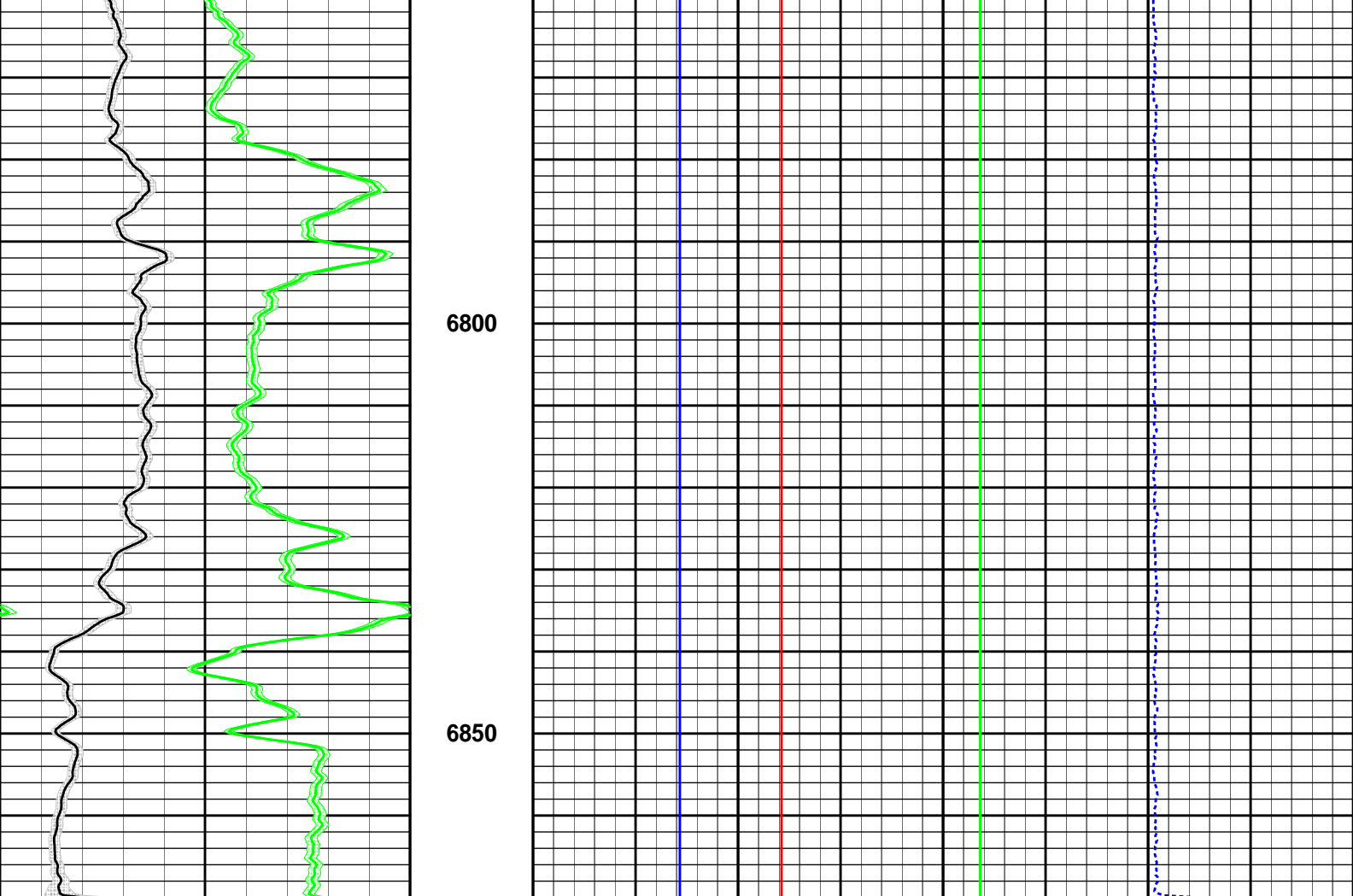
MAIN PASS 5" = 100'

HALLIBURTON

Plot Time: 27-May-13 18:33:54
Plot Range: 6600 ft to 6870 ft
Data: WASTEMGMT2I-401\Well Based\CSNG\
Plot File: \\CSNG\CSNG-FS - Quality 1_240

MAIN PASS 5" = 100'

[illegible]



0	GammaKT	250	1 : 240 MD	Spectrum Offset	-10	10	Spectrum Gain	0.9	1.1	0	Resol Degrade	20	Fitting Error	0	2
0	api														
0	GammaTotal	250											Barite Fact Avg	0	1
	api														
	Gamma Total Err														
	Gamma KT Err														

HALLIBURTON

Plot Time: 27-May-13 18:33:55
Plot Range: 6600 ft to 6870 ft
Data: WASTEMGMT2I-401\Well Based\CSNG\
Plot File: \CSNG\CSNG-FS - Quality 1_240

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Engineer: J. PINKETT

Software Version: WL INSITE R3.8.4 (Build 5)

Calibration Date: 10-May-13 10:01:13

Calibration Version: 1

Calibrator Source S/N: TB-289

Calibrator API Reference:243.00 api

Equivalent Calibrator API Reference:247.3 api

Measurement	Measured	Calibrated	Units
Background	73.1	72.2	api
Background + Calibrator	323.6	319.5	api
Calibrator	250.5	247.3	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11812883

Engineer: J. SCHMIDT

Software Version: WL INSITE R3.8.4 (Build 5)

Reference Calibration Date: 10-May-13 10:01:13

Calibration Date: 27-May-13 09:54:51

Calibration Version: 1

Calibrator Source S/N: TB-289

Calibrator API Reference:243.00 api

Equivalent Calibrator API Reference:247.3 api

Field Verification	Shop	Field	Units
Background	72.2	74.6	api
Background + Calibrator	319.5	319.1	api
Calibrator	247.3	244.6	api

Shop	Field	Difference	Tolerance
247.3	244.6	2.7	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name: CSNG - 10846351

Engineer: J. PINKETT

Software Version: WL INSITE R3.8.4 (Build 5)

Source SN: TB-289

Reference Calibration Date: 14-Mar-13 09:19:24

Calibration Date: 10-May-13 10:17:04

Calibration Version: 1

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.8	23.8	Channel #
583 KEV Peak Channel #	53.4	53.6	Channel #
2614 KEV Peak Channel #	220.1	221.2	Channel #
Calibrate Temperature	60.8	55.5	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 243.00 API

Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1767.3	CPS	335.7	336.5	API
Background	317.9	CPS	59.7	60.5	API

Gamma Ray Gain: 0.96

Expected Gain Range: 0.85 - 1.15

Expected Gain Range: 0.85 - 1.15
Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name: CSNG - 10846351

Engineer: J. SCHMIDT

Software Version: WL INSITE R3.8.4 (Build 5)

Source SN:

Reference Calibration Date: 10-May-13 10:17:04

Calibration Date: 27-May-13 10:01:59

Calibration Version: 1

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.8	23.7	Channel #
583 KEV Peak Channel #	53.6	53.2	Channel #
2614 KEV Peak Channel #	221.2	218.7	Channel #
Calibrate Temperature	55.5	68.4	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 243.00 API
Calibrator Value: 276.0 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1767.2	CPS	336.5	336.0	API
Background	315.6	CPS	60.5	60.0	API

Gamma Ray Gain: 0.96
Expected Gain Range: 0.85 - 1.15
Gamma Gain Check: Passed

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name: DSNT - 11812167

Engineer: J. PINKETT

Software Version: WL INSITE R3.8.4 (Build 5)

Reference Calibration Date: 15-May-13 11:05:48

Calibration Date: 15-May-13 11:20:15

Calibration Version: 1

Logging Source S/N: DSN434
Tank Serial Number: 11068236
Reference value assigned to Tank: 53.720
Snow Block S/N: BRIGHTON
Calibration Tank Water Temperature: 68 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.007	1.005	0.900 - 1.100

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2230	0.2224	0.0007	+/- 0.0020
Calibrated Ratio:	10.13	10.11	0.023	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0849	0.02000 - 0.09000

PASS/FAIL SUMMARY	
Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

DUAL SPACED NEUTRON FIELD CALIBRATION			
Tool Name:	DSNT - 11812167	Reference Calibration Date:	15-May-13 11:20:15
Engineer:	J. SCHMIDT	Calibration Date:	27-May-13 10:08:10
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Logging Source S/N: DSN434
Snow Block S/N: BRIGHTON

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0849	0.0853	0.0004	+/- 0.0150

PASS/FAIL SUMMARY	
Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - 11812177	Reference Calibration Date:	18-Apr-13 10:23:52
Engineer:	J. PINKETT	Calibration Date:	10-May-13 12:51:33
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1
Host Tool Name:	DSNT - 11812167		

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3584.61	-3577.60	-7000.00 - -1000.00
Pad Gain	0.0003852	0.0003802	0.000200 - 0.000600
Arm Offset	-4623.33	-4567.69	-5000.00 - 3000.00
Arm Gain	0.0005645	0.0005668	0.000300 - 0.000700
Arm Power	-0.000005203	-0.000005138	-0.000010000 - 0.000010000

The ring diameter is computed from: $\text{DIAMETER} = \text{PAD EXTENSION} + \text{ARM EXTENSION} + \text{TOOL DIAMETER}$
Tool Diameter: 4.50 in

CALIBRATION RINGS				
Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				
Small Ring (in)	2.02	2.00	-0.02	+/- 0.20
Medium Ring (in)	3.80	3.75	-0.05	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.46	6.50	0.04	+/- 0.20
Medium Ring (in)	8.20	8.25	0.05	+/- 0.20
Large Ring (in)	14.92	15.00	0.08	+/- 0.20

PASS/FAIL SUMMARY	
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Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed
PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed

SDLT CALIPER FIELD CALIBRATION			
Tool Name:	SDLT - 11812177	Reference Calibration Date:	10-May-13 12:51:33
Engineer:	J. SCHMIDT	Calibration Date:	27-May-13 10:00:02
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.76	0.01	+/- 0.10
Ring Diameter	8.25	8.25	-0.00	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

SPECTRAL DENSITY SHOP CALIBRATION			
Tool Name:	SDLT Pad - 11795867	Reference Calibration Date:	10-May-13 11:53:44
Engineer:	J. PINKETT	Calibration Date:	10-May-13 12:13:59
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Logging Source S/N: 5471GW		
Aluminum Block S/N: 63066	Density: 2.602g/cc	Pe: 3.100
Magnesium Block S/N: 12345	Density: 1.690g/cc	Pe: 2.650

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0477	1.0385	0.90 - 1.10
Near Dens Gain	1.0256	1.0138	0.90 - 1.10
Near Peak Gain	1.0116	0.9995	0.90 - 1.10
Near Lith Gain	0.9754	0.9457	0.90 - 1.10
Far Bar Gain	1.0095	1.0075	0.90 - 1.10
Far Dens Gain	0.9981	0.9948	0.90 - 1.10
Far Peak Gain	0.9903	0.9909	0.90 - 1.10
Far Lith Gain	0.9776	0.9798	0.90 - 1.10
Near Bar Offset	-0.5030	-0.4180	NONE
Near Dens Offset	-0.2785	-0.1738	NONE
Near Peak Offset	-0.1459	-0.0432	NONE
Near Lith Offset	0.1333	0.3856	NONE
Far Bar Offset	-0.1932	-0.1763	NONE
Far Dens Offset	-0.0781	-0.0478	NONE
Far Peak Offset	-0.0158	-0.0233	NONE
Far Lith Offset	0.1064	0.0864	NONE
Near Bar Background	835.39	836.60	700 - 1450
Near Dens Background	276.94	277.62	230 - 480
Near Peak Background	119.75	120.29	100 - 210
Near Lith Background	147.71	146.79	125 - 260
Far Bar Background	654.63	655.13	450 - 900
Far Dens Background	256.64	258.05	175 - 345

Far Peak Background	102.14	101.21	70 - 140
Far Lith Background	104.42	103.63	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.691	1.690	-0.001	+/- 0.015
Pe	2.581	2.602	0.021	+/- 0.150
ALUMINUM				
Density (g/cc)	2.602	2.602	0.000	+/- 0.01500
Pe	3.078	3.061	-0.017	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0002	+/- 0.0110	0.0012	+/- 0.0140
Magnesium Block	-0.0004	+/- 0.0110	-0.0006	+/- 0.0140
Aluminum Block	-0.0013	+/- 0.0110	-0.0000	+/- 0.0140
Resolution	8.50	6.00 - 11.50	8.73	6.00 - 11.50
Internal Verifier(B+D+P+L)	1381	1200 - 2700	1118	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK			
Tool Name:	SDLT Pad - 11795867	Reference Calibration Date:	10-May-13 12:13:59
Engineer:	J. SCHMIDT	Calibration Date:	27-May-13 09:54:05
Software Version:	WL INSITE R3.8.4 (Build 5)	Calibration Version:	1

Pad Temperature: 75.2 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1381.310	1383.670	2.360	15.016
Far (B+D+P+L) cps	1118.021	1114.910	-3.111	17.610
Near Resolution	8.50	8.51	0.010	0.50
Far Resolution	8.73	8.92	0.190	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

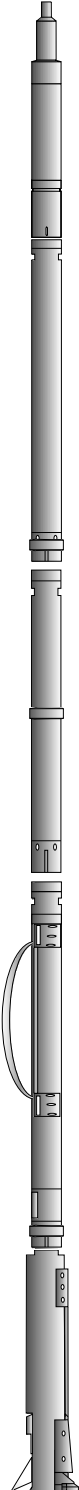
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

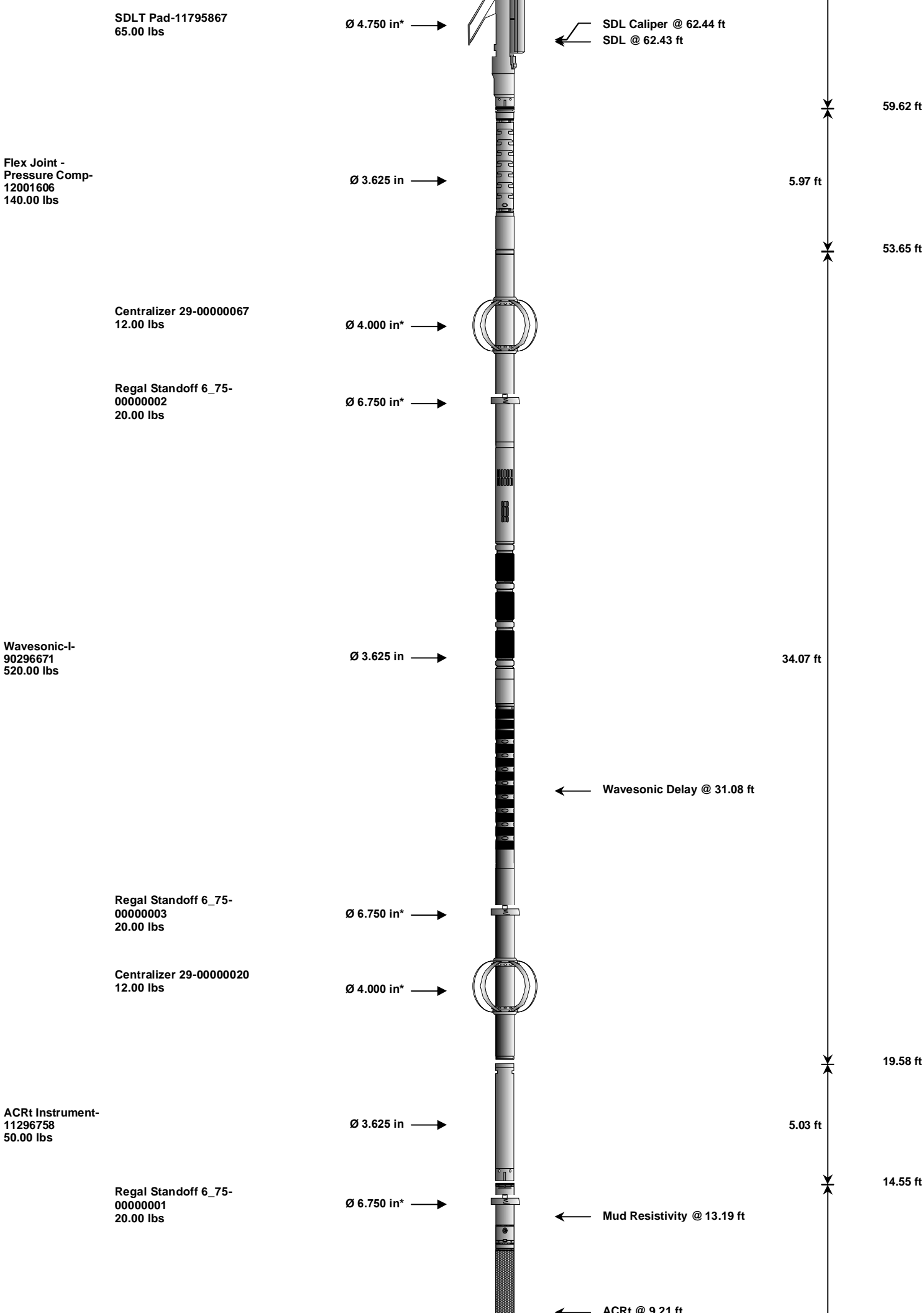
Tool Name: ACRt Sonde - 11294352				Reference Calibration Date: 01-Apr-13 20:48:51					
Engineer: J. SCHMIDT				Calibration Date: 02-May-13 21:01:50					
Software Version: WL INSITE R3.8.4 (Build 5)				Calibration Version: 1					
Host Tool Name: ACRt Instrument - 11296758									
TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.00	1.05	0.95	0.99	1.05	0.95	0.99	1.05
A2 (50")	0.95	1.00	1.05	0.95	1.00	1.05	0.95	1.00	1.05
A3 (29")	0.95	1.00	1.05	0.95	1.00	1.05	0.95	0.99	1.05
A4 (17")	0.95	1.00	1.05	0.95	1.00	1.05	0.95	1.00	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.99	1.05	0.95	0.99	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.97	1.05	0.95	0.97	1.05
TYPICAL SONDE OFFSET RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-0.65	2	-6	-4.13	-2	-8	-5.36	-2
A2 (50")	-7	-2.73	0	-7	-4.00	0	-7	-4.63	0
A3 (29")	-27	-14.22	-9	-9	-4.14	-3	-7	-3.35	-1
A4 (17")	-180	-97.48	-60	-45	-31.23	-15	-39	-25.35	-13
A5 (10")	N/A	N/A	N/A	-150	-101.89	-50	-80	-48.13	-10
A6 (6")	N/A	N/A	N/A	175	316.08	525	90	159.85	270
TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
Signal	Lower	R	Upper		Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)	
12K	0.6	0.87	1.3		Mud Cell	0.95	143.72	1.05	
36K	1.0	1.88	2.0						
72K	1.0	1.11	2.0						
PASS/FAIL SUMMARY									
GAIN RANGE CHK					PASS				
SONDE OFFSET RANGE CHK					PASS				
Tx CURRENT GAIN					PASS				
Rmud VERIFICATION					FAIL				
TOOL OUT OF TOLERANCE									
CALIBRATION SUMMARY									
Sensor	Shop	Field	Post	Difference	Tolerance	Units			
GTET-11812883									
Gamma Ray Calibrator	247.3	244.6	-----	2.7	+/- 9.00	api			
CSNG-10846351									
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #			
239 KEV Peak Channel #	23.8	23.7	-----	0.1	-----	Channel #			
583 KEV Peak Channel #	53.6	53.2	-----	0.4	-----	Channel #			
2614 KEV Peak Channel #	221.2	218.7	-----	2.5	-----	Channel #			
DSNT-11812167									
Snow-Block Porosity	0.0849	0.0853	-----	-0.0004	+/- 0.0150	decp			
SDLT-11812177									

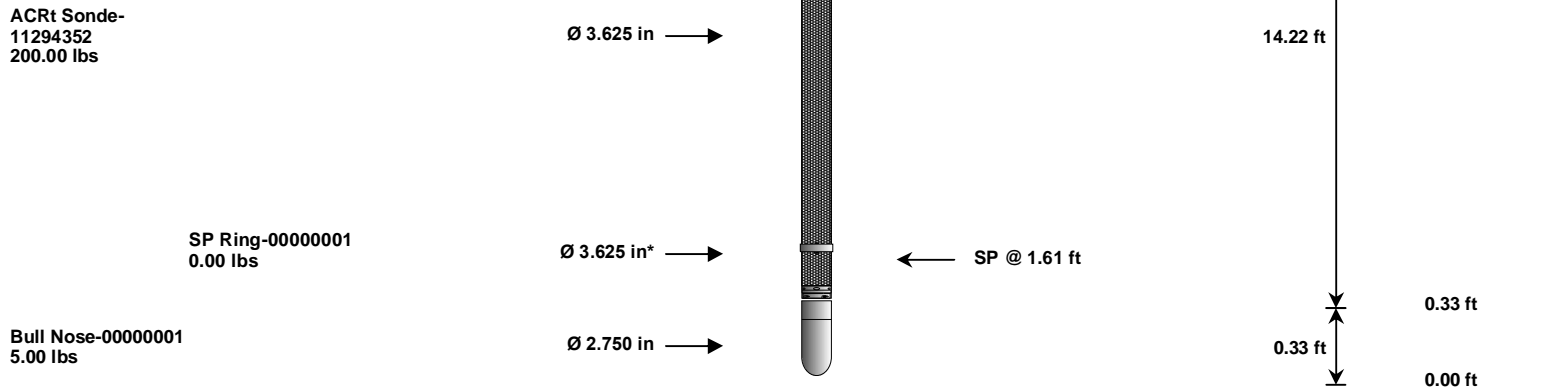
Pad Extension	3.75	3.76	-----	-0.01		in
Ring Diameter	8.25	8.25	-----	0.00	+/-0.15	in
SDLT Pad-11795867						
Near(B+D+P+L)	1381.310	1383.670	-----	-2.360	+/-15.016	cps
Far(B+D+P+L)	1118.021	1114.910	-----	3.111	+/-17.610	cps
ACRt Sonde-11294352						
Mud Cell	143.72	-----	-----	0.00	-----	ohm-m
Data: WASTEMGMT2I-401\0001 TRIPLE_RED_CSNG_WSTT_BLACK ACRTIDLE						
						Date: 27-May-13 16:16:13

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
RWCH-11732195 135.00 lbs		Ø 3.625 in →		← Load Cell @ 99.38 ft ← BH Temperature @ 98.81 ft	6.25 ft	103.06 ft
GTET-11812883 165.00 lbs		Ø 3.625 in →		← GammaRay @ 90.75 ft	8.52 ft	96.81 ft
UnivWearRing3.6-00000001 5.00 lbs		Ø 4.200 in* →				88.29 ft
CSNG-10846351 114.00 lbs	UnivWearRing3.6-00000003 5.00 lbs	Ø 4.200 in* → Ø 3.625 in →		← CSNG @ 82.66 ft	8.17 ft	80.12 ft
DSNT-11812167 174.00 lbs	DSN Decentralizer-00000001 6.60 lbs	Ø 5.000 in* → Ø 3.625 in →		← DSN Far @ 73.19 ft ← DSN Near @ 72.44 ft	9.69 ft	70.44 ft
UnivWearRing3.6-00000002 5.00 lbs		Ø 4.200 in* →				
SDLT-11812177 360.00 lbs		Ø 4.500 in →			10.81 ft	





Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11732195	135.00	6.25	96.81	300.00
GTET	Gamma Telemetry Tool	11812883	165.00	8.52	88.29	60.00
UWR3P6	Universal Wear Ring 3 5-8 inch	00000001	5.00	0.35	* 88.59	300.00
CSNG	Compensated Spectral Natural Gamma	10846351	114.00	8.17	80.12	15.00
UWR3P6	Universal Wear Ring 3 5-8 inch	00000003	5.00	0.35	* 84.20	300.00
DSNT	Dual Spaced Neutron	11812167	174.00	9.69	70.44	60.00
UWR3P6	Universal Wear Ring 3 5-8 inch	00000002	5.00	0.35	* 70.68	300.00
DCNT	DSN Decentralizer	00000001	6.60	5.13	* 73.77	300.00
SDLT	Spectral Density Tool	11812177	360.00	10.81	59.62	60.00
SDLP	Density Insite Pad	11795867	65.00	2.55	* 61.83	60.00
FLEX	Flex Joint - Pressure Compensated	12001606	140.00	5.97	53.65	300.00
WSTT	WaveSonic Insite	90296671	520.00	34.07	19.58	30.00
RSOF	Regal Standoff 6.75in	00000003	20.00	0.52	* 25.60	300.00
OBCEN	Centralizer - 29 in.Overbody	00000020	12.00	2.42	* 21.49	300.00
RSOF	Regal Standoff 6.75in	00000002	20.00	0.52	* 47.06	300.00
OBCEN	Centralizer - 29 in.Overbody	00000067	12.00	2.42	* 49.31	300.00
ACRt	Array Compensated True Resistivity Instrument Section	11296758	50.00	5.03	14.55	300.00
ACRt	Array Compensated True Resistivity Sonde Section	11294352	200.00	14.22	0.33	300.00
SP	SP Ring	00000001	0.00	0.25	* 1.61	300.00
RSOF	Regal Standoff 6.75in	00000001	20.00	0.52	* 13.47	300.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00

Total	2,033.60	103.06
* Not included in Total Length and Length Accumulation.		
Data: WASTEMGMT2i-401\0001 TRIPLE_RED_CSNG_WSTT_BLACK ACRT\005 27-May-13 14:49 Up @6953.3f	Date: 27-May-13 15:30:50	

COMPANY	PDC ENERGY INC		
WELL	WASTE MANAGEMENT 2i-401		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		COMPENSATED SPECTRAL NATURAL GAMMA	