

HALLIBURTON

COMPENSATED SPECTRAL
NATURAL GAMMA RAY

COMPANY		KINDER MORGAN CO2 CO LP	
WELL		CD 4	
FIELD/BLOCK		MCELMO	
COUNTY		MONTEZUMA	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		02-Dec-14	
Run No.		ONE	
Depth - Driller		8725.00 ft	
Depth - Logger		8710.0 ft	
Bottom - Logged Interval		8707.0 ft	
Top - Logged Interval		8300.0 ft	
Casing - Driller		7.000 in @ 8315.0 ft	
Casing - Logger		8315.0 ft	
Bit Size		6.000 in @	
Type Fluid in Hole		Salt Water	
Density		8.9 ppg	
Viscosity		32.00 s/qt	
PH		9.10 pH	
Fluid Loss		380.0 cpm	
Source of Sample		MUD TANK	
Rm @ Meas. Temperature		0.11 ohmm @ 66.80 degF	
Rmf @ Meas. Temperature		0.10 ohmm @ 61.70 degF	
Rmc @ Meas. Temperature		0.200 ohmm @ 61.50 degF	
Source Rmf		MEASURED	
Rmc		MEASURED	
Rm @ BHT		0.04 ohmm @ 180.0 degF	
Time Since Circulation		20.2 hr	
Time on Bottom		02-Dec-14 15:54	
Max. Rec. Temperature		180.0 degF @ 8580.0 ft	
Equipment		11871076	
Location		GJ CO	
Recorded By		B. RIDDEL	
Witnessed By		J. DAVIS	
Sect. 18		Twp. 38N	
Rge. 18W		Elev. 6795.0 ft	
Other Services:		RWCH	
DSNT		D.F.	
WSTT		G.L.	
XRMI		6817.5 ft	
SDLT		6817.5 ft	
MSFL		6795.0 ft	
DLLT			

Fold here

Service Ticket No.: 901883664				API Serial No.: 05083067180000				PGM Version: WL INSITE R4.2.0 (Build 2)							
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		DLLT		N/A		CENT		N/A	
Rmc @ Meas. Temp.		@		@				10731630							
Source Rmf		Rmc				ONE		MSFL		SLIM PEAK		CENT		N/A	
Rm @ BHT		@		@				11555340							
Rmf @ BHT		@		@											
Rmc @ BHT		@		@											
EQUIPMENT DATA															
GAMMA				ACOUSTIC				DENSITY				NEUTRON			
Run No.		ONE		Run No.				Run No.		ONE		Run No.		ONE	
Serial No.		11958949		Serial No.				Serial No.		10865876		Serial No.		10993888	
Model No.		GTET		Model No.				Model No.		SDLT-I		Model No.		DSNT-I	
Diameter		3.625"		No. of Cent.				Diameter		4.5"		Diameter		3.625"	
Detector Model No.		GTET		Spacing				Log Type		GAMMA-GAMMA		Log Type		NEU-THERM	
Type		SCINT						Source Type		Cs137		Source Type		Am241Be	
Length		8"		LSA [Y/N]				Serial No.		5153GW		Serial No.		DSN-388	
Distance to Source		17'		FWDA [Y/N]				Strength		1.5 Ci		Strength		15 Ci	
LOGGING DATA															

GENERAL			GAMMA		ACOUSTIC			DENSITY			NEUTRON					
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix		
No.	From	To	ft/min	L	R	L	R		L	R		L	R			
ONE	8710	8315	REC	0 API	150 API				30 %	-10 %	2.71 g/cc	30 %	-10 %	LIME		
ONE	8315	8300	REC	0 API	150 API											
DIRECTIONAL INFORMATION																
Maximum Deviation								@	KOP							@
Remarks: RUN ONE: CONNECTOR_SUB/FLEX/DTDD/HDDS/BRIDLE/CR/SP/BRIDLE/BS/GTET/CSNG/FLEX/DLLT/MSFL/BN RAN IN COMBINATION																
RUN TWO: CONNECTOR_SUB/FLEX/DTDD/HDDS/GTET/DSNT/SDLT/BN RAN IN COMBINATION																
BOREHOLE RUGOSITY, BITSIZE, TENSION PULLS AND WASHOUTS MAY EFFECT LOG QUALITY AND REPEATABILITY																
CHLORIDES REPORTED TO BE 54,000 ppm																
ANNULAR HOLE VOLUME CALCULATED USING 4.5-INCH CASING																
NO JEWELRY RAN PER CUSTOMER REQUEST DUE TO BOREHOLE SIZE.																
RUN ONE BRIDGED OUT AT 8580'. LOGGED OUT FROM THERE																
YOU CREW TODAY: B. CALWELL, T. RAFF,								RIG: NABORS M40								
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES, GRAND JUNCTION, CO (970) 523-3600																
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.																
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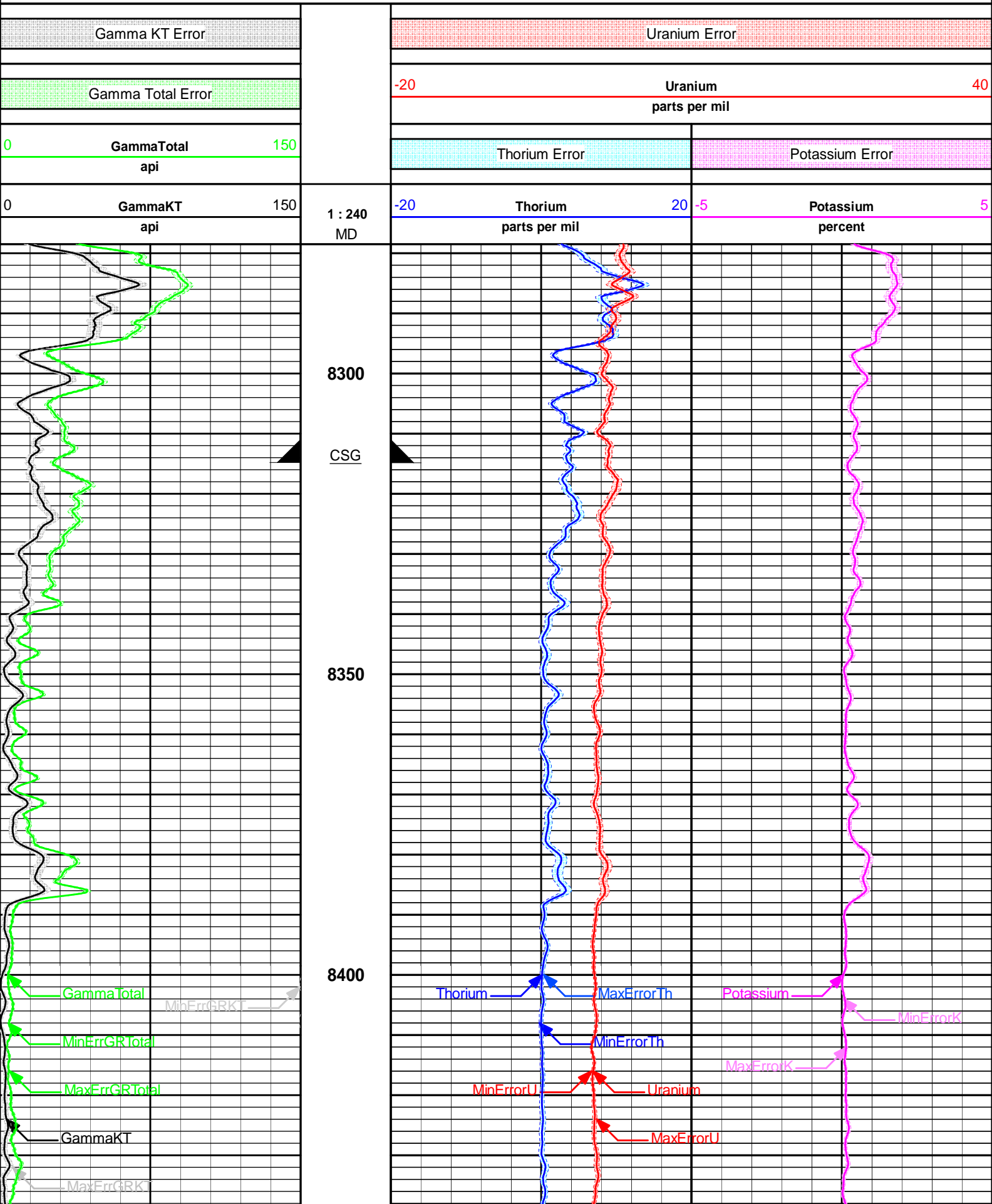
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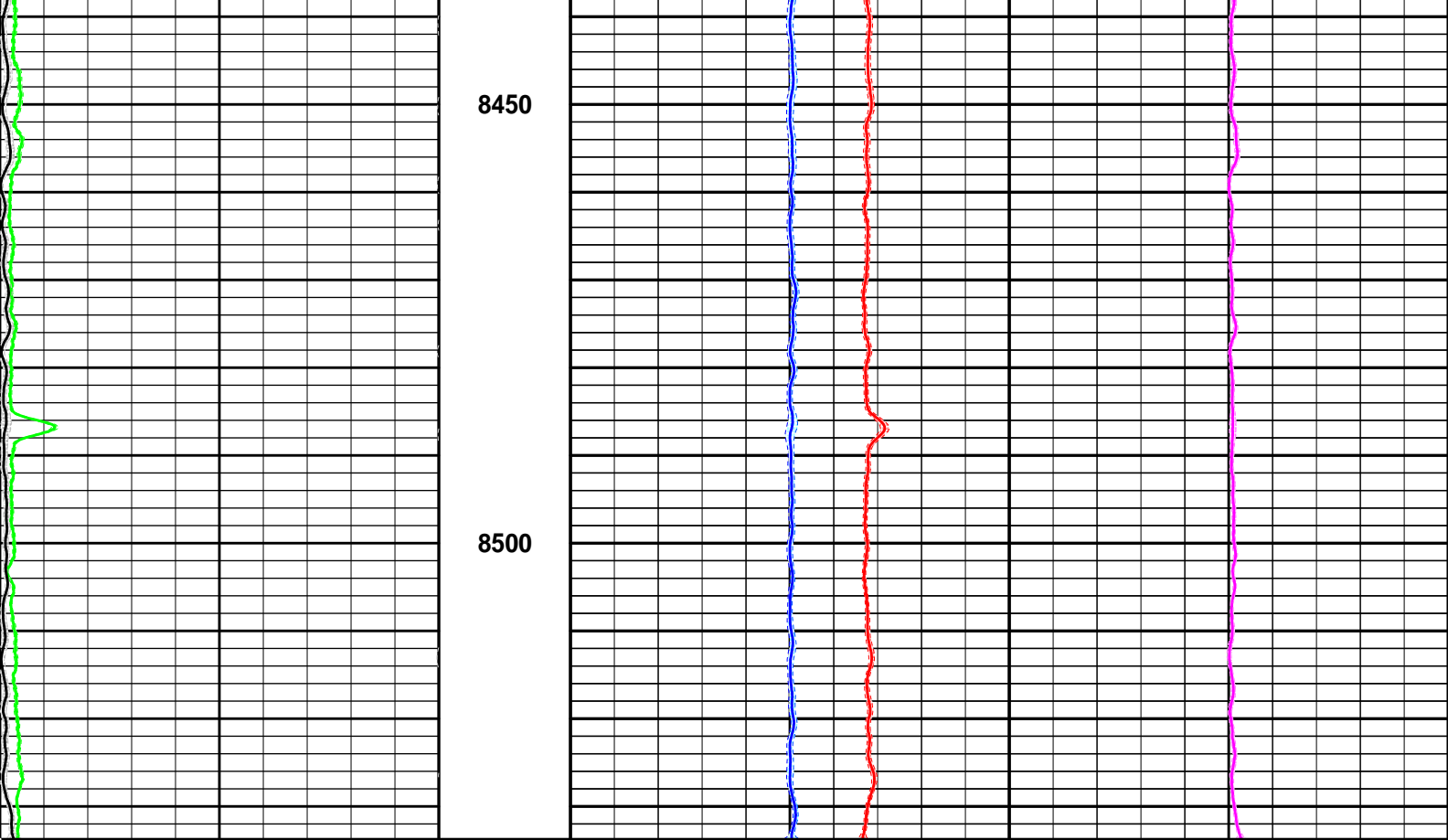
PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	6.000	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	8.900	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	54000.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.114	ohmm
	SHARED	TRM	Temperature of Mud	66.8	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	8725.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	

Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
Rwa / CrossPlot	BHSM	Borehole Size Source Tool	MSFL	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GRSO	Gamma Tool Standoff	0.250	in
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Centered	
GTET	BHSM	Borehole Size Source Tool	MSFL	
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	
CSNG	BHSM	Borehole Size Source Tool	MSFL	
DLLT-I Sonde	DLOK	Process Dual Laterolog?	Yes	
DLLT-I Sonde	DBOK	Process Dual Laterolog Borehole Corrections?	Yes	
DLLT-I Sonde	SBHD	Select Borehole Diam Source	Caliper	
DLLT-I Sonde	TPOS	Tool Position	Standoff	
DLLT-I Sonde	TMPC	Temperature Correction Type	Tool Value	
DLLT-I Sonde	DLOK	Calculate Dual Laterolog DI?	Yes	
DLLT-I Sonde	BHSM	Borehole Size Source Tool	MSFL	
MSFL	DLOK	Process MSFL?	Yes	
MSFL	SLPD	Use MSFL Slim Hole Pad?	Yes	
MSFL	SPDF	MSFL Slim Hole Pad K Factor	1.750	
MSFL	CLOK	Process Caliper Outputs?	Yes	
BOTTOM				
Data: KINDER_CD_4\0001 TPL_DLLT_CSNG\IDLE			Date: 02-Dec-14 19:02:50	

HALLIBURTON		Plot Time: 03-Dec-14 23:37:28 Plot Range: 8278.5 ft to 8533.75 ft Data: KINDER_CD_4\Well Based\DLLT\ Plot File: \\CSNG\CSNG-FS - 2"	
MAIN PASS 2" = 100'			





0	GammaKT api	150	1 : 240 MD	-20	Thorium parts per mil	20	-5	Potassium percent	5
0	GammaTotal api	150			Thorium Error			Potassium Error	
	Gamma Total Error			-20	Uranium parts per mil				40
	Gamma KT Error				Uranium Error				

HALLIBURTON Plot Time: 03-Dec-14 23:37:32
Plot Range: 8278.5 ft to 8533.75 ft
Data: KINDER_CD_4\Well Based\DLLT\
Plot File: \\CSNG\CSNG-FS - MAIN

MAIN PASS 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11958949	Reference Calibration Date:	30-Sep-14 09:24:46
Engineer:	B. RIDDEL	Calibration Date:	01-Dec-14 07:12:41
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1

Calibrator API Reference:239.00 api

Equivalent Calibrator API Reference:243.2 api

Measurement	Measured	Calibrated	Units
Background	27.7	27.7	api
Background + Calibrator	270.8	270.9	api
Calibrator	243.1	243.2	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	GTET - 11958949	Reference Calibration Date:	01-Dec-14 07:12:41
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 03:08:42
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1

Calibrator Source S/N: MP051807-04

Calibrator API Reference:239.00 api

Equivalent Calibrator API Reference:243.2 api

Field Verification	Shop	Field	Units
Background	27.7	32.9	api
Background + Calibrator	270.9	276.2	api
Calibrator	243.2	243.3	api

Shop	Field	Difference	Tolerance
243.2	243.3	-0.1	+/- 9.00

CSNG-FS SHOP CALIBRATION

Tool Name:	CSNG - 10971168	Reference Calibration Date:	27-May-14 18:23:19
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 03:00:38
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1
Source SN:	MP051807-04		

TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.6	23.7	Channel #
583 KEV Peak Channel #	52.3	52.9	Channel #
2614 KEV Peak Channel #	213.2	216.4	Channel #
Calibrate Temperature	84.7	53.2	degF

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

Blanket Reference Value: 239.00 API

Calibrator Value: 271.4 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1454.2	CPS	340.2	293.2	API
Background	108.0	CPS	68.8	21.8	API

Gamma Ray Gain: 1.01

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

Tool Name:	CSNG - 10971168	Reference Calibration Date:	02-Dec-14 03:00:38
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 03:12:55
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	23.7	23.7	Channel #
583 KEV Peak Channel #	52.9	52.8	Channel #
2614 KEV Peak Channel #	216.4	216.3	Channel #
Calibrate Temperature	53.2	55.0	degF

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

Blanket Reference Value: 239.00 API
 Calibrator Value: 271.4 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1457.6	CPS	293.2	293.0	API
Background	107.2	CPS	21.8	21.6	API

Gamma Ray Gain: 1.01
 Expected Gain Range: 0.85 - 1.15
 Gamma Gain Check: Passed

DUAL LATEROLOG SHOP CALIBRATION			
Tool Name:	DLLT-I Sonde - 10731630	Reference Calibration Date:	14-Oct-14 11:18:22
Engineer:	B. RIDDEL	Calibration Date:	14-Oct-14 11:24:52
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1
Host Tool Name:	DLLT-I Measurement - 11563863	Extra Host Tool Name1:	DLLT-I Power and Telemetry - 11527994

Measurement	Deep Measured	Deep Calibrated	Shallow Measured	Shallow Calibrated	Units
External Cal Point #1	1.03	1.04	1.02	1.00	ohmm
External Cal Point #2	119.19	119.47	100.22	99.63	ohmm
External Cal Point #3	1538.94	1541.79	1017.03	1019.96	ohmm
External Check Point	10.52	10.56	9.69	9.62	ohmm
Internal Reference	19.94	20.00	18.36	18.23	ohmm

DUAL LATEROLOG FIELD CALIBRATION			
Tool Name:	DLLT-I Sonde - 10731630	Reference Calibration Date:	14-Oct-14 11:24:52
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 04:09:51
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1

Measurement	Deep Shop	Deep Field	Shallow Shop	Shallow Field	Units
Internal Reference	20.00	19.95	18.23	18.18	ohmm

PASS/FAIL SUMMARY			
Measurement	Difference	Tolerance	Pass/Fail

	Measurement	Difference	Tolerance	Pass/Fail		
	Internal Deep	0.04	+/- 0.8	Passed		
	Internal Shallow	0.05	+/- 0.8	Passed		
MICRO SPHERICALLY FOCUSED LOG SHOP CALIBRATION						
Tool Name:	MSFL - 11555340	Reference Calibration Date:	18-Aug-14 13:39:01			
Engineer:	M. LECUREUX	Calibration Date:	29-Oct-14 14:00:09			
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1			
	Measurement	Measured	Calibrated	Units		
	External Cal Point #1	0.20	0.20	ohmm		
	External Cal Point #2	20.04	20.00	ohmm		
	External Cal Point #3	2062.07	2000.00	ohmm		
	Internal Reference	20.01	19.97	ohmm		
MICRO SPHERICALLY FOCUSED LOG FIELD CALIBRATION						
Tool Name:	MSFL - 11555340	Reference Calibration Date:	29-Oct-14 14:00:09			
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 04:10:14			
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1			
	Measurement	Shop	Field	Change	Control Limit On	Units
	Internal Reference	19.97	19.96	-0.013	0.800	ohmm
PASS/FAIL SUMMARY						
Internal Reference:				Passed		
CALIPER SHOP CALIBRATION						
Tool Name:	MSFL - 11555340	Reference Calibration Date:	14-Oct-14 11:04:10			
Engineer:	B. RIDDEL	Calibration Date:	14-Oct-14 11:08:35			
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1			
	CALIBRATION RINGS AND INTERNAL					
	Measurement	Current Reading (Previous Coeff.)		Calibrated (New Coeff.)	Change	
	RING DIAMETER:					
	Ring #1 (in)	8.36		8.25	0.1100	
	Ring #2 (in)	14.99		15.00	-0.0100	
	Hi/Lo Internal:					
	Lo Internal (in)	4.38		4.21	0.1700	
	Hi Internal (in)	17.31		17.36	-0.0500	
CALIPER FIELD CALIBRATION						
Tool Name:	MSFL - 11555340	Reference Calibration Date:	14-Oct-14 11:08:35			
Engineer:	B. RIDDEL	Calibration Date:	02-Dec-14 04:11:42			
Software Version:	WL INSITE R4.2.0 (Build 2)	Calibration Version:	1			
	MEASURED CALIPER VALUES					
	Measurement	Shop	Field	Change	Control Limit On New Value	
	Lo Internal (in)	4.21	4.23	-0.019	+/- 0.500	
	Hi Internal (in)	17.36	17.36	0.000	+/- 0.500	
PASS/FAIL SUMMARY						
Lo Internal Check:				Passed		
Hi Internal Check:				Passed		

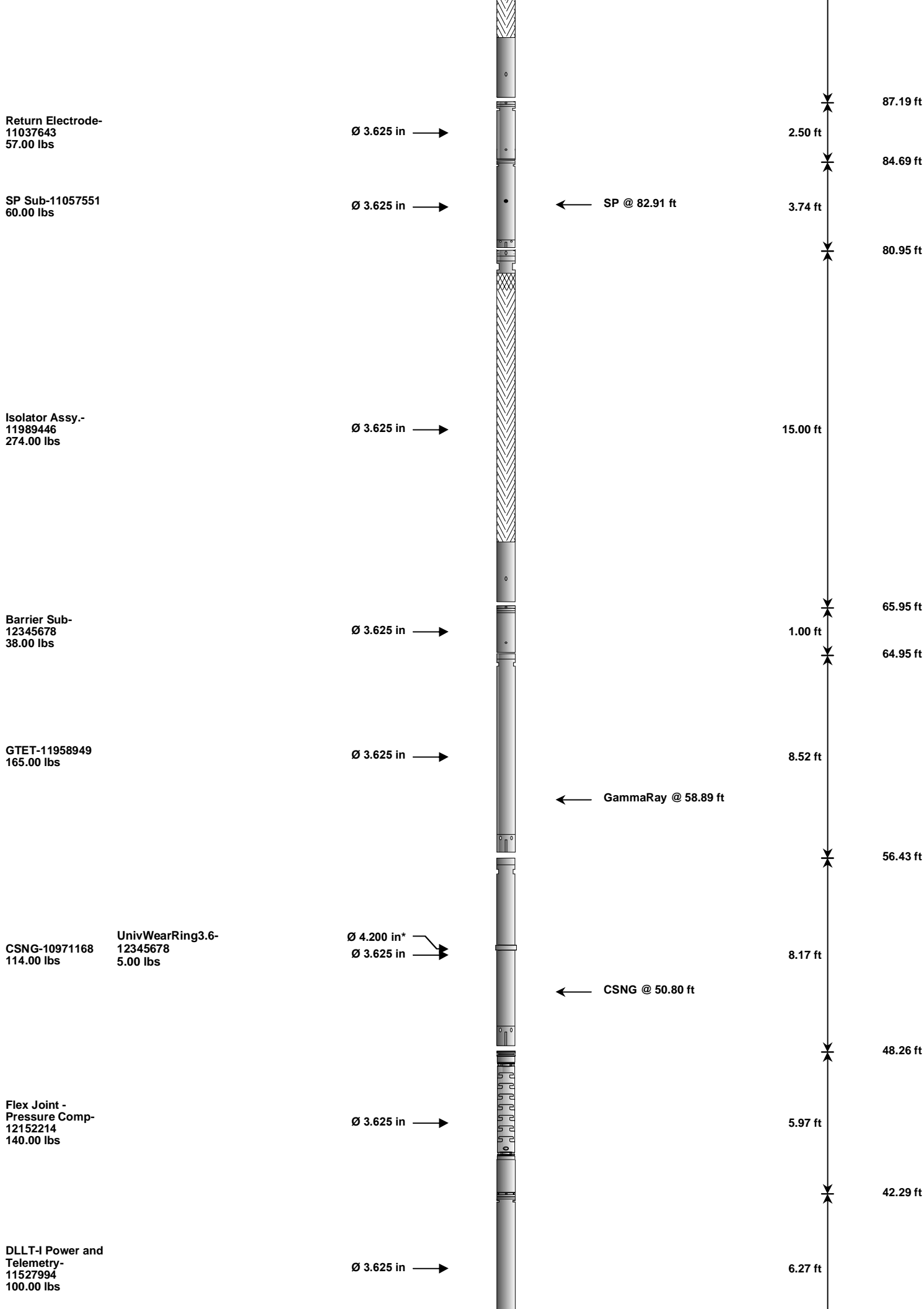
CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11958949						
Gamma Ray Calibrator	243.2	243.3	-----	-0.1	+/- 9.00	api
CSNG-10971168						
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #
239 KEV Peak Channel #	23.7	23.7	-----	0.0	-----	Channel #
583 KEV Peak Channel #	52.9	52.8	-----	0.1	-----	Channel #
2614 KEV Peak Channel #	216.4	216.3	-----	0.1	-----	Channel #
DLLT-I Sonde-10731630						
Deep Internal Ref.	20.00	19.95	-----	0.05	+/- 0.8	ohmm
Shallow Internal Ref.	18.23	18.18	-----	0.05	+/- 0.8	ohmm
MSFL-11555340						
MSFL Internal Ref.	19.97	19.96	-----	0.01	+/- 0.800	ohmm
Caliper Lo. Internal	4.21	4.23	-----	-0.02	+/- 0.500	in
Caliper Hi. Internal	17.36	17.36	-----	0.00	+/- 0.500	in
Data: KINDER_CD_40001 TPL_DLLT_CSNG\IDLE						Date: 02-Dec-14 19:03:17

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
Spacer-12345678 100.00 lbs	Regal Standoff 6_75-00000001 20.00 lbs	Ø 3.625 in Ø 5.000 in*			4.70 ft	120.64 ft
Flex Joint - Pressure Comp-10756977 140.00 lbs		Ø 3.625 in			5.97 ft	115.94 ft
DTDD-10267604 90.00 lbs		Ø 3.625 in		← Load Cell @ 108.88 ft	3.66 ft	109.97 ft
				← Pad Locator @ 107.29 ft		106.31 ft
HDDS-A-00000001 125.00 lbs		Ø 4.060 in			4.13 ft	102.19 ft
Isolator Assy.-11987166 274.00 lbs		Ø 3.625 in			15.00 ft	



DLLT-I Isolator-
12345678
40.00 lbs

Ø 3.625 in →

1.22 ft

36.02 ft

DLLT-I
Measurement-
11563863
160.00 lbs

Ø 3.625 in →

8.84 ft

34.80 ft

DLLT-I Sonde-
10731630
241.00 lbs

Ø 3.625 in →

← DLLT Sonde @ 19.41 ft

15.30 ft

25.96 ft

MSFL-11555340
214.00 lbs

Ø 4.000 in →

10.33 ft

10.66 ft

← MSFL Pad @ 2.75 ft

Bull Nose-00000001
5.00 lbs

Ø 2.750 in →

0.33 ft

0.33 ft

0.00 ft

Mnemonic		Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
SPC	Test		12345678	100.00	4.70	115.94	100.00
RSOF	Regal Standoff 6.75in		00000001	20.00	0.52	* 117.76	300.00
FLEX	Flex Joint - Pressure Compensated		10756977	140.00	5.97	109.97	300.00
DTDD	Downhole Tension Device		10267604	90.00	3.66	106.31	300.00
HDDS-A	Heavy Duty DITS Swivel tool.		00000001	125.00	4.13	102.19	300.00
ISA	Isolator Assembly - Rigid Bridle		11987166	274.00	15.00	87.19	300.00
RE	Return Electrode - Rigid Bridle		11037643	57.00	2.50	84.69	300.00
SP	SP Sub		11057551	60.00	3.74	80.95	300.00
ISA	Isolator Assembly - Rigid Bridle		11989446	274.00	15.00	65.95	300.00
w	Barrier Sub - Rigid Bridle		12345678	38.00	1.00	64.95	300.00
GTET	Gamma Telemetry Tool		11958949	165.00	8.52	56.43	60.00
CSNG	Compensated Spectral Natural Gamma		10971168	114.00	8.17	48.26	15.00
UWR3P6	Universal Wear Ring 3 5-8 inch		12345678	5.00	0.35	* 52.34	300.00
FLEX	Flex Joint - Pressure Compensated		12152214	140.00	5.97	42.29	300.00
DLLT	Dual Laterolog Power and Telemetry		11527994	100.00	6.27	36.02	100.00

DLLT	Dual Laterolog Isolator	12345678	40.00	1.22	34.80	100.00
DLLT	Dual Laterolog Measurement	11563863	160.00	8.84	25.96	100.00
DLLT	Dual Laterolog Sonde	10731630	241.00	15.30	10.66	100.00
MSFL	Micro Spherically Focused Log	11555340	214.00	10.33	0.33	60.00
BLNS	Bull Nose	00000001	5.00	0.33	0.00	300.00
Total			2,362.00	120.64		
* Not included in Total Length and Length Accumulation.						
Data: KINDER_CD_4\0001 TPL_DLLT_CSNG\IDLE				Date: 02-Dec-14 17:07:04		

COMPANY	KINDER MORGAN CO2 CO LP		
WELL	CD 4		
FIELD	MCELMO		
COUNTY	MONTEZUMA	STATE	CO
HALLIBURTON		COMPENSATED SPECTRAL NATURAL GAMMA RAY	