HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY / INSITE CALIPER TOOL / BOREHOLE PROPERTIES TOOL
2"=100' & 5"=100'

COMPANY	MACPHERSON OIL COMPANY
WELL	USL 20 #2950
FIELD/BLOCK	ROUND MTN
COUNTY	KERN
STATE	CA

COMPANY MACPHERSON OIL COMPANY
WELL USL 20 #2950
FIELD/BLOCK ROUND MTN
COUNTY KERN
API No. 030-57593
Location 1856.99' S AND THEN 648.87' E FROM THE NW CORNER OF SEC. 20 T28S R29E.
E (X): 1,736,802.91'
N (Y): 721,650.27'
Other Services: RWCH
DIVISION OF OIL & GAS BAKERSFIELD

Secd. 20	Twp. 28S	Rge. 29E	
Permanent Datum	GL	Elev. 1246.2 ft	Elev.: K.B. 1259.2 ft
Log measured from	KB	13.0 ft above perm. Datum	D.F.
Drilling measured from	KB		G.L. 1246.2 ft

Date	04-Jun-15		
Run No.	ONE		
Depth - Driller	2086.00 ft		
Depth - Logger	2083.0 ft		
Bottom - Logged Interval	2071.00 ft		
Top - Logged Interval	1030.00 ft		
Casing - Driller	9.625 in @ 1030.0 ft	@	@
Casing - Logger	1030.0 ft		
Bit Size	8.500 in	@	@
Type Fluid in Hole	LSND		
Density / Viscosity	9.2 ppg / 40.00 s/qt		
PH / Fluid Loss	6.90 pH / 6.0 cptm		
Source of Sample	FLOWLINE		
Rm @ Meas. Temperature	1.950 ohmm @ 63.00 degF	@	@
Rmf @ Meas. Temperature	1.70 ohmm @ 59.00 degF	@	@
Rmc @ Meas. Temperature	2.270 ohmm @ 59.00 degF	@	@
Source Rmf / Rmc	MEAS / MEAS		
Rm @ BHT	0.92 ohmm @ 141.7 degF	@	@
Time Since Circulation	3.7000 hr		
Time on Bottom	04-Jun-15 07:16:08.000		
Max. Rec. Temperature	144.8 degF @ 1886.0 ft	@	@
Equipment / Location	11871069 / BKSFLD		
Recorded By	A. KOCHERSPERGER		
Witnessed By	NO WITNESS		

Service Ticket No.: 902465496 API Serial No.: 030-57593 PGM Version: WL INSITE R4.6.4 (Build 3)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE			
Date	Sample No.		
Depth-Driller			
Type Fluid in Hole			
Density	Viscosity		
Ph	Fluid Loss		
Source of Sample			
Rm @ Meas. Temp		@	@
Rmf @ Meas. Temp.		@	@
Rmc @ Meas. Temp.		@	@
Source Rmf	Rmc		
Rm @ BHT		@	@
Rmf @ BHT		@	@
Rmc @ BHT		@	@

RESISTIVITY SCALE CHANGES			
Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA				
Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
ONE	ACRT	N/A	1.5" S.O.	N/A
	I-11017974			
	S-11017971			

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.		Run No.	
Serial No.	11534457	Serial No.		Serial No.		Serial No.	
Model No.	GTET	Model No.		Model No.		Model No.	
Diameter	3.625"	No. of Cent.		Diameter		Diameter	
Detector Model No.	GTET	Spacing		Log Type		Log Type	
Type	SCINT			Source Type		Source Type	
Length	8"	LSA [Y/N]		Serial No.		Serial No.	
Distance to Source	N/A	FWDA [Y/N]		Strength		Strength	

LOGGING DATA

Run No.	Depth From	Depth To	Speed ft/min	Gamma Scale L	Gamma Scale R	Acoustic Scale L	Acoustic Scale R	Matrix	Density Scale L	Density Scale R	Matrix	Neutron Scale L	Neutron Scale R	Matrix
ONE	2083'	1030'	REC	0	200									
					GAPI									

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ACRT/ICT/BHPT/GTET/RWCH RAN IN COMBINATION.
6-ARM CALIPER VOLUMES (FT^3) CALCULATED FOR 5.5" CASING FROM TD TO SHOE: AHVT: 354 BHVT: 528.
MAXIMUM TEMPERATURES (DegF): FLOWLINE: N/A BHPT: 144.85 @ 1886' THERMOMETER 1: 136 THERMOMETER 2: 136.
CHLORIDES REPORTED AT 1210 PPM.
ICT S/N: 11437412.
BHPT S/N: 11440691.
RECEIVED GOOD MAGNETIC MARKS AND TOOL ZERO VERIFIED UPON COMPLETION OF LOGGING PASS.
THANK YOU FOR CHOOSING HALLIBURTON. RIG: KEY 78.

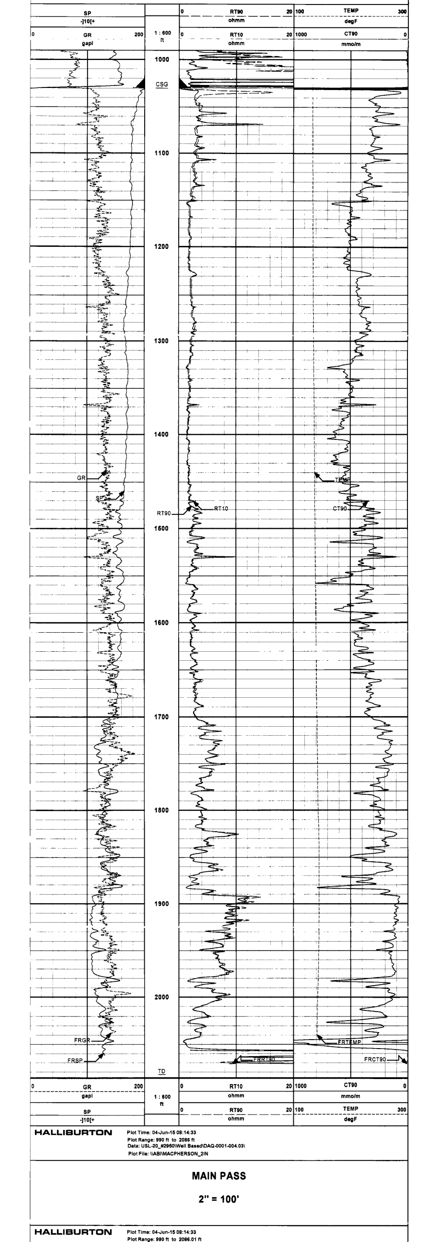
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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.

HALLIBURTON

HALLIBURTON Plot Time: 04-Jun-15 08:14:32
Plot Range: 990 ft to 2086 ft
Data: USL-20_#2950\Well Based\DAQ-0001-004.03\
Plot File: \\ABI\MACPHERSON_2IN

MAIN PASS

2" = 100'



HALLIBURTON Plot Time: 04-Jun-15 08:14:33
Plot Range: 990 ft to 2086 ft
Data: USL-20_#2950\Well Based\DAQ-0001-004.03\
Plot File: \\ABI\MACPHERSON_2IN

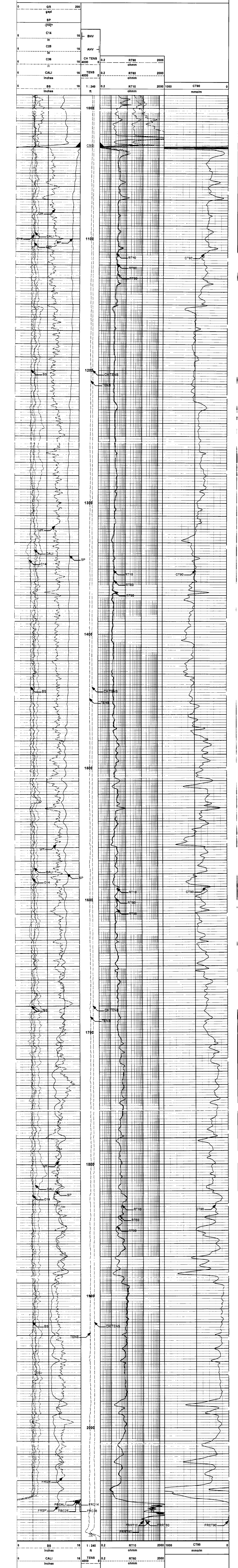
MAIN PASS

2" = 100'

HALLIBURTON Plot Time: 04-Jun-15 08:14:33
Plot Range: 990 ft to 2086.01 ft
Data: USL-20_#2950\Well Based\DAQ-0001-004.03\
Plot File: \\ABI\MACPHERSON_5IN

MAIN PASS

5" = 100'



HALLIBURTON Plot Time: 04-Jun-15 08:14:35
Plot Range: 990 ft to 2086.01 ft
Data: USL-20_#2950\Well Based\DAQ-0001-004.03\
Plot File: \\ABI\MACPHERSON_5IN

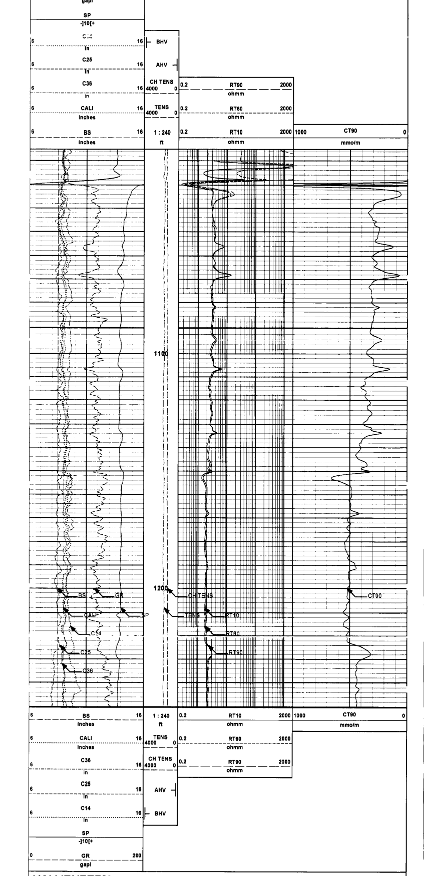
MAIN PASS

5" = 100'

HALLIBURTON Plot Time: 04-Jun-15 08:14:36
Plot Range: 1015 ft to 1250 ft
Data: USL-20_#2950\Well Based\DAQ-0001-003.01\
Plot File: \\ABI\MACPHERSON_5IN REPEAT

REPEAT SECTION

5" = 100'



HALLIBURTON Plot Time: 04-Jun-15 08:14:37
Plot Range: 1015 ft to 1250 ft
Data: USL-20_#2950\Well Based\DAQ-0001-003.01\
Plot File: \\ABI\MACPHERSON_5IN REPEAT

REPEAT SECTION

5" = 100'

HALLIBURTON

PARAMETERS REPORT

Depth (ft)	Tool Name	Description	Value	Units
TOP				
	SHARED	Bit Size	8.500	in
	SHARED	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	Mud Base	Water	
	SHARED	Borehole Fluid Weight	9.200	ppg
	SHARED	Weighting Agent	Natural	
	SHARED	Borehole salinity	0.00	ppm
	SHARED	Formation Salinity NaCl	0.00	ppm
	SHARED	Percent K in Mud by Weight?	0.00	%
	SHARED	Mud Resistivity	1.950	ohmm
	SHARED	Temperature of Mud	63.0	degF
	SHARED	Logging Interval is Cased?	No	
	SHARED	AHV Casing OD	5.500	in
	SHARED	Surface Temperature	75.0	degF
	SHARED	Total Well Depth	2083.00	ft
	SHARED	Bottom Hole Temperature	141.7	degF
	SHARED	High Res Z Accelerometer Master Tool	GTET	
	SHARED	Temperature Master Tool	NONE	
	Rwa / CrossPlot	Process Crossplot?	Yes	
	Rwa / CrossPlot	Select Source of F	Automatic	
	Rwa / CrossPlot	Archie A factor	0.6200	
	Rwa / CrossPlot	Archie M factor	2.1500	
	Rwa / CrossPlot	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	Use Air Porosity to calculate CrossplotPhi	No	
	Rwa / CrossPlot	Borehole Size Source Tool	ICT	
	GTET	Process Gamma Ray?	Yes	
	GTET	Gamma Tool Standoff	0.000	in
	GTET	Process Gamma Ray EVR?	No	
	GTET	Tool Position for Gamma Ray Tools.	Eccentered	
	GTET	Borehole Size Source Tool	ICT	
	BHPT-I	Compute BHPT Results	Yes	
	BHPT-I	Internal Tool Temperature	0.0	degF
	BHPT-I	Tool Pressure	0.00	
	BHPT-I	Use fixed inclination?	Yes	
	BHPT-I	Fixed Inclination Value	0.0	deg
	BHPT-I	Process High Resolution Temperature Tool?	Yes	
	ICT	Process Caliper Outputs?	Yes	
	ICT	Disable Caliper Arm	No	
	ICT	Arm To Disable	0	
	ICT	Method to replace arm?	Caliper Average	
	ICT	Diameter to use for disabled arm	0.00	in
	ICT	Disable Second Caliper Arm	No	
	ICT	Second Arm To Disable	0	
	ICT	Method to replace second arm?	Caliper Average	
	ICT	Diameter to use for second disabled arm	0.00	in
	ICT	Radius 1 Offset	0.0	in
	ICT	Radius 2 Offset	0.0	in
	ICT	Radius 3 Offset	0.0	in
	ICT	Radius 4 Offset	0.0	in
	ICT	Radius 5 Offset	0.0	in
	ICT	Radius 6 Offset	0.0	in
	ICT	Radius type for borehole volume calcuations	Elliptical	
	ACRt Sonde	Process ACRt?	Yes	
	ACRt Sonde	Minimum Tool Standoff	1.50	in
	ACRt Sonde	Temperature Correction Source	FP Lwr & FP Upr	
	ACRt Sonde	Tool Position	Free Hanging	
	ACRt Sonde	Rmud Source	Mud Cell	
	ACRt Sonde	Minimum Resistivity for MAP	0.20	ohmm
	ACRt Sonde	Maximum Resistivity for MAP	200.00	ohmm
	ACRt Sonde	Threshold Quality	0.50	
	ACRt Sonde	Use RMud from BHPT?	No	
	ACRt Sonde	Fixed mud resistivity	2000	ohmm
	ACRt Sonde	Borehole Size Source Tool	ICT	
	ACRt Sonde	Apply Corkscrew Effect?	No	
BOTTOM				

Data: USL-20_#2950\0001 ACRT-ICT-BHPT\IDLE Date: 04-Jun-15 07:50:13

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11534457 Reference Calibration Date: 18-May-15 14:09:15
Engineer: G. ROUSSEAU Calibration Date: 22-May-15 01:04:11
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

Calibrator Source S/N: TB-67
Calibrator API Reference:243.00 api
Equivalent Calibrator API Reference:247.3 api

Measurement	Measured	Calibrated	Units
Background	48.6	47.2	api
Background + Calibrator	302.8	294.5	api
Calibrator	254.3	247.3	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11534457 Reference Calibration Date: 22-May-15 01:04:11
Engineer: A. KOCHERSPERGER Calibration Date: 04-Jun-15 02:47:16
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

Calibrator Source S/N: TB-67
Calibrator API Reference:243.00 api
Equivalent Calibrator API Reference:247.3 api

Field Verification	Shop	Field	Units
Background	47.2	31.0	api
Background + Calibrator	294.5	276.5	api
Calibrator	247.3	245.5	api

Shop	Field	Difference	Tolerance
247.3	245.5	1.8	+/- 9.00

HIGH RESOLUTION TEMPERATURE TOOL SHOP CALIBRATION

Tool Name: BHPT-I - 11440691 Reference Calibration Date: 04-Apr-15 11:29:55
Engineer: G. BELAI Calibration Date: 05-May-15 11:31:47
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

Calibration Summary

Measurement	Previous Raw Value	Current Raw Value	Units
Ambient Temperature	71.53	68.81	degF

HIGH RESOLUTION TEMPERATURE TOOL FIELD CALIBRATION

Tool Name: BHPT-I - 11440691 Reference Calibration Date: 05-May-15 11:31:47
Engineer: A. KOCHERSPERGER Calibration Date: 04-Jun-15 02:44:21
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

MEASURED/CALIBRATED VALUES

Measurement	Measured	Calibrated	Change	Control Limit On New Value
Ambient Temperature (degF)	70	65.15	4.8500	+/- 5.00

PASS/FAIL SUMMARY

Temperature Check: Passed

ICT SHOP CALIBRATION

Tool Name: ICT - 11437412 Reference Calibration Date: 01-Jan-70 00:00:00
Engineer: B. SMETHIE Calibration Date: 13-May-15 16:55:20
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

CALIPERS AND RINGS

Ring	Measured	Calibrated	Units
CALIPER 1:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 2:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 3:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 4:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 5:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in
CALIPER 6:			
Small Ring	3.65	3.65	in
Medium Ring	8.00	8.00	in
Large Ring	15.00	15.00	in
X-Large Ring	21.00	21.00	in

ICT FIELD CALIBRATION

Tool Name: ICT - 11437412 Reference Calibration Date: 13-May-15 16:55:20
Engineer: A. KOCHERSPERGER Calibration Date: 04-Jun-15 02:48:00
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1

CALIPERS

Caliper	Shop	Field	Units
Caliper 1	8.00	7.95	in
Caliper 2	8.00	7.96	in
Caliper 3	8.00	8.00	in
Caliper 4	8.00	7.99	in
Caliper 5	8.00	8.01	in
Caliper 6	8.00	7.96	in

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 11017971 Reference Calibration Date: 14-Apr-15 18:30:22
Engineer: G. BELAI Calibration Date: 18-May-15 16:50:48
Software Version: WL INSITE R4.6.4 (Build 3) Calibration Version: 1
Host Tool Name: ACRt Instrument - 11017974

TYPICAL GAIN RANGE

Subarray	R12KHz Lower	R12KHz (mmho/m)	R12KHz Upper	R36KHz Lower	R36KHz (mmho/m)	R36KHz Upper	R72KHz Lower	R72KHz (mmho/m)	R72KHz Upper
A1 (80")	0.95	1.0217	1.05	0.95	1.0280	1.05	0.95	1.0260	1.05
A2 (50")	0.95	1.0235	1.05	0.95	1.0313	1.05	0.95	1.0307	1.05
A3 (29")	0.95	1.0203	1.05	0.95	1.0280	1.05	0.95	1.0274	1.05
A4 (17")	0.95	0.9985	1.05	0.95	1.0046	1.05	0.95	1.0052	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9995	1.05	0.95	0.9989	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9938	1.05	0.95	0.9927	1.05

SONDE OFFSET

Subarray	R12KHz (mmho/m)	R36KHz (mmho/m)	R72KHz (mmho/m)
A1 (80")	-2.758	-5.019	-6.837
A2 (50")	-4.888	-5.253	-4.788
A3 (29")	-14.602	-4.461	-3.862
A4 (17")	-112.352	-37.301	-30.741
A5 (10")	N/A	-96.865	-48.787
A6 (6")	N/A	305.065	162.154

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.94	1.3
36K	1.0	1.40	2.0
72K	1.0	1.73	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.00	1.05

PASS/FAIL SUMMARY

GAIN RANGE CHK PASS
SONDE OFFSET CHK PASS

TOOL OK TO LOG

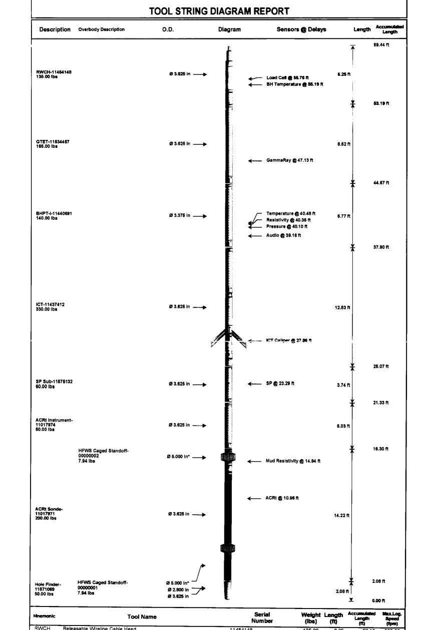
CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11534457						
Gamma Ray Calibrator	247.3	245.5	----------	1.8	+/- 9.00	api
BHPT-I-11440691						
Ambient Temperature:	68.81	65.15	----------	3.66	N/A	degF
ICT-11437412						
Caliper 1	8.00	7.95	----------	0.05	+/-0.25	in
Caliper 2	8.00	7.96	----------	0.04	+/-0.25	in
Caliper 3	8.00	8.00	----------	0.00	+/-0.25	in
Caliper 4	8.00	7.99	----------	0.01	+/-0.25	in
Caliper 5	8.00	8.01	----------	-0.01	+/-0.25	in
Caliper 6	8.00	7.96	----------	0.04	+/-0.25	in
ACRt Sonde-11017971						
Mud Cell	1.00	----------	----------	0.00	----------	ohm-m

Data: USL-20_#2950\0001 ACRT-ICT-BHPT\IDLE Date: 04-Jun-15 02:51:35

HALLIBURTON

TOOL STRING DIAGRAM REPORT



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11454148	135.00	6.25	53.19	300.00
GTET	Gamma Telemetry Tool	11534457	165.00	8.52	44.67	60.00
BHPT	Borehole Properties Tool - Insite	11440691	140.00	6.77	37.90	100.00
CT	Six Independent Arm Caliper	11437412	330.00	12.83	25.07	60.00
SP	SP Sub	11575132	60.00	3.74	21.33	300.00
ACRt	Array Compensated True Resistivity Instrument Section	11017974	50.00	5.03	16.30	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11017971	200.00	14.22	2.08	120.00
HFCS	Hostile Full Wave Sonic Caged Metal and Rubber Standoff	00000002	7.94	1.33 *	14.67	300.00
HFND	Hole Finder	11871069	50.00	2.08	0.00	300.00
HFCS	Hostile Full Wave Sonic Caged Metal and Rubber Standoff	00000001	7.94	1.33 *	2.76	300.00
Total			1,145.88	59.44		

* Not included in Total Length and Length Accumulation

Data: USL-20_#2950\0001 ACRT-ICT-BHPT\IDLE Date: 04-Jun-15 02:37:37

COMPANY	MACPHERSON OIL COMPANY		
WELL	USL 20 #2950		
FIELD	ROUND MTN		
COUNTY	KERN	STATE	CA

HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY
INSITE CALIPER TOOL
BOREHOLE PROPERTIES TOOL
2"=100' & 5"=100'