



**ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG**

COMPANY **SOUTHERN STAR CENTRAL GAS PIPELINE, INC.**
 WELL **ALDEN #0-5**
 FIELD **ALDEN**
 PROVINCE/COUNTY **RICE**
 COUNTRY/STATE **U.S.A. / KANSAS**
 LOCATION **2822' FNL & 95' FWL
NW NW NW SW**

SEC 22 TWP 21S RGE 9W Other Services MPD/MDN MML
 API Number 15-159-19222 MSS
 Permit Number

Permanent Datum G.L., Elevation 1672 feet
 Log Measured From K.B. @ 13 FEET above Permanent Datum
 Drilling Measured From K.B.

Elevations:
 KB 1685.00
 DF 1684.00
 GL 1672.00

Date	07-NOV-2010
Run Number	ONE
Depth Driller	3530.00 feet
Depth Logger	3329.00 feet
First Reading	3526.00 feet
Last Reading	3320.00 feet
Casing Driller	3321.00 feet
Casing Logger	3320.00 feet
Bit Size	6.250 inches
Hole Fluid Type	CHEMICAL
Density / Viscosity	9.00 lb/USg 43.00 CP
PH / Fluid Loss	11.00 10.00 ml/30Min
Sample Source	FLOWLINE
Rm @ Measured Temp	1.71 @ 81.0 ohm-m
Rmf @ Measured Temp	1.37 @ 81.0 ohm-m
Rmc @ Measured Temp	2.05 @ 81.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	1.29 @107.0 ohm-m
Time Since Circulation	4 HOURS
Max Recorded Temp	107.00 deg F
Equipment Name	COMPACT
Equipment / Base	13096 LIB
Recorded By	LYNN SCOTT
Witnessed By	MARK ROUSE
S.O.# / JOB#	3524593 LB10-280

BOREHOLE RECORD

Last Edited: 07-NOV-2010 04:46

Bit Size inches	Depth From feet	Depth To feet
6.250	3320.00	3529.00

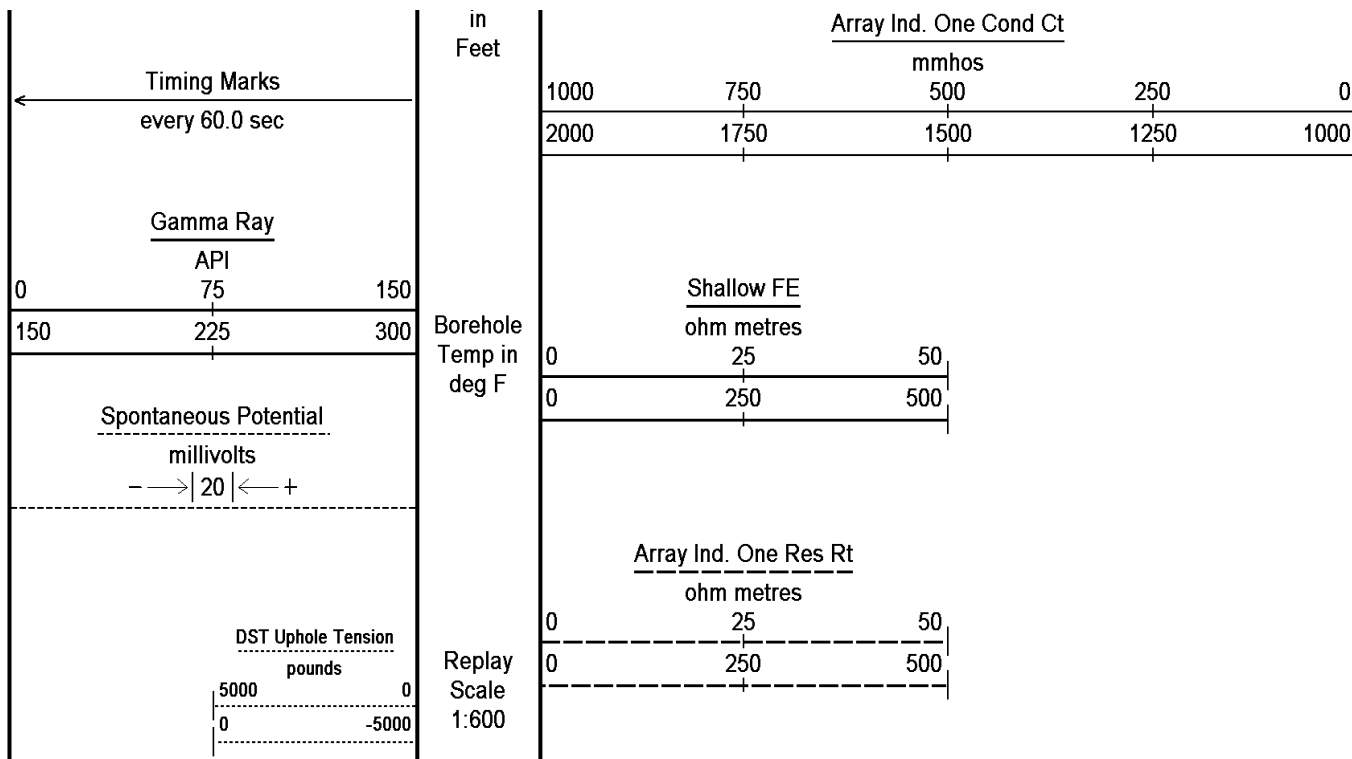
CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	7.000	0.00	3320.00	17.00

REMARKS

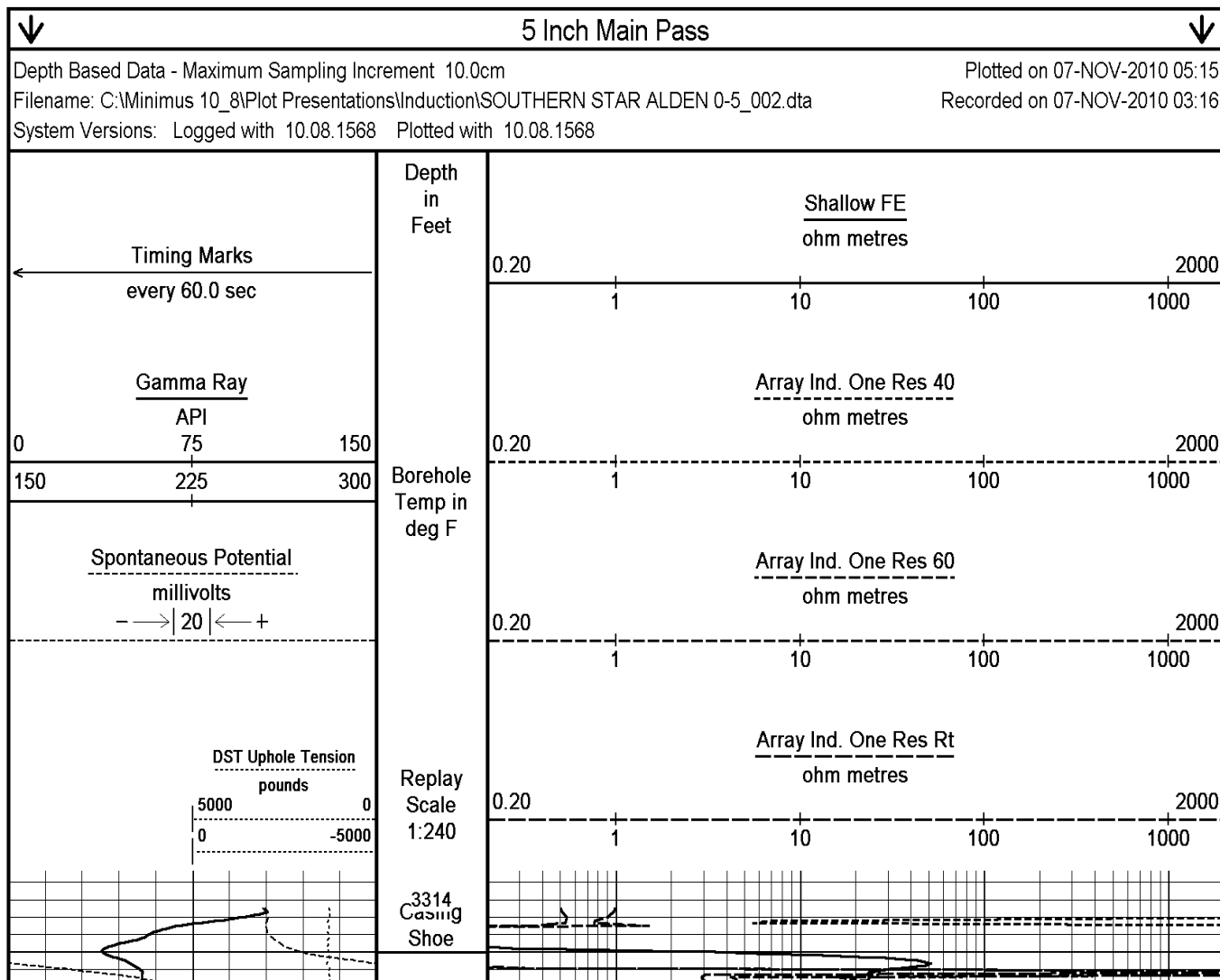
Tools Run: MAI, MPD, MCG, MDN, MML, MFE, SKJ, MSS
 Hardware: MPD: 8 inch profile plate used. MAI MSS and MFE: 0.5 Inch standoffs used. MDN: Dual Eccentraliser used.
 2.71 G/CC Limestone density matrix used to calculate porosity.
 Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
 Borhole rugosity, tight pulls, and washouts will affect data quality.
 All intervals logged and scaled per customer's request.
 Annular volume with 4.5 inch production casing
 Service order #3524593
 Rig: Sterling #4
 Engineer: L. Scott
 Operator(s): J. LaPoint

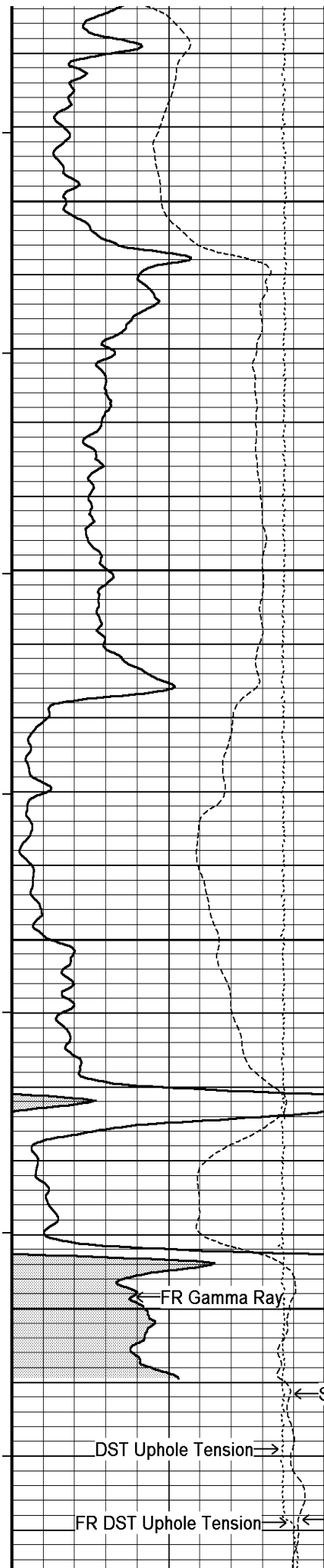
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.



Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 07-NOV-2010 05:15
 Filename: C:\Minimus 10_8\Plot Presentations\Induction\SOUTHERN STAR ALDEN 0-5_002.dta Recorded on 07-NOV-2010 03:16
 System Versions: Logged with 10.08.1568 Plotted with 10.08.1568

↑ 2 Inch Main Pass ↑





3350

107°

3400

107°

3450

107°

3500

Spontaneous Potential

FFR Array Ind. One Res 40

FR Spontaneous Potential

Array Ind. One Res Rt

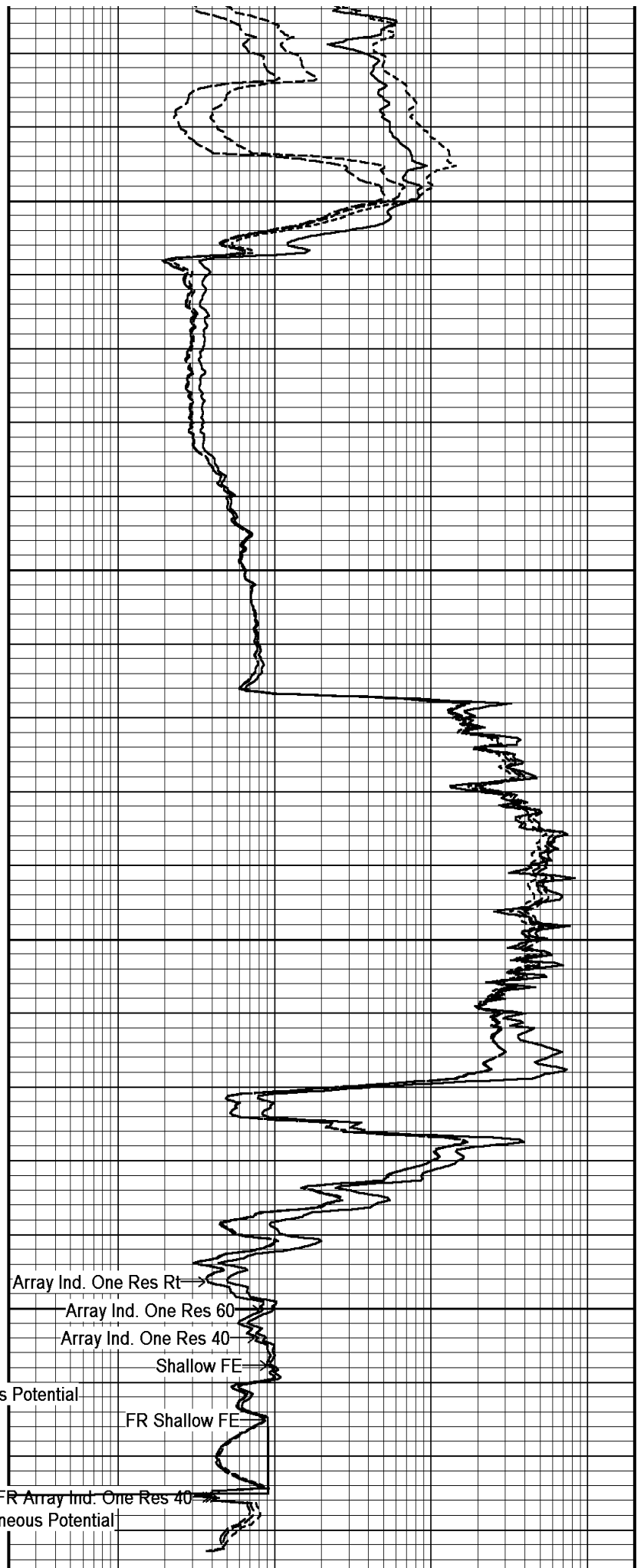
Array Ind. One Res 60

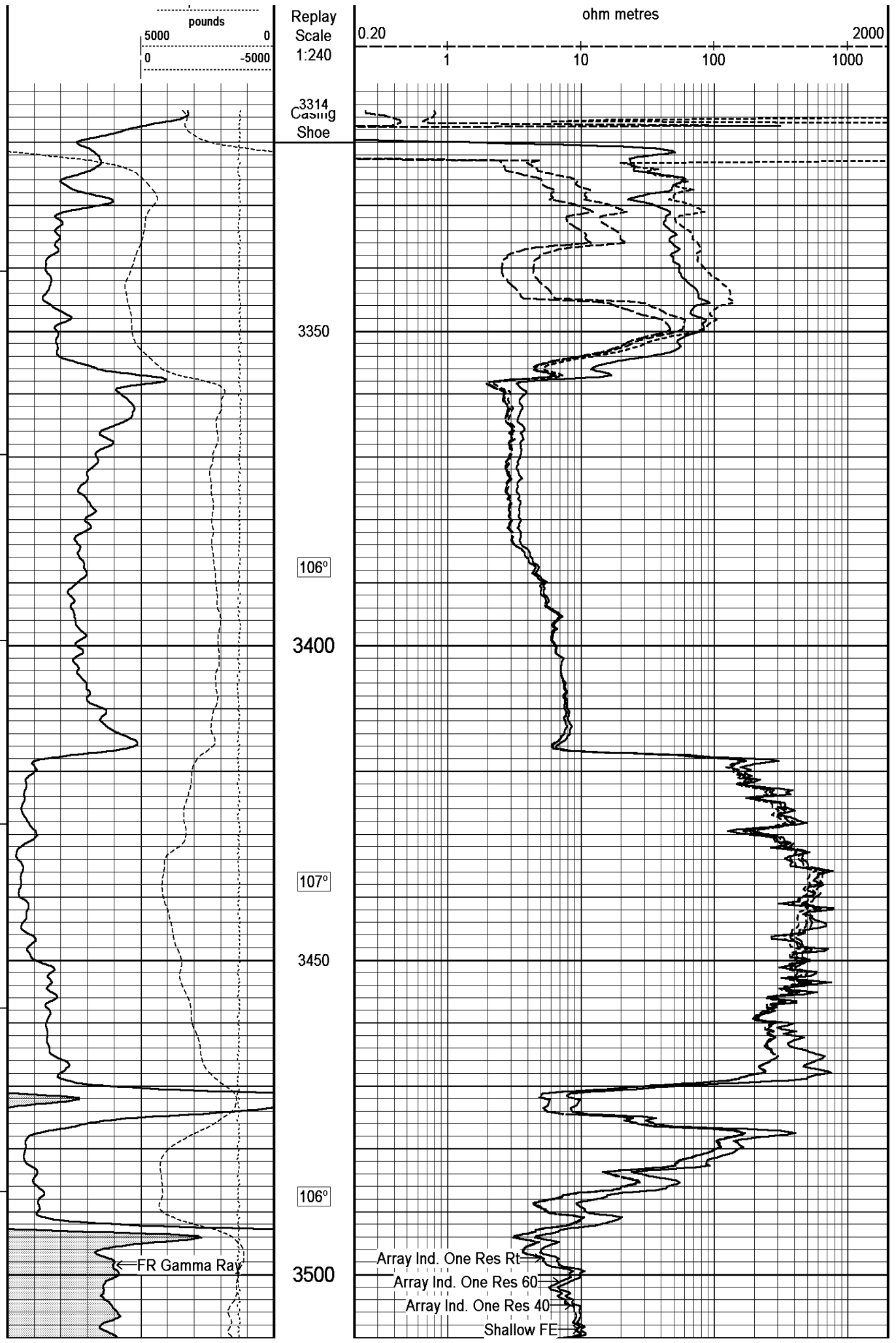
Array Ind. One Res 40

Shallow FE

FR Shallow FE

FFR Array Ind. One Res 40





pounds

5000 0
0 -5000

Replay
Scale
1:240

ohm metres

0.20 1 10 100 1000 2000

3314
Casing
Shoe

3350

106°

3400

107°

3450

106°

3500

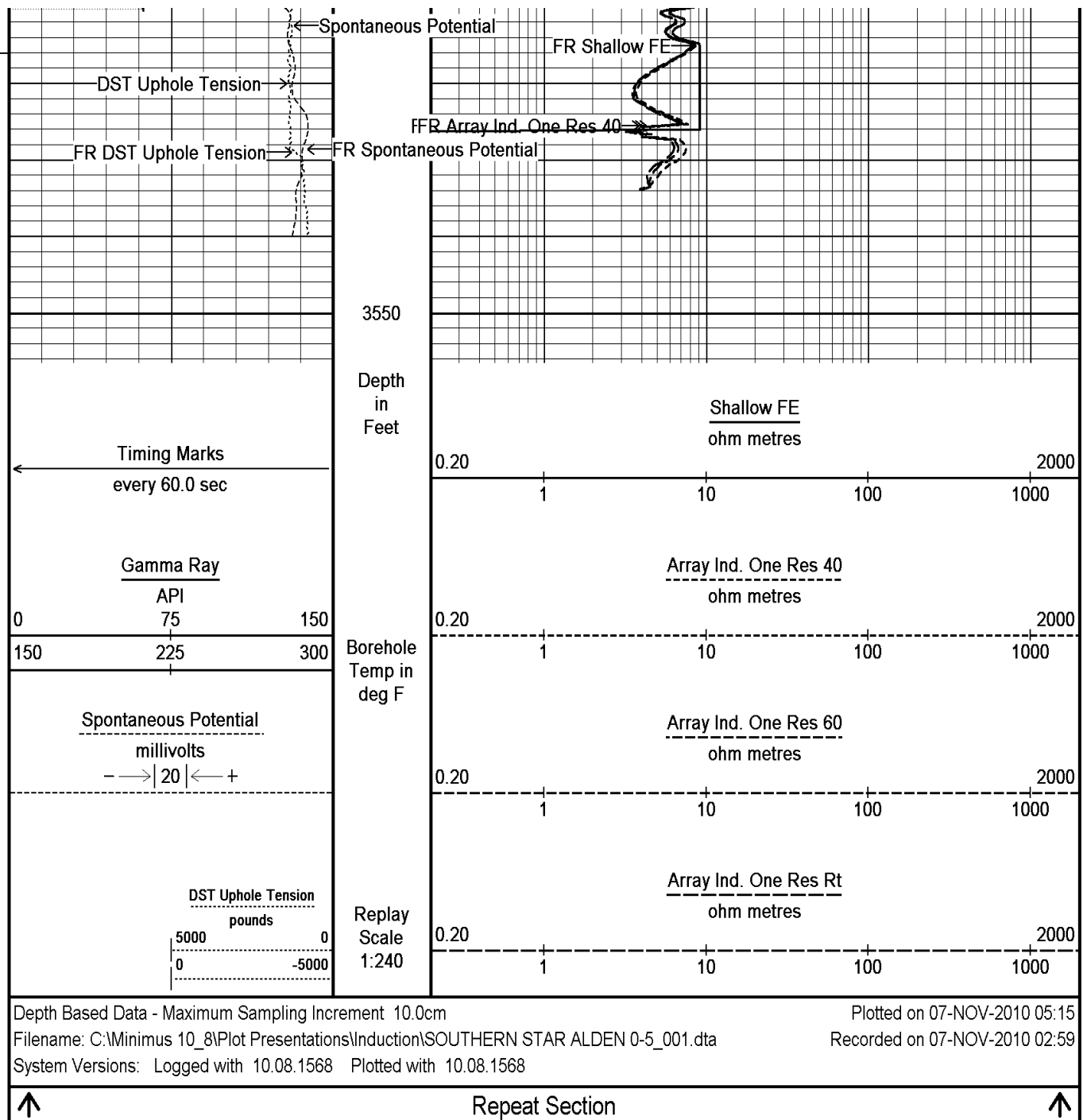
← FR Gamma Ray

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE



BEFORE SURVEY CALIBRATION

C:\Minimus 10_8\Plot Presentations\Induction\SOUTHERN STAR ALDEN 0-5_001.dta

General Constants All 000

Last Edited on 07-NOV-2010,02:12

General Parameters

Mud Resistivity	1.710	ohm-metres
Mud Resistivity Temperature	81.000	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	Bit Size	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	None	

kwa Parameters					
Porosity used				N/A	
Resistivity used				N/A	
RWA Constant A				N/A	
RWA Constant M				N/A	
Down-hole Tension Calibration SMS 000					Field Calibration on 01-NOV-2010
Reading No		Measured		Calibrated (lbs)	
1		0.00		7.00	
2		400.00		473.00	
High Resolution Temperature Calibration MCG 067					Field Calibration on 06-AUG-2010,10:40
		Measured		Calibrated(Deg F)	
Lower		50.00		50.00	
Upper		75.00		75.00	
High Resolution Temperature Constants MCG 067					Last Edited on 06-AUG-2010,10:39
Pre-filter Length			11		
SP Calibration MCG 067					Field Calibration on 09-SEP-2010 13:54
		Measured		Calibrated (mV)	
Reference 1		104.1		100.0	
Reference 2		-95.6		-100.0	
Gamma Calibration MCG 067					Field Calibration on 06-NOV-2010 10:07
		Measured		Calibrated (API)	
Background		66		45	
Calibrator (Gross)		730		501	
Calibrator (Net)		664		456	
Gamma Constants MCG 067					Last Edited on 07-NOV-2010,02:40
Gamma Calibrator Number		grcc141			
Mud Density		1.00		gm/cc	
Caliper Source for Processing		MML Caliper			
Tool Position		Eccentred			
Concentration of KCl		0.00		kppm	
Micro Normal and Micro Inverse Calibration MML 004					Base Calibration on 13-OCT-2010 10:02 Field Check on 06-NOV-2010 09:54
Base Calibration					
			Measured		Calibrated (ohm-m)
Channel		Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal		12.1	60.1	2.6	12.8
Micro Inverse		15.6	78.3	1.7	8.4
Channel		Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal		32.2		32.2	
Micro Inverse		16.3		16.3	
Micro Normal and Micro Inverse Constants MML 004					Last Edited on 07-NOV-2010,02:40
Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159				
Micro Normal K Factor	0.5110				
Micro Inverse K Factor	0.3380				
Standoff Offset	N/A inches				
Caliper Calibration MML 004					Base Calibration on 13-OCT-2010 09:56 Field Calibration on 06-NOV-2010 09:55
Base Calibration					
Reading No		Measured		Calibrator Size (in)	
1		14810		5.96	
2		18235		7.98	
3		21638		9.95	
4		25413		11.91	
5		0		0.00	
6		N/A		N/A	

Field Calibration		Measured Caliper (in) 6.00	Actual Caliper (in) 5.96	
FE Calibration MFE 067				Base Calibration on 13-OCT-2010 09:44 Field Check on 06-NOV-2010 09:51
Base Calibration		Measured	Calibrated (ohm-m)	
Reference 1		0.0	0.0	
Reference 2		961.4	126.8	
Base Check			280.8	
Field Check			280.9	
FE Constants MFE 067				Last Edited on 07-NOV-2010,02:39
Running Mode		No Sleeve		
MFE K Factor		0.1268		
Caliper Source for FE correction		MML 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		0.5	inches	
High Resolution Temperature Calibration MAI 188				Field Calibration on 02-AUG-2010,11:00
		Measured	Calibrated(Deg F)	
Lower		50.00	50.00	
Upper		75.00	75.00	
High Resolution Temperature Constants MAI 188				
Pre-filter Length		11		
Induction Calibration MAI 188				Base Calibration on 09-SEP-2010,10:03 Field Check on 06-NOV-2010 09:50
Base Calibration				
Test Loop Calibration		Measured	Calibrated (mmho/m)	
Channel		Low High	Low High	
1		16.5 472.3	9.3 966.2	
2		6.0 378.3	7.6 821.4	
3		3.5 260.7	5.2 566.0	
4		1.1 135.1	2.6 279.2	
Array Temperature		82.2	Deg F	
Channel		Base Check (mmho/m)	Field Check (mmho/m)	
		Low High	Low High	
1		0.0 0.0	13.4 3849.0	
2		0.0 0.0	30.6 3571.8	
3		0.0 0.0	28.4 3043.1	
4		0.0 0.0	21.0 2040.4	
Deep		0.0 0.0	18.1 1925.2	
Medium		0.0 0.0	40.3 4058.6	
Shallow		0.0 0.0	44.9 5365.0	
Array Temperature		0.0	51.2 Deg F	
Induction Constants MAI 188				Last Edited on 07-NOV-2010,02:39
Induction Model		RtAP-WBM		
Caliper for Borehole Corr.		MML Caliper		
Hole Size for Borehole Correction		N/A	inches	
Tool Centred		No		
Stand-off Type		Fins		
Stand-off		0.50	inches	
Number of Fins on Stand-off		8.0000		
Stand-off Fin Angle		45.00	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	

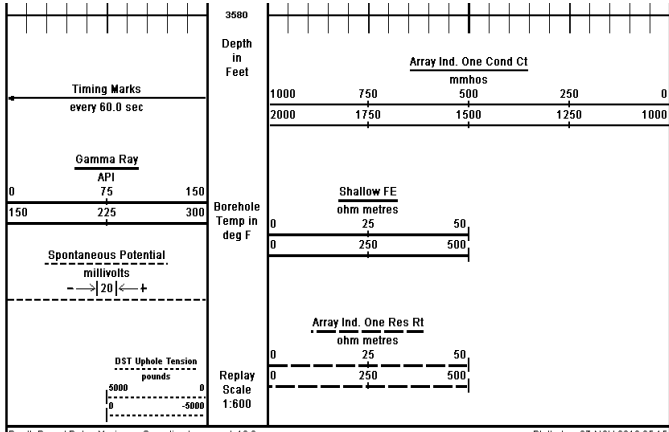
DOWNHOLE EQUIPMENT

C:\Minimus 10_8\Plot Presentations\Induction\SOUTHERN STAR ALDEN 0-5_001.dta

Compact Gamma					
MCG 67	Length: 8.70 ft	Weight: 63.9 lb		30.39 ft	GRGC - Gamma Ray
				27.48 ft	CGXT - MCG External Temperature
Compact Micro-log					
MML 4	Length: 7.97 ft	Weight: 81.6 lb		20.76 ft	AVOL - Annular Volume
				20.76 ft	HVOL - Hole Volume
				20.76 ft	MINV - Micro-inverse
				20.76 ft	MNRL - Micro-normal
SKJ-D.A Compact Knuckle Joint					
SKJ 91	Length: 2.17 ft	Weight: 24.3 lb		20.76 ft	MLTC - MML Caliper
Compact Focussed Electric					
MFE 67	Length: 6.03 ft	Weight: 48.5 lb		13.70 ft	FEFE - Shallow FE
Compact Induction					
MAI 188	Length: 10.81 ft	Weight: 48.5 lb		3.34 ft	RTAO - Array Ind. One Res Rt
				3.34 ft	R600 - Array Ind. One Res 60
				3.34 ft	R400 - Array Ind. One Res 40
				0.23 ft	SPCG - Spontaneous Potential
Total	Length: 35.67 ft	Weight: 266.8 lb			Tool Zero (0.13ft from bottom)
				-0.13 ft	SMTU - DST Uphole Tension
					All measurements relative to tool zero.

COMPANY
WELL
FIELD

SOUTHERN STAR CENTRAL GAS PIPELINE, INC.
ALDEN #0-5
ALDEN



Depth Based Data - Maximum Sampling Increment: 10.0cm
 Plotted on 07-NOV-2010 05:15
 Filename: C:\Minimus 10_8\Pilot Presentations\Induction\SOUTHERN STAR ALDEN 0-5_002.dta
 Recorded on 07-NOV-2010 03:18
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One Inch Main Pass

COMPANY	SOUTHERN STAR CENTRAL GAS PIPELINE, INC.		
WELL	ALDEN #0-5		
FIELD	ALDEN		
PROVINCE/COUNTY	RICE		
COUNTRY/STATE	U.S.A. / KANSAS		

Elevation Kelly Bushing	1685.00	feet	First Reading	3526.00	feet
Elevation Drill Floor	1684.00	feet	Depth Driller	3530.00	feet
Elevation Ground Level	1672.00	feet	Depth Logger	3328.00	feet



Weatherford

ARRAY INDUCTION
 SHALLOW FOCUSED
 ELECTRIC LOG