COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
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	TWP	RGE	Other Services
22	21S	9W	MAI/MFE MML
			MSS

API Number 15-159-19222
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:	feet
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	3516.00	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

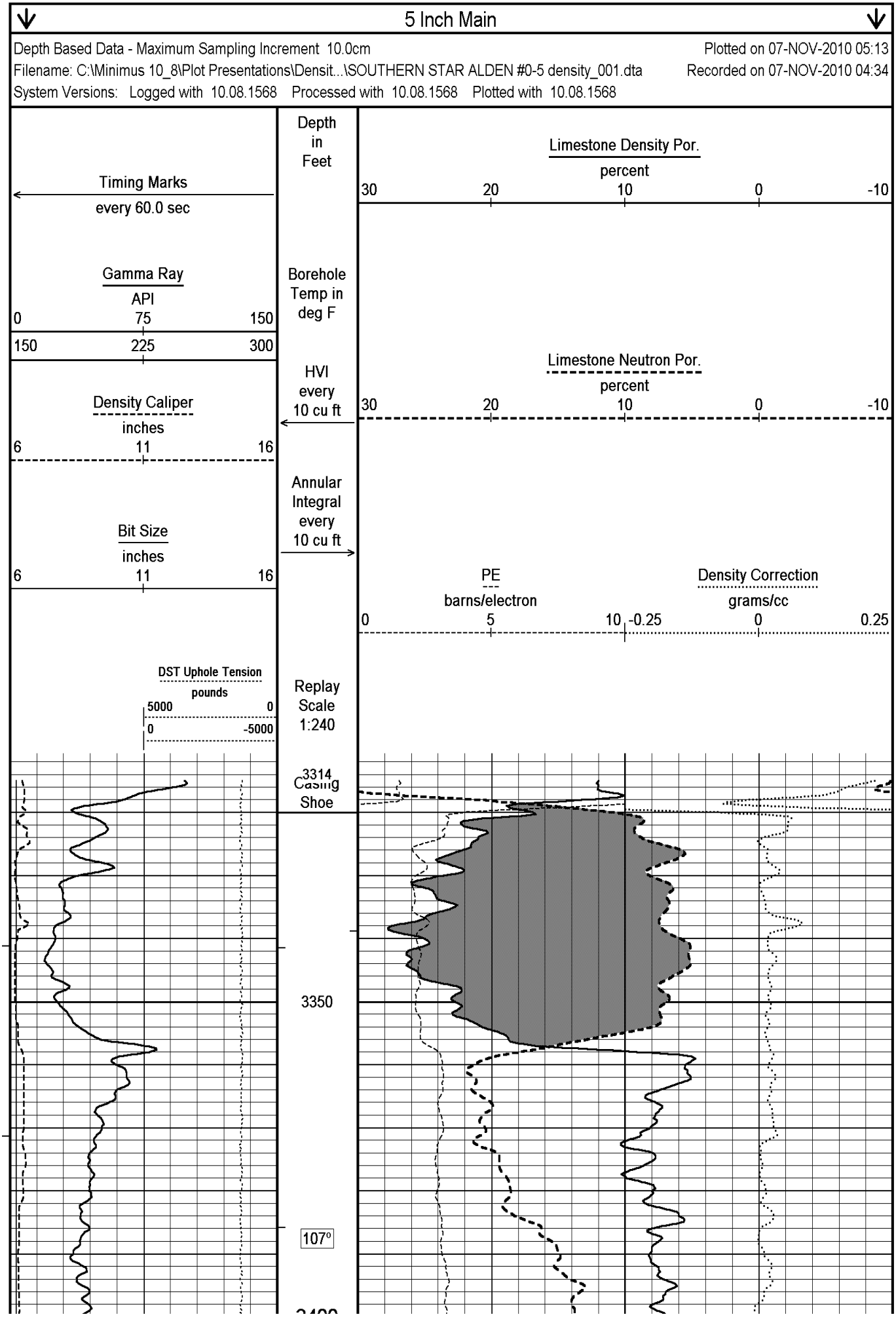
CASING RECORD

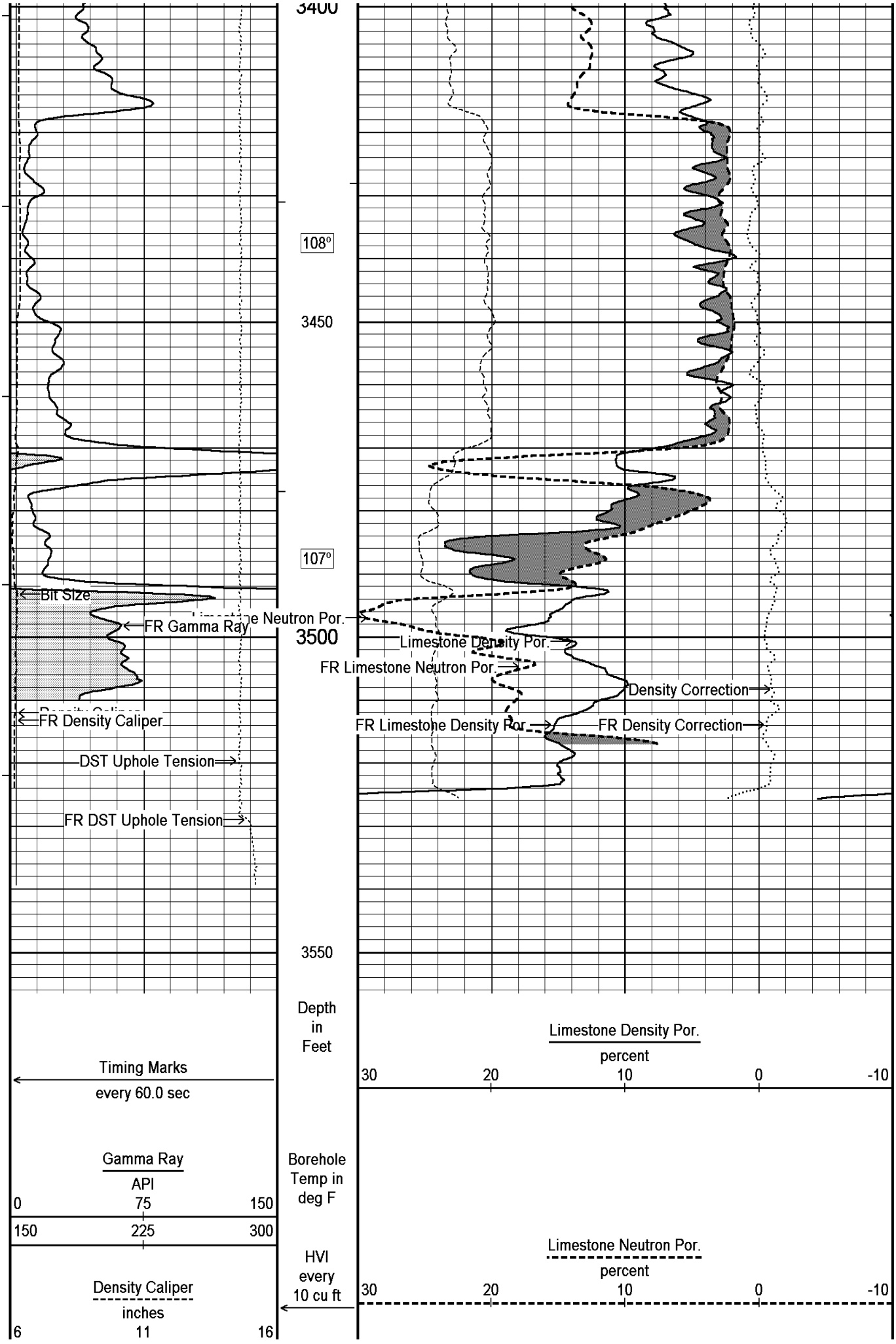
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	7.000	0.00	3320.00	17.00

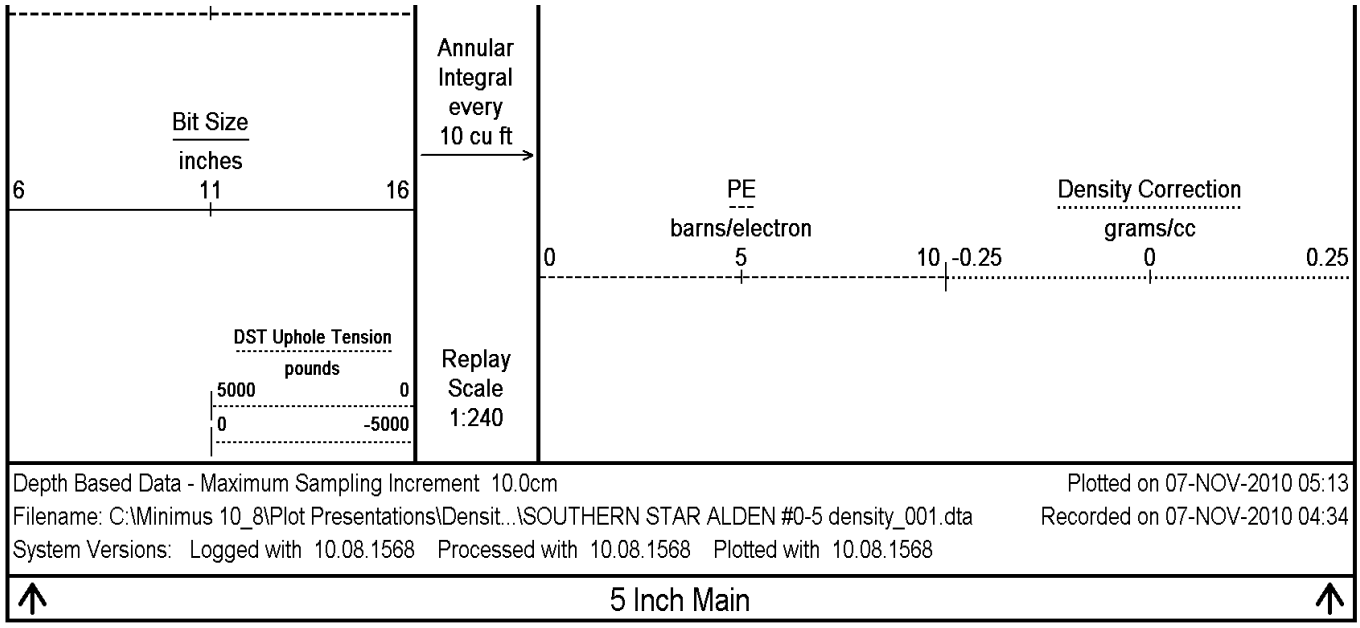
REMARKS

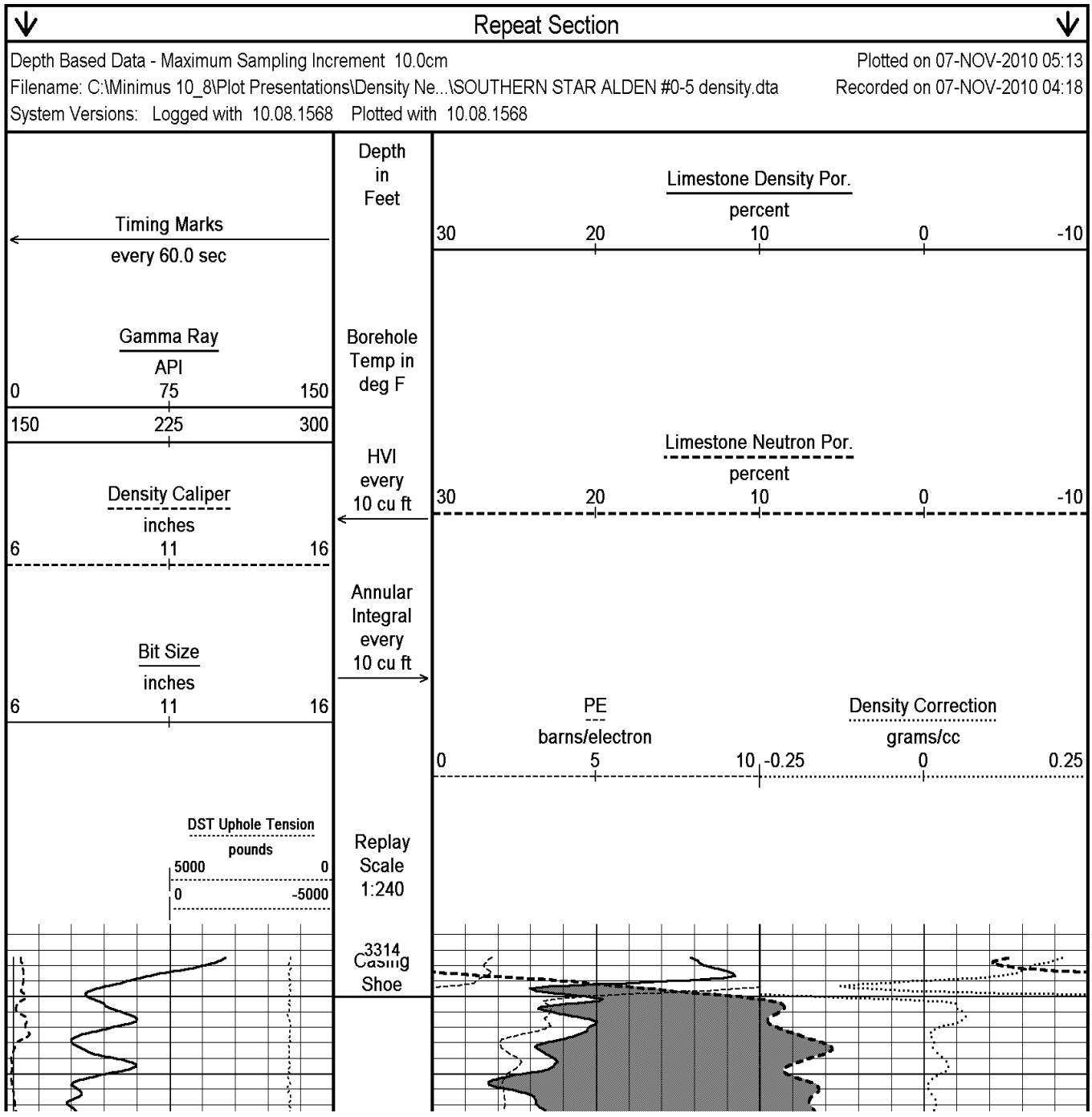
Tools Run: MAI, MPD, MCG, MDN, MML, MFE, SKJ, MSS
Hardware: MPD: 8 inch profile plate used. MAI MSS and MFE: 0.5 Inch standoffs used. MDN: Dual Eccentraliser used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
Borhole 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

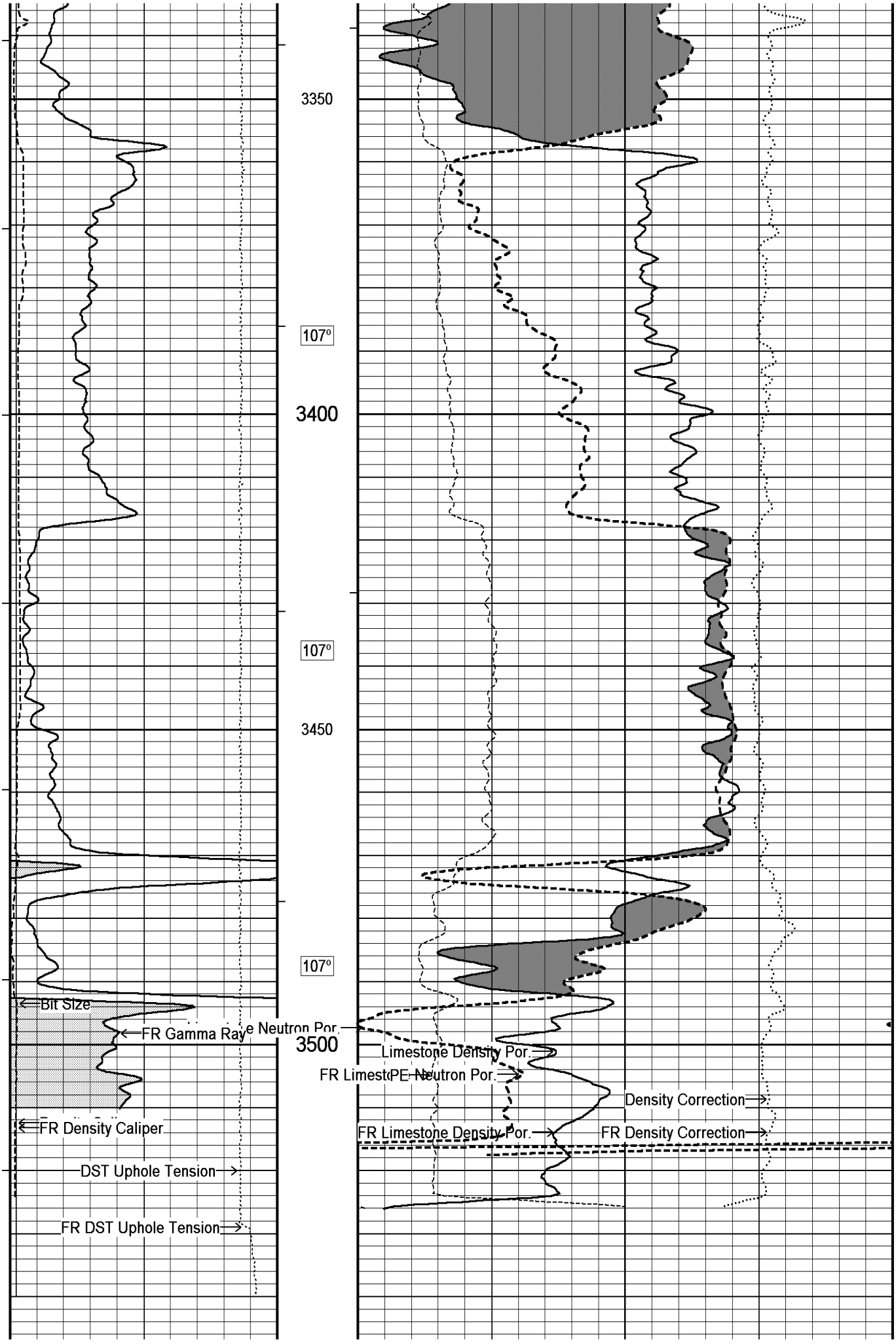
employees. These interpretations are also subject to our general terms and conditions in our price schedule.

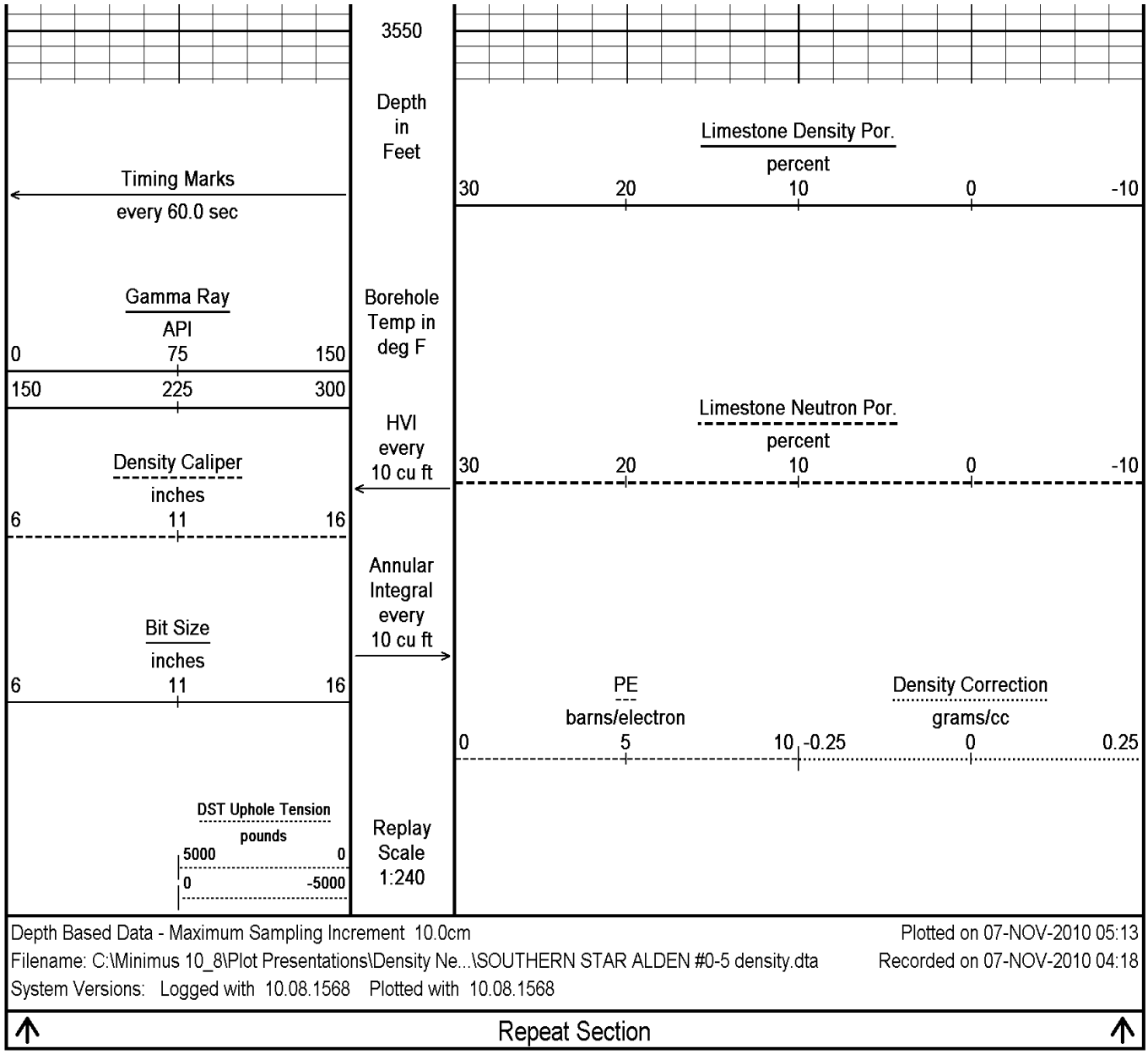



3400
108°
3450
107°
Bit Size
FR Gamma Ray
3500
Limestone Density Por.
FR Limestone Neutron Por.
Density Correction
FR Density Caliper
FR Limestone Density Por.
FR Density Correction
DST Uphole Tension
FR DST Uphole Tension
3550
Depth in Feet
Timing Marks
every 60.0 sec
Limestone Density Por.
percent
30 20 10 0 -10
Gamma Ray
API
0 75 150
150 225 300
Borehole Temp in deg F
Limestone Neutron Por.
percent
30 20 10 0 -10
HVI every 10 cu ft
Density Caliper
inches
6 11 16


Bit Size
inches
6
11
16
Annular Integral every 10 cu ft
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
0
-5000
Replay Scale 1:240
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Densit...\SOUTHERN STAR ALDEN #0-5 density_001.dta
Recorded on 07-NOV-2010 04:34
System Versions: Logged with 10.08.1568 Processed with 10.08.1568 Plotted with 10.08.1568
5 Inch Main


Repeat Section
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Density Ne...\SOUTHERN STAR ALDEN #0-5 density.dta
Recorded on 07-NOV-2010 04:18
System Versions: Logged with 10.08.1568 Plotted with 10.08.1568
Depth in Feet
Timing Marks
every 60.0 sec
Limestone Density Por.
percent
30
20
10
0
-10
Gamma Ray
API
0
75
150
150
225
300
Borehole Temp in deg F
Limestone Neutron Por.
percent
HVI every 10 cu ft
Density Caliper
inches
6
11
16
Annular Integral every 10 cu ft
Bit Size
inches
PE
barns/electron
Density Correction
grams/cc
DST Uphole Tension
pounds
5000
0
-5000
Replay Scale 1:240
3314
Casing Shoe


3350
107°
3400
107°
3450
107°
3500
Bit Size
FR Gamma Ray
Neutron Por.
Limestone Density Por.
FR Limest
PE
Neutron Por.
Density Correction
FR Density Caliper
FR Limestone Density Por.
FR Density Correction
DST Uphole Tension
FR DST Uphole Tension

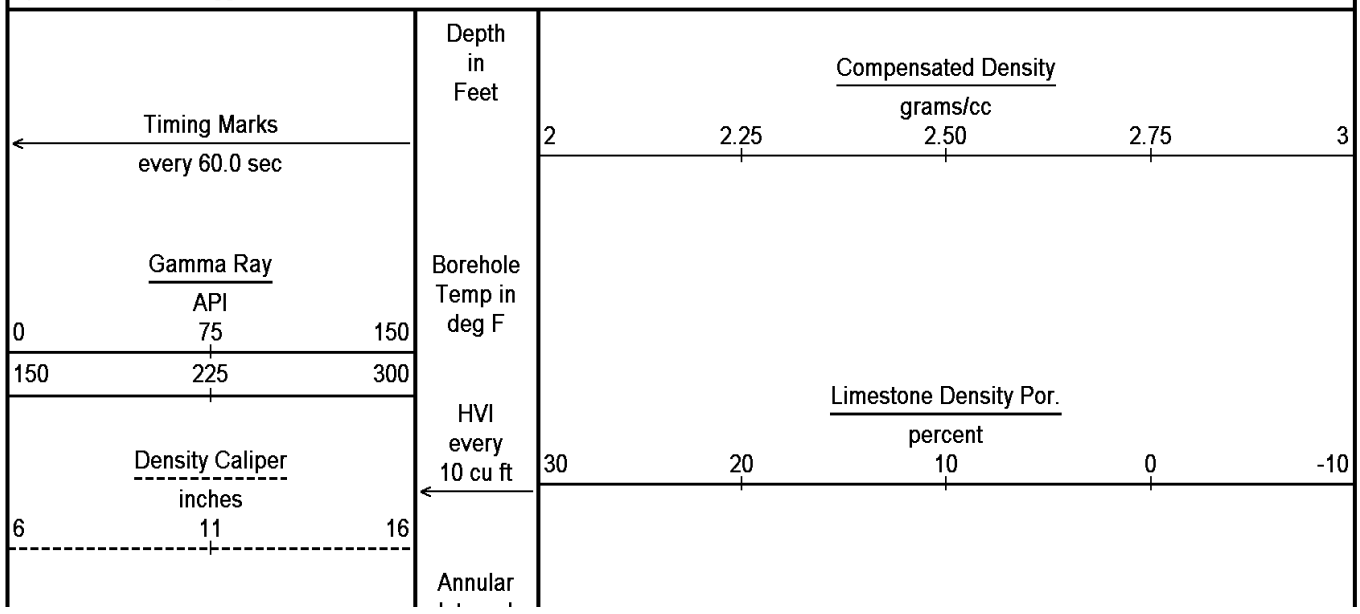


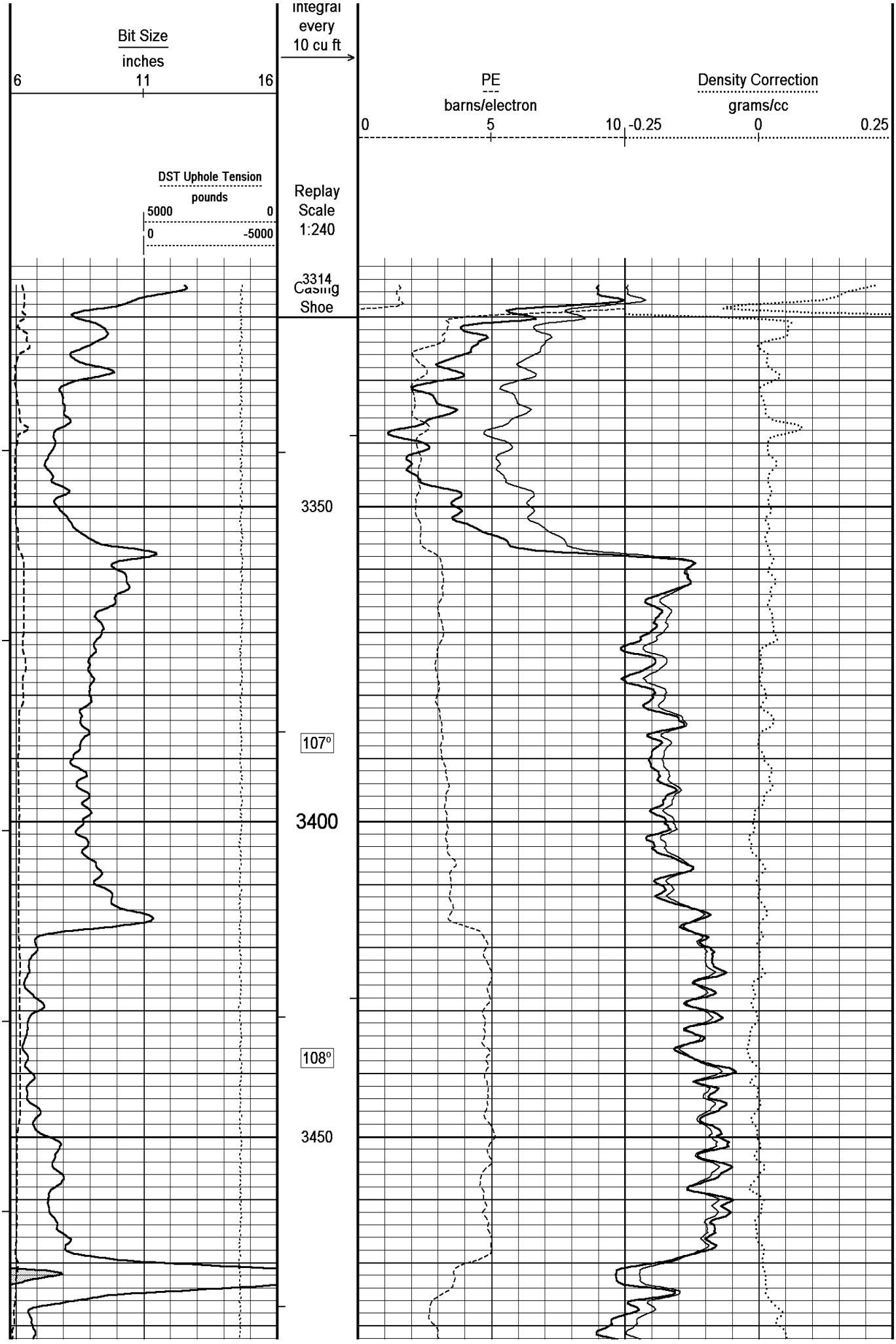
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Density Ne...\SOUTHERN STAR ALDEN #0-5 density.dta — Recorded on 07-NOV-2010 04:18
System Versions: Logged with 10.08.1568 Plotted with 10.08.1568

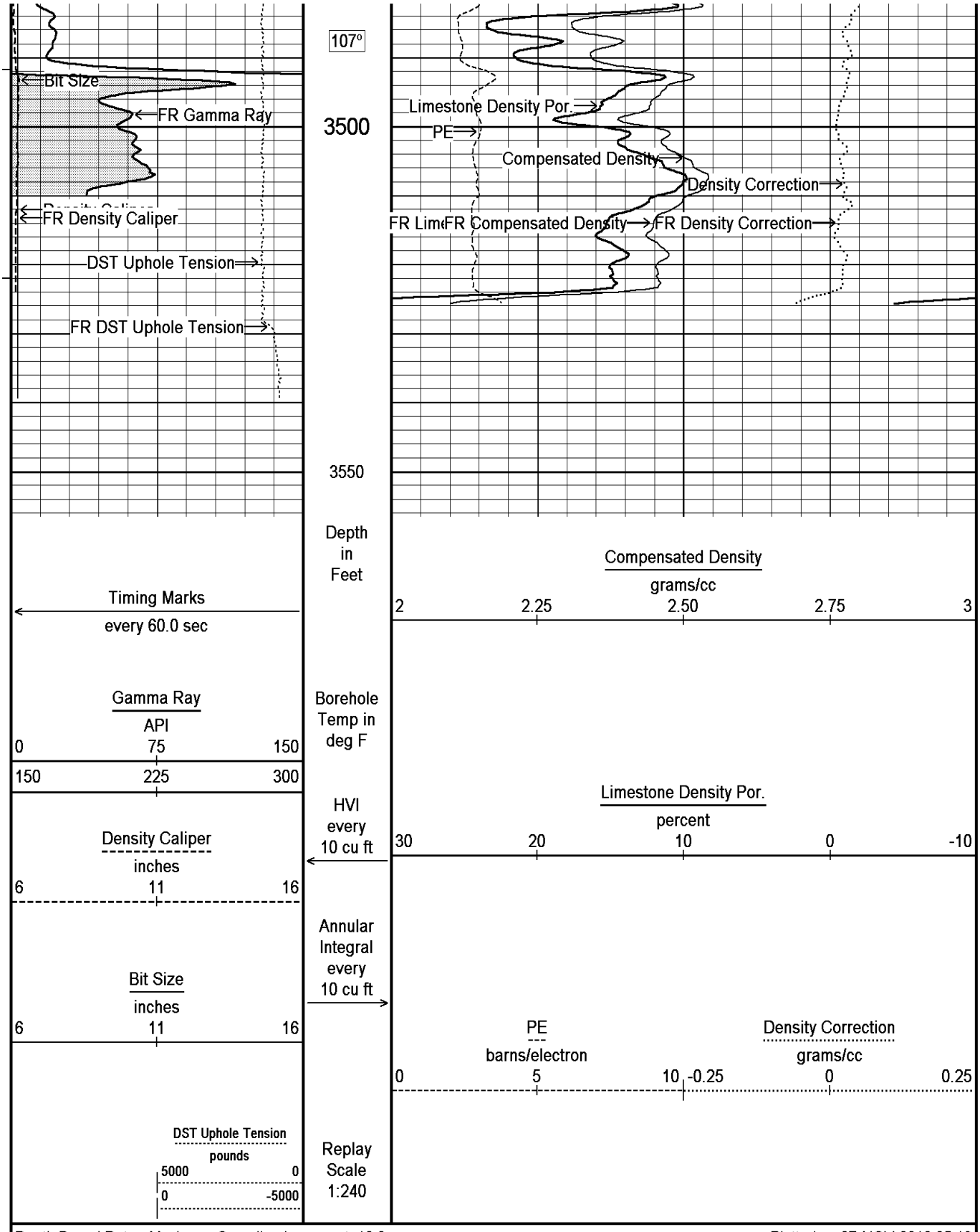
Repeat Section

5 Inch Main

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Densit...\SOUTHERN STAR ALDEN #0-5 density_001.dta — Recorded on 07-NOV-2010 04:34
System Versions: Logged with 10.08.1568 Processed with 10.08.1568 Plotted with 10.08.1568




Bit Size
inches
6
11
16
Integral
every
10 cu ft
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
0
-5000
Replay
Scale
1:240
3314
Casing
Shoe
3350
107°
3400
108°
3450

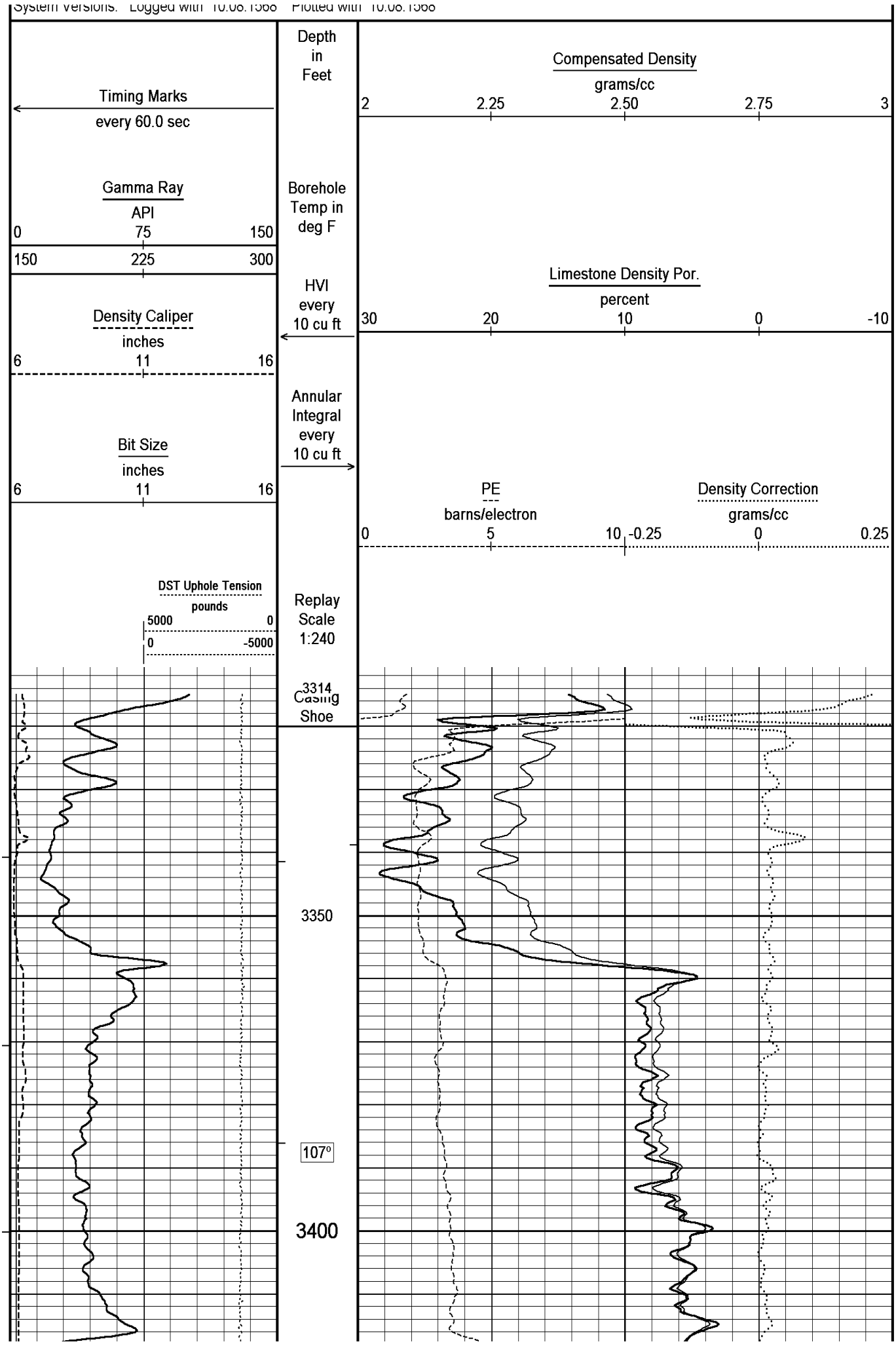


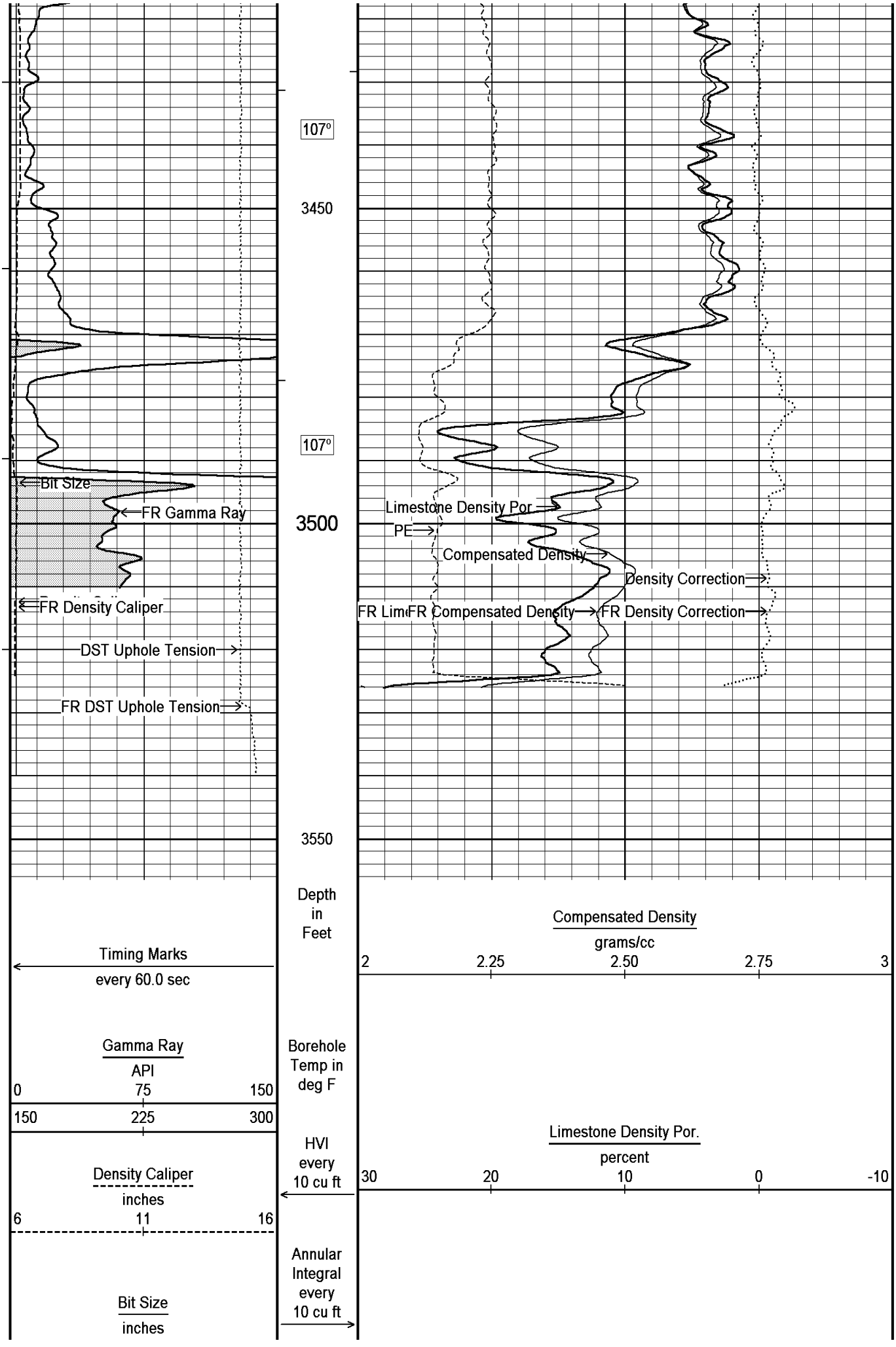
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Densit...\SOUTHERN STAR ALDEN #0-5 density_001.dta — Recorded on 07-NOV-2010 04:34
System Versions: Logged with 10.08.1568 Processed with 10.08.1568 Plotted with 10.08.1568

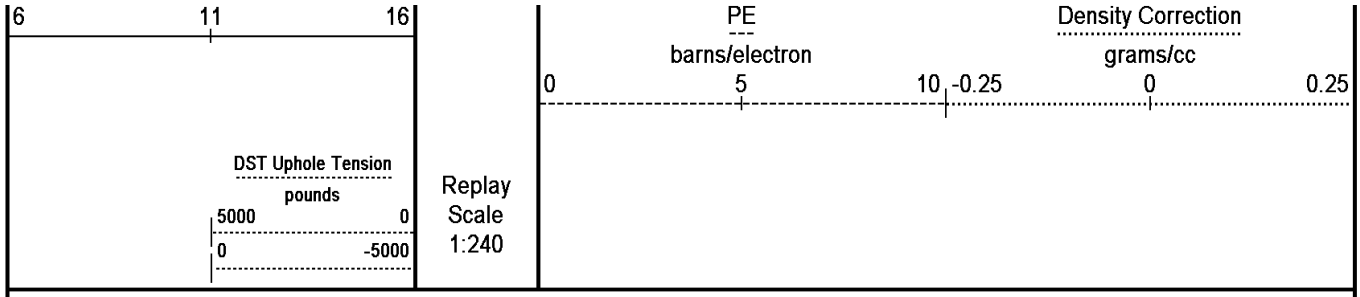
5 Inch Main

Repeat Section

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Density Ne...\SOUTHERN STAR ALDEN #0-5 density.dta — Recorded on 07-NOV-2010 04:18
System Versions: Logged with 10.08.1568 Plotted with 10.08.1568


System Versions: Logged with 10.06.1566 Plotted with 10.06.1566
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0 75 150
150 225 300
Borehole Temp in deg F
Compensated Density
grams/cc
2 2.25 2.50 2.75 3
HVI every 10 cu ft
Limestone Density Por.
percent
30 20 10 0 -10
Density Caliper
inches
6 11 16
Annular Integral every 10 cu ft
Bit Size
inches
6 11 16
PE
barns/electron
0 5 10
Density Correction
grams/cc
-0.25 0 0.25
DST Uphole Tension
pounds
5000 0
0 -5000
Replay Scale 1:240
3314
Casing Shoe
3350
107°
3400


107°
3450
107°
3500
3550
Bit Size
FR Gamma Ray
FR Density Caliper
DST Uphole Tension
FR DST Uphole Tension
Limestone Density Por
PE
Compensated Density
Density Correction
FR Lim
FR Compensated Density
FR Density Correction
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
inches
6
11
16
Bit Size
inches
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Limestone Density Por.
percent
30
20
10
0
-10



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-NOV-2010 05:13
Filename: C:\Minimus 10_8\Plot Presentations\Density Ne...\SOUTHERN STAR ALDEN #0-5 density.dta — Recorded on 07-NOV-2010 04:18
System Versions: Logged with 10.08.1568 Plotted with 10.08.1568

Repeat Section

BEFORE SURVEY CALIBRATION

C:\Minimus 10_8\Plot Presentations\Density Neutron\SOUTHERN STAR ALDEN #0-5 density.dta

General Constants All 000

Last Edited on 07-NOV-2010,03:59

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	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa 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

Neutron Calibration MDN 041

Base Calibration on 13-OCT-2010 12:02
Field Check on 06-NOV-2010 10:12

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3163	98	3714	110
Ratio	32.297		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2080	3027
Ratio	0.687	

Field Check

	Calibrated (cps)	
	2061	3027
Ratio	0.681	

Neutron Constants MDN 041

Last Edited on 06-NOV-2010,14:46

Neutron Source Id	p31124b	
Neutron Jig Number	nj5736	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.08	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

Sonic Constants MSS 126

Last Edited on 06-NOV-2010,14:45

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)

3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Caliper Calibration MPD 061

Base Calibration on 13-OCT-2010 11:11
Field Calibration on 06-NOV-2010 09:52

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19181	4.01
2	29014	5.96
3	39136	7.98
4	49217	9.95
5	59496	11.91
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.98	5.96

Photo Density Calibration MPD 061

Base Calibration on 13-OCT-2010 11:34
Field Check on 06-NOV-2010 10:00

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	41790	18625	59556	30836
Reference 2	16181	1657	24941	2541

Field Check at Base

682.5	840.7

Field Check

686.6	841.9

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	124	608		
Reference 1	16630	41682	0.402	0.371
Reference 2	4501	16101	0.282	0.272

Reference 2	4501	16101	0.282	0.272
Field Check at Base	124.3	608.4		
Field Check	126.0	614.4		

Density Constants MPD 061 — Last Edited on 06-NOV-2010,14:45

Density Source Id	20718b	
Nylon Calibrator Number	dnce695	
Aluminium Calibrator Number	dacd698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.08	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)
2.71	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 10_8\Plot Presentations\Density Neutron\SOUTHERN STAR ALDEN #0-5 density.dta

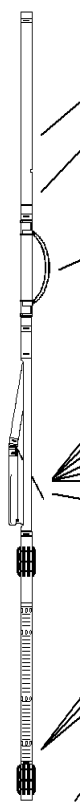
Compact Gamma
MCG 67 Length: 8.70 ft Weight: 63.9 lb

Compact Neutron
MDN 41 Length: 5.04 ft Weight: 50.7 lb

Compact Density/Caliper
MPD 61 Length: 9.59 ft Weight: 90.4 lb

Compact Sonic
MSS 126 Length: 12.52 ft Weight: 72.8 lb

Total Length: 35.85 ft Weight: 277.8 lb



28.42 ft	GRGC - Gamma Ray
25.51 ft	CGXT - MCG External Temperature
21.96 ft	NPRL - Limestone Neutron Por.
13.49 ft	CLDC - Density Caliper
13.49 ft	AVOL - Annular Volume
13.49 ft	HVOL - Hole Volume
12.79 ft	DEN - Compensated Density
12.79 ft	DCOR - Density Correction
12.79 ft	DPRL - Limestone Density Por.
12.73 ft	PDPE - PE
0.00 ft	DT35 - 3-5' Compensated Sonic
0.00 ft	SPRL - Wyllie Lime. Sonic Por.
Tool Zero	(2.28ft from bottom)
-2.28 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

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	3516.00	feet
Elevation Drill Floor	1684.00	feet	Depth Driller	3530.00	feet
Elevation Ground Level	1672.00	feet	Depth Logger	3329.00	feet

Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
LOG