

DGR Dual Gamma Ray
ALD Azimuthal Lithodensity
XCAL Azimuthal Acoustic Caliper

PROPRIETARY

1 : 1200

Country : USA		Field : Posey 6912		Location : Lat: 71° 10' 24.06" North Long: 163° 28' 18.67" West		Well : OCS-Y-2321 BJ001 ST00BP00		Company : Shell Gulf of Mexico Inc.		Rig : Polar Pioneer	
Permanent Datum : Mean Sea Level		Elevation : 0.00 ft		LOG LOCATION		Latitude : 71° 10' 24.06" North Longitude : 163° 28' 18.67" West		Company : Shell Gulf of Mexico Inc.		Rig : Polar Pioneer	
Log Measured From : Drill Floor		76.00 ft Above Permanent Datum		Final UTM Easting = 555,034.550 m Final UTM Northing = 7,897,425.308 m		Well : OCS-Y-2321 BJ001 ST00BP00		Country : USA		API Number : 55-352-00004-00	
Drilling Measured From : Drill Floor		TVD LOG		Other Services CTN, ADR, EWR XBAT, PWD, DDSr MRL-WD		Elev. : N/A		KB : N/A		DF : 76.00 ft GL : N/A WD : 146.00 ft	
Depth Logged : 222.00 ft To 6,795.34 ft		Unit No. : 1		Job No. : AK-XX-0901604700		Date Logged : 30-Jul-15 To 21-Sep-15		Plot Type : Final		Sput Date : 30-Jul-15	
Total Depth MD : 6,800.00 ft		TVD : 6,795.34 ft		Plot Date : 01-Nov-15		Borehole Record (TVD)		Casing Record (TVD)			
Run No.	Size	From	To	Size	Weight	From	To	Weight	From	To	
1	8.500 in	222.00 ft	1,511.97 ft	36,000 in	746.00 lbpf	257.00 ft	375.00 ft				
5	17.500 in	1,511.97 ft	2,962.86 ft	22,000 in	224.00 lbpf	257.00 ft	1,474.97 ft				
6	12.250 in	2,962.86 ft	5,421.17 ft	14,000 in	114.00 lbpf	257.00 ft	2,932.86 ft				
7	8.500 in	5,421.17 ft	6,795.34 ft	9,625 in	53.00 lbpf	2,652.89 ft	5,406.20 ft				

WELL INFORMATION

MWD Run Number	100	600	700		
Date run completed	01-Aug-15	14-Sep-15	22-Sep-15		
Rig Bit Number	1	6	7		
Bit Size (in)	8.500	12.250	8.500		
Tool Nominal OD (in)	6.75	8.000	6.750		
Log Start Depth (TVD, ft)	222.00	2,962.86	5,421.17		
Log End Depth (TVD, ft)	1,511.97	5,421.17	6,795.34		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	30-Jul-15 17:05	12-Sep-15 01:20	20-Sep-15 08:52		
Drill/Wipe End Date and Time	01-Aug-15 11:21	13-Sep-15 16:35	21-Sep-15 23:09		
Min Inc (deg) @ Depth (TVD, ft)	0.00 @ 0.00	0.58 @ 3,074.40	3.42 @ 5,977.80		
Max Inc (deg) @ Depth (TVD, ft)	0.51 @ 320.88	3.70 @ 5,297.46	3.99 @ 6,740.52		
Bit TFA(in2) / Bit Type	0.71 / Tricone	0.99 / PDC	0.55 / PDC		
Flow Rate (gpm)	449.40	828.00	550.00		
Max AV (fpm) / CV (fpm) @ MWD	774.0 / 984.0	239.0 / 357.0	549.0 / 1,000.0		
Fluid Type	Sea Water	Polymer	Polymer		
Density (ppg) / Viscosity (spqt)	8.55 / 27.00	11.40 / 56.00	12.00 / 79.00		
Filtrate CL (ppm)	35,000.00	100,000.00	135,000.00		
pH / Fluid Loss (mptm)	8.50 / 0	9.10 / 4	9.30 / 6		
PV (cP) / YP (lhf2)	17 / 31.00	20 / 27.00	23 / 33.00		
% Solids / % Sand	.01 / .01	16 / 0.5	18 / 0.5		
% Oil / Oil:Water Ratio	0 / 0:100	0 / 0:84	0 / 0:79		
Rm @ Measured Temp (degF)	0.350 @ 35.60	0.080 @ 88.00	0.070 @ 70.00		
Rmf @ Measured Temp (degF)	N/A @ N/A	0.050 @ 88.00	0.060 @ 70.00		
Rmc @ Measured Temp (degF)	N/A @ N/A	0.120 @ 88.00	0.140 @ 70.00		
Max Tool Temp (degF) / Source	42.60 / HCIM	144.94 / HCIM	152.00 / HCIM		

Rm @ Max Tool Temp (degF)	0.3004 @ 42.60	0.0849 @ 144.94	0.0338 @ 152.00	
Lead MWD Engineer	Nick Weeks	Jack Kleinhans	Jack Kleinhans	
Customer Representative	Doug Sloan	Matt Cazalet	Scott Lapiene	

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	HCIM	HCIM	
Software Version	88.58	88.58	88.58	
Sub Serial Number	12272466	11902800	11320539	
Insert Serial Number	14776659	12136690	11752800	
Date and Time Initialized	30-Jul-15 10:14	11-Sep-15 01:12	19-Sep-15 15:17	
Date and Time Read	01-Aug-15 18:48	18-Sep-15 18:26	25-Sep-15 08:40	
ECMB SW Version	N/A	N/A	generic 1.1.1 Linux 2.6.23.1	

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC	
Distance From Bit (ft)	16.80	56.82	48.80	
Software Version	6.33	6.33	6.33	
Sub Serial Number	12510194	12606713	12460872	
Sonde Serial Number	12059421	12059488	11902192	
Sensor ID Number	N/A	N/A	N/A	
Toolface Offset (deg)	0.00	208.54	301.32	

Gamma Ray Sensor Information

Tool Type	DGR	DGR	DGR	
Distance From Bit (ft)	6.67	37.22	38.40	
Recorded Sample Period (sec)	14	10	10	
Software Version	N/A	N/A	N/A	
Sub Serial Number	12519619	11651705	12519617	
Insert/Sonde Serial Number	12464236	12351708	12041832	

Density Sensor Information

Tool Type	ALD	ALD	ALD	
Distance From Bit (ft)	79.17	87.77	113.16	
Recorded Sample Period (sec)	14	10	10	
Software Version	3.13	3.12	3.12	
Sub Serial Number	12522518	12279568	10853150	
Insert Serial Number	12541284	10718012	11496392	
Sensor ID Number	32767	32767	2	
Source Serial Number	46836B	39634B	39364b	
Pin Orientation	Down	Down	Down	
Stabilizer Blade O.D. (in)	8.25	11.90	8.20	
DPA Offset	135.00	45.00	135.00	

XBAT Sensor Information

Tool Type	XBAT	XBAT	XBAT	
Dist from Bit	32.85	130.62	64.79	
Recorded Sample Period	20	15	15	
Electronics Insert SN	11215931	12451413	12465296	
Receiver Insert SN	12267657	12405002	12565577	
Transmitter Insert SN	10603805	12277635	12280476	
Collar SN	12323024	12389351	102064794	
CBM SSProg Version	ssprog 1.0.9-1	ssprog 1.0.9-1	ssprog 1.0.9-1	
CBM Supprt Version	support 1.9.2-1	support 1.9.2-1	support 1.9.2-1	
XBAT Version	xbat 1.2.7-1	xbat 1.2.7-1	xbat 1.2.7-1	

XBAT Caliper ARM Version	122.00	122.00	122.00		
TCM Version	20.08	20.08	20.08		
QXCB DSP Version	52.00	52.00	52.00		
QXDAQ ARM Version	142.00	142.00	121.00		
DAQ DSP Version	53.00	53.00	53.00		
Sequence File Version	120829	131212	131212		
Sequence Selected	13:M9_D5_Q5	8:M9_D9_D4	8:M9_D9_D4		

REMARKS

1. ALL DEPTHS ARE MEASURED DEPTHS (MD), UNLESS OTHERWISE NOTED. THESE DEPTHS ARE BIT DEPTHS AND ARE CALLIBRATED TO THE DRILLERS PIPE TALLY. NO DEPTH CORRECTIONS HAVE BEEN MADE FOR PIPE STRETCH OR COMPRESSION.
2. ALL VERTICAL DEPTHS ARE TRUE VERTICAL DEPTHS (TVD), UNLESS OTHERWISE NOTED. ONLY INVERTED / REVERTED SECTIONS GREATER THAN 30' TVD ARE PRESENTED
3. ALL DATA PRESENTED IS RECORDED DATA UNLESS OTHERWISE STATED.
4. LWD RUN 1 WAS COMPRISED OF DIRECTIONAL, DUAL GAMMA RAY (DGR) UTILIZING GEIGER-MUELLER TUBE TYPE DETECTORS, AZIMUTHAL DEEP ELECTROMAGNETIC WAVE RESISTIVITY (ADR), PRESSURE WHILE DRILLING (PWD) DRILLSTRING DYNAMICS SENSOR (DDSr), AZIMUTHAL LITHODENSITY (ALD), COMPENSATED THERMAL NEUTRON (CTN), MAGNETIC RESONANCE WHILE DRILLING (MRIL-WD), AZIMUTHAL BIMODAL ACOUSTIC TOOL (XBAT), AND THE AZIMUTHAL ACOUSTIC CALIPER TOOL (XCAL).
5. RUN 200 WAS A 36" HOLE OPENING RUN, RUN 300 WAS A 42" HOLE OPENING RUN, RUN 400 WAS A CLEANOUT RUN TO DRILL OUT THE SHOE TRACK AND 30' OF NEW FORMATION. NO LWD SENSORS WERE UTILIZED. THEREFOR THEY ARE NOT PRESENTED.
6. MWD RUN 500 WAS A 17.5" DRILLING RUN UTILIZING DIRECTIONAL AND PWD. NO LOGGING SENSORS WERE PRESENT, ONLY ROP IS PRESENTED.
7. LWD RUN 6 WAS COMPRISED OF DIRECTIONAL, DUAL GAMMA RAY (DGR) UTILIZING GEIGER-MUELLER TUBE TYPE DETECTORS, ELECTROMAGNETIC WAVE RESISTIVITY PHASE 4 (EWR-P4), PRESSURE WHILE DRILLING (PWD) DRILLSTRING DYNAMICS SENSOR (DDSr), AZIMUTHAL LITHODENSITY (ALD), COMPENSATED THERMAL NEUTRON (CTN), AZIMUTHAL BIMODAL ACOUSTIC TOOL (XBAT), AND THE AZIMUTHAL ACOUSTIC CALIPER TOOL (XCAL).
8. LWD RUN 7 WAS COMPRISED OF DIRECTIONAL, DUAL GAMMA RAY (DGR) UTILIZING GEIGER-MUELLER TUBE TYPE DETECTORS, AZIMUTHAL DEEP ELECTROMAGNETIC WAVE RESISTIVITY (ADR), PRESSURE WHILE DRILLING (PWD) DRILLSTRING DYNAMICS SENSOR (DDSr), AZIMUTHAL LITHODENSITY (ALD), COMPENSATED THERMAL NEUTRON (CTN), MAGNETIC RESONANCE WHILE DRILLING (MRIL-WD), AZIMUTHAL BIMODAL ACOUSTIC TOOL (XBAT), AND THE AZIMUTHAL ACOUSTIC CALIPER TOOL (XCAL).
9. OVER THE COURSE OF THE 12.25" HOLE SECTION THERE ARE SEVERAL INSTANCES WHERE THE BOREHOLE RUGOSITY HAS CREATED "SPIKES" IN THE RESISTIVITY DATA. THIS IS DUE TO ONE RECIEVER READING THE HIGH SALINITY BOREHOLE FLUID (WASHOUT) AND THE OTHER READING THE FORMATION. THERE ARE ALSO AREAS ACROSS THE LOGGED INTERVAL THAT SHOW AN UNDERGAUGE HOLE.
10. LWD RUN 100 XBAT WAS SETUP TO FIRE 3 DIFFERENT ACTIVATIONS. ACTIVATION 1 WAS A 9KHz MONOPOLE FIRING, ACTIVATION 2 WAS A 5KHz DIPOLE FIRING, AND ACTIVATION 3 WAS A 5KHz QUADRAPOLE. THE XCAL WAS SAMPLED BEFORE AND AFTER EACH OF THESE ACTIVATIONS.
11. REGARDING THE LWD RUN 100 XCAL LOG, THIS HOLE SECTION WAS DRILLED RISERLESS, THERE WAS NOT A POINT AT WHICH THE XCAL COULD HAVE BEEN QUANTITATIVLY CALIBRATED. CALIBRATION IS PERFORMED INSIDE CASING PRIOR TO DRILLING AHEAD, AND POST RUN AS A SECONDARY VERIFICATION THAT THE MUD SYSTEM PROPERTIES HAVE NOT CHANGED. AS SUCH, A QUALITATIVE CALIBRATION HAS BEEN MADE OVER SEVERAL SECTIONS OF THE LOG WHERE THERE IS LITTLE CHANGE INFORMATION PROPERTIES. ALD HSI HAS BEEN USED AS A SECONDARY VERIFICATION TO MAKE SURE THE CALIBRATION IS REASONABLE. A FLUID VELOCITY OF 220μSECS/FT HAS BEEN USED IN THE XCAL PROCESSING OF THIS HOLE SECTION.
12. LWD RUN 600 XBAT WAS SETUP TO FIRE 3 DIFFERENT ACTIVATIONS. ACTIVATION 1 WAS A 9KHz MONOPOLE FIRING, ACTIVATION 2 WAS A 9KHz DIPOLE FIRING, AND ACTIVATION 3 WAS A 4KHz DIPOLE. THE XCAL WAS SAMPLED BEFORE

AND AFTER EACH OF THESE ACTIVATIONS. A CASING CALIBRATION WAS PERFORMED AND A FLUID VELOCITY OF 191μSECS/FT HAS BEEN USED IN THE XCAL PROCESSING OF THIS HOLE SECTION.

13. LWD RUN 700 XBAT WAS SETUP TO FIRE 3 DIFFERENT ACTIVATIONS. ACTIVATION 1 WAS A 9KHz MONOPOLE FIRING, ACTIVATION 2 WAS A 9KHz DIPOLE FIRING, AND ACTIVATION 3 WAS A 4KHz DIPOLE. THE XCAL WAS SAMPLED BEFORE AND AFTER EACH OF THESE ACTIVATIONS. A CASING CALIBRATION WAS PERFORMED AND A FLUID VELOCITY OF 209μSECS/FT HAS BEEN USED IN THE XCAL PROCESSING OF THIS HOLE SECTION.

14. ALL XCAL WAVEFORMS WERE SAMPLED AT 0.32μSECS INTERVALS.

15. RUNS 1- 7 REPRESENT THE OCS-Y-2321 BJ001 ST00BP00 WELL WITH AN API# OF 55-352-00004-00. THIS WELL REACHED A TOTAL DEPTH OF 6,800'MD / 6,795'TVD

MNEMONICS	CURVE DESCRIPTION
ROPA	AVERAGE RATE OF PENETRATION
DGRCC	DGR COMBINED GAMMA RAY BC
ARH16PC	ADR AVERAGE 2mhz 16" PHASE RESISTIVITY BC
ARH32PC	ADR AVERAGE 2mhz 32" PHASE RESISTIVITY BC
ARH48PC	ADR AVERAGE 2mhz 48" PHASE RESISTIVITY BC
R09PC	EWR AVERAGE 2mhz 09" PHASE RESISTIVITY BC
R15PC	EWR AVERAGE 2mhz 15" PHASE RESISTIVITY BC
R27PC	EWR AVERAGE 2mhz 27" PHASE RESISTIVITY BC
R39PC	EWR AVERAGE 2mhz 39" PHASE RESISTIVITY BC
ADXT	ADR FORMATION EXPOSURE TIME
EWXT	EWR FORMATION EXPOSURE TIME
TNPS	CTN NEUTRON POROSITY - SANDSTONE
ALCDLC	ALD LOW COUNT RATE BIN DENSITY
ALDCLC	ALD LOW COUNT RATE BIN STAND OFF CORRECTION
ALPELC	ALD LOW COUNT RATE BIN PHOTOELECTRIC FACTOR
XBEDA	XCAL EQUIVALENT HOLE DIAMETER
XBVPVS	XBAT VP/Vs RATIO
XBCS	XBAT COMPRESSIONAL SLOWNESS
XBCSS	XBAT COMBINED SHEAR SLOWNESS
XBDFX	XBAT DIPOLE FLEXURAL SLOWNESS
XBSFLAG	XBAT SHEAR FLAG

PARAMETERS USED IN LOG PROCESSING:

HOLE SIZE:	FIXED @ 8.50" AND 12.25"
MUD WEIGHT:	8.6 – 12.0 PPG
WHOLE MUD CHLORIDES:	18,000 PPM Cl- R100, 100,000-125,000 PPM Cl-
FORMATION WATER SALINITY:	21,200 PPM Cl-
FLUID DENSITY:	1.0 g/cc
MATRIX DENSITY:	2.65 g/cc
LITHOLOGY:	SANDSTONE

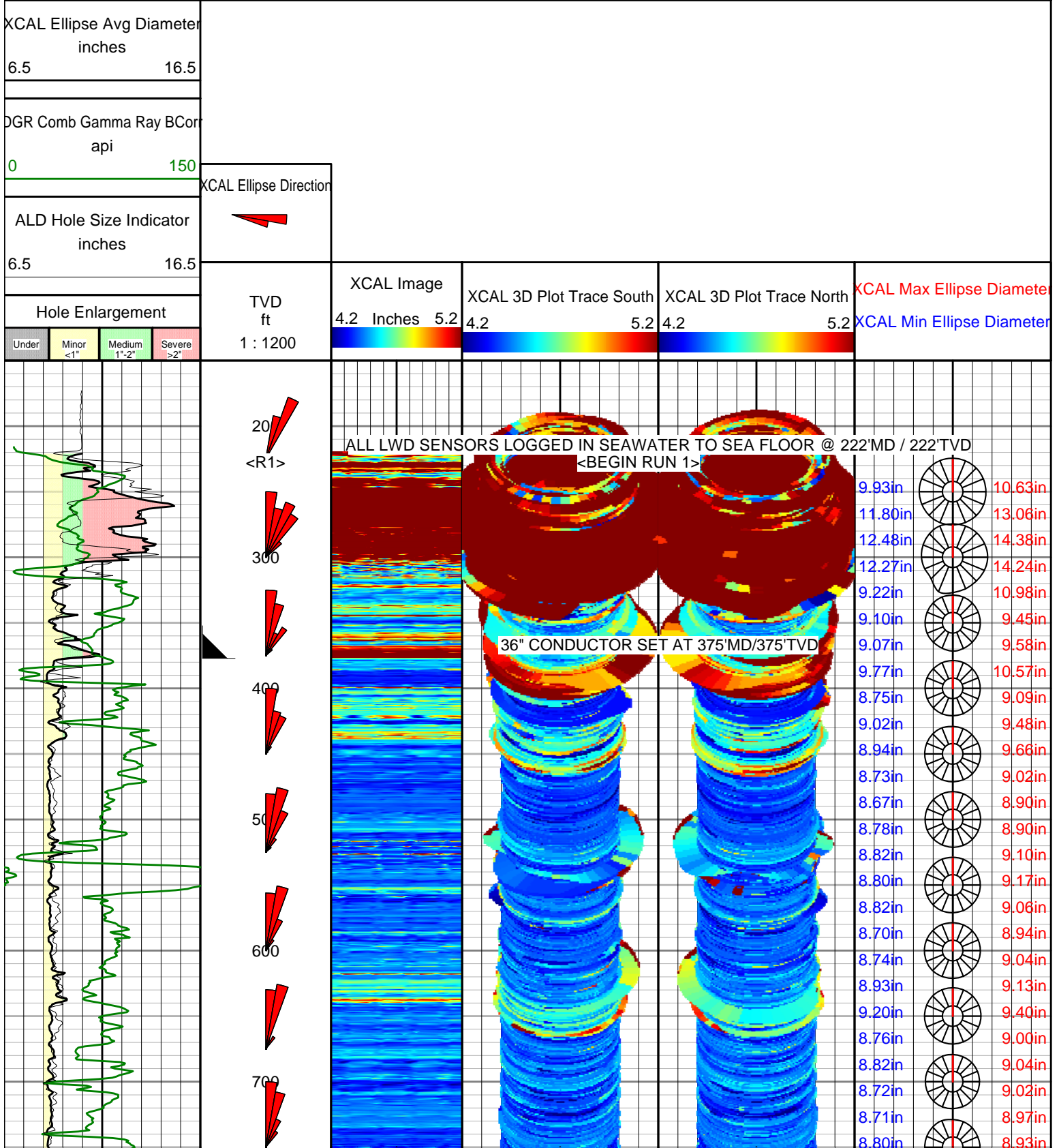
ALL 1:1200 DATA CURVES ARE PRESENTED AT A STEP OF 1.0', AND SMOOTHED OVER A 3.0' WINDOW. GAP FILL IS SET TO 5'. ALL 1:240 DATA CURVES ARE PRESENTED AT A STEP OF 0.5 FT, WITH A WINDOW OF 0.6FT EXCEPT THE ACOUSTIC CURVES, THEY ARE SMOOTHED TO A STEP OF 0.5 WITH A 1.2FT WINDOW. GAP FILL IS SET TO 3FT FOR ALL CURVES.

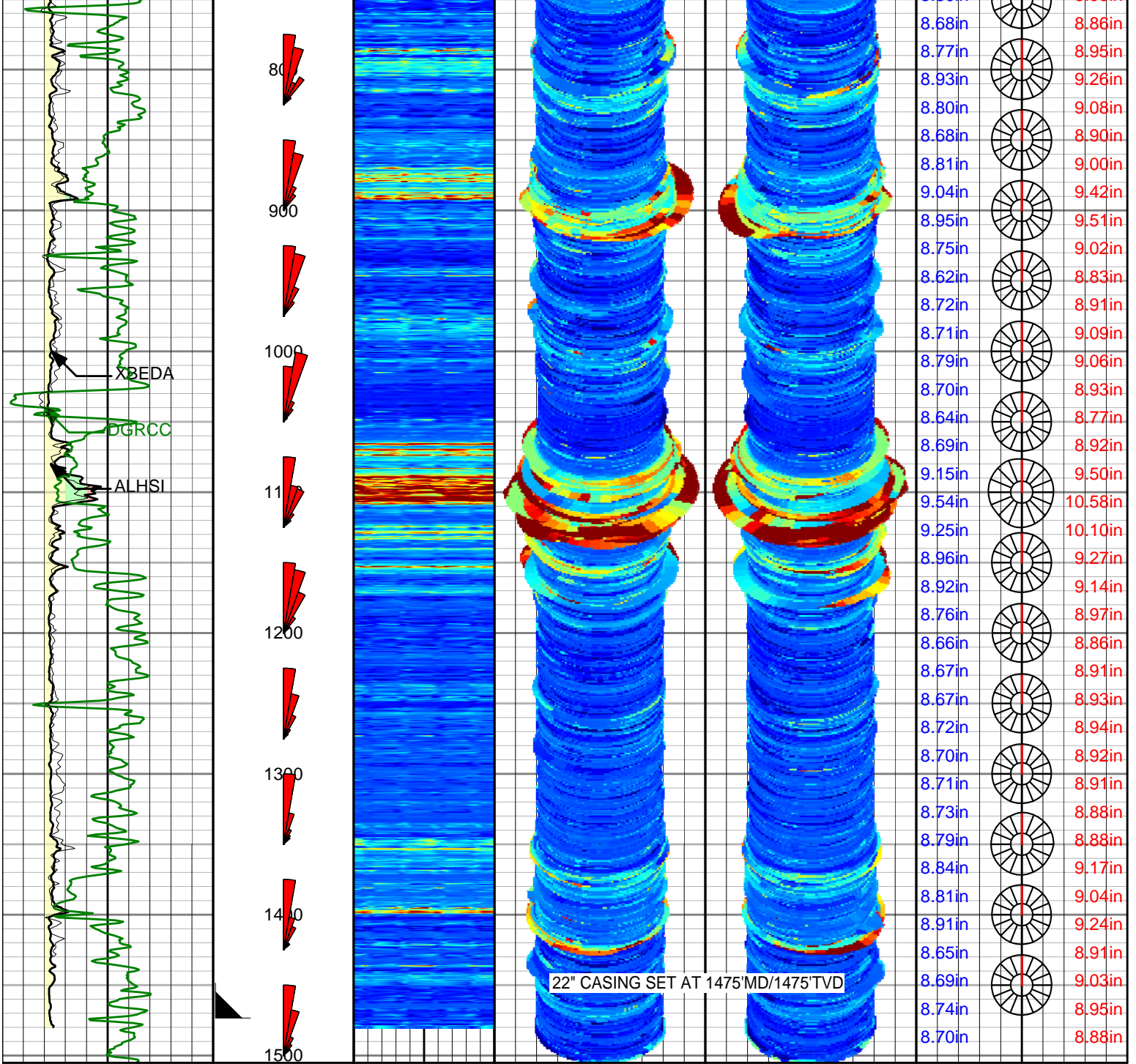
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LWD R100 - 8.50" PILOT HOLE

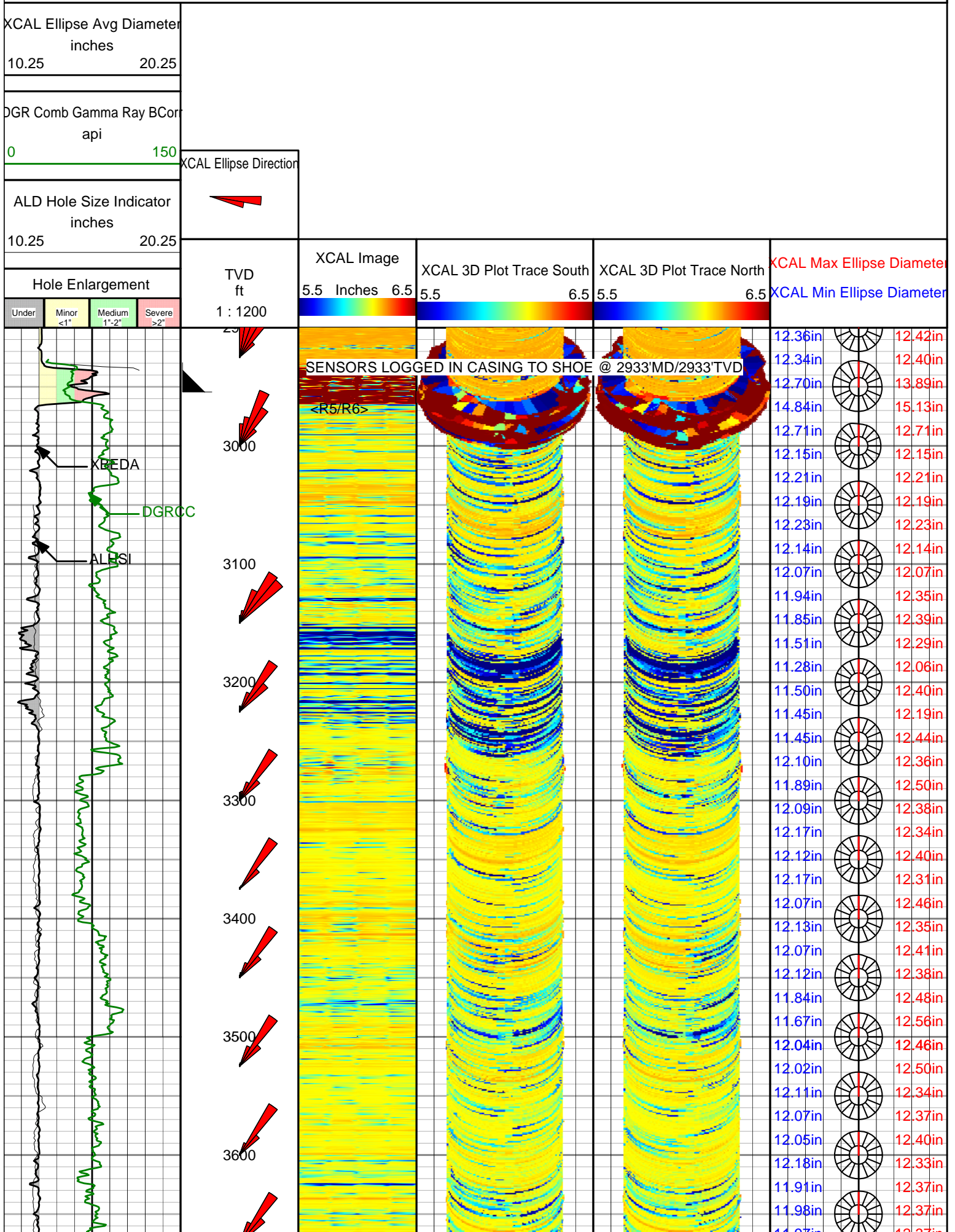


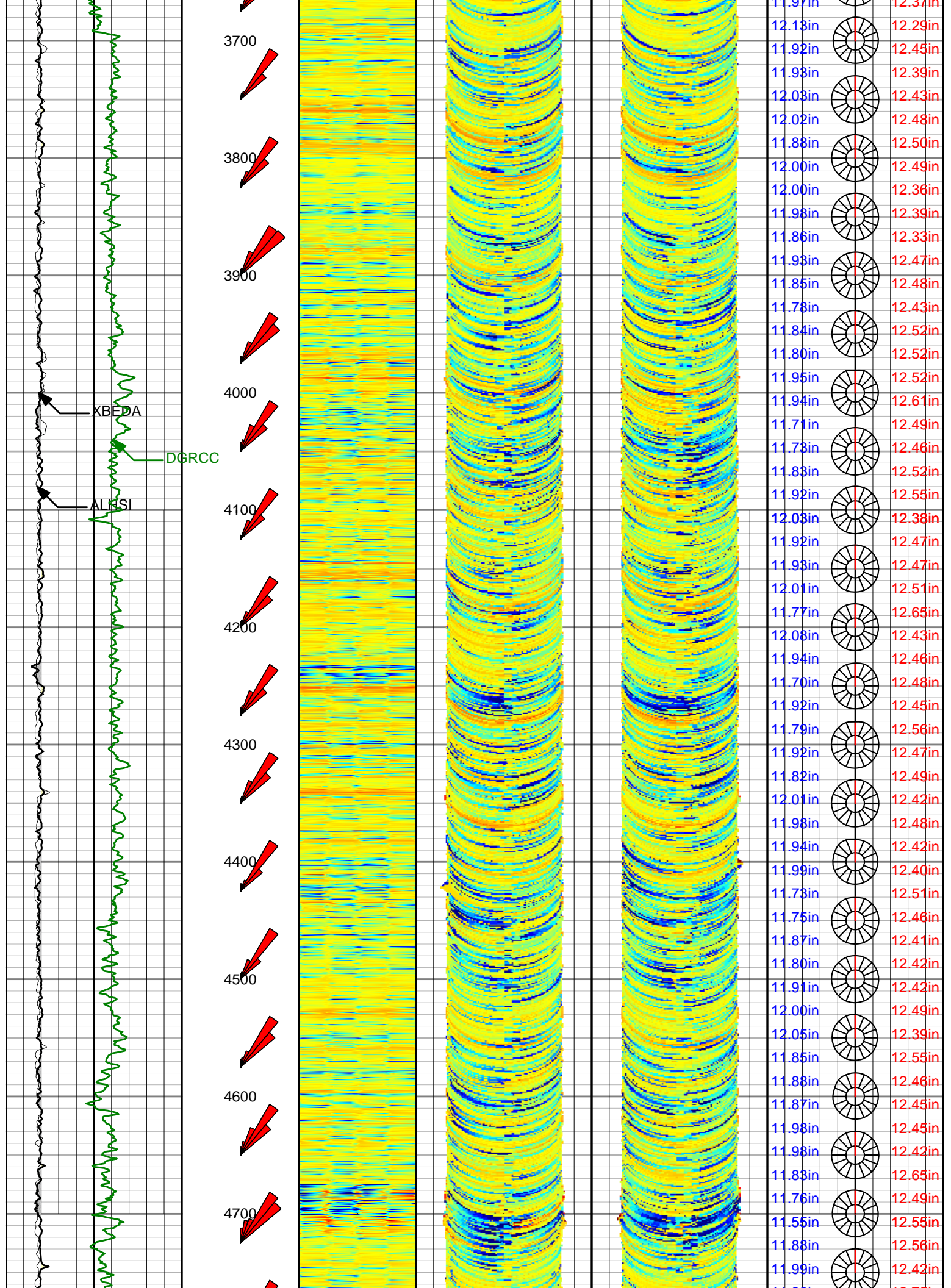


Hole Enlargement		TVD ft 1 : 1200	XCAL Image	XCAL 3D Plot Trace South	XCAL 3D Plot Trace North	XCAL Max Ellipse Diameter
Under	Minor <1"		4.2 Inches	4.2	4.2	XCAL Min Ellipse Diameter
ALD Hole Size Indicator inches		XCAL Ellipse Direction 	5.2	5.2	5.2	
6.5	16.5					
DGR Comb Gamma Ray BC api						
0						
150						
XCAL Ellipse Avg Diameter inches						
6.5						
16.5						

LWD BCOO 12 25" HOLE SECTION

LWD R600 - 12.25 HOLE SECTION





api

0 150

XCAL Ellipse Direction

ALD Hole Size Indicator
inches

6.5 16.5



Hole Enlargement

Under Minor <1" Medium 1"-2" Severe >2"

TVD
ft
1 : 1200

XCAL Image

4 Inches 4.5

XCAL 3D Plot Trace South

4 4.5

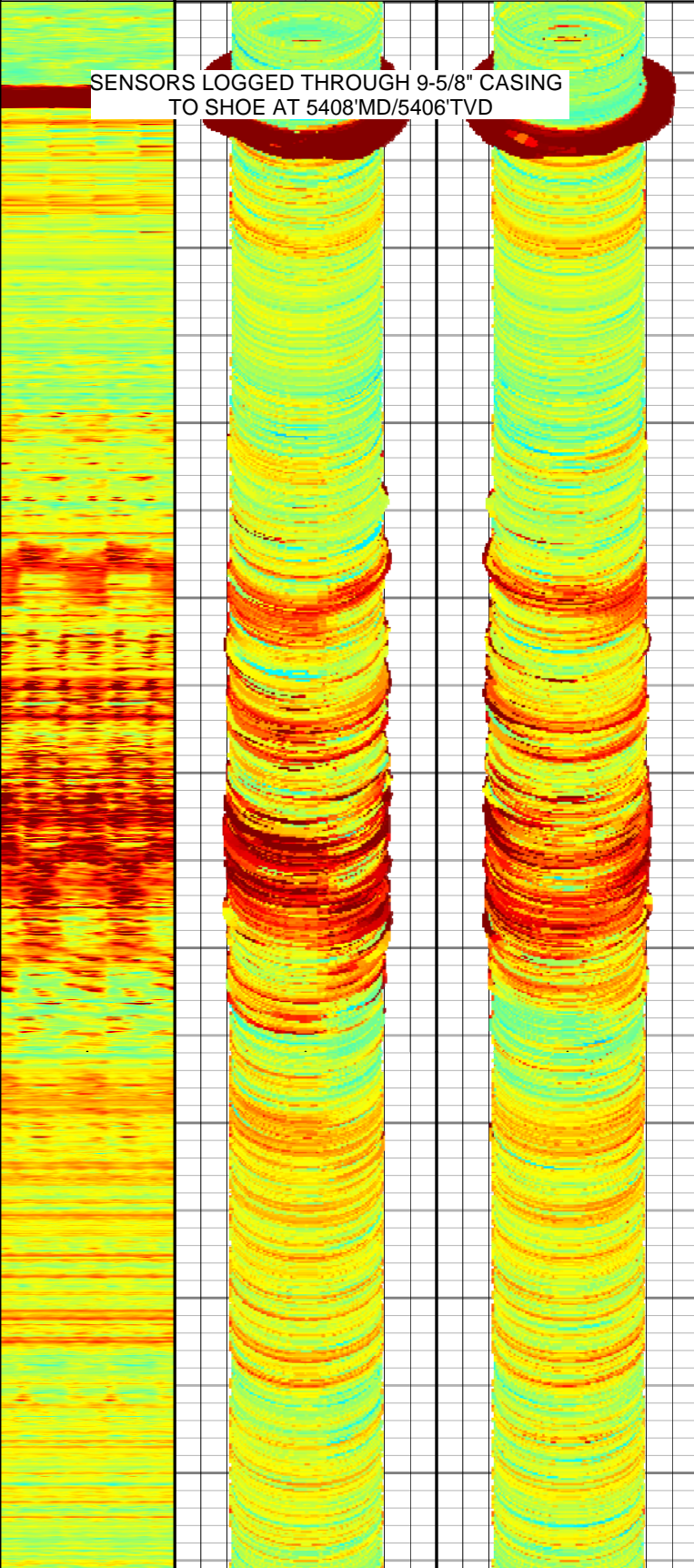
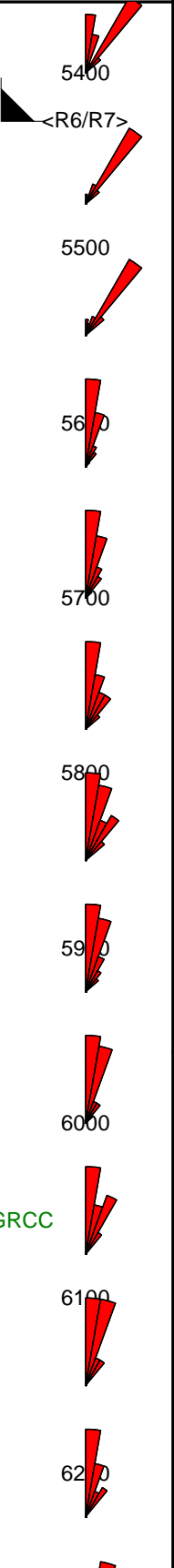
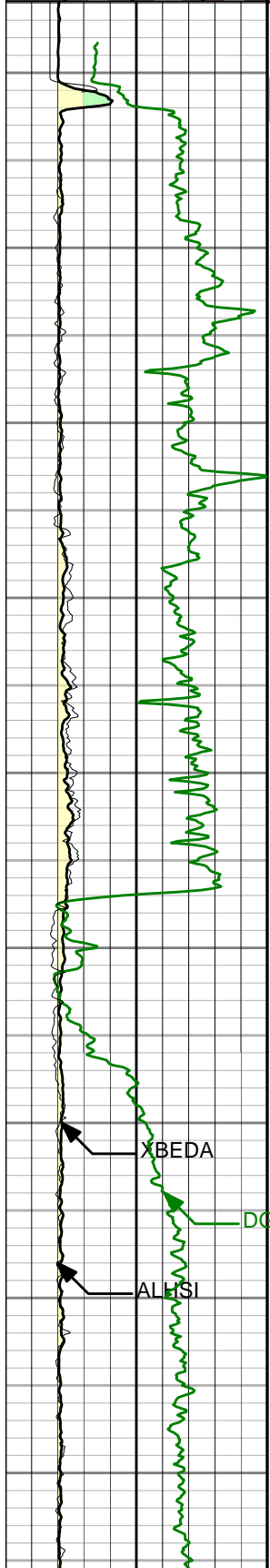
XCAL 3D Plot Trace North

4 4.5

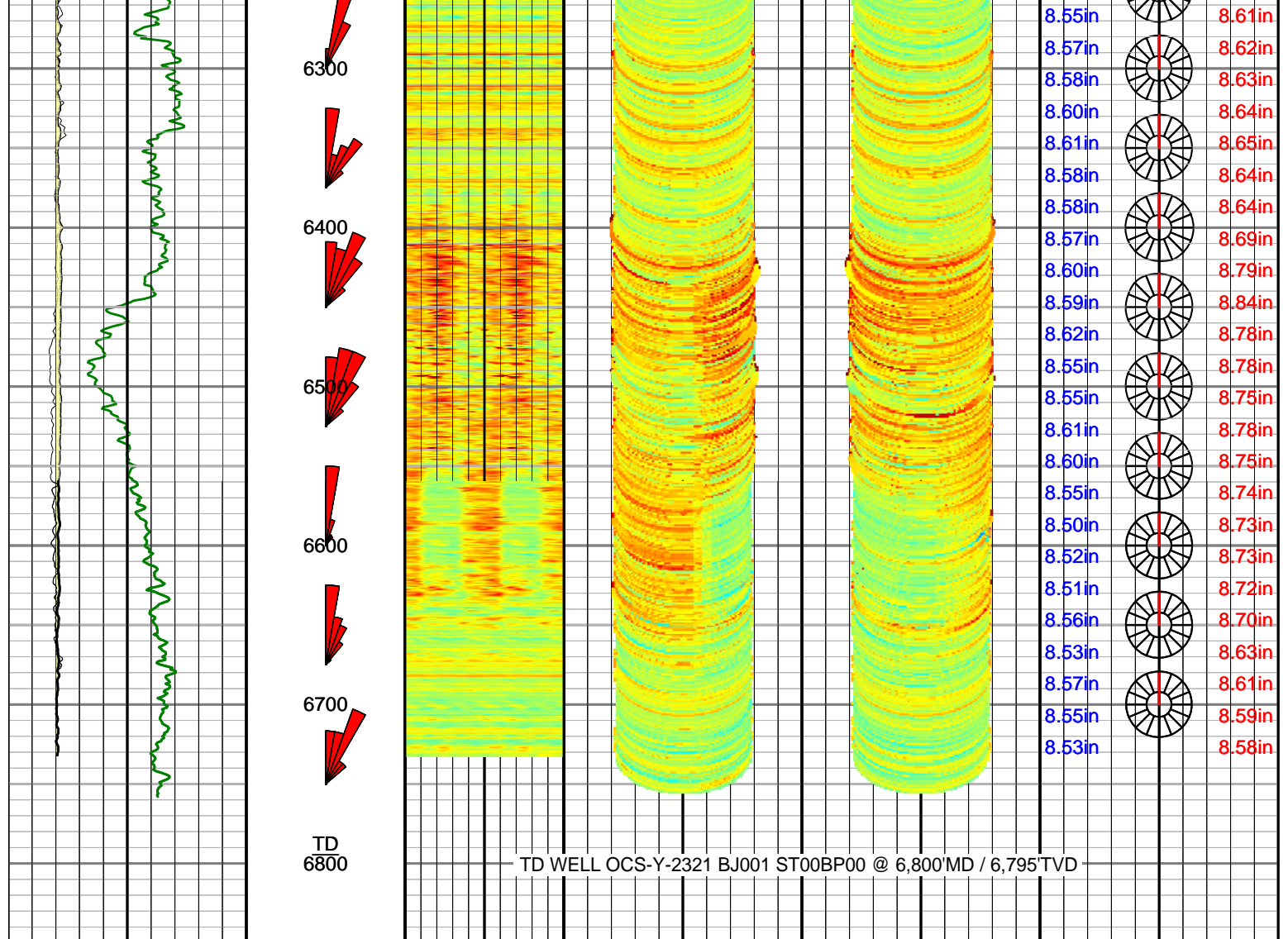
XCAL Max Ellipse Diameter


XCAL Min Ellipse Diameter

SENSORS LOGGED THROUGH 9-5/8" CASING TO SHOE AT 5408'MD/5406'TVD



Depth (ft)	XCAL Max Ellipse Diameter (in)	XCAL Min Ellipse Diameter (in)
5400	8.50in	8.59in
5410	8.50in	8.59in
5420	8.49in	8.57in
5430	9.21in	9.84in
5440	8.50in	8.73in
5450	8.50in	8.73in
5460	8.56in	8.75in
5470	8.50in	8.67in
5480	8.54in	8.60in
5490	8.54in	8.59in
5500	8.54in	8.58in
5510	8.53in	8.60in
5520	8.53in	8.62in
5530	8.57in	8.65in
5540	8.55in	8.63in
5550	8.56in	8.65in
5560	8.62in	8.81in
5570	8.66in	8.85in
5580	8.59in	8.72in
5590	8.61in	8.83in
5600	8.70in	8.94in
5610	8.67in	8.86in
5620	8.64in	8.93in
5630	8.75in	9.04in
5640	8.79in	9.12in
5650	8.75in	9.08in
5660	8.69in	8.97in
5670	8.56in	8.86in
5680	8.59in	8.79in
5690	8.49in	8.68in
5700	8.52in	8.67in
5710	8.60in	8.67in
5720	8.65in	8.72in
5730	8.60in	8.67in
5740	8.63in	8.68in
5750	8.62in	8.65in
5760	8.61in	8.66in
5770	8.60in	8.63in
5780	8.63in	8.67in
5790	8.59in	8.64in
5800	8.54in	8.63in
5810	8.57in	8.65in
5820	8.59in	8.65in
5830	8.58in	8.64in
5840	8.55in	8.59in



Hole Enlargement Under Minor <1" Medium 1"-2" Severe >2"		TVD ft 1 : 1200	XCAL Image 4 Inches 4.5	XCAL 3D Plot Trace South 4 4.5	XCAL 3D Plot Trace North 4 4.5	XCAL Max Ellipse Diameter
ALD Hole Size Indicator inches 6.5 16.5			XCAL Ellipse Direction 	XCAL Min Ellipse Diameter		
DGR Comb Gamma Ray BCorr api 0 150						
XCAL Ellipse Avg Diameter inches 6.5 16.5						

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Shell Gulf of Mexico Inc.
 OCS-Y-2321 BJ001 ST00BP00
 Posey 6912
 Alaska
 USA

AK-XX-0901604700
 Final Survey is projected to well TD

<i>Measured Depth (feet)</i>	<i>Inclination (degrees)</i>	<i>Direction (degrees)</i>	<i>Vertical Depth (feet)</i>	<i>Latitude (feet)</i>	<i>Departure (feet)</i>	<i>Vertical Section (feet)</i>	<i>Dogleg (deg/100ft)</i>
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
220.00	0.00	0.00	220.00	0.00 N	0.00 E	0.00	0.00
320.88	0.51	129.60	320.88	0.29 S	0.35 E	-0.29	0.50
406.77	0.31	89.93	406.76	0.53 S	0.88 E	-0.53	0.39
495.25	0.99	122.22	495.24	0.93 S	1.76 E	-0.93	0.84
590.43	0.31	82.72	590.41	1.34 S	2.71 E	-1.34	0.81
684.05	0.64	327.24	684.03	0.87 S	2.68 E	-0.87	0.88
866.10	0.28	101.20	866.08	0.09 S	2.55 E	-0.09	0.47
957.99	0.00	269.46	957.97	0.13 S	2.77 E	-0.13	0.30
1051.65	0.14	176.72	1051.63	0.24 S	2.78 E	-0.24	0.15
1144.54	0.26	120.65	1144.52	0.46 S	2.97 E	-0.46	0.23
1235.66	0.41	134.11	1235.63	0.80 S	3.38 E	-0.80	0.19
1328.60	0.51	59.75	1328.58	0.83 S	3.98 E	-0.83	0.61
1378.50	0.25	111.62	1378.48	0.76 S	4.27 E	-0.76	0.81
1540.18	0.12	50.83	1540.15	0.78 S	4.74 E	-0.78	0.14
1723.74	0.39	34.99	1723.71	0.14 S	5.26 E	-0.14	0.15
1818.58	0.58	50.01	1818.55	0.43 N	5.81 E	0.43	0.24
2003.18	1.06	39.81	2003.12	2.35 N	7.62 E	2.35	0.27
2095.93	0.87	35.51	2095.87	3.57 N	8.57 E	3.57	0.22
2186.15	0.69	72.12	2186.07	4.30 N	9.49 E	4.30	0.57
2373.34	0.75	76.36	2373.25	4.93 N	11.76 E	4.93	0.04
2463.93	0.78	75.65	2463.83	5.23 N	12.93 E	5.23	0.03
2555.30	0.79	70.25	2555.19	5.59 N	14.13 E	5.59	0.08
2646.22	0.79	76.51	2646.11	5.95 N	15.33 E	5.95	0.10
2743.03	0.70	74.08	2742.91	6.27 N	16.55 E	6.27	0.10
2837.42	0.74	67.59	2837.29	6.66 N	17.68 E	6.66	0.10
2875.38	0.64	69.95	2875.25	6.83 N	18.10 E	6.83	0.27
2978.31	0.74	64.69	2978.17	7.31 N	19.25 E	7.31	0.11
3074.55	0.58	52.33	3074.40	7.88 N	20.20 E	7.88	0.22
3169.04	0.67	47.05	3168.89	8.55 N	20.99 E	8.55	0.11
3258.93	0.77	27.36	3258.77	9.44 N	21.65 E	9.44	0.30
3351.80	0.94	33.05	3351.63	10.64 N	22.35 E	10.64	0.21
3445.40	0.89	33.34	3445.22	11.90 N	23.18 E	11.90	0.06
3537.90	0.88	39.68	3537.71	13.05 N	24.03 E	13.05	0.11
3630.29	0.86	29.57	3630.09	14.20 N	24.82 E	14.20	0.17
3724.13	1.05	46.97	3723.91	15.40 N	25.80 E	15.40	0.37
3815.47	1.16	37.46	3815.23	16.71 N	26.98 E	16.71	0.24
3909.95	1.11	27.77	3909.70	18.28 N	27.99 E	18.28	0.21
4001.96	1.54	18.87	4001.69	20.24 N	28.80 E	20.24	0.52
4095.18	1.55	21.22	4094.87	22.60 N	29.67 E	22.60	0.07
4189.17	1.52	19.27	4188.83	24.97 N	30.54 E	24.97	0.06
4280.67	1.73	13.84	4280.29	27.46 N	31.27 E	27.46	0.28
4373.26	2.11	22.24	4372.83	30.39 N	32.25 E	30.39	0.51
4465.71	1.69	19.56	4465.23	33.26 N	33.35 E	33.26	0.46
4559.04	2.02	19.56	4558.51	36.11 N	34.37 E	36.11	0.35
4651.17	2.19	23.91	4650.58	39.24 N	35.62 E	39.24	0.25
4743.27	2.64	25.07	4742.59	42.77 N	37.23 E	42.77	0.49
4836.87	3.09	32.03	4836.08	46.87 N	39.49 E	46.87	0.61
4929.20	3.15	34.87	4928.26	51.06 N	42.26 E	51.06	0.18
5021.52	3.28	37.85	5020.45	55.22 N	45.33 E	55.22	0.23
5113.59	3.34	39.69	5112.36	59.37 N	48.66 E	59.37	0.13
5206.14	3.59	47.76	5204.74	63.39 N	52.52 E	63.39	0.59
5299.05	3.70	48.27	5297.46	67.34 N	56.92 E	67.34	0.12
5364.19	3.45	52.11	5362.48	69.95 N	60.04 E	69.95	0.54
5429.81	3.65	46.91	5427.97	72.59 N	63.12 E	72.59	0.58
5518.31	3.73	45.18	5516.29	76.55 N	67.22 E	76.55	0.15
5612.70	3.58	42.26	5610.48	80.90 N	71.39 E	80.90	0.25
5704.09	3.56	42.97	5701.70	85.09 N	75.24 E	85.09	0.06
5795.19	3.47	41.51	5792.62	89.22 N	79.00 E	89.22	0.13
5889.32	3.48	42.48	5886.58	93.46 N	82.82 E	93.46	0.06
5980.70	3.42	42.67	5977.80	97.52 N	86.54 E	97.52	0.07
6075.07	3.43	41.69	6072.00	101.69 N	90.33 E	101.69	0.06
6167.81	3.55	39.12	6164.57	105.99 N	93.98 E	105.99	0.21
6259.59	3.53	39.52	6256.17	110.37 N	97.57 E	110.37	0.03
6346.61	3.75	37.26	6343.02	114.70 N	100.99 E	114.70	0.30
6445.34	3.99	34.54	6441.52	120.10 N	104.89 E	120.10	0.31
6536.48	3.96	35.37	6532.44	125.27 N	108.51 E	125.27	0.07
6628.62	3.92	37.04	6624.27	129.22 N	112.05 E	129.22	0.12
6720.76	3.88	38.71	6716.10	133.17 N	115.59 E	133.17	0.17
6812.90	3.84	40.38	6807.93	137.12 N	119.13 E	137.12	0.22
6905.04	3.80	42.05	6899.76	141.07 N	122.67 E	141.07	0.27
7000.00	3.76	43.72	6991.59	145.02 N	126.21 E	145.02	0.32
7100.00	3.72	45.39	7083.42	148.97 N	129.75 E	148.97	0.37
7200.00	3.68	47.06	7175.25	152.92 N	133.29 E	152.92	0.42
7300.00	3.64	48.73	7267.08	156.87 N	136.83 E	156.87	0.47
7400.00	3.60	50.40	7358.91	160.82 N	140.37 E	160.82	0.52
7500.00	3.56	52.07	7450.74	164.77 N	143.91 E	164.77	0.57
7600.00	3.52	53.74	7542.57	168.72 N	147.45 E	168.72	0.62
7700.00	3.48	55.41	7634.40	172.67 N	150.99 E	172.67	0.67
7800.00	3.44	57.08	7726.23	176.62 N	154.53 E	176.62	0.72
7900.00	3.40	58.75	7818.06	180.57 N	158.07 E	180.57	0.77
8000.00	3.36	60.42	7909.89	184.52 N	161.61 E	184.52	0.82
8100.00	3.32	62.09	8001.72	188.47 N	165.15 E	188.47	0.87
8200.00	3.28	63.76	8093.55	192.42 N	168.69 E	192.42	0.92
8300.00	3.24	65.43	8185.38	196.37 N	172.23 E	196.37	0.97
8400.00	3.20	67.10	8277.21	200.32 N	175.77 E	200.32	1.02
8500.00	3.16	68.77	8369.04	204.27 N	179.31 E	204.27	1.07
8600.00	3.12	70.44	8460.87	208.22 N	182.85 E	208.22	1.12
8700.00	3.08	72.11	8552.70	212.17 N	186.39 E	212.17	1.17
8800.00	3.04	73.78	8644.53	216.12 N	189.93 E	216.12	1.22
8900.00	3.00	75.45	8736.36	220.07 N	193.47 E	220.07	1.27
9000.00	2.96	77.12	8828.19	224.02 N	197.01 E	224.02	1.32
9100.00	2.92	78.79	8919.02	227.97 N	200.55 E	227.97	1.37
9200.00	2.88	80.46	9010.85	231.92 N	204.09 E	231.92	1.42
9300.00	2.84	82.13	9102.68	235.87 N	207.63 E	235.87	1.47
9400.00	2.80	83.80	9194.51	239.82 N	211.17 E	239.82	1.52
9500.00	2.76	85.47	9286.34	243.77 N	214.71 E	243.77	1.57
9600.00	2.72	87.14	9378.17	247.72 N	218.25 E	247.72	1.62
9700.00	2.68	88.81	9469.00	251.67 N	221.79 E	251.67	1.67
9800.00	2.64	90.48	9560.83	255.62 N	225.33 E	255.62	1.72
9900.00	2.60	92.15	9652.66	259.57 N	228.87 E	259.57	1.77
10000.00	2.56	93.82	9744.49	263.52 N	232.41 E	263.52	1.82

6628.63	3.92	37.01	6624.37	130.38 N	112.25 E	130.38	0.13
6721.62	3.89	35.41	6717.15	135.49 N	115.99 E	135.49	0.12
6745.05	3.99	35.86	6740.52	136.80 N	116.93 E	136.80	0.46
6800.00	3.99	35.86	6795.34	139.90 N	119.17 E	139.90	0.00

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 0.00 DEGREES (GRID)
A TOTAL CORRECTION OF 10.95 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6800.00 FEET
IS 183.78 FEET ALONG 40.42 DEGREES (GRID)**

**Map System: NAD 83 UTM Zones
Geo Datum: North American Datum of 1983
Map Zone: Universal Transverse Mercator Zone 03N**

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