

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_HOWARD 20-29 PAD

Howard 9-29

Howard 9-29

Plan: Howard 9-29 (wp02)

Standard Planning Report

18 May, 2011



Project: COLORADO NORTHERN ZONE - 83
 Site: WELD_HOWARD 20-29 PAD
 Well: Howard 9-29
 Wellbore: Howard 9-29
 Section:
 SHL:
 Design: Howard 9-29 (wp02)
 Latitude: 40.017839
 Longitude: -104.909547
 GL: 5023.00
 KB: 15' RKB + 5023' GL @ 5038.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3888.00	3999.87	PK Depth
4838.00	4963.53	SX Depth
7356.00	7481.53	NIO Depth
7775.00	7900.53	CD Depth
7854.00	7979.53	GH Depth
8208.00	8333.53	J Depth



Azimuths to True North
 Magnetic North: 8.92°

Magnetic Field
 Strength: 52924.0snT
 Dip Angle: 66.72°
 Date: 5/6/2011
 Model: IGRF2010

WELL DETAILS: Howard 9-29

+N/-S	+E/-W	Northing	Ground Level: Easting	5023.00 Latitude	Longitude	Slot
0.00	0.00	1249895.68	3165373.04	40.017839	-104.909547	

CASING DETAILS

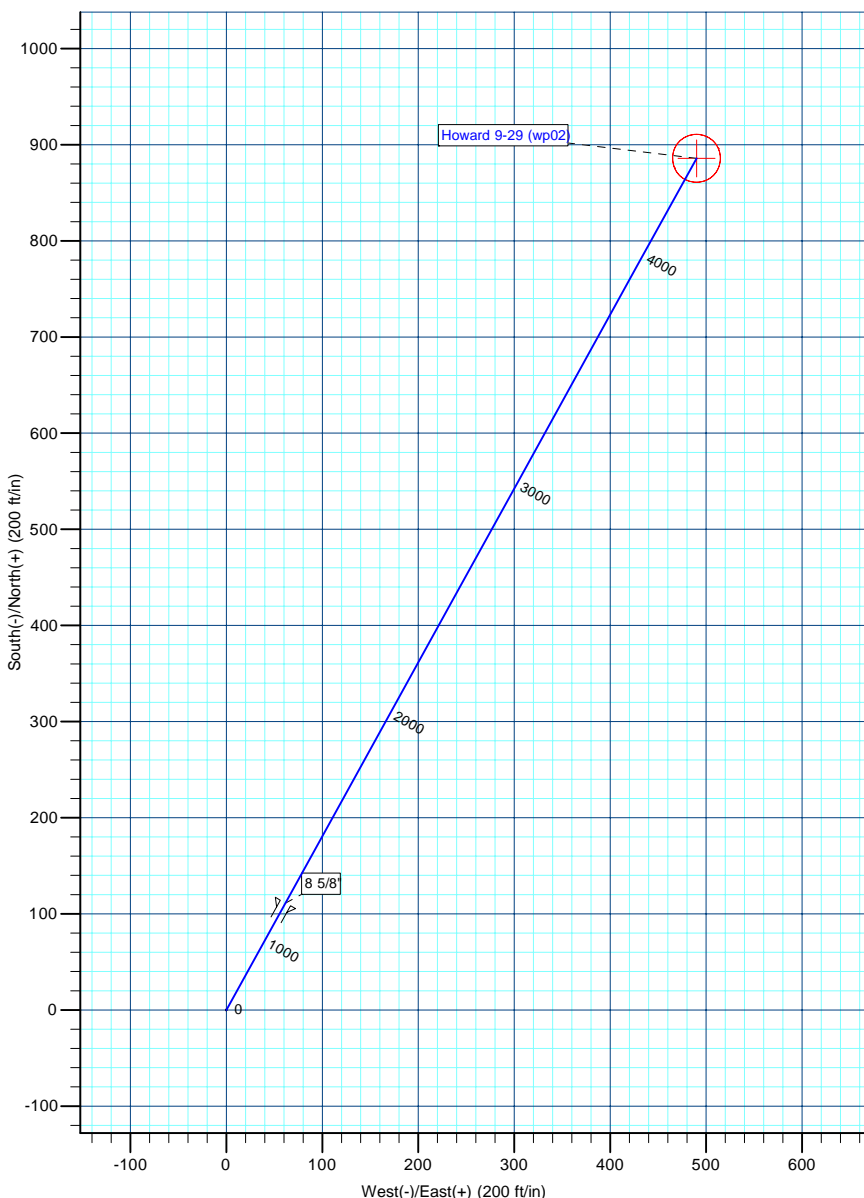
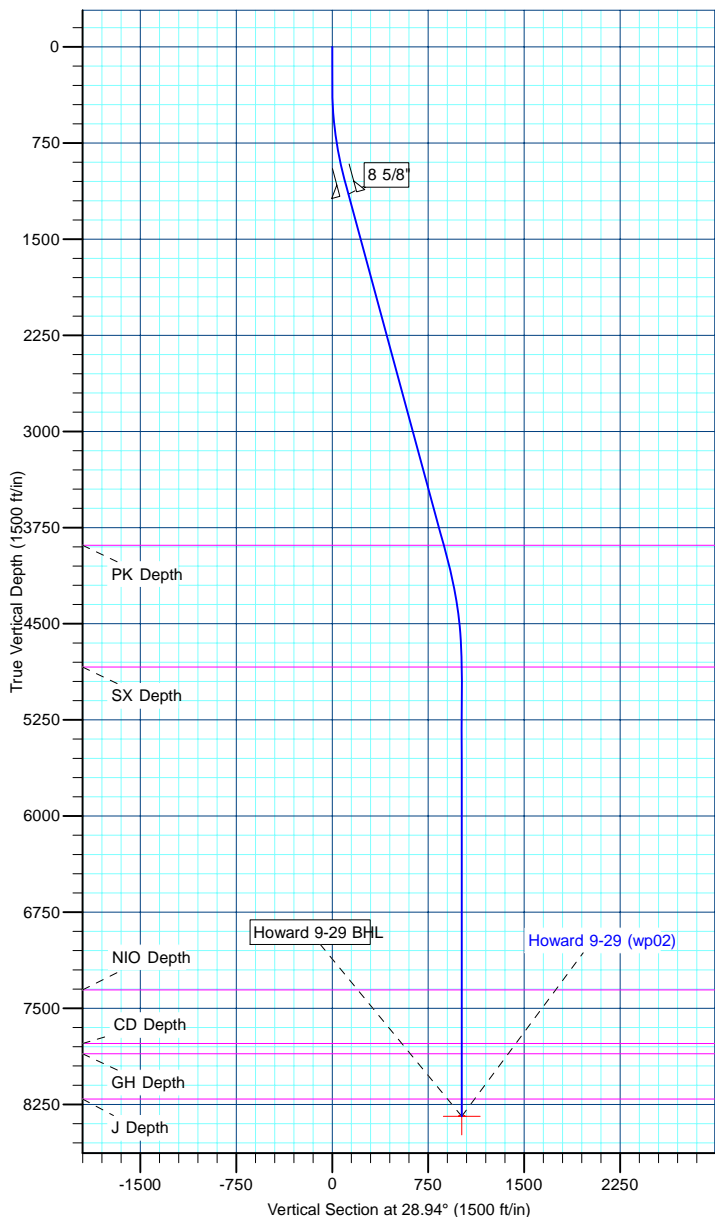
TVD	MD	Name	Size
1150.00	1162.47	8 5/8"	8-5/8

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 9-29 BHL	8343.00	885.94	489.84	1250784.86	3165856.97	40.020271	-104.907798	Circle (Radius: 25.00)

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00
1060.52	15.21	28.94	1051.62	87.83	48.56	2.00	28.94	100.36
4099.36	15.21	28.94	3984.00	785.56	434.35	0.00	0.00	897.64
4968.53	0.00	0.00	4843.00	885.94	489.84	1.75	180.00	1012.34
8468.53	0.00	0.00	8343.00	885.94	489.84	0.00	0.00	1012.34



Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 9-29
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5023' GL @ 5038.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 9-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 9-29		
Design:	Howard 9-29 (wp02)		

Project	COLORADO NORTHERN ZONE - 83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site						WELD_HOWARD 20-29 PAD											
Site Position:						Northing:			1,249,878.45 ft			Latitude:			40.017791		
From:			Lat/Long			Easting:			3,165,409.00 ft			Longitude:			-104.909419		
Position Uncertainty:			0.00 ft			Slot Radius:			0 "			Grid Convergence:			0.38		

Well	Howard 9-29					
Well Position	+N-S	17.47 ft	Northing:	1,249,895.68 ft	Latitude:	40.017839
	+E-W	-35.85 ft	Easting:	3,165,373.04 ft	Longitude:	-104.909547
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,023.00 ft

Wellbore	Howard 9-29				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/6/2011	8.92	66.72	52,924

Design	Howard 9-29 (wp02)			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	28.94

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,060.52	15.21	28.94	1,051.62	87.83	48.56	2.00	2.00	0.00	28.94	
4,099.36	15.21	28.94	3,984.00	785.56	434.35	0.00	0.00	0.00	0.00	
4,968.53	0.00	0.00	4,843.00	885.94	489.84	1.75	-1.75	0.00	180.00	
8,468.53	0.00	0.00	8,343.00	885.94	489.84	0.00	0.00	0.00	0.00	Howard 9-29 BHL

Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 9-29
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5023' GL @ 5038.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 9-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 9-29		
Design:	Howard 9-29 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
400.00	2.00	28.94	399.98	1.53	0.84	1.75	2.00	2.00	0.00
500.00	4.00	28.94	499.84	6.11	3.38	6.98	2.00	2.00	0.00
600.00	6.00	28.94	599.45	13.73	7.59	15.69	2.00	2.00	0.00
700.00	8.00	28.94	698.70	24.40	13.49	27.88	2.00	2.00	0.00
800.00	10.00	28.94	797.47	38.09	21.06	43.52	2.00	2.00	0.00
900.00	12.00	28.94	895.62	54.79	30.29	62.60	2.00	2.00	0.00
1,000.00	14.00	28.94	993.06	74.47	41.18	85.10	2.00	2.00	0.00
1,060.52	15.21	28.94	1,051.62	87.83	48.56	100.36	2.00	2.00	0.00
Start 3038.83 hold at 1060.52 MD									
1,100.00	15.21	28.94	1,089.72	96.89	53.57	110.71	0.00	0.00	0.00
1,162.47	15.21	28.94	1,150.00	111.24	61.50	127.11	0.00	0.00	0.00
8 5/8"									
1,200.00	15.21	28.94	1,186.21	119.85	66.27	136.95	0.00	0.00	0.00
1,300.00	15.21	28.94	1,282.71	142.81	78.96	163.19	0.00	0.00	0.00
1,400.00	15.21	28.94	1,379.21	165.77	91.66	189.42	0.00	0.00	0.00
1,500.00	15.21	28.94	1,475.70	188.73	104.35	215.66	0.00	0.00	0.00
1,600.00	15.21	28.94	1,572.20	211.69	117.05	241.90	0.00	0.00	0.00
1,700.00	15.21	28.94	1,668.70	234.65	129.74	268.13	0.00	0.00	0.00
1,800.00	15.21	28.94	1,765.19	257.62	142.44	294.37	0.00	0.00	0.00
1,900.00	15.21	28.94	1,861.69	280.58	155.13	320.61	0.00	0.00	0.00
2,000.00	15.21	28.94	1,958.19	303.54	167.83	346.84	0.00	0.00	0.00
2,100.00	15.21	28.94	2,054.68	326.50	180.52	373.08	0.00	0.00	0.00
2,200.00	15.21	28.94	2,151.18	349.46	193.22	399.32	0.00	0.00	0.00
2,300.00	15.21	28.94	2,247.68	372.42	205.91	425.55	0.00	0.00	0.00
2,400.00	15.21	28.94	2,344.17	395.38	218.61	451.79	0.00	0.00	0.00
2,500.00	15.21	28.94	2,440.67	418.34	231.30	478.03	0.00	0.00	0.00
2,600.00	15.21	28.94	2,537.17	441.30	244.00	504.26	0.00	0.00	0.00
2,700.00	15.21	28.94	2,633.66	464.26	256.69	530.50	0.00	0.00	0.00
2,800.00	15.21	28.94	2,730.16	487.22	269.39	556.74	0.00	0.00	0.00
2,900.00	15.21	28.94	2,826.66	510.18	282.08	582.97	0.00	0.00	0.00
3,000.00	15.21	28.94	2,923.16	533.14	294.78	609.21	0.00	0.00	0.00
3,100.00	15.21	28.94	3,019.65	556.10	307.48	635.45	0.00	0.00	0.00
3,200.00	15.21	28.94	3,116.15	579.06	320.17	661.68	0.00	0.00	0.00
3,300.00	15.21	28.94	3,212.65	602.03	332.87	687.92	0.00	0.00	0.00
3,400.00	15.21	28.94	3,309.14	624.99	345.56	714.16	0.00	0.00	0.00
3,500.00	15.21	28.94	3,405.64	647.95	358.26	740.39	0.00	0.00	0.00
3,600.00	15.21	28.94	3,502.14	670.91	370.95	766.63	0.00	0.00	0.00
3,700.00	15.21	28.94	3,598.63	693.87	383.65	792.87	0.00	0.00	0.00
3,800.00	15.21	28.94	3,695.13	716.83	396.34	819.10	0.00	0.00	0.00
3,900.00	15.21	28.94	3,791.63	739.79	409.04	845.34	0.00	0.00	0.00
3,999.87	15.21	28.94	3,888.00	762.72	421.72	871.54	0.00	0.00	0.00
PK Depth									
4,000.00	15.21	28.94	3,888.12	762.75	421.73	871.58	0.00	0.00	0.00
4,099.36	15.21	28.94	3,984.00	785.56	434.35	897.64	0.00	0.00	0.00
Start Drop -1.75									
4,100.00	15.20	28.94	3,984.62	785.71	434.43	897.81	1.75	-1.75	0.00
4,200.00	13.45	28.94	4,081.51	807.36	446.40	922.55	1.75	-1.75	0.00
4,300.00	11.70	28.94	4,179.11	826.41	456.93	944.32	1.75	-1.75	0.00
4,400.00	9.95	28.94	4,277.32	842.85	466.02	963.10	1.75	-1.75	0.00

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Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 9-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 9-29		
Design:	Howard 9-29 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,500.00	8.20	28.94	4,376.07	856.65	473.65	978.87	1.75	-1.75	0.00
4,600.00	6.45	28.94	4,475.25	867.81	479.82	991.62	1.75	-1.75	0.00
4,700.00	4.70	28.94	4,574.77	876.31	484.52	1,001.33	1.75	-1.75	0.00
4,800.00	2.95	28.94	4,674.54	882.14	487.74	1,008.00	1.75	-1.75	0.00
4,900.00	1.20	28.94	4,774.47	885.31	489.50	1,011.62	1.75	-1.75	0.00
4,963.53	0.09	28.94	4,838.00	885.93	489.84	1,012.34	1.75	-1.75	0.00
SX Depth									
4,968.53	0.00	0.00	4,843.00	885.94	489.84	1,012.34	1.75	-1.75	0.00
Start 3500.00 hold at 4968.53 MD									
5,000.00	0.00	0.00	4,874.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,100.00	0.00	0.00	4,974.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,200.00	0.00	0.00	5,074.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,300.00	0.00	0.00	5,174.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,400.00	0.00	0.00	5,274.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,500.00	0.00	0.00	5,374.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,600.00	0.00	0.00	5,474.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,700.00	0.00	0.00	5,574.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,800.00	0.00	0.00	5,674.47	885.94	489.84	1,012.34	0.00	0.00	0.00
5,900.00	0.00	0.00	5,774.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,000.00	0.00	0.00	5,874.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,100.00	0.00	0.00	5,974.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,200.00	0.00	0.00	6,074.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,300.00	0.00	0.00	6,174.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,400.00	0.00	0.00	6,274.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,500.00	0.00	0.00	6,374.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,600.00	0.00	0.00	6,474.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,700.00	0.00	0.00	6,574.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,800.00	0.00	0.00	6,674.47	885.94	489.84	1,012.34	0.00	0.00	0.00
6,900.00	0.00	0.00	6,774.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,000.00	0.00	0.00	6,874.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,100.00	0.00	0.00	6,974.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,200.00	0.00	0.00	7,074.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,300.00	0.00	0.00	7,174.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,400.00	0.00	0.00	7,274.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,481.53	0.00	0.00	7,356.00	885.94	489.84	1,012.34	0.00	0.00	0.00
NIO Depth									
7,500.00	0.00	0.00	7,374.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,600.00	0.00	0.00	7,474.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,700.00	0.00	0.00	7,574.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,800.00	0.00	0.00	7,674.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,900.00	0.00	0.00	7,774.47	885.94	489.84	1,012.34	0.00	0.00	0.00
7,900.53	0.00	0.00	7,775.00	885.94	489.84	1,012.34	0.00	0.00	0.00
CD Depth									
7,979.53	0.00	0.00	7,854.00	885.94	489.84	1,012.34	0.00	0.00	0.00
GH Depth									
8,000.00	0.00	0.00	7,874.47	885.94	489.84	1,012.34	0.00	0.00	0.00
8,100.00	0.00	0.00	7,974.47	885.94	489.84	1,012.34	0.00	0.00	0.00
8,200.00	0.00	0.00	8,074.47	885.94	489.84	1,012.34	0.00	0.00	0.00
8,300.00	0.00	0.00	8,174.47	885.94	489.84	1,012.34	0.00	0.00	0.00
8,333.53	0.00	0.00	8,208.00	885.94	489.84	1,012.34	0.00	0.00	0.00
J Depth									
8,400.00	0.00	0.00	8,274.47	885.94	489.84	1,012.34	0.00	0.00	0.00
8,468.53	0.00	0.00	8,343.00	885.94	489.84	1,012.34	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 9-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 9-29		
Design:	Howard 9-29 (wp02)		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
TD at 8468.53 - Howard 9-29 BHL										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Howard 9-29 BHL - hit/miss target - Shape - plan hits target center - Circle (radius 25.00)	0.00	0.00	8,343.00	885.94	489.84	1,250,784.86	3,165,856.97	40.020271	-104.907798

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,162.47	1,150.00	8 5/8"	8-5/8	11	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,999.87	3,888.00	PK Depth				
4,963.53	4,838.00	SX Depth				
7,481.53	7,356.00	NIO Depth				
7,900.53	7,775.00	CD Depth				
7,979.53	7,854.00	GH Depth				
8,333.53	8,208.00	J Depth				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment	
300.00	300.00	0.00	0.00	Start Build 2.00	
1,060.52	1,051.62	87.83	48.56	Start 3038.83 hold at 1060.52 MD	
4,099.36	3,984.00	785.56	434.35	Start Drop -1.75	
4,968.53	4,843.00	885.94	489.84	Start 3500.00 hold at 4968.53 MD	
8,468.53	8,343.00	885.94	489.84	TD at 8468.53	