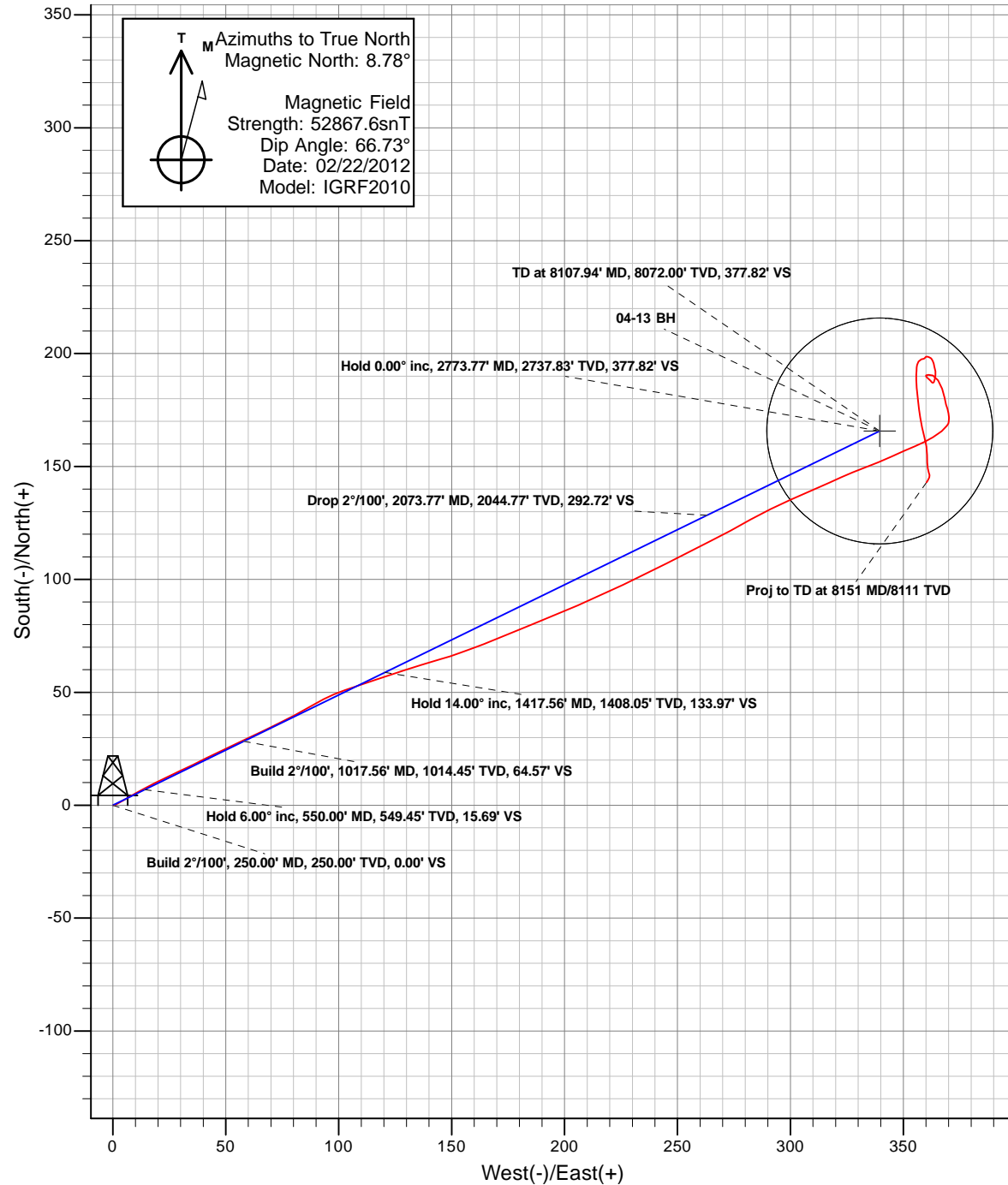
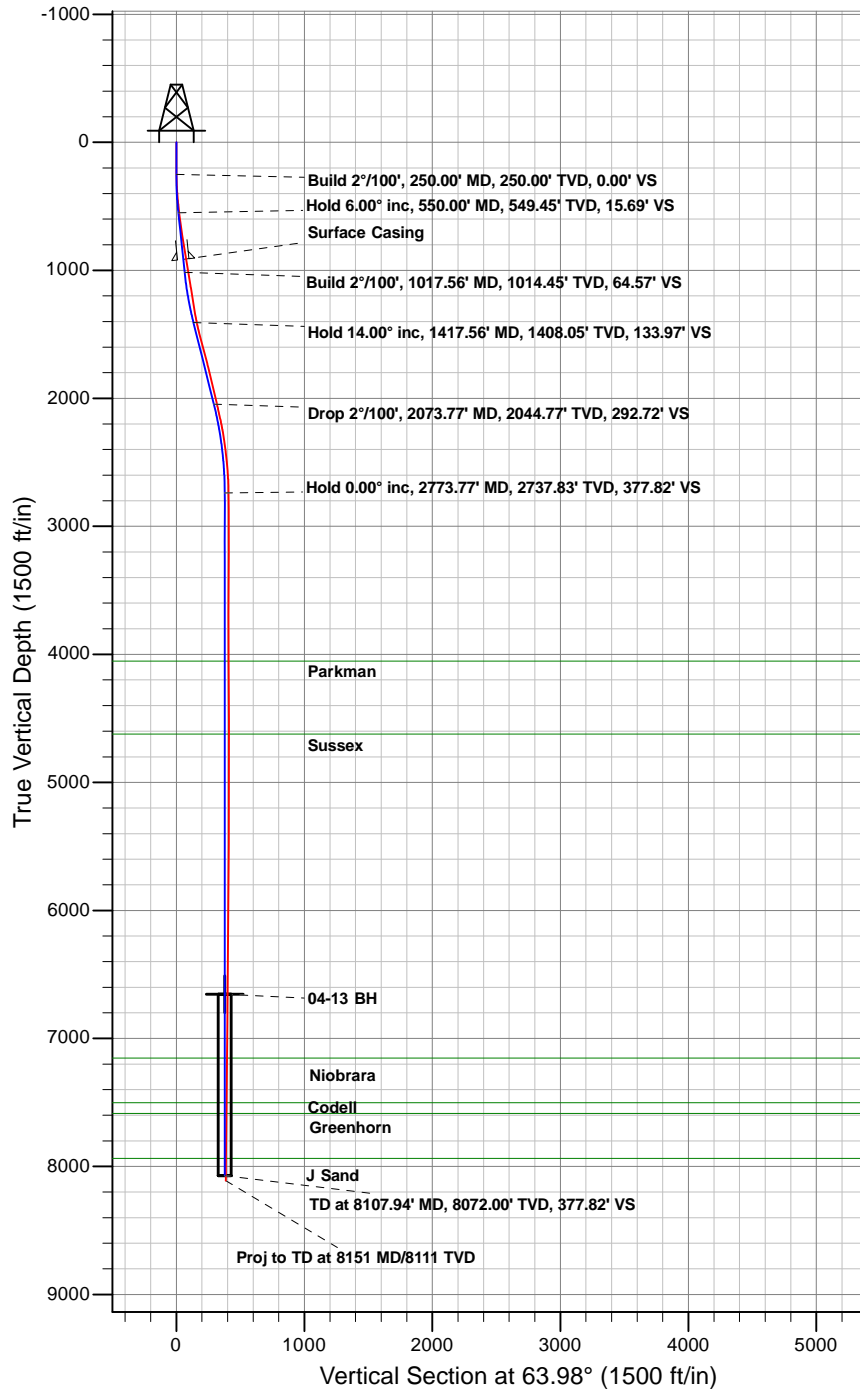




# Anadarko Petroleum Corporation

Riverbend 04-13 (111409)  
Plan vs Actual



# **Anadarko Petroleum Corporation**

**Riverbend**

**Riverbend 14 Pad**

**Riverbend 04-13 (111409) - Slot 04-13**

**04-13**

**Survey: 04-13**

## **Survey Report - Geographic**

**16 February, 2012**

# ARK Directional Services

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 04-13 (111409) - Slot 04-13
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 04-13 (111409)	<b>North Reference:</b>	True
<b>Wellbore:</b>	04-13	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	04-13	<b>Database:</b>	EDM5000

<b>Project</b>	Riverbend		
<b>Map System:</b>	Universal Transverse Mercator	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD83 Colorado - HARN		
<b>Map Zone:</b>	Zone 13N (108 W to 102 W)		

Site	Riverbend 14 Pad				
Site Position:		Northing:	14,547,138.00 usft	Latitude:	40.055934°N
From:	Lat/Long	Easting:	1,683,122.87 usft	Longitude:	104.847381°W
Position Uncertainty:	0.00 ft	Slot Radius:	13.20 in	Grid Convergence:	0.10 °

Well	Riverbend 04-13 (111409) - Slot 04-13					
Well Position	+N/-S	0.00 ft	Northing:	14,547,178.00 usft	Latitude:	40.056044°N
	+E/-W	0.00 ft	Easting:	1,683,122.71 usft	Longitude:	104.847382°W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,952.00 ft

<b>Wellbore</b>	04-13				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	02/22/12	8.79	66.73	52,868

<b>Survey Program</b>	<b>Date</b>	02/16/12			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
84.00	8,151.00	04-13 (04-13)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,547,178.00	1,683,122.71	40.056044°N	104.847382°W	
3.14	0.01	106.07	3.14	0.00	0.00	14,547,178.00	1,683,122.71	40.056044°N	104.847382°W	
Chikuma Harry S #2 (VE) at 1400										
84.00	0.22	106.07	84.00	-0.04	0.15	14,547,177.96	1,683,122.86	40.056044°N	104.847381°W	
176.00	0.00	89.46	176.00	-0.09	0.32	14,547,177.91	1,683,123.03	40.056044°N	104.847380°W	
269.00	1.32	66.26	268.99	0.34	1.31	14,547,178.34	1,683,124.01	40.056045°N	104.847377°W	
361.00	3.30	59.67	360.91	2.10	4.56	14,547,180.11	1,683,127.26	40.056050°N	104.847365°W	
454.00	5.10	60.68	453.66	5.48	10.48	14,547,183.50	1,683,133.17	40.056059°N	104.847344°W	
547.00	6.90	63.36	546.15	10.01	19.07	14,547,188.04	1,683,141.76	40.056071°N	104.847313°W	
640.00	7.78	64.77	638.38	15.20	29.76	14,547,193.25	1,683,152.44	40.056086°N	104.847275°W	
732.00	8.79	63.27	729.42	21.01	41.67	14,547,199.08	1,683,164.34	40.056102°N	104.847233°W	
824.00	9.10	65.29	820.30	27.21	54.56	14,547,205.31	1,683,177.22	40.056119°N	104.847187°W	
915.00	9.40	63.89	910.12	33.49	67.77	14,547,211.61	1,683,190.42	40.056136°N	104.847139°W	
955.00	9.49	63.49	949.58	36.40	73.66	14,547,214.53	1,683,196.30	40.056144°N	104.847118°W	
1,000.00	9.49	63.49	993.96	39.71	80.29	14,547,217.85	1,683,202.93	40.056153°N	104.847095°W	
1,061.00	9.49	58.39	1,054.13	44.59	89.08	14,547,222.75	1,683,211.71	40.056166°N	104.847063°W	
1,151.00	9.80	71.58	1,142.87	50.90	102.66	14,547,229.08	1,683,225.28	40.056184°N	104.847015°W	
1,238.00	8.79	70.79	1,228.72	55.43	115.97	14,547,233.63	1,683,238.58	40.056196°N	104.846967°W	
1,328.00	9.70	72.36	1,317.55	59.99	129.69	14,547,238.21	1,683,252.29	40.056209°N	104.846918°W	
1,416.00	11.51	73.78	1,404.05	64.69	145.18	14,547,242.94	1,683,267.78	40.056222°N	104.846863°W	
1,504.00	14.90	68.19	1,489.71	71.35	164.12	14,547,249.63	1,683,286.71	40.056240°N	104.846795°W	

# ARK Directional Services

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 04-13 (111409) - Slot 04-13
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 04-13 (111409)	<b>North Reference:</b>	True
<b>Wellbore:</b>	04-13	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	04-13	<b>Database:</b>	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,593.00	14.81	67.80	1,575.74	79.90	185.28	14,547,258.22	1,683,307.85	40.056263°N	104.846719°W
1,681.00	14.59	66.79	1,660.86	88.52	205.88	14,547,266.87	1,683,328.43	40.056287°N	104.846646°W
1,770.00	14.02	64.46	1,747.10	97.58	225.91	14,547,275.97	1,683,348.45	40.056312°N	104.846574°W
1,860.00	13.49	62.88	1,834.52	107.07	245.09	14,547,285.49	1,683,367.61	40.056338°N	104.846506°W
1,950.00	13.80	63.18	1,921.98	116.70	264.01	14,547,295.15	1,683,386.52	40.056364°N	104.846438°W
2,040.00	13.01	60.46	2,009.52	126.53	282.40	14,547,305.02	1,683,404.89	40.056391°N	104.846372°W
2,129.00	12.48	67.10	2,096.33	135.22	299.98	14,547,313.73	1,683,422.45	40.056415°N	104.846310°W
2,217.00	12.08	65.16	2,182.32	142.78	317.09	14,547,321.33	1,683,439.55	40.056436°N	104.846248°W
2,306.00	9.58	69.07	2,269.73	149.34	332.47	14,547,327.91	1,683,454.91	40.056454°N	104.846193°W
2,394.00	7.91	65.60	2,356.71	154.46	344.82	14,547,333.05	1,683,467.26	40.056468°N	104.846149°W
2,484.00	6.28	67.58	2,446.01	158.90	355.01	14,547,337.51	1,683,477.44	40.056480°N	104.846113°W
2,573.00	5.32	58.26	2,534.56	162.92	363.02	14,547,341.55	1,683,485.45	40.056491°N	104.846084°W
2,663.00	3.21	43.67	2,624.31	166.94	368.31	14,547,345.57	1,683,490.73	40.056502°N	104.846065°W
2,754.00	1.32	3.37	2,715.24	169.83	370.13	14,547,348.47	1,683,492.54	40.056510°N	104.846059°W
2,844.00	1.01	358.28	2,805.22	171.66	370.17	14,547,350.29	1,683,492.58	40.056515°N	104.846059°W
2,932.00	1.41	351.77	2,893.20	173.51	369.99	14,547,352.14	1,683,492.40	40.056520°N	104.846059°W
3,022.00	1.19	339.69	2,983.17	175.48	369.51	14,547,354.11	1,683,491.91	40.056526°N	104.846061°W
3,112.00	1.49	343.78	3,073.15	177.48	368.86	14,547,356.11	1,683,491.26	40.056531°N	104.846063°W
3,202.00	2.29	352.87	3,163.10	180.39	368.31	14,547,359.02	1,683,490.70	40.056539°N	104.846065°W
3,290.00	3.12	338.06	3,251.00	184.35	367.19	14,547,362.98	1,683,489.58	40.056550°N	104.846069°W
3,380.00	2.29	330.37	3,340.90	188.19	365.39	14,547,366.81	1,683,487.77	40.056561°N	104.846076°W
3,469.00	1.89	292.27	3,429.85	190.29	363.15	14,547,368.91	1,683,485.53	40.056567°N	104.846084°W
3,556.00	1.01	247.27	3,516.82	190.54	361.12	14,547,369.16	1,683,483.49	40.056567°N	104.846091°W
3,644.00	0.40	302.49	3,604.81	190.40	360.14	14,547,369.02	1,683,482.52	40.056567°N	104.846095°W
3,734.00	0.48	165.27	3,694.81	190.21	359.97	14,547,368.82	1,683,482.35	40.056566°N	104.846095°W
3,820.00	0.04	121.98	3,780.81	189.84	360.09	14,547,368.46	1,683,482.47	40.056565°N	104.846095°W
3,910.00	0.88	136.57	3,870.81	189.32	360.59	14,547,367.94	1,683,482.97	40.056564°N	104.846093°W
3,996.00	0.79	129.98	3,956.80	188.46	361.50	14,547,367.08	1,683,483.88	40.056561°N	104.846090°W
4,086.00	0.40	143.08	4,046.79	187.81	362.16	14,547,366.43	1,683,484.55	40.056560°N	104.846087°W
4,175.00	0.22	131.78	4,135.79	187.45	362.48	14,547,366.07	1,683,484.86	40.056559°N	104.846086°W
4,264.00	0.40	131.78	4,224.79	187.13	362.84	14,547,365.75	1,683,485.22	40.056558°N	104.846085°W
4,353.00	0.22	49.17	4,313.79	187.03	363.20	14,547,365.66	1,683,485.58	40.056558°N	104.846084°W
4,443.00	0.48	33.39	4,403.79	187.46	363.54	14,547,366.09	1,683,485.92	40.056559°N	104.846082°W
4,532.00	1.19	11.90	4,492.78	188.68	363.93	14,547,367.30	1,683,486.31	40.056562°N	104.846081°W
4,621.00	1.10	7.46	4,581.76	190.43	364.23	14,547,369.05	1,683,486.61	40.056567°N	104.846080°W
4,710.00	1.19	349.27	4,670.74	192.18	364.17	14,547,370.81	1,683,486.55	40.056572°N	104.846080°W
4,797.00	1.19	345.97	4,757.72	193.95	363.78	14,547,372.57	1,683,486.16	40.056577°N	104.846082°W
4,887.00	1.01	347.47	4,847.71	195.63	363.39	14,547,374.25	1,683,485.76	40.056581°N	104.846083°W
4,975.00	0.79	330.77	4,935.70	196.92	362.92	14,547,375.54	1,683,485.29	40.056585°N	104.846085°W
5,064.00	0.62	317.98	5,024.69	197.81	362.30	14,547,376.43	1,683,484.67	40.056587°N	104.846087°W
5,154.00	0.48	286.29	5,114.69	198.28	361.61	14,547,376.90	1,683,483.98	40.056588°N	104.846089°W
5,242.00	0.62	294.86	5,202.68	198.58	360.83	14,547,377.20	1,683,483.19	40.056589°N	104.846092°W
5,333.00	0.40	249.60	5,293.68	198.68	360.08	14,547,377.29	1,683,482.45	40.056590°N	104.846095°W
5,421.00	0.40	199.59	5,381.68	198.28	359.69	14,547,376.90	1,683,482.06	40.056588°N	104.846096°W
5,511.00	0.40	243.36	5,471.68	197.84	359.30	14,547,376.46	1,683,481.67	40.056587°N	104.846098°W
5,600.00	0.40	258.48	5,560.67	197.64	358.72	14,547,376.26	1,683,481.09	40.056587°N	104.846100°W
5,690.00	0.40	257.69	5,650.67	197.51	358.11	14,547,376.13	1,683,480.47	40.056586°N	104.846102°W
5,778.00	0.40	218.79	5,738.67	197.21	357.62	14,547,375.82	1,683,479.98	40.056585°N	104.846104°W
5,868.00	0.40	246.39	5,828.67	196.84	357.13	14,547,375.45	1,683,479.50	40.056584°N	104.846105°W
5,955.00	0.31	212.77	5,915.67	196.52	356.72	14,547,375.13	1,683,479.09	40.056584°N	104.846107°W
6,046.00	0.62	202.18	6,006.66	195.85	356.41	14,547,374.46	1,683,478.77	40.056582°N	104.846108°W
6,135.00	0.62	198.27	6,095.66	194.95	356.07	14,547,373.56	1,683,478.44	40.056579°N	104.846109°W
6,223.00	0.88	180.69	6,183.65	193.82	355.92	14,547,372.43	1,683,478.29	40.056576°N	104.846110°W
6,310.00	1.10	186.89	6,270.64	192.33	355.81	14,547,370.94	1,683,478.18	40.056572°N	104.846110°W
6,396.00	1.19	180.56	6,356.62	190.61	355.70	14,547,369.22	1,683,478.08	40.056567°N	104.846110°W

# ARK Directional Services

## Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 04-13 (111409) - Slot 04-13
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4967.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 04-13 (111409)	<b>North Reference:</b>	True
<b>Wellbore:</b>	04-13	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	04-13	<b>Database:</b>	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,486.00	1.41	177.27	6,446.60	188.57	355.74	14,547,367.18	1,683,478.12	40.056562°N	104.846110°W
6,574.00	1.01	178.36	6,534.58	186.72	355.82	14,547,365.33	1,683,478.20	40.056557°N	104.846110°W
6,665.00	1.10	181.66	6,625.56	185.04	355.81	14,547,363.65	1,683,478.20	40.056552°N	104.846110°W
6,694.82	1.23	177.14	6,655.37	184.44	355.82	14,547,363.05	1,683,478.21	40.056550°N	104.846110°W
<b>04-13 Legal Window</b>									
6,694.83	1.23	177.13	6,655.39	184.44	355.82	14,547,363.05	1,683,478.21	40.056550°N	104.846110°W
<b>04-13 BH</b>									
6,754.00	1.49	170.50	6,714.54	183.05	355.98	14,547,361.66	1,683,478.37	40.056547°N	104.846109°W
6,844.00	1.58	173.18	6,804.51	180.66	356.32	14,547,359.27	1,683,478.72	40.056540°N	104.846108°W
6,934.00	1.49	173.09	6,894.47	178.27	356.61	14,547,356.88	1,683,479.01	40.056533°N	104.846107°W
7,024.00	2.11	174.06	6,984.43	175.46	356.92	14,547,354.07	1,683,479.33	40.056526°N	104.846106°W
7,114.00	2.68	169.88	7,074.35	171.74	357.46	14,547,350.35	1,683,479.87	40.056516°N	104.846104°W
7,202.00	2.99	170.37	7,162.24	167.45	358.21	14,547,346.06	1,683,480.63	40.056504°N	104.846101°W
7,291.00	2.81	162.98	7,251.13	163.07	359.24	14,547,341.69	1,683,481.66	40.056492°N	104.846098°W
7,380.00	2.59	171.47	7,340.03	159.00	360.17	14,547,337.62	1,683,482.60	40.056481°N	104.846094°W
7,468.00	2.50	179.86	7,427.94	155.11	360.47	14,547,333.73	1,683,482.91	40.056470°N	104.846093°W
7,558.00	1.80	177.79	7,517.88	151.74	360.53	14,547,330.36	1,683,482.98	40.056461°N	104.846093°W
7,647.00	1.41	170.06	7,606.84	149.26	360.77	14,547,327.88	1,683,483.22	40.056454°N	104.846092°W
7,735.00	1.10	160.08	7,694.82	147.40	361.25	14,547,326.02	1,683,483.70	40.056449°N	104.846091°W
7,824.00	0.62	174.98	7,783.81	146.12	361.58	14,547,324.74	1,683,484.04	40.056445°N	104.846089°W
7,914.00	0.70	200.16	7,873.81	145.12	361.43	14,547,323.74	1,683,483.89	40.056442°N	104.846090°W
8,054.00	0.62	215.37	8,013.80	143.70	360.70	14,547,322.32	1,683,483.16	40.056439°N	104.846093°W
8,105.00	0.48	205.17	8,064.80	143.28	360.45	14,547,321.90	1,683,482.91	40.056437°N	104.846093°W
8,145.00	0.48	205.17	8,104.79	142.98	360.31	14,547,321.59	1,683,482.77	40.056437°N	104.846094°W
8,151.00	0.48	205.17	8,110.79	142.93	360.29	14,547,321.55	1,683,482.75	40.056436°N	104.846094°W
<b>Proj to TD at 8151 MD/8111 TVD</b>									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,151.00	8,110.79	142.93	360.29	Proj to TD at 8151 MD/8111 TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_