SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp.
WELL:	Kerr 13C-25HZ
FIELD:	DJ Basin
RIG:	H&P 308
LEGALS:	Sec. 13-T2N-R67W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	True N
MAG. DECL. APPLIED:	8.54
VERTICAL SEC. DIR. :	179.850

SSDS Job Number :	901641312
Start Date of Job :	9/25/2014
End Date of Job :	10/23/2014
Lead Directional Driller:	Jesse Kysar
	Brandon Watson
Other SSDS DD's :	
SSDS MWD Engineers :	AdamSampson
	James Ramsey

	Main Hole ==========>		1st Side Track ========>		2nd Side Track ========>		3rd Side Track ========>		4th Side Track ========>	
ESS Survey		Tie On		Tie On		Tie On		Tie On		Tie On
First Survey Depth	25	Gyro								
Last Survey Depth	1080									
KOP Depth/Sidetrack MD	6916	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth	1171	MWD		MWD		MWD		MWD		MWD
Last Survey Depth	17819	MWD		MWD		MWD		MWD		MWD
Bit Extrapolation to TD	17867	T.D.		T.D.		T.D.		T.D.		T.D.

The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :

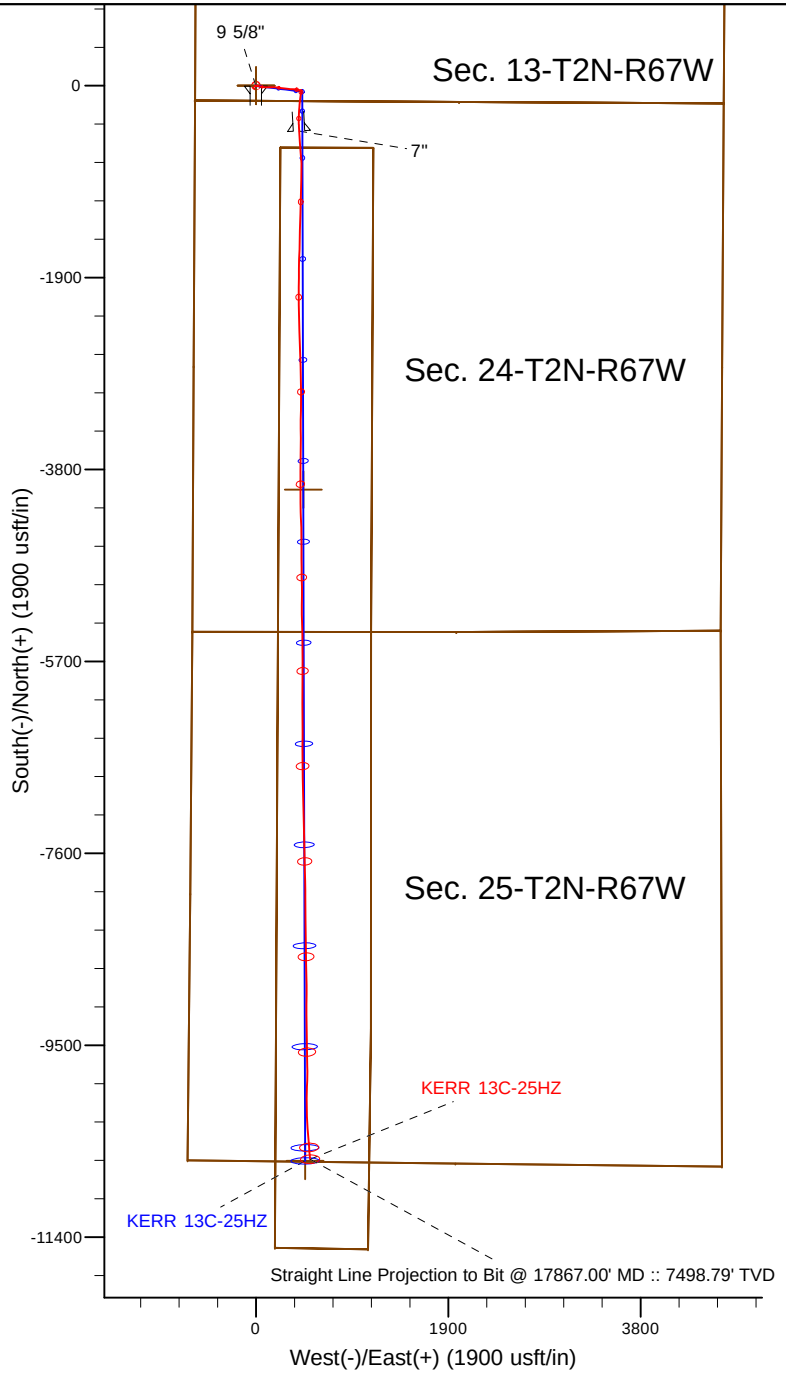
Print Name :		Print Name :	James Ramsey	Print Name :	
Sign Name :		Sign Name :		Sign Name :	
Print Name :	Jesse Kysar	Print Name :	Adam Sampson	Print Name :	
Sign Name :		Sign Name :		Sign Name :	

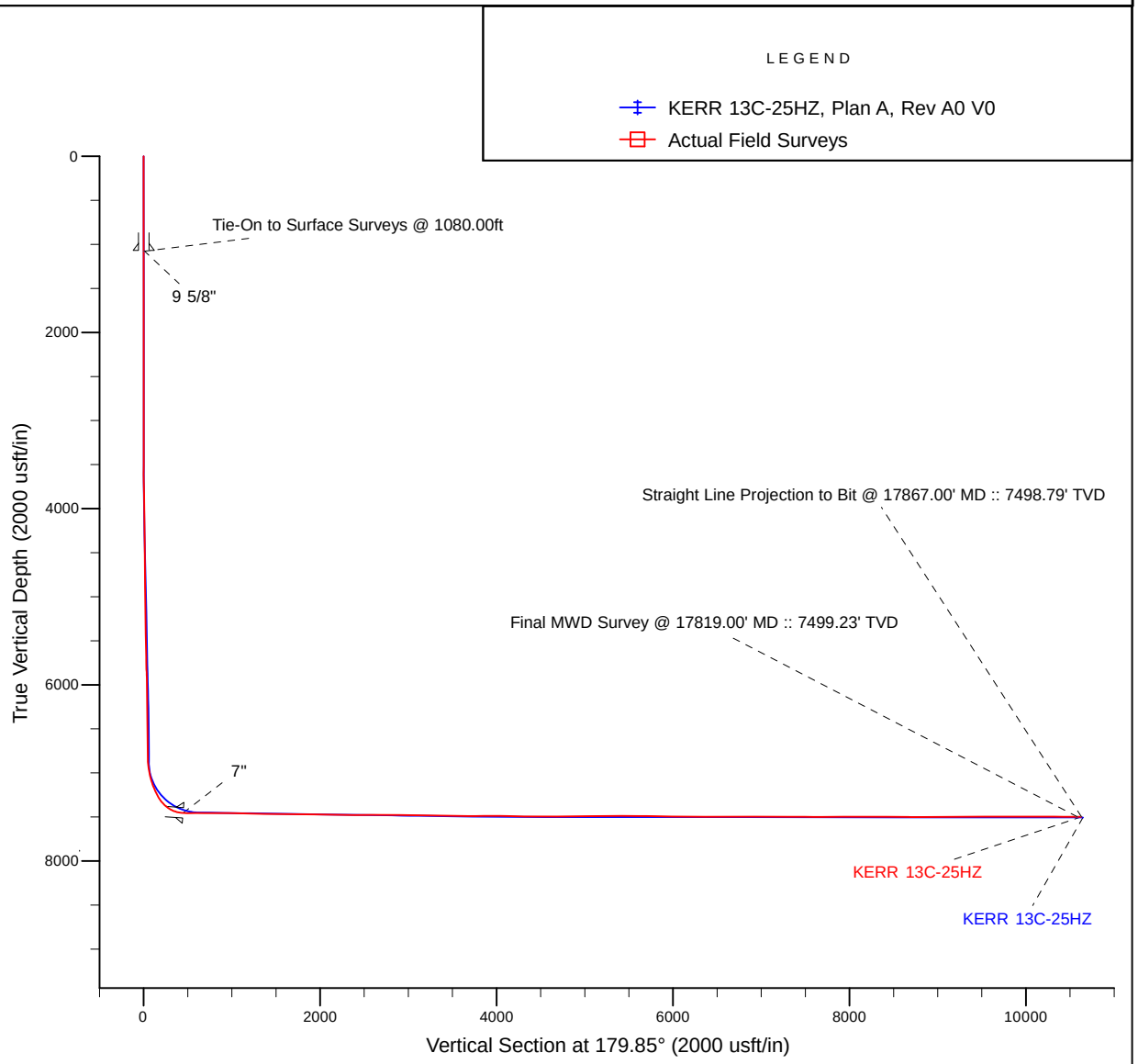
Examples of Survey Types:	TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
	MWD	Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
	ESS	Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
	Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)
	SS	Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.

Project: Weld County, CO (NAD 83)
Site: Sec. 13-T2N-R67W
Well: KERR 13C-25HZ
Wellbore: Plan A
Design: Actual Field Surveys

Anadarko Petroleum Corporation

HALLIBURTON
Sperry Drilling





7" Casing:	~296.22' FNL, ~1029.10' FWL
Lat/Long:	40.129949 N, -104.844916 E
State Planes - CO Northern:	1,290,860.86' N, 3,183,172.87' E
Location:	Sec. 24-T2N-R67W
BHL:	~24.97' FSL, ~1209.34' FWL
Lat/Long:	40.102004 N, -104.844531 E
State Planes - CO Northern:	1,280,681.99' N, 3,183,355.80' E
Location:	Sec. 25-T2N-R67W

WELL DETAILS: KERR 13C-25HZ

Ground Level: 4891.00

RKB = 25' @ 4916.00usft (H&P 308)

Design: Actual Field Surveys (KERR 13C-25HZ/Plan A)

Created By: Katie Benner Date: 12/16/2014

Reviewed: _____ Date: _____

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)
Sec. 13-T2N-R67W
KERR 13C-25HZ
API: 05-123-39354 :: Job #: 901641312
Plan A

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

16 December, 2014

Surface UWI : API: 05-123-39354 :: Job #: 901641312

Well Coordinates: 1,291,306.40 N, 3,182,743.89 E (40° 07' 52.25" N, 104° 50' 47.18" W)
Ground Level: 4,891.00 usft

Local Coordinate Origin:	Centered on Well KERR 13C-25HZ
Viewing Datum:	RKB = 25' @ 4916.00usft (H&P 308)
TVDs to System:	N
North Reference:	True
Unit System:	Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 5000.1 Build: 70

HALLIBURTON

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00
71.00	0.60	257.70	71.00	-0.06	-0.26	0.06	1.18
142.00	0.60	232.90	142.00	-0.36	-0.92	0.36	0.36
210.00	0.60	265.90	209.99	-0.60	-1.56	0.60	0.50
299.00	0.70	259.40	298.99	-0.73	-2.56	0.73	0.14
379.00	0.50	211.60	378.98	-1.12	-3.22	1.11	0.65
459.00	0.50	218.00	458.98	-1.69	-3.62	1.68	0.07
539.00	0.30	179.80	538.98	-2.18	-3.83	2.17	0.40
619.00	0.70	77.70	618.98	-2.28	-3.36	2.27	1.02
699.00	0.60	98.20	698.97	-2.24	-2.46	2.23	0.31
779.00	0.60	98.40	778.97	-2.36	-1.63	2.36	0.00
859.00	0.20	171.20	858.96	-2.56	-1.20	2.56	0.72
939.00	0.00	0.00	938.96	-2.70	-1.18	2.69	0.25
1,019.00	0.10	197.20	1,018.96	-2.76	-1.20	2.76	0.12
1,035.00	0.00	0.00	1,034.96	-2.78	-1.20	2.77	0.62
1,068.10	0.00	0.00	1,068.06	-2.78	-1.20	2.77	0.00
9 5/8"							
1,080.00	0.00	0.00	1,079.96	-2.78	-1.20	2.77	0.00
Tie-On to Surface Surveys @ 1080.00ft							
1,171.00	0.10	318.43	1,170.96	-2.72	-1.26	2.71	0.11
1,263.00	0.20	341.63	1,262.96	-2.51	-1.36	2.50	0.13
1,445.00	0.19	331.86	1,444.96	-1.94	-1.60	1.93	0.02
1,536.00	0.34	302.23	1,535.96	-1.66	-1.90	1.66	0.22
1,588.00	0.26	324.54	1,587.96	-1.48	-2.10	1.48	0.27
1,771.00	0.28	276.81	1,770.96	-1.09	-2.78	1.08	0.12
1,863.00	0.45	269.40	1,862.96	-1.07	-3.37	1.06	0.19
1,954.00	0.65	260.73	1,953.95	-1.15	-4.24	1.14	0.24
2,045.00	0.81	255.66	2,044.95	-1.40	-5.37	1.38	0.19
2,137.00	0.75	258.72	2,136.94	-1.68	-6.59	1.66	0.08
2,228.00	0.61	257.94	2,227.93	-1.89	-7.65	1.87	0.15
2,320.00	0.79	270.46	2,319.92	-1.99	-8.76	1.97	0.26
2,412.00	1.11	284.06	2,411.91	-1.77	-10.26	1.74	0.42
2,503.00	0.88	226.83	2,502.90	-2.03	-11.62	2.00	1.07
2,594.00	1.34	136.36	2,593.89	-3.28	-11.40	3.25	1.77
2,686.00	2.27	84.90	2,685.85	-3.90	-8.84	3.88	1.93
2,778.00	2.11	83.95	2,777.78	-3.56	-5.34	3.54	0.18
2,871.00	1.99	82.65	2,870.72	-3.17	-2.04	3.17	0.14
2,963.00	1.90	83.18	2,962.67	-2.79	1.06	2.79	0.10
3,057.00	1.83	92.78	3,056.62	-2.67	4.11	2.68	0.34
3,148.00	1.73	100.44	3,147.57	-2.99	6.91	3.01	0.28
3,240.00	1.56	93.53	3,239.53	-3.32	9.52	3.35	0.28
3,333.00	1.48	87.17	3,332.50	-3.34	11.99	3.37	0.20
3,425.00	1.47	74.36	3,424.47	-2.96	14.31	3.00	0.36
3,518.00	1.28	49.36	3,517.45	-1.97	16.25	2.01	0.67
3,609.00	1.36	84.25	3,608.42	-1.19	18.09	1.24	0.87
3,701.00	1.14	157.26	3,700.41	-1.93	19.53	1.98	1.63
3,793.00	0.85	160.11	3,792.39	-3.42	20.12	3.47	0.32
3,885.00	2.25	112.82	3,884.36	-4.76	22.02	4.82	1.94
3,978.00	3.69	106.90	3,977.23	-6.34	26.56	6.41	1.58

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,070.00	3.70	106.86	4,069.04	-8.06	32.24	8.14	0.01
4,162.00	5.20	96.23	4,160.76	-9.37	39.22	9.47	1.85
4,255.00	6.49	100.91	4,253.28	-10.82	48.57	10.95	1.48
4,349.00	7.25	99.60	4,346.60	-12.82	59.64	12.97	0.83
4,443.00	10.14	95.33	4,439.51	-14.58	73.73	14.77	3.15
4,537.00	11.28	92.49	4,531.87	-15.74	91.15	15.98	1.34
4,631.00	12.48	90.80	4,623.86	-16.29	110.49	16.57	1.33
4,725.00	11.68	91.19	4,715.78	-16.62	130.16	16.97	0.86
4,819.00	9.74	86.07	4,808.14	-16.28	147.61	16.66	2.30
4,913.00	8.08	84.98	4,901.00	-15.15	162.12	15.58	1.77
5,007.00	9.60	95.11	4,993.89	-15.27	176.51	15.74	2.31
5,101.00	10.94	101.36	5,086.38	-17.73	193.07	18.23	1.85
5,195.00	9.40	97.42	5,178.90	-20.48	209.42	21.03	1.80
5,289.00	9.90	91.96	5,271.57	-21.75	225.11	22.33	1.11
5,383.00	11.50	97.61	5,363.94	-23.26	242.48	23.90	2.03
5,477.00	9.64	94.74	5,456.34	-25.15	259.61	25.83	2.06
5,571.00	10.19	100.53	5,548.94	-27.32	275.63	28.05	1.21
5,665.00	11.56	94.98	5,641.25	-29.66	293.19	30.43	1.83
5,759.00	10.53	92.83	5,733.51	-30.90	311.15	31.72	1.18
5,854.00	10.98	101.52	5,826.85	-33.14	328.69	34.00	1.77
5,948.00	8.76	95.01	5,919.45	-35.55	344.59	36.45	2.64
6,043.00	8.00	93.22	6,013.44	-36.56	358.40	37.49	0.85
6,231.00	8.93	94.75	6,199.39	-38.50	386.00	39.51	0.51
6,326.00	9.82	102.49	6,293.12	-40.86	401.26	41.91	1.62
6,421.00	7.71	98.68	6,387.01	-43.58	415.47	44.66	2.30
6,515.00	6.41	92.28	6,480.29	-44.74	426.95	45.85	1.61
6,610.00	4.88	87.33	6,574.83	-44.76	436.29	45.90	1.69
6,704.00	3.11	87.00	6,668.60	-44.44	442.83	45.60	1.88
6,799.00	1.15	121.52	6,763.53	-44.80	446.21	45.97	2.38
6,846.00	1.54	150.48	6,810.52	-45.60	446.93	46.77	1.64
6,893.00	3.25	177.22	6,857.48	-47.48	447.30	48.65	4.25
6,940.00	5.96	190.23	6,904.32	-51.21	446.93	52.38	6.14
6,987.00	8.24	190.57	6,950.96	-56.92	445.88	58.09	4.85
7,034.00	11.12	190.09	6,997.29	-64.70	444.47	65.86	6.13
7,082.00	13.95	188.59	7,044.14	-74.98	442.79	76.14	5.93
7,129.00	17.20	189.06	7,089.40	-87.45	440.85	88.60	6.92
7,176.00	20.08	187.57	7,133.94	-102.31	438.70	103.46	6.21
7,223.00	22.98	185.11	7,177.65	-119.45	436.81	120.59	6.46
7,271.00	24.36	186.94	7,221.61	-138.61	434.78	139.75	3.26
7,365.00	34.76	185.07	7,303.27	-184.67	430.06	185.80	11.11
7,412.00	41.20	184.99	7,340.30	-213.47	427.53	214.59	13.70
7,460.00	48.22	183.98	7,374.39	-247.12	424.91	248.23	14.70
7,507.00	56.40	181.90	7,403.10	-284.23	423.04	285.33	17.75
7,554.00	64.87	179.97	7,426.13	-325.14	422.40	326.25	18.37
7,601.00	73.44	179.62	7,442.84	-369.03	422.56	370.13	18.25
7,647.00	82.40	177.15	7,452.45	-413.94	423.84	415.05	20.17
7,682.00	86.00	176.73	7,455.99	-448.70	425.70	449.82	10.36
7"							
7,723.00	90.22	176.25	7,457.34	-489.60	428.21	490.72	10.36
7,817.00	90.09	175.90	7,457.09	-583.37	434.64	584.51	0.40
7,912.00	90.03	174.93	7,456.99	-678.07	442.24	679.22	1.02

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,007.00	89.94	177.86	7,457.01	-772.87	448.21	774.04	3.09
8,101.00	90.99	181.37	7,456.25	-866.85	448.84	868.02	3.90
8,196.00	89.17	181.76	7,456.12	-961.81	446.25	962.98	1.96
8,290.00	88.40	181.36	7,458.11	-1,055.75	443.69	1,056.91	0.92
8,385.00	88.52	181.59	7,460.66	-1,150.69	441.24	1,151.84	0.27
8,479.00	88.03	181.30	7,463.49	-1,244.61	438.87	1,245.76	0.61
8,573.00	89.51	181.63	7,465.51	-1,338.56	436.47	1,339.70	1.61
8,668.00	89.48	181.31	7,466.35	-1,433.52	434.03	1,434.66	0.34
8,762.00	89.48	181.48	7,467.20	-1,527.49	431.75	1,528.62	0.18
8,856.00	89.38	181.65	7,468.14	-1,621.45	429.18	1,622.57	0.21
8,951.00	88.55	181.51	7,469.85	-1,716.40	426.56	1,717.51	0.89
9,046.00	88.28	180.94	7,472.48	-1,811.34	424.53	1,812.45	0.66
9,140.00	90.28	180.97	7,473.66	-1,905.32	422.96	1,906.42	2.13
9,234.00	90.19	181.32	7,473.28	-1,999.30	421.08	2,000.39	0.38
9,329.00	89.20	179.09	7,473.78	-2,094.29	420.74	2,095.38	2.57
9,423.00	89.41	179.66	7,474.92	-2,188.27	421.77	2,189.37	0.65
9,517.00	88.68	178.02	7,476.49	-2,282.24	423.67	2,283.34	1.91
9,611.00	88.71	177.54	7,478.63	-2,376.14	427.31	2,377.25	0.51
9,705.00	89.82	178.11	7,479.84	-2,470.07	430.88	2,471.19	1.33
9,800.00	90.92	178.64	7,479.22	-2,565.02	433.57	2,566.15	1.29
9,895.00	90.22	178.45	7,478.28	-2,659.99	435.99	2,661.12	0.76
9,989.00	90.03	178.12	7,478.07	-2,753.95	438.80	2,755.09	0.41
10,084.00	89.69	177.53	7,478.30	-2,848.88	442.40	2,850.02	0.72
10,176.00	89.78	179.50	7,478.73	-2,940.84	444.79	2,941.99	2.14
10,267.00	89.66	181.33	7,479.17	-3,031.83	444.13	3,032.98	2.02
10,359.00	88.64	180.88	7,480.54	-3,123.80	442.36	3,124.95	1.21
10,450.00	88.46	180.29	7,482.84	-3,214.77	441.43	3,215.91	0.68
10,541.00	88.67	180.13	7,485.12	-3,305.74	441.09	3,306.88	0.29
10,633.00	88.24	179.09	7,487.60	-3,397.70	441.72	3,398.85	1.22
10,724.00	89.26	180.38	7,489.59	-3,488.68	442.14	3,489.82	1.81
10,816.00	89.88	180.70	7,490.28	-3,580.67	441.27	3,581.81	0.76
10,908.00	89.69	180.15	7,490.62	-3,672.67	440.59	3,673.81	0.63
10,999.00	90.93	180.72	7,490.13	-3,763.66	439.90	3,764.80	1.50
11,090.00	90.52	180.32	7,488.98	-3,854.65	439.07	3,855.79	0.63
11,181.00	90.18	180.84	7,488.42	-3,945.64	438.15	3,946.78	0.68
11,274.00	88.83	179.46	7,489.23	-4,038.63	437.91	4,039.77	2.08
11,366.00	88.80	179.38	7,491.13	-4,130.61	438.84	4,131.74	0.09
11,459.00	88.71	178.47	7,493.15	-4,223.57	440.58	4,224.71	0.98
11,551.00	88.46	177.44	7,495.42	-4,315.48	443.87	4,316.63	1.15
11,645.00	88.86	178.61	7,497.62	-4,409.40	447.10	4,410.55	1.32
11,736.00	90.59	180.33	7,498.06	-4,500.39	447.95	4,501.54	2.68
11,827.00	91.05	179.96	7,496.75	-4,591.38	447.72	4,592.53	0.65
11,920.00	91.11	179.11	7,495.00	-4,684.36	448.47	4,685.52	0.92
12,013.00	90.31	179.37	7,493.85	-4,777.34	449.70	4,778.50	0.90
12,105.00	90.43	178.79	7,493.25	-4,869.33	451.18	4,870.49	0.64
12,197.00	90.34	178.66	7,492.64	-4,961.30	453.23	4,962.47	0.17
12,288.00	90.28	180.78	7,492.14	-5,052.29	453.67	5,053.46	2.33
12,380.00	90.22	180.14	7,491.74	-5,144.29	452.93	5,145.46	0.70
12,473.00	90.06	179.81	7,491.52	-5,237.29	452.97	5,238.46	0.39
12,565.00	90.55	178.70	7,491.03	-5,329.28	454.17	5,330.45	1.32
12,657.00	90.40	178.47	7,490.26	-5,421.25	456.44	5,422.42	0.30

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,750.00	89.85	179.66	7,490.06	-5,514.23	457.96	5,515.41	1.41
12,842.00	89.38	178.40	7,490.68	-5,606.22	459.52	5,607.40	1.46
12,936.00	89.38	180.15	7,491.70	-5,700.20	460.71	5,701.39	1.86
13,031.00	88.92	180.76	7,493.10	-5,795.18	459.95	5,796.37	0.80
13,125.00	88.98	180.17	7,494.83	-5,889.17	459.19	5,890.35	0.63
13,219.00	89.29	180.72	7,496.25	-5,983.15	458.46	5,984.33	0.67
13,313.00	89.29	180.43	7,497.41	-6,077.14	457.52	6,078.32	0.31
13,408.00	89.60	179.99	7,498.33	-6,172.13	457.17	6,173.31	0.57
13,502.00	90.18	180.20	7,498.51	-6,266.13	457.01	6,267.31	0.66
13,596.00	89.85	178.28	7,498.49	-6,360.12	458.26	6,361.30	2.07
13,690.00	91.05	180.41	7,497.75	-6,454.10	459.33	6,455.28	2.60
13,784.00	89.91	180.78	7,496.96	-6,548.09	458.36	6,549.27	1.28
13,879.00	89.69	179.22	7,497.29	-6,643.09	458.36	6,644.27	1.66
13,973.00	89.69	179.32	7,497.80	-6,737.08	459.56	6,738.26	0.11
14,067.00	89.63	178.65	7,498.36	-6,831.06	461.22	6,832.25	0.72
14,162.00	89.85	178.47	7,498.79	-6,926.03	463.61	6,927.22	0.30
14,256.00	89.94	179.43	7,498.96	-7,020.02	465.33	7,021.21	1.03
14,351.00	90.18	179.25	7,498.86	-7,115.01	466.42	7,116.21	0.32
14,445.00	90.00	178.02	7,498.72	-7,208.98	468.66	7,210.18	1.32
14,540.00	90.25	178.71	7,498.51	-7,303.94	471.37	7,305.15	0.77
14,634.00	89.57	178.94	7,498.66	-7,397.92	473.30	7,399.13	0.76
14,728.00	89.38	177.72	7,499.52	-7,491.88	476.04	7,493.10	1.31
14,823.00	89.63	179.03	7,500.34	-7,586.83	478.73	7,588.06	1.40
14,917.00	90.22	179.39	7,500.46	-7,680.82	480.03	7,682.05	0.74
15,012.00	90.15	178.27	7,500.15	-7,775.80	481.97	7,777.04	1.18
15,106.00	91.26	179.25	7,499.00	-7,869.77	484.00	7,871.01	1.58
15,201.00	90.83	178.46	7,497.27	-7,964.73	485.90	7,965.98	0.95
15,295.00	88.89	179.48	7,497.50	-8,058.71	487.59	8,059.96	2.33
15,389.00	89.11	178.88	7,499.14	-8,152.69	488.94	8,153.94	0.68
15,484.00	89.54	180.37	7,500.25	-8,247.68	489.56	8,248.93	1.63
15,578.00	90.74	180.16	7,500.03	-8,341.67	489.12	8,342.92	1.30
15,672.00	91.14	179.35	7,498.48	-8,435.66	489.53	8,436.91	0.96
15,766.00	89.60	179.23	7,497.88	-8,529.65	490.69	8,530.90	1.64
15,861.00	87.50	177.06	7,500.28	-8,624.55	493.76	8,625.82	3.18
15,955.00	90.18	179.92	7,502.18	-8,718.48	496.24	8,719.75	4.17
16,050.00	90.19	179.21	7,501.88	-8,813.48	496.96	8,814.75	0.75
16,144.00	90.43	178.37	7,501.37	-8,907.46	498.95	8,908.73	0.93
16,239.00	89.85	180.86	7,501.14	-9,002.45	499.58	9,003.72	2.69
16,333.00	90.22	180.25	7,501.08	-9,096.44	498.67	9,097.72	0.76
16,428.00	90.62	179.90	7,500.38	-9,191.44	498.55	9,192.71	0.56
16,522.00	90.62	179.06	7,499.36	-9,285.43	499.40	9,286.70	0.89
16,616.00	90.49	179.25	7,498.45	-9,379.41	500.79	9,380.69	0.24
16,711.00	90.71	179.29	7,497.46	-9,474.40	502.00	9,475.68	0.24
16,805.00	89.78	179.69	7,497.06	-9,568.40	502.83	9,569.68	1.08
16,899.00	89.69	178.08	7,497.49	-9,662.37	504.66	9,663.66	1.72
16,994.00	90.03	179.41	7,497.72	-9,757.35	506.74	9,758.64	1.45
17,088.00	90.25	182.21	7,497.49	-9,851.33	505.42	9,852.62	2.99
17,183.00	90.46	181.69	7,496.91	-9,946.27	502.18	9,947.55	0.59
17,277.00	90.18	180.06	7,496.38	-10,040.26	500.75	10,041.53	1.76
17,372.00	90.31	179.10	7,495.97	-10,135.25	501.44	10,136.53	1.02
17,466.00	89.75	177.58	7,495.93	-10,229.21	504.17	10,230.49	1.72

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
17,561.00	88.80	176.19	7,497.13	-10,324.06	509.33	10,325.36	1.77
17,656.00	89.01	175.23	7,498.94	-10,418.77	516.43	10,420.09	1.03
17,750.00	90.15	175.89	7,499.63	-10,512.49	523.71	10,513.82	1.40
17,819.00	90.52	174.83	7,499.23	-10,581.26	529.29	10,582.61	1.63
Final MWD Survey @ 17819.00' MD :: 7499.23' TVD							
17,867.00	90.52	174.83	7,498.79	-10,629.06	533.62	10,630.42	0.00
Straight Line Projection to Bit @ 17867.00' MD :: 7498.79' TVD - Current MWD Survey @ 7412' MD :: 7340.17' TVD - KERI							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,080.00	1,079.96	-2.78	-1.20	Tie-On to Surface Surveys @ 1080.00ft
17,819.00	7,499.23	-10,581.26	529.29	Final MWD Survey @ 17819.00' MD :: 7499.23' TVD
17,867.00	7,498.79	-10,629.06	533.62	Straight Line Projection to Bit @ 17867.00' MD :: 7498.79' TVD
17,867.00	7,498.79	-10,629.06	533.62	Current MWD Survey @ 7412' MD :: 7340.17' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.85	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
20.00	1,080.00	Cathedral MWD Surface Surveys	MWD
1,171.00	7,723.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,817.00	17,867.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,068.10	1,068.06	9 5/8"	9-5/8	13-1/2
7,682.00	7,455.99	7"	7	8-3/4

Design Report for KERR 13C-25HZ - Actual Field Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KERR 13C-25HZ_SEC	0.00	0.00	0.00	0.01	0.00	1,291,306.41	3,182,743.89	40.131181	-104.846438
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	10,399.25	-562.98	1,301,700.80	3,182,104.30	
Point 2				0.00	10,331.09	2,058.65	1,301,651.96	3,184,726.26	
Point 3				0.00	10,297.06	3,369.41	1,301,627.60	3,186,037.18	
Point 4				0.00	10,262.85	4,680.23	1,301,603.05	3,187,348.16	
Point 5				0.00	7,653.75	4,664.00	1,298,994.01	3,187,351.16	
Point 6				0.00	5,045.22	4,648.14	1,296,385.54	3,187,354.53	
Point 7				0.00	5,084.51	2,030.78	1,296,405.54	3,184,737.06	
Point 8				0.00	5,125.32	-583.86	1,296,427.07	3,182,122.29	
Point 9				0.00	5,084.51	2,030.78	1,296,405.54	3,184,737.06	
Point 10				0.00	5,045.22	4,648.14	1,296,385.54	3,187,354.53	
Point 11				0.00	2,434.54	4,634.76	1,293,774.94	3,187,360.39	
Point 12				0.00	-175.50	4,620.52	1,291,164.97	3,187,365.39	
Point 13				0.00	-161.56	2,007.20	1,291,159.65	3,184,752.14	
Point 14				0.00	-146.54	-605.60	1,291,155.41	3,182,139.41	
Point 15				0.00	-161.56	2,007.20	1,291,159.65	3,184,752.14	
Point 16				0.00	-175.50	4,620.52	1,291,164.97	3,187,365.39	
Point 17				0.00	-2,786.15	4,605.95	1,288,554.39	3,187,370.06	
Point 18				0.00	-5,396.92	4,591.26	1,285,943.69	3,187,374.61	
Point 19				0.00	-5,409.00	1,980.65	1,285,912.37	3,184,764.27	
Point 20				0.00	-5,408.50	-628.85	1,285,893.64	3,182,154.94	
Point 21				0.00	-5,409.00	1,980.65	1,285,912.37	3,184,764.27	
Point 22				0.00	-5,396.92	4,591.26	1,285,943.69	3,187,374.61	
Point 23				0.00	-10,700.63	4,602.97	1,280,640.43	3,187,425.41	
Point 24				0.00	-10,670.82	1,969.40	1,280,650.83	3,184,791.80	
Point 25				0.00	-10,639.73	-675.94	1,280,662.42	3,182,146.41	
Point 26				0.00	-8,001.44	-649.57	1,283,300.72	3,182,153.33	
Point 27				0.00	-5,408.50	-628.85	1,285,893.64	3,182,154.94	
Point 28				0.00	-2,781.05	-616.86	1,288,521.00	3,182,147.57	
Point 29				0.00	-146.57	-601.72	1,291,155.41	3,182,143.29	
Point 30				0.00	2,490.01	-594.66	1,293,791.86	3,182,130.92	
Point 31				0.00	5,125.32	-583.86	1,296,427.07	3,182,122.29	
Point 32				0.00	7,763.05	-575.23	1,299,064.69	3,182,111.48	
KERR 13C-25HZ_SHL	0.00	0.00	0.00	0.01	0.00	1,291,306.41	3,182,743.89	40.131181	-104.846438
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
KERR 13C-25HZ_LD	0.00	0.00	0.00	0.01	0.00	1,291,306.41	3,182,743.89	40.131181	-104.846438
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	-611.43	238.60	1,290,696.78	3,182,986.98	
Point 2				0.00	-616.71	1,158.63	1,290,698.28	3,183,906.98	
Point 3				0.00	-5,408.84	1,135.93	1,285,906.31	3,183,919.60	
Point 4				0.00	-9,341.86	1,134.68	1,281,973.55	3,183,947.34	
Point 5				0.00	-11,519.74	1,106.20	1,279,795.60	3,183,934.91	
Point 6				0.00	-11,506.62	186.16	1,279,801.94	3,183,014.84	
Point 7				0.00	-5,408.66	215.88	1,285,899.71	3,182,999.61	
KERR 13C-25HZ_Lat	0.00	0.00	7,501.00	-4,000.00	466.80	1,287,310.12	3,183,240.14	40.120201	-104.844769
- actual wellpath misses target center by 31.59usft at 11235.39usft MD (7488.63 TVD, -4000.03 N, 437.74 E)									
- Point									
KERR 13C-25HZ_Bhl	0.00	0.00	7,506.00	-10,645.00	484.00	1,280,665.69	3,183,306.31	40.101960	-104.844708
- actual wellpath misses target center by 52.61usft at 17867.00usft MD (7498.79 TVD, -10629.06 N, 533.62 E)									
- Point									

Design Report for KERR 13C-25HZ - Actual Field Surveys

Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	20.17 °/100usft at 7,647.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.861

Audit Info

North Reference Sheet for Sec. 13-T2N-R67W - KERR 13C-25HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 25' @ 4916.00usft (H&P 308). Northing and Easting are relative to KERR 13C-25HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995901

Grid Coordinates of Well: 1,291,306.40 usft N, 3,182,743.89 usft E

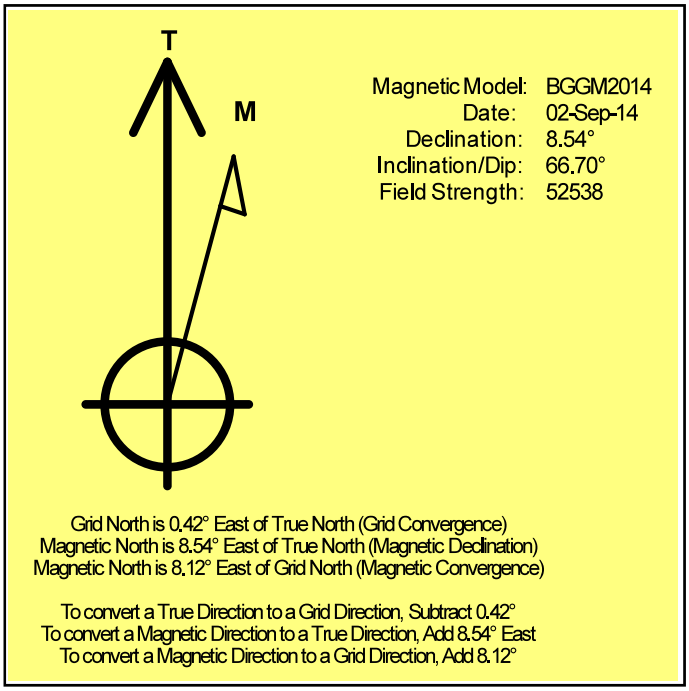
Geographical Coordinates of Well: 40° 07' 52.25" N, 104° 50' 47.18" W

Grid Convergence at Surface is: 0.42°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,867.00usft

the Bottom Hole Displacement is 10,642.45usft in the Direction of 177.13° (True).

Magnetic Convergence at surface is: -8.12° (2 September 2014, , BGGM2014)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)
Sec. 13-T2N-R67W
KERR 13C-25HZ
API: 05-123-39354 :: Job #: 901641312
Plan A

Design: Actual Field Surveys

Sperry Drilling Services

Geodetic Report

16 December, 2014

Well Coordinates: 1,291,306.40 N, 3,182,743.89 E (40° 07' 52.25" N, 104° 50' 47.18" W)
Ground Level: 4,891.00 usft

Local Coordinate Origin:	Centered on Well KERR 13C-25HZ
Viewing Datum:	RKB = 25' @ 4916.00usft (H&P 308)
TVDs to System:	N
North Reference:	True
Unit System:	Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 5000.1 Build: 70

HALLIBURTON

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.131181	-104.846438	1,291,306.40	3,182,743.89
20.00	0.00	0.00	20.00	0.00	0.00	40.131181	-104.846438	1,291,306.40	3,182,743.89
71.00	0.60	257.70	71.00	-0.06	-0.26	40.131181	-104.846439	1,291,306.34	3,182,743.63
142.00	0.60	232.90	142.00	-0.36	-0.92	40.131180	-104.846442	1,291,306.03	3,182,742.97
210.00	0.60	265.90	209.99	-0.60	-1.56	40.131179	-104.846444	1,291,305.79	3,182,742.33
299.00	0.70	259.40	298.99	-0.73	-2.56	40.131179	-104.846447	1,291,305.65	3,182,741.33
379.00	0.50	211.60	378.98	-1.12	-3.22	40.131178	-104.846450	1,291,305.25	3,182,740.67
459.00	0.50	218.00	458.98	-1.69	-3.62	40.131176	-104.846451	1,291,304.68	3,182,740.28
539.00	0.30	179.80	538.98	-2.18	-3.83	40.131175	-104.846452	1,291,304.19	3,182,740.07
619.00	0.70	77.70	618.98	-2.28	-3.36	40.131175	-104.846450	1,291,304.09	3,182,740.55
699.00	0.60	98.20	698.97	-2.24	-2.46	40.131175	-104.846447	1,291,304.14	3,182,741.44
779.00	0.60	98.40	778.97	-2.36	-1.63	40.131175	-104.846444	1,291,304.03	3,182,742.27
859.00	0.20	171.20	858.96	-2.56	-1.20	40.131174	-104.846443	1,291,303.83	3,182,742.71
939.00	0.00	0.00	938.96	-2.70	-1.18	40.131174	-104.846442	1,291,303.69	3,182,742.73
1,019.00	0.10	197.20	1,018.96	-2.76	-1.20	40.131173	-104.846443	1,291,303.63	3,182,742.71
1,035.00	0.00	0.00	1,034.96	-2.78	-1.20	40.131173	-104.846443	1,291,303.61	3,182,742.71
1,068.10	0.00	0.00	1,068.06	-2.78	-1.20	40.131173	-104.846443	1,291,303.61	3,182,742.71
1,080.00	0.00	0.00	1,079.96	-2.78	-1.20	40.131173	-104.846443	1,291,303.61	3,182,742.71
1,171.00	0.10	318.43	1,170.96	-2.72	-1.26	40.131174	-104.846443	1,291,303.67	3,182,742.65
1,263.00	0.20	341.63	1,262.96	-2.51	-1.36	40.131174	-104.846443	1,291,303.88	3,182,742.55
1,445.00	0.19	331.86	1,444.96	-1.94	-1.60	40.131176	-104.846444	1,291,304.45	3,182,742.30
1,536.00	0.34	302.23	1,535.96	-1.66	-1.90	40.131176	-104.846445	1,291,304.72	3,182,742.00
1,588.00	0.26	324.54	1,587.96	-1.48	-2.10	40.131177	-104.846446	1,291,304.90	3,182,741.80
1,771.00	0.28	276.81	1,770.96	-1.09	-2.78	40.131178	-104.846448	1,291,305.29	3,182,741.11
1,863.00	0.45	269.40	1,862.96	-1.07	-3.37	40.131178	-104.846450	1,291,305.31	3,182,740.53
1,954.00	0.65	260.73	1,953.95	-1.15	-4.24	40.131178	-104.846453	1,291,305.21	3,182,739.66
2,045.00	0.81	255.66	2,044.95	-1.40	-5.37	40.131177	-104.846457	1,291,304.96	3,182,738.53
2,137.00	0.75	258.72	2,136.94	-1.68	-6.59	40.131176	-104.846462	1,291,304.67	3,182,737.31
2,228.00	0.61	257.94	2,227.93	-1.89	-7.65	40.131176	-104.846466	1,291,304.45	3,182,736.26
2,320.00	0.79	270.46	2,319.92	-1.99	-8.76	40.131176	-104.846470	1,291,304.34	3,182,735.14
2,412.00	1.11	284.06	2,411.91	-1.77	-10.26	40.131176	-104.846475	1,291,304.55	3,182,733.64
2,503.00	0.88	226.83	2,502.90	-2.03	-11.62	40.131175	-104.846480	1,291,304.28	3,182,732.28
2,594.00	1.34	136.36	2,593.89	-3.28	-11.40	40.131172	-104.846479	1,291,303.03	3,182,732.51
2,686.00	2.27	84.90	2,685.85	-3.90	-8.84	40.131170	-104.846470	1,291,302.43	3,182,735.08
2,778.00	2.11	83.95	2,777.78	-3.56	-5.34	40.131171	-104.846457	1,291,302.80	3,182,738.57
2,871.00	1.99	82.65	2,870.72	-3.17	-2.04	40.131172	-104.846446	1,291,303.21	3,182,741.87
2,963.00	1.90	83.18	2,962.67	-2.79	1.06	40.131173	-104.846434	1,291,303.62	3,182,744.97
3,057.00	1.83	92.78	3,056.62	-2.67	4.11	40.131174	-104.846424	1,291,303.76	3,182,748.01
3,148.00	1.73	100.44	3,147.57	-2.99	6.91	40.131173	-104.846414	1,291,303.46	3,182,750.82
3,240.00	1.56	93.53	3,239.53	-3.32	9.52	40.131172	-104.846404	1,291,303.15	3,182,753.44
3,333.00	1.48	87.17	3,332.50	-3.34	11.99	40.131172	-104.846395	1,291,303.15	3,182,755.90
3,425.00	1.47	74.36	3,424.47	-2.96	14.31	40.131173	-104.846387	1,291,303.54	3,182,758.22

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
3,518.00	1.28	49.36	3,517.45	-1.97	16.25	40.131176	-104.846380	1,291,304.55	3,182,760.15
3,609.00	1.36	84.25	3,608.42	-1.19	18.09	40.131178	-104.846374	1,291,305.34	3,182,761.99
3,701.00	1.14	157.26	3,700.41	-1.93	19.53	40.131176	-104.846368	1,291,304.61	3,182,763.43
3,793.00	0.85	160.11	3,792.39	-3.42	20.12	40.131172	-104.846366	1,291,303.13	3,182,764.03
3,885.00	2.25	112.82	3,884.36	-4.76	22.02	40.131168	-104.846360	1,291,301.80	3,182,765.94
3,978.00	3.69	106.90	3,977.23	-6.34	26.56	40.131164	-104.846343	1,291,300.26	3,182,770.50
4,070.00	3.70	106.86	4,069.04	-8.06	32.24	40.131159	-104.846323	1,291,298.58	3,182,776.18
4,162.00	5.20	96.23	4,160.76	-9.37	39.22	40.131155	-104.846298	1,291,297.32	3,182,783.18
4,255.00	6.49	100.91	4,253.28	-10.82	48.57	40.131151	-104.846265	1,291,295.93	3,182,792.54
4,349.00	7.25	99.60	4,346.60	-12.82	59.64	40.131146	-104.846225	1,291,294.02	3,182,803.62
4,443.00	10.14	95.33	4,439.51	-14.58	73.73	40.131141	-104.846175	1,291,292.37	3,182,817.72
4,537.00	11.28	92.49	4,531.87	-15.74	91.15	40.131138	-104.846112	1,291,291.33	3,182,835.15
4,631.00	12.48	90.80	4,623.86	-16.29	110.49	40.131136	-104.846043	1,291,290.93	3,182,854.49
4,725.00	11.68	91.19	4,715.78	-16.62	130.16	40.131135	-104.845973	1,291,290.73	3,182,874.16
4,819.00	9.74	86.07	4,808.14	-16.28	147.61	40.131136	-104.845910	1,291,291.21	3,182,891.61
4,913.00	8.08	84.98	4,901.00	-15.15	162.12	40.131139	-104.845858	1,291,292.44	3,182,906.11
5,007.00	9.60	95.11	4,993.89	-15.27	176.51	40.131139	-104.845807	1,291,292.43	3,182,920.50
5,101.00	10.94	101.36	5,086.38	-17.73	193.07	40.131132	-104.845748	1,291,290.09	3,182,937.07
5,195.00	9.40	97.42	5,178.90	-20.48	209.42	40.131125	-104.845689	1,291,287.47	3,182,953.45
5,289.00	9.90	91.96	5,271.57	-21.75	225.11	40.131121	-104.845633	1,291,286.31	3,182,969.15
5,383.00	11.50	97.61	5,363.94	-23.26	242.48	40.131117	-104.845571	1,291,284.92	3,182,986.52
5,477.00	9.64	94.74	5,456.34	-25.15	259.61	40.131112	-104.845510	1,291,283.16	3,183,003.67
5,571.00	10.19	100.53	5,548.94	-27.32	275.63	40.131106	-104.845453	1,291,281.11	3,183,019.70
5,665.00	11.56	94.98	5,641.25	-29.66	293.19	40.131100	-104.845390	1,291,278.90	3,183,037.28
5,759.00	10.53	92.83	5,733.51	-30.90	311.15	40.131096	-104.845326	1,291,277.79	3,183,055.25
5,854.00	10.98	101.52	5,826.85	-33.14	328.69	40.131090	-104.845263	1,291,275.68	3,183,072.80
5,948.00	8.76	95.01	5,919.45	-35.55	344.59	40.131083	-104.845206	1,291,273.39	3,183,088.72
6,043.00	8.00	93.22	6,013.44	-36.56	358.40	40.131081	-104.845157	1,291,272.49	3,183,102.53
6,231.00	8.93	94.75	6,199.39	-38.50	386.00	40.131075	-104.845058	1,291,270.75	3,183,130.15
6,326.00	9.82	102.49	6,293.12	-40.86	401.26	40.131069	-104.845003	1,291,268.50	3,183,145.42
6,421.00	7.71	98.68	6,387.01	-43.58	415.47	40.131061	-104.844952	1,291,265.89	3,183,159.65
6,515.00	6.41	92.28	6,480.29	-44.74	426.95	40.131058	-104.844911	1,291,264.81	3,183,171.14
6,610.00	4.88	87.33	6,574.83	-44.76	436.29	40.131058	-104.844878	1,291,264.86	3,183,180.47
6,704.00	3.11	87.00	6,668.60	-44.44	442.83	40.131059	-104.844855	1,291,265.23	3,183,187.01
6,799.00	1.15	121.52	6,763.53	-44.80	446.21	40.131058	-104.844843	1,291,264.89	3,183,190.40
6,846.00	1.54	150.48	6,810.52	-45.60	446.93	40.131056	-104.844840	1,291,264.10	3,183,191.12
6,893.00	3.25	177.22	6,857.48	-47.48	447.30	40.131051	-104.844839	1,291,262.22	3,183,191.51
6,940.00	5.96	190.23	6,904.32	-51.21	446.93	40.131040	-104.844840	1,291,258.48	3,183,191.17
6,987.00	8.24	190.57	6,950.96	-56.92	445.88	40.131025	-104.844844	1,291,252.76	3,183,190.16
7,034.00	11.12	190.09	6,997.29	-64.70	444.47	40.131003	-104.844849	1,291,244.98	3,183,188.80
7,082.00	13.95	188.59	7,044.14	-74.98	442.79	40.130975	-104.844855	1,291,234.69	3,183,187.20
7,129.00	17.20	189.06	7,089.40	-87.45	440.85	40.130941	-104.844862	1,291,222.21	3,183,185.36

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
7,176.00	20.08	187.57	7,133.94	-102.31	438.70	40.130900	-104.844869	1,291,207.33	3,183,183.31
7,223.00	22.98	185.11	7,177.65	-119.45	436.81	40.130853	-104.844876	1,291,190.17	3,183,181.55
7,271.00	24.36	186.94	7,221.61	-138.61	434.78	40.130800	-104.844883	1,291,171.00	3,183,179.66
7,365.00	34.76	185.07	7,303.27	-184.67	430.06	40.130674	-104.844900	1,291,124.91	3,183,175.28
7,412.00	41.20	184.99	7,340.30	-213.47	427.53	40.130595	-104.844909	1,291,096.09	3,183,172.96
7,460.00	48.22	183.98	7,374.39	-247.12	424.91	40.130503	-104.844919	1,291,062.43	3,183,170.59
7,507.00	56.40	181.90	7,403.10	-284.23	423.04	40.130401	-104.844925	1,291,025.31	3,183,168.99
7,554.00	64.87	179.97	7,426.13	-325.14	422.40	40.130288	-104.844928	1,290,984.39	3,183,168.65
7,601.00	73.44	179.62	7,442.84	-369.03	422.56	40.130168	-104.844927	1,290,940.51	3,183,169.14
7,647.00	82.40	177.15	7,452.45	-413.94	423.84	40.130045	-104.844923	1,290,895.61	3,183,170.75
7,682.00	86.00	176.73	7,455.99	-448.70	425.70	40.129949	-104.844916	1,290,860.86	3,183,172.87
7,723.00	90.22	176.25	7,457.34	-489.60	428.21	40.129837	-104.844907	1,290,819.99	3,183,175.67
7,817.00	90.09	175.90	7,457.09	-583.37	434.64	40.129580	-104.844884	1,290,726.27	3,183,182.80
7,912.00	90.03	174.93	7,456.99	-678.07	442.24	40.129320	-104.844857	1,290,631.63	3,183,191.09
8,007.00	89.94	177.86	7,457.01	-772.87	448.21	40.129059	-104.844835	1,290,536.88	3,183,197.76
8,101.00	90.99	181.37	7,456.25	-866.85	448.84	40.128801	-104.844833	1,290,442.92	3,183,199.09
8,196.00	89.17	181.76	7,456.12	-961.81	446.25	40.128541	-104.844842	1,290,347.94	3,183,197.19
8,290.00	88.40	181.36	7,458.11	-1,055.75	443.69	40.128283	-104.844852	1,290,253.99	3,183,195.33
8,385.00	88.52	181.59	7,460.66	-1,150.69	441.24	40.128022	-104.844860	1,290,159.04	3,183,193.58
8,479.00	88.03	181.30	7,463.49	-1,244.61	438.87	40.127764	-104.844869	1,290,065.10	3,183,191.90
8,573.00	89.51	181.63	7,465.51	-1,338.56	436.47	40.127507	-104.844877	1,289,971.15	3,183,190.19
8,668.00	89.48	181.31	7,466.35	-1,433.52	434.03	40.127246	-104.844886	1,289,876.17	3,183,188.46
8,762.00	89.48	181.48	7,467.20	-1,527.49	431.75	40.126988	-104.844894	1,289,782.19	3,183,186.86
8,856.00	89.38	181.65	7,468.14	-1,621.45	429.18	40.126730	-104.844904	1,289,688.22	3,183,184.99
8,951.00	88.55	181.51	7,469.85	-1,716.40	426.56	40.126469	-104.844913	1,289,593.26	3,183,183.07
9,046.00	88.28	180.94	7,472.48	-1,811.34	424.53	40.126209	-104.844920	1,289,498.31	3,183,181.74
9,140.00	90.28	180.97	7,473.66	-1,905.32	422.96	40.125951	-104.844926	1,289,404.33	3,183,180.86
9,234.00	90.19	181.32	7,473.28	-1,999.30	421.08	40.125693	-104.844933	1,289,310.34	3,183,179.68
9,329.00	89.20	179.09	7,473.78	-2,094.29	420.74	40.125432	-104.844934	1,289,215.35	3,183,180.04
9,423.00	89.41	179.66	7,474.92	-2,188.27	421.77	40.125174	-104.844930	1,289,121.38	3,183,181.76
9,517.00	88.68	178.02	7,476.49	-2,282.24	423.67	40.124916	-104.844923	1,289,027.44	3,183,184.35
9,611.00	88.71	177.54	7,478.63	-2,376.14	427.31	40.124658	-104.844910	1,288,933.57	3,183,188.68
9,705.00	89.82	178.11	7,479.84	-2,470.07	430.88	40.124401	-104.844898	1,288,839.68	3,183,192.94
9,800.00	90.92	178.64	7,479.22	-2,565.02	433.57	40.124140	-104.844888	1,288,744.74	3,183,196.34
9,895.00	90.22	178.45	7,478.28	-2,659.99	435.99	40.123879	-104.844879	1,288,649.80	3,183,199.45
9,989.00	90.03	178.12	7,478.07	-2,753.95	438.80	40.123621	-104.844869	1,288,555.87	3,183,202.95
10,084.00	89.69	177.53	7,478.30	-2,848.88	442.40	40.123361	-104.844856	1,288,460.98	3,183,207.26
10,176.00	89.78	179.50	7,478.73	-2,940.84	444.79	40.123108	-104.844848	1,288,369.04	3,183,210.32
10,267.00	89.66	181.33	7,479.17	-3,031.83	444.13	40.122859	-104.844850	1,288,278.05	3,183,210.33
10,359.00	88.64	180.88	7,480.54	-3,123.80	442.36	40.122606	-104.844857	1,288,186.07	3,183,209.24
10,450.00	88.46	180.29	7,482.84	-3,214.77	441.43	40.122356	-104.844860	1,288,095.10	3,183,208.98
10,541.00	88.67	180.13	7,485.12	-3,305.74	441.09	40.122107	-104.844861	1,288,004.13	3,183,209.31

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
10,633.00	88.24	179.09	7,487.60	-3,397.70	441.72	40.121854	-104.844859	1,287,912.18	3,183,210.62
10,724.00	89.26	180.38	7,489.59	-3,488.68	442.14	40.121604	-104.844857	1,287,821.22	3,183,211.71
10,816.00	89.88	180.70	7,490.28	-3,580.67	441.27	40.121352	-104.844860	1,287,729.22	3,183,211.52
10,908.00	89.69	180.15	7,490.62	-3,672.67	440.59	40.121099	-104.844863	1,287,637.23	3,183,211.52
10,999.00	90.93	180.72	7,490.13	-3,763.66	439.90	40.120850	-104.844865	1,287,546.24	3,183,211.49
11,090.00	90.52	180.32	7,488.98	-3,854.65	439.07	40.120600	-104.844868	1,287,455.25	3,183,211.34
11,181.00	90.18	180.84	7,488.42	-3,945.64	438.15	40.120350	-104.844872	1,287,364.25	3,183,211.09
11,274.00	88.83	179.46	7,489.23	-4,038.63	437.91	40.120095	-104.844872	1,287,271.27	3,183,211.53
11,366.00	88.80	179.38	7,491.13	-4,130.61	438.84	40.119842	-104.844869	1,287,179.30	3,183,213.14
11,459.00	88.71	178.47	7,493.15	-4,223.57	440.58	40.119587	-104.844863	1,287,086.36	3,183,215.57
11,551.00	88.46	177.44	7,495.42	-4,315.48	443.87	40.119335	-104.844851	1,286,994.48	3,183,219.53
11,645.00	88.86	178.61	7,497.62	-4,409.40	447.10	40.119077	-104.844840	1,286,900.59	3,183,223.46
11,736.00	90.59	180.33	7,498.06	-4,500.39	447.95	40.118827	-104.844837	1,286,809.62	3,183,224.97
11,827.00	91.05	179.96	7,496.75	-4,591.38	447.72	40.118577	-104.844837	1,286,718.63	3,183,225.41
11,920.00	91.11	179.11	7,495.00	-4,684.36	448.47	40.118322	-104.844835	1,286,625.67	3,183,226.85
12,013.00	90.31	179.37	7,493.85	-4,777.34	449.70	40.118067	-104.844830	1,286,532.70	3,183,228.77
12,105.00	90.43	178.79	7,493.25	-4,869.33	451.18	40.117815	-104.844825	1,286,440.73	3,183,230.92
12,197.00	90.34	178.66	7,492.64	-4,961.30	453.23	40.117562	-104.844818	1,286,348.77	3,183,233.65
12,288.00	90.28	180.78	7,492.14	-5,052.29	453.67	40.117312	-104.844816	1,286,257.79	3,183,234.76
12,380.00	90.22	180.14	7,491.74	-5,144.29	452.93	40.117060	-104.844819	1,286,165.80	3,183,234.70
12,473.00	90.06	179.81	7,491.52	-5,237.29	452.97	40.116804	-104.844819	1,286,072.80	3,183,235.43
12,565.00	90.55	178.70	7,491.03	-5,329.28	454.17	40.116552	-104.844814	1,285,980.83	3,183,237.30
12,657.00	90.40	178.47	7,490.26	-5,421.25	456.44	40.116299	-104.844806	1,285,888.88	3,183,240.25
12,750.00	89.85	179.66	7,490.06	-5,514.23	457.96	40.116044	-104.844801	1,285,795.92	3,183,242.46
12,842.00	89.38	178.40	7,490.68	-5,606.22	459.52	40.115792	-104.844795	1,285,703.95	3,183,244.69
12,936.00	89.38	180.15	7,491.70	-5,700.20	460.71	40.115534	-104.844791	1,285,609.98	3,183,246.57
13,031.00	88.92	180.76	7,493.10	-5,795.18	459.95	40.115273	-104.844794	1,285,515.00	3,183,246.52
13,125.00	88.98	180.17	7,494.83	-5,889.17	459.19	40.115015	-104.844796	1,285,421.02	3,183,246.45
13,219.00	89.29	180.72	7,496.25	-5,983.15	458.46	40.114757	-104.844799	1,285,327.03	3,183,246.41
13,313.00	89.29	180.43	7,497.41	-6,077.14	457.52	40.114499	-104.844802	1,285,233.04	3,183,246.16
13,408.00	89.60	179.99	7,498.33	-6,172.13	457.17	40.114238	-104.844804	1,285,138.05	3,183,246.51
13,502.00	90.18	180.20	7,498.51	-6,266.13	457.01	40.113980	-104.844804	1,285,044.06	3,183,247.05
13,596.00	89.85	178.28	7,498.49	-6,360.12	458.26	40.113722	-104.844800	1,284,950.09	3,183,248.99
13,690.00	91.05	180.41	7,497.75	-6,454.10	459.33	40.113464	-104.844796	1,284,856.12	3,183,250.76
13,784.00	89.91	180.78	7,496.96	-6,548.09	458.36	40.113206	-104.844800	1,284,762.13	3,183,250.47
13,879.00	89.69	179.22	7,497.29	-6,643.09	458.36	40.112945	-104.844800	1,284,667.14	3,183,251.17
13,973.00	89.69	179.32	7,497.80	-6,737.08	459.56	40.112687	-104.844795	1,284,573.16	3,183,253.06
14,067.00	89.63	178.65	7,498.36	-6,831.06	461.22	40.112429	-104.844789	1,284,479.20	3,183,255.42
14,162.00	89.85	178.47	7,498.79	-6,926.03	463.61	40.112169	-104.844781	1,284,384.25	3,183,258.51
14,256.00	89.94	179.43	7,498.96	-7,020.02	465.33	40.111911	-104.844775	1,284,290.29	3,183,260.92
14,351.00	90.18	179.25	7,498.86	-7,115.01	466.42	40.111650	-104.844771	1,284,195.31	3,183,262.72
14,445.00	90.00	178.02	7,498.72	-7,208.98	468.66	40.111392	-104.844763	1,284,101.36	3,183,265.65

Design Report for KERR 13C-25HZ - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Geographic Coordinates Latitude (usft)	Geographic Coordinates Longitude (usft)	UTM Coordinates Northing (usft)	UTM Coordinates Easting (usft)
14,540.00	90.25	178.71	7,498.51	-7,303.94	471.37	40.111131	-104.844753	1,284,006.43	3,183,269.06
14,634.00	89.57	178.94	7,498.66	-7,397.92	473.30	40.110873	-104.844746	1,283,912.47	3,183,271.68
14,728.00	89.38	177.72	7,499.52	-7,491.88	476.04	40.110616	-104.844736	1,283,818.54	3,183,275.11
14,823.00	89.63	179.03	7,500.34	-7,586.83	478.73	40.110355	-104.844727	1,283,723.61	3,183,278.50
14,917.00	90.22	179.39	7,500.46	-7,680.82	480.03	40.110097	-104.844722	1,283,629.64	3,183,280.49
15,012.00	90.15	178.27	7,500.15	-7,775.80	481.97	40.109836	-104.844715	1,283,534.68	3,183,283.13
15,106.00	91.26	179.25	7,499.00	-7,869.77	484.00	40.109578	-104.844708	1,283,440.73	3,183,285.86
15,201.00	90.83	178.46	7,497.27	-7,964.73	485.90	40.109318	-104.844701	1,283,345.79	3,183,288.46
15,295.00	88.89	179.48	7,497.50	-8,058.71	487.59	40.109060	-104.844695	1,283,251.83	3,183,290.84
15,389.00	89.11	178.88	7,499.14	-8,152.69	488.94	40.108802	-104.844690	1,283,157.87	3,183,292.88
15,484.00	89.54	180.37	7,500.25	-8,247.68	489.56	40.108541	-104.844688	1,283,062.89	3,183,294.20
15,578.00	90.74	180.16	7,500.03	-8,341.67	489.12	40.108283	-104.844690	1,282,968.90	3,183,294.46
15,672.00	91.14	179.35	7,498.48	-8,435.66	489.53	40.108025	-104.844688	1,282,874.92	3,183,295.55
15,766.00	89.60	179.23	7,497.88	-8,529.65	490.69	40.107767	-104.844684	1,282,780.95	3,183,297.41
15,861.00	87.50	177.06	7,500.28	-8,624.55	493.76	40.107506	-104.844673	1,282,686.07	3,183,301.18
15,955.00	90.18	179.92	7,502.18	-8,718.48	496.24	40.107248	-104.844664	1,282,592.16	3,183,304.35
16,050.00	90.19	179.21	7,501.88	-8,813.48	496.96	40.106988	-104.844662	1,282,497.18	3,183,305.77
16,144.00	90.43	178.37	7,501.37	-8,907.46	498.95	40.106730	-104.844655	1,282,403.22	3,183,308.45
16,239.00	89.85	180.86	7,501.14	-9,002.45	499.58	40.106469	-104.844652	1,282,308.25	3,183,309.78
16,333.00	90.22	180.25	7,501.08	-9,096.44	498.67	40.106211	-104.844656	1,282,214.25	3,183,309.57
16,428.00	90.62	179.90	7,500.38	-9,191.44	498.55	40.105950	-104.844656	1,282,119.26	3,183,310.14
16,522.00	90.62	179.06	7,499.36	-9,285.43	499.40	40.105692	-104.844653	1,282,025.28	3,183,311.69
16,616.00	90.49	179.25	7,498.45	-9,379.41	500.79	40.105434	-104.844648	1,281,931.31	3,183,313.77
16,711.00	90.71	179.29	7,497.46	-9,474.40	502.00	40.105173	-104.844644	1,281,836.34	3,183,315.68
16,805.00	89.78	179.69	7,497.06	-9,568.40	502.83	40.104915	-104.844641	1,281,742.36	3,183,317.21
16,899.00	89.69	178.08	7,497.49	-9,662.37	504.66	40.104657	-104.844634	1,281,648.40	3,183,319.73
16,994.00	90.03	179.41	7,497.72	-9,757.35	506.74	40.104397	-104.844627	1,281,553.45	3,183,322.51
17,088.00	90.25	182.21	7,497.49	-9,851.33	505.42	40.104139	-104.844632	1,281,459.47	3,183,321.87
17,183.00	90.46	181.69	7,496.91	-9,946.27	502.18	40.103878	-104.844643	1,281,364.51	3,183,319.34
17,277.00	90.18	180.06	7,496.38	-10,040.26	500.75	40.103620	-104.844648	1,281,270.52	3,183,318.60
17,372.00	90.31	179.10	7,495.97	-10,135.25	501.44	40.103359	-104.844646	1,281,175.53	3,183,319.99
17,466.00	89.75	177.58	7,495.93	-10,229.21	504.17	40.103101	-104.844636	1,281,081.60	3,183,323.41
17,561.00	88.80	176.19	7,497.13	-10,324.06	509.33	40.102841	-104.844618	1,280,986.80	3,183,329.27
17,656.00	89.01	175.23	7,498.94	-10,418.77	516.43	40.102581	-104.844592	1,280,892.14	3,183,337.07
17,750.00	90.15	175.89	7,499.63	-10,512.49	523.71	40.102324	-104.844566	1,280,798.49	3,183,345.04
17,819.00	90.52	174.83	7,499.23	-10,581.26	529.29	40.102135	-104.844546	1,280,729.76	3,183,351.13
17,867.00	90.52	174.83	7,498.79	-10,629.06	533.62	40.102004	-104.844531	1,280,681.99	3,183,355.80

Design Report for KERR 13C-25HZ - Actual Field Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
1,080.00	1,079.96	-2.78	-1.20	Tie-On to Surface Surveys @ 1080.00ft
17,819.00	7,499.23	-10,581.26	529.29	Final MWD Survey @ 17819.00' MD :: 7499.23' TVD
17,867.00	7,498.79	-10,629.06	533.62	Straight Line Projection to Bit @ 17867.00' MD :: 7498.79' TVD
17,867.00	7,498.79	-10,629.06	533.62	Current MWD Survey @ 7412' MD :: 7340.17' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	179.85	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
20.00	1,080.00	Cathedral MWD Surface Surveys	MWD
1,171.00	7,723.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
7,817.00	17,867.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,068.10	1,068.06	9 5/8"	9-5/8	13-1/2
7,682.00	7,455.99	7"	7	8-3/4

Design Report for KERR 13C-25HZ - Actual Field Surveys

Design Targets

Shape	Target Name	TVD ()	Northing ()	Easting ()	+N/-S	+E/-W	Created	Updated

Directional Difficulty Index

Average Dogleg over Survey:	1.54 °/100usft	Maximum Dogleg over Survey:	20.17 °/100usft at 7,647.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.861

Audit Info

North Reference Sheet for Sec. 13-T2N-R67W - KERR 13C-25HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 25' @ 4916.00usft (H&P 308). Northing and Easting are relative to KERR 13C-25HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

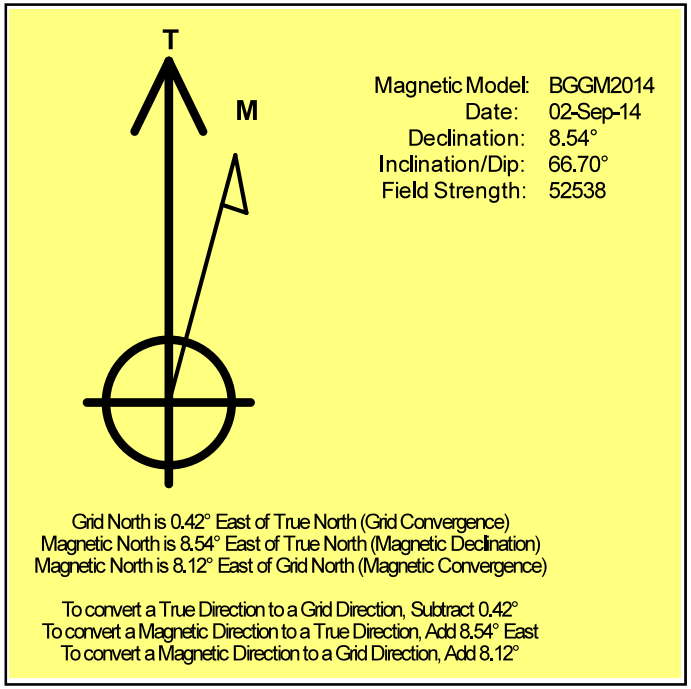
False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995901

Grid Coordinates of Well: 1,291,306.40 usft N, 3,182,743.89 usft E

Geographical Coordinates of Well: 40° 07' 52.25" N, 104° 50' 47.18" W

Grid Convergence at Surface is: 0.42°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,867.00usft

the Bottom Hole Displacement is 10,642.45usft in the Direction of 177.13° (True).

Magnetic Convergence at surface is: -8.12° (2 September 2014, , BGGM2014)