

Project: SEC.9-T1N-R67W
Site: NRC 17-9 Pad Sec.9-T1N-R67W
Well: NRC 8-9
Plan: Wellbore #1



Anadarko, Weld County CO

SEC.9-T1N-R67W

NRC 17-9 Pad Sec.9-T1N-R67W

NRC 8-9

Wellbore #1

Design: Wellbore #1

Standard Survey Report

16 September, 2010



Company:	Anadarko, Weld County CO	Local Co-ordinate Reference:	Well NRC 8-9
Project:	SEC.9-T1N-R67W	TVD Reference:	WELL @ 5012.0ft (Original Well Elev)
Site:	NRC 17-9 Pad Sec.9-T1N-R67W	MD Reference:	WELL @ 5012.0ft (Original Well Elev)
Well:	NRC 8-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM den0-adp01 Server Data

Project	SEC.9-T1N-R67W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	NRC 17-9 Pad Sec.9-T1N-R67W		
Site Position:		Northing:	1,268,177.88 ft
From:	Lat/Long	Easting:	3,170,044.82 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40° 4' 4.580 N
		Longitude:	104° 53' 32.712 W
		Grid Convergence:	0.39 °

Well	NRC 8-9		
Well Position	+N-S	0.0 ft	Northing: 1,268,209.25 ft
	+E-W	0.0 ft	Easting: 3,170,052.16 ft
Position Uncertainty		0.0 ft	Wellhead Elevation: ft
			Latitude: 40° 4' 4.890 N
			Longitude: 104° 53' 32.615 W
			Ground Level: 4,997.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/20/2010	9.01	66.79	53,027

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N-S (ft)	+E-W (ft)	Direction (°)	
	0.0	0.0	0.0	103.79	

Survey Program	Date	9/16/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
146.0	8,655.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
146.0	0.00	235.90	146.0	0.0	0.0	0.0	0.00	0.00	0.00	
239.0	0.50	327.30	239.0	0.3	-0.2	-0.3	0.54	0.54	0.00	
334.0	0.10	247.20	334.0	0.7	-0.5	-0.7	0.52	-0.42	-84.32	
426.0	0.70	307.30	426.0	1.0	-1.0	-1.2	0.71	0.65	65.33	
519.0	0.70	300.40	519.0	1.6	-2.0	-2.3	0.09	0.00	-7.42	
699.0	0.50	274.70	699.0	2.2	-3.7	-4.1	0.18	-0.11	-14.28	
788.0	0.70	272.80	788.0	2.3	-4.6	-5.1	0.23	0.22	-2.13	
875.0	0.80	279.00	875.0	2.4	-5.8	-6.2	0.15	0.11	7.13	
965.0	0.90	294.90	965.0	2.8	-7.0	-7.5	0.28	0.11	17.67	
1,063.0	0.60	272.70	1,062.9	3.1	-8.2	-8.8	0.42	-0.31	-22.65	
1,150.0	0.50	221.90	1,149.9	2.9	-9.0	-9.4	0.55	-0.11	-58.39	
1,240.0	1.30	102.50	1,239.9	2.4	-8.2	-8.5	1.78	0.89	-132.67	

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Site:	NRC 17-9 Pad Sec.9-T1N-R67W	MD Reference:	WELL @ 5012.0ft (Original Well Elev)
Well:	NRC 8-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM den0-adp01 Server Data

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)	
1,331.0	2.40	95.10	1,330.9	2.0	-5.3	-5.6	1.23	1.21	-8.13	
1,421.0	4.30	101.30	1,420.7	1.1	-0.1	-0.4	2.15	2.11	6.89	
1,510.0	5.40	105.40	1,509.4	-0.6	7.2	7.1	1.30	1.24	4.61	
1,599.0	7.10	113.20	1,597.9	-3.9	16.3	16.7	2.13	1.91	8.76	
1,689.0	8.30	109.30	1,687.1	-8.2	27.5	28.7	1.45	1.33	-4.33	
1,778.0	9.90	99.50	1,775.0	-11.6	41.1	42.7	2.50	1.80	-11.01	
1,868.0	11.00	103.50	1,863.5	-14.9	57.1	59.0	1.46	1.22	4.44	
1,957.0	11.60	102.10	1,950.7	-18.8	74.1	76.5	0.74	0.67	-1.57	
2,046.0	11.90	108.90	2,037.9	-23.6	91.5	94.5	1.59	0.34	7.64	
2,136.0	14.30	105.70	2,125.5	-29.6	111.0	114.9	2.78	2.67	-3.56	
2,226.0	14.90	106.70	2,212.6	-36.0	132.8	137.6	0.72	0.67	1.11	
2,317.0	15.70	104.30	2,300.4	-42.4	155.9	161.6	1.12	0.88	-2.64	
2,406.0	15.80	100.60	2,386.1	-47.6	179.5	185.7	1.13	0.11	-4.16	
2,495.0	16.90	105.20	2,471.5	-53.2	203.9	210.7	1.91	1.24	5.17	
2,585.0	16.40	101.10	2,557.7	-59.1	229.0	236.5	1.42	-0.56	-4.56	
2,674.0	16.50	104.30	2,643.0	-64.6	253.6	261.7	1.02	0.11	3.60	
2,763.0	14.50	101.00	2,728.8	-69.8	276.8	285.5	2.46	-2.25	-3.71	
2,851.0	16.30	98.30	2,813.6	-73.7	299.8	308.8	2.20	2.05	-3.07	
2,942.0	15.80	101.20	2,901.1	-78.0	324.6	333.8	1.04	-0.55	3.19	
3,032.0	17.10	102.60	2,987.4	-83.3	349.5	359.3	1.51	1.44	1.56	
3,121.0	17.40	103.40	3,072.4	-89.2	375.3	385.7	0.43	0.34	0.90	
3,211.0	17.20	105.40	3,158.3	-95.8	401.2	412.5	0.70	-0.22	2.22	
3,300.0	15.80	106.00	3,243.7	-102.7	425.5	437.7	1.58	-1.57	0.67	
3,389.0	16.80	107.70	3,329.1	-109.9	449.4	462.7	1.24	1.12	1.91	
3,478.0	15.90	102.40	3,414.5	-116.5	473.6	487.7	1.96	-1.01	-5.96	
3,567.0	15.90	102.40	3,500.1	-121.7	497.4	512.1	0.00	0.00	0.00	
3,657.0	14.80	102.30	3,586.9	-126.8	520.7	535.9	1.22	-1.22	-0.11	
3,748.0	15.50	104.50	3,674.7	-132.3	543.8	559.7	1.00	0.77	2.42	
3,838.0	15.70	107.40	3,761.4	-139.0	567.0	583.8	0.89	0.22	3.22	
3,928.0	15.50	108.00	3,848.1	-146.3	590.1	608.0	0.29	-0.22	0.67	
4,019.0	15.60	106.40	3,935.8	-153.5	613.4	632.3	0.48	0.11	-1.76	
4,107.0	15.20	101.10	4,020.6	-159.1	636.1	655.7	1.66	-0.45	-6.02	
4,198.0	15.90	102.90	4,108.3	-164.2	659.9	680.1	0.93	0.77	1.98	
4,288.0	15.50	101.10	4,194.9	-169.2	683.8	704.4	0.70	-0.44	-2.00	
4,379.0	16.00	110.70	4,282.5	-176.0	707.4	729.0	2.91	0.55	10.55	
4,467.0	17.50	106.40	4,366.8	-184.0	731.5	754.3	2.21	1.70	-4.89	
4,556.0	16.70	106.70	4,451.8	-191.5	756.6	780.4	0.90	-0.90	0.34	
4,645.0	16.20	108.90	4,537.2	-199.2	780.5	805.5	0.90	-0.56	2.47	
4,734.0	16.40	99.60	4,622.6	-205.3	804.7	830.4	2.94	0.22	-10.45	
4,821.0	16.90	100.00	4,706.0	-209.5	829.2	855.3	0.59	0.57	0.46	
4,912.0	17.10	100.60	4,793.0	-214.3	855.4	881.9	0.29	0.22	0.66	
4,999.0	16.90	102.60	4,876.2	-219.4	880.3	907.3	0.71	-0.23	2.30	
5,061.6	15.71	105.83	4,936.3	-223.7	897.4	924.8	2.39	-1.91	5.16	
4894'MD = 171' Radius										
5,089.0	15.20	107.40	4,962.7	-225.8	904.4	932.1	2.39	-1.85	5.72	
5,180.0	14.00	103.70	5,050.8	-232.0	926.4	955.0	1.67	-1.32	-4.07	
5,267.0	14.20	99.50	5,135.1	-236.2	947.2	976.2	1.20	0.23	-4.83	
5,357.0	13.40	98.80	5,222.6	-239.6	968.4	997.6	0.91	-0.89	-0.78	
5,448.0	11.00	100.50	5,311.5	-242.8	987.3	1,016.8	2.67	-2.64	1.87	
5,534.0	9.30	100.20	5,396.1	-245.6	1,002.3	1,031.9	1.98	-1.98	-0.35	
5,625.0	7.30	101.20	5,486.2	-248.0	1,015.2	1,045.0	2.20	-2.20	1.10	
5,714.0	5.80	99.50	5,574.6	-249.8	1,025.1	1,055.1	1.70	-1.69	-1.91	
5,805.0	4.40	102.00	5,665.2	-251.3	1,033.1	1,063.2	1.56	-1.54	2.75	
5,893.0	3.40	91.90	5,753.0	-252.1	1,039.0	1,069.2	1.37	-1.14	-11.48	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM den0-adp01 Server Data

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)	
5,982.0	1.50	111.50	5,841.9	-252.6	1,042.7	1,072.9	2.30	-2.13	22.02	
6,073.0	0.60	128.10	5,932.9	-253.4	1,044.2	1,074.5	1.03	-0.99	18.24	
6,140.0	0.60	118.98	6,000.0	-253.7	1,044.8	1,075.2	0.14	0.00	-13.61	
TARGET BHL 1980'FNL, 660'FEL										
6,162.0	0.60	116.00	6,021.9	-253.8	1,045.0	1,075.4	0.14	0.01	-13.56	
6,251.0	0.40	131.00	6,110.9	-254.3	1,045.7	1,076.1	0.27	-0.22	16.85	
6,340.0	0.40	99.00	6,199.9	-254.5	1,046.2	1,076.7	0.25	0.00	-35.96	
6,429.0	0.20	76.60	6,288.9	-254.5	1,046.7	1,077.1	0.26	-0.22	-25.17	
6,517.0	0.40	63.70	6,376.9	-254.3	1,047.1	1,077.5	0.24	0.23	-14.66	
6,607.0	0.70	79.40	6,466.9	-254.1	1,047.9	1,078.3	0.37	0.33	17.44	
6,696.0	0.80	99.00	6,555.9	-254.1	1,049.0	1,079.4	0.31	0.11	22.02	
6,786.0	1.10	94.30	6,645.9	-254.3	1,050.5	1,080.9	0.34	0.33	-5.22	
6,876.0	1.30	92.90	6,735.9	-254.4	1,052.4	1,082.7	0.22	0.22	-1.56	
6,964.0	1.30	88.80	6,823.9	-254.4	1,054.4	1,084.7	0.11	0.00	-4.66	
7,055.0	0.90	86.10	6,914.8	-254.3	1,056.1	1,086.3	0.44	-0.44	-2.97	
7,145.0	0.80	91.40	7,004.8	-254.3	1,057.5	1,087.6	0.14	-0.11	5.89	
7,235.0	0.60	93.00	7,094.8	-254.3	1,058.6	1,088.7	0.22	-0.22	1.78	
7,326.0	0.10	155.20	7,185.8	-254.4	1,059.1	1,089.2	0.62	-0.55	68.35	
7,416.0	0.20	149.00	7,275.8	-254.7	1,059.2	1,089.4	0.11	0.11	-6.89	
7,459.1	0.23	126.30	7,318.9	-254.8	1,059.3	1,089.5	0.21	0.08	-52.64	
TARGET BOX 400' X 400' 1981'FNL, 658'FEL										
7,507.0	0.30	109.70	7,366.8	-254.9	1,059.5	1,089.7	0.21	0.14	-34.67	
7,596.0	0.40	91.72	7,455.8	-255.0	1,060.0	1,090.3	0.17	0.11	-20.20	
7,684.0	0.40	99.01	7,543.8	-255.0	1,060.6	1,090.9	0.06	0.00	8.28	
7,774.0	0.60	107.30	7,633.8	-255.2	1,061.4	1,091.6	0.24	0.22	9.21	
7,955.0	0.30	92.00	7,814.8	-255.5	1,062.8	1,093.1	0.18	-0.17	-8.45	
8,045.0	0.44	103.80	7,904.8	-255.6	1,063.4	1,093.6	0.18	0.16	13.11	
8,135.0	0.44	164.40	7,994.8	-256.0	1,063.8	1,094.1	0.49	0.00	67.33	
8,226.0	0.52	188.10	8,085.8	-256.8	1,063.8	1,094.4	0.23	0.09	26.04	
8,316.0	0.62	218.45	8,175.8	-257.5	1,063.5	1,094.2	0.35	0.11	33.72	
8,406.0	0.60	180.00	8,265.8	-258.4	1,063.2	1,094.1	0.45	-0.02	-42.72	
8,639.1	0.60	180.00	8,498.9	-260.8	1,063.2	1,094.7	0.00	0.00	0.00	
TARGET CIRCLE 1980'FNL, 660'FEL										
8,655.0	0.60	180.00	8,514.8	-261.0	1,063.2	1,094.7	0.00	0.00	0.00	

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Site:	NRC 17-9 Pad Sec.9-T1N-R67W	MD Reference:	WELL @ 5012.0ft (Original Well Elev)
Well:	NRC 8-9	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM den0-adp01 Server Data

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
4894' MD = 171' Radius - actual wellpath misses target center by 153.8ft at 5061.6ft MD (4936.3 TVD, -223.7 N, 897.4 E) - Circle (radius 171.0)	0.00	0.00	4,894.0	-248.8	1,043.1	1,267,967.62	3,171,096.94	40° 4' 2.431 N	104° 53' 19.198 W
TARGET BHL 1980' F - actual wellpath misses target center by 5.2ft at 6140.0ft MD (6000.0 TVD, -253.7 N, 1044.8 E) - Point	0.00	0.00	6,000.0	-248.8	1,043.1	1,267,967.63	3,171,096.94	40° 4' 2.431 N	104° 53' 19.198 W
TARGET BOX 400' X - actual wellpath misses target center by 15.1ft at 7459.1ft MD (7318.9 TVD, -254.8 N, 1059.3 E) - Rectangle (sides W400.0 H400.0 D1,180.0)	0.00	0.00	7,319.0	-249.8	1,045.1	1,267,966.62	3,171,098.90	40° 4' 2.421 N	104° 53' 19.172 W
TARGET CIRCLE 198 - actual wellpath misses target center by 23.4ft at 8639.1ft MD (8498.9 TVD, -260.8 N, 1063.2 E) - Circle (radius 50.0)	0.00	0.00	8,499.0	-248.8	1,043.1	1,267,967.61	3,171,096.90	40° 4' 2.431 N	104° 53' 19.198 W

Checked By: _____ Approved By: _____ Date: _____