

Project: SEC.9-T1N-R67W
Site: NRC 19-9 Pad Sec.9-T1N-R67W
Well: NRC 23-9
Plan: Wellbore #1



Anadarko, Weld County CO

SEC.9-T1N-R67W

NRC 19-9 Pad Sec.9-T1N-R67W

NRC 23-9

Wellbore #1

Survey: Survey #1

Standard Survey Report

17 August, 2010



Company:	Anadarko, Weld County CO	Local Co-ordinate Reference:	Well NRC 23-9
Project:	SEC.9-T1N-R67W	TVD Reference:	WELL @ 5067.0ft (Original Well Elev)
Site:	NRC 19-9 Pad Sec.9-T1N-R67W	MD Reference:	WELL @ 5067.0ft (Original Well Elev)
Well:	NRC 23-9	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 19-9 Pad Sec.9-T1N-R67W		
Site Position:		Northing:	1,265,668.11 ft
From:	Lat/Long	Easting:	3,167,496.09 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40° 3' 39.949 N
		Longitude:	104° 54' 5.713 W
		Grid Convergence:	0.39 °

Well	NRC 23-9		
Well Position	+N-S	0.0 ft	Northing: 1,265,667.99 ft
	+E-W	0.0 ft	Easting: 3,167,480.13 ft
Position Uncertainty		0.0 ft	Wellhead Elevation: ft
			Latitude: 40° 3' 39.949 N
			Longitude: 104° 54' 5.918 W
			Ground Level: 5,052.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/15/2010	9.05	66.79	53,050

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	80.13	

Survey Program	Date	8/17/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
142.0	8,644.0	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	
142.0	1.00	102.80	142.0	-0.3	1.2	1.1	0.70	0.70	0.00	
234.0	0.30	349.30	234.0	-0.2	1.9	1.9	1.25	-0.76	-123.37	
326.0	0.70	10.10	326.0	0.6	2.0	2.1	0.47	0.43	22.61	
421.0	0.60	30.80	421.0	1.6	2.4	2.6	0.27	-0.11	21.79	
514.0	1.10	354.50	514.0	2.9	2.5	3.0	0.77	0.54	-39.03	
606.0	0.50	24.20	606.0	4.1	2.6	3.3	0.77	-0.65	32.28	
699.0	0.20	260.00	699.0	4.5	2.6	3.3	0.68	-0.32	-133.55	
791.0	0.10	279.10	791.0	4.5	2.4	3.1	0.12	-0.11	20.76	
883.0	0.30	308.90	883.0	4.6	2.1	2.9	0.24	0.22	32.39	
970.0	0.60	307.60	970.0	5.0	1.6	2.4	0.35	0.34	-1.49	
1,059.0	0.40	264.90	1,059.0	5.3	0.9	1.8	0.46	-0.22	-47.98	
1,150.0	1.40	74.50	1,149.9	5.6	1.6	2.6	1.97	1.10	186.37	

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Site:	NRC 19-9 Pad Sec.9-T1N-R67W	MD Reference:	WELL @ 5067.0ft (Original Well Elev)
Well:	NRC 23-9	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)	
1,238.0	3.40	72.70	1,237.9	6.6	5.2	6.2	2.27	2.27	-2.05	
1,329.0	4.60	79.10	1,328.6	8.1	11.3	12.6	1.40	1.32	7.03	
1,416.0	6.60	88.90	1,415.2	8.9	19.8	21.0	2.54	2.30	11.26	
1,504.0	8.00	84.80	1,502.5	9.5	30.9	32.1	1.70	1.59	-4.66	
1,593.0	9.90	79.60	1,590.4	11.5	44.6	45.9	2.32	2.13	-5.84	
1,680.0	11.30	74.60	1,675.9	15.1	60.2	61.9	1.92	1.61	-5.75	
1,767.0	12.30	73.60	1,761.1	20.0	77.3	79.6	1.17	1.15	-1.15	
1,856.0	14.10	74.00	1,847.7	25.6	96.8	99.8	2.03	2.02	0.45	
1,943.0	14.80	76.20	1,932.0	31.2	117.8	121.4	1.02	0.80	2.53	
2,033.0	18.10	80.00	2,018.3	36.4	142.7	146.8	3.85	3.67	4.22	
2,124.0	21.00	78.60	2,104.0	42.0	172.6	177.3	3.23	3.19	-1.54	
2,214.0	22.00	78.60	2,187.8	48.6	205.0	210.3	1.11	1.11	0.00	
2,303.0	23.50	75.30	2,269.9	56.4	238.5	244.6	2.21	1.69	-3.71	
2,392.0	24.60	77.60	2,351.1	64.8	273.7	280.8	1.62	1.24	2.58	
2,481.0	25.90	74.20	2,431.6	74.1	310.5	318.6	2.19	1.46	-3.82	
2,571.0	25.30	70.50	2,512.8	85.9	347.6	357.2	1.90	-0.67	-4.11	
2,660.0	24.40	73.30	2,593.6	97.5	383.1	394.2	1.66	-1.01	3.15	
2,748.0	23.20	74.60	2,674.1	107.4	417.2	429.5	1.49	-1.36	1.48	
2,837.0	24.20	76.20	2,755.6	116.4	451.9	465.1	1.34	1.12	1.80	
2,927.0	25.00	78.70	2,837.4	124.5	488.4	502.5	1.46	0.89	2.78	
3,018.0	26.60	80.90	2,919.3	131.5	527.4	542.1	2.05	1.76	2.42	
3,107.0	27.20	82.60	2,998.7	137.2	567.2	582.4	1.10	0.67	1.91	
3,197.0	25.50	81.00	3,079.3	142.9	606.8	622.3	2.05	-1.89	-1.78	
3,286.0	25.40	83.20	3,159.7	148.2	644.7	660.5	1.07	-0.11	2.47	
3,375.0	25.70	81.10	3,240.0	153.4	682.7	698.9	1.07	0.34	-2.36	
3,464.0	26.50	80.10	3,319.9	159.8	721.3	738.0	1.03	0.90	-1.12	
3,553.0	26.20	80.10	3,399.7	166.6	760.2	777.5	0.34	-0.34	0.00	
3,643.0	23.80	80.30	3,481.3	173.1	797.7	815.6	2.67	-2.67	0.22	
3,734.0	24.50	78.50	3,564.3	180.0	834.3	852.8	1.12	0.77	-1.98	
3,824.0	25.10	83.10	3,646.0	186.0	871.5	890.5	2.24	0.67	5.11	
3,914.0	26.00	81.60	3,727.2	191.1	910.0	929.3	1.23	1.00	-1.67	
4,005.0	26.90	81.50	3,808.7	197.1	950.1	969.8	0.99	0.99	-0.11	
4,093.0	23.60	80.50	3,888.2	203.0	987.2	1,007.3	3.78	-3.75	-1.14	
4,184.0	22.80	82.60	3,971.9	208.2	1,022.6	1,043.2	1.26	-0.88	2.31	
4,274.0	24.00	79.80	4,054.5	213.7	1,057.9	1,078.9	1.82	1.33	-3.11	
4,365.0	26.40	82.10	4,136.8	219.8	1,096.2	1,117.6	2.85	2.64	2.53	
4,453.0	27.40	81.40	4,215.3	225.5	1,135.6	1,157.4	1.19	1.14	-0.80	
4,542.0	26.30	80.00	4,294.7	232.0	1,175.2	1,197.6	1.43	-1.24	-1.57	
4,631.0	27.10	80.50	4,374.2	238.7	1,214.7	1,237.6	0.93	0.90	0.56	
4,720.0	25.30	82.20	4,454.1	244.7	1,253.5	1,276.9	2.19	-2.02	1.91	
4,807.0	23.20	81.30	4,533.4	249.8	1,288.9	1,312.6	2.45	-2.41	-1.03	
4,897.0	21.30	82.40	4,616.7	254.6	1,322.6	1,346.7	2.16	-2.11	1.22	
4,985.0	23.10	85.40	4,698.2	258.1	1,355.6	1,379.8	2.42	2.05	3.41	
5,075.0	24.10	89.50	4,780.6	259.7	1,391.6	1,415.5	2.14	1.11	4.56	
5,166.0	23.60	86.10	4,863.9	261.1	1,428.4	1,452.0	1.61	-0.55	-3.74	
5,252.0	22.30	85.00	4,943.1	263.7	1,461.8	1,485.4	1.59	-1.51	-1.28	
5,343.0	19.20	81.80	5,028.2	267.3	1,493.8	1,517.5	3.63	-3.41	-3.52	
5,434.0	17.20	80.20	5,114.6	271.8	1,521.9	1,545.9	2.27	-2.20	-1.76	
5,520.0	14.50	79.80	5,197.3	275.8	1,545.0	1,569.4	3.14	-3.14	-0.47	
5,611.0	13.00	79.80	5,285.7	279.7	1,566.3	1,591.1	1.65	-1.65	0.00	
5,700.0	10.70	81.80	5,372.8	282.6	1,584.3	1,609.3	2.62	-2.58	2.25	
5,790.0	8.70	80.90	5,461.5	284.9	1,599.3	1,624.5	2.23	-2.22	-1.00	
5,879.0	6.70	83.80	5,549.7	286.5	1,611.1	1,636.4	2.29	-2.25	3.26	
5,968.0	5.90	81.10	5,638.2	287.8	1,620.8	1,646.2	0.96	-0.90	-3.03	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)
6,059.0	4.90	90.70	5,728.8	288.5	1,629.3	1,654.7	1.48	-1.10	10.55
6,147.0	1.40	51.40	5,816.6	289.1	1,633.9	1,659.3	4.45	-3.98	-44.66
6,237.0	1.00	99.00	5,906.6	289.6	1,635.6	1,661.0	1.15	-0.44	52.89
6,325.0	1.60	239.90	5,994.6	288.9	1,635.3	1,660.6	2.79	0.68	160.11
6,331.0	1.57	240.17	6,000.6	288.8	1,635.1	1,660.4	0.58	-0.57	4.49
TARGET BHL 1320' FSL, 2575'FWL									
6,414.0	1.10	245.60	6,083.6	287.9	1,633.4	1,658.6	0.58	-0.56	6.54
6,502.0	0.90	236.80	6,171.6	287.2	1,632.1	1,657.1	0.29	-0.23	-10.00
6,680.0	0.60	244.30	6,349.5	286.0	1,630.0	1,655.0	0.18	-0.17	4.21
6,770.0	0.50	122.60	6,439.5	285.6	1,630.0	1,654.8	1.07	-0.11	-135.22
6,860.0	0.90	188.00	6,529.5	284.7	1,630.2	1,654.9	0.92	0.44	72.67
6,952.0	0.90	359.20	6,621.5	284.7	1,630.1	1,654.8	1.95	0.00	186.09
7,042.0	0.60	64.90	6,711.5	285.6	1,630.5	1,655.3	0.95	-0.33	73.00
7,133.0	0.70	7.90	6,802.5	286.4	1,631.0	1,655.9	0.69	0.11	-62.64
7,223.0	1.00	344.10	6,892.5	287.7	1,630.9	1,656.0	0.51	0.33	-26.44
7,313.0	0.70	6.80	6,982.5	289.0	1,630.7	1,656.1	0.49	-0.33	25.22
7,404.0	0.70	46.10	7,073.5	289.9	1,631.2	1,656.7	0.52	0.00	43.19
7,493.0	0.70	338.10	7,162.5	290.8	1,631.4	1,657.1	0.88	0.00	-76.40
7,583.0	1.30	312.80	7,252.5	292.0	1,630.4	1,656.3	0.81	0.67	-28.11
7,673.0	1.40	311.70	7,342.5	293.4	1,628.8	1,655.0	0.11	0.11	-1.22
7,763.0	0.50	250.30	7,432.4	294.0	1,627.7	1,654.0	1.38	-1.00	-68.22
7,853.0	0.90	231.60	7,522.4	293.5	1,626.7	1,653.0	0.51	0.44	-20.78
7,943.0	1.00	238.90	7,612.4	292.6	1,625.5	1,651.6	0.17	0.11	8.11
8,033.0	0.90	222.80	7,702.4	291.7	1,624.3	1,650.3	0.32	-0.11	-17.89
8,123.0	0.70	220.90	7,792.4	290.8	1,623.5	1,649.3	0.22	-0.22	-2.11
8,213.0	0.60	168.00	7,882.4	289.9	1,623.2	1,648.9	0.65	-0.11	-58.78
8,349.0	0.70	136.70	8,018.4	288.6	1,624.0	1,649.4	0.27	0.07	-23.01
8,437.0	1.40	146.90	8,106.4	287.3	1,624.9	1,650.1	0.82	0.80	11.59
8,527.0	1.80	144.70	8,196.3	285.2	1,626.3	1,651.2	0.45	0.44	-2.44
8,595.0	1.10	137.20	8,264.3	283.9	1,627.4	1,652.0	1.06	-1.03	-11.03
8,631.4	1.10	137.20	8,300.7	283.3	1,627.9	1,652.3	0.00	0.00	0.00
HARDLINE 52'E OF BHL									
8,644.0	1.10	137.20	8,313.3	283.2	1,628.0	1,652.5	0.00	0.00	0.00

Wellbore Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
TARGET BHL 1320' F	0.00	0.00	6,000.0	289.7	1,608.1	1,265,968.50	3,169,086.16	40° 3' 42.811 N	104° 53' 45.236 W
- survey misses target center by 27.0ft at 6331.0ft MD (6000.6 TVD, 288.8 N, 1635.1 E)									
- Circle (radius 50.0)									
HARDLINE 52'E OF E	0.00	0.00	8,299.0	189.7	1,660.1	1,265,868.88	3,169,138.85	40° 3' 41.823 N	104° 53' 44.568 W
- survey misses target center by 99.0ft at 8631.4ft MD (8300.7 TVD, 283.3 N, 1627.9 E)									
- Polygon									
Point 1			8,299.0	0.0	0.0	1,265,868.88	3,169,138.85		
Point 2			8,299.0	200.0	0.0	1,266,068.87	3,169,137.50		

Checked By: _____ Approved By: _____ Date: _____