

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 18-T2N-R65W

Crowder 16N-19HZ

Plan C Rev 0

Plan: Plan C Rev 0 Permit

Sperry Drilling Services

Proposal Report

21 August, 2012

Well Coordinates: 1,296,517.22 N, 3,223,550.81 E (40° 08' 40.44" N, 104° 42' 01.21" W)

Ground Level: 4,953.00 ft

Local Coordinate Origin:

Centered on Well Crowder 16N-19HZ

Viewing Datum:

RKB=16ft @ 4969.00ft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 18-T2N-R65W
Well: Crowder 16N-19HZ
Wellbore: Plan C Rev 0
Design: Plan C Rev 0 Permit

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling

SECTION DETAILS

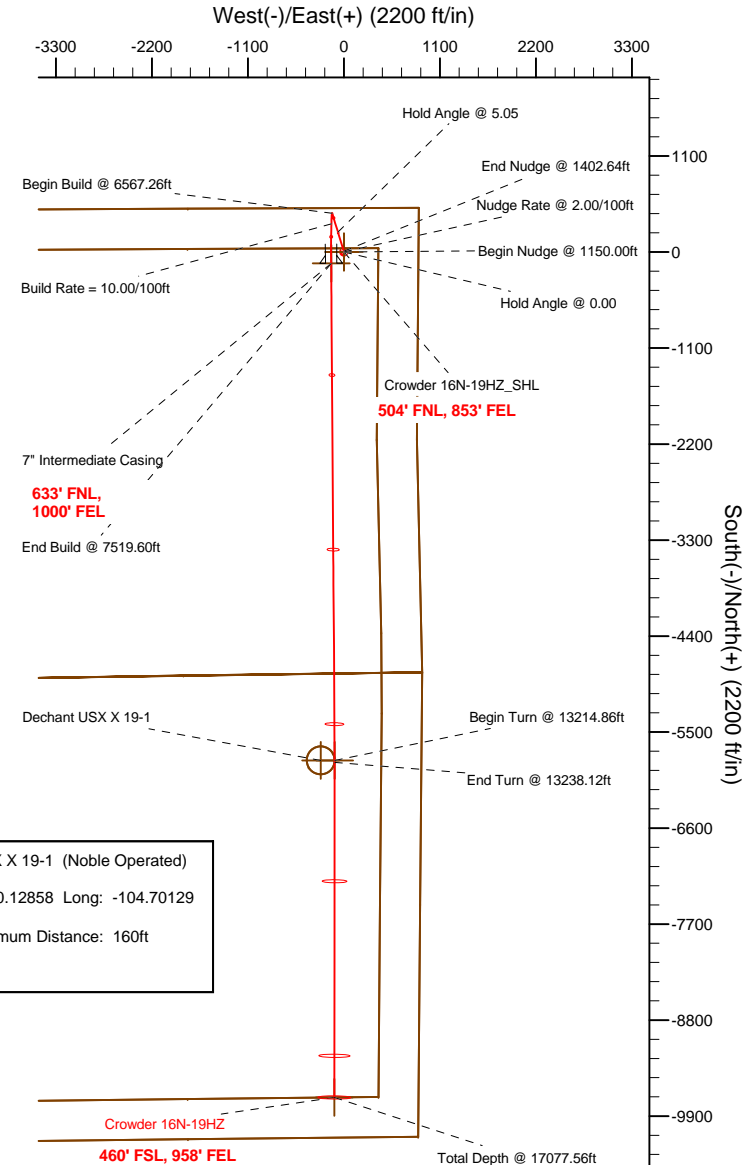
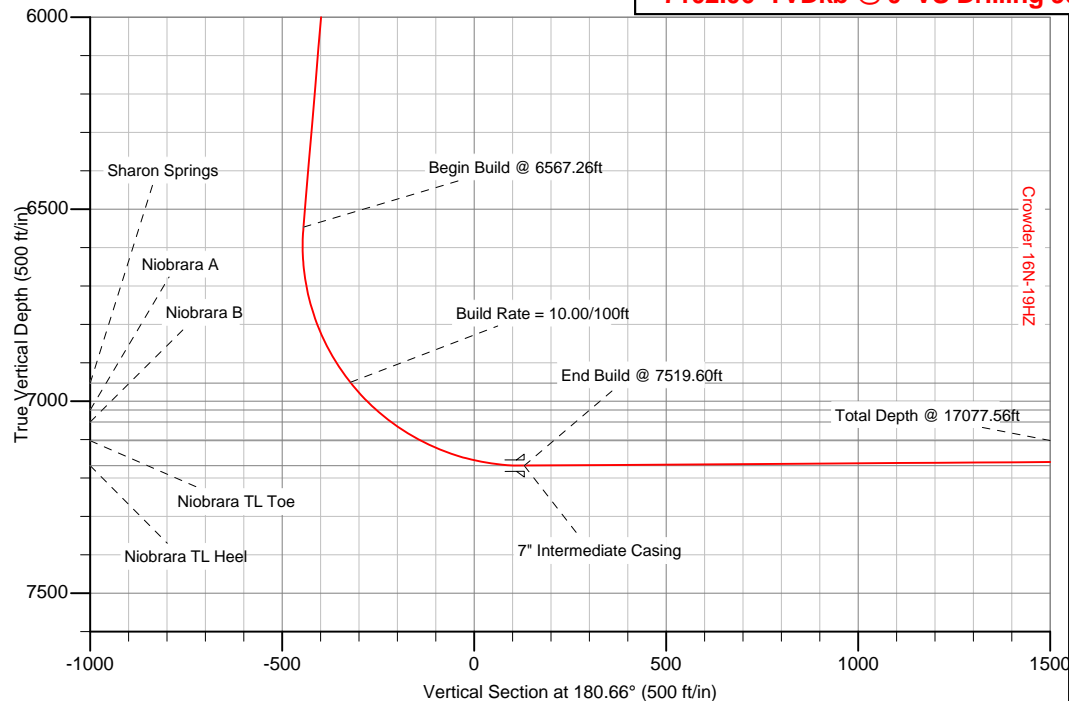
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1150.00	0.00	0.00	1150.00	0.00	0.00	0.00	0.00	0.00	
3	1402.64	5.05	343.11	1402.31	10.65	-3.23	2.00	343.11	-10.61	
4	6567.26	5.05	343.11	6546.87	445.90	-135.37	0.00	0.00	-444.33	
5	7519.60	90.39	179.60	7168.00	-129.00	-147.00	10.00	-163.45	130.67	Crowder 16N-19HZ_Casing Point
6	13214.86	90.39	179.60	7129.27	-5823.98	-106.77	0.00	0.00	5824.82	Crowder 16N-19HZ_WPtgt
7	13238.12	90.39	180.06	7129.11	-5847.24	-106.70	2.00	89.99	5848.08	
8	17077.56	90.39	180.06	7103.00	-9686.59	-110.75	0.00	0.00	9687.22	Crowder 16N-19HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Crowder 16N-19HZ_Section 18/19 Line	0.00	0.00	0.00	40.144567	-104.700336	Polygon
Crowder 16N-19HZ_Section Lines	0.00	0.00	0.00	40.144567	-104.700336	Polygon
Crowder 16N-19HZ_Setback Lines	0.00	0.00	0.00	40.144567	-104.700336	Polygon
Crowder 16N-19HZ_SHL	0.00	0.00	0.00	40.144567	-104.700336	Point
Dechant USX X 19-1	0.00	-5823.98	-266.77	40.128580	-104.701290	Circle (Radius: 160.00)
Crowder 16N-19HZ_BHL	7103.00	-9686.59	-110.75	40.117977	-104.700732	Point
Crowder 16N-19HZ_WPtgt	7129.27	-5823.98	-106.77	40.128580	-104.700718	Point
Crowder 16N-19HZ_Casing Point	7168.00	-129.00	-147.00	40.144213	-104.700862	Point

Target Line:

7102.06' TVDkb @ 0' VS Drilling 90.39°



Dechant USX X 19-1 (Noble Operated)

Lat: 40.12858 Long: -104.70129

Minimum Distance: 160ft

WELL DETAILS: Crowder 16N-19HZ

Ground Level: 4953.00 RKB=16ft @ 4969.00ft (Drilling Rig)

Plan: Plan C Rev 0 Permit (Crowder 16N-19HZ/Plan C Rev 0)

Created By: Fred Hartmann Date: 09-21-2012
Reviewed: _____ Date: _____

Plan Report for Crowder 16N-19HZ - Plan C Rev 0 Permit

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)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crowder 16N-19HZ_SHL - Crowder 16N-19HZ_Section 18/19 Line - Crowder 16N-19HZ_Section Lines - Crowder 16N-19HZ_Setb:										
100.00	0.00	0.00	100.00	0.00	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	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hold Angle @ 0.00										
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,150.00	0.00	0.00	1,150.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 1150.00ft										
1,200.00	1.00	343.11	1,200.00	0.42	-0.13	-0.42	2.00	2.00	0.00	343.11
1,300.00	3.00	343.11	1,299.93	3.76	-1.14	-3.74	2.00	2.00	0.00	0.00
Nudge Rate @ 2.00/100ft										
1,400.00	5.00	343.11	1,399.68	10.43	-3.17	-10.39	2.00	2.00	0.00	0.00
1,402.64	5.05	343.11	1,402.31	10.65	-3.23	-10.61	2.00	2.00	0.00	0.00
End Nudge @ 1402.64ft										
1,500.00	5.05	343.11	1,499.29	18.86	-5.72	-18.79	0.00	0.00	0.00	0.00
1,600.00	5.05	343.11	1,598.91	27.29	-8.28	-27.19	0.00	0.00	0.00	0.00
1,700.00	5.05	343.11	1,698.52	35.71	-10.84	-35.59	0.00	0.00	0.00	0.00
1,800.00	5.05	343.11	1,798.13	44.14	-13.40	-43.98	0.00	0.00	0.00	0.00
1,900.00	5.05	343.11	1,897.74	52.57	-15.96	-52.38	0.00	0.00	0.00	0.00
2,000.00	5.05	343.11	1,997.35	61.00	-18.52	-60.78	0.00	0.00	0.00	0.00
2,100.00	5.05	343.11	2,096.96	69.42	-21.08	-69.18	0.00	0.00	0.00	0.00
2,200.00	5.05	343.11	2,196.57	77.85	-23.63	-77.58	0.00	0.00	0.00	0.00
2,300.00	5.05	343.11	2,296.19	86.28	-26.19	-85.97	0.00	0.00	0.00	0.00
2,400.00	5.05	343.11	2,395.80	94.71	-28.75	-94.37	0.00	0.00	0.00	0.00
2,500.00	5.05	343.11	2,495.41	103.13	-31.31	-102.77	0.00	0.00	0.00	0.00
2,600.00	5.05	343.11	2,595.02	111.56	-33.87	-111.17	0.00	0.00	0.00	0.00
2,700.00	5.05	343.11	2,694.63	119.99	-36.43	-119.56	0.00	0.00	0.00	0.00
2,800.00	5.05	343.11	2,794.24	128.42	-38.99	-127.96	0.00	0.00	0.00	0.00
2,900.00	5.05	343.11	2,893.85	136.84	-41.54	-136.36	0.00	0.00	0.00	0.00
3,000.00	5.05	343.11	2,993.47	145.27	-44.10	-144.76	0.00	0.00	0.00	0.00
3,100.00	5.05	343.11	3,093.08	153.70	-46.66	-153.15	0.00	0.00	0.00	0.00
3,200.00	5.05	343.11	3,192.69	162.13	-49.22	-161.55	0.00	0.00	0.00	0.00
3,300.00	5.05	343.11	3,292.30	170.55	-51.78	-169.95	0.00	0.00	0.00	0.00
3,400.00	5.05	343.11	3,391.91	178.98	-54.34	-178.35	0.00	0.00	0.00	0.00
3,500.00	5.05	343.11	3,491.52	187.41	-56.90	-186.75	0.00	0.00	0.00	0.00
3,600.00	5.05	343.11	3,591.13	195.84	-59.45	-195.14	0.00	0.00	0.00	0.00
3,700.00	5.05	343.11	3,690.75	204.26	-62.01	-203.54	0.00	0.00	0.00	0.00
3,800.00	5.05	343.11	3,790.36	212.69	-64.57	-211.94	0.00	0.00	0.00	0.00
3,900.00	5.05	343.11	3,889.97	221.12	-67.13	-220.34	0.00	0.00	0.00	0.00
3,965.29	5.05	343.11	3,955.00	226.62	-68.80	-225.82	0.00	0.00	0.00	0.00
Parkman										
4,000.00	5.05	343.11	3,989.58	229.55	-69.69	-228.73	0.00	0.00	0.00	0.00
Hold Angle @ 5.05										
4,100.00	5.05	343.11	4,089.19	237.97	-72.25	-237.13	0.00	0.00	0.00	0.00
4,200.00	5.05	343.11	4,188.80	246.40	-74.80	-245.53	0.00	0.00	0.00	0.00
4,300.00	5.05	343.11	4,288.41	254.83	-77.36	-253.93	0.00	0.00	0.00	0.00
4,400.00	5.05	343.11	4,388.02	263.26	-79.92	-262.32	0.00	0.00	0.00	0.00
4,500.00	5.05	343.11	4,487.64	271.68	-82.48	-270.72	0.00	0.00	0.00	0.00
4,562.61	5.05	343.11	4,550.00	276.96	-84.08	-275.98	0.00	0.00	0.00	0.00
Sussex										

Plan Report for Crowder 16N-19HZ - Plan C Rev 0 Permit

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)	Toolface Azimuth (°)
4,600.00	5.05	343.11	4,587.25	280.11	-85.04	-279.12	0.00	0.00	0.00	0.00
4,700.00	5.05	343.11	4,686.86	288.54	-87.60	-287.52	0.00	0.00	0.00	0.00
4,800.00	5.05	343.11	4,786.47	296.97	-90.16	-295.92	0.00	0.00	0.00	0.00
4,900.00	5.05	343.11	4,886.08	305.39	-92.71	-304.31	0.00	0.00	0.00	0.00
5,000.00	5.05	343.11	4,985.69	313.82	-95.27	-312.71	0.00	0.00	0.00	0.00
5,100.00	5.05	343.11	5,085.30	322.25	-97.83	-321.11	0.00	0.00	0.00	0.00
5,200.00	5.05	343.11	5,184.92	330.68	-100.39	-329.51	0.00	0.00	0.00	0.00
5,300.00	5.05	343.11	5,284.53	339.10	-102.95	-337.90	0.00	0.00	0.00	0.00
5,400.00	5.05	343.11	5,384.14	347.53	-105.51	-346.30	0.00	0.00	0.00	0.00
5,500.00	5.05	343.11	5,483.75	355.96	-108.07	-354.70	0.00	0.00	0.00	0.00
5,600.00	5.05	343.11	5,583.36	364.39	-110.62	-363.10	0.00	0.00	0.00	0.00
5,700.00	5.05	343.11	5,682.97	372.81	-113.18	-371.50	0.00	0.00	0.00	0.00
5,800.00	5.05	343.11	5,782.58	381.24	-115.74	-379.89	0.00	0.00	0.00	0.00
5,900.00	5.05	343.11	5,882.20	389.67	-118.30	-388.29	0.00	0.00	0.00	0.00
6,000.00	5.05	343.11	5,981.81	398.10	-120.86	-396.69	0.00	0.00	0.00	0.00
6,100.00	5.05	343.11	6,081.42	406.52	-123.42	-405.09	0.00	0.00	0.00	0.00
6,200.00	5.05	343.11	6,181.03	414.95	-125.98	-413.48	0.00	0.00	0.00	0.00
6,300.00	5.05	343.11	6,280.64	423.38	-128.53	-421.88	0.00	0.00	0.00	0.00
6,400.00	5.05	343.11	6,380.25	431.81	-131.09	-430.28	0.00	0.00	0.00	0.00
6,500.00	5.05	343.11	6,479.86	440.23	-133.65	-438.68	0.00	0.00	0.00	0.00
6,567.26	5.05	343.11	6,546.86	445.90	-135.37	-444.33	0.00	0.00	0.00	0.00
Begin Build @ 6567.26ft										
6,600.00	2.13	317.14	6,579.54	447.73	-136.20	-446.14	10.00	-8.93	-79.33	-163.45
6,700.00	8.55	189.22	6,679.20	441.74	-138.66	-440.12	10.00	6.42	-127.93	-137.52
6,800.00	18.48	183.91	6,776.31	418.53	-140.94	-416.89	10.00	9.93	-5.30	-9.72
6,900.00	28.46	182.26	6,867.92	378.80	-142.97	-377.14	10.00	9.98	-1.65	-4.54
7,000.00	38.45	181.42	6,951.25	323.76	-144.68	-322.09	10.00	9.99	-0.84	-3.02
Build Rate = 10.00/100ft										
7,002.24	38.68	181.40	6,953.00	322.37	-144.71	-320.69	10.00	9.99	-0.65	-2.31
Sharon Springs										
7,098.87	48.33	180.89	7,023.00	255.94	-146.01	-254.26	10.00	9.99	-0.53	-2.30
Niobrara A										
7,100.00	48.45	180.88	7,023.75	255.10	-146.03	-253.41	10.00	9.99	-0.45	-1.93
7,147.91	53.23	180.68	7,054.00	217.96	-146.53	-216.27	10.00	9.99	-0.42	-1.92
Niobrara B										
7,200.00	58.44	180.49	7,083.24	174.88	-146.97	-173.18	10.00	10.00	-0.37	-1.80
7,300.00	68.44	180.17	7,127.90	85.55	-147.47	-83.85	10.00	10.00	-0.32	-1.69
7,400.00	78.43	179.90	7,156.37	-10.18	-147.53	11.87	10.00	10.00	-0.27	-1.55
7,500.00	88.43	179.64	7,167.80	-109.40	-147.13	111.07	10.00	10.00	-0.25	-1.47
7,519.60	90.39	179.60	7,168.00	-129.00	-147.00	130.67	10.00	10.00	-0.25	-1.44
End Build @ 7519.60ft - Niobrara TL Heel - 7" Intermediate Casing - Crowder 16N-19HZ_Casing Point										
7,600.00	90.39	179.60	7,167.45	-209.39	-146.43	211.05	0.00	0.00	0.00	-1.44
7,700.00	90.39	179.60	7,166.77	-309.39	-145.73	311.03	0.00	0.00	0.00	0.00
7,800.00	90.39	179.60	7,166.09	-409.38	-145.02	411.01	0.00	0.00	0.00	0.00
7,900.00	90.39	179.60	7,165.41	-509.38	-144.31	510.99	0.00	0.00	0.00	0.00
8,000.00	90.39	179.60	7,164.73	-609.37	-143.61	610.98	0.00	0.00	0.00	0.00
8,100.00	90.39	179.60	7,164.05	-709.37	-142.90	710.96	0.00	0.00	0.00	0.00
8,200.00	90.39	179.60	7,163.37	-809.36	-142.19	810.94	0.00	0.00	0.00	0.00
8,300.00	90.39	179.60	7,162.69	-909.36	-141.49	910.92	0.00	0.00	0.00	0.00
8,400.00	90.39	179.60	7,162.01	-1,009.35	-140.78	1,010.90	0.00	0.00	0.00	0.00
8,500.00	90.39	179.60	7,161.33	-1,109.35	-140.07	1,110.88	0.00	0.00	0.00	0.00
8,600.00	90.39	179.60	7,160.65	-1,209.34	-139.37	1,210.86	0.00	0.00	0.00	0.00
8,700.00	90.39	179.60	7,159.97	-1,309.34	-138.66	1,310.84	0.00	0.00	0.00	0.00
8,800.00	90.39	179.60	7,159.29	-1,409.33	-137.96	1,410.82	0.00	0.00	0.00	0.00
8,900.00	90.39	179.60	7,158.61	-1,509.33	-137.25	1,510.80	0.00	0.00	0.00	0.00
9,000.00	90.39	179.60	7,157.93	-1,609.33	-136.54	1,610.78	0.00	0.00	0.00	0.00
9,100.00	90.39	179.60	7,157.25	-1,709.32	-135.84	1,710.76	0.00	0.00	0.00	0.00
9,200.00	90.39	179.60	7,156.57	-1,809.32	-135.13	1,810.74	0.00	0.00	0.00	0.00
9,300.00	90.39	179.60	7,155.89	-1,909.31	-134.42	1,910.72	0.00	0.00	0.00	0.00

Plan Report for Crowder 16N-19HZ - Plan C Rev 0 Permit

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)	Toolface Azimuth (°)
9,400.00	90.39	179.60	7,155.21	-2,009.31	-133.72	2,010.70	0.00	0.00	0.00	0.00
9,500.00	90.39	179.60	7,154.53	-2,109.30	-133.01	2,110.68	0.00	0.00	0.00	0.00
9,600.00	90.39	179.60	7,153.85	-2,209.30	-132.30	2,210.66	0.00	0.00	0.00	0.00
9,700.00	90.39	179.60	7,153.17	-2,309.29	-131.60	2,310.65	0.00	0.00	0.00	0.00
9,800.00	90.39	179.60	7,152.49	-2,409.29	-130.89	2,410.63	0.00	0.00	0.00	0.00
9,900.00	90.39	179.60	7,151.81	-2,509.28	-130.19	2,510.61	0.00	0.00	0.00	0.00
10,000.00	90.39	179.60	7,151.13	-2,609.28	-129.48	2,610.59	0.00	0.00	0.00	0.00
10,100.00	90.39	179.60	7,150.45	-2,709.27	-128.77	2,710.57	0.00	0.00	0.00	0.00
10,200.00	90.39	179.60	7,149.77	-2,809.27	-128.07	2,810.55	0.00	0.00	0.00	0.00
10,300.00	90.39	179.60	7,149.09	-2,909.26	-127.36	2,910.53	0.00	0.00	0.00	0.00
10,400.00	90.39	179.60	7,148.41	-3,009.26	-126.65	3,010.51	0.00	0.00	0.00	0.00
10,500.00	90.39	179.60	7,147.73	-3,109.25	-125.95	3,110.49	0.00	0.00	0.00	0.00
10,600.00	90.39	179.60	7,147.05	-3,209.25	-125.24	3,210.47	0.00	0.00	0.00	0.00
10,700.00	90.39	179.60	7,146.37	-3,309.24	-124.53	3,310.45	0.00	0.00	0.00	0.00
10,800.00	90.39	179.60	7,145.69	-3,409.24	-123.83	3,410.43	0.00	0.00	0.00	0.00
10,900.00	90.39	179.60	7,145.01	-3,509.23	-123.12	3,510.41	0.00	0.00	0.00	0.00
11,000.00	90.39	179.60	7,144.33	-3,609.23	-122.42	3,610.39	0.00	0.00	0.00	0.00
11,100.00	90.39	179.60	7,143.65	-3,709.22	-121.71	3,710.37	0.00	0.00	0.00	0.00
11,200.00	90.39	179.60	7,142.97	-3,809.22	-121.00	3,810.35	0.00	0.00	0.00	0.00
11,300.00	90.39	179.60	7,142.29	-3,909.21	-120.30	3,910.33	0.00	0.00	0.00	0.00
11,400.00	90.39	179.60	7,141.61	-4,009.21	-119.59	4,010.32	0.00	0.00	0.00	0.00
11,500.00	90.39	179.60	7,140.93	-4,109.21	-118.88	4,110.30	0.00	0.00	0.00	0.00
11,600.00	90.39	179.60	7,140.25	-4,209.20	-118.18	4,210.28	0.00	0.00	0.00	0.00
11,700.00	90.39	179.60	7,139.57	-4,309.20	-117.47	4,310.26	0.00	0.00	0.00	0.00
11,800.00	90.39	179.60	7,138.89	-4,409.19	-116.76	4,410.24	0.00	0.00	0.00	0.00
11,900.00	90.39	179.60	7,138.21	-4,509.19	-116.06	4,510.22	0.00	0.00	0.00	0.00
12,000.00	90.39	179.60	7,137.53	-4,609.18	-115.35	4,610.20	0.00	0.00	0.00	0.00
12,100.00	90.39	179.60	7,136.85	-4,709.18	-114.65	4,710.18	0.00	0.00	0.00	0.00
12,200.00	90.39	179.60	7,136.17	-4,809.17	-113.94	4,810.16	0.00	0.00	0.00	0.00
12,300.00	90.39	179.60	7,135.49	-4,909.17	-113.23	4,910.14	0.00	0.00	0.00	0.00
12,400.00	90.39	179.60	7,134.81	-5,009.16	-112.53	5,010.12	0.00	0.00	0.00	0.00
12,500.00	90.39	179.60	7,134.13	-5,109.16	-111.82	5,110.10	0.00	0.00	0.00	0.00
12,600.00	90.39	179.60	7,133.45	-5,209.15	-111.11	5,210.08	0.00	0.00	0.00	0.00
12,700.00	90.39	179.60	7,132.77	-5,309.15	-110.41	5,310.06	0.00	0.00	0.00	0.00
12,800.00	90.39	179.60	7,132.09	-5,409.14	-109.70	5,410.04	0.00	0.00	0.00	0.00
12,900.00	90.39	179.60	7,131.41	-5,509.14	-108.99	5,510.02	0.00	0.00	0.00	0.00
13,000.00	90.39	179.60	7,130.73	-5,609.13	-108.29	5,610.00	0.00	0.00	0.00	0.00
13,100.00	90.39	179.60	7,130.05	-5,709.13	-107.58	5,709.99	0.00	0.00	0.00	0.00
13,200.00	90.39	179.60	7,129.37	-5,809.12	-106.87	5,809.97	0.00	0.00	0.00	0.00
13,214.86	90.39	179.60	7,129.27	-5,823.98	-106.77	5,824.82	0.00	0.00	0.00	0.00
Begin Turn @ 13214.86ft - Crowder 16N-19HZ_WPtgt										
13,238.12	90.39	180.06	7,129.11	-5,847.24	-106.70	5,848.08	2.00	0.00	2.00	89.99
End Turn @ 13238.12ft										
13,300.00	90.39	180.06	7,128.69	-5,909.12	-106.77	5,909.95	0.00	0.00	0.00	0.00
13,400.00	90.39	180.06	7,128.01	-6,009.12	-106.87	6,009.95	0.00	0.00	0.00	0.00
13,500.00	90.39	180.06	7,127.33	-6,109.12	-106.98	6,109.94	0.00	0.00	0.00	0.00
13,600.00	90.39	180.06	7,126.65	-6,209.11	-107.08	6,209.93	0.00	0.00	0.00	0.00
13,700.00	90.39	180.06	7,125.97	-6,309.11	-107.19	6,309.92	0.00	0.00	0.00	0.00
13,800.00	90.39	180.06	7,125.29	-6,409.11	-107.29	6,409.92	0.00	0.00	0.00	0.00
13,900.00	90.39	180.06	7,124.61	-6,509.11	-107.40	6,509.91	0.00	0.00	0.00	0.00
14,000.00	90.39	180.06	7,123.93	-6,609.10	-107.50	6,609.90	0.00	0.00	0.00	0.00
14,100.00	90.39	180.06	7,123.25	-6,709.10	-107.61	6,709.89	0.00	0.00	0.00	0.00
14,200.00	90.39	180.06	7,122.57	-6,809.10	-107.72	6,809.89	0.00	0.00	0.00	0.00
14,300.00	90.39	180.06	7,121.89	-6,909.10	-107.82	6,909.88	0.00	0.00	0.00	0.00
14,400.00	90.39	180.06	7,121.21	-7,009.09	-107.93	7,009.87	0.00	0.00	0.00	0.00
14,500.00	90.39	180.06	7,120.53	-7,109.09	-108.03	7,109.86	0.00	0.00	0.00	0.00
14,600.00	90.39	180.06	7,119.85	-7,209.09	-108.14	7,209.85	0.00	0.00	0.00	0.00
14,700.00	90.39	180.06	7,119.17	-7,309.09	-108.24	7,309.85	0.00	0.00	0.00	0.00
14,800.00	90.39	180.06	7,118.49	-7,409.08	-108.35	7,409.84	0.00	0.00	0.00	0.00

Plan Report for Crowder 16N-19HZ - Plan C Rev 0 Permit

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)	Toolface Azimuth (°)
14,900.00	90.39	180.06	7,117.81	-7,509.08	-108.45	7,509.83	0.00	0.00	0.00	0.00
15,000.00	90.39	180.06	7,117.13	-7,609.08	-108.56	7,609.82	0.00	0.00	0.00	0.00
15,100.00	90.39	180.06	7,116.45	-7,709.08	-108.67	7,709.82	0.00	0.00	0.00	0.00
15,200.00	90.39	180.06	7,115.77	-7,809.08	-108.77	7,809.81	0.00	0.00	0.00	0.00
15,300.00	90.39	180.06	7,115.09	-7,909.07	-108.88	7,909.80	0.00	0.00	0.00	0.00
15,400.00	90.39	180.06	7,114.41	-8,009.07	-108.98	8,009.79	0.00	0.00	0.00	0.00
15,500.00	90.39	180.06	7,113.73	-8,109.07	-109.09	8,109.79	0.00	0.00	0.00	0.00
15,600.00	90.39	180.06	7,113.05	-8,209.07	-109.19	8,209.78	0.00	0.00	0.00	0.00
15,700.00	90.39	180.06	7,112.37	-8,309.06	-109.30	8,309.77	0.00	0.00	0.00	0.00
15,800.00	90.39	180.06	7,111.69	-8,409.06	-109.40	8,409.76	0.00	0.00	0.00	0.00
15,900.00	90.39	180.06	7,111.01	-8,509.06	-109.51	8,509.75	0.00	0.00	0.00	0.00
16,000.00	90.39	180.06	7,110.33	-8,609.06	-109.62	8,609.75	0.00	0.00	0.00	0.00
16,100.00	90.39	180.06	7,109.65	-8,709.05	-109.72	8,709.74	0.00	0.00	0.00	0.00
16,200.00	90.39	180.06	7,108.97	-8,809.05	-109.83	8,809.73	0.00	0.00	0.00	0.00
16,300.00	90.39	180.06	7,108.29	-8,909.05	-109.93	8,909.72	0.00	0.00	0.00	0.00
16,400.00	90.39	180.06	7,107.61	-9,009.05	-110.04	9,009.72	0.00	0.00	0.00	0.00
16,500.00	90.39	180.06	7,106.93	-9,109.04	-110.14	9,109.71	0.00	0.00	0.00	0.00
16,600.00	90.39	180.06	7,106.25	-9,209.04	-110.25	9,209.70	0.00	0.00	0.00	0.00
16,700.00	90.39	180.06	7,105.57	-9,309.04	-110.35	9,309.69	0.00	0.00	0.00	0.00
16,800.00	90.39	180.06	7,104.89	-9,409.04	-110.46	9,409.69	0.00	0.00	0.00	0.00
16,900.00	90.39	180.06	7,104.21	-9,509.04	-110.57	9,509.68	0.00	0.00	0.00	0.00
17,000.00	90.39	180.06	7,103.53	-9,609.03	-110.67	9,609.67	0.00	0.00	0.00	0.00
17,077.55	90.39	180.06	7,103.00	-9,686.58	-110.75	9,687.21	0.00	0.00	0.00	0.00
Niobrara TL Toe										
17,077.56	90.39	180.06	7,103.00	-9,686.59	-110.75	9,687.22	0.01	0.00	0.00	0.00
Crowder 16N-19HZ_BHL										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
600.00	600.00	0.00	0.00	Hold Angle @ 0.00
1,150.00	1,150.00	0.00	0.00	Begin Nudge @ 1150.00ft
1,300.00	1,299.93	3.76	-1.14	Nudge Rate @ 2.00/100ft
1,402.64	1,402.31	10.65	-3.23	End Nudge @ 1402.64ft
4,000.00	3,989.58	229.55	-69.69	Hold Angle @ 5.05
6,567.26	6,546.86	445.90	-135.37	Begin Build @ 6567.26ft
7,000.00	6,951.25	323.76	-144.68	Build Rate = 10.00/100ft
7,519.60	7,168.00	-129.00	-147.00	End Build @ 7519.60ft
13,214.86	7,129.27	-5,823.98	-106.77	Begin Turn @ 13214.86ft
13,238.12	7,129.11	-5,847.24	-106.70	End Turn @ 13238.12ft
17,077.56	7,103.00	-9,686.59	-110.75	Total Depth @ 17077.56ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Crowder 16N-19HZ_BHL	180.66	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	17,077.56	Plan C Rev 0 Permit	MWD

Plan Report for Crowder 16N-19HZ - Plan C Rev 0 Permit**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,519.60	7,168.00	7" Intermediate Casing	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,965.29	3,955.00	Parkman		0.00	
4,562.61	4,550.00	Sussex		0.00	
7,002.24	6,953.00	Sharon Springs		0.00	
7,098.87	7,023.00	Niobrara A		0.00	
7,147.91	7,054.00	Niobrara B		0.00	
7,519.60	7,168.00	Niobrara TL Heel		0.00	
17,077.55	7,103.00	Niobrara TL Toe		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Crowder 16N-19HZ_Setback Lines	0.00	0.00	0.00	Polygon
Crowder 16N-19HZ_Section 18/19 Line	0.00	0.00	0.00	Polygon
Crowder 16N-19HZ_SHL	0.00	0.00	0.00	Point
Crowder 16N-19HZ_WPtgt	7,129.27	-5,823.98	-106.77	Point
Crowder 16N-19HZ_BHL	7,103.00	-9,686.59	-110.75	Point
Crowder 16N-19HZ_Section Lines	0.00	0.00	0.00	Polygon
Crowder 16N-19HZ_Casing Point	7,168.00	-129.00	-147.00	Point
Dechant USX X 19-1	0.00	-5,823.98	-266.77	Circle

North Reference Sheet for Sec. 18-T2N-R65W - Crowder 16N-19HZ - Plan C Rev 0

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.
Vertical Depths are relative to RKB=16ft @ 4969.00ft (Drilling Rig). Northing and Easting are relative to Crowder 16N-19HZ
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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°
False Easting: 3,000,000.000644ft, False Northing: 1,000,000.001308ft, Scale Reduction: 0.99995855

Grid Coordinates of Well: 1,296,517.223421 ft N, 3,223,550.805241 ft E
Geographical Coordinates of Well: 40° 08' 40.44" N, 104° 42' 01.21" W
Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,077.56ft
the Bottom Hole Displacement is 9,687.22ft in the Direction of 180.66° (True).

Magnetic Convergence at surface is: -8.13° (24 July 2012, , BGGM2011)

