



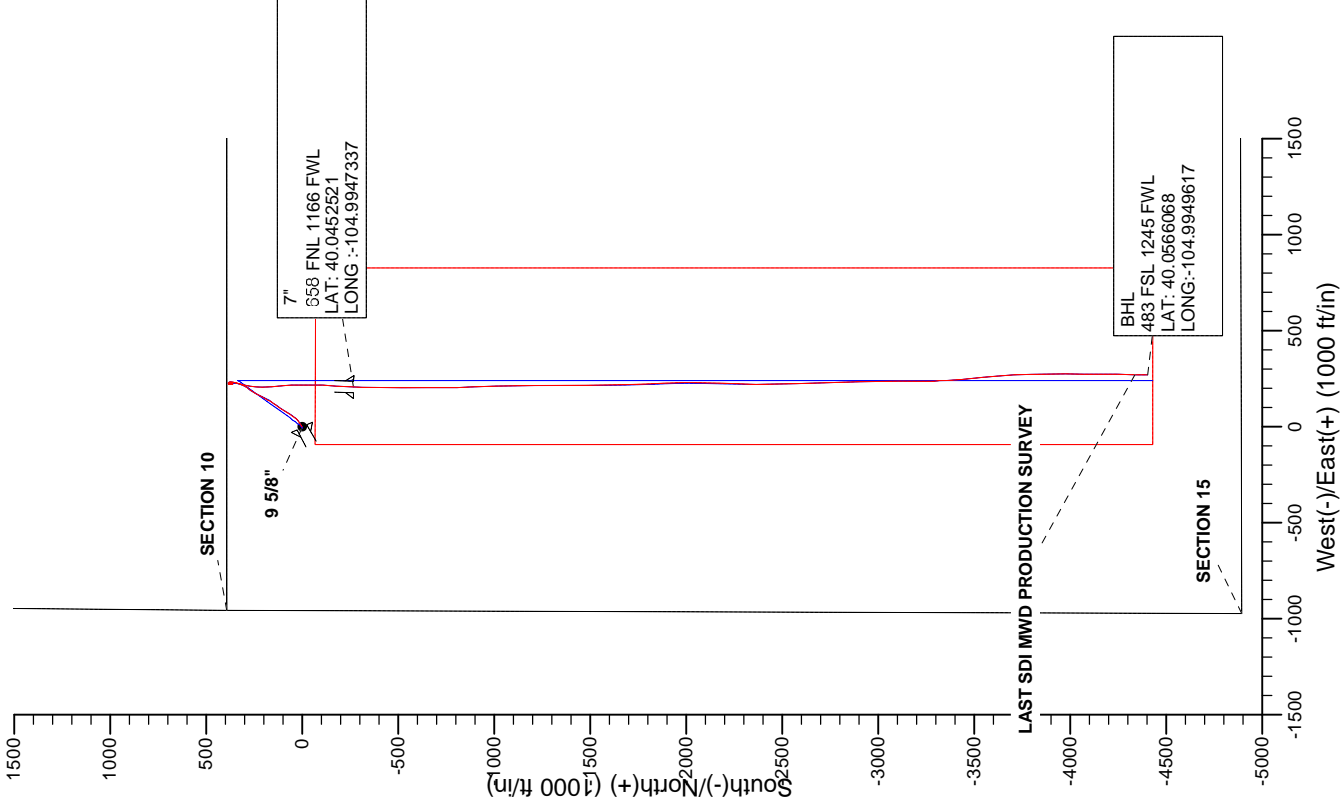
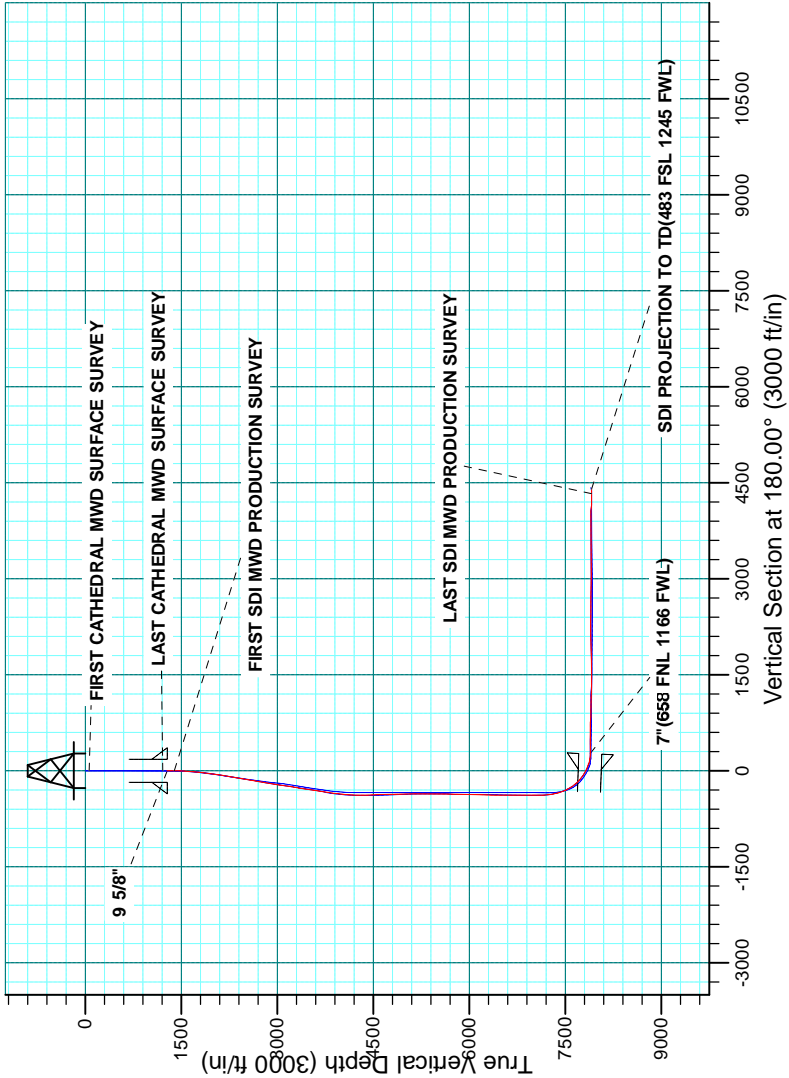
Project: COLORADO NORTHERN ZONE - 83
Site: BUFFALO & BADGER 4C-15HZ PAD
Well: BUFFALO 35C-15HZ
Wellbore: OH
Design: OH



WELL DETAILS: BUFFALO 35C-15HZ					
GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)					
+N/-S 0.00	+E/-W 0.00	Northing 1264136.07	Easting 3141160.78	Latitude 40.0573409	Longitude -104.9957040

PROJECT DETAILS: COLORADO NORTHERN ZONE - 83	
Geodetic System: US State Plane 1983	
Datum: North American Datum 1983	
Ellipsoid: GRS 1980	
Zone: Colorado Northern Zone	
Location: SECTION 15 T1N R68W	
System Datum: Mean Sea Level	

CASING DETAILS	
TVD	Name
1287.94	MD
7895.53	8288.00
	9 5/8" 7"
	9.625
	7.000



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 35C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Site:	BUFFALO & BADGER 4C-15HZ PAD	MD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Well:	BUFFALO 35C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Project	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	BUFFALO & BADGER 4C-15HZ PAD, SECTION 15 T1N R68W				
Site Position:		Northing:	1,264,136.65 usft	Latitude:	40.0573420
From:	Lat/Long	Easting:	3,141,190.73 usft	Longitude:	-104.9955970
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.33 °

Well	BUFFALO 35C-15HZ, 393' FNL 959' FWL					
Well Position	+N/-S	0.00 ft	Northing:	1,264,136.07 usft	Latitude:	40.0573409
	+E/-W	0.00 ft	Easting:	3,141,160.79 usft	Longitude:	-104.9957040
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	5,138.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/5/2014	8.63	66.62	52,536

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	180.00	

Survey Program	Date	5/20/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
14.00	1,272.00	Survey #1 CATHEDRAL MWD SURFACE	MWD	MWD - Standard	
1,391.00	12,427.00	Survey #2 SDI MWD PRODUCTION (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
14.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	
66.00	0.50	247.80	66.00	-0.09	-0.21	0.09	0.96	0.96	0.00	
FIRST CATHEDRAL MWD SURFACE SURVEY										
176.00	0.60	244.00	175.99	-0.52	-1.17	0.52	0.10	0.09	-3.45	
256.00	0.90	274.00	255.99	-0.66	-2.18	0.66	0.61	0.38	37.50	
336.00	1.10	278.50	335.98	-0.50	-3.56	0.50	0.27	0.25	5.63	
416.00	0.80	261.40	415.96	-0.47	-4.87	0.47	0.51	-0.38	-21.38	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 35C-15HZ
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Site:	BUFFALO & BADGER 4C-15HZ PAD	MD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Well:	BUFFALO 35C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
496.00	0.70	278.50	495.96	-0.48	-5.91	0.48	0.30	-0.13	21.38
576.00	0.20	153.30	575.96	-0.54	-6.33	0.54	1.04	-0.63	-156.50
656.00	0.10	180.40	655.96	-0.73	-6.27	0.73	0.15	-0.13	33.88
736.00	0.60	67.70	735.95	-0.64	-5.88	0.64	0.81	0.63	-140.88
816.00	0.50	56.10	815.95	-0.29	-5.20	0.29	0.19	-0.13	-14.50
896.00	0.10	50.40	895.95	-0.05	-4.86	0.05	0.50	-0.50	-7.13
976.00	0.40	98.50	975.95	-0.05	-4.53	0.05	0.43	0.38	60.13
1,056.00	0.30	2.30	1,055.95	0.12	-4.24	-0.12	0.66	-0.13	-120.25
1,136.00	0.40	354.00	1,135.95	0.61	-4.27	-0.61	0.14	0.13	-10.38
1,216.00	0.80	62.10	1,215.94	1.15	-3.80	-1.15	0.94	0.50	85.13
LAST CATHEDRAL MWD SURFACE SURVEY									
1,272.00	0.70	67.10	1,271.94	1.46	-3.14	-1.46	0.21	-0.18	8.93
1,288.00	0.74	62.19	1,287.94	1.55	-2.96	-1.55	0.45	0.23	-30.68
9 5/8"									
1,391.00	1.06	40.86	1,390.92	2.58	-1.75	-2.58	0.45	0.31	-20.71
FIRST SDI MWD PRODUCTION SURVEY									
1,481.00	3.34	78.43	1,480.85	3.74	1.36	-3.74	2.87	2.53	41.74
1,571.00	5.07	59.62	1,570.61	6.27	7.36	-6.27	2.43	1.92	-20.90
1,660.00	6.37	52.70	1,659.17	11.25	14.68	-11.25	1.65	1.46	-7.78
1,750.00	8.99	58.36	1,748.36	17.97	24.64	-17.97	3.03	2.91	6.29
1,840.00	10.05	46.44	1,837.12	27.07	36.32	-27.07	2.48	1.18	-13.24
1,930.00	10.95	36.45	1,925.62	39.36	47.09	-39.36	2.25	1.00	-11.10
2,020.00	10.02	34.80	2,014.12	52.66	56.64	-52.66	1.09	-1.03	-1.83
2,109.00	11.17	33.05	2,101.60	66.25	65.76	-66.25	1.34	1.29	-1.97
2,199.00	10.51	33.18	2,189.99	80.43	75.01	-80.43	0.73	-0.73	0.14
2,289.00	10.83	25.92	2,278.44	94.90	83.19	-94.90	1.53	0.36	-8.07
2,379.00	11.96	38.13	2,366.68	109.84	92.65	-109.84	2.95	1.26	13.57
2,468.00	11.66	34.87	2,453.80	124.48	103.49	-124.48	0.82	-0.34	-3.66
2,558.00	10.05	35.80	2,542.18	138.31	113.28	-138.31	1.80	-1.79	1.03
2,648.00	11.86	34.19	2,630.54	152.33	123.07	-152.33	2.04	2.01	-1.79
2,738.00	10.44	34.36	2,718.84	166.71	132.87	-166.71	1.58	-1.58	0.19
2,828.00	12.34	28.25	2,807.07	181.92	142.03	-181.92	2.50	2.11	-6.79
2,917.00	11.24	26.78	2,894.19	198.04	150.44	-198.04	1.28	-1.24	-1.65
3,007.00	10.08	25.48	2,982.63	212.98	157.78	-212.98	1.32	-1.29	-1.44
3,097.00	9.84	23.49	3,071.28	227.14	164.23	-227.14	0.47	-0.27	-2.21
3,187.00	10.45	33.39	3,159.88	241.01	171.79	-241.01	2.05	0.68	11.00
3,276.00	9.15	33.20	3,247.57	253.67	180.11	-253.67	1.46	-1.46	-0.21
3,366.00	11.37	33.56	3,336.13	267.05	188.93	-267.05	2.47	2.47	0.40
3,456.00	10.74	36.88	3,424.46	281.16	198.87	-281.16	0.99	-0.70	3.69
3,546.00	9.66	32.05	3,513.04	294.26	207.91	-294.26	1.53	-1.20	-5.37
3,636.00	11.26	22.05	3,601.55	308.81	215.21	-308.81	2.68	1.78	-11.11
3,725.00	10.04	18.71	3,689.01	324.21	220.96	-324.21	1.54	-1.37	-3.75

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Site:	BUFFALO & BADGER 4C-15HZ PAD	MD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Well:	BUFFALO 35C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,815.00	8.94	17.25	3,777.78	338.32	225.55	-338.32	1.25	-1.22	-1.62
3,905.00	7.47	13.97	3,866.86	350.68	229.04	-350.68	1.71	-1.63	-3.64
3,995.00	6.12	11.27	3,956.22	361.06	231.39	-361.06	1.54	-1.50	-3.00
4,085.00	4.73	4.40	4,045.82	369.47	232.61	-369.47	1.70	-1.54	-7.63
4,174.00	4.04	354.84	4,134.56	376.25	232.61	-376.25	1.13	-0.78	-10.74
4,264.00	3.86	333.32	4,224.35	382.11	230.97	-382.11	1.65	-0.20	-23.91
4,354.00	3.06	278.94	4,314.21	385.19	227.23	-385.19	3.60	-0.89	-60.42
4,444.00	3.30	224.11	4,404.09	383.71	223.06	-383.71	3.26	0.27	-60.92
4,533.00	3.07	224.07	4,492.95	380.15	219.62	-380.15	0.26	-0.26	-0.04
4,623.00	2.52	152.44	4,582.87	376.67	218.85	-376.67	3.67	-0.61	-79.59
4,713.00	1.90	166.71	4,672.80	373.46	220.11	-373.46	0.92	-0.69	15.86
4,803.00	1.67	175.81	4,762.76	370.70	220.55	-370.70	0.40	-0.26	10.11
4,892.00	1.51	179.56	4,851.72	368.24	220.66	-368.24	0.21	-0.18	4.21
4,982.00	1.44	188.46	4,941.69	365.93	220.50	-365.93	0.27	-0.08	9.89
5,072.00	1.14	125.33	5,031.67	364.30	221.06	-364.30	1.53	-0.33	-70.14
5,162.00	0.93	119.20	5,121.66	363.42	222.43	-363.42	0.26	-0.23	-6.81
5,251.00	0.63	151.72	5,210.65	362.64	223.29	-362.64	0.59	-0.34	36.54
5,341.00	0.69	157.59	5,300.65	361.70	223.73	-361.70	0.10	0.07	6.52
5,431.00	0.54	165.01	5,390.64	360.79	224.05	-360.79	0.19	-0.17	8.24
5,521.00	1.25	46.83	5,480.63	361.05	224.88	-361.05	1.75	0.79	-131.31
5,700.00	1.03	24.26	5,659.60	363.86	226.96	-363.86	0.28	-0.12	-12.61
5,790.00	1.10	12.68	5,749.58	365.44	227.48	-365.44	0.25	0.08	-12.87
5,880.00	0.93	5.04	5,839.57	367.01	227.74	-367.01	0.24	-0.19	-8.49
6,150.00	0.88	350.89	6,109.54	371.24	227.60	-371.24	0.08	-0.02	-5.24
6,329.00	0.84	339.79	6,288.52	373.82	226.93	-373.82	0.10	-0.02	-6.20
6,419.00	1.12	327.03	6,378.50	375.18	226.22	-375.18	0.39	0.31	-14.18
6,509.00	1.18	308.52	6,468.49	376.50	225.02	-376.50	0.42	0.07	-20.57
6,688.00	1.00	328.08	6,647.45	378.97	222.75	-378.97	0.23	-0.10	10.93
6,778.00	1.21	339.98	6,737.44	380.53	222.01	-380.53	0.34	0.23	13.22
6,868.00	1.87	49.15	6,827.41	382.38	222.80	-382.38	2.03	0.73	76.86
7,048.00	1.42	126.18	7,007.35	382.99	226.82	-382.99	1.15	-0.25	42.79
7,137.00	1.21	110.57	7,096.33	382.01	228.59	-382.01	0.46	-0.24	-17.54
7,227.00	2.71	193.58	7,186.29	379.60	228.98	-379.60	3.14	1.67	92.23
7,317.00	7.70	181.42	7,275.89	371.50	228.33	-371.50	5.65	5.54	-13.51
7,407.00	14.73	180.28	7,364.12	354.01	228.12	-354.01	7.81	7.81	-1.27
7,496.00	20.73	192.82	7,448.88	327.30	224.57	-327.30	7.96	6.74	14.09
7,586.00	25.99	194.55	7,531.48	292.66	216.07	-292.66	5.89	5.84	1.92
7,676.00	34.66	186.09	7,609.12	248.02	208.39	-248.02	10.72	9.63	-9.40
7,766.00	43.01	177.91	7,679.21	191.76	206.79	-191.76	10.87	9.28	-9.09
7,855.00	50.46	176.28	7,740.17	127.09	210.13	-127.09	8.48	8.37	-1.83
7,945.00	55.81	175.96	7,794.15	55.28	215.00	-55.28	5.95	5.94	-0.36
8,035.00	65.40	179.57	7,838.28	-22.97	217.94	22.97	11.21	10.66	4.01

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Well:	BUFFALO 35C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,125.00	73.40	183.73	7,869.93	-107.09	215.44	107.09	9.88	8.89	4.62	
8,214.00	81.84	182.68	7,889.00	-193.80	210.59	193.80	9.55	9.48	-1.18	
8,288.00	88.03	181.70	7,895.53	-267.42	207.78	267.42	8.47	8.37	-1.32	
7"(658 FNL 1166 FWL)										
8,318.00	90.54	181.31	7,895.90	-297.41	206.99	297.41	8.47	8.37	-1.31	
8,408.00	89.87	180.83	7,895.58	-387.39	205.31	387.39	0.92	-0.74	-0.53	
8,498.00	88.79	179.92	7,896.63	-477.38	204.72	477.38	1.57	-1.20	-1.01	
8,587.00	88.96	179.79	7,898.38	-566.36	204.95	566.36	0.24	0.19	-0.15	
8,677.00	90.57	180.36	7,898.75	-656.36	204.83	656.36	1.90	1.79	0.63	
8,767.00	89.40	180.23	7,898.77	-746.36	204.37	746.36	1.31	-1.30	-0.14	
8,857.00	88.79	178.04	7,900.19	-836.33	205.72	836.33	2.53	-0.68	-2.43	
9,036.00	88.19	177.82	7,904.91	-1,015.15	212.19	1,015.15	0.36	-0.34	-0.12	
9,126.00	89.29	179.61	7,906.89	-1,105.10	214.20	1,105.10	2.33	1.22	1.99	
9,216.00	88.09	178.38	7,908.95	-1,195.06	215.78	1,195.06	1.91	-1.33	-1.37	
9,306.00	88.59	179.39	7,911.55	-1,285.00	217.53	1,285.00	1.25	0.56	1.12	
9,395.00	89.03	180.24	7,913.40	-1,373.98	217.82	1,373.98	1.08	0.49	0.96	
9,495.00	89.06	180.34	7,915.07	-1,473.97	217.31	1,473.97	0.10	0.03	0.10	
9,665.00	89.97	179.25	7,916.51	-1,643.96	217.92	1,643.96	0.84	0.54	-0.64	
9,755.00	92.22	178.31	7,914.79	-1,733.91	219.84	1,733.91	2.71	2.50	-1.04	
9,844.00	92.24	177.38	7,911.33	-1,822.78	223.18	1,822.78	1.04	0.02	-1.04	
10,024.00	91.78	179.54	7,905.01	-2,002.59	228.02	2,002.59	1.23	-0.26	1.20	
10,204.00	90.64	182.19	7,901.21	-2,182.51	225.30	2,182.51	1.60	-0.63	1.47	
10,383.00	89.63	180.47	7,900.79	-2,361.46	221.14	2,361.46	1.11	-0.56	-0.96	
10,473.00	89.37	178.75	7,901.57	-2,451.45	221.76	2,451.45	1.93	-0.29	-1.91	
10,563.00	89.87	178.71	7,902.17	-2,541.42	223.75	2,541.42	0.56	0.56	-0.04	
10,653.00	90.03	178.38	7,902.25	-2,631.39	226.04	2,631.39	0.41	0.18	-0.37	
10,742.00	89.56	178.25	7,902.57	-2,720.36	228.65	2,720.36	0.55	-0.53	-0.15	
10,832.00	89.93	177.94	7,902.97	-2,810.30	231.65	2,810.30	0.54	0.41	-0.34	
10,922.00	88.93	180.08	7,903.86	-2,900.28	233.20	2,900.28	2.62	-1.11	2.38	
11,012.00	88.93	178.84	7,905.54	-2,990.26	234.05	2,990.26	1.38	0.00	-1.38	
11,191.00	90.80	180.15	7,905.97	-3,169.24	235.63	3,169.24	1.28	1.04	0.73	
11,281.00	91.07	179.00	7,904.50	-3,259.22	236.29	3,259.22	1.31	0.30	-1.28	
11,461.00	88.76	174.25	7,904.76	-3,438.85	246.89	3,438.85	2.93	-1.28	-2.64	
11,551.00	90.17	174.65	7,905.60	-3,528.42	255.59	3,528.42	1.63	1.57	0.44	
11,641.00	90.70	175.42	7,904.92	-3,618.08	263.38	3,618.08	1.04	0.59	0.86	
11,730.00	89.73	176.70	7,904.59	-3,706.86	269.49	3,706.86	1.80	-1.09	1.44	
11,820.00	90.33	178.84	7,904.54	-3,796.79	273.00	3,796.79	2.47	0.67	2.38	
11,910.00	89.97	179.79	7,904.30	-3,886.78	274.07	3,886.78	1.13	-0.40	1.06	
12,000.00	88.79	181.47	7,905.28	-3,976.77	273.08	3,976.77	2.28	-1.31	1.87	
12,089.00	88.36	179.69	7,907.49	-4,065.73	272.18	4,065.73	2.06	-0.48	-2.00	
12,179.00	88.93	179.57	7,909.62	-4,155.70	272.76	4,155.70	0.65	0.63	-0.13	
12,269.00	89.10	180.58	7,911.17	-4,245.69	272.64	4,245.69	1.14	0.19	1.12	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well BUFFALO 35C-15HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Site:	BUFFALO & BADGER 4C-15HZ PAD	MD Reference:	GL 5138 & KB 20 @ 5158.00ft (PRECISION 461)
Well:	BUFFALO 35C-15HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,359.00	88.93	180.28	7,912.71	-4,335.67	271.97	4,335.67	0.38	-0.19	-0.33
LAST SDI MWD PRODUCTION SURVEY									
12,427.00	88.93	180.28	7,913.98	-4,403.66	271.64	4,403.66	0.00	0.00	0.00
SDI PROJECTION TO TD(483 FSL 1245 FWL)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,288.00	1,287.94	9 5/8"	9.625	13.500	
8,288.00	7,895.53	7"(658 FNL 1166 FWL)	7.000	8.750	

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
66.00	66.00	-0.09	-0.21	FIRST CATHEDRAL MWD SURFACE SURVEY	
1,216.00	1,215.94	1.15	-3.80	LAST CATHEDRAL MWD SURFACE SURVEY	
1,391.00	1,390.92	2.58	-1.75	FIRST SDI MWD PRODUCTION SURVEY	
12,359.00	7,912.71	-4,335.67	271.97	LAST SDI MWD PRODUCTION SURVEY	
12,427.00	7,913.98	-4,403.66	271.64	SDI PROJECTION TO TD(483 FSL 1245 FWL)	

Checked By: _____ Approved By: _____ Date: _____