

WELL DETAILS: Land 15C-32HZ

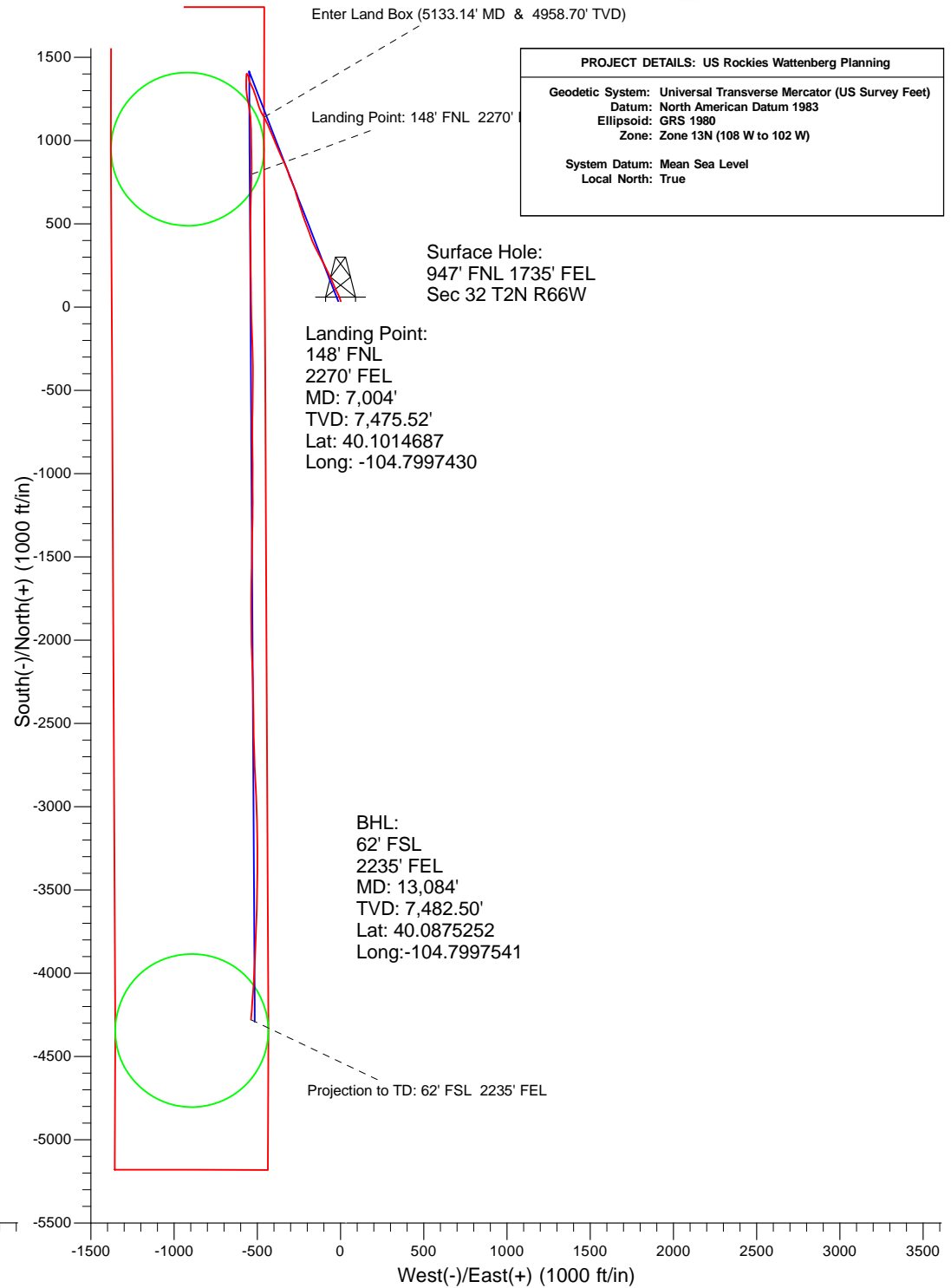
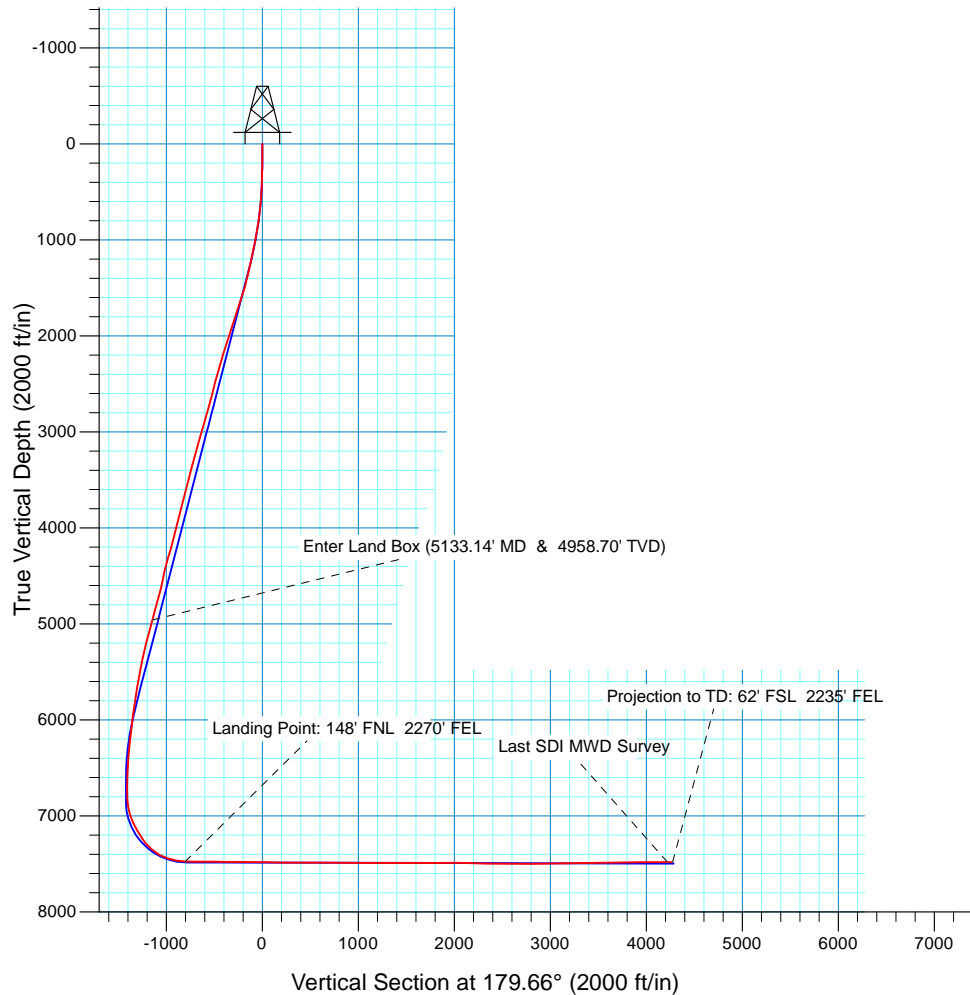
GL 4913' & KB 20' @ 4933.00ft (Precision 461)				4913.00
Northing	Easting	Latitude	Longitude	
14562948.07	1696952.51	40.0992750	-104.7978300	

Design: OH (Land 15C-32HZ/OH)

Created By: Seth Burstad Date: 8-02-2016

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Annotation
4958.70	5133.14	16.58	332.06	1140.69	-459.02	Enter Land Box (5133.14' MD & 4958.70' TVD)
7475.52	8004.00	88.29	181.24	798.82	-534.97	Landing Point: 148' FNL 2270' FEL
7483.13	13030.00	90.67	184.68	-4224.87	-533.76	Last SDI MWD Survey
7482.50	13084.00	90.67	184.68	-4278.68	-538.16	Projection to TD: 62' FSL 2235' FEL



PROJECT DETAILS: US Rockies Wattenberg Planning	
Geodetic System:	Universal Transverse Mercator (US Survey Feet)
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	Zone 13N (108 W to 102 W)
System Datum:	Mean Sea Level
Local North:	True

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Land 15C-32HZ
Project:	US Rockies Wattenberg Planning	TVD Reference:	GL 4913' & KB 20' @ 4933.00ft (Precision 461)
Site:	Land 17-32HZ Pad, 2N-66W-32	MD Reference:	GL 4913' & KB 20' @ 4933.00ft (Precision 461)
Well:	Land 15C-32HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

Project	US Rockies Wattenberg Planning		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 13N (108 W to 102 W)		

Site	Land 17-32HZ Pad, 2N-66W-32, Site Center : Land 14C-32HZ				
Site Position:		Northing:	14,562,948.00 usft	Latitude:	40.0992750
From:	Lat/Long	Easting:	1,696,921.75 usft	Longitude:	-104.7979400
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.13 °

Well	Land 15C-32HZ, 947' FNL 1735' FEL Sec 32 T2N R66W					
Well Position	+N/-S	0.00 ft	Northing:	14,562,948.07 usft	Latitude:	40.0992750
	+E/-W	0.00 ft	Easting:	1,696,952.51 usft	Longitude:	-104.7978300
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,913.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	7/12/2016	8.31	66.90	52,567
	User Defined	7/30/2016	8.30	66.69	52,562

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	179.66	

Survey Program	Date	8/2/2016			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
210.00	1,505.00	Survey #1 - Surface (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	
1,663.00	13,084.00	Survey #2 - Production (OH)	APC_ISCWSA REV 2 MWD+	Fixed:v2:crustal field declination	

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	0.00
210.00	0.93	103.89	209.99	-0.41	1.65	0.42	0.44	0.44	0.44	0.00
First SDI MWD Survey										
303.00	1.28	42.34	302.98	0.18	3.09	-0.16	1.26	0.38	-66.18	
397.00	2.42	17.57	396.93	2.85	4.39	-2.82	1.45	1.21	-26.35	
490.00	2.98	6.33	489.82	7.12	5.25	-7.09	0.83	0.60	-12.09	
583.00	4.28	354.77	582.64	12.98	5.20	-12.95	1.60	1.40	-12.43	
677.00	6.30	350.40	676.23	21.56	4.02	-21.53	2.19	2.15	-4.65	

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Site:	Land 17-32HZ Pad, 2N-66W-32	MD Reference:	GL 4913' & KB 20' @ 4933.00ft (Precision 461)
Well:	Land 15C-32HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

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)	
770.00	8.29	348.01	768.47	33.15	1.78	-33.14	2.16	2.14	-2.57	
864.00	9.87	343.49	861.30	47.50	-1.92	-47.51	1.84	1.68	-4.81	
957.00	11.14	335.74	952.74	63.34	-7.88	-63.38	2.04	1.37	-8.33	
1,050.00	11.59	335.06	1,043.92	80.00	-15.51	-80.09	0.50	0.48	-0.73	
1,144.00	13.54	335.05	1,135.66	98.54	-24.13	-98.68	2.07	2.07	-0.01	
1,239.00	13.55	337.05	1,228.02	118.87	-33.16	-119.07	0.49	0.01	2.11	
1,334.00	13.07	334.25	1,320.47	138.79	-42.17	-139.04	0.85	-0.51	-2.95	
1,429.00	15.95	334.39	1,412.43	160.24	-52.48	-160.55	3.03	3.03	0.15	
1,505.00	16.44	334.21	1,485.41	179.34	-61.67	-179.71	0.65	0.64	-0.24	
Last SDI MWD Surface Survey										
1,663.00	20.99	335.65	1,635.02	225.28	-83.08	-225.77	2.89	2.88	0.91	
First SDI MWD Production Survey										
1,758.00	20.79	333.02	1,723.78	255.81	-97.74	-256.38	1.01	-0.21	-2.77	
1,852.00	20.19	331.09	1,811.83	284.87	-113.15	-285.54	0.96	-0.64	-2.05	
1,946.00	20.60	333.47	1,899.94	313.87	-128.38	-314.63	0.98	0.44	2.53	
2,041.00	19.39	330.97	1,989.21	342.61	-143.50	-343.46	1.56	-1.27	-2.63	
2,136.00	19.14	337.44	2,078.90	370.79	-157.13	-371.71	2.26	-0.26	6.81	
2,231.00	18.00	335.79	2,168.95	398.56	-169.12	-399.56	1.32	-1.20	-1.74	
2,325.00	17.91	340.52	2,258.38	425.43	-179.90	-426.49	1.55	-0.10	5.03	
2,417.00	16.58	341.57	2,346.24	451.22	-188.77	-452.34	1.48	-1.45	1.14	
2,511.00	15.37	337.19	2,436.62	475.43	-197.84	-476.60	1.82	-1.29	-4.66	
2,606.00	15.57	338.14	2,528.17	498.87	-207.47	-500.09	0.34	0.21	1.00	
2,699.00	15.61	341.19	2,617.75	522.30	-216.15	-523.57	0.88	0.04	3.28	
2,793.00	16.34	343.77	2,708.12	546.97	-223.92	-548.29	1.08	0.78	2.74	
2,887.00	16.72	342.05	2,798.24	572.53	-231.79	-573.89	0.66	0.40	-1.83	
2,981.00	15.66	339.73	2,888.51	597.29	-240.35	-598.71	1.32	-1.13	-2.47	
3,075.00	17.01	342.52	2,978.72	622.31	-248.87	-623.77	1.66	1.44	2.97	
3,170.00	16.58	342.51	3,069.66	648.49	-257.12	-650.01	0.45	-0.45	-0.01	
3,264.00	16.92	344.24	3,159.68	674.45	-264.87	-676.01	0.64	0.36	1.84	
3,359.00	16.50	343.16	3,250.66	700.66	-272.53	-702.27	0.55	-0.44	-1.14	
3,453.00	16.42	337.45	3,340.82	725.71	-281.49	-727.37	1.72	-0.09	-6.07	
3,547.00	15.16	334.93	3,431.27	749.12	-291.80	-750.83	1.53	-1.34	-2.68	
3,642.00	14.64	339.02	3,523.08	771.58	-301.36	-773.35	1.23	-0.55	4.31	
3,737.00	15.32	341.38	3,614.85	794.68	-309.66	-796.51	0.96	0.72	2.48	
3,832.00	16.56	339.57	3,706.20	819.26	-318.40	-821.14	1.41	1.31	-1.91	
3,925.00	15.16	338.34	3,795.65	842.99	-327.51	-844.91	1.55	-1.51	-1.32	
4,019.00	14.88	334.19	3,886.45	865.27	-337.30	-867.26	1.18	-0.30	-4.41	
4,114.00	16.36	336.40	3,977.94	888.52	-347.97	-890.57	1.68	1.56	2.33	
4,208.00	14.89	334.48	4,068.46	911.55	-358.48	-913.66	1.66	-1.56	-2.04	
4,303.00	15.38	334.79	4,160.16	933.96	-369.10	-936.14	0.52	0.52	0.33	

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Well:	Land 15C-32HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

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)	
4,398.00	18.06	339.53	4,251.14	959.16	-379.62	-961.40	3.16	2.82	4.99	
4,492.00	17.77	339.32	4,340.59	986.23	-389.78	-988.53	0.32	-0.31	-0.22	
4,587.00	14.08	337.78	4,431.92	1,010.50	-399.27	-1,012.85	3.91	-3.88	-1.62	
4,681.00	11.76	331.58	4,523.54	1,029.51	-408.16	-1,031.92	2.87	-2.47	-6.60	
4,776.00	15.11	335.92	4,615.93	1,049.34	-417.82	-1,051.80	3.68	3.53	4.57	
4,869.00	16.70	337.81	4,705.37	1,072.78	-427.81	-1,075.30	1.80	1.71	2.03	
4,988.00	16.89	336.08	4,819.29	1,104.41	-441.28	-1,107.01	0.45	0.16	-1.45	
5,082.00	15.54	333.13	4,909.55	1,128.13	-452.51	-1,130.80	1.68	-1.44	-3.14	
5,133.14	16.58	332.06	4,958.70	1,140.69	-459.02	-1,143.39	2.12	2.04	-2.08	
Enter Land Box (5133.14' MD & 4958.70' TVD)										
5,177.00	17.48	331.25	5,000.63	1,151.99	-465.12	-1,154.73	2.12	2.05	-1.86	
5,272.00	17.00	333.82	5,091.37	1,176.97	-478.11	-1,179.78	0.95	-0.51	2.71	
5,366.00	15.61	337.52	5,181.59	1,200.99	-489.01	-1,203.87	1.85	-1.48	3.94	
5,460.00	14.08	345.40	5,272.46	1,223.74	-496.73	-1,226.67	2.69	-1.63	8.38	
5,554.00	12.24	344.73	5,363.98	1,244.42	-502.24	-1,247.38	1.96	-1.96	-0.71	
5,649.00	11.48	340.24	5,456.96	1,263.03	-508.09	-1,266.02	1.26	-0.80	-4.73	
5,743.00	9.90	340.88	5,549.32	1,279.47	-513.90	-1,282.50	1.69	-1.68	0.68	
5,837.00	10.89	340.36	5,641.78	1,295.47	-519.53	-1,298.53	1.06	1.05	-0.55	
5,932.00	8.96	337.36	5,735.35	1,310.75	-525.39	-1,313.85	2.10	-2.03	-3.16	
6,024.00	8.75	333.08	5,826.26	1,323.60	-531.32	-1,326.73	0.75	-0.23	-4.65	
6,118.00	10.14	333.49	5,918.98	1,337.38	-538.25	-1,340.55	1.48	1.48	0.44	
6,211.00	7.89	334.39	6,010.83	1,350.47	-544.66	-1,353.67	2.42	-2.42	0.97	
6,304.00	7.25	348.62	6,103.02	1,361.98	-548.58	-1,365.21	2.12	-0.69	15.30	
6,399.00	6.65	353.76	6,197.33	1,373.32	-550.36	-1,376.56	0.91	-0.63	5.41	
6,493.00	5.16	345.68	6,290.83	1,382.83	-552.00	-1,386.08	1.81	-1.59	-8.60	
6,587.00	4.21	333.91	6,384.51	1,390.02	-554.56	-1,393.29	1.43	-1.01	-12.52	
6,683.00	3.27	325.21	6,480.31	1,395.44	-557.67	-1,398.72	1.14	-0.98	-9.06	
6,778.00	2.12	322.61	6,575.20	1,399.06	-560.29	-1,402.36	1.22	-1.21	-2.74	
6,872.00	1.23	322.71	6,669.16	1,401.24	-561.95	-1,404.55	0.95	-0.95	0.11	
6,967.00	1.29	312.55	6,764.14	1,402.78	-563.36	-1,406.09	0.24	0.06	-10.69	
7,060.00	4.85	184.48	6,857.04	1,399.56	-564.44	-1,402.89	6.17	3.83	-137.71	
7,155.00	14.86	181.99	6,950.52	1,383.34	-565.18	-1,386.67	10.54	10.54	-2.62	
7,251.00	22.05	183.67	7,041.52	1,353.02	-566.76	-1,356.36	7.51	7.49	1.75	
7,346.00	29.43	177.60	7,127.05	1,311.84	-566.93	-1,315.18	8.24	7.77	-6.39	
7,439.00	31.16	168.85	7,207.39	1,265.38	-561.31	-1,268.69	5.09	1.86	-9.41	
7,534.00	39.88	169.18	7,284.63	1,211.24	-550.82	-1,214.49	9.18	9.18	0.35	
7,627.00	49.21	173.70	7,350.86	1,146.81	-541.34	-1,150.00	10.59	10.03	4.86	
7,722.00	60.66	180.54	7,405.39	1,069.34	-537.77	-1,072.51	13.41	12.05	7.20	
7,816.00	72.28	178.49	7,442.86	983.31	-536.97	-986.48	12.52	12.36	-2.18	
7,910.00	79.64	178.86	7,465.64	892.21	-534.87	-895.36	7.84	7.83	0.39	
8,004.00	88.29	181.24	7,475.52	798.82	-534.97	-801.98	9.54	9.20	2.53	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

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)	
Landing Point: 148' FNL 2270' FEL										
8,099.00	90.07	181.34	7,476.88	703.86	-537.10	-707.03	1.88	1.87	0.11	
8,193.00	89.93	181.35	7,476.88	609.89	-539.31	-613.08	0.15	-0.15	0.01	
8,286.00	89.76	181.16	7,477.13	516.91	-541.35	-520.11	0.27	-0.18	-0.20	
8,379.00	88.02	178.39	7,478.93	423.94	-540.98	-427.14	3.52	-1.87	-2.98	
8,471.00	89.53	179.71	7,480.90	331.98	-539.46	-335.17	2.18	1.64	1.43	
8,566.00	89.87	180.00	7,481.40	236.98	-539.22	-240.18	0.47	0.36	0.31	
8,660.00	89.53	179.65	7,481.89	142.98	-538.93	-146.18	0.52	-0.36	-0.37	
8,755.00	89.53	179.08	7,482.67	47.99	-537.88	-51.18	0.60	0.00	-0.60	
8,848.00	89.36	178.18	7,483.57	-44.98	-535.65	41.80	0.98	-0.18	-0.97	
8,942.00	89.16	178.03	7,484.78	-138.92	-532.55	135.76	0.27	-0.21	-0.16	
9,036.00	88.96	177.70	7,486.32	-232.84	-529.05	229.70	0.41	-0.21	-0.35	
9,129.00	89.90	179.50	7,487.25	-325.80	-526.77	322.67	2.18	1.01	1.94	
9,223.00	90.17	180.51	7,487.19	-419.80	-526.78	416.67	1.11	0.29	1.07	
9,318.00	90.40	180.32	7,486.72	-514.80	-527.47	511.66	0.31	0.24	-0.20	
9,412.00	90.30	180.86	7,486.15	-608.79	-528.44	605.64	0.58	-0.11	0.57	
9,506.00	89.46	180.09	7,486.34	-702.79	-529.22	699.63	1.21	-0.89	-0.82	
9,600.00	88.99	179.82	7,487.61	-796.78	-529.14	793.62	0.58	-0.50	-0.29	
9,694.00	89.09	179.93	7,489.19	-890.76	-528.94	887.61	0.16	0.11	0.12	
9,789.00	89.16	179.58	7,490.64	-985.75	-528.53	982.60	0.38	0.07	-0.37	
9,882.00	89.36	179.98	7,491.84	-1,078.74	-528.17	1,075.59	0.48	0.22	0.43	
9,977.00	89.56	179.78	7,492.74	-1,173.74	-527.98	1,170.58	0.30	0.21	-0.21	
10,071.00	90.13	181.10	7,492.99	-1,267.73	-528.70	1,264.57	1.53	0.61	1.40	
10,165.00	89.97	181.10	7,492.91	-1,361.71	-530.50	1,358.54	0.17	-0.17	0.00	
10,259.00	90.07	181.14	7,492.88	-1,455.70	-532.34	1,452.51	0.11	0.11	0.04	
10,352.00	90.37	180.75	7,492.52	-1,548.68	-533.87	1,545.49	0.53	0.32	-0.42	
10,447.00	90.71	181.00	7,491.62	-1,643.67	-535.32	1,640.46	0.44	0.36	0.26	
10,541.00	90.77	180.43	7,490.41	-1,737.65	-536.50	1,734.44	0.61	0.06	-0.61	
10,635.00	90.10	179.55	7,489.70	-1,831.65	-536.48	1,828.43	1.18	-0.71	-0.94	
10,728.00	90.60	179.51	7,489.13	-1,924.64	-535.72	1,921.43	0.54	0.54	-0.04	
10,822.00	88.49	178.51	7,489.87	-2,018.62	-534.09	2,015.41	2.48	-2.24	-1.06	
10,915.00	88.96	178.09	7,491.94	-2,111.55	-531.34	2,108.36	0.68	0.51	-0.45	
11,009.00	88.86	178.27	7,493.73	-2,205.49	-528.35	2,202.32	0.22	-0.11	0.19	
11,103.00	88.86	178.25	7,495.60	-2,299.43	-525.50	2,296.27	0.02	0.00	-0.02	
11,195.00	89.16	179.62	7,497.19	-2,391.40	-523.79	2,388.25	1.52	0.33	1.49	
11,289.00	88.35	179.63	7,499.23	-2,485.37	-523.17	2,482.22	0.86	-0.86	0.01	
11,382.00	89.97	178.50	7,500.60	-2,578.34	-521.65	2,575.20	2.12	1.74	-1.22	
11,475.00	90.64	178.11	7,500.10	-2,671.30	-518.90	2,668.18	0.83	0.72	-0.42	
11,568.00	90.34	177.35	7,499.31	-2,764.22	-515.22	2,761.12	0.88	-0.32	-0.82	
11,661.00	90.44	177.22	7,498.67	-2,857.12	-510.82	2,854.04	0.18	0.11	-0.14	

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well Land 15C-32HZ
Project:	US Rockies Wattenberg Planning	TVD Reference:	GL 4913' & KB 20' @ 4933.00ft (Precision 461)
Site:	Land 17-32HZ Pad, 2N-66W-32	MD Reference:	GL 4913' & KB 20' @ 4933.00ft (Precision 461)
Well:	Land 15C-32HZ	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Denver Sales Office

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)	
11,754.00	90.87	177.57	7,497.61	-2,950.02	-506.59	2,946.96	0.60	0.46	0.38	
11,848.00	90.94	177.85	7,496.13	-3,043.93	-502.83	3,040.89	0.31	0.07	0.30	
11,942.00	90.64	180.06	7,494.83	-3,137.90	-501.12	3,134.87	2.37	-0.32	2.35	
12,035.00	90.37	178.01	7,494.01	-3,230.88	-499.55	3,227.85	2.22	-0.29	-2.20	
12,129.00	91.14	180.66	7,492.77	-3,324.85	-498.46	3,321.84	2.94	0.82	2.82	
12,224.00	91.11	180.75	7,490.91	-3,419.83	-499.63	3,416.80	0.10	-0.03	0.09	
12,317.00	90.84	181.13	7,489.32	-3,512.80	-501.16	3,509.77	0.50	-0.29	0.41	
12,411.00	91.07	181.75	7,487.76	-3,606.76	-503.52	3,603.71	0.70	0.24	0.66	
12,503.00	91.54	182.23	7,485.66	-3,698.68	-506.71	3,695.61	0.73	0.51	0.52	
12,596.00	90.10	181.25	7,484.33	-3,791.62	-509.54	3,788.53	1.87	-1.55	-1.05	
12,689.00	90.67	182.00	7,483.71	-3,884.58	-512.17	3,881.47	1.01	0.61	0.81	
12,784.00	89.63	183.53	7,483.46	-3,979.47	-516.76	3,976.33	1.95	-1.09	1.61	
12,877.00	89.87	183.67	7,483.86	-4,072.28	-522.59	4,069.11	0.30	0.26	0.15	
12,971.00	90.37	184.31	7,483.67	-4,166.05	-529.14	4,162.84	0.86	0.53	0.68	
13,030.00	90.67	184.68	7,483.13	-4,224.87	-533.76	4,221.63	0.81	0.51	0.63	
Last SDI MWD Survey										
13,084.00	90.67	184.68	7,482.50	-4,278.69	-538.16	4,275.42	0.00	0.00	0.00	
Projection to TD: 62' FSL 2235' FEL										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
210.00	209.99	-0.41	1.65	First SDI MWD Survey	
1,505.00	1,485.41	179.34	-61.67	Last SDI MWD Surface Survey	
1,663.00	1,635.02	225.28	-83.08	First SDI MWD Production Survey	
5,133.14	4,958.70	1,140.69	-459.02	Enter Land Box (5133.14' MD & 4958.70' TVD)	
8,004.00	7,475.52	798.82	-534.97	Landing Point: 148' FNL 2270' FEL	
13,030.00	7,483.13	-4,224.87	-533.76	Last SDI MWD Survey	
13,084.00	7,482.50	-4,278.69	-538.16	Projection to TD: 62' FSL 2235' FEL	

Checked By: _____ Approved By: _____ Date: _____