



Extraction Oil & Gas

**WELD COUNTY, CO
WINDER SOUTH PAD
WINDER SOUTH 10**

WINDER SOUTH 10

Survey: Survey #2

Standard Survey Report

12 December, 2016



Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well WINDER SOUTH 10
Project:	WELD COUNTY, CO	TVD Reference:	WELL @ 4879.00ft (Patterson 346)
Site:	WINDER SOUTH PAD	MD Reference:	WELL @ 4879.00ft (Patterson 346)
Well:	WINDER SOUTH 10	North Reference:	True
Wellbore:	WINDER SOUTH 10	Survey Calculation Method:	Minimum Curvature
Design:	WINDER SOUTH 10	Database:	EDM 5000.1 Single User Db

Project	WELD COUNTY, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		WINDER SOUTH PAD			
Site Position:		Northing:	1,426,547.14 usft	Latitude:	40° 30' 9.630 N
From:	Lat/Long	Easting:	3,169,438.32 usft	Longitude:	104° 53' 26.516 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16"	Grid Convergence:	0.39 °

Well	WINDER SOUTH 10					
Well Position	+N/-S	0.00 ft	Northing:	1,426,547.13 usft	Latitude:	40° 30' 9.619 N
	+E/-W	0.00 ft	Easting:	3,169,598.20 usft	Longitude:	104° 53' 24.446 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,854.00 ft

Wellbore	WINDER SOUTH 10				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/13/16	8.36	66.93	52,509

Design	WINDER SOUTH 10				
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	255.76

Survey Program	Date	12/12/16			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
155.00	1,530.00	Survey #1 (WINDER SOUTH 10)	MWD	MWD - Standard	
1,667.00	13,097.00	Survey #2 (WINDER SOUTH 10)	MWD	MWD - Standard	

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)	
Helmer Dir tie on										
1,530.00	5.40	168.00	1,521.79	-141.97	19.66	15.86	0.00	0.00	0.00	
1,667.00	5.22	161.47	1,658.20	-154.18	22.98	15.64	0.46	-0.13	-4.77	
1,762.00	5.76	161.75	1,752.76	-162.81	25.85	14.98	0.57	0.57	0.29	
1,856.00	10.80	170.13	1,845.76	-175.97	28.83	15.32	5.50	5.36	8.91	
1,951.00	11.77	173.41	1,938.92	-194.37	31.47	17.29	1.22	1.02	3.45	
2,045.00	15.42	174.11	2,030.27	-216.33	33.86	20.38	3.89	3.88	0.74	
2,140.00	14.66	173.64	2,122.02	-240.84	36.48	23.86	0.81	-0.80	-0.49	
2,234.00	16.05	173.02	2,212.66	-265.56	39.38	27.13	1.49	1.48	-0.66	
2,329.00	18.35	174.76	2,303.40	-293.49	42.34	31.13	2.48	2.42	1.83	
2,424.00	20.65	172.33	2,392.95	-324.99	45.94	35.38	2.57	2.42	-2.56	
2,518.00	23.96	176.98	2,479.91	-360.49	49.16	40.99	3.99	3.52	4.95	

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Well:	WINDER SOUTH 10	North Reference:	True
Wellbore:	WINDER SOUTH 10	Survey Calculation Method:	Minimum Curvature
Design:	WINDER SOUTH 10	Database:	EDM 5000.1 Single User Db

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)
2,612.00	26.77	173.57	2,564.85	-400.60	52.54	47.58	3.37	2.99	-3.63
2,707.00	28.92	172.31	2,648.84	-444.63	58.01	53.11	2.35	2.26	-1.33
2,802.00	31.72	171.49	2,730.84	-492.10	64.78	58.22	2.98	2.95	-0.86
2,896.00	32.05	171.02	2,810.66	-541.17	72.33	62.97	0.44	0.35	-0.50
2,991.00	31.40	170.91	2,891.46	-590.51	80.18	67.50	0.69	-0.68	-0.12
3,085.00	31.79	173.63	2,971.53	-639.30	86.79	73.08	1.57	0.41	2.89
3,180.00	30.42	173.60	3,052.87	-688.07	92.25	79.78	1.44	-1.44	-0.03
3,274.00	32.08	172.85	3,133.23	-736.49	98.01	86.11	1.81	1.77	-0.80
3,369.00	30.73	172.35	3,214.31	-785.58	104.38	92.00	1.45	-1.42	-0.53
3,464.00	30.28	172.97	3,296.16	-833.41	110.54	97.79	0.58	-0.47	0.65
3,558.00	30.24	175.15	3,377.36	-880.52	115.45	104.62	1.17	-0.04	2.32
3,653.00	32.35	175.23	3,458.53	-929.69	119.58	112.71	2.22	2.22	0.08
3,747.00	32.46	173.58	3,537.89	-979.82	124.49	120.27	0.95	0.12	-1.76
3,842.00	33.69	175.83	3,617.50	-1,031.43	129.26	128.34	1.83	1.29	2.37
3,936.00	34.28	174.28	3,695.45	-1,083.78	133.80	136.82	1.12	0.63	-1.65
4,031.00	34.62	174.82	3,773.79	-1,137.27	138.90	145.03	0.48	0.36	0.57
4,126.00	34.67	175.65	3,851.94	-1,191.09	143.38	153.92	0.50	0.05	0.87
4,220.00	34.55	175.02	3,929.31	-1,244.31	147.73	162.79	0.40	-0.13	-0.67
4,315.00	32.42	175.67	4,008.54	-1,296.54	151.99	171.51	2.27	-2.24	0.68
4,409.00	32.82	175.79	4,087.71	-1,347.07	155.76	180.28	0.43	0.43	0.13
4,504.00	34.11	175.25	4,166.96	-1,399.30	159.86	189.15	1.39	1.36	-0.57
4,598.00	32.34	174.15	4,245.59	-1,450.58	164.60	197.16	1.99	-1.88	-1.17
4,693.00	32.39	175.68	4,325.83	-1,501.23	169.11	205.25	0.86	0.05	1.61
4,787.00	33.28	175.62	4,404.81	-1,552.05	172.97	214.00	0.95	0.95	-0.06
4,881.00	32.35	175.28	4,483.81	-1,602.83	177.01	222.57	1.01	-0.99	-0.36
4,976.00	31.50	175.87	4,564.44	-1,652.92	180.89	231.13	0.95	-0.89	0.62
5,070.00	31.90	176.10	4,644.42	-1,702.19	184.35	239.89	0.44	0.43	0.24
5,165.00	31.63	173.66	4,725.19	-1,751.99	188.81	247.82	1.38	-0.28	-2.57
5,260.00	31.17	172.04	4,806.28	-1,801.10	194.96	253.93	1.01	-0.48	-1.71
5,354.00	30.92	171.29	4,886.82	-1,849.06	201.99	258.91	0.49	-0.27	-0.80
5,448.00	32.18	171.82	4,966.92	-1,897.72	209.21	263.88	1.37	1.34	0.56
5,543.00	29.43	174.84	5,048.52	-1,946.01	214.91	270.23	3.32	-2.89	3.18
5,637.00	29.32	171.81	5,130.43	-1,991.80	220.27	276.30	1.59	-0.12	-3.22
5,732.00	29.27	172.18	5,213.28	-2,037.83	226.74	281.34	0.20	-0.05	0.39
5,827.00	29.59	172.76	5,296.03	-2,084.10	232.86	286.79	0.45	0.34	0.61
5,921.00	30.21	174.82	5,377.52	-2,130.68	237.92	293.34	1.28	0.66	2.19
6,015.00	30.26	172.71	5,458.73	-2,177.73	243.06	299.93	1.13	0.05	-2.24
6,110.00	26.63	171.13	5,542.25	-2,222.52	249.38	304.81	3.90	-3.82	-1.66
6,205.00	27.00	174.00	5,627.04	-2,265.01	254.92	309.89	1.42	0.39	3.02
6,299.00	26.59	170.80	5,710.95	-2,307.00	260.51	314.80	1.60	-0.44	-3.40
6,394.00	22.25	173.97	5,797.43	-2,345.89	265.80	319.23	4.77	-4.57	3.34
6,488.00	18.79	173.91	5,885.45	-2,378.65	269.28	323.92	3.68	-3.68	-0.06
6,582.00	15.68	175.05	5,975.22	-2,406.37	271.98	328.11	3.33	-3.31	1.21
6,677.00	12.41	175.47	6,067.37	-2,429.34	273.90	331.91	3.44	-3.44	0.44
6,796.00	9.30	175.35	6,184.23	-2,451.68	275.68	335.67	2.61	-2.61	-0.10
6,891.00	6.15	175.16	6,278.35	-2,464.40	276.74	337.78	3.32	-3.32	-0.20
6,985.00	3.71	184.20	6,372.00	-2,472.45	276.94	339.56	2.72	-2.60	9.62
7,079.00	0.64	183.15	6,465.92	-2,476.01	276.69	340.68	3.27	-3.27	-1.12
7,174.00	5.28	256.55	6,560.78	-2,477.56	272.40	345.21	5.40	4.88	77.26
7,267.00	15.25	266.75	6,652.18	-2,479.25	255.99	361.54	10.86	10.72	10.97
7,363.00	25.22	264.59	6,742.14	-2,481.90	222.94	394.23	10.41	10.39	-2.25
7,457.00	36.46	265.06	6,822.72	-2,486.21	175.02	441.73	11.96	11.96	0.50
7,552.00	46.67	266.47	6,893.71	-2,490.78	112.24	503.70	10.79	10.75	1.48
7,646.00	53.20	269.43	6,954.19	-2,493.26	40.40	573.95	7.35	6.95	3.15

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7,741.00	62.39	267.91	7,004.77	-2,495.18	-39.87	652.23	9.77	9.67	-1.60
WS 10 Hard Line Intersect Point									
7,830.60	74.21	266.94	7,037.84	-2,498.94	-122.88	733.62	13.23	13.19	-1.08
7,835.00	74.79	266.90	7,039.02	-2,499.17	-127.12	737.78	13.23	13.19	-1.00
LP WINDER SOUTH 10 P2									
7,915.68	82.11	272.06	7,055.17	-2,499.84	-206.09	814.49	11.03	9.08	6.40
7,929.00	83.33	272.89	7,056.85	-2,499.27	-219.28	827.14	11.03	9.13	6.23
LP WINDER SOUTH 10									
7,976.82	86.42	273.62	7,061.12	-2,496.56	-266.83	872.56	6.64	6.46	1.52
8,024.00	89.47	274.33	7,062.82	-2,493.29	-313.86	917.34	6.64	6.46	1.51
8,118.00	90.93	274.43	7,062.49	-2,486.12	-407.58	1,006.42	1.56	1.55	0.11
8,213.00	90.45	275.07	7,061.34	-2,478.25	-502.25	1,096.24	0.84	-0.51	0.67
8,307.00	90.72	271.67	7,060.38	-2,472.73	-596.07	1,185.82	3.63	0.29	-3.62
8,402.00	90.99	271.83	7,058.97	-2,469.82	-691.01	1,277.14	0.33	0.28	0.17
8,496.00	93.37	273.09	7,055.39	-2,465.79	-784.85	1,367.10	2.86	2.53	1.34
8,591.00	91.78	269.62	7,051.12	-2,463.55	-879.71	1,458.50	4.01	-1.67	-3.65
8,685.00	92.30	270.54	7,047.78	-2,463.42	-973.65	1,549.52	1.12	0.55	0.98
8,779.00	92.86	270.98	7,043.54	-2,462.18	-1,067.54	1,640.23	0.76	0.60	0.47
8,874.00	92.91	269.71	7,038.76	-2,461.60	-1,162.42	1,732.05	1.34	0.05	-1.34
8,968.00	92.96	271.17	7,033.95	-2,460.88	-1,256.29	1,822.86	1.55	0.05	1.55
9,063.00	92.20	273.43	7,029.67	-2,457.07	-1,351.11	1,913.83	2.51	-0.80	2.38
9,157.00	89.16	272.88	7,028.56	-2,451.90	-1,444.95	2,003.52	3.29	-3.23	-0.59
9,252.00	88.72	272.13	7,030.31	-2,447.75	-1,539.84	2,094.48	0.92	-0.46	-0.79
9,346.00	87.95	273.45	7,033.05	-2,443.18	-1,633.69	2,184.32	1.63	-0.82	1.40
9,441.00	90.52	271.97	7,034.31	-2,438.69	-1,728.56	2,275.18	3.12	2.71	-1.56
9,535.00	89.34	268.87	7,034.43	-2,438.00	-1,822.55	2,366.10	3.53	-1.26	-3.30
9,629.00	88.94	269.06	7,035.84	-2,439.70	-1,916.52	2,457.61	0.47	-0.43	0.20
9,723.00	89.26	269.12	7,037.32	-2,441.19	-2,010.50	2,549.07	0.35	0.34	0.06
9,818.00	88.06	269.60	7,039.54	-2,442.25	-2,105.46	2,641.38	1.36	-1.26	0.51
9,912.00	90.17	269.62	7,040.99	-2,442.89	-2,199.44	2,732.63	2.24	2.24	0.02
10,006.00	88.47	269.31	7,042.10	-2,443.77	-2,293.43	2,823.95	1.84	-1.81	-0.33
10,101.00	92.01	269.51	7,041.71	-2,444.74	-2,388.41	2,916.25	3.73	3.73	0.21
10,195.00	90.92	268.35	7,039.30	-2,446.50	-2,482.36	3,007.75	1.69	-1.16	-1.23
10,290.00	89.16	268.65	7,039.24	-2,448.99	-2,577.32	3,100.41	1.88	-1.85	0.32
10,384.00	91.32	269.58	7,038.84	-2,450.44	-2,671.30	3,191.86	2.50	2.30	0.99
10,478.00	90.84	269.07	7,037.07	-2,451.55	-2,765.28	3,283.22	0.74	-0.51	-0.54
10,573.00	90.13	268.37	7,036.27	-2,453.67	-2,860.25	3,375.80	1.05	-0.75	-0.74
10,668.00	89.55	269.45	7,036.53	-2,455.47	-2,955.23	3,468.31	1.29	-0.61	1.14
10,762.00	88.55	269.63	7,038.09	-2,456.23	-3,049.22	3,559.59	1.08	-1.06	0.19
10,857.00	90.11	267.41	7,039.20	-2,458.68	-3,144.17	3,652.23	2.86	1.64	-2.34
10,951.00	91.19	271.29	7,038.14	-2,459.75	-3,238.14	3,743.57	4.28	1.15	4.13
11,045.00	90.46	269.19	7,036.78	-2,459.36	-3,332.12	3,834.58	2.36	-0.78	-2.23
11,140.00	89.82	269.34	7,036.55	-2,460.57	-3,427.11	3,926.95	0.69	-0.67	0.16
11,235.00	88.10	268.49	7,038.27	-2,462.37	-3,522.07	4,019.44	2.02	-1.81	-0.89
11,329.00	90.65	268.60	7,039.30	-2,464.76	-3,616.03	4,111.10	2.72	2.71	0.12
11,424.00	90.18	269.57	7,038.61	-2,466.28	-3,711.01	4,203.54	1.13	-0.49	1.02
11,519.00	90.31	270.35	7,038.21	-2,466.34	-3,806.01	4,295.63	0.83	0.14	0.82
11,613.00	92.36	270.19	7,036.02	-2,465.90	-3,899.98	4,386.61	2.19	2.18	-0.17
11,707.00	92.40	269.08	7,032.11	-2,466.50	-3,993.90	4,477.79	1.18	0.04	-1.18
11,802.00	91.50	270.98	7,028.88	-2,466.45	-4,088.84	4,569.80	2.21	-0.95	2.00
11,897.00	90.56	271.42	7,027.17	-2,464.46	-4,183.80	4,661.36	1.09	-0.99	0.46
11,991.00	90.63	272.28	7,026.20	-2,461.42	-4,277.74	4,751.67	0.92	0.07	0.91
12,085.00	90.48	270.75	7,025.28	-2,458.94	-4,371.70	4,842.13	1.64	-0.16	-1.63
12,181.00	93.34	271.03	7,022.09	-2,457.45	-4,467.63	4,934.75	2.99	2.98	0.29

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Wellbore:	WINDER SOUTH 10	Survey Calculation Method:	Minimum Curvature
Design:	WINDER SOUTH 10	Database:	EDM 5000.1 Single User Db

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12,275.00	93.35	269.65	7,016.60	-2,456.89	-4,561.47	5,025.57	1.47	0.01	-1.47
12,370.00	91.77	269.39	7,012.36	-2,457.69	-4,656.36	5,117.75	1.69	-1.66	-0.27
12,464.00	91.41	269.31	7,009.75	-2,458.75	-4,750.32	5,209.08	0.39	-0.38	-0.09
12,559.00	91.26	270.31	7,007.54	-2,459.07	-4,845.29	5,301.21	1.06	-0.16	1.05
12,653.00	92.20	268.33	7,004.70	-2,460.18	-4,939.24	5,392.55	2.33	1.00	-2.11
12,748.00	91.91	268.08	7,001.29	-2,463.16	-5,034.13	5,485.26	0.40	-0.31	-0.26
12,842.00	93.68	272.04	6,996.71	-2,463.06	-5,128.00	5,576.22	4.61	1.88	4.21
12,937.00	93.88	271.18	6,990.44	-2,460.40	-5,222.75	5,667.41	0.93	0.21	-0.91
Last Svy									
13,032.00	93.41	269.67	6,984.40	-2,459.69	-5,317.55	5,759.13	1.66	-0.49	-1.59
Proj Svy - PBHL WINDER SOUTH 10									
13,097.00	93.41	269.67	6,980.54	-2,460.07	-5,382.44	5,822.11	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
WS 10 Hard Line Interse	0.00	0.00	7,037.83	-2,498.94	-122.87	1,424,047.41	3,169,492.52	40° 29' 44.925 N	104° 53' 26.037 W
- survey hits target center									
- Point									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,530.00	1,521.79	-141.97	19.66	Helmer Dir tie on
13,032.00	6,984.40	-2,459.69	-5,317.55	Last Svy
13,097.00	6,980.54	-2,460.07	-5,382.44	Proj Svy

Checked By: _____ Approved By: _____ Date: _____