

Extraction Oil & Gas

Well Name: **Thornton 3**

Surface Location: Thornton 8-P Pad Sec.8-T7N-R66W

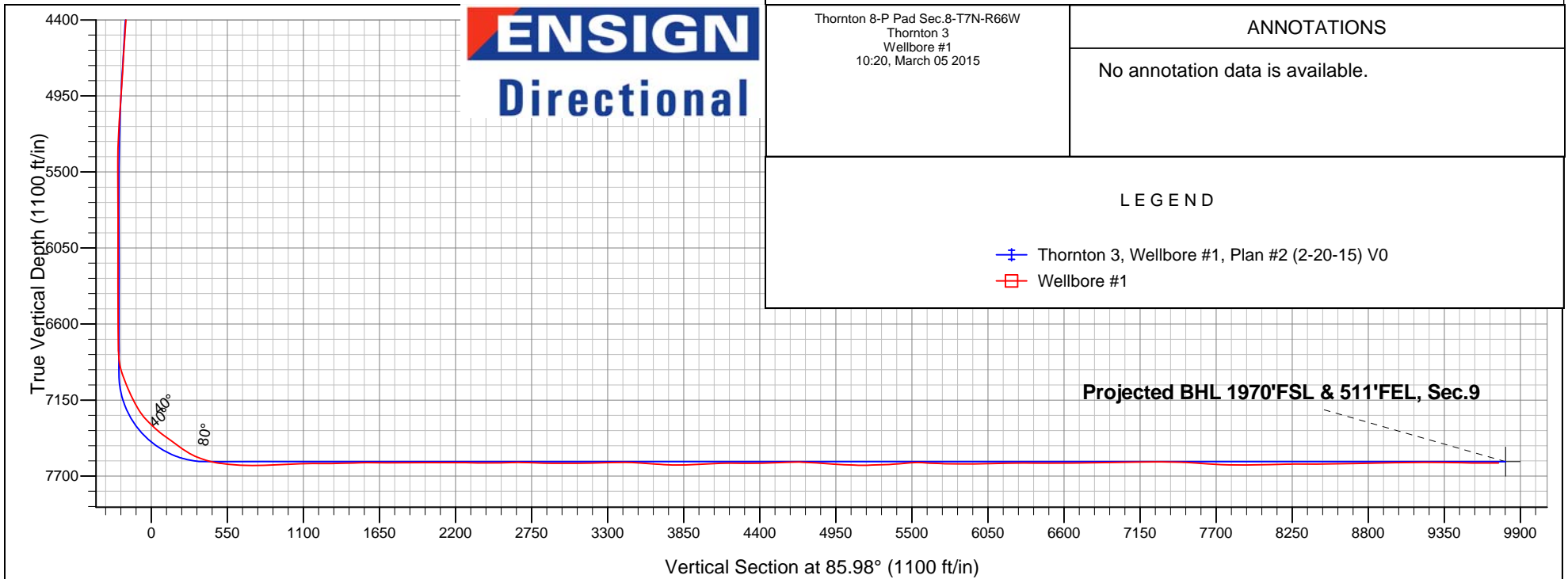
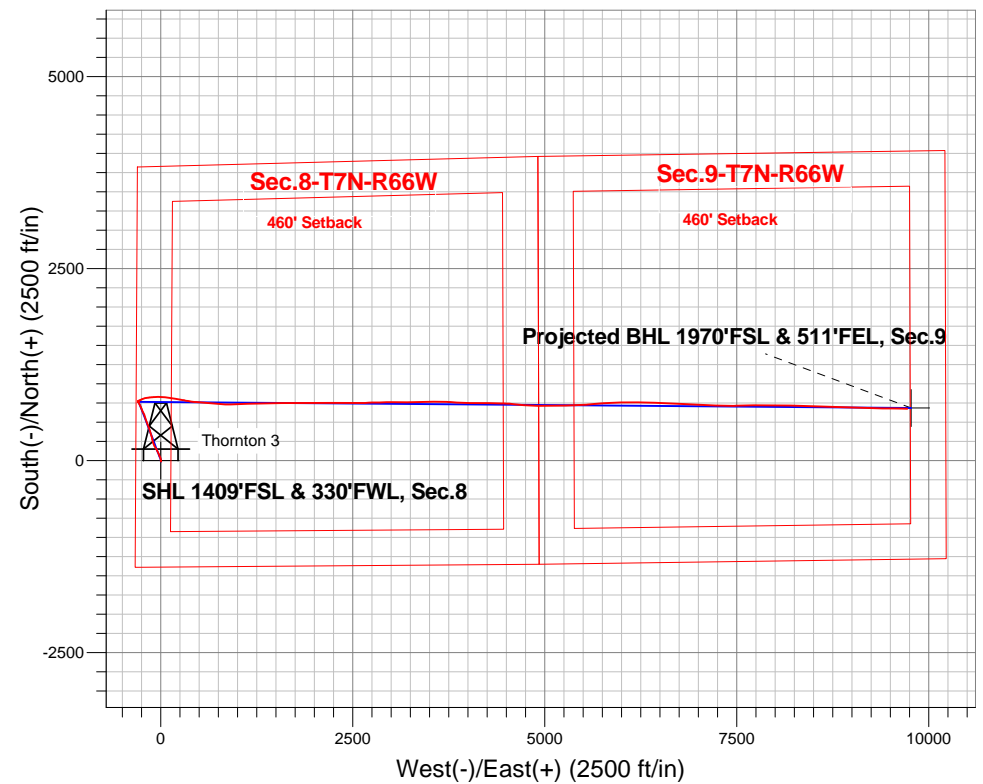
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 5033.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1457075.03	3191541.23	40.586025	-104.810366	
RKB - 24' WELL @ 5057.0ft (RKB - 24')						

FINAL SURVEY

Projected Bottom Hole Location
17347'MD 7605'TVD 676'N & 9718'E of SHL
90.31 degree Incl @ 91.09 degree AZM



ENSIGN
Directional

Thornton 8-P Pad Sec.8-T7N-R66W
Thornton 3
Wellbore #1
10:20, March 05 2015

ANNOTATIONS

No annotation data is available.

LEGEND

- Thornton 3, Wellbore #1, Plan #2 (2-20-15) V0
- Wellbore #1



Extraction Oil & Gas

SEC.8-T7N-T66W

Thornton 8-P Pad Sec.8-T7N-R66W

Thornton 3

Wellbore #1

Design: Wellbore #1

Standard Survey Report

05 March, 2015



Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well Thornton 3
Project:	SEC.8-T7N-T66W	TVD Reference:	WELL @ 5057.0ft (RKB - 24')
Site:	Thornton 8-P Pad Sec.8-T7N-R66W	MD Reference:	WELL @ 5057.0ft (RKB - 24')
Well:	Thornton 3	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.8-T7N-T66W, Weld County, CO		
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	Thornton 8-P Pad Sec.8-T7N-R66W				
Site Position:		Northing:	1,456,822.93ft	Latitude:	40.585333
From:	Lat/Long	Easting:	3,191,541.24ft	Longitude:	-104.810373
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.45 °

Well	Thornton 3					
Well Position	+N/-S	0.0 ft	Northing:	1,457,075.03 ft	Latitude:	40.586025
	+E/-W	0.0 ft	Easting:	3,191,541.23 ft	Longitude:	-104.810366
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,033.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/20/2015	8.41	67.06	52,834

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	85.98	

Survey Program	Date	3/5/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
171.0	17,347.0	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	
171.0	1.90	156.40	171.0	-2.6	1.1	1.0	1.11	1.11	0.00	
263.0	2.30	160.70	262.9	-5.7	2.4	1.9	0.47	0.43	4.67	
355.0	1.60	134.60	354.9	-8.4	3.9	3.3	1.21	-0.76	-28.37	
448.0	0.60	343.60	447.8	-8.8	4.7	4.0	2.31	-1.08	-162.37	
540.0	1.00	351.90	539.8	-7.6	4.4	3.9	0.45	0.43	9.02	
632.0	1.10	347.00	631.8	-5.9	4.1	3.7	0.15	0.11	-5.33	
724.0	1.70	344.30	723.8	-3.7	3.5	3.3	0.66	0.65	-2.93	
809.0	2.10	342.20	808.7	-1.0	2.7	2.6	0.48	0.47	-2.47	
945.0	1.93	338.28	944.7	3.5	1.1	1.4	0.16	-0.13	-2.88	
1,037.0	4.87	353.84	1,036.5	8.8	0.1	0.7	3.32	3.20	16.91	
1,129.0	6.81	347.77	1,128.0	18.0	-1.5	-0.2	2.21	2.11	-6.60	
1,222.0	8.61	341.36	1,220.2	30.0	-4.8	-2.7	2.14	1.94	-6.89	

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Well:	Thornton 3	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
1,314.0	10.37	342.50	1,310.9	44.4	-9.5	-6.4	1.92	1.91	1.24
1,406.0	9.36	335.03	1,401.5	59.1	-15.2	-11.0	1.77	-1.10	-8.12
1,498.0	9.36	335.03	1,492.3	72.6	-21.5	-16.4	0.00	0.00	0.00
1,590.0	12.87	337.31	1,582.6	88.9	-28.6	-22.3	3.84	3.82	2.48
1,683.0	12.83	337.66	1,673.3	108.0	-36.5	-28.9	0.09	-0.04	0.38
1,775.0	11.55	335.20	1,763.2	125.8	-44.3	-35.4	1.50	-1.39	-2.67
1,867.0	11.16	333.09	1,853.4	142.1	-52.2	-42.1	0.62	-0.42	-2.29
1,960.0	9.79	324.48	1,944.8	156.6	-60.8	-49.7	2.23	-1.47	-9.26
2,055.0	10.72	324.21	2,038.3	170.3	-70.7	-58.6	0.98	0.98	-0.28
2,151.0	10.15	329.67	2,132.7	184.9	-80.2	-67.0	1.19	-0.59	5.69
2,247.0	9.97	338.37	2,227.3	199.9	-87.5	-73.3	1.59	-0.19	9.06
2,343.0	10.81	344.17	2,321.7	216.3	-93.1	-77.7	1.40	0.88	6.04
2,438.0	11.07	341.36	2,415.0	233.5	-98.4	-81.8	0.62	0.27	-2.96
2,534.0	11.64	343.99	2,509.1	251.5	-104.0	-86.1	0.80	0.59	2.74
2,630.0	11.55	341.53	2,603.1	269.9	-109.7	-90.5	0.52	-0.09	-2.56
2,726.0	12.17	348.30	2,697.1	289.0	-114.8	-94.3	1.59	0.65	7.05
2,822.0	11.42	346.01	2,791.0	308.1	-119.2	-97.3	0.92	-0.78	-2.39
2,917.0	11.82	346.54	2,884.1	326.7	-123.7	-100.5	0.44	0.42	0.56
3,013.0	11.38	344.17	2,978.1	345.4	-128.6	-104.1	0.68	-0.46	-2.47
3,108.0	12.48	344.61	3,071.1	364.3	-133.9	-108.0	1.16	1.16	0.46
3,204.0	11.90	342.59	3,164.9	383.7	-139.6	-112.3	0.75	-0.60	-2.10
3,300.0	11.20	340.83	3,259.0	402.0	-145.6	-117.1	0.82	-0.73	-1.83
3,396.0	11.11	341.36	3,353.2	419.5	-151.6	-121.8	0.14	-0.09	0.55
3,492.0	11.29	337.93	3,447.3	437.0	-158.1	-127.1	0.72	0.19	-3.57
3,587.0	11.51	336.78	3,540.5	454.3	-165.3	-133.1	0.33	0.23	-1.21
3,683.0	10.63	336.52	3,634.7	471.3	-172.6	-139.2	0.92	-0.92	-0.27
3,779.0	11.42	342.15	3,728.9	488.4	-179.1	-144.4	1.39	0.82	5.86
3,874.0	10.94	343.38	3,822.1	506.0	-184.5	-148.6	0.56	-0.51	1.29
3,970.0	12.61	343.99	3,916.1	524.8	-190.0	-152.8	1.74	1.74	0.64
4,066.0	12.48	342.50	4,009.8	544.8	-196.1	-157.4	0.36	-0.14	-1.55
4,161.0	12.87	340.83	4,102.5	564.6	-202.6	-162.5	0.56	0.41	-1.76
4,257.0	13.30	339.16	4,196.0	585.0	-210.1	-168.5	0.60	0.45	-1.74
4,353.0	12.87	336.87	4,289.5	605.2	-218.2	-175.2	0.70	-0.45	-2.39
4,448.0	10.15	332.39	4,382.6	622.3	-226.2	-182.0	3.01	-2.86	-4.72
4,543.0	9.18	330.46	4,476.2	636.3	-233.8	-188.7	1.08	-1.02	-2.03
4,640.0	10.41	334.24	4,571.8	650.9	-241.5	-195.2	1.43	1.27	3.90
4,736.0	11.77	340.21	4,666.0	668.0	-248.5	-201.1	1.85	1.42	6.22
4,832.0	10.37	335.64	4,760.2	685.0	-255.4	-206.8	1.72	-1.46	-4.76
4,927.0	10.54	336.70	4,853.7	700.8	-262.4	-212.6	0.27	0.18	1.12
5,022.0	10.67	335.38	4,947.0	716.8	-269.5	-218.6	0.29	0.14	-1.39
5,118.0	9.40	332.30	5,041.6	731.8	-276.8	-224.9	1.44	-1.32	-3.21
5,213.0	9.09	331.69	5,135.3	745.3	-284.0	-231.1	0.34	-0.33	-0.64
5,309.0	6.72	328.61	5,230.4	756.8	-290.5	-236.8	2.51	-2.47	-3.21
5,404.0	4.43	333.62	5,325.0	764.8	-295.0	-240.7	2.46	-2.41	5.27
5,500.0	2.15	349.35	5,420.8	769.9	-297.0	-242.3	2.53	-2.38	16.39
5,595.0	0.61	355.19	5,515.8	772.1	-297.4	-242.5	1.63	-1.62	6.15
5,691.0	0.96	139.38	5,611.8	772.0	-296.9	-242.1	1.56	0.36	150.20
5,787.0	0.70	149.23	5,707.7	770.9	-296.1	-241.3	0.31	-0.27	10.26
5,882.0	0.35	129.80	5,802.7	770.2	-295.6	-240.9	0.41	-0.37	-20.45
5,978.0	0.61	173.04	5,898.7	769.5	-295.3	-240.6	0.45	0.27	45.04
6,073.0	0.96	161.62	5,993.7	768.3	-295.0	-240.4	0.40	0.37	-12.02
6,169.0	0.43	327.74	6,089.7	767.8	-294.9	-240.4	1.44	-0.55	173.04
6,265.0	0.96	170.06	6,185.7	767.3	-295.0	-240.4	1.42	0.55	-164.25
6,360.0	0.92	188.43	6,280.7	765.8	-294.9	-240.5	0.32	-0.04	19.34

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Well:	Thornton 3	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
6,457.0	0.43	210.31	6,377.7	764.7	-295.2	-240.9	0.56	-0.51	22.56
6,552.0	0.57	156.61	6,472.7	764.0	-295.2	-240.9	0.49	0.15	-56.53
6,648.0	2.54	10.71	6,568.7	765.6	-294.6	-240.3	3.16	2.05	-151.98
6,744.0	2.85	15.37	6,664.6	770.0	-293.6	-238.9	0.40	0.32	4.85
6,839.0	2.19	358.06	6,759.5	774.1	-293.1	-238.1	1.05	-0.69	-18.22
6,935.0	6.54	53.51	6,855.2	779.2	-288.7	-233.4	5.83	4.53	57.76
7,031.0	19.68	63.01	6,948.5	789.8	-269.8	-213.8	13.82	13.69	9.90
7,127.0	22.89	69.60	7,038.0	803.7	-237.9	-181.0	4.17	3.34	6.86
7,222.0	26.23	76.10	7,124.4	815.2	-200.2	-142.6	4.52	3.52	6.84
7,318.0	29.92	85.42	7,209.1	822.2	-155.7	-97.7	5.96	3.84	9.71
7,413.0	42.75	83.48	7,285.5	827.8	-99.8	-41.5	13.56	13.51	-2.04
7,509.0	47.54	89.72	7,353.2	831.6	-32.0	26.4	6.79	4.99	6.50
7,605.0	55.76	97.99	7,412.8	826.3	42.9	100.8	10.90	8.56	8.61
7,701.0	52.99	97.63	7,468.7	815.7	120.2	177.1	2.90	-2.89	-0.38
7,797.0	58.62	98.43	7,522.6	804.6	198.8	254.8	5.90	5.86	0.83
7,893.0	68.86	101.24	7,565.0	789.8	283.5	338.2	10.98	10.67	2.93
7,988.0	75.62	99.22	7,594.0	773.8	372.5	425.8	7.40	7.12	-2.13
8,015.0	79.45	97.99	7,599.8	769.8	398.6	451.6	14.87	14.19	-4.56
8,079.0	83.71	94.43	7,609.2	763.0	461.5	513.8	8.64	6.66	-5.56
8,173.0	84.79	94.24	7,618.6	755.9	554.7	606.4	1.17	1.15	-0.20
8,269.0	90.18	95.34	7,622.8	747.9	650.3	701.1	5.73	5.61	1.15
8,363.0	90.99	94.29	7,621.9	740.0	743.9	794.0	1.41	0.86	-1.12
8,457.0	92.28	92.44	7,619.2	734.5	837.7	887.2	2.40	1.37	-1.97
8,556.0	92.65	88.78	7,614.9	733.5	936.6	985.7	3.71	0.37	-3.70
8,652.0	91.36	88.07	7,611.6	736.1	1,032.5	1,081.6	1.53	-1.34	-0.74
8,747.0	91.20	87.91	7,609.4	739.4	1,127.4	1,176.5	0.24	-0.17	-0.17
8,843.0	89.42	88.85	7,608.9	742.1	1,223.4	1,272.4	2.10	-1.85	0.98
8,939.0	92.37	88.35	7,607.4	744.5	1,319.3	1,368.3	3.12	3.07	-0.52
9,035.0	91.36	88.47	7,604.3	747.1	1,415.3	1,464.2	1.06	-1.05	0.13
9,131.0	89.97	87.88	7,603.2	750.2	1,511.2	1,560.1	1.57	-1.45	-0.61
9,226.0	89.78	89.24	7,603.4	752.6	1,606.2	1,655.0	1.45	-0.20	1.43
9,322.0	89.97	90.58	7,603.6	752.7	1,702.2	1,750.7	1.41	0.20	1.40
9,418.0	90.43	90.90	7,603.3	751.5	1,798.2	1,846.4	0.58	0.48	0.33
9,513.0	90.28	90.27	7,602.7	750.5	1,893.1	1,941.1	0.68	-0.16	-0.66
9,609.0	89.94	88.99	7,602.5	751.2	1,989.1	2,036.9	1.38	-0.35	-1.33
9,705.0	89.72	88.31	7,602.8	753.4	2,085.1	2,132.8	0.74	-0.23	-0.71
9,800.0	90.22	90.18	7,602.8	754.7	2,180.1	2,227.6	2.04	0.53	1.97
9,896.0	88.74	91.10	7,603.7	753.6	2,276.1	2,323.3	1.82	-1.54	0.96
9,992.0	89.66	91.42	7,605.0	751.5	2,372.1	2,418.9	1.01	0.96	0.33
10,088.0	91.63	91.02	7,604.0	749.4	2,468.0	2,514.5	2.09	2.05	-0.42
10,184.0	91.45	89.92	7,601.4	748.7	2,564.0	2,610.2	1.16	-0.19	-1.15
10,279.0	87.94	86.05	7,601.9	752.0	2,658.9	2,705.1	5.50	-3.69	-4.07
10,375.0	88.43	87.39	7,604.9	757.5	2,754.7	2,801.0	1.49	0.51	1.40
10,467.0	89.45	89.56	7,606.6	759.9	2,846.6	2,892.9	2.61	1.11	2.36
10,559.0	90.06	89.78	7,607.0	760.5	2,938.6	2,984.7	0.70	0.66	0.24
10,652.0	90.06	89.74	7,606.9	760.8	3,031.6	3,077.5	0.04	0.00	-0.04
10,744.0	91.76	90.16	7,605.5	760.9	3,123.6	3,169.3	1.90	1.85	0.46
10,836.0	91.42	89.43	7,602.9	761.3	3,215.6	3,261.0	0.88	-0.37	-0.79
10,929.0	90.83	89.11	7,601.1	762.4	3,308.5	3,353.9	0.72	-0.63	-0.34
11,021.0	89.04	88.41	7,601.2	764.4	3,400.5	3,445.7	2.09	-1.95	-0.76
11,113.0	86.24	88.99	7,605.0	766.5	3,492.4	3,537.6	3.11	-3.04	0.63
11,205.0	85.34	89.15	7,611.7	768.0	3,584.1	3,629.2	0.99	-0.98	0.17
11,298.0	87.32	91.87	7,617.7	767.2	3,676.9	3,721.7	3.61	2.13	2.92
11,390.0	90.03	93.33	7,619.8	763.0	3,768.8	3,813.0	3.35	2.95	1.59

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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)
11,482.0	92.34	92.70	7,617.9	758.2	3,860.7	3,904.3	2.60	2.51	-0.68
11,574.0	92.77	92.37	7,613.8	754.1	3,952.5	3,995.6	0.59	0.47	-0.36
11,667.0	93.82	92.31	7,608.5	750.3	4,045.2	4,087.9	1.13	1.13	-0.06
11,759.0	89.57	90.38	7,605.7	748.2	4,137.1	4,179.4	5.07	-4.62	-2.10
11,851.0	88.98	90.26	7,606.9	747.6	4,229.1	4,271.1	0.65	-0.64	-0.13
11,943.0	90.99	89.59	7,606.9	747.8	4,321.1	4,362.9	2.30	2.18	-0.73
12,036.0	91.85	90.53	7,604.6	747.7	4,414.1	4,455.7	1.37	0.92	1.01
12,128.0	91.97	92.96	7,601.6	744.9	4,506.0	4,547.1	2.64	0.13	2.64
12,220.0	91.29	95.37	7,598.9	738.2	4,597.7	4,638.2	2.72	-0.74	2.62
12,316.0	87.56	96.03	7,599.9	728.7	4,693.2	4,732.8	3.95	-3.89	0.69
12,411.0	85.43	94.43	7,605.7	720.0	4,787.6	4,826.3	2.80	-2.24	-1.68
12,507.0	86.48	92.90	7,612.5	713.9	4,883.2	4,921.2	1.93	1.09	-1.59
12,603.0	87.04	90.01	7,617.9	711.5	4,979.0	5,016.6	3.06	0.58	-3.01
12,699.0	89.20	88.70	7,621.1	712.5	5,074.9	5,112.4	2.63	2.25	-1.36
12,794.0	91.72	88.00	7,620.3	715.3	5,169.9	5,207.3	2.75	2.65	-0.74
12,889.0	92.28	86.95	7,617.0	719.5	5,264.7	5,302.2	1.25	0.59	-1.11
12,986.0	94.44	88.00	7,611.3	723.7	5,361.5	5,399.0	2.48	2.23	1.08
13,082.0	94.47	89.06	7,603.8	726.2	5,457.1	5,494.6	1.10	0.03	1.10
13,177.0	85.93	85.66	7,603.5	730.6	5,551.9	5,589.5	9.67	-8.99	-3.58
13,273.0	87.93	85.15	7,608.7	738.2	5,647.5	5,685.3	2.15	2.08	-0.53
13,324.0	89.02	85.97	7,610.0	742.2	5,698.3	5,736.3	2.67	2.14	1.61
13,420.0	89.82	86.30	7,611.0	748.6	5,794.1	5,832.3	0.90	0.83	0.34
13,515.0	90.15	86.89	7,611.0	754.3	5,888.9	5,927.3	0.71	0.35	0.62
13,612.0	90.92	89.06	7,610.1	757.7	5,985.9	6,024.2	2.37	0.79	2.24
13,707.0	91.14	88.90	7,608.4	759.4	6,080.8	6,119.1	0.29	0.23	-0.17
13,803.0	91.36	90.42	7,606.3	760.0	6,176.8	6,214.9	1.60	0.23	1.58
13,898.0	90.03	91.48	7,605.1	758.4	6,271.8	6,309.5	1.79	-1.40	1.12
13,994.0	89.60	91.36	7,605.5	756.0	6,367.7	6,405.1	0.47	-0.45	-0.13
14,088.0	89.82	91.29	7,605.9	753.9	6,461.7	6,498.7	0.25	0.23	-0.07
14,182.0	90.28	92.01	7,605.9	751.1	6,555.7	6,592.2	0.91	0.49	0.77
14,279.0	90.77	93.32	7,605.0	746.6	6,652.6	6,688.5	1.44	0.51	1.35
14,375.0	90.68	93.32	7,603.7	741.1	6,748.4	6,783.7	0.09	-0.09	0.00
14,471.0	90.71	93.09	7,602.6	735.7	6,844.2	6,879.0	0.24	0.03	-0.24
14,566.0	91.36	93.46	7,600.9	730.3	6,939.1	6,973.2	0.79	0.68	0.39
14,662.0	90.77	92.25	7,599.1	725.5	7,034.9	7,068.5	1.40	-0.61	-1.26
14,758.0	90.74	91.72	7,597.8	722.2	7,130.9	7,163.9	0.55	-0.03	-0.55
14,854.0	90.03	92.46	7,597.2	718.7	7,226.8	7,259.4	1.07	-0.74	0.77
14,950.0	88.74	90.99	7,598.2	715.8	7,322.7	7,354.9	2.04	-1.34	-1.53
15,045.0	89.26	90.62	7,599.9	714.5	7,417.7	7,449.6	0.67	0.55	-0.39
15,141.0	85.07	87.34	7,604.6	716.2	7,513.6	7,545.3	5.54	-4.36	-3.42
15,237.0	86.18	88.94	7,611.9	719.3	7,609.2	7,640.9	2.02	1.16	1.67
15,333.0	87.66	89.80	7,617.1	720.3	7,705.1	7,736.6	1.78	1.54	0.90
15,428.0	89.32	89.94	7,619.6	720.5	7,800.0	7,831.4	1.75	1.75	0.15
15,524.0	90.58	90.28	7,619.7	720.3	7,896.0	7,927.1	1.36	1.31	0.35
15,620.0	91.14	90.17	7,618.2	720.0	7,992.0	8,022.8	0.59	0.58	-0.11
15,715.0	91.11	90.67	7,616.4	719.3	8,087.0	8,117.5	0.53	-0.03	0.53
15,811.0	91.91	89.69	7,613.8	719.0	8,183.0	8,213.2	1.32	0.83	-1.02
15,907.0	89.63	91.80	7,612.6	717.7	8,278.9	8,308.9	3.24	-2.38	2.20
16,002.0	89.97	91.64	7,612.9	714.9	8,373.9	8,403.4	0.40	0.36	-0.17
16,098.0	90.68	91.71	7,612.3	712.1	8,469.8	8,498.9	0.74	0.74	0.07
16,194.0	91.42	91.57	7,610.6	709.3	8,565.8	8,594.4	0.78	0.77	-0.15
16,290.0	90.58	92.16	7,608.9	706.2	8,661.7	8,689.9	1.07	-0.88	0.61
16,386.0	91.17	92.49	7,607.4	702.3	8,757.6	8,785.3	0.70	0.61	0.34
16,482.0	91.42	91.97	7,605.3	698.6	8,853.5	8,880.7	0.60	0.26	-0.54

Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well Thornton 3
Project:	SEC.8-T7N-T66W	TVD Reference:	WELL @ 5057.0ft (RKB - 24')
Site:	Thornton 8-P Pad Sec.8-T7N-R66W	MD Reference:	WELL @ 5057.0ft (RKB - 24')
Well:	Thornton 3	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
16,577.0	90.62	92.40	7,603.6	694.9	8,948.4	8,975.2	0.96	-0.84	0.45
16,673.0	91.66	92.89	7,601.7	690.5	9,044.3	9,070.5	1.20	1.08	0.51
16,769.0	89.32	91.49	7,600.8	686.8	9,140.2	9,165.9	2.84	-2.44	-1.46
16,865.0	89.45	90.92	7,601.9	684.8	9,236.2	9,261.5	0.61	0.14	-0.59
16,960.0	90.55	91.47	7,601.9	682.8	9,331.2	9,356.1	1.29	1.16	0.58
17,056.0	88.30	90.35	7,602.8	681.3	9,427.2	9,451.7	2.62	-2.34	-1.17
17,152.0	89.29	91.02	7,604.9	680.2	9,523.1	9,547.4	1.25	1.03	0.70
17,278.0	90.31	91.09	7,605.3	677.9	9,649.1	9,672.9	0.81	0.81	0.06
17,347.0	90.31	91.09	7,604.9	676.5	9,718.1	9,741.6	0.00	0.00	0.00

Design Targets
Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
SHL 1409'FSL & 330'I - actual wellpath hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,457,075.04	3,191,541.23	40.586025	-104.810366
BHL 1980'FSL & 460'I - actual wellpath misses target center by 52.8ft at 17347.0ft MD (7604.9 TVD, 676.5 N, 9718.1 E) - Point	0.00	0.00	7,595.0	686.9	9,768.9	1,457,837.84	3,201,304.20	40.587905	-104.775194

Checked By: _____ Approved By: _____ Date: _____