

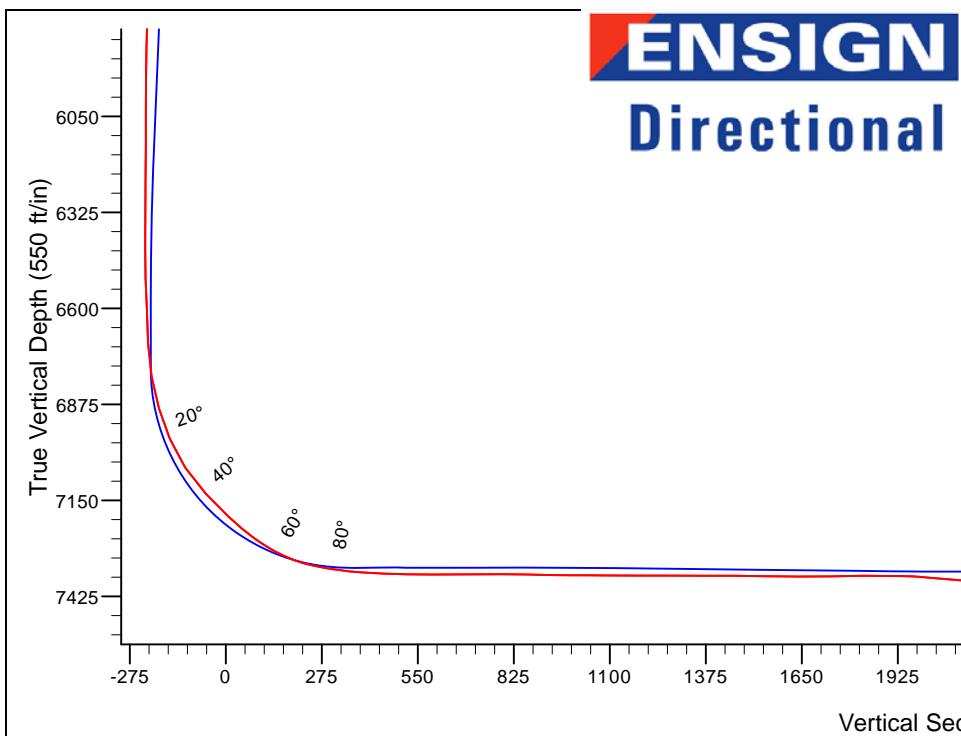
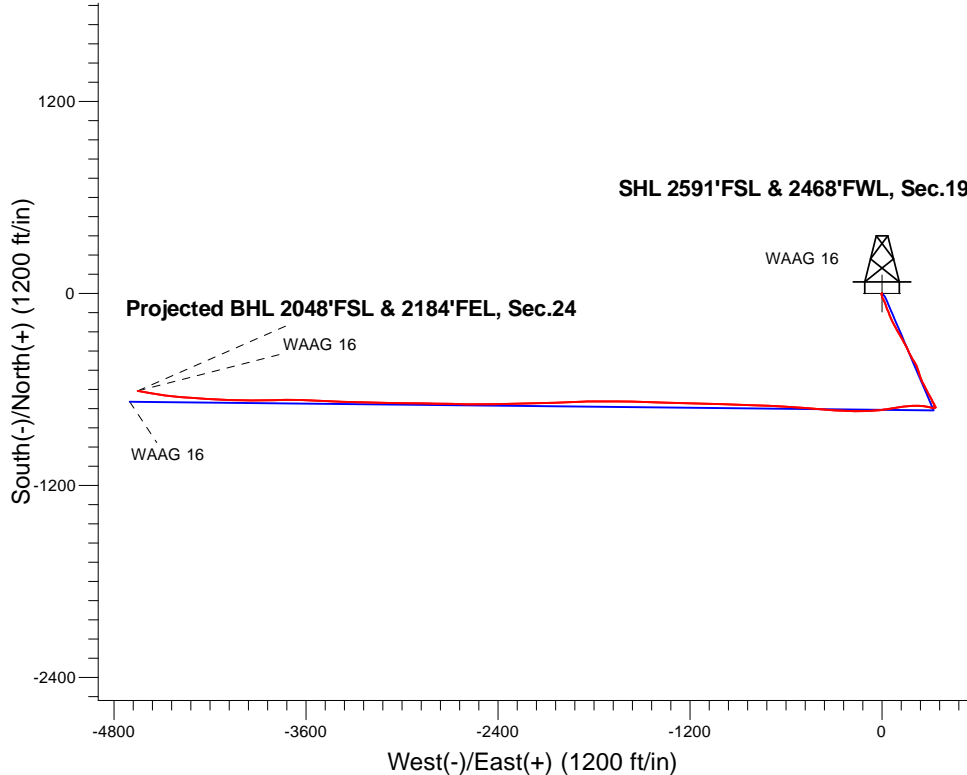
# Extraction Oil & Gas

Well Name: **WAAG 16**

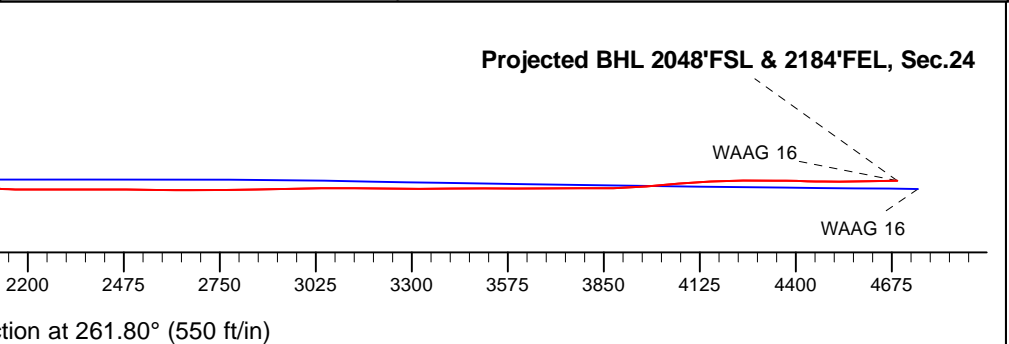
Surface Location: WAAG North Pad Sec.19-T7N-R65W  
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone  
 Ground Elevation: 4883.0  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.0 0.0 1448165.78 3220339.88 40.560910 -104.706970  
 RKB - 24' WELL @ 4907.0ft (RKB - 24')

## FINAL SURVEY

Projected Bottom Hole Location  
 12150'MD 7357'TVD 609'S & 4651'W of SHL  
 91.1 degree Incl @ 280.2 degree AZM



WAAG North Pad Sec.19-T7N-R65W WAAG 16 Wellbore #1 9:58, September 15 2015	<b>ANNOTATIONS</b> No annotation data is available.
<b>LEGEND</b> <ul style="list-style-type: none"> <li>△ WAAG 16, Wellbore #1, Plan #2 (8-28-19) V0</li> <li>□ Wellbore #1</li> <li>○ Survey #2</li> </ul>	





# Directional

## Extraction Oil & Gas

SEC.19-T7N-R65W

WAAG North Pad Sec.19-T7N-R65W

WAAG 16

Wellbore #1

Survey: Survey #2

## Standard Survey Report

15 September, 2015



<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 16
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Well:</b>	WAAG 16	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	US_EDM

<b>Project</b>	SEC.19-T7N-R65W, Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

<b>Site</b>	WAAG North Pad Sec.19-T7N-R65W				
<b>Site Position:</b>		<b>Northing:</b>	1,448,388.03 usft	<b>Latitude:</b>	40.561520
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,220,340.68 usft	<b>Longitude:</b>	-104.706960
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.51 °

<b>Well</b>	WAAG 16					
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,448,165.78 usft	<b>Latitude:</b>	40.560910
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	3,220,339.89 usft	<b>Longitude:</b>	-104.706970
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	0.0 ft	<b>Ground Level:</b>	4,883.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	8/21/2015	8.30	67.08	52,631

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	261.80	

<b>Survey Program</b>	<b>Date</b>	9/15/2015			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
140.0	896.0	Survey #1 - Surface (Wellbore #1)	MWD	MWD - Standard	
980.0	12,150.0	Survey #2 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
896.0	0.30	264.20	895.9	-1.0	-1.1	1.3	0.00	0.00	0.00	
980.0	0.70	216.60	979.9	-1.4	-1.7	1.9	0.65	0.48	-56.67	
1,070.0	0.60	240.70	1,069.9	-2.1	-2.4	2.7	0.32	-0.11	26.78	
1,161.0	2.30	191.50	1,160.9	-4.1	-3.2	3.7	2.16	1.87	-54.07	
1,252.0	4.40	169.50	1,251.7	-9.3	-2.9	4.2	2.67	2.31	-24.18	
1,343.0	7.70	161.60	1,342.2	-18.6	-0.4	3.0	3.73	3.63	-8.68	
1,435.0	10.50	152.80	1,433.1	-31.9	5.4	-0.8	3.39	3.04	-9.57	
1,526.0	12.70	153.80	1,522.2	-48.2	13.6	-6.6	2.43	2.42	1.10	
1,617.0	13.90	162.10	1,610.8	-67.6	21.4	-11.5	2.47	1.32	9.12	
1,709.0	13.50	158.90	1,700.1	-88.1	28.7	-15.8	0.93	-0.43	-3.48	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 16
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Well:</b>	WAAG 16	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	US_EDM

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)	
1,801.0	15.00	157.70	1,789.3	-109.2	37.1	-21.1	1.66	1.63	-1.30	
1,892.0	16.00	159.10	1,877.0	-131.8	46.0	-26.7	1.17	1.10	1.54	
1,984.0	15.60	154.20	1,965.5	-154.8	55.9	-33.3	1.51	-0.43	-5.33	
2,076.0	16.10	154.90	2,054.0	-177.5	66.7	-40.7	0.58	0.54	0.76	
2,167.0	17.10	155.10	2,141.2	-201.0	77.7	-48.2	1.10	1.10	0.22	
2,259.0	15.70	149.60	2,229.5	-224.0	89.7	-56.8	2.27	-1.52	-5.98	
2,351.0	15.70	148.60	2,318.1	-245.4	102.5	-66.4	0.29	0.00	-1.09	
2,445.0	17.00	149.60	2,408.3	-268.1	116.0	-76.6	1.41	1.38	1.06	
2,540.0	14.30	150.20	2,499.7	-290.3	128.9	-86.2	2.85	-2.84	0.63	
2,634.0	14.20	152.40	2,590.8	-310.5	140.0	-94.3	0.59	-0.11	2.34	
2,729.0	14.50	153.70	2,682.9	-331.5	150.7	-101.9	0.46	0.32	1.37	
2,823.0	15.50	153.30	2,773.7	-353.3	161.5	-109.5	1.07	1.06	-0.43	
2,917.0	13.60	153.00	2,864.7	-374.4	172.2	-117.0	2.02	-2.02	-0.32	
3,011.0	13.80	153.70	2,956.0	-394.3	182.2	-124.1	0.28	0.21	0.74	
3,106.0	14.90	147.50	3,048.0	-414.7	193.8	-132.6	1.99	1.16	-6.53	
3,200.0	15.10	147.70	3,138.8	-435.3	206.8	-142.6	0.22	0.21	0.21	
3,294.0	12.30	158.20	3,230.1	-454.9	217.1	-150.0	3.97	-2.98	11.17	
3,389.0	12.50	161.20	3,322.9	-474.1	224.1	-154.2	0.71	0.21	3.16	
3,483.0	13.40	163.30	3,414.5	-494.1	230.6	-157.7	1.08	0.96	2.23	
3,577.0	12.80	165.30	3,506.1	-514.6	236.3	-160.5	0.80	-0.64	2.13	
3,671.0	13.30	153.80	3,597.7	-534.4	243.7	-165.0	2.81	0.53	-12.23	
3,766.0	12.30	153.80	3,690.3	-553.3	253.0	-171.5	1.05	-1.05	0.00	
3,860.0	11.50	153.80	3,782.3	-570.7	261.6	-177.5	0.85	-0.85	0.00	
4,048.0	6.70	151.60	3,967.9	-597.2	275.1	-187.1	2.56	-2.55	-1.17	
4,143.0	8.20	153.30	4,062.1	-608.1	280.8	-191.2	1.60	1.58	1.79	
4,237.0	10.00	154.90	4,154.9	-621.5	287.2	-195.7	1.93	1.91	1.70	
4,337.0	8.90	148.90	4,253.5	-635.9	294.9	-201.2	1.48	-1.10	-6.00	
4,431.0	6.00	147.90	4,346.7	-646.3	301.3	-206.0	3.09	-3.09	-1.06	
4,525.0	4.70	150.00	4,440.3	-653.8	305.8	-209.4	1.40	-1.38	2.23	
4,620.0	4.70	153.10	4,535.0	-660.7	309.5	-212.1	0.27	0.00	3.26	
4,714.0	4.70	158.90	4,628.7	-667.7	312.7	-214.2	0.51	0.00	6.17	
4,808.0	5.20	164.70	4,722.3	-675.4	315.2	-215.6	0.75	0.53	6.17	
4,903.0	4.90	137.90	4,817.0	-682.6	319.0	-218.4	2.48	-0.32	-28.21	
4,997.0	3.50	139.60	4,910.7	-687.7	323.6	-222.2	1.50	-1.49	1.81	
5,092.0	2.30	150.50	5,005.6	-691.6	326.4	-224.4	1.38	-1.26	11.47	
5,186.0	1.60	165.40	5,099.5	-694.5	327.7	-225.3	0.91	-0.74	15.85	
5,280.0	1.50	193.70	5,193.5	-697.0	327.7	-224.9	0.81	-0.11	30.11	
5,374.0	1.30	212.60	5,287.5	-699.1	326.8	-223.8	0.53	-0.21	20.11	
5,468.0	1.80	160.20	5,381.5	-701.4	326.8	-223.4	1.53	0.53	-55.74	
5,563.0	1.00	195.30	5,476.4	-703.6	327.0	-223.4	1.20	-0.84	36.95	
5,657.0	0.50	221.50	5,570.4	-704.7	326.6	-222.7	0.63	-0.53	27.87	
5,751.0	1.90	124.50	5,664.4	-705.9	327.6	-223.5	2.15	1.49	-103.19	
5,845.0	1.20	67.90	5,758.4	-706.4	329.8	-225.7	1.70	-0.74	-60.21	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 16
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Well:</b>	WAAG 16	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	US_EDM

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)	
5,940.0	1.00	101.10	5,853.4	-706.2	331.5	-227.4	0.69	-0.21	34.95	
6,034.0	0.70	115.90	5,947.3	-706.6	332.8	-228.6	0.39	-0.32	15.74	
6,128.0	0.50	144.50	6,041.3	-707.1	333.6	-229.3	0.38	-0.21	30.43	
6,222.0	0.90	164.40	6,135.3	-708.2	334.0	-229.6	0.49	0.43	21.17	
6,316.0	1.00	148.90	6,229.3	-709.6	334.6	-230.0	0.29	0.11	-16.49	
6,411.0	0.80	144.70	6,324.3	-710.9	335.5	-230.6	0.22	-0.21	-4.42	
6,505.0	0.50	164.90	6,418.3	-711.8	335.9	-231.0	0.40	-0.32	21.49	
6,599.0	1.80	242.30	6,512.3	-712.9	334.7	-229.6	1.87	1.38	82.34	
6,694.0	2.70	236.50	6,607.2	-714.8	331.6	-226.2	0.98	0.95	-6.11	
6,788.0	2.20	230.10	6,701.1	-717.2	328.3	-222.7	0.61	-0.53	-6.81	
6,882.0	10.60	282.00	6,794.5	-716.5	318.5	-213.0	10.00	8.94	55.21	
6,977.0	17.80	283.90	6,886.5	-711.2	295.8	-191.3	7.59	7.58	2.00	
7,070.0	23.00	278.80	6,973.7	-705.0	264.0	-160.8	5.90	5.59	-5.48	
7,164.0	34.60	270.20	7,055.9	-702.1	219.0	-116.6	13.08	12.34	-9.15	
7,259.0	42.20	264.80	7,130.4	-704.9	160.1	-58.0	8.74	8.00	-5.68	
7,353.0	47.30	259.80	7,197.1	-713.9	94.6	8.1	6.59	5.43	-5.32	
7,447.0	53.00	262.50	7,257.3	-724.9	23.4	80.3	6.45	6.06	2.87	
7,541.0	64.50	266.00	7,306.0	-732.8	-56.4	160.4	12.64	12.23	3.72	
7,635.0	77.80	270.90	7,336.3	-735.1	-145.1	248.5	14.98	14.15	5.21	
7,726.0	83.40	270.40	7,351.2	-734.0	-234.9	337.2	6.18	6.15	-0.55	
7,825.0	87.60	275.30	7,359.0	-729.1	-333.4	434.0	6.51	4.24	4.95	
7,920.0	88.80	274.80	7,362.0	-720.8	-428.0	526.4	1.37	1.26	-0.53	
8,109.0	91.20	273.20	7,362.0	-707.6	-616.5	711.1	1.53	1.27	-0.85	
8,203.0	89.40	272.30	7,361.5	-703.1	-710.4	803.4	2.14	-1.91	-0.96	
8,298.0	88.50	272.30	7,363.2	-699.3	-805.3	896.8	0.95	-0.95	0.00	
8,392.0	90.20	272.00	7,364.3	-695.7	-899.2	989.3	1.84	1.81	-0.32	
8,487.0	88.80	271.40	7,365.1	-692.9	-994.2	1,082.8	1.60	-1.47	-0.63	
8,581.0	90.70	272.10	7,365.5	-690.1	-1,088.1	1,175.4	2.15	2.02	0.74	
8,675.0	88.90	271.60	7,365.8	-687.0	-1,182.1	1,268.0	1.99	-1.91	-0.53	
8,770.0	90.50	271.10	7,366.3	-684.8	-1,277.0	1,361.7	1.76	1.68	-0.53	
8,958.0	88.90	272.10	7,367.3	-679.5	-1,465.0	1,546.9	1.00	-0.85	0.53	
9,053.0	90.00	271.40	7,368.2	-676.6	-1,559.9	1,640.5	1.37	1.16	-0.74	
9,147.0	90.80	270.40	7,367.6	-675.2	-1,653.9	1,733.3	1.36	0.85	-1.06	
9,242.0	90.70	270.20	7,366.3	-674.7	-1,748.9	1,827.2	0.24	-0.11	-0.21	
9,336.0	89.20	269.00	7,366.4	-675.3	-1,842.9	1,920.3	2.04	-1.60	-1.28	
9,430.0	84.70	266.50	7,371.4	-679.0	-1,936.6	2,013.7	5.47	-4.79	-2.66	
9,525.0	85.60	268.10	7,379.4	-683.5	-2,031.2	2,107.9	1.93	0.95	1.68	
9,619.0	90.40	269.30	7,382.7	-685.6	-2,125.1	2,201.1	5.26	5.11	1.28	
9,713.0	89.60	268.50	7,382.7	-687.4	-2,219.1	2,294.4	1.20	-0.85	-0.85	
9,808.0	90.30	268.60	7,382.8	-689.8	-2,314.0	2,388.8	0.74	0.74	0.11	
9,902.0	89.80	268.60	7,382.7	-692.1	-2,408.0	2,482.1	0.53	-0.53	0.00	
9,996.0	89.00	270.00	7,383.7	-693.2	-2,502.0	2,575.3	1.72	-0.85	1.49	
10,091.0	90.20	270.70	7,384.4	-692.7	-2,597.0	2,669.2	1.46	1.26	0.74	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 16
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Well:</b>	WAAG 16	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	US_EDM

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)
10,185.0	90.70	271.60	7,383.6	-690.8	-2,691.0	2,762.0	1.10	0.53	0.96
10,279.0	90.80	270.90	7,382.4	-688.7	-2,784.9	2,854.7	0.75	0.11	-0.74
10,374.0	91.70	270.70	7,380.3	-687.4	-2,879.9	2,948.5	0.97	0.95	-0.21
10,468.0	90.00	270.60	7,378.9	-686.3	-2,973.9	3,041.4	1.81	-1.81	-0.11
10,562.0	89.90	270.90	7,379.0	-685.1	-3,067.9	3,134.2	0.34	-0.11	0.32
10,656.0	89.20	271.10	7,379.8	-683.5	-3,161.8	3,227.0	0.77	-0.74	0.21
10,751.0	90.00	271.40	7,380.4	-681.4	-3,256.8	3,320.7	0.90	0.84	0.32
10,845.0	90.70	272.30	7,379.8	-678.3	-3,350.8	3,413.3	1.21	0.74	0.96
10,939.0	90.00	272.70	7,379.3	-674.2	-3,444.7	3,505.6	0.86	-0.74	0.43
11,033.0	89.60	273.00	7,379.6	-669.6	-3,538.6	3,597.9	0.53	-0.43	0.32
11,128.0	90.70	271.40	7,379.4	-665.9	-3,633.5	3,691.3	2.04	1.16	-1.68
11,222.0	90.10	268.80	7,378.7	-665.8	-3,727.5	3,784.3	2.84	-0.64	-2.77
11,316.0	89.90	269.00	7,378.7	-667.6	-3,821.5	3,877.6	0.30	-0.21	0.21
11,411.0	96.00	270.60	7,373.8	-667.9	-3,916.3	3,971.5	6.64	6.42	1.68
11,505.0	94.10	270.00	7,365.5	-667.4	-4,009.9	4,064.1	2.12	-2.02	-0.64
11,598.0	93.10	271.80	7,359.7	-666.0	-4,102.7	4,155.7	2.21	-1.08	1.94
11,693.0	90.20	274.60	7,357.0	-660.7	-4,197.5	4,248.8	4.24	-3.05	2.95
11,787.0	89.50	272.90	7,357.2	-654.5	-4,291.3	4,340.8	1.96	-0.74	-1.81
11,882.0	88.50	274.80	7,358.9	-648.1	-4,386.1	4,433.7	2.26	-1.05	2.00
11,976.0	90.30	277.90	7,359.9	-637.7	-4,479.5	4,524.6	3.81	1.91	3.30
12,071.0	91.10	280.20	7,358.7	-622.8	-4,573.3	4,615.3	2.56	0.84	2.42
12,150.0	91.10	280.20	7,357.2	-608.8	-4,651.0	4,690.3	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
SHL 2591'FSL & 2468'F1	0.00	0.00	1.0	0.0	0.0	1,448,165.79	3,220,339.89	40.560910	-104.706970
- hit/miss target									
- Shape									
- survey misses target center by 894.9ft at 896.0ft MD (895.9 TVD, -1.0 N, -1.1 E)									
- Point									

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_