

# Extraction Oil & Gas

Well Name: **WAAG 17**

Surface Location: WAAG North Pad Sec.19-T7N-R65W

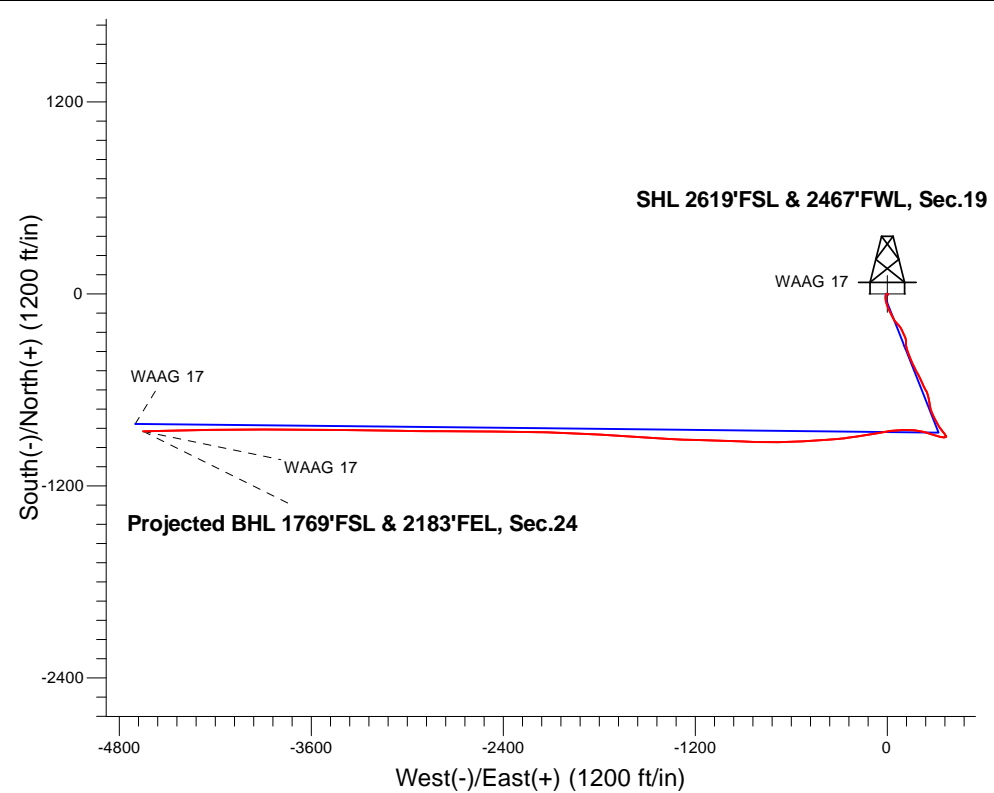
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone

Ground Elevation: 4883.0

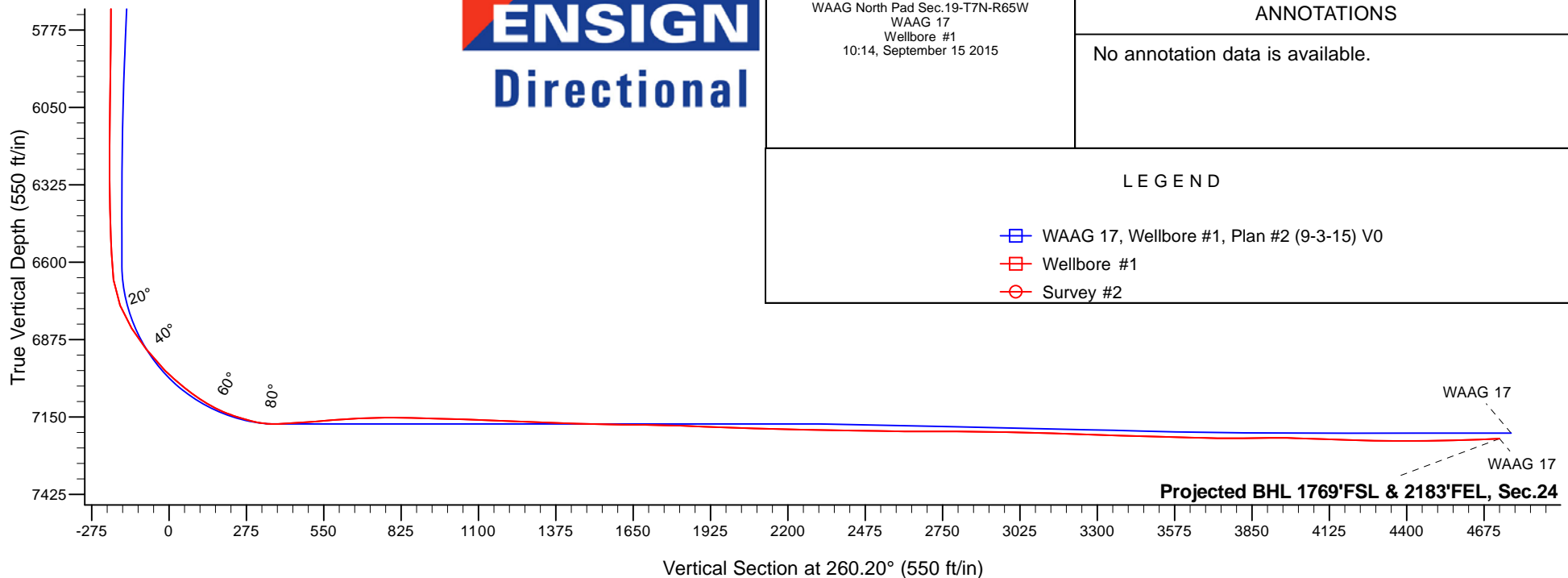
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1448136.63	3220340.14	40.560830	-104.706970	
RKB - 24' WELL @ 4907.0ft (RKB - 24')						

## FINAL SURVEY

Projected Bottom Hole Location  
12050'MD 7227'TVD 858'S & 4652'W of SHL  
92.3 degree Incl @ 268.6 degree AZM



**ENSIGN**  
Directional



WAAG North Pad Sec.19-T7N-R65W  
WAAG 17  
Wellbore #1  
10:14, September 15 2015

### ANNOTATIONS

No annotation data is available.

### LEGEND

- WAAG 17, Wellbore #1, Plan #2 (9-3-15) V0
- Wellbore #1
- Survey #2



# Directional

## Extraction Oil & Gas

SEC.19-T7N-R65W

WAAG North Pad Sec.19-T7N-R65W

WAAG 17

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 17
<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 17	<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

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

Well	WAAG 17					
Well Position	+N/-S	0.0 ft	Northing:	1,448,136.64 usft	Latitude:	40.560830
	+E/-W	0.0 ft	Easting:	3,220,340.15 usft	Longitude:	-104.706970
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	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	260.20	

<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	895.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	
984.0	12,050.0	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>	
895.0	0.70	280.40	894.8	1.2	-3.6	3.4	0.00	0.00	0.00	
984.0	0.60	276.70	983.8	1.3	-4.6	4.3	0.12	-0.11	-4.16	
1,075.0	1.40	213.10	1,074.8	0.4	-5.7	5.5	1.38	0.88	-69.89	
1,166.0	3.90	194.60	1,165.7	-3.5	-7.1	7.6	2.87	2.75	-20.33	
1,256.0	4.50	193.90	1,255.4	-9.9	-8.7	10.3	0.67	0.67	-0.78	
1,347.0	6.20	189.90	1,346.0	-18.2	-10.4	13.3	1.91	1.87	-4.40	
1,439.0	8.90	180.70	1,437.2	-30.2	-11.3	16.3	3.21	2.93	-10.00	
1,531.0	12.30	168.10	1,527.6	-46.9	-9.4	17.3	4.45	3.70	-13.70	
1,622.0	14.80	158.90	1,616.1	-67.3	-3.2	14.6	3.62	2.75	-10.11	
1,714.0	15.80	156.80	1,704.8	-89.7	5.9	9.4	1.24	1.09	-2.28	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 17
<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 17	<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)
1,805.0	16.50	154.90	1,792.3	-112.8	16.3	3.1	0.96	0.77	-2.09
1,897.0	17.00	153.50	1,880.4	-136.7	27.8	-4.2	0.70	0.54	-1.52
1,988.0	17.70	148.40	1,967.2	-160.4	41.0	-13.1	1.84	0.77	-5.60
2,080.0	19.00	136.10	2,054.6	-183.1	58.7	-26.7	4.43	1.41	-13.37
2,172.0	15.10	141.40	2,142.5	-203.2	76.6	-40.9	4.56	-4.24	5.76
2,264.0	11.50	155.30	2,232.1	-221.0	87.9	-49.0	5.21	-3.91	15.11
2,356.0	10.60	156.50	2,322.3	-237.0	95.1	-53.4	1.01	-0.98	1.30
2,450.0	10.90	156.00	2,414.7	-253.1	102.2	-57.6	0.33	0.32	-0.53
2,544.0	11.30	154.00	2,506.9	-269.5	109.9	-62.4	0.59	0.43	-2.13
2,639.0	10.20	170.40	2,600.3	-286.2	115.3	-64.9	3.41	-1.16	17.26
2,733.0	10.70	177.80	2,692.7	-303.1	117.1	-63.8	1.52	0.53	7.87
2,828.0	11.30	179.90	2,786.0	-321.2	117.4	-61.0	0.76	0.63	2.21
2,922.0	13.70	163.50	2,877.8	-341.1	120.6	-60.8	4.53	2.55	-17.45
3,016.0	15.10	158.40	2,968.8	-363.2	128.3	-64.6	2.01	1.49	-5.43
3,111.0	16.40	159.80	3,060.3	-387.2	137.5	-69.5	1.43	1.37	1.47
3,205.0	16.30	157.00	3,150.5	-411.8	147.2	-74.9	0.85	-0.11	-2.98
3,299.0	16.40	155.60	3,240.7	-436.1	157.8	-81.3	0.43	0.11	-1.49
3,394.0	17.10	153.70	3,331.6	-460.8	169.6	-88.6	0.94	0.74	-2.00
3,488.0	17.70	153.00	3,421.3	-485.9	182.2	-96.8	0.68	0.64	-0.74
3,582.0	17.50	150.20	3,510.9	-510.9	195.7	-105.9	0.93	-0.21	-2.98
3,676.0	13.50	154.70	3,601.5	-533.1	207.4	-113.6	4.44	-4.26	4.79
3,770.0	11.90	157.50	3,693.2	-552.0	215.8	-118.7	1.82	-1.70	2.98
3,865.0	11.50	155.10	3,786.2	-569.6	223.5	-123.3	0.66	-0.42	-2.53
4,053.0	13.50	150.20	3,969.8	-605.7	242.3	-135.7	1.20	1.06	-2.61
4,147.0	14.90	163.20	4,060.9	-626.8	251.3	-140.9	3.70	1.49	13.83
4,242.0	16.90	168.60	4,152.3	-652.0	257.5	-142.8	2.62	2.11	5.68
4,336.0	18.60	169.70	4,241.8	-680.2	262.9	-143.3	1.84	1.81	1.17
4,431.0	19.30	169.80	4,331.7	-710.5	268.4	-143.6	0.74	0.74	0.11
4,525.0	19.30	156.80	4,420.4	-740.1	277.3	-147.3	4.56	0.00	-13.83
4,620.0	18.90	154.20	4,510.2	-768.4	290.2	-155.1	0.99	-0.42	-2.74
4,714.0	14.90	151.90	4,600.1	-792.8	302.5	-163.1	4.31	-4.26	-2.45
4,808.0	13.80	148.70	4,691.2	-813.0	314.0	-171.0	1.44	-1.17	-3.40
4,902.0	14.70	148.00	4,782.3	-832.7	326.1	-179.7	0.97	0.96	-0.74
4,997.0	11.90	143.10	4,874.7	-850.7	338.4	-188.7	3.17	-2.95	-5.16
5,091.0	6.90	138.70	4,967.4	-862.7	348.0	-196.0	5.37	-5.32	-4.68
5,185.0	4.60	142.80	5,061.0	-870.0	354.0	-200.7	2.48	-2.45	4.36
5,280.0	3.80	143.80	5,155.7	-875.6	358.1	-203.9	0.85	-0.84	1.05
5,374.0	3.50	144.70	5,249.5	-880.4	361.6	-206.5	0.32	-0.32	0.96
5,468.0	1.20	166.50	5,343.4	-883.7	363.5	-207.8	2.58	-2.45	23.19
5,565.0	0.40	216.80	5,531.4	-886.2	363.6	-207.5	0.53	-0.43	26.76
5,751.0	0.40	219.90	5,626.4	-886.7	363.2	-207.0	0.02	0.00	3.26
5,845.0	0.60	139.10	5,720.4	-887.3	363.3	-207.0	0.71	0.21	-85.96
5,940.0	1.10	136.30	5,815.4	-888.3	364.2	-207.7	0.53	0.53	-2.95

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<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	WELL @ 4907.0ft (RKB - 24')
<b>Well:</b>	WAAG 17	<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)
6,034.0	1.00	132.00	5,909.4	-889.5	365.5	-208.7	0.14	-0.11	-4.57
6,128.0	0.80	140.00	6,003.4	-890.6	366.5	-209.6	0.25	-0.21	8.51
6,222.0	0.40	126.20	6,097.4	-891.3	367.2	-210.1	0.45	-0.43	-14.68
6,316.0	0.40	115.00	6,191.4	-891.6	367.8	-210.6	0.08	0.00	-11.91
6,410.0	0.30	132.80	6,285.4	-891.9	368.2	-211.0	0.16	-0.11	18.94
6,505.0	0.20	204.30	6,380.4	-892.2	368.4	-211.1	0.32	-0.11	75.26
6,599.0	2.60	245.30	6,474.3	-893.3	366.3	-209.0	2.61	2.55	43.62
6,694.0	2.50	248.60	6,569.2	-894.9	362.5	-204.8	0.19	-0.11	3.47
6,788.0	6.90	259.10	6,662.9	-896.8	355.0	-197.2	4.75	4.68	11.17
6,882.0	23.10	281.80	6,753.4	-894.0	331.2	-174.2	18.01	17.23	24.15
6,976.0	36.00	290.10	6,835.1	-880.7	287.0	-132.9	14.37	13.72	8.83
7,070.0	40.90	286.00	6,908.7	-862.7	231.5	-81.2	5.87	5.21	-4.36
7,164.0	44.90	274.10	6,977.6	-851.8	168.7	-21.2	9.60	4.26	-12.66
7,258.0	51.60	269.70	7,040.2	-849.7	98.6	47.4	7.93	7.13	-4.68
7,352.0	57.30	261.40	7,094.9	-855.8	22.6	123.4	9.39	6.06	-8.83
7,446.0	68.90	260.20	7,137.4	-869.2	-60.0	207.1	12.39	12.34	-1.28
7,541.0	76.60	261.10	7,165.5	-883.9	-149.5	297.8	8.16	8.11	0.95
7,632.0	91.40	261.60	7,175.0	-897.5	-238.7	388.0	16.27	16.26	0.55
7,762.0	96.00	266.90	7,166.6	-910.5	-367.7	517.3	5.39	3.54	4.08
7,825.0	94.30	265.80	7,161.0	-914.5	-430.3	579.7	3.21	-2.70	-1.75
7,919.0	93.00	266.50	7,155.0	-920.8	-523.9	673.0	1.57	-1.38	0.74
8,014.0	90.30	268.60	7,152.2	-924.8	-618.8	767.2	3.60	-2.84	2.21
8,109.0	88.20	269.90	7,153.5	-926.1	-713.8	861.0	2.60	-2.21	1.37
8,204.0	88.60	271.80	7,156.1	-924.7	-808.7	954.3	2.04	0.42	2.00
8,298.0	88.70	271.80	7,158.3	-921.7	-902.6	1,046.4	0.11	0.11	0.00
8,392.0	87.40	272.00	7,161.5	-918.6	-996.5	1,138.3	1.40	-1.38	0.21
8,487.0	87.70	271.60	7,165.6	-915.6	-1,091.4	1,231.3	0.53	0.32	-0.42
8,581.0	87.70	271.60	7,169.4	-913.0	-1,185.3	1,323.4	0.00	0.00	0.00
8,676.0	88.00	271.40	7,172.9	-910.5	-1,280.2	1,416.5	0.38	0.32	-0.21
8,770.0	88.80	273.90	7,175.6	-906.2	-1,374.0	1,508.2	2.79	0.85	2.66
8,864.0	89.80	273.60	7,176.7	-900.0	-1,467.8	1,599.6	1.11	1.06	-0.32
8,959.0	88.40	273.90	7,178.2	-893.8	-1,562.6	1,691.9	1.51	-1.47	0.32
9,053.0	89.30	273.40	7,180.1	-887.8	-1,656.4	1,783.4	1.10	0.96	-0.53
9,148.0	87.20	273.70	7,183.0	-882.0	-1,751.2	1,875.7	2.23	-2.21	0.32
9,242.0	87.80	273.00	7,187.1	-876.5	-1,844.9	1,967.2	0.98	0.64	-0.74
9,336.0	88.90	272.50	7,189.8	-872.0	-1,938.8	2,058.9	1.29	1.17	-0.53
9,431.0	88.00	272.10	7,192.4	-868.2	-2,033.7	2,151.8	1.04	-0.95	-0.42
9,525.0	88.90	271.60	7,194.9	-865.1	-2,127.6	2,243.8	1.10	0.96	-0.53
9,619.0	89.40	271.30	7,196.3	-862.7	-2,221.5	2,336.0	0.62	0.53	-0.32
9,714.0	88.50	270.60	7,198.0	-861.2	-2,316.5	2,429.3	1.20	-0.95	-0.74
9,808.0	89.40	270.40	7,199.8	-860.3	-2,410.5	2,521.7	0.98	0.96	-0.21
9,902.0	89.00	270.40	7,201.1	-859.7	-2,504.5	2,614.3	0.43	-0.43	0.00
9,996.0	90.50	270.40	7,201.5	-859.0	-2,598.5	2,706.8	1.60	1.60	0.00

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<b>Well:</b>	WAAG 17	<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)
10,091.0	89.60	270.90	7,201.4	-858.0	-2,693.5	2,800.2	1.08	-0.95	0.53
10,185.0	88.90	270.00	7,202.6	-857.2	-2,787.4	2,892.7	1.21	-0.74	-0.96
10,280.0	89.50	269.90	7,204.0	-857.3	-2,882.4	2,986.3	0.64	0.63	-0.11
10,374.0	87.70	271.30	7,206.3	-856.3	-2,976.4	3,078.7	2.43	-1.91	1.49
10,468.0	88.20	270.70	7,209.6	-854.7	-3,070.3	3,171.0	0.83	0.53	-0.64
10,563.0	88.80	270.40	7,212.1	-853.8	-3,165.3	3,264.4	0.71	0.63	-0.32
10,657.0	87.80	271.10	7,214.9	-852.5	-3,259.2	3,356.8	1.30	-1.06	0.74
10,751.0	88.30	270.90	7,218.1	-850.9	-3,353.2	3,449.1	0.57	0.53	-0.21
10,845.0	88.90	270.00	7,220.4	-850.2	-3,447.1	3,541.5	1.15	0.64	-0.96
10,940.0	88.00	270.90	7,223.0	-849.4	-3,542.1	3,635.0	1.34	-0.95	0.95
11,034.0	89.10	270.70	7,225.3	-848.1	-3,636.0	3,727.3	1.19	1.17	-0.21
11,128.0	90.70	270.90	7,225.5	-846.8	-3,730.0	3,819.7	1.72	1.70	0.21
11,222.0	90.60	269.90	7,224.4	-846.1	-3,824.0	3,912.2	1.07	-0.11	-1.06
11,317.0	88.50	268.50	7,225.2	-847.5	-3,919.0	4,006.1	2.66	-2.21	-1.47
11,411.0	87.60	270.00	7,228.4	-848.7	-4,012.9	4,098.8	1.86	-0.96	1.60
11,505.0	88.30	269.70	7,231.7	-848.9	-4,106.9	4,191.4	0.81	0.74	-0.32
11,599.0	88.80	269.30	7,234.1	-849.8	-4,200.8	4,284.2	0.68	0.53	-0.43
11,694.0	89.80	269.00	7,235.3	-851.2	-4,295.8	4,378.0	1.10	1.05	-0.32
11,788.0	90.70	269.00	7,234.9	-852.8	-4,389.8	4,470.9	0.96	0.96	0.00
11,883.0	91.40	268.80	7,233.1	-854.6	-4,484.8	4,564.8	0.77	0.74	-0.21
11,977.0	92.30	268.60	7,230.1	-856.8	-4,578.7	4,657.7	0.98	0.96	-0.21
12,050.0	92.30	268.60	7,227.2	-858.5	-4,651.6	4,729.9	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									
SHL 2619'FSL & 2467'F <sup>1</sup>	0.00	0.00	1.0	0.0	0.0	1,448,136.64	3,220,340.15	40.560830	-104.706970
- survey misses target center by 893.8ft at 895.0ft MD (894.8 TVD, 1.2 N, -3.6 E)									
- Point									

Checked By: _____	Approved By: _____	Date: _____
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