

Extraction Oil & Gas

Well Name: **WAAG 18**

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

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

Ground Elevation: 4882.0

+N/-S +E/-W Northing Easting Latitude Longitude Slot

0.0 0.0 1448107.49 3220340.41 40.560750 -104.706970

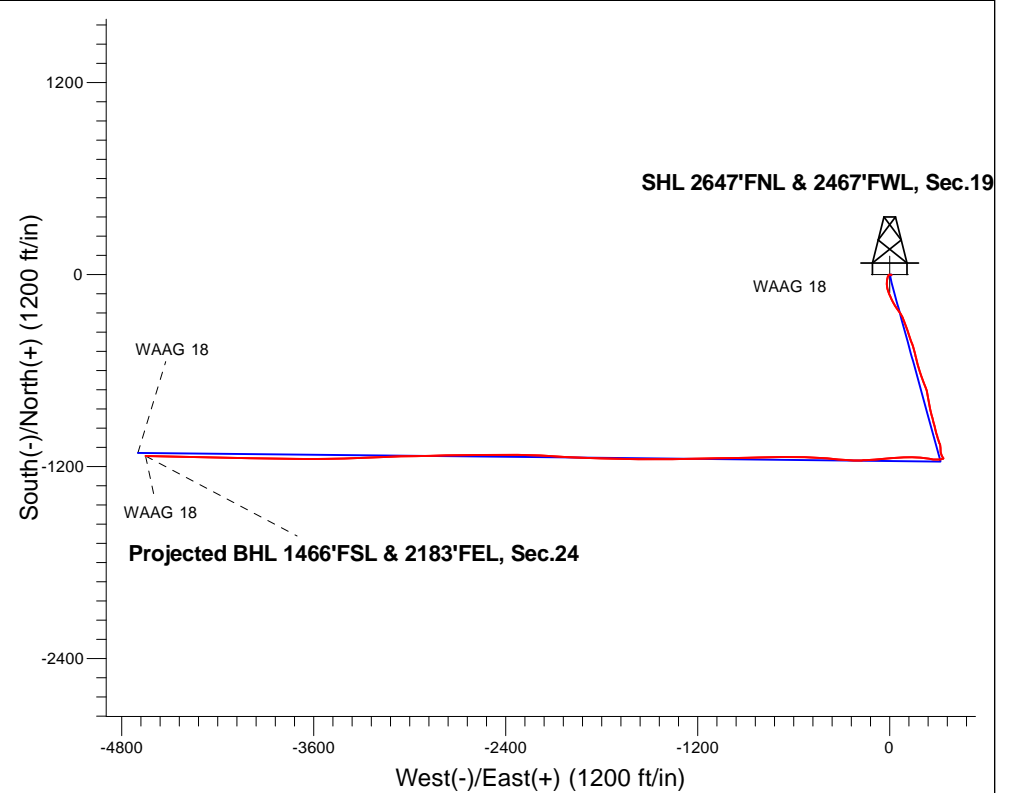
RKB - 24' WELL @ 4906.0ft (RKB - 24')

FINAL SURVEY

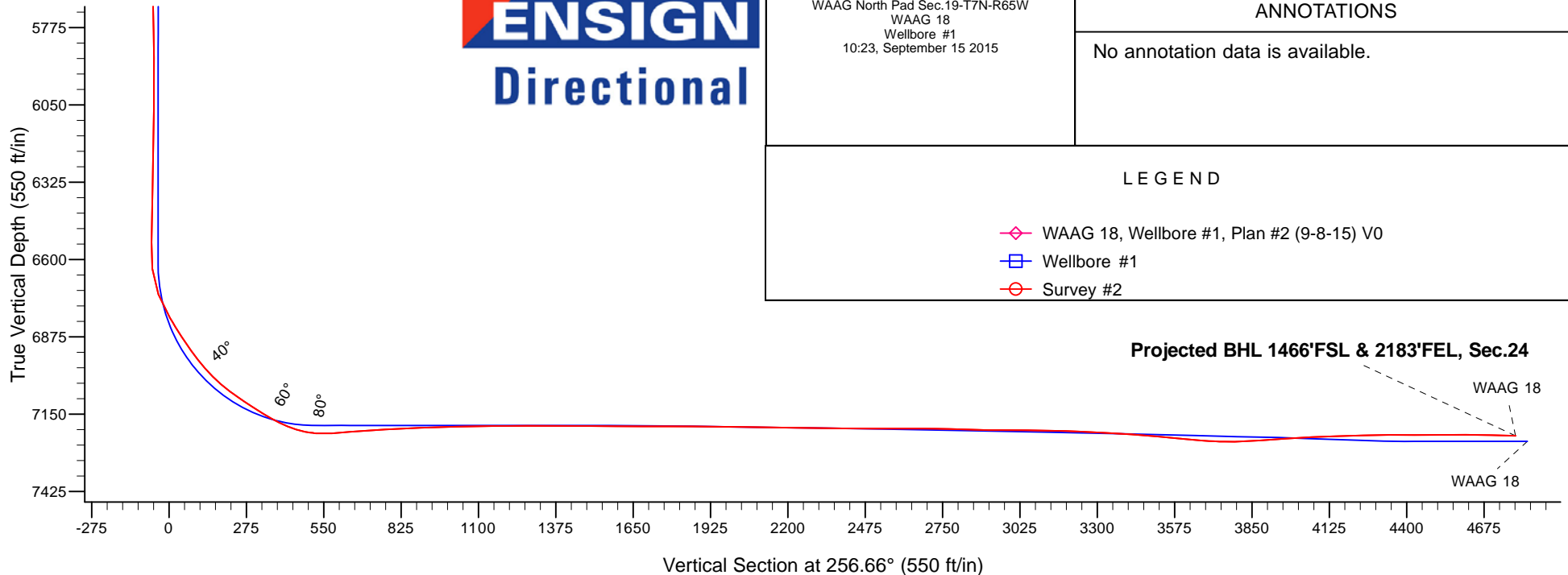
Projected Bottom Hole Location

12065'MD 7227'TVD 1134'S & 4650'W of SHL

88.7 degree Incl @ 271.3 degree AZM



ENSIGN
Directional



WAAG North Pad Sec.19-T7N-R65W
WAAG 18
Wellbore #1
10:23, September 15 2015

ANNOTATIONS

No annotation data is available.

LEGEND

- WAAG 18, Wellbore #1, Plan #2 (9-8-15) V0
- Wellbore #1
- Survey #2



Directional

Extraction Oil & Gas

SEC.19-T7N-R65W

WAAG North Pad Sec.19-T7N-R65W

WAAG 18

Wellbore #1

Survey: Survey #2

Standard Survey Report

15 September, 2015



Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well WAAG 18
Project:	SEC.19-T7N-R65W	TVD Reference:	WELL @ 4906.0ft (RKB - 24')
Site:	WAAG North Pad Sec.19-T7N-R65W	MD Reference:	WELL @ 4906.0ft (RKB - 24')
Well:	WAAG 18	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Project	SEC.19-T7N-R65W, 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		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 18					
Well Position	+N/-S	0.0 ft	Northing:	1,448,107.49 usft	Latitude:	40.560750
	+E/-W	0.0 ft	Easting:	3,220,340.41 usft	Longitude:	-104.706970
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,882.0 ft

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

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	256.66	

Survey Program	Date	9/15/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
80.0	895.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	
985.0	12,065.0	Survey #2 (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 (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
895.0	1.00	270.60	894.7	-4.0	4.8	-3.7	0.00	0.00	0.00	
985.0	3.90	308.20	984.6	-2.1	1.6	-1.1	3.52	3.22	41.78	
1,075.0	3.00	259.50	1,074.5	-0.6	-3.1	3.2	3.29	-1.00	-54.11	
1,166.0	5.60	210.00	1,165.2	-4.9	-7.7	8.6	4.73	2.86	-54.40	
1,256.0	10.50	199.20	1,254.3	-16.4	-12.6	16.1	5.67	5.44	-12.00	
1,348.0	15.10	187.80	1,344.0	-36.2	-17.0	24.9	5.68	5.00	-12.39	
1,439.0	18.50	177.80	1,431.2	-62.4	-18.0	32.0	4.89	3.74	-10.99	
1,531.0	20.80	165.80	1,517.8	-92.9	-13.5	34.5	5.04	2.50	-13.04	
1,622.0	22.30	156.30	1,602.5	-124.3	-2.6	31.2	4.17	1.65	-10.44	
1,714.0	20.00	155.00	1,688.3	-154.6	11.1	24.9	2.55	-2.50	-1.41	

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Site:	WAAG North Pad Sec.19-T7N-R65W	MD Reference:	WELL @ 4906.0ft (RKB - 24')
Well:	WAAG 18	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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	21.20	149.60	1,773.5	-182.9	26.0	16.9	2.47	1.32	-5.93
1,897.0	17.90	146.80	1,860.2	-209.1	42.2	7.2	3.73	-3.59	-3.04
1,989.0	17.70	142.40	1,947.8	-232.0	58.4	-3.3	1.48	-0.22	-4.78
2,081.0	15.60	151.00	2,035.9	-253.9	73.0	-12.4	3.51	-2.28	9.35
2,172.0	14.20	160.40	2,123.9	-275.1	82.7	-16.9	3.06	-1.54	10.33
2,264.0	14.50	160.00	2,213.0	-296.6	90.4	-19.5	0.34	0.33	-0.43
2,356.0	14.30	158.20	2,302.1	-317.9	98.5	-22.5	0.53	-0.22	-1.96
2,450.0	14.70	156.80	2,393.1	-339.7	107.5	-26.3	0.57	0.43	-1.49
2,545.0	14.30	165.80	2,485.1	-362.1	115.2	-28.5	2.41	-0.42	9.47
2,639.0	14.20	163.30	2,576.2	-384.4	121.3	-29.4	0.66	-0.11	-2.66
2,733.0	14.20	157.70	2,667.3	-406.1	129.0	-31.8	1.46	0.00	-5.96
2,828.0	14.50	156.30	2,759.4	-427.8	138.2	-35.8	0.48	0.32	-1.47
2,922.0	13.90	167.00	2,850.5	-449.6	145.5	-37.8	2.86	-0.64	11.38
3,016.0	13.90	164.70	2,941.8	-471.5	151.0	-38.2	0.59	0.00	-2.45
3,111.0	14.80	164.20	3,033.8	-494.2	157.3	-39.1	0.96	0.95	-0.53
3,205.0	12.60	167.90	3,125.1	-515.7	162.7	-39.4	2.52	-2.34	3.94
3,299.0	12.40	164.00	3,216.9	-535.5	167.7	-39.6	0.92	-0.21	-4.15
3,394.0	12.80	164.20	3,309.6	-555.4	173.4	-40.5	0.42	0.42	0.21
3,488.0	13.50	163.90	3,401.1	-576.0	179.2	-41.5	0.75	0.74	-0.32
3,582.0	13.30	163.90	3,492.6	-596.9	185.3	-42.6	0.21	-0.21	0.00
3,676.0	13.20	162.50	3,584.1	-617.5	191.5	-43.9	0.36	-0.11	-1.49
3,771.0	12.80	161.60	3,676.6	-637.8	198.1	-45.6	0.47	-0.42	-0.95
3,865.0	12.70	159.30	3,768.3	-657.4	205.0	-47.8	0.55	-0.11	-2.45
3,959.0	12.80	156.70	3,860.0	-676.6	212.8	-50.9	0.62	0.11	-2.77
4,053.0	12.80	159.30	3,951.7	-695.9	220.6	-54.1	0.61	0.00	2.77
4,148.0	14.20	160.40	4,044.1	-716.7	228.2	-56.7	1.50	1.47	1.16
4,242.0	14.20	170.00	4,135.2	-739.0	234.1	-57.3	2.50	0.00	10.21
4,337.0	15.10	171.10	4,227.1	-762.7	238.0	-55.6	0.99	0.95	1.16
4,431.0	16.20	170.00	4,317.6	-787.7	242.2	-53.9	1.21	1.17	-1.17
4,525.0	16.80	169.30	4,407.7	-813.9	247.0	-52.5	0.67	0.64	-0.74
4,620.0	17.80	168.10	4,498.4	-841.6	252.5	-51.5	1.12	1.05	-1.26
4,714.0	18.30	166.00	4,587.8	-870.0	259.1	-51.3	0.87	0.53	-2.23
4,808.0	15.80	164.90	4,677.7	-896.7	266.0	-51.9	2.68	-2.66	-1.17
4,903.0	15.30	165.40	4,769.2	-921.3	272.5	-52.6	0.54	-0.53	0.53
4,997.0	16.10	164.40	4,859.7	-945.9	279.1	-53.4	0.90	0.85	-1.06
5,091.0	16.60	165.40	4,949.9	-971.4	286.0	-54.2	0.61	0.53	1.06
5,186.0	13.80	165.40	5,041.6	-995.5	292.3	-54.7	2.95	-2.95	0.00
5,280.0	12.00	161.90	5,133.2	-1,015.7	298.2	-55.8	2.09	-1.91	-3.72
5,374.0	11.80	163.20	5,225.2	-1,034.1	304.0	-57.2	0.36	-0.21	1.38
5,468.0	7.70	161.20	5,317.8	-1,049.3	308.8	-58.4	4.38	-4.36	-2.13
5,562.0	5.90	151.40	5,411.1	-1,059.5	313.1	-60.2	2.27	-1.91	-10.43
5,657.0	6.20	170.40	5,505.6	-1,068.9	316.3	-61.2	2.12	0.32	20.00
5,751.0	6.40	183.60	5,599.0	-1,079.1	316.8	-59.3	1.55	0.21	14.04

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Site:	WAAG North Pad Sec.19-T7N-R65W	MD Reference:	WELL @ 4906.0ft (RKB - 24')
Well:	WAAG 18	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
5,845.0	6.40	177.60	5,692.5	-1,089.6	316.7	-56.8	0.71	0.00	-6.38
5,940.0	5.90	173.90	5,786.9	-1,099.7	317.5	-55.2	0.67	-0.53	-3.89
6,034.0	5.50	172.70	5,880.5	-1,109.0	318.6	-54.1	0.44	-0.43	-1.28
6,128.0	5.30	168.30	5,974.0	-1,117.7	320.0	-53.5	0.49	-0.21	-4.68
6,222.0	5.00	157.90	6,067.7	-1,125.7	322.4	-54.0	1.04	-0.32	-11.06
6,316.0	4.50	153.80	6,161.3	-1,132.9	325.6	-55.4	0.64	-0.53	-4.36
6,411.0	3.70	149.30	6,256.1	-1,138.8	328.8	-57.2	0.91	-0.84	-4.74
6,505.0	3.40	152.30	6,349.9	-1,143.9	331.7	-58.8	0.38	-0.32	3.19
6,599.0	1.60	132.40	6,443.8	-1,147.3	333.9	-60.2	2.10	-1.91	-21.17
6,694.0	1.10	87.20	6,538.8	-1,148.1	335.8	-61.9	1.20	-0.53	-47.58
6,788.0	4.50	228.00	6,632.7	-1,150.5	334.0	-59.5	5.74	3.62	149.79
6,882.0	22.50	261.20	6,723.8	-1,155.8	313.3	-38.1	20.09	19.15	35.32
6,976.0	31.70	276.70	6,807.5	-1,155.7	270.8	3.1	12.27	9.79	16.49
7,070.0	36.00	278.30	6,885.6	-1,148.8	218.9	52.0	4.67	4.57	1.70
7,164.0	38.70	273.90	6,960.3	-1,142.8	162.3	105.8	4.04	2.87	-4.68
7,258.0	47.70	267.20	7,028.8	-1,142.5	98.1	168.2	10.74	9.57	-7.13
7,353.0	55.70	266.00	7,087.6	-1,147.0	23.7	241.6	8.48	8.42	-1.26
7,447.0	58.00	265.10	7,139.0	-1,153.1	-54.8	319.3	2.57	2.45	-0.96
7,541.0	64.30	266.30	7,184.3	-1,159.2	-136.8	400.6	6.79	6.70	1.28
7,635.0	79.70	270.70	7,213.3	-1,161.4	-225.9	487.8	16.97	16.38	4.68
7,731.0	94.50	276.20	7,218.2	-1,155.6	-321.3	579.3	16.44	15.42	5.73
7,826.0	94.40	274.60	7,210.8	-1,146.7	-415.6	668.9	1.68	-0.11	-1.68
7,920.0	93.10	271.10	7,204.6	-1,142.1	-509.2	759.0	3.96	-1.38	-3.72
8,015.0	91.70	269.90	7,200.7	-1,141.2	-604.2	851.2	1.94	-1.47	-1.26
8,109.0	92.20	269.70	7,197.5	-1,141.6	-698.1	942.7	0.57	0.53	-0.21
8,204.0	91.20	269.00	7,194.6	-1,142.6	-793.1	1,035.3	1.28	-1.05	-0.74
8,298.0	91.70	268.60	7,192.3	-1,144.6	-887.0	1,127.2	0.68	0.53	-0.43
8,393.0	89.40	269.00	7,191.4	-1,146.6	-982.0	1,220.0	2.46	-2.42	0.42
8,487.0	90.30	269.30	7,191.6	-1,148.0	-1,076.0	1,311.8	1.01	0.96	0.32
8,581.0	89.60	268.80	7,191.7	-1,149.5	-1,169.9	1,403.6	0.92	-0.74	-0.53
8,676.0	89.40	268.30	7,192.5	-1,151.9	-1,264.9	1,496.6	0.57	-0.21	-0.53
8,770.0	89.90	269.20	7,193.1	-1,154.0	-1,358.9	1,588.5	1.10	0.53	0.96
8,864.0	89.80	269.90	7,193.3	-1,154.7	-1,452.9	1,680.1	0.75	-0.11	0.74
8,959.0	89.90	270.60	7,193.6	-1,154.3	-1,547.9	1,772.4	0.74	0.11	0.74
9,053.0	89.60	270.90	7,194.0	-1,153.1	-1,641.9	1,863.6	0.45	-0.32	0.32
9,148.0	89.60	271.80	7,194.7	-1,150.9	-1,736.8	1,955.5	0.95	0.00	0.95
9,242.0	89.10	271.60	7,195.7	-1,148.1	-1,830.8	2,046.3	0.57	-0.53	-0.21
9,336.0	89.20	272.10	7,197.1	-1,145.0	-1,924.7	2,137.0	0.54	0.11	0.53
9,431.0	89.20	272.70	7,198.4	-1,141.1	-2,019.6	2,228.4	0.63	0.00	0.63
9,525.0	89.70	273.90	7,199.3	-1,135.6	-2,113.5	2,318.5	1.38	0.53	1.28
9,619.0	88.90	273.40	7,200.5	-1,129.7	-2,207.3	2,408.4	1.00	-0.85	-0.53
9,714.0	90.00	270.00	7,201.4	-1,126.8	-2,302.2	2,500.1	3.76	1.16	-3.58
9,808.0	90.30	270.40	7,201.2	-1,126.5	-2,396.2	2,591.5	0.53	0.32	0.43

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
9,902.0	89.60	269.70	7,201.2	-1,126.4	-2,490.2	2,682.9	1.05	-0.74	-0.74
9,996.0	88.10	268.80	7,203.1	-1,127.7	-2,584.2	2,774.6	1.86	-1.60	-0.96
10,091.0	88.70	269.30	7,205.8	-1,129.2	-2,679.1	2,867.4	0.82	0.63	0.53
10,185.0	90.00	268.80	7,206.9	-1,130.8	-2,773.1	2,959.2	1.48	1.38	-0.53
10,280.0	89.30	268.80	7,207.4	-1,132.8	-2,868.1	3,052.1	0.74	-0.74	0.00
10,374.0	89.10	269.00	7,208.7	-1,134.6	-2,962.1	3,143.9	0.30	-0.21	0.21
10,468.0	87.30	268.30	7,211.7	-1,136.8	-3,056.0	3,235.8	2.05	-1.91	-0.74
10,563.0	87.00	268.10	7,216.4	-1,139.8	-3,150.8	3,328.8	0.38	-0.32	-0.21
10,845.0	84.20	267.80	7,238.1	-1,149.8	-3,431.8	3,604.5	1.00	-0.99	-0.11
10,940.0	86.70	269.30	7,245.6	-1,152.2	-3,526.4	3,697.1	3.07	2.63	1.58
11,034.0	90.70	270.00	7,247.7	-1,152.8	-3,620.4	3,788.7	4.32	4.26	0.74
11,128.0	94.10	270.90	7,243.8	-1,152.1	-3,714.3	3,879.9	3.74	3.62	0.96
11,222.0	93.90	271.10	7,237.2	-1,150.4	-3,808.1	3,970.7	0.30	-0.21	0.21
11,317.0	93.10	270.70	7,231.4	-1,148.9	-3,902.9	4,062.6	0.94	-0.84	-0.42
11,411.0	90.90	270.90	7,228.1	-1,147.6	-3,996.8	4,153.7	2.35	-2.34	0.21
11,505.0	92.20	271.60	7,225.6	-1,145.6	-4,090.7	4,244.7	1.57	1.38	0.74
11,600.0	89.80	270.70	7,223.9	-1,143.7	-4,185.7	4,336.6	2.70	-2.53	-0.95
11,694.0	89.80	271.30	7,224.3	-1,142.0	-4,279.7	4,427.7	0.64	0.00	0.64
11,788.0	90.80	271.80	7,223.8	-1,139.5	-4,373.6	4,518.5	1.19	1.06	0.53
11,883.0	89.60	270.70	7,223.5	-1,137.4	-4,468.6	4,610.5	1.71	-1.26	-1.16
11,977.0	88.70	271.30	7,224.8	-1,135.8	-4,562.6	4,701.5	1.15	-0.96	0.64
12,065.0	88.70	271.30	7,226.8	-1,133.8	-4,650.5	4,786.7	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 2647°FNL & 2467°F	0.00	0.00	1.0	0.0	0.0	1,448,107.50	3,220,340.41	40.560750	-104.706970
- survey misses target center by 893.7ft at 895.0ft MD (894.7 TVD, -4.0 N, 4.8 E)									
- Point									

Checked By: _____	Approved By: _____	Date: _____
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