

# Extraction Oil & Gas

Well Name: **WAAG 9**

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

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

Ground Elevation: 4886.0

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

0.0 0.0 1448358.87 3220340.94 40.561440 -104.706960

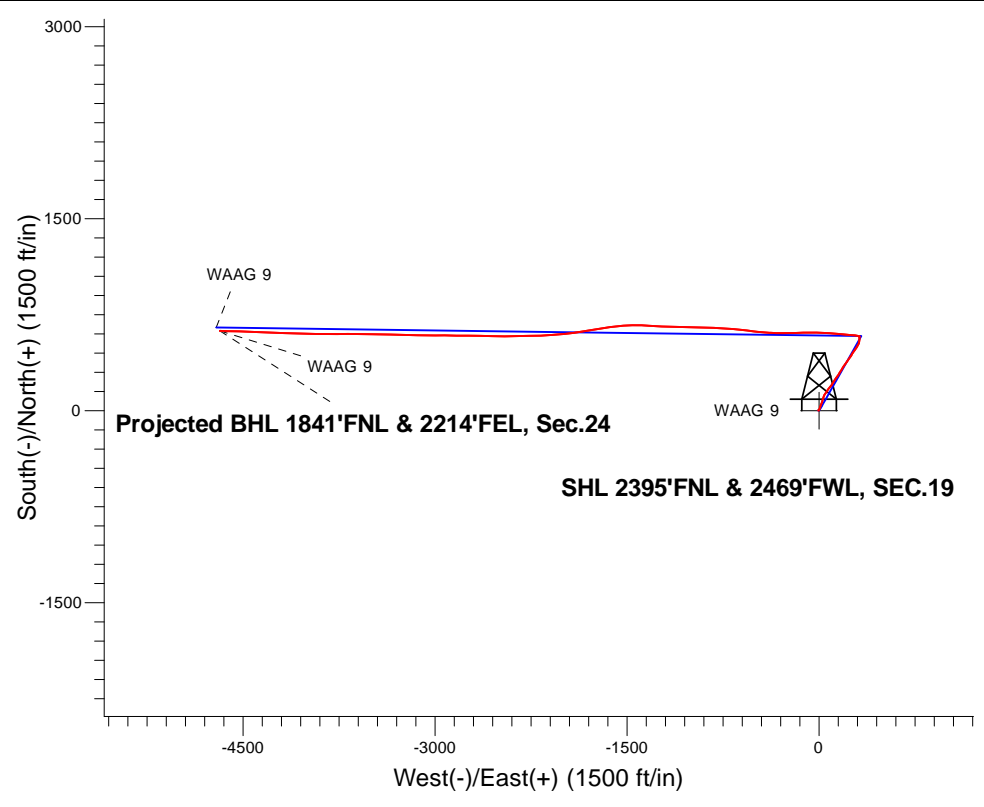
H&P 319 RKB @ 4910.0ft (H&P 319)

## FINAL SURVEY

Projected Bottom Hole Location

11940'MD 7194'TVD 623'N & 4681'W of SHL

89.3 degree Incl @ 271.6 degree AZM

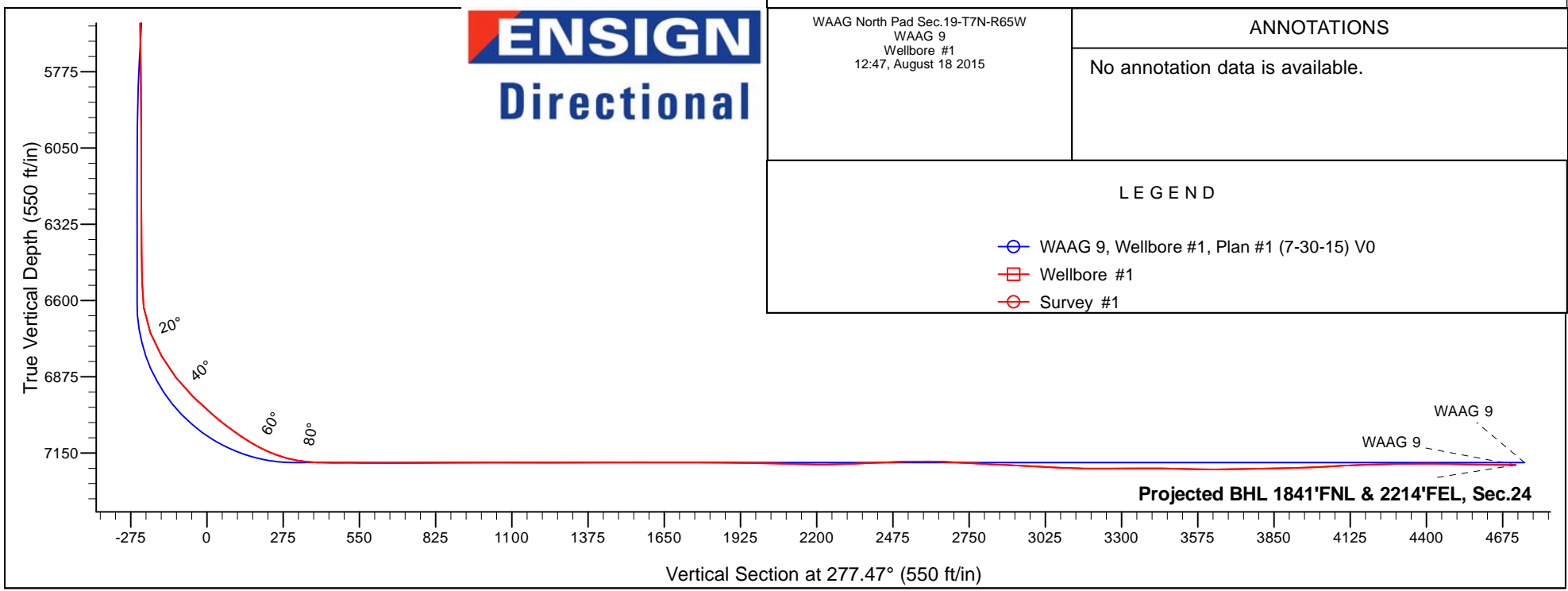


WAAG North Pad Sec.19-T7N-R65W  
WAAG 9  
Wellbore #1  
12:47, August 18 2015

**ANNOTATIONS**  
No annotation data is available.

**LEGEND**

- WAAG 9, Wellbore #1, Plan #1 (7-30-15) V0
- Wellbore #1
- Survey #1





## **Extraction Oil & Gas**

**SEC.19-T7N-R65W**

**WAAG North Pad Sec.19-T7N-R65W**

**WAAG 9**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**18 August, 2015**



<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 9
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Well:</b>	WAAG 9	<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 9					
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,448,358.87 usft	<b>Latitude:</b>	40.561440
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	3,220,340.94 usft	<b>Longitude:</b>	-104.706960
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	0.0 ft	<b>Ground Level:</b>	4,886.0 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	7/31/2015	8.32	67.08	52,638

<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	277.47	

<b>Survey Program</b>	<b>Date</b>	8/18/2015			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
852.0	11,940.0	Survey #1 (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>	
852.0	1.20	149.00	851.8	2.6	-5.3	5.6	0.00	0.00	0.00	
<b>SHL 2395'FNL &amp; 2469'FWL, SEC.19</b>										
965.0	1.10	153.50	964.7	0.6	-4.2	4.2	0.12	-0.09	3.98	
1,057.0	1.60	57.20	1,056.7	0.5	-2.7	2.7	2.22	0.54	-104.67	
1,147.0	2.70	33.30	1,146.7	3.0	-0.5	0.9	1.55	1.22	-26.56	
1,239.0	3.30	26.40	1,238.5	7.2	1.9	-0.9	0.76	0.65	-7.50	
1,329.0	6.60	21.50	1,328.2	14.3	4.9	-3.0	3.69	3.67	-5.44	
1,512.0	8.40	16.20	1,509.6	36.9	12.5	-7.6	1.05	0.98	-2.90	
1,603.0	9.80	24.00	1,599.5	50.4	17.5	-10.8	2.05	1.54	8.57	
1,695.0	9.40	19.60	1,690.2	64.6	23.2	-14.6	0.91	-0.43	-4.78	
1,787.0	9.00	14.50	1,781.0	78.6	27.6	-17.1	0.99	-0.43	-5.54	

<b>Company:</b>	Extraction Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well WAAG 9
<b>Project:</b>	SEC.19-T7N-R65W	<b>TVD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Well:</b>	WAAG 9	<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)	
1,878.0	9.00	19.00	1,870.9	92.3	31.7	-19.4	0.77	0.00	4.95	
1,970.0	8.50	15.90	1,961.8	105.6	35.9	-21.8	0.75	-0.54	-3.37	
2,061.0	9.10	24.10	2,051.8	118.6	40.6	-24.9	1.53	0.66	9.01	
2,153.0	9.60	37.70	2,142.5	131.4	48.3	-30.8	2.46	0.54	14.78	
2,244.0	9.20	35.00	2,232.3	143.3	57.1	-38.0	0.65	-0.44	-2.97	
2,336.0	8.80	34.20	2,323.2	155.2	65.3	-44.6	0.46	-0.43	-0.87	
2,430.0	8.40	29.90	2,416.1	167.1	72.8	-50.4	0.81	-0.43	-4.57	
2,525.0	9.10	40.70	2,510.0	178.8	81.1	-57.2	1.88	0.74	11.37	
2,619.0	9.40	37.90	2,602.8	190.5	90.7	-65.1	0.58	0.32	-2.98	
2,714.0	8.90	35.00	2,696.6	202.6	99.7	-72.5	0.72	-0.53	-3.05	
2,808.0	8.50	33.10	2,789.5	214.4	107.6	-78.8	0.52	-0.43	-2.02	
2,902.0	7.90	29.80	2,882.6	225.8	114.6	-84.3	0.81	-0.64	-3.51	
3,091.0	9.40	37.00	3,069.4	249.4	130.4	-96.8	0.98	0.79	3.81	
3,185.0	8.20	34.50	3,162.3	261.1	138.8	-103.7	1.34	-1.28	-2.66	
3,279.0	7.40	30.80	3,255.4	271.8	145.7	-109.1	1.00	-0.85	-3.94	
3,374.0	9.00	35.20	3,349.5	283.1	153.1	-115.0	1.81	1.68	4.63	
3,468.0	8.40	32.40	3,442.4	294.9	161.0	-121.3	0.78	-0.64	-2.98	
3,562.0	7.10	29.40	3,535.5	305.8	167.6	-126.4	1.45	-1.38	-3.19	
3,656.0	7.70	34.90	3,628.7	316.0	174.0	-131.4	0.99	0.64	5.85	
3,751.0	6.60	31.50	3,723.0	325.9	180.5	-136.6	1.24	-1.16	-3.58	
3,845.0	8.90	33.30	3,816.1	336.6	187.3	-142.0	2.46	2.45	1.91	
3,940.0	8.10	28.70	3,910.1	348.6	194.6	-147.6	1.10	-0.84	-4.84	
4,034.0	9.10	37.90	4,003.0	360.3	202.3	-153.7	1.81	1.06	9.79	
4,128.0	9.70	36.40	4,095.8	372.5	211.6	-161.3	0.69	0.64	-1.60	
4,222.0	10.20	35.90	4,188.4	385.6	221.2	-169.1	0.54	0.53	-0.53	
4,317.0	10.10	35.00	4,281.9	399.3	230.9	-177.0	0.20	-0.11	-0.95	
4,411.0	8.90	33.80	4,374.6	412.1	239.6	-184.0	1.29	-1.28	-1.28	
4,506.0	8.30	33.60	4,468.5	423.9	247.5	-190.3	0.63	-0.63	-0.21	
4,600.0	7.60	31.70	4,561.6	434.8	254.5	-195.8	0.80	-0.74	-2.02	
4,694.0	6.90	31.50	4,654.9	444.9	260.8	-200.7	0.75	-0.74	-0.21	
4,788.0	8.00	36.80	4,748.1	455.0	267.6	-206.2	1.38	1.17	5.64	
4,883.0	8.10	35.70	4,842.1	465.7	275.5	-212.6	0.19	0.11	-1.16	
4,977.0	7.20	34.30	4,935.3	475.9	282.7	-218.4	0.98	-0.96	-1.49	
5,072.0	8.80	33.60	5,029.4	486.9	290.1	-224.3	1.69	1.68	-0.74	
5,166.0	7.80	32.60	5,122.4	498.3	297.5	-230.1	1.07	-1.06	-1.06	
5,260.0	7.70	31.30	5,215.5	509.0	304.2	-235.4	0.21	-0.11	-1.38	
5,354.0	8.90	19.20	5,308.5	521.3	309.8	-239.4	2.25	1.28	-12.87	
5,449.0	7.40	12.40	5,402.6	534.2	313.6	-241.4	1.87	-1.58	-7.16	
5,543.0	6.00	8.50	5,495.9	545.0	315.6	-242.1	1.57	-1.49	-4.15	
5,637.0	4.70	358.50	5,589.5	553.7	316.2	-241.5	1.70	-1.38	-10.64	
5,731.0	3.70	352.70	5,683.3	560.5	315.7	-240.2	1.15	-1.06	-6.17	
5,825.0	3.50	359.20	5,777.1	566.4	315.3	-239.0	0.48	-0.21	6.91	
5,920.0	3.30	357.60	5,871.9	572.0	315.2	-238.1	0.23	-0.21	-1.68	

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<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Well:</b>	WAAG 9	<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)	
6,014.0	2.90	355.00	5,965.8	577.1	314.8	-237.1	0.45	-0.43	-2.77	
6,108.0	0.40	92.00	6,059.7	579.5	315.0	-236.9	3.17	-2.66	103.19	
6,202.0	0.10	51.90	6,153.7	579.5	315.4	-237.3	0.35	-0.32	-42.66	
6,297.0	0.40	341.20	6,248.7	579.9	315.3	-237.2	0.40	0.32	-74.42	
6,391.0	0.60	302.60	6,342.7	580.4	314.8	-236.6	0.40	0.21	-41.06	
6,485.0	0.90	294.30	6,436.7	581.0	313.7	-235.5	0.34	0.32	-8.83	
6,580.0	0.90	324.40	6,531.7	581.9	312.6	-234.3	0.49	0.00	31.68	
6,674.0	7.20	282.00	6,625.4	583.8	306.4	-227.9	6.98	6.70	-45.11	
6,768.0	21.60	276.70	6,716.2	587.0	283.3	-204.6	15.37	15.32	-5.64	
6,862.0	30.00	274.60	6,800.8	590.9	242.6	-163.7	8.99	8.94	-2.23	
6,957.0	37.70	275.00	6,879.6	595.4	190.0	-110.9	8.11	8.11	0.42	
7,050.0	46.10	275.50	6,948.8	601.1	128.2	-48.9	9.04	9.03	0.54	
7,144.0	49.30	274.10	7,012.1	606.9	58.9	20.5	3.58	3.40	-1.49	
7,239.0	54.50	271.30	7,070.7	610.3	-15.7	95.0	5.94	5.47	-2.95	
7,333.0	60.50	267.10	7,121.2	609.1	-95.0	173.4	7.41	6.38	-4.47	
7,427.0	71.30	269.20	7,159.5	606.4	-180.6	257.9	11.67	11.49	2.23	
7,492.5	79.31	269.84	7,176.1	605.9	-243.9	320.6	12.27	12.23	0.97	
<b>Entry Point 1815'FNL &amp; 2229'FWL, SEC.19</b>										
7,521.0	82.80	270.10	7,180.5	605.9	-272.0	348.5	12.27	12.24	0.93	
7,548.0	86.40	269.70	7,183.1	605.8	-298.9	375.2	13.41	13.33	-1.48	
7,637.0	90.30	274.30	7,185.6	608.9	-387.8	463.7	6.77	4.38	5.17	
7,731.0	89.30	275.00	7,186.0	616.6	-481.5	557.6	1.30	-1.06	0.74	
7,825.0	90.40	277.60	7,186.2	626.9	-574.9	651.5	3.00	1.17	2.77	
7,920.0	90.10	274.80	7,185.8	637.1	-669.3	746.5	2.96	-0.32	-2.95	
8,014.0	90.70	273.00	7,185.1	643.5	-763.1	840.3	2.02	0.64	-1.91	
8,109.0	89.90	272.20	7,184.6	647.8	-858.0	935.0	1.19	-0.84	-0.84	
8,203.0	90.30	272.20	7,184.5	651.4	-951.9	1,028.6	0.43	0.43	0.00	
8,297.0	90.00	270.60	7,184.2	653.7	-1,045.9	1,122.0	1.73	-0.32	-1.70	
8,392.0	90.00	270.10	7,184.2	654.3	-1,140.9	1,216.3	0.53	0.00	-0.53	
8,486.0	90.00	273.00	7,184.2	656.9	-1,234.9	1,309.8	3.09	0.00	3.09	
8,581.0	89.50	274.80	7,184.6	663.3	-1,329.6	1,404.6	1.97	-0.53	1.89	
8,675.0	90.90	270.10	7,184.3	667.3	-1,423.5	1,498.2	5.22	1.49	-5.00	
8,769.0	90.20	266.20	7,183.4	664.3	-1,517.4	1,590.9	4.22	-0.74	-4.15	
8,864.0	89.80	262.30	7,183.4	654.8	-1,611.9	1,683.4	4.13	-0.42	-4.11	
8,958.0	89.60	260.40	7,183.9	640.7	-1,704.9	1,773.7	2.03	-0.21	-2.02	
9,053.0	89.40	260.60	7,184.7	625.0	-1,798.6	1,864.6	0.30	-0.21	0.21	
9,147.0	88.90	262.50	7,186.1	611.2	-1,891.5	1,954.9	2.09	-0.53	2.02	
9,241.0	88.60	263.90	7,188.2	600.0	-1,984.8	2,046.0	1.52	-0.32	1.49	
9,336.0	88.70	265.70	7,190.4	591.4	-2,079.4	2,138.7	1.90	0.11	1.89	
9,430.0	90.10	268.30	7,191.4	586.5	-2,173.3	2,231.1	3.14	1.49	2.77	
9,524.0	92.40	268.70	7,189.3	584.1	-2,267.2	2,323.9	2.48	2.45	0.43	
9,618.0	92.60	268.30	7,185.2	581.6	-2,361.1	2,416.7	0.48	0.21	-0.43	
9,713.0	92.20	270.10	7,181.3	580.3	-2,456.0	2,510.6	1.94	-0.42	1.89	

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<b>Site:</b>	WAAG North Pad Sec.19-T7N-R65W	<b>MD Reference:</b>	RKB @ 4910.0ft (H&P 319)
<b>Well:</b>	WAAG 9	<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)
9,807.0	88.90	272.00	7,180.4	582.0	-2,550.0	2,604.0	4.05	-3.51	2.02
9,902.0	87.20	271.10	7,183.6	584.6	-2,644.9	2,698.4	2.02	-1.79	-0.95
9,996.0	86.30	270.20	7,188.9	585.6	-2,738.7	2,791.6	1.35	-0.96	-0.96
10,090.0	87.80	270.60	7,193.8	586.3	-2,832.6	2,884.8	1.65	1.60	0.43
10,184.0	87.10	270.10	7,197.9	586.9	-2,926.5	2,977.9	0.91	-0.74	-0.53
10,279.0	87.10	270.40	7,202.8	587.3	-3,021.4	3,072.1	0.32	0.00	0.32
10,373.0	88.90	270.80	7,206.0	588.3	-3,115.3	3,165.3	1.96	1.91	0.43
10,468.0	90.70	271.80	7,206.4	590.4	-3,210.3	3,259.8	2.17	1.89	1.05
10,562.0	90.30	271.60	7,205.5	593.2	-3,304.2	3,353.3	0.48	-0.43	-0.21
10,656.0	89.30	271.10	7,205.9	595.4	-3,398.2	3,446.8	1.19	-1.06	-0.53
10,750.0	88.30	271.10	7,207.8	597.2	-3,492.1	3,540.2	1.06	-1.06	0.00
10,845.0	89.80	270.20	7,209.4	598.3	-3,587.1	3,634.5	1.84	1.58	-0.95
10,939.0	91.80	270.60	7,208.1	598.9	-3,681.1	3,727.7	2.17	2.13	0.43
11,033.0	90.50	268.70	7,206.2	598.4	-3,775.1	3,820.8	2.45	-1.38	-2.02
11,127.0	91.50	270.60	7,204.6	597.8	-3,869.1	3,913.9	2.28	1.06	2.02
11,222.0	92.70	271.60	7,201.1	599.6	-3,964.0	4,008.3	1.64	1.26	1.05
11,316.0	93.60	271.30	7,195.9	602.0	-4,057.8	4,101.6	1.01	0.96	-0.32
11,410.0	91.00	272.00	7,192.2	604.7	-4,151.7	4,195.1	2.86	-2.77	0.74
11,504.0	91.80	272.00	7,189.9	608.0	-4,245.6	4,288.6	0.85	0.85	0.00
11,599.0	89.90	272.50	7,188.5	611.7	-4,340.5	4,383.2	2.07	-2.00	0.53
11,693.0	88.70	272.20	7,189.6	615.6	-4,434.4	4,476.8	1.32	-1.28	-0.32
11,788.0	88.90	271.60	7,191.6	618.7	-4,529.3	4,571.3	0.67	0.21	-0.63
11,873.0	89.30	271.60	7,192.9	621.1	-4,614.3	4,655.9	0.47	0.47	0.00
11,940.0	89.30	271.60	7,193.7	623.0	-4,681.3	4,722.5	0.00	0.00	0.00
<b>BHL 1815'FNL &amp; 2242'FEL SEC SEC 24</b>									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 2395'FNL & 2469'F'	0.00	0.00	1.0	0.0	0.0	1,448,358.89	3,220,340.94	40.561440	-104.706960
- survey misses target center by 850.8ft at 852.0ft MD (851.8 TVD, 2.6 N, -5.3 E)									
- Point									

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