



Project: WELD COUNTY, CO
 Site: WAAG PAD
 Well: WAAG 23
 Wellbore: WAAG 23
 Design: WAAG 23
 Latitude: 40° 33' 15.336 N
 Longitude: 104° 42' 26.784 W
 GL: 4868.00
 KB: KB @ 4892.50ft (Patterson 346)



WELLBORE TARGET DETAILS (LAT/LONG)

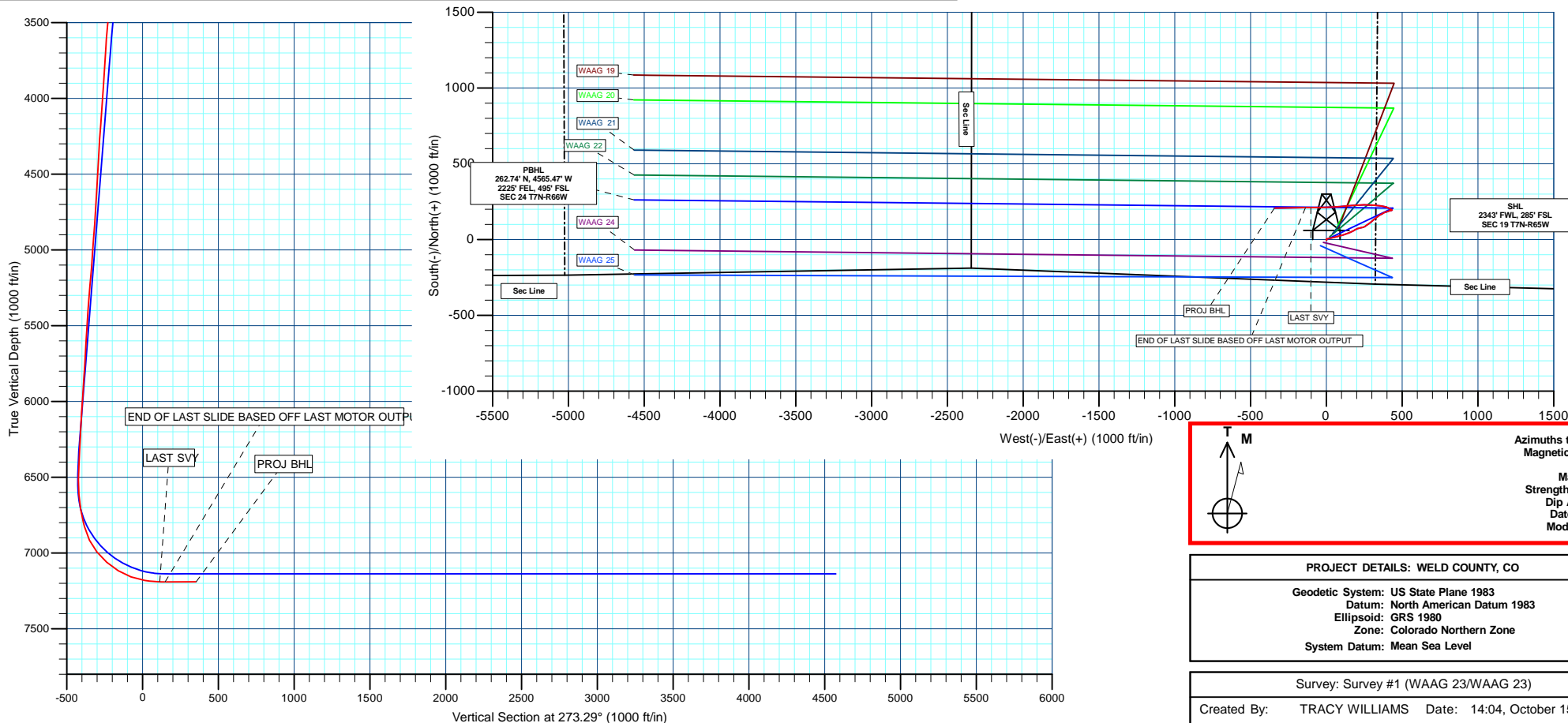
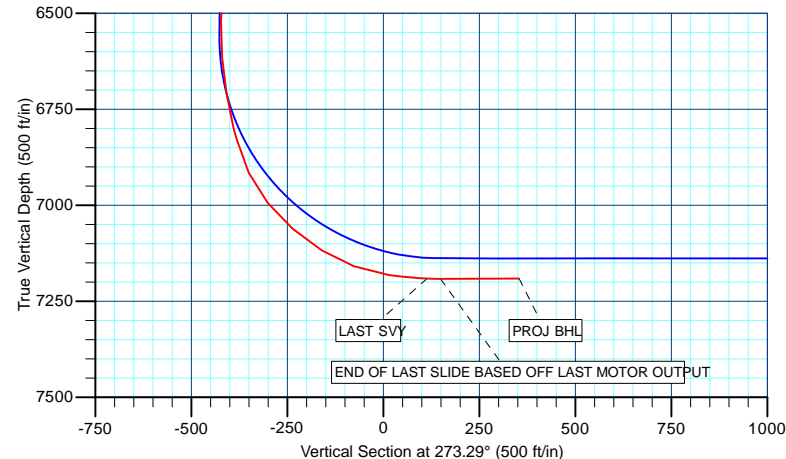
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP WAAG 23	7138.00	214.97	-133.38	1445955.79	3220095.66	40° 33' 17.460 N	104° 42' 28.512 W
PBHL WAAG 23	7138.00	262.75	-4565.47	1445963.96	3215663.32	40° 33' 17.928 N	104° 43' 25.932 W

WELL DETAILS: WAAG 23

+N/-S	+E/-W	Northing	Ground Level:	Latitude	Longitude	Slot
0.00	0.00	1445742.02	4868.00	40° 33' 15.336 N	104° 42' 26.784 W	
			Easting			
			3220230.95			

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
1158.55	5.17	64.60	1158.20	5.00	10.53	2.00	64.60	-10.23	Start 5139.52 hold at 1158.55 MD
6298.07	5.17	64.60	6276.80	203.70	428.97	0.00	0.00	-416.56	Start Drop -2.00
6556.62	0.00	0.00	6535.00	208.70	439.50	2.00	180.00	-426.78	Start 30.04 hold at 6556.62 MD
6586.66	0.00	0.00	6565.04	208.70	439.50	0.00	0.00	-426.78	Start DLS 10.00 TFO 270.62
7486.66	90.00	270.62	7138.00	214.89	-133.43	10.00	270.62	145.55	Start 4432.31 hold at 7486.66 MD
11918.97	90.00	270.62	7138.00	262.75	-4565.47	0.00	0.00	4573.03	TD at 11918.97



Azimuths to True North
 Magnetic North: 8.40°
 Magnetic Field
 Strength: 52702.1nT
 Dip Angle: 67.04°
 Date: 07/01/2015
 Model: IGRF2015

PROJECT DETAILS: WELD COUNTY, CO	
Geodetic System: US State Plane 1983	
Datum: North American Datum 1983	
Ellipsoid: GRS 1980	
Zone: Colorado Northern Zone	
System Datum: Mean Sea Level	
Survey: Survey #1 (WAAG 23/WAAG 23)	
Created By:	TRACY WILLIAMS Date: 14:04, October 15 2015



Extraction Oil & Gas

WELD COUNTY, CO

WAAG PAD

WAAG 23

WAAG 23

Survey: Survey #1

Standard Survey Report

15 October, 2015



Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well WAAG 23
Project:	WELD COUNTY, CO	TVD Reference:	KB @ 4892.50ft (Patterson 346)
Site:	WAAG PAD	MD Reference:	KB @ 4892.50ft (Patterson 346)
Well:	WAAG 23	North Reference:	True
Wellbore:	WAAG 23	Survey Calculation Method:	Minimum Curvature
Design:	WAAG 23	Database:	EDM 5000.1 Single User Db

Project	WELD COUNTY, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		WAAG PAD			
Site Position: From:	Lat/Long	Northing:	1,445,742.04 usft	Latitude:	40° 33' 15.336 N
		Easting:	3,220,230.95 usft	Longitude:	104° 42' 26.784 W
		Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16"

Well	WAAG 23					
Well Position	+N/-S	0.00 ft	Northing:	1,445,742.02 usft	Latitude:	40° 33' 15.336 N
	+E/-W	0.00 ft	Easting:	3,220,230.95 usft	Longitude:	104° 42' 26.784 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	4,868.00 ft

Wellbore	WAAG 23				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	07/01/15	8.40	67.04	52,702

Design	WAAG 23				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	273.29	

Survey Program	Date	10/15/15			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
141.00	7,760.00	Survey #1 (WAAG 23)	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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
141.00	1.40	161.10	140.99	-1.63	0.56	-0.65	0.99	0.99	0.00	
231.00	0.50	138.60	230.97	-2.96	1.17	-1.34	1.06	-1.00	-25.00	
321.00	0.50	122.30	320.97	-3.47	1.77	-1.96	0.16	0.00	-18.11	
411.00	0.80	131.50	410.96	-4.10	2.57	-2.80	0.35	0.33	10.22	
501.00	1.00	329.50	500.96	-3.83	2.64	-2.86	1.98	0.22	-180.00	
591.00	1.10	334.40	590.94	-2.38	1.87	-2.00	0.15	0.11	5.44	
681.00	1.20	330.70	680.93	-0.78	1.03	-1.08	0.14	0.11	-4.11	
771.00	0.90	346.90	770.91	0.73	0.41	-0.37	0.47	-0.33	18.00	
859.00	0.40	352.10	858.91	1.71	0.21	-0.11	0.57	-0.57	5.91	
1,073.00	0.60	299.90	1,072.90	3.01	-0.86	1.03	0.22	0.09	-24.39	
1,162.00	1.50	79.90	1,161.89	3.44	-0.12	0.32	2.24	1.01	157.30	
1,253.00	6.60	76.20	1,252.63	4.90	6.14	-5.85	5.61	5.60	-4.07	

Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well WAAG 23
Project:	WELD COUNTY, CO	TVD Reference:	KB @ 4892.50ft (Patterson 346)
Site:	WAAG PAD	MD Reference:	KB @ 4892.50ft (Patterson 346)
Well:	WAAG 23	North Reference:	True
Wellbore:	WAAG 23	Survey Calculation Method:	Minimum Curvature
Design:	WAAG 23	Database:	EDM 5000.1 Single User Db

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)	
1,342.00	8.40	77.00	1,340.87	7.58	17.44	-16.98	2.03	2.02	0.90	
1,524.00	8.50	77.40	1,520.89	13.51	43.52	-42.67	0.06	0.05	0.22	
1,613.00	8.50	76.30	1,608.91	16.50	56.33	-55.29	0.18	0.00	-1.24	
1,703.00	8.40	76.50	1,697.94	19.61	69.18	-67.94	0.12	-0.11	0.22	
1,794.00	8.00	75.40	1,788.01	22.76	81.77	-80.33	0.47	-0.44	-1.21	
1,885.00	7.60	74.00	1,878.16	26.01	93.69	-92.04	0.49	-0.44	-1.54	
1,975.00	7.10	73.00	1,967.42	29.28	104.73	-102.87	0.57	-0.56	-1.11	
2,065.00	6.80	72.70	2,056.76	32.49	115.13	-113.08	0.34	-0.33	-0.33	
2,156.00	6.70	71.00	2,147.13	35.82	125.30	-123.03	0.25	-0.11	-1.87	
2,339.00	6.00	67.80	2,329.01	42.91	144.25	-141.54	0.43	-0.38	-1.75	
2,428.00	5.70	66.90	2,417.55	46.40	152.62	-149.70	0.35	-0.34	-1.01	
2,520.00	5.30	65.30	2,509.12	49.97	160.68	-157.54	0.47	-0.43	-1.74	
2,611.00	4.90	65.40	2,599.76	53.35	168.03	-164.69	0.44	-0.44	0.11	
2,702.00	4.60	66.20	2,690.45	56.44	174.90	-171.37	0.34	-0.33	0.88	
2,792.00	4.30	64.60	2,780.18	59.34	181.25	-177.55	0.36	-0.33	-1.78	
2,974.00	3.60	57.40	2,961.75	65.34	192.23	-188.16	0.47	-0.38	-3.96	
3,064.00	3.60	57.40	3,051.57	68.39	196.99	-192.74	0.00	0.00	0.00	
3,155.00	4.80	60.30	3,142.32	71.82	202.71	-198.25	1.34	1.32	3.19	
3,249.00	5.00	74.50	3,235.98	74.86	210.07	-205.42	1.30	0.21	15.11	
3,438.00	5.70	82.60	3,424.16	78.27	227.32	-222.44	0.54	0.37	4.29	
3,532.00	4.70	83.30	3,517.77	79.32	235.77	-230.82	1.07	-1.06	0.74	
3,626.00	4.80	66.10	3,611.45	81.36	243.19	-238.11	1.51	0.11	-18.30	
3,719.00	3.80	60.60	3,704.19	84.45	249.43	-244.17	1.16	-1.08	-5.91	
3,907.00	5.10	56.00	3,891.62	92.18	261.79	-256.06	0.72	0.69	-2.45	
4,001.00	4.60	56.60	3,985.28	96.59	268.40	-262.41	0.53	-0.53	0.64	
4,096.00	5.40	54.40	4,079.92	101.29	275.21	-268.94	0.87	0.84	-2.32	
4,190.00	5.50	51.90	4,173.50	106.65	282.36	-275.76	0.27	0.11	-2.66	
4,284.00	4.80	51.90	4,267.12	111.85	289.00	-282.09	0.74	-0.74	0.00	
4,378.00	4.50	52.70	4,360.81	116.52	295.02	-287.84	0.33	-0.32	0.85	
4,473.00	3.90	52.70	4,455.55	120.73	300.56	-293.13	0.63	-0.63	0.00	
4,567.00	4.60	51.60	4,549.29	125.01	306.06	-298.37	0.75	0.74	-1.17	
4,660.00	4.80	49.30	4,641.98	129.86	311.93	-303.95	0.30	0.22	-2.47	
4,754.00	4.60	45.20	4,735.66	135.08	317.58	-309.30	0.42	-0.21	-4.36	
4,848.00	5.70	53.20	4,829.28	140.54	324.00	-315.39	1.39	1.17	8.51	
4,943.00	5.80	53.00	4,923.81	146.25	331.61	-322.66	0.11	0.11	-0.21	
5,036.00	5.50	50.00	5,016.36	151.94	338.78	-329.49	0.45	-0.32	-3.23	
5,130.00	5.00	51.00	5,109.96	157.42	345.41	-335.79	0.54	-0.53	1.06	
5,224.00	6.30	62.10	5,203.50	162.41	353.15	-343.24	1.80	1.38	11.81	
5,318.00	5.60	63.40	5,297.00	166.88	361.81	-351.62	0.76	-0.74	1.38	
5,413.00	5.00	60.60	5,391.59	170.98	369.56	-359.13	0.69	-0.63	-2.95	
5,506.00	4.20	58.20	5,484.29	174.77	375.99	-365.32	0.88	-0.86	-2.58	
5,600.00	3.50	57.40	5,578.08	178.13	381.33	-370.47	0.75	-0.74	-0.85	
5,789.00	4.00	79.20	5,766.68	182.47	392.67	-381.53	0.79	0.26	11.53	
5,884.00	3.60	74.00	5,861.47	183.92	398.79	-387.56	0.56	-0.42	-5.47	
5,979.00	4.50	69.80	5,956.24	186.02	405.15	-393.80	1.00	0.95	-4.42	
6,073.00	3.90	69.60	6,049.98	188.41	411.61	-400.10	0.64	-0.64	-0.21	
6,261.00	3.10	81.00	6,237.63	191.44	422.62	-410.93	0.56	-0.43	6.06	
6,355.00	2.80	78.10	6,331.51	192.31	427.38	-415.63	0.36	-0.32	-3.09	
6,449.00	2.60	71.90	6,425.40	193.44	431.65	-419.83	0.38	-0.21	-6.60	
6,543.00	1.80	32.70	6,519.34	195.35	434.48	-422.54	1.76	-0.85	-41.70	
6,638.00	4.10	288.70	6,614.25	197.69	432.07	-419.99	5.12	2.42	-109.47	
6,732.00	10.60	299.00	6,707.43	202.97	421.31	-408.95	7.03	6.91	10.96	
6,825.00	15.20	296.90	6,798.06	212.64	402.95	-390.06	4.97	4.95	-2.26	
6,855.00	15.90	286.00	6,826.97	215.55	395.49	-382.45	10.00	2.33	-36.33	

Company:	Extraction Oil & Gas	Local Co-ordinate Reference:	Well WAAG 23
Project:	WELD COUNTY, CO	TVD Reference:	KB @ 4892.50ft (Patterson 346)
Site:	WAAG PAD	MD Reference:	KB @ 4892.50ft (Patterson 346)
Well:	WAAG 23	North Reference:	True
Wellbore:	WAAG 23	Survey Calculation Method:	Minimum Curvature
Design:	WAAG 23	Database:	EDM 5000.1 Single User Db

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)	
6,949.00	24.30	279.40	6,915.18	222.27	363.97	-350.59	9.24	8.94	-7.02	
7,042.00	39.90	274.50	6,993.73	227.77	315.04	-301.43	16.99	16.77	-5.27	
7,136.00	48.40	268.50	7,061.14	229.22	249.70	-236.12	10.07	9.04	-6.38	
7,231.00	58.30	265.40	7,117.79	225.04	173.71	-160.49	10.74	10.42	-3.26	
7,325.00	69.70	266.00	7,158.93	218.73	89.60	-76.88	12.14	12.13	0.64	
7,420.00	82.60	268.00	7,181.62	213.96	-2.31	14.60	13.73	13.58	2.11	
LAST SVY										
7,520.00	86.80	269.30	7,190.86	211.62	-101.83	113.83	4.39	4.20	1.30	
END OF LAST SLIDE BASED OFF LAST MOTOR OUTPUT										
7,555.00	90.23	269.30	7,191.77	211.19	-136.81	148.72	9.80	9.80	0.00	
PROJ BHL										
7,760.00	90.23	269.30	7,190.94	208.69	-341.80	353.22	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,520.00	7,190.86	211.62	-101.83	LAST SVY	
7,555.00	7,191.77	211.19	-136.81	END OF LAST SLIDE BASED OFF LAST MOTOR OUTPUT	
7,760.00	7,190.94	208.69	-341.80	PROJ BHL	

Checked By: _____	Approved By: _____	Date: _____
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