



# US ROCKIES WATTENBERG PLANNING

Project: WELD-NAD83-UTMFT13N  
Site: 2N-68W-15 Keown Pad  
Well: KEOWN STATE 19N-34HZ  
Wellbore: Original Hole  
Design: Original Hole

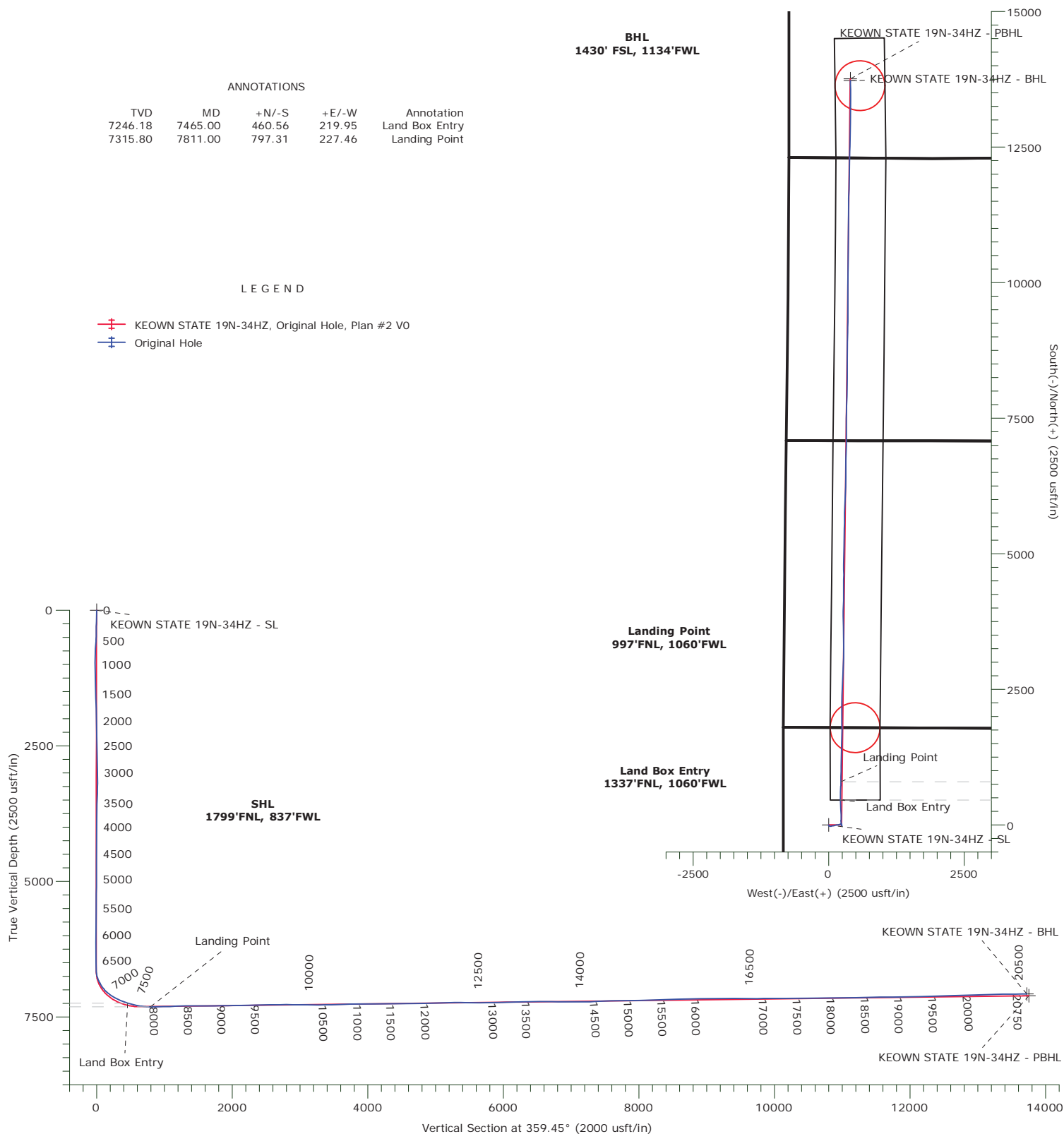


## ANNOTATIONS

TVD	MD	+N/-S	+E/-W	Annotation
7246.18	7465.00	460.56	219.95	Land Box Entry
7315.80	7811.00	797.31	227.46	Landing Point

## LEGEND

- KEOWN STATE 19N-34HZ, Original Hole, Plan #2 V0
- Original Hole



## WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
KEOWN STATE 19N-34HZ - SL	0.00	0.00	0.00	14578146.75	1641607.22	40° 8' 28.280400 N	104° 59' 44.664000 W	Point
KEOWN STATE 19N-34HZ - BHL	7077.98	13728.69	401.91	14591875.46	1642008.47	40° 10' 44.002504 N	104° 59' 39.483980 W	Point
KEOWN STATE 19N-34HZ - PBHL	7112.00	13762.23	400.00	14591909.00	1642006.56	40° 10' 44.334094 N	104° 59' 39.508590 W	Point

# **US ROCKIES WATTENBERG PLANNING**

**WELD-NAD83-UTMFT13N  
2N-68W-15 Keown Pad  
KEOWN STATE 19N-34HZ**

**Original Hole**

**Design: Original Hole**

## **Standard Survey Report**

**15 March, 2017**

# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

<b>Project</b>	WELD-NAD83-UTMFT13N		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Zone 13N (108 W to 102 W)		

<b>Site</b>	2N-68W-15 Keown Pad		
<b>Site Position:</b>		<b>Northing:</b>	14,578,109.97 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,641,581.51 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13.20 in
		<b>Latitude:</b>	40.141088°N
		<b>Longitude:</b>	104.995832°W
		<b>Grid Convergence:</b>	0.00 °

<b>Well</b>	KEOWN STATE 19N-34HZ		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 14,578,146.75 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 1,641,607.22 usft
<b>Position Uncertainty</b>	3.28 usft	<b>Wellhead Elevation:</b>	0.00 usft
		<b>Latitude:</b>	40.141189°N
		<b>Longitude:</b>	104.995740°W
		<b>Ground Level:</b>	4,872.00 usft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	8/12/2015	8.41	66.66	52,533

<b>Design</b>	Original Hole				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	359.45	

<b>Survey Program</b>	<b>Date</b>	3/15/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
210.00	20,700.00	Survey #1 (Original Hole)	APC_ISCWSA REV 2 MW	Fixed:v2:Rockies, crustal dec + 3-axis correction	
20,750.00	20,750.00	Survey #2 (Original Hole)	APC_BLIND	OWSG BLIND	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
210.00	0.88	236.47	209.99	-0.89	-1.34	-0.88	0.42	0.42	0.00	
302.00	0.97	161.06	301.98	-2.02	-1.68	-2.00	1.23	0.10	-81.97	
487.00	1.85	135.92	486.93	-5.64	0.91	-5.65	0.57	0.48	-13.59	
580.00	3.34	143.48	579.83	-8.90	3.56	-8.93	1.64	1.60	8.13	
672.00	4.48	134.34	671.61	-13.57	7.73	-13.64	1.41	1.24	-9.93	
768.00	5.54	117.11	767.25	-18.30	14.53	-18.44	1.91	1.10	-17.95	
863.00	6.68	100.41	861.72	-21.39	24.05	-21.62	2.21	1.20	-17.58	
959.00	7.21	88.28	957.02	-22.21	35.57	-22.55	1.62	0.55	-12.64	
1,055.00	7.05	81.15	1,052.28	-21.13	47.41	-21.58	0.94	-0.17	-7.43	

# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,150.00	7.15	79.32	1,146.55	-19.13	58.98	-19.70	0.26	0.11	-1.93
1,246.00	7.39	81.60	1,241.78	-17.13	70.96	-17.81	0.39	0.25	2.38
1,341.00	7.21	85.12	1,336.01	-15.73	82.94	-16.52	0.51	-0.19	3.71
1,437.00	6.16	80.55	1,431.35	-14.37	94.02	-15.27	1.23	-1.09	-4.76
1,533.00	5.28	74.40	1,526.88	-12.33	103.36	-13.33	1.12	-0.92	-6.41
1,628.00	5.28	71.59	1,621.47	-9.78	111.72	-10.85	0.27	0.00	-2.96
1,724.00	5.80	72.82	1,717.02	-6.95	120.54	-8.11	0.56	0.54	1.28
1,819.00	5.63	75.45	1,811.55	-4.36	129.64	-5.61	0.33	-0.18	2.77
1,915.00	5.45	73.69	1,907.10	-1.90	138.57	-3.23	0.26	-0.19	-1.83
2,010.00	5.28	78.62	2,001.69	0.23	147.19	-1.18	0.52	-0.18	5.19
2,106.00	5.54	80.02	2,097.26	1.91	156.08	0.41	0.30	0.27	1.46
2,201.00	5.36	81.96	2,191.83	3.32	164.99	1.74	0.27	-0.19	2.04
2,286.00	5.28	83.89	2,276.47	4.29	172.81	2.63	0.23	-0.09	2.27
2,347.00	5.90	82.94	2,337.18	4.98	178.71	3.26	1.03	1.02	-1.56
2,442.00	4.42	82.77	2,431.79	6.04	187.19	4.24	1.56	-1.56	-0.18
2,537.00	4.26	81.35	2,526.52	7.03	194.31	5.16	0.20	-0.17	-1.49
2,633.00	3.69	74.98	2,622.28	8.37	200.82	6.44	0.75	-0.59	-6.64
2,728.00	2.99	67.40	2,717.12	10.11	206.06	8.13	0.87	-0.74	-7.98
2,823.00	2.59	60.00	2,812.01	12.14	210.21	10.12	0.57	-0.42	-7.79
2,919.00	2.31	68.17	2,907.92	13.94	213.88	11.89	0.47	-0.29	8.51
3,014.00	1.84	77.56	3,002.86	14.98	217.15	12.90	0.61	-0.49	9.88
3,110.00	1.98	72.20	3,098.81	15.82	220.23	13.70	0.24	0.15	-5.58
3,205.00	2.64	83.59	3,193.73	16.57	223.97	14.41	0.84	0.69	11.99
3,301.00	2.83	119.89	3,289.63	15.63	228.22	13.44	1.78	0.20	37.81
3,396.00	2.33	107.65	3,384.53	13.88	232.09	11.65	0.78	-0.53	-12.88
3,492.00	2.36	133.86	3,480.45	11.92	235.38	9.66	1.11	0.03	27.30
3,587.00	1.88	139.05	3,575.39	9.38	237.81	7.10	0.54	-0.51	5.46
3,682.00	1.09	140.56	3,670.36	7.51	239.41	5.21	0.83	-0.83	1.59
3,778.00	0.72	165.83	3,766.34	6.22	240.13	3.91	0.56	-0.39	26.32
3,873.00	0.73	203.61	3,861.34	5.09	240.04	2.78	0.49	0.01	39.77
3,969.00	0.74	216.04	3,957.33	4.02	239.43	1.72	0.17	0.01	12.95
4,064.00	0.45	221.12	4,052.32	3.25	238.82	0.95	0.31	-0.31	5.35
4,160.00	0.30	199.94	4,148.32	2.73	238.49	0.44	0.21	-0.16	-22.06
4,255.00	0.30	245.86	4,243.32	2.39	238.18	0.10	0.25	0.00	48.34
4,351.00	0.28	207.00	4,339.32	2.08	237.84	-0.20	0.20	-0.02	-40.48
4,446.00	0.16	75.28	4,434.32	1.91	237.86	-0.38	0.43	-0.13	-138.65
4,542.00	0.23	110.41	4,530.32	1.87	238.17	-0.41	0.14	0.07	36.59
4,637.00	0.46	100.39	4,625.32	1.74	238.73	-0.55	0.25	0.24	-10.55
4,733.00	0.35	101.35	4,721.31	1.61	239.39	-0.69	0.11	-0.11	1.00
4,828.00	0.24	113.61	4,816.31	1.47	239.86	-0.83	0.13	-0.12	12.91
4,924.00	0.34	118.80	4,912.31	1.26	240.29	-1.05	0.11	0.10	5.41
5,019.00	0.34	141.20	5,007.31	0.90	240.72	-1.41	0.14	0.00	23.58
5,115.00	0.43	129.27	5,103.31	0.45	241.18	-1.87	0.13	0.09	-12.43

# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
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<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,234.00	0.45	85.66	5,222.31	0.20	241.99	-2.12	0.28	0.02	-36.65	
5,330.00	0.58	103.67	5,318.30	0.12	242.84	-2.21	0.21	0.14	18.76	
5,425.00	0.33	139.35	5,413.30	-0.20	243.48	-2.54	0.39	-0.26	37.56	
5,521.00	1.19	174.49	5,509.29	-1.41	243.76	-3.75	0.98	0.90	36.60	
5,616.00	1.08	168.91	5,604.27	-3.27	244.02	-5.61	0.16	-0.12	-5.87	
5,712.00	1.10	166.02	5,700.25	-5.05	244.42	-7.40	0.06	0.02	-3.01	
5,807.00	0.74	189.90	5,795.24	-6.54	244.53	-8.89	0.55	-0.38	25.14	
5,903.00	0.30	176.43	5,891.24	-7.40	244.44	-9.75	0.47	-0.46	-14.03	
5,998.00	0.18	238.63	5,986.24	-7.73	244.33	-10.07	0.28	-0.13	65.47	
6,094.00	0.41	275.38	6,082.24	-7.77	243.86	-10.11	0.30	0.24	38.28	
6,189.00	0.45	299.99	6,177.23	-7.55	243.20	-9.89	0.20	0.04	25.91	
6,285.00	0.41	278.45	6,273.23	-7.32	242.53	-9.64	0.17	-0.04	-22.44	
6,380.00	0.18	275.30	6,368.23	-7.25	242.05	-9.57	0.24	-0.24	-3.32	
6,475.00	0.29	17.20	6,463.23	-7.01	241.97	-9.33	0.39	0.12	107.26	
6,571.00	0.20	114.55	6,559.23	-6.85	242.20	-9.17	0.39	-0.09	101.41	
6,666.00	4.21	342.84	6,654.15	-3.58	241.32	-5.90	4.57	4.22	-138.64	
6,762.00	12.44	345.36	6,749.05	9.81	237.66	7.53	8.58	8.57	2.63	
6,857.00	20.86	348.49	6,839.99	36.34	231.69	34.11	8.91	8.86	3.29	
6,953.00	27.23	2.60	6,927.69	75.10	229.27	72.89	8.90	6.64	14.70	
7,048.00	35.87	4.27	7,008.57	124.66	232.33	122.42	9.14	9.09	1.76	
7,144.00	47.87	358.12	7,079.95	188.55	233.26	186.30	13.20	12.50	-6.41	
7,239.00	53.86	356.82	7,139.89	262.12	229.97	259.90	6.39	6.31	-1.37	
7,334.00	61.10	355.81	7,190.93	342.01	224.80	339.83	7.67	7.62	-1.06	
7,430.00	66.95	358.68	7,232.96	428.16	220.71	426.02	6.66	6.09	2.99	
7,465.00	68.68	358.65	7,246.18	460.56	219.95	458.43	4.94	4.94	-0.10	
Land Box Entry										
7,525.00	71.64	358.59	7,266.54	516.98	218.59	514.85	4.94	4.94	-0.09	
7,620.00	77.11	2.60	7,292.13	608.40	219.58	606.27	7.05	5.76	4.22	
7,716.00	81.96	2.82	7,309.56	702.67	224.05	700.49	5.06	5.05	0.23	
7,811.00	90.50	1.32	7,315.80	797.31	227.46	795.09	9.13	8.99	-1.58	
Landing Point										
7,907.00	90.90	1.13	7,314.63	893.29	229.51	891.04	0.46	0.42	-0.20	
8,003.00	92.02	1.11	7,312.18	989.23	231.39	986.97	1.17	1.17	-0.02	
8,098.00	93.25	0.40	7,307.81	1,084.12	232.64	1,081.84	1.49	1.29	-0.75	
8,193.00	92.52	1.06	7,303.03	1,178.99	233.85	1,176.69	1.04	-0.77	0.69	
8,289.00	91.79	0.89	7,299.42	1,274.91	235.48	1,272.59	0.78	-0.76	-0.18	
8,384.00	89.44	2.21	7,298.40	1,369.86	238.05	1,367.51	2.84	-2.47	1.39	
8,479.00	89.78	1.78	7,299.05	1,464.80	241.36	1,462.42	0.58	0.36	-0.45	
8,575.00	91.51	1.67	7,297.97	1,560.75	244.25	1,558.33	1.81	1.80	-0.11	
8,670.00	90.11	1.14	7,296.63	1,655.71	246.58	1,653.27	1.58	-1.47	-0.56	
8,765.00	90.56	0.30	7,296.07	1,750.70	247.77	1,748.24	1.00	0.47	-0.88	
8,861.00	90.95	359.21	7,294.81	1,846.69	247.36	1,844.23	1.21	0.41	-1.14	
8,956.00	91.51	358.27	7,292.77	1,941.64	245.27	1,939.20	1.15	0.59	-0.99	
9,052.00	90.78	359.53	7,290.85	2,037.60	243.43	2,035.17	1.52	-0.76	1.31	

# Precision Drilling Corporation

## Survey Report

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<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,148.00	91.23	0.97	7,289.16	2,133.58	243.85	2,131.14	1.57	0.47	1.50
9,243.00	91.74	0.15	7,286.70	2,228.55	244.78	2,226.09	1.02	0.54	-0.86
9,338.00	91.85	1.41	7,283.73	2,323.49	246.07	2,321.02	1.33	0.12	1.33
9,434.00	91.12	1.77	7,281.24	2,419.42	248.73	2,416.92	0.85	-0.76	0.38
9,530.00	90.62	3.43	7,279.78	2,515.30	253.09	2,512.76	1.81	-0.52	1.73
9,625.00	91.12	2.68	7,278.34	2,610.16	258.15	2,607.56	0.95	0.53	-0.79
9,721.00	91.79	1.73	7,275.90	2,706.05	261.84	2,703.42	1.21	0.70	-0.99
9,816.00	89.50	2.72	7,274.83	2,800.97	265.53	2,798.29	2.63	-2.41	1.04
9,912.00	89.94	2.00	7,275.30	2,896.89	269.48	2,894.17	0.88	0.46	-0.75
10,007.00	88.93	1.93	7,276.24	2,991.82	272.74	2,989.07	1.07	-1.06	-0.07
10,102.00	88.15	2.13	7,278.66	3,086.73	276.10	3,083.94	0.85	-0.82	0.21
10,198.00	89.22	0.64	7,280.86	3,182.68	278.42	3,179.86	1.91	1.11	-1.55
10,293.00	91.35	0.13	7,280.39	3,277.67	279.06	3,274.84	2.31	2.24	-0.54
10,389.00	91.35	359.77	7,278.13	3,373.64	278.98	3,370.81	0.37	0.00	-0.38
10,484.00	91.40	359.22	7,275.85	3,468.61	278.14	3,465.78	0.58	0.05	-0.58
10,580.00	91.57	358.70	7,273.36	3,564.56	276.40	3,561.74	0.57	0.18	-0.54
10,675.00	92.64	357.87	7,269.87	3,659.45	273.56	3,656.66	1.43	1.13	-0.87
10,771.00	93.47	359.12	7,264.75	3,755.28	271.04	3,752.50	1.56	0.86	1.30
10,866.00	91.85	0.22	7,260.34	3,850.17	270.49	3,847.40	2.06	-1.71	1.16
10,962.00	90.17	1.81	7,258.65	3,946.13	272.19	3,943.34	2.41	-1.75	1.66
11,057.00	89.94	1.45	7,258.56	4,041.09	274.90	4,038.27	0.45	-0.24	-0.38
11,153.00	89.94	1.05	7,258.66	4,137.07	276.99	4,134.22	0.42	0.00	-0.42
11,248.00	89.72	0.64	7,258.94	4,232.06	278.39	4,229.19	0.49	-0.23	-0.43
11,344.00	89.72	0.42	7,259.41	4,328.06	279.28	4,325.17	0.23	0.00	-0.23
11,439.00	89.55	359.92	7,260.02	4,423.05	279.56	4,420.17	0.56	-0.18	-0.53
11,535.00	91.68	0.59	7,258.99	4,519.04	279.99	4,516.14	2.33	2.22	0.70
11,630.00	91.57	359.75	7,256.29	4,614.00	280.27	4,611.10	0.89	-0.12	-0.88
11,726.00	91.35	359.37	7,253.85	4,709.97	279.53	4,707.07	0.46	-0.23	-0.40
11,821.00	92.07	0.90	7,251.01	4,804.92	279.76	4,802.01	1.78	0.76	1.61
11,917.00	91.85	0.30	7,247.73	4,900.86	280.76	4,897.94	0.67	-0.23	-0.63
12,012.00	92.24	1.81	7,244.34	4,995.78	282.51	4,992.84	1.64	0.41	1.59
12,108.00	91.91	0.80	7,240.86	5,091.69	284.69	5,088.72	1.11	-0.34	-1.05
12,203.00	91.51	0.52	7,238.03	5,186.64	285.79	5,183.66	0.51	-0.42	-0.29
12,299.00	90.00	1.61	7,236.76	5,282.61	287.57	5,279.61	1.94	-1.57	1.14
12,394.00	89.83	1.07	7,236.90	5,377.58	289.79	5,374.56	0.60	-0.18	-0.57
12,490.00	89.61	1.19	7,237.37	5,473.57	291.69	5,470.51	0.26	-0.23	0.13
12,585.00	89.50	0.73	7,238.11	5,568.55	293.28	5,565.48	0.50	-0.12	-0.48
12,681.00	89.10	0.41	7,239.28	5,664.54	294.23	5,661.45	0.53	-0.42	-0.33
12,776.00	90.28	1.59	7,239.80	5,759.52	295.89	5,756.41	1.76	1.24	1.24
12,872.00	92.41	2.53	7,237.54	5,855.42	299.34	5,852.28	2.43	2.22	0.98
12,967.00	92.02	2.57	7,233.87	5,950.26	303.56	5,947.07	0.41	-0.41	0.04
13,063.00	91.85	2.32	7,230.63	6,046.11	307.66	6,042.88	0.31	-0.18	-0.26
13,158.00	91.74	2.31	7,227.65	6,140.99	311.49	6,137.72	0.12	-0.12	-0.01

# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,254.00	91.85	1.36	7,224.65	6,236.89	314.57	6,233.59	1.00	0.11	-0.99
13,349.00	91.40	0.97	7,221.95	6,331.83	316.50	6,328.51	0.63	-0.47	-0.41
13,445.00	91.06	0.38	7,219.89	6,427.81	317.63	6,424.46	0.71	-0.35	-0.61
13,540.00	91.12	0.05	7,218.09	6,522.79	317.98	6,519.43	0.35	0.06	-0.35
13,636.00	88.94	0.83	7,218.04	6,618.78	318.72	6,615.41	2.41	-2.27	0.81
13,731.00	89.05	0.61	7,219.70	6,713.76	319.91	6,710.38	0.26	0.12	-0.23
13,827.00	89.22	0.73	7,221.15	6,809.74	321.04	6,806.34	0.22	0.18	0.13
13,922.00	89.16	1.99	7,222.49	6,904.70	323.29	6,901.28	1.33	-0.06	1.33
14,018.00	88.88	1.35	7,224.14	7,000.64	326.09	6,997.19	0.73	-0.29	-0.67
14,113.00	90.78	0.29	7,224.42	7,095.63	327.45	7,092.16	2.29	2.00	-1.12
14,254.00	91.06	359.01	7,222.15	7,236.61	326.59	7,233.14	0.93	0.20	-0.91
14,301.00	91.96	359.54	7,220.92	7,283.58	325.99	7,280.12	2.22	1.91	1.13
14,394.00	93.31	0.14	7,216.64	7,376.48	325.73	7,373.02	1.59	1.45	0.65
14,486.00	93.37	1.40	7,211.28	7,468.32	326.97	7,464.83	1.37	0.07	1.37
14,579.00	91.46	1.30	7,207.36	7,561.20	329.16	7,557.70	2.06	-2.05	-0.11
14,671.00	91.85	0.47	7,204.70	7,653.15	330.58	7,649.63	1.00	0.42	-0.90
14,717.00	91.96	0.67	7,203.17	7,699.13	331.03	7,695.59	0.50	0.24	0.43
14,764.00	91.18	2.89	7,201.89	7,746.08	332.49	7,742.53	5.00	-1.66	4.72
14,812.00	91.01	2.96	7,200.97	7,794.01	334.94	7,790.44	0.38	-0.35	0.15
14,860.00	90.84	2.83	7,200.19	7,841.94	337.37	7,838.34	0.45	-0.35	-0.27
14,908.00	90.28	1.86	7,199.73	7,889.90	339.33	7,886.28	2.33	-1.17	-2.02
14,955.00	91.01	0.89	7,199.20	7,936.88	340.46	7,933.25	2.58	1.55	-2.06
15,003.00	92.18	1.25	7,197.86	7,984.85	341.35	7,981.21	2.55	2.44	0.75
15,051.00	92.02	1.08	7,196.10	8,032.81	342.33	8,029.16	0.49	-0.33	-0.35
15,099.00	91.96	0.90	7,194.43	8,080.78	343.16	8,077.11	0.40	-0.13	-0.38
15,146.00	92.19	0.37	7,192.73	8,127.74	343.68	8,124.07	1.23	0.49	-1.13
15,194.00	92.13	0.12	7,190.92	8,175.71	343.88	8,172.03	0.54	-0.13	-0.52
15,242.00	92.13	0.04	7,189.14	8,223.67	343.95	8,219.99	0.17	0.00	-0.17
15,337.00	92.52	359.55	7,185.29	8,318.60	343.61	8,314.91	0.66	0.41	-0.52
15,432.00	93.03	1.10	7,180.69	8,413.48	344.15	8,409.79	1.72	0.54	1.63
15,528.00	91.34	0.65	7,177.03	8,509.39	345.61	8,505.69	1.82	-1.76	-0.47
15,623.00	91.85	0.50	7,174.38	8,604.35	346.57	8,600.63	0.56	0.54	-0.16
15,719.00	90.84	0.22	7,172.13	8,700.32	347.17	8,696.59	1.09	-1.05	-0.29
15,814.00	91.91	359.95	7,169.85	8,795.29	347.31	8,791.56	1.16	1.13	-0.28
15,909.00	91.40	1.09	7,167.11	8,890.25	348.17	8,886.50	1.31	-0.54	1.20
16,005.00	91.51	1.26	7,164.67	8,986.20	350.14	8,982.42	0.21	0.11	0.18
16,100.00	90.62	1.70	7,162.90	9,081.15	352.59	9,077.35	1.05	-0.94	0.46
16,196.00	90.90	0.93	7,161.63	9,177.11	354.80	9,173.29	0.85	0.29	-0.80
16,291.00	90.45	1.25	7,160.51	9,272.09	356.60	9,268.24	0.58	-0.47	0.34
16,387.00	88.43	0.62	7,161.45	9,368.07	358.17	9,364.20	2.20	-2.10	-0.66
16,482.00	88.49	359.83	7,164.00	9,463.03	358.54	9,459.15	0.83	0.06	-0.83
16,577.00	88.99	359.87	7,166.09	9,558.01	358.29	9,554.13	0.53	0.53	0.04
16,673.00	90.62	359.43	7,166.42	9,654.00	357.71	9,650.12	1.76	1.70	-0.46

# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,768.00	91.57	358.94	7,164.60	9,748.97	356.36	9,745.10	1.13	1.00	-0.52
16,864.00	91.51	0.47	7,162.02	9,844.93	355.86	9,841.06	1.59	-0.06	1.59
16,959.00	91.94	0.06	7,159.16	9,939.89	356.30	9,936.01	0.63	0.45	-0.43
17,054.00	89.83	1.00	7,157.69	10,034.87	357.18	10,030.98	2.43	-2.22	0.99
17,150.00	89.89	1.09	7,157.93	10,130.85	358.93	10,126.94	0.11	0.06	0.09
17,245.00	89.83	0.81	7,158.16	10,225.84	360.51	10,221.91	0.30	-0.06	-0.29
17,341.00	90.00	0.62	7,158.30	10,321.83	361.70	10,317.88	0.27	0.18	-0.20
17,436.00	90.73	0.15	7,157.70	10,416.83	362.34	10,412.87	0.91	0.77	-0.49
17,532.00	91.29	0.03	7,156.01	10,512.81	362.49	10,508.85	0.60	0.58	-0.13
17,627.00	91.74	359.71	7,153.49	10,607.78	362.28	10,603.81	0.58	0.47	-0.34
17,723.00	89.38	359.34	7,152.56	10,703.76	361.48	10,699.80	2.49	-2.46	-0.39
17,818.00	90.00	1.94	7,153.07	10,798.75	362.54	10,794.77	2.81	0.65	2.74
17,913.00	90.50	1.63	7,152.66	10,893.70	365.50	10,889.69	0.62	0.53	-0.33
18,009.00	90.56	1.43	7,151.77	10,989.66	368.07	10,985.62	0.22	0.06	-0.21
18,104.00	91.01	0.89	7,150.47	11,084.63	369.99	11,080.57	0.74	0.47	-0.57
18,200.00	91.79	0.32	7,148.12	11,180.60	371.00	11,176.52	1.01	0.81	-0.59
18,295.00	92.24	0.04	7,144.78	11,275.54	371.30	11,271.45	0.56	0.47	-0.29
18,391.00	92.80	359.55	7,140.56	11,371.44	370.96	11,367.36	0.77	0.58	-0.51
18,486.00	91.40	359.95	7,137.08	11,466.38	370.54	11,462.29	1.53	-1.47	0.42
18,582.00	91.06	1.53	7,135.02	11,562.34	371.78	11,558.24	1.68	-0.35	1.65
18,677.00	90.67	1.93	7,133.58	11,657.29	374.65	11,653.15	0.59	-0.41	0.42
18,773.00	90.00	2.50	7,133.02	11,753.21	378.36	11,749.04	0.92	-0.70	0.59
18,868.00	90.56	1.31	7,132.56	11,848.16	381.52	11,843.95	1.38	0.59	-1.25
18,964.00	90.56	0.86	7,131.62	11,944.14	383.34	11,939.91	0.47	0.00	-0.47
19,059.00	91.46	0.58	7,129.94	12,039.11	384.53	12,034.87	0.99	0.95	-0.29
19,155.00	92.24	0.47	7,126.85	12,135.06	385.41	12,130.80	0.82	0.81	-0.11
19,250.00	92.19	1.67	7,123.17	12,229.97	387.18	12,225.69	1.26	-0.05	1.26
19,441.00	91.74	0.71	7,116.62	12,420.81	391.15	12,416.48	0.55	-0.24	-0.50
19,537.00	91.01	1.24	7,114.32	12,516.77	392.78	12,512.42	0.94	-0.76	0.55
19,632.00	91.57	2.04	7,112.18	12,611.70	395.50	12,607.33	1.03	0.59	0.84
19,727.00	91.85	1.10	7,109.35	12,706.63	398.10	12,702.22	1.03	0.29	-0.99
19,823.00	92.69	0.84	7,105.54	12,802.54	399.72	12,798.11	0.92	0.88	-0.27
19,918.00	93.36	0.82	7,100.53	12,897.39	401.10	12,892.95	0.71	0.71	-0.02
20,014.00	94.04	0.68	7,094.34	12,993.18	402.35	12,988.72	0.72	0.71	-0.15
20,109.00	93.36	0.83	7,088.21	13,087.98	403.60	13,083.50	0.73	-0.72	0.16
20,205.00	91.96	1.34	7,083.75	13,183.85	405.42	13,179.35	1.55	-1.46	0.53
20,300.00	90.95	1.35	7,081.34	13,278.80	407.65	13,274.27	1.06	-1.06	0.01
20,396.00	89.50	359.60	7,080.96	13,374.79	408.44	13,370.25	2.37	-1.51	-1.82
20,492.00	89.89	358.99	7,081.47	13,470.78	407.26	13,466.25	0.75	0.41	-0.64
20,587.00	90.56	358.93	7,081.10	13,565.76	405.54	13,561.24	0.71	0.71	-0.06
20,682.00	91.29	358.62	7,079.57	13,660.72	403.50	13,656.22	0.83	0.77	-0.33
20,700.00	91.34	358.66	7,079.15	13,678.71	403.08	13,674.22	0.36	0.28	0.22
20,750.00	91.34	358.66	7,077.98	13,728.69	401.91	13,724.20	0.00	0.00	0.00



# Precision Drilling Corporation

## Survey Report

<b>Company:</b>	US ROCKIES WATTENBERG PLANNING	<b>Local Co-ordinate Reference:</b>	Well KEOWN STATE 19N-34HZ
<b>Project:</b>	WELD-NAD83-UTMFT13N	<b>TVD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Site:</b>	2N-68W-15 Keown Pad	<b>MD Reference:</b>	4872'GL+30'KB @ 4902.00usft (SD 105)
<b>Well:</b>	KEOWN STATE 19N-34HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Original Hole	<b>Database:</b>	Local2

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
KEOWN STATE 19N-	0.00	0.00	0.00	0.00	0.00	14,578,146.75	1,641,607.22	40.141189°N	104.995740°W
- actual wellpath hits target center									
- Point									
KEOWN STATE 19N-	0.00	0.00	7,077.98	13,728.69	401.91	14,591,875.46	1,642,008.47	40.178890°N	104.994301°W
- actual wellpath hits target center									
- Point									
KEOWN STATE 19N-	0.00	0.00	7,112.00	13,762.23	400.00	14,591,909.00	1,642,006.56	40.178982°N	104.994308°W
- actual wellpath misses target center by 47.81usft at 20750.00usft MD (7077.98 TVD, 13728.69 N, 401.91 E)									
- Point									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
7,465.00	7,246.18	460.56	219.95	Land Box Entry
7,811.00	7,315.80	797.31	227.46	Landing Point

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