

CRESTONE PEAK RESOURCES

ARAPAHOE COUNTY

SEC 30-T4S-R64W

WATKINS 4-64 30-29 3BH

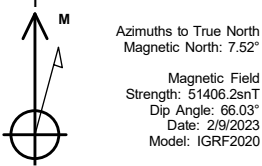
OWB

Plan: PROPOSAL 1

Standard Planning Report

10 February, 2023

Project: ARAPAHOE COUNTY
Site: SEC 30-T4S-R64W
Well: WATKINS 4-64 30-29 3BH
Wellbore: OWB
Design: PROPOSAL 1



WELL DETAILS: WATKINS 4-64 30-29 3BH						
			5767.00			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1671417.59	3252836.75	39.673408°N	104.601774°W	

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	Start Build 2.00	
1103.92	8.08	237.38	1102.58	-15.32	-23.94	-22.76	28.43	Start 5977.78 hold at 1103.92 MD	
7081.70	8.08	237.38	7021.05	-468.11	-731.51	-695.41	868.47	Start DLS 10.00 TFO -146.02	
8048.83	90.00	91.10	7659.00	-529.27	-163.55	-124.51	1454.95	Start 10029.76 hold at 8048.83 MD	
18078.58	90.00	91.10	7659.00	-721.52	9864.36	9890.71	11484.71	TD at 18078.58	

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00
3	1103.92	8.08	237.38	1102.58	-15.32	-23.94	2.00	237.38	-22.76
4	7081.70	8.08	237.38	7021.05	-468.11	-731.51	0.00	0.00	-695.41
5	8048.83	90.00	91.10	7659.00	-529.27	-163.55	10.00	-146.02	-124.51
6	18078.58	90.00	91.10	7659.00	-721.52	9864.36	0.00	0.00	9890.71

		Target	
		LP-WATKINS 4-64 3BH	
		PBHL-WATKINS 4-64 3BH	

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
LP-WATKINS 4-64 3BH	7659.00	-529.27	-163.55	1670886.74	3252678.45	39.671955°N	104.602355°W	Point	
- plan hits target center									
PBHL-WATKINS 4-64 3BH	7659.00	-721.52	9864.36	1670793.65	3262707.63	39.671422°N	104.566732°W	Point	
- plan hits target center									

PROJECT DETAILS: ARAPAHOE COUNTY

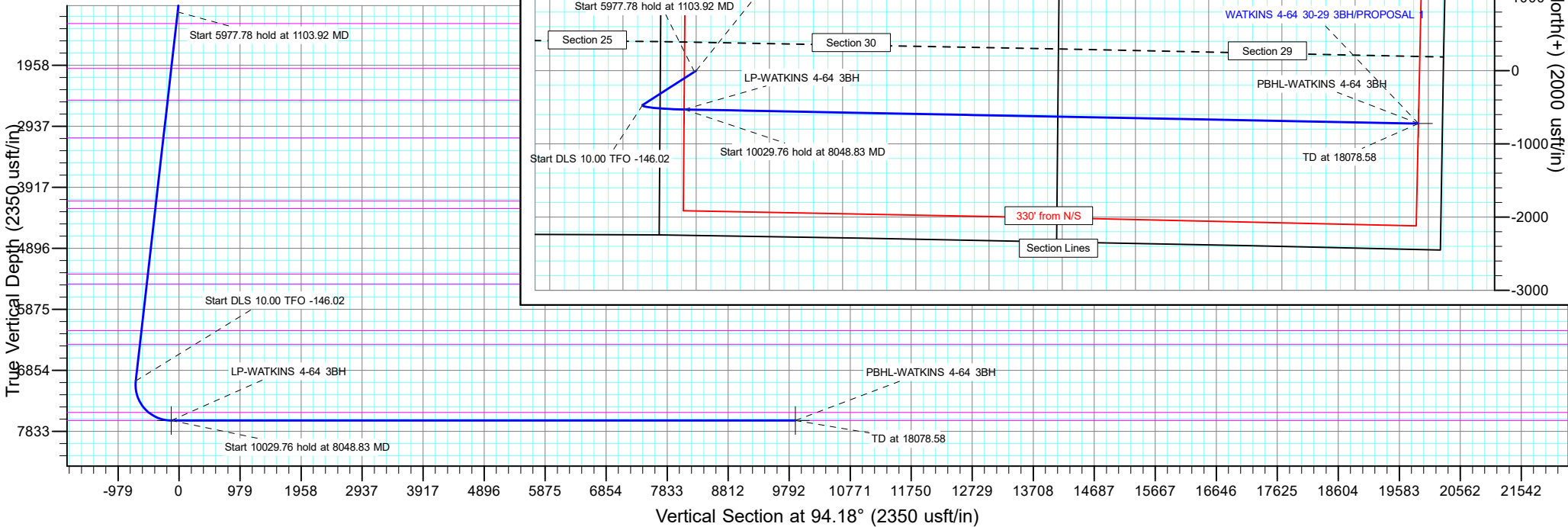
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone

System Datum: Mean Sea Level

SHL:
2252' FSL, 490' FWL
Sec 30-T4S-R64W

LP:
1720' FSL, 330' FWL
Sec 30-T4S-R64W

BHL:
1720' FSL, 330' FEL
Sec 29-T4S-R64W



Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Project	ARAPAHOE COUNTY		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		Using geodetic scale factor

Site		SEC 30-T4S-R64W			
Site Position:		Northing:	1,669,168.52 usft	Latitude:	39.667247°N
From:	Lat/Long	Easting:	3,252,354.22 usft	Longitude:	104.603567°W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence:	0.57 °

Well	WATKINS 4-64 30-29 3BH					
Well Position	+N/-S	2,244.24 usft	Northing:	1,671,417.59 usft	Latitude:	39.673408°N
	+E/-W	504.72 usft	Easting:	3,252,836.76 usft	Longitude:	104.601774°W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	5,767.00 usft

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	2/9/2023	7.52	66.03	51,406.23078312

Design	PROPOSAL 1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	94.18

Plan Survey Tool Program	Date	2/10/2023		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	18,078.58	PROPOSAL 1 (OWB)	MWD OWSG
				OWSG MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,103.92	8.08	237.38	1,102.58	-15.32	-23.94	2.00	2.00	0.00	237.38	
7,081.70	8.08	237.38	7,021.05	-468.11	-731.51	0.00	0.00	0.00	0.00	
8,048.83	90.00	91.10	7,659.00	-529.27	-163.55	10.00	8.47	-15.13	-146.02	LP-WATKINS 4-64 3E
18,078.58	90.00	91.10	7,659.00	-721.52	9,864.36	0.00	0.00	0.00	0.00	PBHL-WATKINS 4-64

Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24.00	0.00	0.00	24.00	0.00	0.00	0.00	0.00	0.00	0.00
Denver									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
689.00	0.00	0.00	689.00	0.00	0.00	0.00	0.00	0.00	0.00
Arapahoe									
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
800.00	2.00	237.38	799.98	-0.94	-1.47	-1.40	2.00	2.00	0.00
900.00	4.00	237.38	899.84	-3.76	-5.88	-5.59	2.00	2.00	0.00
1,000.00	6.00	237.38	999.45	-8.46	-13.22	-12.57	2.00	2.00	0.00
1,103.92	8.08	237.38	1,102.58	-15.32	-23.94	-22.76	2.00	2.00	0.00
Start 5977.78 hold at 1103.92 MD									
1,200.00	8.08	237.38	1,197.71	-22.60	-35.32	-33.57	0.00	0.00	0.00
1,292.21	8.08	237.38	1,289.00	-29.58	-46.23	-43.95	0.00	0.00	0.00
Laramie-Fox Hills Formation									
1,300.00	8.08	237.38	1,296.72	-30.18	-47.15	-44.83	0.00	0.00	0.00
1,400.00	8.08	237.38	1,395.73	-37.75	-58.99	-56.08	0.00	0.00	0.00
1,500.00	8.08	237.38	1,494.73	-45.32	-70.83	-67.33	0.00	0.00	0.00
1,600.00	8.08	237.38	1,593.74	-52.90	-82.66	-78.58	0.00	0.00	0.00
1,700.00	8.08	237.38	1,692.75	-60.47	-94.50	-89.84	0.00	0.00	0.00
1,800.00	8.08	237.38	1,791.76	-68.05	-106.34	-101.09	0.00	0.00	0.00
1,900.00	8.08	237.38	1,890.76	-75.62	-118.17	-112.34	0.00	0.00	0.00
2,000.00	8.08	237.38	1,989.77	-83.20	-130.01	-123.60	0.00	0.00	0.00
2,019.42	8.08	237.38	2,009.00	-84.67	-132.31	-125.78	0.00	0.00	0.00
Pierre Formation									
2,100.00	8.08	237.38	2,088.78	-90.77	-141.85	-134.85	0.00	0.00	0.00
2,200.00	8.08	237.38	2,187.79	-98.35	-153.68	-146.10	0.00	0.00	0.00
2,300.00	8.08	237.38	2,286.79	-105.92	-165.52	-157.35	0.00	0.00	0.00
2,400.00	8.08	237.38	2,385.80	-113.49	-177.36	-168.61	0.00	0.00	0.00
2,500.00	8.08	237.38	2,484.81	-121.07	-189.19	-179.86	0.00	0.00	0.00
2,534.53	8.08	237.38	2,519.00	-123.69	-193.28	-183.74	0.00	0.00	0.00
Upper Pierre aquifer									
2,600.00	8.08	237.38	2,583.82	-128.64	-201.03	-191.11	0.00	0.00	0.00
2,700.00	8.08	237.38	2,682.82	-136.22	-212.87	-202.36	0.00	0.00	0.00
2,800.00	8.08	237.38	2,781.83	-143.79	-224.70	-213.62	0.00	0.00	0.00
2,900.00	8.08	237.38	2,880.84	-151.37	-236.54	-224.87	0.00	0.00	0.00
3,000.00	8.08	237.38	2,979.85	-158.94	-248.38	-236.12	0.00	0.00	0.00
3,100.00	8.08	237.38	3,078.86	-166.52	-260.21	-247.37	0.00	0.00	0.00
3,145.60	8.08	237.38	3,124.00	-169.97	-265.61	-252.50	0.00	0.00	0.00
Base of Upper Pierre aquifer									
3,200.00	8.08	237.38	3,177.86	-174.09	-272.05	-258.63	0.00	0.00	0.00
3,300.00	8.08	237.38	3,276.87	-181.67	-283.89	-269.88	0.00	0.00	0.00
3,400.00	8.08	237.38	3,375.88	-189.24	-295.72	-281.13	0.00	0.00	0.00
3,500.00	8.08	237.38	3,474.89	-196.81	-307.56	-292.38	0.00	0.00	0.00
3,600.00	8.08	237.38	3,573.89	-204.39	-319.40	-303.64	0.00	0.00	0.00
3,700.00	8.08	237.38	3,672.90	-211.96	-331.23	-314.89	0.00	0.00	0.00
3,800.00	8.08	237.38	3,771.91	-219.54	-343.07	-326.14	0.00	0.00	0.00

Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
3,900.00	8.08	237.38	3,870.92	-227.11	-354.91	-337.39	0.00	0.00	0.00	
4,000.00	8.08	237.38	3,969.92	-234.69	-366.74	-348.65	0.00	0.00	0.00	
4,100.00	8.08	237.38	4,068.93	-242.26	-378.58	-359.90	0.00	0.00	0.00	
4,170.77	8.08	237.38	4,139.00	-247.62	-386.96	-367.86	0.00	0.00	0.00	
Larimer ("Parkman") sandstone										
4,200.00	8.08	237.38	4,167.94	-249.84	-390.42	-371.15	0.00	0.00	0.00	
4,291.97	8.08	237.38	4,259.00	-256.80	-401.30	-381.50	0.00	0.00	0.00	
Pierre Formation										
4,300.00	8.08	237.38	4,266.95	-257.41	-402.25	-382.40	0.00	0.00	0.00	
4,400.00	8.08	237.38	4,365.96	-264.99	-414.09	-393.66	0.00	0.00	0.00	
4,500.00	8.08	237.38	4,464.96	-272.56	-425.93	-404.91	0.00	0.00	0.00	
4,600.00	8.08	237.38	4,563.97	-280.13	-437.76	-416.16	0.00	0.00	0.00	
4,700.00	8.08	237.38	4,662.98	-287.71	-449.60	-427.41	0.00	0.00	0.00	
4,800.00	8.08	237.38	4,761.99	-295.28	-461.44	-438.67	0.00	0.00	0.00	
4,900.00	8.08	237.38	4,860.99	-302.86	-473.27	-449.92	0.00	0.00	0.00	
5,000.00	8.08	237.38	4,960.00	-310.43	-485.11	-461.17	0.00	0.00	0.00	
5,100.00	8.08	237.38	5,059.01	-318.01	-496.95	-472.42	0.00	0.00	0.00	
5,200.00	8.08	237.38	5,158.02	-325.58	-508.78	-483.68	0.00	0.00	0.00	
5,300.00	8.08	237.38	5,257.02	-333.16	-520.62	-494.93	0.00	0.00	0.00	
5,352.50	8.08	237.38	5,309.00	-337.13	-526.83	-500.84	0.00	0.00	0.00	
Terry ("Sussex") sandstone										
5,400.00	8.08	237.38	5,356.03	-340.73	-532.46	-506.18	0.00	0.00	0.00	
5,500.00	8.08	237.38	5,455.04	-348.31	-544.29	-517.43	0.00	0.00	0.00	
5,514.10	8.08	237.38	5,469.00	-349.37	-545.96	-519.02	0.00	0.00	0.00	
Pierre Formation										
5,600.00	8.08	237.38	5,554.05	-355.88	-556.13	-528.69	0.00	0.00	0.00	
5,700.00	8.08	237.38	5,653.06	-363.45	-567.97	-539.94	0.00	0.00	0.00	
5,800.00	8.08	237.38	5,752.06	-371.03	-579.80	-551.19	0.00	0.00	0.00	
5,900.00	8.08	237.38	5,851.07	-378.60	-591.64	-562.44	0.00	0.00	0.00	
6,000.00	8.08	237.38	5,950.08	-386.18	-603.48	-573.70	0.00	0.00	0.00	
6,100.00	8.08	237.38	6,049.09	-393.75	-615.31	-584.95	0.00	0.00	0.00	
6,200.00	8.08	237.38	6,148.09	-401.33	-627.15	-596.20	0.00	0.00	0.00	
6,271.62	8.08	237.38	6,219.00	-406.75	-635.63	-604.26	0.00	0.00	0.00	
Hygiene ("Shannon") sandstone										
6,300.00	8.08	237.38	6,247.10	-408.90	-638.98	-607.45	0.00	0.00	0.00	
6,400.00	8.08	237.38	6,346.11	-416.48	-650.82	-618.71	0.00	0.00	0.00	
6,493.82	8.08	237.38	6,439.00	-423.58	-661.93	-629.26	0.00	0.00	0.00	
Pierre Formation										
6,500.00	8.08	237.38	6,445.12	-424.05	-662.66	-629.96	0.00	0.00	0.00	
6,600.00	8.08	237.38	6,544.12	-431.62	-674.49	-641.21	0.00	0.00	0.00	
6,700.00	8.08	237.38	6,643.13	-439.20	-686.33	-652.46	0.00	0.00	0.00	
6,800.00	8.08	237.38	6,742.14	-446.77	-698.17	-663.72	0.00	0.00	0.00	
6,900.00	8.08	237.38	6,841.15	-454.35	-710.00	-674.97	0.00	0.00	0.00	
7,000.00	8.08	237.38	6,940.16	-461.92	-721.84	-686.22	0.00	0.00	0.00	
7,081.70	8.08	237.38	7,021.05	-468.11	-731.51	-695.41	0.00	0.00	0.00	
Start DLS 10.00 TFO -146.02										
7,100.00	6.64	228.50	7,039.19	-469.51	-733.39	-697.18	10.00	-7.86	-48.52	
7,150.00	4.51	179.61	7,088.98	-473.39	-735.54	-699.05	10.00	-4.27	-97.79	
7,200.00	6.81	132.35	7,138.76	-477.35	-733.33	-696.56	10.00	4.61	-94.51	
7,250.00	11.07	114.86	7,188.15	-481.37	-726.78	-689.73	10.00	8.50	-34.99	
7,300.00	15.76	107.31	7,236.77	-485.41	-715.94	-678.62	10.00	9.39	-15.09	
7,350.00	20.59	103.20	7,284.27	-489.44	-700.89	-663.32	10.00	9.67	-8.22	
7,400.00	25.49	100.61	7,330.27	-493.43	-681.74	-643.93	10.00	9.79	-5.18	

Planning Report

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Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
7,450.00	30.42	98.81	7,374.42	-497.35	-658.64	-620.60	10.00	9.86	-3.60	
7,500.00	35.37	97.47	7,416.39	-501.18	-631.76	-593.52	10.00	9.89	-2.68	
7,550.00	40.33	96.42	7,455.86	-504.87	-601.32	-562.89	10.00	9.92	-2.09	
7,600.00	45.29	95.57	7,492.53	-508.41	-567.54	-528.94	10.00	9.93	-1.71	
7,650.00	50.26	94.85	7,526.12	-511.76	-530.67	-491.93	10.00	9.94	-1.44	
7,654.53	50.72	94.79	7,529.00	-512.05	-527.19	-488.43	10.00	9.95	-1.32	
Sharon Springs Member										
7,700.00	55.24	94.23	7,556.37	-514.90	-491.01	-452.14	10.00	9.95	-1.23	
7,750.00	60.22	93.68	7,583.06	-517.82	-448.85	-409.88	10.00	9.96	-1.10	
7,800.00	65.20	93.18	7,605.98	-520.47	-404.51	-365.46	10.00	9.96	-1.00	
7,850.00	70.18	92.73	7,624.95	-522.85	-358.32	-319.23	10.00	9.96	-0.92	
7,900.00	75.16	92.29	7,639.84	-524.94	-310.65	-271.53	10.00	9.97	-0.86	
7,950.00	80.15	91.88	7,650.52	-526.72	-261.86	-222.74	10.00	9.97	-0.82	
8,000.00	85.13	91.48	7,656.93	-528.17	-212.31	-173.21	10.00	9.97	-0.80	
8,048.83	90.00	91.10	7,659.00	-529.27	-163.55	-124.51	10.00	9.97	-0.79	
Start 10029.76 hold at 8048.83 MD - Niobrara Formation										
8,100.00	90.00	91.10	7,659.00	-530.25	-112.39	-73.41	0.00	0.00	0.00	
8,200.00	90.00	91.10	7,659.00	-532.17	-12.41	26.45	0.00	0.00	0.00	
8,300.00	90.00	91.10	7,659.00	-534.08	87.58	126.30	0.00	0.00	0.00	
8,400.00	90.00	91.10	7,659.00	-536.00	187.56	226.16	0.00	0.00	0.00	
8,500.00	90.00	91.10	7,659.00	-537.92	287.54	326.01	0.00	0.00	0.00	
8,600.00	90.00	91.10	7,659.00	-539.83	387.52	425.87	0.00	0.00	0.00	
8,700.00	90.00	91.10	7,659.00	-541.75	487.50	525.72	0.00	0.00	0.00	
8,800.00	90.00	91.10	7,659.00	-543.67	587.48	625.58	0.00	0.00	0.00	
8,900.00	90.00	91.10	7,659.00	-545.58	687.47	725.43	0.00	0.00	0.00	
9,000.00	90.00	91.10	7,659.00	-547.50	787.45	825.29	0.00	0.00	0.00	
9,100.00	90.00	91.10	7,659.00	-549.42	887.43	925.14	0.00	0.00	0.00	
9,200.00	90.00	91.10	7,659.00	-551.33	987.41	1,025.00	0.00	0.00	0.00	
9,300.00	90.00	91.10	7,659.00	-553.25	1,087.39	1,124.85	0.00	0.00	0.00	
9,400.00	90.00	91.10	7,659.00	-555.17	1,187.37	1,224.71	0.00	0.00	0.00	
9,500.00	90.00	91.10	7,659.00	-557.08	1,287.36	1,324.56	0.00	0.00	0.00	
9,600.00	90.00	91.10	7,659.00	-559.00	1,387.34	1,424.42	0.00	0.00	0.00	
9,700.00	90.00	91.10	7,659.00	-560.92	1,487.32	1,524.27	0.00	0.00	0.00	
9,800.00	90.00	91.10	7,659.00	-562.84	1,587.30	1,624.13	0.00	0.00	0.00	
9,900.00	90.00	91.10	7,659.00	-564.75	1,687.28	1,723.98	0.00	0.00	0.00	
10,000.00	90.00	91.10	7,659.00	-566.67	1,787.26	1,823.84	0.00	0.00	0.00	
10,100.00	90.00	91.10	7,659.00	-568.59	1,887.25	1,923.69	0.00	0.00	0.00	
10,200.00	90.00	91.10	7,659.00	-570.50	1,987.23	2,023.55	0.00	0.00	0.00	
10,300.00	90.00	91.10	7,659.00	-572.42	2,087.21	2,123.40	0.00	0.00	0.00	
10,400.00	90.00	91.10	7,659.00	-574.34	2,187.19	2,223.26	0.00	0.00	0.00	
10,500.00	90.00	91.10	7,659.00	-576.25	2,287.17	2,323.11	0.00	0.00	0.00	
10,600.00	90.00	91.10	7,659.00	-578.17	2,387.15	2,422.97	0.00	0.00	0.00	
10,700.00	90.00	91.10	7,659.00	-580.09	2,487.13	2,522.83	0.00	0.00	0.00	
10,800.00	90.00	91.10	7,659.00	-582.00	2,587.12	2,622.68	0.00	0.00	0.00	
10,900.00	90.00	91.10	7,659.00	-583.92	2,687.10	2,722.54	0.00	0.00	0.00	
11,000.00	90.00	91.10	7,659.00	-585.84	2,787.08	2,822.39	0.00	0.00	0.00	
11,100.00	90.00	91.10	7,659.00	-587.75	2,887.06	2,922.25	0.00	0.00	0.00	
11,200.00	90.00	91.10	7,659.00	-589.67	2,987.04	3,022.10	0.00	0.00	0.00	
11,300.00	90.00	91.10	7,659.00	-591.59	3,087.02	3,121.96	0.00	0.00	0.00	
11,400.00	90.00	91.10	7,659.00	-593.50	3,187.01	3,221.81	0.00	0.00	0.00	
11,500.00	90.00	91.10	7,659.00	-595.42	3,286.99	3,321.67	0.00	0.00	0.00	
11,600.00	90.00	91.10	7,659.00	-597.34	3,386.97	3,421.52	0.00	0.00	0.00	
11,700.00	90.00	91.10	7,659.00	-599.25	3,486.95	3,521.38	0.00	0.00	0.00	
11,800.00	90.00	91.10	7,659.00	-601.17	3,586.93	3,621.23	0.00	0.00	0.00	

Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,900.00	90.00	91.10	7,659.00	-603.09	3,686.91	3,721.09	0.00	0.00	0.00
12,000.00	90.00	91.10	7,659.00	-605.01	3,786.90	3,820.94	0.00	0.00	0.00
12,100.00	90.00	91.10	7,659.00	-606.92	3,886.88	3,920.80	0.00	0.00	0.00
12,200.00	90.00	91.10	7,659.00	-608.84	3,986.86	4,020.65	0.00	0.00	0.00
12,300.00	90.00	91.10	7,659.00	-610.76	4,086.84	4,120.51	0.00	0.00	0.00
12,400.00	90.00	91.10	7,659.00	-612.67	4,186.82	4,220.36	0.00	0.00	0.00
12,500.00	90.00	91.10	7,659.00	-614.59	4,286.80	4,320.22	0.00	0.00	0.00
12,600.00	90.00	91.10	7,659.00	-616.51	4,386.79	4,420.07	0.00	0.00	0.00
12,700.00	90.00	91.10	7,659.00	-618.42	4,486.77	4,519.93	0.00	0.00	0.00
12,800.00	90.00	91.10	7,659.00	-620.34	4,586.75	4,619.78	0.00	0.00	0.00
12,900.00	90.00	91.10	7,659.00	-622.26	4,686.73	4,719.64	0.00	0.00	0.00
13,000.00	90.00	91.10	7,659.00	-624.17	4,786.71	4,819.49	0.00	0.00	0.00
13,100.00	90.00	91.10	7,659.00	-626.09	4,886.69	4,919.35	0.00	0.00	0.00
13,200.00	90.00	91.10	7,659.00	-628.01	4,986.68	5,019.20	0.00	0.00	0.00
13,300.00	90.00	91.10	7,659.00	-629.92	5,086.66	5,119.06	0.00	0.00	0.00
13,400.00	90.00	91.10	7,659.00	-631.84	5,186.64	5,218.91	0.00	0.00	0.00
13,500.00	90.00	91.10	7,659.00	-633.76	5,286.62	5,318.77	0.00	0.00	0.00
13,600.00	90.00	91.10	7,659.00	-635.67	5,386.60	5,418.62	0.00	0.00	0.00
13,700.00	90.00	91.10	7,659.00	-637.59	5,486.58	5,518.48	0.00	0.00	0.00
13,800.00	90.00	91.10	7,659.00	-639.51	5,586.57	5,618.33	0.00	0.00	0.00
13,900.00	90.00	91.10	7,659.00	-641.42	5,686.55	5,718.19	0.00	0.00	0.00
14,000.00	90.00	91.10	7,659.00	-643.34	5,786.53	5,818.04	0.00	0.00	0.00
14,100.00	90.00	91.10	7,659.00	-645.26	5,886.51	5,917.90	0.00	0.00	0.00
14,200.00	90.00	91.10	7,659.00	-647.17	5,986.49	6,017.75	0.00	0.00	0.00
14,300.00	90.00	91.10	7,659.00	-649.09	6,086.47	6,117.61	0.00	0.00	0.00
14,400.00	90.00	91.10	7,659.00	-651.01	6,186.46	6,217.46	0.00	0.00	0.00
14,500.00	90.00	91.10	7,659.00	-652.93	6,286.44	6,317.32	0.00	0.00	0.00
14,600.00	90.00	91.10	7,659.00	-654.84	6,386.42	6,417.17	0.00	0.00	0.00
14,700.00	90.00	91.10	7,659.00	-656.76	6,486.40	6,517.03	0.00	0.00	0.00
14,800.00	90.00	91.10	7,659.00	-658.68	6,586.38	6,616.88	0.00	0.00	0.00
14,900.00	90.00	91.10	7,659.00	-660.59	6,686.36	6,716.74	0.00	0.00	0.00
15,000.00	90.00	91.10	7,659.00	-662.51	6,786.34	6,816.59	0.00	0.00	0.00
15,100.00	90.00	91.10	7,659.00	-664.43	6,886.33	6,916.45	0.00	0.00	0.00
15,200.00	90.00	91.10	7,659.00	-666.34	6,986.31	7,016.30	0.00	0.00	0.00
15,300.00	90.00	91.10	7,659.00	-668.26	7,086.29	7,116.16	0.00	0.00	0.00
15,400.00	90.00	91.10	7,659.00	-670.18	7,186.27	7,216.01	0.00	0.00	0.00
15,500.00	90.00	91.10	7,659.00	-672.09	7,286.25	7,315.87	0.00	0.00	0.00
15,600.00	90.00	91.10	7,659.00	-674.01	7,386.23	7,415.72	0.00	0.00	0.00
15,700.00	90.00	91.10	7,659.00	-675.93	7,486.22	7,515.58	0.00	0.00	0.00
15,800.00	90.00	91.10	7,659.00	-677.84	7,586.20	7,615.43	0.00	0.00	0.00
15,900.00	90.00	91.10	7,659.00	-679.76	7,686.18	7,715.29	0.00	0.00	0.00
16,000.00	90.00	91.10	7,659.00	-681.68	7,786.16	7,815.14	0.00	0.00	0.00
16,100.00	90.00	91.10	7,659.00	-683.59	7,886.14	7,915.00	0.00	0.00	0.00
16,200.00	90.00	91.10	7,659.00	-685.51	7,986.12	8,014.85	0.00	0.00	0.00
16,300.00	90.00	91.10	7,659.00	-687.43	8,086.11	8,114.71	0.00	0.00	0.00
16,400.00	90.00	91.10	7,659.00	-689.34	8,186.09	8,214.56	0.00	0.00	0.00
16,500.00	90.00	91.10	7,659.00	-691.26	8,286.07	8,314.42	0.00	0.00	0.00
16,600.00	90.00	91.10	7,659.00	-693.18	8,386.05	8,414.27	0.00	0.00	0.00
16,700.00	90.00	91.10	7,659.00	-695.10	8,486.03	8,514.13	0.00	0.00	0.00
16,800.00	90.00	91.10	7,659.00	-697.01	8,586.01	8,613.98	0.00	0.00	0.00
16,900.00	90.00	91.10	7,659.00	-698.93	8,686.00	8,713.84	0.00	0.00	0.00
17,000.00	90.00	91.10	7,659.00	-700.85	8,785.98	8,813.69	0.00	0.00	0.00
17,100.00	90.00	91.10	7,659.00	-702.76	8,885.96	8,913.55	0.00	0.00	0.00
17,200.00	90.00	91.10	7,659.00	-704.68	8,985.94	9,013.40	0.00	0.00	0.00

Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
17,300.00	90.00	91.10	7,659.00	-706.60	9,085.92	9,113.26	0.00	0.00	0.00	
17,400.00	90.00	91.10	7,659.00	-708.51	9,185.90	9,213.12	0.00	0.00	0.00	
17,500.00	90.00	91.10	7,659.00	-710.43	9,285.89	9,312.97	0.00	0.00	0.00	
17,600.00	90.00	91.10	7,659.00	-712.35	9,385.87	9,412.83	0.00	0.00	0.00	
17,700.00	90.00	91.10	7,659.00	-714.26	9,485.85	9,512.68	0.00	0.00	0.00	
17,800.00	90.00	91.10	7,659.00	-716.18	9,585.83	9,612.54	0.00	0.00	0.00	
17,900.00	90.00	91.10	7,659.00	-718.10	9,685.81	9,712.39	0.00	0.00	0.00	
18,000.00	90.00	91.10	7,659.00	-720.01	9,785.79	9,812.25	0.00	0.00	0.00	
18,078.58	90.00	91.10	7,659.00	-721.52	9,864.36	9,890.71	0.00	0.00	0.00	
TD at 18078.58										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
LP-WATKINS 4-64 3BH - hit/miss target - Shape - Point	0.00	0.00	7,659.00	-529.27	-163.55	1,670,886.74	3,252,678.45	39.671955°N	104.602355°W	
PBHL-WATKINS 4-64 3BH - plan hits target center - Point	0.00	0.00	7,659.00	-721.52	9,864.36	1,670,793.65	3,262,707.63	39.671422°N	104.566732°W	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
24.00	24.00	Denver				
689.00	689.00	Arapahoe				
1,292.21	1,289.00	Laramie-Fox Hills Formation				
2,019.42	2,009.00	Pierre Formation				
2,534.53	2,519.00	Upper Pierre aquifer				
3,145.60	3,124.00	Base of Upper Pierre aquifer				
4,170.77	4,139.00	Larimer ("Parkman") sandstone				
4,291.97	4,259.00	Pierre Formation				
5,352.50	5,309.00	Terry ("Sussex") sandstone				
5,514.10	5,469.00	Pierre Formation				
6,271.62	6,219.00	Hygiene ("Shannon") sandstone				
6,493.82	6,439.00	Pierre Formation				
7,654.53	7,529.00	Sharon Springs Member				
8,048.83	7,659.00	Niobrara Formation				

Planning Report

Database:	EDT_32Bit_ODBC	Local Co-ordinate Reference:	Well WATKINS 4-64 30-29 3BH
Company:	CRESTONE PEAK RESOURCES	TVD Reference:	KB 25' @ 5792.00usft
Project:	ARAPAHOE COUNTY	MD Reference:	KB 25' @ 5792.00usft
Site:	SEC 30-T4S-R64W	North Reference:	True
Well:	WATKINS 4-64 30-29 3BH	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.00	700.00	0.00	0.00	Start Build 2.00
1,103.92	1,102.58	-15.32	-23.94	Start 5977.78 hold at 1103.92 MD
7,081.70	7,021.05	-468.11	-731.51	Start DLS 10.00 TFO -146.02
8,048.83	7,659.00	-529.27	-163.55	Start 10029.76 hold at 8048.83 MD
18,078.58	7,659.00	-721.52	9,864.36	TD at 18078.58