

# **New Ventures**

**Routt Co. CO NAD 83 CZ Sec  
22-T06N-R88W  
DILL GULCH 6-88 2-22H21  
WB#1**

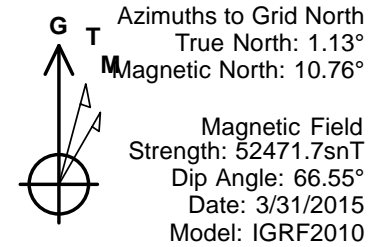
**Plan: Permit Plan\_2\_West**

## **Survey Report**

**14 May, 2015**



**Southwestern Energy**  
**Routt Co. CO NAD 83 CZ**  
**Sec 22-T06N-R88W**  
**DILL GULCH 6-88 2-22H21**



WELL DETAILS: DILL GULCH 6-88 2-22H21

RKB @ 6572.0usft (PD706)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1416057.11	2511339.15	40° 27' 43.900 N	107° 15' 22.600 W

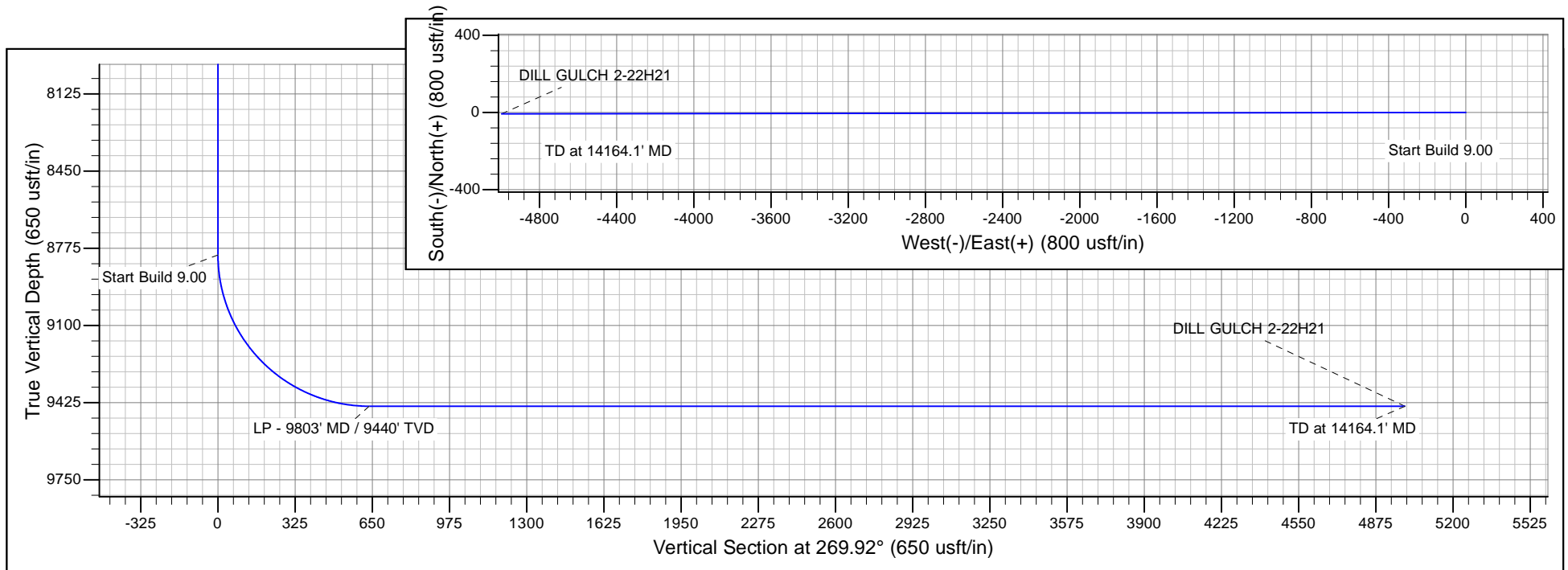
SECTION DETAILS

PROJECT DETAILS: Routt Co. CO NAD 83 CZ

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target	Annotation	Geodetic System: US State Plane 1983
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0			Datum: North American Datum 1983
2	8803.4	0.00	0.00	8803.4	0.0	0.0	0.00	0.00	0.0		Start Build 9.00	Ellipsoid: GRS 1980
3	9803.4	90.00	269.92	9440.0	-0.9	-636.6	9.00	269.92	636.6	2-22H West BHL	LP - 9803' MD / 9440' TVD	Zone: Colorado Northern Zone
4	14164.1	90.00	269.92	9440.0	-7.1	-4997.3	0.00	0.00	4997.3	2-22H West LP	TD at 14164.1' MD	System Datum: Mean Sea Level

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
2-22H West BHL	9440.0	-7.1	-4997.3	1416050.05	2506341.88	40° 27' 42.847 N	107° 16' 27.239 W
2-22H West LP	9440.0	-0.9	-636.6	1416056.21	2510702.55	40° 27' 43.766 N	107° 15' 30.834 W



# Southwestern Energy

## Survey Report

<b>Company:</b>	New Ventures	<b>Local Co-ordinate Reference:</b>	Well DILL GULCH 2-22H
<b>Project:</b>	Routt Co. CO NAD 83 CZ	<b>TVD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Site:</b>	Sec 22-T06N-R88W	<b>MD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Well:</b>	DILL GULCH 6-88 2-22H21	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	WB#1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Permit Plan_2_West	<b>Database:</b>	OSC_EDM12

<b>Project</b>	Routt Co. CO NAD 83 CZ, Colorado,		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		Sec 22-T06N-R88W			
Site Position:		Northing:	1,413,833.46 usft	Latitude:	40° 27' 21.859 N
From:	Lat/Long	Easting:	2,510,975.79 usft	Longitude:	107° 15' 26.730 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-1.14 °

Well		DILL GULCH 2-22H				
Well Position	+N/-S	0.0 usft	Northing:	1,416,057.11 usft	Latitude:	40° 27' 43.900 N
	+E/-W	0.0 usft	Easting:	2,511,339.15 usft	Longitude:	107° 15' 22.600 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	6,550.0 usft

<b>Wellbore</b>	WB#1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	3/31/2015	9.63	66.55	52,472

<b>Design</b>	Permit Plan_2_West			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	269.92

<b>Survey Tool Program</b>	<b>Date</b>	4/22/2015		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	14,164.1	Permit Plan_2_West (WB#1)	EMS	EMS - Standard

<b>Planned Survey</b>									
<b>MD (usft)</b>	<b>Inc (°)</b>	<b>Azi (azimuth) (°)</b>	<b>TVD (usft)</b>	<b>DLS (°/100usft)</b>	<b>VS (usft)</b>	<b>N/S (usft)</b>	<b>E/W (usft)</b>		
0.0		0.00	0.00	0.0	0.00	0.0	0.0	0.0	0.0
100.0		0.00	0.00	100.0	0.00	0.0	0.0	0.0	0.0
200.0		0.00	0.00	200.0	0.00	0.0	0.0	0.0	0.0
300.0		0.00	0.00	300.0	0.00	0.0	0.0	0.0	0.0
400.0		0.00	0.00	400.0	0.00	0.0	0.0	0.0	0.0
500.0		0.00	0.00	500.0	0.00	0.0	0.0	0.0	0.0
600.0		0.00	0.00	600.0	0.00	0.0	0.0	0.0	0.0
700.0		0.00	0.00	700.0	0.00	0.0	0.0	0.0	0.0
800.0		0.00	0.00	800.0	0.00	0.0	0.0	0.0	0.0
900.0		0.00	0.00	900.0	0.00	0.0	0.0	0.0	0.0
1,000.0		0.00	0.00	1,000.0	0.00	0.0	0.0	0.0	0.0
1,100.0		0.00	0.00	1,100.0	0.00	0.0	0.0	0.0	0.0

# Southwestern Energy

## Survey Report

<b>Company:</b>	New Ventures	<b>Local Co-ordinate Reference:</b>	Well DILL GULCH 2-22H
<b>Project:</b>	Routt Co. CO NAD 83 CZ	<b>TVD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Site:</b>	Sec 22-T06N-R88W DILL	<b>MD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Well:</b>	GULCH 6-88 2-22H21	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	WB#1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Permit Plan_2_West	<b>Database:</b>	OSC_EDM12

Planned Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	DLS (°/100usft)	VS (usft)	N/S (usft)	E/W (usft)		
1,200.0	0.00	0.00	1,200.0	0.00	0.0	0.0	0.0		0.0
1,300.0	0.00	0.00	1,300.0	0.00	0.0	0.0	0.0		0.0
1,400.0	0.00	0.00	1,400.0	0.00	0.0	0.0	0.0		0.0
1,500.0	0.00	0.00	1,500.0	0.00	0.0	0.0	0.0		0.0
1,600.0	0.00	0.00	1,600.0	0.00	0.0	0.0	0.0		0.0
1,700.0	0.00	0.00	1,700.0	0.00	0.0	0.0	0.0		0.0
1,800.0	0.00	0.00	1,800.0	0.00	0.0	0.0	0.0		0.0
1,900.0	0.00	0.00	1,900.0	0.00	0.0	0.0	0.0		0.0
2,000.0	0.00	0.00	2,000.0	0.00	0.0	0.0	0.0		0.0
2,100.0	0.00	0.00	2,100.0	0.00	0.0	0.0	0.0		0.0
2,200.0	0.00	0.00	2,200.0	0.00	0.0	0.0	0.0		0.0
2,300.0	0.00	0.00	2,300.0	0.00	0.0	0.0	0.0		0.0
2,400.0	0.00	0.00	2,400.0	0.00	0.0	0.0	0.0		0.0
2,500.0	0.00	0.00	2,500.0	0.00	0.0	0.0	0.0		0.0
2,600.0	0.00	0.00	2,600.0	0.00	0.0	0.0	0.0		0.0
2,700.0	0.00	0.00	2,700.0	0.00	0.0	0.0	0.0		0.0
2,800.0	0.00	0.00	2,800.0	0.00	0.0	0.0	0.0		0.0
2,900.0	0.00	0.00	2,900.0	0.00	0.0	0.0	0.0		0.0
3,000.0	0.00	0.00	3,000.0	0.00	0.0	0.0	0.0		0.0
3,100.0	0.00	0.00	3,100.0	0.00	0.0	0.0	0.0		0.0
3,200.0	0.00	0.00	3,200.0	0.00	0.0	0.0	0.0		0.0
3,300.0	0.00	0.00	3,300.0	0.00	0.0	0.0	0.0		0.0
3,400.0	0.00	0.00	3,400.0	0.00	0.0	0.0	0.0		0.0
3,500.0	0.00	0.00	3,500.0	0.00	0.0	0.0	0.0		0.0
3,600.0	0.00	0.00	3,600.0	0.00	0.0	0.0	0.0		0.0
3,700.0	0.00	0.00	3,700.0	0.00	0.0	0.0	0.0		0.0
3,800.0	0.00	0.00	3,800.0	0.00	0.0	0.0	0.0		0.0
3,900.0	0.00	0.00	3,900.0	0.00	0.0	0.0	0.0		0.0
4,000.0	0.00	0.00	4,000.0	0.00	0.0	0.0	0.0		0.0
4,100.0	0.00	0.00	4,100.0	0.00	0.0	0.0	0.0		0.0
4,200.0	0.00	0.00	4,200.0	0.00	0.0	0.0	0.0		0.0
4,300.0	0.00	0.00	4,300.0	0.00	0.0	0.0	0.0		0.0
4,400.0	0.00	0.00	4,400.0	0.00	0.0	0.0	0.0		0.0
4,500.0	0.00	0.00	4,500.0	0.00	0.0	0.0	0.0		0.0
4,600.0	0.00	0.00	4,600.0	0.00	0.0	0.0	0.0		0.0
4,700.0	0.00	0.00	4,700.0	0.00	0.0	0.0	0.0		0.0
4,800.0	0.00	0.00	4,800.0	0.00	0.0	0.0	0.0		0.0
4,900.0	0.00	0.00	4,900.0	0.00	0.0	0.0	0.0		0.0
5,000.0	0.00	0.00	5,000.0	0.00	0.0	0.0	0.0		0.0
5,100.0	0.00	0.00	5,100.0	0.00	0.0	0.0	0.0		0.0
5,200.0	0.00	0.00	5,200.0	0.00	0.0	0.0	0.0		0.0
5,300.0	0.00	0.00	5,300.0	0.00	0.0	0.0	0.0		0.0
5,400.0	0.00	0.00	5,400.0	0.00	0.0	0.0	0.0		0.0
5,500.0	0.00	0.00	5,500.0	0.00	0.0	0.0	0.0		0.0

# Southwestern Energy

## Survey Report

<b>Company:</b>	New Ventures	<b>Local Co-ordinate Reference:</b>	Well DILL GULCH 2-22H
<b>Project:</b>	Routt Co. CO NAD 83 CZ	<b>TVD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Site:</b>	Sec 22-T06N-R88W DILL	<b>MD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Well:</b>	GULCH 6-88 2-22H21	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	WB#1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Permit Plan_2_West	<b>Database:</b>	OSC_EDM12

### Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	DLS (°/100usft)	VS (usft)	N/S (usft)	E/W (usft)
5,600.0	0.00	0.00	5,600.0	0.00	0.0	0.0	0.0
5,700.0	0.00	0.00	5,700.0	0.00	0.0	0.0	0.0
5,800.0	0.00	0.00	5,800.0	0.00	0.0	0.0	0.0
5,900.0	0.00	0.00	5,900.0	0.00	0.0	0.0	0.0
6,000.0	0.00	0.00	6,000.0	0.00	0.0	0.0	0.0
6,100.0	0.00	0.00	6,100.0	0.00	0.0	0.0	0.0
6,200.0	0.00	0.00	6,200.0	0.00	0.0	0.0	0.0
6,300.0	0.00	0.00	6,300.0	0.00	0.0	0.0	0.0
6,400.0	0.00	0.00	6,400.0	0.00	0.0	0.0	0.0
6,500.0	0.00	0.00	6,500.0	0.00	0.0	0.0	0.0
6,600.0	0.00	0.00	6,600.0	0.00	0.0	0.0	0.0
6,700.0	0.00	0.00	6,700.0	0.00	0.0	0.0	0.0
6,800.0	0.00	0.00	6,800.0	0.00	0.0	0.0	0.0
6,900.0	0.00	0.00	6,900.0	0.00	0.0	0.0	0.0
7,000.0	0.00	0.00	7,000.0	0.00	0.0	0.0	0.0
7,100.0	0.00	0.00	7,100.0	0.00	0.0	0.0	0.0
7,200.0	0.00	0.00	7,200.0	0.00	0.0	0.0	0.0
7,300.0	0.00	0.00	7,300.0	0.00	0.0	0.0	0.0
7,400.0	0.00	0.00	7,400.0	0.00	0.0	0.0	0.0
7,500.0	0.00	0.00	7,500.0	0.00	0.0	0.0	0.0
7,600.0	0.00	0.00	7,600.0	0.00	0.0	0.0	0.0
7,700.0	0.00	0.00	7,700.0	0.00	0.0	0.0	0.0
7,800.0	0.00	0.00	7,800.0	0.00	0.0	0.0	0.0
7,900.0	0.00	0.00	7,900.0	0.00	0.0	0.0	0.0
8,000.0	0.00	0.00	8,000.0	0.00	0.0	0.0	0.0
8,100.0	0.00	0.00	8,100.0	0.00	0.0	0.0	0.0
8,200.0	0.00	0.00	8,200.0	0.00	0.0	0.0	0.0
8,300.0	0.00	0.00	8,300.0	0.00	0.0	0.0	0.0
8,400.0	0.00	0.00	8,400.0	0.00	0.0	0.0	0.0
8,500.0	0.00	0.00	8,500.0	0.00	0.0	0.0	0.0
8,600.0	0.00	0.00	8,600.0	0.00	0.0	0.0	0.0
8,700.0	0.00	0.00	8,700.0	0.00	0.0	0.0	0.0
8,800.0	0.00	0.00	8,800.0	0.00	0.0	0.0	0.0
8,803.4	0.00	0.00	8,803.4	0.00	0.0	0.0	0.0
8,900.0	8.69	269.92	8,899.6	9.00	7.3	0.0	-7.3
9,000.0	17.69	269.92	8,996.9	9.00	30.1	0.0	-30.1
9,100.0	26.69	269.92	9,089.4	9.00	67.9	-0.1	-67.9
9,200.0	35.69	269.92	9,174.8	9.00	119.6	-0.2	-119.6
9,300.0	44.69	269.92	9,251.1	9.00	184.1	-0.3	-184.1
9,400.0	53.69	269.92	9,316.4	9.00	259.7	-0.4	-259.7
9,500.0	62.69	269.92	9,369.1	9.00	344.6	-0.5	-344.6
9,600.0	71.69	269.92	9,407.8	9.00	436.7	-0.6	-436.7
9,700.0	80.69	269.92	9,431.6	9.00	533.7	-0.8	-533.7
9,800.0	89.69	269.92	9,440.0	9.00	633.2	-0.9	-633.2

# Southwestern Energy

## Survey Report

<b>Company:</b>	New Ventures	<b>Local Co-ordinate Reference:</b>	Well DILL GULCH 2-22H
<b>Project:</b>	Routt Co. CO NAD 83 CZ	<b>TVD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Site:</b>	Sec 22-T06N-R88W DILL	<b>MD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Well:</b>	GULCH 6-88 2-22H21	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	WB#1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Permit Plan_2_West	<b>Database:</b>	OSC_EDM12

### Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	DLS (°/100usft)	VS (usft)	N/S (usft)	E/W (usft)
9,803.4	90.00	269.92	9,440.0	9.00	636.6	-0.9	-636.6
9,900.0	90.00	269.92	9,440.0	0.00	733.2	-1.0	-733.2
10,000.0	90.00	269.92	9,440.0	0.00	833.2	-1.2	-833.2
10,100.0	90.00	269.92	9,440.0	0.00	933.2	-1.3	-933.2
10,200.0	90.00	269.92	9,440.0	0.00	1,033.2	-1.5	-1,033.2
10,300.0	90.00	269.92	9,440.0	0.00	1,133.2	-1.6	-1,133.2
10,400.0	90.00	269.92	9,440.0	0.00	1,233.2	-1.7	-1,233.2
10,500.0	90.00	269.92	9,440.0	0.00	1,333.2	-1.9	-1,333.2
10,600.0	90.00	269.92	9,440.0	0.00	1,433.2	-2.0	-1,433.2
10,700.0	90.00	269.92	9,440.0	0.00	1,533.2	-2.2	-1,533.2
10,800.0	90.00	269.92	9,440.0	0.00	1,633.2	-2.3	-1,633.2
10,900.0	90.00	269.92	9,440.0	0.00	1,733.2	-2.4	-1,733.2
11,000.0	90.00	269.92	9,440.0	0.00	1,833.2	-2.6	-1,833.2
11,100.0	90.00	269.92	9,440.0	0.00	1,933.2	-2.7	-1,933.2
11,200.0	90.00	269.92	9,440.0	0.00	2,033.2	-2.9	-2,033.2
11,300.0	90.00	269.92	9,440.0	0.00	2,133.2	-3.0	-2,133.2
11,400.0	90.00	269.92	9,440.0	0.00	2,233.2	-3.2	-2,233.2
11,500.0	90.00	269.92	9,440.0	0.00	2,333.2	-3.3	-2,333.2
11,600.0	90.00	269.92	9,440.0	0.00	2,433.2	-3.4	-2,433.2
11,700.0	90.00	269.92	9,440.0	0.00	2,533.2	-3.6	-2,533.2
11,800.0	90.00	269.92	9,440.0	0.00	2,633.2	-3.7	-2,633.2
11,900.0	90.00	269.92	9,440.0	0.00	2,733.2	-3.9	-2,733.2
12,000.0	90.00	269.92	9,440.0	0.00	2,833.2	-4.0	-2,833.2
12,100.0	90.00	269.92	9,440.0	0.00	2,933.2	-4.1	-2,933.2
12,200.0	90.00	269.92	9,440.0	0.00	3,033.2	-4.3	-3,033.2
12,300.0	90.00	269.92	9,440.0	0.00	3,133.2	-4.4	-3,133.2
12,400.0	90.00	269.92	9,440.0	0.00	3,233.2	-4.6	-3,233.2
12,500.0	90.00	269.92	9,440.0	0.00	3,333.2	-4.7	-3,333.2
12,600.0	90.00	269.92	9,440.0	0.00	3,433.2	-4.8	-3,433.2
12,700.0	90.00	269.92	9,440.0	0.00	3,533.2	-5.0	-3,533.2
12,800.0	90.00	269.92	9,440.0	0.00	3,633.2	-5.1	-3,633.2
12,900.0	90.00	269.92	9,440.0	0.00	3,733.2	-5.3	-3,733.2
13,000.0	90.00	269.92	9,440.0	0.00	3,833.2	-5.4	-3,833.2
13,100.0	90.00	269.92	9,440.0	0.00	3,933.2	-5.6	-3,933.2
13,200.0	90.00	269.92	9,440.0	0.00	4,033.2	-5.7	-4,033.2
13,300.0	90.00	269.92	9,440.0	0.00	4,133.2	-5.8	-4,133.2
13,400.0	90.00	269.92	9,440.0	0.00	4,233.2	-6.0	-4,233.2
13,500.0	90.00	269.92	9,440.0	0.00	4,333.2	-6.1	-4,333.2
13,600.0	90.00	269.92	9,440.0	0.00	4,433.2	-6.3	-4,433.2
13,700.0	90.00	269.92	9,440.0	0.00	4,533.2	-6.4	-4,533.2
13,800.0	90.00	269.92	9,440.0	0.00	4,633.2	-6.5	-4,633.2
13,900.0	90.00	269.92	9,440.0	0.00	4,733.2	-6.7	-4,733.2
14,000.0	90.00	269.92	9,440.0	0.00	4,833.2	-6.8	-4,833.2
14,100.0	90.00	269.92	9,440.0	0.00	4,933.2	-7.0	-4,933.2
14,164.1	90.00	269.92	9,440.0	0.00	4,997.3	-7.1	-4,997.3

# Southwestern Energy

## Survey Report

<b>Company:</b>	New Ventures	<b>Local Co-ordinate Reference:</b>	Well DILL GULCH 2-22H
<b>Project:</b>	Routt Co. CO NAD 83 CZ	<b>TVD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Site:</b>	Sec 22-T06N-R88W DILL	<b>MD Reference:</b>	RKB @ 6572.0usft (PD706)
<b>Well:</b>	GULCH 6-88 2-22H21	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	WB#1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Permit Plan_2_West	<b>Database:</b>	OSC_EDM12

Planned Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	DLS (°/100usft)	VS (usft)	N/S (usft)	E/W (usft)

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
8,792.0	8,792.0	Buck Peak		0.00		
9,539.2	9,386.0	Wolf Mtn		0.00		
9,055.5	9,049.0	Tow Creek		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
8,803.4	8,803.4	0.0	0.0	Start Build 9.00	
9,803.4	9,440.0	-0.9	-636.6	LP - 9803' MD / 9440' TVD	
14,164.1	9,440.0	-7.1	-4,997.3	TD at 14164.1' MD	

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