

# Directional Plus

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Rasmussen 42-28
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KBE @ 4990.0ft (Patterson #03
<b>Site:</b>	SENE S28-T2N-R68W	<b>MD Reference:</b>	KBE @ 4990.0ft (Patterson #03
<b>Well:</b>	Rasmussen 42-28	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<b>Database:</b>	EDM 2003.21 US Multi User Db

**Project** DJ Wattenberg

<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** SENE S28-T2N-R68W

<b>Site Position:</b>		<b>Northing:</b>	1,284,070.12 ft	<b>Latitude:</b>	
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,139,566.84 ft	<b>Longitude:</b>	
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	in	<b>Grid Convergence:</b>	

**Well** Rasmussen 42-28

<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,284,070.11 ft	<b>Latitude:</b>	
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	3,139,566.84 ft	<b>Longitude:</b>	
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	

**Wellbore** DD

<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Fi</b>
	IGRF200510	10/24/2008	9.29	66.87	

**Design** DD

**Audit Notes:**

<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
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<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	206.66

**Survey Program** **Date** 10/31/2008

<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
60.0	7,787.0	Survey #1 (DD)	MWD	Geolink MWD

**Survey**

<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>
0.0	0.00	0.00	0.0	0.0	0.0	0.00
60.0	0.80	146.80	60.0	-0.4	0.2	1.33
88.0	0.80	141.00	88.0	-0.7	0.5	0.29
118.0	1.10	154.60	118.0	-1.1	0.7	1.24
147.0	1.40	162.00	147.0	-1.7	0.9	1.17
176.0	1.50	171.40	176.0	-2.4	1.1	0.89
205.0	2.00	175.20	205.0	-3.3	1.2	1.77
233.0	2.60	176.20	232.9	-4.4	1.3	2.15
262.0	2.90	180.90	261.9	-5.8	1.3	1.29
291.0	3.40	182.80	290.9	-7.4	1.3	1.76

	321.0	3.50	183.90	320.8	-9.2	1.2	7.7	0.40
	352.0	3.60	190.90	351.7	-11.1	0.9	9.5	1.43
	382.0	4.00	189.10	381.7	-13.0	0.6	11.4	1.39

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)
412.0	4.00	191.40	411.6	-15.1	0.2	13.4
443.0	4.10	198.50	442.5	-17.2	-0.4	15.5
473.0	4.00	194.40	472.5	-19.2	-1.0	17.6
504.0	4.00	199.50	503.4	-21.3	-1.6	19.8
534.0	4.00	202.40	533.3	-23.3	-2.3	21.8
564.0	4.30	204.00	563.2	-25.2	-3.2	24.0
595.0	4.20	207.30	594.1	-27.3	-4.2	26.3
625.0	4.00	210.70	624.1	-29.2	-5.2	28.4
656.0	4.30	208.90	655.0	-31.1	-6.3	30.7
688.0	4.30	211.60	686.9	-33.2	-7.6	33.1
738.0	4.20	211.70	736.8	-36.4	-9.5	36.8
841.0	4.60	209.80	839.5	-43.2	-13.5	44.6
904.0	4.20	209.70	902.3	-47.4	-15.9	49.5
968.0	5.00	214.80	966.1	-51.7	-18.7	54.6
1,031.0	5.10	217.00	1,028.8	-56.2	-21.9	60.0
1,126.0	4.70	211.60	1,123.5	-62.9	-26.5	68.1
1,221.0	5.00	215.10	1,218.1	-69.6	-30.9	76.0
1,316.0	4.20	206.00	1,312.8	-76.1	-34.8	83.6
1,412.0	4.10	203.40	1,408.6	-82.4	-37.7	90.6
1,507.0	3.90	209.00	1,503.3	-88.3	-40.7	97.2
1,602.0	3.30	213.90	1,598.2	-93.4	-43.8	103.1
1,697.0	3.50	208.10	1,693.0	-98.3	-46.6	108.7
1,792.0	4.30	199.50	1,787.8	-104.2	-49.2	115.2
1,887.0	3.90	204.50	1,882.5	-110.5	-51.7	121.9
1,983.0	4.90	206.30	1,978.2	-117.1	-54.9	129.3
2,078.0	3.90	209.50	2,073.0	-123.6	-58.3	136.6
2,173.0	4.70	204.80	2,167.7	-129.9	-61.5	143.7
2,268.0	3.90	207.80	2,262.4	-136.3	-64.6	150.8
2,363.0	4.60	206.00	2,357.2	-142.6	-67.8	157.9
2,458.0	3.70	201.50	2,451.9	-148.9	-70.6	164.7
2,554.0	4.10	210.30	2,547.7	-154.7	-73.5	171.2
2,649.0	3.50	207.80	2,642.5	-160.2	-76.6	177.5
2,744.0	4.20	211.80	2,737.3	-165.7	-79.7	183.9
2,839.0	4.00	215.40	2,832.0	-171.4	-83.5	190.6
2,934.0	3.90	218.30	2,926.8	-176.6	-87.4	197.1
3,029.0	4.40	202.00	3,021.6	-182.5	-90.8	203.9
3,124.0	3.60	200.40	3,116.3	-188.7	-93.2	210.5
3,219.0	1.30	209.90	3,211.2	-192.4	-94.8	214.5
3,283.0	1.60	213.50	3,275.2	-193.8	-95.6	216.1
3,378.0	2.90	198.50	3,370.1	-197.2	-97.1	219.8
3,474.0	3.50	209.90	3,466.0	-202.0	-99.3	225.1
3,569.0	4.70	207.70	3,560.7	-208.0	-102.6	231.9
3,664.0	3.80	207.50	3,655.5	-214.2	-105.9	239.0
3,759.0	3.70	208.90	3,750.3	-219.7	-108.8	245.2
3,854.0	4.60	207.00	3,845.0	-225.8	-112.0	252.0
3,949.0	4.00	211.50	3,939.8	-232.0	-115.5	259.1
4,044.0	4.20	211.30	4,034.5	-237.8	-119.0	265.9
4,140.0	5.00	208.40	4,130.2	-244.5	-122.8	273.6
4,235.0	4.40	207.00	4,224.9	-251.4	-126.4	281.4
4,330.0	4.50	210.30	4,319.6	-257.8	-130.0	288.7
4,425.0	4.10	208.60	4,414.3	-264.0	-133.5	295.9
4,520.0	4.70	208.30	4,509.1	-270.4	-137.0	303.1
4,615.0	4.60	208.60	4,603.7	-277.2	-140.6	310.8

Survey

Measured Depth	Inclination	Azimuth	Vertical Depth (ft)	+N/-S	+E/-W	Vertical Section
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(ft)	(°)	(°)		(ft)	(ft)	(ft)	
4,710.0	4.30	205.60	4,698.5	-283.8	-144.0	318.2	0.40
4,806.0	3.80	203.50	4,794.2	-289.9	-146.8	325.0	0.54
4,901.0	4.10	200.60	4,889.0	-296.0	-149.3	331.5	0.38
4,996.0	5.00	203.90	4,983.7	-303.0	-152.1	339.0	0.99
5,091.0	4.70	206.80	5,078.4	-310.2	-155.6	347.0	0.41
5,186.0	3.80	209.30	5,173.1	-316.4	-158.9	354.1	0.97
5,282.0	4.10	213.50	5,268.9	-322.1	-162.3	360.7	0.43
5,377.0	4.40	209.70	5,363.6	-328.1	-166.0	367.7	0.43
5,472.0	3.50	209.70	5,458.4	-333.8	-169.2	374.2	0.95
5,567.0	4.00	207.00	5,553.2	-339.2	-172.2	380.4	0.56
5,662.0	4.00	206.50	5,647.9	-345.2	-175.2	387.1	0.04
5,757.0	3.40	204.00	5,742.7	-350.7	-177.8	393.2	0.65
5,852.0	2.50	212.90	5,837.6	-355.0	-180.1	398.1	1.06
5,947.0	1.90	214.50	5,932.5	-358.0	-182.1	401.7	0.63
6,042.0	1.40	209.60	6,027.5	-360.4	-183.5	404.4	0.55
6,137.0	0.90	206.10	6,122.5	-362.0	-184.4	406.3	0.53
6,233.0	0.70	212.00	6,218.5	-363.2	-185.1	407.6	0.23
6,328.0	0.70	225.90	6,313.5	-364.1	-185.8	408.8	0.18
6,423.0	0.60	218.20	6,408.5	-364.9	-186.5	409.8	0.14
6,518.0	0.70	204.70	6,503.5	-365.8	-187.1	410.9	0.19
6,613.0	0.50	149.30	6,598.5	-366.7	-187.1	411.7	0.62
6,708.0	0.80	147.60	6,693.4	-367.6	-186.5	412.2	0.32
6,803.0	1.40	130.00	6,788.4	-368.9	-185.3	412.8	0.72
6,930.0	2.20	111.70	6,915.4	-370.8	-181.8	413.0	0.77
7,026.0	2.20	66.40	7,011.3	-370.8	-178.4	411.4	1.76
7,121.0	2.20	32.80	7,106.2	-368.5	-175.8	408.2	1.34
7,216.0	1.40	19.70	7,201.2	-365.9	-174.4	405.2	0.94
7,311.0	0.90	18.50	7,296.2	-364.1	-173.8	403.3	0.53
7,406.0	0.90	8.10	7,391.2	-362.6	-173.4	401.9	0.17
7,501.0	0.70	345.80	7,486.2	-361.3	-173.5	400.7	0.39
7,597.0	0.40	336.00	7,582.1	-360.5	-173.8	400.1	0.33
7,692.0	0.40	354.50	7,677.1	-359.8	-173.9	399.6	0.14
7,787.0	0.10	279.34	7,772.1	-359.5	-174.0	399.3	0.41

## Targets

### Target Name

- hit/miss target	Dip	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude
- Shape	Angle	(°)	(ft)	(ft)	(ft)	(ft)	(ft)	
Rasmussen 42-28 Bl	0.00	0.00	8,190.0	-378.8	-190.2	1,283,690.21	3,139,378.78	40.111040
- survey misses target center by 418.6ft at 7787.0ft MD (7772.1 TVD, -359.5 N, -174.0 E)								
- Circle (radius 100.0)								
Rasmussen 42-28 T	0.00	0.00	6,400.0	-378.8	-190.2	1,283,690.21	3,139,378.78	40.111040
- survey misses target center by 14.5ft at 6414.7ft MD (6400.1 TVD, -364.8 N, -186.5 E)								
- Point								

## Survey Annotations

Measured	Vertical	Local Coordinates		Comment
Depth	Depth	+N/-S	+E/-W	
(ft)	(ft)	(ft)	(ft)	
7,787.0	7,772.1	-359.5	-174.0	Last DP svy @ 7787'

Checked By:

Approved By:

Date:



4)  
4)

,

40.112080  
-105.001020

0.32 °

40.112080  
-105.001020  
4,974.0 ft

ield Strength  
(nT)

53,248

Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
0.00		
1.33		
0.00		
1.00		
1.03		
0.34		
1.72		
2.14		
1.03		
1.72		

0.33  
0.32  
1.33

Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
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0.00		
0.32		
-0.33		
0.00		
0.00		
1.00		
-0.32		
-0.67		
0.97		
0.00		
-0.20		
0.39		
-0.63		
1.25		
0.16		
-0.42		
0.32		
-0.84		
-0.10		
-0.21		
-0.63		
0.21		
0.84		
-0.42		
1.04		
-1.05		
0.84		
-0.84		
0.74		
-0.95		
0.42		
-0.63		
0.74		
-0.21		
-0.11		
0.53		
-0.84		
-2.42		
0.47		
1.37		
0.62		
1.26		
-0.95		
-0.11		
0.95		
-0.63		
0.21		
0.83		
-0.63		
0.11		
-0.42		
0.63		
-0.11		

Dogleg Rate	Build Rate	Formations / Comments
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(°/100ft)	(°/100ft)
-0.32	
-0.52	
0.32	
0.95	
-0.32	
-0.95	
0.31	
0.32	
-0.95	
0.53	
0.00	
-0.63	
-0.95	
-0.63	
-0.53	
-0.53	
-0.21	
0.00	
-0.11	
0.11	
-0.21	
0.32	
0.63	
0.63	
0.00	
0.00	
-0.84	
-0.53	
0.00	
-0.21	
-0.31	
0.00	
-0.32	Last DP svy @ 7787'

Longitude

-105.001700

-105.001700

*COMPASS 2003.21 Build 37*