



30-015-37982

Ryan Energy Directional Drilling Report

Field: Eddy Co, NM
Site: Skelly Unit #823
Well: #823
Wellpath: OH

Prepared For:

COG Operating LLC



Ryan Energy Technology

19510 Oil Center Blvd
Houston, TX 77073
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www.ryanenergy.com



COG Operating LLC

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Azimuths to Grid North
True North: -0.26°
Magnetic North: 7.54°
Magnetic Field
Strength: 49006nT
Dip Angle: 60.71°
Date: 3/17/2011
Model: IGRF2010

FIELD DETAILS

Eddy Co, NM
New Mexico
U.S.A.

Geodetic System: US State Plane Coordinate System 1927
Ellipsoid: NAD27 (Clarke 1866)
Zone: New Mexico, Eastern Zone
Magnetic Model: IGRF2010

System Datum: Mean Sea Level
Local North: Grid North

WELLPATH DETAILS

OH

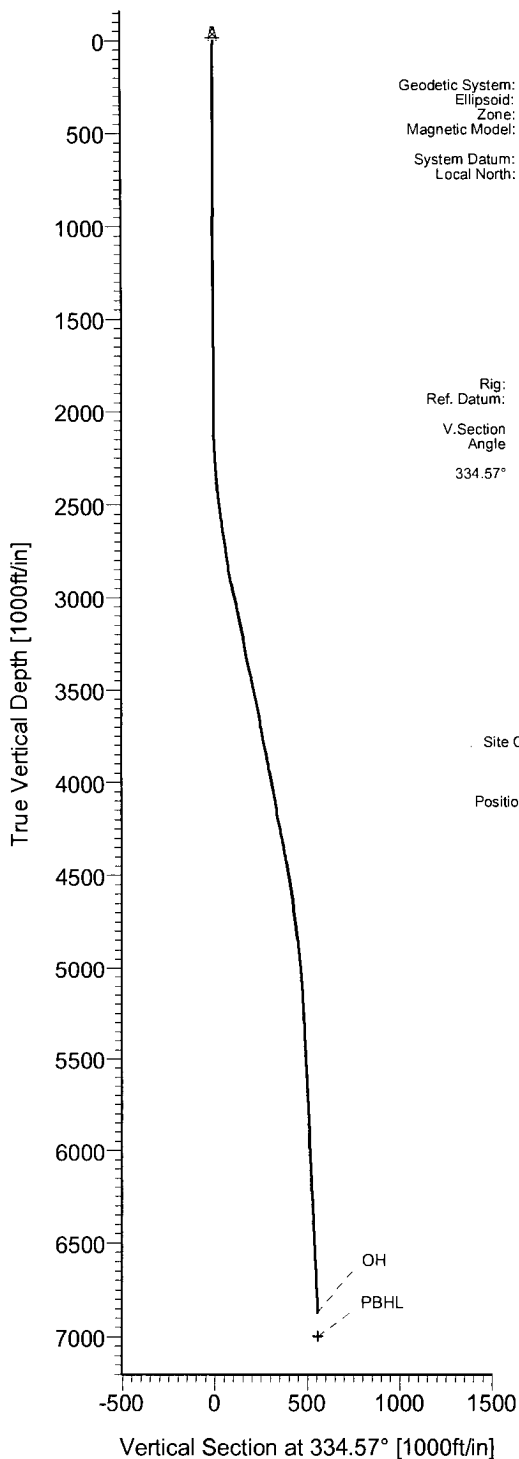
Rig: Silver Oak #1
Ref. Datum: SITE 3880.00ft
V. Section Angle: 334.57°
Origin +N/-S: 0.00
Origin +E/-W: 0.00
Starting From TVD: 0.00

SITE DETAILS

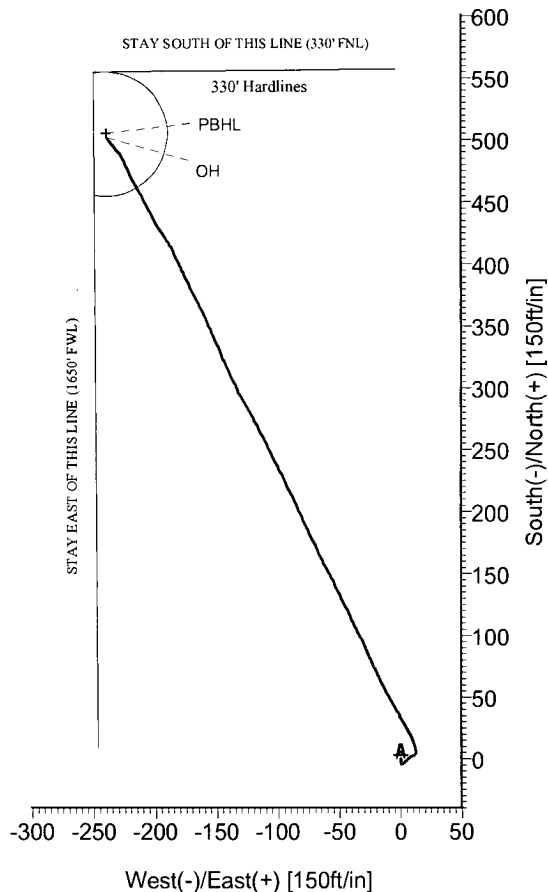
Skelly Unit #823
15-17S-31E
Eddy Co, NM

Site Centre Northing: 669374.20
Easting: 645563.60

Ground Level: 3880.00
Positional Uncertainty: 0.00
Convergence: 0.26



STAY SOUTH OF THIS LINE (330° FNL)



TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL	7000.00	504.90	-240.10	669879.10	645323.50	32°50'26.479N	103°51'36.627W	Point



Ryan Energy Technologies Survey Report



Company: COG Operating LLC	Date: 4/4/2011	Time: 10:14:33	Page: 1
Field: Eddy Co, NM	Co-ordinate(NE) Reference:	Site: Skelly Unit #823, Grid North	
Site: Skelly Unit #823	Vertical (TVD) Reference:	SITE 3880.0	
Well: #823	Section (VS) Reference:	Well (0.00N,0.00E,334.57Azi)	
Wellpath: OH	Survey Calculation Method:	Minimum Curvature	Dh: Sybase

Field: Eddy Co, NM New Mexico U.S.A.	Map System: US State Plane Coordinate System 1927	Map Zone: New Mexico, Eastern Zone
Geo Datum: NAD27 (Clarke 1866)	Coordinate System: Site Centre	
Sys Datum: Mean Sea Level	Geomagnetic Model: IGRF2010	

Site: Skelly Unit #823 15-17S-31E Eddy Co, NM	
Site Position:	Northing: 669374.20 ft Latitude: 32 50 21.472 N
From: Map	Easting: 645563.60 ft Longitude: 103 51 33.839 W
Position Uncertainty: 0.00 ft	North Reference: Grid
Ground Level: 3880.00 ft	Grid Convergence: 0.26 deg

Well: #823	Slot Name:
Well Position: +N/-S 0.00 ft Northing: 669374.20 ft Latitude: 32 50 21.472 N	
+E/-W 0.00 ft Easting: 645563.60 ft Longitude: 103 51 33.839 W	
Position Uncertainty: 0.00 ft	

Wellpath: OH	Drilled From: Surface
Current Datum: SITE	Tie-on Depth: 0.00 ft
Magnetic Data: 3/17/2011	Above System Datum: Mean Sea Level
Field Strength: 49006 nT	Declination: 7.80 deg
Vertical Section: Depth From (TVD)	Mag Dip Angle: 60.71 deg
ft	+N/-S ft +E/-W ft Direction deg
0.00	0.00 0.00 334.57

Survey Program for Definitive Wellpath			Version: 1	
Date: 4/4/2011	Validated: No	Toolcode	Tool Name	
Actual From ft	To ft	Survey		
100.00	1867.00	Survey #1 (100.00-1867.00)	Gyro	Gyro
2008.00	6871.00	Survey #2 (2008.00-6871.00)	Ryan MWD	Ryan MWD
6920.00	6920.00	Survey #3 (6920.00-6920.00)	Projection	Projection

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
100.00	0.14	127.16	100.00	-0.07	0.10	-0.11	0.14	0.14	0.00	Gyro
200.00	0.26	145.61	200.00	-0.33	0.32	-0.44	0.13	0.12	18.45	Gyro
300.00	0.23	179.43	300.00	-0.72	0.45	-0.85	0.15	-0.03	33.82	Gyro
400.00	0.51	191.76	400.00	-1.36	0.36	-1.38	0.29	0.28	12.33	Gyro
500.00	0.43	199.68	499.99	-2.15	0.15	-2.00	0.10	-0.08	7.92	Gyro
600.00	0.16	208.79	599.99	-2.62	-0.05	-2.35	0.27	-0.27	9.11	Gyro
700.00	0.17	220.62	699.99	-2.86	-0.21	-2.49	0.04	0.01	11.83	Gyro
800.00	0.24	138.70	799.99	-3.13	-0.17	-2.75	0.27	0.07	-81.92	Gyro
900.00	0.28	141.50	899.99	-3.48	0.12	-3.19	0.04	0.04	2.80	Gyro
1000.00	0.28	144.85	999.99	-3.87	0.41	-3.67	0.02	0.00	3.35	Gyro
1100.00	0.33	153.77	1099.99	-4.33	0.68	-4.20	0.07	0.05	8.92	Gyro
1200.00	0.25	106.22	1199.99	-4.65	1.02	-4.63	0.25	-0.08	-47.55	Gyro
1300.00	0.18	54.86	1299.99	-4.62	1.36	-4.75	0.20	-0.07	-51.36	Gyro
1400.00	0.71	54.48	1399.98	-4.17	1.99	-4.62	0.53	0.53	-0.38	Gyro
1500.00	0.82	45.13	1499.97	-3.30	3.00	-4.27	0.17	0.11	-9.35	Gyro
1600.00	1.04	45.27	1599.96	-2.16	4.15	-3.73	0.22	0.22	0.14	Gyro
1700.00	1.59	46.58	1699.93	-0.57	5.81	-3.00	0.55	0.55	1.31	Gyro
1800.00	1.33	51.00	1799.90	1.12	7.72	-2.30	0.28	-0.26	4.42	Gyro
1867.00	0.97	68.68	1866.89	1.81	8.85	-2.16	0.75	-0.54	26.39	Gyro
2008.00	1.20	67.60	2007.86	2.81	11.32	-2.32	0.16	0.16	-0.77	Ryan MWD



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Survey Report



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Co-ordinate(N/E) Reference: Site: Skelly Unit #823, Grid North
Vertical (TVD) Reference: SITE 3880.0
Section (VS) Reference: Well (0.00N,0.00E,334.57Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
2101.00	1.50	14.60	2100.84	4.36	12.53	-1.44	1.33	0.32	-56.99	Ryan MWD
2195.00	2.90	342.20	2194.77	7.81	12.12	1.86	1.94	1.49	-34.47	Ryan MWD
2290.00	4.00	337.00	2289.60	13.15	10.09	7.55	1.20	1.16	-5.47	Ryan MWD
2384.00	5.10	334.00	2383.30	19.93	6.97	15.00	1.20	1.17	-3.19	Ryan MWD
2478.00	6.50	329.80	2476.82	28.28	2.46	24.48	1.56	1.49	-4.47	Ryan MWD
2572.00	7.60	329.30	2570.10	38.22	-3.39	35.97	1.17	1.17	-0.53	Ryan MWD
2666.00	8.10	331.60	2663.22	49.39	-9.71	48.78	0.63	0.53	2.45	Ryan MWD
2766.00	8.50	333.20	2762.18	62.19	-16.39	63.20	0.46	0.40	1.60	Ryan MWD
2859.00	10.10	336.30	2853.95	75.79	-22.77	78.22	1.80	1.72	3.33	Ryan MWD
2953.00	12.60	334.80	2946.11	92.62	-30.45	96.72	2.68	2.66	-1.60	Ryan MWD
3047.00	12.00	333.80	3037.95	110.66	-39.13	116.74	0.68	-0.64	-1.06	Ryan MWD
3140.00	11.60	334.30	3128.98	127.76	-47.45	135.76	0.44	-0.43	0.54	Ryan MWD
3234.00	11.10	332.80	3221.14	144.33	-55.69	154.25	0.62	-0.53	-1.60	Ryan MWD
3328.00	12.00	334.00	3313.24	161.16	-64.11	173.07	0.99	0.96	1.28	Ryan MWD
3422.00	12.20	333.80	3405.15	178.85	-72.77	192.77	0.22	0.21	-0.21	Ryan MWD
3515.00	11.50	334.50	3496.17	196.04	-81.10	211.87	0.77	-0.75	0.75	Ryan MWD
3609.00	11.30	334.70	3588.31	212.82	-89.07	230.45	0.22	-0.21	0.21	Ryan MWD
3704.00	11.30	333.80	3681.47	229.59	-97.16	249.06	0.19	0.00	-0.95	Ryan MWD
3797.00	10.50	333.30	3772.79	245.33	-104.99	266.65	0.87	-0.86	-0.54	Ryan MWD
3891.00	10.50	333.60	3865.22	260.66	-112.65	283.77	0.06	0.00	0.32	Ryan MWD
3986.00	10.10	331.00	3958.69	275.70	-120.54	300.74	0.65	-0.42	-2.74	Ryan MWD
4079.00	10.10	329.90	4050.25	289.88	-128.58	317.01	0.21	0.00	-1.18	Ryan MWD
4173.00	10.80	334.70	4142.69	304.98	-136.48	334.03	1.19	0.74	5.11	Ryan MWD
4268.00	11.00	335.70	4235.98	321.28	-144.01	351.99	0.29	0.21	1.05	Ryan MWD
4362.00	10.40	337.00	4328.34	337.27	-151.02	369.44	0.69	-0.64	1.38	Ryan MWD
4456.00	9.80	334.90	4420.89	352.32	-157.72	385.91	0.75	-0.64	-2.23	Ryan MWD
4550.00	9.60	335.50	4513.54	366.70	-164.37	401.75	0.24	-0.21	0.64	Ryan MWD
4644.00	8.40	332.30	4606.38	379.91	-170.81	416.45	1.38	-1.28	-3.40	Ryan MWD
4739.00	7.90	334.10	4700.42	391.93	-176.89	429.91	0.59	-0.53	1.89	Ryan MWD
4833.00	7.20	335.00	4793.61	403.08	-182.20	442.26	0.76	-0.74	0.96	Ryan MWD
4927.00	5.90	331.60	4886.99	412.67	-186.99	452.98	1.44	-1.38	-3.62	Ryan MWD
5021.00	5.40	327.00	4980.54	420.62	-191.69	462.19	0.72	-0.53	-4.89	Ryan MWD
5116.00	4.00	324.70	5075.21	427.08	-196.04	469.88	1.49	-1.47	-2.42	Ryan MWD
5210.00	3.10	327.10	5169.03	431.89	-199.32	475.63	0.97	-0.96	2.55	Ryan MWD
5304.00	2.90	334.00	5262.90	436.16	-201.74	480.53	0.44	-0.21	7.34	Ryan MWD
5398.00	2.60	334.10	5356.80	440.21	-203.71	485.04	0.32	-0.32	0.11	Ryan MWD
5492.00	2.70	338.90	5450.70	444.20	-205.44	489.38	0.26	0.11	5.11	Ryan MWD
5585.00	2.90	327.80	5543.59	448.23	-207.49	493.90	0.62	0.22	-11.94	Ryan MWD
5680.00	2.90	325.50	5638.46	452.25	-210.13	498.66	0.12	0.00	-2.42	Ryan MWD
5774.00	2.50	338.90	5732.36	456.12	-212.21	503.05	0.79	-0.43	14.26	Ryan MWD
5868.00	3.00	326.90	5826.25	460.09	-214.29	507.53	0.81	0.53	-12.77	Ryan MWD
5961.00	3.20	329.90	5919.12	464.38	-216.92	512.53	0.28	0.22	3.23	Ryan MWD
6056.00	2.60	334.20	6013.99	468.61	-219.19	517.33	0.67	-0.63	4.53	Ryan MWD
6150.00	2.90	337.00	6107.89	472.72	-221.05	521.84	0.35	0.32	2.98	Ryan MWD
6243.00	2.60	336.30	6200.78	476.82	-222.82	526.30	0.32	-0.32	-0.75	Ryan MWD
6337.00	2.60	333.60	6294.68	480.68	-224.62	530.56	0.13	0.00	-2.87	Ryan MWD
6431.00	2.30	330.30	6388.60	484.23	-226.50	534.57	0.35	-0.32	-3.51	Ryan MWD
6525.00	2.80	325.50	6482.50	487.76	-228.74	538.72	0.58	0.53	-5.11	Ryan MWD
6618.00	2.50	322.40	6575.40	491.24	-231.26	542.95	0.36	-0.32	-3.33	Ryan MWD
6713.00	2.40	324.60	6670.32	494.50	-233.68	546.93	0.14	-0.11	2.32	Ryan MWD
6806.00	2.60	321.80	6763.23	497.74	-236.11	550.91	0.25	0.22	-3.01	Ryan MWD
6871.00	2.60	319.90	6828.16	500.03	-237.97	553.77	0.13	0.00	-2.92	Ryan MWD
6920.00	2.60	319.90	6877.11	501.73	-239.40	555.92	0.00	0.00	0.00	PROJECTED to TD