



30-015-36830

Ryan Energy Directional Drilling Report

Field: Eddy Co, NM NAD 83
Site: PLU Pierce Canyon 28 Fed 1H
Well: PLU Pierce Canyon 28 Fed 1H
Wellpath: 28 Fed 1H Lateral

Prepared For:

Chesapeake Operating, Inc.



Ryan Energy Technology

19510 Oil Center Blvd
Houston, TX 77073
Ph: 281-443-1414
Fx: 281-443-1676

www.ryanenergy.com



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Adjusts to Grid North
 True North: -0.21°
 Magnetic North: 7.73°
 Magnetic Field
 Strength: 4882nT
 Dip Angle: 60.16°
 Date: 4/26/2009
 Model: Igr2005

SITE DETAILS

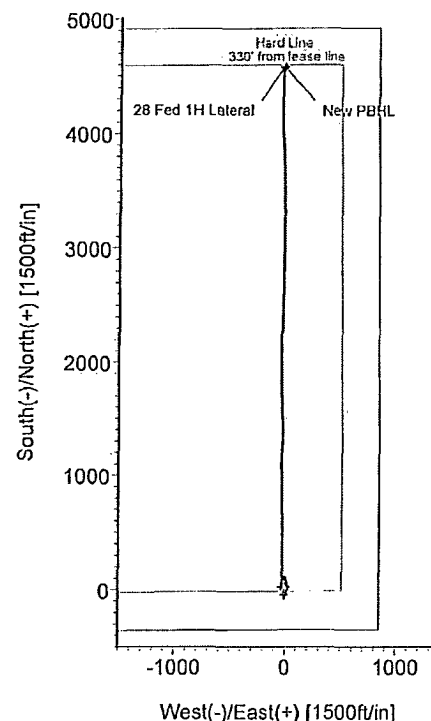
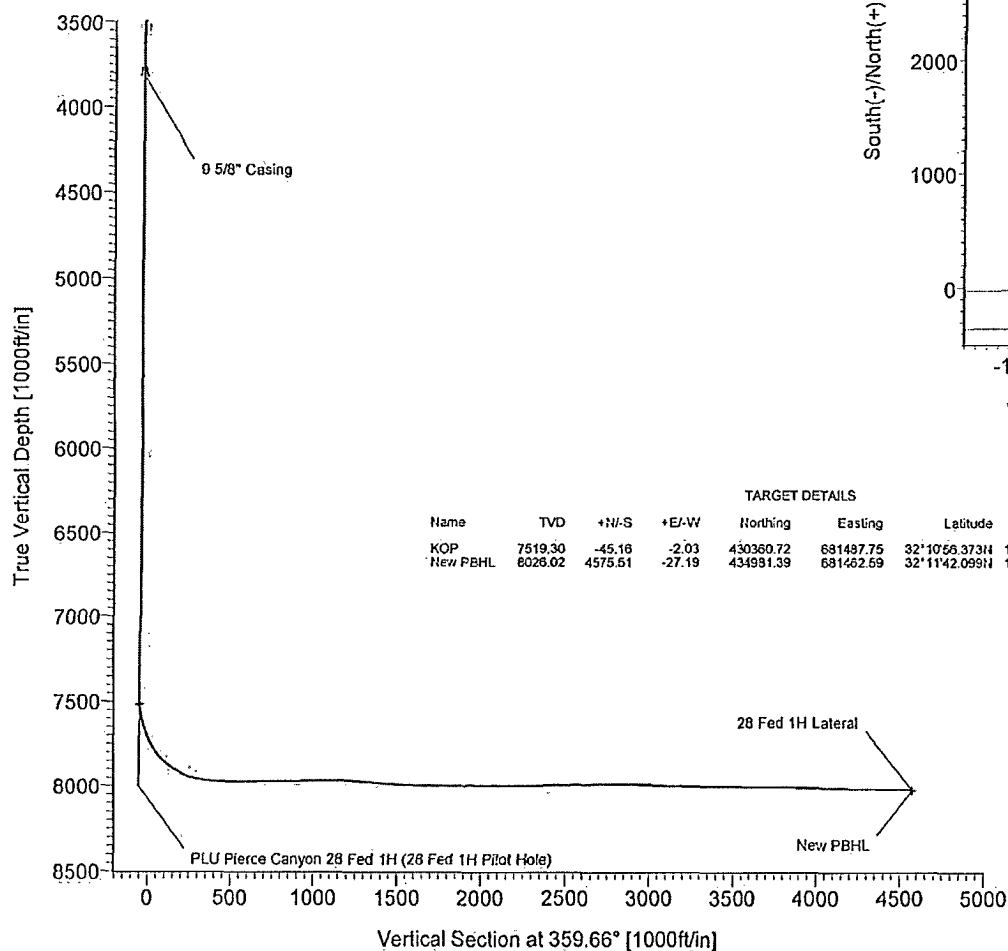
PLU Pierce Canyon 28 Fed 1H
 Sec 28 T24S R30E
 Eddy Co, NM
 Site Centre Northing: 430405.88
 Easting: 681489.78
 Ground Level: 3300.00
 Positional Uncertainty: 0.00
 Convergence: 0.24

FIELD DETAILS

Eddy Co, NM NAD 83
 USA
 Geodetic System: US State Plane Coordinate System 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico, Eastern Zone
 Magnetic Model: Igr2005
 System Datum: Mean Sea Level
 Local North: Grid North

WELLPATH DETAILS

28 Fed 1H Lateral
 Rig: Latchshaw 6
 Ref. Datum: Est RKB 3321.00ft
 V. Section Origin Origin Starting
 Angle +N/S +E/W From TVD
 359.66° 0.00 0.00 0.00



TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
KOP	7519.30	-45.16	-2.03	430360.72	681497.75	32°10'56.373N	103°52'49.174W	Point
New PBHL	8026.02	4575.51	-27.19	434981.39	681462.59	32°11'42.059N	103°52'49.240W	Point

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Wellpath: PLU Pierce Canyon 28 Fed 1H (28 Fed 1H Lateral)
 Created By: Val L. A. Larson Date: 6/2/2009
 Drawn By: _____ Date: _____
 Reviewed By: _____ Date: _____
 Approved By: _____ Date: _____



Ryan Energy Technologies Survey Report



Company: Chesapeake Operating, Inc.		Date: 6/9/2009	Time: 09:42:32	Page: 1						
Field: Eddy Co, NM NAD 83		Co-ordinate(N/E) Reference: Site: PLU Pierce Canyon 28 Fed 1H								
Site: PLU Pierce Canyon 28 Fed 1H		Vertical (TVD) Reference: Est RKB 3321.0								
Well: PLU Pierce Canyon 28 Fed 1H		Section (VS) Reference: Well (0.00N,0.00E,359.66Azi)								
Wellpath: 28 Fed 1H Lateral		Survey Calculation Method: Minimum Curvature Db: Sybase								
Field: Eddy Co, NM NAD 83										
USA										
Map System: US State Plane Coordinate System 1983		Map Zone: New Mexico, Eastern Zone								
Geo Datum: GRS 1980		Coordinate System: Site Centre								
Sys Datum: Mean Sea Level		Geomagnetic Model: Igrf2005								
Site: PLU Pierce Canyon 28 Fed 1H Sec 28 T24S-R30E Eddy Co, NM										
Site Position:		Northing: 430405.88 ft	Latitude: 32 10 56.819 N							
From: Map		Easting: 681489.78 ft	Longitude: 103 52 49.148 W							
Position Uncertainty: 0.00 ft			North Reference: Grid							
Ground Level: 3300.00 ft			Grid Convergence: 0.24 deg							
Well: PLU Pierce Canyon 28 Fed 1H Slot Name:										
Well Position: +N/-S 0.00 ft		Northing: 430405.88 ft	Latitude: 32 10 56.819 N							
+E/-W 0.00 ft		Easting: 681489.78 ft	Longitude: 103 52 49.148 W							
Position Uncertainty: 0.00 ft										
Wellpath: 28 Fed 1H Lateral										
Current Datum: Est RKB		Height: 3321.00 ft	Drilled From: Surface							
Magnetic Data: 4/26/2009			Tie-on Depth: 0.00 ft							
Field Strength: 48824 nT			Above System Datum: Mean Sea Level							
Vertical Section: Depth From (TVD)		+N/-S	Declination: 7.97 deg							
ft		ft	Mag Dip Angle: 60.16 deg							
		+E/-W	Direction							
		ft	deg							
0.00		0.00	0.00	359.66						
Survey Program for Definitive Wellpath										
Date: 6/9/2009		Validated: No	Version: 0							
Actual From	To	Survey	Toolcode	Tool Name						
ft	ft									
200.00	7400.00	Survey #1 (200.00-7400.00)	Gyro	Gyro MS						
7515.00	12347.00	Survey #2 (7515.00-12347.00)	MWD	MWD - Standard						
12402.00	12402.00	Survey #3 (12402.00-12402.00)	Project							
Survey										
MD	Incl	Azim	TVD	+N/-S	+E/-W	VS	DLS	Build	Turn	Tool/Comment
ft	deg	deg	ft	ft	ft	ft	deg/100ft	deg/100ft	deg/100ft	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
200.00	1.25	159.12	199.98	-2.04	0.78	-2.04	0.62	0.62	0.00	Gyro
400.00	1.50	133.10	399.93	-5.87	3.47	-5.89	0.33	0.12	-13.01	Gyro
600.00	1.75	122.09	599.85	-9.28	7.97	-9.32	0.20	0.12	-5.50	Gyro
800.00	1.50	124.98	799.77	-12.40	12.70	-12.47	0.13	-0.12	1.44	Gyro
1000.00	0.75	112.94	999.73	-14.41	16.05	-14.51	0.39	-0.37	-6.02	Gyro
1200.00	0.50	65.92	1199.72	-14.56	18.05	-14.67	0.27	-0.12	-23.51	Gyro
1400.00	0.50	299.90	1399.71	-13.77	18.09	-13.88	0.45	0.00	-63.01	Gyro
1600.00	0.50	62.86	1599.71	-12.94	18.11	-13.05	0.44	0.00	61.48	Gyro
1800.00	0.50	299.85	1799.71	-12.11	18.13	-12.22	0.44	0.00	-61.51	Gyro
2000.00	0.50	276.81	1999.70	-11.57	16.51	-11.67	0.10	0.00	-11.52	Gyro
2200.00	0.75	95.77	2199.69	-11.60	16.94	-11.70	0.62	0.12	89.48	Gyro
2400.00	1.25	267.74	2399.68	-11.82	16.06	-11.91	1.00	0.25	85.98	Gyro
2600.00	0.75	212.70	2599.66	-13.00	13.18	-13.08	0.51	-0.25	-27.52	Gyro
2800.00	2.75	171.67	2799.56	-18.85	13.17	-18.93	1.12	1.00	-20.51	Gyro
3000.00	0.75	227.63	2999.46	-24.48	12.89	-24.56	1.21	-1.00	27.98	Gyro
3200.00	0.25	24.50	3199.46	-24.97	12.11	-25.04	0.49	-0.25	78.44	Gyro
3400.00	0.50	127.47	3399.46	-25.10	12.98	-25.18	0.30	0.12	51.48	Gyro
3600.00	0.75	157.43	3599.44	-26.84	14.18	-26.92	0.20	0.12	14.98	Gyro
3800.00	0.25	274.40	3799.44	-28.02	14.24	-28.10	0.45	-0.25	58.48	Gyro
4000.00	0.50	241.36	3999.43	-28.40	13.04	-28.48	0.16	0.12	-16.52	Gyro



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Wellpath: 28 Fed 1H Lateral

Date: 6/9/2009 Time: 09:42:32 Page: 2
Co-ordinate(NE) Reference: Site: PLU Pierce Canyon 28 Fed 1H
Vertical (TVD) Reference: Est RKB 3321.0
Section (VS) Reference: Well (0.00N,0.00E,359.66Azi)
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
4200.00	0.25	238.33	4199.43	-29.05	11.90	-29.12	0.13	-0.12	-1.51	Gyro
4400.00	0.25	242.29	4399.43	-29.48	11.15	-29.55	0.01	0.00	1.98	Gyro
4600.00	0.25	256.25	4599.43	-29.79	10.34	-29.85	0.03	0.00	6.98	Gyro
4800.00	0.50	260.22	4799.42	-30.04	9.05	-30.09	0.13	0.12	1.98	Gyro
5000.00	0.75	266.18	4999.41	-30.27	6.89	-30.31	0.13	0.12	2.98	Gyro
5200.00	0.75	267.06	5199.39	-30.43	4.27	-30.45	0.01	0.00	0.44	Gyro
5400.00	0.50	250.02	5399.38	-30.79	2.15	-30.81	0.15	-0.12	-8.52	Gyro
5600.00	0.25	178.99	5599.38	-31.53	1.33	-31.54	0.24	-0.12	-35.51	Gyro
5800.00	0.25	231.95	5799.37	-32.23	1.00	-32.24	-0.11	0.00	26.48	Gyro
6000.00	0.25	211.91	5999.37	-32.87	0.42	-32.88	0.04	0.00	-10.02	Gyro
6200.00	0.25	183.88	6199.37	-33.68	0.16	-33.68	0.08	0.00	-14.01	Gyro
6400.00	0.50	176.64	6399.37	-34.99	0.19	-34.99	0.13	0.12	-3.62	Gyro
6600.00	0.75	262.16	6599.36	-36.04	-1.06	-36.03	0.43	0.12	42.76	Gyro
6800.00	0.50	172.17	6799.35	-37.08	-2.24	-37.06	0.45	-0.12	-44.99	Gyro
7000.00	0.50	186.93	6999.34	-38.81	-2.22	-38.80	0.06	0.00	7.38	Gyro
7200.00	0.75	179.11	7199.33	-40.98	-2.31	-40.97	0.13	0.12	-3.91	Gyro
7400.00	0.75	174.87	7399.31	-43.60	-2.17	-43.58	0.03	0.00	-2.12	Gyro
7515.00	1.00	327.90	7514.31	-43.50	-2.64	-43.48	1.48	0.22	133.07	MWD
7547.00	4.80	347.50	7546.26	-41.95	-3.08	-41.93	12.10	11.87	61.25	MWD
7579.00	9.00	350.10	7578.02	-38.18	-3.80	-38.15	13.16	13.12	8.12	MWD
7611.00	13.30	349.90	7609.41	-32.09	-4.87	-32.06	13.44	13.44	-0.62	MWD
7643.00	17.00	350.30	7640.29	-23.85	-6.31	-23.81	11.57	11.56	1.25	MWD
7675.00	20.20	351.70	7670.62	-13.77	-7.89	-13.72	10.10	10.00	4.37	MWD
7705.00	23.10	355.20	7698.50	-2.77	-9.13	-2.72	10.58	9.67	11.67	MWD
7736.00	26.10	358.00	7726.68	10.10	-9.88	10.16	10.38	9.68	9.03	MWD
7768.00	29.40	357.60	7755.00	24.99	-10.46	25.05	10.33	10.31	-1.25	MWD
7800.00	32.80	356.00	7782.40	41.49	-11.39	41.56	10.93	10.62	-5.00	MWD
7832.00	36.60	355.30	7808.70	59.65	-12.78	59.72	11.94	11.87	-2.19	MWD
7864.00	41.20	355.30	7833.60	79.67	-14.42	79.76	14.37	14.37	0.00	MWD
7896.00	45.70	355.50	7856.82	101.60	-16.19	101.70	14.07	14.06	0.62	MWD
7928.00	50.30	355.90	7878.23	125.31	-17.96	125.41	14.40	14.37	1.25	MWD
7960.00	54.70	357.00	7897.71	150.64	-19.53	150.75	14.02	13.75	3.44	MWD
7992.00	59.30	357.60	7915.13	177.44	-20.79	177.56	14.46	14.37	1.87	MWD
8024.00	63.90	358.00	7930.35	205.56	-21.87	205.69	14.42	14.37	1.25	MWD
8056.00	68.80	358.60	7943.18	234.85	-22.73	234.98	15.41	15.31	1.87	MWD
8088.00	74.40	359.10	7953.28	265.20	-23.34	265.33	17.56	17.50	1.56	MWD
8119.00	78.80	359.40	7960.46	295.34	-23.73	295.48	14.22	14.19	0.97	MWD
8152.00	80.80	359.70	7966.30	327.82	-23.99	327.96	6.13	6.06	0.91	MWD
8183.00	82.70	359.70	7970.75	358.50	-24.15	358.64	6.13	6.13	0.00	MWD
8215.00	86.10	359.10	7973.87	390.34	-24.48	390.48	10.79	10.62	-1.87	MWD
8247.00	87.70	359.20	7975.60	422.29	-24.96	422.43	5.01	5.00	0.31	MWD
8279.00	88.10	359.00	7976.77	454.26	-25.46	454.40	1.40	1.25	-0.62	MWD
8373.00	90.80	0.10	7977.68	548.24	-26.20	548.39	3.10	2.87	1.17	MWD
8468.00	91.60	358.90	7975.69	643.22	-27.03	643.37	1.52	0.84	-1.26	MWD
8564.00	90.10	359.70	7974.26	739.20	-28.20	739.35	1.77	-1.56	0.83	MWD
8660.00	91.20	359.30	7973.17	835.18	-29.04	835.34	1.22	1.15	-0.42	MWD
8755.00	90.60	359.00	7971.68	930.16	-30.45	930.33	0.71	-0.63	-0.32	MWD
8851.00	91.20	358.90	7970.17	1026.13	-32.21	1026.31	0.63	0.62	-0.10	MWD
8947.00	90.60	359.70	7968.67	1122.11	-33.38	1122.29	1.04	-0.62	0.83	MWD
9043.00	87.00	0.60	7970.68	1218.08	-33.13	1218.25	3.87	-3.75	0.94	MWD
9139.00	84.50	0.70	7977.79	1313.80	-32.04	1313.96	2.61	-2.60	0.10	MWD
9233.00	85.30	359.90	7986.15	1407.42	-31.55	1407.58	1.20	0.85	-0.85	MWD
9328.00	86.00	359.30	7993.35	1502.15	-32.21	1502.31	0.97	0.74	-0.63	MWD
9424.00	87.70	358.30	7998.63	1597.97	-34.22	1598.15	2.05	1.77	-1.04	MWD



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Date: 6/9/2009 Time: 09:42:32 Page: 3
Co-ordinate(N/E) Reference: Site: PLU Pierce Canyon 28 Fed 1H
Vertical (TVD) Reference: Est RKB 3321.0
Section (VS) Reference: Well (0.00N,0.00E,359.66Azi)
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
9520.00	89.30	357.90	8001.14	1693.89	-37.40	1694.08	1.72	1.67	-0.42	MWD
9615.00	91.30	359.60	8000.64	1788.85	-39.48	1789.06	2.76	2.11	1.79	MWD
9711.00	91.00	0.10	7998.72	1884.83	-39.73	1885.04	0.61	-0.31	0.52	MWD
9807.00	89.10	359.70	7998.63	1980.83	-39.89	1981.03	2.02	-1.98	-0.42	MWD
9903.00	89.10	359.60	8000.14	2076.82	-40.48	2077.02	0.10	0.00	-0.10	MWD
9998.00	90.00	1.20	8000.89	2171.81	-39.82	2172.00	1.93	0.95	1.68	MWD
10094.00	90.70	1.70	8000.30	2267.77	-37.39	2267.95	0.90	0.73	0.52	MWD
10190.00	91.40	1.80	7998.54	2363.71	-34.46	2363.87	0.74	0.73	0.10	MWD
10283.00	90.80	1.80	7996.76	2456.65	-31.54	2456.79	0.65	-0.65	0.00	MWD
10378.00	91.90	1.60	7994.52	2551.58	-28.72	2551.70	1.18	1.16	-0.21	MWD
10474.00	91.30	1.10	7991.84	2647.51	-26.46	2647.62	0.81	-0.62	-0.52	MWD
10570.00	90.30	1.50	7990.50	2743.48	-24.28	2743.57	1.12	-1.04	0.42	MWD
10666.00	90.00	2.00	7990.25	2839.43	-21.35	2839.51	0.61	-0.31	0.52	MWD
10762.00	88.30	1.80	7991.67	2935.36	-18.17	2935.42	1.78	-1.77	-0.21	MWD
10857.00	86.90	0.80	7995.65	3030.25	-16.01	3030.30	1.81	-1.47	-1.05	MWD
10953.00	88.30	0.30	7999.67	3126.16	-15.09	3126.20	1.55	1.46	-0.52	MWD
11049.00	88.90	359.30	8002.01	3222.13	-15.43	3222.17	1.21	0.62	-1.04	MWD
11142.00	89.50	358.70	8003.31	3315.11	-17.05	3315.15	0.91	0.65	-0.65	MWD
11238.00	90.50	359.40	8003.31	3411.09	-18.64	3411.14	1.27	1.04	0.73	MWD
11334.00	88.80	358.80	8003.90	3507.07	-20.15	3507.13	1.88	-1.77	-0.62	MWD
11429.00	88.90	358.10	8005.80	3602.02	-22.72	3602.09	0.74	0.11	-0.74	MWD
11524.00	89.20	357.90	8007.38	3696.95	-26.03	3697.04	0.38	0.32	-0.21	MWD
11620.00	90.20	358.40	8007.88	3792.90	-29.13	3793.00	1.16	1.04	0.52	MWD
11715.00	89.10	358.10	8008.46	3887.85	-32.03	3887.97	1.20	-1.16	-0.32	MWD
11811.00	88.50	356.90	8010.47	3983.73	-36.22	3983.88	1.40	-0.62	-1.25	MWD
11907.00	88.90	358.20	8012.65	4079.62	-40.32	4079.79	1.42	0.42	1.35	MWD
12002.00	88.80	0.00	8014.56	4174.58	-41.81	4174.76	1.90	-0.11	1.89	MWD
12097.00	89.00	0.30	8016.38	4269.57	-41.57	4269.74	0.38	0.21	0.32	MWD
12191.00	88.30	0.20	8018.60	4363.54	-41.16	4363.71	0.75	-0.74	-0.11	MWD
12284.00	89.80	0.30	8020.14	4456.52	-40.75	4456.69	1.62	1.61	0.11	MWD
12347.00	90.10	0.40	8020.19	4519.52	-40.36	4519.68	0.50	0.48	0.16	MWD
12402.00	90.10	0.40	8020.10	4574.52	-39.98	4574.68	0.00	0.00	0.00	PROJECTED to TD