

P.O. Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

A GYRO TECHNOLOGIES INC. COMPANY

30-015-38146

August 29, 2012

COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, TX 79701

Attn: Kanicia Castillo

Re: Lizard Pot Fed Com 2H

Please find enclosed a copy of the survey from 0' to 8,652' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

Sincerely,

Keith Havelka
Operations

NMOCB Rec 12/5/12



Rig Name: MCVAY 7
State/County: NEW MEXICO/EDDY
Latitude: 32.61
GRID North is 0.27 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB=18 FT

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: lizard pot fed com #2h_ed.ut

Minimum Curvature Method

Report Date/Time: 8/29/2012 / 13:47

Vaughn Energy Services

Gardendale Texas

432-563-5444

Surveyor: Danny Spring

Lizard Pot Fed Com 2H / API 30-015-38146

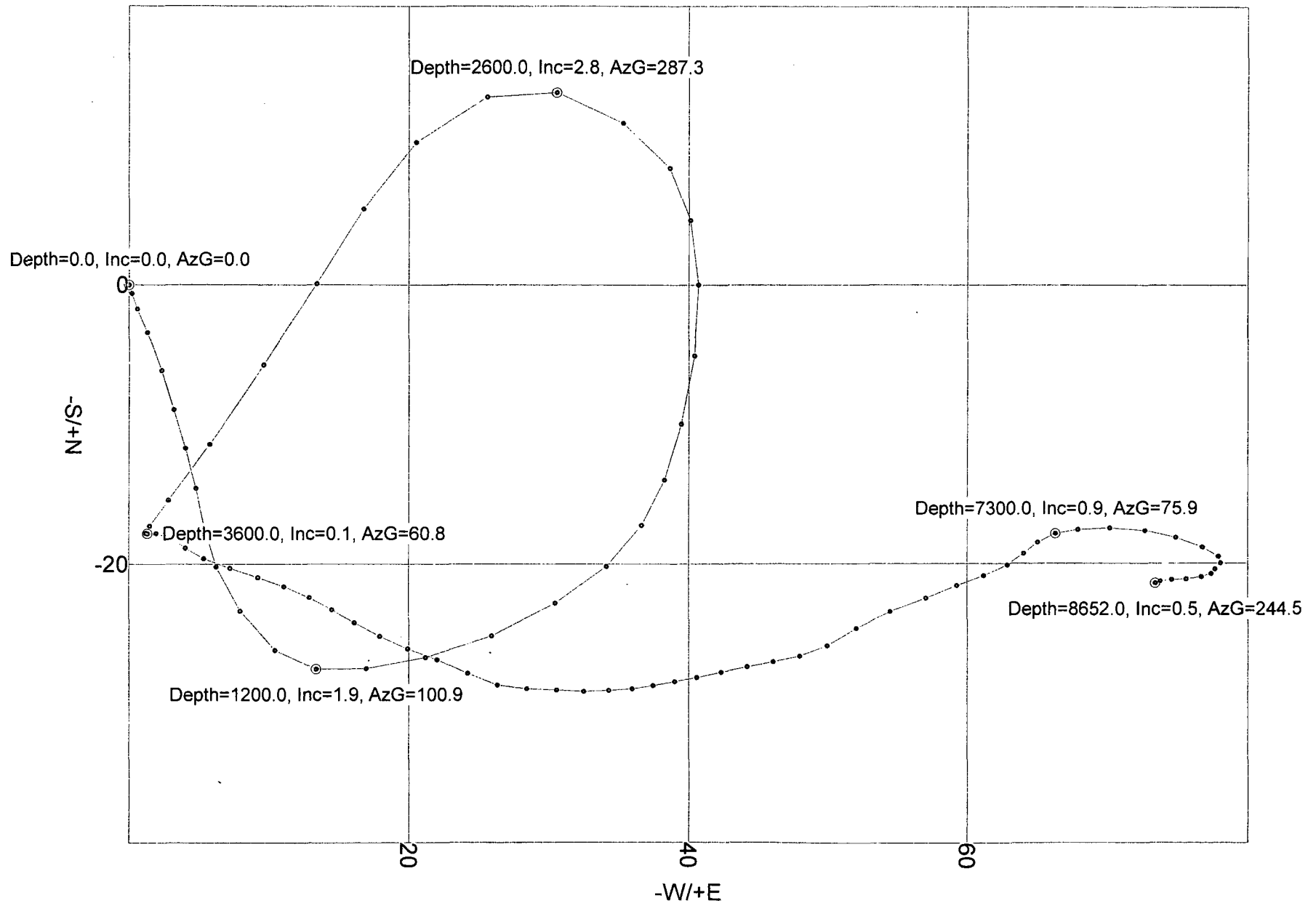
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.76	161.26	100.00	-0.63	0.21	0.67	161.26	0.76
200.00	0.56	159.64	199.99	-1.72	0.60	1.82	160.83	0.20
300.00	1.53	155.75	299.97	-3.39	1.32	3.64	158.80	0.98
400.00	1.75	162.41	399.93	-6.07	2.33	6.50	159.02	0.29
500.00	1.59	162.80	499.89	-8.85	3.20	9.41	160.13	0.16
600.00	1.75	164.17	599.85	-11.65	4.03	12.33	160.93	0.17
700.00	1.68	166.46	699.80	-14.55	4.79	15.31	161.78	0.10
800.00	1.66	169.88	799.76	-17.39	5.38	18.21	162.80	0.10
900.00	1.74	156.77	899.72	-20.21	6.24	21.15	162.85	0.40
1000.00	2.38	147.48	999.65	-23.35	7.95	24.67	161.20	0.72
1100.00	1.97	127.18	1099.58	-26.14	10.44	28.15	158.23	0.87
1200.00	1.86	100.92	1199.53	-27.49	13.40	30.58	154.01	0.88
1300.00	2.29	79.82	1299.46	-27.44	16.95	32.26	148.29	0.87
1400.00	2.63	79.13	1399.37	-26.66	21.17	34.04	141.54	0.35
1500.00	3.07	66.17	1499.25	-25.14	25.88	36.08	134.17	0.78
1600.00	2.85	59.54	1599.11	-22.80	30.48	38.06	126.80	0.41
1700.00	2.32	48.10	1699.01	-20.19	34.12	39.65	120.61	0.74
1800.00	2.18	32.24	1798.94	-17.23	36.64	40.49	115.18	0.63

measured Depth FT	inci Angle Deg	Dirt Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	2.04	20.45	1898.87	-13.95	38.28	40.74	110.02	0.46
2000.00	2.83	13.25	1998.78	-9.88	39.47	40.69	104.05	0.85
2100.00	2.81	8.48	2098.66	-5.05	40.40	40.71	97.12	0.24
2200.00	3.03	358.49	2198.53	0.02	40.69	40.69	89.98	0.55
2300.00	2.36	345.56	2298.42	4.65	40.11	40.37	83.39	0.90
2400.00	2.30	332.27	2398.34	8.42	38.66	39.57	77.72	0.54
2500.00	3.24	300.87	2498.22	11.64	35.30	37.17	71.75	1.75
2600.00	2.78	287.28	2598.09	13.81	30.56	33.54	65.69	0.84
2700.00	3.29	248.78	2697.96	13.49	25.57	28.91	62.18	2.06
2800.00	3.70	227.18	2797.77	10.26	20.52	22.94	63.44	1.37
2900.00	3.40	208.23	2897.58	5.45	16.75	17.61	71.98	1.21
3000.00	3.85	214.77	2997.38	0.07	13.43	13.43	89.69	0.61
3100.00	4.09	212.53	3097.14	-5.69	9.60	11.16	120.66	0.28
3200.00	3.76	215.88	3196.91	-11.35	5.76	12.73	153.10	0.40
3300.00	1.98	215.93	3296.78	-15.41	2.82	15.67	169.62	1.77
3400.00	0.63	217.21	3396.75	-17.25	1.48	17.31	175.11	1.35
3500.00	0.12	140.93	3496.75	-17.76	1.21	17.80	176.11	0.61
3600.00	0.09	60.78	3596.75	-17.80	1.34	17.85	175.70	0.13
3700.00	0.64	90.46	3696.75	-17.77	1.96	17.88	173.71	0.56
3800.00	0.66	124.04	3796.74	-18.10	3.00	18.35	170.60	0.38
3900.00	0.81	128.08	3896.73	-18.86	4.03	19.29	167.93	0.15
4000.00	0.95	113.23	3996.72	-19.62	5.35	20.34	164.75	0.26
4100.00	1.35	107.75	4096.70	-20.31	7.23	21.55	160.41	0.41
4200.00	1.06	108.77	4196.68	-20.96	9.22	22.90	156.26	0.29
4300.00	1.20	109.52	4296.66	-21.61	11.08	24.29	152.84	0.14
4400.00	1.07	117.09	4396.64	-22.39	12.91	25.84	150.04	0.20
4500.00	1.04	119.94	4496.62	-23.26	14.52	27.43	148.02	0.06
4600.00	1.05	121.24	4596.61	-24.19	16.09	29.06	146.37	0.03
4700.00	1.31	115.28	4696.59	-25.16	17.91	30.88	144.55	0.28
4800.00	1.21	112.51	4796.56	-26.05	19.91	32.79	142.60	0.12
4900.00	1.36	108.06	4896.54	-26.82	22.01	34.69	140.62	0.18
5000.00	1.38	119.55	4996.51	-27.78	24.18	36.82	138.96	0.27
5100.00	1.27	103.67	5096.48	-28.63	26.30	38.88	137.43	0.38
5200.00	1.21	89.98	5196.46	-28.89	28.44	40.54	135.46	0.30
5300.00	1.23	94.90	5296.44	-28.98	30.56	42.12	133.48	0.11
5400.00	1.01	90.21	5396.42	-29.08	32.51	43.61	131.81	0.24
5500.00	1.05	85.92	5496.40	-29.02	34.30	44.93	130.23	0.09
5600.00	0.87	85.75	5596.39	-28.89	35.97	46.14	128.77	0.18
5700.00	0.87	77.11	5696.38	-28.67	37.47	47.18	127.42	0.13

Measured Depth FT	measured Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.92	81.01	5796.36	-28.37	39.00	48.23	126.04	0.08
5900.00	0.92	77.30	5896.35	-28.07	40.58	49.34	124.68	0.06
6000.00	1.10	78.51	5996.33	-27.70	42.30	50.56	123.22	0.18
6100.00	1.07	78.28	6096.32	-27.32	44.15	51.92	121.75	0.03
6200.00	1.10	79.68	6196.30	-26.96	46.01	53.33	120.37	0.04
6300.00	1.13	76.96	6296.28	-26.57	47.92	54.79	119.00	0.06
6400.00	1.29	63.61	6396.26	-25.85	49.89	56.18	117.39	0.32
6500.00	1.48	56.91	6496.23	-24.64	51.98	57.52	115.36	0.26
6600.00	1.67	70.10	6596.19	-23.44	54.43	59.26	113.30	0.41
6700.00	1.52	68.99	6696.15	-22.47	57.04	61.30	111.50	0.15
6800.00	1.22	67.27	6796.12	-21.58	59.26	63.07	110.01	0.30
6900.00	1.14	72.82	6896.10	-20.87	61.19	64.66	108.83	0.14
7000.00	1.01	57.66	6996.08	-20.11	62.89	66.03	107.73	0.31
7100.00	0.64	50.39	7096.07	-19.28	64.07	66.91	106.74	0.39
7200.00	0.82	51.62	7196.07	-18.47	65.06	67.63	105.85	0.18
7300.00	0.87	75.88	7296.06	-17.84	66.36	68.72	105.05	0.36
7400.00	0.99	84.23	7396.04	-17.57	67.96	70.20	104.49	0.18
7500.00	1.62	89.02	7496.02	-17.46	70.24	72.37	103.96	0.63
7600.00	1.26	101.29	7595.98	-17.65	72.72	74.83	103.64	0.47
7700.00	1.32	104.55	7695.96	-18.15	74.91	77.08	103.62	0.09
7800.00	1.00	118.81	7795.94	-18.86	76.79	79.07	103.80	0.42
7900.00	0.53	121.72	7895.93	-19.52	77.94	80.35	104.06	0.48
8000.00	0.37	226.34	7995.93	-19.99	78.10	80.62	104.36	0.72
8100.00	0.31	216.06	8095.93	-20.43	77.71	80.35	104.73	0.09
8200.00	0.19	230.04	8195.92	-20.75	77.42	80.16	105.00	0.13
8300.00	0.67	257.57	8295.92	-20.98	76.72	79.54	105.30	0.51
8400.00	0.58	266.37	8395.92	-21.14	75.64	78.54	105.62	0.13
8500.00	0.59	269.46	8495.91	-21.18	74.62	77.57	105.85	0.03
8600.00	0.34	251.65	8595.91	-21.28	73.81	76.82	106.08	0.29
8652.00	0.50	244.47	8647.91	-21.43	73.46	76.52	106.26	0.31



Vaughn Energy Services
Gardendale Texas
432-563-5444
Surveyor: Danny Spring
Lizard Pot Fed Com 2H / API 30-015-38146



VES Survey Date: 08/23/2012



A Schlumberger Company

COG Operating LLC

Eddy County(NAD27)

Lizard Pot State Com

#2H

OH

Design: OH

Pathfinder X&Y Report

05 September, 2012





A Schlumberger Company

Pathfinder
Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Lizard Pot State Com
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3498.0usft (Original Well Elev)
MD Reference: WELL @ 3498.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project Eddy County(NAD27)

Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site Lizard Pot State Com

Site Position: Northing: 586,506.393 usft Latitude: 32.611396
From: Map Easting: 655,405.700 usft Longitude: -103.826641
Position Uncertainty: 0.0 usft Slot Radius: 13-3/16 " Grid Convergence: 0.27 °

Well #2H

Well Position +N/-S 0.0 usft Northing: 586,514.400 usft Latitude: 32.611401
+E/-W 0.0 usft Easting: 656,725.500 usft Longitude: -103.824355
Position Uncertainty 0.0 usft Wellhead Elevation: usft Ground Level: 3,481.0 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	8/11/2012	7.58	60.50	48,746

Design OH

Audit Notes:
Version: 1.0 Phase: ACTUAL Tie On Depth: 0.0
Vertical Section: Depth From (TVD) +N/-S +E/-W Direction
(usft) (usft) (usft) (°)
0.0 0.0 0.0 179.99

Company: COG Operating LLC
Project: Eddy County(NAD27)
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Survey Program		Date			
From (usft)	To (usft)	9/5/2012			
100.0	8,652.0	Gyro #1 (OH)	Tool Name	Description	
8,704.0	14,670.0	MWD #2 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
			MWD	MWD - Standard	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D. Leg (°/100usft)	Latitude (°)	Longitude (°)
0.0	0.00	0.00	0.0	-3,498.0	0.0	0.0	0.0	0.00	32.61	-103.82
100.0	0.76	161.26	100.0	-3,398.0	-0.6	0.2	0.6	0.76	32.61	-103.82
200.0	0.56	159.64	200.0	-3,298.0	-1.7	0.6	1.7	0.20	32.61	-103.82
300.0	1.53	155.75	300.0	-3,198.0	-3.4	1.3	3.4	0.97	32.61	-103.82
400.0	1.75	162.41	399.9	-3,098.1	-6.1	2.3	6.1	0.29	32.61	-103.82
500.0	1.59	162.80	499.9	-2,998.1	-8.8	3.2	8.8	0.16	32.61	-103.82
600.0	1.75	164.17	599.8	-2,898.2	-11.6	4.0	11.6	0.16	32.61	-103.82
700.0	1.68	166.46	699.8	-2,798.2	-14.5	4.8	14.5	0.10	32.61	-103.82
800.0	1.66	169.88	799.8	-2,698.2	-17.4	5.4	17.4	0.10	32.61	-103.82
900.0	1.74	156.77	899.7	-2,598.3	-20.2	6.2	20.2	0.40	32.61	-103.82
1,000.0	2.38	147.48	999.7	-2,498.3	-23.3	7.9	23.4	0.72	32.61	-103.82
1,100.0	1.97	127.18	1,099.6	-2,398.4	-26.1	10.4	26.1	0.87	32.61	-103.82
1,200.0	1.86	100.92	1,199.5	-2,298.5	-27.5	13.4	27.5	0.88	32.61	-103.82
1,300.0	2.29	79.82	1,299.5	-2,198.5	-27.4	17.0	27.4	0.87	32.61	-103.82
1,400.0	2.63	79.13	1,399.4	-2,098.6	-26.7	21.2	26.7	0.34	32.61	-103.82
1,500.0	3.07	66.17	1,499.2	-1,998.8	-25.1	25.9	25.1	0.78	32.61	-103.82
1,600.0	2.85	59.54	1,599.1	-1,898.9	-22.8	30.5	22.8	0.41	32.61	-103.82
1,700.0	2.32	48.10	1,699.0	-1,799.0	-20.2	34.1	20.2	0.74	32.61	-103.82
1,800.0	2.18	32.24	1,798.9	-1,699.1	-17.2	36.6	17.2	0.64	32.61	-103.82
1,900.0	2.04	20.45	1,898.9	-1,599.1	-13.9	38.3	14.0	0.46	32.61	-103.82
2,000.0	2.83	13.25	1,998.8	-1,499.2	-9.9	39.5	9.9	0.85	32.61	-103.82



A Schlumberger Company

Pathfinder
Pathfinder X&Y Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Lizard Pot State Com
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3498.0usft (Original Well Elev)
MD Reference: WELL @ 3498.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)	
2,100.0	2.81	8.48	2,098.7	-1,399.3	-5.1	40.4	5.1	0.24	32.61	-103.82	
2,200.0	3.03	358.49	2,198.5	-1,299.5	0.0	40.7	0.0	0.55	32.61	-103.82	
2,300.0	2.36	345.56	2,298.4	-1,199.6	4.7	40.1	-4.6	0.90	32.61	-103.82	
2,400.0	2.30	332.27	2,398.3	-1,099.7	8.4	38.7	-8.4	0.54	32.61	-103.82	
2,500.0	3.24	300.87	2,498.2	-999.8	11.6	35.3	-11.6	1.75	32.61	-103.82	
2,600.0	2.78	287.28	2,598.1	-899.9	13.8	30.6	-13.8	0.85	32.61	-103.82	
2,700.0	3.29	248.78	2,698.0	-800.0	13.5	25.6	-13.5	2.06	32.61	-103.82	
2,800.0	3.70	227.18	2,797.8	-700.2	10.3	20.5	-10.3	1.37	32.61	-103.82	
2,900.0	3.40	208.23	2,897.6	-600.4	5.5	16.8	-5.5	1.20	32.61	-103.82	
3,000.0	3.85	214.77	2,997.4	-500.6	0.1	13.4	-0.1	0.61	32.61	-103.82	
3,100.0	4.09	212.53	3,097.1	-400.9	-5.7	9.6	5.7	0.29	32.61	-103.82	
3,200.0	3.76	215.88	3,196.9	-301.1	-11.3	5.8	11.3	0.40	32.61	-103.82	
3,300.0	1.98	215.93	3,296.8	-201.2	-15.4	2.8	15.4	1.78	32.61	-103.82	
3,400.0	0.63	217.21	3,396.8	-101.2	-17.2	1.5	17.2	1.35	32.61	-103.82	
3,500.0	0.12	140.93	3,496.8	-1.2	-17.7	1.2	17.7	0.61	32.61	-103.82	
3,600.0	0.09	60.78	3,596.8	98.8	-17.8	1.3	17.8	0.14	32.61	-103.82	
3,700.0	0.64	90.46	3,696.7	198.7	-17.8	2.0	17.8	0.56	32.61	-103.82	
3,800.0	0.66	124.04	3,796.7	298.7	-18.1	3.0	18.1	0.38	32.61	-103.82	
3,900.0	0.81	128.08	3,896.7	398.7	-18.8	4.0	18.8	0.16	32.61	-103.82	
4,000.0	0.95	113.23	3,996.7	498.7	-19.6	5.4	19.6	0.27	32.61	-103.82	
4,100.0	1.35	107.75	4,096.7	598.7	-20.3	7.2	20.3	0.41	32.61	-103.82	
4,200.0	1.06	108.77	4,196.7	698.7	-20.9	9.2	20.9	0.29	32.61	-103.82	
4,300.0	1.20	109.52	4,296.7	798.7	-21.6	11.1	21.6	0.14	32.61	-103.82	
4,400.0	1.07	117.09	4,396.6	898.6	-22.4	12.9	22.4	0.20	32.61	-103.82	
4,500.0	1.04	119.94	4,496.6	998.6	-23.2	14.5	23.3	0.06	32.61	-103.82	
4,600.0	1.05	121.24	4,596.6	1,098.6	-24.2	16.1	24.2	0.03	32.61	-103.82	
4,700.0	1.31	115.28	4,696.6	1,198.6	-25.1	17.9	25.1	0.29	32.61	-103.82	

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Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLog (°/100usft)	Latitude (°)	Longitude (°)
4,800.0	1.21	112.51	4,796.6	1,298.6	-26.0	19.9	26.0	0.12	32.61	-103.82
4,900.0	1.36	108.06	4,896.5	1,398.5	-26.8	22.0	26.8	0.18	32.61	-103.82
5,000.0	1.38	119.55	4,996.5	1,498.5	-27.8	24.2	27.8	0.27	32.61	-103.82
5,100.0	1.27	103.67	5,096.5	1,598.5	-28.6	26.3	28.6	0.38	32.61	-103.82
5,200.0	1.21	89.98	5,196.5	1,698.5	-28.9	28.5	28.9	0.30	32.61	-103.82
5,300.0	1.23	94.90	5,296.4	1,798.4	-29.0	30.6	29.0	0.11	32.61	-103.82
5,400.0	1.01	90.21	5,396.4	1,898.4	-29.1	32.6	29.1	0.24	32.61	-103.82
5,500.0	1.05	85.92	5,496.4	1,998.4	-29.0	34.3	29.0	0.09	32.61	-103.82
5,600.0	0.87	85.75	5,596.4	2,098.4	-28.9	36.0	28.9	0.18	32.61	-103.82
5,700.0	0.87	77.11	5,696.4	2,198.4	-28.7	37.5	28.7	0.13	32.61	-103.82
5,800.0	0.92	81.01	5,796.4	2,298.4	-28.4	39.0	28.4	0.08	32.61	-103.82
5,900.0	0.92	77.30	5,896.3	2,398.3	-28.1	40.6	28.1	0.06	32.61	-103.82
6,000.0	1.10	78.51	5,996.3	2,498.3	-27.7	42.3	27.7	0.18	32.61	-103.82
6,100.0	1.07	78.28	6,096.3	2,598.3	-27.3	44.2	27.3	0.03	32.61	-103.82
6,200.0	1.10	79.68	6,196.3	2,698.3	-27.0	46.1	27.0	0.04	32.61	-103.82
6,300.0	1.13	76.96	6,296.3	2,798.3	-26.6	48.0	26.6	0.06	32.61	-103.82
6,400.0	1.29	63.61	6,396.3	2,898.3	-25.8	49.9	25.8	0.32	32.61	-103.82
6,500.0	1.48	56.91	6,496.2	2,998.2	-24.6	52.0	24.6	0.25	32.61	-103.82
6,600.0	1.67	70.10	6,596.2	3,098.2	-23.4	54.5	23.4	0.41	32.61	-103.82
6,700.0	1.52	68.99	6,696.2	3,198.2	-22.5	57.1	22.5	0.15	32.61	-103.82
6,800.0	1.22	67.27	6,796.1	3,298.1	-21.6	59.3	21.6	0.30	32.61	-103.82
6,900.0	1.14	72.82	6,896.1	3,398.1	-20.9	61.2	20.9	0.14	32.61	-103.82
7,000.0	1.01	57.66	6,996.1	3,498.1	-20.1	62.9	20.1	0.31	32.61	-103.82
7,100.0	0.64	50.39	7,096.1	3,598.1	-19.3	64.1	19.3	0.38	32.61	-103.82
7,200.0	0.82	51.62	7,196.1	3,698.1	-18.5	65.1	18.5	0.18	32.61	-103.82
7,300.0	0.87	75.88	7,296.1	3,798.1	-17.8	66.4	17.9	0.36	32.61	-103.82
7,400.0	0.99	84.23	7,396.0	3,898.0	-17.6	68.0	17.6	0.18	32.61	-103.82



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Site: Lizard Pot State Com
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well #2H
WELL @ 3498.0usft (Original Well Elev)
WELL @ 3498.0usft (Original Well Elev)
Grid
Minimum Curvature
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Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)	
7,500.0	1.62	89.02	7,496.0	3,998.0	-17.5	70.3	17.5	0.64	32.61	-103.82	
7,600.0	1.26	101.29	7,596.0	4,098.0	-17.7	72.8	17.7	0.47	32.61	-103.82	
7,700.0	1.32	104.55	7,696.0	4,198.0	-18.2	75.0	18.2	0.09	32.61	-103.82	
7,800.0	1.00	118.81	7,795.9	4,297.9	-18.9	76.8	18.9	0.43	32.61	-103.82	
7,900.0	0.53	121.72	7,895.9	4,397.9	-19.5	78.0	19.5	0.47	32.61	-103.82	
8,000.0	0.37	226.34	7,995.9	4,497.9	-20.0	78.1	20.0	0.72	32.61	-103.82	
8,100.0	0.31	216.06	8,095.9	4,597.9	-20.4	77.8	20.4	0.09	32.61	-103.82	
8,200.0	0.19	230.04	8,195.9	4,697.9	-20.8	77.5	20.8	0.13	32.61	-103.82	
8,300.0	0.67	257.57	8,295.9	4,797.9	-21.0	76.8	21.0	0.51	32.61	-103.82	
8,400.0	0.58	266.37	8,395.9	4,897.9	-21.2	75.7	21.2	0.13	32.61	-103.82	
8,500.0	0.59	269.46	8,495.9	4,997.9	-21.2	74.7	21.2	0.03	32.61	-103.82	
8,600.0	0.34	251.65	8,595.9	5,097.9	-21.3	73.9	21.3	0.29	32.61	-103.82	
8,652.0	0.50	244.47	8,647.9	5,149.9	-21.4	73.5	21.4	0.32	32.61	-103.82	
8,704.0	0.26	251.14	8,699.9	5,201.9	-21.6	73.2	21.6	0.47	32.61	-103.82	
8,736.0	1.41	144.08	8,731.9	5,233.9	-21.9	73.4	21.9	4.71	32.61	-103.82	
8,768.0	2.55	122.42	8,763.9	5,265.9	-22.6	74.2	22.6	4.20	32.61	-103.82	
8,799.0	2.90	137.12	8,794.8	5,296.8	-23.6	75.3	23.6	2.51	32.61	-103.82	
8,831.0	4.84	168.87	8,826.8	5,328.8	-25.5	76.1	25.5	8.82	32.61	-103.82	
8,863.0	6.95	179.24	8,858.6	5,360.6	-28.7	76.4	28.7	7.36	32.61	-103.82	
8,895.0	9.23	182.25	8,890.3	5,392.3	-33.2	76.3	33.2	7.24	32.61	-103.82	
8,927.0	11.70	188.17	8,921.8	5,423.8	-39.0	75.8	39.0	8.41	32.61	-103.82	
8,959.0	14.07	189.46	8,952.9	5,454.9	-46.1	74.7	46.1	7.46	32.61	-103.82	
8,991.0	16.80	188.05	8,983.8	5,485.8	-54.5	73.4	54.5	8.61	32.61	-103.82	
9,023.0	21.46	184.88	9,014.0	5,516.0	-64.9	72.2	64.9	14.91	32.61	-103.82	
9,054.0	25.94	184.34	9,042.4	5,544.4	-77.3	71.3	77.3	14.47	32.61	-103.82	
9,086.0	31.13	185.40	9,070.5	5,572.5	-92.5	69.9	92.6	16.30	32.61	-103.82	
9,118.0	36.49	184.16	9,097.1	5,599.1	-110.3	68.5	110.3	16.89	32.61	-103.82	



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WELL @ 3498.0usft (Original Well Elev)
WELL @ 3498.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V.Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)
9,150.0	40.63	182.02	9,122.1	5,624.1	-130.2	67.4	130.2	13.59	32.61	-103.82
9,181.0	44.32	180.12	9,145.0	5,647.0	-151.1	67.0	151.1	12.60	32.61	-103.82
9,213.0	48.36	179.63	9,167.0	5,669.0	-174.3	67.1	174.3	12.67	32.61	-103.82
9,245.0	51.53	180.45	9,187.6	5,689.6	-198.7	67.1	198.8	10.10	32.61	-103.82
9,277.0	53.38	181.64	9,207.1	5,709.1	-224.1	66.6	224.1	6.49	32.61	-103.82
9,309.0	56.72	181.38	9,225.5	5,727.5	-250.3	65.9	250.3	10.46	32.61	-103.82
9,341.0	61.47	181.60	9,241.9	5,743.9	-277.8	65.2	277.8	14.86	32.61	-103.82
9,372.0	65.42	181.27	9,255.7	5,757.7	-305.5	64.5	305.5	12.78	32.61	-103.82
9,404.0	67.62	180.15	9,268.5	5,770.5	-334.8	64.1	334.8	7.59	32.61	-103.82
9,430.0	70.52	178.72	9,277.8	5,779.8	-359.1	64.4	359.1	12.28	32.61	-103.82
9,462.0	73.78	178.78	9,287.6	5,789.6	-389.6	65.1	389.6	10.19	32.61	-103.82
9,492.0	76.24	180.11	9,295.4	5,797.4	-418.5	65.3	418.5	9.25	32.61	-103.82
9,524.0	78.44	181.43	9,302.4	5,804.4	-449.8	64.9	449.8	7.97	32.61	-103.82
9,555.0	81.34	181.96	9,307.8	5,809.8	-480.3	64.0	480.3	9.51	32.61	-103.82
9,587.0	83.36	181.79	9,312.1	5,814.1	-512.0	63.0	512.0	6.33	32.61	-103.82
9,619.0	84.50	181.28	9,315.4	5,817.4	-543.8	62.1	543.8	3.90	32.61	-103.82
9,650.0	86.26	180.15	9,317.9	5,819.9	-574.7	61.7	574.7	6.74	32.61	-103.82
9,682.0	87.58	179.59	9,319.7	5,821.7	-606.6	61.8	606.6	4.48	32.61	-103.82
9,713.0	88.81	179.54	9,320.6	5,822.6	-637.6	62.0	637.6	3.97	32.61	-103.82
9,745.0	88.72	180.51	9,321.3	5,823.3	-669.6	62.0	669.6	3.04	32.61	-103.82
9,777.0	88.90	180.59	9,322.0	5,824.0	-701.6	61.7	701.6	0.62	32.61	-103.82
9,872.0	88.46	178.73	9,324.2	5,826.2	-796.5	62.3	796.6	2.01	32.61	-103.82
9,935.0	88.37	179.41	9,325.9	5,827.9	-859.5	63.3	859.5	1.09	32.61	-103.82
9,998.0	87.76	179.08	9,328.1	5,830.1	-922.5	64.1	922.5	1.10	32.61	-103.82
10,062.0	88.46	179.36	9,330.2	5,832.2	-986.4	65.0	986.4	1.18	32.61	-103.82
10,125.0	89.16	180.77	9,331.5	5,833.5	-1,049.4	64.9	1,049.4	2.50	32.61	-103.82
10,188.0	89.08	180.26	9,332.4	5,834.4	-1,112.4	64.4	1,112.4	0.82	32.61	-103.82



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Local Co-ordinate Reference: Well #2H
TVD Reference: WELL @ 3498.0usft (Original Well Elev)
MD Reference: WELL @ 3498.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)
10,251.0	88.64	179.83	9,333.7	5,835.7	-1,175.4	64.3	1,175.4	0.98	32.61	-103.82
10,315.0	88.90	181.28	9,335.1	5,837.1	-1,239.4	63.7	1,239.4	2.30	32.61	-103.82
10,379.0	88.81	181.35	9,336.3	5,838.3	-1,303.3	62.2	1,303.3	0.18	32.61	-103.82
10,441.0	88.37	180.55	9,337.9	5,839.9	-1,365.3	61.2	1,365.3	1.47	32.61	-103.82
10,504.0	89.52	181.53	9,339.0	5,841.0	-1,428.3	60.1	1,428.3	2.40	32.61	-103.82
10,567.0	89.52	180.96	9,339.6	5,841.6	-1,491.3	58.7	1,491.3	0.90	32.61	-103.82
10,629.0	89.34	180.24	9,340.2	5,842.2	-1,553.3	58.0	1,553.3	1.20	32.61	-103.82
10,724.0	89.16	181.40	9,341.4	5,843.4	-1,648.2	56.7	1,648.3	1.24	32.61	-103.82
10,819.0	89.08	180.21	9,342.9	5,844.9	-1,743.2	55.3	1,743.2	1.26	32.61	-103.82
10,914.0	90.13	180.80	9,343.5	5,845.5	-1,838.2	54.5	1,838.2	1.27	32.61	-103.82
11,009.0	90.57	179.73	9,343.0	5,845.0	-1,933.2	54.1	1,933.2	1.22	32.61	-103.82
11,104.0	89.08	180.26	9,343.2	5,845.2	-2,028.2	54.1	2,028.2	1.66	32.61	-103.82
11,198.0	89.08	180.81	9,344.8	5,846.8	-2,122.2	53.2	2,122.2	0.59	32.61	-103.82
11,294.0	88.81	181.10	9,346.5	5,848.5	-2,218.2	51.6	2,218.2	0.41	32.61	-103.82
11,388.0	88.46	179.87	9,348.8	5,850.8	-2,312.1	50.8	2,312.1	1.36	32.61	-103.82
11,484.0	89.34	180.29	9,350.6	5,852.6	-2,408.1	50.7	2,408.1	1.02	32.60	-103.82
11,577.0	89.60	179.48	9,351.5	5,853.5	-2,501.1	50.9	2,501.1	0.91	32.60	-103.82
11,670.0	90.22	178.25	9,351.6	5,853.6	-2,594.1	52.7	2,594.1	1.48	32.60	-103.82
11,766.0	90.84	176.83	9,350.7	5,852.7	-2,690.0	56.8	2,690.0	1.61	32.60	-103.82
11,861.0	91.36	178.93	9,348.9	5,850.9	-2,784.9	60.3	2,784.9	2.28	32.60	-103.82
11,954.0	90.66	178.67	9,347.3	5,849.3	-2,877.9	62.3	2,877.9	0.80	32.60	-103.82
12,017.0	90.22	178.68	9,346.8	5,848.8	-2,940.8	63.7	2,940.9	0.70	32.60	-103.82
12,079.0	89.25	180.04	9,347.1	5,849.1	-3,002.8	64.4	3,002.8	2.69	32.60	-103.82
12,143.0	87.41	182.98	9,348.9	5,850.9	-3,066.8	62.7	3,066.8	5.42	32.60	-103.82
12,206.0	87.41	182.49	9,351.8	5,853.8	-3,129.6	59.7	3,129.7	0.78	32.60	-103.82
12,301.0	87.93	180.58	9,355.6	5,857.6	-3,224.5	57.2	3,224.5	2.08	32.60	-103.82
12,396.0	87.23	182.14	9,359.6	5,861.6	-3,319.4	54.9	3,319.4	1.80	32.60	-103.82



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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLag (°/100usft)	Latitude (°)	Longitude (°)
12,491.0	87.58	182.20	9,363.9	5,865.9	-3,414.2	51.4	3,414.3	0.37	32.60	-103.82
12,586.0	88.37	181.44	9,367.3	5,869.3	-3,509.1	48.3	3,509.1	1.15	32.60	-103.82
12,681.0	88.72	180.31	9,369.7	5,871.7	-3,604.1	46.9	3,604.1	1.24	32.60	-103.82
12,776.0	88.99	179.41	9,371.6	5,873.6	-3,699.1	47.1	3,699.1	0.99	32.60	-103.82
12,871.0	87.49	179.52	9,374.5	5,876.5	-3,794.0	48.0	3,794.0	1.58	32.60	-103.82
12,965.0	88.11	180.12	9,378.1	5,880.1	-3,888.0	48.3	3,888.0	0.92	32.60	-103.82
13,061.0	88.29	181.53	9,381.2	5,883.2	-3,983.9	46.9	3,983.9	1.48	32.60	-103.82
13,156.0	89.34	182.35	9,383.1	5,885.1	-4,078.8	43.7	4,078.8	1.40	32.60	-103.82
13,250.0	89.96	181.69	9,383.7	5,885.7	-4,172.8	40.4	4,172.8	0.96	32.60	-103.82
13,343.0	90.31	184.01	9,383.5	5,885.5	-4,265.6	35.8	4,265.6	2.52	32.60	-103.82
13,435.0	91.10	182.62	9,382.3	5,884.3	-4,357.5	30.4	4,357.5	1.74	32.60	-103.82
13,527.0	89.87	182.97	9,381.6	5,883.6	-4,449.4	26.0	4,449.4	1.39	32.60	-103.82
13,619.0	90.40	182.33	9,381.4	5,883.4	-4,541.3	21.7	4,541.3	0.90	32.60	-103.82
13,711.0	90.40	182.40	9,380.7	5,882.7	-4,633.2	17.9	4,633.2	0.08	32.60	-103.82
13,803.0	88.81	181.81	9,381.3	5,883.3	-4,725.1	14.5	4,725.1	1.84	32.60	-103.82
13,896.0	89.52	180.18	9,382.7	5,884.7	-4,818.1	12.9	4,818.1	1.91	32.60	-103.82
13,988.0	88.11	180.57	9,384.6	5,886.6	-4,910.1	12.3	4,910.1	1.59	32.60	-103.82
14,080.0	89.34	179.70	9,386.6	5,888.6	-5,002.0	12.1	5,002.0	1.64	32.60	-103.82
14,172.0	86.97	180.17	9,389.6	5,891.6	-5,094.0	12.2	5,094.0	2.63	32.60	-103.82
14,264.0	87.32	179.02	9,394.2	5,896.2	-5,185.9	12.9	5,185.9	1.31	32.60	-103.82
14,356.0	87.76	178.32	9,398.1	5,900.1	-5,277.7	15.0	5,277.7	0.90	32.60	-103.82
14,449.0	89.16	179.10	9,400.6	5,902.6	-5,370.7	17.1	5,370.7	1.72	32.60	-103.82
14,541.0	89.69	179.25	9,401.6	5,903.6	-5,462.7	18.4	5,462.7	0.60	32.60	-103.82
14,622.0	89.96	177.89	9,401.8	5,903.8	-5,543.6	20.4	5,543.6	1.71	32.60	-103.82
14,670.0	89.96	177.89	9,401.8	5,903.8	-5,591.6	22.2	5,591.6	0.00	32.60	-103.82

Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Lizard Pot State Com
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well #2H
WELL @ 3498.0usft (Original Well Elev)
WELL @ 3498.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,704.0	8,699.9	-21.6	73.2	KOP - 8704.0 'MD, 8699.9 'TVD, -21.6 'N, 73.2 'E
9,713.0	9,320.6	-637.6	62.0	LP - 9713.0 'MD, 9320.6 'TVD, -637.6 'N, 62.0 'E
14,670.0	9,401.8	-5,591.6	22.2	PROJECTED BHL - 14670.0 'MD, 9401.8 'TVD, -5591.6 'N, 22.2 'E

Checked By: _____ Approved By: _____ Date: _____



Project: Eddy County(NAD27)
Site: Lizard Pot State Cor
Well: #2H
Wellbore: OH
Plan: Post Gyro Plan #3 (#2H/OH)



Azimuths to Grid North
True North: -0.27°
Magnetic North: 7.31°

Magnetic Field
Strength: 48746.2anT
Dip Angle: 60.50°
Date: 8/11/2012
Model: IGRF200510



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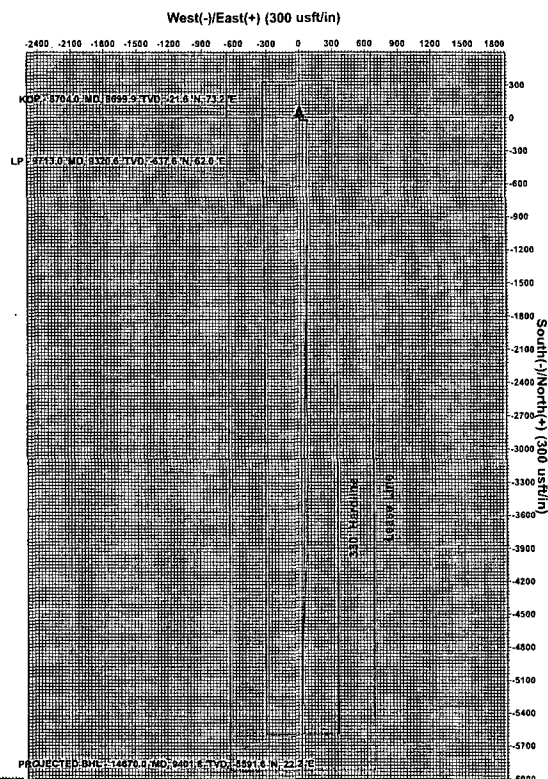
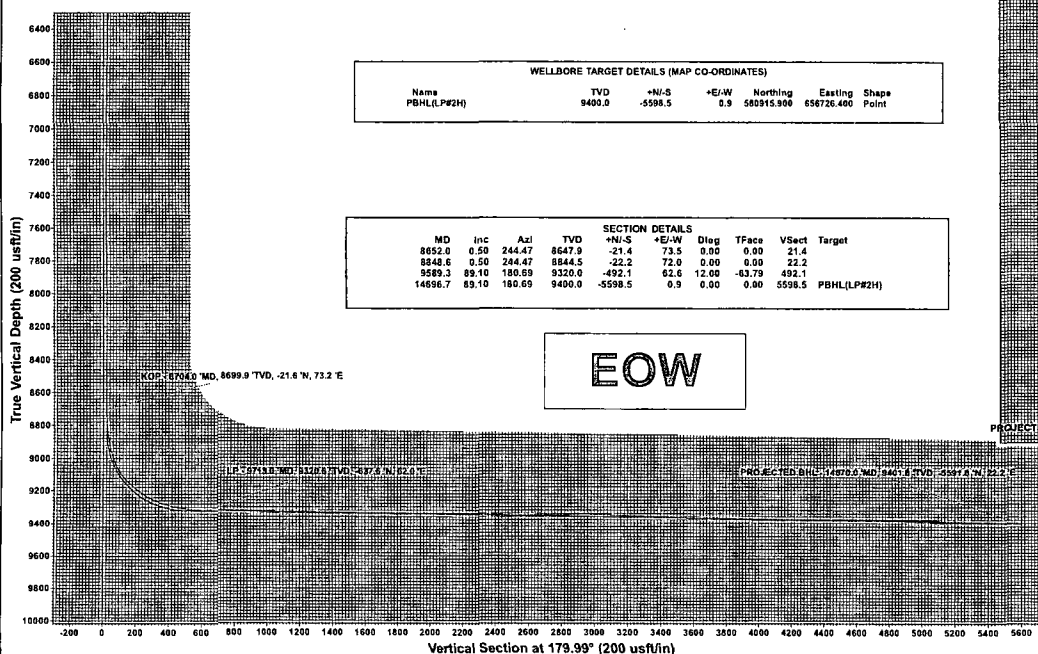
PROJECT DETAILS: Eddy County(NAD27)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3091
System Datum: Mean Sea Level
Local North: Grid

WELL DETAILS: #2H					
Ground Elevation: 3481.0					
RKB Elevation: WELL @ 3498.0usft (Original Well Elev)					
Rig Name: Original Well Elev					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	586514.400	658725.500	32.611401	-103.824355
Slot					

WELDBORE TARGET DETAILS (MAP CO-ORDINATES)					
Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL(LP#2H)	9400.0	-5598.5	0.9	580915.900	656726.400
Shape Point					

SECTION DETAILS									
MD	inc	Azi	TVD	+N/-S	+E/-W	Diag	TFace	VSect	Target
8852.0	0.50	244.47	8647.9	-21.4	73.5	0.00	0.00	21.4	
8848.6	0.50	244.47	8844.5	-22.2	72.0	0.00	0.00	22.2	
8859.3	89.10	180.69	9320.0	-492.1	62.6	12.00	-43.79	492.1	
14696.7	89.10	180.69	9400.0	-5598.5	0.9	0.00	0.00	5598.5	PBHL(LP#2H)

EOW



Plan: Post Gyro Plan #3 (#2H/OH)	
Created By: Sam Bille	Date: 8/31, September 05 2012
Checked: _____	Date: _____

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Lizard Pot State Cor
OH
Post Gyro Plan #3