



McVAY DRILLING COMPANY
 P.O. Box 2450
 Hobbs, New Mexico 88241
 (575) 397-3311
 FAX: 39-DRILL

HOBBS OCD

JUL 30 2015

RECEIVED

Well Name and Num: Kingfisher State Com #5H
 Location: Sec 23, T18S, R34E
 Operator: COG
 Drilling Contractor: McVay Drilling Company

The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

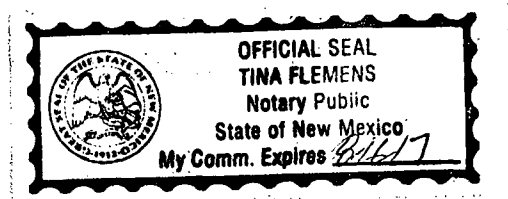
30-025-42472

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
1.10	291	1.19	5635	95.70	10218
0.42	663	1.10	6108	94.90	10689
1.40	882	1.30	6422	94.10	10972
0.40	1012	0.88	6735	96.00	11255
0.30	1200	1.40	7235	96.90	11604
0.90	1387	0.80	7520	93.40	11913
0.30	1577	0.80	7837	94.30	12007
0.20	1734	1.00	8150	93.60	12382
0.31	2068	0.70	8407	96.30	12560
0.09	2376	0.40	8562	95.50	12843
0.22	2690	0.62	8686	95.30	12947
1.50	3130	1.10	8874	95.10	13230
1.19	3397	0.49	9031	97.40	13403
1.19	3597	1.50	9249	96.40	13513
0.62	4035	15.60	9437	97.50	13890
0.62	4443	68.70	9938	94.80	14078
1.30	5321	88.00	10127	95.30	14256

By: Mario A. Camacho

Subscribed and sworn to before me this 30th day of April, 2015

Tina Flemens
 Notary Public, Lea County, New Mexico



AUG 03 2015

[Handwritten mark]




April 16, 2015

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo


RE: **Kingfisher State Com 5H**

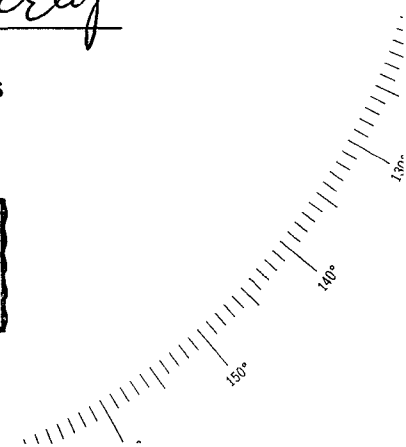
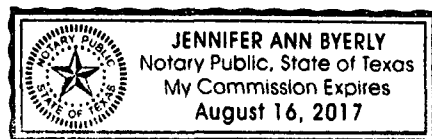
Please find enclosed a copy of the survey from 0' to 9140' ran on the above referenced well.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 16 day of April, A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: COG Operating
 Lease/Well: Kingfisher State Com/5H
 Location: S23 T18S R34E
 Rig Name: McVay 6
 State/County: New Mexico/Lea
 Latitude: 32.73, Longitude: -103.53
 GRID North is 0.44 Degrees East of True North
 VS-Azi: 8.56 Degrees



Depth Reference : RKB = 19 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
 Minimum Curvature Method
 Report Date/Time: 4/16/2015 / 08:42

VES Survey International
 Midland, TX
 432-563-5444
 Surveyor: Andrew Askew
 Kingfisher State Com 5H / API 30-025-42472

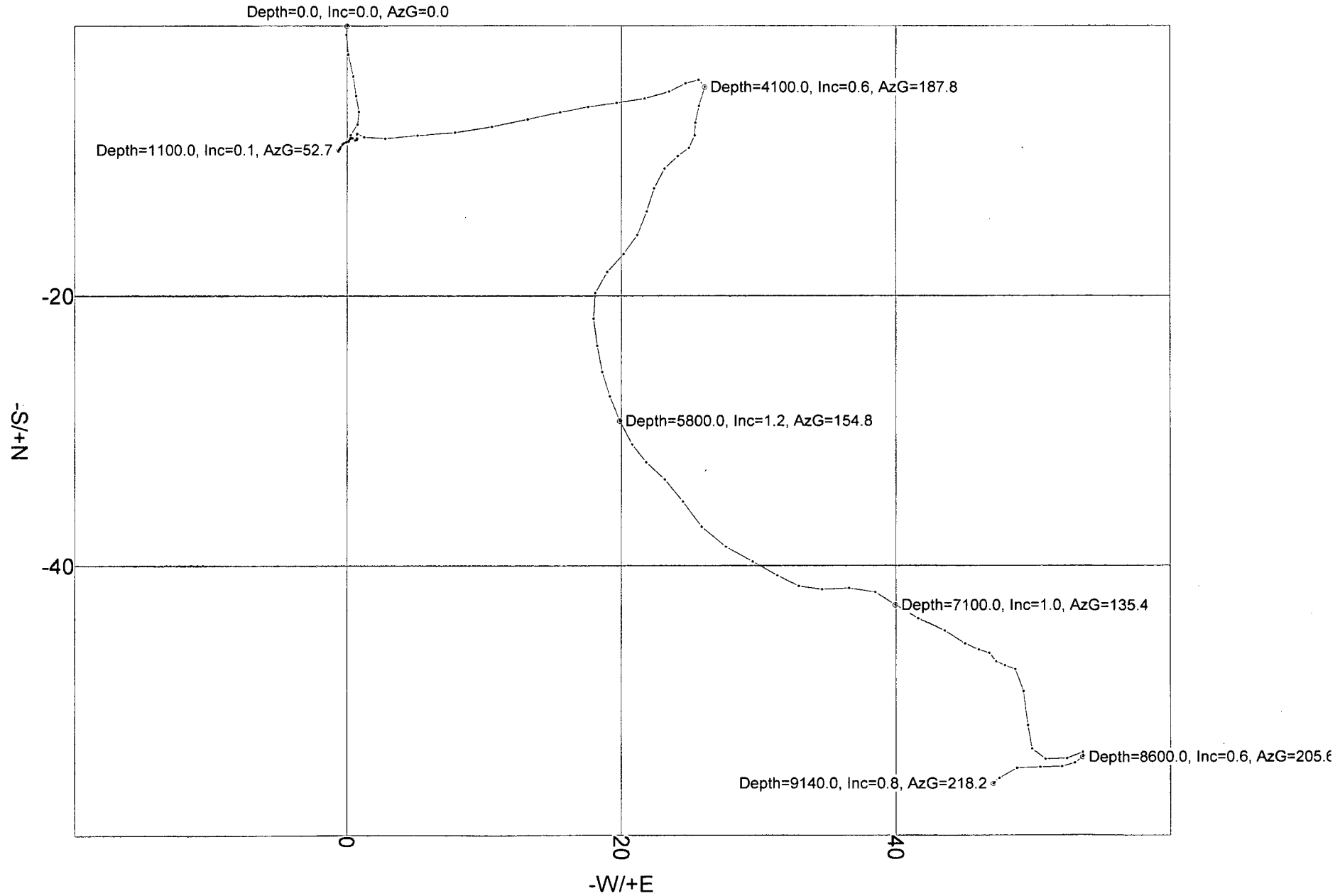
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.75	185.43	100.00	-0.65	-0.06	-0.65	0.65	185.43	0.75
200.00	0.97	164.50	199.99	-2.12	0.10	-2.08	2.12	177.23	0.38
300.00	0.94	168.84	299.97	-3.74	0.49	-3.62	3.77	172.57	0.08
400.00	0.76	173.97	399.96	-5.21	0.72	-5.04	5.25	172.16	0.19
500.00	0.60	166.05	499.95	-6.37	0.91	-6.17	6.44	171.85	0.19
600.00	0.56	205.92	599.95	-7.32	0.82	-7.11	7.36	173.57	0.40
700.00	0.54	221.94	699.94	-8.10	0.30	-7.97	8.11	177.89	0.15
800.00	0.38	221.91	799.94	-8.70	-0.24	-8.64	8.70	181.55	0.16
900.00	0.21	205.13	899.94	-9.11	-0.53	-9.09	9.13	183.35	0.19
1000.00	0.04	283.35	999.94	-9.27	-0.64	-9.26	9.29	183.97	0.21
1100.00	0.10	52.70	1099.94	-9.21	-0.60	-9.20	9.23	183.75	0.13
1200.00	0.17	19.32	1199.94	-9.02	-0.49	-8.99	9.03	183.08	0.10
1300.00	0.14	48.28	1299.94	-8.80	-0.35	-8.76	8.81	182.27	0.08
1400.00	0.23	68.42	1399.94	-8.65	-0.07	-8.56	8.65	180.47	0.12
1500.00	0.03	154.42	1499.94	-8.59	0.13	-8.48	8.59	179.14	0.23
1600.00	0.04	318.79	1599.94	-8.59	0.12	-8.47	8.59	179.22	0.06
1700.00	0.08	36.23	1699.94	-8.51	0.13	-8.39	8.51	179.10	0.08
1800.00	0.08	42.78	1799.94	-8.40	0.22	-8.28	8.41	178.50	0.01

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.01	300.27	1899.94	-8.35	0.26	-8.22	8.35	178.24	0.08
2000.00	0.07	61.28	1999.94	-8.31	0.30	-8.17	8.32	177.92	0.08
2100.00	0.12	125.57	2099.94	-8.34	0.44	-8.18	8.35	176.98	0.11
2200.00	0.17	129.26	2199.94	-8.49	0.64	-8.30	8.52	175.70	0.06
2300.00	0.15	358.97	2299.94	-8.46	0.75	-8.25	8.49	174.90	0.29
2400.00	0.10	156.54	2399.94	-8.41	0.79	-8.20	8.45	174.65	0.24
2500.00	0.18	338.00	2499.94	-8.35	0.76	-8.14	8.38	174.78	0.28
2600.00	0.18	22.57	2599.94	-8.05	0.76	-7.85	8.09	174.58	0.14
2700.00	0.11	197.91	2699.94	-8.00	0.80	-7.79	8.04	174.31	0.29
2800.00	0.61	109.86	2799.94	-8.27	1.27	-7.98	8.36	171.25	0.62
2900.00	1.17	85.20	2899.92	-8.36	2.79	-7.85	8.82	161.52	0.67
3000.00	1.53	84.29	2999.89	-8.14	5.14	-7.29	9.63	147.72	0.36
3100.00	1.61	86.10	3099.86	-7.91	7.87	-6.65	11.16	135.15	0.09
3200.00	1.54	76.06	3199.82	-7.50	10.58	-5.84	12.96	125.32	0.28
3300.00	1.52	80.20	3299.78	-6.95	13.19	-4.91	14.91	117.78	0.11
3400.00	1.26	73.71	3399.75	-6.41	15.55	-4.03	16.82	112.42	0.30
3500.00	1.14	84.00	3499.73	-6.00	17.59	-3.32	18.59	108.83	0.24
3600.00	1.24	80.50	3599.71	-5.72	19.65	-2.73	20.47	106.22	0.12
3700.00	1.14	81.62	3699.69	-5.40	21.70	-2.11	22.36	103.96	0.10
3800.00	1.00	64.79	3799.67	-4.88	23.47	-1.33	23.97	101.75	0.34
3900.00	0.56	59.93	3899.66	-4.26	24.68	-0.54	25.04	99.80	0.44
4000.00	0.59	87.73	3999.66	-4.00	25.61	-0.14	25.92	98.87	0.28
4100.00	0.64	187.77	4099.65	-4.53	26.05	-0.60	26.44	99.87	0.94
4200.00	1.05	202.12	4199.64	-5.94	25.63	-2.05	26.31	103.04	0.46
4300.00	0.47	168.11	4299.64	-7.19	25.37	-3.33	26.37	105.82	0.71
4400.00	0.63	192.49	4399.63	-8.13	25.33	-4.27	26.61	107.79	0.28
4500.00	0.57	217.21	4499.63	-9.07	24.91	-5.26	26.51	110.00	0.26
4600.00	0.62	248.29	4599.62	-9.67	24.10	-5.97	25.97	111.86	0.32
4700.00	0.98	211.68	4699.61	-10.59	23.15	-7.03	25.46	114.59	0.60
4800.00	0.92	202.27	4799.60	-12.06	22.40	-8.59	25.44	118.30	0.17
4900.00	1.14	194.63	4899.58	-13.76	21.84	-10.35	25.82	122.21	0.26
5000.00	1.02	207.65	4999.56	-15.50	21.18	-12.18	26.25	126.20	0.27
5100.00	0.99	224.80	5099.55	-16.90	20.16	-13.71	26.31	129.97	0.30
5200.00	1.05	219.09	5199.53	-18.23	18.98	-15.20	26.31	133.84	0.12
5300.00	1.03	198.91	5299.52	-19.79	18.11	-16.87	26.82	137.54	0.37
5400.00	1.23	170.54	5399.50	-21.69	17.99	-18.77	28.18	140.33	0.59
5500.00	1.10	174.86	5499.48	-23.70	18.26	-20.72	29.92	142.40	0.16
5600.00	1.16	163.77	5599.46	-25.63	18.62	-22.58	31.69	144.00	0.23
5700.00	1.00	162.89	5699.44	-27.45	19.17	-24.29	33.48	145.07	0.16

Measured Depth FT.	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	1.25	154.84	5799.42	-29.27	19.89	-25.98	35.38	145.80	0.29
5900.00	1.01	149.27	5899.40	-31.01	20.80	-27.57	37.34	146.15	0.26
6000.00	0.92	135.31	5999.39	-32.34	21.82	-28.73	39.01	146.00	0.25
6100.00	1.19	131.31	6099.37	-33.60	23.16	-29.78	40.81	145.42	0.29
6200.00	1.24	150.53	6199.35	-35.23	24.48	-31.19	42.90	145.21	0.41
6300.00	1.43	138.69	6299.32	-37.11	25.84	-32.85	45.22	145.16	0.33
6400.00	1.24	119.85	6399.29	-38.59	27.60	-34.05	47.44	144.43	0.48
6500.00	1.34	118.37	6499.27	-39.68	29.57	-34.84	49.49	143.31	0.10
6600.00	1.05	121.43	6599.25	-40.72	31.38	-35.59	51.40	142.38	0.30
6700.00	0.97	112.22	6699.23	-41.51	32.94	-36.15	52.99	141.57	0.18
6800.00	1.04	85.78	6799.22	-41.77	34.63	-36.15	54.26	140.33	0.47
6900.00	1.21	88.51	6899.20	-41.67	36.60	-35.76	55.46	138.71	0.18
7000.00	1.04	111.08	6999.18	-41.97	38.51	-35.77	56.96	137.47	0.47
7100.00	1.01	135.45	7099.16	-42.93	39.97	-36.50	58.66	137.04	0.43
7200.00	1.25	109.86	7199.14	-43.93	41.62	-37.24	60.51	136.54	0.55
7300.00	1.18	120.64	7299.12	-44.82	43.53	-37.84	62.48	135.84	0.24
7400.00	0.85	125.81	7399.11	-45.78	45.02	-38.57	64.21	135.48	0.35
7500.00	0.45	93.19	7499.10	-46.24	46.02	-38.87	65.23	135.14	0.53
7600.00	0.48	122.34	7599.10	-46.48	46.76	-39.00	65.94	134.83	0.24
7700.00	0.50	159.72	7699.09	-47.11	47.27	-39.55	66.74	134.91	0.31
7800.00	0.57	77.13	7799.09	-47.41	47.90	-39.75	67.40	134.70	0.71
7900.00	0.55	145.32	7899.09	-47.69	48.66	-39.92	68.14	134.42	0.63
8000.00	1.47	165.47	7999.07	-49.33	49.26	-41.45	69.71	135.04	0.97
8100.00	1.46	180.16	8099.04	-51.85	49.57	-43.89	71.73	136.28	0.38
8200.00	0.64	147.04	8199.02	-53.59	49.88	-45.57	73.21	137.06	0.99
8300.00	0.84	112.75	8299.01	-54.35	50.85	-46.17	74.43	136.90	0.47
8400.00	1.12	69.93	8399.00	-54.30	52.44	-45.89	75.49	136.00	0.76
8500.00	0.32	60.25	8498.99	-53.82	53.60	-45.25	75.96	135.12	0.80
8600.00	0.61	205.64	8598.99	-54.16	53.61	-45.58	76.21	135.29	0.89
8700.00	0.44	271.44	8698.98	-54.64	53.00	-46.14	76.12	135.87	0.59
8800.00	0.71	242.91	8798.98	-54.91	52.06	-46.55	75.67	136.52	0.39
8900.00	1.22	282.99	8898.97	-54.95	50.47	-46.83	74.61	137.43	0.82
9000.00	0.81	244.87	8998.95	-55.01	48.79	-47.14	73.53	138.43	0.77
9100.00	0.92	235.74	9098.94	-55.76	47.49	-48.07	73.25	139.58	0.17
9140.00	0.79	218.21	9138.94	-56.16	47.06	-48.53	73.27	140.04	0.72



VES Survey International
Midland, TX
432-563-5444
Surveyor: Andrew Askew
Kingfisher State Com 5H / API 30-025-42472



V.E.S. Survey Date: 4/9/2015

Archer Survey Report

Company: COG OPERATING, LLC	Local Co-ordinate Reference: Well 5H	
Project: Lea County, NM	TVD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)	
Site: Kingfisher State Com 5H	MD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)	
Well: 5H	North Reference: Grid	
Wellbore: Lateral	Survey Calculation Method: Minimum Curvature	
Design: Surveys	Database: EDM R5000.1 MULTI	

Project Lea County, NM		
Map System: US State Plane 1927 (Exact solution)	System Datum: Mean Sea Level	
Geo Datum: NAD 1927 (NADCON CONUS)		
Map Zone: New Mexico East 3001		

Site Kingfisher State Com 5H		
Site Position:	Northing: 629,123.50 usft	Latitude: 32° 43' 37.03 N
From: Map	Easting: 748,430.20 usft	Longitude: 103° 31' 31.82 W
Position Uncertainty: 0.00 usft	Slot Radius: 13.200 in	Grid Convergence: 0.44 °

Well 5H		
Well Position +N/-S	0.00 usft	Northing: 629,123.50 usft
+E/-W	0.00 usft	Easting: 748,430.20 usft
Position Uncertainty	0.00 usft	Wellhead Elevation: 0.00 usft
		Latitude: 32° 43' 37.03 N
		Longitude: 103° 31' 31.82 W
		Ground Level: 3,986.00 usft

Wellbore Lateral		
Magnetics	Model Name	Sample Date
	HDGM	4/1/2015
		Declination (°)
		6.88
		Dip Angle (°)
		60.80
		Field Strength (nT)
		48,514

Design Surveys		
Audit Notes:		
Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	Direction (°)
	0.00	4.37

Survey Program	Date 4/28/2015	
From (usft)	To (usft)	Survey (Wellbore)
100.00	9,140.00	Gyro (Lateral)
9,249.00	14,307.00	MWD (Lateral)
		Tool Name
		Gyroscope
		MWD+HDGM
		Description
		Gyrocompass Gyro
		OWSG MWD + HDGM

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.75	185.43	100.00	-0.65	-0.06	-0.65	0.75	0.75	0.00
200.00	0.97	164.50	199.99	-2.12	0.10	-2.10	0.38	0.22	-20.93
300.00	0.94	168.84	299.97	-3.74	0.49	-3.69	0.08	-0.03	4.34
400.00	0.76	173.97	399.96	-5.20	0.72	-5.13	0.20	-0.18	5.13
500.00	0.60	166.05	499.95	-6.37	0.91	-6.28	0.19	-0.16	-7.92
600.00	0.56	205.92	599.95	-7.32	0.82	-7.23	0.40	-0.04	39.87
700.00	0.54	221.94	699.94	-8.11	0.30	-8.06	0.15	-0.02	16.02
800.00	0.38	221.91	799.94	-8.71	-0.24	-8.70	0.16	-0.16	-0.03
900.00	0.21	205.13	899.94	-9.12	-0.54	-9.13	0.19	-0.17	-16.78

Archer

Survey Report

Company: COG OPERATING, LLC	Local Co-ordinate Reference: Well 5H
Project: Lea County, NM	TVD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Site: Kingfisher State Com 5H	MD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Well: 5H	North Reference: Grid
Wellbore: Lateral	Survey Calculation Method: Minimum Curvature
Design: Surveys	Database: EDM R5000.1 MULTI

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.04	283.35	999.94	-9.28	-0.65	-9.30	0.21	-0.17	78.22
1,100.00	0.10	52.70	1,099.94	-9.22	-0.62	-9.24	0.13	0.06	129.35
1,200.00	0.17	19.32	1,199.94	-9.02	-0.50	-9.03	0.10	0.07	-33.38
1,300.00	0.14	48.28	1,299.94	-8.80	-0.36	-8.80	0.08	-0.03	28.96
1,400.00	0.23	68.42	1,399.94	-8.65	-0.08	-8.63	0.11	0.09	20.14
1,500.00	0.03	154.42	1,499.94	-8.60	0.12	-8.56	0.23	-0.20	86.00
1,600.00	0.04	318.79	1,599.94	-8.59	0.11	-8.56	0.07	0.01	164.37
1,700.00	0.08	36.23	1,699.94	-8.51	0.12	-8.48	0.08	0.04	77.44
1,800.00	0.08	42.78	1,799.94	-8.40	0.21	-8.36	0.01	0.00	6.55
1,900.00	0.01	300.27	1,899.94	-8.35	0.25	-8.30	0.08	-0.07	-102.51
2,000.00	0.07	61.28	1,999.94	-8.31	0.30	-8.27	0.08	0.06	121.01
2,100.00	0.12	125.57	2,099.94	-8.35	0.44	-8.29	0.11	0.05	64.29
2,200.00	0.17	129.26	2,199.94	-8.50	0.64	-8.43	0.05	0.05	3.69
2,300.00	0.15	358.97	2,299.94	-8.46	0.75	-8.38	0.29	-0.02	-130.29
2,400.00	0.10	156.54	2,399.94	-8.41	0.78	-8.33	0.25	-0.05	157.57
2,500.00	0.18	338.00	2,499.94	-8.35	0.76	-8.26	0.28	0.08	-178.54
2,600.00	0.18	22.57	2,599.94	-8.06	0.76	-7.97	0.14	0.00	44.57
2,700.00	0.11	197.91	2,699.94	-8.00	0.79	-7.92	0.29	-0.07	175.34
2,800.00	0.61	109.86	2,799.94	-8.27	1.26	-8.15	0.62	0.50	-88.05
2,900.00	1.17	85.20	2,899.92	-8.37	2.78	-8.13	0.67	0.56	-24.66
3,000.00	1.53	84.29	2,999.89	-8.15	5.13	-7.74	0.36	0.36	-0.91
3,100.00	1.61	86.10	3,099.86	-7.92	7.86	-7.30	0.09	0.08	1.81
3,200.00	1.54	76.06	3,199.82	-7.50	10.56	-6.68	0.28	-0.07	-10.04
3,300.00	1.52	80.20	3,299.78	-6.95	13.17	-5.93	0.11	-0.02	4.14
3,400.00	1.26	73.71	3,399.75	-6.42	15.54	-5.22	0.30	-0.26	-6.49
3,500.00	1.14	84.00	3,499.73	-6.01	17.58	-4.65	0.25	-0.12	10.29
3,600.00	1.24	80.50	3,599.71	-5.73	19.64	-4.21	0.12	0.10	-3.50
3,700.00	1.14	81.62	3,699.69	-5.40	21.69	-3.73	0.10	-0.10	1.12
3,800.00	1.00	64.79	3,799.67	-4.89	23.46	-3.08	0.34	-0.14	-16.83
3,900.00	0.56	59.93	3,899.66	-4.27	24.67	-2.38	0.44	-0.44	-4.86
4,000.00	0.59	87.73	3,999.66	-4.00	25.61	-2.04	0.28	0.03	27.80
4,100.00	0.64	187.77	4,099.65	-4.54	26.05	-2.54	0.94	0.05	100.04
4,200.00	1.05	202.12	4,199.64	-5.94	25.63	-3.97	0.46	0.41	14.35
4,300.00	0.47	168.11	4,299.63	-7.19	25.37	-5.23	0.71	-0.58	-34.01
4,400.00	0.63	192.49	4,399.63	-8.13	25.33	-6.17	0.28	0.16	24.38
4,500.00	0.57	217.21	4,499.63	-9.06	24.91	-7.13	0.26	-0.06	24.72
4,600.00	0.62	248.29	4,599.62	-9.66	24.11	-7.79	0.32	0.05	31.08
4,700.00	0.98	211.68	4,699.61	-10.58	23.16	-8.79	0.61	0.36	-36.61
4,800.00	0.92	202.27	4,799.60	-12.05	22.41	-10.31	0.17	-0.06	-9.41
4,900.00	1.14	194.63	4,899.58	-13.76	21.85	-12.05	0.26	0.22	-7.64
5,000.00	1.02	207.65	4,999.56	-15.51	21.19	-13.85	0.27	-0.12	13.02
5,100.00	0.99	224.80	5,099.55	-16.91	20.16	-15.33	0.30	-0.03	17.15
5,200.00	1.05	219.09	5,199.53	-18.24	18.98	-16.74	0.12	0.06	-5.71

Archer

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 5H
Project:	Lea County, NM	TVD Reference:	3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Site:	Kingfisher State Com 5H	MD Reference:	3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Well:	5H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000.1 MULTI

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,300.00	1.03	198.91	5,299.52	-19.80	18.11	-18.36	0.36	-0.02	-20.18
5,400.00	1.23	170.54	5,399.50	-21.71	17.99	-20.27	0.59	0.20	-28.37
5,500.00	1.10	174.86	5,499.48	-23.72	18.26	-22.26	0.16	-0.13	4.32
5,600.00	1.16	163.77	5,599.46	-25.65	18.63	-24.16	0.23	0.06	-11.09
5,700.00	1.00	162.89	5,699.44	-27.46	19.17	-25.91	0.16	-0.16	-0.88
5,800.00	1.25	154.84	5,799.42	-29.28	19.89	-27.68	0.30	0.25	-8.05
5,900.00	1.01	149.27	5,899.40	-31.02	20.80	-29.35	0.26	-0.24	-5.57
6,000.00	0.92	135.31	5,999.39	-32.35	21.81	-30.59	0.25	-0.09	-13.96
6,100.00	1.19	131.31	6,099.37	-33.61	23.16	-31.74	0.28	0.27	-4.00
6,200.00	1.24	150.53	6,199.35	-35.23	24.47	-33.27	0.41	0.05	19.22
6,300.00	1.43	138.69	6,299.32	-37.11	25.83	-35.04	0.33	0.19	-11.84
6,400.00	1.24	119.85	6,399.29	-38.59	27.59	-36.37	0.48	-0.19	-18.84
6,500.00	1.34	118.37	6,499.27	-39.68	29.56	-37.31	0.11	0.10	-1.48
6,600.00	1.05	121.43	6,599.25	-40.72	31.37	-38.21	0.30	-0.29	3.06
6,700.00	0.97	112.22	6,699.23	-41.51	32.93	-38.88	0.18	-0.08	-9.21
6,800.00	1.04	85.78	6,799.22	-41.77	34.62	-39.01	0.46	0.07	-26.44
6,900.00	1.21	88.51	6,899.20	-41.67	36.58	-38.76	0.18	0.17	2.73
7,000.00	1.04	111.08	6,999.18	-41.97	38.48	-38.92	0.47	-0.17	22.57
7,100.00	1.01	135.45	7,099.16	-42.93	39.95	-39.76	0.43	-0.03	24.37
7,200.00	1.25	109.86	7,199.14	-43.93	41.59	-40.63	0.55	0.24	-25.59
7,300.00	1.18	120.64	7,299.12	-44.82	43.51	-41.37	0.24	-0.07	10.78
7,400.00	0.85	125.81	7,399.11	-45.78	44.99	-42.22	0.34	-0.33	5.17
7,500.00	0.45	93.19	7,499.10	-46.24	45.99	-42.59	0.53	-0.40	-32.62
7,600.00	0.48	122.34	7,599.10	-46.48	46.73	-42.78	0.24	0.03	29.15
7,700.00	0.50	159.72	7,699.09	-47.11	47.24	-43.38	0.31	0.02	37.38
7,800.00	0.57	77.13	7,799.09	-47.41	47.87	-43.62	0.71	0.07	-82.59
7,900.00	0.55	145.32	7,899.09	-47.70	48.63	-43.85	0.63	-0.02	68.19
8,000.00	1.47	165.47	7,999.07	-49.33	49.23	-45.44	0.97	0.92	20.15
8,100.00	1.46	180.16	8,099.04	-51.85	49.55	-47.92	0.37	-0.01	14.69
8,200.00	0.64	147.04	8,199.02	-53.59	49.85	-49.64	0.99	-0.82	-33.12
8,300.00	0.84	112.75	8,299.01	-54.34	50.83	-50.31	0.48	0.20	-34.29
8,400.00	1.12	69.93	8,399.00	-54.29	52.42	-50.14	0.76	0.28	-42.82
8,500.00	0.32	60.25	8,498.99	-53.82	53.58	-49.58	0.81	-0.80	-9.68
8,600.00	0.61	205.64	8,598.99	-54.16	53.59	-49.92	0.89	0.29	145.39
8,700.00	0.44	271.44	8,698.99	-54.63	52.98	-50.43	0.59	-0.17	65.80
8,800.00	0.71	242.91	8,798.98	-54.90	52.04	-50.77	0.39	0.27	-28.53
8,900.00	1.22	282.99	8,898.97	-54.95	50.45	-50.94	0.82	0.51	40.08
9,000.00	0.81	244.87	8,998.95	-55.01	48.78	-51.13	0.77	-0.41	-38.12
9,100.00	0.92	235.74	9,098.94	-55.76	47.47	-51.98	0.18	0.11	-9.13
9,140.00	0.79	218.21	9,138.94	-56.16	47.04	-52.41	0.73	-0.33	-43.83
9,249.00	1.50	184.50	9,247.91	-58.17	46.46	-54.46	0.87	0.65	-30.93
9,280.00	0.80	197.20	9,278.91	-58.78	46.36	-55.07	2.39	-2.26	40.97
9,312.00	1.60	7.90	9,310.91	-58.55	46.36	-54.84	7.48	2.50	533.44

Archer

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well 5H
Project:	Lea County, NM	TVD Reference:	3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Site:	Kingfisher State Com 5H	MD Reference:	3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Well:	5H	North Reference:	Grid
Wellbore:	Lateral	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM R5000.1 MULTI

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,343.00	4.70	10.20	9,341.85	-56.87	46.64	-53.15	10.01	10.00	7.42	
9,375.00	8.00	11.80	9,373.65	-53.40	47.33	-49.64	10.33	10.31	5.00	
9,406.00	11.70	13.10	9,404.19	-48.23	48.49	-44.39	11.96	11.94	4.19	
9,438.00	15.60	14.70	9,435.28	-40.90	50.31	-36.94	12.24	12.19	5.00	
9,469.00	19.60	17.80	9,464.83	-31.91	52.96	-27.78	13.25	12.90	10.00	
9,501.00	23.30	19.80	9,494.60	-20.85	56.75	-16.46	11.78	11.56	6.25	
9,531.00	26.20	21.80	9,521.85	-9.11	61.22	-4.42	10.06	9.67	6.67	
9,563.00	28.60	22.20	9,550.25	4.54	66.74	9.62	7.52	7.50	1.25	
9,594.00	31.90	21.50	9,577.03	19.04	72.54	24.51	10.71	10.65	-2.26	
9,625.00	35.60	20.70	9,602.80	35.10	78.74	41.00	12.02	11.94	-2.58	
9,657.00	39.30	19.30	9,628.20	53.39	85.38	59.74	11.86	11.56	-4.38	
9,688.00	42.90	18.20	9,651.56	72.68	91.92	79.48	11.84	11.61	-3.55	
9,719.00	46.50	17.50	9,673.59	93.44	98.60	100.68	11.72	11.61	-2.26	
9,750.00	49.70	18.00	9,694.29	115.41	105.64	123.13	10.39	10.32	1.61	
9,782.00	52.60	18.50	9,714.36	139.07	113.44	147.32	9.14	9.06	1.56	
9,813.00	55.60	18.50	9,732.54	162.88	121.41	171.67	9.68	9.68	0.00	
9,845.00	59.40	18.10	9,749.73	188.50	129.88	197.86	11.92	11.88	-1.25	
9,876.00	62.60	17.30	9,764.75	214.33	138.12	224.24	10.57	10.32	-2.58	
9,907.00	65.70	16.60	9,778.27	241.01	146.25	251.46	10.20	10.00	-2.26	
9,938.00	68.70	16.60	9,790.28	268.40	154.41	279.39	9.68	9.68	0.00	
9,970.00	71.60	17.00	9,801.15	297.21	163.11	308.78	9.14	9.06	1.25	
10,001.00	74.50	17.40	9,810.18	325.53	171.88	337.69	9.44	9.35	1.29	
10,032.00	77.60	17.20	9,817.65	354.25	180.83	367.01	10.02	10.00	-0.65	
10,064.00	81.30	16.90	9,823.51	384.32	190.05	397.70	11.60	11.56	-0.94	
10,096.00	84.50	17.30	9,827.47	414.67	199.39	428.67	10.08	10.00	1.25	
10,127.00	88.00	16.70	9,829.49	444.25	208.43	458.85	11.45	11.29	-1.94	
10,159.00	92.10	16.90	9,829.47	474.87	217.67	490.09	12.83	12.81	0.63	
10,218.00	95.70	16.80	9,825.45	531.20	234.73	547.55	6.10	6.10	-0.17	
10,313.00	96.40	17.00	9,815.44	621.59	262.20	639.78	0.77	0.74	0.21	
10,406.00	95.80	15.70	9,805.56	710.32	288.23	730.23	1.53	-0.65	-1.40	
10,501.00	94.80	13.80	9,796.78	801.79	312.31	823.27	2.25	-1.05	-2.00	
10,595.00	95.20	12.00	9,788.59	893.07	333.21	915.88	1.95	0.43	-1.91	
10,689.00	94.90	10.00	9,780.31	984.98	351.08	1,008.88	2.14	-0.32	-2.13	
10,783.00	93.90	8.50	9,773.10	1,077.48	366.14	1,102.26	1.91	-1.06	-1.60	
10,878.00	94.80	7.30	9,765.90	1,171.30	379.16	1,196.81	1.58	0.95	-1.26	
10,972.00	94.10	5.30	9,758.60	1,264.45	389.45	1,290.46	2.25	-0.74	-2.13	
11,066.00	94.10	5.70	9,751.88	1,357.78	398.43	1,384.21	0.42	0.00	0.43	
11,160.00	95.10	5.90	9,744.34	1,450.99	407.90	1,477.87	1.08	1.06	0.21	
11,255.00	96.00	5.10	9,735.16	1,545.11	416.96	1,572.41	1.26	0.95	-0.84	
11,348.00	96.20	4.30	9,725.27	1,637.27	424.54	1,664.88	0.88	0.22	-0.86	
11,442.00	95.50	3.70	9,715.69	1,730.55	431.06	1,758.39	0.98	-0.74	-0.64	
11,536.00	97.70	3.90	9,704.89	1,823.72	437.25	1,851.75	2.35	2.34	0.21	
11,630.00	96.70	4.30	9,693.11	1,916.74	443.92	1,945.01	1.14	-1.06	0.43	
11,724.00	96.40	4.70	9,682.38	2,009.84	451.25	2,038.39	0.53	-0.32	0.43	

Archer

Survey Report

Company: COG OPERATING, LLC	Local Co-ordinate Reference: Well 5H
Project: Lea County, NM	TVD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Site: Kingfisher State Com 5H	MD Reference: 3986' GL + 19' RKB @ 4005.00usft (McVay 6)
Well: 5H	North Reference: Grid
Wellbore: Lateral	Survey Calculation Method: Minimum Curvature
Design: Surveys	Database: EDM R5000.1 MULTI

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,819.00	96.20	5.40	9,671.96	2,103.90	459.56	2,132.81	0.76	-0.21	0.74
11,913.00	93.40	5.50	9,664.09	2,197.13	468.45	2,226.46	2.98	-2.98	0.11
12,007.00	94.30	5.50	9,657.78	2,290.49	477.44	2,320.23	0.96	0.96	0.00
12,100.00	95.00	5.90	9,650.24	2,382.72	486.65	2,412.90	0.87	0.75	0.43
12,194.00	95.60	6.10	9,641.56	2,475.81	496.43	2,506.46	0.67	0.64	0.21
12,288.00	95.40	5.20	9,632.55	2,568.92	505.64	2,600.00	0.98	-0.21	-0.96
12,382.00	93.60	5.20	9,625.18	2,662.24	514.14	2,693.70	1.91	-1.91	0.00
12,466.00	95.30	4.90	9,618.66	2,745.66	521.51	2,777.43	2.05	2.02	-0.36
12,560.00	96.30	4.40	9,609.16	2,838.87	529.09	2,870.95	1.19	1.06	-0.53
12,654.00	95.20	4.90	9,599.74	2,932.09	536.67	2,964.47	1.28	-1.17	0.53
12,748.00	96.00	5.70	9,590.57	3,025.24	545.31	3,058.01	1.20	0.85	0.85
12,843.00	95.50	4.90	9,581.05	3,119.35	554.04	3,152.52	0.99	-0.53	-0.84
12,947.00	95.30	5.20	9,571.26	3,222.49	563.16	3,256.05	0.35	-0.19	0.29
13,041.00	95.00	5.00	9,562.83	3,315.74	571.48	3,349.66	0.38	-0.32	-0.21
13,136.00	95.10	5.00	9,554.46	3,410.01	579.73	3,444.29	0.11	0.11	0.00
13,230.00	95.10	5.50	9,546.11	3,503.25	588.30	3,537.91	0.53	0.00	0.53
13,324.00	93.70	5.70	9,538.90	3,596.52	597.44	3,631.60	1.50	-1.49	0.21
13,419.00	97.50	5.40	9,529.63	3,690.60	606.58	3,726.11	4.01	4.00	-0.32
13,513.00	96.40	6.10	9,518.25	3,783.44	615.93	3,819.39	1.38	-1.17	0.74
13,607.00	96.60	6.00	9,507.61	3,876.32	625.78	3,912.75	0.24	0.21	-0.11
13,701.00	97.20	5.60	9,496.32	3,969.16	635.21	4,006.04	0.77	0.64	-0.43
13,796.00	97.50	4.90	9,484.17	4,062.98	643.83	4,100.25	0.80	0.32	-0.74
13,890.00	97.50	5.00	9,471.90	4,155.83	651.87	4,193.44	0.11	0.00	0.11
13,984.00	95.50	5.70	9,461.26	4,248.81	660.58	4,286.82	2.25	-2.13	0.74
14,078.00	94.80	5.70	9,452.82	4,341.97	669.88	4,380.41	0.74	-0.74	0.00
14,172.00	94.90	4.30	9,444.87	4,435.28	678.04	4,474.07	1.49	0.11	-1.49
14,256.00	95.30	4.20	9,437.40	4,518.71	684.24	4,557.73	0.49	0.48	-0.12
14,307.00	95.30	4.20	9,432.69	4,569.36	687.96	4,608.51	0.00	0.00	0.00

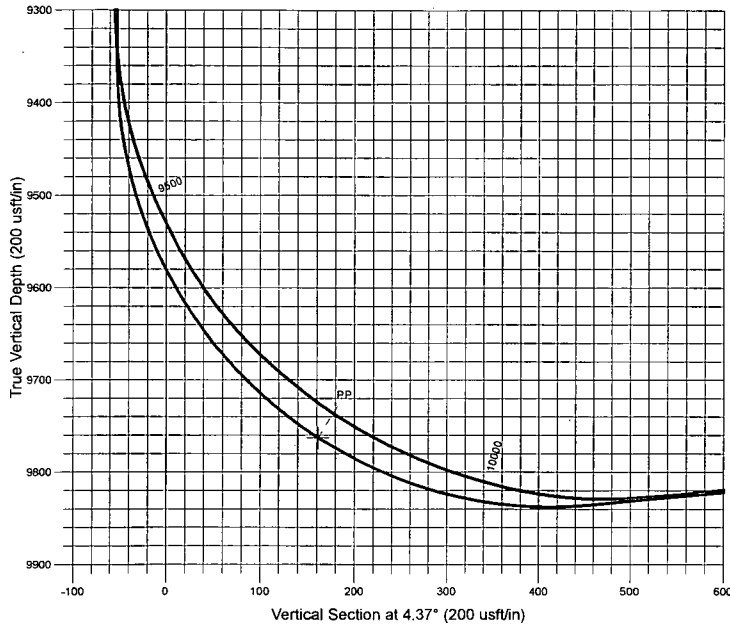
Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Kingfisher State Com 5H - hit/miss target - Shape	0.00	0.00	0.00	0.00	0.00	629,123.50	748,430.20	32° 43' 37.03 N	103° 31' 31.82 W
- actual wellpath hits target center									
- Point									
Kingfisher State Com 5H - hit/miss target - Shape	0.00	0.00	9,432.69	4,569.36	687.96	633,692.86	749,118.16	32° 44' 22.19 N	103° 31' 23.36 W
- actual wellpath hits target center									
- Point									

COG OPERATING, LLC

Field: Lea County, NM
 Site: Kingfisher State Com 5H
 Well: 5H
 Plan: Surveys

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Kingfisher State Com 5H SHL	0.00	0.00	0.00	629123.50	748430.20	32° 43' 37.03 N	103° 31' 31.82 W
Kingfisher State Com 5H BHL	9432.69	4569.36	687.96	633692.86	749118.16	32° 44' 22.19 N	103° 31' 23.36 W

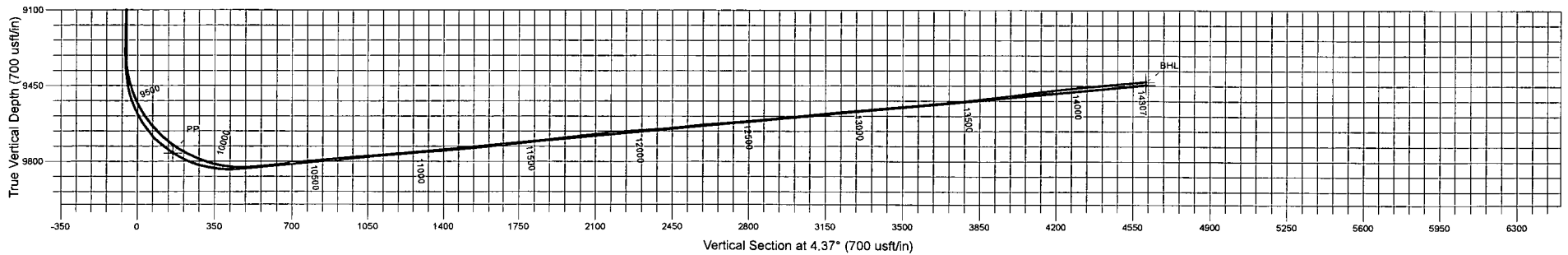
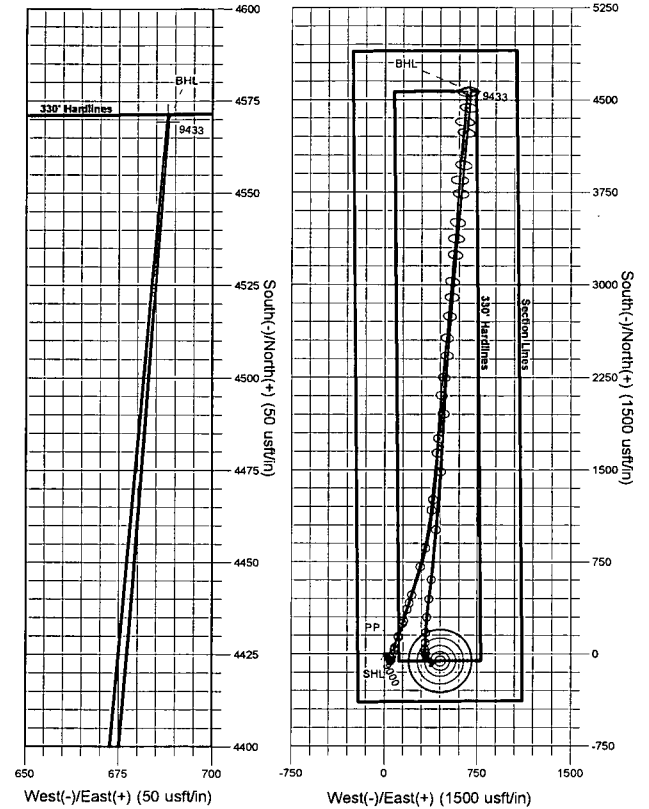


Section Distances

Sec23,T18S,R34E
 SHL - Unit P
 390°FSL, 1110°FEL
 PP - Unit P
 542°FSL, 994°FEL
 PBHL - Unit A
 332°FNL, 380°FEL

LEGEND

- 1H, 1H, Surveys V0
- 2 PXA, 2 PXA, Surveys V0
- 5H, Lateral, Plan #3 V0
- Surveys



ARCHER DIRECTIONAL DRILLING SERVICES
 12101 Cutten Rd. Houston, Texas 77066
 Phone: 281-301-2600 Fax: 281-301-2795

Design: Surveys (5H/Lateral)
 Created By: Keith Noack
 Date: 8:04, April 28 2015