



May 21, 2014

30-015-42363

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 06 2014

RECEIVED

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

Attn: Kanicia Castillo

RE: **Beech Federal 25 No. 010H**

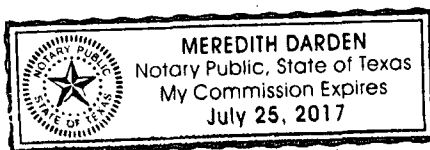
Please find enclosed a copy of the survey from 0.00' to 2,788.00' ran on the above referenced well.

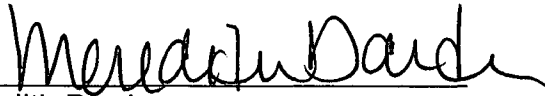
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 21st day of May,
A.D., 2014, by Keith Havelka.




Meredith Darden
Notary Public, State of Texas



Company: COG Operating, LLC (Concho)
Lease/Well: Beech Federal 25 /No. 010H
Location: Sec25 T17S R27E
Rig Name: Silver Oak 3
State/County: New Mexico/Eddy
Latitude: 32.80, Longitude: -104.24
GRID North is 0.05 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB = 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: beech fed 25 #10h-de_01.ut

Minimum Curvature Method

Report Date/Time: 5/23/2014 / 13:41

VES Survey International

West, Texas

432-563-5444

Surveyor: Chris Bankson

Beech Federal 25 No. 010H / API 30-015-42363

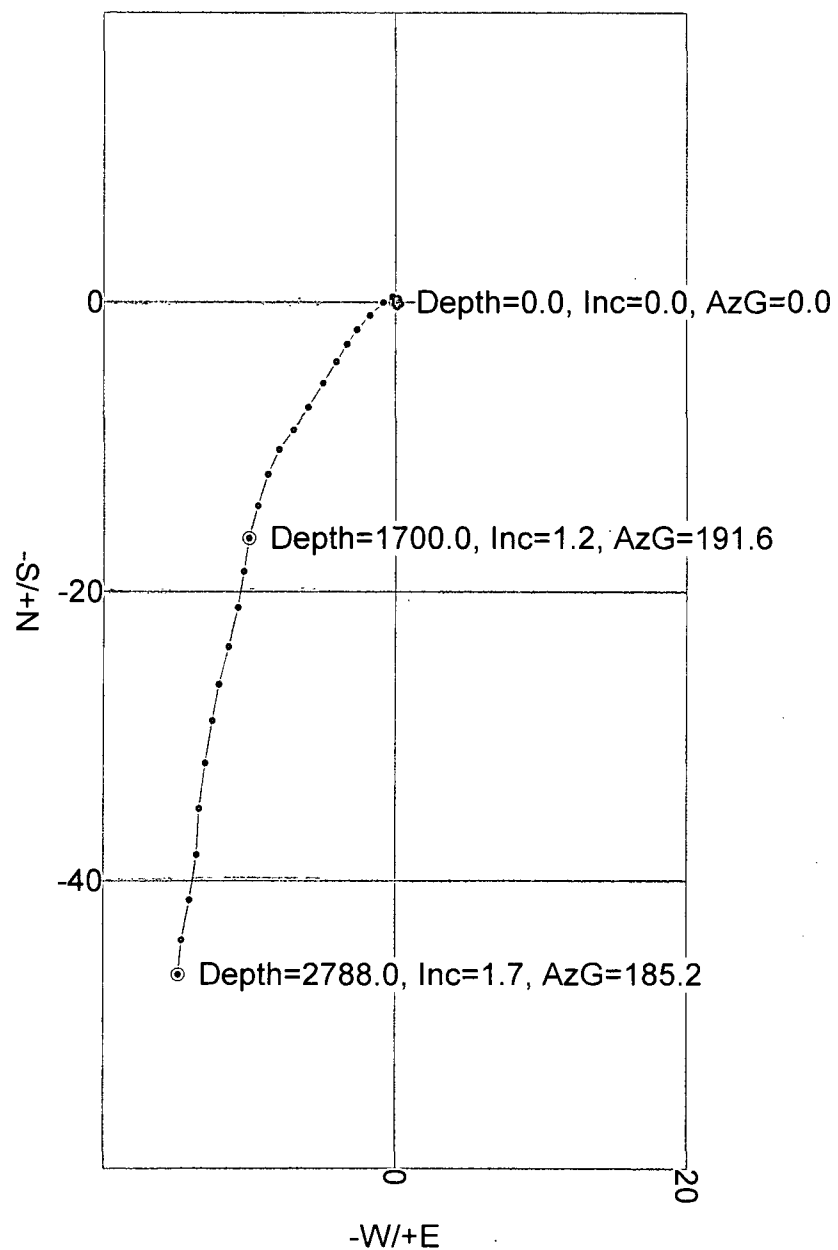
NM OIL CONSERVATION
ARTESIA DISTRICT
AUG 06 2014
RECEIVED

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	0.17	202.89	100.00	-0.14	-0.06	-0.14	0.15	202.89	0.17
200.00	0.27	104.22	200.00	-0.33	0.11	-0.33	0.35	162.21	0.34
300.00	0.30	8.72	300.00	-0.13	0.37	-0.13	0.39	109.84	0.42
400.00	0.30	305.74	400.00	0.27	0.20	0.27	0.34	36.12	0.31
500.00	0.24	258.70	500.00	0.38	-0.22	0.38	0.44	330.66	0.22
600.00	0.63	228.03	599.99	-0.02	-0.83	-0.02	0.83	268.44	0.44
700.00	0.84	225.19	699.99	-0.90	-1.76	-0.90	1.98	242.73	0.22
800.00	0.68	217.87	799.98	-1.89	-2.64	-1.89	3.25	234.41	0.19
900.00	0.72	211.20	899.97	-2.90	-3.33	-2.90	4.41	228.98	0.09
1000.00	0.90	210.68	999.96	-4.11	-4.06	-4.11	5.78	224.61	0.18
1100.00	1.07	212.30	1099.94	-5.58	-4.96	-5.58	7.47	221.62	0.17
1200.00	1.17	209.96	1199.92	-7.26	-5.97	-7.26	9.41	219.44	0.11
1300.00	0.99	217.84	1299.91	-8.83	-7.01	-8.83	11.28	218.46	0.24
1400.00	0.94	214.31	1399.89	-10.19	-8.01	-10.19	12.96	218.15	0.07
1500.00	1.20	195.39	1499.88	-11.88	-8.75	-11.88	14.76	216.36	0.44
1600.00	1.42	198.76	1599.85	-14.07	-9.42	-14.07	16.93	213.82	0.23
1700.00	1.24	191.62	1699.82	-16.30	-10.04	-16.30	19.14	211.63	0.24
1800.00	1.41	185.67	1799.80	-18.58	-10.38	-18.58	21.29	209.19	0.21

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	1.51	192.25	1899.76	-21.09	-10.78	-21.09	23.69	207.07	0.20
2000.00	1.70	194.67	1999.72	-23.81	-11.44	-23.81	26.42	205.65	0.20
2100.00	1.37	193.86	2099.69	-26.41	-12.10	-26.41	29.05	204.61	0.32
2200.00	1.54	186.85	2199.66	-28.90	-12.54	-28.90	31.51	203.46	0.24
2300.00	1.86	191.64	2299.61	-31.83	-13.03	-31.83	34.39	202.27	0.35
2400.00	1.80	183.57	2399.56	-34.98	-13.46	-34.98	37.48	201.04	0.27
2500.00	1.89	182.42	2499.51	-38.19	-13.62	-38.19	40.55	199.63	0.10
2600.00	1.78	195.36	2599.46	-41.34	-14.11	-41.34	43.68	198.84	0.43
2700.00	1.48	185.83	2699.42	-44.12	-14.65	-44.12	46.49	198.37	0.41
2788.00	1.67	185.24	2787.38	-46.53	-14.88	-46.53	48.85	197.74	0.22



VES Survey International
West, Texas
432-563-5444
Surveyor: Chris Bankson
Beech Federal 25 No. 010H / API 30-015-42363



VES Survey Date: 05/13/2014



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 06 2014

RECEIVED

May 26, 2014

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Beech 25 Federal #10H
110' FSL & 240' FWL
Sec. 25, T17S, R27E
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

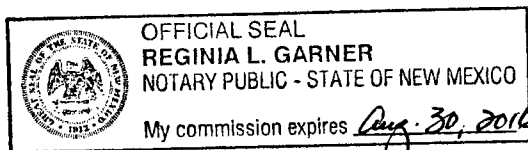
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 26th day of May, 2014.

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

BEECH 25 FEDERAL 10 H

Date	Depth	Deviation	Direction
5/8/2014	114	0.30	0.00
5/8/2014	298	0.60	0.00
5/10/2014	547	0.60	0.00
5/10/2014	792	0.20	0.00
5/10/2014	948	0.10	0.00
5/12/2014	1193	0.50	0.00
5/12/2014	1630	1.50	0.00
5/12/2014	1849	1.60	0.00
5/12/2014	2065	1.70	0.00
5/12/2014	2220	1.20	0.00
5/13/2014	2473	1.50	0.00
5/14/2014	2909	1.90	152.60
5/14/2014	2941	2.90	110.40
5/14/2014	2973	4.70	89.40
5/14/2014	3004	7.00	77.20
5/14/2014	3036	9.70	69.00
5/14/2014	3067	12.50	62.30
5/14/2014	3098	15.30	58.00
5/14/2014	3130	18.20	56.70
5/14/2014	3160	21.30	55.70
5/14/2014	3191	24.70	56.50
5/14/2014	3222	27.80	58.50
5/14/2014	3254	31.20	59.40
5/14/2014	3284	34.60	59.70
5/14/2014	3316	38.10	59.70
5/14/2014	3347	41.50	60.50
5/14/2014	3378	44.90	60.80
5/14/2014	3409	48.30	60.90
5/14/2014	3440	51.60	61.20
5/15/2014	3471	55.00	60.20
5/15/2014	3502	58.70	60.00
5/15/2014	3534	62.70	59.50
5/15/2014	3565	66.60	59.20
5/15/2014	3596	70.60	58.60
5/15/2014	3627	74.20	58.70
5/15/2014	3658	78.60	58.30
5/15/2014	3690	83.40	57.80
5/15/2014	3741	88.30	58.50
5/16/2014	3772	88.70	59.40
5/16/2014	3804	88.50	59.90
5/16/2014	3834	88.70	60.70
5/16/2014	3865	89.10	61.10
5/16/2014	3896	89.40	61.40

Date	Depth	Deviation	Direction
5/16/2014	3927	89.50	61.20
5/16/2014	3958	89.90	61.70
5/16/2014	4021	90.60	62.50
5/16/2014	4053	90.50	63.40
5/16/2014	4084	91.10	63.70
5/16/2014	4115	91.00	64.60
5/16/2014	4146	91.30	65.10
5/16/2014	4178	91.30	66.70
5/16/2014	4239	91.30	69.00
5/16/2014	4270	91.10	70.10
5/16/2014	4301	90.90	70.80
5/16/2014	4332	90.80	71.80
5/16/2014	4364	90.40	72.90
5/16/2014	4395	90.20	74.10
5/17/2014	4426	90.60	74.40
5/17/2014	4457	90.20	75.80
5/17/2014	4489	90.10	76.90
5/17/2014	4519	89.90	77.90
5/17/2014	4551	90.00	78.90
5/17/2014	4583	90.00	80.10
5/17/2014	4613	90.20	80.90
5/17/2014	4645	90.40	81.10
5/17/2014	4676	90.40	82.30
5/17/2014	4707	90.20	84.30
5/17/2014	4738	89.70	86.50
5/18/2014	4770	89.80	88.20
5/18/2014	4801	89.60	89.10
5/18/2014	4832	90.50	89.90
5/18/2014	4864	90.70	90.60
5/18/2014	4895	90.90	91.70
5/18/2014	4958	90.90	92.90
5/18/2014	5020	90.20	96.60
5/18/2014	5051	90.10	97.10
5/18/2014	5083	90.20	98.60
5/18/2014	5114	90.80	98.50
5/18/2014	5208	91.40	99.30
5/18/2014	5301	91.80	99.30
5/18/2014	5395	92.50	99.00
5/19/2014	5489	92.20	98.90
5/19/2014	5583	92.70	99.00
5/19/2014	5677	91.50	98.70
5/19/2014	5771	91.00	98.30
5/19/2014	5865	90.30	97.60
5/20/2014	5959	91.00	97.30
5/20/2014	6053	89.20	96.50

Date	Depth	Deviation	Direction
5/20/2014	6147	89.20	96.50
5/21/2014	6241	89.10	96.00
5/21/2014	6334	89.60	97.90
5/21/2014	6427	89.80	97.40
5/21/2014	6521	90.10	99.10
5/21/2014	6614	89.90	99.60
5/21/2014	6708	90.10	98.50
5/21/2014	6745	90.10	98.40



PHOENIX
TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG Operating LLC**
Well **Beech 25 Federal #10H**
Field **Eddy County, NM**
Rig **Silver Oak 3**
Phoenix Rep. **Cory Black**

Correction **7.54**
Target TVD **3450.3**
Target Az. **85.53**
Tgt. Coord.

Date	No.	DEPTH	INC.	AZM	C.L.	T.V.D.	V.S.	N/S	E/W	DLS	B/D.	BHA
Tie - In	0	2,788 ft	1.67	185.24		2787.38	-46.53	46.53 S	14.88 W			
13-May	1	2815	1.8	191.1	27	2814.37	-18.64	47.34 S	15.00 W	0.81	0.48	1
	2	2846	1.9	189.4	31	2845.35	-18.90	48.32 S	15.18 W	0.37	0.32	
	3	2878	1.9	185.9	32	2877.33	-19.12	49.37 S	15.32 W	0.36	0.00	
	4	2909	1.9	152.6	31	2908.32	-19.01	50.34 S	15.13 W	3.51	0.00	
14-May	5	2941	2.9	110.4	32	2940.29	-18.07	51.09 S	14.13 W	6.14	3.13	
	6	2972	4.7	89.4	31	2971.22	-16.09	51.35 S	12.12 W	7.25	5.81	
	7	3004	7.0	77.2	32	3003.06	-12.85	50.91 S	8.91 W	8.13	7.19	
	8	3035	9.7	69.0	31	3033.73	-8.48	49.55 S	4.63 W	9.50	8.71	
	9	3066	12.5	62.3	31	3064.14	-2.89	47.06 S	0.78 E	9.93	9.03	
	10	3098	15.3	58.0	32	3095.20	4.03	43.21 S	7.42 E	9.32	8.75	
	11	3129	18.2	56.7	31	3124.89	11.90	38.38 S	14.94 E	9.43	9.35	
	12	3160	21.3	55.7	31	3154.06	21.03	32.55 S	23.64 E	10.06	10.00	
	13	3191	24.7	56.5	31	3182.59	31.58	25.80 S	33.69 E	11.01	10.97	
	14	3223	27.8	58.5	32	3211.29	44.07	18.21 S	45.63 E	10.07	9.69	
	15	3254	31.2	59.4	31	3238.26	57.72	10.34 S	58.71 E	11.06	10.97	
	16	3285	34.6	59.7	31	3264.29	72.86	1.81 S	73.22 E	10.98	10.97	
	17	3316	38.1	59.7	31	3289.25	89.39	7.46 N	89.08 E	11.29	11.29	
	18	3347	41.5	60.5	31	3313.07	107.31	17.34 N	106.28 E	11.09	10.97	
	19	3378	44.9	60.8	31	3335.66	126.55	27.74 N	124.77 E	10.99	10.97	
	20	3409	48.3	60.9	31	3356.96	147.01	38.71 N	144.44 E	10.97	10.97	
	21	3440	51.6	61.2	31	3376.90	168.61	50.19 N	165.20 E	10.67	10.65	
15-May	22	3471	55.0	60.2	31	3395.43	191.15	62.36 N	186.86 E	11.27	10.97	2
	23	3503	58.7	60.0	32	3412.92	215.34	75.71 N	210.08 E	11.57	11.56	
	24	3534	62.7	59.5	31	3428.09	239.67	89.33 N	233.42 E	12.98	12.90	
	25	3565	66.6	59.2	31	3441.36	264.81	103.61 N	257.51 E	12.61	12.58	
	26	3597	70.6	58.6	32	3453.03	291.43	119.00 N	283.01 E	12.62	12.50	
	27	3628	74.2	58.7	31	3462.41	317.77	134.37 N	308.24 E	11.62	11.61	
	28	3659	78.6	58.3	31	3469.69	344.60	150.11 N	333.92 E	14.25	14.19	
	29	3690	83.4	57.8	31	3474.54	371.75	166.31 N	359.88 E	15.57	15.48	
	30	3741	88.3	58.5	51	3478.23	416.89	193.14 N	403.06 E	9.70	9.61	3
	31	3772	88.7	59.4	31	3479.04	444.60	209.12 N	429.61 E	3.18	1.29	
	32	3803	88.5	59.9	31	3479.80	472.48	224.78 N	456.35 E	1.74	0.65	
16-May	33	3834	88.7	60.7	31	3480.56	500.52	240.14 N	483.27 E	2.66	0.65	
	34	3865	89.1	61.1	31	3481.15	528.69	255.21 N	510.35 E	1.82	1.29	
	35	3896	89.4	61.4	31	3481.56	556.95	270.12 N	537.53 E	1.37	0.97	
	36	3927	89.5	61.2	31	3481.86	585.22	285.01 N	564.72 E	0.72	0.32	
	37	3958	89.9	61.7	31	3482.02	613.52	299.82 N	591.95 E	2.07	1.29	
	38	3990	90.6	62.0	32	3481.88	642.82	314.92 N	620.17 E	2.38	2.19	
	39	4021	90.6	62.5	31	3481.55	671.30	329.35 N	647.60 E	1.61	0.00	
	40	4052	90.5	63.4	31	3481.26	699.92	343.45 N	675.21 E	2.92	0.32	
	41	4083	91.1	63.7	31	3480.82	728.66	357.26 N	702.96 E	2.16	1.94	



PHOENIX TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG Operating, LLC**
Well **Beech 25 Federal #10H**
Field **Eddy County, NM**
Rig **Silver Oak 3**
Phoenix Rep. **Cory Black**

Correction **7.54**
Target TVD **3450.3**
Target Az. **85.53**
Tgt. Coord.

												CLT
Date	No.	DEPTH	INC.	AZM	C.L.	T.V.D.	V.S.	N/S	E/W	DLS	B/D.	BHA
	42	4114	91.0	64.6	31	3480.26	757.52	370.77 N	730.85 E	2.92	-0.32	
	43	4146	91.3	65.1	32	3479.61	787.46	384.37 N	759.81 E	1.82	-0.94	
	44	4177	91.3	66.7	31	3478.91	816.64	397.02 N	788.10 E	5.16	-0.00	
	45	4208	91.3	67.9	31	3478.21	846.08	408.98 N	816.69 E	3.87	-0.00	
	46	4239	91.3	69.0	31	3477.50	875.70	420.36 N	845.51 E	3.55	-0.00	
	47	4270	91.1	70.1	31	3476.85	905.50	431.19 N	874.55 E	3.61	-0.65	
	48	4301	90.9	70.8	31	3476.31	935.43	441.56 N	903.76 E	2.35	-0.65	
	49	4332	90.8	71.8	31	3475.85	965.47	451.50 N	933.12 E	3.24	-0.32	
	50	4364	90.4	72.9	32	3475.52	996.63	461.20 N	963.61 E	3.66	-1.25	
	51	4395	90.2	74.1	31	3475.36	1026.94	470.01 N	993.33 E	3.92	-0.65	
	52	4426	90.6	74.4	31	3475.14	1057.34	478.42 N	1023.17 E	1.61	-1.29	
17-May	53	4457	90.2	75.8	31	3474.92	1087.83	486.39 N	1053.12 E	4.70	-1.29	
	54	4488	90.1	76.9	31	3474.84	1118.43	493.71 N	1083.25 E	3.56	-0.32	
	55	4519	89.9	77.9	31	3474.84	1149.12	500.47 N	1113.50 E	3.29	-0.65	
	56	4551	90.0	78.9	32	3474.87	1180.87	506.91 N	1144.85 E	3.14	-0.31	
	57	4582	90.0	80.1	31	3474.87	1211.70	512.56 N	1175.33 E	3.87	-0.00	
	58	4613	90.2	80.9	31	3474.82	1242.58	517.67 N	1205.90 E	2.66	-0.65	
	59	4645	90.4	81.1	32	3474.65	1274.48	522.68 N	1237.51 E	0.88	-0.63	4
	60	4676	90.4	82.3	31	3474.43	1305.41	527.15 N	1268.18 E	3.87	-0.00	
	61	4707	90.2	84.3	31	3474.27	1336.38	530.77 N	1298.96 E	6.48	-0.65	
	62	4738	89.7	86.5	31	3474.30	1367.37	533.25 N	1329.86 E	7.28	-1.61	
	63	4770	89.8	88.2	32	3474.44	1399.36	534.73 N	1361.82 E	5.32	-0.31	
	64	4801	89.6	89.1	31	3474.60	1430.31	535.46 N	1392.81 E	2.97	-0.65	
18-May	65	4832	90.5	89.9	31	3474.57	1461.23	535.74 N	1423.81 E	3.88	-2.90	
	66	4864	90.7	90.6	32	3474.24	1493.12	535.60 N	1455.81 E	2.27	-0.63	
	67	4895	90.9	91.7	31	3473.80	1523.97	534.97 N	1486.80 E	3.61	-0.65	
	68	4926	90.9	92.9	31	3473.32	1554.75	533.73 N	1517.77 E	3.87	-0.00	
	69	4958	90.7	94.0	32	3472.87	1586.44	531.80 N	1549.71 E	3.49	-0.63	
	70	4989	90.4	95.1	31	3472.57	1617.05	529.35 N	1580.61 E	3.68	-0.97	
	71	5020	90.2	96.6	31	3472.41	1647.55	526.19 N	1611.44 E	4.88	-0.65	
	72	5051	90.1	97.1	31	3472.33	1677.95	522.49 N	1642.22 E	1.64	-0.32	
	73	5082	90.2	98.6	31	3472.25	1708.23	518.25 N	1672.93 E	4.85	-0.32	
	74	5114	90.8	98.5	32	3471.97	1739.41	513.50 N	1704.57 E	1.90	-1.87	
	75	5207	91.4	99.3	93	3470.18	1829.87	499.11 N	1796.43 E	1.08	-0.65	
	76	5301	91.8	99.3	94	3467.56	1921.13	483.93 N	1889.16 E	0.43	-0.43	
	77	5395	92.5	99.0	94	3464.03	2012.42	468.99 N	1981.90 E	0.81	-0.74	
19-May	78	5489	92.2	98.9	94	3460.18	2103.78	454.38 N	2074.67 E	0.34	-0.32	
	79	5583	92.7	99.0	94	3456.16	2195.13	439.77 N	2167.44 E	0.54	-0.53	
	80	5677	91.5	98.7	94	3452.71	2286.53	425.32 N	2260.26 E	1.32	-1.28	
	81	5771	91.0	98.3	94	3450.66	2378.11	411.43 N	2353.20 E	0.68	-0.53	
	82	5865	90.3	97.6	94	3449.60	2469.90	398.43 N	2446.29 E	1.05	-0.74	
20-May	83	5959	91.0	97.3	94	3448.53	2561.87	386.24 N	2539.49 E	0.81	-0.74	5
	84	6053	89.2	96.5	94	3448.37	2654.01	374.95 N	2632.80 E	2.10	-1.91	
	85	6147	89.2	96.5	94	3449.68	2746.29	364.31 N	2726.19 E	0.00	-0.00	
	86	6241	89.1	96.0	94	3451.07	2838.64	354.07 N	2819.62 E	0.54	-0.14	



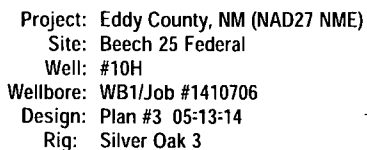
PHOENIX
TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG Operating LLC**
Well **Beech 25 Federal #10H**
Field **Eddy County, NM**
Rig **Silver Oak 3**
Phoenix Rep. **Cory Black**

Correction **7.54**
Target TVD **3450.3**
Target Az. **85.53**
Tgt. Coord.

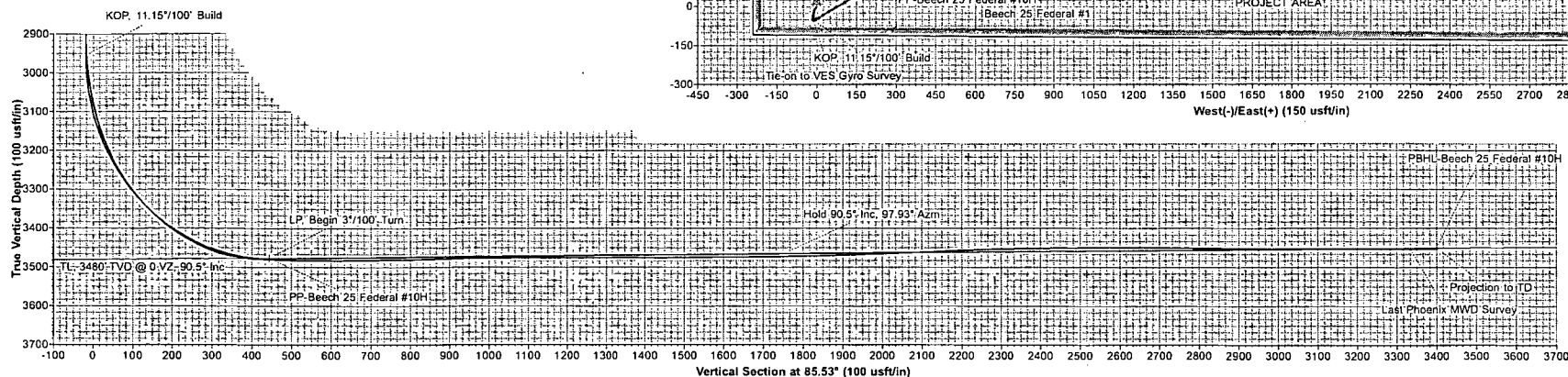
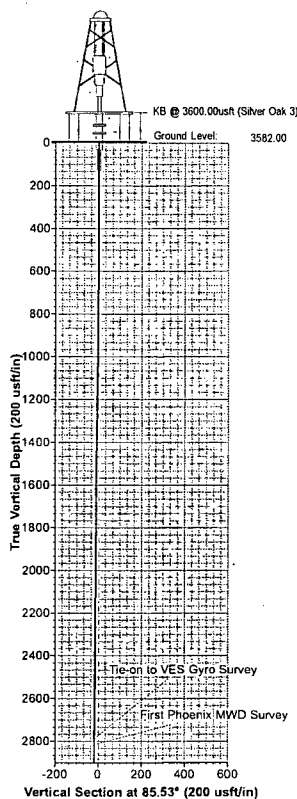
												CLT
Date	No.	DEPTH	INC.	AZM	C.L.	T.V.D.	V.S.	N/S	E/W	DLS	B/D.	BHA
21-May	87	6334	89.6	97.9	93	3452.13	2929.78	342.82°N	2911.92°E	2.11	0.54	
	88	6427	89.8	97.4	93	3452.62	3020.71	330.44°N	3004.09°E	0.58	0.22	
	89	6521	90.1	99.1	94	3452.70	3112.39	316.95°N	3097.11°E	1.84	0.32	
	90	6614	89.9	99.6	93	3452.70	3202.70	301.84°N	3188.87°E	0.58	0.22	
	91	6708	90.1	98.5	94	3452.70	3294.09	287.06°N	3281.70°E	1.19	0.21	
	92	6745	90.1	98.4	37	3452.63	3330.15	281.62°N	3318.30°E	0.27	0.00	
PTB	93	6816	90.1	98.4	71	3452.51	3399.37	271.25°N	3388.54°E	0.00	0.00	
					0	0.00	0.00	0.00°N	0.00°E	0.00	0.00	
					0	0.00	0.00	0.00°N	0.00°E	0.00	0.00	
					0	0.00	0.00	0.00°N	0.00°E	0.00	0.00	
					0	0.00	0.00	0.00°N	0.00°E	0.00	0.00	
					0	0.00	0.00	0.00°N	0.00°E	0.00	0.00	



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
 True North: -0.05°
 Magnetic North: 7.54°
 Magnetic Field
 Strength: 48600.8nT
 Dip Angle: 60.53°
 Date: 04/24/2014
 Model: IGRF2010_14



WELL DETAILS

		Ground Level:		3582.00	
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.00	0.00	654067.30	528823.90	32° 47' 53.10787 N	104° 14' 22.30754 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+W/-W	Dleg	TFace	VSet	Target	Annotation
1	2788.00	1.67	185.24	2787.38	-46.53	-14.88	0.00	-18.48		On to VES Gyro Survey
2	2954.75	1.67	185.24	2954.06	-51.37	-15.32	0.00	-19.28		KOP, 11°15'10" Build
3	3775.76	90.50	57.50	3477.05	216.90	428.41	11.15	-127.72	44.00	LP, 33°1'00" Turn
4	5813.44	90.50	97.93	3464.84	497.70	1718.03	3.00	88.72	1751.58	Hold 90° 51" E, 97.93° Azm
5	6211.22	90.50	97.93	3450.25	264.80	3389.60	0.00	0.00	3399.93	PBHL-Beech 25 Federal #10H TD at 6811.12

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBH-Beech 25 Federal #10H	3450.25	264.80	3389.60	654332.10	532123.50	32° 47' 55.69569 N	104° 13' 42.59295 W	Point
		- plan his target center						
PP-Beech 25 Federal #10H	3477.05	216.80	428.25	654284.10	529252.15	32° 47' 55.24937 N	104° 14' 17.28801 W	Point
		- plan his target center						

PROJECT DETAILS: Eddy County, NM (NAD27 NME)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001

System Datum: Mean Sea Level

SITE DETAILS: Beech 25 Federal

Site Centre Northing: 654947.50
Easting: 528762.70

Positional Uncertainty: 0.00
Convergence: 0.05
Local North: Grid

FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION	DIPANGLE	DIP
3476.37	3744.40	TL 3480' TVD @ 0 VZ 90.5° Inc	-0.50	85

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866

Zone Name: New Mexico East 3001

ZONE NAME: NEW MEXICO EAST 500

Local Origin: Well #10H, Grid North

Local Origin: Well #104, GHS North

Latitude: 32° 47' 53.10787 N

Longitude: 104° 14' 22.30754 W

Longitude: 104° 14' 22.30754 W

Grid East: 528823.90

Grid East: 528823.90
Grid North: 654067.30

Scale Factor: 1,000

Geomagnetic Model: IGRF2010 14

Geomagnetic Model: IGRF2010_14
Sample Date: 24-Apr-14

Sample Date: 24-Apr-14
Magnetic Declination: 7.59°

Magnetic Declination: 7.59°
Dip Angle from Horizontal: 60.53°

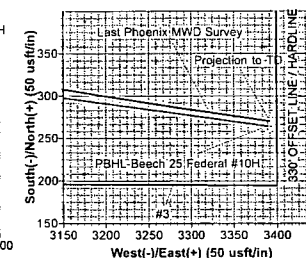
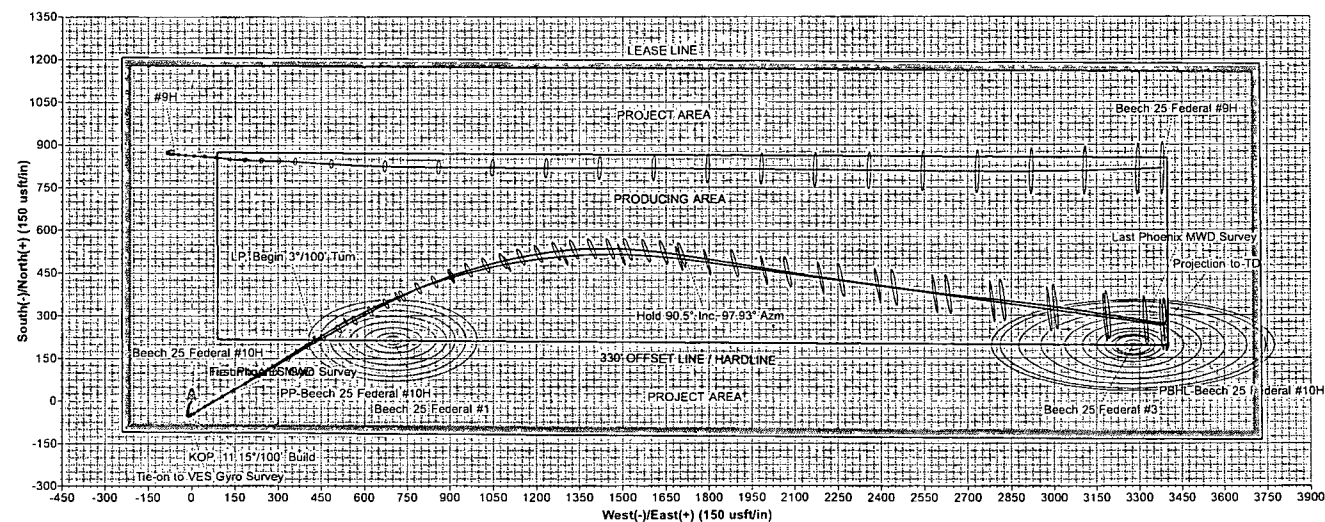
Dip Angle from Horizontal: 60.53°
Magnetic Field Strength: 48601

Magnetic Field Strength: 48601

To convert a Magnetic Direction to a Grid Direction, Add 7.54°
 To convert a Magnetic Direction to a True Direction, Add 7.59° East
 To convert a True Direction to a Grid Direction, Subtract 0.05°

LEGEND

- _____#9H, WB1/Job #1311101, Surveys (Silver Oak 3) V0
 _____#1, WB1, Inc Surveys V0
 _____#3, WB1, Inc Surveys V0
 _____#10H, WB1/Job #1410706, Surveys (Silver Oak 3) V0
 _____Plan #3 05-13-14





COG Operating LLC

Eddy County, NM (NAD27 NME)

Beech 25 Federal

#10H

WB1/Job #1410706

Survey: Phoenix MWD Survey

Standard Survey Report

22 May, 2014





Phoenix Technology Services

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #10H
Project:	Eddy County, NM (NAD27, NME)	TVD Reference:	KB @ 3600.00usft (Silver Oak 3)
Site:	Beech 25 Federal	MD Reference:	KB @ 3600.00usft (Silver Oak 3)
Well:	#10H	North Reference:	Grid
Wellbore:	WB1/Job #1410706	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

Project:	Eddy County, NM (NAD27 NME)		
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:		Beech 25 Federal			
Site Position:		Northing:	654,947.50 usft	Latitude:	32° 48' 1.81838 N
From:	Map	Easting:	528,762.70 usft	Longitude:	104° 14' 23.01541 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.05 °

Well:	#10H					
Well Position	+N/-S	0.00 usft	Northing:	654,067.30 usft	Latitude:	32° 47' 53.10787 N
	+E/-W	0.00 usft	Easting:	528,823.90 usft	Longitude:	104° 14' 22.30754 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,582.00 usft

Wellbore		WB1/Job #1410706			
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	04/24/14	7.59	60.53	48,601

Design	Surveys (Silver Oak 3)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	85.53	

Survey Program		Date	05/22/14		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	2,788.00	VES Gyro Survey (WB1/Job #1410706)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
2,815.00	6,819.00	Phoenix MWD Survey (WB1/Job #141070	MWD	MWD - Standard	

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)
2,788.00	1.67	185.24	2,787.38	-46.53	-14.88	-18.46	0.00	0.00	0.00
Tie-on to VES Gyro Survey									
2,815.00	1.80	191.10	2,814.37	-47.34	-15.00	-18.64	0.81	0.48	21.70
First Phoenix MWD Survey									
2,846.00	1.90	189.40	2,845.36	-48.32	-15.18	-18.90	0.37	0.32	-5.48
2,878.00	1.90	185.90	2,877.34	-49.37	-15.32	-19.12	0.36	0.00	-10.94
2,909.00	1.90	152.60	2,908.32	-50.34	-15.13	-19.01	3.51	0.00	-107.42
2,941.00	2.90	110.40	2,940.30	-51.09	-14.13	-18.07	6.14	3.13	-131.88
2,972.00	4.70	89.40	2,971.23	-51.35	-12.12	-16.09	7.25	5.81	-67.74



Phoenix Technology Services

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #10H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3600.00usft (Silver Oak 3)
Site:	Beech 25 Federal	MD Reference:	KB @ 3600.00usft (Silver Oak 3)
Well:	#10H	North Reference:	Grid
Wellbore:	WB1/Job #1410706	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

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)
3,004.00	7.00	77.20	3,003.06	-50.91	-8.91	-12.85	8.13	7.19	-38.13
3,035.00	9.70	69.00	3,033.73	-49.55	-4.63	-8.48	9.50	8.71	-26.45
3,066.00	12.50	62.30	3,064.15	-47.06	0.78	-2.89	9.93	9.03	-21.61
3,098.00	15.30	58.00	3,095.21	-43.21	7.43	4.04	9.32	8.75	-13.44
3,129.00	18.20	56.70	3,124.89	-38.38	14.94	11.91	9.43	9.35	-4.19
3,160.00	21.30	55.70	3,154.06	-32.55	23.64	21.03	10.06	10.00	-3.23
3,191.00	24.70	56.50	3,182.60	-25.80	33.70	31.59	11.01	10.97	2.58
3,223.00	27.80	58.50	3,211.29	-18.21	45.64	44.08	10.07	9.69	6.25
3,254.00	31.20	59.40	3,238.27	-10.34	58.72	57.73	11.06	10.97	2.90
3,285.00	34.60	59.70	3,264.29	-1.81	73.23	72.87	10.98	10.97	0.97
3,316.00	38.10	59.70	3,289.26	7.46	89.10	89.41	11.29	11.29	0.00
3,347.00	41.50	60.50	3,313.07	17.34	106.30	107.33	11.09	10.97	2.58
3,378.00	44.90	60.80	3,335.67	27.74	124.79	126.57	10.99	10.97	0.97
3,409.00	48.30	60.90	3,356.96	38.71	144.46	147.04	10.97	10.97	0.32
3,440.00	51.60	61.20	3,376.91	50.19	165.22	168.63	10.67	10.65	0.97
3,471.00	55.00	60.20	3,395.43	62.36	186.89	191.18	11.27	10.97	-3.23
3,503.00	58.70	60.00	3,412.93	75.71	210.11	215.38	11.57	11.56	-0.63
3,534.00	62.70	59.50	3,428.09	89.33	233.46	239.71	12.98	12.90	-1.61
3,565.00	66.60	59.20	3,441.36	103.61	257.56	264.85	12.61	12.58	-0.97
3,597.00	70.60	58.60	3,453.04	119.00	283.06	291.48	12.62	12.50	-1.88
3,628.00	74.20	58.70	3,462.41	134.37	308.29	317.83	11.62	11.61	0.32
3,659.00	78.60	58.30	3,469.70	150.11	333.98	344.66	14.25	14.19	-1.29
3,690.00	83.40	57.80	3,474.55	166.31	359.95	371.81	15.57	15.48	-1.61
3,741.00	88.30	58.50	3,478.24	193.14	403.14	416.97	9.70	9.61	1.37
3,772.00	88.70	59.40	3,479.05	209.12	429.69	444.68	3.18	1.29	2.90
3,803.00	88.50	59.90	3,479.80	224.78	456.44	472.57	1.74	-0.65	1.61
3,834.00	88.70	60.70	3,480.56	240.14	483.35	500.60	2.66	0.65	2.58
3,865.00	89.10	61.10	3,481.16	255.21	510.44	528.77	1.82	1.29	1.29
3,896.00	89.40	61.40	3,481.56	270.12	537.61	557.03	1.37	0.97	0.97
3,927.00	89.50	61.20	3,481.86	285.01	564.80	585.30	0.72	0.32	-0.65
3,958.00	89.90	61.70	3,482.02	299.82	592.03	613.60	2.07	1.29	1.61
3,990.00	90.60	62.00	3,481.88	314.92	620.25	642.90	2.38	2.19	0.94
4,021.00	90.60	62.50	3,481.56	329.35	647.68	671.38	1.61	0.00	1.61
4,052.00	90.50	63.40	3,481.26	343.45	675.29	700.00	2.92	-0.32	2.90
4,083.00	91.10	63.70	3,480.83	357.26	703.04	728.74	2.16	1.94	0.97
4,114.00	91.00	64.60	3,480.26	370.77	730.93	757.61	2.92	-0.32	2.90
4,146.00	91.30	65.10	3,479.62	384.37	759.89	787.54	1.82	0.94	1.56
4,177.00	91.30	66.70	3,478.91	397.02	788.18	816.73	5.16	0.00	5.16
4,208.00	91.30	67.90	3,478.21	408.98	816.77	846.16	3.87	0.00	3.87
4,239.00	91.30	69.00	3,477.51	420.36	845.60	875.79	3.55	0.00	3.55
4,270.00	91.10	70.10	3,476.86	431.19	874.64	905.58	3.61	-0.65	3.55
4,301.00	90.90	70.80	3,476.32	441.56	903.85	935.51	2.35	-0.65	2.26
4,332.00	90.80	71.80	3,475.86	451.50	933.21	965.56	3.24	-0.32	3.23



Phoenix Technology Services

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #10H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3600.00usft (Silver Oak 3)
Site:	Beech 25 Federal	MD Reference:	KB @ 3600.00usft (Silver Oak 3)
Well:	#10H	North Reference:	Grid
Wellbore:	WB1/Job #1410706	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR/DB

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)
4,364.00	90.40	72.90	3,475.52	461.20	963.70	996.71	3.66	-1.25	3.44
4,395.00	90.20	74.10	3,475.36	470.01	993.42	1,027.03	3.92	-0.65	3.87
4,426.00	90.60	74.40	3,475.14	478.42	1,023.26	1,057.43	1.61	1.29	0.97
4,457.00	90.20	75.80	3,474.93	486.39	1,053.21	1,087.92	4.70	-1.29	4.52
4,488.00	90.10	76.90	3,474.85	493.71	1,083.34	1,118.52	3.56	-0.32	3.55
4,519.00	89.90	77.90	3,474.85	500.47	1,113.59	1,149.21	3.29	-0.65	3.23
4,551.00	90.00	78.90	3,474.87	506.91	1,144.93	1,180.96	3.14	0.31	3.13
4,582.00	90.00	80.10	3,474.87	512.56	1,175.41	1,211.79	3.87	0.00	3.87
4,613.00	90.20	80.90	3,474.82	517.67	1,205.99	1,242.67	2.66	0.65	2.58
4,645.00	90.40	81.10	3,474.65	522.68	1,237.59	1,274.57	0.88	0.63	0.63
4,676.00	90.40	82.30	3,474.44	527.15	1,268.27	1,305.50	3.87	0.00	3.87
4,707.00	90.20	84.30	3,474.27	530.77	1,299.06	1,336.47	6.48	-0.65	6.45
4,738.00	89.70	86.50	3,474.30	533.25	1,329.95	1,367.47	7.28	-1.61	7.10
4,770.00	89.80	88.20	3,474.44	534.73	1,361.92	1,399.45	5.32	0.31	5.31
4,801.00	89.60	89.10	3,474.60	535.46	1,392.91	1,430.40	2.97	-0.65	2.90
4,832.00	90.50	89.90	3,474.58	535.74	1,423.91	1,461.33	3.88	2.90	2.58
4,864.00	90.70	90.60	3,474.24	535.60	1,455.90	1,493.22	2.27	0.63	2.19
4,895.00	90.90	91.70	3,473.81	534.97	1,486.89	1,524.07	3.61	0.65	3.55
4,926.00	90.90	92.90	3,473.32	533.73	1,517.87	1,554.85	3.87	0.00	3.87
4,958.00	90.70	94.00	3,472.87	531.80	1,549.80	1,586.54	3.49	-0.63	3.44
4,989.00	90.40	95.10	3,472.58	529.35	1,580.70	1,617.15	3.68	-0.97	3.55
5,020.00	90.20	96.60	3,472.41	526.19	1,611.54	1,647.65	4.88	-0.65	4.84
5,051.00	90.10	97.10	3,472.33	522.49	1,642.32	1,678.05	1.64	-0.32	1.61
5,082.00	90.20	98.60	3,472.25	518.25	1,673.03	1,708.33	4.85	0.32	4.84
5,114.00	90.80	98.50	3,471.97	513.50	1,704.67	1,739.51	1.90	1.88	-0.31
5,207.00	91.40	99.30	3,470.19	499.11	1,796.53	1,829.97	1.08	0.65	0.86
5,301.00	91.80	99.30	3,467.56	483.93	1,889.26	1,921.23	0.43	0.43	0.00
5,395.00	92.50	99.00	3,464.04	468.99	1,982.00	2,012.52	0.81	0.74	-0.32
5,489.00	92.20	98.90	3,460.18	454.38	2,074.78	2,103.88	0.34	-0.32	-0.11
5,583.00	92.70	99.00	3,456.16	439.77	2,167.55	2,195.23	0.54	0.53	0.11
5,677.00	91.50	98.70	3,452.72	425.32	2,260.36	2,286.64	1.32	-1.28	-0.32
5,771.00	91.00	98.30	3,450.67	411.43	2,353.31	2,378.22	0.68	-0.53	-0.43
5,865.00	90.30	97.60	3,449.60	398.43	2,446.40	2,470.01	1.05	-0.74	-0.74
5,959.00	91.00	97.30	3,448.54	386.24	2,539.60	2,561.98	0.81	0.74	-0.32
6,053.00	89.20	96.50	3,448.37	374.95	2,632.91	2,654.13	2.10	-1.91	-0.85
6,147.00	89.20	96.50	3,449.68	364.31	2,726.30	2,746.40	0.00	0.00	0.00
6,241.00	89.10	96.00	3,451.08	354.07	2,819.73	2,838.75	0.54	-0.11	-0.53
6,334.00	89.60	97.90	3,452.13	342.82	2,912.04	2,929.90	2.11	0.54	2.04
6,427.00	89.80	97.40	3,452.62	330.44	3,004.21	3,020.82	0.58	0.22	-0.54
6,521.00	90.10	99.10	3,452.70	316.95	3,097.23	3,112.51	1.84	0.32	1.81
6,614.00	89.90	99.60	3,452.70	301.84	3,188.99	3,202.82	0.58	-0.22	0.54
6,708.00	90.10	98.50	3,452.70	287.06	3,281.82	3,294.21	1.19	0.21	-1.17
6,748.00	90.10	98.40	3,452.63	281.18	3,321.39	3,333.20	0.25	0.00	-0.25
Last Phoenix MWD Survey									



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #10H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3600.00usft (Silver Oak 3)
Site:	Beech 25 Federal	MD Reference:	KB @ 3600.00usft (Silver Oak 3)
Well:	#10H	North Reference:	Grid
Wellbore:	WB1/Job #1410706	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR DB

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)
6,819.00	90.10	98.40	3,452.51	270.81	3,391.63	3,402.42	0.00	0.00	0.00
Projection to TD									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,788.00	2,787.38	-46.53	-14.88	Tie-on to VES Gyro Survey
2,815.00	2,814.37	-47.34	-15.00	First Phoenix MWD Survey
6,748.00	3,452.63	281.18	3,321.39	Last Phoenix MWD Survey
6,819.00	3,452.51	270.81	3,391.63	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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