



COG Operating LLC

Eddy County, New Mexico (NAD 27 NME)

Beech 25 Federal

#9H

WB1/Job #1311101

Survey: Phoenix MWD Surveys

Phoenix Final Survey Report

05 September, 2013





Phoenix Technology Services
Phoenix Final Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #9H
Project:	Eddy County, New Mexico (NAD 27, NME)	TVD Reference:	KB @ 3604' 00usft (Silver Oak 3)
Site:	Beech 25 Federal	MD Reference:	KB @ 3604' 00usft (Silver Oak 3)
Well:	#9H	North Reference:	Grid
Wellbore:	WB1/Job #1311101	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR/DB

Project	Eddy County, New Mexico (NAD 27, 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
From:	Map	Easting:	528,762.70 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 48' 1.81838 N
		Longitude:	104° 14' 23.01541 W
		Grid Convergence:	0.05 °

Well	#9H		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 48' 1.81838 N
		Longitude:	104° 14' 23.01541 W
		Ground Level:	3,586.00 usft

Wellbore	WB1/Job #1311101		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	08/23/13	7.67
			Dip Angle
			(°)
			Field Strength
			(nT)
			60.55
			48,669

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
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
		Direction	(°)
		91.26	

Survey Program	Date 09/05/13		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,790.00	VES Gyro (WB1/Job #1311101)	VES-ISCWSA-GYRO-3
2,874.00	6,738.00	Phoenix MWD Surveys (WB1/Job #131110)	MWD
			Description
			Biaxial Semi-Cont. Gyro
			MWD - Standard

Survey	MD	Inc	Azi (azimuth)	TVD	N/S	E/W	V. Sec	D Leg
	(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(%/100usft)
	2,790.00	0.39	180.75	2,789.83	-8.33	-23.83	-23.64	0.00
Tie-on								
	2,874.00	0.50	164.90	2,873.83	-8.97	-23.73	-23.53	0.20
First Phoenix MWD Survey								
	2,905.00	1.00	124.40	2,904.82	-9.25	-23.47	-23.27	2.26
	2,936.00	2.50	106.50	2,935.81	-9.59	-22.60	-22.39	5.09
	2,968.00	4.20	103.00	2,967.75	-10.06	-20.79	-20.57	5.35
	3,000.00	6.10	100.70	2,999.62	-10.64	-17.98	-17.74	5.97
	3,031.00	8.40	96.50	3,030.37	-11.20	-14.11	-13.86	7.61
	3,063.00	10.90	93.50	3,061.92	-11.65	-8.77	-8.51	7.97
	3,094.00	13.70	93.40	3,092.20	-12.04	-2.18	-1.91	9.03



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Well:	#9H	North Reference:	Grid
Wellbore:	WB1/Job#1311101	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Silver Oak 3)	Database:	GCR-DB

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
3,125.00	16.60	93.50	3,122.12	-12.53	5.91	6.18	9.36
3,157.00	19.40	94.30	3,152.55	-13.21	15.77	16.06	8.78
3,188.00	22.40	95.00	3,181.51	-14.11	26.79	27.10	9.71
3,219.00	25.70	94.90	3,209.81	-15.20	39.38	39.70	10.65
3,250.00	28.60	94.30	3,237.40	-16.33	53.48	53.82	9.40
3,281.00	31.30	94.30	3,264.25	-17.49	68.91	69.28	8.71
3,312.00	33.90	94.50	3,290.37	-18.77	85.56	85.95	8.39
3,344.00	37.40	94.50	3,316.37	-20.24	104.15	104.57	10.94
3,375.00	40.60	94.60	3,340.45	-21.78	123.60	124.05	10.32
3,408.00	44.60	95.20	3,364.74	-23.70	145.85	146.33	12.18
3,439.00	48.90	95.90	3,385.98	-25.88	168.31	168.84	13.97
3,471.00	53.30	96.20	3,406.07	-28.51	193.07	193.65	13.77
3,502.00	57.80	94.70	3,423.60	-30.93	218.51	219.14	15.05
3,533.00	62.50	93.40	3,439.02	-32.82	245.33	245.99	15.59
3,565.00	67.20	92.10	3,452.62	-34.20	274.25	274.94	15.14
3,596.00	71.20	90.90	3,463.63	-34.96	303.21	303.91	13.40
3,627.00	74.90	90.80	3,472.66	-35.40	332.86	333.56	11.94
3,659.00	77.90	91.50	3,480.19	-36.02	363.95	364.65	9.61
3,690.00	81.40	92.60	3,485.76	-37.12	394.42	395.14	11.82
3,716.00	84.70	93.70	3,488.90	-38.53	420.19	420.93	13.37
3,779.00	90.10	93.70	3,491.76	-42.59	482.97	483.79	8.57
3,842.00	89.90	93.40	3,491.76	-46.49	545.85	546.74	0.57
3,935.00	90.30	92.60	3,491.60	-51.36	638.72	639.69	0.96
4,028.00	90.70	91.50	3,490.78	-54.69	731.65	732.68	1.26
4,123.00	90.00	90.80	3,490.20	-56.60	826.63	827.68	1.04
4,217.00	91.00	90.70	3,489.38	-57.83	920.62	921.67	1.07
4,310.00	90.20	90.30	3,488.41	-58.64	1,013.61	1,014.65	0.96
4,404.00	90.10	90.90	3,488.16	-59.62	1,107.60	1,108.65	0.65
4,497.00	91.10	90.60	3,487.19	-60.84	1,200.59	1,201.64	1.12
4,591.00	90.10	90.20	3,486.21	-61.49	1,294.58	1,295.62	1.15
4,684.00	91.20	90.30	3,485.15	-61.90	1,387.57	1,388.60	1.19
4,777.00	90.60	89.00	3,483.69	-61.33	1,480.56	1,481.55	1.54
4,871.00	90.10	90.20	3,483.12	-60.68	1,574.55	1,575.50	1.38
4,965.00	90.20	91.10	3,482.87	-61.74	1,668.54	1,669.50	0.96
5,059.00	91.50	90.60	3,481.48	-63.14	1,762.52	1,763.48	1.48
5,153.00	91.70	89.70	3,478.85	-63.38	1,856.48	1,857.43	0.98
5,247.00	91.40	90.80	3,476.31	-63.79	1,950.45	1,951.38	1.21
5,341.00	91.20	90.20	3,474.18	-64.61	2,044.42	2,045.34	0.67
5,435.00	91.20	91.10	3,472.21	-65.68	2,138.39	2,139.32	0.96
5,528.00	91.60	90.30	3,469.93	-66.81	2,231.35	2,232.28	0.96
5,622.00	90.70	91.20	3,468.05	-68.05	2,325.32	2,326.26	1.35
5,716.00	91.10	90.80	3,466.57	-69.69	2,419.30	2,420.25	0.60
5,810.00	90.40	90.80	3,465.34	-71.00	2,513.28	2,514.23	0.74
5,903.00	90.90	90.30	3,464.29	-71.89	2,606.27	2,607.22	0.76



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Wellbore:	WB1/Job #1311101	Survey Calculation Method:	Minimum Curvature
Design:	Surveys, (Silver Oak 3)	Database:	GCR DB

MD (usft)	Inc. (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	Dleg (%/100usft)
5,996.00	90.20	90.60	3,463.39	-72.62	2,699.26	2,700.21	0.82
6,091.00	91.00	90.80	3,462.40	-73.78	2,794.25	2,795.20	0.87
6,184.00	89.80	89.80	3,461.75	-74.27	2,887.24	2,888.18	1.68
6,278.00	90.30	89.70	3,461.67	-73.86	2,981.24	2,982.14	0.54
6,371.00	89.70	89.30	3,461.67	-73.05	3,074.24	3,075.10	0.78
6,465.00	90.20	88.60	3,461.75	-71.32	3,168.22	3,169.02	0.92
6,559.00	90.90	88.40	3,460.85	-68.86	3,262.18	3,262.91	0.77
6,652.00	91.70	88.10	3,458.74	-66.02	3,355.12	3,355.76	0.92
Last Phoenix MWD Survey							
6,738.00	91.70	88.10	3,456.19	-63.17	3,441.03	3,441.59	0.00
Projection to TD							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,790.00	2,789.83	-8.33	-23.83	Tie-on
2,874.00	2,873.83	-8.97	-23.73	First Phoenix MWD Survey
6,652.00	3,458.74	-66.02	3,355.12	Last Phoenix MWD Survey
6,738.00	3,456.19	-63.17	3,441.03	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



PHOENIX
TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG Resources LLC**
Well **Beech 25 Federal #9H**
Field **Eddy, New Mexico**
Rig **Silver Oak #3**
Phoenix Rep. **Bob Dillon**

Correction **7.67**
Target TVD **3336.2**
Target Az. **91.26**
Tgt. Coord.

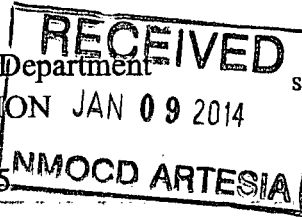
QDT
CLT

Date	No.	DEPTH	INC.	AZM	C.L.	T.V.D.	V.S.	N/S	E/W	DLS	B./D.	BHA
Tie - In	0	2790	0.39	180.75	0	2789.83	-23.60	8.33 S	23.79 W	0.00		
28-Aug	1	2874	0.5	164.9	84	2873.83	-23.50	8.97 S	23.70 W	0.20	0.13	1
	2	2905	1.0	124.4	31	2904.82	-23.23	9.25 S	23.44 W	2.26	1.61	
	3	2936	2.5	106.5	31	2935.81	-22.35	9.60 S	22.57 W	5.09	4.84	
	4	2968	4.2	103.0	32	2967.75	-20.53	10.06 S	20.76 W	5.35	5.31	
	5	3000	6.1	100.7	32	2999.62	-17.71	10.64 S	17.94 W	5.97	5.94	
	6	3031	8.4	96.5	31	3030.37	-13.83	11.20 S	14.08 W	7.61	7.42	
29-Aug	7	3063	10.9	93.5	32	3061.92	-8.48	11.65 S	8.73 W	7.97	7.81	
	8	3094	13.7	93.4	31	3092.20	-1.88	12.05 S	2.14 W	9.03	9.03	
	9	3125	16.6	93.5	31	3122.12	6.22	12.54 S	5.94 E	9.36	9.35	
	10	3157	19.4	94.3	32	3152.55	16.09	13.21 S	15.81 E	8.78	8.75	
29-Aug	11	3188	22.4	95.0	31	3181.51	27.13	14.11 S	26.82 E	9.71	9.68	2
	12	3219	25.7	94.9	31	3209.82	39.73	15.20 S	39.41 E	10.65	10.65	
	13	3250	28.6	94.3	31	3237.40	53.85	16.33 S	53.50 E	9.40	9.35	
	14	3281	31.3	94.3	31	3264.26	69.30	17.49 S	68.93 E	8.71	8.71	
	15	3312	33.9	94.5	31	3290.37	85.98	18.78 S	85.58 E	8.39	8.39	
	16	3344	37.4	94.5	32	3316.37	104.59	20.24 S	104.17 E	10.94	10.94	
	17	3375	40.6	94.6	31	3340.46	124.06	21.79 S	123.61 E	10.32	10.32	
30-Aug	18	3408	44.6	95.2	33	3364.74	146.35	23.70 S	145.86 E	12.18	12.12	3
	19	3439	48.9	95.9	31	3385.98	168.85	25.89 S	168.32 E	13.97	13.87	
	20	3471	53.3	96.2	32	3406.07	193.65	28.51 S	193.07 E	13.77	13.75	
	21	3502	57.8	94.7	31	3423.60	219.13	30.93 S	218.51 E	15.05	14.52	
	22	3533	62.5	93.4	31	3439.03	245.97	32.82 S	245.31 E	15.59	15.16	
	23	3565	67.2	92.1	32	3452.62	274.91	34.21 S	274.23 E	15.14	14.69	
	24	3596	71.2	90.9	31	3463.63	303.88	34.96 S	303.18 E	13.40	12.90	
	25	3627	74.9	90.8	31	3472.67	333.52	35.40 S	332.82 E	11.94	11.94	
	26	3659	77.9	91.5	32	3480.19	364.62	36.03 S	363.91 E	9.61	9.38	
	27	3690	81.4	92.6	31	3485.76	395.10	37.12 S	394.38 E	11.82	11.29	
	28	3716	84.7	93.7	26	3488.90	420.89	38.54 S	420.14 E	13.37	12.69	4
31-Aug	29	3779	90.1	93.7	63	3491.76	483.72	42.60 S	482.90 E	8.57	8.57	
	30	3842	89.9	93.4	63	3491.76	546.67	46.50 S	545.78 E	0.57	-0.32	
	31	3935	90.3	92.6	93	3491.60	639.62	51.37 S	638.65 E	0.96	0.43	
	32	4028	90.7	91.5	93	3490.79	732.61	54.69 S	731.58 E	1.26	0.43	
	33	4123	90.0	90.8	95	3490.21	827.60	56.60 S	826.56 E	1.04	-0.74	
	34	4217	91.0	90.7	94	3489.39	921.59	57.83 S	920.54 E	1.07	1.06	
	35	4310	90.2	90.3	93	3488.41	1014.58	58.64 S	1013.53 E	0.96	-0.86	
	36	4404	90.1	90.9	94	3488.17	1108.57	59.62 S	1107.53 E	0.65	-0.11	
	37	4497	91.1	90.6	93	3487.19	1201.56	60.84 S	1200.51 E	1.12	1.08	
1-Sep	38	4591	90.1	90.2	94	3486.21	1295.54	61.50 S	1294.50 E	1.15	-1.06	
	39	4684	91.2	90.3	93	3485.15	1388.52	61.90 S	1387.49 E	1.19	1.18	
	40	4777	90.6	89.0	93	3483.69	1481.46	61.34 S	1480.47 E	1.54	-0.65	
	41	4871	90.1	90.2	94	3483.12	1575.42	60.68 S	1574.46 E	1.38	-0.53	
	42	4965	90.2	91.1	94	3482.87	1669.41	61.75 S	1668.46 E	0.96	0.11	
	43	5059	91.5	90.6	94	3481.48	1763.39	63.14 S	1762.43 E	1.48	1.38	
	44	5153	91.7	89.7	94	3478.85	1857.34	63.39 S	1856.39 E	0.98	0.21	

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505



Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-40208	Pool Code 96836	Pool Name Red Lake; Glorieta-Yeso, Northeast
Property Code 40314	Property Name BEECH 25 FEDERAL	Well Number 9H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3586'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	25	17-S	27-E		990	SOUTH	180	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	25	17-S	27-E		927	SOUTH	1671	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
120			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

CORNER COORDINATES TABLE A - Y=655275.7 N, X=528582.3 E B - Y=655249.9 N, X=532549.1 E C - Y=653959.0 N, X=528584.2 E D - Y=653929.8 N, X=532555.6 E GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=654947.5 N X=528762.7 E BOTTOM HOLE LOCATION Y=654922.0 N X=532223.9 E DETAIL 3578.8' 3589.1' 600' 3578.6' 3593.6' GRID AZ = 90°25'22" HORZ. DIST. = 3462.2' 180' S.L. SEE DETAIL 990' 1671' 927'	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>Chasity Jackson</i> 1/6/14 Signature Date Chasity Jackson Printed Name cjackson@concho.com E-mail Address SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. AUGUST 9, 2012 Date of Survey Signature of Professional Surveyor: <i>Garrett J. Eidson</i> 5/18/2013 Certificate Number: Garrett J. Eidson 12641 Professional Surveyor: 3239 ACK REV: 7/18/13 REV: 1/17/05 JWSC W.O.: 12.11.1431
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