



PHOENIX
TECHNOLOGY SERVICES

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DISTRICT II-ARTESIA O.C.D.

COG Operating LLC

Eddy County, NM (NAD83 NME)

Dodd Federal Unit

983H

OH / 63957

Survey: Phoenix MWD Surveys

Standard Survey Report

13 December, 2018



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 983H
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	RKB @ 3594.50usft (Trinidad 436)
Site:	Dodd Federal Unit	MD Reference:	RKB @ 3594.50usft (Trinidad 436)
Well:	983H	North Reference:	Grid
Wellbore:	OH / 63957	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Trinidad 436)	Database:	USA Compass

Project	Eddy County, NM (NAD83 NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Dodd Federal Unit				
Site Position:		Northing:	669,073.16 usft	Latitude:	32° 50' 20.39158 N
From:	Map	Easting:	626,883.92 usft	Longitude:	104° 3' 17.28311 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.15 °

Well	983H					
Well Position	+N/-S	0.00 usft	Northing:	673,361.80 usft	Latitude:	32° 51' 2.92773 N
	+E/-W	0.00 usft	Easting:	622,958.30 usft	Longitude:	104° 4' 3.16961 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,578.00 usft

Wellbore	OH / 63957				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	1/15/2019	7.46	60.59	48,090.60153419

Design	Surveys (Trinidad 436)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	90.90	

Survey Program	Date 12/13/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	865.30	Scientific Gyro Surveys (OH / 63957)	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper	
993.00	13,397.00	Phoenix MWD Surveys (OH / 63957)	MWD+HDGM	OWSG Rev.2 MWD + HDGM	

Survey										
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865.30	0.62	94.76	864.88	1.51	22.23	22.21	0.00	0.00	0.00	
Tie In										
993.00	0.39	93.98	992.57	1.42	23.35	23.33	0.18	-0.18	-0.61	
First Phoenix MWD Survey										
1,056.00	0.27	84.78	1,055.57	1.42	23.72	23.69	0.21	-0.19	-14.60	
1,119.00	0.38	275.24	1,118.57	1.45	23.66	23.63	1.03	0.17	-269.11	
1,182.00	0.63	284.42	1,181.57	1.56	23.11	23.08	0.42	0.40	14.57	
1,244.00	0.95	272.34	1,243.57	1.66	22.27	22.24	0.58	0.52	-19.48	
1,307.00	0.92	272.58	1,306.56	1.71	21.24	21.21	0.05	-0.05	0.38	

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1,371.00	0.85	283.29	1,370.55	1.84	20.27	20.23	0.28	-0.11	16.73	
1,434.00	0.64	265.70	1,433.54	1.92	19.46	19.43	0.49	-0.33	-27.92	
1,496.00	0.71	280.11	1,495.54	1.96	18.74	18.70	0.30	0.11	23.24	
1,559.00	0.74	289.96	1,558.53	2.17	17.97	17.93	0.20	0.05	15.63	
1,622.00	0.41	291.51	1,621.53	2.39	17.38	17.34	0.52	-0.52	2.46	
1,685.00	0.57	265.80	1,684.53	2.45	16.86	16.82	0.43	0.25	-40.81	
1,748.00	0.63	295.01	1,747.53	2.58	16.23	16.19	0.49	0.10	46.37	
1,811.00	0.56	262.05	1,810.52	2.68	15.61	15.57	0.55	-0.11	-52.32	
1,874.00	0.43	269.83	1,873.52	2.64	15.07	15.03	0.23	-0.21	12.35	
1,937.00	0.70	287.80	1,936.52	2.75	14.47	14.42	0.51	0.43	28.52	
2,000.00	0.75	311.24	1,999.51	3.14	13.79	13.74	0.47	0.08	37.21	
2,063.00	0.60	296.29	2,062.51	3.56	13.18	13.13	0.37	-0.24	-23.73	
2,126.00	0.89	306.39	2,125.50	4.00	12.49	12.43	0.50	0.46	16.03	
2,189.00	0.87	320.98	2,188.50	4.66	11.80	11.72	0.36	-0.03	23.16	
2,252.00	0.94	320.85	2,251.49	5.43	11.17	11.09	0.11	0.11	-0.21	
2,315.00	0.96	325.89	2,314.48	6.27	10.55	10.45	0.14	0.03	8.00	
2,377.00	0.90	319.06	2,376.47	7.07	9.94	9.83	0.20	-0.10	-11.02	
2,440.00	0.81	338.85	2,439.46	7.86	9.45	9.33	0.49	-0.14	31.41	
2,503.00	1.21	295.89	2,502.45	8.56	8.70	8.56	1.31	0.63	-68.19	
2,566.00	1.74	288.92	2,565.43	9.16	7.19	7.05	0.89	0.84	-11.06	
2,593.00	1.93	281.64	2,592.42	9.39	6.36	6.21	1.11	0.70	-26.96	
2,655.00	1.98	282.81	2,654.38	9.84	4.29	4.14	0.10	0.08	1.89	
2,718.00	0.90	250.74	2,717.36	9.91	2.76	2.61	2.08	-1.71	-50.90	
2,782.00	1.30	185.97	2,781.35	9.03	2.21	2.07	1.92	0.63	-101.20	
2,845.00	1.39	179.86	2,844.34	7.55	2.14	2.02	0.27	0.14	-9.70	
2,908.00	1.21	191.85	2,907.32	6.14	2.01	1.91	0.52	-0.29	19.03	
2,971.00	1.18	175.63	2,970.31	4.84	1.92	1.84	0.54	-0.05	-25.75	
3,034.00	1.22	181.66	3,033.29	3.52	1.95	1.89	0.21	0.06	9.57	
3,097.00	1.18	180.30	3,096.28	2.20	1.93	1.89	0.08	-0.06	-2.16	
3,160.00	1.09	186.70	3,159.27	0.96	1.85	1.84	0.25	-0.14	10.16	
3,224.00	1.06	188.35	3,223.26	-0.23	1.70	1.70	0.07	-0.05	2.58	
3,286.00	1.26	185.06	3,285.24	-1.48	1.55	1.58	0.34	0.32	-5.31	
3,350.00	1.03	173.54	3,349.23	-2.75	1.56	1.60	0.51	-0.36	-18.00	
3,413.00	1.26	181.68	3,412.22	-4.01	1.60	1.66	0.45	0.37	12.92	
3,474.00	2.32	117.66	3,473.19	-5.25	2.67	2.76	3.44	1.74	-104.95	
3,507.00	5.76	92.07	3,506.11	-5.62	4.92	5.01	11.52	10.42	-77.55	
3,537.00	8.89	86.70	3,535.86	-5.54	8.74	8.83	10.67	10.43	-17.90	
3,600.00	16.34	82.21	3,597.30	-4.06	22.40	22.46	11.92	11.83	-7.13	
3,663.00	23.09	83.69	3,656.57	-1.50	43.48	43.50	10.74	10.71	2.35	
3,725.00	28.94	87.35	3,712.27	0.54	70.58	70.56	9.78	9.44	5.90	
3,788.00	35.05	89.64	3,765.67	1.35	103.93	103.89	9.89	9.70	3.63	
3,852.00	39.57	88.31	3,816.56	2.07	142.70	142.65	7.17	7.06	-2.08	
3,915.00	44.18	88.16	3,863.46	3.37	184.72	184.65	7.32	7.32	-0.24	

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3,977.00	44.21	88.06	3,907.91	4.79	227.92	227.81	0.12	0.05	-0.16	
3,980.30	44.19	88.04	3,910.28	4.87	230.22	230.11	0.63	-0.48	-0.58	
FTP: 3980' MD										
4,040.00	43.91	87.69	3,953.19	6.42	271.70	271.56	0.63	-0.48	-0.59	
4,103.00	44.53	87.27	3,998.34	8.35	315.59	315.42	1.09	0.98	-0.67	
4,166.00	51.03	89.90	4,040.65	9.45	362.20	362.01	10.77	10.32	4.17	
4,229.00	57.55	92.39	4,077.41	8.38	413.31	413.13	10.83	10.35	3.95	
4,292.00	64.18	92.11	4,108.06	6.23	468.27	468.11	10.53	10.52	-0.44	
4,355.00	69.94	91.21	4,132.61	4.56	526.24	526.10	9.24	9.14	-1.43	
4,418.00	74.50	90.46	4,151.84	3.69	586.20	586.07	7.33	7.24	-1.19	
4,481.00	79.24	92.80	4,166.15	1.93	647.51	647.40	8.35	7.52	3.71	
4,514.00	83.44	92.98	4,171.12	0.29	680.09	680.00	12.74	12.73	0.55	
4,543.00	86.62	92.66	4,173.63	-1.14	708.94	708.87	11.02	10.97	-1.10	
4,606.00	89.52	91.61	4,175.75	-3.48	771.85	771.81	4.90	4.60	-1.67	
4,677.00	89.65	91.45	4,176.27	-5.38	842.82	842.80	0.29	0.18	-0.23	
4,740.00	90.08	91.17	4,176.42	-6.82	905.81	905.80	0.81	0.68	-0.44	
4,804.00	89.96	90.80	4,176.39	-7.92	969.80	969.80	0.61	-0.19	-0.58	
4,867.00	88.16	91.13	4,177.43	-8.98	1,032.78	1,032.79	2.90	-2.86	0.52	
4,929.00	86.87	91.52	4,180.12	-10.41	1,094.70	1,094.73	2.17	-2.08	0.63	
4,992.00	87.35	90.69	4,183.29	-11.62	1,157.61	1,157.65	1.52	0.76	-1.32	
5,055.00	87.47	90.57	4,186.14	-12.32	1,220.54	1,220.58	0.27	0.19	-0.19	
5,118.00	87.64	91.01	4,188.83	-13.18	1,283.48	1,283.53	0.75	0.27	0.70	
5,181.00	88.39	91.61	4,191.01	-14.62	1,346.42	1,346.48	1.52	1.19	0.95	
5,245.00	89.30	92.45	4,192.30	-16.89	1,410.37	1,410.46	1.93	1.42	1.31	
5,308.00	89.56	92.11	4,192.93	-19.40	1,473.31	1,473.44	0.68	0.41	-0.54	
5,371.00	90.13	92.58	4,193.10	-21.97	1,536.26	1,536.42	1.17	0.90	0.75	
5,434.00	90.16	92.31	4,192.94	-24.66	1,599.20	1,599.39	0.43	0.05	-0.43	
5,497.00	88.76	90.83	4,193.53	-26.39	1,662.17	1,662.38	3.23	-2.22	-2.35	
5,560.00	88.78	91.37	4,194.88	-27.60	1,725.15	1,725.37	0.86	0.03	0.86	
5,623.00	89.05	91.45	4,196.08	-29.15	1,788.12	1,788.35	0.45	0.43	0.13	
5,686.00	89.41	91.92	4,196.92	-31.00	1,851.08	1,851.34	0.94	0.57	0.75	
5,749.00	89.62	92.15	4,197.46	-33.24	1,914.04	1,914.33	0.49	0.33	0.37	
5,812.00	90.52	92.89	4,197.38	-36.01	1,976.98	1,977.30	1.85	1.43	1.17	
5,875.00	91.28	92.95	4,196.39	-39.21	2,039.89	2,040.25	1.21	1.21	0.10	
5,938.00	91.56	91.50	4,194.83	-41.66	2,102.82	2,103.22	2.34	0.44	-2.30	
6,001.00	92.56	91.46	4,192.56	-43.29	2,165.76	2,166.17	1.59	1.59	-0.06	
6,032.00	91.01	90.74	4,191.60	-43.88	2,196.74	2,197.15	5.51	-5.00	-2.32	
6,064.00	91.30	90.51	4,190.95	-44.23	2,228.73	2,229.15	1.16	0.91	-0.72	
6,127.00	90.56	90.72	4,189.93	-44.91	2,291.72	2,292.14	1.22	-1.17	0.33	
6,189.00	91.19	91.40	4,188.98	-46.05	2,353.70	2,354.13	1.50	1.02	1.10	
6,252.00	89.88	90.42	4,188.39	-47.05	2,416.68	2,417.12	2.60	-2.08	-1.56	
6,315.00	88.10	90.05	4,189.51	-47.31	2,479.67	2,480.11	2.89	-2.83	-0.59	
6,378.00	88.73	90.73	4,191.25	-47.74	2,542.64	2,543.08	1.47	1.00	1.08	
6,441.00	89.12	91.67	4,192.43	-49.06	2,605.62	2,606.07	1.62	0.62	1.49	

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	6,504.00	89.19	91.58	4,193.36	-50.84	2,668.59	2,669.06	0.18	0.11	-0.14
	6,567.00	88.73	91.07	4,194.50	-52.30	2,731.56	2,732.04	1.09	-0.73	-0.81
	6,629.00	89.22	91.86	4,195.61	-53.89	2,793.53	2,794.03	1.50	0.79	1.27
	6,692.00	89.09	91.58	4,196.54	-55.78	2,856.49	2,857.02	0.49	-0.21	-0.44
	6,755.00	89.07	90.74	4,197.55	-57.05	2,919.47	2,920.01	1.33	-0.03	-1.33
	6,817.00	89.10	90.70	4,198.54	-57.83	2,981.46	2,982.00	0.08	0.05	-0.06
	6,881.00	89.73	89.86	4,199.20	-58.14	3,045.45	3,045.99	1.64	0.98	-1.31
	6,944.00	90.30	90.57	4,199.18	-58.38	3,108.45	3,108.99	1.45	0.90	1.13
	7,007.00	87.76	90.58	4,200.25	-59.01	3,171.43	3,171.97	4.03	-4.03	0.02
	7,070.00	88.42	91.01	4,202.35	-59.89	3,234.39	3,234.94	1.25	1.05	0.68
	7,133.00	89.33	91.34	4,203.58	-61.18	3,297.37	3,297.92	1.54	1.44	0.52
	7,196.00	88.72	89.74	4,204.65	-61.77	3,360.35	3,360.91	2.72	-0.97	-2.54
	7,259.00	89.21	89.68	4,205.79	-61.45	3,423.34	3,423.88	0.78	0.78	-0.10
	7,322.00	89.64	90.12	4,206.42	-61.34	3,486.34	3,486.87	0.98	0.68	0.70
	7,385.00	88.56	89.78	4,207.41	-61.29	3,549.33	3,549.85	1.80	-1.71	-0.54
	7,448.00	89.36	90.25	4,208.56	-61.30	3,612.32	3,612.84	1.47	1.27	0.75
	7,511.00	89.93	90.35	4,208.95	-61.63	3,675.32	3,675.83	0.92	0.90	0.16
	7,574.00	89.55	89.06	4,209.23	-61.31	3,738.31	3,738.81	2.13	-0.60	-2.05
	7,637.00	90.84	90.04	4,209.02	-60.82	3,801.31	3,801.79	2.57	2.05	1.56
	7,701.00	91.96	90.30	4,207.46	-61.00	3,865.29	3,865.77	1.80	1.75	0.41
	7,764.00	90.16	88.53	4,206.29	-60.36	3,928.27	3,928.73	4.01	-2.86	-2.81
	7,825.00	91.51	88.88	4,205.40	-58.98	3,989.25	3,989.68	2.29	2.21	0.57
	7,889.00	89.42	89.79	4,204.88	-58.24	4,053.23	4,053.65	3.56	-3.27	1.42
	7,952.00	87.95	90.44	4,206.33	-58.37	4,116.22	4,116.62	2.55	-2.33	1.03
	8,015.00	89.88	91.54	4,207.52	-59.46	4,179.19	4,179.61	3.53	3.06	1.75
	8,078.00	91.22	91.73	4,206.92	-61.25	4,242.16	4,242.60	2.15	2.13	0.30
	8,141.00	90.30	92.38	4,206.08	-63.51	4,305.11	4,305.58	1.79	-1.46	1.03
	8,204.00	89.58	92.85	4,206.15	-66.39	4,368.05	4,368.55	1.36	-1.14	0.75
	8,267.00	88.12	93.19	4,207.41	-69.70	4,430.95	4,431.49	2.38	-2.32	0.54
	8,330.00	88.72	92.64	4,209.15	-72.91	4,493.84	4,494.43	1.29	0.95	-0.87
	8,393.00	89.09	91.25	4,210.35	-75.04	4,556.79	4,557.41	2.28	0.59	-2.21
	8,456.00	89.19	88.95	4,211.30	-75.15	4,619.78	4,620.39	3.65	0.16	-3.65
	8,519.00	88.58	87.26	4,212.52	-73.07	4,682.73	4,683.30	2.85	-0.97	-2.68
	8,582.00	87.78	87.13	4,214.52	-69.99	4,745.62	4,746.14	1.29	-1.27	-0.21
	8,645.00	89.92	87.53	4,215.79	-67.06	4,808.54	4,809.00	3.46	3.40	0.63
	8,708.00	91.19	88.42	4,215.18	-64.83	4,871.49	4,871.91	2.46	2.02	1.41
	8,771.00	91.13	88.93	4,213.90	-63.37	4,934.46	4,934.85	0.81	-0.10	0.81
	8,834.00	89.18	89.16	4,213.73	-62.32	4,997.45	4,997.81	3.12	-3.10	0.37
	8,897.00	88.18	93.79	4,215.18	-63.94	5,060.40	5,060.78	7.52	-1.59	7.35
	8,960.00	89.29	94.44	4,216.58	-68.46	5,123.22	5,123.66	2.04	1.76	1.03
	9,022.00	89.25	92.77	4,217.37	-72.36	5,185.09	5,185.58	2.69	-0.06	-2.69
	9,088.00	90.21	91.12	4,217.68	-74.60	5,251.05	5,251.57	2.89	1.45	-2.50
	9,151.00	88.41	90.98	4,218.44	-75.76	5,314.03	5,314.56	2.87	-2.86	-0.22

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 983H
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	RKB @ 3594.50usft (Trinidad 436)
Site:	Dodd Federal Unit	MD Reference:	RKB @ 3594.50usft (Trinidad 436)
Well:	983H	North Reference:	Grid
Wellbore:	OH / 63957	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Trinidad 436)	Database:	USA Compass

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)
	9,214.00	88.27	91.21	4,220.26	-76.96	5,376.99	5,377.53	0.43	-0.22	0.37
	9,276.00	88.45	91.83	4,222.03	-78.60	5,438.94	5,439.51	1.04	0.29	1.00
	9,339.00	88.59	92.29	4,223.66	-80.87	5,501.88	5,502.47	0.76	0.22	0.73
	9,402.00	87.44	91.24	4,225.84	-82.81	5,564.81	5,565.42	2.47	-1.83	-1.67
	9,465.00	87.56	91.32	4,228.59	-84.21	5,627.73	5,628.36	0.23	0.19	0.13
	9,528.00	87.65	90.71	4,231.22	-85.33	5,690.67	5,691.31	0.98	0.14	-0.97
	9,591.00	87.85	90.65	4,233.70	-86.07	5,753.62	5,754.26	0.33	0.32	-0.10
	9,654.00	88.53	90.83	4,235.69	-86.89	5,816.58	5,817.23	1.12	1.08	0.29
	9,717.00	89.99	91.29	4,236.50	-88.05	5,879.56	5,880.22	2.43	2.32	0.73
	9,780.00	90.45	91.43	4,236.26	-89.55	5,942.54	5,943.22	0.76	0.73	0.22
	9,843.00	90.16	91.38	4,235.92	-91.09	6,005.52	6,006.21	0.47	-0.46	-0.08
	9,906.00	90.36	91.37	4,235.64	-92.60	6,068.50	6,069.21	0.32	0.32	-0.02
	9,968.00	90.28	91.49	4,235.29	-94.15	6,130.48	6,131.21	0.23	-0.13	0.19
	10,031.00	90.30	91.58	4,234.97	-95.84	6,193.46	6,194.20	0.15	0.03	0.14
	10,092.00	90.33	91.89	4,234.64	-97.69	6,254.43	6,255.19	0.51	0.05	0.51
	10,154.00	90.07	91.68	4,234.42	-99.62	6,316.40	6,317.19	0.54	-0.42	-0.34
	10,215.00	88.70	90.32	4,235.08	-100.68	6,377.39	6,378.18	3.16	-2.25	-2.23
	10,276.00	88.72	90.72	4,236.45	-101.24	6,438.37	6,439.16	0.66	0.03	0.66
	10,336.00	88.36	90.66	4,237.98	-101.96	6,498.34	6,499.14	0.61	-0.60	-0.10
	10,397.00	89.04	90.88	4,239.36	-102.78	6,559.32	6,560.13	1.17	1.11	0.36
	10,458.00	89.50	91.54	4,240.14	-104.07	6,620.30	6,621.12	1.32	0.75	1.08
	10,519.00	89.58	91.89	4,240.63	-105.89	6,681.27	6,682.11	0.59	0.13	0.57
	10,580.00	89.21	90.85	4,241.27	-107.35	6,742.25	6,743.11	1.81	-0.61	-1.70
	10,641.00	89.79	91.24	4,241.81	-108.46	6,803.24	6,804.10	1.15	0.95	0.64
	10,702.00	89.92	91.55	4,241.96	-109.95	6,864.22	6,865.10	0.55	0.21	0.51
	10,763.00	89.33	91.29	4,242.36	-111.46	6,925.20	6,926.10	1.06	-0.97	-0.43
	10,824.00	89.18	91.50	4,243.15	-112.94	6,986.18	6,987.09	0.42	-0.25	0.34
	10,885.00	89.19	91.69	4,244.02	-114.64	7,047.15	7,048.08	0.31	0.02	0.31
	10,946.00	89.53	90.63	4,244.70	-115.88	7,108.13	7,109.07	1.82	0.56	-1.74
	11,007.00	89.50	90.53	4,245.22	-116.49	7,169.12	7,170.07	0.17	-0.05	-0.16
	11,068.00	89.36	90.82	4,245.82	-117.21	7,230.12	7,231.07	0.53	-0.23	0.48
	11,129.00	89.85	90.89	4,246.24	-118.12	7,291.11	7,292.06	0.81	0.80	0.11
	11,189.00	89.84	91.01	4,246.41	-119.12	7,351.10	7,352.06	0.20	-0.02	0.20
	11,251.00	89.68	91.33	4,246.67	-120.38	7,413.09	7,414.06	0.58	-0.26	0.52
	11,311.00	89.32	91.50	4,247.19	-121.86	7,473.07	7,474.06	0.66	-0.60	0.28
	11,372.00	89.50	91.61	4,247.82	-123.52	7,534.04	7,535.05	0.35	0.30	0.18
	11,436.00	90.28	90.84	4,247.94	-124.89	7,598.02	7,599.05	1.71	1.22	-1.20
	11,499.00	89.65	90.81	4,247.98	-125.80	7,661.02	7,662.05	1.00	-1.00	-0.05
	11,563.00	89.28	90.66	4,248.58	-126.62	7,725.01	7,726.05	0.62	-0.58	-0.23
	11,625.00	89.22	89.53	4,249.39	-126.72	7,787.00	7,788.03	1.82	-0.10	-1.82
	11,689.00	89.08	89.72	4,250.34	-126.30	7,850.99	7,852.01	0.37	-0.22	0.30
	11,752.00	89.59	89.30	4,251.07	-125.76	7,913.99	7,914.99	1.05	0.81	-0.67
	11,815.00	89.95	89.69	4,251.32	-125.21	7,976.98	7,977.97	0.84	0.57	0.62
	11,878.00	89.45	90.06	4,251.65	-125.07	8,039.98	8,040.96	0.99	-0.79	0.59

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 983H
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	RKB @ 3594.50usft (Trinidad 436)
Site:	Dodd Federal Unit	MD Reference:	RKB @ 3594.50usft (Trinidad 436)
Well:	983H	North Reference:	Grid
Wellbore:	OH / 63957	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Trinidad 436)	Database:	USA Compass

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)
11,941.00	89.10	89.81	4,252.45	-125.00	8,102.98	8,103.94	0.68	-0.56	-0.40
12,004.00	88.21	89.32	4,253.93	-124.52	8,165.96	8,166.91	1.61	-1.41	-0.78
12,067.00	88.48	90.10	4,255.75	-124.20	8,228.93	8,229.87	1.31	0.43	1.24
12,130.00	88.82	90.87	4,257.23	-124.73	8,291.91	8,292.85	1.34	0.54	1.22
12,193.00	90.42	90.27	4,257.65	-125.36	8,354.90	8,355.84	2.71	2.54	-0.95
12,256.00	91.28	91.53	4,256.72	-126.35	8,417.89	8,418.83	2.42	1.37	2.00
12,319.00	91.21	91.82	4,255.35	-128.19	8,480.84	8,481.81	0.47	-0.11	0.46
12,382.00	90.99	92.10	4,254.14	-130.35	8,543.80	8,544.79	0.57	-0.35	0.44
12,445.00	90.73	92.43	4,253.19	-132.83	8,606.74	8,607.76	0.67	-0.41	0.52
12,508.00	90.42	92.12	4,252.56	-135.34	8,669.69	8,670.74	0.70	-0.49	-0.49
12,571.00	89.68	90.91	4,252.50	-137.00	8,732.66	8,733.74	2.25	-1.17	-1.92
12,633.00	89.02	90.79	4,253.21	-137.92	8,794.65	8,795.73	1.08	-1.06	-0.19
12,696.00	88.75	90.97	4,254.43	-138.89	8,857.63	8,858.72	0.52	-0.43	0.29
12,759.00	89.05	91.28	4,255.64	-140.12	8,920.61	8,921.71	0.68	0.48	0.49
12,822.00	90.01	91.62	4,256.16	-141.72	8,983.59	8,984.70	1.62	1.52	0.54
12,885.00	89.24	91.32	4,256.57	-143.33	9,046.56	9,047.70	1.31	-1.22	-0.48
12,948.00	88.88	91.38	4,257.61	-144.82	9,109.54	9,110.69	0.58	-0.57	0.10
13,011.00	88.67	91.54	4,258.95	-146.42	9,172.50	9,173.67	0.42	-0.33	0.25
13,074.00	87.87	91.23	4,260.85	-147.95	9,235.45	9,236.64	1.36	-1.27	-0.49
13,137.00	87.31	91.14	4,263.50	-149.25	9,298.38	9,299.58	0.90	-0.89	-0.14
13,199.00	89.93	91.60	4,265.00	-150.73	9,360.34	9,361.56	4.29	4.23	0.74
13,262.00	89.22	91.06	4,265.46	-152.19	9,423.32	9,424.55	1.42	-1.13	-0.86
13,325.00	90.95	91.66	4,265.37	-153.69	9,486.30	9,487.55	2.91	2.75	0.95
13,336.00	91.02	91.80	4,265.18	-154.02	9,497.30	9,498.54	1.42	0.64	1.27
Final Phoenix MWD Survey									
13,397.00	91.02	91.80	4,264.10	-155.93	9,558.26	9,559.53	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)	
865.30	864.88	1.51	22.23	Tie In
993.00	992.57	1.42	23.35	First Phoenix MWD Survey
3,980.30	3,910.28	4.87	230.22	FTP: 3980' MD
13,336.00	4,265.18	-154.02	9,497.30	Final Phoenix MWD Survey
13,397.00	4,264.10	-155.93	9,558.26	Projection to TD