

30-015-39476

Plan Proposal

FOR

COG Operating, LLC
Puckett 12 Federal #7H (Dual Hz)
Eddy Co., NM

Design #2

Presented By:

Aaron Boger
Account Manager

Bret Wolford
Well Planner

SHL
15' FSL & 819' FEL
Penetration Point
330' FSL & 866' FEL
PBHL
330' FNL & 990' FEL
Sec.12-T17S-R31E

WATER



Project: Eddy County(NM27E)
Site: Sec.12-T17S-R31E
Well: Puckett 12 Federal #7H
Wellbore: Wellbore #2 (Dual Hz)
Design: Design #2
Lat: 32° 50' 30.711 N
Long: 103° 48' 59.997 W
GL: 3965.00
KB: WELL @ 3979.00usft

Archer

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
5615.00	0.70	12.60	5614.19	7.10	-39.33	0.00	0.00	8.68	Tie-In / OH Survey
5635.12	0.56	0.75	5634.30	7.32	-39.30	0.94	-142.64	8.90	Int. KOP / Start DLS 11.00° TFO -2.61
6457.29	91.00	358.14	6150.00	536.99	-56.27	11.00	-2.61	538.82	EOC / Start 4400.50° hold at 6457.29 MD
10857.80	91.00	358.14	6073.20	4934.50	-199.10	0.00	0.00	4938.52	TD at 10857.80

WELL DETAILS: Puckett 12 Federal #7H

+N/-S	+E/-W	Northing	Ground Level:	3965.00	Longitude	Slot
0.00	0.00	670369.400	Easting	658684.500	32° 50' 30.711 N	103° 48' 59.997 W

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Puckett 12 Fed #7H PBHL	6073.20	4934.50	-199.10	32° 51' 19.547 N	103° 49' 2.048 W	Point

PROJECT DETAILS: Eddy County(NM27E)

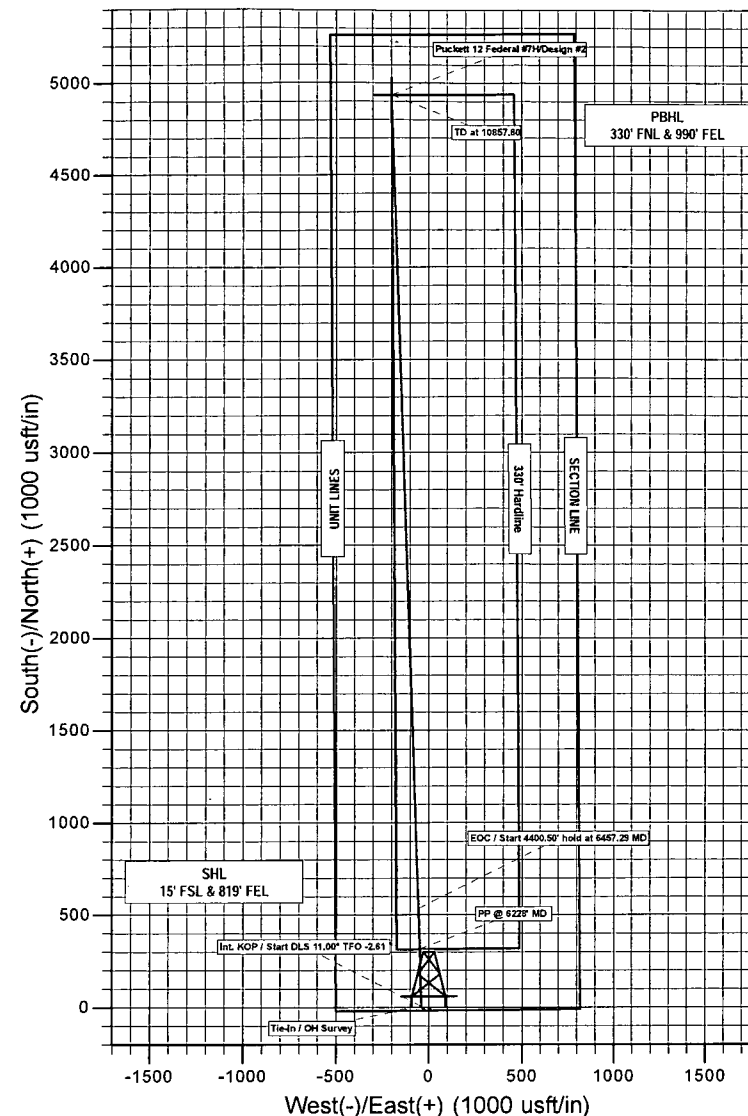
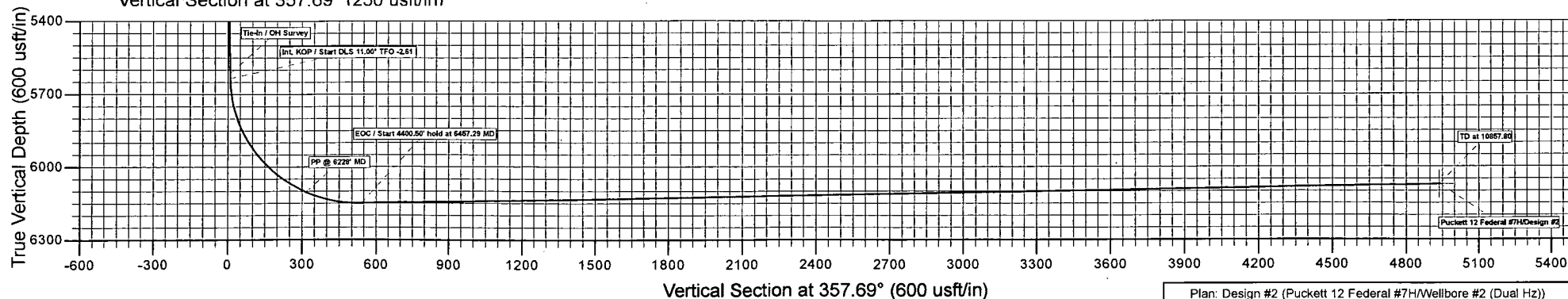
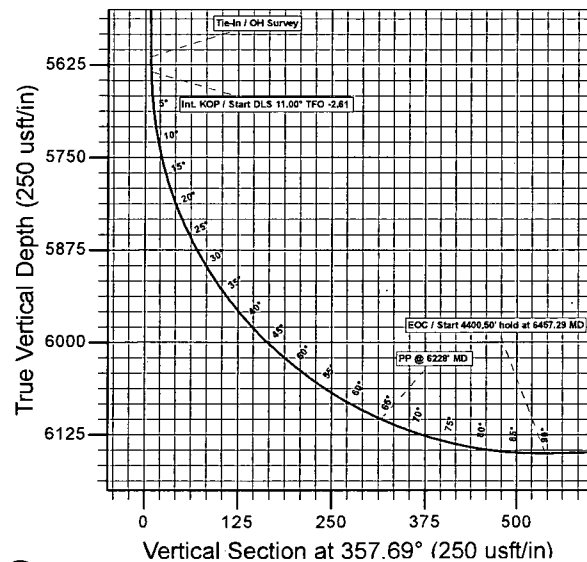
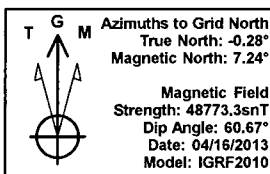
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001

System Datum: Mean Sea Level

SITE DETAILS: Sec.12-T17S-R31E

Site Centre Latitude: 32° 50' 30.996 N
Longitude: 103° 48' 57.311 W

Positional Uncertainty: 0.00
Convergence: 0.28
Local North: Grid



Plan: Design #2 (Puckett 12 Federal #7H/Wellbore #2 (Dual Hz))

Created By: Bret Wolford Date: 14:37, April 16 2013



COG Operating, LLC

Eddy County(NM27E)

Sec.12-T17S-R31E

Puckett 12 Federal #7H

Wellbore #2 (Dual Hz)

Plan: Design #2

Standard Planning Report

16 April, 2013

Archer

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3979.00usft
Project:	Eddy County(NM27E)	MD Reference:	WELL @ 3979.00usft
Site:	Sec.12-T17S-R31E	North Reference:	Grid
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual Hz)		
Design:	Design #2		

Project:	Eddy County(NM27E)		
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:	Sec.12-T17S-R31E		
Site Position:		Northing:	670,399.300 usft
From:	Map	Easting:	658,913.500 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 30.996 N
		Longitude:	103° 48' 57.311 W
		Grid Convergence:	0.28 °

Well	Puckett 12 Federal #7H					
Well Position	+N/-S	-29.90 usft	Northing:	670,369.400 usft	Latitude:	32° 50' 30.711 N
	+E/-W	-229.00 usft	Easting:	658,684.500 usft	Longitude:	103° 48' 59.997 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,965.00 usft

Wellbore		Wellbore #2 (Dual Hz)			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	04/16/13	7.52	60.67	48,773

Design		Design #2		
Audit Notes:				
Version:		Phase:	PLAN	Tie On Depth: 5,615.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	357.69

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
5,615.00	0.70	12.60	5,614.19	7.10	-39.33	0.00	0.00	0.00	0.00	
5,635.12	0.56	0.75	5,634.30	7.32	-39.30	0.94	-0.69	-58.91	-142.64	
6,457.29	91.00	358.14	6,150.00	536.99	-56.27	11.00	11.00	-0.32	-2.61	Puckett 12 Fed #7H F
10,857.80	91.00	358.14	6,073.20	4,934.50	-199.10	0.00	0.00	0.00	0.00	Puckett 12 Fed #7H F

Database:	EDM 5000.1 Single User.Db	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3979.00usft
Project:	Eddy County(NM27E)	MD Reference:	WELL @ 3979.00usft
Site:	Sec.12-T17S-R31E	North Reference:	Grid
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual Hz)		
Design:	Design #2		

Planned 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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.76	164.64	100.00	-0.64	0.18	-0.65	0.76	0.76	0.00
200.00	0.72	170.65	199.99	-1.90	0.45	-1.92	0.09	-0.04	6.01
300.00	0.86	181.33	299.98	-3.27	0.54	-3.29	0.20	0.14	10.68
400.00	0.78	188.13	399.97	-4.69	0.42	-4.71	0.13	-0.08	6.80
500.00	0.83	189.83	499.96	-6.08	0.20	-6.08	0.06	0.05	1.70
600.00	0.75	194.24	599.95	-7.43	-0.08	-7.42	0.10	-0.08	4.41
700.00	0.76	229.43	699.94	-8.49	-0.74	-8.46	0.46	0.01	35.19
800.00	0.27	256.08	799.94	-8.98	-1.48	-8.92	0.53	-0.49	26.65
900.00	0.18	179.83	899.94	-9.20	-1.71	-9.12	0.29	-0.09	-76.25
1,000.00	0.43	197.43	999.94	-9.71	-1.82	-9.63	0.26	0.25	17.60
1,100.00	0.54	210.41	1,099.93	-10.48	-2.17	-10.38	0.15	0.11	12.98
1,200.00	0.27	265.56	1,199.93	-10.90	-2.64	-10.79	0.44	-0.27	55.15
1,300.00	0.61	102.24	1,299.93	-11.03	-2.36	-10.93	0.87	0.34	-163.32
1,500.00	0.48	114.13	1,499.92	-11.60	-0.55	-11.57	0.09	-0.06	5.94
1,600.00	0.48	114.13	1,599.92	-11.94	0.21	-11.94	0.00	0.00	0.00
1,700.00	0.71	97.10	1,699.91	-12.19	1.21	-12.23	0.29	0.23	-17.03
1,800.00	0.74	64.71	1,799.90	-11.99	2.41	-12.08	0.41	0.03	-32.39
1,900.00	1.04	59.49	1,899.89	-11.25	3.77	-11.40	0.31	0.30	-5.22
2,000.00	1.00	68.40	1,999.87	-10.47	5.37	-10.68	0.16	-0.04	8.91
2,100.00	0.62	73.95	2,099.86	-10.00	6.70	-10.26	0.39	-0.38	5.55
2,200.00	0.33	86.99	2,199.86	-9.84	7.51	-10.13	0.31	-0.29	13.04
2,300.00	0.64	99.91	2,299.86	-9.92	8.34	-10.25	0.33	0.31	12.92
2,400.00	0.46	103.15	2,399.85	-10.11	9.29	-10.47	0.18	-0.18	3.24
2,500.00	0.30	139.65	2,499.85	-10.40	9.85	-10.78	0.28	-0.16	36.50
2,600.00	0.25	203.27	2,599.85	-10.80	9.93	-11.19	0.29	-0.05	63.62
2,700.00	0.48	224.35	2,699.85	-11.30	9.55	-11.67	0.26	0.23	21.08
2,800.00	0.62	237.91	2,799.84	-11.88	8.80	-12.23	0.19	0.14	13.56
2,900.00	0.89	253.81	2,899.83	-12.39	7.59	-12.68	0.34	0.27	15.90
3,000.00	1.10	257.05	2,999.82	-12.82	5.91	-13.05	0.22	0.21	3.24
3,100.00	1.19	257.45	3,099.80	-13.26	3.96	-13.41	0.09	0.09	0.40
3,200.00	1.15	260.23	3,199.78	-13.66	1.96	-13.72	0.07	-0.04	2.78
3,300.00	1.37	257.98	3,299.75	-14.07	-0.20	-14.05	0.23	0.22	-2.25
3,400.00	1.33	261.79	3,399.73	-14.49	-2.51	-14.38	0.10	-0.04	3.81
3,500.00	1.46	260.09	3,499.70	-14.87	-4.92	-14.66	0.14	0.13	-1.70
3,600.00	1.38	265.98	3,599.67	-15.18	-7.37	-14.87	0.17	-0.08	5.89
3,700.00	1.41	271.29	3,699.64	-15.23	-9.81	-14.83	0.13	0.03	5.31
3,800.00	1.85	282.51	3,799.60	-14.86	-12.61	-14.34	0.54	0.44	11.22
3,900.00	1.56	290.27	3,899.55	-14.04	-15.46	-13.40	0.37	-0.29	7.76
4,000.00	1.56	295.65	3,999.51	-12.97	-17.97	-12.24	0.15	0.00	5.38
4,100.00	1.60	296.69	4,099.48	-11.76	-20.44	-10.92	0.05	0.04	1.04
4,200.00	1.55	295.03	4,199.44	-10.56	-22.92	-9.63	0.07	-0.05	-1.66
4,300.00	1.41	295.87	4,299.41	-9.45	-25.25	-8.42	0.14	-0.14	0.84
4,400.00	1.27	311.22	4,399.38	-8.18	-27.19	-7.08	0.38	-0.14	15.35
4,500.00	1.38	312.67	4,499.35	-6.64	-28.91	-5.47	0.11	0.11	1.45
4,600.00	1.42	311.30	4,599.32	-5.00	-30.72	-3.76	0.05	0.04	-1.37
4,700.00	1.32	307.69	4,699.29	-3.48	-32.57	-2.17	0.13	-0.10	-3.61
4,800.00	1.15	319.41	4,799.27	-2.01	-34.13	-0.64	0.30	-0.17	11.72
4,900.00	1.11	317.70	4,899.25	-0.54	-35.43	0.89	0.05	-0.04	-1.71
5,000.00	0.93	322.53	4,999.23	0.82	-36.58	2.30	0.20	-0.18	4.83
5,100.00	0.81	315.75	5,099.22	1.97	-37.57	3.49	0.16	-0.12	-6.78
5,200.00	0.75	313.77	5,199.21	2.93	-38.53	4.48	0.07	-0.06	-1.98
5,300.00	0.56	323.93	5,299.21	3.78	-39.29	5.36	0.22	-0.19	10.16
5,400.00	0.70	356.13	5,399.20	4.79	-39.62	6.38	0.37	0.14	32.20

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Company:	COG Operating, LLC	TVD Reference:	WELL @ 3979.00usft
Project:	Eddy County(NM27E)	MD Reference:	WELL @ 3979.00usft
Site:	Sec.12-T17S-R31E	North Reference:	Grid
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual Hz)		
Design:	Design #2		

Planned 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)
5,500.00	0.46	3.20	5,499.20	5.80	-39.64	7.39	0.25	-0.24	7.07
5,521.00	0.70	26.10	5,520.20	6.00	-39.58	7.59	1.57	1.14	109.05
5,552.00	0.70	3.60	5,551.19	6.35	-39.48	7.94	0.88	0.00	-72.58
5,583.00	0.70	15.70	5,582.19	6.73	-39.42	8.31	0.48	0.00	39.03
Tie-In / OH Survey									
5,615.00	0.70	12.60	5,614.19	7.10	-39.33	8.68	0.12	0.00	-9.69
Int. KOP / Start DLS 11.00° TFO -2.61									
5,635.12	0.56	0.75	5,634.30	7.32	-39.30	8.90	0.94	-0.69	-58.91
5,650.00	2.20	358.81	5,649.18	7.68	-39.30	9.26	11.00	11.00	-13.06
5,700.00	7.70	358.33	5,698.98	11.99	-39.42	13.57	11.00	11.00	-0.95
5,750.00	13.20	358.25	5,748.13	21.05	-39.69	22.63	11.00	11.00	-0.16
5,800.00	18.70	358.22	5,796.19	34.78	-40.12	36.37	11.00	11.00	-0.07
5,850.00	24.20	358.20	5,842.71	53.04	-40.69	54.64	11.00	11.00	-0.04
5,900.00	29.70	358.18	5,887.26	75.68	-41.41	77.29	11.00	11.00	-0.02
5,950.00	35.20	358.18	5,929.44	102.48	-42.26	104.10	11.00	11.00	-0.02
6,000.00	40.70	358.17	5,968.85	133.20	-43.24	134.84	11.00	11.00	-0.01
6,050.00	46.20	358.16	6,005.14	167.56	-44.34	169.21	11.00	11.00	-0.01
6,100.00	51.70	358.16	6,037.96	205.23	-45.54	206.90	11.00	11.00	-0.01
6,150.00	57.20	358.16	6,067.02	245.87	-46.85	247.56	11.00	11.00	-0.01
6,200.00	62.70	358.15	6,092.05	289.11	-48.24	290.82	11.00	11.00	-0.01
PP @ 6228' MD									
6,228.00	65.78	358.15	6,104.22	314.31	-49.06	316.03	11.00	11.00	-0.01
6,250.00	68.20	358.15	6,112.82	334.55	-49.71	336.28	11.00	11.00	-0.01
6,300.00	73.70	358.15	6,129.14	381.77	-51.24	383.52	11.00	11.00	-0.01
6,350.00	79.20	358.14	6,140.85	430.33	-52.81	432.11	11.00	11.00	-0.01
6,400.00	84.70	358.14	6,147.85	479.79	-54.41	481.60	11.00	11.00	-0.01
6,450.00	90.20	358.14	6,150.08	529.70	-56.03	531.53	11.00	11.00	0.00
EOC / Start 4400.50' hold at 6457.29 MD									
6,457.29	91.00	358.14	6,150.00	536.98	-56.27	538.82	11.00	11.00	0.00
6,500.00	91.00	358.14	6,149.25	579.66	-57.65	581.52	0.00	0.00	0.00
6,600.00	91.00	358.14	6,147.51	679.60	-60.90	681.50	0.00	0.00	0.00
6,700.00	91.00	358.14	6,145.76	779.53	-64.15	781.48	0.00	0.00	0.00
6,800.00	91.00	358.14	6,144.02	879.46	-67.39	881.46	0.00	0.00	0.00
6,900.00	91.00	358.14	6,142.27	979.39	-70.64	981.44	0.00	0.00	0.00
7,000.00	91.00	358.14	6,140.53	1,079.33	-73.88	1,081.43	0.00	0.00	0.00
7,100.00	91.00	358.14	6,138.78	1,179.26	-77.13	1,181.41	0.00	0.00	0.00
7,200.00	91.00	358.14	6,137.04	1,279.19	-80.37	1,281.39	0.00	0.00	0.00
7,300.00	91.00	358.14	6,135.29	1,379.12	-83.62	1,381.37	0.00	0.00	0.00
7,400.00	91.00	358.14	6,133.55	1,479.05	-86.87	1,481.35	0.00	0.00	0.00
7,500.00	91.00	358.14	6,131.80	1,578.99	-90.11	1,581.33	0.00	0.00	0.00
7,600.00	91.00	358.14	6,130.06	1,678.92	-93.36	1,681.32	0.00	0.00	0.00
7,700.00	91.00	358.14	6,128.31	1,778.85	-96.60	1,781.30	0.00	0.00	0.00
7,800.00	91.00	358.14	6,126.57	1,878.78	-99.85	1,881.28	0.00	0.00	0.00
7,900.00	91.00	358.14	6,124.82	1,978.71	-103.10	1,981.26	0.00	0.00	0.00
8,000.00	91.00	358.14	6,123.08	2,078.65	-106.34	2,081.24	0.00	0.00	0.00
8,100.00	91.00	358.14	6,121.33	2,178.58	-109.59	2,181.22	0.00	0.00	0.00
8,200.00	91.00	358.14	6,119.59	2,278.51	-112.83	2,281.21	0.00	0.00	0.00
8,300.00	91.00	358.14	6,117.84	2,378.44	-116.08	2,381.19	0.00	0.00	0.00
8,400.00	91.00	358.14	6,116.10	2,478.37	-119.32	2,481.17	0.00	0.00	0.00
8,500.00	91.00	358.14	6,114.35	2,578.31	-122.57	2,581.15	0.00	0.00	0.00
8,600.00	91.00	358.14	6,112.60	2,678.24	-125.82	2,681.13	0.00	0.00	0.00
8,700.00	91.00	358.14	6,110.86	2,778.17	-129.06	2,781.11	0.00	0.00	0.00
8,800.00	91.00	358.14	6,109.11	2,878.10	-132.31	2,881.10	0.00	0.00	0.00

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Site:	Sec.12-T17S-R31E	North Reference:	Grid
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual Hz)		
Design:	Design #2		

Planned 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)
8,900.00	91.00	358.14	6,107.37	2,978.03	-135.55	2,981.08	0.00	0.00	0.00
9,000.00	91.00	358.14	6,105.62	3,077.97	-138.80	3,081.06	0.00	0.00	0.00
9,100.00	91.00	358.14	6,103.88	3,177.90	-142.05	3,181.04	0.00	0.00	0.00
9,200.00	91.00	358.14	6,102.13	3,277.83	-145.29	3,281.02	0.00	0.00	0.00
9,300.00	91.00	358.14	6,100.39	3,377.76	-148.54	3,381.00	0.00	0.00	0.00
9,400.00	91.00	358.14	6,098.64	3,477.69	-151.78	3,480.99	0.00	0.00	0.00
9,500.00	91.00	358.14	6,096.90	3,577.63	-155.03	3,580.97	0.00	0.00	0.00
9,600.00	91.00	358.14	6,095.15	3,677.56	-158.27	3,680.95	0.00	0.00	0.00
9,700.00	91.00	358.14	6,093.41	3,777.49	-161.52	3,780.93	0.00	0.00	0.00
9,800.00	91.00	358.14	6,091.66	3,877.42	-164.77	3,880.91	0.00	0.00	0.00
9,900.00	91.00	358.14	6,089.92	3,977.36	-168.01	3,980.89	0.00	0.00	0.00
10,000.00	91.00	358.14	6,088.17	4,077.29	-171.26	4,080.88	0.00	0.00	0.00
10,100.00	91.00	358.14	6,086.43	4,177.22	-174.50	4,180.86	0.00	0.00	0.00
10,200.00	91.00	358.14	6,084.68	4,277.15	-177.75	4,280.84	0.00	0.00	0.00
10,300.00	91.00	358.14	6,082.94	4,377.08	-180.99	4,380.82	0.00	0.00	0.00
10,400.00	91.00	358.14	6,081.19	4,477.02	-184.24	4,480.80	0.00	0.00	0.00
10,500.00	91.00	358.14	6,079.45	4,576.95	-187.49	4,580.79	0.00	0.00	0.00
10,600.00	91.00	358.14	6,077.70	4,676.88	-190.73	4,680.77	0.00	0.00	0.00
10,700.00	91.00	358.14	6,075.95	4,776.81	-193.98	4,780.75	0.00	0.00	0.00
10,800.00	91.00	358.14	6,074.21	4,876.74	-197.22	4,880.73	0.00	0.00	0.00
TD at 10857.80 - Puckett 12 Fed #7H PBHL									
10,857.80	91.00	358.14	6,073.20	4,934.50	-199.10	4,938.52	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
- hit/miss target									
- Shape									
Puckett 12 Fed #7H PBH	0.00	0.00	6,073.20	4,934.50	-199.10	675,303.900	658,485.400	32° 51' 19.547 N	103° 49' 2.048 W
- plan hits target center									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,615.00	5,614.19	7.10	-39.33	Tie-In / OH Survey
5,635.12	5,634.30	7.32	-39.30	Int. KOP / Start DLS 11.00° TFO -2.61
6,228.00	6,104.22	314.31	-49.06	PP @ 6228' MD
6,457.29	6,150.00	536.98	-56.27	EOC / Start 4400.50' hold at 6457.29 MD
10,857.80	6,073.20	4,934.50	-199.10	TD at 10857.80



COG Operating, LLC

Eddy County(NM27E)

Sec.12-T17S-R31E

Puckett 12 Federal #7H

Wellbore #2 (Dual Hz)

Design #2

Anticollision Report

16 April, 2013

Archer

Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H.
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Design #2

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program Date: 04/16/13

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	5,500.00	Gyro Survey-OH (Wellbore #2 (Dual Hz))	GYD_DP_MS	Gyrodatta gyro-compassing and drop
5,521.00	5,615.00	MWD Survey-OH (Wellbore #2 (Dual Hz))	MWD	MWD - Standard
5,615.00	10,857.80	Design #2 (Wellbore #2 (Dual Hz))	MWD	MWD - Standard

Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sec.12-T17S-R31E						
Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1	5,635.12	5,635.12	0.00	-13.28	0.000	Level 1, CC, ES, SF

Sec.12-T17S-R31E - Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1													Offset Site Error: 0.00 usft
Survey Program: 100-MWD, 5500-MWD													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
100.00	100.00	100.00	100.00	0.09	0.10	0.00	-0.64	0.18	0.00	-0.19	0.19	0.000	Level 1
200.00	199.99	200.00	199.99	0.23	0.31	0.00	-1.90	0.45	0.00	-0.54	0.54	0.000	Level 1
300.00	299.98	300.00	299.98	0.32	0.53	0.00	-3.27	0.54	0.00	-0.84	0.84	0.000	Level 1
400.00	399.97	400.00	399.97	0.39	0.74	0.00	-4.69	0.42	0.00	-1.13	1.13	0.000	Level 1
500.00	499.96	500.00	499.96	0.45	0.96	0.00	-6.08	0.20	0.00	-1.40	1.40	0.000	Level 1
600.00	599.95	600.00	599.95	0.51	1.17	0.00	-7.43	-0.08	0.00	-1.67	1.67	0.000	Level 1
700.00	699.94	700.00	699.94	0.56	1.39	0.00	-8.49	-0.74	0.00	-1.92	1.92	0.000	Level 1
800.00	799.94	800.00	799.94	0.60	1.59	0.00	-8.98	-1.48	0.00	-2.16	2.16	0.000	Level 1
900.00	899.94	900.00	899.94	0.63	1.79	0.00	-9.20	-1.71	0.00	-2.41	2.41	0.000	Level 1
1,000.00	999.94	1,000.00	999.94	0.68	2.00	0.00	-9.71	-1.82	0.00	-2.66	2.66	0.000	Level 1
1,100.00	1,099.93	1,100.00	1,099.93	0.72	2.21	0.00	-10.48	-2.17	0.00	-2.92	2.92	0.000	Level 1
1,200.00	1,199.93	1,200.00	1,199.93	0.75	2.42	0.00	-10.90	-2.64	0.00	-3.11	3.11	0.000	Level 1
1,300.00	1,299.93	1,300.00	1,299.93	0.76	2.63	0.00	-11.03	-2.36	0.00	-3.30	3.30	0.000	Level 1
1,500.00	1,499.92	1,500.00	1,499.92	0.87	3.04	0.00	-11.60	-0.55	0.00	-3.84	3.84	0.000	Level 1
1,600.00	1,599.92	1,600.00	1,599.92	0.90	3.25	0.00	-11.94	0.21	0.00	-4.08	4.08	0.000	Level 1
1,700.00	1,699.91	1,700.00	1,699.91	0.92	3.45	0.00	-12.19	1.21	0.00	-4.30	4.30	0.000	Level 1
1,800.00	1,799.90	1,800.00	1,799.90	0.94	3.66	0.00	-11.99	2.41	0.00	-4.54	4.54	0.000	Level 1
1,900.00	1,899.89	1,900.00	1,899.89	0.96	3.87	0.00	-11.25	3.77	0.00	-4.77	4.77	0.000	Level 1
2,000.00	1,999.87	2,000.00	1,999.87	0.98	4.08	0.00	-10.47	5.37	0.00	-5.00	5.00	0.000	Level 1
2,100.00	2,099.86	2,100.00	2,099.86	1.01	4.29	0.00	-10.00	6.70	0.00	-5.23	5.23	0.000	Level 1
2,200.00	2,199.86	2,200.00	2,199.86	1.03	4.50	0.00	-9.84	7.51	0.00	-5.48	5.48	0.000	Level 1
2,300.00	2,299.86	2,300.00	2,299.86	1.06	4.71	0.00	-9.92	8.34	0.00	-5.73	5.73	0.000	Level 1
2,400.00	2,399.85	2,400.00	2,399.85	1.09	4.92	0.00	-10.11	9.29	0.00	-5.97	5.97	0.000	Level 1

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design										Sec.12-T17S-R31E - Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1		Offset Site Error: 0.00 usft	
Survey Program: 100-MWD, 5500-MWD												Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis				Distance					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,500.00	2,499.85	2,500.00	2,499.85	1.12	5.13	0.00	-10.40	9.85	0.00	-6.24	6.24	0.000	Level 1
2,600.00	2,599.85	2,600.00	2,599.85	1.14	5.35	0.00	-10.80	9.93	0.00	-6.41	6.41	0.000	Level 1
2,700.00	2,699.85	2,700.00	2,699.85	1.16	5.56	0.00	-11.30	9.55	0.00	-6.63	6.63	0.000	Level 1
2,800.00	2,799.84	2,800.00	2,799.84	1.18	5.78	0.00	-11.88	8.80	0.00	-6.86	6.86	0.000	Level 1
2,900.00	2,899.83	2,900.00	2,899.83	1.20	5.99	0.00	-12.39	7.59	0.00	-7.10	7.10	0.000	Level 1
3,000.00	2,999.82	3,000.00	2,999.82	1.22	6.21	0.00	-12.82	5.91	0.00	-7.33	7.33	0.000	Level 1
3,100.00	3,099.80	3,100.00	3,099.80	1.23	6.42	0.00	-13.26	3.96	0.00	-7.57	7.57	0.000	Level 1
3,200.00	3,199.78	3,200.00	3,199.78	1.25	6.63	0.00	-13.66	1.96	0.00	-7.80	7.80	0.000	Level 1
3,300.00	3,299.75	3,300.00	3,299.75	1.27	6.84	0.00	-14.07	-0.20	0.00	-8.02	8.02	0.000	Level 1
3,400.00	3,399.73	3,400.00	3,399.73	1.29	7.06	0.00	-14.49	-2.51	0.00	-8.25	8.25	0.000	Level 1
3,500.00	3,499.70	3,500.00	3,499.70	1.31	7.27	0.00	-14.87	-4.92	0.00	-8.49	8.49	0.000	Level 1
3,600.00	3,599.67	3,600.00	3,599.67	1.32	7.48	0.00	-15.18	-7.37	0.00	-8.71	8.71	0.000	Level 1
3,700.00	3,699.64	3,700.00	3,699.64	1.34	7.69	0.00	-15.23	-9.81	0.00	-8.94	8.94	0.000	Level 1
3,800.00	3,799.60	3,800.00	3,799.60	1.36	7.90	0.00	-14.86	-12.61	0.00	-9.17	9.17	0.000	Level 1
3,900.00	3,899.55	3,900.00	3,899.55	1.38	8.11	0.00	-14.04	-15.46	0.00	-9.40	9.40	0.000	Level 1
4,000.00	3,999.51	4,000.00	3,999.51	1.39	8.31	0.00	-12.97	-17.97	0.00	-9.62	9.62	0.000	Level 1
4,100.00	4,099.48	4,100.00	4,099.48	1.41	8.52	0.00	-11.76	-20.44	0.00	-9.84	9.84	0.000	Level 1
4,200.00	4,199.44	4,200.00	4,199.44	1.42	8.73	0.00	-10.56	-22.92	0.00	-10.07	10.07	0.000	Level 1
4,300.00	4,299.41	4,300.00	4,299.41	1.44	8.94	0.00	-9.45	-25.25	0.00	-10.29	10.29	0.000	Level 1
4,400.00	4,399.38	4,400.00	4,399.38	1.45	9.14	0.00	-8.18	-27.19	0.00	-10.51	10.51	0.000	Level 1
4,500.00	4,499.35	4,500.00	4,499.35	1.47	9.35	0.00	-6.64	-28.91	0.00	-10.73	10.73	0.000	Level 1
4,600.00	4,599.32	4,600.00	4,599.32	1.48	9.57	0.00	-5.00	-30.72	0.00	-10.96	10.96	0.000	Level 1
4,700.00	4,699.29	4,700.00	4,699.29	1.50	9.78	0.00	-3.48	-32.57	0.00	-11.19	11.19	0.000	Level 1
4,800.00	4,799.27	4,800.00	4,799.27	1.51	9.98	0.00	-2.01	-34.13	0.00	-11.41	11.41	0.000	Level 1
4,900.00	4,899.25	4,900.00	4,899.25	1.53	10.19	0.00	-0.54	-35.43	0.00	-11.63	11.63	0.000	Level 1
5,000.00	4,999.23	5,000.00	4,999.23	1.55	10.39	0.00	0.82	-36.58	0.00	-11.85	11.85	0.000	Level 1
5,100.00	5,099.22	5,100.00	5,099.22	1.56	10.60	0.00	1.97	-37.57	0.00	-12.08	12.08	0.000	Level 1
5,200.00	5,199.21	5,200.00	5,199.21	1.58	10.81	0.00	2.93	-38.53	0.00	-12.31	12.31	0.000	Level 1
5,300.00	5,299.21	5,300.00	5,299.21	1.60	11.01	0.00	3.78	-39.29	0.00	-12.52	12.52	0.000	Level 1
5,400.00	5,399.20	5,400.00	5,399.20	1.61	11.22	0.00	4.79	-39.62	0.00	-12.75	12.75	0.000	Level 1
5,500.00	5,499.20	5,500.00	5,499.20	1.62	11.43	0.00	5.80	-39.64	0.00	-12.97	12.97	0.000	Level 1
5,521.00	5,520.20	5,521.00	5,520.20	1.62	11.47	0.00	6.00	-39.58	0.00	-13.04	13.04	0.000	Level 1
5,552.00	5,551.19	5,552.00	5,551.19	1.63	11.54	0.00	6.35	-39.48	0.00	-13.08	13.08	0.000	Level 1
5,583.00	5,582.19	5,583.00	5,582.19	1.63	11.60	0.00	6.73	-39.42	0.00	-13.17	13.17	0.000	Level 1
5,615.00	5,614.19	5,615.00	5,614.19	1.64	11.67	0.00	7.10	-39.33	0.00	-13.24	13.24	0.000	Level 1
5,635.12	5,634.30	5,635.12	5,634.30	1.65	11.71	0.00	7.32	-39.30	0.00	-13.28	13.28	0.000	Level 1, CC, ES, SF
5,639.48	5,638.66	5,639.48	5,638.66	1.65	11.72	-178.20	7.36	-39.30	0.02	-13.27	13.29	0.001	Level 1
5,650.00	5,649.18	5,650.00	5,649.18	1.65	11.74	-178.49	7.46	-39.31	0.22	-13.10	13.32	0.017	Level 1
5,700.00	5,698.98	5,699.84	5,699.03	1.68	11.85	178.81	8.03	-39.34	3.97	-9.58	13.54	0.293	Level 1
5,750.00	5,748.13	5,749.07	5,748.25	1.73	11.96	177.97	8.57	-39.25	12.49	-1.35	13.84	0.902	Level 1
5,800.00	5,796.19	5,797.23	5,796.41	1.85	12.06	177.91	8.99	-39.18	25.81	11.64	14.17	1.822	
5,850.00	5,842.71	5,843.85	5,843.03	2.01	12.17	178.12	9.34	-39.26	43.73	29.25	14.48	3.020	
5,900.00	5,887.26	5,888.48	5,887.65	2.22	12.27	178.15	9.68	-39.27	66.03	51.27	14.76	4.472	
5,950.00	5,929.44	5,930.75	5,929.92	2.56	12.36	178.16	9.91	-39.28	92.63	77.61	15.01	6.169	
6,000.00	5,968.85	5,971.98	5,971.16	2.99	12.45	178.16	10.20	-39.29	123.09	107.86	15.23	8.084	
6,050.00	6,005.14	6,027.26	6,026.27	3.52	12.58	178.16	13.95	-39.39	155.13	139.71	15.42	10.061	
6,100.00	6,037.96	6,100.02	6,096.95	4.13	12.76	177.95	30.79	-39.29	184.25	168.65	15.60	11.808	
6,150.00	6,067.02	6,181.66	6,171.24	4.80	12.98	177.84	64.29	-40.02	209.47	193.69	15.79	13.269	
6,200.00	6,092.05	6,261.13	6,236.77	5.54	13.25	177.94	109.09	-41.77	231.07	215.10	15.97	14.472	
6,250.00	6,112.82	6,328.53	6,287.17	6.33	13.56	177.82	153.78	-42.82	251.24	235.10	16.14	15.566	
6,300.00	6,129.14	6,396.29	6,334.00	7.16	13.94	177.32	202.73	-42.86	272.19	255.85	16.34	16.655	
6,350.00	6,140.85	6,485.24	6,387.54	8.02	14.59	176.77	273.65	-43.97	292.37	275.74	16.63	17.582	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error: 0.00 usft	
Sec.12-T17S-R31E - Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1													Offset Well Error: 0.00 usft	
Survey Program: 100-MWD, 5500-MWD														
Reference		Offset		Semi Major Axis		Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
6,400.00	6,147.85	6,591.87	6,434.98	8.91	15.60	175.92	368.92	-46.50	307.89	290.88	17.02	18.093		
6,450.00	6,150.08	6,673.15	6,460.10	9.80	16.54	174.71	446.16	-48.30	321.17	303.78	17.40	18.463		
6,457.29	6,150.00	6,686.18	6,463.38	9.93	16.70	174.28	458.77	-48.43	323.09	305.63	17.46	18.505		
6,500.00	6,149.25	6,759.19	6,477.31	10.70	17.66	170.04	530.41	-49.00	331.84	313.84	18.00	18.433		
6,600.00	6,147.51	6,909.51	6,487.10	12.51	19.88	86.01	680.16	-52.77	339.69	320.30	19.38	17.524		
6,700.00	6,145.76	7,012.07	6,486.52	14.33	21.50	70.72	782.69	-55.11	340.89	320.21	20.69	16.478		
6,800.00	6,144.02	7,111.74	6,485.67	16.15	23.04	74.39	882.34	-57.09	341.81	319.72	22.09	15.473		
6,900.00	6,142.27	7,209.58	6,485.12	17.98	24.46	86.15	980.15	-59.36	343.04	319.46	23.57	14.552		
7,000.00	6,140.53	7,308.49	6,485.46	19.81	25.95	91.43	1,079.03	-61.96	345.13	319.99	25.14	13.728		
7,100.00	6,138.78	7,419.48	6,484.35	21.64	27.86	47.64	1,189.95	-65.41	345.93	319.07	26.86	12.877		
7,200.00	6,137.04	7,527.60	6,479.32	23.47	29.90	32.91	1,297.91	-68.26	343.00	314.38	28.63	11.982		
7,300.00	6,135.29	7,620.55	6,474.89	25.31	31.56	48.18	1,390.73	-70.65	340.04	309.73	30.31	11.219		
7,400.00	6,133.55	7,718.74	6,472.33	27.15	33.29	53.89	1,488.84	-73.45	339.19	307.12	32.07	10.577		
7,500.00	6,131.80	7,821.18	6,469.10	28.98	35.25	49.38	1,591.20	-75.87	337.82	303.91	33.91	9.963		
7,576.71	6,130.46	7,892.05	6,467.00	30.39	36.53	67.77	1,662.03	-76.98	336.96	301.69	35.27	9.553		
7,600.00	6,130.06	7,912.93	6,466.69	30.82	36.90	76.13	1,682.90	-77.22	337.05	301.36	35.69	9.445		
7,700.00	6,128.31	8,014.90	6,465.58	32.66	38.74	72.20	1,784.87	-77.86	337.84	300.24	37.60	8.985		
7,800.00	6,126.57	8,118.10	6,463.21	34.50	40.79	67.29	1,888.04	-77.72	337.49	297.92	39.58	8.527		
7,855.10	6,125.60	8,170.59	6,461.94	35.51	41.75	74.60	1,940.51	-77.45	337.27	296.63	40.64	8.298		
7,900.00	6,124.82	8,212.00	6,461.23	36.34	42.51	82.94	1,981.92	-77.23	337.42	295.92	41.50	8.130		
8,000.00	6,123.08	8,308.18	6,460.66	38.18	44.14	91.09	2,078.09	-77.07	338.85	295.38	43.47	7.795		
8,100.00	6,121.33	8,406.33	6,461.02	40.02	45.86	94.08	2,176.25	-76.88	341.26	295.78	45.49	7.503		
8,200.00	6,119.59	8,501.26	6,462.56	41.86	47.58	101.90	2,271.15	-77.91	344.82	297.38	47.45	7.268		
8,300.00	6,117.84	8,606.02	6,464.59	43.70	49.54	94.19	2,375.85	-80.76	348.56	299.10	49.46	7.047		
8,400.00	6,116.10	8,719.22	6,463.58	45.54	51.77	72.93	2,488.96	-84.85	349.35	297.81	51.54	6.778		
8,500.00	6,114.35	8,818.15	6,460.26	47.38	53.71	74.40	2,587.76	-88.71	347.70	294.21	53.49	6.500		
8,518.39	6,114.03	8,834.23	6,459.94	47.72	54.02	78.07	2,603.83	-89.39	347.63	293.81	53.82	6.459		
8,600.00	6,112.60	8,911.07	6,459.54	49.22	55.50	85.92	2,680.59	-92.82	348.51	293.15	55.36	6.296		
8,700.00	6,110.86	9,010.11	6,459.30	51.06	57.41	87.55	2,779.53	-97.16	349.90	292.62	57.28	6.108		
8,800.00	6,109.11	9,111.42	6,459.38	52.90	59.36	85.08	2,880.75	-101.58	351.62	292.38	59.24	5.936		
8,900.00	6,107.37	9,214.93	6,458.42	54.74	61.41	78.24	2,984.15	-106.17	352.33	291.11	61.22	5.755		
9,000.00	6,105.62	9,323.25	6,455.81	56.59	63.60	63.24	3,092.35	-110.27	351.64	288.36	63.28	5.557		
9,100.00	6,103.88	9,417.12	6,452.69	58.43	65.45	74.19	3,186.12	-113.00	350.12	284.87	65.24	5.366		
9,200.00	6,102.13	9,525.00	6,449.57	60.27	67.58	60.30	3,293.87	-117.17	348.94	281.64	67.30	5.185		
9,300.00	6,100.39	9,619.87	6,445.94	62.11	69.43	70.09	3,388.66	-118.47	347.03	277.69	69.35	5.004		
9,400.00	6,098.64	9,718.59	6,443.03	63.95	71.27	73.56	3,487.34	-119.11	346.07	274.59	71.48	4.842		
9,454.91	6,097.68	9,770.95	6,441.83	64.96	72.25	78.11	3,539.67	-119.82	345.87	273.25	72.62	4.763		
9,500.00	6,096.90	9,814.62	6,441.13	65.80	73.08	80.59	3,583.34	-120.60	345.99	272.45	73.55	4.704		
9,600.00	6,095.15	9,916.94	6,439.24	67.64	75.10	77.33	3,685.62	-122.42	346.04	270.36	75.68	4.572		
9,700.00	6,093.41	10,017.47	6,436.78	69.48	77.10	77.39	3,786.12	-122.94	345.64	267.74	77.90	4.437		
9,800.00	6,091.66	10,119.07	6,434.27	71.32	79.04	76.29	3,887.68	-122.71	345.33	265.13	80.20	4.306		
9,900.00	6,089.92	10,223.93	6,430.12	73.16	81.05	71.41	3,992.46	-123.12	343.49	260.94	82.55	4.161		
10,000.00	6,088.17	10,323.64	6,425.93	75.01	82.98	72.36	4,092.06	-124.79	341.26	256.50	84.76	4.026		
10,100.00	6,086.43	10,423.65	6,421.74	76.85	84.91	73.13	4,191.98	-125.84	339.15	252.11	87.04	3.896		
10,200.00	6,084.68	10,524.27	6,417.45	78.69	86.87	73.03	4,292.50	-127.45	336.90	247.59	89.31	3.772		
10,300.00	6,082.94	10,620.09	6,413.52	80.53	88.73	78.08	4,388.23	-128.17	334.96	243.35	91.61	3.656		
10,373.24	6,081.66	10,689.70	6,411.64	81.88	90.04	82.18	4,457.82	-128.44	334.60	241.28	93.32	3.585		
10,400.00	6,081.19	10,715.37	6,411.13	82.37	90.52	83.36	4,483.48	-128.67	334.65	240.71	93.94	3.562		
10,500.00	6,079.45	10,809.24	6,410.29	84.22	92.30	89.61	4,577.34	-129.94	335.81	239.66	96.15	3.493		
10,600.00	6,077.70	10,907.72	6,410.95	86.06	94.17	91.05	4,675.80	-131.85	338.41	240.09	98.33	3.442		
10,700.00	6,075.95	11,008.46	6,411.71	87.90	96.16	90.31	4,776.49	-134.91	340.91	240.51	100.40	3.395		
10,800.00	6,074.21	11,108.86	6,412.24	89.74	98.15	89.91	4,876.84	-137.83	343.21	240.71	102.50	3.348		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report

Archer

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 100-MWD, 5500-MWD													Offset Well Error:	0.00 usft
Reference														
Semi Major Axis														
Measured	Vertical	Measured	Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Depth	Depth	Depth	Depth			from North	+N/-S	+E/-W	Between	Between	Separation	Factor		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	Centres	Ellipses	(usft)			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
10,857.80	6,073.20	11,157.00	6,412.49	90.81	99.11	99.07	4,924.96	-139.34	344.64	241.05	103.59	3.327		

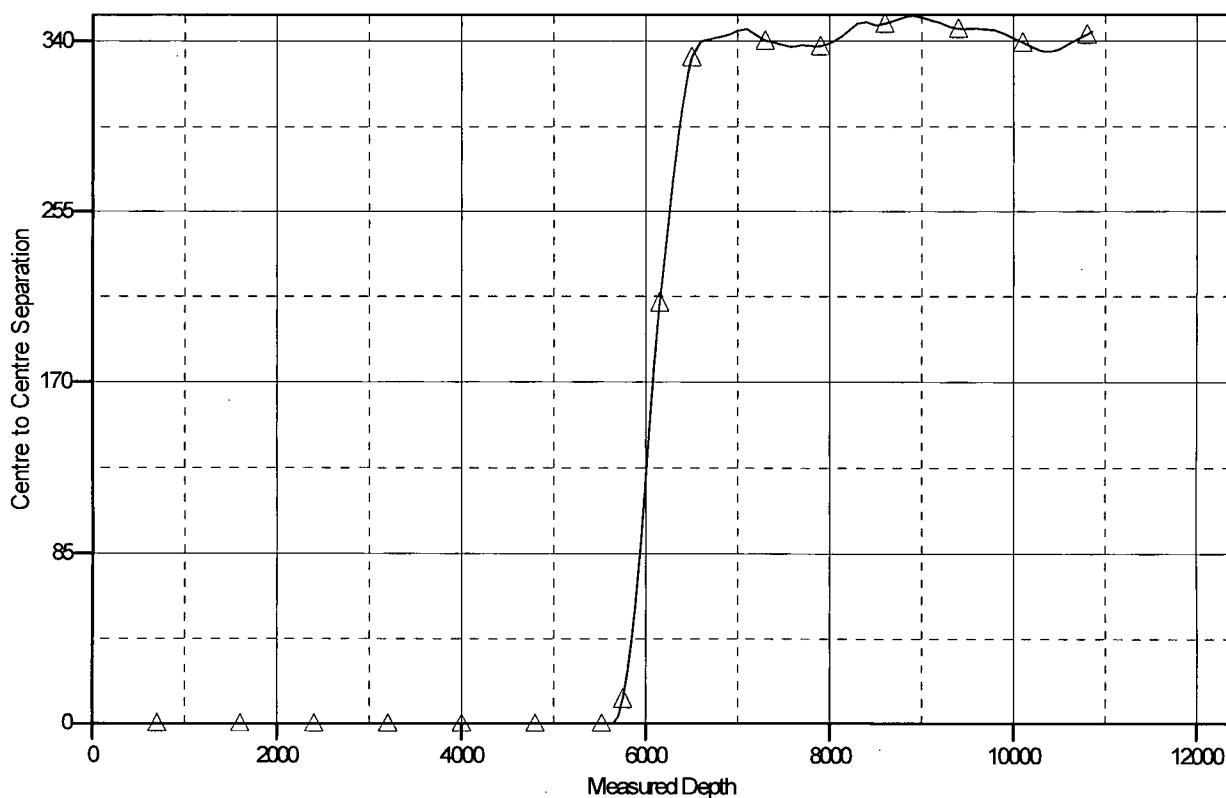
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3979.00usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Puckett 12 Federal #7H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.28°

Ladder Plot



LEGEND

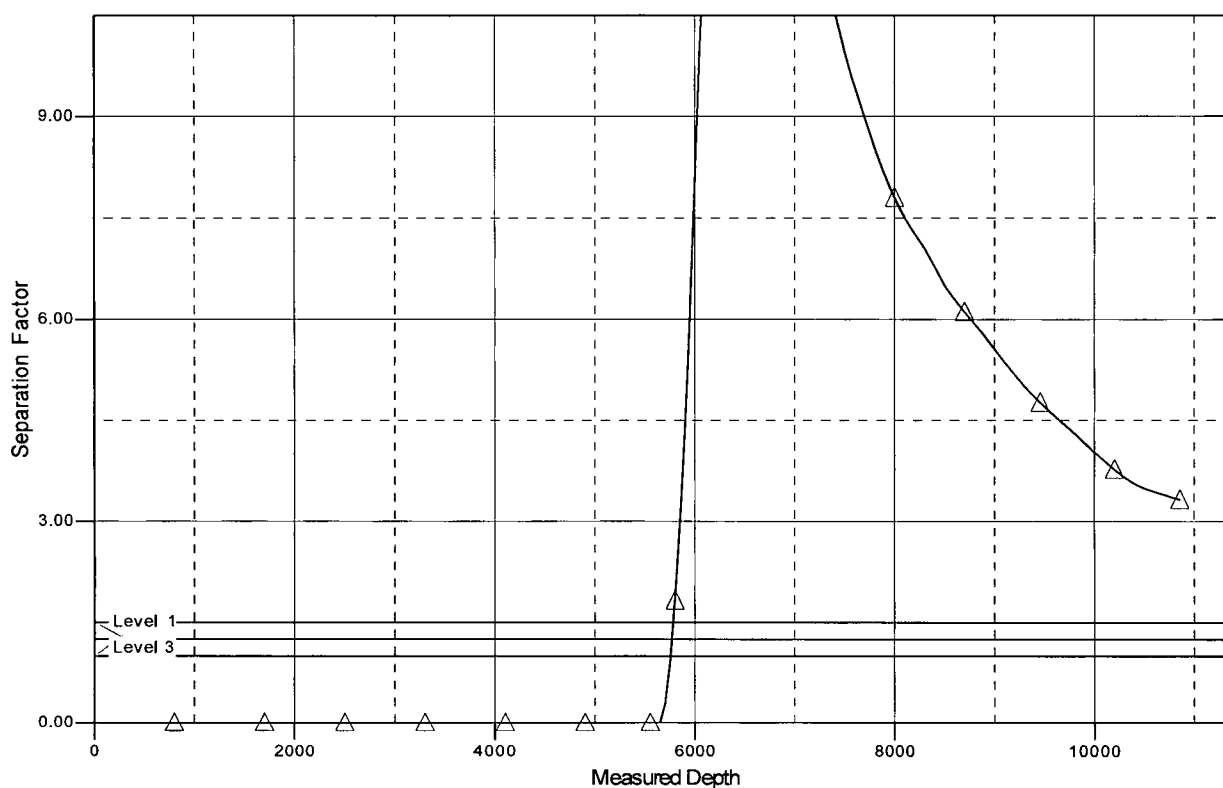
Puckett 12 Federal #7H, Wellbore #1, Wellbore #1 V0

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County(NM27E)	TVD Reference:	WELL @ 3979.00usft
Reference Site:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3979.00usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

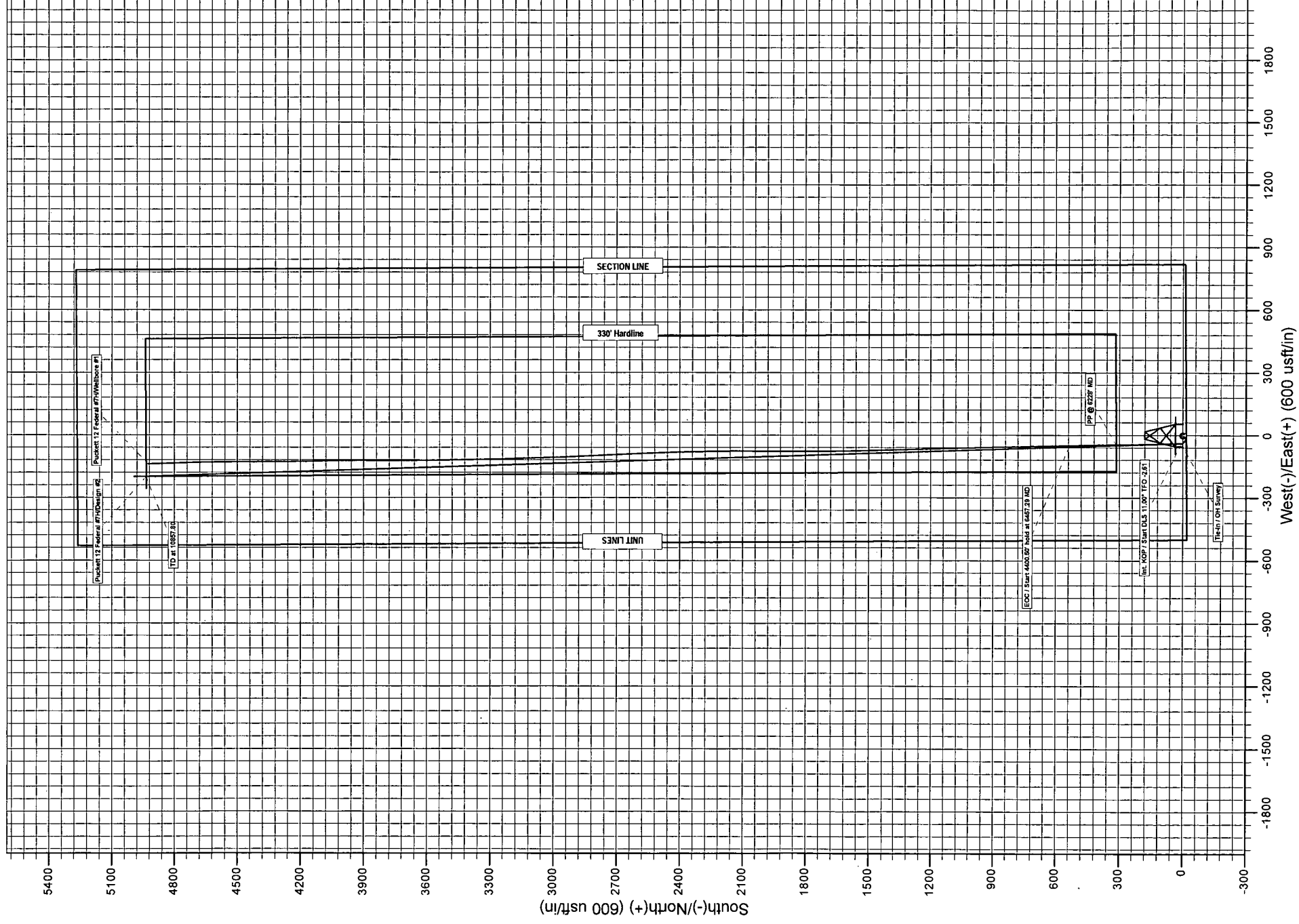
Coordinates are relative to: Puckett 12 Federal #7H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.28°

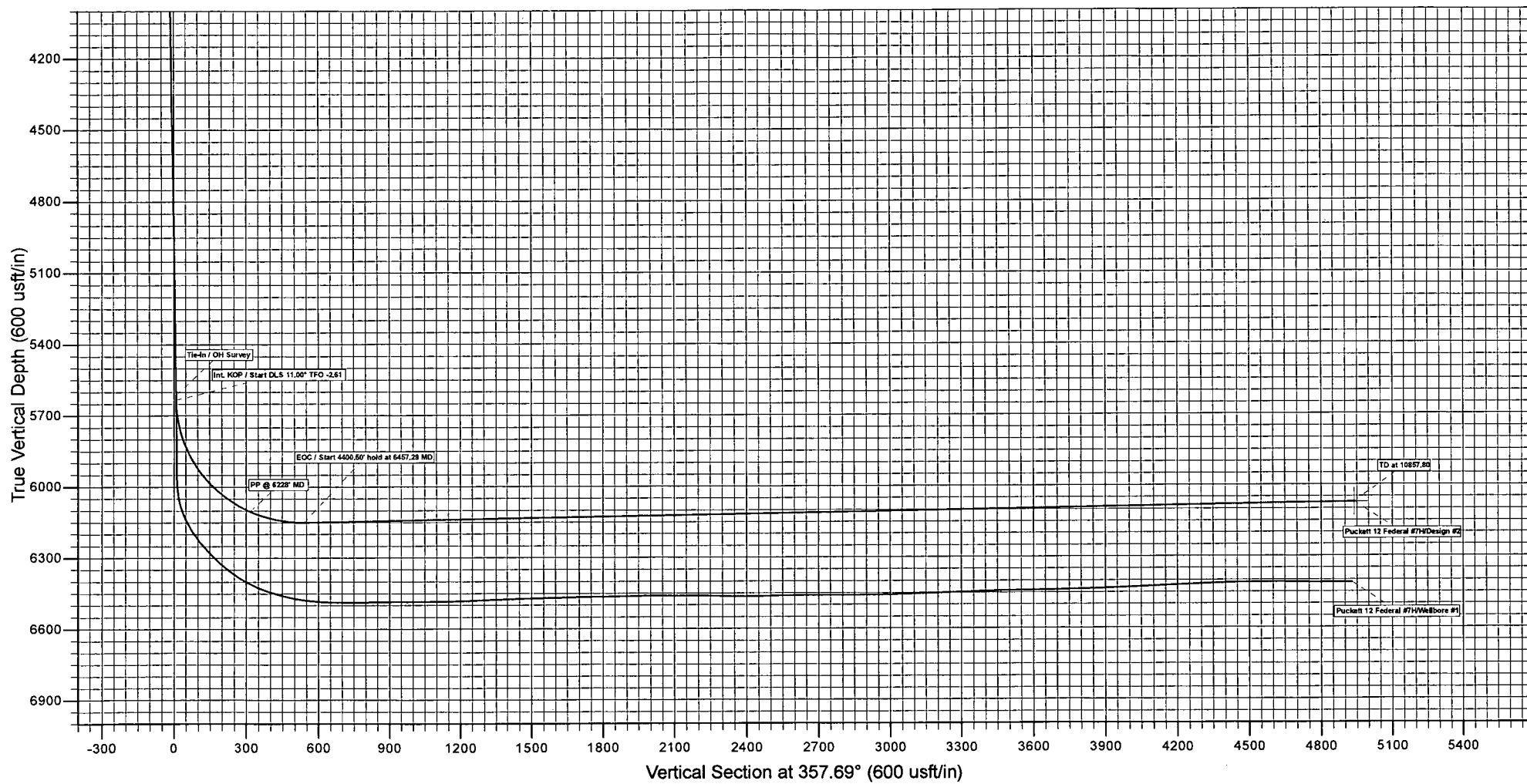
Separation Factor Plot



LEGEND

Puckett 12 Federal #7H, Wellbore #1, Wellbore #1 V0





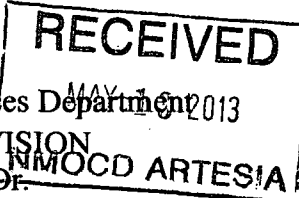
DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

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 30-015-39476	Pool Code 26770	Pool Name Fren;Glorieta-Yeso
Property Code 38858	Property Name PUCKETT 12 FEDERAL	Well Number 7H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3965'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	12	17-S	31-E		15	SOUTH	819	EAST	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
A	12	17-S	31-E		330	NORTH	990	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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

DETAIL 3964.9' 3968.4' 600' 600' 3959.7' 3964.4'	Project Area A 330' B.H. 990' B Producing Area HORIZ. DIST. = 4940.0' GRID. AZ. = 357°41'21"	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>Kanicia Castillo</i> 5/9/13 Signature Date Kanicia Castillo Printed Name kcastillo@concho.com E-mail Address
GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=670369.4 N X=658684.5 E LAT.=32.841864° N LONG.=103.816666° W		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. JUNE 28, 2011 Date of Survey <i>Ronald J. Eidson</i> Signature & Seal of Professional Surveyor NEW MEXICO REGISTERED SURVEYOR 3239 Certificate Number: 12641 Ronald J. Eidson 3239 AF Rev. 11/07/2012 JWSC W.O.: 12.13.0228
BOTTOM HOLE LOCATION Y=675304.1 N X=658485.4 E CORNER COORDINATES TABLE A - Y=675631.7 N, X=658153.1 E B - Y=675640.7 N, X=659473.2 E C - Y=670350.6 N, X=658184.2 E D - Y=670360.5 N, X=659503.3 E	Penetration Point 330' FSL & 866' FEL S.L. SEE DETAIL C 15' 819'	

Puckett 12 Federal #7H MIDDLE LATERAL PROGRAM

1. Estimated Tops of Important Geologic Markers

Yeso Group +/- 5317'

2. Estimated Depths of Anticipated Fresh Water, 132'.

This re-entry originates in the Yeso and will finish in the Yeso. The entire Yeso group is an oil and gas bearing interval.

3. Casing Program

Hole Size	Interval	OD Casing	Weight	Grade**	Jt./Condition	Burst/collapse/tension
6-1/8"	5645'-10858'	4.5"	13.5#	L-80	LTC/New	3.98/4.09/3.21 (L80)

4. Cement Program

4.5" Liner: No cement planned; external packers will be used for stimulation isolation.

NOTE: COG OPERATING LLC REQUESTS A VARIANCE TO THE LINER TOP FLUID ENTRY OR PRESSURE TEST BECAUSE THE NEW LATERAL WILL BE COMPLETED IN THE SAME ZONE AS THE CURRENT PERFS AND THE ENTIRE INTERVAL IS RECOGNIZED BY THE OCD AS ONE INTERVAL (YESO). AS PER ONSHORE ORDER NO. 2 SECT III: REQUIREMENTS, PART B. CASING AND CEMENTING REQUIREMENTS, SUBPART b. "NO TEST SHALL BE REQUIRED FOR LINERS THAT DO NOT INCORPORATE OR NEED A SEAL MECHANISM." COG BELIEVES WE MEET THE CRITERIA TO NOT BE REQUIRED TESTING THE LINER TOP BECAUSE THERE IS NO NEED FOR A SEAL MECHANISM.

NOTE: COG OPERATING LLC REQUESTS A VARIANCE TO THE 200' MINIMUM TIE BACK TO THE PRODUCTION CASING BECAUSE THE BOTTOM LATERAL IS PRODUCTIVE FROM THE YESO BELOW THIS PROPOSED LATERAL, COG DESIRES TO NOT COVER THAT OR MAKE IT INACCESSIBLE WITH A LINER OVERLAP.

5. Minimum Specifications for Pressure Control

The BOP equipment will be a 2000 psi double ram type hydraulically operated preventer. This equipment will be nipped up to a 7-1/16" 3K flange. The pipe rams are located above blind rams. The BOP is tested to 2000 psi prior to drilling new formation. Access to the annulus will be through the valves on the 7-1/16" casing head.

6. Types and Characteristics of the Proposed Mud System

This well will be drilled from the window that is cut in the 7" casing to TD of lateral with FW/CBW drilling mud. Visual or electronic mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volumes.

7. Auxillary Well Control and Monitoring Equipment

- A. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

8. Logging, Testing, and Coring Program

- A. The electric logging program will consist of MWD GR, which will be run from TD to 7" production casing sidetrack.
- B. No drill stem tests.

- C. No conventional coring anticipated.
- D. Further testing procedures will be determined after the 4-1/2" casing has been run to TD, based on drill shows and log evaluation.

9. Abnormal Conditions, Pressure, Temperatures, and Potential Hazards

No abnormal pressures or temperatures are anticipated. The estimated bottomhole temperature at TD is 96 degrees and the estimated maximum bottomhole pressure is 2700 psig. The drilling starts in the Yeso and ends in the Yeso. The section of Yeso being drilled has very low permeability (less than 1 md).

10. Anticipated Starting Date and Duration of Operations

There will be no road or location work required as this is an existing well location. Once commenced, drilling operations should be finished in approximately 20 days. If the well is productive, an additional 30-90 days will be required for completion and testing before a decision is made to remove the whipstock and RBP separating the laterals, to commingle the production from the two laterals.

11. Centralizer Program

Centralizers will not be run or required due to the lack of cement and the centralizing nature of the external casing packers.

12. Summary Drilling and Completion Program

Preparatory/2ND Lateral Procedure

1. Pull test anchors. MIRU pulling unit.
2. TOH with production equipment (tally and stand back tubing) and LD.
3. PU 6-1/8" bit and scraper, TIH to 6000'. TOH.
4. RU wireline. Run GR/CCL correlation log from 5900' to 5200'.
5. Set RBP at +/- 6000'. RU pump truck, test casing and RBP to 1000 psi for 30 minutes. TIH OE, spot 15' sand on RBP. TOH, LD tubing, RD BOPE, RD pulling unit.
6. MIRU Key or Basic workover rig & horizontal package. NU hydraulic 6" 2M double BOP w/2-7/8" pipe rams on top & blind rams on bottom. Wellhead has 7-1/16" 3M series flanged connection. Move in and rig up pumps, closed loop solids control equipment, power swivel, frac tanks, generators, pipe racks, and other equipment. Use rig pump to test BOP, casing & RBP to 500 psi for 30 minutes, close blind rams in BOP and test BOP above rams to 2000/250 psi for 30 minutes and document on report.
7. PU & TIH w/spacer, anchor, retrievable whipstock (3° slide), starting mill, & UBHO on workstring. (Line up UBHO & whipstock face on surface. Gyro stinger should be inserted into UBHO to check for compatibility and orientation.) TIH to within 20' of setting depth. Pull up to next connection & RU Gyro. Take check shot & orient whipstock while working out all torque.
8. If orientation is satisfactory, set anchor (bottom of anchor 2' above casing collar, at approximately 5700'). Pull 5,000# upstrain to check anchor set, then set down 20-30,000#

weight to shear running bolt. RD Gyro.

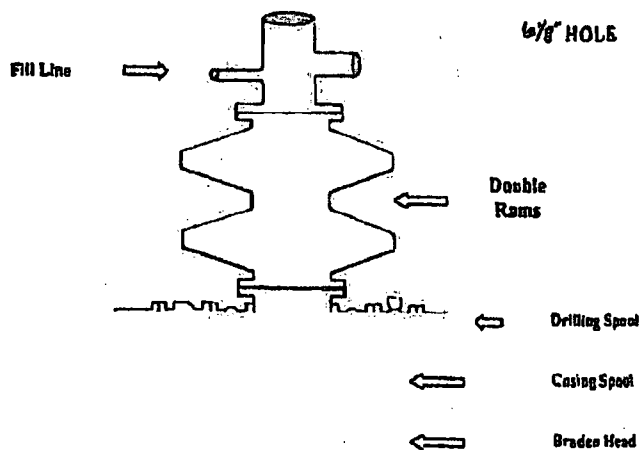
9. After obtaining free torque, record Pick-Up & Slack-Off weights. Make starting cut through casing wall (approximately 30" total). Sweep with high viscosity polymer pills (if needed) to clean hole. Install two (2) or more ditch magnets at flowline. TOH.
10. TIH with window mill, watermelon mill, & string mill on workstring. Mill window from 5560' to 5660', plus 5' of open hole (KOP - +/-5600')(or depth required by directional company). Circulate hole clean. TOH. (Trip & ream through finished window several times to make sure it is fully open. Check mill gauges after laying down.) Fax in the fisherman's diagram of the window. Verify that the depths on the diagram match the depths on the morning report.
11. PU 6-1/8" bit, downhole motor, muleshoe (UBHO sub), (2) monel drill collars (Install MWD probe inside NMDC and obtain offset), XO flow sub, & muleshoe sub f/gyro on workstring. Surface test motor and MWD. TIH to btm filling pipe as necessary.
12. PU swivel and establish circulation (130 gpm). RU Gyro. Time drill away from casing using continuous readout gyro for checking well path and tool face. Magnetic interference may occur, particularly while motor is in the window. If necessary, use gyro single shots for drilling away from casing. Once MWD readouts can function without magnetic influence from casing, RD Gyro & drill remaining curve at 164-200 GPM to EOC ($\pm 6,457'$ MD, 6,150' TVD) using MWD.
13. Build curve at $11.0^\circ/100'$ BUR to planned inclination of 91.0° and azimuth (after gyro correction) of 184.65° . Survey as needed to ensure curve is built according to plan. Sweep hole with high viscosity polymer pills (if needed) for good hole cleaning. Sweep hole at least once per day.
14. At EOC, TOH. PU & TIH w/6-1/8" **PDC** bit, downhole motor, muleshoe (UBHO sub), (2) monel drill collars (Install MWD probe inside NMDC and obtain offset) & XO flow sub on 3-1/2" drill pipe or PH-6 workstring. TIH very carefully with bit through the casing window to prevent bit damage. Ream curve as necessary to remove any severe "kinks" or doglegs.
15. Drill the lateral section with the angle hold motor in the oriented and rotary mode as necessary. Drill at 91.0° inclination, 184.65° azimuth for a total of 5015' vertical section at lease line (estimated to be at 10,768' MD, 6,075' TVD). Take surveys every 30' or as needed to maintain inclination and direction.
16. At TD, circ hole clean. Make reamer runs as required. TOH, LD DP and tools.
17. Run 4.5", 13.5# L-80 EUE 8rd LTC casing. With external casing packers for zonal stage treatment isolation (+/-15 stages), open hole liner hanger/packer at +/-5610', J-latch at +/-5600'; casing to surface. Set packers and liner hanger.
18. ND BOPE, NU WH w/cap.
19. RDMO rig.

Completion Procedure

1. RU frac valve. Frac as per Completion Engineer's design, pumping down balls to open frac sleeves to treat zones isolated between open-hole packers. Rig down frac company.
2. After frac, rig up coiled tubing unit. Drill out sleeves.
3. Flow well back until fluid recovery reduces to 10 barrel/hour. Test well, including running pumping equipment as required for long-term lateral production testing.
4. Rig up Pulling unit. NU BOPE.
5. Release frac string from liner hanger. TOH. PU work string and TIH.
6. Retrieve whipstock. Retrieve RBP at +/-5775'.
7. Run production equipment & place on pump with both laterals commingled.
8. Report test results.

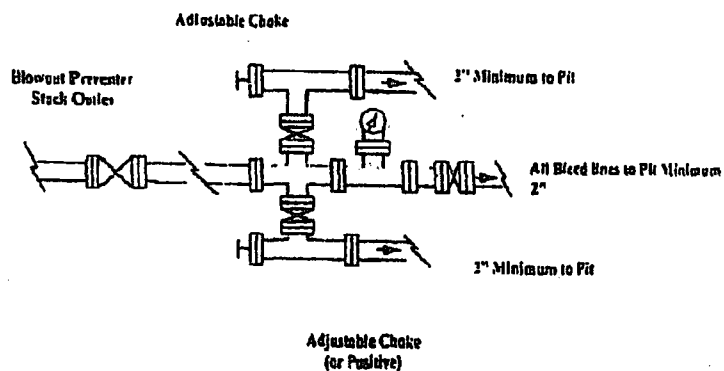
COG Operating LLC

BOPE and Choke Schematic



Minimum 4" Nominal choke and kill hoses

Choke Manifold Requirement (2000 psi WP)
No Annular Required



NOTES REGARDING THE BLOWOUT PREVENTERS

Master Drilling Plaza
Eddy County, New Mexico

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

**Puckett 12 Federal #7H
Blinebry/Paddock Horizontal
Eddy County, New Mexico**

<u>Surface</u>	<u>Lateral Terminus</u>
15' FSL	330' FNL
819' FEL	990' FEL
S-12	S-12
T17S, R31E	

Proposed Wellbore

API: 30-015-39476

**KB: 14'
GL: 3965'**

Bit Size: 17-1/2"
13-3/8" 48# H40/J55 STC @ 746'
Torque 3220
350 sx C w/ 2% CaCl₂, 4% gel 13.5 ppg, 1.74 cf/sk
450 sx C w/ 2% CaCl₂ 14.8 ppg, 1.35 cf/sk
320 sacks CIRCULATED TO SURFACE

Bit Size: 12-1/4"

9-5/8" 40# J55 LTC @ 2032'

300 sx 50:50:10 Poz:C:gel w/ 5 pps LCM-1
5% NaCl, 11.8 ppg, 2.45 cf/sk
200 sx C w/ 2% CaCl₂ 14.8 ppg, 1.34 cf/sk
TOC 440', 1" w/ 134 sx to surf, circ 29 sx

Middle Blinebry: KOP @ 5615'
Liner Hanger/Pkr @ 5630';
Landing point @ 6457' MD, 6150' TVD
TD 10858' MD, 6073' TVD
91° inclination, 358.14° azm, vertical section 4939'

Rustler @ 687'

Base of Salt @ 1788'

Yates @ 2029'

Queen @ 2989'

San Andres @ 3743'

Glorietta @ 5243'

Yeso @ 5323'

PRODUCTION HOLE MUD:
CBW 8.8-9.5 ppg, FV 28-29, WL
NC (5675'-10858')

Bit Size: 6-1/8"

4-1/2" 13.5# L80 LTC LSA 5688' - 10858'
w/ Peak packers and sleeves for 15 stage completion

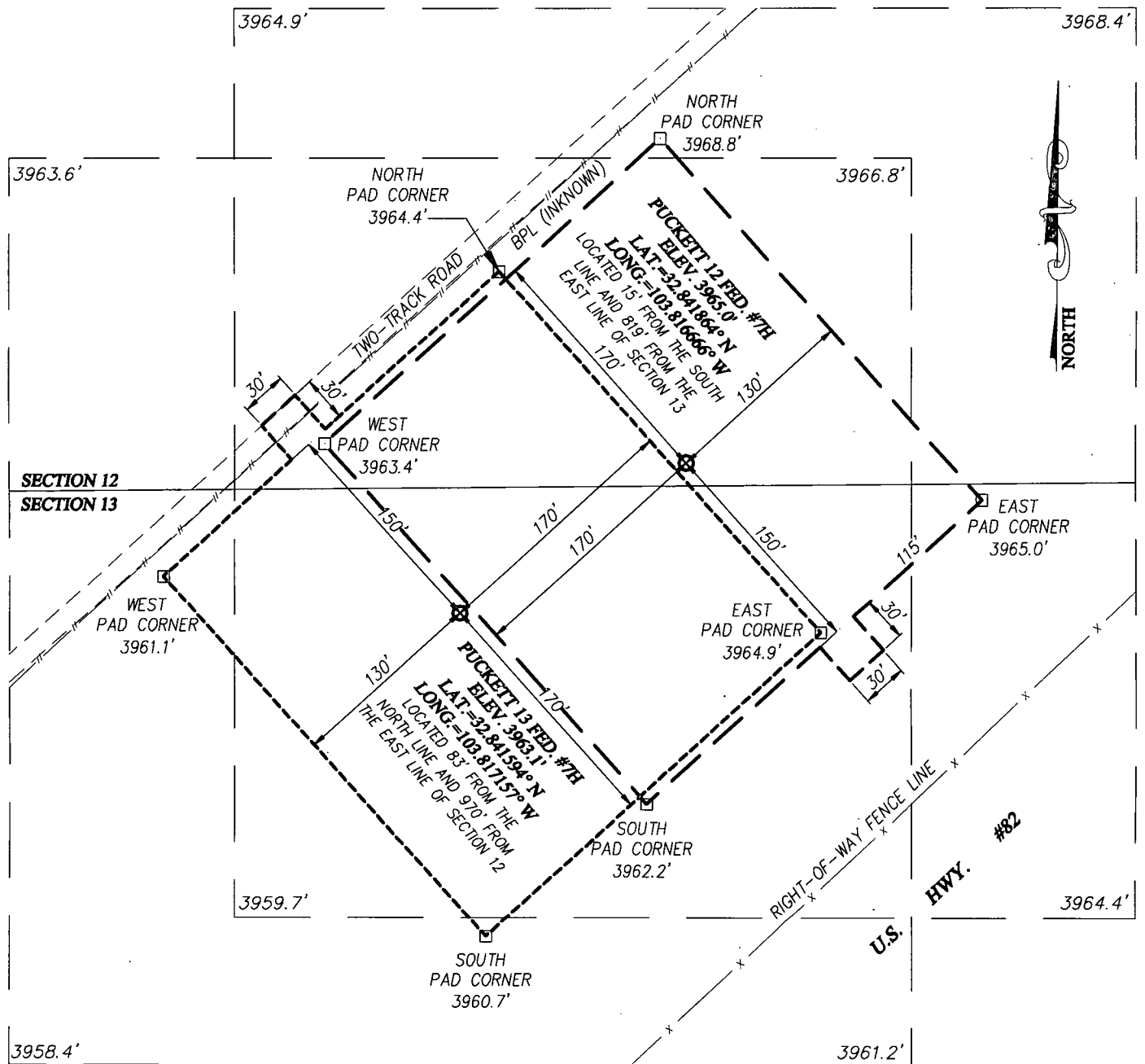
Bit Size: Vertical & Curve & Lateral - 8-3/4"

~5,173' VS Lateral 178.3° AZ

TAPERED STRING 7" 26# L80 LTC @ 5965'; 5-1/2" 17# L80 5965' -11,481' 600 sx 35:65:6 followed by 400 sx 75:25 followed by 600 sx Acid Soluble TOC (by CBL) at 400'

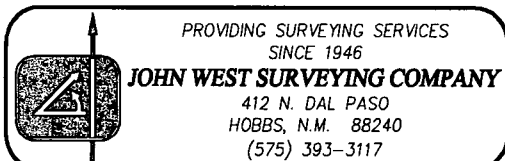
**11,496' MD,
6522' TVD**

SECTIONS 12 & 13, TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.
 EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF U.S. HWY. #82 AND CO. RD. #224 (RIPPLE RD.), GO NORTHEAST ON U.S. HWY. #82 APPROX. 0.6 MILES. TURN LEFT AND GO NORTHWEST ON TWO-TRACK RD. 0.1 MILES. TURN RIGHT AND GO NORTHEAST APPROX. 0.2 MILES. THESE LOCATION STAKES ARE APPROX. 200-220 FEET SOUTHEAST OF TWO-TRACK RD.

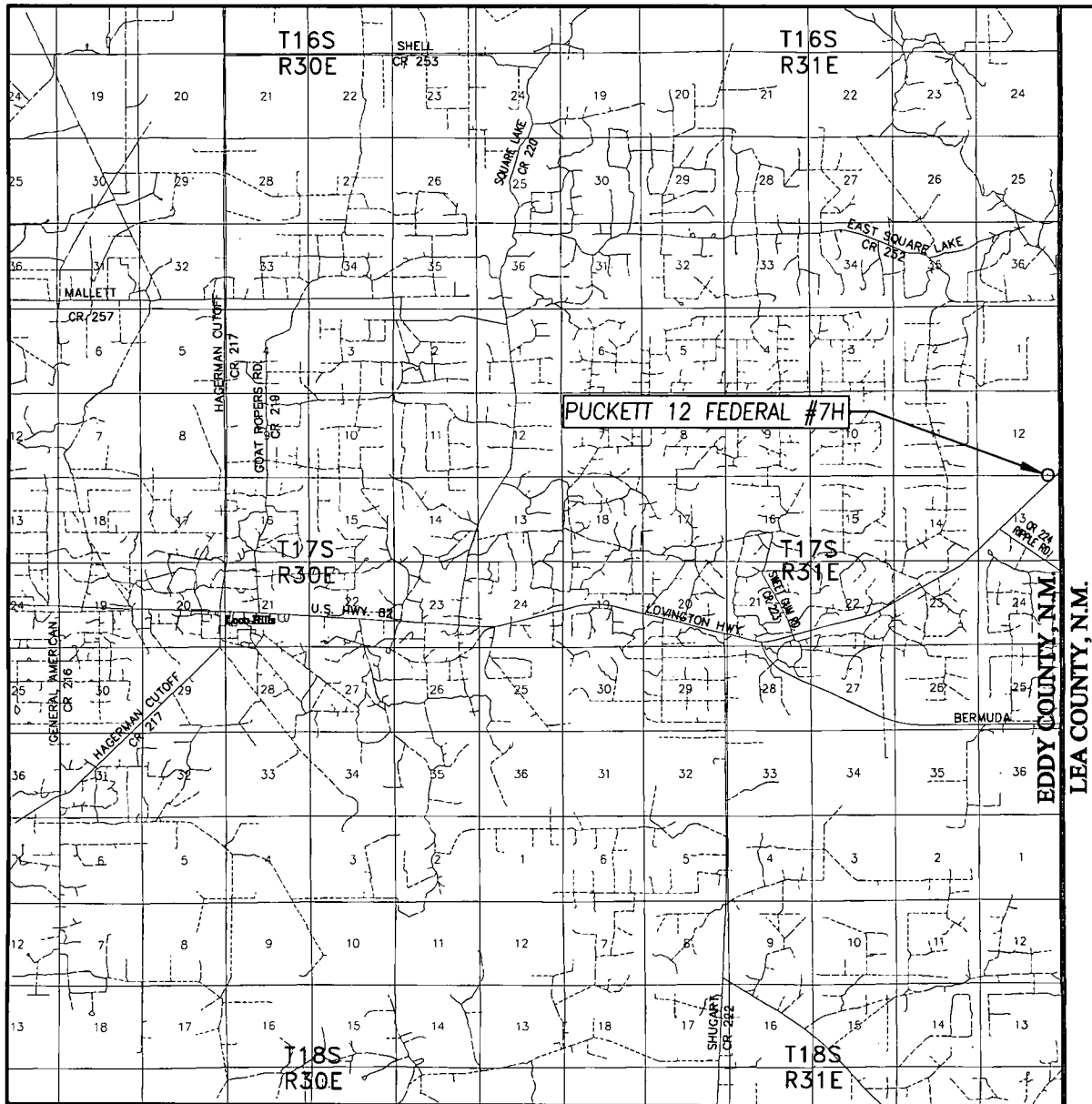


COG OPERATING, LLC

PUCKETT 12 FEDERAL #7H & PUCKETT 13 FEDERAL #7H WELLS
 LOCATED IN THE SOUTHEAST QUARTER OF SECTION 12
 AND THE NORTHEAST QUARTER OF SECTION 13
 TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO

Survey Date: 6/28/11	Sheet 1 of 1 Sheets
W.O. Number: 11.13.1809	Dr By: DSS
Date: 8/17/11	Rel: 11111159 & 11111164
11131809	Scale: 1" = 100'

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 12 TWP. 17-S RGE. 31-E

SURVEY N.M.P.M.

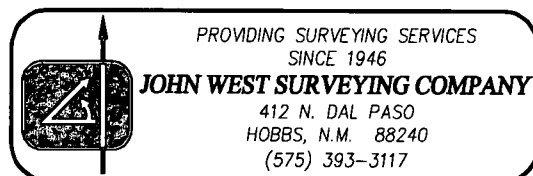
COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 15' FSL & 819' FEL

ELEVATION 3965'

OPERATOR COG OPERATING, LLC

LEASE PUCKETT 12 FEDERAL



This is a black and white topographic map of a region in North Carolina. The map features a grid with coordinates, including '3981' at the top and '3957' at the bottom. The Taylor River is a prominent feature, flowing from the top right towards the bottom center. A label 'Taylor' is written vertically along the river. A rectangular box labeled 'PUCKETT 12 FEDERAL #7H' is located in the lower center. A road labeled 'LOVINGTON HIGHWAY U.S. HWY #82' runs diagonally from the bottom right towards the center. The map also shows various elevation contours and labels for 'EDDY COUNTY' and 'LEA COUNTY' on the right side. A small circle with a cross inside is located in the middle left area. The map is oriented with North at the top.

CONTOUR INTERVAL:
MALJAMAR, N.M. - 10'

U.S.G.S. TOPOGRAPHIC MAP
MALJAMAR, N.M.

