



COG Production LLC

Eddy County, NM

Patron 23 Federal

#4H

OH

Plan: Plan #1

Standard Planning Report

29 May, 2015

30-015-4245-1





TDS
Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site: Patron 23 Federal
Company:	COG Production LLC	TVD Reference:	KB @ 3188.0usft (Latashaw 44)
Project:	Eddy County, NM	MD Reference:	KB @ 3188.0usft (Latashaw 44)
Site:	Patron 23 Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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

Site		Patron 23 Federal			
Site Position:		Northing:	408,355.90 usft	Latitude:	32° 7' 19.584
From:	Map	Easting:	619,229.70 usft	Longitude:	103° 58' 53.537 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.20

Well:	#4H					
Well Position	+N-S	0.0 usft	Northing:	408,355.90 usft	Latitude:	32° 7' 19.584 N
	+E-W	0.0 usft	Easting:	619,229.70 usft	Longitude:	103° 58' 53.537 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,141.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/29/2015	7.27	59.93	48,122

Design:		Plan #1		
Audit Notes:				
Version:		Phase:	PLAN	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.0	0.0	0.0	179.85

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,228.5	0.00	0.00	10,228.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,977.9	89.93	179.85	10,708.0	-476.9	1.2	12.00	12.00	24.00	179.85	
14,959.0	89.93	179.85	10,711.0	-4,457.9	11.5	0.00	0.00	0.00	0.00	PBHL (P23F #4H/OH)



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Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Patron 23 Federal
Company:	COG Production LLC	TVD Reference:	KB @ 3188.0usft (Latahaw 44)
Project:	Eddy County, NM	MD Reference:	KB @ 3188.0usft (Latahaw 44)
Site:	Patron 23 Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00



TDS
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Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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)
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00
10,200.0	0.00	0.00	10,200.0	0.0	0.0	0.0	0.00	0.00	0.00
10,228.5	0.00	0.00	10,228.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start DLS 12.00 TFO 179.85									
10,250.0	2.58	179.85	10,250.0	-0.5	0.0	0.5	12.00	12.00	0.00
10,275.0	5.58	179.85	10,274.9	-2.3	0.0	2.3	12.00	12.00	0.00



TDS
Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Patron 23 Federal
Company:	COG Production LLC	TVD Reference:	KB @ 3186.0usft (Latahaw 44)
Project:	Eddy County, NM	MD Reference:	KB @ 3186.0usft (Latahaw 44)
Site:	Patron 23 Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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)	
10,300.0	8.58	179.85	10,299.7	-5.3	0.0	5.3	12.00	12.00	0.00	
10,325.0	11.58	179.85	10,324.3	-8.7	0.0	9.7	12.00	12.00	0.00	
10,350.0	14.58	179.85	10,348.7	-15.4	0.0	15.4	12.00	12.00	0.00	
10,375.0	17.58	179.85	10,372.7	-22.3	0.1	22.3	12.00	12.00	0.00	
10,400.0	20.58	179.85	10,396.3	-30.5	0.1	30.5	12.00	12.00	0.00	
10,425.0	23.58	179.85	10,419.5	-39.9	0.1	39.9	12.00	12.00	0.00	
10,450.0	26.58	179.85	10,442.1	-50.5	0.1	50.5	12.00	12.00	0.00	
10,475.0	29.58	179.85	10,464.2	-62.2	0.2	62.2	12.00	12.00	0.00	
10,500.0	32.58	179.85	10,485.8	-75.1	0.2	75.1	12.00	12.00	0.00	
10,525.0	35.58	179.85	10,506.3	-89.1	0.2	89.1	12.00	12.00	0.00	
10,550.0	38.58	179.85	10,526.3	-104.2	0.3	104.2	12.00	12.00	0.00	
10,575.0	41.58	179.85	10,545.4	-120.3	0.3	120.3	12.00	12.00	0.00	
10,600.0	44.58	179.85	10,563.6	-137.4	0.4	137.4	12.00	12.00	0.00	
10,625.0	47.58	179.85	10,581.0	-155.4	0.4	155.4	12.00	12.00	0.00	
10,650.0	50.58	179.85	10,597.3	-174.3	0.4	174.3	12.00	12.00	0.00	
10,675.0	53.58	179.85	10,612.7	-194.0	0.5	194.0	12.00	12.00	0.00	
10,700.0	56.58	179.85	10,627.0	-214.5	0.6	214.5	12.00	12.00	0.00	
10,725.0	59.58	179.85	10,640.2	-235.7	0.6	235.7	12.00	12.00	0.00	
10,750.0	62.58	179.85	10,652.3	-257.6	0.7	257.6	12.00	12.00	0.00	
10,775.0	65.58	179.85	10,663.3	-280.1	0.7	280.1	12.00	12.00	0.00	
10,800.0	68.58	179.85	10,673.0	-303.1	0.8	303.1	12.00	12.00	0.00	
10,825.0	71.58	179.85	10,681.5	-326.6	0.8	326.6	12.00	12.00	0.00	
10,850.0	74.58	179.85	10,688.8	-350.5	0.9	350.5	12.00	12.00	0.00	
10,875.0	77.58	179.85	10,694.8	-374.8	1.0	374.8	12.00	12.00	0.00	
10,900.0	80.58	179.85	10,699.5	-399.3	1.0	399.3	12.00	12.00	0.00	
10,925.0	83.58	179.85	10,703.0	-424.1	1.1	424.1	12.00	12.00	0.00	
10,950.0	86.58	179.85	10,705.1	-449.0	1.2	449.0	12.00	12.00	0.00	
10,975.0	89.58	179.85	10,706.0	-474.0	1.2	474.0	12.00	12.00	0.00	
10,977.9	89.93	179.85	10,706.0	-476.9	1.2	476.9	12.00	12.00	0.00	
EOC Start 3981.1 hold at 10977.9 MD										
11,000.0	89.93	179.85	10,706.0	-499.0	1.3	499.0	0.00	0.00	0.00	
11,100.0	89.93	179.85	10,706.1	-599.0	1.5	599.0	0.00	0.00	0.00	
11,200.0	89.93	179.85	10,706.2	-699.0	1.8	699.0	0.00	0.00	0.00	
11,300.0	89.93	179.85	10,706.4	-799.0	2.1	799.0	0.00	0.00	0.00	
11,400.0	89.93	179.85	10,706.5	-899.0	2.3	899.0	0.00	0.00	0.00	
11,500.0	89.93	179.85	10,706.6	-999.0	2.6	999.0	0.00	0.00	0.00	
11,600.0	89.93	179.85	10,706.8	-1,099.0	2.8	1,099.0	0.00	0.00	0.00	
11,700.0	89.93	179.85	10,706.9	-1,199.0	3.1	1,199.0	0.00	0.00	0.00	
11,800.0	89.93	179.85	10,707.0	-1,299.0	3.4	1,299.0	0.00	0.00	0.00	
11,900.0	89.93	179.85	10,707.1	-1,399.0	3.6	1,399.0	0.00	0.00	0.00	
12,000.0	89.93	179.85	10,707.3	-1,499.0	3.9	1,499.0	0.00	0.00	0.00	
12,100.0	89.93	179.85	10,707.4	-1,599.0	4.1	1,599.0	0.00	0.00	0.00	
12,200.0	89.93	179.85	10,707.5	-1,699.0	4.4	1,699.0	0.00	0.00	0.00	
12,300.0	89.93	179.85	10,707.6	-1,799.0	4.6	1,799.0	0.00	0.00	0.00	
12,400.0	89.93	179.85	10,707.8	-1,899.0	4.9	1,899.0	0.00	0.00	0.00	
12,500.0	89.93	179.85	10,707.9	-1,999.0	5.2	1,999.0	0.00	0.00	0.00	
12,600.0	89.93	179.85	10,708.0	-2,099.0	5.4	2,099.0	0.00	0.00	0.00	
12,700.0	89.93	179.85	10,708.1	-2,199.0	5.7	2,199.0	0.00	0.00	0.00	
12,800.0	89.93	179.85	10,708.3	-2,299.0	5.9	2,299.0	0.00	0.00	0.00	
12,900.0	89.93	179.85	10,708.4	-2,399.0	6.2	2,399.0	0.00	0.00	0.00	
13,000.0	89.93	179.85	10,708.5	-2,499.0	6.4	2,499.0	0.00	0.00	0.00	
13,100.0	89.93	179.85	10,708.6	-2,599.0	6.7	2,599.0	0.00	0.00	0.00	
13,200.0	89.93	179.85	10,708.8	-2,699.0	7.0	2,699.0	0.00	0.00	0.00	
13,300.0	89.93	179.85	10,708.9	-2,799.0	7.2	2,799.0	0.00	0.00	0.00	



TDS
Planning Report



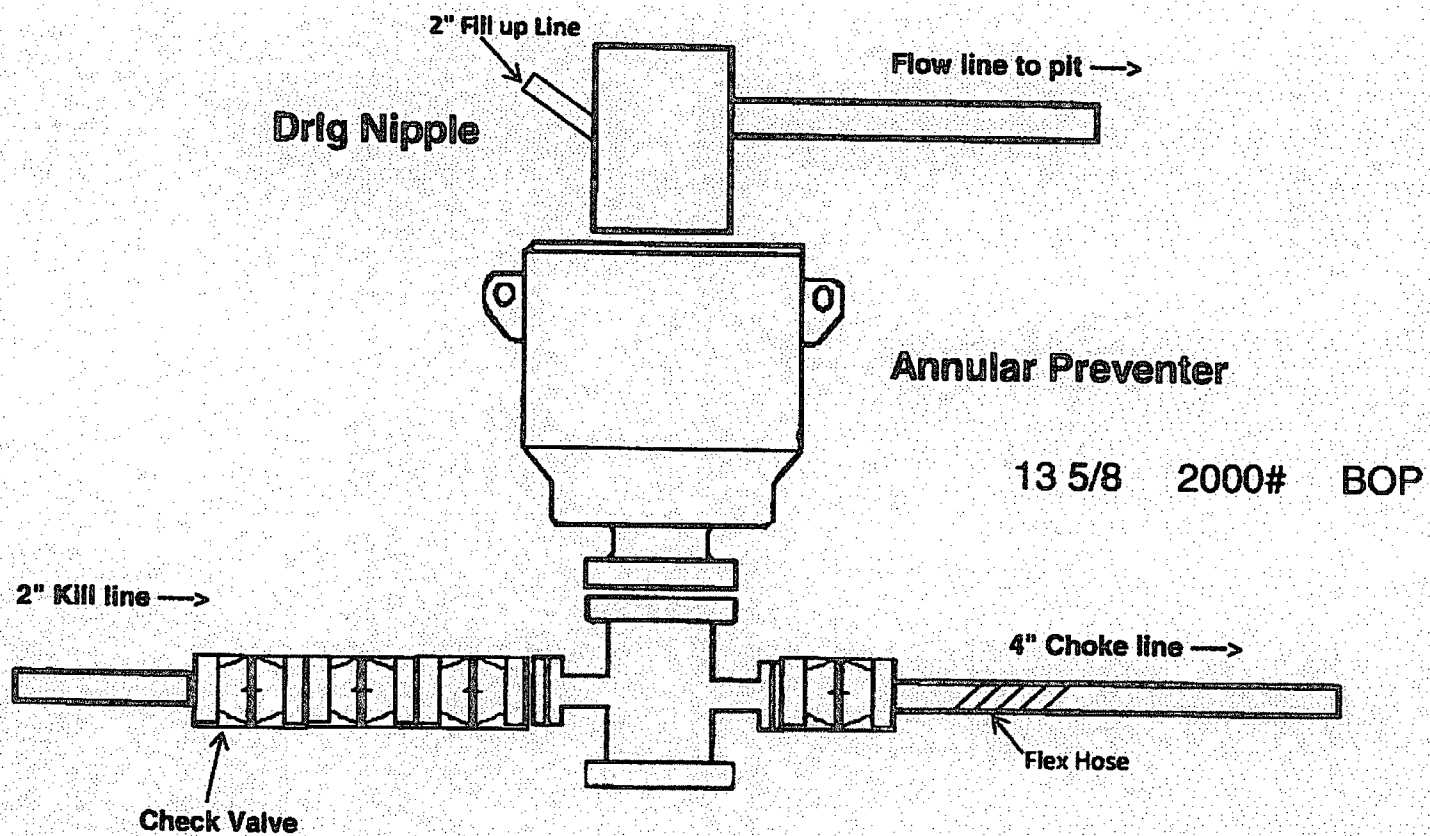
Database:	EDM 5000.1: Single User Db	Local Co-ordinate Reference:	Site Patron 23 Federal
Company:	COG Production LLC	TVD Reference:	KB @ 3168.0usft (Latashaw 44)
Project:	Eddy County, NM	MD Reference:	KB @ 3168.0usft (Latashaw 44)
Site:	Patron 23 Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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)
13,400.0	89.93	179.85	10,709.0	-2,899.0	7.5	2,899.0	0.00	0.00	0.00
13,500.0	89.93	179.85	10,709.2	-2,989.0	7.7	2,989.0	0.00	0.00	0.00
13,600.0	89.93	179.85	10,709.3	-3,099.0	8.0	3,099.0	0.00	0.00	0.00
13,700.0	89.93	179.85	10,709.4	-3,199.0	8.3	3,199.0	0.00	0.00	0.00
13,800.0	89.93	179.85	10,709.5	-3,299.0	8.5	3,299.0	0.00	0.00	0.00
13,900.0	89.93	179.85	10,709.7	-3,399.0	8.8	3,399.0	0.00	0.00	0.00
14,000.0	89.93	179.85	10,709.8	-3,499.0	9.0	3,499.0	0.00	0.00	0.00
14,100.0	89.93	179.85	10,709.9	-3,599.0	9.3	3,599.0	0.00	0.00	0.00
14,200.0	89.93	179.85	10,710.0	-3,698.9	9.5	3,699.0	0.00	0.00	0.00
14,300.0	89.93	179.85	10,710.2	-3,798.9	9.8	3,799.0	0.00	0.00	0.00
14,400.0	89.93	179.85	10,710.3	-3,898.9	10.1	3,899.0	0.00	0.00	0.00
14,500.0	89.93	179.85	10,710.4	-3,998.9	10.3	3,999.0	0.00	0.00	0.00
14,600.0	89.93	179.85	10,710.5	-4,098.9	10.6	4,099.0	0.00	0.00	0.00
14,700.0	89.93	179.85	10,710.7	-4,198.9	10.8	4,199.0	0.00	0.00	0.00
14,800.0	89.93	179.85	10,710.8	-4,298.9	11.1	4,299.0	0.00	0.00	0.00
14,900.0	89.93	179.85	10,710.9	-4,398.9	11.3	4,399.0	0.00	0.00	0.00
14,959.0	89.93	179.85	10,711.0	-4,457.9	11.5	4,457.9	0.00	0.00	0.00
TD at 14959.0									

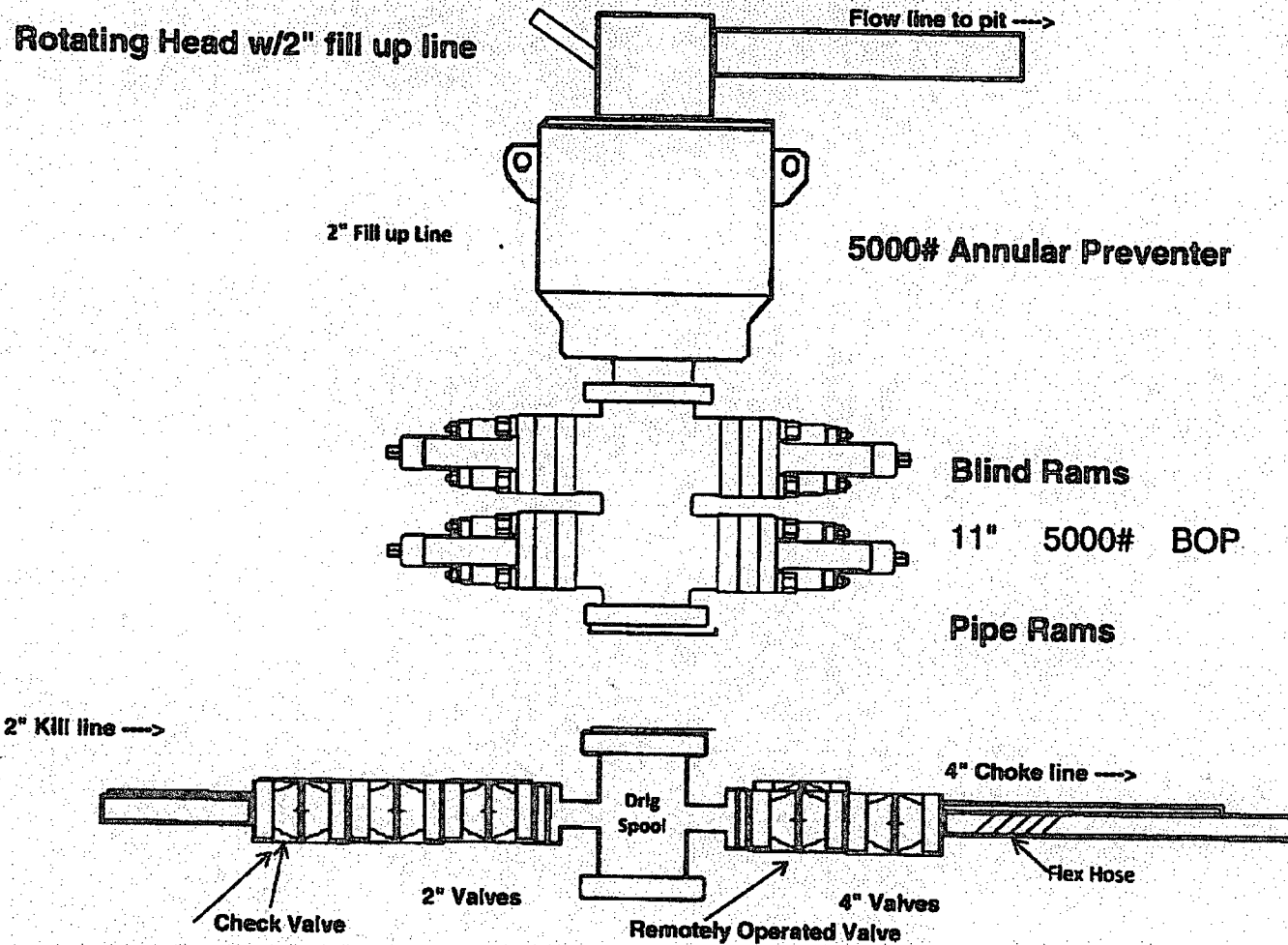
Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Drilling Window/Hard Lir	0.00	179.86	0.0	-470.0	1.2	407,885.90	619,230.90	32° 7' 14.912 N	103° 56' 53.543 W
- plan misses target center by 470.0usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)									
- Rectangle (sides W100.0 H3,987.9 D0.0)									
EOC (P23F #4H/OH Pla	0.00	0.00	10,706.0	-476.9	1.2	407,879.04	619,230.93	32° 7' 14.845 N	103° 56' 53.543 W
- plan hits target center									
- Point									
PBHL (P23F #4H/OH)	0.00	0.00	10,711.0	-4,457.9	11.5	403,898.00	619,241.20	32° 6' 35.447 N	103° 56' 53.589 W
- plan hits target center									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
10,228.5	10,228.5	0.0	0.0	KOP - Start DLS 12.00 TFO 179.85
10,977.9	10,706.0	-476.9	1.2	EOC - Start 3981.1 hold at 10977.9 MD
14,959.0	10,711.0	-4,457.9	11.5	TD at 14959.0

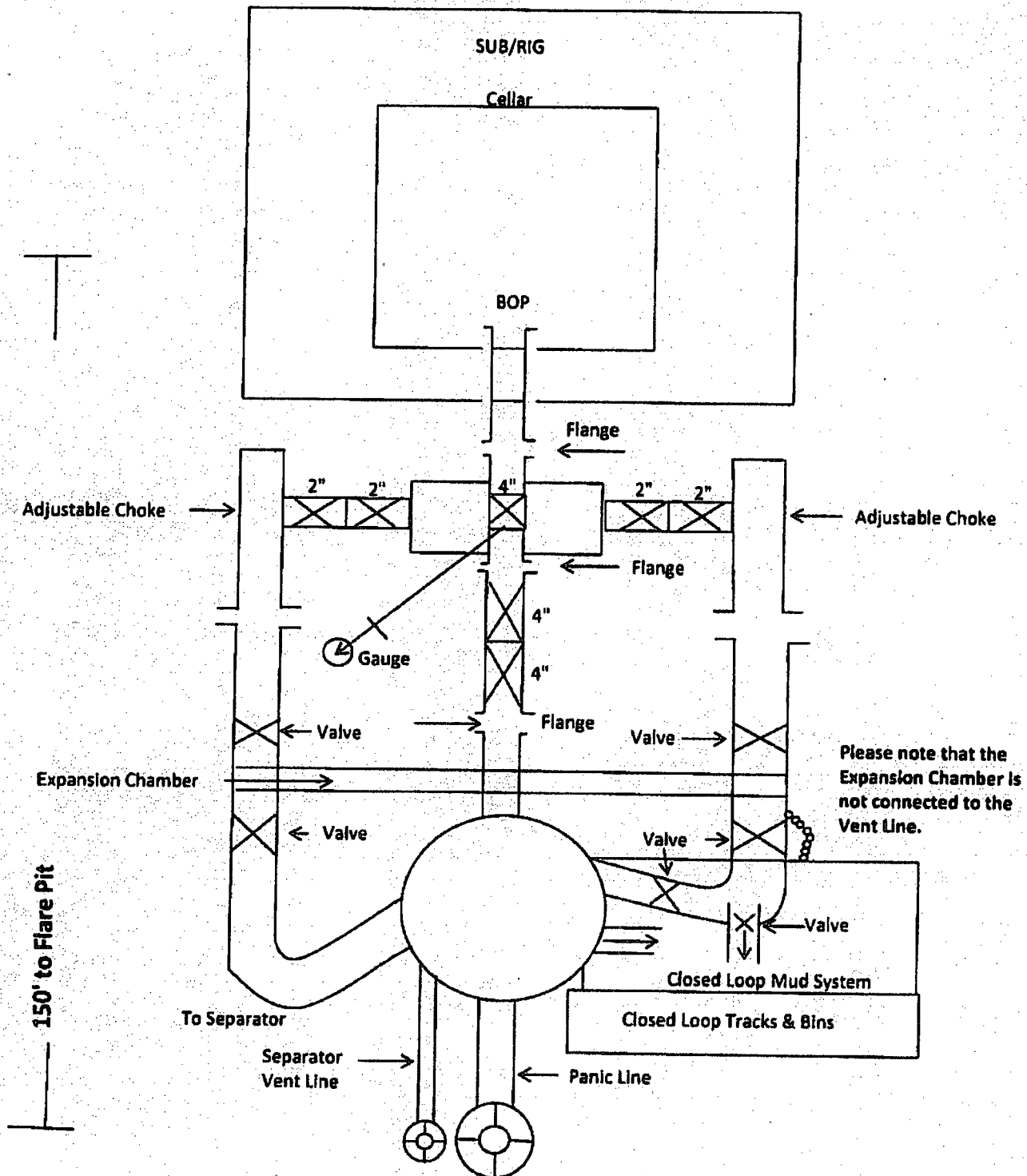
2,000 psi BOP Schematic



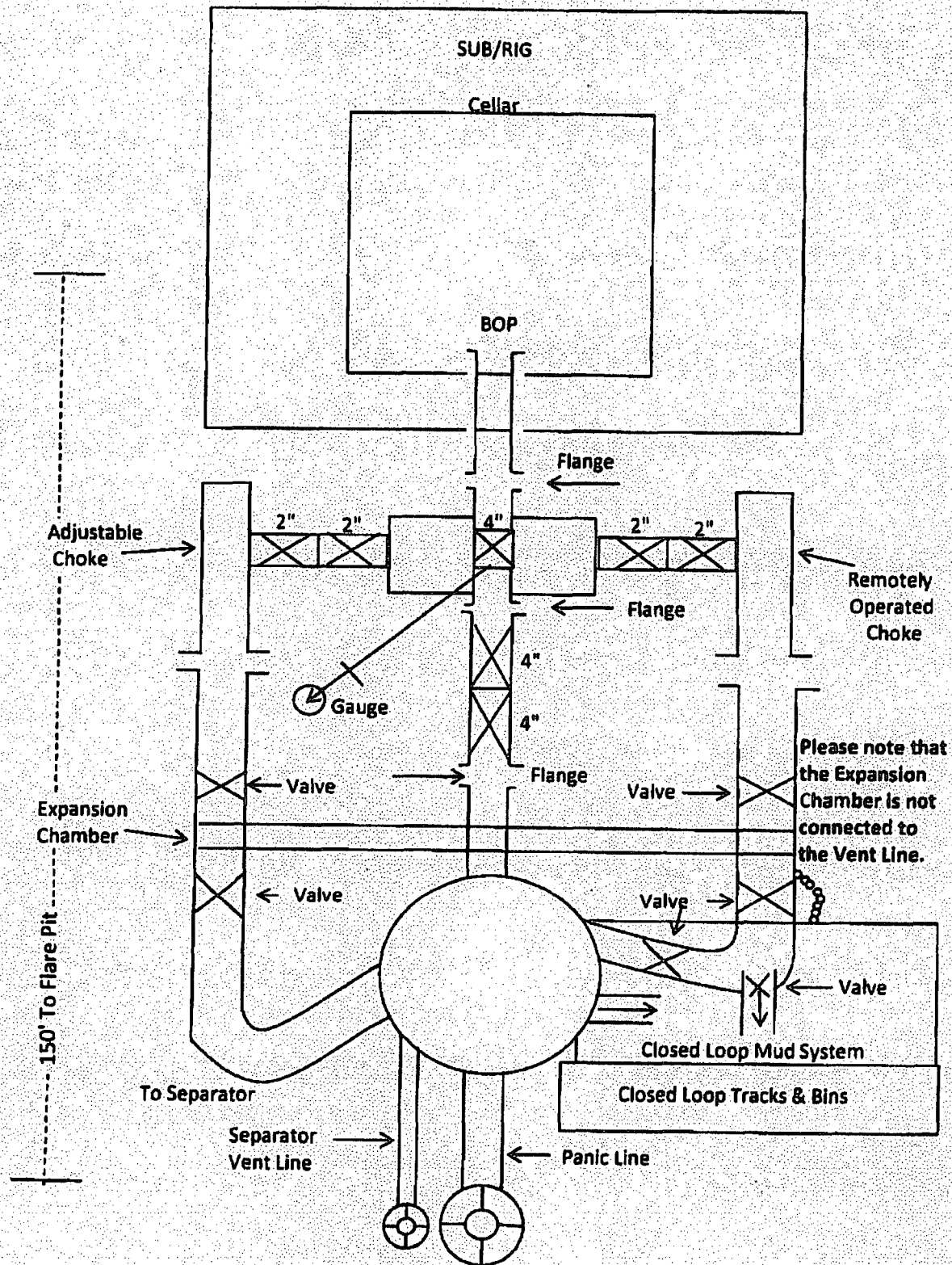
5,000 psi BOP Schematic



2M Choke Manifold Equipment



5M Choke Manifold Equipment





Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **LATSHAW DRILLING**

Customer P.O.# **RIG#44**

Sales Order # **242739**

Date Assembled: **2/9/2015**

Specifications

Hose Assembly Type: **Choke & Kill**

Assembly Serial # **292614-1**

Hose Lot # and Date Code **10900-08/13**

Hose Working Pressure (psi) **10000**

Test Pressure (psi) **15000**

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

Comments:

Approved By

Date

2/10/2015



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **LATSHAW DRILLING**

Customer P.O.# **RIG#44**

Sales Order # **242739**

Date Assembled: **2/9/2015**

Specifications

Hose Assembly Type: **Choke & Kill**

Assembly Serial # **292614-2**

Hose Lot # and Date Code **11794-10/14**

Hose Working Pressure (psi) **10000**

Test Pressure (psi) **15000**

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

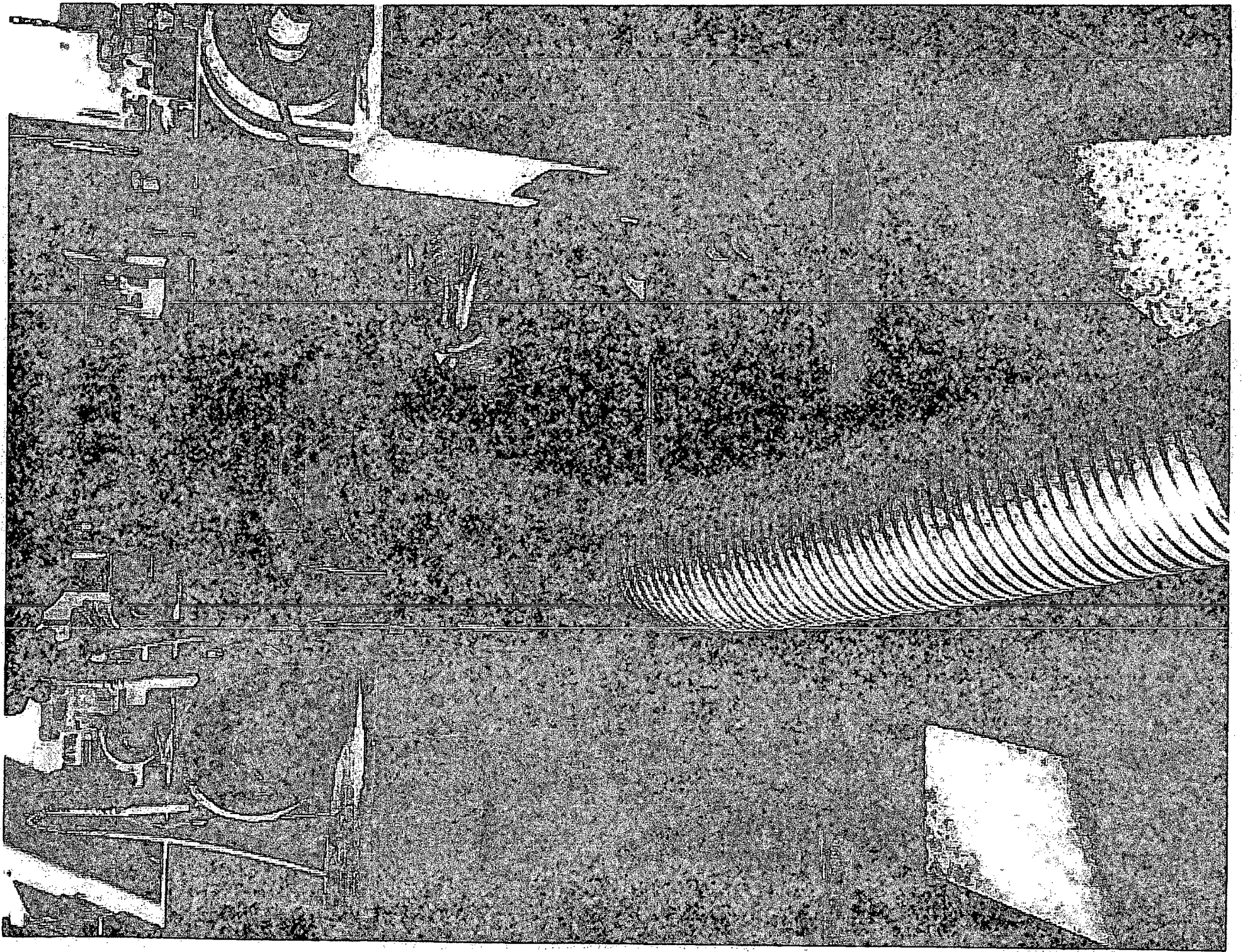
Oklahoma City, OK 73129

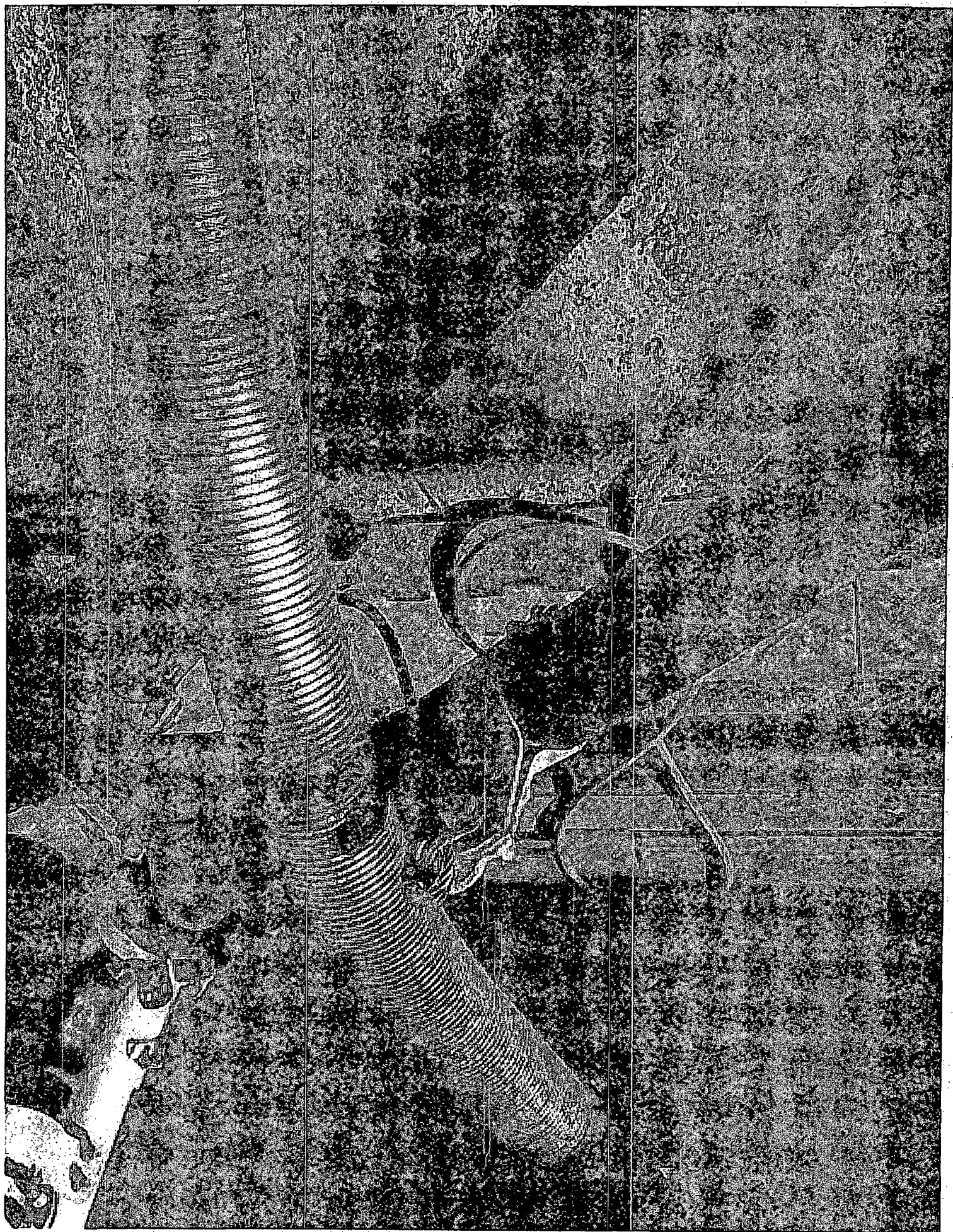
Comments:

Approved By

Date

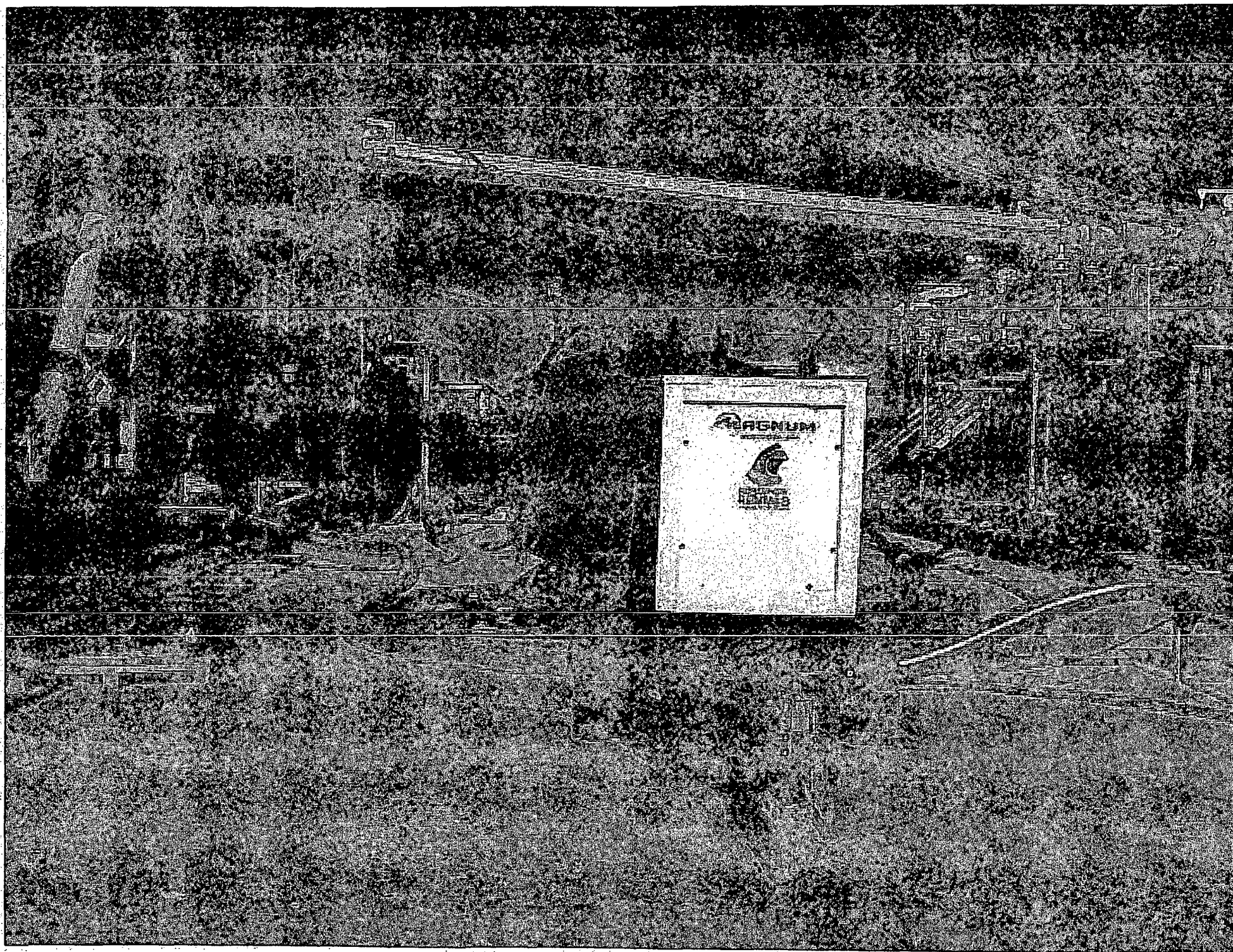
2/10/2015











PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Production LLC
LEASE NO.:	NMNM-120895
WELL NAME & NO.:	Patron 23 Federal 4H
SURFACE HOLE FOOTAGE:	0190' FNL & 0660' FEL
BOTTOM HOLE FOOTAGE:	0660' FSL & 0660' FEL
LOCATION:	Section 23, T. 25 S., R 29 E., NMPM
COUNTY:	Eddy County, New Mexico

I. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

1. **Operator has stated that Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. Operator has also stated that if H₂S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area will meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.

4. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Water Basin:

After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possibility of water flows in the Canyon, Ellenburger, and Precambrian.
Possibility of lost circulation in the Ellenburger.

1. The 13-3/8 inch surface casing shall be set at approximately 750 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

- b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.
 - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. Report results to BLM office.

Centralizers required through the curve and a minimum of one every other joint.

Pilot hole is required to have a plug at the bottom of the hole. If two plugs are set, the BLM is to be contacted (575-361-2822) prior to tag of bottom plug, which must be a minimum of 200' in length. Operator can set one plug from bottom of pilot hole to kick-off point and save the WOC time for tagging the first plug. Additional cement will be required as plug 1 excess calculates to NEGATIVE 41% and plug 2 excess calculates to NEGATIVE 33%.

3. The minimum required fill of cement behind the 7 inch production casing is:

☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Excess calculates to 22% - Additional cement may be required.**

Formation below the 7" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole. Report results to BLM office.

4. The minimum required fill of cement behind the 4-1/2 inch production Liner is:

☒ Cement as proposed. Operator shall provide method of verification.

5. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. Variance approved to use flex line from BOP to choke manifold. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. **Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M) psi.**
 - a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **5000 (5M) psi. 5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
- a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
 - c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
 - d. The results of the test shall be reported to the appropriate BLM office.
 - e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
 - f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
 - g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

D. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

E. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

F. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

JAM 060815