NM OIL CONSERVATION

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ARTESIA DISTRICT
JUN 10 2015
RECEIVED

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

5. Lease Serial No.
NMNM120895

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
PATRON 23 FEDERAL 4H

2. Name of Operator
COG PRODUCTION LLC
Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

9. API Well No.
30-015-42451-00-X1

3a. Address
2208 W MAIN STREET
ARTESIA, NM 88210

3b. Phone No. (include area code)
Ph: 575.748.6945
(98138)

10. Field and Pool, or Exploratory
~~CORRAL DRAW~~
UPR
WC-015 G-07 S252923A; Wolfcamp

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T25S R29E NENE 190FNL 660FEL
32.122101 N Lat, 103.948205 W Lon

11. County or Parish, and State
EDDY COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Production LLC, respectfully requests approval for the following changes to the original approved APD.

BHL:
From BHL: 330? FSL & 660? FEL
To BHL: 660? FSL & 660? FEL
C102 attached.

Drilling Changes:
Drilling program, directional plan, BOP and choke schematics attached.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.
Electronic Submission #304048 verified by the BLM Well Information System
For COG PRODUCTION LLC, sent to the Carlsbad
Committed to AFMSS for processing by JENNIFER SANCHEZ on 06/05/2015 (15JAS0369SE)

Name *(Printed/Typed)* MAYTE X REYES — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 06/04/2015

APPROVED
JUN 8 2015
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ Title _____ Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Additional data for EC transaction #304048 that would not fit on the form

32. Additional remarks, continued

Formation:
From: WILLOW LAKE;BONE SPRING, SOUTHEAST [96217]
To: WC-015 G-07 S252923A;UPR WOLFCAMP [98138]

Flex Hose Variance attached.

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., 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
11885 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015-42451	98138	WC-015 G-07 S252923A; Wolfcamp

Property Code	Property Name	Well Number
37491	PATRON 23 FEDERAL	4H

OGRID No.	Operator Name	Elevation
217955	COG PRODUCTION, LLC	3141.0

Surface Location

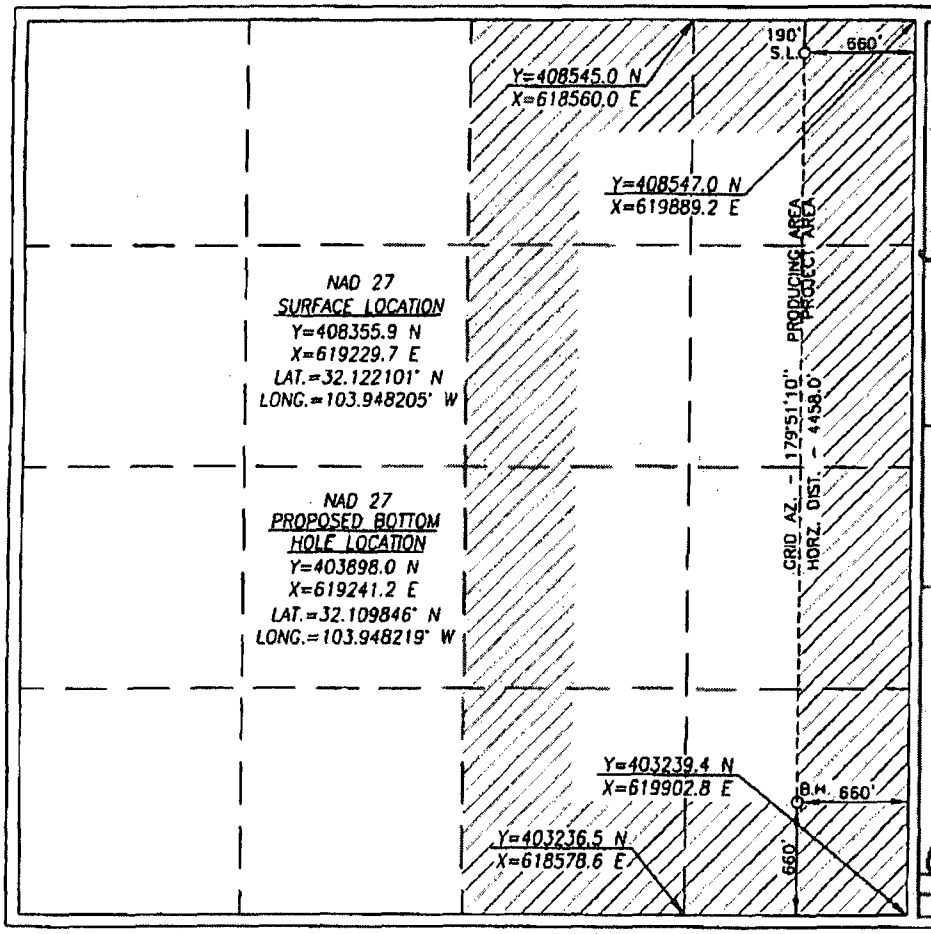
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	23	25-S	29-E		190	NORTH	660	EAST	EDDY

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	County
P	23	25-S	29-E		660	SOUTH	660	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
320			

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



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.

Mayte Reyes 6-4-15
Signature Date

Mayte Reyes
Printed Name

mreyes1@concho.com
E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 24, 2013
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 5/18/15
Certificate No. CHAD HARCROW 17777

W.O. # 15-635 DRAWN BY: AM

COG Operating LLC, Patron 23 Federal 4H

1. Geologic Formations

TVD of target	10,711'	Pilot hole depth	12,200'
MD at TD:	14,959'	Deepest expected fresh water:	60'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	718	Water	
Top of Salt	1222	Salt	
Lamar	3291		
Delaware Group	3310	Oil/Gas	
Bone Spring	7116	Oil/Gas	
Wolfcamp	10,306	Oil/Gas	
Penn Shale	12,046		
Strawn	12,786	Will Not Penetrate	
Middle Wolfcamp	10,711	Target Zone	
Pilot Hole TD	12,200		

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	750	13.375"	54.5	J55	STC	3.184	1.748	16.856
12.25"	0	3300	9.625"	36	J55	LTC	1.294	0.719	3.813
8.75"	0	10,350	7"	29	HCP110	LTC	1.878	1.940	3.095
6.125"	9850	14,959	4.5"	13.5	HCP110	BTC	2.105	2.448	2.918
				BLM Minimum Safety Factor			1.125	1.0	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations.
- Explanation for SF's below BLM's minimum standards:
  - 9-5/8" Burst SF @ 0.719 – used BLM's frac gradiant scenario to qualify. 3520 psi/3300'=1.06>0.7

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Is casing API approved? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification. See assumptions above table.	N
Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Csg	# sx	Density ppg	Yield ft3/sx	H_20 gal/sx	500# Comp. Strength (hours)	Slurry Description
Sfc	350	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 2% CaCl2
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Intrmd 1	950	13.5	1.75	9.2	15	Lead: Class C + 4% Gel
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Intrmd 2	500	10.2	3.50	22.0	72	Lead:Tuned Light H Blend (FR, Retarder, FL adds as needed)
	200	16.4	1.10	4.3	12	Tail: Class H (FR, Retarder, FL adds as needed)
Prod	300	14.4	1.25	5.7	17	Lead:50:50:2 H Blend (FR, Retarder, FL adds as needed)
	300	14.4	1.25	5.7	17	Tail:50:50:2 H Blend (FR, FL adds as needed)

Casing String	TOC	% Excess
Surface	0'	50% on OH volumes
Intermediate 1	0'	35% on OH volumes
Intermediate 2	0'	35% on OH volumes
Production	9850' (@ Top of Liner)	35% on OH volumes

PHTD = 12,200'
KOP = 10,350'

will need more cement. This is not adequate

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type
10,350	11,300	10	225	17.2	0.99	5	Class H
11,300	12,200	10	225	17.2	0.99	5	Class H

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.

BOP installed and tested before drilling which hole?	Size?	System Rated WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	X	50% of working pressure
			Blind Ram		WP
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	11"	5M	Annular	X	50% testing pressure
			Blind Ram	X	WP
			Pipe Ram	X	
			Double Ram		
			Other*		
6-1/8"	11"	5M	Annular	X	50% testing pressure
			Blind Ram	X	WP
			Pipe Ram	X	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic & Description.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6-8.8	28-34	N/C
Surf csg	Int 1 shoe	Saturated Brine	10.0-10.2	28-34	N/C
Int 1 shoe	Int 2 shoe	Cut Brine	8.7-9.3	28-34	N/C
Int 2 shoe	PHTD	Cut Brine	8.7-9.3	28-34	N/C
Int 2 shoe/KOP	TMD	OBM	11.0 - 14.0	40-60	10-50

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Weighted OBM system will be used in the curve and lateral for shale stability, not for formation over pressure.

What will be used to monitor the loss or gain of fluid?	Pason PVT

6. Logging and Testing Procedures

Logging, Coring and Testing:	
X	Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Additional logs planned		Interval
	Resistivity	
	Density	
	CBL	
	Mud log	
	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	5773 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe:
No abnormal drilling conditions are expected to occur.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
	H2S is present
X	H2S Contingency Plan Attached

8. Other Facets of Operation

Is this a walking operation? No
Will be pre-setting casing? No

Attachments:

- BOP & Choke Schematics
- Flex hose spec sheet & test chart
- Directional Plan

CONCHO

COG Production LLC
Project: Eddy County, NM
Site: Patron 23 Federal
Well: #4H
Wellbore: OH
Plan: Plan #1 (#4H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10228.5	0.00	0.00	10228.5	0.0	0.0	0.00	0.00	0.0	
3	10977.9	89.93	179.85	10706.0	-476.9	1.2	12.00	179.85	476.9	
4	14959.0	89.93	179.86	10711.0	-4457.9	11.5	0.00	0.00	4457.9	PBHL (P23F #4H/OH)

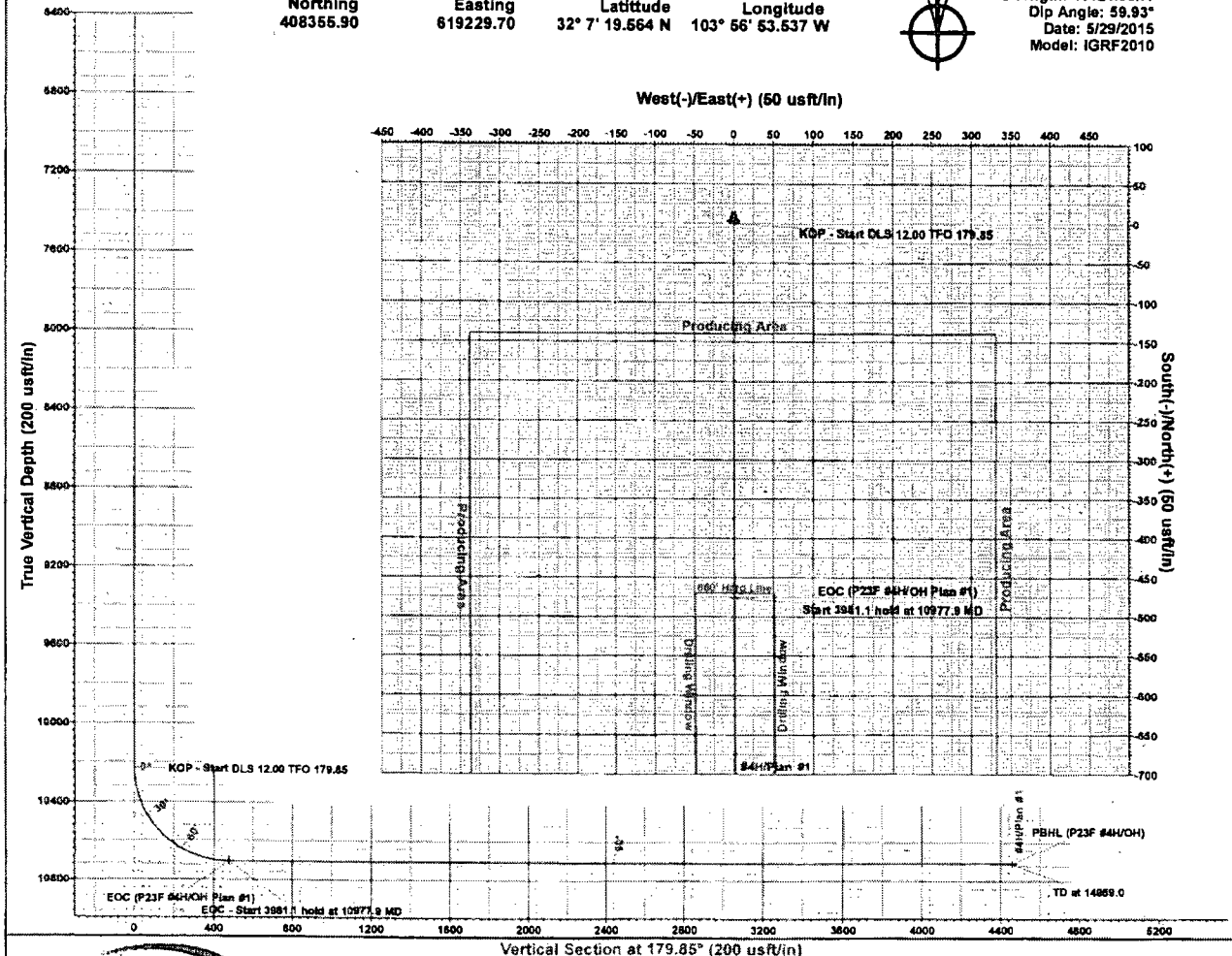
WELL DETAILS: #4H

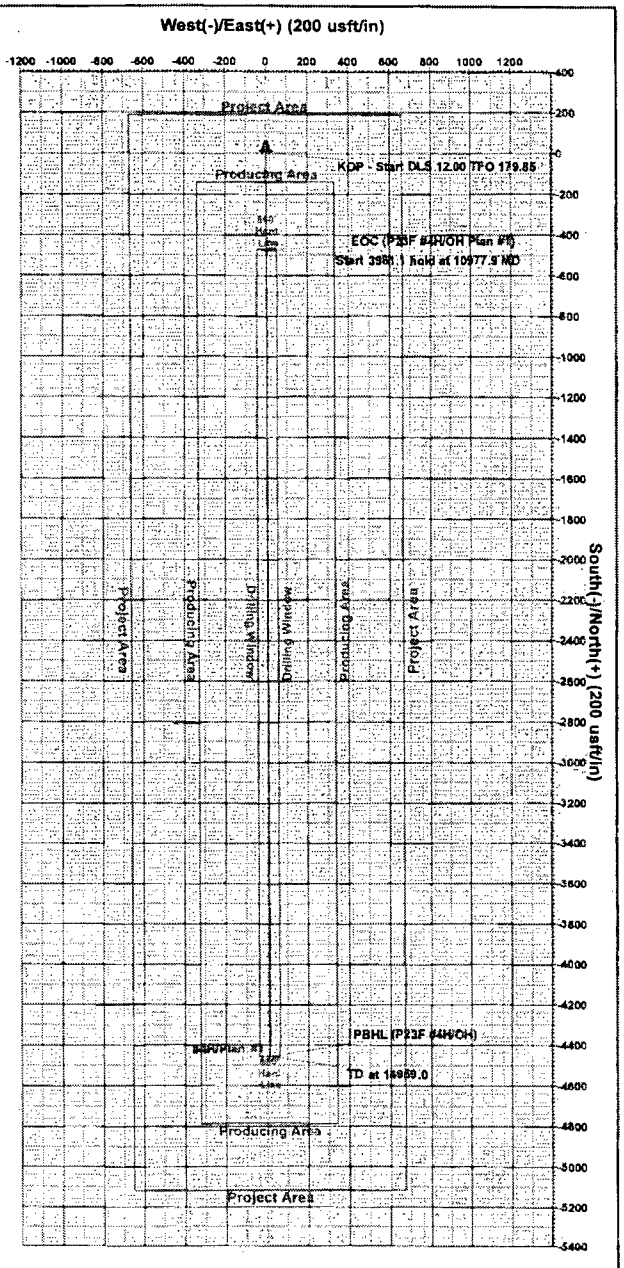
Ground Elevation:: 3141.0
RKB Elevation: KB @ 3166.0usft (Latshaw 44)
Rig Name: Latshaw 44

Northing	Easting	Latitude	Longitude
408355.90	619229.70	32° 7' 19.564 N	103° 56' 53.537 W

Azimuths to Grid North
True North: -0.20°
Magnetic North: 7.06°

Magnetic Field
Strength: 48121.5snT
Dip Angle: 59.93°
Date: 5/29/2015
Model: IGRF2010





Plan: Plan #1 (#4H/OH)
Created By: Well Planner Date: 13:38, May 29 2015

Terra Directional Services
322 Spring Hill Drive, Suite A100. Spring,Texas 77386
432.425.7532

PROJECT DETAILS: Eddy County, NM
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
Local North: Grid

CONCHO

COG Production LLC

Eddy County, NM
Patron 23 Federal
#4H

OH

Plan: Plan #1

Standard Planning Report

29 May, 2015

TDS
TERRA DIRECTIONAL SERVICES, L.L.C.

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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' 19.564 N
From:	Map	**Easting:**	619,229.70 usft	**Longitude:**	103° 56' 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' 19.564 N
	+E/-W	0.0 usft	**Easting:**	619,229.70 usft	**Longitude:**	103° 56' 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	10,706.0	-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)

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3168.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3168.0usft (Latshaw 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)
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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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	-9.7	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	10,485.6	-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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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	-2,999.0	7.7	2,999.0	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									

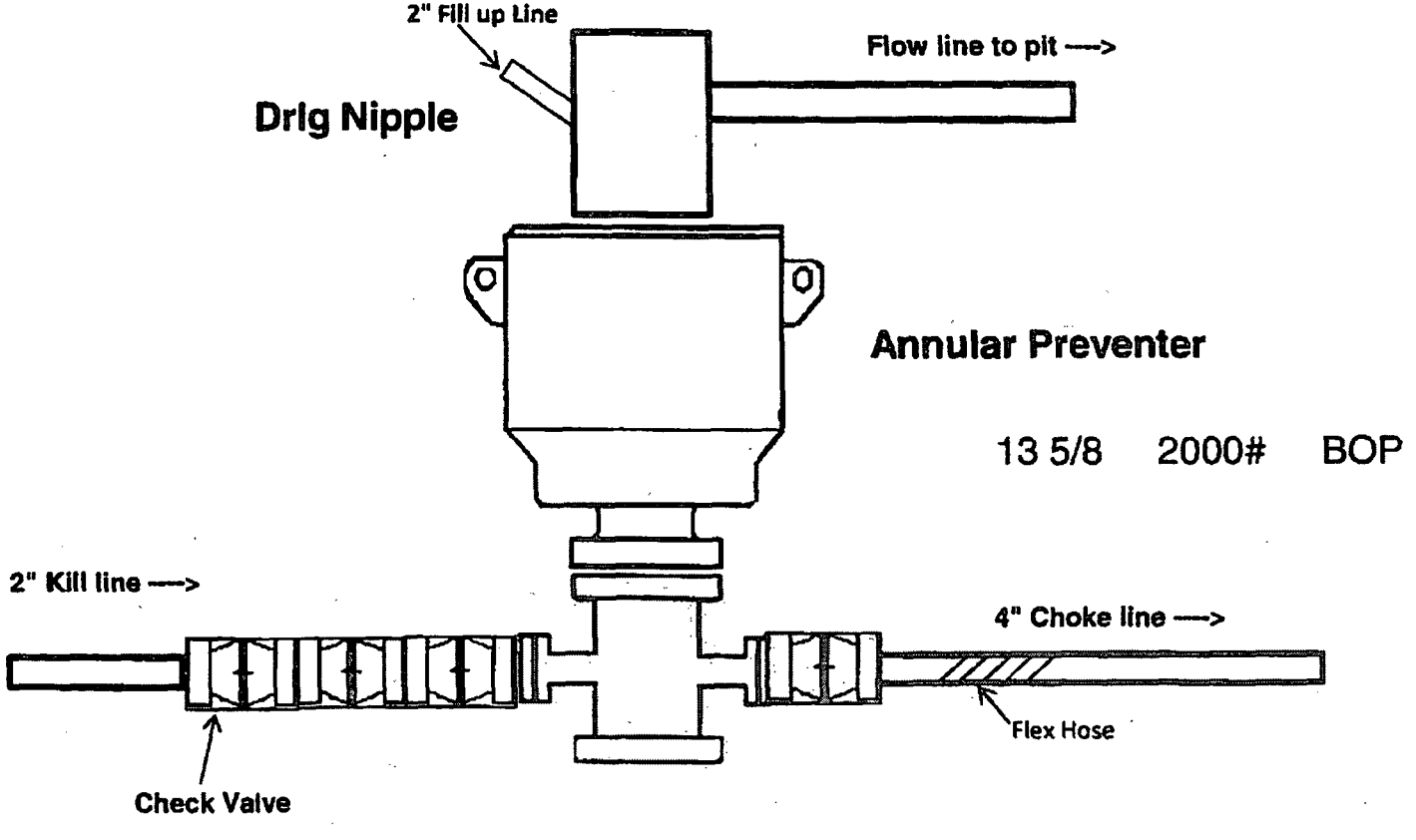
Design Targets

Target Name - hit/miss target - Shape	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									

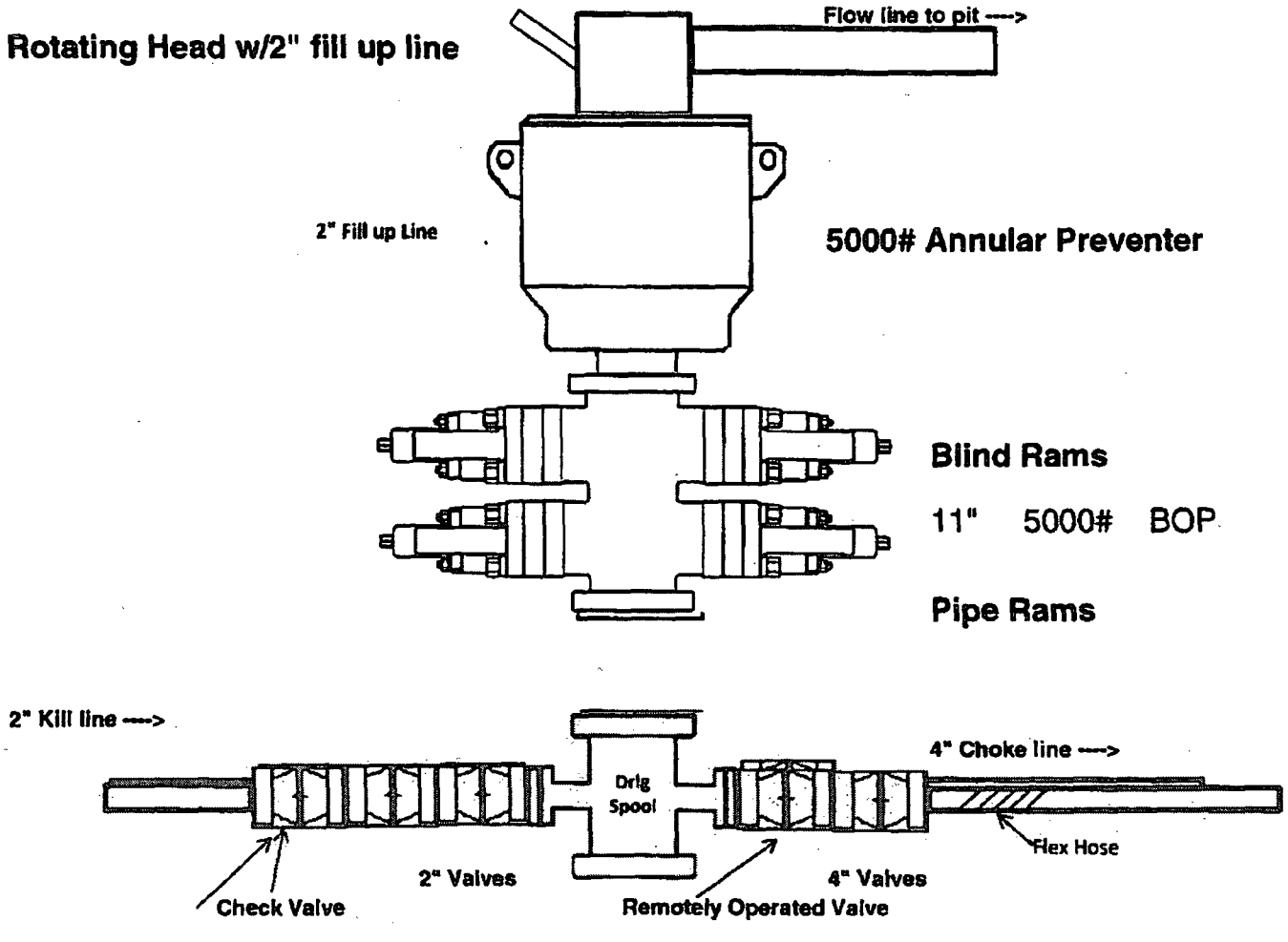
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +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

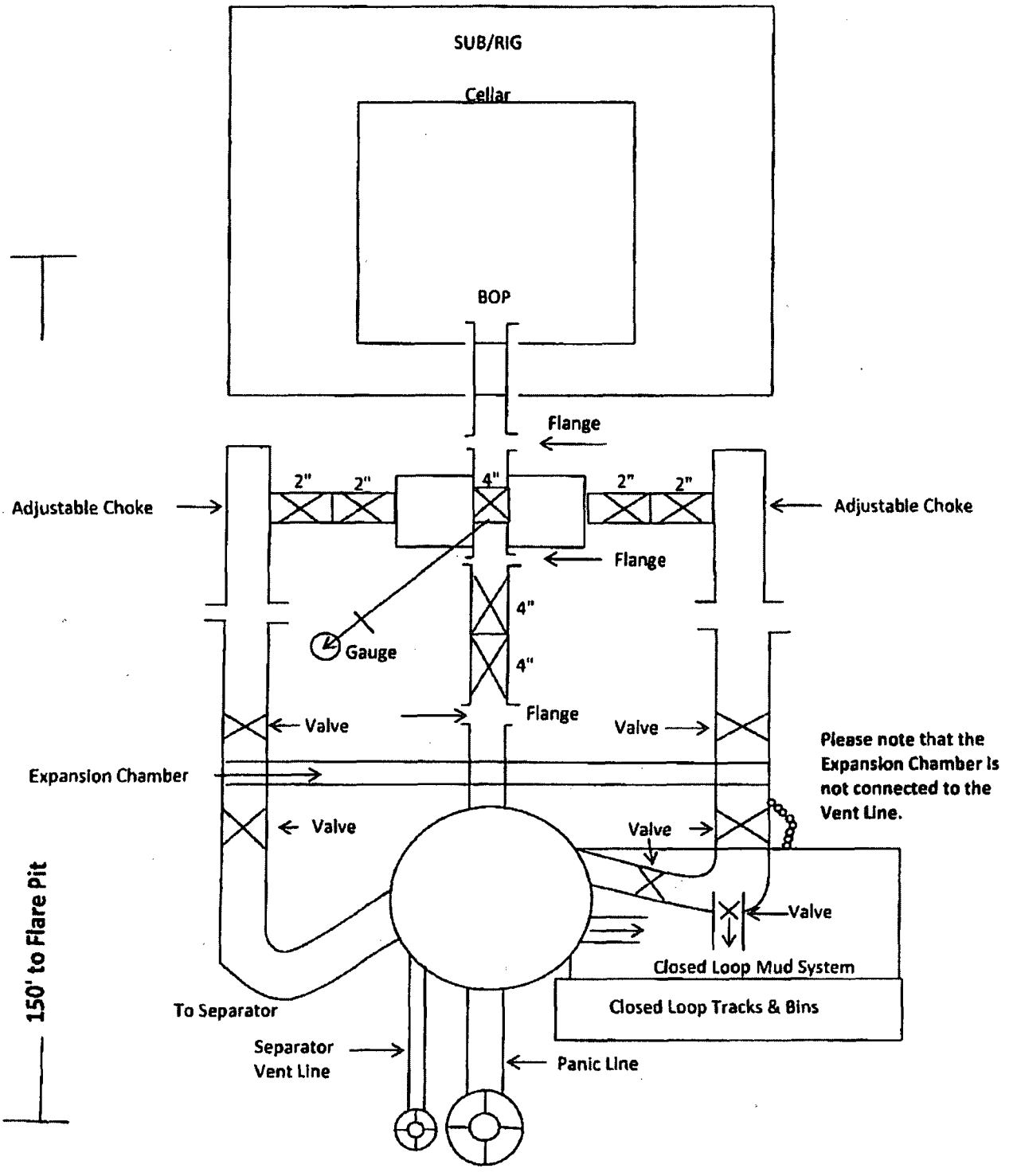
2,000 psi BOP Schematic



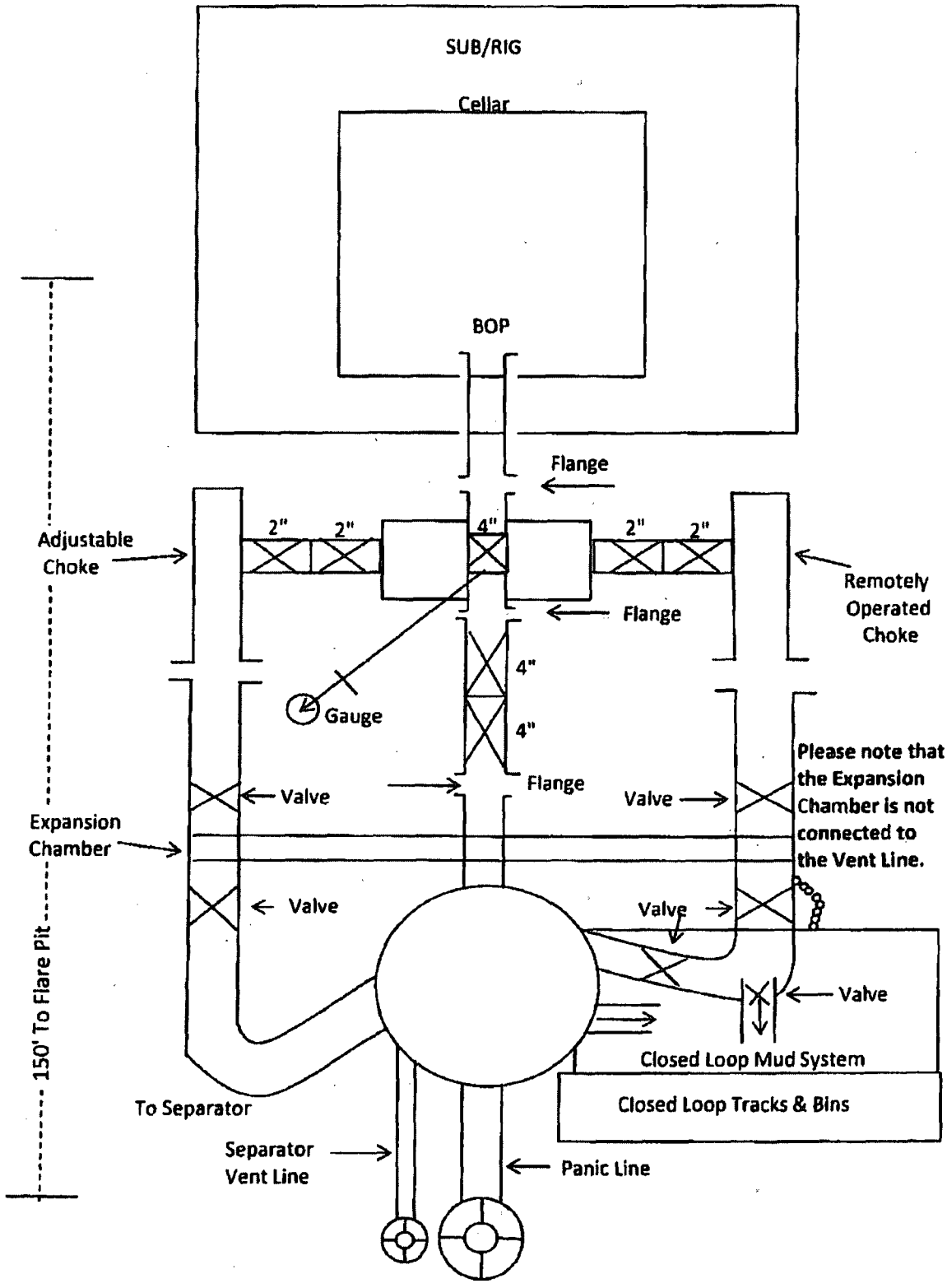
5,000 psi BOP Schematic



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

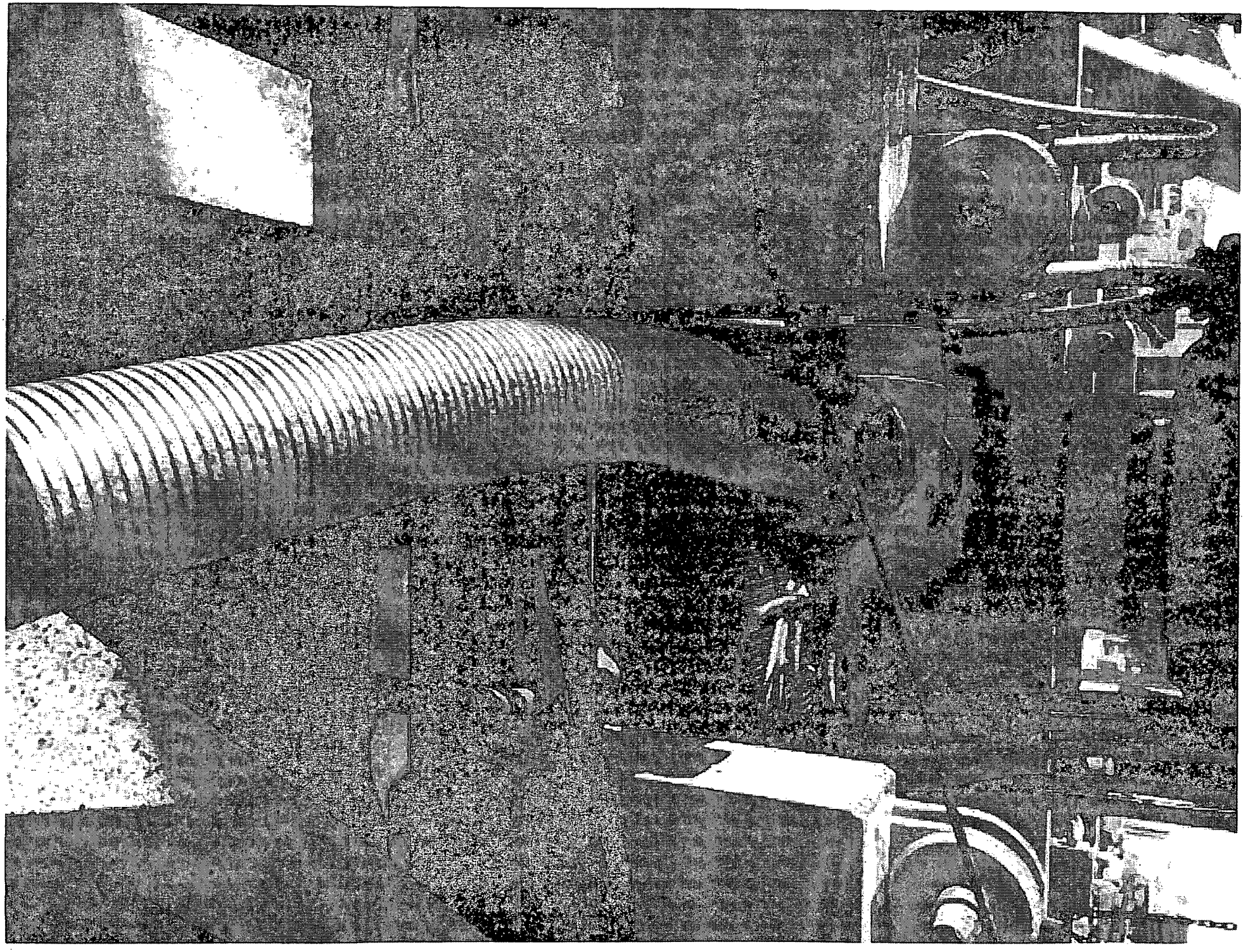
Hose Assembly Type:	**Choke & Kill**		
Assembly Serial #	**292614-2**	*Hose Lot # and Date Code*	**11794-10/14**
Hose Working Pressure (psi)	**10000**	*Test Pressure (psi)*	**15000**

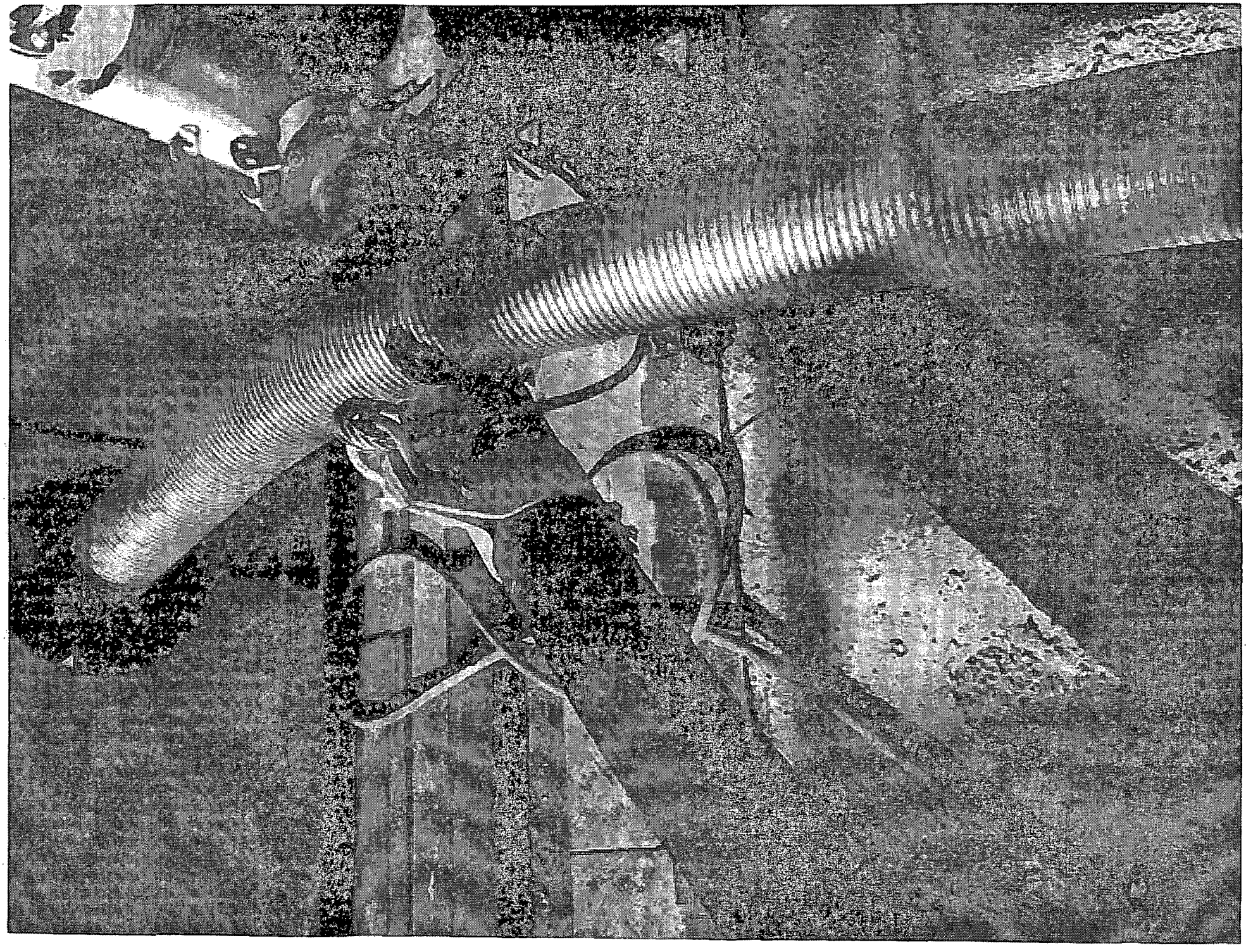
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

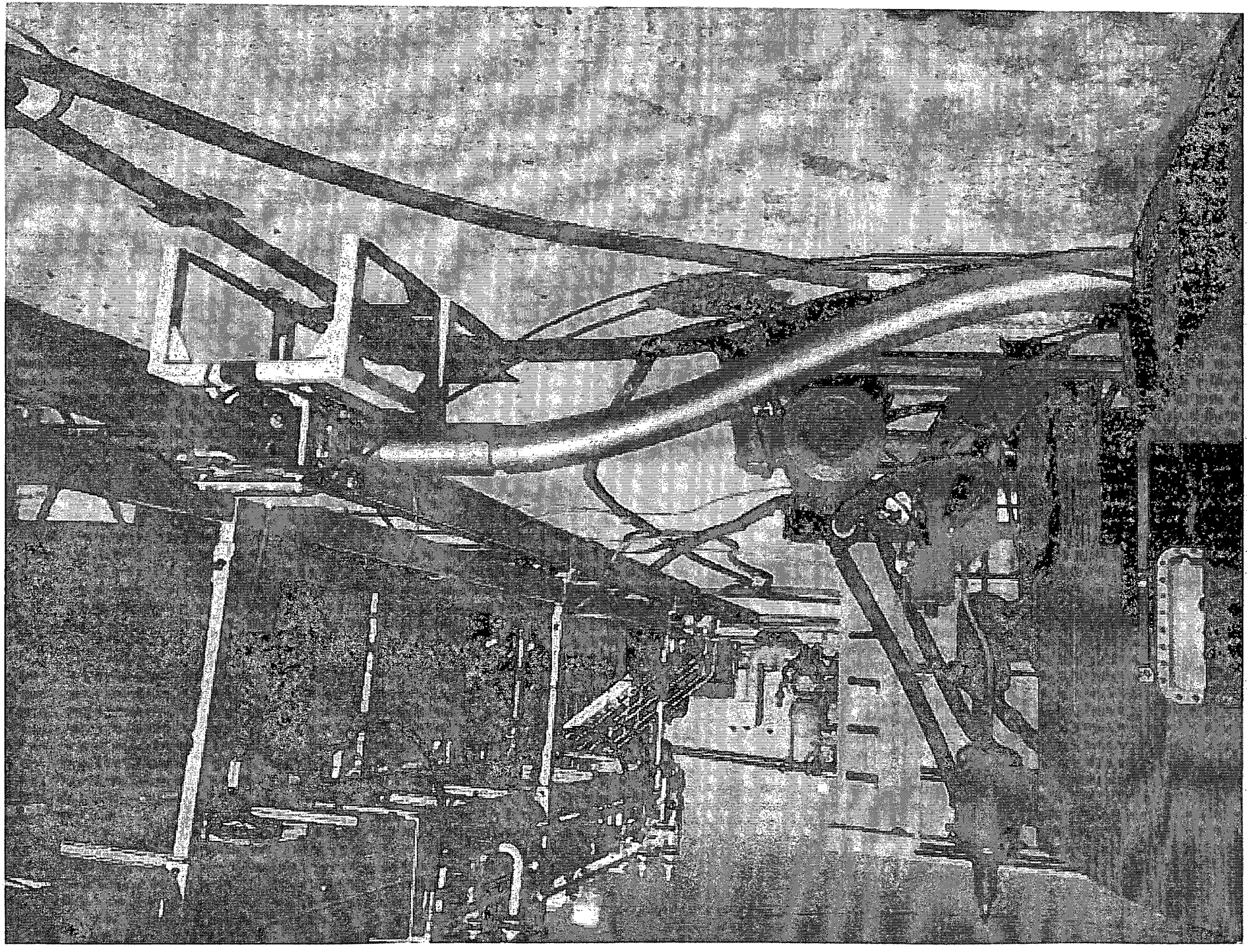
Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

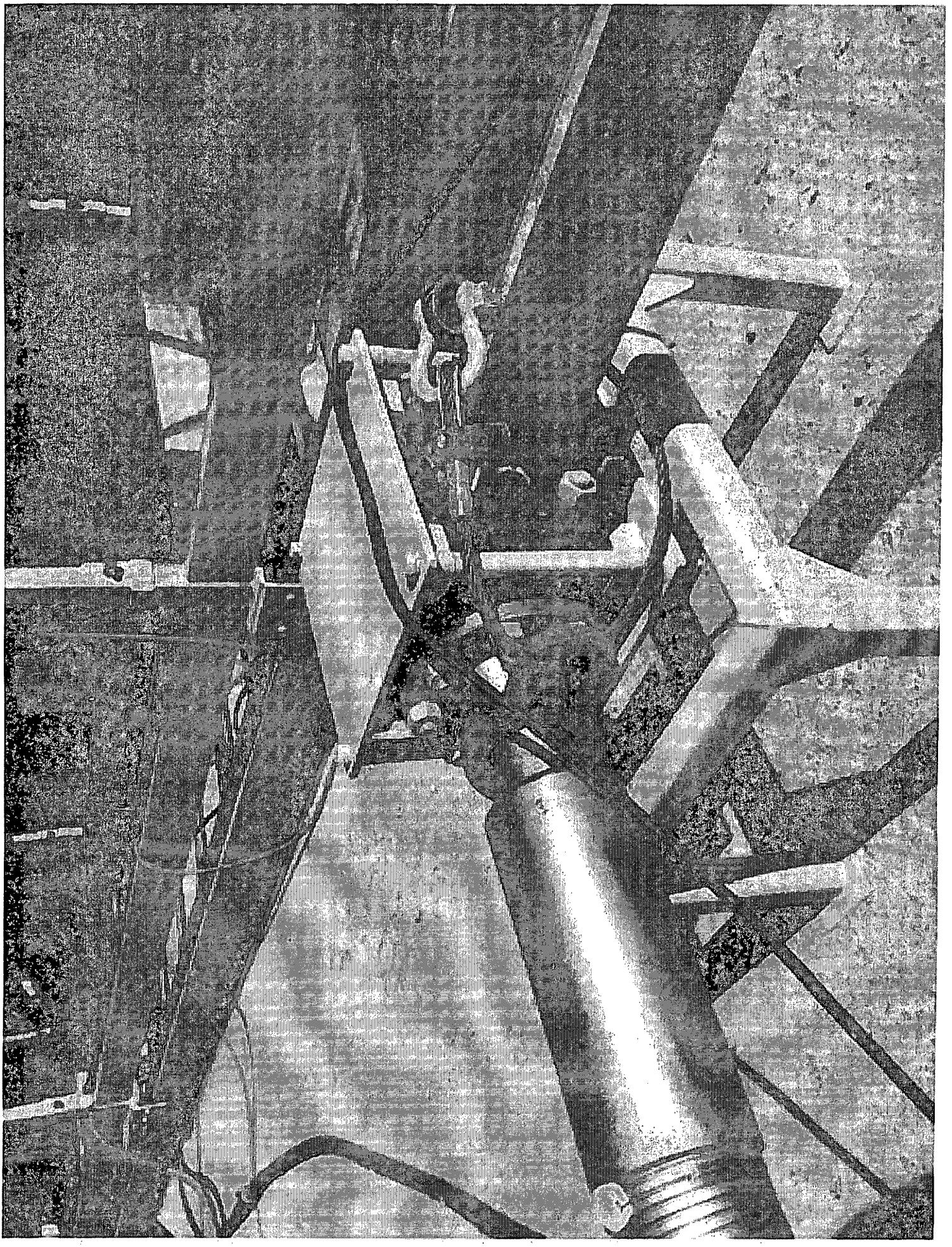
Comments:

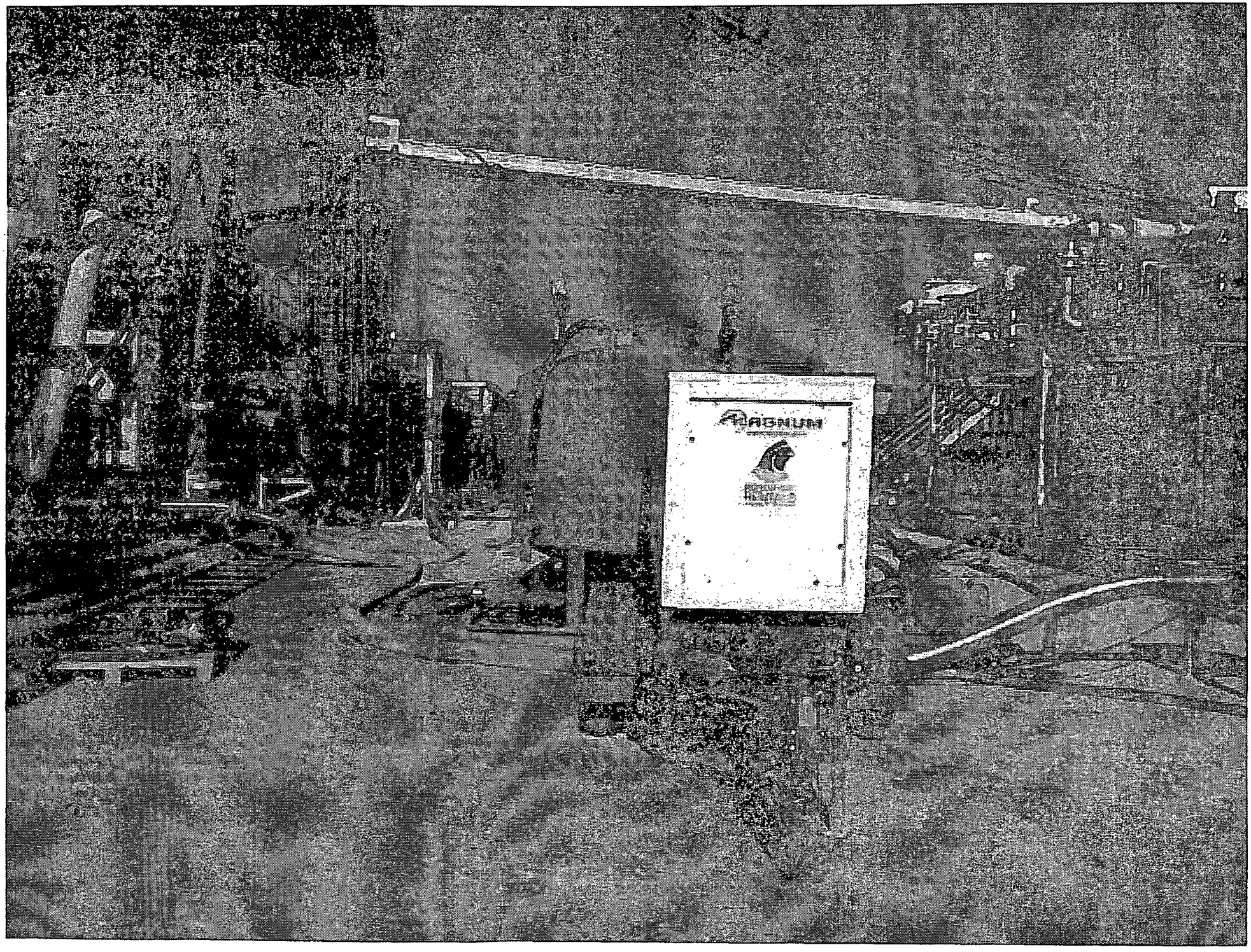
Approved By	*Date*
	2/10/2015










MAGNUM

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

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

5. Lease Serial No.
NMNM120895

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
PATRON 23 FEDERAL 4H

2. Name of Operator
COG PRODUCTION LLC
Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

9. API Well No.
30-015-42451-00-X1

3a. Address
2208 W MAIN STREET
ARTESIA, NM 88210

3b. Phone No. (include area code)
Ph: 575.748.6945

10. Field and Pool, or Exploratory
CORRAL DRAW

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 23 T25S R29E NENE 190FNL 660FEL
32.122101 N Lat, 103.948205 W Lon

11. County or Parish, and State
EDDY COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Production LLC, respectfully requests approval for the following changes to the original approved APD.

BHL:
From BHL: 330? FSL & 660? FEL
To BHL: 660? FSL & 660? FEL
C102 attached.

Drilling Changes:
Drilling program, directional plan, BOP and choke schematics attached.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #304048 verified by the BLM Well Information System
For COG PRODUCTION LLC, sent to the Carlsbad
Committed to AFMSS for processing by JENNIFER SANCHEZ on 06/05/2015 (15JAS0369SE)

Name *(Printed/Typed)* MAYTE X REYES — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 06/04/2015

APPROVED
JUN 8 2015
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ Title _____ Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Additional data for EC transaction #304048 that would not fit on the form

32. Additional remarks, continued

Formation:
From: WILLOW LAKE;BONE SPRING, SOUTHEAST [96217]
To: WC-015 G-07 S252923A;UPR WOLFCAMP [98138]

Flex Hose Variance attached.

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., 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
11885 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-015-42451	98138	WC-015 G-07 S252923A; Wolfcamp

Property Code	Property Name	Well Number
37491	PATRON 23 FEDERAL	4H

OGRID No.	Operator Name	Elevation
217955	COG PRODUCTION, LLC	3141.0

Surface Location

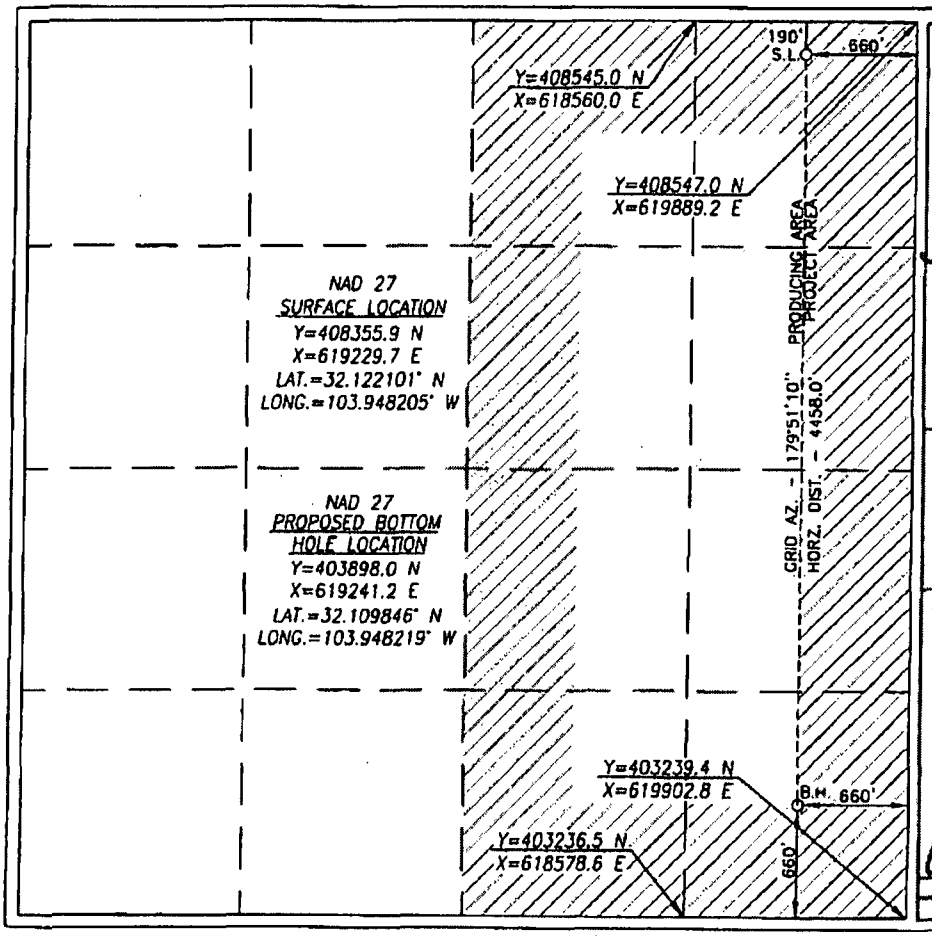
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	23	25-S	29-E		190	NORTH	660	EAST	EDDY

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	County
P	23	25-S	29-E		660	SOUTH	660	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
320			

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



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.

Mayte Reyes 6-4-15
Signature Date

Mayte Reyes
Printed Name

mreyes1@concho.com
E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 24, 2013
Date of Survey

Signature & Seal of Professional Surveyor

CHAD L. HARCROW
NEW MEXICO
17777
LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 5/18/15
Certificate No. CHAD HARCROW 17777

W.O. # 15-635 DRAWN BY: AM

COG Operating LLC, Patron 23 Federal 4H

1. Geologic Formations

TVD of target	10,711'	Pilot hole depth	12,200'
MD at TD:	14,959'	Deepest expected fresh water:	60'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	718	Water	
Top of Salt	1222	Salt	
Lamar	3291		
Delaware Group	3310	Oil/Gas	
Bone Spring	7116	Oil/Gas	
Wolfcamp	10,306	Oil/Gas	
Penn Shale	12,046		
Strawn	12,786	Will Not Penetrate	
Middle Wolfcamp	10,711	Target Zone	
Pilot Hole TD	12,200		

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	750	13.375"	54.5	J55	STC	3.184	1.748	16.856
12.25"	0	3300	9.625"	36	J55	LTC	1.294	0.719	3.813
8.75"	0	10,350	7"	29	HCP110	LTC	1.878	1.940	3.095
6.125"	9850	14,959	4.5"	13.5	HCP110	BTC	2.105	2.448	2.918
				BLM Minimum Safety Factor			1.125	1.0	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations.
- Explanation for SF's below BLM's minimum standards:
  - 9-5/8" Burst SF @ 0.719 – used BLM's frac gradiant scenario to qualify. 3520 psi/3300'=1.06>0.7

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Is casing API approved? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification. See assumptions above table.	N
Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Csg	# sx	Density ppg	Yield ft3/sx	H_20 gal/sx	500# Comp. Strength (hours)	Slurry Description
Sfc	350	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 2% CaCl2
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Intrmd 1	950	13.5	1.75	9.2	15	Lead: Class C + 4% Gel
	250	14.8	1.34	6.4	6	Tail: Class C + 2% CaCl2
Intrmd 2	500	10.2	3.50	22.0	72	Lead:Tuned Light H Blend (FR, Retarder, FL adds as needed)
	200	16.4	1.10	4.3	12	Tail: Class H (FR, Retarder, FL adds as needed)
Prod	300	14.4	1.25	5.7	17	Lead:50:50:2 H Blend (FR, Retarder, FL adds as needed)
	300	14.4	1.25	5.7	17	Tail:50:50:2 H Blend (FR, FL adds as needed)

Casing String	TOC	% Excess
Surface	0'	50% on OH volumes
Intermediate 1	0'	35% on OH volumes
Intermediate 2	0'	35% on OH volumes
Production	9850' (@ Top of Liner)	35% on OH volumes

PHTD = 12,200'
KOP = 10,350'

will need more cement. This is not adequate

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type
10,350	11,300	10	225	17.2	0.99	5	Class H
11,300	12,200	10	225	17.2	0.99	5	Class H

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.

BOP installed and tested before drilling which hole?	Size?	System Rated WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	X	50% of working pressure
			Blind Ram		WP
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	11"	5M	Annular	X	50% testing pressure
			Blind Ram	X	WP
			Pipe Ram	X	
			Double Ram		
			Other*		
6-1/8"	11"	5M	Annular	X	50% testing pressure
			Blind Ram	X	WP
			Pipe Ram	X	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic & Description.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.6-8.8	28-34	N/C
Surf csg	Int 1 shoe	Saturated Brine	10.0-10.2	28-34	N/C
Int 1 shoe	Int 2 shoe	Cut Brine	8.7-9.3	28-34	N/C
Int 2 shoe	PHTD	Cut Brine	8.7-9.3	28-34	N/C
Int 2 shoe/KOP	TMD	OBM	11.0 – 14.0	40-60	10-50

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Weighted OBM system will be used in the curve and lateral for shale stability, not for formation over pressure.

What will be used to monitor the loss or gain of fluid?	Pason PVT

6. Logging and Testing Procedures

Logging, Coring and Testing.	
X	Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Additional logs planned		Interval
	Resistivity	
	Density	
	CBL	
	Mud log	
	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	5773 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe:
No abnormal drilling conditions are expected to occur.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
	H2S is present
X	H2S Contingency Plan Attached

8. Other Facets of Operation

Is this a walking operation? No
Will be pre-setting casing? No

Attachments:

- BOP & Choke Schematics
- Flex hose spec sheet & test chart
- Directional Plan

CONCHO

COG Production LLC
Project: Eddy County, NM
Site: Patron 23 Federal
Well: #4H
Wellbore: OH
Plan: Plan #1 (#4H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10228.6	0.00	0.00	10228.6	0.0	0.0	0.00	0.00	0.0	
3	10977.9	89.93	179.85	10706.0	-476.9	1.2	12.00	179.85	476.9	
4	14959.0	89.93	179.86	10711.0	-4457.9	11.6	0.00	0.00	4457.9	PBHL (P23F #4H/OH)

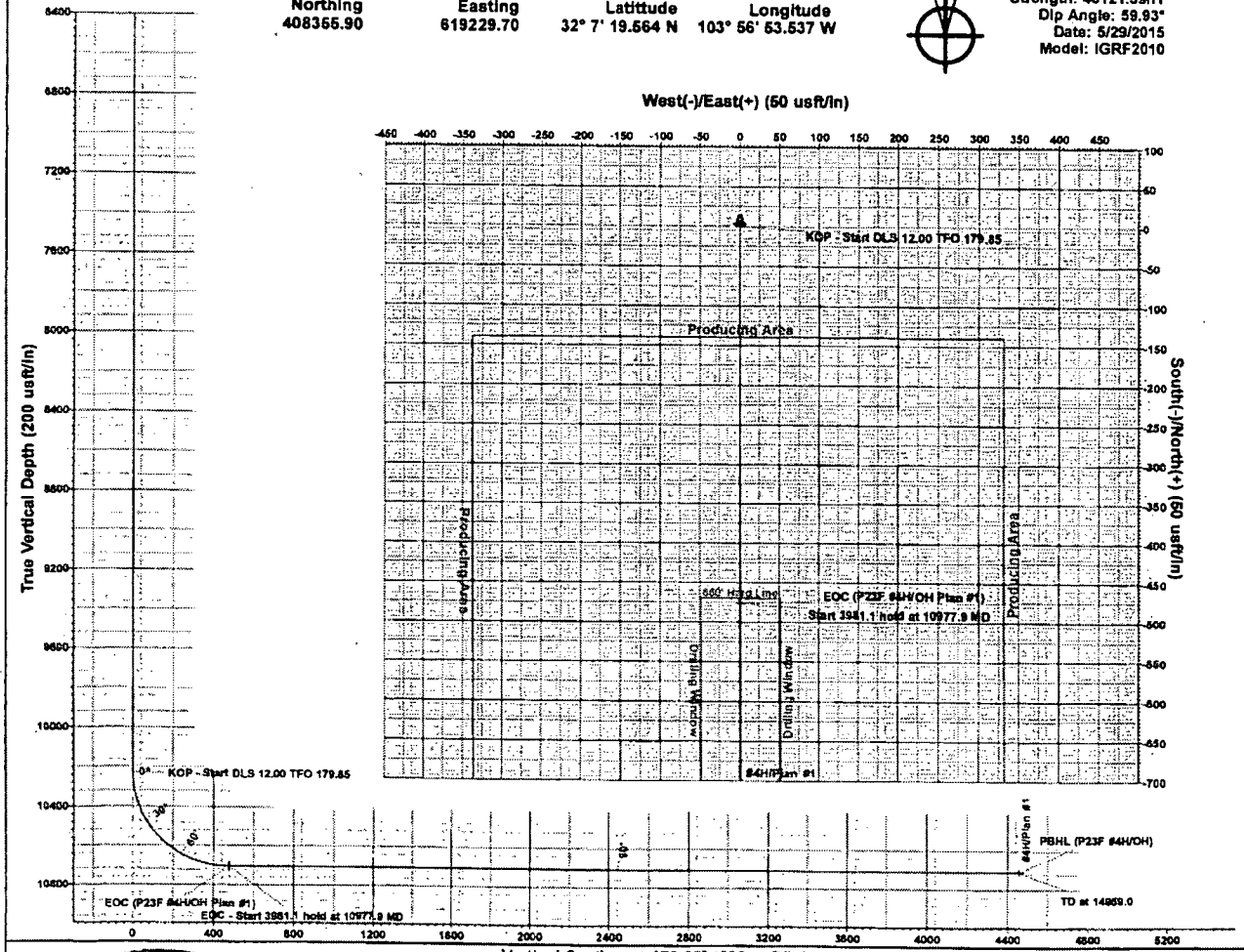
WELL DETAILS: #4H

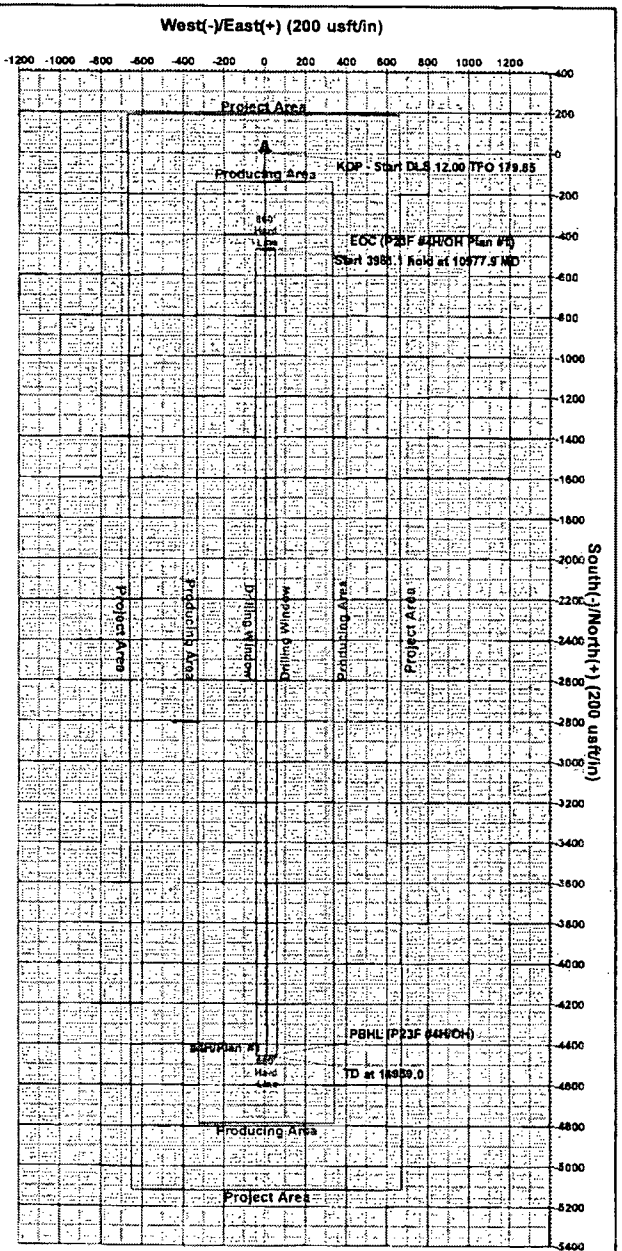
Ground Elevation:: 3141.0
RKB Elevation: KB @ 3166.0usft (Latshaw 44)
Rig Name: Latshaw 44

Northing	Easting	Latitude	Longitude
408355.90	619229.70	32° 7' 19.564 N	103° 56' 53.537 W

Azimuths to Grid North
True North: -0.20°
Magnetic North: 7.08°

Magnetic Field
Strength: 48121.5snT
Dip Angle: 59.93°
Date: 5/29/2015
Model: IGRF2010





Terra Directional Services
322 Spring Hill Drive, Suite A100. Spring,Texas 77386
432.425.7532

Plan: Plan #1 (#4H/OH)
Created By: Well Planner Date: 13:38, May 29 2015

PROJECT DETAILS: Eddy County, NM
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
Local North: Grid

CONCHO

COG Production LLC

Eddy County, NM
Patron 23 Federal
#4H

OH

Plan: Plan #1

Standard Planning Report

29 May, 2015

TDS
TERRA DIRECTIONAL SERVICES, L.L.C.

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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' 19.564 N
From:	Map	**Easting:**	619,229.70 usft	**Longitude:**	103° 56' 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' 19.564 N
	+E/-W	0.0 usft	**Easting:**	619,229.70 usft	**Longitude:**	103° 56' 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	10,706.0	-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)

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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)
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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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	-9.7	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	10,485.6	-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

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Site Patron 23 Federal
Company:	COG Production LLC	**TVD Reference:**	KB @ 3166.0usft (Latshaw 44)
Project:	Eddy County, NM	**MD Reference:**	KB @ 3166.0usft (Latshaw 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	-2,999.0	7.7	2,999.0	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									

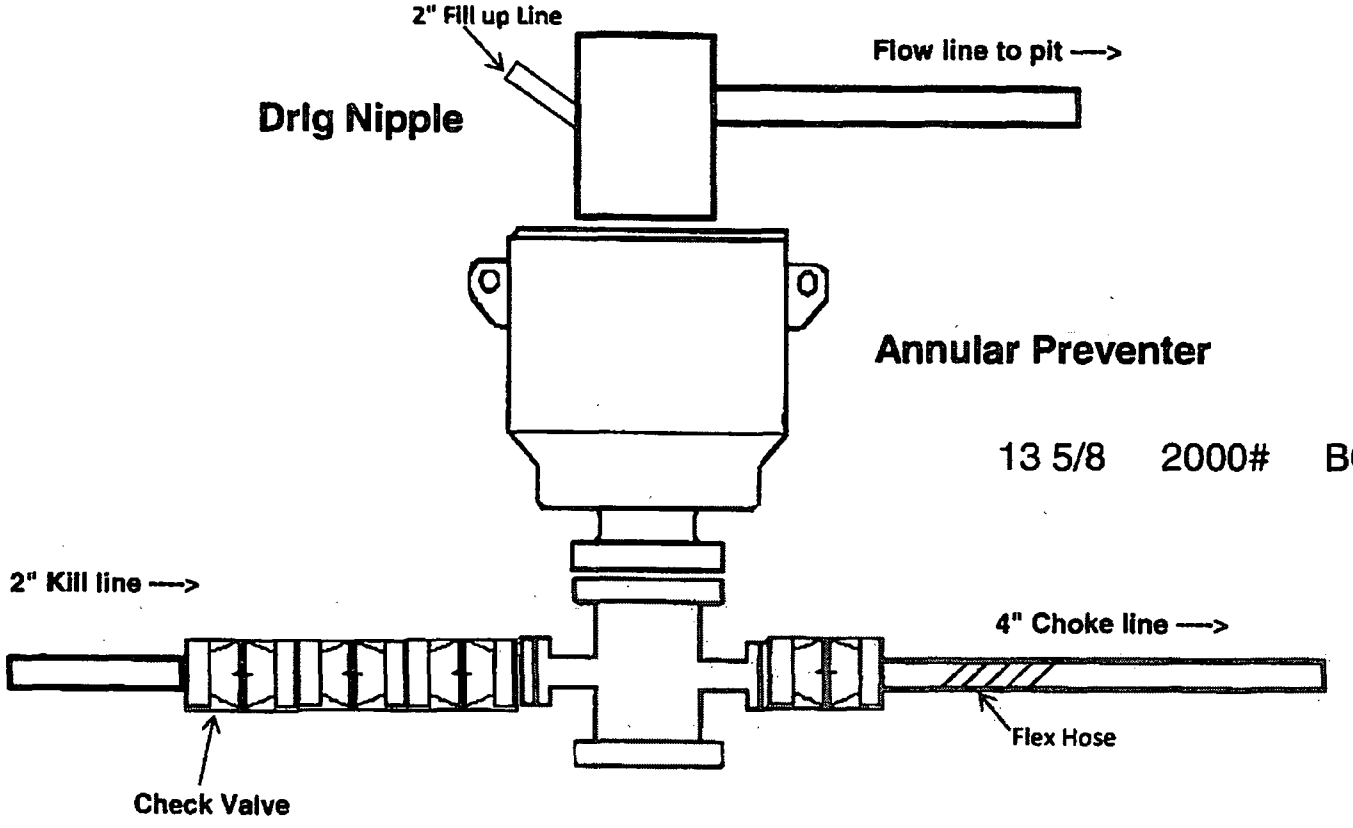
Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Drilling Window/Hard Lir - 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)	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
EOC (P23F #4H/OH Pla - plan hits target center - Point	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
PBHL (P23F #4H/OH) - plan hits target center - Point	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

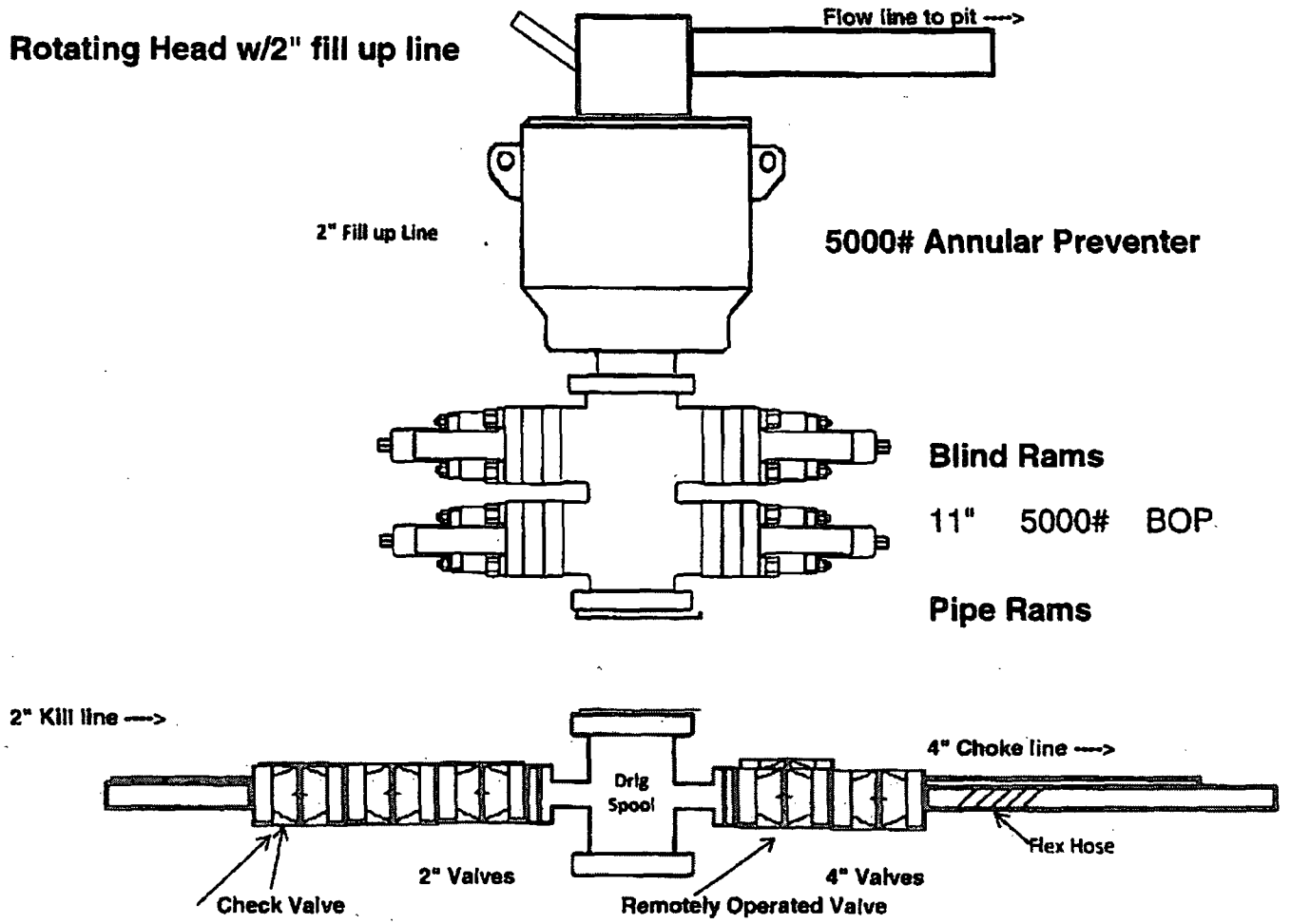
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +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

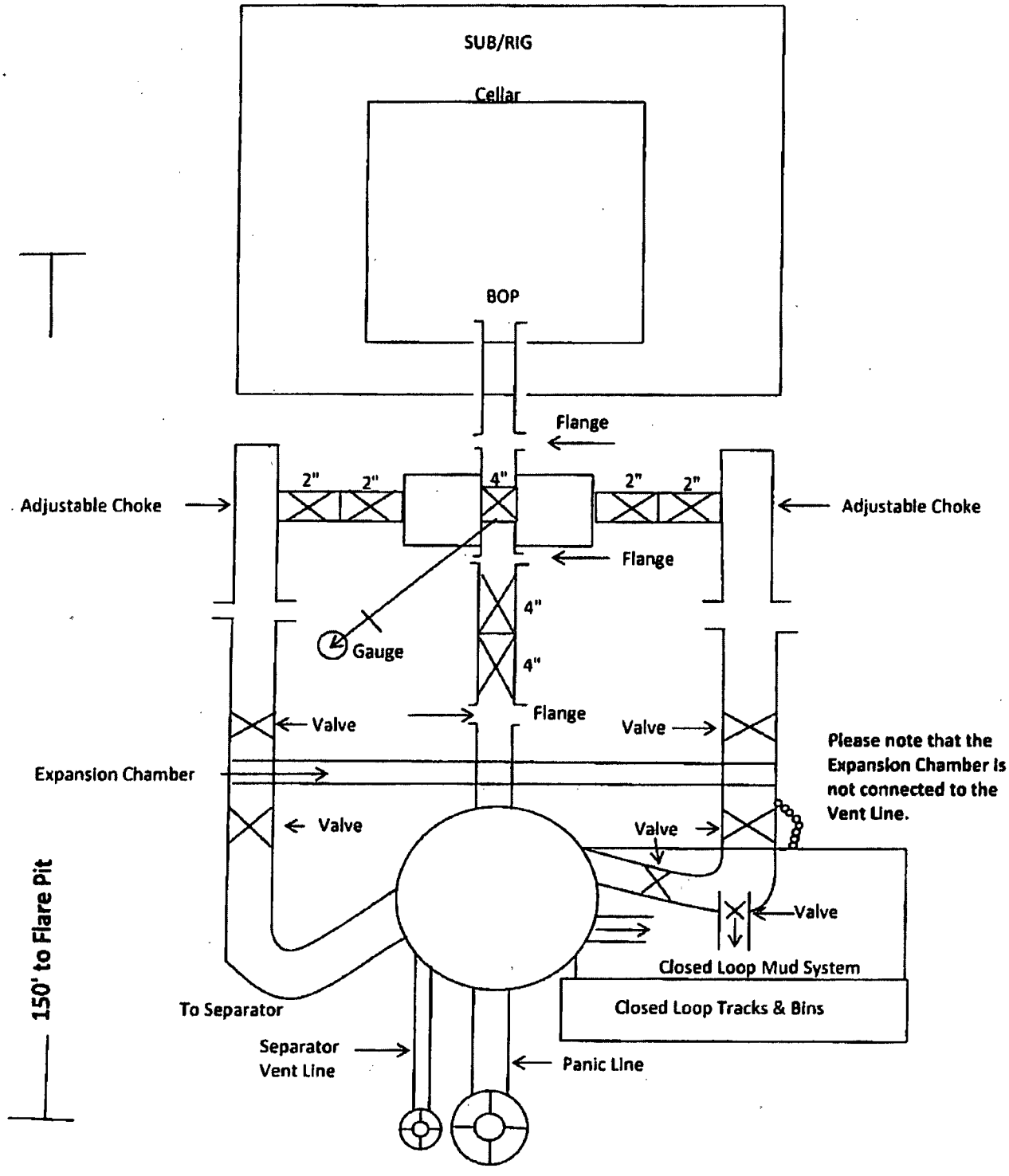
2,000 psi BOP Schematic



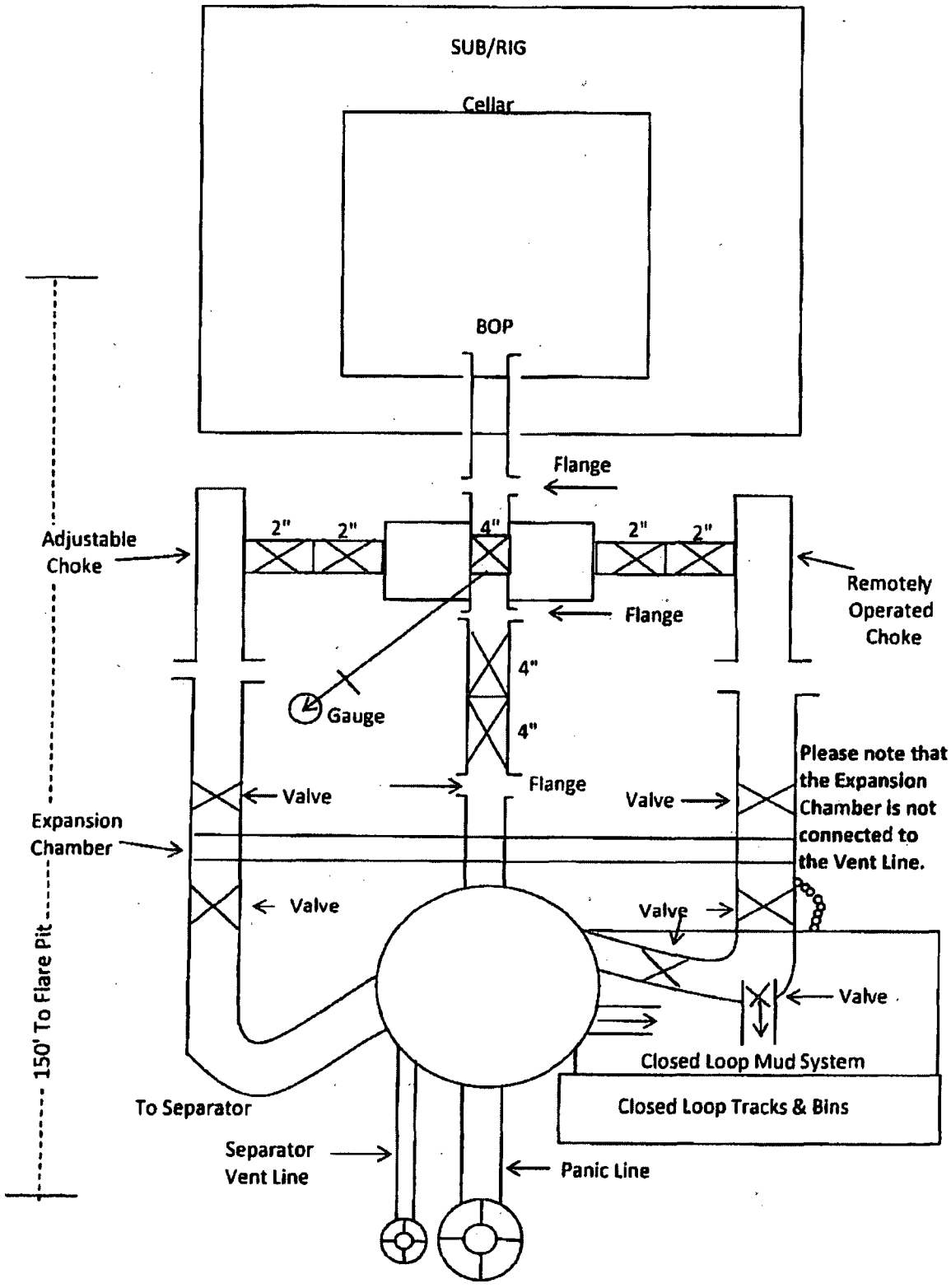
5,000 psi BOP Schematic



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

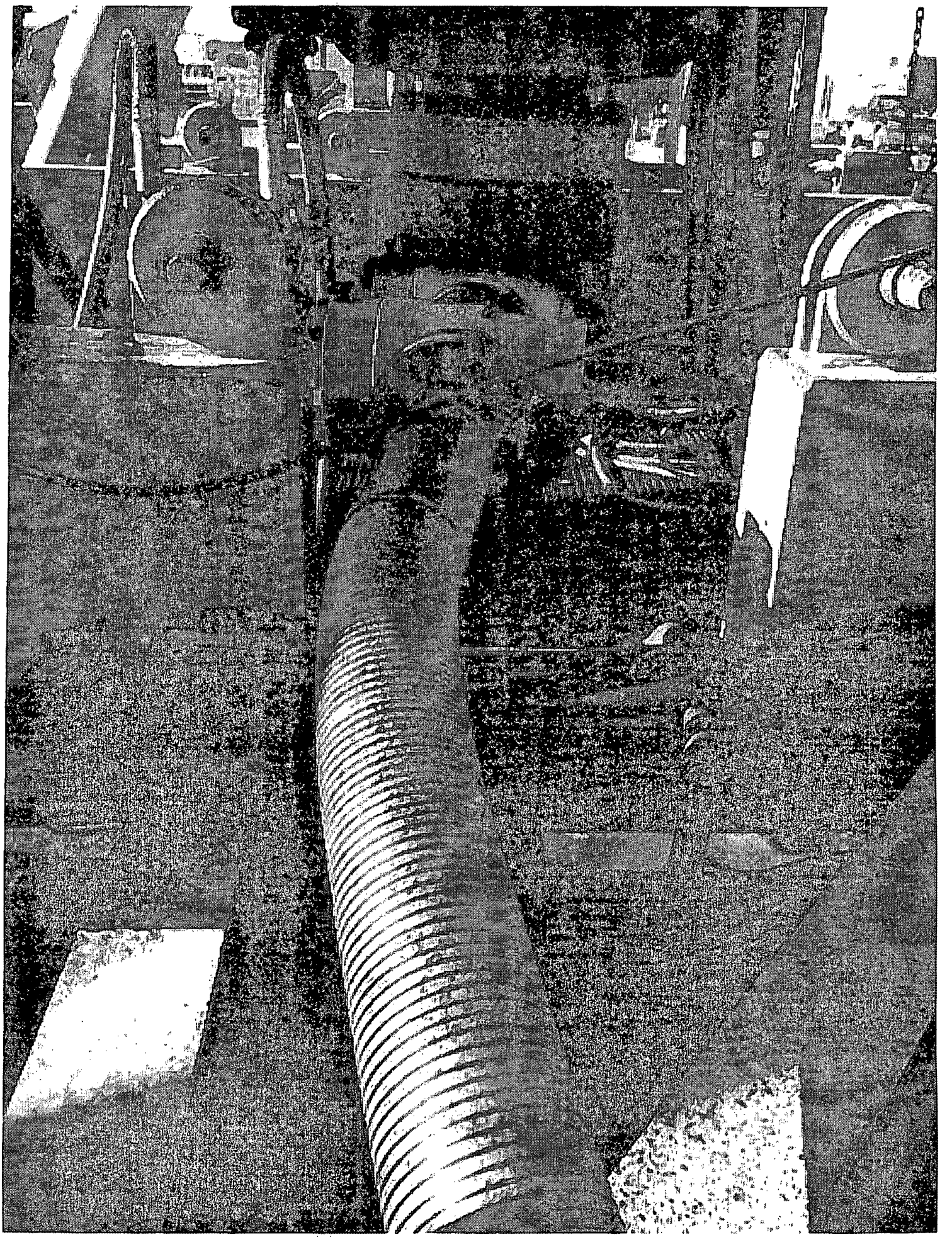
Hose Assembly Type:	**Choke & Kill**		
Assembly Serial #	**292614-2**	*Hose Lot # and Date Code*	**11794-10/14**
Hose Working Pressure (psi)	**10000**	*Test Pressure (psi)*	**15000**

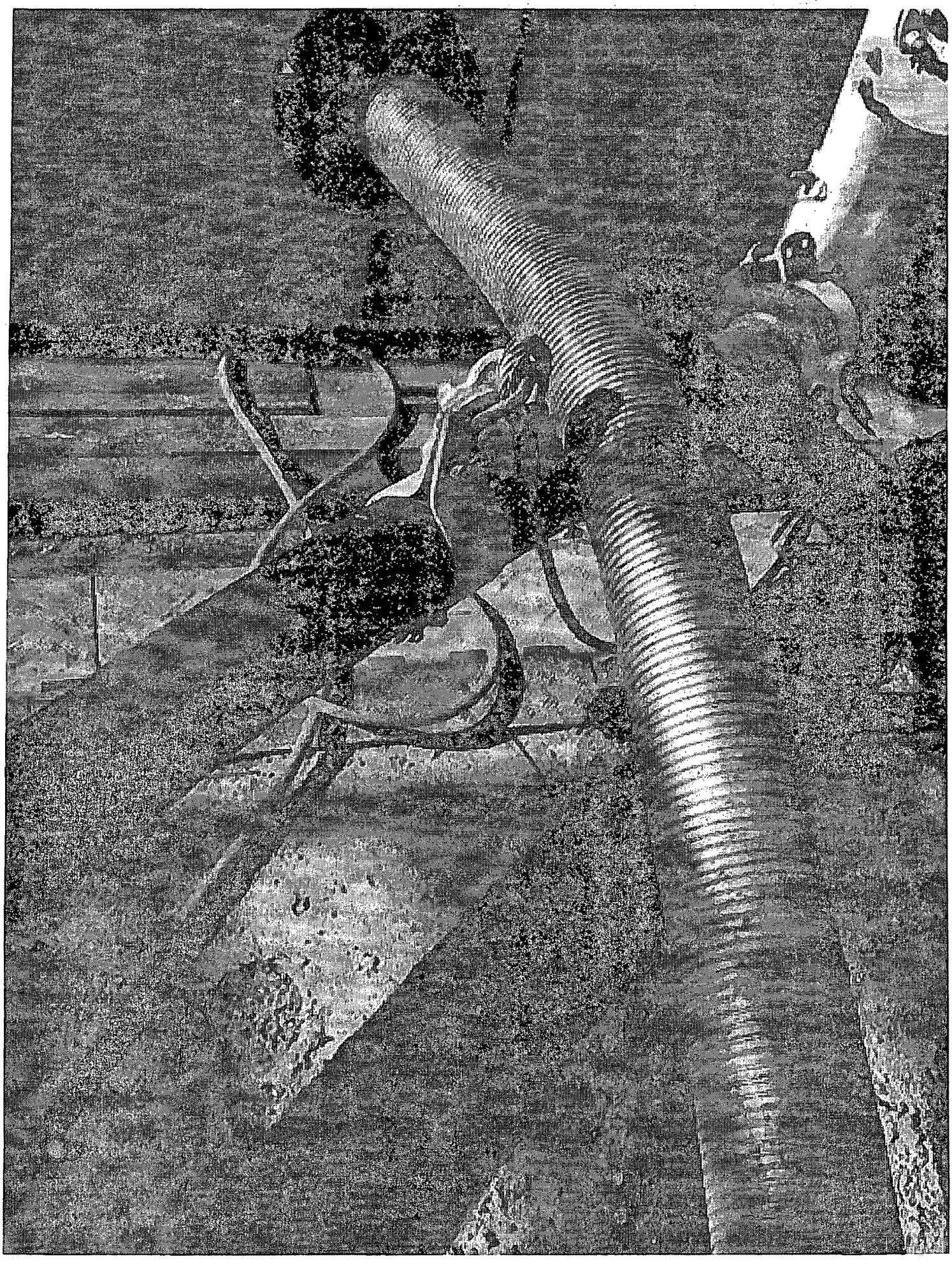
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

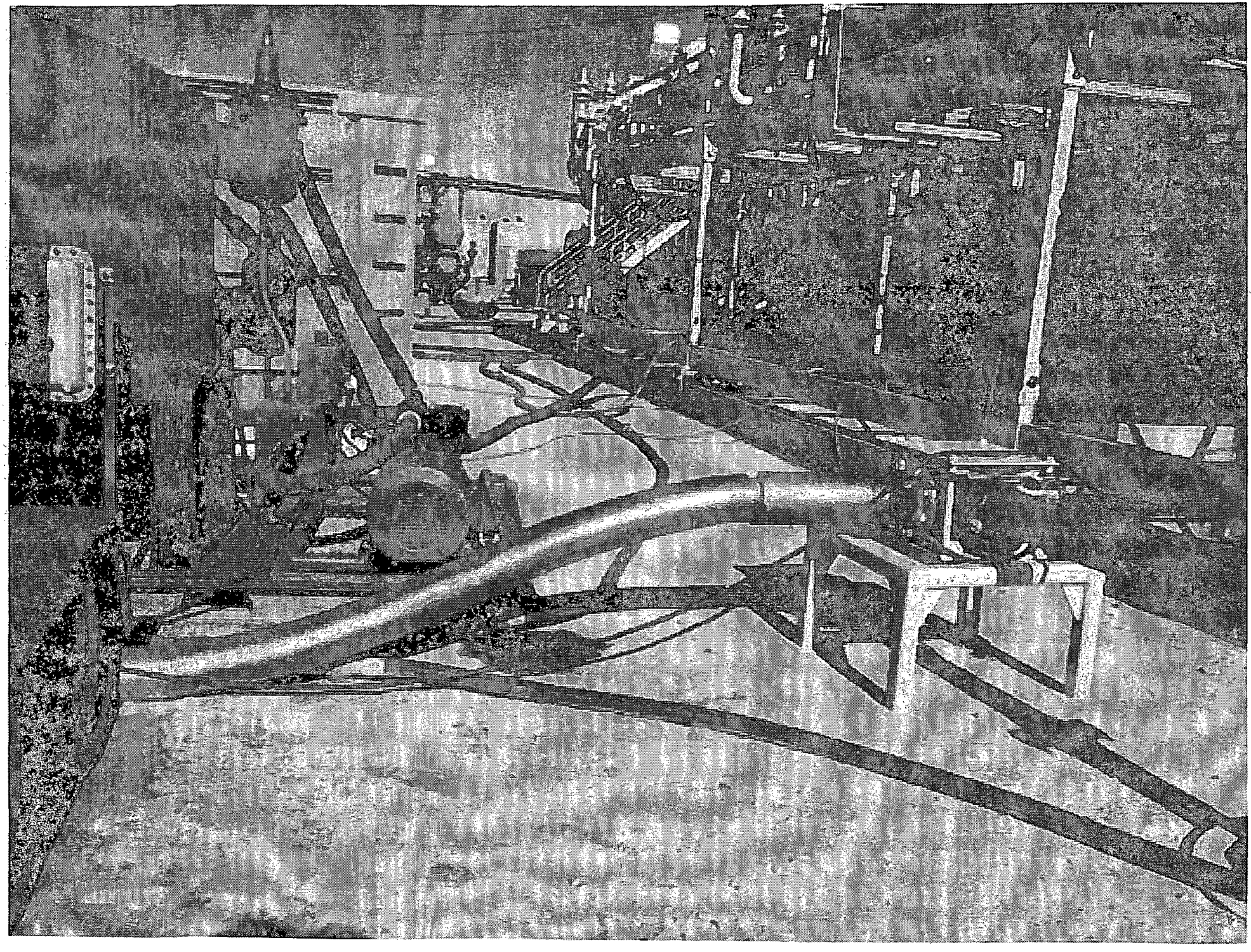
Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

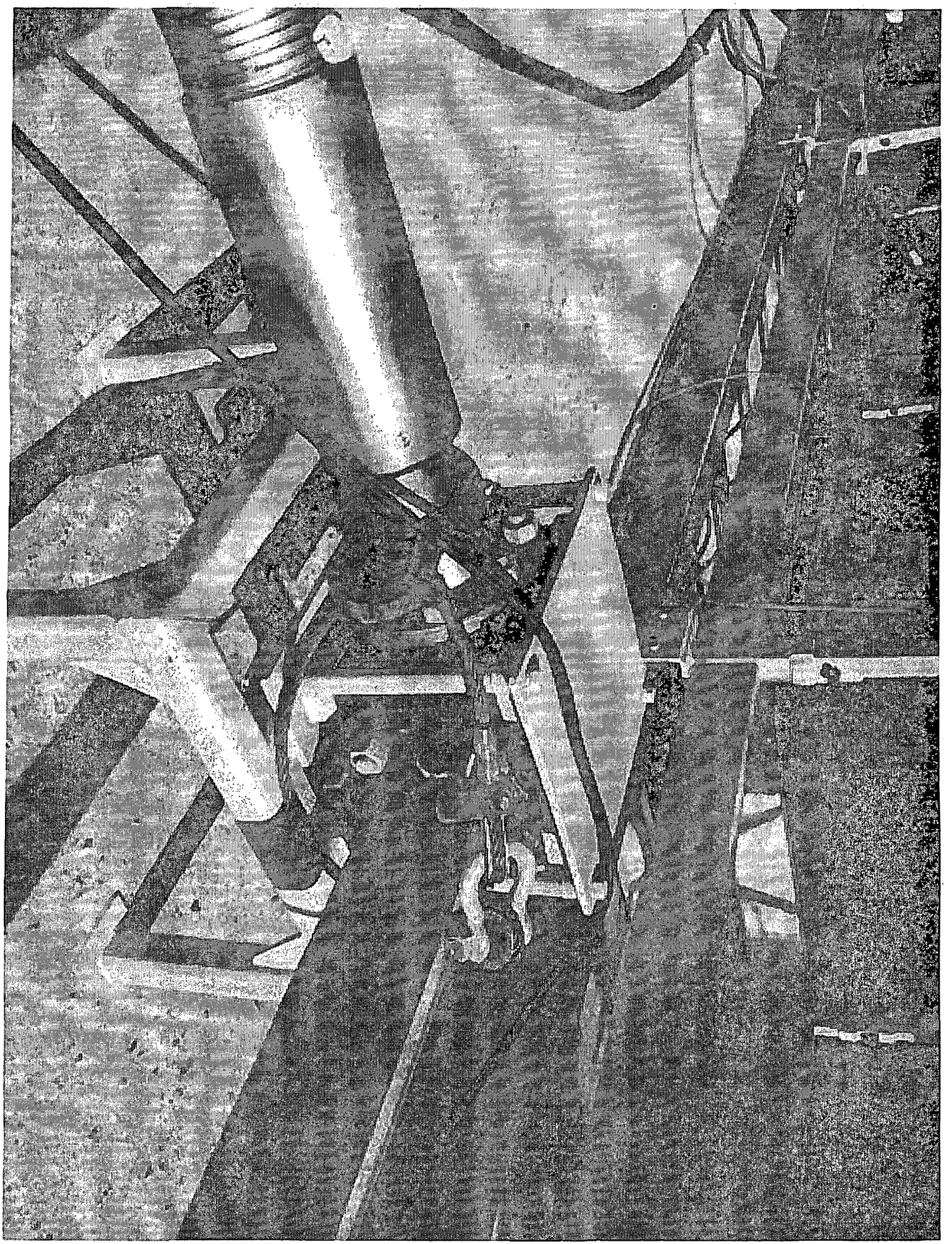
Comments:

Approved By	*Date*
	2/10/2015










ARNUM

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