Form 3160-3
(March 2012)

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No. NMNM118113

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No. PUDGE FEDERAL 21H 32562

2. Name of Operator COG OPERATING LLC 229137

9. API Well No. 30-015-45045

3a. Address 600 West Illinois Ave Midland TX 79701

3b. Phone No. (include area code) (432)683-7443

10. Field and Pool, or Exploratory PURPLE SAGE / WOLFCAMP GAS

4. Location of Well (Report location clearly and in accordance with any State requirements.*)

At surface SESE / 615 FSL / 760 FEL / LAT 32.080635 / LONG -104.017483

At proposed prod. zone SESE / 200 FSL / 330 FEL / LAT 32.064916 / LONG -104.016036

11. Sec., T. R. M. or Blk. and Survey or Area SEC 31 / T25S / R29E / NMP

14. Distance in miles and direction from nearest town or post office* 15 miles

12. County or Parish EDDY

13. State NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 200 feet

16. No. of acres in lease 719.45

17. Spacing Unit dedicated to this well 320

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 110 feet

19. Proposed Depth 10808 feet / 16413 feet

20. BLM/BIA Bond No. on file FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.) 2939 feet

22. Approximate date work will start* 05/01/2017

23. Estimated duration 30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25. Signature	Name (Printed/Typed)	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6945	04/10/2017

Title: Regulatory Analyst

Approved by (Signature)	Name (Printed/Typed)	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	06/12/2018

Title	Office
Supervisor Multiple Resources	CARLSBAD

Application approval 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.
Conditions of approval, if any, are attached.

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.

(Continued on page 2)

*(Instructions on page 2)

APPROVED WITH CONDITIONS

Approval Date: 06/12/2018

NM OIL CONSERVATION
ARTESIA DISTRICT
JUN 28 2018
RECEIVED

RWP 6-29-18

CONCHO

Pudge Fed #21H
Water Transfer Route

Date: 4/10/2017
Author: Whitnie McDonald
State: New Mexico
County: Eddy

Disclaimer: This is not a legal survey document

Map Legend

Route

N
W E
S

0 0.25 0.5 1 1.5 2 Miles

CONCHO

Pudge Fed #21H
To Malaga I Brine

Date 4/10/2017
Author Whytnie McDonald
State New Mexico
County Eddy

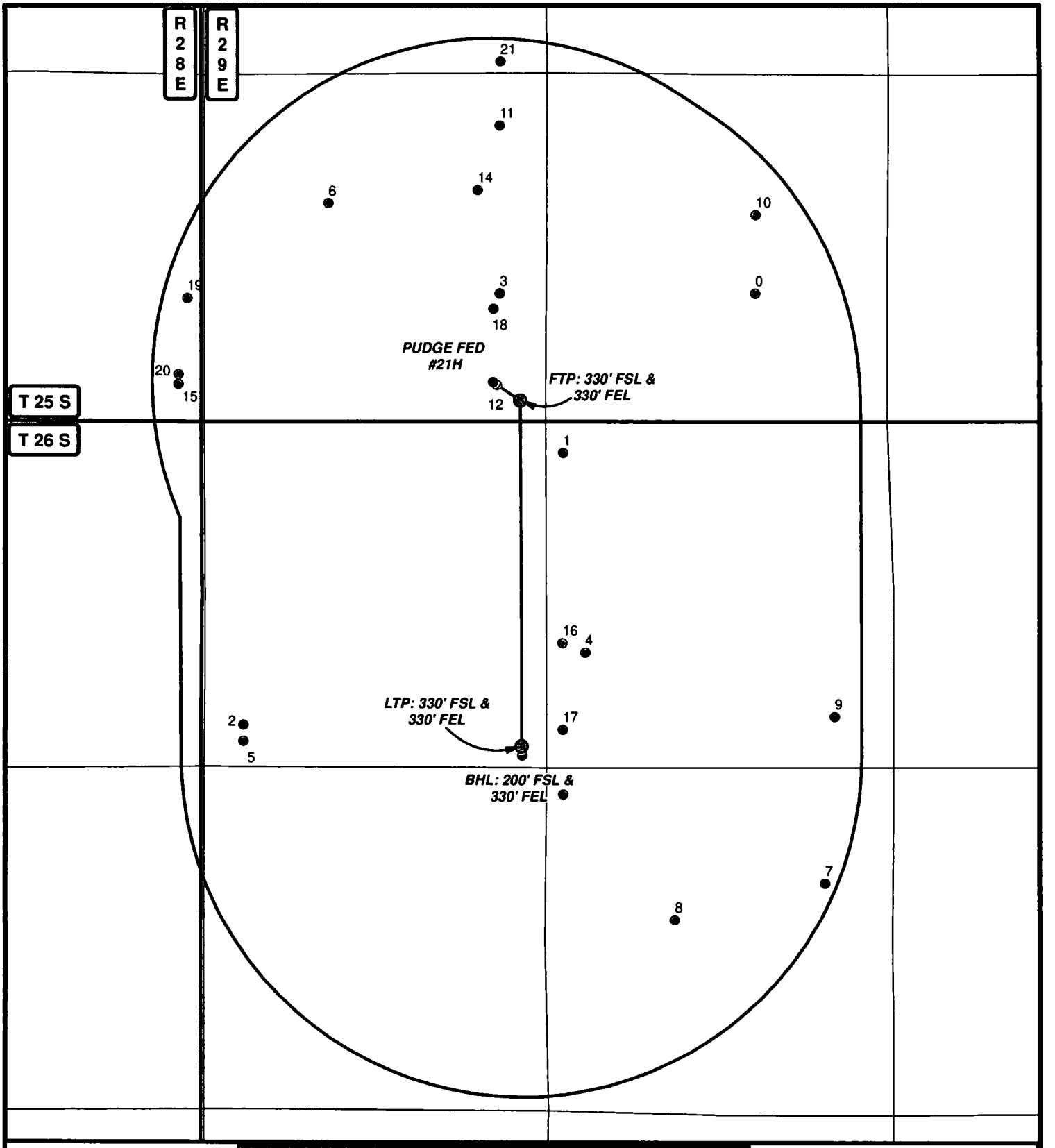
Disclaimer: This is not a legal survey document

Map Legend

Route

0 0.5 1 2 3 4 Miles

N
W E
S



LEGEND

- WELL
- BOTTOMHOLE
- WELLS WITHIN 1 MI.
- 1 MI. BUFFER

PUDGE FEDERAL #21H

SEC: 31	TWP: 25 S.	RGE: 29 E.	ELEVATION: 2938.6'
STATE: NEW MEXICO		COUNTY: EDDY	615' FSL & 760' FEL
W.O. # 17-394		LEASE: PUDGE FED	SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.15 0.3 0.6 Miles

1 IN = 2,333 FT

LOCATION MAP | 1 MILE MAP | 04/03/2017 | S.A.

N

CONCHO

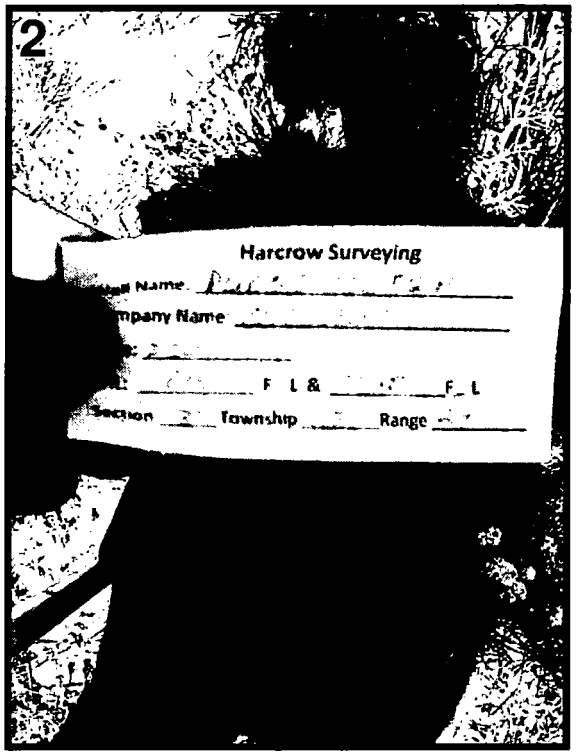
COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
c.harcrow@harcrowsurveying.com

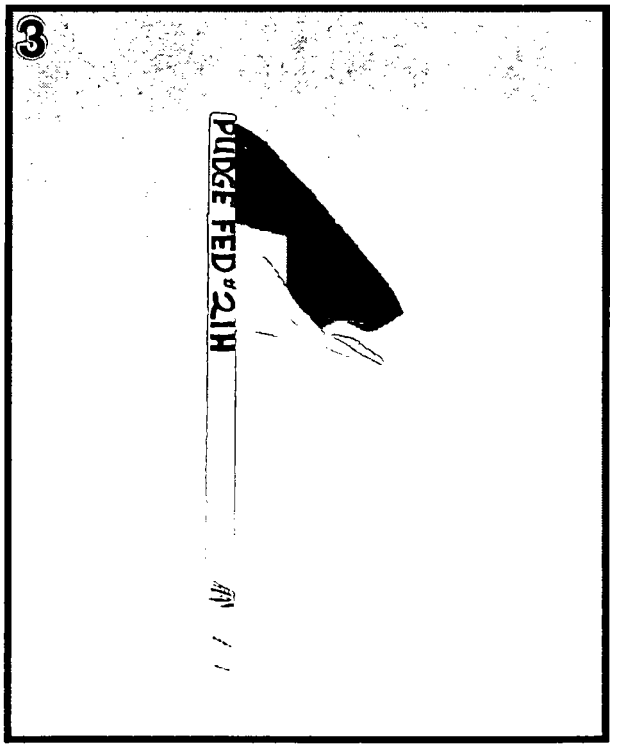
1. LOCATION STAKE
2. PILL BOTTLE SHEET
3. LOCATION STAKE NAME

1

2

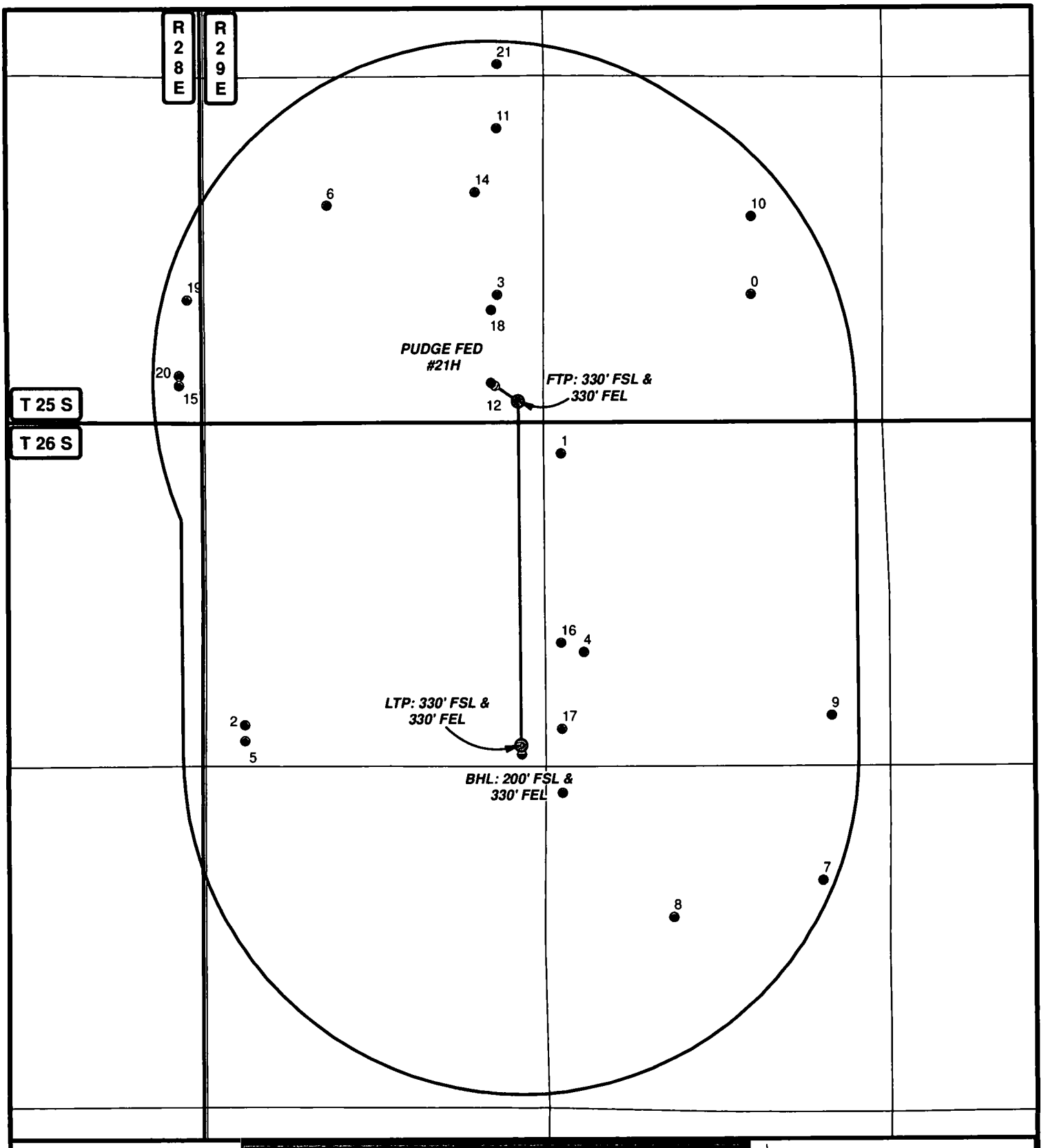


3



CONCHO COG OPERATING, LLC	FUDGE FEDERAL #21H		
SEC: 31	TWP: 25 S.	RGE: 29 E.	ELEVATION: 2938.6'
STATE: NEW MEXICO		COUNTY: EDDY	615' FSL & 760' FEL
W.O. #17-394		LEASE: PUDGE FED	SURVEY: N.M.P.M
PHOTO SHEET		04/03/2017	S.A.

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
c.harcrow@harcrowsurveying.com



LEGEND

- WELL
- BOTTOMHOLE
- WELLS WITHIN 1 MI.
- 1 MI. BUFFER

PUDGE FEDERAL #21H

SEC: 31	TWP: 25 S.	RGE: 29 E.	ELEVATION: 2938.6'
STATE: NEW MEXICO		COUNTY: EDDY	615' FSL & 760' FEL
W.O. # 17-394		LEASE: PUDGE FED	SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.15 0.3 0.6 Miles

1 IN = 2,333 FT

LOCATION MAP | 1 MILE MAP | 04/03/2017 | S.A.

N

CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
c.harcrow@harcrowsurveying.com

PUDGE FEDERAL #21H 1 MILE DATA

FID	Shape *	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	COMPL_STAT
0	Point	D B SCULLY	SUPERIOR ST 001	32.084361	-104.004324	3001503721	32	25.0S	29E	1980	S	1980	E	Plugged
1	Point	SOUTHERN CALIFORNIA PETROLEUM CORP	SCULLY FED 001	32.077654	-104.013954	3001503726	5	26.0S	29E	460	N	330	W	Plugged
2	Point	BENNETT J GLE	ASHLAND FED 001	32.066196	-104.029967	3001503727	6	26.0S	29E	660	S	660	W	Plugged
3	Point	DUNCAN DRLG CO	SLATER 001	32.084363	-104.017134	3001520156	31	25.0S	29E	1980	S	660	E	Plugged
4	Point	DINERO OPERATING CO	RENAI FINLEY 001	32.069233	-104.01286	3001523909	5	26.0S	29E	1780	S	660	W	Plugged
5	Point	POGO PRODUCING CO	FEDERAL 35 001	32.065509	-104.029972	3001524124	6	26.0S	29E	410	S	660	W	Plugged
6	Point	MAX WILSON INC	EXXON FEDERAL 001	32.088136	-104.025694	3001525563	31	25.0S	29E	1980	N	1980	W	Plugged
7	Point	MARBOB ENERGY CORP	WEST BRUSHY 8 FEDERAL 2 SWD 002	32.059529	-104.000837	3001531866	8	26.0S	29E	1750	N	990	E	Plugged
8	Point	BP AMERICA PRODUCTION COMPANY	WEST BRUSHY 8 FEDERAL 004	32.05799	-104.008378	3001531868	8	26.0S	29E	2310	N	2060	W	
9	Point	COG OPERATING LLC	WEST BRUSHY 5 FEDERAL SWD 005	32.066539	-104.000346	3001531869	5	26.0S	29E	800	S	850	E	Plugged
10	Point	EOG Y RESOURCES, INC.	SHOCKER 32 STATE 004G	32.087655	-104.004304	3001536224	32	25.0S	29E	1981	N	1981	E	New (Not drilled or compl)
11	Point	COG PRODUCTION, LLC	COOPER 31 FEDERAL 001H	32.091441	-104.017133	3001536282	31	25.0S	29E	660	N	660	E	Active
12	Point	COG PRODUCTION, LLC	COOPER 31 FEDERAL 002H	32.080504	-104.017276	3001536755	31	25.0S	29E	660	S	660	E	Plugged
13	Point	COG OPERATING LLC	BOYLES FEE COM 001	32.063278	-104.013957	3001537394	8	26.0S	29E	330	N	330	W	Plugged
14	Point	COG PRODUCTION, LLC	COOPER 31 FEDERAL 003H	32.088712	-104.01824	3001537749	31	25.0S	29E	1650	N	990	E	New (Not drilled or compl)
15	Point	EOG Y RESOURCES, INC.	TROJANS BQT STATE 001H	32.080533	-104.033228	3001538261	36	25.0S	28E	660	S	330	E	New (Not drilled or compl)
16	Point	COG OPERATING LLC	HAMBONE FEE COM 002H	32.069628	-104.014011	3001538318	5	26.0S	29E	1980	S	330	W	Plugged
17	Point	COG OPERATING LLC	HAMBONE FEE COM 001H	32.065999	-104.01398	3001538980	5	26.0S	29E	660	S	330	W	Plugged
18	Point	COG PRODUCTION, LLC	COOPER 31 FEDERAL 004H	32.083721	-104.017461	3001539343	31	25.0S	29E	1830	S	730	E	New (Not drilled or compl)
19	Point	EOG Y RESOURCES, INC.	TROJANS BQT STATE 002H	32.084162	-104.032791	3001542053	36	25.0S	28E	1980	S	200	E	New (Not drilled or compl)
20	Point	EOG Y RESOURCES, INC.	TROJANS BQT STATE 003H	32.080946	-104.033226	3001542255	36	25.0S	28E	810	S	330	E	New (Not drilled or compl)
21	Point	EOG Y RESOURCES, INC.	THRILLER BWL FEDERAL 001H	32.094162	-104.017098	3001543909	30	25.0S	29E	330	S	660	E	New (Not drilled or compl)

COG Production LLC - PUDGE FEDERAL 21H

1. Geologic Formations

TVD of target	10,808' EOL	Pilot hole depth	NA
MD at TD:	16,413'	Deepest expected fresh water:	207'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	849	Water	
Top of Salt	1031	Salt	
Base of Salt	2679	Salt	
Lamar	2779	Salt Water	
Bell Canyon	2824	Salt Water	
Cherry Canyon	3669	Oil/Gas	
Brushy Canyon	4950	Oil/Gas	
Bone Spring Lime	6515	Oil/Gas	
U. Avalon Shale	6838	Oil/Gas	
L. Avalon Shale	7088	Oil/Gas	
1st Bone Spring Sand	7442	Oil/Gas	
2nd Bone Spring Sand	8283	Oil/Gas	
3rd Bone Spring Sand	9344	Oil/Gas	
Wolfcamp	9707	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body
13.5"	0	875	10.75"	45.5	N80	BTC	6.17	1.51	26.12
9.875"	0	9370	7.875"	29.7	P110	BTC	1.62	1.35	3.90
6.75"	0	8870	5.5"	23	P110	BTC	2.35	2.48	3.75
6.75"	8870	16,413	5"	18	P110	BTC	2.35	2.48	3.75
			BLM Minimum Safety Factor				1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Surface burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface and
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

The 5" casing will be run back 500' into the intermediate casing to ensure the coupling OD clearance is greater than .422" for the cement bond tie in.

COG Production LLC - PUDGE FEDERAL 21H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? 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 (loading assumptions, casing design criteria).	Y
Will the intermediate 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

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	90	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl2
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter.	750	10.3	3.6	21.48	16	Tuned Light Blend
	250	16.4	1.08	4.32	8	Tail: Class H
Prod	250	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	750	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results
Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1st Intermediate	0'	50%
Production	8,870'	35% OH in Lateral (KOP to EOL)

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?	Min. Required WP	Type	x	Tested to:
9-7/8"	13-5/8"	3M	Annular	x	3000 psi
			Blind Ram		3M
			Pipe Ram		
			Double Ram		
			Other*		
6-3/4"	13-5/8"	5M	Annular	x	50% testing pressure
			Blind Ram	x	5M
			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.

X	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.
	N 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.

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	9-5/8" Int shoe	Brine Diesel Emulsion	8.4 - 9	28-34	N/C
7-5/8" Int shoe	Lateral TD	OBM	9.6 - 11	35-45	<20

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

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

6. Logging and Testing Procedures

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

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	6185 psi at 10808' TVD
Abnormal Temperature	NO 165 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

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.	
N	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

N	Is it a walking operation?
N	Is casing pre-set?

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

CONCHO

COG PRODUCTION LLC

EDDY COUNTY, NM
ATLAS
PUDGE FEDERAL #21H

OWB

Plan: PWP0

Survey Report - Geographic

06 April, 2017

CONCHO

COG PRODUCTION LLC

Survey Report - Geographic

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well PUDGE FEDERAL #21H
Project:	EDDY COUNTY, NM	**TVD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Site:	ATLAS	**MD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Well:	PUDGE FEDERAL #21H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**Database:**	EDM_Users

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	ATLAS				
Site Position:		**Northing:**	371,480.80 usft	**Latitude:**	32° 1' 15.933 N
From:	Map	**Easting:**	573,599.60 usft	**Longitude:**	104° 5' 45.086 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.13 °

Well	PUDGE FEDERAL #21H				
Well Position	**+N/-S**	0.0 usft	**Northing:**	393,157.50 usf	**Latitude:** 32° 4' 49.839 N
	+E/-W	0.0 usft	**Easting:**	597,976.80 usf	**Longitude:** 104° 1' 1.192 W
Position Uncertainty		3.0 usft	**Wellhead Elevation:**	usf	**Ground Level:** 2,938.6 usf

Wellbore	OWB			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	WMM2015	4/5/2017	7.19	59.85	47,817.93607999

Design	PWP0				
Audit Notes:					
Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	175.35	

Survey Tool Program **Date** 4/5/2017

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
0.0	16,413.2	PWP0 (OWB)	MWD	OWSG MWD - Standard

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
100.0	0.00	0.00	100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
200.0	0.00	0.00	200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
300.0	0.00	0.00	300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
400.0	0.00	0.00	400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
500.0	0.00	0.00	500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
600.0	0.00	0.00	600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
700.0	0.00	0.00	700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
800.0	0.00	0.00	800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
900.0	0.00	0.00	900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well PUDGE FEDERAL #21H
Project:	EDDY COUNTY, NM	**TVD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Site:	ATLAS	**MD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Well:	PUDGE FEDERAL #21H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**Database:**	EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,200.0	0.00	0.00	1,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,300.0	0.00	0.00	5,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,500.0	0.00	0.00	5,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,600.0	0.00	0.00	6,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well PUDGE FEDERAL #21H
Project:	EDDY COUNTY, NM	**TVD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Site:	ATLAS	**MD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Well:	PUDGE FEDERAL #21H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**Database:**	EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,700.0	0.00	0.00	6,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,200.0	0.00	0.00	8,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,300.0	0.00	0.00	8,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,400.0	0.00	0.00	8,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,600.0	0.00	0.00	8,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,700.0	0.00	0.00	8,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,800.0	0.00	0.00	8,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
8,900.0	0.00	0.00	8,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,000.0	0.00	0.00	9,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,100.0	0.00	0.00	9,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,200.0	0.00	0.00	9,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,300.0	0.00	0.00	9,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,400.0	0.00	0.00	9,400.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,500.0	0.00	0.00	9,500.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,600.0	0.00	0.00	9,600.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,700.0	0.00	0.00	9,700.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,800.0	0.00	0.00	9,800.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
9,900.0	0.00	0.00	9,900.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,000.0	0.00	0.00	10,000.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,100.0	0.00	0.00	10,100.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,200.0	0.00	0.00	10,200.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,300.0	0.00	0.00	10,300.0	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,324.5	0.00	0.00	10,324.5	0.0	0.0	393,157.50	597,976.80	32° 4' 49.839 N	104° 1' 1.192 W
10,400.0	9.06	149.80	10,399.7	-5.1	3.0	393,152.35	597,979.80	32° 4' 49.788 N	104° 1' 1.157 W
10,500.0	21.06	149.80	10,496.1	-27.6	16.0	393,129.94	597,992.84	32° 4' 49.565 N	104° 1' 1.006 W
10,600.0	33.06	149.80	10,585.0	-66.8	38.9	393,090.69	598,015.68	32° 4' 49.176 N	104° 1' 0.742 W
10,700.0	45.06	149.80	10,662.5	-121.2	70.5	393,036.34	598,047.32	32° 4' 48.638 N	104° 1' 0.376 W
10,800.0	57.06	149.80	10,725.2	-188.3	109.6	392,969.24	598,086.37	32° 4' 47.972 N	104° 0' 59.925 W
10,900.0	69.05	149.80	10,770.4	-265.2	154.3	392,892.33	598,131.13	32° 4' 47.210 N	104° 0' 59.407 W
11,000.0	81.05	149.80	10,796.2	-348.5	202.8	392,808.98	598,179.64	32° 4' 46.384 N	104° 0' 58.846 W
11,074.1	89.94	149.80	10,802.0	-412.3	239.9	392,745.24	598,216.74	32° 4' 45.752 N	104° 0' 58.417 W
11,100.0	89.94	150.84	10,802.0	-434.8	252.8	392,722.70	598,229.59	32° 4' 45.528 N	104° 0' 58.268 W
11,200.0	89.94	154.84	10,802.1	-523.8	298.4	392,633.75	598,275.23	32° 4' 44.647 N	104° 0' 57.741 W
11,300.0	89.94	158.84	10,802.2	-615.7	337.8	392,541.83	598,314.56	32° 4' 43.736 N	104° 0' 57.287 W
11,400.0	89.94	162.84	10,802.4	-710.1	370.6	392,447.39	598,347.38	32° 4' 42.800 N	104° 0' 56.909 W
11,500.0	89.94	166.84	10,802.5	-806.6	396.7	392,350.89	598,373.53	32° 4' 41.845 N	104° 0' 56.608 W
11,600.0	89.94	170.84	10,802.6	-904.7	416.1	392,252.80	598,392.88	32° 4' 40.873 N	104° 0' 56.387 W
11,700.0	89.94	174.84	10,802.7	-1,003.9	428.5	392,153.60	598,405.35	32° 4' 39.891 N	104° 0' 56.245 W
11,800.0	89.94	178.84	10,802.8	-1,103.7	434.1	392,053.77	598,410.86	32° 4' 38.903 N	104° 0' 56.184 W
11,819.6	89.94	179.62	10,802.8	-1,123.3	434.3	392,034.19	598,411.12	32° 4' 38.709 N	104° 0' 56.182 W

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well PUDGE FEDERAL #21H
Project:	EDDY COUNTY, NM	**TVD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Site:	ATLAS	**MD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Well:	PUDGE FEDERAL #21H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**Database:**	EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,900.0	89.94	179.62	10,802.9	-1,203.7	434.9	391,953.77	598,411.66	32° 4' 37.913 N	104° 0' 56.179 W
12,000.0	89.94	179.62	10,803.0	-1,303.7	435.5	391,853.78	598,412.32	32° 4' 36.924 N	104° 0' 56.174 W
12,100.0	89.94	179.62	10,803.1	-1,403.7	436.2	391,753.78	598,412.98	32° 4' 35.934 N	104° 0' 56.170 W
12,200.0	89.94	179.62	10,803.3	-1,503.7	436.8	391,653.78	598,413.64	32° 4' 34.945 N	104° 0' 56.166 W
12,300.0	89.94	179.62	10,803.4	-1,603.7	437.5	391,553.78	598,414.30	32° 4' 33.955 N	104° 0' 56.162 W
12,400.0	89.94	179.62	10,803.5	-1,703.7	438.2	391,453.79	598,414.96	32° 4' 32.965 N	104° 0' 56.157 W
12,500.0	89.94	179.62	10,803.6	-1,803.7	438.8	391,353.79	598,415.62	32° 4' 31.976 N	104° 0' 56.153 W
12,600.0	89.94	179.62	10,803.7	-1,903.7	439.5	391,253.79	598,416.29	32° 4' 30.986 N	104° 0' 56.149 W
12,700.0	89.94	179.62	10,803.8	-2,003.7	440.1	391,153.79	598,416.95	32° 4' 29.996 N	104° 0' 56.144 W
12,800.0	89.94	179.62	10,803.9	-2,103.7	440.8	391,053.79	598,417.61	32° 4' 29.007 N	104° 0' 56.140 W
12,900.0	89.94	179.62	10,804.0	-2,203.7	441.5	390,953.80	598,418.27	32° 4' 28.017 N	104° 0' 56.136 W
13,000.0	89.94	179.62	10,804.2	-2,303.7	442.1	390,853.80	598,418.93	32° 4' 27.027 N	104° 0' 56.132 W
13,100.0	89.94	179.62	10,804.3	-2,403.7	442.8	390,753.80	598,419.59	32° 4' 26.038 N	104° 0' 56.127 W
13,200.0	89.94	179.62	10,804.4	-2,503.7	443.5	390,653.80	598,420.25	32° 4' 25.048 N	104° 0' 56.123 W
13,300.0	89.94	179.62	10,804.5	-2,603.7	444.1	390,553.81	598,420.91	32° 4' 24.058 N	104° 0' 56.119 W
13,400.0	89.94	179.62	10,804.6	-2,703.7	444.8	390,453.81	598,421.58	32° 4' 23.069 N	104° 0' 56.115 W
13,500.0	89.94	179.62	10,804.7	-2,803.7	445.4	390,353.81	598,422.24	32° 4' 22.079 N	104° 0' 56.110 W
13,600.0	89.94	179.62	10,804.8	-2,903.7	446.1	390,253.81	598,422.90	32° 4' 21.090 N	104° 0' 56.106 W
13,700.0	89.94	179.62	10,804.9	-3,003.7	446.8	390,153.81	598,423.56	32° 4' 20.100 N	104° 0' 56.102 W
13,800.0	89.94	179.62	10,805.1	-3,103.7	447.4	390,053.82	598,424.22	32° 4' 19.110 N	104° 0' 56.098 W
13,900.0	89.94	179.62	10,805.2	-3,203.7	448.1	389,953.82	598,424.88	32° 4' 18.121 N	104° 0' 56.093 W
14,000.0	89.94	179.62	10,805.3	-3,303.7	448.7	389,853.82	598,425.54	32° 4' 17.131 N	104° 0' 56.089 W
14,100.0	89.94	179.62	10,805.4	-3,403.7	449.4	389,753.82	598,426.21	32° 4' 16.141 N	104° 0' 56.085 W
14,200.0	89.94	179.62	10,805.5	-3,503.7	450.1	389,653.83	598,426.87	32° 4' 15.152 N	104° 0' 56.081 W
14,300.0	89.94	179.62	10,805.6	-3,603.7	450.7	389,553.83	598,427.53	32° 4' 14.162 N	104° 0' 56.076 W
14,400.0	89.94	179.62	10,805.7	-3,703.7	451.4	389,453.83	598,428.19	32° 4' 13.172 N	104° 0' 56.072 W
14,500.0	89.94	179.62	10,805.8	-3,803.7	452.0	389,353.83	598,428.85	32° 4' 12.183 N	104° 0' 56.068 W
14,600.0	89.94	179.62	10,806.0	-3,903.7	452.7	389,253.83	598,429.51	32° 4' 11.193 N	104° 0' 56.063 W
14,700.0	89.94	179.62	10,806.1	-4,003.7	453.4	389,153.84	598,430.17	32° 4' 10.203 N	104° 0' 56.059 W
14,800.0	89.94	179.62	10,806.2	-4,103.7	454.0	389,053.84	598,430.83	32° 4' 9.214 N	104° 0' 56.055 W
14,900.0	89.94	179.62	10,806.3	-4,203.7	454.7	388,953.84	598,431.50	32° 4' 8.224 N	104° 0' 56.051 W
15,000.0	89.94	179.62	10,806.4	-4,303.7	455.4	388,853.84	598,432.16	32° 4' 7.234 N	104° 0' 56.046 W
15,100.0	89.94	179.62	10,806.5	-4,403.7	456.0	388,753.85	598,432.82	32° 4' 6.245 N	104° 0' 56.042 W
15,200.0	89.94	179.62	10,806.6	-4,503.7	456.7	388,653.85	598,433.48	32° 4' 5.255 N	104° 0' 56.038 W
15,300.0	89.94	179.62	10,806.7	-4,603.6	457.3	388,553.85	598,434.14	32° 4' 4.266 N	104° 0' 56.034 W
15,400.0	89.94	179.62	10,806.9	-4,703.6	458.0	388,453.85	598,434.80	32° 4' 3.276 N	104° 0' 56.029 W
15,500.0	89.94	179.62	10,807.0	-4,803.6	458.7	388,353.86	598,435.46	32° 4' 2.286 N	104° 0' 56.025 W
15,600.0	89.94	179.62	10,807.1	-4,903.6	459.3	388,253.86	598,436.13	32° 4' 1.297 N	104° 0' 56.021 W
15,700.0	89.94	179.62	10,807.2	-5,003.6	460.0	388,153.86	598,436.79	32° 4' 0.307 N	104° 0' 56.017 W
15,800.0	89.94	179.62	10,807.3	-5,103.6	460.6	388,053.86	598,437.45	32° 3' 59.317 N	104° 0' 56.012 W
15,900.0	89.94	179.62	10,807.4	-5,203.6	461.3	387,953.86	598,438.11	32° 3' 58.328 N	104° 0' 56.008 W
16,000.0	89.94	179.62	10,807.5	-5,303.6	462.0	387,853.87	598,438.77	32° 3' 57.338 N	104° 0' 56.004 W
16,100.0	89.94	179.62	10,807.6	-5,403.6	462.6	387,753.87	598,439.43	32° 3' 56.348 N	104° 0' 56.000 W
16,200.0	89.94	179.62	10,807.8	-5,503.6	463.3	387,653.87	598,440.09	32° 3' 55.359 N	104° 0' 55.995 W
16,300.0	89.94	179.62	10,807.9	-5,603.6	464.0	387,553.87	598,440.75	32° 3' 54.369 N	104° 0' 55.991 W
16,400.0	89.94	179.62	10,808.0	-5,703.6	464.6	387,453.88	598,441.42	32° 3' 53.379 N	104° 0' 55.987 W
16,413.2	89.94	179.62	10,808.0	-5,716.8	464.7	387,440.70	598,441.50	32° 3' 53.249 N	104° 0' 55.986 W

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well PUDGE FEDERAL #21H
Project:	EDDY COUNTY, NM	**TVD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Site:	ATLAS	**MD Reference:**	RKB=2938.6+25 @ 2963.6usft (LATSHAW 44)
Well:	PUDGE FEDERAL #21H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**Database:**	EDM_Users

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
PBHL-Pudge Federal - plan hits target center - Point	0.00	0.01	10,808.0	-5,716.8	464.7	387,440.70	598,441.50	32° 3' 53.249 N	104° 0' 55.986 W

Checked By: _____ Approved By: _____ Date: _____

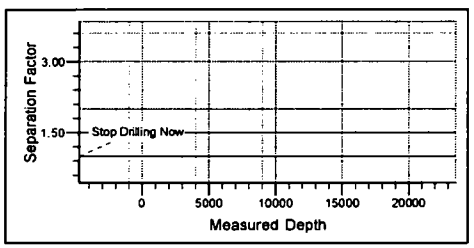
CONCHO

WELL DETAILS: PUDGE FEDERAL #21H
2938.6

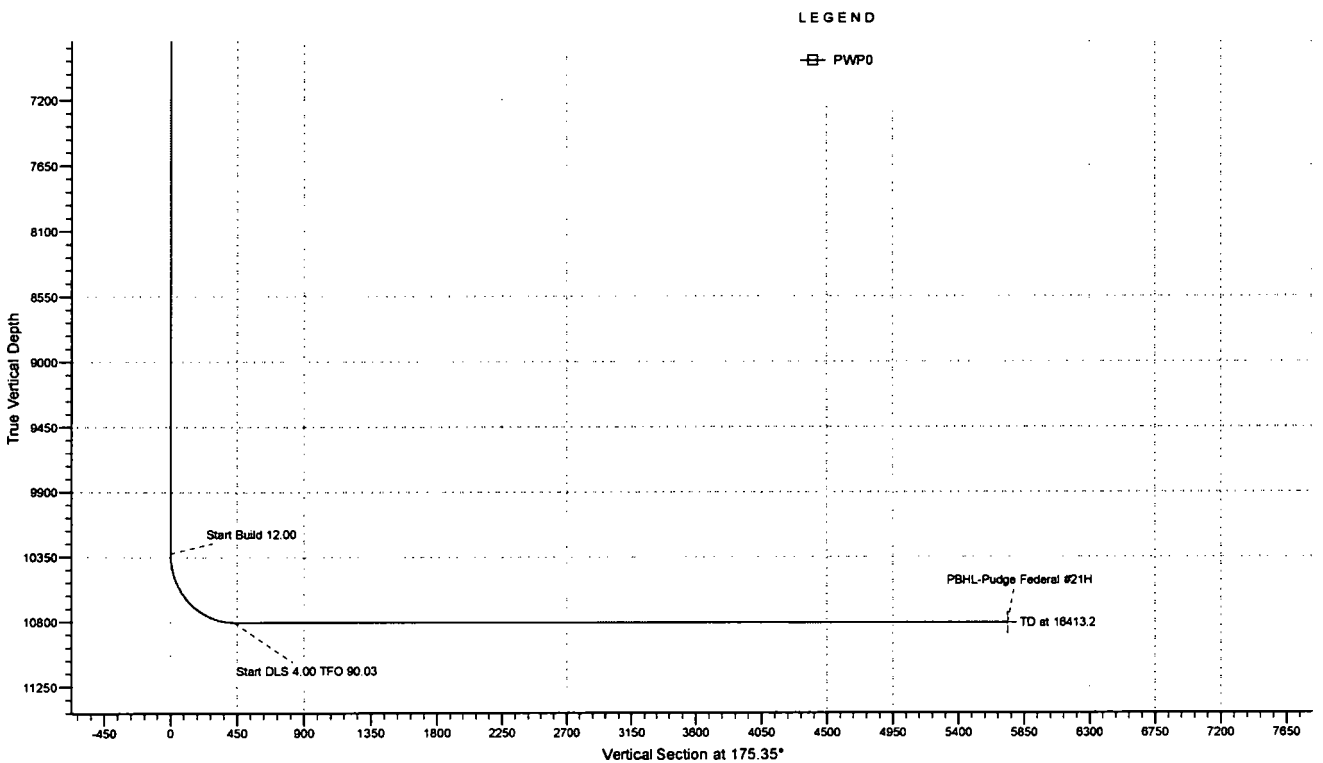
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	393157.50	597976.80	32° 4' 49.839 N	104° 1' 1.192 W	

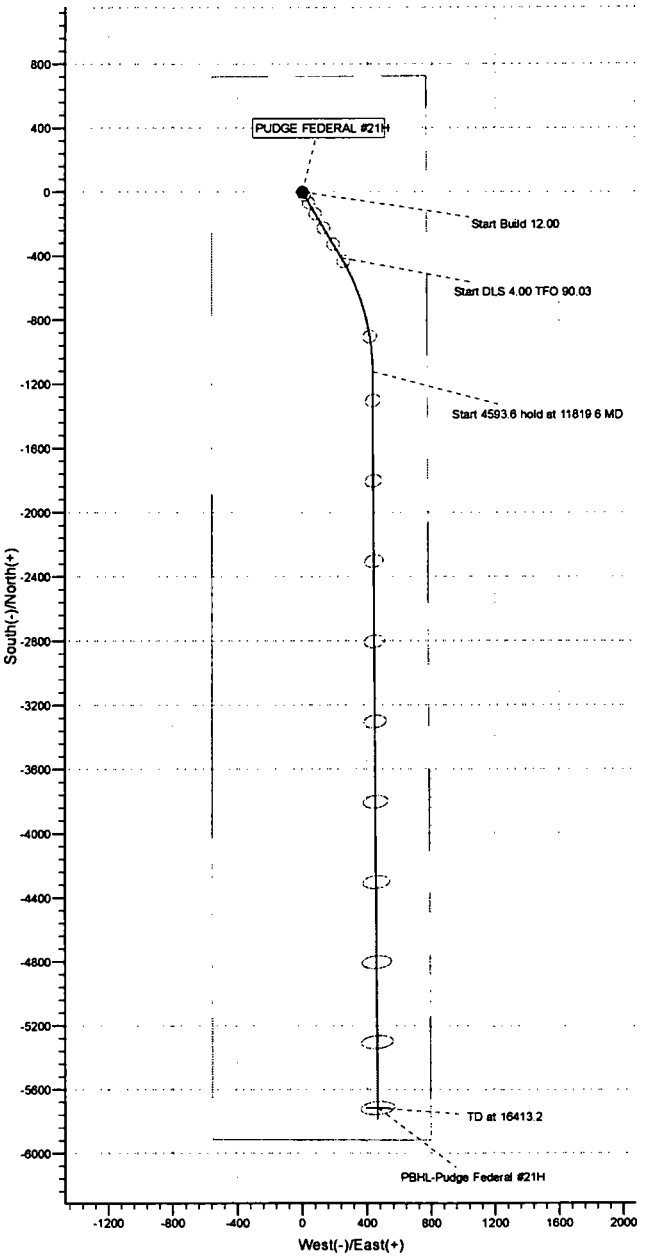
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10324.5	0.00	0.00	10324.5	0.0	0.0	0.00	0.00	0.0	
3	11074.1	89.94	149.80	10802.0	-412.3	239.9	12.00	149.80	430.3	
4	11819.6	89.94	179.62	10802.8	-1123.3	434.3	4.00	90.03	1154.8	
5	16413.2	89.94	179.62	10808.0	-5716.8	464.7	0.00	0.00	5735.7	

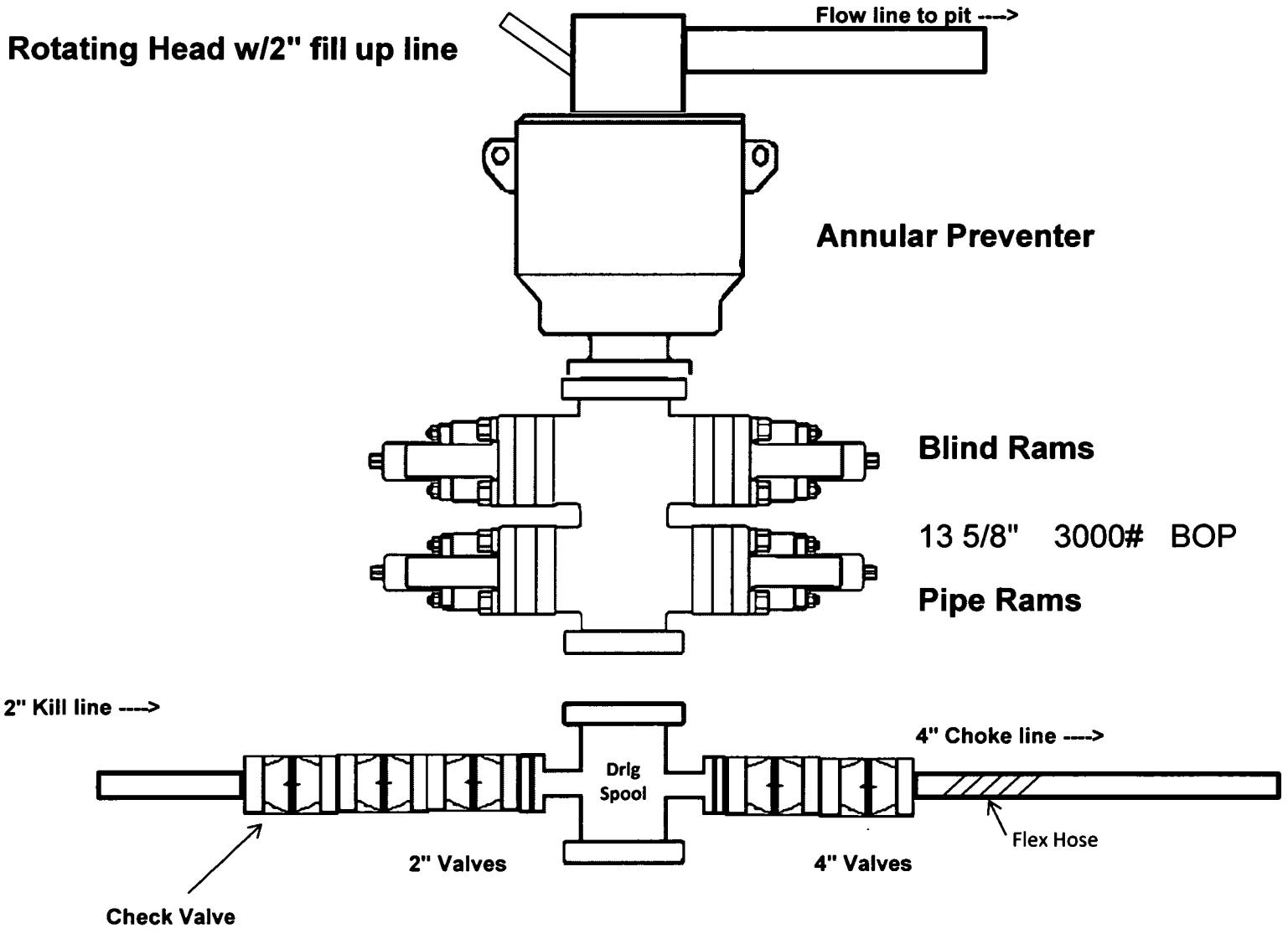


Project: EDDY COUNTY, NM
Site: ATLAS
Well: PUDGE FEDERAL #21H
Wellbore: OWB
Design: PWP0

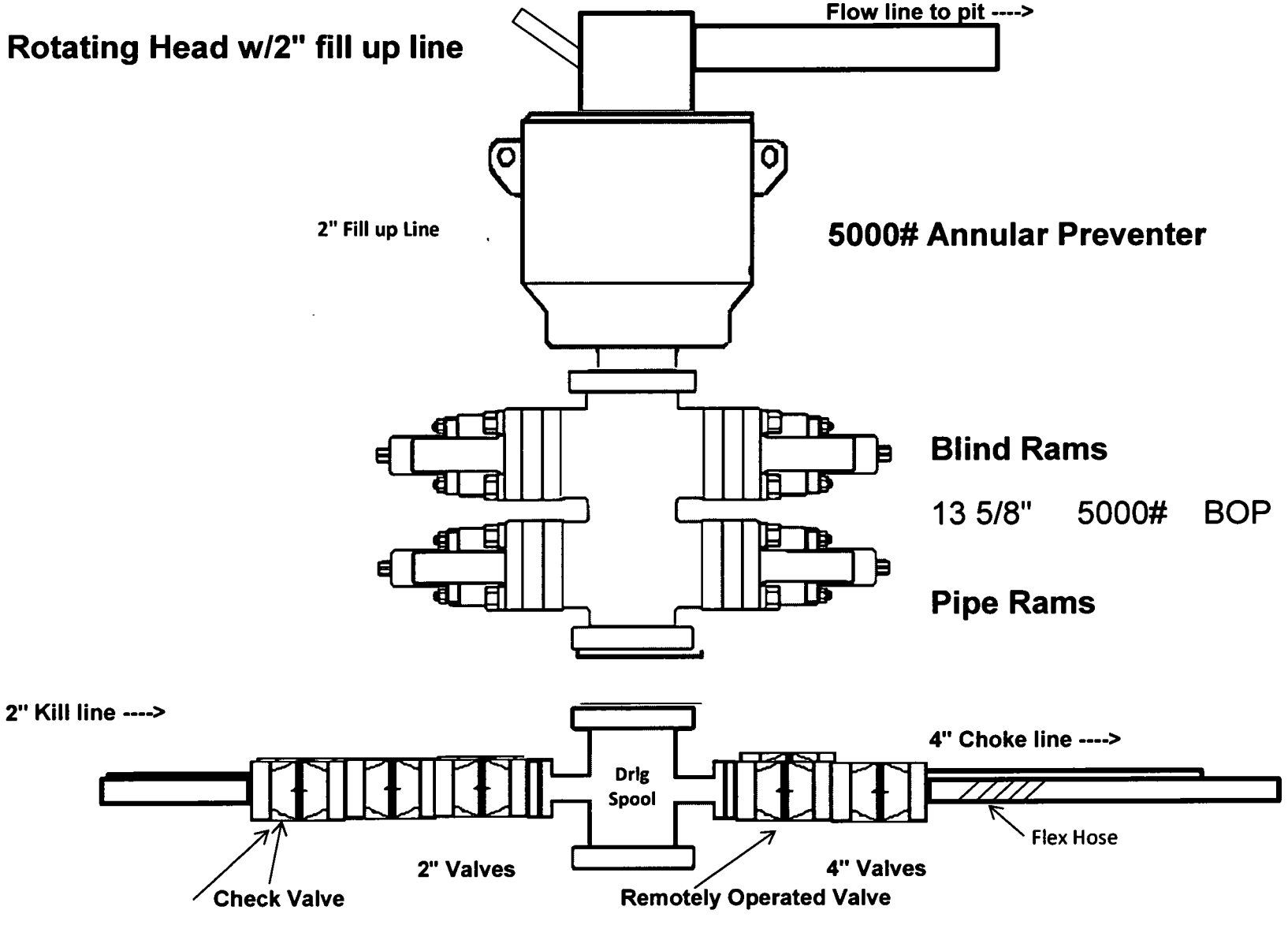




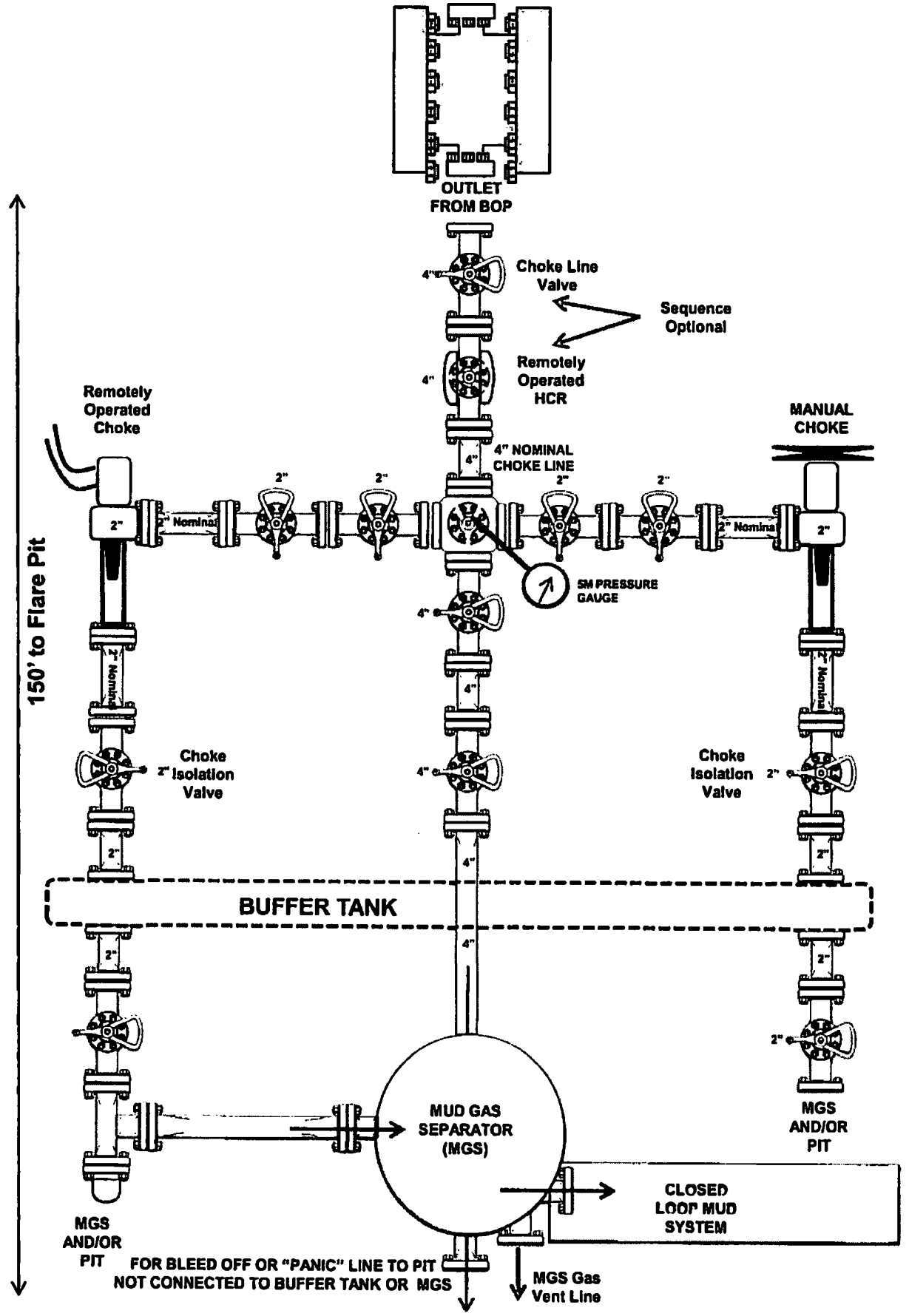
3,000 psi BOP Schematic



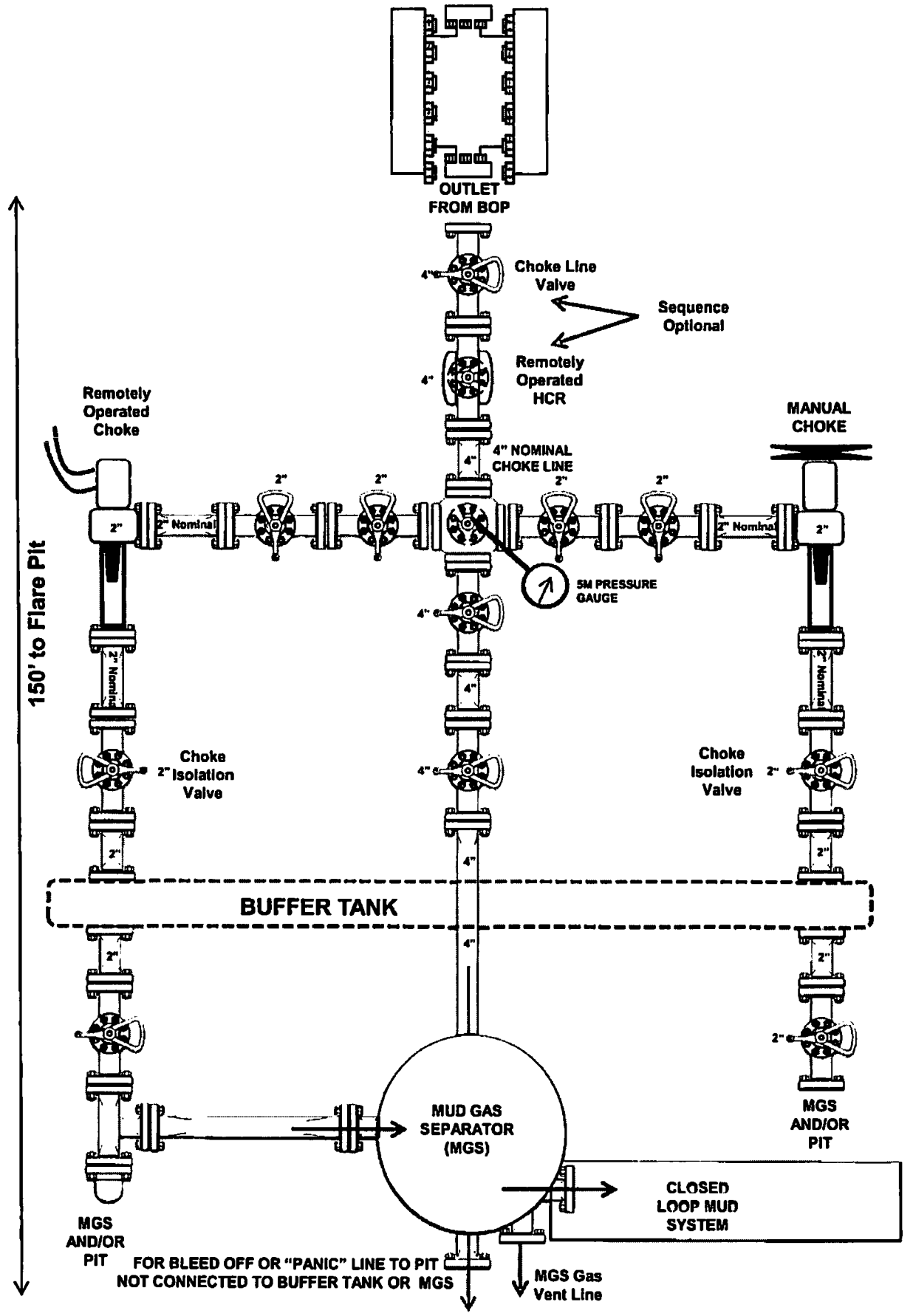
5,000 psi BOP Schematic



3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



5M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



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

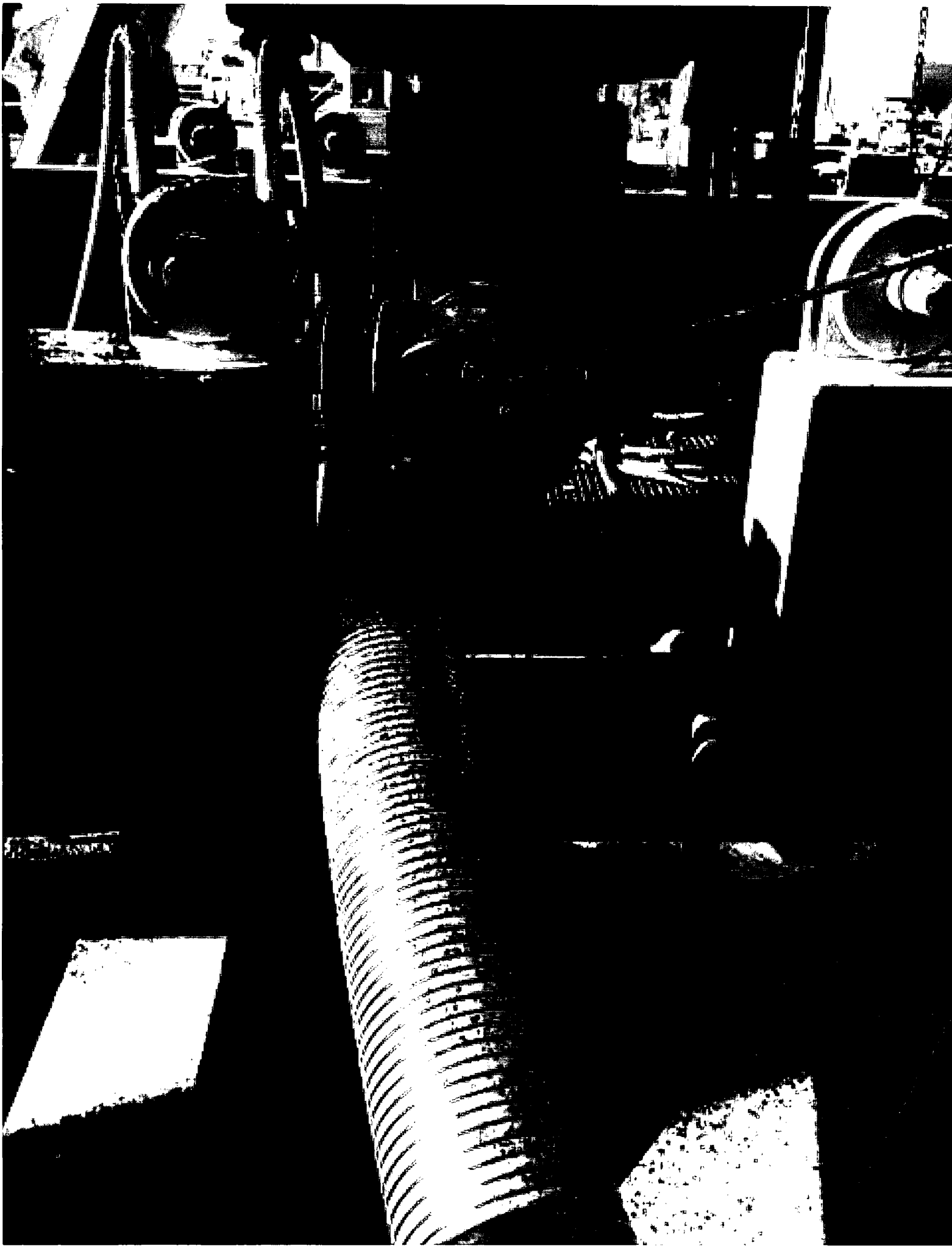
Hose Assembly Type:	**Choke & Kill**		
Assembly Serial #	**292614-2**	*Hose Lot # and Date Code*	**11794-10/14**
Hose Working Pressure (psi)	**10000**	*Test Pressure (psi)*	**15000**

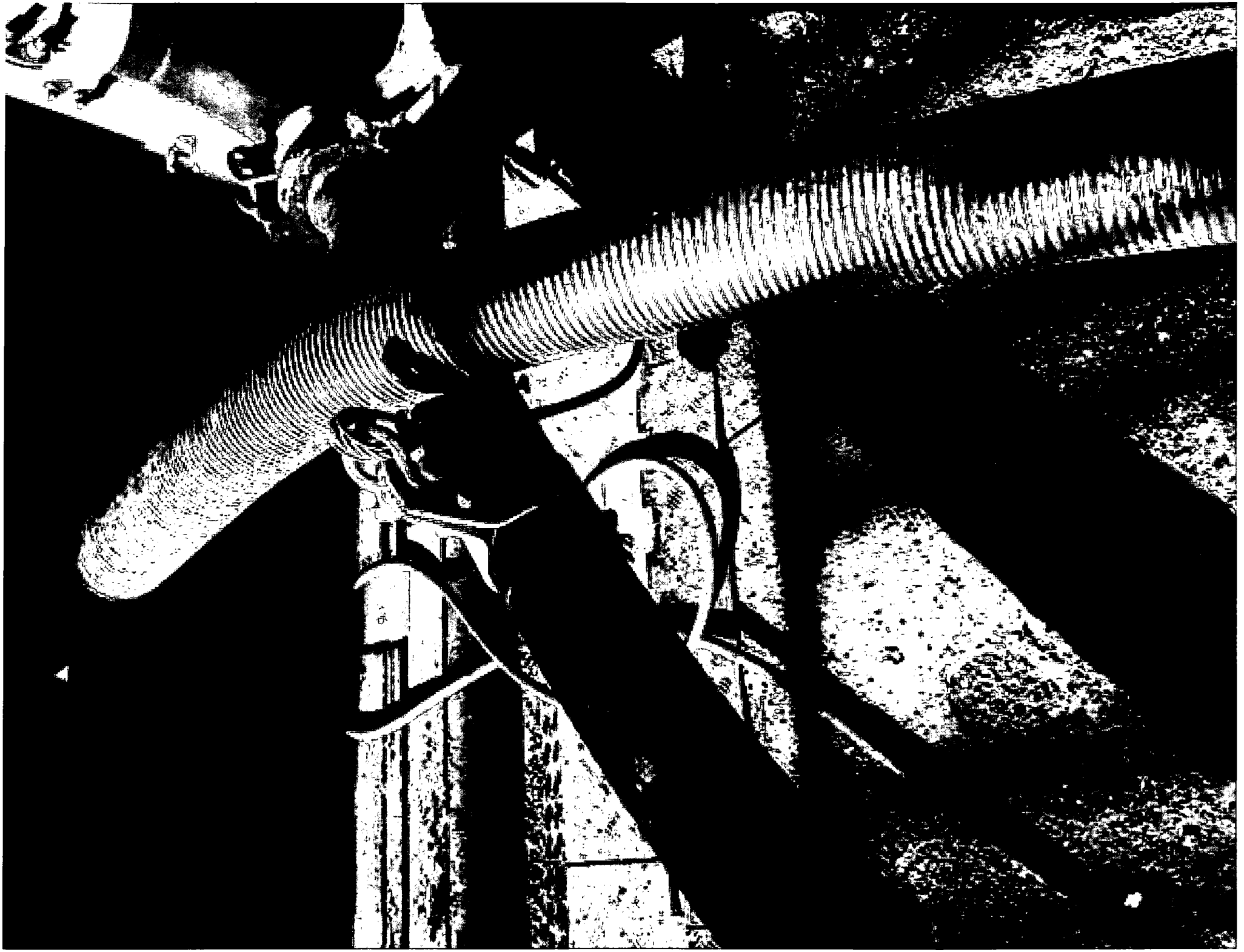
We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

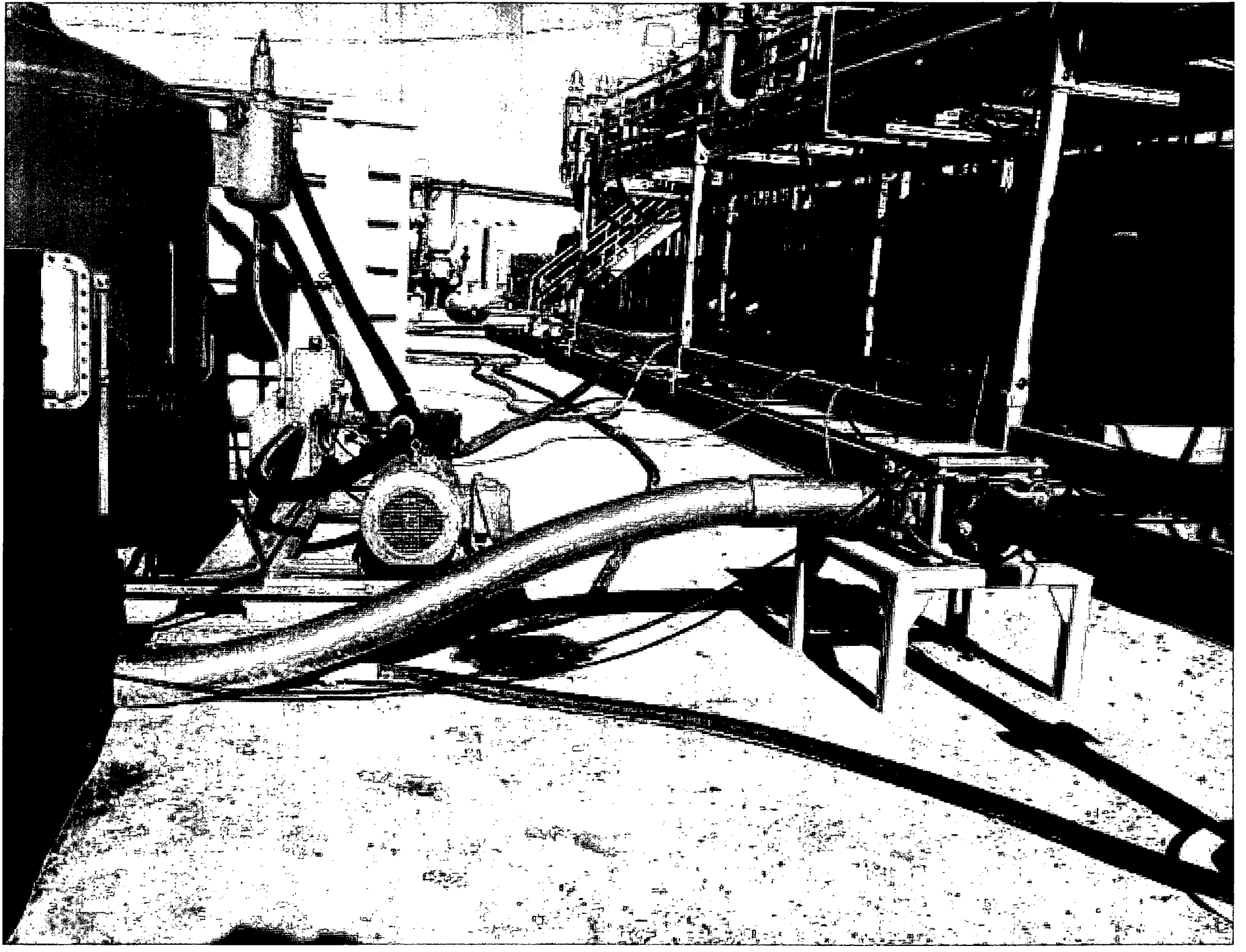
Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

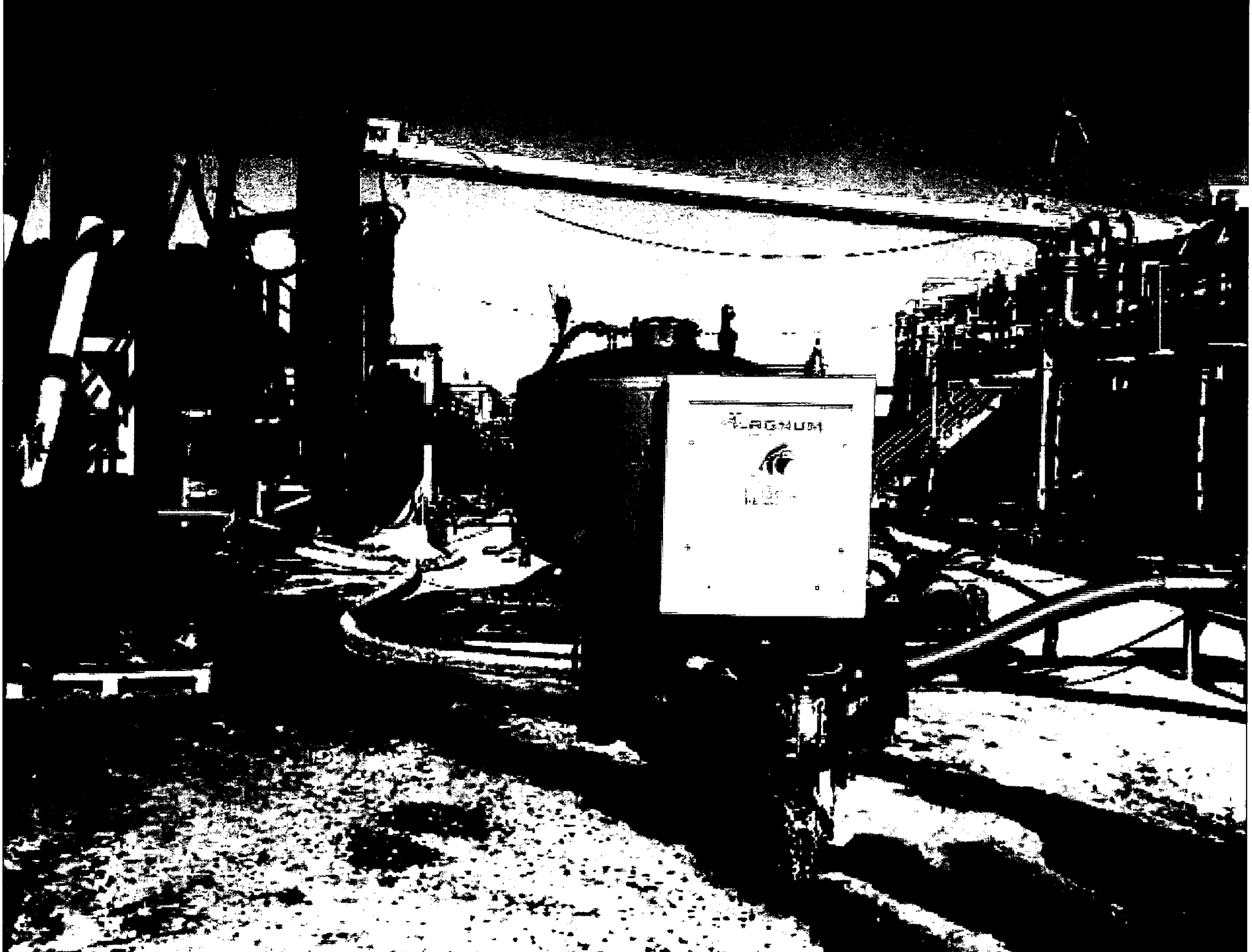
Comments:

Approved By	*Date*
	2/10/2015








MAGNUM

COG PRODUCTION LLC

Rig Plat & Closed Loop Equipment Diagram

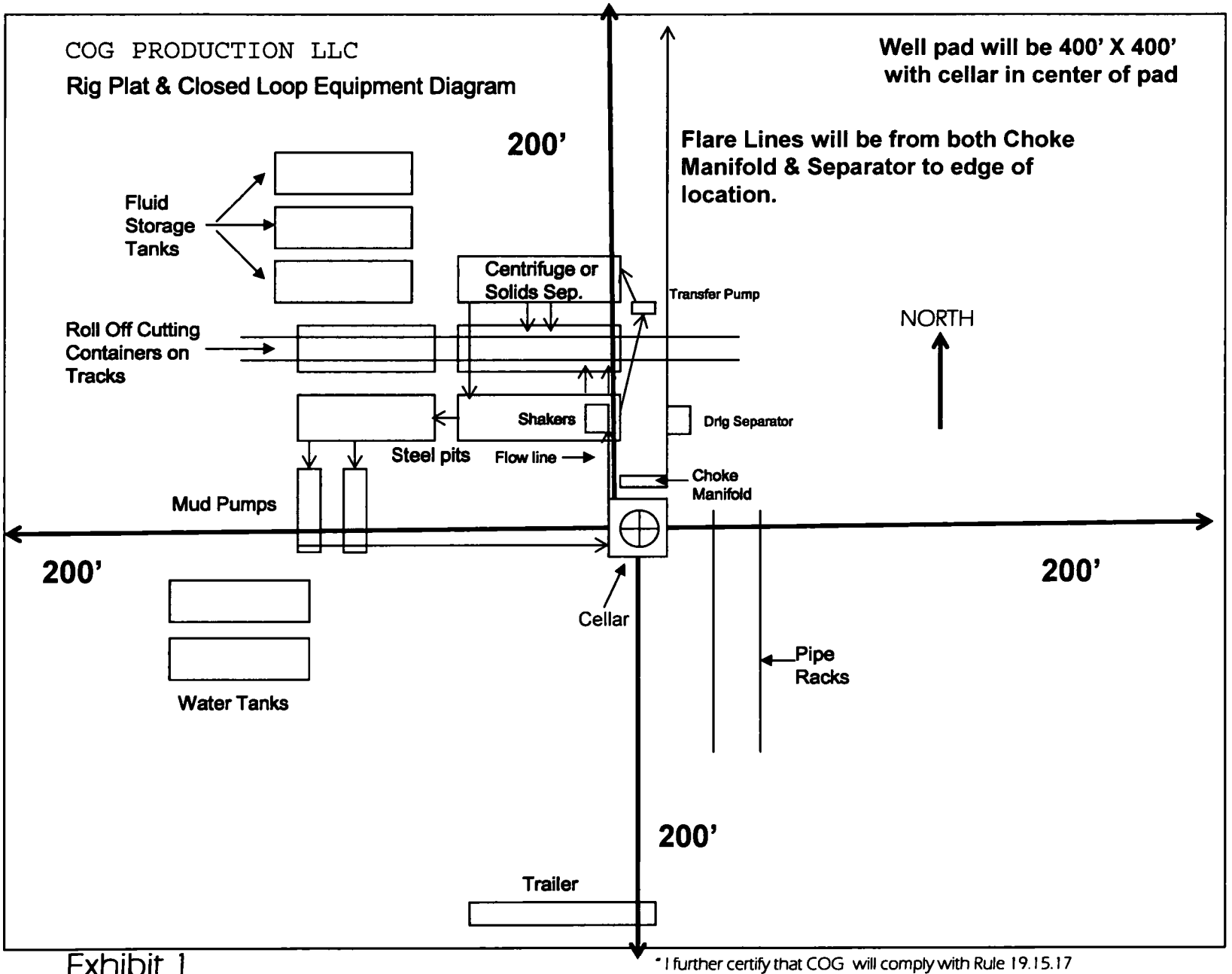
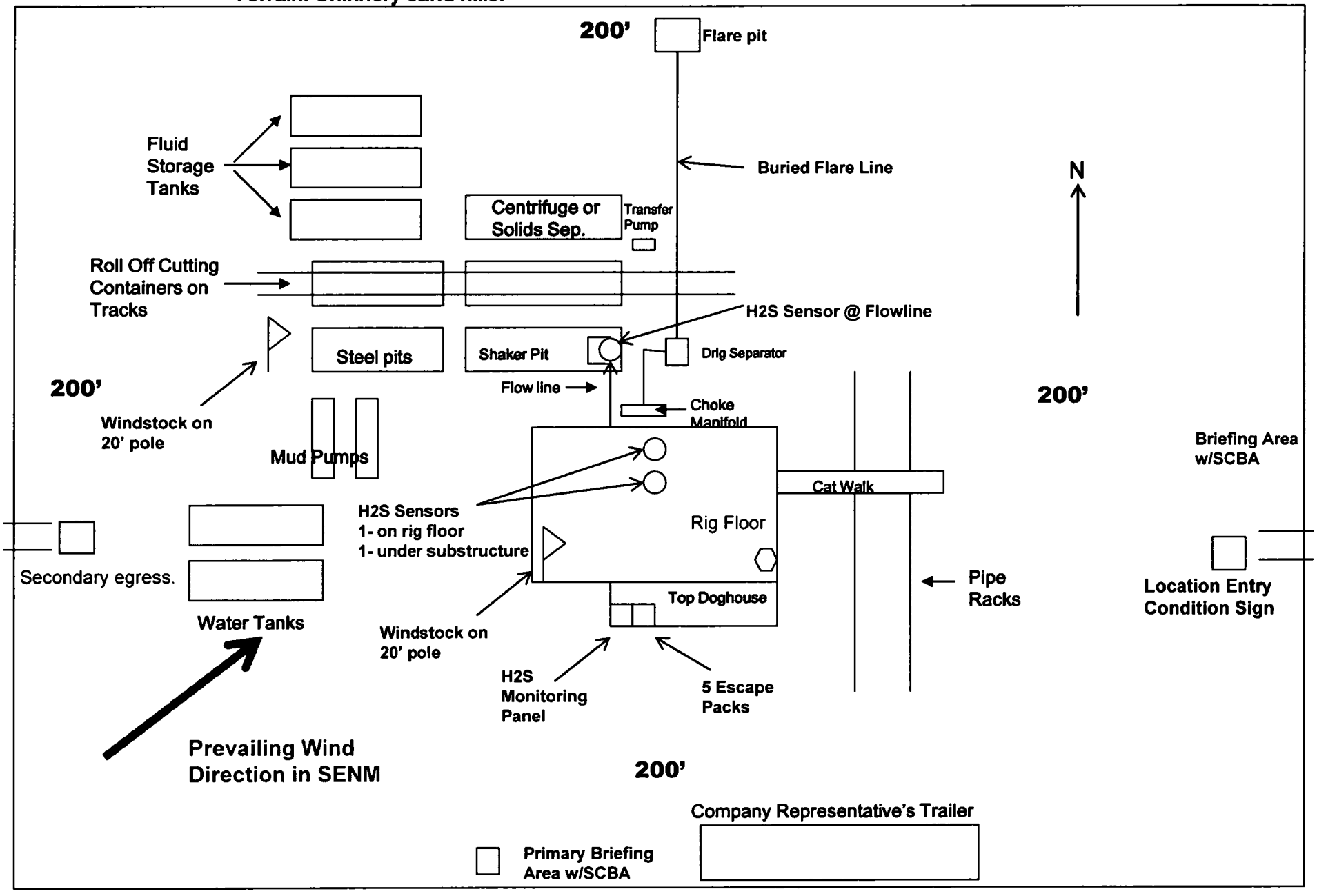


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

COG Production LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.

Well pad will be 400' x 400' with cellar in center of pad



COG PRODUCTION LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

a. The hazards and characteristics of hydrogen sulfide (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

a. The effects of H2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
c. The contents and requirements of the H_2S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H2S. If H2S greater than 100 ppm is encountered in the gas stream we will shut in and install H2S equipment.

a. Well Control Equipment:
   Flare line.
   Choke manifold with remotely operated choke.
   Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
   Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.

c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.

d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.

f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

g. Communication:
Company vehicles equipped with cellular telephone.

COG PRODUCTION LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

YOU ARE ENTERING AN H_2S AREA
AUTHORIZED PERSONNEL ONLY

1. ***BEARDS OR CONTACT LENSES NOT ALLOWED***
2. ***HARD HATS REQUIRED***
3. ***SMOKING IN DESIGNATED AREAS ONLY***
4. ***BE WIND CONSCIOUS AT ALL TIMES***
5. ***CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG PRODUCTION LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
COG PRODUCTION LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	OFFICE
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

CONCHO

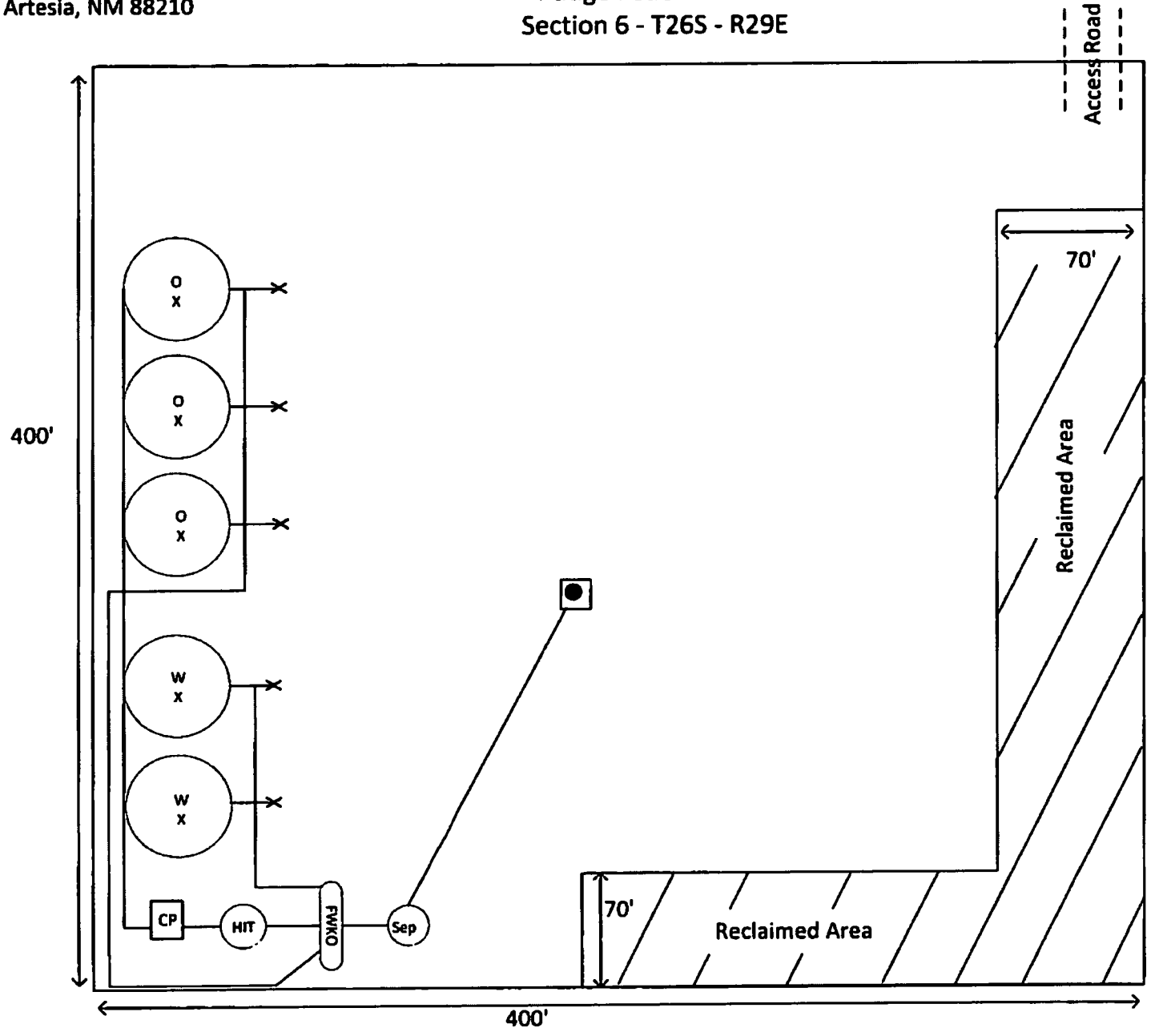
COG Production LLC
2208 W Main St.
Artesia, NM 88210

Well Site Layout

Production Facility Layout

Pudge Federal #21H
Section 6 - T26S - R29E

Exhibit 3



Legend
O = 500 BBL Steel Oil Tank
W = 500 BBL Steel Water Tank
H = 6' x 20' Heater
X = Valve
SEP = Separator
FWKO = Fresh Water Knockout
HIT = Heater
CP = Control Panel
● = Wellhead

Topsoil will be stacked pile on the Southeast side

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 7th day of APRIL, 2017.

Signed: Mayte Reyes

Printed Name: Mayte Reyes
Position: Regulatory Analyst
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6945
E-mail: mreyes1@concho.com
Field Representative (if not above signatory): Rand French
Telephone: (575) 748-6940. E-mail: rfrench@concho.com

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 7th day of April, 2017.

Signed: Mayte Reyes

Printed Name: Mayte Reyes
Position: Regulatory Analyst
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6945
E-mail: mreyes1@concho.com
Field Representative (if not above signatory): Rand French
Telephone: (575) 748-6940. E-mail: rfrench@concho.com

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Production LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 7th day of APRIL, 2017.

Signed: Mayte Reyes

Printed Name: Mayte Reyes
Position: Regulatory Analyst
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6945
E-mail: mreyes1@concho.com
Field Representative (if not above signatory): Rand French
E-mail: rfrench@concho.com

APD ID: 10400013235
Operator Name: COG OPERATING LLC
Well Name: PUDGE FEDERAL
Well Type: OIL WELL

Submission Date: 04/10/2017
Federal/Indian APD: FED
Well Number: 21H
Well Work Type: Drill

Highlighted data reflects the most recent changes
Show Final Text

Application

Section 1 - General

APD ID: 10400013235
Tie to previous NOS?
Submission Date: 04/10/2017

BLM Office: CARLSBAD
User: Mayte Reyes
Title: Regulatory Analyst

Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED

Lease number: NMNM118113
Lease Acres: 719.45

Surface access agreement in place?
Allotted?
Reservation:

Agreement in place? NO
Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? NO
APD Operator: COG OPERATING LLC

Operator letter of designation:

Operator Info

Operator Organization Name: COG OPERATING LLC
Operator Address: 600 West Illinois Ave
Zip: 79701
Operator PO Box:
Operator City: Midland
State: TX
Operator Phone: (432)683-7443
Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO
Mater Development Plan name:

Well in Master SUPO? NO
Master SUPO name:

Well in Master Drilling Plan? NO
Master Drilling Plan name:

Operator Name: COG OPERATING LLC

Well Name: PUDGE FEDERAL **Well Number:** 21H

Well Name: PUDGE FEDERAL **Well Number:** 21H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** PURPLE SAGE **Pool Name:** WOLFCAMP GAS

Is the proposed well in an area containing other mineral resources? NATURAL GAS,OIL

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: SINGLE WELL **Multiple Well Pad Name:** **Number:**

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 15 Miles **Distance to nearest well:** 110 FT **Distance to lease line:** 200 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: COG_Pudge_21H_C102_04-10-2017.pdf

Well work start Date: 05/01/2017 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	615	FSL	760	FEL	25S	29E	31	Aliquot SESE	32.080635	-104.017483	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 100555	2939	0	0
KOP Leg #1	615	FSL	760	FEL	25S	29E	31	Aliquot SESE	32.080635	-104.017483	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 100555	2939	0	0
PPP Leg #1	330	FNL	330	FEL	26S	29E	6	Aliquot NENE	32.080635	-104.017483	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 118113	-7385	10324	10324

Operator Name: COG OPERATING LLC

Well Name: PUDGE FEDERAL **Well Number:** 21H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
EXIT Leg #1	330	FSL	330	FEL	26S	29E	6	Aliquot SESE	32.065273	-104.016038	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 118113	-7868	15300	10807
BHL Leg #1	200	FSL	330	FEL	26S	29E	6	Aliquot SESE	32.064916	-104.016036	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 118113	-7869	16413	10808

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	UNKNOWN	2885	0	0		NONE	No
2	RUSTLER	2036	849	849		NONE	No
3	TOP SALT	1854	1031	1031		NONE	No
4	BASE OF SALT	206	2679	2679		NONE	No
5	LAMAR	106	2779	2779		NONE	No
6	BELL CANYON	61	2824	2824		NATURAL GAS,OIL	No
7	CHERRY CANYON	-784	3669	3669		NATURAL GAS,OIL	No
8	BRUSHY CANYON	-2065	4950	4950		NATURAL GAS,OIL	No
9	BONE SPRING LIME	-3630	6515	6515		NATURAL GAS,OIL	No
10	UPPER AVALON SHALE	-4203	7088	7088		NATURAL GAS,OIL	No
11	BONE SPRING 1ST	-4557	7442	7442		NATURAL GAS,OIL	No
12	BONE SPRING 2ND	-5398	8283	8283		NATURAL GAS,OIL	No
13	BONE SPRING 3RD	-6459	9344	9344		NATURAL GAS,OIL	No

Operator Name: COG OPERATING LLC

Well Name: PUDGE FEDERAL **Well Number:** 21H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
14	WOLFCAMP	-6822	9707	9707		NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M **Rating Depth:** 9370

Equipment: Annular. The BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold

Requesting Variance? YES

Variance request: 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.

Testing Procedure: 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.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.

Choke Diagram Attachment:

COG_Pudge_21H_3M_Choke_04-10-2017.pdf

BOP Diagram Attachment:

COG_Pudge_21H_3M_BOP_04-10-2017.pdf

Pressure Rating (PSI): 5M **Rating Depth:** 10950

Equipment: Annular. Blind Ram. Pipe Ram. The BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.

Requesting Variance? YES

Variance request: 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.

Testing Procedure: 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.

Choke Diagram Attachment:

COG_Pudge_21H_5M_Choke_04-10-2017.pdf

BOP Diagram Attachment:

COG_Pudge_21H_5M_BOP_04-10-2017.pdf

COG_Pudge_21H_Flex_Hose_06-06-2017.pdf

Operator Name: COG OPERATING LLC

Well Name: PUDGE FEDERAL **Well Number:** 21H

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	
1	SURFACE	13.5	10.75	NEW	API	N	0	875	0	875	-7869	-8769	875	N-80	45.5	OTHER - BTC	6.17	1.51	DRY	26.12	DRY	26 2
2	INTERMEDIATE	6.75	5.0	NEW	API	N	0	8870	0	8870	-7869	-17269	8870	P-110	23	OTHER - BTC	2.35	2.48	DRY	3.75	DRY	3.
3	INTERMEDIATE	9.875	7.875	NEW	API	N	0	9370	0	9370	-7869	-8769	9370	P-110	29.7	OTHER - BTC	1.62	1.35	DRY	3.9	DRY	3.
4	PRODUCTION	6.75	5.0	NEW	API	N	8870	16413	8870	16413	-7869	-17269	7543	P-110	18	OTHER - BTC	2.35	2.48	DRY	3.75	DRY	3.

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Pudge_21H_Casing_Prog_04-10-2017.pdf

Casing Attachments

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Pudge_21H_Casing_Prog_04-10-2017.pdf

Casing ID: 3 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Pudge_21H_Casing_Prog_04-10-2017.pdf

Casing ID: 4 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Pudge_21H_Casing_Prog_04-10-2017.pdf

Section 4 - Cement

Operator Name: COG OPERATING LLC

Well Name: PUDGE FEDERAL **Well Number:** 21H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	875	90	1.75	13.5	157.5	50	Class C + 4% Gel	1% CaCl
SURFACE	Tail		0	875	250	1.34	14.8	335	50	Class C	2% CaCl
INTERMEDIATE	Lead		0	8870	750	3.6	10.3	2700	50	Tined Light Blend	No additives
INTERMEDIATE	Tail		0	8870	250	1.08	16.4	270	50	Class H	No additives
INTERMEDIATE	Lead		0	9370	750	3.6	10.3	2700	50	Tuned Light Blend	No additives.
INTERMEDIATE	Tail		0	9370	250	1.08	16.4	270	50	Class H	No additives.
PRODUCTION	Lead		0	16413	250	2.5	11.9	625	35	50:50:10 H Blend	No additives
PRODUCTION	Tail		0	16413	750	1.24	14.4	930	35	50:50:2 H Blend	No additives

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	875	OTHER : FW Gel	8.6	8.8							FW Gel
875	9370	OTHER : Brine/Diesel Emulsion	8.4	9							Brine/Diesel Emulsion
9370	16413	OIL-BASED MUD	9.6	11							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

None planned.

List of open and cased hole logs run in the well:

OTH

Other log type(s):

GR/CNL

Coring operation description for the well:

None planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6185 **Anticipated Surface Pressure:** 3807.24

Anticipated Bottom Hole Temperature(F): 165

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Pudge_21H_H2S_Schem_04-10-2017.pdf
COG_Pudge_21H_H2S_SUP_04-10-2017.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Pudge_21H_Direc_Plan_04-10-2017.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

COG_Pudge_21H_Drilling_Prog_04-10-2017.pdf

Other Variance attachment:

COG_Pudge_21H_Flex_Hose_04-10-2017.pdf

SUPO

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Pudge_21H_Maps_Plats_04-10-2017.pdf

Existing Road Purpose: ACCESS **Row(s) Exist?** NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

COG_Pudge_21H_1Mile_Data_04-10-2017.pdf

Existing Wells description:

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: A tank battery and facilities will be constructed as shown on the Production Facility Layout/Well Site Layout.

Production Facilities map:

COG_Pudge_21H_Prod_Facility_04-10-2017.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING

Water source type: OTHER

Describe type: Brine water will be provided by Malaga 2 brine station. Brine water will be purchased by Mesquite SWD Services. 2313 E Greene St, Carlsbad, NM 88220. (575) 887-4847

Source longitude:

Source latitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: COMMERCIAL

Water source transport method: TRUCKING

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 30000

Source volume (acre-feet): 3.866793

Source volume (gal): 1260000

Water source use type: STIMULATION, SURFACE CASING **Water source type:** OTHER

Describe type: Fresh water will be furnished by GWWS water well located in Section 14. T26S. R28E., the water will be purchased by Vision Resources, 2512 Hepler Rd Carlsbad, NM 88221, 575-236-6041. **Source longitude:**

Source latitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: PIPELINE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 450000 **Source volume (acre-feet):** 58.001892

Source volume (gal): 18900000

Water source and transportation map:

COG_Pudge_21H_Fresh_H2O_04-10-2017.pdf

COG_Pudge_21H_Brine_H2O_04-10-2017.pdf

Water source comments: Fresh water will be furnished by GWWS water well located in Section 14. T26S. R28E., the water will be purchased by Vision Resources, 2512 Hepler Rd Carlsbad, NM 88221, 575-236-6041. Brine water will be provided by Malaga 2 brine station. Brine water will be purchased by Mesquite SWD Services. 2313 E Greene St, Carlsbad, NM 88220. (575) 887-4847

New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, candidate source will be caliche pit from Draper Brantley located in Section 13. T23S. R28E. Phone (575) 706-3169

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: SEWAGE

Waste content description: Human waste and gray water.

Amount of waste: 1000 gallons

Waste disposal frequency : One Time Only

Safe containment description: Waste will be properly contained and disposed of properly at a state approved disposal facility.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** PRIVATE

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Waste type: DRILLING

Waste content description: Drilling fluids and produced oil land water while drilling and completion operations.

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

Safe containment description: All drilling waste will be stored safely and disposed of properly.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations.

Amount of waste: 500 pounds

Waste disposal frequency : One Time Only

Safe containment description: Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Roll off cutting containers on tracks.

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: YES

Ancillary Facilities attachment:

COG_Pudge_21H_GCP_04-10-2017.pdf

Comments: GCP attached.

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Pudge_21H_Prod_Facility_04-10-2017.pdf

Comments: A tank battery and facilities will be constructed as shown on the Production Facility Layout/Well Site Layout.

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name:

Multiple Well Pad Number:

Recontouring attachment:

Drainage/Erosion control construction: Approximately 400' of straw waddles will be placed on the east side to reduce sediment impacts to fragile/sensitive soils.
Drainage/Erosion control reclamation: N/A

Wellpad long term disturbance (acres): 2.5

Wellpad short term disturbance (acres): 3.67

Access road long term disturbance (acres): 0

Access road short term disturbance (acres): 0

Pipeline long term disturbance (acres): 0

Pipeline short term disturbance (acres): 0

Other long term disturbance (acres): 0

Other short term disturbance (acres): 0

Total long term disturbance: 2.5

Total short term disturbance: 3.67

Disturbance Comments:

Reconstruction method: Portions of the pad not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused. The stockpiled topsoil will be spread out over reclaimed area and reseeded with BLM approved seed mixture.
Topsoil redistribution: Southeast of the south side 70'. East 70'.

Soil treatment: None.

Existing Vegetation at the well pad: Shinnery Oak/Mesquite grassland.

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Shinnery Oak/Mesquite grassland.

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Shinnery Oak/Mesquite grassland.

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: N/A

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre: **Proposed seeding season:**

Seed Summary	
Seed Type	**Pounds/Acre**

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Rand **Last Name:** French

Phone: (432)254-5556 **Email:** rfrench@concho.com

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description:

Pit closure attachment:

COG_Pudge_1H__Closed_Loop_04-10-2017.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Section 12 - Other Information

Right of Way needed? NO **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite completed on 3/20/2017 by Gerald Herrera (COG) and Jeff Robertson (BLM)

Other SUPO Attachment

COG_Pudge_21H_Certification_04-10-2017.pdf

PWD

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

Payment Info

Payment

APD Fee Payment Method: PAY.GOV

pay.gov Tracking ID: 261PBIR2

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating, LLC**
LEASE NO.:	**NMNM-118113**
WELL NAME & NO.:	**Pudge Federal 21H**
SURFACE HOLE FOOTAGE:	**0615' FSL & 0760' FEL**
BOTTOM HOLE FOOTAGE	**0200' FSL & 0330' FEL Sec. 06, T. 25 S., R 29 E.**
LOCATION:	**Section 31, T. 25 S., R 29 E., NMPM**
COUNTY:	**County, New Mexico**

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

A. **Hydrogen Sulfide**

1. **Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall 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.

Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

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

Medium Cave/Karst
Possibility of water flows in the Salado and Castile.
Possibility of lost circulation in the Rustler, Red Beds, and Delaware.
Abnormal pressures may be encountered upon penetrating the 3rd Bone Spring Sand Stone and all subsequent formations.

1. The **10-3/4** inch surface casing shall be set at approximately **875** 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 **7-5/8** inch intermediate casing is:

    ☐ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

If cement does not circulate to surface on the intermediate casing, the cement on the production casing must come to surface.

Formation below the 7-5/8" 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 on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **5-1/2 X 5** inch production casing is:

    ☐ Cement as proposed by operator. Operator shall provide method of verification.

4. 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 53.

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 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 **7-5/8** intermediate casing shoe shall be 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 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).

    a. 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).

    b. 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.

    c. The results of the test shall be reported to the appropriate BLM office.

    d. 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.**

    e. 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.

    f. 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 053118

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating
LEASE NO.:	NM118113
WELL NAME & NO.:	Pudge Federal – 21H
SURFACE HOLE FOOTAGE:	615'/S & 760'/E
BOTTOM HOLE FOOTAGE	200'/S & 330'/E, sec. 6, T 26 S., R 29 E
LOCATION:	Section 31, T. 25 S., R. 26 E., NMPM
COUNTY:	Eddy County, New Mexico

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Cave and Karst

** Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

Cave/Karst Surface Mitigation

The following stipulations will be applied to minimize impacts during construction, drilling and production.

Construction:
In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

No Blasting:
No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

Pad Berming:
The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

Tank Battery Liners and Berms:
Tank battery locations and all facilities will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

Leak Detection System:

A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating values and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

Automatic Shut-off Systems:
Automatic shut off, check values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and ground water concerns:

Rotary Drilling with Fresh Water:
Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

Directional Drilling:
Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

Lost Circulation:
ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

Abandonment Cementing:
Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:
Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

Watershed

- The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the

well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed.

- Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing
The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width
The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing
Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching
Ditching shall be required on both sides of the road.

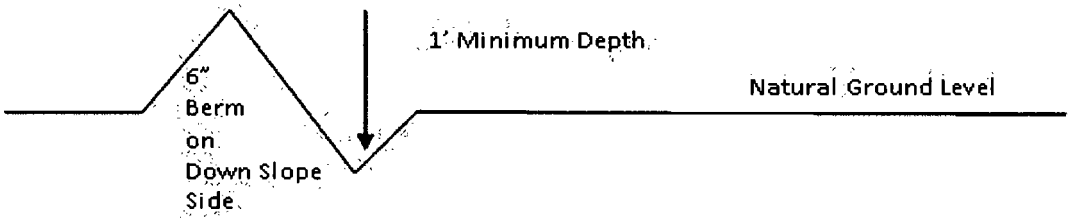
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

400 foot road with 4% road slope: $\frac{400'}{4\%} + 100' = 200'$ lead-off ditch interval

Cattle guards

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

Fence Requirement

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road
3. Redistribute topsoil
4. Revegetate slopes

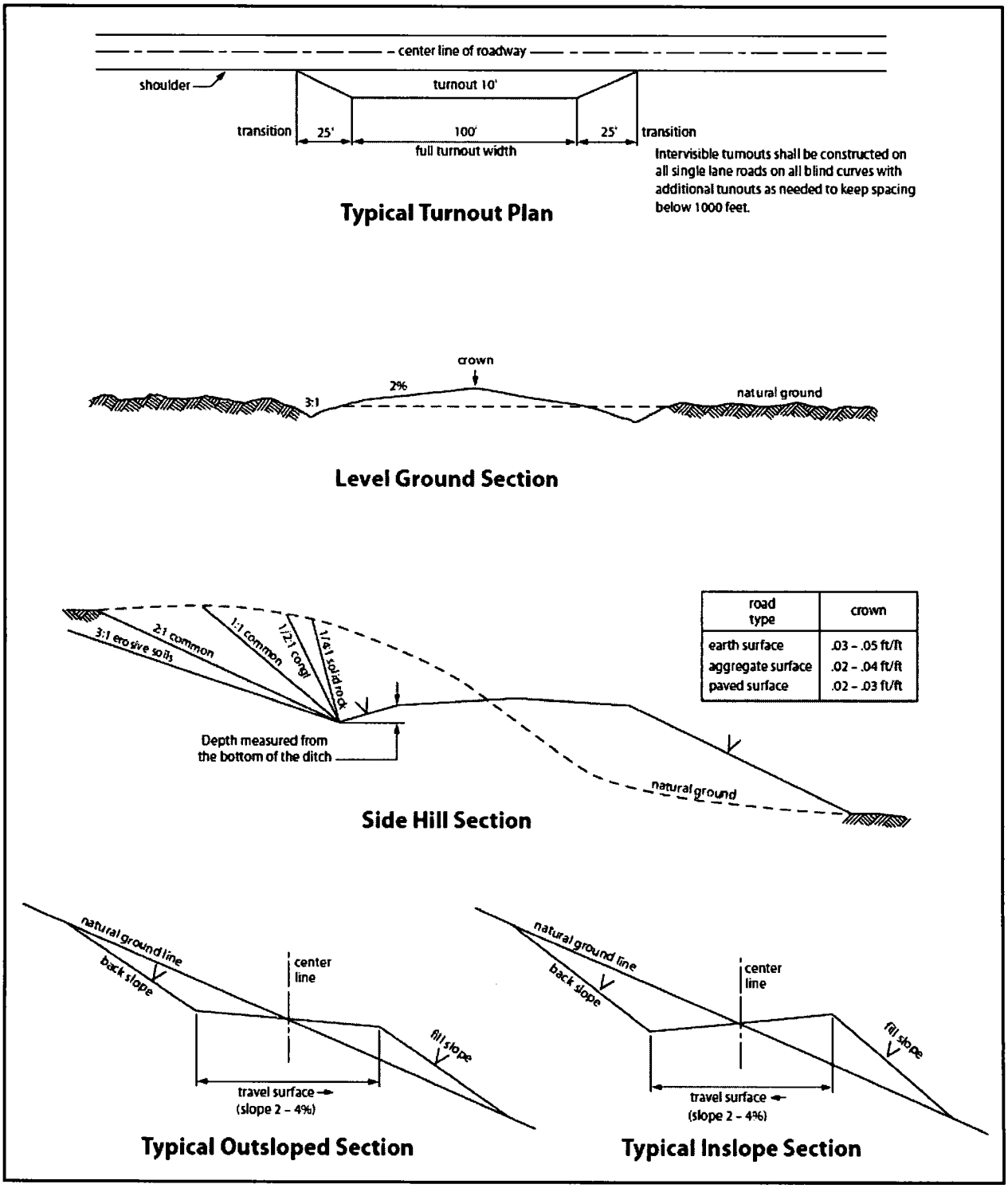


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities
Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)
Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening
The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures
The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement
All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

VIII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

IX. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Seed Mixture 3, for Shallow Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

Species	lb/acre
Plains Bristlegrass (*Setaria macrostachya*)	1.0
Green Sprangletop (*Leptochloa dubia*)	2.0
Sideoats Grama (*Bouteloua curtipendula)*	5.0

*Pounds of pure live seed:

Pounds of seed **x** percent purity **x** percent germination = pounds pure live seed