

NM OIL CONSERVATION
ARTESIA DISTRICT
DEC 22 2016

Carlsbad Field Office
OCD Artesia

ATS-14-873
FORM APPROVED
OMB No. 1004-013
Expires July 31, 2010

RECEIVED
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
R-111-POTASH
Secretary

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of Work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. SHL: NMNM114354 BHL: NMNM0429170
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG Operating LLC.		7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210	3b. Phone No. (include area code) 575-748-6940	8. Lease Name and Well No. Solution Federal Com #4H
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 420' FNL & 990' FWL Lot 4 NWNW SHL Sec 5-T20S-R30E At proposed prod. Zone 2310' FNL & 660' FWL Unit Letter E SWNW SHL Sec 8-T20S-R30E		9. API Well No. 30-015-44011
14. Distance in miles and direction from nearest town or post office* About 13 miles from Carlsbad		10. Field and Pool, or Exploratory Parkway; Bone Spring
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 190'	16. No. of acres in lease SHL: 599.68 BHL: 320	11. Sec., T.R.M. or Blk and Survey or Area Sec. 5- T20S - R30E
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 1281' (Solution #4H) BHL: 4340'	17. Spacing Unit dedicated to this well 240.15	12. County or Parish Eddy County
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3256.3' GL	22. Approximate date work will start* 1/1/2015	13. State NM

24. Attachments

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

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

25. Signature <i>Mayte Reyes</i>	Name (Printed/Typed) Mayte Reyes	Date 12-11-2014
Title Regulatory Analyst		
Approved by (Signature) <i>/s/Cody Layton</i>	Name (Printed/Typed)	Date DEC 19 2016
Title FIELD MANAGER		
Office CARLSBAD FIELD OFFICE		

Application approval does not warrant or certify that the applicant holds legan 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.

APPROVAL FOR TWO YE

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)

Capitan Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations Attached

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

DEC 22 2016

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

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

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-0720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION

1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-44011	Pool Code 49622	Pool Name Parkway; Bone Spring
Property Code 315036	Property Name SOLUTION FEDERAL COM	Well Number 4H
OGRID No. 229137	Operator Name COG OPERATING LLC	Elevation 3256.3'

Surface Location

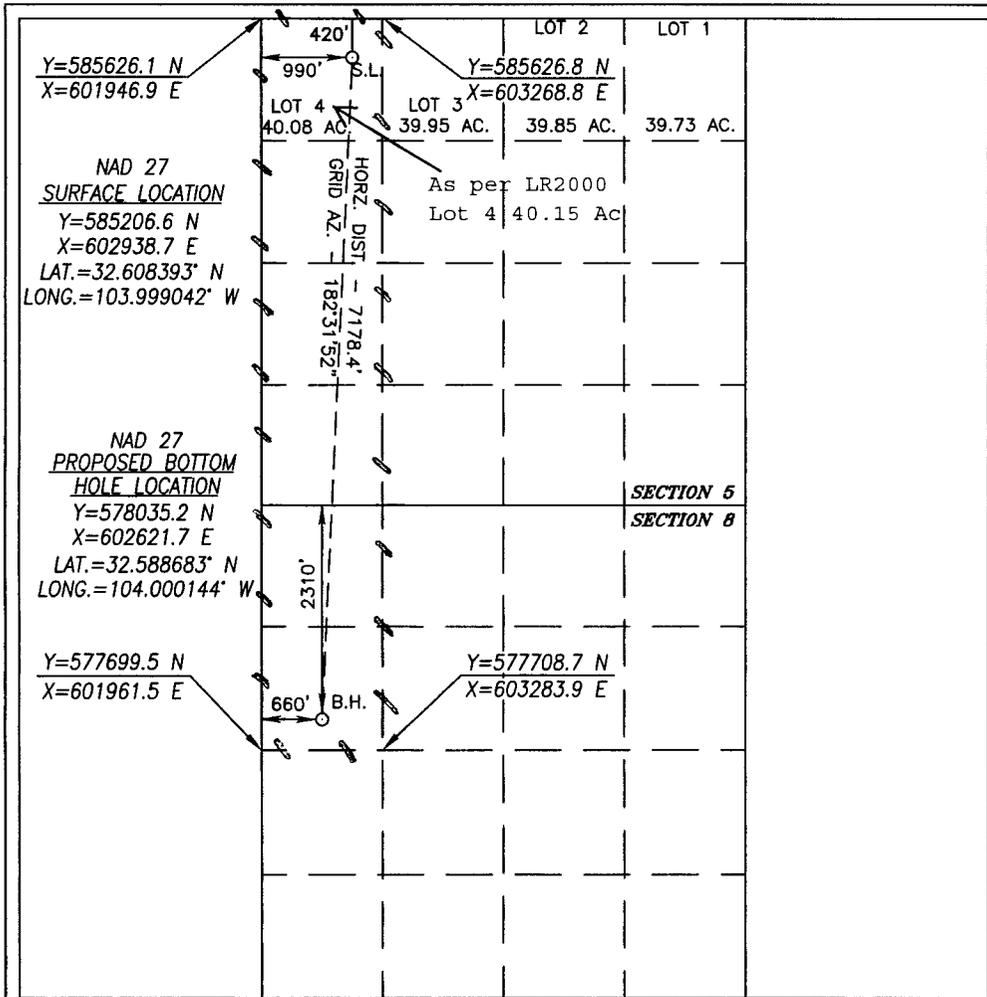
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	5	20-S	30-E		420	NORTH	990	WEST	EDDY

Bottom Hole Location if Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	8	20-S	30-E		2310	NORTH	660	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
240.15			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION
I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature: *Melanie J Parker* Date: 12/11/14
Printed Name: Melanie J Parker
E-mail Address: mparker@concho.com

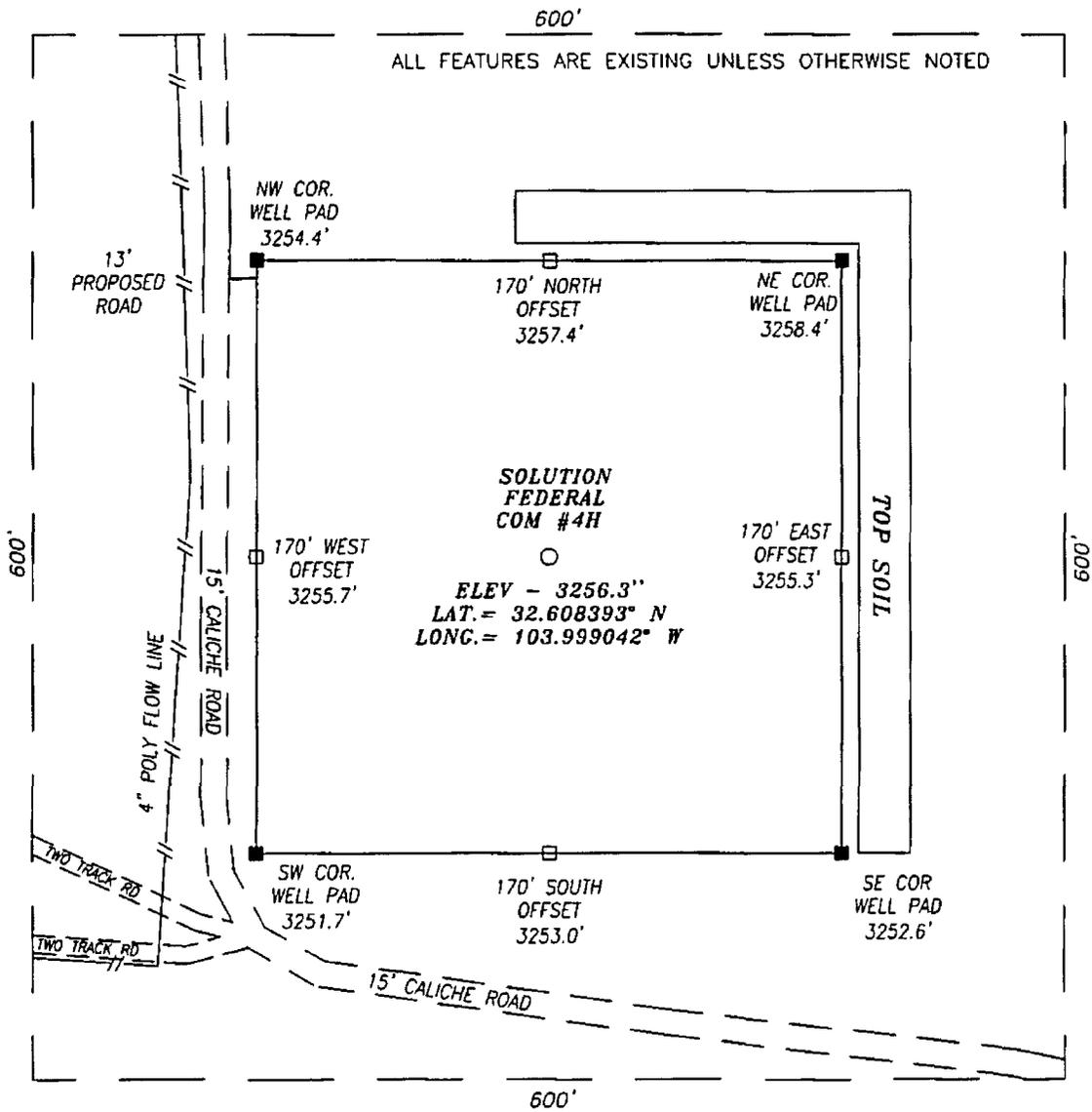
SURVEYOR CERTIFICATION
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

AUGUST 8, 2014
Date of Survey

Signature & Seal of Professional Surveyor

Chad L. Harcrow 10/07/14
Certificate No. CHAD HARCROW 17777
W.O. # 14-980 DRAWN BY: JC

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST, N.M.P.M.,
 EDDY COUNTY NEW MEXICO

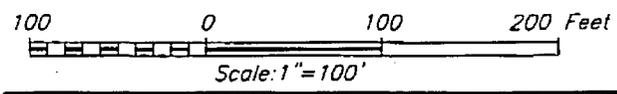


DIRECTIONS TO LOCATION
 FROM THE INTERSECTION OF HWY 360 (BLUESTEM RD.) AND CR #235 (CURRY COMB RD.) GO APPROX. 2.3 MILES NORTHWEST ALONG CR #235 (CURRY COMB RD.); THEN TURN LEFT SOUTHWEST AND GO APPROX 1.1 MILES; THEN TURN RIGHT (WEST) AND GO APPROX. 0.35 MILE; THEN TURN RIGHT (NORTH) AND GO APPROX. 350 FEET; THEN PROPOSED WELL IS APPROX. 250 FEET SOUTHEAST.

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



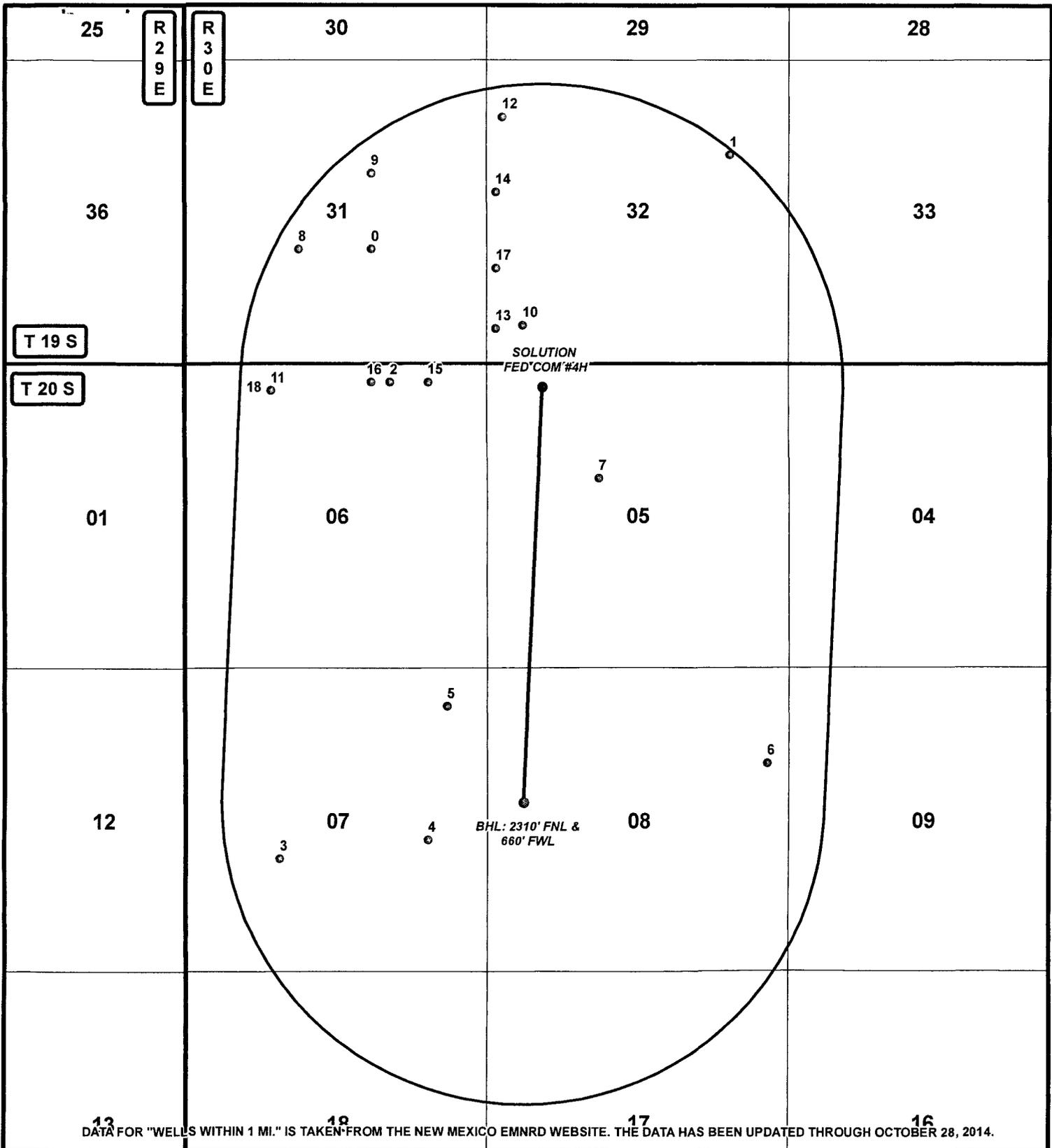
CERTIFICATION
 I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow
 CHAD HARCROW N.M.P.S. NO. 17777

2/11/16
 DATE

COG OPERATING, LLC		
SOLUTION FEDERAL COM #4H WELL LOCATED 420 FEET FROM THE NORTH LINE AND 990 FEET FROM THE WEST LINE OF SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO		
SURVEY DATE: 8/8/2014	PAGE: 1 OF 1	
DRAFTING DATE: 10/28/2014		
APPROVED BY: CH	DRAWN BY: JC	FILE: 14-1052



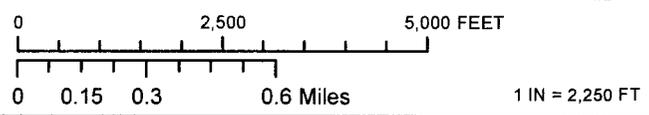
DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH OCTOBER 28, 2014.

LEGEND

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

SOLUTION FED COM #4H

SEC: 5 TWP: 20 S. RGE: 30 E. ELEVATION: 3256.3'
 STATE: NEW MEXICO COUNTY: EDDY 420' FNL & 990' FWL
 W.O. # 14-1052 LEASE: SOLUTION FED COM SURVEY: N.M.P.M



1 MILE MAP 10/28/2014 S.P.



Solution Federal Com #4H

FID	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	H & W FOGERTY	STOREY 001	32.615105	-104.009282	3001504651	31	19.0S	30E	1980 S		1980 E		0	Plugged
1	HENRY BLACK DRLG CO	STATE LOWE 002	32.619602	-103.988884	3001504653	32	19.0S	30E	1650 N		990 E		0	Plugged
2	MARK WHELAN	RIGGS 001	32.608755	-104.008212	3001504661	6	20.0S	30E	330 N		1650 E		0	Plugged
3	ANDERSON-PRICHARD OIL CO	Federal 7 001	32.586077	-104.014551	3001504663	7	20.0S	30E	1980 S		1650 W		0	Plugged
4	A J HARDENDORF	RIGGS 001	32.586974	-104.006098	3001504664	7	20.0S	30E	2310 S		990 E		0	Plugged
5	GROVER-MANN BRO	RIGGS 001	32.593327	-104.00499	3001504665	7	20.0S	30E	660 N		660 E		0	Plugged
6	CONTINENTAL OIL	Cunningham 001	32.590619	-103.986775	3001504666	8	20.0S	30E	1650 N		330 E		0	Plugged
7	IKE LOVELADY INC	CONTINENTAL FED 5 001	32.604201	-103.996358	3001510003	5	20.0S	30E	1980 N		1980 W		0	Plugged
8	EASTLAND OIL CO	RONADERO FEDERAL 002	32.615109	-104.013414	3001526222	31	19.0S	30E	1980 S		1980 W		0	Plugged
9	YATES PETROLEUM CORPORATION	HANAGAN APL FEDERAL COM 001	32.618733	-104.009277	3001528635	31	19.0S	30E	1980 N		1980 E		12140	Active
10	COG OPERATING LLC	STRAIGHT JOE STATE COM 001	32.611466	-104.000673	3001534068	32	19.0S	30E	660 S		660 W		12180	Active
11	CIMAREX ENERGY CO. OF COLORADO	BURTON 6 FEDERAL 002E	32.608359	-104.01499	3001538486	6	20.0S	30E	476 N		1501 W		0	New (Not drilled or compl)
12	COG OPERATING LLC	SHOELESS JOE 32 STATE COM 001H	32.621448	-104.001832	3001540586	32	19.0S	30E	990 N		300 W		8440	New (Not drilled or compl)
13	COG OPERATING LLC	SHOELESS JOE 32 STATE COM 004H	32.611304	-104.002207	3001541242	32	19.0S	30E	600 S		190 W		8378	New (Not drilled or compl)
14	COG OPERATING LLC	SHOELESS JOE 32 STATE COM 002H	32.61782	-104.002197	3001541238	32	19.0S	30E	2310 N		190 W		0	New (Not drilled or compl)
15	CIMAREX ENERGY CO.	BURTON 6 FEDERAL COM 004H	32.608753	-104.006058	3001539332	6	20.0S	30E	330 N		990 E		0	New (Not drilled or compl)
16	CIMAREX ENERGY CO.	BURTON 6 FEDERAL 003H	32.608756	-104.009288	3001539331	6	20.0S	30E	330 N		1980 E		0	New (Not drilled or compl)
17	COG OPERATING LLC	SHOELESS JOE 32 STATE COM 003H	32.61419	-104.002203	3001541028	32	19.0S	30E	1650 S		190 W		8405	New (Not drilled or compl)
18	CIMAREX ENERGY CO.	BURTON 6 FEDERAL 002H	32.608361	-104.014993	3001542352	6	20.0S	30E	475 N		1500 W		0	New (Not drilled or compl)

COG Operating LLC, Solution Federal Com #4H

1. Geologic Formations

TVD of target @ EOC	8350'	Pilot hole depth	NA
MD at TD:	15285'	Deepest expected fresh water:	148'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards*
Quaternary Fill	Surface	Fresh Water	
Rustler	136'	Fresh Water	
Top of Salt	399'	Salt	
Tansill	1496'	Barren	
Yates	1576'	Barren	
Capitan Reef	1968'	Water	
Delaware Group	3394'	Oil/Gas	
Bone Spring	6148'	Oil/Gas	
2 nd Bone Spring	8012'	Target Zone	
3 rd Bone Spring	9094'	Will Not Penetrate	

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

2. Casing Program

per Alex Korzenewski

See COA

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
26"	0	350'	20"	94	J55	STC	3.36	2.54	23.80
17 1/2"	0	1600' <i>1710'</i>	13.375"	54.5	J55	STC	1.36	1.77	6.28
12 1/4"	0'	3414'	9.625"	40	J55	LTC	1.66	1.01	3.81
8 3/4"	0	7809'	7.0"	26	P110	BTC	1.59	1.33	4.20
8 3/4"	7809'	15285'	5.5 "	17	P110	BTC	1.90	1.33	4.30
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations.
- Assumed 9.0 ppg MW equivalent pore pressure thru entire wellbore.

COG Operating LLC, Solution Federal Com #4H

	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?	Y
If yes, does production casing cement tie back a minimum of 50' above the Reef?	Y
Is well within the designated 4 string boundary.	Y
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	Y
If yes, are the first three strings cemented to surface?	Y
Is 2 nd string set 100' to 600' below the base of salt?	Y
Is well located in high Cave/Karst?	Y
If yes, are there two strings cemented to surface?	Y
(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?	

. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft/sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	875	13.5	1.75	9.2	10	Lead: Class C + 4.0% Gel+2% CaCl ₂ + 0.25 pps CF
	325	14.8	1.34	6.3	6	Tail: Class C + 2% CaCl ₂ + 0.25 pps CF
1 st Inter.	1200	12.7	1.75	11.5	10	Lead: Class "C" + 4.0 % Gel+2% CaCl ₂ + 0.25 pps CF
	375	14.8	1.32	6.3	6	Tail: Class C + 2% CaCl ₂ +0.25 pps CF
2nd Inter.	300	11.8	2.45	14.4	72	1 st stage Lead: 50:50:10 C: Poz:Gel w/5% Salt + 5 pps LCM + 0.25 pps CF
	250	14.8	1.32	6.3	6	1 st stage Tail: Class "C" w/2% CaCl ₂ + 0.25 pps CF
	DV Tool/ ECP @ approx. 1918'					
	425	11.8	2.45	14.4	72	2 nd stage lead: 50:50:10 C:Poz:Gel w/5% Salt+ 5 pps LCM + 0.25 pps CF
	200	14.8	1.32	6.3	6	2 nd stage Tail: Class "C" + 2% CaCl ₂ + 0.25 pps CF

COG Operating LLC, Solution Federal Com #4H

*See
CEA*

Prod.	600	11.9	2.51	14.2	22	Lead: EconoCem-H+ 0.5% Halad-322 + 5 pps Kol-Seal + 0.25 pps D-AIR 5000 + 0.2% HR-601
	1850	14.4	1.24	5.7	8	Tail: VersaCem + 0.4% GasStop+ 0.3% CFR-3 + 1% Salt + 0.1% HR-601

DV tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	100%
1 st Intermediate	0'	100%
2 nd Intermediate	0'	100%
Production	0'	35%

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	✓	Tested to:
17 1/2"	20"	2M	Annular	x	50% of working pressure 2000 psi WP
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		
12 1/4"	13 5/8"	2M	Annular	x	50% testing pressure 2000 psi WP
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		
8 3/4" & 7 7/8"	13 5/8"	3M	Annular	x	3000 psi WP
			Blind Ram	x	
			Pipe Ram	x	
			Double Ram		
			Other*		

*Specify if additional ram is utilized.

COG Operating LLC, Solution Federal Com #4H

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.

N	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.
N	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.
NA	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	Fresh Water	8.4-8.6	29-40	N/C
Surf shoe	1 st Int. shoe	Brine	10.0-10.1	29-32	N/C
1 st Int. shoe	2 nd Int. shoe	Fresh Water	8.4-8.7	28-32	N/C
2 nd Int. shoe	TD	Cut Brine	8.4-9.0	29-36	N/C

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.	
X	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.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	3665 psi
Abnormal Temperature	No

If severe losses are encountered in the Capitan Reef and hole conditions allow, dry drilling to TD while using only fresh water in mud system will be the preferred operation. If hole conditions do not allow dry drilling with fresh water – LCM sweeps, cement plugs, air or other loss circulation remedies may be introduced to operations to manage lost circulation. Cement will be circulated to surface in two stages using a stage tool and an external casing packer to isolate the weaker zones in the Capitan Reef.

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

Is this a walking operation? No

- No casings will be pre-set
- Anti-Collision practices will be used to avoid collision in vertical well bores

Attachments:

- BOP & Choke schematics
- Directional plan
- C102 and supporting maps
- Anti-collision report
- Rig plat schematic
- H2S plan schematic
- H2S contingency plan
- Interim reclamation plat

GEG: 10/22/14

NM OIL CONSERVATION
ARTESIA DISTRICT

DEC 22 2016

RECEIVED

COG OPERATING, LLC

**Eddy County, NM
Solution Federal Com 4H
4H**

Lateral

Plan: Plan #2

Standard Planning Report

21 October, 2014

Section Distances
Sec5,T20S,R30E
SHL - Lot 4
420'FNL, 990'FWL
Sec8,T20S,R30E
PBHL - Unit E
2310'FNL,660'FWL

Archer

Planning Report

Database:	EDM R5000.1 MULTI	Local Co-ordinate Reference:	Well 4H
Company:	COG OPERATING, LLC	TVD Reference:	3256'GL+19'KB @ 3275.00usft (Planning)
Project:	Eddy County, NM	MD Reference:	3256'GL+19'KB @ 3275.00usft (Planning)
Site:	Solution Federal Com 4H	North Reference:	Grid
Well:	4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral		
Design:	Plan #2		

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		Solution Federal 4H			
Site Position:		Northing:	585,206.60 usft	Latitude:	32° 36' 30.21 N
From:	Map	Easting:	602,938.70 usft	Longitude:	103° 59' 56.55 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence:	0.18 °

Well		4H				
Well Position	+N/-S	0.00 usft	Northing:	585,206.60 usft	Latitude:	32° 36' 30.21 N
	+E/-W	0.00 usft	Easting:	602,938.70 usft	Longitude:	103° 59' 56.55 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,256.00 usft	

Wellbore		Lateral			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/21/2014	7.73	60.52	48,511

Design		Plan #2			
Audit Notes:					
Version:		Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.00	0.00	0.00	182.53

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7,809.13	0.00	0.00	7,809.13	0.00	0.00	0.00	0.00	0.00	0.00	
8,625.75	89.83	182.53	8,330.00	-518.80	-22.93	11.00	11.00	0.00	182.53	
15,284.87	89.83	182.53	8,350.00	-7,171.40	-317.00	0.00	0.00	0.00	0.00	Solution 4H PBHL

Archer

Planning Report

Database: EDM R5000.1 MULTI
Company: COG OPERATING, LLC
Project: Eddy County, NM
Site: Solution Federal Com 4H
Well: 4H
Wellbore: Lateral
Design: Plan #2

Local Co-ordinate Reference: Well 4H
TVD Reference: 3256'GL+19'KB @ 3275.00usft (Planning)
MD Reference: 3256'GL+19'KB @ 3275.00usft (Planning)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

Archer

Planning Report

Database: EDM R5000.1 MULTI
Company: COG OPERATING, LLC
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North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,809.13	0.00	0.00	7,809.13	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 11.00									
7,850.00	4.50	182.53	7,849.96	-1.60	-0.07	1.60	11.00	11.00	0.00
7,900.00	10.00	182.53	7,899.54	-7.90	-0.35	7.91	11.00	11.00	0.00
7,950.00	15.50	182.53	7,948.29	-18.92	-0.84	18.93	11.00	11.00	0.00
8,000.00	21.00	182.53	7,995.76	-34.55	-1.53	34.58	11.00	11.00	0.00
8,050.00	26.50	182.53	8,041.51	-54.66	-2.42	54.71	11.00	11.00	0.00
8,100.00	32.00	182.53	8,085.12	-79.05	-3.49	79.13	11.00	11.00	0.00
8,150.00	37.50	182.53	8,126.19	-107.51	-4.75	107.61	11.00	11.00	0.00
8,200.00	43.00	182.53	8,164.33	-139.77	-6.18	139.90	11.00	11.00	0.00
8,250.00	48.50	182.53	8,199.21	-175.53	-7.76	175.70	11.00	11.00	0.00
8,300.00	54.00	182.53	8,230.50	-214.47	-9.48	214.68	11.00	11.00	0.00
8,350.00	59.50	182.53	8,257.91	-256.23	-11.33	256.48	11.00	11.00	0.00
8,400.00	65.00	182.53	8,281.18	-300.41	-13.28	300.71	11.00	11.00	0.00
8,450.00	70.50	182.53	8,300.11	-346.63	-15.32	346.96	11.00	11.00	0.00
8,500.00	76.00	182.53	8,314.52	-394.44	-17.44	394.82	11.00	11.00	0.00
8,550.00	81.50	182.53	8,324.27	-443.41	-19.60	443.84	11.00	11.00	0.00
8,600.00	87.00	182.53	8,329.28	-493.09	-21.80	493.57	11.00	11.00	0.00
8,625.75	89.83	182.53	8,330.00	-518.80	-22.93	519.31	11.00	11.00	0.00
Start 6659.13 hold at 8625.75 MD									
8,700.00	89.83	182.53	8,330.22	-592.98	-26.21	593.56	0.00	0.00	0.00
8,800.00	89.83	182.53	8,330.52	-692.88	-30.63	693.56	0.00	0.00	0.00
8,900.00	89.83	182.53	8,330.82	-792.78	-35.04	793.56	0.00	0.00	0.00
9,000.00	89.83	182.53	8,331.12	-892.69	-39.46	893.56	0.00	0.00	0.00
9,100.00	89.83	182.53	8,331.42	-992.59	-43.88	993.56	0.00	0.00	0.00
9,200.00	89.83	182.53	8,331.72	-1,092.49	-48.29	1,093.56	0.00	0.00	0.00
9,300.00	89.83	182.53	8,332.02	-1,192.39	-52.71	1,193.56	0.00	0.00	0.00
9,400.00	89.83	182.53	8,332.32	-1,292.29	-57.12	1,293.56	0.00	0.00	0.00
9,500.00	89.83	182.53	8,332.62	-1,392.20	-61.54	1,393.56	0.00	0.00	0.00

Archer

Planning Report

Database: EDM R5000.1 MULTI
Company: COG OPERATING, LLC
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Well: 4H
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Design: Plan #2

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North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,600.00	89.83	182.53	8,332.92	-1,492.10	-65.96	1,493.55	0.00	0.00	0.00
9,700.00	89.83	182.53	8,333.22	-1,592.00	-70.37	1,593.55	0.00	0.00	0.00
9,800.00	89.83	182.53	8,333.53	-1,691.90	-74.79	1,693.55	0.00	0.00	0.00
9,900.00	89.83	182.53	8,333.83	-1,791.80	-79.20	1,793.55	0.00	0.00	0.00
10,000.00	89.83	182.53	8,334.13	-1,891.71	-83.62	1,893.55	0.00	0.00	0.00
10,100.00	89.83	182.53	8,334.43	-1,991.61	-88.04	1,993.55	0.00	0.00	0.00
10,200.00	89.83	182.53	8,334.73	-2,091.51	-92.45	2,093.55	0.00	0.00	0.00
10,300.00	89.83	182.53	8,335.03	-2,191.41	-96.87	2,193.55	0.00	0.00	0.00
10,400.00	89.83	182.53	8,335.33	-2,291.31	-101.28	2,293.55	0.00	0.00	0.00
10,500.00	89.83	182.53	8,335.63	-2,391.22	-105.70	2,393.55	0.00	0.00	0.00
10,600.00	89.83	182.53	8,335.93	-2,491.12	-110.12	2,493.55	0.00	0.00	0.00
10,700.00	89.83	182.53	8,336.23	-2,591.02	-114.53	2,593.55	0.00	0.00	0.00
10,800.00	89.83	182.53	8,336.53	-2,690.92	-118.95	2,693.55	0.00	0.00	0.00
10,900.00	89.83	182.53	8,336.83	-2,790.82	-123.36	2,793.55	0.00	0.00	0.00
11,000.00	89.83	182.53	8,337.13	-2,890.73	-127.78	2,893.55	0.00	0.00	0.00
11,100.00	89.83	182.53	8,337.43	-2,990.63	-132.20	2,993.55	0.00	0.00	0.00
11,200.00	89.83	182.53	8,337.73	-3,090.53	-136.61	3,093.55	0.00	0.00	0.00
11,300.00	89.83	182.53	8,338.03	-3,190.43	-141.03	3,193.55	0.00	0.00	0.00
11,400.00	89.83	182.53	8,338.33	-3,290.33	-145.44	3,293.55	0.00	0.00	0.00
11,500.00	89.83	182.53	8,338.63	-3,390.24	-149.86	3,393.55	0.00	0.00	0.00
11,600.00	89.83	182.53	8,338.93	-3,490.14	-154.28	3,493.55	0.00	0.00	0.00
11,700.00	89.83	182.53	8,339.23	-3,590.04	-158.69	3,593.55	0.00	0.00	0.00
11,800.00	89.83	182.53	8,339.53	-3,689.94	-163.11	3,693.55	0.00	0.00	0.00
11,900.00	89.83	182.53	8,339.83	-3,789.84	-167.52	3,793.54	0.00	0.00	0.00
12,000.00	89.83	182.53	8,340.13	-3,889.75	-171.94	3,893.54	0.00	0.00	0.00
12,100.00	89.83	182.53	8,340.43	-3,989.65	-176.36	3,993.54	0.00	0.00	0.00
12,200.00	89.83	182.53	8,340.73	-4,089.55	-180.77	4,093.54	0.00	0.00	0.00
12,300.00	89.83	182.53	8,341.03	-4,189.45	-185.19	4,193.54	0.00	0.00	0.00
12,400.00	89.83	182.53	8,341.33	-4,289.35	-189.60	4,293.54	0.00	0.00	0.00
12,500.00	89.83	182.53	8,341.64	-4,389.26	-194.02	4,393.54	0.00	0.00	0.00
12,600.00	89.83	182.53	8,341.94	-4,489.16	-198.44	4,493.54	0.00	0.00	0.00
12,700.00	89.83	182.53	8,342.24	-4,589.06	-202.85	4,593.54	0.00	0.00	0.00
12,800.00	89.83	182.53	8,342.54	-4,688.96	-207.27	4,693.54	0.00	0.00	0.00
12,900.00	89.83	182.53	8,342.84	-4,788.86	-211.68	4,793.54	0.00	0.00	0.00
13,000.00	89.83	182.53	8,343.14	-4,888.77	-216.10	4,893.54	0.00	0.00	0.00
13,100.00	89.83	182.53	8,343.44	-4,988.67	-220.52	4,993.54	0.00	0.00	0.00
13,200.00	89.83	182.53	8,343.74	-5,088.57	-224.93	5,093.54	0.00	0.00	0.00
13,300.00	89.83	182.53	8,344.04	-5,188.47	-229.35	5,193.54	0.00	0.00	0.00
13,400.00	89.83	182.53	8,344.34	-5,288.37	-233.76	5,293.54	0.00	0.00	0.00
13,500.00	89.83	182.53	8,344.64	-5,388.28	-238.18	5,393.54	0.00	0.00	0.00
13,600.00	89.83	182.53	8,344.94	-5,488.18	-242.60	5,493.54	0.00	0.00	0.00
13,700.00	89.83	182.53	8,345.24	-5,588.08	-247.01	5,593.54	0.00	0.00	0.00
13,800.00	89.83	182.53	8,345.54	-5,687.98	-251.43	5,693.54	0.00	0.00	0.00
13,900.00	89.83	182.53	8,345.84	-5,787.88	-255.84	5,793.54	0.00	0.00	0.00
14,000.00	89.83	182.53	8,346.14	-5,887.79	-260.26	5,893.54	0.00	0.00	0.00
14,100.00	89.83	182.53	8,346.44	-5,987.69	-264.68	5,993.53	0.00	0.00	0.00
14,200.00	89.83	182.53	8,346.74	-6,087.59	-269.09	6,093.53	0.00	0.00	0.00
14,300.00	89.83	182.53	8,347.04	-6,187.49	-273.51	6,193.53	0.00	0.00	0.00
14,400.00	89.83	182.53	8,347.34	-6,287.39	-277.92	6,293.53	0.00	0.00	0.00
14,500.00	89.83	182.53	8,347.64	-6,387.30	-282.34	6,393.53	0.00	0.00	0.00
14,600.00	89.83	182.53	8,347.94	-6,487.20	-286.76	6,493.53	0.00	0.00	0.00
14,700.00	89.83	182.53	8,348.24	-6,587.10	-291.17	6,593.53	0.00	0.00	0.00
14,800.00	89.83	182.53	8,348.54	-6,687.00	-295.59	6,693.53	0.00	0.00	0.00
14,900.00	89.83	182.53	8,348.84	-6,786.90	-300.00	6,793.53	0.00	0.00	0.00

Archer

Planning Report

Database: EDM R5000.1 MULTI
Company: COG OPERATING, LLC
Project: Eddy County, NM
Site: Solution Federal Com 4H
Well: 4H
Wellbore: Lateral
Design: Plan #2

Local Co-ordinate Reference: Well 4H
TVD Reference: 3256'GL+19'KB @ 3275.00usft (Planning)
MD Reference: 3256'GL+19'KB @ 3275.00usft (Planning)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,000.00	89.83	182.53	8,349.14	-6,886.81	-304.42	6,893.53	0.00	0.00	0.00
15,100.00	89.83	182.53	8,349.44	-6,986.71	-308.84	6,993.53	0.00	0.00	0.00
15,200.00	89.83	182.53	8,349.75	-7,086.61	-313.25	7,093.53	0.00	0.00	0.00
15,284.87	89.83	182.53	8,350.00	-7,171.40	-317.00	7,178.40	0.00	0.00	0.00

TD at 15284.87

Design Targets

Target Name - hit/mis target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Solution 4H Surface - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	585,206.60	602,938.70	32° 36' 30.21 N	103° 59' 56.55 W
Solution 4H PBHL - plan hits target center - Point	0.00	0.00	8,350.00	-7,171.40	-317.00	578,035.20	602,621.70	32° 35' 19.26 N	104° 0' 0.52 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,809.13	7,809.13	0.00	0.00	Start Build 11.00
8,625.75	8,330.00	-518.80	-22.93	Start 6659.13 hold at 8625.75 MD
15,284.87	8,350.00	-7,171.40	-317.00	TD at 15284.87

COG OPERATING, LLC

Field: Eddy County, NM
 Site: Solution Federal Cor 4H
 Well: 4H
 Wellbore: Lateral
 Plan: Plan #2

TARGET DETAILS

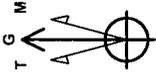
TVD 8350.00 +N/S 0.00 +E/W 0.00 Northing 585206.80 Easting 602938.70
 0.00 -7171.40 0.00 -317.00 578035.20 602621.70
 8350.00 0.00 0.00 32° 36' 30.21 N 103° 59' 56.55 W
 0.00 -7171.40 -317.00 32° 35' 19.26 N 104° 0' 0.52 W

Longitude 103° 59' 56.55 W
 Shape Point

SECTION DETAILS

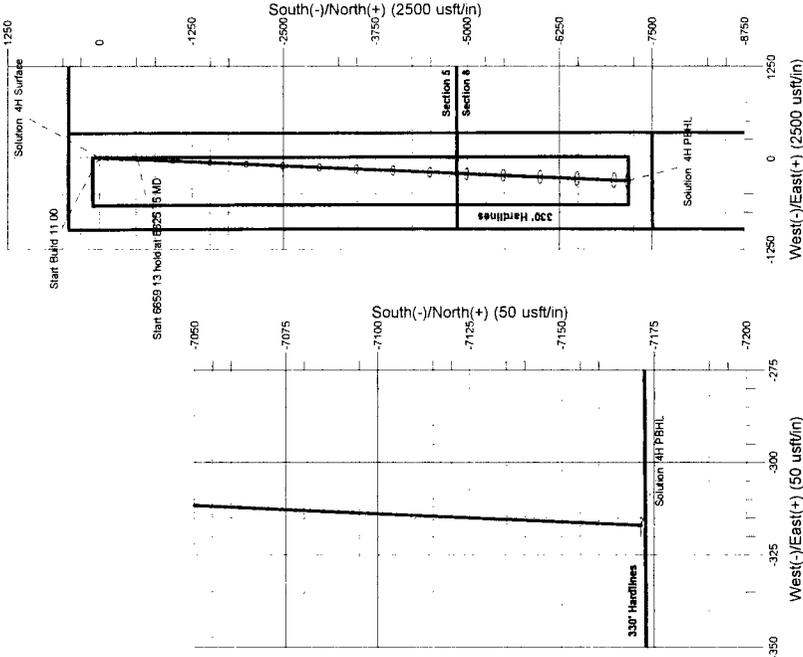
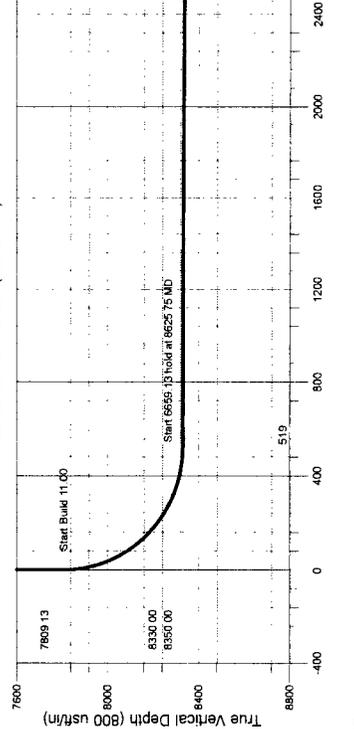
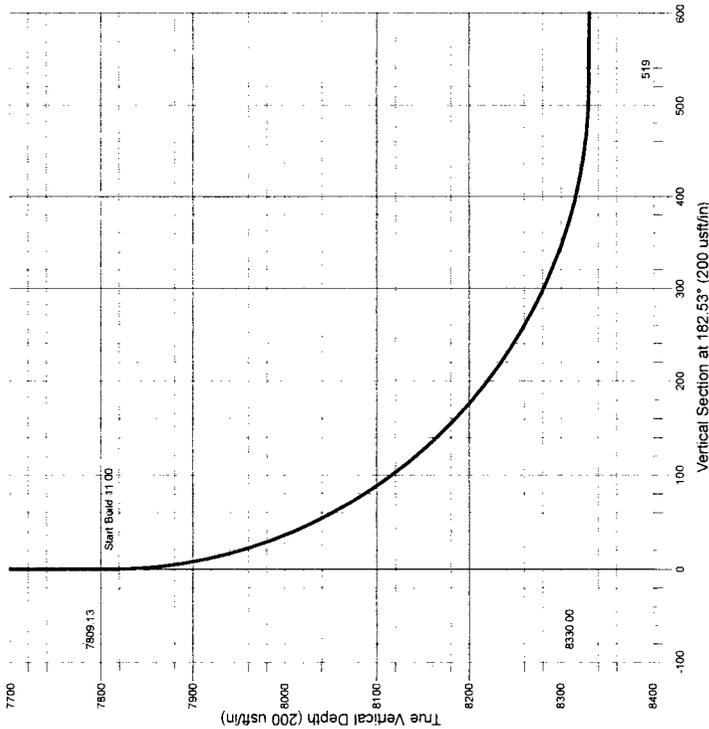
Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Dleg	TFace	V Sect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	7809.13	0.00	0.00	7809.13	0.00	0.00	0.00	0.00	0.00	0.00
3	8625.75	89.83	182.53	8330.00	-518.80	-27.93	11.00	182.53	519.31	0.00
4	15284.87	89.83	182.53	8350.00	-7171.40	-317.00	0.00	0.00	7178.40	Solution 4H PBHL

Section Distances
 Sec5 T20S R30E
 SHL - Unit E
 420'FNL, 900'FWL
 Sec8 T20S R30E
 PBHL - Unit E
 2310'FNL, 660'FWL



Magnetic Field
 Strength: 48511.0snT
 Dip Angle: 60.52°
 Date: 10/21/2014
 Model: HDGM

Azimuths to Grid North
 True North: -0.18°
 Magnetic North: 7.55°



ARCHER DIRECTIONAL DRILLING SERVICES
 12101 Cullen Rd, Houston, Texas 77066
 Phone: 281-301-2600 Fax: 281-301-2795

Design: Plan #2 (4H/Lateral)
 Created By: Ivonne Gonzalez
 Date: 10/21/2014



New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 8

Township: 20S

Range: 30E



New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 5

Township: 20S

Range: 30E



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced,
 O=orphaned,
 C=the file is closed) (quarters are 1=NW 2=NE 3=SW 4=SE)
 (quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
<u>CP 00419</u>			ED	4	3	32	20S	30E		594250	3599003*	262	170	92
<u>CP 00431</u>			ED	2	3	33	20S	30E		595857	3599419*	235	195	40
<u>CP 00532</u>			ED	4	3	4	21	20S	30E	596328	3602138*	335	150	185
<u>CP 00537</u>			LE	3	1	1	36	20S	30E	600176	3600161*	3500		
<u>CP 00551</u>			ED	1	1	1	33	20S	30E	595343	3600320*	286	187	99
<u>CP 00775</u>			ED	2	1	4	11	20S	30E	599515	3605981*	350	40	310
<u>CP 00834</u>			LE	2	3	06	20S	30E		592566	3607436*	120		

Average Depth to Water: **148 feet**
 Minimum Depth: **40 feet**
 Maximum Depth: **195 feet**

Record Count: 7

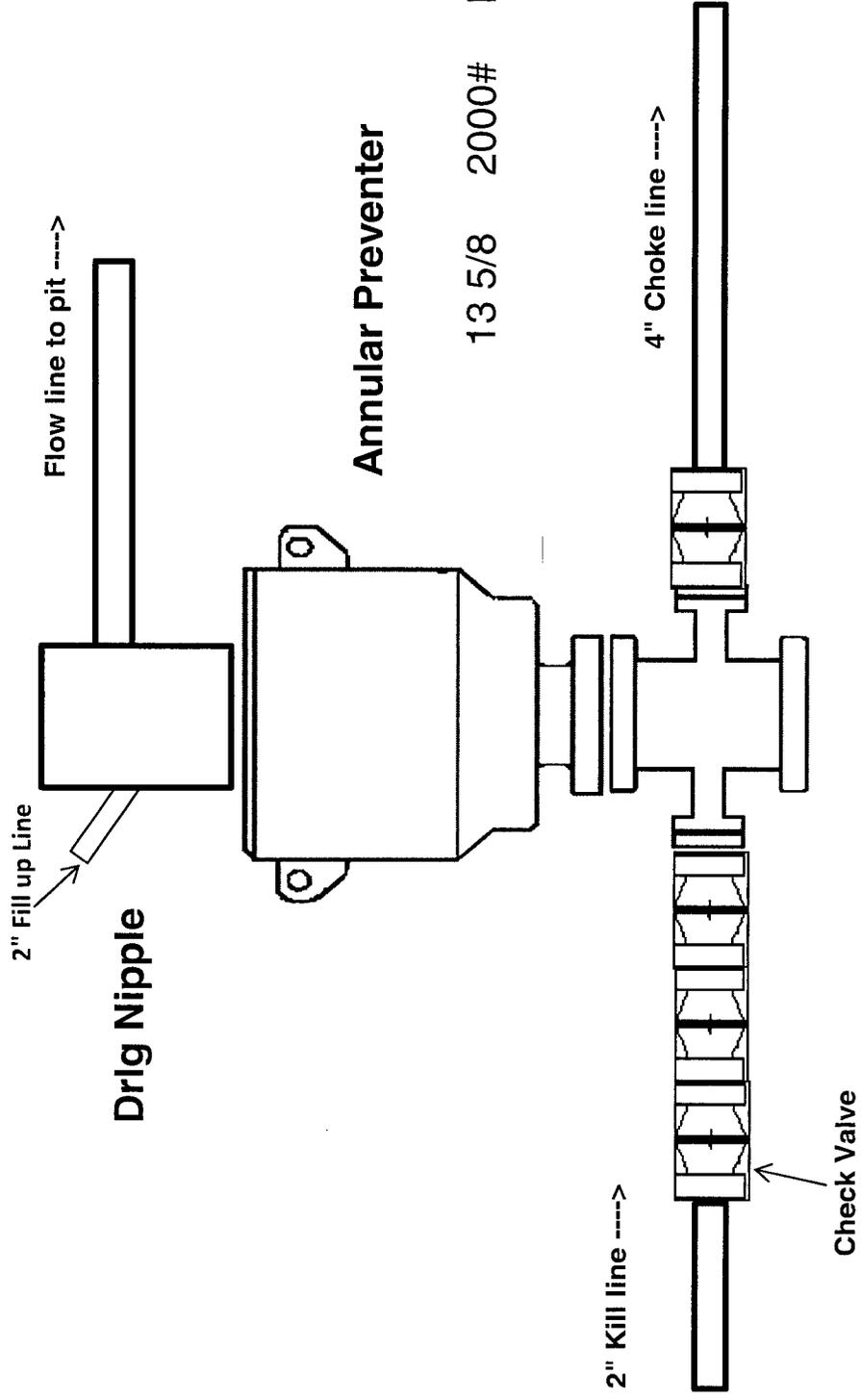
PLSS Search:

Township: 20S Range: 30E

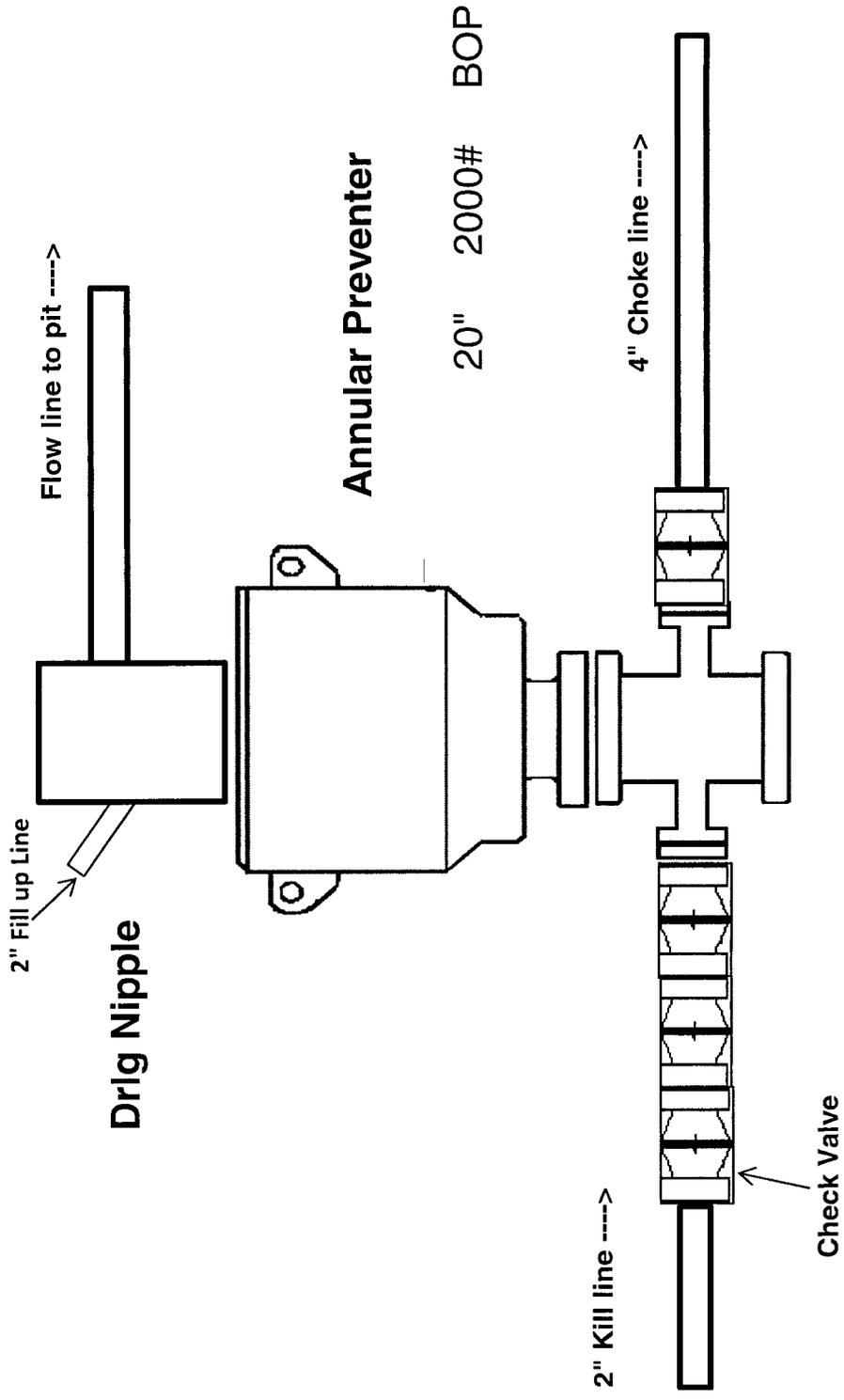
*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

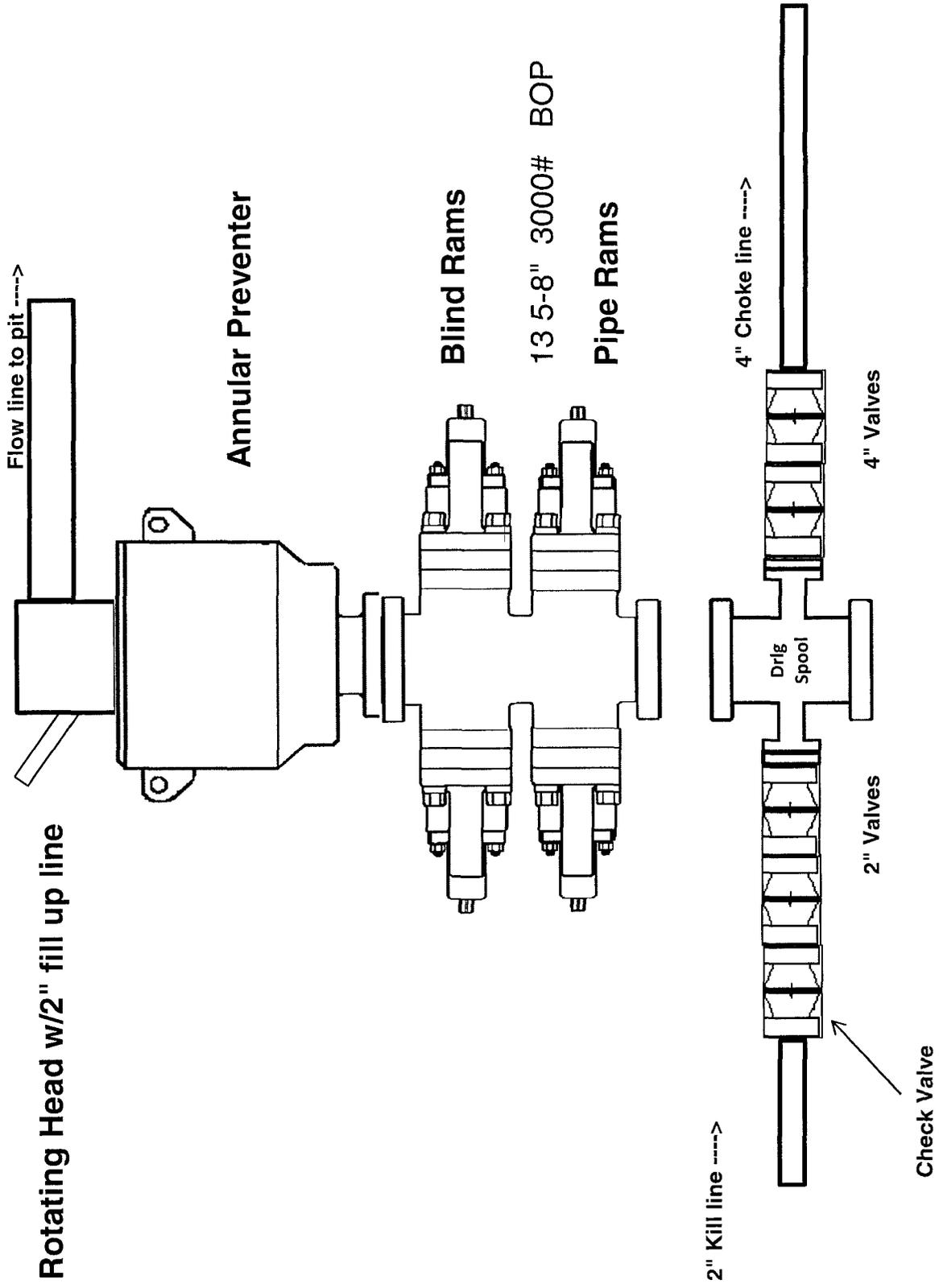
2,000 psi BOP Schematic



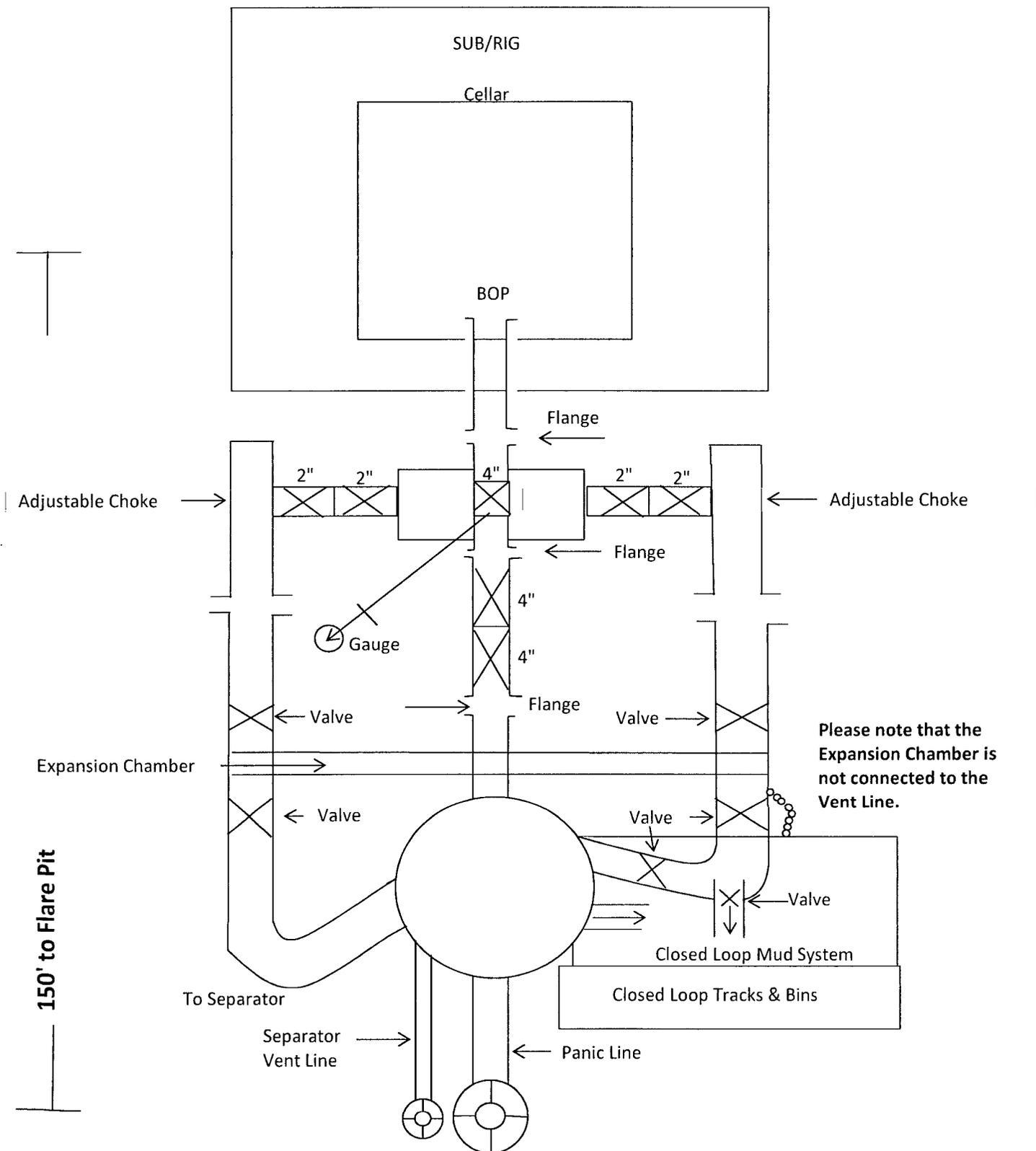
2,000 psi BOP Schematic



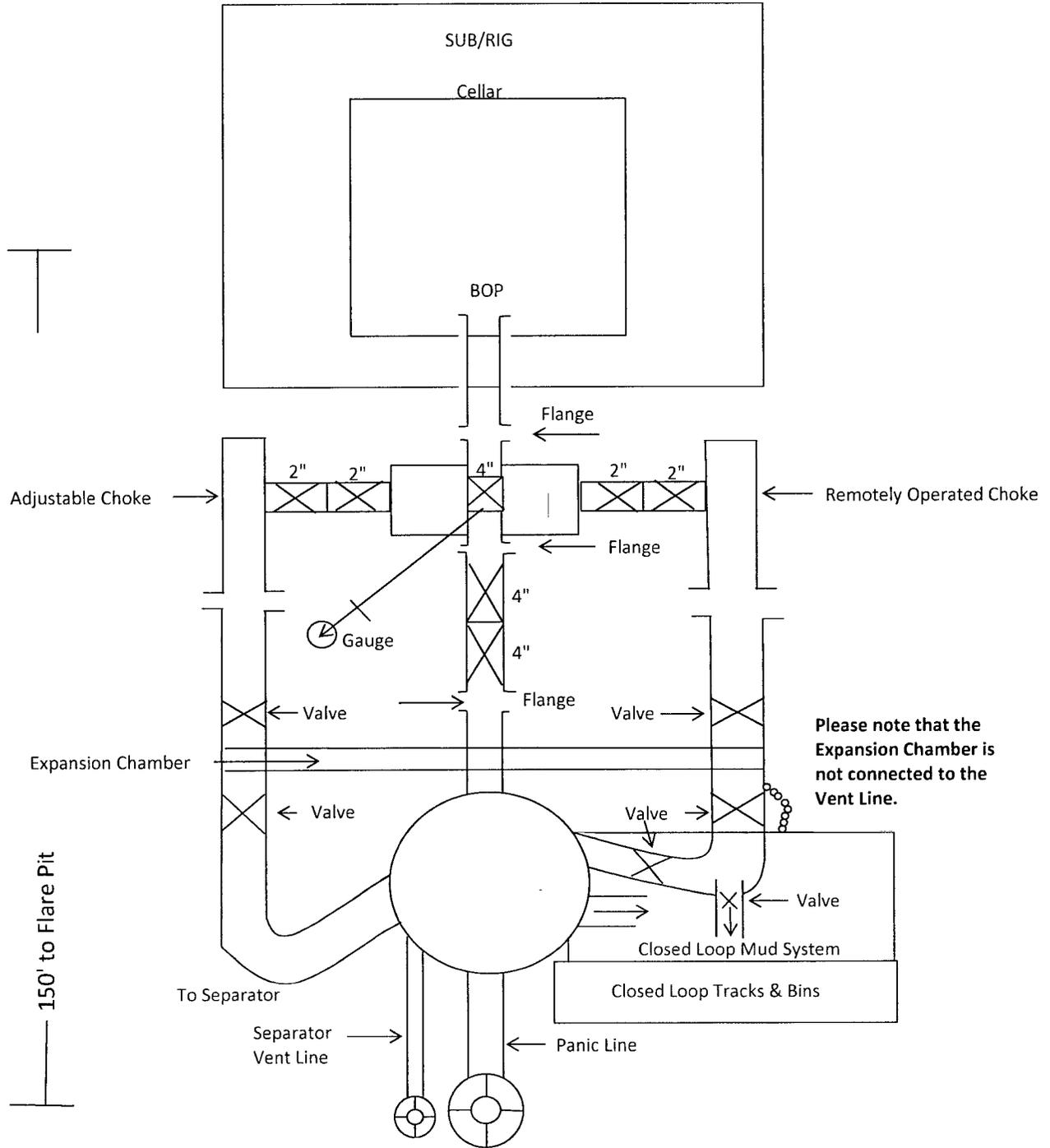
3,000 psi BOP Schematic

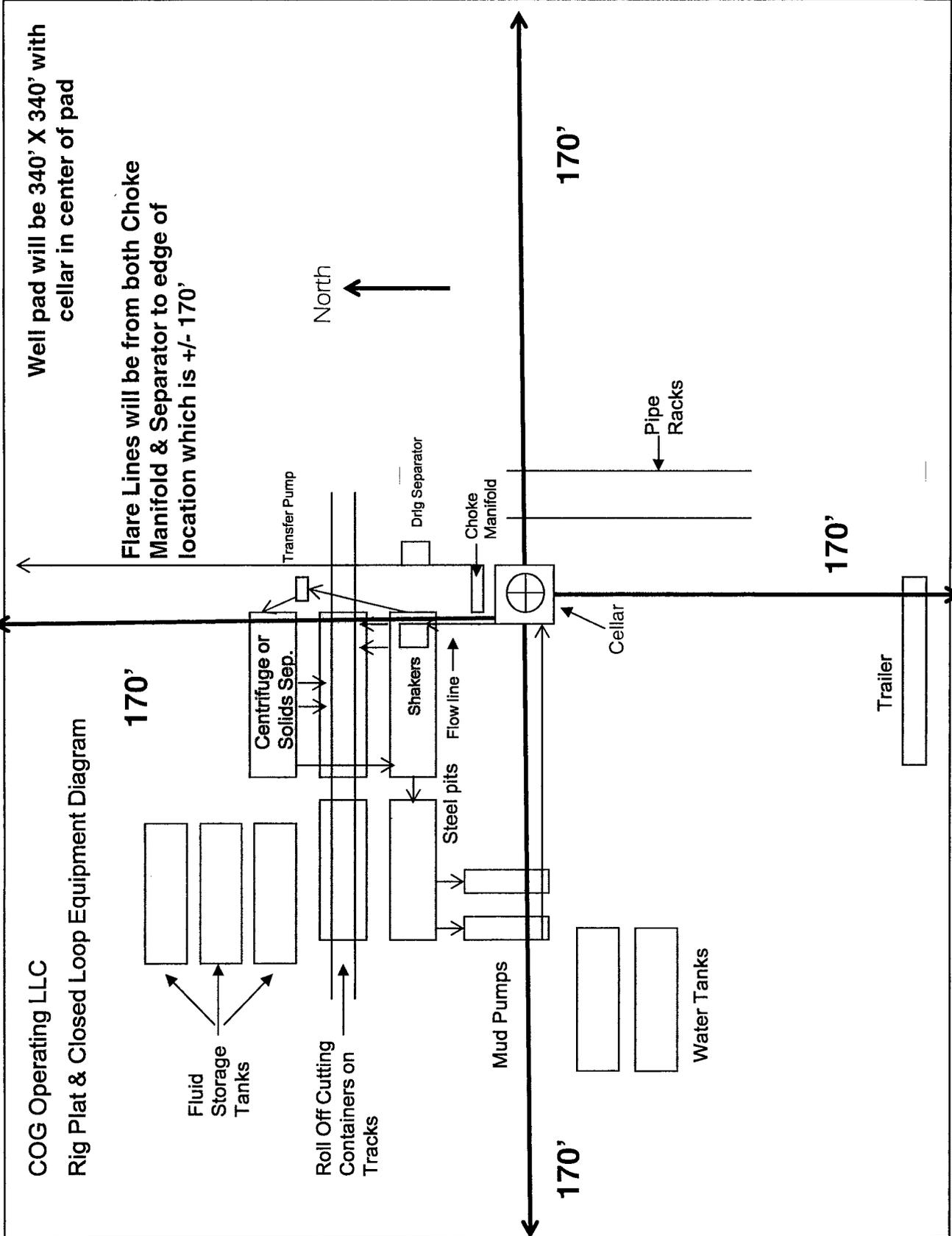


2M Choke Manifold Equipment



3M Choke Manifold Equipment





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

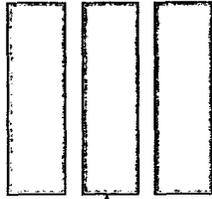
Location Entry
Condition Sign



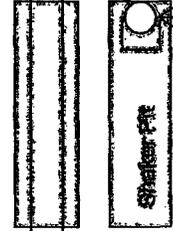
Primary
egress



Fluid
Storage
Tanks



Roll Off Cutting
Containers on
Tracks



Centrifuge or
Solids Sep.

150' Buried Flare Line



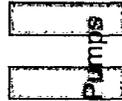
Terrain: Shinnery sand hills.



Steel pits



Mud Pumps



Windstock on
20' pole



Water Tanks



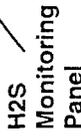
H2S Sensors
1- on rig floor
1- under substructure



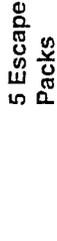
Windstock on
20' pole



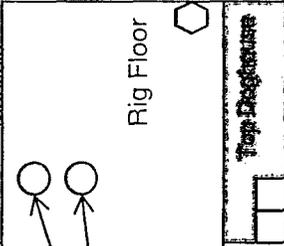
H2S
Monitoring
Panel



5 Escape
Packs



Rig Floor



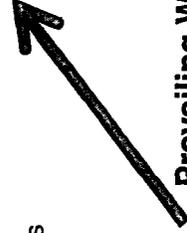
Pipe
Racks



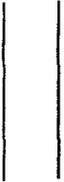
Briefing Area
w/SCBA



Prevailing Wind
Direction in SENM



Secondary egress.



Company Representative's Trailer



Primary Briefing
Area w/SCBA



COG OPERATING 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 (H₂S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H₂S 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 H₂S 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. H₂S SAFETY EQUIPMENT AND SYSTEMS

Note: All H₂S 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 OPERATING 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 H₂S 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 OPERATING LLC

1-575-748-6940

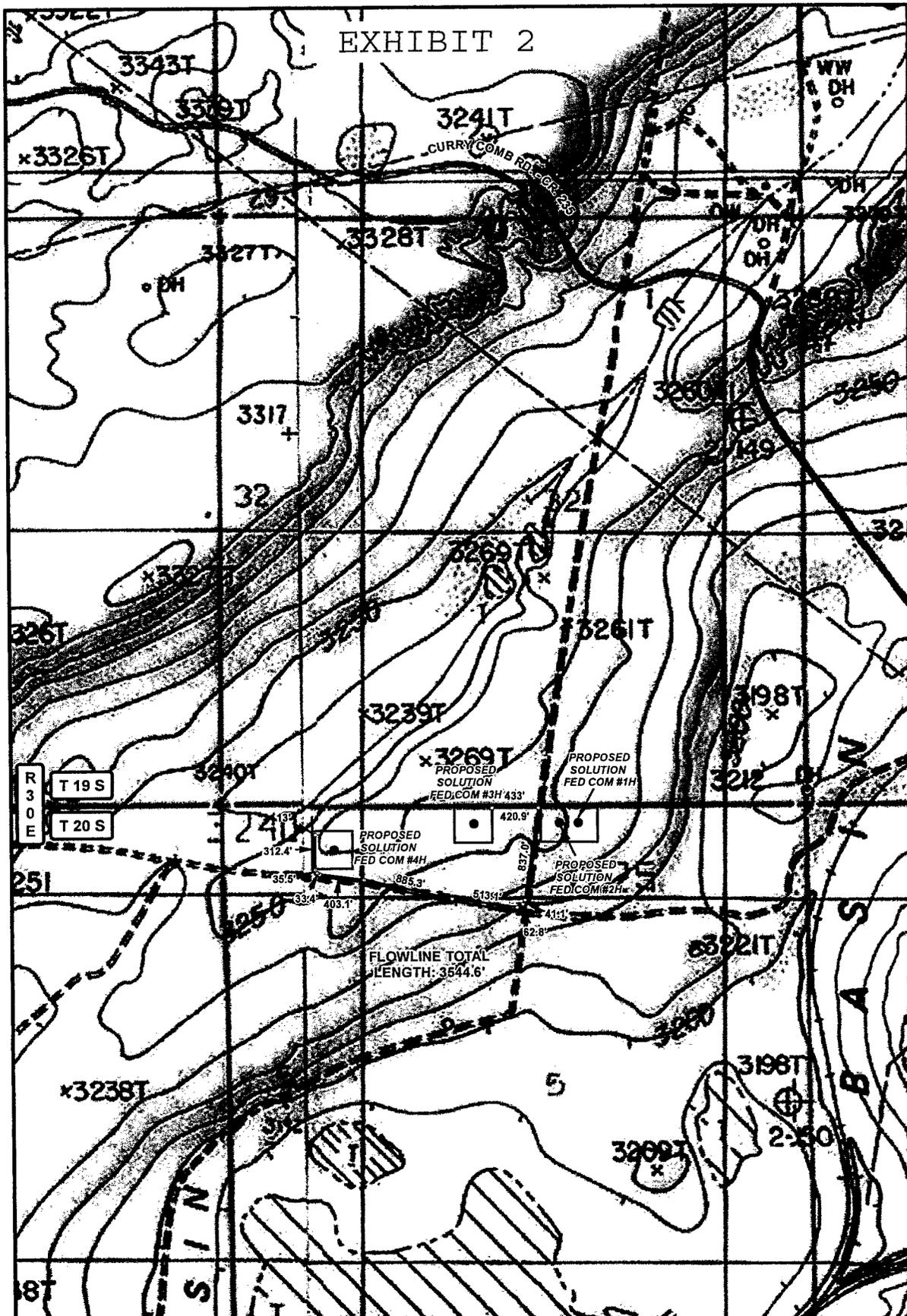
EMERGENCY CALL LIST

	<u>OFFICE</u>	<u>MOBILE</u>
COG OPERATING LLC OFFICE	575-748-6940	
SHERYL BAKER	575-748-6940	432-934-1873
KENT GREENWAY	575-746-2010	432-557-1694
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	<u>OFFICE</u>
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

EXHIBIT 2



LEGEND

- FLOWLINE
- WELL
- WELLPAD
- PROPOSED RD.
- EXISTING RD.

SOLUTION FED COM FLOWLINE

SECTION: 5	TOWNSHIP: 20 S.	RANGE: 30 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 14-1215		LEASE: SOLUTION FED COM

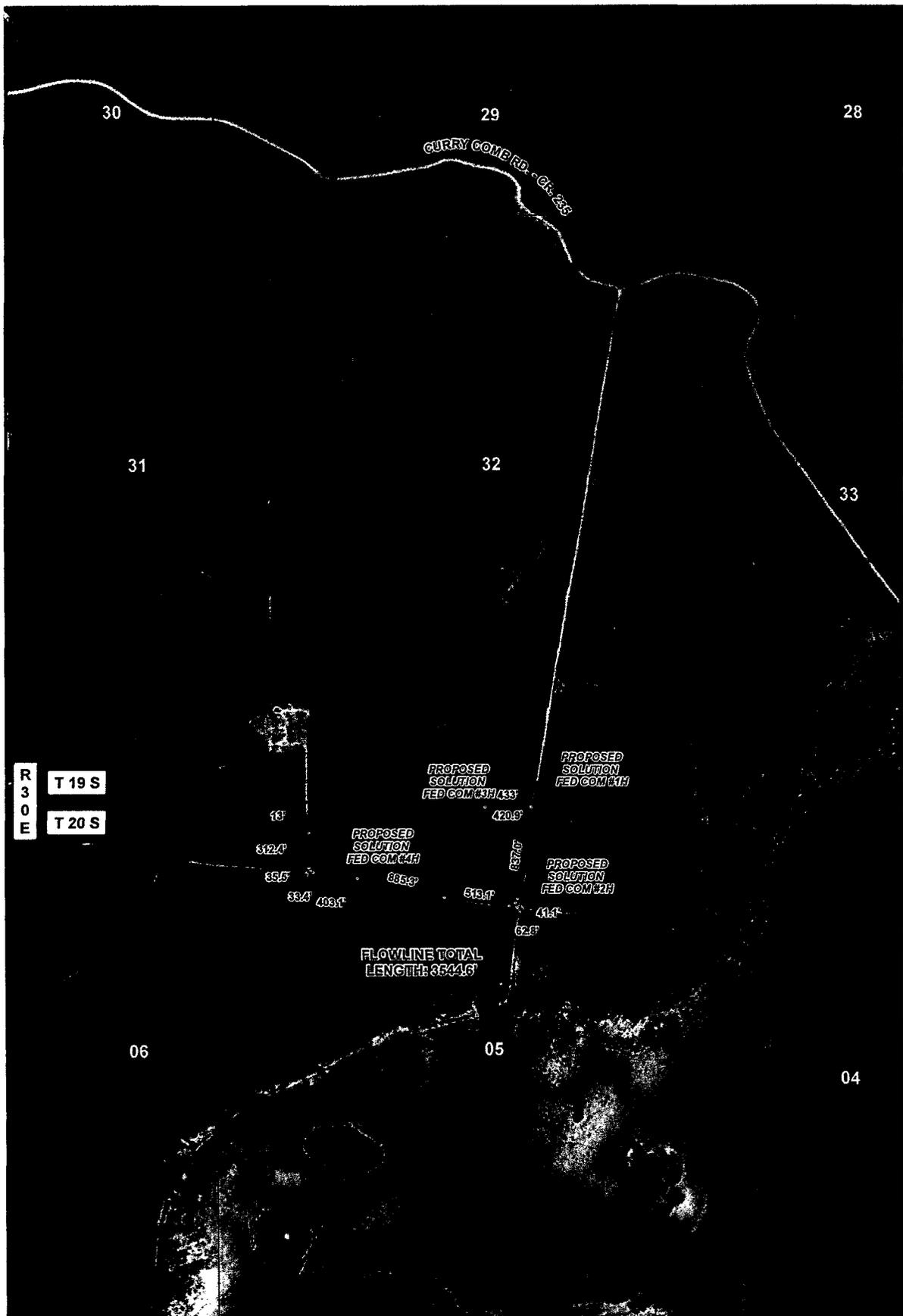
0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

PIPELINE OVERVIEW TOPO 12/2/2011 A.F.


CONCHO
 COG OPERATING, LLC


HARCROW SURVEYING, LLC.
 2314 W. MAIN ST. ARTESIA, NM 88210
 PH: (575) 513-2570 FAX: (575) 746-2158
 chad_harcrow77@yahoo.com



R 30 E
 T 19 S
 T 20 S

FLOWLINE TOTAL
 LENGTH: 3644.6'

LEGEND

- FLOWLINE
- WELL
- WELLPAD
- PROPOSED RD.
- EXISTING RD.

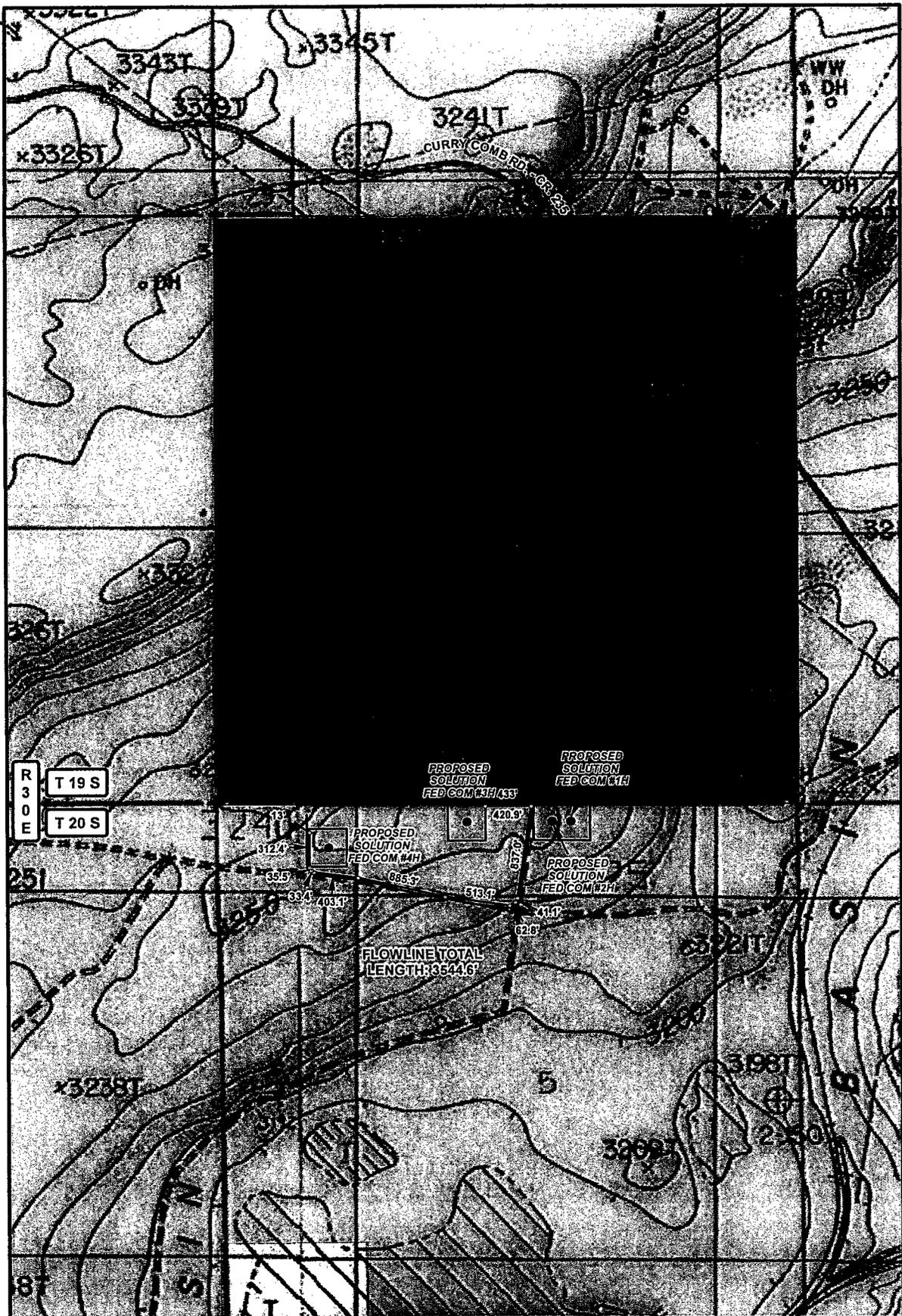
SOLUTION FED COM FLOWLINE

SECTION: 5	TOWNSHIP: 20 S.	RANGE: 30 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 14-1215	LEASE: SOLUTION FED COM	

PIPELINE OVERVIEW IMAGERY 12/22/2011 A.P.

CONCHO
 COG OPERATING, LLC

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 PH: (575) 513-2570 FAX: (575) 746-2158
 chad_harcrow77@yahoo.com



R 30 E
T 19 S
T 20 S

PROPOSED SOLUTION FED.COM #3H/433
PROPOSED SOLUTION FED.COM #4H

PROPOSED SOLUTION FED.COM #4H
PROPOSED SOLUTION FED.COM #2H

FLOWLINE TOTAL LENGTH: 3544.6'

LEGEND

- FLOWLINE
- WELL
- WELLPAD
- PROPOSED RD.
- EXISTING RD.
- PRIVATE
- STATE OF NM
- US BLM

SOLUTION FED COM FLOWLINE

SECTION: 5	TOWNSHIP: 20 S.	RANGE: 30 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 14-1215	LEASE: SOLUTION FED COM	

0 2,500 FEET
0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

PIPELINE OVERVIEW LAND STATUS 12/21/2014 A.F.

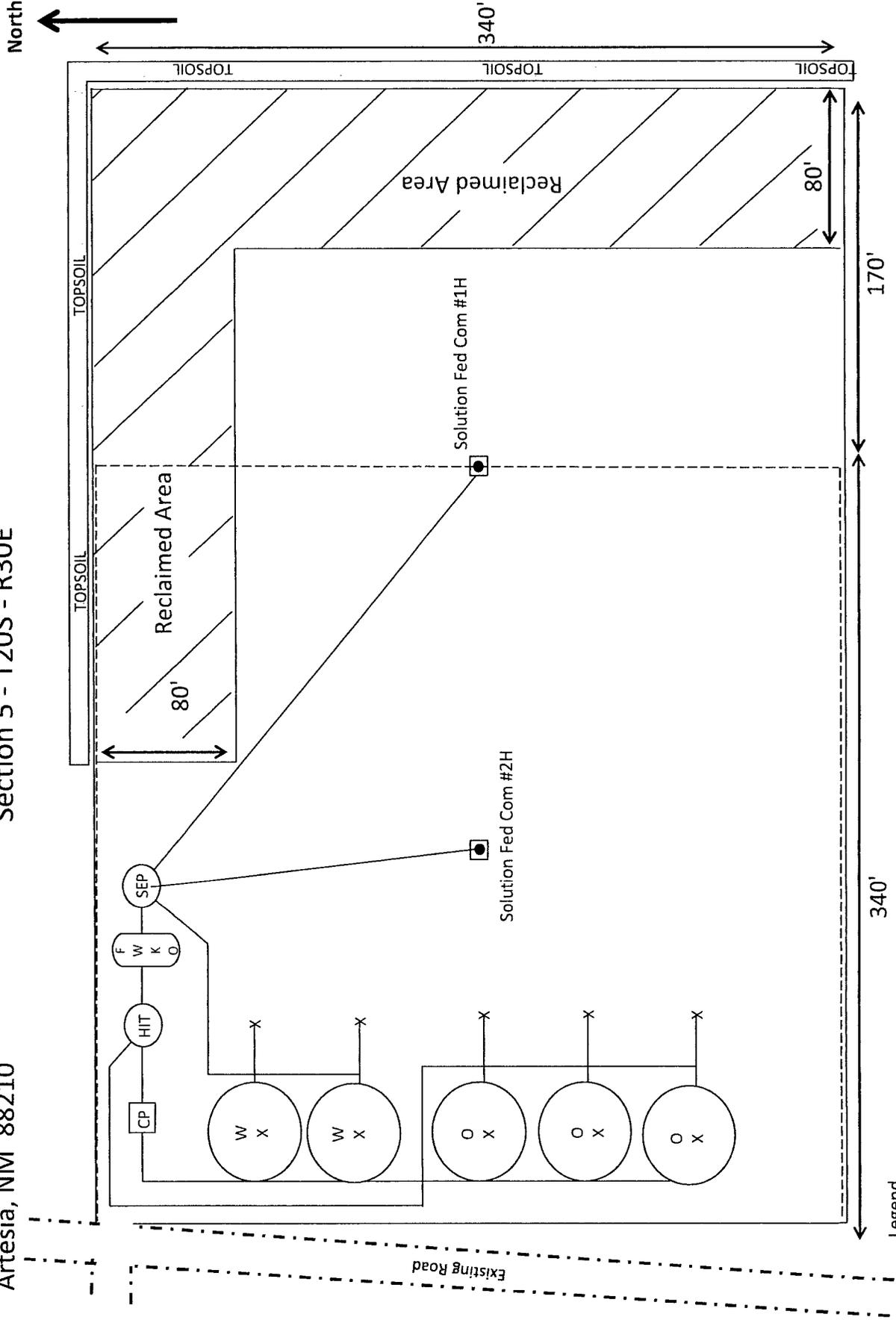
CONCHO
COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 513-2570 FAX: (575) 746-2158
chad_harcrow77@yahoo.com

Production Facility Layout

Solution Federal Com #1H & #2H
 Section 5 - T20S - R30E

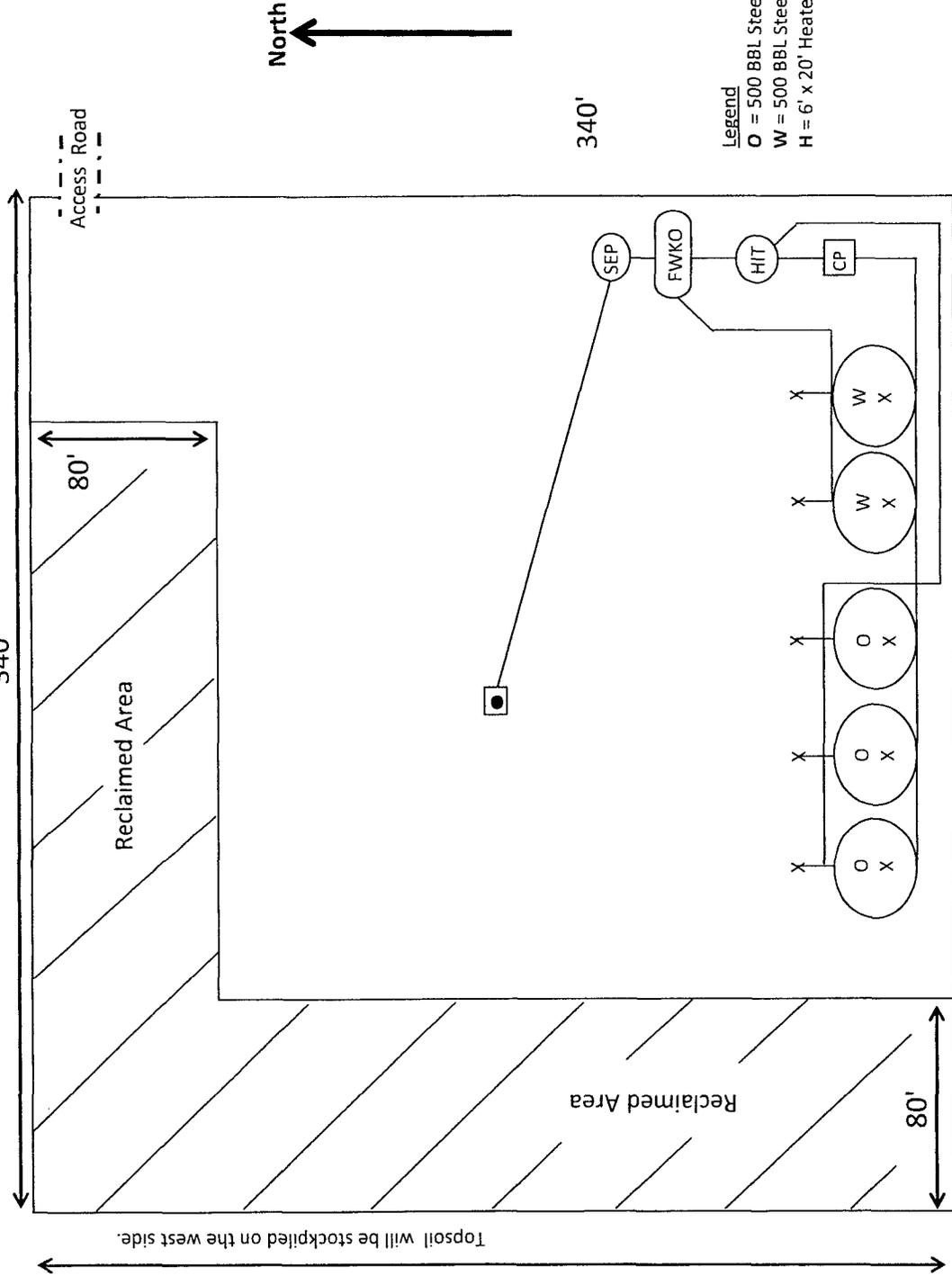
Exhibit 3



Legend
 O = 500 BBL Steel Oil Tank W = 500 BBL Steel Water Tank H = 6' x 20' Heater

Production Facility Layout
 Solution Federal Com #3H
 Section 5 - T20S - R30E

Exhibit 3



Production Facility Layout
Solution Federal Com #4
Section 5 - T20S - R30E

Exhibit 3

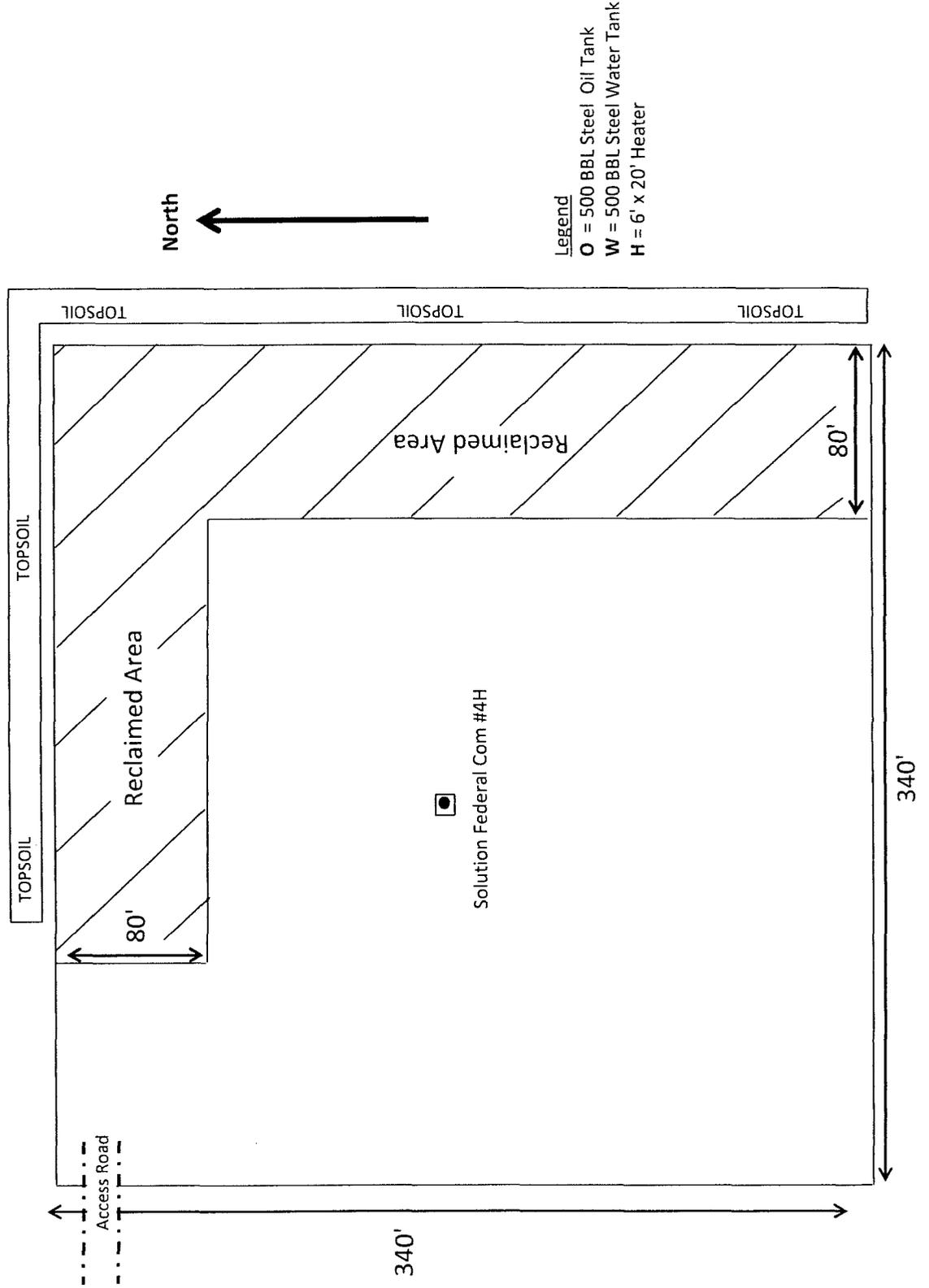
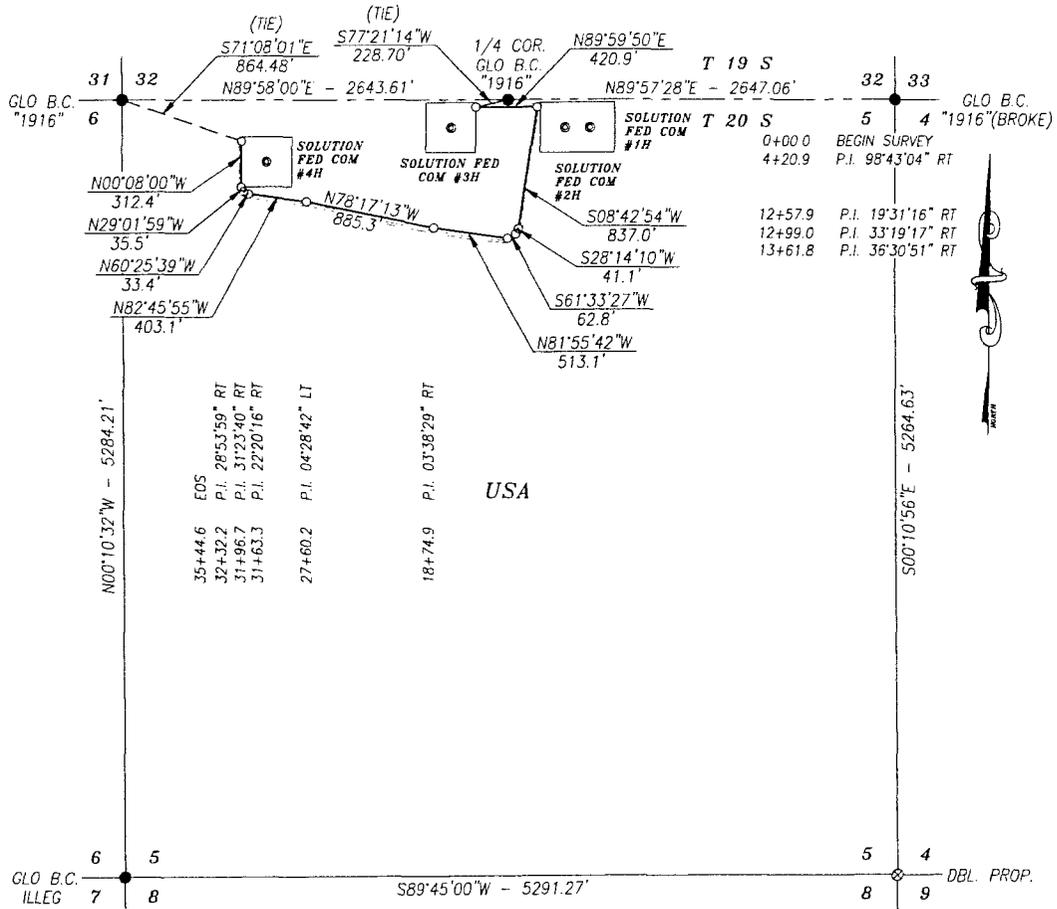


EXHIBIT 2A

SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 3544.6 FEET OR 214.82 RODS OR 0.671 MILES IN LENGTH CROSSING USA LAND IN SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

BASIS OF BEARING:
BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

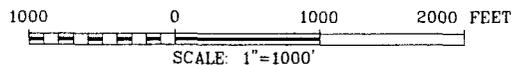
HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 746-2158 FAX: (575) 746-2158
c.harcrow@harcrowsurveying.com



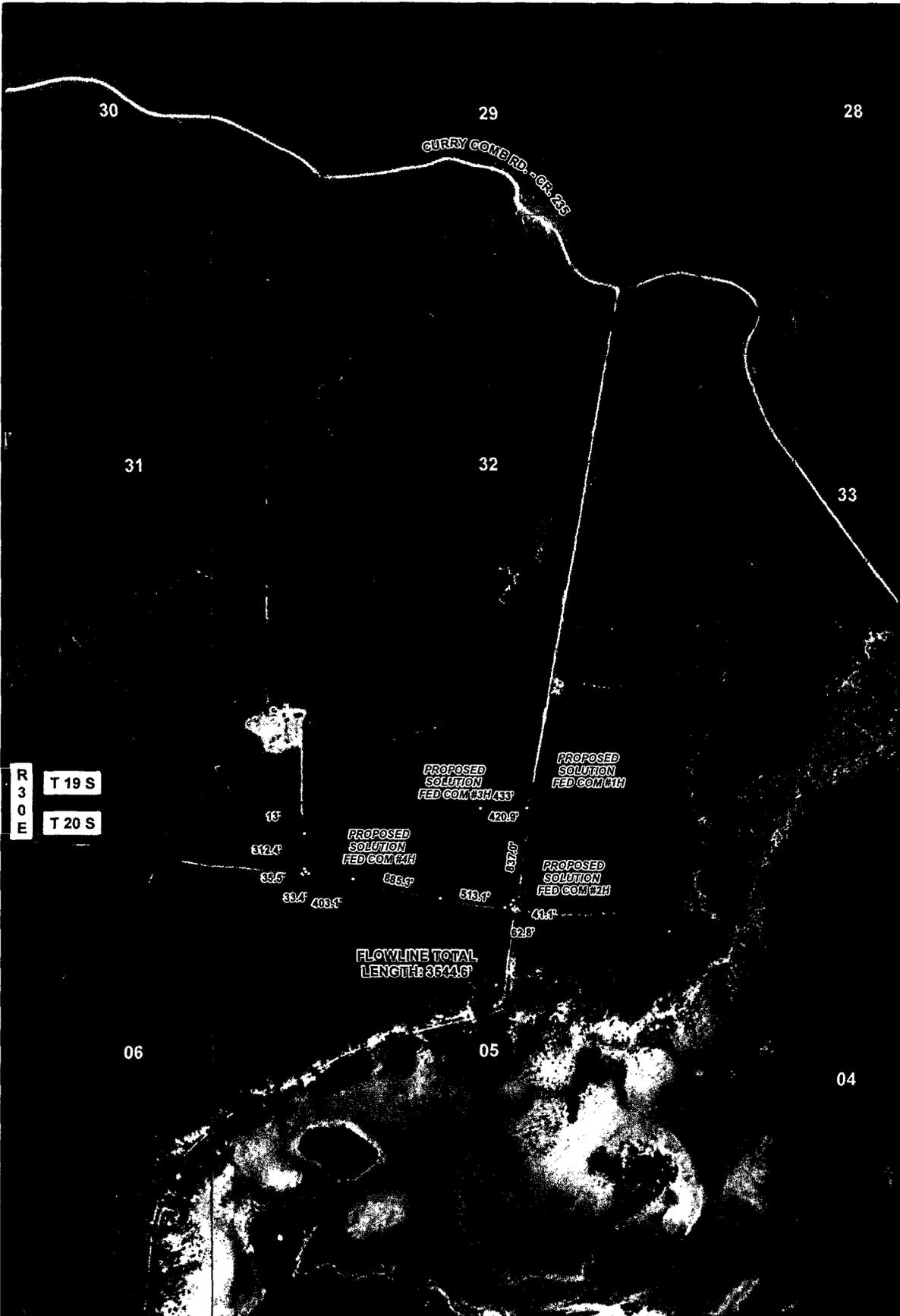
CERTIFICATION
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777
DATE 12/3/14



COG OPERATING, LLC	
SURVEY OF A PROPOSED FLOWLINE LOCATED IN SECTION 5, TOWNSHIP 20 SOUTH, RANGE 30 EAST, EDDY COUNTY, NMPM, NEW MEXICO	
SURVEY DATE: DECEMBER 2, 2014	
DRAFTING DATE: DECEMBER 2, 2014	PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: SP
	FILE: 14-1215



R 30 E
T 19 S
T 20 S

FLOWLINE TOTAL LENGTH: 36446'

LEGEND

- FLOWLINE
- WELL
- WELLPAD
- PROPOSED RD.
- EXISTING RD.

SOLUTION FED COM FLOWLINE

SECTION: 5	TOWNSHIP: 20 S.	RANGE: 30 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 14-1215	LEASE: SOLUTION FED COM	

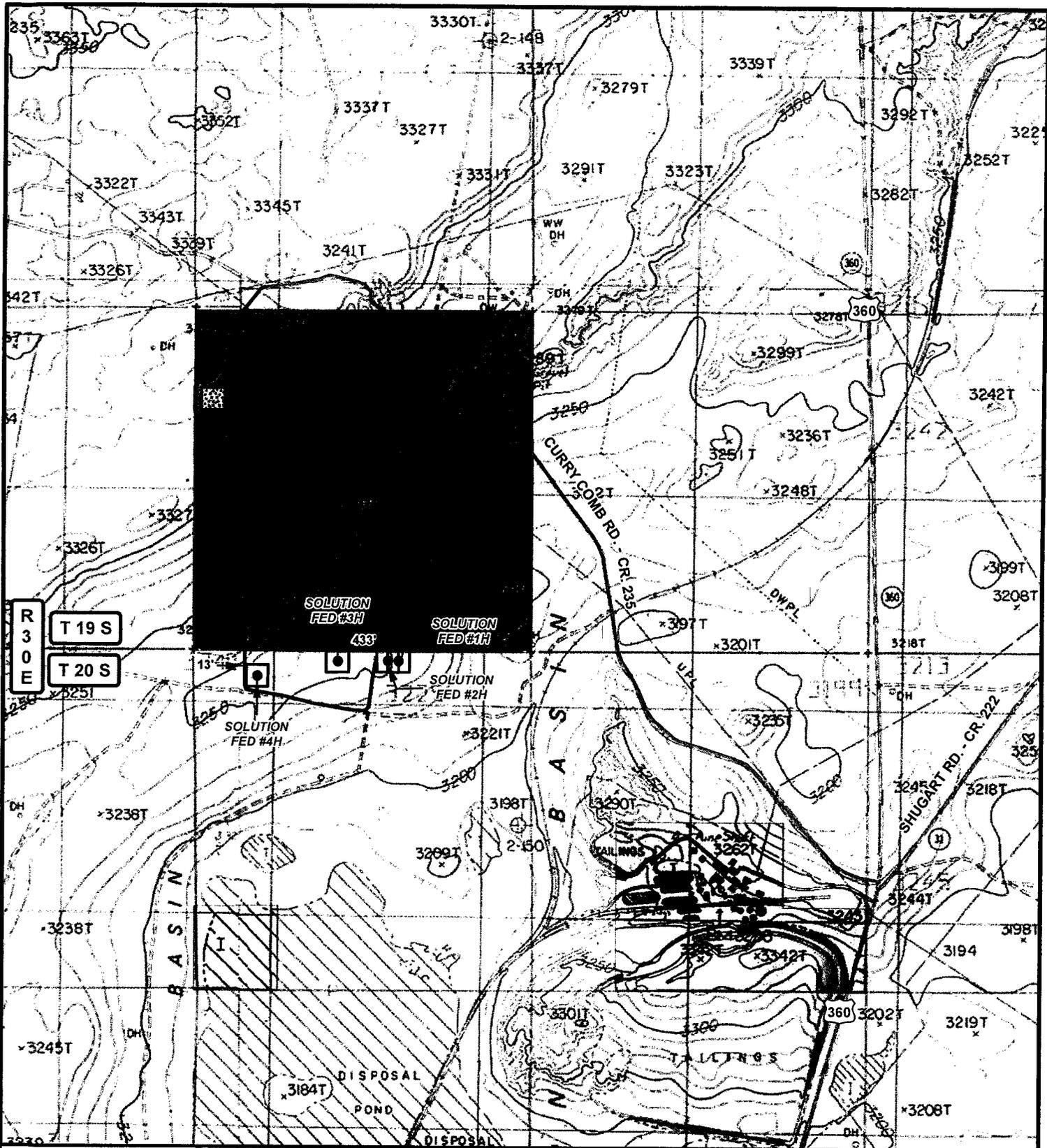
0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 1,000 FT

PIPELINE OVERVIEW IMAGERY 12/22/14 A.F.


CONCHO
 COG OPERATING, LLC


HARCROW SURVEYING, LLC.
 2314 W. MAIN ST, ARTESIA, NM 88210
 PH: (575) 513-2570 FAX: (575) 746-2158
 chad_harcrow77@yahoo.com



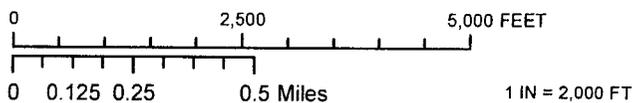
R 30 E
T 19 S
T 20 S

LEGEND

- WELL
- ◻ WELLPAD
- ▨ FRAC POND
- PLATTED EXISTING ROAD
- PROPOSED ROAD
- EXISTING ROAD
- PRIVATE
- STATE OF NM
- US BLM

SOLUTION FED ROAD REROUTE

SECTIONS: 5, 29, 32 TOWNSHIP: 19 & 20 S. RANGE: 30 E.
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M
 W.O. # 14-1202 LEASE: SOLUTION FED



LOCATION MAP LAN STATUS 12/04/2014 S.P.



Run Time: 10:06 AM

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Run Date: 10/20/2014
Page 1 of 1

LLD ACREAGE REPORT

Admin State: NM

Geo State: NM

MTR: 23 0200S 0300E

Section: 005

<u>Sur Type</u>	<u>Sur No</u>	<u>Lld Suff</u>	<u>NE</u> <u>NW</u> <u>SW</u> <u>SE</u> <u>NNSS</u> <u>NNSS</u> <u>NNSS</u> <u>NNSS</u> <u>EWWE</u> <u>EWWE</u> <u>EWWE</u> <u>EWWE</u>	<u>Sur Note</u>	<u>Dup</u> <u>Flg</u>	<u>Sub</u> <u>Surf</u>	<u>Acreege</u>
A			--XX --XX XXXX XXXX				480.000
L	1		X----				39.690
L	2		-X--				39.850
L	3		---- X--				39.990
L	4		---- -X--				40.150

Section 005 Total: 639.680

MTR Total Excluding Survey Notes C/D/R
and Sub Surf = Y 639.680

Grand Total Excluding Survey Notes C/D/R
and Sub Surf = Y: 639.680

*Surface Use Plan
COG Operating LLC
Solution Federal Com #4H
SHL: 420' FNL & 990' FWL Lot 4
Section 5, T20S, R30E
BHL: 2310' FNL & 660' FWL UL E
Section 8, T20S, R30E
Eddy County, New Mexico*

Supplemental Surface Use & Operating Plan

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

- A. Based on current road maintenance performed on other roads serving existing wells, we anticipate maintaining the lease roads leading to the proposed well pad at least twice a year on dry conditions and three a year in wetter conditions.

2. Proposed Access Road:

The Location Verification Map shows that 13' of new access road will be required for this location. If any road is required it will be constructed as follows:

The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

- A. The average grade will be less than 1%.
- B. No turnouts are planned.
- C. No cattleguard, culvert, gates, low water crossings or fence cuts are necessary.
 - 1) Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from the nearest BLM approved caliche pit. Any additional construction materials will be purchased from contractors.

3. Location of Existing and/or Proposed Facilities:

- A. COG Operating LLC does not operate an oil production facility on this lease.
- B. If the well is productive, contemplated facilities will be as follows:
 - 2) A tank battery and facilities will be constructed as shown on Exhibit 3.
 - 3) The tank battery and facilities will be installed according to API specifications. No flow lines are anticipated at this time.

- 4) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, caliche will be hauled from the nearest BLM approved caliche pit. Any additional construction materials will be purchased from contractors.
- 5) It will be necessary to run electric power if this well is productive. Power will be provided by Xcel Energy and they will submit a separate plan and ROW for service to the well location.
- 6) If the well is productive, rehabilitation plans will include the following:
 - The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

4. Location and Type of Water Supply:

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from private source Rio Fast-Line and Tanks, 4602 W. Pierce Street, Carlsbad, NM 88220, (575) 887-0042. No water well will be drilled on the location.

5. Source of Construction Materials and Location "Turn-Over" Procedure:

Obtaining caliche: One primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well site. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

- A. Equipment that is needed to construct the proposed location will be as follows: Two dozers, one blade, one morograder, one backhoe, one water truck and two dump trucks.
- B. The time line to complete construction will be approximately 10 days.
- C. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.
- D. An approximate 160' X 160' area is used within the proposed well site to remove caliche.
- E. Subsoil is removed and stockpiled within the surveyed well pad.
- F. When caliche is found, material will be stock piled within the pad site to build the location and road.

- G. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.
- H. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced.
- I. Neither caliche, nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in the Well Site Layout or survey plat.

In the event that no caliche is found onsite, caliche will be hauled from the nearest BLM approved caliche pit. Any additional construction materials will be purchased from contractors.

6. Methods of Handling Water Disposal:

- A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud box commercials and taken to R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240. .
- B. Drilling fluids will be contained in steel mud pits and taken to R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.
- C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility R360's disposal site located at 4507 West Carlsbad Highway, Hobbs, NM 88240.
- D. It is anticipated that the disposal of produced water will be trucked to unspecified commercial SWD wells in the area around the leases.
- E. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill-Lea Landfill LLC located at Mile Marker 64, Highway 62-180 East, P O Box 3247, Carlsbad, NM 88221. No toxic waste or hazardous chemicals will be produced by this operation.
- F. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).
- G. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

7. Plans for Restoration of the Surface:

- A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are 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 to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.
- B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recountoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be reseeded with a BLM approved mixture and re-vegetated as per BLM orders. When required by BLM, the well pad site will be restored to match pre-construction grades.

8. (Sedimentation and Erosion Control)

Immediately following pad construction approximately 340' of straw waddles will be placed on the East side and 340' across the South side of the location to reduce sediment impacts to fragile/sensitive soils. Since the tank battery will be on the South side, there is no need for straw waddles since there are berms around the tank battery, which detours water from running off location.

Surface Use Plan
COG Operating LLC
Solution FederalCom #4H
SHL: 420' FNL & 990' FWL Lot 4
Section 5, T20S, R30E
BHL: 2310' FNL & 660' FWL UL E
Section 8, T20S, R30E
Eddy County, New Mexico

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 2nd day of March, 2015.

Signed: _____



Printed Name: Melanie J. Parker

Position: Regulatory Coordinator

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6940

Field Representative (if not above signatory): Rand French

E-mail: mparker@concho.com

DEC 22 2016

**PECOS DISTRICT
CONDITIONS OF APPROVAL**

RECEIVED

OPERATOR'S NAME:	COG Operating, LLC
LEASE NO.:	NMNM-0429170
WELL NAME & NO.:	Solution Federal Com 4H
SURFACE HOLE FOOTAGE:	0420' FNL & 0990' FWL
BOTTOM HOLE FOOTAGE	2310' FNL & 0660' FWL Sec. 08, T. 20 S., R 30 E.
LOCATION:	Section 05, T. 20 S., R 30 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.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
 - Communitization Agreement
 - Cave/Karst
 - Vegetation
 - Potash
 - Watershed
- Construction**
 - Notification
 - Topsoil
 - Closed Loop System
 - Federal Mineral Material Pits
 - Well Pads
 - Roads
- Road Section Diagram**
- Drilling**
 - Cement Requirements
 - H2S Requirements
 - Secretary's Potash
 - High Cave/Karst
 - Capitan Reef
 - Logging Requirements
 - Waste Material and Fluids
- Production (Post Drilling)**
 - Well Structures & Facilities
- Interim Reclamation**
- Final Abandonment & Reclamation**

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)

Communitization Agreement

A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales. In addition, the well sign shall include the surface and bottom hole lease numbers. If the Communitization Agreement number is known, it shall also be on the sign. If not, it shall be placed on the sign when the sign is replaced.

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 pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the pad.

Closed Mud System Using Steel Tanks with All Fluids and Cuttings Hauled Off.

A closed mud system using steel tanks for all cuttings and fluids is required. All fluids and cuttings will be hauled off site for disposal. No pits are allowed.

Tank Battery Liners and Berms:

Tank battery locations 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, siting valves 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 valves, 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.

Vegetation

Interim reclamation will be conducted on all disturbed areas not needed for active support of production operations, and if caliche is used as a surfacing material it will be removed at time of reclamation to enhance re-establishment of vegetation.

Sedimentation control structures are needed at the access road diversion ditches constructed at several locations along the road.

Potash

(1) Drilling within the Designated Potash Area. It is the intent of the Department of the Interior to administer oil and gas operations throughout the Designated Potash Area in a manner which promotes

safe, orderly co-development of oil, gas, and potash resources. It is the policy of the Department of the Interior to deny approval of most applications for permits to drill oil and gas wells from surface locations within the Designated Potash Area. Three exceptions to this policy will be permitted if the drilling will occur under the following conditions from:

(a) A Drilling Island associated with a Development Area established under this Order or a Drilling Island established under a prior Order;

(b) A Barren Area and the Authorized Officer determines that such operations will not adversely affect active or planned potash mining operations in the immediate vicinity of the proposed drill-site; or

(c) A Drilling Island, not covered by (a) above or single well site established under this Order by the approval and in the sole discretion of the Authorized Officer, provided that such site was jointly recommended to the Authorized Officer by the oil and gas lessee(s) and the nearest potash lessee(s).

(2) Development Areas

(a) When processing an application for permit to drill (APD) an oil or gas well in the Designated Potash Area that complies with regulatory requirements, the Authorized Officer will determine whether to establish a Development Area in connection with the application, and if so, will determine the boundaries of the Development Area and the location within the Development Area of one or more Drilling Islands from which drilling will be permitted. The BLM may also designate a Development Area outside of the APD process based on information in its possession, and may modify the boundaries of a Development Area. Existing wells may be included within the boundaries of a Development Area. A Development Area may include Federal oil and gas leases and other Federal and non-Federal lands.

(b) After designating or modifying a Development Area, the BLM will issue a Notice to Lessees, consistent with its authorities under 43 CFR Subpart 3105 and part 3180, information lessees that future drilling on lands under an oil and gas lease within that Development Area will:

(i) occur, under most circumstances, from a Barren Area or A Drilling Island within the Development Area; and

(ii) be managed under a unit or communitization agreement, generally by a single operator, consistent with BLM regulations and this Order. Unit and communitization agreements will

be negotiated among lessees. The BLM will consider whether a specific plan of development is necessary or advisable for a particular Drilling Island.

(c) The Authorized Officer reserves the right to approve an operator or successor operator of a Development Area and/or a Drilling Island, if applicable, to ensure that the operator has the resources to operate and extract the oil and gas resources consistent with the requirements of this Order and all applicable laws and regulations, and has provided financial assurance in the amount required by the Authorized Officer.

(d) The Authorized Officer will determine the appropriate designation of a Development Area in terms of location, shape and size. In most cases, a single Drilling Island will be established for each Development Area. In establishing the location, shape and size of a Development Area and an associated Drilling Island, the Authorized Officer will consider:

(i) the appropriate location, shape, and size of a Development Area and associated Drillings Island to allow effective extraction of oil and gas resources while managing the impact on potash resources;

(ii) the application of available oil and gas drilling and production technology in the Permian Basin;

(iii) the applicable geology of the Designated Potash Area and optimal locations to minimize loss of potash ore while considering co-development of both resources;

(iv) any long term exploration and/or mining plans provided by the potash industry;

(v) whether a Barren Area may be the most appropriate area for a Drilling Island;

(vi) the requirements of this Order; and

(vii) any other relevant factors

(e) As the Authorized Officer establishes a Development Area, the Authorized Officer will more strictly apply the factors listed in Section 6.e.(2)(d), especially the appropriate application of the available oil and gas drilling and production technology in the Permian Basin, when closer to current traditional (non-solution) potash mining operations. Greater flexibility in the application of the factors listed in Section 6.e(2)(d) will be applied further from current and near-term traditional (non-solution)potash mining operations. No Drilling Islands will be established within one mile of any area where approved potash mining

operations will be conducted within 3 years consistent with the 3-year mine plan referenced above (Section 6.d.(8)) without the consent of the affected potash lessee(s).

(f) The Authorized Officer may establish a Development Area associated with a well or wells drilled from a Barren Area as appropriate and necessary.

(g) As part of the consideration for establishing Development Areas and Drilling Islands, the BLM will consider input from the potash lessees and the oil and gas lessees or mineral right owner who would be potentially subject to a unitization agreement supporting the Development Area, provided that the input is given timely.

(3) Buffer Zones. Buffer Zones of $\frac{1}{4}$ mile for oil wells and $\frac{1}{2}$ mile for gas wells are hereby established. These Buffer Zones will stay in effect until such time as revised distances are adopted by the BLM Director or other BLM official, as delegated. However, the Authorized Officer may adjust the Buffer Zones in an individual case, when the facts and circumstances demonstrate that such adjustment would enhance conservation and would not compromise safety. The Director will base revised Buffer Zones on science, engineering, and new technology and will consider comments and reports from the Joint Industry Technical Committee and other interested parties in adopting any revisions.

(4) Unitization and Communitization. To more properly conserve the potash, oil and gas resources in the Designated Potash Area and to adequately protect the rights of all parties in interest, including the United States, it is the policy of the Department of the Interior that all Federal oil and gas leases within a Development Area should be unitized or subject to an approved communitization agreement unless there is a compelling reason for another operating system. The Authorized Officer will make full use of his/her authorities wherever necessary or advisable to require unitization and/or communitization pursuant to the regulations in 43 CFR Subparts 3105 and 3180. The Authorized Officer will use his/her discretion to the fullest extent possible to assure that any communitization agreement and any unit plan of operations hereafter approved or prescribed within the Designated Potash Area will adhere to the provisions of this Order. The Authorized Officer will work with Federal lessees, and with the State Of New Mexico as provided below, to include non-Federal mineral rights owners in unit or communitization agreements to the extent possible.

(5) Coordination with the State of New Mexico.

(a) If the effective operation of any Development Area requires that the New Mexico Oil Conservation Division (NMOCD) revise the State's mandatory well spacing requirements, the BLM will participate as needed in such a process. The BLM may adopt the NMOCD spacing requirements and require lessees to enter into communitization agreements based on those requirements.

(b) The BLM will cooperate with the NMOCD in the implementation of that agency's rules and regulations.

(c) In taking any action under Section 6.e. of this Order, the Authorized Officer will take into consideration the applicable rules and regulations of the NMOCD.

To minimize impacts to potash resources, the proposed well is confined within the boundaries of the established Solution Drill Island (See Potash Memo and Map in attached file for Drill Island description).

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.
- A leak detection plan will be submitted to the BLM Carlsbad Field Office for approval prior to pipeline installation. The method could incorporate gauges to detect pressure drops, siting values and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.
- With the topography having flat to low slope grades no sedimentation control structures are needed.

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

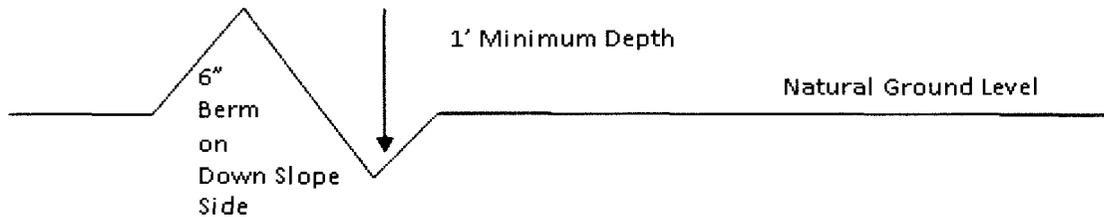
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

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:

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

Cattleguards

An appropriately sized cattleguard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattleguards 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 cattleguards 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

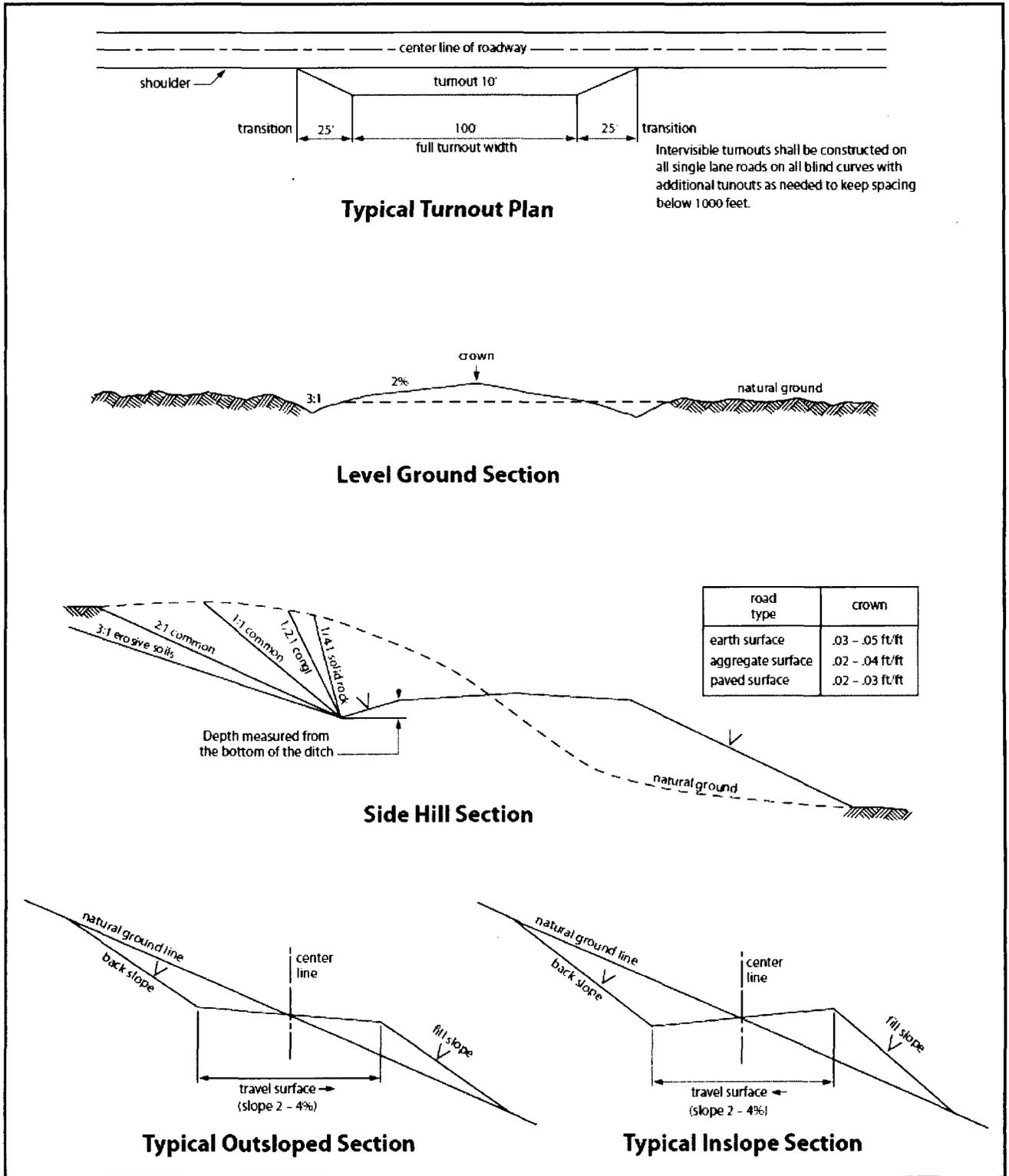


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

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

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

Eddy County

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

1. **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 Potash Areas:

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 for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log.

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

Secretary's Potash

High Cave/Karst

Capitan Reef

Possibility of water flows in the Artesia Group and Salado.

Possibility of lost circulation in the Artesia Group, Capitan Reef, and Delaware.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH.

1. The 20 inch surface casing shall be set at approximately 350 feet 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 13-3/8 inch 1st intermediate casing, which shall be set at approximately 1710 feet (**Top of Seven Rivers formation**), 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 and potash.**

3. The minimum required fill of cement behind the 9-5/8 inch 2nd intermediate casing is:

Operator has proposed DV tool at depth of 1918', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool:

Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

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 Capitan Reef and potash.**

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

4. The minimum required fill of cement behind the 7 X 5-1/2 inch production casing is:

Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Excess calculates to 23% - Additional cement may be required.**

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

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 9-5/8 2nd intermediate casing shoe shall be **3000 (3M)** psi.

4. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

- a. In potash areas, 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. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time.
- b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- d. The results of the test shall be reported to the appropriate BLM office.
- e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
- f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

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

E. 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 071315

VIII. 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).

IX. 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).

X. 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 1 for Loamy Sites

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 shall 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 shall be either certified or registered seed. The seed container shall be tagged in accordance with State law(s) and available for inspection by the Authorized Officer.

Seed shall be planted using a drill equipped with a depth regulator to ensure proper depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area (small/heavier seeds have a tendency to drop the bottom of the drill and are planted first). Holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre shall be doubled. The seeding shall be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth may 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:

<u>Species</u>	<u>lb/acre</u>
Plains lovegrass (<i>Eragrostis intermedia</i>)	0.5
Sand dropseed (<i>Sporobolus cryptandrus</i>)	1.0
Sideoats grama (<i>Bouteloua curtipendula</i>)	5.0
Plains bristlegrass (<i>Setaria macrostachya</i>)	2.0

*Pounds of pure live seed:

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

NMOCD CONDITION OF APPROVAL

The *New!* Gas Capture Plan (GCP) notice is posted on the NMOCD website under Announcements. The Plan became effective May 1, 2016. A copy of the GCP form is included with the NOTICE and is also in our FORMS section under Unnumbered Forms. Please review filing dates for all applicable activities currently approved or pending and submit accordingly. Failure to file a GCP may jeopardize the operator's ability to obtain C-129 approval to flare gas after the initial 60-day completion period.