

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER
1b. Type of Well: ☒ Oil Well ☒ Gas Well ☐ Other
1c. Type of Completion: ☐ Hydraulic Fracturing ☒ Single Zone ☐ Multiple Zone

5. Lease Serial No.
NMMN138607

6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.

LITTLEFIELD 33 FEDERAL COM
801H

9. API Well No.

322243
30-015-46366
JENNINGS WOLF CAMP GAS

2. Name of Operator
COG OPERATING LLC

3a. Address
600 West Illinois Ave Midland TX 79701

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

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

At surface NENE / 210 FNL / 330 FEL / LAT 32.020442 / LONG -103.981609

At proposed prod. zone LOT 12 / 200 FSL / 330 FEL / LAT 32.000659 / LONG -103.982182

11. Sec., T, R, M, or Blk. and Survey or Area
SEC 28 / T26S / R29E / NMP

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

12. County or Parish
EDDY

13. State
NM

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

16. No of acres in lease
874.57

17. Spacing, Unit dedicated to this well
463.96

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

19. Proposed Depth
10973 feet / 17922 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
2893 feet

22. Approximate date work will start*
05/01/2019

23. Estimated duration
30 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).

4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature
(Electronic Submission)

Name (Printed/Typed)
Mayte Reyes / Ph: (575)748-6945

Date
01/25/2019

Title
Regulatory Analyst

Approved by (Signature)
(Electronic Submission)

Name (Printed/Typed)
Cody Layton / Ph: (575)234-5959

Date
09/19/2019

Title
Assistant Field Manager Lands & Minerals

Office
CARLSBAD

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

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

APPROVED WITH CONDITIONS
Approval Date: 09/19/2019

Ruf 10-8-19

Additional Operator Remarks

Location of Well

1. SHL: NENE / 210 FNL / 330 FEL / TWSP: 26S / RANGE: 29E / SECTION: 28 / LAT: 32.020442 / LONG: -103.981609 (TVD: 0 feet, MD: 0 feet)
PPP: NENE / 330 FNL / 330 FEL / TWSP: 26S / RANGE: 29E / SECTION: 33 / LAT: 32.020113 / LONG: -103.981623 (TVD: 10917 feet, MD: 11050 feet)
PPP: NESE / 2640 FSL / 330 FEL / TWSP: 26S / RANGE: 29E / SECTION: 28 / LAT: 32.013829 / LONG: -103.981804 (TVD: 10957 feet, MD: 13050 feet)
BHL: LOT 12 / 200 FSL / 330 FEL / TWSP: 26S / RANGE: 29E / SECTION: 33 / LAT: 32.000659 / LONG: -103.982182 (TVD: 10973 feet, MD: 17922 feet)

BLM Point of Contact

Name: Ciji Methola

Title: GIS Support - Adjudicator

Phone: 5752345924

Email: cmethola@blm.gov

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Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

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U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

APD Print Report

10/07/2019

APD ID: 10400038194

Submission Date: 01/25/2019

Highlighted data
reflects the most
recent changes

Operator Name: COG OPERATING LLC

Federal/Indian APD: FED

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Application

Section 1 - General

APD ID: 10400038194

Tie to previous NOS?

Submission Date: 01/25/2019

BLM Office: CARLSBAD

User: Mayte Reyes

Title: Regulatory Analyst

Federal/Indian APD: FED

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

Lease number: NMNM138607

Lease Acres: 874.57

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? YES

Permitting Agent? NO

APD Operator: COG OPERATING LLC

Operator letter of designation:

Operator Info

Operator Organization Name: COG OPERATING LLC

Operator Address: 600 West Illinois Ave

Zip: 79701

Operator PO Box:

Operator City: Midland

State: TX

Operator Phone: (432)683-7443

Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO

Master Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: JENNINGS

Pool Name: WOLFCAMP GAS

Is the proposed well in an area containing other mineral resources? USEABLE WATER,OIL

Is the proposed well in a Helium production area? N

Use Existing Well Pad? NO

New surface disturbance?

Type of Well Pad: MULTIPLE WELL

Multiple Well Pad Name:

Number: 801H

Well Class: HORIZONTAL

LITTLEFIELD 33 FEDERAL COM

Number of Legs:

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 15 Miles

Distance to nearest well: 641 FT

Distance to lease line: 210 FT

Reservoir well spacing assigned acres Measurement: 463.96 Acres

Well plat: COG_Littlefield_801H_C102_20190125101140.pdf

Well work start Date: 05/01/2019

Duration: 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83

Vertical Datum: NAVD88

Survey number:

Reference Datum:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	210	FNL	330	FEL	26S	29E	28	Aliquot NENE	32.02044 2	- 103.9816 09	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 138607	289 3	0	0
KOP Leg #1	210	FNL	330	FEL	26S	29E	28	Aliquot NENE	32.02044 2	- 103.9816 09	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 138607	289 3	0	0
PPP Leg #1	264 0	FSL	330	FEL	26S	29E	28	Aliquot NESE	32.01382 9	- 103.9818 04	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 071599	- 806 4	130 50	109 57

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	330	FNL	330	FEL	26S	29E	33	Aliquot NENE	32.020113	-103.981623	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 138607	-8024	11050	10917
EXIT Leg #1	330	FSL	330	FEL	26S	29E	33	Lot 12	32.001016	-103.982172	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 065928 A	-8030	17900	10923
BHL Leg #1	200	FSL	330	FEL	26S	29E	33	Lot 12	32.000659	-103.982182	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 065928 A	-8080	17922	10973

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	QUATERNARY	2893	0	0		NONE	N
2	RUSTLER	2405	488	488		NONE	N
3	TOP SALT	2173	720	720	SALT	NONE	N
4	BASE OF SALT	172	2721	2721	ANHYPDRITE	NONE	N
5	LAMAR	-13	2906	2906	LIMESTONE	OTHER : Salt Water	N
6	DELAWARE	-46	2939	2939		OTHER : Salt Water	N
7	BONE SPRING	-3705	6598	6598		NATURAL GAS,OIL	N
8	BONE SPRING 1ST	-4629	7522	7522		NATURAL GAS,OIL	N
9	BONE SPRING 2ND	-5049	7942	7942	SANDSTONE	NATURAL GAS,OIL	N
10	BONE SPRING 3RD	-6102	8995	8995		NATURAL GAS,OIL	N
11	WOLFCAMP	-6571	9464	9464		NATURAL GAS,OIL	N
12	WOLFCAMP	-7201	10094	10094		NATURAL GAS,OIL	N

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
13	WOLFCAMP	-7495	10388	10388		NATURAL GAS,OIL	N
14	WOLFCAMP	-7831	10724	10724		NATURAL GAS,OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M

Rating Depth: 9160

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

Requesting Variance? YES

Variance request: A variance is requested for the use of a flexible choke line from the BOP to the choke manifold. See attached for specs and hydrostatic test chart.

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

Choke Diagram Attachment:

COG_Littlefield_801H_3M_Choke_20190121084557.pdf

BOP Diagram Attachment:

COG_Littlefield_801H_3M_BOP_20190121084604.pdf

COG_Littlefield_801H_Flex_Hose_20190121084617.pdf

Pressure Rating (PSI): 5M

Rating Depth: 10973

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

Requesting Variance? YES

Variance request: A variance is requested for the use of a flexible choke line from the BOP to the choke manifold. See attached for specs and hydrostatic test chart.

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

Choke Diagram Attachment:

COG_Littlefield_801H_5M_Choke_20190121084651.pdf

BOP Diagram Attachment:

COG_Littlefield_801H_5M_BOP_20190121084659.pdf

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

COG_Littlefield_801H_5M_Choke_20190121084651.pdf

COG_Littlefield_801H_Flex_Hose_20190121084711.pdf

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	13.5	10.75	NEW	API	N	0	600	0	600	-6999	-7974	600	N-80	45.5	OTHER - BTC	9	1.55	DRY	38.1	DRY	38.1
2	INTERMEDIATE	9.875	7.875	NEW	API	N	0	9160	0	9160	-6999	-18749	9160	P-110	29.7	OTHER - BTC	1.66	1.33	DRY	3.99	DRY	3.99
3	PRODUCTION	6.75	5.0	NEW	API	Y	0	17922	0	10973	-6999	-24211	17922	P-110	18	OTHER - BTC	2.31	2.44	DRY	3.69	DRY	3.69

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Littlefield_801H_Casing_Prog_20190121084819.pdf

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Casing Attachments

Casing ID: 2 String Type: INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Littlefield_801H_Casing_Prog_20190121084755.pdf

Casing ID: 3 String Type: PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

COG_Littlefield_801H_Casing_Prog_20190605161938.pdf

Casing Design Assumptions and Worksheet(s):

COG_Littlefield_801H_Casing_Prog_20190121084747.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	600	30	1.75	13.5	52	75	Class C	4% Gel + 1% CaCl2
SURFACE	Tail		0	600	250	1.34	14.8	335	75	Class C	2% CaCl2
INTERMEDIATE	Lead		0	9160	750	3.6	10.3	2700	50	Tuned Light Blend	As needed
INTERMEDIATE	Tail		0	9160	250	1.08	16.4	270	50	Tail: Class H	As needed

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		8660	1792 2	300	2.5	11.9	750	35	50:50:10 H Blend	As needed
PRODUCTION	Tail		8660	1792 2	920	1.24	14.4	1140	35	50:50:2 Class H Blend	As needed

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

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

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

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
600	9160	OTHER : Brine Diesel Emulsion	8.4	9							Brine Diesel Emulsion
0	600	OTHER : FW Gel	8.6	8.8							FW Gel
9160	1792 2	OIL-BASED MUD	9.6	11							OBM

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 6 - Test, Logging, Coring

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

None planned

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

CNL,GR

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 6280

Anticipated Surface Pressure: 3865.94

Anticipated Bottom Hole Temperature(F): 165

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

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Littlefield_801H_H2S_Schem_20190121085508.pdf

COG_Littlefield_801H_H2S_SUP_20190121085516.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Littlefield_801H_AC_Report_20190121085530.pdf

COG_Littlefield_801H_Direct_Plan_20190121085539.pdf

Other proposed operations facets description:

Drilling Plan Attached.

GCP Attached.

Other proposed operations facets attachment:

COG_Littlefield_801H_Direct_Plan_20190121085554.pdf

COG_Littlefield_801H_GCP_20190121085603.pdf

Other Variance attachment:

COG_6.75_5M_Variance_WCP_20190121085757.pdf

SUPO

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Littlefield_801H_Existing_Road_20190117141155.pdf

Existing Road Purpose: ACCESS

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

COG_Littlefield_801H_Maps_Plats_20190117141142.pdf

New road type: TWO-TRACK

Length: 923.6 **Feet** **Width (ft.):** 30

Max slope (%): 33 **Max grade (%):** 1

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 14

New road access erosion control: Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Turnout? N

Access surfacing type: OTHER

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Blading

Access other construction information: No turnouts are planned. Re-routing access road around proposed well location.

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: None necessary.

Road Drainage Control Structures (DCS) description: None needed.

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

COG_Littlefield_801H_Existing_Road_20190117141206.pdf

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: A Central Tank Battery and production facilities are proposed in Section 28, T26S, R29E. Production will be sent to the proposed Littlefield 33 Federal Central Tank Battery facility. We plan to install 3 buried flow lines of approximately 30' of 8" poly lines carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Littlefield 33 Federal Central Tank Battery location. We plan to install 6 4" High pressure flex Steel line for flowlines. We plan to install 4 2" HP Steel Gas Lines to well head. We plan to install 2 4' buried poly line transporting Gas Lift Gas from the Littlefield 33 Federal Central Tank Battery to the Littlefield 33 Federal Com 801H. The buried Gas Lift Gas pipe of approximately 30' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road. The tank battery and facilities will be installed according to API specifications. No flow lines are anticipated at this time.

Production Facilities map:

COG_Littlefield_801H_Flowlines_20190125095758.pdf

COG_Littlefield_CTB_20190125095808.pdf

COG_Littlefield_801H_Prod_Facility_20190125095822.pdf

COG_Littlefield_801H_Reclamation_20190125101600.pdf

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: OTHER

Describe type: Fresh H2O

Water source use type: SURFACE CASING
STIMULATION

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Water source transport method: PIPELINE

Source land ownership: PRIVATE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 337500

Source volume (acre-feet): 43.50142

Source volume (gal): 14175000

Water source type: OTHER

Describe type: Brine H2O

Water source use type: INTERMEDIATE/PRODUCTION
CASING

Source latitude:

Source longitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Water source transport method: TRUCKING

Source land ownership: COMMERCIAL

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 22500

Source volume (acre-feet): 2.9000947

Source volume (gal): 945000

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Water source and transportation map:

COG_Littlefield_801H_Fresh_H2O_20190121105050.pdf

COG_Littlefield_801H_Brine_H2O_20190121105101.pdf

Water source comments: Fresh water will be obtained from High Roller Wells, LLC CP-417610 water well located in Section 1. 58 T1. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E., and will be provided by Malaga Brine Station.

New water well? NO

New Water Well Info

Well latitude:

Well Longitude:

Well datum:

Well target aquifer:

Est. depth to top of aquifer(ft):

Est thickness of aquifer:

Aquifer comments:

Aquifer documentation:

Well depth (ft):

Well casing type:

Well casing outside diameter (in.):

Well casing inside diameter (in.):

New water well casing?

Used casing source:

Drilling method:

Drill material:

Grout material:

Grout depth:

Casing length (ft.):

Casing top depth (ft.):

Well Production type:

Completion Method:

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be obtained from Brantley caliche pit located in Section 14, T26S, R28E.

Construction Materials source location attachment:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 7 - Methods for Handling Waste

Waste type: GARBAGE

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

Amount of waste: 125 pounds

Waste disposal frequency : Weekly

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: SEWAGE

Waste content description: Human waste and gray water

Amount of waste: 250 gallons

Waste disposal frequency : Weekly

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: DRILLING

Waste content description: Drilling fluids and produced oil and water during drilling and completion operations

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.)

Reserve pit width (ft.)

Reserve pit depth (ft.)

Reserve pit volume (cu. yd.)

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Roll off cuttings containers on tracks

Cuttings area length (ft.)

Cuttings area width (ft.)

Cuttings area depth (ft.)

Cuttings area volume (cu. yd.)

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments: GCP attached.

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Littlefield_801H_Prod_Facility_20190125095900.pdf

COG_Littlefield_801H_Flowlines_20190125095910.pdf

COG_Littlefield_CTB_20190125095920.pdf

Comments: A Central Tank Battery and production facilities are proposed in Section 28. T26S. R29E. Production will be sent to the proposed Littlefield 33 Federal Central Tank Battery facility. We plan to install 3 buried flow lines of approximately 30'

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

of 8" poly lines carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Littlefield 33 Federal Central Tank Battery location. We plan to install 6 4" High pressure flex Steel line for flowlines. We plan to install 4 2" HP Steel Gas Lines to well head. We plan to install 2 4' buried poly line transporting Gas Lift Gas from the Littlefield 33 Federal Central Tank Battery to the Littlefield 33 Federal Com 801H. The buried Gas Lift Gas pipe of approximately 30' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road. The tank battery and facilities will be installed according to API specifications. No flow lines are anticipated at this time.

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: LITTLEFIELD 33 FEDERAL COM

Multiple Well Pad Number: 801H

Recontouring attachment:

Drainage/Erosion control construction: Immediately following construction approximately 400' of straw waddles will be placed on all four sides of the well pad and the central tank battery location, due to the close proximity of the Red Bluff reservoir and the 100 year floodplain, to reduce sedimentation into the reservoir.

Drainage/Erosion control reclamation: Reclaim north 50'. East 50'

Well pad proposed disturbance (acres): 3.67

Well pad interim reclamation (acres): 0.01

Well pad long term disturbance (acres): 2.94

Road proposed disturbance (acres): 0.3

Road interim reclamation (acres): 0.3

Road long term disturbance (acres): 0.3

Powerline proposed disturbance (acres): 0

Powerline interim reclamation (acres): 0

Powerline long term disturbance (acres): 0

Pipeline proposed disturbance (acres): 0.01

Pipeline interim reclamation (acres): 0.01

Pipeline long term disturbance (acres): 0.01

Other proposed disturbance (acres): 4.91

Other interim reclamation (acres): 4.91

Other long term disturbance (acres): 4.91

Total proposed disturbance: 8.89

Total interim reclamation: 5.23

Total long term disturbance: 8.16

Disturbance Comments:

Reconstruction method: New construction of pad.

Topsoil redistribution: Reclaim north 50'. East 50'

Soil treatment: None

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

Existing Vegetation at the well pad attachment:

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

Existing Vegetation Community at the road attachment:

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

Existing Vegetation Community at the pipeline attachment:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Existing Vegetation Community at other disturbances: N/A

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre
-----------	-------------

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Gerald

Last Name: Herrera

Phone: (432)260-7399

Email: gherrera@concho.com

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

COG_Littlefield_801H_Closed_Loop_20190125100113.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 12 - Other Information

Right of Way needed? NO

Use APD as ROW?

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: On-site was done by Gerald Herrera (COG); Jeffery Robertson (BLM); on November 20th, 2018.

Other SUPO Attachment

COG_Littlefield_801H_1_Mile_20190121105124.pdf
COG_Littlefield_801H_Brine_H2O_20190121105135.pdf
COG_Littlefield_801H_Certification_20190121105146.pdf
COG_Littlefield_801H_Closed_Loop_20190121105156.pdf
COG_Littlefield_801H_Existing_Road_20190121105206.pdf
COG_Littlefield_801H_Fresh_H2O_20190121105218.pdf
COG_Littlefield_801H_Layout_20190121105229.pdf
COG_Littlefield_801H_Maps_Plats_20190121105241.pdf
COG_Littlefield_801H_Reclamation_20190121105248.pdf
COG_Littlefield_801H_Flowlines_20190125100514.pdf
COG_Littlefield_CTB_20190125100526.pdf
COG_Littlefield_801H_Prod_Facility_20190125100537.pdf
COG_Littlefield_801H_SUP_20190125100904.pdf

PWD

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD disturbance (acres):

PWD surface owner:

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number:

Injection well name:

Assigned injection well API number?

Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently 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 the company I represent, 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.

NAME: Mayte Reyes

Signed on: 01/17/2019

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

Operator Name: COG OPERATING LLC

Well Name: LITTLEFIELD 33 FEDERAL COM

Well Number: 801H

Field Representative

Representative Name: Gerald Herrera

Street Address: 2208 West Main Street

City: Artesia

State: NM

Zip: 88210

Phone: (575)748-6940

Email address: gherrera@concho.com

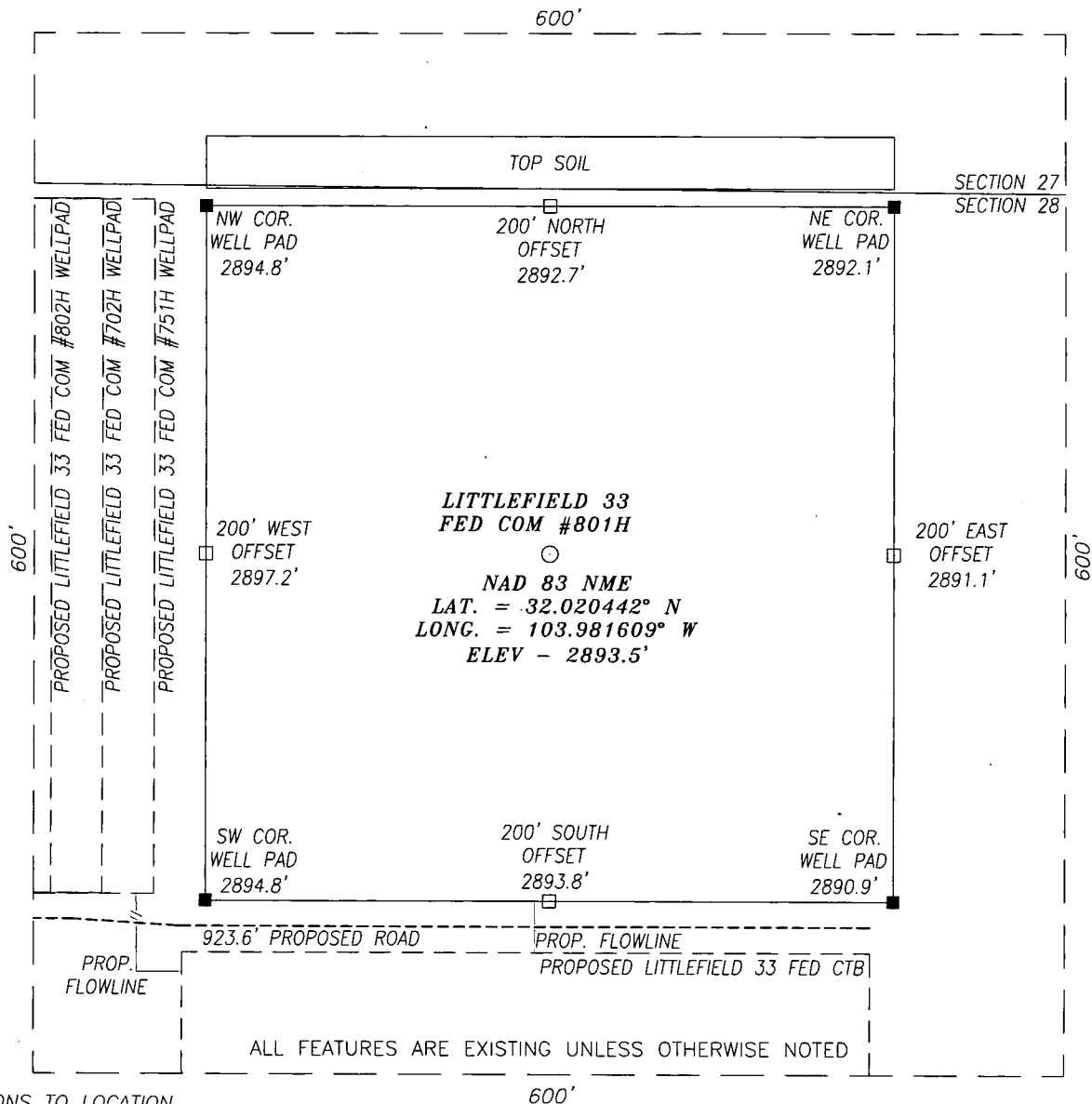
Payment Info

Payment

APD Fee Payment Method: PAY.GOV

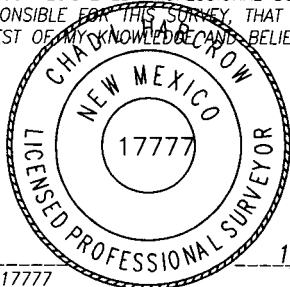
pay.gov Tracking ID: 26ER58IE

SECTION 28, TOWNSHIP 26 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
FROM THE INTERSECTION OF U.S. HWY. 285 & LONGHORN RD. (CR. 725), GO ON LONGHORN RD. (MEANDERING NORTHEASTERLY, SOUTHEASTERLY AND SOUTHERLY) FOR APPROX. 7.5 MILES; THEN TURN RIGHT (SOUTHEAST) AT THE Y AND GO APPROX. 400 FT; THEN TURN RIGHT (WESTERLY) AT THE Y AND GO APPROX. 0.6 MILES; THEN TURN LEFT (SOUTHERLY) AND GO APPROX. 0.3 MILES TO A PROPOSED ROAD. PROPOSED WELL LIES APPROX. 766 FEET NORTHEAST.

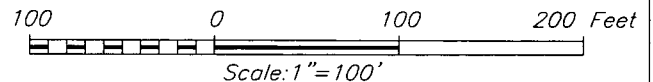
CERTIFICATION
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



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

1/14/18
DATE

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

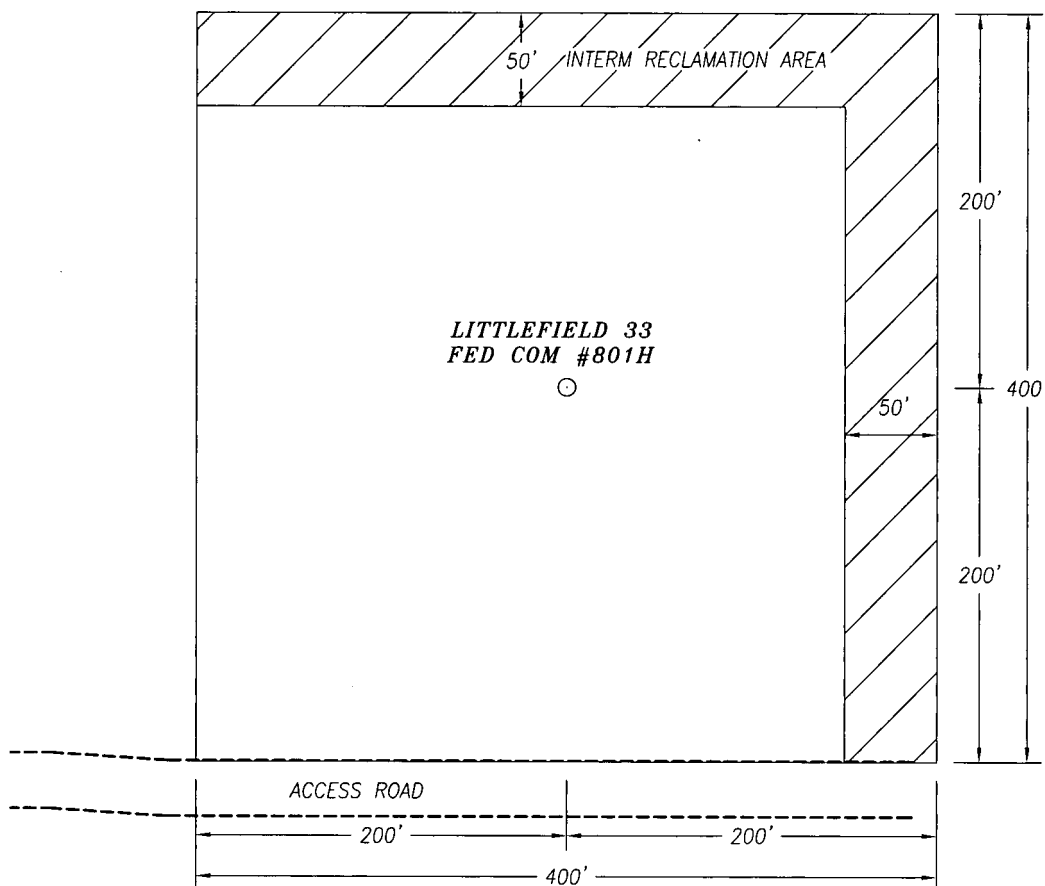


COG OPERATING, LLC

LITTLEFIELD 33 FEDERAL COM #801H WELL
LOCATED 210 FEET FROM THE NORTH LINE
AND 330 FEET FROM THE EAST LINE OF SECTION 28,
TOWNSHIP 26 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

SURVEY DATE: NOVEMBER 26, 2018	600
DRAFTING DATE: DECEMBER 28, 2018	PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: AM
FILE: 18-1674	

RECLAMATION AND FACILITY DIAGRAM – PRODUCTION FACILITIES DIAGRAM
 COG OPERATING, LLC
 SECTION 28, TOWNSHIP 26 SOUTH, RANGE 29 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO.



LEASE NAME WELL & WELL NUMBER: LITTLEFIELD 33 FEDERAL COM #801H
 LATITUDE: 32.020442° N
 LONGITUDE: 103.981609° W

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



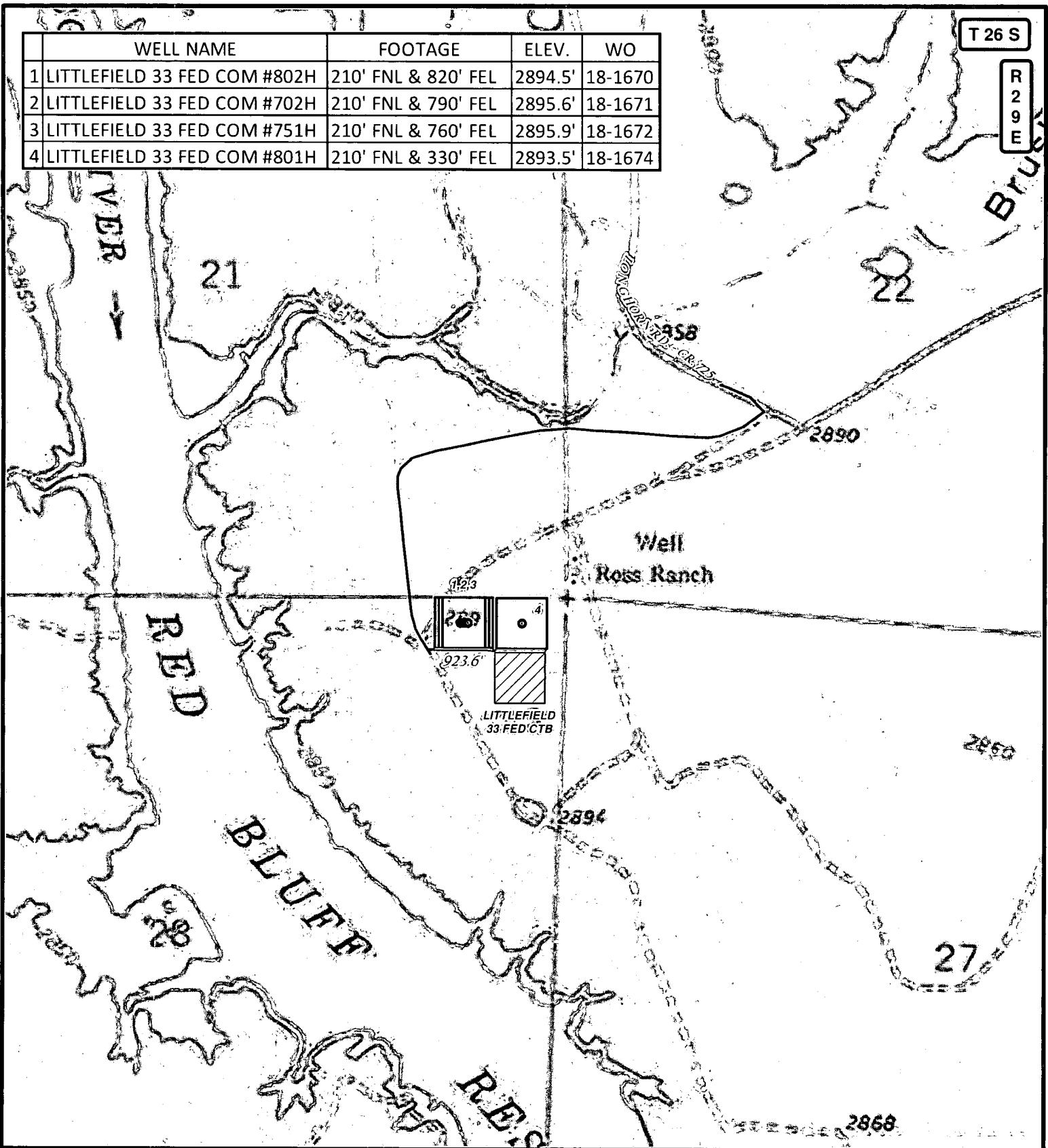
100 0 100 200 Feet
 Scale: 1" = 100'

COG OPERATING, LLC	
SURVEY DATE: NOVEMBER 26, 2018	RECLAMATION
DRAFTING DATE: JANUARY 14, 2019	PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: AM
FILE: 18-1674	

	WELL NAME	FOOTAGE	ELEV.	WO
1	LITTLEFIELD 33 FED COM #802H	210' FNL & 820' FEL	2894.5'	18-1670
2	LITTLEFIELD 33 FED COM #702H	210' FNL & 790' FEL	2895.6'	18-1671
3	LITTLEFIELD 33 FED COM #751H	210' FNL & 760' FEL	2895.9'	18-1672
4	LITTLEFIELD 33 FED COM #801H	210' FNL & 330' FEL	2893.5'	18-1674

T 26 S

R 29 E



LEGEND

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD

LITTLEFIELD 33 FED COM #802H, #702H, #751H, #801H

SECTION: 28

TOWNSHIP: 26 S.

RANGE: 29 E.

STATE: NEW MEXICO

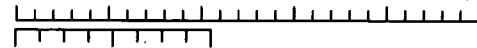
COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 18-1670-1672, 1674

LEASE: LITTLEFIELD

0 500 1,000 1,500 2,000 2,500 FEET



0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP

TOPO

12/27/2018

A.M.



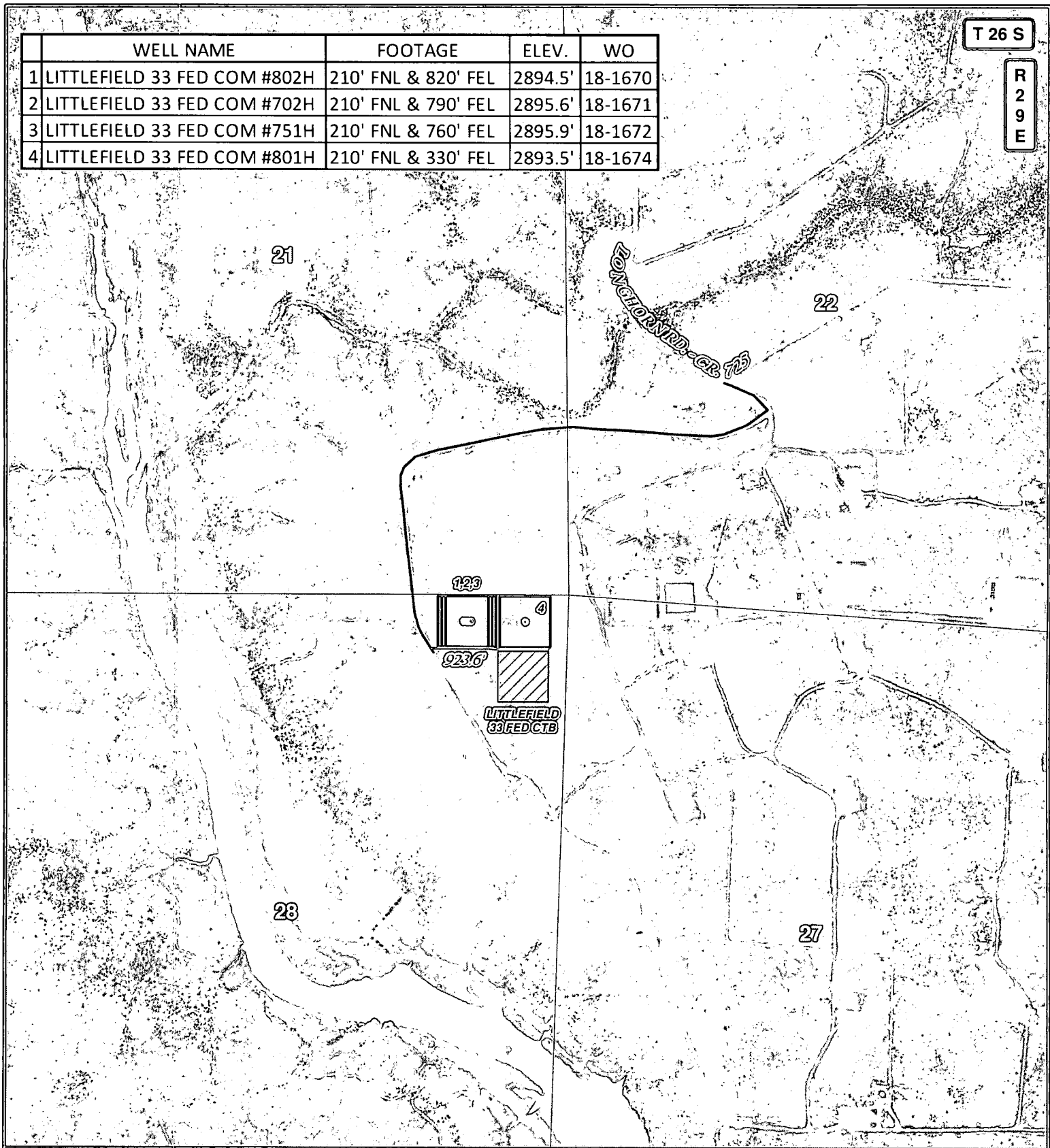
COG OPERATING, LLC



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c.harcrow@harcrowsurveying.com

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T 26 S
R 29 E



LEGEND

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD

LITTLEFIELD 33 FED COM #802H, #702H, #751H, #801H

SECTION: 28	TOWNSHIP: 26 S.	RANGE: 29 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1670-1672, 1674		LEASE: LITTLEFIELD

0 500 1,000 1,500 2,000 2,500 FEET

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

LOCATION MAP IMAGERY 12/27/2018 A.M.

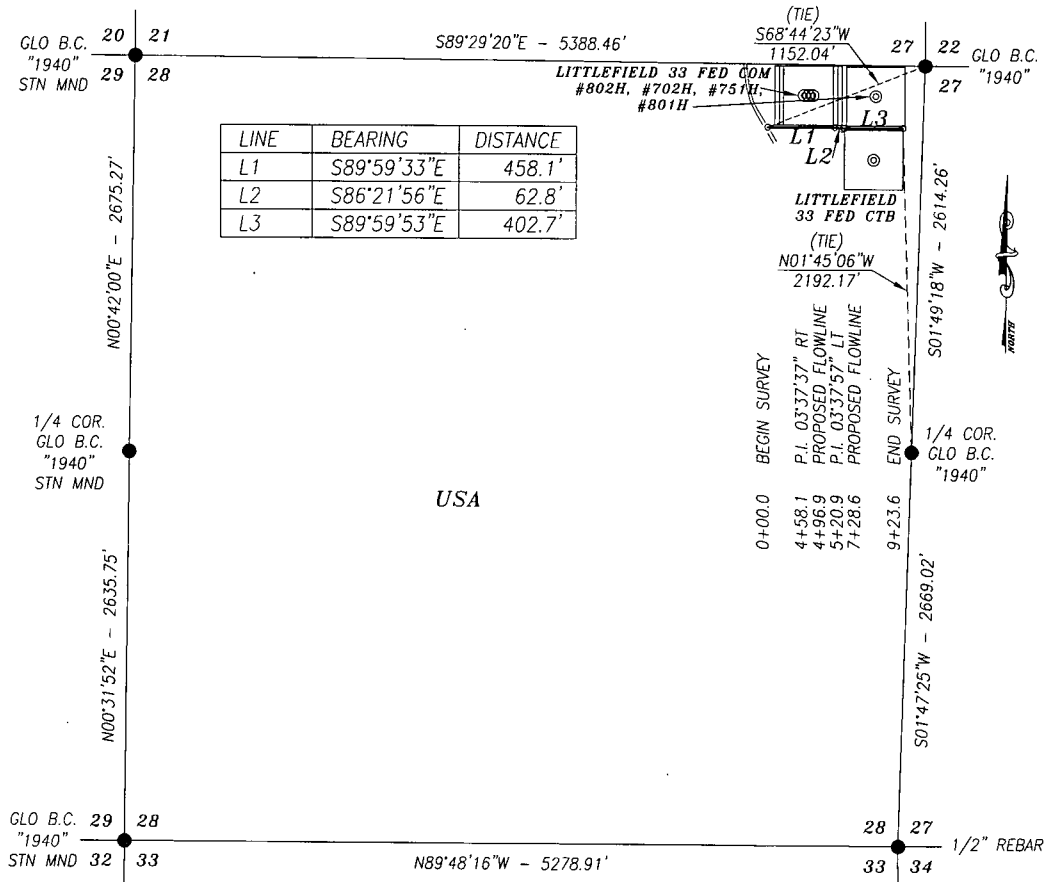
CONCHO

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c.harcrow@harcrowsurveying.com

ACCESS ROAD PLAT COG OPERATING, LLC

A PROPOSED ACCESS ROAD FROM AN EXISTING ROAD TO THE LITTLEFIELD 33 FED COM
#802H, #702H, #751H, #801H, AND THE LITTLEFIELD 33 FED CTB IN
SECTION 28, TOWNSHIP 26 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 923.6 FEET OR 55.98 RODS OR 0.175 MILES IN LENGTH CROSSING USA LAND IN SECTION 28, TOWNSHIP 26 SOUTH, RANGE 29 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.

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

12/21/18
DATE

HARCROW SURVEYING, LLC

2314 W. MAIN ST. ARTESIA, N.M. 88210

PH: (575) 746-2158

c.harcrow@harcrowsurveying.com



1000 0 1000 2000 FEET

SCALE: 1"=1000'

COG OPERATING, LLC

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 28, TOWNSHIP 26 SOUTH, RANGE 29 EAST, NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: NOVEMBER 26, 2018	ACCESS ROAD_1
DRAFTING DATE: DECEMBER 18, 2018	PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: AM
	FILE: 18-1689

T 26 S

R
2
9
E

LITTLEFIELD
33 FED COM
#802H, #702H, #751H



LITTLEFIELD 33
FED COM #801H

RED

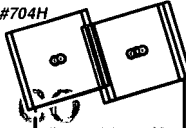
BLUE

RESERVOIR

33

LITTLEFIELD
33 FED COM
#804H, #704H

LITTLEFIELD
33 FED COM
#752H, #803H, #703H



EDDY CO

54

NEW MEXICO

REEVES CO

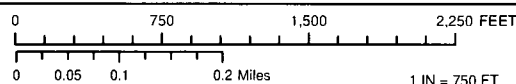
TEXAS

LEGEND

- WELL
- WELLPAD
- ACCESS ROAD
- - - TEMP ACCESS ROAD
- PRIVATE
- STATE OF NM
- US BLM

LITTLEFIELD 33 FED COM ACCESS ROADS

SECTIONS: 28, 33 TOWNSHIP: 26 S. RANGE: 29 E.
STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M.
W.O. # 18-1681 LEASE: LITTLEFIELD 33 FED COM



ACCESS ROAD MAP LAND STATUS 12/20/2018 A.M.

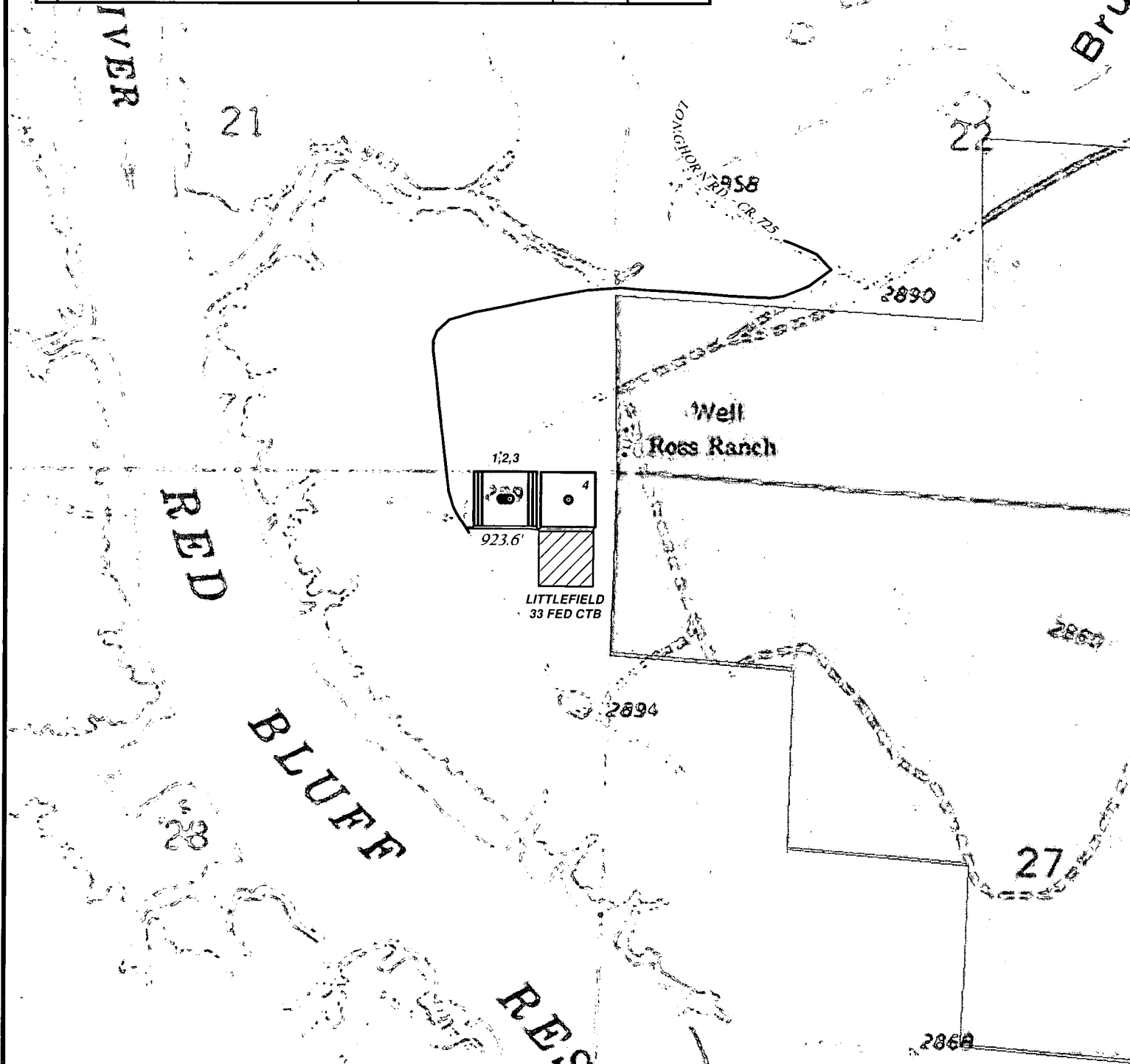
CONCHO
COG OPERATING, LLC

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T 26 S

R 29 E

	WELL NAME	FOOTAGE	ELEV.	WO
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LEGEND

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

LITTLEFIELD 33 FED COM #802H, #702H, #751H, #801H

SECTION: 28

TOWNSHIP: 26 S.

RANGE: 29 E.

STATE: NEW MEXICO

COUNTY: EDDY

SURVEY: N.M.P.M

W.O. # 18-1670-1672, 1674

LEASE: LITTLEFIELD

0 500 1,000 1,500 2,000 2,500 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP

LAND STATUS

12/27/2018

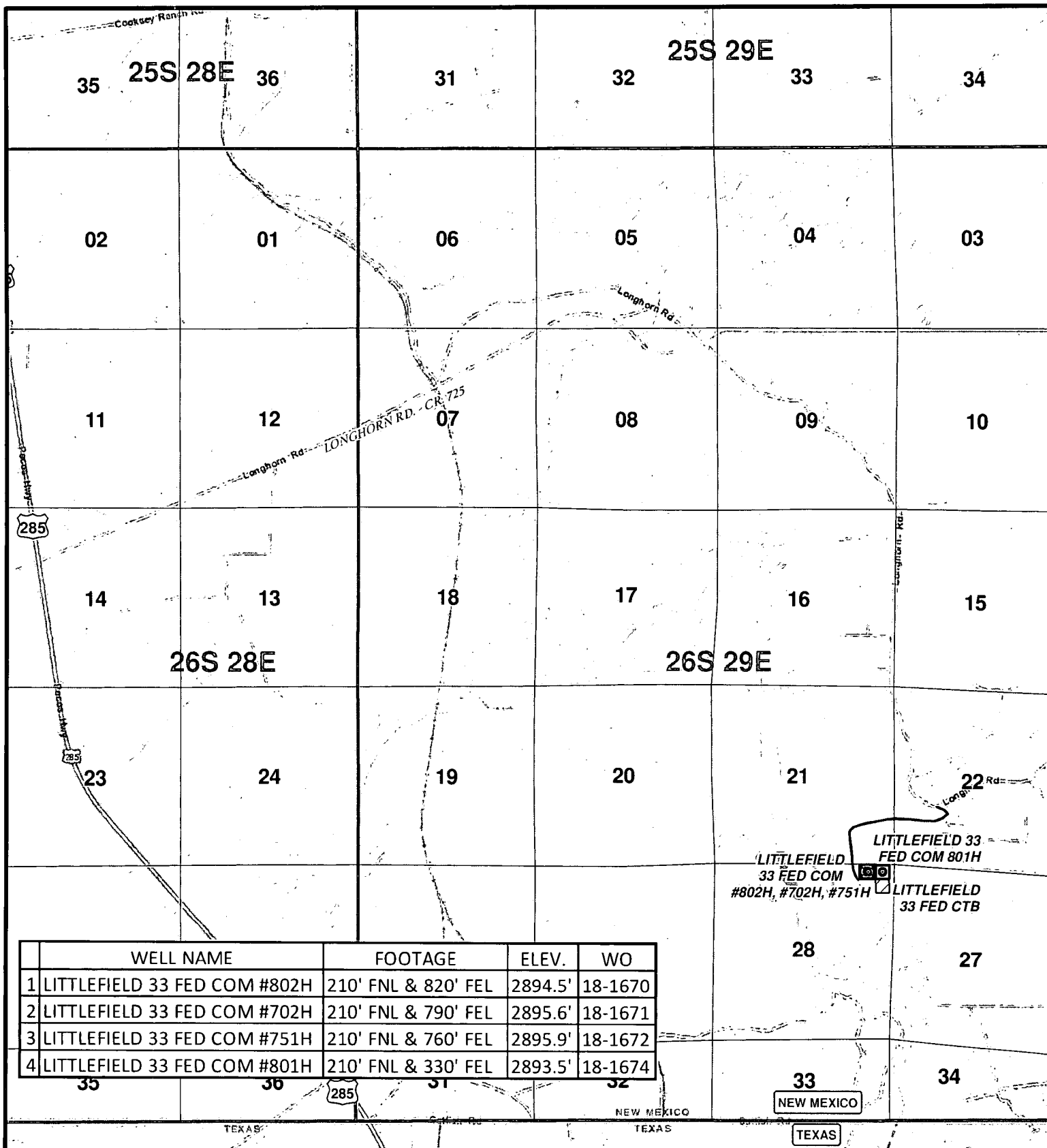
A.M.

CONCHO

COG OPERATING, LLC



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



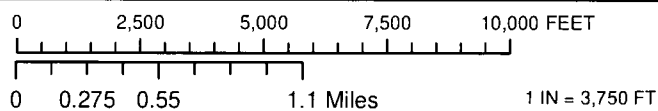
	WELL NAME	FOOTAGE	ELEV.	WO
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LEGEND

- WELL
- WELLPAD
- ▨ TANK BATTERY
- EXISTING ROAD
- PROPOSED ROAD

LITTLEFIELD 33 FED COM #802H, #702H, #751H, #801H

SECTION: 28 TOWNSHIP: 26 S. RANGE: 29 E.
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M.
 W.O. # 18-1670-1672, 1674 LEASE: LITTLEFIELD



LOCATION MAP

VICINITY

12/27/2018

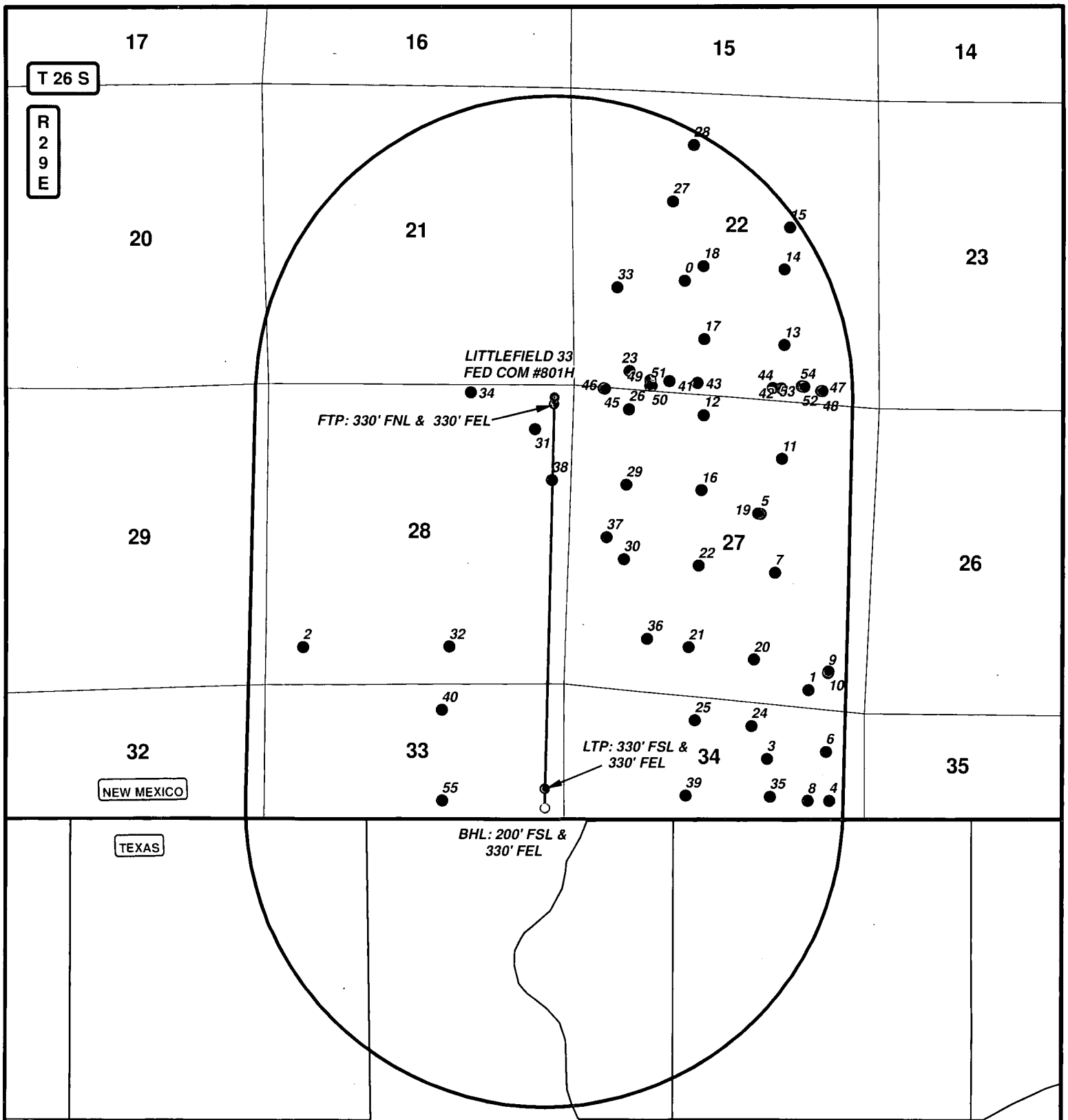
A.M.



COG OPERATING, LLC



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DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH JUNE 30, 2018.

LEGEND

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

LITTLEFIELD 33 FEDERAL COM #801H

SEC: 28 & 33	TWP: 26 S.	RGE: 29 E.	ELEVATION: 2893.5'
STATE: NEW MEXICO	COUNTY: EDDY	210' FNL & 330' FEL	
W.O. # 18-1674	LEASE: LITTLEFIELD	SURVEY: N.M.P.M	

0 2,500 5,000 FEET

0 0.15 0.3 0.6 Miles

1 IN = 2,252 FT

LOCATION MAP

IMAGERY

12/28/2018

A.M.



COG OPERATING, LLC

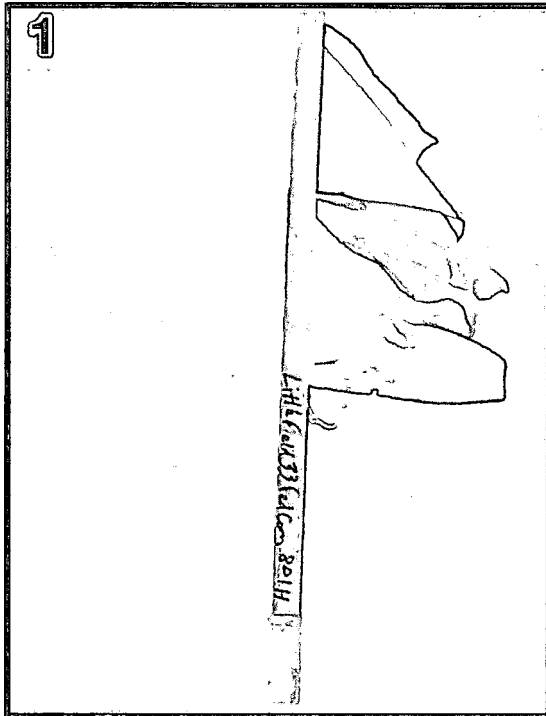


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 TEXAS FIRM NO. 10194089
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LITTLEFIELD 33 FEDERAL COM #801H 1 MILE DATA (18-1674)													
FID	WELL_NAME	OPERATOR	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	LATITUDE	LONGITUDE	COMPL_STAT
0	ASHLAND 001	BENNETT J GLE	3001503738	22	26.0S	29E	1980 S		1980 W		32.026046	-103.974149	Plugged
1	ELLIOTT FED 002	CHAPMAN FORD	3001503746	27	26.0S	29E	330 S		990 E		32.006396	-103.96711	Plugged
2	ELLIOTT FED 001	CHAPMAN FORD	3001503747	28	26.0S	29E	660 S		660 W		32.008428	-103.995963	Plugged
3	LITTLEFIELD BO FEDERAL 001		3001503748	34	26.0S	29E	948 N		1699 E		32.003069	-103.96947	Active
4	GULF PIPKIN FEDERAL 001	SHENANDOAH PETROLEUM CORPORATION	3001503751	34	26.0S	29E	330 S		605 E		32.001032	-103.965923	Active
5	RED BLUFF FED 001	HANSON OIL CORP	3001521014	27	26.0S	29E	1980 N		1980 E		32.014856	-103.969837	Plugged
6	LITTLEFIELD BO FEDERAL 002		3001524529	34	26.0S	29E	724 N		660 E		32.003403	-103.966102	Active
7	AMOCO FEDERAL 003	CIMAREX ENERGY CO. OF COLORADO	3001524535	27	26.0S	29E	2310 S		1681 E		32.01202	-103.969029	Plugged
8	YATES FEDERAL 001	RKI EXPLORATION & PRODUCTION, LLC	3001524602	34	26.0S	29E	330 S		990 E		32.001031	-103.967171	Active
9	PECOS FED 001	EL PASO EXPLORATION	3001524825	27	26.0S	29E	660 S		660 E		32.007212	-103.965991	Plugged
10	PECOS FEDERAL 001Y	RKI EXPLORATION & PRODUCTION, LLC	3001524875	27	26.0S	29E	690 S		660 E		32.007295	-103.965986	Active
11	AMOCO FEDERAL 006	CIMAREX ENERGY CO. OF COLORADO	3001524923	27	26.0S	29E	990 N		1650 E		32.017503	-103.968612	Plugged
12	AMOCO FEDERAL 007	CIMAREX ENERGY CO. OF COLORADO	3001525114	27	26.0S	29E	330 N		2310 W		32.019613	-103.973086	Plugged
13	MOBIL 22 FEDERAL 003	STEPHENS & JOHNSON OP CO	3001525165	22	26.0S	29E	990 S		1650 E		32.022948	-103.968469	Active
14	MOBIL 22 FEDERAL 004	STEPHENS & JOHNSON OP CO	3001525166	22	26.0S	29E	2310 S		1650 E		32.026585	-103.968471	Active
15	WORTH FEDERAL 003	STEPHENS & JOHNSON OP CO	3001525188	22	26.0S	29E	2265 N		1550 E		32.028606	-103.968147	Active
16	AMOCO FEDERAL 008	CIMAREX ENERGY CO. OF COLORADO	3001525223	27	26.0S	29E	1650 N		2310 W		32.015986	-103.973234	Plugged
17	MOBIL 22 FEDERAL 005	STEPHENS & JOHNSON OP CO	3001525321	22	26.0S	29E	990 S		2310 W		32.023247	-103.973054	Active
18	MOBIL 22 FEDERAL 006	STEPHENS & JOHNSON OP CO	3001525333	22	26.0S	29E	2260 S		2310 W		32.026748	-103.973085	Active
19	PECOS FEDERAL 002	QUANTUM RESOURCES MANAGEMENT, LLC	3001525376	27	26.0S	29E	1980 N		2030 E		32.014866	-103.969998	Plugged
20	PECOS FEDERAL 003	QUANTUM RESOURCES MANAGEMENT, LLC	3001525435	27	26.0S	29E	760 S		1980 E		32.007846	-103.970241	Plugged
21	PECOS FEDERAL 004	RKI EXPLORATION & PRODUCTION, LLC	3001525436	27	26.0S	29E	860 S		2180 W		32.008436	-103.973963	Plugged
22	AMOCO FEDERAL 009	CIMAREX ENERGY CO. OF COLORADO	3001525442	27	26.0S	29E	2300 S		2310 W		32.012359	-103.973382	Plugged
23	MOBIL 22 FEDERAL 009	STEPHENS & JOHNSON OP CO	3001525588	22	26.0S	29E	330 S		990 W		32.021707	-103.977321	Active
24	LITTLEFIELD BO FEDERAL 003		3001525609	34	26.0S	29E	400 N		1980 E		32.004658	-103.970381	Active
25	LITTLEFIELD BO FEDERAL 004		3001525622	34	26.0S	29E	400 N		2310 W		32.004931	-103.973623	Active
26	AMOCO FEDERAL 011	CIMAREX ENERGY CO. OF COLORADO	3001525666	27	26.0S	29E	330 N		990 W		32.019891	-103.977358	Plugged
27	MOBIL 22 FEDERAL 007	STEPHENS & JOHNSON OP CO	3001525687	22	26.0S	29E	1905 N		1780 W		32.029867	-103.974832	Active
28	MOBIL 22 FEDERAL 008	STEPHENS & JOHNSON OP CO	3001525701	22	26.0S	29E	890 N		2160 W		32.03261	-103.973624	Active
29	AMOCO FEDERAL 010	CIMAREX ENERGY CO. OF COLORADO	3001525720	27	26.0S	29E	1650 N		990 W		32.016265	-103.977506	Plugged
30	AMOCO RED BLUFF FEDERAL 001	CIMAREX ENERGY CO. OF COLORADO	3001525786	27	26.0S	29E	2281 S		990 W		32.012667	-103.977652	Plugged
31	AMOCO FEDERAL 013	CIMAREX ENERGY CO. OF COLORADO	3001525810	28	26.0S	29E	760 N		660 E		32.018927	-103.982751	Plugged
32	AMOCO FEDERAL 014	CIMAREX ENERGY CO. OF COLORADO	3001525858	28	26.0S	29E	660 S		2030 E		32.008457	-103.987623	Plugged
33	MOBIL 22 FEDERAL 010	STEPHENS & JOHNSON OP CO	3001525936	22	26.0S	29E	1775 S		790 W		32.025732	-103.978005	Active
34	AMOCO RED BLUFF FEDERAL 003	CIMAREX ENERGY CO. OF COLORADO	3001526244	28	26.0S	29E	130 N		1805 E		32.020675	-103.986395	Plugged
35	LITTLEFIELD BO FEDERAL 005		3001526423	34	26.0S	29E	1610 N		1650 E		32.00123	-103.969311	Active
36	COYOTE FEDERAL 27 001	ROBERT H FORREST JR OIL LLC	3001526800	27	26.0S	29E	935 S		1443 W		32.008843	-103.976338	Active
37	SKINK FEDERAL 27 001	ROBERT H FORREST JR OIL LLC	3001526892	27	26.0S	29E	2600 N		675 W		32.013721	-103.978631	Active
38	MALLON PECOS RIVER 28 FEDERAL 001	CIMAREX ENERGY CO. OF COLORADO	3001529371	28	26.0S	29E	1650 N		330 E		32.016477	-103.98178	Plugged
39	LITTLEFIELD BO FEDERAL 006		3001535174	34	26.0S	29E	423 S		2150 W		32.001284	-103.974147	Active
40	LITTLEFIELD BO FEDERAL 008	GP II ENERGY INC	3001535489	33	26.0S	29E	400 N		2141 E		32.005428	-103.988058	New (Not drilled or compl)
41	EAST PECOS FEDERAL COM 22 001H	RKI EXPLORATION & PRODUCTION, LLC	3001540568	22	26.0S	29E	250 S		1690 W		32.021216	-103.975052	New (Not drilled or compl)
42	EAST PECOS FEDERAL COM 22 002H	RKI EXPLORATION & PRODUCTION, LLC	3001540582	22	26.0S	29E	250 S		1690 E		32.020864	-103.968653	New (Not drilled or compl)
43	EAST PECOS FEDERAL 22 005H	RKI EXPLORATION & PRODUCTION, LLC	3001542270	22	26.0S	29E	250 S		2185 W		32.021128	-103.973447	New (Not drilled or compl)
44	EAST PECOS FEDERAL COM 22 006H	RKI EXPLORATION & PRODUCTION, LLC	3001542281	22	26.0S	29E	250 S		1840 E		32.020891	-103.969139	New (Not drilled or compl)
45	EAST PECOS FEDERAL 22 003H	RKI EXPLORATION & PRODUCTION, LLC	3001542285	22	26.0S	29E	50 S		530 W		32.020872	-103.978814	New (Not drilled or compl)
46	EAST PECOS FEDERAL 22 004H	RKI EXPLORATION & PRODUCTION, LLC	3001542286	22	26.0S	29E	50 S		555 W		32.020868	-103.978733	New (Not drilled or compl)
47	EAST PECOS FEDERAL COM 22 007H	RKI EXPLORATION & PRODUCTION, LLC	3001542287	22	26.0S	29E	250 S		990 E		32.02074	-103.966384	New (Not drilled or compl)
48	EAST PECOS FEDERAL COM 22 008H	RKI EXPLORATION & PRODUCTION, LLC	3001542288	22	26.0S	29E	250 S		965 E		32.020735	-103.966303	New (Not drilled or compl)
49	EAST PECOS FEDERAL 22 009H	RKI EXPLORATION & PRODUCTION, LLC	3001543349	22	26.0S	29E	250 S		1355 W		32.021276	-103.976138	New (Not drilled or compl)
50	EAST PECOS FEDERAL 22 011H	RKI EXPLORATION & PRODUCTION, LLC	3001543415	22	26.0S	29E	150 S		1380 W		32.020996	-103.976058	New (Not drilled or compl)
51	EAST PECOS FEDERAL 22 010H	RKI EXPLORATION & PRODUCTION, LLC	3001543416	22	26.0S	29E	150 S		1355 W		32.021	-103.976139	New (Not drilled or compl)
52	EAST PECOS FEDERAL COM 22 012H	RKI EXPLORATION & PRODUCTION, LLC	3001543584	22	26.0S	29E	310 S		1335 E		32.020966	-103.967501	New (Not drilled or compl)

53 EAST PECOS FEDERAL COM 22 013H	RKI EXPLORATION & PRODUCTION, LLC	3001543585	22 26.05	29E	310 S	1310 E	32.020962	-103.96742 New (Not drilled or compl)
54 EAST PECOS FEDERAL COM 22 014H	RKI EXPLORATION & PRODUCTION; LLC	3001543586	22 26.05	29E	310 S	1285 E	32.020957	-103.967339 New (Not drilled or compl)
55 LITTLEFIELD 33 FEDERAL 001H		3001543818	33 26.05	29E	330 S	2130 E	32.00103	-103.988043 New (Not drilled or compl)

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



2

Harcrow Surveying

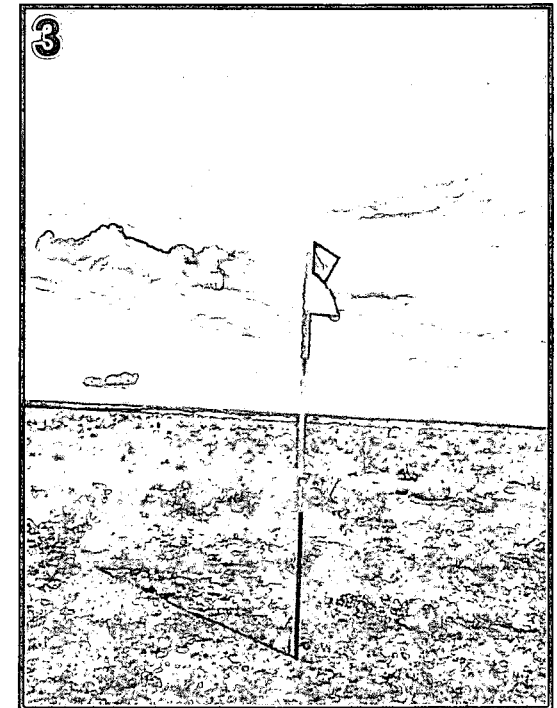
Well Name: Littlefield 33 Fed Com #801H

Company Name: COG Operating, LLC

Date: 11-26-18

HL: 210' FNL & 330' FEL

Section 28 Township 26S Range 29E



CONCHO
COG OPERATING, LLC

LITTLEFIELD 33 FEDERAL COM #801H

SEC: 28	TWP: 26 S.	RGE: 33 E.	ELEVATION: 2893.5'
STATE: NEW MEXICO	COUNTY: EDDY	210' FNL & 330' FEL	
W.O. #18-1674	LEASE: LITTLEFIELD	SURVEY: N.M.P.M	
PHOTO SHEET	12/31/2018	A.M.	



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COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 28, T26S, R29E

Littlefield 33 Fed Com #801H

Wellbore #1

Design #1

QES Anticollision Report

17 January, 2019





Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	1/17/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	17,922.0	Design #1 (Wellbore #1)	MWD	OWSG MWD - Standard	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sec 22, T26S, R29E						
East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1	7,862.6	7,845.9	750.3	711.0	19.119	CC, ES
East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1	8,100.0	7,996.0	763.6	722.8	18.685	SF

Offset Design	Sec 22, T26S, R29E - East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1										Offset Site Error:	0.0 usft
Survey Program:	100-, 2847-										Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
0.0	0.0	0.0	28.5	0.0	0.0	75.84	218.5	866.1	893.7			
100.0	100.0	79.6	108.1	0.1	0.0	75.90	217.5	866.0	892.9	892.8	5,359.531	
200.0	200.0	195.6	224.0	0.5	0.1	76.12	213.6	864.9	891.2	890.6	1,494.345	
300.0	300.0	296.6	324.9	0.8	0.2	76.37	209.3	863.0	888.4	887.4	873.513	
400.0	400.0	393.1	421.3	1.2	0.2	76.58	205.5	861.4	885.8	884.3	818.782	
500.0	500.0	491.3	519.5	1.6	0.3	76.76	202.2	859.8	883.5	881.6	478.423	
600.0	600.0	591.4	619.5	1.9	0.4	76.94	199.1	858.3	881.3	879.0	389.436	
700.0	700.0	692.6	720.6	2.3	0.4	77.12	195.9	856.7	879.0	876.3	327.911	
800.0	800.0	792.8	820.7	2.6	0.5	77.31	192.6	855.0	876.7	873.6	282.983	
900.0	900.0	893.6	921.5	3.0	0.5	77.50	189.2	853.3	874.2	870.7	248.633	
1,000.0	1,000.0	994.4	1,022.2	3.4	0.6	77.70	185.6	851.5	871.7	867.8	221.504	
1,100.0	1,100.0	1,096.5	1,124.2	3.7	0.7	77.93	181.7	849.5	869.1	864.7	199.463	
1,200.0	1,200.0	1,197.4	1,225.0	4.1	0.7	78.17	177.5	847.5	866.2	861.5	181.272	
1,300.0	1,300.0	1,298.3	1,325.8	4.4	0.8	78.42	173.2	845.3	863.3	858.1	165.997	
1,400.0	1,400.0	1,399.6	1,427.0	4.8	0.9	78.68	168.8	843.1	860.2	854.6	152.968	
1,500.0	1,500.0	1,501.9	1,529.1	5.1	1.0	78.95	164.2	840.6	857.0	850.9	141.695	
1,600.0	1,600.0	1,602.2	1,629.3	5.5	1.0	79.22	159.5	838.0	853.5	847.1	131.877	
1,700.0	1,700.0	1,697.8	1,724.7	5.9	1.1	79.49	155.0	835.8	850.4	843.5	123.353	
1,800.0	1,800.0	1,794.4	1,821.3	6.2	1.2	79.76	150.6	833.9	847.7	840.3	115.877	
1,900.0	1,900.0	1,893.1	1,919.9	6.6	1.2	80.03	146.3	832.2	845.2	837.5	109.233	
2,000.0	2,000.0	1,987.4	2,014.1	6.9	1.3	80.29	142.2	831.0	843.2	835.0	103.373	
2,100.0	2,100.0	2,084.9	2,111.4	7.3	1.3	80.54	138.4	830.2	841.7	833.1	98.138	
2,200.0	2,200.0	2,182.3	2,208.7	7.7	1.4	80.79	134.5	829.6	840.5	831.5	93.417	
2,296.6	2,296.6	2,270.2	2,296.6	8.0	1.5	81.03	131.0	829.7	839.9	830.5	89.348	
2,300.0	2,300.0	2,273.2	2,299.6	8.0	1.5	81.04	130.8	829.7	839.9	830.5	89.213	

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



Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Sec 22, T26S, R29E - East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 usft
Survey Program: 100-, 2847-												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning		
2,400.0	2,400.0	2,367.2	2,393.5	8.4	1.5	81.31	126.9	830.8	840.4	830.6	85.457		
2,500.0	2,500.0	2,461.3	2,487.6	8.7	1.6	81.60	123.0	832.4	841.5	831.3	82.063		
2,600.0	2,600.0	2,554.7	2,580.8	9.1	1.6	81.90	118.7	834.8	843.4	832.7	78.995		
2,700.0	2,700.0	2,649.5	2,675.4	9.4	1.7	82.27	113.8	838.0	846.0	834.9	76.199		
2,800.0	2,800.0	2,749.1	2,774.8	9.8	1.8	82.68	108.2	841.8	849.1	837.5	73.613		
2,900.0	2,900.0	2,847.0	2,872.5	10.2	1.8	83.03	103.3	845.3	852.0	840.1	71.432		
3,000.0	3,000.0	2,933.9	2,959.3	10.5	1.8	83.22	100.9	848.9	855.8	843.5	69.544		
3,100.0	3,100.0	3,026.1	3,051.3	10.9	1.9	83.14	102.7	854.0	861.5	848.8	67.812		
3,200.0	3,200.0	3,178.1	3,202.7	11.2	2.0	82.31	115.4	854.8	862.6	849.4	65.382		
3,260.0	3,260.0	3,235.4	3,259.8	11.5	2.0	82.00	120.0	854.0	862.4	848.9	64.054		
3,300.0	3,300.0	3,268.3	3,292.6	11.6	2.1	81.84	122.5	853.8	862.6	848.9	63.224		
3,400.0	3,400.0	3,356.2	3,380.4	12.0	2.2	81.42	128.9	854.4	864.3	850.2	61.273		
3,500.0	3,500.0	3,455.0	3,478.9	12.3	2.3	80.99	135.7	855.7	866.7	852.1	59.354		
3,600.0	3,600.0	3,552.9	3,576.5	12.7	2.5	80.54	142.7	857.1	869.2	854.1	57.512		
3,700.0	3,700.0	3,666.6	3,689.9	13.0	2.7	79.99	151.5	858.3	871.7	856.0	55.618		
3,800.0	3,800.0	3,800.6	3,823.3	13.4	2.9	79.20	163.2	855.2	870.9	854.7	53.497		
3,900.0	3,900.0	3,930.0	3,952.2	13.7	3.2	78.54	171.8	847.3	866.1	849.2	51.345		
4,000.0	4,000.0	4,032.6	4,054.3	14.1	3.4	78.07	177.4	839.6	859.8	842.4	49.339		
4,100.0	4,100.0	4,131.8	4,153.1	14.5	3.6	77.62	182.7	832.1	853.6	835.6	47.463		
4,200.0	4,200.0	4,230.8	4,251.6	14.8	3.8	77.16	188.0	824.7	847.4	828.9	45.678		
4,300.0	4,300.0	4,327.9	4,348.3	15.2	4.0	76.70	193.3	817.5	841.5	822.3	44.005		
4,400.0	4,400.0	4,434.7	4,454.7	15.5	4.2	76.22	198.6	809.8	835.6	815.9	42.421		
4,500.0	4,500.0	4,538.7	4,558.3	15.9	4.4	75.87	201.8	801.6	828.6	808.4	40.899		
4,600.0	4,600.0	4,638.7	4,658.0	16.3	4.6	75.56	204.4	793.6	821.6	800.8	39.459		
4,700.0	4,700.0	4,737.9	4,756.9	16.6	4.8	75.24	207.0	785.7	814.6	793.2	38.087		
4,800.0	4,800.0	4,825.8	4,844.5	17.0	5.0	74.95	209.6	779.3	808.2	786.3	36.825		
4,900.0	4,900.0	4,922.4	4,940.8	17.3	5.2	74.63	212.5	773.3	803.1	780.5	35.656		
5,000.0	5,000.0	5,021.3	5,039.5	17.7	5.4	74.32	215.4	767.4	798.0	774.9	34.556		
5,100.0	5,100.0	5,121.0	5,139.0	18.1	5.6	74.02	218.1	761.5	793.1	769.4	33.516		
5,200.0	5,200.0	5,219.0	5,236.8	18.4	5.9	73.73	220.6	755.9	788.3	764.1	32.526		
5,300.0	5,300.0	5,316.7	5,334.3	18.8	6.1	73.46	223.0	750.6	783.8	759.0	31.591		
5,400.0	5,400.0	5,416.3	5,433.8	19.1	6.3	73.19	225.2	745.4	779.4	754.0	30.708		
5,500.0	5,500.0	5,516.5	5,533.8	19.5	6.5	72.93	227.3	740.2	775.1	749.1	29.867		
5,600.0	5,600.0	5,614.5	5,631.7	19.8	6.7	72.69	229.1	735.3	770.8	744.3	29.062		
5,700.0	5,700.0	5,713.4	5,730.5	20.2	6.9	72.45	231.0	730.5	766.8	739.7	28.299		
5,800.0	5,800.0	5,810.7	5,827.7	20.6	7.1	72.24	232.6	726.1	763.0	735.3	27.575		
5,900.0	5,900.0	5,909.7	5,926.5	20.9	7.4	72.04	234.0	722.0	759.4	731.2	26.891		
6,000.0	6,000.0	6,005.6	6,022.4	21.3	7.6	71.87	235.1	718.2	756.1	727.3	26.238		
6,100.0	6,100.0	6,095.1	6,111.9	21.6	7.8	71.73	236.3	715.7	753.8	724.4	25.638		
6,200.0	6,200.0	6,186.8	6,203.5	22.0	7.9	71.63	237.3	714.5	752.9	722.9	25.113		
6,300.0	6,300.0	6,286.8	6,303.5	22.4	8.1	71.56	238.0	713.8	752.4	721.9	24.639		
6,400.0	6,400.0	6,387.7	6,404.4	22.7	8.3	71.52	238.3	713.1	751.9	720.8	24.183		
6,500.0	6,500.0	6,487.6	6,504.4	23.1	8.5	71.50	238.3	712.4	751.3	719.6	23.740		
6,600.0	6,600.0	6,585.0	6,601.7	23.4	8.7	71.50	238.2	712.1	750.9	718.7	23.313		
6,664.3	6,664.3	6,647.6	6,664.3	23.7	8.8	71.50	238.2	712.0	750.8	718.2	23.052		
6,700.0	6,700.0	6,681.1	6,697.8	23.8	8.9	71.50	238.2	712.0	750.8	718.1	22.910		
6,800.0	6,800.0	6,775.3	6,792.0	24.1	9.1	71.49	238.5	712.6	751.5	718.2	22.540		
6,900.0	6,900.0	6,875.7	6,892.4	24.5	9.3	71.47	239.3	713.7	752.8	718.9	22.210		
7,000.0	7,000.0	6,982.7	6,999.4	24.9	9.5	71.48	239.3	714.2	753.2	718.8	21.878		
7,100.0	7,100.0	7,083.6	7,100.3	25.2	9.7	71.50	239.0	714.3	753.2	718.2	21.535		
7,140.0	7,140.0	7,123.3	7,140.0	25.4	9.8	71.50	239.0	714.3	753.2	718.0	21.399		
7,200.0	7,200.0	7,179.5	7,196.2	25.6	9.9	71.49	239.1	714.4	753.3	717.8	21.196		

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



Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design Sec 22, T26S, R29E - East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 usft
Survey Program: 100-, 2847-												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
7,300.0	7,300.0	7,273.2	7,289.9	25.9	10.1	71.47	239.7	715.1	754.2	718.1	20.882		
7,400.0	7,400.0	7,377.5	7,394.2	26.3	10.3	71.46	240.3	716.2	755.5	718.8	20.607		
7,500.0	7,500.0	7,491.2	7,507.9	26.7	10.5	71.39	241.0	715.9	755.4	718.2	20.328		
7,600.0	7,600.0	7,596.4	7,613.1	27.0	10.7	71.30	241.7	714.1	754.0	716.3	20.003		
7,700.0	7,700.0	7,696.4	7,713.0	27.4	10.9	71.23	242.0	712.1	752.2	714.0	19.663		
7,800.0	7,800.0	7,792.1	7,808.7	27.7	11.1	71.18	242.1	710.5	750.7	711.8	19.326		
7,862.6	7,862.6	7,845.9	7,862.6	28.0	11.2	71.07	243.4	709.7	750.3	711.0	19.119	CC, ES	
7,900.0	7,900.0	7,870.0	7,886.6	28.1	11.3	70.94	245.0	709.3	750.5	711.0	18.994		
8,000.0	8,000.0	7,933.0	7,949.0	28.4	11.4	70.35	253.2	709.2	754.7	714.5	18.766		
8,100.0	8,100.0	7,996.0	8,010.4	28.8	11.6	69.38	267.0	709.8	763.6	722.8	18.685	SF	
8,200.0	8,200.0	8,060.0	8,070.8	29.2	11.8	67.93	288.1	710.4	777.4	736.0	18.744		
8,300.0	8,300.0	8,124.7	8,129.7	29.5	12.0	66.12	315.0	711.5	796.5	754.5	18.946		
8,400.0	8,400.0	8,202.5	8,198.0	29.9	12.4	63.67	352.0	711.5	819.1	776.5	19.200		
8,500.0	8,500.0	8,250.0	8,238.0	30.2	12.6	62.04	377.7	711.5	847.1	804.1	19.708		
8,600.0	8,600.0	8,282.0	8,263.6	30.6	12.8	60.86	396.9	711.8	881.6	838.6	20.506		
8,700.0	8,700.0	8,323.8	8,295.5	31.0	13.0	59.25	423.9	712.6	922.6	879.6	21.452		
8,800.0	8,800.0	8,377.8	8,334.5	31.3	13.4	57.13	461.1	713.5	968.7	925.6	22.458		
8,900.0	8,900.0	8,439.0	8,378.3	31.7	13.8	54.78	504.0	714.0	1,017.8	974.5	23.479		
9,000.0	9,000.0	8,471.0	8,400.6	32.0	14.1	53.59	526.9	714.4	1,071.1	1,028.0	24.853		
9,100.0	9,100.0	8,510.9	8,426.8	32.4	14.4	52.07	557.0	714.7	1,128.8	1,085.8	26.270		
9,200.0	9,200.0	8,541.1	8,445.4	32.7	14.7	50.88	580.8	714.2	1,190.3	1,147.6	27.892		
9,300.0	9,300.0	8,566.0	8,459.8	33.1	14.9	49.88	601.1	713.4	1,255.4	1,213.1	29.675		
9,400.0	9,400.0	8,586.9	8,471.2	33.5	15.1	49.04	618.5	712.5	1,323.9	1,282.1	31.598		
9,500.0	9,500.0	8,598.0	8,477.1	33.8	15.2	48.60	627.9	712.2	1,395.6	1,354.3	33.738		
9,600.0	9,600.0	8,630.0	8,493.2	34.2	15.6	47.34	655.6	711.6	1,470.1	1,428.9	35.654		
9,700.0	9,700.0	8,630.0	8,493.2	34.5	15.6	47.34	655.6	711.6	1,546.8	1,506.2	38.081		
9,800.0	9,800.0	8,644.2	8,499.8	34.9	15.7	46.80	668.1	711.5	1,625.8	1,585.5	40.347		
9,900.0	9,900.0	8,661.0	8,507.2	35.3	15.9	46.16	683.2	711.5	1,706.7	1,666.6	42.598		
10,000.0	10,000.0	8,661.0	8,507.2	35.6	15.9	46.16	683.2	711.5	1,789.3	1,749.6	45.150		
10,100.0	10,100.0	8,661.0	8,507.2	36.0	15.9	46.16	683.2	711.5	1,873.5	1,834.2	47.730		
10,200.0	10,200.0	8,679.5	8,514.8	36.3	16.1	45.47	700.1	711.8	1,958.8	1,919.6	49.968		
10,300.0	10,300.0	8,693.0	8,519.8	36.7	16.2	44.97	712.6	712.0	2,045.4	2,006.3	52.292		
10,400.0	10,400.0	8,693.0	8,519.8	37.0	16.2	-135.80	712.6	712.0	2,133.0	2,094.1	54.853		
10,500.0	10,499.4	8,693.0	8,519.8	37.4	16.2	-117.91	712.6	712.0	2,224.3	2,185.5	57.398		
10,600.0	10,595.7	8,693.0	8,519.8	37.7	16.2	-89.42	712.6	712.0	2,319.0	2,280.2	59.843		
10,700.0	10,685.9	8,693.0	8,519.8	38.0	16.2	-60.12	712.6	712.0	2,414.1	2,375.2	62.111		
10,800.0	10,767.3	8,693.0	8,519.8	38.3	16.2	-41.09	712.6	712.0	2,506.7	2,467.7	64.136		
10,900.0	10,837.5	8,693.0	8,519.8	38.6	16.2	-30.33	712.6	712.0	2,594.6	2,555.2	65.863		
11,000.0	10,894.2	8,693.0	8,519.8	38.9	16.2	-24.01	712.6	712.0	2,675.6	2,635.8	67.247		
11,100.0	10,935.8	8,661.0	8,507.2	39.2	15.9	-19.87	683.2	711.5	2,747.4	2,707.5	68.880		
11,200.0	10,960.9	8,661.0	8,507.2	39.5	15.9	-17.38	683.2	711.5	2,808.8	2,768.3	69.442		
11,300.0	10,968.9	8,647.1	8,501.1	39.9	15.7	-15.70	670.7	711.5	2,858.6	2,817.6	69.844		
11,400.0	10,968.2	8,630.0	8,493.2	40.3	15.6	-15.70	655.6	711.6	2,903.4	2,861.9	70.084		
11,500.0	10,967.6	8,630.0	8,493.2	40.7	15.6	-15.70	655.6	711.6	2,950.5	2,908.4	70.045		
11,600.0	10,966.9	8,598.0	8,477.1	41.3	15.2	-15.63	627.9	712.2	2,999.7	2,957.2	70.632		
11,700.0	10,966.2	8,598.0	8,477.1	41.8	15.2	-15.63	627.9	712.2	3,051.0	3,007.9	70.693		
11,800.0	10,965.5	8,566.0	8,459.8	42.5	14.9	-15.56	601.1	713.4	3,104.3	3,060.8	71.351		
11,900.0	10,964.8	8,566.0	8,459.8	43.2	14.9	-15.56	601.1	713.4	3,159.4	3,115.2	71.518		
12,000.0	10,964.1	8,545.4	8,448.0	43.9	14.7	-15.52	584.3	714.1	3,216.3	3,171.7	72.066		
12,100.0	10,963.4	8,531.0	8,439.3	44.7	14.6	-15.48	572.7	714.4	3,274.9	3,229.8	72.564		
12,200.0	10,962.7	8,517.7	8,431.1	45.5	14.5	-15.44	562.3	714.6	3,335.2	3,289.6	73.088		
12,300.0	10,962.0	8,503.0	8,421.8	46.4	14.3	-15.40	550.9	714.7	3,397.0	3,350.9	73.679		

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



Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design											Offset Site Error:	0.0 usft
Sec 22, T26S, R29E - East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1											Offset Well Error:	0.0 usft
Survey Program: 100-, 2847-												
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
12,400.0	10,961.3	8,503.0	8,421.8	47.3	14.3	-15.40	550.9	714.7	3,460.5	3,413.8	74.119	
12,500.0	10,960.6	8,471.0	8,400.6	48.3	14.1	-15.28	526.9	714.4	3,525.2	3,478.2	75.014	
12,600.0	10,959.9	8,471.0	8,400.6	49.3	14.1	-15.28	526.9	714.4	3,591.2	3,543.7	75.542	
12,700.0	10,959.2	8,453.9	8,388.8	50.3	13.9	-15.22	514.5	714.2	3,658.6	3,610.7	76.321	
12,800.0	10,958.5	8,439.0	8,378.3	51.4	13.8	-15.16	504.0	714.0	3,727.2	3,678.9	77.108	
12,900.0	10,957.8	8,397.5	8,348.6	52.5	13.5	-15.00	474.9	713.7	3,796.9	3,748.4	78.212	
13,000.0	10,957.1	8,345.0	8,311.0	53.6	13.2	-14.80	438.3	713.1	3,866.9	3,818.2	79.420	
13,100.0	10,956.5	8,345.0	8,311.0	54.8	13.2	-14.80	438.3	713.1	3,937.6	3,888.5	80.096	
13,200.0	10,955.8	8,326.3	8,297.4	55.9	13.1	-14.73	425.6	712.7	4,009.4	3,959.9	80.991	
13,300.0	10,955.1	8,313.0	8,287.4	57.1	13.0	-14.68	416.7	712.4	4,082.2	4,032.4	81.863	
13,400.0	10,954.4	8,313.0	8,287.4	58.3	13.0	-14.68	416.7	712.4	4,156.0	4,105.7	82.645	
13,500.0	10,953.7	8,297.8	8,275.9	59.6	12.9	-14.61	406.8	712.0	4,230.7	4,180.1	83.590	
13,600.0	10,953.0	8,282.0	8,263.6	60.8	12.8	-14.55	396.9	711.8	4,306.4	4,255.4	84.566	
13,700.0	10,952.3	8,282.0	8,263.6	62.1	12.8	-14.55	396.9	711.8	4,382.8	4,331.5	85.438	
13,800.0	10,951.6	8,282.0	8,263.6	63.4	12.8	-14.55	396.9	711.8	4,460.1	4,408.5	86.343	
13,900.0	10,950.9	8,282.0	8,263.6	64.7	12.8	-14.55	396.9	711.8	4,538.4	4,486.4	87.278	
14,000.0	10,950.2	8,250.0	8,238.0	66.0	12.6	-14.42	377.7	711.5	4,617.2	4,565.0	88.456	
14,100.0	10,949.5	8,250.0	8,238.0	67.4	12.6	-14.42	377.7	711.5	4,696.6	4,644.1	89.429	
14,200.0	10,948.8	8,250.0	8,238.0	68.7	12.6	-14.42	377.7	711.5	4,776.9	4,724.1	90.428	
14,300.0	10,948.1	8,250.0	8,238.0	70.1	12.6	-14.42	377.7	711.5	4,857.9	4,804.7	91.452	
14,400.0	10,947.4	8,250.0	8,238.0	71.5	12.6	-14.42	377.7	711.5	4,939.5	4,886.1	92.498	
14,500.0	10,946.7	8,232.6	8,223.6	72.8	12.5	-14.35	367.9	711.4	5,021.5	4,967.9	93.655	
14,600.0	10,946.0	8,218.0	8,211.3	74.2	12.4	-14.30	360.1	711.4	5,104.4	5,050.5	94.812	
14,700.0	10,945.4	8,218.0	8,211.3	75.6	12.4	-14.30	360.1	711.4	5,187.6	5,133.5	95.904	
14,800.0	10,944.7	8,218.0	8,211.3	77.1	12.4	-14.30	360.1	711.4	5,271.4	5,217.1	97.013	
14,900.0	10,944.0	8,218.0	8,211.3	78.5	12.4	-14.30	360.1	711.4	5,355.8	5,301.2	98.139	
15,000.0	10,943.3	8,218.0	8,211.3	79.9	12.4	-14.30	360.1	711.4	5,440.7	5,385.9	99.281	
15,100.0	10,942.6	8,186.0	8,183.7	81.4	12.3	-14.17	343.8	711.6	5,525.9	5,471.0	100.568	
15,200.0	10,941.9	8,186.0	8,183.7	82.8	12.3	-14.17	343.8	711.6	5,611.5	5,556.4	101.726	
15,300.0	10,941.2	8,186.0	8,183.7	84.3	12.3	-14.17	343.8	711.6	5,697.6	5,642.2	102.897	
15,400.0	10,940.5	8,186.0	8,183.7	85.7	12.3	-14.17	343.8	711.6	5,784.1	5,728.5	104.080	
15,500.0	10,939.8	8,155.0	8,156.5	87.2	12.2	-14.05	329.0	711.8	5,870.9	5,815.2	105.377	
15,600.0	10,939.1	8,155.0	8,156.5	88.7	12.2	-14.05	329.0	711.8	5,958.0	5,902.1	106.572	
15,700.0	10,938.4	8,155.0	8,156.5	90.2	12.2	-14.05	329.0	711.8	6,045.5	5,989.4	107.778	
15,800.0	10,937.7	8,136.5	8,140.1	91.6	12.1	-13.97	320.3	711.6	6,133.3	6,077.0	109.042	
15,900.0	10,937.0	8,123.0	8,128.1	93.1	12.0	-13.92	314.2	711.4	6,221.4	6,164.9	110.296	
16,000.0	10,936.3	8,123.0	8,128.1	94.6	12.0	-13.92	314.2	711.4	6,309.7	6,253.1	111.519	
16,100.0	10,935.6	8,123.0	8,128.1	96.1	12.0	-13.92	314.2	711.4	6,398.4	6,341.7	112.750	
16,200.0	10,934.9	8,123.0	8,128.1	97.6	12.0	-13.92	314.2	711.4	6,487.5	6,430.5	113.988	
16,300.0	10,934.3	8,105.9	8,112.8	99.2	12.0	-13.84	306.7	711.2	6,576.6	6,519.6	115.266	
16,400.0	10,933.6	8,091.0	8,099.3	100.7	11.9	-13.78	300.4	711.0	6,666.2	6,609.0	116.542	
16,500.0	10,932.9	8,091.0	8,099.3	102.2	11.9	-13.78	300.4	711.0	6,756.0	6,698.6	117.792	
16,600.0	10,932.2	8,091.0	8,099.3	103.7	11.9	-13.78	300.4	711.0	6,846.0	6,788.5	119.047	
16,700.0	10,931.5	8,091.0	8,099.3	105.2	11.9	-13.78	300.4	711.0	6,936.3	6,878.6	120.307	
16,800.0	10,930.8	8,091.0	8,099.3	106.8	11.9	-13.78	300.4	711.0	7,026.8	6,969.0	121.573	
16,900.0	10,930.1	8,091.0	8,099.3	108.3	11.9	-13.78	300.4	711.0	7,117.6	7,059.7	122.842	
17,000.0	10,929.4	8,075.1	8,084.7	109.8	11.8	-13.71	294.0	710.7	7,208.5	7,150.5	124.131	
17,100.0	10,928.7	8,060.0	8,070.8	111.4	11.8	-13.64	288.1	710.4	7,299.8	7,241.6	125.422	
17,200.0	10,928.0	8,060.0	8,070.8	112.9	11.8	-13.64	288.1	710.4	7,391.2	7,332.8	126.696	
17,300.0	10,927.3	8,060.0	8,070.8	114.5	11.8	-13.64	288.1	710.4	7,482.7	7,424.3	127.974	
17,400.0	10,926.6	8,060.0	8,070.8	116.0	11.8	-13.64	288.1	710.4	7,574.5	7,515.9	129.254	
17,500.0	10,925.9	8,060.0	8,070.8	117.6	11.8	-13.64	288.1	710.4	7,666.5	7,607.8	130.537	

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



Anticollision Report



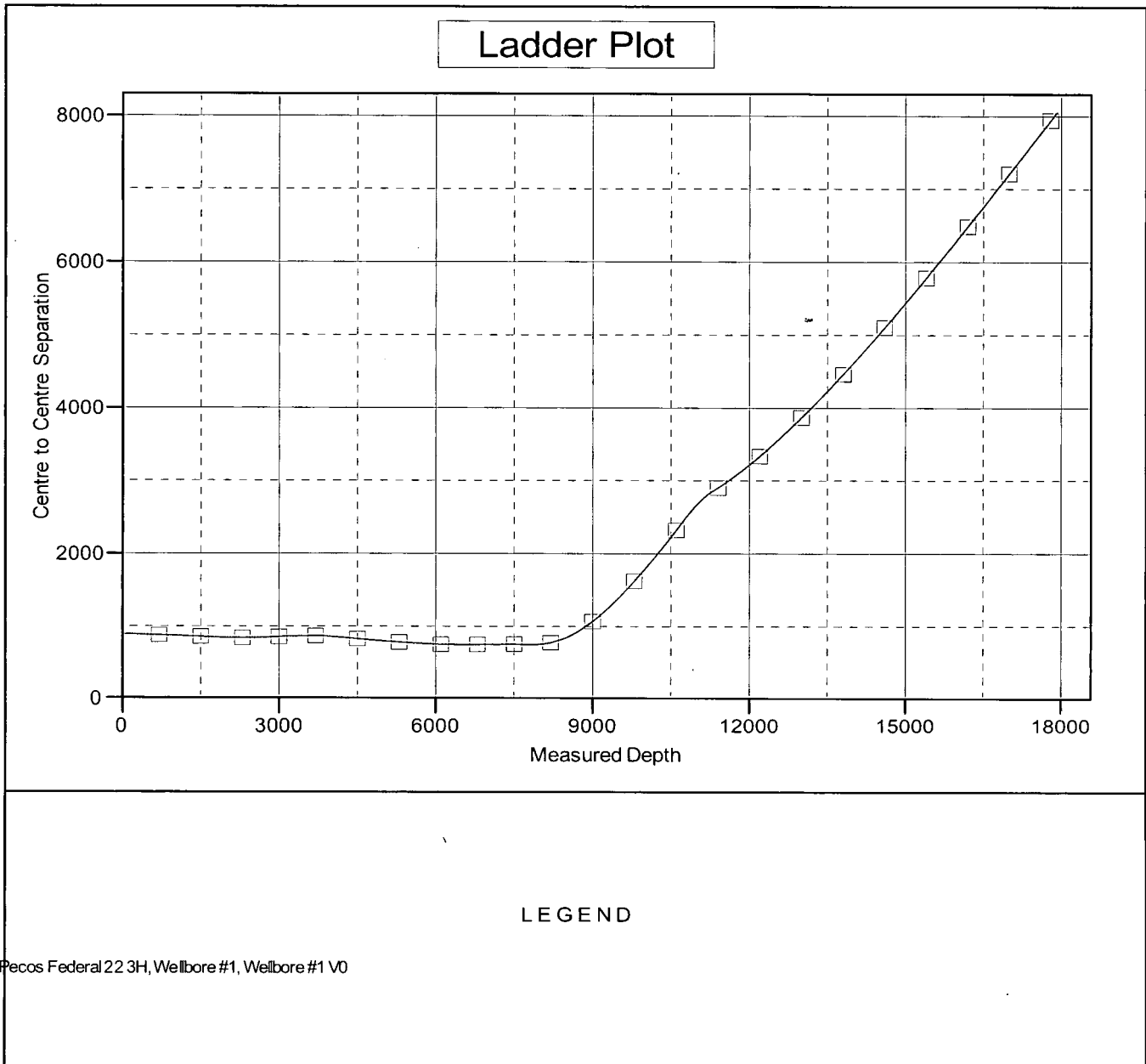
Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design											Offset Site Error:	0.0 usft
Sec 22, T26S, R29E - East Pecos Federal 22 3H - Wellbore #1 - Wellbore #1											Offset Well Error:	0.0 usft
Survey Program: 100-, 2847-												
Reference	Vertical	Offset	Semi Major Axis		Highside	Distance		Separation	Warning			
Measured	Depth	Measured	Reference	Offset		Between	Between					
Depth	(usft)	Depth	(usft)	(usft)	Toolface	Centres	Ellipses	Factor				
(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)					
17,600.0	10,925.2	8,060.0	8,070.8	119.1	11.8	-13.64	288.1	710.4	7,758.7	7,699.8	131.823	
17,700.0	10,924.5	8,060.0	8,070.8	120.7	11.8	-13.64	288.1	710.4	7,851.1	7,792.1	133.110	
17,800.0	10,923.8	8,060.0	8,070.8	122.2	11.8	-13.64	288.1	710.4	7,943.6	7,884.5	134.400	
17,900.0	10,923.2	8,060.0	8,070.8	123.8	11.8	-13.64	288.1	710.4	8,036.4	7,977.1	135.690	
17,922.0	10,923.0	8,045.1	8,057.0	124.1	11.7	-13.58	282.7	710.2	8,056.6	7,997.3	135.973	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to KB=29' @ 2922.5usft (Noram #21)
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Littlefield 33 Fed Com #801H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.19°

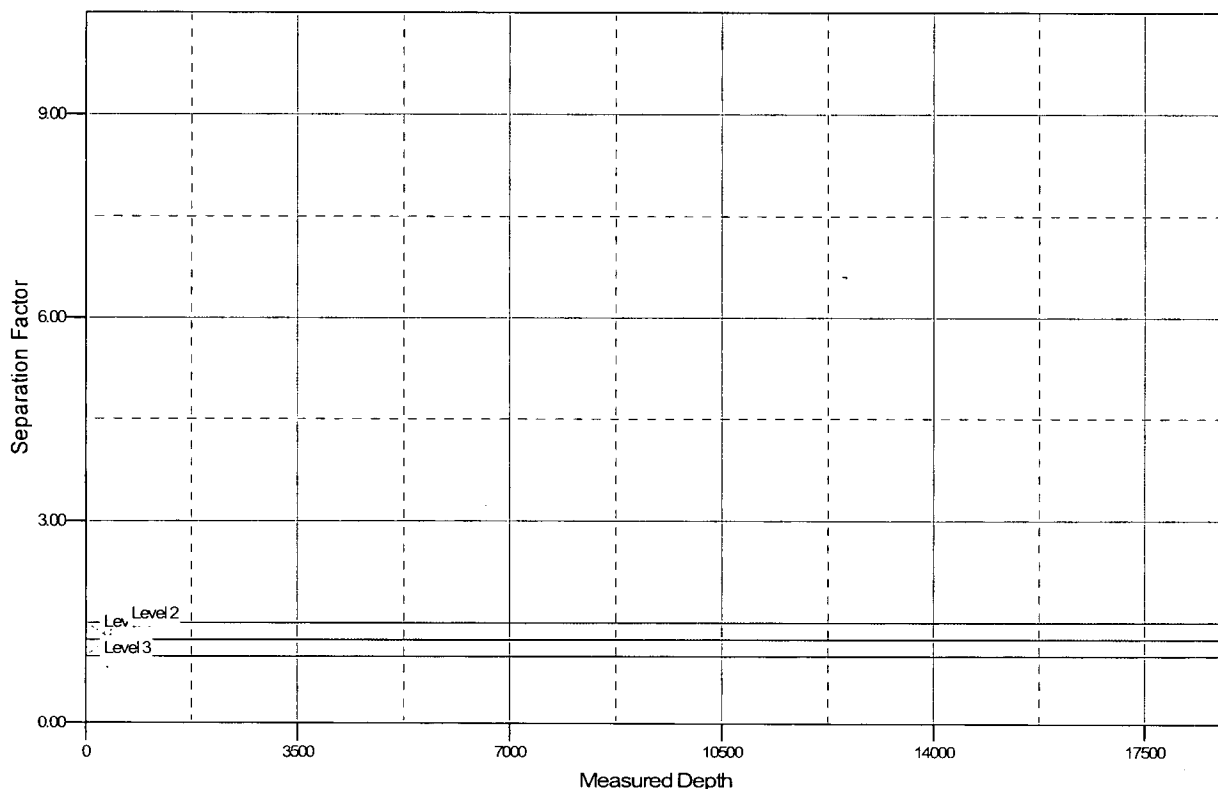


Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Reference Site:	Sec 28, T26S, R29E	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to KB=29' @ 2922.5usft (Noram #21)
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Littlefield 33 Fed Com #801H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.19°

Separation Factor Plot



LEGEND

it Pecos Federal 22 3H, Wellbore #1, Wellbore #1 V0



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 28, T26S, R29E

Littlefield 33 Fed Com #801H

Wellbore #1

Plan: Design #1

QES Well Planning Report

17 January, 2019





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Eddy County, NM (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec 28, T26S, R29E		
Site Position:		Northing:	371,295.80 usft
From:	Map	Easting:	609,158.10 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 1' 13.142 N
		Longitude:	103° 58' 52.060 W
		Grid Convergence:	0.19 °

Well	Littlefield 33 Fed Com #801H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level:
			2,893.5 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	1/17/2019	6.96
			Dip Angle
			(°)
			59.79
			Field Strength
			(nT)
			47,614.94972433

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			181.23

Plan Sections										
Measured	Inclination	Azimuth	Vertical			Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	+N/-S	+E/-W	Rate	Rate	Rate	(°)	
(usft)			(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,396.0	0.00	0.00	10,396.0	0.0	0.0	0.00	0.00	0.00	0.00	
11,300.0	90.40	181.30	10,968.9	-576.8	-13.1	10.00	10.00	0.00	181.30	
11,303.9	90.40	181.22	10,968.9	-580.7	-13.2	2.00	-0.06	-2.00	-91.81	
17,922.0	90.40	181.22	10,923.0	-7,197.1	-154.3	0.00	0.00	0.00	0.00	0.00 PBHL - L 33 FC #801

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
Rustler									
719.5	0.00	0.00	719.5	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
TOS									
2,720.5	0.00	0.00	2,720.5	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
BOS (Fletcher)									
2,905.5	0.00	0.00	2,905.5	0.0	0.0	0.0	0.00	0.00	0.00
LMAR (Top Delaware)									
2,938.5	0.00	0.00	2,938.5	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
3,815.5	0.00	0.00	3,815.5	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
CYCN									
5,084.5	0.00	0.00	5,084.5	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
BYCN									
6,597.5	0.00	0.00	6,597.5	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
Bone Sprg (BSGL)									
6,796.5	0.00	0.00	6,796.5	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
U Avalon Sh									
7,193.5	0.00	0.00	7,193.5	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
L Avalon Sh									
7,521.5	0.00	0.00	7,521.5	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
FBSG_sand									
7,941.5	0.00	0.00	7,941.5	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
SBSG_sand										
8,656.5	0.00	0.00	8,656.5	0.0	0.0	0.0	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
SBSG_sand base										
8,994.5	0.00	0.00	8,994.5	0.0	0.0	0.0	0.00	0.00	0.00	
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
TBSG_sand										
9,463.5	0.00	0.00	9,463.5	0.0	0.0	0.0	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
WFMP										
9,757.5	0.00	0.00	9,757.5	0.0	0.0	0.0	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
WFMP A Shale										
10,093.5	0.00	0.00	10,093.5	0.0	0.0	0.0	0.00	0.00	0.00	
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,200.0	0.00	0.00	10,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,300.0	0.00	0.00	10,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
WFMP B										
10,387.5	0.00	0.00	10,387.5	0.0	0.0	0.0	0.00	0.00	0.00	
Build 10°/100'										
10,396.0	0.00	0.00	10,396.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,400.0	0.40	181.30	10,400.0	0.0	0.0	0.0	10.00	10.00	0.00	
10,450.0	5.40	181.30	10,449.9	-2.5	-0.1	2.5	10.00	10.00	0.00	
10,500.0	10.40	181.30	10,499.4	-9.4	-0.2	9.4	10.00	10.00	0.00	
10,550.0	15.40	181.30	10,548.2	-20.6	-0.5	20.6	10.00	10.00	0.00	
10,600.0	20.40	181.30	10,595.7	-35.9	-0.8	35.9	10.00	10.00	0.00	
10,650.0	25.40	181.30	10,641.8	-55.4	-1.3	55.4	10.00	10.00	0.00	
10,700.0	30.40	181.30	10,685.9	-78.8	-1.8	78.8	10.00	10.00	0.00	
WFMP C										
10,744.6	34.86	181.30	10,723.5	-102.8	-2.3	102.8	10.00	10.00	0.00	
10,750.0	35.40	181.30	10,727.9	-105.9	-2.4	105.9	10.00	10.00	0.00	
10,800.0	40.40	181.30	10,767.3	-136.6	-3.1	136.6	10.00	10.00	0.00	
10,850.0	45.40	181.30	10,804.0	-170.6	-3.9	170.7	10.00	10.00	0.00	
10,900.0	50.40	181.30	10,837.5	-207.7	-4.7	207.7	10.00	10.00	0.00	
10,950.0	55.40	181.30	10,867.6	-247.5	-5.6	247.6	10.00	10.00	0.00	
11,000.0	60.40	181.30	10,894.2	-289.9	-6.6	289.9	10.00	10.00	0.00	
11,050.0	65.40	181.30	10,917.0	-334.4	-7.6	334.4	10.00	10.00	0.00	
11,100.0	70.40	181.30	10,935.8	-380.7	-8.6	380.8	10.00	10.00	0.00	
11,150.0	75.40	181.30	10,950.5	-428.4	-9.7	428.5	10.00	10.00	0.00	
11,200.0	80.40	181.30	10,960.9	-477.3	-10.8	477.4	10.00	10.00	0.00	
11,250.0	85.40	181.30	10,967.1	-526.9	-12.0	527.0	10.00	10.00	0.00	

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Littlefield 33 Fed Com #801H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 2922.5usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
EOC @ 90.40° Inc / 181.30° Azm / 10968.9' TVD - Turn 2°/100'									
11,300.0	90.40	181.30	10,968.9	-576.8	-13.1	577.0	10.00	10.00	0.00
EOT @ 181.22° Azm									
11,303.9	90.40	181.22	10,968.9	-580.7	-13.2	580.9	2.00	-0.06	-2.00
11,400.0	90.40	181.22	10,968.2	-676.8	-15.2	677.0	0.00	0.00	0.00
11,500.0	90.40	181.22	10,967.6	-776.8	-17.4	777.0	0.00	0.00	0.00
11,600.0	90.40	181.22	10,966.9	-876.7	-19.5	877.0	0.00	0.00	0.00
11,700.0	90.40	181.22	10,966.2	-976.7	-21.6	976.9	0.00	0.00	0.00
11,800.0	90.40	181.22	10,965.5	-1,076.7	-23.8	1,076.9	0.00	0.00	0.00
11,900.0	90.40	181.22	10,964.8	-1,176.7	-25.9	1,176.9	0.00	0.00	0.00
12,000.0	90.40	181.22	10,964.1	-1,276.6	-28.0	1,276.9	0.00	0.00	0.00
12,100.0	90.40	181.22	10,963.4	-1,376.6	-30.2	1,376.9	0.00	0.00	0.00
12,200.0	90.40	181.22	10,962.7	-1,476.6	-32.3	1,476.9	0.00	0.00	0.00
12,300.0	90.40	181.22	10,962.0	-1,576.6	-34.4	1,576.9	0.00	0.00	0.00
12,400.0	90.40	181.22	10,961.3	-1,676.5	-36.5	1,676.9	0.00	0.00	0.00
12,500.0	90.40	181.22	10,960.6	-1,776.5	-38.7	1,776.9	0.00	0.00	0.00
12,600.0	90.40	181.22	10,959.9	-1,876.5	-40.8	1,876.9	0.00	0.00	0.00
12,700.0	90.40	181.22	10,959.2	-1,976.5	-42.9	1,976.9	0.00	0.00	0.00
12,800.0	90.40	181.22	10,958.5	-2,076.4	-45.1	2,076.9	0.00	0.00	0.00
12,900.0	90.40	181.22	10,957.8	-2,176.4	-47.2	2,176.9	0.00	0.00	0.00
13,000.0	90.40	181.22	10,957.1	-2,276.4	-49.3	2,276.9	0.00	0.00	0.00
13,100.0	90.40	181.22	10,956.5	-2,376.4	-51.5	2,376.9	0.00	0.00	0.00
13,200.0	90.40	181.22	10,955.8	-2,476.3	-53.6	2,476.9	0.00	0.00	0.00
13,300.0	90.40	181.22	10,955.1	-2,576.3	-55.7	2,576.9	0.00	0.00	0.00
13,400.0	90.40	181.22	10,954.4	-2,676.3	-57.9	2,676.9	0.00	0.00	0.00
13,500.0	90.40	181.22	10,953.7	-2,776.3	-60.0	2,776.9	0.00	0.00	0.00
13,600.0	90.40	181.22	10,953.0	-2,876.2	-62.1	2,876.9	0.00	0.00	0.00
13,700.0	90.40	181.22	10,952.3	-2,976.2	-64.3	2,976.9	0.00	0.00	0.00
13,800.0	90.40	181.22	10,951.6	-3,076.2	-66.4	3,076.9	0.00	0.00	0.00
13,900.0	90.40	181.22	10,950.9	-3,176.2	-68.5	3,176.9	0.00	0.00	0.00
14,000.0	90.40	181.22	10,950.2	-3,276.1	-70.7	3,276.9	0.00	0.00	0.00
14,100.0	90.40	181.22	10,949.5	-3,376.1	-72.8	3,376.9	0.00	0.00	0.00
14,200.0	90.40	181.22	10,948.8	-3,476.1	-74.9	3,476.9	0.00	0.00	0.00
14,300.0	90.40	181.22	10,948.1	-3,576.1	-77.1	3,576.9	0.00	0.00	0.00
14,400.0	90.40	181.22	10,947.4	-3,676.0	-79.2	3,676.9	0.00	0.00	0.00
14,500.0	90.40	181.22	10,946.7	-3,776.0	-81.3	3,776.9	0.00	0.00	0.00
14,600.0	90.40	181.22	10,946.0	-3,876.0	-83.5	3,876.9	0.00	0.00	0.00
14,700.0	90.40	181.22	10,945.4	-3,976.0	-85.6	3,976.9	0.00	0.00	0.00
14,800.0	90.40	181.22	10,944.7	-4,075.9	-87.7	4,076.9	0.00	0.00	0.00
14,900.0	90.40	181.22	10,944.0	-4,175.9	-89.9	4,176.9	0.00	0.00	0.00
15,000.0	90.40	181.22	10,943.3	-4,275.9	-92.0	4,276.9	0.00	0.00	0.00
15,100.0	90.40	181.22	10,942.6	-4,375.9	-94.1	4,376.9	0.00	0.00	0.00
15,200.0	90.40	181.22	10,941.9	-4,475.8	-96.3	4,476.9	0.00	0.00	0.00
15,300.0	90.40	181.22	10,941.2	-4,575.8	-98.4	4,576.9	0.00	0.00	0.00
15,400.0	90.40	181.22	10,940.5	-4,675.8	-100.5	4,676.9	0.00	0.00	0.00
15,500.0	90.40	181.22	10,939.8	-4,775.8	-102.7	4,776.9	0.00	0.00	0.00
15,600.0	90.40	181.22	10,939.1	-4,875.7	-104.8	4,876.9	0.00	0.00	0.00
15,700.0	90.40	181.22	10,938.4	-4,975.7	-106.9	4,976.9	0.00	0.00	0.00
15,800.0	90.40	181.22	10,937.7	-5,075.7	-109.1	5,076.8	0.00	0.00	0.00
15,900.0	90.40	181.22	10,937.0	-5,175.7	-111.2	5,176.8	0.00	0.00	0.00
16,000.0	90.40	181.22	10,936.3	-5,275.6	-113.3	5,276.8	0.00	0.00	0.00
16,100.0	90.40	181.22	10,935.6	-5,375.6	-115.4	5,376.8	0.00	0.00	0.00
16,200.0	90.40	181.22	10,934.9	-5,475.6	-117.6	5,476.8	0.00	0.00	0.00
16,300.0	90.40	181.22	10,934.3	-5,575.6	-119.7	5,576.8	0.00	0.00	0.00

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Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 2922.5usft (Noram #21)
Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
16,400.0	90.40	181.22	10,933.6	-5,675.5	-121.8	5,676.8	0.00	0.00	0.00	
16,500.0	90.40	181.22	10,932.9	-5,775.5	-124.0	5,776.8	0.00	0.00	0.00	
16,600.0	90.40	181.22	10,932.2	-5,875.5	-126.1	5,876.8	0.00	0.00	0.00	
16,700.0	90.40	181.22	10,931.5	-5,975.5	-128.2	5,976.8	0.00	0.00	0.00	
16,800.0	90.40	181.22	10,930.8	-6,075.4	-130.4	6,076.8	0.00	0.00	0.00	
16,900.0	90.40	181.22	10,930.1	-6,175.4	-132.5	6,176.8	0.00	0.00	0.00	
17,000.0	90.40	181.22	10,929.4	-6,275.4	-134.6	6,276.8	0.00	0.00	0.00	
17,100.0	90.40	181.22	10,928.7	-6,375.4	-136.8	6,376.8	0.00	0.00	0.00	
17,200.0	90.40	181.22	10,928.0	-6,475.3	-138.9	6,476.8	0.00	0.00	0.00	
17,300.0	90.40	181.22	10,927.3	-6,575.3	-141.0	6,576.8	0.00	0.00	0.00	
17,400.0	90.40	181.22	10,926.6	-6,675.3	-143.2	6,676.8	0.00	0.00	0.00	
17,500.0	90.40	181.22	10,925.9	-6,775.3	-145.3	6,776.8	0.00	0.00	0.00	
17,600.0	90.40	181.22	10,925.2	-6,875.2	-147.4	6,876.8	0.00	0.00	0.00	
17,700.0	90.40	181.22	10,924.5	-6,975.2	-149.6	6,976.8	0.00	0.00	0.00	
17,800.0	90.40	181.22	10,923.8	-7,075.2	-151.7	7,076.8	0.00	0.00	0.00	
17,900.0	90.40	181.22	10,923.2	-7,175.1	-153.8	7,176.8	0.00	0.00	0.00	
TD @ 17922.0' MD / 10923.0' TVD										
17,922.0	90.40	181.22	10,923.0	-7,197.1	-154.3	7,198.8	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude		Longitude
LTP - L 33 FC #801	0.00	0.00	0.0	-7,067.1	-151.5	364,228.66	609,006.57	32° 0' 3.207 N		103° 58' 54.087 W
- hit/miss target										
- plan misses target center by 7068.8usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)										
- Point										
PBHL - L 33 FC #801	0.00	0.00	10,923.0	-7,197.1	-154.3	364,098.70	609,003.80	32° 0' 1.921 N		103° 58' 54.124 W
- plan hits target center										
- Point										
FTP - L 33 FC #801	0.00	0.00	10,973.0	-120.0	-3.9	371,175.80	609,154.20	32° 1' 11.955 N		103° 58' 52.109 W
- plan misses target center by 160.6usft at 10911.8usft MD (10844.9 TVD, -216.9 N, -4.9 E)										
- Point										

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Site:	Sec 28, T26S, R29E	North Reference:	Grid
Well:	Littlefield 33 Fed Com #801H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
719.5	719.5	Rustler				
2,720.5	2,720.5	TOS				
2,905.5	2,905.5	BOS (Fletcher)				
2,938.5	2,938.5	LMAR (Top Delaware)				
3,815.5	3,815.5	BLCN				
5,084.5	5,084.5	CYCN				
6,597.5	6,597.5	BYCN				
6,796.5	6,796.5	Bone Sprg (BSGL)				
7,193.5	7,193.5	U Avalon Sh				
7,521.5	7,521.5	L Avalon Sh				
7,941.5	7,941.5	FBSG_sand				
8,656.5	8,656.5	SBSG_sand				
8,994.5	8,994.5	SBSG_sand base				
9,463.5	9,463.5	TBSG_sand				
9,757.5	9,757.5	WFMP				
10,093.5	10,093.5	WFMP A Shale				
10,387.5	10,387.5	WFMP B				
10,744.6	10,723.5	WFMP C				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)		Comment
10,396.0	10,396.0	0.0	0.0		Build 10°/100'
11,300.0	10,968.9	-576.8	-13.1		EOC @ 90.40° Inc / 181.30° Azm / 10968.9' TVD - Turn 2°/100'
11,303.9	10,968.9	-580.7	-13.2		EOT @ 181.22° Azm
17,922.0	10,923.0	-7,197.1	-154.3		TD @ 17922.0' MD / 10923.0' TVD

Sac 28, T26S, R29E
Littlefield 33 Fed Com #801H
Q181... & W1-181...
Design #1



Company Name: COG Operating, LLC
Littlefield 33 Fed Com #801H
Eddy County, NM (NAD 27)
Rig: Norm #21
Created by: Keith Noack
Date: 14/35, January 17 2019



PROJECT DETAILS: Eddy County, NM (NAD 27)

Geodetic System: US State Plane 1927 (Exact solution)

Datum: NAD 1927 (NADCON CONUS)

Ellipsoid: Clarke 1866

Zone: New Mexico East 3001

System Datum: Mean Sea Level

WELL DETAILS: Littlefield 33 Fed Com #801H

Ground Level: 2893.5

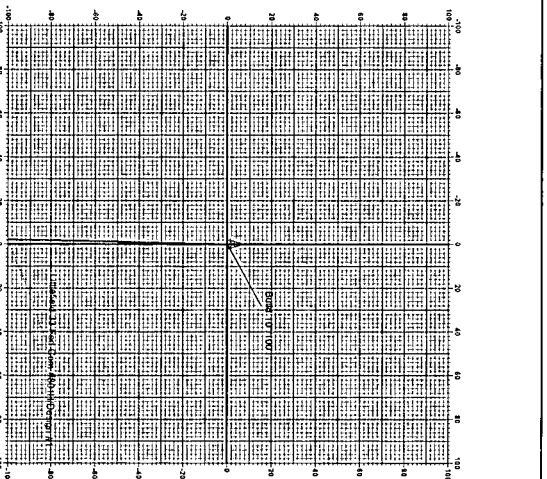
+N-/S	+E/W	Northing	Easting	Latitude	Longitude
0.0	0.0	371295.50	609158.10	32° 1' 13.142" N	103° 58' 52.060" W

DESIGN TARGET DETAILS

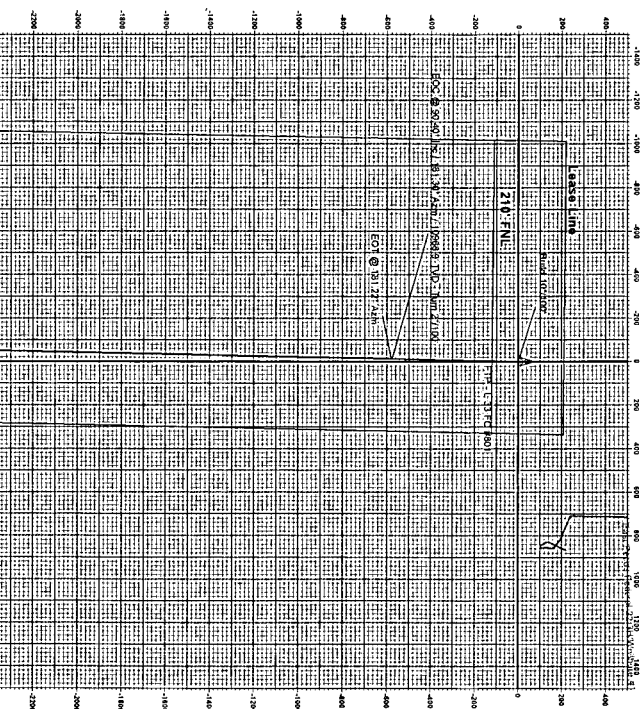
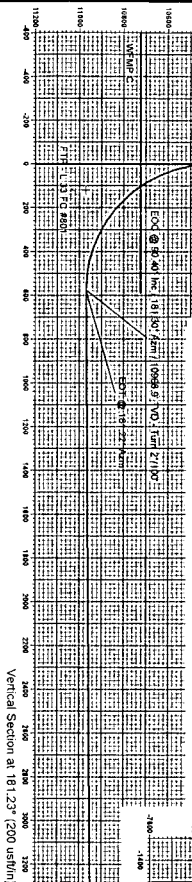
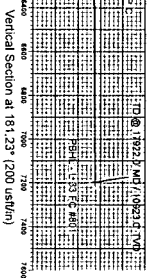
Name	TVD	+N-/S	+E/W	Northing	Easting	Latitude	Longitude
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PBH - L 33 FC #801	10923.0	-7197.1	-154.3	364098.70	609005.80	32° 0' 1.921" N	103° 58' 54.124" W
FTF - L 33 FC #801	10973.0	-120.0	-3.9	371773.80	609154.20	32° 1' 11.955" N	103° 58' 52.109" W

SECTION DETAILS

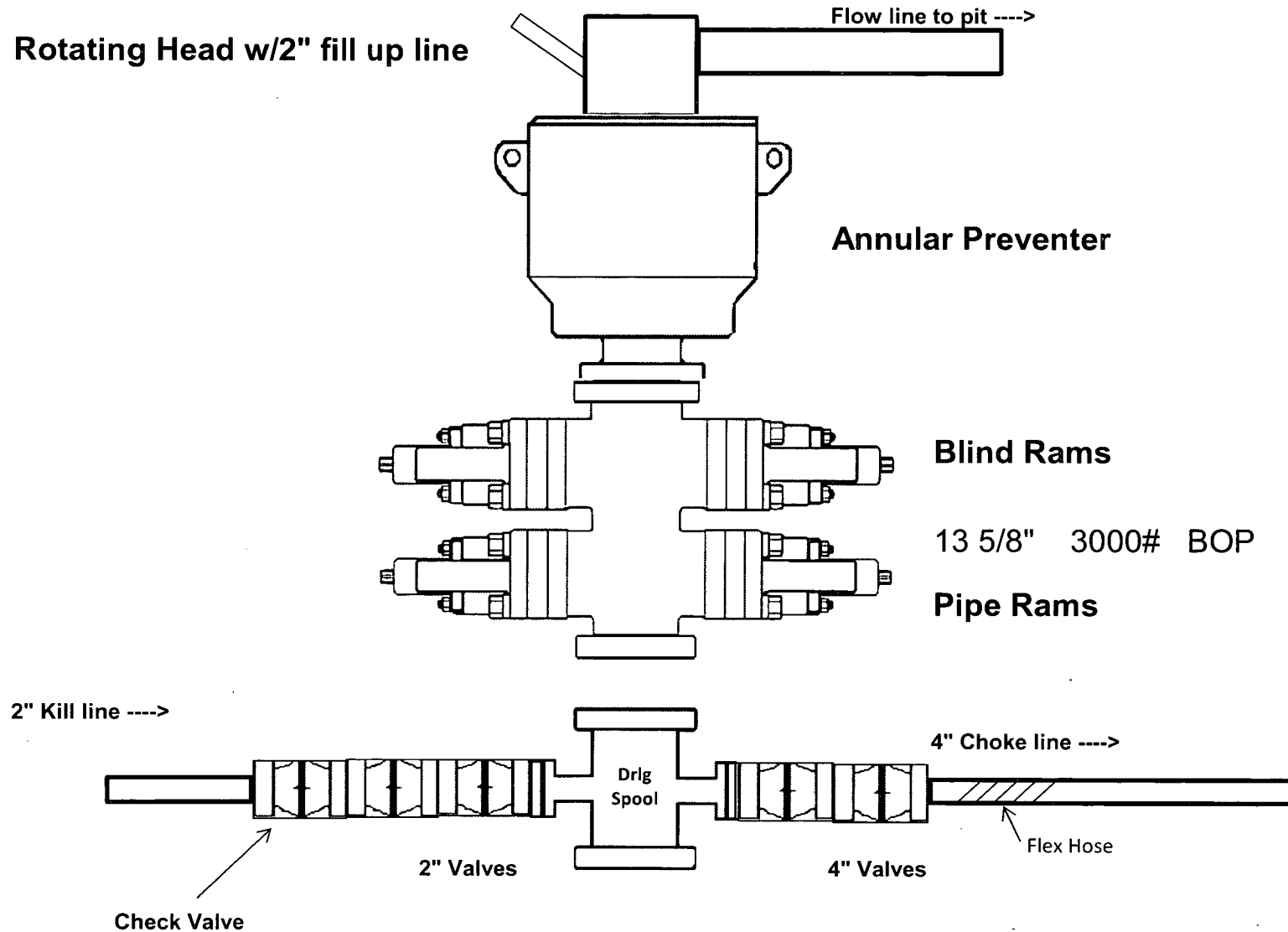
MD	Inc	Azi	TVD	+N-/S	+E/W	Dleg	Tface	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	Build 10°/100°
10396.0	0.00	0.00	10396.0	0.0	0.0	0.00	0.00	0.0	EOC @ 50.40° Inc / 181.30° Azm / 10968.9° TVD - Turn 27100°
11300.9	90.40	181.30	10968.9	-576.8	-13.1	10.00	181.30	577.0	EOC @ 181.22° Azm
11300.9	90.40	181.22	10968.9	-580.7	-13.2	2.00	-91.81	580.9	TD @ 17922.0 MD / 10923.0° TVD
17922.0	90.40	181.22	10923.0	-7197.1	-154.3	0.00	0.00	7198.8	



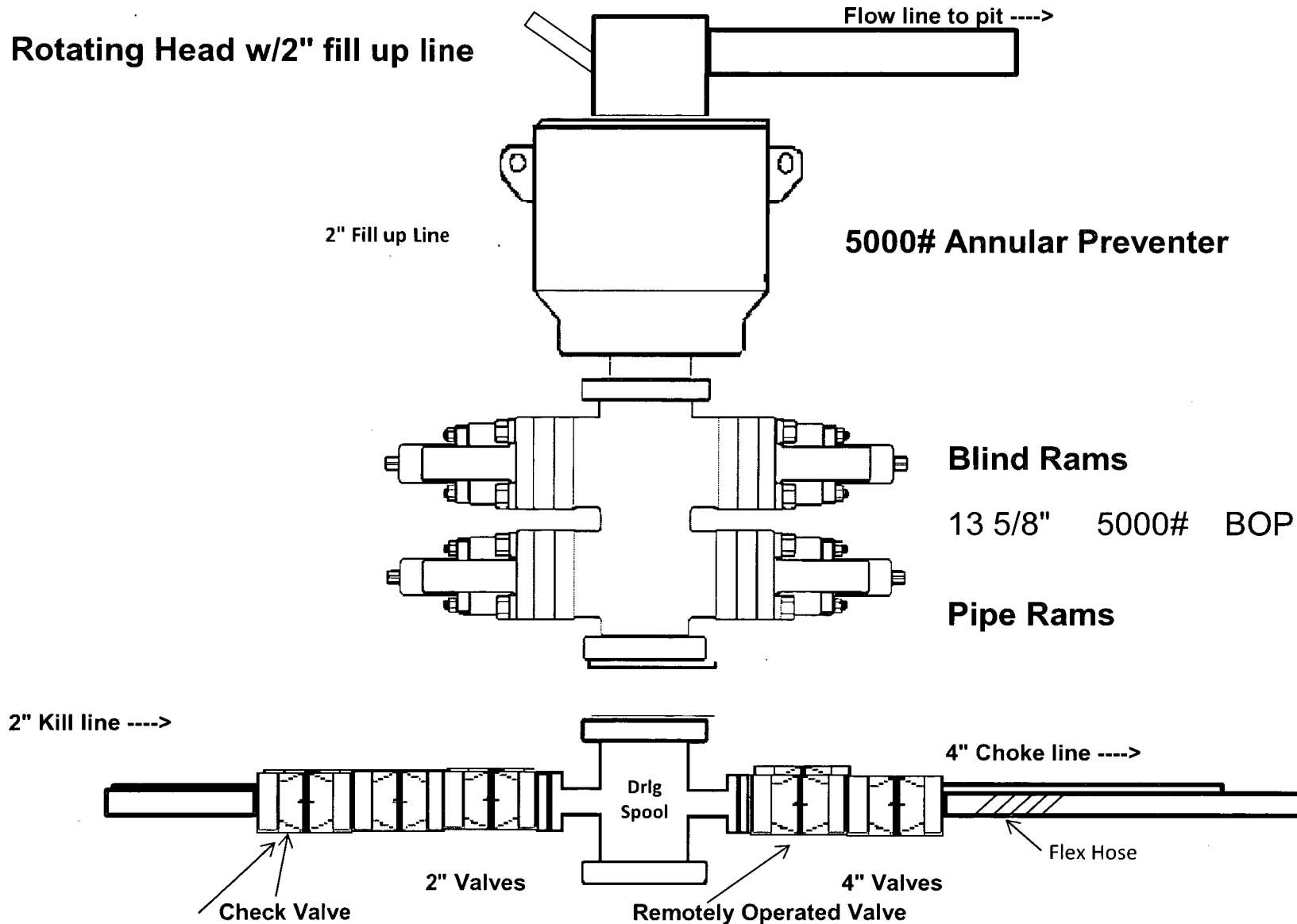
Azinuths to Grid North
True North: -0.13°
Magnetic North: 6.77°
Magnetic Field
Strength: 47614.85 nT
Dip Angle: 59.73°
Date: 1/17/2019
Model: IGRF2015



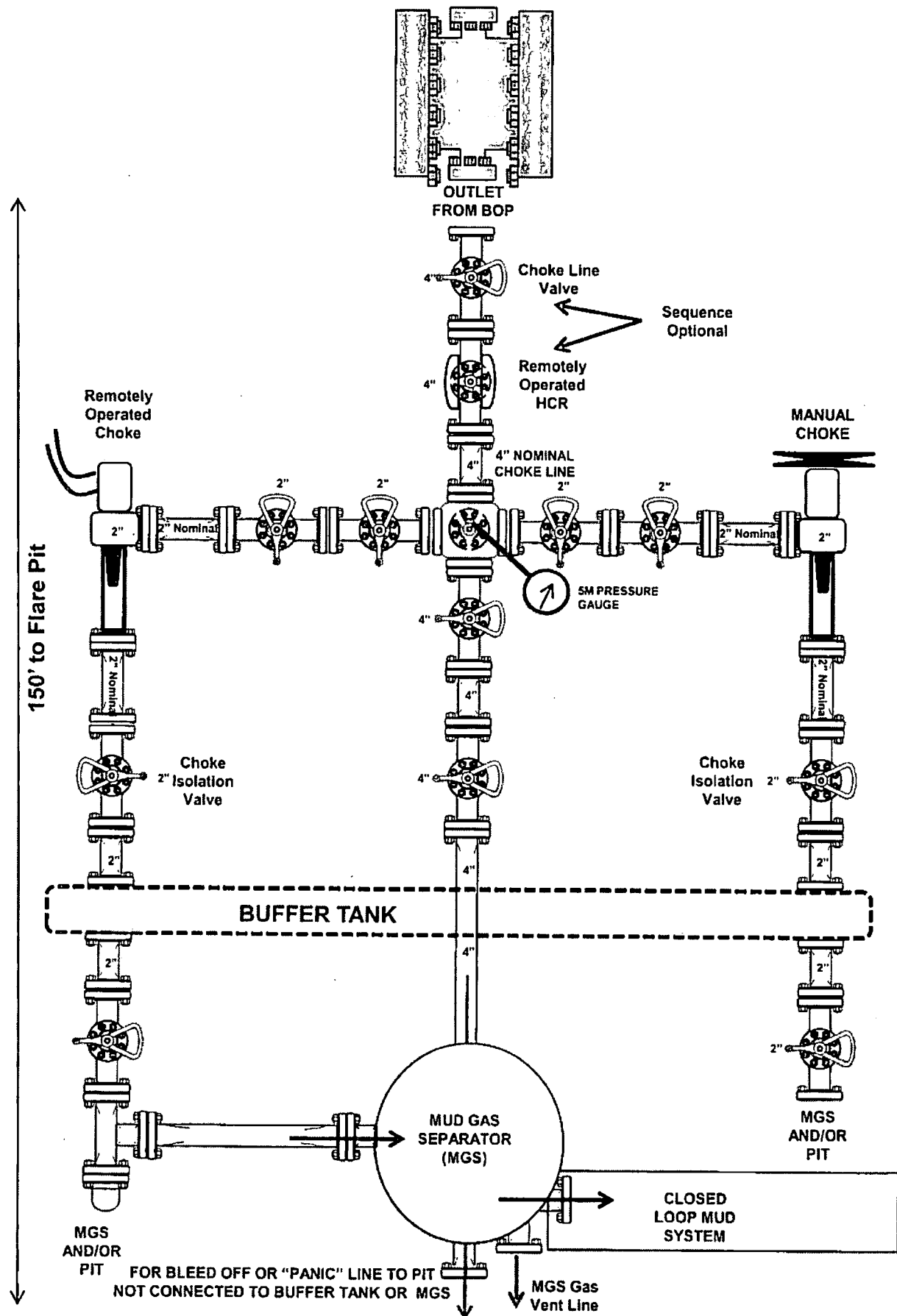
3,000 psi BOP Schematic



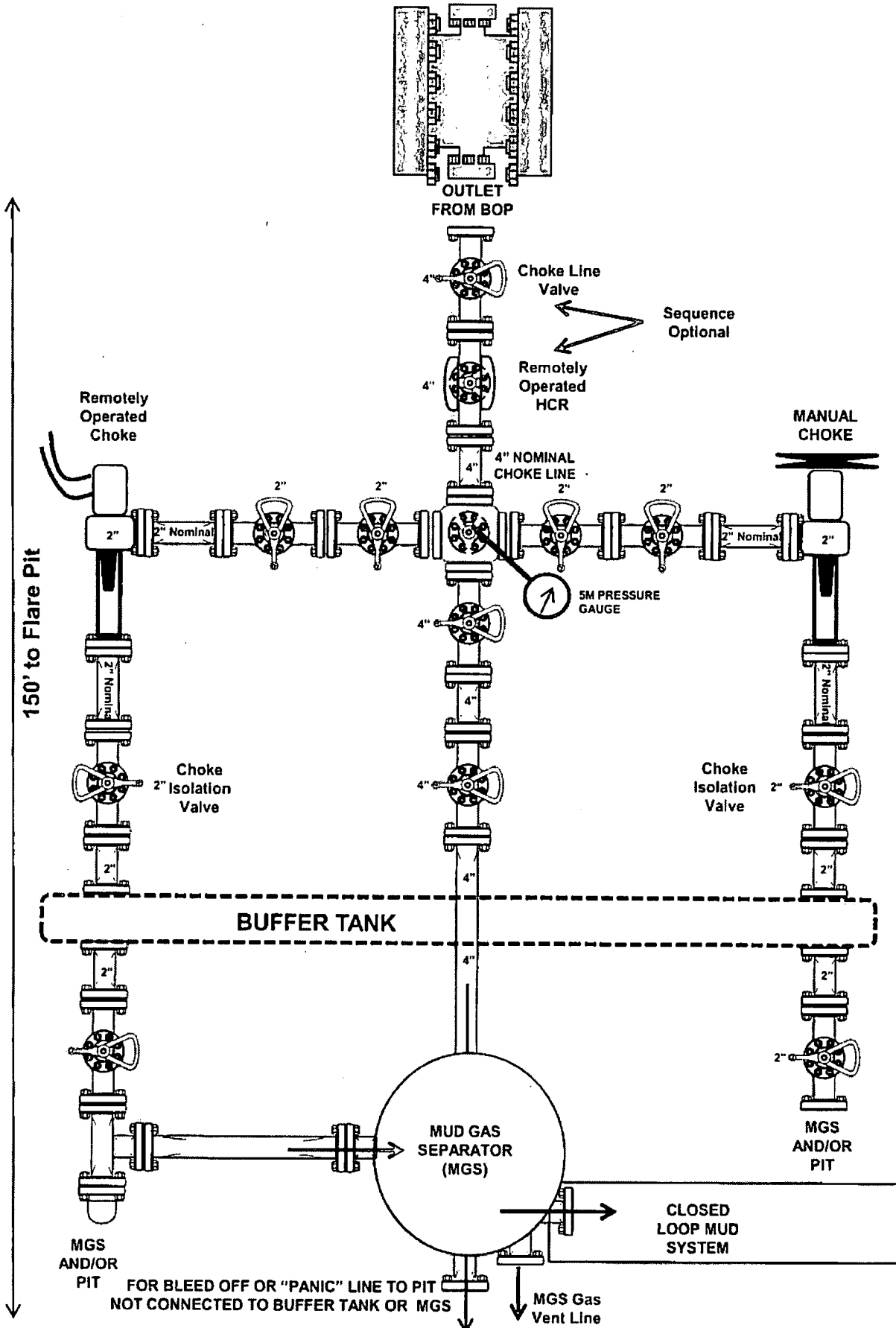
5,000 psi BOP Schematic



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



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





Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	Odessa	Hose Assembly Type	Choke & Kill
MWH Sales Representative	Charles Ash	Certification	API 7K/FSL LEVEL2
Date Assembled	11/11/2016	Hose Grade	Mud
Location Assembled	OKC	Hose Working Pressure	100000
Sales Order #	308747	Hose Lot # and Date Code	12354-09/15
Customer Purchase Order #	345144	Hose I.D. (Inches)	3.5"
Assembly Serial # (Pick Ticket #)	371501	Hose O.D. (Inches)	5.87"
Hose Assembly Length	35 Feet	Armor (yes/no)	No
Fittings			
End A		End B	
Stem (Part and Revision #)	R3.5X64WB	Stem (Part and Revision #)	R3.5X64WB
Stem (Heat #)	A112669	Stem (Heat #)	A112669
Ferrule (Part and Revision #)	RF3.5X5750	Ferrule (Part and Revision #)	RF3.5X5750
Ferrule (Heat #)	41632	Ferrule (Heat #)	41632
Connection (Flange Hammer Union Part)	4-1/16 10K	Connection (Part #)	4-1/16 10K
Connection (Heat #)		Connection (Heat #)	
Nut (Part #)		Nut (Part #)	
Nut (Heat #)		Nut (Heat #)	
Dies Used	5.80"	Dies Used	5.80"
Hydrostatic Test Requirements			
Test Pressure (psi)	15,000	Hose assembly was tested with ambient water temperature.	
Test Pressure Hold Time (minutes)	24 1/2		
Date Tested	Tested By	Approved By	
11/11/2016	Richard Dier	Charles Ash	



Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **Odessa**

Customer P.O.# **345144**

Sales Order # **308747**

Date Assembled: **11/11/2016**

Specifications

Hose Assembly Type: **Choke & Kill**

Rig # **N/A**

Assembly Serial # **371501**

Hose Lot # and Date Code **12354-09/15**

Hose Working Pressure (psi) **100000**

Test Pressure (psi) **15000**

Hose Assembly Description:

CK56-SS-10K-6410K-6410K-35'00' FT-W/LIFTERS

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

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

Oklahoma City, OK 73129

Comments:

Approved By

Charles Ash

Date

11/11/2016



Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Graph

November 11, 2016

Customer: Odessa

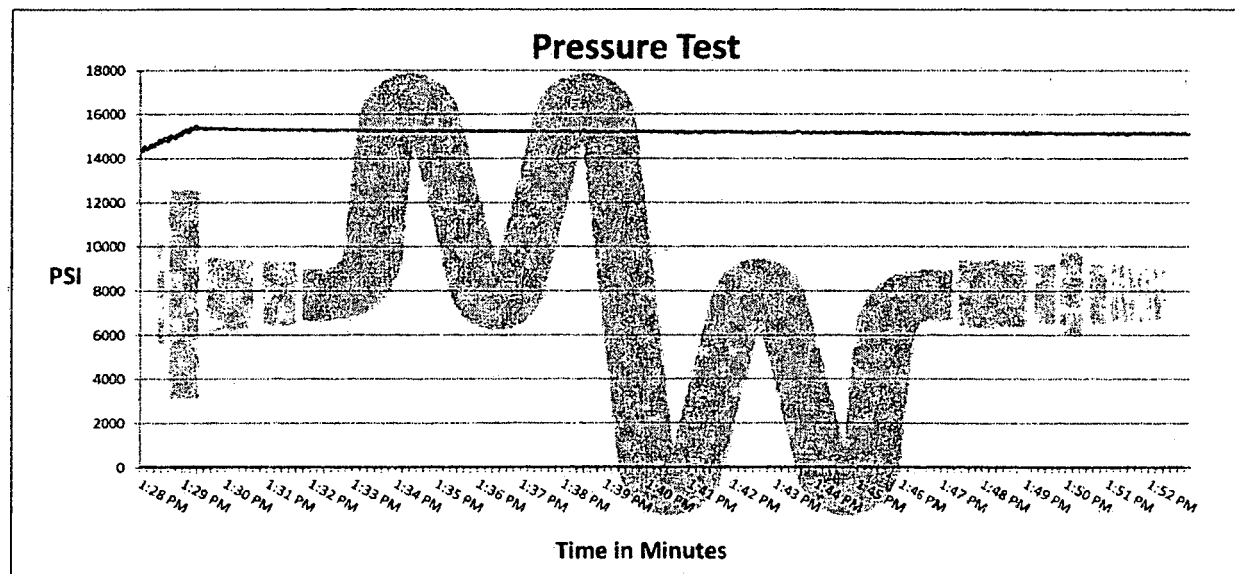
Pick Ticket #: 371501

Hose Specifications

Hose Type	Length
Ck	35'
I.D.	O.D.
3.5"	5.30"
Working Pressure	Burst Pressure
10000 PSI	Standard Safety Multiplier Applies

Verification

Type of Fitting	Coupling Method
4 1/16 10K	Swage
Die Size	Final O.D.
5.80"	5.83"
Hose Serial #	Hose Assembly Serial #
12354	371501



Test Pressure
15000 PSI

Time Held at Test Pressure
24 2/4 Minutes

Actual Burst Pressure

Peak Pressure
15512 PSI

Comments: Hose assembly pressure tested with water at ambient temperature.

Tested By: Richard Davis

Approved By: Charles Ash

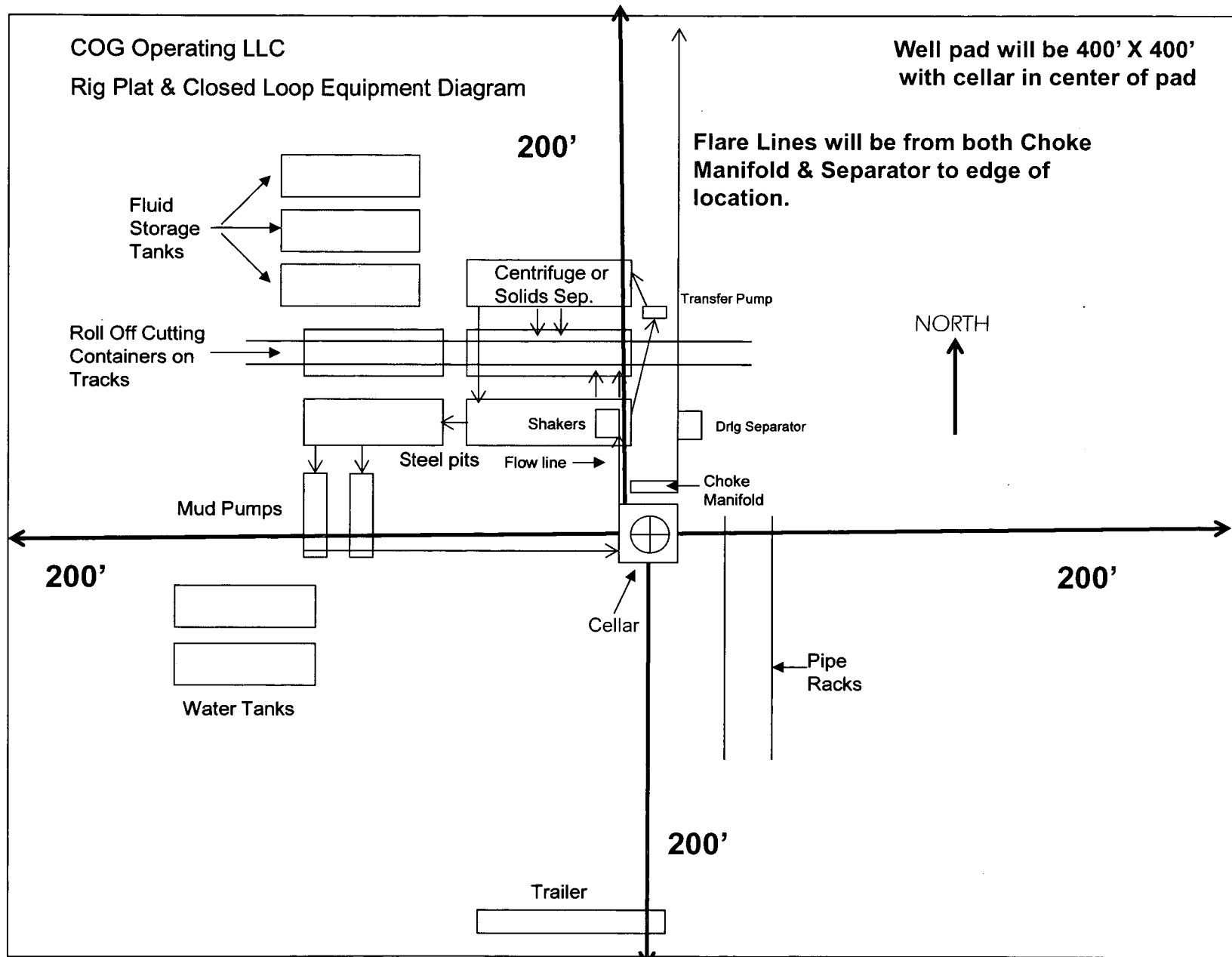
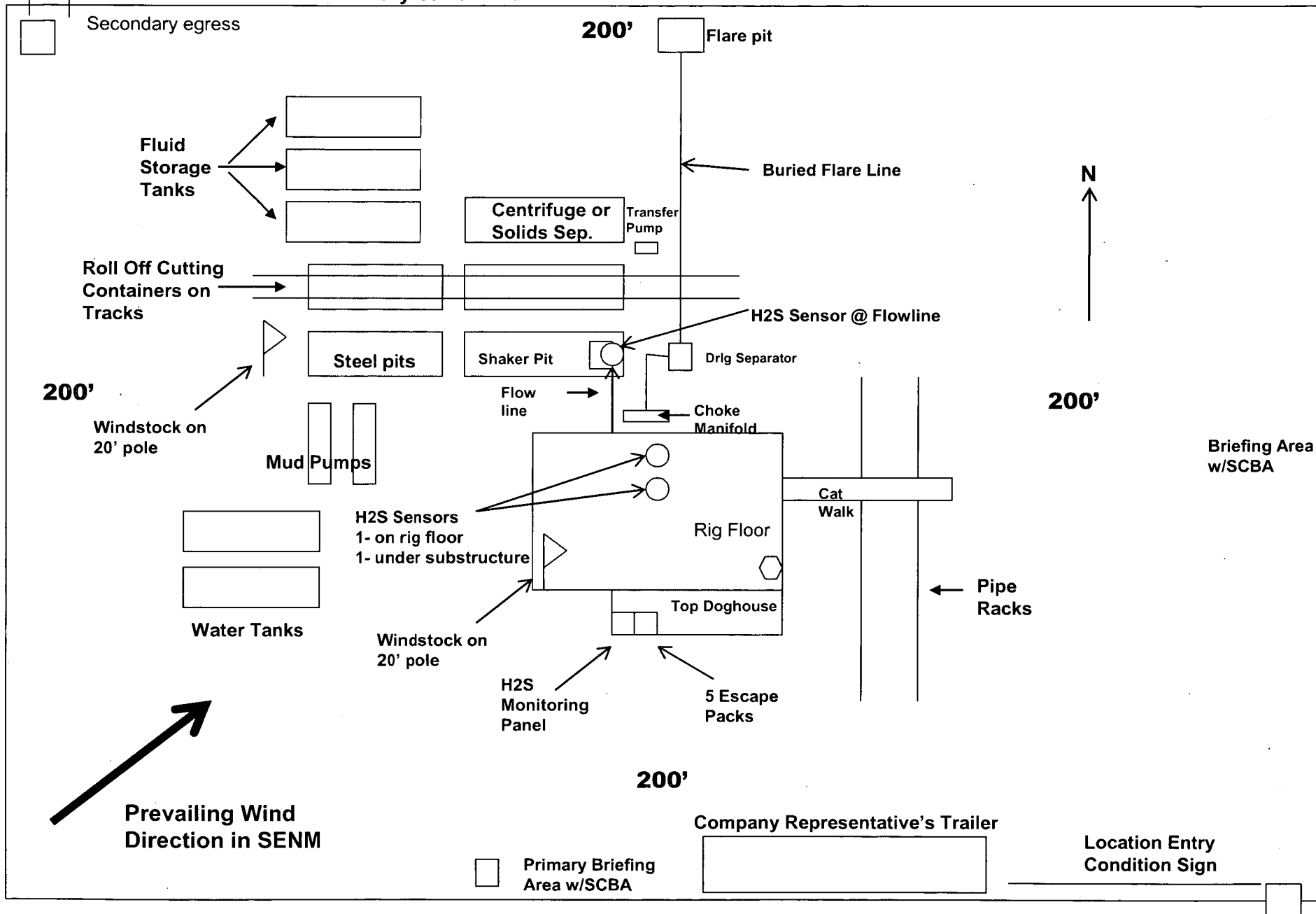


Exhibit 1

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

COG Operating LLC
H₂S Equipment Schematic
Terrain: Shinnery sand hills.

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



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	
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

Surface Use & Operating Plan

Littlefield Federal Com #801H

- Surface Owner: US Government
- New Road: 923.6'
- Flow Line: Will follow road to proposed Littlefield 33 Federal Central Tank Battery facility located in Section 28. T26S. R29E.
- Tank Battery Facilities: Will utilize facilities at the Littlefield 33 Federal Central Tank Battery.
- Well Pad: Single.

Well Site Information

- V Door: East
- Topsoil: North
- Interim Reclamation: North and East

Attachments

- C102
- Closed Loop System
- CTB
- Flowlines
- Production Facility Layout
- Brine H2O
- Existing Roads
- Fresh H2O

Surface Use Plan
COG Operating LLC
Littlefield Federal Com #801H
SHL: 210' FNL & 330' FEL UL A
Section 28, T26S, R29E
BHL: 200' FSL & 330' FEL Lot 12
Section 33, T26S, R29E
Eddy County, New Mexico

- 1Mile Map and Data
- Maps and Plats
- Well Site Layout
- Reclamation

Notes

Onsite: On-site was done by Gerald Herrera (COG); Jeffery Robertson (BLM); on November 20th, 2018.

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

- A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by Harcrow Surveying, Artesia, NM.
- B. All roads to the location are shown on the maps and road plats. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in well layout map. The road shown in the well layout will be used to access the well.
- C. Directions to location: See 600 x 600 plat
- D. 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 once a year on dry conditions and twice a year in wetter conditions.

2. Proposed Access Road:

The Location Verification Map shows that 923.6' of new 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.
- D. 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 obtained from Brantley caliche pit located in Section 14, T26S, R28E.

3. Location of Existing Well:

The One-Mile Radius Map shows existing wells within a one-mile radius of the proposed wellbore.

4. Location of Existing and/or Proposed Facilities:

A. COG Operating LLC does not operate an oil production facility on this lease.

- 1) A Central Tank Battery and production facilities are proposed in Section 28, T26S, R29E. Production will be sent to the proposed Littlefield 33 Federal Central Tank Battery facility. We plan to install 3 buried flow lines of approximately 30' of 8" poly lines carrying oil, gas and water under a maximum pressure of 125 psi will follow the access road to the Littlefield 33 Federal Central Tank Battery location. We plan to install 6 4" High pressure flex Steel line for flowlines. We plan to install 4 2" HP Steel Gas Lines to well head. We plan to install 2 4' buried poly line transporting Gas Lift Gas from the Littlefield 33 Federal Central Tank Battery to the Littlefield 33 Federal Com 801H. The buried Gas Lift Gas pipe of approximately 30' under a maximum pressure of 125 psi will be installed no further than 10' from the edge of the road.
- 2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.
- 3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be obtained from Brantley caliche pit located in Section 14, T26S, R28E. Any additional construction materials will be purchased from contractors.
- 4) 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.
- 5) 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.

5. 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. Fresh water will be obtained from High Roller Wells, LLC CP-417610 water well, located in Section 1. T58. T1. Brine water will be obtained from the Malaga I Brine station located in Section 2. T21S. R25E., or if necessary commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in road maps. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

6. 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. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.
- B. An approximate 160' X 160' area is used within the proposed well site to remove caliche.
- C. Subsoil is removed and stockpiled within the surveyed well pad.
- D. When caliche is found, material will be stock piled within the pad site to build the location and road.
- E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.
- F. 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.
- G. 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, the caliche will be obtained from Brantley caliche pit located in Section 14, T26S, R28E.

7. 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 boxes and taken to R360's disposal site.
- B. Drilling fluids will be contained in steel mud pits.
- 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..
- D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.
- E. 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).
- F. 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.

8. Ancillary Facilities:

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

9. Well Site Layout:

- A. The drill pad layout, with elevations staked by Harcrow Surveying, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is East. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.
- B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

10. 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.

11. Sedimentation and Erosion Control

Immediately following construction approximately 400' of straw waddles will be placed on all four sides of the well pad and the central tank battery location, due to the close proximity of the Red Bluff reservoir and the 100 year floodplain, to reduce sedimentation into the reservoir.

- 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.

12. Surface Ownership:

- A. The surface is owned by the U.S. Government and is administered by the Bureau of Land Management. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas. The surface owner was notified before staking this well.
- B. The proposed road routes and surface location will be restored as directed by the BLM.

Surface Use Plan
COG Operating LLC
Littlefield Federal Com #801H
SHL: 210' FNL & 330' FEL UL A
Section 28, T26S, R29E
BHL: 200' FSL & 330' FEL Lot 12
Section 33, T26S, R29E
Eddy County, New Mexico

13. Other Information:

- A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. If needed, a Cultural Resources Examination is being prepared by Boone Arch Services of NM, LLC., 2030 North Canal, Carlsbad, New Mexico, 88210, phone # 575-885-1352 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

14. Bond Coverage:

Bond Coverage is Statewide Bonds # NMB000740 and NMB000215

14. Lessee's and Operator's Representative:

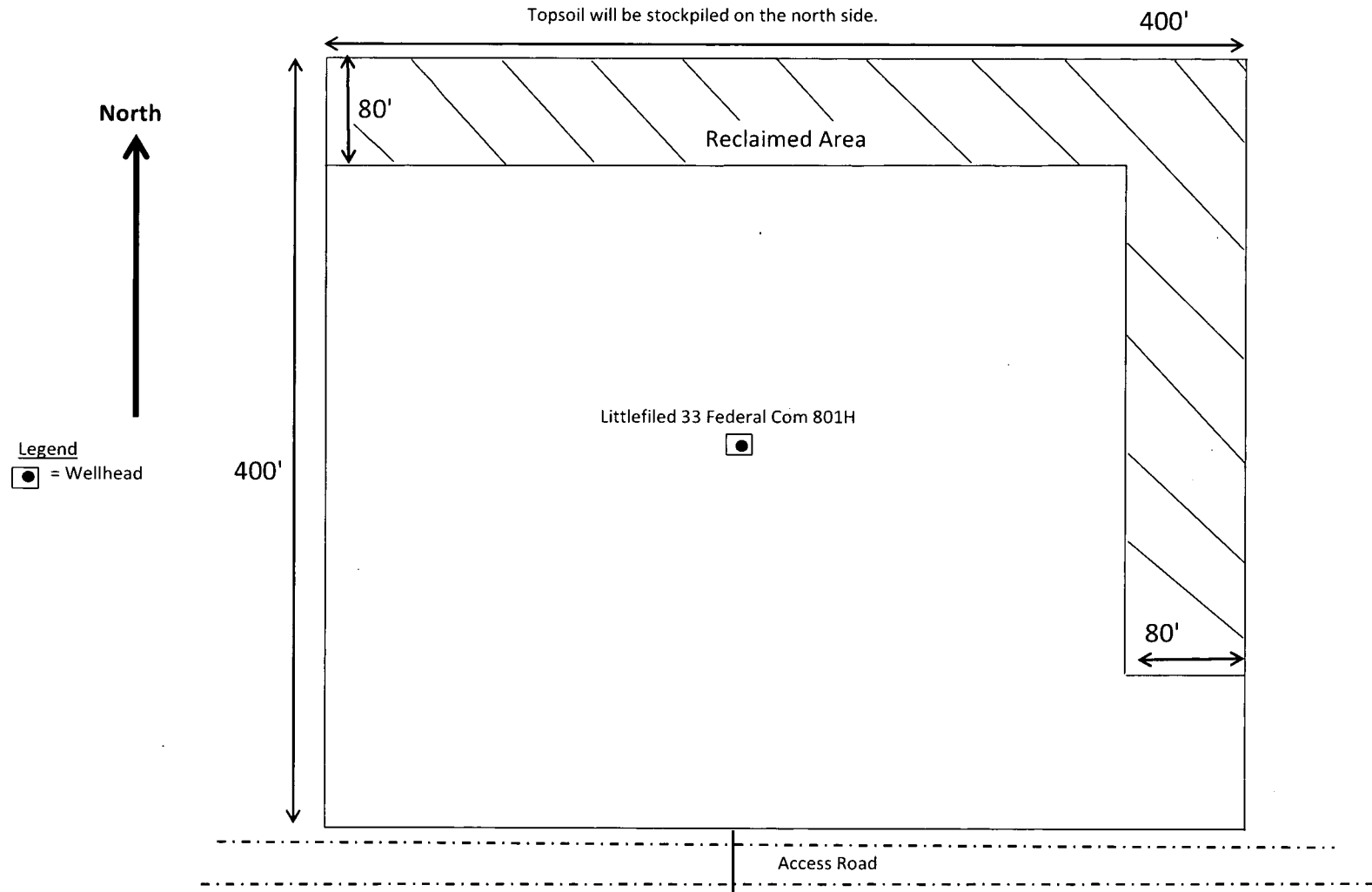
The COG Operating LLC representative responsible for assuring compliance with the surface use plan is as follows:

Seth Wild
Drilling Superintendent
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
(432) 221-0414 (office)
(432) 525-3633(cell)

Ray Peterson
Drilling Manager
COG Operating LLC
One Concho Center
600 W Illinois Ave
Midland, TX 79701
Phone (432) 685-4304 (office)
(432) 818-2254 (business)

Well Site Layout
Production Facility Layout
Littlefield 33 Federal Com 801H
Section 33, T26S, R29E

Exhibit 3



Flowline |

Littlefield 33 Federal CTB

PECOS DISTRICT DRILLING OPERATIONS CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
LEASE NO.:	NMNM138607
WELL NAME & NO.:	Littlefield 33 Federal Com 801H
SURFACE HOLE FOOTAGE:	210' FNL & 330' FEL
BOTTOM HOLE FOOTAGE:	200' FSL & 330' FEL
LOCATION:	Section 28, T 26S, R 29E, NMPM
COUNTY:	Eddy County, New Mexico

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input type="radio"/> Low	<input checked="" type="radio"/> Medium	<input type="radio"/> High
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input checked="" type="radio"/> Conventional	<input type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit

A. HYDROGEN SULFIDE

1. A Hydrogen Sulfide (H2S) Drilling Plan shall be activated **500 feet** prior to drilling into the **Delaware** formation. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

B. CASING

1. The **10-3/4"** surface casing shall be set at approximately **450'** (a minimum of 75' into the Rustler Anhydrite and above the salt) and cemented to surface.
 - a. **If cement does not circulate to 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 **6 hours** after pumping cement, ideally between 8-10 hours after completing the cement job.
 - b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
 - c. If cement falls back, remedial cementing will be done prior to drilling out that string.
 - d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The 7-5/8" intermediate casing shall be cemented to surface.
 - a. **If cement does not circulate to surface**, see B.1.a, c & d.
3. The 5" production casing shall be cemented to surface.
 - a. **If cement does not circulate to surface**, see B.1.a, c & d.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

D. SPECIAL REQUIREMENTS

1. The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
2. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 9/4/2019

GENERAL REQUIREMENTS

1. 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
 - ☒ Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 393-3612
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.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
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 are 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 (one log per well pad is acceptable) 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.

A. CASING

1. 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.

2. 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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. 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. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. 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.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible

hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. 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, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
 - c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
 - d. 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.

- 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. This test shall be performed prior to the test at full stack pressure.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

- 1. 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.
- 2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	COG Operating LLC
WELL NAME & NO.:	Littlefield 33 Federal Com 801H
SURFACE HOLE FOOTAGE:	520'/N & 1330'/E
BOTTOM HOLE FOOTAGE:	2624'/S & 2280'/E
LOCATION:	Section 31, T.23 S., R.31 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**
 - Hydrology
 - Cave/Karst
 - Texas Hornshell
- ☐ **Construction**
 - Notification
 - Topsoil
 - Closed Loop System
 - Federal Mineral Material Pits
 - Well Pads
 - Roads
- ☐ **Road Section Diagram**
- ☒ **Production (Post Drilling)**
 - Well Structures & Facilities
 - Pipelines
- ☐ **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)

Hydrology:

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). 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 integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

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 or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

When crossing ephemeral drainages the pipeline(s) will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

Prior to pipeline installation/construction a leak detection plan will be developed. The method(s) could incorporate gauges to detect pressure drops, situating valves 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.

Any water erosion that may occur due to the construction of overhead electric line and during the life of the power line will be quickly corrected and proper measures will be taken to prevent future erosion. A power pole should not be placed in drainages, playas,

wetlands, riparian areas, or floodplains and must span across the features at a distance away that would not promote further erosion.

Temporary Fresh Water Frac Line: once the temporary use exceeds the timeline of 180 days and/or with a 90 day extension status; further analysis will be required if the applicant pursues to turn the temporary ROW into a permanent ROW.

Cave/Karst Surface Mitigation

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

Construction:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will be vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

Tank Battery Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- All tank battery locations and facilities will be lined and bermed.
- The liner should be at least 20 mil in thickness and installed with a 4 oz. felt backing, or equivalent, to prevent tears or punctures.
- Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

Road Construction:

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

Buried Pipeline/Cable Construction:

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

Powerline Construction:

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

Surface Flowlines Installation:

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

Leak Detection System:

- A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present.
- A leak detection plan will be submitted to BLM that incorporates an automatic shut off system (see below) to minimize the effects of an undesirable event that could negatively sensitive cave/karst resources.
- Well heads, pipelines (surface and buried), storage tanks, and all supporting equipment should be monitored regularly after installation to promptly identify and fix leaks.

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 groundwater concerns:

Closed Loop System:

- A closed loop system using steel tanks will be utilized during drilling – no pits
- All fluids and cuttings will be hauled off-site and disposed of properly at an authorized site

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:

- The kick off point 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 between surface and the base of the cave occurrence zone will be logged and reported in the drilling report.
- If a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, regardless of the type of drilling machinery used, 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:

- Additional plugging conditions of approval may be required upon well abandonment in high and medium karst potential occurrence zones.

- The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:

- The operator will perform annual pressure monitoring 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.

Texas Hornshell

Oil and Gas and Associated Infrastructure Mitigation Measures for Zone D – CCA Boundary Requirements:

- Provide CEHMM with the permit, lease grant, or other authorization form BLM, if applicable.
- Provide CEHMM with plats or other electronic media describing the new surface disturbance for the project.

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.

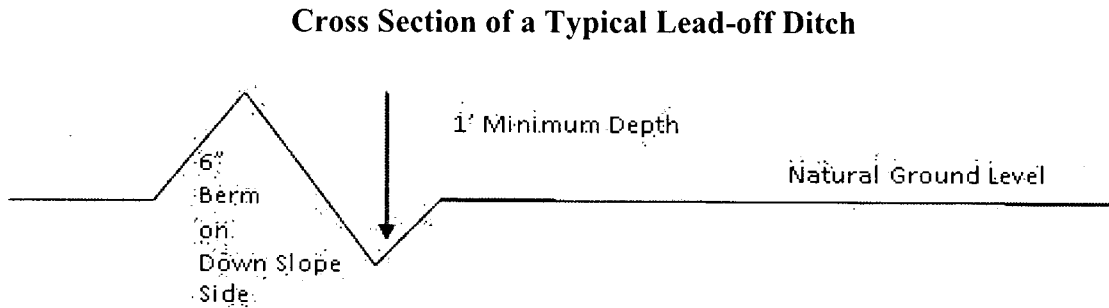
Turnouts

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 outslowing and inslaping, 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.



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:

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

Cattle guards

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

Fence Requirement

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

Public Access

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

Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

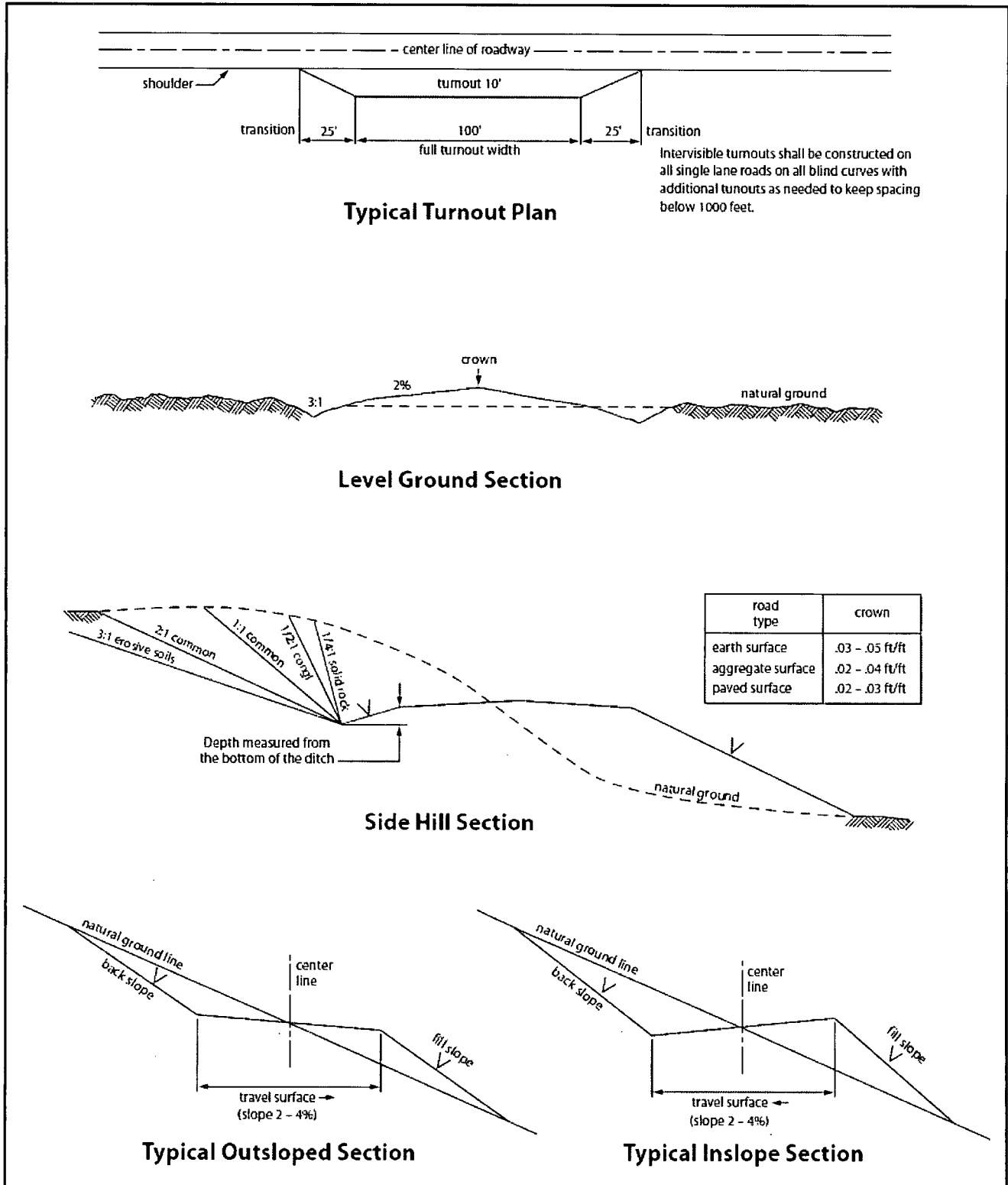


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

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

Exclosure Netting (Open-top Tanks)

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

Chemical and Fuel Secondary Containment and Exclosure Screening

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

Open-Vent Exhaust Stack Exclosures

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

Containment Structures

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

Painting Requirement

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

B. PIPELINES

BURIED PIPELINE STIPULATIONS

A copy of the application (Grant, APD, or Sundry Notice) and attachments, including conditions of approval, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of

the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil or other pollutant, wherever found, shall be the responsibility of holder, regardless of fault. Upon failure of holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve holder of any responsibility as provided herein.

5. All construction and maintenance activity will be confined to the authorized right-of-way.

6. The pipeline will be buried with a minimum cover of 36 inches between the top of the pipe and ground level.

7. The maximum allowable disturbance for construction in this right-of-way will be 30 feet:

- Blading of vegetation within the right-of-way will be allowed: maximum width of blading operations will not exceed 30 feet. The trench is included in this area. (*Blading is defined as the complete removal of brush and ground vegetation.*)
- Clearing of brush species within the right-of-way will be allowed: maximum width of clearing operations will not exceed 30 feet. The trench and bladed area are included in this area. (*Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface.*)
- The remaining area of the right-of-way (if any) shall only be disturbed by compressing the vegetation. (*Compressing can be caused by vehicle tires, placement of equipment, etc.*)

8. The holder shall stockpile an adequate amount of topsoil where blading is allowed. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles from trench construction. The topsoil will be evenly distributed over the bladed area for the preparation of seeding.

9. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

10. Vegetation, soil, and rocks left as a result of construction or maintenance activity will be randomly scattered on this right-of-way and will not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. The entire right-of-way shall be recontoured to match the surrounding landscape. The backfilled soil shall be compacted and a 6 inch berm will be left over the ditch line to allow for settling back to grade.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. The holder will reseed all disturbed areas. Seeding will be done according to the attached seeding requirements, using the following seed mix.

<input type="checkbox"/> seed mixture 1	<input checked="" type="checkbox"/> seed mixture 3
<input type="checkbox"/> seed mixture 2	<input type="checkbox"/> seed mixture 4
<input type="checkbox"/> seed mixture 2/LPC	<input type="checkbox"/> Aplomado Falcon Mixture

13. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2.

14. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. All signs and information thereon will be posted in a permanent, conspicuous manner, and will be maintained in a legible condition for the life of the pipeline.

15. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder before maintenance begins. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway. As determined necessary during the life of the pipeline, the Authorized Officer may ask the holder to construct temporary deterrence structures.

16. Any cultural and/or paleontological resources (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

17. 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 associated roads, 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.

18. Escape Ramps - The operator will construct and maintain pipeline/utility trenches [that are not otherwise fenced, screened, or netted] to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in the trenches according to the following criteria:

- a. Any trench left open for eight (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, the contractor/operator shall inspect the trench for wildlife, remove all trapped wildlife, and release them at least 100 yards from the trench.
- b. For trenches left open for eight (8) hours or more, earthen escape ramps (built at no more than a 30 degree slope and spaced no more than 500 feet apart) shall be placed in the trench.

VIII. INTERIM RECLAMATION

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

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

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

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

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

IX. FINAL ABANDONMENT & RECLAMATION

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

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

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

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

Seed Mixture 3, for Shallow Sites

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

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

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

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

*Pounds of pure live seed:

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