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Form 3160-3
(June 2015)

FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES JUN 21 2019
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT DISTRICT II-ARTESIA O.C.D.

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM018613A

6. If Indian, Allotee or Tribe Name

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

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

8. Lease Name and Well No.
QUIEN SABE FEDERAL COM
603H 325762

2. Name of Operator
COG OPERATING LLC

9. API Well No.
30-015-46125

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
600 West Illinois Ave Midland TX 79701	(432)683-7443	PURPLE SAGE / WOLFCAMP GAS

4. Location of Well *(Report location clearly and in accordance with any State requirements. *)*
At surface NWNE / 695 FNL / 2280 FEL / LAT 32.208328 / LONG -104.142835
At proposed prod. zone SWSE / 200 FSL / 1980 FEL / LAT 32.181585 / LONG -104.141896

11. Sec. T. R. M. or Blk. and Survey or Area
SEC 24 / T24S / R27E / NMP

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
4 miles	EDDY	NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
200 feet	760.24	640

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
200 feet	9252 feet / 19381 feet	FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3123 feet	05/01/2019	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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6945	03/01/2019

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	06/19/2019

Title	Office
Assistant Field Manager Lands & Minerals	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

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 06/19/2019

RWP 6-25-19

AFMSS

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

APD Print Report

06/20/2019

APD ID: 10400039573
Submission Date: 03/01/2019
Operator Name: COG OPERATING LLC
Federal/Indian APD: FED
Well Name: QUIEN SABE FEDERAL COM
Well Number: 603H
Well Type: OIL WELL
Well Work Type: Drill

Highlighted data reflects the most recent changes

Show Final Text

Application

Section 1 - General

APD ID: 10400039573
Tie to previous NOS?
Submission Date: 03/01/2019
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: NMNM018613A
Lease Acres: 760.24
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:
Well in Master Drilling Plan? NO
Master Drilling Plan name:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H **Well API Number:**

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

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

Describe other minerals:

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** QUIEN SABE FEDERAL COM **Number:** 603H/702H/703H

Well Class: HORIZONTAL **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: 4 Miles **Distance to nearest well:** 200 FT **Distance to lease line:** 200 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: COG_Quien_Sabe_603H_C102_20190226155701.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:

	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	695	FNL	2280	FEL	24S	27E	24	Aliquot NWNE	32.208328	-104.142835	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 018613A	3123	0	0
KOP Leg #1	695	FNL	2280	FEL	24S	27E	24	Aliquot NWNE	32.208328	-104.142835	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 018613A	3123	0	0
PPP Leg #1	330	FNL	1980	FEL	24S	27E	24	Aliquot NWNE	32.20935	-104.141885	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 018613A	-1958	5100	5081

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

	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	2641	FNL	1980	FEL	24S	27E	24	Aliquot NWSE	32.20297	-104.141887	EDDY	NEW MEXICO	NEW MEXICO	S	STATE	-6096	11800	9219
EXIT Leg #1	330	FSL	1980	FEL	24S	27E	25	Aliquot SWSE	32.181942	-104.141896	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 111412	-6474	19250	9597
BHL Leg #1	200	FSL	1980	FEL	24S	27E	25	Aliquot SWSE	32.181585	-104.141896	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 111412	-6129	19381	9252

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	---	3123	0	0	ALLUVIUM	NONE	No
2	RUSTLER	2465	658	658		NONE	No
3	TOP SALT	2301	822	822	SALT	NONE	No
4	BASE OF SALT	915	2208	2208	SALT	NONE	No
5	LAMAR	-713	2410	2410	LIMESTONE	NONE	No
6	BELL CANYON	682	2441	2441	SANDSTONE	NONE	No
7	CHERRY CANYON	-123	3246	3246	SANDSTONE	NATURAL GAS,OIL	No
8	BRUSHY CANYON	-1248	4371	4371	SANDSTONE	NATURAL GAS,OIL	No
9	BONE SPRING LIME	-2780	5903	5903	LIMESTONE	NATURAL GAS,OIL	No
10	UPPER AVALON SHALE	-2952	6075	6075	SHALE	NATURAL GAS,OIL	No
11	---	-3209	6316	6316	SANDSTONE	NATURAL GAS,OIL	No
12	BONE SPRING 1ST	-3783	6906	6906	SANDSTONE	NATURAL GAS,OIL	No

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
13	BONE SPRING 2ND	-4514	7637	7637	SANDSTONE	NATURAL GAS,OIL	No
14	BONE SPRING 3RD	-4690	7813	7813	SANDSTONE	NATURAL GAS,OIL	No
15	WOLFCAMP	-6026	9149	9149		NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M **Rating Depth:** 8400

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

Variance request: A variance is requested for the use of a flexible choke line from the BOP to choke manifold. See attached for specs and hydrostatic test chart.
Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all of the components installed will be functional and tested.

Choke Diagram Attachment:

COG_Quien_Sabe_603H_3M_Choke_20190227090138.pdf

BOP Diagram Attachment:

COG_Quien_Sabe_603H_3M_BOP_20190227090146.pdf

COG_Quien_Sabe_603H_Flex_Hose_20190227090357.pdf

Pressure Rating (PSI): 5M **Rating Depth:** 9252

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

Variance request: A variance is requested for the use of a flexible choke line from the BOP to choke manifold. See attached for specs and hydrostatic test chart.
Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all of the components installed will be functional and tested.

Choke Diagram Attachment:

COG_Quien_Sabe_603H_5M_Choke_20190227090458.pdf

BOP Diagram Attachment:

COG_Quien_Sabe_603H_5M_BOP_20190227090506.pdf

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

COG_Quien_Sabe_603H_5M_Choke_20190227090458.pdf

COG_Quien_Sabe_603H_Flex_Hose_20190227090527.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	17.5	13.375	NEW	API	N	0	750	0	750	3330	2205	750	J-55	54.5	STC	3.37	9.4	DRY	12.57	DRY	12.57
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	8400	0	8400	3330	-8403	8400	HCL-80	40	OTHER - BTC	1.41	1.24	DRY	2.82	DRY	2.82
3	PRODUCTION	8.5	5.5	NEW	API	N	0	19381	0	19381	3330	-7903	19381	P-110	20	OTHER - BTC	1.85	2.48	DRY	3.6	DRY	3.6

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Quien_Sabe_603H_Casing_Prog_20190227091603.pdf

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Quien_Sabe_603H_Casing_Prog_20190227091611.pdf

Casing ID: 3 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Quien_Sabe_603H_Casing_Prog_20190227091621.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	750	260	1.75	13.5	455	50	Class C	4% Gel
SURFACE	Tail			750	250	1.34	14.8	335	50	Class C	2% CaCl2
INTERMEDIATE	Lead		0	8400	890	2.8	11	2492	50	NeoCem	As needed
INTERMEDIATE	Tail			8400	300	1.1	16.4	330	50	Class H	As needed

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		0	19381	400	2	12.7	800	35	35:65:6 H Blend	As needed
PRODUCTION	Tail			19381	3020	1.24	14.4	3744	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
750	8400	OTHER : Diesel Brine Emulsion	8.6	9.4							Diesel Brine Emulsion
8400	19381	OIL-BASED MUD	10.5	12.5							OBM
0	750	OTHER : Fresh water gel	8.4	8.6							Fresh water gel

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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: 6015 **Anticipated Surface Pressure:** 3903.66

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Quien_Sabe_603H_H2S_Schem_20190227092109.pdf

COG_Quien_Sabe_603H_H2S_SUP_20190227092117.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Quien_Sabe_603H_AC_Report_20190227092133.pdf

COG_Quien_Sabe_603H_Direct_Plan_20190227092141.pdf

Other proposed operations facets description:

None

Other proposed operations facets attachment:

COG_Quien_Sabe_603H_Drilling_Prog_20190227092151.pdf

Other Variance attachment:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Quien_Sabe_603H_Existing_Rd_20190226162425.pdf

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

ROW ID(s)

ID:

Do the existing roads need to be improved? YES

Existing Road Improvement Description: Existing roads will be maintained in the same condition or better.

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

COG_Quien_Sabe_603H_Maps_Plats_20190301102652.pdf

New road type: RESOURCE

Length: 1738 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:

Access surfacing type: OTHER

Access topsoil source: ONSITE

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

COG_Quien_Sabe_603H_1Mile_Data_20190226162732.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: A Central Tank Battery and production facilities are proposed in Section 24. T24S. R27E. Production will be sent to the proposed Quien Sabe Central Tank Battery facility. 3 buried flow lines of approximately 294.7' of 4" flex pipe carrying oil, gas and water under a maximum pressure of 250 psi will follow the access road to the Quien Sabe Central Tank Battery facility location. We plan to install a 4" buried flex pipe transporting Gas Lift Gas from the Quien Sabe Central Tank Battery facility to the Quien Sabe Federal Com 603H, 703H and 702H wells. The buried Gas Lift Gas pipe of approximately 294.7' under a maximum pressure of 250 psi will be installed no further than 10' from the edge of the road.

Production Facilities map:

COG_Quien_Sabe_603H_CTB_20190227092324.pdf

COG_Quien_Sabe_CTB_Layout_20190227092334.pdf

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: ICE PAD CONSTRUCTION & MAINTENANCE, STIMULATION, SURFACE CASING
Describe type: Fresh Water
Water source type: OTHER
Source latitude:
Source longitude:
Source datum:
Water source permit type: PRIVATE CONTRACT
Source land ownership: PRIVATE
Water source transport method: PIPELINE
Source transportation land ownership: PRIVATE
Water source volume (barrels): 450000
Source volume (acre-feet): 58.001892
Source volume (gal): 18900000

Water source use type: INTERMEDIATE/PRODUCTION CASING
Water source type: OTHER
Describe type: Brine Water
Source latitude:
Source longitude:
Source datum:
Water source permit type: PRIVATE CONTRACT
Source land ownership: COMMERCIAL
Water source transport method: TRUCKING
Source transportation land ownership: COMMERCIAL
Water source volume (barrels): 30000
Source volume (acre-feet): 3.866793
Source volume (gal): 1260000

Water source and transportation map:

COG_Quien_Sabe_603H_Fresh_H20_20190227092731.pdf
COG_Quien_Sabe_603H_Brine_H20_20190227092745.pdf

Water source comments: Fresh water will be obtained from Efren B. Collins fresh water well located in Section 16. T24S, R28E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E. See attached maps
New water well? NO

New Water Well Info

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

Well target aquifer:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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

Aquifer comments:

Aquifer documentation:

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

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

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

Drilling method: **Drill material:**

Grout material: **Grout depth:**

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

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche source will be from George H and Nancy Brantley caliche pit located in Sec 13. T24S. R27E.

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: SEWAGE

Waste content description: Human waste and gray water

Amount of waste: 1000 gallons

Waste disposal frequency : One Time Only

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: DRILLING

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

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: GARBAGE

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

Amount of waste: 500 pounds

Waste disposal frequency : One Time Only

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

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

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

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Roll off cutting containers on tracks

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

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

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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: Gas Capture Plan attached

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Quien_Sabe_603H_CTB_20190227092637.pdf

COG_Quien_Sabe_603H_Layout_20190227092648.pdf

COG_Quien_Sabe_CTB_Layout_20190227092708.pdf

Comments: A Central Tank Battery and production facilities are proposed in Section 24. T24S. R27E. Production will be sent to the proposed Quien Sabe Central Tank Battery facility. 3 buried flow lines of approximately 294.7' of 4" flex pipe carrying oil, gas and water under a maximum pressure of 250 psi will follow the access road to the Quien Sabe Central Tank Battery facility location. We plan to install a 4" buried flex pipe transporting Gas Lift Gas from the Quien Sabe Central Tank Battery facility to the Quien Sabe Federal Com 603H, 703H and 702H wells. The buried Gas Lift Gas pipe of approximately 294.7' under a maximum pressure of 250 psi will be installed no further than 10' from the edge of the road. The battery and facilities will be installed according to API specifications.

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: QUIEN SABE FEDERAL COM

Multiple Well Pad Number: 603H/702H/703H

Recontouring attachment:

COG_Quien_Sabe_603H_Reclamation_20190227092810.pdf

Drainage/Erosion control construction: Straw Waddles will be used as necessary at the well site to reduce sediment impacts to fragile/sensitive soils.

Drainage/Erosion control reclamation: North 50'. Northwest 50'.

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Well pad proposed disturbance (acres): 3.67
Road proposed disturbance (acres): 0.08
Powerline proposed disturbance (acres): 0
Pipeline proposed disturbance (acres): 0.11
Other proposed disturbance (acres): 5.74
Total proposed disturbance: 9.6

Well pad interim reclamation (acres): 0.06
Road interim reclamation (acres): 0.08
Powerline interim reclamation (acres): 0
Pipeline interim reclamation (acres): 0.11
Other interim reclamation (acres): 5.74
Total interim reclamation: 5.99

Well pad long term disturbance (acres): 2.81
Road long term disturbance (acres): 0.08
Powerline long term disturbance (acres): 0
Pipeline long term disturbance (acres): 0.11
Other long term disturbance (acres): 5.74
Total long term disturbance: 8.74

Disturbance Comments:

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

Soil treatment: None

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

Existing Vegetation at the well pad attachment:

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

Existing Vegetation Community at the road attachment:

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

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: N/A

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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

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:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

COG_Quien_Sabe_603H_Closed_Loop_20190227092822.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Section 12 - Other Information

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

ROW Type(s):

ROW Applications

SUPO Additional Information: Surface Use & Operating Plan.

Use a previously conducted onsite? YES

Previous Onsite information: Onsite completed on 11/29/2018 by Gerald Herrera (COG) and Jeff Robertson (BLM).

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Other SUPO Attachment

COG_Quien_Sabe_603H_1Mile_Data_20190227092857.pdf
COG_Quien_Sabe_603H_Brine_H20_20190227092908.pdf
COG_Quien_Sabe_603H_Closed_Loop_20190227092917.pdf
COG_Quien_Sabe_603H_CTB_20190227092928.pdf
COG_Quien_Sabe_603H_Existing_Rd_20190227092937.pdf
COG_Quien_Sabe_603H_Existing_Rd_20190227092947.pdf
COG_Quien_Sabe_603H_Fresh_H20_20190227092958.pdf
COG_Quien_Sabe_603H_Layout_20190227093011.pdf
COG_Quien_Sabe_603H_Maps_Plats_20190227093024.pdf
COG_Quien_Sabe_603H_Reclamation_20190227093033.pdf
COG_Quien_Sabe_CTB_Layout_20190227093040.pdf
COG_Quien_Sabe_603H_SUP_20190301102623.pdf

PWD

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

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

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

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

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

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

Produced Water Disposal (PWD) Location:

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

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Name: COG OPERATING LLC

Well Name: QUIEN SABE FEDERAL COM **Well Number:** 603H

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:** 02/26/2019

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

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

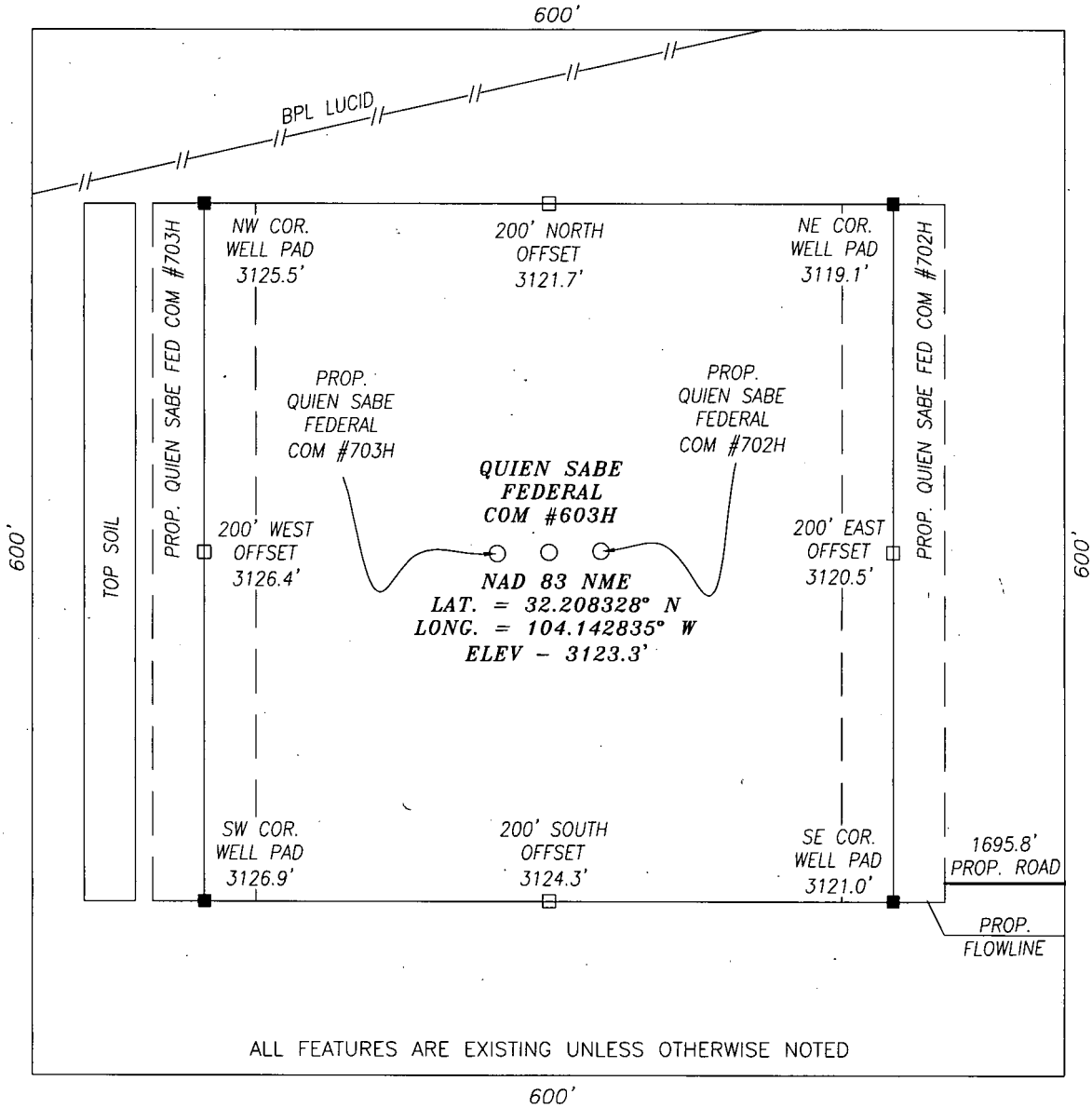
Payment

APD Fee Payment Method: PAY.GOV

pay.gov Tracking ID: 26FN0CFN

SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,

EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF HIGHWAY 285 AND BLACK RIVER VILLAGE RD. (CR. 720), GO WEST ON BLACK RIVER VILLAGE RD. FOR APPROX. 2.75 MILES; THEN TURN LEFT (SOUTHWEST) ON ROADRUNNER RD. (CR. 774) AND GO APPROX. 1.5 MILES; THEN TURN RIGHT (WEST) AND GO APPROX. 770 FEET TO THE PROPOSED ROAD. PROPOSED WELL LIES APPROX. 1900 FEET WEST.

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 NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 1/24/19

CHAD HARCROW N.M.P.S. NO. 17777 DATE

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

100 0 100 200 Feet

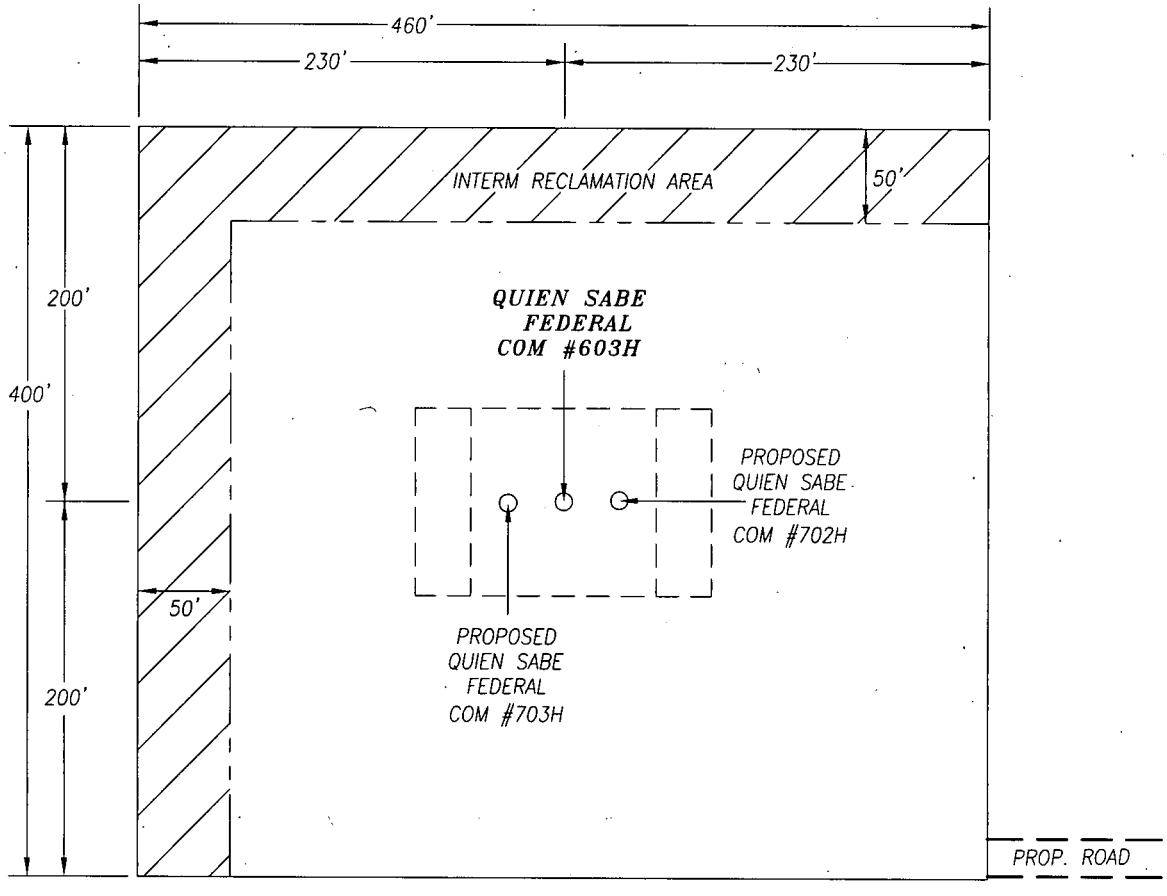
Scale: 1"=100'

COG OPERATING, LLC

QUIEN SABE FEDERAL COM #603H WELL LOCATED 695 FEET FROM THE NORTH LINE AND 2280 FEET FROM THE EAST LINE OF SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 3, 2018		600S
DRAFTING DATE: JANUARY 7, 2018		PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: VD	FILE: 18-1696

RECLAMATION AND FACILITY DIAGRAM – PRODUCTION FACILITIES DIAGRAM
COG OPERATING, LLC
SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



LEASE NAME WELL & WELL NUMBER: QUIEN SABE FEDERAL COM #603H
NAD 83 NME
LATITUDE: 32.208328° N
LONGITUDE: 104.142835° W

HARCROW SURVEYING, LLC
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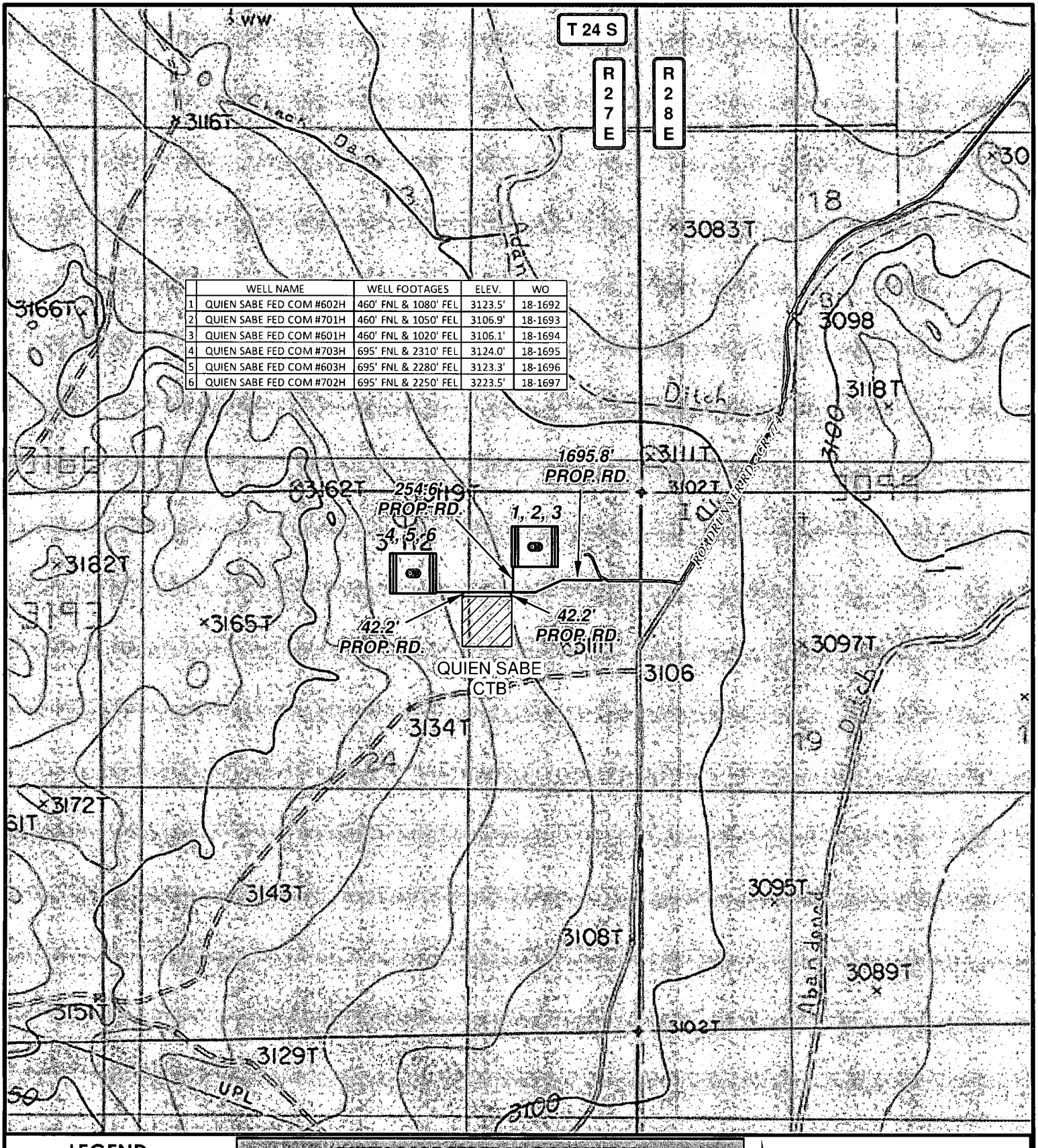
PH: (575) 746-2158
c.harcrow@harcrowsurveying.com

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

COG OPERATING, LLC	
SURVEY DATE: DECEMBER 3, 2018	RECLAMATION
DRAFTING DATE: JANUARY 18, 2019	PAGE: 1 OF 1
APPROVED BY: CH / DRAWN BY: VD	FILE: 18-1696



LEGEND

- WELL
- TANKBATTERY
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

QUIEN SABE FEDERAL COM WELLS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1692-1697 & 1718		LEASE: QUIEN SABE FED COM

0 750 1,500 2,250 3,000 FEET

0 0.075 0.15 0.3 Miles 1 IN = 1,250 FT

LOCATION MAP TOPO 1/8/2019 V.D.

N

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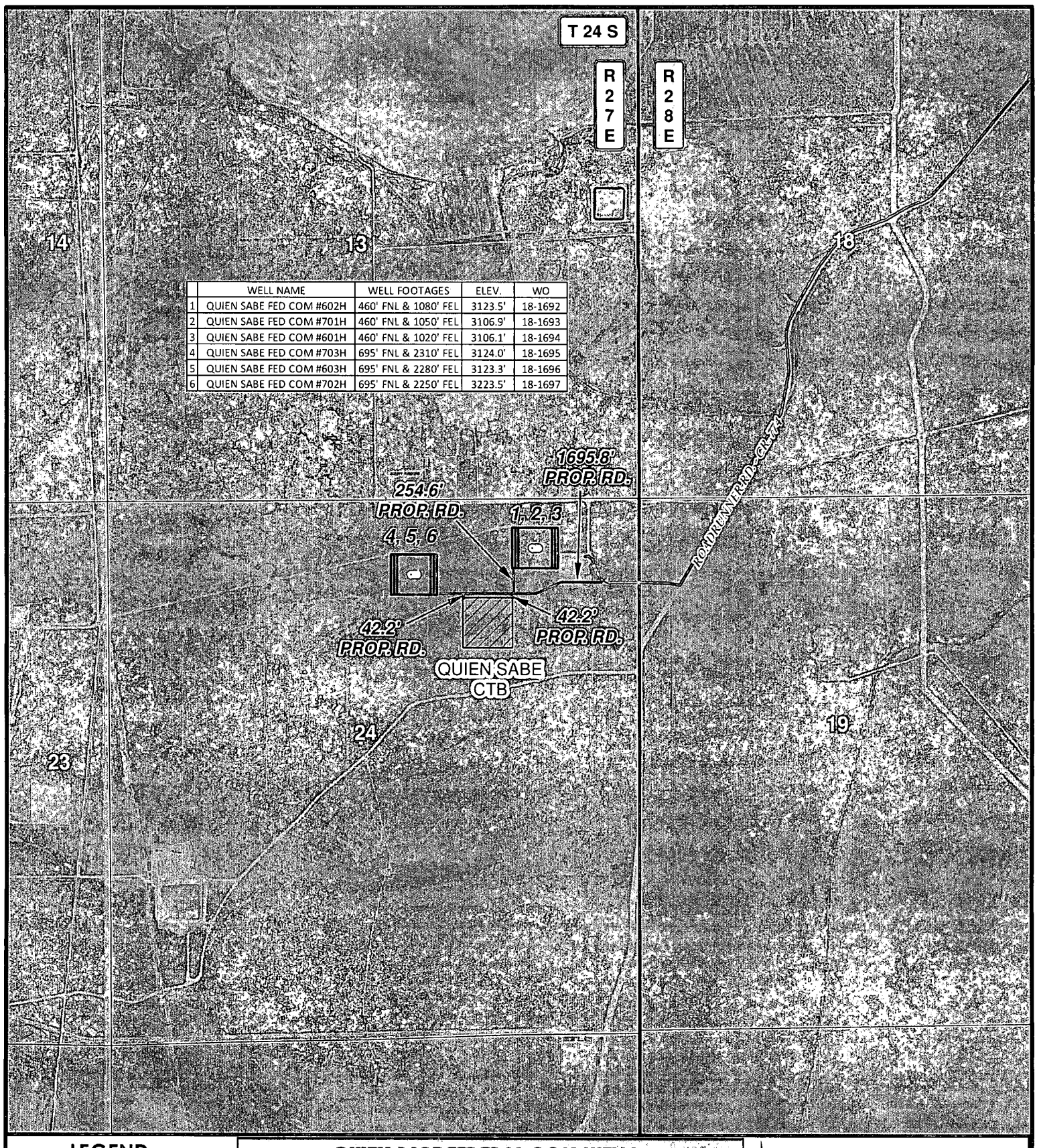

	WELL NAME	WELL FOOTAGES	ELEV.	WO
1	QUIEN SABE FED COM #602H	460' FNL & 1080' FEL	3123.5'	18-1692
2	QUIEN SABE FED COM #701H	460' FNL & 1050' FEL	3106.9'	18-1693
3	QUIEN SABE FED COM #601H	460' FNL & 1020' FEL	3106.1'	18-1694
4	QUIEN SABE FED COM #703H	695' FNL & 2310' FEL	3124.0'	18-1695
5	QUIEN SABE FED COM #603H	695' FNL & 2280' FEL	3123.3'	18-1696
6	QUIEN SABE FED COM #702H	695' FNL & 2250' FEL	3223.5'	18-1697

LEGEND

- ⊙ *WELL*
- TANKBATTERY
- WELLPAD
- *EXISTING ROAD*
- *PROPOSED ROAD*

QUIEN SABE FEDERAL COM WELLS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1692-1697 & 1718		LEASE: QUIEN SABE FED COM

0 750 1,500 2,250 3,000 FEET

0 0.075 0.15 0.3 Miles

1 IN = 1,250 FT

LOCATION MAP IMAGERY 1/8/2019 V.D.

N

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COG OPERATING, LLC

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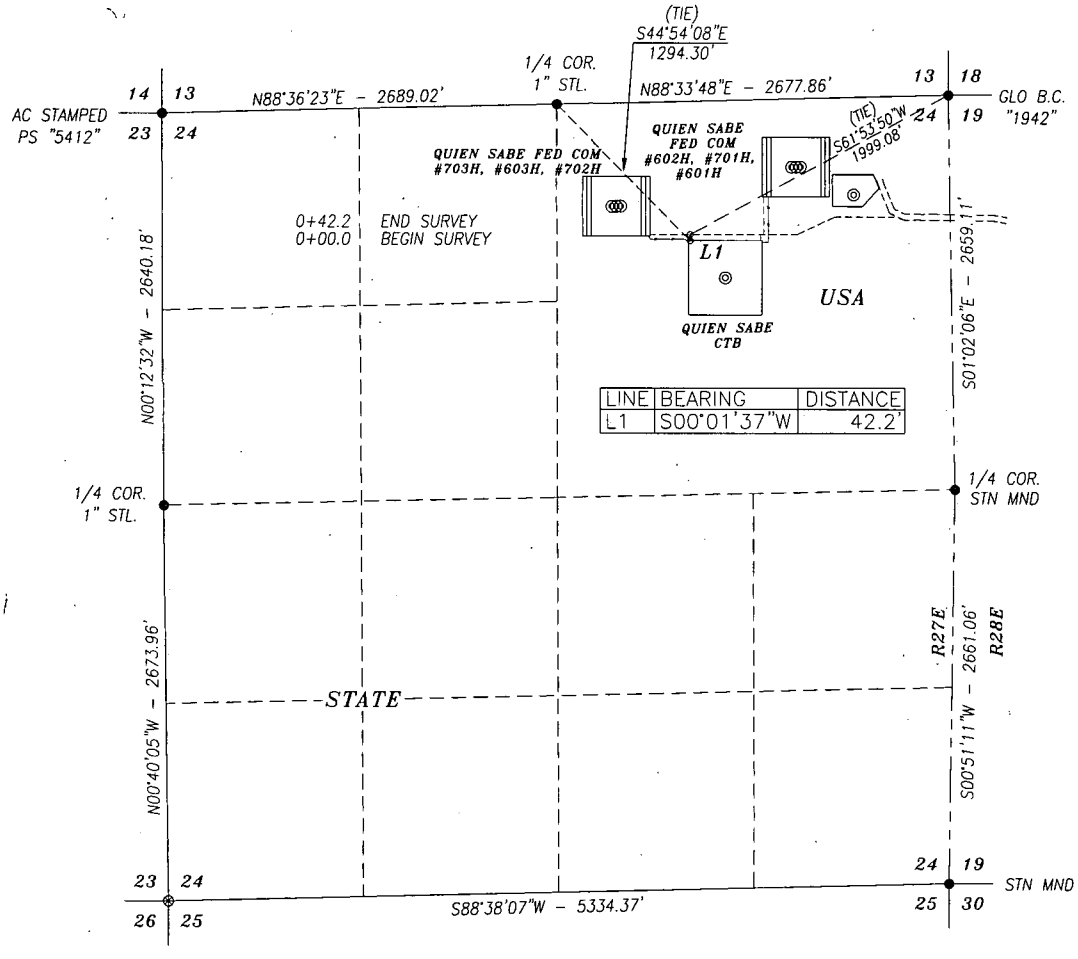
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

ACCESS ROAD PLAT
COG OPERATING, LLC

A PROPOSED ACCESS ROAD FROM PROPOSED MAIN ACCESS ROAD
TO QUIEN SABE CTB IN
SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



LINE	BEARING	DISTANCE
L1	S00°01'37"W	42.2'

DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 42.2 FEET OR 2.56 RODS OR 0.008 MILES IN LENGTH CROSSING USA LAND IN SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 1/24/19
CHAD HARCROW N.M.P.S. NO. 17777 DATE

HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
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c.harcrow@harcrowsurveying.com

1000 0 1000 2000 FEET
SCALE: 1"=1000'

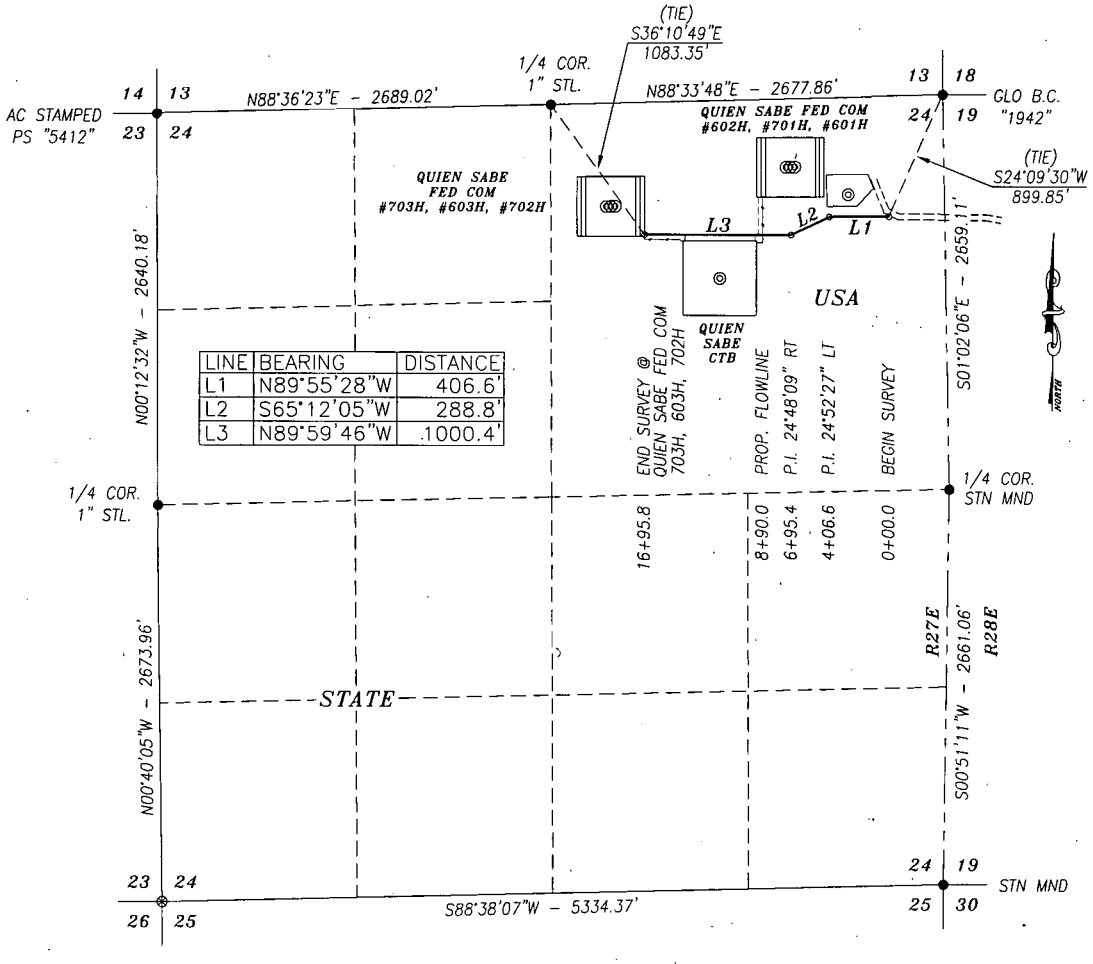
COG OPERATING, LLC

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: JANUARY 8, 2018		ACCESS RD.
DRAFTING DATE: JANUARY 12, 2019		PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: VD	FILE: 18-1719

ACCESS ROAD PLAT
COG OPERATING, LLC

A PROPOSED ACCESS ROAD FROM EXISTING LINE TO
QUIEN SABE FED COM 703H, 603H, AND 702H IN
SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 1695.8 FEET OR 102.78 RODS OR 0.321 MILES IN LENGTH CROSSING USA LAND IN SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 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 L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 1/24/19
CHAD HARCROW N.M.P.S. NO. 17777 DATE

HARCROW SURVEYING, LLC
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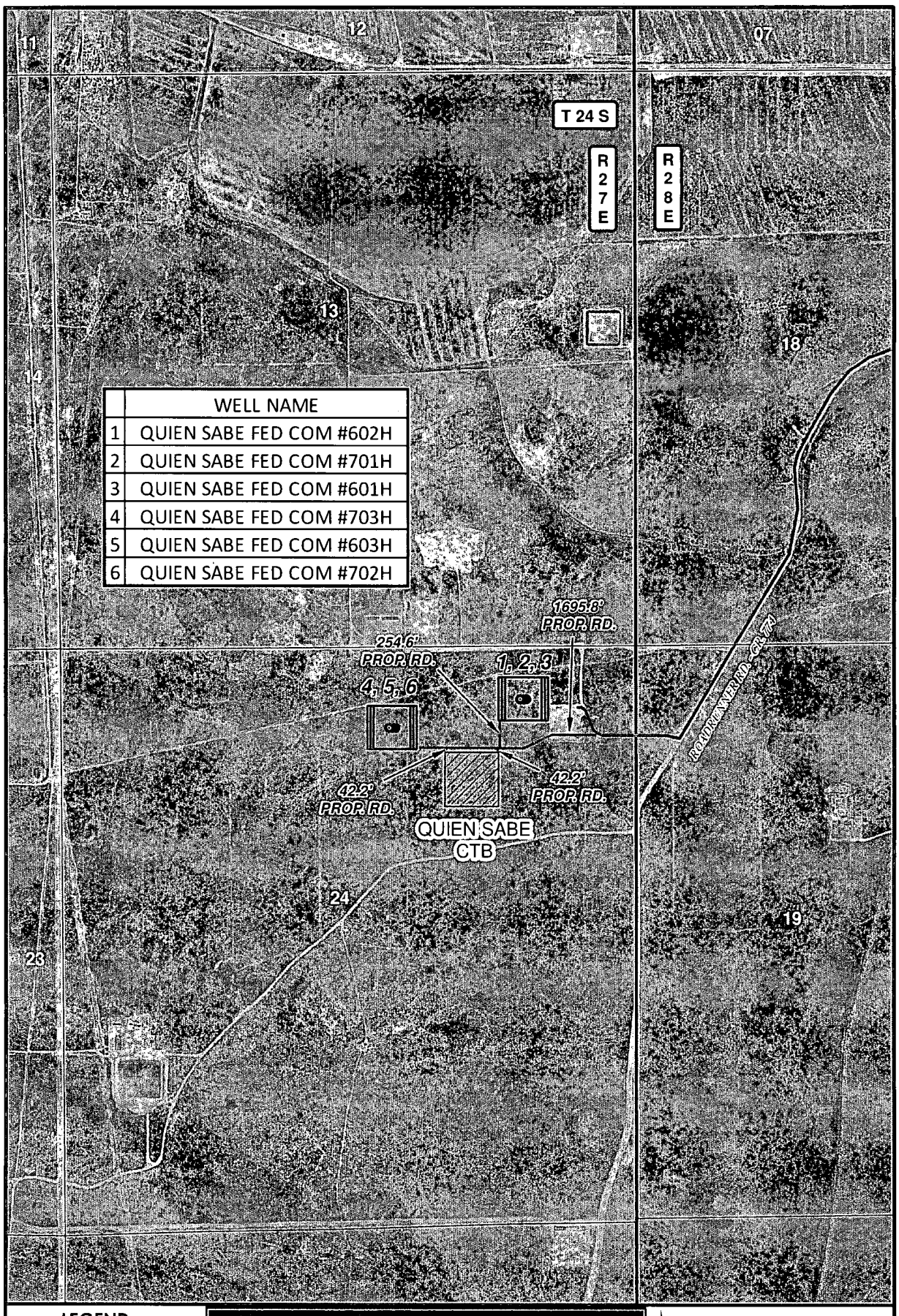
c.harcrow@harcrowsurveying.com

1000 0 1000 2000 FEET
SCALE: 1"=1000'

COG OPERATING, LLC

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 24, TOWNSHIP 24 SOUTH, RANGE 27 EAST, NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: JANUARY 8, 2018		MAIN RD.
DRAFTING DATE: JANUARY 12, 2019		PAGE 1 OF 1
APPROVED BY: CH	DRAWN BY: VD	FILE: 18-1719



	WELL NAME
1	QUIEN SABE FED COM #602H
2	QUIEN SABE FED COM #701H
3	QUIEN SABE FED COM #601H
4	QUIEN SABE FED COM #703H
5	QUIEN SABE FED COM #603H
6	QUIEN SABE FED COM #702H

LEGEND

- WELL
- TANKBATTERY
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

QUIEN SABE FEDERAL COM ACCESS ROADS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1719		LEASE: QUIEN SABE FED COM

0 750 1,500 2,250 FEET

0 0.05 0.1 0.2 Miles

1 IN = 1,000 FT

LOCATION MAP | IMAGERY | 1/8/2019 | V.D.

CONCHO

COG OPERATING, LLC

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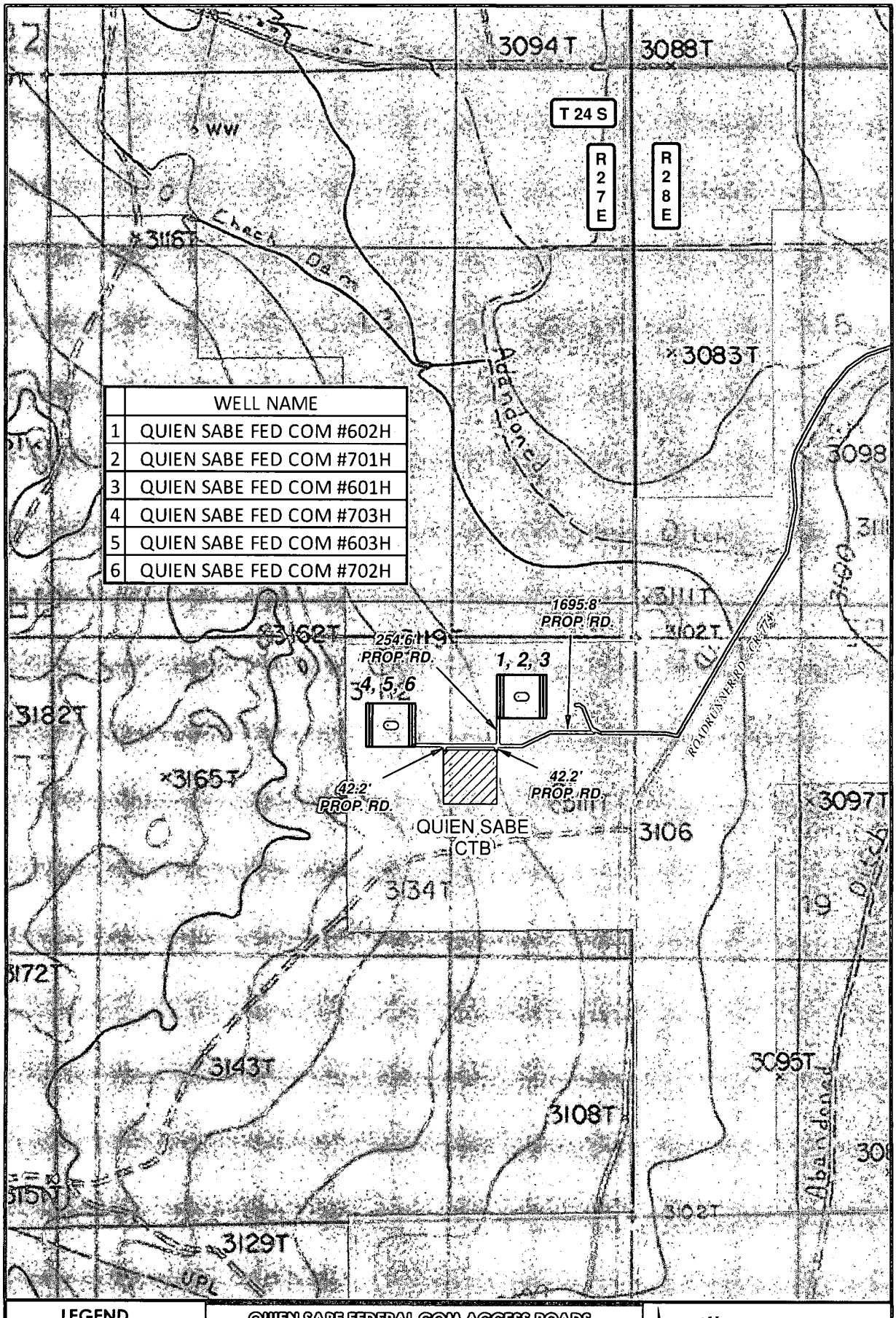

	WELL NAME
1	QUIEN SABE FED COM #602H
2	QUIEN SABE FED COM #701H
3	QUIEN SABE FED COM #601H
4	QUIEN SABE FED COM #703H
5	QUIEN SABE FED COM #603H
6	QUIEN SABE FED COM #702H

LEGEND

- WELL
- TANKBATTERY
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

QUIEN SABE FEDERAL COM ACCESS ROADS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1719		LEASE: QUIEN SABE FED COM

0 750 1,500 2,250 FEET

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

LOCATION MAP | LAND STATUS | 1/8/2019 | V.D.

N

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COG OPERATING, LLC

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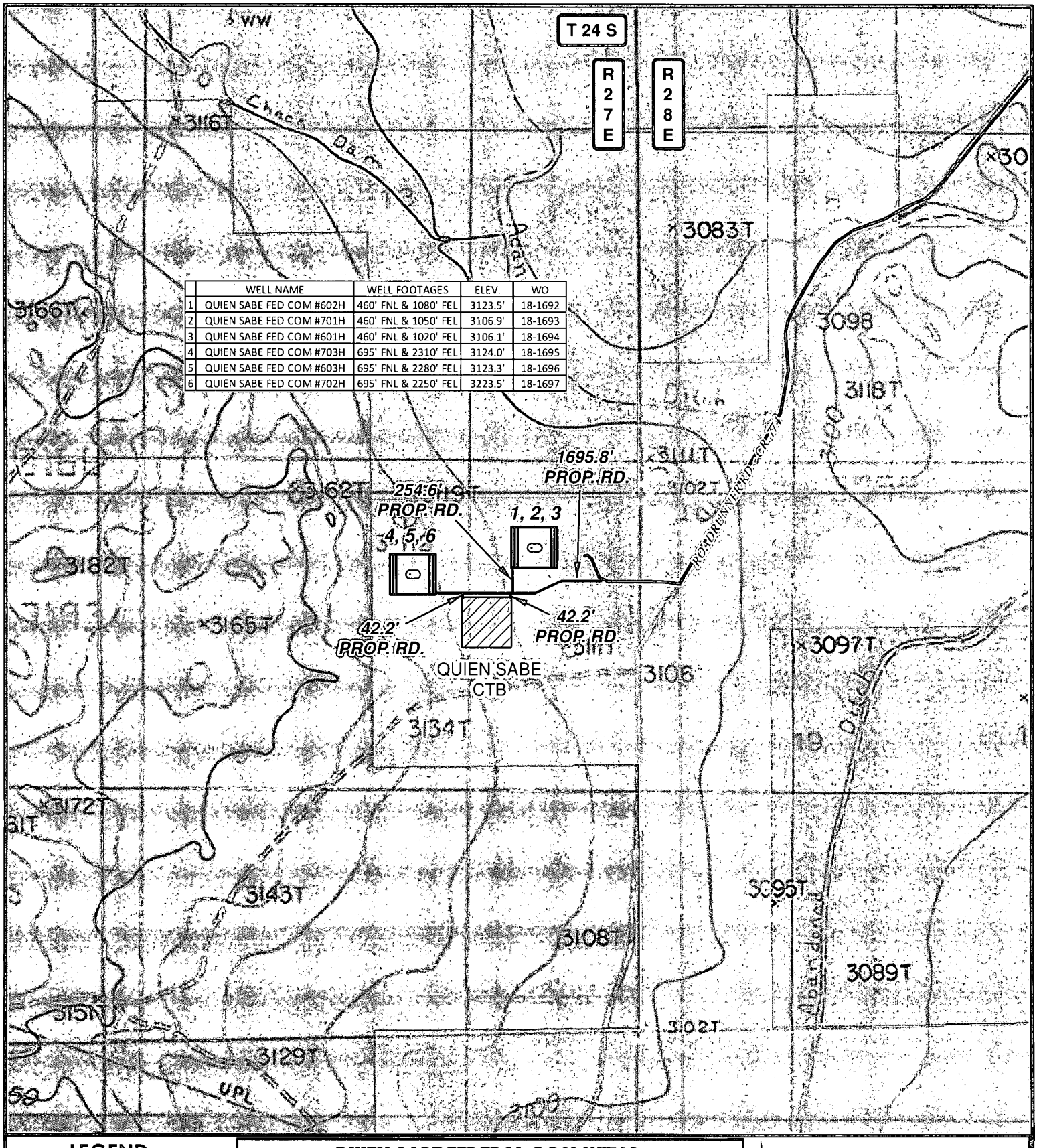


	WELL NAME	WELL FOOTAGES	ELEV.	WO
1	QUIEN SABE FED COM #602H	460' FNL & 1080' FEL	3123.5'	18-1692
2	QUIEN SABE FED COM #701H	460' FNL & 1050' FEL	3106.9'	18-1693
3	QUIEN SABE FED COM #601H	460' FNL & 1020' FEL	3106.1'	18-1694
4	QUIEN SABE FED COM #703H	695' FNL & 2310' FEL	3124.0'	18-1695
5	QUIEN SABE FED COM #603H	695' FNL & 2280' FEL	3123.3'	18-1696
6	QUIEN SABE FED COM #702H	695' FNL & 2250' FEL	3223.5'	18-1697

LEGEND

- WELL
- TANKBATTERY
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

QUIEN SABE FEDERAL COM WELLS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1692-1697 & 1718		LEASE: QUIEN SABE FED COM

0 750 1,500 2,250 3,000 FEET

0 0.075 0.15 0.3 Miles

1 IN = 1,250 FT

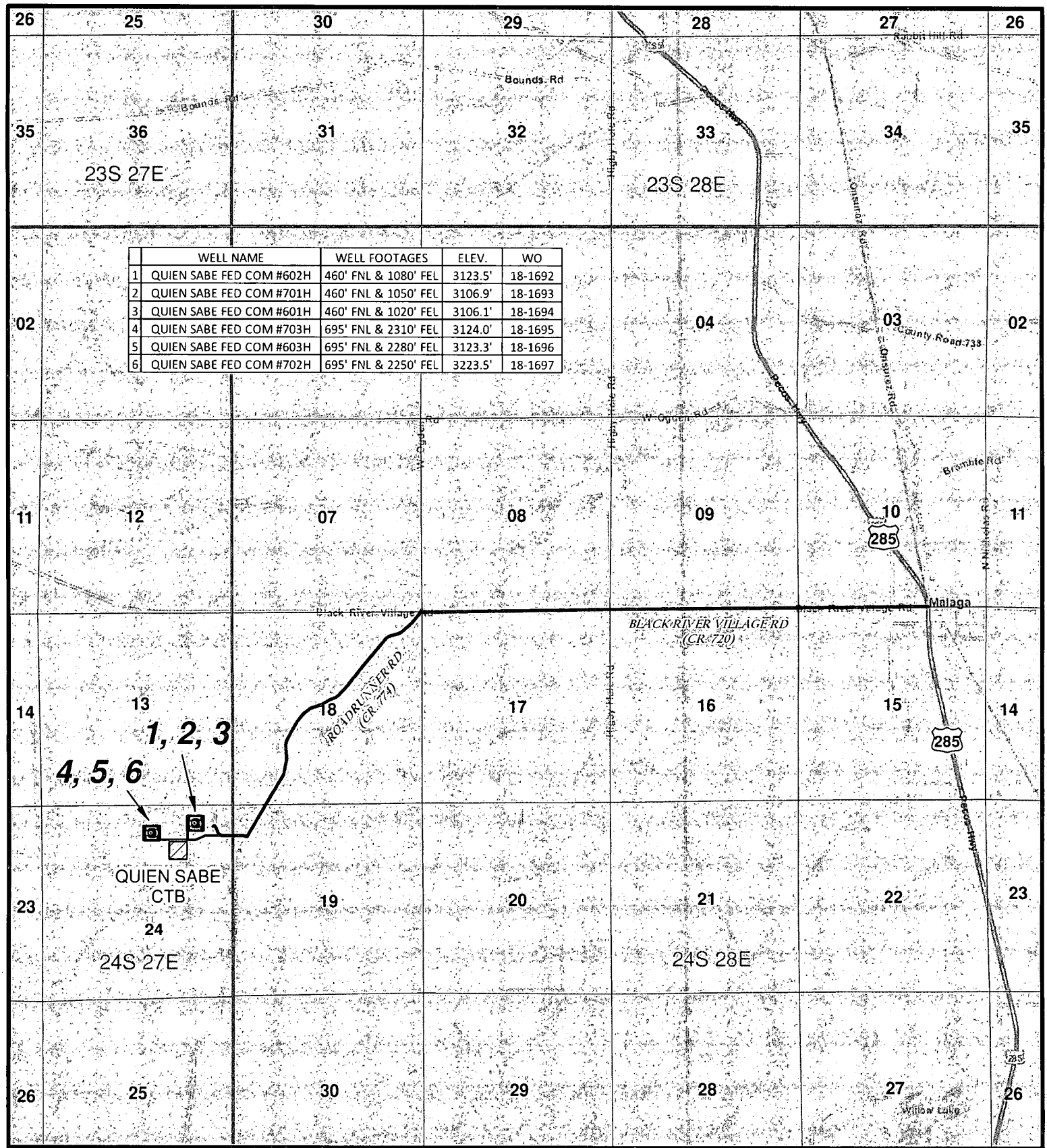
LOCATION MAP | TOPO | 1/8/2019 | V.D.

N

CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



	WELL NAME	WELL FOOTAGES	ELEV.	WO
1	QUIEN SABE FED COM #602H	460' FNL & 1080' FEL	3123.5'	18-1692
2	QUIEN SABE FED COM #701H	460' FNL & 1050' FEL	3106.9'	18-1693
3	QUIEN SABE FED COM #601H	460' FNL & 1020' FEL	3106.1'	18-1694
4	QUIEN SABE FED COM #703H	695' FNL & 2310' FEL	3124.0'	18-1695
5	QUIEN SABE FED COM #603H	695' FNL & 2280' FEL	3123.3'	18-1696
6	QUIEN SABE FED COM #702H	695' FNL & 2250' FEL	3223.5'	18-1697

LEGEND

- WELL
- TANKBATTERY
- WELLPAD
- EXISTING ROAD
- PROPOSED ROAD

QUIEN SABE FEDERAL COM WELLS

SECTION: 24	TOWNSIP: 24 S.	RANGE: 27 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-1692-1697 & 1718		LEASE: QUIEN SABE FED COM

0 0.25 0.5 1 Miles

1 IN = 3,500 FT

LOCATION MAP | VICINITY MAP | 1/8/2019 | V.D.

N

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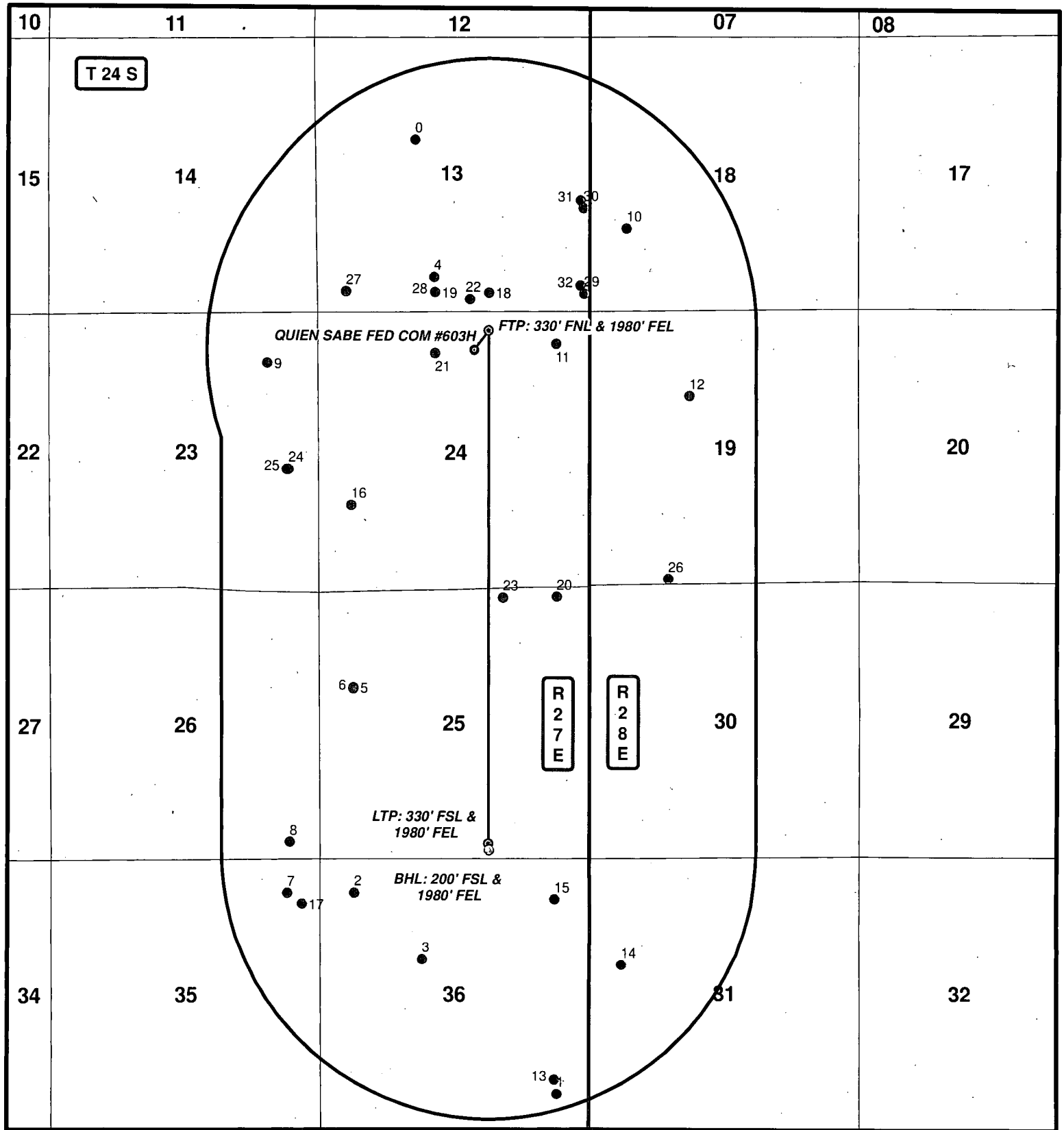

DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH SEPTEMBER 16, 2018.

LEGEND

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

QUIEN SABE FEDERAL COM #603H

SEC: 24	TWP: 24 S.	RGE: 27 E.	ELEVATION: 3123.3'
STATE: NEW MEXICO		COUNTY: EDDY	695' FNL & 2280' FEL
W.O. # 18-1696	LEASE: QUIEN SABE FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,500 FT

1 MILE MAP 1/9/2019 V.D.

N

CONCHO

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PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

QUIEN SABE FEDERAL COM #603H 1 MILE DATA (18-1696)

FID	API	OPERATOR	RANGE	SECTION	TOWNSHIP	WELL_NAME	COMPL_STAT	EW_CD	FTG_EW	FTG_NS	LATITUDE	LONGITUDE	NS_CD
0	3001501124	UNION OIL CO OF CALIFORNIA	27E	13	24.0S	BEEMAN 001	Plugged	W	1980	1980	32.219556	-104.146637	N
1	3001501140	W H MCKINLEY	27E	36	24.0S	KELLY ST 001	Plugged	E	660	660	32.168434	-104.1376	S
2	3001501167	YORK & HARPER	27E	36	24.0S	STATE 002	Plugged	W	660	660	32.179319	-104.150493	N
3	3001522352	PURVIS OPERATING CO	27E	36	24.0S	RED BLUFF STATE 001	Plugged	W	1980	1980	32.175717	-104.146181	N
4	3001523022	HNG FOSSIL FUELS CO	27E	13	24.0S	BRANTLEY 13 STATE CO 001	Plugged	W	2310	660	32.212205	-104.145408	S
5	3001523411	AMOCO PRODUCTION CO	27E	25	24.0S	STATE 1S 001	Plugged	W	660	1980	32.190284	-104.150561	N
6	3001523751	AMOCO PRODUCTION CO	27E	25	24.0S	STATE 15 001	Zone Plugged	W	660	2005	32.190216	-104.15056	N
7	3001523972	DINERO OPERATING CO	27E	35	24.0S	PUBCO STATE 001	Plugged	E	660	660	32.179287	-104.154779	N
8	3001526812	DINERO OPERATING CO	27E	26	24.0S	RJR STATE 001	Plugged	E	600	330	32.18201	-104.154603	S
9	3001532889	EOG Y RESOURCES, INC.	27E	23	24.0S	HUMIDOR BMJ STATE COM 001	Active	E	990	990	32.207579	-104.156065	N
10	3001533639	MARBOB ENERGY CORP	28E	18	24.0S	CHRIS DUNGHILL FEE COM 001C	New (Not drilled or compl)	W	735	1575	32.214813	-104.133126	S
11	3001535495	COG OPERATING LLC	27E	24	24.0S	WOODY'S HOPE FEDERAL COM 001	Active	E	660	660	32.208634	-104.137654	N
12	3001535760	TRINITY RIVER ENERGY, LLC	28E	19	24.0S	WEATHERBY 001F	New (Not drilled or compl)	W	1981	1651	32.205865	-104.129102	N
13	3001535838	EOG Y RESOURCES, INC.	27E	36	24.0S	GURKHA BKG STATE COM 001	Active	E	660	990	32.16922	-104.13774	S
14	3001535957	TRINITY RIVER ENERGY, LLC	28E	31	24.0S	RUGER 31 STATE 001E	New (Not drilled or compl)	W	661	1981	32.175415	-104.13345	N
15	3001536305	EOG Y RESOURCES, INC.	27E	36	24.0S	STOGEY BLG STATE COM 001H	Active	E	660	660	32.178983	-104.13774	N
16	3001536499	EOG Y RESOURCES, INC.	27E	24	24.0S	PERDOMO BMP STATE COM 001H	New (Not drilled or compl)	W	660	1650	32.200025	-104.150695	S
17	3001538260	EOG Y RESOURCES, INC.	27E	35	24.0S	HARKEY 35 STATE 002H	New (Not drilled or compl)	E	330	760	32.178722	-104.15385	N
18	3001540950	COG OPERATING LLC	27E	13	24.0S	BONGO FEE 001H	New (Not drilled or compl)	E	1980	330	32.211376	-104.141932	S
19	3001541407	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 001C	New (Not drilled or compl)	W	2310	331	32.211395	-104.145368	S
20	3001541528	COG OPERATING LLC	27E	25	24.0S	QUIEN SABE 25 FEDERAL 001H	New (Not drilled or compl)	E	600	190	32.195156	-104.13759	N
21	3001541748	EOG Y RESOURCES, INC.	27E	24	24.0S	FONSECA BTD STATE COM 001H	New (Not drilled or compl)	W	2310	860	32.208121	-104.145359	N
22	3001542029	COG OPERATING LLC	27E	13	24.0S	KUDU FEE 001H	New (Not drilled or compl)	E	2350	200	32.211025	-104.143131	S
23	3001542662	COG OPERATING LLC	27E	25	24.0S	QUIEN SABE 25 FEDERAL 002H	New (Not drilled or compl)	E	1650	190	32.195107	-104.141	N
24	3001542755	EOG Y RESOURCES, INC.	27E	23	24.0S	HUMIDOR BML STATE COM 005H	New (Not drilled or compl)	E	575	2365	32.201934	-104.154713	S
25	3001542893	EOG Y RESOURCES, INC.	27E	23	24.0S	MACANUDO BTE STATE COM 001H	New (Not drilled or compl)	E	605	2365	32.201933	-104.15481	S
26	3001543214	COG OPERATING LLC	28E	19	24.0S	PARDUE 19 FEDERAL COM 004H	New (Not drilled or compl)	W	1600	110	32.196106	-104.130441	S
27	3001543581	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 002H	New (Not drilled or compl)	W	560	330	32.21142	-104.151054	S
28	3001543674	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 001H	New (Not drilled or compl)	W	2310	330	32.211393	-104.145368	S
29	3001543898	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 003H	New (Not drilled or compl)	E	100	330	32.211347	-104.135823	S
30	3001544042	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 004H	New (Not drilled or compl)	E	100	1987	32.215902	-104.135864	S
31	3001544062	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 005H	New (Not drilled or compl)	E	160	2137	32.216315	-104.136063	S
32	3001544077	CAZA OPERATING, LLC	27E	13	24.0S	MAD RIVER 13 STATE COM 006H	New (Not drilled or compl)	E	175	480	32.21176	-104.136071	S

COG Operating, LLC - Quien Sabe Federal Com 603H

1. Geologic Formations

TVD of target	9,252'	Pilot hole depth	NA
MD at TD:	19,381'	Deepest expected fresh water:	110'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	658	Water	
Top of Salt	822	Salt	
Base of Salt	2208	Salt	
Lamar	2410	Salt Water	
Bell Canyon	2441	Salt Water	
Cherry Canyon	3246	Oil/Gas	
Brushy Canyon	4371	Oil/Gas	
Bone Spring Lime	5903	Oil/Gas	
U. Avalon Shale	6075	Oil/Gas	
L. Avalon Shale	6310	Oil/Gas	
1st Bone Spring Sand	6906	Oil/Gas	
2nd Bone Spring Sand	7637	Oil/Gas	
3rd Bone Spring Sand	7813	Oil/Gas	
Wolfcamp	9149	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	750	13.375"	54.5	J55	STC	3.37	9.40	12.57
12.25"	0	8400	9.625"	40	HCL80	BTC	1.41	1.24	2.82
8.5	0	19,381	5.5"	20	P110	BTC	1.85	2.48	3.60
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

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

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

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	260	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter. Stage1	890	11	2.8	19	48	Lead: NeoCem
	300	16.4	1.1	5	8	Tail: Class H
DV Tool @ 2400'						
Inter. Stage2	260	11	2.8	19	48	Lead: NeoCem
	100	14.8	1.35	6.34	8	Tail: Class C + 2% Cacl
5.5 Prod	400	12.7	2	10.6	16	Lead: 35:65:6 H Blend
	3020	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

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

Casing String	TOC	% Excess
Surface	0'	50%
1st Intermediate	0'	50%
Production	7,900'	35%

COG Operating, LLC - Quien Sabe Federal Com 603H

4. Pressure Control Equipment

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

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	3M	Annular	x	1500 psi
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8 1/2"	13-5/8"	5M	5M Annular	x	2500 psi
			Blind Ram	x	5M
			Pipe Ram	x	
			Double Ram	x	
			Other*		

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

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

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

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.4 - 8.6	28-29	N/C
Surf csg	Int shoe	Diesel Brine Emul	8.6 - 9.4	30-40	N/C
Int shoe	Lateral TD	OBM	10.5 - 12.5	30-40	20

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

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

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
N	Are Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

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

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	6015 psi at 9252' TVD
Abnormal Temperature	NO 150 Deg. F.

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

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

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

8. Other Facets of Operation

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

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

PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Eddy County, NM (NAD27 NME)
Quien Sabe Fed Com
603H

OH

Plan: Plan 1 02-15-19

Standard Planning Report

15 February, 2019

CONCHO

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

Project Eddy County, NM (NAD27 NME)

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 Quien Sabe Fed Com

Site Position:		**Northing:**	439,517.70 usft	**Latitude:**	32° 12' 29.54517 N
From:	Map	**Easting:**	559,072.60 usft	**Longitude:**	104° 8' 32.42618 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.10 °

Well 603H

Well Position	**+N/-S**	0.00 usft	**Northing:**	439,517.70 usft	**Latitude:**	32° 12' 29.54517 N
	+E/-W	0.00 usft	**Easting:**	559,072.60 usft	**Longitude:**	104° 8' 32.42618 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,123.30 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	4/10/2019	7.17	59.95	47,890.34083067

Design Plan 1 02-15-19

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	178.19

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.06	6.00	24.17	1,799.51	14.32	6.43	2.00	2.00	0.00	24.17	
8,341.89	6.00	24.17	8,305.49	638.30	286.48	0.00	0.00	0.00	0.00	
8,641.95	0.00	0.00	8,605.00	652.62	292.90	2.00	-2.00	0.00	180.00	
8,673.00	0.00	0.00	8,636.05	652.62	292.90	0.00	0.00	0.00	0.00	
9,570.49	89.75	179.92	9,209.00	82.18	293.71	10.00	10.00	20.05	179.92	
19,380.67	89.75	179.92	9,252.00	-9,727.90	307.60	0.00	0.00	0.00	0.00	BHL - Quien Sabe F

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
1,600.00	2.00	24.17	1,599.98	1.59	0.71	-1.57	2.00	2.00	0.00
1,700.00	4.00	24.17	1,699.84	6.37	2.86	-6.27	2.00	2.00	0.00
1,800.00	6.00	24.17	1,799.45	14.32	6.43	-14.11	2.00	2.00	0.00
1,800.06	6.00	24.17	1,799.51	14.32	6.43	-14.11	2.00	2.00	0.00
Hold 6.00° Inc at 24.17° Azm									
1,900.00	6.00	24.17	1,898.90	23.86	10.71	-23.51	0.00	0.00	0.00
2,000.00	6.00	24.17	1,998.36	33.39	14.99	-32.90	0.00	0.00	0.00
2,100.00	6.00	24.17	2,097.81	42.93	19.27	-42.30	0.00	0.00	0.00
2,200.00	6.00	24.17	2,197.26	52.47	23.55	-51.70	0.00	0.00	0.00
2,300.00	6.00	24.17	2,296.71	62.01	27.83	-61.10	0.00	0.00	0.00
2,400.00	6.00	24.17	2,396.16	71.55	32.11	-70.50	0.00	0.00	0.00
2,500.00	6.00	24.17	2,495.62	81.09	36.39	-79.89	0.00	0.00	0.00
2,600.00	6.00	24.17	2,595.07	90.62	40.67	-89.29	0.00	0.00	0.00
2,700.00	6.00	24.17	2,694.52	100.16	44.95	-98.69	0.00	0.00	0.00
2,800.00	6.00	24.17	2,793.97	109.70	49.23	-108.09	0.00	0.00	0.00
2,900.00	6.00	24.17	2,893.42	119.24	53.52	-117.49	0.00	0.00	0.00
3,000.00	6.00	24.17	2,992.88	128.78	57.80	-126.89	0.00	0.00	0.00
3,100.00	6.00	24.17	3,092.33	138.31	62.08	-136.28	0.00	0.00	0.00
3,200.00	6.00	24.17	3,191.78	147.85	66.36	-145.68	0.00	0.00	0.00
3,300.00	6.00	24.17	3,291.23	157.39	70.64	-155.08	0.00	0.00	0.00
3,400.00	6.00	24.17	3,390.68	166.93	74.92	-164.48	0.00	0.00	0.00
3,500.00	6.00	24.17	3,490.14	176.47	79.20	-173.88	0.00	0.00	0.00
3,600.00	6.00	24.17	3,589.59	186.01	83.48	-183.27	0.00	0.00	0.00
3,700.00	6.00	24.17	3,689.04	195.54	87.76	-192.67	0.00	0.00	0.00
3,800.00	6.00	24.17	3,788.49	205.08	92.04	-202.07	0.00	0.00	0.00
3,900.00	6.00	24.17	3,887.94	214.62	96.32	-211.47	0.00	0.00	0.00
4,000.00	6.00	24.17	3,987.40	224.16	100.60	-220.87	0.00	0.00	0.00
4,100.00	6.00	24.17	4,086.85	233.70	104.89	-230.27	0.00	0.00	0.00
4,200.00	6.00	24.17	4,186.30	243.24	109.17	-239.66	0.00	0.00	0.00
4,300.00	6.00	24.17	4,285.75	252.77	113.45	-249.06	0.00	0.00	0.00
4,400.00	6.00	24.17	4,385.20	262.31	117.73	-258.46	0.00	0.00	0.00
4,500.00	6.00	24.17	4,484.66	271.85	122.01	-267.86	0.00	0.00	0.00
4,600.00	6.00	24.17	4,584.11	281.39	126.29	-277.26	0.00	0.00	0.00
4,700.00	6.00	24.17	4,683.56	290.93	130.57	-286.65	0.00	0.00	0.00
4,800.00	6.00	24.17	4,783.01	300.46	134.85	-296.05	0.00	0.00	0.00
4,900.00	6.00	24.17	4,882.46	310.00	139.13	-305.45	0.00	0.00	0.00
5,000.00	6.00	24.17	4,981.92	319.54	143.41	-314.85	0.00	0.00	0.00
5,100.00	6.00	24.17	5,081.37	329.08	147.69	-324.25	0.00	0.00	0.00
5,200.00	6.00	24.17	5,180.82	338.62	151.98	-333.65	0.00	0.00	0.00
5,300.00	6.00	24.17	5,280.27	348.16	156.26	-343.04	0.00	0.00	0.00
5,400.00	6.00	24.17	5,379.72	357.69	160.54	-352.44	0.00	0.00	0.00
5,500.00	6.00	24.17	5,479.18	367.23	164.82	-361.84	0.00	0.00	0.00
5,600.00	6.00	24.17	5,578.63	376.77	169.10	-371.24	0.00	0.00	0.00
5,700.00	6.00	24.17	5,678.08	386.31	173.38	-380.64	0.00	0.00	0.00
5,800.00	6.00	24.17	5,777.53	395.85	177.66	-390.03	0.00	0.00	0.00
5,900.00	6.00	24.17	5,876.98	405.39	181.94	-399.43	0.00	0.00	0.00
6,000.00	6.00	24.17	5,976.44	414.92	186.22	-408.83	0.00	0.00	0.00
6,100.00	6.00	24.17	6,075.89	424.46	190.50	-418.23	0.00	0.00	0.00
6,200.00	6.00	24.17	6,175.34	434.00	194.78	-427.63	0.00	0.00	0.00
6,300.00	6.00	24.17	6,274.79	443.54	199.06	-437.03	0.00	0.00	0.00
6,400.00	6.00	24.17	6,374.24	453.08	203.35	-446.42	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

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)
6,500.00	6.00	24.17	6,473.70	462.61	207.63	-455.82	0.00	0.00	0.00
6,600.00	6.00	24.17	6,573.15	472.15	211.91	-465.22	0.00	0.00	0.00
6,700.00	6.00	24.17	6,672.60	481.69	216.19	-474.62	0.00	0.00	0.00
6,800.00	6.00	24.17	6,772.05	491.23	220.47	-484.02	0.00	0.00	0.00
6,900.00	6.00	24.17	6,871.50	500.77	224.75	-493.41	0.00	0.00	0.00
7,000.00	6.00	24.17	6,970.96	510.31	229.03	-502.81	0.00	0.00	0.00
7,100.00	6.00	24.17	7,070.41	519.84	233.31	-512.21	0.00	0.00	0.00
7,200.00	6.00	24.17	7,169.86	529.38	237.59	-521.61	0.00	0.00	0.00
7,300.00	6.00	24.17	7,269.31	538.92	241.87	-531.01	0.00	0.00	0.00
7,400.00	6.00	24.17	7,368.76	548.46	246.15	-540.41	0.00	0.00	0.00
7,500.00	6.00	24.17	7,468.22	558.00	250.43	-549.80	0.00	0.00	0.00
7,600.00	6.00	24.17	7,567.67	567.54	254.72	-559.20	0.00	0.00	0.00
7,700.00	6.00	24.17	7,667.12	577.07	259.00	-568.60	0.00	0.00	0.00
7,800.00	6.00	24.17	7,766.57	586.61	263.28	-578.00	0.00	0.00	0.00
7,900.00	6.00	24.17	7,866.02	596.15	267.56	-587.40	0.00	0.00	0.00
8,000.00	6.00	24.17	7,965.47	605.69	271.84	-596.79	0.00	0.00	0.00
8,100.00	6.00	24.17	8,064.93	615.23	276.12	-606.19	0.00	0.00	0.00
8,200.00	6.00	24.17	8,164.38	624.76	280.40	-615.59	0.00	0.00	0.00
8,300.00	6.00	24.17	8,263.83	634.30	284.68	-624.99	0.00	0.00	0.00
8,341.89	6.00	24.17	8,305.49	638.30	286.48	-628.93	0.00	0.00	0.00
Begin 2.00°/100' Drop									
8,400.00	4.84	24.17	8,363.34	643.31	288.72	-633.86	2.00	-2.00	0.00
8,500.00	2.84	24.17	8,463.11	649.41	291.46	-639.88	2.00	-2.00	0.00
8,600.00	0.84	24.17	8,563.05	652.34	292.78	-642.76	2.00	-2.00	0.00
8,641.95	0.00	0.00	8,605.00	652.62	292.90	-643.04	2.00	-2.00	-57.62
Begin Vertical Hold									
8,673.00	0.00	0.00	8,636.05	652.62	292.90	-643.04	0.00	0.00	0.00
KOP2, Begin 10.00°/100' Build									
8,700.00	2.70	179.92	8,663.04	651.99	292.90	-642.40	10.00	10.00	0.00
8,800.00	12.70	179.92	8,762.02	638.60	292.92	-629.03	10.00	10.00	0.00
8,900.00	22.70	179.92	8,857.16	608.24	292.97	-598.68	10.00	10.00	0.00
9,000.00	32.70	179.92	8,945.59	561.81	293.03	-552.27	10.00	10.00	0.00
9,100.00	42.70	179.92	9,024.61	500.74	293.12	-491.22	10.00	10.00	0.00
9,200.00	52.70	179.92	9,091.82	426.87	293.22	-417.39	10.00	10.00	0.00
9,300.00	62.70	179.92	9,145.19	342.45	293.34	-333.01	10.00	10.00	0.00
9,400.00	72.70	179.92	9,183.09	250.05	293.47	-240.65	10.00	10.00	0.00
9,500.00	82.70	179.92	9,204.36	152.46	293.61	-143.11	10.00	10.00	0.00
9,570.49	89.75	179.92	9,209.00	82.18	293.71	-72.85	10.00	10.00	0.00
LP, Hold 89.75° Inc at 179.92° Azm									
9,600.00	89.75	179.92	9,209.13	52.66	293.75	-43.35	0.00	0.00	0.00
9,700.00	89.75	179.92	9,209.57	-47.34	293.89	56.60	0.00	0.00	0.00
9,800.00	89.75	179.92	9,210.01	-147.34	294.04	156.56	0.00	0.00	0.00
9,900.00	89.75	179.92	9,210.45	-247.33	294.18	256.51	0.00	0.00	0.00
10,000.00	89.75	179.92	9,210.89	-347.33	294.32	356.46	0.00	0.00	0.00
10,100.00	89.75	179.92	9,211.32	-447.33	294.46	456.42	0.00	0.00	0.00
10,200.00	89.75	179.92	9,211.76	-547.33	294.60	556.37	0.00	0.00	0.00
10,300.00	89.75	179.92	9,212.20	-647.33	294.74	656.32	0.00	0.00	0.00
10,400.00	89.75	179.92	9,212.64	-747.33	294.89	756.28	0.00	0.00	0.00
10,500.00	89.75	179.92	9,213.08	-847.33	295.03	856.23	0.00	0.00	0.00
10,600.00	89.75	179.92	9,213.51	-947.33	295.17	956.18	0.00	0.00	0.00
10,700.00	89.75	179.92	9,213.95	-1,047.33	295.31	1,056.14	0.00	0.00	0.00
10,800.00	89.75	179.92	9,214.39	-1,147.33	295.45	1,156.09	0.00	0.00	0.00
10,900.00	89.75	179.92	9,214.83	-1,247.32	295.59	1,256.04	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

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)
11,000.00	89.75	179.92	9,215.27	-1,347.32	295.73	1,356.00	0.00	0.00	0.00
11,100.00	89.75	179.92	9,215.71	-1,447.32	295.88	1,455.95	0.00	0.00	0.00
11,200.00	89.75	179.92	9,216.14	-1,547.32	296.02	1,555.90	0.00	0.00	0.00
11,300.00	89.75	179.92	9,216.58	-1,647.32	296.16	1,655.86	0.00	0.00	0.00
11,400.00	89.75	179.92	9,217.02	-1,747.32	296.30	1,755.81	0.00	0.00	0.00
11,500.00	89.75	179.92	9,217.46	-1,847.32	296.44	1,855.76	0.00	0.00	0.00
11,600.00	89.75	179.92	9,217.90	-1,947.32	296.58	1,955.72	0.00	0.00	0.00
11,700.00	89.75	179.92	9,218.34	-2,047.32	296.73	2,055.67	0.00	0.00	0.00
11,800.00	89.75	179.92	9,218.77	-2,147.31	296.87	2,155.62	0.00	0.00	0.00
11,900.00	89.75	179.92	9,219.21	-2,247.31	297.01	2,255.58	0.00	0.00	0.00
12,000.00	89.75	179.92	9,219.65	-2,347.31	297.15	2,355.53	0.00	0.00	0.00
12,100.00	89.75	179.92	9,220.09	-2,447.31	297.29	2,455.48	0.00	0.00	0.00
12,200.00	89.75	179.92	9,220.53	-2,547.31	297.43	2,555.44	0.00	0.00	0.00
12,300.00	89.75	179.92	9,220.97	-2,647.31	297.58	2,655.39	0.00	0.00	0.00
12,400.00	89.75	179.92	9,221.40	-2,747.31	297.72	2,755.35	0.00	0.00	0.00
12,500.00	89.75	179.92	9,221.84	-2,847.31	297.86	2,855.30	0.00	0.00	0.00
12,600.00	89.75	179.92	9,222.28	-2,947.31	298.00	2,955.25	0.00	0.00	0.00
12,700.00	89.75	179.92	9,222.72	-3,047.31	298.14	3,055.21	0.00	0.00	0.00
12,800.00	89.75	179.92	9,223.16	-3,147.30	298.28	3,155.16	0.00	0.00	0.00
12,900.00	89.75	179.92	9,223.60	-3,247.30	298.42	3,255.11	0.00	0.00	0.00
13,000.00	89.75	179.92	9,224.03	-3,347.30	298.57	3,355.07	0.00	0.00	0.00
13,100.00	89.75	179.92	9,224.47	-3,447.30	298.71	3,455.02	0.00	0.00	0.00
13,200.00	89.75	179.92	9,224.91	-3,547.30	298.85	3,554.97	0.00	0.00	0.00
13,300.00	89.75	179.92	9,225.35	-3,647.30	298.99	3,654.93	0.00	0.00	0.00
13,400.00	89.75	179.92	9,225.79	-3,747.30	299.13	3,754.88	0.00	0.00	0.00
13,500.00	89.75	179.92	9,226.23	-3,847.30	299.27	3,854.83	0.00	0.00	0.00
13,600.00	89.75	179.92	9,226.66	-3,947.30	299.42	3,954.79	0.00	0.00	0.00
13,700.00	89.75	179.92	9,227.10	-4,047.29	299.56	4,054.74	0.00	0.00	0.00
13,800.00	89.75	179.92	9,227.54	-4,147.29	299.70	4,154.69	0.00	0.00	0.00
13,900.00	89.75	179.92	9,227.98	-4,247.29	299.84	4,254.65	0.00	0.00	0.00
14,000.00	89.75	179.92	9,228.42	-4,347.29	299.98	4,354.60	0.00	0.00	0.00
14,100.00	89.75	179.92	9,228.86	-4,447.29	300.12	4,454.55	0.00	0.00	0.00
14,200.00	89.75	179.92	9,229.29	-4,547.29	300.27	4,554.51	0.00	0.00	0.00
14,300.00	89.75	179.92	9,229.73	-4,647.29	300.41	4,654.46	0.00	0.00	0.00
14,400.00	89.75	179.92	9,230.17	-4,747.29	300.55	4,754.41	0.00	0.00	0.00
14,500.00	89.75	179.92	9,230.61	-4,847.29	300.69	4,854.37	0.00	0.00	0.00
14,600.00	89.75	179.92	9,231.05	-4,947.28	300.83	4,954.32	0.00	0.00	0.00
14,700.00	89.75	179.92	9,231.48	-5,047.28	300.97	5,054.27	0.00	0.00	0.00
14,800.00	89.75	179.92	9,231.92	-5,147.28	301.11	5,154.23	0.00	0.00	0.00
14,900.00	89.75	179.92	9,232.36	-5,247.28	301.26	5,254.18	0.00	0.00	0.00
15,000.00	89.75	179.92	9,232.80	-5,347.28	301.40	5,354.14	0.00	0.00	0.00
15,100.00	89.75	179.92	9,233.24	-5,447.28	301.54	5,454.09	0.00	0.00	0.00
15,200.00	89.75	179.92	9,233.68	-5,547.28	301.68	5,554.04	0.00	0.00	0.00
15,300.00	89.75	179.92	9,234.11	-5,647.28	301.82	5,654.00	0.00	0.00	0.00
15,400.00	89.75	179.92	9,234.55	-5,747.28	301.96	5,753.95	0.00	0.00	0.00
15,500.00	89.75	179.92	9,234.99	-5,847.28	302.11	5,853.90	0.00	0.00	0.00
15,600.00	89.75	179.92	9,235.43	-5,947.27	302.25	5,953.86	0.00	0.00	0.00
15,700.00	89.75	179.92	9,235.87	-6,047.27	302.39	6,053.81	0.00	0.00	0.00
15,800.00	89.75	179.92	9,236.31	-6,147.27	302.53	6,153.76	0.00	0.00	0.00
15,900.00	89.75	179.92	9,236.74	-6,247.27	302.67	6,253.72	0.00	0.00	0.00
16,000.00	89.75	179.92	9,237.18	-6,347.27	302.81	6,353.67	0.00	0.00	0.00
16,100.00	89.75	179.92	9,237.62	-6,447.27	302.96	6,453.62	0.00	0.00	0.00
16,200.00	89.75	179.92	9,238.06	-6,547.27	303.10	6,553.58	0.00	0.00	0.00
16,300.00	89.75	179.92	9,238.50	-6,647.27	303.24	6,653.53	0.00	0.00	0.00

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

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)
16,400.00	89.75	179.92	9,238.94	-6,747.27	303.38	6,753.48	0.00	0.00	0.00
16,500.00	89.75	179.92	9,239.37	-6,847.26	303.52	6,853.44	0.00	0.00	0.00
16,600.00	89.75	179.92	9,239.81	-6,947.26	303.66	6,953.39	0.00	0.00	0.00
16,700.00	89.75	179.92	9,240.25	-7,047.26	303.80	7,053.34	0.00	0.00	0.00
16,800.00	89.75	179.92	9,240.69	-7,147.26	303.95	7,153.30	0.00	0.00	0.00
16,900.00	89.75	179.92	9,241.13	-7,247.26	304.09	7,253.25	0.00	0.00	0.00
17,000.00	89.75	179.92	9,241.57	-7,347.26	304.23	7,353.20	0.00	0.00	0.00
17,100.00	89.75	179.92	9,242.00	-7,447.26	304.37	7,453.16	0.00	0.00	0.00
17,200.00	89.75	179.92	9,242.44	-7,547.26	304.51	7,553.11	0.00	0.00	0.00
17,300.00	89.75	179.92	9,242.88	-7,647.26	304.65	7,653.06	0.00	0.00	0.00
17,400.00	89.75	179.92	9,243.32	-7,747.26	304.80	7,753.02	0.00	0.00	0.00
17,500.00	89.75	179.92	9,243.76	-7,847.25	304.94	7,852.97	0.00	0.00	0.00
17,600.00	89.75	179.92	9,244.20	-7,947.25	305.08	7,952.93	0.00	0.00	0.00
17,700.00	89.75	179.92	9,244.63	-8,047.25	305.22	8,052.88	0.00	0.00	0.00
17,800.00	89.75	179.92	9,245.07	-8,147.25	305.36	8,152.83	0.00	0.00	0.00
17,900.00	89.75	179.92	9,245.51	-8,247.25	305.50	8,252.79	0.00	0.00	0.00
18,000.00	89.75	179.92	9,245.95	-8,347.25	305.65	8,352.74	0.00	0.00	0.00
18,100.00	89.75	179.92	9,246.39	-8,447.25	305.79	8,452.69	0.00	0.00	0.00
18,200.00	89.75	179.92	9,246.83	-8,547.25	305.93	8,552.65	0.00	0.00	0.00
18,300.00	89.75	179.92	9,247.26	-8,647.25	306.07	8,652.60	0.00	0.00	0.00
18,400.00	89.75	179.92	9,247.70	-8,747.24	306.21	8,752.55	0.00	0.00	0.00
18,500.00	89.75	179.92	9,248.14	-8,847.24	306.35	8,852.51	0.00	0.00	0.00
18,600.00	89.75	179.92	9,248.58	-8,947.24	306.49	8,952.46	0.00	0.00	0.00
18,700.00	89.75	179.92	9,249.02	-9,047.24	306.64	9,052.41	0.00	0.00	0.00
18,800.00	89.75	179.92	9,249.46	-9,147.24	306.78	9,152.37	0.00	0.00	0.00
18,900.00	89.75	179.92	9,249.89	-9,247.24	306.92	9,252.32	0.00	0.00	0.00
19,000.00	89.75	179.92	9,250.33	-9,347.24	307.06	9,352.27	0.00	0.00	0.00
19,100.00	89.75	179.92	9,250.77	-9,447.24	307.20	9,452.23	0.00	0.00	0.00
19,200.00	89.75	179.92	9,251.21	-9,547.24	307.34	9,552.18	0.00	0.00	0.00
19,300.00	89.75	179.92	9,251.65	-9,647.24	307.49	9,652.13	0.00	0.00	0.00
19,380.67	89.75	179.92	9,252.00	-9,727.90	307.60	9,732.76	0.00	0.00	0.00
TD at 19380.67									

Design Targets

Target Name - hit/miss target Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
FTP - Quien Sabe 60:	0.00	0.00	9,209.00	372.50	293.30	439,890.20	559,365.90	32° 12' 33.22639 N	104° 8' 29.00460 W
- plan misses target center by 70.53usft at 9300.00usft MD (9145.19 TVD, 342.45 N, 293.34 E)									
- Point									
LTP - Quien Sabe 60:	0.00	0.00	9,251.43	-9,597.80	307.50	429,919.90	559,380.10	32° 10' 54.55633 N	104° 8' 29.04645 W
- plan misses target center by 0.08usft at 19250.56usft MD (9251.43 TVD, -9597.80 N, 307.42 E)									
- Point									
BHL - Quien Sabe 60:	0.00	0.00	9,252.00	-9,727.90	307.60	429,789.80	559,380.20	32° 10' 53.26881 N	104° 8' 29.04799 W
- plan hits target center									
- Point									

Database:	USA Compass	**Local Co-ordinate Reference:**	Well 603H
Company:	COG Operating LLC	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Project:	Eddy County, NM (NAD27 NME)	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site:	Quien Sabe Fed Com	**North Reference:**	Grid
Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 02-15-19		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
658.30	658.30	Rustler		0.25	178.19
822.30	822.30	TOS		0.25	178.19
2,210.87	2,208.07	BOS (Fletcher)		0.25	178.19
2,413.90	2,409.99	LMAR (Top Delaware)		0.25	178.19
2,445.06	2,440.97	BLCN		0.25	178.19
3,254.16	3,245.64	CYCN		0.25	178.19
4,384.89	4,370.18	BYCN		0.25	178.19
5,924.70	5,901.55	Bone Sprg (BSGL)		0.25	178.19
6,097.58	6,073.48	U Avalon Sh		0.25	178.19
6,333.77	6,308.38	L Avalon Sh		0.25	178.19
6,764.96	6,737.20	B Avalon Sh		0.25	178.19
6,932.81	6,904.13	FBSG_sand		0.25	178.19
7,667.54	7,634.83	SBSG_sand		0.25	178.19
7,844.43	7,810.76	SBSG_sand_Base		0.25	178.19
8,831.55	8,792.59	TBSPG_sand		0.25	178.19
9,305.90	9,147.87	WFMP		0.25	178.19

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
1,500.00	1,500.00	0.00	0.00	KOP, Begin 2.00°/100' Build
1,800.06	1,799.51	14.32	6.43	Hold 6.00° Inc at 24.17° Azm
8,341.89	8,305.49	638.30	286.48	Begin 2.00°/100' Drop
8,641.95	8,605.00	652.62	292.90	Begin Vertical Hold
8,673.00	8,636.05	652.62	292.90	KOP2, Begin 10.00°/100' Build
9,570.49	9,209.00	82.18	293.71	LP, Hold 89.75° Inc at 179.92° Azm
19,380.67	9,252.00	-9,727.90	307.60	TD at 19380.67

CONCHO

RKB @ 3148.30usft (Precision 595)

3123.30

Project: Eddy County, NM (NAD27 NME)
Site: Quien Sabe Fed Com
Well: 603H
Wellbore: OH
Design: Plan 1 02-15-19
Rig: Precision 595

PHOENIX TECHNOLOGY SERVICES

Azimuths to Grid North
True North: -0.10°
Magnetic North: 7.07°

Magnetic Field
Strength: 47890.3snT
Dip Angle: 59.95°
Date: 4/10/2019
Model: MVHD

WELL DETAILS

3123.30

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	439517.70	559072.60	32° 12' 29.54517 N	104° 8' 32.42618 W

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP - Quien Sabe 603H	9209.00	372.50	293.30	439890.20	559365.90	32° 12' 33.22639 N	104° 8' 29.00460 W
LTP - Quien Sabe 603H	9251.43	-9597.80	307.50	429919.90	559380.10	32° 10' 54.55633 N	104° 8' 29.04645 W
BHL - Quien Sabe 603H	9252.00	-9727.90	307.60	429789.80	559380.20	32° 10' 53.26881 N	104° 8' 29.04799 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00		KOP, Begin 2.00°/100' Build
3	1800.06	6.00	24.17	1799.51	14.32	6.43	2.00	24.17	-14.11		Hold 6.00° Inc at 24.17° Azm
4	8341.89	6.00	24.17	8305.49	638.30	286.48	0.00	0.00	-628.93		Begin 2.00°/100' Drop
5	8641.95	0.00	0.00	8605.00	652.62	292.90	2.00	180.00	-643.04		Begin Vertical Hold
6	8673.00	0.00	0.00	8636.05	652.62	292.90	0.00	0.00	-643.04		KOP2, Begin 10.00°/100' Build
7	9570.49	89.75	179.92	9209.00	82.18	293.71	10.00	179.92	-72.85		LP, Hold 89.75° Inc at 179.92° Azm
8	19380.67	89.75	179.92	9252.00	-9727.90	307.60	0.00	0.00	9732.76	BHL - Quien Sabe 603H	TD at 19380.67

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

Local Origin: Well 603H, Grid North

Latitude: 32° 12' 29.54517 N
Longitude: 104° 8' 32.42618 W

Grid East: 559072.60
Grid North: 439517.70
Scale Factor: 1.000

Geomagnetic Model: MVHD
Sample Date: 10-Apr-19
Magnetic Declination: 7.17°
Dip Angle from Horizontal: 59.95°
Magnetic Field Strength: 47890.34083066nT

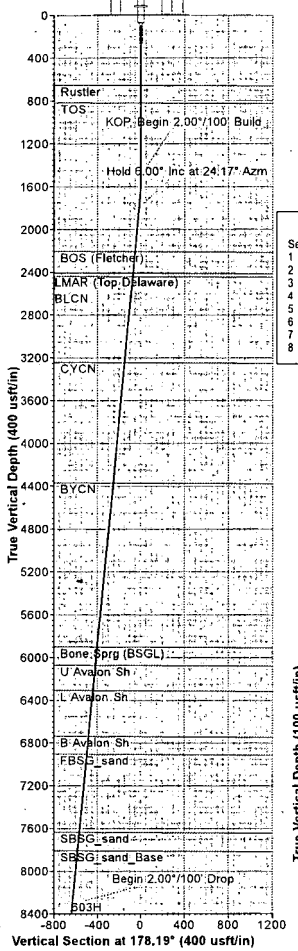
To convert a Magnetic Direction to a Grid Direction, Add 7.07°
To convert a Magnetic Direction to a True Direction, Add 7.17° East
To convert a True Direction to a Grid Direction, Subtract 0.10°

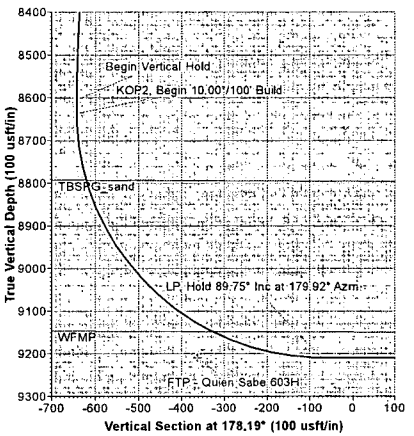
FORMATION TOP DETAILS

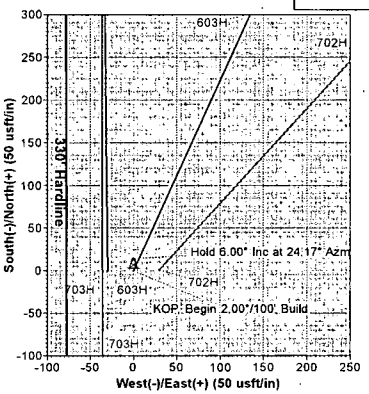
TVDPath	MDPath	Formation	DipAngle	DipDir
658.30	658.30	Rustler	0.25	178.19
822.30	822.30	TOS	0.25	178.19
2208.07	2210.87	BOS (Fletcher)	0.25	178.19
2409.99	2413.90	LMAR (Top Delaware)	0.25	178.19
2440.97	2445.06	BLCN	0.25	178.19
3245.64	3254.16	CYCN	0.25	178.19
4370.18	4384.89	BYCN	0.25	178.19
5901.55	5924.70	Bone Sprg (BSGL)	0.25	178.19
6073.48	6097.58	U Avalon Sh	0.25	178.19
6308.38	6333.77	L Avalon Sh	0.25	178.19
6737.20	6764.96	B Avalon Sh	0.25	178.19
6904.13	6932.81	FBSG_sand	0.25	178.19
7634.83	7667.54	SBSG_sand	0.25	178.19
7810.76	7844.43	SBSG_sand_Base	0.25	178.19
8792.59	8831.55	TBSPG_sand	0.25	178.19
9147.87	9305.90	WFMP	0.25	178.19

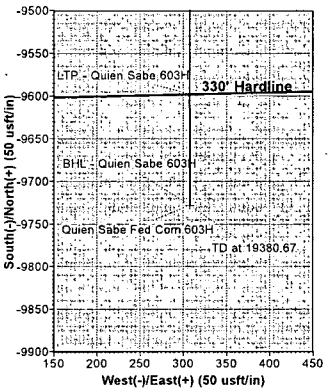
LEGEND

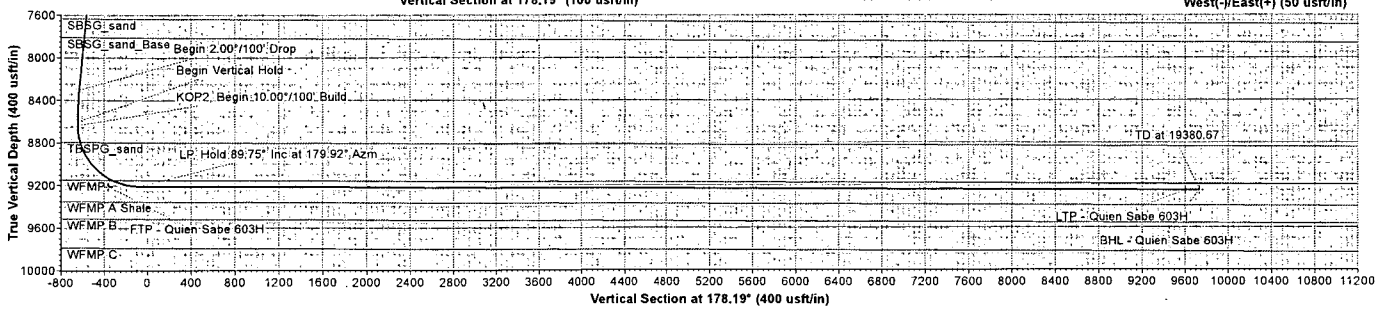
- 703H, OH, Plan 1 02-15-19 V0
- 702H, OH, Plan 1 02-15-19 V0
- Plan 1 02-15-19

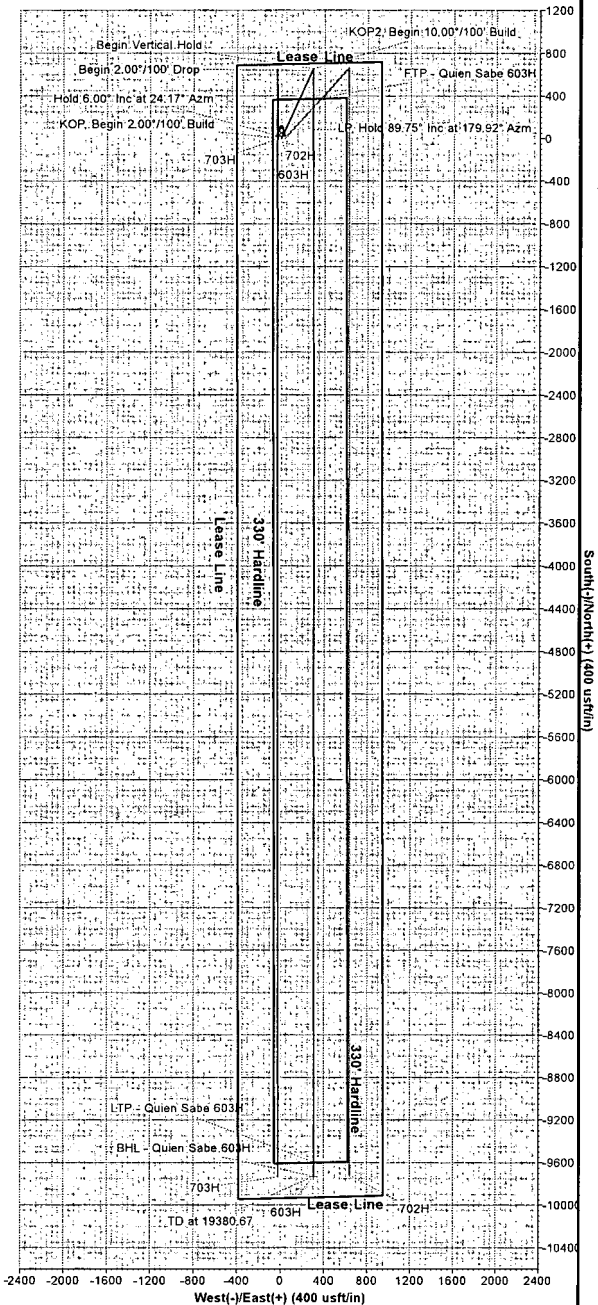












Created By: Tyler Carlson Date: 13:45, February 15 2019

PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Eddy County, NM (NAD27 NME)
Quien Sabe Fed Com
603H

OH
Plan 1 02-15-19

Anticollision Report

15 February, 2019

CONCHO

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Reference Plan 1 02-15-19

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 50,000.00 u	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 2/15/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	19,380.67	Plan 1 02-15-19 (OH)	MWD+HDGM	OWSG Rev.2 MWD + HDGM

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Quien Sabe Fed Com						
702H - OH - Plan 1 02-15-19	1,416.60	1,416.80	30.01	20.62	3.194	CC
702H - OH - Plan 1 02-15-19	1,600.00	1,599.48	30.45	19.75	2.846	ES
702H - OH - Plan 1 02-15-19	19,380.67	19,569.11	375.87	107.71	1.402	Level 3, SF
703H - OH - Plan 1 02-15-19	1,500.02	1,500.72	30.01	20.01	3.002	CC, ES
703H - OH - Plan 1 02-15-19	19,380.67	19,541.41	371.72	99.00	1.363	Level 3, SF

Offset Design Quien Sabe Fed Com - 702H - OH - Plan 1 02-15-19 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
100.00	100.00	100.20	100.20	0.00	0.14	88.47	0.80	30.00	30.01	29.88	0.14	221.736	
200.00	200.00	200.20	200.20	0.18	0.49	88.47	0.80	30.00	30.01	29.34	0.67	44.602	
300.00	300.00	300.20	300.20	0.54	0.85	88.47	0.80	30.00	30.01	28.62	1.39	21.594	
400.00	400.00	400.20	400.20	0.90	1.21	88.47	0.80	30.00	30.01	27.90	2.11	14.245	
500.00	500.00	500.20	500.20	1.25	1.57	88.47	0.80	30.00	30.01	27.19	2.82	10.628	
600.00	600.00	600.20	600.20	1.61	1.93	88.47	0.80	30.00	30.01	26.47	3.54	8.476	
700.00	700.00	700.20	700.20	1.97	2.29	88.47	0.80	30.00	30.01	25.75	4.26	7.049	
800.00	800.00	800.20	800.20	2.33	2.64	88.47	0.80	30.00	30.01	25.04	4.97	6.033	
900.00	900.00	900.20	900.20	2.69	3.00	88.47	0.80	30.00	30.01	24.32	5.69	5.273	
1,000.00	1,000.00	1,000.20	1,000.20	3.05	3.36	88.47	0.80	30.00	30.01	23.60	6.41	4.683	
1,100.00	1,100.00	1,100.20	1,100.20	3.41	3.72	88.47	0.80	30.00	30.01	22.89	7.13	4.212	
1,200.00	1,200.00	1,200.20	1,200.20	3.76	4.08	88.47	0.80	30.00	30.01	22.17	7.84	3.827	
1,300.00	1,300.00	1,300.20	1,300.20	4.12	4.44	88.47	0.80	30.00	30.01	21.45	8.56	3.506	
1,400.00	1,400.00	1,400.20	1,400.20	4.48	4.80	88.47	0.80	30.00	30.01	20.73	9.28	3.235	
1,416.60	1,416.60	1,416.80	1,416.80	4.54	4.85	88.47	0.80	30.00	30.01	20.62	9.40	3.194	CC
1,500.00	1,500.00	1,500.00	1,500.00	4.84	5.15	88.47	0.80	30.00	30.01	20.02	9.99	3.003	
1,600.00	1,599.98	1,599.48	1,599.46	5.20	5.51	64.87	2.08	31.15	30.45	19.75	10.70	2.846	ES
1,700.00	1,699.84	1,698.75	1,698.59	5.56	5.86	66.51	5.93	34.60	31.78	20.38	11.40	2.788	
1,800.06	1,799.51	1,798.04	1,797.50	5.91	6.21	68.94	12.32	40.35	34.05	21.95	12.10	2.814	
1,900.00	1,898.90	1,897.14	1,895.86	6.27	6.57	69.41	21.25	48.36	37.88	25.09	12.79	2.961	
2,000.00	1,998.36	1,996.98	1,994.74	6.63	6.93	67.87	31.58	57.64	42.87	29.36	13.51	3.173	
2,100.00	2,097.81	2,096.85	2,093.64	7.00	7.30	66.65	41.92	66.93	47.87	33.64	14.23	3.364	

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

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 702H - OH - Plan 1 02-15-19 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,200.00	2,197.26	2,196.72	2,192.54	7.36	7.67	65.66	52.26	76.21	52.89	37.94	14.96	3.537	
2,300.00	2,296.71	2,296.59	2,291.44	7.73	8.04	64.85	62.60	85.50	57.93	42.25	15.68	3.694	
2,400.00	2,396.16	2,396.46	2,390.33	8.10	8.42	64.16	72.94	94.78	62.98	46.56	16.42	3.836	
2,500.00	2,495.62	2,496.33	2,489.23	8.47	8.80	63.58	83.28	104.07	68.03	50.88	17.15	3.967	
2,600.00	2,595.07	2,596.20	2,588.13	8.84	9.18	63.07	93.62	113.35	73.09	55.20	17.89	4.086	
2,700.00	2,694.52	2,696.07	2,687.03	9.21	9.56	62.63	103.95	122.64	78.15	59.53	18.62	4.196	
2,800.00	2,793.97	2,795.94	2,785.93	9.59	9.95	62.25	114.29	131.92	83.22	63.86	19.36	4.298	
2,900.00	2,893.42	2,895.81	2,884.83	9.96	10.33	61.91	124.63	141.21	88.30	68.19	20.11	4.391	
3,000.00	2,992.88	2,995.68	2,983.73	10.33	10.72	61.61	134.97	150.49	93.37	72.52	20.85	4.478	
3,100.00	3,092.33	3,095.55	3,082.62	10.71	11.10	61.33	145.31	159.78	98.45	76.85	21.59	4.559	
3,200.00	3,191.78	3,195.42	3,181.52	11.08	11.49	61.09	155.65	169.06	103.53	81.19	22.34	4.635	
3,300.00	3,291.23	3,295.29	3,280.42	11.46	11.88	60.86	165.99	178.34	108.61	85.52	23.08	4.705	
3,400.00	3,390.68	3,395.16	3,379.32	11.84	12.27	60.66	176.33	187.63	113.69	89.86	23.83	4.771	
3,500.00	3,490.14	3,495.03	3,478.22	12.21	12.66	60.48	186.66	196.91	118.77	94.20	24.58	4.833	
3,600.00	3,589.59	3,594.90	3,577.12	12.59	13.05	60.31	197.00	206.20	123.86	98.53	25.33	4.891	
3,700.00	3,689.04	3,694.77	3,676.02	12.97	13.45	60.15	207.34	215.48	128.94	102.87	26.07	4.945	
3,800.00	3,788.49	3,794.64	3,774.91	13.35	13.84	60.00	217.68	224.77	134.03	107.21	26.82	4.997	
3,900.00	3,887.94	3,894.51	3,873.81	13.72	14.23	59.87	228.02	234.05	139.12	111.54	27.57	5.045	
4,000.00	3,987.40	3,994.38	3,972.71	14.10	14.63	59.75	238.36	243.34	144.21	115.88	28.32	5.091	
4,100.00	4,086.85	4,094.25	4,071.61	14.48	15.02	59.63	248.70	252.62	149.30	120.22	29.08	5.135	
4,200.00	4,186.30	4,194.12	4,170.51	14.86	15.41	59.52	259.04	261.91	154.38	124.56	29.83	5.176	
4,300.00	4,285.75	4,293.99	4,269.41	15.24	15.81	59.42	269.37	271.19	159.47	128.90	30.58	5.215	
4,400.00	4,385.20	4,393.86	4,368.31	15.62	16.20	59.32	279.71	280.47	164.56	133.23	31.33	5.253	
4,500.00	4,484.66	4,493.73	4,467.20	16.00	16.60	59.23	290.05	289.76	169.66	137.57	32.08	5.288	
4,600.00	4,584.11	4,593.60	4,566.10	16.37	17.00	59.15	300.39	299.04	174.75	141.91	32.84	5.322	
4,700.00	4,683.56	4,693.47	4,665.00	16.75	17.39	59.07	310.73	308.33	179.84	146.25	33.59	5.354	
4,800.00	4,783.01	4,793.34	4,763.90	17.13	17.79	58.99	321.07	317.61	184.93	150.59	34.34	5.385	
4,900.00	4,882.46	4,893.21	4,862.80	17.51	18.19	58.92	331.41	326.90	190.02	154.93	35.10	5.414	
5,000.00	4,981.92	4,993.08	4,961.70	17.89	18.58	58.86	341.75	336.18	195.12	159.27	35.85	5.443	
5,100.00	5,081.37	5,092.95	5,060.60	18.27	18.98	58.79	352.08	345.47	200.21	163.60	36.60	5.470	
5,200.00	5,180.82	5,192.82	5,159.49	18.65	19.38	58.73	362.42	354.75	205.30	167.94	37.36	5.496	
5,300.00	5,280.27	5,292.69	5,258.39	19.03	19.77	58.67	372.76	364.04	210.39	172.28	38.11	5.521	
5,400.00	5,379.72	5,392.56	5,357.29	19.41	20.17	58.62	383.10	373.32	215.49	176.62	38.87	5.544	
5,500.00	5,479.18	5,492.43	5,456.19	19.79	20.57	58.57	393.44	382.61	220.58	180.96	39.62	5.567	
5,600.00	5,578.63	5,592.30	5,555.09	20.17	20.97	58.52	403.78	391.89	225.67	185.30	40.38	5.589	
5,700.00	5,678.08	5,692.17	5,653.99	20.55	21.36	58.47	414.12	401.17	230.77	189.64	41.13	5.611	
5,800.00	5,777.53	5,792.04	5,752.89	20.94	21.76	58.42	424.46	410.46	235.86	193.98	41.89	5.631	
5,900.00	5,876.98	5,891.91	5,851.78	21.32	22.16	58.38	434.79	419.74	240.96	198.32	42.64	5.651	
6,000.00	5,976.44	5,991.78	5,950.68	21.70	22.56	58.33	445.13	429.03	246.05	202.65	43.40	5.670	
6,100.00	6,075.89	6,091.65	6,049.58	22.08	22.96	58.29	455.47	438.31	251.15	206.99	44.15	5.688	
6,200.00	6,175.34	6,191.52	6,148.48	22.46	23.36	58.26	465.81	447.60	256.24	211.33	44.91	5.706	
6,300.00	6,274.79	6,291.39	6,247.38	22.84	23.75	58.22	476.15	456.88	261.34	215.67	45.66	5.723	
6,400.00	6,374.24	6,391.26	6,346.28	23.22	24.15	58.18	486.49	466.17	266.43	220.01	46.42	5.740	
6,500.00	6,473.70	6,491.13	6,445.18	23.60	24.55	58.15	496.83	475.45	271.52	224.35	47.18	5.756	
6,600.00	6,573.15	6,591.00	6,544.07	23.98	24.95	58.11	507.17	484.74	276.62	228.69	47.93	5.771	
6,700.00	6,672.60	6,690.87	6,642.97	24.36	25.35	58.08	517.50	494.02	281.71	233.03	48.69	5.786	
6,800.00	6,772.05	6,790.74	6,741.87	24.74	25.75	58.05	527.84	503.31	286.81	237.37	49.44	5.801	
6,900.00	6,871.50	6,890.61	6,840.77	25.12	26.15	58.02	538.18	512.59	291.91	241.71	50.20	5.815	
7,000.00	6,970.96	6,990.48	6,939.67	25.51	26.55	57.99	548.52	521.87	297.00	246.04	50.96	5.828	
7,100.00	7,070.41	7,090.35	7,038.57	25.89	26.95	57.96	558.86	531.16	302.10	250.38	51.71	5.842	
7,200.00	7,169.86	7,190.22	7,137.47	26.27	27.35	57.94	569.20	540.44	307.19	254.72	52.47	5.855	
7,300.00	7,269.31	7,290.09	7,236.36	26.65	27.75	57.91	579.54	549.73	312.29	259.06	53.23	5.867	

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

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 702H - OH - Plan 1 02-15-19 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
7,400.00	7,368.76	7,389.96	7,335.26	27.03	28.15	57.89	589.88	559.01	317.38	263.40	53.98	5.879	
7,500.00	7,468.22	7,489.83	7,434.16	27.41	28.55	57.86	600.21	568.30	322.48	267.74	54.74	5.891	
7,600.00	7,567.67	7,589.70	7,533.06	27.79	28.95	57.84	610.55	577.58	327.57	272.08	55.50	5.903	
7,700.00	7,667.12	7,689.57	7,631.96	28.18	29.35	57.81	620.89	586.87	332.67	276.42	56.25	5.914	
7,800.00	7,766.57	7,789.44	7,730.86	28.56	29.75	57.79	631.23	596.15	337.77	280.75	57.01	5.925	
7,900.00	7,866.02	7,890.67	7,831.11	28.94	30.15	57.77	641.68	605.54	342.84	285.05	57.78	5.933	
8,000.00	7,965.47	8,000.71	7,940.41	29.32	30.58	58.04	651.09	613.99	346.07	287.46	58.61	5.904	
8,100.00	8,064.93	8,110.72	8,050.08	29.70	30.98	58.75	657.37	619.63	346.41	287.00	59.41	5.831	
8,200.00	8,164.38	8,220.37	8,159.65	30.08	31.36	59.93	660.51	622.44	343.94	283.77	60.18	5.716	
8,300.00	8,263.83	8,324.75	8,264.03	30.46	31.71	61.46	660.91	622.80	339.16	278.23	60.94	5.566	
8,400.00	8,363.34	8,424.26	8,363.54	30.84	32.04	62.90	660.91	622.80	334.54	272.83	61.71	5.421	
8,500.00	8,463.11	8,524.03	8,463.31	31.21	32.37	63.87	660.91	622.80	331.54	269.08	62.46	5.308	
8,600.00	8,563.05	8,623.98	8,563.25	31.56	32.69	64.34	660.91	622.80	330.13	266.96	63.17	5.226	
8,683.12	8,646.16	8,707.08	8,646.36	31.84	32.97	-90.00	660.91	622.80	329.87	266.14	63.72	5.176	
8,700.00	8,663.04	8,723.97	8,663.24	31.90	33.03	-91.47	660.91	622.80	330.02	266.17	63.84	5.169	
8,800.00	8,762.02	8,822.94	8,762.22	32.17	33.35	-93.69	660.91	622.80	330.63	266.28	64.35	5.138	
8,900.00	8,857.16	8,923.66	8,862.81	32.38	33.66	-98.10	657.35	622.81	333.52	268.88	64.64	5.160	
9,000.00	8,945.59	9,031.67	8,968.38	32.55	33.93	-102.59	635.31	622.84	338.65	273.99	64.66	5.237	
9,100.00	9,024.61	9,146.25	9,073.74	32.66	34.13	-106.70	590.77	622.90	345.33	281.03	64.30	5.371	
9,200.00	9,091.82	9,267.79	9,173.45	32.73	34.27	-110.28	521.66	623.00	352.66	289.21	63.45	5.558	
9,300.00	9,145.19	9,396.17	9,260.46	32.77	34.32	-113.16	427.63	623.13	359.52	297.30	62.22	5.778	
9,400.00	9,183.09	9,530.45	9,326.72	32.81	34.29	-115.16	311.20	623.30	364.83	303.83	61.00	5.981	
9,500.00	9,204.36	9,668.73	9,364.79	32.85	34.20	-116.18	178.61	623.49	367.66	307.33	60.33	6.094	
9,600.00	9,209.13	9,793.59	9,372.23	32.91	34.10	-116.28	54.13	623.67	367.94	307.49	60.45	6.086	
9,700.00	9,209.57	9,893.59	9,372.84	33.03	34.08	-116.30	-45.87	623.81	368.02	307.36	60.66	6.067	
9,800.00	9,210.01	9,993.59	9,373.45	33.23	34.23	-116.33	-145.87	623.95	368.09	307.12	60.98	6.037	
9,900.00	9,210.45	10,093.59	9,374.06	33.49	34.51	-116.35	-245.87	624.09	368.17	306.76	61.41	5.995	
10,000.00	9,210.89	10,193.59	9,374.67	33.82	34.85	-116.37	-345.86	624.24	368.25	306.29	61.96	5.944	
10,100.00	9,211.32	10,293.59	9,375.28	34.20	35.25	-116.40	-445.86	624.38	368.33	305.71	62.61	5.883	
10,200.00	9,211.76	10,393.59	9,375.89	34.64	35.69	-116.42	-545.86	624.52	368.41	305.03	63.37	5.813	
10,300.00	9,212.20	10,493.59	9,376.51	35.13	36.19	-116.45	-645.86	624.66	368.48	304.25	64.24	5.736	
10,400.00	9,212.64	10,593.59	9,377.12	35.67	36.73	-116.47	-745.85	624.81	368.56	303.36	65.20	5.653	
10,500.00	9,213.08	10,693.59	9,377.73	36.27	37.31	-116.49	-845.85	624.95	368.64	302.39	66.25	5.564	
10,600.00	9,213.51	10,793.59	9,378.34	36.90	37.94	-116.52	-945.85	625.09	368.72	301.32	67.40	5.471	
10,700.00	9,213.95	10,893.59	9,378.95	37.58	38.61	-116.54	-1,045.85	625.23	368.80	300.17	68.62	5.374	
10,800.00	9,214.39	10,993.59	9,379.56	38.31	39.32	-116.57	-1,145.85	625.38	368.87	298.94	69.93	5.275	
10,900.00	9,214.83	11,093.59	9,380.18	39.07	40.07	-116.59	-1,245.84	625.52	368.95	297.64	71.31	5.174	
11,000.00	9,215.27	11,193.59	9,380.79	39.87	40.85	-116.61	-1,345.84	625.66	369.03	296.26	72.77	5.071	
11,100.00	9,215.71	11,293.59	9,381.40	40.70	41.67	-116.64	-1,445.84	625.80	369.11	294.82	74.29	4.969	
11,200.00	9,216.14	11,393.59	9,382.01	41.57	42.52	-116.66	-1,545.84	625.95	369.19	293.32	75.87	4.866	
11,300.00	9,216.58	11,493.59	9,382.62	42.47	43.40	-116.69	-1,645.84	626.09	369.27	291.75	77.51	4.764	
11,400.00	9,217.02	11,593.59	9,383.23	43.40	44.31	-116.71	-1,745.83	626.23	369.35	290.14	79.21	4.663	
11,500.00	9,217.46	11,693.59	9,383.84	44.35	45.25	-116.73	-1,845.83	626.37	369.42	288.47	80.96	4.563	
11,600.00	9,217.90	11,793.59	9,384.46	45.33	46.21	-116.76	-1,945.83	626.52	369.50	286.75	82.75	4.465	
11,700.00	9,218.34	11,893.59	9,385.07	46.34	47.20	-116.78	-2,045.83	626.66	369.58	284.99	84.60	4.369	
11,800.00	9,218.77	11,993.59	9,385.68	47.36	48.20	-116.81	-2,145.82	626.80	369.66	283.18	86.48	4.275	
11,900.00	9,219.21	12,093.59	9,386.29	48.41	49.23	-116.83	-2,245.82	626.94	369.74	281.34	88.40	4.183	
12,000.00	9,219.65	12,193.59	9,386.90	49.48	50.28	-116.85	-2,345.82	627.09	369.82	279.46	90.36	4.093	
12,100.00	9,220.09	12,293.59	9,387.51	50.57	51.35	-116.88	-2,445.82	627.23	369.90	277.54	92.35	4.005	
12,200.00	9,220.53	12,393.59	9,388.13	51.67	52.44	-116.90	-2,545.82	627.37	369.98	275.60	94.38	3.920	
12,300.00	9,220.97	12,493.59	9,388.74	52.79	53.54	-116.93	-2,645.81	627.51	370.06	273.62	96.44	3.837	
12,400.00	9,221.40	12,593.59	9,389.35	53.92	54.66	-116.95	-2,745.81	627.66	370.14	271.62	98.52	3.757	

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 702H - OH - Plan 1 02-15-19 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,500.00	9,221.84	12,693.59	9,389.96	55.07	55.79	-116.97	-2,845.81	627.80	370.22	269.59	100.63	3.679	
12,600.00	9,222.28	12,793.59	9,390.57	56.24	56.94	-117.00	-2,945.81	627.94	370.30	267.53	102.77	3.603	
12,700.00	9,222.72	12,893.59	9,391.18	57.41	58.10	-117.02	-3,045.81	628.09	370.38	265.45	104.92	3.530	
12,800.00	9,223.16	12,993.59	9,391.79	58.60	59.27	-117.04	-3,145.80	628.23	370.45	263.35	107.10	3.459	
12,900.00	9,223.60	13,093.59	9,392.41	59.80	60.46	-117.07	-3,245.80	628.37	370.53	261.23	109.30	3.390	
13,000.00	9,224.03	13,193.59	9,393.02	61.01	61.65	-117.09	-3,345.80	628.51	370.61	259.09	111.52	3.323	
13,100.00	9,224.47	13,293.59	9,393.63	62.22	62.86	-117.12	-3,445.80	628.66	370.69	256.94	113.76	3.259	
13,200.00	9,224.91	13,393.59	9,394.24	63.45	64.07	-117.14	-3,545.80	628.80	370.77	254.76	116.01	3.196	
13,300.00	9,225.35	13,493.59	9,394.85	64.69	65.30	-117.16	-3,645.79	628.94	370.85	252.57	118.28	3.135	
13,400.00	9,225.79	13,593.59	9,395.46	65.93	66.53	-117.19	-3,745.79	629.08	370.93	250.37	120.56	3.077	
13,500.00	9,226.23	13,693.59	9,396.08	67.19	67.77	-117.21	-3,845.79	629.23	371.01	248.15	122.86	3.020	
13,600.00	9,226.66	13,793.59	9,396.69	68.45	69.02	-117.23	-3,945.79	629.37	371.09	245.92	125.17	2.965	
13,700.00	9,227.10	13,893.59	9,397.30	69.71	70.27	-117.26	-4,045.78	629.51	371.17	243.68	127.50	2.911	
13,800.00	9,227.54	13,993.59	9,397.91	70.99	71.54	-117.28	-4,145.78	629.65	371.25	241.42	129.83	2.860	
13,900.00	9,227.98	14,093.59	9,398.52	72.27	72.80	-117.31	-4,245.78	629.80	371.33	239.16	132.18	2.809	
14,000.00	9,228.42	14,193.59	9,399.13	73.55	74.08	-117.33	-4,345.78	629.94	371.41	236.88	134.53	2.761	
14,100.00	9,228.86	14,293.59	9,399.74	74.84	75.36	-117.35	-4,445.78	630.08	371.50	234.60	136.90	2.714	
14,200.00	9,229.29	14,393.59	9,400.36	76.14	76.65	-117.38	-4,545.77	630.22	371.58	232.30	139.27	2.668	
14,300.00	9,229.73	14,493.59	9,400.97	77.44	77.94	-117.40	-4,645.77	630.37	371.66	230.00	141.66	2.624	
14,400.00	9,230.17	14,593.59	9,401.58	78.75	79.24	-117.42	-4,745.77	630.51	371.74	227.69	144.05	2.581	
14,500.00	9,230.61	14,693.59	9,402.19	80.06	80.54	-117.45	-4,845.77	630.65	371.82	225.37	146.45	2.539	
14,600.00	9,231.05	14,793.59	9,402.80	81.38	81.85	-117.47	-4,945.77	630.79	371.90	223.04	148.86	2.498	
14,700.00	9,231.48	14,893.59	9,403.41	82.70	83.16	-117.49	-5,045.76	630.94	371.98	220.71	151.27	2.459	
14,800.00	9,231.92	14,993.59	9,404.03	84.02	84.47	-117.52	-5,145.76	631.08	372.06	218.37	153.69	2.421	
14,900.00	9,232.36	15,093.59	9,404.64	85.35	85.79	-117.54	-5,245.76	631.22	372.14	216.02	156.12	2.384	
15,000.00	9,232.80	15,193.59	9,405.25	86.68	87.12	-117.57	-5,345.76	631.36	372.22	213.67	158.55	2.348	
15,100.00	9,233.24	15,293.59	9,405.86	88.02	88.45	-117.59	-5,445.75	631.51	372.30	211.31	160.99	2.313	
15,200.00	9,233.68	15,393.59	9,406.47	89.35	89.78	-117.61	-5,545.75	631.65	372.38	208.95	163.44	2.278	
15,300.00	9,234.11	15,493.59	9,407.08	90.70	91.11	-117.64	-5,645.75	631.79	372.47	206.58	165.89	2.245	
15,400.00	9,234.55	15,593.59	9,407.69	92.04	92.45	-117.66	-5,745.75	631.93	372.55	204.21	168.34	2.213	
15,500.00	9,234.99	15,693.59	9,408.31	93.39	93.79	-117.68	-5,845.75	632.08	372.63	201.83	170.80	2.182	
15,600.00	9,235.43	15,793.59	9,408.92	94.74	95.13	-117.71	-5,945.74	632.22	372.71	199.45	173.26	2.151	
15,700.00	9,235.87	15,893.59	9,409.53	96.09	96.48	-117.73	-6,045.74	632.36	372.79	197.06	175.73	2.121	
15,800.00	9,236.31	15,993.59	9,410.14	97.44	97.82	-117.75	-6,145.74	632.50	372.87	194.67	178.20	2.092	
15,900.00	9,236.74	16,093.59	9,410.75	98.80	99.18	-117.78	-6,245.74	632.65	372.95	192.28	180.68	2.064	
16,000.00	9,237.18	16,193.58	9,411.36	100.16	100.53	-117.80	-6,345.74	632.79	373.04	189.88	183.15	2.037	
16,100.00	9,237.62	16,293.58	9,411.97	101.52	101.89	-117.82	-6,445.73	632.93	373.12	187.48	185.64	2.010	
16,200.00	9,238.06	16,393.58	9,412.59	102.89	103.24	-117.85	-6,545.73	633.07	373.20	185.08	188.12	1.984	
16,300.00	9,238.50	16,493.58	9,413.20	104.25	104.61	-117.87	-6,645.73	633.22	373.28	182.67	190.61	1.958	
16,400.00	9,238.94	16,593.58	9,413.81	105.62	105.97	-117.89	-6,745.73	633.36	373.36	180.26	193.10	1.934	
16,500.00	9,239.37	16,693.58	9,414.42	106.99	107.33	-117.92	-6,845.73	633.50	373.44	177.85	195.60	1.909	
16,600.00	9,239.81	16,793.58	9,415.03	108.36	108.70	-117.94	-6,945.72	633.64	373.53	175.43	198.09	1.886	
16,700.00	9,240.25	16,893.58	9,415.64	109.74	110.07	-117.96	-7,045.72	633.79	373.61	173.02	200.59	1.863	
16,800.00	9,240.69	16,993.58	9,416.26	111.11	111.44	-117.99	-7,145.72	633.93	373.69	170.60	203.09	1.840	
16,900.00	9,241.13	17,093.58	9,416.87	112.49	112.81	-118.01	-7,245.72	634.07	373.77	168.18	205.60	1.818	
17,000.00	9,241.57	17,193.58	9,417.48	113.87	114.18	-118.03	-7,345.71	634.21	373.86	165.75	208.10	1.796	
17,100.00	9,242.00	17,293.58	9,418.09	115.25	115.56	-118.06	-7,445.71	634.36	373.94	163.33	210.61	1.775	
17,200.00	9,242.44	17,393.58	9,418.70	116.63	116.94	-118.08	-7,545.71	634.50	374.02	160.90	213.12	1.755	
17,300.00	9,242.88	17,493.58	9,419.31	118.01	118.32	-118.11	-7,645.71	634.64	374.10	158.47	215.63	1.735	
17,400.00	9,243.32	17,593.58	9,419.92	119.40	119.70	-118.13	-7,745.71	634.79	374.18	156.04	218.15	1.715	
17,500.00	9,243.76	17,693.58	9,420.54	120.78	121.08	-118.15	-7,845.70	634.93	374.27	153.61	220.66	1.696	
17,600.00	9,244.20	17,793.58	9,421.15	122.17	122.46	-118.17	-7,945.70	635.07	374.35	151.17	223.18	1.677	

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

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 702H - OH - Plan 1 02-15-19 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
17,700.00	9,244.63	17,893.58	9,421.76	123.56	123.84	-118.20	-8,045.70	635.21	374.43	148.74	225.70	1.659	
17,800.00	9,245.07	17,993.58	9,422.37	124.95	125.23	-118.22	-8,145.70	635.36	374.52	146.30	228.22	1.641	
17,900.00	9,245.51	18,093.58	9,422.98	126.34	126.62	-118.24	-8,245.70	635.50	374.60	143.86	230.74	1.623	
18,000.00	9,245.95	18,193.58	9,423.59	127.73	128.00	-118.27	-8,345.69	635.64	374.68	141.42	233.26	1.606	
18,100.00	9,246.39	18,293.58	9,424.21	129.12	129.39	-118.29	-8,445.69	635.78	374.76	138.98	235.78	1.589	
18,200.00	9,246.83	18,393.58	9,424.82	130.52	130.78	-118.31	-8,545.69	635.93	374.85	136.54	238.31	1.573	
18,300.00	9,247.26	18,493.58	9,425.43	131.91	132.17	-118.34	-8,645.69	636.07	374.93	134.10	240.83	1.557	
18,400.00	9,247.70	18,593.58	9,426.04	133.31	133.57	-118.36	-8,745.68	636.21	375.01	131.65	243.36	1.541	
18,500.00	9,248.14	18,693.58	9,426.65	134.71	134.96	-118.38	-8,845.68	636.35	375.10	129.21	245.89	1.525	
18,600.00	9,248.58	18,793.58	9,427.26	136.10	136.35	-118.41	-8,945.68	636.50	375.18	126.76	248.42	1.510	
18,700.00	9,249.02	18,893.58	9,427.87	137.50	137.75	-118.43	-9,045.68	636.64	375.26	124.31	250.95	1.495	Level 3
18,800.00	9,249.46	18,993.58	9,428.49	138.90	139.15	-118.45	-9,145.68	636.78	375.35	121.87	253.48	1.481	Level 3
18,900.00	9,249.89	19,093.58	9,429.10	140.30	140.54	-118.48	-9,245.67	636.92	375.43	119.42	256.01	1.466	Level 3
19,000.00	9,250.33	19,193.58	9,429.71	141.70	141.94	-118.50	-9,345.67	637.07	375.51	116.97	258.54	1.452	Level 3
19,100.00	9,250.77	19,293.58	9,430.32	143.11	143.34	-118.52	-9,445.67	637.21	375.60	114.52	261.08	1.439	Level 3
19,200.00	9,251.21	19,393.58	9,430.93	144.51	144.74	-118.55	-9,545.67	637.35	375.68	112.07	263.61	1.425	Level 3
19,300.00	9,251.65	19,493.58	9,431.54	145.91	146.14	-118.57	-9,645.67	637.49	375.76	109.62	266.14	1.412	Level 3
19,304.24	9,251.67	19,497.82	9,431.57	145.97	146.20	-118.57	-9,649.91	637.50	375.77	109.52	266.25	1.411	Level 3
19,380.67	9,252.00	19,569.11	9,432.01	147.04	147.20	-118.59	-9,721.19	637.60	375.87	107.71	268.16	1.402	Level 3, SF

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 703H - OH - Plan 1 02-15-19 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
100.00	100.00	100.70	100.70	0.00	0.14	-91.34	-0.70	-30.00	30.01	29.87	0.14	218.820	
200.00	200.00	200.70	200.70	0.18	0.50	-91.34	-0.70	-30.00	30.01	29.33	0.67	44.480	
300.00	300.00	300.70	300.70	0.54	0.85	-91.34	-0.70	-30.00	30.01	28.62	1.39	21.564	
400.00	400.00	400.70	400.70	0.90	1.21	-91.34	-0.70	-30.00	30.01	27.90	2.11	14.232	
500.00	500.00	500.70	500.70	1.25	1.57	-91.34	-0.70	-30.00	30.01	27.18	2.83	10.621	
600.00	600.00	600.70	600.70	1.61	1.93	-91.34	-0.70	-30.00	30.01	26.47	3.54	8.471	
700.00	700.00	700.70	700.70	1.97	2.29	-91.34	-0.70	-30.00	30.01	25.75	4.26	7.045	
800.00	800.00	800.70	800.70	2.33	2.65	-91.34	-0.70	-30.00	30.01	25.03	4.98	6.030	
900.00	900.00	900.70	900.70	2.69	3.00	-91.34	-0.70	-30.00	30.01	24.31	5.69	5.271	
1,000.00	1,000.00	1,000.70	1,000.70	3.05	3.36	-91.34	-0.70	-30.00	30.01	23.60	6.41	4.681	
1,100.00	1,100.00	1,100.70	1,100.70	3.41	3.72	-91.34	-0.70	-30.00	30.01	22.88	7.13	4.210	
1,200.00	1,200.00	1,200.70	1,200.70	3.76	4.08	-91.34	-0.70	-30.00	30.01	22.16	7.84	3.826	
1,300.00	1,300.00	1,300.70	1,300.70	4.12	4.44	-91.34	-0.70	-30.00	30.01	21.45	8.56	3.505	
1,400.00	1,400.00	1,400.70	1,400.70	4.48	4.80	-91.34	-0.70	-30.00	30.01	20.73	9.28	3.234	
1,500.00	1,500.00	1,500.70	1,500.70	4.84	5.16	-91.34	-0.70	-30.00	30.01	20.01	9.99	3.002	
1,500.02	1,500.02	1,500.72	1,500.72	4.84	5.16	-91.34	-0.70	-30.00	30.01	20.01	10.00	3.002	CC, ES
1,600.00	1,599.98	1,600.71	1,600.69	5.20	5.51	-115.13	1.07	-30.02	30.74	20.03	10.71	2.870	
1,700.00	1,699.84	1,700.68	1,700.52	5.56	5.87	-114.19	6.33	-30.08	32.93	21.51	11.42	2.883	
1,800.06	1,799.51	1,800.64	1,800.09	5.91	6.23	-112.89	15.06	-30.17	36.61	24.47	12.14	3.016	
1,900.00	1,898.90	1,900.48	1,899.39	6.27	6.59	-111.75	25.49	-30.28	41.02	28.17	12.85	3.191	
2,000.00	1,998.36	2,000.38	1,998.74	6.63	6.95	-110.83	35.93	-30.40	45.46	31.88	13.58	3.348	
2,100.00	2,097.81	2,100.28	2,098.09	7.00	7.31	-110.08	46.36	-30.51	49.90	35.60	14.30	3.489	
2,200.00	2,197.26	2,200.18	2,197.44	7.36	7.68	-109.45	56.80	-30.62	54.35	39.31	15.03	3.615	
2,300.00	2,296.71	2,300.08	2,296.80	7.73	8.05	-108.91	67.24	-30.74	58.80	43.04	15.77	3.730	
2,400.00	2,396.16	2,399.98	2,396.15	8.10	8.41	-108.46	77.67	-30.85	63.26	46.76	16.50	3.834	
2,500.00	2,495.62	2,499.88	2,495.50	8.47	8.78	-108.06	88.11	-30.96	67.73	50.49	17.24	3.928	
2,600.00	2,595.07	2,599.78	2,594.85	8.84	9.15	-107.71	98.54	-31.08	72.19	54.21	17.98	4.015	
2,700.00	2,694.52	2,699.68	2,694.21	9.21	9.53	-107.40	108.98	-31.19	76.66	57.94	18.72	4.095	
2,800.00	2,793.97	2,799.58	2,793.56	9.59	9.90	-107.12	119.42	-31.30	81.13	61.66	19.47	4.168	
2,900.00	2,893.42	2,899.48	2,892.91	9.96	10.27	-106.88	129.85	-31.42	85.60	65.39	20.21	4.235	
3,000.00	2,992.88	2,999.38	2,992.26	10.33	10.64	-106.66	140.29	-31.53	90.07	69.12	20.96	4.298	
3,100.00	3,092.33	3,099.28	3,091.62	10.71	11.02	-106.45	150.73	-31.64	94.55	72.84	21.70	4.356	
3,200.00	3,191.78	3,199.17	3,190.97	11.08	11.39	-106.27	161.16	-31.76	99.02	76.57	22.45	4.410	
3,300.00	3,291.23	3,299.07	3,290.32	11.46	11.77	-106.11	171.60	-31.87	103.50	80.30	23.20	4.461	
3,400.00	3,390.68	3,398.97	3,389.68	11.84	12.14	-105.95	182.04	-31.98	107.98	84.03	23.95	4.508	
3,500.00	3,490.14	3,498.87	3,489.03	12.21	12.52	-105.81	192.47	-32.10	112.46	87.75	24.70	4.552	
3,600.00	3,589.59	3,598.77	3,588.38	12.59	12.90	-105.68	202.91	-32.21	116.93	91.48	25.45	4.594	
3,700.00	3,689.04	3,698.67	3,687.73	12.97	13.27	-105.56	213.35	-32.32	121.41	95.21	26.21	4.633	
3,800.00	3,788.49	3,798.57	3,787.09	13.35	13.65	-105.45	223.78	-32.43	125.89	98.93	26.96	4.670	
3,900.00	3,887.94	3,898.47	3,886.44	13.72	14.03	-105.35	234.22	-32.55	130.37	102.66	27.71	4.705	
4,000.00	3,987.40	3,998.37	3,985.79	14.10	14.40	-105.25	244.65	-32.66	134.85	106.39	28.46	4.738	
4,100.00	4,086.85	4,098.27	4,085.14	14.48	14.78	-105.16	255.09	-32.77	139.33	110.11	29.22	4.769	
4,200.00	4,186.30	4,198.17	4,184.50	14.86	15.16	-105.07	265.53	-32.89	143.81	113.84	29.97	4.798	
4,300.00	4,285.75	4,298.07	4,283.85	15.24	15.54	-104.99	275.96	-33.00	148.30	117.57	30.73	4.826	
4,400.00	4,385.20	4,397.97	4,383.20	15.62	15.92	-104.92	286.40	-33.11	152.78	121.29	31.48	4.853	
4,500.00	4,484.66	4,497.87	4,482.55	16.00	16.29	-104.85	296.84	-33.23	157.26	125.02	32.24	4.878	
4,600.00	4,584.11	4,597.77	4,581.91	16.37	16.67	-104.78	307.27	-33.34	161.74	128.75	32.99	4.902	
4,700.00	4,683.56	4,697.66	4,681.26	16.75	17.05	-104.71	317.71	-33.45	166.22	132.47	33.75	4.925	
4,800.00	4,783.01	4,797.56	4,780.61	17.13	17.43	-104.65	328.15	-33.57	170.71	136.20	34.51	4.947	
4,900.00	4,882.46	4,897.46	4,879.96	17.51	17.81	-104.60	338.58	-33.68	175.19	139.92	35.26	4.968	
5,000.00	4,981.92	4,997.36	4,979.32	17.89	18.19	-104.54	349.02	-33.79	179.67	143.65	36.02	4.988	
5,100.00	5,081.37	5,097.26	5,078.67	18.27	18.57	-104.49	359.46	-33.91	184.15	147.38	36.78	5.007	

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

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 703H - OH - Plan 1 02-15-19 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD+HDGM — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,180.82	5,197.16	5,178.02	18.65	18.95	-104.44	369.89	-34.02	188.64	151.10	37.54	5.026	
5,300.00	5,280.27	5,297.06	5,277.37	19.03	19.33	-104.40	380.33	-34.13	193.12	154.83	38.29	5.043	
5,400.00	5,379.72	5,396.96	5,376.73	19.41	19.71	-104.35	390.76	-34.25	197.60	158.55	39.05	5.060	
5,500.00	5,479.18	5,496.86	5,476.08	19.79	20.08	-104.31	401.20	-34.36	202.09	162.28	39.81	5.076	
5,600.00	5,578.63	5,596.76	5,575.43	20.17	20.46	-104.27	411.64	-34.47	206.57	166.01	40.57	5.092	
5,700.00	5,678.08	5,696.66	5,674.79	20.55	20.84	-104.23	422.07	-34.59	211.06	169.73	41.33	5.107	
5,800.00	5,777.53	5,796.56	5,774.14	20.94	21.22	-104.19	432.51	-34.70	215.54	173.46	42.08	5.122	
5,900.00	5,876.98	5,896.46	5,873.49	21.32	21.60	-104.15	442.95	-34.81	220.02	177.18	42.84	5.136	
6,000.00	5,976.44	5,996.36	5,972.84	21.70	21.98	-104.12	453.38	-34.93	224.51	180.91	43.60	5.149	
6,100.00	6,075.89	6,096.26	6,072.20	22.08	22.36	-104.09	463.82	-35.04	228.99	184.63	44.36	5.162	
6,200.00	6,175.34	6,196.15	6,171.55	22.46	22.74	-104.05	474.26	-35.15	233.48	188.36	45.12	5.175	
6,300.00	6,274.79	6,296.05	6,270.90	22.84	23.12	-104.02	484.69	-35.26	237.96	192.08	45.88	5.187	
6,400.00	6,374.24	6,395.95	6,370.25	23.22	23.50	-103.99	495.13	-35.38	242.44	195.81	46.64	5.199	
6,500.00	6,473.70	6,495.85	6,469.61	23.60	23.88	-103.97	505.56	-35.49	246.93	199.53	47.40	5.210	
6,600.00	6,573.15	6,595.75	6,568.96	23.98	24.26	-103.94	516.00	-35.60	251.41	203.26	48.16	5.221	
6,700.00	6,672.60	6,695.65	6,668.31	24.36	24.65	-103.91	526.44	-35.72	255.90	206.98	48.91	5.232	
6,800.00	6,772.05	6,795.55	6,767.66	24.74	25.03	-103.89	536.87	-35.83	260.38	210.71	49.67	5.242	
6,900.00	6,871.50	6,895.45	6,867.02	25.12	25.41	-103.86	547.31	-35.94	264.87	214.43	50.43	5.252	
7,000.00	6,970.96	6,995.35	6,966.37	25.51	25.79	-103.84	557.75	-36.06	269.35	218.16	51.19	5.261	
7,100.00	7,070.41	7,095.25	7,065.72	25.89	26.17	-103.81	568.18	-36.17	273.84	221.88	51.95	5.271	
7,200.00	7,169.86	7,195.15	7,165.07	26.27	26.55	-103.79	578.62	-36.28	278.32	225.61	52.71	5.280	
7,300.00	7,269.31	7,295.05	7,264.43	26.65	26.93	-103.77	589.06	-36.40	282.81	229.33	53.47	5.289	
7,400.00	7,368.76	7,394.95	7,363.78	27.03	27.31	-103.75	599.49	-36.51	287.29	233.06	54.23	5.297	
7,500.00	7,468.22	7,494.85	7,463.13	27.41	27.69	-103.73	609.93	-36.62	291.78	236.78	54.99	5.306	
7,600.00	7,567.67	7,594.75	7,562.49	27.79	28.07	-103.71	620.37	-36.74	296.26	240.51	55.75	5.314	
7,700.00	7,667.12	7,695.06	7,662.26	28.18	28.45	-103.70	630.77	-36.85	300.73	244.22	56.52	5.321	
7,800.00	7,766.57	7,796.97	7,763.84	28.56	28.83	-104.16	638.87	-36.94	304.75	247.47	57.28	5.321	
7,900.00	7,866.02	7,898.63	7,865.39	28.94	29.20	-105.26	643.35	-36.99	308.18	250.16	58.02	5.312	
8,000.00	7,965.47	7,999.42	7,966.17	29.32	29.54	-106.95	644.34	-37.00	311.24	252.50	58.74	5.298	
8,100.00	8,064.93	8,098.87	8,065.63	29.70	29.88	-108.76	644.34	-37.00	314.47	255.02	59.45	5.290	
8,200.00	8,164.38	8,198.32	8,165.08	30.08	30.22	-110.54	644.34	-37.00	318.00	257.85	60.15	5.286	
8,300.00	8,263.83	8,297.77	8,264.53	30.46	30.56	-112.27	644.34	-37.00	321.83	260.98	60.86	5.288	
8,400.00	8,363.34	8,397.28	8,364.04	30.84	30.90	-113.91	644.34	-37.00	325.72	264.17	61.55	5.292	
8,500.00	8,463.11	8,497.05	8,463.81	31.21	31.25	-115.03	644.34	-37.00	328.50	266.25	62.25	5.277	
8,600.00	8,563.05	8,597.00	8,563.75	31.56	31.59	-115.56	644.34	-37.00	329.87	266.93	62.94	5.241	
8,700.00	8,663.04	8,696.98	8,663.74	31.90	31.93	88.75	644.34	-37.00	329.99	266.37	63.62	5.187	
8,767.75	8,730.37	8,764.31	8,731.07	32.08	32.16	90.00	644.34	-37.00	329.91	265.86	64.05	5.151	
8,800.00	8,762.02	8,795.96	8,762.72	32.17	32.27	91.05	644.34	-37.00	329.97	265.71	64.26	5.135	
8,900.00	8,857.16	8,894.29	8,860.97	32.38	32.59	95.67	641.98	-36.99	331.69	266.85	64.84	5.115	
9,000.00	8,945.59	8,998.77	8,963.59	32.55	32.86	100.53	623.10	-36.97	336.09	270.84	65.24	5.151	
9,100.00	9,024.61	9,109.88	9,067.01	32.66	33.09	105.11	582.98	-36.91	342.67	277.39	65.28	5.249	
9,200.00	9,091.82	9,228.36	9,166.56	32.73	33.27	109.23	519.12	-36.82	350.60	285.81	64.79	5.412	
9,300.00	9,145.19	9,354.53	9,255.72	32.77	33.41	112.71	430.22	-36.69	358.73	294.97	63.77	5.626	
9,400.00	9,183.09	9,487.97	9,326.48	32.81	33.52	115.37	317.43	-36.53	365.80	303.27	62.53	5.850	
9,500.00	9,204.36	9,627.23	9,370.49	32.85	33.63	117.04	185.67	-36.35	370.60	308.94	61.66	6.010	
9,600.00	9,209.13	9,760.74	9,382.09	32.91	33.74	117.57	52.93	-36.16	372.18	310.52	61.66	6.036	
9,700.00	9,209.57	9,860.74	9,382.52	33.03	33.88	117.57	-47.07	-36.02	372.17	310.21	61.96	6.007	
9,800.00	9,210.01	9,960.74	9,382.95	33.23	34.07	117.57	-147.07	-35.88	372.17	309.79	62.37	5.967	
9,900.00	9,210.45	10,060.74	9,383.38	33.49	34.32	117.57	-247.06	-35.73	372.16	309.27	62.90	5.917	
10,000.00	9,210.89	10,160.74	9,383.80	33.82	34.63	117.57	-347.06	-35.59	372.16	308.63	63.52	5.858	
10,100.00	9,211.32	10,260.74	9,384.23	34.20	34.99	117.56	-447.06	-35.45	372.15	307.90	64.26	5.792	
10,200.00	9,211.76	10,360.74	9,384.66	34.64	35.42	117.56	-547.06	-35.31	372.15	307.06	65.09	5.717	

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

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 703H - OH - Plan 1 02-15-19 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,300.00	9,212.20	10,460.74	9,385.09	35.13	35.89	117.56	-647.06	-35.17	372.14	306.12	66.02	5.637	
10,400.00	9,212.64	10,560.74	9,385.52	35.67	36.41	117.56	-747.06	-35.03	372.14	305.10	67.04	5.551	
10,500.00	9,213.08	10,660.74	9,385.95	36.27	36.99	117.56	-847.06	-34.88	372.13	303.98	68.15	5.460	
10,600.00	9,213.51	10,760.74	9,386.37	36.90	37.61	117.56	-947.06	-34.74	372.13	302.78	69.35	5.366	
10,700.00	9,213.95	10,860.74	9,386.80	37.58	38.27	117.56	-1,047.06	-34.60	372.13	301.50	70.62	5.269	
10,800.00	9,214.39	10,960.74	9,387.23	38.31	38.98	117.55	-1,147.06	-34.46	372.12	300.15	71.97	5.170	
10,900.00	9,214.83	11,060.74	9,387.66	39.07	39.72	117.55	-1,247.05	-34.32	372.12	298.72	73.39	5.070	
11,000.00	9,215.27	11,160.74	9,388.09	39.87	40.50	117.55	-1,347.05	-34.18	372.11	297.23	74.88	4.969	
11,100.00	9,215.71	11,260.74	9,388.51	40.70	41.32	117.55	-1,447.05	-34.04	372.11	295.67	76.43	4.868	
11,200.00	9,216.14	11,360.74	9,388.94	41.57	42.17	117.55	-1,547.05	-33.89	372.10	294.06	78.05	4.768	
11,300.00	9,216.58	11,460.74	9,389.37	42.47	43.06	117.55	-1,647.05	-33.75	372.10	292.38	79.71	4.668	
11,400.00	9,217.02	11,560.74	9,389.80	43.40	43.97	117.55	-1,747.05	-33.61	372.09	290.66	81.43	4.569	
11,500.00	9,217.46	11,660.74	9,390.23	44.35	44.91	117.54	-1,847.05	-33.47	372.09	288.88	83.20	4.472	
11,600.00	9,217.90	11,760.74	9,390.65	45.33	45.88	117.54	-1,947.05	-33.33	372.08	287.06	85.02	4.376	
11,700.00	9,218.34	11,860.74	9,391.08	46.34	46.87	117.54	-2,047.05	-33.19	372.08	285.20	86.88	4.283	
11,800.00	9,218.77	11,960.74	9,391.51	47.36	47.88	117.54	-2,147.05	-33.04	372.07	283.29	88.78	4.191	
11,900.00	9,219.21	12,060.74	9,391.94	48.41	48.92	117.54	-2,247.04	-32.90	372.07	281.35	90.72	4.101	
12,000.00	9,219.65	12,160.74	9,392.37	49.48	49.97	117.54	-2,347.04	-32.76	372.06	279.37	92.69	4.014	
12,100.00	9,220.09	12,260.74	9,392.80	50.57	51.05	117.54	-2,447.04	-32.62	372.06	277.36	94.70	3.929	
12,200.00	9,220.53	12,360.74	9,393.22	51.67	52.14	117.54	-2,547.04	-32.48	372.05	275.32	96.74	3.846	
12,300.00	9,220.97	12,460.74	9,393.65	52.79	53.25	117.53	-2,647.04	-32.34	372.05	273.24	98.81	3.765	
12,400.00	9,221.40	12,560.74	9,394.08	53.92	54.37	117.53	-2,747.04	-32.19	372.05	271.14	100.90	3.687	
12,500.00	9,221.84	12,660.74	9,394.51	55.07	55.51	117.53	-2,847.04	-32.05	372.04	269.02	103.02	3.611	
12,600.00	9,222.28	12,760.74	9,394.94	56.24	56.66	117.53	-2,947.04	-31.91	372.04	266.87	105.17	3.537	
12,700.00	9,222.72	12,860.74	9,395.36	57.41	57.83	117.53	-3,047.04	-31.77	372.03	264.69	107.34	3.466	
12,800.00	9,223.16	12,960.74	9,395.79	58.60	59.01	117.53	-3,147.03	-31.63	372.03	262.50	109.53	3.397	
12,900.00	9,223.60	13,060.74	9,396.22	59.80	60.19	117.53	-3,247.03	-31.49	372.02	260.28	111.74	3.329	
13,000.00	9,224.03	13,160.74	9,396.65	61.01	61.39	117.52	-3,347.03	-31.35	372.02	258.05	113.97	3.264	
13,100.00	9,224.47	13,260.74	9,397.08	62.22	62.60	117.52	-3,447.03	-31.20	372.01	255.79	116.22	3.201	
13,200.00	9,224.91	13,360.74	9,397.51	63.45	63.82	117.52	-3,547.03	-31.06	372.01	253.52	118.48	3.140	
13,300.00	9,225.35	13,460.74	9,397.93	64.69	65.05	117.52	-3,647.03	-30.92	372.00	251.24	120.77	3.080	
13,400.00	9,225.79	13,560.74	9,398.36	65.93	66.29	117.52	-3,747.03	-30.78	372.00	248.94	123.06	3.023	
13,500.00	9,226.23	13,660.74	9,398.79	67.19	67.53	117.52	-3,847.03	-30.64	371.99	246.62	125.37	2.967	
13,600.00	9,226.66	13,760.74	9,399.22	68.45	68.79	117.52	-3,947.03	-30.50	371.99	244.29	127.70	2.913	
13,700.00	9,227.10	13,860.74	9,399.65	69.71	70.05	117.51	-4,047.03	-30.35	371.98	241.95	130.04	2.861	
13,800.00	9,227.54	13,960.74	9,400.07	70.99	71.32	117.51	-4,147.02	-30.21	371.98	239.59	132.38	2.810	
13,900.00	9,227.98	14,060.74	9,400.50	72.27	72.59	117.51	-4,247.02	-30.07	371.97	237.23	134.75	2.761	
14,000.00	9,228.42	14,160.74	9,400.93	73.55	73.87	117.51	-4,347.02	-29.93	371.97	234.85	137.12	2.713	
14,100.00	9,228.86	14,260.74	9,401.36	74.84	75.15	117.51	-4,447.02	-29.79	371.97	232.47	139.50	2.666	
14,200.00	9,229.29	14,360.74	9,401.79	76.14	76.44	117.51	-4,547.02	-29.65	371.96	230.07	141.89	2.621	
14,300.00	9,229.73	14,460.74	9,402.21	77.44	77.74	117.51	-4,647.02	-29.50	371.96	227.66	144.29	2.578	
14,400.00	9,230.17	14,560.74	9,402.64	78.75	79.04	117.50	-4,747.02	-29.36	371.95	225.25	146.70	2.535	
14,500.00	9,230.61	14,660.74	9,403.07	80.06	80.35	117.50	-4,847.02	-29.22	371.95	222.82	149.12	2.494	
14,600.00	9,231.05	14,760.74	9,403.50	81.38	81.66	117.50	-4,947.02	-29.08	371.94	220.39	151.55	2.454	
14,700.00	9,231.48	14,860.74	9,403.93	82.70	82.97	117.50	-5,047.02	-28.94	371.94	217.95	153.98	2.415	
14,800.00	9,231.92	14,960.74	9,404.36	84.02	84.29	117.50	-5,147.01	-28.80	371.93	215.51	156.43	2.378	
14,900.00	9,232.36	15,060.74	9,404.78	85.35	85.62	117.50	-5,247.01	-28.66	371.93	213.05	158.88	2.341	
15,000.00	9,232.80	15,160.74	9,405.21	86.68	86.94	117.50	-5,347.01	-28.51	371.92	210.59	161.33	2.305	
15,100.00	9,233.24	15,260.74	9,405.64	88.02	88.27	117.49	-5,447.01	-28.37	371.92	208.12	163.79	2.271	
15,200.00	9,233.68	15,360.74	9,406.07	89.35	89.61	117.49	-5,547.01	-28.23	371.91	205.65	166.26	2.237	
15,300.00	9,234.11	15,460.74	9,406.50	90.70	90.94	117.49	-5,647.01	-28.09	371.91	203.17	168.74	2.204	
15,400.00	9,234.55	15,560.74	9,406.92	92.04	92.28	117.49	-5,747.01	-27.95	371.90	200.69	171.22	2.172	

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Offset Design Quien Sabe Fed Com - 703H - OH - Plan 1 02-15-19 — **Offset Site Error:** 0.00 usft

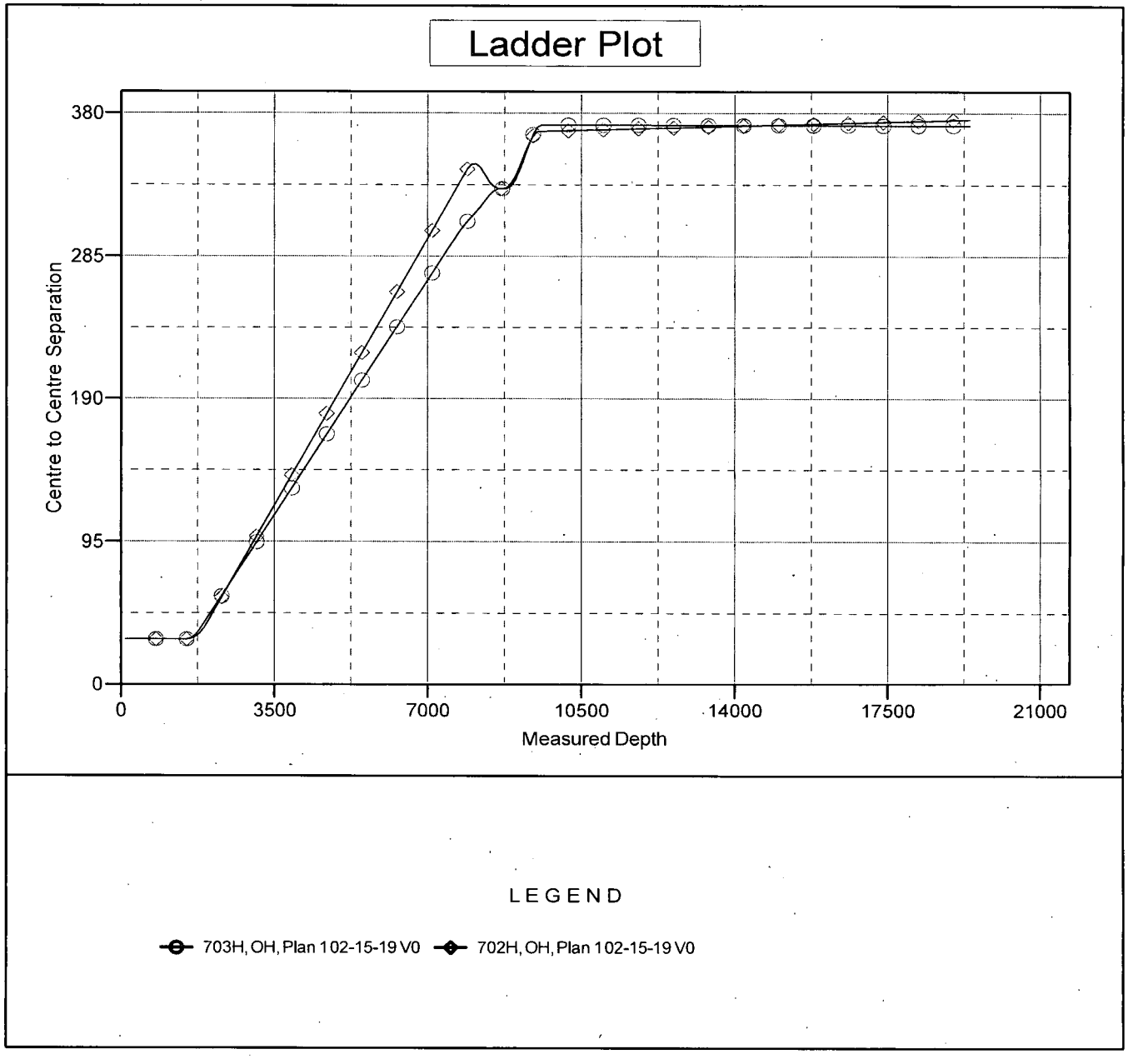
Survey Program: 0-MWD+HDGM — **Offset Well Error:** 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
15,500.00	9,234.99	15,660.74	9,407.35	93.39	93.63	117.49	-5,847.01	-27.81	371.90	198.20	173.70	2.141	
15,600.00	9,235.43	15,760.74	9,407.78	94.74	94.97	117.49	-5,947.01	-27.66	371.89	195.70	176.19	2.111	
15,700.00	9,235.87	15,860.74	9,408.21	96.09	96.32	117.49	-6,047.01	-27.52	371.89	193.20	178.69	2.081	
15,800.00	9,236.31	15,960.74	9,408.64	97.44	97.67	117.49	-6,147.00	-27.38	371.89	190.70	181.19	2.053	
15,900.00	9,236.74	16,060.74	9,409.06	98.80	99.03	117.48	-6,247.00	-27.24	371.88	188.19	183.69	2.024	
16,000.00	9,237.18	16,160.74	9,409.49	100.16	100.38	117.48	-6,347.00	-27.10	371.88	185.68	186.20	1.997	
16,100.00	9,237.62	16,260.74	9,409.92	101.52	101.74	117.48	-6,447.00	-26.96	371.87	183.16	188.71	1.971	
16,200.00	9,238.06	16,360.74	9,410.35	102.89	103.10	117.48	-6,547.00	-26.81	371.87	180.64	191.23	1.945	
16,300.00	9,238.50	16,460.74	9,410.78	104.25	104.47	117.48	-6,647.00	-26.67	371.86	178.11	193.75	1.919	
16,400.00	9,238.94	16,560.74	9,411.21	105.62	105.83	117.48	-6,747.00	-26.53	371.86	175.58	196.27	1.895	
16,500.00	9,239.37	16,660.74	9,411.63	106.99	107.20	117.48	-6,847.00	-26.39	371.85	173.05	198.80	1.870	
16,600.00	9,239.81	16,760.74	9,412.06	108.36	108.57	117.47	-6,947.00	-26.25	371.85	170.51	201.33	1.847	
16,700.00	9,240.25	16,860.74	9,412.49	109.74	109.94	117.47	-7,047.00	-26.11	371.84	167.98	203.87	1.824	
16,800.00	9,240.69	16,960.74	9,412.92	111.11	111.31	117.47	-7,146.99	-25.96	371.84	165.43	206.41	1.801	
16,900.00	9,241.13	17,060.74	9,413.35	112.49	112.69	117.47	-7,246.99	-25.82	371.83	162.89	208.95	1.780	
17,000.00	9,241.57	17,160.74	9,413.77	113.87	114.06	117.47	-7,346.99	-25.68	371.83	160.34	211.49	1.758	
17,100.00	9,242.00	17,260.74	9,414.20	115.25	115.44	117.47	-7,446.99	-25.54	371.82	157.79	214.04	1.737	
17,200.00	9,242.44	17,360.74	9,414.63	116.63	116.82	117.47	-7,546.99	-25.40	371.82	155.23	216.59	1.717	
17,300.00	9,242.88	17,460.74	9,415.06	118.01	118.20	117.46	-7,646.99	-25.26	371.81	152.68	219.14	1.697	
17,400.00	9,243.32	17,560.74	9,415.49	119.40	119.58	117.46	-7,746.99	-25.12	371.81	150.12	221.69	1.677	
17,500.00	9,243.76	17,660.74	9,415.91	120.78	120.96	117.46	-7,846.99	-24.97	371.81	147.55	224.25	1.658	
17,600.00	9,244.20	17,760.74	9,416.34	122.17	122.35	117.46	-7,946.99	-24.83	371.80	144.99	226.81	1.639	
17,700.00	9,244.63	17,860.74	9,416.77	123.56	123.73	117.46	-8,046.99	-24.69	371.80	142.42	229.37	1.621	
17,800.00	9,245.07	17,960.74	9,417.20	124.95	125.12	117.46	-8,146.98	-24.55	371.79	139.85	231.94	1.603	
17,900.00	9,245.51	18,060.74	9,417.63	126.34	126.51	117.46	-8,246.98	-24.41	371.79	137.28	234.50	1.585	
18,000.00	9,245.95	18,160.74	9,418.06	127.73	127.90	117.45	-8,346.98	-24.27	371.78	134.71	237.07	1.568	
18,100.00	9,246.39	18,260.74	9,418.48	129.12	129.29	117.45	-8,446.98	-24.12	371.78	132.13	239.64	1.551	
18,200.00	9,246.83	18,360.74	9,418.91	130.52	130.68	117.45	-8,546.98	-23.98	371.77	129.56	242.22	1.535	
18,300.00	9,247.26	18,460.74	9,419.34	131.91	132.07	117.45	-8,646.98	-23.84	371.77	126.98	244.79	1.519	
18,400.00	9,247.70	18,560.74	9,419.77	133.31	133.47	117.45	-8,746.98	-23.70	371.76	124.40	247.37	1.503	
18,500.00	9,248.14	18,660.74	9,420.20	134.71	134.86	117.45	-8,846.98	-23.56	371.76	121.81	249.94	1.487	Level 3
18,600.00	9,248.58	18,760.74	9,420.62	136.10	136.26	117.45	-8,946.98	-23.42	371.75	119.23	252.52	1.472	Level 3
18,700.00	9,249.02	18,860.74	9,421.05	137.50	137.66	117.44	-9,046.98	-23.27	371.75	116.64	255.11	1.457	Level 3
18,800.00	9,249.46	18,960.74	9,421.48	138.90	139.05	117.44	-9,146.97	-23.13	371.74	114.06	257.69	1.443	Level 3
18,900.00	9,249.89	19,060.74	9,421.91	140.30	140.45	117.44	-9,246.97	-22.99	371.74	111.47	260.27	1.428	Level 3
19,000.00	9,250.33	19,160.74	9,422.34	141.70	141.85	117.44	-9,346.97	-22.85	371.73	108.87	262.86	1.414	Level 3
19,100.00	9,250.77	19,260.74	9,422.76	143.11	143.25	117.44	-9,446.97	-22.71	371.73	106.28	265.45	1.400	Level 3
19,200.00	9,251.21	19,360.74	9,423.19	144.51	144.65	117.44	-9,546.97	-22.57	371.73	103.69	268.04	1.387	Level 3
19,300.00	9,251.65	19,460.74	9,423.62	145.91	146.05	117.44	-9,646.97	-22.43	371.72	101.09	270.63	1.374	Level 3
19,380.67	9,252.00	19,541.41	9,423.97	147.04	147.19	117.44	-9,727.63	-22.31	371.72	99.00	272.72	1.363	Level 3, SF

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
Project:	Eddy County, NM (NAD27 NME)	**TVD Reference:**	RKB @ 3148.30usft (Precision 595)
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB @ 3148.30usft (Precision 595)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 603H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.10°



Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well 603H
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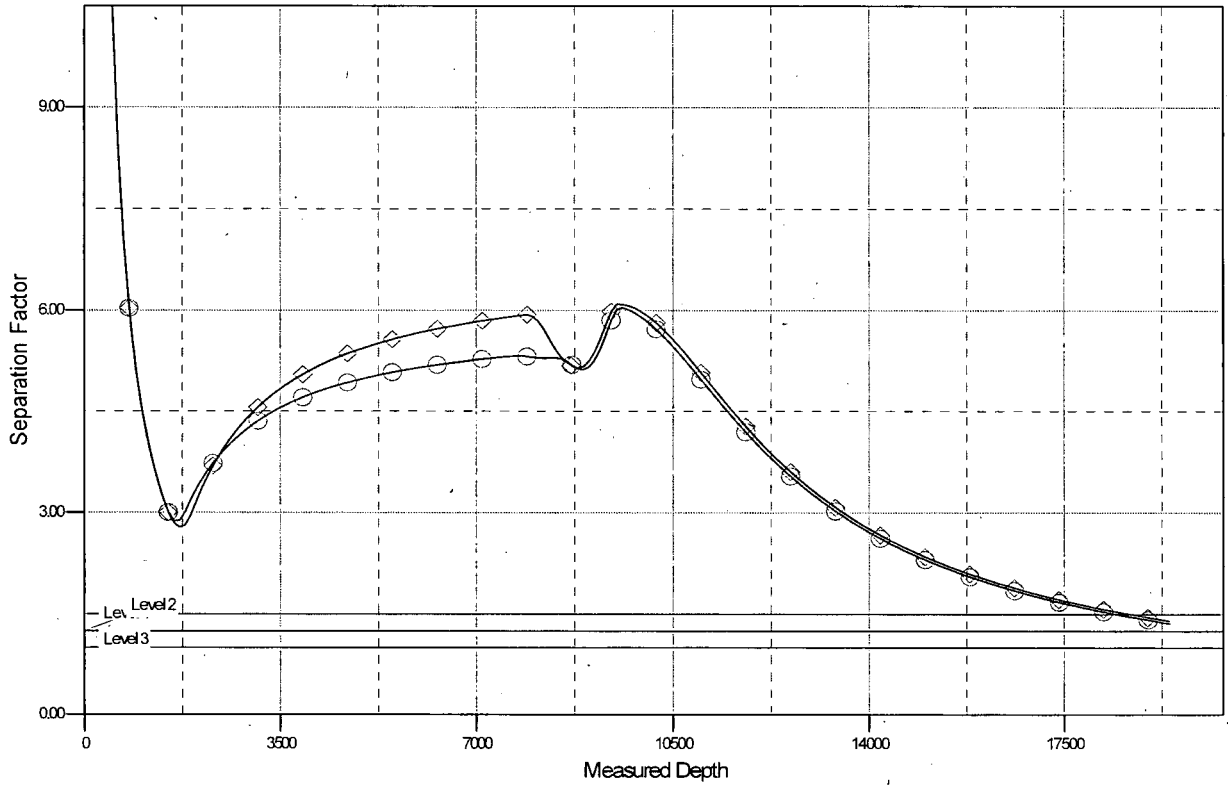
Reference Site:	Quien Sabe Fed Com	**MD Reference:**	RKB @ 3148.30usft (Precision 595)
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	603H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OH	**Database:**	USA Compass
Reference Design:	Plan 1 02-15-19	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB @ 3148.30usft (Precision 595)	Coordinates are relative to: 603H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 19' 60.00000 W	Grid Convergence at Surface is: 0.10°

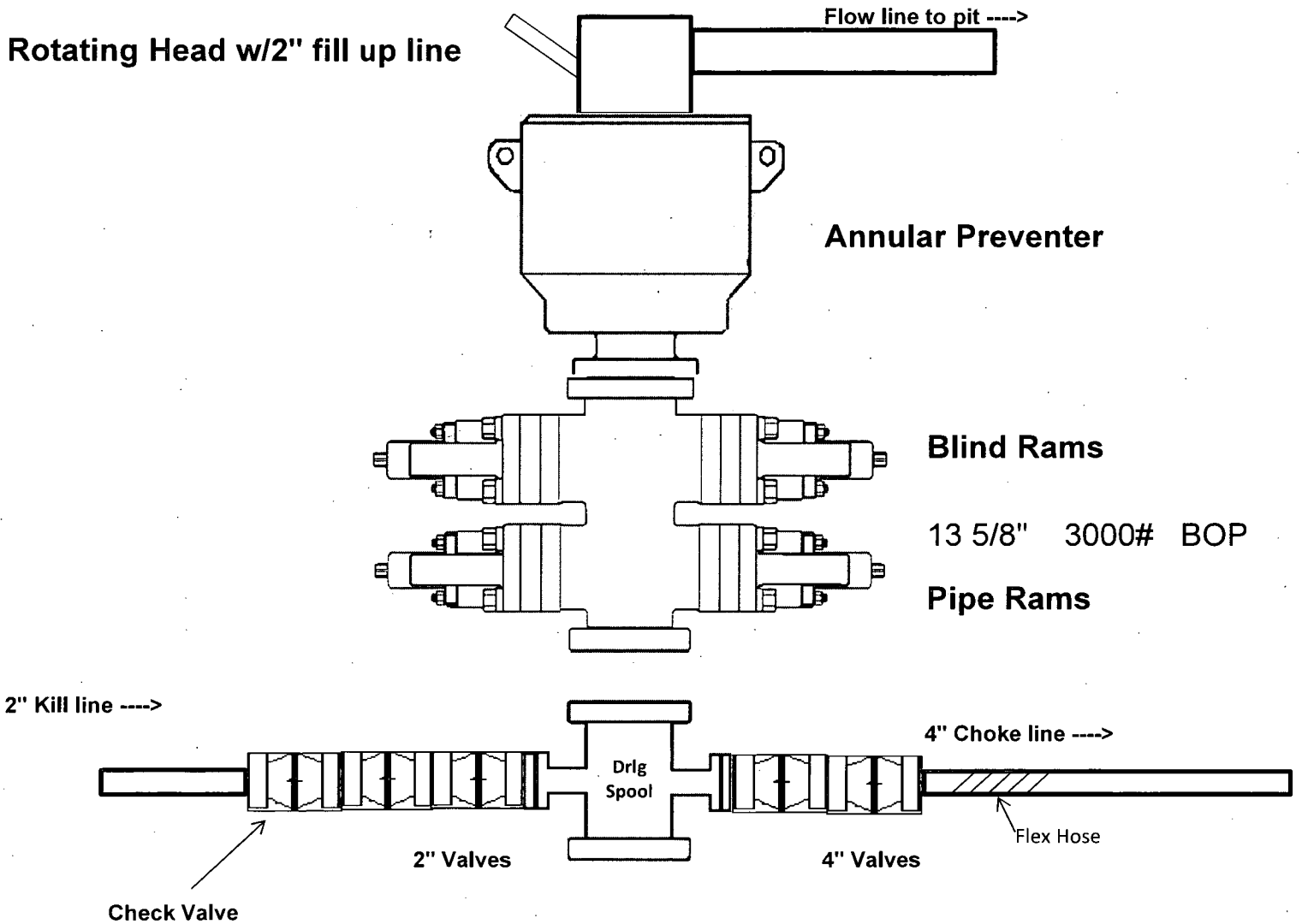
Separation Factor Plot



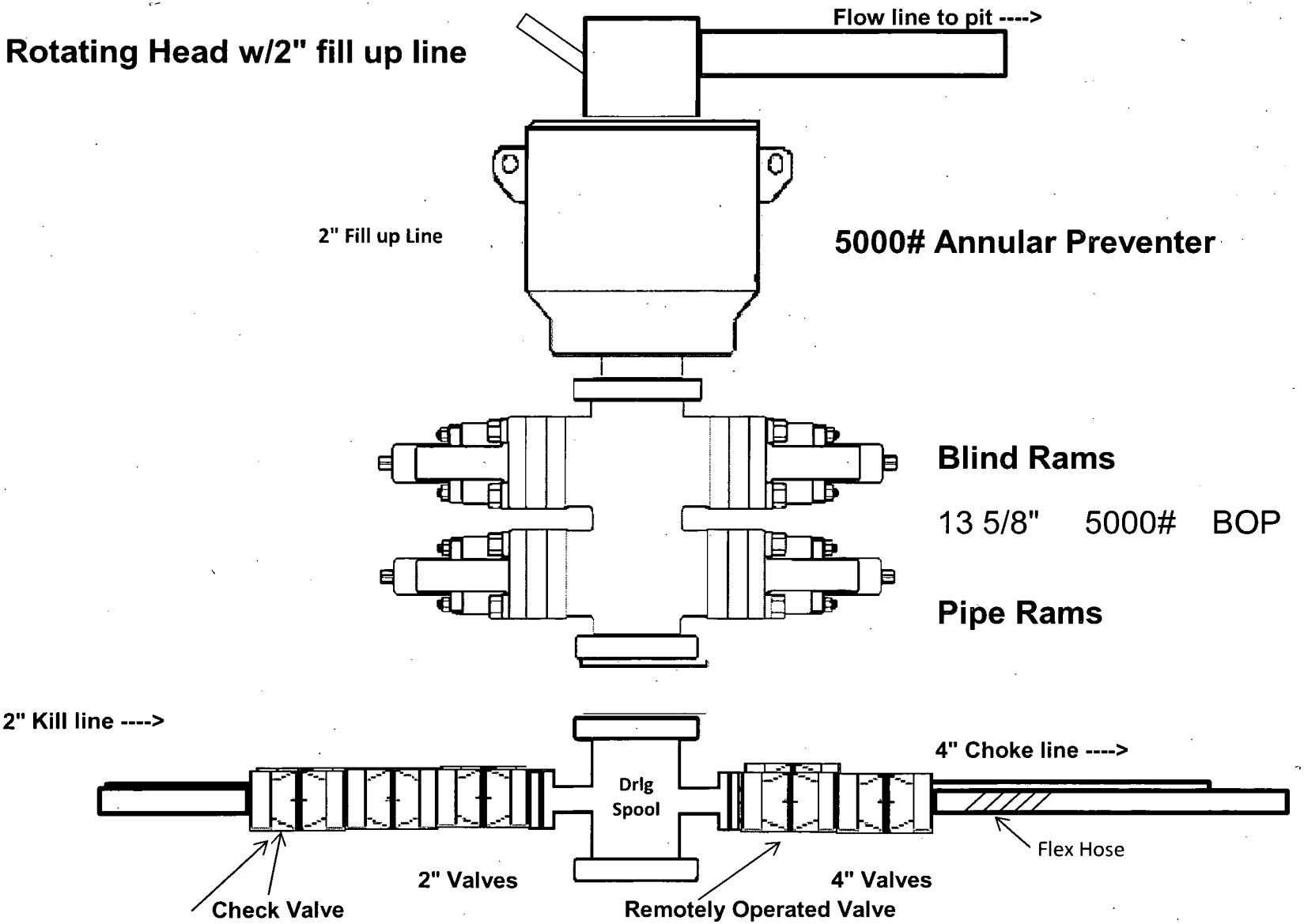
LEGEND

703H, OH, Plan 1 02-15-19 V0 — 702H, OH, Plan 1 02-15-19 V0

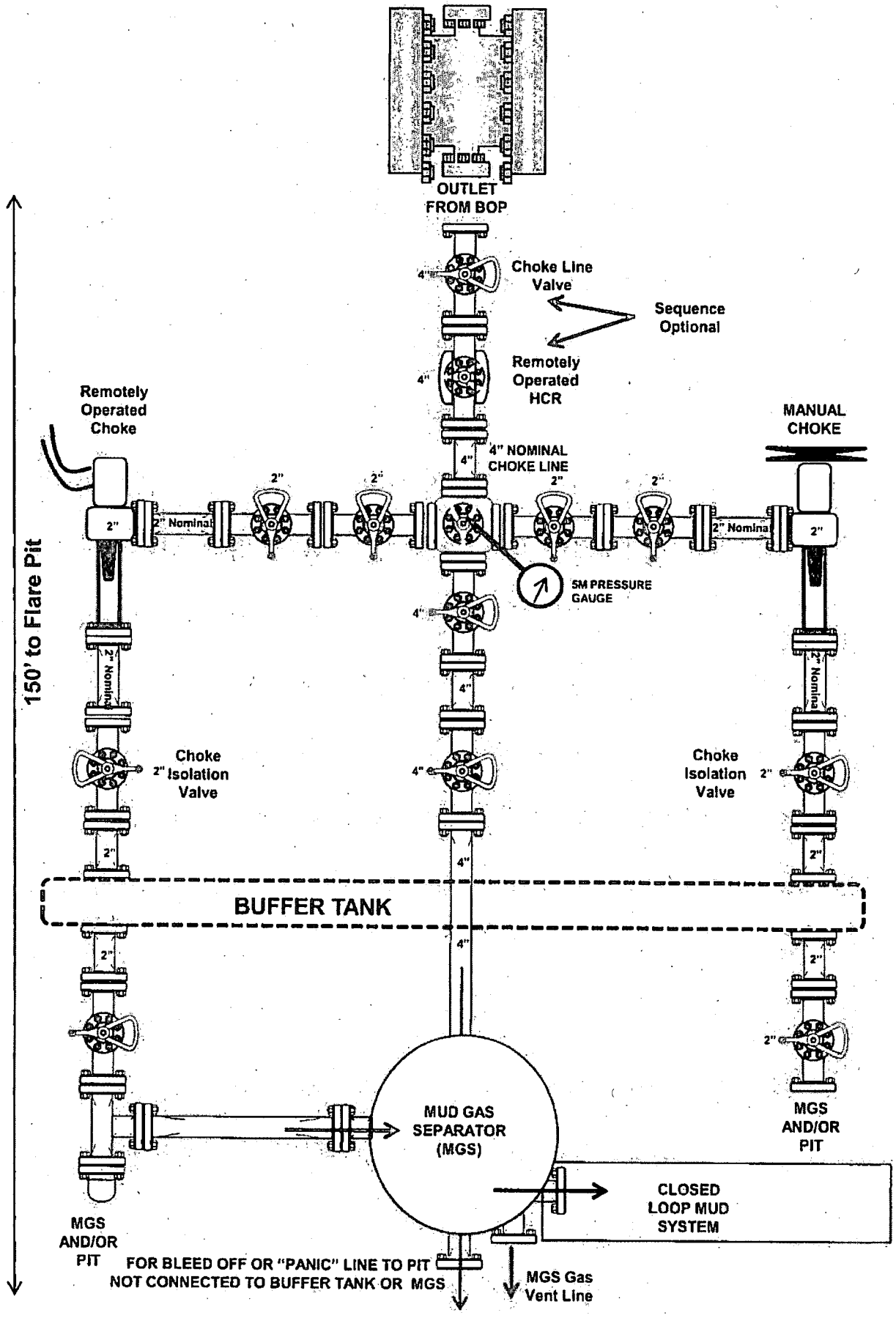
3,000 psi BOP Schematic



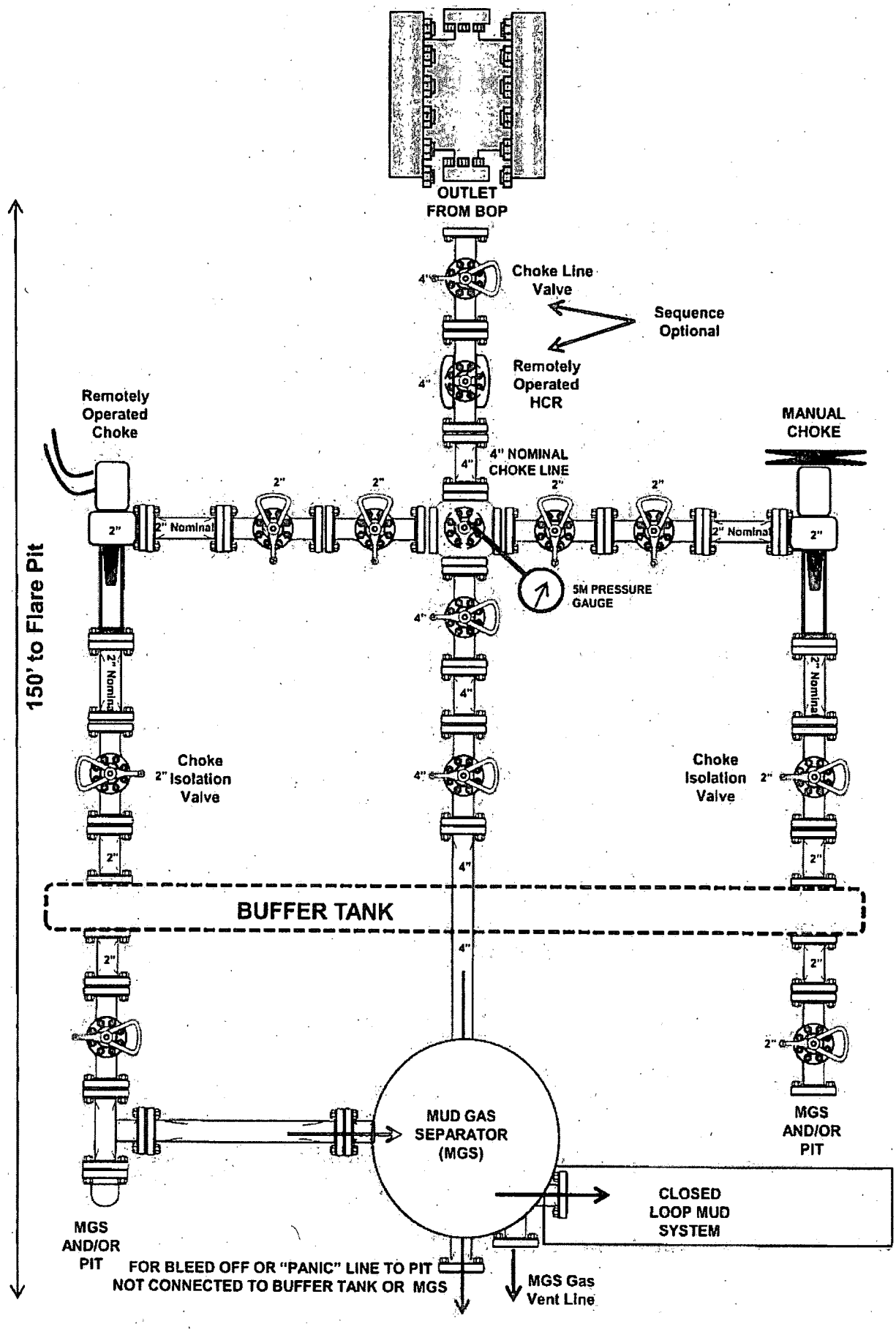
5,000 psi BOP Schematic



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



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



Certificate of Conformance	
Equipment Name	STUDS & NUTS KIT, FLG, 4-10M
Part Number	20022221
Serial Number	N/A
Customer	NOV GALENA PARK – CO 514
Rig	RIG 129
Customer Purchase Order	GPK1000357
NOV Sales Order	830047
Date of Manufacturing	MAY 2012
Quantity	10 (TEN)

NOV certifies that the above equipment:

1) Was manufactured and inspected in accordance with NOV specifications and customer purchase order requirements.

PREPARED BY:
Lucy Garcia
Documentation Specialist

REVIEWED BY:
Ashleigh Woodhouse
Documentation Specialist

CERTIFIED BY:
Quality Department

Certificate of Conformance	
Equipment Name	KILL HOSE, 02.0"ID X 40' LG, 10K PSI
Part Number	20095185
Serial Number	20095185-61453
Customer	NOV GALENA PARK – CO 514
Rig	RIG 129
Customer Purchase Order	GPK1000357
NOV Sales Order	830047
Date of Manufacturing	OCTOBER 2011
Quantity	1 (ONE)

NOV certifies that the above equipment:

1) Was manufactured and inspected in accordance with NOV specifications and customer purchase order requirements.

2) Manufactured to:
   - API SPECIFICATION 16C

3) Meets the applicable portions of NACE MR 0175/ISO 15156-1, for internal H_2S service.

PREPARED BY: _____
Lucy Garcia
Documentation Specialist

REVIEWED BY: _____
Ashleigh Woodhouse
Documentation Specialist

CERTIFIED BY: _____
Quality Department

PN 20080216P
LN RJ 503
EAR BLK 21-5M
LXT 3.26 X 5.00

Printed: 04/18/20
Page

Certifi

Order Number
74692

REPUBLIC HEAT TREAT

8902 N. MAIN
HOUSTON, TX 770220
Ph: 713-692-3410 Fax: 713-692-3910

Customer: 00000068
SFI-GRAY STEEL INC.
3511 W.12TH STREET
HOUSTON, TX 77008

Shipped To:
SFI-GRAY STEEL INC.
3511 W. 12TH STREET
HOUSTON, TX 77008

Customer Purchase Order No.	Customer Shipper No.	Material Type	Mat'l Heat Code	Lot Number
18354		4130	SEE BELOW	

Process: NQT

PROCESSING SPECIFICATIONS

Requirement	Specified	Qty Tested	Test Results
SFC HDNS:	212-235 BHN	4	228-235

Line#	Quantity	Weight	Part Number/Description	Revision
1	60	208.0	P/DWG#20080216PD	
2			3/4" PL 3.26" X 5"	
3	1		3/4" PL 4" X 6" COUPON TO LAB	
4			HT#E50984L-66872A	

Operation	Spec Temp Range	Specified Soak Time	Furnace# Load#	Atmos/Dpt CarbPot	Q-Media Q-Temp	Start Date	Time In	Time Out	Date Complete
NORMALIZE	1675	1:00	1			04/12/2011	2:30	4:30	04/12/2011
QUENCH	1600	1:00	5		WATER 72-80	04/13/2011	9:30	12:00	04/13/2011
TEMPER	1275	1:00	3			04/15/2011	6:30	8:00	04/15/2011

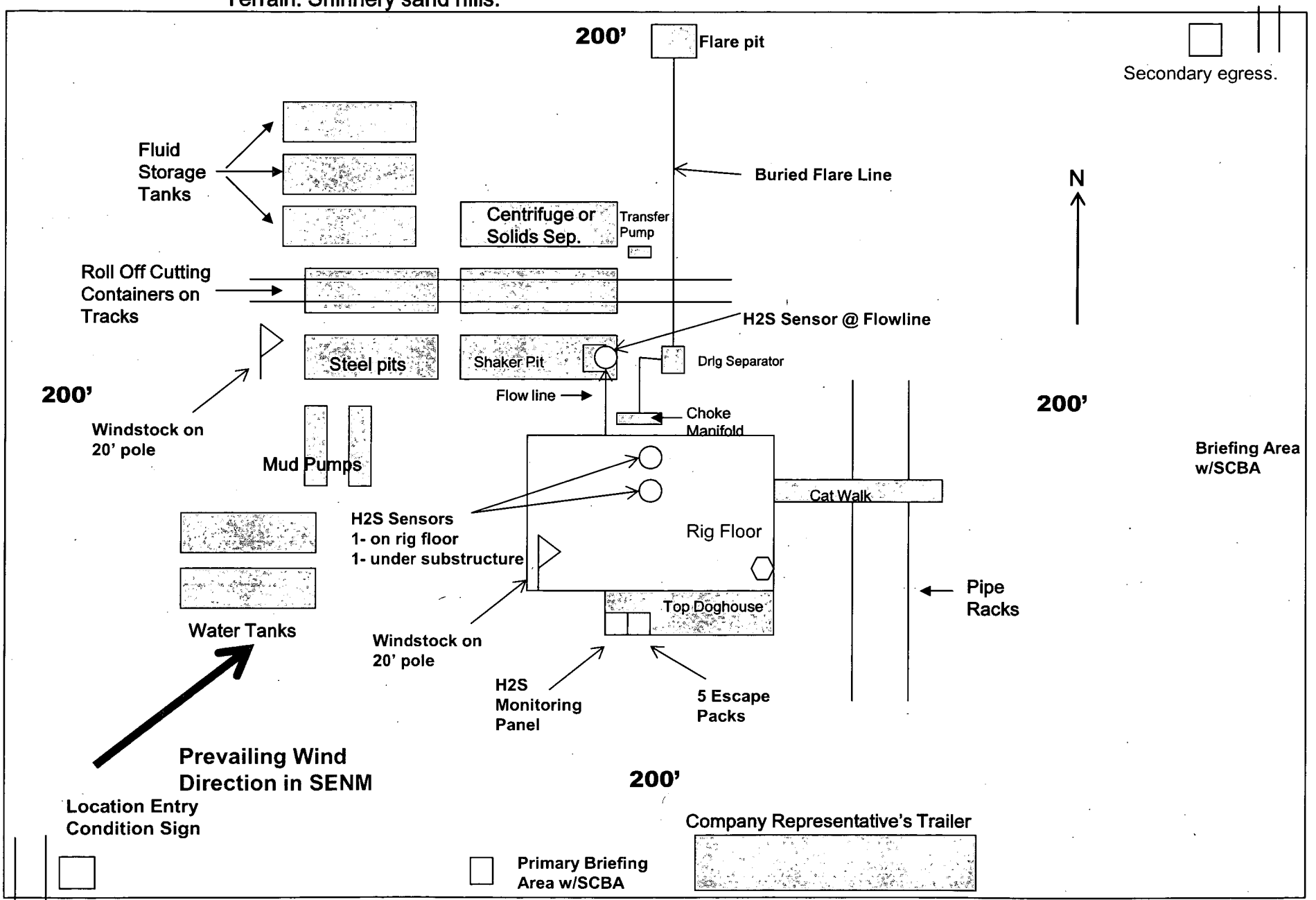
COMMENTS

JAMES MUSGROVE — 4-18-11 Date Signed

REVIEW OF REPUBLIC
WORK ORDER ☐ CERTS ☑
TO CUSTOMER REQUIREMENTS
DATE 4.18.11 BY

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

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



COG Operating LLC

Rig Plat & Closed Loop Equipment Diagram

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

Flare Lines will be from both Choke Manifold & Separator to edge of location.

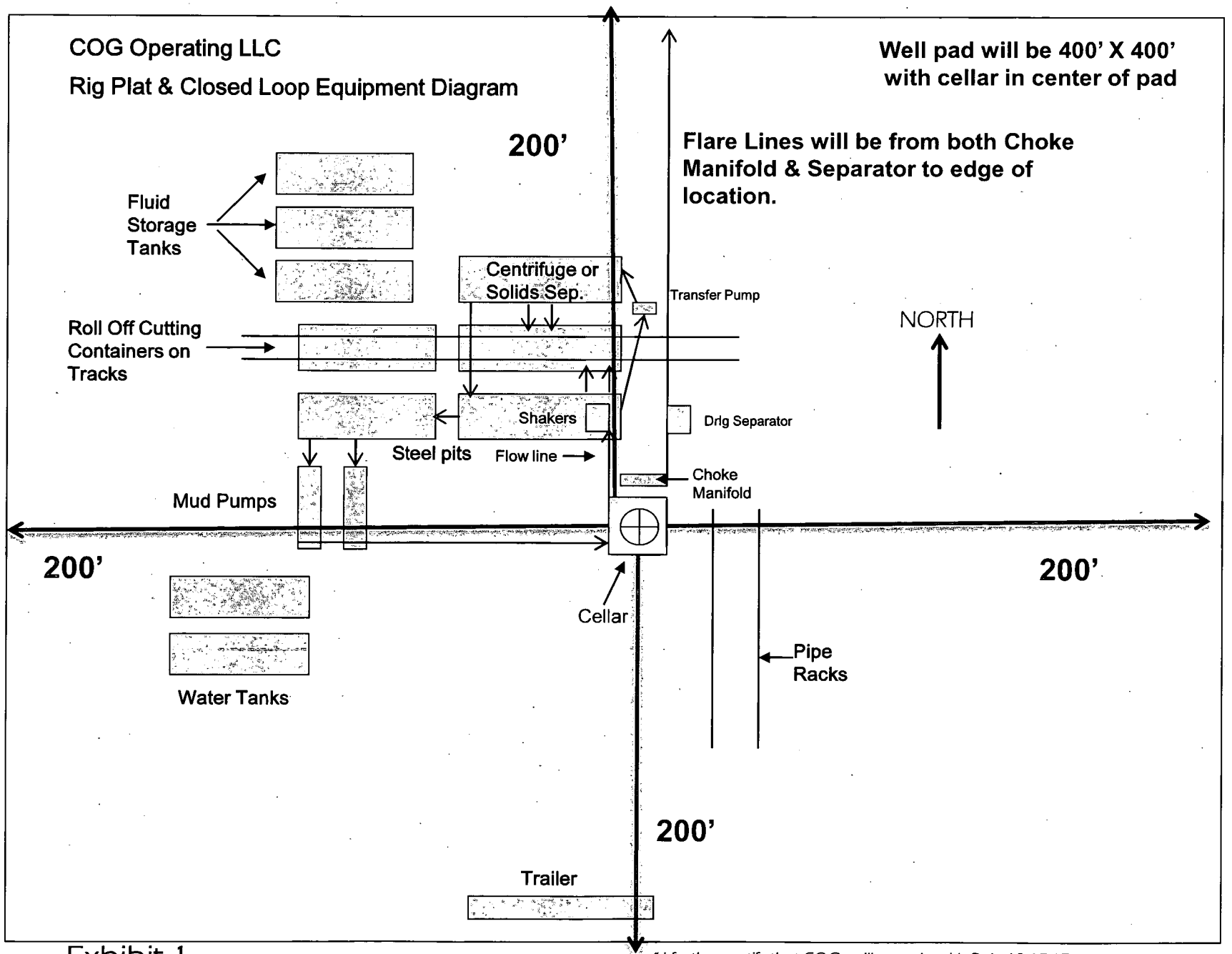


Exhibit 1

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

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

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

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

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

2. H_2S SAFETY EQUIPMENT AND SYSTEMS

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

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

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

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

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

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

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

g. Communication:
Company vehicles equipped with cellular telephone.

COG 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 H_2S AREA
AUTHORIZED PERSONNEL ONLY

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

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	OFFICE	MOBILE
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

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

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC**
LEASE NO.:	**NMNM18613A**
WELL NAME & NO.:	**Quien Sabe Fed Com 603H**
SURFACE HOLE FOOTAGE:	**695' FNL & 2280' FEL**
BOTTOM HOLE FOOTAGE	**200' FSL & 1980' FEL**
LOCATION:	**Section 24, T. 24 S., R 27 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

COA

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☑ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ Unit

A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **350** (Set in first competent anhydrite layer below 350' and at least 25 above the salt) feet and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
    b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8**

Approval Date: 06/19/2019

hours or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

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

Option 1 (Single Stage):

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

Option 2:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

b. Second stage above DV tool:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office.
  Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.

❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

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

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

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 **3000 (3M)** psi.

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** inch intermediate casing shoe shall be **5000 (5M)** psi.

D. SPECIAL REQUIREMENT(S)

Communitization Agreement

- 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.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

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

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

☒ Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.

After office hours call (575)

☒ 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

1. 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.

2. 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.

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

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.

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.

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: 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. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
    e. 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.

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.

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

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

f. 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.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. 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

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

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

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

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
WELL NAME & NO.:	QUIEN SABE FEDERAL COM 603H
SURFACE HOLE FOOTAGE:	695'/N & 2280'/E
BOTTOM HOLE FOOTAGE	200'/S & 1980'/E
LOCATION:	Section 24, T.24 S., R.27 E., NMPM
COUNTY:	Eddy County, New Mexico

TABLE OF CONTENTS

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

I. GENERAL PROVISIONS

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

II. PERMIT EXPIRATION

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

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

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

IV. NOXIOUS WEEDS

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

V. SPECIAL REQUIREMENT(S)

Cave/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 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 values 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 values, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Cave/Karst Subsurface Mitigation

The following stipulations will be applied to protect cave/karst and 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.

Hydrology

The entire 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 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.

When crossing ephemeral drainages the pipeline 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.

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.

A leak detection plan will be submitted to the BLM Carlsbad Field Office for approval prior to pipeline installation. The method could incorporate gauges to detect pressure drops, 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.

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.

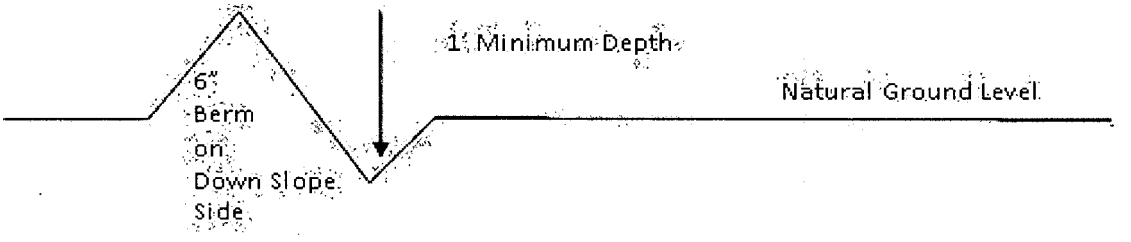
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

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

Cattle guards

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

Fence Requirement

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

Public Access

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

Construction Steps

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

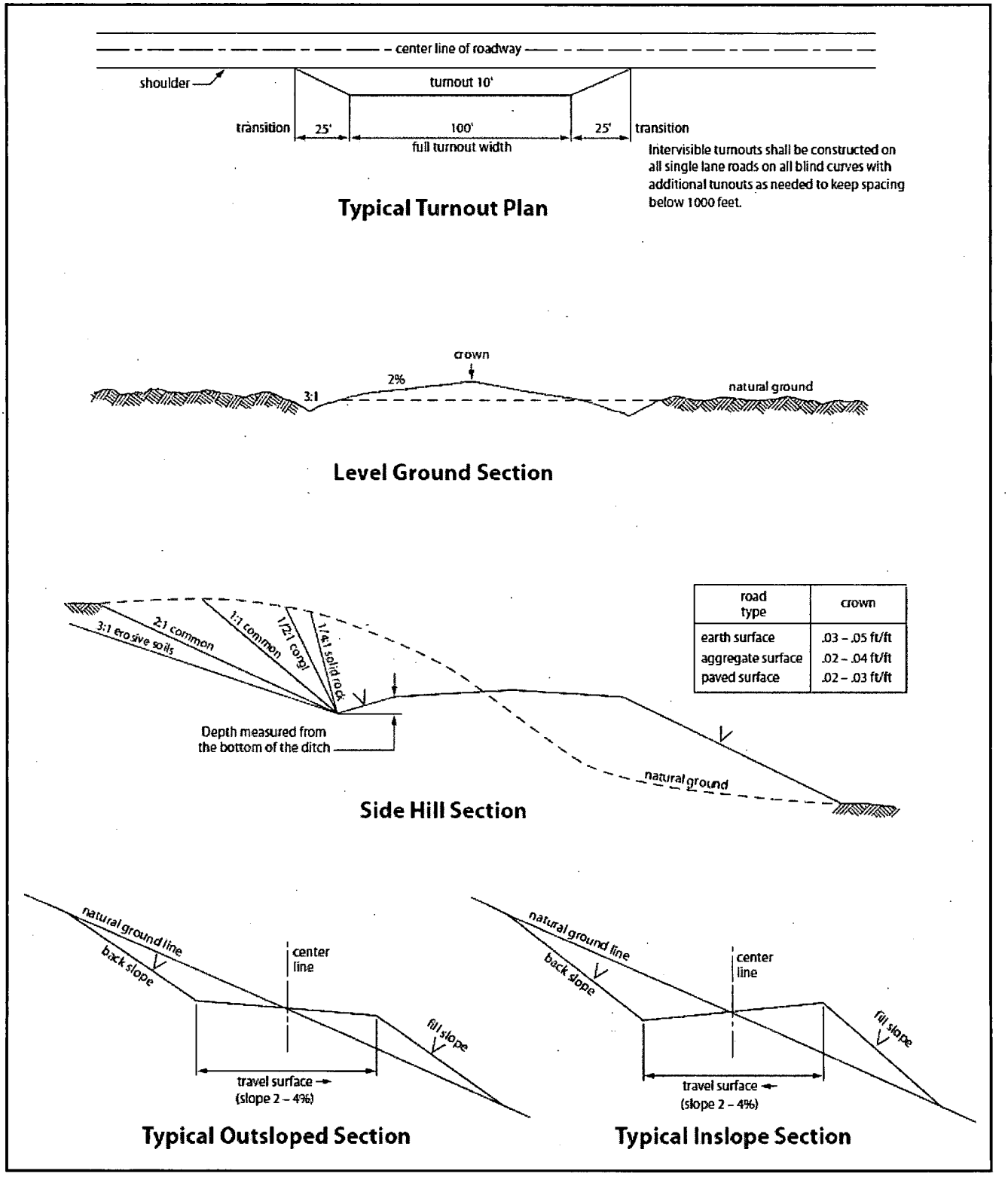


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

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

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

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

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

Containment Structures

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

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

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 **20** 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.

(X) seed mixture 1	( ) seed mixture 3
() seed mixture 2	( ) seed mixture 4
( ) seed mixture 2/LPC	( ) 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 1 for Loamy Sites

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

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

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

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

*Pounds of pure live seed:

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