Carlsbad Field Office
OCD Artesia

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 06 2017
RECEIVED

Form 3160-3
(March 2012)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMLC028784A

6. If Indian, Allotee or Tribe Name:

1a. Type of work: ☑ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.: BURCH-KEELY / NMNM88525X

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

8. Lease Name and Well No.: BURCH KEELY UNIT 942H

2. Name of Operator: COG OPERATING LLC

9. API Well No.: 30-015-44081

3a. Address: 600 West Illinois Ave Midland TX 79701

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

10. Field and Pool, or Exploratory: BURCH KEELY / GLORIETA-UPPER YE

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

At surface: NESE / 2285 FSL / 230 FEL / LAT 32.8335601 / LONG -104.0204078

At proposed prod. zone: NESE / 2310 FSL / 330 FEL / LAT 32.8336376 / LONG -104.0038246

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 13 / T17S / R29E / NMP

14. Distance in miles and direction from nearest town or post office*: 3 miles

12. County or Parish: EDDY

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 230 feet

16. No. of acres in lease: 640

17. Spacing Unit dedicated to this well: 157.39

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 176.7 feet

19. Proposed Depth: 4870 feet / 9821 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3635 feet

22. Approximate date work will start*: 02/28/2017

23. Estimated duration: 15 days

24. Attachments

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

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Robyn Odom / Ph: (432)685-4385	06/27/2016

Title: Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	02/17/2017

Title	Office
Supervisor Multiple Resources	CARLSBAD

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

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

(Continued on page 2)

*(Instructions on page 2)

APPROVED WITH CONDITIONS

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 06 2017
RECEIVED

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015- 44081	97918	Burch Keely; Glorieta-Upper Yeso

[4] Property Code	[5] Property Name	[6] Well Number
308086	BURCH KEELY UNIT	942H

[7] OGRID No.	[8] Operator Name	[9] Elevation
229137	COG OPERATING, LLC	3635'

[10] Surface Location

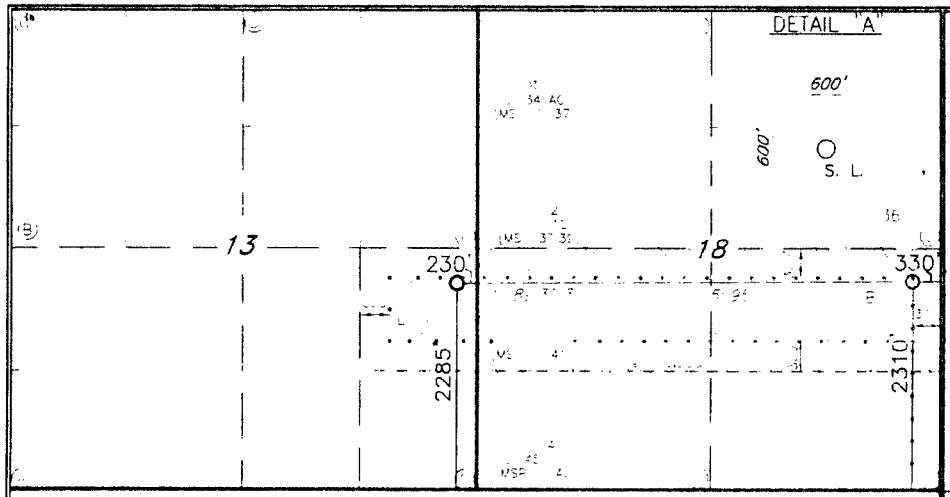
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	13	17-S	29-E		2285	SOUTH	230	EAST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	18	17-S	30-E		2310	SOUTH	330	EAST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
157.39			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



[17] OPERATOR CERTIFICATION

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

6/27/16
Signature Date

Robyn M. Russell
Printed Name

Rrussell@concho.com
E-mail Address

[18] SURVEYOR CERTIFICATION

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

7/8/13
Date of Survey

Signature and Seal of Professional Surveyor

19680
Certificate Number

APD ID: 10400002535
Operator Name: COG OPERATING LLC
Well Name: BURCH KEELY UNIT
Well Type: OIL WELL

Submission Date: 06/27/2016
Federal/Indian APD: FED
Well Number: 942H
Well Work Type: Drill

Highlight All Changes

Application

Section 1 - General

APD ID: 10400002535
Tie to previous NOS?
Submission Date: 06/27/2016
BLM Office: CARLSBAD
User: Robyn Odom
Title: Regulatory Analyst
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMLC028784A
Lease Acres: 640
Surface access agreement in place?
Allotted?
Reservation:
Agreement in place? YES
Federal or Indian agreement: FEDERAL
Agreement number: NMNM88525X
Agreement name: BURCH-KEELY
Keep application confidential? NO
Permitting Agent? NO
APD Operator: COG OPERATING LLC
Operator letter of designation:
Keep application confidential? NO

Operator Info

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

Section 2 - Well Information

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

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

Well Name: BURCH KEELY UNIT **Well Number:** 942H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** BURCH KEELY **Pool Name:** GLORIETA-UPPER YESO

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

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** YES **New surface disturbance?** Y

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

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

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 3 Miles **Distance to nearest well:** 176.7 FT **Distance to lease line:** 230 FT

Reservoir well spacing assigned acres Measurement: 157.39 Acres

Well plat: Burch Keely Unit 942H C102_06-27-2016.pdf

Well work start Date: 02/28/2017 **Duration:** 15 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.8335601	**Longitude:** -104.0204078	
SHL	**Elevation:** 3635	**MD:** 0	**TVD:** 0
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028784A	
	NS-Foot: 2285	**NS Indicator:** FSL	
	EW-Foot: 230	**EW Indicator:** FEL	
	Twsp: 17S	**Range:** 29E	**Section:** 13
	Aliquot: NESE	**Lot:**	**Tract:**

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.8335601	**Longitude:** -104.0204078	
KOP	**Elevation:** -794	**MD:** 4429	**TVD:** 4429
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028784A	
	NS-Foot: 2285	**NS Indicator:** FSL	
	EW-Foot: 230	**EW Indicator:** FEL	
	Twsp: 17S	**Range:** 29E	**Section:** 13
	Aliquot: NESE	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.8335601	**Longitude:** -104.0204078	
PPP	**Elevation:** 3634	**MD:** 1	**TVD:** 1
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028784A	
	NS-Foot: 2285	**NS Indicator:** FSL	
	EW-Foot: 230	**EW Indicator:** FEL	
	Twsp: 17S	**Range:** 29E	**Section:** 13
	Aliquot: NESE	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.833453	**Longitude:** -104.018076	
PPP	**Elevation:** -1276	**MD:** 7400	**TVD:** 4911
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028793C	
	NS-Foot: 2285	**NS Indicator:** FNL	
	EW-Foot: 2640	**EW Indicator:** FWL	
	Twsp: 17S	**Range:** 29E	**Section:** 18
	Aliquot: NWSE	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.833453	**Longitude:** -104.018076	
PPP	**Elevation:** -1205	**MD:** 5000	**TVD:** 4840
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028784B	
	NS-Foot: 2285	**NS Indicator:** FNL	
	EW-Foot: 1	**EW Indicator:** FWL	

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

	Twsp: 17S	**Range:** 29E	**Section:** 18
	Aliquot:	**Lot:** 3	**Tract:**
	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.833453	**Longitude:** -104.018076	
EXIT	**Elevation:** -1235	**MD:** 9821	**TVD:** 4870
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028793C	
	NS-Foot: 2310	**NS Indicator:** FSL	
	EW-Foot: 330	**EW Indicator:** FEL	
	Twsp: 17S	**Range:** 29E	**Section:** 18
	Aliquot: NESE	**Lot:**	**Tract:**
	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** EDDY
	Latitude: 32.8336376	**Longitude:** -104.0038246	
BHL	**Elevation:** -1235	**MD:** 9821	**TVD:** 4870
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMLC028793C	
	NS-Foot: 2310	**NS Indicator:** FSL	
	EW-Foot: 330	**EW Indicator:** FEL	
	Twsp: 17S	**Range:** 29E	**Section:** 18
	Aliquot: NESE	**Lot:**	**Tract:**

Drilling Plan

Section 1 - Geologic Formations

ID: Surface formation **Name:** UNKNOWN

Lithology(ies):

ALLUVIUM

Elevation: 3635 **True Vertical Depth:** 0 **Measured Depth:** 0

Mineral Resource(s):

USEABLE WATER

Is this a producing formation? N

ID: Formation 1 **Name:** RUSTLER

Lithology(ies):

ANHYDRITE

Elevation: 3348 **True Vertical Depth:** 287 **Measured Depth:** 287

Mineral Resource(s):

OTHER - Brackish Water

Is this a producing formation? N

ID: Formation 2 **Name:** TOP SALT

Lithology(ies):

SALT

Elevation: 3160 **True Vertical Depth:** 475 **Measured Depth:** 475

Mineral Resource(s):

OTHER - Salt

Is this a producing formation? N

ID: Formation 3 **Name:** TANSILL

Lithology(ies):

DOLOMITE

Elevation: 2664 **True Vertical Depth:** 971 **Measured Depth:** 971

Mineral Resource(s):

NONE

Is this a producing formation? N

ID: Formation 4 **Name:** YATES

Lithology(ies):

SANDSTONE

DOLOMITE

Elevation: 2558 **True Vertical Depth:** 1077 **Measured Depth:** 1077

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 5 **Name:** SEVEN RIVERS

Lithology(ies):

SANDSTONE

DOLOMITE

Elevation: 2270 **True Vertical Depth:** 1365 **Measured Depth:** 1365

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 6 **Name:** QUEEN

Lithology(ies):

SANDSTONE

Elevation: 1665 **True Vertical Depth:** 1970 **Measured Depth:** 1970

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 7 **Name:** GRAYBURG

Lithology(ies):

SANDSTONE

DOLOMITE

Elevation: 1264 **True Vertical Depth:** 2371 **Measured Depth:** 2371

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 8 **Name:** SAN ANDRES

Lithology(ies):

DOLOMITE

ANHYDRITE

Elevation: 964 **True Vertical Depth:** 2671 **Measured Depth:** 2671

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 9 **Name:** GLORIETA

Lithology(ies):

SANDSTONE

SILTSTONE

Elevation: -427 **True Vertical Depth:** 4062 **Measured Depth:** 4062

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 10 **Name:** PADDOCK

Lithology(ies):

DOLOMITE

Elevation: -523 **True Vertical Depth:** 4158 **Measured Depth:** 4158

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 11 **Name:** BLINEBRY

Lithology(ies):

DOLOMITE

Elevation: -1020 **True Vertical Depth:** 4660 **Measured Depth:** 4660

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? Y

ID: Formation 12 **Name:** TUBB

Lithology(ies):

SANDSTONE

DOLOMITE

Elevation: -2025 **True Vertical Depth:** 5660 **Measured Depth:** 5660

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

Section 2 - Blowout Prevention

Pressure Rating (PSI): 2M **Rating Depth:** 9500

Equipment: ALL REQUIRED EQUIPMENT PER FEDERAL AND STATE REGULATIONS TO BE IN PLACE PRIOR TO DRILLING OUT THE SURFACE CASING.
Requesting Variance? NO

Variance request:

Testing Procedure: BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested. Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.

Choke Diagram Attachment:

2M Choke Schematic 1-12-16.pdf

BOP Diagram Attachment:

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

2M Choke Schematic 1-12-16.pdf

2M ANNULAR BOP 2-1-16.pdf

Section 3 - Casing

String Type: SURFACE **Other String Type:**

Hole Size: 17.5

Top setting depth MD: 0 **Top setting depth TVD:** 0

Top setting depth MSL: 3635

Bottom setting depth MD: 315 **Bottom setting depth TVD:** 315

Bottom setting depth MSL: 3320

Calculated casing length MD: 315

Casing Size: 13.375 **Other Size**

Grade: H-40 **Other Grade:**

Weight: 48

Joint Type: STC **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 5.23 **Burst Design Safety Factor:** 3.28

Joint Tensile Design Safety Factor type: DRY **Joint Tensile Design Safety Factor:** 21.71

Body Tensile Design Safety Factor type: DRY **Body Tensile Design Safety Factor:** 21.71

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_06-27-2016.pdf

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

String Type: INTERMEDIATE **Other String Type:**

Hole Size: 12.25

Top setting depth MD: 0 **Top setting depth TVD:** 0

Top setting depth MSL: 3635

Bottom setting depth MD: 1100 **Bottom setting depth TVD:** 1100

Bottom setting depth MSL: 2535

Calculated casing length MD: 1100

Casing Size: 9.625 **Other Size**

Grade: J-55 **Other Grade:**

Weight: 40

Joint Type: LTC **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 4.89 **Burst Design Safety Factor:** 1.67

Joint Tensile Design Safety Factor type: DRY **Joint Tensile Design Safety Factor:** 12.87

Body Tensile Design Safety Factor type: DRY **Body Tensile Design Safety Factor:** 12.87

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_06-27-2016.pdf

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

String Type: PRODUCTION **Other String Type:**

Hole Size: 8.75

Top setting depth MD: 0 **Top setting depth TVD:** 0

Top setting depth MSL: 3635

Bottom setting depth MD: 4429 **Bottom setting depth TVD:** 4429

Bottom setting depth MSL: -794

Calculated casing length MD: 4429

Casing Size: 7.0 **Other Size**

Grade: L-80 **Other Grade:**

Weight: 29

Joint Type: LTC **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 3.31 **Burst Design Safety Factor:** 1.33

Joint Tensile Design Safety Factor type: DRY **Joint Tensile Design Safety Factor:** 2.76

Body Tensile Design Safety Factor type: DRY **Body Tensile Design Safety Factor:** 2.76

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_06-27-2016.pdf

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

String Type: PRODUCTION **Other String Type:**

Hole Size: 8.75

Top setting depth MD: 4429 **Top setting depth TVD:** 4429

Top setting depth MSL: -794

Bottom setting depth MD: 5256 **Bottom setting depth TVD:** 4950

Bottom setting depth MSL: -1315

Calculated casing length MD: 827

Casing Size: 5.5 **Other Size**

Grade: L-80 **Other Grade:**

Weight: 17

Joint Type: LTC **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 2.66 **Burst Design Safety Factor:** 1.26

Joint Tensile Design Safety Factor type: DRY **Joint Tensile Design Safety Factor:** 3.71

Body Tensile Design Safety Factor type: DRY **Body Tensile Design Safety Factor:** 3.71

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_06-27-2016.pdf

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

String Type: PRODUCTION **Other String Type:**

Hole Size: 7.875

Top setting depth MD: 5256 **Top setting depth TVD:** 4950

Top setting depth MSL: -1315

Bottom setting depth MD: 9821 **Bottom setting depth TVD:** 4870

Bottom setting depth MSL: -1235

Calculated casing length MD: 4565

Casing Size: 5.5 **Other Size**

Grade: L-80 **Other Grade:**

Weight: 17

Joint Type: LTC **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 2.66 **Burst Design Safety Factor:** 1.26

Joint Tensile Design Safety Factor type: DRY **Joint Tensile Design Safety Factor:** 7.62

Body Tensile Design Safety Factor type: DRY **Body Tensile Design Safety Factor:** 7.62

Casing Design Assumptions and Worksheet(s):

Casing Design Attachement_06-27-2016.pdf

Section 4 - Cement

Casing String Type: SURFACE

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 315 **Cement Type:** Class C

Additives: 2% CaCl2+0.25pps CF **Quantity (sks):** 400 **Yield (cu.ff./sk):** 1.32

Density: 14.8 **Volume (cu.ft.):** 528 **Percent Excess:** 141

Casing String Type: INTERMEDIATE

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 1100 **Cement Type:** 50:50:10 C; Poz:Gel

Additives: 5% Salt+5pps LCM+0.25pps Celloflake **Quantity (sks):** 250 **Yield (cu.ff./sk):** 2.45

Density: 11.8 **Volume (cu.ft.):** 612.5 **Percent Excess:** 210

Tail

Top MD of Segment: **Bottom MD Segment:** 1100 **Cement Type:** Class C

Additives: 2% CaCl2 **Quantity (sks):** 200 **Yield (cu.ff./sk):** 1.32

Density: 14.8 **Volume (cu.ft.):** 264 **Percent Excess:**

Casing String Type: PRODUCTION

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 4429 **Cement Type:** 35:65:6 C:Poz:Gel

Additives: 5%Salt+5pps LCM+0.25pps CF **Quantity (sks):** 450 **Yield (cu.ff./sk):** 2.05

Density: 12.5 **Volume (cu.ft.):** 922.5 **Percent Excess:** 59

Tail

Top MD of Segment: 0 **Bottom MD Segment:** 4429 **Cement Type:** 50:50:2 C:Poz:Gel

Additives: 5%Salt+3pps LCM+0.6%SMS+1%FL-25+1%Ba- **Quantity (sks):** 1200 **Yield (cu.ff./sk):** 1.37

Density: 14 **Volume (cu.ft.):** 1644 **Percent Excess:** 59

Stage Tool Depth:

Lead

Top MD of Segment: 4429 **Bottom MD Segment:** 5256 **Cement Type:** 35:65:6 C:Poz:Gel

Additives: 5%Salt+5pps LCM+0.25pps CF **Quantity (sks):** 450 **Yield (cu.ff./sk):** 2.05

Density: 12.5 **Volume (cu.ft.):** 922.5 **Percent Excess:** 59

Tail

Top MD of Segment: 4429 **Bottom MD Segment:** 5256 **Cement Type:** 50:50:2 C:Poz:Gel

Additives: 5%Salt+3pps LCM+0.6%SMS+1%FL-25+1%Ba- **Quantity (sks):** 1200 **Yield (cu.ff./sk):** 1.37

Density: 14 **Volume (cu.ft.):** 1644 **Percent Excess:** 59

Stage Tool Depth:

Lead

Top MD of Segment: 5256 **Bottom MD Segment:** 9821 **Cement Type:** 35:65:6 C:Poz:Gel

Additives: 5%salt+5pps LCM+0.2%SMS+1%FL-25+1%Ba-58+0.3%FL-52A+0.125pps CF **Quantity (sks):** 450 **Yield (cu.ff./sk):** 2.05

Density: 12.5 **Volume (cu.ft.):** 922.5 **Percent Excess:** 59

Tail

Top MD of Segment: 5256 **Bottom MD Segment:** 9821 **Cement Type:** 50:50:2 C:Poz:Gel

Additives: 5%salt+3pps LCM+0.6%SMS+1%FL-25+1%BA- **Quantity (sks):** 1200 **Yield (cu.ff./sk):** 1.37

Density: 14 **Volume (cu.ft.):** 1644 **Percent Excess:** 59

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: 0 **Bottom Depth:** 309

Mud Type: WATER-BASED MUD

Min Weight (lbs./gal.): 8.6 **Max Weight (lbs./gal.):** 8.8

Density (lbs/cu.ft.): **Gel Strength (lbs/100 sq.ft.):**

PH: **Viscosity (CP):**

Filtration (cc): **Salinity (ppm):**

Additional Characteristics:

Top Depth: 0 **Bottom Depth:** 5256

Mud Type: SALT SATURATED

Min Weight (lbs./gal.): 10 **Max Weight (lbs./gal.):** 10.2

Density (lbs/cu.ft.): **Gel Strength (lbs/100 sq.ft.):**

PH: **Viscosity (CP):**

Filtration (cc): **Salinity (ppm):**

Additional Characteristics:

Top Depth: 5256 **Bottom Depth:** 9821

Mud Type: WATER-BASED MUD

Min Weight (lbs./gal.): 8.5 **Max Weight (lbs./gal.):** 9.2

Density (lbs/cu.ft.): **Gel Strength (lbs/100 sq.ft.):**

PH: **Viscosity (CP):**

Filtration (cc): **Salinity (ppm):**

Additional Characteristics:

Section 6 - Test, Logging, Coring

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

INTERVAL PERFORATING, FRACTURE STIMULATING, FLOW BACK TESTING.

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

CNL,MUDLOG

Coring operation description for the well:

N/A

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 2143 **Anticipated Surface Pressure:** 1062.58

Anticipated Bottom Hole Temperature(F): 106

Anticipated abnormal proessures, 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:

H2S Plan_05-20-2016.pdf

Burch Keely Unit 942H H2S Schematic_06-27-2016.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Burch Keely Unit 942H - Plan 1 11-15-13_06-27-2016.pdf

Other proposed operations facets description:

9 5/8" DV TOOL CEMENT OPTION IS PROPOSED FOR APPROVAL. THIS MAY BECOME NECESSARY IF LOST CIRCULATIC OCCURS WHILE DRILLING THE 12 1/4" INTERMEDIATE HOLE. DV TOOL DEPTH WILL BE BASED ON HOLE CONDITIONS. CEMENT VOLUMES WILL BE ADJUSTED PROPORTIONALLY. DV TOOL WILL BE SET MINIMUM OF 50' BELOW PREVIOUS CASING AND A MINIMUM OF 200' ABOUT CURRENT SHOE.
7" DV TOOL CEMENT OPTION IS PROPOSED FOR APPROVAL. THIS MAY BECOME NECESSARY IF WATER FLOWS IN TH SAN ANDRES ARE ENCOUNTERED. THESE WATER FLOWS NORMALLY OCCUR IN AREAS WHERE PRODUCED WATER DISPOSAL IS HAPPENING. THIS DENSE CEMENT IS USED TO COMBAT WATER FLOWS. THIS CEMENT RECIPE ALSO HA RIGHT ANGLE SET TIME AND IS MIXED A LITTLE UNDER SATURATED SO THE WATER FLOW WILL BE ABSORBED BY CEMENT. DV TOOL DEPTH WILL BE BASED ON HOLE CONDITIONS. CEMENT VOLUMES WILL BE ADJUSTED PROPORTIONALLY. DV TOOL WILL BE SET A MINIUM OF 50' BELOW PREVIOUS CASING AND A MINIMUM OF 200' ABOVE CURRENT SHOE.

Other proposed operations facets attachment:

A Blank C-144 Closed Loop_06-27-2016.pdf

Burch Keely Unit 942H - Plan 1 11-15-13 AC Report_06-27-2016.pdf

BKU 942H_Prod Cement Breakdown_09-22-2016.pdf

Other Variance attachment:

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

Burch Keely Unit 942H Vacinity plat_06-27-2016.pdf

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

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

Burch Keely Unit 942H 1mileRadius Map_06-27-2016.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: PRODUCTION TO BE SENT TO THE BKU 18-A FEDERAL TANK BATTERY IN SECTION 18, T17S, R30E, AT THE EXISTING BKU #411 WELL SITE AT 1910' FNL & 990' FWL. 2 PROPOSED FLOWLINES WILL FOLLOW AN ARCHAEOLOGICALLY APPROVED ROUTE TO THE BKU 18-A FEDERAL TANK BATTERY. THE FLOWLINE WILL BE SDR 7 3" POLY LINE LAID ON THE SURFACE AND WILL BE APPROX. 2916' IN LENGTH. NORMAL WORKING PRESSURE OF THE FLOWLINES WILL BE BELOW 70 PSI AND CARRY AND MIXTURE OF OIL, WATER AND GAS. FLOWLINES WILL FOLLOW EXISTING WELL-TRAVELED OR PROPOSED ROADS.

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: DUST CONTROL, INTERMEDIATE/PRODUCTION CASING, SURFACE CASING
Water source type: GW WELL
Describe type:
Source latitude:
Source longitude:
Source datum:
Water source permit type: PRIVATE CONTRACT
Source land ownership: COMMERCIAL
Water source transport method: PIPELINE,TRUCKING
Source transportation land ownership: COMMERCIAL
Water source volume (barrels): 8000
Source volume (acre-feet): 1.0311447
Source volume (gal): 336000

Water source and transportation map:

Loco Hills Water Disposal Co..pdf

Water source comments: The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. Water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Vicinity Map. A fresh water source is nearby and fast line may be laid along existing road ROW's and fresh water pumped to the well. All water will originate from private wells located in Section 16 T-17S-R30E, depicted on the "Loco Hills Water Disposal Co." map attached to this APD. Loco Hills Water Disposal Co., James R. Maloney, 575-677-2118. No water well will be drilled on the location.
New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**
Well target aquifer:

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

Aquifer comments:

Aquifer documentation:

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

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

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

Drilling method: **Drill material:**

Grout material: **Grout depth:**

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

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. Secondary candidate source will be NMSLO Caliche Pit located in S2 SW4 of Section 32 Township 16 South Range 30 East.
Construction Materials source location attachment:

Construction Turn-Over Procedure_06-27-2016.pdf

Burch Keely Unit 942H NMSLO Caliche Pit_12-05-2016.pdf

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: DRILL CUTTINGS AND DRILLING FLUIDS

Amount of waste: 100 barrels

Waste disposal frequency : Daily

Safe containment description: CLOSED LOOP SYSTEM

Safe containmant attachment:

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

Disposal location description: R360'S DISPOSAL SITE LOCATED AT 4507 WEST CARLSBAD HIGHWAY, HOBBS, NM 88240.

Waste type: PRODUCED WATER

Waste content description: PRODUCED WATER

Amount of waste: 100 barrels

Waste disposal frequency : Daily

Safe containment description: STEEL TANKS

Safe containmant attachment:

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

Disposal location description: NMOCD APPROVED COMMERCIAL DISPOSAL FACILITY. R360'S DISPOSAL SITE LOCATED AT 4507 WEST CARLSBAD HIGHWAY, HOBBS, NM 88240.

Waste type: GARBAGE

Waste content description: GARBAGE AND TRASH PRODUCED DURING DRILLING AND COMPLETION OPERATIONS.
Amount of waste: 100 pounds

Waste disposal frequency : Weekly

Safe containment description: TRASH BIN

Safe containmant attachment:

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

Disposal location description: GARBAGE AND TRASH TO BE COLLECTED IN TRASH BIN AND HAULED TO LEA LANDFILL LLC. LOCATED AT MILE MARKER 64, HIGHWAY 62-180 EAST, PO BOX 3247, CARLSBAD, NM 88221. NO TOXIC WASTE OR HAZARDOUS CHEMICALS WILL BE PRODUCED BY THIS OPERATION.

Waste type: SEWAGE

Waste content description: HUMAN WASTE AND GREY WATER.

Amount of waste: 100 gallons

Waste disposal frequency : Weekly

Safe containment description: PORTABLE SEPTIC SYSTEM AND/OR PORTABLE WASTE GATHERING SYSTEM.

Safe containmant attachment:

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

Disposal location description: HAULED TO NMOCD APPROVED WASTE DISPOSAL FACILTY.

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 CLOSED LOOP MUD SYSTEM: ROLL-OFF STYLE MUD BOX.

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

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

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Burch Keely Unit 942H Well Site plat_12-05-2016.pdf
Burch Keely Unit 942H Interim Reclamation plat_12-05-2016.pdf
Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: PAD EXPANSION

Recontouring attachment:

Drainage/Erosion control construction: NO SEDIMENTATION OR EROSION CONTROL WILL BE NECESSARY ON THIS LOCATION AS IT IS GENERALLY FLAT WITH LITTLE TO NO SLOPE OR CUT AND FILL.
Drainage/Erosion control reclamation: NO SEDIMENTATION OR EROSION CONTROL WILL BE NECESSARY ON THIS LOCATION AS IT IS GENERALLY FLAT WITH LITTLE TO NO SLOPE OR CUT AND FILL.

Wellpad long term disturbance (acres): 1.38 **Wellpad short term disturbance (acres):** 2.07

Access road long term disturbance (acres): 0 **Access road short term disturbance (acres):** 0

Pipeline long term disturbance (acres): 0.0011707989 **Pipeline short term disturbance (acres):** 0.0011707989

Other long term disturbance (acres): 0 **Other short term disturbance (acres):** 0

Total long term disturbance: 1.3811707 **Total short term disturbance:** 2.0711708

Reconstruction method: AFTER WELL IS COMPLETED, THE PAD WILL BE DOWNSIZED BY RECLAIMING THE AREAS NOT NEEDED FOR PRODUCTION OPERATIONS. THE PORTIONS OF THE PAD THAT ARE NOT NEEDED FOR PRODUCTION OPERATIONS WILL BE RE-CONTOURED TO ITS ORIGINAL STATE AS MUSH AS POSSIBLE. THE CALICHE THAT IS REMOVED WILL BE REUSED TO EITHER BUILD ANOTHER PAD SITE OR FOR ROAD REPAIRS WITHIN THE LEASE.
Topsoil redistribution: THE STOCKPILED TOPSOIL WILL BE SPREAD OUT ON RECLAIMED AREA AND RESEEDED WITH A BLM APPROVED SEED MIXTURE.
Soil treatment: INTERIM RECLAMATION AS IDENTIFIED DURING ONSITE.

Existing Vegetation at the well pad: GRASSLAND AREA WITH SANDY TOPSOIL. VEGETATION IS MODERATELY SPARSE WITH NATIVE PRAIRIE GRASSES, SOME MESQUITE AND SHINNERY OAK.
Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: GRASSLAND AREA WITH SANDY TOPSOIL. VEGETATION IS MODERATELY SPARSE WITH NATIVE PRAIRIE GRASSES, SOME MESQUITE AND SHINNERY OAK.
Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: GRASSLAND AREA WITH SANDY TOPSOIL. VEGETATION IS MODERATELY SPARSE WITH NATIVE PRAIRIE GRASSES, SOME MESQUITE AND SHINNERY OAK.
Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: GRASSLAND AREA WITH SANDY TOPSOIL. VEGETATION IS MODERATELY SPARSE WITH NATIVE PRAIRIE GRASSES, SOME MESQUITE AND SHINNERY OAK.
Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

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

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: APPROVED EPA AND BLM REQUIREMENTS AND POLICIES FOR WEED CONTROL METHODS WILL BE FOLLOWED.
Weed treatment plan attachment:

Monitoring plan description: EVALUATION OF GROWTH WILL BE MADE AFTER THE COMPLETION OF ONE FULL GROWING SEASON AFTER SEEDING. -OR- BLM REPRESENTATIVE WILL BE CONTACTED PRIOR TO COMMENCING CONSTRUCTION OF WELL PAD AND ROAD. BLM REPERSENTATIVE WILL ALSO BE CONTACTED PRIOR TO COMMENCING RECLAMATION WORK.
Monitoring plan attachment:

Success standards: 80% COVERAGE BY 2ND GROWING SEASON OF NATIVE SPECIES WITH LESS THAN 5% INVASIVE SPECIES.
Pit closure description: N/A

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: EXISTING ACCESS ROAD

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:**

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:

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

Other Local Office:

USFS Region:

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

Disturbance type: PIPELINE

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Section 12 - Other Information

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

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: ONSITE PERFORMED ON 06/20/2013 BY LEGION(BLM), CANDEN JAMESON(COG), GARY BOX(P.C.)

Other SUPO Attachment

Burch Keely Unit 942H_Flowline Map_12-05-2016.pdf

PWD

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

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

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

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

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

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

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

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

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: Robyn Odom **Signed on:** 06/27/2016

Title: Regulatory Analyst

Street Address: 600 W Illinois Ave

Operator Name: COG OPERATING LLC

Well Name: BURCH KEELY UNIT **Well Number:** 942H

City: Midland **State:** TX **Zip:** 79701

Phone: (432)685-4385

Email address: rodom@concho.com

Field Representative

Representative Name: Caden Jameson

Street Address: 600 W Illinois Ave

City: Midland **State:** TX **Zip:** 79701

Phone: (432)254-5559

Email address: cjameson@concho.com

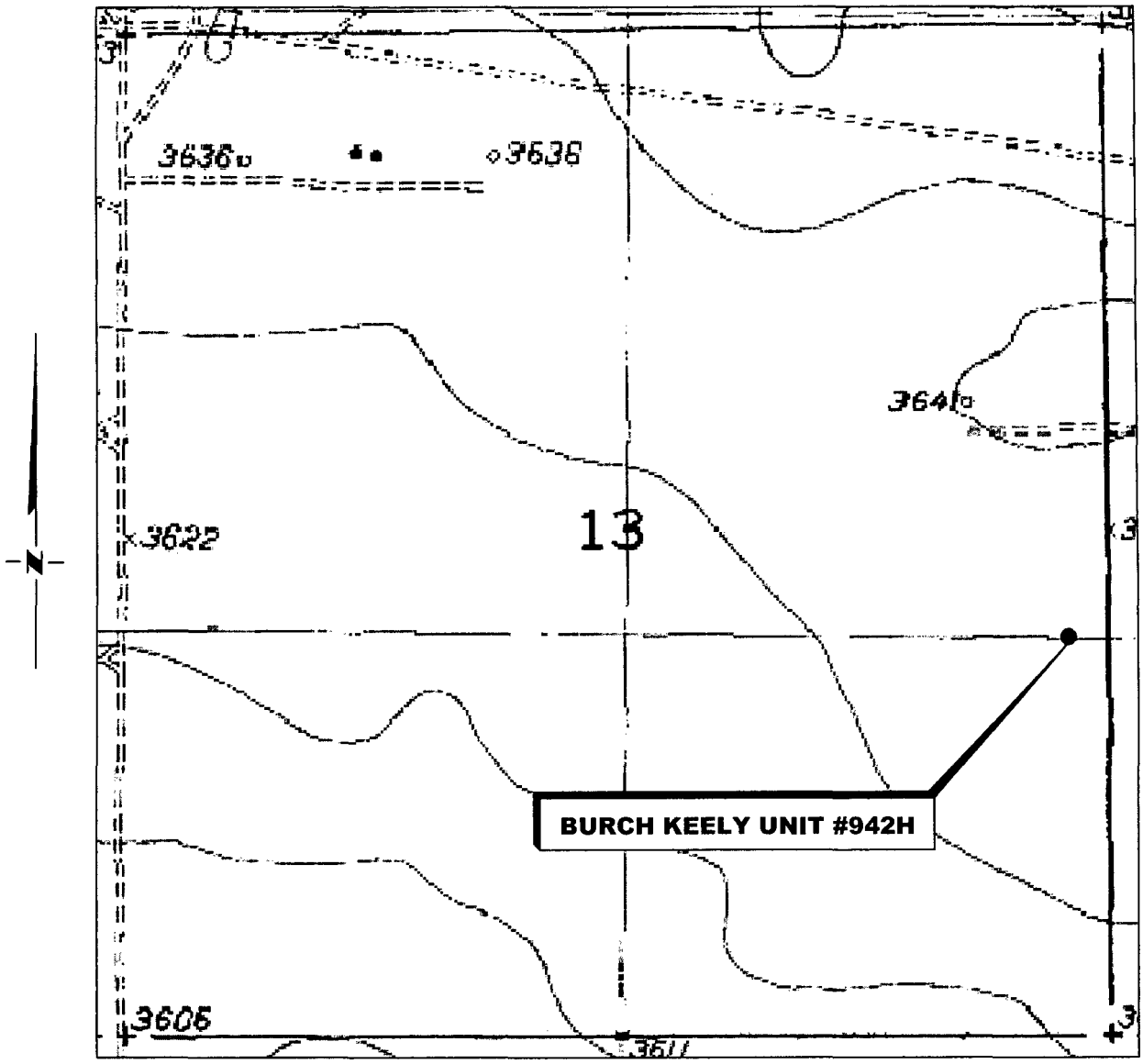
Payment Info

Payment

APD Fee Payment Method: PAY.GOV

pay.gov Tracking ID: 25SDTSS7

LOCATION VERIFICATION MAP



SECTION 13, TWP. 17 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO

OPERATOR: COG Operating, LLC
LEASE: Burch Keely Unit
WELL NO.: 942H
ELEVATION: 3635'

LOCATION: 2285' FSL & 230' FEL
CONTOUR INTERVAL: 10'
USGS TOPO. SOURCE MAP:
Red Lake SE, NM (1955)

NO.	REVISION	DATE

JOB NO.: LS130269
DWG. NO.: 130269LVM

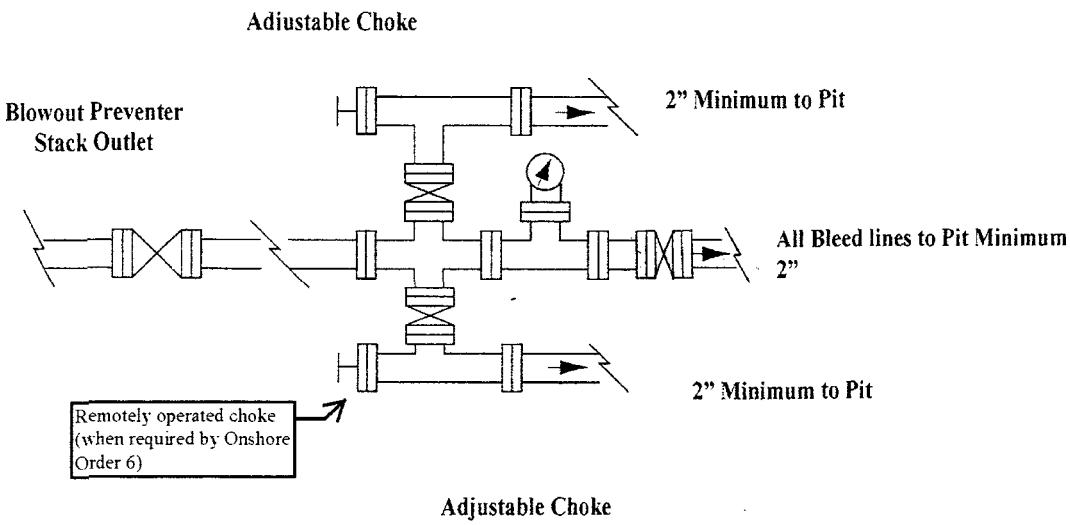
PROSPERITY CONSULTANTS, LLC

2251 Double Creek Drive, Suite 602, Round Rock, Texas 78664 o (512) 992-2087 f (512) 251-2518

SCALE: 1" = 1000'
DATE: 7/8/13
SURVEYED BY: GB/SM
DRAWN BY: DR
APPROVED BY: LWB
SHEET : 1 OF 1

COG Operating LLC
Exhibit #9
Choke Schematic

Choke Manifold Requirement (2000 psi WP)



NOTES REGARDING THE BLOWOUT PREVENTERS

Master Drilling Plan
Eddy County, New Mexico

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.

2. Wear ring to be properly installed in head.

3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.

4. All fittings to be flanged.

5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.

6. All choke and fill lines to be securely anchored especially ends of choke lines.

7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.

8. Kelly cock on Kelly.

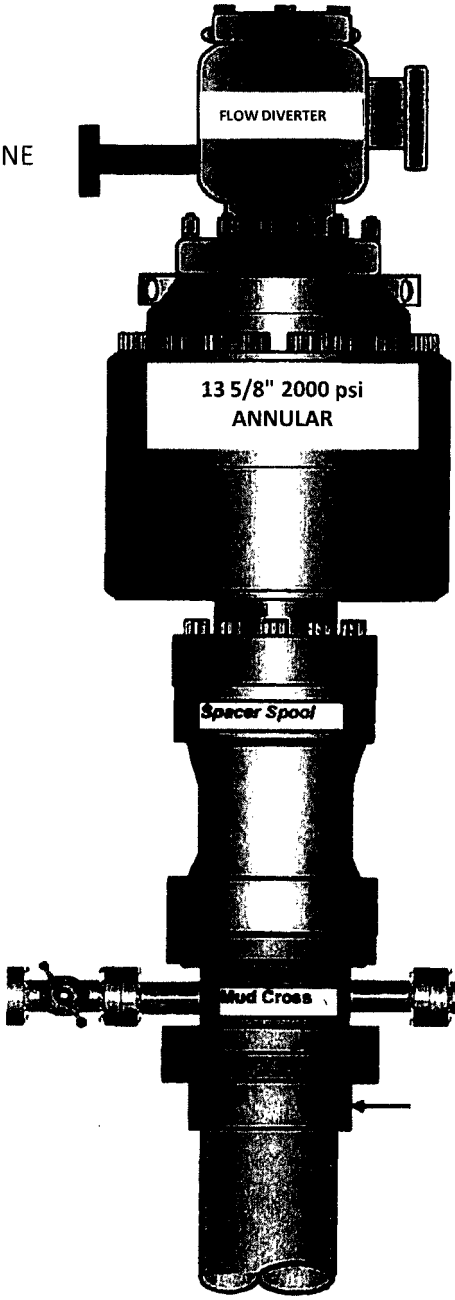
9. Extension wrenches and hands wheels to be properly installed.

10. Blow out preventer control to be located as close to driller's position as feasible.

11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

Exhibit #10

13 5/8" 2K ANNULAR



FILL LINE

4-1/16",2K VALVES

13 5/8" 3K "A" SECTION

Casing Program

	Collapse SF	Burst SF	Tension SF
BLM Minimum Safety Factor	1.125	1	1.6 Dry 1.8 Wet

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Assumed 9.0ppg MW equivalent pore pressure from 9 5/8" shoe to deepest TVD in wellbore.

BLM standard formulas were used on all SF calculations.
Casing design does meet and/or exceed BLM's minimum standards.
The pipe will be kept at a minimum 1/3 fluid fill to avoid approaching the collapse pressure rating of the casing.

This well is not located within the Capitan Reef.
This well is not located in the SOPA or in the R-111-P.

This well is not located in a high or critical Cave/Karst area.

This is not a walking operation.
We will not be pre-setting casing.
All completion intervals are planned to be fracture stimulated.

Well: BKU 942H

Hole Volumes						
Hole	**Hole Section (Length)**	**Casing**	**Capacity (ft3/Lin.ft)**	**Cu.Ft**	**Total Cu.Ft**	**% Excess**
Prod (Casing Overlap)	0-1100 (1100)	7"	0.1585	174.4	174.4	0
Prod	1100-4429 (3329)	7"	0.1503	500.3	1500.3	59
Prod	4429-5256 (827)	5.5"	0.2526	208.9		59
Prod	5256-9821 (4565)	5.5"	0.1733	791.1		59

Cement Volumes					
Blend	**Cement Sacks**	**Yield**	**Weight**	**Volume**	**Total Volume**
35:65:6	450	2.05	12.5	922.5	2566.5
50:50:02	1200	1.37	14	1644	

% Excess Calculation			
Total Volume	2566.5		2392.1
Cu.Ft	-174.4		/1500.3
	2392.1		**59% Excess**

COG Operating LLC

Hydrogen Sulfide Drilling Operation Plan

I. 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:

1. The hazards an characteristics of hydrogen sulfide (H2S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H2S detectors alarms warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

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

1. The effects of H2S on metal components. If high tensile tubular are to be used, personnel well be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H2S Drilling Operations Plan and 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. **The concentrations of H2S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

II. H2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonable expected to contain H2S.

1. **Well Control Equipment:**

   A. Flare line.

   B. Choke manifold with minimum of one remotely operated choke.

   C. Closed Loop Blow Down Tank

   D. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.

   E. Auxiliary equipment may include if applicable: mud-gas separator, annular preventer & rotating head.

2. **Protective equipment for essential personnel:**

   A. SCBA (Self contained breathing apparatus) 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

3. **H2S detection and monitoring equipment:**

   A. Portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

4. **Visual warning systems:**

   A. Wind direction indicators as shown on well site diagram.

   B. Caution/Danger signs (Exhibit #7) 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.

5. **Mud program:**

   A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices, and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

6. **Metallurgy:**

   A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

   B. All elastomers used for packing and seals shall be H2S trim.

7. **Communication:**

   A. Radio communications in company vehicles including cellular telephone and 2-way radio.

   B. Land line (telephone) communication at Office.

8. **Well testing:**

   A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H2S environment will use the closed chamber method of testing.

   B. There will be no drill stem testing.

EXHIBIT #7

WARNING

YOU ARE ENTERING AN H2S

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. CHECK WITH COG OPERATING FOREMAN AT

COG OPERATING LLC
1-432-683-7443
1-575-746-2010

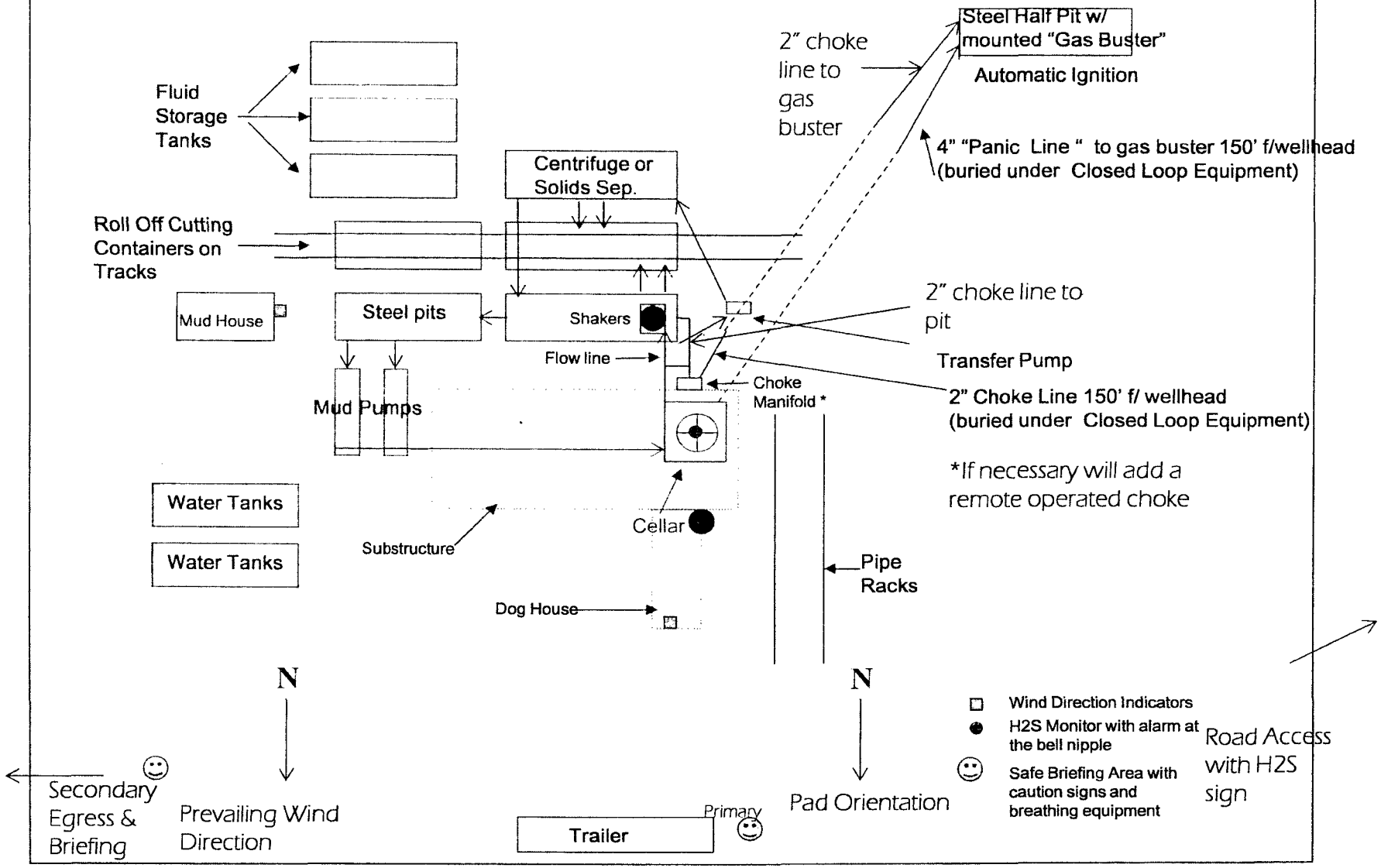
EDDY COUNTY EMERGENCY NUMBERS
ARTESIA FIRE DEPT. 575-746-5050
ARTESIA POLICE DEPT. 575-746-5000
EDDY CO. SHERIFF DEPT. 575-746-9888

LEA COUNTY EMERGENCY NUMBERS
HOBBS FIRE DEPT. 575-397-9308
HOBBS POLICE DEPT. 575-397-9285
LEA CO. SHERIFF DEPT. 575-396-1196

COG Operating LLC

Drilling Location - H2S Safety Equipment Diagram

EXHIBIT 8-
BKU 942



CONCHO

COG Operating LLC

Eddy County, New Mexico (NAD 27 NME)
Burch Keely Unit
#942H

WB1

Plan: Plan #1 11-15-13
Surface: 2285' FSL, 230' FEL, Sec 13, T17S, R29E, Unit I
PP: 2315' FSL, 330' FWL, Sec 18, T17S, R30E, Unit I
BHL: 2310' FSL, 330' FEL, Sec 18, T17S, R30E, Unit I

Standard Planning Report

15 November, 2013

PHOENIX
TECHNOLOGY SERVICES

Database:	GCR DB	**Local Co-ordinate Reference:**	Well #942H
Company:	COG Operating LLC	**TVD Reference:**	GL @ 3635.00usft
Project:	Eddy County, New Mexico (NAD 27 NME)	**MD Reference:**	GL @ 3635.00usft
Site:	Burch Keely Unit	**North Reference:**	Grid
Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 11-15-13		

Project	Eddy County, New Mexico (NAD 27 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 Burch Keely Unit

Site Position:		**Northing:**	666,591.10 usft	**Latitude:**	32° 49' 55.74916 N
From:	Map	**Easting:**	596,305.50 usft	**Longitude:**	104° 1' 11.28420 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.17 °

Well #942H

Well Position	**+N/-S**	469.80 usft	**Northing:**	667,060.90 usft	**Latitude:**	32° 50' 0.39888 N
	+E/-W	-31.50 usft	**Easting:**	596,274.00 usft	**Longitude:**	104° 1' 11.63705 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,635.00 usft

Wellbore WB1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	11/15/13	7.54	60.61	48,690

Design Plan #1 11-15-13

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	89.51

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	
4,429.21	0.00	0.00	4,429.21	0.00	0.00	0.00	0.00	0.00	0.00	
5,256.48	91.00	89.51	4,950.00	4.55	529.94	11.00	11.00	0.00	89.51	
9,821.00	91.00	89.51	4,870.34	43.70	5,093.60	0.00	0.00	0.00	0.00	PBHL-Burch Keely #9

Database:	GCR DB	**Local Co-ordinate Reference:**	Well #942H
Company:	COG Operating LLC	**TVD Reference:**	GL @ 3635.00usft
Project:	Eddy County, New Mexico (NAD 27 NME)	**MD Reference:**	GL @ 3635.00usft
Site:	Burch Keely Unit	**North Reference:**	Grid
Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 11-15-13		

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
4,429.21	0.00	0.00	4,429.21	0.00	0.00	0.00	0.00	0.00	0.00
KOP Start Build 11.00									
4,500.00	7.79	89.51	4,499.78	0.04	4.80	4.80	11.00	11.00	0.00
4,600.00	18.79	89.51	4,596.96	0.24	27.75	27.75	11.00	11.00	0.00
4,700.00	29.79	89.51	4,687.97	0.59	68.82	68.82	11.00	11.00	0.00
4,800.00	40.79	89.51	4,769.47	1.09	126.49	126.50	11.00	11.00	0.00
4,900.00	51.79	89.51	4,838.47	1.70	198.66	198.67	11.00	11.00	0.00
5,000.00	62.79	89.51	4,892.43	2.43	282.67	282.68	11.00	11.00	0.00
5,100.00	73.79	89.51	4,929.37	3.22	375.42	375.44	11.00	11.00	0.00
5,200.00	84.79	89.51	4,947.93	4.06	473.53	473.54	11.00	11.00	0.00
5,256.48	91.00	89.51	4,950.00	4.55	529.94	529.96	11.00	11.00	0.00
LP Start 4564.52 hold at 5256.48 MD									
5,286.55	91.00	89.51	4,949.48	4.80	560.00	560.02	0.00	0.00	0.00
PP-Burch Keely #942H									
5,300.00	91.00	89.51	4,949.24	4.92	573.45	573.47	0.00	0.00	0.00
5,400.00	91.00	89.51	4,947.50	5.78	673.43	673.46	0.00	0.00	0.00
5,500.00	91.00	89.51	4,945.75	6.64	773.41	773.44	0.00	0.00	0.00
5,600.00	91.00	89.51	4,944.01	7.49	873.39	873.43	0.00	0.00	0.00
5,700.00	91.00	89.51	4,942.26	8.35	973.37	973.41	0.00	0.00	0.00
5,800.00	91.00	89.51	4,940.52	9.21	1,073.36	1,073.40	0.00	0.00	0.00
5,900.00	91.00	89.51	4,938.77	10.07	1,173.34	1,173.38	0.00	0.00	0.00
6,000.00	91.00	89.51	4,937.03	10.92	1,273.32	1,273.36	0.00	0.00	0.00
6,100.00	91.00	89.51	4,935.28	11.78	1,373.30	1,373.35	0.00	0.00	0.00
6,200.00	91.00	89.51	4,933.54	12.64	1,473.28	1,473.33	0.00	0.00	0.00
6,300.00	91.00	89.51	4,931.79	13.50	1,573.26	1,573.32	0.00	0.00	0.00
6,400.00	91.00	89.51	4,930.04	14.36	1,673.24	1,673.30	0.00	0.00	0.00
6,500.00	91.00	89.51	4,928.30	15.21	1,773.22	1,773.29	0.00	0.00	0.00
6,600.00	91.00	89.51	4,926.55	16.07	1,873.20	1,873.27	0.00	0.00	0.00
6,700.00	91.00	89.51	4,924.81	16.93	1,973.19	1,973.26	0.00	0.00	0.00
6,800.00	91.00	89.51	4,923.06	17.79	2,073.17	2,073.24	0.00	0.00	0.00
6,900.00	91.00	89.51	4,921.32	18.64	2,173.15	2,173.23	0.00	0.00	0.00
7,000.00	91.00	89.51	4,919.57	19.50	2,273.13	2,273.21	0.00	0.00	0.00
7,100.00	91.00	89.51	4,917.83	20.36	2,373.11	2,373.20	0.00	0.00	0.00
7,200.00	91.00	89.51	4,916.08	21.22	2,473.09	2,473.18	0.00	0.00	0.00
7,300.00	91.00	89.51	4,914.34	22.08	2,573.07	2,573.17	0.00	0.00	0.00
7,400.00	91.00	89.51	4,912.59	22.93	2,673.05	2,673.15	0.00	0.00	0.00
7,500.00	91.00	89.51	4,910.85	23.79	2,773.03	2,773.14	0.00	0.00	0.00
7,600.00	91.00	89.51	4,909.10	24.65	2,873.02	2,873.12	0.00	0.00	0.00
7,700.00	91.00	89.51	4,907.36	25.51	2,973.00	2,973.11	0.00	0.00	0.00
7,800.00	91.00	89.51	4,905.61	26.36	3,072.98	3,073.09	0.00	0.00	0.00
7,900.00	91.00	89.51	4,903.87	27.22	3,172.96	3,173.08	0.00	0.00	0.00
8,000.00	91.00	89.51	4,902.12	28.08	3,272.94	3,273.06	0.00	0.00	0.00
8,100.00	91.00	89.51	4,900.38	28.94	3,372.92	3,373.04	0.00	0.00	0.00
8,200.00	91.00	89.51	4,898.63	29.80	3,472.90	3,473.03	0.00	0.00	0.00
8,300.00	91.00	89.51	4,896.89	30.65	3,572.88	3,573.01	0.00	0.00	0.00
8,400.00	91.00	89.51	4,895.14	31.51	3,672.86	3,673.00	0.00	0.00	0.00
8,500.00	91.00	89.51	4,893.39	32.37	3,772.85	3,772.98	0.00	0.00	0.00
8,600.00	91.00	89.51	4,891.65	33.23	3,872.83	3,872.97	0.00	0.00	0.00
8,700.00	91.00	89.51	4,889.90	34.08	3,972.81	3,972.95	0.00	0.00	0.00
8,800.00	91.00	89.51	4,888.16	34.94	4,072.79	4,072.94	0.00	0.00	0.00
8,900.00	91.00	89.51	4,886.41	35.80	4,172.77	4,172.92	0.00	0.00	0.00
9,000.00	91.00	89.51	4,884.67	36.66	4,272.75	4,272.91	0.00	0.00	0.00

Database:	GCR DB	**Local Co-ordinate Reference:**	Well #942H
Company:	COG Operating LLC	**TVD Reference:**	GL @ 3635.00usft
Project:	Eddy County, New Mexico (NAD 27 NME)	**MD Reference:**	GL @ 3635.00usft
Site:	Burch Keely Unit	**North Reference:**	Grid
Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 11-15-13		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,100.00	91.00	89.51	4,882.92	37.52	4,372.73	4,372.89	0.00	0.00	0.00
9,200.00	91.00	89.51	4,881.18	38.37	4,472.71	4,472.88	0.00	0.00	0.00
9,300.00	91.00	89.51	4,879.43	39.23	4,572.69	4,572.86	0.00	0.00	0.00
9,400.00	91.00	89.51	4,877.69	40.09	4,672.68	4,672.85	0.00	0.00	0.00
9,500.00	91.00	89.51	4,875.94	40.95	4,772.66	4,772.83	0.00	0.00	0.00
9,600.00	91.00	89.51	4,874.20	41.80	4,872.64	4,872.82	0.00	0.00	0.00
9,700.00	91.00	89.51	4,872.45	42.66	4,972.62	4,972.80	0.00	0.00	0.00
9,800.00	91.00	89.51	4,870.71	43.52	5,072.60	5,072.79	0.00	0.00	0.00
9,821.00	91.00	89.51	4,870.34	43.70	5,093.60	5,093.79	0.00	0.00	0.00
TD at 9821.00 - PBHL-Burch Keely #942H									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-Burch Keely #942 - plan hits target center - Point	0.00	0.01	4,870.34	43.70	5,093.60	667,104.60	601,367.60	32° 50' 0.67785 N	104° 0' 11.93761 W
PP-Burch Keely #942H - plan hits target center - Point	0.00	0.00	4,949.48	4.80	560.00	667,065.71	596,834.00	32° 50' 0.42994 N	104° 1' 5.07358 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
4,429.21	4,429.21	0.00	0.00	KOP Start Build 11.00
5,256.48	4,950.00	4.55	529.94	LP Start 4564.52 hold at 5256.48 MD
9,821.00	4,870.34	43.70	5,093.60	TD at 9821.00

CONCHO

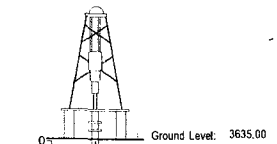
Project: Eddy County, New Mexico (NAD 27 NME)
Site: Burch Keely Unit
Well: #942H
Wellbore: WB1
Design: Plan #1 11-15-13

PHOENIX TECHNOLOGY SERVICES

T G M

Azimuths to Grid North
True North: -0.17°
Magnetic North: 7.37°

Magnetic Field
Strength: 48689.9snT
Dip Angle: 60.61°
Date: 11/15/2013
Model: IGRF2010_14



WELL DETAILS

Ground Level: 3635.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	667060.90	596274.00	32° 50' 0.39888 N	104° 1' 11.63705 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	4429.21	0.00	0.00	4429.21	0.00	0.00	0.00	0.00	0.00		KOP Start Build 11.00
3	5256.48	91.00	89.51	4950.00	4.55	529.94	11.00	89.51	529.96		LP Start 4564.52 hold at 5256.48 MD
4	9821.00	91.00	89.51	4870.34	43.70	5093.60	0.00	0.00	5093.79	PBHL-Burch Keely #942H	TD at 9821.00

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL-Burch Keely #942H	4870.34 - plan hits target center	43.70	5093.60	667104.60	601367.60	32° 50' 0.67785 N	104° 0' 11.93761 W	Point
PP-Burch Keely #942H	4949.48 - plan hits target center	4.80	560.00	667065.70	596834.00	32° 50' 0.42994 N	104° 1' 5.07358 W	Point

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 #942H, Grid North

Latitude: 32° 50' 0.39888 N
Longitude: 104° 1' 11.63705 W

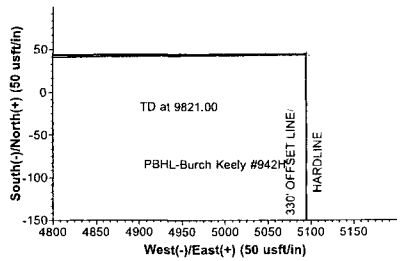
Grid East: 596274.00
Grid North: 667060.90
Scale Factor: 1.000

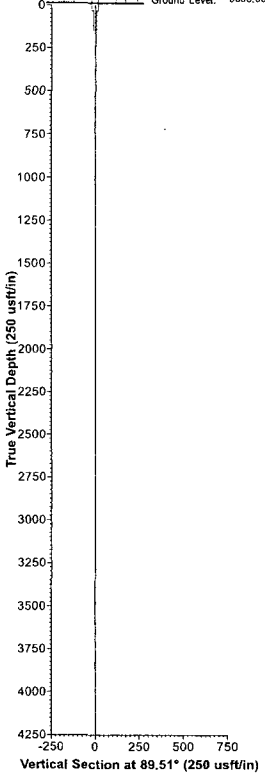
Geomagnetic Model: IGRF2010_14
Sample Date: 15-Nov-13
Magnetic Declination: 7.54°
Dip Angle from Horizontal: 60.61°
Magnetic Field Strength: 48690

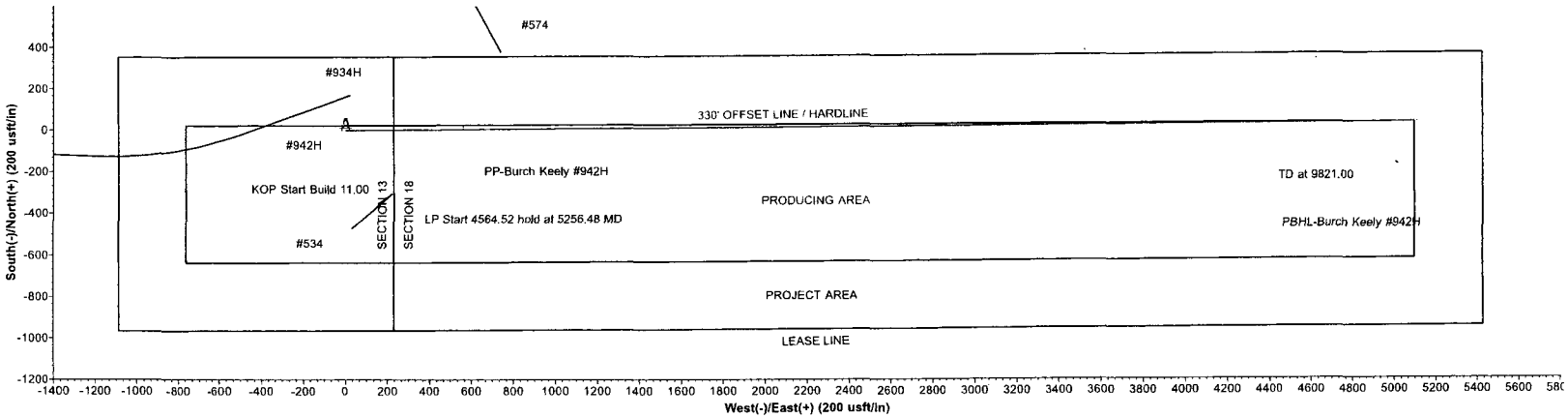
To convert a Magnetic Direction to a Grid Direction, Add 7.37°
To convert a Magnetic Direction to a True Direction, Add 7.54° East
To convert a True Direction to a Grid Direction, Subtract 0.17°

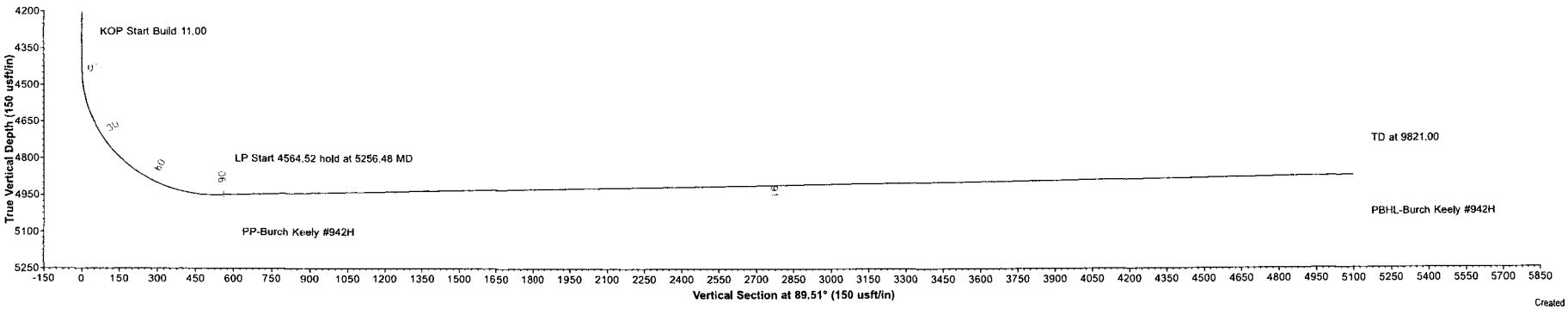
LEGEND

- #534, WB1, Plan #1 03-27-13 V0
- #574, WB1, Plan #1 11-07-13 V0
- #934H, WB1, Plan #1 11-06-13 V0
- #944H, WB1, Plan #1 10-17-13 V0
- Plan #1 11-15-13









Created By: Julio Piña Date: 12:17, November 15

Closed Loop Operation & Maintenance Procedure

All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

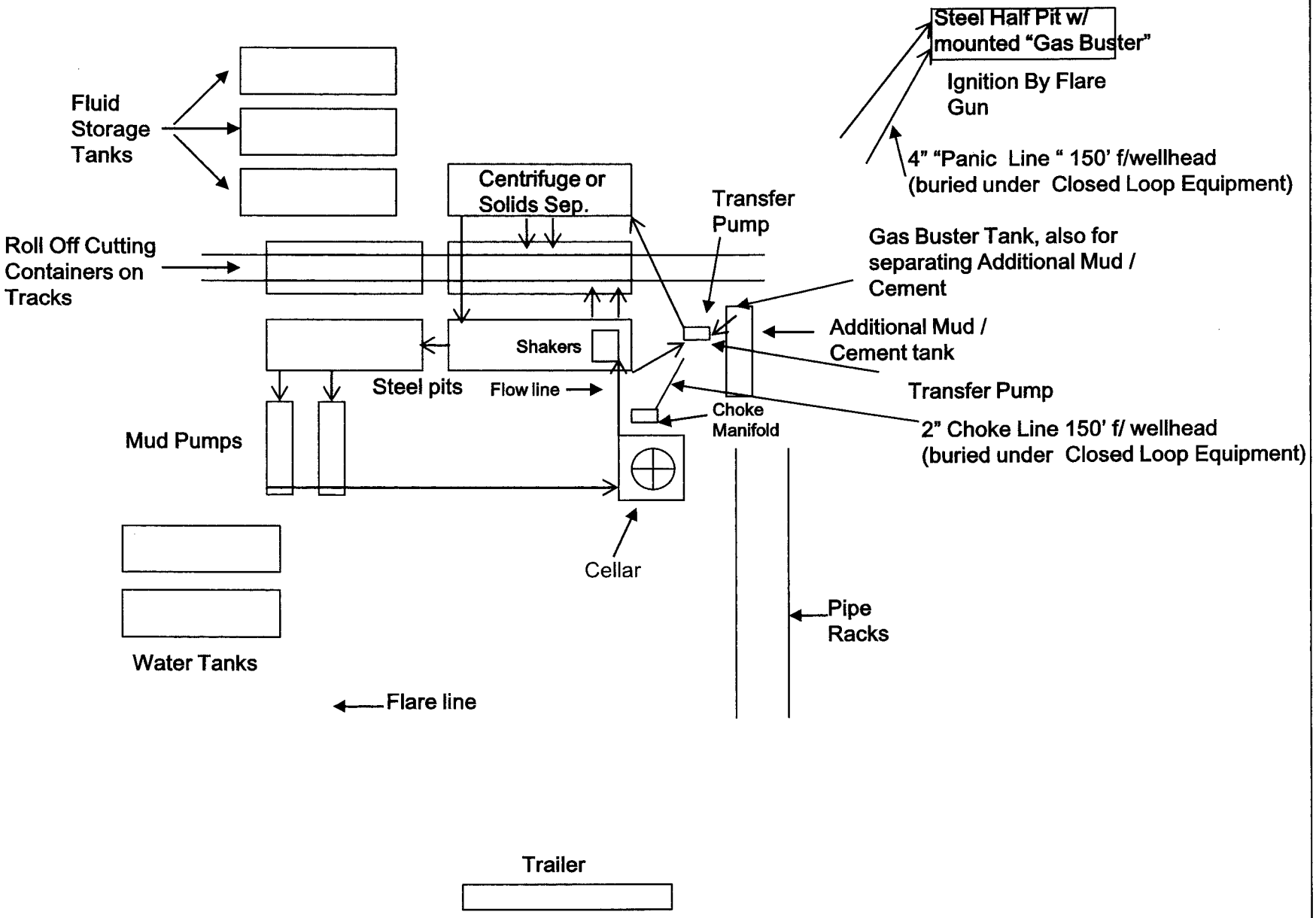
Cuttings will be hauled to either:

CRI (permit number R9166)
or
GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.

COG Operating LLC

Closed Loop Equipment Diagram



CONCHO

COG Operating LLC

Eddy County, New Mexico (NAD 27 NME)
Burch Keely Unit
#942H

WB1
Plan #1 11-15-13

Anticollision Report

15 November, 2013

PHOENIX
TECHNOLOGY SERVICES

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Reference	Plan #1 11-15-13		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	**Error Surface:**	Circular Conic
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 11/15/13

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	9,821.00	Plan #1 11-15-13 (WB1)	MWD	MWD - Standard

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
Burch Keely Unit						
#534 - WB1 - Plan #1 03-27-13	4,894.46	4,811.33	308.53	285.69	13.503	CC, ES
#534 - WB1 - Plan #1 03-27-13	4,950.00	4,811.33	313.14	289.78	13.403	SF
#574 - WB1 - Plan #1 11-07-13	5,305.33	4,699.98	743.89	713.69	24.630	CC, ES
#574 - WB1 - Plan #1 11-07-13	5,800.00	4,699.98	893.35	851.29	21.238	SF
#934H - WB1 - Plan #1 11-06-13	4,589.02	4,596.36	163.57	143.21	8.035	CC, ES
#934H - WB1 - Plan #1 11-06-13	4,600.00	4,605.63	163.71	143.30	8.024	SF
#944H - WB1 - Plan #1 10-17-13	4,437.62	4,432.34	1,252.12	1,232.41	63.526	CC
#944H - WB1 - Plan #1 10-17-13	9,821.00	9,746.35	1,319.71	1,044.01	4.787	ES, SF

Offset Design Burch Keely Unit - #534 - WB1 - Plan #1 03-27-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
0.00	0.00	0.00	0.00	0.00	0.00	176.16	-469.80	31.50	470.89				
100.00	100.00	94.00	94.00	0.11	0.11	176.16	-469.80	31.50	470.85	470.64	0.22	2,159.537	
200.00	200.00	194.00	194.00	0.34	0.32	176.16	-469.80	31.50	470.85	470.19	0.66	712.540	
300.00	300.00	294.00	294.00	0.56	0.55	176.16	-469.80	31.50	470.85	469.74	1.11	424.062	
400.00	400.00	394.00	394.00	0.79	0.77	176.16	-469.80	31.50	470.85	469.29	1.56	301.854	
500.00	500.00	494.00	494.00	1.01	1.00	176.16	-469.80	31.50	470.85	468.85	2.01	234.325	
600.00	600.00	594.00	594.00	1.24	1.22	176.16	-469.80	31.50	470.85	468.40	2.46	191.487	
700.00	700.00	694.00	694.00	1.46	1.45	176.16	-469.80	31.50	470.85	467.95	2.91	161.891	
800.00	800.00	794.00	794.00	1.69	1.67	176.16	-469.80	31.50	470.85	467.50	3.36	140.219	
900.00	900.00	894.00	894.00	1.91	1.90	176.16	-469.80	31.50	470.85	467.05	3.81	123.664	
1,000.00	1,000.00	994.00	994.00	2.14	2.12	176.16	-469.80	31.50	470.85	466.60	4.26	110.605	
1,100.00	1,100.00	1,094.00	1,094.00	2.36	2.35	176.16	-469.80	31.50	470.85	466.15	4.71	100.041	
1,200.00	1,200.00	1,198.87	1,198.87	2.58	2.58	176.12	-469.53	31.81	470.63	465.46	5.16	91.122	
1,300.00	1,300.00	1,309.80	1,309.71	2.81	2.82	175.73	-466.86	34.85	468.43	462.79	5.63	83.174	
1,400.00	1,400.00	1,419.96	1,419.56	3.03	3.07	174.91	-461.43	41.06	463.95	457.85	6.10	76.005	
1,500.00	1,500.00	1,519.53	1,518.69	3.26	3.30	173.98	-455.31	48.04	458.51	451.95	6.56	69.912	
1,600.00	1,600.00	1,619.09	1,617.83	3.48	3.54	173.02	-449.20	55.01	453.18	446.16	7.02	64.553	
1,700.00	1,700.00	1,718.66	1,716.96	3.71	3.78	172.04	-443.09	61.99	447.99	440.50	7.49	59.827	
1,800.00	1,800.00	1,818.22	1,816.09	3.93	4.03	171.03	-436.98	68.97	442.94	434.98	7.96	55.644	
1,900.00	1,900.00	1,917.79	1,915.22	4.16	4.28	170.00	-430.86	75.94	438.02	429.58	8.44	51.922	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	*0.00 usft*	**Output errors are at**	*2.00 sigma*
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #534 - WB1 - Plan #1 03-27-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
2,000.00	2,000.00	2,017.35	2,014.35	4.38	4.53	168.95	-424.75	82.92	433.25	424.33	8.91	48.598	
2,100.00	2,100.00	2,116.92	2,113.49	4.61	4.79	167.88	-418.64	89.90	428.63	419.23	9.40	45.616	
2,200.00	2,200.00	2,216.48	2,212.62	4.83	5.05	166.78	-412.53	96.88	424.16	414.28	9.88	42.931	
2,300.00	2,300.00	2,316.05	2,311.75	5.06	5.31	165.67	-406.41	103.85	419.85	409.48	10.37	40.505	
2,400.00	2,400.00	2,415.61	2,410.88	5.28	5.57	164.52	-400.30	110.83	415.70	404.85	10.85	38.305	
2,500.00	2,500.00	2,515.18	2,510.01	5.51	5.83	163.36	-394.19	117.81	411.73	400.39	11.34	36.305	
2,600.00	2,600.00	2,614.74	2,609.15	5.73	6.10	162.18	-388.08	124.78	407.93	396.10	11.83	34.481	
2,700.00	2,700.00	2,714.31	2,708.28	5.96	6.36	160.97	-381.97	131.76	404.30	391.98	12.32	32.814	
2,800.00	2,800.00	2,813.87	2,807.41	6.18	6.63	159.74	-375.85	138.74	400.87	388.05	12.81	31.287	
2,900.00	2,900.00	2,913.44	2,906.54	6.41	6.90	158.49	-369.74	145.72	397.62	384.31	13.30	29.885	
3,000.00	3,000.00	3,013.00	3,005.67	6.63	7.17	157.22	-363.63	152.69	394.56	380.76	13.80	28.595	
3,100.00	3,100.00	3,112.57	3,104.81	6.86	7.44	155.93	-357.52	159.67	391.70	377.41	14.29	27.408	
3,200.00	3,200.00	3,212.13	3,203.94	7.08	7.71	154.63	-351.40	166.65	389.04	374.26	14.79	26.312	
3,300.00	3,300.00	3,311.70	3,303.07	7.30	7.98	153.31	-345.29	173.62	386.59	371.31	15.28	25.299	
3,400.00	3,400.00	3,411.26	3,402.20	7.53	8.25	151.97	-339.18	180.60	384.35	368.58	15.78	24.363	
3,500.00	3,500.00	3,510.83	3,501.33	7.75	8.52	150.61	-333.07	187.58	382.33	366.05	16.27	23.496	
3,600.00	3,600.00	3,610.39	3,600.47	7.98	8.79	149.25	-326.95	194.55	380.52	363.75	16.77	22.693	
3,700.00	3,700.00	3,709.96	3,699.60	8.20	9.06	147.87	-320.84	201.53	378.93	361.66	17.26	21.949	
3,800.00	3,800.00	3,809.52	3,798.73	8.43	9.33	146.48	-314.73	208.51	377.56	359.80	17.76	21.258	
3,900.00	3,900.00	3,908.15	3,896.99	8.65	9.58	145.20	-309.15	214.88	376.50	358.27	18.23	20.653	
4,000.00	4,000.00	4,006.65	3,995.35	8.88	9.77	144.40	-305.66	218.86	375.94	357.29	18.64	20.164	
4,100.00	4,100.00	4,105.40	4,094.07	9.10	9.94	144.11	-304.40	220.30	375.76	356.72	19.04	19.736	
4,135.46	4,135.46	4,140.79	4,129.46	9.18	10.00	144.11	-304.40	220.30	375.75	356.57	19.18	19.590	
4,200.00	4,200.00	4,205.33	4,194.00	9.33	10.11	144.11	-304.40	220.30	375.75	356.31	19.44	19.326	
4,300.00	4,300.00	4,305.33	4,294.00	9.55	10.31	144.11	-304.40	220.30	375.75	355.89	19.87	18.915	
4,400.00	4,400.00	4,405.33	4,394.00	9.78	10.51	144.11	-304.40	220.30	375.75	355.46	20.29	18.519	
4,429.21	4,429.21	4,434.54	4,423.21	9.84	10.57	144.11	-304.40	220.30	375.75	355.34	20.41	18.407	
4,450.00	4,449.99	4,455.32	4,443.99	9.89	10.61	54.67	-304.40	220.30	375.51	355.01	20.50	18.318	
4,500.00	4,499.78	4,505.11	4,493.78	9.99	10.71	55.45	-304.40	220.30	372.99	352.29	20.70	18.019	
4,550.00	4,548.92	4,554.25	4,542.92	10.09	10.81	57.08	-304.40	220.30	367.85	346.95	20.90	17.598	
4,600.00	4,596.96	4,602.29	4,590.96	10.20	10.91	59.58	-304.40	220.30	360.39	339.28	21.11	17.072	
4,650.00	4,643.45	4,648.78	4,637.45	10.33	11.00	62.95	-304.40	220.30	351.07	329.74	21.33	16.460	
4,700.00	4,687.97	4,693.30	4,681.97	10.47	11.09	67.13	-304.40	220.30	340.54	318.97	21.57	15.791	
4,750.00	4,730.10	4,735.43	4,724.10	10.66	11.18	71.99	-304.40	220.30	329.68	307.84	21.83	15.100	
4,800.00	4,769.47	4,774.80	4,763.47	10.89	11.26	77.30	-304.40	220.30	319.56	297.42	22.14	14.431	
4,850.00	4,805.70	4,811.03	4,799.70	11.18	11.33	82.70	-304.40	220.30	311.49	288.98	22.51	13.836	
4,894.46	4,835.02	4,811.33	4,800.00	11.52	11.33	83.07	-304.40	220.30	308.53	285.69	22.85	13.503	CC, ES
4,900.00	4,838.47	4,811.33	4,800.00	11.56	11.33	83.06	-304.40	220.30	308.58	285.69	22.89	13.480	
4,950.00	4,867.46	4,811.33	4,800.00	12.03	11.33	82.56	-304.40	220.30	313.14	289.78	23.36	13.403	SF
5,000.00	4,892.43	4,811.33	4,800.00	12.60	11.33	81.25	-304.40	220.30	324.81	300.87	23.94	13.570	
5,050.00	4,913.12	4,811.33	4,800.00	13.28	11.33	79.16	-304.40	220.30	342.77	318.15	24.61	13.926	
5,100.00	4,929.37	4,811.33	4,800.00	14.06	11.33	76.34	-304.40	220.30	365.94	340.55	25.39	14.412	
5,150.00	4,941.00	4,811.33	4,800.00	14.93	11.33	72.89	-304.40	220.30	393.22	366.96	26.26	14.974	
5,200.00	4,947.93	4,811.33	4,800.00	15.87	11.33	68.91	-304.40	220.30	423.58	396.37	27.20	15.570	
5,250.00	4,950.07	4,811.33	4,800.00	16.87	11.33	64.57	-304.40	220.30	456.15	427.95	28.20	16.173	
5,256.48	4,950.00	4,811.33	4,800.00	17.01	11.33	63.99	-304.40	220.30	460.50	432.16	28.34	16.250	
5,300.00	4,949.24	4,811.33	4,800.00	17.92	11.33	63.99	-304.40	220.30	490.83	461.58	29.25	16.780	
5,400.00	4,947.50	4,811.33	4,800.00	20.13	11.33	63.99	-304.40	220.30	567.06	535.60	31.46	18.022	
5,500.00	4,945.75	4,811.33	4,800.00	22.47	11.33	63.99	-304.40	220.30	649.77	615.98	33.80	19.225	
5,600.00	4,944.01	4,811.33	4,800.00	24.89	11.33	63.99	-304.40	220.30	736.79	700.57	36.22	20.343	
5,700.00	4,942.26	4,811.33	4,800.00	27.37	11.33	63.99	-304.40	220.30	826.74	788.04	38.70	21.363	
5,800.00	4,940.52	4,811.33	4,800.00	29.90	11.33	63.99	-304.40	220.30	918.78	877.55	41.23	22.284	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #534 - WB1 - Plan #1 03-27-13

Offset Site Error: 0.00 usft

Survey Program: 0-MWD

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
5,900.00	4,938.77	4,811.33	4,800.00	32.47	11.33	63.99	-304.40	220.30	1,012.32	968.52	43.80	23.114	
6,000.00	4,937.03	4,811.33	4,800.00	35.06	11.33	63.99	-304.40	220.30	1,107.00	1,060.60	46.39	23.861	
6,100.00	4,935.28	4,811.33	4,800.00	37.68	11.33	63.99	-304.40	220.30	1,202.54	1,153.52	49.01	24.536	
6,200.00	4,933.54	4,811.33	4,800.00	40.31	11.33	63.99	-304.40	220.30	1,298.74	1,247.10	51.65	25.146	
6,300.00	4,931.79	4,811.33	4,800.00	42.97	11.33	63.99	-304.40	220.30	1,395.49	1,341.19	54.30	25.700	
6,400.00	4,930.04	4,811.33	4,800.00	45.63	11.33	63.99	-304.40	220.30	1,492.66	1,435.70	56.96	26.205	
6,500.00	4,928.30	4,811.33	4,800.00	48.30	11.33	63.99	-304.40	220.30	1,590.18	1,530.55	59.63	26.665	
6,600.00	4,926.55	4,811.33	4,800.00	50.98	11.33	63.99	-304.40	220.30	1,688.00	1,625.68	62.32	27.087	
6,700.00	4,924.81	4,811.33	4,800.00	53.67	11.33	63.99	-304.40	220.30	1,786.05	1,721.04	65.01	27.475	
6,800.00	4,923.06	4,811.33	4,800.00	56.37	11.33	63.99	-304.40	220.30	1,884.31	1,816.61	67.70	27.832	
6,900.00	4,921.32	4,811.33	4,800.00	59.07	11.33	63.99	-304.40	220.30	1,982.74	1,912.34	70.40	28.163	
7,000.00	4,919.57	4,811.33	4,800.00	61.78	11.33	63.99	-304.40	220.30	2,081.33	2,008.22	73.11	28.469	
7,100.00	4,917.83	4,811.33	4,800.00	64.49	11.33	63.99	-304.40	220.30	2,180.04	2,104.22	75.82	28.753	
7,200.00	4,916.08	4,811.33	4,800.00	67.20	11.33	63.99	-304.40	220.30	2,278.86	2,200.33	78.53	29.018	
7,300.00	4,914.34	4,811.33	4,800.00	69.92	11.33	63.99	-304.40	220.30	2,377.78	2,296.54	81.25	29.265	
7,400.00	4,912.59	4,811.33	4,800.00	72.64	11.33	63.99	-304.40	220.30	2,476.79	2,392.83	83.97	29.497	
7,500.00	4,910.85	4,811.33	4,800.00	75.36	11.33	63.99	-304.40	220.30	2,575.88	2,489.19	86.69	29.714	
7,600.00	4,909.10	4,811.33	4,800.00	78.08	11.33	63.99	-304.40	220.30	2,675.03	2,585.62	89.41	29.917	
7,700.00	4,907.36	4,811.33	4,800.00	80.81	11.33	63.99	-304.40	220.30	2,774.25	2,682.11	92.14	30.109	
7,800.00	4,905.61	4,811.33	4,800.00	83.54	11.33	63.99	-304.40	220.30	2,873.52	2,778.65	94.87	30.289	
7,900.00	4,903.87	4,811.33	4,800.00	86.27	11.33	63.99	-304.40	220.30	2,972.83	2,875.24	97.60	30.460	
8,000.00	4,902.12	4,811.33	4,800.00	89.00	11.33	63.99	-304.40	220.30	3,072.20	2,971.87	100.33	30.621	
8,100.00	4,900.38	4,811.33	4,800.00	91.73	11.33	63.99	-304.40	220.30	3,171.60	3,068.54	103.06	30.773	
8,200.00	4,898.63	4,811.33	4,800.00	94.46	11.33	63.99	-304.40	220.30	3,271.04	3,165.24	105.80	30.918	
8,300.00	4,896.89	4,811.33	4,800.00	97.20	11.33	63.99	-304.40	220.30	3,370.51	3,261.98	108.53	31.055	
8,400.00	4,895.14	4,811.33	4,800.00	99.94	11.33	63.99	-304.40	220.30	3,470.01	3,358.74	111.27	31.186	
8,500.00	4,893.39	4,811.33	4,800.00	102.67	11.33	63.99	-304.40	220.30	3,569.54	3,455.54	114.01	31.310	
8,600.00	4,891.65	4,811.33	4,800.00	105.41	11.33	63.99	-304.40	220.30	3,669.10	3,552.35	116.74	31.429	
8,700.00	4,889.90	4,811.33	4,800.00	108.15	11.33	63.99	-304.40	220.30	3,768.68	3,649.19	119.48	31.542	
8,800.00	4,888.16	4,811.33	4,800.00	110.89	11.33	63.99	-304.40	220.30	3,868.28	3,746.06	122.22	31.649	
8,900.00	4,886.41	4,811.33	4,800.00	113.63	11.33	63.99	-304.40	220.30	3,967.90	3,842.94	124.96	31.753	
9,000.00	4,884.67	4,811.33	4,800.00	116.37	11.33	63.99	-304.40	220.30	4,067.54	3,939.83	127.70	31.851	
9,100.00	4,882.92	4,811.33	4,800.00	119.11	11.33	63.99	-304.40	220.30	4,167.19	4,036.75	130.45	31.946	
9,200.00	4,881.18	4,811.33	4,800.00	121.86	11.33	63.99	-304.40	220.30	4,266.87	4,133.68	133.19	32.037	
9,300.00	4,879.43	4,811.33	4,800.00	124.60	11.33	63.99	-304.40	220.30	4,366.56	4,230.63	135.93	32.123	
9,400.00	4,877.69	4,811.33	4,800.00	127.34	11.33	63.99	-304.40	220.30	4,466.26	4,327.58	138.67	32.207	
9,500.00	4,875.94	4,811.33	4,800.00	130.09	11.33	63.99	-304.40	220.30	4,565.97	4,424.55	141.42	32.287	
9,600.00	4,874.20	4,811.33	4,800.00	132.83	11.33	63.99	-304.40	220.30	4,665.70	4,521.54	144.16	32.364	
9,700.00	4,872.45	4,811.33	4,800.00	135.57	11.33	63.99	-304.40	220.30	4,765.44	4,618.53	146.91	32.439	
9,800.00	4,870.71	4,811.33	4,800.00	138.32	11.33	63.99	-304.40	220.30	4,865.19	4,715.54	149.65	32.510	
9,821.00	4,870.34	4,811.33	4,800.00	138.90	11.33	63.99	-304.40	220.30	4,886.14	4,735.91	150.23	32.525	

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #574 - WB1 - Plan #1 11-07-13

Offset Site Error: 0.00 usft

Survey Program: 0-MWD

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
0.00	0.00	2.00	2.00	0.00	0.00	62.70	381.50	739.20	831.84				
100.00	100.00	102.00	102.00	0.11	0.12	62.70	381.50	739.20	831.84	831.61	0.23	3,628.351	
200.00	200.00	202.00	202.00	0.34	0.34	62.70	381.50	739.20	831.84	831.16	0.68	1,225.470	
300.00	300.00	302.00	302.00	0.56	0.57	62.70	381.50	739.20	831.84	830.71	1.13	737.235	
400.00	400.00	402.00	402.00	0.79	0.79	62.70	381.50	739.20	831.84	830.26	1.58	527.196	
500.00	500.00	502.00	502.00	1.01	1.02	62.70	381.50	739.20	831.84	829.81	2.03	410.301	
600.00	600.00	602.00	602.00	1.24	1.24	62.70	381.50	739.20	831.84	829.36	2.48	335.836	
700.00	700.00	702.00	702.00	1.46	1.47	62.70	381.50	739.20	831.84	828.91	2.93	284.249	
800.00	800.00	802.00	802.00	1.69	1.69	62.70	381.50	739.20	831.84	828.46	3.38	246.399	
900.00	900.00	902.00	902.00	1.91	1.92	62.70	381.50	739.20	831.84	828.02	3.83	217.445	
1,000.00	1,000.00	1,002.00	1,002.00	2.14	2.14	62.70	381.50	739.20	831.84	827.57	4.28	194.580	
1,100.00	1,100.00	1,102.00	1,102.00	2.36	2.36	62.70	381.50	739.20	831.84	827.12	4.72	176.067	
1,200.00	1,200.00	1,202.00	1,202.00	2.58	2.59	62.70	381.50	739.20	831.84	826.67	5.17	160.770	
1,300.00	1,300.00	1,302.00	1,302.00	2.81	2.81	62.70	381.50	739.20	831.84	826.22	5.62	147.918	
1,400.00	1,400.00	1,402.29	1,402.29	3.03	3.04	62.67	381.92	738.97	831.83	825.76	6.07	136.973	
1,500.00	1,500.00	1,502.73	1,502.66	3.26	3.26	62.42	385.08	737.26	831.77	825.25	6.52	127.532	
1,600.00	1,600.00	1,602.79	1,602.46	3.48	3.49	61.93	391.30	733.89	831.70	824.72	6.97	119.267	
1,653.85	1,653.85	1,656.43	1,655.85	3.60	3.61	61.57	395.90	731.41	831.68	824.46	7.22	115.217	
1,700.00	1,700.00	1,702.29	1,701.42	3.71	3.72	61.22	400.40	728.97	831.70	824.27	7.43	111.942	
1,800.00	1,800.00	1,801.65	1,800.15	3.93	3.96	60.45	410.25	723.64	831.84	823.95	7.89	105.378	
1,900.00	1,900.00	1,901.01	1,898.88	4.16	4.21	59.68	420.10	718.31	832.14	823.77	8.37	99.460	
2,000.00	2,000.00	2,000.38	1,997.61	4.38	4.46	58.91	429.95	712.97	832.59	823.75	8.85	94.124	
2,100.00	2,100.00	2,099.74	2,096.34	4.61	4.72	58.14	439.80	707.64	833.20	823.87	9.33	89.302	
2,200.00	2,200.00	2,199.10	2,195.06	4.83	4.99	57.37	449.66	702.31	833.95	824.13	9.82	84.935	
2,300.00	2,300.00	2,298.46	2,293.79	5.06	5.25	56.60	459.51	696.98	834.86	824.55	10.31	80.967	
2,400.00	2,400.00	2,397.83	2,392.52	5.28	5.52	55.84	469.36	691.64	835.92	825.11	10.81	77.352	
2,500.00	2,500.00	2,497.19	2,491.25	5.51	5.80	55.08	479.21	686.31	837.13	825.82	11.30	74.049	
2,600.00	2,600.00	2,596.55	2,589.98	5.73	6.07	54.32	489.06	680.98	838.49	826.68	11.81	71.024	
2,700.00	2,700.00	2,695.92	2,688.71	5.96	6.35	53.56	498.91	675.65	839.99	827.68	12.31	68.246	
2,800.00	2,800.00	2,795.28	2,787.44	6.18	6.63	52.80	508.76	670.31	841.65	828.84	12.81	65.689	
2,900.00	2,900.00	2,894.64	2,886.17	6.41	6.91	52.05	518.61	664.98	843.45	830.13	13.32	63.328	
3,000.00	3,000.00	2,994.00	2,984.90	6.63	7.20	51.30	528.46	659.65	845.40	831.58	13.83	61.145	
3,100.00	3,100.00	3,093.37	3,083.63	6.86	7.48	50.56	538.32	654.32	847.50	833.16	14.33	59.122	
3,200.00	3,200.00	3,192.73	3,182.36	7.08	7.76	49.81	548.17	648.99	849.74	834.89	14.84	57.243	
3,300.00	3,300.00	3,292.09	3,281.08	7.30	8.05	49.08	558.02	643.65	852.12	836.77	15.36	55.494	
3,400.00	3,400.00	3,391.45	3,379.81	7.53	8.34	48.34	567.87	638.32	854.65	838.78	15.87	53.864	
3,500.00	3,500.00	3,490.82	3,478.54	7.75	8.62	47.61	577.72	632.99	857.31	840.93	16.38	52.342	
3,600.00	3,600.00	3,590.18	3,577.27	7.98	8.91	46.89	587.57	627.66	860.12	843.23	16.89	50.918	
3,700.00	3,700.00	3,689.54	3,676.00	8.20	9.20	46.17	597.42	622.32	863.06	845.66	17.41	49.585	
3,800.00	3,800.00	3,788.90	3,774.73	8.43	9.49	45.45	607.27	616.99	866.14	848.22	17.92	48.334	
3,900.00	3,900.00	3,888.27	3,873.46	8.65	9.78	44.75	617.12	611.66	869.36	850.92	18.43	47.158	
4,000.00	4,000.00	3,987.63	3,972.19	8.88	10.07	44.04	626.98	606.33	872.71	853.76	18.95	46.053	
4,100.00	4,100.00	4,086.99	4,070.92	9.10	10.36	43.34	636.83	601.00	876.19	856.72	19.47	45.011	
4,200.00	4,200.00	4,186.35	4,169.65	9.33	10.65	42.65	646.68	595.66	879.80	859.82	19.98	44.030	
4,300.00	4,300.00	4,285.72	4,268.38	9.55	10.95	41.96	656.53	590.33	883.54	863.05	20.50	43.103	
4,400.00	4,400.00	4,385.08	4,367.10	9.78	11.24	41.28	666.38	585.00	887.41	866.40	21.02	42.227	
4,429.21	4,429.21	4,414.10	4,395.94	9.84	11.32	41.08	669.26	583.44	888.57	867.40	21.17	41.980	
4,450.00	4,449.99	4,434.73	4,416.44	9.89	11.38	-48.54	671.30	582.33	889.12	867.85	21.27	41.799	
4,500.00	4,499.78	4,483.97	4,465.37	9.99	11.53	-49.16	676.18	579.69	888.25	866.74	21.52	41.283	
4,550.00	4,548.92	4,532.31	4,513.40	10.09	11.67	-50.24	680.98	577.10	884.37	862.61	21.76	40.636	
4,600.00	4,596.96	4,579.31	4,560.10	10.20	11.81	-51.79	685.64	574.58	877.67	855.66	22.01	39.872	
4,650.00	4,643.45	4,624.54	4,605.04	10.33	11.94	-53.80	690.12	572.15	868.38	846.11	22.27	38.993	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #934H - WB1 - Plan #1 11-06-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
0.00	0.00	0.00	0.00	0.00	0.00	6.58	169.90	19.60	171.04				
100.00	100.00	98.00	98.00	0.11	0.11	6.58	169.90	19.60	171.03	170.80	0.22	768.583	
200.00	200.00	198.00	198.00	0.34	0.33	6.58	169.90	19.60	171.03	170.36	0.67	255.339	
300.00	300.00	298.00	298.00	0.56	0.56	6.58	169.90	19.60	171.03	169.91	1.12	152.793	
400.00	400.00	398.00	398.00	0.79	0.78	6.58	169.90	19.60	171.03	169.46	1.57	109.013	
500.00	500.00	498.00	498.00	1.01	1.01	6.58	169.90	19.60	171.03	169.01	2.02	84.734	
600.00	600.00	598.00	598.00	1.24	1.23	6.58	169.90	19.60	171.03	168.56	2.47	69.300	
700.00	700.00	698.00	698.00	1.46	1.46	6.58	169.90	19.60	171.03	168.11	2.92	58.622	
800.00	800.00	798.00	798.00	1.69	1.68	6.58	169.90	19.60	171.03	167.66	3.37	50.795	
900.00	900.00	898.00	898.00	1.91	1.91	6.58	169.90	19.60	171.03	167.21	3.82	44.812	
1,000.00	1,000.00	998.00	998.00	2.14	2.13	6.58	169.90	19.60	171.03	166.76	4.27	40.090	
1,100.00	1,100.00	1,098.00	1,098.00	2.36	2.36	6.58	169.90	19.60	171.03	166.31	4.72	36.268	
1,200.00	1,200.00	1,198.00	1,198.00	2.58	2.58	6.58	169.90	19.60	171.03	165.86	5.17	33.112	
1,300.00	1,300.00	1,298.00	1,298.00	2.81	2.81	6.58	169.90	19.60	171.03	165.41	5.61	30.461	
1,400.00	1,400.00	1,398.00	1,398.00	3.03	3.03	6.58	169.90	19.60	171.03	164.96	6.06	28.203	
1,500.00	1,500.00	1,498.00	1,498.00	3.26	3.25	6.58	169.90	19.60	171.03	164.51	6.51	26.256	
1,600.00	1,600.00	1,598.00	1,598.00	3.48	3.48	6.58	169.90	19.60	171.03	164.06	6.96	24.561	
1,700.00	1,700.00	1,698.00	1,698.00	3.71	3.70	6.58	169.90	19.60	171.03	163.61	7.41	23.072	
1,800.00	1,800.00	1,798.00	1,798.00	3.93	3.93	6.58	169.90	19.60	171.03	163.16	7.86	21.753	
1,900.00	1,900.00	1,898.00	1,898.00	4.16	4.15	6.58	169.90	19.60	171.03	162.71	8.31	20.576	
2,000.00	2,000.00	1,998.00	1,998.00	4.38	4.38	6.58	169.90	19.60	171.03	162.27	8.76	19.521	
2,100.00	2,100.00	2,098.00	2,098.00	4.61	4.60	6.58	169.90	19.60	171.03	161.82	9.21	18.568	
2,200.00	2,200.00	2,198.00	2,198.00	4.83	4.83	6.58	169.90	19.60	171.03	161.37	9.66	17.704	
2,300.00	2,300.00	2,298.00	2,298.00	5.06	5.05	6.58	169.90	19.60	171.03	160.92	10.11	16.917	
2,400.00	2,400.00	2,398.00	2,398.00	5.28	5.28	6.58	169.90	19.60	171.03	160.47	10.56	16.196	
2,500.00	2,500.00	2,498.00	2,498.00	5.51	5.50	6.58	169.90	19.60	171.03	160.02	11.01	15.535	
2,600.00	2,600.00	2,598.00	2,598.00	5.73	5.73	6.58	169.90	19.60	171.03	159.57	11.46	14.926	
2,700.00	2,700.00	2,698.00	2,698.00	5.96	5.95	6.58	169.90	19.60	171.03	159.12	11.91	14.362	
2,800.00	2,800.00	2,798.00	2,798.00	6.18	6.18	6.58	169.90	19.60	171.03	158.67	12.36	13.840	
2,900.00	2,900.00	2,898.00	2,898.00	6.41	6.40	6.58	169.90	19.60	171.03	158.22	12.81	13.354	
3,000.00	3,000.00	2,998.00	2,998.00	6.63	6.63	6.58	169.90	19.60	171.03	157.77	13.26	12.901	
3,100.00	3,100.00	3,098.00	3,098.00	6.86	6.85	6.58	169.90	19.60	171.03	157.32	13.71	12.478	
3,200.00	3,200.00	3,198.00	3,198.00	7.08	7.08	6.58	169.90	19.60	171.03	156.87	14.16	12.082	
3,300.00	3,300.00	3,298.00	3,298.00	7.30	7.30	6.58	169.90	19.60	171.03	156.42	14.61	11.710	
3,400.00	3,400.00	3,398.00	3,398.00	7.53	7.53	6.58	169.90	19.60	171.03	155.97	15.05	11.360	
3,500.00	3,500.00	3,498.00	3,498.00	7.75	7.75	6.58	169.90	19.60	171.03	155.52	15.50	11.031	
3,600.00	3,600.00	3,598.00	3,598.00	7.98	7.97	6.58	169.90	19.60	171.03	155.07	15.95	10.720	
3,700.00	3,700.00	3,698.00	3,698.00	8.20	8.20	6.58	169.90	19.60	171.03	154.62	16.40	10.426	
3,800.00	3,800.00	3,798.00	3,798.00	8.43	8.42	6.58	169.90	19.60	171.03	154.17	16.85	10.148	
3,900.00	3,900.00	3,898.00	3,898.00	8.65	8.65	6.58	169.90	19.60	171.03	153.72	17.30	9.885	
4,000.00	4,000.00	3,998.00	3,998.00	8.88	8.87	6.58	169.90	19.60	171.03	153.27	17.75	9.634	
4,100.00	4,100.00	4,098.00	4,098.00	9.10	9.10	6.58	169.90	19.60	171.03	152.83	18.20	9.396	
4,200.00	4,200.00	4,198.00	4,198.00	9.33	9.32	6.58	169.90	19.60	171.03	152.38	18.65	9.170	
4,300.00	4,300.00	4,298.00	4,298.00	9.55	9.55	6.58	169.90	19.60	171.03	151.93	19.10	8.954	
4,400.00	4,400.00	4,398.00	4,398.00	9.78	9.77	6.58	169.90	19.60	171.03	151.48	19.55	8.748	
4,429.21	4,429.21	4,427.21	4,427.21	9.84	9.84	6.58	169.90	19.60	171.03	151.35	19.68	8.690	
4,450.00	4,449.99	4,451.20	4,451.19	9.89	9.89	-83.25	169.74	19.16	170.80	151.03	19.77	8.637	
4,500.00	4,499.78	4,508.17	4,507.87	9.99	10.00	-86.87	167.86	13.99	168.37	148.38	19.98	8.425	
4,550.00	4,548.92	4,560.38	4,559.00	10.09	10.10	-93.81	164.28	4.16	164.90	144.70	20.20	8.165	
4,589.02	4,586.53	4,596.36	4,593.51	10.18	10.18	-100.47	160.81	-5.39	163.57	143.21	20.36	8.035	CC, ES
4,600.00	4,596.96	4,605.63	4,602.28	10.20	10.20	-102.39	159.78	-8.21	163.71	143.30	20.40	8.024	SF
4,650.00	4,643.45	4,642.97	4,637.02	10.33	10.29	-110.53	155.11	-21.04	168.71	148.10	20.61	8.185	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #934H - WB1 - Plan #1 11-06-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
4,700.00	4,687.97	4,672.47	4,663.72	10.47	10.36	-116.71	150.82	-32.81	182.74	161.90	20.84	8.769	
4,750.00	4,730.10	4,694.77	4,683.41	10.66	10.43	-120.25	147.24	-42.65	206.34	185.26	21.08	9.787	
4,800.00	4,769.47	4,710.77	4,697.26	10.89	10.48	-120.97	144.50	-50.19	238.14	216.78	21.36	11.147	
4,850.00	4,805.70	4,721.41	4,706.32	11.18	10.51	-118.68	142.60	-55.42	276.09	254.39	21.70	12.725	
4,900.00	4,838.47	4,727.52	4,711.48	11.56	10.54	-112.95	141.47	-58.50	318.26	296.16	22.10	14.404	
4,950.00	4,867.46	4,729.85	4,713.43	12.03	10.54	-103.14	141.04	-59.69	363.13	340.56	22.57	16.086	
5,000.00	4,892.43	4,729.02	4,712.73	12.60	10.54	-89.11	141.20	-59.26	409.57	386.43	23.14	17.696	
5,050.00	4,913.12	4,725.53	4,709.81	13.28	10.53	-72.53	141.84	-57.49	456.71	432.90	23.81	19.181	
5,100.00	4,929.37	4,719.82	4,704.98	14.06	10.51	-56.80	142.88	-54.63	503.89	479.32	24.57	20.509	
5,150.00	4,941.00	4,712.22	4,698.50	14.93	10.48	-44.30	144.24	-50.89	550.60	525.19	25.41	21.667	
5,200.00	4,947.93	4,700.00	4,687.97	15.87	10.44	-34.96	146.36	-45.07	596.43	570.12	26.31	22.666	
5,250.00	4,950.07	4,700.00	4,687.97	16.87	10.44	-29.16	146.36	-45.07	641.10	613.78	27.31	23.471	
5,256.48	4,950.00	4,700.00	4,687.97	17.01	10.44	-28.52	146.36	-45.07	646.81	619.37	27.45	23.566	
5,300.00	4,949.24	4,681.42	4,671.68	17.92	10.39	-27.62	149.42	-36.67	684.88	656.57	28.31	24.193	
5,400.00	4,947.50	4,650.00	4,643.45	20.13	10.30	-26.16	154.13	-23.72	774.12	743.68	30.44	25.434	
5,500.00	4,945.75	4,650.00	4,643.45	22.47	10.30	-26.16	154.13	-23.72	864.50	831.73	32.77	26.382	
5,600.00	4,944.01	4,629.44	4,624.54	24.89	10.25	-25.25	156.90	-16.12	956.21	921.07	35.14	27.211	
5,700.00	4,942.26	4,616.20	4,612.21	27.37	10.22	-24.68	158.54	-11.60	1,048.98	1,011.39	37.59	27.904	
5,800.00	4,940.52	4,600.00	4,596.96	29.90	10.19	-24.00	160.41	-6.48	1,142.61	1,102.53	40.09	28.504	
5,900.00	4,938.77	4,600.00	4,596.96	32.47	10.19	-24.00	160.41	-6.48	1,236.95	1,194.29	42.65	29.001	
6,000.00	4,937.03	4,600.00	4,596.96	35.06	10.19	-24.00	160.41	-6.48	1,332.11	1,286.86	45.25	29.440	
6,100.00	4,935.28	4,576.18	4,574.23	37.68	10.14	-23.04	162.86	0.25	1,427.24	1,379.42	47.82	29.849	
6,200.00	4,933.54	4,568.52	4,566.87	40.31	10.12	-22.74	163.57	2.20	1,523.10	1,472.67	50.44	30.199	
6,300.00	4,931.79	4,550.00	4,548.92	42.97	10.08	-22.02	165.13	6.50	1,619.51	1,566.46	53.05	30.529	
6,400.00	4,930.04	4,550.00	4,548.92	45.63	10.08	-22.02	165.13	6.50	1,715.96	1,660.25	55.71	30.801	
6,500.00	4,928.30	4,550.00	4,548.92	48.30	10.08	-22.02	165.13	6.50	1,812.79	1,754.41	58.38	31.049	
6,600.00	4,926.55	4,550.00	4,548.92	50.98	10.08	-22.02	165.13	6.50	1,909.95	1,848.88	61.07	31.277	
6,700.00	4,924.81	4,550.00	4,548.92	53.67	10.08	-22.02	165.13	6.50	2,007.39	1,943.63	63.76	31.486	
6,800.00	4,923.06	4,550.00	4,548.92	56.37	10.08	-22.02	165.13	6.50	2,105.07	2,038.62	66.45	31.678	
6,900.00	4,921.32	4,550.00	4,548.92	59.07	10.08	-22.02	165.13	6.50	2,202.96	2,133.81	69.15	31.856	
7,000.00	4,919.57	4,526.39	4,525.83	61.78	10.03	-21.14	166.81	11.11	2,300.42	2,228.60	71.81	32.034	
7,100.00	4,917.83	4,522.72	4,522.22	64.49	10.03	-21.01	167.04	11.73	2,398.45	2,323.93	74.51	32.188	
7,200.00	4,916.08	4,500.00	4,499.78	67.20	9.98	-20.19	168.26	15.09	2,497.01	2,419.83	77.18	32.352	
7,300.00	4,914.34	4,500.00	4,499.78	69.92	9.98	-20.19	168.26	15.09	2,595.16	2,515.26	79.90	32.481	
7,400.00	4,912.59	4,500.00	4,499.78	72.64	9.98	-20.19	168.26	15.09	2,693.45	2,610.83	82.62	32.601	
7,500.00	4,910.85	4,500.00	4,499.78	75.36	9.98	-20.19	168.26	15.09	2,791.86	2,706.52	85.34	32.715	
7,600.00	4,909.10	4,500.00	4,499.78	78.08	9.98	-20.19	168.26	15.09	2,890.38	2,802.31	88.06	32.821	
7,700.00	4,907.36	4,500.00	4,499.78	80.81	9.98	-20.19	168.26	15.09	2,989.00	2,898.21	90.79	32.922	
7,800.00	4,905.61	4,500.00	4,499.78	83.54	9.98	-20.19	168.26	15.09	3,087.70	2,994.18	93.52	33.017	
7,900.00	4,903.87	4,500.00	4,499.78	86.27	9.98	-20.19	168.26	15.09	3,186.49	3,090.24	96.25	33.107	
8,000.00	4,902.12	4,500.00	4,499.78	89.00	9.98	-20.19	168.26	15.09	3,285.35	3,186.37	98.98	33.192	
8,100.00	4,900.38	4,500.00	4,499.78	91.73	9.98	-20.19	168.26	15.09	3,384.28	3,282.57	101.71	33.273	
8,200.00	4,898.63	4,500.00	4,499.78	94.46	9.98	-20.19	168.26	15.09	3,483.27	3,378.82	104.45	33.350	
8,300.00	4,896.89	4,500.00	4,499.78	97.20	9.98	-20.19	168.26	15.09	3,582.31	3,475.13	107.18	33.423	
8,400.00	4,895.14	4,500.00	4,499.78	99.94	9.98	-20.19	168.26	15.09	3,681.41	3,571.49	109.92	33.492	
8,500.00	4,893.39	4,500.00	4,499.78	102.67	9.98	-20.19	168.26	15.09	3,780.55	3,667.90	112.66	33.559	
8,600.00	4,891.65	4,500.00	4,499.78	105.41	9.98	-20.19	168.26	15.09	3,879.74	3,764.35	115.39	33.622	
8,700.00	4,889.90	4,500.00	4,499.78	108.15	9.98	-20.19	168.26	15.09	3,978.97	3,860.84	118.13	33.682	
8,800.00	4,888.16	4,500.00	4,499.78	110.89	9.98	-20.19	168.26	15.09	4,078.24	3,957.36	120.87	33.740	
8,900.00	4,886.41	4,500.00	4,499.78	113.63	9.98	-20.19	168.26	15.09	4,177.54	4,053.92	123.61	33.796	
9,000.00	4,884.67	4,500.00	4,499.78	116.37	9.98	-20.19	168.26	15.09	4,276.87	4,150.52	126.35	33.849	
9,100.00	4,882.92	4,500.00	4,499.78	119.11	9.98	-20.19	168.26	15.09	4,376.23	4,247.14	129.09	33.899	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	***Survey Calculation Method:***	*Minimum Curvature*
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #574 - WB1 - Plan #1 11-07-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
9,100.00	4,882.92	4,633.98	4,614.42	119.11	11.97	-63.86	691.06	571.64	3,866.34	3,735.25	131.08	29.495	
9,200.00	4,881.18	4,626.97	4,607.45	121.86	11.95	-63.37	690.36	572.02	3,964.41	3,830.60	133.81	29.628	
9,300.00	4,879.43	4,619.95	4,600.48	124.60	11.93	-62.88	689.67	572.39	4,062.56	3,926.03	136.53	29.756	
9,400.00	4,877.69	4,612.94	4,593.51	127.34	11.91	-62.40	688.97	572.77	4,160.79	4,021.54	139.25	29.880	
9,500.00	4,875.94	4,605.92	4,586.54	130.09	11.89	-61.92	688.27	573.15	4,259.09	4,117.11	141.97	29.999	
9,600.00	4,874.20	4,598.91	4,579.57	132.83	11.87	-61.44	687.58	573.52	4,357.45	4,212.75	144.70	30.114	
9,700.00	4,872.45	4,591.89	4,572.60	135.57	11.85	-60.97	686.88	573.90	4,455.88	4,308.46	147.42	30.225	
9,800.00	4,870.71	4,584.88	4,565.63	138.32	11.83	-60.50	686.19	574.28	4,554.36	4,404.22	150.15	30.333	
9,821.00	4,870.34	4,583.41	4,564.17	138.90	11.82	-60.40	686.04	574.36	4,575.06	4,424.34	150.72	30.355	

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #934H - WB1 - Plan #1 11-06-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
0.00	0.00	0.00	0.00	0.00	0.00	6.58	169.90	19.60	171.04				
100.00	100.00	98.00	98.00	0.11	0.11	6.58	169.90	19.60	171.03	170.80	0.22	768.583	
200.00	200.00	198.00	198.00	0.34	0.33	6.58	169.90	19.60	171.03	170.36	0.67	255.339	
300.00	300.00	298.00	298.00	0.56	0.56	6.58	169.90	19.60	171.03	169.91	1.12	152.793	
400.00	400.00	398.00	398.00	0.79	0.78	6.58	169.90	19.60	171.03	169.46	1.57	109.013	
500.00	500.00	498.00	498.00	1.01	1.01	6.58	169.90	19.60	171.03	169.01	2.02	84.734	
600.00	600.00	598.00	598.00	1.24	1.23	6.58	169.90	19.60	171.03	168.56	2.47	69.300	
700.00	700.00	698.00	698.00	1.46	1.46	6.58	169.90	19.60	171.03	168.11	2.92	58.622	
800.00	800.00	798.00	798.00	1.69	1.68	6.58	169.90	19.60	171.03	167.66	3.37	50.795	
900.00	900.00	898.00	898.00	1.91	1.91	6.58	169.90	19.60	171.03	167.21	3.82	44.812	
1,000.00	1,000.00	998.00	998.00	2.14	2.13	6.58	169.90	19.60	171.03	166.76	4.27	40.090	
1,100.00	1,100.00	1,098.00	1,098.00	2.36	2.36	6.58	169.90	19.60	171.03	166.31	4.72	36.268	
1,200.00	1,200.00	1,198.00	1,198.00	2.58	2.58	6.58	169.90	19.60	171.03	165.86	5.17	33.112	
1,300.00	1,300.00	1,298.00	1,298.00	2.81	2.81	6.58	169.90	19.60	171.03	165.41	5.61	30.461	
1,400.00	1,400.00	1,398.00	1,398.00	3.03	3.03	6.58	169.90	19.60	171.03	164.96	6.06	28.203	
1,500.00	1,500.00	1,498.00	1,498.00	3.26	3.25	6.58	169.90	19.60	171.03	164.51	6.51	26.256	
1,600.00	1,600.00	1,598.00	1,598.00	3.48	3.48	6.58	169.90	19.60	171.03	164.06	6.96	24.561	
1,700.00	1,700.00	1,698.00	1,698.00	3.71	3.70	6.58	169.90	19.60	171.03	163.61	7.41	23.072	
1,800.00	1,800.00	1,798.00	1,798.00	3.93	3.93	6.58	169.90	19.60	171.03	163.16	7.86	21.753	
1,900.00	1,900.00	1,898.00	1,898.00	4.16	4.15	6.58	169.90	19.60	171.03	162.71	8.31	20.576	
2,000.00	2,000.00	1,998.00	1,998.00	4.38	4.38	6.58	169.90	19.60	171.03	162.27	8.76	19.521	
2,100.00	2,100.00	2,098.00	2,098.00	4.61	4.60	6.58	169.90	19.60	171.03	161.82	9.21	18.568	
2,200.00	2,200.00	2,198.00	2,198.00	4.83	4.83	6.58	169.90	19.60	171.03	161.37	9.66	17.704	
2,300.00	2,300.00	2,298.00	2,298.00	5.06	5.05	6.58	169.90	19.60	171.03	160.92	10.11	16.917	
2,400.00	2,400.00	2,398.00	2,398.00	5.28	5.28	6.58	169.90	19.60	171.03	160.47	10.56	16.196	
2,500.00	2,500.00	2,498.00	2,498.00	5.51	5.50	6.58	169.90	19.60	171.03	160.02	11.01	15.535	
2,600.00	2,600.00	2,598.00	2,598.00	5.73	5.73	6.58	169.90	19.60	171.03	159.57	11.46	14.926	
2,700.00	2,700.00	2,698.00	2,698.00	5.96	5.95	6.58	169.90	19.60	171.03	159.12	11.91	14.362	
2,800.00	2,800.00	2,798.00	2,798.00	6.18	6.18	6.58	169.90	19.60	171.03	158.67	12.36	13.840	
2,900.00	2,900.00	2,898.00	2,898.00	6.41	6.40	6.58	169.90	19.60	171.03	158.22	12.81	13.354	
3,000.00	3,000.00	2,998.00	2,998.00	6.63	6.63	6.58	169.90	19.60	171.03	157.77	13.26	12.901	
3,100.00	3,100.00	3,098.00	3,098.00	6.86	6.85	6.58	169.90	19.60	171.03	157.32	13.71	12.478	
3,200.00	3,200.00	3,198.00	3,198.00	7.08	7.08	6.58	169.90	19.60	171.03	156.87	14.16	12.082	
3,300.00	3,300.00	3,298.00	3,298.00	7.30	7.30	6.58	169.90	19.60	171.03	156.42	14.61	11.710	
3,400.00	3,400.00	3,398.00	3,398.00	7.53	7.53	6.58	169.90	19.60	171.03	155.97	15.05	11.360	
3,500.00	3,500.00	3,498.00	3,498.00	7.75	7.75	6.58	169.90	19.60	171.03	155.52	15.50	11.031	
3,600.00	3,600.00	3,598.00	3,598.00	7.98	7.97	6.58	169.90	19.60	171.03	155.07	15.95	10.720	
3,700.00	3,700.00	3,698.00	3,698.00	8.20	8.20	6.58	169.90	19.60	171.03	154.62	16.40	10.426	
3,800.00	3,800.00	3,798.00	3,798.00	8.43	8.42	6.58	169.90	19.60	171.03	154.17	16.85	10.148	
3,900.00	3,900.00	3,898.00	3,898.00	8.65	8.65	6.58	169.90	19.60	171.03	153.72	17.30	9.885	
4,000.00	4,000.00	3,998.00	3,998.00	8.88	8.87	6.58	169.90	19.60	171.03	153.27	17.75	9.634	
4,100.00	4,100.00	4,098.00	4,098.00	9.10	9.10	6.58	169.90	19.60	171.03	152.83	18.20	9.396	
4,200.00	4,200.00	4,198.00	4,198.00	9.33	9.32	6.58	169.90	19.60	171.03	152.38	18.65	9.170	
4,300.00	4,300.00	4,298.00	4,298.00	9.55	9.55	6.58	169.90	19.60	171.03	151.93	19.10	8.954	
4,400.00	4,400.00	4,398.00	4,398.00	9.78	9.77	6.58	169.90	19.60	171.03	151.48	19.55	8.748	
4,429.21	4,429.21	4,427.21	4,427.21	9.84	9.84	6.58	169.90	19.60	171.03	151.35	19.68	8.690	
4,450.00	4,449.99	4,451.20	4,451.19	9.89	9.89	-83.25	169.74	19.16	170.80	151.03	19.77	8.637	
4,500.00	4,499.78	4,508.17	4,507.87	9.99	10.00	-86.87	167.86	13.99	168.37	148.38	19.98	8.425	
4,550.00	4,548.92	4,560.38	4,559.00	10.09	10.10	-93.81	164.28	4.16	164.90	144.70	20.20	8.165	
4,589.02	4,586.53	4,596.36	4,593.51	10.18	10.18	-100.47	160.81	-5.39	163.57	143.21	20.36	8.035	CC, ES
4,600.00	4,596.96	4,605.63	4,602.28	10.20	10.20	-102.39	159.78	-8.21	163.71	143.30	20.40	8.024	SF
4,650.00	4,643.45	4,642.97	4,637.02	10.33	10.29	-110.53	155.11	-21.04	168.71	148.10	20.61	8.185	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #934H - WB1 - Plan #1 11-06-13

Offset Site Error: 0.00 usft

Survey Program: 0-MWD

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
4,700.00	4,687.97	4,672.47	4,663.72	10.47	10.36	-116.71	150.82	-32.81	182.74	161.90	20.84	8.769	
4,750.00	4,730.10	4,694.77	4,683.41	10.66	10.43	-120.25	147.24	-42.65	206.34	185.26	21.08	9.787	
4,800.00	4,769.47	4,710.77	4,697.26	10.89	10.48	-120.97	144.50	-50.19	238.14	216.78	21.36	11.147	
4,850.00	4,805.70	4,721.41	4,706.32	11.18	10.51	-118.68	142.60	-55.42	276.09	254.39	21.70	12.725	
4,900.00	4,838.47	4,727.52	4,711.48	11.56	10.54	-112.95	141.47	-58.50	318.26	296.16	22.10	14.404	
4,950.00	4,867.46	4,729.85	4,713.43	12.03	10.54	-103.14	141.04	-59.69	363.13	340.56	22.57	16.086	
5,000.00	4,892.43	4,729.02	4,712.73	12.60	10.54	-89.11	141.20	-59.26	409.57	386.43	23.14	17.696	
5,050.00	4,913.12	4,725.53	4,709.81	13.28	10.53	-72.53	141.84	-57.49	456.71	432.90	23.81	19.181	
5,100.00	4,929.37	4,719.82	4,704.98	14.06	10.51	-56.80	142.88	-54.63	503.89	479.32	24.57	20.509	
5,150.00	4,941.00	4,712.22	4,698.50	14.93	10.48	-44.30	144.24	-50.89	550.60	525.19	25.41	21.667	
5,200.00	4,947.93	4,700.00	4,687.97	15.87	10.44	-34.96	146.36	-45.07	596.43	570.12	26.31	22.666	
5,250.00	4,950.07	4,700.00	4,687.97	16.87	10.44	-29.16	146.36	-45.07	641.10	613.78	27.31	23.471	
5,256.48	4,950.00	4,700.00	4,687.97	17.01	10.44	-28.52	146.36	-45.07	646.81	619.37	27.45	23.566	
5,300.00	4,949.24	4,681.42	4,671.68	17.92	10.39	-27.62	149.42	-36.67	684.88	656.57	28.31	24.193	
5,400.00	4,947.50	4,650.00	4,643.45	20.13	10.30	-26.16	154.13	-23.72	774.12	743.68	30.44	25.434	
5,500.00	4,945.75	4,650.00	4,643.45	22.47	10.30	-26.16	154.13	-23.72	864.50	831.73	32.77	26.382	
5,600.00	4,944.01	4,629.44	4,624.54	24.89	10.25	-25.25	156.90	-16.12	956.21	921.07	35.14	27.211	
5,700.00	4,942.26	4,616.20	4,612.21	27.37	10.22	-24.68	158.54	-11.60	1,048.98	1,011.39	37.59	27.904	
5,800.00	4,940.52	4,600.00	4,596.96	29.90	10.19	-24.00	160.41	-6.48	1,142.61	1,102.53	40.09	28.504	
5,900.00	4,938.77	4,600.00	4,596.96	32.47	10.19	-24.00	160.41	-6.48	1,236.95	1,194.29	42.65	29.001	
6,000.00	4,937.03	4,600.00	4,596.96	35.06	10.19	-24.00	160.41	-6.48	1,332.11	1,286.86	45.25	29.440	
6,100.00	4,935.28	4,576.18	4,574.23	37.68	10.14	-23.04	162.86	0.25	1,427.24	1,379.42	47.82	29.849	
6,200.00	4,933.54	4,568.52	4,566.87	40.31	10.12	-22.74	163.57	2.20	1,523.10	1,472.67	50.44	30.199	
6,300.00	4,931.79	4,550.00	4,548.92	42.97	10.08	-22.02	165.13	6.50	1,619.51	1,566.46	53.05	30.529	
6,400.00	4,930.04	4,550.00	4,548.92	45.63	10.08	-22.02	165.13	6.50	1,715.96	1,660.25	55.71	30.801	
6,500.00	4,928.30	4,550.00	4,548.92	48.30	10.08	-22.02	165.13	6.50	1,812.79	1,754.41	58.38	31.049	
6,600.00	4,926.55	4,550.00	4,548.92	50.98	10.08	-22.02	165.13	6.50	1,909.95	1,848.88	61.07	31.277	
6,700.00	4,924.81	4,550.00	4,548.92	53.67	10.08	-22.02	165.13	6.50	2,007.39	1,943.63	63.76	31.486	
6,800.00	4,923.06	4,550.00	4,548.92	56.37	10.08	-22.02	165.13	6.50	2,105.07	2,038.62	66.45	31.678	
6,900.00	4,921.32	4,550.00	4,548.92	59.07	10.08	-22.02	165.13	6.50	2,202.96	2,133.81	69.15	31.856	
7,000.00	4,919.57	4,526.39	4,525.83	61.78	10.03	-21.14	166.81	11.11	2,300.42	2,228.60	71.81	32.034	
7,100.00	4,917.83	4,522.72	4,522.22	64.49	10.03	-21.01	167.04	11.73	2,398.45	2,323.93	74.51	32.188	
7,200.00	4,916.08	4,500.00	4,499.78	67.20	9.98	-20.19	168.26	15.09	2,497.01	2,419.83	77.18	32.352	
7,300.00	4,914.34	4,500.00	4,499.78	69.92	9.98	-20.19	168.26	15.09	2,595.16	2,515.26	79.90	32.481	
7,400.00	4,912.59	4,500.00	4,499.78	72.64	9.98	-20.19	168.26	15.09	2,693.45	2,610.83	82.62	32.601	
7,500.00	4,910.85	4,500.00	4,499.78	75.36	9.98	-20.19	168.26	15.09	2,791.86	2,706.52	85.34	32.715	
7,600.00	4,909.10	4,500.00	4,499.78	78.08	9.98	-20.19	168.26	15.09	2,890.38	2,802.31	88.06	32.821	
7,700.00	4,907.36	4,500.00	4,499.78	80.81	9.98	-20.19	168.26	15.09	2,989.00	2,898.21	90.79	32.922	
7,800.00	4,905.61	4,500.00	4,499.78	83.54	9.98	-20.19	168.26	15.09	3,087.70	2,994.18	93.52	33.017	
7,900.00	4,903.87	4,500.00	4,499.78	86.27	9.98	-20.19	168.26	15.09	3,186.49	3,090.24	96.25	33.107	
8,000.00	4,902.12	4,500.00	4,499.78	89.00	9.98	-20.19	168.26	15.09	3,285.35	3,186.37	98.98	33.192	
8,100.00	4,900.38	4,500.00	4,499.78	91.73	9.98	-20.19	168.26	15.09	3,384.28	3,282.57	101.71	33.273	
8,200.00	4,898.63	4,500.00	4,499.78	94.46	9.98	-20.19	168.26	15.09	3,483.27	3,378.82	104.45	33.350	
8,300.00	4,896.89	4,500.00	4,499.78	97.20	9.98	-20.19	168.26	15.09	3,582.31	3,475.13	107.18	33.423	
8,400.00	4,895.14	4,500.00	4,499.78	99.94	9.98	-20.19	168.26	15.09	3,681.41	3,571.49	109.92	33.492	
8,500.00	4,893.39	4,500.00	4,499.78	102.67	9.98	-20.19	168.26	15.09	3,780.55	3,667.90	112.66	33.559	
8,600.00	4,891.65	4,500.00	4,499.78	105.41	9.98	-20.19	168.26	15.09	3,879.74	3,764.35	115.39	33.622	
8,700.00	4,889.90	4,500.00	4,499.78	108.15	9.98	-20.19	168.26	15.09	3,978.97	3,860.84	118.13	33.682	
8,800.00	4,888.16	4,500.00	4,499.78	110.89	9.98	-20.19	168.26	15.09	4,078.24	3,957.36	120.87	33.740	
8,900.00	4,886.41	4,500.00	4,499.78	113.63	9.98	-20.19	168.26	15.09	4,177.54	4,053.92	123.61	33.796	
9,000.00	4,884.67	4,500.00	4,499.78	116.37	9.98	-20.19	168.26	15.09	4,276.87	4,150.52	126.35	33.849	
9,100.00	4,882.92	4,500.00	4,499.78	119.11	9.98	-20.19	168.26	15.09	4,376.23	4,247.14	129.09	33.899	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #934H - WB1 - Plan #1 11-06-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
9,200.00	4,881.18	4,500.00	4,499.78	121.86	9.98	-20.19	168.26	15.09	4,475.63	4,343.79	131.84	33.948	
9,300.00	4,879.43	4,500.00	4,499.78	124.60	9.98	-20.19	168.26	15.09	4,575.05	4,440.47	134.58	33.995	
9,400.00	4,877.69	4,477.04	4,476.97	127.34	9.94	-19.40	169.15	17.54	4,673.96	4,536.68	137.28	34.047	
9,500.00	4,875.94	4,475.95	4,475.88	130.09	9.94	-19.36	169.18	17.63	4,773.38	4,633.36	140.02	34.091	
9,600.00	4,874.20	4,474.90	4,474.84	132.83	9.93	-19.33	169.22	17.72	4,872.82	4,730.06	142.76	34.132	
9,700.00	4,872.45	4,473.89	4,473.83	135.57	9.93	-19.29	169.25	17.80	4,972.28	4,826.77	145.51	34.172	
9,800.00	4,870.71	4,472.91	4,472.86	138.32	9.93	-19.26	169.27	17.88	5,071.76	4,923.51	148.25	34.211	
9,821.00	4,870.34	4,472.71	4,472.66	138.90	9.93	-19.25	169.28	17.89	5,092.65	4,943.83	148.82	34.219	

Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #944H - WB1 - Plan #1 10-17-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
0.00	0.00	0.00	0.00	0.00	0.00	176.22	-1,249.40	82.50	1,252.13				
100.00	100.00	96.00	96.00	0.11	0.11	176.22	-1,249.40	82.50	1,252.12	1,251.90	0.22	5,684.257	
200.00	200.00	196.00	196.00	0.34	0.33	176.22	-1,249.40	82.50	1,252.12	1,251.46	0.67	1,882.018	
300.00	300.00	296.00	296.00	0.56	0.55	176.22	-1,249.40	82.50	1,252.12	1,251.01	1.11	1,123.140	
400.00	400.00	396.00	396.00	0.79	0.78	176.22	-1,249.40	82.50	1,252.12	1,250.56	1.56	800.399	
500.00	500.00	496.00	496.00	1.01	1.00	176.22	-1,249.40	82.50	1,252.12	1,250.11	2.01	621.738	
600.00	600.00	596.00	596.00	1.24	1.23	176.22	-1,249.40	82.50	1,252.12	1,249.66	2.46	508.282	
700.00	700.00	696.00	696.00	1.46	1.45	176.22	-1,249.40	82.50	1,252.12	1,249.21	2.91	429.844	
800.00	800.00	796.00	796.00	1.69	1.68	176.22	-1,249.40	82.50	1,252.12	1,248.76	3.36	372.378	
900.00	900.00	896.00	896.00	1.91	1.90	176.22	-1,249.40	82.50	1,252.12	1,248.31	3.81	328.465	
1,000.00	1,000.00	996.00	996.00	2.14	2.13	176.22	-1,249.40	82.50	1,252.12	1,247.86	4.26	293.817	
1,100.00	1,100.00	1,096.00	1,096.00	2.36	2.35	176.22	-1,249.40	82.50	1,252.12	1,247.41	4.71	265.781	
1,200.00	1,200.00	1,196.00	1,196.00	2.58	2.58	176.22	-1,249.40	82.50	1,252.12	1,246.96	5.16	242.630	
1,300.00	1,300.00	1,296.00	1,296.00	2.81	2.80	176.22	-1,249.40	82.50	1,252.12	1,246.51	5.61	223.188	
1,400.00	1,400.00	1,396.00	1,396.00	3.03	3.03	176.22	-1,249.40	82.50	1,252.12	1,246.06	6.06	206.631	
1,500.00	1,500.00	1,496.00	1,496.00	3.26	3.25	176.22	-1,249.40	82.50	1,252.12	1,245.61	6.51	192.361	
1,600.00	1,600.00	1,596.00	1,596.00	3.48	3.47	176.22	-1,249.40	82.50	1,252.12	1,245.16	6.96	179.935	
1,700.00	1,700.00	1,696.00	1,696.00	3.71	3.70	176.22	-1,249.40	82.50	1,252.12	1,244.71	7.41	169.016	
1,800.00	1,800.00	1,796.00	1,796.00	3.93	3.92	176.22	-1,249.40	82.50	1,252.12	1,244.26	7.86	159.347	
1,900.00	1,900.00	1,896.00	1,896.00	4.16	4.15	176.22	-1,249.40	82.50	1,252.12	1,243.81	8.31	150.724	
2,000.00	2,000.00	1,996.00	1,996.00	4.38	4.37	176.22	-1,249.40	82.50	1,252.12	1,243.36	8.76	142.987	
2,100.00	2,100.00	2,096.00	2,096.00	4.61	4.60	176.22	-1,249.40	82.50	1,252.12	1,242.91	9.21	136.005	
2,200.00	2,200.00	2,196.00	2,196.00	4.83	4.82	176.22	-1,249.40	82.50	1,252.12	1,242.46	9.66	129.674	
2,300.00	2,300.00	2,296.00	2,296.00	5.06	5.05	176.22	-1,249.40	82.50	1,252.12	1,242.02	10.11	123.905	
2,400.00	2,400.00	2,396.00	2,396.00	5.28	5.27	176.22	-1,249.40	82.50	1,252.12	1,241.57	10.56	118.628	
2,500.00	2,500.00	2,496.00	2,496.00	5.51	5.50	176.22	-1,249.40	82.50	1,252.12	1,241.12	11.00	113.782	
2,600.00	2,600.00	2,596.00	2,596.00	5.73	5.72	176.22	-1,249.40	82.50	1,252.12	1,240.67	11.45	109.317	
2,700.00	2,700.00	2,696.00	2,696.00	5.96	5.95	176.22	-1,249.40	82.50	1,252.12	1,240.22	11.90	105.188	
2,800.00	2,800.00	2,796.00	2,796.00	6.18	6.17	176.22	-1,249.40	82.50	1,252.12	1,239.77	12.35	101.361	
2,900.00	2,900.00	2,896.00	2,896.00	6.41	6.40	176.22	-1,249.40	82.50	1,252.12	1,239.32	12.80	97.802	
3,000.00	3,000.00	2,996.00	2,996.00	6.63	6.62	176.22	-1,249.40	82.50	1,252.12	1,238.87	13.25	94.484	
3,100.00	3,100.00	3,096.00	3,096.00	6.86	6.85	176.22	-1,249.40	82.50	1,252.12	1,238.42	13.70	91.384	
3,200.00	3,200.00	3,196.00	3,196.00	7.08	7.07	176.22	-1,249.40	82.50	1,252.12	1,237.97	14.15	88.481	
3,300.00	3,300.00	3,296.00	3,296.00	7.30	7.30	176.22	-1,249.40	82.50	1,252.12	1,237.52	14.60	85.757	
3,400.00	3,400.00	3,396.00	3,396.00	7.53	7.52	176.22	-1,249.40	82.50	1,252.12	1,237.07	15.05	83.196	
3,500.00	3,500.00	3,496.00	3,496.00	7.75	7.75	176.22	-1,249.40	82.50	1,252.12	1,236.62	15.50	80.783	
3,600.00	3,600.00	3,596.00	3,596.00	7.98	7.97	176.22	-1,249.40	82.50	1,252.12	1,236.17	15.95	78.506	
3,700.00	3,700.00	3,696.00	3,696.00	8.20	8.19	176.22	-1,249.40	82.50	1,252.12	1,235.72	16.40	76.354	
3,800.00	3,800.00	3,796.00	3,796.00	8.43	8.42	176.22	-1,249.40	82.50	1,252.12	1,235.27	16.85	74.317	
3,900.00	3,900.00	3,896.00	3,896.00	8.65	8.64	176.22	-1,249.40	82.50	1,252.12	1,234.82	17.30	72.385	
4,000.00	4,000.00	3,996.00	3,996.00	8.88	8.87	176.22	-1,249.40	82.50	1,252.12	1,234.37	17.75	70.552	
4,100.00	4,100.00	4,096.00	4,096.00	9.10	9.09	176.22	-1,249.40	82.50	1,252.12	1,233.92	18.20	68.809	
4,200.00	4,200.00	4,196.00	4,196.00	9.33	9.32	176.22	-1,249.40	82.50	1,252.12	1,233.47	18.65	67.150	
4,300.00	4,300.00	4,296.00	4,296.00	9.55	9.54	176.22	-1,249.40	82.50	1,252.12	1,233.02	19.10	65.569	
4,400.00	4,400.00	4,396.00	4,396.00	9.78	9.77	176.22	-1,249.40	82.50	1,252.12	1,232.58	19.55	64.061	
4,429.21	4,429.21	4,425.21	4,425.21	9.84	9.83	176.22	-1,249.40	82.50	1,252.12	1,232.44	19.68	63.634	
4,437.62	4,437.62	4,432.34	4,432.34	9.86	9.85	86.72	-1,249.40	82.51	1,252.12	1,232.41	19.71	63.526	CC
4,450.00	4,449.99	4,441.13	4,441.13	9.89	9.87	86.72	-1,249.41	82.64	1,252.13	1,232.37	19.75	63.384	
4,500.00	4,499.78	4,476.66	4,476.60	9.99	9.94	86.75	-1,249.63	84.65	1,252.36	1,232.44	19.93	62.850	
4,550.00	4,548.92	4,512.25	4,511.90	10.09	10.01	86.78	-1,250.09	89.07	1,252.90	1,232.80	20.10	62.328	
4,600.00	4,596.96	4,550.00	4,548.92	10.20	10.09	86.85	-1,250.86	96.37	1,253.75	1,233.46	20.29	61.792	
4,650.00	4,643.45	4,583.74	4,581.49	10.33	10.16	86.90	-1,251.78	105.13	1,254.90	1,234.42	20.49	61.251	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Offset Design Burch Keely Unit - #944H - WB1 - Plan #1 10-17-13

Survey Program: 0-MWD

Offset Site Error: 0.00 usft

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
4,700.00	4,687.97	4,619.73	4,615.51	10.47	10.25	86.97	-1,253.00	116.77	1,256.38	1,235.66	20.72	60.638	
4,750.00	4,730.10	4,650.00	4,643.45	10.66	10.32	87.01	-1,254.22	128.35	1,258.18	1,237.21	20.98	59.984	
4,800.00	4,769.47	4,692.41	4,681.35	10.89	10.44	87.15	-1,256.20	147.24	1,260.27	1,238.94	21.33	59.084	
4,850.00	4,805.70	4,729.19	4,712.88	11.18	10.57	87.26	-1,258.18	166.06	1,262.70	1,240.95	21.75	58.044	
4,900.00	4,838.47	4,766.35	4,743.30	11.56	10.72	87.37	-1,260.41	187.28	1,265.46	1,243.17	22.28	56.792	
4,950.00	4,867.46	4,800.00	4,769.47	12.03	10.88	87.44	-1,262.62	208.30	1,268.54	1,245.64	22.91	55.374	
5,000.00	4,892.43	4,842.05	4,800.16	12.60	11.13	87.62	-1,265.62	236.87	1,271.94	1,248.21	23.73	53.597	
5,050.00	4,913.12	4,880.74	4,826.28	13.28	11.41	87.76	-1,268.61	265.25	1,275.67	1,250.98	24.69	51.669	
5,100.00	4,929.37	4,920.11	4,850.60	14.06	11.74	87.91	-1,271.84	296.03	1,279.72	1,253.92	25.80	49.594	
5,150.00	4,941.00	4,960.27	4,872.93	14.93	12.15	88.06	-1,275.33	329.21	1,284.08	1,257.00	27.07	47.428	
5,200.00	4,947.93	5,000.00	4,892.43	15.87	12.60	88.20	-1,278.95	363.63	1,288.74	1,260.26	28.48	45.257	
5,250.00	4,950.07	5,043.45	4,910.66	16.87	13.20	88.39	-1,283.07	402.83	1,293.68	1,263.61	30.07	43.024	
5,256.48	4,950.00	5,050.00	4,913.12	17.01	13.29	88.43	-1,283.70	408.87	1,294.34	1,264.05	30.29	42.730	
5,300.00	4,949.24	5,087.37	4,925.69	17.92	13.87	89.02	-1,287.38	443.86	1,298.93	1,267.14	31.79	40.859	
5,400.00	4,947.50	5,182.53	4,946.05	20.13	15.56	90.00	-1,297.08	536.17	1,310.07	1,274.38	35.69	36.704	
5,500.00	4,945.75	5,340.86	4,948.51	22.47	18.86	90.22	-1,311.76	693.62	1,320.82	1,279.50	41.32	31.962	
5,600.00	4,944.01	5,532.95	4,944.97	24.89	23.29	90.22	-1,314.63	885.61	1,322.19	1,274.02	48.18	27.444	
5,700.00	4,942.26	5,632.95	4,943.10	27.37	25.73	90.21	-1,313.72	985.59	1,322.13	1,269.04	53.09	24.902	
5,800.00	4,940.52	5,732.95	4,941.24	29.90	28.22	90.21	-1,312.80	1,085.57	1,322.07	1,263.96	58.12	22.749	
5,900.00	4,938.77	5,832.95	4,939.37	32.47	30.76	90.20	-1,311.88	1,185.55	1,322.01	1,258.79	63.22	20.911	
6,000.00	4,937.03	5,932.95	4,937.50	35.06	33.33	90.19	-1,310.97	1,285.53	1,321.96	1,253.57	68.39	19.330	
6,100.00	4,935.28	6,032.95	4,935.64	37.68	35.93	90.19	-1,310.05	1,385.50	1,321.90	1,248.29	73.61	17.959	
6,200.00	4,933.54	6,132.95	4,933.77	40.31	38.55	90.18	-1,309.13	1,485.48	1,321.84	1,242.97	78.86	16.761	
6,300.00	4,931.79	6,232.95	4,931.91	42.97	41.19	90.18	-1,308.22	1,585.46	1,321.78	1,237.63	84.15	15.707	
6,400.00	4,930.04	6,332.95	4,930.04	45.63	43.84	90.17	-1,307.30	1,685.44	1,321.72	1,232.25	89.47	14.773	
6,500.00	4,928.30	6,432.95	4,928.17	48.30	46.50	90.17	-1,306.38	1,785.42	1,321.66	1,226.85	94.80	13.941	
6,600.00	4,926.55	6,532.95	4,926.31	50.98	49.18	90.16	-1,305.47	1,885.39	1,321.60	1,221.44	100.16	13.195	
6,700.00	4,924.81	6,632.95	4,924.44	53.67	51.86	90.16	-1,304.55	1,985.37	1,321.54	1,216.01	105.53	12.523	
6,800.00	4,923.06	6,732.95	4,922.58	56.37	54.55	90.15	-1,303.63	2,085.35	1,321.48	1,210.56	110.92	11.914	
6,900.00	4,921.32	6,832.95	4,920.71	59.07	57.24	90.15	-1,302.71	2,185.33	1,321.42	1,205.10	116.31	11.361	
7,000.00	4,919.57	6,932.95	4,918.84	61.78	59.95	90.14	-1,301.80	2,285.31	1,321.36	1,199.64	121.72	10.856	
7,100.00	4,917.83	7,032.95	4,916.98	64.49	62.65	90.14	-1,300.88	2,385.29	1,321.30	1,194.16	127.14	10.393	
7,200.00	4,916.08	7,132.95	4,915.11	67.20	65.36	90.13	-1,299.96	2,485.26	1,321.24	1,188.68	132.56	9.967	
7,300.00	4,914.34	7,232.95	4,913.24	69.92	68.07	90.13	-1,299.05	2,585.24	1,321.18	1,183.19	137.99	9.574	
7,400.00	4,912.59	7,332.95	4,911.38	72.64	70.79	90.12	-1,298.13	2,685.22	1,321.12	1,177.70	143.43	9.211	
7,500.00	4,910.85	7,432.95	4,909.51	75.36	73.51	90.12	-1,297.21	2,785.20	1,321.06	1,172.19	148.87	8.874	
7,600.00	4,909.10	7,532.95	4,907.65	78.08	76.23	90.11	-1,296.30	2,885.18	1,321.00	1,166.69	154.31	8.560	
7,700.00	4,907.36	7,632.95	4,905.78	80.81	78.96	90.11	-1,295.38	2,985.16	1,320.94	1,161.18	159.76	8.268	
7,800.00	4,905.61	7,732.95	4,903.91	83.54	81.68	90.10	-1,294.46	3,085.13	1,320.88	1,155.67	165.22	7.995	
7,900.00	4,903.87	7,832.95	4,902.05	86.27	84.41	90.10	-1,293.54	3,185.11	1,320.82	1,150.15	170.68	7.739	
8,000.00	4,902.12	7,932.95	4,900.18	89.00	87.14	90.09	-1,292.63	3,285.09	1,320.77	1,144.63	176.14	7.499	
8,100.00	4,900.38	8,032.95	4,898.32	91.73	89.87	90.08	-1,291.71	3,385.07	1,320.71	1,139.11	181.60	7.273	
8,200.00	4,898.63	8,132.95	4,896.45	94.46	92.60	90.08	-1,290.79	3,485.05	1,320.65	1,133.58	187.07	7.060	
8,300.00	4,896.89	8,232.95	4,894.58	97.20	95.34	90.07	-1,289.88	3,585.03	1,320.59	1,128.05	192.54	6.859	
8,400.00	4,895.14	8,332.95	4,892.72	99.94	98.07	90.07	-1,288.96	3,685.00	1,320.53	1,122.52	198.01	6.669	
8,500.00	4,893.39	8,432.95	4,890.85	102.67	100.81	90.06	-1,288.04	3,784.98	1,320.47	1,116.99	203.48	6.489	
8,600.00	4,891.65	8,532.95	4,888.98	105.41	103.54	90.06	-1,287.13	3,884.96	1,320.41	1,111.45	208.95	6.319	
8,700.00	4,889.90	8,632.95	4,887.12	108.15	106.28	90.05	-1,286.21	3,984.94	1,320.35	1,105.92	214.43	6.157	
8,800.00	4,888.16	8,732.95	4,885.25	110.89	109.02	90.05	-1,285.29	4,084.92	1,320.29	1,100.38	219.91	6.004	
8,900.00	4,886.41	8,832.95	4,883.39	113.63	111.76	90.04	-1,284.38	4,184.90	1,320.23	1,094.84	225.39	5.858	
9,000.00	4,884.67	8,932.95	4,881.52	116.37	114.50	90.04	-1,283.46	4,284.87	1,320.17	1,089.30	230.87	5.718	
9,100.00	4,882.92	9,032.95	4,879.65	119.11	117.24	90.03	-1,282.54	4,384.85	1,320.11	1,083.76	236.35	5.585	

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 #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

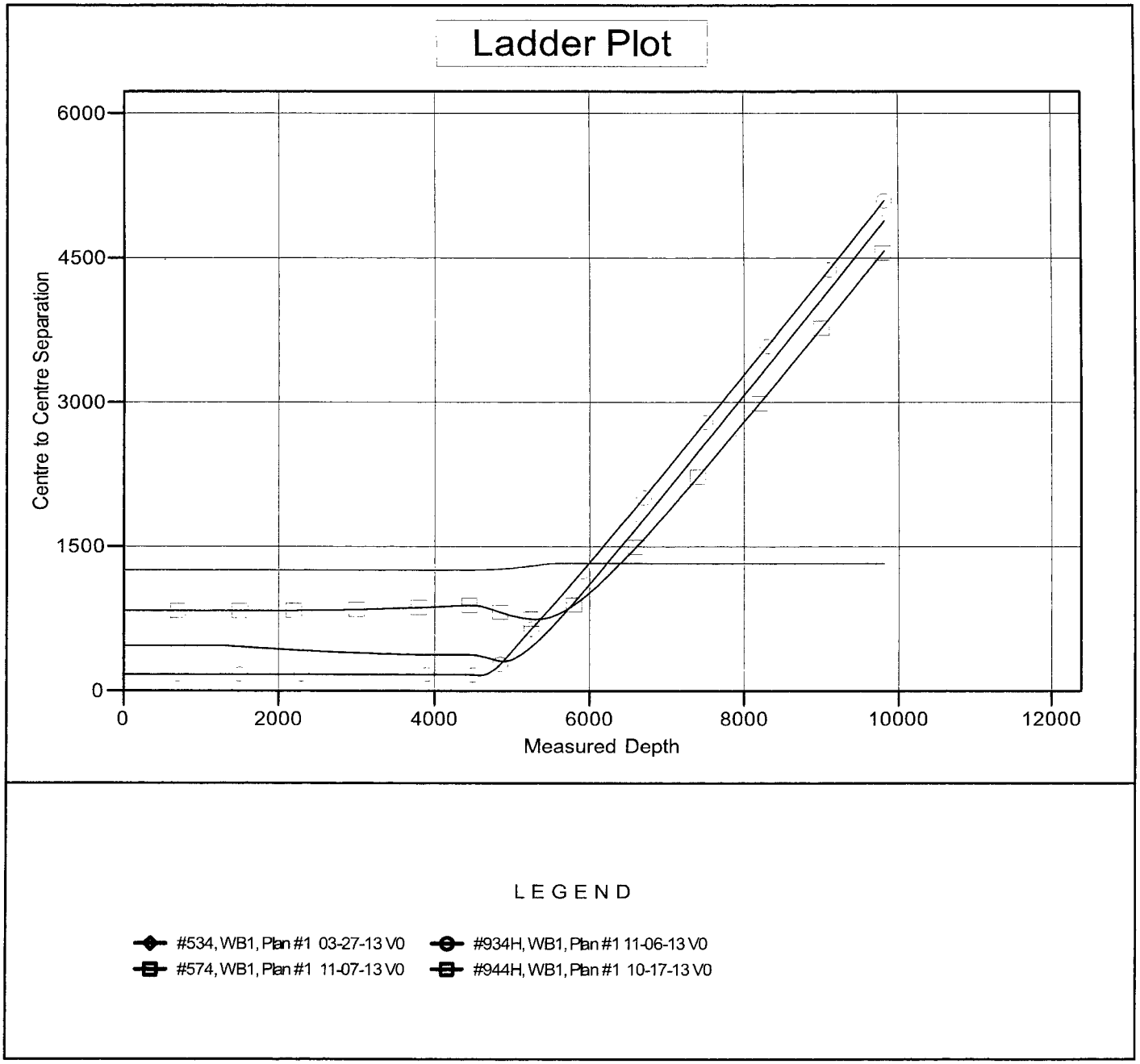
Offset Design Burch Keely Unit - #944H - WB1 - Plan #1 10-17-13 — **Offset Site Error:** 0.00 usft

Survey Program: 0-MWD — **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
9,200.00	4,881.18	9,132.95	4,877.79	121.86	119.98	90.03	-1,281.62	4,484.83	1,320.05	1,078.22	241.84	5.458	
9,300.00	4,879.43	9,232.95	4,875.92	124.60	122.72	90.02	-1,280.71	4,584.81	1,319.99	1,072.67	247.32	5.337	
9,400.00	4,877.69	9,332.95	4,874.05	127.34	125.46	90.02	-1,279.79	4,684.79	1,319.94	1,067.13	252.81	5.221	
9,500.00	4,875.94	9,432.95	4,872.19	130.09	128.21	90.01	-1,278.87	4,784.77	1,319.88	1,061.58	258.29	5.110	
9,600.00	4,874.20	9,532.95	4,870.32	132.83	130.95	90.01	-1,277.96	4,884.74	1,319.82	1,056.04	263.78	5.003	
9,700.00	4,872.45	9,632.95	4,868.46	135.57	133.69	90.00	-1,277.04	4,984.72	1,319.76	1,050.49	269.27	4.901	
9,800.00	4,870.71	9,732.95	4,866.59	138.32	136.44	90.00	-1,276.12	5,084.70	1,319.70	1,044.94	274.76	4.803	
9,814.18	4,870.46	9,746.35	4,866.34	138.71	136.81	89.99	-1,276.00	5,098.10	1,319.69	1,044.18	275.51	4.790	
9,821.00	4,870.34	9,746.35	4,866.34	138.90	136.81	89.99	-1,276.00	5,098.10	1,319.71	1,044.01	275.70	4.787	ES, SF

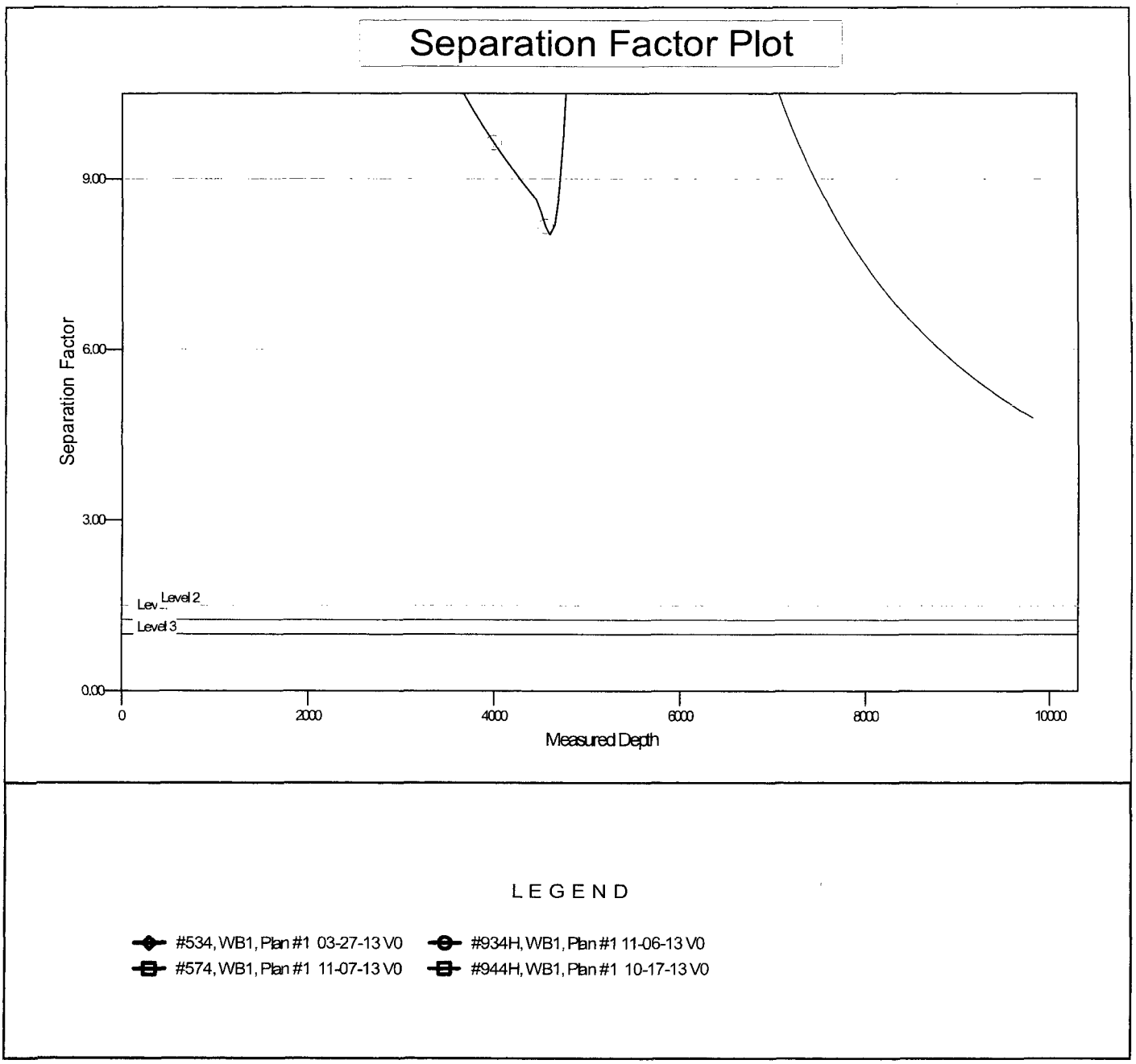
Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to GL @ 3635.00usft	Coordinates are relative to: #942H
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: 0.17°



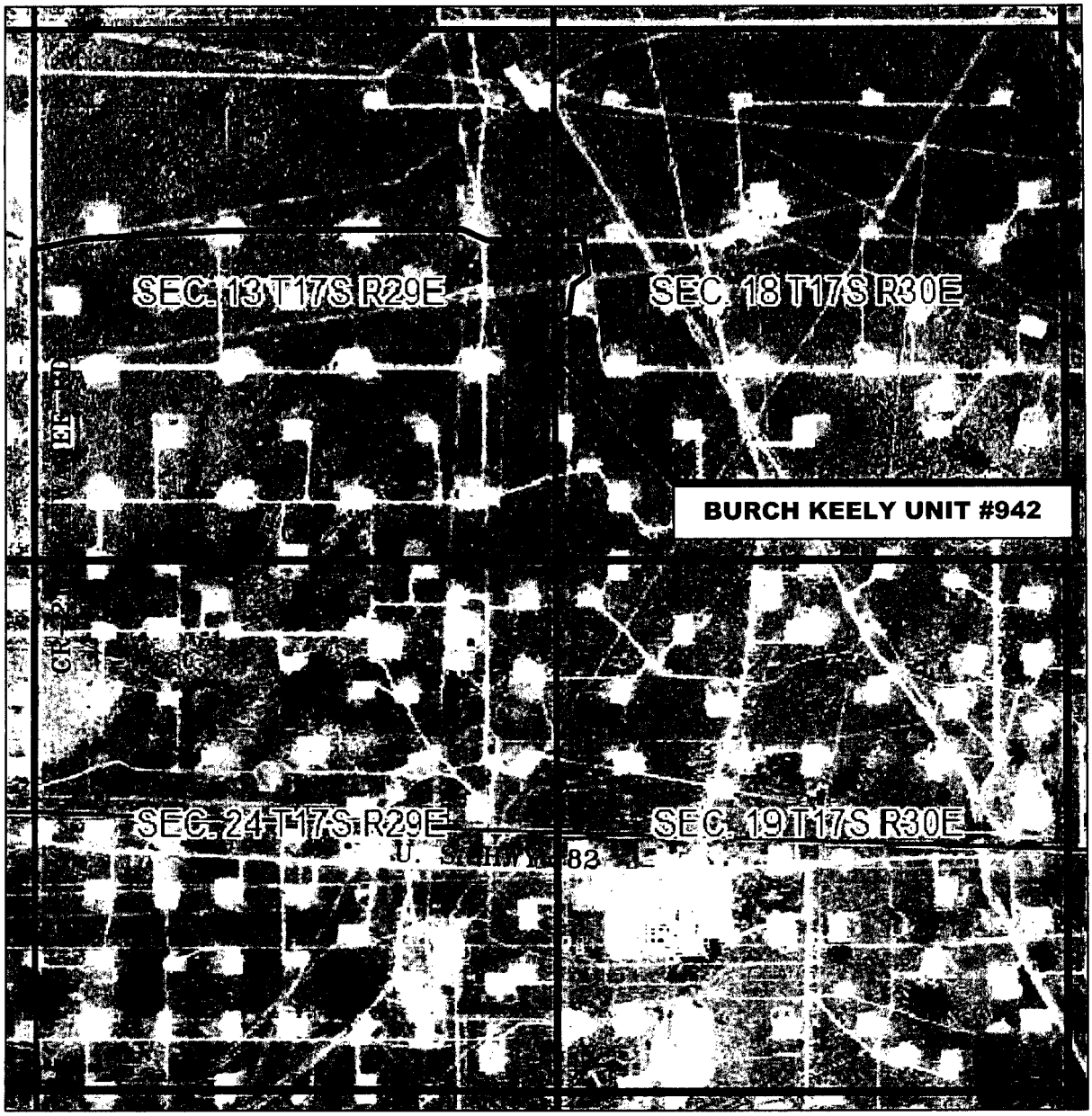
Company:	COG Operating LLC	**Local Co-ordinate Reference:**	Well #942H
Project:	Eddy County, New Mexico (NAD 27 NME)	**TVD Reference:**	GL @ 3635.00usft
Reference Site:	Burch Keely Unit	**MD Reference:**	GL @ 3635.00usft
Site Error:	0.00 usft	**North Reference:**	Grid
Reference Well:	#942H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	WB1	**Database:**	GCR DB
Reference Design:	Plan #1 11-15-13	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to GL @ 3635.00usft	Coordinates are relative to: #942H
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: 0.17°



VICINITY MAP

NOT TO SCALE



SECTION 13, TWP. 17 SOUTH, RGE. 29 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO

OPERATOR: COG Operating, LLC
LEASE: Burch Keely Unit
WELL NO.: 942H

LOCATION: 2285' FSL & 230' FEL
ELEVATION: 3635'

NO.	REVISION	DATE

JOB NO.: LS130269
DWG. NO.: 130269VM

PROSPERITY CONSULTANTS, LLC
2251 Double Creek Drive, Suite 602, Round Rock, Texas 78664 o (512) 992-2087 f (512) 251-2518

SCALE: NOT TO SCALE
DATE: 7/8/13
SURVEYED BY: GB/SM
DRAWN BY: DR
APPROVED BY: LWB
SHEET : 1 OF 1

NEW ACCESS ROAD PLAN

1. Proposed Access Road:

The Elevation Plat shows that 69.61' of new access road will be required for this location. If any road is required it will be constructed as follows:

A. The maximum width of the running surface will be 20'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

B. The average grade will be less than 1%.

C. No turnouts are planned.

D. No culverts, cattleguard, gates, low water crossings or fence cuts are necessary.

E. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. Secondary candidate source will be NMSLO Caliche Pit located in S2 SW4 of Section 32, Township 16 South, Range 30 East.

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

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

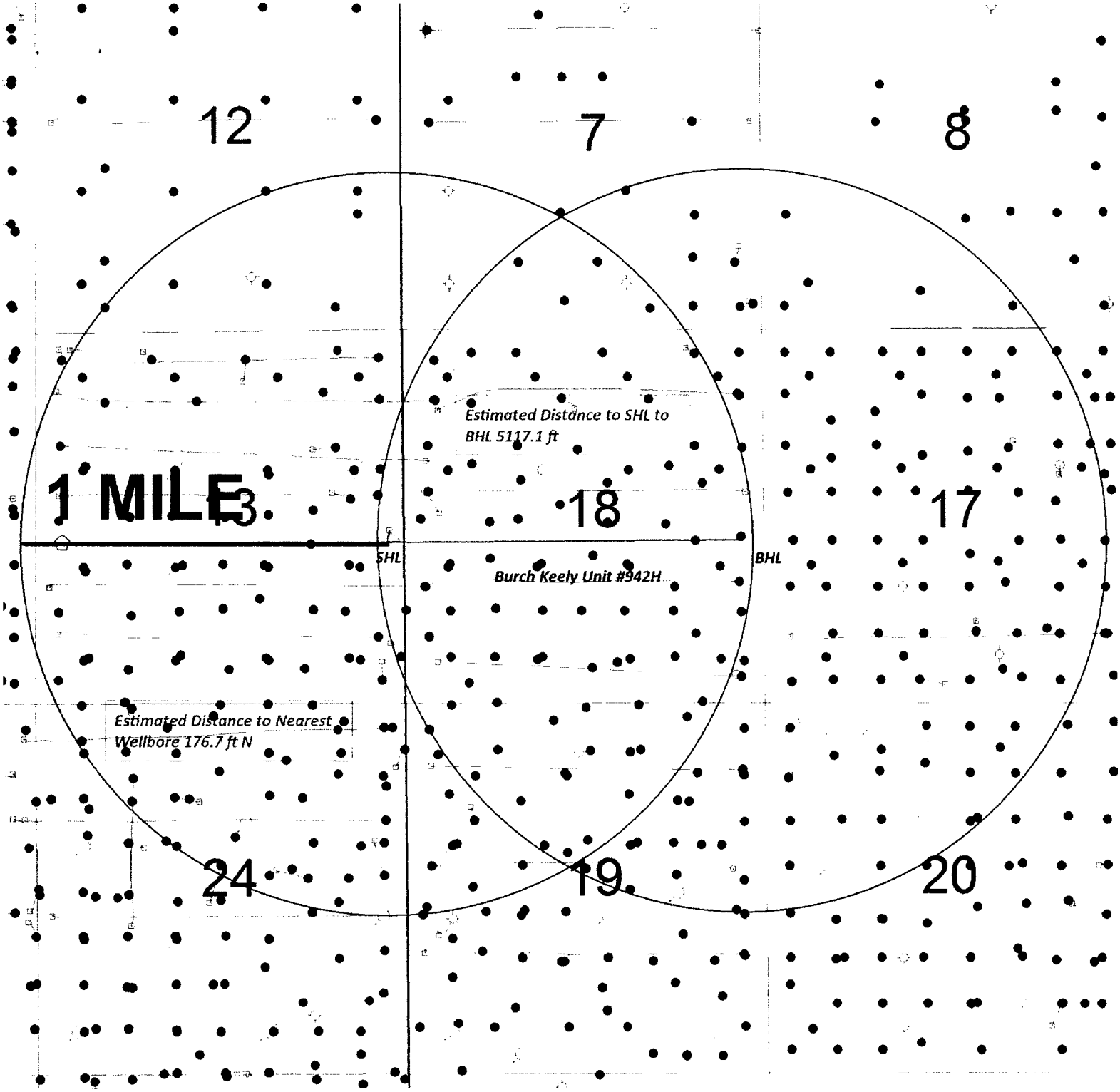
B. An approximate 120' X 120' area is used within the proposed well site to remove caliche.

C. Subsoil is removed and piled alongside the 120' by 120' area within the pad site.

D. When caliche is found, material will be stock piled within the pad site to build the location and road.

E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.

F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.



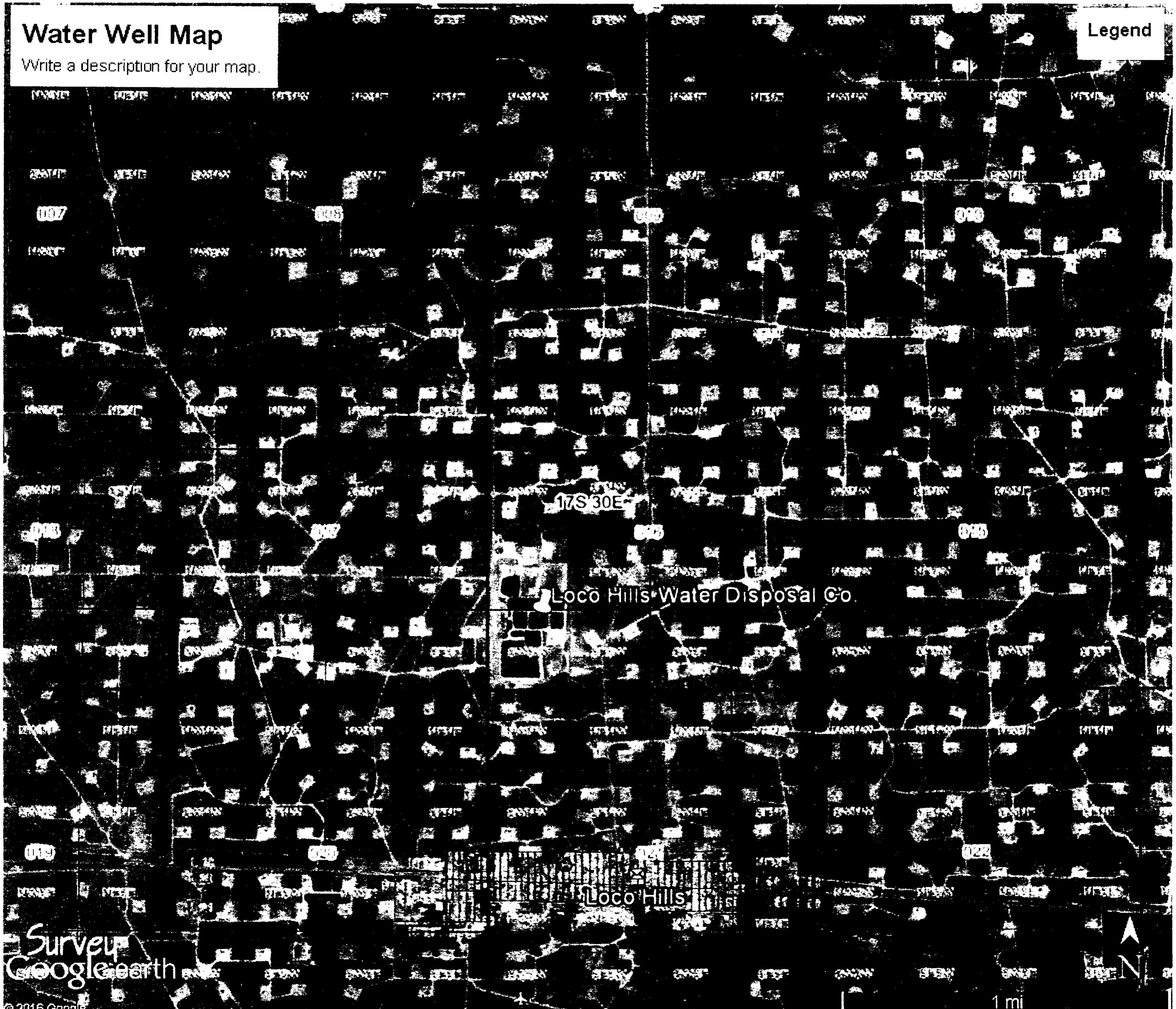
CONCHO

SENM SHELF AREA

Burch Keely Unit #942H

Sec. 13, T17S-R31E SHL 2285 FSL 230 FEL, Unit I
Sec. 18, T17S-R30E SHL 2310 FSL 330 FEL, Unit I

Author: L. Marley	All Wells	Date: 9 March, 2016
	Scale:	Lm_RA_1mileRadius_map.


Water Well Map
Write a description for your map.
Legend
17S 30E
Loco Hills Water Disposal Co.
Loco Hills
Survey
Google earth
© 2016 Google
1 mi
N

WELL SITE AND ROAD CONSTRUCTION

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

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.

B. An approximate 120' X 120' area is used within the proposed well site to remove caliche.

C. Subsoil is removed and piled alongside the 120' by 120' area within the pad site.

D. When caliche is found, material will be stock piled within the pad site to build the location and road.

E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.

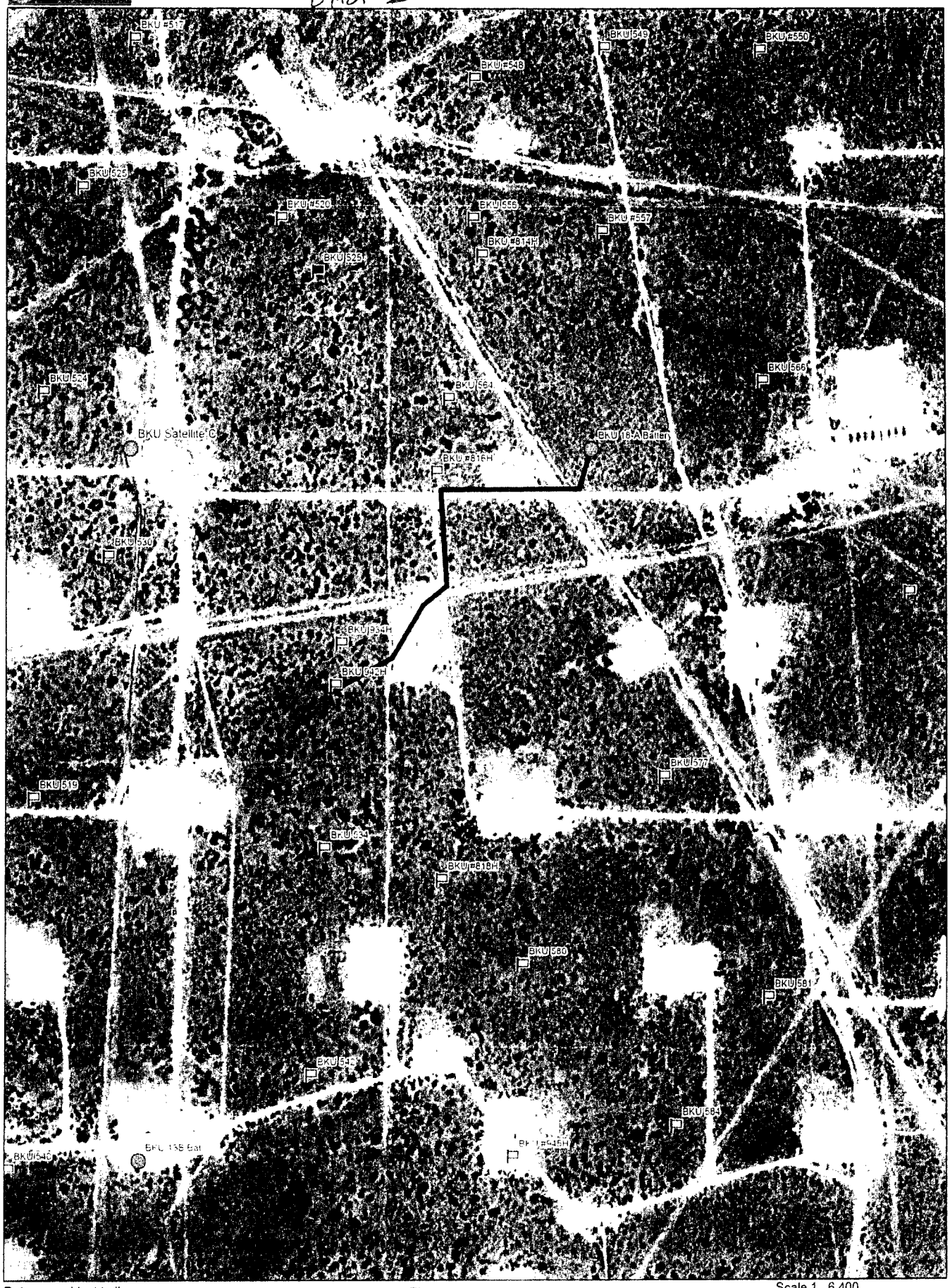
F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.

- In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit.

DELORME

EXBT 1

XMap® 7



Data use subject to license.

© DeLorme. XMap® 7

www.delorme.com

TN

MN (7.6°E)

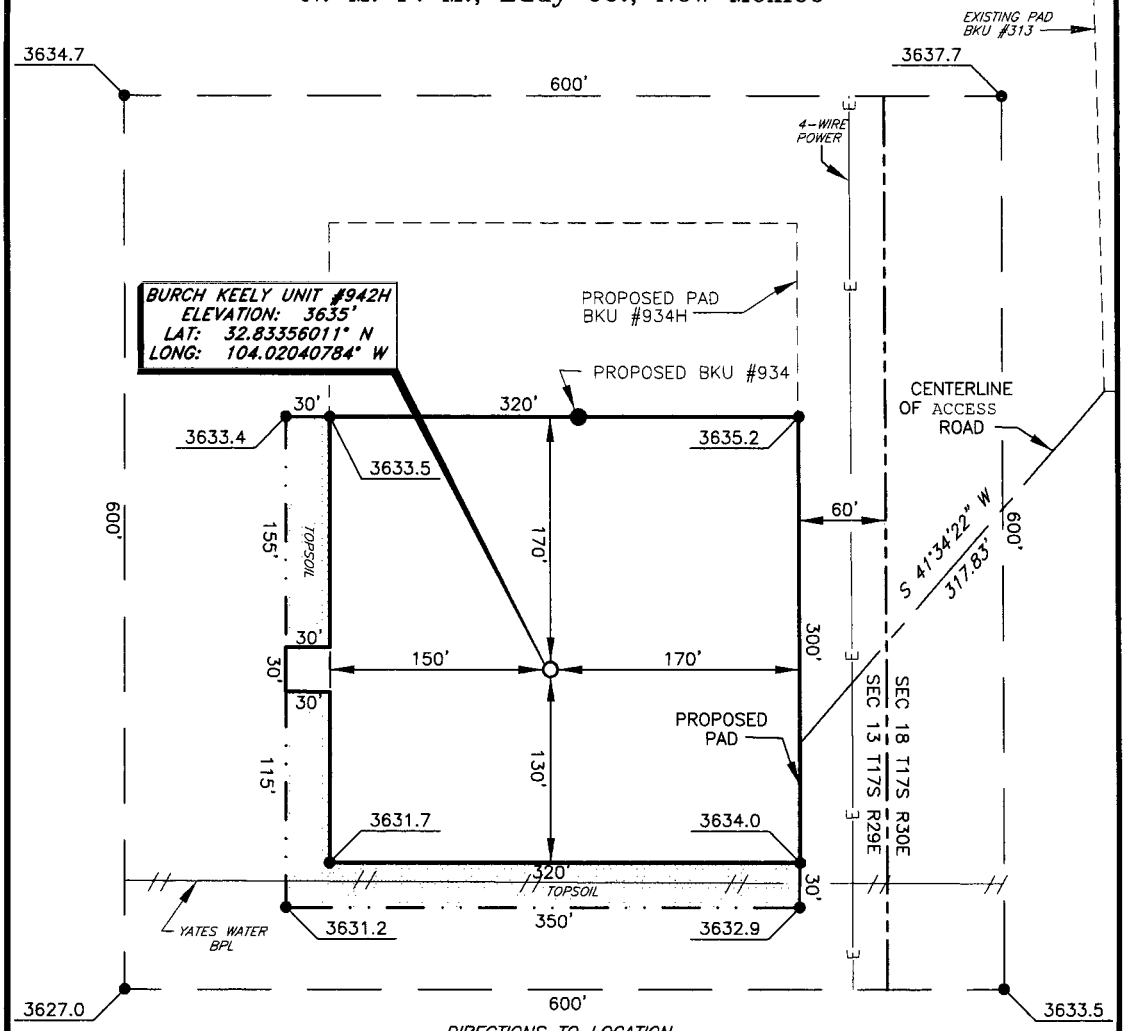
Scale 1 : 6,400

1" = 533.3 ft

Data Zoom 15-0

COG OPERATING, LLC

Burch Keely Unit #942H
(2285' FSL & 230' FEL)
Section 13, T-17-S, R-29-E,
N. M. P. M., Eddy Co., New Mexico



DIRECTIONS TO LOCATION

From the intersection of U. S. Hwy. No. 82 and County Road No. 215 (Kewanee):

Go North on County Road 215 approx. 1.0 mile;

Turn right. Go East approx. 1.0 mile;

Turn right. Go South approx. 0.1 mile to BKU #313;

Location is approx. 582 feet Southwest of existing well.

SCALE: 1" = 100'
0 50 100

BEARINGS ARE NAD 83 - NM EAST DISTANCES ARE GROUND.

THIS IS NOT A BOUNDARY SURVEY, APPARENT PROPERTY CORNERS AND PROPERTY LINES ARE SHOWN FOR INFORMATION ONLY. BOUNDARY DATA IS SHOWN FROM A PREVIOUS SURVEY REFERENCED HEREON.

I, R. M. Howett, a N. M. Professional Surveyor, hereby certify that this prepared this unclassified survey of a well location from an actual survey made on the ground under my direct supervision, said survey and plat meet the Min. Stds. for Land Surveying in the State of N. M. and are true and correct to the best of my knowledge and belief.

Robert M. Howett

Robert M. Howett NM PS 19680

ROBERT M. HOWETT NEW MEXICO 19680 PROFESSIONAL SURVEYOR 5/11/16

NO.	REVISION	DATE

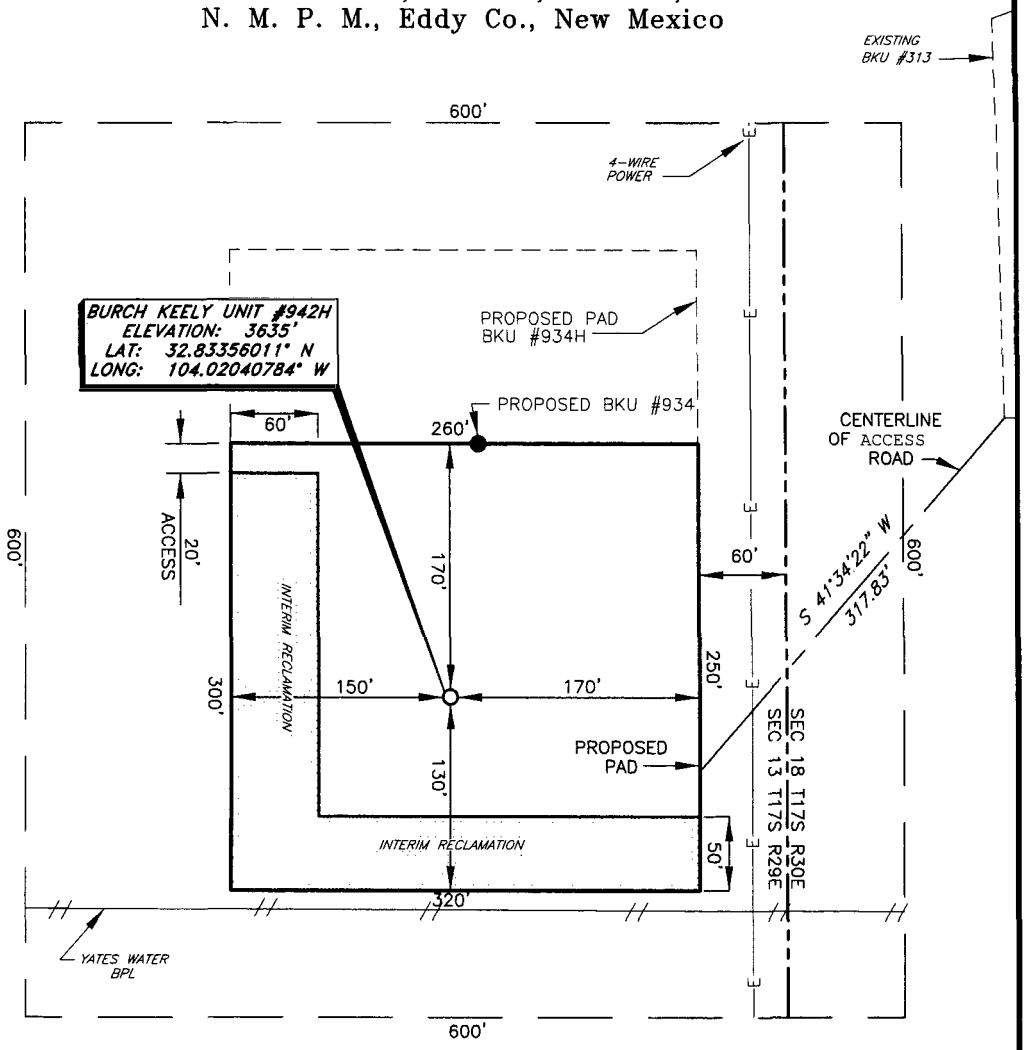
JOB NO.: LS130269
DWG. NO.: 130269PAD

PROSPERITY CONSULTANTS, LLC

2251 Double Creek Drive, Suite 602, Round Rock, Texas 78664 o (512) 992-2087 f (512) 251-2518

SCALE: 1" = 100'
DATE: 7/8/13
SURVEYED BY: GB/SM
DRAWN BY: DR
APPROVED BY: LWB
SHEET : 1 OF 1

COG OPERATING, LLC
Interim Reclamation
Burch Keely Unit #942H
(2285' FSL & 230' FEL)
Section 13, T-17-S, R-29-E,
N. M. P. M., Eddy Co., New Mexico



SCALE: 1" = 100'
0 50 100

BEARINGS ARE NAD 83 - NM EAST
DISTANCES ARE GROUND.

DIRECTIONS TO LOCATION

From the intersection of U. S. Hwy. No. 82 and County Road No. 215 (Kewanee):

Go North on County Road 215 approx. 1.0 mile;

Turn right. Go East approx. 1.0 mile;

Turn right. Go South approx. 0.1 mile to BKU #313;

Location is approx. 582 feet Southwest of existing well.

NO.	REVISION	DATE

JOB NO.: LS130269
DWG. NO.: 130269REC

PROSPERITY CONSULTANTS, LLC
2251 Double Creek Drive, Suite 602, Round Rock, Texas 78664
o (512) 992-2087 f (512) 251-2518

SCALE: 1" = 100'
DATE: 7/8/13
SURVEYED BY: GB/SM
DRAWN BY: DR
APPROVED BY: LWB
SHEET : 1 OF 1

Burch Keely Unit #942H Surface Flowlines Map

NMSLO Caliche Pit

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating, LLC
LEASE NO.:	NMLC028793A
WELL NAME & NO.:	942H – Burch Keely Unit
SURFACE HOLE FOOTAGE:	2285'/S & 230'/E
BOTTOM HOLE FOOTAGE	2310'/S & 330'/E; 18
LOCATION:	Section 13 T.17 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

A. DRILLING OPERATIONS REQUIREMENTS

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

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

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

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

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

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

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Water Basin:
After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

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

Possibility of water flows in the Artesia Group.
Possibility of lost circulation in the Red Beds, Artesia Group, and San Andres.

1. The **13-3/8** inch surface casing shall be set at approximately **315** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) 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 is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

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

   ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

3. The minimum required fill of cement behind the **7 X 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.

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

C. PRESSURE CONTROL

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

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

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

   a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

   b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

   c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall

have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

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

e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

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

D. DRILL STEM TEST

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

E. WASTE MATERIAL AND FLUIDS

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

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

F. SPECIAL REQUIREMENT(S)

Unit Wells
The well sign for a unit well shall include the unit number in addition to the surface and bottom hole lease numbers.

MHH 02142017

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating, LLC
LEASE NO.:	NMLC028793A
WELL NAME & NO.:	942H – Burch Keely Unit
SURFACE HOLE FOOTAGE:	2285'/S & 230'/E
BOTTOM HOLE FOOTAGE	2310'/S & 330'/E; 18
LOCATION:	Section 13 T.17 S., R.29 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)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken: Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Below Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

This authorization is subject to your Certificate of Participation and/or Certificate of Inclusion under the New Mexico Candidate Conservation Agreement. Because it involves surface disturbing activities covered under your Certificate, your Habitat Conservation Fund Account with the Center of Excellence for Hazardous Materials Management (CEHMM) will be debited according to Exhibit B Part 2 of the Certificate of Participation.

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.

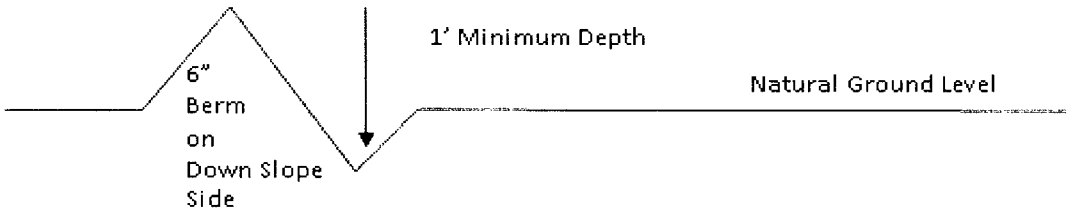
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

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

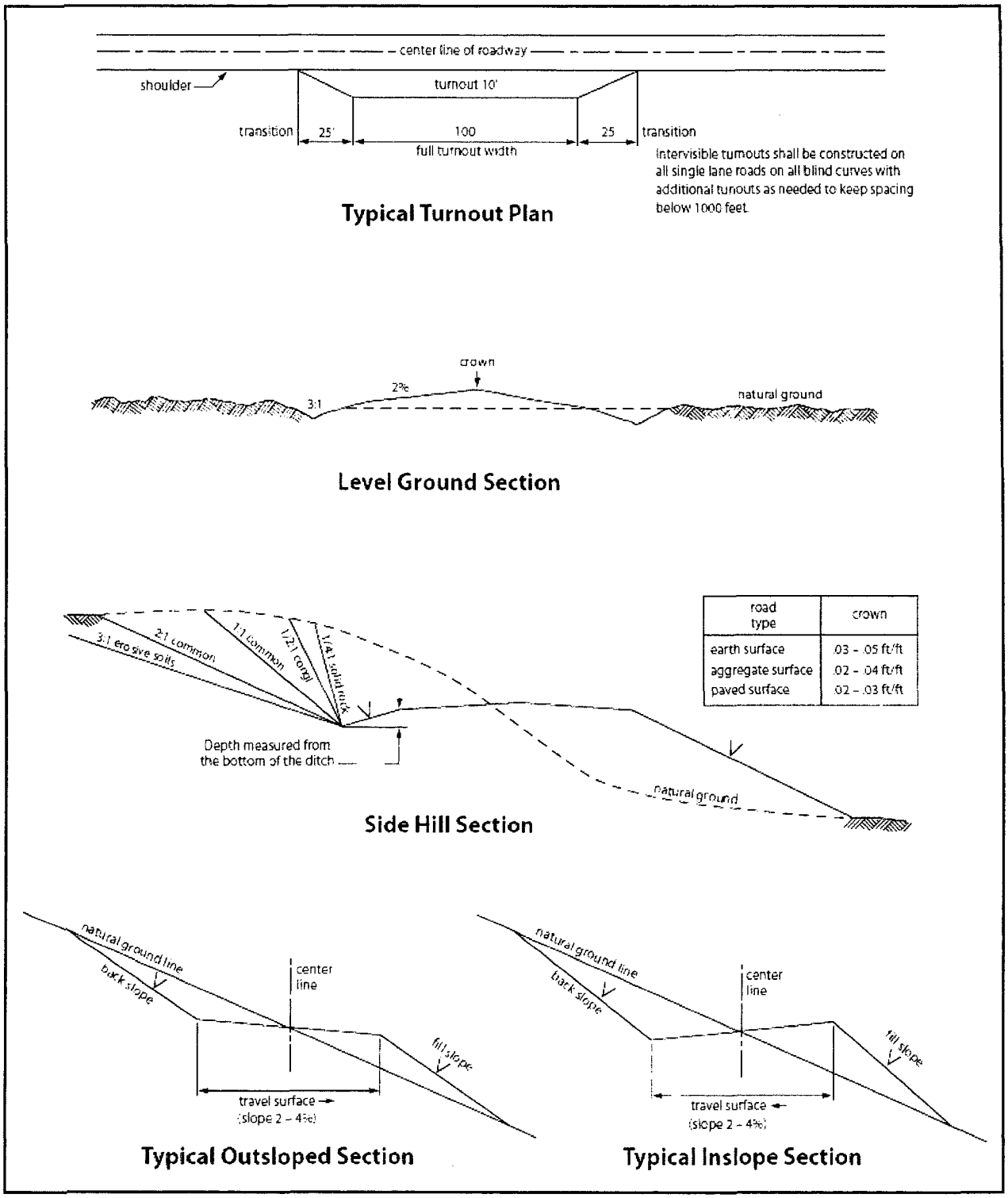


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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
STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES

A copy of the Grant and attachments, including stipulations, survey plat(s) and/or map(s), shall be on location during construction. BLM personnel may request to review 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. 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. Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, Holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC § 2601 *et seq.* (1982) with regard 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 in particular, 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. 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 activity of 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 provision applies without regard to whether a release is caused by Holder, its agent, or unrelated third

parties.

4. Holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. Holder shall be held to a standard of strict liability for damage or injury to the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

a. Activities of Holder including, but not limited to: construction, operation, maintenance, and termination of the facility;

b. Activities of other parties including, but not limited to:
   (1) Land clearing
   (2) Earth-disturbing and earth-moving work
   (3) Blasting
   (4) Vandalism and sabotage;

c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, 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, salt water, 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/she 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 Holder. Such action by the Authorized Officer shall not relieve Holder of any responsibility as provided herein.

6. All construction and maintenance activity shall be confined to the authorized right-of-way width of **20** feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline shall be installed no farther than 10 feet from the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline shall be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity shall be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

8. Holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky of duney areas, the pipeline shall be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of **24** inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

10. 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.

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. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

13. 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. Signs will be maintained in a legible condition for the life of the pipeline.

14. 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. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

15. Any cultural and/or paleontological resource (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 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.

16. 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, powerline 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.

17. Surface pipelines shall be less than or equal to 4 inches and a working pressure below 125 psi.

18. Special Stipulations:

a. **Lesser Prairie-Chicken:** Oil and gas activities will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities and pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Normal vehicle use on existing roads will not be restricted.

b. This authorization is subject to your Certificate of Participation and/or Certificate of Inclusion under the New Mexico Candidate Conservation Agreement. Because it involves surface disturbing activities covered under your Certificate, your Habitat Conservation Fund Account with the Center of Excellence for Hazardous Materials Management (CEHMM) will be debited according to Exhibit B Part 2 of the Certificate of Participation.

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).

Below Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture for LPC Sand/Shinnery 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 will be tested and the viability testing of seed shall 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 will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). Holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. 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 Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

*Pounds of pure live seed:

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