

MAY 25 2017

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

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

RECEIVED

**APPLICATION FOR PERMIT TO DRILL OR REENTER**

|                                                                                                                                                                                                                                                              |                                                     |                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------|
| 1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER                                                                                                                                                                 |                                                     | 5. Lease Serial No.<br>NMNM113937                                          |
| 1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone                                       |                                                     | 6. If Indian, Allottee or Tribe Name                                       |
| 2. Name of Operator<br>COG OPERATING LLC                                                                                                                                                                                                                     |                                                     | 7. If Unit or CA Agreement, Name and No.                                   |
| 3a. Address<br>600 West Illinois Ave Midland TX 79701                                                                                                                                                                                                        |                                                     | 8. Lease Name and Well No.<br>CRAIG FEDERAL COM 2H 317787                  |
| 3b. Phone No. (include area code)<br>(432)683-7443                                                                                                                                                                                                           |                                                     | 9. API Well No.<br>30-015-44209                                            |
| 4. Location of Well (Report location clearly and in accordance with any State requirements.)<br>At surface NWNW / 675 FNL / 760 FWL / LAT 32.077153 / LONG -104.252773<br>At proposed prod. zone NWNW / 200 FNL / 330 FWL / LAT 32.107583 / LONG -104.253695 |                                                     | 10. Field and Pool, or Exploratory<br>WC-015 G-03 S252636M / BONE SPRIN    |
| 14. Distance in miles and direction from nearest town or post office*<br>10 miles                                                                                                                                                                            |                                                     | 11. Sec., T. R. M. or Blk. and Survey or Area<br>SEC 1 / T26S / R26E / NMP |
| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)<br>200 feet                                                                                                                            | 16. No. of acres in lease<br>1720                   | 12. County or Parish<br>EDDY                                               |
| 17. Spacing Unit dedicated to this well<br>320                                                                                                                                                                                                               | 13. State<br>NM                                     |                                                                            |
| 18. Distance from proposed location* to nearest well, drilling, completed, 1151 feet applied for, on this lease, ft.                                                                                                                                         | 19. Proposed Depth<br>7437 feet / 18474 feet        | 20. BLM/BIA Bond No. on file<br>FED: NMB000215                             |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.)<br>3370 feet                                                                                                                                                                                             | 22. Approximate date work will start*<br>03/01/2017 | 23. Estimated duration<br>30 days                                          |

**24. Attachments**

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

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

|                                                    |                                                         |                    |
|----------------------------------------------------|---------------------------------------------------------|--------------------|
| 25. Signature<br>(Electronic Submission)           | Name (Printed/Typed)<br>Mayte Reyes / Ph: (575)748-6945 | Date<br>01/12/2017 |
| Title<br>Regulatory Analyst                        |                                                         |                    |
| Approved by (Signature)<br>(Electronic Submission) | Name (Printed/Typed)<br>Cody Layton / Ph: (575)234-5959 | Date<br>05/18/2017 |
| Title<br>Supervisor Multiple Resources             |                                                         |                    |
| Office<br>HOBBS                                    |                                                         |                    |

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**

RP. 5-30-17

**Operator Certification**

*I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.*

**NAME:** Mayte Reyes**Signed on:** 01/12/2017**Title:** Regulatory Analyst**Street Address:** 2208 W Main Street**City:** Artesia**State:** NM**Zip:** 88210**Phone:** (575)748-6945**Email address:** Mreyes1@concho.com**Field Representative****Representative Name:** Rand French**Street Address:** 2208 West main Street**City:** Artesia**State:** NM**Zip:** 88210**Phone:** (575)748-6940**Email address:** rfrench@concho.com

**APD ID:** 10400010034

**Submission Date:** 01/12/2017

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Well Type:** OIL WELL

**Well Work Type:** Drill

## Section 1 - General

**APD ID:** 10400010034

**Tie to previous NOS?**
**Submission Date:** 01/12/2017

**BLM Office:** HOBBS

**User:** Mayte Reyes

**Title:** Regulatory Analyst

**Federal/Indian APD:** FED

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

**Lease number:** NMNM113937

**Lease Acres:** 1720

**Surface access agreement in place?**
**Allotted?**
**Reservation:**
**Agreement in place?** NO

**Federal or Indian agreement:**
**Agreement number:**
**Agreement name:**
**Keep application confidential?** YES

**Permitting Agent?** NO

**APD Operator:** COG OPERATING LLC

**Operator letter of designation:**
**Keep application confidential?** YES

## 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:**
**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Well API Number:**
**Field/Pool or Exploratory?** Field and Pool

**Field Name:** WC-015 G-03  
S252636M

**Pool Name:** BONE SPRING

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

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

**Describe other minerals:**

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

**Type of Well Pad:** 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:** EXPLORATORY (WILDCAT)

**Describe sub-type:**

**Distance to town:** 10 Miles

**Distance to nearest well:** 1151 FT

**Distance to lease line:** 200 FT

**Reservoir well spacing assigned acres Measurement:** 320 Acres

**Well plat:** COG Craig 2H\_C102\_01-12-2017.pdf

**Well work start Date:** 03/01/2017

**Duration:** 30 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:** 32.077153

**Longitude:** -104.252773

SHL

**Elevation:** 3370

**MD:** 0

**TVD:** 0

**Leg #:** 1

**Lease Type:** FEDERAL

**Lease #:** NMNM113937

**NS-Foot:** 675

**NS Indicator:** FNL

**EW-Foot:** 760

**EW Indicator:** FWL

**Twsp:** 26S

**Range:** 26E

**Section:** 1

**Aliquot:** NWNW

**Lot:**

**Tract:**



**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

|                 |                            |                                       |                     |
|-----------------|----------------------------|---------------------------------------|---------------------|
|                 | <b>STATE:</b> NEW MEXICO   | <b>Meridian:</b> NEW MEXICO PRINCIPAL | <b>County:</b> EDDY |
|                 | <b>Latitude:</b> 32.077153 | <b>Longitude:</b> -104.252773         |                     |
| KOP             | <b>Elevation:</b> 3370     | <b>MD:</b> 0                          | <b>TVD:</b> 0       |
| <b>Leg #: 1</b> | <b>Lease Type:</b> FEDERAL | <b>Lease #:</b> NMNM113937            |                     |
|                 | <b>NS-Foot:</b> 675        | <b>NS Indicator:</b> FNL              |                     |
|                 | <b>EW-Foot:</b> 760        | <b>EW Indicator:</b> FWL              |                     |
|                 | <b>Twsp:</b> 26S           | <b>Range:</b> 26E                     | <b>Section:</b> 1   |
|                 | <b>Aliquot:</b> NWNW       | <b>Lot:</b>                           | <b>Tract:</b>       |
|                 | <b>STATE:</b> NEW MEXICO   | <b>Meridian:</b> NEW MEXICO PRINCIPAL | <b>County:</b> EDDY |
|                 | <b>Latitude:</b> 32.079912 | <b>Longitude:</b> -104.254107         |                     |
| PPP             | <b>Elevation:</b> -3671    | <b>MD:</b> 7041                       | <b>TVD:</b> 7041    |
| <b>Leg #: 1</b> | <b>Lease Type:</b> FEDERAL | <b>Lease #:</b> NMNM113937            |                     |
|                 | <b>NS-Foot:</b> 330        | <b>NS Indicator:</b> FSL              |                     |
|                 | <b>EW-Foot:</b> 330        | <b>EW Indicator:</b> FWL              |                     |
|                 | <b>Twsp:</b> 25S           | <b>Range:</b> 26E                     | <b>Section:</b> 36  |
|                 | <b>Aliquot:</b> SWSW       | <b>Lot:</b>                           | <b>Tract:</b>       |
|                 | <b>STATE:</b> NEW MEXICO   | <b>Meridian:</b> NEW MEXICO PRINCIPAL | <b>County:</b> EDDY |
|                 | <b>Latitude:</b> 32.107225 | <b>Longitude:</b> -104.253701         |                     |
| EXIT            | <b>Elevation:</b> -7205    | <b>MD:</b> 18000                      | <b>TVD:</b> 10575   |
| <b>Leg #: 1</b> | <b>Lease Type:</b> FEE     | <b>Lease #:</b> FEE                   |                     |
|                 | <b>NS-Foot:</b> 330        | <b>NS Indicator:</b> FNL              |                     |
|                 | <b>EW-Foot:</b> 330        | <b>EW Indicator:</b> FWL              |                     |
|                 | <b>Twsp:</b> 25S           | <b>Range:</b> 26E                     | <b>Section:</b> 25  |
|                 | <b>Aliquot:</b> NWNW       | <b>Lot:</b>                           | <b>Tract:</b>       |
|                 | <b>STATE:</b> NEW MEXICO   | <b>Meridian:</b> NEW MEXICO PRINCIPAL | <b>County:</b> EDDY |
|                 | <b>Latitude:</b> 32.107583 | <b>Longitude:</b> -104.253695         |                     |
| BHL             | <b>Elevation:</b> -4067    | <b>MD:</b> 18474                      | <b>TVD:</b> 7437    |
| <b>Leg #: 1</b> | <b>Lease Type:</b> FEE     | <b>Lease #:</b> FEE                   |                     |
|                 | <b>NS-Foot:</b> 200        | <b>NS Indicator:</b> FNL              |                     |
|                 | <b>EW-Foot:</b> 330        | <b>EW Indicator:</b> FWL              |                     |

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Twsp:** 25S

**Range:** 26E

**Section:** 25

**Aliquot:** NWNW

**Lot:**

**Tract:**

**APD ID:** 10400010034

**Submission Date:** 01/12/2017

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Well Type:** OIL WELL

**Well Work Type:** Drill

## Section 1 - Geologic Formations

**ID:** Surface formation

**Name:** UNKNOWN

**Lithology(ies):**

**Elevation:** 0

**True Vertical Depth:** 0

**Measured Depth:** 0

**Mineral Resource(s):**

NONE

**Is this a producing formation?** N

**ID:** Formation 1

**Name:** RUSTLER

**Lithology(ies):**

**Elevation:** -130

**True Vertical Depth:** 130

**Measured Depth:** 130

**Mineral Resource(s):**

NONE

**Is this a producing formation?** N

**ID:** Formation 2

**Name:** TOP OF SALT

**Lithology(ies):**

**Elevation:** -449

**True Vertical Depth:** 449

**Measured Depth:** 449

**Mineral Resource(s):**

NONE

**Is this a producing formation?** N

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**ID:** Formation 3

**Name:** BASE OF SALT

**Lithology(ies):**

**Elevation:** -1831

**True Vertical Depth:** 1831

**Measured Depth:** 1831

**Mineral Resource(s):**

NONE

**Is this a producing formation?** N

**ID:** Formation 4

**Name:** LAMAR LS

**Lithology(ies):**

**Elevation:** -2024

**True Vertical Depth:** 2024

**Measured Depth:** 2024

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 5

**Name:** BELL CANYON

**Lithology(ies):**

**Elevation:** -2070

**True Vertical Depth:** 2070

**Measured Depth:** 2070

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 6

**Name:** CHERRY CANYON

**Lithology(ies):**

**Elevation:** -2934

**True Vertical Depth:** 2934

**Measured Depth:** 2934

**Mineral Resource(s):**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 7

**Name:** BRUSHY CANYON

**Lithology(ies):**

**Elevation:** -4021

**True Vertical Depth:** 4021

**Measured Depth:** 4021

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 8

**Name:** BONE SPRING LIME

**Lithology(ies):**

**Elevation:** -5581

**True Vertical Depth:** 5581

**Measured Depth:** 5581

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 9

**Name:** BONE SPRINGS UPPER SHAL

**Lithology(ies):**

**Elevation:** -5862

**True Vertical Depth:** 5862

**Measured Depth:** 5862

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**ID:** Formation 10

**Name:** BONE SPRING LOWER

**Lithology(ies):**

**Elevation:** -6054

**True Vertical Depth:** 6054

**Measured Depth:** 6054

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 11

**Name:** BONE SPRING 1ST

**Lithology(ies):**

**Elevation:** -6554

**True Vertical Depth:** 6554

**Measured Depth:** 6554

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 12

**Name:** BONE SPRING 2ND

**Lithology(ies):**

**Elevation:** -7283

**True Vertical Depth:** 7283

**Measured Depth:** 7283

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** Y

**ID:** Formation 13

**Name:** BONE SPRING 3RD

**Lithology(ies):**

**Elevation:** -8407

**True Vertical Depth:** 8407

**Measured Depth:** 8407

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

**ID:** Formation 14

**Name:** WOLFCAMP

**Lithology(ies):**

**Elevation:** -8764

**True Vertical Depth:** 8764

**Measured Depth:** 8764

**Mineral Resource(s):**

NATURAL GAS

OIL

**Is this a producing formation?** N

## Section 2 - Blowout Prevention

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

**Rating Depth:** 12000

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

**Requesting Variance?** YES

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

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

**Choke Diagram Attachment:**

COG Craig 2H\_2M Choke\_01-12-2017.pdf

**BOP Diagram Attachment:**

COG Craig 2H\_2M BOP\_01-12-2017.pdf

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

**Rating Depth:** 23000

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

**Requesting Variance?** NO

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

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

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

tested.

**Choke Diagram Attachment:**

COG Craig 2H\_3M Choke\_01-12-2017.pdf

**BOP Diagram Attachment:**

COG\_Craig\_2H\_3M\_BOP\_03-30-2017.pdf

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### Section 3 - Casing

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**String Type:** SURFACE

**Other String Type:**

**Hole Size:** 17.5

**Top setting depth MD:** 0

**Top setting depth TVD:** 0

**Top setting depth MSL:** -7205

**Bottom setting depth MD:** 155

**Bottom setting depth TVD:** 155

**Bottom setting depth MSL:** -7360

**Calculated casing length MD:** 155

**Casing Size:** 13.375

**Other Size**

**Grade:** J-55

**Other Grade:**

**Weight:** 54.5

**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:** 15.93

**Burst Design Safety Factor:** 3.11

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

**Joint Tensile Design Safety Factor:** 60.85

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

**Body Tensile Design Safety Factor:** 60.85

**Casing Design Assumptions and Worksheet(s):**

COG Craig 2H\_Casing Prog\_01-12-2017.pdf

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**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**String Type:** INTERMEDIATE

**Other String Type:**

**Hole Size:** 12.25

**Top setting depth MD:** 0

**Top setting depth TVD:** 0

**Top setting depth MSL:** -7205

**Bottom setting depth MD:** 2050

**Bottom setting depth TVD:** 2050

**Bottom setting depth MSL:** -9255

**Calculated casing length MD:** 2050

**Casing Size:** 9.625

**Other Size**

**Grade:** J-55

**Other Grade:**

**Weight:** 40

**Joint Type:** LTC

**Other Joint Type:** BTC

**Condition:** NEW

**Inspection Document:**

**Standard:** API

**Spec Document:**

**Tapered String?:** N

**Tapered String Spec:**

### **Safety Factors**

**Collapse Design Safety Factor:** 2.36

**Burst Design Safety Factor:** 1.37

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

**Joint Tensile Design Safety Factor:** 6.34

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

**Body Tensile Design Safety Factor:** 6.34

**Casing Design Assumptions and Worksheet(s):**

COG Craig 2H\_Casing Prog\_01-12-2017.pdf

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**String Type:** PRODUCTION

**Other String Type:**

**Hole Size:** 8.75

**Top setting depth MD:** 0

**Top setting depth TVD:** 0

**Top setting depth MSL:** -7205

**Bottom setting depth MD:** 18474

**Bottom setting depth TVD:** 18474

**Bottom setting depth MSL:** -25679

**Calculated casing length MD:** 18474

**Casing Size:** 5.5

**Other Size**

**Grade:** P-110

**Other Grade:**

**Weight:** 17

**Joint Type:** LTC

**Other Joint Type:** BTC

**Condition:** NEW

**Inspection Document:**

**Standard:** API

**Spec Document:**

**Tapered String?:** N

**Tapered String Spec:**

### **Safety Factors**

**Collapse Design Safety Factor:** 2.06

**Burst Design Safety Factor:** 3.68

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

**Joint Tensile Design Safety Factor:** 3.52

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

**Body Tensile Design Safety Factor:** 3.52

**Casing Design Assumptions and Worksheet(s):**

COG Craig 2H\_Casing Prog\_01-12-2017.pdf

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### **Section 4 - Cement**

**Casing String Type:** SURFACE

Operator Name: COG OPERATING LLC

Well Name: CRAIG FEDERAL COM

Well Number: 2H

**Stage Tool Depth:**

Lead

Top MD of Segment: 0

Bottom MD Segment: 155

Cement Type: Class C

Additives: 4% Gel + 1% CaCl<sub>2</sub>

Quantity (sks): 0

Yield (cu.ff./sk): 1.75

Density: 13.5

Volume (cu.ft.): 0

Percent Excess: 50

Tail

Top MD of Segment: 0

Bottom MD Segment: 155

Cement Type: C

Additives: 2% CaCl<sub>2</sub>

Quantity (sks): 250

Yield (cu.ff./sk): 1.34

Density: 14.8

Volume (cu.ft.): 335

Percent Excess: 50

**Casing String Type: INTERMEDIATE**

**Stage Tool Depth:**

Lead

Top MD of Segment: 0

Bottom MD Segment: 2050

Cement Type: C Blend 35:65:6

Additives: No Additives

Quantity (sks): 310

Yield (cu.ff./sk): 2

Density: 12.7

Volume (cu.ft.): 620

Percent Excess: 50

Tail

Top MD of Segment: 0

Bottom MD Segment: 2050

Cement Type: C

Additives: 2% CaCl

Quantity (sks): 250

Yield (cu.ff./sk): 1.34

Density: 14.8

Volume (cu.ft.): 335

Percent Excess: 50

**Casing String Type: PRODUCTION**

**Stage Tool Depth:**

Lead

Top MD of Segment: 0

Bottom MD Segment: 18474

Cement Type: Lead: 50:50:10 H Blend

Additives: No additives

Quantity (sks): 750

Yield (cu.ff./sk): 2.5

Density: 11.9

Volume (cu.ft.): 1875

Percent Excess: 25

Tail

Top MD of Segment: 0

Bottom MD Segment: 18474

Cement Type: Tail: 50:50:2 Class H Blend

Additives: No additives

Quantity (sks): 2940

Yield (cu.ff./sk): 1.24

Density: 14.4

Volume (cu.ft.): 2645

Percent Excess: 25

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

## 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

|                                    |                                       |
|------------------------------------|---------------------------------------|
| <b>Top Depth:</b> 155              | <b>Bottom Depth:</b> 2050             |
| <b>Mud Type:</b> OTHER             | Saturated Brine                       |
| <b>Min Weight (lbs./gal.):</b> 10  | <b>Max Weight (lbs./gal.):</b> 10.2   |
| <b>Density (lbs/cu.ft.):</b>       | <b>Gel Strength (lbs/100 sq.ft.):</b> |
| <b>PH:</b>                         | <b>Viscosity (CP):</b>                |
| <b>Filtration (cc):</b>            | <b>Salinity (ppm):</b>                |
| <b>Additional Characteristics:</b> |                                       |
| <b>Top Depth:</b> 2050             | <b>Bottom Depth:</b> 18474            |
| <b>Mud Type:</b> OTHER             | CUT BRINE                             |
| <b>Min Weight (lbs./gal.):</b> 8.6 | <b>Max Weight (lbs./gal.):</b> 9.4    |
| <b>Density (lbs/cu.ft.):</b>       | <b>Gel Strength (lbs/100 sq.ft.):</b> |
| <b>PH:</b>                         | <b>Viscosity (CP):</b>                |
| <b>Filtration (cc):</b>            | <b>Salinity (ppm):</b>                |
| <b>Additional Characteristics:</b> |                                       |

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Top Depth:** 0

**Bottom Depth:** 155

**Mud Type:** OTHER

Fresh water gel

**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:**

---

## **Section 6 - Test, Logging, Coring**

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

None planned

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

CNL,GR

**Coring operation description for the well:**

None planned

## **Section 7 - Pressure**

**Anticipated Bottom Hole Pressure:** 3640

**Anticipated Surface Pressure:** 1994.84

**Anticipated Bottom Hole Temperature(F):** 135

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards attachment:**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations plan:**

COG Craig 2H\_H2S Schematic\_01-12-2017.pdf

COG Craig 2H\_H2S SUP\_01-12-2017.pdf

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

## **Section 8 - Other Information**

**Proposed horizontal/directional/multi-lateral plan submission:**

COG Craig 2H\_AC Rpt\_01-12-2017.pdf

COG Craig 2H\_Directional Plan\_01-12-2017.pdf

**Other proposed operations facets description:**

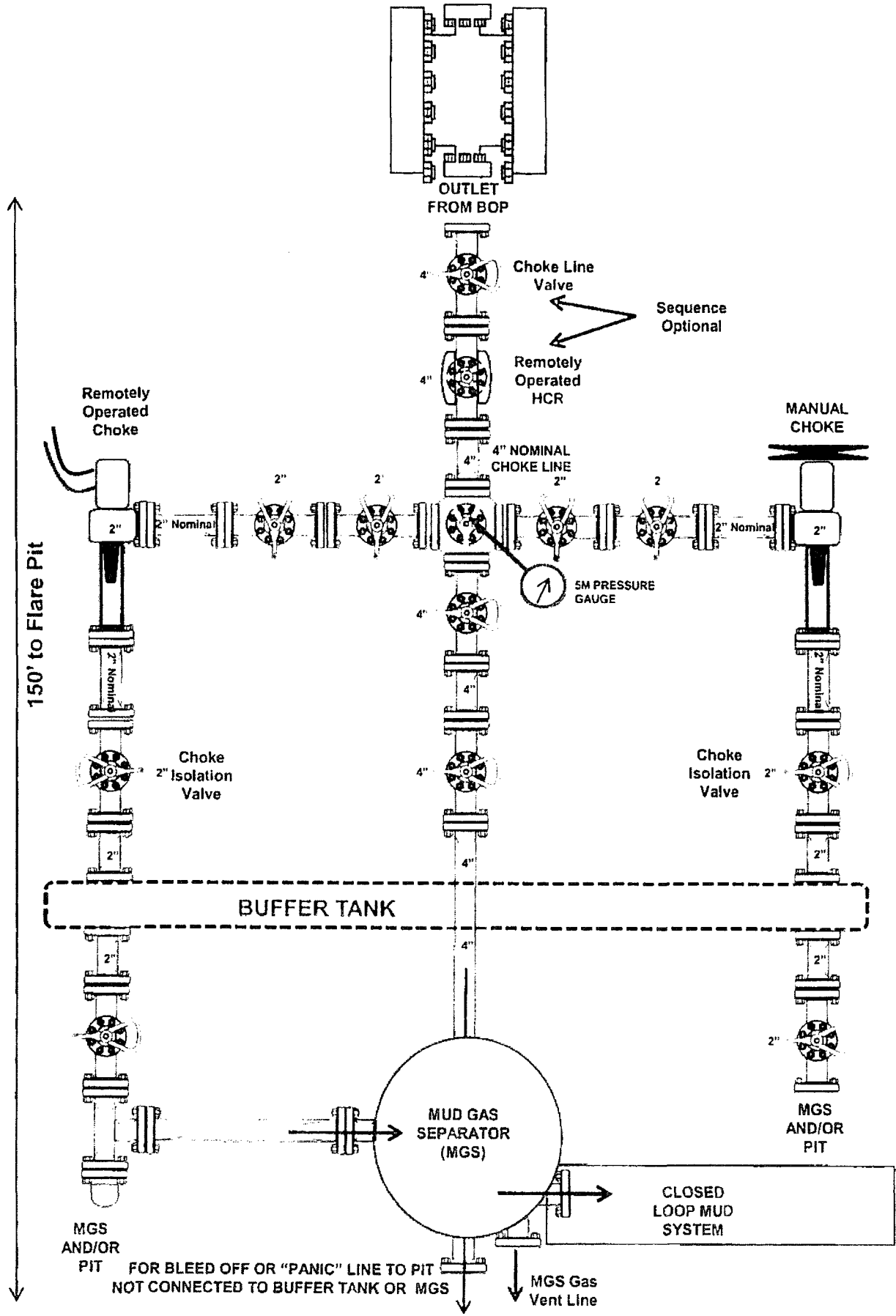
None

**Other proposed operations facets attachment:**

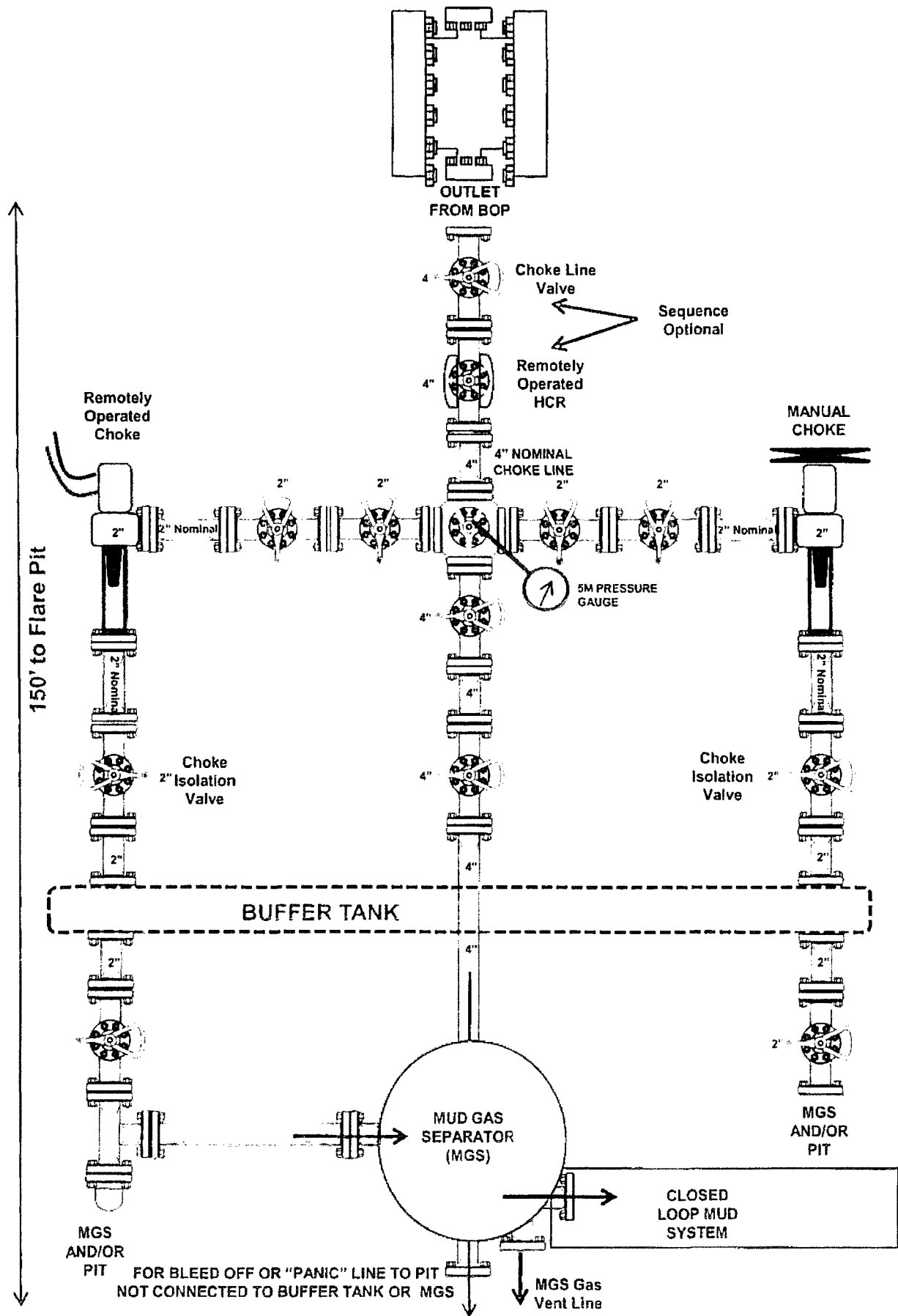
**Other Variance attachment:**

COG Craig 2H\_Flex Hose Variance\_01-12-2017.pdf

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

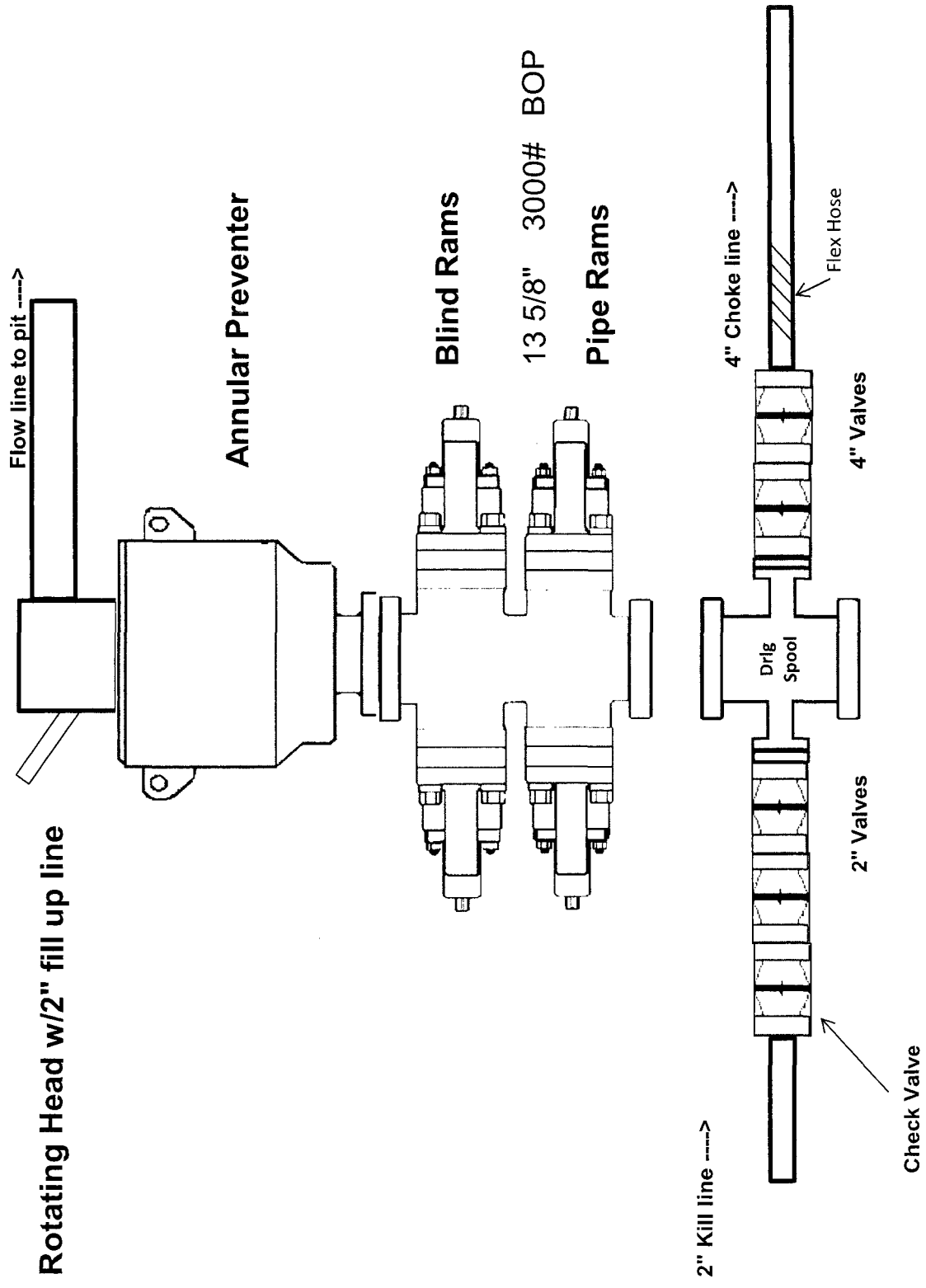


# 2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)

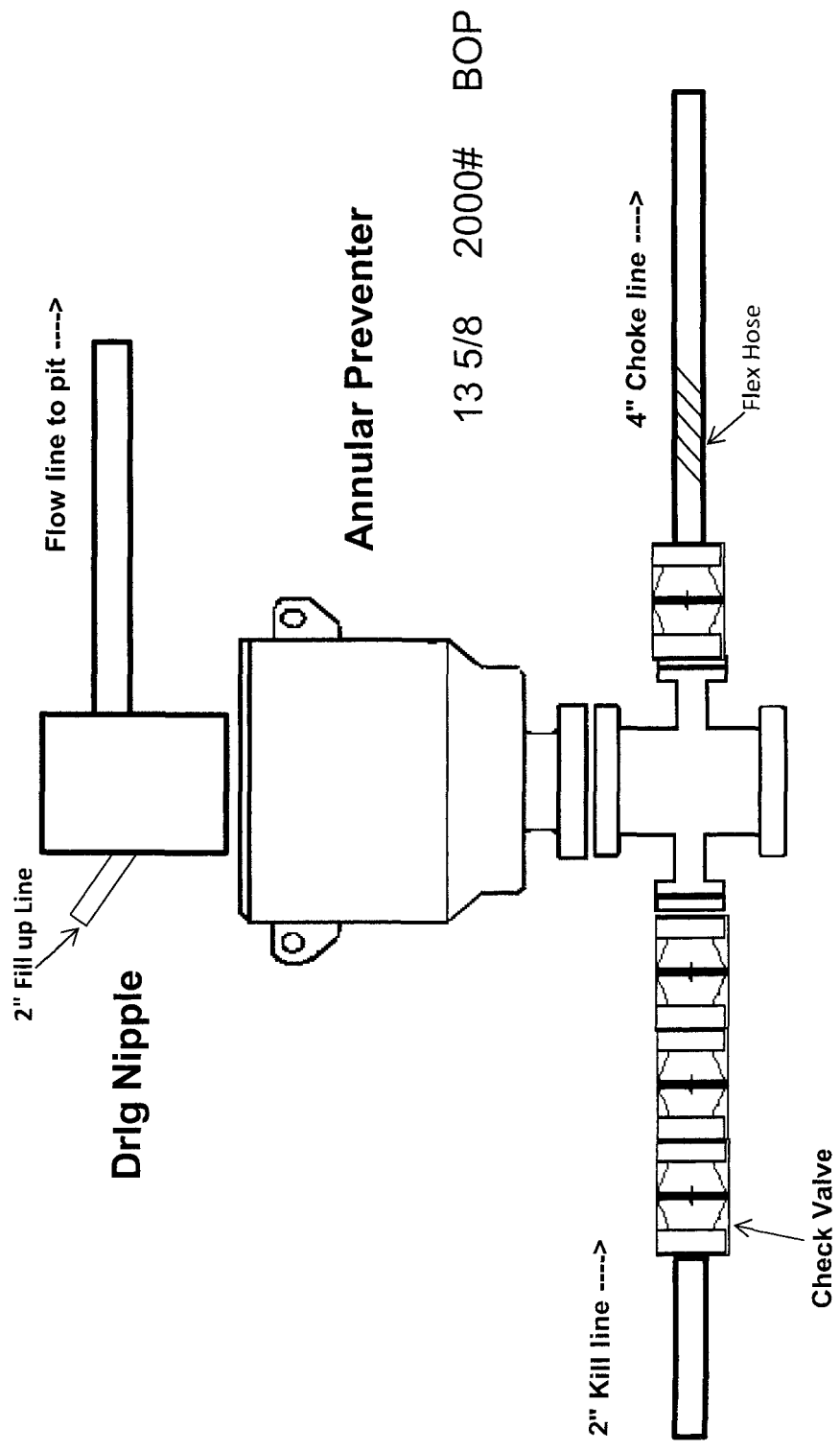




# 3,000 psi BOP Schematic



# 2,000 psi BOP Schematic



## Casing Program

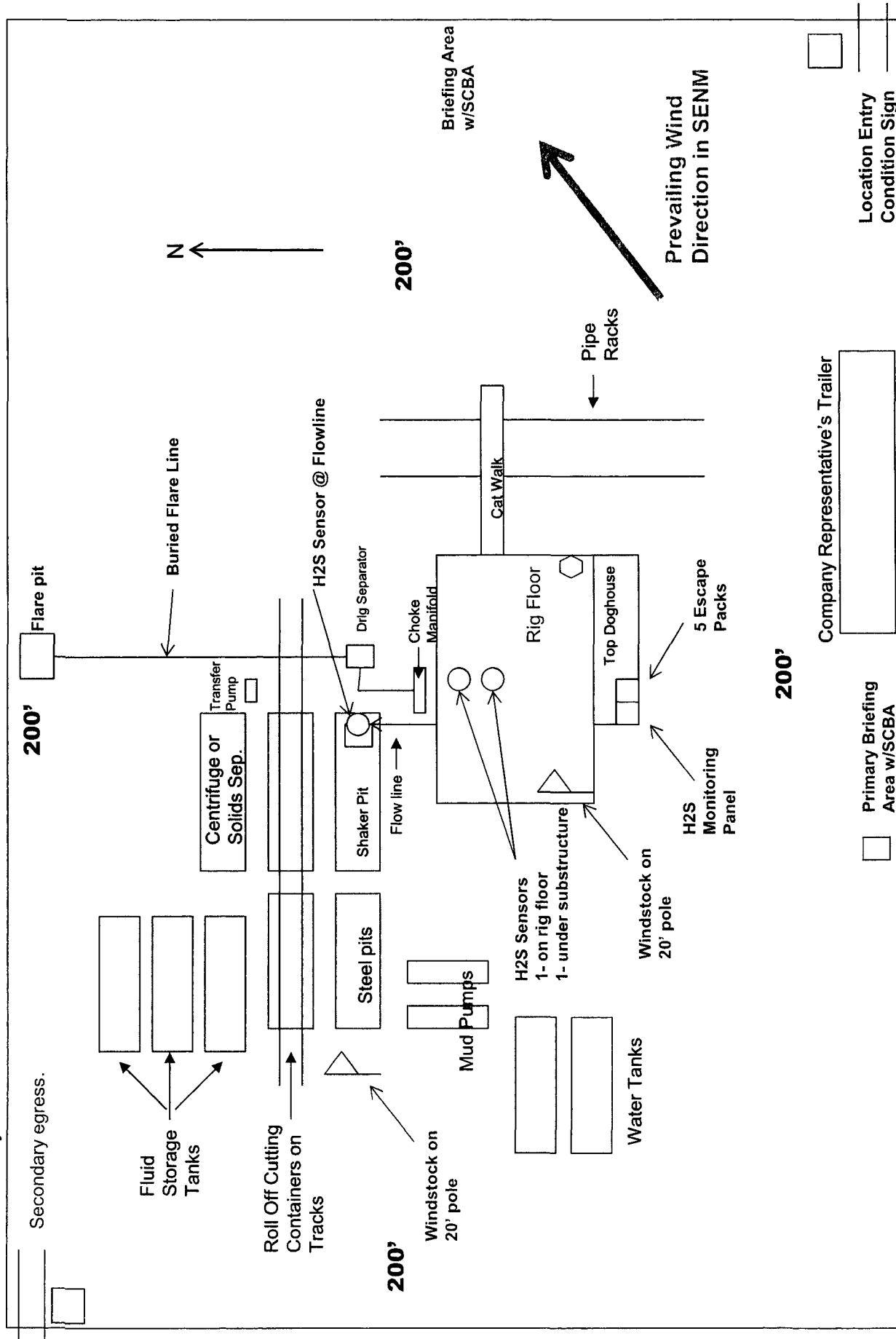
| Hole Size                 | Casing |        | Csg. Size | Weight (lbs) | Grade | Conn. | SF Collapse | SF Burst | SF Tension         |
|---------------------------|--------|--------|-----------|--------------|-------|-------|-------------|----------|--------------------|
|                           | From   | To     |           |              |       |       |             |          |                    |
| 17.5"                     | 0      | 155    | 13.375"   | 54.5         | J55   | STC   | 15.93       | 3.11     | 60.85              |
| 12.25"                    | 0      | 2050   | 9.625"    | 40           | J55   | LTC   | 2.36        | 1.37     | 6.34               |
| 8.75"                     | 0      | 18,474 | 5.5"      | 17           | P110  | LTC   | 2.06        | 3.68     | 3.52               |
| BLM Minimum Safety Factor |        |        |           |              |       |       | 1.125       | 1        | 1.6 Dry<br>1.8 Wet |

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

COG Operating LLC  
H<sub>2</sub>S Equipment Schematic  
Terrain: Shinnery sand hills.

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



Company Representative's Trailer

Primary Briefing Area w/SCBA

Location Entry Condition Sign

**COG OPERATING LLC**  
**HYDROGEN SULFIDE DRILLING OPERATIONS PLAN**

**1. HYDROGEN SULFIDE TRAINING**

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

- a. The hazards and characteristics of hydrogen sulfide (H<sub>2</sub>S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H<sub>2</sub>S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
- d. The proper techniques for first aid and rescue procedures.

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

- a. The effects of H<sub>2</sub>S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
- b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
- c. The contents and requirements of the H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H<sub>2</sub>S zone (within 3 days or 500 feet) and weekly H<sub>2</sub>S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

**2. H<sub>2</sub>S SAFETY EQUIPMENT AND SYSTEMS**

Note: All H<sub>2</sub>S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H<sub>2</sub>S. If H<sub>2</sub>S greater than 100 ppm is encountered in the gas stream we will shut in and install H<sub>2</sub>S equipment.

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

- b. Protective equipment for essential personnel:  
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.
- c. H2S detection and monitoring equipment:  
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.
- d. Visual warning systems:  
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.
- e. Mud Program:  
The mud program has been designed to minimize the volume of H2S circulated to the surface.
- f. Metallurgy:  
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- g. Communication:  
Company vehicles equipped with cellular telephone.

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

# **W A R N I N G**

**YOU ARE ENTERING AN H<sub>2</sub>S AREA  
AUTHORIZED PERSONNEL ONLY**

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

**COG OPERATING LLC**

**1-575-748-6940**

## **EMERGENCY CALL LIST**

|                          | <b><u>OFFICE</u></b> | <b><u>MOBILE</u></b> |
|--------------------------|----------------------|----------------------|
| COG OPERATING LLC OFFICE | 575-748-6940         |                      |
| SETH WILD                | 432-683-7443         | 432-528-3633         |
| WALTER ROYE              | 575-748-6940         | 432-934-1886         |

## **EMERGENCY RESPONSE NUMBERS**

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





# **COG Operating LLC**

Eddy County, NM (NAD-27 2015)

Craig Federal Com #2H

Craig Federal Com #2H

Craig Federal Com #2H

Design #2

## **Anticollision Report**

05 January, 2017





**TDS**  
Anticollision Report



|                                                 |                                                                |
|-------------------------------------------------|----------------------------------------------------------------|
| <b>Company:</b> COG Operating LLC               | <b>Local Co-ordinate Reference:</b> Well Craig Federal Com #2H |
| <b>Project:</b> Eddy County, NM (NAD-27 2015)   | <b>TVD Reference:</b> KB @ 3394.80usft (Latshaw 44)            |
| <b>Reference Site:</b> Craig Federal Com #2H    | <b>MD Reference:</b> KB @ 3394.80usft (Latshaw 44)             |
| <b>Site Error:</b> 0.00 usft                    | <b>North Reference:</b> Grid                                   |
| <b>Reference Well:</b> Craig Federal Com #2H    | <b>Survey Calculation Method:</b> Minimum Curvature            |
| <b>Well Error:</b> 0.00 usft                    | <b>Output errors are at</b> 2.00 sigma                         |
| <b>Reference Wellbore</b> Craig Federal Com #2H | <b>Database:</b> EDM 5000.1 Single User Db                     |
| <b>Reference Design:</b> Design #2              | <b>Offset TVD Reference:</b> Offset Datum                      |

|                                     |                                                                     |
|-------------------------------------|---------------------------------------------------------------------|
| <b>Reference</b>                    | Design #2                                                           |
| <b>Filter type:</b>                 | NO GLOBAL FILTER: Using user defined selection & filtering criteria |
| <b>Interpolation Method:</b>        | Stations                                                            |
| <b>Depth Range:</b>                 | Unlimited                                                           |
| <b>Results Limited by:</b>          | Maximum center-center distance of 9,999.98 usft                     |
| <b>Warning Levels Evaluated at:</b> | 2.00 Sigma                                                          |
| <b>Error Model:</b>                 | ISCWSA                                                              |
| <b>Scan Method:</b>                 | Closest Approach 3D                                                 |
| <b>Error Surface:</b>               | Elliptical Conic                                                    |
| <b>Casing Method:</b>               | Not applied                                                         |

**Survey Tool Program**                      **Date** 1/5/2017

| From<br>(usft) | To<br>(usft) | Survey (Wellbore)                 | Tool Name | Description    |
|----------------|--------------|-----------------------------------|-----------|----------------|
| 0.00           | 18,474.08    | Design #2 (Craig Federal Com #2H) | MWD       | MWD - Standard |

**Summary**

| Site Name                              | Reference<br>Measured<br>Depth<br>(usft) | Offset<br>Measured<br>Depth<br>(usft) | Distance<br>Between<br>Centres<br>(usft) | Distance<br>Between<br>Ellipses<br>(usft) | Separation<br>Factor | Warning |
|----------------------------------------|------------------------------------------|---------------------------------------|------------------------------------------|-------------------------------------------|----------------------|---------|
| <b>Offset Well - Wellbore - Design</b> |                                          |                                       |                                          |                                           |                      |         |
| Eddy County Offset Wells               |                                          |                                       |                                          |                                           |                      |         |
| Bodacious BSM Federal #1H - OH - OH    | 7,717.23                                 | 12,036.13                             | 401.15                                   | 356.16                                    | 8.916                | CC      |
| Bodacious BSM Federal #1H - OH - OH    | 7,725.00                                 | 12,036.80                             | 401.27                                   | 355.76                                    | 8.816                | ES      |
| Bodacious BSM Federal #1H - OH - OH    | 7,800.00                                 | 12,036.80                             | 416.20                                   | 365.76                                    | 8.251                | SF      |
| Craig State Com #1H - OH - OH          | 5,891.16                                 | 5,915.49                              | 1,062.32                                 | 1,042.64                                  | 53.973               | CC      |
| Craig State Com #1H - OH - OH          | 5,900.00                                 | 5,924.62                              | 1,062.33                                 | 1,042.52                                  | 53.628               | ES      |
| Craig State Com #1H - OH - OH          | 6,200.00                                 | 6,087.15                              | 1,089.73                                 | 1,067.22                                  | 48.427               | SF      |

| Offset Design                      Eddy County Offset Wells - Bodacious BSM Federal #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         | Offset Site Error: 0.00 usft |                   |         |
|---------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|------------------------------|-------------------|---------|
| Survey Program: 100-ISCWSA-GYRO-3, 412-MWD                                                        |                       |                       |                       |                  |               |                       |                                     |              |                        |                         | Offset Well Error: 0.00 usft |                   |         |
| Reference                                                                                         |                       | Offset                |                       | Semi Major Axis  |               | Distance              |                                     |              |                        |                         |                              |                   |         |
| Measured Depth (usft)                                                                             | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft)    | Separation Factor | Warning |
| 0.00                                                                                              | 0.00                  | 0.00                  | 0.00                  | 0.00             | 0.00          | -177.63               | -4,132.33                           | -171.17      | 4,136.90               |                         |                              |                   |         |
| 100.00                                                                                            | 100.00                | 0.00                  | 0.00                  | 0.08             | 0.00          | -177.63               | -4,132.33                           | -171.17      | 4,135.89               | 4,135.80                | 0.08                         | N/A               |         |
| 200.00                                                                                            | 200.00                | 80.22                 | 80.22                 | 0.31             | 0.07          | -177.63               | -4,132.61                           | -171.14      | 4,136.24               | 4,135.88                | 0.37                         | N/A               |         |
| 300.00                                                                                            | 300.00                | 163.04                | 163.03                | 0.53             | 0.20          | -177.63               | -4,133.37                           | -171.00      | 4,137.15               | 4,136.43                | 0.73                         | 5,690.573         |         |
| 400.00                                                                                            | 400.00                | 245.60                | 245.59                | 0.76             | 0.35          | -177.64               | -4,134.44                           | -170.74      | 4,138.44               | 4,137.33                | 1.11                         | 3,742.430         |         |
| 500.00                                                                                            | 500.00                | 331.23                | 331.21                | 0.98             | 0.51          | -177.64               | -4,135.94                           | -170.59      | 4,140.17               | 4,138.68                | 1.49                         | 2,774.153         |         |
| 600.00                                                                                            | 600.00                | 412.00                | 411.96                | 1.21             | 0.65          | -177.64               | -4,137.50                           | -170.33      | 4,142.12               | 4,140.26                | 1.86                         | 2,228.918         |         |
| 700.00                                                                                            | 700.00                | 502.00                | 501.93                | 1.43             | 0.69          | -177.65               | -4,139.70                           | -169.77      | 4,144.54               | 4,142.42                | 2.12                         | 1,958.795         |         |
| 800.00                                                                                            | 800.00                | 565.55                | 565.45                | 1.66             | 0.75          | -177.66               | -4,141.62                           | -169.34      | 4,147.54               | 4,145.13                | 2.41                         | 1,723.000         |         |
| 900.00                                                                                            | 900.00                | 737.06                | 736.87                | 1.88             | 0.97          | -177.68               | -4,147.05                           | -168.01      | 4,151.07               | 4,148.22                | 2.85                         | 1,458.401         |         |
| 1,000.00                                                                                          | 1,000.00              | 856.53                | 856.32                | 2.11             | 1.16          | -177.68               | -4,148.63                           | -168.20      | 4,152.37               | 4,149.10                | 3.27                         | 1,270.729         |         |
| 1,100.00                                                                                          | 1,100.00              | 954.43                | 954.21                | 2.33             | 1.34          | -177.67               | -4,149.87                           | -168.60      | 4,153.64               | 4,149.97                | 3.67                         | 1,132.784         |         |
| 1,200.00                                                                                          | 1,200.00              | 1,047.99              | 1,047.76              | 2.56             | 1.51          | -177.67               | -4,151.13                           | -168.97      | 4,155.01               | 4,150.94                | 4.07                         | 1,021.806         |         |
| 1,300.00                                                                                          | 1,300.00              | 1,140.32              | 1,140.08              | 2.78             | 1.69          | -177.67               | -4,152.56                           | -168.95      | 4,156.55               | 4,152.09                | 4.47                         | 930.703           |         |
| 1,400.00                                                                                          | 1,400.00              | 1,218.69              | 1,218.43              | 3.01             | 1.84          | -177.68               | -4,154.02                           | -168.49      | 4,158.41               | 4,153.56                | 4.84                         | 858.698           |         |
| 1,500.00                                                                                          | 1,500.00              | 1,291.63              | 1,291.35              | 3.23             | 1.99          | -177.69               | -4,155.88                           | -167.36      | 4,160.89               | 4,155.68                | 5.21                         | 798.626           |         |
| 1,600.00                                                                                          | 1,600.00              | 1,397.00              | 1,396.63              | 3.46             | 2.20          | -177.73               | -4,159.22                           | -164.75      | 4,163.98               | 4,158.33                | 5.64                         | 737.842           |         |
| 1,700.00                                                                                          | 1,700.00              | 1,564.90              | 1,564.48              | 3.68             | 2.54          | -177.76               | -4,162.01                           | -162.45      | 4,165.41               | 4,159.20                | 6.21                         | 671.224           |         |
| 1,800.00                                                                                          | 1,800.00              | 1,654.49              | 1,654.05              | 3.91             | 2.73          | -177.79               | -4,163.12                           | -160.87      | 4,166.58               | 4,159.97                | 6.61                         | 629.995           |         |
| 1,900.00                                                                                          | 1,900.00              | 1,752.63              | 1,752.16              | 4.13             | 2.93          | -177.82               | -4,164.60                           | -158.64      | 4,168.00               | 4,160.96                | 7.04                         | 592.088           |         |
| 2,000.00                                                                                          | 2,000.00              | 1,891.12              | 1,890.62              | 4.35             | 3.21          | -177.85               | -4,165.68                           | -156.16      | 4,168.65               | 4,161.10                | 7.55                         | 552.195           |         |

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



# TDS

## Anticollision Report



**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Reference Site:** Craig Federal Com #2H  
**Site Error:** 0.00 usft  
**Reference Well:** Craig Federal Com #2H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Craig Federal Com #2H  
**Reference Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Offset Datum

| Offset Design Eddy County Offset Wells - Bodacious BSM Federal #1H - OH - OH |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   | Offset Site Error: |
|------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|--------------------|
| Survey Program: 100-ISCWSA-GYRO-3. 412-MWD                                   |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   | 0.00 usft          |
| Reference                                                                    |                       | Offset                |                       | Semi Major Axis  |               | Distance             |                                     |              |                        |                         |                           |                   |                    |
| Measured Depth (usft)                                                        | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Tooface (') | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning            |
| 2,100.00                                                                     | 2,100.00              | 1,991.08              | 1,990.58              | 4.58             | 3.42          | -177.87              | -4,166.12                           | -154.97      | 4,169.04               | 4,161.06                | 7.98                      | 522.401           |                    |
| 2,200.00                                                                     | 2,200.00              | 2,086.43              | 2,085.92              | 4.80             | 3.62          | -177.88              | -4,166.61                           | -153.92      | 4,169.52               | 4,161.11                | 8.40                      | 496.188           |                    |
| 2,300.00                                                                     | 2,300.00              | 2,183.54              | 2,183.01              | 5.03             | 3.82          | -177.90              | -4,167.21                           | -152.90      | 4,170.09               | 4,161.26                | 8.83                      | 472.207           |                    |
| 2,400.00                                                                     | 2,400.00              | 2,281.78              | 2,281.26              | 5.25             | 4.03          | -177.91              | -4,167.86                           | -151.89      | 4,170.72               | 4,161.46                | 9.26                      | 450.277           |                    |
| 2,500.00                                                                     | 2,500.00              | 2,394.45              | 2,393.91              | 5.48             | 4.27          | -177.92              | -4,168.51                           | -151.05      | 4,171.27               | 4,161.55                | 9.72                      | 428.973           |                    |
| 2,600.00                                                                     | 2,600.00              | 2,511.94              | 2,511.41              | 5.70             | 4.51          | -177.92              | -4,168.63                           | -151.32      | 4,171.38               | 4,161.18                | 10.19                     | 409.164           |                    |
| 2,650.44                                                                     | 2,650.44              | 2,559.17              | 2,558.64              | 5.82             | 4.61          | -177.92              | -4,168.60                           | -151.64      | 4,171.36               | 4,160.95                | 10.41                     | 400.831           |                    |
| 2,700.00                                                                     | 2,700.00              | 2,605.59              | 2,605.05              | 5.93             | 4.71          | -177.91              | -4,168.61                           | -151.96      | 4,171.38               | 4,160.76                | 10.62                     | 392.968           |                    |
| 2,800.00                                                                     | 2,800.00              | 2,699.61              | 2,699.07              | 6.15             | 4.90          | -177.90              | -4,168.73                           | -152.59      | 4,171.53               | 4,160.49                | 11.04                     | 377.997           |                    |
| 2,900.00                                                                     | 2,900.00              | 2,800.10              | 2,799.55              | 6.38             | 5.11          | -177.89              | -4,168.92                           | -153.27      | 4,171.74               | 4,160.27                | 11.47                     | 363.776           |                    |
| 3,000.00                                                                     | 3,000.00              | 2,899.90              | 2,899.36              | 6.60             | 5.31          | -177.89              | -4,169.09                           | -153.94      | 4,171.94               | 4,160.05                | 11.90                     | 350.629           |                    |
| 3,100.00                                                                     | 3,100.00              | 2,996.29              | 2,995.74              | 6.83             | 5.51          | -177.88              | -4,169.32                           | -154.57      | 4,172.20               | 4,159.88                | 12.32                     | 338.608           |                    |
| 3,200.00                                                                     | 3,200.00              | 3,093.89              | 3,093.34              | 7.05             | 5.71          | -177.87              | -4,169.63                           | -155.18      | 4,172.54               | 4,159.79                | 12.75                     | 327.323           |                    |
| 3,300.00                                                                     | 3,300.00              | 3,196.57              | 3,196.02              | 7.28             | 5.92          | -177.86              | -4,169.93                           | -155.82      | 4,172.86               | 4,159.68                | 13.18                     | 316.496           |                    |
| 3,400.00                                                                     | 3,400.00              | 3,297.64              | 3,297.09              | 7.50             | 6.13          | -177.85              | -4,170.18                           | -156.50      | 4,173.13               | 4,159.51                | 13.62                     | 306.414           |                    |
| 3,500.00                                                                     | 3,500.00              | 3,395.64              | 3,395.08              | 7.73             | 6.34          | -177.84              | -4,170.43                           | -157.37      | 4,173.42               | 4,159.37                | 14.05                     | 297.053           |                    |
| 3,600.00                                                                     | 3,600.00              | 3,502.38              | 3,501.81              | 7.95             | 6.56          | -177.82              | -4,170.69                           | -158.64      | 4,173.72               | 4,159.22                | 14.50                     | 287.866           |                    |
| 3,700.00                                                                     | 3,700.00              | 3,621.95              | 3,621.37              | 8.18             | 6.82          | -177.79              | -4,170.52                           | -160.64      | 4,173.63               | 4,158.66                | 14.98                     | 278.681           |                    |
| 3,800.00                                                                     | 3,800.00              | 11,645.00             | 7,799.23              | 8.40             | 72.28         | -117.72              | -45.91                              | -87.38       | 4,092.22               | 4,060.13                | 32.09                     | 127.524           |                    |
| 3,900.00                                                                     | 3,900.00              | 11,645.00             | 7,799.23              | 8.63             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,992.25               | 3,960.15                | 32.10                     | 124.357           |                    |
| 4,000.00                                                                     | 4,000.00              | 11,645.00             | 7,799.23              | 8.85             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,892.28               | 3,860.16                | 32.12                     | 121.183           |                    |
| 4,100.00                                                                     | 4,100.00              | 11,645.00             | 7,799.23              | 9.07             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,792.32               | 3,760.18                | 32.14                     | 118.000           |                    |
| 4,200.00                                                                     | 4,200.00              | 11,645.00             | 7,799.23              | 9.30             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,692.35               | 3,660.19                | 32.16                     | 114.809           |                    |
| 4,300.00                                                                     | 4,300.00              | 11,645.00             | 7,799.23              | 9.52             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,592.39               | 3,560.20                | 32.19                     | 111.611           |                    |
| 4,400.00                                                                     | 4,400.00              | 11,645.00             | 7,799.23              | 9.75             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,492.43               | 3,460.21                | 32.22                     | 108.405           |                    |
| 4,500.00                                                                     | 4,500.00              | 11,645.00             | 7,799.23              | 9.97             | 72.28         | -117.72              | -45.91                              | -87.38       | 3,392.47               | 3,360.22                | 32.25                     | 105.194           |                    |
| 4,600.00                                                                     | 4,600.00              | 11,645.00             | 7,799.23              | 10.20            | 72.28         | -117.72              | -45.91                              | -87.38       | 3,292.51               | 3,260.22                | 32.29                     | 101.976           |                    |
| 4,700.00                                                                     | 4,700.00              | 11,672.00             | 7,799.24              | 10.42            | 72.73         | -102.18              | -18.91                              | -87.60       | 3,192.30               | 3,159.79                | 32.51                     | 98.195            |                    |
| 4,800.00                                                                     | 4,800.00              | 11,672.26             | 7,799.24              | 10.65            | 72.73         | -102.02              | -18.66                              | -87.61       | 3,092.34               | 3,059.78                | 32.56                     | 94.983            |                    |
| 4,900.00                                                                     | 4,900.00              | 11,672.52             | 7,799.24              | 10.87            | 72.74         | -101.86              | -18.40                              | -87.61       | 2,992.38               | 2,959.77                | 32.61                     | 91.768            |                    |
| 5,000.00                                                                     | 5,000.00              | 11,672.79             | 7,799.24              | 11.10            | 72.74         | -101.69              | -18.12                              | -87.61       | 2,892.43               | 2,859.76                | 32.66                     | 88.551            |                    |
| 5,100.00                                                                     | 5,100.00              | 11,673.07             | 7,799.24              | 11.32            | 72.75         | -101.51              | -17.84                              | -87.61       | 2,792.47               | 2,759.75                | 32.72                     | 85.333            |                    |
| 5,200.00                                                                     | 5,200.00              | 11,673.36             | 7,799.24              | 11.55            | 72.75         | -101.33              | -17.55                              | -87.62       | 2,692.53               | 2,659.74                | 32.79                     | 82.115            |                    |
| 5,300.00                                                                     | 5,300.00              | 11,673.66             | 7,799.25              | 11.77            | 72.76         | -101.14              | -17.25                              | -87.62       | 2,592.59               | 2,559.73                | 32.86                     | 78.898            |                    |
| 5,400.00                                                                     | 5,400.00              | 11,673.98             | 7,799.25              | 12.00            | 72.76         | -100.94              | -16.93                              | -87.62       | 2,492.65               | 2,459.71                | 32.94                     | 75.683            |                    |
| 5,500.00                                                                     | 5,500.00              | 11,674.31             | 7,799.25              | 12.22            | 72.77         | -100.73              | -16.60                              | -87.63       | 2,392.71               | 2,359.70                | 33.02                     | 72.471            |                    |
| 5,600.00                                                                     | 5,600.00              | 11,674.65             | 7,799.25              | 12.45            | 72.77         | -100.51              | -16.26                              | -87.63       | 2,292.79               | 2,259.68                | 33.10                     | 69.263            |                    |
| 5,700.00                                                                     | 5,700.00              | 11,675.01             | 7,799.26              | 12.67            | 72.78         | -100.29              | -15.90                              | -87.63       | 2,192.87               | 2,159.67                | 33.19                     | 66.061            |                    |
| 5,800.00                                                                     | 5,800.00              | 11,675.38             | 7,799.26              | 12.90            | 72.78         | -100.05              | -15.53                              | -87.64       | 2,092.95               | 2,059.66                | 33.29                     | 62.865            |                    |
| 5,900.00                                                                     | 5,900.00              | 11,675.77             | 7,799.26              | 13.12            | 72.79         | -99.80               | -15.14                              | -87.64       | 1,993.05               | 1,959.65                | 33.40                     | 59.677            |                    |
| 6,000.00                                                                     | 6,000.00              | 11,676.18             | 7,799.26              | 13.35            | 72.80         | -99.54               | -14.74                              | -87.64       | 1,893.15               | 1,859.64                | 33.51                     | 56.498            |                    |
| 6,100.00                                                                     | 6,100.00              | 11,676.60             | 7,799.27              | 13.57            | 72.81         | -99.27               | -14.31                              | -87.65       | 1,793.27               | 1,759.64                | 33.63                     | 53.328            |                    |
| 6,200.00                                                                     | 6,200.00              | 11,677.05             | 7,799.27              | 13.80            | 72.81         | -98.99               | -13.86                              | -87.65       | 1,693.40               | 1,659.64                | 33.75                     | 50.168            |                    |
| 6,300.00                                                                     | 6,300.00              | 11,677.52             | 7,799.27              | 14.02            | 72.82         | -98.69               | -13.40                              | -87.66       | 1,593.54               | 1,559.65                | 33.89                     | 47.019            |                    |
| 6,400.00                                                                     | 6,400.00              | 11,678.01             | 7,799.28              | 14.24            | 72.83         | -98.37               | -12.90                              | -87.66       | 1,493.71               | 1,459.67                | 34.04                     | 43.882            |                    |
| 6,500.00                                                                     | 6,500.00              | 11,678.53             | 7,799.28              | 14.47            | 72.84         | -98.04               | -12.39                              | -87.66       | 1,393.90               | 1,359.70                | 34.20                     | 40.758            |                    |
| 6,600.00                                                                     | 6,600.00              | 11,679.07             | 7,799.29              | 14.69            | 72.85         | -97.69               | -11.84                              | -87.67       | 1,294.11               | 1,259.74                | 34.36                     | 37.647            |                    |
| 6,700.00                                                                     | 6,700.00              | 11,679.65             | 7,799.29              | 14.92            | 72.86         | -97.32               | -11.27                              | -87.67       | 1,194.37               | 1,159.80                | 34.57                     | 34.548            |                    |
| 6,800.00                                                                     | 6,800.00              | 11,680.25             | 7,799.30              | 15.14            | 72.87         | -96.93               | -10.66                              | -87.68       | 1,094.67               | 1,059.87                | 34.79                     | 31.463            |                    |
| 6,900.00                                                                     | 6,900.00              | 11,680.89             | 7,799.30              | 15.37            | 72.88         | -96.52               | -10.02                              | -87.69       | 995.03                 | 959.98                  | 35.05                     | 28.391            |                    |
| 7,000.00                                                                     | 7,000.00              | 11,681.57             | 7,799.31              | 15.59            | 72.89         | -96.08               | -9.34                               | -87.69       | 895.46                 | 860.11                  | 35.35                     | 25.331            |                    |
| 7,040.55                                                                     | 7,040.55              | 11,681.86             | 7,799.31              | 15.68            | 72.89         | -95.89               | -9.05                               | -87.70       | 855.12                 | 819.63                  | 35.49                     | 24.093            |                    |

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



# TDS

## Anticollision Report



Company: COG Operating LLC  
 Project: Eddy County, NM (NAD-27 2015)  
 Reference Site: Craig Federal Com #2H  
 Site Error: 0.00 usft  
 Reference Well: Craig Federal Com #2H  
 Well Error: 0.00 usft  
 Reference Wellbore: Craig Federal Com #2H  
 Reference Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
 TVD Reference: KB @ 3394.80usft (Latshaw 44)  
 MD Reference: KB @ 3394.80usft (Latshaw 44)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: EDM 5000.1 Single User Db  
 Offset TVD Reference: Offset Datum

| Offset Design Eddy County Offset Wells - Bodacious BSM Federal #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Site Error: | 0.00 usft |
|------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|--------------------|-----------|
| Survey Program: 100-ISCWSA-GYRO-3 412-MWD                                    |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Well Error: | 0.00 usft |
| Reference                                                                    |                       | Offset                |                       | Semi Major Axis  |               |                       | Distance                            |              |                        |                         |                           |                   | Warning            |           |
| Measured Depth (usft)                                                        | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor |                    |           |
| 7,050.00                                                                     | 7,050.00              | 11,681.99             | 7,799.31              | 15.71            | 72.89         | -77.50                | -8.92                               | -87.70       | 845.72                 | 810.19                  | 35.53                     | 23.805            |                    |           |
| 7,075.00                                                                     | 7,074.97              | 11,682.93             | 7,799.32              | 15.76            | 72.91         | -107.00               | -7.99                               | -87.71       | 820.84                 | 785.22                  | 35.62                     | 23.047            |                    |           |
| 7,100.00                                                                     | 7,099.85              | 11,684.74             | 7,799.34              | 15.82            | 72.94         | -129.23               | -6.17                               | -87.72       | 796.00                 | 760.31                  | 35.70                     | 22.298            |                    |           |
| 7,125.00                                                                     | 7,124.56              | 11,687.46             | 7,799.37              | 15.87            | 72.98         | -142.80               | -3.46                               | -87.75       | 771.28                 | 735.51                  | 35.77                     | 21.562            |                    |           |
| 7,150.00                                                                     | 7,149.04              | 11,691.08             | 7,799.42              | 15.93            | 73.04         | -151.15               | 0.17                                | -87.79       | 746.74                 | 710.91                  | 35.83                     | 20.841            |                    |           |
| 7,175.00                                                                     | 7,173.23              | 11,695.62             | 7,799.48              | 15.99            | 73.12         | -156.66               | 4.71                                | -87.83       | 722.45                 | 686.57                  | 35.88                     | 20.137            |                    |           |
| 7,200.00                                                                     | 7,197.05              | 11,701.09             | 7,799.57              | 16.05            | 73.21         | -160.56               | 10.17                               | -87.89       | 698.49                 | 662.58                  | 35.91                     | 19.452            |                    |           |
| 7,225.00                                                                     | 7,220.45              | 11,707.48             | 7,799.69              | 16.10            | 73.32         | -163.49               | 16.56                               | -87.96       | 674.93                 | 639.01                  | 35.92                     | 18.788            |                    |           |
| 7,250.00                                                                     | 7,243.35              | 11,714.81             | 7,799.85              | 16.16            | 73.44         | -165.81               | 23.89                               | -88.04       | 651.85                 | 615.93                  | 35.92                     | 18.145            |                    |           |
| 7,275.00                                                                     | 7,265.69              | 11,723.06             | 7,800.05              | 16.22            | 73.57         | -167.72               | 32.14                               | -88.14       | 629.34                 | 593.43                  | 35.91                     | 17.526            |                    |           |
| 7,300.00                                                                     | 7,287.42              | 11,740.00             | 7,800.56              | 16.28            | 73.85         | -169.83               | 49.07                               | -88.34       | 607.53                 | 571.62                  | 35.92                     | 16.916            |                    |           |
| 7,325.00                                                                     | 7,308.47              | 11,743.33             | 7,800.67              | 16.34            | 73.91         | -170.85               | 52.40                               | -88.38       | 586.33                 | 550.49                  | 35.85                     | 16.357            |                    |           |
| 7,350.00                                                                     | 7,328.79              | 11,758.82             | 7,801.14              | 16.41            | 74.17         | -172.45               | 67.88                               | -88.56       | 565.94                 | 530.12                  | 35.82                     | 15.800            |                    |           |
| 7,375.00                                                                     | 7,348.31              | 11,775.14             | 7,801.59              | 16.48            | 74.45         | -173.97               | 84.19                               | -88.71       | 546.33                 | 510.54                  | 35.79                     | 15.265            |                    |           |
| 7,400.00                                                                     | 7,367.00              | 11,792.25             | 7,801.99              | 16.57            | 74.74         | -175.44               | 101.29                              | -88.83       | 527.57                 | 491.80                  | 35.77                     | 14.749            |                    |           |
| 7,425.00                                                                     | 7,384.78              | 11,810.08             | 7,802.34              | 16.66            | 75.04         | -176.88               | 119.13                              | -88.92       | 509.75                 | 473.98                  | 35.77                     | 14.250            |                    |           |
| 7,450.00                                                                     | 7,401.63              | 11,828.60             | 7,802.63              | 16.75            | 75.35         | -178.30               | 137.64                              | -88.97       | 492.93                 | 457.11                  | 35.82                     | 13.761            |                    |           |
| 7,475.00                                                                     | 7,417.48              | 11,845.65             | 7,802.85              | 16.86            | 75.64         | -179.57               | 154.69                              | -88.97       | 477.21                 | 441.28                  | 35.93                     | 13.282            |                    |           |
| 7,500.00                                                                     | 7,432.31              | 11,862.32             | 7,803.10              | 16.98            | 75.92         | -179.22               | 171.36                              | -88.96       | 462.77                 | 426.64                  | 36.13                     | 12.808            |                    |           |
| 7,525.00                                                                     | 7,446.05              | 11,879.63             | 7,803.40              | 17.11            | 76.21         | -177.99               | 188.66                              | -88.94       | 449.69                 | 413.23                  | 36.46                     | 12.334            |                    |           |
| 7,550.00                                                                     | 7,458.69              | 11,897.52             | 7,803.76              | 17.26            | 76.52         | -176.75               | 206.55                              | -88.90       | 438.06                 | 401.12                  | 36.94                     | 11.859            |                    |           |
| 7,575.00                                                                     | 7,470.18              | 11,915.95             | 7,804.18              | 17.41            | 76.83         | -175.47               | 224.98                              | -88.83       | 427.96                 | 390.36                  | 37.60                     | 11.382            |                    |           |
| 7,600.00                                                                     | 7,480.49              | 11,935.40             | 7,804.68              | 17.58            | 77.16         | -174.12               | 244.42                              | -88.75       | 419.46                 | 381.00                  | 38.46                     | 10.907            |                    |           |
| 7,625.00                                                                     | 7,489.60              | 11,956.83             | 7,805.20              | 17.77            | 77.52         | -172.62               | 265.84                              | -88.64       | 412.54                 | 373.03                  | 39.52                     | 10.440            |                    |           |
| 7,650.00                                                                     | 7,497.48              | 11,978.60             | 7,805.69              | 17.97            | 77.89         | -171.10               | 287.60                              | -88.54       | 407.22                 | 366.44                  | 40.78                     | 9.987             |                    |           |
| 7,675.00                                                                     | 7,504.10              | 11,999.86             | 7,806.13              | 18.18            | 78.25         | -169.60               | 308.86                              | -88.44       | 403.54                 | 361.32                  | 42.22                     | 9.558             |                    |           |
| 7,700.00                                                                     | 7,509.45              | 12,021.26             | 7,806.58              | 18.40            | 78.62         | -168.08               | 330.26                              | -88.34       | 401.55                 | 357.73                  | 43.82                     | 9.164             |                    |           |
| 7,717.23                                                                     | 7,512.40              | 12,036.13             | 7,806.89              | 18.56            | 78.88         | -167.02               | 345.13                              | -88.27       | 401.15                 | 356.16                  | 44.99                     | 8.916 CC          |                    |           |
| 7,725.00                                                                     | 7,513.52              | 12,036.80             | 7,806.91              | 18.64            | 78.89         | -166.97               | 345.79                              | -88.27       | 401.27                 | 355.76                  | 45.52                     | 8.816 ES          |                    |           |
| 7,750.00                                                                     | 7,516.29              | 12,036.80             | 7,806.91              | 18.89            | 78.89         | -166.91               | 345.79                              | -88.27       | 403.53                 | 356.31                  | 47.22                     | 8.546             |                    |           |
| 7,775.00                                                                     | 7,517.76              | 12,036.80             | 7,806.91              | 19.15            | 78.89         | -166.76               | 345.79                              | -88.27       | 408.55                 | 359.67                  | 48.88                     | 8.358             |                    |           |
| 7,794.13                                                                     | 7,518.00              | 12,036.80             | 7,806.91              | 19.35            | 78.89         | -166.60               | 345.79                              | -88.27       | 414.20                 | 364.11                  | 50.09                     | 8.270             |                    |           |
| 7,800.00                                                                     | 7,517.96              | 12,036.80             | 7,806.91              | 19.41            | 78.89         | -166.52               | 345.79                              | -88.27       | 416.20                 | 365.76                  | 50.44                     | 8.251 SF          |                    |           |
| 7,900.00                                                                     | 7,517.20              | 12,036.80             | 7,806.91              | 20.52            | 78.89         | -164.66               | 345.79                              | -88.27       | 459.78                 | 404.65                  | 55.13                     | 8.340             |                    |           |
| 8,000.00                                                                     | 7,516.43              | 12,036.80             | 7,806.91              | 21.73            | 78.89         | -161.95               | 345.79                              | -88.27       | 517.80                 | 460.41                  | 57.40                     | 9.021             |                    |           |
| 8,100.00                                                                     | 7,515.65              | 12,036.80             | 7,806.91              | 23.01            | 78.89         | -158.49               | 345.79                              | -88.27       | 585.76                 | 527.90                  | 57.86                     | 10.124            |                    |           |
| 8,200.00                                                                     | 7,514.87              | 12,036.80             | 7,806.91              | 24.33            | 78.89         | -154.41               | 345.79                              | -88.27       | 660.31                 | 603.15                  | 57.16                     | 11.552            |                    |           |
| 8,300.00                                                                     | 7,514.10              | 12,036.80             | 7,806.91              | 25.66            | 78.89         | -149.90               | 345.79                              | -88.27       | 739.17                 | 683.39                  | 55.77                     | 13.253            |                    |           |
| 8,400.00                                                                     | 7,513.32              | 12,036.80             | 7,806.91              | 26.98            | 78.89         | -145.18               | 345.79                              | -88.27       | 820.75                 | 766.76                  | 53.99                     | 15.201            |                    |           |
| 8,500.00                                                                     | 7,512.55              | 12,036.80             | 7,806.91              | 28.29            | 78.89         | -140.43               | 345.79                              | -88.27       | 903.99                 | 851.99                  | 52.00                     | 17.386            |                    |           |
| 8,536.25                                                                     | 7,512.28              | 12,036.80             | 7,806.91              | 28.76            | 78.89         | -138.74               | 345.79                              | -88.27       | 934.41                 | 883.17                  | 51.24                     | 18.236            |                    |           |
| 8,600.00                                                                     | 7,511.79              | 12,036.80             | 7,806.91              | 29.58            | 78.89         | -138.74               | 345.79                              | -88.27       | 988.60                 | 938.64                  | 49.96                     | 19.788            |                    |           |
| 8,700.00                                                                     | 7,511.04              | 12,036.80             | 7,806.91              | 30.88            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,075.72               | 1,027.54                | 48.18                     | 22.326            |                    |           |
| 8,800.00                                                                     | 7,510.28              | 12,036.80             | 7,806.91              | 32.23            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,164.91               | 1,118.24                | 46.66                     | 24.964            |                    |           |
| 8,900.00                                                                     | 7,509.52              | 12,036.80             | 7,806.91              | 33.63            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,255.73               | 1,210.36                | 45.36                     | 27.682            |                    |           |
| 9,000.00                                                                     | 7,508.76              | 12,036.80             | 7,806.91              | 35.07            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,347.84               | 1,303.60                | 44.25                     | 30.461            |                    |           |
| 9,100.00                                                                     | 7,508.01              | 12,036.80             | 7,806.91              | 36.54            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,441.01               | 1,397.73                | 43.29                     | 33.290            |                    |           |
| 9,200.00                                                                     | 7,507.25              | 12,036.80             | 7,806.91              | 38.04            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,535.04               | 1,492.59                | 42.46                     | 36.156            |                    |           |
| 9,300.00                                                                     | 7,506.49              | 12,036.80             | 7,806.91              | 39.56            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,629.79               | 1,588.05                | 41.73                     | 39.052            |                    |           |
| 9,400.00                                                                     | 7,505.73              | 12,036.80             | 7,806.91              | 41.11            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,725.12               | 1,684.02                | 41.10                     | 41.970            |                    |           |
| 9,500.00                                                                     | 7,504.98              | 12,036.80             | 7,806.91              | 42.69            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,820.96               | 1,780.40                | 40.55                     | 44.904            |                    |           |
| 9,600.00                                                                     | 7,504.22              | 12,036.80             | 7,806.91              | 44.28            | 78.89         | -138.74               | 345.79                              | -88.27       | 1,917.22               | 1,877.15                | 40.07                     | 47.849            |                    |           |

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



**TDS**  
Anticollision Report



**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Reference Site:** Craig Federal Com #2H  
**Site Error:** 0.00 usft  
**Reference Well:** Craig Federal Com #2H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Craig Federal Com #2H  
**Reference Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Offset Datum

| Offset Design Eddy County Offset Wells - Bodacious BSM Federal #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Site Error: | 0.00 usft |
|------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|--------------------|-----------|
| Survey Program: 100-ISCWSA-GYRO-3, 412-MWD                                   |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Well Error: | 0.00 usft |
| Reference                                                                    |                       | Offset                |                       | Semi Major Axis  |               |                       | Distance                            |              |                        |                         |                           |                   |                    | Warning   |
| Measured Depth (usft)                                                        | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor |                    |           |
| 9,700.00                                                                     | 7,503.46              | 12,036.80             | 7,806.91              | 45.89            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,013.84               | 1,974.20                | 39.64                     | 50.803            |                    |           |
| 9,800.00                                                                     | 7,502.70              | 12,036.80             | 7,806.91              | 47.51            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,110.78               | 2,071.52                | 39.26                     | 53.761            |                    |           |
| 9,900.00                                                                     | 7,501.95              | 12,036.80             | 7,806.91              | 49.15            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,207.99               | 2,169.07                | 38.93                     | 56.722            |                    |           |
| 10,000.00                                                                    | 7,501.19              | 12,036.80             | 7,806.91              | 50.81            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,305.44               | 2,266.82                | 38.63                     | 59.683            |                    |           |
| 10,100.00                                                                    | 7,500.43              | 12,036.80             | 7,806.91              | 52.47            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,403.10               | 2,364.74                | 38.36                     | 62.643            |                    |           |
| 10,200.00                                                                    | 7,499.67              | 12,036.80             | 7,806.91              | 54.14            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,500.95               | 2,462.82                | 38.12                     | 65.600            |                    |           |
| 10,300.00                                                                    | 7,498.92              | 12,036.80             | 7,806.91              | 55.83            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,598.96               | 2,561.05                | 37.91                     | 68.554            |                    |           |
| 10,400.00                                                                    | 7,498.16              | 12,036.80             | 7,806.91              | 57.52            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,697.11               | 2,659.39                | 37.72                     | 71.504            |                    |           |
| 10,500.00                                                                    | 7,497.40              | 12,036.80             | 7,806.91              | 59.22            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,795.40               | 2,757.85                | 37.55                     | 74.448            |                    |           |
| 10,600.00                                                                    | 7,496.64              | 12,036.80             | 7,806.91              | 60.93            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,893.80               | 2,856.41                | 37.39                     | 77.386            |                    |           |
| 10,700.00                                                                    | 7,495.89              | 12,036.80             | 7,806.91              | 62.64            | 78.89         | 138.74                | 345.79                              | -88.27       | 2,992.31               | 2,955.06                | 37.26                     | 80.319            |                    |           |
| 10,800.00                                                                    | 7,495.13              | 12,036.80             | 7,806.91              | 64.36            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,090.92               | 3,053.79                | 37.13                     | 83.244            |                    |           |
| 10,900.00                                                                    | 7,494.37              | 12,036.80             | 7,806.91              | 66.09            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,189.61               | 3,152.59                | 37.02                     | 86.163            |                    |           |
| 11,000.00                                                                    | 7,493.62              | 12,036.80             | 7,806.91              | 67.82            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,288.38               | 3,251.46                | 36.92                     | 89.075            |                    |           |
| 11,100.00                                                                    | 7,492.86              | 12,036.80             | 7,806.91              | 69.55            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,387.22               | 3,350.40                | 36.83                     | 91.979            |                    |           |
| 11,200.00                                                                    | 7,492.10              | 12,036.80             | 7,806.91              | 71.29            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,486.13               | 3,449.39                | 36.74                     | 94.875            |                    |           |
| 11,300.00                                                                    | 7,491.34              | 12,036.80             | 7,806.91              | 73.04            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,585.10               | 3,548.43                | 36.67                     | 97.764            |                    |           |
| 11,400.00                                                                    | 7,490.59              | 12,036.80             | 7,806.91              | 74.79            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,684.13               | 3,647.52                | 36.61                     | 100.644           |                    |           |
| 11,500.00                                                                    | 7,489.83              | 12,036.80             | 7,806.91              | 76.54            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,783.21               | 3,746.66                | 36.55                     | 103.516           |                    |           |
| 11,600.00                                                                    | 7,489.07              | 12,036.80             | 7,806.91              | 78.29            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,882.33               | 3,845.83                | 36.49                     | 106.381           |                    |           |
| 11,700.00                                                                    | 7,488.31              | 12,036.80             | 7,806.91              | 80.05            | 78.89         | 138.74                | 345.79                              | -88.27       | 3,981.50               | 3,945.05                | 36.45                     | 109.236           |                    |           |
| 11,800.00                                                                    | 7,487.56              | 12,036.80             | 7,806.91              | 81.81            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,080.71               | 4,044.30                | 36.41                     | 112.084           |                    |           |
| 11,900.00                                                                    | 7,486.80              | 12,036.80             | 7,806.91              | 83.58            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,179.95               | 4,143.58                | 36.37                     | 114.923           |                    |           |
| 12,000.00                                                                    | 7,486.04              | 12,036.80             | 7,806.91              | 85.35            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,279.23               | 4,242.89                | 36.34                     | 117.753           |                    |           |
| 12,100.00                                                                    | 7,485.28              | 12,036.80             | 7,806.91              | 87.12            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,378.55               | 4,342.23                | 36.31                     | 120.574           |                    |           |
| 12,200.00                                                                    | 7,484.53              | 12,036.80             | 7,806.91              | 88.89            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,477.89               | 4,441.60                | 36.29                     | 123.387           |                    |           |
| 12,300.00                                                                    | 7,483.77              | 12,036.80             | 7,806.91              | 90.66            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,577.26               | 4,540.99                | 36.27                     | 126.191           |                    |           |
| 12,400.00                                                                    | 7,483.01              | 12,036.80             | 7,806.91              | 92.44            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,676.66               | 4,640.41                | 36.26                     | 128.986           |                    |           |
| 12,500.00                                                                    | 7,482.25              | 12,036.80             | 7,806.91              | 94.21            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,776.09               | 4,739.84                | 36.24                     | 131.773           |                    |           |
| 12,600.00                                                                    | 7,481.50              | 12,036.80             | 7,806.91              | 95.99            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,875.54               | 4,839.30                | 36.24                     | 134.550           |                    |           |
| 12,700.00                                                                    | 7,480.74              | 12,036.80             | 7,806.91              | 97.77            | 78.89         | 138.74                | 345.79                              | -88.27       | 4,975.01               | 4,938.78                | 36.23                     | 137.318           |                    |           |
| 12,800.00                                                                    | 7,479.98              | 12,036.80             | 7,806.91              | 99.56            | 78.89         | 138.74                | 345.79                              | -88.27       | 5,074.50               | 5,038.27                | 36.23                     | 140.077           |                    |           |
| 12,900.00                                                                    | 7,479.22              | 12,036.80             | 7,806.91              | 101.34           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,174.01               | 5,137.78                | 36.23                     | 142.827           |                    |           |
| 13,000.00                                                                    | 7,478.47              | 12,036.80             | 7,806.91              | 103.13           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,273.54               | 5,237.31                | 36.23                     | 145.568           |                    |           |
| 13,100.00                                                                    | 7,477.71              | 12,036.80             | 7,806.91              | 104.91           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,373.09               | 5,336.86                | 36.23                     | 148.300           |                    |           |
| 13,200.00                                                                    | 7,476.95              | 12,036.80             | 7,806.91              | 106.70           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,472.65               | 5,436.41                | 36.24                     | 151.022           |                    |           |
| 13,300.00                                                                    | 7,476.19              | 12,036.80             | 7,806.91              | 108.49           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,572.23               | 5,535.98                | 36.25                     | 153.735           |                    |           |
| 13,400.00                                                                    | 7,475.44              | 12,036.80             | 7,806.91              | 110.28           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,671.82               | 5,635.57                | 36.26                     | 156.439           |                    |           |
| 13,500.00                                                                    | 7,474.68              | 12,036.80             | 7,806.91              | 112.07           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,771.43               | 5,735.16                | 36.27                     | 159.133           |                    |           |
| 13,600.00                                                                    | 7,473.92              | 12,036.80             | 7,806.91              | 113.87           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,871.05               | 5,834.77                | 36.28                     | 161.818           |                    |           |
| 13,700.00                                                                    | 7,473.16              | 12,036.80             | 7,806.91              | 115.66           | 78.89         | 138.74                | 345.79                              | -88.27       | 5,970.69               | 5,934.39                | 36.30                     | 164.493           |                    |           |
| 13,800.00                                                                    | 7,472.41              | 12,036.80             | 7,806.91              | 117.45           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,070.33               | 6,034.02                | 36.31                     | 167.158           |                    |           |
| 13,900.00                                                                    | 7,471.65              | 12,036.80             | 7,806.91              | 119.25           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,169.99               | 6,133.66                | 36.33                     | 169.815           |                    |           |
| 14,000.00                                                                    | 7,470.89              | 12,036.80             | 7,806.91              | 121.05           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,269.66               | 6,233.30                | 36.35                     | 172.461           |                    |           |
| 14,100.00                                                                    | 7,470.13              | 12,036.80             | 7,806.91              | 122.84           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,369.34               | 6,332.96                | 36.38                     | 175.098           |                    |           |
| 14,200.00                                                                    | 7,469.38              | 12,036.80             | 7,806.91              | 124.64           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,469.02               | 6,432.63                | 36.40                     | 177.725           |                    |           |
| 14,300.00                                                                    | 7,468.62              | 12,036.80             | 7,806.91              | 126.44           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,568.72               | 6,532.30                | 36.42                     | 180.342           |                    |           |
| 14,400.00                                                                    | 7,467.86              | 12,036.80             | 7,806.91              | 128.24           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,668.43               | 6,631.98                | 36.45                     | 182.950           |                    |           |
| 14,500.00                                                                    | 7,467.10              | 12,036.80             | 7,806.91              | 130.04           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,768.15               | 6,731.67                | 36.48                     | 185.548           |                    |           |
| 14,600.00                                                                    | 7,466.35              | 12,036.80             | 7,806.91              | 131.84           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,867.87               | 6,831.36                | 36.50                     | 188.136           |                    |           |
| 14,700.00                                                                    | 7,465.59              | 12,036.80             | 7,806.91              | 133.65           | 78.89         | 138.74                | 345.79                              | -88.27       | 6,967.60               | 6,931.07                | 36.53                     | 190.714           |                    |           |
| 14,800.00                                                                    | 7,464.83              | 12,036.80             | 7,806.91              | 135.45           | 78.89         | 138.74                | 345.79                              | -88.27       | 7,067.34               | 7,030.78                | 36.56                     | 193.282           |                    |           |

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



# TDS

## Anticollision Report



Company: COG Operating LLC  
 Project: Eddy County, NM (NAD-27 2015)  
 Reference Site: Craig Federal Com #2H  
 Site Error: 0.00 usft  
 Reference Well: Craig Federal Com #2H  
 Well Error: 0.00 usft  
 Reference Wellbore: Craig Federal Com #2H  
 Reference Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
 TVD Reference: KB @ 3394.80usft (Latshaw 44)  
 MD Reference: KB @ 3394.80usft (Latshaw 44)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: EDM 5000.1 Single User Db  
 Offset TVD Reference: Offset Datum

| Offset Design Eddy County Offset Wells - Bodacious BSM Federal #1H - OH - OH |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   | Offset Site Error: 0.00 usft |
|------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|------------------------------|
| Survey Program: 100-ISCWSA-GYRO-3, 412-MWD                                   |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   | Offset Well Error: 0.00 usft |
| Reference                                                                    |                       | Offset                |                       | Semi Major Axis  |               |                      | Distance                            |              |                        |                         |                           |                   |                              |
| Measured Depth (usft)                                                        | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Tooface (") | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning                      |
| 14,900.00                                                                    | 7,464.07              | 12,036.80             | 7,806.91              | 137.25           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,167.09               | 7,130.49                | 36.60                     | 195.840           |                              |
| 15,000.00                                                                    | 7,463.32              | 12,036.80             | 7,806.91              | 139.05           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,266.84               | 7,230.21                | 36.63                     | 198.389           |                              |
| 15,100.00                                                                    | 7,462.56              | 12,036.80             | 7,806.91              | 140.86           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,366.60               | 7,329.94                | 36.66                     | 200.927           |                              |
| 15,200.00                                                                    | 7,461.80              | 12,036.80             | 7,806.91              | 142.66           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,466.37               | 7,429.67                | 36.70                     | 203.456           |                              |
| 15,300.00                                                                    | 7,461.04              | 12,036.80             | 7,806.91              | 144.47           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,566.14               | 7,529.41                | 36.73                     | 205.974           |                              |
| 15,400.00                                                                    | 7,460.29              | 12,036.80             | 7,806.91              | 146.27           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,665.92               | 7,629.15                | 36.77                     | 208.482           |                              |
| 15,500.00                                                                    | 7,459.53              | 12,036.80             | 7,806.91              | 148.08           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,765.71               | 7,728.90                | 36.81                     | 210.980           |                              |
| 15,600.00                                                                    | 7,458.77              | 12,036.80             | 7,806.91              | 149.89           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,865.50               | 7,828.65                | 36.85                     | 213.469           |                              |
| 15,700.00                                                                    | 7,458.01              | 12,036.80             | 7,806.91              | 151.69           | 78.89         | 138.74               | 345.79                              | -88.27       | 7,965.29               | 7,928.41                | 36.89                     | 215.947           |                              |
| 15,800.00                                                                    | 7,457.26              | 12,036.80             | 7,806.91              | 153.50           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,065.09               | 8,028.17                | 36.93                     | 218.415           |                              |
| 15,900.00                                                                    | 7,456.50              | 12,036.80             | 7,806.91              | 155.31           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,164.90               | 8,127.93                | 36.97                     | 220.872           |                              |
| 16,000.00                                                                    | 7,455.74              | 12,036.80             | 7,806.91              | 157.12           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,264.71               | 8,227.70                | 37.01                     | 223.320           |                              |
| 16,100.00                                                                    | 7,454.98              | 12,036.80             | 7,806.91              | 158.93           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,364.52               | 8,327.47                | 37.05                     | 225.758           |                              |
| 16,200.00                                                                    | 7,454.23              | 12,036.80             | 7,806.91              | 160.74           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,464.34               | 8,427.25                | 37.09                     | 228.185           |                              |
| 16,300.00                                                                    | 7,453.47              | 12,036.80             | 7,806.91              | 162.54           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,564.16               | 8,527.02                | 37.14                     | 230.602           |                              |
| 16,400.00                                                                    | 7,452.71              | 12,036.80             | 7,806.91              | 164.35           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,663.99               | 8,626.81                | 37.18                     | 233.009           |                              |
| 16,500.00                                                                    | 7,451.95              | 12,036.80             | 7,806.91              | 166.16           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,763.82               | 8,726.59                | 37.23                     | 235.406           |                              |
| 16,600.00                                                                    | 7,451.20              | 12,036.80             | 7,806.91              | 167.97           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,863.66               | 8,826.38                | 37.27                     | 237.792           |                              |
| 16,700.00                                                                    | 7,450.44              | 12,036.80             | 7,806.91              | 169.79           | 78.89         | 138.74               | 345.79                              | -88.27       | 8,963.49               | 8,926.17                | 37.32                     | 240.169           |                              |
| 16,800.00                                                                    | 7,449.68              | 12,036.80             | 7,806.91              | 171.60           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,063.34               | 9,025.97                | 37.37                     | 242.535           |                              |
| 16,900.00                                                                    | 7,448.92              | 12,036.80             | 7,806.91              | 173.41           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,163.18               | 9,125.77                | 37.42                     | 244.891           |                              |
| 17,000.00                                                                    | 7,448.17              | 12,036.80             | 7,806.91              | 175.22           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,263.03               | 9,225.57                | 37.47                     | 247.236           |                              |
| 17,100.00                                                                    | 7,447.41              | 12,036.80             | 7,806.91              | 177.03           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,362.88               | 9,325.37                | 37.52                     | 249.572           |                              |
| 17,200.00                                                                    | 7,446.65              | 12,036.80             | 7,806.91              | 178.84           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,462.74               | 9,425.17                | 37.57                     | 251.897           |                              |
| 17,300.00                                                                    | 7,445.89              | 12,036.80             | 7,806.91              | 180.66           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,562.60               | 9,524.98                | 37.62                     | 254.212           |                              |
| 17,400.00                                                                    | 7,445.14              | 12,036.80             | 7,806.91              | 182.47           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,662.46               | 9,624.79                | 37.67                     | 256.517           |                              |
| 17,500.00                                                                    | 7,444.38              | 12,036.80             | 7,806.91              | 184.28           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,762.32               | 9,724.60                | 37.72                     | 258.812           |                              |
| 17,600.00                                                                    | 7,443.62              | 12,036.80             | 7,806.91              | 186.09           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,862.19               | 9,824.42                | 37.77                     | 261.096           |                              |
| 17,700.00                                                                    | 7,442.86              | 12,036.80             | 7,806.91              | 187.91           | 78.89         | 138.74               | 345.79                              | -88.27       | 9,962.06               | 9,924.23                | 37.83                     | 263.370           |                              |



# TDS

## Anticollision Report



Company: COG Operating LLC  
 Project: Eddy County, NM (NAD-27 2015)  
 Reference Site: Craig Federal Com #2H  
 Site Error: 0.00 usft  
 Reference Well: Craig Federal Com #2H  
 Well Error: 0.00 usft  
 Reference Wellbore: Craig Federal Com #2H  
 Reference Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
 TVD Reference: KB @ 3394.80usft (Latshaw 44)  
 MD Reference: KB @ 3394.80usft (Latshaw 44)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: EDM 5000.1 Single User Db  
 Offset TVD Reference: Offset Datum

| Offset Design Eddy County Offset Wells - Craig State Com #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Site Error: 0.00 usft |
|------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|------------------------------|
| Survey Program: 100-Scientific Gyro, 5548-MWD                          |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Well Error: 0.00 usft |
| Reference                                                              |                       | Offset                |                       | Semi Major Axis  |               | Distance              |                                     |              |                        |                         |                           |                   |                              |
| Measured Depth (usft)                                                  | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning                      |
| 0.00                                                                   | 0.00                  | 0.00                  | 0.00                  | 0.00             | 0.00          | -21.54                | 1,053.40                            | -415.70      | 1,132.95               |                         |                           |                   |                              |
| 100.00                                                                 | 100.00                | 69.30                 | 69.30                 | 0.08             | 0.05          | -21.55                | 1,053.25                            | -415.85      | 1,132.38               | 1,132.25                | 0.13                      | 8,930.796         |                              |
| 200.00                                                                 | 200.00                | 169.94                | 169.93                | 0.31             | 0.16          | -21.59                | 1,052.62                            | -416.62      | 1,132.08               | 1,131.66                | 0.42                      | 2,671.966         |                              |
| 300.00                                                                 | 300.00                | 269.61                | 269.59                | 0.53             | 0.29          | -21.67                | 1,051.79                            | -418.01      | 1,131.81               | 1,131.09                | 0.72                      | 1,569.886         |                              |
| 400.00                                                                 | 400.00                | 369.82                | 369.77                | 0.76             | 0.42          | -21.79                | 1,050.74                            | -419.95      | 1,131.56               | 1,130.54                | 1.02                      | 1,112.840         |                              |
| 500.00                                                                 | 500.00                | 469.83                | 469.74                | 0.98             | 0.55          | -21.94                | 1,049.34                            | -422.69      | 1,131.28               | 1,129.97                | 1.31                      | 862.229           |                              |
| 600.00                                                                 | 600.00                | 572.07                | 571.92                | 1.21             | 0.68          | -22.11                | 1,047.78                            | -425.65      | 1,130.95               | 1,129.34                | 1.61                      | 702.660           |                              |
| 700.00                                                                 | 700.00                | 673.02                | 672.82                | 1.43             | 0.82          | -22.27                | 1,046.10                            | -428.35      | 1,130.42               | 1,128.51                | 1.91                      | 592.767           |                              |
| 800.00                                                                 | 800.00                | 768.59                | 768.34                | 1.66             | 0.94          | -22.43                | 1,044.56                            | -431.09      | 1,130.02               | 1,127.82                | 2.20                      | 513.842           |                              |
| 826.76                                                                 | 826.76                | 793.72                | 793.46                | 1.72             | 0.97          | -22.47                | 1,044.23                            | -431.84      | 1,130.00               | 1,127.73                | 2.28                      | 496.296           |                              |
| 900.00                                                                 | 900.00                | 861.15                | 860.85                | 1.88             | 1.06          | -22.58                | 1,043.52                            | -433.99      | 1,130.19               | 1,127.70                | 2.49                      | 454.548           |                              |
| 1,000.00                                                               | 1,000.00              | 953.48                | 953.11                | 2.11             | 1.17          | -22.75                | 1,042.95                            | -437.43      | 1,131.06               | 1,128.28                | 2.77                      | 408.021           |                              |
| 1,100.00                                                               | 1,100.00              | 1,051.48              | 1,051.02              | 2.33             | 1.29          | -22.96                | 1,042.62                            | -441.79      | 1,132.47               | 1,129.41                | 3.06                      | 369.812           |                              |
| 1,200.00                                                               | 1,200.00              | 1,156.64              | 1,156.07              | 2.56             | 1.42          | -23.20                | 1,041.97                            | -446.53      | 1,133.66               | 1,130.30                | 3.36                      | 337.430           |                              |
| 1,300.00                                                               | 1,300.00              | 1,268.20              | 1,267.50              | 2.78             | 1.57          | -23.46                | 1,040.46                            | -451.47      | 1,134.19               | 1,130.52                | 3.66                      | 309.626           |                              |
| 1,400.00                                                               | 1,400.00              | 1,383.34              | 1,382.58              | 3.01             | 1.71          | -23.66                | 1,038.10                            | -454.77      | 1,133.45               | 1,129.48                | 3.97                      | 285.576           |                              |
| 1,500.00                                                               | 1,500.00              | 1,495.78              | 1,494.97              | 3.23             | 1.82          | -23.76                | 1,035.25                            | -455.77      | 1,131.49               | 1,127.21                | 4.28                      | 264.550           |                              |
| 1,600.00                                                               | 1,600.00              | 1,608.29              | 1,607.42              | 3.46             | 1.90          | -23.79                | 1,031.88                            | -454.88      | 1,128.43               | 1,123.84                | 4.60                      | 245.550           |                              |
| 1,700.00                                                               | 1,700.00              | 1,717.28              | 1,716.29              | 3.68             | 1.92          | -23.66                | 1,028.77                            | -450.79      | 1,124.29               | 1,119.37                | 4.92                      | 228.617           |                              |
| 1,800.00                                                               | 1,800.00              | 1,809.86              | 1,808.73              | 3.91             | 1.93          | -23.48                | 1,026.69                            | -446.07      | 1,120.20               | 1,114.97                | 5.23                      | 214.307           |                              |
| 1,900.00                                                               | 1,900.00              | 1,900.00              | 1,898.76              | 4.13             | 1.93          | -23.33                | 1,025.13                            | -442.05      | 1,116.84               | 1,111.30                | 5.54                      | 201.766           |                              |
| 2,000.00                                                               | 2,000.00              | 1,994.99              | 1,993.69              | 4.35             | 1.95          | -23.20                | 1,023.72                            | -438.84      | 1,114.14               | 1,108.29                | 5.85                      | 190.429           |                              |
| 2,100.00                                                               | 2,100.00              | 2,087.94              | 2,086.60              | 4.58             | 1.98          | -23.11                | 1,022.62                            | -436.43      | 1,112.03               | 1,105.87                | 6.17                      | 180.372           |                              |
| 2,200.00                                                               | 2,200.00              | 2,180.89              | 2,179.53              | 4.80             | 2.01          | -23.03                | 1,021.96                            | -434.49      | 1,110.56               | 1,104.08                | 6.48                      | 171.453           |                              |
| 2,300.00                                                               | 2,300.00              | 2,279.21              | 2,277.83              | 5.03             | 2.04          | -22.97                | 1,021.52                            | -432.94      | 1,109.53               | 1,102.73                | 6.80                      | 163.286           |                              |
| 2,400.00                                                               | 2,400.00              | 2,379.35              | 2,377.96              | 5.25             | 2.09          | -22.92                | 1,020.94                            | -431.72      | 1,108.52               | 1,101.40                | 7.12                      | 155.705           |                              |
| 2,500.00                                                               | 2,500.00              | 2,475.35              | 2,473.96              | 5.48             | 2.16          | -22.89                | 1,020.42                            | -430.80      | 1,107.65               | 1,100.21                | 7.44                      | 148.816           |                              |
| 2,600.00                                                               | 2,600.00              | 2,574.97              | 2,573.58              | 5.70             | 2.23          | -22.87                | 1,020.04                            | -430.20      | 1,107.07               | 1,099.29                | 7.77                      | 142.416           |                              |
| 2,700.00                                                               | 2,700.00              | 2,675.34              | 2,673.94              | 5.93             | 2.31          | -22.85                | 1,019.57                            | -429.64      | 1,106.42               | 1,098.31                | 8.11                      | 136.443           |                              |
| 2,800.00                                                               | 2,800.00              | 2,775.31              | 2,773.91              | 6.15             | 2.41          | -22.84                | 1,019.05                            | -429.19      | 1,105.76               | 1,097.31                | 8.45                      | 130.879           |                              |
| 2,900.00                                                               | 2,900.00              | 2,875.90              | 2,874.49              | 6.38             | 2.52          | -22.83                | 1,018.48                            | -428.79      | 1,105.09               | 1,096.30                | 8.79                      | 125.696           |                              |
| 3,000.00                                                               | 3,000.00              | 2,976.23              | 2,974.82              | 6.60             | 2.62          | -22.82                | 1,017.90                            | -428.30      | 1,104.37               | 1,095.23                | 9.14                      | 120.892           |                              |
| 3,100.00                                                               | 3,100.00              | 3,075.56              | 3,074.15              | 6.83             | 2.73          | -22.81                | 1,017.33                            | -427.83      | 1,103.65               | 1,094.18                | 9.48                      | 116.453           |                              |
| 3,200.00                                                               | 3,200.00              | 3,173.45              | 3,172.04              | 7.05             | 2.84          | -22.80                | 1,016.84                            | -427.50      | 1,103.06               | 1,093.24                | 9.82                      | 112.334           |                              |
| 3,300.00                                                               | 3,300.00              | 3,275.50              | 3,274.09              | 7.28             | 2.96          | -22.80                | 1,016.38                            | -427.22      | 1,102.54               | 1,092.37                | 10.17                     | 108.418           |                              |
| 3,400.00                                                               | 3,400.00              | 3,376.68              | 3,375.26              | 7.50             | 3.08          | -22.80                | 1,015.68                            | -426.92      | 1,101.79               | 1,091.27                | 10.52                     | 104.740           |                              |
| 3,500.00                                                               | 3,500.00              | 3,475.45              | 3,474.03              | 7.73             | 3.20          | -22.80                | 1,014.99                            | -426.68      | 1,101.05               | 1,090.18                | 10.87                     | 101.328           |                              |
| 3,600.00                                                               | 3,600.00              | 3,575.24              | 3,573.82              | 7.95             | 3.33          | -22.81                | 1,014.32                            | -426.61      | 1,100.41               | 1,089.20                | 11.21                     | 98.149            |                              |
| 3,700.00                                                               | 3,700.00              | 3,674.24              | 3,672.82              | 8.18             | 3.45          | -22.83                | 1,013.61                            | -426.73      | 1,099.79               | 1,088.25                | 11.55                     | 95.241            |                              |
| 3,800.00                                                               | 3,800.00              | 3,773.86              | 3,772.44              | 8.40             | 3.56          | -22.86                | 1,012.89                            | -427.10      | 1,099.27               | 1,087.39                | 11.87                     | 92.592            |                              |
| 3,900.00                                                               | 3,900.00              | 3,872.99              | 3,871.56              | 8.63             | 3.67          | -22.90                | 1,012.14                            | -427.61      | 1,098.77               | 1,086.59                | 12.19                     | 90.154            |                              |
| 4,000.00                                                               | 4,000.00              | 3,973.46              | 3,972.03              | 8.85             | 3.78          | -22.94                | 1,011.43                            | -428.16      | 1,098.33               | 1,085.83                | 12.50                     | 87.865            |                              |
| 4,100.00                                                               | 4,100.00              | 4,073.95              | 4,072.51              | 9.07             | 3.90          | -22.99                | 1,010.61                            | -428.76      | 1,097.82               | 1,085.00                | 12.82                     | 85.628            |                              |
| 4,200.00                                                               | 4,200.00              | 4,176.09              | 4,174.65              | 9.30             | 4.01          | -23.04                | 1,009.70                            | -429.33      | 1,097.21               | 1,084.07                | 13.14                     | 83.511            |                              |
| 4,300.00                                                               | 4,300.00              | 4,276.47              | 4,275.02              | 9.52             | 4.14          | -23.08                | 1,008.67                            | -429.76      | 1,096.44               | 1,082.98                | 13.46                     | 81.432            |                              |
| 4,400.00                                                               | 4,400.00              | 4,375.03              | 4,373.57              | 9.75             | 4.26          | -23.12                | 1,007.71                            | -430.25      | 1,095.74               | 1,081.95                | 13.79                     | 79.483            |                              |
| 4,500.00                                                               | 4,500.00              | 4,470.95              | 4,469.49              | 9.97             | 4.36          | -23.17                | 1,006.92                            | -430.97      | 1,095.27               | 1,081.18                | 14.09                     | 77.746            |                              |
| 4,600.00                                                               | 4,600.00              | 4,570.92              | 4,569.44              | 10.20            | 4.46          | -23.24                | 1,006.24                            | -432.08      | 1,095.09               | 1,080.71                | 14.38                     | 76.157            |                              |
| 4,700.00                                                               | 4,700.00              | 4,675.18              | 4,673.69              | 10.42            | 4.57          | -23.31                | 1,005.31                            | -433.12      | 1,094.67               | 1,079.99                | 14.68                     | 74.562            |                              |
| 4,800.00                                                               | 4,800.00              | 4,778.80              | 4,777.31              | 10.65            | 4.69          | -23.38                | 1,003.96                            | -434.11      | 1,093.85               | 1,078.85                | 15.00                     | 72.944            |                              |
| 4,900.00                                                               | 4,900.00              | 4,880.88              | 4,879.37              | 10.87            | 4.82          | -23.47                | 1,002.34                            | -435.10      | 1,092.77               | 1,077.46                | 15.31                     | 71.354            |                              |
| 5,000.00                                                               | 5,000.00              | 4,985.33              | 4,983.79              | 11.10            | 4.95          | -23.56                | 1,000.33                            | -436.20      | 1,091.43               | 1,075.80                | 15.64                     | 69.794            |                              |

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



# TDS

## Anticollision Report



Company: COG Operating LLC  
 Project: Eddy County, NM (NAD-27 2015)  
 Reference Site: Craig Federal Com #2H  
 Site Error: 0.00 usft  
 Reference Well: Craig Federal Com #2H  
 Well Error: 0.00 usft  
 Reference Wellbore: Craig Federal Com #2H  
 Reference Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
 TVD Reference: KB @ 3394.80usft (Latshaw 44)  
 MD Reference: KB @ 3394.80usft (Latshaw 44)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: EDM 5000.1 Single User Db  
 Offset TVD Reference: Offset Datum

| Offset Design Eddy County Offset Wells - Craig State Com #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Site Error: 0.00 usft |
|------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|------------------------------|
| Survey Program: 100-Scientific Gyro, 5548-MWD                          |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Well Error: 0.00 usft |
| Reference                                                              |                       | Offset                |                       | Semi Major Axis  |               | Distance              |                                     |              |                        |                         |                           |                   | Warning                      |
| Measured Depth (usft)                                                  | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toelface (") | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor |                              |
| 5,100.00                                                               | 5,100.00              | 5,085.97              | 5,084.40              | 11.32            | 5.07          | -23.68                | 997.95                              | -437.57      | 1,089.81               | 1,073.86                | 15.96                     | 68.300            |                              |
| 5,200.00                                                               | 5,200.00              | 5,187.39              | 5,185.78              | 11.55            | 5.19          | -23.80                | 995.44                              | -439.05      | 1,088.13               | 1,071.86                | 16.27                     | 66.863            |                              |
| 5,300.00                                                               | 5,300.00              | 5,288.40              | 5,286.73              | 11.77            | 5.32          | -23.94                | 992.72                              | -440.71      | 1,086.33               | 1,069.74                | 16.59                     | 65.481            |                              |
| 5,400.00                                                               | 5,400.00              | 5,387.15              | 5,385.43              | 12.00            | 5.44          | -24.08                | 989.98                              | -442.49      | 1,084.53               | 1,067.63                | 16.90                     | 64.167            |                              |
| 5,500.00                                                               | 5,500.00              | 5,484.99              | 5,483.21              | 12.22            | 5.56          | -24.24                | 987.30                              | -444.57      | 1,082.90               | 1,065.70                | 17.21                     | 62.933            |                              |
| 5,600.00                                                               | 5,600.00              | 5,585.55              | 5,582.00              | 12.45            | 5.64          | -22.63                | 990.90                              | -413.02      | 1,076.91               | 1,059.41                | 17.50                     | 61.537            |                              |
| 5,700.00                                                               | 5,700.00              | 5,761.00              | 5,741.04              | 12.67            | 5.85          | -19.97                | 1,002.55                            | -364.22      | 1,069.25               | 1,051.21                | 18.04                     | 59.280            |                              |
| 5,800.00                                                               | 5,800.00              | 5,842.20              | 5,804.81              | 12.90            | 6.22          | -17.27                | 1,015.32                            | -315.65      | 1,063.94               | 1,045.14                | 18.80                     | 56.604            |                              |
| 5,891.16                                                               | 5,891.16              | 5,915.46              | 5,857.86              | 13.10            | 6.76          | -14.55                | 1,028.27                            | -266.82      | 1,062.32               | 1,042.64                | 19.68                     | 53.973 CC         |                              |
| 5,900.00                                                               | 5,900.00              | 5,924.62              | 5,864.13              | 13.12            | 6.84          | -14.19                | 1,029.92                            | -260.38      | 1,062.33               | 1,042.52                | 19.81                     | 53.628 ES         |                              |
| 6,000.00                                                               | 6,000.00              | 5,994.53              | 5,907.57              | 13.35            | 7.66          | -11.24                | 1,042.91                            | -207.26      | 1,064.94               | 1,044.03                | 20.91                     | 50.931            |                              |
| 6,100.00                                                               | 6,100.00              | 6,043.56              | 5,933.57              | 13.57            | 8.38          | -9.01                 | 1,052.44                            | -166.81      | 1,073.87               | 1,052.09                | 21.78                     | 49.313            |                              |
| 6,200.00                                                               | 6,200.00              | 6,087.15              | 5,954.98              | 13.80            | 9.11          | -6.98                 | 1,061.05                            | -129.82      | 1,089.73               | 1,067.22                | 22.50                     | 48.427 SF         |                              |
| 6,300.00                                                               | 6,300.00              | 6,119.73              | 5,970.30              | 14.02            | 9.70          | -5.45                 | 1,067.71                            | -101.87      | 1,112.76               | 1,089.84                | 22.92                     | 48.544            |                              |
| 6,400.00                                                               | 6,400.00              | 6,145.70              | 5,981.72              | 14.24            | 10.19         | -4.22                 | 1,073.23                            | -79.20       | 1,142.94               | 1,119.83                | 23.10                     | 49.470            |                              |
| 6,500.00                                                               | 6,500.00              | 6,169.00              | 5,991.01              | 14.47            | 10.65         | -3.10                 | 1,078.32                            | -58.45       | 1,180.03               | 1,156.90                | 23.13                     | 51.019            |                              |
| 6,600.00                                                               | 6,600.00              | 6,184.03              | 5,996.50              | 14.69            | 10.96         | -2.38                 | 1,081.66                            | -44.87       | 1,223.57               | 1,200.67                | 22.90                     | 53.421            |                              |
| 6,700.00                                                               | 6,700.00              | 6,201.00              | 6,002.26              | 14.92            | 11.31         | -1.55                 | 1,085.49                            | -29.37       | 1,273.04               | 1,250.38                | 22.66                     | 56.191            |                              |
| 6,800.00                                                               | 6,800.00              | 6,218.53              | 6,007.82              | 15.14            | 11.69         | -0.70                 | 1,089.46                            | -13.23       | 1,327.78               | 1,305.40                | 22.38                     | 59.326            |                              |
| 6,900.00                                                               | 6,900.00              | 6,232.00              | 6,011.92              | 15.37            | 11.98         | -0.04                 | 1,092.52                            | -0.77        | 1,387.18               | 1,365.18                | 22.00                     | 63.060            |                              |
| 7,000.00                                                               | 7,000.00              | 6,253.73              | 6,018.24              | 15.59            | 12.46         | 1.01                  | 1,097.48                            | 19.43        | 1,450.66               | 1,428.88                | 21.78                     | 66.618            |                              |
| 7,040.55                                                               | 7,040.55              | 6,264.00              | 6,021.12              | 15.68            | 12.69         | 1.51                  | 1,099.83                            | 29.00        | 1,477.47               | 1,455.76                | 21.71                     | 68.050            |                              |
| 7,050.00                                                               | 7,050.00              | 6,264.00              | 6,021.12              | 15.71            | 12.69         | 30.00                 | 1,099.83                            | 29.00        | 1,483.73               | 1,462.09                | 21.65                     | 68.540            |                              |
| 7,075.00                                                               | 7,074.97              | 6,264.00              | 6,021.12              | 15.76            | 12.69         | 28.76                 | 1,099.83                            | 29.00        | 1,499.88               | 1,478.41                | 21.47                     | 69.853            |                              |
| 7,100.00                                                               | 7,099.85              | 6,264.00              | 6,021.12              | 15.82            | 12.69         | 27.64                 | 1,099.83                            | 29.00        | 1,515.38               | 1,494.10                | 21.29                     | 71.188            |                              |
| 7,125.00                                                               | 7,124.56              | 6,264.00              | 6,021.12              | 15.87            | 12.69         | 26.63                 | 1,099.83                            | 29.00        | 1,530.23               | 1,509.13                | 21.10                     | 72.534            |                              |
| 7,150.00                                                               | 7,149.04              | 6,264.00              | 6,021.12              | 15.93            | 12.69         | 25.72                 | 1,099.83                            | 29.00        | 1,544.39               | 1,523.49                | 20.90                     | 73.892            |                              |
| 7,175.00                                                               | 7,173.23              | 6,264.00              | 6,021.12              | 15.99            | 12.69         | 24.90                 | 1,099.83                            | 29.00        | 1,557.85               | 1,537.15                | 20.70                     | 75.261            |                              |
| 7,200.00                                                               | 7,197.05              | 6,264.00              | 6,021.12              | 16.05            | 12.69         | 24.16                 | 1,099.83                            | 29.00        | 1,570.59               | 1,550.10                | 20.49                     | 76.640            |                              |
| 7,225.00                                                               | 7,220.45              | 6,264.00              | 6,021.12              | 16.10            | 12.69         | 23.50                 | 1,099.83                            | 29.00        | 1,582.60               | 1,562.32                | 20.28                     | 78.027            |                              |
| 7,250.00                                                               | 7,243.35              | 6,275.86              | 6,024.27              | 16.16            | 12.97         | 23.37                 | 1,102.55                            | 40.11        | 1,593.71               | 1,573.42                | 20.29                     | 78.556            |                              |
| 7,275.00                                                               | 7,265.69              | 6,276.73              | 6,024.49              | 16.22            | 12.99         | 22.86                 | 1,102.75                            | 40.92        | 1,604.17               | 1,584.08                | 20.08                     | 79.876            |                              |
| 7,300.00                                                               | 7,287.42              | 6,277.45              | 6,024.67              | 16.28            | 13.00         | 22.40                 | 1,102.91                            | 41.59        | 1,613.85               | 1,593.98                | 19.87                     | 81.207            |                              |
| 7,325.00                                                               | 7,308.47              | 6,278.00              | 6,024.81              | 16.34            | 13.01         | 21.99                 | 1,103.04                            | 42.12        | 1,622.74               | 1,603.08                | 19.66                     | 82.549            |                              |
| 7,350.00                                                               | 7,328.79              | 6,278.42              | 6,024.92              | 16.41            | 13.02         | 21.63                 | 1,103.14                            | 42.50        | 1,630.83               | 1,611.39                | 19.44                     | 83.898            |                              |
| 7,375.00                                                               | 7,348.31              | 6,278.68              | 6,024.98              | 16.48            | 13.03         | 21.30                 | 1,103.20                            | 42.75        | 1,638.11               | 1,618.89                | 19.22                     | 85.251            |                              |
| 7,400.00                                                               | 7,367.00              | 6,278.81              | 6,025.02              | 16.57            | 13.03         | 21.02                 | 1,103.23                            | 42.87        | 1,644.57               | 1,625.58                | 18.99                     | 86.603            |                              |
| 7,425.00                                                               | 7,384.78              | 6,278.80              | 6,025.01              | 16.66            | 13.03         | 20.77                 | 1,103.23                            | 42.86        | 1,650.20               | 1,631.44                | 18.76                     | 87.950            |                              |
| 7,450.00                                                               | 7,401.63              | 6,278.66              | 6,024.98              | 16.75            | 13.03         | 20.56                 | 1,103.19                            | 42.73        | 1,654.99               | 1,636.46                | 18.54                     | 89.286            |                              |
| 7,475.00                                                               | 7,417.48              | 6,278.39              | 6,024.91              | 16.86            | 13.02         | 20.38                 | 1,103.13                            | 42.48        | 1,658.95               | 1,640.64                | 18.31                     | 90.606            |                              |
| 7,500.00                                                               | 7,432.31              | 6,277.99              | 6,024.81              | 16.98            | 13.01         | 20.24                 | 1,103.04                            | 42.11        | 1,662.06               | 1,643.98                | 18.09                     | 91.902            |                              |
| 7,525.00                                                               | 7,446.05              | 6,277.48              | 6,024.68              | 17.11            | 13.00         | 20.13                 | 1,102.92                            | 41.62        | 1,664.32               | 1,646.46                | 17.86                     | 93.167            |                              |
| 7,550.00                                                               | 7,458.69              | 6,276.85              | 6,024.52              | 17.26            | 12.99         | 20.05                 | 1,102.78                            | 41.03        | 1,665.73               | 1,648.08                | 17.65                     | 94.393            |                              |
| 7,575.00                                                               | 7,470.18              | 6,276.10              | 6,024.33              | 17.41            | 12.97         | 20.00                 | 1,102.61                            | 40.33        | 1,666.28               | 1,648.85                | 17.43                     | 95.571            |                              |
| 7,600.00                                                               | 7,480.49              | 6,264.00              | 6,021.12              | 17.58            | 12.69         | 19.60                 | 1,099.83                            | 29.00        | 1,666.12               | 1,649.07                | 17.05                     | 97.745            |                              |
| 7,625.00                                                               | 7,489.60              | 6,264.00              | 6,021.12              | 17.77            | 12.69         | 19.64                 | 1,099.83                            | 29.00        | 1,664.94               | 1,648.07                | 16.86                     | 98.725            |                              |
| 7,650.00                                                               | 7,497.48              | 6,264.00              | 6,021.12              | 17.97            | 12.69         | 19.73                 | 1,099.83                            | 29.00        | 1,662.90               | 1,646.20                | 16.69                     | 99.615            |                              |
| 7,675.00                                                               | 7,504.10              | 6,264.00              | 6,021.12              | 18.18            | 12.69         | 19.85                 | 1,099.83                            | 29.00        | 1,660.00               | 1,643.47                | 16.53                     | 100.405           |                              |
| 7,700.00                                                               | 7,509.45              | 6,264.00              | 6,021.12              | 18.40            | 12.69         | 20.00                 | 1,099.83                            | 29.00        | 1,656.26               | 1,639.88                | 16.38                     | 101.087           |                              |
| 7,725.00                                                               | 7,513.52              | 6,264.00              | 6,021.12              | 18.64            | 12.69         | 20.19                 | 1,099.83                            | 29.00        | 1,651.67               | 1,635.42                | 16.25                     | 101.649           |                              |
| 7,750.00                                                               | 7,516.29              | 6,264.00              | 6,021.12              | 18.89            | 12.69         | 20.43                 | 1,099.83                            | 29.00        | 1,646.24               | 1,630.11                | 16.13                     | 102.085           |                              |
| 7,775.00                                                               | 7,517.76              | 6,264.00              | 6,021.12              | 19.15            | 12.69         | 20.70                 | 1,099.83                            | 29.00        | 1,639.98               | 1,623.96                | 16.02                     | 102.386           |                              |

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





**TDS**  
Anticollision Report



**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Reference Site:** Craig Federal Com #2H  
**Site Error:** 0.00 usft  
**Reference Well:** Craig Federal Com #2H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Craig Federal Com #2H  
**Reference Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Offset Datum

| Offset Design Eddy County Offset Wells - Craig State Com #1H - OH - OH |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   |         | Offset Site Error: | 0.00 usft |
|------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|---------|--------------------|-----------|
| Survey Program: 100-Scientific Gyro, 5548-MWD                          |                       |                       |                       |                  |               |                      |                                     |              |                        |                         |                           |                   |         | Offset Well Error: | 0.00 usft |
| Reference                                                              |                       | Offset                |                       | Semi Major Axis  |               | Distance             |                                     |              |                        |                         |                           |                   |         |                    |           |
| Measured Depth (usft)                                                  | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Tooface (') | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | Warning |                    |           |
| 7,794.13                                                               | 7,518.00              | 6,264.00              | 6,021.12              | 19.35            | 12.69         | 20.94                | 1,099.83                            | 29.00        | 1,634.63               | 1,618.68                | 15.95                     | 102.516           |         |                    |           |
| 7,800.00                                                               | 7,517.96              | 6,264.00              | 6,021.12              | 19.41            | 12.69         | 20.87                | 1,099.83                            | 29.00        | 1,632.92               | 1,616.99                | 15.92                     | 102.540           |         |                    |           |
| 7,900.00                                                               | 7,517.20              | 6,254.99              | 6,018.60              | 20.52            | 12.49         | 19.51                | 1,097.77                            | 20.60        | 1,605.48               | 1,590.06                | 15.42                     | 104.110           |         |                    |           |
| 8,000.00                                                               | 7,516.43              | 6,247.77              | 6,016.54              | 21.73            | 12.33         | 18.34                | 1,096.12                            | 13.88        | 1,581.49               | 1,566.45                | 15.04                     | 105.132           |         |                    |           |
| 8,100.00                                                               | 7,515.65              | 6,243.72              | 6,015.37              | 23.01            | 12.24         | 17.44                | 1,095.19                            | 10.11        | 1,561.32               | 1,546.50                | 14.82                     | 105.361           |         |                    |           |
| 8,200.00                                                               | 7,514.87              | 6,242.84              | 6,015.11              | 24.33            | 12.22         | 16.81                | 1,094.99                            | 9.29         | 1,545.27               | 1,530.51                | 14.76                     | 104.679           |         |                    |           |
| 8,300.00                                                               | 7,514.10              | 6,245.13              | 6,015.78              | 25.66            | 12.27         | 16.48                | 1,095.52                            | 11.43        | 1,533.55               | 1,518.66                | 14.89                     | 103.000           |         |                    |           |
| 8,400.00                                                               | 7,513.32              | 6,250.60              | 6,017.35              | 26.98            | 12.40         | 16.43                | 1,096.77                            | 16.51        | 1,526.30               | 1,511.09                | 15.21                     | 100.317           |         |                    |           |
| 8,500.00                                                               | 7,512.55              | 6,264.00              | 6,021.12              | 28.29            | 12.69         | 16.85                | 1,099.83                            | 29.00        | 1,523.56               | 1,507.73                | 15.83                     | 96.260            |         |                    |           |
| 8,513.02                                                               | 7,512.45              | 6,264.00              | 6,021.12              | 28.46            | 12.69         | 16.85                | 1,099.83                            | 29.00        | 1,523.52               | 1,507.64                | 15.89                     | 95.886            |         |                    |           |
| 8,536.25                                                               | 7,512.28              | 6,264.00              | 6,021.12              | 28.76            | 12.69         | 16.87                | 1,099.83                            | 29.00        | 1,523.65               | 1,507.64                | 16.00                     | 95.207            |         |                    |           |
| 8,600.00                                                               | 7,511.79              | 6,264.00              | 6,021.12              | 29.58            | 12.69         | 16.87                | 1,099.83                            | 29.00        | 1,525.65               | 1,509.29                | 16.37                     | 93.214            |         |                    |           |
| 8,700.00                                                               | 7,511.04              | 6,264.00              | 6,021.12              | 30.88            | 12.69         | 16.87                | 1,099.83                            | 29.00        | 1,534.14               | 1,517.06                | 17.08                     | 89.811            |         |                    |           |
| 8,800.00                                                               | 7,510.28              | 6,279.95              | 6,025.30              | 32.23            | 13.06         | 17.45                | 1,103.49                            | 43.95        | 1,548.74               | 1,530.51                | 18.23                     | 84.978            |         |                    |           |
| 8,900.00                                                               | 7,509.52              | 6,296.00              | 6,029.04              | 33.63            | 13.43         | 18.03                | 1,107.19                            | 59.11        | 1,569.72               | 1,550.24                | 19.48                     | 80.597            |         |                    |           |
| 9,000.00                                                               | 7,508.76              | 6,296.00              | 6,029.04              | 35.07            | 13.43         | 18.03                | 1,107.19                            | 59.11        | 1,596.39               | 1,575.91                | 20.48                     | 77.966            |         |                    |           |
| 9,100.00                                                               | 7,508.01              | 6,296.00              | 6,029.04              | 36.54            | 13.43         | 18.03                | 1,107.19                            | 59.11        | 1,628.77               | 1,607.29                | 21.48                     | 75.822            |         |                    |           |
| 9,200.00                                                               | 7,507.25              | 6,296.00              | 6,029.04              | 38.04            | 13.43         | 18.03                | 1,107.19                            | 59.11        | 1,666.53               | 1,644.07                | 22.47                     | 74.179            |         |                    |           |
| 9,300.00                                                               | 7,506.49              | 6,310.37              | 6,031.98              | 39.56            | 13.77         | 18.55                | 1,110.49                            | 72.78        | 1,709.07               | 1,685.36                | 23.72                     | 72.061            |         |                    |           |
| 9,400.00                                                               | 7,505.73              | 6,328.00              | 6,035.04              | 41.11            | 14.18         | 19.19                | 1,114.50                            | 89.68        | 1,756.45               | 1,731.45                | 25.00                     | 70.247            |         |                    |           |
| 9,500.00                                                               | 7,504.98              | 6,328.00              | 6,035.04              | 42.69            | 14.18         | 19.19                | 1,114.50                            | 89.68        | 1,807.77               | 1,781.92                | 25.85                     | 69.936            |         |                    |           |
| 9,600.00                                                               | 7,504.22              | 6,328.00              | 6,035.04              | 44.28            | 14.18         | 19.19                | 1,114.50                            | 89.68        | 1,863.05               | 1,836.42                | 26.63                     | 69.963            |         |                    |           |
| 9,700.00                                                               | 7,503.46              | 6,328.00              | 6,035.04              | 45.89            | 14.18         | 19.19                | 1,114.50                            | 89.68        | 1,921.94               | 1,894.60                | 27.35                     | 70.285            |         |                    |           |
| 9,800.00                                                               | 7,502.70              | 6,340.23              | 6,036.82              | 47.51            | 14.48         | 19.63                | 1,117.27                            | 101.45       | 1,983.99               | 1,955.69                | 28.29                     | 70.119            |         |                    |           |
| 9,900.00                                                               | 7,501.95              | 6,346.49              | 6,037.62              | 49.15            | 14.63         | 19.85                | 1,118.69                            | 107.50       | 2,049.00               | 2,019.95                | 29.05                     | 70.541            |         |                    |           |
| 10,000.00                                                              | 7,501.19              | 6,360.00              | 6,039.11              | 50.81            | 14.96         | 20.33                | 1,121.75                            | 120.57       | 2,116.71               | 2,086.78                | 29.93                     | 70.720            |         |                    |           |
| 10,100.00                                                              | 7,500.43              | 6,360.00              | 6,039.11              | 52.47            | 14.96         | 20.33                | 1,121.75                            | 120.57       | 2,186.75               | 2,156.32                | 30.43                     | 71.869            |         |                    |           |
| 10,200.00                                                              | 7,499.67              | 6,360.00              | 6,039.11              | 54.14            | 14.96         | 20.33                | 1,121.75                            | 120.57       | 2,259.04               | 2,228.17                | 30.87                     | 73.167            |         |                    |           |
| 10,300.00                                                              | 7,498.92              | 6,377.25              | 6,040.60              | 55.83            | 15.38         | 20.93                | 1,125.67                            | 137.30       | 2,333.22               | 2,301.48                | 31.74                     | 73.519            |         |                    |           |
| 10,400.00                                                              | 7,498.16              | 6,391.00              | 6,041.53              | 57.52            | 15.72         | 21.40                | 1,128.83                            | 150.65       | 2,409.21               | 2,376.74                | 32.48                     | 74.183            |         |                    |           |
| 10,500.00                                                              | 7,497.40              | 6,391.00              | 6,041.53              | 59.22            | 15.72         | 21.40                | 1,128.83                            | 150.65       | 2,486.81               | 2,454.00                | 32.81                     | 75.786            |         |                    |           |
| 10,600.00                                                              | 7,496.64              | 6,407.34              | 6,042.36              | 60.93            | 16.12         | 21.96                | 1,132.61                            | 166.53       | 2,565.84               | 2,532.26                | 33.57                     | 76.427            |         |                    |           |
| 10,700.00                                                              | 7,495.89              | 6,423.00              | 6,042.88              | 62.64            | 16.51         | 22.48                | 1,136.26                            | 181.75       | 2,646.21               | 2,611.92                | 34.29                     | 77.164            |         |                    |           |
| 10,800.00                                                              | 7,495.13              | 6,423.00              | 6,042.88              | 64.36            | 16.51         | 22.48                | 1,136.26                            | 181.75       | 2,727.78               | 2,693.23                | 34.55                     | 78.955            |         |                    |           |
| 10,900.00                                                              | 7,494.37              | 6,423.00              | 6,042.88              | 66.09            | 16.51         | 22.48                | 1,136.26                            | 181.75       | 2,810.54               | 2,775.76                | 34.78                     | 80.807            |         |                    |           |
| 11,000.00                                                              | 7,493.62              | 6,423.00              | 6,042.88              | 67.82            | 16.51         | 22.48                | 1,136.26                            | 181.75       | 2,894.39               | 2,859.40                | 34.99                     | 82.714            |         |                    |           |
| 11,100.00                                                              | 7,492.86              | 6,437.60              | 6,043.07              | 69.55            | 16.87         | 22.97                | 1,139.58                            | 195.96       | 2,979.02               | 2,943.41                | 35.61                     | 83.653            |         |                    |           |
| 11,200.00                                                              | 7,492.10              | 6,441.45              | 6,043.06              | 71.29            | 16.97         | 23.10                | 1,140.42                            | 199.72       | 3,064.66               | 3,028.76                | 35.90                     | 85.358            |         |                    |           |
| 11,300.00                                                              | 7,491.34              | 6,455.00              | 6,042.81              | 73.04            | 17.31         | 23.54                | 1,143.27                            | 212.96       | 3,151.21               | 3,114.74                | 36.47                     | 86.407            |         |                    |           |
| 11,400.00                                                              | 7,490.59              | 6,455.00              | 6,042.81              | 74.79            | 17.31         | 23.54                | 1,143.27                            | 212.96       | 3,238.37               | 3,201.74                | 36.62                     | 88.430            |         |                    |           |
| 11,500.00                                                              | 7,489.83              | 6,455.00              | 6,042.81              | 76.54            | 17.31         | 23.54                | 1,143.27                            | 212.96       | 3,326.24               | 3,289.48                | 36.76                     | 90.484            |         |                    |           |
| 11,600.00                                                              | 7,489.07              | 6,465.64              | 6,042.48              | 78.29            | 17.57         | 23.88                | 1,145.46                            | 223.37       | 3,414.78               | 3,377.57                | 37.21                     | 91.770            |         |                    |           |
| 11,700.00                                                              | 7,488.31              | 6,487.00              | 6,041.78              | 80.05            | 18.11         | 24.56                | 1,149.93                            | 244.25       | 3,503.77               | 3,465.79                | 37.98                     | 92.250            |         |                    |           |
| 11,800.00                                                              | 7,487.56              | 6,487.00              | 6,041.78              | 81.81            | 18.11         | 24.56                | 1,149.93                            | 244.25       | 3,593.31               | 3,555.21                | 38.09                     | 94.329            |         |                    |           |
| 11,900.00                                                              | 7,486.80              | 6,503.14              | 6,041.26              | 83.58            | 18.51         | 25.07                | 1,153.23                            | 260.03       | 3,683.26               | 3,644.56                | 38.70                     | 95.178            |         |                    |           |
| 12,000.00                                                              | 7,486.04              | 6,518.00              | 6,040.85              | 85.35            | 18.89         | 25.54                | 1,156.08                            | 274.62       | 3,773.77               | 3,734.51                | 39.26                     | 96.117            |         |                    |           |
| 12,100.00                                                              | 7,485.28              | 6,518.00              | 6,040.85              | 87.12            | 18.89         | 25.54                | 1,156.08                            | 274.62       | 3,864.65               | 3,825.30                | 39.35                     | 98.202            |         |                    |           |
| 12,200.00                                                              | 7,484.53              | 6,518.00              | 6,040.85              | 88.89            | 18.89         | 25.54                | 1,156.08                            | 274.62       | 3,955.97               | 3,916.53                | 39.44                     | 100.302           |         |                    |           |
| 12,300.00                                                              | 7,483.77              | 6,518.00              | 6,040.85              | 90.66            | 18.89         | 25.54                | 1,156.08                            | 274.62       | 4,047.70               | 4,008.17                | 39.52                     | 102.416           |         |                    |           |
| 12,400.00                                                              | 7,483.01              | 6,533.06              | 6,040.55              | 92.44            | 19.27         | 26.01                | 1,158.79                            | 289.43       | 4,139.72               | 4,099.64                | 40.08                     | 103.287           |         |                    |           |
| 12,500.00                                                              | 7,482.25              | 6,539.01              | 6,040.47              | 94.21            | 19.42         | 26.20                | 1,159.81                            | 295.29       | 4,232.11               | 4,191.77                | 40.34                     | 104.902           |         |                    |           |
| 12,600.00                                                              | 7,481.50              | 6,550.00              | 6,040.39              | 95.99            | 19.70         | 26.54                | 1,161.62                            | 306.13       | 4,324.83               | 4,284.06                | 40.77                     | 106.087           |         |                    |           |

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



# TDS

## Anticollision Report



Company: COG Operating LLC  
 Project: Eddy County, NM (NAD-27 2015)  
 Reference Site: Craig Federal Com #2H  
 Site Error: 0.00 usft  
 Reference Well: Craig Federal Com #2H  
 Well Error: 0.00 usft  
 Reference Wellbore: Craig Federal Com #2H  
 Reference Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
 TVD Reference: KB @ 3394.80usft (Latshaw 44)  
 MD Reference: KB @ 3394.80usft (Latshaw 44)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Output errors are at: 2.00 sigma  
 Database: EDM 5000.1 Single User Db  
 Offset TVD Reference: Offset Datum

| Offset Design Eddy County Offset Wells - Craig State Com #1H - OH - OH |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Site Error: | 0.00 usft |
|------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|--------------------|-----------|
| Survey Program: 100-Scientific Gyro. 5548-MWD                          |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Offset Well Error: | 0.00 usft |
| Reference                                                              |                       | Offset                |                       | Semi Major Axis  |               |                       | Distance                            |              |                        |                         |                           |                   | Warning            |           |
| Measured Depth (usft)                                                  | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor |                    |           |
| 12,700.00                                                              | 7,480.74              | 6,582.00              | 6,040.26              | 97.77            | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,417.78               | 4,375.90                | 41.88                     | 105.496           |                    |           |
| 12,800.00                                                              | 7,479.98              | 6,582.00              | 6,040.26              | 99.56            | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,510.95               | 4,469.01                | 41.94                     | 107.560           |                    |           |
| 12,900.00                                                              | 7,479.22              | 6,582.00              | 6,040.26              | 101.34           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,604.40               | 4,562.40                | 42.00                     | 109.632           |                    |           |
| 13,000.00                                                              | 7,478.47              | 6,582.00              | 6,040.26              | 103.13           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,698.12               | 4,656.06                | 42.06                     | 111.710           |                    |           |
| 13,100.00                                                              | 7,477.71              | 6,582.00              | 6,040.26              | 104.91           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,792.09               | 4,749.98                | 42.11                     | 113.795           |                    |           |
| 13,200.00                                                              | 7,476.95              | 6,582.00              | 6,040.26              | 106.70           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,886.31               | 4,844.14                | 42.17                     | 115.885           |                    |           |
| 13,300.00                                                              | 7,476.19              | 6,582.00              | 6,040.26              | 108.49           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 4,980.75               | 4,938.53                | 42.22                     | 117.980           |                    |           |
| 13,400.00                                                              | 7,475.44              | 6,582.00              | 6,040.26              | 110.28           | 20.52         | 27.54                 | 1,166.94                            | 337.68       | 5,075.40               | 5,033.13                | 42.27                     | 120.079           |                    |           |
| 13,500.00                                                              | 7,474.68              | 6,609.26              | 6,040.19              | 112.07           | 21.22         | 28.37                 | 1,171.24                            | 364.60       | 5,169.84               | 5,126.62                | 43.22                     | 119.609           |                    |           |
| 13,600.00                                                              | 7,473.92              | 6,611.93              | 6,040.19              | 113.87           | 21.29         | 28.45                 | 1,171.62                            | 367.24       | 5,264.80               | 5,221.44                | 43.36                     | 121.423           |                    |           |
| 13,700.00                                                              | 7,473.16              | 6,614.51              | 6,040.19              | 115.66           | 21.36         | 28.53                 | 1,171.99                            | 369.80       | 5,359.94               | 5,316.44                | 43.49                     | 123.240           |                    |           |
| 13,800.00                                                              | 7,472.41              | 6,617.01              | 6,040.19              | 117.45           | 21.42         | 28.61                 | 1,172.33                            | 372.28       | 5,455.24               | 5,411.62                | 43.62                     | 125.060           |                    |           |
| 13,900.00                                                              | 7,471.65              | 6,619.44              | 6,040.18              | 119.25           | 21.49         | 28.68                 | 1,172.66                            | 374.68       | 5,550.70               | 5,506.95                | 43.75                     | 126.883           |                    |           |
| 14,000.00                                                              | 7,470.89              | 6,647.00              | 6,040.21              | 121.05           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 5,646.66               | 5,601.94                | 44.72                     | 126.270           |                    |           |
| 14,100.00                                                              | 7,470.13              | 6,647.00              | 6,040.21              | 122.84           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 5,742.36               | 5,697.60                | 44.76                     | 128.288           |                    |           |
| 14,200.00                                                              | 7,469.38              | 6,647.00              | 6,040.21              | 124.64           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 5,838.20               | 5,793.40                | 44.80                     | 130.308           |                    |           |
| 14,300.00                                                              | 7,468.62              | 6,647.00              | 6,040.21              | 126.44           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 5,934.18               | 5,889.33                | 44.84                     | 132.328           |                    |           |
| 14,400.00                                                              | 7,467.86              | 6,647.00              | 6,040.21              | 128.24           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,030.28               | 5,985.40                | 44.89                     | 134.349           |                    |           |
| 14,500.00                                                              | 7,467.10              | 6,647.00              | 6,040.21              | 130.04           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,126.51               | 6,081.59                | 44.93                     | 136.369           |                    |           |
| 14,600.00                                                              | 7,466.35              | 6,647.00              | 6,040.21              | 131.84           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,222.87               | 6,177.90                | 44.97                     | 138.390           |                    |           |
| 14,700.00                                                              | 7,465.59              | 6,647.00              | 6,040.21              | 133.65           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,319.33               | 6,274.32                | 45.01                     | 140.409           |                    |           |
| 14,800.00                                                              | 7,464.83              | 6,647.00              | 6,040.21              | 135.45           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,415.90               | 6,370.86                | 45.05                     | 142.428           |                    |           |
| 14,900.00                                                              | 7,464.07              | 6,647.00              | 6,040.21              | 137.25           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,512.58               | 6,467.49                | 45.09                     | 144.446           |                    |           |
| 15,000.00                                                              | 7,463.32              | 6,647.00              | 6,040.21              | 139.05           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,609.35               | 6,564.23                | 45.13                     | 146.463           |                    |           |
| 15,100.00                                                              | 7,462.56              | 6,647.00              | 6,040.21              | 140.86           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,706.22               | 6,661.06                | 45.17                     | 148.478           |                    |           |
| 15,200.00                                                              | 7,461.80              | 6,647.00              | 6,040.21              | 142.66           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,803.18               | 6,757.98                | 45.21                     | 150.491           |                    |           |
| 15,300.00                                                              | 7,461.04              | 6,647.00              | 6,040.21              | 144.47           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,900.23               | 6,854.98                | 45.25                     | 152.503           |                    |           |
| 15,400.00                                                              | 7,460.29              | 6,647.00              | 6,040.21              | 146.27           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 6,997.36               | 6,952.07                | 45.29                     | 154.512           |                    |           |
| 15,500.00                                                              | 7,459.53              | 6,647.00              | 6,040.21              | 148.08           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 7,094.57               | 7,049.24                | 45.33                     | 156.519           |                    |           |
| 15,600.00                                                              | 7,458.77              | 6,647.00              | 6,040.21              | 149.89           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 7,191.86               | 7,146.49                | 45.37                     | 158.524           |                    |           |
| 15,700.00                                                              | 7,458.01              | 6,647.00              | 6,040.21              | 151.69           | 22.20         | 29.51                 | 1,176.01                            | 402.04       | 7,289.22               | 7,243.81                | 45.41                     | 160.526           |                    |           |
| 15,800.00                                                              | 7,457.26              | 6,674.38              | 6,040.38              | 153.50           | 22.91         | 30.33                 | 1,178.88                            | 429.26       | 7,386.54               | 7,340.16                | 46.38                     | 159.258           |                    |           |
| 15,900.00                                                              | 7,456.50              | 6,679.71              | 6,040.44              | 155.31           | 23.05         | 30.49                 | 1,179.42                            | 434.56       | 7,483.99               | 7,437.39                | 46.60                     | 160.589           |                    |           |
| 16,000.00                                                              | 7,455.74              | 6,684.93              | 6,040.51              | 157.12           | 23.19         | 30.64                 | 1,179.95                            | 439.76       | 7,581.50               | 7,534.68                | 46.82                     | 161.919           |                    |           |
| 16,100.00                                                              | 7,454.98              | 6,690.05              | 6,040.58              | 158.93           | 23.32         | 30.79                 | 1,180.46                            | 444.86       | 7,679.07               | 7,632.03                | 47.04                     | 163.249           |                    |           |
| 16,200.00                                                              | 7,454.23              | 6,695.08              | 6,040.66              | 160.74           | 23.45         | 30.94                 | 1,180.95                            | 449.86       | 7,776.69               | 7,729.44                | 47.25                     | 164.579           |                    |           |
| 16,300.00                                                              | 7,453.47              | 6,700.01              | 6,040.74              | 162.54           | 23.58         | 31.09                 | 1,181.43                            | 454.76       | 7,874.37               | 7,826.91                | 47.46                     | 165.908           |                    |           |
| 16,400.00                                                              | 7,452.71              | 6,704.84              | 6,040.83              | 164.35           | 23.71         | 31.23                 | 1,181.89                            | 459.57       | 7,972.09               | 7,924.42                | 47.67                     | 167.236           |                    |           |
| 16,500.00                                                              | 7,451.95              | 6,709.59              | 6,040.92              | 166.16           | 23.83         | 31.37                 | 1,182.35                            | 464.30       | 8,069.87               | 8,022.00                | 47.87                     | 168.564           |                    |           |
| 16,600.00                                                              | 7,451.20              | 6,714.25              | 6,041.02              | 167.97           | 23.95         | 31.50                 | 1,182.79                            | 468.94       | 8,167.69               | 8,119.62                | 48.08                     | 169.891           |                    |           |
| 16,700.00                                                              | 7,450.44              | 6,742.00              | 6,041.74              | 169.79           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,265.64               | 8,216.56                | 49.08                     | 168.414           |                    |           |
| 16,800.00                                                              | 7,449.68              | 6,742.00              | 6,041.74              | 171.60           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,363.52               | 8,314.40                | 49.12                     | 170.267           |                    |           |
| 16,900.00                                                              | 7,448.92              | 6,742.00              | 6,041.74              | 173.41           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,461.46               | 8,412.30                | 49.16                     | 172.116           |                    |           |
| 17,000.00                                                              | 7,448.17              | 6,742.00              | 6,041.74              | 175.22           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,559.45               | 8,510.24                | 49.20                     | 173.963           |                    |           |
| 17,100.00                                                              | 7,447.41              | 6,742.00              | 6,041.74              | 177.03           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,657.48               | 8,608.23                | 49.24                     | 175.805           |                    |           |
| 17,200.00                                                              | 7,446.65              | 6,742.00              | 6,041.74              | 178.84           | 24.68         | 32.31                 | 1,185.31                            | 496.56       | 8,755.55               | 8,706.27                | 49.29                     | 177.644           |                    |           |
| 17,300.00                                                              | 7,445.89              | 6,748.66              | 6,041.94              | 180.66           | 24.85         | 32.50                 | 1,185.89                            | 503.19       | 8,853.67               | 8,804.11                | 49.56                     | 178.640           |                    |           |
| 17,400.00                                                              | 7,445.14              | 6,759.11              | 6,042.28              | 182.47           | 25.12         | 32.80                 | 1,186.81                            | 513.60       | 8,951.82               | 8,901.85                | 49.97                     | 179.147           |                    |           |
| 17,500.00                                                              | 7,444.38              | 6,769.51              | 6,042.63              | 184.28           | 25.40         | 33.10                 | 1,187.72                            | 523.95       | 9,049.99               | 8,999.62                | 50.38                     | 179.650           |                    |           |
| 17,600.00                                                              | 7,443.62              | 6,779.85              | 6,043.00              | 186.09           | 25.67         | 33.39                 | 1,188.62                            | 534.24       | 9,148.20               | 9,097.41                | 50.78                     | 180.149           |                    |           |
| 17,700.00                                                              | 7,442.86              | 6,790.13              | 6,043.40              | 187.91           | 25.94         | 33.68                 | 1,189.51                            | 544.48       | 9,246.43               | 9,195.24                | 51.19                     | 180.643           |                    |           |
| 17,800.00                                                              | 7,442.11              | 6,878.29              | 6,047.33              | 189.72           | 28.26         | 36.11                 | 1,197.43                            | 632.19       | 9,344.68               | 9,290.29                | 54.38                     | 171.826           |                    |           |

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



**TDS**  
Anticollision Report



**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Reference Site:** Craig Federal Com #2H  
**Site Error:** 0.00 usft  
**Reference Well:** Craig Federal Com #2H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Craig Federal Com #2H  
**Reference Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at:** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Offset Datum

| Offset Design         |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | Eddy County Offset Wells - Craig State Com #1H - OH - OH |         | Offset Site Error: |  | 0.00 usft |  |
|-----------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|-------------------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|----------------------------------------------------------|---------|--------------------|--|-----------|--|
| Survey Program:       |                       |                       |                       |                  |               |                       |                                     |              |                        |                         |                           |                   | 100-Scientific Gyro, 5548-MWD                            |         | Offset Well Error: |  | 0.00 usft |  |
| Reference             |                       | Offset                |                       | Semi Major Axis  |               |                       | Distance                            |              |                        |                         |                           |                   |                                                          | Warning |                    |  |           |  |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (usft) | +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor |                                                          |         |                    |  |           |  |
| 17,900.00             | 7,441.35              | 6,889.01              | 6,047.81              | 191.54           | 28.54         | 36.40                 | 1,198.45                            | 642.85       | 9,442.88               | 9,388.06                | 54.82                     | 172.264           |                                                          |         |                    |  |           |  |
| 18,000.00             | 7,440.59              | 6,899.83              | 6,048.25              | 193.35           | 28.82         | 36.69                 | 1,199.47                            | 653.62       | 9,541.10               | 9,485.85                | 55.25                     | 172.681           |                                                          |         |                    |  |           |  |
| 18,100.00             | 7,439.83              | 6,902.00              | 6,048.34              | 195.16           | 28.88         | 36.74                 | 1,199.68                            | 655.78       | 9,639.35               | 9,583.98                | 55.37                     | 174.080           |                                                          |         |                    |  |           |  |
| 18,200.00             | 7,439.08              | 6,902.00              | 6,048.34              | 196.98           | 28.88         | 36.74                 | 1,199.68                            | 655.78       | 9,737.64               | 9,682.23                | 55.41                     | 175.724           |                                                          |         |                    |  |           |  |
| 18,300.00             | 7,438.32              | 6,902.00              | 6,048.34              | 198.79           | 28.88         | 36.74                 | 1,199.68                            | 655.78       | 9,835.97               | 9,780.51                | 55.46                     | 177.365           |                                                          |         |                    |  |           |  |
| 18,400.00             | 7,437.56              | 6,902.00              | 6,048.34              | 200.61           | 28.88         | 36.74                 | 1,199.68                            | 655.78       | 9,934.32               | 9,878.83                | 55.50                     | 179.003           |                                                          |         |                    |  |           |  |



TDS  
Anticollision Report



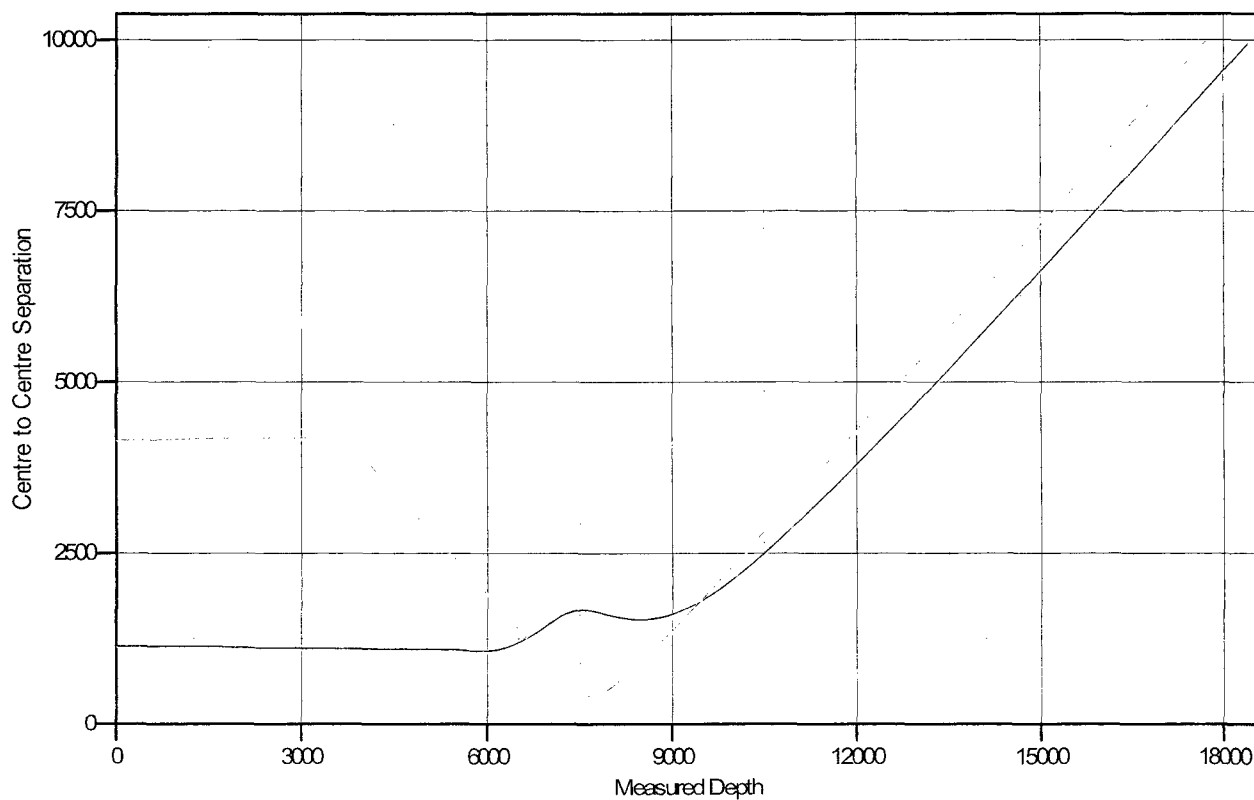
**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Reference Site:** Craig Federal Com #2H  
**Site Error:** 0.00 usft  
**Reference Well:** Craig Federal Com #2H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Craig Federal Com #2H  
**Reference Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at:** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Offset Datum

Reference Depths are relative to KB @ 3394.80usft (Latshaw 44)  
Offset Depths are relative to Offset Datum  
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Craig Federal Com #2H  
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30  
Grid Convergence at Surface is: 0.04°

## Ladder Plot



### LEGEND

✱ Craig State Com #1H, OH, OHV0

✱ BodaciousBSM Federal #1H, OH, OHV0



TDS  
Anticollision Report



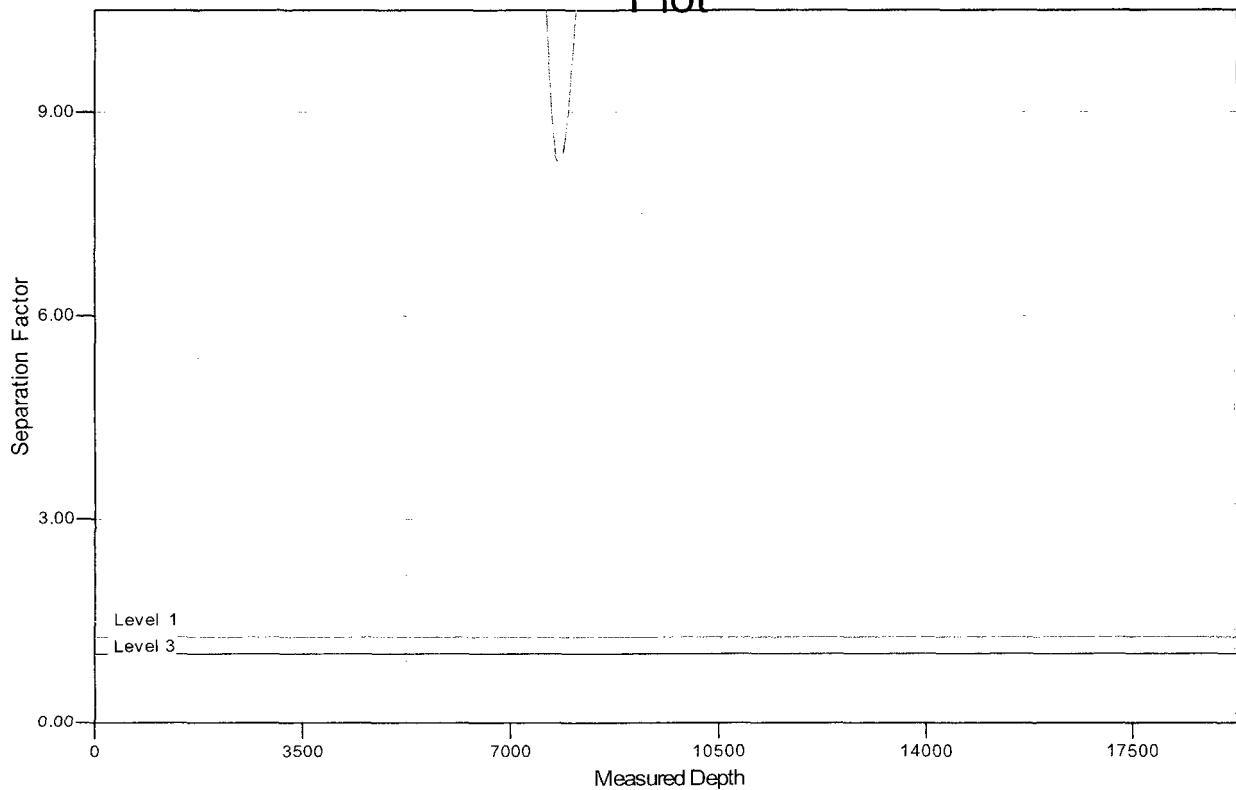
Company: COG Operating LLC  
Project: Eddy County, NM (NAD-27 2015)  
Reference Site: Craig Federal Com #2H  
Site Error: 0.00 usft  
Reference Well: Craig Federal Com #2H  
Well Error: 0.00 usft  
Reference Wellbore: Craig Federal Com #2H  
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Local Co-ordinate Reference: Well Craig Federal Com #2H  
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MD Reference: KB @ 3394.80usft (Latshaw 44)  
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Output errors are at: 2.00 sigma  
Database: EDM 5000.1 Single User Db  
Offset TVD Reference: Offset Datum

Reference Depths are relative to KB @ 3394.80usft (Latshaw 44)  
Offset Depths are relative to Offset Datum  
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Craig Federal Com #2H  
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30  
Grid Convergence at Surface is: 0.04°

## Separation Factor Plot



### LEGEND

✱ Craig State Com #1H, OH, OHV0

✱ BodaciousBSM Federal #1H, OH, OHV0



# **COG Operating LLC**

Eddy County, NM (NAD-27 2015)

Craig Federal Com #2H

Craig Federal Com #2H

Craig Federal Com #2H

Plan: Design #2

## **Standard Planning Report**

05 January, 2017





# TDS Planning Report



**Database:** EDM 5000.1 Single User Db  
**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Site:** Craig Federal Com #2H  
**Well:** Craig Federal Com #2H  
**Wellbore:** Craig Federal Com #2H  
**Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Eddy County, NM (NAD-27 2015)        |                      |                |
| <b>Map System:</b> | US State Plane 1927 (Exact solution) | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | NAD 1927 (NADCON CONUS)              |                      |                |
| <b>Map Zone:</b>   | New Mexico East 3001                 |                      |                |

**Site** Craig Federal Com #2H

**Site Position:** **From:** Map **Northing:** 391,758.00 usft **Latitude:** 32° 4' 37.317 N  
**Easting:** 525,106.20 usft **Longitude:** 104° 15' 8.195 W  
**Position Uncertainty:** 0.00 usft **Slot Radius:** 13.20 in **Grid Convergence:** 0.04 °

**Well** Craig Federal Com #2H

**Well Position** **+N/-S** 0.00 usft **Northing:** 391,758.00 usft **Latitude:** 32° 4' 37.317 N  
**+E/-W** 0.00 usft **Easting:** 525,106.20 usft **Longitude:** 104° 15' 8.195 W  
**Position Uncertainty** 0.00 usft **Wellhead Elevation:** 0.00 usft **Ground Level:** 3,369.80 usft

**Wellbore** Craig Federal Com #2H

| Magnetics | Model Name | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|-----------|------------|-------------|--------------------|------------------|------------------------|
|           | IGRF2015   | 12/21/2016  | 7.31               | 59.82            | 47,827                 |

**Design** Design #2

**Audit Notes:**

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

| Vertical Section: | Depth From (TVD)<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Direction<br>(°) |
|-------------------|----------------------------|-----------------|-----------------|------------------|
|                   | 0.00                       | 0.00            | 0.00            | 358.48           |

**Plan Sections**

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) | TFO<br>(°) | Target           |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|------------------------------|-----------------------------|------------|------------------|
| 0.00                        | 0.00               | 0.00           | 0.00                        | 0.00            | 0.00            | 0.00                          | 0.00                         | 0.00                        | 0.00       |                  |
| 7,040.55                    | 0.00               | 0.00           | 7,040.55                    | 0.00            | 0.00            | 0.00                          | 0.00                         | 0.00                        | 0.00       |                  |
| 7,794.13                    | 90.43              | 331.00         | 7,518.00                    | 420.73          | -233.22         | 12.00                         | 12.00                        | 0.00                        | 331.00     |                  |
| 8,536.25                    | 90.43              | 0.69           | 7,512.28                    | 1,132.27        | -412.70         | 4.00                          | 0.00                         | 4.00                        | 89.88      |                  |
| 18,474.08                   | 90.43              | 0.69           | 7,437.00                    | 11,069.10       | -293.80         | 0.00                          | 0.00                         | 0.00                        | 0.00       | PBHL (CFC#2H/L1) |



TDS  
Planning Report



Database: EDM 5000.1 Single User Db  
Company: COG Operating LLC  
Project: Eddy County, NM (NAD-27 2015)  
Site: Craig Federal Com #2H  
Well: Craig Federal Com #2H  
Wellbore: Craig Federal Com #2H  
Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
TVD Reference: KB @ 3394.80usft (Latshaw 44)  
MD Reference: KB @ 3394.80usft (Latshaw 44)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

Planned Survey

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





# TDS Planning Report



Database: EDM 5000.1 Single User Db  
Company: COG Operating LLC  
Project: Eddy County, NM (NAD-27 2015)  
Site: Craig Federal Com #2H  
Well: Craig Federal Com #2H  
Wellbore: Craig Federal Com #2H  
Design: Design #2

Local Co-ordinate Reference: Well Craig Federal Com #2H  
TVD Reference: KB @ 3394.80usft (Latshaw 44)  
MD Reference: KB @ 3394.80usft (Latshaw 44)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

## Planned Survey

| Measured<br>Depth<br>(usft)     | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|---------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 5,400.00                        | 0.00               | 0.00           | 5,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 5,500.00                        | 0.00               | 0.00           | 5,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 5,600.00                        | 0.00               | 0.00           | 5,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 5,700.00                        | 0.00               | 0.00           | 5,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 5,800.00                        | 0.00               | 0.00           | 5,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 5,900.00                        | 0.00               | 0.00           | 5,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,000.00                        | 0.00               | 0.00           | 6,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,100.00                        | 0.00               | 0.00           | 6,100.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,200.00                        | 0.00               | 0.00           | 6,200.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,300.00                        | 0.00               | 0.00           | 6,300.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,400.00                        | 0.00               | 0.00           | 6,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,500.00                        | 0.00               | 0.00           | 6,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,600.00                        | 0.00               | 0.00           | 6,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,700.00                        | 0.00               | 0.00           | 6,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,800.00                        | 0.00               | 0.00           | 6,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 6,900.00                        | 0.00               | 0.00           | 6,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 7,000.00                        | 0.00               | 0.00           | 7,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 7,040.55                        | 0.00               | 0.00           | 7,040.55                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| <b>Start Build 12.00</b>        |                    |                |                             |                 |                 |                               |                               |                              |                             |
| 7,050.00                        | 1.13               | 331.00         | 7,050.00                    | 0.08            | -0.05           | 0.08                          | 12.00                         | 12.00                        | 0.00                        |
| 7,075.00                        | 4.13               | 331.00         | 7,074.97                    | 1.09            | -0.60           | 1.10                          | 12.00                         | 12.00                        | 0.00                        |
| 7,100.00                        | 7.13               | 331.00         | 7,099.85                    | 3.23            | -1.79           | 3.28                          | 12.00                         | 12.00                        | 0.00                        |
| 7,125.00                        | 10.13              | 331.00         | 7,124.56                    | 6.52            | -3.61           | 6.61                          | 12.00                         | 12.00                        | 0.00                        |
| 7,150.00                        | 13.13              | 331.00         | 7,149.04                    | 10.92           | -6.06           | 11.08                         | 12.00                         | 12.00                        | 0.00                        |
| 7,175.00                        | 16.13              | 331.00         | 7,173.23                    | 16.45           | -9.12           | 16.68                         | 12.00                         | 12.00                        | 0.00                        |
| 7,200.00                        | 19.13              | 331.00         | 7,197.05                    | 23.07           | -12.79          | 23.40                         | 12.00                         | 12.00                        | 0.00                        |
| 7,225.00                        | 22.13              | 331.00         | 7,220.45                    | 30.77           | -17.06          | 31.22                         | 12.00                         | 12.00                        | 0.00                        |
| 7,250.00                        | 25.13              | 331.00         | 7,243.35                    | 39.54           | -21.92          | 40.11                         | 12.00                         | 12.00                        | 0.00                        |
| 7,275.00                        | 28.13              | 331.00         | 7,265.69                    | 49.34           | -27.35          | 50.05                         | 12.00                         | 12.00                        | 0.00                        |
| 7,300.00                        | 31.13              | 331.00         | 7,287.42                    | 60.15           | -33.34          | 61.01                         | 12.00                         | 12.00                        | 0.00                        |
| 7,325.00                        | 34.13              | 331.00         | 7,308.47                    | 71.94           | -39.88          | 72.97                         | 12.00                         | 12.00                        | 0.00                        |
| 7,350.00                        | 37.13              | 331.00         | 7,328.79                    | 84.68           | -46.94          | 85.89                         | 12.00                         | 12.00                        | 0.00                        |
| 7,375.00                        | 40.13              | 331.00         | 7,348.31                    | 98.33           | -54.50          | 99.74                         | 12.00                         | 12.00                        | 0.00                        |
| 7,400.00                        | 43.13              | 331.00         | 7,367.00                    | 112.85          | -62.56          | 114.47                        | 12.00                         | 12.00                        | 0.00                        |
| 7,425.00                        | 46.13              | 331.00         | 7,384.78                    | 128.21          | -71.07          | 130.05                        | 12.00                         | 12.00                        | 0.00                        |
| 7,450.00                        | 49.13              | 331.00         | 7,401.63                    | 144.37          | -80.02          | 146.44                        | 12.00                         | 12.00                        | 0.00                        |
| 7,475.00                        | 52.13              | 331.00         | 7,417.48                    | 161.27          | -89.39          | 163.59                        | 12.00                         | 12.00                        | 0.00                        |
| 7,500.00                        | 55.13              | 331.00         | 7,432.31                    | 178.88          | -99.15          | 181.44                        | 12.00                         | 12.00                        | 0.00                        |
| 7,525.00                        | 58.13              | 331.00         | 7,446.05                    | 197.13          | -109.27         | 199.96                        | 12.00                         | 12.00                        | 0.00                        |
| 7,550.00                        | 61.13              | 331.00         | 7,458.69                    | 216.00          | -119.73         | 219.10                        | 12.00                         | 12.00                        | 0.00                        |
| 7,575.00                        | 64.13              | 331.00         | 7,470.18                    | 235.41          | -130.49         | 238.79                        | 12.00                         | 12.00                        | 0.00                        |
| 7,600.00                        | 67.13              | 331.00         | 7,480.49                    | 255.33          | -141.53         | 259.00                        | 12.00                         | 12.00                        | 0.00                        |
| 7,625.00                        | 70.13              | 331.00         | 7,489.60                    | 275.69          | -152.82         | 279.65                        | 12.00                         | 12.00                        | 0.00                        |
| 7,650.00                        | 73.13              | 331.00         | 7,497.48                    | 296.44          | -164.32         | 300.70                        | 12.00                         | 12.00                        | 0.00                        |
| 7,675.00                        | 76.13              | 331.00         | 7,504.10                    | 317.52          | -176.01         | 322.08                        | 12.00                         | 12.00                        | 0.00                        |
| 7,700.00                        | 79.13              | 331.00         | 7,509.45                    | 338.88          | -187.84         | 343.74                        | 12.00                         | 12.00                        | 0.00                        |
| 7,725.00                        | 82.13              | 331.00         | 7,513.52                    | 360.45          | -199.80         | 365.62                        | 12.00                         | 12.00                        | 0.00                        |
| 7,750.00                        | 85.13              | 331.00         | 7,516.29                    | 382.18          | -211.84         | 387.66                        | 12.00                         | 12.00                        | 0.00                        |
| 7,775.00                        | 88.13              | 331.00         | 7,517.76                    | 404.00          | -223.94         | 409.80                        | 12.00                         | 12.00                        | 0.00                        |
| 7,794.13                        | 90.43              | 331.00         | 7,518.00                    | 420.73          | -233.22         | 426.77                        | 12.00                         | 12.00                        | 0.00                        |
| <b>Start DLS 4.00 TFO 89.88</b> |                    |                |                             |                 |                 |                               |                               |                              |                             |
| 7,800.00                        | 90.43              | 331.23         | 7,517.96                    | 425.87          | -236.05         | 431.98                        | 4.00                          | 0.01                         | 4.00                        |
| 7,900.00                        | 90.44              | 335.23         | 7,517.20                    | 515.14          | -281.07         | 522.41                        | 4.00                          | 0.01                         | 4.00                        |



# TDS Planning Report



**Database:** EDM 5000.1 Single User Db  
**Company:** COG Operating LLC  
**Project:** Eddy County, NM (NAD-27 2015)  
**Site:** Craig Federal Com #2H  
**Well:** Craig Federal Com #2H  
**Wellbore:** Craig Federal Com #2H  
**Design:** Design #2

**Local Co-ordinate Reference:** Well Craig Federal Com #2H  
**TVD Reference:** KB @ 3394.80usft (Latshaw 44)  
**MD Reference:** KB @ 3394.80usft (Latshaw 44)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature

## Planned Survey

| Measured<br>Depth<br>(usft)             | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 8,000.00                                | 90.44              | 339.23         | 7,516.43                    | 607.32          | -319.76         | 615.59                        | 4.00                          | 0.01                         | 4.00                        |
| 8,100.00                                | 90.45              | 343.24         | 7,515.65                    | 701.99          | -351.92         | 711.08                        | 4.00                          | 0.00                         | 4.00                        |
| 8,200.00                                | 90.45              | 347.24         | 7,514.87                    | 798.66          | -377.40         | 808.39                        | 4.00                          | 0.00                         | 4.00                        |
| 8,300.00                                | 90.45              | 351.24         | 7,514.10                    | 896.88          | -396.07         | 907.07                        | 4.00                          | 0.00                         | 4.00                        |
| 8,400.00                                | 90.44              | 355.24         | 7,513.32                    | 996.16          | -407.85         | 1,006.63                      | 4.00                          | 0.00                         | 4.00                        |
| 8,500.00                                | 90.44              | 359.24         | 7,512.55                    | 1,096.02        | -412.67         | 1,106.58                      | 4.00                          | -0.01                        | 4.00                        |
| 8,536.25                                | 90.43              | 0.69           | 7,512.28                    | 1,132.27        | -412.70         | 1,142.82                      | 4.00                          | -0.01                        | 4.00                        |
| <b>Start 9937.83 hold at 8536.25 MD</b> |                    |                |                             |                 |                 |                               |                               |                              |                             |
| 8,600.00                                | 90.43              | 0.69           | 7,511.79                    | 1,196.01        | -411.94         | 1,206.52                      | 0.00                          | 0.00                         | 0.00                        |
| 8,700.00                                | 90.43              | 0.69           | 7,511.04                    | 1,296.00        | -410.74         | 1,306.44                      | 0.00                          | 0.00                         | 0.00                        |
| 8,800.00                                | 90.43              | 0.69           | 7,510.28                    | 1,395.99        | -409.54         | 1,406.37                      | 0.00                          | 0.00                         | 0.00                        |
| 8,900.00                                | 90.43              | 0.69           | 7,509.52                    | 1,495.98        | -408.35         | 1,506.29                      | 0.00                          | 0.00                         | 0.00                        |
| 9,000.00                                | 90.43              | 0.69           | 7,508.76                    | 1,595.97        | -407.15         | 1,606.21                      | 0.00                          | 0.00                         | 0.00                        |
| 9,100.00                                | 90.43              | 0.69           | 7,508.01                    | 1,695.96        | -405.95         | 1,706.14                      | 0.00                          | 0.00                         | 0.00                        |
| 9,200.00                                | 90.43              | 0.69           | 7,507.25                    | 1,795.95        | -404.76         | 1,806.06                      | 0.00                          | 0.00                         | 0.00                        |
| 9,300.00                                | 90.43              | 0.69           | 7,506.49                    | 1,895.94        | -403.56         | 1,905.98                      | 0.00                          | 0.00                         | 0.00                        |
| 9,400.00                                | 90.43              | 0.69           | 7,505.73                    | 1,995.93        | -402.36         | 2,005.91                      | 0.00                          | 0.00                         | 0.00                        |
| 9,500.00                                | 90.43              | 0.69           | 7,504.98                    | 2,095.92        | -401.17         | 2,105.83                      | 0.00                          | 0.00                         | 0.00                        |
| 9,600.00                                | 90.43              | 0.69           | 7,504.22                    | 2,195.91        | -399.97         | 2,205.75                      | 0.00                          | 0.00                         | 0.00                        |
| 9,700.00                                | 90.43              | 0.69           | 7,503.46                    | 2,295.90        | -398.77         | 2,305.67                      | 0.00                          | 0.00                         | 0.00                        |
| 9,800.00                                | 90.43              | 0.69           | 7,502.70                    | 2,395.89        | -397.58         | 2,405.60                      | 0.00                          | 0.00                         | 0.00                        |
| 9,900.00                                | 90.43              | 0.69           | 7,501.95                    | 2,495.88        | -396.38         | 2,505.52                      | 0.00                          | 0.00                         | 0.00                        |
| 10,000.00                               | 90.43              | 0.69           | 7,501.19                    | 2,595.87        | -395.19         | 2,605.44                      | 0.00                          | 0.00                         | 0.00                        |
| 10,100.00                               | 90.43              | 0.69           | 7,500.43                    | 2,695.86        | -393.99         | 2,705.37                      | 0.00                          | 0.00                         | 0.00                        |
| 10,200.00                               | 90.43              | 0.69           | 7,499.67                    | 2,795.85        | -392.79         | 2,805.29                      | 0.00                          | 0.00                         | 0.00                        |
| 10,300.00                               | 90.43              | 0.69           | 7,498.92                    | 2,895.84        | -391.60         | 2,905.21                      | 0.00                          | 0.00                         | 0.00                        |
| 10,400.00                               | 90.43              | 0.69           | 7,498.16                    | 2,995.83        | -390.40         | 3,005.14                      | 0.00                          | 0.00                         | 0.00                        |
| 10,500.00                               | 90.43              | 0.69           | 7,497.40                    | 3,095.82        | -389.20         | 3,105.06                      | 0.00                          | 0.00                         | 0.00                        |
| 10,600.00                               | 90.43              | 0.69           | 7,496.64                    | 3,195.81        | -388.01         | 3,204.98                      | 0.00                          | 0.00                         | 0.00                        |
| 10,700.00                               | 90.43              | 0.69           | 7,495.89                    | 3,295.80        | -386.81         | 3,304.90                      | 0.00                          | 0.00                         | 0.00                        |
| 10,800.00                               | 90.43              | 0.69           | 7,495.13                    | 3,395.79        | -385.61         | 3,404.83                      | 0.00                          | 0.00                         | 0.00                        |
| 10,900.00                               | 90.43              | 0.69           | 7,494.37                    | 3,495.78        | -384.42         | 3,504.75                      | 0.00                          | 0.00                         | 0.00                        |
| 11,000.00                               | 90.43              | 0.69           | 7,493.62                    | 3,595.77        | -383.22         | 3,604.67                      | 0.00                          | 0.00                         | 0.00                        |
| 11,100.00                               | 90.43              | 0.69           | 7,492.86                    | 3,695.76        | -382.02         | 3,704.60                      | 0.00                          | 0.00                         | 0.00                        |
| 11,200.00                               | 90.43              | 0.69           | 7,492.10                    | 3,795.75        | -380.83         | 3,804.52                      | 0.00                          | 0.00                         | 0.00                        |
| 11,300.00                               | 90.43              | 0.69           | 7,491.34                    | 3,895.74        | -379.63         | 3,904.44                      | 0.00                          | 0.00                         | 0.00                        |
| 11,400.00                               | 90.43              | 0.69           | 7,490.59                    | 3,995.73        | -378.44         | 4,004.37                      | 0.00                          | 0.00                         | 0.00                        |
| 11,500.00                               | 90.43              | 0.69           | 7,489.83                    | 4,095.72        | -377.24         | 4,104.29                      | 0.00                          | 0.00                         | 0.00                        |
| 11,600.00                               | 90.43              | 0.69           | 7,489.07                    | 4,195.71        | -376.04         | 4,204.21                      | 0.00                          | 0.00                         | 0.00                        |
| 11,700.00                               | 90.43              | 0.69           | 7,488.31                    | 4,295.70        | -374.85         | 4,304.14                      | 0.00                          | 0.00                         | 0.00                        |
| 11,800.00                               | 90.43              | 0.69           | 7,487.56                    | 4,395.69        | -373.65         | 4,404.06                      | 0.00                          | 0.00                         | 0.00                        |
| 11,900.00                               | 90.43              | 0.69           | 7,486.80                    | 4,495.68        | -372.45         | 4,503.98                      | 0.00                          | 0.00                         | 0.00                        |
| 12,000.00                               | 90.43              | 0.69           | 7,486.04                    | 4,595.67        | -371.26         | 4,603.90                      | 0.00                          | 0.00                         | 0.00                        |
| 12,100.00                               | 90.43              | 0.69           | 7,485.28                    | 4,695.66        | -370.06         | 4,703.83                      | 0.00                          | 0.00                         | 0.00                        |
| 12,200.00                               | 90.43              | 0.69           | 7,484.53                    | 4,795.65        | -368.86         | 4,803.75                      | 0.00                          | 0.00                         | 0.00                        |
| 12,300.00                               | 90.43              | 0.69           | 7,483.77                    | 4,895.64        | -367.67         | 4,903.67                      | 0.00                          | 0.00                         | 0.00                        |
| 12,400.00                               | 90.43              | 0.69           | 7,483.01                    | 4,995.63        | -366.47         | 5,003.60                      | 0.00                          | 0.00                         | 0.00                        |
| 12,500.00                               | 90.43              | 0.69           | 7,482.25                    | 5,095.62        | -365.27         | 5,103.52                      | 0.00                          | 0.00                         | 0.00                        |
| 12,600.00                               | 90.43              | 0.69           | 7,481.50                    | 5,195.61        | -364.08         | 5,203.44                      | 0.00                          | 0.00                         | 0.00                        |
| 12,700.00                               | 90.43              | 0.69           | 7,480.74                    | 5,295.60        | -362.88         | 5,303.37                      | 0.00                          | 0.00                         | 0.00                        |
| 12,800.00                               | 90.43              | 0.69           | 7,479.98                    | 5,395.59        | -361.69         | 5,403.29                      | 0.00                          | 0.00                         | 0.00                        |
| 12,900.00                               | 90.43              | 0.69           | 7,479.22                    | 5,495.58        | -360.49         | 5,503.21                      | 0.00                          | 0.00                         | 0.00                        |
| 13,000.00                               | 90.43              | 0.69           | 7,478.47                    | 5,595.57        | -359.29         | 5,603.13                      | 0.00                          | 0.00                         | 0.00                        |
| 13,100.00                               | 90.43              | 0.69           | 7,477.71                    | 5,695.56        | -358.10         | 5,703.06                      | 0.00                          | 0.00                         | 0.00                        |



**TDS**  
Planning Report



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**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature

**Planned Survey**

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 13,200.00                   | 90.43              | 0.69           | 7,476.95                    | 5,795.55        | -356.90         | 5,802.98                      | 0.00                          | 0.00                         | 0.00                        |
| 13,300.00                   | 90.43              | 0.69           | 7,476.19                    | 5,895.54        | -355.70         | 5,902.90                      | 0.00                          | 0.00                         | 0.00                        |
| 13,400.00                   | 90.43              | 0.69           | 7,475.44                    | 5,995.53        | -354.51         | 6,002.83                      | 0.00                          | 0.00                         | 0.00                        |
| 13,500.00                   | 90.43              | 0.69           | 7,474.68                    | 6,095.52        | -353.31         | 6,102.75                      | 0.00                          | 0.00                         | 0.00                        |
| 13,600.00                   | 90.43              | 0.69           | 7,473.92                    | 6,195.51        | -352.11         | 6,202.67                      | 0.00                          | 0.00                         | 0.00                        |
| 13,700.00                   | 90.43              | 0.69           | 7,473.16                    | 6,295.50        | -350.92         | 6,302.60                      | 0.00                          | 0.00                         | 0.00                        |
| 13,800.00                   | 90.43              | 0.69           | 7,472.41                    | 6,395.49        | -349.72         | 6,402.52                      | 0.00                          | 0.00                         | 0.00                        |
| 13,900.00                   | 90.43              | 0.69           | 7,471.65                    | 6,495.48        | -348.53         | 6,502.44                      | 0.00                          | 0.00                         | 0.00                        |
| 14,000.00                   | 90.43              | 0.69           | 7,470.89                    | 6,595.47        | -347.33         | 6,602.36                      | 0.00                          | 0.00                         | 0.00                        |
| 14,100.00                   | 90.43              | 0.69           | 7,470.13                    | 6,695.46        | -346.13         | 6,702.29                      | 0.00                          | 0.00                         | 0.00                        |
| 14,200.00                   | 90.43              | 0.69           | 7,469.38                    | 6,795.45        | -344.94         | 6,802.21                      | 0.00                          | 0.00                         | 0.00                        |
| 14,300.00                   | 90.43              | 0.69           | 7,468.62                    | 6,895.44        | -343.74         | 6,902.13                      | 0.00                          | 0.00                         | 0.00                        |
| 14,400.00                   | 90.43              | 0.69           | 7,467.86                    | 6,995.43        | -342.54         | 7,002.06                      | 0.00                          | 0.00                         | 0.00                        |
| 14,500.00                   | 90.43              | 0.69           | 7,467.10                    | 7,095.42        | -341.35         | 7,101.98                      | 0.00                          | 0.00                         | 0.00                        |
| 14,600.00                   | 90.43              | 0.69           | 7,466.35                    | 7,195.41        | -340.15         | 7,201.90                      | 0.00                          | 0.00                         | 0.00                        |
| 14,700.00                   | 90.43              | 0.69           | 7,465.59                    | 7,295.40        | -338.95         | 7,301.83                      | 0.00                          | 0.00                         | 0.00                        |
| 14,800.00                   | 90.43              | 0.69           | 7,464.83                    | 7,395.39        | -337.76         | 7,401.75                      | 0.00                          | 0.00                         | 0.00                        |
| 14,900.00                   | 90.43              | 0.69           | 7,464.07                    | 7,495.38        | -336.56         | 7,501.67                      | 0.00                          | 0.00                         | 0.00                        |
| 15,000.00                   | 90.43              | 0.69           | 7,463.32                    | 7,595.37        | -335.36         | 7,601.60                      | 0.00                          | 0.00                         | 0.00                        |
| 15,100.00                   | 90.43              | 0.69           | 7,462.56                    | 7,695.36        | -334.17         | 7,701.52                      | 0.00                          | 0.00                         | 0.00                        |
| 15,200.00                   | 90.43              | 0.69           | 7,461.80                    | 7,795.35        | -332.97         | 7,801.44                      | 0.00                          | 0.00                         | 0.00                        |
| 15,300.00                   | 90.43              | 0.69           | 7,461.04                    | 7,895.34        | -331.78         | 7,901.36                      | 0.00                          | 0.00                         | 0.00                        |
| 15,400.00                   | 90.43              | 0.69           | 7,460.29                    | 7,995.33        | -330.58         | 8,001.29                      | 0.00                          | 0.00                         | 0.00                        |
| 15,500.00                   | 90.43              | 0.69           | 7,459.53                    | 8,095.32        | -329.38         | 8,101.21                      | 0.00                          | 0.00                         | 0.00                        |
| 15,600.00                   | 90.43              | 0.69           | 7,458.77                    | 8,195.31        | -328.19         | 8,201.13                      | 0.00                          | 0.00                         | 0.00                        |
| 15,700.00                   | 90.43              | 0.69           | 7,458.01                    | 8,295.30        | -326.99         | 8,301.06                      | 0.00                          | 0.00                         | 0.00                        |
| 15,800.00                   | 90.43              | 0.69           | 7,457.26                    | 8,395.29        | -325.79         | 8,400.98                      | 0.00                          | 0.00                         | 0.00                        |
| 15,900.00                   | 90.43              | 0.69           | 7,456.50                    | 8,495.28        | -324.60         | 8,500.90                      | 0.00                          | 0.00                         | 0.00                        |
| 16,000.00                   | 90.43              | 0.69           | 7,455.74                    | 8,595.27        | -323.40         | 8,600.83                      | 0.00                          | 0.00                         | 0.00                        |
| 16,100.00                   | 90.43              | 0.69           | 7,454.98                    | 8,695.26        | -322.20         | 8,700.75                      | 0.00                          | 0.00                         | 0.00                        |
| 16,200.00                   | 90.43              | 0.69           | 7,454.23                    | 8,795.25        | -321.01         | 8,800.67                      | 0.00                          | 0.00                         | 0.00                        |
| 16,300.00                   | 90.43              | 0.69           | 7,453.47                    | 8,895.24        | -319.81         | 8,900.59                      | 0.00                          | 0.00                         | 0.00                        |
| 16,400.00                   | 90.43              | 0.69           | 7,452.71                    | 8,995.23        | -318.61         | 9,000.52                      | 0.00                          | 0.00                         | 0.00                        |
| 16,500.00                   | 90.43              | 0.69           | 7,451.95                    | 9,095.22        | -317.42         | 9,100.44                      | 0.00                          | 0.00                         | 0.00                        |
| 16,600.00                   | 90.43              | 0.69           | 7,451.20                    | 9,195.21        | -316.22         | 9,200.36                      | 0.00                          | 0.00                         | 0.00                        |
| 16,700.00                   | 90.43              | 0.69           | 7,450.44                    | 9,295.20        | -315.03         | 9,300.29                      | 0.00                          | 0.00                         | 0.00                        |
| 16,800.00                   | 90.43              | 0.69           | 7,449.68                    | 9,395.19        | -313.83         | 9,400.21                      | 0.00                          | 0.00                         | 0.00                        |
| 16,900.00                   | 90.43              | 0.69           | 7,448.92                    | 9,495.18        | -312.63         | 9,500.13                      | 0.00                          | 0.00                         | 0.00                        |
| 17,000.00                   | 90.43              | 0.69           | 7,448.17                    | 9,595.17        | -311.44         | 9,600.06                      | 0.00                          | 0.00                         | 0.00                        |
| 17,100.00                   | 90.43              | 0.69           | 7,447.41                    | 9,695.16        | -310.24         | 9,699.98                      | 0.00                          | 0.00                         | 0.00                        |
| 17,200.00                   | 90.43              | 0.69           | 7,446.65                    | 9,795.15        | -309.04         | 9,799.90                      | 0.00                          | 0.00                         | 0.00                        |
| 17,300.00                   | 90.43              | 0.69           | 7,445.89                    | 9,895.14        | -307.85         | 9,899.82                      | 0.00                          | 0.00                         | 0.00                        |
| 17,400.00                   | 90.43              | 0.69           | 7,445.14                    | 9,995.13        | -306.65         | 9,999.75                      | 0.00                          | 0.00                         | 0.00                        |
| 17,500.00                   | 90.43              | 0.69           | 7,444.38                    | 10,095.12       | -305.45         | 10,099.67                     | 0.00                          | 0.00                         | 0.00                        |
| 17,600.00                   | 90.43              | 0.69           | 7,443.62                    | 10,195.11       | -304.26         | 10,199.59                     | 0.00                          | 0.00                         | 0.00                        |
| 17,700.00                   | 90.43              | 0.69           | 7,442.86                    | 10,295.10       | -303.06         | 10,299.52                     | 0.00                          | 0.00                         | 0.00                        |
| 17,800.00                   | 90.43              | 0.69           | 7,442.11                    | 10,395.09       | -301.86         | 10,399.44                     | 0.00                          | 0.00                         | 0.00                        |
| 17,900.00                   | 90.43              | 0.69           | 7,441.35                    | 10,495.08       | -300.67         | 10,499.36                     | 0.00                          | 0.00                         | 0.00                        |
| 18,000.00                   | 90.43              | 0.69           | 7,440.59                    | 10,595.07       | -299.47         | 10,599.29                     | 0.00                          | 0.00                         | 0.00                        |
| 18,100.00                   | 90.43              | 0.69           | 7,439.83                    | 10,695.06       | -298.28         | 10,699.21                     | 0.00                          | 0.00                         | 0.00                        |
| 18,200.00                   | 90.43              | 0.69           | 7,439.08                    | 10,795.05       | -297.08         | 10,799.13                     | 0.00                          | 0.00                         | 0.00                        |
| 18,300.00                   | 90.43              | 0.69           | 7,438.32                    | 10,895.04       | -295.88         | 10,899.05                     | 0.00                          | 0.00                         | 0.00                        |
| 18,400.00                   | 90.43              | 0.69           | 7,437.56                    | 10,995.03       | -294.69         | 10,998.98                     | 0.00                          | 0.00                         | 0.00                        |
| 18,474.08                   | 90.43              | 0.69           | 7,437.00                    | 11,069.10       | -293.80         | 11,073.00                     | 0.00                          | 0.00                         | 0.00                        |



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Planning Report



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**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature

**Planned Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|

TD at 18474.08

**Design Targets**

**Target Name**

| - hit/miss target<br>- Shape                                                                                                                                      | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude        | Longitude         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-----------------|-------------------|
| KOP-D2 (CFC#2H/L1)<br>- plan hits target center<br>- Point                                                                                                        | 0.00          | 0.00         | 7,040.55   | 0.00         | 0.00         | 391,758.00      | 525,106.20     | 32° 4' 37.317 N | 104° 15' 8.195 W  |
| PBHL (CFC#2H/L1)<br>- plan hits target center<br>- Point                                                                                                          | 0.00          | 0.00         | 7,437.00   | 11,069.10    | -293.80      | 402,827.10      | 524,812.40     | 32° 6' 26.865 N | 104° 15' 11.514 W |
| LTP (CFC#2H/L1)<br>- plan misses target center by 0.59usft at 18344.00usft MD (7437.99 TVD, 10939.04 N, -295.36 E)<br>- Rectangle (sides W100.00 H9,935.96 D0.00) | -0.45         | 0.69         | 7,437.99   | 10,939.03    | -294.77      | 402,697.03      | 524,811.43     | 32° 6' 25.578 N | 104° 15' 11.527 W |
| END TURN-D2 (CFC#2H/L1)<br>- plan hits target center<br>- Point                                                                                                   | 0.00          | 0.00         | 7,512.28   | 1,132.27     | -412.70      | 392,890.27      | 524,693.50     | 32° 4' 48.525 N | 104° 15' 12.982 W |
| FTP (CFC#2H/L1)<br>- plan misses target center by 6.42usft at 8407.50usft MD (7513.26 TVD, 1003.64 N, -408.45 E)<br>- Point                                       | 0.00          | 0.00         | 7,513.26   | 1,003.33     | -414.87      | 392,761.33      | 524,691.33     | 32° 4' 47.249 N | 104° 15' 13.008 W |
| EOC/TURN-D2 (CFC#2H/L1)<br>- plan hits target center<br>- Point                                                                                                   | 0.00          | 0.00         | 7,518.00   | 420.73       | -233.22      | 392,178.73      | 524,872.99     | 32° 4' 41.482 N | 104° 15' 10.902 W |

**Plan Annotations**

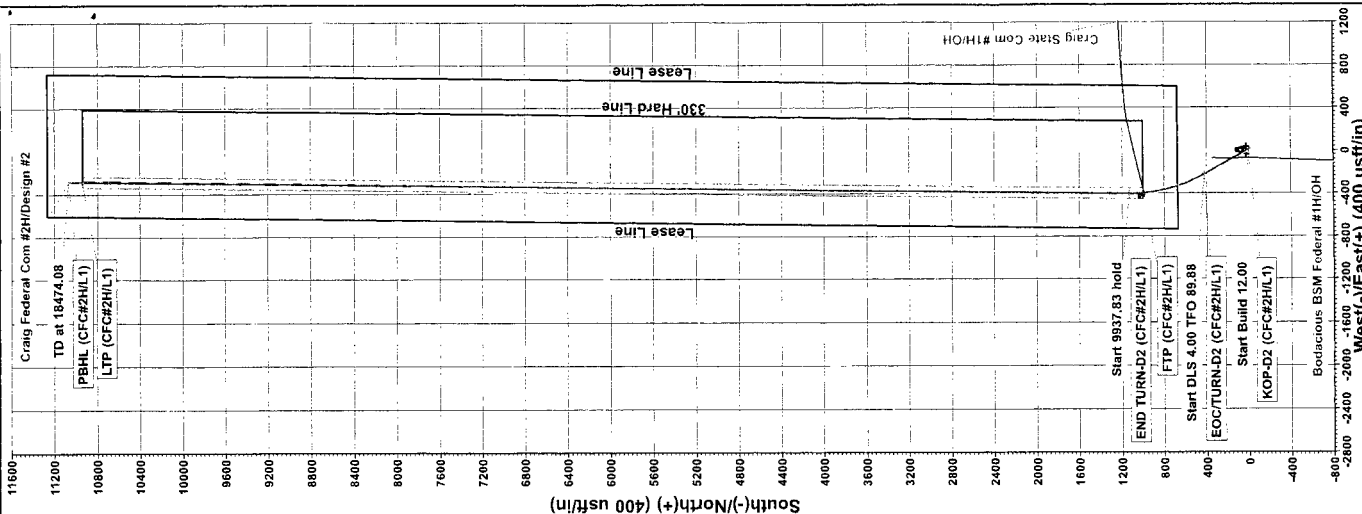
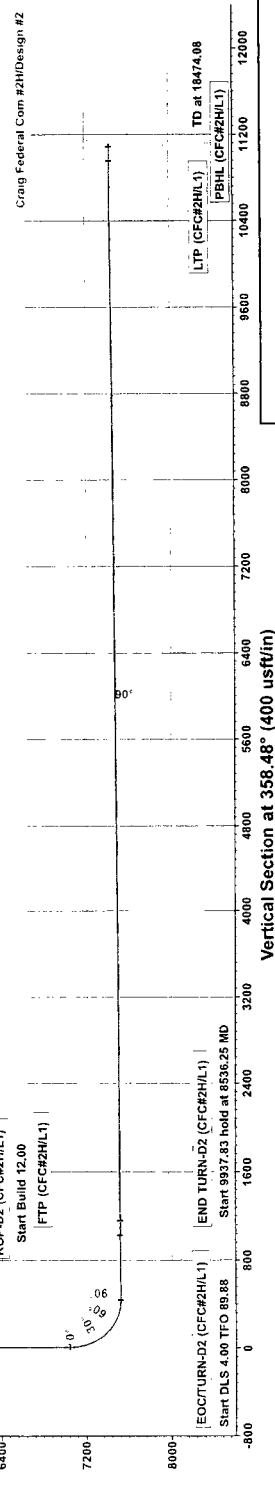
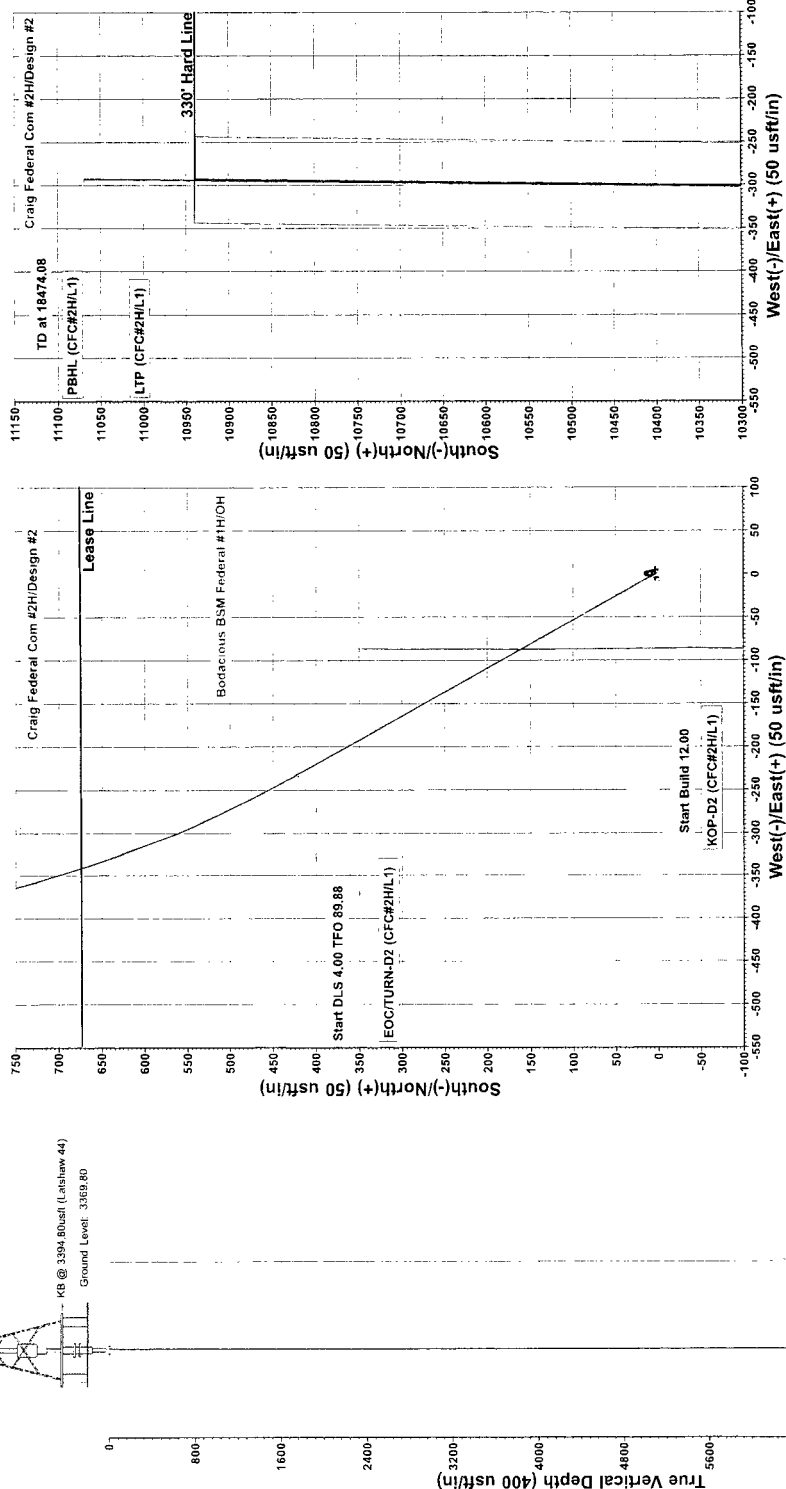
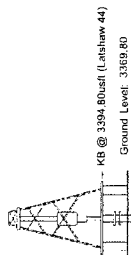
| Measured Depth (usft) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Comment                          |
|-----------------------|-----------------------|--------------|--------------|----------------------------------|
| 7,040.55              | 7,040.55              | 0.00         | 0.00         | Start Build 12.00                |
| 7,794.13              | 7,518.00              | 420.73       | -233.22      | Start DLS 4.00 TFO 89.88         |
| 8,536.25              | 7,512.28              | 1,132.27     | -412.70      | Start 9937.83 hold at 8536.25 MD |
| 18,474.08             | 7,437.00              | 11,069.10    | -293.80      | TD at 18474.08                   |



Project: Eddy County, NM (NAD-27 2015)  
Site: Craig Federal Com #2H  
Well: Craig Federal Com #2H  
Wellbore: Craig Federal Com #2H  
Plan: Design #2 (Craig Federal Com #2H/Craig Federal Com #2H)

#### Section Details

| Sec | MD       | Inc   | Azi    | +N-S    | TVD      | +E-W    | Dleg  | TFace  | VSect    |
|-----|----------|-------|--------|---------|----------|---------|-------|--------|----------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00    | 0.00     | 0.00    | 0.00  | 0.00   | 0.00     |
| 2   | 7040.55  | 0.00  | 0.00   | 0.00    | 7040.55  | 0.00    | 0.00  | 0.00   | 0.00     |
| 3   | 7794.13  | 90.43 | 331.00 | 420.73  | 7518.00  | 233.22  | 12.00 | 331.00 | 428.77   |
| 4   | 8536.25  | 90.43 | 0.69   | 7512.28 | 1132.27  | -412.70 | 4.00  | 89.88  | 1142.82  |
| 5   | 18474.08 | 90.43 | 0.69   | 7437.00 | 11069.10 | -293.80 | 0.00  | 0.00   | 11073.00 |



Ground Elevation: 3369.80  
RKB Elevation: KB @ 3394.80usft (Latshaw 44)  
Rig Name: Latshaw 44  
Northing: 391758.00  
Easting: 525106.20  
Latitude: 32° 4' 37.317 N  
Longitude: 104° 15' 8.195 W

Terra Directional Services  
3705 South County Road 1210, Midland, TX 79706  
(432) 618-1210



PROJECT DETAILS: Eddy County, NM (NAD-27 2015)  
Geoid System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: New Mexico East 3001  
System Datum: Mean Sea Level  
Local North: Grid



Midwest Hose  
& Specialty, Inc.

### Certificate of Conformity

Customer: LATSHAW DRILLING

Customer P.O.# RIG#44

Sales Order # 242739

Date Assembled: 2/9/2015

### Specifications

Hose Assembly Type: Choke & Kill

Assembly Serial # 292614-1

Hose Lot # and Date Code 10900-08/13

Hose Working Pressure (psi) 10000

Test Pressure (psi) 15000

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

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

Oklahoma City, OK 73129

Comments:

Approved By

Date

2/10/2015



Midwest Hose  
& Specialty, Inc.

### Certificate of Conformity

Customer: LATSHAW DRILLING

Customer P.O.# RIG#44

Sales Order # 242739

Date Assembled: 2/9/2015

### Specifications

Hose Assembly Type: Choke & Kill

Assembly Serial # 292614-2

Hose Lot # and Date Code 11794-10/14

Hose Working Pressure (psi) 10000

Test Pressure (psi) 15000

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

Supplier:

Midwest Hose & Specialty, Inc.

3312 S I-35 Service Rd

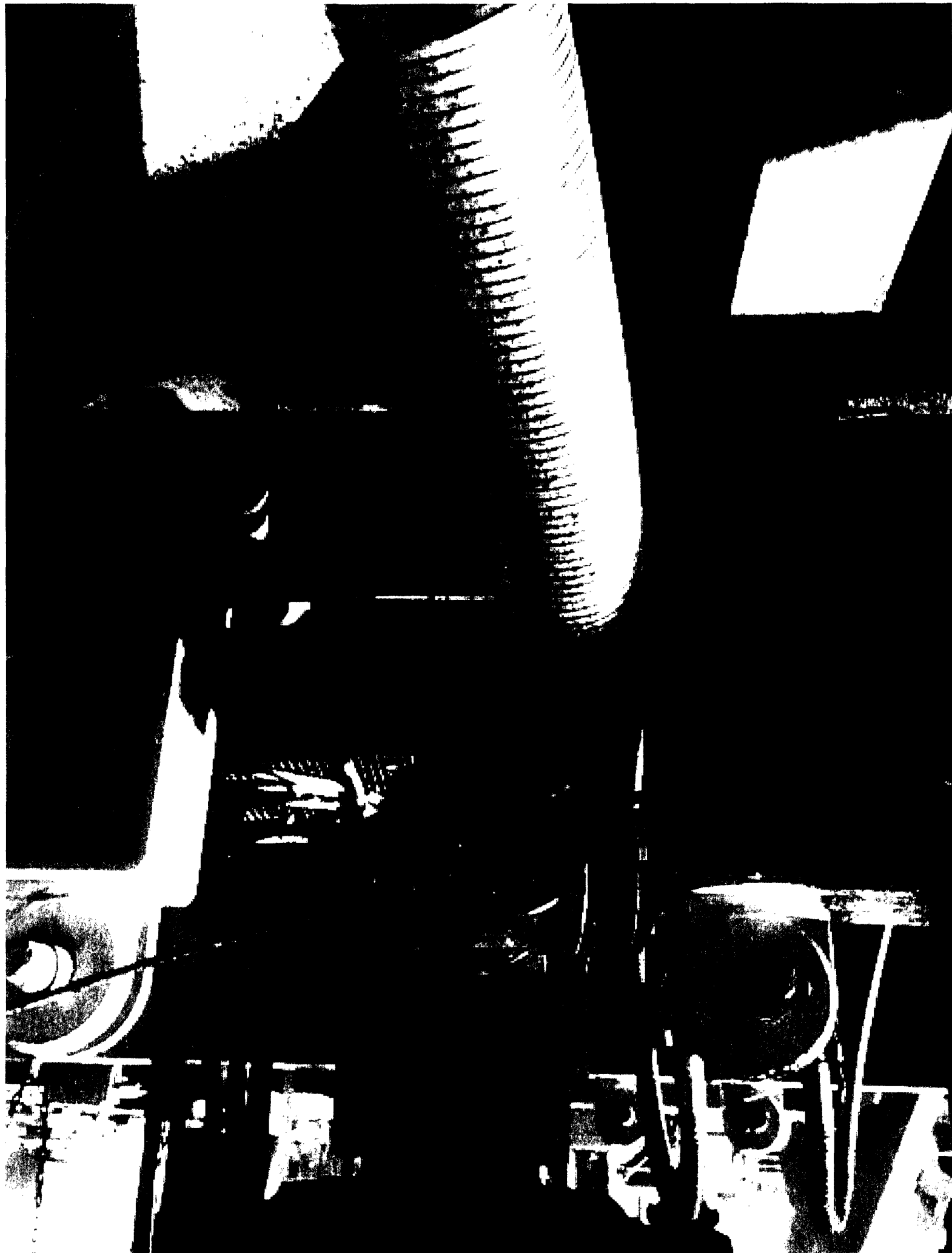
Oklahoma City, OK 73129

Comments:

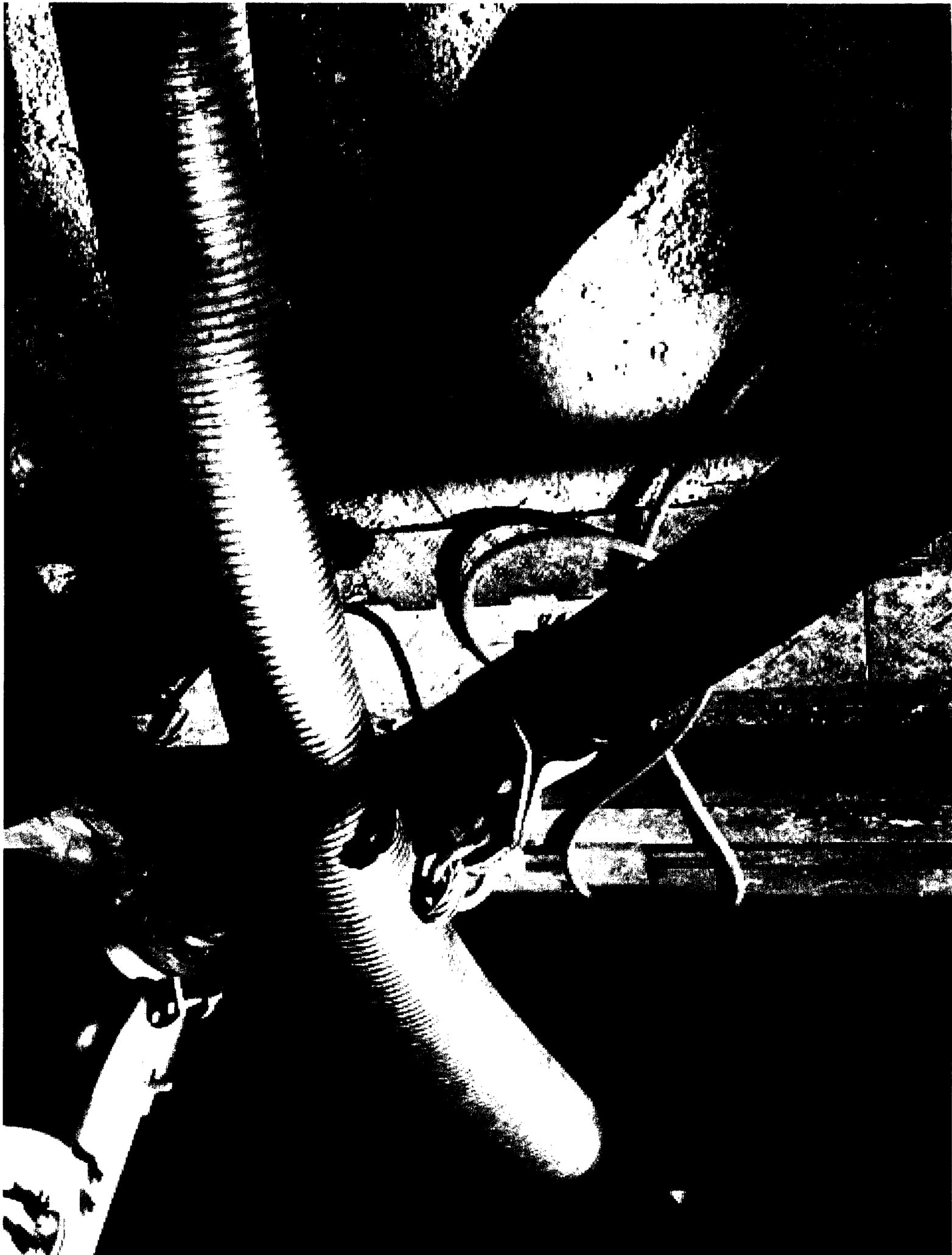
Approved By

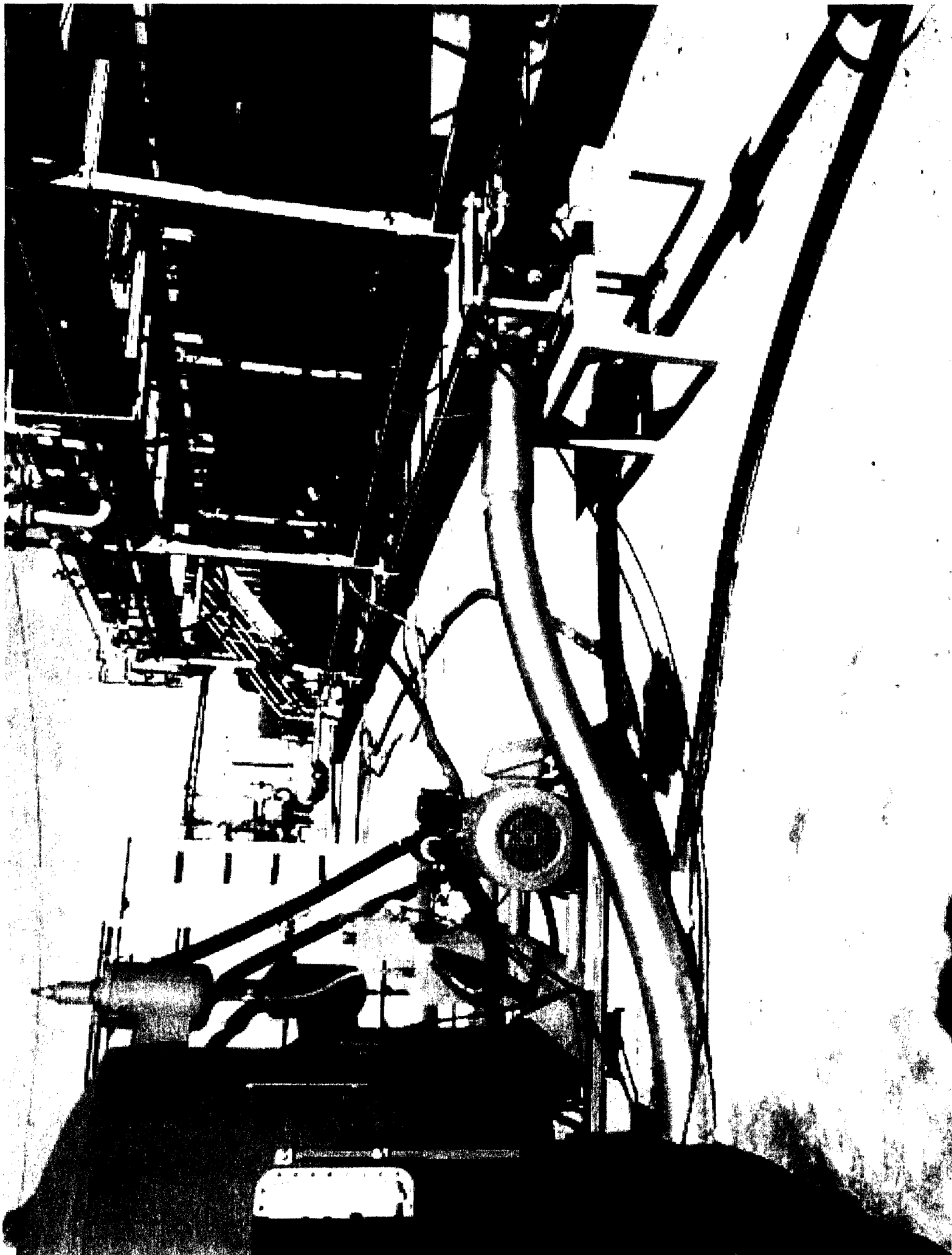
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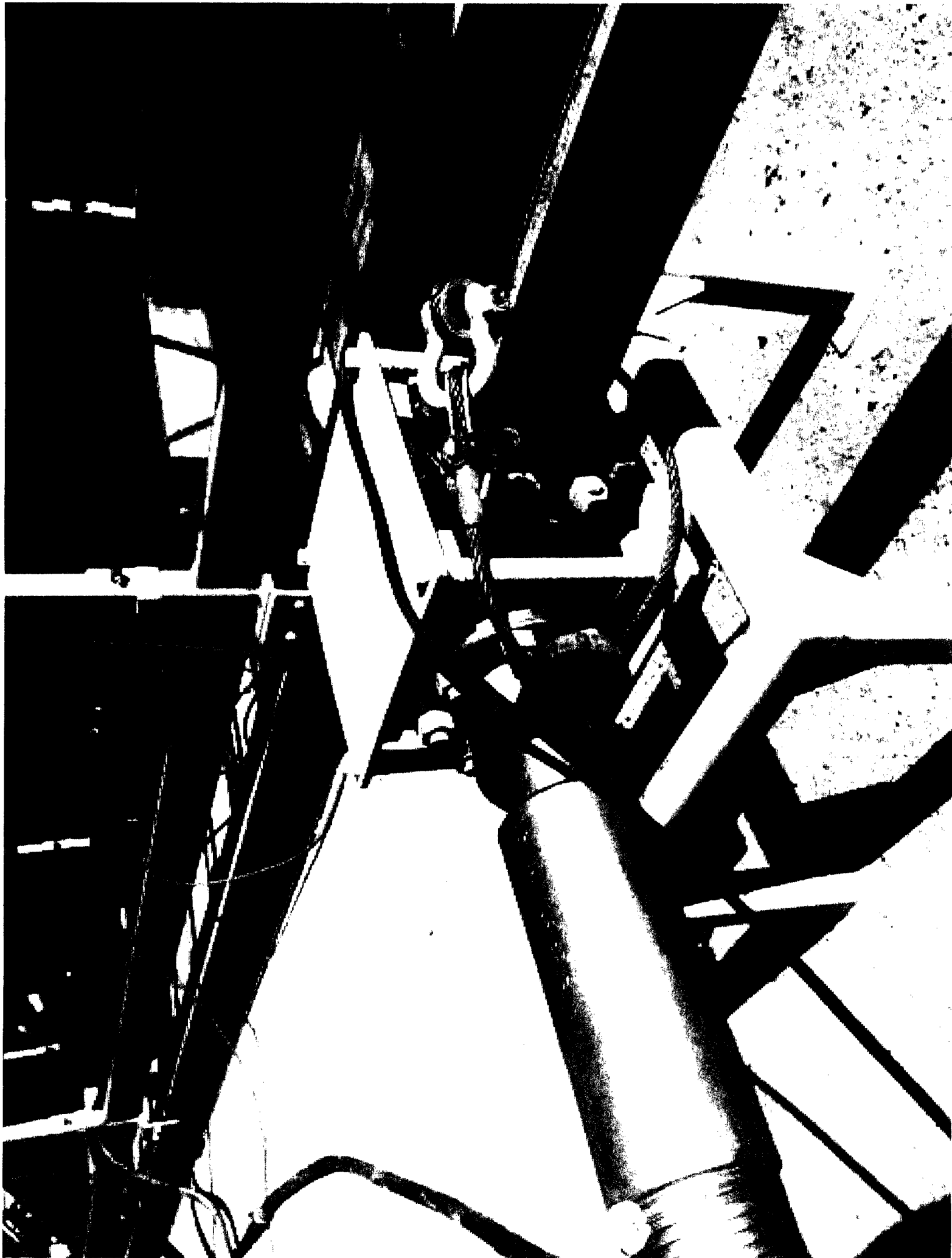
2/10/2015

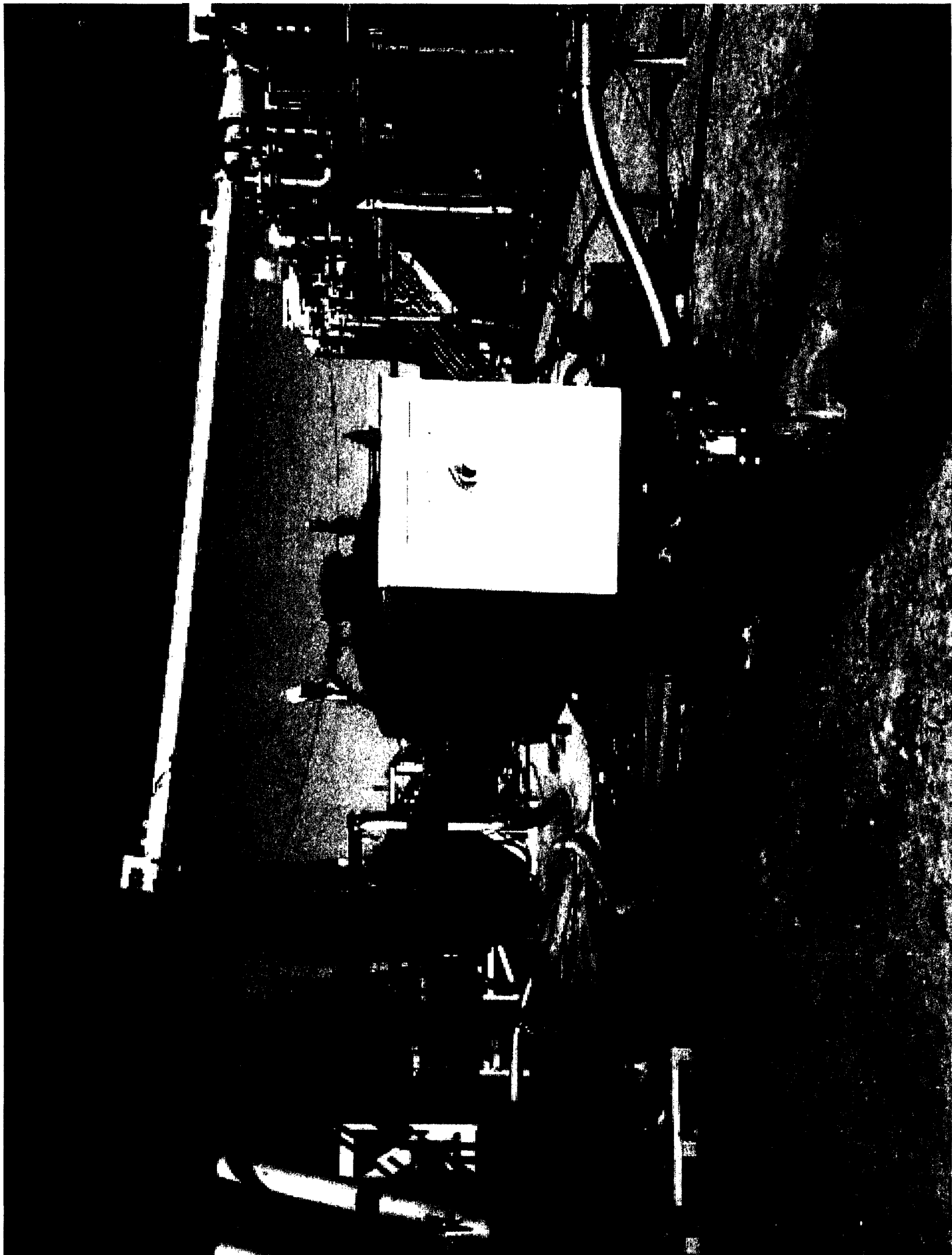












**APD ID:** 10400010034**Submission Date:** 01/12/2017**Operator Name:** COG OPERATING LLC**Well Name:** CRAIG FEDERAL COM**Well Number:** 2H**Well Type:** OIL WELL**Well Work Type:** Drill

## Section 1 - Existing Roads

**Will existing roads be used?** NO

## Section 2 - New or Reconstructed Access Roads

**Will new roads be needed?** YES**New Road Map:**

COG Craig 2H\_Maps Plats\_01-12-2017.pdf

**New road type:** RESOURCE**Length:** 159.5 Feet**Width (ft.):** 30**Max slope (%):** 33**Max grade (%):** 1**Army Corp of Engineers (ACOE) permit required?** NO**ACOE Permit Number(s):****New road travel width:** 14**New road access erosion control:** Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.**New road access plan or profile prepared?** NO**New road access plan attachment:****Access road engineering design?** NO**Access road engineering design attachment:****Access surfacing type:** OTHER**Access topsoil source:** ONSITE**Access surfacing type description:** Caliche

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Access onsite topsoil source depth:** 6

**Offsite topsoil source description:**

**Onsite topsoil removal process:** Blading

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

**Access miscellaneous information:**

**Number of access turnouts:**

**Access turnout map:**

### **Drainage Control**

**New road drainage crossing:** OTHER

**Drainage Control comments:** None necessary

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

**Road Drainage Control Structures (DCS) attachment:**

### **Access Additional Attachments**

**Additional Attachment(s):**

## **Section 3 - Location of Existing Wells**

**Existing Wells Map?** YES

**Attach Well map:**

COG Craig 2H\_1 Mile Map Data\_01-12-2017.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 will be sent to a proposed 200' x 300' Craig Central Tank Battery facility located in Section 36, T25S, R26E. A surface flow line of approximately 873.6' of 3" steel pipe carrying oil, gas and water under a maximum pressure of 125 psi will follow the road to the proposed facility at the Craig Central Tank Battery location. We plan to install a 4" surface polyethylene pipe transporting Gas Lift Gas from the Craig Central Tank Battery to the Craig Federal #2H. The surface Gas Lift Gas pipe of approximately 873.6' under a maximum pressure of 125 psi will be installed no farther than 10 feet from the edge of the road. A ROW has been obtained for the Craig Central Tank Battery and flowlines, and the SWD surface pipeline.

## **Section 5 - Location and Types of Water Supply**

### **Water Source Table**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Water source use type:** ICE PAD CONSTRUCTION & MAINTENANCE, STIMULATION, SURFACE CASING

**Water source type:** OTHER

**Describe type:** Fresh water will be furnished by the C-100 water well located in Section 15, T24S, R26E, the water will be purchased from Gregory Rock House Ranch LLC, 1108 W Pierce Street, Carlsbad, NM 88220.

**Source longitude:**

**Source latitude:**

**Source datum:**

**Water source permit type:** PRIVATE CONTRACT

**Source land ownership:** PRIVATE

**Water source transport method:** PIPELINE

**Source transportation land ownership:** PRIVATE

**Water source volume (barrels):** 450000

**Source volume (acre-feet):** 58.001892

**Source volume (gal):** 18900000

**Water source use type:** INTERMEDIATE/PRODUCTION CASING

**Water source type:** OTHER

**Describe type:** Brine water will be provided by Malaga Brine Station. Brine water will be purchased from Mesquite SWD Inc., P O Box 1479, Carlsbad, NM 88221. Phone: 575-706-1840

**Source longitude:**

**Source latitude:**

**Source datum:**

**Water source permit type:** PRIVATE CONTRACT

**Source land ownership:** COMMERCIAL

**Water source transport method:** TRUCKING

**Source transportation land ownership:** COMMERCIAL

**Water source volume (barrels):** 30000

**Source volume (acre-feet):** 3.866793

**Source volume (gal):** 1260000

**Water source and transportation map:**

COG Craig 2H\_Fresh Water map\_01-12-2017.pdf

COG Craig 2H\_Brine Water Map\_01-12-2017.pdf

**Water source comments:** Fresh water will be furnished by the C-100 water well located in Section 15, T24S, R26E, the water will be purchased from Gregory Rock House Ranch LLC, 1108 W Pierce Street, Carlsbad, NM 88220. Brine water will be provided by Malaga Brine Station. Brine water will be purchased from Mesquite SWD Inc., P O Box 1479, Carlsbad, NM 88221. Phone: 575-706-1840

**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:**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Aquifer comments:**

**Aquifer documentation:**

**Well depth (ft):**

**Well casing type:**

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

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

**New water well casing?**

**Used casing source:**

**Drilling method:**

**Drill material:**

**Grout material:**

**Grout depth:**

**Casing length (ft.):**

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

**Well Production type:**

**Completion Method:**

**Water well additional information:**

**State appropriation permit:**

**Additional information attachment:**

## Section 6 - Construction Materials

**Construction Materials description:** Caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from the SRO caliche pit located in Section 18. T26S. R28E.

**Construction Materials source location attachment:**

## Section 7 - Methods for Handling Waste

**Waste type:** SEWAGE

**Waste content description:** Human waste and gray water

**Amount of waste:** 1000 gallons

**Waste disposal frequency :** One Time Only

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

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** Trucked to an approved disposal facility

**Waste type:** DRILLING

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

**Amount of waste:** 6000 barrels

**Waste disposal frequency :** One Time Only

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

**Safe containmant attachment:**



**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

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

**Disposal type description:**

**Disposal location description:** Trucked to an approved disposal facility

**Waste type:** GARBAGE

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

**Amount of waste:** 500                      pounds

**Waste disposal frequency :** One Time Only

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

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** Trucked to an approved disposal facility.

### Reserve Pit

**Reserve Pit being used?** NO

**Temporary disposal of produced water into reserve pit?**

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

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

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

**Reserve pit liner**

**Reserve pit liner specifications and installation description**

### Cuttings Area

**Cuttings Area being used?** NO

**Are you storing cuttings on location?** YES

**Description of cuttings location** Roll off cutting containers on tracks

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

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

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

**WCuttings area liner**

**Cuttings area liner specifications and installation description**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

## Section 8 - Ancillary Facilities

**Are you requesting any Ancillary Facilities?:** YES

**Ancillary Facilities attachment:**

COG Craig 2H\_GCP\_01-12-2017.pdf

**Comments:** Gas Capture Plan attached

## Section 9 - Well Site Layout

**Well Site Layout Diagram:**

COG Craig 2H\_Production Facility Layout\_01-12-2017.pdf

COG\_Craig\_2H\_CTB\_03-30-2017.pdf

COG\_Craig\_2H\_SWD\_Plat\_03-30-2017.pdf

COG\_Craig\_2H\_Flowline\_03-30-2017.pdf

**Comments:** Also attached: Flowlines, Craig CTB and SWD plats.

## Section 10 - Plans for Surface Reclamation

**Type of disturbance:** NEW

**Recontouring attachment:**

**Drainage/Erosion control construction:** As depicted by the well site layout; there is no need to place waddles on the edge of the location, to prevent surface run on or run off of water. No erosion should result from this location.

**Drainage/Erosion control reclamation:** N/A

**Wellpad long term disturbance (acres):** 2.94

**Wellpad short term disturbance (acres):** 3.67

**Access road long term disturbance (acres):** 0.05

**Access road short term disturbance (acres):** 0.05

**Pipeline long term disturbance (acres):** 0

**Pipeline short term disturbance (acres):** 0

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

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

**Total long term disturbance:** 2.99

**Total short term disturbance:** 3.72

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

**Topsoil redistribution:** South 80'

**Soil treatment:** None

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

**Existing Vegetation at the well pad attachment:**

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

**Existing Vegetation Community at the road attachment:**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

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

**Existing Vegetation Community at the pipeline attachment:**

**Existing Vegetation Community at other disturbances:** N/A

**Existing Vegetation Community at other disturbances attachment:**

**Non native seed used?** NO

**Non native seed description:**

**Seedling transplant description:**

**Will seedlings be transplanted for this project?** NO

**Seedling transplant description attachment:**

**Will seed be harvested for use in site reclamation?** NO

**Seed harvest description:**

**Seed harvest description attachment:**

## **Seed Management**

### **Seed Table**

**Seed type:**

**Seed source:**

**Seed name:**

**Source name:**

**Source address:**

**Source phone:**

**Seed cultivar:**

**Seed use location:**

**PLS pounds per acre:**

**Proposed seeding season:**

### **Seed Summary**

**Total pounds/Acre:**

**Seed Type**

**Pounds/Acre**

**Seed reclamation attachment:**

## **Operator Contact/Responsible Official Contact Info**

**First Name:** Rand

**Last Name:** French

**Phone:** (432)254-5556

**Email:** rfrench@concho.com

**Seedbed prep:**

**Seed BMP:**

**Seed method:**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Existing invasive species?** NO

**Existing invasive species treatment description:**

**Existing invasive species treatment attachment:**

**Weed treatment plan description:** N/A

**Weed treatment plan attachment:**

**Monitoring plan description:** N/A

**Monitoring plan attachment:**

**Success standards:** N/A

**Pit closure description:** N/A

**Pit closure attachment:**

COG Craig 2H\_Closed Loop System\_01-12-2017.pdf

## **Section 11 - Surface Ownership**

**Disturbance type:** WELL PAD

**Describe:**

**Surface Owner:** BUREAU OF LAND MANAGEMENT

**Other surface owner description:**

**BIA Local Office:**

**BOR Local Office:**

**COE Local Office:**

**DOD Local Office:**

**NPS Local Office:**

**State Local Office:**

**Military Local Office:**

**USFWS Local Office:**

**Other Local Office:**

**USFS Region:**

**USFS Forest/Grassland:**

**USFS Ranger District:**

**Operator Name:** COG OPERATING LLC

**Well Name:** CRAIG FEDERAL COM

**Well Number:** 2H

**Fee Owner:** Bert Madera

**Fee Owner Address:** PO Box 2795, Ruidoso NM 88355

**Phone:** (575)631-4444

**Email:**

**Surface use plan certification:** NO

**Surface use plan certification document:**

**Surface access agreement or bond:** Agreement

**Surface Access Agreement Need description:** As per Surface Use and Occupancy Agreement between COG Operating LLC and S&S, Inc., dated

**Surface Access Bond BLM or Forest Service:**

**BLM Surface Access Bond number:**

**USFS Surface access bond number:**

## Section 12 - Other Information

**Right of Way needed?** NO

**Use APD as ROW?**

**ROW Type(s):**

### ROW Applications

**SUPO Additional Information:**

**Use a previously conducted onsite?** YES

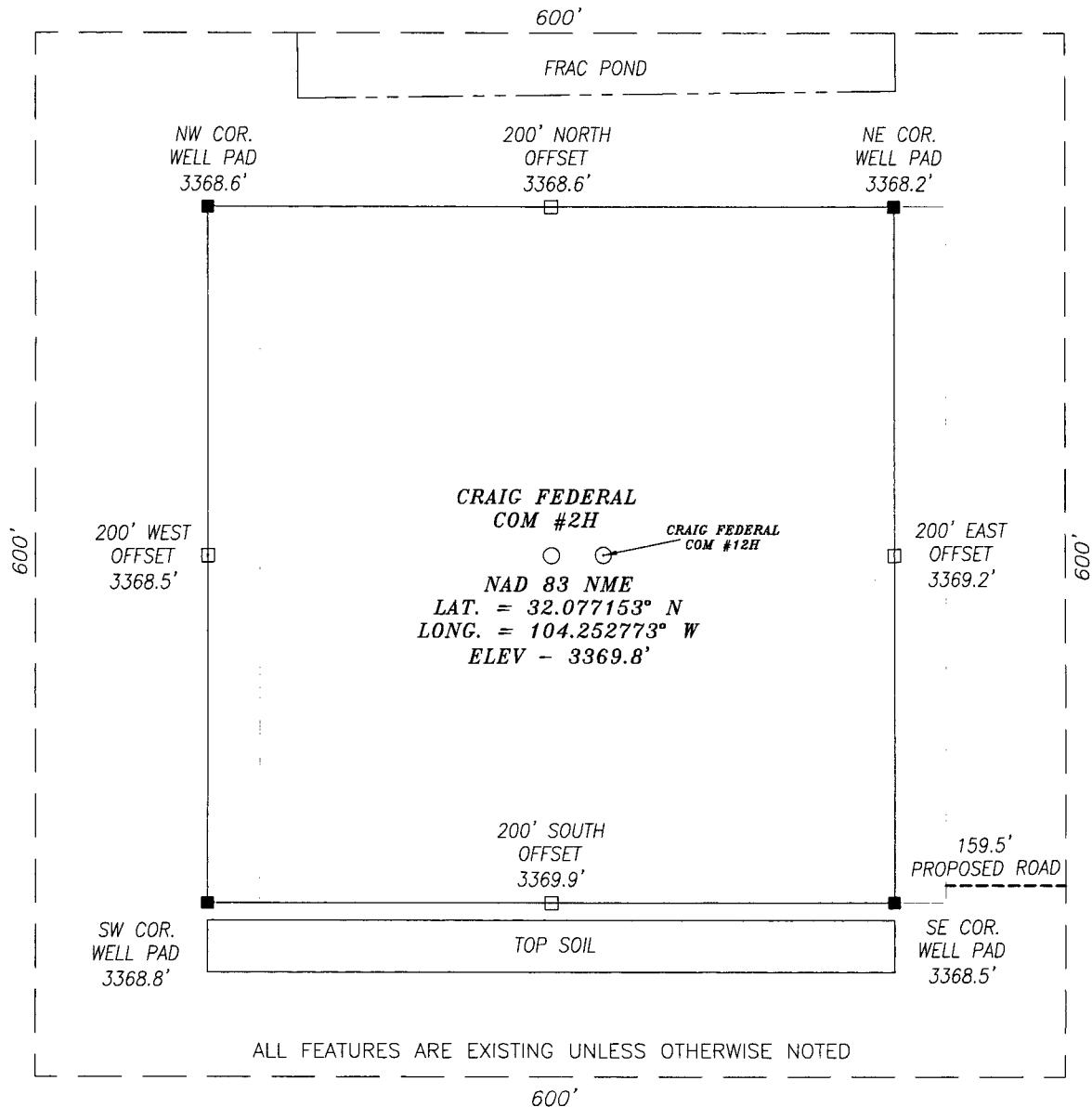
**Previous Onsite information:** Onsite completed on 11/09/2016 by Rand French (COG) and Jeff Robertson (BLM).

### Other SUPO Attachment

COG Craig 2H\_Certification\_01-12-2017.pdf

COG Craig 2H\_Closed Loop System\_01-13-2017.pdf

SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, N.M.P.M.,  
EDDY COUNTY NEW MEXICO



DIRECTIONS TO LOCATION

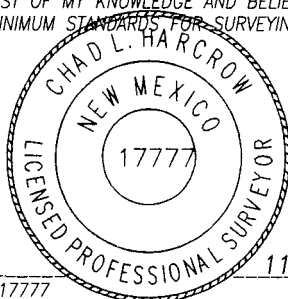
FROM THE INTERSECTION OF JOHN D. FOREHAND RD (CR 742) AND WHITES CITY RD (CR 724) GO NORTH APPROXIMATELY 0.7 MILES TO PROPOSED ROAD ON THE LEFT (WEST). PROPOSED WELL IS APPROX. 430 FEET WESTNORTHWEST.

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



CERTIFICATION

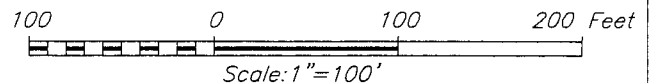
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow

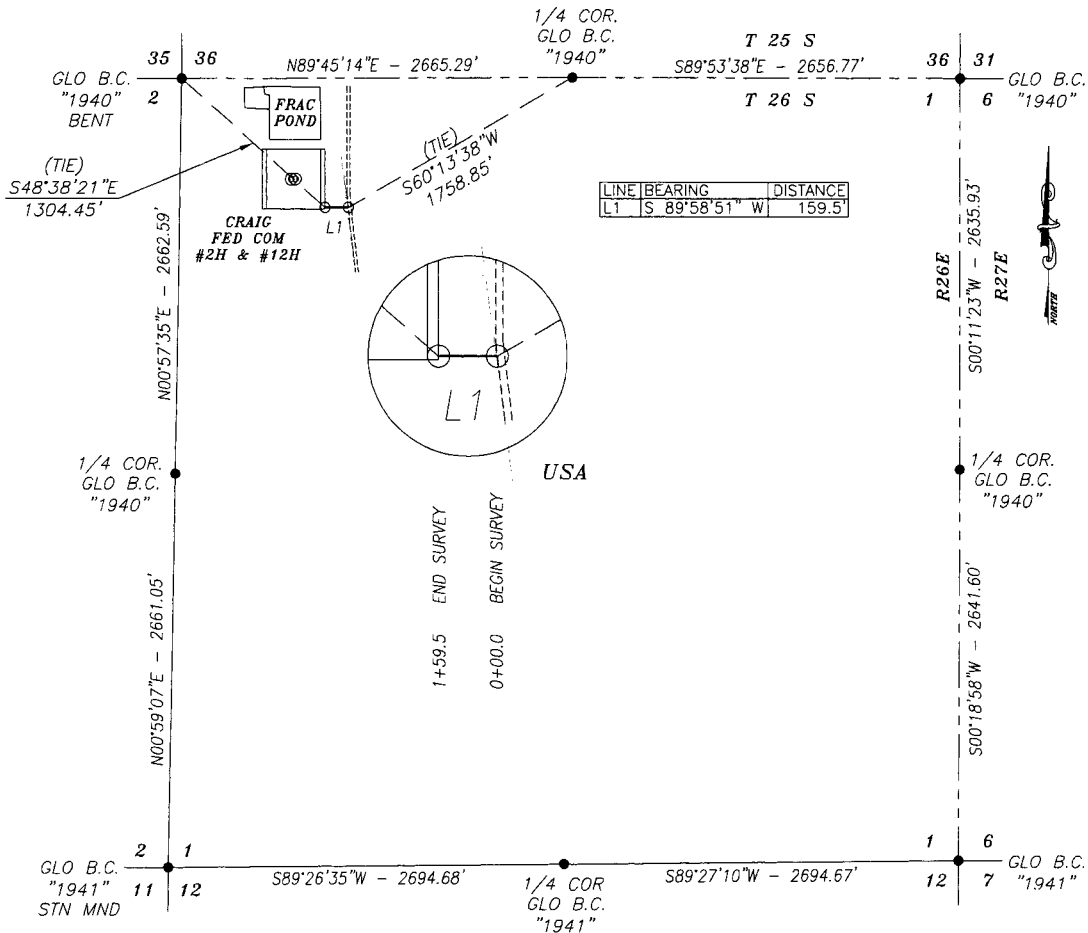
CHAD HARCROW N.M.P.S. NO. 17777

11/18/16  
DATE

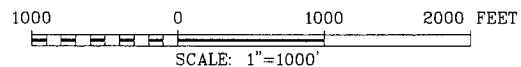


| COG OPERATING, LLC                                                                                                                                                                           |              |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|
| CRAIG FEDERAL COM #2 WELL<br>LOCATED 675 FEET FROM THE NORTH LINE<br>AND 760 FEET FROM THE WEST LINE OF SECTION 1,<br>TOWNSHIP 26 SOUTH, RANGE 26 EAST, N.M.P.M.,<br>EDDY COUNTY, NEW MEXICO |              |              |
| SURVEY DATE: NOVEMBER 11, 2016                                                                                                                                                               | PAGE: 1 OF 1 |              |
| DRAFTING DATE: NOVEMBER 17, 2016                                                                                                                                                             |              |              |
| APPROVED BY: CH                                                                                                                                                                              | DRAWN BY: VD | FILE: 16-930 |

SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



A STRIP OF LAND 30.0 FEET WIDE AND 159.5 FEET OR 9.67 RODS OR 0.030 MILES IN LENGTH CROSSING USA LAND IN SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.



FILE: 16-932

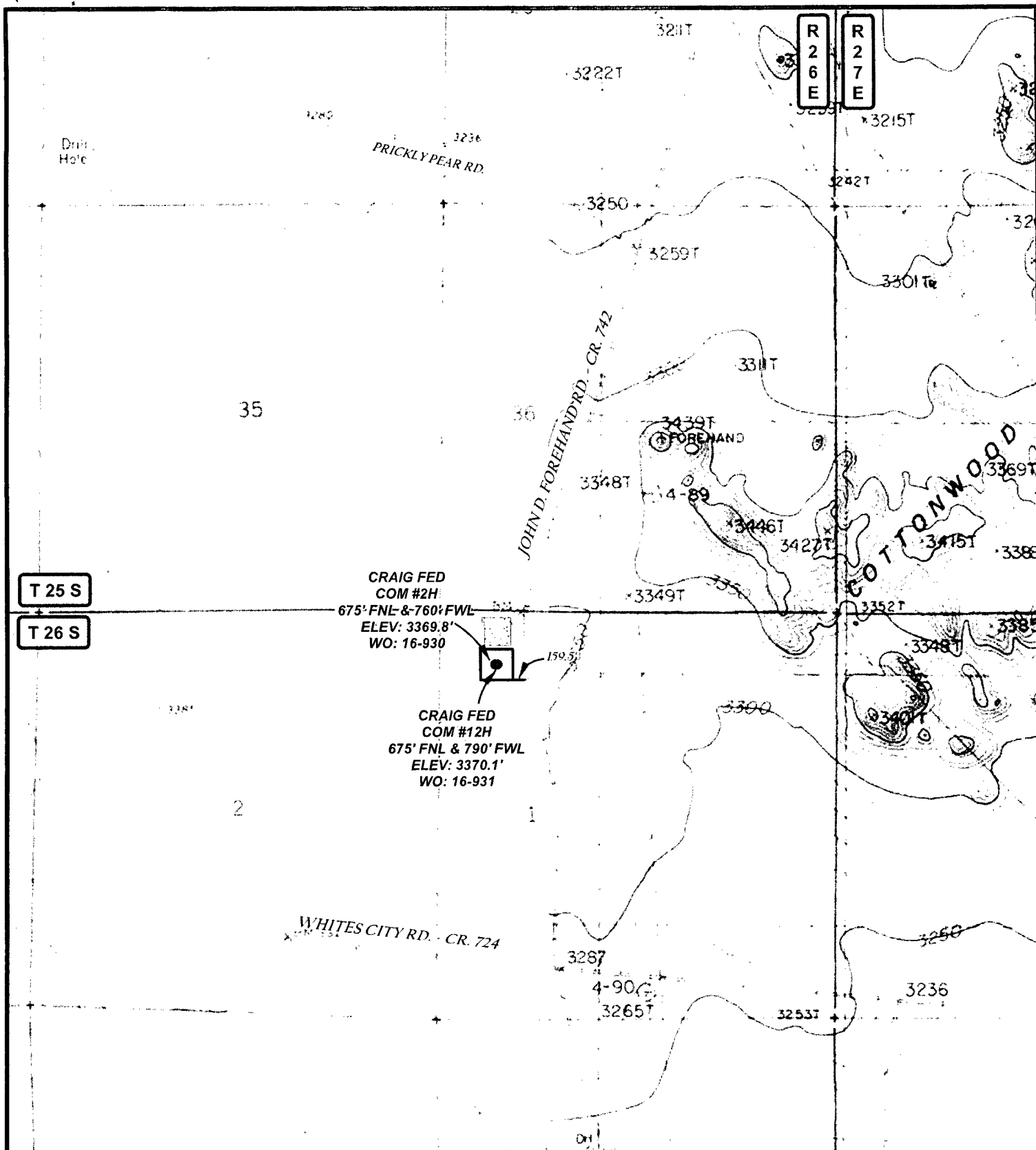


Chad Harrow

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

11/18/16

DATE \_\_\_\_\_

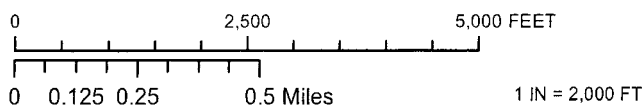


# LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- ▨ FRAC POND

## CRAIG FEDERAL COM #2H & #12H

SECTION: 1 TOWNSHIP: 26 S. RANGE: 26 E.  
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M.  
 W.O. # 16-930, 931 LEASE: CRAIG FED COM



LOCATION MAP

TOPO

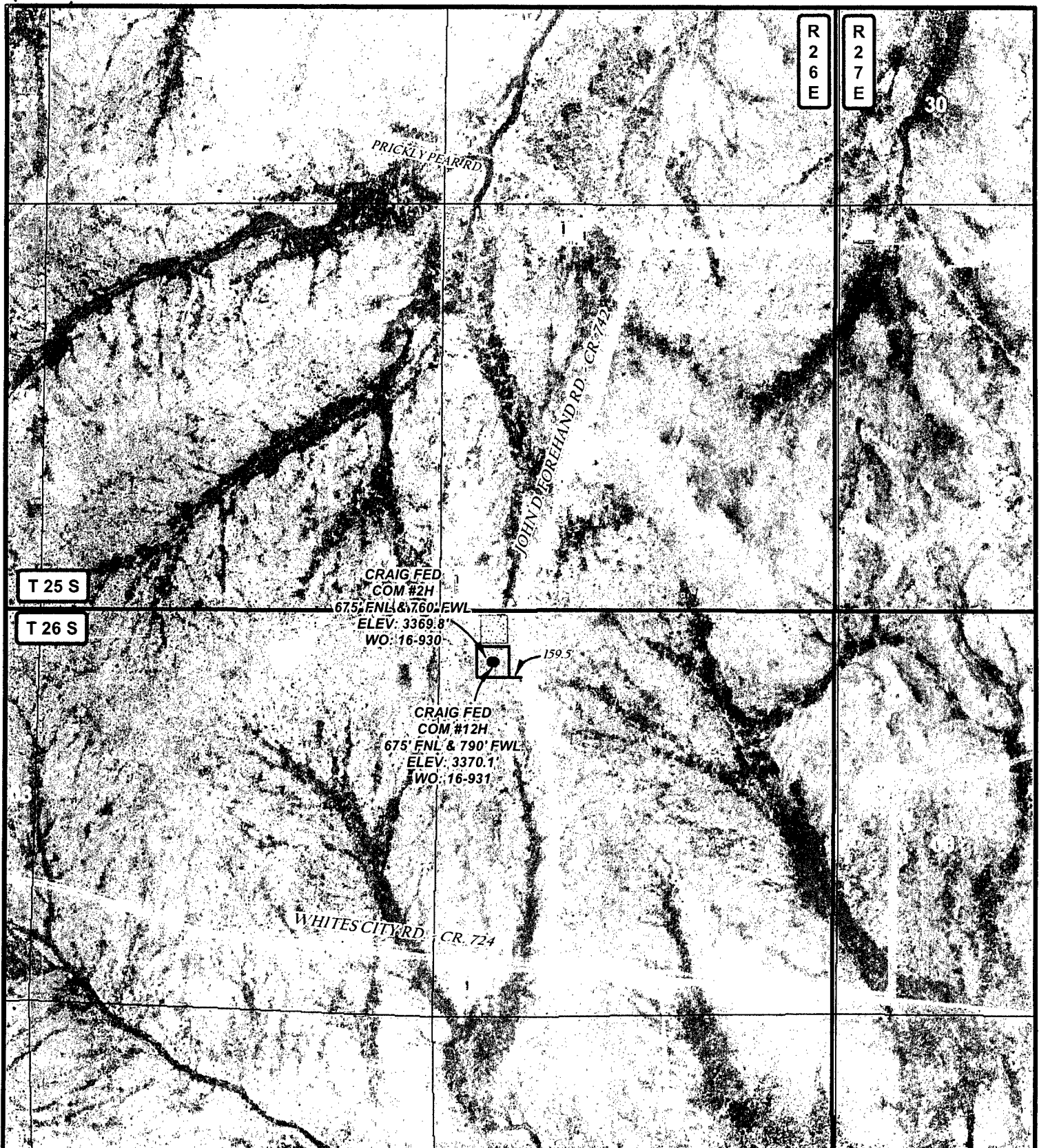
11/17/2016

S.P.

**CONCHO**  
 COG OPERATING, LLC

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



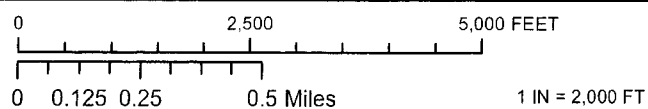


# LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- ▨ FRAC POND

## CRAIG FEDERAL COM #2H & #12H

SECTION: 1 TOWNSHIP: 26 S. RANGE: 26 E.  
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M  
 W.O. # 16-930, 931 LEASE: CRAIG FED COM



LOCATION MAP

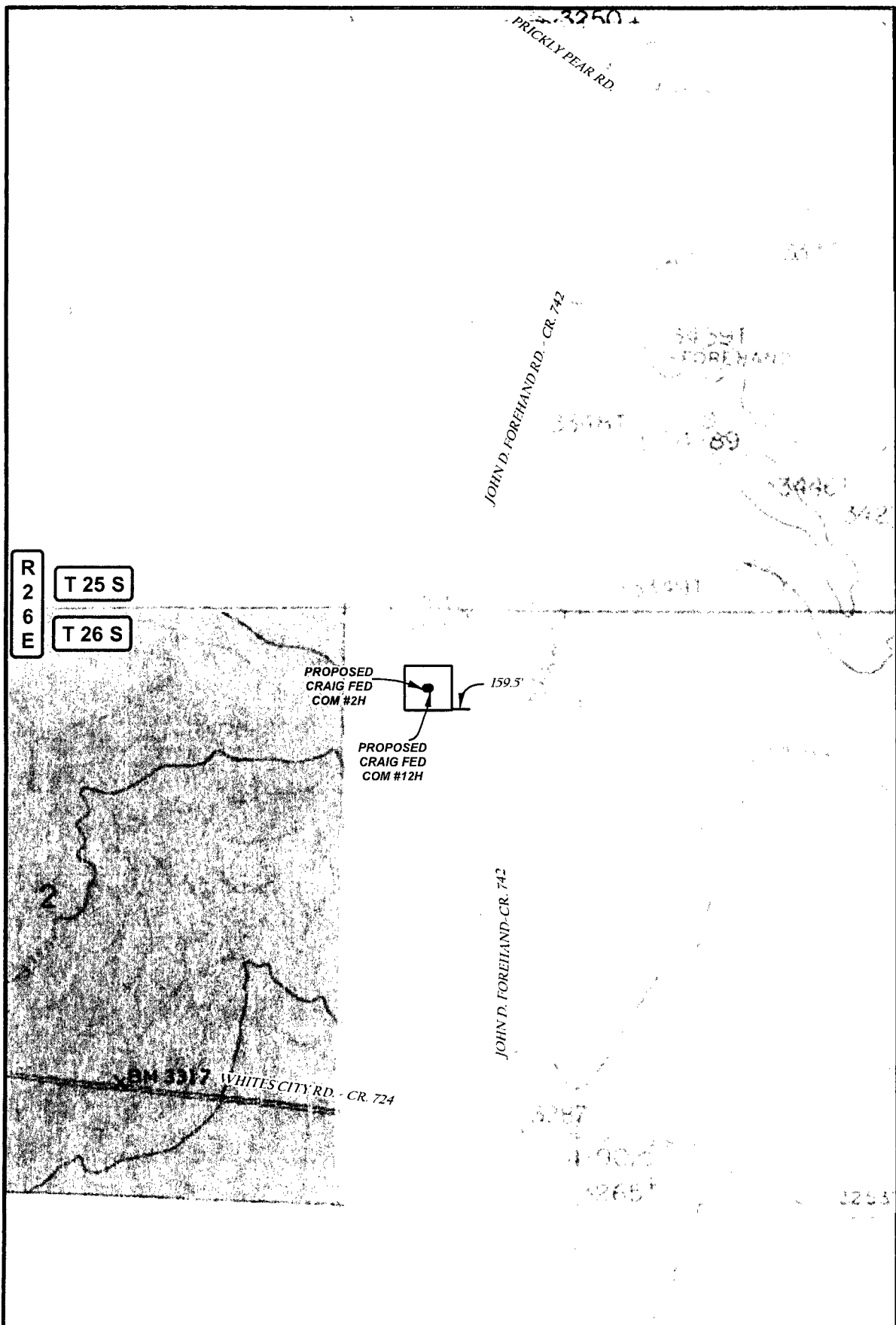
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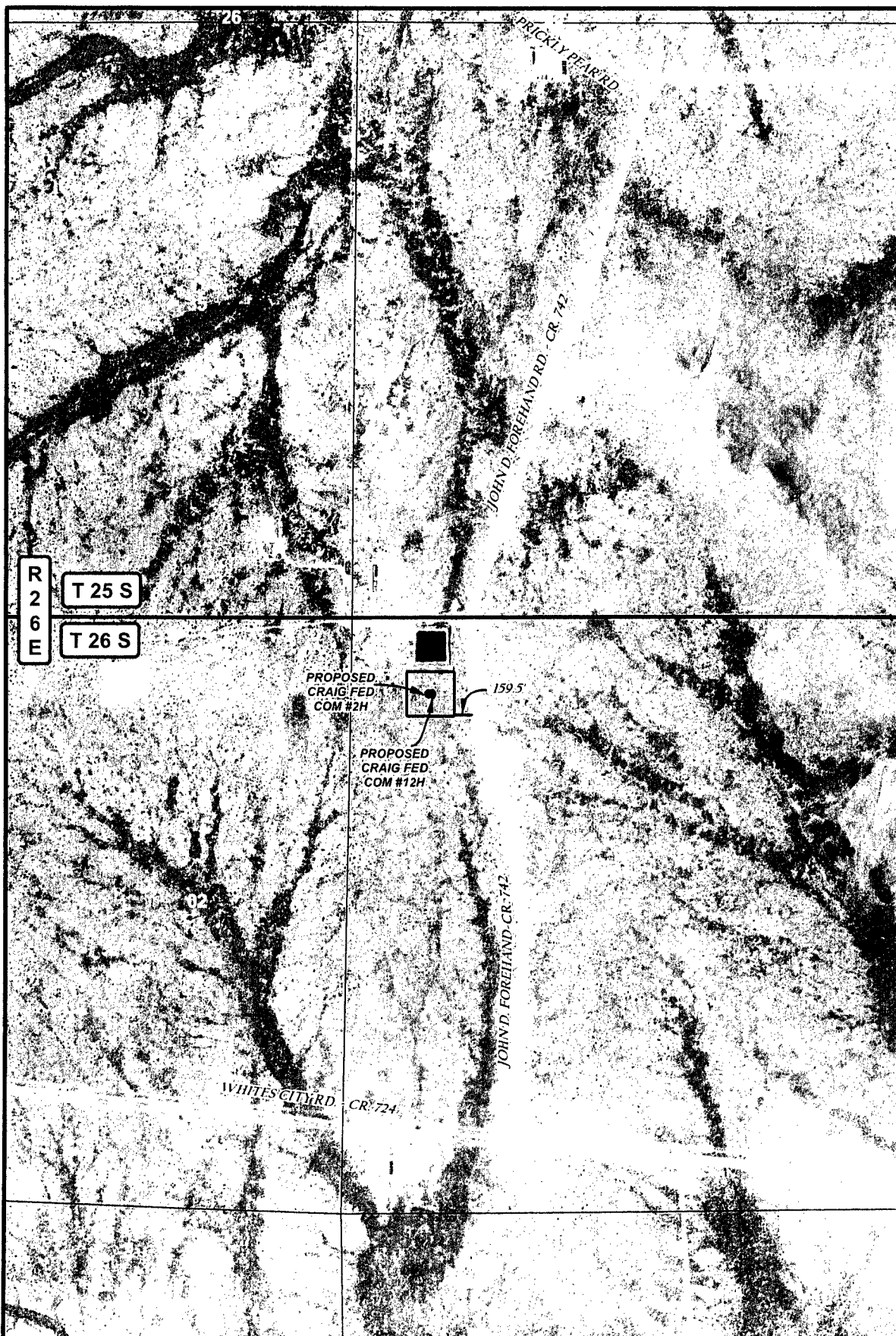
S.P.

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|                                                                                                                                                                           |                                                 |                 |                      |                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LEGEND</b><br><ul style="list-style-type: none"> <li>• WELL</li> <li>□ WELLPAD</li> <li>— ACCESS ROAD</li> <li>PRIVATE</li> <li>STATE OF NM</li> <li>US BLM</li> </ul> | <b>CRAIG FED COM #2H &amp; #12H ACCESS ROAD</b> |                 |                      | <br><b>CONCHO</b><br>COG OPERATING, LLC<br><br><br><b>HARCROW SURVEYING, LLC.</b><br>2314 W. MAIN ST, ARTESIA, NM 88210<br>PH: (575) 746-2158 FAX: (575) 746-2158<br>c.harcrow@harcrowsurveying.com |
|                                                                                                                                                                           | SECTION: 1                                      | TOWNSHIP: 26 S. | RANGE: 26 E.         |                                                                                                                                                                                                     |
|                                                                                                                                                                           | STATE: NEW MEXICO                               | COUNTY: EDDY    | SURVEY: N.M.P.M      |                                                                                                                                                                                                     |
|                                                                                                                                                                           | W.O. # 16-932                                   |                 | LEASE: CRAIG FED COM |                                                                                                                                                                                                     |
|                                                                                                                                                                           |                                                 |                 |                      |                                                                                                                                                                                                     |
| ACCESS ROAD MAP      LAND STATUS      11/17/2016      S.P.                                                                                                                |                                                 |                 |                      |                                                                                                                                                                                                     |

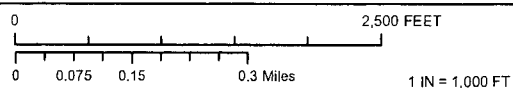


# LEGEND

- WELL
- WELLPAD
- ACCESS ROAD

## CRAIG FED COM #2H & #12H ACCESS ROAD

SECTION: 1 TOWNSHIP: 26 S. RANGE: 26 E.  
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M  
 W.O. # 16-932 LEASE: CRAIG FED COM



ACCESS ROAD MAP

IMAGERY

11/17/2016

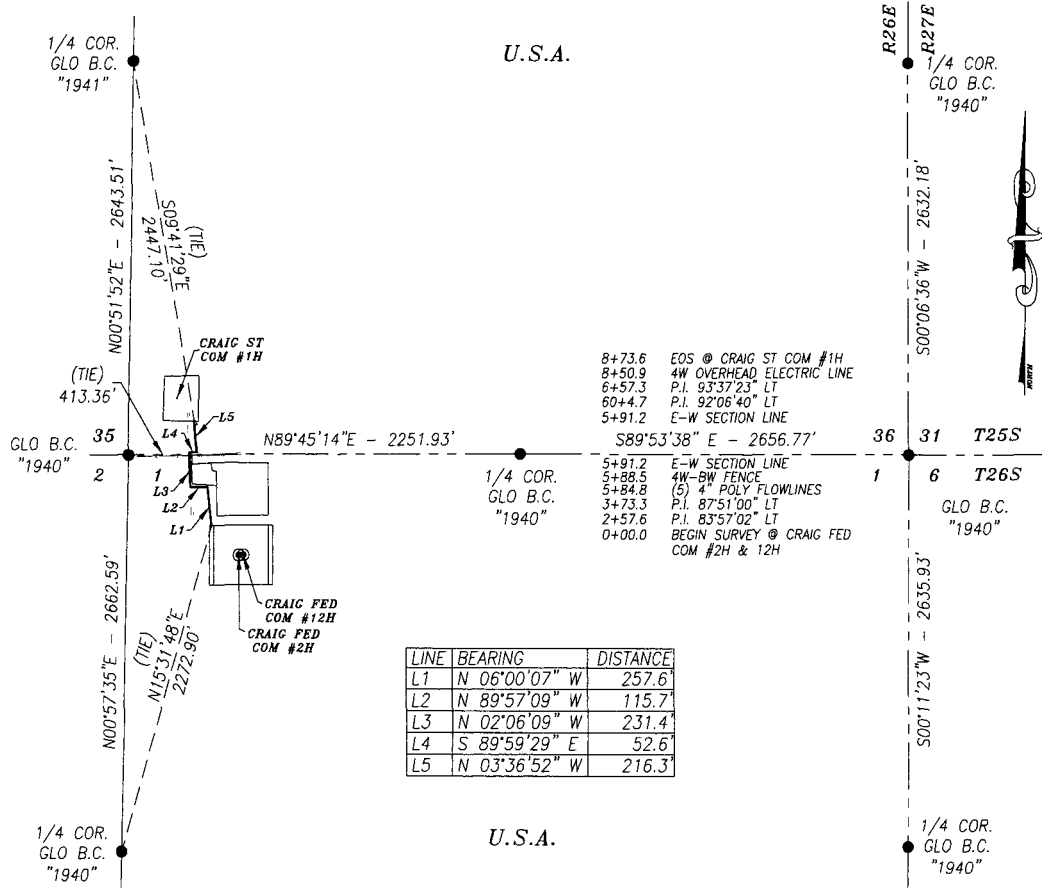
S.P.

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**FLOWLINE PLAT  
COG OPERATING, LLC.**

2-7/8" POLY FLOWLINE FROM THE CRAIG FEDERAL COM #2H & 12H  
TO THE CRAIG ST. COM #1H IN  
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,  
& SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



**DESCRIPTION**

A STRIP OF LAND 30.0 FEET WIDE AND 873.6 FEET OR 52.95 RODS OR 0.165 MILES IN LENGTH CROSSING U.S.A. LAND IN SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, AND SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

**BASIS OF BEARING:**

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

**CERTIFICATION**

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



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

DATE

**HARCROW SURVEYING, LLC**

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



1000 0 1000 2000 FEET

SCALE: 1"=1000'

**COG OPERATING, LLC**

SURVEY OF A PROPOSED POLY FLOWLINE LOCATED IN  
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST,  
SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST,  
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: NOV. 11, 2016

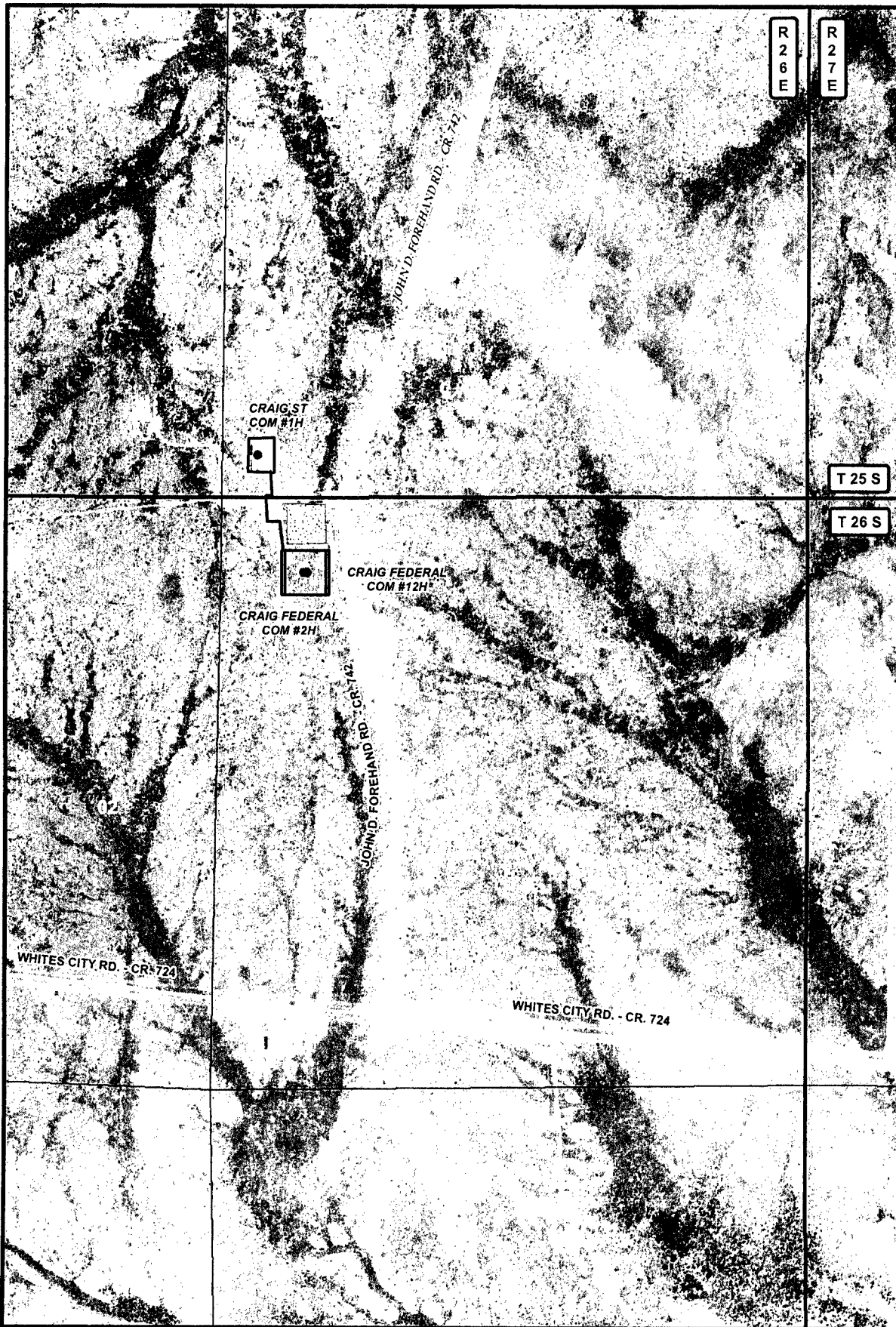
DRAFTING DATE: NOV. 17, 2016

APPROVED BY: CH

DRAWN BY: JR

PAGE 1 OF 0

FILE: 16-933

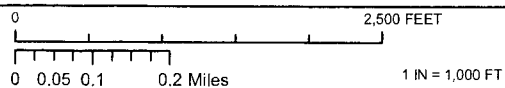


**LEGEND**

- WELL
- WELLPAD
- PIPELINE
- ▨ FRAC POND

**CRAIG FEDERAL COM #2H & 12H**

SECTIONS: 36 & 1    TOWNSHIPS: 25 & 26 S.    RANGE: 26 E.  
 STATE: NEW MEXICO    COUNTY: EDDY    SURVEY: N.M.P.M  
 W.O. # 16-933    LEASE: CRAIG FEDERAL COM



PIPELINE OVERVIEW

IMAGERY

11/17/2016

JR

**CONCHO**  
 COG OPERATING, LLC

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 c.harcrow@harcrowsurveying.com



R  
2  
7  
E

JOHN D. FOREHAND JR. - CR. 747

44-38861-  
FOREMAN

13489

189

363

3028

**CRAIG ST  
COM #1H**

T 25 S

**T 26 S**

**CRAIG FEDERAL  
COM #12H**

**CRAIG FEDERAL  
COM #2H**

JOHN D. FOREHAND RD. - CR. 742

WHITES CITY RD. - CR. 724

WHITES CITY RD. - CR. 724

3297

4-900

4265

525



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

R 26 E  
R 27 E

32221

PRICKLY PEAR RD.

3250

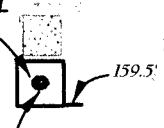
JOHN D. FOREHAND RD. - CR. 742

COTTONWOOD

T 25 S

T 26 S

CRAIG FED  
COM #2H  
675' FNL & 760' FWL  
ELEV: 3369.8'  
WO: 16-930



CRAIG FED  
COM #12H  
675' FNL & 790' FWL  
ELEV: 3370.1'  
WO: 16-931

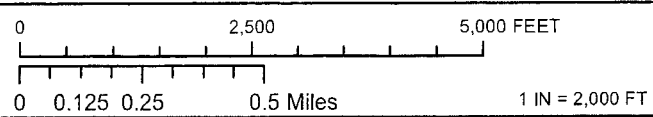
WHITES CITY RD. - CR. 724

LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- FRAC POND
- PRIVATE
- STATE OF NM
- US BLM

CRAIG FEDERAL COM #2H & #12H

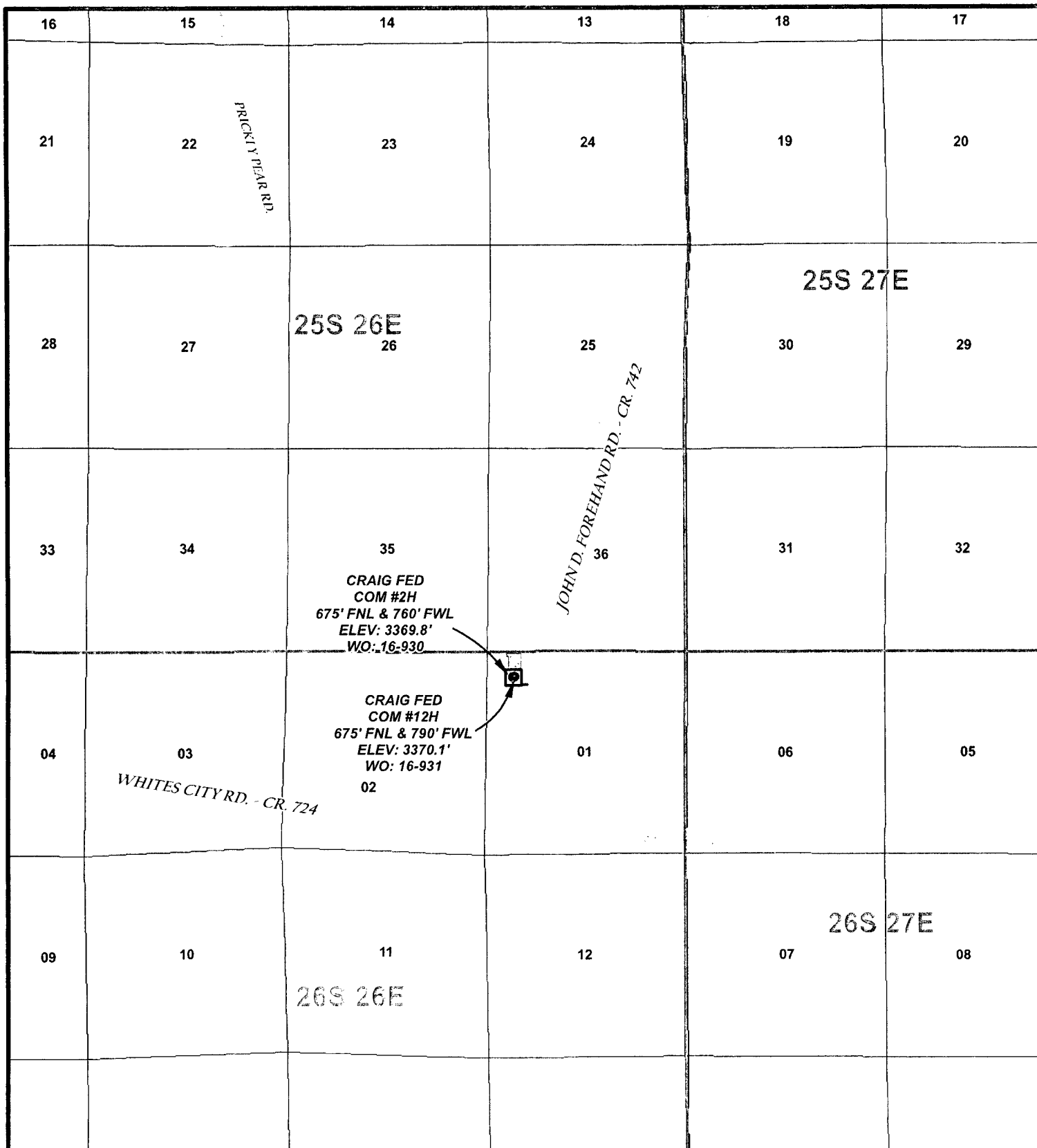
|                    |                      |                 |
|--------------------|----------------------|-----------------|
| SECTION: 1         | TOWNSHIP: 26 S.      | RANGE: 26 E.    |
| STATE: NEW MEXICO  | COUNTY: EDDY         | SURVEY: N.M.P.M |
| W.O. # 16-930, 931 | LEASE: CRAIG FED COM |                 |



LOCATION MAP LAND STATUS 11/17/2016 S.P.

CONCHO  
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# LEGEND

- WELL
- WELLPAD
- PROPOSED ROAD
- ▨ FRAC POND

## CRAIG FEDERAL COM #2H & #12H

SECTION: 1 TOWNSHIP: 26 S. RANGE: 26 E.  
 STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M  
 W.O. # 16-930, 931 LEASE: CRAIG FED COM

0 2,500 5,000 7,500 10,000 FEET

0 0.275 0.55 1.1 Miles

1 IN = 4,000 FT

LOCATION MAP

VICINITY

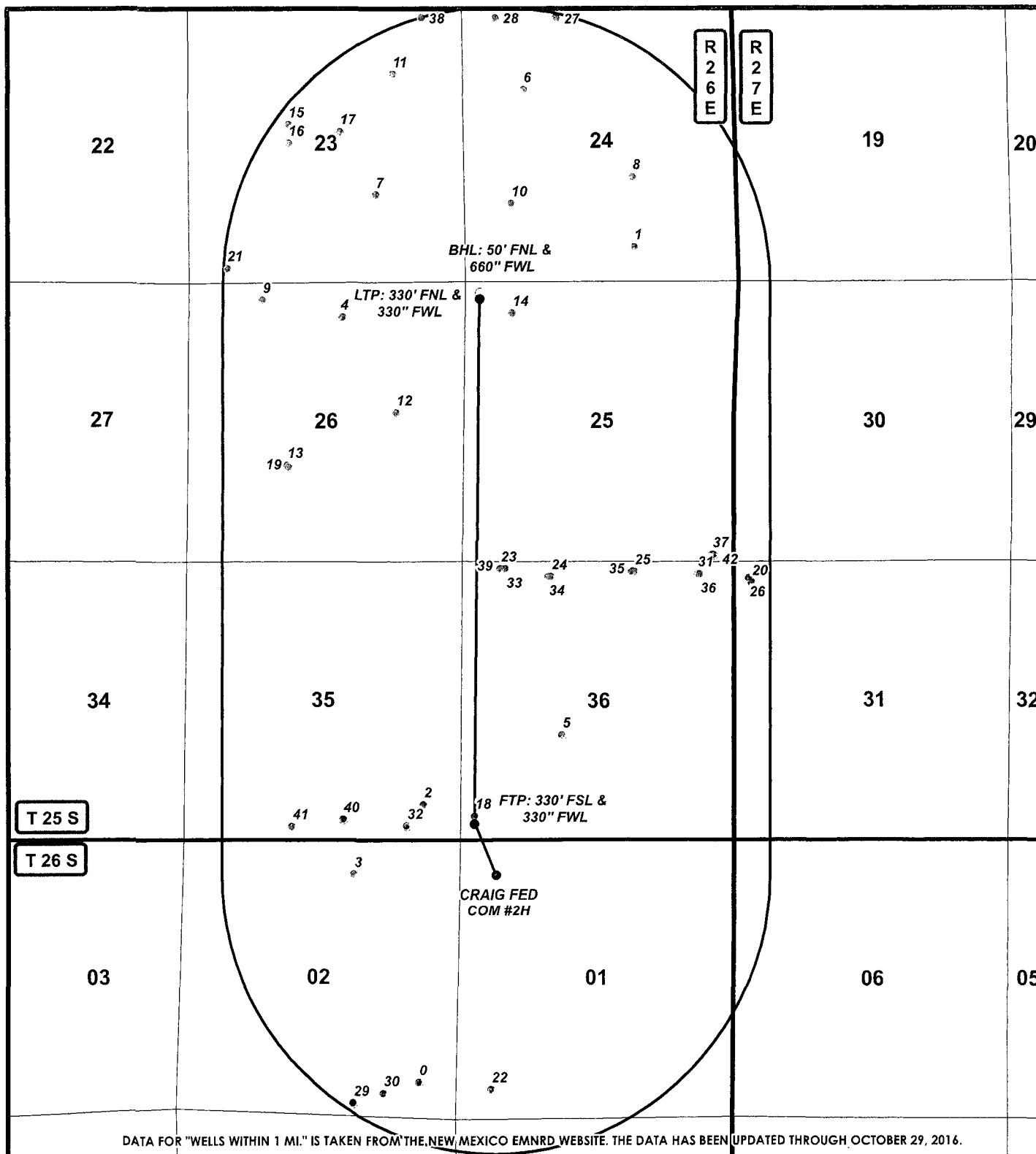
11/17/2016

S.P.

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DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH OCTOBER 29, 2016.

## LEGEND

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

## CRAIG FEDERAL COM #2H

SEC: 1 TWP: 26 S. RGE: 26 E. ELEV: 3369.8'  
 STATE: NEW MEXICO COUNTY: EDDY 675' FNL & 760' FWL  
 W.O. # 16-930 LEASE: CRAIG FED COM SURVEY: N.M.P.M

0 2,500 5,000 7,500 FEET

0 0.2 0.4 0.8 Miles 1 IN = 2,917 FT

1 MILE MAP

11/18/2016

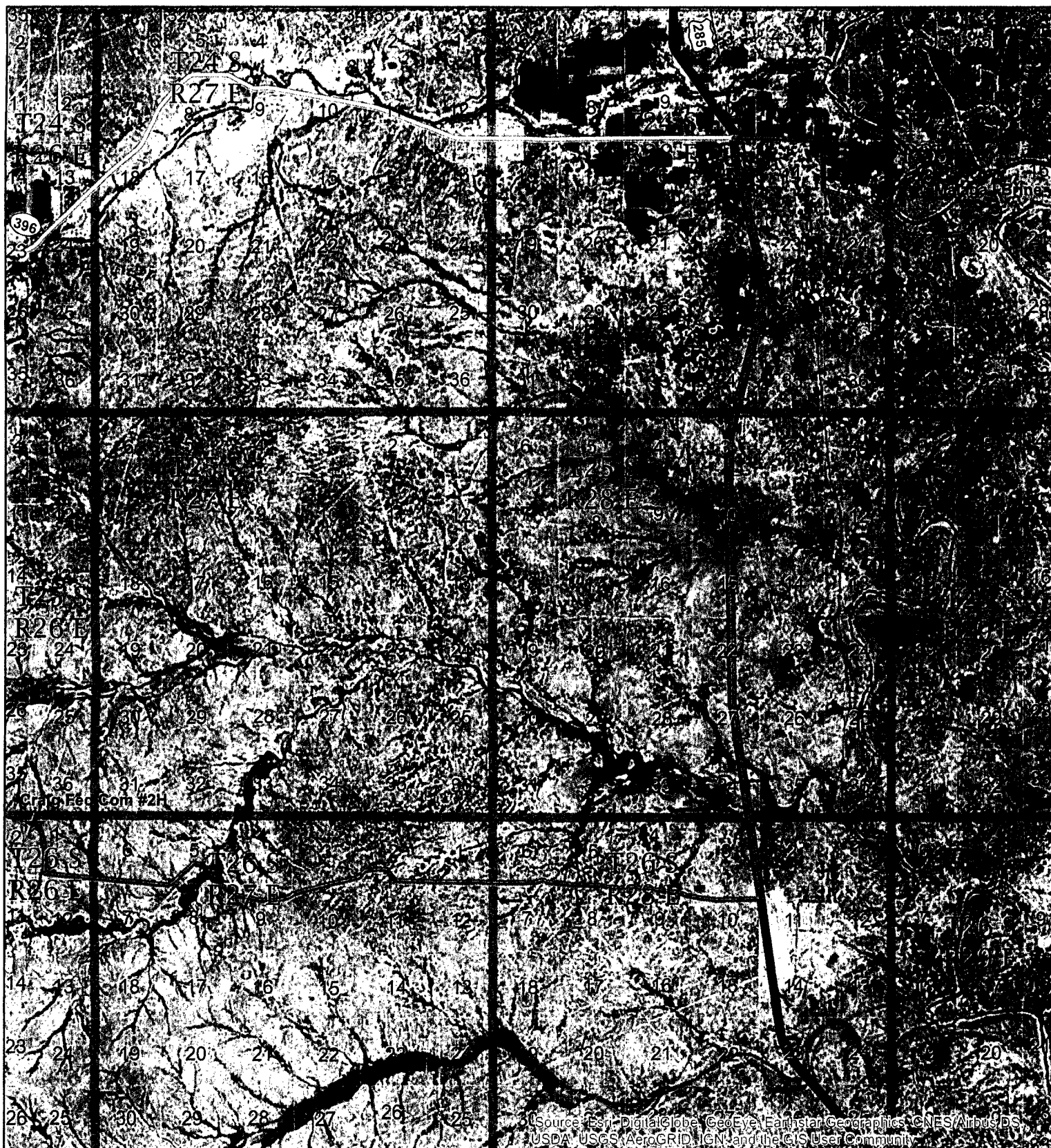
C.H.

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| FID   | Shape * | OPERATOR                       | WELL_NAME                     | ROAD RUNNER FED COM #2H WELLS |             |            |         |          |       |        |        |                            |       |
|-------|---------|--------------------------------|-------------------------------|-------------------------------|-------------|------------|---------|----------|-------|--------|--------|----------------------------|-------|
|       |         |                                |                               | LATITUDE                      | LONGITUDE   | API        | SECTION | TOWNSHIP | RANGE | FTG_NS | NS_CD  | FTG_FW                     | EW_CD |
| 14447 | Point   | BILL & PATSY RICH              | SULPHATE SISTER 001           | 32.131768                     | -104.248557 | 3001521029 | 13      | 25.05    | 26E   | 1980 N | 1980 W | Plugged                    |       |
| 14470 | Point   | ROBERT N ENFIELD               | BOLTON FEDERAL 001            | 32.117171                     | -104.235674 | 3001521053 | 19      | 25.05    | 27E   | 1980 N | 660 W  | Plugged                    |       |
| 14589 | Point   | BEARD OIL CO                   | GRIFFETH FED 001              | 32.109931                     | -104.244051 | 3001521186 | 24      | 25.05    | 26E   | 660 S  | 1980 E | Plugged                    |       |
| 16734 | Point   | CHEVRON U S A INC              | FEDERAL 13 COM 001            | 32.132681                     | -104.249634 | 3001523492 | 13      | 25.05    | 26E   | 1650 N | 1650 W | Plugged                    |       |
| 18624 | Point   | BILL & PATSY RICH              | WHITE CITY 14 FEDERAL 002     | 32.127179                     | -104.260312 | 3001525661 | 14      | 25.05    | 26E   | 1650 S | 1650 E | Plugged                    |       |
| 21667 | Point   | COG OPERATING LLC              | COTTONWOOD 36 STATE SWD 001   | 32.084475                     | -104.248667 | 3001529560 | 36      | 25.05    | 26E   | 1980 S | 1980 W | Plugged                    |       |
| 24282 | Point   | COG OPERATING LLC              | LIGHTNING 24 FEDERAL COM 001  | 32.120816                     | -104.244344 | 3001533001 | 24      | 25.05    | 26E   | 660 N  | 1980 E | Active                     |       |
| 24352 | Point   | CIMAREX ENERGY CO. OF COLORADO | LIBERTY 24 FEDERAL COM 001    | 32.11813                      | -104.250968 | 3001533094 | 24      | 25.05    | 26E   | 1650 N | 1200 W | Active                     |       |
| 24556 | Point   | CIMAREX ENERGY CO. OF COLORADO | FEDERAL 13 COM 002            | 32.126965                     | -104.25041  | 3001533344 | 13      | 25.05    | 26E   | 1565 S | 1400 W | Active                     |       |
| 24722 | Point   | CIMAREX ENERGY CO. OF COLORADO | WIGEON 23 FEDERAL COM 001     | 32.112644                     | -104.260142 | 3001533563 | 23      | 25.05    | 26E   | 1650 S | 1650 E | Active                     |       |
| 24734 | Point   | COG OPERATING LLC              | LIGHTNING 24 FEDERAL COM 002  | 32.11356                      | -104.244149 | 3001533578 | 24      | 25.05    | 26E   | 1980 S | 1980 E | Active                     |       |
| 24821 | Point   | CIMAREX ENERGY CO. OF COLORADO | LIBERTY 24 FEDERAL COM 002    | 32.112183                     | -104.251728 | 3001533683 | 24      | 25.05    | 26E   | 1475 S | 940 W  | Active                     |       |
| 24822 | Point   | CIMAREX ENERGY CO. OF COLORADO | WIGEON 23 FEDERAL COM 002     | 32.118942                     | -104.259094 | 3001533684 | 26      | 25.05    | 26E   | 2475 N | 1250 E | TA                         |       |
| 24823 | Point   | CIMAREX ENERGY CO. OF COLORADO | BUFFLEHEAD 26 FEDERAL COM 001 | 32.10131                      | -104.258903 | 3001533685 | 26      | 25.05    | 26E   | 725 S  | 1750 E | New (Not drilled or compl) |       |
| 24908 | Point   | CIMAREX ENERGY CO. OF COLORADO | FEDERAL 13 COM 003            | 32.124619                     | -104.243643 | 3001533785 | 13      | 25.05    | 26E   | 1480 N | 1130 W | Plugged                    |       |
| 25071 | Point   | OXY USA INC                    | MARINE 19 FEDERAL 001         | 32.118558                     | -104.234186 | 3001533981 | 19      | 25.05    | 27E   | 1980 S | 1400 E | Active                     |       |
| 25255 | Point   | CIMAREX ENERGY CO. OF COLORADO | FEDERAL 13 COM 004            | 32.132629                     | -104.242588 | 3001534199 | 13      | 25.05    | 26E   | 1620 N | 1400 E | Plugged                    |       |
| 25702 | Point   | CIMAREX ENERGY CO. OF COLORADO | FREEDOM 25 FEE 001C           | 32.106491                     | -104.251699 | 3001534716 | 25      | 25.05    | 26E   | 660 N  | 990 W  | New (Not drilled or compl) |       |
| 27425 | Point   | CIMAREX ENERGY CO. OF COLORADO | FEDERAL 13 COM 006            | 32.133662                     | -104.248543 | 3001536571 | 13      | 25.05    | 26E   | 1310 N | 1980 W | New (Not drilled or compl) |       |
| 29469 | Point   | COG OPERATING LLC              | JACK FEDERAL 001H             | 32.092415                     | -104.236801 | 3001538643 | 31      | 25.05    | 27E   | 330 N  | 380 W  | New (Not drilled or compl) |       |
| 30772 | Point   | OXY USA INC                    | PEACHES 19 FEDERAL 001H       | 32.121537                     | -104.228275 | 3001540250 | 19      | 25.05    | 27E   | 330 N  | 2310 E | New (Not drilled or compl) |       |
| 32486 | Point   | COG OPERATING LLC              | CRAIG STATE 002               | 32.093161                     | -104.252462 | 3001541970 | 36      | 25.05    | 26E   | 210 N  | 800 W  | New (Not drilled or compl) |       |
| 32487 | Point   | COG OPERATING LLC              | CRAIG STATE 003H              | 32.092743                     | -104.249319 | 3001541971 | 36      | 25.05    | 26E   | 350 N  | 1770 W | New (Not drilled or compl) |       |
| 32497 | Point   | COG OPERATING LLC              | CRAIG STATE 004H              | 32.093004                     | -104.244105 | 3001541981 | 36      | 25.05    | 26E   | 190 N  | 1870 E | New (Not drilled or compl) |       |
| 32546 | Point   | OXY USA INC                    | PEACHES 19 FEDERAL 004H       | 32.121966                     | -104.235735 | 3001542030 | 19      | 25.05    | 27E   | 150 N  | 660 W  | New (Not drilled or compl) |       |
| 32648 | Point   | COG OPERATING LLC              | JACK FEDERAL 002H             | 32.092662                     | -104.236965 | 3001542132 | 31      | 25.05    | 27E   | 240 N  | 330 W  | New (Not drilled or compl) |       |
| 32649 | Point   | COG OPERATING LLC              | JACK FEDERAL 003H             | 32.092796                     | -104.230379 | 3001542133 | 31      | 25.05    | 27E   | 206 N  | 2360 W | New (Not drilled or compl) |       |
| 32650 | Point   | COG OPERATING LLC              | JACK FEDERAL 004H             | 32.092853                     | -104.228261 | 3001542134 | 31      | 25.05    | 27E   | 190 N  | 2310 E | New (Not drilled or compl) |       |
| 32777 | Point   | CIMAREX ENERGY CO. OF COLORADO | LIBERTY 24 FEDERAL COM 003H   | 32.121889                     | -104.248925 | 3001542261 | 24      | 25.05    | 26E   | 330 N  | 1830 W | New (Not drilled or compl) |       |
| 32778 | Point   | CIMAREX ENERGY CO. OF COLORADO | LIBERTY 24 FEDERAL COM 004H   | 32.121919                     | -104.252723 | 3001542262 | 24      | 25.05    | 26E   | 330 N  | 660 W  | New (Not drilled or compl) |       |
| 32959 | Point   | OXY USA INC                    | PEACHES 19 FEDERAL 003H       | 32.10994                      | -104.230969 | 3001542446 | 19      | 25.05    | 27E   | 730 S  | 1980 W | New (Not drilled or compl) |       |
| 33009 | Point   | COG OPERATING LLC              | CRAIG STATE 005H              | 32.09287                      | -104.240178 | 3001542497 | 36      | 25.05    | 26E   | 190 N  | 660 E  | New (Not drilled or compl) |       |
| 33288 | Point   | CIMAREX ENERGY CO. OF COLORADO | FEDERAL 13 COM 008H           | 32.136235                     | -104.244487 | 3001542777 | 13      | 25.05    | 26E   | 330 N  | 1980 E | New (Not drilled or compl) |       |
| 33495 | Point   | COG OPERATING LLC              | CRAIG STATE 012H              | 32.093162                     | -104.252138 | 3001542989 | 36      | 25.05    | 26E   | 210 N  | 900 W  | New (Not drilled or compl) |       |
| 33551 | Point   | COG OPERATING LLC              | CRAIG STATE 013H              | 32.092748                     | -104.249481 | 3001543045 | 36      | 25.05    | 26E   | 350 N  | 1720 W | New (Not drilled or compl) |       |
| 33552 | Point   | COG OPERATING LLC              | CRAIG STATE 014H              | 32.093001                     | -104.244267 | 3001543046 | 36      | 25.05    | 26E   | 190 N  | 1920 E | New (Not drilled or compl) |       |
| 33553 | Point   | COG OPERATING LLC              | CRAIG STATE 015H              | 32.092864                     | -104.240016 | 3001543047 | 36      | 25.05    | 26E   | 190 N  | 610 E  | New (Not drilled or compl) |       |
| 33639 | Point   | COG OPERATING LLC              | ROAD RUNNER FEDERAL 001H      | 32.093883                     | -104.239249 | 3001543133 | 25      | 25.05    | 26E   | 190 S  | 380 E  | New (Not drilled or compl) |       |
| 33662 | Point   | CIMAREX ENERGY CO. OF COLORADO | WIGEON 23 FEDERAL COM 004H    | 32.121921                     | -104.257322 | 3001543156 | 23      | 25.05    | 26E   | 305 N  | 757 E  | New (Not drilled or compl) |       |
| 33663 | Point   | CIMAREX ENERGY CO. OF COLORADO | WIGEON 23 FEDERAL COM 005H    | 32.121792                     | -104.260714 | 3001543157 | 23      | 25.05    | 26E   | 334 N  | 1802 E | New (Not drilled or compl) |       |
| 33708 | Point   | COG OPERATING LLC              | CRAIG STATE 002H              | 32.093161                     | -104.252462 | 3001543202 | 36      | 25.05    | 26E   | 210 N  | 800 W  | New (Not drilled or compl) |       |
| 34262 | Point   | CIMAREX ENERGY CO.             | WHITE CITY 14 FEDERAL 015H    | 32.122106                     | -104.257399 | 3001543760 | 23      | 25.05    | 26E   | 237 N  | 781 E  | New (Not drilled or compl) |       |
| 34402 | Point   | COG OPERATING LLC              | ROAD RUNNER FEDERAL COM 011H  | 32.09388                      | -104.239152 | 3001543900 | 25      | 25.05    | 26E   | 190 S  | 350 E  | New (Not drilled or compl) |       |





**Craig Fed Com #2H  
To Malaga 1 Brine**

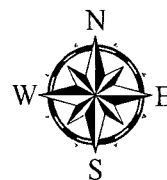
Date: 1/11/2017  
Author: Whitney McDonald  
State: New Mexico  
County: Eddy

Disclaimer: This is not a legal survey document.

**Map Legend**

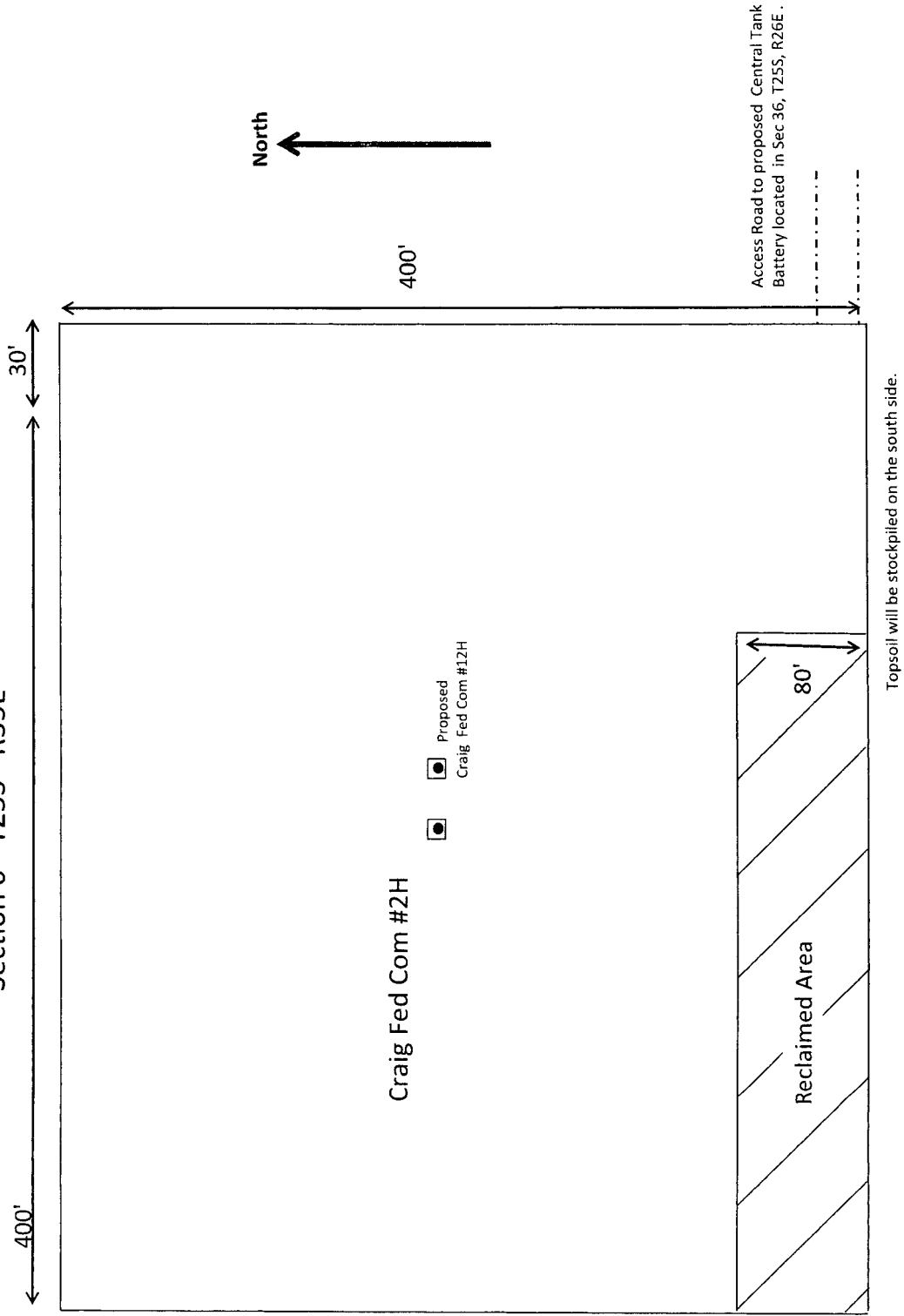
Route

0 0.75 1.5 3 4.5 6 Miles



Well Site Layout  
Production Facility Layout  
Craig Federal Com #2H  
Section 6 - T25S - R35E

Exhibit 3







## LEGEND

- WELL
- WELLPAD
- PIPELINE
- ▨ FRAC\_POND

## CRAIG FED COM #2H & #12H SWD PIPELINE

SECTIONS: 1 & 36 TOWNSHIP: 25 S. & 26 S. RANGE: 26 E.

STATE: NEW MEXICO COUNTY: EDDY SURVEY: N.M.P.M

W.O. # 17-265

LEASE: CRAIG FED COM

0 2,500 FEET

0 0.05 0.1 0.2 Miles 1 IN = 896 FT

PIPELINE OVERVIEW

IMAGERY

03/15/17

V.D.

**CONCHO**

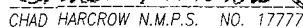
COG OPERATING, LLC



HARCROW SURVEYING, LLC.

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

CRAIG FED COM #2H & #12H TO THE COTTONWOOD 36 ST. SWD IN  
SECTION 1, TOWNSHIP 26 SOUTH, RANGE 26 EAST, N.M.P.M.,  
SECTION 36, TOWNSHIP 25 SOUTH, RANGE 26 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



DATE \_\_\_\_\_

JOHN D. FOREHAND

EXISTING  
COTTONWOOD 36  
ST. SWD #1

R  
2  
6  
E

R  
2  
7  
E

T 25 S

T 26 S

CRAIG FED  
COM #2H & #12H

JOHN D. FOREHAND RD. - CR. 742

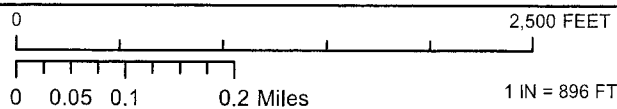
WHITES CITY RD. - CR. 724

**LEGEND**

- WELL
- WELLPAD
- PIPELINE
- PRIVATE
- STATE OF NM
- US BLM
- ▨ FRAC\_POND

**CRAIG FED COM #2H & #12H SWD PIPELINE**

SECTIONS: 1 & 36      TOWNSHIP: 25 S. & 26 S.      RANGE: 26 E.  
STATE: NEW MEXICO      COUNTY: EDDY      SURVEY: N.M.P.M  
W.O. # 17-265      LEASE: CRAIG FED COM



PIPELINE OVERVIEW

LAND STATUS

03/15/17

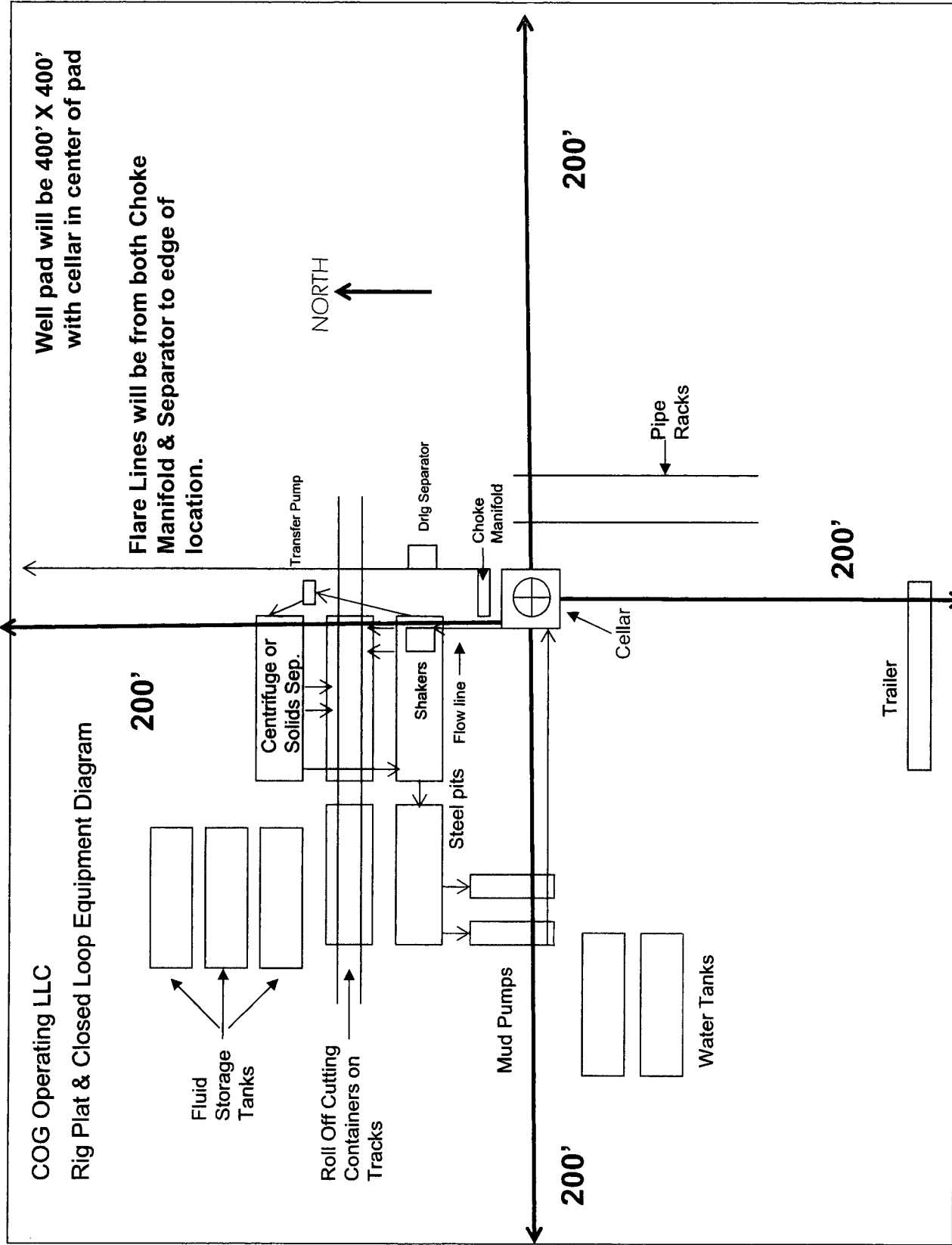
V.D.

**CONCHO**  
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c.harcrow@harcrowsurveying.com





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

Exhibit 1

Surface Use Plan  
COG Operating LLC  
Craig Federal Com #2H  
SHL: 675' FNL & 790' FWL UL D  
Section 1, T26S, R26E  
BHL: 200' FNL & 330' FWL UL D  
Section 25, T25S, R26E  
Eddy County, New Mexico

---

### OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 11<sup>th</sup> day of JANUARY, 2017.

Signed: Mayte Reyes

Printed Name: Mayte Reyes

Position: Regulatory Analyst

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

Telephone: (575) 748-6945

E-mail: [mreyes1@concho.com](mailto:mreyes1@concho.com)

Field Representative (if not above signatory): Rand French

Telephone: (575) 748-6940. E-mail: [rfrench@concho.com](mailto:rfrench@concho.com)

## Section 1 - General

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

## Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

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:

Describe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

### **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:



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

## Bond Info Data Report

05/18/2017

### 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:

## **Additional Operator Remarks**

### **Location of Well**

1. SHL: NWNW / 675 FNL / 760 FWL / TWSP: 26S / RANGE: 26E / SECTION: 1 / LAT: 32.077153 / LONG: -104.252773 ( TVD: 0 feet, MD: 0 feet )  
PPP: SWSW / 330 FSL / 330 FWL / TWSP: 25S / RANGE: 26E / SECTION: 36 / LAT: 32.079912 / LONG: -104.254107 ( TVD: 7041 feet, MD: 7041 feet )  
BHL: NWNW / 200 FNL / 330 FWL / TWSP: 25S / RANGE: 26E / SECTION: 25 / LAT: 32.107583 / LONG: -104.253695 ( TVD: 7437 feet, MD: 18474 feet )

## **BLM Point of Contact**

Name: Melissa Agee

Title: Legal Instruments Examiner

Phone: 5752345937

Email: [magee@blm.gov](mailto:magee@blm.gov)

## **Review and Appeal Rights**

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



**PECOS DISTRICT  
DRILLING OPERATIONS  
CONDITIONS OF APPROVAL**

|                       |                                   |
|-----------------------|-----------------------------------|
| OPERATOR'S NAME:      | COG Operating LLC                 |
| LEASE NO.:            | NMNM113937                        |
| WELL NAME & NO.:      | 2H – Craig Federal Com            |
| SURFACE HOLE FOOTAGE: | 675'/N & 760'/W                   |
| BOTTOM HOLE FOOTAGE:  | 200'/N & 330'/W, 25               |
| LOCATION:             | Section 01 T.26 S., R.26 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. **Although Hydrogen Sulfide has not been reported in the area, it is always a potential hazard. It is recommended that monitoring equipment be onsite for potential Hydrogen Sulfide. If H<sub>2</sub>S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, report measured amounts and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.
4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM**

office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

## **B. CASING**

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

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

### **Wait on cement (WOC) for Water Basin:**

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

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

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

### **High Cave Karst**

**Possibility of water flows in the Castile and Salado**

**Possibility of lost circulation in the Castile, Salado and Delaware**

1. The 13-3/8 inch surface casing shall be set at approximately 155 feet and cemented to the surface. If salt is encountered, set casing at least 25 feet above the salt.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature

survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

- b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
- ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office.
3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
- ☒ Cement should tie-back at least **200** feet into the previous 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. Variance approved to use flex line from BOP to choke manifold. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. **Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the

field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **13-3/8"** surface casing shoe shall be **2000 (2M)** annular.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8"** intermediate casing shoe shall be **3000 (3M)** psi.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
  - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
  - c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
  - d. The results of the test shall be reported to the appropriate BLM office.
  - e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

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

#### **D. DRILL STEM TEST**

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

#### **E. WASTE MATERIAL AND FLUIDS**

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

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

#### **F. SPECIAL REQUIREMENT(S)**

##### **Communitization Agreement**

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

**MHH 04202017**

**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

|                       |                                   |
|-----------------------|-----------------------------------|
| OPERATOR'S NAME:      | COG Operating LLC                 |
| LEASE NO.:            | NMNM113937                        |
| WELL NAME & NO.:      | 2H – Craig Federal Com            |
| SURFACE HOLE FOOTAGE: | 675'/N & 760'/W                   |
| BOTTOM HOLE FOOTAGE   | 200'/N & 330'/W, 25               |
| LOCATION:             | Section 01 T.26 S., R.26 E., NMPM |
| COUNTY:               | Eddy County, New Mexico           |

**TABLE OF CONTENTS**

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

- ☐ **General Provisions**
- ☐ **Permit Expiration**
- ☐ **Archaeology, Paleontology, and Historical Sites**
- ☐ **Noxious Weeds**
- ☒ **Special Requirements**
  - Watershed
  - Cave/Karst
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
- ☐ **Interim Reclamation**
- ☐ **Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

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

## **II. PERMIT EXPIRATION**

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

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

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

## **IV. NOXIOUS WEEDS**

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

## **V. SPECIAL REQUIREMENT(S)**

### **Watershed**

- The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The berm shall be maintained through the life of the well and after interim reclamation has been completed.
- Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion.

### **Cave and Karst Conditions of Approval**

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

### **Cave/Karst Surface Mitigation**

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

#### **Construction:**

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

#### **No Blasting:**

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

#### **Pad Berming:**

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

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



- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

#### **Tank Battery Liners and Berms:**

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

#### **Leak Detection System:**

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

#### **Automatic Shut-off Systems:**

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

#### **Cave/Karst Subsurface Mitigation**

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

#### **Rotary Drilling with Fresh Water:**

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

#### **Directional Drilling:**

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

#### **Lost Circulation:**

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

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

**Abandonment Cementing:**

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

**Pressure Testing:**

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

## **VI. CONSTRUCTION**

### **A. NOTIFICATION**

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

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

### **B. TOPSOIL**

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

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

### **C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

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

### **D. FEDERAL MINERAL MATERIALS PIT**

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

### **E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

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

### **F. EXCLOSURE FENCING (CELLARS & PITS)**

**Exclosure Fencing**

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

**G. ON LEASE ACCESS ROADS****Road Width**

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

**Surfacing**

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

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

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

**Crowning**

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

**Ditching**

Ditching shall be required on both sides of the road.

**Turnouts**

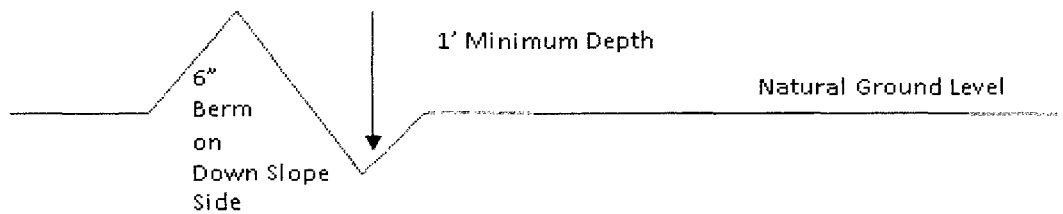
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**Drainage**

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

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

#### **Cross Section of a Typical Lead-off Ditch**



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

#### **Formula for Spacing Interval of Lead-off Ditches**

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

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

#### **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

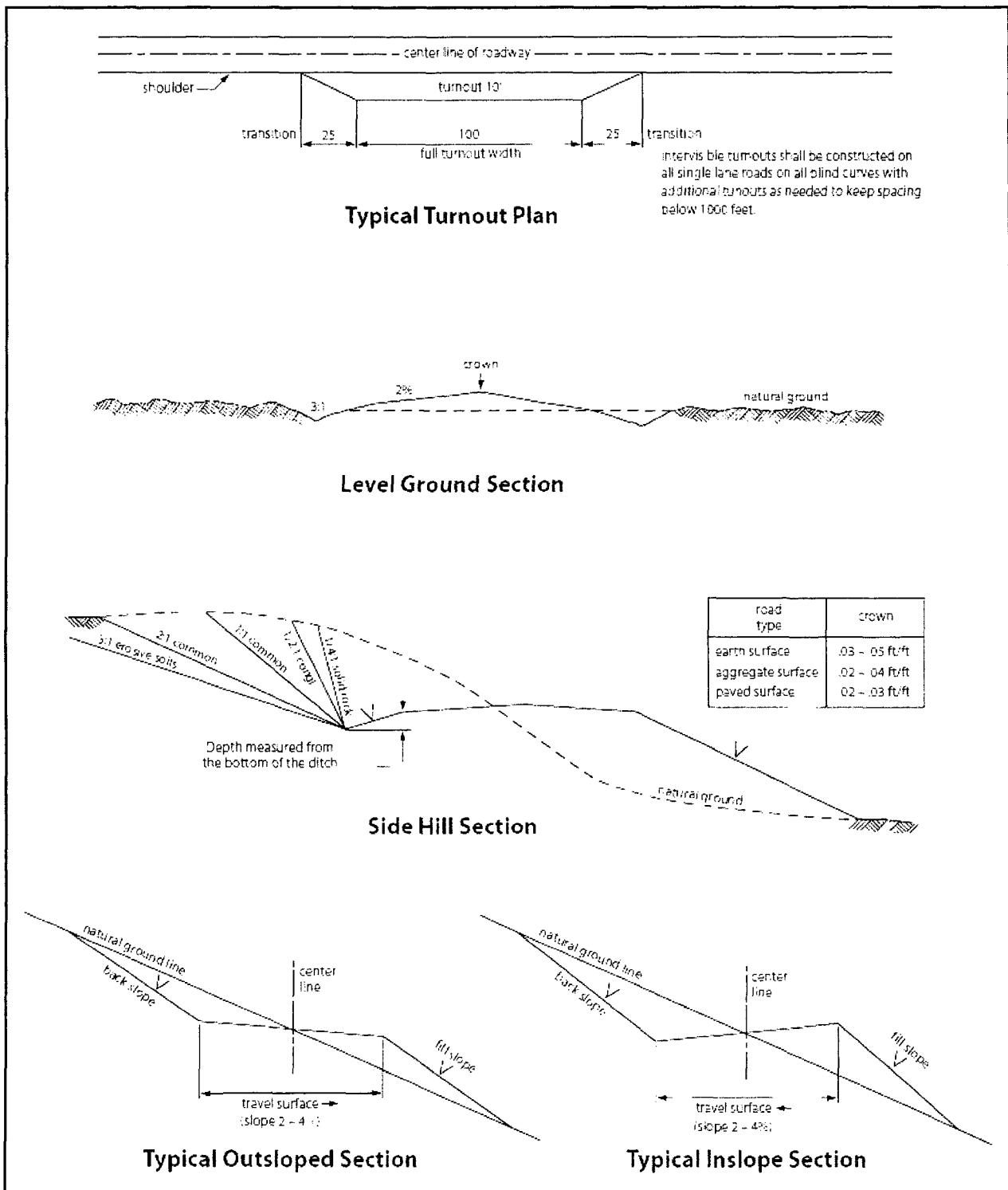


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## **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 or dune 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.

## **VIII. INTERIM RECLAMATION**

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

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

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

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

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

## **IX. FINAL ABANDONMENT & RECLAMATION**

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

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

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

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

### **Seed Mixture 1 for Loamy Sites**

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

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

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

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

\*Pounds of pure live seed:

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