Form 3160-3
(March 2012)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM129267

6. If Indian, Allotee or Tribe Name:

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

8. Lease Name and Well No.: WEST GRAMA RIDGE 8 5 FEDER 2H

2. Name of Operator: CIMAREX ENERGY CO [215099]

9. API Well No.: 30-025-43554

3a. Address: 202 S. Cheyenne Ave., Ste 1000 Tulsa OK 74

3b. Phone No. *(include area code)*: (432)620-1936

10. Field and Pool, or Exploratory: GRAMA RIDGE; BONE SPRING WEST [28432]

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

At surface: SESW / 280 FSL / 2000 FWL / LAT 32.399739 / LONG -103.494114

At proposed prod. zone: LOT 3 / 330 FNL / 1880 FWL / LAT 32.4271472 / LONG -103.4944361

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 8 / T22S / R34E / NMP

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

12. County or Parish: LEA

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 280 feet

16. No. of acres in lease: 1078.3

17. Spacing Unit dedicated to this well: 160

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 0 feet

19. Proposed Depth: 10960 feet / 20518 feet

20. BLM/BIA Bond No. on file: FED: NMB001188

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3531 feet

22. Approximate date work will start*: 02/01/2017

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

25. Signature: (Electronic Submission)

Name *(Printed/Typed)*: Aricka Easterling / Ph: (918)560-7060

Date: 10/31/2016

Title: Regulatory Analyst

Approved by *(Signature)*: (Electronic Submission)

Name *(Printed/Typed)*: Christopher Walls / Ph: (575)234-2234

Date: 12/28/2016

Title: Petroleum Engineer

Office: 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)

Kz 01/23/2017

APPROVED WITH CONDITIONS

INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.
AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160
PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.
ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.
EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Additional Operator Remarks

Location of Well

1. SHL: 280 FSL / 2000 FWL / TWSP: 22S / RANGE: 34E / SECTION: 8 / LAT: 32.399739 / LONG: -103.494114 (TVD: 10960 feet, MD: 20518 feet)
   PPP: 1 FSL / 1703 FWL / TWSP: 22S / RANGE: 34E / SECTION: 5 / LAT: 32.4134861 / LONG: -103.4945611 (TVD: 10838 feet, MD: 15546 feet)
   PPP: 282 FSL / 1987 FWL / TWSP: 22S / RANGE: 34E / SECTION: 8 / LAT: 32.3997444 / LONG: -103.4941556 (TVD: 10248 feet, MD: 10250 feet)
   BHL: LOT 3 / 330 FNL / 1880 FWL / TWSP: 22S / RANGE: 34E / SECTION: 5 / LAT: 32.4271472 / LONG: -103.4944361 (TVD: 10960 feet, MD: 20518 feet)

BLM Point of Contact

Name: Deborah McKinney
Title: Legal Instruments Examiner
Phone: 5752345931
Email: dmckinne@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.

APD ID: 10400006232
Operator Name: CIMAREX ENERGY CO
Well Name: WEST GRAMA RIDGE 8-5 FEDERAL
Well Type: OIL WELL

Submission Date: 10/31/2016
Federal/Indian APD: FED
Well Number: 2H
Well Work Type: Drill

Highlight
All Changes

Application

Section 1 - General

APD ID: 10400006232 **Tie to previous NOS?** 10400005801 **Submission Date:** 10/31/2016

BLM Office: HOBBS **User:** Aricka Easterling **Title:** Regulatory Analyst

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

Lease number: NMNM129267 **Lease Acres:** 1078.3

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:** CIMAREX ENERGY CO

Operator letter of designation:

Keep application confidential? YES

Permitting Agent Information

Agent Address: **Zip:**

Agent PO Box:

Agent city: **State:**

Agent Phone:

Agent Internet Address:

Operator Info

Operator Organization Name: CIMAREX ENERGY CO

Operator Address: 202 S. Cheyenne Ave., Ste 1000 **Zip:** 74103

Operator PO Box:

Operator City: Tulsa **State:** OK

Operator Phone: (432)620-1936

Operator Internet Address: tstathem@cimarex.com

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

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: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** BONE SPRING **Pool Name:** GRAMA RIDGE; BONE SPRING WEST

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

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** 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: **Distance to nearest well:** 0 FT **Distance to lease line:** 280 FT

Reservoir well spacing assigned acres Measurement: 160 Acres

Well plat: W Grama 8_5 Fed Com 2H_C-102 Plat_10-27-2016.pdf

Well work start Date: 02/01/2017 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 0

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** LEA
	Latitude: 32.399739	**Longitude:** -103.494114	
SHL	**Elevation:** 3531	**MD:** 20518	**TVD:** 10960
Leg #: 1	**Lease Type:** STATE	**Lease #:** STATE	
	NS-Foot: 280	**NS Indicator:** FSL	

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

	EW-Foot: 2000	**EW Indicator:** FWL	
	Twsp: 22S	**Range:** 34E	**Section:** 8
	Aliquot: SESW	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** LEA
	Latitude: 32.3997389	**Longitude:** -103.4941139	
KOP	**Elevation:** -6607	**MD:** 10138	**TVD:** 10138
Leg #: 1	**Lease Type:** STATE	**Lease #:** STATE	

	NS-Foot: 280	**NS Indicator:** FSL	
	EW-Foot: 2000	**EW Indicator:** FWL	
	Twsp: 22S	**Range:** 34E	**Section:** 8
	Aliquot: SESW	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** LEA
	Latitude: 32.4134861	**Longitude:** -103.4945611	
PPP	**Elevation:** -7307	**MD:** 15546	**TVD:** 10838
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMNM129267	

	NS-Foot: 1	**NS Indicator:** FSL	
	EW-Foot: 1703	**EW Indicator:** FWL	
	Twsp: 22S	**Range:** 34E	**Section:** 5
	Aliquot: SESW	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** LEA
	Latitude: 32.3997444	**Longitude:** -103.4941556	
PPP	**Elevation:** -6717	**MD:** 10250	**TVD:** 10248
Leg #: 1	**Lease Type:** STATE	**Lease #:** STATE	

	NS-Foot: 282	**NS Indicator:** FSL	
	EW-Foot: 1987	**EW Indicator:** FWL	
	Twsp: 22S	**Range:** 34E	**Section:** 8
	Aliquot: SESW	**Lot:**	**Tract:**

	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL	**County:** LEA
	Latitude: 32.4271472	**Longitude:** -103.4944361	
EXIT	**Elevation:** -7429	**MD:** 20518	**TVD:** 10960
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMNM129267	

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

	NS-Foot: 330	**NS Indicator:** FNL			
	EW-Foot: 1880	**EW Indicator:** FWL			
	Twsp: 22S	**Range:** 34E		**Section:** 5	
	Aliquot:	**Lot:** 3		**Tract:**	
	STATE: NEW MEXICO	**Meridian:** NEW MEXICO PRINCIPAL		**County:** LEA	
	Latitude: 32.4271472	**Longitude:** -103.4944361			
BHL	**Elevation:** -7429	**MD:** 20518		**TVD:** 10960	
Leg #: 1	**Lease Type:** FEDERAL	**Lease #:** NMNM129267			
	NS-Foot: 330	**NS Indicator:** FNL			
	EW-Foot: 1880	**EW Indicator:** FWL			
	Twsp: 22S	**Range:** 34E		**Section:** 5	
	Aliquot:	**Lot:** 3		**Tract:**	

Drilling Plan

Section 1 - Geologic Formations

ID: Surface formation **Name:** RUSTLER

Lithology(ies):

Elevation: 3540 **True Vertical Depth:** 1530 **Measured Depth:** 1530

Mineral Resource(s):

USEABLE WATER

Is this a producing formation? N

ID: Formation 1 **Name:** SALADO

Lithology(ies):

Elevation: 1860 **True Vertical Depth:** 1680 **Measured Depth:** 1680

Mineral Resource(s):

NONE

Is this a producing formation? N

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

ID: Formation 2 **Name:** BASE OF SALT

Lithology(ies):

Elevation: -200 **True Vertical Depth:** 3740 **Measured Depth:** 3740

Mineral Resource(s):

NONE

Is this a producing formation? N

ID: Formation 3 **Name:** CAPITAN REEF

Lithology(ies):

Elevation: -700 **True Vertical Depth:** 4240 **Measured Depth:** 4240

Mineral Resource(s):

NONE

Is this a producing formation? N

ID: Formation 4 **Name:** DELAWARE SAND

Lithology(ies):

Elevation: -1620 **True Vertical Depth:** 5160 **Measured Depth:** 5160

Mineral Resource(s):

NONE

Is this a producing formation? N

ID: Formation 5 **Name:** BONE SPRING

Lithology(ies):

Elevation: -5100 **True Vertical Depth:** 8640 **Measured Depth:** 8640

Mineral Resource(s):

OIL

Is this a producing formation? N

ID: Formation 6 **Name:** BONE SPRING 1ST

Lithology(ies):

Elevation: -6160 **True Vertical Depth:** 9700 **Measured Depth:** 9700

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 7 **Name:** BONE SPRING 2ND

Lithology(ies):

Elevation: -6710 **True Vertical Depth:** 10250 **Measured Depth:** 10250

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? Y

ID: Formation 8 **Name:** BONE SPRING 2ND

Lithology(ies):

Elevation: -6990 **True Vertical Depth:** 10530 **Measured Depth:** 10530

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? Y

ID: Formation 9 **Name:** BONE SPRING 3RD

Lithology(ies):

Elevation: -7140 **True Vertical Depth:** 10680 **Measured Depth:** 10680

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

Section 2 - Blowout Prevention

Pressure Rating (PSI): 2M **Rating Depth:** 5140

Equipment: Exhibit “E-1”. A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.
Requesting Variance? YES

Variance request: Co-flex line between the BOP & choke manifold. Certification for proposed co-flex hose is attached (Please see Exhibit F, F-1, F-2, F-3). The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.
Testing Procedure: BOP’s will be tested by an independent service company. The ram preventers, choke manifold, and safety valves will be tested as follows: On the surface casing, pressure tests will be made to 250 psi low and 3000 psi high. On the intermediate casing, pressure tests will be made to 250 psi low and 10000 psi high. The Annular Preventer will be tested to 250 psi low and 1500 psi high on the surface casing and 250 psi low and 5000 psi high on the intermediate casing.

Choke Diagram Attachment:

W Grama 8_5 Fed Com 2H_ Choke_10-05-2016.pdf

BOP Diagram Attachment:

W Grama 8_5 Fed Com 2H_ BOP 2M_10-05-2016.pdf

Pressure Rating (PSI): 3M **Rating Depth:** 20518

Equipment: Exhibit “E-1”. A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.
Requesting Variance? YES

Variance request: Co-flex line between the BOP & choke manifold. Certification for proposed co-flex hose is attached (Please see Exhibit F, F-1, F-2, F-3). The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.
Testing Procedure: BOP’s will be tested by an independent service company. The ram preventers, choke manifold, and safety valves will be tested as follows: On the surface casing, pressure tests will be made to 250 psi low and 3000 psi high. On the intermediate casing, pressure tests will be made to 250 psi low and 10000 psi high. The Annular Preventer will be tested to 250 psi low and 1500 psi high on the surface casing and 250 psi low and 5000 psi high on the intermediate casing.

Choke Diagram Attachment:

W Grama 8_5 Fed Com 2H_ Choke_10-05-2016.pdf

BOP Diagram Attachment:

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

W Grama 8_5 Fed Com 2H_ Choke_10-05-2016.pdf

W Grama 8_5 Fed Com 2H_ BOP 3M_10-05-2016.pdf

Section 3 - Casing

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

Hole Size: 8.75

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

Top setting depth MSL: -7307

Bottom setting depth MD: 10138 **Bottom setting depth TVD:** 10138

Bottom setting depth MSL: -17445

Calculated casing length MD: 10138

Casing Size: 5.5 **Other Size**

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

Weight: 20

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

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 1.82 **Burst Design Safety Factor:** 1.89

Joint Tensile Design Safety Factor type: BUOYANT **Joint Tensile Design Safety Factor:** 2.23

Body Tensile Design Safety Factor type: BUOYANT **Body Tensile Design Safety Factor:** 2.23

Casing Design Assumptions and Worksheet(s):

W Grama 8_5 Fed Com 2H_Casing Assumptions_10-04-2016.pdf

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

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

Hole Size: 17.5

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

Top setting depth MSL: -7307

Bottom setting depth MD: 1430 **Bottom setting depth TVD:** 1430

Bottom setting depth MSL: -8737

Calculated casing length MD: 1430

Casing Size: 13.375 **Other Size**

Grade: OTHER **Other Grade:** H-40/J-55 Hybrid

Weight: 48

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

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 1.13 **Burst Design Safety Factor:** 2.64

Joint Tensile Design Safety Factor type: BUOYANT **Joint Tensile Design Safety Factor:** 4.69

Body Tensile Design Safety Factor type: BUOYANT **Body Tensile Design Safety Factor:** 4.69

Casing Design Assumptions and Worksheet(s):

W Grama 8_5 Fed Com 2H_Casing Assumptions_10-04-2016.pdf

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **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: -7307

Bottom setting depth MD: 5140 **Bottom setting depth TVD:** 5140

Bottom setting depth MSL: -12447

Calculated casing length MD: 5140

Casing Size: 9.625 **Other Size**

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

Weight: 40

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

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 1.33 **Burst Design Safety Factor:** 1.45

Joint Tensile Design Safety Factor type: BUOYANT **Joint Tensile Design Safety Factor:** 2.53

Body Tensile Design Safety Factor type: BUOYANT **Body Tensile Design Safety Factor:** 2.53

Casing Design Assumptions and Worksheet(s):

W Grama 8_5 Fed Com 2H_Casing Assumptions_10-04-2016.pdf

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

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

Hole Size: 8.75

Top setting depth MD: 10138 **Top setting depth TVD:** 10138

Top setting depth MSL: -17445

Bottom setting depth MD: 20518 **Bottom setting depth TVD:** 20518

Bottom setting depth MSL: -27825

Calculated casing length MD: 10380

Casing Size: 5.5 **Other Size**

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

Weight: 17

Joint Type: BUTT **Other Joint Type:**

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 1.2 **Burst Design Safety Factor:** 1.48

Joint Tensile Design Safety Factor type: BUOYANT **Joint Tensile Design Safety Factor:** 28.41

Body Tensile Design Safety Factor type: BUOYANT **Body Tensile Design Safety Factor:** 28.41

Casing Design Assumptions and Worksheet(s):

W Grama 8_5 Fed Com 2H_Casing Assumptions_10-04-2016.pdf

Section 4 - Cement

Casing String Type: SURFACE

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 1430 **Cement Type:** Class C

Additives: Bentonite **Quantity (sks):** 694 **Yield (cu.ff./sk):** 1.72

Density: 13.5 **Volume (cu.ft.):** 1192 **Percent Excess:** 50

Tail

Top MD of Segment: 0 **Bottom MD Segment:** 1430 **Cement Type:** Class C

Additives: LCM **Quantity (sks):** 168 **Yield (cu.ff./sk):** 1.34

Density: 14.8 **Volume (cu.ft.):** 248 **Percent Excess:** 25

Casing String Type: INTERMEDIATE

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 5140 **Cement Type:** 35:65 (poz:C)

Additives: Salt Bentonite **Quantity (sks):** 964 **Yield (cu.ff./sk):** 1.88

Density: 12.9 **Volume (cu.ft.):** 1812 **Percent Excess:** 50

Tail

Top MD of Segment: 0 **Bottom MD Segment:** 5140 **Cement Type:** Class C

Additives: LCM **Quantity (sks):** 292 **Yield (cu.ff./sk):** 1.34

Density: 14.8 **Volume (cu.ft.):** 391 **Percent Excess:** 25

Casing String Type: PRODUCTION

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 10138 **Cement Type:** Tuned Light I Class H

Additives: N/A **Quantity (sks):** 695 **Yield (cu.ff./sk):** 2.35

Density: 10.8 **Volume (cu.ft.):** 1631 **Percent Excess:** 25

Tail

Top MD of Segment: 10138 **Bottom MD Segment:** 20518 **Cement Type:** 50:50 (Poz:H)

Additives: Salt, Bentonite, Fluid Loss, Distersant, SMS **Quantity (sks):** 2220 **Yield (cu.ff./sk):** 1.3

Density: 14.2 **Volume (cu.ft.):** 2885 **Percent Excess:** 10

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Stage Tool Depth:

Lead

Top MD of Segment: 0 **Bottom MD Segment:** 10138 **Cement Type:** Tuned Light I Class H

Additives: N/A **Quantity (sks):** 695 **Yield (cu.ff./sk):** 2.35

Density: 10.8 **Volume (cu.ft.):** 1631 **Percent Excess:** 25

Tail

Top MD of Segment: 10138 **Bottom MD Segment:** 20518 **Cement Type:** 50:50 (poz:H)

Additives: Slat, Bentonite, Fluid Loss, Dispersant, SMS **Quantity (sks):** 2220 **Yield (cu.ff./sk):** 1.3

Density: 14.2 **Volume (cu.ft.):** 2885 **Percent Excess:** 10

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 will be kept on location at all times in order to combat lost circulation or unexpected kicks. In order to run DSTs, open hole logs, and casing, the viscosity and water loss may have to be adjusted in order to meet these needs.
Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth: 0 **Bottom Depth:** 1430

Mud Type: SPUD MUD

Min Weight (lbs./gal.): 8.3 **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:

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Top Depth: 1430 **Bottom Depth:** 5140

Mud Type: SALT SATURATED

Min Weight (lbs./gal.): 9.7 **Max Weight (lbs./gal.):** 10.2

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

PH: **Viscosity (CP):**

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

Additional Characteristics:

Top Depth: 5140 **Bottom Depth:** 20518

Mud Type: OTHER

Min Weight (lbs./gal.): 8.7 **Max Weight (lbs./gal.):** 9.2

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

PH: **Viscosity (CP):**

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

Additional Characteristics:

Section 6 - Test, Logging, Coring

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

No DST Planned

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

CNL,DS,GR

Coring operation description for the well:

N/A

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 5243 **Anticipated Surface Pressure:** 2831.8

Anticipated Bottom Hole Temperature(F): 179

Anticipated abnormal proessures, temperatures, or potential geologic hazards? YES

Describe:

Over-pressured zones are possible from the Oswego through the Mississippi Lime (Meramec and Osage Groups). The Morrow and Springer sandstones may contain the highest possible pressure at approximately 14.5 ppg EMW (1.73x hydrostatic pressure (0.434-psi/foot distilled water) with possible reservoirs of isolated stream- or distributary-channels. Pressure was found in nine section area based on offset DST data.
Lost Circulation Zones of Permian Evaporates (Blaine Anhydrite through the Wellington Evaporates are intermittent from 230-feet-of-depth through 3,300-feet-of-depth). Lost Circulation is can also occur in the Cottage Grove interval in the area.

Contingency Plans geoharzards description:

Sufficient barite material will be available if pressure is encountered. Cimarex also has contingency liner and liner hanger on stand-by if needed to cover up encountered pressure that is deemed too risky to move forward with the drilling of the well. Sufficient LCM material will be on location if lost circulation is encountered. Additional drilling fluid will be stored on location at all times in addition to the drilling rig pit system. Drilling fluid can be mixed on location or mixed in vendor mud plant and trucked to location if needed.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

W Grama 8_5 Fed Com 2H_H2S_10-04-2016.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

W Grama 8_5 Fed Com 2H_Directional Prelim_10-07-2016.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

W Grama 8_5 Fed Com 2H_Drilling Plan_10-04-2016.pdf

Other Variance attachment:

W Grama 8_5 Fed Com 2H_ Flex Hose_10-04-2016.pdf

SUPO

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:

W Grama 8_5 Fed Com 2H_ Road ROW_10-26-2016.pdf

New road type: COLLECTOR

Length: 4545.62 Feet **Width (ft.):** 30

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Max slope (%): 2 **Max grade (%):** 6

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 14

New road access erosion control: The side slopes of any drainage channels or swales that are crossed will be re-contoured to original grade and compacted and mulched as necessary to avoid erosion. Where steeper slopes cannot be avoided, water bars or silt fence will be constructed, mulch/rip-rap applied, or other measures employed as necessary to control erosion. Hay bales, straw waddles or silt fence may also be installed to control erosion as needed. All disturbed areas will be seeded with a mix appropriate for the area unless specified otherwise by the landowner.

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: GRAVEL

Access topsoil source: ONSITE

Access surfacing type description:

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Push off and stockpile alongside the location.

Access other construction information: The operator will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations or other events.

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: CULVERT,LOW WATER

Drainage Control comments: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.

Road Drainage Control Structures (DCS) description: N/A

Road Drainage Control Structures (DCS) attachment:

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

W Grama 8_5 Fed Com 2H_ Existing wells_10-26-2016.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Estimated Production Facilities description:

Production Facilities description: If upon completion the well is a producer, a production facility battery will be constructed and production equipment installed at the wellsite.

Production Facilities map:

W Grama 8_5 Fed Com 2H_ Reclamation and Prod Fac_10-26-2016.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: INTERMEDIATE/PRODUCTION CASING, SURFACE CASING

Water source type: MUNICIPAL

Describe type:

Source latitude:

Source longitude:

Source datum:

Water source permit type: WATER RIGHT

Permit Number:

Source land ownership: PRIVATE

Water source transport method: PIPELINE,TRUCKING

Source transportation land ownership: PRIVATE

Water source volume (barrels): 5000

Source volume (acre-feet): 0.6444655

Source volume (gal): 210000

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Water source use type: INTERMEDIATE/PRODUCTION CASING, SURFACE CASING **Water source type:** MUNICIPAL

Describe type:

Source latitude: **Source longitude:**

Source datum:

Water source permit type:

Permit Number:

Source land ownership: FEDERAL

Water source transport method: PIPELINE,TRUCKING

Source transportation land ownership: FEDERAL

Water source volume (barrels): 5000 **Source volume (acre-feet):** 0.6444655

Source volume (gal): 210000

Water source and transportation map:

W Grama 8_5 Fed Com 2H_Water Route_10-31-2016.pdf

Water source comments:

New water well? NO

New Water Well Info

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

Well target aquifer:

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

Aquifer comments:

Aquifer documentation:

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

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

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

Drilling method: **Drill material:**

Grout material: **Grout depth:**

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

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Section 6 - Construction Materials

Construction Materials description: The drilling and testing operations will be conducted on a watered and compacted native soil grade. Soft spots will be covered with scoria, free of large rocks (3" diameter). Upon completion as a commercial producer the location will be covered with scoria, free of large rocks (3" dia.) from an existing privately owned gravel pit.
Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling Fluids, drill cuttings, water and other waste produced from the well during drilling operations.
Amount of waste: 15000 barrels

Waste disposal frequency : One Time Only

Safe containment description: n/a

Safe containmant attachment:

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

Disposal location description: Haul to R360 commercial Disposal

Waste type: GARBAGE

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

Amount of waste: 32500 pounds

Waste disposal frequency : Weekly

Safe containment description: n/a

Safe containmant attachment:

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

Disposal location description: Windmill Spraying Service hauls trash to Lea County Landfill

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? NO

Description of cuttings location

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

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

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

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

W Grama 8_5 Fed Com 2H_ Loc Layout_10-26-2016.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: NEW

Recontouring attachment:

W Grama 8_5 Fed Com 2H_ Reclamation and Prod Fac_10-26-2016.pdf

Drainage/Erosion control construction: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed

during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.
Drainage/Erosion control reclamation: All disturbed and re-contoured areas would be reseeded according to specifications. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Wellpad long term disturbance (acres): 3.358 **Wellpad short term disturbance (acres):** 3.358

Access road long term disturbance (acres): 3.131 **Access road short term disturbance (acres):** 3.131

Pipeline long term disturbance (acres): 0.0261708 **Pipeline short term disturbance (acres):** 0.0261708

Other long term disturbance (acres): 7.921 **Other short term disturbance (acres):** 7.921

Total long term disturbance: 14.436171 **Total short term disturbance:** 14.436171

Reconstruction method: After well plugging, all disturbed areas would be returned to the original contour or a contour that blends with the surrounding landform including roads unless the surface owner requests that they be left intact. In consultation with the surface owners it will be determined if any gravel or similar materials used to reinforce an area are to be removed, buried, or left in place during final reclamation. Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated. As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, or fertilizing. Reclamation, Re-vegetation, and Drainage: All disturbed and recontoured areas would be reseeded using techniques outlined under Phase I and II of this plan or as specified by the land owner. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.
Topsoil redistribution: Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated.

Soil treatment: As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching or fertilizing.
Existing Vegetation at the well pad: n/a

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: n/a

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: n/a

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: n/a

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

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

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: 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:

Section 11 - Surface Ownership

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Disturbance type: WELL PAD

Describe:

Surface Owner: STATE GOVERNMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office: NM STATE LAND OFFICE

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

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

Section 12 - Other Information

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

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite held on 9/27/16 with BLM (Jeff Robertson) and Cimarex (Barry Hunt)

Other SUPO Attachment

W Grama 8_5 Fed Com 2H_CBS Receipt_10-18-2016.pdf
W Grama 8_5 Fed Com 2H_ ELine_10-26-2016.pdf
W Grama 8_5 Fed Com 2H_ Public access Road_10-26-2016.pdf
W Grama 8_5 Fed Com 2H_ Topo Map_10-26-2016.pdf
W Grama 8_5 Fed Com 2H_ Directions_10-26-2016.pdf

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

W Grama 8_5 Fed Com 2H_C-102 Plat_10-27-2016.pdf
W Grama 8_5 Fed Com 2H_SUPO_10-27-2016.pdf
W Grama 8_5 Fed Com 2H_ Gas_10-27-2016.pdf
W Grama 8_5 Fed Com 2H_ RigDiagram_10-27-2016.pdf

PWD

Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

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

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001188

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

Operator Certification

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

NAME: Aricka Easterling **Signed on:** 10/19/2016

Title: Regulatory Analyst

Street Address: 202 S. Cheyenne Ave, Ste 1000

Operator Name: CIMAREX ENERGY CO

Well Name: WEST GRAMA RIDGE 8-5 FEDERAL **Well Number:** 2H

City: Tulsa **State:** OK **Zip:** 74103

Phone: (918)560-7060

Email address: aeasterling@cimarex.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

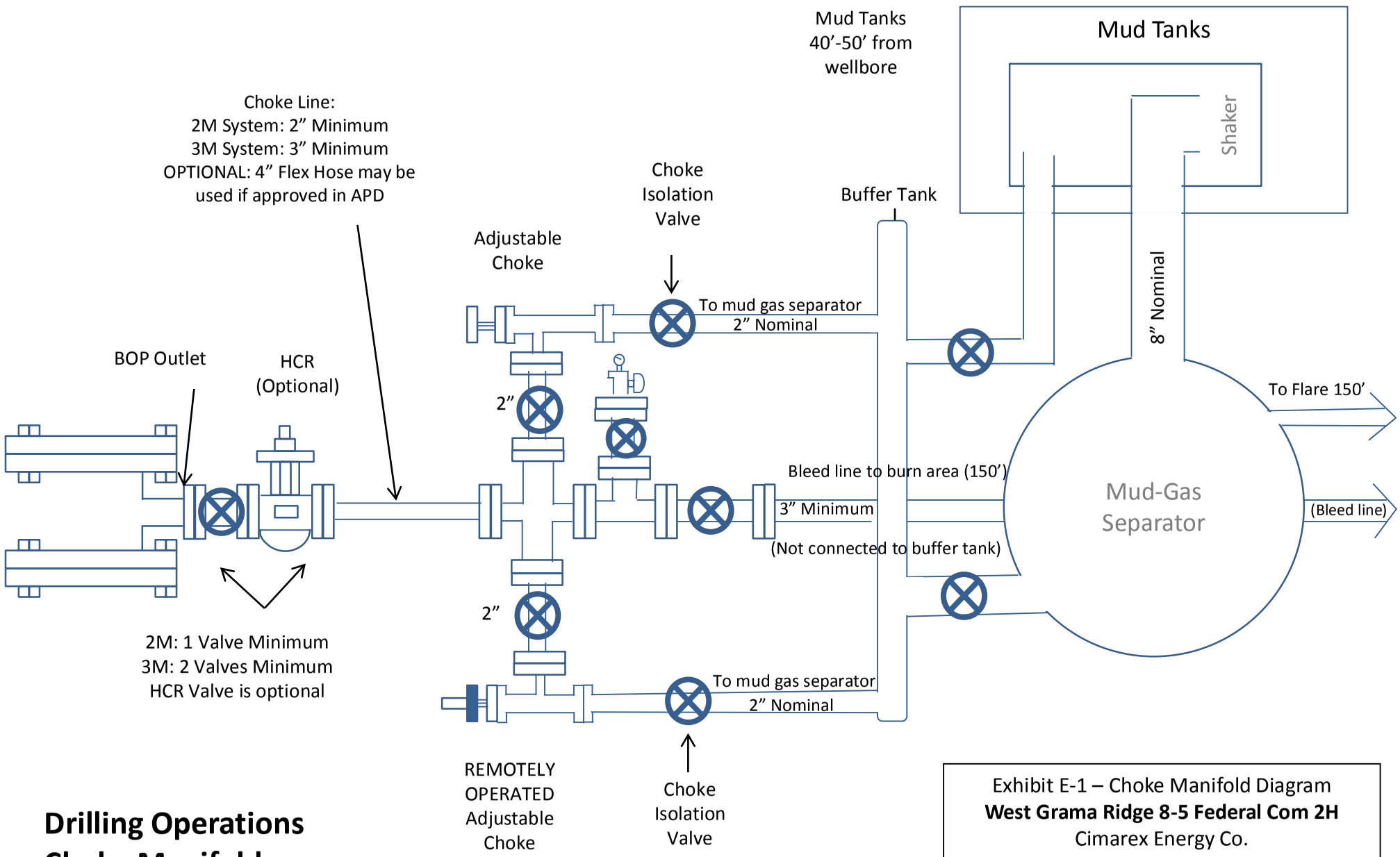
Email address:

Payment Info

Payment

APD Fee Payment Method: BLM DIRECT

CBS Receipt number: 3677543



Drilling Operations
Choke Manifold
2M/3M Service

Exhibit E-1 – Choke Manifold Diagram
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Drilling 12-1/4” hole
below 13 3/8” Casing

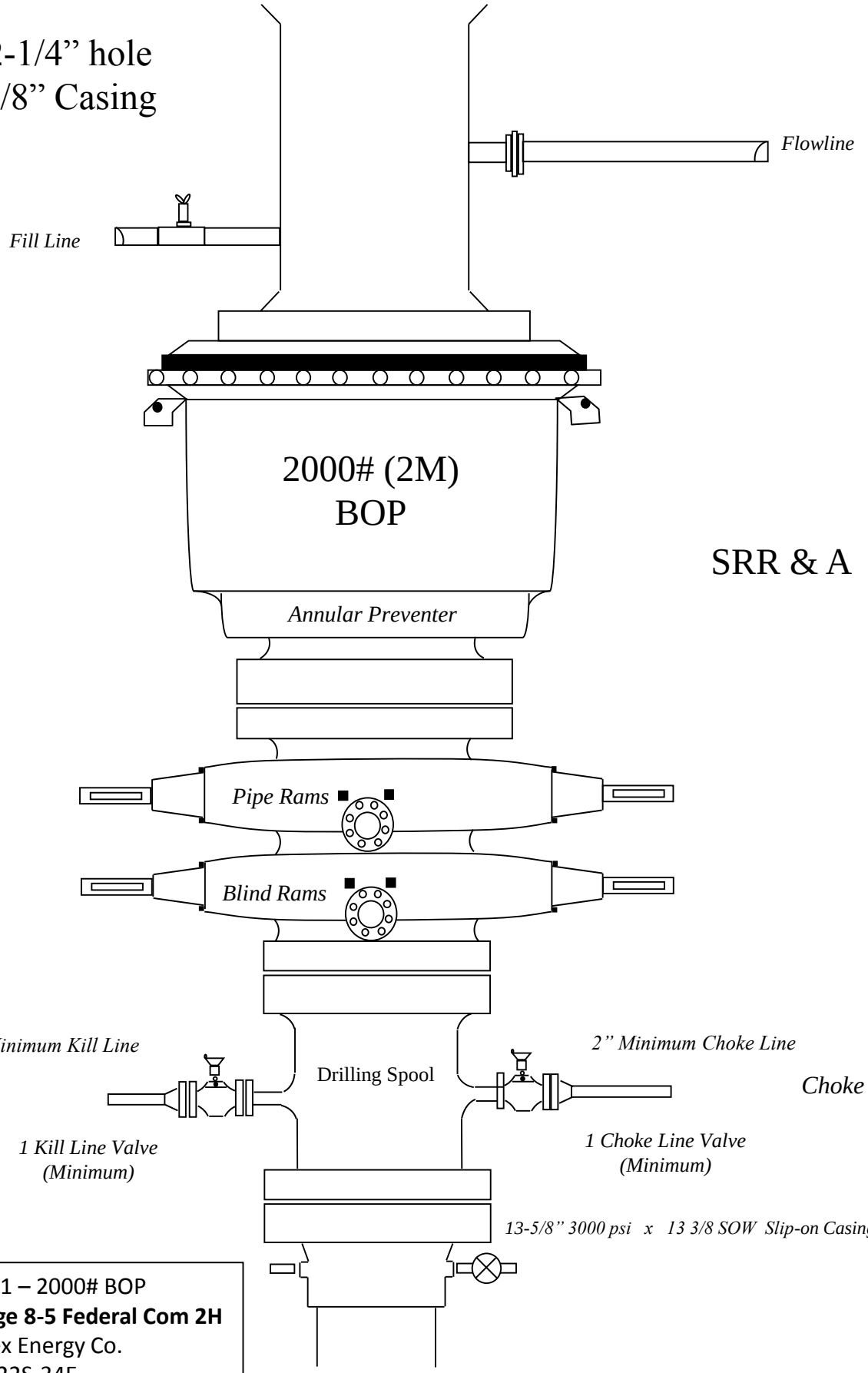
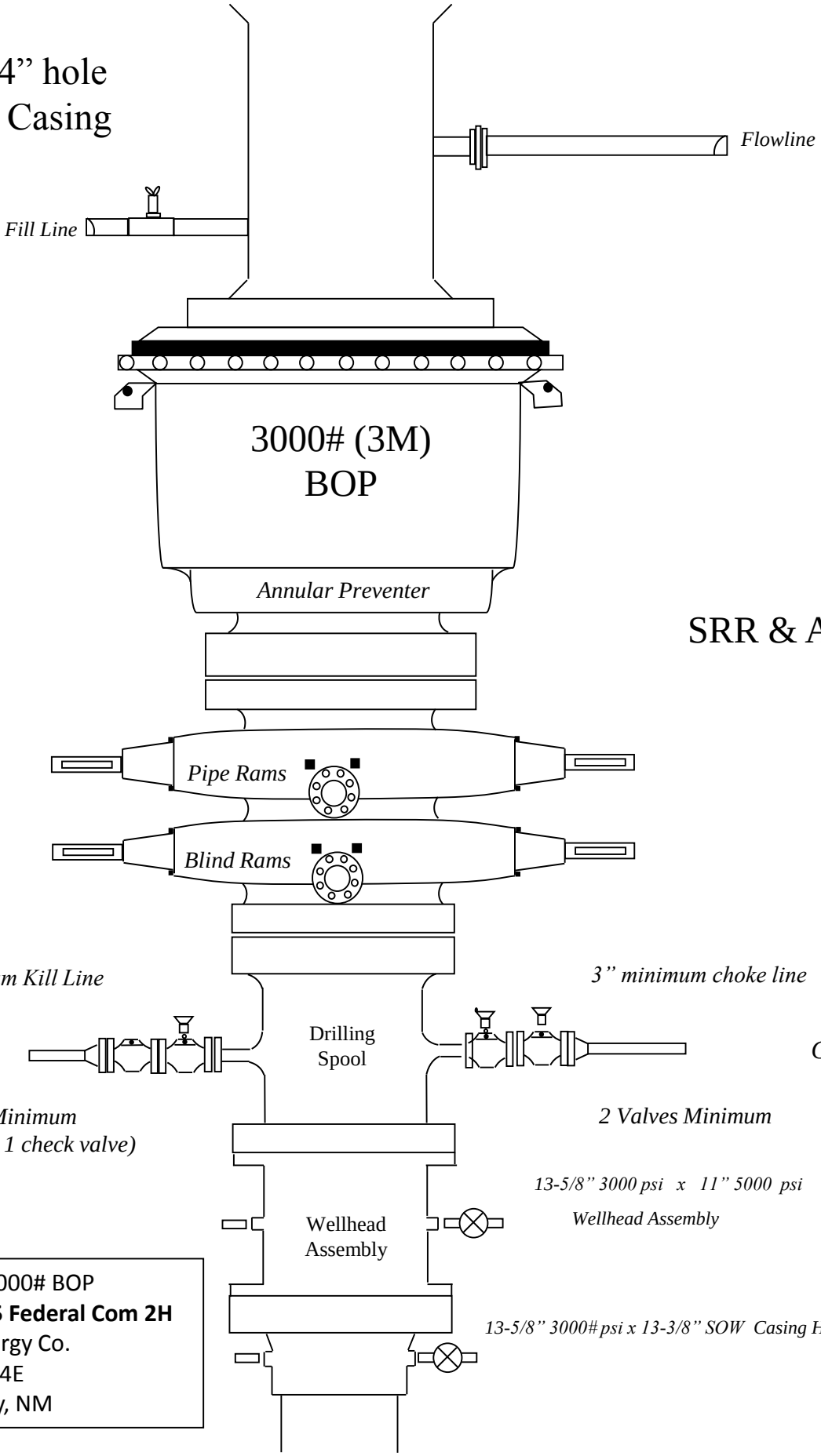


Exhibit E-1 – 2000# BOP
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Drilling 8-3/4" hole
below 9 5/8" Casing



SRR & A

Exhibit E-1 – 3000# BOP
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

West Grama Ridge 8-5 Federal Com 2H

Casing Assumptions

Hole Size	Casing Depth From	Casing Depth To	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	1430	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.13	2.64	4.69
12 1/4	0	5140	9-5/8"	40.00	J-55	LT&C	1.33	1.45	2.53
8 3/4	0	10138	5-1/2"	20.00	L-80	LT&C	1.82	1.89	2.23
8 3/4	10138	20518	5-1/2"	17.00	L-80	BT&C	1.20	1.48	28.41
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

1. Geological Formations

TVD of target 10,960
MD at TD 20,518

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	1530	N/A	
Salado	1680	N/A	
Base of Salt	3740	N/A	
Delaware Sands	5160	N/A	
Bone Spring	8640	N/A	
1st Bone Spring	9700	Hydrocarbons	
2nd Bone Spring Sand	10250	Hydrocarbons	
2nd BSPG Sand Target	10530	Hydrocarbons	
3rd Bone spring	10680	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	1430	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.13	2.64	4.69
12 1/4	0	5140	9-5/8"	40.00	J-55	LT&C	1.33	1.45	2.53
8 3/4	0	10138	5-1/2"	20.00	L-80	LT&C	1.82	1.89	2.23
8 3/4	10138	20518	5-1/2"	17.00	L-80	BT&C	1.20	1.48	28.41
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

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

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

3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft3/sack	H2O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	694	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	186	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	964	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	292	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	695	10.80	2.35	9.60	17:43	Lead: Tuned Light I Class H
	2220	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface	0	45
Intermediate	0	44
Production	4940	15

4. Pressure Control Equipment

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

BOP installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
12 1/4	**13 5/8**	**2M**	Annular	X	50% of working pressure
			Blind Ram	X	2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	**13 5/8**	**3M**	Annular	X	50% of working pressure
			Blind Ram	X	3M
			Pipe Ram		
			Double Ram	X	
			Other		

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

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

	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.	
X	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.	
	N	Are anchors required by manufacturer?

5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 1430'	FW Spud Mud	8.30 - 8.80	28	N/C
1430' to 5140'	Brine Water	9.70 - 10.20	30-32	N/C
5140' to 20518'	FW/Cut Brine	8.70 - 9.20	30-32	N/C

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

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

6. Logging and Testing Procedures

Logging, Coring and Testing	
X	Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No logs are planned based on well control or offset log information.
	Drill stem test?
	Coring?

Additional Logs Planned	Interval

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	5243 psi
Abnormal Temperature	No

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

8. Other Facets of Operation

Exhibit F – Co-Flex Hose

West Grama Ridge 8-5 Federal Com 2H

Cimarex Energy Co.

8-22S-34E

Lea County, NM

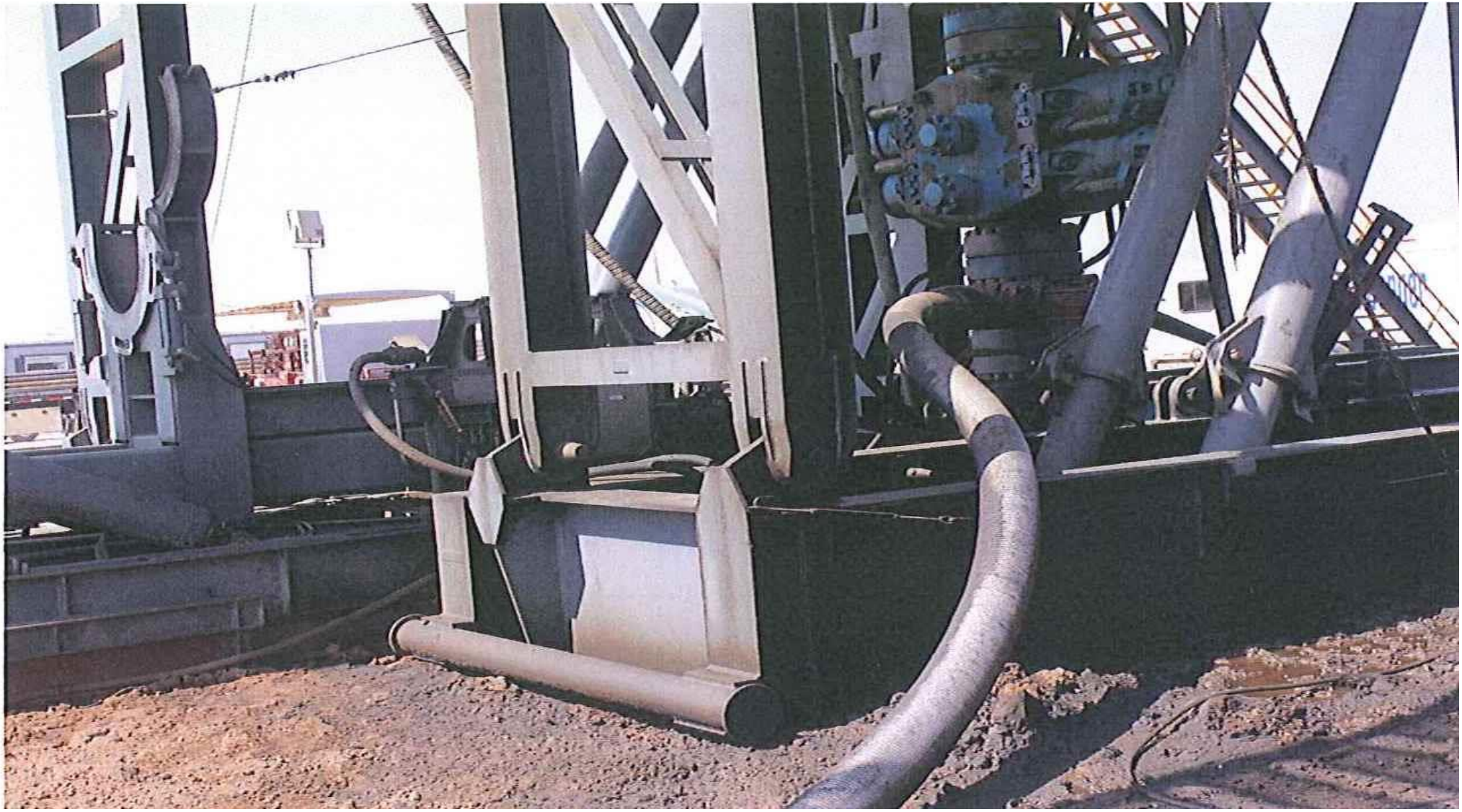


Exhibit F-1 – Co-Flex Hose Hydrostatic Test
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Midwest Hose & Specialty, Inc.

INTERNAL HYDROSTATIC TEST REPORT

Customer:	P.O. Number:
Oderco Inc	odyd-271

HOSE SPECIFICATIONS

Type:	Hose Length:
Stainless Steel Armor Choke & Kill Hose	45'ft.

I.D.	O.D.
4 INCHES	9 INCHES

WORKING PRESSURE	TEST PRESSURE	BURST PRESSURE
10,000 PSI	15,000 PSI	0 PSI

COUPLINGS

Stem Part No.	Ferrule No.
OKC OKC	OKC OKC
Type of Coupling: Swage-It	

PROCEDURE

Hose assembly pressure tested with water at ambient temperature.

TIME HELD AT TEST PRESSURE	ACTUAL BURST PRESSURE:
15 MIN.	0 PSI

Hose Assembly Serial Number:	Hose Serial Number:
79793	OKC

Comments:

Date:	Tested:	Approved:
3/8/2011	A. Jaime Sanchez	

Midwest Hose & Specialty, Inc.

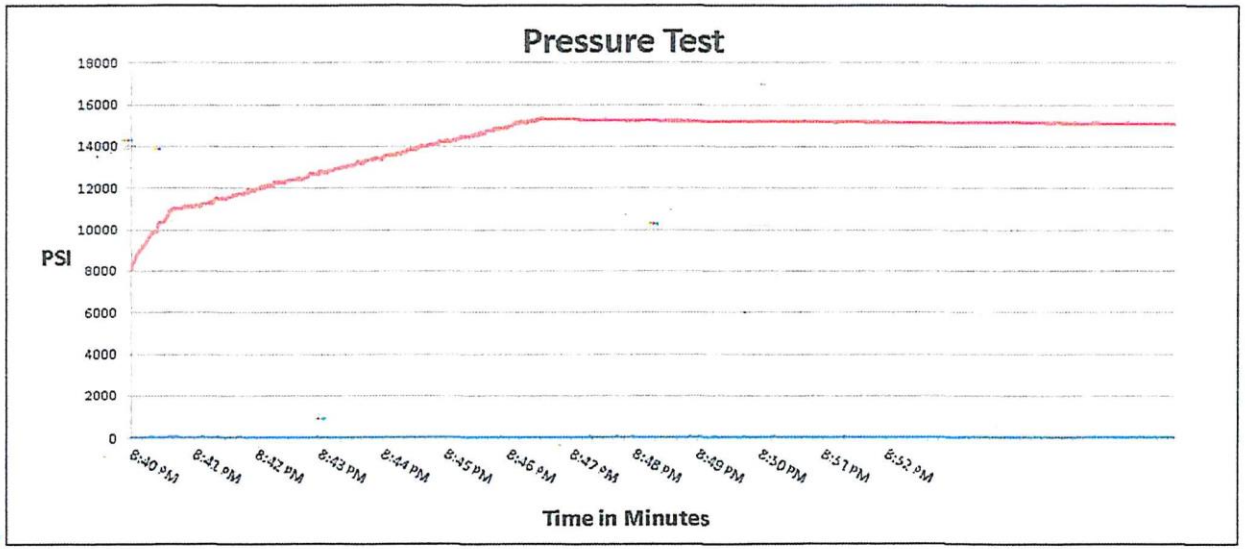
Internal Hydrostatic Test Graph

March 3, 2011

Customer: Houston

Pick Ticket #: 94260

Hose Specifications		Verification	
Hose Type	**Length**	**Type of Fitting**	**Coupling Method**
C & K	45'	4 1/16 10K	Swage
I.D.	**O.D.**	**Die Size**	**Final O.D.**
4"	6.09"	6.38"	6.25"
Working Pressure	**Burst Pressure**	**Hose Serial #**	**Hose Assembly Serial #**
10000 PSI	Standard Safety Multiplier Applies	5544	79793



Test Pressure	Time Held at Test Pressure	Actual Burst Pressure	Peak Pressure
15000 PSI	11 Minutes		15483 PSI

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

Tested By: *Zac Mcconnell*

Approved By: *Kim Thomas*

Exhibit F-1 – Co-Flex Hose Hydrostatic Test
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Exhibit F-2 – Co-Flex Hose
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Midwest Hose & Specialty, Inc.

Certificate of Conformity

Customer: DEM	PO ODYD-271
SPECIFICATIONS	
Sales Order 79793	Dated: 3/8/2011

We hereby cerify that the 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.
10640 Tanner Road
Houston, Texas 77041

Comments:

Approved: Samuel Garcia	Date: 3/8/2011

Midwest Hose & Specialty, Inc.

Exhibit F -3– Co-Flex Hose
West Grama Ridge 8-5 Federal Com 2H
Cimarex Energy Co.
8-22S-34E
Lea County, NM

Specification Sheet
Choke & Kill Hose

The Midwest Hose & Specialty Choke & Kill hose is manufactured with only premium componets.The reinforcement cables, inner liner and cover are made of the highest quality material to handle the tough drilling applications of today's industry. The end connections are available with API flanges, API male threads, hubs, hammer unions or other special fittings upon request. Hose assembly is manufactured to API 7K. This assembly is wrapped with fire resistant vermculite coated fiberglass insulation, rated at 2000 degrees with stainless steel armor cover.

Working Pressure:	5,000 or 10,000 psi working pressure
Test Pressure:	10,000 or 15,000 psi test pressure
Reinforcement:	Multiple steel cables
Cover:	Stainless Steel Armor
Inner Tube:	Petroleum resistant, Abrasion resistant
End Fitting:	API flanges, API male threads, threaded or butt weld hammer unions, unibolt and other special connections
Maximum Length:	110 Feet
ID:	2-1/2", 3", 3-1/2", 4"
Operating Temperature:	-22 deg F to +180 deg F (-30 deg C to +82 deg C)

P.O. Box 96558 – 1421 S.E. 29th St. Oklahoma City, OK 73143 * (405) 670-6718 * Fax: (405) 670-6816