

OCD Hobbs

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

F/F

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

HOBBS OCD  
MAR 08 2019  
RECEIVED

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM117125
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zones		7. If Unit or CA Agreement, Name and No.
2. Name of Operator MATADOR PRODUCTION COMPANY (228937)		8. Lease Name and Well No. BRAD LUMMIS FED COM 221H (324861)
3a. Address 5400 LBJ Freeway, Suite 1500 Dallas TX 75240	3b. Phone No. (include area code) (972)371-5200	9. API-Well No. 30-025-45709 (2220)
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface NWNW / 429 FNL / 424 FWL / LAT 32.2091103 / LONG -103.4479093 At proposed prod. zone SWSW / 240 FSL / 330 FWL / LAT 32.1964375 / LONG -103.4482168		10. Field and Pool, or Exploratory WOLFCAMP / ANTELOPE RIDGE; BS, N
14. Distance in miles and direction from nearest town or post office*		11. Sec., T, R, M, or Blk. and Survey or Area SEC 23 / T24S / R34E / NMP
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 424 feet		12. County or Parish LEA
16. No of acres in lease 400		13. State NM
17. Spacing Unit dedicated to this well 320		
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 30 feet		20. BLM/BIA Bond No. in file FED: NMB001079
19. Proposed Depth 13275 feet / 18001 feet		
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3493 feet		22. Approximate date work will start* 12/01/2018
23. Estimated duration 30 days		
24. Attachments		

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

- |  |   |
|--|---|
| 1. Well plat certified by a registered surveyor.   | 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 requested by the BLM.            |

25. Signature (Electronic Submission)	Name (Printed/Typed) Lara Thompson / Ph: (505)254-1115	Date 08/31/2018
Title Assistant Project Manager		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575)234-5959	Date 01/25/2019
Title Assistant Field Manager Lands & Minerals Office CARLSBAD		

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

Conditions of approval, if any, are attached.

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

SCP Rec 03/08/19

KZ  
07/10/19

**APPROVED WITH CONDITIONS**  
Approval Date: 01/25/2019

Double sided

## 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.

**ITEM 24:** If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

## 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 Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

## Additional Operator Remarks

### Location of Well

1. SHL: NWNW / 429 FNL / 424 FWL / TWSP: 24S / RANGE: 34E / SECTION: 23 / LAT: 32.2091103 / LONG: -103.4479093 ( TVD: 0 feet, MD: 0 feet )  
PPP: NWNW / 330 FNL / 330 FWL / TWSP: 24S / RANGE: 34E / SECTION: 23 / LAT: 32.2093843 / LONG: -103.4482115 ( TVD: 13275 feet, MD: 13761 feet )  
BHL: SWSW / 240 FSL / 330 FWL / TWSP: 24S / RANGE: 34E / SECTION: 23 / LAT: 32.1964375 / LONG: -103.4482168 ( TVD: 13275 feet, MD: 18001 feet )

### BLM Point of Contact

Name: Tenille Ortiz

Title: Legal Instruments Examiner

Phone: 5752342224

Email: tortiz@blm.gov

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## **Review and Appeal Rights**

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

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**PECOS DISTRICT  
DRILLING CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	MATADOR PRODUCTION COMPANY
LEASE NO.:	NMNM 117125
WELL NAME & NO.:	BRAD LUMIS FED COM 221H
SURFACE HOLE FOOTAGE:	429'/N & 424'/W
BOTTOM HOLE FOOTAGE:	240'/S & 330'/W
LOCATION:	SECTION 23, T24S, R34E, NMPM
COUNTY:	LEA

Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP

**A. HYDROGEN SULFIDE**

1. Hydrogen Sulfide (H<sub>2</sub>S) monitors shall be installed prior to drilling out the surface shoe. 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, provide measured values and formations to the BLM.

**B. CASING**

1. The 13 3/8 inch surface casing shall be set at approximately **1150** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength,

whichever is greater.

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

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

2. The minimum required fill of cement behind the **9 5/8** inch first intermediate casing is:
  - Cement to surface. If cement does not circulate see B.1.a, c-d above.
3. The minimum required fill of cement behind the **7 5/8 X 7** inch second intermediate casing is:
  - Cement should tie-back at least **200** feet into previous casing string. If cement does not circulate see B.1.a, c-d above.
4. The minimum required fill of cement behind the **5 1/2 X 4 1/2** inch production casing is:
  - Cement should tie-back at least **200** feet into previous casing string. Operator shall provide method of verification.

**C. PRESSURE CONTROL**

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
- 2.

**Option 1:**

- i. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M) psi**.
- ii. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **7 5/8 X 7** inch second intermediate casing shoe shall be **10,000 (10M) psi**. **Variance is approved to use a 5M Annular which shall be tested to 5000 psi.**

**Option 2:**

- i. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **10,000 (10M) psi. Variance is approved to use 5M Annular which shall be tested to 5000 psi.**
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. **Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.**
  - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

**D. SPECIAL REQUIREMENT(S)**

**Communitization Agreement**

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

**MHH 01122018**

## GENERAL REQUIREMENTS

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

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

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

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

Lea County  
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)  
393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
  - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
  - b. When the operator proposes to set surface casing with Spudder Rig
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

**B. PRESSURE CONTROL**

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
  - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after

installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time.
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

**C. DRILLING MUD**

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

**D. WASTE MATERIAL AND FLUIDS**

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

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

**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	MATADOR PRODUCTION COMPANY
LEASE NO.:	NMNM 117125
WELL NAME & NO.:	BRAD LUMIS FED COM 221H
SURFACE HOLE FOOTAGE:	429'/N & 424'/W
BOTTOM HOLE FOOTAGE:	240'/S & 330'/W
LOCATION:	SECTION 23, T24S, R34E, NMPM
COUNTY:	LEA

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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**
  - Lesser Prairie-Chicken Timing Stipulations
  - Ground-level Abandoned Well Marker
  - Range
  - Raptor Nest Mitigation
  - Hydrology
- 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)

### **Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken:**

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

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

### **Raptor Nest Mitigation**

For portions of the project being constructed during the nesting season (March 1–August 31), the operator should contact a BLM biologist and conduct pre-construction nest surveys up to 2 weeks prior of vegetation removal and avoidance buffers around any occupied nest could be established (distances to be specified by the BLM) to ensure compliance with the MBTA.

### **Hydrology:**

The entire well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must

be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

**Cattleguards**

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s). Any existing cattleguard(s) on the access road 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 cattleguard(s) that are in place and are utilized during lease operations. A gate shall be constructed on one side of the cattleguard and fastened securely to H-braces.

**Fence Requirement**

Where entry granted across a fence line, the fence must be braced and tied off on both sides of the passageway prior to cutting. Once the work is completed, the fence will be restored to its prior condition, or better. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

**Livestock Watering Requirement**

Structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs, will be avoided by moving the proposed action.

-OR-

Any damage to structures that provide water to livestock throughout the life of the well, caused by operations from the well site, must be immediately corrected by the operator. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

## **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**

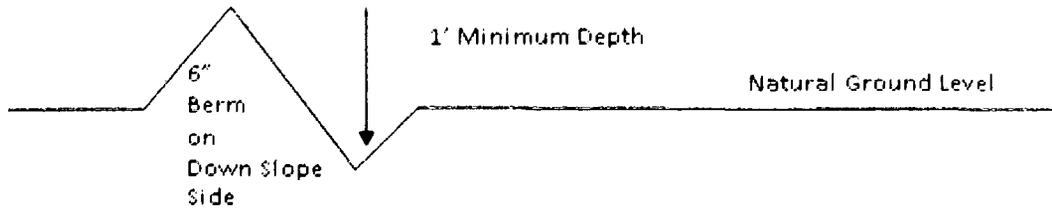
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**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.

### Livestock Watering Requirement

Structures that provide water to livestock, such as windmills, pipelines, drinking troughs, and earthen reservoirs, will be avoided by moving the proposed action.

-OR-

Any damage to structures that provide water to livestock throughout the life of the well, caused by operations from the well site, must be immediately corrected by the operator. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

**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

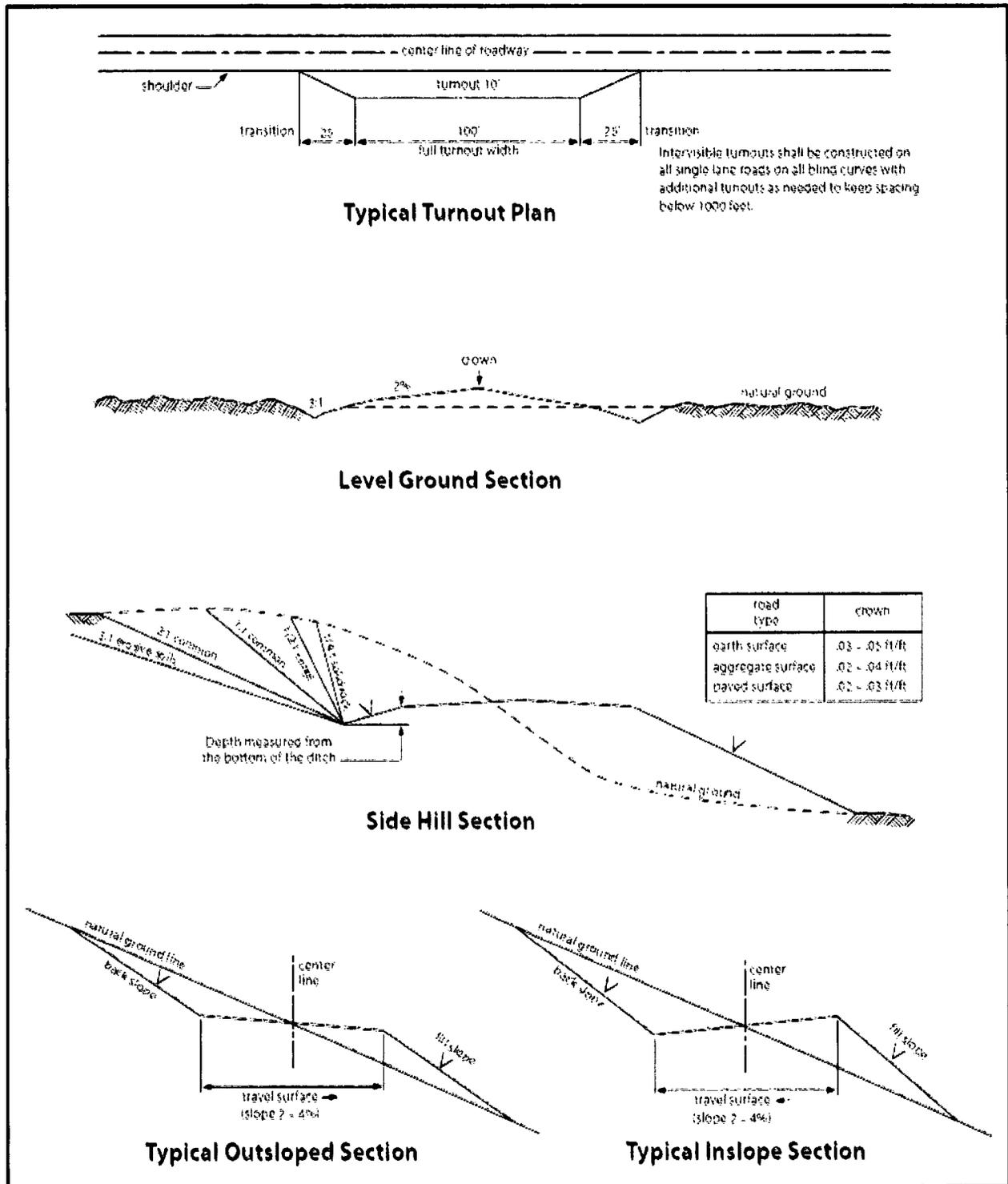


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## **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.

### **VRM Facility Requirement**

#### **Painting Requirement**

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

## **B. PIPELINES**

### **BURIED PIPELINE STIPULATIONS**

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

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

1. The Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 *et seq.* (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, *et seq.* or the Resource Conservation and Recovery Act, 42 U.S.C.6901, *et seq.*) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

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

5. All construction and maintenance activity will be confined to the authorized right-of-way.
6. The pipeline will be buried with a minimum cover of 36 inches between the top of the pipe and ground level.
7. The maximum allowable disturbance for construction in this right-of-way will be 30 feet:
  - Blading of vegetation within the right-of-way will be allowed: maximum width of blading operations will not exceed 20 feet. The trench is included in this area. (*Blading is defined as the complete removal of brush and ground vegetation.*)
  - Clearing of brush species within the right-of-way will be allowed: maximum width of clearing operations will not exceed 30 feet. The trench and bladed area are included in this area. (*Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface.*)
  - The remaining area of the right-of-way (if any) shall only be disturbed by compressing the vegetation. (*Compressing can be caused by vehicle tires, placement of equipment, etc.*)
8. The holder shall stockpile an adequate amount of topsoil where blading is allowed. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles from trench construction. The topsoil will be evenly distributed over the bladed area for the preparation of seeding.
9. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.
10. Vegetation, soil, and rocks left as a result of construction or maintenance activity will be randomly scattered on this right-of-way and will not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. The entire right-of-way shall be recontoured to match the surrounding landscape. The backfilled soil shall be compacted and a 6 inch berm will be left over the ditch line to allow for settling back to grade.
11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

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

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

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

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

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

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

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

18. Escape Ramps - The operator will construct and maintain pipeline/utility trenches that are not otherwise fenced, screened, or netted to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or

other methods of avian and terrestrial wildlife escape in the trenches according to the following criteria:

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

19. Special Stipulations:

**Lesser Prairie-Chicken**

Oil and gas activities will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, geophysical exploration other than 3-D operations, and pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise.

## **VIII. INTERIM RECLAMATION**

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

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

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

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

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

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

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

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

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

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

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

## Seed Mixture for LPC Sand/Shinnery Sites

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

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

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

<u>Species</u>	<u>lb/acre</u>
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

\*Pounds of pure live seed:

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



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

# Operator Certification Data Report

01/28/2019

*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:** Lara Thompson

**Signed on:** 08/29/2018

**Title:** Assistant Project Manager

**Street Address:** 5647 Jefferson Street NE

**City:** Albuquerque

**State:** NM

**Zip:** 87109

**Phone:** (505)254-1115

**Email address:** Lara.Thompson@swca.com

**Representative Name:**

**Street Address:**

**City:**

**State:**

**Zip:**

**Phone:**

**Email address:**



APD ID: 10400033605

Submission Date: 08/31/2018

Highlighted data reflects the most recent changes

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: BRAD LUMMIS FED COM

Well Number: 221H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

APD ID: 10400033605

Tie to previous NOS?

Submission Date: 08/31/2018

BLM Office: CARLSBAD

User: Lara Thompson

Title: Assistant Project Manager

Federal/Indian APD: FED

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

Lease number: NMNM117125

Lease Acres: 400

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? YES

APD Operator: MATADOR PRODUCTION COMPANY

Operator letter of designation:

Operator Organization Name: MATADOR PRODUCTION COMPANY

Operator Address: 5400 LBJ Freeway, Suite 1500

Zip: 75240

Operator PO Box:

Operator City: Dallas

State: TX

Operator Phone: (972)371-5200

Operator Internet Address: amonroe@matadorresources.com

Well in Master Development Plan? NO

Master Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: BRAD LUMMIS FED COM

Well Number: 221H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: WOLFCAMP

Pool Name: ANTELOPE RIDGE; BS, NORTH

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

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Describe other minerals:**

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

**Type of Well Pad:** MULTIPLE WELL

**Multiple Well Pad Name:** SLOT    **Number:** 6

**Well Class:** HORIZONTAL

1

**Number of Legs:** 1

**Well Work Type:** Drill

**Well Type:** OIL WELL

**Describe Well Type:**

**Well sub-Type:** APPRAISAL

**Describe sub-type:**

**Distance to town:**

**Distance to nearest well:** 30 FT

**Distance to lease line:** 424 FT

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

**Well plat:** BO\_BRAD\_LUMMIS\_SLOT\_1\_SURFACE\_PAD\_SITE\_S\_20180612150129.pdf

1Mile\_Radius\_Map\_20180830124859.docx

BradLummis\_221H\_20180830131326.pdf

**Well work start Date:** 12/01/2018

**Duration:** 30 DAYS

**Survey Type:** RECTANGULAR

**Describe Survey Type:**

**Datum:** NAD83

**Vertical Datum:** NAVD88

**Survey number:**

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	429	FNL	424	FWL	24S	34E	23	Aliquot NWN W	32.20911 03	- 103.4479 093	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 117125	349 3	0	0
KOP Leg #1	429	FNL	424	FWL	24S	34E	23	Aliquot NWN W	32.20911 03	- 103.4479 093	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 117125	- 916 0	126 70	126 53

**Operator Name:** MATADOR PRODUCTION COMPANY

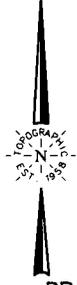
**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	330	FNL	330	FWL	24S	34E	23	Aliquot NWN W	32.20938 43	- 103.4482 115	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 117125	- 978 2	137 61	132 75
EXIT Leg #1	330	FSL	330	FWL	24S	34E	23	Aliquot SWS W	32.19668 49	- 103.4482 167	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 117125	- 978 2	179 11	132 75
BHL Leg #1	240	FSL	330	FWL	24S	34E	23	Aliquot SWS W	32.19643 75	- 103.4482 168	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 117125	- 978 2	180 01	132 75

SECTION 23, TOWNSHIP 24-S, RANGE 34-E, N.M.P.M.  
LEA COUNTY, NEW MEXICO

SCALE: 1" = 1000'  
0' 500' 1000'



**BRAD LUMMIS SLOT 1  
SURFACE PAD SITE**

Metes and Bounds Description of a proposed 5.11 surface pad site located within Section 23, Township 24 South, Range 34 East, N.M.P.M., in Lea County, New Mexico.

BEGINNING at a 1/2" iron rod with cap stamped "Topographic" set for the Southwest corner of this site, from whence a brass cap found for the West quarter corner of said Section 23, bears: S 08°35'13" W, a distance of 2104.86 feet;

Thence N 04°56'08" E, a distance of 420.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Northwest corner of this site;

Thence S 85°03'52" E, a distance of 430.00 feet to a 1/2" iron rod with cap stamped "Topographic"

Thence S 85°03'52" E, a distance of 100.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Northeast corner of this site;

Thence S 04°56'08" W, a distance of 420.00 feet to a 1/2" iron rod with cap stamped "Topographic" set for the Southeast corner of this site;

Thence N 85°03'52" W, a distance of 100.00 feet to a 1/2" iron rod with cap stamped "Topographic"

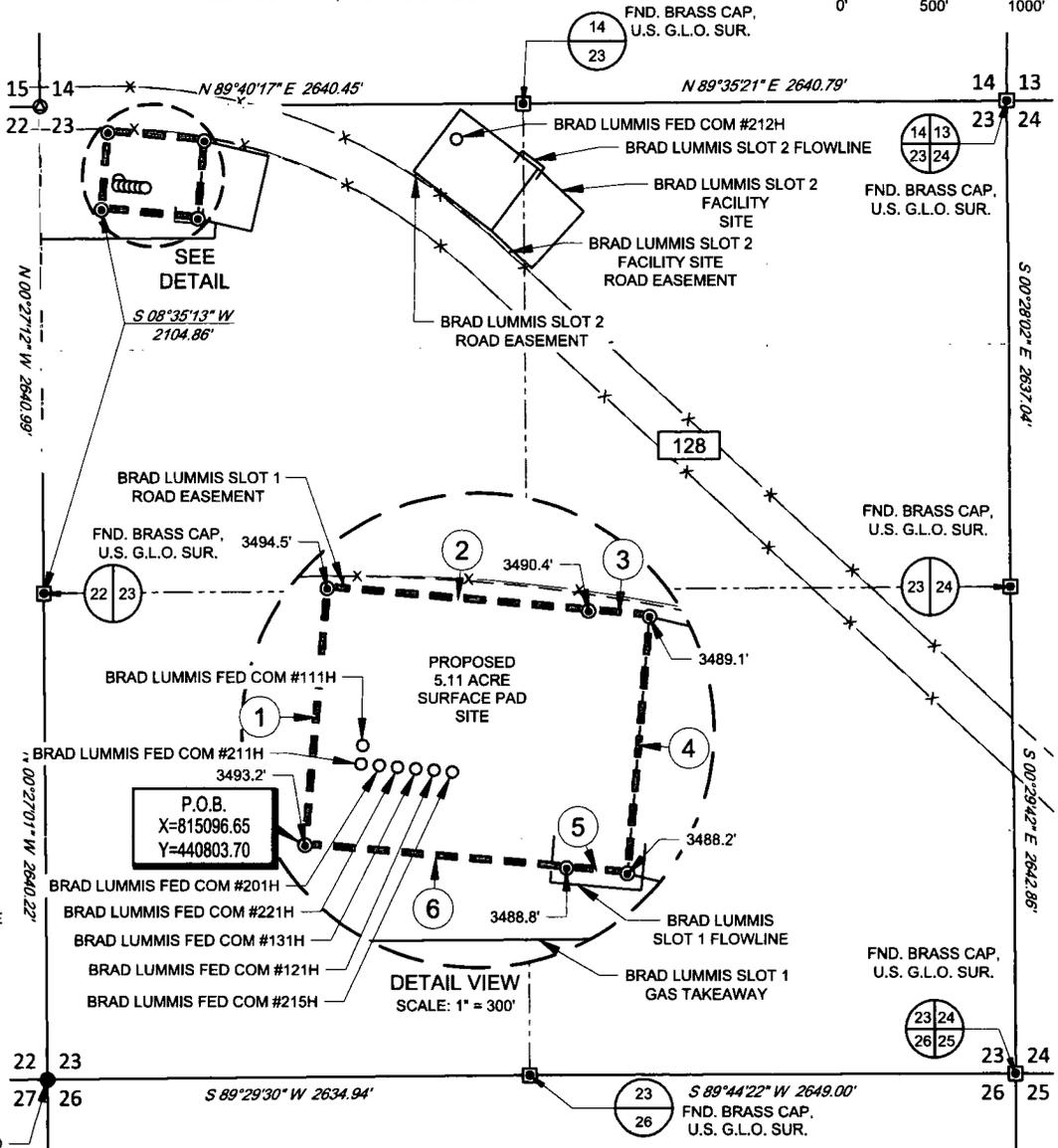
Thence N 85°03'52" W, a distance of 430.00 feet to the Point of Beginning.

**LEGEND**

- SURVEY/SECTION LINE
- - - QUARTER SECTION LINE
- - - SIXTEENTH SECTION LINE
- - - PROPOSED SITE
- - - TRACT BORDER
- == ROAD WAY
- X FENCE LINE
- ⊙ IRON ROD SET
- ⊕ MONUMENT
- ⊙ CALCULATED CORNER
- IRON ROD FOUND

**LINE TABLE**  
5/8" IRON ROD FOUND

LINE	BEARING	DISTANCE
1	N 04°56'08" E	420.00'
2	S 85°03'52" E	430.00'
3	S 85°03'52" E	100.00'
4	S 04°56'08" W	420.00'
5	N 85°03'52" W	100.00'
6	N 85°03'52" W	430.00'



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APRIL 27, 2018

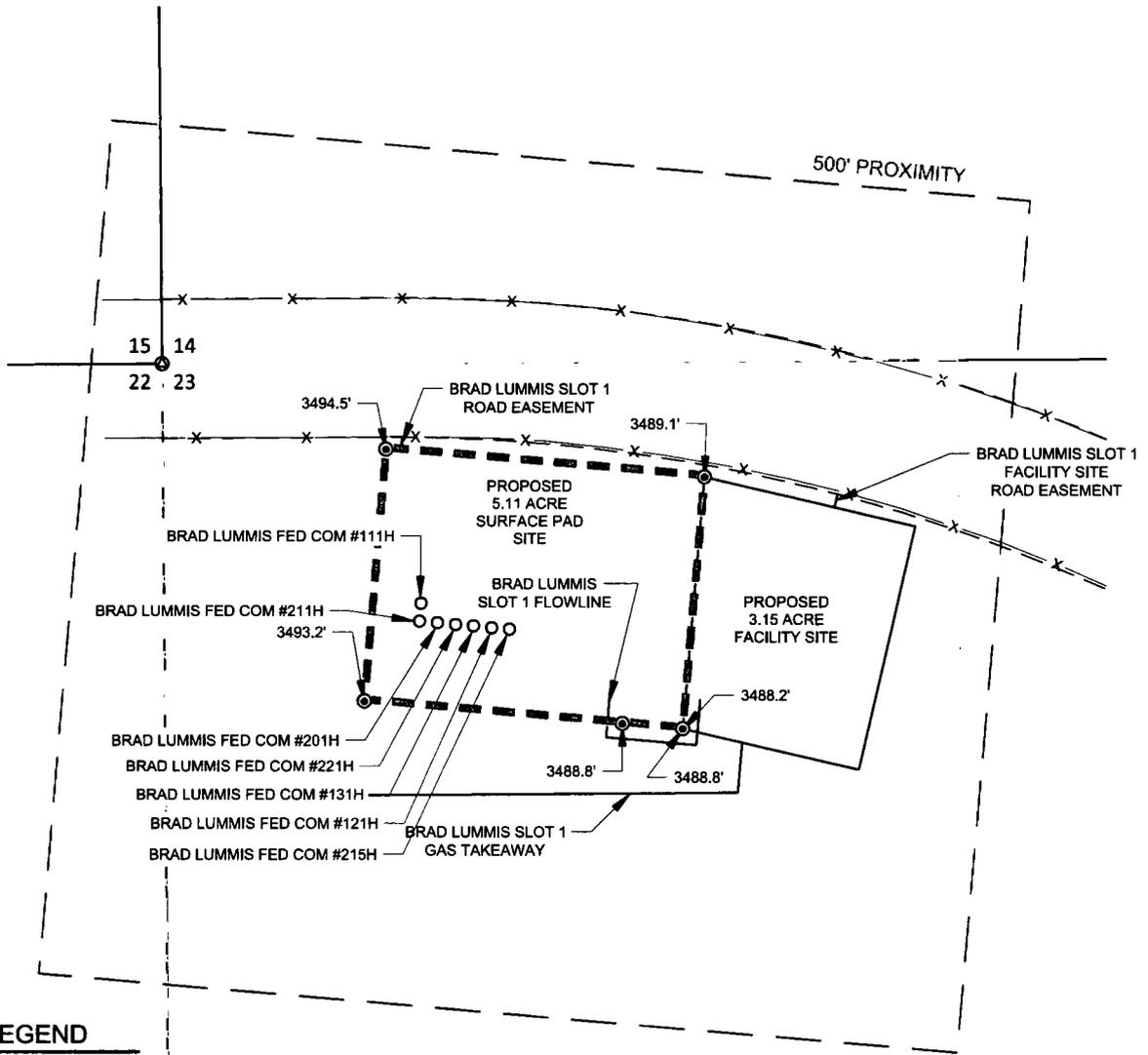
BRAD LUMMIS SLOT 1 SURFACE PAD SITE	REVISION:	
	INT	DATE
DATE: 04/27/18		
FILE: BO_BRAD_LUMMIS_SLOT_1_SURFACE_PAD_SITE		
DRAWN BY: EAH		
SHEET: 1 OF 2		

**NOTES:**

1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM OF 1983, EAST ZONE, U.S. SURVEY FEET.
3. CERTIFICATION IS MADE ONLY TO THE LOCATION OF THIS EASEMENT, IN RELATION TO THE EVIDENCE FOUND DURING A FIELD SURVEY, MADE ON THE GROUND, UNDER MY SUPERVISION, AND USING DOCUMENTATION PROVIDED BY MATADOR PRODUCTION COMPANY. ONLY UTILITIES/EASEMENTS THAT WERE VISIBLE ON THE DATE OF THIS SURVEY, WITHIN/ADJOINING THIS EASEMENT, HAVE BEEN LOCATED AS SHOWN HEREON OF WHICH I HAVE KNOWLEDGE. THIS CERTIFICATION IS LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE, AND MADE FOR THIS TRANSACTION ONLY.
4. B.O.L./P.O.B. = BEGINNING OF LINE/POINT OF BEGINNING
5. E.O.L./P.O.E. = END OF LINE/POINT OF EXIT
6. ADJOINER INFORMATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.

SECTION 23, TOWNSHIP 24-S, RANGE 34-E, N.M.P.M.  
LEA COUNTY, NEW MEXICO

SCALE: 1" = 1000'  
0' 500' 1000'



**LEGEND**

- SURVEY/SECTION LINE
- 500' OFFSET
- SIXTEENTH SECTION LINE
- PROPOSED SITE
- TRACT BORDER
- ROAD WAY
- FENCE LINE
- IRON ROD SET
- CALCULATED CORNER



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APRIL 27, 2018

**BRAD LUMMIS SLOT 1  
SURFACE PAD SITE  
-PROXIMITY MAP-**

REVISION:

INT	DATE

DATE: 04/27/18

FILE: BO\_BRAD\_LUMMIS\_SLOT\_1\_SURFACE\_PAD\_SITE

DRAWN BY: EAH

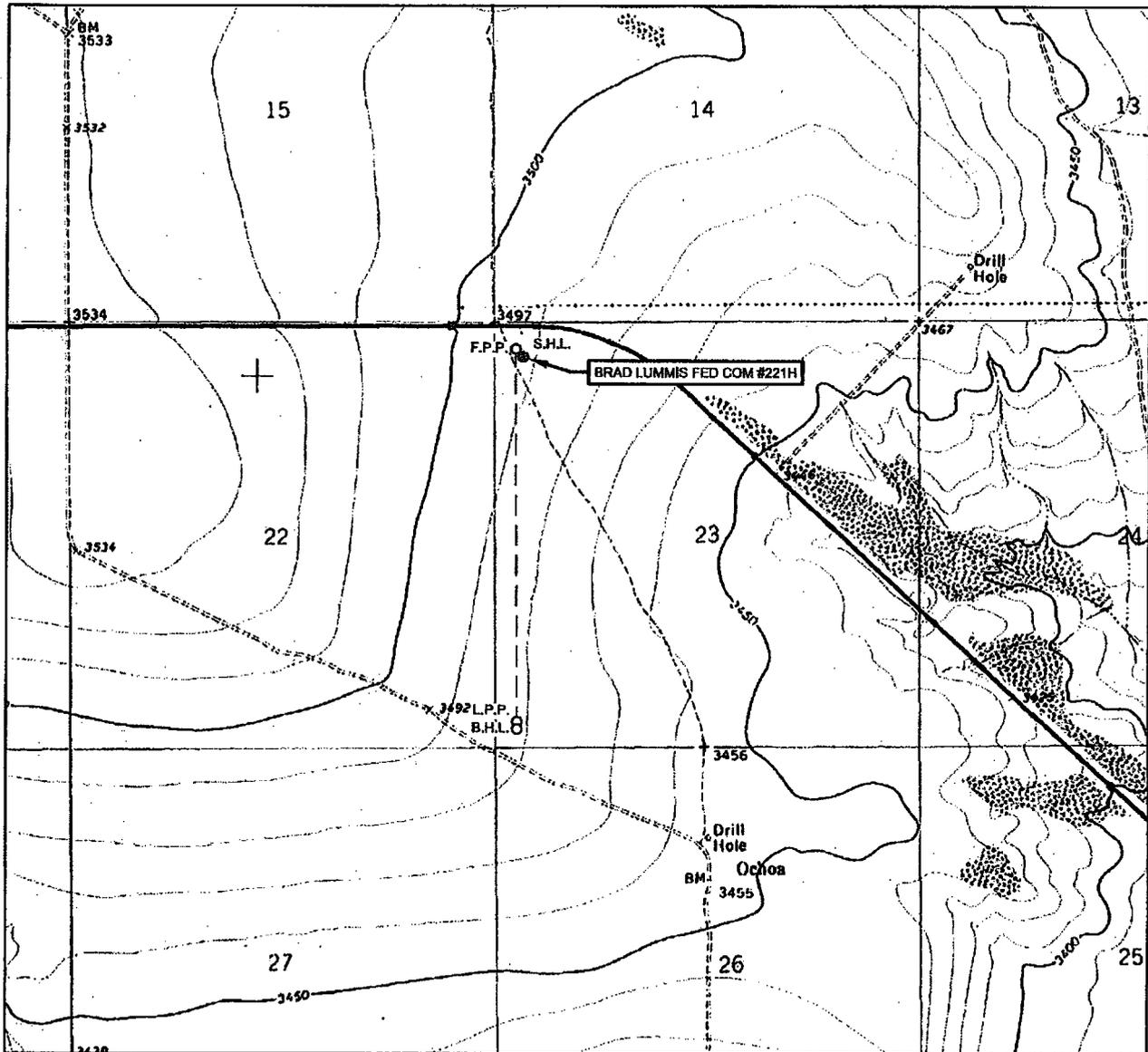
SHEET: 2 OF 2

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# LOCATION & ELEVATION VERIFICATION MAP



LEASE NAME & WELL NO.: BRAD LUMMIS FED COM #221H

SECTION 23 TWP 24-S RGE 34-E SURVEY N.M.P.M.  
 COUNTY LEA STATE NM ELEVATION 3493'  
 DESCRIPTION 429' FNL & 424' FWL

LATITUDE N 32.2091103 LONGITUDE W 103.4479093



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

THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY MATADOR PRODUCTION COMPANY. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM OF 1983, EAST ZONE, U.S. SURVEY FEET.



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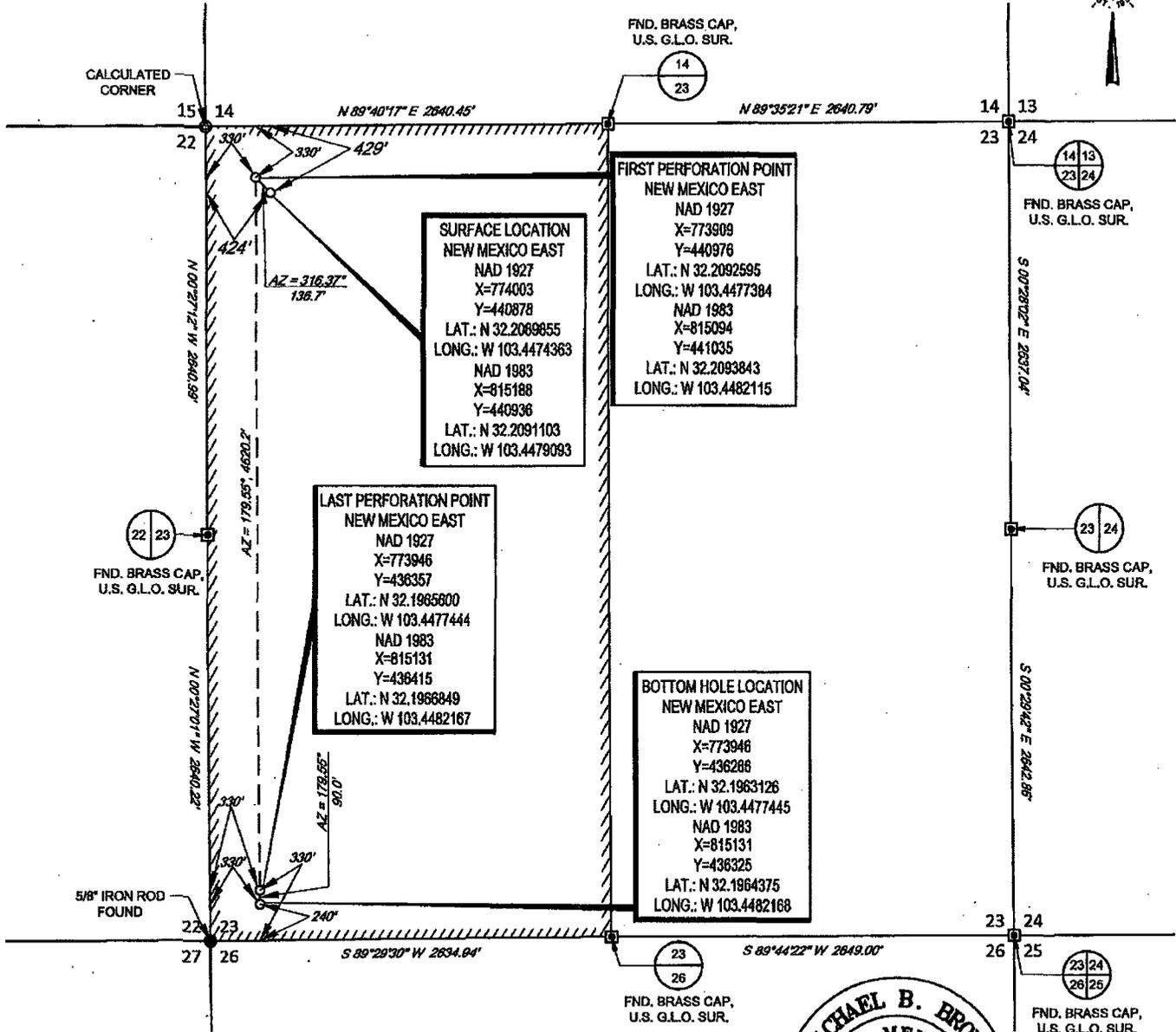
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SCALE: 1" = 1000'  
 0' 500' 1000'



SECTION 23, TOWNSHIP 24-S, RANGE 34-E, N.M.P.M.  
 LEA COUNTY, NEW MEXICO



LEASE NAME & WELL NO.: BRAD LUMMIS FED COM #221H  
 SECTION 23 TWP 24-S RGE 34-E SURVEY N.M.P.M.  
 COUNTY LEA STATE NM  
 DESCRIPTION 429' FNL & 424' FWL

DISTANCE & DIRECTION  
 FROM INT. OF NM-128 & NM-18. GO WEST ON NM-128 ±16.9 MILES.  
 THENCE SOUTH (LEFT) ON PROPOSED RD. ±22 FEET TO A POINT ±285  
 FEET NORTHWEST OF THE LOCATION.



Michael Blake Brown, P.S. No. 18329  
 MAY 03, 2018

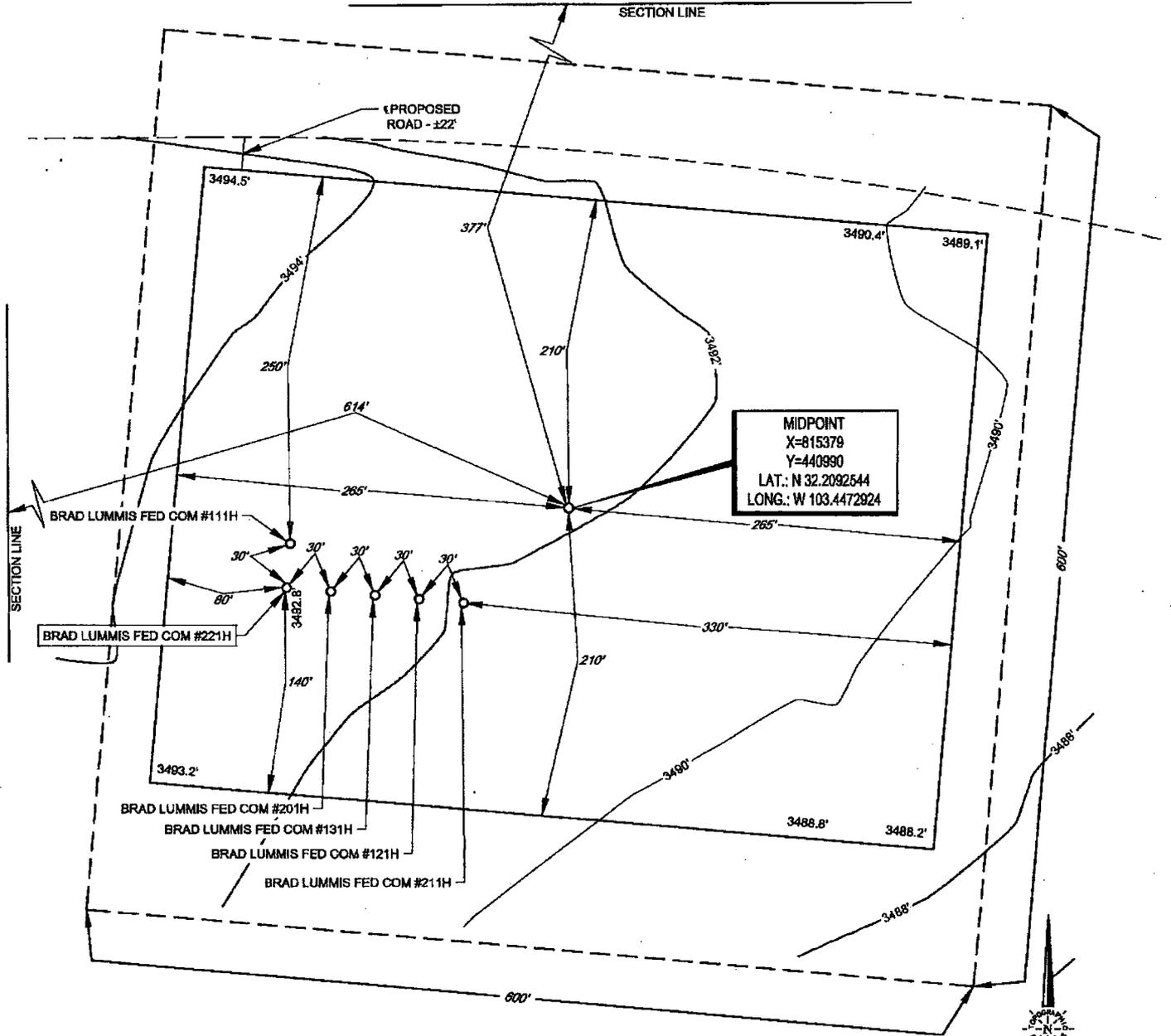
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 THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY MATADOR PRODUCTION COMPANY. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.  
 AS OF THE DATE OF SURVEY, ALL ABOVE GROUND APPURTENANCES WITHIN 300' OF THE STAKED LOCATION ARE SHOWN HEREON.



SECTION 23, TOWNSHIP 24-S, RANGE 34-E, N.M.P.M.  
LEA COUNTY, NEW MEXICO

DETAIL VIEW  
SCALE: 1" = 100'



CENTERLINE POINT IS 377' FNL & 614' FWL

LEGEND

- — — — — EXISTING ROAD
- - - - - PROPOSED ROAD

LEASE NAME & WELL NO.: BRAD LUMMIS FED COM #221H  
#221H LATITUDE N 32.2091103 #221H LONGITUDE W 103.4479093

SCALE: 1" = 100'  
0' 50' 100'

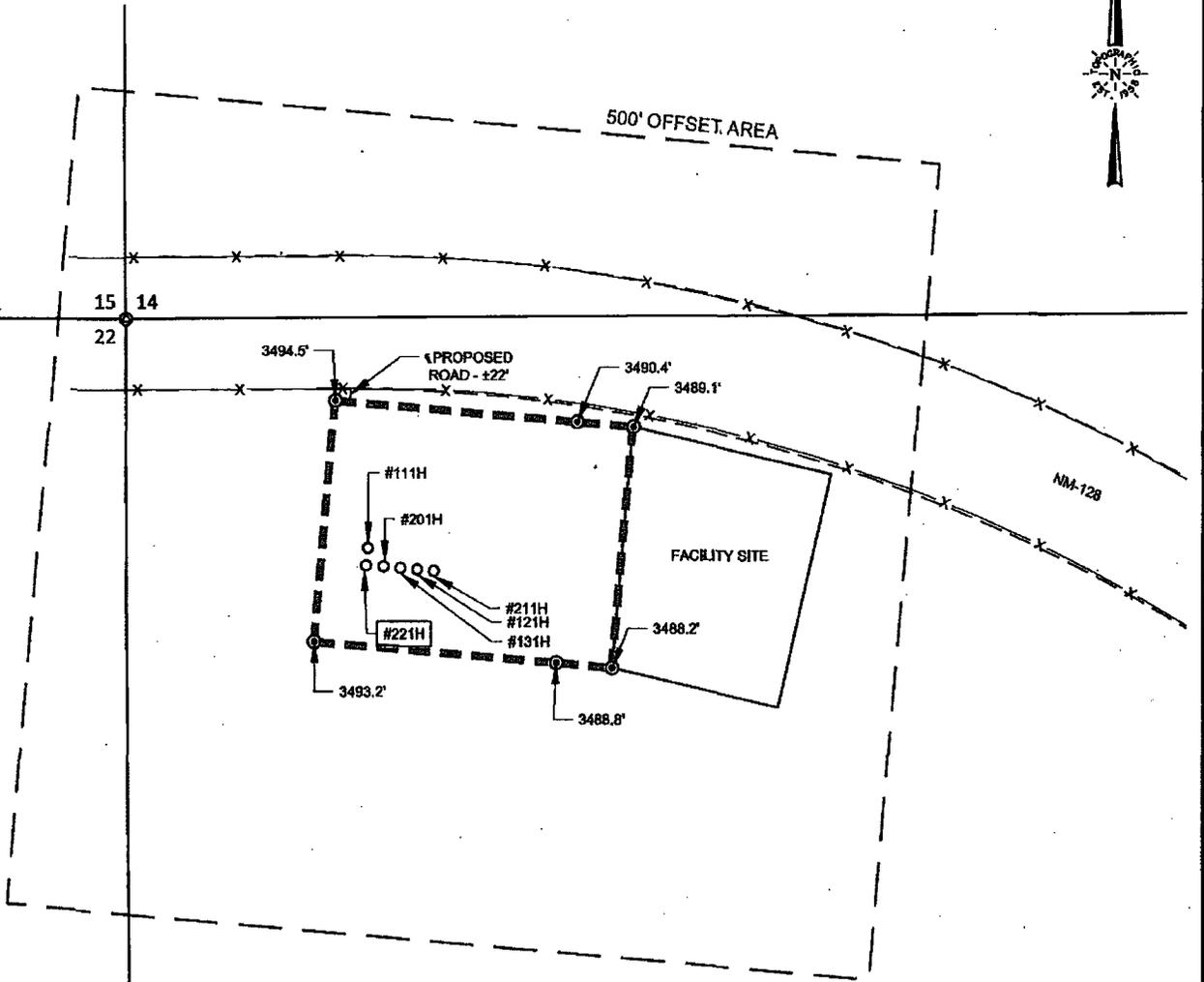
ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO COORDINATE SYSTEM OF 1983, EAST ZONE, U.S. SURVEY FEET

THIS PROPOSED PAD SITE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY MATADOR PRODUCTION COMPANY. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

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SCALE: 1" = 300'  
 0' 150' 300'

SECTION 23, TOWNSHIP 24-S, RANGE 34-E, N.M.P.M.  
 LEA COUNTY, NEW MEXICO

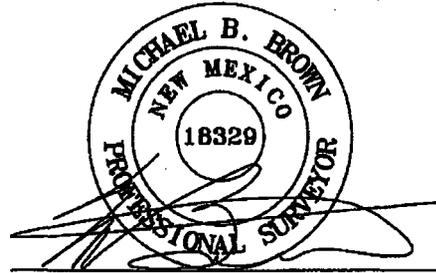


LEGEND

- PROPOSED SITE
- 500' PROXIMITY
- SURVEY/SECTION LINE
- FENCE
- ROAD WAY
- CALCULATED CORNER
- IRON ROD SET



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 MAY 03, 2018

BRAD LUMMIS FED COM 221H -PROXIMITY MAP-	REVISION:	
	MML	05/03/18
DATE: 04/18/18		
FILE: I:\0_BRAD_LUMMIS_FED_COM_221H_REV1		
DRAWN BY: EAH		
SHEET: 7 OF 7		

- NOTES:
1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
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**APD ID:** 10400033605

**Submission Date:** 08/31/2018

highlighted data  
reflects the most  
recent changes

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

[Show Final Text](#)

**Well Type:** OIL WELL

**Well Work Type:** Drill

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	RUSTLER	3493	1103	1103		USEABLE WATER	No
2	TOP SALT	1924	1568	1568		NONE	No
3	CASTILE	-300	3792	3792		NONE	No
4	BASE OF SALT	-1878	5370	5370		NONE	No
5	BELL CANYON	-1921	5413	5413		NATURAL GAS,OIL	No
6	CHERRY CANYON	-3073	6565	6565		NATURAL GAS,OIL	No
7	BRUSHY CANYON	-4273	7765	7765		NATURAL GAS,OIL	No
8	BONE SPRING LIME	-5756	9249	9249		NATURAL GAS,OIL	No
9	BONE SPRING 1ST	-6480	9973	9973		NATURAL GAS,OIL,URANIUM	No
10	BONE SPRING 2ND	-7088	10581	10581		NATURAL GAS,OIL	No
11	BONE SPRING 3RD	-7807	11300	11300		NATURAL GAS,OIL	No
12	WOLFCAMP	-8629	12122	12122		NATURAL GAS,OIL	Yes

**Pressure Rating (PSI):** 10M

**Rating Depth:** 15000

**Equipment:** A BOP consisting of 3 rams with 2 pipe rams, 1 blind ram and one annular preventer. The BOP will be utilized below surface casing to TD. See attachments for BOP and choke manifold diagrams. Also present will be an accumulator that meets the requirements of Onshore Order #2 for the pressure rating of the BOP stack. A rotating head will also be installed as needed. BOP will be inspected and operated as recommended in Onshore Order #2. A Kelly cock and sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position. A third party company will test the BOPs.

**Requesting Variance?** YES

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: BRAD LUMMIS FED COM

Well Number: 221H

Variance request: The operator requests a variance to have invocation of running a speed head for setting the intermediate strings. In the case of running a speed head with landing mandrel for 9-5/8" casing, a minimum of a 5M BOP/E system will be installed after surface casing is set. BOP test pressures will be 250 psi low and 5000 psi high with the annular being tested to 250 psi low and 2500 psi high before drilling below surface shoe. A diagram of the speed head is attached. Matador Resources requests a variance to drill this well using a co-lex line between the BOP and choke manifold. Certification for proposed co-lex hose is attached (see Exhibit E-2). The hose is not required by the manufacturer to be anchored. In the event the specific hoses are not available, one of equal or higher rating will be used.

Testing Procedure: After setting surface casing and before drilling below the surface casing shoe, a minimum of a 5M BOP/E system will be installed and tested to 250 psi low and 5000 psi high with the annular being tested to 250 psi low and 2500 psi high. After setting intermediate casing, a minimum of a 10M system will be installed and tested to 250 psi low and 5000 psi high with the annular being tested to 500 psi low and 5000 psi high.

**Choke Diagram Attachment:**

BLM\_10M\_Choke\_Manifold\_20181107164026.pdf

**BOP Diagram Attachment:**

BOP\_297\_001\_20180829142303.pdf

297Co\_Flex\_Certs\_\_20180831130518.pdf

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	Y	0	1150	0	1150			1150	J-55	54.5	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
2	INTERMEDIATE	12.25	9.625	NEW	API	Y	0	5400	0	5400			5400	J-55	40	BUTT	1.125	1.125	BUOY	1.8	BUOY	1.8
3	PRODUCTION	6.125	5.5	NEW	NON API	Y	0	12400	0	12400			12400	P-110	20	OTHER - DWCC-IS-MS	1.125	1.125	BUOY	1.8	BUOY	1.8
4	INTERMEDIATE	8.75	7.625	NEW	NON API	Y	5000	12500	5000	12500			7500	P-110	29.7	OTHER - VAM HTF-NR	1.125	1.125	BUOY	1.8	BUOY	1.8

**Casing Attachments**

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Casing Attachments**

---

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

**Inspection Document:**

**Spec Document:**

VRCC\_16\_1177\_\_\_CDS\_\_\_7.625\_in\_29.70\_ppf\_P110\_EC\_VAM\_\_\_HTF\_NR\_Rev02\_20180619124429.pdf

**Tapered String Spec:**

Tapered\_String\_Spec\_Sheet\_221\_20180829144437.pdf

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

BLM\_Casing\_Design\_Assumptions\_4\_string\_20180830114245.pdf

---

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

**Inspection Document:**

**Spec Document:**

5.500in\_x\_20\_\_VST\_P110EC\_DWC\_C\_IS\_MS\_CDS\_20180614144434.PDF

**Tapered String Spec:**

Tapered\_String\_Spec\_Sheet\_221\_20180829144545.pdf

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

BLM\_Casing\_Design\_Assumptions\_4\_string\_20180830114237.pdf

---

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

**Inspection Document:**

**Spec Document:**

5.500in\_x\_20\_\_0.361in\_\_P110RY\_DWC\_C\_HT\_IS\_PLUS\_Casing\_CDS\_20180829163106.PDF

**Tapered String Spec:**

Tapered\_String\_Spec\_Sheet\_221\_20180829144916.pdf

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

BLM\_Casing\_Design\_Assumptions\_4\_string\_20180830114215.pdf

---

Operator Name: MATADOR PRODUCTION COMPANY

Well Name: BRAD LUMMIS FED COM

Well Number: 221H

### Casing Attachments

Casing ID: 4 String Type: INTERMEDIATE

Inspection Document:

Spec Document:

7.625\_\_29.7\_\_P110\_VAM\_HTF\_NR\_20180829162944.pdf

Tapered String Spec:

Tapered\_String\_Spec\_Sheet\_221\_20180829162637.pdf

Casing Design Assumptions and Worksheet(s):

BLM\_Casing\_Design\_Assumptions\_4\_string\_20180830114206.pdf

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	850	650	1.75	13.5	1138	100	C	Bentonite + 2% CaCL2 + 3% NaCl + LCM
SURFACE	Tail		850	1150	330	1.38	14.8	455	100	C	5% NaCl + LCM
INTERMEDIATE	Lead		0	4320	1300	1.85	12.8	2405	100	C	Bentonite + 1% CaCL2 + 8% NaCl + LCM
INTERMEDIATE	Tail		4320	5400	515	1.38	14.8	711	100	C	5% NaCl + LCM
INTERMEDIATE	Lead		4400	1134 4	452	2.35	11.5	1062		TXI	Fluid Loss + Dispersant + Retarder + LCM
INTERMEDIATE	Tail		1134 4	1800 1	300	1.39	13.2	417		TXI	Fluid Loss + Dispersant + Retarder + LCM
PRODUCTION	Lead		1204 4	1800 1	570	1.17	15.8	667	35	H	Fluid Loss + Dispersant + Retarder + LCM

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**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:** All necessary mud products for weight addition and fluid loss control will be on location at all times. Mud program subject to change due to hole conditions.

**Describe the mud monitoring system utilized:** An electronic Pason mud monitoring system complying with Onshore Order 2 will be used

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
1150	5400	SALT SATURATED	10	10							
1318 5	1327 5	OIL-BASED MUD	13	13							
0	1150	SPUD MUD	8.3	8.3							
5400	1318 5	OTHER : FW/cut brine	9	9							

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

A 2-person mud logging program will be utilized from the ~5400' to TD. No electric OH logs are planned at this time.

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

CBL,GR,MUDLOG

**Coring operation description for the well:**

There will be no coring on this well.

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Anticipated Bottom Hole Pressure:** 8974

**Anticipated Surface Pressure:** 6053.5

**Anticipated Bottom Hole Temperature(F):** 170

**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:**

H2S\_Emergency\_Contacts\_20180829165001.docx

MRC\_Energy\_Co\_\_Drilling\_Contingency\_plan\_20180829165005.doc

Matador\_Hydrogen\_Sulfide\_Drilling\_20180829165002.docx

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

Matador\_BradLummisFedCom\_221H\_PrelimA\_WPReport\_20180829165041.pdf

**Other proposed operations facets description:**

**Other proposed operations facets attachment:**

10M\_Well\_Control\_Plan\_20180829165718.docx

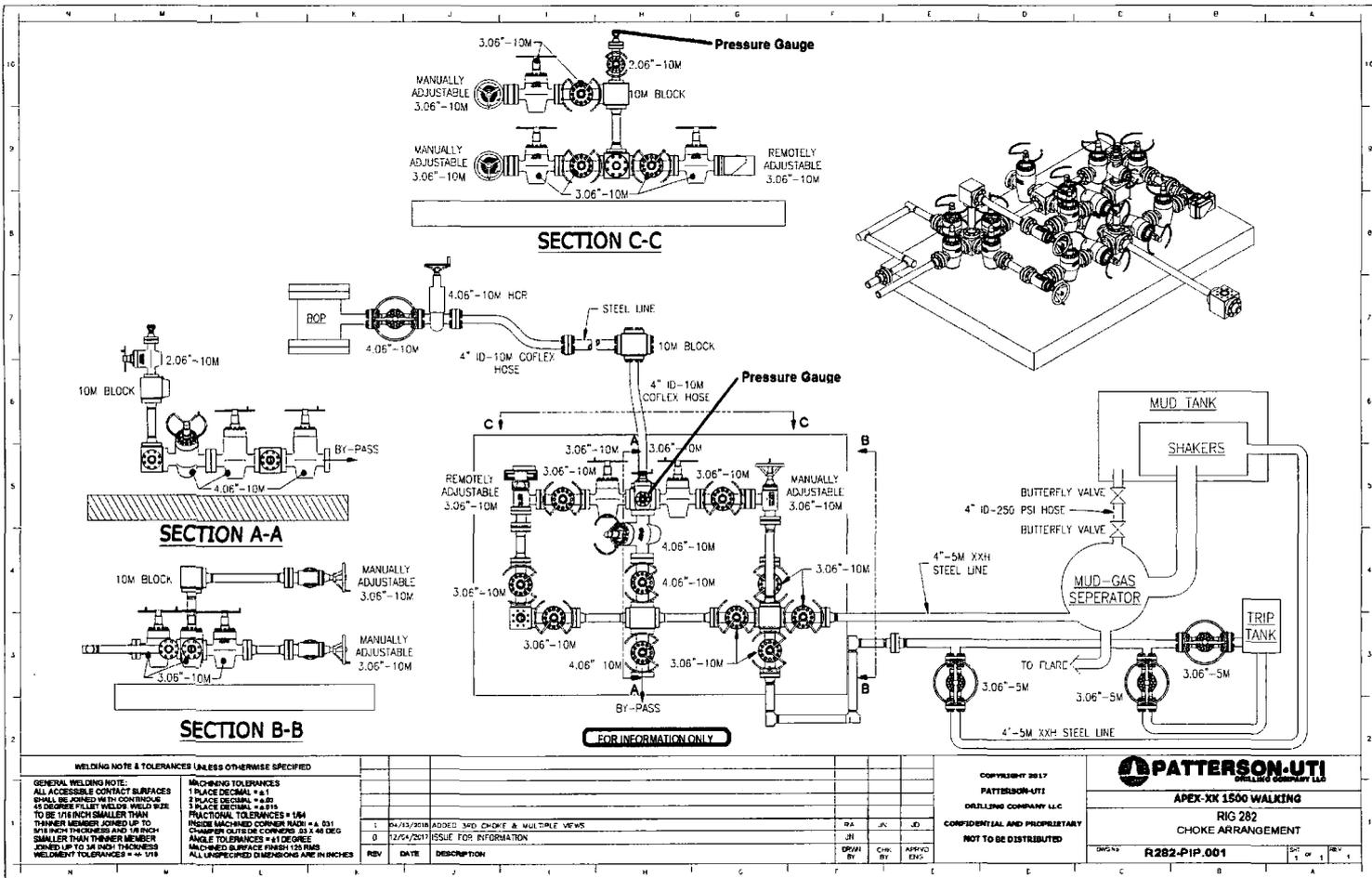
Close\_Loop\_System\_20180830125243.docx

Gas\_Capture\_Plan\_\_Brad\_Lummis\_Fed\_Com\_\_121H\_\_131H\_\_201H\_\_211H\_\_215H\_\_2...\_20180830125804.docx

Full\_Wellhead\_4\_String\_20181107164115.pdf

Brad\_Lummis\_Fed\_Com\_\_221H\_MTDR\_Drill\_Plan\_20181219133522.docx

**Other Variance attachment:**



**WELDING NOTE & TOLERANCES UNLESS OTHERWISE SPECIFIED**

**GENERAL WELDING NOTE:**  
 ALL ACCESSIBLE CONTACT SURFACES SHALL BE JOINED WITH CONTINUOUS 45 DEGREE FILLET WELDS WELD SIZE TO BE 1/8 INCH SMALLER THAN THINNER MEMBER JOINED UP TO 3/8 INCH THICKNESS AND 1/8 INCH SMALLER THAN THINNER MEMBER JOINED UP TO 3/8 INCH THICKNESS WELDMENT TOLERANCES = ± .015

**MACHINING TOLERANCES**  
 1 PLACE DECIMAL = ± .1  
 2 PLACE DECIMAL = ± .05  
 3 PLACE DECIMAL = ± .015  
 FRACTIONAL TOLERANCES  
 INSIDE MACHINED CORNER RADIUS = 4.031  
 CHAMFER OUTSIDE CORNER 30 X 45 DEG  
 ANGLE TO FINISHES = ± 1 DEGREE  
 MACHINED SURFACE FINISH: 125 RMS  
 ALL UNSPECIFIED DIMENSIONS ARE IN INCHES

REV	DATE	DESCRIPTION
1	04/13/2016	ADDED 3RD CHOKE & MULTIPLE VIEWS
0	12/24/2017	ISSUE FOR INFORMATION

COPYRIGHT 2017  
 PATTERSON-UTI  
 DRILLING COMPANY LLC  
 CONFIDENTIAL AND PROPRIETARY  
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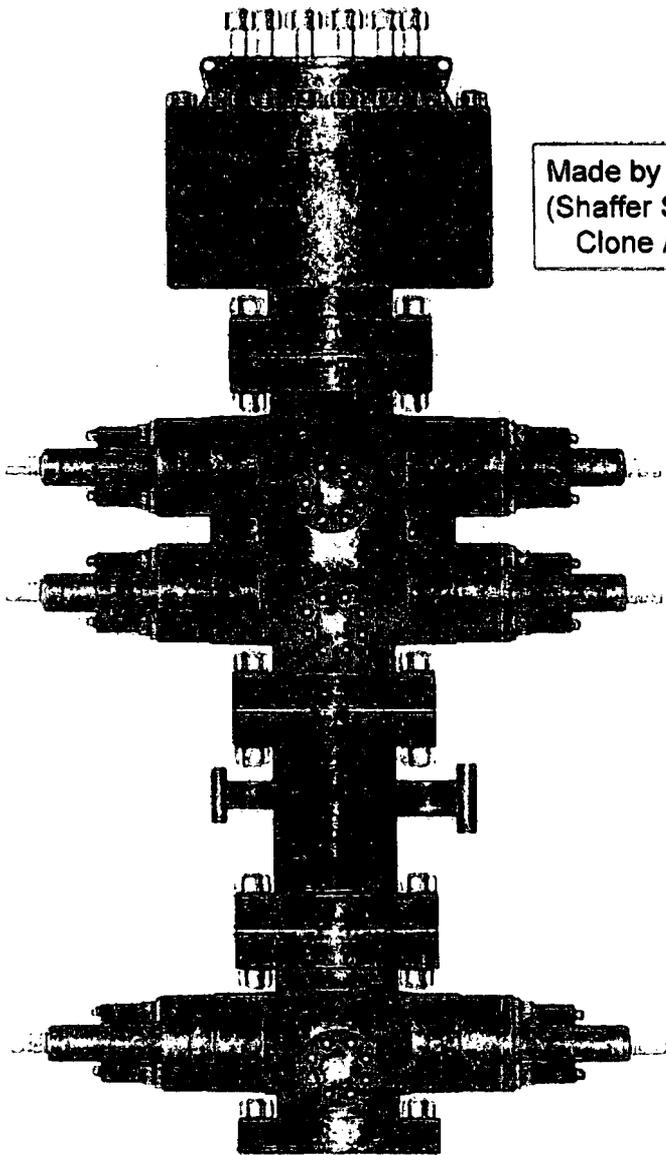
**PATTERSON-UTI**  
 DRILLING COMPANY LLC  
**APEX-XK 1500 WALKING**  
**RIG 282**  
**CHOKES ARRANGEMENT**  
 DWG NO: **R282-PIP-001**



**PATTERSON-UTI**

*Well Control*

**RIG:** 297



Made by Cameron  
(Shaffer Spherical)  
Clone Annular

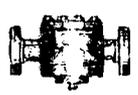
PATTERSON-UTI # PS2-628  
STYLE: New Shaffer Spherical  
BORE 13 5/8" PRESSURE 5,000  
HEIGHT: 48 1/2" WEIGHT: 13,800 lbs

PATTERSON-UTI # PC2-128  
STYLE: New Cameron Type U  
BORE 13 5/8" PRESSURE 10,000  
RAMS: TOP 5" Pipe BTM Blinds  
HEIGHT: 66 5/8" WEIGHT: 24,000 lbs

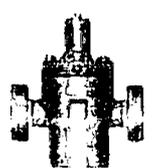
Length 40" Outlets 4" 10M  
DSA 4" 10M x 2" 10M

PATTERSON-UTI # PC2-228  
STYLE: New Cameron Type U  
BORE 13 5/8" PRESSURE 10,000  
RAMS: 5" Pipe  
HEIGHT: 41 5/8" WEIGHT: 13,000 lbs

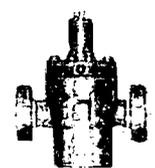
**WING VALVES**



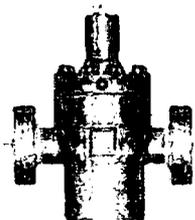
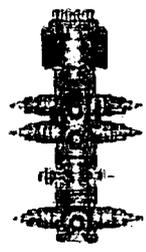
2" Check Valve



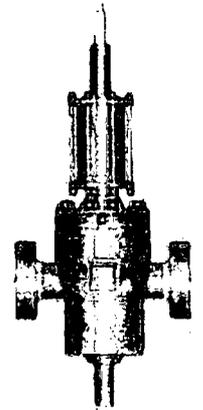
2" Manual Valve



2" Manual Valve



4" Manual Valve



4" Hydraulic Valve



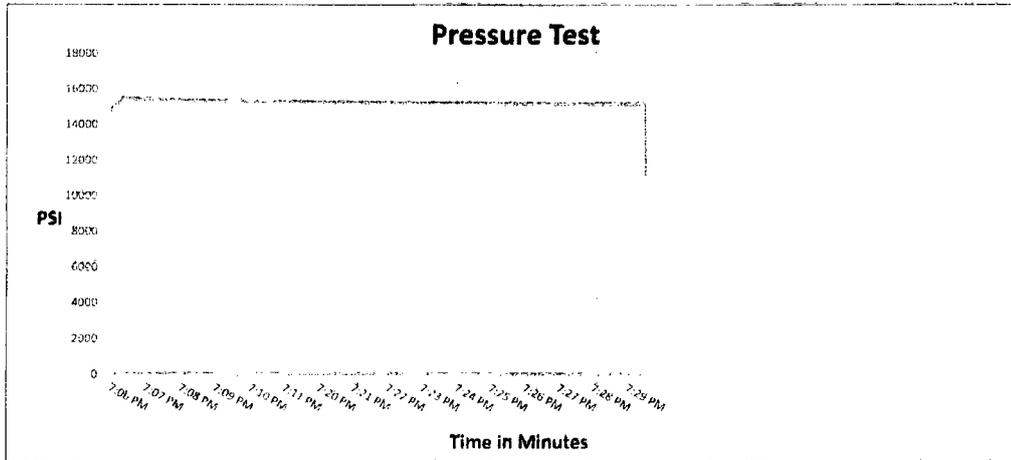
Midwest Hose  
& Specialty, Inc.

**Internal Hydrostatic Test Graph**

Customer: Patterson

Pick Ticket #: 284918

Hose Specifications		Verification	
<b>Hose Type</b>	<b>Length</b>	<b>Type of Fitting</b>	<b>Coupling Method</b>
CK	10'	4-1/16 10K	Swage
<b>I.D.</b>	<b>O.D.</b>	<b>Die Size</b>	<b>Final O.D.</b>
3"	4.79"	5.37"	5.37"
<b>Working Pressure</b>	<b>Burst Pressure</b>	<b>Hose Serial #</b>	<b>Hose Assembly Serial #</b>
10000 PSI	Standard Safety 22.000psi Applies	10490	284918-2



<b>Test Pressure</b>	<b>Time Held at Test Pressure</b>	<b>Actual Burst Pressure</b>	<b>Peak Pressure</b>
15000 PSI	15 2/4 Minutes		15732 PSI

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

**Tested By:** Tyler Hill  
*(Signature)*

**Approved By:** Ryan Adams  
*(Signature)*



Midwest Hose  
& Specialty, Inc.

### Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	PATTERSON B&E	Hose Assembly Type	Choke & Kill
MWH Sales Representative	AMY WHITE	Certification	API 7K
Date Assembled	12/8/2014	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	10000
Sales Order #	236404	Hose Lot # and Date Code	10490-01/13
Customer Purchase Order #	260471	Hose I.D. (Inches)	3"
Assembly Serial # (Pick Ticket #)	287918-2	Hose O.D. (Inches)	5.30"
Hose Assembly Length	10'	Armor (yes/no)	YES
Fittings			
End A		End B	
Stem (Part and Revision #)	R3.0X64WB	Stem (Part and Revision #)	R3.0X64WB
Stem (Heat #)	91996	Stem (Heat #)	91996
Ferrule (Part and Revision #)	RF3.0	Ferrule (Part and Revision #)	RF3.0
Ferrule (Heat #)	37DA5631	Ferrule (Heat #)	37DA5631
Connection (Part #)	4 1/16 10K	Connection (Part #)	4 1/16 10K
Connection (Heat #)		Connection (Heat #)	
Dies Used	5.37	Dies Used	5.37
Hydrostatic Test Requirements			
Test Pressure (psi)	15,000	Hose assembly was tested with ambient water temperature.	
Test Pressure Hold Time (minutes)	15 1/2		
Date Tested		Tested By	Approved By
12/8/2014			



Midwest Hose  
& Specialty, Inc.

### Certificate of Conformity

Customer: **PATTERSON B&E**

Customer P.O.# **260471**

Sales Order # **236404**

Date Assembled: **12/8/2014**

### Specifications

Hose Assembly Type: **Choke & Kill**

Assembly Serial # **287918-2**

Hose Lot # and Date Code **10490-01/13**

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

**12/9/2014**

Exhibit E-2: Co-Flex Certifications  
 Brad Lummis Fed Com #221H  
 Matador Resources Company



Midwest Hose  
& Specialty, Inc.

### Internal Hydrostatic Test Graph

December 9, 2014

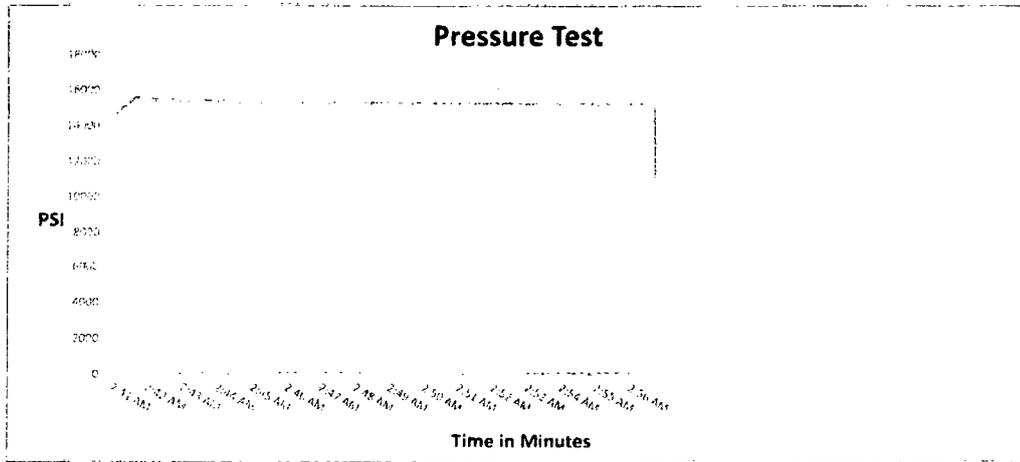
Customer: Patterson

Pick Ticket #: 284918

**Hose Specifications**

**Verification**

Hose Type	Length	Type of Fitting	Coupling Method
CA	70'	4 1/16 10K	Swage
I.D.	O.D.	Die Size	Final O.D.
3"	4.77"	5.3"	5.40"
<b>Working Pressure</b>	<b>Hurst Pressure</b>	<b>Hose Serial #</b>	<b>Hose Assembly Serial #</b>
10000 PSI	Standard Safety Hydraulic Hoses	10490	284918-1



**Test Pressure**  
15000 PSI

**Time Held at Test Pressure**  
15 2/4 Minutes

**Actual Burst Pressure**

**Peak Pressure**  
15893 PSI

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

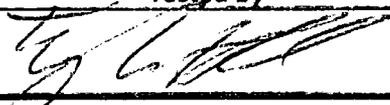
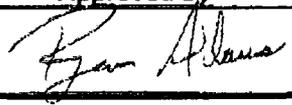
Tested By: Tyler Hill

Approved By: Ryan Adams



Midwest Hose  
& Specialty, Inc.

### Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	PATTERSON B&E	Hose Assembly Type	Choke & Kill
MWH Sales Representative	AMY WHITE	Certification	API 7K
Date Assembled	12/8/2014	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	10000
Sales Order #	236404	Hose Lot # and Date Code	10490-01/13
Customer Purchase Order #	260471	Hose I.D. (Inches)	3"
Assembly Serial # (Pick Ticket #)	287918-1	Hose O.D. (Inches)	5.30"
Hose Assembly Length	20'	Armor (yes/no)	YES
Fittings			
End A		End B	
Stem (Part and Revision #)	R3.OX64WB	Stem (Part and Revision #)	R3.OX64WB
Stem (Heat #)	A141420	Stem (Heat #)	A141420
Ferrule (Part and Revision #)	RF3.0	Ferrule (Part and Revision #)	RF3.0
Ferrule (Heat #)	37DA5631	Ferrule (Heat #)	37DA5631
Connection (Part #)	4 1/16 10K	Connection (Part #)	4 1/16 10K
Connection (Heat #)	V3579	Connection (Heat #)	V3579
Dies Used	5.37	Dies Used	5.37
Hydrostatic Test Requirements			
Test Pressure (psi)	15,000	Hose assembly was tested with ambient water temperature.	
Test Pressure Hold Time (minutes)	15 1/2		
Date Tested		Tested By	
12/9/2014			
		Approved By	
			



Midwest Hose  
& Specialty, Inc.

### Certificate of Conformity

<i>Customer:</i> <b>PATTERSON B&amp;E</b>	<i>Customer P.O.#</i> <b>260471</b>
<i>Sales Order #</i> <b>236404</b>	<i>Date Assembled:</i> <b>12/8/2014</b>

### Specifications

<i>Hose Assembly Type:</i> <b>Choke &amp; Kill</b>	
<i>Assembly Serial #</i> <b>287918-1</b>	<i>Hose Lot # and Date Code</i> <b>10490-01/13</b>
<i>Hose Working Pressure (psi)</i> <b>10000</b>	<i>Test Pressure (psi)</i> <b>15000</b>

*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:*

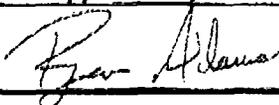
<i>Approved By</i> 	<i>Date</i> <b>12/9/2014</b>
---	---------------------------------

Exhibit E-2: Co-Flex Certifications  
 Brad Lummis Fed Com #221H  
 Matador Resources Company

December 9, 2014



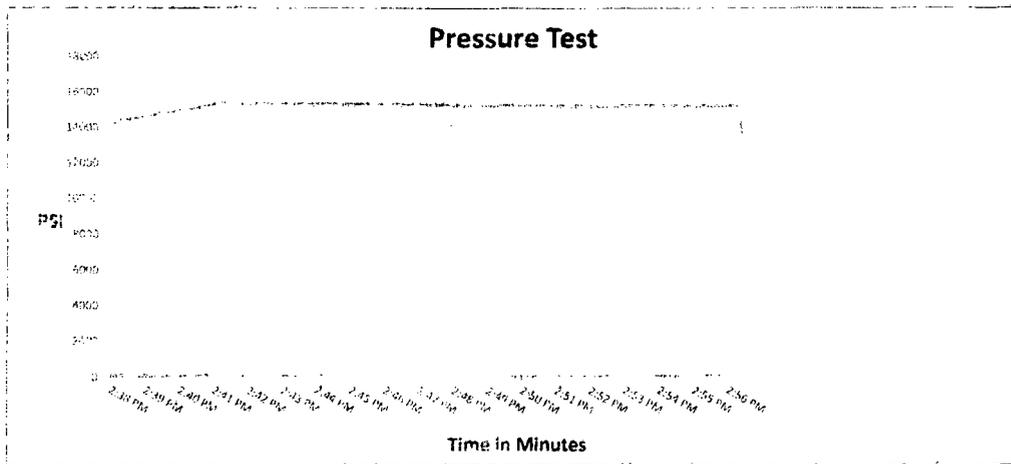
Midwest Hose  
& Specialty, Inc.

### Internal Hydrostatic Test Graph

Customer: Patterson

Pick Ticket #: 284918

Hose Specifications		Verification	
<b>Hose Type</b> Mud	<b>Length</b> 70'	<b>Type of Fitting</b> 4 1/16 10c	<b>Coupling Method</b> Swage
<b>I.D.</b> 3"	<b>O.D.</b> 4.79"	<b>Die Size</b> 5.37"	<b>Final O.D.</b> 5.37"
<b>Working Pressure</b> 10000 PSI	<b>Burst Pressure</b> Standard Safety Factor of 3 applies	<b>Hose Serial #</b> 10490	<b>Hose Assembly Serial #</b> 284918-3



**Test Pressure:** 15000 PSI  
**Time Held at Test Pressure:** 16 3/4 Minutes  
**Actual Burst Pressure:** 15410 PSI  
**Peak Pressure:** 15410 PSI

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

**Tested By:** Tyler Hill  
**Approved By:** Ryan Adams



Midwest Hose  
& Specialty, Inc.

### Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	PATTERSON B&E	Hose Assembly Type	Choke & Kill
MWH Sales Representative	AMY WHITE	Certification	API 7K
Date Assembled	12/8/2014	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	10000
Sales Order #	236404	Hose Lot # and Date Code	10490-01/13
Customer Purchase Order #	260471	Hose I.D. (Inches)	3"
Assembly Serial # (Pick Ticket #)	287918-3	Hose O.D. (Inches)	5.23"
Hose Assembly Length	70'	Armor (yes/no)	YES
Fittings			
End A		End B	
Stem (Part and Revision #)	R3.0X64WB	Stem (Part and Revision #)	R3.0X64WB
Stem (Heat #)	A141420	Stem (Heat #)	A141420
Ferrule (Part and Revision #)	RF3.0	Ferrule (Part and Revision #)	RF3.0
Ferrule (Heat #)	37DA5631	Ferrule (Heat #)	37DA5631
Connection (Part #)	4 1/16 10K	Connection (Part #)	4 1/16 10K
Connection (Heat #)		Connection (Heat #)	
Dies Used	5.37	Dies Used	5.37
Hydrostatic Test Requirements			
Test Pressure (psi)	15,000	Hose assembly was tested with ambient water temperature.	
Test Pressure Hold Time (minutes)	16 3/4		
Date Tested		Tested By	Approved By
12/9/2014			



Midwest Hose  
& Specialty, Inc.

### Certificate of Conformity

Customer: **PATTERSON B&E**

Customer P.O.# **260471**

Sales Order # **236404**

Date Assembled: **12/8/2014**

### Specifications

Hose Assembly Type: **Choke & Kill**

Assembly Serial # **287918-3**

Hose Lot # and Date Code **10490-01/13**

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

**12/9/2014**

**DATA ARE INFORMATIVE ONLY.  
BASED ON SI\_PD-101836 P&B**

Connection Data Sheet

OD	Weight	Wall Th.	Grade	API Drift	Connection
<b>7 5/8 in.</b>	<b>29.70 lb/ft</b>	<b>0.375 in.</b>	<b>P110 EC</b>	<b>6.750 in.</b>	<b>VAM® HTF NR</b>

Nominal OD	7.625 in.	Connection Type	Premium Integral Flush
Nominal ID	6.875 in.	Connection OD (nom)	7.701 in.
Nominal Cross Section Area	8.541 sqin.	Connection ID (nom)	6.782 in.
Grade Type	Enhanced API	Make-Up Loss	4.657 in.
Min. Yield Strength	125 ksi	Critical Cross Section	4.971 sqin.
Max. Yield Strength	140 ksi	Tension Efficiency	58 % of pipe
Min. Ultimate Tensile Strength	135 ksi	Compression Efficiency	72.7 % of pipe
Tensile Yield Strength	1 068 klb	Compression Efficiency with Sealability	34.8 % of pipe
Internal Yield Pressure	10 760 psi	Internal Pressure Efficiency	100 % of pipe
Collapse pressure	7 360 psi	External Pressure Efficiency	100 % of pipe
Tensile Yield Strength	619 klb	Min. Make-up torque	9 600 ft.lb
Compression Resistance	778 klb	Opti. Make-up torque	11 300 ft.lb
Compression with Sealability	372 klb	Max. Make-up torque	13 000 ft.lb
Internal Yield Pressure	10 760 psi	Max. Torque with Sealability	58 500 ft.lb
External Pressure Resistance	7 360 psi	Max. Torsional Value	73 000 ft.lb
Max. Bending	44 °/100ft		
Max. Bending with Sealability	17 °/100ft		

VAM® HTF™ (High Torque Flush) is a flush OD integral connection providing maximum clearance along with torque strength for challenging applications such as extended reach and slim hole wells, drilling liner / casing, liner rotation to achieve better cementation in highly deviated and critical High Pressure / High Temperature wells.

Looking ahead on the outcoming testing industry standards, VAM® decided to create an upgraded design and launch on the market the VAM® HTF-NR as the new standard version of VAM® extreme high torque flush connection. The VAM® HTF-NR has extensive tests as per API RP 5C5:2015 CAL II which include the gas sealability having load points with bending, internal pressure and high temperature at 135°C.

canada@vamfieldservice.com  
usa@vamfieldservice.com  
mexico@vamfieldservice.com  
brazil@vamfieldservice.com

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nigeria@vamfieldservice.com  
angola@vamfieldservice.com

china@vamfieldservice.com  
baku@vamfieldservice.com  
singapore@vamfieldservice.com  
australia@vamfieldservice.com

Other Connection Data Sheets are available at [www.vamservices.com](http://www.vamservices.com)

**Vallourec Group**

## Technical Specifications

<b>Connection Type:</b> DWC/C-IS MS Casing standard	<b>Size(O.D.):</b> 5-1/2 in	<b>Weight (Wall):</b> 20.00 lb/ft (0.361 in)	<b>Grade:</b> VST P110 EC
---	--------------------------------	---	------------------------------

<b>VST P110 EC</b>	<b>Material</b>
125,000	Grade
135,000	Minimum Yield Strength (psi)
	Minimum Ultimate Strength (psi)

**USA**

VAM USA  
4424 W. Sam Houston Pkwy. Suite 150  
Houston, TX 77041  
Phone: 713-479-3200  
Fax: 713-479-3234  
E-mail:

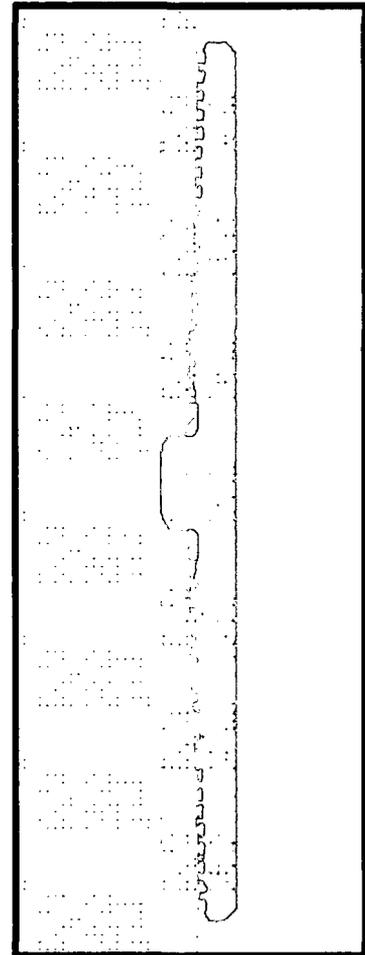
	<b>Pipe Dimensions</b>
5.500	Nominal Pipe Body O.D. (in)
4.778	Nominal Pipe Body I.D.(in)
0.361	Nominal Wall Thickness (in)
20.00	Nominal Weight (lbs/ft)
19.83	Plain End Weight (lbs/ft)
5.828	Nominal Pipe Body Area (sq in)

	<b>Pipe Body Performance Properties</b>
729,000	Minimum Pipe Body Yield Strength (lbs)
12,090	Minimum Collapse Pressure (psi)
14,360	Minimum Internal Yield Pressure (psi)
13,100	Hydrostatic Test Pressure (psi)

	<b>Connection Dimensions</b>
6.115	Connection O.D. (in)
4.778	Connection I.D. (in)
4.653	Connection Drift Diameter (in)
4.13	Make-up Loss (in)
5.828	Critical Area (sq in)
100.0	Joint Efficiency (%)

	<b>Connection Performance Properties</b>
729,000	Joint Strength (lbs)
26,040	Reference String Length (ft) 1.4 Design Factor
728,000	API Joint Strength (lbs)
729,000	Compression Rating (lbs)
12,090	API Collapse Pressure Rating (psi)
14,360	API Internal Pressure Resistance (psi)
104.2	Maximum Uniaxial Bend Rating [degrees/100 ft]

	<b>Appoximated Field End Torque Values</b>
16,100	Minimum Final Torque (ft-lbs)
18,600	Maximum Final Torque (ft-lbs)
21,100	Connection Yield Torque (ft-lbs)



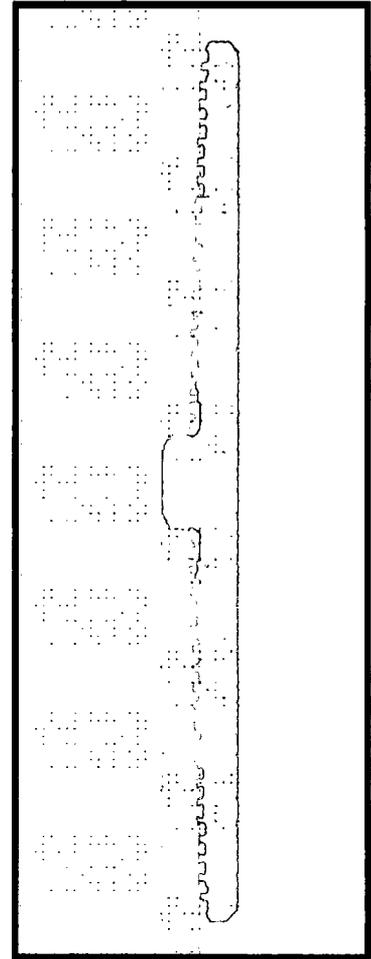
**For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).**

Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.

**DWC Connection Data Notes:**

1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a give pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API Internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.



Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

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1/11/2017 8:38:10 AM

**DATA ARE INFORMATIVE ONLY.  
BASED ON SI\_PD-101836 P&B**

Connection Data Sheet

OD	Weight	Wall Th.	Grade	API Drift	Connection
7 5/8 in.	29.70 lb/ft	0.375 in.	P110 EC	6.750 in.	VAM® HTF NR

Nominal OD	7.625 in.	Connection Type	Premium Integral Flush
Nominal ID	6.875 in.	Connection OD (nom)	7.701 in.
Nominal Cross Section Area	8.541 sqin.	Connection ID (nom)	6.782 in.
Grade Type	Enhanced API	Make-Up Loss	4.657 in.
Min. Yield Strength	125 ksi	Critical Cross Section	4.971 sqin.
Max. Yield Strength	140 ksi	Tension Efficiency	58 % of pipe
Min. Ultimate Tensile Strength	135 ksi	Compression Efficiency	72.7 % of pipe
Tensile Yield Strength	1 068 klb	Compression Efficiency with Sealability	34.8 % of pipe
Internal Yield Pressure	10 760 psi	Internal Pressure Efficiency	100 % of pipe
Collapse pressure	7 360 psi	External Pressure Efficiency	100 % of pipe
Tensile Yield Strength	619 klb	Min. Make-up torque	9 600 ft.lb
Compression Resistance	778 klb	Opti. Make-up torque	11 300 ft.lb
Compression with Sealability	372 klb	Max. Make-up torque	13 000 ft.lb
Internal Yield Pressure	10 760 psi	Max. Torque with Sealability	58 500 ft.lb
External Pressure Resistance	7 360 psi	Max. Torsional Value	73 000 ft.lb
Max. Bending	44 °/100ft		
Max. Bending with Sealability	17 °/100ft		

VAM® HTF™ (High Torque Flush) is a flush OD integral connection providing maximum clearance along with torque strength for challenging applications such as extended reach and slim hole wells, drilling liner / casing, liner rotation to achieve better cementation in highly deviated and critical High Pressure / High Temperature wells.

Looking ahead on the upcoming testing industry standards, VAM® decided to create an upgraded design and launch on the market the VAM® HTF-NR as the new standard version of VAM® extreme high torque flush connection. The VAM® HTF-NR has extensive tests as per API RP 5C5:2015 CAL II which include the gas sealability having load points with bending, internal pressure and high temperature at 135°C.

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Other Connection Data Sheets are available at [www.vamservices.com](http://www.vamservices.com)

**Vallourec Group**

**Tapered String Spec Sheet- Brad Lummis #221H**

Name	Hole Size	Top Setting Depth (MD)	Top Setting Depth (TVD)	Bottom Setting Depth (MD)	Bottom Setting Depth (TVD)	Casing Size	Wt/Grade	Joint Type	API Standard
Surface	17-1/2"	0	0	1150	1150	13-3/8" (new)	54.5# J-55	BUTT	Yes
Intermediate	12-1/4"	0	0	5400	5400	9-5/8" (new)	40# J-55	BUTT	Yes
Intermediate 2 Top	8-3/4"	0	0	5000	5000	7-5/8" (new)	29.7# P-110	BUTT	Yes
Intermediate 2 Middle	8-3/4"	5000	5000	12500	12500	7-5/8" (new)	29.7# P-110	VAM HTF-NR	No
Intermediate 2 Bottom	8-3/4"	12500	12500	13344	13185	7" (new)	29# P-110	BUTT	Yes
Production Top	6-1/8"	0	0	12400	12400	5-1/2" (new)	20# P-110	DWCC-IS MS	No
Production Bottom	6-1/8"	12400	12400	18001	13275	4-1/2" (new)	13.5# P-110	DWCC-HT-IS	No

Safety Design Factors: Collapse: 1.125, Burst: 1.125, Body Tensile: 1.8 (Buoyant), Joint Tensile: 1.8 (Buoyant)

**Tapered String Spec Sheet- Brad Lummis #221H**

Name	Hole Size	Top Setting Depth (MD)	Top Setting Depth (TVD)	Bottom Setting Depth (MD)	Bottom Setting Depth (TVD)	Casing Size	Wt/Grade	Joint Type	API Standard
Surface	17-1/2"	0	0	1150	1150	13-3/8" (new)	54.5# J-55	BUTT	Yes
Intermediate	12-1/4"	0	0	5400	5400	9-5/8" (new)	40# J-55	BUTT	Yes
Intermediate 2 Top	8-3/4"	0	0	5000	5000	7-5/8" (new)	29.7# P-110	BUTT	Yes
Intermediate 2 Middle	8-3/4"	5000	5000	12500	12500	7-5/8" (new)	29.7# P-110	VAM HTF-NR	No
Intermediate 2 Bottom	8-3/4"	12500	12500	13344	13185	7" (new)	29# P-110	BUTT	Yes
Production Top	6-1/8"	0	0	12400	12400	5-1/2" (new)	20# P-110	DWCC-IS MS	No
Production Bottom	6-1/8"	12400	12400	18001	13275	4-1/2" (new)	13.5# P-110	DWCC-HT-IS	No

Safety Design Factors: Collapse: 1.125, Burst: 1.125, Body Tensile: 1.8 (Buoyant), Joint Tensile: 1.8 (Buoyant)

**Tapered String Spec Sheet- Brad Lummis #221H**

Name	Hole Size	Top Setting Depth (MD)	Top Setting Depth (TVD)	Bottom Setting Depth (MD)	Bottom Setting Depth (TVD)	Casing Size	Wt/Grade	Joint Type	API Standard
Surface	17-1/2"	0	0	1150	1150	13-3/8" (new)	54.5# J-55	BUTT	Yes
Intermediate	12-1/4"	0	0	5400	5400	9-5/8" (new)	40# J-55	BUTT	Yes
Intermediate 2 Top	8-3/4"	0	0	5000	5000	7-5/8" (new)	29.7# P-110	BUTT	Yes
Intermediate 2 Middle	8-3/4"	5000	5000	12500	12500	7-5/8" (new)	29.7# P-110	VAM HTF-NR	No
Intermediate 2 Bottom	8-3/4"	12500	12500	13344	13185	7" (new)	29# P-110	BUTT	Yes
Production Top	6-1/8"	0	0	12400	12400	5-1/2" (new)	20# P-110	DWCC-IS MS	No
Production Bottom	6-1/8"	12400	12400	18001	13275	4-1/2" (new)	13.5# P-110	DWCC-HT-IS	No

Safety Design Factors: Collapse: 1.125, Burst: 1.125, Body Tensile: 1.8 (Buoyant), Joint Tensile: 1.8 (Buoyant)

**Tapered String Spec Sheet- Brad Lummis #221H**

Name	Hole Size	Top Setting Depth (MD)	Top Setting Depth (TVD)	Bottom Setting Depth (MD)	Bottom Setting Depth (TVD)	Casing Size	Wt/Grade	Joint Type	API Standard
Surface	17-1/2"	0	0	1150	1150	13-3/8" (new)	54.5# J-55	BUTT	Yes
Intermediate	12-1/4"	0	0	5400	5400	9-5/8" (new)	40# J-55	BUTT	Yes
Intermediate 2 Top	8-3/4"	0	0	5000	5000	7-5/8" (new)	29.7# P-110	BUTT	Yes
Intermediate 2 Middle	8-3/4"	5000	5000	12500	12500	7-5/8" (new)	29.7# P-110	VAM HTF-NR	No
Intermediate 2 Bottom	8-3/4"	12500	12500	13344	13185	7" (new)	29# P-110	BUTT	Yes
Production Top	6-1/8"	0	0	12400	12400	5-1/2" (new)	20# P-110	DWCC-IS MS	No
Production Bottom	6-1/8"	12400	12400	18001	13275	4-1/2" (new)	13.5# P-110	DWCC-HT-IS	No

Safety Design Factors: Collapse: 1.125, Burst: 1.125, Body Tensile: 1.8 (Buoyant), Joint Tensile: 1.8 (Buoyant)

## **Casing Design Criteria and Load Case Assumptions**

### **Surface Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

### **Intermediate #2 Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

### **Production Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

## **Casing Design Criteria and Load Case Assumptions**

### **Surface Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

### **Intermediate #1 Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

### **Intermediate #2 Casing**

Collapse:  $DF_c=1.125$

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

## Production Casing

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

## **Casing Design Criteria and Load Case Assumptions**

### **Surface Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

### **Intermediate #1 Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

### **Intermediate #2 Casing**

Collapse:  $DF_c=1.125$

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

## Production Casing

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

## **Casing Design Criteria and Load Case Assumptions**

### **Surface Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

### **Intermediate #1 Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

### **Intermediate #2 Casing**

Collapse:  $DF_c=1.125$

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

## Production Casing

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

## **Casing Design Criteria and Load Case Assumptions**

### **Surface Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.43 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.52 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.43 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (8.3 ppg).

### **Intermediate #1 Casing**

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.52 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 50 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.47 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.52 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (10.0 ppg).

### **Intermediate #2 Casing**

Collapse:  $DF_c=1.125$

- Partial Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.47 psi/ft). The effects of axial load on collapse will be considered. Internal force equal to gas gradient over half of setting depth and mud gradient with which the next hole section will be run below that (0.65 psi/ft).

- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.47 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: Casing test per Onshore Oil and Gas Order No. 2 with an external force equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Gas Kick Profile: Internal burst force at the shoe will be Fracture Pressure at that depth. Surface burst pressure will be fracture gradient at setting depth less a gas gradient to equivalent height of 100 bbl kick with Drill Pipe inside casing and mud gradient with which the next hole section will be run above that (0.65 psi/ft). External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft), which is a more conservative backup force than pore pressure.
- Fracture at Shoe with 1/3 BHP at Surface: Internal burst force at the shoe will be Fracture Pressure at setting depth. Internal burst force at surface will be 1/3 of pore pressure at setting depth. External force will be equal to the mud gradient in which the casing will be run (0.47 psi/ft) which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (9.0 ppg).

## Production Casing

Collapse:  $DF_c=1.125$

- Full Internal Evacuation: Collapse force equal to the mud gradient in which the casing will be run (0.65 psi/ft). The effects of axial load on collapse will be considered.
- Cementing: Collapse force equal to the gradient of planned cement slurries to planned depths and mud gradient in which the casing will be run above that (0.65 psi/ft) and an internal force equal to mud gradient of displacement fluid (0.43 psi/ft).

Burst:  $DF_b=1.125$

- Pressure Test: 8000 psi casing test with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.
- Injection Down Casing: 9500 psi surface injection pressure plus an internal pressure gradient of 0.65 psi/ft with an external force equal to the mud gradient in which the casing will be run (0.65 psi/ft), which is a more conservative backup force than pore pressure.

Tensile:  $DF_t=1.8$

- Overpull: A downward force of 100,000 lbs is applied at the shoe along with the weight of the casing string utilizing the effects of buoyancy (12.5 ppg).

Exhibit E-6: H2S Contingency Plan Emergency Contacts  
 Brad Lummis Fed Com #221H  
 Matador Resources Company  
 Sec. 23, 24S, 34E  
 Lea County, NM

<b>Company Office</b>			
Matador Resources Company		(972)-371-5200	
<b>Key Personnel</b>			
<b>Name</b>	<b>Title</b>	<b>Office</b>	<b>Mobile</b>
Billy Goodwin	Vice President Drilling	972-371-5210	817-522-2928
Dee Smith	Drilling Superintendent	972-371-5447	972-822-1010
Blake Hermes	Drilling Engineer Construction Superintendent Construction Superintendent	972-371-5485	713-876-8558
<b>Artesia</b>			
Ambulance			911
State Police		575-746-2703	
City Police		575-746-2703	
Sheriff's Office		575-746-9888	
Fire Department		575-746-2701	
Local Emergency Planning Committee		575-746-2122	
New Mexico Oil Conservation Division		575-748-1283	
<b>Carlsbad</b>			
Ambulance			911
State Police		575-885-3137	
City Police		575-885-2111	
Sheriff's Office		575-887-7551	
Fire Department		575-887-3798	
Local Emergency Planning Committee		575-887-6544	
New Mexico Oil Conservation Division		575-887-6544	
<b>Santa Fe</b>			
New Mexico Emergency Response Commission (Santa Fe)		505-476-9600	
New Mexico Emergency Response Commission (Santa Fe) 24 hrs		505-827-9126	
New Mexico State Emergency Operations Center		505-476-9635	
<b>National</b>			
National Emergency Response Center (Washington, D.C.)		800-424-8802	
<b>Medical</b>			
Flight for Life- 4000 24th St.; Lubbock, TX		806-743-9911	
Aerocare- R3, Box 49F; Lubbock, TX		806-747-8923	
Med Flight Air Amb- 2301 Yale Blvd S.E., D3; Albuquerque, NM		505-842-4433	
SB Air Med Service- 2505 Clark Carr Loop S.E.; Albuquerque, NM		505-842-4949	
<b>Other</b>			
Boots & Coots IWC		800-256-9688	or 281-931-8884
Cudd Pressure Control		432-699-0139	or 432-563-3356

Haliburton  
B.J. Services

575-746-2757  
575-746-3569

**HYDROGEN SULFIDE CONTINGENCY PLAN  
Drilling, Testing, & Completion**

**MRC ENERGY CO.**

**Brad Lummis Fed Com #221H**

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**Reviewers**

----- Operations Manager  
----- Operations Supt.  
----- Staff RES  
----- Field Supv.  
Blake Hermes---Engineering

**Latitude: 32.2089698" N  
Longitude: 103.4472432" W**

**SHL 435' FNL & 483' FWL, Sec. 23  
BHL 240' FSL & 330' FWL, Sec. 23**

**H2S Contingency Plan # 0165      Revision# 0**

**This H2S Contingency Plan is subject to updating**

Effective date: July 8, 2015

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## **INTRODUCTION**

**The H2S equipment will be rigged up 2 days prior to reaching a potential H2S containing zone. Drilling into any potential H2S zone shall not commence until the on-site MRC Drilling Supervisor has confirmed this plan in place.**

**The onsite Drilling Foreman will give Total Safety one week (7 days) notice to prepare for rig up of H2S equipment)**

To be effective, the plan requires the cooperation and effort of each person participating in the drilling of an H<sub>2</sub>S well. Each person must know his/her responsibilities and all emergency and safety procedures. He/she should thoroughly understand and be able to use with accuracy, all safety equipment while performing his/her normal duties, if the circumstance should arise. He/she should therefore familiarize himself/herself with the location of all safety equipment and check to see that it is properly stored, easily accessible at all times, and routinely maintained.

It is the intention of MRC ENERGY CO. and the Drilling Contractor to make every effort to provide adequate safeguards against harm to persons on the rig and in the immediate vicinity from the effects of hydrogen sulfide, which may be released into the atmosphere under emergency conditions. However, the initiative rests with the individual in utilizing the safeguards provided. The ideas and suggestions of the individuals involved in the drilling of this well are highly welcomed and act as a fundamental tool for providing the safest working conditions possible.

The drilling representative is required to enforce these procedures. They are set up for your safety and the safety of all others.

## **II. PURPOSE**

It is MRC Energy Co.'s intent to provide a safe working place, not only for its employees, but also for other contractors who are aiding in the drilling of this well. The safety of the general public is of utmost concern. All precautions will be taken to keep a safe working environment and protect the public.

MRC ENERGY CO.'S

**There is a possibility of encountering toxic hydrogen sulfide gas. Safety procedures must be adhered to in order to protect all personnel connected with the operations as well as people living within the area.**

**The MRC Energy Co. representative will enforce all aspects of the H2S Contingency Plan. This job will become easier by a careful study of the following pages and training and informing all personnel that will be working on the well, their duties and responsibilities.**

**A. OPERATING PROCEDURES**

**DEFINITIONS:**

**For purpose of this plan, on-site personnel shall be referred to as “In Scope Personnel” or “Out of Scope Personnel”, per the following definitions:**

**In Scope Personnel** – Personnel who will be working or otherwise present in potential H<sub>2</sub>S release areas, including the rig floor, cellar, pits, and shaker areas.

**Out of Scope Personnel** – Personnel who will not be working or Otherwise present in potential H<sub>2</sub>S areas. Such personnel include rig Site visitor, delivery and camp services personnel.

**GENERAL:**

Before this H<sub>2</sub>S contingency plan becomes operational, all regularly assigned In Scope Personnel (primarily the MRC, drilling contractor, and certain service personnel,) shall be thoroughly trained in the use of breathing equipment, emergency procedures, and responsibilities. Total Safety Technician or a designee assigned by the MRC Drilling Foreman shall keep a list of all personnel who have been through the on-site H<sub>2</sub>S training program at the drill site.

All In Scope Personnel shall be given H<sub>2</sub>S training and the steps to be taken during H<sub>2</sub>S conditions under which the well may be drilled. General information will be explained about toxic gases, as well as the physiological effects of H<sub>2</sub>S and the various classified operating conditions. In addition, the reader will be informed his/her general responsibility concerning safety equipment and emergency procedures.

The Total Safety H<sub>2</sub>S Safety Technician or MRC on-site RSE Technician shall make available the H<sub>2</sub>S Contingency Plan for all personnel to review.

Without exception, all personnel that arrive on location must proceed directly to and sign-in with the on-site MRC RSE Technician. In Scope Personnel will be required to complete an on-site H<sub>2</sub>S training and respirator fit testing before starting work, or produce evidence that they have received equivalent training. Out of Scope Personnel will be required to complete a site H<sub>2</sub>S awareness and general safety briefing. This briefing will consist of a H<sub>2</sub>S hazard overview, alarm review and required response to alarms.

**B. PROCEDURES TO BE INITIATED PRIOR TO H2S CONTINGENCY PLAN COMPLIANCE:**

A list of emergency phone numbers and contacts will be on location and posted at the following locations:

1. MRC ENERGY CO.'S Representative's Office
2. Drilling Contractor's, Toolpusher Office
3. Living Quarters Area

All safety equipment and H<sub>2</sub>S related hardware must be set up as required by MRC Energy Co. with regard to location of briefing areas, breathing equipment, etc. All safety equipment must be inspected periodically (at least weekly) with particular attention to resuscitators and breathing equipment.

In Scope Personnel working in the well site area will be assigned breathing apparatus. Operator and drilling contractor personnel required to work in the following areas will be provided with Self Contained Breathing Apparatus:

1. Rig Floor
2. Mud Pits
3. Derrick
4. Shale Shaker
5. Cellar

The Total Safety H<sub>2</sub>S Safety Technician will be responsible for rigging up all H<sub>2</sub>S continuous monitoring-type detectors. The Total Safety Technician will monitor and bump test the detector units periodically (at least at least once a week to test alarm function during drilling conditions. In the event H<sub>2</sub>S is detected, or when drilling in a zone confirmed to contain H<sub>2</sub>S, the units shall be bump tested at least once every 24 hours. A bump test/calibration log will be kept on location. All results will be reported to the MRC on-site Drilling Foreman.

All Total Safety H<sub>2</sub>S equipment will be maintained and inspected by a Total Safety Technician on at least a Weekly basis.

**C. DRILLING BELOW CONTINGENCY PLAN DEPTH**

H2S response drills will be held at least once per week if possible or as often as necessary to acquaint the crews and service company personnel of their responsibilities and the proper procedures to shut-in a well. Initial drills will be performed until crews demonstrate competency donning and working under mask. After the MRC Energy Co.'s representative is satisfied with initial blowout drill procedures, a drill will be conducted weekly with each crew, as necessary. The H2S Safety Technician or designee will conduct safety talks and maintain the safety equipment, consult and carry out the instructions of the drilling supervisor. All personnel allowed in the well work area during drilling or testing operations will be instructed in the use of breathing equipment until supervisory personnel are satisfied that they are capable of using it.

After familiarization, each person must perform a drill with breathing equipment. The drill should include getting the breathing equipment, donning the breathing apparatus, and performing expected duties for a short period. A record shall be kept of all personnel drilled and the date of the drill. H2S training records will be kept on location for all personnel.

Rig crews and service company personnel shall be made aware of the location of spare air bottles, resuscitation equipment, portable fire extinguishers, H<sub>2</sub>S monitors and detectors. Knowledge of the location of the H<sub>2</sub>S monitors and detectors are vital in determining as our gas location and the severity of the emergency conditions.

After any device has initially detected H<sub>2</sub>S, all areas of poor ventilation shall be inspected periodically by means of a portable H<sub>2</sub>S detector instrument. The buddy system will be utilized. (When an alarm sounds, personnel will don an SCBA, shut the well in, and proceed to SBA for roll call. The H<sub>2</sub>S Technician or designee will mask up, with a buddy and will verify source of H<sub>2</sub>S and report back to the on-site MRC Foreman.)

**D. PROCEDURES PROGRAM**

1. Drill Site
  - a. The drilling rig will be located to allow prevailing winds to blow across the reserve pit.
  - b. A Safe Briefing Area will be provided with a breathing air cascade trailer and or 30-minute SCBA's at the Primary Area. Personnel will assemble at the most up-wind station under alarm conditions, or when so ordered by the MRC Energy Co. representative, the Contractor representative, or

the Total Safety H<sub>2</sub>S Safety Technician. Windssocks or streamers will be anchored to various strategic places on a pole about 10 feet high, so it is in easy view from the rig floor at all times.

- c. Warning signs will be posted on the perimeters. "No Smoking" signs will be posted by MRC Energy Co.as well.
- d. One multi-channel automatic H<sub>2</sub>S monitor will be provided by Total Safety and the detector heads will be at the shale shaker, bell nipple, mud pits, rig floor, and quarter's area. The monitor will be located inside HSE or Company man trailer. Should the alarm be shut off to silence the sirens, the blinker light must continue to warn of H<sub>2</sub>S presence. The Total Safety H<sub>2</sub>S Safety Technician or designee will continuously monitor the detectors and will reactivate the alarm if H<sub>2</sub>S concentrations increase to a dangerous level.
- e. A method of escape will be open at all times.
- f. If available, land line telephone service will be provided or cell phones provided. (Primary communications provided)
- g. A rig communication system will be provided, as needed.
- h. A gas trap, choke manifold, and degasser will be installed.
- i. A kill line, securely anchored and of ample strength, will be laid to the well-head from a safe location. This line is to be used only in an emergency.

#### General

- a. The MRC Energy Co. representative and/or the Contractor's Toolpusher will be available at all times. The drilling supervisor, while on duty, will have complete charge of the rig and location operations and will take whatever action is deemed necessary to insure personnel safety, to protect the well, and to prevent damage.
- b. A Mud Engineer will be on location at all times when drilling takes place at the depth H<sub>2</sub>S may be expected.
- c. The mud engineer will be able to verify the presence or absence of H<sub>2</sub>S.

### III. CONDITIONS AND EMERGENCY PROCEDURES

#### A. DEFINITION OF OPERATIONAL "CONDITIONS"

<b>CONDITION I</b>	<b>"POSSIBLE DANGER"</b>
Warning Flags	Green
Alarms	No Alarm. Less than 10 ppm
Characterized By:	Drilling operations in zones that may contain hydrogen sulfide. This condition remains in effect unless H <sub>2</sub> S is detected and it becomes necessary to go to Condition II.
General Action:	<ol style="list-style-type: none"><li>Be alert for a condition change</li><li>Check all safety equipment for availability and proper functioning.</li><li>Perform all drills for familiarization and proficiency.</li></ol>
<b>CONDITION II</b>	<b>"MODERATE DANGER"</b>
Warning Flags	Yellow
Alarms:	Actuates at 10 ppm. Continuous flashing light.
Characterized By:	Drilling operations in zones containing hydrogen sulfide. This condition will remain in effect until adding chemicals to the mud system neutralizes the hydrogen sulfide or it becomes necessary to go to Condition III.
General Action:	<ol style="list-style-type: none"><li>Be alert for a condition change</li><li>WHEN DRILLING AHEAD - Driller and designated crewmember will don 30 min SCBA, shut-in the well and immediately proceed to the Safe Briefing Area.  WHEN TRIPPING – Driller and two designated crewmembers will don 30 min SCBA, shut in the well and immediately proceed to the Safe Briefing Area. The Derrickman will</li></ol>

don a 5-minute escape pack, descend to the rig floor, don a 30-min SCBA (if necessary) and immediately proceed to the Safe Briefing Area.

- c. All In Scope Personnel will proceed directly to the appropriate Safe Briefing Area.
- d. Remain in safe briefing area, take roll call and wait for instructions
- e. Contact the Total H2S Technician if not on location.
- f. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering an H<sub>2</sub>S contaminated area to provide assistance to anyone who may be injured or overcome by toxic gases.
- g. All Out of Scope Personnel will report to the appropriate Safe Briefing Area.

**CONDITION III      “EXTREME DANGER”**  
Warning Flags                      Red

Alarms                                      Actuate at 15 ppm. Continuous Sirens and Flashing Lights

Characterized by:                      Critical well operations which pose an immediate threat of H<sub>2</sub>S exposure to on-site personnel and a potential threat to the public.

General Action:                      a.      WHEN DRILLING AHEAD - Driller and designated crewmember will don 30 min SCBA, shut-in the well and immediately proceed to the Safe Briefing Area.

WHEN TRIPPING – Driller and two designated crewmembers will don 30

min SCBA, shut in the well and immediately proceed to the Safe Briefing Area. The Derrickman will don a 5-minute escape pack, descend to the rig floor, don a 30-min SCBA (if necessary) and immediately proceed to the Safe Briefing Area.

- b. All In Scope Personnel should don SCBA if nearby and immediately proceed to Safe Briefing Area. If SCBA is not nearby at time of alarm, DO NOT GO TOWARDS RIG AREA, but proceed directly to the Safe Briefing Area
- c. All out of Scope Personnel shall evacuate the location.
- d. Remain in the Safe Briefing Area, take roll call and wait for instructions.
- e. Contact the Total H2S Technician if not on location.
- f. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering an H<sub>2</sub>S contaminated area to provide assistance to anyone who may be injured or overcome by toxic gases. Use the buddy system.
- g. Remain in safe briefing area, take roll call and wait for instructions.
- h. A cascade breathing air systems shall be mobilized and utilized to conduct any additional on rig work required to correct the H2S release condition.
- i. If well is ignited do not assume area is safe. SO<sub>2</sub> is hazardous and not all H<sub>2</sub>S will burn.

## **H<sub>2</sub>S EMERGENCY PROCEDURES; IN SCOPE PERSONNEL**

### **A. Day To Day Drilling Operations**

1. Upon discovering a release of H<sub>2</sub>S gas in the ambient air by warning alarms or in any other way **Do Not Panic**.
2. Hold your breath donning the nearest Self Contained Breathing Apparatus and rapidly move up or across-wind away from the areas where H<sub>2</sub>S sensing devices are in place, to the closest available safe briefing area. Continue to use breathing apparatus until it has been determined that the exposure of H<sub>2</sub>S gas in the ambient air no longer exists. **Do Not Panic!**
3. Utilize the "Buddy System", i.e.; select and pair up each person participating in the drilling of an H<sub>2</sub>S well prior to an emergency situation.
4. Help anyone who is overcome or affected by the H<sub>2</sub>S gas by taking him/her up-wind out of the contaminated area. (This should be done utilizing an SCBA and with a buddy.)
5. Take necessary steps to confirm the release of the H<sub>2</sub>S gas into the ambient air.
  - When an H<sub>2</sub>S alarm activates, two designated personnel using the buddy system, while wearing their self contained breathing apparatus, will determine by the read-out on the fixed monitor which sensing device has detected the release of the H<sub>2</sub>S gas.
  - They will utilize the hand-held sniffer type device at the particular sensing point disclosed on the fixed monitor to corroborate the fact that H<sub>2</sub>S gas has actually been released. This will rule out the possibility of a false alarm. This will be done with a buddy and under mask after reporting to the Safe Briefing Area for roll call and instructions by on-site MRC Foreman.
6. Refer to the Emergency Phone Numbers and call emergency personnel.
7. Take the necessary steps to suppress the release of H<sub>2</sub>S gas into the ambient air. Comply with the MRC Energy Co. Representative to physically suppress the release of H<sub>2</sub>S gas at the actual release point.

8. Check all of MRC Energy Co.'s monitoring devices and increase gas-monitoring activities with the portable hand-operated H<sub>2</sub>S and gas detector units.

**Do Not Panic!**

The MRC Energy Co. representative will assess the situation and with assistance of the Contractor's Representative and Total Safety's H<sub>2</sub>S Safety Technician or on site designee, will assign duties to each person to bring the situation under control.

**B. RESPONSIBILITIES OF WELL-SITE PERSONNEL**

In the event of a release of potentially hazardous amounts of H<sub>2</sub>S, all personnel will immediately don their protective breathing apparatus, the well will be shut in and personnel will proceed upwind to the nearest designated safe briefing area for roll call and instructions by MRC Foreman. Consideration will be given to evacuating Out of Scope Personnel, as situation warrants.

**1. MRC ENERGY CO.'S Well-site Representatives**

- a. If MRC Energy Co.'s well-site representative is incapacitated or not on location, this responsibility will fall to the Toolpusher/Driller.
- b. Immediately upon assessing the situation, set this plan into Action by initiating the proper procedures to contain the gas and notify the appropriate people and agencies.
- c. Ensure that the alarm area indicated by the fixed H<sub>2</sub>S Monitor is checked and verified with a portable H<sub>2</sub>S detector. (Safety Technician if on location or MRC assigned designee with a buddy utilizing SCBA's)
- d. Consult Pusher/driller of remedial actions as needed.
- e. Ensure that non-essential personnel proceed to the safe briefing area.
- f. Ensure location entrance barricades are positioned. Keep the number of persons on location to a minimum during hazardous operations.

- g. Consult each contractor, Service Company and all others allowed to enter the site, that H<sub>2</sub>S gas may be encountered and the potential hazards that may exist.
- h. Authorize the evacuation of local residents if H<sub>2</sub>S threatens Their safety.
- i. Non essential personnel should be evacuated from location if Situation warrants.

**2. Toolpusher**

- a. Toolpusher/Driller will assume responsibilities of MRC Energy Co.'s well-site representative if that person is incapacitated or not on location.
- b. Ensure that the alarm area indicated by the fixed H<sub>2</sub>S monitor is checked and verified with a portable H<sub>2</sub>S gas detector. (Alarm area indicated by the monitor will be Checked by the H<sub>2</sub>S Technician and a buddy, under mask.) This will be done after checking in and roll call at the Upwind Safe Briefing Area.
- c. Confer with MRC Energy Co.'s well-site representative or superintendent and direct remedial action to suppress the H<sub>2</sub>S and control the well.
- d. Ensure that personnel at the safe briefing area are instructed on emergency actions required.
- e. Ensure that personnel at the drill floor area are instructed on emergency actions required.
- f. Ensure that all personnel observe the appropriate safety and emergency procedures.
- g. Ensure that all persons are accounted for and provided emergency assistance as necessary.

**3. Mud Engineer**

- a. Run a sulfide check on the flowline mud.
- b. Take steps to determine the source of the H<sub>2</sub>S and suppress it. Lime and H<sub>2</sub>S scavenger shall be added to the mud as necessary.

**4. Total H<sub>2</sub>S Safety Technician, if on location, or MRC Designee**

- a. H<sub>2</sub>S Safety Technician or designee don nearest SCBA and report to Safe Briefing Area for roll call, take a buddy masked up and check monitor and verify with a portable H<sub>2</sub>S detector the alarm area indicated by the fixed H<sub>2</sub>S monitor. Advise the Toolpusher/Driller and MRC Energy Co.'s well-site representative of findings. Record all findings.
- b. If H<sub>2</sub>S is flared, check for sulfur dioxide (SO<sub>2</sub>) near the flare as necessary. Take hourly readings at different perimeters, log readings and record on location.
- c. Ensure that personnel at the safe briefing area are instructed on emergency actions required.
- d. Ensure that the appropriate warning flags are displayed.
- e. Ensure that all personnel are in S.C.B.A. as necessary.
- f. Ensure that all persons are accounted for and provide emergency assistance as necessary.
- g. Be prepared to evacuate rig if order is issued.

**5. General Personnel & Visitors**

- a. All In Scope Personnel, if not specifically designated to shut the well in or control the well, shall proceed to the (upwind) safe briefing area. All Out of Scope Personnel shall immediately proceed to the appropriate (upwind) safe briefing area or evacuate the site as conditions warrant.

- b. During any emergency, use the “buddy” system to prevent anyone from entering or being left in a gas area alone, even wearing breathing apparatus.
- c. Provide assistance to anyone who may be injured or overcome by toxic gases. Personnel shall ensure that their breathing apparatus is properly fitted and operational before entering a potentially H<sub>2</sub>S contaminated area.
- d. Remain in safe briefing area and wait for instructions.

**C. INSTRUCTIONS FOR IGNITING THE WELL**

- 1. The Toolpusher/Driller will confer with MRC Energy Co.'s well-site representative who will secure the approval of the “Texas Wells Delivery Manager, prior to igniting the well, if at all possible.

The Toolpusher/Driller will be responsible for igniting the well in the event of severe well control problems. This decision should be made only as a last resort in situations where it is clear that:

- a. Human life and property are endangered, or
  - b. There is no hope of controlling the well under current conditions.
- 2. Once the decision has been made, the following procedures should be followed:
    - a. Two people wearing self-contained breathing apparatus will be needed for the actual lighting of the well. They must first establish the flammable perimeter by using an explosimeter. This should be established at 30% to 40% of the lower flammable limits.
    - b. After the flammable perimeter has been established and everyone removed from the area, the ignition team should select a site upwind of the well from which to ignite the well. This site should offer the maximum protection and have a clear path for retreat from the area.

- c. The ignition team should have safety belts and lifeline attached and manned before attempting ignition. If the leak is not ignited on the first attempt, move in 20 to 30 feet and fire again. Continue to monitor with the explosimeter and NEVER fire from an area with over 75% of the Lower Explosive Limit (LEL). If having trouble igniting the well, try firing 40 degrees to 90 degrees on either side of the well.
- d. If ignition is not possible due to the makeup of the gas, the toxic perimeter must be established and evacuation continued until the well is contained.
- e. All personnel must act only as directed by the person in charge of the operations.

NOTE: After the well is ignited, burning hydrogen sulfide (H<sub>2</sub>S) will convert to sulfur dioxide (SO<sub>2</sub>), which is also a highly toxic gas.

**DO NOT ASSUME THE AREA IS SAFE AFTER THE WELL IS IGNITED**

**D. CORING PROCEDURES**

Only essential personnel shall be on the rig floor. Ten (10) stands prior to retrieving core barrel; all personnel on drill floor and in derrick shall confirm self-Contained breathing apparatus available and ready for use.

A Total H<sub>2</sub>S Technician will don a SCBA with a buddy assigned from the rig crew, and continuously monitor for H<sub>2</sub>S at each connection. Any levels detected will require operations to be shut down and all involved personnel to don SCBAs. Precautions will remain in place until barrel is laid down.

All involved personnel will don SCBAs when removing the inner barrel from the outer barrel. SCBAs can be removed once the absence of H<sub>2</sub>S is confirmed by the Total H<sub>2</sub>S Technician.

Cores will be appropriately marked and sealed for transportation.

## Normal Operations

### 1. Responsibilities of well-site personnel

#### a. Well-site Representative

1. Notify H<sub>2</sub>S Technician of expected date to reach Contingency Plan implementation depth (Two (2) days prior to reaching suspected H<sub>2</sub>S bearing zone) or prior to starting well work.
2. Ensure H<sub>2</sub>S Safety Technician completes rig-up procedures prior to reaching Contingency Plan effective depth.
3. Restrict the number of personnel at the drilling rig or well site to a minimum while drilling, starting well work, testing or coring.
4. Ensure weekly H<sub>2</sub>S drills/training are performed, if possible.

#### B. Toolpusher

1. Ensure that necessary H<sub>2</sub>S safety equipment is provided on the rig, and that it is properly inspected and maintained.
2. Ensure that all personnel that work in the well area, are thoroughly trained in the use of H<sub>2</sub>S safety equipment and periodic drills are held to maintain an adequate level of proficiency.

#### C. In Scope Personnel

1. Remain clean-shaven. Beards and long sideburns do not allow a proper facepiece seal.
2. Receive H<sub>2</sub>S safety training on location, or confirm prior training by certification that is one year within date.
3. Familiarize yourself with the rig's Contingency Plan.
4. Inspect and practice putting on your breathing apparatus.

5. Know the location of the “safe briefing areas”.
6. Keep yourself “wind conscious”. Be prepared to quickly move upwind and away in the event of any emergency involving release of H<sub>2</sub>S.

**D. Total Safety H<sub>2</sub>S Safety Technician or MRC Designee**

1. Conduct training as necessary to ensure all personnel working in well area are familiar with the contingency procedures and the operation of emergency equipment.
2. Check all H<sub>2</sub>S safety equipment to ensure that it is ready for emergency use:
  - Check pressure weekly for each shift on breathing apparatus (both 30-minute and hip-packs) to make sure they are charged to full volume.
  - Check pressure on cascade air bottles, if on location, to see that they are capable of recharging breathing apparatus.
  - Check oxygen resuscitator, if on location, to ensure that it is charged to full volume.
  - Check H<sub>2</sub>S detectors weekly for each shift (fixed and portable), and explosimeter, to ensure they are working properly.
3. Provide a weekly report to MRC Energy Co.'s well-site representative documenting:
  - Calibrations performed on H<sub>2</sub>S detectors.
  - Proper location and working order of H<sub>2</sub>S safety equipment.
  - Attendance of all personnel, trained or retrained, and their company.
  - Weekly drills, if held and a list of personnel participating and summary of actions.

**OUT OF SCOPE PERSONNEL**

MRC Energy Co. policy will not require Out of Scope Personnel to be clean shaven, have processed medical questionnaires, fit testing, or have certified H2S Training.

## SAFETY EQUIPMENT

**All respirators will be designed, selected, used and maintained in conformance with ANSI Z88.2, American National Standard for respiratory protection.**

Personal protective equipment must be provided and used. Those who are expected to use respiratory equipment in case of an emergency will be carefully instructed in the proper use and told why the equipment is being used. Careful attention will be given to the minute details in order to avoid possible misuse of the equipment during periods of extreme stress.

Self-contained breathing apparatus provides complete respiratory and eye protection in any concentration of toxic gases and under any condition of oxygen deficiency. The wearer is independent of the surrounding atmosphere because he/she is breathing with a system admitting no outside air. It consists of a full face mask, breathing tube, pressure demand regulator, air supply cylinder, and harness. Pure breathing air from the supply cylinder flows to the mask automatically through the pressure demand regulator which reduces the pressure to a breathing level. Upon inhalation, air flows into the mask at a rate precisely regulated to the user's demand. Upon exhalation, the flow to the mask stops and the exhaled breath passes through a valve in the face piece to the surrounding atmosphere. The apparatus includes an alarm & gauge which warns the wearer to leave the contaminated area for a new cylinder of air or cylinder refill.

The derrickman is provided with a full face piece unit attached to a 5- minute escape cylinder. He will also have his own self-contained 30-minute unit breathing apparatus located on the drilling floor. He will use the 5-minute unit to exit the derrick to the floor, donning the 30-minute unit located on the floor, if needed.

All respiratory protective equipment, when not in use, should be stored in a clean, cool, dry place, and out of direct sunlight to retard the deterioration of rubber parts. After each use, the mask assembly will be scrubbed with soap and water, rinsed thoroughly, and dried. Air cylinders can be recharged to a full condition from a cascade system.

Personnel in each crew will be trained in the proper techniques of bottle filling.

The primary piece of equipment to be utilized, should anyone be overcome by hydrogen sulfide, is the oxygen resuscitator, if on location.

When asphyxiation occurs, the victim must be moved to fresh air and immediately given artificial respiration. In order to assure readiness, the bottles of oxygen will be checked at regular intervals and an extra tank kept on hand.

Hand-operated pump-type detectors incorporating detector tubes will give more accurate readings of hydrogen sulfide. The pump-type draws air to be tested through the detector tube containing lead acetate-silica gel granules. Presence of hydrogen sulfide in the air sample is shown by the development of a dark brown stain on the granules, which is the

scale reading of the concentration of hydrogen sulfide. By changing the type of detector tube used, this detector may also be used for sulfur dioxide (SO<sub>2</sub>) detection when hydrogen sulfide (H<sub>2</sub>S) is being burned in the flare area.

Provisions must be made for the storage of all safety equipment as is evident from the foregoing discussion. All equipment must be stored in an available location so that anyone engaged in normal work situations is no more than "one breath away" from a mask.

## V – TOXICITY OF VARIOUS GASES

<b>Lethal Common Name ppm<sup>4</sup></b>	<b>Chemical Formula</b>	<b>Specific Gravity<sup>1</sup></b>	<b>PEL (OSHA)<sup>2</sup></b>	<b>STEL<sup>3</sup></b>
Hydrogen Cyanide 300	HCN	0.94	10	150
Hydrogen Sulfide 600	H <sub>2</sub> S	1.18	20	Peak- 50ppm
Note: The ACGIH(7) recommends a TWA(6) value of 10ppm as the TLV(5) for H <sub>2</sub> S and an STEL of 15ppm.				
Sulfur Dioxide 1000	SO <sub>2</sub>	2.21	2	5 ppm
Chlorine	CL <sub>2</sub>	2.45	1	
Carbon Monoxide 1000	CO	0.97	35	200/1 Hour
Carbon Dioxide 10%	CO <sub>2</sub>	1.52	5000	5%
Methane	CH <sub>4</sub>	0.55	90000	

<sup>1</sup> **Air = 1.0**

<sup>2</sup> **Permissible** - Concentration at which is believed that all workers may repeatedly be exposed, day after day, without adverse effect.

<sup>3</sup> **STEL** - Short Term Exposure Limit. A 15-minute time weighted average.

<sup>4</sup> **Lethal** - Concentration that will cause death with short-term exposure.

**TLV** – Threshold Limit Value; a concentration recommended by the American Conference of Governmental Industrial Hygienists (ACGIH)

**TWA** – Time Weighted Average; the average concentration of contaminant one can be exposed to over a given eight-hour period.

**ACGIH** – (American Conference of Governmental Industrial Hygienists) is an organization comprised of Occupational Health Professionals believed by many to be the top experts in the field of Industrial Hygiene. They are recognized as an expert resource by OSHA. The ACGIH releases a bi-annual publication “Threshold Limit Values and Biological Indices” that many safety professionals consider to be the authoritative document on airborne contaminants.

Reference: API RP-49, September 1974 - Reissued August 1978

**VI. PROPERTIES OF GASES**

**A. CARBON DIOXIDE**

1. Carbon Dioxide (CO<sub>2</sub>) is usually considered inert and is commonly used to extinguish fires. It is 1.52 times heavier than air and will concentrate in low areas of still air. Humans cannot breathe air containing more than 10% CO<sub>2</sub> without losing conscience or becoming disorientation in a few minutes. Continued exposure to CO<sub>2</sub> after being affected will cause convulsions, coma, and respiratory failure.
2. The threshold limit of CO<sub>2</sub> is 5000 ppm. Short-term exposure to 50,000 ppm (5%) is reasonable. This gas is colorless, odorless, and can be tolerated in relatively high concentrations.

**B. HYDROGEN SULFIDE**

1. Hydrogen Sulfide (H<sub>2</sub>S) is a colorless, transparent, flammable gas. It is heavier than air and, hence, may accumulate in low places.
2. Although the slightest presence of H<sub>2</sub>S in the air is normally detectable by its characteristic "rotten egg" odor, it is dangerous to rely on the odor as a means of detecting excessive concentrations because the sense of smell is rapidly lost, allowing lethal concentrations to be accumulated without warning. The following table indicates the poisonous nature of H<sub>2</sub>S.

CONCENTRATION			EFFECTS
% H <sub>2</sub> S	PPM	GR/100 SCF <sup>1</sup>	
0.001	10	.65	Safe for 8 hours without respirator. Obvious and unpleasant odor.
0.0015	15	0.975	Safe for 15 minutes of exposure without respirator.
0.01	100	6.48	Kills smell in 3-15 minutes; may sting eyes and throat.
0.02	200	12.96	Kills smell quickly; stings eyes and throat.
0.05	500	32.96	Dizziness; breathing ceases in a few minutes; need prompt artificial respiration.
0.07	700	45.92	Rapid Unconsciousness; death will result if not rescued promptly.
0.1	1000	64.80	Instant unconsciousness, followed by death within minutes.

<sup>1</sup> Grains per 100 Cubic Feet

**VII. Treatment Procedures for Hydrogen Sulfide Poisoning**

- A. Remove the victim to fresh air.

- B. If breathing has ceased or is labored, begin resuscitation immediately.  
 Note: This is the quickest and preferred method of clearing victim's lungs of contaminated air; however, under disaster conditions, it may not be practical to move the victim to fresh air. In such instances, where those rendering first aid must continue to wear masks, a resuscitator should be used.
- C. Apply resuscitator to help purge H<sub>2</sub>S from the blood stream.
- D. Keep the victim at rest and prevent chilling.
- E. Get victim under physician's care as soon as possible.

**C. SULPHUR DIOXIDE**

- 1. Sulfur Dioxide (SO<sub>2</sub>) is a colorless, non-flammable, transparent gas.
- 2. SO<sub>2</sub> is produced during the burning of H<sub>2</sub>S. Although SO<sub>2</sub> is heavier than air, it can be picked up by a breeze and carried downwind at elevated temperatures. Since SO<sub>2</sub> is extremely irritating to the eyes and mucous membranes of the upper respiratory tract, it has exceptionally good warning powers in this respect. The following table indicates the toxic nature of SO<sub>2</sub>:

CONCENTRATION		EFFECTS
% SO <sub>2</sub>	PPM	
0.0005	3 to 5	Pungent odor, normally a person can detect SO <sub>2</sub> in this range.
0.0012	12	Throat irritation, coughing, constriction of the chest, tearing and smarting of eyes.
0.015	150	So irritating that it can only be endured for a few minutes.
.05	500	Causes a sense of suffocation, event with the first breath.

**VIII. BREATHING AIR EQUIPMENT DRILLS FOR ON & OFF DUTY PERSONNEL**

**An H<sub>2</sub>S Drill and Training Session must be given once a week to ALL on-duty personnel with off duty personnel. On-duty and Off-duty personnel will reverse roles on alternate drills.**

**An H2S drill and training session must be given once a week to all off-duty personnel in coincidence with on-duty personnel reversing roles on alternate drills.**

The purpose of this drill is to instruct the crews in the operation and use of breathing air and H<sub>2</sub>S related emergency equipment and to allow the personnel to become acquainted with using the equipment under working conditions. The crews should be trained to put on the breathing air equipment within one minute when required or requested to do so.

The following procedure should be used for weekly drills. The MRC supervisor must be satisfied that the crews are proficient with the equipment.

1. All personnel should be informed that a drill will be held.
2. The Total H2S Safety Technician or a designee assigned by the MRC Drilling Foreman should initiate the drill by signaling as he/she would if H<sub>2</sub>S was detected.
3. Personnel should don their breathing apparatus.
4. Once the breathing air equipment is on, the H<sub>2</sub>S Technician should check all personnel to insure proper operation.

A training and information session will be conducted after each drill to answer any H<sub>2</sub>S related questions and to cover any gaps identified from one of the following topics:

- Condition II, and III alerts and steps to be taken by all personnel.
- The importance of wind direction when dealing with H<sub>2</sub>S.
- Proper use and storage of all types of breathing equipment.
- Proper use and storage of oxygen resuscitators.
- Proper use and storage of H<sub>2</sub>S detectors (Mini Checks or equivalent).
- The "buddy system" and the procedure for rescuing a person overcome by H<sub>2</sub>S.
- Responsibilities and duties.
- Location of H<sub>2</sub>S safety equipment.
- Other parts of the "H<sub>2</sub>S Contingency Plan" that should be reviewed.

NOTE: A record of attendance must be kept for weekly drills and training sessions.

## **IX. HYDROGEN SULFIDE TRAINING CURRICULUM**

(FOR EMPLOYERS, VISITORS, AND CONTRACTORS)

**EACH PERSON WILL BE INFORMED ON THE RESTRICTIONS OF HAVING BEARDS AND CONTACT LENS. THEY WILL ALSO BE INFORMED OF THE AVAILABILITY OF SPECTACLE KITS.**

**AFTER THE H2S EQUIPMENT IS RIGGED UP, ALL IN SCOPE PERSONNEL WILL BE H2S TRAINED AND PUT THROUGH A DRILL. ANY DEFICIENCIES WILL BE CORRECTED.**

**Training Completion cards are good for one year and will indicate date of completion or expiration. Personnel previously trained on another facility and visiting, must attend a "supplemental briefing" on H2S equipment and procedures before beginning duty. Visitors**

who remain on the location more than 24 hours must receive full H2S training given all crew members. A "supplemental briefing" will include but not be limited to: Location of respirators, familiarization with safe briefing areas, alarms with instruction on responsibilities in the event of a release and hazards of H2S and (SO2, if applicable). A training and drill log will be kept.

Topics for full H2S training shall include the following equipment if on location, but not be limited to the following:

1. **Brief Introduction on H2S**
  - A. Slide or Computer presentation (If Available)
  - B. H2S material will be distributed
  - C. Re-emphasize the properties, toxicity, and hazards of H2S
  - D. Source of SO2 (if applicable)
  
2. **H2S Detection**
  - A. Description of H2S sensors
  - B. Description of warning system (how it works & it's location)
  - C. Actual location of H2S sensors
  - D. Instruction on use of pump type detector (Gastec)
  - E. Use of card detectors, ampoules, or dosimeters
  - F. Use of combustible gas detector
  - G. Other personnel detectors used
  - H. Alarm conditions I & II,
  - I. SO2 alarms (if applicable)
  
3. **H2S Protection**
  - A. Types of breathing apparatus provided (30-minute SCBA & 5-minute SCBA (with voice diaphragms for communication if supplied)
  - B. Principle of how breathing apparatus works
  - C. Demonstration on how to use breathing apparatus
  - D. Location of breathing apparatus
  
4. **Cascade System**
  - A. Description of cascade system
  - B. How system works
  - C. Cascade location of rig with reference to briefing areas

- D. How to use cascade system (with 5-minute hose work line units & refill, if supplied)
  - E. Importance of wind direction and actual location of Windsocks
  - F. Purpose of compressor/function (if one is on site)
5. **H2S Rescue and First Aid**
- A. Importance of wind direction
  - B. Safe briefing area
  - C. Buddy system
  - D. H2S symptoms
  - E. Methods of rescue
6. **Hands on Training**
- A. Donning/familiarization of SCBA 30-minute unit
  - B. Donning/familiarization of SKADA 5- MIN. Packs
  - C. Familiarization of cascades
  - D. Use of O2 resuscitator
  - E. Alarm conditions - upwind briefing areas, etc...
  - F. Duties and responsibilities of all personnel
  - G. Procedures for evacuation
  - H. Search and Rescue teams
7. **Certification**
- A. Testing on material covered

**TOTAL SAFETY US INC., FIT TEST**

*X. EMPLOYEE INFORMATION*

Employee Name: \_\_\_\_\_ Date: \_\_\_\_\_

Date of Employee Medical Evaluation: \_\_\_\_\_

Medical Status (circle):      Unrestricted      Limitations on Use      Use Not Authorized

**RESPIRATOR INFORMATION**

Respirator Type (Dustmask, SCBA, etc): \_\_\_\_\_

Brand: \_\_\_\_\_

MRC ENERGY CO.'S

Size: (circle):        XS            S            M            L            XL

**FIT TEST INFORMATION**

Type of Fit Test Performed:

**Quantitative**

Porta Count  
Fittester 3000

Fit Factor: \_\_\_\_\_

Fit Factor: \_\_\_\_\_

**Qualitative**

Irritant Smoke  
Isoamyl Acetate (Banana Oil)  
Saccharin  
Bitrex

Passed / Failed

Passed / Failed

Passed / Failed

Passed / Failed

I hereby certify that this fittest was conducted in accordance with the OSHA Fit Testing Protocols found in Appendix A of 1910.134.

Fit Tester Name (Print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## XI. H<sub>2</sub>S SAFETY SERVICES

HYDROGEN SULFIDE SAFETY PACKAGE – Contained on location in Total Safety H<sub>2</sub>S Equipment Trailer, unless otherwise noted:

### RESPIRATORY SAFETY SYSTEMS

#### QTY DESCRIPTION

- 12 30-Minute Pressure Demand SCBA  
(4-Primary Safe Briefing Area, 4-Secondary Safe Briefing Area, 4-floor with one of these for derrick man)
- 9 Hose Line 5-minute Work Unit w/Escap e Cylinder (1 in derrick, 6 on drill floor, 1 in mud pit wt area, 1 in shaker area)

The following shall be part of the package if requested by the MRC Foremen (at least one trailer with cascade system is required to be located in the MRC Magnolia asset for use as needed)

- 1 Breathing air cascade of 10 bottles w/regulator
- 2 Refill lines to refill 30-minute units on location
- 1 6-Man manifold that can be rigged up to work area on floor, if needed
- 6 25 foot hose lines
- 2 50 foot hose lines
- 100 Feet of hose line to rig cascade up to 12 man manifold on floor
- 12 30-minute Self Contained Breathing apparatus

### DETECTION AND ALARM SAFETY SYSTEM

- 1 H<sub>2</sub>S Fixed Monitor w/8Channels (Loc determined at rig up) suggested.  
(Mud pit area, shaker area, bell nipple area, floor/driller area, & outside quarters)
- 5 H<sub>2</sub>S Sensors
- 3 Explosion Proof Alarms (Light and Siren)  
(1 on floor, 1 in work area, 1 in trailer area where quarters are located)
- 2 Personal H<sub>2</sub>S monitors
- 1 Portable Tri-Gas Hand Held Meter (O<sub>2</sub>, LEL, H<sub>2</sub>S)
- 1 Sensidyne/Gastech Manual Pump Type Detector
- 8 Boxes H<sub>2</sub>S Tubes Various Ranges
- 2 Boxes SO<sub>2</sub> Tubes Various Ranges
- 1 Calibration Gas
- 1 Set Paper Work for Records: Training, Cal, Inspection, other

**ADDITIONAL SAFETY RELATED EQUIPMENT**

**QTY DESCRIPTION**

- 2 Windsocks with Pole and Bracket
- 1 Set Well Condition Sign w/Green, Yellow, Red Flags
- 1 Primary Safe Briefing Area Sign
- 1 Secondary Safe Briefing Area Sign
- 6 Operating Condition Signs for Work Areas & Living Quarters

**TRAILER WITH BREATHING AIR CASCADE WILL  
ALSO INCLUDE THE FOLLOWING:**

This equipment will be part of the H2S equipment stored in the trailer, when on location

- 1 First aid kit
- 1 Fire Blanket
- 1 Eye wash station
- 2 Safety Harness w/150' safety line

**XII. EMERGENCY PHONE NUMBERS (Updated March 18, 2009)**

**EMERGENCY PHONE NUMBERS**

MRC Energy Co. Emergency Phone #  
 MRC Energy Co. Permian Operations Phone-----  
**MRC Energy Co. Production**  
 113 Daw Rd  
 Mansfield LA 71052

<b>Title</b>	<b>Names</b>	<b>Phone</b>	<b>Cell</b>
Operations Manager			
Operation Supt.			
Operations Supervisor			
Operations Supervisor			
Office Supervisor			
HSE			
Scheduler Planner			

**Hydrogen Sulfide Safety Consultants**

Total Safety W. Bender Blvd. Hobbs, NM	575-392-2973	After Hours 24 Hour Call Center Through Office Number
Tommy Throckmorton Operations Manager	575-392-2973	940-268-9614
Rodney Jourdan Sales Contact	575-392-2973	432-349-3928

**MRC Energy Co. MEDICAL RESPONSE PLAN AND IT'S MEDICAL PROTOCOLS WILL BE FOLLOWED**

**MEDICAL COORDINATOR # -----**

**Hospitals (911)**

<b>Artesia General Hospital 702 N. 13<sup>th</sup> St. Artesia, NM 88210</b>	<b>Main Phone Number</b>	<b>575-748-3333</b>
<b>Nor-Lea General Hospital 1600 N. Main Ave. Lovington, NM 88260</b>	<b>Main Phone Number</b>	<b>575-396-6611</b>
<b>Lea Regional Medical Center 5419 N. Lovington Hwy Hobbs, NM 88240</b>	<b>Main Phone Number</b>	<b>575-492-5260</b>
<b>Carlsbad General Hospital 2430 W. Pierce St. Carlsbad, NM</b>	<b>Main Phone Number</b>	<b>575-887-4100</b>
<b>Lovelace Regional Hospital 117 E. 19<sup>th</sup> St Roswell, NM 88201</b>	<b>Main Phone Number</b>	<b>575-627-7000</b>
<b>Winkler Co. Memorial Hospital 821 Jeffee Dr. Kermit, Texas 79745</b>	<b>Main Phone Number</b>	<b>432-586-8299</b>
<b>Reeves County Hospital 2323 Texas St. Pecos, Texas 79772</b>	<b>Main Phone Number</b>	<b>432-447-3551</b>

**State Police (911)**

<b>Texas DPS Loving co. 225 N.Pecos Mentone, Texas 79754</b>	<b>Office Number</b>	<b>432-377-2411</b>
<b>Texas DPS Winkler Co. 100 E Winkler Kermit, Texas 79745</b>	<b>Office Number</b>	<b>432-586-3465</b>
<b>Texas DPS Pecos Co. 148 N I-20 Frontage RD Pecos, Texas 79772</b>	<b>Office Number</b>	<b>432-447-3532</b>
<b>New Mexico State Police 3300 W. Main St Artesia, NM</b>	<b>Office Number</b>	<b>575-748-9718</b>
<b>New Mexico State Police 304 N. Canyon St Carlsbad, NM 88220</b>	<b>Office Number</b>	<b>575-885-3137</b>
<b>New Mexico State Police 5100 Jack Gomez Blvd. Hobbs, NM 88240</b>	<b>Office Number</b>	<b>575-392-5588</b>

**Local Law Enforcement (911) (Sheriff)**

<b>Reeves Co. Sheriff 500 N. Oak ST Pecos, Texas 79722</b>	<b>Office Number</b>	<b>432-445-4901</b>
<b>Winkler Co. Sheriff 1300 Bellaire St. Kermit, Texas 79745</b>	<b>Office Number</b>	<b>432-586-3461</b>
<b>Loving Co. Sheriff Courthouse Mentone, Texas</b>	<b>Office Number</b>	<b>432-377-2411</b>
<b>Lea Co. Sheriff 1417 S. Commercial St. Lovington, NM 88260</b>	<b>Office Number</b>	
<b>Eddy Co. Sheriff 305 N 7th St. Artesia, NM 88210</b>	<b>Office Number</b>	<b>575-766-9888</b>
<b>Eddy Co. Sheriff 305 N 7th St. Carlsbad, NM 88220</b>	<b>Office Number</b>	<b>575-746-9888</b>

Federal & State Agencies

<b>OSHA Lubbock Area Office 1205 Texas Av. Room 806 Lubbock, Texas 79401</b>	<b>Main Number</b>	<b>806-472-7681 EXT 7685</b>
<b>New Mexico Environment Department 400 N Pennsylvania Roswell, NM 88201</b>	<b>Joe Fresquez</b>	<b>575-623-3935</b>
<b>Texas Railroad Commission Midland, Texas</b>	<b>Main Number</b>	<b>844-773-0305</b>
<b>BLM Carlsbad, NM Field Office 620 E. Green ST Carlsbad, NM 88220</b>	<b>Main Number</b>	<b>575-234-5972</b>
<b>BLM Hobbs Field Station 414 W. Taylor Rd. Hobbs, NM 88240</b>	<b>Main Number</b>	<b>575-393-3612</b>
<b>BLM Roswell District Office 2909 W. Second St. Roswell, NM 88201</b>	<b>Main Number</b>	<b>575-627-0272</b>
<b>TECQ Texas Commission on Environmental Quality</b>	<b>Main Number</b>	<b>800-832-8224</b>
<b>New Mexico OCD</b>		
<b>U.S. Environmental Protection Agency Region 6 Texas/New Mexico</b>	<b>Main Number</b>	<b>214-655-2222</b>
<b>National Response Center Toxic Chemicals &amp; Oil Spills</b>	<b>Main Number</b>	<b>800-424-8802</b>

**Rig Company**


### **XIII. EVACUATION OF THE GENERAL PUBLIC**

The procedure to be used in alerting nearby persons in the event of any occurrence that could pose a threat to life or property will be arranged and completed with public officials in detail, prior to drilling into the hydrogen sulfide formations.

In the event of an actual emergency, the following steps will be immediately taken:

1. The MRC Energy Co.'s representative will dispatch sufficient personnel to immediately warn each resident and transients down-wind within radius of exposure from the well site. Then warn all residence in the radius of exposure. Additional evacuation zones may be necessary as the situation warrants.
2. The MRC Energy Co.'s representative will immediately notify proper authorities, including the Sheriff's Office, Highway Patrol, and any other public officials as described above and will enlist their assistance in warning residents and transients in the calculated radius of exposure.
3. The MRC Energy Co.'s representative will dispatch sufficient personnel to divert traffic in the vicinity away from the potentially dangerous area. A guard to the entrance of the well site will be posted to monitor essential and non essential traffic.
4. General:
  - A. The area included within the radius of exposure is considered to be the zone of maximum potential hazard from a hydrogen sulfide gas escape. Immediate evacuation of public areas, in accordance with the provisions of this contingency plan, is imperative. When it is determined that conditions exist which create an additional area (beyond the initial zone of maximum potential hazard) vulnerable to possible hazard, public areas in the additional hazardous area will be evacuated in accordance with the contingency plan.
  - B. In the event of a disaster, after the public areas have been evacuated and traffic stopped, it is expected that local civil authorities will have arrived and within a few hours will have assumed direction of and control of the public, including all public areas. MRC Energy Co. will cooperate with these authorities to the fullest extent and will exert every effort by careful advice to such authorities to prevent panic or rumors.
  - C. MRC Energy Co. will dispatch appropriate management personnel at the disaster site as soon as possible. The company's personnel

will cooperate with and provide such information to civil authorities as they might require.

- D. One of the products of the combustion of hydrogen sulfide is sulfur dioxide (SO<sub>2</sub>). Under certain conditions this gas may be equally as dangerous as H<sub>2</sub>S. A pump type detector device, which determines the percent of SO<sub>2</sub> in air through concentrations in ppm, will be available. Although normal air movement is sufficient to dissipate this material to safe levels, the SO<sub>2</sub> detector should be utilized to check concentrations in the proximity of the well once every hour, or as necessary and the situation warrants. Also, if any low areas are suspected of having high concentrations, personnel should be made aware of these areas, and steps should be taken to determine whether or not these low areas are hazardous.

Hydrogen Sulfide Drilling  
Operations Plan  
Matador Resources

1 H2S safety instructions to the following:

- Characteristics of H2S
- Physical effects and hazards
- Principal and operation of H2S detectors, warning system and briefing areas
- Evacuation procedures, routes and first aid
- Proper use of safety equipment & life support systems
- Essential personnel meeting medical evaluation criteria will receive additional training on the proper use of 30min pressure demand air packs

2 H2S Detection and Alarm Systems:

- H2S sensor/detectors to be located on the drilling rig floor, in the base of the sub structure / cellar area, on the mud pits in the shale shaker area. Additional H2S detectors may be placed as deemed necessary
- An audio alarm system will be installed on the derrick floor and in the doghouse

3 Windssocks and / Wind Streamers:

- Windssocks at mud pit area should be high enough to be visible
- Windssock on the rig floor and / top of doghouse should be high enough to be visible

4 Condition Flags and Signs:

- Warning sign on access road to location
- Flags to be displayed on sign at entrance to location
  - Green Flag – Normal Safe Operation Condition
  - Yellow Flag – Potential Pressure and Danger
  - Red Flag – Danger (H2S present in dangerous concentrations) Only H2S trained personnel admitted on location

5 Well Control Equipment:

- See Exhibit E-1

6 Communication:

- While working under masks chalkboards will be used for communications

- Hand signals will be used where chalk board is inappropriate
- Two way radio will be used to communicate off location in case of emergency help is required. In most cases cellular telephones will be available at most drilling foreman's trailer or living quarters.

#### 7 Drilling Stem Testing:

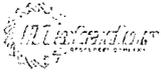
- No DST cores are planned at this time

8 Drilling contractor supervisor will be required to be familiar with the effects H<sub>2</sub>S has on tubulars good and other mechanical equipment

9 If H<sub>2</sub>S is encountered, mud system will be altered if necessary to maintain control of formation. A mud gas separator will be brought into service along with H<sub>2</sub>S scavengers if necessary

#### 11 Emergency Contacts

- See exhibit E-6



Pro Directional  
Survey Report



<b>Company:</b> Matador Resources	<b>Local Co-ordinate Reference:</b> Well #221H
<b>Project:</b> Lea County, NM	<b>TVD Reference:</b> GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)
<b>Site:</b> Brad Lummis Fed Com	<b>MD Reference:</b> GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)
<b>Well:</b> #221H	<b>North Reference:</b> Grid
<b>Wellbore:</b> OH	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Prelim A	<b>Database:</b> WellPlanner1

<b>Project</b>	Lea County, NM		
<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		

<b>Site</b>	Brad Lummis Fed Com				
<b>Site Position:</b>		<b>Northing:</b>	440,907.00 usft	<b>Latitude:</b>	32.209066
<b>From:</b>	Map	<b>Easting:</b>	774,006.00 usft	<b>Longitude:</b>	-103.447427
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b>	0.47 °

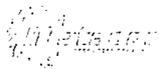
<b>Well</b>	#221H					
<b>Well Position</b>	<b>+N-S</b>	0.00 usft	<b>Northing:</b>	440,878.00 usft	<b>Latitude:</b>	32.208987
	<b>+E-W</b>	0.00 usft	<b>Easting:</b>	774,003.00 usft	<b>Longitude:</b>	-103.447438
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b>	3,493.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	5/24/2018	6.73	59.92	48,003.30

<b>Design</b>	Prelim A				
<b>Audit Notes:</b>					
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00	
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	179.55	

<b>Survey Tool Program</b>	<b>Date</b>	5/29/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
0.00	18,001.34	Prelim A (OH)	MWD+HDGM	OWSG MWD + HRGM	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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



Pro Directional  
Survey Report



**Company:** Matador Resources  
**Project:** Lea County, NM  
**Site:** Brad Lummis Fed Com  
**Well:** #221H  
**Wellbore:** OH  
**Design:** Prelim A

**Local Co-ordinate Reference:** Well #221H  
**TVD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**MD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

**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)
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
1,350.00	0.00	0.00	1,350.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.50	338.88	1,400.00	0.20	-0.08	-0.20	1.00	1.00	0.00
1,500.00	1.50	338.88	1,499.98	1.83	-0.71	-1.84	1.00	1.00	0.00
1,600.00	2.50	338.88	1,599.92	5.09	-1.96	-5.10	1.00	1.00	0.00
1,700.00	3.50	338.88	1,699.78	9.97	-3.85	-10.00	1.00	1.00	0.00
1,800.00	4.50	338.88	1,799.54	16.48	-6.36	-16.53	1.00	1.00	0.00
1,849.50	5.00	338.88	1,848.87	20.30	-7.84	-20.36	1.00	1.00	0.00
1,900.00	5.00	338.88	1,899.18	24.40	-9.42	-24.47	0.00	0.00	0.00
2,000.00	5.00	338.88	1,998.80	32.52	-12.56	-32.62	0.00	0.00	0.00
2,100.00	5.00	338.88	2,098.42	40.64	-15.70	-40.77	0.00	0.00	0.00
2,200.00	5.00	338.88	2,198.04	48.77	-18.84	-48.91	0.00	0.00	0.00
2,300.00	5.00	338.88	2,297.66	56.89	-21.97	-57.06	0.00	0.00	0.00
2,400.00	5.00	338.88	2,397.28	65.01	-25.11	-65.20	0.00	0.00	0.00
2,500.00	5.00	338.88	2,496.90	73.13	-28.25	-73.35	0.00	0.00	0.00
2,600.00	5.00	338.88	2,596.52	81.25	-31.39	-81.50	0.00	0.00	0.00
2,700.00	5.00	338.88	2,696.14	89.38	-34.52	-89.64	0.00	0.00	0.00
2,800.00	5.00	338.88	2,795.76	97.50	-37.66	-97.79	0.00	0.00	0.00
2,900.00	5.00	338.88	2,895.38	105.62	-40.80	-105.94	0.00	0.00	0.00
3,000.00	5.00	338.88	2,995.00	113.74	-43.93	-114.08	0.00	0.00	0.00
3,100.00	5.00	338.88	3,094.62	121.86	-47.07	-122.23	0.00	0.00	0.00
3,200.00	5.00	338.88	3,194.24	129.99	-50.21	-130.38	0.00	0.00	0.00
3,300.00	5.00	338.88	3,293.86	138.11	-53.35	-138.52	0.00	0.00	0.00
3,400.00	5.00	338.88	3,393.48	146.23	-56.48	-146.67	0.00	0.00	0.00
3,500.00	5.00	338.88	3,493.10	154.35	-59.62	-154.82	0.00	0.00	0.00
3,600.00	5.00	338.88	3,592.72	162.47	-62.76	-162.96	0.00	0.00	0.00
3,700.00	5.00	338.88	3,692.34	170.60	-65.90	-171.11	0.00	0.00	0.00
3,800.00	5.00	338.88	3,791.96	178.72	-69.03	-179.26	0.00	0.00	0.00
3,900.00	5.00	338.88	3,891.58	186.84	-72.17	-187.40	0.00	0.00	0.00
4,000.00	5.00	338.88	3,991.20	194.96	-75.31	-195.55	0.00	0.00	0.00
4,100.00	5.00	338.88	4,090.82	203.08	-78.44	-203.69	0.00	0.00	0.00
4,200.00	5.00	338.88	4,190.44	211.21	-81.58	-211.84	0.00	0.00	0.00
4,300.00	5.00	338.88	4,290.06	219.33	-84.72	-219.99	0.00	0.00	0.00
4,400.00	5.00	338.88	4,389.68	227.45	-87.86	-228.13	0.00	0.00	0.00
4,500.00	5.00	338.88	4,489.30	235.57	-90.99	-236.28	0.00	0.00	0.00
4,600.00	5.00	338.88	4,588.92	243.69	-94.13	-244.43	0.00	0.00	0.00
4,700.00	5.00	338.88	4,688.54	251.82	-97.27	-252.57	0.00	0.00	0.00
4,800.00	5.00	338.88	4,788.16	259.94	-100.41	-260.72	0.00	0.00	0.00



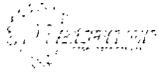
Pro Directional  
Survey Report



<b>Company:</b> Matador Resources	<b>Local Co-ordinate Reference:</b> Well #221H
<b>Project:</b> Lea County, NM	<b>TVD Reference:</b> GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)
<b>Site:</b> Brad Lummis Fed Com	<b>MD Reference:</b> GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)
<b>Well:</b> #221H	<b>North Reference:</b> Grid
<b>Wellbore:</b> OH	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> Prelim A	<b>Database:</b> WellPlanner1

**Planned Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,900.00	5.00	338.88	4,887.78	268.06	-103.54	-268.87	0.00	0.00	0.00
5,000.00	5.00	338.88	4,987.40	276.18	-106.68	-277.01	0.00	0.00	0.00
5,100.00	5.00	338.88	5,087.02	284.31	-109.82	-285.16	0.00	0.00	0.00
5,200.00	5.00	338.88	5,186.64	292.43	-112.95	-293.31	0.00	0.00	0.00
5,300.00	5.00	338.88	5,286.26	300.55	-116.09	-301.45	0.00	0.00	0.00
5,400.00	5.00	338.88	5,385.88	308.67	-119.23	-309.60	0.00	0.00	0.00
5,500.00	5.00	338.88	5,485.50	316.79	-122.37	-317.74	0.00	0.00	0.00
5,600.00	5.00	338.88	5,585.12	324.92	-125.50	-325.89	0.00	0.00	0.00
5,700.00	5.00	338.88	5,684.74	333.04	-128.64	-334.04	0.00	0.00	0.00
5,800.00	5.00	338.88	5,784.36	341.16	-131.78	-342.18	0.00	0.00	0.00
5,900.00	5.00	338.88	5,883.98	349.28	-134.92	-350.33	0.00	0.00	0.00
6,000.00	5.00	338.88	5,983.61	357.40	-138.05	-358.48	0.00	0.00	0.00
6,087.35	5.00	338.88	6,070.62	364.50	-140.79	-365.59	0.00	0.00	0.00
6,100.00	4.81	338.88	6,083.23	365.51	-141.18	-366.60	1.50	-1.50	0.00
6,200.00	3.31	338.88	6,182.97	372.10	-143.73	-373.22	1.50	-1.50	0.00
6,300.00	1.81	338.88	6,282.87	376.26	-145.34	-377.39	1.50	-1.50	0.00
6,400.00	0.31	338.88	6,382.85	377.98	-146.00	-379.11	1.50	-1.50	0.00
6,420.35	0.00	0.00	6,403.20	378.03	-146.02	-379.17	1.50	-1.50	0.00
6,500.00	0.00	0.00	6,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
6,600.00	0.00	0.00	6,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
6,700.00	0.00	0.00	6,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
6,800.00	0.00	0.00	6,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00
6,900.00	0.00	0.00	6,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,000.00	0.00	0.00	6,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,100.00	0.00	0.00	7,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,200.00	0.00	0.00	7,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,300.00	0.00	0.00	7,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,400.00	0.00	0.00	7,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,500.00	0.00	0.00	7,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,600.00	0.00	0.00	7,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,700.00	0.00	0.00	7,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,800.00	0.00	0.00	7,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00
7,900.00	0.00	0.00	7,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,000.00	0.00	0.00	7,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,100.00	0.00	0.00	8,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,200.00	0.00	0.00	8,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,300.00	0.00	0.00	8,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,400.00	0.00	0.00	8,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,500.00	0.00	0.00	8,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,600.00	0.00	0.00	8,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,700.00	0.00	0.00	8,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
8,800.00	0.00	0.00	8,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00



Pro Directional  
Survey Report



**Company:** Matador Resources  
**Project:** Lea County, NM  
**Site:** Brad Lummis Fed Com  
**Well:** #221H  
**Wellbore:** OH  
**Design:** Prelim A

**Local Co-ordinate Reference:** Well #221H  
**TVD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**MD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

**Planned Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Buidl Rate (°/100usft)	Turn Rate (°/100usft)
8,900.00	0.00	0.00	8,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,000.00	0.00	0.00	8,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,100.00	0.00	0.00	9,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,200.00	0.00	0.00	9,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,300.00	0.00	0.00	9,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,400.00	0.00	0.00	9,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,500.00	0.00	0.00	9,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,600.00	0.00	0.00	9,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,700.00	0.00	0.00	9,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,800.00	0.00	0.00	9,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00
9,900.00	0.00	0.00	9,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,000.00	0.00	0.00	9,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,100.00	0.00	0.00	10,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,200.00	0.00	0.00	10,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,300.00	0.00	0.00	10,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,400.00	0.00	0.00	10,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,500.00	0.00	0.00	10,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,600.00	0.00	0.00	10,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,700.00	0.00	0.00	10,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,800.00	0.00	0.00	10,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00
10,900.00	0.00	0.00	10,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,000.00	0.00	0.00	10,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,100.00	0.00	0.00	11,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,200.00	0.00	0.00	11,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,300.00	0.00	0.00	11,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,400.00	0.00	0.00	11,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,500.00	0.00	0.00	11,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,600.00	0.00	0.00	11,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,700.00	0.00	0.00	11,682.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,800.00	0.00	0.00	11,782.85	378.03	-146.02	-379.17	0.00	0.00	0.00
11,900.00	0.00	0.00	11,882.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,000.00	0.00	0.00	11,982.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,100.00	0.00	0.00	12,082.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,200.00	0.00	0.00	12,182.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,300.00	0.00	0.00	12,282.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,400.00	0.00	0.00	12,382.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,500.00	0.00	0.00	12,482.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,600.00	0.00	0.00	12,582.85	378.03	-146.02	-379.17	0.00	0.00	0.00
12,670.35	0.00	0.00	12,653.20	378.03	-146.02	-379.17	0.00	0.00	0.00
12,700.00	2.97	169.00	12,682.84	377.28	-145.87	-378.41	10.00	10.00	0.00
12,750.00	7.97	169.00	12,732.60	372.60	-144.97	-373.73	10.00	10.00	0.00
12,800.00	12.97	169.00	12,781.75	363.69	-143.23	-364.81	10.00	10.00	0.00



Pro Directional  
Survey Report



**Company:** Matador Resources

**Project:** Lea County, NM

**Site:** Brad Lummis Fed Com

**Well:** #221H

**Wellbore:** OH

**Design:** Prelim A

**Local Co-ordinate Reference:** Well #221H

**TVD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)

**MD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)

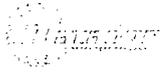
**North Reference:** Grid

**Survey Calculation Method:** Minimum Curvature

**Database:** WellPlanner1

**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)
12,850.00	17.97	169.00	12,829.92	350.61	-140.69	-351.70	10.00	10.00	0.00
12,900.00	22.97	169.00	12,876.75	333.45	-137.36	-334.52	10.00	10.00	0.00
12,950.00	27.97	169.00	12,921.88	312.36	-133.25	-313.39	10.00	10.00	0.00
13,000.00	32.97	169.00	12,964.96	287.48	-128.42	-288.48	10.00	10.00	0.00
13,050.00	37.97	169.00	13,005.67	259.01	-122.89	-259.97	10.00	10.00	0.00
13,100.00	42.97	169.00	13,043.70	227.17	-116.70	-228.08	10.00	10.00	0.00
13,150.00	47.97	169.00	13,078.76	192.19	-109.90	-193.05	10.00	10.00	0.00
13,170.35	50.00	169.00	13,092.11	177.12	-106.97	-177.96	10.00	10.00	0.00
13,200.00	52.49	171.07	13,110.67	154.35	-102.97	-155.16	10.00	8.38	6.99
13,250.00	56.75	174.27	13,139.62	113.93	-97.81	-114.70	10.00	8.53	6.40
13,300.00	61.09	177.17	13,165.43	71.24	-94.64	-71.98	10.00	8.68	5.80
13,344.45	65.00	179.55	13,185.57	31.65	-93.52	-32.39	10.00	8.79	5.35
13,350.00	65.33	179.55	13,187.91	26.61	-93.48	-27.35	6.00	6.00	0.00
13,400.00	68.33	179.55	13,207.57	-19.35	-93.12	18.62	6.00	6.00	0.00
13,450.00	71.33	179.55	13,224.81	-66.28	-92.75	65.55	6.00	6.00	0.00
13,500.00	74.33	179.55	13,239.57	-114.04	-92.38	113.31	6.00	6.00	0.00
13,550.00	77.33	179.55	13,251.80	-162.51	-92.00	161.79	6.00	6.00	0.00
13,600.00	80.33	179.55	13,261.48	-211.56	-91.61	210.83	6.00	6.00	0.00
13,650.00	83.33	179.55	13,268.59	-261.05	-91.22	260.32	6.00	6.00	0.00
13,700.00	86.33	179.55	13,273.09	-310.84	-90.83	310.11	6.00	6.00	0.00
13,750.00	89.33	179.55	13,274.98	-360.79	-90.44	360.07	6.00	6.00	0.00
13,761.12	90.00	179.55	13,275.04	-371.91	-90.35	371.19	6.00	6.00	0.00
13,800.00	90.00	179.55	13,275.04	-410.79	-90.04	410.07	0.00	0.00	0.00
13,900.00	90.00	179.55	13,275.04	-510.79	-89.26	510.07	0.00	0.00	0.00
14,000.00	90.00	179.55	13,275.04	-610.79	-88.47	610.07	0.00	0.00	0.00
14,100.00	90.00	179.55	13,275.04	-710.78	-87.68	710.07	0.00	0.00	0.00
14,200.00	90.00	179.55	13,275.04	-810.78	-86.90	810.07	0.00	0.00	0.00
14,300.00	90.00	179.55	13,275.04	-910.78	-86.11	910.07	0.00	0.00	0.00
14,400.00	90.00	179.55	13,275.04	-1,010.77	-85.32	1,010.07	0.00	0.00	0.00
14,500.00	90.00	179.55	13,275.04	-1,110.77	-84.54	1,110.07	0.00	0.00	0.00
14,600.00	90.00	179.55	13,275.03	-1,210.77	-83.75	1,210.07	0.00	0.00	0.00
14,700.00	90.00	179.55	13,275.03	-1,310.76	-82.96	1,310.07	0.00	0.00	0.00
14,800.00	90.00	179.55	13,275.03	-1,410.76	-82.18	1,410.07	0.00	0.00	0.00
14,900.00	90.00	179.55	13,275.03	-1,510.76	-81.39	1,510.07	0.00	0.00	0.00
15,000.00	90.00	179.55	13,275.03	-1,610.75	-80.61	1,610.07	0.00	0.00	0.00
15,100.00	90.00	179.55	13,275.03	-1,710.75	-79.82	1,710.07	0.00	0.00	0.00
15,200.00	90.00	179.55	13,275.03	-1,810.75	-79.03	1,810.07	0.00	0.00	0.00
15,300.00	90.00	179.55	13,275.03	-1,910.75	-78.25	1,910.07	0.00	0.00	0.00
15,400.00	90.00	179.55	13,275.03	-2,010.74	-77.46	2,010.07	0.00	0.00	0.00
15,500.00	90.00	179.55	13,275.03	-2,110.74	-76.67	2,110.07	0.00	0.00	0.00
15,600.00	90.00	179.55	13,275.02	-2,210.74	-75.89	2,210.07	0.00	0.00	0.00
15,700.00	90.00	179.55	13,275.02	-2,310.73	-75.10	2,310.07	0.00	0.00	0.00



Pro Directional  
Survey Report



**Company:** Matador Resources  
**Project:** Lea County, NM  
**Site:** Brad Lummis Fed Com  
**Well:** #221H  
**Wellbore:** OH  
**Design:** Prelim A

**Local Co-ordinate Reference:** Well #221H  
**TVD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**MD Reference:** GL: 3493' + KB: 28.5' @ 3521.50usft (Patterson 274)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** WellPlanner1

**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)
15,800.00	90.00	179.55	13,275.02	-2,410.73	-74.31	2,410.07	0.00	0.00	0.00
15,900.00	90.00	179.55	13,275.02	-2,510.73	-73.53	2,510.07	0.00	0.00	0.00
16,000.00	90.00	179.55	13,275.02	-2,610.72	-72.74	2,610.07	0.00	0.00	0.00
16,100.00	90.00	179.55	13,275.02	-2,710.72	-71.95	2,710.07	0.00	0.00	0.00
16,200.00	90.00	179.55	13,275.02	-2,810.72	-71.17	2,810.07	0.00	0.00	0.00
16,300.00	90.00	179.55	13,275.02	-2,910.71	-70.38	2,910.07	0.00	0.00	0.00
16,400.00	90.00	179.55	13,275.02	-3,010.71	-69.59	3,010.07	0.00	0.00	0.00
16,500.00	90.00	179.55	13,275.02	-3,110.71	-68.81	3,110.07	0.00	0.00	0.00
16,600.00	90.00	179.55	13,275.01	-3,210.70	-68.02	3,210.07	0.00	0.00	0.00
16,700.00	90.00	179.55	13,275.01	-3,310.70	-67.23	3,310.07	0.00	0.00	0.00
16,800.00	90.00	179.55	13,275.01	-3,410.70	-66.45	3,410.07	0.00	0.00	0.00
16,900.00	90.00	179.55	13,275.01	-3,510.70	-65.66	3,510.07	0.00	0.00	0.00
17,000.00	90.00	179.55	13,275.01	-3,610.69	-64.88	3,610.07	0.00	0.00	0.00
17,100.00	90.00	179.55	13,275.01	-3,710.69	-64.09	3,710.07	0.00	0.00	0.00
17,200.00	90.00	179.55	13,275.01	-3,810.69	-63.30	3,810.07	0.00	0.00	0.00
17,300.00	90.00	179.55	13,275.01	-3,910.68	-62.52	3,910.07	0.00	0.00	0.00
17,400.00	90.00	179.55	13,275.01	-4,010.68	-61.73	4,010.07	0.00	0.00	0.00
17,500.00	90.00	179.55	13,275.01	-4,110.68	-60.94	4,110.07	0.00	0.00	0.00
17,600.00	90.00	179.55	13,275.00	-4,210.67	-60.16	4,210.07	0.00	0.00	0.00
17,700.00	90.00	179.55	13,275.00	-4,310.67	-59.37	4,310.07	0.00	0.00	0.00
17,800.00	90.00	179.55	13,275.00	-4,410.67	-58.58	4,410.07	0.00	0.00	0.00
17,900.00	90.00	179.55	13,275.00	-4,510.66	-57.80	4,510.07	0.00	0.00	0.00
18,001.34	90.00	179.55	13,275.00	-4,612.00	-57.00	4,611.41	0.00	0.00	0.00

**Design Targets**

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target - Shape									
BHL(B L F C #221H)	0.00	0.00	13,275.0 0	-4,612.00	-57.00	436,266.00	773,946.00	32.196311	-103.447745
- plan hits target center - Point									
FPP(B L F C #221H)	0.00	0.00	13,275.0 0	98.00	-94.00	440,976.00	773,909.00	32.209258	-103.447739
- plan misses target center by 109.42usft at 13325.86usft MD (13177.48 TVD, 48.38 N, -93.79 E) - Point									
LPP(B L F C #221H)	0.00	0.00	13,275.0 0	-4,521.00	-57.00	436,357.00	773,946.00	32.196561	-103.447743
- plan misses target center by 10.37usft at 17900.00usft MD (13275.00 TVD, -4510.66 N, -57.80 E) - Point									

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



## Well Control Plan For 10M MASP Section of Wellbore

### Component and Preventer Compatibility Table:

The table below covers the drilling and casing of the 10M MASP portion of the well and outlines the tubulars and the compatible preventers in use. This table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Component	OD	Preventer	RWP
Drill pipe	4"	Lower 3.5-5.5" VBR Upper 3.5-5.5" VBR	10M
HWDP	4"		
Jars/Agitator	4.75-5"		
Drill collars and MWD tools	4.75-5.25"		
Mud Motor	4.75-5.25"		
Production casing	4.5-5.5"		
ALL	0-13.625"	Annular	5M
Open-hole	-	Blind Rams	10M

VBR = Variable Bore Ram with compatible range listed in chart

HWDP = Heavy Weight Drill Pipe

MWD = Measurement While Drilling

### Well Control Procedures

Well control procedures are specific to the rig equipment and the operation at the time the kick occurs. Below are the minimal high-level tasks prescribed to assure a proper shut-in while drilling, tripping, running casing, pipe out of the hole (open hole), and moving the Bottom Hole Assembly (BHA) through the Blowout Preventers (BOP). The maximum pressure at which well control is transferred from the annular to another compatible ram is 3,000 psi.

#### General Procedure While Drilling

1. Sound alarm (alert crew)
2. Space out drill string
3. Shut down pumps and stop rotary
4. Shut-in well with the annular preventer (The Hydraulic Control Remote (HCR) valve and choke will already be in the closed position)
5. Confirm shut-in
6. Notify tool pusher and company representative
7. Read and record the following:
  - SIDPP and SICP
  - Pit gain
  - Time of shut in
8. Regroup and identify forward plan



## Well Control Plan For 10M MASP Section of Wellbore

9. If pressure has increased or is anticipated to increase above 3,000 psi, confirm spacing and close the upper pipe rams

### General Procedure While Tripping

1. Sound alarm (alert crew)
2. Stab full opening safety valve and close
3. Space out drill string
4. Shut-in well with annular preventer (The HCR valve and choke will already be in the closed position)
5. Confirm shut-in
6. Notify tool pusher and company representative
7. Read and record the following:
  - SIDPP and SICP
  - Pit gain
  - Time of shut in
8. Regroup and identify forward plan
9. If pressure has increased or is anticipated to increase above 3,000 psi, confirm spacing and close the upper pipe rams

### General Procedure While Running Casing

1. Sound alarm (alert crew)
2. Stab crossover and full opening safety valve and close
3. Space out string
4. Shut-in well with annular preventer (The HCR valve and choke will already be in the closed position)
5. Confirm shut-in
6. Notify tool pusher and company representative
7. Read and record the following:
  - SIDPP and SICP
  - Pit gain
  - Time of shut in
8. Regroup and identify forward plan



## Well Control Plan For 10M MASP Section of Wellbore

9. If pressure has increased or is anticipated to increase above 3,000 psi, confirm spacing and close the upper pipe rams

### General Procedure with No Pipe In Hole

1. At any point when the BOP stack is clear of pipe or BHA, the well will be shut in with blind rams, the HCR valve will be open, and choke will be closed. If pressure increase is observed:
2. Sound alarm (alert crew)
3. Confirm shut-in
4. Notify tool pusher and company representative
5. Read and record the following:
  - SICP
  - Time of shut in
6. Regroup and identify forward plan

### General Procedure While Pulling BHA through Stack

1. Prior to pulling last joint/stand of drill pipe through the stack, perform flow check. If flowing:
  - a. Sound alarm (alert crew)
  - b. Stab full opening safety valve and close
  - c. Space out drill string
  - d. Shut-in well with annular preventer (The HCR valve and choke will already be in the closed position)
  - e. Confirm shut-in
  - f. Notify tool pusher and company representative
  - g. Read and record the following:
    - SIDPP and SICP
    - Pit gain
    - Time of shut in
  - h. Regroup and identify forward plan
2. With BHA in the stack and compatible ram preventer and pipe combo immediately available:
  - a. Sound alarm (alert crew)
  - b. Stab crossover and full opening safety valve and close



## Well Control Plan For 10M MASP Section of Wellbore

- c. Space out drill string with the upset just beneath the compatible pipe ram
  - d. Shut-in well using compatible pipe rams (The HCR valve and choke will already be in the closed position)
  - e. Confirm shut-in
  - f. Notify tool pusher and company representative
  - g. Read and record the following:
    - SIDPP and SICP
    - Pit gain
    - Time of shut in
  - h. Regroup and identify forward plan
3. With BHA in the stack and no compatible ram preventer and pipe combo immediately available:
- a. Sound alarm (alert crew)
  - b. If possible to pick up high enough, pull BHA clear of the stack
    - b.i. Follow "No Pipe in Hole" procedure above
  - c. If impossible to pick up high enough to pull string clear of the stack:
    - c.i. Stab crossover, make up one joint/stand of drill pipe, and full opening safety valve and close
    - c.ii. Space out drill string with the upset just beneath the compatible pipe ram
    - c.iii. Shut-in well using compatible pipe rams (The HCR valve and choke will already be in the closed position)
    - c.iv. Confirm shut-in
    - c.v. Notify tool pusher and company representative
    - c.vi. Read and record the following:
      - SIDPP and SICP
      - Pit gain
      - Time of shut in
    - c.vii. Regroup and identify forward plan

### **Well Control Drills**



## **Well Control Plan For 10M MASP Section of Wellbore**

Well control drills are specific to the rig equipment, personnel, and operations. Each crew will execute one drill weekly relevant to ongoing operations, but will make a reasonable attempt to vary the type of drills. The drills will be recorded in the daily drilling log.

# **Closed-Loop System**

## **Operating and Maintenance Plan:**

During drilling operations, third party service companies will utilize solids control equipment to remove cuttings from the drilling fluids and collect it in haul-off bins. Equipment will be closely monitored at all times while drilling by the derrick man and the service company employees.

## **Closure Plan:**

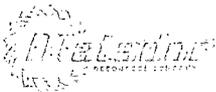
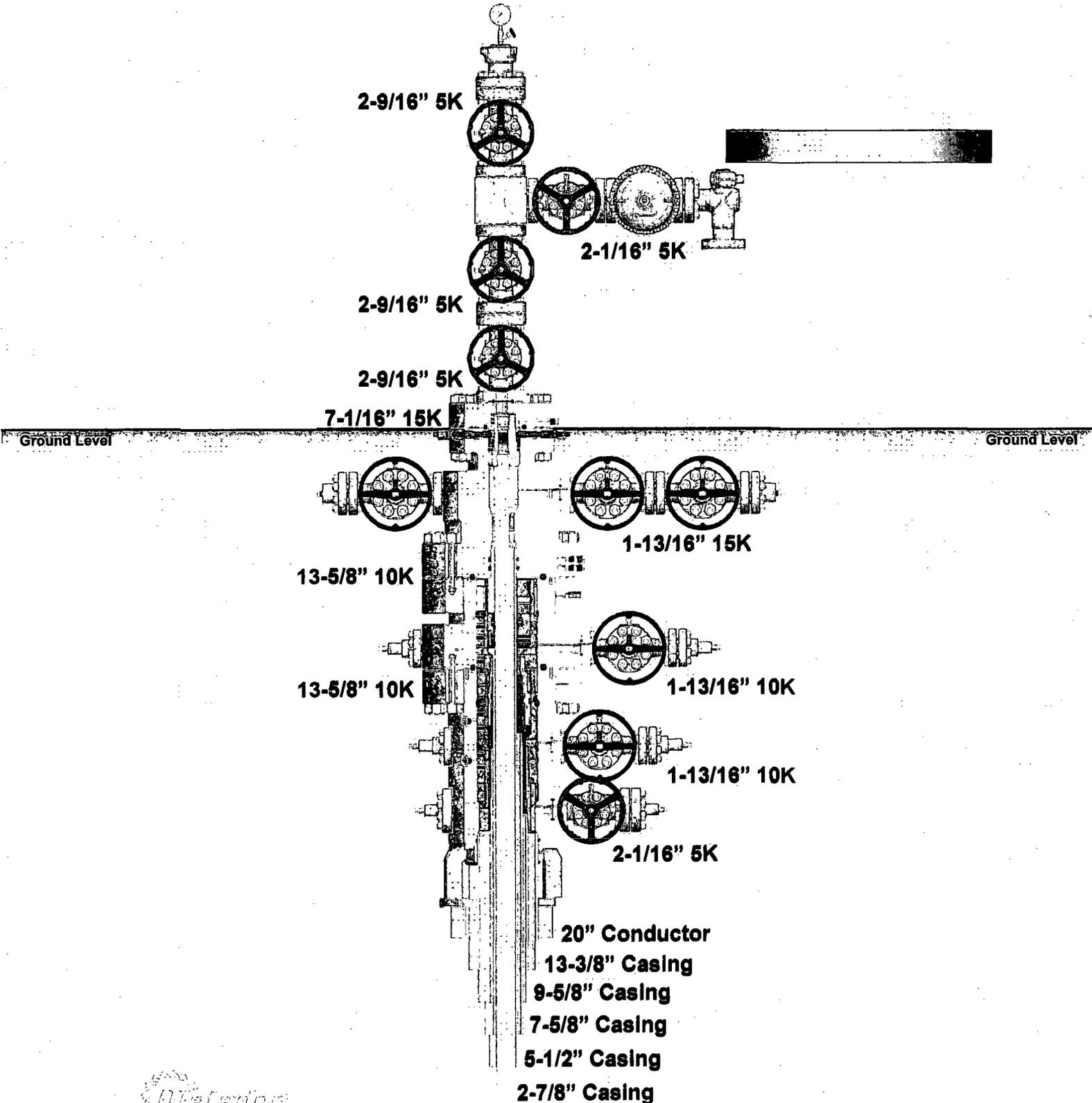
During drilling operations, third party service companies will haul off drill solids and fluids to an approved disposal facility. At the end of the well, all closed loop equipment will be removed from the location.



# CAMERON

A Schlumberger Company

## 13-5/8" 10K MN-DS Wellhead 13-3/8 x 9-5/8 x 7-5/8 x 5-1/2 Casing Program



2018-147-02

NOTE: All dimensions on this drawing are estimated measurements and should be evaluated by engineering.



Drilling Operations Plan  
Brad Lummis Fed Com #201H  
Matador Resources Company  
Sec. 23, 24S, 34E  
Lea County, NM

		(MD)	Depth (TVD)	g Depth (MD)	(TVD)				
Surface	17-1/2"	0	0	1150	1150	13-3/8" (new)	54.5# J-55	BUTT	Yes
Intermediate	12-1/4"	0	0	5400	5400	9-5/8" (new)	40# J-55	BUTT	Yes
Intermediate 2 Top	8-3/4"	0	0	5000	5000	7-5/8" (new)	29.7# P-110	BUTT	Yes
Intermediate 2 Middle	8-3/4"	5000	5000	12000	12000	7-5/8" (new)	29.7# P-110	VAM HTF-NR	No
Intermediate 2 Bottom	8-3/4"	12000	12000	12897	12636	7" (new)	29# P-110	BUTT	Yes
Production Top	6-1/8"	0	0	11900	11900	5-1/2" (new)	20# P-110	DWCC-IS MS	No
Production Bottom	6-1/8"	11900	11900	17412	12650	4-1/2" (new)	13.5# P-110	DWCC-HT-IS	No

Minimum Safety Factors:    Burst: 1.125    Collapse: 1.125    Tension 1.8

**Cementing Program**

Name	Type	Top (MD)	Bottom (MD)	Sacks	Yield	Weight	Blend
Surface	Lead	0	850	650	1.75	13.5	Class C + Bentonite + 2 CaCL2 + 3% NaCl + LCM
	Tail	850	1150	330	1.38	14.8	Class C + 5% NaCl + LCM
100% Excess				Centralizers per Onshore Order 2.III.B.1f			
Intermediate	Lead	0	4320	1300	1.85	12.8	Class C + Bentonite + 1 CaCL2 + 8% NaCl + LCM
	Tail	4320	5400	515	1.38	14.8	Class C + 5% NaCl + LCM
100% Excess				2 on btm jt, 1 on 2nd jt, 1 every 4th jt to surface			
Intermediate 2	Lead	4400	10897	425	2.35	11.5	TXI + Fluid Loss + Dispersant Retarder + LC
	Tail	10897	12897	300	1.39	13.2	TXI + Fluid Loss + Dispersant Retarder + LC
60% Excess				2 on btm jt, 1 on 2nd jt, 1 every 4th jt to surface			
Production	Lead	11597	17412	555	1.17	15.8	H + Fluid Loss + Dispersant Retarder + LC
25% Excess							

**Pressure Control Equipment:**

A BOP consisting of 3 rams with 2 pipe rams, 1 blind ram and one annular preventer. The BOP will be utilized below surface casing to TD. See attachments for BOP and choke manifold diagrams. Also present will be an accumulator that meets the requirements of Onshore Order #2 for the pressure rating of the BOP stack. A

Drilling Operations Plan  
 Brad Lummis Fed Com #201H  
 Matador Resources Company  
 Sec. 23, 24S, 34E  
 Lea County, NM

rotating head will also be installed as needed. BOP will be inspected and operated as recommended in Onshore Order #2. A Kelly cock and sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position. A third party company will test the BOPs. After setting surface casing, a minimum 5M BOPE system will be installed. Test pressures will be 250 psi low and 5000 psi high with the annular being tested to 250 psi low and 2500 psi high before drilling below surface shoe. In the event that the rig drills multiple wells on the pad and the BOPs are removed after setting Intermediate 2 casing, a full BOP test will be performed when the rig returns and a 10M BOPE system will be installed. Test pressures will be 250 psi low and 10000 psi high with the annular being tested to 250 psi low and 5000 psi high before drilling below the Intermediate 2 shoe.

Matador requests a variance to have the option of running a speed head for setting the Intermediate 1, Intermediate 2, and Production Strings. Matador requests a variance to drill this well using a co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached (see Exhibit E-2). The hose is not required by the manufacturer to be anchored. If the specific hose is not available, then one of equal or higher rating will be used.

Matador requests a variance to have the option of batch drilling this well with other wells on the same pad. In the event that this well is batch drilled, after drilling surface, 1st intermediate, and 2nd intermediate hole sections and cementing 2nd intermediate casing, a 10M dry hole cap with bleed off valve will be installed. The rig will then walk to another well on the pad. When the rig returns to this well and BOPs are installed, the operator will perform a full BOP test. Matador requests a variance to run 7-5/8" BTC casing inside 9-5/8" BTC casing which will be less than the 0.422" stand off regulation. Matador has met with Christopher Walls and Mustafa Haque as well as other BLM representatives and determined that this would be acceptable as long as the 7-5/8" flush casing was run throughout the entire 300' cement tie back section between 9-5/8" and 7-5/8" casing. Matador Resources requests a variance to drill this well using a 5M annular preventer with a 10M BOP ram stack. The "Well Control Plan For 10M MASP Section of Wellbore" is attached.  
 Proposed Mud System:

Name	Hole Size	Top Depth (TVD)	Bottom Depth (TVD)	Mud Weight	Type Mud
Surface	17-1/2"	0	1150	8.30	FW Spud Mud
Intermediate	12-1/4"	1150	5400	10.00	Brine Water
Intermediate 2	8-3/4"	5400	12636	9.00	FW/Cut Brine
Production	6-1/8"	12636	12650	12.50	OBM

All necessary mud products (barite, bentonite, LCM) for weight addition and fluid loss control will be on location at all times. Mud program is subject to change due to hole conditions.

An electronic Pason mud monitoring system complying with Onshore Order 2 will be used.

**Testing, Logging & Coring Program:**

A 2-person mud logging program will be utilized from the ~5400' to TD. No electric OH logs are planned at this time. CBL, GR, Mudlog

Drilling Operations Plan  
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Lea County, NM

Potential Hazards:

No abnormal pressures or temperatures are expected. In accordance with Onshore Order 6, Matador does not anticipate that there will be enough H<sub>2</sub>S from the surface to the Bone Spring formations to meet the BLM's minimum requirements for the submission of an "H<sub>2</sub>S Drilling Operation Plan" or "Public Protection Plan" for the drilling and completion of this well. Since we have an H<sub>2</sub>S safety package on all wells, attached is an "H<sub>2</sub>S Drilling Operations Plan". Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely. All personnel will be familiar with all aspects of safe operation of equipment being used

Estimated BHP: 8223

Estimated BHT: 170°

Construction and Drilling:

Road and location construction will begin after BLM approval of APD. Anticipated spud date as soon as approved. Drilling expected to take 35 days. If production casing is run an additional 30 days will be required to complete and construct surface facilities

**APD ID:** 10400033605

**Submission Date:** 08/31/2018

**Operator Name:** MATADOR PRODUCTION COMPANY



**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

[Show Final Text](#)

**Well Type:** OIL WELL

**Well Work Type:** Drill

**Will existing roads be used?** YES

**Existing Road Map:**

Existing\_Roads\_Screenshot\_20180612152943.JPG

**Existing Road Purpose:** ACCESS

**Row(s) Exist?** NO

**ID:**

**Do the existing roads need to be improved?** NO

**Existing Road Improvement Description:**

**Existing Road Improvement Attachment:**

**Will new roads be needed?** NO

**Existing Wells Map?** YES

**Attach Well map:**

OCD\_Existing\_Wells\_Map\_20180614150552.pdf

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Existing Wells description:**

**Submit or defer a Proposed Production Facilities plan?** SUBMIT

**Production Facilities description:**

**Production Facilities map:**

SK\_300X400\_FACILITY\_SITE\_LAYOUT\_20180730114207.PDF

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

**Describe type:**

**Source latitude:** 32.21486

**Source datum:** NAD83

**Water source permit type:** PRIVATE CONTRACT

**Source land ownership:** PRIVATE

**Water source transport method:** PIPELINE

**Source transportation land ownership:** PRIVATE

**Water source volume (barrels):** 4761.905

**Source volume (gal):** 200000

**Water source type:** GW WELL

**Source longitude:** -103.45763

**Source volume (acre-feet):** 0.6137766

**Water source and transportation map:**

OSE\_Water\_Wells\_1\_Mile\_Radius\_map\_20180615105016.JPG

OSE\_Water\_Wells\_1\_Mile\_Radius\_20180615104313.pdf

**Water source comments:**

**New water well?** NO

**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:**

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**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:**

**Construction Materials description:**

**Construction Materials source location attachment:**

**Waste type:** GARBAGE

**Waste content description:** Trash generated by drilling crew

**Amount of waste:** 50 pounds

**Waste disposal frequency :** Weekly

**Safe containment description:** garbage cans

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** Lea County Landfill

**Waste type:** DRILLING

**Waste content description:** drill cuttings, mud, salts and other chemicals

**Amount of waste:** 2000 barrels

**Waste disposal frequency :** Daily

**Safe containment description:** steel tanks

**Safe containmant attachment:**

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

**Disposal type description:**

**Disposal location description:** Located in Halfway, NM

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**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 being used?** NO

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

**Description of cuttings location** Steel tanks located on adjacent facility site

**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**

**Are you requesting any Ancillary Facilities?:** NO

**Ancillary Facilities attachment:**

**Comments:**

**Well Site Layout Diagram:**

Location\_Layout\_Flipped\_20180829142741.pdf

**Comments:**

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Type of disturbance:** New Surface Disturbance

**Multiple Well Pad Name:** SLOT 1

**Multiple Well Pad Number:** 6

**Recontouring attachment:**

**Drainage/Erosion control construction:** per BLM COAs

**Drainage/Erosion control reclamation:** per BLM COAs

<b>Well pad proposed disturbance (acres):</b> 5.11	<b>Well pad interim reclamation (acres):</b> 1.25	<b>Well pad long term disturbance (acres):</b> 3.86
<b>Road proposed disturbance (acres):</b> 0.03	<b>Road interim reclamation (acres):</b> 0	<b>Road long term disturbance (acres):</b> 0
<b>Powerline proposed disturbance (acres):</b> 0	<b>Powerline interim reclamation (acres):</b> 0	<b>Powerline long term disturbance (acres):</b> 0
<b>Pipeline proposed disturbance (acres):</b> 0	<b>Pipeline interim reclamation (acres):</b> 0	<b>Pipeline long term disturbance (acres):</b> 0
<b>Other proposed disturbance (acres):</b> 0	<b>Other interim reclamation (acres):</b> 0	<b>Other long term disturbance (acres):</b> 0
<b>Total proposed disturbance:</b> 5.14	<b>Total interim reclamation:</b> 1.25	<b>Total long term disturbance:</b> 3.86

**Disturbance Comments:**

**Reconstruction method:** Per BLM COAs

**Topsoil redistribution:** The areas planned for interim reclamation will be harrowed on the contour to match pre-construction grades. Where applicable, the fill material of the well pad will be backfilled into the cut to bring the area back to the original contour. Topsoil and brush will be evenly respread over the entire disturbed area. Disturbed areas will be seeded in accordance with the surface owner's requirements. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.

**Soil treatment:** Per BLM COAs

**Existing Vegetation at the well pad:**

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

**Existing Vegetation Community at the road:**

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

**Existing Vegetation Community at the pipeline:**

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

**Existing Vegetation Community at other disturbances:**

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

**Non native seed used?**

**Non native seed description:**

**Operator Name: MATADOR PRODUCTION COMPANY**

**Well Name: BRAD LUMMIS FED COM**

**Well Number: 221H**

**Seedling transplant description:**

**Will seedlings be transplanted for this project?**

**Seedling transplant description attachment:**

**Will seed be harvested for use in site reclamation?**

**Seed harvest description:**

**Seed harvest description attachment:**

**Seed type:**

**Seed source:**

**Seed name:**

**Source name:**

**Source address:**

**Source phone:**

**Seed cultivar:**

**Seed use location:**

**PLS pounds per acre:**

**Proposed seeding season:**

**Total pounds/Acre:**

**Seed Type**

**Pounds/Acre**

**Seed reclamation attachment:**

**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:**

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

**Well Number:** 221H

**Weed treatment plan description:** Per BLM COAs

**Weed treatment plan attachment:**

**Monitoring plan description:** Per BLM COAs

**Monitoring plan attachment:**

**Success standards:** Per BLM COAs

**Pit closure description:** NA

**Pit closure attachment:**

**Disturbance type:** WELL PAD

**Describe:**

**Surface Owner:** PRIVATE OWNERSHIP

**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:**

**Right of Way needed?** NO

**Use APD as ROW?**

**ROW Type(s):**

**Operator Name:** MATADOR PRODUCTION COMPANY

**Well Name:** BRAD LUMMIS FED COM

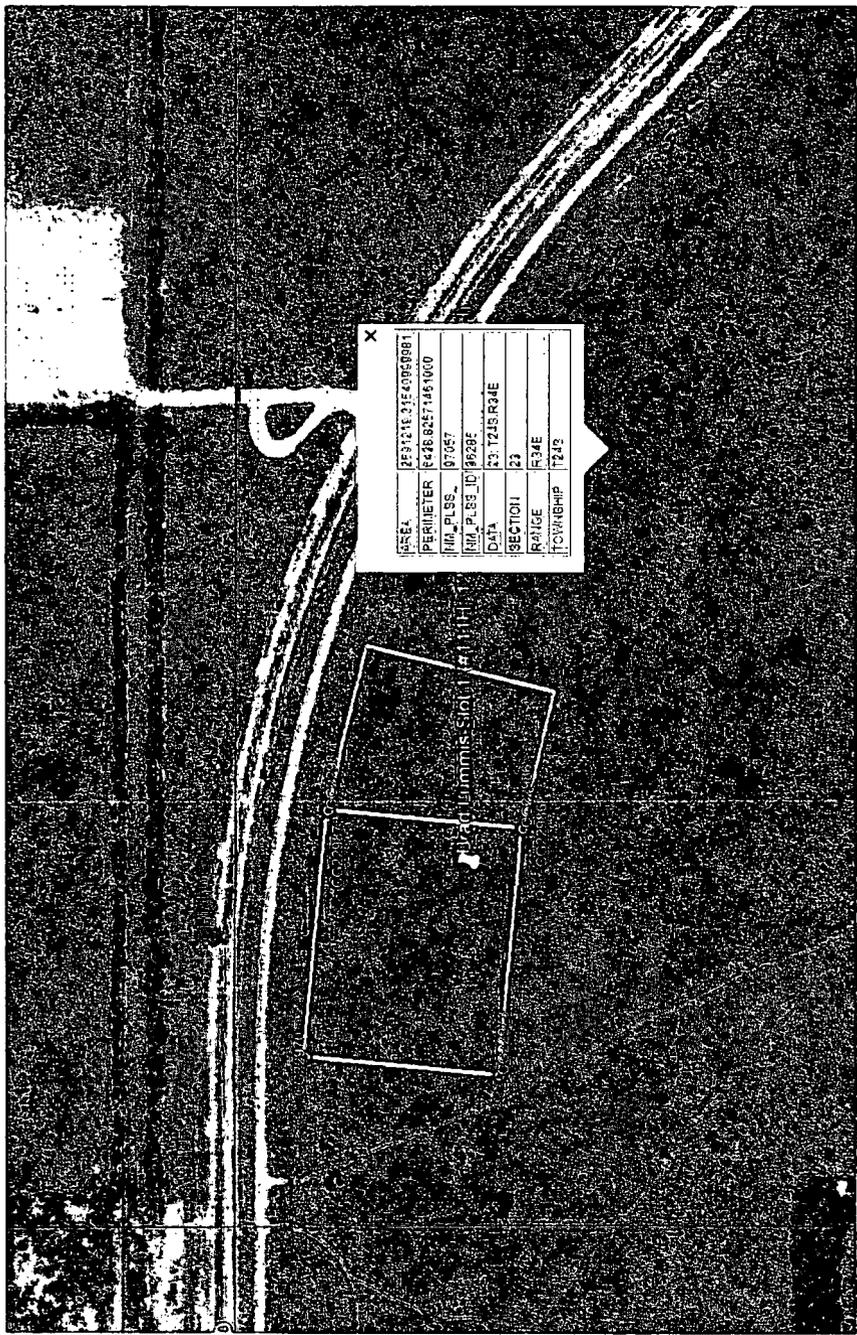
**Well Number:** 221H

**SUPO Additional Information:**

**Use a previously conducted onsite?** YES

**Previous Onsite information:** Onsite conducted on 4/24/18 with Jesse Bassett, and covered well pad (with 7 wells) and adjacent facility site.

BradLummis\_Surface\_Use\_Plan\_of\_Operations\_20180829142921.docx

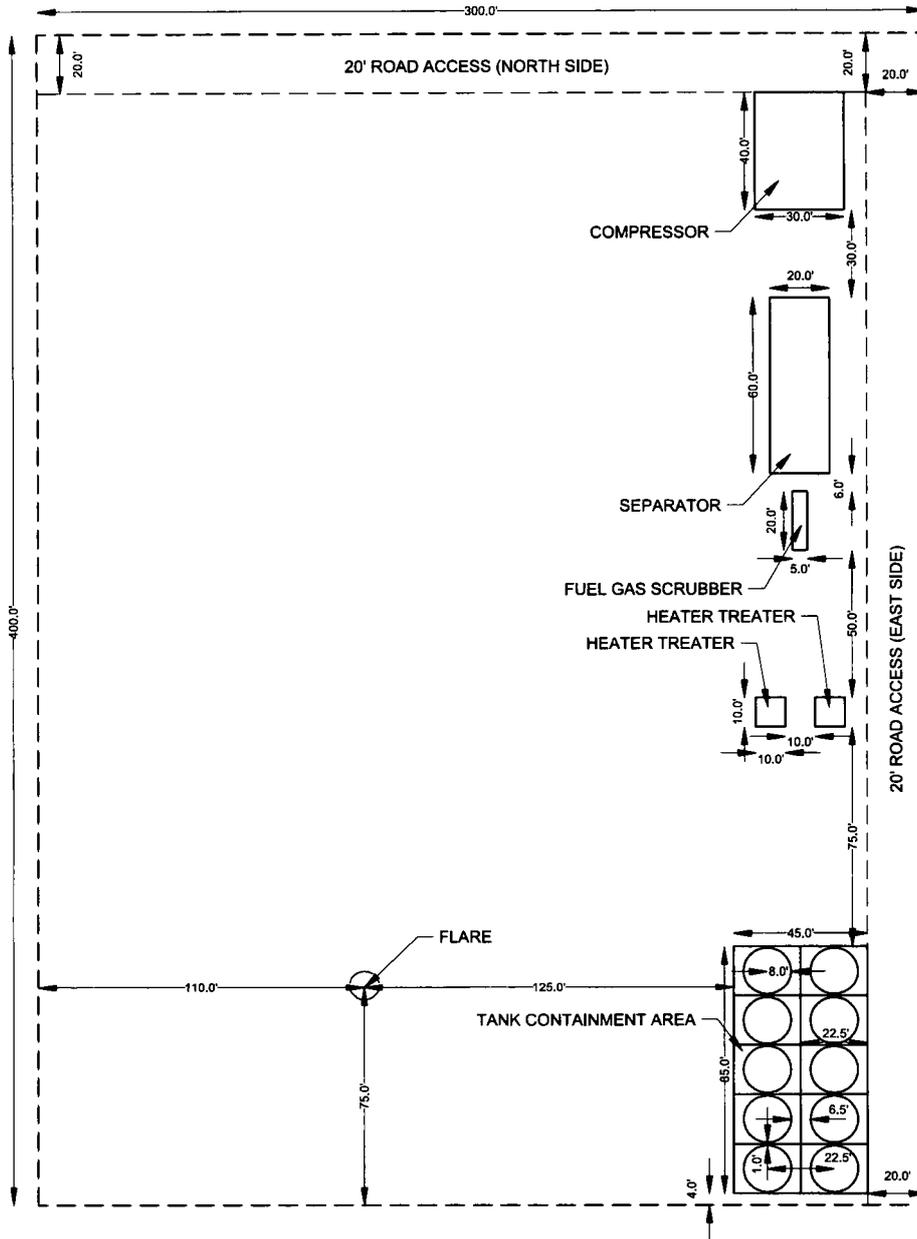


	X		
AREA	253121E	21E40969981	
PERIMETER	6438.82571451000		
AREA_PLUS	97057		
AREA_PLUS_ID	9829E		
DATA	43.7215834E		
SECTION	23		
RANGE	R34E		
TOWNSHIP	T24S		

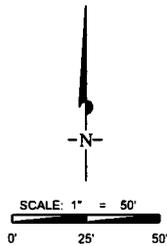




SECTION --, TOWNSHIP --, RANGE --, N.M.P.M.  
 -- COUNTY, NEW MEXICO



SKETCH NAME : 300' X 400' FACILITY SITE LAYOUT



ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE OF THE NORTH AMERICAN DATUM 1927, U.S. SURVEY FEET

THIS PROPOSED PAD SITE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY MATADOR PRODUCTION COMPANY. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

**TOPOGRAPHIC**  
 LOYALTY INNOVATION LEGACY  
 1400 EVERMAN PARKWAY, Ste. 197 • FT. WORTH, TEXAS 76140  
 TELEPHONE: (817) 744-7512 • FAX: (817) 744-7548  
 2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705  
 TELEPHONE: (432) 682-1653 OR (800) 787-1653 • FAX: (432) 682-1743  
 WWW.TOPOGRAPHIC.COM



OSE Label	Use	Well Use	status	pod_status	Owner-Last Name	wner-First Nar	depth_well	depth_water	distance_to_center	utm_easting	utm_northing
C 03902 POD3	EXP	null	PMT	PEN	KARGER	BRYCE	null	null	1428.038	646936.5	3566027.2
C 03932 POD12	EXP	null	PMT	PEN	KARGER	BRYCE	null	null	986.426	645834.2	3565459.6
C 03932 POD13	EXP	null	PMT	ACT	KARGER	BRYCE	90	null	1244.687	645314.2	3565203.5
C 03580 POD1	EXP	null	null	PEN	INTERCONTINENTAL POTASH CORP	null	null	null	965.065	647336.4	3564313.3

# Rig Diagram

-  Wind Direction Indicator
-  H2S Monitors
-  Briefing Areas

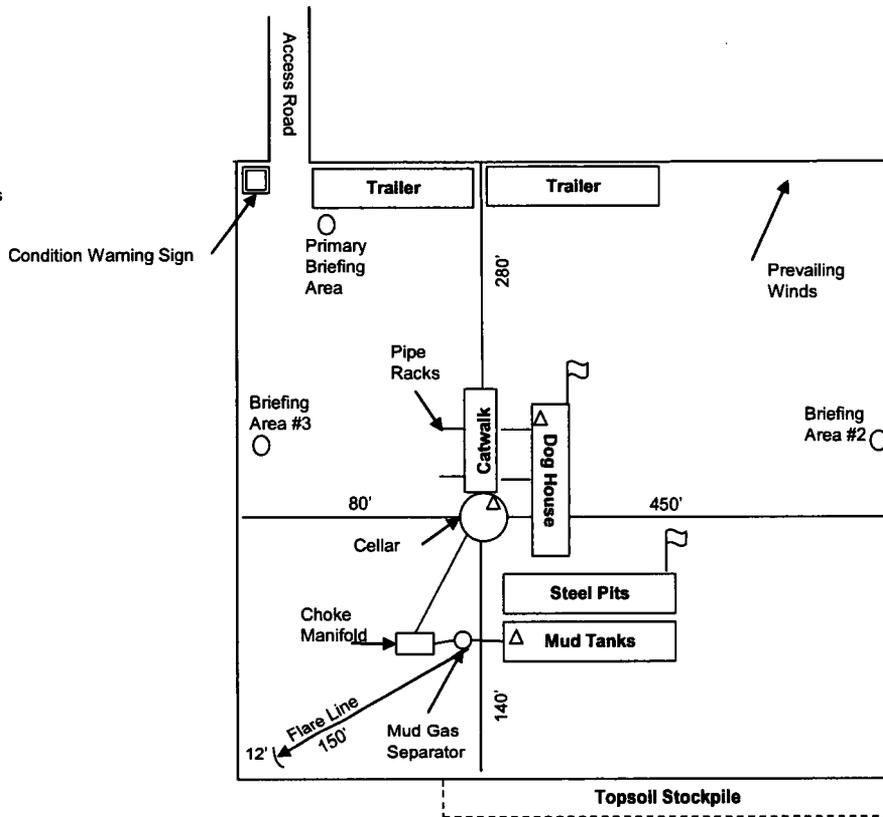


Exhibit E-3: Rig Diagram  
 Brad Lummis Fed Com #221H  
 Matador Resources Company  
 23-24S-34E  
 SHL 435' FNL & 483' FWL  
 BHL 240' FSL & 330' FWL  
 Lea County, NM

# Surface Use Plan of Operations- Brad Lummis Federal

Wells #111, 121, 131, 201, 211, 221

## Existing Roads

1. Improvements to the driving surface of existing roads will be done as needed to Gold Book standards. No new surface disturbance along existing roads will be done.
2. The existing access road route to the proposed project does not cross lease or unit boundaries.
3. The operator will improve or maintain existing roads in a condition the same as or better than before operations begin. All existing structures on the entire access route such as cattle guards, other range improvement projects, culverts, etc. will be properly repaired or replaced if damaged or deteriorated beyond practical use.

## New or Reconstructed Access Roads

1. Additional access roads will be needed for this proposed project. See the survey plat for the location and length of the access road. The new roads will be constructed to BLM standards.
2. Total width of disturbance when constructing the access road will be 30 feet. The driving width of the access road (permanent disturbance) will be 14 feet. All areas outside of the driving surface will be revegetated after construction is complete.
3. The access road will be capped with compacted caliche from a BLM-approved third party source.
4. The road will have a 0% slope from the tip of the road crown to the edge of the driving surface. The maximum grade for the access road will be 1%.
5. The access road will be constructed with a ditch on each side.
6. No turnouts will be constructed on the proposed access road.
7. No culverts will be constructed for this proposed access road.
8. No low water crossings will be constructed for the access road.

## Production Facilities

1. Topsoil removed during the construction of the well pad (420' X 530') for all six wells will have will be stored along the south side of pad
  - a. Reclamation area will be along the east side of the pad (130' x 420')
2. A facility site (360' X 416' X 300' X 420') will be built adjacent to the eastern edge of the well pad
  - a. See Well Site Layout Diagram for dimension of reclamation areas and topsoil storage areas
3. No electrical line will be installed as part of this project.

4. A buried gas takeaway line will be installed, with a 30ft-wide permanent easement and a 20ft-wide temporary workspace. The disturbance will be reclaimed and revegetated after construction.
5. A flowline easement between well pad and surface facility site will be installed, with a 50ft-wide permanent easement and a 25ft-wide temporary workspace. The disturbance will be reclaimed and revegetated after construction.

#### Location and Types of Water

1. Water source: see 1-Mile OSE Water Well Map
  - a. Transport method: temporary surface water lines
  - b. Water source volume: estimated 180,000 barrels

#### Waste Disposal

1. Drilling: drill cuttings, mud, salts and other chemicals will be stored in steel tanks and hauled to state approved private commercial facility in Halfway, NM. Estimated volume of drilling waste is 2000 barrels. The well will be drilled utilizing a closed loop system.
2. Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at Lea County Landfill. All trash on and around the well site will be collected for disposal.
3. Human waste and grey water will be properly contained and disposed of properly at Carlsbad Wastewater Treatment Plant.

#### Topsoil Salvaging

1. The top 6 inches of soil material will be stripped and stockpiled on the perimeter of the well location and along the perimeter of the access road. Grass, forbs, and small woody vegetation, such as mesquite will be excavated as the topsoil is removed. Large woody vegetation will be stripped and stored separately and respread evenly on the site following topsoil respreading. Topsoil will be clearly segregated and stored separately from subsoils. Contaminated soil will not be stockpiled, but properly treated and handled prior to topsoil salvaging.

#### Surface Reclamation Procedures

1. The BLM will be notified at least 3 days prior to commencement of any reclamation procedures.
2. If circumstances allow, interim reclamation and/or final reclamation actions will be completed no later than 6 months from when the final well on the location has been completed or plugged. We will gain written permission from the BLM if more time is needed.
3. Interim reclamation will be performed on the well site after the final well on well pad is drilled and completed. Reclamation diagrams depict the location and dimensions of the planned interim reclamation for the well sites.
4. Within 30 days of well completion, the well location and surrounding areas will be cleared of all materials, trash, and equipment not required for production.

5. In areas planned for interim reclamation, all the surface material will be removed and returned to the original location or recycled to repair/build roads and well pads.
6. The areas planned for interim reclamation will be harrowed on the contour to match pre-construction grades. Where applicable, the fill material of the well pad will be backfilled into the cut to bring the area back to the original contour.
7. Topsoil and brush will be evenly respread over the entire disturbed area. Disturbed areas will be seeded in accordance with the surface owner's requirements. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.
8. Proper erosion control methods will be used on the area to control erosion, runoff and siltation of the surrounding area.
9. The interim reclamation will be monitored periodically to ensure that vegetation has reestablished and that erosion is controlled.

Final Reclamation (well pad, buried pipelines, etc.)

1. Prior to final reclamation procedures, the well pad, road, and surrounding area will be cleared of material, trash, and equipment.
2. All surfacing material will be removed and returned to the original location or recycled to repair/build roads and well pads.
3. All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be recontoured as best as possible to match pre-construction grades. The topsoil that was spread over the interim reclamation areas will be redistributed evenly over the entire disturbed site to ensure successful revegetation.
4. After all the disturbed areas have been properly prepared, the areas will be seeded with the proper seed mixture, free of noxious weeds. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.
5. Proper erosion control methods will be used on the entire area to control erosion, runoff and siltation of the surrounding area.
6. All unused equipment and structures including pipelines, electric line poles, tanks, etc. that serviced the well will be removed.
7. All reclaimed areas will be monitored periodically to ensure that revegetation occurs, that the area is not redisturbed, and that erosion is controlled.

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

**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:**

**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:**

**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:**

**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:**

**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

01/28/2019

**Federal/Indian APD:** FED

**BLM Bond number:** NMB001079

**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:**