

# PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Devon Energy Production Company LP
LEASE NO.:	NMLC062300
WELL NAME & NO.:	Marwari 28-16 State Fed Com 232H
SURFACE HOLE FOOTAGE:	175'/N & 410'/W
BOTTOM HOLE FOOTAGE:	330'/N & 330'/W
LOCATION:	Section 28, T25S, R32E, NMPM
COUNTY:	Lea County, New Mexico

**HOBBS OCD**  
SEP 18 2018  
**RECEIVED**

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 **900** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.  
**Excess calculates to 24% - additional cement might be required.**
  - 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 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 5 1/2 inch production casing is:
  - Cement should tie-back at least **200** feet into previous casing string. Operator shall provide method of verification. **Excess calculates to 24% - additional cement might be required.**

### **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 **3000 (3M) 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 3000 (3M) 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)**

##### **Waste Minimization Plan (WMP)**

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

##### **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 09062018**

## 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**

<b>OPERATOR'S NAME:</b>	Devon Energy Production Company LP
<b>LEASE NO.:</b>	NMLC062300
<b>WELL NAME &amp; NO.:</b>	Marwari 28-16 State Fed Com 232H
<b>SURFACE HOLE FOOTAGE:</b>	175'/N & 410'/W
<b>BOTTOM HOLE FOOTAGE:</b>	330'/N & 330'/W
<b>LOCATION:</b>	Section 28, T25S, R32E, NMPM
<b>COUNTY:</b>	Lea County, New Mexico

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**Approval Date: 09/13/2018**

## **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.

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

### **Power line Avian Protection**

Power lines shall be constructed and designed in accordance to standards outlined in "Suggested Practices for Avian Protection on Power lines: The State of the Art in 2006" Edison Electric Institute, APLIC, and the California Energy Commission 2006. The holder shall assume the burden and expense of proving that pole designs not shown in the above publication deter raptor perching, roosting, and nesting. Such proof shall be provided by a raptor expert approved by the Authorized Officer. The BLM reserves the right to require modification or additions to all power line structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. The holder without liability or expense shall make such modifications and/or additions to the United States.

### **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.

During construction, Devon shall minimize disturbance to existing fences, water lines, troughs, windmills, and other improvements on public lands. Devon 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 grazing permittee/allottee prior to disturbing any range improvement projects. 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.

- The entire well pad and CTB pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the pads. 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 pad. The berm shall be maintained through the life of the well and CTB and after interim reclamation has been completed.
- Any water erosion that may occur due to the construction of the well pad or CTB pad during the life of the well or CTB will be corrected within two weeks and proper measures will be taken to prevent future erosion.



## **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**

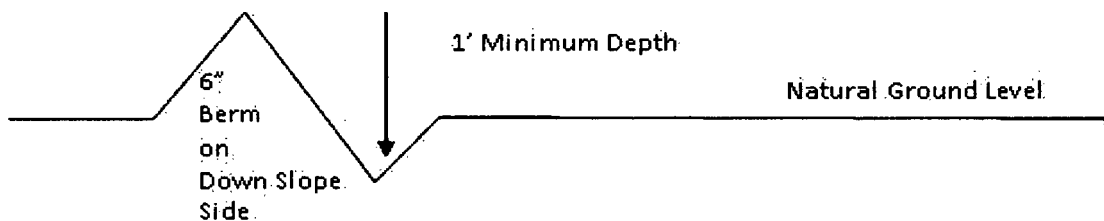
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

**Drainage**

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

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

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



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

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

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

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

#### **Cattle guards**

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

#### **Fence Requirement**

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

#### **Public Access**

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



## Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

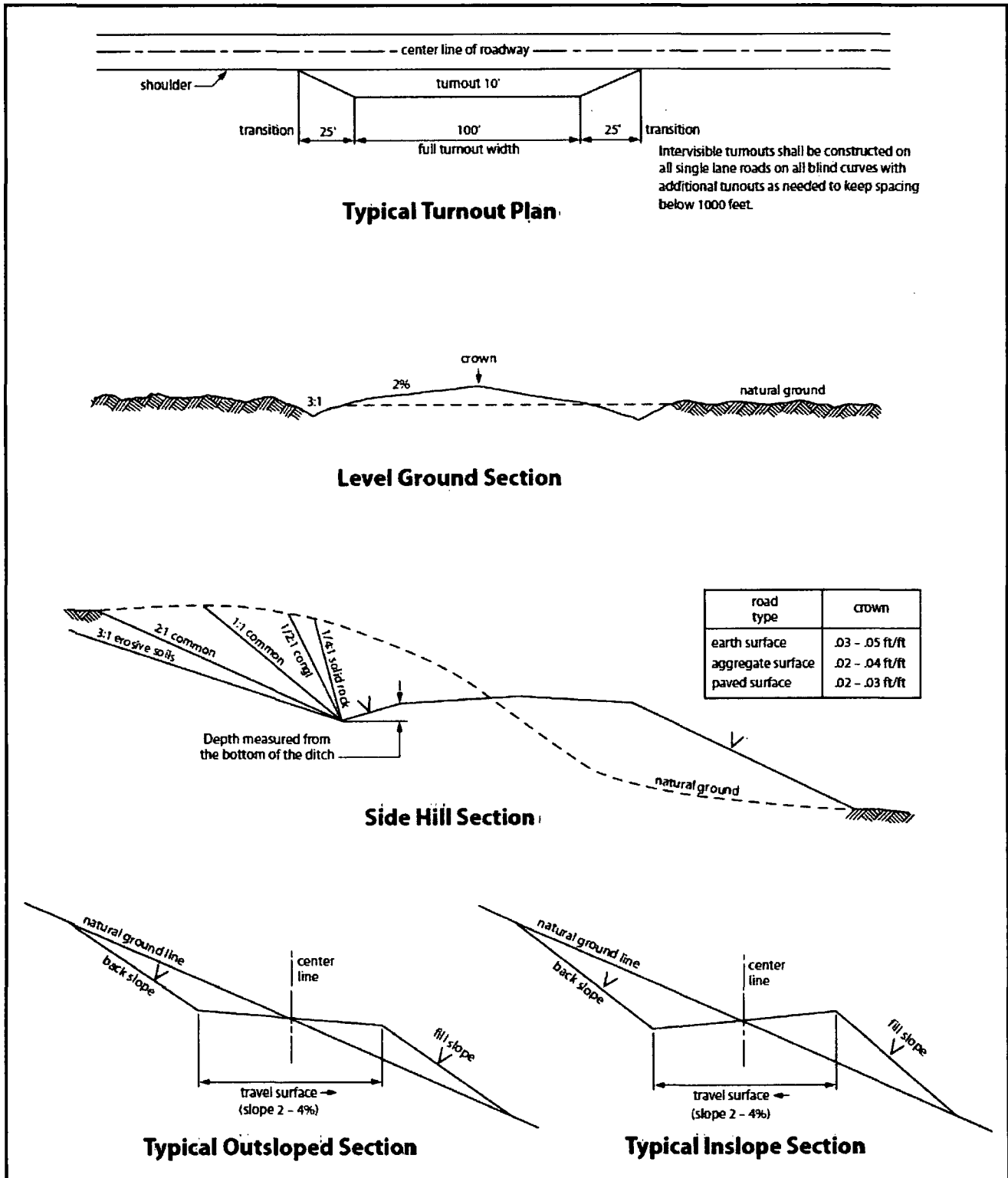


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## **VII. PRODUCTION (POST DRILLING)**

### **A. WELL STRUCTURES & FACILITIES**

#### **Placement of Production Facilities**

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

#### **Exclosure Netting (Open-top Tanks)**

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

#### **Chemical and Fuel Secondary Containment and Exclosure Screening**

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

#### **Open-Vent Exhaust Stack Exclosures**

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

#### **Containment Structures**

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

#### **Painting Requirement**

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

### **B. PIPELINES**

#### **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:

- c. 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.
- d. 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.

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

#### **C. ELECTRIC LINES**

##### **STANDARD STIPULATIONS FOR OVERHEAD ELECTRIC DISTRIBUTION LINES**

**A copy of the grant and attachments, including stipulations, 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. There will be no clearing or blading of the right-of-way unless otherwise agreed to in writing by the Authorized Officer.

5. Power lines shall be constructed and designed in accordance to standards outlined in "Suggested Practices for Avian Protection on Power lines: The State of the Art in 2006" Edison Electric Institute, APLIC, and the California Energy Commission 2006 . The holder shall assume the burden and expense of proving that pole designs not shown in the above publication deter raptor perching, roosting, and nesting. Such proof shall be provided by a raptor expert approved by the Authorized Officer. The BLM reserves the right to require modification or additions to all powerline structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States.

Raptor deterrence will consist of but not limited to the following: triangle perch discouragers shall be placed on each side of the cross arms and a nonconductive perching deterrence shall be placed on all vertical poles that extend past the cross arms.

6. 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 the fence. No permanent gates will be allowed unless approved by the Authorized Officer.



7. The BLM serial number assigned to this authorization shall be posted in a permanent, conspicuous manner where the power line crosses roads and at all serviced facilities. Numbers will be at least two inches high and will be affixed to the pole nearest the road crossing and at the facilities served.

8. Upon cancellation, relinquishment, or expiration of this grant, the holder shall comply with those abandonment procedures as prescribed by the Authorized Officer.

9. All surface structures (poles, lines, transformers, etc.) shall be removed within 180 days of abandonment, relinquishment, or termination of use of the serviced facility or facilities or within 180 days of abandonment, relinquishment, cancellation, or expiration of this grant, whichever comes first. This will not apply where the power line extends service to an active, adjoining facility or facilities.

10. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the Authorized Officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate 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.

11. Special Stipulations:

- For reclamation remove poles, lines, transformer, etc. and dispose of properly.
- Fill in any holes from the poles removed.

**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, 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. 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 ft. from the source of the noise.

This authorization is subject to your Certificate of Participation and/or Certificate of Inclusion under the New Mexico Candidate Conservation Agreement. Because it involves surface disturbing activities covered under your Certificate, your Habitat Conservation Fund Account with the Center of Excellence for Hazardous Materials

Management (CEHMM) will be debited according to Exhibit B Part 2 of the Certificate of Participation.

## **VIII. INTERIM RECLAMATION**

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

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

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

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

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

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

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

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

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

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

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

## Seed Mixture for LPC Sand/Shinnery Sites

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

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

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

<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



**Devon Energy Center  
333 West Sheridan Avenue  
Oklahoma City, Oklahoma 73102-5015**

# **Hydrogen Sulfide (H<sub>2</sub>S) Contingency Plan**

**For**

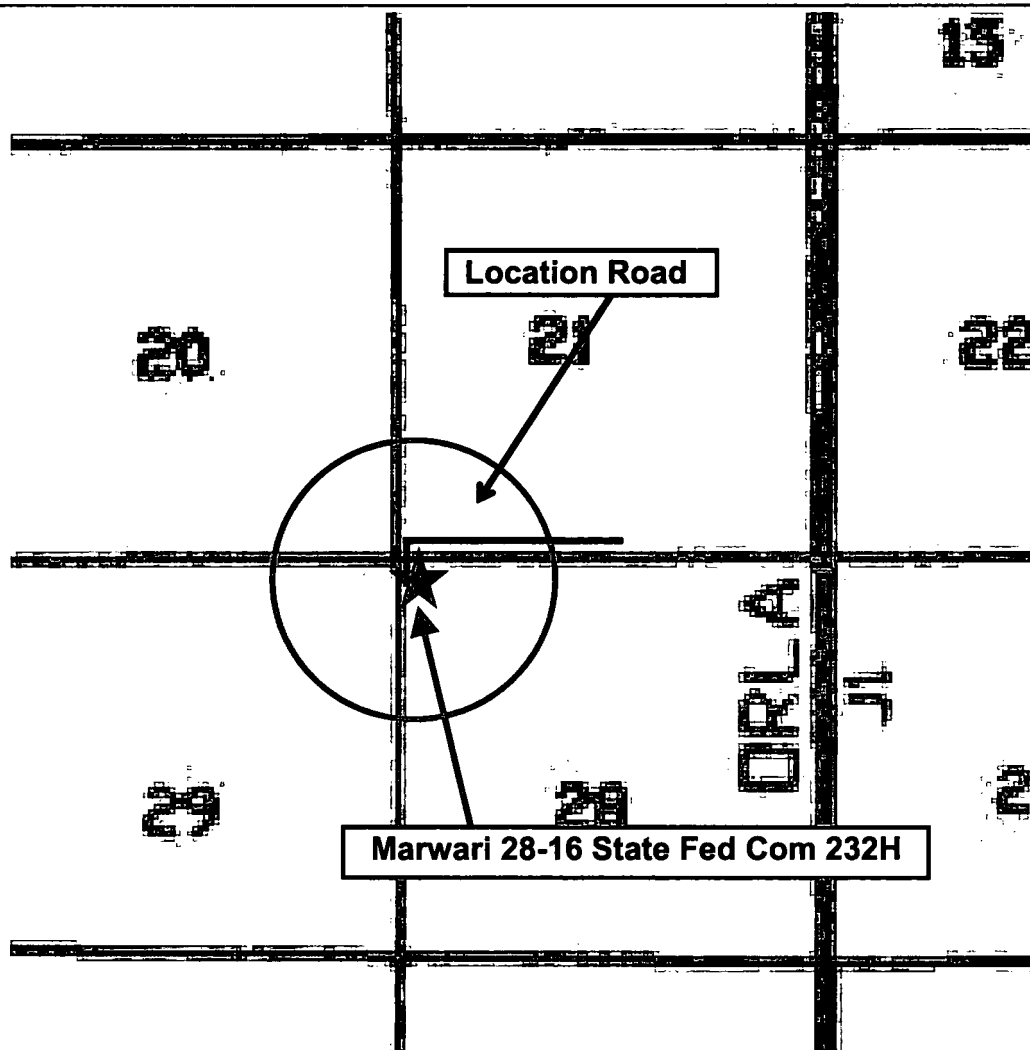
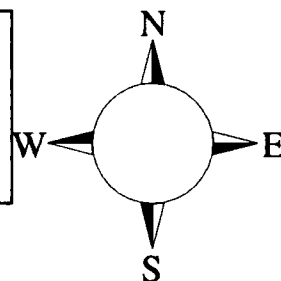
**Marwari 28-16 State Fed Com 232H**

**Sec-28 T-25S R-32E  
175' FNL & 410' FWL  
LAT. = 32.1081014' N (NAD83)  
LONG = 103.6873567' W**

**Lea County NM**

## Marwari 28-16 State Fed Com 232H

This is an open drilling site. H<sub>2</sub>S monitoring equipment and emergency response equipment will be used within 500' of zones known to contain H<sub>2</sub>S, including warning signs, wind indicators and H<sub>2</sub>S monitor.



Assumed 100 ppm ROE = 3000' (Radius of Exposure)  
100 ppm H<sub>2</sub>S concentration shall trigger activation of this plan.

### Escape

Crews shall escape upwind of escaping gas in the event of an emergency release of gas. Escape can be facilitated from the location entrance road. Crews should then block the entrance to the location from the lease road so as not to allow anyone traversing into a hazardous area. The blockade should be at a safe distance outside of the ROE. There are no homes or buildings in or near the ROE.

**Assumed 100 ppm ROE = 3000'**

**100 ppm H<sub>2</sub>S concentration shall trigger activation of this plan.**

### **Emergency Procedures**

**In the event of a release of gas containing H<sub>2</sub>S, the first responder(s) must**

- **Isolate the area and prevent entry by other persons into the 100 ppm ROE.**
- **Evacuate any public places encompassed by the 100 ppm ROE.**
- **Be equipped with H<sub>2</sub>S monitors and air packs in order to control the release.**
- **Use the “buddy system” to ensure no injuries occur during the response**
- **Take precautions to avoid personal injury during this operation.**
- **Contact operator and/or local officials to aid in operation. See list of phone numbers attached.**
- **Have received training in the**
  - **Detection of H<sub>2</sub>S, and**
  - **Measures for protection against the gas,**
  - **Equipment used for protection and emergency response.**

### **Ignition of Gas Source**

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO<sub>2</sub>). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of the gas

### **Characteristics of H<sub>2</sub>S and SO<sub>2</sub>**

<b>Common Name</b>	<b>Chemical Formula</b>	<b>Specific Gravity</b>	<b>Threshold Limit</b>	<b>Hazardous Limit</b>	<b>Lethal Concentration</b>
<b>Hydrogen Sulfide</b>	<b>H<sub>2</sub>S</b>	<b>1.189 Air = 1</b>	<b>10 ppm</b>	<b>100 ppm/hr</b>	<b>600 ppm</b>
<b>Sulfur Dioxide</b>	<b>SO<sub>2</sub></b>	<b>2.21 Air = 1</b>	<b>2 ppm</b>	<b>N/A</b>	<b>1000 ppm</b>

### **Contacting Authorities**

Devon Energy Corp. personnel must liaison with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available. The following call list of essential and potential responders has been prepared for use during a release. Devon Energy Corp. Company response must be in coordination with the State of New Mexico's 'Hazardous Materials Emergency Response Plan' (HMER)

## **Hydrogen Sulfide Drilling Operation Plan**

### **I. HYDROGEN SULFIDE (H<sub>2</sub>S) TRAINING**

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

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

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

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

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

### **II. HYDROGEN SULFIDE TRAINING**

Note: All H<sub>2</sub>S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H<sub>2</sub>S.



## **1. Well Control Equipment**

- A. Flare line
- B. Choke manifold – Remotely Operated
- C. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit
- D. Auxiliary equipment may include if applicable: annular preventer and rotating head.
- E. Mud/Gas Separator

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

30-minute SCBA units located at briefing areas, as indicated on well site diagram, with escape units available in the top doghouse. As it may be difficult to communicate audibly while wearing these units, hand signals shall be utilized.

## **3. H<sub>2</sub>S detection and monitoring equipment:**

Portable H<sub>2</sub>S monitors positioned on location for best coverage and response. These units have warning lights which activate when H<sub>2</sub>S levels reach 10 ppm and audible sirens which activate at 15 ppm. Sensor locations:

- Bell nipple
- Possum Belly/Shale shaker
- Rig floor
- Choke manifold
- Cellar

### **Visual warning systems:**

- A. Wind direction indicators as shown on well site diagram
- B. Caution/ Danger signs shall be posted on roads providing direct access to locations. Signs will be painted a high visibility yellow with black lettering of sufficient size to be reasonable distance from the immediate location. Bilingual signs will be used when appropriate.

#### **4. Mud program:**

The mud program has been designed to minimize the volume of H<sub>2</sub>S circulated to surface. Proper mud weight, safe drilling practices and the use of H<sub>2</sub>S scavengers will minimize hazards when penetrating H<sub>2</sub>S bearing zones.

#### **5. Metallurgy:**

- A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold lines, and valves shall be H<sub>2</sub>S trim.
- B. All elastomers used for packing and seals shall be H<sub>2</sub>S trim:

#### **6. Communication:**

- A. Company personnel have/use cellular telephones in the field.
- B. Land line (telephone) communications at Office

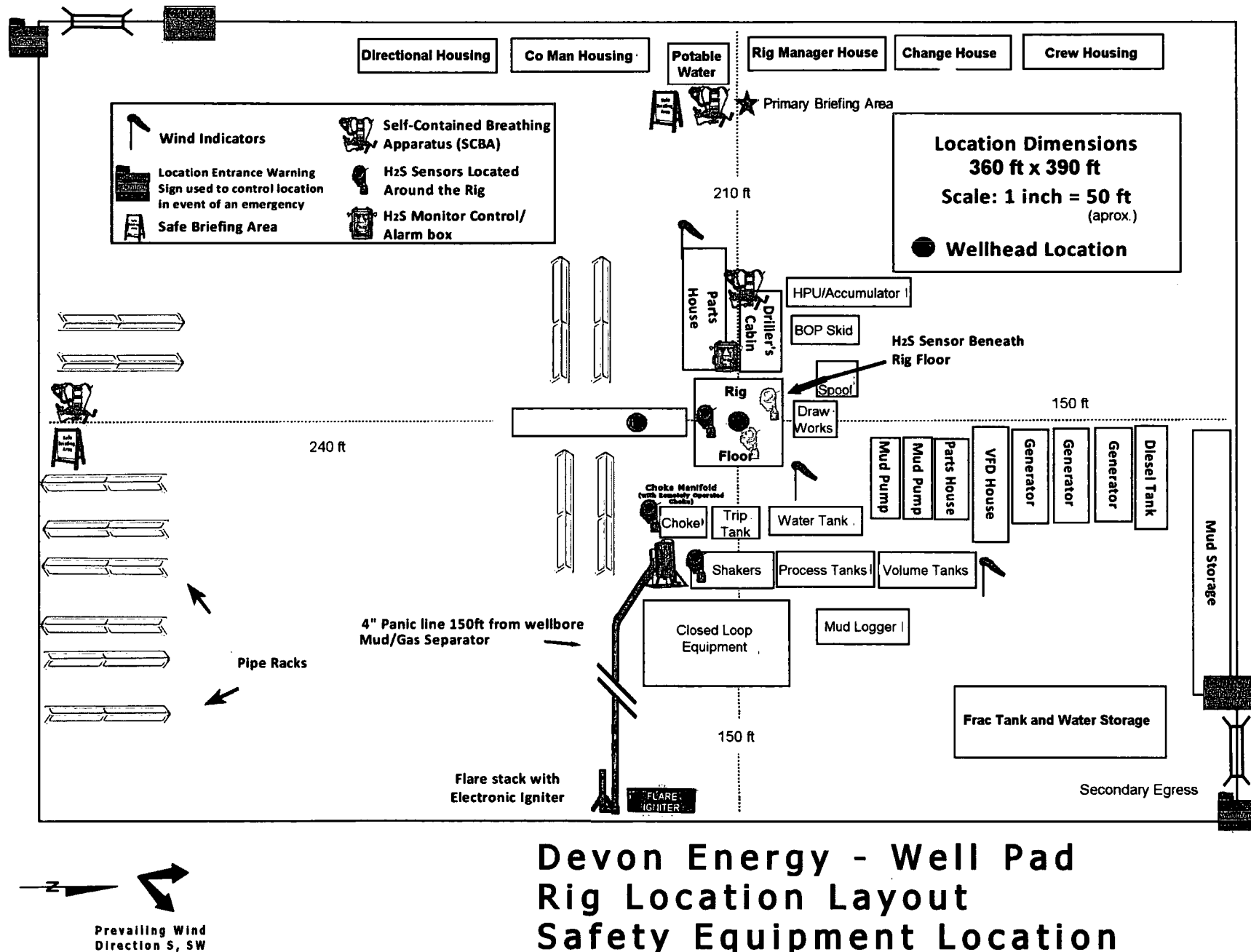
#### **7. Well testing:**

- A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safety and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H<sub>2</sub>S environment will use the closed chamber method of testing.
- B. There will be no drill stem testing.

<b><u>Devon Energy Corp. Company Call List</u></b>		
Drilling Supervisor – Basin – Mark Kramer		405-823-4796
EHS Professional – Laura Wright		405-439-8129
<b><u>Agency Call List</u></b>		
<b><u>Lea County (575)</u></b>	<b>Hobbs</b>	
	Lea County Communication Authority	393-3981
	State Police	392-5588
	City Police	397-9265
	Sheriff's Office	393-2515
	<b>Ambulance</b>	<b>911</b>
	Fire Department	397-9308
	LEPC (Local Emergency Planning Committee)	393-2870
	NMOCD	393-6161
	US Bureau of Land Management	393-3612
<b><u>Eddy County (575)</u></b>	<b>Carlsbad</b>	
	State Police	885-3137
	City Police	885-2111
	Sheriff's Office	887-7551
	<b>Ambulance</b>	<b>911</b>
	Fire Department	885-3125
	LEPC (Local Emergency Planning Committee)	887-3798
	US Bureau of Land Management	887-6544
	NM Emergency Response Commission (Santa Fe)	(505) 476-9600
	24 HR	(505) 827-9126
	National Emergency Response Center	(800) 424-8802
	National Pollution Control Center: Direct	(703) 872-6000
	For Oil Spills	(800) 280-7118
	<b>Emergency Services</b>	
	Wild Well Control	(281) 784-4700
	Cudd Pressure Control	(915) 699-0139 (915) 563-3356
	Halliburton	(575) 746-2757
	B. J. Services	(575) 746-3569
<b><u>Give GPS position:</u></b>	Native Air – Emergency Helicopter – Hobbs	(575) 392-6429
	Flight For Life - Lubbock, TX	(806) 743-9911
	Aerocare - Lubbock, TX	(806) 747-8923
	Med Flight Air Amb - Albuquerque, NM	(575) 842-4433
	Lifeguard Air Med Svc. Albuquerque, NM	(800) 222-1222
	Poison Control (24/7)	(575) 272-3115
	Oil & Gas Pipeline 24 Hour Service	(800) 364-4366
	NOAA – Website - <a href="http://www.nhc.noaa.gov">www.nhc.noaa.gov</a>	

Prepared in conjunction with  
Dave Small









Pro Directional  
Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
Site:	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

Project	Lea County, NM (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Van Doo Dah/Marwari			
Site Position:		Northing:	404,059.28 usft	Latitude: 32° 6' 33.0230 N
From:	Map	Easting:	742,415.57 usft	Longitude: 103° 41' 2.0574 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.35 °

Well	Marwari 28-16 State Fed Com 232H			
Well Position	+N/-S	-396.27 usft	Northing:	403,663.01 usft
	+E/-W	-1,066.45 usft	Easting:	741,349.12 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	Ground Level: 3,372.00 usft	

Wellbore	OH			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	2/26/2018	6.80	59.78	47,920.80

Design	Prelim A			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	359.78

Plan Survey Tool Program		Date 2/26/2018		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	20,293.25 Prelim A (OH)	MWD+HDGM	
			OWSG MWD + HDGM	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,799.73	4.00	321.34	1,799.08	21.78	-17.43	0.50	0.50	0.00	321.34	
3,036.16	4.00	321.34	3,032.50	89.11	-71.29	0.00	0.00	0.00	0.00	
3,436.02	0.00	0.00	3,432.04	100.00	-80.00	1.00	-1.00	0.00	180.00	
9,651.02	0.00	0.00	9,647.04	100.00	-80.00	0.00	0.00	0.00	0.00	
10,551.02	90.00	359.78	10,220.00	672.95	-82.23	10.00	10.00	-0.02	359.78	
20,293.32	90.00	359.78	10,220.00	10,415.18	-120.09	0.00	0.00	0.00	0.00	BHL - Marwari 232H

Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
825.00	0.00	0.00	825.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
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
Start Build 0.50									
1,100.00	0.50	321.34	1,100.00	0.34	-0.27	0.34	0.50	0.50	0.00
1,200.00	1.00	321.34	1,199.99	1.36	-1.09	1.37	0.50	0.50	0.00
1,205.01	1.03	321.34	1,205.00	1.43	-1.15	1.44	0.50	0.50	0.00
Salado									
1,300.00	1.50	321.34	1,299.97	3.07	-2.45	3.08	0.50	0.50	0.00
1,400.00	2.00	321.34	1,399.92	5.45	-4.36	5.47	0.50	0.50	0.00
1,500.00	2.50	321.34	1,499.84	8.52	-6.81	8.54	0.50	0.50	0.00
1,600.00	3.00	321.34	1,599.73	12.26	-9.81	12.30	0.50	0.50	0.00
1,700.00	3.50	321.34	1,699.56	16.69	-13.35	16.74	0.50	0.50	0.00
1,799.73	4.00	321.34	1,799.08	21.78	-17.43	21.85	0.50	0.50	0.00
Start 1236.43 hold at 1799.73 MD									
1,900.00	4.00	321.34	1,899.11	27.24	-21.79	27.33	0.00	0.00	0.00
2,000.00	4.00	321.34	1,998.86	32.69	-26.15	32.79	0.00	0.00	0.00
2,100.00	4.00	321.34	2,098.62	38.13	-30.51	38.25	0.00	0.00	0.00
2,200.00	4.00	321.34	2,198.38	43.58	-34.86	43.71	0.00	0.00	0.00
2,300.00	4.00	321.34	2,298.13	49.02	-39.22	49.17	0.00	0.00	0.00
2,400.00	4.00	321.34	2,397.89	54.47	-43.57	54.64	0.00	0.00	0.00
2,500.00	4.00	321.34	2,497.65	59.91	-47.93	60.10	0.00	0.00	0.00
2,600.00	4.00	321.34	2,597.40	65.36	-52.29	65.56	0.00	0.00	0.00
2,700.00	4.00	321.34	2,697.16	70.80	-56.64	71.02	0.00	0.00	0.00
2,800.00	4.00	321.34	2,796.92	76.25	-61.00	76.48	0.00	0.00	0.00
2,900.00	4.00	321.34	2,896.67	81.69	-65.36	81.95	0.00	0.00	0.00
3,000.00	4.00	321.34	2,996.43	87.14	-69.71	87.41	0.00	0.00	0.00
3,036.16	4.00	321.34	3,032.50	89.11	-71.29	89.38	0.00	0.00	0.00
Start Drop -1.00									
3,100.00	3.36	321.34	3,096.21	92.31	-73.85	92.59	1.00	-1.00	0.00
3,200.00	2.36	321.34	3,196.08	96.20	-76.96	96.50	1.00	-1.00	0.00
3,300.00	1.36	321.34	3,296.03	98.74	-78.99	99.04	1.00	-1.00	0.00
3,400.00	0.36	321.34	3,396.02	99.91	-79.93	100.22	1.00	-1.00	0.00
3,436.02	0.00	0.00	3,432.04	100.00	-80.00	100.31	1.00	-1.00	0.00
Start 6215.00 hold at 3436.02 MD									
3,500.00	0.00	0.00	3,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
3,600.00	0.00	0.00	3,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
3,700.00	0.00	0.00	3,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
3,800.00	0.00	0.00	3,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
3,900.00	0.00	0.00	3,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,000.00	0.00	0.00	3,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,100.00	0.00	0.00	4,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,200.00	0.00	0.00	4,196.02	100.00	-80.00	100.31	0.00	0.00	0.00



# Pro Directional Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
Site:	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

## 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)
4,300.00	0.00	0.00	4,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,367.98	0.00	0.00	4,364.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Base of Salt</b>									
4,400.00	0.00	0.00	4,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,500.00	0.00	0.00	4,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,568.98	0.00	0.00	4,565.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Delaware</b>									
4,600.00	0.00	0.00	4,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,700.00	0.00	0.00	4,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,800.00	0.00	0.00	4,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
4,900.00	0.00	0.00	4,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,000.00	0.00	0.00	4,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,100.00	0.00	0.00	5,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,200.00	0.00	0.00	5,196.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,300.00	0.00	0.00	5,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,400.00	0.00	0.00	5,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,500.00	0.00	0.00	5,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,600.00	0.00	0.00	5,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,700.00	0.00	0.00	5,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,800.00	0.00	0.00	5,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
5,900.00	0.00	0.00	5,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,000.00	0.00	0.00	5,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,100.00	0.00	0.00	6,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,200.00	0.00	0.00	6,196.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,300.00	0.00	0.00	6,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,400.00	0.00	0.00	6,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,500.00	0.00	0.00	6,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,600.00	0.00	0.00	6,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,700.00	0.00	0.00	6,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,800.00	0.00	0.00	6,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
6,900.00	0.00	0.00	6,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,000.00	0.00	0.00	6,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,100.00	0.00	0.00	7,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,200.00	0.00	0.00	7,196.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,300.00	0.00	0.00	7,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,400.00	0.00	0.00	7,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,500.00	0.00	0.00	7,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,600.00	0.00	0.00	7,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,700.00	0.00	0.00	7,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,800.00	0.00	0.00	7,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
7,900.00	0.00	0.00	7,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,000.00	0.00	0.00	7,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,100.00	0.00	0.00	8,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,200.00	0.00	0.00	8,196.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,300.00	0.00	0.00	8,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,323.98	0.00	0.00	8,320.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>L Brushy Canyon</b>									
8,400.00	0.00	0.00	8,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,500.00	0.00	0.00	8,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,533.98	0.00	0.00	8,530.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Bone Spring</b>									
8,600.00	0.00	0.00	8,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,663.98	0.00	0.00	8,660.00	100.00	-80.00	100.31	0.00	0.00	0.00





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Wellbore:	OH		
Design:	Prelim A		

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)
<b>Leonard 'A'</b>									
8,700.00	0.00	0.00	8,696.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,800.00	0.00	0.00	8,796.02	100.00	-80.00	100.31	0.00	0.00	0.00
8,900.00	0.00	0.00	8,896.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,000.00	0.00	0.00	8,996.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,048.98	0.00	0.00	9,045.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Leonard 'B'</b>									
9,100.00	0.00	0.00	9,096.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,200.00	0.00	0.00	9,196.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,258.98	0.00	0.00	9,255.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Leonard 'C'</b>									
9,300.00	0.00	0.00	9,296.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,400.00	0.00	0.00	9,396.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,500.00	0.00	0.00	9,496.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,518.98	0.00	0.00	9,515.00	100.00	-80.00	100.31	0.00	0.00	0.00
<b>1st BSPG Sand</b>									
9,600.00	0.00	0.00	9,596.02	100.00	-80.00	100.31	0.00	0.00	0.00
9,651.02	0.00	0.00	9,647.04	100.00	-80.00	100.31	0.00	0.00	0.00
<b>Start DLS 10.00 TFO 359.78</b>									
9,700.00	4.90	359.78	9,695.96	102.09	-80.01	102.40	10.00	10.00	0.00
9,750.00	9.90	359.78	9,745.53	108.53	-80.03	108.83	10.00	10.00	0.00
9,800.00	14.90	359.78	9,794.34	119.26	-80.07	119.57	10.00	10.00	0.00
9,850.00	19.90	359.78	9,842.04	134.20	-80.13	134.51	10.00	10.00	0.00
9,900.00	24.90	359.78	9,888.25	153.25	-80.21	153.56	10.00	10.00	0.00
9,950.00	29.90	359.78	9,932.63	176.25	-80.30	176.56	10.00	10.00	0.00
10,000.00	34.90	359.78	9,974.84	203.03	-80.40	203.34	10.00	10.00	0.00
10,050.00	39.90	359.78	10,014.55	233.39	-80.52	233.70	10.00	10.00	0.00
10,063.77	41.27	359.78	10,025.00	242.34	-80.55	242.65	10.00	10.00	0.00
<b>2nd BSPG Lime</b>									
10,100.00	44.90	359.78	10,051.46	267.09	-80.65	267.40	10.00	10.00	0.00
10,150.00	49.90	359.78	10,085.29	303.88	-80.79	304.19	10.00	10.00	0.00
10,200.00	54.90	359.78	10,115.79	343.48	-80.95	343.79	10.00	10.00	0.00
10,250.00	59.90	359.78	10,142.72	385.59	-81.11	385.90	10.00	10.00	0.00
10,300.00	64.90	359.78	10,165.88	429.89	-81.28	430.19	10.00	10.00	0.00
10,350.00	69.90	359.78	10,185.09	476.03	-81.46	476.34	10.00	10.00	0.00
10,400.00	74.90	359.78	10,200.21	523.67	-81.65	523.98	10.00	10.00	0.00
10,450.00	79.90	359.78	10,211.11	572.45	-81.84	572.76	10.00	10.00	0.00
10,500.00	84.90	359.78	10,217.73	622.00	-82.03	622.31	10.00	10.00	0.00
10,551.02	90.00	359.78	10,220.00	672.95	-82.23	673.26	10.00	10.00	0.00
<b>Start 9742.30 hold at 10551.02 MD - 2nd BSPG Sand</b>									
10,600.00	90.00	359.78	10,220.00	721.93	-82.42	722.24	0.00	0.00	0.00
10,700.00	90.00	359.78	10,220.00	821.93	-82.81	822.24	0.00	0.00	0.00
10,800.00	90.00	359.78	10,220.00	921.93	-83.19	922.24	0.00	0.00	0.00
10,900.00	90.00	359.78	10,220.00	1,021.93	-83.58	1,022.24	0.00	0.00	0.00
11,000.00	90.00	359.78	10,220.00	1,121.93	-83.97	1,122.24	0.00	0.00	0.00
11,100.00	90.00	359.78	10,220.00	1,221.93	-84.36	1,222.24	0.00	0.00	0.00
11,200.00	90.00	359.78	10,220.00	1,321.93	-84.75	1,322.24	0.00	0.00	0.00
11,300.00	90.00	359.78	10,220.00	1,421.92	-85.14	1,422.24	0.00	0.00	0.00
11,400.00	90.00	359.78	10,220.00	1,521.92	-85.53	1,522.24	0.00	0.00	0.00
11,500.00	90.00	359.78	10,220.00	1,621.92	-85.91	1,622.24	0.00	0.00	0.00
11,600.00	90.00	359.78	10,220.00	1,721.92	-86.30	1,722.24	0.00	0.00	0.00
11,700.00	90.00	359.78	10,220.00	1,821.92	-86.69	1,822.24	0.00	0.00	0.00
11,800.00	90.00	359.78	10,220.00	1,921.92	-87.08	1,922.24	0.00	0.00	0.00



Pro Directional  
Planning Report



Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
Site:	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,900.00	90.00	359.78	10,220.00	2,021.92	-87.47	2,022.24	0.00	0.00	0.00
12,000.00	90.00	359.78	10,220.00	2,121.92	-87.86	2,122.24	0.00	0.00	0.00
12,100.00	90.00	359.78	10,220.00	2,221.92	-88.25	2,222.24	0.00	0.00	0.00
12,200.00	90.00	359.78	10,220.00	2,321.92	-88.64	2,322.24	0.00	0.00	0.00
12,300.00	90.00	359.78	10,220.00	2,421.92	-89.02	2,422.24	0.00	0.00	0.00
12,400.00	90.00	359.78	10,220.00	2,521.92	-89.41	2,522.24	0.00	0.00	0.00
12,500.00	90.00	359.78	10,220.00	2,621.92	-89.80	2,622.24	0.00	0.00	0.00
12,600.00	90.00	359.78	10,220.00	2,721.91	-90.19	2,722.24	0.00	0.00	0.00
12,700.00	90.00	359.78	10,220.00	2,821.91	-90.58	2,822.24	0.00	0.00	0.00
12,800.00	90.00	359.78	10,220.00	2,921.91	-90.97	2,922.24	0.00	0.00	0.00
12,900.00	90.00	359.78	10,220.00	3,021.91	-91.36	3,022.24	0.00	0.00	0.00
13,000.00	90.00	359.78	10,220.00	3,121.91	-91.74	3,122.24	0.00	0.00	0.00
13,100.00	90.00	359.78	10,220.00	3,221.91	-92.13	3,222.24	0.00	0.00	0.00
13,200.00	90.00	359.78	10,220.00	3,321.91	-92.52	3,322.24	0.00	0.00	0.00
13,300.00	90.00	359.78	10,220.00	3,421.91	-92.91	3,422.24	0.00	0.00	0.00
13,400.00	90.00	359.78	10,220.00	3,521.91	-93.30	3,522.24	0.00	0.00	0.00
13,500.00	90.00	359.78	10,220.00	3,621.91	-93.69	3,622.24	0.00	0.00	0.00
13,600.00	90.00	359.78	10,220.00	3,721.91	-94.08	3,722.24	0.00	0.00	0.00
13,700.00	90.00	359.78	10,220.00	3,821.91	-94.47	3,822.24	0.00	0.00	0.00
13,800.00	90.00	359.78	10,220.00	3,921.91	-94.85	3,922.24	0.00	0.00	0.00
13,900.00	90.00	359.78	10,220.00	4,021.90	-95.24	4,022.24	0.00	0.00	0.00
14,000.00	90.00	359.78	10,220.00	4,121.90	-95.63	4,122.24	0.00	0.00	0.00
14,100.00	90.00	359.78	10,220.00	4,221.90	-96.02	4,222.24	0.00	0.00	0.00
14,200.00	90.00	359.78	10,220.00	4,321.90	-96.41	4,322.24	0.00	0.00	0.00
14,300.00	90.00	359.78	10,220.00	4,421.90	-96.80	4,422.24	0.00	0.00	0.00
14,400.00	90.00	359.78	10,220.00	4,521.90	-97.19	4,522.24	0.00	0.00	0.00
14,500.00	90.00	359.78	10,220.00	4,621.90	-97.57	4,622.24	0.00	0.00	0.00
14,600.00	90.00	359.78	10,220.00	4,721.90	-97.96	4,722.24	0.00	0.00	0.00
14,700.00	90.00	359.78	10,220.00	4,821.90	-98.35	4,822.24	0.00	0.00	0.00
14,800.00	90.00	359.78	10,220.00	4,921.90	-98.74	4,922.24	0.00	0.00	0.00
14,900.00	90.00	359.78	10,220.00	5,021.90	-99.13	5,022.24	0.00	0.00	0.00
15,000.00	90.00	359.78	10,220.00	5,121.90	-99.52	5,122.24	0.00	0.00	0.00
15,100.00	90.00	359.78	10,220.00	5,221.90	-99.91	5,222.24	0.00	0.00	0.00
15,200.00	90.00	359.78	10,220.00	5,321.90	-100.29	5,322.24	0.00	0.00	0.00
15,300.00	90.00	359.78	10,220.00	5,421.89	-100.68	5,422.24	0.00	0.00	0.00
15,400.00	90.00	359.78	10,220.00	5,521.89	-101.07	5,522.24	0.00	0.00	0.00
15,500.00	90.00	359.78	10,220.00	5,621.89	-101.46	5,622.24	0.00	0.00	0.00
15,600.00	90.00	359.78	10,220.00	5,721.89	-101.85	5,722.24	0.00	0.00	0.00
15,700.00	90.00	359.78	10,220.00	5,821.89	-102.24	5,822.24	0.00	0.00	0.00
15,800.00	90.00	359.78	10,220.00	5,921.89	-102.63	5,922.24	0.00	0.00	0.00
15,900.00	90.00	359.78	10,220.00	6,021.89	-103.02	6,022.24	0.00	0.00	0.00
16,000.00	90.00	359.78	10,220.00	6,121.89	-103.40	6,122.24	0.00	0.00	0.00
16,100.00	90.00	359.78	10,220.00	6,221.89	-103.79	6,222.24	0.00	0.00	0.00
16,200.00	90.00	359.78	10,220.00	6,321.89	-104.18	6,322.24	0.00	0.00	0.00
16,300.00	90.00	359.78	10,220.00	6,421.89	-104.57	6,422.24	0.00	0.00	0.00
16,400.00	90.00	359.78	10,220.00	6,521.89	-104.96	6,522.24	0.00	0.00	0.00
16,500.00	90.00	359.78	10,220.00	6,621.89	-105.35	6,622.24	0.00	0.00	0.00
16,600.00	90.00	359.78	10,220.00	6,721.88	-105.74	6,722.24	0.00	0.00	0.00
16,700.00	90.00	359.78	10,220.00	6,821.88	-106.12	6,822.24	0.00	0.00	0.00
16,800.00	90.00	359.78	10,220.00	6,921.88	-106.51	6,922.24	0.00	0.00	0.00
16,900.00	90.00	359.78	10,220.00	7,021.88	-106.90	7,022.24	0.00	0.00	0.00
17,000.00	90.00	359.78	10,220.00	7,121.88	-107.29	7,122.24	0.00	0.00	0.00
17,100.00	90.00	359.78	10,220.00	7,221.88	-107.68	7,222.24	0.00	0.00	0.00
17,200.00	90.00	359.78	10,220.00	7,321.88	-108.07	7,322.24	0.00	0.00	0.00

Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
Site:	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

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)
17,300.00	90.00	359.78	10,220.00	7,421.88	-108.46	7,422.24	0.00	0.00	0.00
17,400.00	90.00	359.78	10,220.00	7,521.88	-108.85	7,522.24	0.00	0.00	0.00
17,500.00	90.00	359.78	10,220.00	7,621.88	-109.23	7,622.24	0.00	0.00	0.00
17,600.00	90.00	359.78	10,220.00	7,721.88	-109.62	7,722.24	0.00	0.00	0.00
17,700.00	90.00	359.78	10,220.00	7,821.88	-110.01	7,822.24	0.00	0.00	0.00
17,800.00	90.00	359.78	10,220.00	7,921.88	-110.40	7,922.24	0.00	0.00	0.00
17,900.00	90.00	359.78	10,220.00	8,021.87	-110.79	8,022.24	0.00	0.00	0.00
18,000.00	90.00	359.78	10,220.00	8,121.87	-111.18	8,122.24	0.00	0.00	0.00
18,100.00	90.00	359.78	10,220.00	8,221.87	-111.57	8,222.24	0.00	0.00	0.00
18,200.00	90.00	359.78	10,220.00	8,321.87	-111.95	8,322.24	0.00	0.00	0.00
18,300.00	90.00	359.78	10,220.00	8,421.87	-112.34	8,422.24	0.00	0.00	0.00
18,400.00	90.00	359.78	10,220.00	8,521.87	-112.73	8,522.24	0.00	0.00	0.00
18,500.00	90.00	359.78	10,220.00	8,621.87	-113.12	8,622.24	0.00	0.00	0.00
18,600.00	90.00	359.78	10,220.00	8,721.87	-113.51	8,722.24	0.00	0.00	0.00
18,700.00	90.00	359.78	10,220.00	8,821.87	-113.90	8,822.24	0.00	0.00	0.00
18,800.00	90.00	359.78	10,220.00	8,921.87	-114.29	8,922.24	0.00	0.00	0.00
18,900.00	90.00	359.78	10,220.00	9,021.87	-114.67	9,022.24	0.00	0.00	0.00
19,000.00	90.00	359.78	10,220.00	9,121.87	-115.06	9,122.24	0.00	0.00	0.00
19,100.00	90.00	359.78	10,220.00	9,221.87	-115.45	9,222.24	0.00	0.00	0.00
19,200.00	90.00	359.78	10,220.00	9,321.86	-115.84	9,322.24	0.00	0.00	0.00
19,300.00	90.00	359.78	10,220.00	9,421.86	-116.23	9,422.24	0.00	0.00	0.00
19,400.00	90.00	359.78	10,220.00	9,521.86	-116.62	9,522.24	0.00	0.00	0.00
19,500.00	90.00	359.78	10,220.00	9,621.86	-117.01	9,622.24	0.00	0.00	0.00
19,600.00	90.00	359.78	10,220.00	9,721.86	-117.40	9,722.24	0.00	0.00	0.00
19,700.00	90.00	359.78	10,220.00	9,821.86	-117.78	9,822.24	0.00	0.00	0.00
19,800.00	90.00	359.78	10,220.00	9,921.86	-118.17	9,922.24	0.00	0.00	0.00
19,900.00	90.00	359.78	10,220.00	10,021.86	-118.56	10,022.24	0.00	0.00	0.00
20,000.00	90.00	359.78	10,220.00	10,121.86	-118.95	10,122.24	0.00	0.00	0.00
20,100.00	90.00	359.78	10,220.00	10,221.86	-119.34	10,222.24	0.00	0.00	0.00
20,200.00	90.00	359.78	10,220.00	10,321.86	-119.73	10,322.24	0.00	0.00	0.00
20,293.32	90.00	359.78	10,220.00	10,415.18	-120.09	10,415.56	0.00	0.00	0.00
TD at 20293.32									

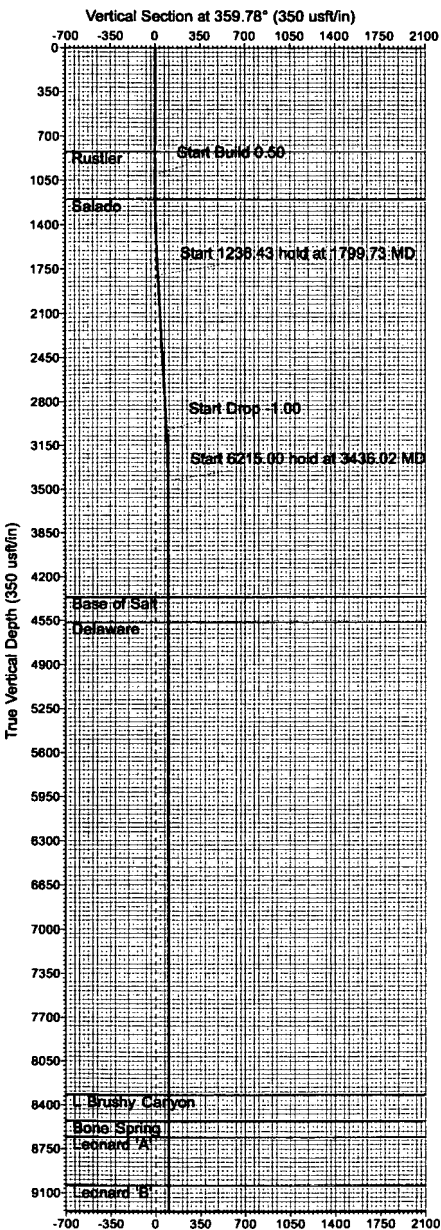
Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
825.00	825.00	Rustler		0.00	
1,205.01	1,205.00	Salado		0.00	
4,367.98	4,364.00	Base of Salt		0.00	
4,568.98	4,565.00	Delaware		0.00	
8,323.98	8,320.00	L Brushy Canyon		0.00	
8,533.98	8,530.00	Bone Spring		0.00	
8,663.98	8,660.00	Leonard 'A'		0.00	
9,048.98	9,045.00	Leonard 'B'		0.00	
9,258.98	9,255.00	Leonard 'C'		0.00	
9,518.98	9,515.00	1st BSPG Sand		0.00	
10,063.77	10,025.00	2nd BSPG Lime		0.00	
10,551.02	10,220.00	2nd BSPG Sand		0.00	



Database:	WellPlanner1	Local Co-ordinate Reference:	Well Marwari 28-16 State Fed Com 232H
Company:	Devon Energy Corp.	TVD Reference:	RKB @ 3395.00usft
Project:	Lea County, NM (NAD83)	MD Reference:	RKB @ 3395.00usft
Site:	Van Doo Dah/Marwari	North Reference:	Grid
Well:	Marwari 28-16 State Fed Com 232H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Prelim A		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,000.00	1,000.00	0.00	0.00	Start Build 0.50
1,799.73	1,799.08	21.78	-17.43	Start 1236.43 hold at 1799.73 MD
3,036.16	3,032.50	89.11	-71.29	Start Drop -1.00
3,436.02	3,432.04	100.00	-80.00	Start 6215.00 hold at 3436.02 MD
9,651.02	9,647.04	100.00	-80.00	Start DLS 10.00 TFO 359.78
10,551.02	10,220.00	672.95	-82.23	Start 9742.30 hold at 10551.02 MD
20,293.32	10,220.00	10,415.18	-120.09	TD at 20293.32



**devon**

Devon Energy Corp.  
Lea County, (NAD83)  
Van Doo Dah irwari  
Marwari 28-16 State Fed Com 232H  
Prelim A



RKB Elevation: RKB @ 3395.00usft

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	403663.01	741349.12	32° 6' 29.1650 N	103° 41' 14.4840 W	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
BHL - Marwari 232H	10220.00	10415.18	-120.09	414078.19	741229.03

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	
3	1799.73	4.00	321.34	1799.08	21.78	-17.43	0.50	21.85	
4	3036.16	4.00	321.34	3032.50	89.11	-71.29	0.00	89.38	
5	3436.02	0.00	0.00	3432.04	100.00	-80.00	1.00	100.31	
6	9651.02	0.00	0.00	9647.04	100.00	-80.00	0.00	100.31	
7	10551.02	90.00	359.78	10220.00	672.95	-82.23	10.00	673.26	
8	20293.32	90.00	359.78	10220.00	10415.18	-120.09	0.00	10415.56	BHL - Marwari 232H

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
825.00	825.00	Rustler
1205.00	1205.01	Salado
4364.00	4367.98	Base of Salt
4565.00	4568.98	Delaware
8320.00	8323.98	L. Brushy Canyon
8530.00	8533.98	Bone Spring
8660.00	8663.98	Leonard 'A'
9045.00	9048.98	Leonard 'B'
9255.00	9258.98	Leonard 'C'
9515.00	9518.98	1st BSPG Sand
10025.00	10063.77	2nd BSPG Lime
10220.00	10551.02	2nd BSPG Sand

CASING DETAILS

No casing data is available

Map System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone Name: New Mexico Eastern Zone

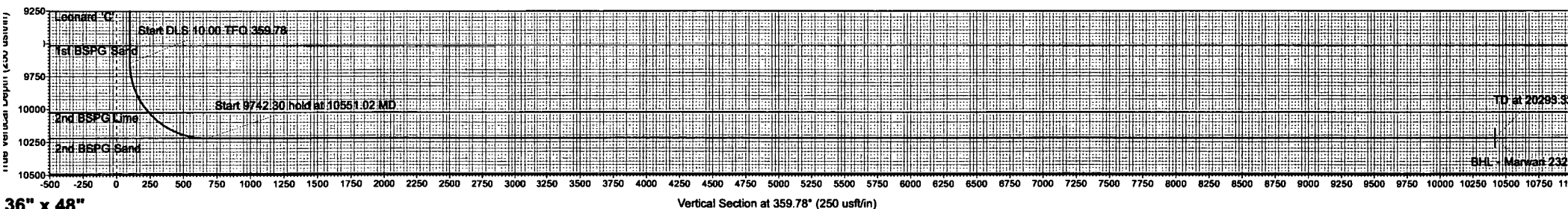
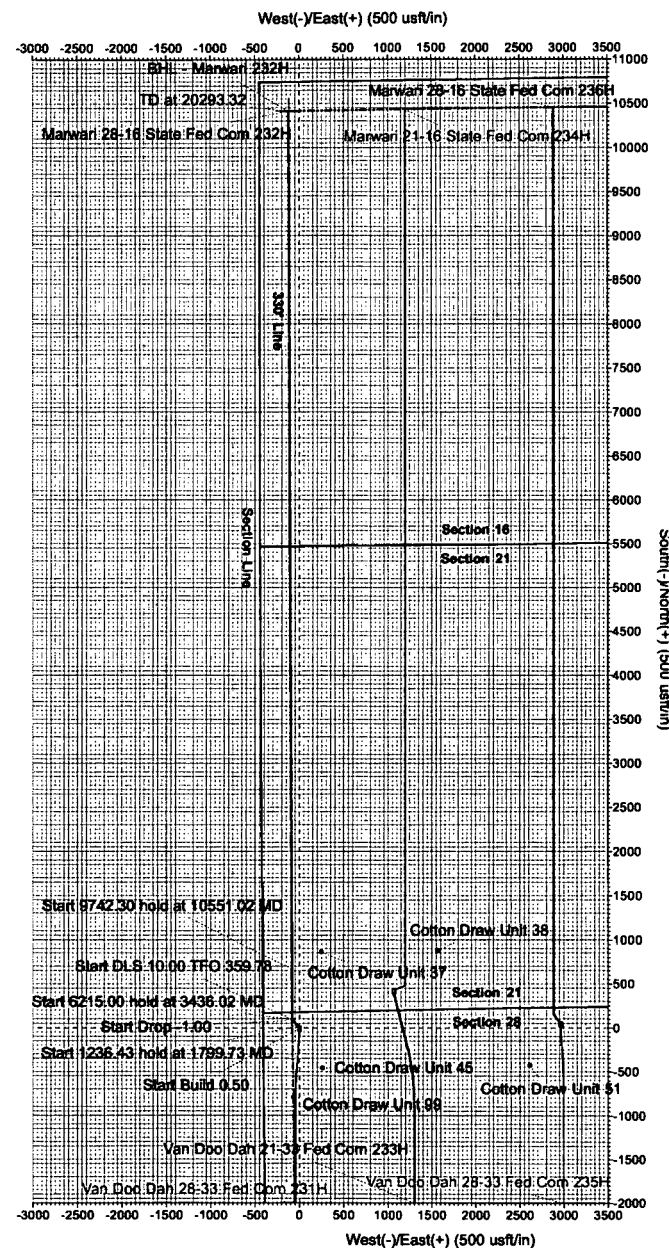
Local Origin: Well Marwari 28-16 232H, Grid North

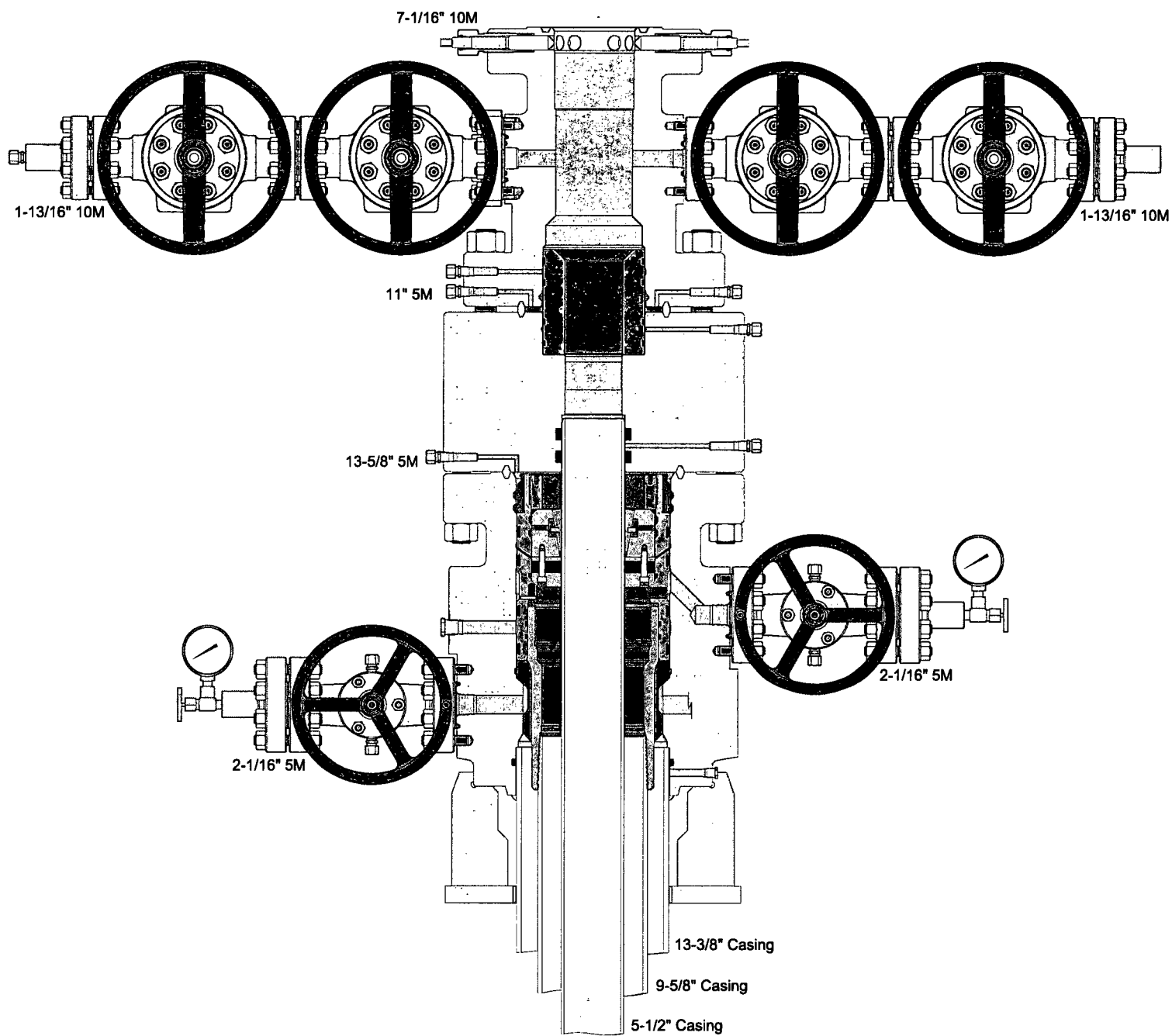
Latitude: 32° 6' 29.1650 N  
Longitude: 103° 41' 14.4840 W

Grid East: 741349.12  
Grid North: 403663.01  
Scale Factor: 1.000

Geomagnetic Model: HDGM  
Sample Date: 26-Feb-18  
Magnetic Declination: 6.80°  
Dip Angle from Horizontal: 59.78°  
Magnetic Field Strength: 47920.80nT

To convert a Magnetic Direction to a Grid Direction, Add 6.48°  
To convert a Magnetic Direction to a True Direction, Add 6.80° East  
To convert a True Direction to a Grid Direction, Subtract 0.34°





## Devon Energy, Marwari 28-16 Fed 232H

### 1. Geologic Formations

TVD of target	10,220	Pilot hole depth	N/A
MD at TD:	20,293	Deepest expected fresh water:	

#### Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Rustler	790		
Salado	1250		
Base of Salt	4364		
Delaware	4565		
Lower Brushy Canyon	8320		
Bone Spring	8530		
Leonard A	8660		
Leonard B	9045		
Leonard C	9255		
1 <sup>st</sup> Bone Spring Sand	9515		
2 <sup>nd</sup> Bone Spring Lime	10025		
2 <sup>nd</sup> Bone Spring Sand	10220		

\*H<sub>2</sub>S, water flows, loss of circulation, abnormal pressures, etc.

## Devon Energy, Marwari 28-16 Fed 232H

### 2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	815'	13.375"	48	H40	STC	1.125	1	1.6
12.25"	0	4,450'	9.625"	40	J55	LTC	1.125	1	1.6
8.75"	0	20,293	5.5"	17	P110	BTC	1.125	1	1.6
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

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

Must have table for contingency casing

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



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**3. Cementing Program**

Casing	# Sk	Wt. lb/ gal	Yld ft3/ sack	H <sub>2</sub> O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	632	14.8	1.33	6.32	6	Lead: Class C Cement + 0.125 lbs/sack Poly-F-Flake
Inter.	742	10.3	3.65	22.06	24	Lead: (50:50) Poz (Silica) 3 lbm/sk Kol-Seal, .125 lbm/sk Poly-E-Flake
	153	14.8	1.33	6.32	6	Tail: Class C Cement + 0.125 lbs/sack Poly-F-Flake
Prod.	801	9	3.27	13.5	21	Lead: Tuned Light Cement
	1997	14.5	1.2	5.31	25	Tail: (50:50) Clas H Cement: Poz (Fly Ash) + 0.5% bwoc HALAD-344 + 0.4% bwoc CFR-3 + 0.2% BWOC HR-601 + 2% bwoc Bentonite

Casing String	TOC	% Excess
13-3/8" Surface	0'	50%
9-5/8" Intermediate	0'	30%
5-1/2" Production	4250'	25%

**4. Pressure Control Equipment**

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	3M	Annular	x	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		
			Annular		
			Blind Ram		

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			Pipe Ram			
			Double Ram			
			Other *			

\*Specify if additional ram is utilized.

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

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

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
Y	Are anchors required by manufacturer?
Y	<p>A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.</p> <p>Devon proposes using 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 3000 (3M) psi.</p> <ul style="list-style-type: none"> <li>○ Wellhead will be installed by wellhead representatives.</li> <li>○ If the welding is performed by a third party, the wellhead representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal.</li> <li>○ Wellhead representative will install the test plug for the initial BOP test.</li> <li>○ Wellhead company will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the packoff, the pack-off and the lower flange will be tested to 3M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time.</li> </ul>

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- If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted.
- Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating.
- Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.

After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi. Low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.

After running the 9-5/8" intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 3M will already be installed on the wellhead.

The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a Kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.

Devon's proposed wellhead manufactures will be EMC Technologies, Cactus Wellhead, or Cameron.

The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.

### 5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	815	FW Gel	8.5-9.0	28-34	N/C
815	4,250	Saturated Brine	10.0-11.0	28-34	N/C
4,250	20,293	Cut Brine	8.5-9.3	28-34	N/C

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

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
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## 6. Logging and Testing Procedures

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

<b>Additional logs planned</b>	<b>Interval</b>
	Resistivity
	Density
X	CBL
X	Mud log
	PEX

## 7. Drilling Conditions

<b>Condition</b>	<b>Specify what type and where?</b>
BH Pressure at deepest TVD	4942 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe. Lost circulation material/sweeps/mud scavengers.

Hydrogen Sulfide (H <sub>2</sub> S) monitors will be installed prior to drilling out the surface shoe. If H <sub>2</sub> S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H <sub>2</sub> S is present
Y	H <sub>2</sub> S Plan attached

## 8. Other facets of operation

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Is this a walking operation? No.

Will be pre-setting casing? No.

**Attachments**

☒ Directional Plan

☐ Other, describe