

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENTFORM APPROVED  
OMB NO. 1004-0137  
Expires: January 31, 2018**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*5. Lease Serial No.  
NMNM125635

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.  
LUSITANO 27-34 FED COM 622H9. API Well No.  
30-015-45656-00-X110. Field and Pool or Exploratory Area  
WOLFCAMP11. County or Parish, State  
EDDY COUNTY, NM**SUBMIT IN TRIPLICATE - Other instructions on page 2**1. Type of Well  
☒ Oil Well ☒ Gas Well ☐ Other2. Name of Operator  
DEVON ENERGY PRODUCTION COMPANY  
Contact: LINDA GOOD  
Email: linda.good@devn.com3a. Address  
6488 SEVEN RIVERS HIGHWAY  
ARTESIA, NM 882103b. Phone No. (include area code)  
Ph: 405-552-6558**NM OIL CONSERVATION  
ARTESIA DISTRICT**

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 27 T25S R31E NENW 235FNL 1702FWL  
32.107906 N Lat, 103.768990 W Lon**FEB 08 2019****12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	Change to Original A PD
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Devon Energy Production Co., LP respectfully request permission to change the Bottom Hole Location from 20 FSL 1650 FWL to 990 FNL 1650 FWL.

Updated MD at TD (section 1)

Updated casing program (section 2): casing point is shallower, removed flushmax / FJL from both primary and contingency designs, added variance request for TLW casing

Updated cementing program (section 3): updated volumes to reflect shorter lateral length

Attachments

**Carlsbad Field Office  
OCD Artesia**

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #451195 verified by the BLM Well Information System  
For DEVON ENERGY PRODUCTION COMPANY, sent to the Carlsbad  
Committed to AFMSS for processing by PRISCILLA PEREZ on 01/29/2019 (19PP0784SE)

Name (Printed/Typed) LINDA GOOD

Title REGULATORY SPECIALIST

Signature (Electronic Submission)

Date 01/21/2019

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By LONG VO

Title PETROLEUM ENGINEER

Date 02/06/2019

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

Office Carlsbad

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

(Instructions on page 2)

**\*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\* BLM REVISED \*\****KWP. 3-22-19*

# PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	DEVON ENERGY PRODUCTION COMPANY LP
<b>LEASE NO.:</b>	NMNM125635
<b>WELL NAME &amp; NO.:</b>	LUSITANO 27-34 FED COM 622H
<b>SURFACE HOLE FOOTAGE:</b>	235'/N & 1702'/W
<b>BOTTOM HOLE FOOTAGE:</b>	20'/S & 1650'/W
<b>LOCATION:</b>	SECTION 27, T25S, R31E, NMPM
<b>COUNTY:</b>	EDDY

COA

H2S	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input type="radio"/> Low	<input checked="" 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 type="radio"/> Multibowl	<input checked="" type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP

**All Previous COAs Still Apply.**

## A. CASING

### Primary Casing Design

1. The 10-3/4 inch surface casing shall be set at approximately **924** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

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

2. The minimum required fill of cement behind the 7-5/8 inch intermediate casing is:

**Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above.  
**Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

**Option 2:**

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

- b. Second stage above DV tool:

Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

- ❖ **In Medium Cave/Karst Areas** if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

**Operator has proposed to pump down 10 3/4" X 7 5/8" annulus. Operator must run a CBL from TD of the 7 5/8" casing to surface. Submit results to BLM.**

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.  
**Cement excess is less than 25%, more cement might be required.**

### **Alternate Casing Design**

4. The 13-3/8 inch surface casing shall be set at approximately **924** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - e. 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.
  - f. 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)
  - g. 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.
  - h. 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.**

5. The minimum required fill of cement behind the 8-5/8 inch intermediate casing is:

#### **Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above.  
**Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

#### **Option 2:**

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

- c. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

- d. Second stage above DV tool:

Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

- ❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings , the cement on the 3rd casing string must come to surface.

**Operator has proposed to pump down 13 3/8" X 8 5/8" annulus. Operator must run a CBL from TD of the 8 5/8" casing to surface. Submit results to BLM.**

**Operator is NOT APPROVED for option to drill change intermediate 1 hole size to 9.625" with TLW connection. Clearance does not pass 0.422" requirement.**

6. 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.  
**Cement excess is less than 25%, more cement might be required.**

## 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 (one log per well pad is acceptable) 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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
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.



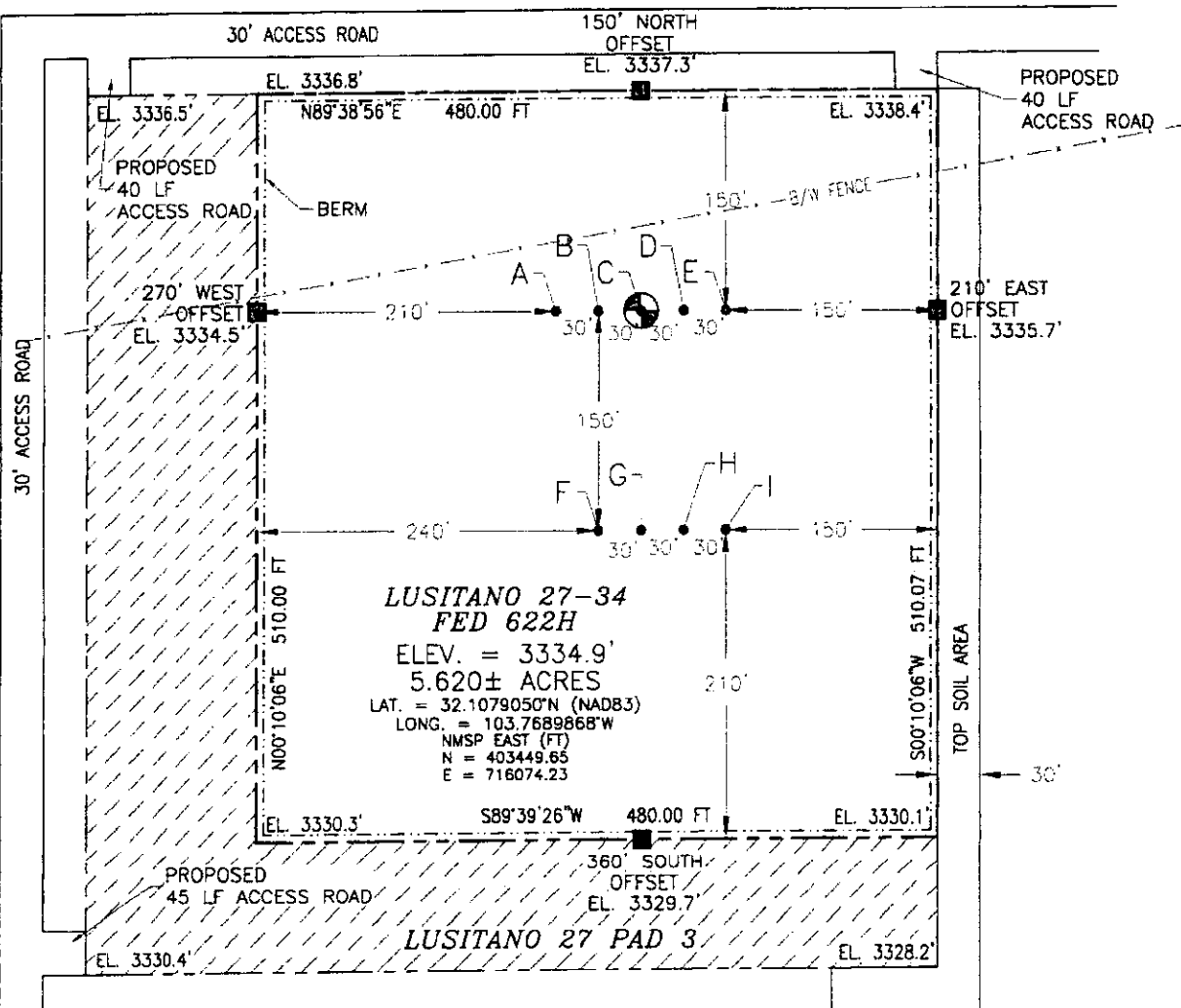
# SITE MAP

A - LUSITANO 27-22 FED COM 232H  
B - LUSITANO 27-34 FED 733H  
C - LUSITANO 27-34 FED 622H  
D - LUSITANO 27-34 FED 333H  
E - LUSITANO 27-34 FED 713H

F - LUSITANO 27-34 FED COM 233H  
G - LUSITANO 27-34 FED COM 533H  
H - LUSITANO 27-34 FED COM 523H  
I - LUSITANO 27-34 FED COM 534H

SEC. 22  
SEC. 27

- SURVEYED FILE LINE



012 60 120 240

SCALE 1" = 120'

**DIRECTIONS TO LOCATION**

FROM STATE HIGHWAY 128 AND CR 1 (ORLA HIGHWAY) GO SOUTH ON CR 1 6.5 MILES TO MONSANTO ROAD, TURN RIGHT GO WEST 2.1 MILES, TURN RIGHT GO NORTH 0.8 OF A MILE, TURN LEFT GO WEST 2.1 MILES, BEND LEFT GO SOUTHWEST 1.3 MILES, TURN LEFT GO SOUTH 1.0 MILE TO BEGIN ROAD SURVEY, GO WEST 3437' (0.65 MILE), THEN SOUTH 40' TO THE NORTHEAST PAD CORNER FOR THIS LOCATION.

LUSITANO 27-34 FED 622H

LOCATED 235 FT. FROM THE NORTH LINE  
AND 1702 FT. FROM THE WEST LINE OF  
SECTION 27, TOWNSHIP 25 SOUTH,  
RANGE 31 EAST, N.M.P.M.

EDDY COUNTY, STATE OF NEW MEXICO  
LAND STATUS: BLM

DECEMBER 7, 2018

SURVEY NO. 6429A

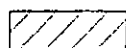
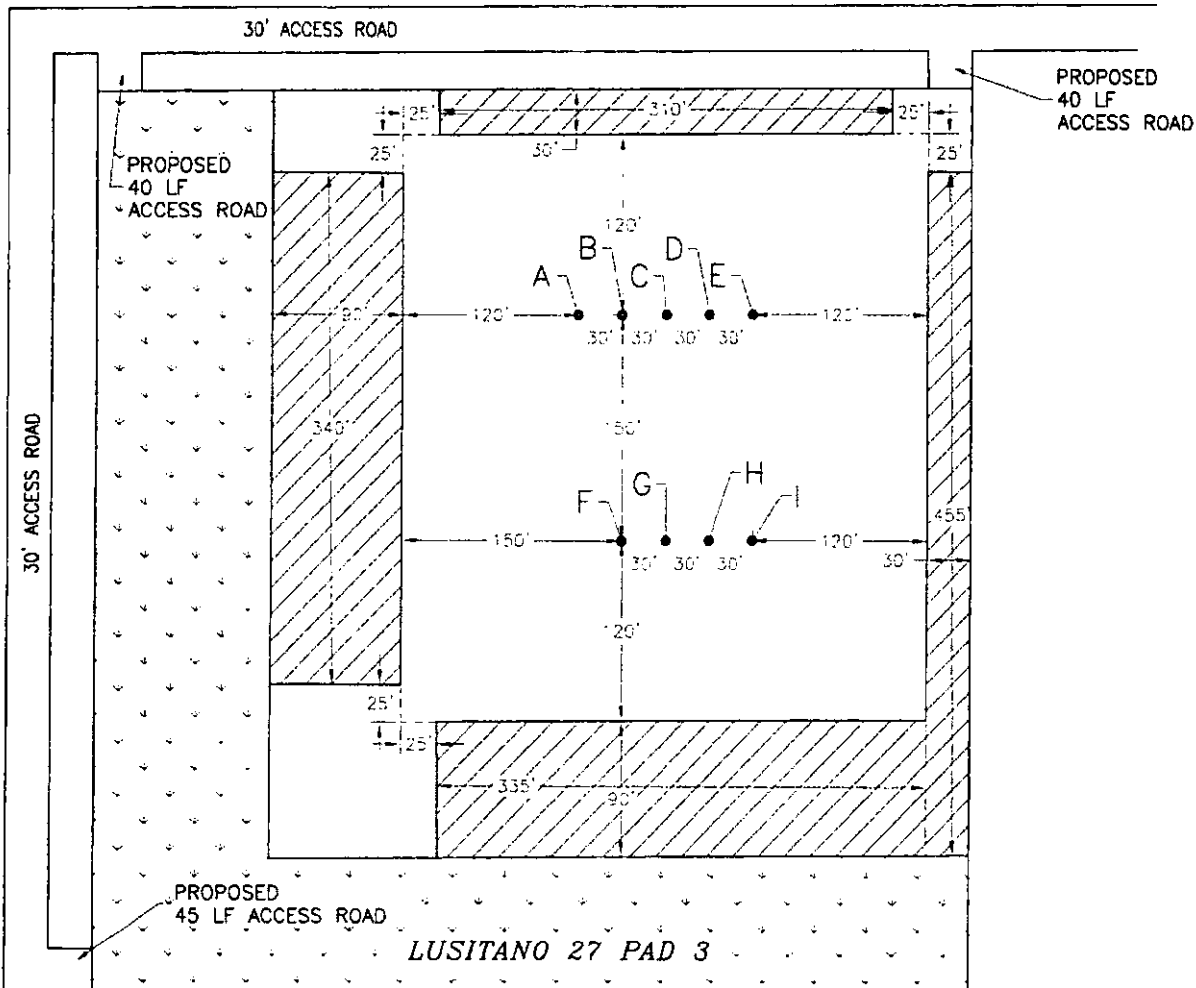
**MADRON SURVEYING, INC.** 307 SOUTH CANAL  
(575) 234-3343

CARLSBAD, NEW MEXICO

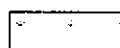
SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
 EDDY COUNTY, STATE OF NEW MEXICO  
 INTERIM SITE BUILD PLAN

A - LUSITANO 27-22 FED COM 232H	F - LUSITANO 27-34 FED COM 233H
B - LUSITANO 27-34 FED 733H	G - LUSITANO 27-34 FED COM 533H
C - LUSITANO 27-34 FED 622H	H - LUSITANO 27-34 FED COM 523H
D - LUSITANO 27-34 FED 333H	I - LUSITANO 27-34 FED COM 534H
E - LUSITANO 27-34 FED 713H	

SEC. 22  
 SEC. 27



DENOTES INTERIM PAD  
 RECLAMATION AREA



DENOTES GRADING SITE  
 RECLAMATION AREA

012 60 120 240  
 SCALE 1" = 120'

1.921± ACRES INTERIM PAD RECLAMATION AREA  
 2.646± ACRES GRADING SITE RECLAMATION AREA  
 3.699± ACRES NON-RECLAIMED AREA  
 8.266± ACRES LUSITANO 27 PAD 3

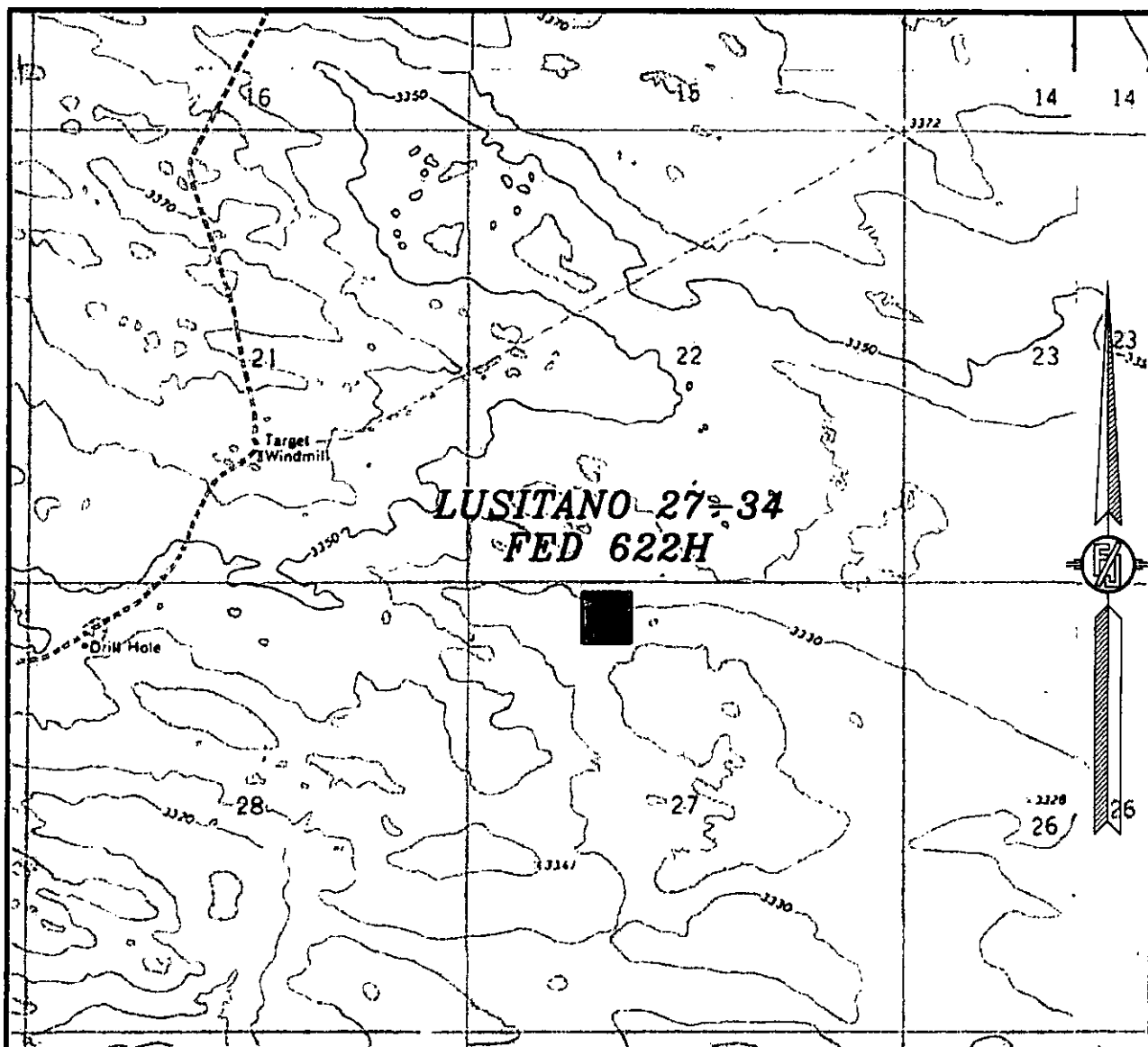
DEVON ENERGY PRODUCTION COMPANY, L.P.  
**LUSITANO 27-34 FED 622H**  
 LOCATED 235 FT. FROM THE NORTH LINE  
 AND 1702 FT. FROM THE WEST LINE OF  
 SECTION 27, TOWNSHIP 25 SOUTH,  
 RANGE 31 EAST, N.M.P.M.  
 EDDY COUNTY, STATE OF NEW MEXICO  
 LAND STATUS: BLM

DECEMBER 7, 2018

SURVEY NO. 6429A

MADRON SURVEYING, INC. 501 SOUTH CANAL CARLSBAD, NEW MEXICO  
 (505) 234-3341

SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
LOCATION VERIFICATION MAP



USGS QUAD MAP:  
PHANTOM BANKS

NOT TO SCALE

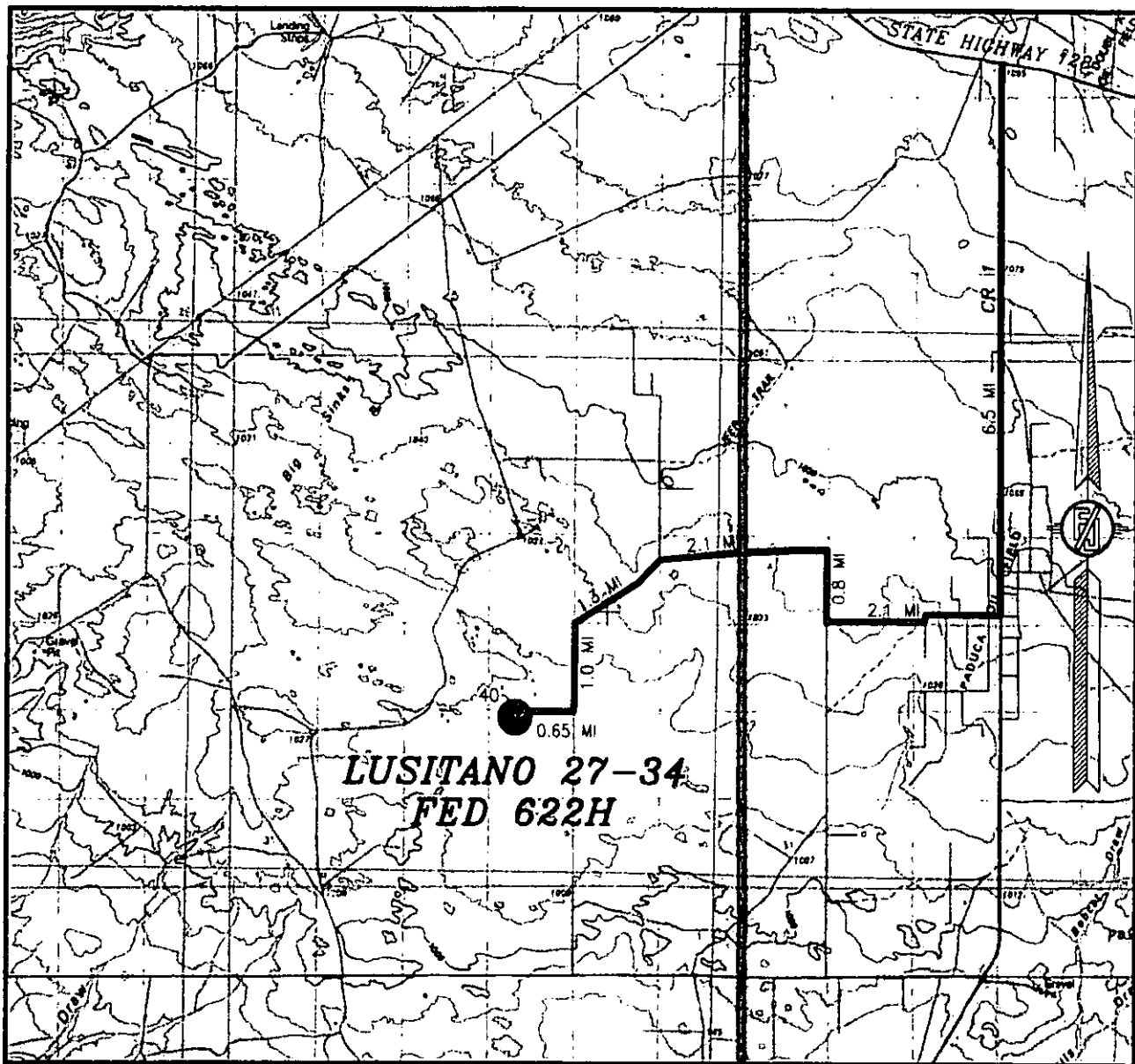
DEVON ENERGY PRODUCTION COMPANY, L.P.  
**LUSITANO 27-34 FED 622H**  
LOCATED 235 FT. FROM THE NORTH LINE  
AND 1702 FT. FROM THE WEST LINE OF  
SECTION 27, TOWNSHIP 25 SOUTH,  
RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
LAND STATUS: BLM

DECEMBER 7, 2018

SURVEY NO. 6429A

MADRON SURVEYING, INC. 501 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
VICINITY MAP



DISTANCES IN MILES

NOT TO SCALE  
DEVON ENERGY PRODUCTION COMPANY, L.P.

**LUSITANO 27-34 FED 622H**

LOCATED 235 FT. FROM THE NORTH LINE  
AND 1702 FT. FROM THE WEST LINE OF  
SECTION 27, TOWNSHIP 25 SOUTH,  
RANGE 31 EAST, N.M.P.M.

EDDY COUNTY, STATE OF NEW MEXICO  
LAND STATUS: BLM

**DIRECTIONS TO LOCATION**

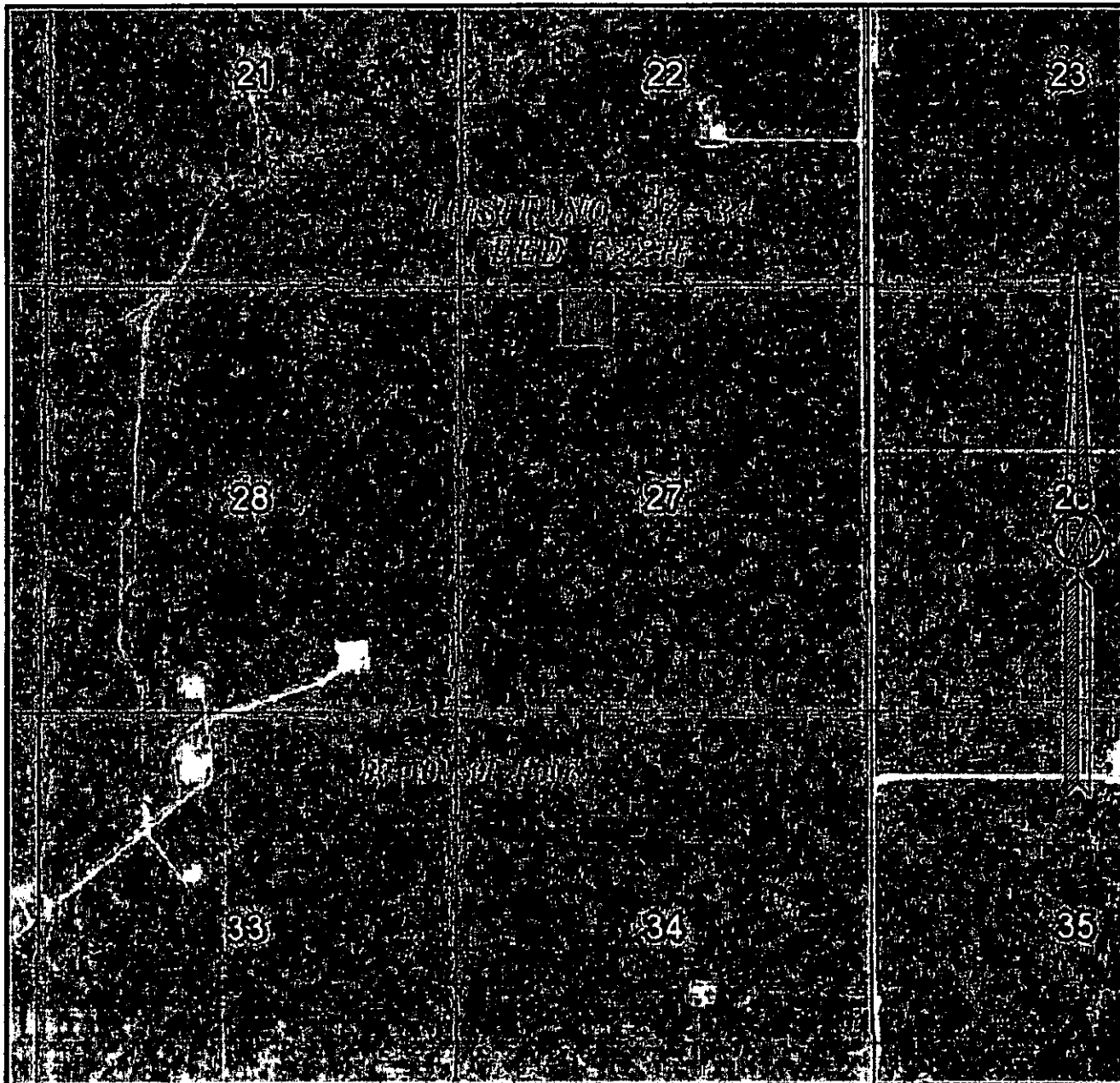
FROM STATE HIGHWAY 128 AND CR 1 (ORLA HIGHWAY) GO SOUTH ON CR 1 6.5 MILES TO MONSANTO ROAD, TURN RIGHT GO WEST 2.1 MILES, TURN RIGHT GO NORTH 0.8 OF A MILE, TURN LEFT GO WEST 2.1 MILES, BEND LEFT GO SOUTHWEST 1.3 MILES, TURN LEFT GO SOUTH 1.0 MILE TO BEGIN ROAD SURVEY, GO WEST 3437' (0.65 MILE), THEN SOUTH 40' TO THE NORTHEAST PAD CORNER FOR THIS LOCATION.

DECEMBER 7, 2018

SURVEY NO. 6429A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
AERIAL PHOTO



NOT TO SCALE  
AERIAL PHOTO:  
GOOGLE EARTH  
NOVEMBER 2017

DEVON ENERGY PRODUCTION COMPANY, L.P.

LUSITANO 27-34 FED 622H

LOCATED 235 FT. FROM THE NORTH LINE  
AND 1702 FT. FROM THE WEST LINE OF  
SECTION 27, TOWNSHIP 25 SOUTH,  
RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
LAND STATUS: BLM

DECEMBER 7, 2018

SURVEY NO. 6429A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
 EDDY COUNTY, STATE OF NEW MEXICO  
 ACCESS AERIAL ROUTE MAP



NOT TO SCALE  
 AERIAL PHOTO:  
 GOOGLE EARTH  
 NOVEMBER 2017

DEVON ENERGY PRODUCTION COMPANY, L.P.  
 LUSITANO 27-34 FED 622H  
 LOCATED 235 FT. FROM THE NORTH LINE  
 AND 1702 FT. FROM THE WEST LINE OF  
 SECTION 27, TOWNSHIP 25 SOUTH,  
 RANGE 31 EAST, N.M.P.M.  
 EDDY COUNTY, STATE OF NEW MEXICO  
 LAND STATUS: BLM

DECEMBER 7, 2018

SURVEY NO. 6429A

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

[illegible]

0 60 120 240  
SCALE 1" = 120'

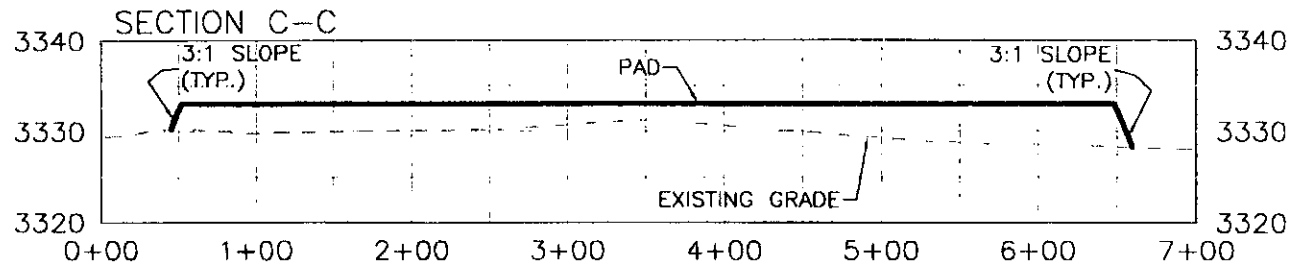
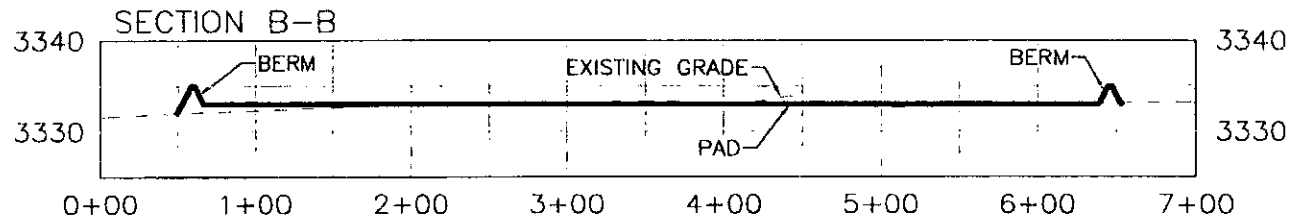
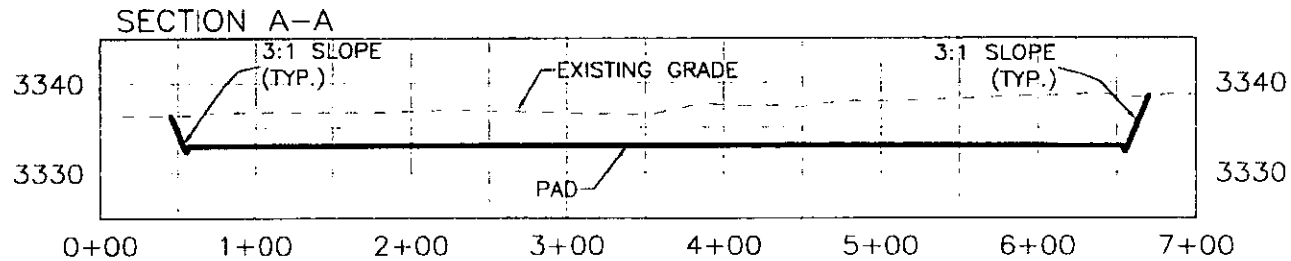
**MADRON SURVEYING, INC.** 501 SOUTH CANAL CARLSBAD, NEW MEXICO  
(575) 234-3341

CUT	FILL	NET
14475 CU. YD	14269 CU. YD	207 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

SHEET 1-2  
SURVEY NO. 6429A

# CROSS SECTIONS



DEVON ENERGY PRODUCTION COMPANY, L.P.  
GRADING PLAN AND CROSS SECTIONS  
FOR LUSITANO 27-34 FED 622H  
SECTION 27, TOWNSHIP 25 SOUTH,  
RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

012 60 120 240  
SCALE 1" = 120' - 1" = 20' VER

CUT	FILL	NET
14475 CU. YD	14269 CU. YD	207 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

DECEMBER 7, 2018

MADRON SURVEYING, INC. 501 SOUTH CANAL CARLSBAD, NEW MEXICO

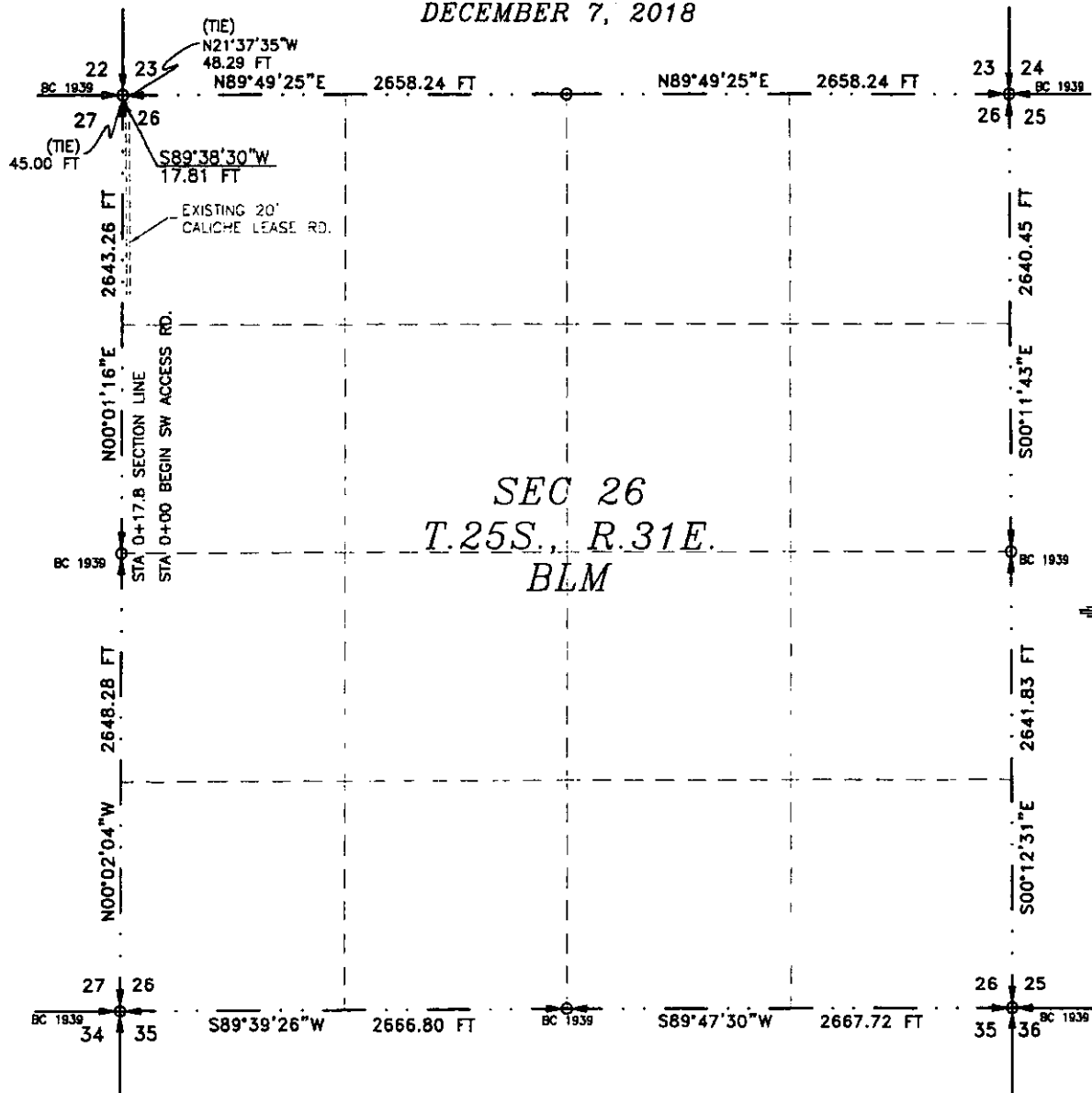
SHEET 2-2  
SURVEY NO. 6429A



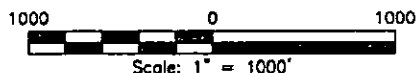
# ACCESS ROAD PLAT

ACCESS ROAD TO THE LUSITANO 27 PAD 3 (LUSITANO 27-22 FED COM 232H, LUSITANO 27-34 FED COM 233H, 533H, 523H, 534H, LUSITANO 27-34 FED 713H, 333H, 622H, 733H)

DEVON ENERGY PRODUCTION COMPANY, L.P.  
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
DECEMBER 7, 2018



SEE NEXT SHEET (2-4) FOR DESCRIPTION



## GENERAL NOTES

- 1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.
- 2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

## SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 7<sup>TH</sup> DAY OF DECEMBER 2018

FILMON F. JARAMILLO, PLS. 12797  
301 SOUTH CANAL  
(575) 234-3341

MADRON SURVEYING, INC.  
301 SOUTH CANAL  
CARLSBAD, NEW MEXICO 85220  
Phone (575) 234-3341

SHEET: 1-4

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

SURVEY NO. 6429A

### ACCESS ROAD PLAT

ACCESS ROAD TO THE LUSITANO 27 PAD 3 (LUSITANO 27-22 FED COM 232H, LUSITANO 27-34 FED COM 233H, 533H, 523H, 534H, LUSITANO 27-34 FED 713H, 333H, 622H, 733H)

DEVON ENERGY PRODUCTION COMPANY, L.P.  
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
DECEMBER 7, 2018

### DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING BUREAU OF LAND MANAGEMENT LAND IN SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

#### SOUTHWEST ACCESS ROAD

BEGINNING AT A POINT WITHIN THE NW/4 NW/4 OF SAID SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., WHENCE THE NORTHWEST CORNER OF SAID SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N21°37'35"W, A DISTANCE OF 48.29 FEET;

THENCE S89°38'30"W A DISTANCE OF 17.81 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE NORTHWEST CORNER OF SAID SECTION 26, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N00°01'16"E, A DISTANCE OF 45.00 FEET;

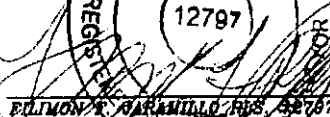
SAID STRIP OF LAND BEING 17.81 FEET OR 1.08 RODS IN LENGTH, CONTAINING 0.012 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

NW/4 NW/4 17.81 L.F. 1.08 RODS 0.012 ACRES

### SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 7 DAY OF DECEMBER 2018

  
FILMON F. JARAMILLO REG. 12797  
301 SOUTH CANAL  
(575) 234-3341

MADRON SURVEYING, INC.  
301 SOUTH CANAL  
CARLSBAD, NEW MEXICO 88220  
Phone (575) 234-3341

### GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SHEET: 2-4

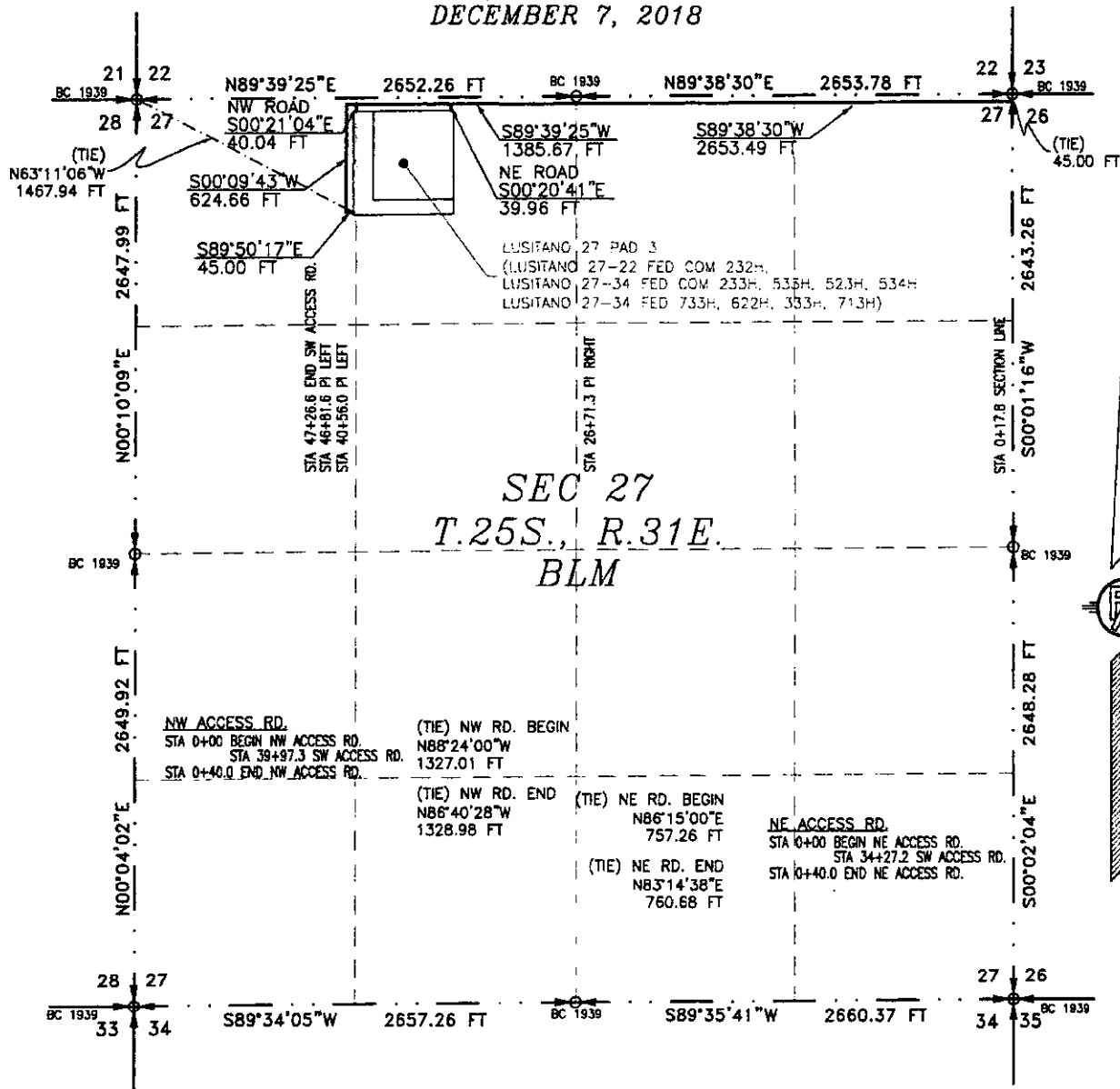
MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

SURVEY NO. 6429A

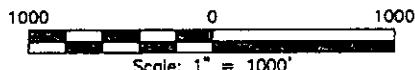
# ACCESS ROAD PLAT

ACCESS ROAD TO THE LUSITANO 27 PAD 3 (LUSITANO 27-22 FED COM 232H, LUSITANO 27-34 FED COM 233H, 533H, 523H, 534H, LUSITANO 27-34 FED 713H, 333H, 622H, 733H)

DEVON ENERGY PRODUCTION COMPANY, L.P.  
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
DECEMBER 7, 2018



SEE NEXT SHEET (4-4) FOR DESCRIPTION



## GENERAL NOTES

- 1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.
- 2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SHEET: 3-4

MADRON SURVEYING, INC.

## SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 12TH DAY OF DECEMBER 2018

MADRON SURVEYING, INC.  
301 SOUTH CANAL  
CARLSBAD, NEW MEXICO 88220  
Phone (575) 234-3341

FILMON F. JARAMILLO, 12797

SURVEY NO. 6429A

301 SOUTH CANAL  
(575) 234-3341 CARLSBAD, NEW MEXICO

## ACCESS ROAD PLAT

ACCESS ROAD TO THE LUSITANO 27 PAD 3 (LUSITANO 27-22 FED COM 232H, LUSITANO 27-34 FED COM 233H, 533H, 523H, 534H, LUSITANO 27-34 FED 713H, 333H, 622H, 733H)

**DEVON ENERGY PRODUCTION COMPANY, L.P.**  
**CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING**  
**SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M.**  
**EDDY COUNTY, STATE OF NEW MEXICO**  
**DECEMBER 7, 2018**

### DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING BUREAU OF LAND MANAGEMENT LAND IN SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

#### SOUTHWEST ACCESS ROAD

BEGINNING AT A POINT WITHIN THE NE/4 NE/4 OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., WHENCE THE NORTHEAST CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N00°01'16"E, A DISTANCE OF 45.00 FEET;

THENCE S89°38'30"W A DISTANCE OF 2653.49 FEET TO AN ANGLE POINT OF THE LINE HEREIN DESCRIBED;

THENCE S89°39'25"W A DISTANCE OF 1385.67 FEET TO AN ANGLE POINT OF THE LINE HEREIN DESCRIBED;

THENCE S00°09'43"W A DISTANCE OF 624.66 FEET TO AN ANGLE POINT OF THE LINE HEREIN DESCRIBED;

THENCE S89°50'17"E A DISTANCE OF 45.00 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE NORTHWEST CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N63°11'06"W, A DISTANCE OF 1467.94 FEET;

SAID STRIP OF LAND BEING 4708.82 FEET OR 285.38 RODS IN LENGTH, CONTAINING 3.243 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

NE/4 NE/4 1326.91 L.F. 80.42 RODS 0.914 ACRES

NW/4 NE/4 1326.91 L.F. 80.42 RODS 0.914 ACRES

NE/4 NW/4 1326.17 L.F. 80.37 RODS 0.913 ACRES

NW/4 NW/4 728.83 L.F. 44.17 RODS 0.502 ACRES

#### NORTHEAST ACCESS ROAD

BEGINNING AT A POINT WITHIN THE NE/4 NW/4 OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., WHENCE THE NORTH QUARTER CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N86°15'00"E, A DISTANCE OF 757.26 FEET;

THENCE S00°20'41"E A DISTANCE OF 39.96 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE NORTH QUARTER CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N83°14'38"E, A DISTANCE OF 760.68 FEET;

SAID STRIP OF LAND BEING 39.96 FEET OR 2.42 RODS IN LENGTH, CONTAINING 0.028 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

NE/4 NW/4 39.96 L.F. 2.42 RODS 0.028 ACRES

#### NORTHWEST ACCESS ROAD

BEGINNING AT A POINT WITHIN THE NE/4 NW/4 OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M., WHENCE THE NORTHWEST CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N88°24'00"W, A DISTANCE OF 1327.01 FEET;

THENCE S00°21'04"E A DISTANCE OF 40.04 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE NORTHWEST CORNER OF SAID SECTION 27, TOWNSHIP 25 SOUTH, RANGE 31 EAST, N.M.P.M. BEARS N86°40'28"W, A DISTANCE OF 1328.98 FEET;

SAID STRIP OF LAND BEING 40.04 FEET OR 2.43 RODS IN LENGTH, CONTAINING 0.028 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

NE/4 NW/4 40.04 L.F. 2.43 RODS 0.028 ACRES

### SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 12<sup>TH</sup> DAY OF DECEMBER 2018

MADRON SURVEYING, INC.  
301 SOUTH CANAL  
CARLSBAD, NEW MEXICO 88220  
Phone (575) 234-3341

### GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SHEET: 4-4

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SURVEY NO. 6429A

# Lusitano 27-34 Fed Com 622H

## 1. Geologic Formations

TVD of target	11747	Pilot hole depth	N/A
MD at TD:	17422	Deepest expected fresh water:	

### Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Rustler	883		
Salado	1153		
Base of Salt	4238		
Delaware	4278		
L Brushy Canyon	7993		
Bone Spring	8218		
Leonard 'A'	8318		
Leonard 'B'	8723		
Leonard 'C'	8983		
1st BSPG Sand	9258		
2nd BSPG Lime	9648		
2nd BSPG Sand	9978		
L 2nd BSPG Sand	10283		
3rd BSPG Lime	10358		
3rd BSPG Sand	11153		
Wolfcamp	11643		
Wolfcamp 100	11788		

\*H2S, water flows, loss of circulation, abnormal pressures, etc.

## 2. Casing Program (Primary Design) - see CDR

Hole Size	Casing Interval		Csg. Size	Wt (PPF)	Grade	Conn.	Min SF Collapse	Min SF Burst	Min SF Tension
	From	To							
14.75"	0	923 908	10.75"	40.5	J-55	STC	1.125	1.25	1.6
9.875"	0	11178 TVD	7.625"	29.7	P110	BTC	1.125	1.25	1.6
6.75"	0	TD	5.5"	20	P110	Vam SG	1.125	1.25	1.6
BLM Minimum Safety Factor							1.125	1.00	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
- Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.
- Int casing shoe will be selected based on drilling data / gamma, setting depth with be revised accordingly if needed.
- A variance is requested to wave the centralizer requirement for the Intermediate casing and production casing.

TD = 11178

MD = 17422

**Lusitano 27-34 Fed Com 622H**

Casing Program (Alternate Design) - see C6A

Hole Size	Casing Interval		Csg. Size	Wt. (PPF)	Grade	Conn	Min SF Collapse	Min SF Burst	Min SF Tension
	From	To							
17.5"	0	Same as above	13.375"	48	H-40	STC	1.125	1.25	1.6
10.625"	0	Same as above	8.625"	32	P110EC	BTC	1.125	1.25	1.6
7.875"	0	TD	5.5"	17	P110	BTC	1.125	1.25	1.6
				BLM Minimum Safety Factor			1.125	1.00	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
- Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.
- Int 1 casing shoe will be selected based on drilling data / gamma, setting depth will be revised accordingly if needed.
- ~~Operator will change intermediate 11 1/8" hole to 9 5/8" connection and change from 11 1/8" to 9 5/8" connection.~~  
Does not meet 0.422" clearance Requirement.
- ~~Operator will change 9 5/8" connection to 11 1/8" connection.~~
- A variance is requested to wave the centralizer requirement for the Intermediate casing and production casing.
- Variance is requested for collapse rating on intermediate casing. Operator will keep pipe full while running casing. No losses are expected in subsequent hole section.

	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?	

## Lusitano 27-34 Fed Com 622H

Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

### 3. Cementing Program (Primary Design)

Casing	# Sks	TOC	Wt. (lb/gal)	Yld. (ft3/sack)	Slurry Description
Surface	568	Surf	13.2	1.33	Lead: Class C Cement + additives
Int 1	1055	Surf	9	1.85	Lead: Class C Cement + additives
	847	4000' above shoe	13.2	1.33	Tail: Class H / C + additives
Int 1 Two Stage w DV @ ~4500	550	Surf	9	1.85	1 <sup>st</sup> stage Lead: Class C Cement + additives
	55	500' above shoe	13.2	1.33	1 <sup>st</sup> stage Tail: Class H / C + additives
	560	Surf	9	1.85	2 <sup>nd</sup> stage Lead: Class C Cement + additives
	55	500' above DV	13.2	1.33	2 <sup>nd</sup> stage Tail: Class H / C + additives
Int 1 Intermediate Squeeze	As Needed	Surf	13.2	1.33	Squeeze Lead: Class C Cement + additives
	1055	Surf	9	1.85	Lead: Class C Cement + additives
	847	4000' above shoe	13.2	1.33	Tail: Class H / C + additives
Production	475	500' tieback	13.2	1.33	Lead: Class H / C + additives

If a DV tool is ran the depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Slurry weights will be adjusted based on estimated fracture gradient of the formation. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. If cement is not returned to surface during the primary cement job on the surface casing string, a planned top job will be conducted immediately after completion of the primary job.

Casing String	% Excess
Surface	50%
Intermediate 1	30%
Intermediate 1 (Two Stage)	25%
Prod	10%

## Lusitano 27-34 Fed Com 622H

### Cementing Program (Alternate Design)

Casing	# Sks	TOC	Wt. (lb/gal)	Yld (ft <sup>3</sup> /sack)	Slurry Description
Surface	752	Surf	13.2	1.33	Lead: Class C Cement + additives
Int 1	1152	Surf	9	1.85	Lead: Class C Cement + additives
	831	4000' above shoe	13.2	1.33	Tail: Class H / C + additives
Int 1 Two Stage w DV @ ~4500	590	Surf	9	1.85	1 <sup>st</sup> stage Lead: Class C Cement + additives
	55	500' above shoe	13.2	1.33	1 <sup>st</sup> stage Tail: Class H / C + additives
	600	Surf	9	1.85	2 <sup>nd</sup> stage Lead: Class C Cement + additives
	55	500' above DV	13.2	1.33	2 <sup>nd</sup> stage Tail: Class H / C + additives
Int 1 Intermediate Squeeze	As Needed	Surf	13.2	1.33	Squeeze Lead: Class C Cement + additives
	1152	Surf	9	1.85	Lead: Class C Cement + additives
	831	4000' above shoe	13.2	1.33	Tail: Class H / C + additives
Production	860	500' tieback	13.2	1.33	Lead: Class H / C + additives

If a DV tool is ran the depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Slurry weights will be adjusted based on estimated fracture gradient of the formation. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. If cement is not returned to surface during the primary cement job on the surface casing string, a planned top job will be conducted immediately after completion of the primary job.

Casing String	% Excess
Surface	50%
Intermediate 1	30%
Intermediate 1 (Two Stage)	25%
Prod	10%



## Lusitano 27-34 Fed Com 622H

### 4. Pressure Control Equipment (Three String Design)

Pressure Control Equipment (Pace String Design)						
BOP installed and tested before drilling which hole?		Size?	Min. Required WP	Type	✓	Tested to:
Int 1	13-5/8"	5M	Annular		X	50% of rated working pressure
			Blind Ram		X	5M
			Pipe Ram			
			Double Ram		X	
			Other*			
Production	13-5/8"	10M	Annular (5M)		X	100% of rated working pressure
			Blind Ram		X	10M
			Pipe Ram			
			Double Ram		X	
			Other *			
			Annular			
			Blind Ram			
			Pipe Ram			
			Double Ram			
			Other *			
N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.					
Y	A variance is requested to run a 5M annular on a 10M system.					

### 5. Mud Program (3 String Design)

Section	Type	Weight (ppg)	Vis	Water Loss
Surface	FW Gel	8.5 - 9	28-34	N/C
Intermediate	DBE / Cut Brine	9 - 10	28-34	N/C
Production	OBM	10-10.5	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
---	-----------------------------

### 6. Logging and Testing Procedures

Logging, Coring and Testing.	
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

## Lusitano 27-34 Fed Com 622H

Additional logs planned		Interval
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
X	CBL	Production casing
X	Mud log	Intermediate shoe to TD
	PEX	

### 7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	6414 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

Is this a walking operation? Potentially

1. If operator elects, drilling rig will batch drill the surface holes and run/cement surface casing; walking the rig to next wells on the pad.
2. The drilling rig will then batch drill the intermediate sections and run/cement intermediate casing; the wellbore will be isolated with a blind flange and pressure gauge installed for monitoring the well before walking to the next well.
3. The drilling rig will then batch drill the production hole sections on the wells with OBM, run/cement production casing, and install TA caps or tubing heads for completions.

NOTE: During batch operations the drilling rig will be moved from well to well however, it will not be removed from the pad until all wells have production casing run/cemented.

Will be pre-setting casing? Potentially

1. Spudder rig will move in and drill surface hole.
  - a. Rig will utilize fresh water based mud to drill surface hole to TD. Solids control will be handled entirely on a closed loop basis.
2. After drilling the surface hole section, the spudder rig will run casing and cement following all of the applicable rules and regulations (OnShore Order 2, all COAs and NMOCD regulations).
3. The wellhead will be installed and tested once the surface casing is cut off and the WOC time has been reached.
4. A blind flange with the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with a pressure gauge installed on the wellhead.
5. Spudder rig operations is expected to take 4-5 days per well on a multi well pad.
6. The NMOCD will be contacted and notified 24 hours prior to commencing spudder rig operations.

## **Lusitano 27-34 Fed Com 622H**

7. Drilling operations will be performed with the drilling rig. At that time an approved BOP stack will be nipped up and tested on the wellhead before drilling operations commences on each well.
  - a. The NMOCD will be contacted / notified 24 hours before the drilling rig moves back on to the pad with the pre-set surface casing.

### **Attachments**

- ☒ Directional Plan  
☐ Other, describe

# Devon Energy

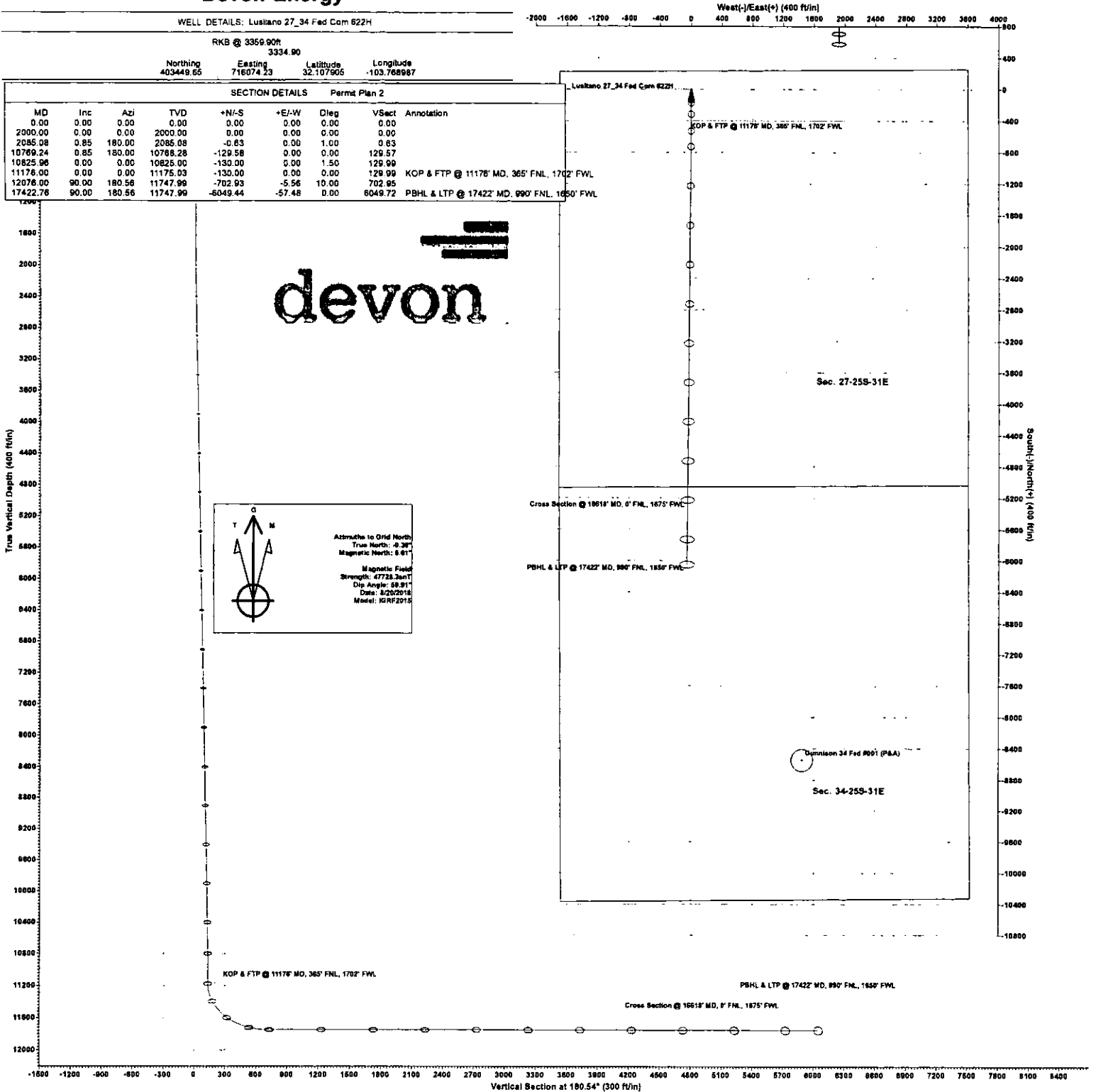
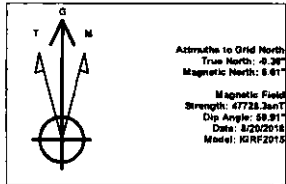
WELL DETAILS: Lusitano 27\_34 Fed Com 622H

RKB @ 3359.90ft  
3334.90  
Northing 403449.65 Easting 716074.23 Latitude 32.107905 Longitude -103.768967

## SECTION DETAILS Perma Plan 2

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	V Sct	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	
2085.08	0.85	180.00	2085.08	-0.83	0.00	1.00	0.83	
10769.24	0.85	180.00	10769.24	-129.58	0.00	0.00	129.57	
10825.96	0.00	0.00	10825.00	-130.00	0.00	1.50	129.99	
11176.00	0.00	0.00	11176.03	-130.00	0.00	0.00	129.99	KOP & FTP @ 11176' MD, 365' FNL, 1702' FWL
12076.00	90.00	180.56	11747.99	-702.93	-5.56	10.00	702.95	
17422.76	90.00	180.56	11747.99	-6049.44	-57.48	0.00	6049.72	PBHL & LTP @ 17422' MD, 990' FNL, 1650' FWL

devon



# **WCDSC Permian NM**

**Eddy County (NAD 83 NM Eastern)**

**Sec 27-T25S-R31E**

**Lusitano 27\_34 Fed Com 622H**

**Wellbore #1**

**Plan: Permit Plan 2**

## **Standard Planning Report - Geographic**

**17 December, 2018**

# Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Lusitano 27_34 Fed Com 622H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3359.90ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3359.90ft
Site:	Sec 27-T25S-R31E	North Reference:	Grid
Well:	Lusitano 27_34 Fed Com 622H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 2		

Project	Eddy County (NAD 83 NM Eastern)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 27-T25S-R31E		
Site Position:	Northings:	403,674.44 usft	Latitude: 32.108547
From: Map	Easting:	714,373.23 usft	Longitude: -103.774477
Position Uncertainty:	0.00 ft	Slot Radius: 13-3/16 "	Grid Convergence: 0.30 "

Well	Lusitano 27_34 Fed Com 622H		
Well Position	+N-S	0.00 ft	Northings: 403,449.65 usft
	+E-W	0.00 ft	Easting: 716,074.23 usft
Position Uncertainty	0.50 ft	Wellhead Elevation:	Ground Level: 3,334.90 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	IGRF2015	8/20/2018	6.91
			59.91
			47,728.29789976

Design	Permit Plan 2		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			180.54

Plan Survey Tool Program	Date	12/17/2018		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	17,422.76 Permit Plan 2 (Wellbore #1)	MWD+HDGM	
			OWSG MWD + HDGM	

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	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	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,085.08	0.85	180.00	2,085.08	-0.63	0.00	1.00	1.00	0.00	180.00	
10,769.24	0.85	180.00	10,768.28	-129.58	0.00	0.00	0.00	0.00	0.00	
10,825.96	0.00	0.00	10,825.00	-130.00	0.00	1.50	-1.50	0.00	180.00	
11,176.00	0.00	0.00	11,175.04	-130.00	0.00	0.00	0.00	0.00	0.00	
12,076.00	90.00	180.56	11,747.99	-702.93	-5.56	10.00	10.00	0.00	180.56	PBHL - Lusitano 27_3
17,422.76	90.00	180.56	11,747.99	-6,049.44	-57.48	0.00	0.00	0.00	0.00	PBHL - Lusitano 27_3

# Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Lusitano 27_34 Fed Com 622H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3359.90ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3359.90ft
Site:	Sec 27-T25S-R31E	North Reference:	Grid
Well:	Lusitano 27_34 Fed Com 622H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
100.00	0.00	0.00	100.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
200.00	0.00	0.00	200.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
300.00	0.00	0.00	300.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
400.00	0.00	0.00	400.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
500.00	0.00	0.00	500.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
600.00	0.00	0.00	600.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
700.00	0.00	0.00	700.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
800.00	0.00	0.00	800.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
900.00	0.00	0.00	900.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,000.00	0.00	0.00	1,000.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,100.00	0.00	0.00	1,100.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,200.00	0.00	0.00	1,200.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,300.00	0.00	0.00	1,300.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,400.00	0.00	0.00	1,400.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,500.00	0.00	0.00	1,500.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,600.00	0.00	0.00	1,600.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,700.00	0.00	0.00	1,700.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,800.00	0.00	0.00	1,800.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
1,900.00	0.00	0.00	1,900.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
2,000.00	0.00	0.00	2,000.00	0.00	0.00	403,449.65	716,074.23	32.107905	-103.768987
2,085.08	0.85	180.00	2,085.08	-0.83	0.00	403,449.02	716,074.23	32.107903	-103.768987
2,100.00	0.85	180.00	2,100.00	-0.85	0.00	403,448.80	716,074.23	32.107903	-103.768987
2,200.00	0.85	180.00	2,199.98	-2.34	0.00	403,447.31	716,074.23	32.107899	-103.768987
2,300.00	0.85	180.00	2,299.97	-3.82	0.00	403,445.83	716,074.23	32.107895	-103.768987
2,400.00	0.85	180.00	2,399.96	-5.31	0.00	403,444.34	716,074.23	32.107890	-103.768987
2,500.00	0.85	180.00	2,499.95	-6.79	0.00	403,442.86	716,074.23	32.107886	-103.768987
2,600.00	0.85	180.00	2,599.94	-8.28	0.00	403,441.37	716,074.23	32.107882	-103.768987
2,700.00	0.85	180.00	2,699.93	-9.76	0.00	403,439.89	716,074.23	32.107878	-103.768987
2,800.00	0.85	180.00	2,799.92	-11.25	0.00	403,438.40	716,074.23	32.107874	-103.768987
2,900.00	0.85	180.00	2,899.91	-12.73	0.00	403,436.92	716,074.23	32.107870	-103.768987
3,000.00	0.85	180.00	2,999.90	-14.22	0.00	403,435.43	716,074.23	32.107866	-103.768987
3,100.00	0.85	180.00	3,099.89	-15.70	0.00	403,433.95	716,074.23	32.107862	-103.768987
3,200.00	0.85	180.00	3,199.87	-17.19	0.00	403,432.46	716,074.23	32.107858	-103.768987
3,300.00	0.85	180.00	3,299.86	-18.67	0.00	403,430.98	716,074.23	32.107854	-103.768987
3,400.00	0.85	180.00	3,399.85	-20.16	0.00	403,429.49	716,074.23	32.107850	-103.768987
3,500.00	0.85	180.00	3,499.84	-21.64	0.00	403,428.01	716,074.23	32.107846	-103.768987
3,600.00	0.85	180.00	3,599.83	-23.13	0.00	403,426.52	716,074.23	32.107841	-103.768987
3,700.00	0.85	180.00	3,699.82	-24.61	0.00	403,425.04	716,074.23	32.107837	-103.768988
3,800.00	0.85	180.00	3,799.81	-26.10	0.00	403,423.55	716,074.23	32.107833	-103.768988
3,900.00	0.85	180.00	3,899.80	-27.58	0.00	403,422.07	716,074.23	32.107829	-103.768988
4,000.00	0.85	180.00	3,999.79	-29.07	0.00	403,420.58	716,074.23	32.107825	-103.768988
4,100.00	0.85	180.00	4,099.77	-30.55	0.00	403,419.10	716,074.23	32.107821	-103.768988
4,200.00	0.85	180.00	4,199.76	-32.04	0.00	403,417.61	716,074.23	32.107817	-103.768988
4,300.00	0.85	180.00	4,299.75	-33.52	0.00	403,416.13	716,074.23	32.107813	-103.768988
4,400.00	0.85	180.00	4,399.74	-35.00	0.00	403,414.64	716,074.23	32.107809	-103.768988
4,500.00	0.85	180.00	4,499.73	-36.49	0.00	403,413.16	716,074.23	32.107805	-103.768988
4,600.00	0.85	180.00	4,599.72	-37.97	0.00	403,411.67	716,074.23	32.107801	-103.768988
4,700.00	0.85	180.00	4,699.71	-39.46	0.00	403,410.19	716,074.23	32.107797	-103.768988
4,800.00	0.85	180.00	4,799.70	-40.94	0.00	403,408.70	716,074.23	32.107792	-103.768988
4,900.00	0.85	180.00	4,899.69	-42.43	0.00	403,407.22	716,074.23	32.107788	-103.768988
5,000.00	0.85	180.00	4,999.68	-43.91	0.00	403,405.74	716,074.23	32.107784	-103.768988
5,100.00	0.85	180.00	5,099.66	-45.40	0.00	403,404.25	716,074.23	32.107780	-103.768988
5,200.00	0.85	180.00	5,199.65	-46.88	0.00	403,402.77	716,074.23	32.107776	-103.768988
5,300.00	0.85	180.00	5,299.64	-48.37	0.00	403,401.28	716,074.23	32.107772	-103.768988

# Planning Report - Geographic

<b>Database:</b>	EDM r5000.141_Prod US	<b>Local Co-ordinate Reference:</b>	Well Lusitano 27_34 Fed Com 622H
<b>Company:</b>	WCDSC Permian NM	<b>TVD Reference:</b>	RKB @ 3359.90ft
<b>Project:</b>	Eddy County (NAD 83 NM Eastern)	<b>MD Reference:</b>	RKB @ 3359.90ft
<b>Site:</b>	Sec 27-T25S-R31E	<b>North Reference:</b>	Grid
<b>Well:</b>	Lusitano 27_34 Fed Com 622H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Permit Plan 2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,400.00	0.85	180.00	5,399.63	-49.85	0.00	403,399.80	716,074.23	32.107768	-103.768988
5,500.00	0.85	180.00	5,499.62	-51.34	0.00	403,398.31	716,074.23	32.107764	-103.768988
5,600.00	0.85	180.00	5,599.61	-52.82	0.00	403,396.83	716,074.23	32.107760	-103.768988
5,700.00	0.85	180.00	5,699.60	-54.31	0.00	403,395.34	716,074.23	32.107756	-103.768988
5,800.00	0.85	180.00	5,799.59	-55.79	0.00	403,393.86	716,074.23	32.107752	-103.768988
5,900.00	0.85	180.00	5,899.58	-57.28	0.00	403,392.37	716,074.23	32.107748	-103.768988
6,000.00	0.85	180.00	5,999.57	-58.76	0.00	403,390.89	716,074.23	32.107744	-103.768988
6,100.00	0.85	180.00	6,099.55	-60.25	0.00	403,389.40	716,074.23	32.107739	-103.768988
6,200.00	0.85	180.00	6,199.54	-61.73	0.00	403,387.92	716,074.23	32.107735	-103.768988
6,300.00	0.85	180.00	6,299.53	-63.22	0.00	403,386.43	716,074.23	32.107731	-103.768988
6,400.00	0.85	180.00	6,399.52	-64.70	0.00	403,384.95	716,074.23	32.107727	-103.768988
6,500.00	0.85	180.00	6,499.51	-66.19	0.00	403,383.46	716,074.23	32.107723	-103.768988
6,600.00	0.85	180.00	6,599.50	-67.67	0.00	403,381.98	716,074.23	32.107719	-103.768988
6,700.00	0.85	180.00	6,699.49	-69.16	0.00	403,380.49	716,074.23	32.107715	-103.768988
6,800.00	0.85	180.00	6,799.48	-70.64	0.00	403,379.01	716,074.23	32.107711	-103.768988
6,900.00	0.85	180.00	6,899.47	-72.13	0.00	403,377.52	716,074.23	32.107707	-103.768988
7,000.00	0.85	180.00	6,999.46	-73.61	0.00	403,376.04	716,074.23	32.107703	-103.768988
7,100.00	0.85	180.00	7,099.44	-75.10	0.00	403,374.55	716,074.23	32.107699	-103.768988
7,200.00	0.85	180.00	7,199.43	-76.58	0.00	403,373.07	716,074.23	32.107695	-103.768988
7,300.00	0.85	180.00	7,299.42	-78.07	0.00	403,371.58	716,074.23	32.107690	-103.768988
7,400.00	0.85	180.00	7,399.41	-79.55	0.00	403,370.10	716,074.23	32.107686	-103.768988
7,500.00	0.85	180.00	7,499.40	-81.04	0.00	403,368.61	716,074.23	32.107682	-103.768988
7,600.00	0.85	180.00	7,599.39	-82.52	0.00	403,367.13	716,074.23	32.107678	-103.768988
7,700.00	0.85	180.00	7,699.38	-84.01	0.00	403,365.64	716,074.23	32.107674	-103.768988
7,800.00	0.85	180.00	7,799.37	-85.49	0.00	403,364.16	716,074.23	32.107670	-103.768988
7,900.00	0.85	180.00	7,899.36	-86.97	0.00	403,362.67	716,074.23	32.107666	-103.768988
8,000.00	0.85	180.00	7,999.34	-88.46	0.00	403,361.19	716,074.23	32.107662	-103.768988
8,100.00	0.85	180.00	8,099.33	-89.94	0.00	403,359.70	716,074.23	32.107658	-103.768988
8,200.00	0.85	180.00	8,199.32	-91.43	0.00	403,358.22	716,074.23	32.107654	-103.768988
8,300.00	0.85	180.00	8,299.31	-92.91	0.00	403,356.73	716,074.23	32.107650	-103.768988
8,400.00	0.85	180.00	8,399.30	-94.40	0.00	403,355.25	716,074.23	32.107646	-103.768988
8,500.00	0.85	180.00	8,499.29	-95.88	0.00	403,353.77	716,074.23	32.107641	-103.768988
8,600.00	0.85	180.00	8,599.28	-97.37	0.00	403,352.28	716,074.23	32.107637	-103.768988
8,700.00	0.85	180.00	8,699.27	-98.85	0.00	403,350.80	716,074.23	32.107633	-103.768988
8,800.00	0.85	180.00	8,799.26	-100.34	0.00	403,349.31	716,074.23	32.107629	-103.768988
8,900.00	0.85	180.00	8,899.25	-101.82	0.00	403,347.83	716,074.23	32.107625	-103.768988
9,000.00	0.85	180.00	8,999.23	-103.31	0.00	403,346.34	716,074.23	32.107621	-103.768988
9,100.00	0.85	180.00	9,099.22	-104.79	0.00	403,344.86	716,074.23	32.107617	-103.768988
9,200.00	0.85	180.00	9,199.21	-106.28	0.00	403,343.37	716,074.23	32.107613	-103.768988
9,300.00	0.85	180.00	9,299.20	-107.76	0.00	403,341.89	716,074.23	32.107609	-103.768988
9,400.00	0.85	180.00	9,399.19	-109.25	0.00	403,340.40	716,074.23	32.107605	-103.768988
9,500.00	0.85	180.00	9,499.18	-110.73	0.00	403,338.92	716,074.23	32.107601	-103.768988
9,600.00	0.85	180.00	9,599.17	-112.22	0.00	403,337.43	716,074.23	32.107597	-103.768988
9,700.00	0.85	180.00	9,699.16	-113.70	0.00	403,335.95	716,074.23	32.107592	-103.768988
9,800.00	0.85	180.00	9,799.15	-115.19	0.00	403,334.46	716,074.23	32.107588	-103.768988
9,900.00	0.85	180.00	9,899.14	-116.67	0.00	403,332.98	716,074.23	32.107584	-103.768988
10,000.00	0.85	180.00	9,999.12	-118.16	0.00	403,331.49	716,074.23	32.107580	-103.768988
10,100.00	0.85	180.00	10,099.11	-119.64	0.00	403,330.01	716,074.23	32.107576	-103.768988
10,200.00	0.85	180.00	10,199.10	-121.13	0.00	403,328.52	716,074.23	32.107572	-103.768988
10,300.00	0.85	180.00	10,299.09	-122.61	0.00	403,327.04	716,074.23	32.107568	-103.768988
10,400.00	0.85	180.00	10,399.08	-124.10	0.00	403,325.55	716,074.23	32.107564	-103.768988
10,500.00	0.85	180.00	10,499.07	-125.58	0.00	403,324.07	716,074.23	32.107560	-103.768988
10,600.00	0.85	180.00	10,599.06	-127.07	0.00	403,322.58	716,074.23	32.107556	-103.768988
10,700.00	0.85	180.00	10,699.05	-128.55	0.00	403,321.10	716,074.23	32.107552	-103.768988
10,769.24	0.85	180.00	10,768.28	-129.58	0.00	403,320.07	716,074.23	32.107549	-103.768988



# Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Lusitano 27_34 Fed Com 622H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3359.90ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3359.90ft
Site:	Sec 27-T25S-R31E	North Reference:	Grid
Well:	Lusitano 27_34 Fed Com 622H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,800.00	0.39	180.00	10,799.04	-129.91	0.00	403,319.74	716,074.23	32.107548	-103.768989
10,825.96	0.00	0.00	10,825.00	-130.00	0.00	403,319.65	716,074.23	32.107548	-103.768989
10,900.00	0.00	0.00	10,899.04	-130.00	0.00	403,319.65	716,074.23	32.107548	-103.768989
11,000.00	0.00	0.00	10,999.04	-130.00	0.00	403,319.65	716,074.23	32.107548	-103.768989
11,100.00	0.00	0.00	11,099.04	-130.00	0.00	403,319.65	716,074.23	32.107548	-103.768989
11,176.00	0.00	0.00	11,175.04	-130.00	0.00	403,319.65	716,074.23	32.107548	-103.768989
KOP & FTP @ 11176' MD, 366' FNL, 1702' FWL									
11,200.00	2.40	180.56	11,199.03	-130.50	0.00	403,319.15	716,074.22	32.107546	-103.768989
11,300.00	12.40	180.56	11,298.07	-143.37	-0.13	403,306.28	716,074.10	32.107511	-103.768990
11,400.00	22.40	180.56	11,393.37	-173.23	-0.42	403,276.42	716,073.81	32.107429	-103.768991
11,500.00	32.40	180.56	11,482.04	-219.19	-0.87	403,230.46	716,073.36	32.107303	-103.768994
11,600.00	42.40	180.56	11,561.38	-279.85	-1.46	403,169.80	716,072.77	32.107136	-103.768997
11,700.00	52.40	180.56	11,628.99	-353.36	-2.17	403,096.29	716,072.06	32.106934	-103.769000
11,800.00	62.40	180.56	11,682.79	-437.50	-2.99	403,012.15	716,071.24	32.106702	-103.769004
11,900.00	72.40	180.56	11,721.17	-529.70	-3.88	402,919.95	716,070.34	32.106449	-103.769009
12,000.00	82.40	180.56	11,742.96	-627.16	-4.83	402,822.49	716,069.40	32.106181	-103.769013
12,076.00	90.00	180.56	11,747.99	-702.93	-5.56	402,746.72	716,068.66	32.105973	-103.769017
12,100.00	90.00	180.56	11,747.99	-726.93	-5.80	402,722.72	716,068.43	32.105907	-103.769018
12,200.00	90.00	180.56	11,747.99	-826.93	-6.77	402,622.72	716,067.46	32.105632	-103.769023
12,300.00	90.00	180.56	11,747.99	-926.92	-7.74	402,522.73	716,066.49	32.105357	-103.769028
12,400.00	90.00	180.56	11,747.99	-1,026.92	-8.71	402,422.73	716,065.52	32.105082	-103.769033
12,500.00	90.00	180.56	11,747.99	-1,126.91	-9.68	402,322.74	716,064.55	32.104807	-103.769037
12,600.00	90.00	180.56	11,747.99	-1,226.91	-10.65	402,222.74	716,063.57	32.104533	-103.769042
12,700.00	90.00	180.56	11,747.99	-1,326.90	-11.62	402,122.75	716,062.60	32.104258	-103.769047
12,800.00	90.00	180.56	11,747.99	-1,426.90	-12.59	402,022.75	716,061.63	32.103983	-103.769052
12,900.00	90.00	180.56	11,747.99	-1,526.89	-13.56	401,922.76	716,060.66	32.103708	-103.769057
13,000.00	90.00	180.56	11,747.99	-1,626.89	-14.54	401,822.76	716,059.69	32.103433	-103.769062
13,100.00	90.00	180.56	11,747.99	-1,726.88	-15.51	401,722.77	716,058.72	32.103158	-103.769066
13,200.00	90.00	180.56	11,747.99	-1,826.88	-16.48	401,622.77	716,057.75	32.102884	-103.769071
13,300.00	90.00	180.56	11,747.99	-1,926.87	-17.45	401,522.78	716,056.78	32.102609	-103.769076
13,400.00	90.00	180.56	11,747.99	-2,026.87	-18.42	401,422.78	716,055.81	32.102334	-103.769081
13,500.00	90.00	180.56	11,747.99	-2,126.87	-19.39	401,322.79	716,054.84	32.102059	-103.769086
13,600.00	90.00	180.56	11,747.99	-2,226.86	-20.36	401,222.79	716,053.86	32.101784	-103.769090
13,700.00	90.00	180.56	11,747.99	-2,326.86	-21.33	401,122.80	716,052.89	32.101509	-103.769095
13,800.00	90.00	180.56	11,747.99	-2,426.85	-22.30	401,022.80	716,051.92	32.101234	-103.769100
13,900.00	90.00	180.56	11,747.99	-2,526.85	-23.27	400,922.81	716,050.95	32.100960	-103.769105
14,000.00	90.00	180.56	11,747.99	-2,626.84	-24.25	400,822.81	716,049.98	32.100685	-103.769110
14,100.00	90.00	180.56	11,747.99	-2,726.84	-25.22	400,722.82	716,049.01	32.100410	-103.769115
14,200.00	90.00	180.56	11,747.99	-2,826.83	-26.19	400,622.82	716,048.04	32.100135	-103.769119
14,300.00	90.00	180.56	11,747.99	-2,926.83	-27.16	400,522.83	716,047.07	32.099860	-103.769124
14,400.00	90.00	180.56	11,747.99	-3,026.82	-28.13	400,422.83	716,046.10	32.099585	-103.769129
14,500.00	90.00	180.56	11,747.99	-3,126.82	-29.10	400,322.84	716,045.13	32.099310	-103.769134
14,600.00	90.00	180.56	11,747.99	-3,226.81	-30.07	400,222.84	716,044.15	32.099036	-103.769139
14,700.00	90.00	180.56	11,747.99	-3,326.81	-31.04	400,122.85	716,043.18	32.098761	-103.769144
14,800.00	90.00	180.56	11,747.99	-3,426.80	-32.01	400,022.85	716,042.21	32.098486	-103.769148
14,900.00	90.00	180.56	11,747.99	-3,526.80	-32.98	399,922.86	716,041.24	32.098211	-103.769153
15,000.00	90.00	180.56	11,747.99	-3,626.79	-33.96	399,822.86	716,040.27	32.097936	-103.769158
15,100.00	90.00	180.56	11,747.99	-3,726.79	-34.93	399,722.87	716,039.30	32.097661	-103.769163
15,200.00	90.00	180.56	11,747.99	-3,826.79	-35.90	399,622.87	716,038.33	32.097386	-103.769168
15,300.00	90.00	180.56	11,747.99	-3,926.78	-36.87	399,522.88	716,037.36	32.097112	-103.769173
15,400.00	90.00	180.56	11,747.99	-4,026.78	-37.84	399,422.88	716,036.39	32.096837	-103.769177
15,500.00	90.00	180.56	11,747.99	-4,126.77	-38.81	399,322.89	716,035.42	32.096562	-103.769182
15,600.00	90.00	180.56	11,747.99	-4,226.77	-39.78	399,222.89	716,034.44	32.096287	-103.769187
15,700.00	90.00	180.56	11,747.99	-4,326.76	-40.75	399,122.90	716,033.47	32.096012	-103.769192

# Planning Report - Geographic

<b>Database:</b>	EDM r5000.141_Prod US	<b>Local Co-ordinate Reference:</b>	Well Lusitano 27_34 Fed Com 622H
<b>Company:</b>	WCDSC Permian NM	<b>TVD Reference:</b>	RKB @ 3359.90ft
<b>Project:</b>	Eddy County (NAD 83 NM Eastern)	<b>MD Reference:</b>	RKB @ 3359.90ft
<b>Site:</b>	Sec 27-T25S-R31E	<b>North Reference:</b>	Grid
<b>Well:</b>	Lusitano 27_34 Fed Com 622H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Permit Plan 2		

## Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,800.00	90.00	180.56	11,747.99	-4,426.76	-41.72	399,022.90	716,032.50	32.095737	-103.769197
15,900.00	90.00	180.56	11,747.99	-4,526.75	-42.69	398,922.91	716,031.53	32.095462	-103.769201
16,000.00	90.00	180.56	11,747.99	-4,626.75	-43.67	398,822.91	716,030.56	32.095188	-103.769206
16,100.00	90.00	180.56	11,747.99	-4,726.74	-44.64	398,722.92	716,029.59	32.094913	-103.769211
16,200.00	90.00	180.56	11,747.99	-4,826.74	-45.61	398,622.92	716,028.62	32.094638	-103.769216
16,300.00	90.00	180.56	11,747.99	-4,926.73	-46.58	398,522.93	716,027.65	32.094363	-103.769221
16,400.00	90.00	180.56	11,747.99	-5,026.73	-47.55	398,422.93	716,026.68	32.094088	-103.769226
16,500.00	90.00	180.56	11,747.99	-5,126.72	-48.52	398,322.94	716,025.71	32.093813	-103.769230
16,600.00	90.00	180.56	11,747.99	-5,226.72	-49.49	398,222.94	716,024.73	32.093538	-103.769235
16,618.00	90.00	180.56	11,747.99	-5,244.72	-49.67	398,204.94	716,024.56	32.093489	-103.769236
<b>Cross Section @ 16618' MD, 0' FNL, 1675' FWL</b>									
16,700.00	90.00	180.56	11,747.99	-5,326.71	-50.46	398,122.95	716,023.76	32.093264	-103.769240
16,800.00	90.00	180.56	11,747.99	-5,426.71	-51.43	398,022.95	716,022.79	32.092989	-103.769245
16,900.00	90.00	180.56	11,747.99	-5,526.71	-52.40	397,922.95	716,021.82	32.092714	-103.769250
17,000.00	90.00	180.56	11,747.99	-5,626.70	-53.38	397,822.96	716,020.85	32.092439	-103.769255
17,100.00	90.00	180.56	11,747.99	-5,726.70	-54.35	397,722.96	716,019.88	32.092164	-103.769259
17,200.00	90.00	180.56	11,747.99	-5,826.69	-55.32	397,622.97	716,018.91	32.091889	-103.769264
17,300.00	90.00	180.56	11,747.99	-5,926.69	-56.29	397,522.97	716,017.94	32.091614	-103.769269
17,400.00	90.00	180.56	11,747.99	-6,026.68	-57.26	397,422.98	716,016.97	32.091340	-103.769274
17,422.75	90.00	180.56	11,747.99	-6,049.43	-57.48	397,400.23	716,016.75	32.091277	-103.769275
<b>PBHL &amp; LTP @ 17422' MD, 990' FNL, 1650' FWL</b>									
17,422.75	90.00	180.56	11,747.99	-6,049.44	-57.48	397,400.22	716,016.75	32.091277	-103.769275

## Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL - Lusitano 27_34	0.00	0.00	0.00	-6,049.44	-57.48	397,400.22	716,016.75	32.091277	-103.769275
- plan misses target center by 6049.72ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									

## Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
11,176.00	11,175.04	-130.00	0.00	KOP & FTP @ 11176' MD, 365' FNL, 1702' FWL
16,618.00	11,747.99	-224.47	-0.92	Cross Section @ 16618' MD, 0' FNL, 1675' FWL
17,422.75	11,747.99	-5,244.72	-49.67	PBHL & LTP @ 17422' MD, 990' FNL, 1650' FWL

WCDSC Permian NM

Lusitano 27\_34 Fed Com 622H - Permit Plan 2

Eddy County (NAD 83 NM Eastern)

Sec 27-T25S-R31E

Your Ref:

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0	0	0	0	0	0	0	0
100	0	0	100	0	0	0	0
200	0	0	200	0	0	0	0
300	0	0	300	0	0	0	0
400	0	0	400	0	0	0	0
500	0	0	500	0	0	0	0
600	0	0	600	0	0	0	0
700	0	0	700	0	0	0	0
800	0	0	800	0	0	0	0
900	0	0	900	0	0	0	0
1000	0	0	1000	0	0	0	0
1100	0	0	1100	0	0	0	0
1200	0	0	1200	0	0	0	0
1300	0	0	1300	0	0	0	0
1400	0	0	1400	0	0	0	0
1500	0	0	1500	0	0	0	0
1600	0	0	1600	0	0	0	0
1700	0	0	1700	0	0	0	0
1800	0	0	1800	0	0	0	0
1900	0	0	1900	0	0	0	0
2000	0	0	2000	0	0	0	0
2085.08	0.851	180	2085.08	-0.63	0	0.63	1
2100	0.851	180	2100	-0.85	0	0.85	0
2200	0.851	180	2199.98	-2.34	0	2.34	0
2300	0.851	180	2299.97	-3.82	0	3.82	0
2400	0.851	180	2399.96	-5.31	0	5.31	0
2500	0.851	180	2499.95	-6.79	0	6.79	0
2600	0.851	180	2599.94	-8.28	0	8.28	0
2700	0.851	180	2699.93	-9.76	0	9.76	0
2800	0.851	180	2799.92	-11.25	0	11.25	0
2900	0.851	180	2899.91	-12.73	0	12.73	0
3000	0.851	180	2999.9	-14.22	0	14.22	0

3100	0.851	180	3099.88	-15.7	0	15.7	0
3200	0.851	180	3199.87	-17.19	0	17.19	0
3300	0.851	180	3299.86	-18.67	0	18.67	0
3400	0.851	180	3399.85	-20.16	0	20.16	0
3500	0.851	180	3499.84	-21.64	0	21.64	0
3600	0.851	180	3599.83	-23.13	0	23.12	0
3700	0.851	180	3699.82	-24.61	0	24.61	0
3800	0.851	180	3799.81	-26.1	0	26.09	0
3900	0.851	180	3899.8	-27.58	0	27.58	0
4000	0.851	180	3999.79	-29.07	0	29.06	0
4100	0.851	180	4099.77	-30.55	0	30.55	0
4200	0.851	180	4199.76	-32.04	0	32.03	0
4300	0.851	180	4299.75	-33.52	0	33.52	0
4400	0.851	180	4399.74	-35	0	35	0
4500	0.851	180	4499.73	-36.49	0	36.49	0
4600	0.851	180	4599.72	-37.97	0	37.97	0
4700	0.851	180	4699.71	-39.46	0	39.46	0
4800	0.851	180	4799.7	-40.94	0	40.94	0
4900	0.851	180	4899.69	-42.43	0	42.43	0
5000	0.851	180	4999.68	-43.91	0	43.91	0
5100	0.851	180	5099.66	-45.4	0	45.4	0
5200	0.851	180	5199.65	-46.88	0	46.88	0
5300	0.851	180	5299.64	-48.37	0	48.37	0
5400	0.851	180	5399.63	-49.85	0	49.85	0
5500	0.851	180	5499.62	-51.34	0	51.34	0
5600	0.851	180	5599.61	-52.82	0	52.82	0
5700	0.851	180	5699.6	-54.31	0	54.31	0
5800	0.851	180	5799.59	-55.79	0	55.79	0
5900	0.851	180	5899.58	-57.28	0	57.28	0
6000	0.851	180	5999.57	-58.76	0	58.76	0
6100	0.851	180	6099.55	-60.25	0	60.24	0
6200	0.851	180	6199.54	-61.73	0	61.73	0
6300	0.851	180	6299.53	-63.22	0	63.21	0
6400	0.851	180	6399.52	-64.7	0	64.7	0
6500	0.851	180	6499.51	-66.19	0	66.18	0
6600	0.851	180	6599.5	-67.67	0	67.67	0
6700	0.851	180	6699.49	-69.16	0	69.15	0
6800	0.851	180	6799.48	-70.64	0	70.64	0
6900	0.851	180	6899.47	-72.13	0	72.12	0
7000	0.851	180	6999.46	-73.61	0	73.61	0
7100	0.851	180	7099.44	-75.1	0	75.09	0
7200	0.851	180	7199.43	-76.58	0	76.58	0
7300	0.851	180	7299.42	-78.07	0	78.06	0
7400	0.851	180	7399.41	-79.55	0	79.55	0
7500	0.851	180	7499.4	-81.04	0	81.03	0
7600	0.851	180	7599.39	-82.52	0	82.52	0
7700	0.851	180	7699.38	-84.01	0	84	0

7800	0.851	180	7799.37	-85.49	0	85.49	0
7900	0.851	180	7899.36	-86.97	0	86.97	0
8000	0.851	180	7999.34	-88.46	0	88.46	0
8100	0.851	180	8099.33	-89.94	0	89.94	0
8200	0.851	180	8199.32	-91.43	0	91.43	0
8300	0.851	180	8299.31	-92.91	0	92.91	0
8400	0.851	180	8399.3	-94.4	0	94.39	0
8500	0.851	180	8499.29	-95.88	0	95.88	0
8600	0.851	180	8599.28	-97.37	0	97.36	0
8700	0.851	180	8699.27	-98.85	0	98.85	0
8800	0.851	180	8799.26	-100.34	0	100.33	0
8900	0.851	180	8899.25	-101.82	0	101.82	0
9000	0.851	180	8999.23	-103.31	0	103.3	0
9100	0.851	180	9099.22	-104.79	0	104.79	0
9200	0.851	180	9199.21	-106.28	0	106.27	0
9300	0.851	180	9299.2	-107.76	0	107.76	0
9400	0.851	180	9399.19	-109.25	0	109.24	0
9500	0.851	180	9499.18	-110.73	0	110.73	0
9600	0.851	180	9599.17	-112.22	0	112.21	0
9700	0.851	180	9699.16	-113.7	0	113.7	0
9800	0.851	180	9799.15	-115.19	0	115.18	0
9900	0.851	180	9899.14	-116.67	0	116.67	0
10000	0.851	180	9999.12	-118.16	0	118.15	0
10100	0.851	180	10099.11	-119.64	0	119.64	0
10200	0.851	180	10199.1	-121.13	0	121.12	0
10300	0.851	180	10299.09	-122.61	0	122.61	0
10400	0.851	180	10399.08	-124.1	0	124.09	0
10500	0.851	180	10499.07	-125.58	0	125.58	0
10600	0.851	180	10599.06	-127.07	0	127.06	0
10700	0.851	180	10699.05	-128.55	0	128.54	0
10769.24	0.851	180	10768.28	-129.58	0	129.57	0
10800	0.389	180	10799.04	-129.91	0	129.91	1.5
10825.96	0	0	10825	-130	0	129.99	1.5
10900	0	0	10899.04	-130	0	129.99	0
11000	0	0	10999.04	-130	0	129.99	0
11100	0	0	11099.04	-130	0	129.99	0
11176	0	0	11175.04	-130	0	129.99	0
11200	2.4	180.556	11199.03	-130.5	0	130.5	10
11300	12.4	180.556	11298.07	-143.37	-0.13	143.36	10
11400	22.4	180.556	11393.37	-173.23	-0.42	173.23	10
11500	32.4	180.556	11482.04	-219.19	-0.87	219.19	10
11600	42.4	180.556	11561.38	-279.85	-1.46	279.85	10
11700	52.4	180.556	11628.99	-353.36	-2.17	353.37	10
11800	62.4	180.556	11682.79	-437.5	-2.99	437.5	10
11900	72.4	180.556	11721.17	-529.7	-3.88	529.71	10
12000	82.4	180.556	11742.96	-627.16	-4.83	627.18	10
12076	90	180.556	11747.99	-702.93	-5.56	702.95	10

12100	90	180.556	11747.99	-726.93	-5.8	726.95	0
12200	90	180.556	11747.99	-826.93	-6.77	826.95	0
12300	90	180.556	11747.99	-926.92	-7.74	926.95	0
12400	90	180.556	11747.99	-1026.92	-8.71	1026.95	0
12500	90	180.556	11747.99	-1126.91	-9.68	1126.95	0
12600	90	180.556	11747.99	-1226.91	-10.65	1226.95	0
12700	90	180.556	11747.99	-1326.9	-11.62	1326.95	0
12800	90	180.556	11747.99	-1426.9	-12.59	1426.95	0
12900	90	180.556	11747.99	-1526.89	-13.56	1526.95	0
13000	90	180.556	11747.99	-1626.89	-14.54	1626.95	0
13100	90	180.556	11747.99	-1726.88	-15.51	1726.95	0
13200	90	180.556	11747.99	-1826.88	-16.48	1826.95	0
13300	90	180.556	11747.99	-1926.87	-17.45	1926.95	0
13400	90	180.556	11747.99	-2026.87	-18.42	2026.95	0
13500	90	180.556	11747.99	-2126.87	-19.39	2126.95	0
13600	90	180.556	11747.99	-2226.86	-20.36	2226.95	0
13700	90	180.556	11747.99	-2326.86	-21.33	2326.95	0
13800	90	180.556	11747.99	-2426.85	-22.3	2426.95	0
13900	90	180.556	11747.99	-2526.85	-23.27	2526.95	0
14000	90	180.556	11747.99	-2626.84	-24.25	2626.95	0
14100	90	180.556	11747.99	-2726.84	-25.22	2726.95	0
14200	90	180.556	11747.99	-2826.83	-26.19	2826.95	0
14300	90	180.556	11747.99	-2926.83	-27.16	2926.95	0
14400	90	180.556	11747.99	-3026.82	-28.13	3026.95	0
14500	90	180.556	11747.99	-3126.82	-29.1	3126.95	0
14600	90	180.556	11747.99	-3226.81	-30.07	3226.95	0
14700	90	180.556	11747.99	-3326.81	-31.04	3326.95	0
14800	90	180.556	11747.99	-3426.8	-32.01	3426.95	0
14900	90	180.556	11747.99	-3526.8	-32.98	3526.95	0
15000	90	180.556	11747.99	-3626.79	-33.96	3626.95	0
15100	90	180.556	11747.99	-3726.79	-34.93	3726.95	0
15200	90	180.556	11747.99	-3826.79	-35.9	3826.95	0
15300	90	180.556	11747.99	-3926.78	-36.87	3926.95	0
15400	90	180.556	11747.99	-4026.78	-37.84	4026.95	0
15500	90	180.556	11747.99	-4126.77	-38.81	4126.95	0
15600	90	180.556	11747.99	-4226.77	-39.78	4226.95	0
15700	90	180.556	11747.99	-4326.76	-40.75	4326.95	0
15800	90	180.556	11747.99	-4426.76	-41.72	4426.95	0
15900	90	180.556	11747.99	-4526.75	-42.69	4526.95	0
16000	90	180.556	11747.99	-4626.75	-43.67	4626.95	0
16100	90	180.556	11747.99	-4726.74	-44.64	4726.95	0
16200	90	180.556	11747.99	-4826.74	-45.61	4826.95	0
16300	90	180.556	11747.99	-4926.73	-46.58	4926.95	0
16400	90	180.556	11747.99	-5026.73	-47.55	5026.95	0
16500	90	180.556	11747.99	-5126.72	-48.52	5126.95	0
16600	90	180.556	11747.99	-5226.72	-49.49	5226.95	0
16700	90	180.556	11747.99	-5326.71	-50.46	5326.95	0

16800	90	180.556	11747.99	-5426.71	-51.43	5426.95	0
16900	90	180.556	11747.99	-5526.71	-52.4	5526.95	0
17000	90	180.556	11747.99	-5626.7	-53.38	5626.95	0
17100	90	180.556	11747.99	-5726.7	-54.35	5726.95	0
17200	90	180.556	11747.99	-5826.69	-55.32	5826.95	0
17300	90	180.556	11747.99	-5926.69	-56.29	5926.95	0
17400	90	180.556	11747.99	-6026.68	-57.26	6026.95	0
17422.76	90	180.556	11747.99	-6049.44	-57.48	6049.72	0

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.  
Vertical depths are relative to RKB. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.

Vertical Section is from Slot and calculated along an Azimuth of 180.544° (Grid).

Coordinate System is North American Datum 1983 US State Plane 1983, New Mexico Eastern Zone.  
Central meridian is -104.333°.

Grid Convergence at Surface is 0.300°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 17422.76ft.,  
the Bottom Hole Displacement is 6049.72ft., in the Direction of 180.544° (Grid).



# TEC-LOCK WEDGE

8.625" 32.00 LB/FT (.352" Wall)  
BORUSAN MANNESMANN P110 HSCY

## Pipe Body Data

Nominal OD:	8.625	in
Nominal Wall:	.352	in
Nominal Weight:	32.00	lb/ft
Plain End Weight:	31.13	lb/ft
Material Grade:	P110 HSCY	
Mill/Specification:	BORUSAN MANNESMANN	
Yield Strength:	125,000	psi
Tensile Strength:	125,000	psi
Nominal ID:	7.921	in
API Drift Diameter:	7.796	in
Special Drift Diameter:	7.875	in
RBW:	87.5 %	
Body Yield:	1,144,000	lbf
Burst:	8,930	psi
Collapse:	4,230	psi

## Connection Data

Standard OD:	9.000	in
Pin Bored ID:	7.921	in
Critical Section Area:	8.61433	in <sup>2</sup>
Tensile Efficiency:	94.2 %	
Compressive Efficiency:	100.0 %	
Longitudinal Yield Strength:	1,077,000	lbf
Compressive Limit:	1,144,000	lbf
Internal Pressure Rating:	8,930	psi
External Pressure Rating:	4,230	psi
Maximum Bend:	62.6	°/100

## Operational Data

Minimum Makeup Torque:	29,900	ft*lb
Optimum Makeup Torque:	37,375	ft*lb
Maximum Makeup Torque:	80,900	ft*lb
Minimum Yield:	89,900	ft*lb
Makeup Loss:	5.97	in

## Notes

Operational Torque is equivalent to the Maximum Make-Up Torque.

