

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

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM077046
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		7. If Unit or CA Agreement, Name and No.
2. Name of Operator DEVON ENERGY PRODUCTION COMPANY LP		8. Lease Name and Well No. KO LANTA 9-4 FED COM 331H
3a. Address 333 West Sheridan Avenue, Oklahoma City, OK 73102	3b. Phone No. (include area code) (800) 583-3866	9. API Well No. 30 015 47403
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SWSW / 200 FSL / 945 FWL / LAT 32.312287 / LONG -103.7882951 At proposed prod. zone LOT 4 / 20 FNL / 1090 FWL / LAT 32.3406949 / LONG -103.7878394		10. Field and Pool, or Exploratory LOS MEDANOS; BONE SPRING
14. Distance in miles and direction from nearest town or post office*		11. Sec., T. R. M. or Blk. and Survey or Area SEC 9/T23S/R31E/NMP
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 200 feet		12. County or Parish EDDY
16. No of acres in lease 1320		13. State NM
17. Spacing Unit dedicated to this well 400.0		
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 1321 feet		20. BLM/BIA Bond No. in file FED: NMB000801
19. Proposed Depth 11270 feet / 21513 feet		
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3348 feet		22. Approximate date work will start* 05/07/2021
23. Estimated duration 45 days		
24. Attachments		

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

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

25. Signature (Electronic Submission)	Name (Printed/Typed) JENNY HARMS / Ph: (800) 583-3866	Date 05/17/2020
Title Regulatory Compliance Professional		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575) 234-5959	Date 08/14/2020
Title Assistant Field Manager Lands & Minerals		
Office Carlsbad Field Office		

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

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

APPROVED WITH CONDITIONS
Approval Date: 08/14/2020

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Jenny Harms 5-13-2020
Signature Date

JENNY HARMS
Printed Name
JENNY.HARMS@DVN.COM
E-mail Address

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

MARCH 16, 2020
Date of Survey

Jenny Harms
Signature and Seal of Professional Surveyor
Certificate Number: 12797

NEW MEXICO
JERRY L. JARAMILLO, PLS 12797
REGISTERED PROFESSIONAL SURVEYOR

Intent ☒ As Drilled ☐

API #								
Operator Name: DEVON ENERGY PRODUCTION COMPANY, L.P.			Property Name: KO LANTA 9-4 FED COM			Well Number 331H		

Kick Off Point (KOP)

UL M	Section 9	Township 23S	Range 31E	Lot	Feet 50 FSL	From N/S	Feet 1010 FWL	From E/W	County EDDY
Latitude 32.31187300					Longitude -103.78782900				NAD 83

First Take Point (FTP)

UL M	Section 9	Township 23S	Range 31E	Lot	Feet 100	From N/S SOUTH	Feet 1090	From E/W WEST	County EDDY
Latitude 32.3120122					Longitude 103.7878253				NAD 83

Last Take Point (LTP)

UL D	Section 4	Township 23S	Range 31E	Lot 4	Feet 100	From N/S NORTH	Feet 1090	From E/W WEST	County EDDY
Latitude 32.3404750					Longitude 103.7878395				NAD 83

Is this well the defining well for the Horizontal Spacing Unit? ☐ NO

Is this well an infill well? ☐ YES

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #								
Operator Name:			Property Name:			Well Number		

KZ 06/29/2018

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Original
to Appropriate
District Office

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

GAS CAPTURE PLAN

Date: April 30, 2020

☒ Original

Devon & OGRID No.: Devon Energy Production Co., L.P. 6137

☐ Amended - Reason for Amendment: _____

This Gas Capture Plan outlines actions to be taken by the Devon to reduce well/production facility flaring/venting for new completion (new drill, recomple to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location	SHL Footages				Expected MCF/D	Flared or Vented	Comments
KO LANTA 9-4 FED COM 231H		9-23S-31E	945	FWL	350	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 232H		9-23S-31E	975	FWL	350	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 512H		9-23S-31E	735	FWL	500	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 522H		9-23S-31E	765	FWL	500	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 621H		9-23S-31E	885	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 711H		9-23S-31E	915	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 331H		9-23S-31E	945	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 622H		9-23S-31E	975	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 514H		9-23S-31E	2534	FWL	500	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 524H		9-23S-31E	2564	FWL	500	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 712H		9-23S-31E	2534	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 332H		9-23S-31E	2564	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 623H		9-23S-31E	2594	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 713H		9-23S-31E	2624	FWL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 233H		9-23S-31E	1250	FEL	350	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 234H		9-23S-31E	1220	FEL	350	FSL			KO LANTA 9 CTB 3

KO LANTA 9-4 FED COM 516H		9-23S-31E	1430	FEL	350	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 526H		9-23S-31E	1400	FEL	350	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 333H		9-23S-31E	1130	FEL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 624H		9-23S-31E	1100	FEL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 714H		9-23S-31E	1070	FEL	200	FSL			KO LANTA 9 CTB 3
KO LANTA 9-4 FED COM 334H		9-23S-31E	1040	FEL	200	FSL			KO LANTA 9 CTB 3

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if DCP system is in place. The gas produced from production facility is dedicated to DCP and will be connected to DCP low/high pressure gathering system located in Lea County, New Mexico. It will require 0' of pipeline to connect the facility to low/high pressure gathering system. Devon provides (periodically) to DCP a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Devon and DCP have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at DCP Processing Plant located in the reference table. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on DCP system at that time. Based on current information, it is Devon's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
 - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
 - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
 - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

Reference Table:

DCP Plant locations
 Artesia Sec. 7, T18S, R28E,
 Eunice Sec. 5, T21S, R36E
 Linam Sec. 6, T19S, R37E
 Zia II Sec. 19, T19S, R32E

1. Geologic Formations

TVD of target	11270	Pilot hole depth	N/A
MD at TD:	21513	Deepest expected fresh water	

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards*
Rustler	485		
Salt	815		
Base of Salt	3965		
Delaware	4195		
Bone Spring 1st	9148		
Bone Spring 2nd	9682		
Bone Spring 3rd	10900		
Wolfcamp	11375		

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

2. Casing Program (Primary Design)

Hole Size	Csg. Size	Wt (PPF)	Grade	Conn	Casing Interval		Casing Interval	
					From (MD)	To (MD)	From (TVD)	To (TVD)
17 1/2	13 3/8	48.0	H40	STC	0	510	0	510
9 7/8	8 5/8	32.0	P110	TLW	0	9707	0	9707
7 7/8	5 1/2	17.0	P110	BTC	0	21513	0	11270

• All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 IILB.1.h Must have table for contingency casing.

3. Cementing Program (Primary Design)

Casing	# Sks	TOC	Wt. ppg	Yld (ft3/sack)	Slurry Description
Surface	408	Surf	13.2	1.44	Lead: Class C Cement + additives
Int 1	510	Surf	9	3.27	Lead: Class C Cement + additives
	67	4000' above	13.2	1.44	Tail: Class H / C + additives
Int 1 Intermediate Squeeze	As Needed	Surf	13.2	1.44	Squeeze Lead: Class C Cement + additives
	510	Surf	9	3.27	Lead: Class C Cement + additives
	67	4000' above	13.2	1.44	Tail: Class H / C + additives
Production	87	9207	9.0	3.3	Lead: Class H / C + additives
	1431	10700	13.2	1.4	Tail: Class H / C + additives

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

4. Pressure Control Equipment (Three 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"	5M	Annular (5M)		X	50% of rated working pressure
				Blind Ram		X	5M
				Pipe Ram			
				Double Ram		X	
				Other*			
				Annular (5M)			
				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 5 M annular on a 10M system						

5. Mud Program (Three String Design)

Section	Type	Weight (ppg)
Surface	FW Gel	8.5-9
Intermediate	DBE / Cut Brine	10-10.5
Production	OBM	8.5-9

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

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.

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	5274
Abnormal temperature	No

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

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

N	H ₂ S is present
Y	H ₂ 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 batch 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 pa.
- 6 The NMOCD will be contacted and notified 24 hours prior to commencing spudder rig operations.
- 7 Drilling operations will be performed with drilling rig. A 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

X Directional Plan
 Other, describe

WCDSC Permian NM

Eddy County (NAD 83 NM Eastern)

Sec 09-T23S-R31E

Ko Lanta 9-4 Fed Com 331H

Wellbore #1

Plan: Permit Plan 1

Standard Planning Report - Geographic

03 May, 2020

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

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 09-T23S-R31E			
Site Position:		Northing:	477,565.71 usft	Latitude:	32.311737
From:	Map	Easting:	708,775.36 usft	Longitude:	-103.791352
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.29 °

Well	Ko Lanta 9-4 Fed Com 331H					
Well Position	+N/-S	0.00 ft	Northing:	477,770.50 usft	Latitude:	32.312287
	+E/-W	0.00 ft	Easting:	709,718.77 usft	Longitude:	-103.788295
Position Uncertainty		0.50 ft	Wellhead Elevation:		Ground Level:	3,348.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/28/2020	6.75	60.07	47,673.67315971

Design	Permit Plan 1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	0.49

Plan Survey Tool Program	Date	5/3/2020		
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	21,512.59 Permit Plan 1 (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	
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,165.77	1.66	135.97	3,165.75	-1.72	1.67	1.00	1.00	0.00	135.97	
10,239.49	1.66	135.97	10,236.50	-148.85	143.89	0.00	0.00	0.00	0.00	
10,350.00	0.00	0.00	10,347.00	-150.00	145.00	1.50	-1.50	0.00	180.00	
10,700.04	0.00	0.00	10,697.04	-150.00	145.00	0.00	0.00	0.00	0.00	
11,600.04	90.00	359.69	11,270.00	422.95	141.90	10.00	10.00	0.00	359.69	PBHL - Ko Lanta 9-4
21,512.59	90.00	359.69	11,270.00	10,335.35	88.18	0.00	0.00	0.00	0.00	PBHL - Ko Lanta 9-4

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

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	477,770.50	709,718.77	32.312287	-103.788295
100.00	0.00	0.00	100.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
200.00	0.00	0.00	200.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
300.00	0.00	0.00	300.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
400.00	0.00	0.00	400.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
500.00	0.00	0.00	500.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
600.00	0.00	0.00	600.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
700.00	0.00	0.00	700.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
800.00	0.00	0.00	800.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
900.00	0.00	0.00	900.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,000.00	0.00	0.00	1,000.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,100.00	0.00	0.00	1,100.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,200.00	0.00	0.00	1,200.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,300.00	0.00	0.00	1,300.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,400.00	0.00	0.00	1,400.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,500.00	0.00	0.00	1,500.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,600.00	0.00	0.00	1,600.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,700.00	0.00	0.00	1,700.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,800.00	0.00	0.00	1,800.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
1,900.00	0.00	0.00	1,900.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,000.00	0.00	0.00	2,000.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,100.00	0.00	0.00	2,100.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,200.00	0.00	0.00	2,200.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,300.00	0.00	0.00	2,300.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,400.00	0.00	0.00	2,400.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,500.00	0.00	0.00	2,500.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,600.00	0.00	0.00	2,600.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,700.00	0.00	0.00	2,700.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,800.00	0.00	0.00	2,800.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
2,900.00	0.00	0.00	2,900.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
3,000.00	0.00	0.00	3,000.00	0.00	0.00	477,770.50	709,718.77	32.312287	-103.788295
3,100.00	1.00	135.97	3,099.99	-0.63	0.61	477,769.87	709,719.37	32.312285	-103.788293
3,165.77	1.66	135.97	3,165.75	-1.72	1.67	477,768.78	709,720.43	32.312282	-103.788290
3,200.00	1.66	135.97	3,199.96	-2.44	2.35	477,768.06	709,721.12	32.312280	-103.788288
3,300.00	1.66	135.97	3,299.92	-4.52	4.37	477,765.98	709,723.13	32.312275	-103.788281
3,400.00	1.66	135.97	3,399.88	-6.60	6.38	477,763.90	709,725.14	32.312269	-103.788275
3,500.00	1.66	135.97	3,499.84	-8.68	8.39	477,761.82	709,727.15	32.312263	-103.788268
3,600.00	1.66	135.97	3,599.80	-10.76	10.40	477,759.75	709,729.16	32.312257	-103.788262
3,700.00	1.66	135.97	3,699.75	-12.84	12.41	477,757.67	709,731.17	32.312252	-103.788255
3,800.00	1.66	135.97	3,799.71	-14.92	14.42	477,755.59	709,733.18	32.312246	-103.788249
3,900.00	1.66	135.97	3,899.67	-17.00	16.43	477,753.51	709,735.19	32.312240	-103.788243
4,000.00	1.66	135.97	3,999.63	-19.08	18.44	477,751.43	709,737.21	32.312234	-103.788236
4,100.00	1.66	135.97	4,099.59	-21.16	20.45	477,749.35	709,739.22	32.312229	-103.788230
4,200.00	1.66	135.97	4,199.54	-23.24	22.46	477,747.27	709,741.23	32.312223	-103.788223
4,300.00	1.66	135.97	4,299.50	-25.31	24.47	477,745.19	709,743.24	32.312217	-103.788217
4,400.00	1.66	135.97	4,399.46	-27.39	26.48	477,743.11	709,745.25	32.312211	-103.788210
4,500.00	1.66	135.97	4,499.42	-29.47	28.49	477,741.03	709,747.26	32.312206	-103.788204
4,600.00	1.66	135.97	4,599.38	-31.55	30.50	477,738.95	709,749.27	32.312200	-103.788197
4,700.00	1.66	135.97	4,699.33	-33.63	32.51	477,736.87	709,751.28	32.312194	-103.788191
4,800.00	1.66	135.97	4,799.29	-35.71	34.52	477,734.79	709,753.29	32.312188	-103.788184
4,900.00	1.66	135.97	4,899.25	-37.79	36.53	477,732.71	709,755.30	32.312183	-103.788178
5,000.00	1.66	135.97	4,999.21	-39.87	38.55	477,730.63	709,757.31	32.312177	-103.788171
5,100.00	1.66	135.97	5,099.17	-41.95	40.56	477,728.55	709,759.32	32.312171	-103.788165
5,200.00	1.66	135.97	5,199.13	-44.03	42.57	477,726.47	709,761.33	32.312166	-103.788158
5,300.00	1.66	135.97	5,299.08	-46.11	44.58	477,724.39	709,763.34	32.312160	-103.788152

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

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	1.66	135.97	5,399.04	-48.19	46.59	477,722.31	709,765.35	32.312154	-103.788145
5,500.00	1.66	135.97	5,499.00	-50.27	48.60	477,720.23	709,767.36	32.312148	-103.788139
5,600.00	1.66	135.97	5,598.96	-52.35	50.61	477,718.15	709,769.37	32.312143	-103.788132
5,700.00	1.66	135.97	5,698.92	-54.43	52.62	477,716.07	709,771.38	32.312137	-103.788126
5,800.00	1.66	135.97	5,798.87	-56.51	54.63	477,713.99	709,773.40	32.312131	-103.788120
5,900.00	1.66	135.97	5,898.83	-58.59	56.64	477,711.91	709,775.41	32.312125	-103.788113
6,000.00	1.66	135.97	5,998.79	-60.67	58.65	477,709.83	709,777.42	32.312120	-103.788107
6,100.00	1.66	135.97	6,098.75	-62.75	60.66	477,707.75	709,779.43	32.312114	-103.788100
6,200.00	1.66	135.97	6,198.71	-64.83	62.67	477,705.67	709,781.44	32.312108	-103.788094
6,300.00	1.66	135.97	6,298.67	-66.91	64.68	477,703.59	709,783.45	32.312102	-103.788087
6,400.00	1.66	135.97	6,398.62	-68.99	66.69	477,701.51	709,785.46	32.312097	-103.788081
6,500.00	1.66	135.97	6,498.58	-71.07	68.70	477,699.43	709,787.47	32.312091	-103.788074
6,600.00	1.66	135.97	6,598.54	-73.15	70.71	477,697.35	709,789.48	32.312085	-103.788068
6,700.00	1.66	135.97	6,698.50	-75.23	72.72	477,695.27	709,791.49	32.312079	-103.788061
6,800.00	1.66	135.97	6,798.46	-77.31	74.74	477,693.19	709,793.50	32.312074	-103.788055
6,900.00	1.66	135.97	6,898.41	-79.39	76.75	477,691.11	709,795.51	32.312068	-103.788048
7,000.00	1.66	135.97	6,998.37	-81.47	78.76	477,689.03	709,797.52	32.312062	-103.788042
7,100.00	1.66	135.97	7,098.33	-83.55	80.77	477,686.95	709,799.53	32.312056	-103.788035
7,200.00	1.66	135.97	7,198.29	-85.63	82.78	477,684.87	709,801.54	32.312051	-103.788029
7,300.00	1.66	135.97	7,298.25	-87.71	84.79	477,682.79	709,803.55	32.312045	-103.788022
7,400.00	1.66	135.97	7,398.20	-89.79	86.80	477,680.71	709,805.56	32.312039	-103.788016
7,500.00	1.66	135.97	7,498.16	-91.87	88.81	477,678.63	709,807.58	32.312033	-103.788009
7,600.00	1.66	135.97	7,598.12	-93.95	90.82	477,676.55	709,809.59	32.312028	-103.788003
7,700.00	1.66	135.97	7,698.08	-96.03	92.83	477,674.47	709,811.60	32.312022	-103.787997
7,800.00	1.66	135.97	7,798.04	-98.11	94.84	477,672.39	709,813.61	32.312016	-103.787990
7,900.00	1.66	135.97	7,898.00	-100.19	96.85	477,670.31	709,815.62	32.312010	-103.787984
8,000.00	1.66	135.97	7,997.95	-102.27	98.86	477,668.23	709,817.63	32.312005	-103.787977
8,100.00	1.66	135.97	8,097.91	-104.35	100.87	477,666.15	709,819.64	32.311999	-103.787971
8,200.00	1.66	135.97	8,197.87	-106.43	102.88	477,664.07	709,821.65	32.311993	-103.787964
8,300.00	1.66	135.97	8,297.83	-108.51	104.89	477,661.99	709,823.66	32.311987	-103.787958
8,400.00	1.66	135.97	8,397.79	-110.59	106.90	477,659.91	709,825.67	32.311982	-103.787951
8,500.00	1.66	135.97	8,497.74	-112.67	108.92	477,657.83	709,827.68	32.311976	-103.787945
8,600.00	1.66	135.97	8,597.70	-114.75	110.93	477,655.75	709,829.69	32.311970	-103.787938
8,700.00	1.66	135.97	8,697.66	-116.83	112.94	477,653.67	709,831.70	32.311964	-103.787932
8,800.00	1.66	135.97	8,797.62	-118.91	114.95	477,651.59	709,833.71	32.311959	-103.787925
8,900.00	1.66	135.97	8,897.58	-120.99	116.96	477,649.51	709,835.72	32.311953	-103.787919
9,000.00	1.66	135.97	8,997.54	-123.07	118.97	477,647.43	709,837.73	32.311947	-103.787912
9,100.00	1.66	135.97	9,097.49	-125.15	120.98	477,645.35	709,839.74	32.311941	-103.787906
9,200.00	1.66	135.97	9,197.45	-127.23	122.99	477,643.27	709,841.75	32.311936	-103.787899
9,300.00	1.66	135.97	9,297.41	-129.31	125.00	477,641.19	709,843.77	32.311930	-103.787893
9,400.00	1.66	135.97	9,397.37	-131.39	127.01	477,639.11	709,845.78	32.311924	-103.787886
9,500.00	1.66	135.97	9,497.33	-133.47	129.02	477,637.03	709,847.79	32.311918	-103.787880
9,600.00	1.66	135.97	9,597.28	-135.55	131.03	477,634.95	709,849.80	32.311913	-103.787874
9,700.00	1.66	135.97	9,697.24	-137.63	133.04	477,632.87	709,851.81	32.311907	-103.787867
9,800.00	1.66	135.97	9,797.20	-139.71	135.05	477,630.79	709,853.82	32.311901	-103.787861
9,900.00	1.66	135.97	9,897.16	-141.79	137.06	477,628.71	709,855.83	32.311895	-103.787854
10,000.00	1.66	135.97	9,997.12	-143.87	139.07	477,626.63	709,857.84	32.311890	-103.787848
10,100.00	1.66	135.97	10,097.08	-145.95	141.08	477,624.55	709,859.85	32.311884	-103.787841
10,200.00	1.66	135.97	10,197.03	-148.03	143.10	477,622.47	709,861.86	32.311878	-103.787835
10,239.49	1.66	135.97	10,236.50	-148.85	143.89	477,621.65	709,862.65	32.311876	-103.787832
10,300.00	0.75	135.97	10,297.00	-149.76	144.77	477,620.74	709,863.54	32.311873	-103.787829
10,350.00	0.00	0.00	10,347.00	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829
10,400.00	0.00	0.00	10,397.00	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829
10,500.00	0.00	0.00	10,497.00	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829
10,600.00	0.00	0.00	10,597.00	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,700.00	0.00	0.00	10,697.00	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829
10,700.04	0.00	0.00	10,697.04	-150.00	145.00	477,620.50	709,863.77	32.311873	-103.787829
KOP @ 10700' MD, 50' FSL, 1010' FWL									
10,800.00	10.00	359.69	10,796.49	-141.30	144.95	477,629.20	709,863.72	32.311897	-103.787829
10,900.00	20.00	359.69	10,892.97	-115.46	144.81	477,655.04	709,863.58	32.311968	-103.787829
10,941.00	24.10	359.69	10,930.96	-100.07	144.73	477,670.43	709,863.50	32.312010	-103.787829
FTP @ 10941' MD, 100' FSL, 1010' FWL									
11,000.00	30.00	359.69	10,983.49	-73.26	144.58	477,697.24	709,863.35	32.312084	-103.787829
11,100.00	40.00	359.69	11,065.30	-15.98	144.27	477,754.52	709,863.04	32.312241	-103.787829
11,200.00	50.00	359.69	11,135.93	54.63	143.89	477,825.13	709,862.66	32.312435	-103.787829
11,300.00	60.00	359.69	11,193.22	136.44	143.45	477,906.94	709,862.21	32.312660	-103.787829
11,400.00	70.00	359.69	11,235.43	226.95	142.96	477,997.45	709,861.72	32.312909	-103.787829
11,500.00	80.00	359.69	11,261.29	323.42	142.43	478,093.92	709,861.20	32.313174	-103.787829
11,600.00	90.00	359.69	11,270.00	422.91	141.90	478,193.41	709,860.66	32.313448	-103.787829
11,600.04	90.00	359.69	11,270.00	422.95	141.90	478,193.45	709,860.66	32.313448	-103.787829
11,700.00	90.00	359.69	11,270.00	522.91	141.35	478,293.41	709,860.12	32.313722	-103.787829
11,800.00	90.00	359.69	11,270.00	622.91	140.81	478,393.41	709,859.58	32.313997	-103.787829
11,900.00	90.00	359.69	11,270.00	722.91	140.27	478,493.40	709,859.04	32.314272	-103.787829
12,000.00	90.00	359.69	11,270.00	822.90	139.73	478,593.40	709,858.49	32.314547	-103.787830
12,100.00	90.00	359.69	11,270.00	922.90	139.19	478,693.40	709,857.95	32.314822	-103.787830
12,200.00	90.00	359.69	11,270.00	1,022.90	138.64	478,793.40	709,857.41	32.315097	-103.787830
12,300.00	90.00	359.69	11,270.00	1,122.90	138.10	478,893.40	709,856.87	32.315372	-103.787830
12,400.00	90.00	359.69	11,270.00	1,222.90	137.56	478,993.40	709,856.33	32.315647	-103.787830
12,500.00	90.00	359.69	11,270.00	1,322.90	137.02	479,093.39	709,855.78	32.315922	-103.787830
12,600.00	90.00	359.69	11,270.00	1,422.90	136.48	479,193.39	709,855.24	32.316196	-103.787830
12,700.00	90.00	359.69	11,270.00	1,522.89	135.93	479,293.39	709,854.70	32.316471	-103.787830
12,800.00	90.00	359.69	11,270.00	1,622.89	135.39	479,393.39	709,854.16	32.316746	-103.787830
12,900.00	90.00	359.69	11,270.00	1,722.89	134.85	479,493.39	709,853.62	32.317021	-103.787831
13,000.00	90.00	359.69	11,270.00	1,822.89	134.31	479,593.39	709,853.07	32.317296	-103.787831
13,100.00	90.00	359.69	11,270.00	1,922.89	133.77	479,693.38	709,852.53	32.317571	-103.787831
13,200.00	90.00	359.69	11,270.00	2,022.89	133.23	479,793.38	709,851.99	32.317846	-103.787831
13,300.00	90.00	359.69	11,270.00	2,122.88	132.68	479,893.38	709,851.45	32.318121	-103.787831
13,400.00	90.00	359.69	11,270.00	2,222.88	132.14	479,993.38	709,850.91	32.318395	-103.787831
13,500.00	90.00	359.69	11,270.00	2,322.88	131.60	480,093.38	709,850.37	32.318670	-103.787831
13,600.00	90.00	359.69	11,270.00	2,422.88	131.06	480,193.38	709,849.82	32.318945	-103.787831
13,700.00	90.00	359.69	11,270.00	2,522.88	130.52	480,293.37	709,849.28	32.319220	-103.787831
13,800.00	90.00	359.69	11,270.00	2,622.88	129.97	480,393.37	709,848.74	32.319495	-103.787831
13,900.00	90.00	359.69	11,270.00	2,722.88	129.43	480,493.37	709,848.20	32.319770	-103.787832
14,000.00	90.00	359.69	11,270.00	2,822.87	128.89	480,593.37	709,847.66	32.320045	-103.787832
14,100.00	90.00	359.69	11,270.00	2,922.87	128.35	480,693.37	709,847.11	32.320320	-103.787832
14,200.00	90.00	359.69	11,270.00	3,022.87	127.81	480,793.37	709,846.57	32.320594	-103.787832
14,300.00	90.00	359.69	11,270.00	3,122.87	127.26	480,893.36	709,846.03	32.320869	-103.787832
14,400.00	90.00	359.69	11,270.00	3,222.87	126.72	480,993.36	709,845.49	32.321144	-103.787832
14,500.00	90.00	359.69	11,270.00	3,322.87	126.18	481,093.36	709,844.95	32.321419	-103.787832
14,600.00	90.00	359.69	11,270.00	3,422.87	125.64	481,193.36	709,844.40	32.321694	-103.787832
14,700.00	90.00	359.69	11,270.00	3,522.86	125.10	481,293.36	709,843.86	32.321969	-103.787832
14,800.00	90.00	359.69	11,270.00	3,622.86	124.55	481,393.36	709,843.32	32.322244	-103.787833
14,900.00	90.00	359.69	11,270.00	3,722.86	124.01	481,493.35	709,842.78	32.322519	-103.787833
15,000.00	90.00	359.69	11,270.00	3,822.86	123.47	481,593.35	709,842.24	32.322793	-103.787833
15,100.00	90.00	359.69	11,270.00	3,922.86	122.93	481,693.35	709,841.69	32.323068	-103.787833
15,200.00	90.00	359.69	11,270.00	4,022.86	122.39	481,793.35	709,841.15	32.323343	-103.787833
15,300.00	90.00	359.69	11,270.00	4,122.86	121.85	481,893.35	709,840.61	32.323618	-103.787833
15,400.00	90.00	359.69	11,270.00	4,222.85	121.30	481,993.35	709,840.07	32.323893	-103.787833
15,500.00	90.00	359.69	11,270.00	4,322.85	120.76	482,093.34	709,839.53	32.324168	-103.787833

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSC Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,600.00	90.00	359.69	11,270.00	4,422.85	120.22	482,193.34	709,838.99	32.324443	-103.787833
15,700.00	90.00	359.69	11,270.00	4,522.85	119.68	482,293.34	709,838.44	32.324718	-103.787834
15,800.00	90.00	359.69	11,270.00	4,622.85	119.14	482,393.34	709,837.90	32.324992	-103.787834
15,900.00	90.00	359.69	11,270.00	4,722.85	118.59	482,493.34	709,837.36	32.325267	-103.787834
16,000.00	90.00	359.69	11,270.00	4,822.85	118.05	482,593.34	709,836.82	32.325542	-103.787834
16,100.00	90.00	359.69	11,270.00	4,922.84	117.51	482,693.33	709,836.28	32.325817	-103.787834
16,200.00	90.00	359.69	11,270.00	5,022.84	116.97	482,793.33	709,835.73	32.326092	-103.787834
16,261.00	90.00	359.69	11,270.00	5,083.84	116.64	482,854.33	709,835.40	32.326260	-103.787834
Cross section @ 16261' MD, 0' FSL, 1090' FWL									
16,300.00	90.00	359.69	11,270.00	5,122.84	116.43	482,893.33	709,835.19	32.326367	-103.787834
16,400.00	90.00	359.69	11,270.00	5,222.84	115.88	482,993.33	709,834.65	32.326642	-103.787834
16,500.00	90.00	359.69	11,270.00	5,322.84	115.34	483,093.33	709,834.11	32.326917	-103.787834
16,600.00	90.00	359.69	11,270.00	5,422.84	114.80	483,193.33	709,833.57	32.327191	-103.787834
16,700.00	90.00	359.69	11,270.00	5,522.84	114.26	483,293.32	709,833.02	32.327466	-103.787835
16,800.00	90.00	359.69	11,270.00	5,622.83	113.72	483,393.32	709,832.48	32.327741	-103.787835
16,900.00	90.00	359.69	11,270.00	5,722.83	113.18	483,493.32	709,831.94	32.328016	-103.787835
17,000.00	90.00	359.69	11,270.00	5,822.83	112.63	483,593.32	709,831.40	32.328291	-103.787835
17,100.00	90.00	359.69	11,270.00	5,922.83	112.09	483,693.32	709,830.86	32.328566	-103.787835
17,200.00	90.00	359.69	11,270.00	6,022.83	111.55	483,793.32	709,830.32	32.328841	-103.787835
17,300.00	90.00	359.69	11,270.00	6,122.83	111.01	483,893.31	709,829.77	32.329116	-103.787835
17,400.00	90.00	359.69	11,270.00	6,222.82	110.47	483,993.31	709,829.23	32.329390	-103.787835
17,500.00	90.00	359.69	11,270.00	6,322.82	109.92	484,093.31	709,828.69	32.329665	-103.787835
17,600.00	90.00	359.69	11,270.00	6,422.82	109.38	484,193.31	709,828.15	32.329940	-103.787836
17,700.00	90.00	359.69	11,270.00	6,522.82	108.84	484,293.31	709,827.61	32.330215	-103.787836
17,800.00	90.00	359.69	11,270.00	6,622.82	108.30	484,393.31	709,827.06	32.330490	-103.787836
17,900.00	90.00	359.69	11,270.00	6,722.82	107.76	484,493.30	709,826.52	32.330765	-103.787836
18,000.00	90.00	359.69	11,270.00	6,822.82	107.21	484,593.30	709,825.98	32.331040	-103.787836
18,100.00	90.00	359.69	11,270.00	6,922.81	106.67	484,693.30	709,825.44	32.331315	-103.787836
18,200.00	90.00	359.69	11,270.00	7,022.81	106.13	484,793.30	709,824.90	32.331589	-103.787836
18,300.00	90.00	359.69	11,270.00	7,122.81	105.59	484,893.30	709,824.35	32.331864	-103.787836
18,400.00	90.00	359.69	11,270.00	7,222.81	105.05	484,993.30	709,823.81	32.332139	-103.787836
18,500.00	90.00	359.69	11,270.00	7,322.81	104.51	485,093.29	709,823.27	32.332414	-103.787836
18,600.00	90.00	359.69	11,270.00	7,422.81	103.96	485,193.29	709,822.73	32.332689	-103.787837
18,700.00	90.00	359.69	11,270.00	7,522.81	103.42	485,293.29	709,822.19	32.332964	-103.787837
18,800.00	90.00	359.69	11,270.00	7,622.80	102.88	485,393.29	709,821.65	32.333239	-103.787837
18,900.00	90.00	359.69	11,270.00	7,722.80	102.34	485,493.29	709,821.10	32.333514	-103.787837
19,000.00	90.00	359.69	11,270.00	7,822.80	101.80	485,593.29	709,820.56	32.333789	-103.787837
19,100.00	90.00	359.69	11,270.00	7,922.80	101.25	485,693.28	709,820.02	32.334063	-103.787837
19,200.00	90.00	359.69	11,270.00	8,022.80	100.71	485,793.28	709,819.48	32.334338	-103.787837
19,300.00	90.00	359.69	11,270.00	8,122.80	100.17	485,893.28	709,818.94	32.334613	-103.787837
19,400.00	90.00	359.69	11,270.00	8,222.80	99.63	485,993.28	709,818.39	32.334888	-103.787837
19,500.00	90.00	359.69	11,270.00	8,322.79	99.09	486,093.28	709,817.85	32.335163	-103.787838
19,600.00	90.00	359.69	11,270.00	8,422.79	98.54	486,193.28	709,817.31	32.335438	-103.787838
19,700.00	90.00	359.69	11,270.00	8,522.79	98.00	486,293.27	709,816.77	32.335713	-103.787838
19,800.00	90.00	359.69	11,270.00	8,622.79	97.46	486,393.27	709,816.23	32.335988	-103.787838
19,900.00	90.00	359.69	11,270.00	8,722.79	96.92	486,493.27	709,815.68	32.336262	-103.787838
20,000.00	90.00	359.69	11,270.00	8,822.79	96.38	486,593.27	709,815.14	32.336537	-103.787838
20,100.00	90.00	359.69	11,270.00	8,922.79	95.83	486,693.27	709,814.60	32.336812	-103.787838
20,200.00	90.00	359.69	11,270.00	9,022.78	95.29	486,793.27	709,814.06	32.337087	-103.787838
20,300.00	90.00	359.69	11,270.00	9,122.78	94.75	486,893.26	709,813.52	32.337362	-103.787838
20,400.00	90.00	359.69	11,270.00	9,222.78	94.21	486,993.26	709,812.97	32.337637	-103.787838
20,500.00	90.00	359.69	11,270.00	9,322.78	93.67	487,093.26	709,812.43	32.337912	-103.787839
20,600.00	90.00	359.69	11,270.00	9,422.78	93.13	487,193.26	709,811.89	32.338187	-103.787839
20,700.00	90.00	359.69	11,270.00	9,522.78	92.58	487,293.26	709,811.35	32.338461	-103.787839

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	Local Co-ordinate Reference:	Well Ko Lanta 9-4 Fed Com 331H
Company:	WCDSO Permian NM	TVD Reference:	RKB @ 3373.00ft
Project:	Eddy County (NAD 83 NM Eastern)	MD Reference:	RKB @ 3373.00ft
Site:	Sec 09-T23S-R31E	North Reference:	Grid
Well:	Ko Lanta 9-4 Fed Com 331H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,800.00	90.00	359.69	11,270.00	9,622.77	92.04	487,393.26	709,810.81	32.338736	-103.787839
20,900.00	90.00	359.69	11,270.00	9,722.77	91.50	487,493.25	709,810.27	32.339011	-103.787839
21,000.00	90.00	359.69	11,270.00	9,822.77	90.96	487,593.25	709,809.72	32.339286	-103.787839
21,100.00	90.00	359.69	11,270.00	9,922.77	90.42	487,693.25	709,809.18	32.339561	-103.787839
21,200.00	90.00	359.69	11,270.00	10,022.77	89.87	487,793.25	709,808.64	32.339836	-103.787839
21,300.00	90.00	359.69	11,270.00	10,122.77	89.33	487,893.25	709,808.10	32.340111	-103.787839
21,400.00	90.00	359.69	11,270.00	10,222.77	88.79	487,993.25	709,807.56	32.340386	-103.787840
21,433.00	90.00	359.69	11,270.00	10,255.77	88.61	488,026.25	709,807.38	32.340476	-103.787840
LTP @ 21433' MD, 100' FNL, 1010' FWL									
21,500.00	90.00	359.69	11,270.00	10,322.76	88.25	488,093.24	709,807.01	32.340660	-103.787840
21,512.58	90.00	359.69	11,270.00	10,335.34	88.18	488,105.82	709,806.95	32.340695	-103.787840
PBHL; 20' FNL, 1010' FWL									
21,512.59	90.00	359.69	11,270.00	10,335.35	88.18	488,105.83	709,806.95	32.340695	-103.787840

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 - Ko Lanta 9-4 Fed Com 331H	0.00	0.00	0.00	10,335.35	88.18	488,105.83	709,806.95	32.340695	-103.787840
- plan misses target center by 10335.73ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
10,700.04	10,697.04	-150.00	145.00	KOP @ 10700' MD, 50' FSL, 1010' FWL	
10,941.00	10,930.96	-100.07	144.73	FTP @ 10941' MD, 100' FSL, 1010' FWL	
16,261.00	11,270.00	5,083.84	116.64	Cross section @ 16261' MD, 0' FSL, 1090' FWL	
21,433.00	11,270.00	10,255.77	88.61	LTP @ 21433' MD, 100' FNL, 1010' FWL	
21,512.58	11,270.00	10,335.34	88.18	PBHL; 20' FNL, 1010' FWL	

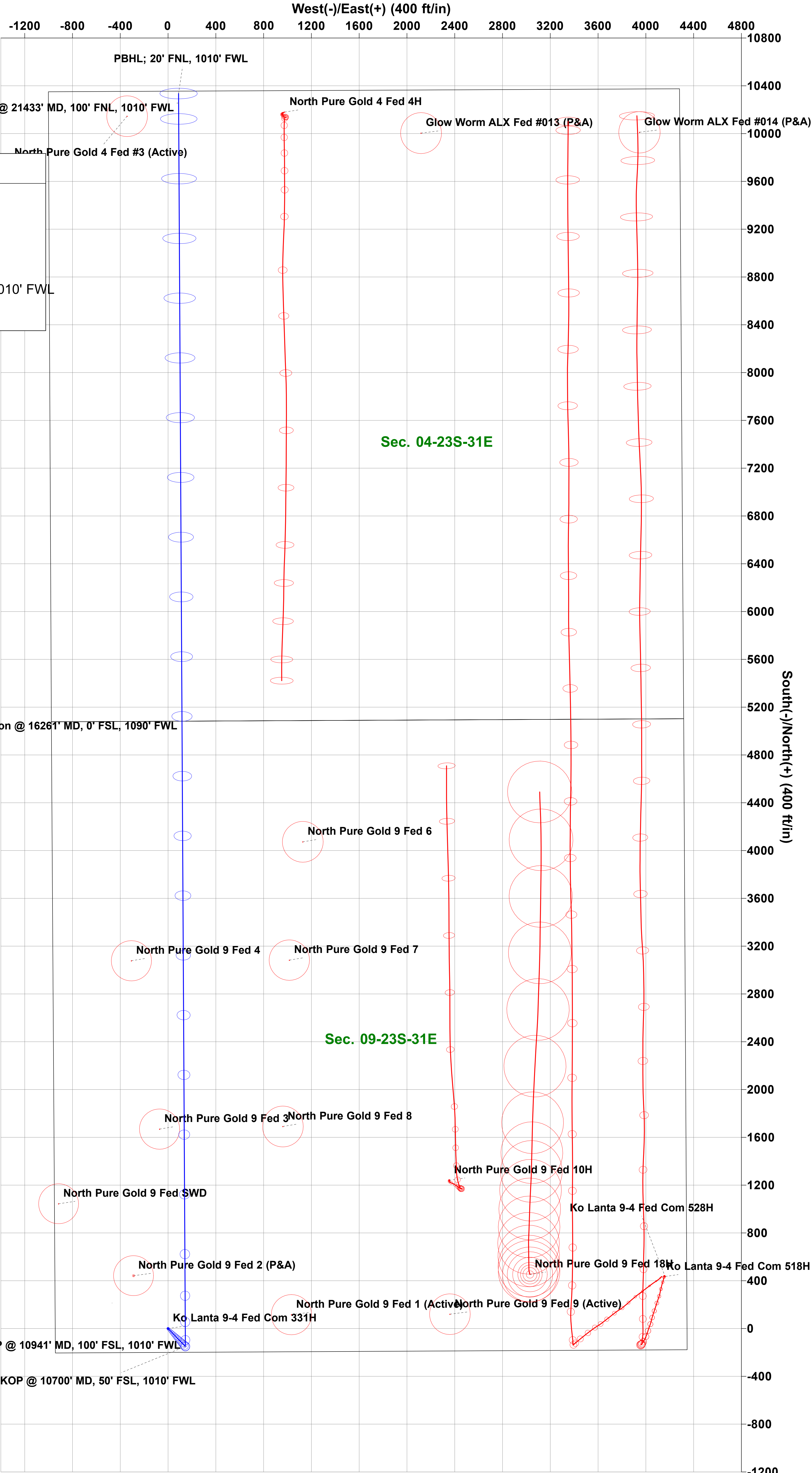
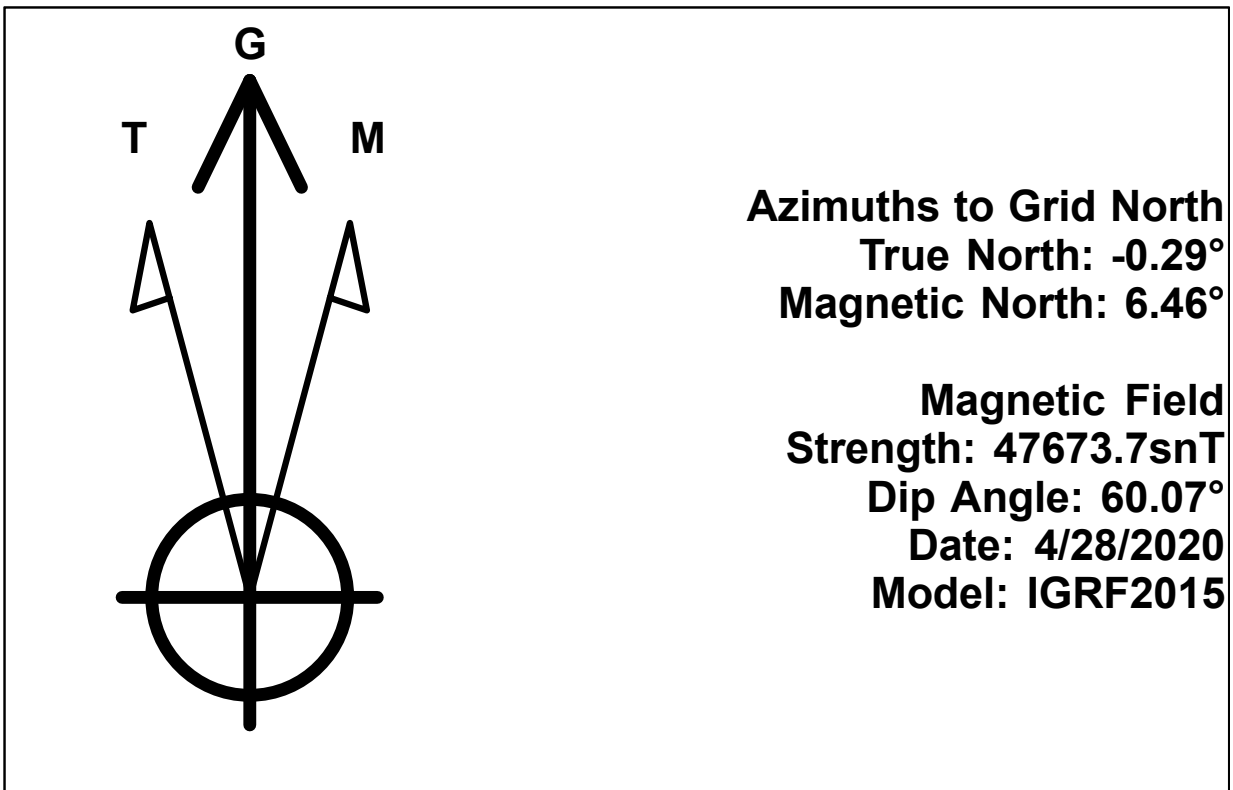
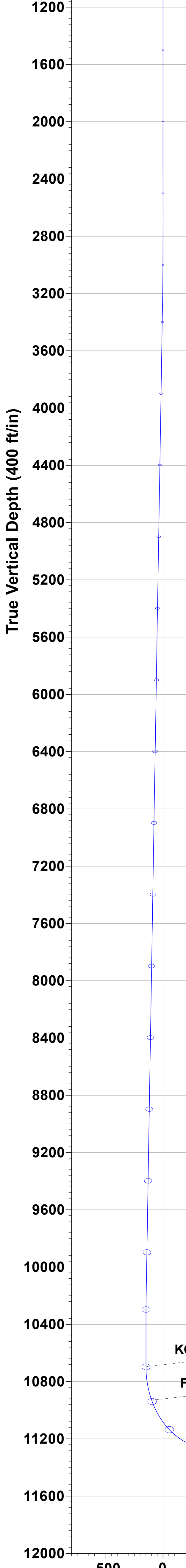
Devon Energy

WELL DETAILS: Ko Lanta 9-4 Fed Com 331H

RKB @ 3373.00ft
3348.00

Northing 477770.50 Easting 709718.77 Latitude 32.312287 Longitude -103.788295

SECTION DETAILS					Permit Plan 1				
	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect	Annotation
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	3000.00	0.00	0.00	3000.00	0.00	0.00	0.00	0.00	
	3165.77	1.66	135.97	3165.75	-1.72	1.67	1.00	-1.71	
	10239.49	1.66	135.97	10236.50	-148.85	143.89	0.00	-147.62	
5	10350.00	0.00	0.00	10347.00	-150.00	145.00	1.50	-148.76	
6	10700.04	0.00	0.00	10697.04	-150.00	145.00	0.00	-148.76	KOP @ 10700' MD, 50' FSL, 1010' FW
7	11600.04	90.00	359.69	11270.00	422.95	141.90	10.00	424.15	
8	21512.59	90.00	359.69	11270.00	10335.35	88.18	0.00	10335.73	PBHL; 20' FNL, 1010' FWL



Vertical Section at 0.49° (500 ft/in)

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Devon Energy Production Company LP
LEASE NO.:	NMNM077046
LOCATION:	Section 9, T.23 S., R.31 E., NMPM
COUNTY:	Eddy County, New Mexico

WELL NAME & NO.:	Ko Lanta 9-4 Fed Com 331H
SURFACE HOLE FOOTAGE:	200'/S & 945'/W
BOTTOM HOLE FOOTAGE:	20'/N & 1090'/W

WELL NAME & NO.:	Ko Lanta 9-4 Fed Com 332H
SURFACE HOLE FOOTAGE:	200'/S & 2564'/W
BOTTOM HOLE FOOTAGE:	20'/N & 2310'/W

WELL NAME & NO.:	Ko Lanta 9-4 Fed Com 333H
SURFACE HOLE FOOTAGE:	200'/S & 1130'/E
BOTTOM HOLE FOOTAGE:	20'/N & 1650'/E

WELL NAME & NO.:	Ko Lanta 9-4 Fed Com 334H
SURFACE HOLE FOOTAGE:	200'/S & 1040'/E
BOTTOM HOLE FOOTAGE:	20'/N & 330'/E

COA

H2S	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Potash	<input checked="" type="checkbox"/> None	<input checked="" type="checkbox"/> Secretary	<input checked="" type="checkbox"/> R-111-P
Cave/Karst Potential	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Cave/Karst Potential	<input checked="" type="checkbox"/> Critical		
Variance	<input checked="" type="checkbox"/> None	<input checked="" type="checkbox"/> Flex Hose	<input checked="" type="checkbox"/> Other
Wellhead	<input checked="" type="checkbox"/> Conventional	<input checked="" type="checkbox"/> Multibowl	<input checked="" type="checkbox"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input checked="" type="checkbox"/> Fluid Filled	<input checked="" type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit

A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S 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 **550 feet** (a minimum of **70 feet (Eddy County)** 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 **24 hours in the Potash Area** 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 **8-5/8** inch intermediate casing is:
 - 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.
 - ❖ In Secretary Potash 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.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
 - Cement should tie-back at least **500 feet** into previous casing string. Operator shall provide method of verification.
Cement excess is less than 25%, more 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. 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 **5000 (5M)** 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. 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.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, 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.

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)

☒ 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 2nd 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. 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.

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: The flex line must meet the requirements of API 16C. 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, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- 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.



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

Hydrogen Sulfide (H₂S) Contingency Plan

For

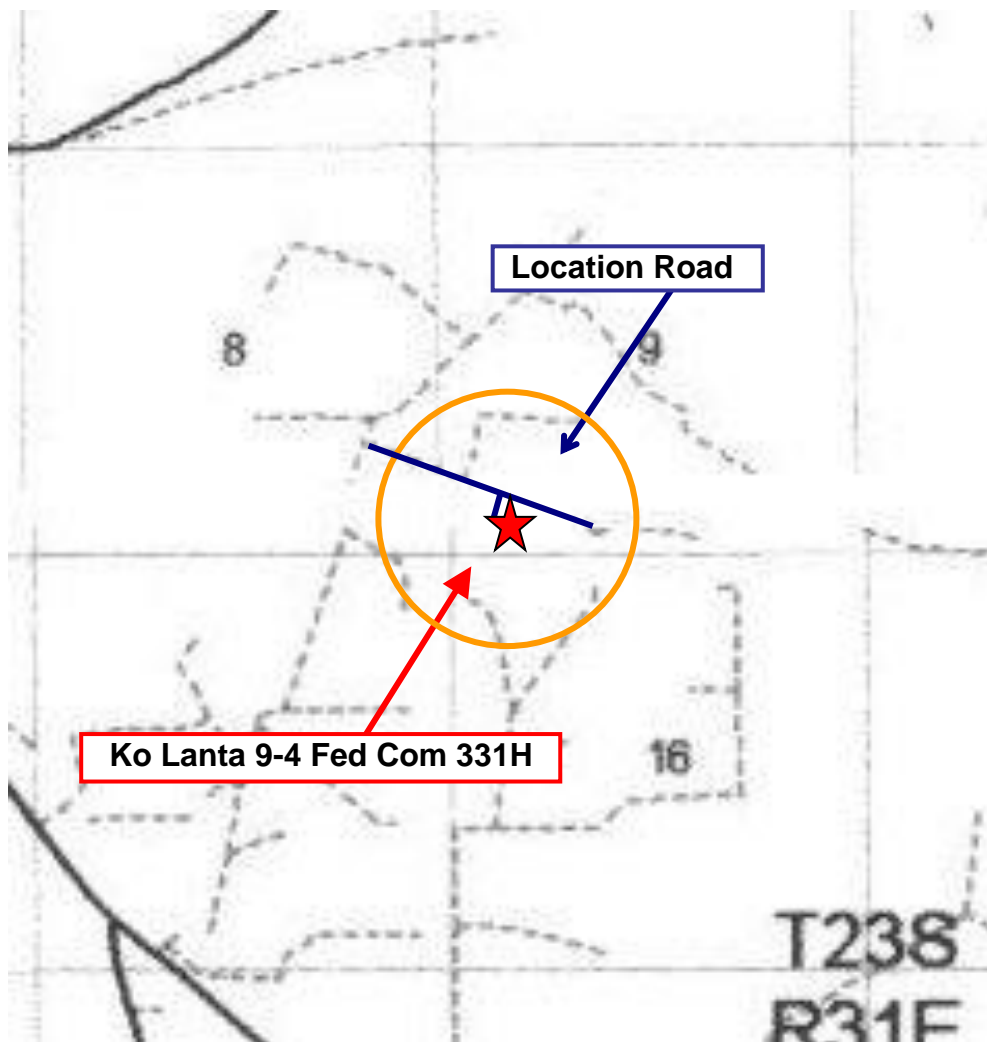
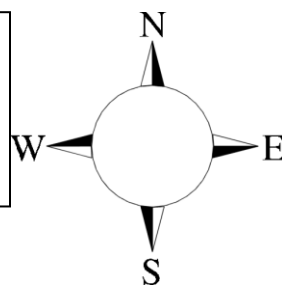
Ko Lanta 9-4 Fed Com 331H

**Sec-9 T-23S R-31E
200' FSL & 945' FWL
LAT. = 32.3122870' N (NAD83)
LONG = 103.7882951' W**

Eddy County NM

Ko Lanta 9-4 Fed Com 331H

This is an open drilling site. H₂S monitoring equipment and emergency response equipment will be used within 500' of zones known to contain H₂S, including warning signs, wind indicators and H₂S monitor.



Assumed 100 ppm ROE = 3000' (Radius of Exposure)
100 ppm H₂S 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 H₂S concentration shall trigger activation of this plan.

Emergency Procedures

In the event of a release of gas containing H₂S, 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 H₂S 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 H₂S, 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 (SO₂). 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 H₂S and SO₂

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

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 (H₂S) 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 (H₂S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H₂S 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 H₂S 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 H₂S Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H₂S zone (within 3 days or 500 feet) and weekly H₂S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H₂S Drilling Operations Plan and the Public Protection Plan.

II. HYDROGEN SULFIDE TRAINING

Note: All H₂S 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 H₂S.

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. H₂S detection and monitoring equipment:

Portable H₂S monitors positioned on location for best coverage and response. These units have warning lights which activate when H₂S 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 H₂S circulated to surface. Proper mud weight, safe drilling practices and the use of H₂S scavengers will minimize hazards when penetrating H₂S bearing zones.

5. Metallurgy:

- A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold lines, and valves shall be H₂S trim.
- B. All elastomers used for packing and seals shall be H₂S 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 H₂S environment will use the closed chamber method of testing.
- B. There will be no drill stem testing.