devon

30-025-42425

Thistle Unit 71

APD

- C-102
- Drilling Plan
- Directional Survey

Devon Energy, Thistle Unit 71H

1. Geologic Formations

TVD of target	10,465'	Pilot hole depth	N/A
MD at TD:	14,948'	Deepest expected fresh water:	

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Rustler	1,350	110'	
Top of Salt	1,617	Barren	
Lamar	5,275	Barren	
Delaware	5,300	Oil	
Cherry Canyon	6,240	Oil	
Brushy Canyon	8,035	Oil	
Lower Brushy Canyon	9,000	Oil	
1st Bone Spring Lime	9,160	Oil	
1st Bone Spring Sand	10,280	Oil	

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

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	1,380'	13.375"	48	H-40	STC	1.22	2.74	4.86
12.25"	0	5,250'	9.625"	40	HCK-55	BTC	1.55	1.45	4.41
8.75"	0	9,872'	7"	29	P-110	BTC	1.80	2.38	2.84
8.75"	9,872'	14,948'	5.5"	17	P-110	BTC	1.49	2.13	6.58
				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

	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 3rd 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 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	H_2O gal/sk	Yld ft3/ sack	500# Comp. Strength (hours)	Slurry Description
13-3/8" Surface	670	12.9	9.81	1.85	14	Lead: (65:35) Class C Cement: Poz (Fly Ash): 6% BWOC Bentonite + 5% BWOW Sodium Chloride + 0.125 lbs/sack Poly-E-Flake
	550	14.8	6.32	1.33	6	Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake
9-5/8" Inter.	1090	12.9	9.81	1.85	14	Lead: (65:35) Class C Cement: Poz (Fly Ash): 6% BWOC Bentonite + 5% BWOW Sodium Chloride + 0.125 lbs/sack Poly-E-Flake
	430	14.8	6.32	1.33	6	Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake
7 x 5-1/2" Combo Prod.	300	10.4	16.9	3.17	16	Lead: Tuned Light ® + 0.125 lb/sk Pol-E-Flake
	1350	14.5	5.31	1.2	25	Tail: (50:50) Class H Cement: Poz (Fly Ash) + 0.5% bwoc HALAD-344 + 0.4% bwoc CFR-3 + 0.2% BWOC HR-601 + 2% bwoc Bentonite

Casing String	TOC	% Excess
13-3/8" Surface	0'	100%
9-5/8" Intermediate	0'	75%
7 x 5-1/2" Production Casing	4750'	25%

4. Pressure Control Equipment

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

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	3M	Annular	x	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	x	
			Other *		
			Annular		
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other *		

*Specify if additional ram is utilized.

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

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

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.

Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.	
	Y	Are anchors required by manufacturer?
Y	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. Devon proposes using a multi-bowl wellhead assembly (FMC Uni-head). This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 3000 (3M) psi. • Wellhead will be installed by FMC's representatives. • If the welding is performed by a third party, the FMC's representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal. • FMC representative will install the test plug for the initial BOP test. • FMC will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the pack-off, the pack-off and the lower flange will be tested to 3M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time. • If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted. • Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating. • Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2. After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the FMC Uni-head wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2. After running the 9-5/8' intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 3M will already be installed on the FMC Uni-head. The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.	

	Devon requests a variance to use a flexible line with flanged ends between the BOP and the choke manifold (choke line). The line will be kept as straight as possible with minimal turns See attached schematic.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	1,380'	FW Gel	8.6-8.8	28-34	N/C
1,380'	5,250'	Saturated Brine	10.0-10.2	28-34	N/C
5,250'	14,948'	Cut Brine	8.5-9.3	28-34	N/C

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

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

6. Logging and Testing Procedures

Logging, Coring and Testing.	
x	Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? 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	2759 psi
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	H2S is present
Y	H2S Plan attached

8. Other facets of operation

Is this a walking operation? No.
Will be pre-setting casing? No.

Attachments
_x_ Directional Plan
___ Other, describe

DEVON ENERGY

Project: Lea County, NM (NAD-83)
Site: Thistle Unit
Well: 71H
Wellbore: OH
Design: Plan #1

Azimuths to Grid North
True North: -0.42°
Magnetic North: 6.89°

Magnetic Field
Strength: 48244.2snT
Dip Angle: 60.15°
Date: 1/21/2015
Model: BGGM2014

PROJECT DETAILS: Lea County, NM (NAD-83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level

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SECTION DETAILS

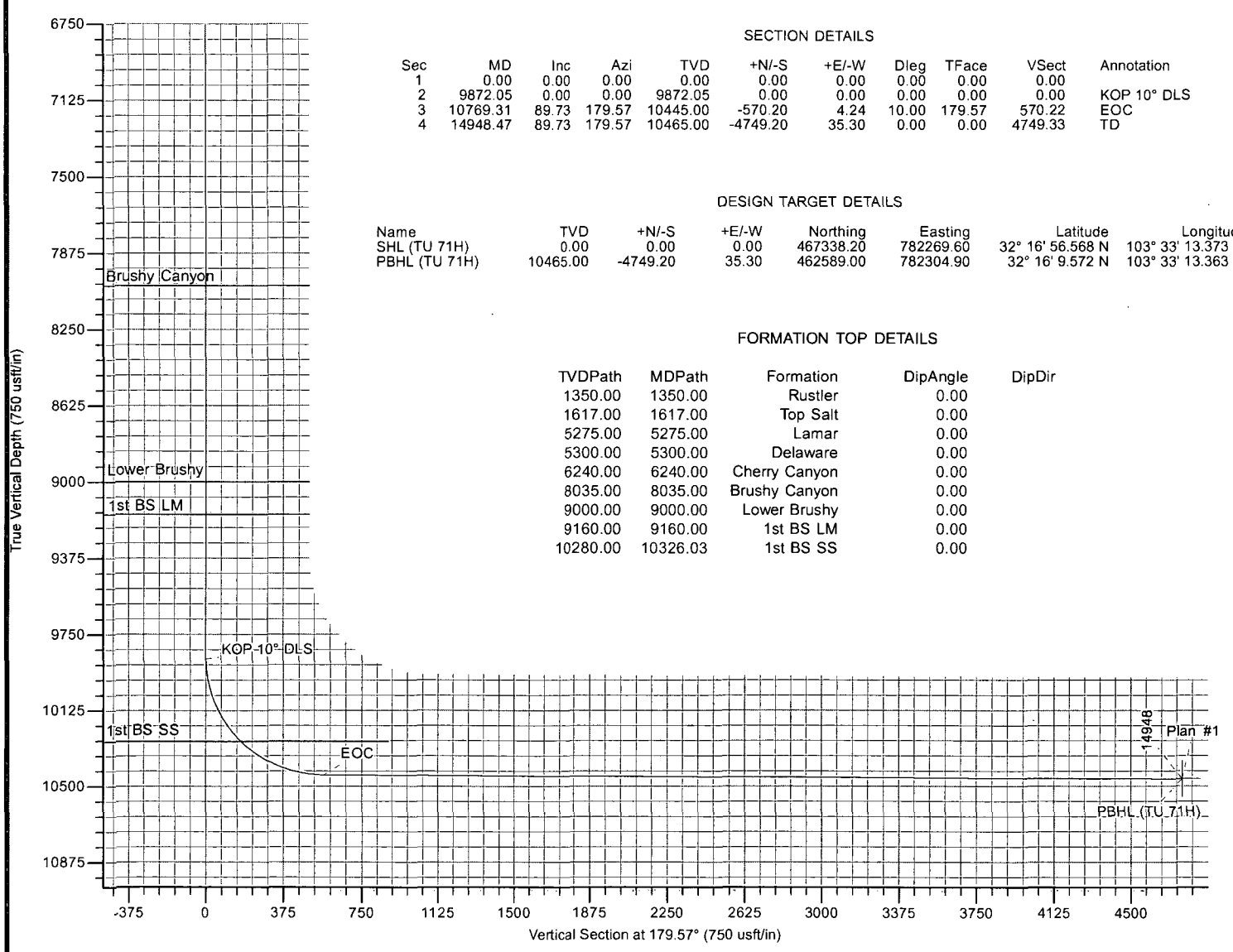
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	9872.05	0.00	0.00	9872.05	0.00	0.00	0.00	0.00	0.00	KOP 10° DLS
3	10769.31	89.73	179.57	10445.00	-570.20	4.24	10.00	179.57	570.22	EOC
4	14948.47	89.73	179.57	10465.00	-4749.20	35.30	0.00	0.00	4749.33	TD

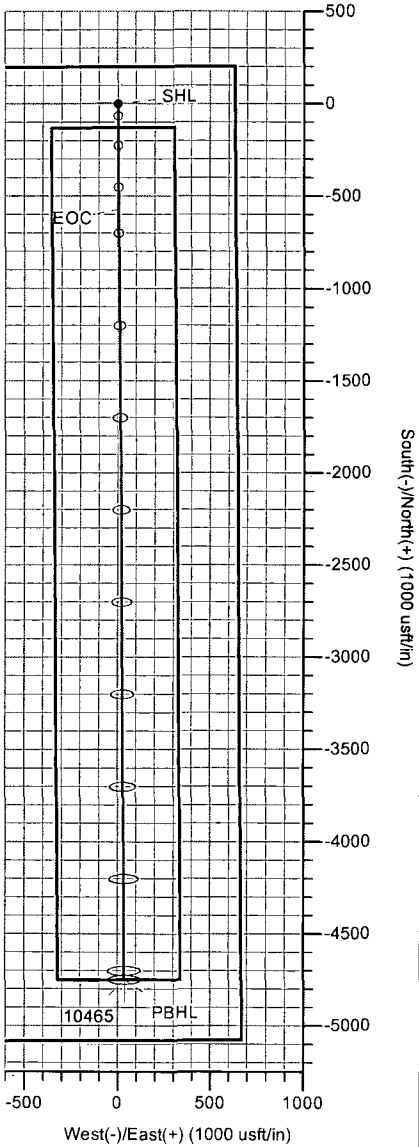
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL (TU 71H)	0.00	0.00	0.00	467338.20	782269.60	32° 16' 56.568 N	103° 33' 13.373 W
PBHL (TU 71H)	10465.00	-4749.20	35.30	462589.00	782304.90	32° 16' 9.572 N	103° 33' 13.363 W

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
1350.00	1350.00	Rustler	0.00	
1617.00	1617.00	Top Salt	0.00	
5275.00	5275.00	Lamar	0.00	
5300.00	5300.00	Delaware	0.00	
6240.00	6240.00	Cherry Canyon	0.00	
8035.00	8035.00	Brushy Canyon	0.00	
9000.00	9000.00	Lower Brushy	0.00	
9160.00	9160.00	1st BS LM	0.00	
10280.00	10326.03	1st BS SS	0.00	





LEAM Drilling Systems, Inc.

LEAM DRILLING SYSTEMS LLC
2010 East Davis, Conroe, Texas 77301
Phone: 936/756-7577, Fax 936/756-7595

Plan: Plan #1 (71H/OH)
Thistle Unit
Created By: Brady Deaver Date: 15:48, January 21 2015
Date: _____
Approved: _____ Date: _____

LEAM
Drilling Systems, Inc.

DEVON ENERGY

Lea County, NM (NAD-83)
Thistle Unit
71H

OH

Plan: Plan #1

Standard Planning Report

21 January, 2015

devon

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
Company:	DEVON ENERGY	**TVD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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

Site	Thistle Unit				
Site Position:		**Northing:**	468,026.90 usft	**Latitude:**	32° 17' 3.494 N
From:	Map	**Easting:**	780,722.56 usft	**Longitude:**	103° 33' 31.335 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.41 °

Well	71H, 1st BS SS					
Well Position	**+N/-S**	-688.70 usft	**Northing:**	467,338.20 usft	**Latitude:**	32° 16' 56.568 N
	+E/-W	1,547.04 usft	**Easting:**	782,269.60 usft	**Longitude:**	103° 33' 13.373 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	3,706.00 usft	**Ground Level:**	3,681.00 usft

Wellbore	OH				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	BGGM2014	1/21/2015	7.31	60.15	48,244

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	179.57	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
9,872.05	0.00	0.00	9,872.05	0.00	0.00	0.00	0.00	0.00	0.00	
10,769.31	89.73	179.57	10,445.00	-570.20	4.24	10.00	10.00	20.01	179.57	
14,948.47	89.73	179.57	10,465.00	-4,749.20	35.30	0.00	0.00	0.00	0.00	PBHL (TU 71H)

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
Company:	DEVON ENERGY	**TVD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SHL (TU 71H)									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,350.00	0.00	0.00	1,350.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,617.00	0.00	0.00	1,617.00	0.00	0.00	0.00	0.00	0.00	0.00
Top Salt									
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	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
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	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
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
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Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,275.00	0.00	0.00	5,275.00	0.00	0.00	0.00	0.00	0.00	0.00
Lamar									
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00
Delaware									
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,240.00	0.00	0.00	6,240.00	0.00	0.00	0.00	0.00	0.00	0.00
Cherry Canyon									
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00
8,035.00	0.00	0.00	8,035.00	0.00	0.00	0.00	0.00	0.00	0.00
Brushy Canyon									
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,800.00	0.00	0.00	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,900.00	0.00	0.00	0.00	0.00	0.00	0.00
9,000.00	0.00	0.00	9,000.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
Company:	DEVON ENERGY	**TVD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Lower Brushy									
9,100.00	0.00	0.00	9,100.00	0.00	0.00	0.00	0.00	0.00	0.00
9,160.00	0.00	0.00	9,160.00	0.00	0.00	0.00	0.00	0.00	0.00
1st BS LM									
9,200.00	0.00	0.00	9,200.00	0.00	0.00	0.00	0.00	0.00	0.00
9,300.00	0.00	0.00	9,300.00	0.00	0.00	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,400.00	0.00	0.00	0.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,500.00	0.00	0.00	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,600.00	0.00	0.00	0.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,700.00	0.00	0.00	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,800.00	0.00	0.00	0.00	0.00	0.00	0.00
9,872.05	0.00	0.00	9,872.05	0.00	0.00	0.00	0.00	0.00	0.00
KOP 10° DLS									
9,900.00	2.80	179.57	9,899.99	-0.68	0.01	0.68	10.00	10.00	0.00
9,950.00	7.80	179.57	9,949.76	-5.29	0.04	5.29	10.00	10.00	0.00
10,000.00	12.80	179.57	9,998.94	-14.23	0.11	14.23	10.00	10.00	0.00
10,050.00	17.80	179.57	10,047.15	-27.41	0.20	27.41	10.00	10.00	0.00
10,100.00	22.80	179.57	10,094.03	-44.75	0.33	44.75	10.00	10.00	0.00
10,150.00	27.80	179.57	10,139.23	-66.11	0.49	66.11	10.00	10.00	0.00
10,200.00	32.80	179.57	10,182.38	-91.32	0.68	91.32	10.00	10.00	0.00
10,250.00	37.80	179.57	10,223.18	-120.20	0.89	120.20	10.00	10.00	0.00
10,300.00	42.80	179.57	10,261.30	-152.52	1.13	152.53	10.00	10.00	0.00
10,326.03	45.40	179.57	10,280.00	-170.64	1.27	170.64	10.00	10.00	0.00
1st BS SS									
10,350.00	47.80	179.57	10,296.47	-188.05	1.40	188.05	10.00	10.00	0.00
10,400.00	52.80	179.57	10,328.40	-226.50	1.68	226.51	10.00	10.00	0.00
10,450.00	57.80	179.57	10,356.86	-267.59	1.99	267.60	10.00	10.00	0.00
10,500.00	62.80	179.57	10,381.63	-311.01	2.31	311.02	10.00	10.00	0.00
10,550.00	67.80	179.57	10,402.52	-356.41	2.65	356.42	10.00	10.00	0.00
10,600.00	72.80	179.57	10,419.37	-403.47	3.00	403.48	10.00	10.00	0.00
10,650.00	77.80	179.57	10,432.06	-451.82	3.36	451.83	10.00	10.00	0.00
10,700.00	82.80	179.57	10,440.48	-501.08	3.72	501.10	10.00	10.00	0.00
10,750.00	87.80	179.57	10,444.58	-550.90	4.09	550.91	10.00	10.00	0.00
10,769.31	89.73	179.57	10,445.00	-570.20	4.24	570.22	10.00	10.00	0.00
EOC									
10,800.00	89.73	179.57	10,445.15	-600.89	4.47	600.91	0.00	0.00	0.00
10,900.00	89.73	179.57	10,445.63	-700.89	5.21	700.91	0.00	0.00	0.00
11,000.00	89.73	179.57	10,446.11	-800.88	5.95	800.91	0.00	0.00	0.00
11,100.00	89.73	179.57	10,446.58	-900.88	6.70	900.90	0.00	0.00	0.00
11,200.00	89.73	179.57	10,447.06	-1,000.88	7.44	1,000.90	0.00	0.00	0.00
11,300.00	89.73	179.57	10,447.54	-1,100.87	8.18	1,100.90	0.00	0.00	0.00
11,400.00	89.73	179.57	10,448.02	-1,200.87	8.93	1,200.90	0.00	0.00	0.00
11,500.00	89.73	179.57	10,448.50	-1,300.86	9.67	1,300.90	0.00	0.00	0.00
11,600.00	89.73	179.57	10,448.98	-1,400.86	10.41	1,400.90	0.00	0.00	0.00
11,700.00	89.73	179.57	10,449.46	-1,500.86	11.16	1,500.90	0.00	0.00	0.00
11,800.00	89.73	179.57	10,449.93	-1,600.85	11.90	1,600.90	0.00	0.00	0.00
11,900.00	89.73	179.57	10,450.41	-1,700.85	12.64	1,700.89	0.00	0.00	0.00
12,000.00	89.73	179.57	10,450.89	-1,800.84	13.39	1,800.89	0.00	0.00	0.00
12,100.00	89.73	179.57	10,451.37	-1,900.84	14.13	1,900.89	0.00	0.00	0.00
12,200.00	89.73	179.57	10,451.85	-2,000.84	14.87	2,000.89	0.00	0.00	0.00
12,300.00	89.73	179.57	10,452.33	-2,100.83	15.62	2,100.89	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
Company:	DEVON ENERGY	**TVD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,400.00	89.73	179.57	10,452.80	-2,200.83	16.36	2,200.89	0.00	0.00	0.00
12,500.00	89.73	179.57	10,453.28	-2,300.82	17.10	2,300.89	0.00	0.00	0.00
12,600.00	89.73	179.57	10,453.76	-2,400.82	17.84	2,400.89	0.00	0.00	0.00
12,700.00	89.73	179.57	10,454.24	-2,500.82	18.59	2,500.89	0.00	0.00	0.00
12,800.00	89.73	179.57	10,454.72	-2,600.81	19.33	2,600.88	0.00	0.00	0.00
12,900.00	89.73	179.57	10,455.20	-2,700.81	20.07	2,700.88	0.00	0.00	0.00
13,000.00	89.73	179.57	10,455.68	-2,800.80	20.82	2,800.88	0.00	0.00	0.00
13,100.00	89.73	179.57	10,456.15	-2,900.80	21.56	2,900.88	0.00	0.00	0.00
13,200.00	89.73	179.57	10,456.63	-3,000.80	22.30	3,000.88	0.00	0.00	0.00
13,300.00	89.73	179.57	10,457.11	-3,100.79	23.05	3,100.88	0.00	0.00	0.00
13,400.00	89.73	179.57	10,457.59	-3,200.79	23.79	3,200.88	0.00	0.00	0.00
13,500.00	89.73	179.57	10,458.07	-3,300.79	24.53	3,300.88	0.00	0.00	0.00
13,600.00	89.73	179.57	10,458.55	-3,400.78	25.28	3,400.88	0.00	0.00	0.00
13,700.00	89.73	179.57	10,459.03	-3,500.78	26.02	3,500.87	0.00	0.00	0.00
13,800.00	89.73	179.57	10,459.50	-3,600.77	26.76	3,600.87	0.00	0.00	0.00
13,900.00	89.73	179.57	10,459.98	-3,700.77	27.51	3,700.87	0.00	0.00	0.00
14,000.00	89.73	179.57	10,460.46	-3,800.77	28.25	3,800.87	0.00	0.00	0.00
14,100.00	89.73	179.57	10,460.94	-3,900.76	28.99	3,900.87	0.00	0.00	0.00
14,200.00	89.73	179.57	10,461.42	-4,000.76	29.74	4,000.87	0.00	0.00	0.00
14,300.00	89.73	179.57	10,461.90	-4,100.75	30.48	4,100.87	0.00	0.00	0.00
14,400.00	89.73	179.57	10,462.38	-4,200.75	31.22	4,200.87	0.00	0.00	0.00
14,500.00	89.73	179.57	10,462.85	-4,300.75	31.97	4,300.87	0.00	0.00	0.00
14,600.00	89.73	179.57	10,463.33	-4,400.74	32.71	4,400.86	0.00	0.00	0.00
14,700.00	89.73	179.57	10,463.81	-4,500.74	33.45	4,500.86	0.00	0.00	0.00
14,800.00	89.73	179.57	10,464.29	-4,600.73	34.20	4,600.86	0.00	0.00	0.00
14,900.00	89.73	179.57	10,464.77	-4,700.73	34.94	4,700.86	0.00	0.00	0.00
14,948.47	89.73	179.57	10,465.00	-4,749.20	35.30	4,749.33	0.00	0.00	0.00
TD - PBHL (TU 71H)									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL (TU 71H) - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	467,338.20	782,269.60	32° 16' 56.568 N	103° 33' 13.373 W
PBHL (TU 71H) - plan hits target center - Point	0.00	0.00	10,465.00	-4,749.20	35.30	462,589.00	782,304.90	32° 16' 9.572 N	103° 33' 13.363 W

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well 71H
Company:	DEVON ENERGY	**TVD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Project:	Lea County, NM (NAD-83)	**MD Reference:**	3681' GL + 25' RKB @ 3706.00usft (Original Well Elev)
Site:	Thistle Unit	**North Reference:**	Grid
Well:	71H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,350.00	1,350.00	Rustler		0.00	
1,617.00	1,617.00	Top Salt		0.00	
5,275.00	5,275.00	Lamar		0.00	
5,300.00	5,300.00	Delaware		0.00	
6,240.00	6,240.00	Cherry Canyon		0.00	
8,035.00	8,035.00	Brushy Canyon		0.00	
9,000.00	9,000.00	Lower Brushy		0.00	
9,160.00	9,160.00	1st BS LM		0.00	
10,326.03	10,280.00	1st BS SS		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
9,872.05	9,872.05	0.00	0.00	KOP 10° DLS
10,769.31	10,445.00	-570.20	4.24	EOC
14,948.47	10,465.00	-4,749.20	35.30	TD