

DEVON ENERGY CORPORATION

January 20, 1993

TO: Mack Duckworth
FROM: Mike Jolley/Chuck Horsman
RE: Drilling Prognosis
Cactus State #1
East Catelaw Draw
960' FNL & 1860' FWL
Section 16-T21S-R26E
Eddy County, New Mexico
4500 Delaware, Bone Springs Test

Elevation 3295' G.L. (Est.)

Construct minimum size location for selected rig. Dig double horseshoe reserve pit with divider. Line reserve pit with 6 mil plastic (fill with enough water to hold plastic in place). Double line the reserve pit on the rig side.

SURFACE INTERVAL 0' - 350'

Notify New Mexico OCD 24 hours prior spud (505) 748-1283

1. Set +/- 40' of 20" conductor pipe. Cement to surface with redi-mix. Construct 6'X6'X6' of cellar. (Note: tin horn type cellar is acceptable)
2. MIRU Rotary Tools. Move in trailer house, fresh water system, waste facilities, telephone communications, and set refuse container.
3. PU 17-1/2" bit and BHA to maximize rate of penetration and control deviation. Run surveys every 90' (more often than necessary) to insure a straight surface hole. Drill to a minimum 350' below ground level (50' below base of the Rustler). Circulate hole clean and strap out to run casing.

Note: Hole problems through this interval include: Sloughing gravel, sand, and possible loss circulation.

Notify OCD prior to running and cementing surface casing.

4. RU casing tools. Run surface casing as follows: (See page #5)
 - A. Float Shoe (welded)
 - B. 1 joint 13-3/8", 48#, WC-40, ST&C casing (welded and centralized)

- C. Insert float
- D. Balance of 13-3/8" casing
- E. Centralize middle of 1st joint and minimum every 4th joint to surface

Set casing one (1) foot off bottom. Cement to surface as per recommendation (See page 6). Use wooden plug and displace with 10 ppg brine water. Cement volumes are based on 100% excess. Wait on cement 6 hours. Cut off 20" conductor pipe, 13-3/8" casing, and weld on rental 13-3/8" SO X 13-5/8" 2000 casing head. Test weld to 370 psi (50% collapse), NU BOP, choke lines and manifold. Function test BOPE.

INTERMEDIATE INTERVAL 350' - 2200'

5. PU 11" bit and BHA. GIH drill insert float and cement. Test pipe rams and casing to 500 psi prior to drilling shoe.
6. Drill shoe and formation to +/- 2200' using brine water while circulating reserve pit. Maintain light mud weight and keep sufficient amount of I.C.M (paper) on location should seepage or lost circulation occur. Run surveys at minimum 500' intervals. Deviation can be a problem through this interval. Upon reaching casing point, circulate hole clean, short trip, circulate hole clean, and run a fluid caliper log. Raise viscosity to 36-40 to insure a clean hole prior to PQOH. Strap pipe out of hole. Fill hole every 5 stands on all trips out of hole. Lay down DC's not to be utilized on remainder of hole.

Note: Hole problems through this interval include: Severe lost returns, sloughing salt, and sloughing shales.

Notify OCD prior to running casing.

7. If total loss circulation occurs in intermediate interval, note depth loss occurs as an external casing packer may be utilized. If possible, run fluid caliper @ T.D.
8. RU casing tools and run 8-5/8" casing as follows: (See page 5)
 - A. Guide shoe (welded)
 - B. (2) 8-5/8", 24#, WC-50, ST&C shoe joints (centralized and welded)
 - C. Float Collar (welded bottom)
 - D. Balance of 8-5/8" casing w/minimum one centralizer every 4th joint to 350'
9. Set casing 1' off bottom. Circulate hole clean-minimum 140 bbls (casing capacity). Condition mud prior to cementing. Cement to surface. Displace cement w +/- 140 bbls fresh water. Wait on cement 6 hrs. Cut off 13 3/8 rental casinghead, cut off 8-5/8" casing. Weld on 11" 3M X 8-5/8" casinghead and test to 650 psi (50% collapse) Nipple up BOP and test to rated pressure. Install wear bushing.

Note: If cement does not circulate, notify OCD to discuss remedial action.

Note: Must wait 24 hours prior to drilling out.

Note: Rig up and maintain H2S monitor.

PRODUCTION INTERVAL 2200' - 4500'

10. Two man logging unit to rig up after running intermediate casing at approximately 2200'.

Catch 10' samples - draft 2' drill times - draft 1" and 5" scale logs - log connection and trip gas, - report deviation surveys - log carbide lags every 500' - call morning report at 8:00 a.m. to Alan Jackson during week days at (405) 235-3611 and on weekends at (405) 340-3011 - at T.D. circulate and log bottoms up twice - cut one set of dry samples and deliver to: Midland Sample Library
704 South Connel
Midland, Texas 79702

Note: DO NOT CIRCULATE SHOWS OR DRILLING BREAKS. RECORD AND REPORT SHOWS TO GEOLOGIST DURING MORNING REPORT.

Notifications:

1st: Alan Jackson (Geologist) Office: (405) 552-4541
Home: (405) 340-3011

2nd: Brad Biddy (Geologist) Office: (405) 522-4546
Home: (405) 348-0872

3rd: Jeff Hall (Geologist) Office: (405) 552-4544
Home: (405) 348-4802

Notify geologist 24 hours before anticipated T.D.

11. Pick up 7-7/8" bit and BHA. Circulate through fresh water side of reserve pit. Drill float collar and 1 shoe joint. Test casing to 1000 psi. Drill bottom shoe joint, guide shoe and 7-7/8" hole to 4500'.

12. Circulate reserve pit while drilling 7-7/8" hole.

Note: Hole problems through this interval include: Sloughing shale, sloughing sands, and loss circulation.

13. Clean steel pits and prepare mud system to displace hole @ +/- 2500.

14. Rig up loggers. Logging company pending bid. Run open hole logs as follows:

Surface to 4500'	GR Neutron
2200' - 4500'	Litho Density
2200' - 4500'	DLL/MSFL

- Present cross plot porosity on 5" scale
- Present all logs on 2" & 5" = 100' scale
- Generate a 3.5" disk of data in LAS format

Note: Fax pay interval immediately to Alan Jackson (405) 552-4552

Distribution: Devon Energy Corporation
1500 Mid America Tower
20 North Broadway
Oklahoma City, Oklahoma 73102-8260
Attn: Alan Jackson
Field - 4 Final - 3

15. After logs, PU bit, GIH to TD, circulate hole clean (minimum 2 bottoms up). RU laydown machine and laydown drill pipe and drill collars. **Remove wear bushing.**

Notify OCD before running casing.

16. RU casing tools.

- A. Conventional float shoe
- B. One 5-1/2, 15.5 #, J-55, LT&C shoe joint
- C. Float Collar
- D. Balance of 5-1/2 " casing
- E. Centralize minimum every other collar through pay zones

Note: All casing through prospective pay intervals will be sandblasted and centralizers placed on every other collar.

17. Set casing one foot off bottom. Circulate hole clean-minimum 110 bbls. (casing capacity). Pump cement equivalent to cover all open hole. Estimated top of cement +/- 2000' (200' into intermediate casing). Attempt to pump at turbulent rate (8 bpm.)
18. Set slips with casing in full tension. Cut off casing and nipple down BOP. Install protective cap. Clean pits and release rotary tools. Fence reserve pit prior to leaving location.
19. Completion procedure to follow.

TUBULAR DESCRIPTION AND CASING DESIGN

SURFACE CASING

INTERVAL	FTG	SIZE	WEIGHT	GRADE	THREAD	CLPSE	BURST	TENSION
0-350'	350'	13-3/8"	48	WC-40	ST&C	740	1700	308,000

INTERMEDIATE CASING

INTERVAL	FTG	SIZE	WEIGHT	GRADE	THREAD	CLPSE	BURST	TENSION
0-2200'	2200'	8-5/8"	24	WC-50	ST&C	1330	2700	237,000

PRODUCTION CASING

INTERVAL	FTG	SIZE	WEIGHT	GRADE	THREAD	CLPSE	BURST	TENSION
0-4500'	4500'	5-1/2"	15.5	J-55	LT&C	4040	4810	217,000

Note: Casing values listed are 100%

CEMENTING RECOMMENDATION

SURFACE CASING

Plan to set 350' of 13-3/8" casing in a 17-1/2" hole, cement to surface in a single stage.

RECOMMENDED SLURRY

Lead: 400 sx Class 'C' cement + 2% gel + 2% CaCl₂
14.1 ppg, 1.51 cfps, 7.6 gps

Note: Precede cement with 20 bbls fresh water and lime flush

INTERMEDIATE CASING:

Plan to set 2200' of 8-5/8" casing in an 11" hole.

Note: It is recommended to run a fluid caliper prior to cementing this string of pipe. Volume will be calculated to lift cement up to surface in a single stage. Caliper +15%. A clean 20 bbl brine pre-flush should be run ahead of each slurry.

RECOMMENDED SLURRY

Lead: +/- 650 sx Lite 'C' + 10% Gilsonite + 1/4 #/sk cellophane
12.0 ppg, 2.22 cfps, 11.6 gps
Tail: 250 sx 'C' + 2% CaCl₂
14.8 ppg, 1.32 cfps, 6.3 gps

PRODUCTION CASING

Plan to set 4500' of 5-1/2" casing in a 7-7/8" hole.

RECOMMENDED SLURRY

Pump 60 bbls KCL containing corrosion inhibitor with water spacer ahead and behind.
Preflush with 1000 gal. sodium silicate spacer.

Lead: +/-500 sx 50/50 POZ + 2% gel + 1/4 #/sk cellophane 14.4 ppg, 1.26 cfps,
5.56 gps (2500' fill) (May consider adding salt to this slurry.)

Note: After running caliper log, volume will be adjusted to adequately cover the Bone Springs Intervals and Delaware Interval. A mud flush is recommended ahead of each slurry.

PROPOSED MUD PROGRAM

INTERVAL 0' - 350'

Weight	8.4 - 8.6 ppg
Viscosity	32-36 sec/qt
Filtrate	No Control
Mud Type	Spud Mud

GEL flocculated with lime for ample yield point to clean the hole. Gravel beds and sand can be troublesome in this area. Ground paper can be used to control seepage. Suggest pumping 150-200 bbl 45 +/- vis sweeps prior to running casing.

INTERVAL 350' - 2200'

Weight	10.0 - 10.1 sec/qt
Viscosity	28
Filtrate	No Control
Mud Type	Saturated Brine Water

Use clear saturated brine water circulated through the reserve pit. Should keep premix pit full of prehydrated salt, gel, and paper for sweeps. Allow hole conditions to dictate the need for viscosity or sweeps.

INTERVAL 2200' - 2500'

Weight	8.8 - 9.2 ppg
Viscosity	28
Filtrate	No Control
Mud Type	Cut Brine

Circulate the reserve pit using cut brine. Begin maintaining a 9.5-10.5 pH with caustic to retard corrosion.

INTERVAL 2500' - 4500'

Weight	8.8 - 9.2 ppg
Viscosity	30
Filtrate	15 - 20 cc
Mud Type	Cut Brine

At 2500' or prior to drilling the Delaware, restrict circulation to steel pits. Recommend mudding up with a starch mud system. Mud properties should be adjusted to hole conditions.

WELLHEAD EQUIPMENT (USED)

Casinghead (Rental)

C-22, 13-5/8" 2M X 13-3/8" SO w/2" LP outlet, 2" ball valve

Casinghead

C-22, 11" 3M X 8-5/8" SO w/2 - 2" LPD, bull plug, plug valve

Tubinghead

C, 11" 3M X 7-1/16" 3M w/2 - 2-1/16" 3M FPO X BTM 2-1/16" 3M gate valve, secondary seal, ring gaskets, C-22 hangers, and studs.

Tree

C2P adapter 7-1/16" 3M X 2-1/16" 3M w/2 - 2-3/8" 8 RND, 2" X 3000 gate valves, swab valve, and single wing w/adjustable choke.