

Devon Energy, Thistle Unit 116H

1. Geologic Formations

| | | | |
|---------------|---------|-------------------------------|------|
| TVD of target | 9,773' | Pilot hole depth | N/A |
| MD at TD: | 17,160' | Deepest expected fresh water: | 225' |

Basin

| Formation | Depth (TVD) from KB | Water/Mineral Bearing/ Target Zone? | Hazards* |
|----------------------------------|---------------------|-------------------------------------|----------|
| Rustler | 1,360 | Barren | |
| Top of Salt | 1,868 | Barren | |
| Base of Salt | 4,974 | Barren | |
| Delaware | 5,261 | Oil | |
| Lower Brushy Canyon | 8,903 | Oil | |
| 1 st Bone Spring Lime | 9,113 | Oil | |
| Leonard A | 9,326 | Oil | |
| Leonard B | 9,668 | Oil | |
| Leonard B Base | 9,778 | Oil | |
| Leonard C | 10,010 | Oil | |
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*H2S, water flows, loss of circulation, abnormal pressures, etc.

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2. Casing Program

| Hole Size | Casing Interval | | Csg. Size | Weight (lbs) | Grade | Conn. | SF Collapse | SF Burst | SF Tension |
|---------------------------|-----------------|---------|-----------|--------------|---------|-------|-------------|----------|--------------------|
| | From | To | | | | | | | |
| 17.5" | 0 | 1,400' | 13.375" | 54.5 | J-55 | BTC | 1.81 | 1.92 | 5.53 |
| 12.25" | 0 | 4,000' | 9.625" | 40 | J-55 | LTC | 1.38 | 1.24 | 1.88 |
| 12.25" | 4,000' | 5,100' | 9.625" | 40 | HCK-55 | BTC | 2.02 | 1.24 | 7.46 |
| 8.75" | 0 | 17,160' | 5.5" | 17 | P-110RY | DWC/C | 1.59 | 1.25 | 2.29 |
| 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 3 rd string cement tied back 500' into previous casing? | |
| Is well located in R-111-P and SOPA? | N |
| If yes, are the first three strings cemented to surface? | |
| Is 2 nd string set 100' to 600' below the base of salt? | |
| Is well located in high Cave/Karst? | N |
| If yes, are there two strings cemented to surface? | |
| (For 2 string wells) If yes, is there a contingency casing if lost circulation occurs? | |
| Is well located in critical Cave/Karst? | N |
| If yes, are there three strings cemented to surface? | |

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3. Cementing Program

| Casing | # Sk | Wt. lb/ gal | H ₂ O gal/sk | Yld ft ³ / sack | 500# Comp. Strength (hours) | Slurry Description |
|------------------------------------|------------------|-------------------|----------------------------|----------------------------------|--------------------------------------|---|
| 13-3/8" Surface | 680 | 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 |
| 13-3/8" Surface Two Stage | 460 | 12.9 | 9.81 | 1.85 | 14 | 1 st Stage 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 | 1 st Stage Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake |
| | DV Tool = 300ft | | | | | |
| | 320 | 14.8 | 6.32 | 1.33 | 6 | 2 nd Stage Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake |
| 9-5/8" Inter. | 1060 | 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 |
| | 140 | 14.8 | 6.32 | 1.33 | 6 | 2 nd Stage Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake |
| 5-1/2" Prod | 420 | 10.9 | 20.6 | 3.31 | 24 | Lead: (50:40:10) Class C: Silicalite: Enhancer 923 + 10% BWOC Bentonite + 0.05% BWOC SA-1015 + 0.3% BWOC HR-800 + 0.2% BWOC FE-2 + 0.125 lb/sk Pol-E-Flake + 0.5 lb/sk D-Air 5000 |
| | 2080 | 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 |
| 5-1/2" Prod Two Stage | 400 | 10.9 | 20.6 | 3.31 | 24 | 1 st Stage Lead: (50:40:10) Class C: Silicalite: Enhancer 923 + 10% BWOC Bentonite + 0.05% BWOC SA-1015 + 0.3% BWOC HR-800 + 0.2% BWOC FE-2 + 0.125 lb/sk Pol-E-Flake + 0.5 lb/sk D-Air 5000 |
| | 2080 | 14.5 | 5.31 | 1.2 | 25 | 1 st Stage 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 |
| | DV Tool = 5150ft | | | | | |
| | 20 | 10.9 | 20.6 | 3.31 | 24 | 2 nd Stage Lead: (50:40:10) Class C: Silicalite: Enhancer 923 + 10% BWOC Bentonite + 0.05% BWOC SA-1015 + 0.3% BWOC HR-800 + 0.2% BWOC FE-2 + 0.125 lb/sk Pol-E-Flake + 0.5 lb/sk D-Air 5000 |
| | 30 | 14.8 | 6.32 | 1.33 | 6 | 2 nd Stage Tail: Class C Cement + 0.125 lbs/sack Poly-E-Flake |

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If a DV tool is used, depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

| Casing String | TOC | % Excess |
|---|---|----------|
| 13-3/8" Surface | 0' | 100% |
| 13-3/8" Surface – Two Stage Option | 1 st Stage = 300' / 2 nd Stage = 0' | 100% |
| 9-5/8" Intermediate | 0' | 75% |
| 9-5/8" Intermediate – Two Stage Option | 1 st Stage = 1450' / 2 nd Stage = 0' | 75% |
| 5-1/2" Production Casing | 4900' | 25% |
| 5-1/2" Production Casing – Two Stage Option | 1 st Stage = 5150' / 2 nd Stage = 4900' | 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 3M |
| | | | Blind Ram | | |
| | | | Pipe Ram | | |
| | | | Double Ram | x | |
| | | | Other* | | |
| 8-3/4" | 13-5/8" | 3M | Annular | x | 50% testing pressure 3M |
| | | | Blind Ram | | |
| | | | Pipe Ram | | |
| | | | Double Ram | x | |
| | | | Other * | | |
| | | | | | |
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*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.

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

| | |
|---|---|
| Y | Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. |
| Y | A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart. |
| Y | Are anchors required by manufacturer? |
| Y | <p>A multibowl wellhead may be used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.</p> <p>Devon proposes the option of using a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 3000 (3M) psi.</p> <ul style="list-style-type: none"> Wellhead will be installed by vendor's representatives. If the welding is performed by a third party, the vendor's representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal. Vendor representative will install the test plug for the initial BOP test. Vendor 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. <p>After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.</p> |

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

5. Mud Program

| Depth | | Type | Weight (ppg) | Viscosity | Water Loss |
|--------|---------|-----------------|--------------|-----------|------------|
| From | To | | | | |
| 0 | 1,400' | FW Gel | 8.6-8.8 | 28-34 | N/C |
| 1,400' | 5,100' | Saturated Brine | 10.0-10.2 | 28-34 | N/C |
| 5,100' | 17,160' | 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.

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

6. Logging and Testing Procedures

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

| 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 | |

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7. Drilling Conditions

| Condition | Specify what type and where? |
|----------------------------|------------------------------|
| BH Pressure at deepest TVD | 4726 psi |
| Abnormal Temperature | No |

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

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

8. Other facets of operation

Is this a walking operation? No.

Will be pre-setting casing? No.

Attachments

☒ Directional Plan

☐ Other, describe