U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

# Sundry Print Report

02/02/2024

**Well Name:** SANDRA JEAN 23 FED COM

**Well Location:** T20S / R33E / SEC 23 / SESE /

**County or Parish/State:**

**Well Number:** 751H

**Type of Well:** OIL WELL

**Allottee or Tribe Name:**

**Lease Number:** NMNM29704

**Unit or CA Name:**

**Unit or CA Number:**

**US Well Number:** 3002552289

**Well Status:** Approved Application for Permit to Drill

**Operator:** AVANT OPERATING LLC

## Notice of Intent

**Sundry ID:** 2763540

**Type of Submission:** Notice of Intent

**Type of Action:** APD Change

**Date Sundry Submitted:** 12/04/2023

**Time Sundry Submitted:** 10:00

**Date proposed operation will begin:** 01/10/2024

**Procedure Description:** Avant Operating, LLC requests to add a pilot hole to this well, please see attached and below to reflect this change. Casing setpoint changes - 13-3/8” 1st intermediate: set at 3,300' TVD (100' below Salt) - 10-3/4" 2nd intermediate: set at 5,200' TVD to cover Capitan Reef Added 3rd Intermediate: - 7-5/8" 3rd intermediate: set at 10,010' to drill pilot hole with updated mud program - Reduced production hole size to 6.75" for vertical, curve, and lateral - 5-1/2" split string to include semi flush connections with 5.748" OD from 3rd intermediate set point to KOP - Pilot hole procedure includes 2 cement plugs described in the updated cement proposal. Plug #1 will be spotted from pilot hole TD to 50’ above the Penn Shale. Plug #2 will be spotted 400’ above and below KOP.

## NOI Attachments

**Procedure Description**

5.500_x_20.00__P_110_HC_Anaconda__SP_Data_Sheet_20240111161305.pdf

SJ_751H_Casing_Design_Criteria_20240111161029.pdf

Sandra_Jean_23_Fed_Com_751H_WC_20240105124805.pdf

Sandra_Jean_23_Fed_Com_751H_WBS_5_String_Pilot_20240105124749.pdf

Sandra_Jean_23_Fed_Com_751H_Cement_Procedure_20240105124735.pdf

| | | |
|---|---|---|
| **Well Name:** SANDRA JEAN 23 FED COM | **Well Location:** T20S / R33E / SEC 23 / SESE / | **County or Parish/State:** |
| **Well Number:** 751H | **Type of Well:** OIL WELL | **Allottee or Tribe Name:** |
| **Lease Number:** NMNM29704 | **Unit or CA Name:** | **Unit or CA Number:** |
| **US Well Number:** 3002552289 | **Well Status:** Approved Application for Permit to Drill | **Operator:** AVANT OPERATING LLC |

## Conditions of Approval

**Specialist Review**

Sandra_Jean_23_Fed_Com_751H_Sundry_ID_2764998_LV_20240201150636.pdf

## Operator

*I certify that the foregoing is true and correct. 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. Electronic submission of Sundry Notices through this system satisfies regulations requiring a*

**Operator Electronic Signature:** MEGHAN TWELE

**Signed on:** JAN 11, 2024 04:13 PM

**Name:** AVANT OPERATING LLC

**Title:** Contract Regulatory Analyst

**Street Address:** 1515 WYNKOOP ST SUITE 700

**City:** DENVER **State:** CO

**Phone:** (720) 339-6880

**Email address:** MTWELE@OUTLOOK.COM

## Field

**Representative Name:**

**Street Address:**

**City:** **State:** **Zip:**

**Phone:**

**Email address:**

## BLM Point of Contact

**BLM POC Name:** CHRISTOPHER WALLS

**BLM POC Title:** Petroleum Engineer

**BLM POC Phone:** 5752342234

**BLM POC Email Address:** cwalls@blm.gov

**Disposition:** Approved

**Disposition Date:** 02/02/2024

**Signature:** Chris Walls

Fermata Technologies

# 5.500 x 20.00# P-110 HC Anaconda™ SP

| Pipe Body Data | | |
|---|---|---|
| Nominal OD | 5.500 | Inches |
| Wall Thickness | 0.361 | Inches |
| Weight | 20.00 | lb/ft |
| PE Weight | 19.83 | lb/ft |
| Nominal ID | 4.778 | Inches |
| Drift | 4.653 | Inches |
| Minimum Yield Strength | 110,000 | PSI |
| Minimum Tensile Strength | 125,000 | PSI |
| RBW | 87.5% | Rating |

| Connection Data | | |
|---|---|---|
| Connection OD | 5.748 | Inches |
| Connection ID | 4.778 | Inches |
| Make-Up Loss | 4.765 | Inches |
| Tension Efficiency | 90% | Rating |
| Compression Efficiency | 90% | Rating |
| Yield Strength in Tension | 577,000 | LBS. |
| Yield Strength in Compression | 577,000 | LBS. |
| MIYP (Burst) | 12,640 | PSI |
| Collapse* | 12,770 | PSI |
| Uniaxial Bending | 82.6 | °/100 FT |

| Make-Up Torque | | |
|---|---|---|
| Yield Torque | 37,000 | FT-LBS. |
| Max Operating Torque | 29,600 | FT-LBS. |
| Max Make-Up | 22,000 | FT-LBS. |
| Optimum Make-Up | 20,000 | FT-LBS. |
| Minimum Make-Up | 18,000 | FT-LBS. |

Revision 7.12.23

**For Technical Support please email support@fermata-tech.com or call (281) 941-5257.** 1/5/2024



*Collapse value based on API collapse +10-15% depending on D/t ratio and is used for example only. The actual collapse rating is 100% of pipe body and will vary depending on the mill. Verify the collapse rating of the pipe body with the manufacturer.

| Size (in) | Intermediate 2 Casing | ID (in) | Drift (in) | Burst (in) | Collapse (psi) | Tension (k-lbs) | Conn OD (in) | Joint Strength (k-lbs) | Depths | TVD | MD | Drill Bit SIze |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10-3/4” | 10-3/4” 40.5# J-55 LTC | 10.05 | 9.894 | 3130 | 1580 | 629 | 11.75 | 700 | 0’-5,201’ | 5,200’ | 5,201’ | 12-1/4” |

| Size (in) | Intermediate 3 Casing | ID (in) | Drift (in) | Burst (in) | Collapse (psi) | Tension (k-lbs) | Conn OD (in) | Joint Strength (k-lbs) | Depths | TVD | MD | Drill Bit SIze |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7-5/8” | 7-5/8” 29.7# P-110 HC LTC | 6.875 | 6.75 | 9470 | 7150 | 940 | 8.50 | 769 | 0’-10,011’ | 10,010’ | 10,011’ | 9-7/8” |

| Size (in) | Production Casing | ID (in) | Drift (in) | Burst (in) | Collapse (psi) | Tension (k-lbs) | Conn OD (in) | Joint Strength (k-lbs) | Depths | TVD | MD | Drill Bit SIze |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-1/2” | 5-1/2” 20# P-110 HC GBCD | 4.778 | 4.653 | 12,630 | 12630 | 641 | 6.05 | 667 | 0’-10,011’ | 10,010’ | 10,011’ | 6-3/4” |
| Size (in) | Production Casing | ID (in) | Drift (in) | Burst (in) | Collapse (psi) | Tension (k-lbs) | Conn OD (in) | Joint Strength (k-lbs) | Depths | TVD | MD | Drill Bit SIze |
| 5-1/2” | 5-1/2” 20# P-110 HC Anaconda SP | 4.778 | 4.653 | 12,640 | 12770 | 641 | 5.748 | 577 | 10,011’-11,124’ | 11,123’ | 10,011’-11,124’ | 6-3/4” |
| Size (in) | Production Casing | ID (in) | Drift (in) | Burst (in) | Collapse (psi) | Tension (k-lbs) | Conn OD (in) | Joint Strength (k-lbs) | Depths | TVD | MD | Drill Bit SIze |
| 5-1/2” | 5-1/2” 20# P-110 HC GBCD | 4.778 | 4.653 | 12,630 | 12630 | 641 | 6.05 | 667 | 11,124’-16,530’ | 11,600’ | 11,124’-16,530’ | 6-3/4” |

# SANDRA JEAN 23 FED COM 751H

## Drilling Fluids Program

AVANT NATURAL RESOURCES

LEA COUNTY, NEW MEXICO

API NUMBER: TBD AFE NUMBER: NM0106

LAT: 32.5519283 LONG: -103.6278495

PLANNED MD: 16,530' PLANNED TVD: 11,600'

SECTION: 23, T20S, R33E

PREPARED FOR:

RYAN HARRIS – DRILLING AND COMPLETIONS ENGINEER

PREPARED BY:

TREY POLANSKY – TECHNICAL FLUIDS ENGINEER

REVIEWED BY:

KEVIN REED – ACCOUNT MANAGER

Report Issued:
**4 January 2024**

AES DRILLING FLUIDS

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# 1. INTRODUCTION

## AES COMPANY POLICY, MANAGEMENT AND SAFETY STATEMENT

Deviations from this drilling fluids program, including suggestions or recommendations from AES Drilling Fluids field personnel or third-party field representatives, will be discussed and approved by AES Drilling Fluids and customer management.

All mixing, ordering, and general management of liquid and sack chemicals on location will be approved by AES Drilling Fluids with the consent of the customer. All day drilling fluid operations will be reported on the daily mud reports without exception.

## PROJECT MANAGEMENT TEAM

KEVIN REED
*ACCOUNT MANAGER*
Kevin.Reed@AESFluids.com
575-441-6646

SCOTT GOODBLANKET
*ENGINEEING MANAGER*
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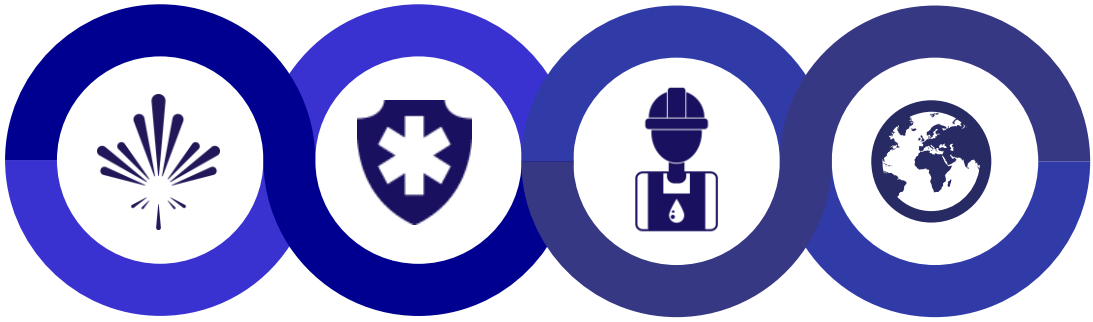
432-230-6383

TREY POLANSKY
*TECHNICAL ADVISOR*
John.Polansky@AESFluids.com
432-254-7210

## COMMITMENT TO SAFETY

AES Drilling Fluids remains committed to the health and safety of everyone, everywhere we work. We set high standards for our people to not only participate, but to lead in working safely. Our dedicated health and safety staff regularly audit our work locations to ensure that everyone we work with is properly trained and equipped to return home safely. We actively work with our customers to enhance safety programs and design solutions to minimize risk. Refer to the appendix for more information on our safety practices and training.



## 2. CASING DESIGN

SURFACE: 0' – 1,453'

HOLE SIZE: 24"

CASING SIZE: 20" (94.0#, J-55, BTC)

MUD SYSTEM: FRESH WATER

1ST INTERMEDIATE: 1,453' – 3.300'

HOLE SIZE: 17-1/2"

CASING SIZE: 13-3/8" (54.5#, J-55 LTC)

MUD SYSTEM: BRINE WATER

2ND INTERMEDIATE: 3,300' – 5,200'

HOLE SIZE: 12-1/4"

CASING SIZE: 9-5/8" (40#, L-80 HC, LTC)

MUD SYSTEM: FRESH WATER

3RD INTERMEDIATE: 5,200' – 10,011'

HOLE SIZE: 9-7/8"

CASING SIZE: 7-5/8" (29.7#, P110 HC, LTC)

MUD SYSTEM: FRESH WATER

PRODUCTION VERTICAL/PILOT HOLE: 10,011' – 12,801'

HOLE SIZE: 6-3/4"

CASING SIZE: 5-1/2" (20#, P-110 HC GBCD)

MUD SYSTEM: AES VERT™

PRODUCTION CURVE/LATERAL: 10,724' – 22,019'

KOP: 11,124'MD EOC: 11,874'/11,600' MD/TVD

HOLE SIZE: 6-3/4"

CASING SIZE: 5-1/2" (20#, P-110 HC GBCD)

MUD SYSTEM: AES VERT™

## 3. PROJECT ISSUES/CONCERNS

### SURFACE INTERVAL

- Loss of circulation is possible in the surface hole. If loss of circulation occurs, and 1-2 pits of mud loaded with LCM do not stop the losses, recommend dry drilling to total depth.

### 1ST INTERMEDIATE INTERVAL

- H2S and salt-water flows have been observed in this area. Keep corrosion chemicals on location in the event H2S becomes present.
- Severe to complete losses may and can occur in the Capitan Reef formation, (±3,300'). Maintaining 300bbls of 20-30ppb of LCM in pre-mix pit for standby is recommended.
- Fluid density may be changed as hole conditions dictate. Mud weight may need to be adjusted to hold back water flows.

### 2ND INTERMEDIATE INTERVAL

- The Cherry/Brushy Canyons, and other Delaware Zones, when broken down due to excessive mud weight, have a tendency to balloon. Once the annulus pressure is lowered below the pore pressure of the Brushy Canyon, the formation may give this lost volume back to the annulus, thus appearing that the well is flowing. If no pressure is visible during a shut-in procedure, all indications point to the formation ballooning.
- Mud weights must remain at 8.4-8.6 ppg or less for the duration of this interval.

### PRODUCTION INTERVAL

- Light seepage to heavy losses could occur throughout the interval. Incorporate an LCM sweep regiment with ECM 1, ECM 2, and EnerLOC, to aide to reducing losses.
- Keep solids to a minimum by the use of all solids control equipment available. This will help reduce the chance of loss of circulation and higher mud costs. All SCE MUST be working properly.

AVANT NATURAL RESOURCES

SANDRA JEAN 23 FED COM 751H – WOLFCAMP (TARGET) / PILOT HOLE (STRAWN)

# 4. WELLBORE DESIGN

| EST. FORMATION TOPS | DEPTH FT | DEPTH TVD | MUD WEIGHT ppg |
|---|---|---|---|
| RUSTLER | | 1,428' | 8.4-10.0 |
| 20" SURFACE CSG | | 1,453' | 8.4-10.0 |
| YATES | | 3,200' | 10.0-10.5 |
| 1st INT CASING | 3,300' | 3,300' | 10.0-10.5 |
| CAPITAN REEF | | 3,593' | 8.4-8.6 |
| 2nd INT CASING | 5,201' | 5,200' | 8.4-8.6 |
| CHERRY CANYON | 5,251' | 5,250' | 8.8-9.2 |
| DELAWARE | 5,261' | 5,260' | 8.8-9.2 |
| BRUSHY CANYON | 6,701' | 6,700' | 8.8-9.2 |
| BONE SPRING | 8,322' | 8,321' | 8.8-9.2 |
| 1st BS SAND | 9,396' | 9,395' | 8.8-9.2 |
| 2nd BS SAND | 9,910' | 9,909' | 8.8-9.2 |
| 3rd INT CASING | 10,011' | 10,010' | 8.8-9.2 |
| 3rd BS Sand | 10,646' | 10,795' | 9.2-9.5 |
| KOP | 11,124' | 11,123' | 9.2-9.5 |
| WOLFCAMP | 11,306' | 11,300' | 9.2-9.5 |
| EOC | 11,874' | 11,600' | 9.2-9.5 |
| WELL TD | 16,530' | 11,600' | 9.5-9.8 |
| PENN SHALE | 12,001' | 12,000' | 11.0-12.0 |
| STRAWN | 12,601' | 12,600' | 11.0-12.0 |
| PILOT HOLE TD | 12,801' | 12,800' | 11.0-12.0 |

**SURFACE - FRESH WATER**

VOLUME SUMMARY

| | | |
|---|---|---|
| Surface | 24.00 in | |
| Open hole Volume at TD | 813 | bbls |
| Total circ volume at TD | 1313 | bbls |

**1ST INTERMEDIATE - BRINE WATER**

VOLUME SUMMARY

| | | |
|---|---|---|
| 1st Int | 17.50 in | |
| OH Length | 1,847 | ft |
| Casing Volume | 516 | bbls |
| OH Volume | 549 | bbls |
| Circulating Volume | 1566 | bbls |

**2ND INTERMEDAITE- FRESH WATER**

VOLUME SUMMARY

| | | |
|---|---|---|
| 2nd Int | 12.25 in | |
| OH Length | 1,900 | ft |
| Casing Volume | 494 | bbls |
| OH Volume | 277 | bbls |
| Circulating Volume | 1271 | bbls |

**3RD INTERMEDAITE- CUT-BRINE**

VOLUME SUMMARY

| | | |
|---|---|---|
| 2nd Int | 9.875 in | |
| OH Length | 4,810 | ft |
| Casing Volume | 394 | bbls |
| OH Volume | 456 | bbls |
| Circulating Volume | 1350 | bbls |

**PRODUCTION VERTICAL / PILOT - AES VERT™**

VOLUME SUMMARY

| | | |
|---|---|---|
| Production | 6.75 in | |
| OH LENGTH | 2,791 | ft |
| CASING VOLUME | 394 | bbls |
| OH VOLUME | 124 | bbls |
| CIRCULATING VOLUME | 1,018 | bbls |

**PRODUCTION - AES VERT™**

VOLUME SUMMARY

| | | |
|---|---|---|
| Production | 6.75 in | |
| OH LENGTH | 6,520 | ft |
| CASING VOLUME | 394 | bbls |
| OH VOLUME | 289 | bbls |
| CIRCULATING VOLUME | 1,183 | bbls |

AES DRILLING FLUIDS

| SYSTEM Interval | HOLE SIZE (in) | CSG SIZE (in) | PROPERTIES / COMMENTS | |
|---|---|---|---|---|
| SURFACE | 24" | 20" | 0' MD | 1,453' MD |
| FRESH WATER | | | | |
| Mud Weight | 8.4 – 10.0 | | ppg | |
| Funnel Viscosity | 28 – 36 | | sec/qt | |
| PV @ 120 F | 1 – 8 | | cps | |
| YP @ 120 F | 1 – 12 | | lb/100 ft² | |
| pH | 7.5 – 8.5 | | | |
| API Fluid Loss | N/C | | cc/30 min | |
| LGS | < 8 | | % by volume | |
| Spud in with fresh water, build mud natively. Sweep the hole only as needed and approved by AEP DSM, with Freshwater Gel alternating with EnerPLUS. | | | | |
| 1ST INTERMEDIATE | 17 1/2" | 13 3/8" | 1,453' MD | 3,300' MD |
| BRINE WATER | | | | |
| Mud Weight | 10.0 – 10.5 | | ppg | |
| Funnel Viscosity | 28 – 30 | | sec/qt | |
| PV @ 120 F | 1 – 4 | | cps | |
| YP @ 120 F | 1 – 8 | | lb/100 ft² | |
| pH | 10.0 – 10.5 | | | |
| API Fluid Loss | N/C - <20 @ TD | | cc/30 min | |
| LGS | < 6 | | % by volume | |
| Chlorides | >180.,000 | | ppm | |
| Drill out with 10 ppg Brine with 180k or higher chlorides. Use ENERZAN and EnerPLUS for sweeping the hole. Do not add fresh water during this interval. | | | | |
| 2ND INTERMEDIATE | 12 1/4" | 9 5/8" | 3,300' MD | 5,200' MD |
| FRESH WATER | | | | |
| Mud Weight | 8.4 – 8.6 | | ppg | |
| Funnel Viscosity | 28 – 30 | | sec/qt | |
| PV @ 120 F | 1 – 4 | | cps | |
| YP @ 120 F | 1 – 8 | | lb/100 ft² | |
| pH | 10.0 – 11.0 | | | |
| API Fluid Loss | N/C - <20 @ TD | | cc/30 min | |
| LGS | < 6 | | % by volume | |
| Drill out from the 1st Intermediate casing with fresh water. Sweep hole as needed with XG Vis sweeps. If losses are encountered and returns cannot be regained, dry drill with fresh water to TD. Use Caustic for a 10-11 pH. EnerPLUS may be alternated with XG Vis sweeps for hole cleaning. | | | | |
| 3RD INTERMEDIATE | 12 1/4" | 9 5/8" | 5,200' MD | 10,010' MD |
| CUT-BRINE | | | | |
| Mud Weight | 8.8 – 9.2 | | ppg | |
| Funnel Viscosity | 28 – 30 | | sec/qt | |
| PV @ 120 F | 1 – 4 | | cps | |
| YP @ 120 F | 1 – 8 | | lb/100 ft² | |
| pH | 10.0 – 11.0 | | | |
| API Fluid Loss | N/C - <20 @ TD | | cc/30 min | |
| LGS | < 6 | | % by volume | |
| Drill out from 2nd Int casing with 8.8 ppg Cut-Brine fluid. Maintain a mud weight of 8.8 - 9.2ppg. Adjust the mud weight, as needed, to combat water flows and gas. Spot low filtrate pill on bottom for csg run. LCM sweeps must be approved by Avant Mgmt. | | | | |
| PROD VERTICAL / PILOT | 6 3/4" | 5 1/2" | 10,010' MD | 12,801' MD |
| AES VERT™ | | | | 12,800' TVD |
| Mud Weight | 9.2 – 12.0 | | WPS | ±220,000 |
| Funnel Viscosity | 45 – 60 | | Excess Lime | 3 – 4 |
| PV @ 120 F | 10 – 22 | | E.S. | >300 |
| pH | 8.0 – 12.0 | | H.T.H.P. | 6 – 8 |
| 6 Reading | 4.0 – 8.0 | | LGS | <8% |
| 10 sec | 5.0 – 10 lb/100 ft | | O:W Ratio | 70/30 |
| 10 min | 10.0 – 20 lb/100 ft² | | | |
| Drill out the 3rd Int casing shoe with AES VERT. Plan to spot 55-60 bbls Hi-Vis pill on bottom to leave below cement once pilot hole operations are completed. | | | | |
| CURVE / LATERAL | 6 3/4" | 5 1/2" | 12,801' MD | 16,530' MD |
| AES VERT™ | | | | 11,600' TVD |
| Mud Weight | 9.2 – 9.8 | | WPS | ±220,000 |
| Funnel Viscosity | 45 – 60 | | Excess Lime | 3 – 4 |
| PV @ 150 F | 10 – 22 | | E.S. | >300 |
| YP @ 150 F | 8 – 12 | | H.T.H.P. | 6 – 8 |
| 6 Reading | 4.0 – 8.0 | | LGS | <8% |
| 10 sec | 5.0 – 10 lb/100 ft | | O:W Ratio | 70/30 |
| 10 min | 10.0 – 20 lb/100 ft² | | | |
| Kick-off after plug back of pilot hole with above properties through to TD. Maximize all working SC equipment. Maintain desired rheology with additions of Claytone II and AES VIS LS. Recommend circulating 4-6 bottoms up at TD, prior to TOH for casing run. | | | | |

ACCOUNT MANAGER
KEVIN REED 575-441-6646

CORPORATE OFFICE
Houston, TX Tel: 888-556-4533

## 5. SURFACE

| 0' – 1,453' MD<br>Hole Size: 24" | Casing Size: 20" |
|---|---|
| Drilling Fluid System | Fresh Water |
| Potential Problems | Hole Cleaning. Formation Losses. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb./bbl.) |
| Mud Weight | 8.4 – 10.0 lb./gal | Freshwater Gel | 20 – 25 In Sweeps |
| Funnel Viscosity | 28 – 36 sec/qt. | Soda Ash | 0.3 – 0.5 |
| Plastic Viscosity | 1 – 8 cP | ENERPLUS | As Needed |
| Yield Point | 1 – 12 lb./100 ft² | Drilling Paper | As Needed |
| 10 sec Gel | 1 – 15 lb./100 ft² | BLUE MAX | As Needed |
| 10 min Gel | 1 – 20 lb./100 ft² | Cedar Fiber | As Needed |
| pH | 7.5 - 8.5 | SAPP / Soap Sticks | As Needed |
| A.P.I. Fluid Loss | N/C | Agri Plug | As Needed |
| Low Gravity Solids | ≤ 8 % by volume | Cedar Fiber | As Needed |

*Rheology and Gel Strengths should be checked at ambient temperature.*

### INTERNAL OBJECTIVES

Suggest spudding with fresh water, building mud natively. If more viscosity is needed, add Soda Ash and Freshwater Gel to the system. Be mindful that it may become necessary to raise and maintain the viscosity at 45-55+ sec/quart to help to prevent potential gravel beds and unconsolidated surface sands from sloughing in the hole. Drop one SAPP/Soap Stick at every connection, to help with bit balling.

- While drilling this interval, monitor the shakers in order to monitor for possible gravel beds and unconsolidated sands.
- Sweep the hole with Freshwater Gel. ENERPLUS is very beneficial, added down the drill string at connections, when drilling through reactive clays and for hole cleaning.
- If losses occur, maintain the viscosity at 40-45 sec/qt. and add 3-4 ppb each of Cedar Fiber, Agri Plug, and LCF-Blend. Monitor the quantity of LCM that is returned to surface and the overall volume of returns. As the LCM is shaken out of the drilling fluid, continue to mix LCM back into the system and maintain 9-12ppb throughout the interval to TD.

## 6. 1ST INTERMEDIATE

| 1,453' – 3,300' MD<br>Hole Size: 17-1/2" Casing Size: 13-3/8" | |
|---|---|
| Drilling Fluid System | Brine Water |
| Potential Problems | Hole Cleaning. Water Flows. Severe Washout. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb./bbl.) |
| Mud Weight | 10.0 – 10.5 lb./gal | Saltwater Gel | 20.0-25.0/sweeps |
| Funnel Viscosity | 28 – 30 sec/qt. | Caustic Soda/Lime | 0.25 - 0.5 |
| Plastic Viscosity | 1 – 4 cP | ENERPLUS (PHPA) | 0.25 - 0.5 |
| Yield Point | 1 – 8 lb./100 ft² | BLUE MAX DS | 20 gals/tour |
| 10 sec Gel | 1 – 10 lb./100 ft² | ENERPAC-R | .5 – 1.0 |
| 10 min Gel | 1 – 10 lb./100 ft² | White Starch | 3.0-4.0 |
| Chlorides | >180,000 mg/l | SAPP | A/N |
| pH | 10.0 -10.5 | Soap Sticks | A/N |
| A.P.I. Fluid Loss | N/C / <20 at TD | LCF Blend | A/N for losses |
| Low Gravity Solids | ≤ 6 % by volume | Cedar Fiber | A/N for losses |

*Rheology and Gel Strengths should be checked at ambient temperature.*

### INTERVAL OBJECTIVES:

Drill out from surface casing with 10 ppg Brine Water (180,000 chlorides). Sweep hole, only if approved by Avant Management, with 30-40 bbls of high viscosity (50-60 sec/qt) Saltwater Gel sweeps. You may incorporate slugging 2-3 gals of ENERPLUS (PHPA) down the drill pipe, to help ensure a clean hole.

- Mix Caustic Soda/Lime as needed for 10.0-10.5 pH.
- Mix Drilling Paper for any seepage.
- If needed, additions of Blue Max (DS) can be added to help minimize bit balling and to help keep the BHA free of cuttings build up.
- In the event that H2S becomes present, use Caustic Soda/Lime to maintain an 11.0-12.0 pH.
- At TD, spot a low filtrate pill on bottom. This will aid in a more trouble free casing run.

## 7. 2ND INTERMEDIATE

| 3,300' – 5,200' MD<br>Hole Size: 12-1/4" Casing Size: 9-5/8" | |
|---|---|
| Drilling Fluid System | FRESH WATER |
| Potential Problems | Hole Cleaning. Formation Losses. Severe Washout. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb./bbl.) |
| Mud Weight | 8.4 – 8.6 lb./gal | ENERZAN | 1.0-2.0/sweeps |
| Funnel Viscosity | 28 – 30 sec/qt. | Caustic Soda/Lime | 0.25 - 0.5 |
| Plastic Viscosity | 1 – 4 cP | ENERPLUS (PHPA) | 0.25 - 0.5 |
| Yield Point | 1 – 8 lb./100 ft² | BLUE MAX DS | 20 gals/tour |
| Viscometer 6 Θ | 1 - 3 RPM | ENERPAC-R | .5 – 1.0 |
| 10 sec Gel | 1 – 2 lb./100 ft² | White Starch | 3.0-4.0 |
| 10 min Gel | 1 – 2 lb./100 ft² | SAPP | A/N |
| 30 min Gel | 1 – 2 lb./100 ft² | Soap Sticks | A/N |
| pH | 10.0 – 11.0 | LCF Blend | A/N for losses |
| A.P.I. Fluid Loss | N/C | Cedar Fiber | A/N for losses |
| Low Gravity Solids | ≤6 % by volume | Drilling Paper | A/N for seepage |

*Rheology and Gel Strengths should be checked at ambient temperature.*

### INTERVAL OBJECTIVES:

Drill out from 1ST Intermediate casing with Fresh Water. Sweep hole, only if approved by AVANT Management, with 30-40 bbls of high viscosity (50-60 sec/qt) ENERZAN sweeps. You may incorporate slugging 2-3 gals of ENERPLUS (PHPA) down the drill pipe, to help ensure a clean hole.

- Mix Caustic Soda/Lime as needed for 10.0-10.5 pH.
- Mix Drilling Paper to help combat seepage.
- If needed, additions of Blue Max (DS) can be added to help minimize bit balling and to help keep the BHA free of cuttings build up.
- In the event that H2S is encountered, use Caustic Soda/Lime to maintain an 11.0-12.0 pH.
- Any LCM sweeps mud be approved by AVANT management.

## 8. 3RD INTERMEDIATE

| 5,200' – 10,011' MD<br>Hole Size: 9-7/8" Casing Size: 7-5/8" | |
|---|---|
| Drilling Fluid System | CUT-BRINE WATER |
| Potential Problems | Hole Cleaning. Formation Losses. Severe Washout. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb./bbl.) |
| Mud Weight | 8.8 – 9.2 lb./gal | ENERZAN | 1.0-2.0/sweeps |
| Funnel Viscosity | 28 – 30 sec/qt. | Caustic Soda/Lime | 0.25 - 0.5 |
| Plastic Viscosity | 1 – 4 cP | ENERPLUS (PHPA) | 0.25 - 0.5 |
| Yield Point | 1 – 8 lb./100 ft² | BLUE MAX DS | 20 gals/tour |
| Viscometer 6 Θ | 1 - 3 RPM | ENERPAC-R | .5 – 1.0 |
| 10 sec Gel | 1 – 2 lb./100 ft² | White Starch | 3.0-4.0 |
| 10 min Gel | 1 – 2 lb./100 ft² | SAPP | A/N |
| 30 min Gel | 1 – 2 lb./100 ft² | Soap Sticks | A/N |
| pH | 10.0 – 11.0 | LCF Blend | A/N for losses |
| A.P.I. Fluid Loss | N/C | Cedar Fiber | A/N for losses |
| Low Gravity Solids | ≤6 % by volume | Drilling Paper | A/N for seepage |

*Rheology and Gel Strengths should be checked at ambient temperature.*

### INTERVAL OBJECTIVES:

Drill out from 2nd Intermediate casing with Cut-Brine fluid. Sweep hole, only if approved by AVANT Management, with 30-40 bbls of high viscosity (50-60 sec/qt) ENERZAN sweeps. You may incorporate slugging 2-3 gals of ENERPLUS (PHPA) down the drill pipe, to help ensure a clean hole.

- Mix Caustic Soda/Lime as needed for 10.0-10.5 pH.
- Mix Drilling Paper to help combat seepage.
- If needed, additions of Blue Max (DS) can be added to help minimize bit balling and to help keep the BHA free of cuttings build up.
- In the event that H2S is encountered, use Caustic Soda/Lime to maintain an 11.0-12.0 pH.
- Any LCM sweeps mud be approved by AVANT management.

## 9. PRODUCTION VERTICAL / PILOT HOLE

| 10,011'MD – 12,801' MD<br>PLUG BACK DEPTH: 10,724' MD<br>Hole Size: 6-3/4" Casing Size: 5-1/2" | |
|---|---|
| Drilling Fluid System | AES VERT™ |
| Potential Problems | Hole Cleaning. Hole Instability. Pressures. Seepage/Loss of Circulation. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb. /bbl.) |
| Mud Weight | 9.2 – 12.0 lb/gal | AES MUL X | 2.0 – 3.0 |
| Funnel Viscosity | 45 – 60 sec/qt | Claytone II | 2.0 – 4.0 |
| Plastic Viscosity | 10 - 22 cP | AES VIS LS | 1.0 – 2.0 |
| Yield Point | 8 - 12 lb/100 ft² | AES WA II | 2.0 - 4.0 |
| Viscometer 6 Θ | 4 - 8 RPM | FLR PLUS | 1.0 – 5.0 |
| 10 sec Gel | 5 - 10 lb/100 ft² | Lime | As Needed |
| 10 min Gel | 10 - 20 lb/100 ft² | Calcium Chloride | As Needed |
| Salinity / Chlorides | ±220,000 ppm | SHALETEX II | As Needed |
| Electrical Stability | ±300 - 450 volts | ECM 1 | As Needed |
| Excess Lime | 3.0 - 4.0 | ECM 2 | As Needed |
| H.T.H.P. Fluid Loss | 6 - 8 ml/30 mins | ENERLOC | As Needed |
| Low Gravity Solids | ≤ 8 % by vol | | |
| O:W Ratio | 70:30 | | |

*Rheology and Gel Strengths should be checked at the API recommended temperature of 150°.*

### INTERVAL OBJECTIVES:

This section will utilize AES VERT™ invert drilling fluid system while drilling the pilot hole.

- **Initial mud properties are recommended as follows:** Initial Mud Density should be 9.2 ppg or as per customer. Maintain fluids specifications as listed above.
- Increase mud weight as hole conditions dictate. Upon reaching Penn and Strawn formations, offsets indicate mud weight range could require 11-12ppg to reach TD and perform logging operations.
- Before plugging back to ~10,724' MD a high viscosity pill will be placed in the open hole below cement plugs. This pill will require 55-60 bbls of pumpable volume which will cover from ~11,524' MD to TD (12,801' MD)

## 10. PRODUCTION

| KOP: 11,124' – EOC: 11,874' MD – TD: 16,530'/11,600' MD/TVD<br>Hole Size: 6-3/4" Casing Size: 5-1/2" | |
|---|---|
| Drilling Fluid System | AES VERT™ |
| Potential Problems | Hole Cleaning. Hole Instability. Pressures. Seepage/Loss of Circulation. |

| Recommended Properties | | Recommended Products | |
|---|---|---|---|
| Properties | Specifications | Products | Concentration (lb./bbl.) |
| Mud Weight | 9.5 – 9.8 lb/gal | AES MUL X | 2.0 – 3.0 |
| Funnel Viscosity | ±55 - 65 sec/qt | Claytone II | 2.0 – 4.0 |
| Plastic Viscosity | 10 - 22 cP | AES VIS LS | 1.0 – 2.0 |
| Yield Point | 8 - 12 lb/100 ft² | AES WA II | 2.0 - 4.0 |
| Viscometer 6 Θ | 4 - 8 RPM | FLR PLUS | 1.0 – 5.0 |
| 10 sec Gel | 10 - 15 lb/100 ft² | Lime | As Needed |
| 10 min Gel | 15 - 20 lb/100 ft² | Calcium Chloride | As Needed |
| Salinity / Chlorides | ±220,000 ppm | SHALETEX II | As Needed |
| Electrical Stability | ±300 - 450 volts | ECM 1 | As Needed |
| Excess Lime | 3.0 - 4.0 | ECM 2 | As Needed |
| H.T.H.P. Fluid Loss | 6 - 8 ml/30 mins | ENERLOC | As Needed |
| Low Gravity Solids | ≤ 8 % by vol | | |
| O:W Ratio | 70:30 | | |

*Rheology and Gel Strengths should be checked at the API recommended temperature of 150°.*

### INTERVAL OBJECTIVES:

This section will utilize AES VERT™ invert drilling fluid system while kicking off cement to build curve and drill ahead in lateral.

- **Initial mud properties are recommended as follows:** Initial Mud Density should be 9.5 ppg and the Plastic Viscosity 10-22, Yield Point 8-12. Viscosity of 55-65 sec/quart, HTHP filtrate of 6-8cc/30 min. and an ES (Electrical Stability) of ±300.
- Excess Lime content should be maintained at 3-4 lb./bbl. Total Calcium Chlorides should be ±220,000ppm, with an Oil/Water ratio of 70:30. This will be a conventional Tight Emulsion OBM system.
- Additions of AES VIS III (Organophilic Clay) will be necessary for increasing the yield point for proper hole cleaning and additions of AES VIS LS (Low End Modifier) to help increase the 6 RPM reading as needed. Maintain the HTHP fluid loss at 6-8cc/30 min. through Total Depth with FLR PLUS and Shaletex II additions.

## INTERVAL OBJECTIVES: (CONTINUED)

- An elevated low-end rheology fluid is the most effective method to ensure proper hole cleaning in directional wellbores. Therefore, particular attention should be paid to elevating and maintaining the mud system's low-end rheologies. While drilling the 6-3/4" lateral interval, the 6-RPM reading should be maintained within the recommended 4Θ – 8Θ range.

- From this point to TD, particular emphasis on flow rate, rotary speed and mud rheology will be monitored closely. If possible, pipe rotation should be 100 rpm, flow rate should be 450-550 gpm, in an 8-1/2" hole, and the 6 rpm reading should be ±1.0 times that of the hole diameter. These three play the most important role in cleaning a high angle extended reach horizontal hole along with circulation time. Prior to any bit/short trips, circulate for at least 2 suction to suction cycles while on bottom rotating and reciprocating.

- Utilizing tourly additions of FLR and Shaletex II, the H.T.H.P. Fluid Loss should be kept within the 6-8 ml/30 min range throughout this interval to provide enhanced formation integrity and wellbore stability. Providing that is no free water in the filtrate.

- Torque and drag should be monitored closely to help with early indications of improper hole cleaning. Additionally, monitor returns at the shakers in order to determine if clean up cycles would be beneficiary.

- There should be at least two waves of drill cuttings cross the shaker. It is normal to see a pause in these waves as layers are cleared from the hole and circulated to surface. Depending on hole conditions it may become necessary to pull off bottom and circulate if any torque of drag is encountered. Circulate 2 complete suction to suction cycles, prior to any short/bit trips to ensure the annulus is clear of large cuttings beds.

- Additional mud densities may be required to stabilize the wellbore, due to heaving shale from tectonically fractured formations. Increase the mud weight in increments of .2 ppb over the original circulating weight, until the wellbore has become stable and no signs of heaving formation are present over the shaker.

- Additional mixing of Barite, chemicals, diesel, and water will be required if weighted or high viscosity sweeps are pumped and returned back into the circulating system. Maintaining desired rheology, for proper hole cleaning, becomes costly, time consuming, and creates "spotty" property results throughout the active system.

***Finally, increasing the fluid density or lowering it will be determined as needed depending on hole conditions.***

***Note:*** *Mud losses can occur when drilling fluid ECD's reach 11.0-11.5 ppg or higher. Decreasing the mud weight will be needed to prevent continued losses, if down-hole pressures will allow. An LCM regiment of 5-10 lb/bbl of ECM 1 and ECM 2, each, have shown to greatly reduce down-hole seepage/losses when drilling parameters require a heavier mud density that exceeds the fracture gradient.*

## 11. LOSS CIRCULATION

# Lost Circulation Mitigation Recommendations

**Seepage Losses** (**<20bph**): Recommend pumping 20-30bbls at 15 - 20ppb.

| PRODUCT | CONCENTRATION |
|---|---|
| ECM 1 (40) | 6 |
| ECM 2 (40) | 6 |

**Intermediate to Heavy Losses** (**20 – 80bph**): Recommend pumping or spotting 50bbls at 35 - 45ppb across thief zone and allow hole to heal.

| PRODUCT | CONCENTRATION |
|---|---|
| ECM 1 (40) | 10 |
| ECM 2 (40) | 10 |
| ENERLOC (40) | 10 |

**Total Losses** (**>80bph**): Recommend spotting 50 – 100bbls at 45 - 55ppb across thief zone and allow hole to heal.

| PRODUCT | CONCENTRATION |
|---|---|
| CEDAR FIBER | 10 |
| ECM 1 (40) | 15 |
| ECM 2 (40) | 15 |
| ENERLOC (40) | 20 |

# 12. HOW WE SUPPORT A SAFE WORK ENVIRONMENT

## AES DRILLING FLUIDS, LLC: SAFETY FIRST

AES Drilling Fluids believes that any job that cannot be done safely should not be performed. Our employees are authorized to stop any job or act they deem unsafe.

We are committed to the policies provided by governing bodies, AES Drilling Fluids health and safety experts, and those of our customers to eliminate or minimize risks to people and the environment. AES employs health and safety professionals to coordinate the latest best practices between stakeholders and verify active participation in safety initiatives. They will regularly audit rig site activities and training to make sure our employees are properly equipped and demonstrate working knowledge of these practices.

Employees are required to follow all guidelines for proper personal protective equipment (PPE). Spills must be reported immediately for appropriate spill response measures and reporting. AES Drilling Fluids employees will brief the rig crews to communicate the hazards associated with drilling fluid chemicals. Even though a drilling fluid may be considered non-toxic, it may contain chemicals that cause skin irritation or other issues. These briefings will include general safety precautions, expectations, and PPE requirements for handling the fluid and its additives.

Generally speaking, our PPE includes, but is not limited to, a hard hat, safety glasses or safety googles, safety toed boots or shoes and flame retardant protective clothing. Some activities require additional equipment such as Tyvek suits, chemical protective aprons, leather and rubber gloves, and more. Safety data sheets serve a guide for the required equipment for a specific chemical. Two safety data sheet (SDS) books will be available at the work site for quick review. One will be located in the drilling rig control room (“dog house) and the second will be located in the drilling fluids lab.

Key elements of the AES Drilling Fluids Safety Programs and Policies:

- Pre-employment background screening and drug and alcohol testing
- A training program meeting or exceeding all OSHA requirements. This program includes a comprehensive safety orientation program where all procedures and policies are reviewed. We are also a member of PEC Premier, where our program is rated Above Average.
- Programs to track accidents, injuries, incident and near-miss investigations, and lessons learned
- Policies for Drug and Alcohol, Weapons, and Disciplinary Measures. These measures are extended to complement customer-specific policies, where necessary.
- Documented monthly safety meetings and training
- Documented risk assessments for hazard identification and job hazard analysis
- Participation in all pre-spud meetings

AES Drilling Fluids will always remain committed to our clients’ continued success while maintaining an injury free work environment. If there are questions about our programs or policies, please feel free to contact our Environmental Health and Safety Manager.

**AFE:** **NM0106**

API:

REGULATORY: BLM

PERMIT #

RIG: H&P 460

KB: 3665.5 (26.5')

GL: 3639'

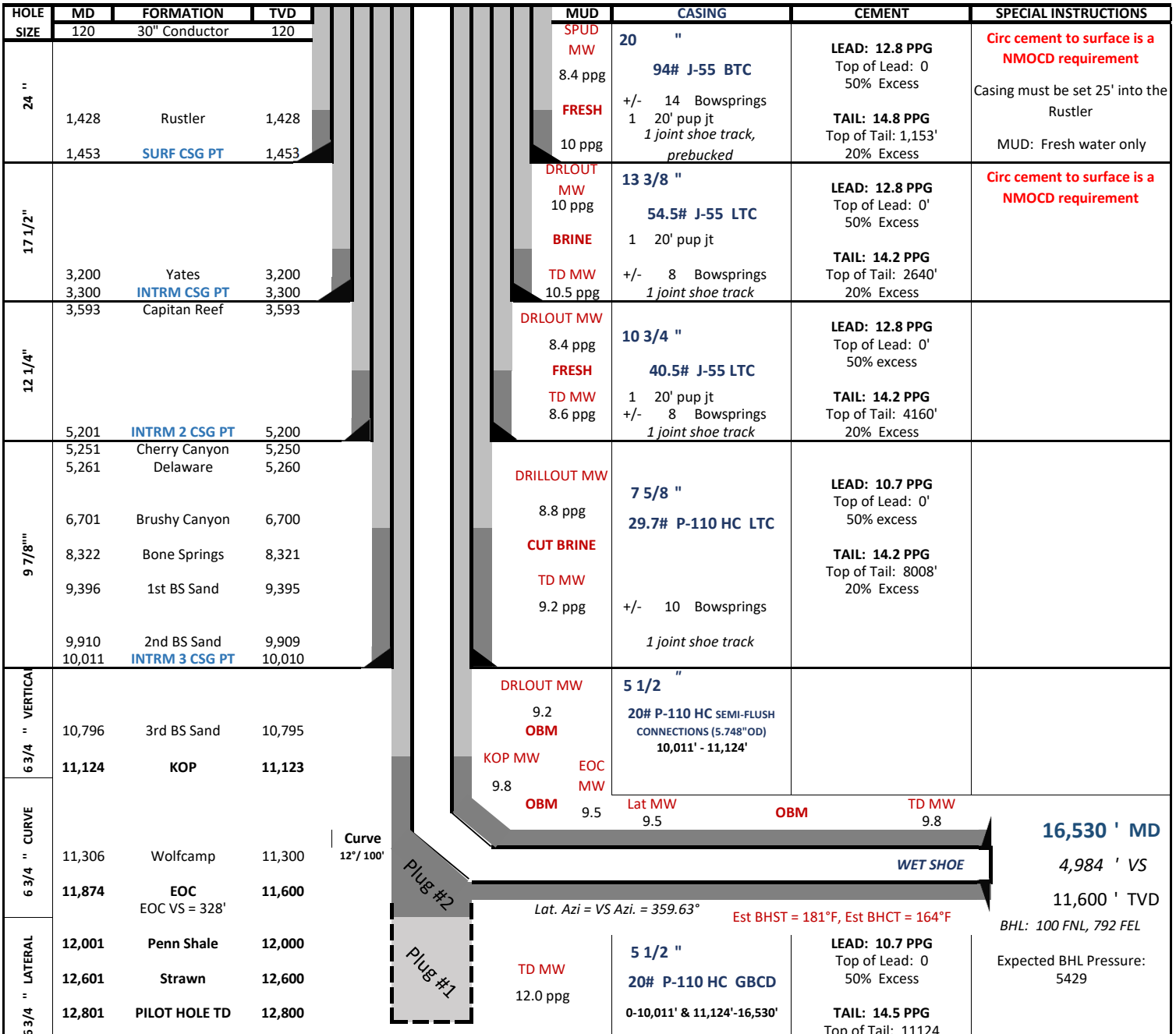
# Sandra Jean 23 Fed Com 751H

## *Wolfcamp*

*Lea County, NM*

**SHL:** *Sec. 23, T-20S, R-33E; 200 FSL, 772 FEL*

*Lat: 32.5519283, Long: -103.6278495 (NAD83)*




| HOLE SIZE | MD | FORMATION | TVD | MUD | CASING | CEMENT | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| 24 " | 120 | 30" Conductor | 120 | SPUD MW 8.4 ppg FRESH 10 ppg | 20 " 94# J-55 BTC +/- 14 Bowsprings 1 20' pup jt *1 joint shoe track, prebucked* | LEAD: 12.8 PPG Top of Lead: 0 50% Excess TAIL: 14.8 PPG Top of Tail: 1,153' 20% Excess | Circ cement to surface is a NMOCD requirement Casing must be set 25' into the Rustler MUD: Fresh water only |
| | 1,428 | Rustler | 1,428 | | | | |
| | 1,453 | SURF CSG PT | 1,453 | | | | |
| 17 1/2" | 3,200 | Yates | 3,200 | DRLOUT MW 10 ppg BRINE TD MW 10.5 ppg | 13 3/8 " 54.5# J-55 LTC 1 20' pup jt +/- 8 Bowsprings *1 joint shoe track* | LEAD: 12.8 PPG Top of Lead: 0' 50% Excess TAIL: 14.2 PPG Top of Tail: 2640' 20% Excess | Circ cement to surface is a NMOCD requirement |
| | 3,300 | INTRM CSG PT | 3,300 | | | | |
| 12 1/4" | 3,593 | Capitan Reef | 3,593 | DRLOUT MW 8.4 ppg FRESH TD MW 8.6 ppg | 10 3/4 " 40.5# J-55 LTC 1 20' pup jt +/- 8 Bowsprings *1 joint shoe track* | LEAD: 12.8 PPG Top of Lead: 0' 50% excess TAIL: 14.2 PPG Top of Tail: 4160' 20% Excess | |
| | 5,201 | INTRM 2 CSG PT | 5,200 | | | | |
| 9 7/8"" | 5,251 | Cherry Canyon | 5,250 | DRILLOUT MW 8.8 ppg CUT BRINE TD MW 9.2 ppg | 7 5/8 " 29.7# P-110 HC LTC +/- 10 Bowsprings *1 joint shoe track* | LEAD: 10.7 PPG Top of Lead: 0' 50% excess TAIL: 14.2 PPG Top of Tail: 8008' 20% Excess | |
| | 5,261 | Delaware | 5,260 | | | | |
| | 6,701 | Brushy Canyon | 6,700 | | | | |
| | 8,322 | Bone Springs | 8,321 | | | | |
| | 9,396 | 1st BS Sand | 9,395 | | | | |
| | 9,910 | 2nd BS Sand | 9,909 | | | | |
| | 10,011 | INTRM 3 CSG PT | 10,010 | | | | |
| 6 3/4 " VERTICAL | 10,796 | 3rd BS Sand | 10,795 | DRLOUT MW 9.2 OBM KOP MW 9.8 OBM EOC MW 9.5 | 5 1/2 " 20# P-110 HC SEMI-FLUSH CONNECTIONS (5.748"OD) 10,011' - 11,124' | | |
| | **11,124** | **KOP** | **11,123** | | | | |
| 6 3/4 " CURVE | 11,306 | Wolfcamp | 11,300 | | | | |
| | **11,874** | **EOC** | **11,600** | | | | |
| | | EOC VS = 328' | | | | | |
| 6 3/4 " LATERAL | **12,001** | **Penn Shale** | **12,000** | TD MW 12.0 ppg | 5 1/2 " 20# P-110 HC GBCD 0-10,011' & 11,124'-16,530' 1 15' pup jt 2 20' Marker Jts +/- 10 Bowsprings +/- 27 Doublebows +/- 110 Solid Bodies | LEAD: 10.7 PPG Top of Lead: 0 50% Excess TAIL: 14.5 PPG Top of Tail: 11124 20% Excess All aqueous fluids (spacer and disp) left inside or outside of pipe must have biocide & corrision inhibitor | Expected BHL Pressure: 5429 |
| | **12,601** | **Strawn** | **12,600** | | | | |
| | **12,801** | **PILOT HOLE TD** | **12,800** | | | | |

Lat MW 9.5 OBM TD MW 9.8

**16,530 ' MD**

*4,984 ' VS*

11,600 ' TVD

*BHL: 100 FNL, 792 FEL*

**Pilot hole plug #1: Cement plug spotted from Pilot Hole TD to 50' above Penn Shale per Onshore Order 2.**

**Pilot hole plug #2: Cement plug spotted 400' above and below KOP.**

**DIRECTIONAL PLAN**

| MD | INC | INC | TVD | ANNOTATION |
|---|---|---|---|---|

**DIRECTIONS TO LOCATION:**

Drilling Engineer: Ryan Harris

***Sandra Jean 23 Fed Com 751H (H&P 460)***

Date: 1/4/2024

**PROPOSAL#: 230502165702-K**

# CEMENT PROCEDURE & PROPOSAL

**PREPARED FOR:**
Mr. Braden Harris
EMAIL: braden@avantnr.com
PHONE NUMBER: 406-600-3310

# Avant Natural Resources

## Sandra Jean 23 Fed Com #751H

Lea County, NM
Rig: H&P 460

AFE Number: NM0106

**Service Point**
Odessa
1400 S JBS Parkway Odessa, TX 79766
432-701-8955

**Technical Writer**
Jonathan Smith
jonathan@wtcementers.com
432-701-3719

**WTC Representative**
Jon Reynolds
jon@wtcementers.com
432-257-1234



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Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Surface

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 8.4# Spud Mud |
| PREVIOUS PIPE | 30'' 98.89# CSG to 120 |
| OPEN HOLE | 24'' OH to 1453 |
| CASING/INJECTION | 20'' 94# J-55/BTC to 1453 |
| MD | 1453 |
| TVD | 1453 |
| EST BHST/BHCT | 92-F / 85-F (0.8-F/100-FT) |
| NOTES | Standby charges start after WTC has been on location for more than 4-hrs. |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Lead | 120 | 29.376 | 20 | | 0.4497 | 54.0 |
| Lead | 1033 | 24 | 20 | 50% | 0.2564 | 264.9 |
| Tail | 300 | 24 | 20 | 20% | 0.2052 | 61.5 |
| SHOE JOINT | 40 | 20 | 19.124 | | 0.3553 | 14.2 |

**FLUIDS**

SPACER

Fresh Water

| | |
|---|---|
| VOLUME | 20-bbl |

Lead

35% B_Poz+65% Class C+6% Gel+5% SALT+0.25PPS Pol-E-Flake+0.005GPS NoFoam V1A

| | | |
|---|---|---|
| VOLUME | 945-SX | *319.8-bbls* |
| DENSITY | 12.8-ppg | |
| YIELD | 1.9-cf/sx | |
| MIX WATER | 10.17-gps | |
| TOP OF CEMENT | Surface | |
| EXCESS | 50% | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Surface

PROPOSAL#: 230502165702-K

| Tail | | |
|---|---|---|
| | 100% Class C+1% CaCl2+0.005GPS NoFoam V1A | |
| VOLUME | 320-SX | *75.8-bbls* |
| DENSITY | 14.8-ppg | |
| YIELD | 1.33-cf/sx | |
| MIX WATER | 6.34-gps | |
| TOP OF CEMENT | 1153-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| | Displacement | |
| VOLUME | 502-bbl | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 1st Intermediate

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 10.5# Brine |
| PREVIOUS PIPE | 20'' 94# CSG to 1453 |
| OPEN HOLE | 17.5'' OH to 3300 |
| CASING/INJECTION | 13.375'' 54.5# J-55/LTC to 3300 |
| MD | 3300 |
| EST BHST/BHCT | 107-F / 96-F (0.8-F/100-FT) |
| NOTES | Standby charges start after WTC has been on location for more than 4-hrs. |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Lead | 1453 | 19.124 | 13.375 | | 0.1815 | 263.7 |
| Lead | 1187 | 17.5 | 13.375 | 50% | 0.1856 | 220.3 |
| Tail | 660 | 17.5 | 13.375 | 20% | 0.1485 | 98.0 |
| SHOE JOINT | 40 | 13.375 | 12.615 | | 0.1546 | 6.2 |

**FLUIDS**

SPACER

Fresh Water

| | |
|---|---|
| VOLUME | 25-bbl |

Lead

35% B_Poz+65% Class C+6% Gel+5% SALT+0.5% R-1300+0.25PPS Pol-E-Flake+0.005GPS NoFoam V1A

| | | |
|---|---|---|
| VOLUME | 1430-SX | *483.9-bbls* |
| DENSITY | 12.8-ppg | |
| YIELD | 1.9-cf/sx | |
| MIX WATER | 10.18-gps | |
| TOP OF CEMENT | Surface | |
| EXCESS | 50% | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 1st Intermediate

PROPOSAL#: 230502165702-K

| Tail | | |
|---|---|---|
| 50% B_Poz+50% Class C+5% SALT+0.005GPS NoFoam V1A | | |
| VOLUME | 465-SX | *105.2-bbls* |
| DENSITY | 14.2-ppg | |
| YIELD | 1.27-cf/sx | |
| MIX WATER | 5.81-gps | |
| TOP OF CEMENT | 2640-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| Displacement | | |
| VOLUME | 503.9-bbl | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 2nd Intermediate

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 8.4# Fresh Water |
| PREVIOUS PIPE | 13.375'' 54.5# CSG to 3300 |
| OPEN HOLE | 12.25'' OH to 5201 |
| CASING/INJECTION | 10.75'' 40.5# J-55/LTC to 5201 |
| MD | 5201 |
| TVD | 5200 |
| EST BHST/BHCT | 122-F / 106-F (0.8-F/100-FT) |
| NOTES | Standby charges start after WTC has been on location for more than 4-hrs. |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Lead | 3300 | 12.615 | 10.75 | | 0.0423 | 139.7 |
| Lead | 860 | 12.25 | 10.75 | 50% | 0.0503 | 43.2 |
| Tail | 1041 | 12.25 | 10.75 | 20% | 0.0402 | 41.9 |
| SHOE JOINT | 40 | 10.75 | 10.05 | | 0.0981 | 3.9 |

**FLUIDS**

**SPACER**

Fresh Water

VOLUME 25-bbl

**Lead**

35% B_Poz+65% Class C+6% Gel+5% SALT+0.1% R-1300+0.25PPS Pol-E-Flake+0.005GPS NoFoam V1A

| | | |
|---|---|---|
| VOLUME | 545-SX | *184.4-bbls* |
| DENSITY | 12.8-ppg | |
| YIELD | 1.9-cf/sx | |
| MIX WATER | 10.17-gps | |
| TOP OF CEMENT | Surface | |
| EXCESS | 50% | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 2nd Intermediate

PROPOSAL#: 230502165702-K

| Tail | | |
|---|---|---|
| 50% B_Poz+50% Class C+5% SALT+0.1% FR-5+0.005GPS NoFoam V1A | | |
| VOLUME | 205-SX | *46.4-bbls* |
| DENSITY | 14.2-ppg | |
| YIELD | 1.27-cf/sx | |
| MIX WATER | 5.8-gps | |
| TOP OF CEMENT | 4160-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| Displacement | | |
| VOLUME | 506.3-bbl | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 3rd Intermediate

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 8.4# Cut Brine |
| PREVIOUS PIPE | 10.75'' 40.5# CSG to 5201 |
| OPEN HOLE | 9.875'' OH to 10011 |
| CASING/INJECTION | 7.625'' 29.7# P-110-HC/LTC to 10011 |
| MD | 10011 |
| TVD | 10010 |
| EST BHST/BHCT | 161-F / 139-F (0.8-F/100-FT) |
| NOTES | Standby charges start after WTC has been on location for more than 6-hrs. |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Lead | 5201 | 10.05 | 7.625 | | 0.0416 | 216.5 |
| Lead | 2807 | 9.875 | 7.625 | 50% | 0.0574 | 161.0 |
| Tail | 2003 | 9.875 | 7.625 | 20% | 0.0459 | 91.9 |
| SHOE JOINT | 40 | 7.625 | 6.875 | | 0.0459 | 1.8 |

**FLUIDS**

| SPACER | |
|---|---|
| | Fresh Water |
| VOLUME | 25-bbl |

| Lead | | |
|---|---|---|
| | 100% ProLite+5PPS Plexcrete STE+2% SMS+0.7% R-1300+3PPS Gilsonite+0.005GPS NoFoam V1A | |
| VOLUME | 630-SX | *379.2-bbls* |
| DENSITY | 10.7-ppg | |
| YIELD | 3.38-cf/sx | |
| MIX WATER | 21.06-gps | |
| TOP OF CEMENT | Surface | |
| EXCESS | 50% | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# 3rd Intermediate

PROPOSAL#: 230502165702-K

| Tail | | |
|---|---|---|
| 50% B_Poz+50% Class H+5% SALT+0.2% FR-5+0.2% FL-24+0.005GPS NoFoam V1A | | |
| VOLUME | 415-SX | *93.9-bbls* |
| DENSITY | 14.2-ppg | |
| YIELD | 1.27-cf/sx | |
| MIX WATER | 5.79-gps | |
| TOP OF CEMENT | 8008-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| Displacement | | |
| VOLUME | 457.8-bbl | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Kick Off Plug

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 9.5# OBM |
| PREVIOUS PIPE | 7.625'' 29.7# CSG to 10011 |
| OPEN HOLE | 6.75'' OH to 12801 |
| MD | 12801 |
| EST BHST/BHCT | 183-F / 146-F (0.8-F/100-FT) |
| DRILL PIPE | 4.5" 16.6# DP |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Plugback | 850 | 6.75 | 0 | 20% | 0.0531 | 45.1 |
| KOP | 800 | 6.75 | 0 | 20% | 0.0531 | 42.5 |

**FLUIDS**

**SPACER**

Wt. Spacer 37.63GPB Water+8PPB PolyScrub 4320+89.05PPB Barite+1GPB HoleScrub 4311+1PPB R-1300

| | |
|---|---|
| VOLUME | 19-bbl |
| DENSITY | 10-ppg |

**Plugback**

100% Class H+0.2% FR-5+0.005GPS NoFoam V1A

| | | |
|---|---|---|
| VOLUME | 215-SX | *45.2-bbls* |
| DENSITY | 15.6-ppg | |
| YIELD | 1.18-cf/sx | |
| MIX WATER | 5.22-gps | |
| TOP OF CEMENT | 11951-ft | |
| EXCESS | 20% | |

**SPACER**

Wt. Spacer 37.63GPB Water+8PPB PolyScrub 4320+89.05PPB Barite+1GPB HoleScrub 4311+1PPB R-1300

| | |
|---|---|
| VOLUME | 11-bbl |
| DENSITY | 10-ppg |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Kick Off Plug

PROPOSAL#: 230502165702-K

| | | |
|---|---|---|
| **DISPLACEMENT** | | |
| | OBM | |
| VOLUME | 156.8-bbl | |
| **SPACER** | | |
| Wt. Spacer | 37.63GPB Water+8PPB PolyScrub 4320+89.05PPB Barite+1GPB HoleScrub 4311+1PPB R-1300 | |
| VOLUME | 20-bbl | |
| DENSITY | 10-ppg | |
| **KOP** | | |
| | 100% Class H+5% SALT+0.05% FR-5+1.2% C-37+0.005GPS NoFoam V1A | |
| VOLUME | 265-SX | *42.5-bbls* |
| DENSITY | 18-ppg | |
| YIELD | 0.9-cf/sx | |
| MIX WATER | 3-gps | |
| TOP OF CEMENT | 10724-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| Wt. Spacer | 37.63GPB Water+8PPB PolyScrub 4320+89.05PPB Barite+1GPB HoleScrub 4311+1PPB R-1300 | |
| VOLUME | 10-bbl | |
| DENSITY | 10-ppg | |
| **DISPLACEMENT** | | |
| | OBM | |
| VOLUME | 140.5-bbl | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Production

PROPOSAL#: 230502165702-K

| WELL INFORMATION | |
|---|---|
| MUD | 9.8# OBM |
| PREVIOUS PIPE | 7.625'' 29.7# CSG to 10011 |
| OPEN HOLE | 6.75'' OH to 16530 |
| CASING/INJECTION | 5.5'' 20# P-110/HC/GBCD to 16530 |
| MD | 16530 |
| TVD | 11600 |
| EST BHST/BHCT | 236-F / 219-F (1.34-F/100-FT) |
| KOP | 11124 |
| NOTES | Standby charges start after WTC has been on location for more than 8-hrs. |

**VOLUMES**

| FLUID NAME | LENGTH (ft) | OD (in.) | ID (in.) | XS (%) | FACTOR (bbl/ft) | VOLUME (bbl) |
|---|---|---|---|---|---|---|
| Lead | 10011 | 6.875 | 5.5 | | 0.0165 | 165.5 |
| Lead | 1113 | 6.75 | 5.5 | 50% | 0.0223 | 24.8 |
| Tail | 5406 | 6.75 | 5.5 | 20% | 0.0178 | 96.5 |
| SHOE JOINT | 80 | 5.5 | 4.778 | | 0.0222 | 1.8 |

**FLUIDS**

**SPACER**

Wt. Spacer 37.16GPB Water+8PPB PolyScrub 4320+105.54PPB Barite+1GPB HoleScrub 4311+1PPB R-1300

| | |
|---|---|
| VOLUME | 40-bbl |
| DENSITY | 10.3-ppg |

**Lead**

100% ProLite+5PPS Plexcrete STE+2% SMS+0.65% R-1300+0.5% FL-24+0.005GPS NoFoam V1A

| | | |
|---|---|---|
| VOLUME | 325-SX | *193.3-bbls* |
| DENSITY | 10.7-ppg | |
| YIELD | 3.34-cf/sx | |
| MIX WATER | 20.97-gps | |
| TOP OF CEMENT | Surface | |
| EXCESS | 50% | |

Avant Natural Resources
Sandra Jean 23 Fed Com #751H
Lea County, NM
Rig: H&P 460

# Production

PROPOSAL#: 230502165702-K

| Tail | | |
|---|---|---|
| 50% B_Poz+50% Class H+5% SALT+0.05% RCKCAS-100+0.75% R-1201+0.5% FL-24+0.005GPS NoFoam V1A | | |
| VOLUME | 460-SX | *99.1-bbls* |
| DENSITY | 14.5-ppg | |
| YIELD | 1.21-cf/sx | |
| MIX WATER | 5.28-gps | |
| TOP OF CEMENT | 11124-ft | |
| EXCESS | 20% | |
| **DISPLACEMENT** | | |
| Fresh Water+ 0.25GPT Plexcide 24L+1GPT Corplex | | |
| VOLUME | 364.8-bbl | |
| DENSITY | 8.34-ppg | |

| CHEMICAL DESCRIPTIONS | | |
|---|---|---|
| **CHEMICAL NAME** | **CODE** | **DESCRIPTION** |
| B_Poz | WTC228 | Poz - Fly Ash, Extender |
| Class H | WTC101 | API Cement |
| Class C | WTC100 | API Cement |
| Premium C | WTC270 | API Cement |
| ProLite | | Blended Based Cement |
| Plexcrete SFA | WTC129 | Cement Strength Enhancer |
| Gel | WTC102 | Extender |
| Micro Crystal | WTC212 | Cement Strength Enhancer |
| Micro Shell | WTC209 | Cement Strength Enhancer |
| WTC1 | WTC250 | Extender |
| Plexcrete STE | WTC127 | Cement Strength Enhancer |
| FAR-2 | WTC260 | Cement Strength Enhancer |
| Gypsum | WTC111 | Free Water Control, Extender |
| CaCl2 | WTC112 | Accelerator |
| SMS | WTC115 | Free Water Control, Extender |
| RCKCAS-100 | WTC276 | Free Water Control, Anti-Settling Agent |
| SA-1 | WTC264 | Free Water Control, Extender |
| R-1201 | WTC253 | Lignosulfonate Retarder |
| R-1300 | WTC201 | Low Temperature Retarder |
| FR-5 | WTC258 | Lignosulfonate Retarder |
| CRT-201 | WTC278 | Lignosulfonate Retarder |
| C-37 | WTC224 | Dispersant, Friction Reducer |
| FL-24 | WTC277 | Fluid Loss (polymers/copolymers - 300-F max) |
| EC-10 | WTC120 | Expanding Agent |
| Gas Bond | WTC126 | Gas Migration Control (Hydrogen Generating) |
| Gilsonite | WTC003 | Premium Lost Circulation Material, Free Water Control |
| Pol-E-Flake | WTC106 | Lost Circulation Material |
| Web Seal | WTC133 | Premium Fiber Lost Circulation Material |
| Zone Seal | WTC207 | Premium Lost Circulation Material |
| NoFoam V1A | WTC105 | Liquid Defoamer |
| Water | | Fresh Water |
| PolyScrub 4320 | WTC232 | Spacer Gelling Agent |
| Barite | WTC116 | Weighting Agent |
| HoleScrub 4311 | WTC281 | Surfactant |
| HoleScrub 4305 | WTC213 | Surfactant |
| HoleScrub 4308 | WTC215 | Surfactant |
| Soda Ash | WTC164 | pH Control |
| R-1300 | WTC201 | Low Temperature Retarder |
| SuspendaCem 6302 | WTC005 | Free Water Control, Anti-Settling Agent |
| Sugar | WTC119 | Retarder |
| AI-1, Acid Inhibitor | WTC015 | Corrosion Inhibitor |
| Plexcide 24L | WTC166 | Biocide |
| Corplex | WTC134 | Corrosion Inhibitor |
| Clay Max | WTC096 | KCL Substitute |
| Zone Seal | WTC207 | Premium Lost Circulation Material |

**District I**
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
**District II**
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
**District III**
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
**District IV**
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

# State of New Mexico
# Energy, Minerals and Natural Resources
# Oil Conservation Division
# 1220 S. St Francis Dr.
# Santa Fe, NM 87505

CONDITIONS

Action 310950

## CONDITIONS

| | |
|---|---|
| Operator:<br>Avant Operating, LLC<br>1515 Wynkoop Street<br>Denver, CO 80202 | OGRID:<br>330396 |
| | Action Number:<br>310950 |
| | Action Type:<br>[C-103] NOI Change of Plans (C-103A) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| pkautz | None | 3/15/2024 |