Form 3160-5
(June 2019)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: October 31, 2021

**SUNDRY NOTICES AND REPORTS ON WELLS**

***Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.***

***SUBMIT IN TRIPLICATE*** *- Other instructions on page 2*

5. Lease Serial No. NMNM19452

6. If Indian, Allottee or Tribe Name

7. If Unit of CA/Agreement, Name and/or No.

1. Type of Well
☑ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No. STONEWALL 28 FED COM/407H

2. Name of Operator EOG RESOURCES INCORPORATED

9. API Well No. 30-025-52706

3a. Address 1111 BAGBY SKY LOBBY 2, HOUSTON, TX 77(

3b. Phone No. *(include area code)* (713) 651-7000

10. Field and Pool or Exploratory Area RED HILLS/BONE SPRING, NORTH

4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)*
SEC 28/T24S/R34E/NMP

11. Country or Parish, State
LEA/NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

| TYPE OF SUBMISSION | TYPE OF ACTION | | | |
|---|---|---|---|---|
| ☑ Notice of Intent | ☐ Acidize | ☐ Deepen | ☐ Production (Start/Resume) | ☐ Water Shut-Off |
| | ☐ Alter Casing | ☐ Hydraulic Fracturing | ☐ Reclamation | ☐ Well Integrity |
| ☐ Subsequent Report | ☐ Casing Repair | ☐ New Construction | ☐ Recomplete | ☐ Other |
| | ☑ Change Plans | ☐ Plug and Abandon | ☐ Temporarily Abandon | |
| ☐ Final Abandonment Notice | ☐ Convert to Injection | ☐ Plug Back | ☐ Water Disposal | |

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be perfonned or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has detennined that the site is ready for final inspection.)

EOG respectfully requests an amendment to our approved APD for this well to reflect the following changes:

Stonewall 28 Fed Com 514H (FKA 407H) API #: 30-025-52706

Change name from Stonewall 28 Fed Com 407H to Stonewall 28 Fed Com 514H.

Change BHL from T-24-S, R-34-E, Sec 33, 100' FSL, 990' FEL, Lea Co., NM,
to T-24-S, R-34-E, Sec 33, 100' FSL, 1290' FEL, Lea Co., N.M.

Change target formation to Second Bone Spring Sand.

EOG requests approval to use alternate casing designs listed in the Blanket Casing Design

Continued on page 3 additional information

14. I hereby certify that the foregoing is true and correct. Name *(Printed/Typed)*
STAR HARRELL / Ph: (432) 848-9161

Title Regulatory Specialist

Signature (Electronic Submission)

Date 03/28/2024

**THE SPACE FOR FEDERAL OR STATE OFICE USE**

Approved by
KEITH P IMMATTY / Ph: (575) 988-4722 / Approved

Title ENGINEER

Date 04/06/2024

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

Office CARLSBAD

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.

(Instructions on page 2)

## GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations and reports of such operations when completed as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local area or regional procedures and practices, are either shown below, will be issued by or may be obtained from the local Federal office.

## SPECIFIC INSTRUCTIONS

*Item 4* - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

*Item 13:* Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present productive zones or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to the top of any tubing left in the hole; method of closing top of well and date well site conditioned for final inspection looking for approval of the abandonment. If the proposal will involve **hydraulic fracturing operations**, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

## NOTICES

The privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.
AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.
PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3, and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c)and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.
ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.
EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3-4.

The Paperwork Reduction Act of 1995 requires us to inform you that:
The BLM collects this information to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.
Response to this request is mandatory.
The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

**BURDEN HOURS STATEMENT:** Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect ofthis form to U.S. Department ofthe Interior, Bureau ofLand Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C St., N.W., Mail Stop 401 LS, Washington, D.C. 20240

## Additional Information

### Additional Remarks

(EOG BLM Variance 5a - Alternate Shallow Casing Designs.pdf) document. See Sundry ID #2782217.

### Location of Well

0. SHL: TR B / 260 FNL / 1759 FEL / TWSP: 24S / RANGE: 34E / SECTION: 28 / LAT: 32.1950794 / LONG: -103.4720556 ( TVD: 0 feet, MD: 0 feet )

PPP: TR A / 100 FNL / 989 FEL / TWSP: 24S / RANGE: 34E / SECTION: 28 / LAT: 32.1955167 / LONG: -103.4695667 ( TVD: 10206 feet, MD: 10266 feet )

PPP: TR I / 2640 FNL / 990 FEL / TWSP: 24S / RANGE: 34E / SECTION: 28 / LAT: 32.1885386 / LONG: -103.4695561 ( TVD: 10471 feet, MD: 12907 feet )

BHL: TR P / 100 FSL / 990 FEL / TWSP: 24S / RANGE: 34E / SECTION: 33 / LAT: 32.1670453 / LONG: -103.469523 ( TVD: 10471 feet, MD: 20726 feet )

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) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

# WELL LOCATION AND ACREAGE DEDICATION PLAT

| API Number | Pool Code | Pool Name |
|---|---|---|
| 30-025-52706 | 96434 | Red Hills; Bone Spring, North |

| Property Code | Property Name | Well Number |
|---|---|---|
| 321477 | STONEWALL 28 FED COM | 514H |

| OGRID No. | Operator Name | Elevation |
|---|---|---|
| 7377 | EOG RESOURCES, INC. | 3491' |

## Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 28 | 24-S | 34-E | - | 260' | NORTH | 1759' | EAST | LEA |

## Bottom Hole Location If Different From Surface

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 33 | 24-S | 34-E | - | 100' | SOUTH | 1290' | EAST | LEA |

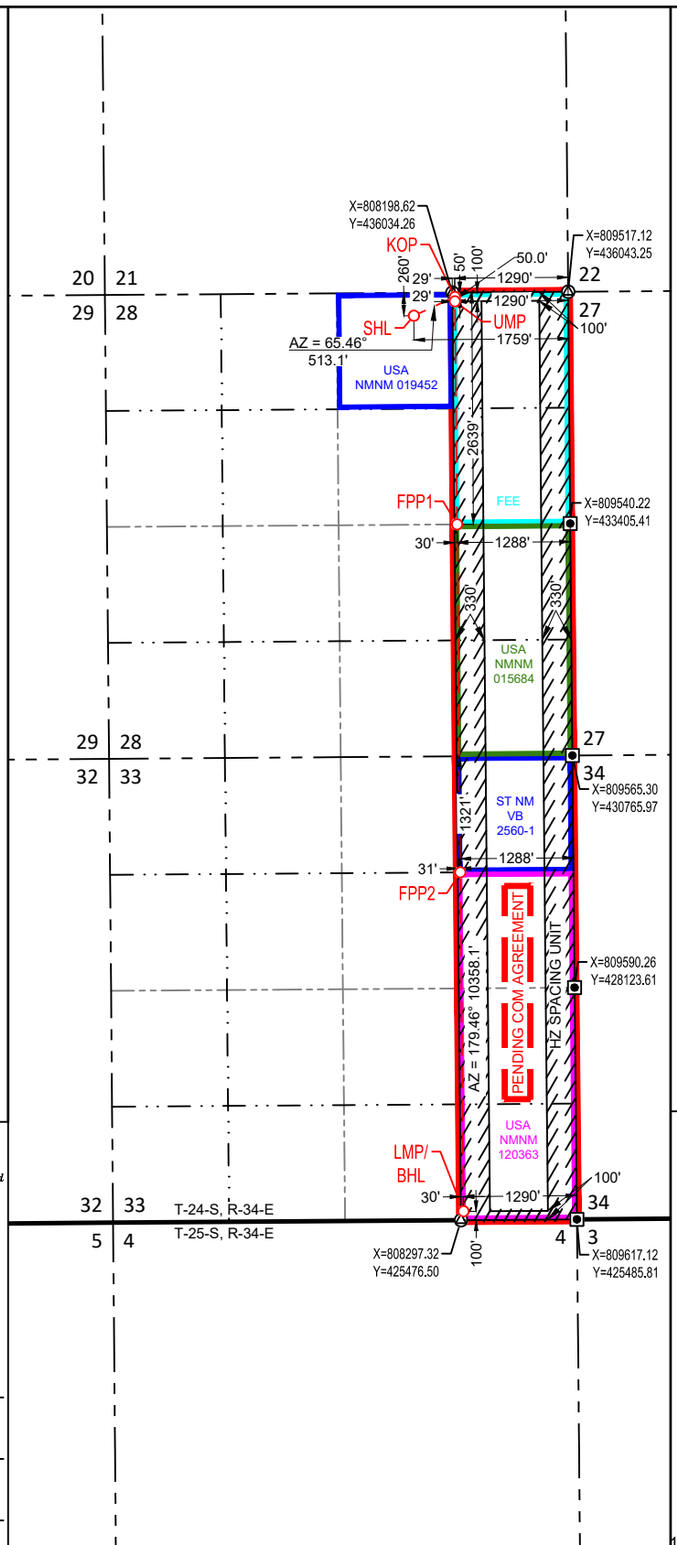
| Dedicated Acres | Joint or Infill | Consolidated Code | Order No. |
|---|---|---|---|
| 320.00 | | | PENDING COM AGREEMENT |

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

**SURFACE LOCATION (SHL)**
NEW MEXICO EAST
NAD 1983
X=807761 Y=435771
LAT.: N 32.1950794
LONG.: W 103.4720556
NAD 1927
X=766576 Y=435713
LAT.: N 32.1949548
LONG.: W 103.4715823
260' FNL 1759' FEL

**KICK OFF POINT (KOP)**
NEW MEXICO EAST
NAD 1983
X=808228 Y=435984
LAT.: N 32.1956549
LONG.: W 103.4705414
NAD 1927
X=767043 Y=435926
LAT.: N 32.1955303
LONG.: W 103.4700682
50' FNL 1290' FEL

**UPPER MOST PERF. (UMP)**
NEW MEXICO EAST
NAD 1983
X=808228 Y=435934
LAT.: N 32.1955175
LONG.: W 103.4705412
NAD 1927
X=767043 Y=435876
LAT.: N 32.1953929
LONG.: W 103.4700680
100' FNL 1290' FEL




**FED PERF. POINT (FPP1)**
NEW MEXICO EAST
NAD 1983
X=808252 Y=433396
LAT.: N 32.1885401
LONG.: W 103.4705293
NAD 1927
X=767067 Y=433338
LAT.: N 32.1884154
LONG.: W 103.4700566
2639' FNL 1288' FEL

**FED PERF. POINT (FPP2)**
NEW MEXICO EAST
NAD 1983
X=808290 Y=429436
LAT.: N 32.1776540
LONG.: W 103.4705108
NAD 1927
X=767104 Y=429377
LAT.: N 32.1775293
LONG.: W 103.4700387
1321' FNL 1288' FEL

**LOWER MOST PERF. (LMP)**
**BOTTOM HOLE LOCATION (BHL)**
NEW MEXICO EAST
NAD 1983
X=808326 Y=425577
LAT.: N 32.1670461
LONG.: W 103.4704927
NAD 1927
X=767141 Y=425518
LAT.: N 32.1669213
LONG.: W 103.4700213
100' FSL 1290' FEL

## OPERATOR CERTIFICATION

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

Star L Harrell 3/28/24
Signature Date

Star L Harrell
Print Name

star_harrell@eogresources.com
E-mail Address

## SURVEYORS CERTIFICATION

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

01/17/2024
Date of Survey
Signature and Seal of Professional Surveyor:


1/30/2024 11:22:17 AM

S:\SURVEY\EOG_MIDLAND\STONEWALL_28_FED_COM\FINAL_PRODUCTS\LO_STONEWALL_28_FED_COM_514H.dwg MLEWIN 1/30/2024 11:22 AM

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**Stonewall 28 Fed Com 514H**

**Revised Permit Information 01/11/2024:**

Well Name: Stonewall 28 Fed Com 514H; FKA Stonewall 28 Fed Com 407H
Location: SHL: 260' FNL & 1759' FEL, Section 28, T-24-S, R-34-E, Lea Co., N.M.
BHL: 100' FSL & 1290' FEL, Section 33, T-24-S, R-34-E, Lea Co., N.M.

## 1. CASING PROGRAM:

| Hole Size | Interval MD From (ft) | Interval MD To (ft) | Interval TVD From (ft) | Interval TVD To (ft) | Csg OD | Weight | Grade | Conn |
|---|---|---|---|---|---|---|---|---|
| 13-1/2" | 0 | 1,210 | 0 | 1,210 | 10-3/4" | 40.5# | J-55 | STC |
| 9-7/8" | 0 | 5,182 | 0 | 5,160 | 8-5/8" | 32# | J-55 | BTC-SC |
| 6-3/4" | 0 | 21,206 | 0 | 10,982 | 5-1/2" | 20# | P110-EC | DWC/C IS MS |

Variance is requested to waive the centralizer requirements for the 8-5/8" casing in the 9-7/8" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 9-7/8" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 5-1/2" casing in the 6-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 6-3/4" hole interval to maximize cement bond and zonal isolation.

EOG requests permission to allow deviation from the 0.422'' annulus clearance requirement for the intermediate (salt) section from Title 43 CFR Part 3170 under the following conditions:

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues.

## 2. CEMENTING PROGRAM:

| Depth | No. Sacks | Wt. ppg | Yld Ft3/sk | Slurry Description |
|---|---|---|---|---|
| 1,210' 10-3/4'' | 320 | 13.5 | 1.73 | Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface) |
| | 140 | 14.8 | 1.34 | Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1,010') |
| 5,160' 8-5/8'' | 320 | 12.7 | 2.22 | Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface) |
| | 140 | 14.8 | 1.32 | Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 4,150') |
| 21,206' 5-1/2'' | 350 | 10.5 | 3.21 | Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 4,660') |
| | 750 | 13.2 | 1.52 | Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 10530') |

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**Stonewall 28 Fed Com 514H**

| Additive | Purpose |
|---|---|
| Bentonite Gel | Lightweight/Lost circulation prevention |
| Calcium Chloride | Accelerator |
| Cello-flake | Lost circulation prevention |
| Sodium Metasilicate | Accelerator |
| MagOx | Expansive agent |
| Pre-Mag-M | Expansive agent |
| Sodium Chloride | Accelerator |
| FL-62 | Fluid loss control |
| Halad-344 | Fluid loss control |
| Halad-9 | Fluid loss control |
| HR-601 | Retarder |
| Microbond | Expansive Agent |

Note: Cement volumes based on bit size plus at least 25% excess in the open hole plus 10% excess in the cased-hole overlap section.

## 3. MUD PROGRAM:

| Depth (TVD) | Type | Weight (ppg) | Viscosity | Water Loss |
|---|---|---|---|---|
| 0 – 1,210' | Fresh - Gel | 8.6-8.8 | 28-34 | N/c |
| 1,210' – 5,160' | Brine | 9.0-10.5 | 28-34 | N/c |
| 5,160’ – 21,206’ | Oil Base | 8.8-9.5 | 58-68 | N/c - 6 |

## 4. VARIANCE REQUESTS:

EOG requests the additional variance(s) in the attached document(s):

Variances requested include (supporting documents attached):

- BOP Break Testing for 5M Intermediate Intervals (EOG BLM Variance 3a_b)
- Offline Cementing for Surface and Intermediate Intervals (EOG BLM Variance 3a_b)
- Salt Interval Washout Annular Clearnace (EOG BLM Variance 4a)
- EOG requests approval to use alternate casing designs listed in the Blanket Casing Design (EOG BLM Variance 5a - Alternate Shallow Casing Designs.pdf) document.

**Stonewall 28 Fed Com 514H**

## 5. TUBING REQUIREMENTS

EOG respectively requests an exception to the following NMOCD rule:

- 19.15.16.10 Casing AND TUBING RQUIREMENTS:
  J (3): "The operator shall set tubing as near the bottom as practical and tubing perforations shall not be more than 250 feet above top of pay zone."

With horizontal flowing and gas lifted wells an end of tubing depth placed at or slightly above KOP is a conservative way to ensure the tubing stays clean from debris, plugging, and allows for fewer well interventions post offset completion. The deeper the tubulars are run into the curve, the higher the probability is that the tubing will become stuck in sand and or well debris as the well produces over time. An additional consideration for EOT placement during artificial lift installations is avoiding the high dog leg severity and inclinations found in the curve section of the wellbore to help improve reliability and performance. Dog leg severity and inclinations tend not to hamper gas lifted or flowing wells, but they do effect other forms of artificial lift like rod pump or ESP (electric submersible pump). Keeping the EOT above KOP is an industry best practice for those respective forms of artificial lift.

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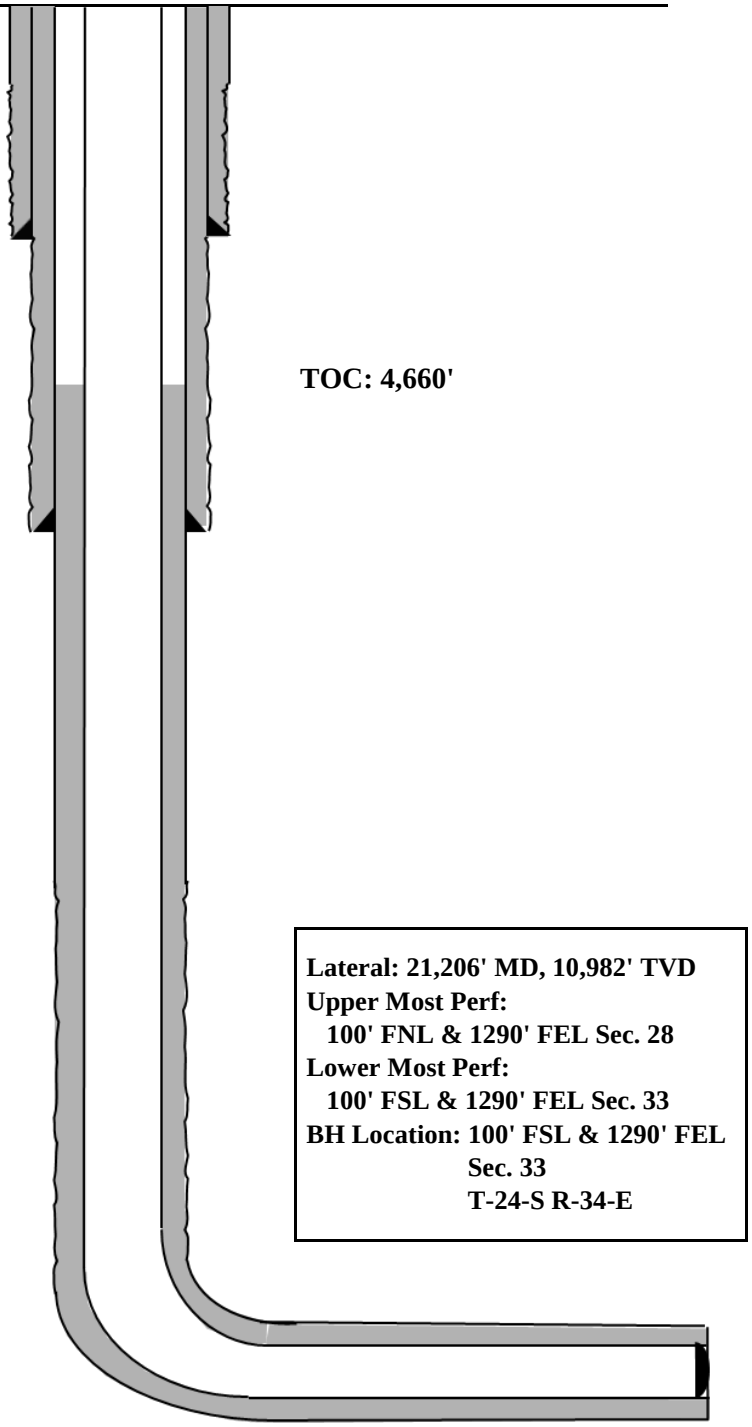
# Stonewall 28 Fed Com 514H

**260' FNL**
**1759' FEL**
**Section 28**
**T-24-S, R-34-E**

**Revised Wellbore**

**API: 30-025-52706**

**KB: 3516'**
**GL: 3491'**



**Bit Size: 13-1/2"**
**10-3/4'', 40.5#, J-55, STC**
**@ 0' - 1,210'**

**Bit Size: 9-7/8"**
**8-5/8'', 32.#, J-55, BTC-SC**
**@ 0' - 5,160'**

**TOC: 4,660'**

**Bit Size: 6-3/4''**
**5-1/2'', 20.#, P110-EC, DWC/C IS MS**
**@ 0' - 21,206'**

**Lateral: 21,206' MD, 10,982' TVD**
**Upper Most Perf:**
**100' FNL & 1290' FEL Sec. 28**
**Lower Most Perf:**
**100' FSL & 1290' FEL Sec. 33**
**BH Location: 100' FSL & 1290' FEL**
**Sec. 33**
**T-24-S R-34-E**

**KOP: 10,526' MD, 9,338' TVD**
**EOC: 11,276' MD, 9,911' TVD**

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**Stonewall 28 Fed Com 514H**

**GEOLOGIC NAME OF SURFACE FORMATION**:

Permian

**ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

| | |
|---|---|
| Rustler | 1,092' |
| Tamarisk Anhydrite | 1,186' |
| Top of Salt | 1,347' |
| Base of Salt | 5,063' |
| Lamar | 5,349' |
| Bell Canyon | 5,375' |
| Cherry Canyon | 6,319' |
| Brushy Canyon | 7,658' |
| Bone Spring Lime | 9,198' |
| Leonard (Avalon) Shale | 9,265' |
| 1st Bone Spring Sand | 10,163' |
| 2nd Bone Spring Shale | 10,373' |
| 2nd Bone Spring Sand | 10,631' |
| 3rd Bone Spring Carb | 11,171' |
| 3rd Bone Spring Sand | 11,741' |
| Wolfcamp | 12,133' |
| TD | 10,982' |

**ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:**

| | | |
|---|---|---|
| Upper Permian Sands | 0- 400’ | Fresh Water |
| Bell Canyon | 5,375' | Oil |
| Cherry Canyon | 6,319' | Oil |
| Brushy Canyon | 7,658' | Oil |
| Leonard (Avalon) Shale | 9,265' | Oil |
| 1st Bone Spring Sand | 10,163' | Oil |
| 2nd Bone Spring Shale | 10,373' | Oil |
| 2nd Bone Spring Sand | 10,631' | Oil |

# Midland

**Lea County, NM (NAD 83 NME)**
**Stonewall 28 Fed Com**
**#514H**

**OH**

**Plan: Plan #0.2**

# Standard Planning Report

**08 February, 2024**

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**Project** Lea County, NM (NAD 83 NME)

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | |
| **Map Zone:** | New Mexico Eastern Zone | | |

**Site** Stonewall 28 Fed Com

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 435,811.00 usft | **Latitude:** | 32° 11' 42.907 N |
| **From:** | Map | **Easting:** | 804,872.00 usft | **Longitude:** | 103° 28' 53.013 W |
| **Position Uncertainty:** | 0.0 usft | **Slot Radius:** | 13-3/16 " | | |

**Well** #514H

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 usft | **Northing:** | 435,771.00 usft | **Latitude:** | 32° 11' 42.283 N |
| | **+E/-W** | 0.0 usft | **Easting:** | 807,761.00 usft | **Longitude:** | 103° 28' 19.399 W |
| **Position Uncertainty** | | 0.0 usft | **Wellhead Elevation:** | usft | **Ground Level:** | 3,491.0 usft |
| **Grid Convergence:** | | 0.46 ° | | | | |

**Wellbore** OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2020 | 11/17/2022 | 6.33 | 59.84 | 47,337.80081960 |

**Design** Plan #0.2

| | | | | |
|---|---|---|---|---|
| **Audit Notes:** | | | | |
| **Version:** | **Phase:** | PLAN | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 176.83 |

**Plan Survey Tool Program** **Date** 2/8/2024

| | Depth From (usft) | Depth To (usft) | Survey (Wellbore) | Tool Name | Remarks |
|---|---|---|---|---|---|
| 1 | 0.0 | 21,205.7 | Plan #0.2 (OH) | EOG MWD+IFR1 | |
| | | | | MWD + IFR1 | |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,539.8 | 4.80 | 65.48 | 1,539.5 | 4.2 | 9.1 | 2.00 | 2.00 | 0.00 | 65.48 | |
| 7,439.4 | 4.80 | 65.48 | 7,418.5 | 208.8 | 457.9 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,679.2 | 0.00 | 0.00 | 7,658.0 | 213.0 | 467.0 | 2.00 | -2.00 | 0.00 | 180.00 | |
| 10,525.7 | 0.00 | 0.00 | 10,504.5 | 213.0 | 467.0 | 0.00 | 0.00 | 0.00 | 0.00 | KOP(Stonewall 28 Fe |
| 10,746.2 | 26.46 | 180.00 | 10,717.2 | 163.0 | 467.0 | 12.00 | 12.00 | 81.65 | 180.00 | FTP(Stonewall 28 Fe |
| 11,275.7 | 90.00 | 179.43 | 10,981.9 | -264.4 | 469.9 | 12.00 | 12.00 | -0.11 | -0.64 | |
| 13,386.3 | 90.00 | 179.43 | 10,982.0 | -2,375.0 | 491.0 | 0.00 | 0.00 | 0.00 | 0.00 | Fed Perf 1(Stonewall |
| 17,346.5 | 90.00 | 179.47 | 10,982.0 | -6,335.0 | 529.0 | 0.00 | 0.00 | 0.00 | 86.34 | Fed Perf 2(Stonewall |
| 21,205.7 | 90.00 | 179.46 | 10,982.0 | -10,194.0 | 565.0 | 0.00 | 0.00 | 0.00 | -102.29 | PBHL(Stonewall 28 F |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 100.0 | 0.00 | 0.00 | 100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 200.0 | 0.00 | 0.00 | 200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 500.0 | 0.00 | 0.00 | 500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 600.0 | 0.00 | 0.00 | 600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 700.0 | 0.00 | 0.00 | 700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 800.0 | 0.00 | 0.00 | 800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 900.0 | 0.00 | 0.00 | 900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,000.0 | 0.00 | 0.00 | 1,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,100.0 | 0.00 | 0.00 | 1,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,200.0 | 0.00 | 0.00 | 1,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,400.0 | 2.00 | 65.48 | 1,400.0 | 0.7 | 1.6 | -0.6 | 2.00 | 2.00 | 0.00 |
| 1,500.0 | 4.00 | 65.48 | 1,499.8 | 2.9 | 6.3 | -2.5 | 2.00 | 2.00 | 0.00 |
| 1,539.8 | 4.80 | 65.48 | 1,539.5 | 4.2 | 9.1 | -3.7 | 2.00 | 2.00 | 0.00 |
| 1,600.0 | 4.80 | 65.48 | 1,599.5 | 6.3 | 13.7 | -5.5 | 0.00 | 0.00 | 0.00 |
| 1,700.0 | 4.80 | 65.48 | 1,699.2 | 9.7 | 21.3 | -8.5 | 0.00 | 0.00 | 0.00 |
| 1,800.0 | 4.80 | 65.48 | 1,798.8 | 13.2 | 28.9 | -11.6 | 0.00 | 0.00 | 0.00 |
| 1,900.0 | 4.80 | 65.48 | 1,898.5 | 16.7 | 36.5 | -14.6 | 0.00 | 0.00 | 0.00 |
| 2,000.0 | 4.80 | 65.48 | 1,998.1 | 20.1 | 44.1 | -17.7 | 0.00 | 0.00 | 0.00 |
| 2,100.0 | 4.80 | 65.48 | 2,097.8 | 23.6 | 51.7 | -20.7 | 0.00 | 0.00 | 0.00 |
| 2,200.0 | 4.80 | 65.48 | 2,197.4 | 27.1 | 59.3 | -23.7 | 0.00 | 0.00 | 0.00 |
| 2,300.0 | 4.80 | 65.48 | 2,297.1 | 30.5 | 66.9 | -26.8 | 0.00 | 0.00 | 0.00 |
| 2,400.0 | 4.80 | 65.48 | 2,396.7 | 34.0 | 74.6 | -29.8 | 0.00 | 0.00 | 0.00 |
| 2,500.0 | 4.80 | 65.48 | 2,496.4 | 37.5 | 82.2 | -32.9 | 0.00 | 0.00 | 0.00 |
| 2,600.0 | 4.80 | 65.48 | 2,596.0 | 40.9 | 89.8 | -35.9 | 0.00 | 0.00 | 0.00 |
| 2,700.0 | 4.80 | 65.48 | 2,695.7 | 44.4 | 97.4 | -39.0 | 0.00 | 0.00 | 0.00 |
| 2,800.0 | 4.80 | 65.48 | 2,795.3 | 47.9 | 105.0 | -42.0 | 0.00 | 0.00 | 0.00 |
| 2,900.0 | 4.80 | 65.48 | 2,895.0 | 51.4 | 112.6 | -45.0 | 0.00 | 0.00 | 0.00 |
| 3,000.0 | 4.80 | 65.48 | 2,994.6 | 54.8 | 120.2 | -48.1 | 0.00 | 0.00 | 0.00 |
| 3,100.0 | 4.80 | 65.48 | 3,094.3 | 58.3 | 127.8 | -51.1 | 0.00 | 0.00 | 0.00 |
| 3,200.0 | 4.80 | 65.48 | 3,193.9 | 61.8 | 135.4 | -54.2 | 0.00 | 0.00 | 0.00 |
| 3,300.0 | 4.80 | 65.48 | 3,293.6 | 65.2 | 143.0 | -57.2 | 0.00 | 0.00 | 0.00 |
| 3,400.0 | 4.80 | 65.48 | 3,393.2 | 68.7 | 150.6 | -60.3 | 0.00 | 0.00 | 0.00 |
| 3,500.0 | 4.80 | 65.48 | 3,492.9 | 72.2 | 158.2 | -63.3 | 0.00 | 0.00 | 0.00 |
| 3,600.0 | 4.80 | 65.48 | 3,592.5 | 75.6 | 165.8 | -66.3 | 0.00 | 0.00 | 0.00 |
| 3,700.0 | 4.80 | 65.48 | 3,692.2 | 79.1 | 173.4 | -69.4 | 0.00 | 0.00 | 0.00 |
| 3,800.0 | 4.80 | 65.48 | 3,791.8 | 82.6 | 181.0 | -72.4 | 0.00 | 0.00 | 0.00 |
| 3,900.0 | 4.80 | 65.48 | 3,891.5 | 86.0 | 188.7 | -75.5 | 0.00 | 0.00 | 0.00 |
| 4,000.0 | 4.80 | 65.48 | 3,991.1 | 89.5 | 196.3 | -78.5 | 0.00 | 0.00 | 0.00 |
| 4,100.0 | 4.80 | 65.48 | 4,090.8 | 93.0 | 203.9 | -81.6 | 0.00 | 0.00 | 0.00 |
| 4,200.0 | 4.80 | 65.48 | 4,190.4 | 96.5 | 211.5 | -84.6 | 0.00 | 0.00 | 0.00 |
| 4,300.0 | 4.80 | 65.48 | 4,290.1 | 99.9 | 219.1 | -87.6 | 0.00 | 0.00 | 0.00 |
| 4,400.0 | 4.80 | 65.48 | 4,389.7 | 103.4 | 226.7 | -90.7 | 0.00 | 0.00 | 0.00 |
| 4,500.0 | 4.80 | 65.48 | 4,489.4 | 106.9 | 234.3 | -93.7 | 0.00 | 0.00 | 0.00 |
| 4,600.0 | 4.80 | 65.48 | 4,589.0 | 110.3 | 241.9 | -96.8 | 0.00 | 0.00 | 0.00 |
| 4,700.0 | 4.80 | 65.48 | 4,688.7 | 113.8 | 249.5 | -99.8 | 0.00 | 0.00 | 0.00 |
| 4,800.0 | 4.80 | 65.48 | 4,788.3 | 117.3 | 257.1 | -102.9 | 0.00 | 0.00 | 0.00 |
| 4,900.0 | 4.80 | 65.48 | 4,888.0 | 120.7 | 264.7 | -105.9 | 0.00 | 0.00 | 0.00 |
| 5,000.0 | 4.80 | 65.48 | 4,987.6 | 124.2 | 272.3 | -108.9 | 0.00 | 0.00 | 0.00 |
| 5,100.0 | 4.80 | 65.48 | 5,087.3 | 127.7 | 279.9 | -112.0 | 0.00 | 0.00 | 0.00 |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 4.80 | 65.48 | 5,186.9 | 131.1 | 287.5 | -115.0 | 0.00 | 0.00 | 0.00 |
| 5,300.0 | 4.80 | 65.48 | 5,286.6 | 134.6 | 295.1 | -118.1 | 0.00 | 0.00 | 0.00 |
| 5,400.0 | 4.80 | 65.48 | 5,386.2 | 138.1 | 302.7 | -121.1 | 0.00 | 0.00 | 0.00 |
| 5,500.0 | 4.80 | 65.48 | 5,485.9 | 141.6 | 310.4 | -124.2 | 0.00 | 0.00 | 0.00 |
| 5,600.0 | 4.80 | 65.48 | 5,585.5 | 145.0 | 318.0 | -127.2 | 0.00 | 0.00 | 0.00 |
| 5,700.0 | 4.80 | 65.48 | 5,685.2 | 148.5 | 325.6 | -130.2 | 0.00 | 0.00 | 0.00 |
| 5,800.0 | 4.80 | 65.48 | 5,784.8 | 152.0 | 333.2 | -133.3 | 0.00 | 0.00 | 0.00 |
| 5,900.0 | 4.80 | 65.48 | 5,884.5 | 155.4 | 340.8 | -136.3 | 0.00 | 0.00 | 0.00 |
| 6,000.0 | 4.80 | 65.48 | 5,984.1 | 158.9 | 348.4 | -139.4 | 0.00 | 0.00 | 0.00 |
| 6,100.0 | 4.80 | 65.48 | 6,083.8 | 162.4 | 356.0 | -142.4 | 0.00 | 0.00 | 0.00 |
| 6,200.0 | 4.80 | 65.48 | 6,183.4 | 165.8 | 363.6 | -145.5 | 0.00 | 0.00 | 0.00 |
| 6,300.0 | 4.80 | 65.48 | 6,283.1 | 169.3 | 371.2 | -148.5 | 0.00 | 0.00 | 0.00 |
| 6,400.0 | 4.80 | 65.48 | 6,382.7 | 172.8 | 378.8 | -151.5 | 0.00 | 0.00 | 0.00 |
| 6,500.0 | 4.80 | 65.48 | 6,482.4 | 176.2 | 386.4 | -154.6 | 0.00 | 0.00 | 0.00 |
| 6,600.0 | 4.80 | 65.48 | 6,582.0 | 179.7 | 394.0 | -157.6 | 0.00 | 0.00 | 0.00 |
| 6,700.0 | 4.80 | 65.48 | 6,681.7 | 183.2 | 401.6 | -160.7 | 0.00 | 0.00 | 0.00 |
| 6,800.0 | 4.80 | 65.48 | 6,781.3 | 186.7 | 409.2 | -163.7 | 0.00 | 0.00 | 0.00 |
| 6,900.0 | 4.80 | 65.48 | 6,881.0 | 190.1 | 416.8 | -166.8 | 0.00 | 0.00 | 0.00 |
| 7,000.0 | 4.80 | 65.48 | 6,980.6 | 193.6 | 424.5 | -169.8 | 0.00 | 0.00 | 0.00 |
| 7,100.0 | 4.80 | 65.48 | 7,080.3 | 197.1 | 432.1 | -172.9 | 0.00 | 0.00 | 0.00 |
| 7,200.0 | 4.80 | 65.48 | 7,179.9 | 200.5 | 439.7 | -175.9 | 0.00 | 0.00 | 0.00 |
| 7,300.0 | 4.80 | 65.48 | 7,279.6 | 204.0 | 447.3 | -178.9 | 0.00 | 0.00 | 0.00 |
| 7,400.0 | 4.80 | 65.48 | 7,379.2 | 207.5 | 454.9 | -182.0 | 0.00 | 0.00 | 0.00 |
| 7,439.4 | 4.80 | 65.48 | 7,418.5 | 208.8 | 457.9 | -183.2 | 0.00 | 0.00 | 0.00 |
| 7,500.0 | 3.58 | 65.48 | 7,478.9 | 210.7 | 461.9 | -184.8 | 2.00 | -2.00 | 0.00 |
| 7,600.0 | 1.58 | 65.48 | 7,578.8 | 212.5 | 466.0 | -186.4 | 2.00 | -2.00 | 0.00 |
| 7,679.2 | 0.00 | 0.00 | 7,658.0 | 213.0 | 467.0 | -186.8 | 2.00 | -2.00 | 0.00 |
| 7,700.0 | 0.00 | 0.00 | 7,678.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 7,800.0 | 0.00 | 0.00 | 7,778.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 7,900.0 | 0.00 | 0.00 | 7,878.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,000.0 | 0.00 | 0.00 | 7,978.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,100.0 | 0.00 | 0.00 | 8,078.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,200.0 | 0.00 | 0.00 | 8,178.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,300.0 | 0.00 | 0.00 | 8,278.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,400.0 | 0.00 | 0.00 | 8,378.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,500.0 | 0.00 | 0.00 | 8,478.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,600.0 | 0.00 | 0.00 | 8,578.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,700.0 | 0.00 | 0.00 | 8,678.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,800.0 | 0.00 | 0.00 | 8,778.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 8,900.0 | 0.00 | 0.00 | 8,878.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,000.0 | 0.00 | 0.00 | 8,978.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,100.0 | 0.00 | 0.00 | 9,078.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,200.0 | 0.00 | 0.00 | 9,178.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,300.0 | 0.00 | 0.00 | 9,278.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,400.0 | 0.00 | 0.00 | 9,378.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,500.0 | 0.00 | 0.00 | 9,478.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,600.0 | 0.00 | 0.00 | 9,578.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,700.0 | 0.00 | 0.00 | 9,678.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,800.0 | 0.00 | 0.00 | 9,778.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 9,900.0 | 0.00 | 0.00 | 9,878.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,000.0 | 0.00 | 0.00 | 9,978.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,100.0 | 0.00 | 0.00 | 10,078.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,200.0 | 0.00 | 0.00 | 10,178.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 10,300.0 | 0.00 | 0.00 | 10,278.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,400.0 | 0.00 | 0.00 | 10,378.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,500.0 | 0.00 | 0.00 | 10,478.8 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,525.7 | 0.00 | 0.00 | 10,504.5 | 213.0 | 467.0 | -186.8 | 0.00 | 0.00 | 0.00 |
| 10,550.0 | 2.91 | 180.00 | 10,528.8 | 212.4 | 467.0 | -186.2 | 12.00 | 12.00 | 0.00 |
| 10,575.0 | 5.92 | 180.00 | 10,553.7 | 210.5 | 467.0 | -184.3 | 12.00 | 12.00 | 0.00 |
| 10,600.0 | 8.92 | 180.00 | 10,578.5 | 207.2 | 467.0 | -181.1 | 12.00 | 12.00 | 0.00 |
| 10,625.0 | 11.92 | 180.00 | 10,603.1 | 202.7 | 467.0 | -176.6 | 12.00 | 12.00 | 0.00 |
| 10,650.0 | 14.92 | 180.00 | 10,627.4 | 196.9 | 467.0 | -170.8 | 12.00 | 12.00 | 0.00 |
| 10,675.0 | 17.92 | 180.00 | 10,651.4 | 189.8 | 467.0 | -163.7 | 12.00 | 12.00 | 0.00 |
| 10,700.0 | 20.92 | 180.00 | 10,674.9 | 181.5 | 467.0 | -155.4 | 12.00 | 12.00 | 0.00 |
| 10,725.0 | 23.92 | 180.00 | 10,698.0 | 172.0 | 467.0 | -145.9 | 12.00 | 12.00 | 0.00 |
| 10,746.2 | 26.46 | 180.00 | 10,717.2 | 163.0 | 467.0 | -136.9 | 12.00 | 12.00 | 0.00 |
| 10,750.0 | 26.92 | 179.99 | 10,720.6 | 161.3 | 467.0 | -135.2 | 12.00 | 12.00 | -0.30 |
| 10,775.0 | 29.92 | 179.92 | 10,742.6 | 149.4 | 467.0 | -123.3 | 12.00 | 12.00 | -0.26 |
| 10,800.0 | 32.92 | 179.87 | 10,763.9 | 136.4 | 467.0 | -110.3 | 12.00 | 12.00 | -0.22 |
| 10,825.0 | 35.92 | 179.82 | 10,784.6 | 122.2 | 467.1 | -96.2 | 12.00 | 12.00 | -0.19 |
| 10,850.0 | 38.92 | 179.78 | 10,804.4 | 107.0 | 467.1 | -81.0 | 12.00 | 12.00 | -0.16 |
| 10,875.0 | 41.92 | 179.75 | 10,823.5 | 90.8 | 467.2 | -64.8 | 12.00 | 12.00 | -0.14 |
| 10,900.0 | 44.92 | 179.71 | 10,841.6 | 73.6 | 467.3 | -47.7 | 12.00 | 12.00 | -0.13 |
| 10,925.0 | 47.92 | 179.69 | 10,858.8 | 55.5 | 467.4 | -29.6 | 12.00 | 12.00 | -0.11 |
| 10,950.0 | 50.92 | 179.66 | 10,875.1 | 36.6 | 467.5 | -10.6 | 12.00 | 12.00 | -0.10 |
| 10,975.0 | 53.92 | 179.64 | 10,890.3 | 16.7 | 467.6 | 9.2 | 12.00 | 12.00 | -0.09 |
| 11,000.0 | 56.92 | 179.61 | 10,904.5 | -3.8 | 467.7 | 29.7 | 12.00 | 12.00 | -0.09 |
| 11,025.0 | 59.92 | 179.59 | 10,917.6 | -25.1 | 467.9 | 51.0 | 12.00 | 12.00 | -0.08 |
| 11,050.0 | 62.92 | 179.57 | 10,929.6 | -47.1 | 468.0 | 72.9 | 12.00 | 12.00 | -0.08 |
| 11,075.0 | 65.92 | 179.56 | 10,940.4 | -69.6 | 468.2 | 95.4 | 12.00 | 12.00 | -0.07 |
| 11,100.0 | 68.92 | 179.54 | 10,950.0 | -92.7 | 468.4 | 118.5 | 12.00 | 12.00 | -0.07 |
| 11,125.0 | 71.92 | 179.52 | 10,958.4 | -116.3 | 468.6 | 142.0 | 12.00 | 12.00 | -0.07 |
| 11,150.0 | 74.92 | 179.51 | 10,965.5 | -140.2 | 468.8 | 165.9 | 12.00 | 12.00 | -0.06 |
| 11,175.0 | 77.92 | 179.49 | 10,971.4 | -164.5 | 469.0 | 190.2 | 12.00 | 12.00 | -0.06 |
| 11,200.0 | 80.92 | 179.47 | 10,976.0 | -189.1 | 469.2 | 214.8 | 12.00 | 12.00 | -0.06 |
| 11,225.0 | 83.92 | 179.46 | 10,979.3 | -213.9 | 469.5 | 239.5 | 12.00 | 12.00 | -0.06 |
| 11,250.0 | 86.92 | 179.44 | 10,981.3 | -238.8 | 469.7 | 264.4 | 12.00 | 12.00 | -0.06 |
| 11,275.7 | 90.00 | 179.43 | 10,981.9 | -264.4 | 469.9 | 290.0 | 12.00 | 12.00 | -0.06 |
| 11,300.0 | 90.00 | 179.43 | 10,981.9 | -288.8 | 470.2 | 314.3 | 0.00 | 0.00 | 0.00 |
| 11,400.0 | 90.00 | 179.43 | 10,982.0 | -388.7 | 471.2 | 414.2 | 0.00 | 0.00 | 0.00 |
| 11,500.0 | 90.00 | 179.43 | 10,982.0 | -488.7 | 472.2 | 514.1 | 0.00 | 0.00 | 0.00 |
| 11,600.0 | 90.00 | 179.43 | 10,982.0 | -588.7 | 473.2 | 614.0 | 0.00 | 0.00 | 0.00 |
| 11,700.0 | 90.00 | 179.43 | 10,982.0 | -688.7 | 474.2 | 713.9 | 0.00 | 0.00 | 0.00 |
| 11,800.0 | 90.00 | 179.43 | 10,982.0 | -788.7 | 475.2 | 813.8 | 0.00 | 0.00 | 0.00 |
| 11,900.0 | 90.00 | 179.43 | 10,982.0 | -888.7 | 476.2 | 913.7 | 0.00 | 0.00 | 0.00 |
| 12,000.0 | 90.00 | 179.43 | 10,982.0 | -988.7 | 477.2 | 1,013.6 | 0.00 | 0.00 | 0.00 |
| 12,100.0 | 90.00 | 179.43 | 10,982.0 | -1,088.7 | 478.2 | 1,113.5 | 0.00 | 0.00 | 0.00 |
| 12,200.0 | 90.00 | 179.43 | 10,982.0 | -1,188.7 | 479.2 | 1,213.4 | 0.00 | 0.00 | 0.00 |
| 12,300.0 | 90.00 | 179.43 | 10,982.0 | -1,288.7 | 480.2 | 1,313.3 | 0.00 | 0.00 | 0.00 |
| 12,400.0 | 90.00 | 179.43 | 10,982.0 | -1,388.7 | 481.2 | 1,413.2 | 0.00 | 0.00 | 0.00 |
| 12,500.0 | 90.00 | 179.43 | 10,982.0 | -1,488.7 | 482.2 | 1,513.1 | 0.00 | 0.00 | 0.00 |
| 12,600.0 | 90.00 | 179.43 | 10,982.0 | -1,588.7 | 483.2 | 1,613.0 | 0.00 | 0.00 | 0.00 |
| 12,700.0 | 90.00 | 179.43 | 10,982.0 | -1,688.7 | 484.2 | 1,712.9 | 0.00 | 0.00 | 0.00 |
| 12,800.0 | 90.00 | 179.43 | 10,982.0 | -1,788.7 | 485.2 | 1,812.8 | 0.00 | 0.00 | 0.00 |
| 12,900.0 | 90.00 | 179.43 | 10,982.0 | -1,888.7 | 486.1 | 1,912.7 | 0.00 | 0.00 | 0.00 |
| 13,000.0 | 90.00 | 179.43 | 10,982.0 | -1,988.7 | 487.1 | 2,012.6 | 0.00 | 0.00 | 0.00 |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 13,100.0 | 90.00 | 179.43 | 10,982.0 | -2,088.7 | 488.1 | 2,112.5 | 0.00 | 0.00 | 0.00 |
| 13,200.0 | 90.00 | 179.43 | 10,982.0 | -2,188.7 | 489.1 | 2,212.4 | 0.00 | 0.00 | 0.00 |
| 13,300.0 | 90.00 | 179.43 | 10,982.0 | -2,288.7 | 490.1 | 2,312.3 | 0.00 | 0.00 | 0.00 |
| 13,386.3 | 90.00 | 179.43 | 10,982.0 | -2,375.0 | 491.0 | 2,398.5 | 0.00 | 0.00 | 0.00 |
| 13,400.0 | 90.00 | 179.43 | 10,982.0 | -2,388.6 | 491.1 | 2,412.2 | 0.00 | 0.00 | 0.00 |
| 13,500.0 | 90.00 | 179.43 | 10,982.0 | -2,488.6 | 492.1 | 2,512.1 | 0.00 | 0.00 | 0.00 |
| 13,600.0 | 90.00 | 179.43 | 10,982.0 | -2,588.6 | 493.1 | 2,612.0 | 0.00 | 0.00 | 0.00 |
| 13,700.0 | 90.00 | 179.43 | 10,982.0 | -2,688.6 | 494.1 | 2,711.9 | 0.00 | 0.00 | 0.00 |
| 13,800.0 | 90.00 | 179.43 | 10,982.0 | -2,788.6 | 495.1 | 2,811.8 | 0.00 | 0.00 | 0.00 |
| 13,900.0 | 90.00 | 179.43 | 10,982.0 | -2,888.6 | 496.1 | 2,911.7 | 0.00 | 0.00 | 0.00 |
| 14,000.0 | 90.00 | 179.44 | 10,982.0 | -2,988.6 | 497.1 | 3,011.5 | 0.00 | 0.00 | 0.00 |
| 14,100.0 | 90.00 | 179.44 | 10,982.0 | -3,088.6 | 498.1 | 3,111.4 | 0.00 | 0.00 | 0.00 |
| 14,200.0 | 90.00 | 179.44 | 10,982.0 | -3,188.6 | 499.1 | 3,211.3 | 0.00 | 0.00 | 0.00 |
| 14,300.0 | 90.00 | 179.44 | 10,982.0 | -3,288.6 | 500.0 | 3,311.2 | 0.00 | 0.00 | 0.00 |
| 14,400.0 | 90.00 | 179.44 | 10,982.0 | -3,388.6 | 501.0 | 3,411.1 | 0.00 | 0.00 | 0.00 |
| 14,500.0 | 90.00 | 179.44 | 10,982.0 | -3,488.6 | 502.0 | 3,511.0 | 0.00 | 0.00 | 0.00 |
| 14,600.0 | 90.00 | 179.44 | 10,982.0 | -3,588.6 | 503.0 | 3,610.9 | 0.00 | 0.00 | 0.00 |
| 14,700.0 | 90.00 | 179.44 | 10,982.0 | -3,688.6 | 503.9 | 3,710.8 | 0.00 | 0.00 | 0.00 |
| 14,800.0 | 90.00 | 179.44 | 10,982.0 | -3,788.6 | 504.9 | 3,810.7 | 0.00 | 0.00 | 0.00 |
| 14,900.0 | 90.00 | 179.45 | 10,982.0 | -3,888.6 | 505.9 | 3,910.6 | 0.00 | 0.00 | 0.00 |
| 15,000.0 | 90.00 | 179.45 | 10,982.0 | -3,988.6 | 506.8 | 4,010.5 | 0.00 | 0.00 | 0.00 |
| 15,100.0 | 90.00 | 179.45 | 10,982.0 | -4,088.6 | 507.8 | 4,110.4 | 0.00 | 0.00 | 0.00 |
| 15,200.0 | 90.00 | 179.45 | 10,982.0 | -4,188.6 | 508.8 | 4,210.3 | 0.00 | 0.00 | 0.00 |
| 15,300.0 | 90.00 | 179.45 | 10,982.0 | -4,288.6 | 509.7 | 4,310.2 | 0.00 | 0.00 | 0.00 |
| 15,400.0 | 90.00 | 179.45 | 10,982.0 | -4,388.6 | 510.7 | 4,410.1 | 0.00 | 0.00 | 0.00 |
| 15,500.0 | 90.00 | 179.45 | 10,982.0 | -4,488.5 | 511.7 | 4,510.0 | 0.00 | 0.00 | 0.00 |
| 15,600.0 | 90.00 | 179.45 | 10,982.0 | -4,588.5 | 512.6 | 4,609.9 | 0.00 | 0.00 | 0.00 |
| 15,700.0 | 90.00 | 179.45 | 10,982.0 | -4,688.5 | 513.6 | 4,709.8 | 0.00 | 0.00 | 0.00 |
| 15,800.0 | 90.00 | 179.45 | 10,982.0 | -4,788.5 | 514.5 | 4,809.7 | 0.00 | 0.00 | 0.00 |
| 15,900.0 | 90.00 | 179.46 | 10,982.0 | -4,888.5 | 515.5 | 4,909.6 | 0.00 | 0.00 | 0.00 |
| 16,000.0 | 90.00 | 179.46 | 10,982.0 | -4,988.5 | 516.4 | 5,009.5 | 0.00 | 0.00 | 0.00 |
| 16,100.0 | 90.00 | 179.46 | 10,982.0 | -5,088.5 | 517.4 | 5,109.4 | 0.00 | 0.00 | 0.00 |
| 16,200.0 | 90.00 | 179.46 | 10,982.0 | -5,188.5 | 518.3 | 5,209.2 | 0.00 | 0.00 | 0.00 |
| 16,300.0 | 90.00 | 179.46 | 10,982.0 | -5,288.5 | 519.2 | 5,309.1 | 0.00 | 0.00 | 0.00 |
| 16,400.0 | 90.00 | 179.46 | 10,982.0 | -5,388.5 | 520.2 | 5,409.0 | 0.00 | 0.00 | 0.00 |
| 16,500.0 | 90.00 | 179.46 | 10,982.0 | -5,488.5 | 521.1 | 5,508.9 | 0.00 | 0.00 | 0.00 |
| 16,600.0 | 90.00 | 179.46 | 10,982.0 | -5,588.5 | 522.1 | 5,608.8 | 0.00 | 0.00 | 0.00 |
| 16,700.0 | 90.00 | 179.46 | 10,982.0 | -5,688.5 | 523.0 | 5,708.7 | 0.00 | 0.00 | 0.00 |
| 16,800.0 | 90.00 | 179.47 | 10,982.0 | -5,788.5 | 523.9 | 5,808.6 | 0.00 | 0.00 | 0.00 |
| 16,900.0 | 90.00 | 179.47 | 10,982.0 | -5,888.5 | 524.9 | 5,908.5 | 0.00 | 0.00 | 0.00 |
| 17,000.0 | 90.00 | 179.47 | 10,982.0 | -5,988.5 | 525.8 | 6,008.4 | 0.00 | 0.00 | 0.00 |
| 17,100.0 | 90.00 | 179.47 | 10,982.0 | -6,088.5 | 526.7 | 6,108.3 | 0.00 | 0.00 | 0.00 |
| 17,200.0 | 90.00 | 179.47 | 10,982.0 | -6,188.5 | 527.6 | 6,208.2 | 0.00 | 0.00 | 0.00 |
| 17,300.0 | 90.00 | 179.47 | 10,982.0 | -6,288.5 | 528.6 | 6,308.1 | 0.00 | 0.00 | 0.00 |
| 17,346.5 | 90.00 | 179.47 | 10,982.0 | -6,335.0 | 529.0 | 6,354.6 | 0.00 | 0.00 | 0.00 |
| 17,400.0 | 90.00 | 179.47 | 10,982.0 | -6,388.5 | 529.5 | 6,408.0 | 0.00 | 0.00 | 0.00 |
| 17,500.0 | 90.00 | 179.47 | 10,982.0 | -6,488.5 | 530.4 | 6,507.9 | 0.00 | 0.00 | 0.00 |
| 17,600.0 | 90.00 | 179.47 | 10,982.0 | -6,588.5 | 531.3 | 6,607.8 | 0.00 | 0.00 | 0.00 |
| 17,700.0 | 90.00 | 179.47 | 10,982.0 | -6,688.5 | 532.3 | 6,707.7 | 0.00 | 0.00 | 0.00 |
| 17,800.0 | 90.00 | 179.47 | 10,982.0 | -6,788.4 | 533.2 | 6,807.6 | 0.00 | 0.00 | 0.00 |
| 17,900.0 | 90.00 | 179.47 | 10,982.0 | -6,888.4 | 534.1 | 6,907.4 | 0.00 | 0.00 | 0.00 |
| 18,000.0 | 90.00 | 179.47 | 10,982.0 | -6,988.4 | 535.0 | 7,007.3 | 0.00 | 0.00 | 0.00 |
| 18,100.0 | 90.00 | 179.47 | 10,982.0 | -7,088.4 | 536.0 | 7,107.2 | 0.00 | 0.00 | 0.00 |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 18,200.0 | 90.00 | 179.47 | 10,982.0 | -7,188.4 | 536.9 | 7,207.1 | 0.00 | 0.00 | 0.00 |
| 18,300.0 | 90.00 | 179.47 | 10,982.0 | -7,288.4 | 537.8 | 7,307.0 | 0.00 | 0.00 | 0.00 |
| 18,400.0 | 90.00 | 179.47 | 10,982.0 | -7,388.4 | 538.7 | 7,406.9 | 0.00 | 0.00 | 0.00 |
| 18,500.0 | 90.00 | 179.47 | 10,982.0 | -7,488.4 | 539.7 | 7,506.8 | 0.00 | 0.00 | 0.00 |
| 18,600.0 | 90.00 | 179.47 | 10,982.0 | -7,588.4 | 540.6 | 7,606.7 | 0.00 | 0.00 | 0.00 |
| 18,700.0 | 90.00 | 179.47 | 10,982.0 | -7,688.4 | 541.5 | 7,706.6 | 0.00 | 0.00 | 0.00 |
| 18,800.0 | 90.00 | 179.47 | 10,982.0 | -7,788.4 | 542.5 | 7,806.5 | 0.00 | 0.00 | 0.00 |
| 18,900.0 | 90.00 | 179.47 | 10,982.0 | -7,888.4 | 543.4 | 7,906.4 | 0.00 | 0.00 | 0.00 |
| 19,000.0 | 90.00 | 179.47 | 10,982.0 | -7,988.4 | 544.3 | 8,006.3 | 0.00 | 0.00 | 0.00 |
| 19,100.0 | 90.00 | 179.47 | 10,982.0 | -8,088.4 | 545.3 | 8,106.2 | 0.00 | 0.00 | 0.00 |
| 19,200.0 | 90.00 | 179.47 | 10,982.0 | -8,188.4 | 546.2 | 8,206.1 | 0.00 | 0.00 | 0.00 |
| 19,300.0 | 90.00 | 179.47 | 10,982.0 | -8,288.4 | 547.1 | 8,306.0 | 0.00 | 0.00 | 0.00 |
| 19,400.0 | 90.00 | 179.47 | 10,982.0 | -8,388.4 | 548.0 | 8,405.9 | 0.00 | 0.00 | 0.00 |
| 19,500.0 | 90.00 | 179.46 | 10,982.0 | -8,488.4 | 549.0 | 8,505.7 | 0.00 | 0.00 | 0.00 |
| 19,600.0 | 90.00 | 179.46 | 10,982.0 | -8,588.4 | 549.9 | 8,605.6 | 0.00 | 0.00 | 0.00 |
| 19,700.0 | 90.00 | 179.46 | 10,982.0 | -8,688.4 | 550.9 | 8,705.5 | 0.00 | 0.00 | 0.00 |
| 19,800.0 | 90.00 | 179.46 | 10,982.0 | -8,788.4 | 551.8 | 8,805.4 | 0.00 | 0.00 | 0.00 |
| 19,900.0 | 90.00 | 179.46 | 10,982.0 | -8,888.4 | 552.7 | 8,905.3 | 0.00 | 0.00 | 0.00 |
| 20,000.0 | 90.00 | 179.46 | 10,982.0 | -8,988.4 | 553.7 | 9,005.2 | 0.00 | 0.00 | 0.00 |
| 20,100.0 | 90.00 | 179.46 | 10,982.0 | -9,088.3 | 554.6 | 9,105.1 | 0.00 | 0.00 | 0.00 |
| 20,200.0 | 90.00 | 179.46 | 10,982.0 | -9,188.3 | 555.5 | 9,205.0 | 0.00 | 0.00 | 0.00 |
| 20,300.0 | 90.00 | 179.46 | 10,982.0 | -9,288.3 | 556.5 | 9,304.9 | 0.00 | 0.00 | 0.00 |
| 20,400.0 | 90.00 | 179.46 | 10,982.0 | -9,388.3 | 557.4 | 9,404.8 | 0.00 | 0.00 | 0.00 |
| 20,500.0 | 90.00 | 179.46 | 10,982.0 | -9,488.3 | 558.4 | 9,504.7 | 0.00 | 0.00 | 0.00 |
| 20,600.0 | 90.00 | 179.46 | 10,982.0 | -9,588.3 | 559.3 | 9,604.6 | 0.00 | 0.00 | 0.00 |
| 20,700.0 | 90.00 | 179.46 | 10,982.0 | -9,688.3 | 560.2 | 9,704.5 | 0.00 | 0.00 | 0.00 |
| 20,800.0 | 90.00 | 179.46 | 10,982.0 | -9,788.3 | 561.2 | 9,804.4 | 0.00 | 0.00 | 0.00 |
| 20,900.0 | 90.00 | 179.46 | 10,982.0 | -9,888.3 | 562.1 | 9,904.3 | 0.00 | 0.00 | 0.00 |
| 21,000.0 | 90.00 | 179.46 | 10,982.0 | -9,988.3 | 563.1 | 10,004.2 | 0.00 | 0.00 | 0.00 |
| 21,100.0 | 90.00 | 179.46 | 10,982.0 | -10,088.3 | 564.0 | 10,104.1 | 0.00 | 0.00 | 0.00 |
| 21,205.7 | 90.00 | 179.46 | 10,982.0 | -10,194.0 | 565.0 | 10,209.6 | 0.00 | 0.00 | 0.00 |

# Planning Report

| | | | |
|---|---|---|---|
| **Database:** | PEDM | **Local Co-ordinate Reference** | Well #514H |
| **Company:** | Midland | **TVD Reference:** | kb = 26' @ 3518.0usft |
| **Project:** | Lea County, NM (NAD 83 NME) | **MD Reference:** | kb = 26' @ 3518.0usft |
| **Site:** | Stonewall 28 Fed Com | **North Reference:** | Grid |
| **Well:** | #514H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #0.2 | | |

**Design Targets**

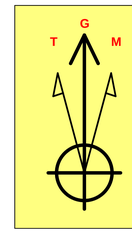
| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| KOP(Stonewall 28 Fed C<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,504.5 | 213.0 | 467.0 | 435,984.00 | 808,228.00 | 32° 11' 44.354 N | 103° 28' 13.944 W |
| FTP(Stonewall 28 Fed C<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,717.2 | 163.0 | 467.0 | 435,934.00 | 808,228.00 | 32° 11' 43.859 N | 103° 28' 13.949 W |
| Fed Perf 1(Stonewall 28<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,982.0 | -2,375.0 | 491.0 | 433,396.00 | 808,252.00 | 32° 11' 18.744 N | 103° 28' 13.907 W |
| Fed Perf 2(Stonewall 28<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,982.0 | -6,335.0 | 529.0 | 429,436.00 | 808,290.00 | 32° 10' 39.557 N | 103° 28' 13.834 W |
| PBHL(Stonewall 28 Fed<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,982.0 | -10,194.0 | 565.0 | 425,577.00 | 808,326.00 | 32° 10' 1.369 N | 103° 28' 13.775 W |

# eog resources

## Lea County, NM (NAD 83 NME)

## Stonewall 28 Fed Com #514H

## Plan #0.2




Azimuths to Grid North
True North: -0.46°
Magnetic North: 5.87°

Magnetic Field
Strength: 47337.8nT
Dip Angle: 59.84°
Date: 11/17/2022
Model: IGRF2020

To convert a Magnetic Direction to a Grid Direction, Add 5.87°
To convert a Magnetic Direction to a True Direction, Add 6.33° East
To convert a True Direction to a Grid Direction, Subtract 0.46°

**PROJECT DETAILS: Lea County, NM (NAD 83 NME)**

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

**WELL DETAILS: #514H**

3491.0
kb = 26' @ 3518.0usft

| Northing | Easting | Latittude | Longitude |
|---|---|---|---|
| 435771.00 | 807761.00 | 32° 11' 42.283 N | 103° 28' 19.399 W |

**SECTION DETAILS**

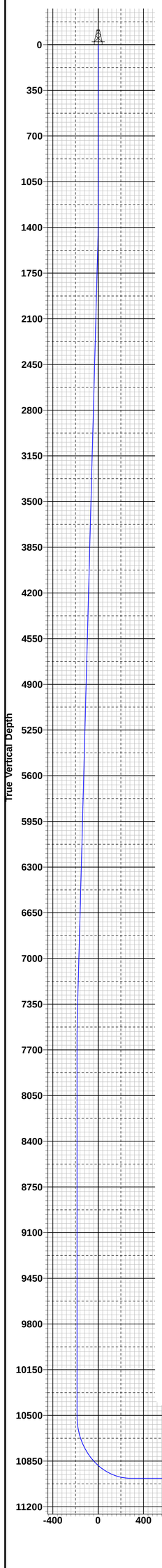
| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | VSect | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 2 | 1300.0 | 0.00 | 0.00 | 1300.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 3 | 1539.8 | 4.80 | 65.48 | 1539.5 | 4.2 | 9.1 | 2.00 | 65.48 | -3.7 | |
| 4 | 7439.4 | 4.80 | 65.48 | 7418.5 | 208.8 | 457.9 | 0.00 | 0.00 | -183.2 | |
| 5 | 7679.2 | 0.00 | 0.00 | 7658.0 | 213.0 | 467.0 | 2.00 | 180.00 | -186.8 | |
| 6 | 10525.7 | 0.00 | 0.00 | 10504.5 | 213.0 | 467.0 | 0.00 | 0.00 | -186.8 | KOP(Stonewall 28 Fed Com #407H) |
| 7 | 10746.2 | 26.46 | 180.00 | 10717.2 | 163.0 | 467.0 | 12.00 | 180.00 | -136.9 | FTP(Stonewall 28 Fed Com #407H) |
| 8 | 11275.7 | 90.00 | 179.43 | 10981.9 | -264.4 | 469.9 | 12.00 | -0.64 | 290.0 | |
| 9 | 13386.3 | 90.00 | 179.43 | 10982.0 | -2375.0 | 491.0 | 0.00 | 0.00 | 2398.5 | Fed Perf 1(Stonewall 28 Fed Com #407H) |
| 10 | 17346.5 | 90.00 | 179.47 | 10982.0 | -6335.0 | 529.0 | 0.00 | 86.34 | 6354.6 | Fed Perf 2(Stonewall 28 Fed Com #407H) |
| 11 | 21205.7 | 90.00 | 179.46 | 10982.0 | -10194.0 | 565.0 | 0.00 | -102.29 | 10209.6 | PBHL(Stonewall 28 Fed Com #407H) |

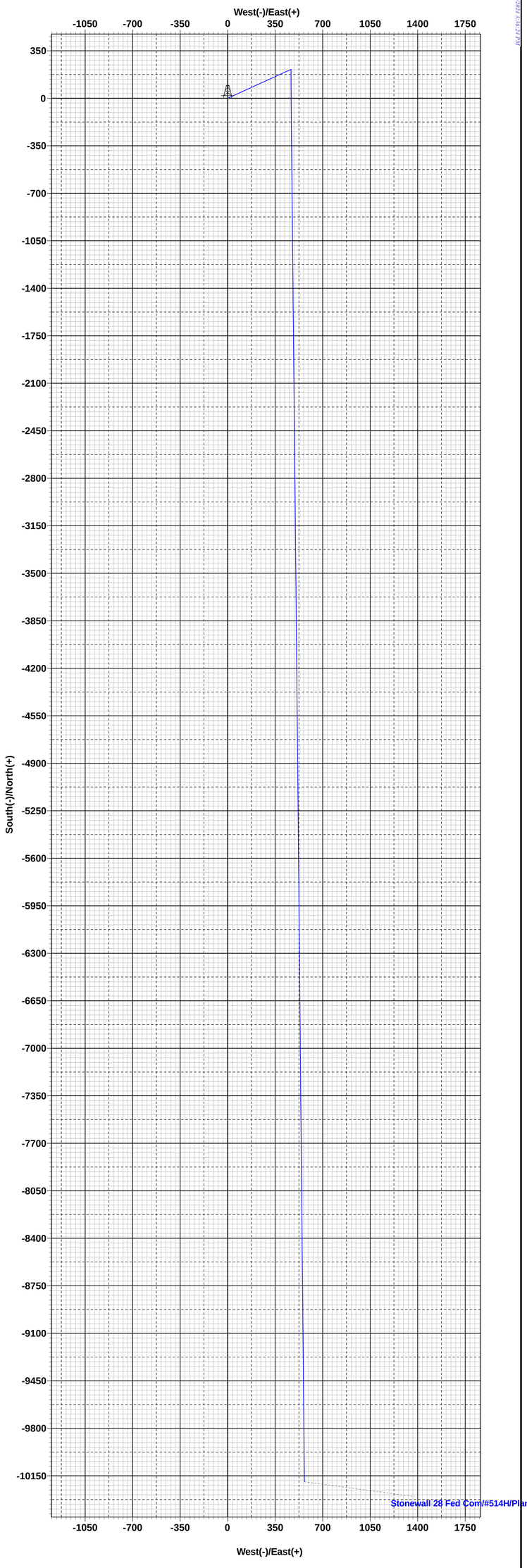
**CASING DETAILS**

No casing data is available

**WELLBORE TARGET DETAILS (MAP CO-ORDINATES)**

| Name | TVD | +N/-S | +E/-W | Northing | Easting |
|---|---|---|---|---|---|
| KOP(Stonewall 28 Fed Com #407H) | 10504.5 | 213.0 | 467.0 | 435984.00 | 808228.00 |
| FTP(Stonewall 28 Fed Com #407H) | 10717.2 | 163.0 | 467.0 | 435934.00 | 808228.00 |
| Fed Perf 1(Stonewall 28 Fed Com #407H) | 10982.0 | -2375.0 | 491.0 | 433396.00 | 808252.00 |
| Fed Perf 2(Stonewall 28 Fed Com #407H) | 10982.0 | -6335.0 | 529.0 | 429436.00 | 808290.00 |
| PBHL(Stonewall 28 Fed Com #407H) | 10982.0 | -10194.0 | 565.0 | 425577.00 | 808326.00 |




Lea County, NM (NAD 83 NME)
Stonewall 28 Fed Com
#514H
OH
Plan #0.2
14:40, February 08 2024

eog resources

**EOG BLANKET CASING DESIGN VARIANCE**

EOG respectfully requests the drill plans in the attached document 'EOG Alternate Casing Designs – BLM APPROVED' be added to the COA's for this well. These designs have been approved by the BLM down to the TVDs listed below and will allow EOG to run alternate casing designs for this well if necessary.

The designs and associated details listed are the "worst case scenario" boundaries for design safety factors. Location and lithology have NOT been accounted for in these designs. The specific well details will be based on the APD/Sundry package and the information listed in the COA.

The mud program will not change from the original design for this well. Summary of the mud programs for both shallow and deep targets are listed at the end of this document. If the target is changing, a sundry will be filed to update the casing design and mud/cement programs.

Cement volumes listed in this document are for reference only. The cement volumes for the specific well will be adjusted to ensure cement tops meet BLM requirements as listed in the COA and to allow bradenhead cementing when applicable.

This blanket document only applies to wells with three string designs outside of Potash and Capitan Reef boundaries.

| Shallow Design Boundary Conditions | | | | |
|---|---|---|---|---|
| | Deepest MD (ft) | Deepest TVD (ft) | Max Inc (deg) | Max DLS (°/100usft) |
| Surface | 2030 | 2030 | 0 | 0 |
| Intermediate | 7793 | 5650 | 40 | 8 |
| Production | 28578 | 11225 | 90 | 25 |

eog resources

**Shallow Design A**

## 1. CASING PROGRAM

| Hole Size | Interval MD From (ft) | Interval MD To (ft) | Interval TVD From (ft) | Interval TVD To (ft) | Csg OD | Weight | Grade | Conn |
|---|---|---|---|---|---|---|---|---|
| 16" | 0 | 2,030 | 0 | 2,030 | 13-3/8" | 54.5# | J-55 | STC |
| 11" | 0 | 7,793 | 0 | 5,650 | 9-5/8" | 40# | J-55 | LTC |
| 6-3/4" | 0 | 28,578 | 0 | 11,225 | 5-1/2" | 20# | P110-EC | DWC/C IS MS |

Hole will be full during casing run for well control and tensile SF factor. Casing will be kept at least half full during run for this design to meet BLM collapse SF requirement. External pressure will be reviewed prior to conducting casing pressure tests to ensure that 70% of the yield is not exceeded.

Variance is requested to waive the centralizer requirements for the 9-5/8" casing in the 11" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 11" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 5-1/2" casing in the 6-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 6-3/4" hole interval to maximize cement bond and zonal isolation.

EOG requests permission to allow deviation from the 0.422'' annulus clearance requirement for the intermediate (salt) section from Title 43 CFR Part 3170 under the following conditions:

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues.

## 2. CEMENTING PROGRAM:

| Depth | No. Sacks | Wt. ppg | Yld Ft3/sk | Slurry Description |
|---|---|---|---|---|
| 2,030' 13-3/8'' | 570 | 13.5 | 1.73 | Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface) |
| | 160 | 14.8 | 1.34 | Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830') |
| 7,793' 9-5/8'' | 770 | 12.7 | 2.22 | Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface) |
| | 250 | 14.8 | 1.32 | Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 6238') |
| 28,578' 5-1/2'' | 410 | 10.5 | 3.21 | Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 7300') |
| | 1110 | 13.2 | 1.52 | Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 12730') |

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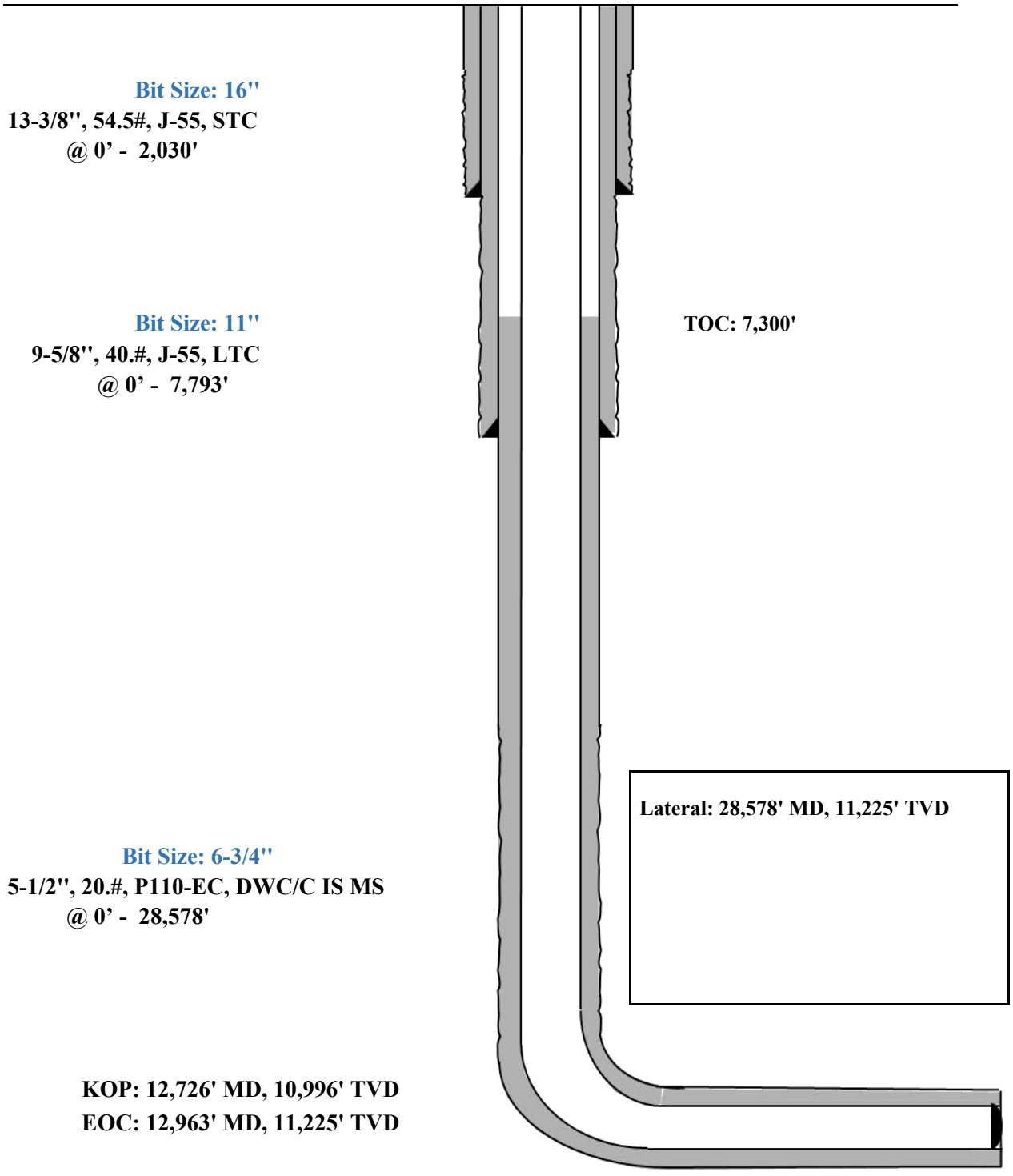
**Shallow Design A**

**KB: 3558'**
**GL: 3533'**

**Proposed Wellbore**



StressCheck - [Triaxial Results - Shallow 30 Mile - Big Hole*]

File Edit Wellbore Tubular View Composer Tools Window Help

9 5/8" Intermediate Casing

Pressure Test

Triaxial Results

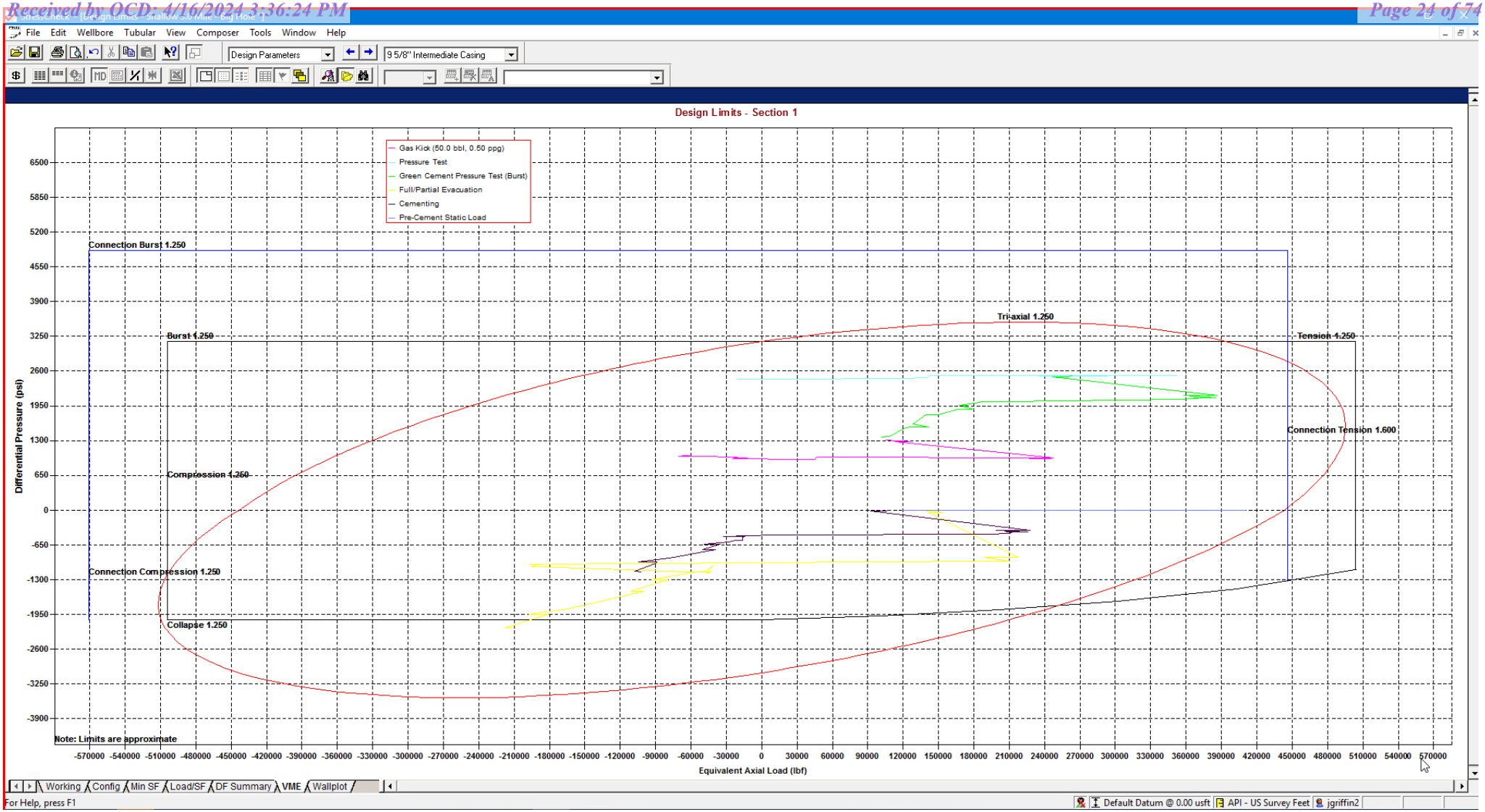
| | Depth (MD) (usft) | Axial Force (lbf) | | Equivalent Axial Load (lbf) | Bending Stress at OD (psi) | Absolute Safety Factor | | | | Temperature (°F) | Pressure (psi) | | Addt'l Pickup To Prevent Buck. (lbf) | Buckled Length (usft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Apparent (w/Bending) | Actual (w/o Bending) | | | Triaxial | Burst | Collapse (V) | Axial | | Internal | External | | |
| 1 | 0 | 252987 | 228954 | 253140 | 2098.2 | 1.69 | 1.58 | N/A | 2.82 F | 70.00 | 2500.00 | 0.00 | N/A | N/A |
| 2 | 100 | 247735 | 223702 | 248466 | 2098.2 | 1.69 | 1.58 | N/A | 2.88 F | 71.10 | 2543.63 | 43.63 | | |
| 3 | 100 | 234996 | 223701 | 235716 | 986.2 | 1.71 | 1.58 | N/A | 3.04 F | 71.10 | 2543.64 | 43.64 | | |
| 4 | 1700 | 341565 | 139667 | 352253 | 17627.2 | 1.53 | 1.57 | N/A | 2.09 F | 88.70 | 3241.64 | 741.64 | | |
| 5 | 1700 | 312979 | 139666 | 323488 | 15131.5 | 1.58 | 1.57 | N/A | 2.28 F | 88.70 | 3241.65 | 741.65 | | |
| 6 | 1850 | 336881 | 132027 | 348440 | 17885.2 | 1.51 | 1.57 | N/A | 2.12 F | 90.29 | 3305.05 | 805.05 | | |
| 7 | 1850 | 318549 | 132027 | 329984 | 16284.8 | 1.54 | 1.57 | N/A | 2.24 F | 90.29 | 3305.06 | 805.06 | | |
| 8 | 1950 | 320468 | 127243 | 332475 | 16869.9 | 1.52 | 1.57 | N/A | 2.23 F | 91.30 | 3344.87 | 844.87 | | |
| 9 | 1950 | 312802 | 127243 | 324756 | 16200.7 | 1.53 | 1.57 | N/A | 2.28 F | 91.30 | 3344.87 | 844.87 | | |
| 10 | 2050 | 307858 | 122773 | 320295 | 16159.3 | 1.52 | 1.57 | N/A | 2.32 F | 92.23 | 3381.89 | 881.89 | | |
| 11 | 2050 | 303560 | 122772 | 315965 | 15784.1 | 1.53 | 1.57 | N/A | 2.35 F | 92.23 | 3381.89 | 881.89 | | |
| 12 | 2300 | 151294 | 112633 | 163658 | 3375.4 | 1.71 | 1.57 | N/A | 4.72 F | 94.35 | 3466.13 | 966.13 | | |
| 13 | 2300 | 132741 | 112633 | 144956 | 1755.6 | 1.72 | 1.57 | N/A | 5.38 F | 94.35 | 3466.14 | 966.14 | | |
| 14 | 2370 | 129966 | 109858 | 142452 | 1755.6 | 1.72 | 1.57 | N/A | 5.49 F | 94.94 | 3489.28 | 989.28 | | |
| 15 | 2370 | 127909 | 107800 | 140922 | 1755.6 | 1.75 | 1.60 | N/A | 5.58 F | 94.94 | 3489.29 | 1036.40 | | |
| 16 | 2700 | 105515 | 94232 | 119785 | 985.1 | 1.75 | 1.60 | N/A | 6.77 F | 97.73 | 3599.97 | 1152.35 | | |
| 17 | 2700 | 111680 | 94231 | 126006 | 1523.4 | 1.75 | 1.60 | N/A | 6.39 F | 97.73 | 3599.97 | 1152.35 | | |
| 18 | 3100 | 110766 | 77783 | 126839 | 2879.6 | 1.71 | 1.60 | N/A | 6.44 F | 101.11 | 3734.23 | 1293.00 | | |
| 19 | 3100 | 97392 | 77783 | 113331 | 1712.1 | 1.73 | 1.60 | N/A | 7.33 F | 101.11 | 3734.23 | 1293.01 | | |
| 20 | 3700 | 71565 | 53303 | 89806 | 1594.4 | 1.70 | 1.61 | N/A | 9.97 F | 106.15 | 3934.24 | 1502.54 | | |
| 21 | 3700 | 60887 | 53302 | 79004 | 662.3 | 1.71 | 1.61 | N/A | 11.72 F | 106.16 | 3934.25 | 1502.55 | | |
| 22 | 4650 | 34671 | 14219 | 56495 | 1785.6 | 1.64 | 1.61 | N/A | 20.59 F | 114.20 | 4253.37 | 1836.86 | | |
| 23 | 4900 | 44595 | 4828 | 67626 | 3472.0 | 1.59 | 1.61 | N/A | 16.01 F | 116.32 | 4337.37 | 1924.87 | | |
| 24 | 4900 | 28975 | 4828 | 51775 | 2108.2 | 1.62 | 1.61 | N/A | 24.64 F | 116.32 | 4337.38 | 1924.87 | | |
| 25 | 5029 | 22103 | 34 | 45340 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.40 | 1969.94 | | |
| 26 | 5029 | 22102 | 33 | 45339 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.41 | 1969.95 | | |
| 27 | 5600 | -45329 | -21341 | -20805 | 2094.3 | 1.57 | 1.62 | N/A | (13.67) | 122.23 | 4572.11 | 2170.78 | | |
| 28 | 5650 | -40465 | -23210 | -15657 | 1506.5 | 1.58 | 1.62 | N/A | (15.31) | 122.66 | 4588.87 | 2188.34 | | |
| 29 | | | | | | | | | | | | | | |
| 30 | F | Conn Fracture | | | | | | | | | | | | |
| 31 | ( ) | Compression | | | | | | | | | | | | |
| 32 | (V) | Vector Collapse Safety Factor | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | |

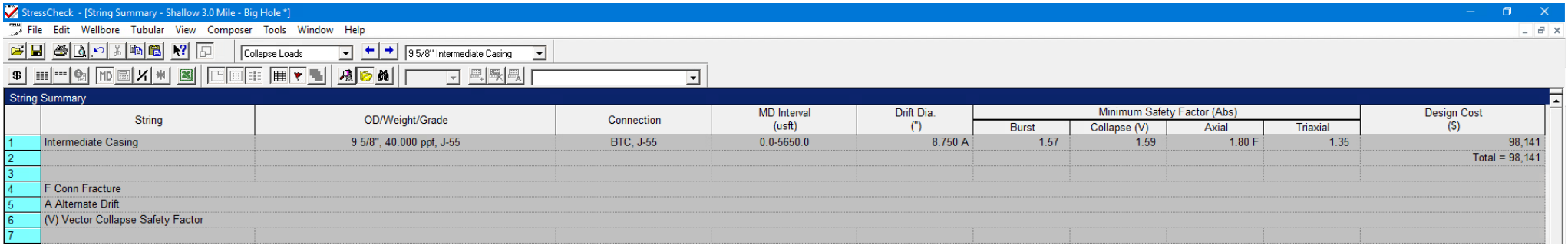
Working Config Min SF Load/SF DF Summary VME Wallplot

For Help, press F1

Default Datum @ 0.00 usft API - US Survey Feet jqriffin2

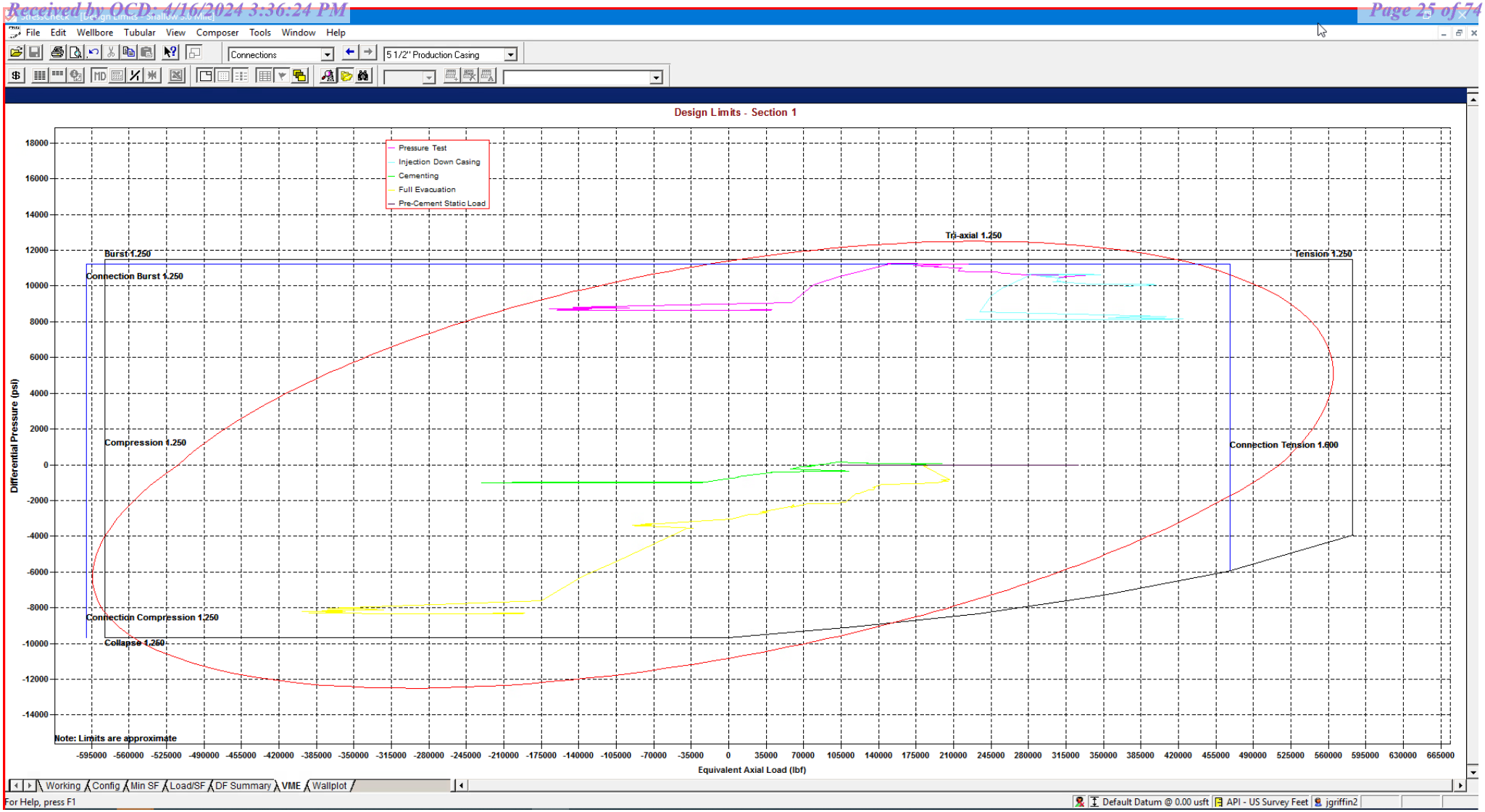
9-5/8” Intermediate Casing Pressure Test:
Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi
External Profile based off Pore Pressure: 2188 psi

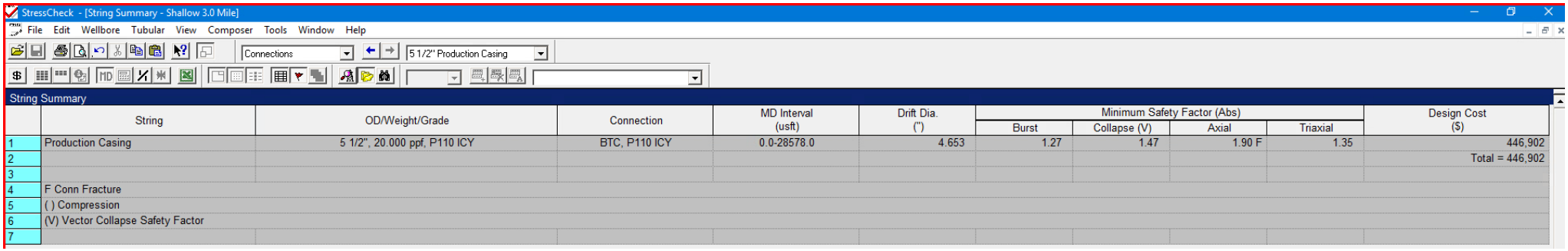



| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Intermediate Casing | 9 5/8", 40.000 ppf, J-55 | BTC, J-55 | 0.0-5650.0 | 8.750 A | 1.57 | 1.59 | 1.80 F | 1.35 | 98,141 |
| 2 | | | | | | | | | | Total = 98,141 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | A Alternate Drift | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 9-5/8” 40# Intermediate Casing. Passes all Burst, Collapse and Tensile design criteria.




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Production Casing | 5 1/2", 20.000 ppf, P110 ICY | BTC, P110 ICY | 0.0-28578.0 | 4.653 | 1.27 | 1.47 | 1.90 F | 1.35 | 446,902 |
| 2 | | | | | | | | | | Total = 446,902 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | ( ) Compression | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 5-1/2” 20# Production Casing with a 125ksi Control Yield. Passes all Burst, Collapse and Tensile design criteria.

eog resources

**Shallow Design B**

## 1. CASING PROGRAM

| Hole Size | Interval MD From (ft) | Interval MD To (ft) | Interval TVD From (ft) | Interval TVD To (ft) | Csg OD | Weight | Grade | Conn |
|---|---|---|---|---|---|---|---|---|
| 13-1/2" | 0 | 2,030 | 0 | 2,030 | 10-3/4" | 40.5# | J-55 | STC |
| 9-7/8" | 0 | 7,793 | 0 | 5,650 | 8-5/8" | 32# | J-55 | BTC-SC |
| 6-3/4" | 0 | 28,578 | 0 | 11,225 | 5-1/2" | 20# | P110-EC | DWC/C IS MS |

Hole will be full during casing run for well control and tensile SF factor. Casing will be kept at least half full during run for this design to meet BLM collapse SF requirement. External pressure will be reviewed prior to conducting casing pressure tests to ensure that 70% of the yield is not exceeded.

Variance is requested to waive the centralizer requirements for the 8-5/8" casing in the 9-7/8" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 9-7/8" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 5-1/2" casing in the 6-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 6-3/4" hole interval to maximize cement bond and zonal isolation.

EOG requests permission to allow deviation from the 0.422'' annulus clearance requirement for the intermediate (salt) section from Title 43 CFR Part 3170 under the following conditions:

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues.

## 2. CEMENTING PROGRAM:

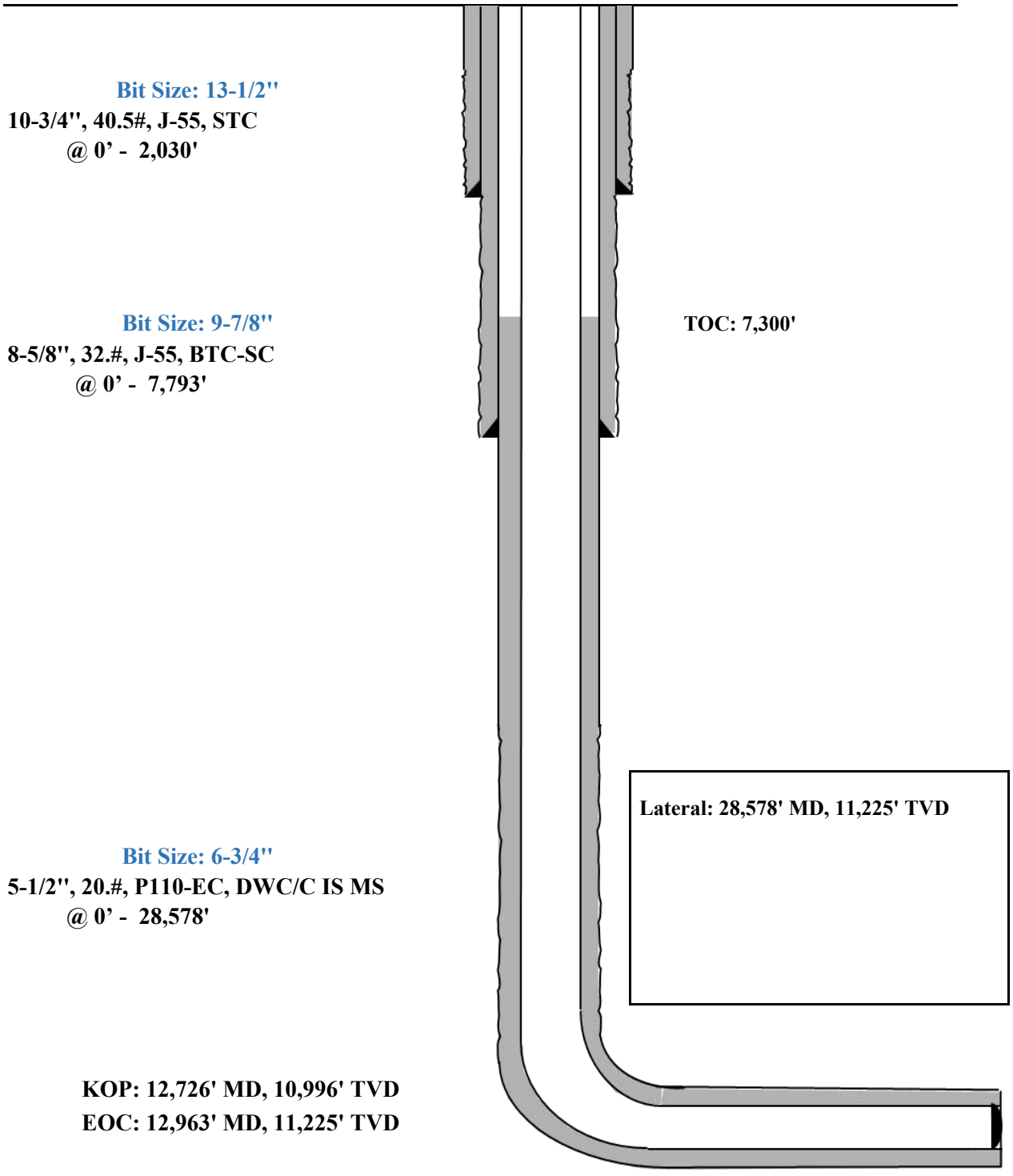
| Depth | No. Sacks | Wt. ppg | Yld Ft3/sk | Slurry Description |
|---|---|---|---|---|
| 2,030' 10-3/4'' | 530 | 13.5 | 1.73 | Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface) |
| | 140 | 14.8 | 1.34 | Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830') |
| 7,793' 8-5/8'' | 460 | 12.7 | 2.22 | Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface) |
| | 210 | 14.8 | 1.32 | Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 6238') |
| 28,578' 5-1/2'' | 400 | 10.5 | 3.21 | Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 7300') |
| | 1110 | 13.2 | 1.52 | Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 12730') |

eog resources

**Shallow Design B**

**KB: 3558'**
**GL: 3533'**

**Proposed Wellbore**



StressCheck - [Triaxial Results - Shallow 3.0 Mile *]

File Edit Wellbore Tubular View Composer Tools Window Help

Burst Design | 8 5/8" Intermediate Casing | Pressure Test

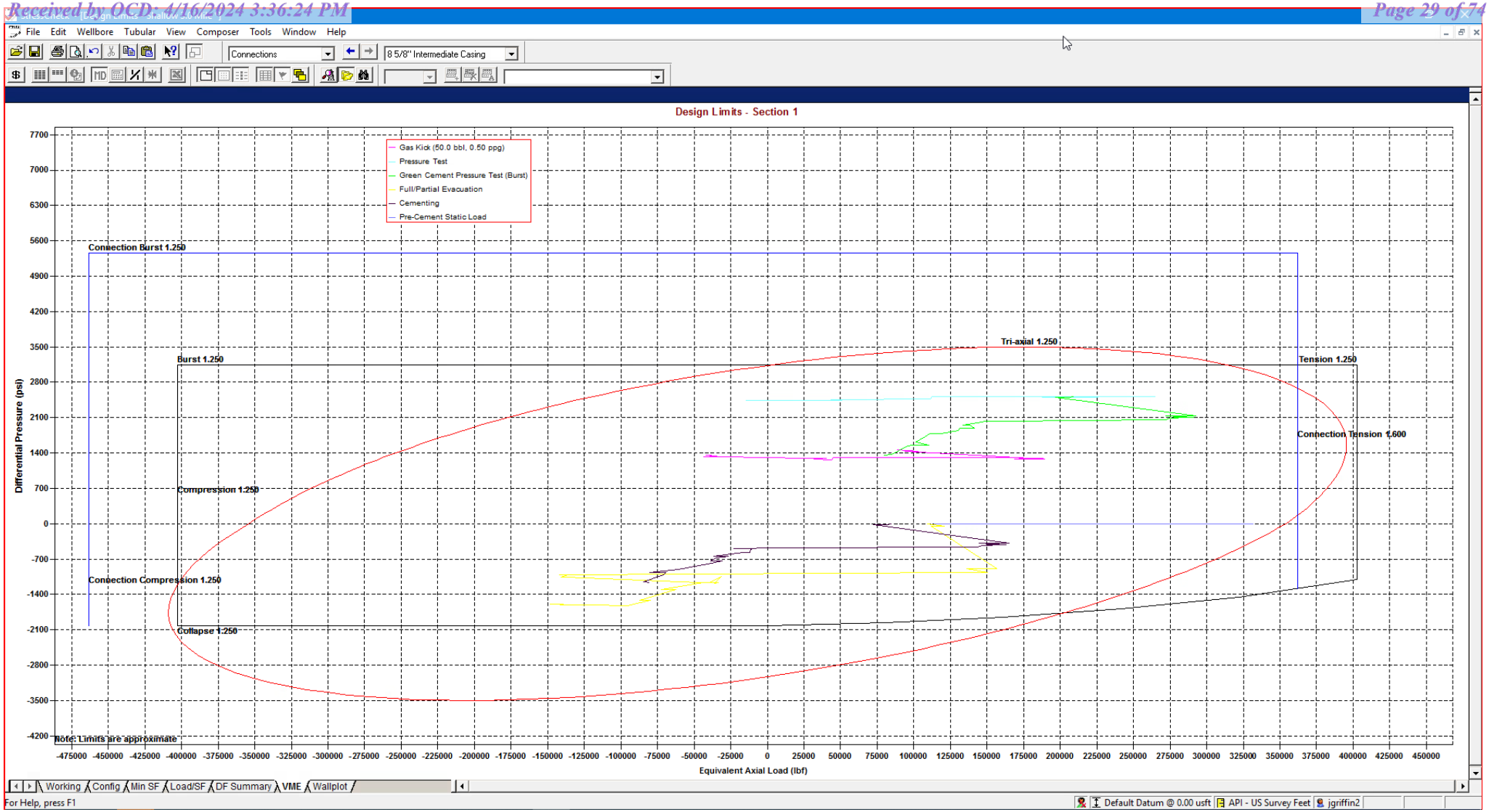
Triaxial Results

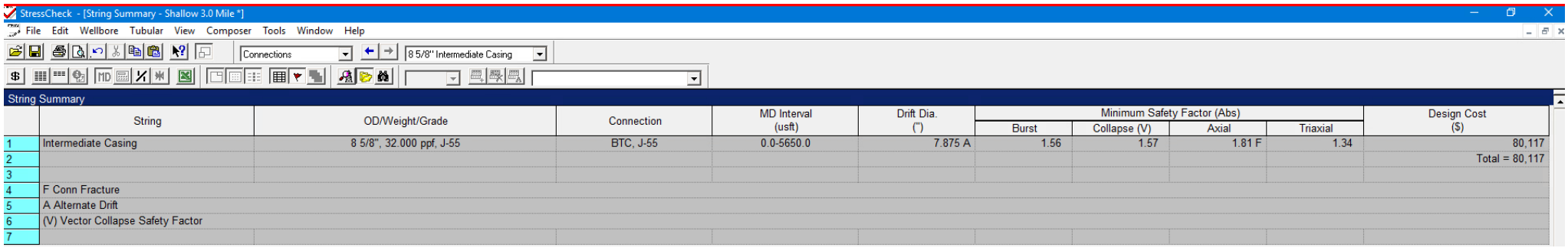
| | Depth (MD) (usft) | Axial Force (lbf) | | Equivalent Axial Load (lbf) | Bending Stress at OD (psi) | Absolute Safety Factor | | | | Temperature (°F) | Pressure (psi) | | Addt'l Pickup To Prevent Buck. (lbf) | Buckled Length (usft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Apparent (w/Bending) | Actual (w/o Bending) | | | Triaxial | Burst | Collapse (V) | Axial | | Internal | External | | |
| 1 | 0 | 200426 | 183224 | 200546 | 1880.2 | 1.68 | 1.57 | N/A | 2.89 F | 70.00 | 2500.00 | 0.00 | N/A | N/A |
| 2 | 100 | 196229 | 179028 | 196812 | 1880.2 | 1.69 | 1.57 | N/A | 2.95 F | 71.10 | 2543.63 | 43.63 | | |
| 3 | 100 | 187111 | 179027 | 187686 | 883.7 | 1.70 | 1.57 | N/A | 3.10 F | 71.10 | 2543.64 | 43.64 | | |
| 4 | 1700 | 256401 | 111891 | 264835 | 15795.8 | 1.56 | 1.56 | N/A | 2.26 F | 88.70 | 3241.64 | 741.64 | | |
| 5 | 1700 | 235940 | 111891 | 244247 | 13559.4 | 1.60 | 1.56 | N/A | 2.45 F | 88.70 | 3241.65 | 741.65 | | |
| 6 | 1850 | 252413 | 105788 | 261533 | 16027.0 | 1.54 | 1.56 | N/A | 2.29 F | 90.29 | 3305.05 | 805.05 | | |
| 7 | 1850 | 239292 | 105787 | 248323 | 14592.9 | 1.56 | 1.56 | N/A | 2.42 F | 90.29 | 3305.06 | 805.06 | | |
| 8 | 1950 | 240267 | 101966 | 249748 | 15117.2 | 1.54 | 1.56 | N/A | 2.41 F | 91.30 | 3344.87 | 844.87 | | |
| 9 | 1950 | 234781 | 101965 | 244223 | 14517.5 | 1.56 | 1.56 | N/A | 2.47 F | 91.30 | 3344.87 | 844.87 | | |
| 10 | 2050 | 230871 | 98395 | 240694 | 14480.4 | 1.55 | 1.56 | N/A | 2.51 F | 92.23 | 3381.89 | 881.89 | | |
| 11 | 2050 | 227794 | 98394 | 237594 | 14144.2 | 1.55 | 1.56 | N/A | 2.54 F | 92.23 | 3381.89 | 881.89 | | |
| 12 | 2300 | 117966 | 90294 | 127818 | 3024.7 | 1.70 | 1.56 | N/A | 4.91 F | 94.35 | 3466.13 | 966.13 | | |
| 13 | 2300 | 104686 | 90293 | 114432 | 1573.2 | 1.71 | 1.56 | N/A | 5.53 F | 94.35 | 3466.14 | 966.14 | | |
| 14 | 2370 | 102469 | 88077 | 112431 | 1573.2 | 1.71 | 1.56 | N/A | 5.65 F | 94.94 | 3489.28 | 989.28 | | |
| 15 | 2370 | 100817 | 86424 | 111200 | 1573.2 | 1.75 | 1.59 | N/A | 5.75 F | 94.94 | 3489.29 | 1036.40 | | |
| 16 | 2700 | 83660 | 75583 | 95052 | 882.8 | 1.74 | 1.59 | N/A | 6.92 F | 97.73 | 3599.97 | 1152.35 | | |
| 17 | 2700 | 88072 | 75583 | 99504 | 1365.1 | 1.74 | 1.59 | N/A | 6.58 F | 97.73 | 3599.97 | 1152.35 | | |
| 18 | 3100 | 86049 | 62442 | 98863 | 2580.4 | 1.71 | 1.59 | N/A | 6.73 F | 101.11 | 3734.23 | 1293.00 | | |
| 19 | 3100 | 76477 | 62441 | 89195 | 1534.2 | 1.72 | 1.59 | N/A | 7.57 F | 101.11 | 3734.23 | 1293.01 | | |
| 20 | 3700 | 55953 | 42882 | 70509 | 1428.8 | 1.69 | 1.60 | N/A | 10.35 F | 106.15 | 3934.24 | 1502.54 | | |
| 21 | 3700 | 48311 | 42881 | 62778 | 593.5 | 1.71 | 1.60 | N/A | 11.99 F | 106.16 | 3934.25 | 1502.55 | | |
| 22 | 4000 | 41458 | 33043 | 56865 | 919.9 | 1.69 | 1.60 | N/A | 13.97 F | 108.69 | 4034.82 | 1607.91 | | |
| 23 | 4650 | 26293 | 11655 | 43706 | 1600.1 | 1.63 | 1.60 | N/A | 22.03 F | 114.20 | 4253.37 | 1836.86 | | |
| 24 | 4900 | 32619 | 4156 | 50970 | 3111.2 | 1.59 | 1.60 | N/A | 17.76 F | 116.32 | 4337.37 | 1924.87 | | |
| 25 | 4900 | 21439 | 4155 | 39625 | 1889.2 | 1.61 | 1.60 | N/A | 27.02 F | 116.32 | 4337.38 | 1924.87 | | |
| 26 | 5039 | 15822 | 26 | 34389 | 1726.6 | 1.61 | 1.61 | N/A | 36.61 F | 117.49 | 4383.77 | 1973.48 | | |
| 27 | 5039 | 15822 | 26 | 34388 | 1726.6 | 1.61 | 1.61 | N/A | 36.61 F | 117.49 | 4383.78 | 1973.49 | | |
| 28 | 5600 | -33912 | -16743 | -14286 | 1876.7 | 1.57 | 1.61 | N/A | (14.60) | 122.23 | 4572.11 | 2170.78 | | |
| 29 | 5650 | -30585 | -18235 | -10742 | 1350.0 | 1.58 | 1.61 | N/A | (16.18) | 122.66 | 4588.87 | 2188.34 | | |
| 30 | | | | | | | | | | | | | | |
| 31 | F | Conn Fracture | | | | | | | | | | | | |
| 32 | ( ) | Compression | | | | | | | | | | | | |
| 33 | (V) | Vector Collapse Safety Factor | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | |

Working | Config | Min SF | Load/SF | DF Summary | VME | Wallplot

For Help, press F1 | Default Datum @ 0.00 usft | API - US Survey Feet | jgriffin2

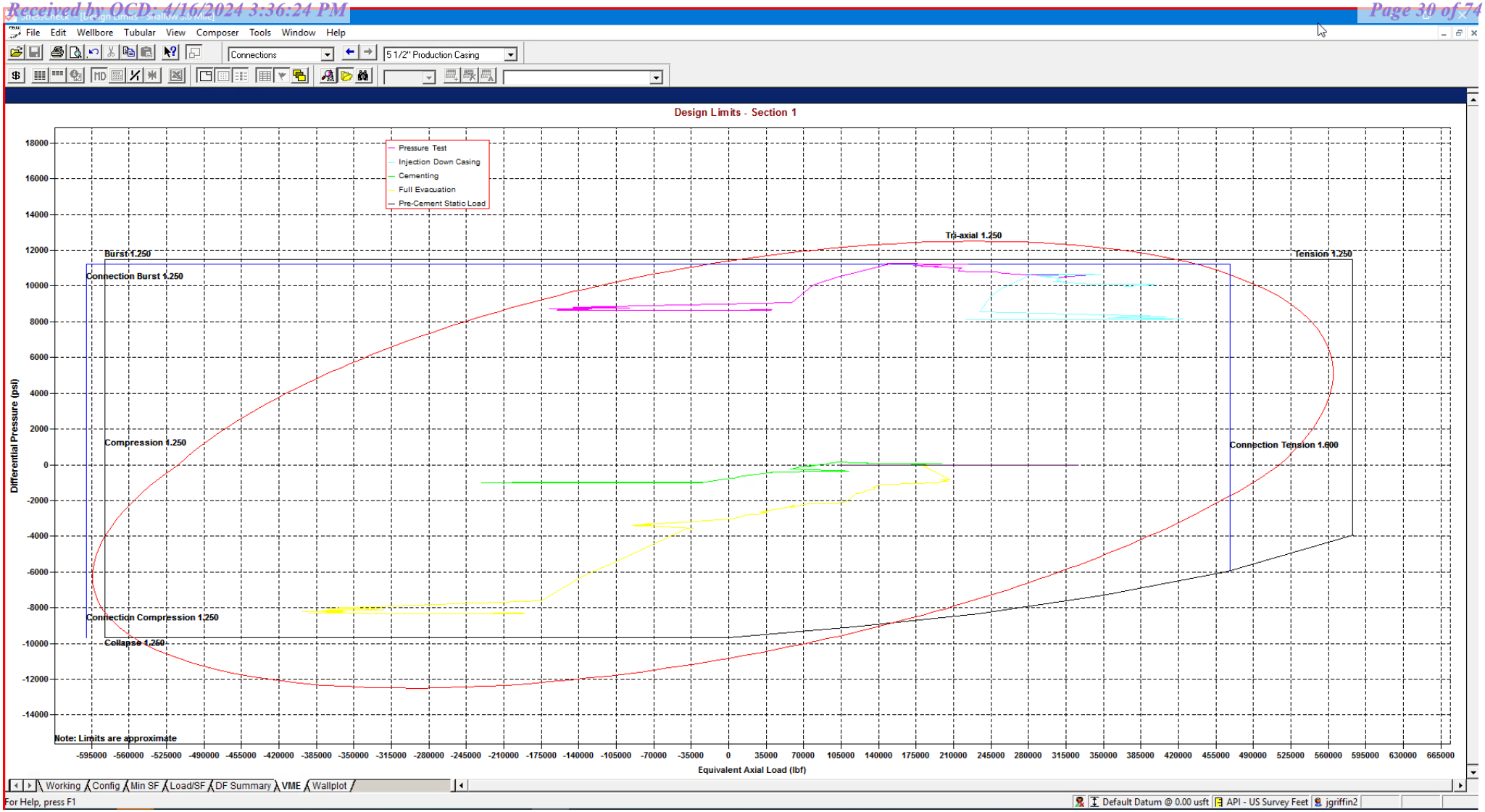
8-5/8" Intermediate Casing Pressure Test:
Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi
External Profile based off Pore Pressure: 2188 psi

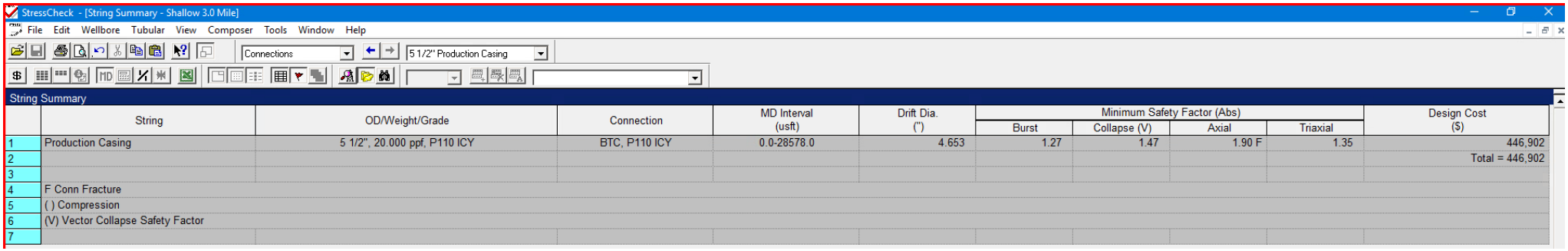



| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) | | | | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Burst | Collapse (V) | Axial | Triaxial | |
| 1 | Intermediate Casing | 8 5/8", 32.000 ppf, J-55 | BTC, J-55 | 0.0-5650.0 | 7.875 A | 1.56 | 1.57 | 1.81 F | 1.34 | 80,117 |
| 2 | | | | | | | | | | Total = 80,117 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | A Alternate Drift | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 8-5/8" 32# Intermediate Casing. Passes all Burst, Collapse and Tensile design criteria.




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Production Casing | 5 1/2", 20.000 ppf, P110 ICY | BTC, P110 ICY | 0.0-28578.0 | 4.653 | 1.27 | 1.47 | 1.90 F | 1.35 | 446,902 |
| 2 | | | | | | | | | | Total = 446,902 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | ( ) Compression | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 5-1/2” 20# Production Casing with a 125ksi Control Yield. Passes all Burst, Collapse and Tensile design criteria.

eog resources

**Shallow Design C**

## 1. CASING PROGRAM

| Hole Size | Interval MD From (ft) | Interval MD To (ft) | Interval TVD From (ft) | Interval TVD To (ft) | Csg OD | Weight | Grade | Conn |
|---|---|---|---|---|---|---|---|---|
| 16" | 0 | 2,030 | 0 | 2,030 | 13-3/8" | 54.5# | J-55 | STC |
| 11" | 0 | 7,793 | 0 | 5,650 | 9-5/8" | 40# | J-55 | LTC |
| 7-7/8" | 0 | 28,578 | 0 | 11,225 | 6" | 24.5# | P110-EC | VAM Sprint-SF |

Hole will be full during casing run for well control and tensile SF factor. Casing will be kept at least half full during run for this design to meet BLM collapse SF requirement. External pressure will be reviewed prior to conducting casing pressure tests to ensure that 70% of the yield is not exceeded.

Variance is requested to waive the centralizer requirements for the 9-5/8" casing in the 11" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 11" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 6" casing in the 7-7/8" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 7-7/8" hole interval to maximize cement bond and zonal isolation.

EOG requests permission to allow deviation from the 0.422'' annulus clearance requirement for the intermediate (salt) section from Title 43 CFR Part 3170 under the following conditions:

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues.

## 2. CEMENTING PROGRAM:

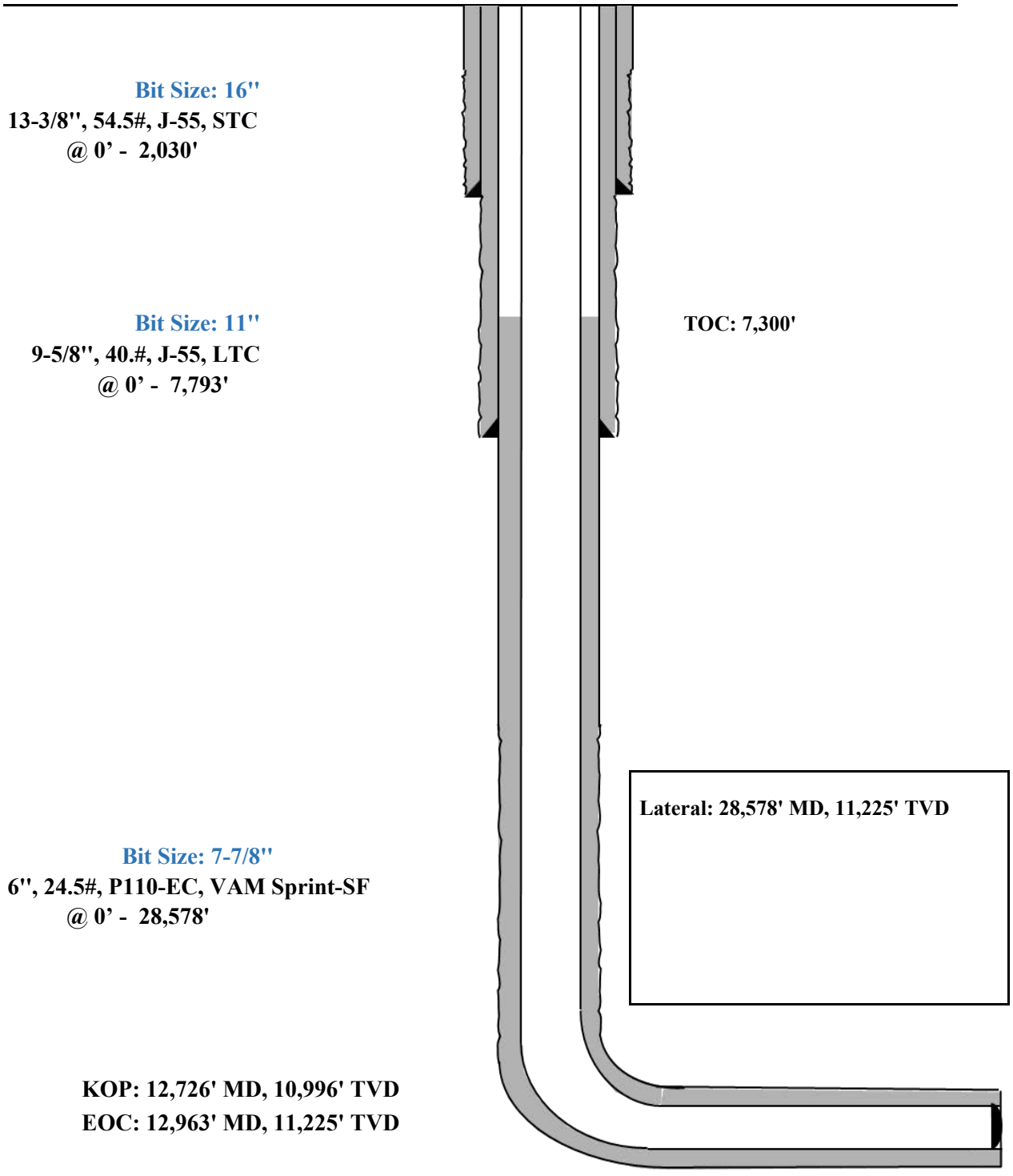
| Depth | No. Sacks | Wt. ppg | Yld Ft3/sk | Slurry Description |
|---|---|---|---|---|
| 2,030' 13-3/8'' | 570 | 13.5 | 1.73 | Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface) |
| | 160 | 14.8 | 1.34 | Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830') |
| 7,793' 9-5/8'' | 770 | 12.7 | 2.22 | Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface) |
| | 250 | 14.8 | 1.32 | Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 6238') |
| 28,578' 6'' | 650 | 10.5 | 3.21 | Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 7300') |
| | 1870 | 13.2 | 1.52 | Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 12730') |

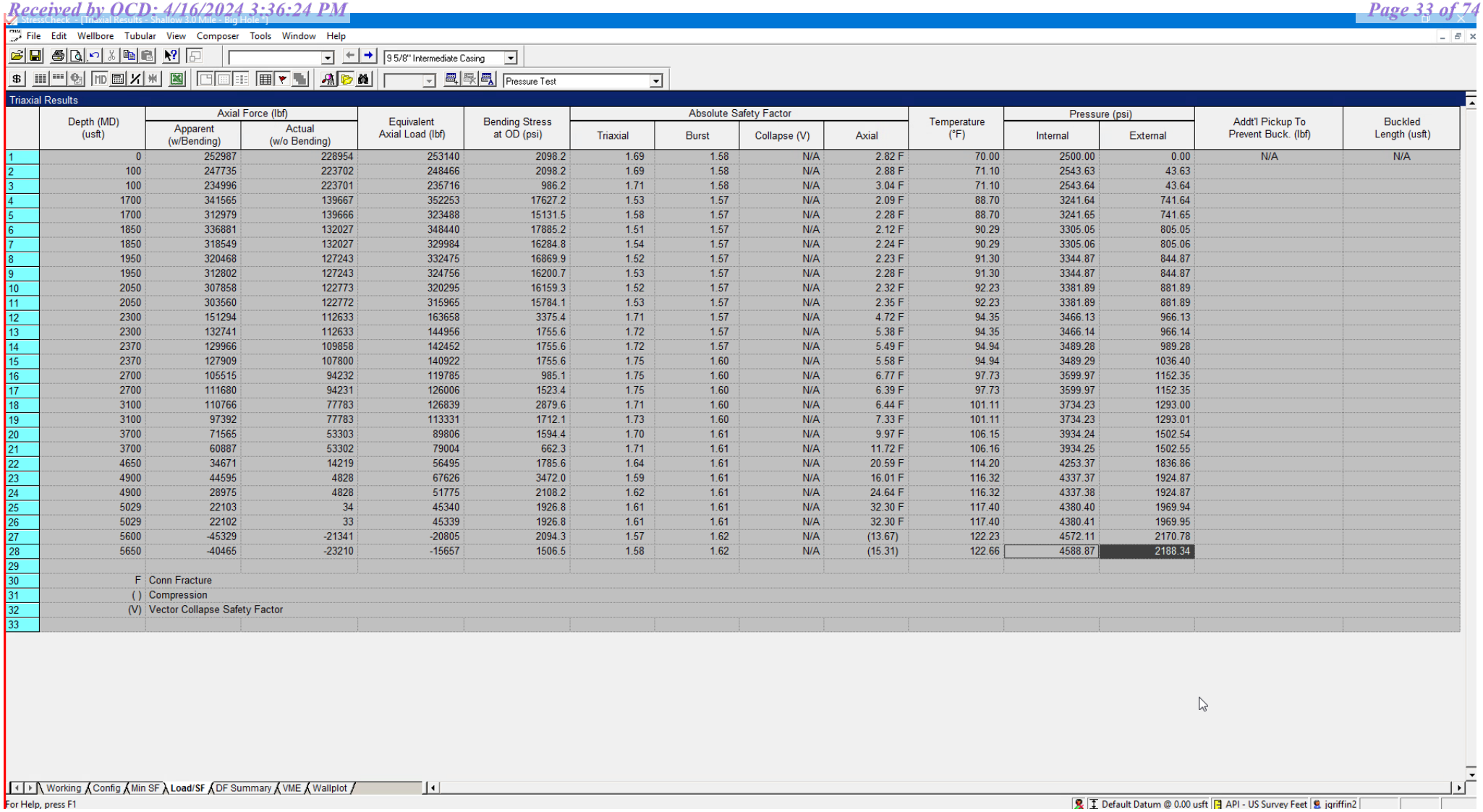
eog resources

**Shallow Design C**

**KB: 3558'**
**GL: 3533'**

**Proposed Wellbore**





StressCheck - [Triaxial Results - Shallow 30 Mile - Big Hole*]

File Edit Wellbore Tubular View Composer Tools Window Help

9 5/8" Intermediate Casing

Pressure Test

Triaxial Results

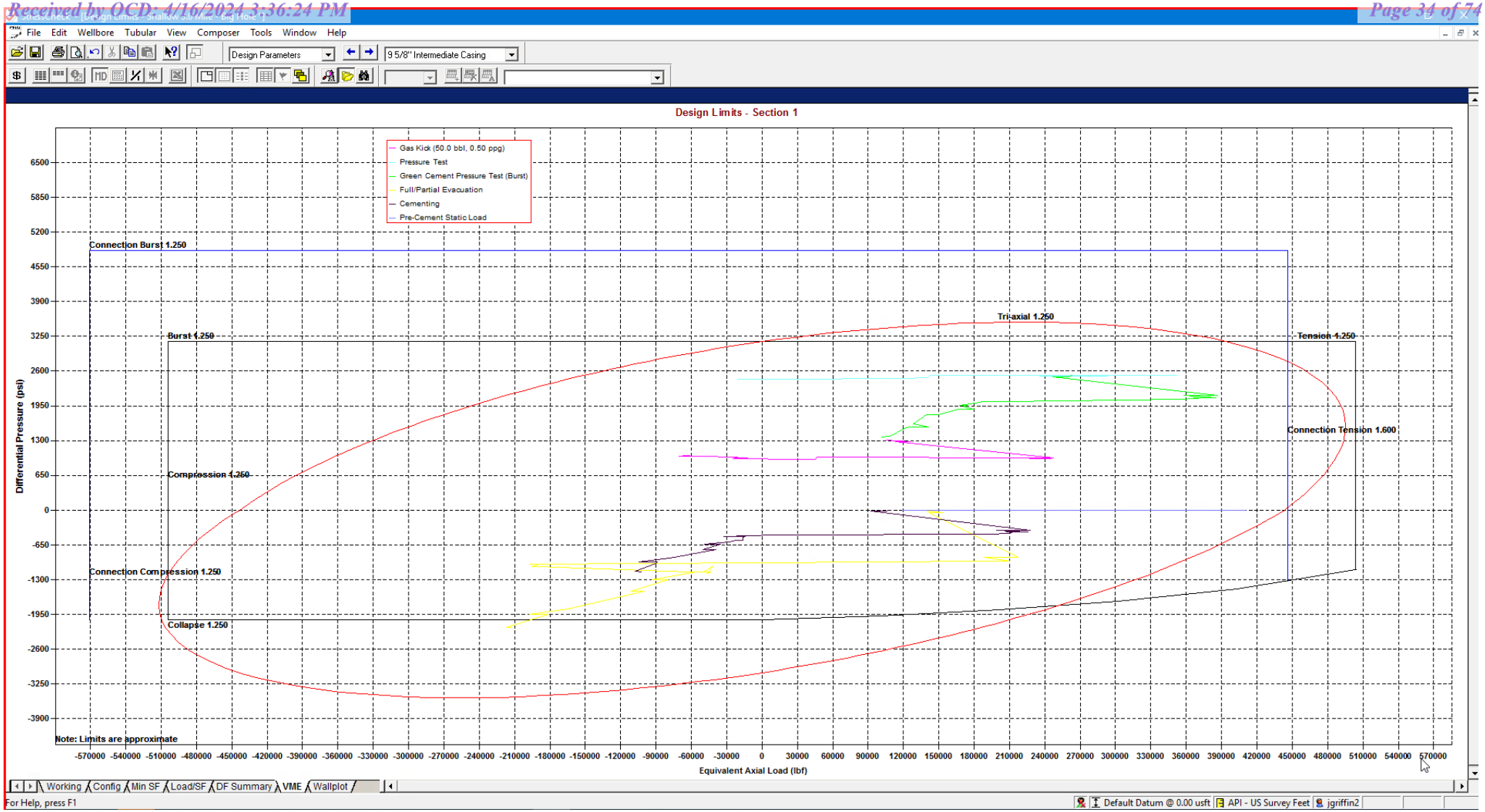
| | Depth (MD) (usft) | Axial Force (lbf) | | Equivalent Axial Load (lbf) | Bending Stress at OD (psi) | Absolute Safety Factor | | | | Temperature (°F) | Pressure (psi) | | Addt'l Pickup To Prevent Buck. (lbf) | Buckled Length (usft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Apparent (w/Bending) | Actual (w/o Bending) | | | Triaxial | Burst | Collapse (V) | Axial | | Internal | External | | |
| 1 | 0 | 252987 | 228954 | 253140 | 2098.2 | 1.69 | 1.58 | N/A | 2.82 F | 70.00 | 2500.00 | 0.00 | N/A | N/A |
| 2 | 100 | 247735 | 223702 | 248466 | 2098.2 | 1.69 | 1.58 | N/A | 2.88 F | 71.10 | 2543.63 | 43.63 | | |
| 3 | 100 | 234996 | 223701 | 235716 | 986.2 | 1.71 | 1.58 | N/A | 3.04 F | 71.10 | 2543.64 | 43.64 | | |
| 4 | 1700 | 341565 | 139667 | 352253 | 17627.2 | 1.53 | 1.57 | N/A | 2.09 F | 88.70 | 3241.64 | 741.64 | | |
| 5 | 1700 | 312979 | 139666 | 323488 | 15131.5 | 1.58 | 1.57 | N/A | 2.28 F | 88.70 | 3241.65 | 741.65 | | |
| 6 | 1850 | 336881 | 132027 | 348440 | 17885.2 | 1.51 | 1.57 | N/A | 2.12 F | 90.29 | 3305.05 | 805.05 | | |
| 7 | 1850 | 318549 | 132027 | 329984 | 16284.8 | 1.54 | 1.57 | N/A | 2.24 F | 90.29 | 3305.06 | 805.06 | | |
| 8 | 1950 | 320468 | 127243 | 332475 | 16869.9 | 1.52 | 1.57 | N/A | 2.23 F | 91.30 | 3344.87 | 844.87 | | |
| 9 | 1950 | 312802 | 127243 | 324756 | 16200.7 | 1.53 | 1.57 | N/A | 2.28 F | 91.30 | 3344.87 | 844.87 | | |
| 10 | 2050 | 307858 | 122773 | 320295 | 16159.3 | 1.52 | 1.57 | N/A | 2.32 F | 92.23 | 3381.89 | 881.89 | | |
| 11 | 2050 | 303560 | 122772 | 315965 | 15784.1 | 1.53 | 1.57 | N/A | 2.35 F | 92.23 | 3381.89 | 881.89 | | |
| 12 | 2300 | 151294 | 112633 | 163658 | 3375.4 | 1.71 | 1.57 | N/A | 4.72 F | 94.35 | 3466.13 | 966.13 | | |
| 13 | 2300 | 132741 | 112633 | 144956 | 1755.6 | 1.72 | 1.57 | N/A | 5.38 F | 94.35 | 3466.14 | 966.14 | | |
| 14 | 2370 | 129966 | 109858 | 142452 | 1755.6 | 1.72 | 1.57 | N/A | 5.49 F | 94.94 | 3489.28 | 989.28 | | |
| 15 | 2370 | 127909 | 107800 | 140922 | 1755.6 | 1.75 | 1.60 | N/A | 5.58 F | 94.94 | 3489.29 | 1036.40 | | |
| 16 | 2700 | 105515 | 94232 | 119785 | 985.1 | 1.75 | 1.60 | N/A | 6.77 F | 97.73 | 3599.97 | 1152.35 | | |
| 17 | 2700 | 111680 | 94231 | 126006 | 1523.4 | 1.75 | 1.60 | N/A | 6.39 F | 97.73 | 3599.97 | 1152.35 | | |
| 18 | 3100 | 110766 | 77783 | 126839 | 2879.6 | 1.71 | 1.60 | N/A | 6.44 F | 101.11 | 3734.23 | 1293.00 | | |
| 19 | 3100 | 97392 | 77783 | 113331 | 1712.1 | 1.73 | 1.60 | N/A | 7.33 F | 101.11 | 3734.23 | 1293.01 | | |
| 20 | 3700 | 71565 | 53303 | 89806 | 1594.4 | 1.70 | 1.61 | N/A | 9.97 F | 106.15 | 3934.24 | 1502.54 | | |
| 21 | 3700 | 60887 | 53302 | 79004 | 662.3 | 1.71 | 1.61 | N/A | 11.72 F | 106.16 | 3934.25 | 1502.55 | | |
| 22 | 4650 | 34671 | 14219 | 56495 | 1785.6 | 1.64 | 1.61 | N/A | 20.59 F | 114.20 | 4253.37 | 1836.86 | | |
| 23 | 4900 | 44595 | 4828 | 67626 | 3472.0 | 1.59 | 1.61 | N/A | 16.01 F | 116.32 | 4337.37 | 1924.87 | | |
| 24 | 4900 | 28975 | 4828 | 51775 | 2108.2 | 1.62 | 1.61 | N/A | 24.64 F | 116.32 | 4337.38 | 1924.87 | | |
| 25 | 5029 | 22103 | 34 | 45340 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.40 | 1969.94 | | |
| 26 | 5029 | 22102 | 33 | 45339 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.41 | 1969.95 | | |
| 27 | 5600 | -45329 | -21341 | -20805 | 2094.3 | 1.57 | 1.62 | N/A | (13.67) | 122.23 | 4572.11 | 2170.78 | | |
| 28 | 5650 | -40465 | -23210 | -15657 | 1506.5 | 1.58 | 1.62 | N/A | (15.31) | 122.66 | 4588.87 | 2188.34 | | |
| 29 | | | | | | | | | | | | | | |
| 30 | F | Conn Fracture | | | | | | | | | | | | |
| 31 | ( ) | Compression | | | | | | | | | | | | |
| 32 | (V) | Vector Collapse Safety Factor | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | |

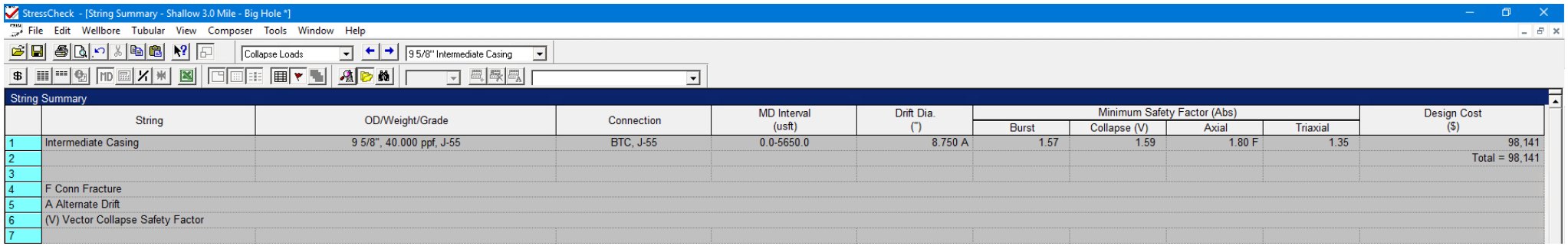
Working Config Min SF Load/SF DF Summary VME Wallplot

For Help, press F1

Default Datum @ 0.00 usft API - US Survey Feet jqriffin2

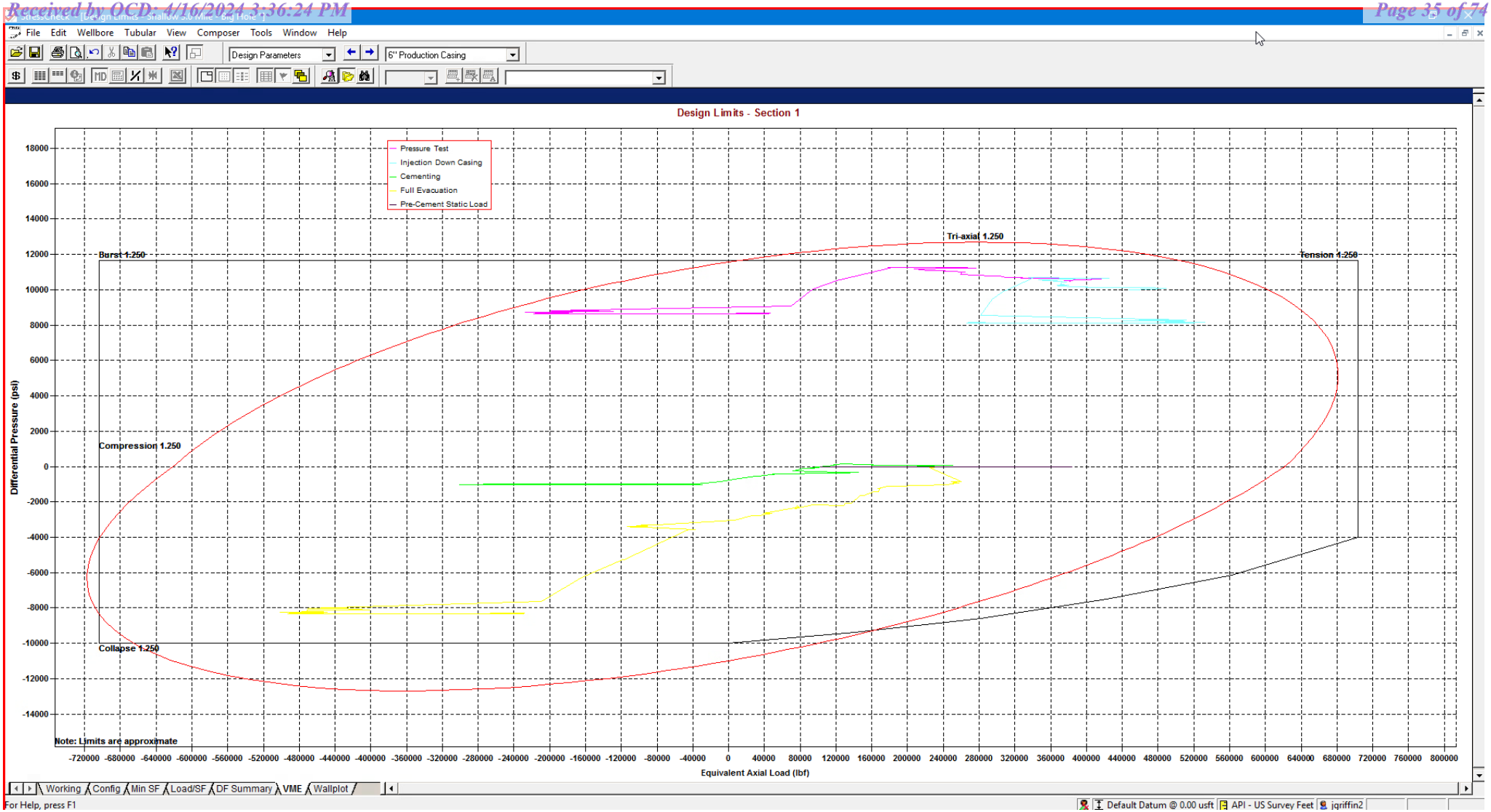
9-5/8” Intermediate Casing Pressure Test:
Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi
External Profile based off Pore Pressure: 2188 psi

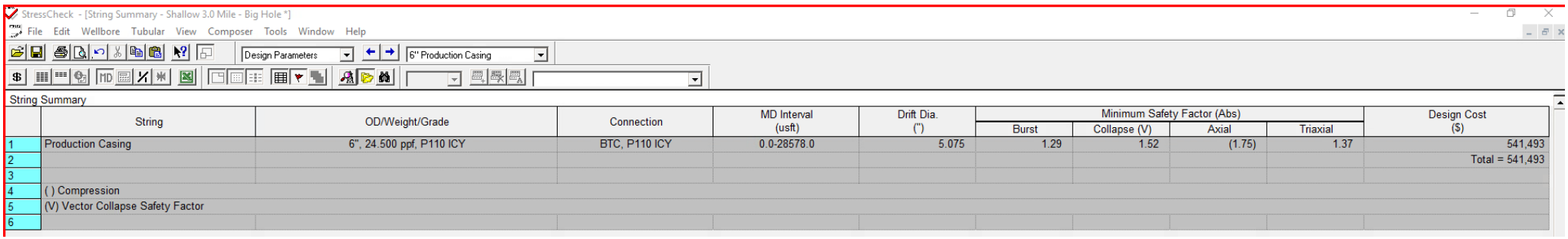



| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Intermediate Casing | 9 5/8", 40.000 ppf, J-55 | BTC, J-55 | 0.0-5650.0 | 8.750 A | 1.57 | 1.59 | 1.80 F | 1.35 | 98,141 |
| 2 | | | | | | | | | | Total = 98,141 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | A Alternate Drift | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 9-5/8” 40# Intermediate Casing. Passes all Burst, Collapse and Tensile design criteria.




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Production Casing | 6", 24.500 ppf, P110 ICY | BTC, P110 ICY | 0.0-28578.0 | 5.075 | 1.29 | 1.52 | (1.75) | 1.37 | 541,493 |
| 2 | | | | | | | | | | Total = 541,493 |
| 3 | | | | | | | | | | |
| 4 | ( ) Compression | | | | | | | | | |
| 5 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 6 | | | | | | | | | | |

*Modelling done with 6" Production Casing with a 125ksi Control Yield. Passes all Burst, Collapse and Tensile design criteria.

eog resources

**Shallow Design D**

## 4. CASING PROGRAM

| Hole Size | Interval MD From (ft) | Interval MD To (ft) | Interval TVD From (ft) | Interval TVD To (ft) | Csg OD | Weight | Grade | Conn |
|---|---|---|---|---|---|---|---|---|
| 16" | 0 | 2,030 | 0 | 2,030 | 13-3/8" | 54.5# | J-55 | STC |
| 11" | 0 | 7,793 | 0 | 5,650 | 9-5/8" | 40# | J-55 | LTC |
| 7-7/8" | 0 | 12,626 | 0 | 10,896 | 6" | 22.3# | P110-EC | DWC/C IS |
| 6-3/4" | 12,626 | 28,578 | 10,896 | 11,225 | 5-1/2" | 20# | P110-EC | DWC/C IS MS |

Hole will be full during casing run for well control and tensile SF factor. Casing will be kept at least half full during run for this design to meet BLM collapse SF requirement. External pressure will be reviewed prior to conducting casing pressure tests to ensure that 70% of the yield is not exceeded.

Variance is requested to waive the centralizer requirements for the 9-5/8" casing in the 11" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 11" hole interval to maximize cement bond and zonal isolation.

Variance is also requested to waive any centralizer requirements for the 6" and 5-1/2" casings in the 7-7/8" and 6-3/4" hole sizes. An expansion additive will be utilized in the cement slurry for the entire length of the 7-7/8" and 6-3/4" hole intervals to maximize cement bond and zonal isolation.

EOG requests permission to allow deviation from the 0.422'' annulus clearance requirement for the intermediate (salt) section from Title 43 CFR Part 3170 under the following conditions:

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues.

## 5. CEMENTING PROGRAM:

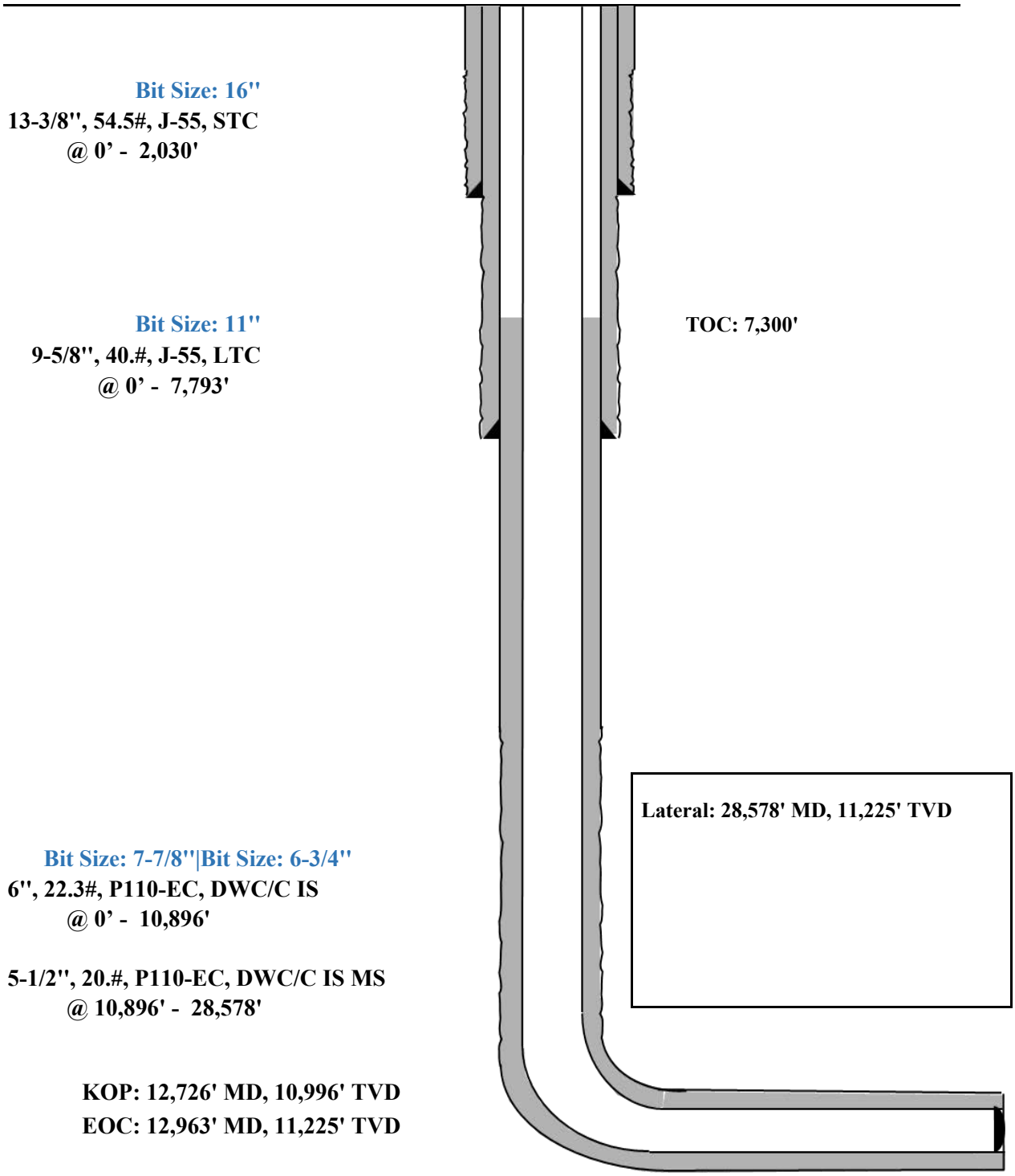
| Depth | No. Sacks | Wt. ppg | Yld Ft3/sk | Slurry Description |
|---|---|---|---|---|
| 2,030' 13-3/8'' | 570 | 13.5 | 1.73 | Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface) |
| | 160 | 14.8 | 1.34 | Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830') |
| 7,793' 9-5/8'' | 770 | 12.7 | 2.22 | Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface) |
| | 250 | 14.8 | 1.32 | Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 6238') |
| 28,578' 6'' | 650 | 10.5 | 3.21 | Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 7300') |
| | 1870 | 13.2 | 1.52 | Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 12730') |

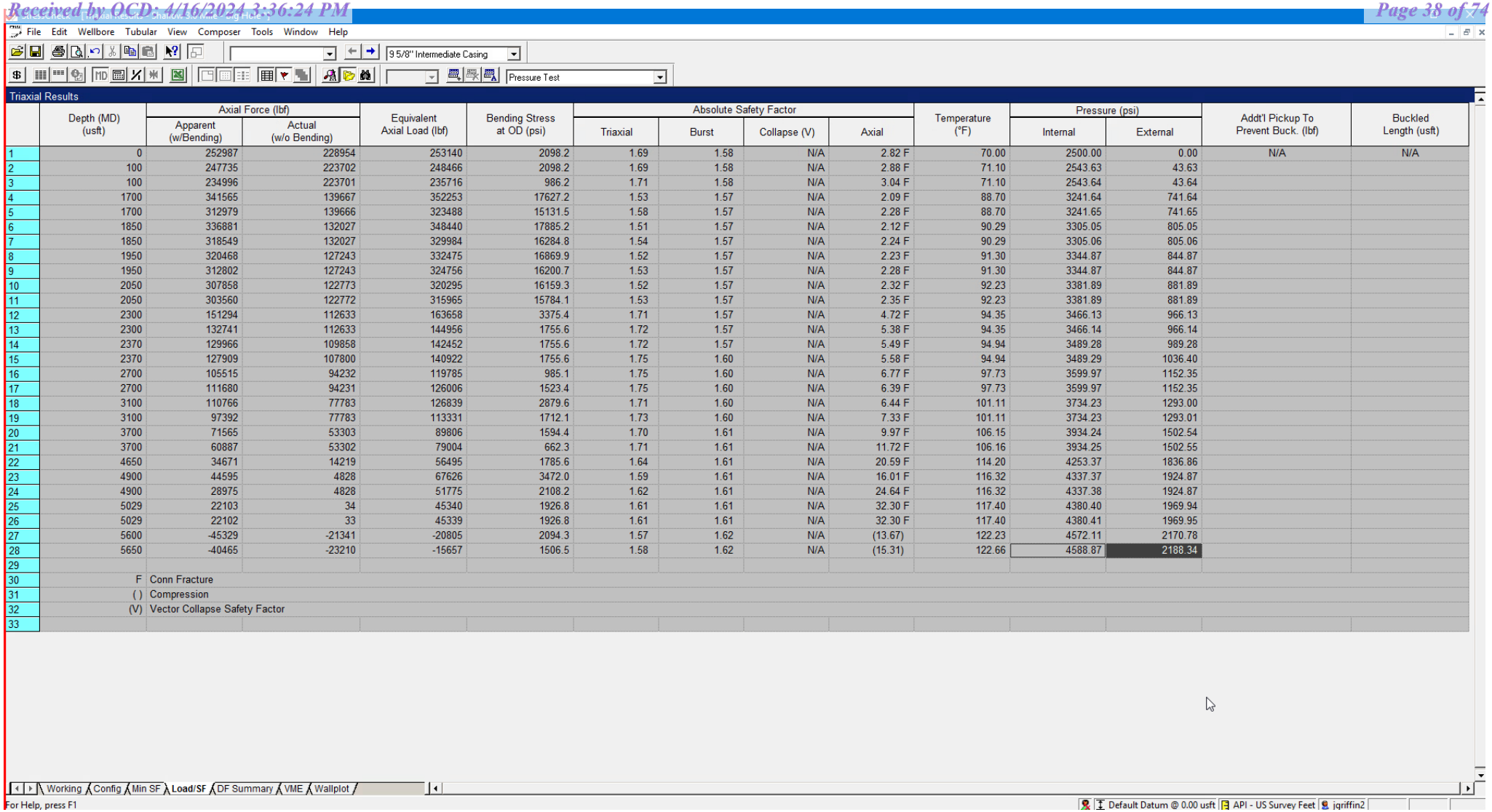
eog resources

**Shallow Design D**

**KB: 3558'**
**GL: 3533'**

**Proposed Wellbore**





File Edit Wellbore Tubular View Composer Tools Window Help

9 5/8" Intermediate Casing

Pressure Test

Triaxial Results

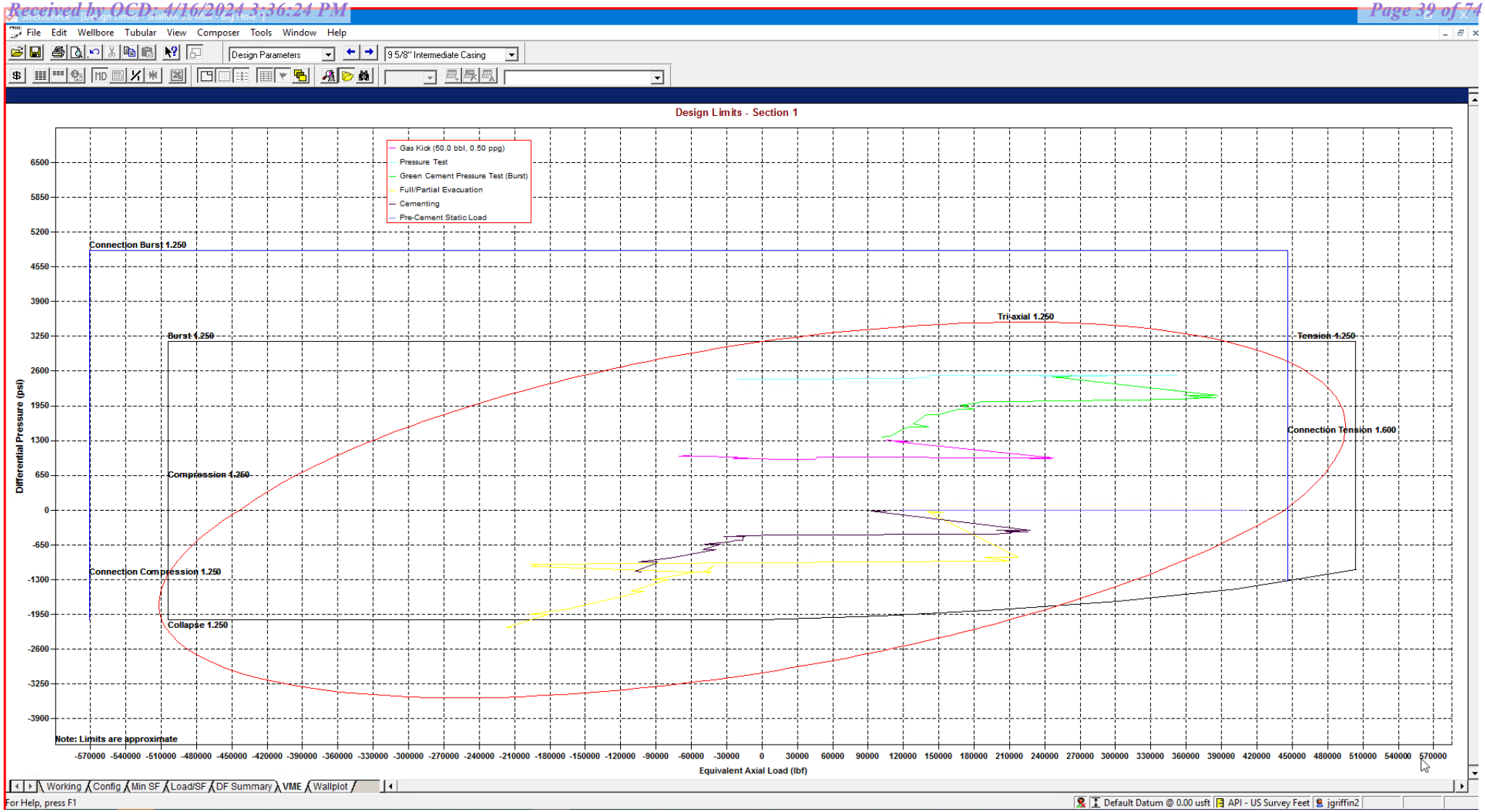
| | Depth (MD) (usft) | Axial Force (lbf) | | Equivalent Axial Load (lbf) | Bending Stress at OD (psi) | Absolute Safety Factor | | | | Temperature (°F) | Pressure (psi) | | Addt'l Pickup To Prevent Buck. (lbf) | Buckled Length (usft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Apparent (w/Bending) | Actual (w/o Bending) | | | Triaxial | Burst | Collapse (V) | Axial | | Internal | External | | |
| 1 | 0 | 252987 | 228954 | 253140 | 2098.2 | 1.69 | 1.58 | N/A | 2.82 F | 70.00 | 2500.00 | 0.00 | N/A | N/A |
| 2 | 100 | 247735 | 223702 | 248466 | 2098.2 | 1.69 | 1.58 | N/A | 2.88 F | 71.10 | 2543.63 | 43.63 | | |
| 3 | 100 | 234996 | 223701 | 235716 | 986.2 | 1.71 | 1.58 | N/A | 3.04 F | 71.10 | 2543.64 | 43.64 | | |
| 4 | 1700 | 341565 | 139667 | 352253 | 17627.2 | 1.53 | 1.57 | N/A | 2.09 F | 88.70 | 3241.64 | 741.64 | | |
| 5 | 1700 | 312979 | 139666 | 323488 | 15131.5 | 1.58 | 1.57 | N/A | 2.28 F | 88.70 | 3241.65 | 741.65 | | |
| 6 | 1850 | 336881 | 132027 | 348440 | 17885.2 | 1.51 | 1.57 | N/A | 2.12 F | 90.29 | 3305.05 | 805.05 | | |
| 7 | 1850 | 318549 | 132027 | 329984 | 16284.8 | 1.54 | 1.57 | N/A | 2.24 F | 90.29 | 3305.06 | 805.06 | | |
| 8 | 1950 | 320468 | 127243 | 332475 | 16869.9 | 1.52 | 1.57 | N/A | 2.23 F | 91.30 | 3344.87 | 844.87 | | |
| 9 | 1950 | 312802 | 127243 | 324756 | 16200.7 | 1.53 | 1.57 | N/A | 2.28 F | 91.30 | 3344.87 | 844.87 | | |
| 10 | 2050 | 307858 | 122773 | 320295 | 16159.3 | 1.52 | 1.57 | N/A | 2.32 F | 92.23 | 3381.89 | 881.89 | | |
| 11 | 2050 | 303560 | 122772 | 315965 | 15784.1 | 1.53 | 1.57 | N/A | 2.35 F | 92.23 | 3381.89 | 881.89 | | |
| 12 | 2300 | 151294 | 112633 | 163658 | 3375.4 | 1.71 | 1.57 | N/A | 4.72 F | 94.35 | 3466.13 | 966.13 | | |
| 13 | 2300 | 132741 | 112633 | 144956 | 1755.6 | 1.72 | 1.57 | N/A | 5.38 F | 94.35 | 3466.14 | 966.14 | | |
| 14 | 2370 | 129966 | 109858 | 142452 | 1755.6 | 1.72 | 1.57 | N/A | 5.49 F | 94.94 | 3489.28 | 989.28 | | |
| 15 | 2370 | 127909 | 107800 | 140922 | 1755.6 | 1.75 | 1.60 | N/A | 5.58 F | 94.94 | 3489.29 | 1036.40 | | |
| 16 | 2700 | 105515 | 94232 | 119785 | 985.1 | 1.75 | 1.60 | N/A | 6.77 F | 97.73 | 3599.97 | 1152.35 | | |
| 17 | 2700 | 111680 | 94231 | 126006 | 1523.4 | 1.75 | 1.60 | N/A | 6.39 F | 97.73 | 3599.97 | 1152.35 | | |
| 18 | 3100 | 110766 | 77783 | 126839 | 2879.6 | 1.71 | 1.60 | N/A | 6.44 F | 101.11 | 3734.23 | 1293.00 | | |
| 19 | 3100 | 97392 | 77783 | 113331 | 1712.1 | 1.73 | 1.60 | N/A | 7.33 F | 101.11 | 3734.23 | 1293.01 | | |
| 20 | 3700 | 71565 | 53303 | 89806 | 1594.4 | 1.70 | 1.61 | N/A | 9.97 F | 106.15 | 3934.24 | 1502.54 | | |
| 21 | 3700 | 60887 | 53302 | 79004 | 662.3 | 1.71 | 1.61 | N/A | 11.72 F | 106.16 | 3934.25 | 1502.55 | | |
| 22 | 4650 | 34671 | 14219 | 56495 | 1785.6 | 1.64 | 1.61 | N/A | 20.59 F | 114.20 | 4253.37 | 1836.86 | | |
| 23 | 4900 | 44595 | 4828 | 67626 | 3472.0 | 1.59 | 1.61 | N/A | 16.01 F | 116.32 | 4337.37 | 1924.87 | | |
| 24 | 4900 | 28975 | 4828 | 51775 | 2108.2 | 1.62 | 1.61 | N/A | 24.64 F | 116.32 | 4337.38 | 1924.87 | | |
| 25 | 5029 | 22103 | 34 | 45340 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.40 | 1969.94 | | |
| 26 | 5029 | 22102 | 33 | 45339 | 1926.8 | 1.61 | 1.61 | N/A | 32.30 F | 117.40 | 4380.41 | 1969.95 | | |
| 27 | 5600 | -45329 | -21341 | -20805 | 2094.3 | 1.57 | 1.62 | N/A | (13.67) | 122.23 | 4572.11 | 2170.78 | | |
| 28 | 5650 | -40465 | -23210 | -15657 | 1506.5 | 1.58 | 1.62 | N/A | (15.31) | 122.66 | 4588.87 | 2188.34 | | |
| 29 | | | | | | | | | | | | | | |
| 30 | F | Conn Fracture | | | | | | | | | | | | |
| 31 | ( ) | Compression | | | | | | | | | | | | |
| 32 | (V) | Vector Collapse Safety Factor | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | |

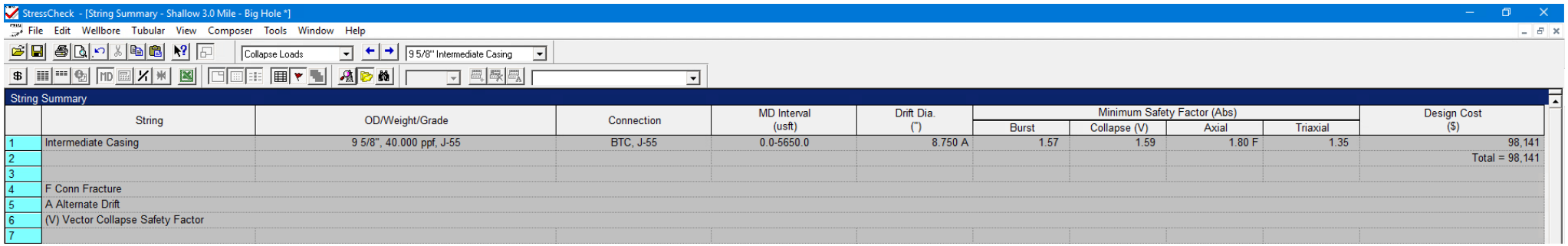
Working Config Min SF Load/SF DF Summary VME Wallplot

For Help, press F1

Default Datum @ 0.00 usft API - US Survey Feet jqriffin2

9-5/8” Intermediate Casing Pressure Test:
Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi
External Profile based off Pore Pressure: 2188 psi

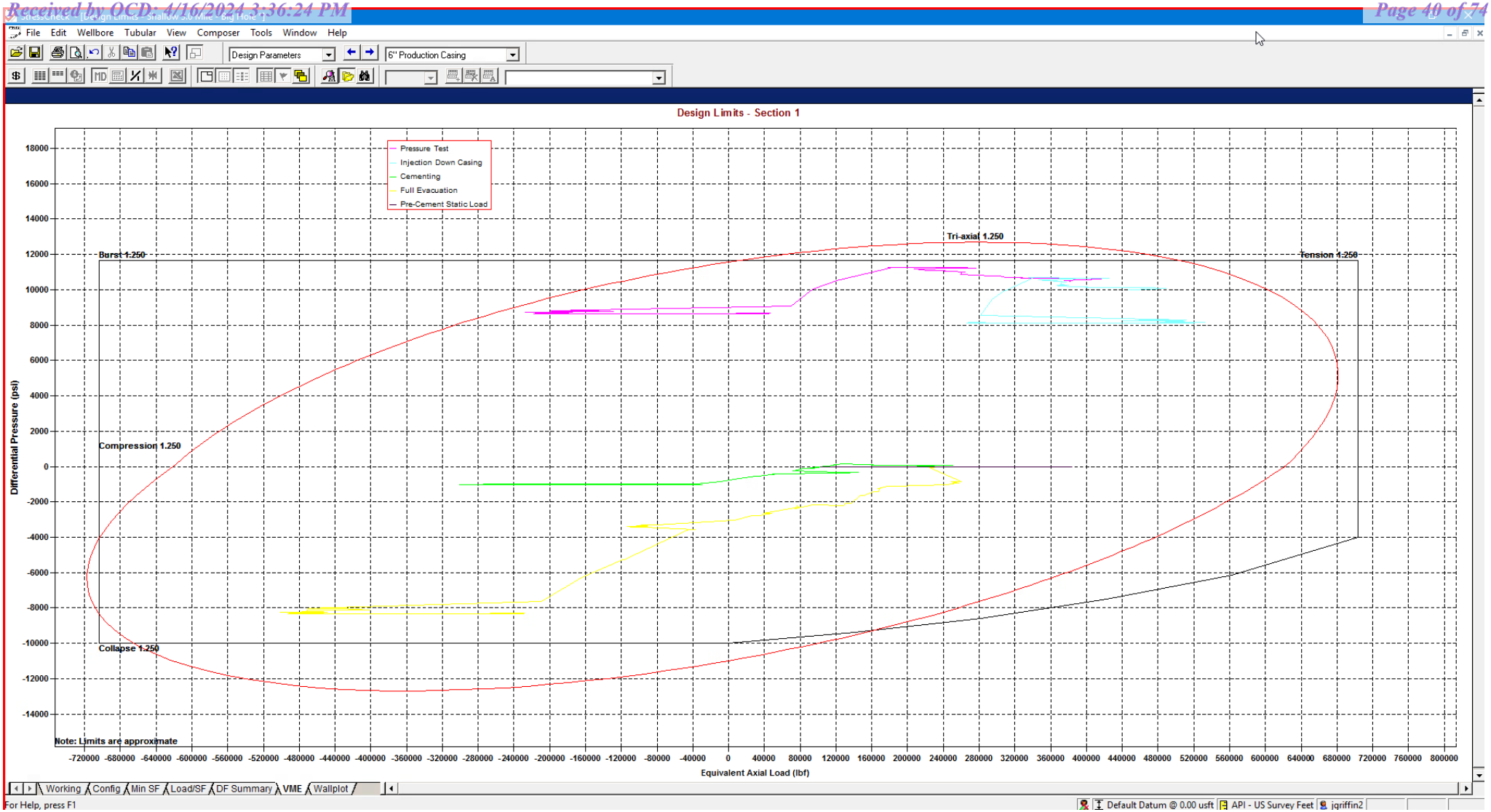


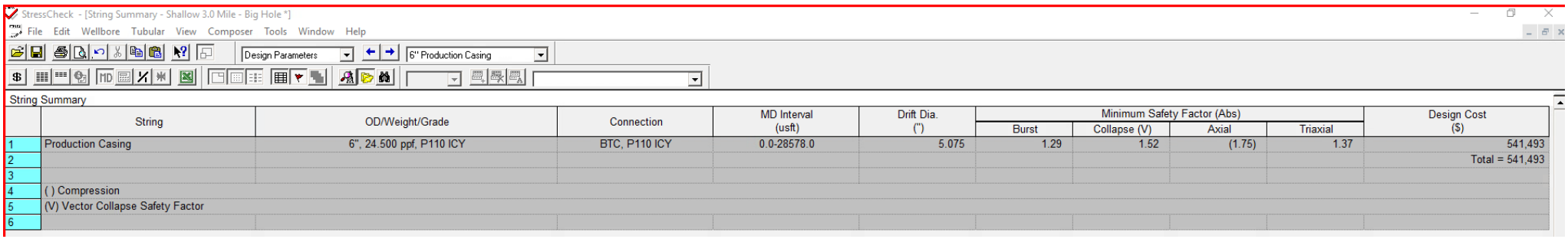




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) | | | | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Burst | Collapse (V) | Axial | Triaxial | |
| 1 | Intermediate Casing | 9 5/8", 40.000 ppf, J-55 | BTC, J-55 | 0.0-5650.0 | 8.750 A | 1.57 | 1.59 | 1.80 F | 1.35 | 98,141 |
| 2 | | | | | | | | | | Total = 98,141 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | A Alternate Drift | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 9-5/8” 40# Intermediate Casing. Passes all Burst, Collapse and Tensile design criteria.

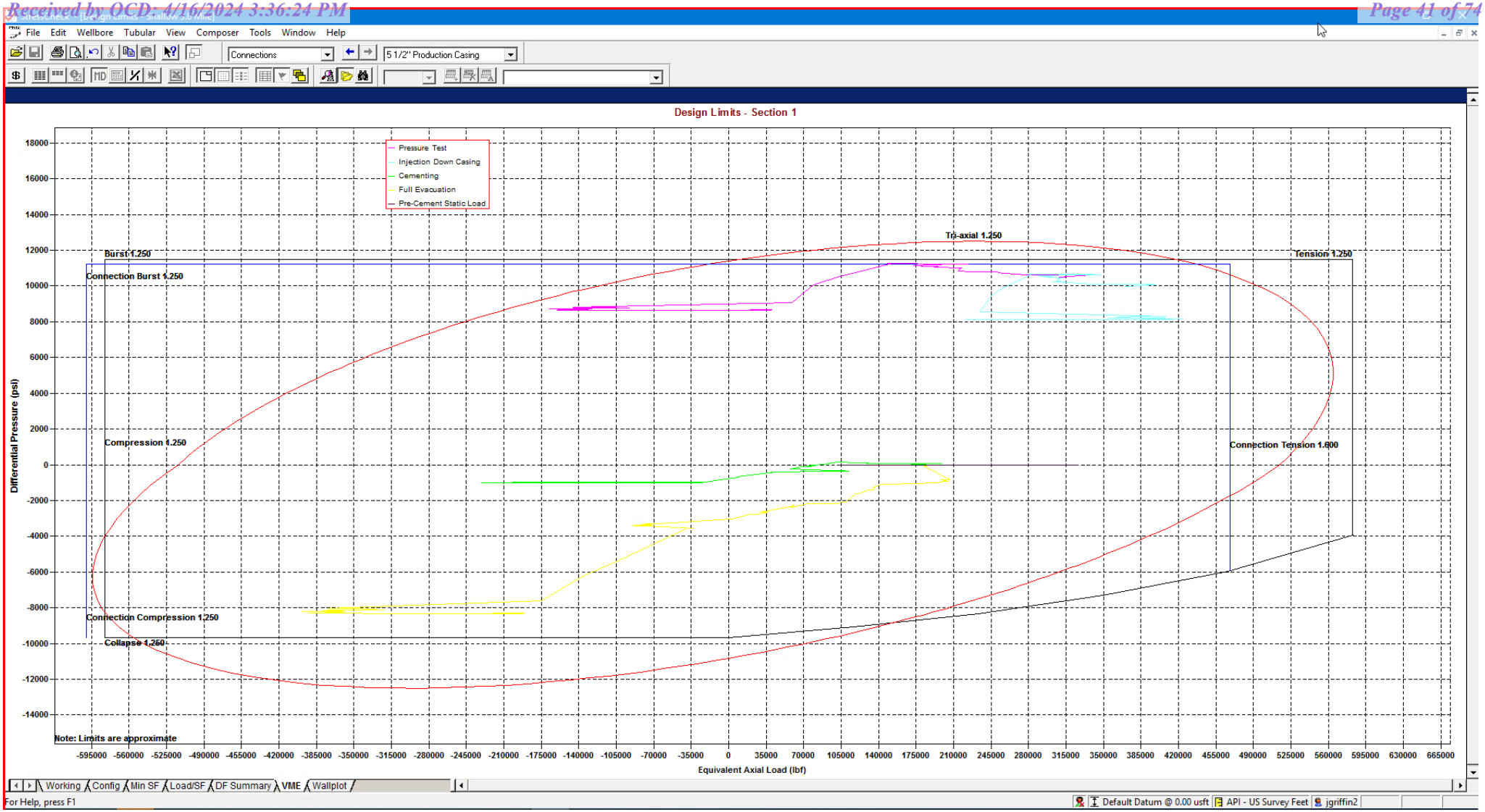


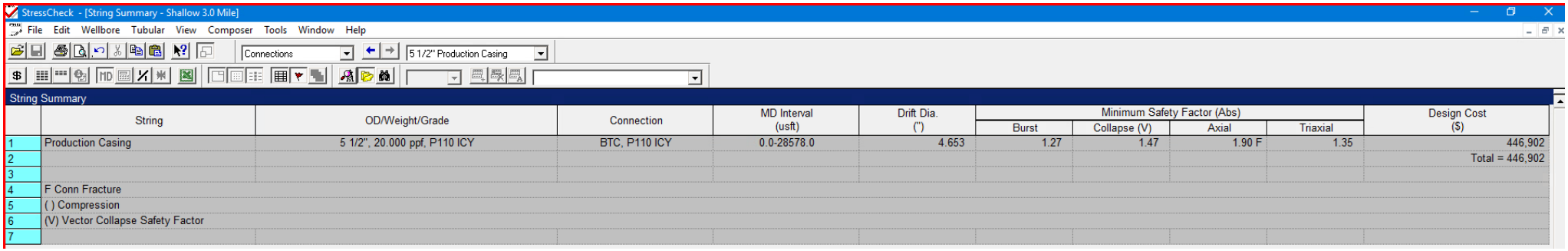




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Production Casing | 6", 24.500 ppf, P110 ICY | BTC, P110 ICY | 0.0-28578.0 | 5.075 | 1.29 | 1.52 | (1.75) | 1.37 | 541,493 |
| 2 | | | | | | | | | | Total = 541,493 |
| 3 | | | | | | | | | | |
| 4 | ( ) Compression | | | | | | | | | |
| 5 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 6 | | | | | | | | | | |

*Modelling done with 6" Production Casing with a 125ksi Control Yield. Passes all Burst, Collapse and Tensile design criteria.




String Summary

| | String | OD/Weight/Grade | Connection | MD Interval (usft) | Drift Dia. (") | Minimum Safety Factor (Abs) Burst | Collapse (V) | Axial | Triaxial | Design Cost ($) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Production Casing | 5 1/2", 20.000 ppf, P110 ICY | BTC, P110 ICY | 0.0-28578.0 | 4.653 | 1.27 | 1.47 | 1.90 F | 1.35 | 446,902 |
| 2 | | | | | | | | | | Total = 446,902 |
| 3 | | | | | | | | | | |
| 4 | F Conn Fracture | | | | | | | | | |
| 5 | ( ) Compression | | | | | | | | | |
| 6 | (V) Vector Collapse Safety Factor | | | | | | | | | |
| 7 | | | | | | | | | | |

*Modelling done with 5-1/2” 20# Production Casing with a 125ksi Control Yield. Passes all Burst, Collapse and Tensile design criteria.

**MUD PROGRAM:**

During this procedure we plan to use a Closed-Loop System and haul contents to the required disposal. The applicable depths and properties of the drilling fluid systems are as follows:

| Measured Depth | Type | Weight (ppg) | Viscosity | Water Loss |
|---|---|---|---|---|
| 0 – 2,030' | Fresh - Gel | 8.6-8.8 | 28-34 | N/c |
| 2,030' – 7,793' | Brine | 9-10.5 | 28-34 | N/c |
| 5,450' – 28,578' Lateral | Oil Base | 8.8-9.5 | 58-68 | N/c - 6 |

An electronic pit volume totalizer (PVT) will be utilized on the circulating system, to monitor pit volume, flow rate, pump pressure and stroke rate.

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

**CEMENTING ADDITIVES:**

| Additive | Purpose |
|---|---|
| Bentonite Gel | Lightweight/Lost circulation prevention |
| Calcium Chloride | Accelerator |
| Cello-flake | Lost circulation prevention |
| Sodium Metasilicate | Accelerator |
| MagOx | Expansive agent |
| Pre-Mag-M | Expansive agent |
| Sodium Chloride | Accelerator |
| FL-62 | Fluid loss control |
| Halad-344 | Fluid loss control |
| Halad-9 | Fluid loss control |
| HR-601 | Retarder |
| Microbond | Expansive Agent |

Cement integrity tests will be performed immediately following plug bump.

Note: Cement volumes based on bit size plus at least 25% excess in the open hole plus 10% excess in the cased-hole overlap section.

# Pipe Body and API Connections Performance Data

13.375 54.50/0.380 J55

PDF

New Search »

« Back to Previous List

USC Metric

6/8/2015 10:04:37 AM

| Mechanical Properties | Pipe | BTC | LTC | STC | |
|---|---|---|---|---|---|
| Minimum Yield Strength | 55,000 | -- | -- | -- | psi |
| Maximum Yield Strength | 80,000 | -- | -- | -- | psi |
| Minimum Tensile Strength | 75,000 | -- | -- | -- | psi |
| **Dimensions** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Outside Diameter | 13.375 | 14.375 | -- | 14.375 | in. |
| Wall Thickness | 0.380 | -- | -- | -- | in. |
| Inside Diameter | 12.615 | 12.615 | -- | 12.615 | in. |
| Standard Drift | 12.459 | 12.459 | -- | 12.459 | in. |
| Alternate Drift | -- | -- | -- | -- | in. |
| Nominal Linear Weight, T&C | 54.50 | -- | -- | -- | lbs/ft |
| Plain End Weight | 52.79 | -- | -- | -- | lbs/ft |
| **Performance** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Minimum Collapse Pressure | 1,130 | 1,130 | -- | 1,130 | psi |
| Minimum Internal Yield Pressure | 2,740 | 2,740 | -- | 2,740 | psi |
| Minimum Pipe Body Yield Strength | 853.00 | -- | -- | -- | 1000 lbs |
| Joint Strength | -- | 909 | -- | 514 | 1000 lbs |
| Reference Length | -- | 11,125 | -- | 6,290 | ft |
| **Make-Up Data** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Make-Up Loss | -- | 4.81 | -- | 3.50 | in. |
| Minimum Make-Up Torque | -- | -- | -- | 3,860 | ft-lbs |
| Maximum Make-Up Torque | -- | -- | -- | 6,430 | ft-lbs |

# Pipe Body and API Connections Performance Data

9.625 40.00/0.395 J55

PDF

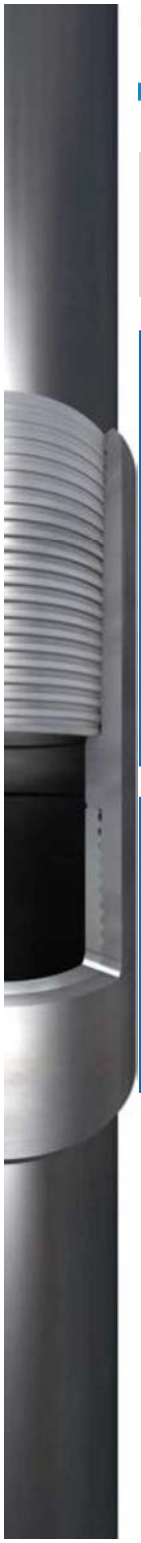
New Search »

« Back to Previous List

USC Metric

6/8/2015 10:23:27 AM

| Mechanical Properties | Pipe | BTC | LTC | STC | |
|---|---|---|---|---|---|
| Minimum Yield Strength | 55,000 | -- | -- | -- | psi |
| Maximum Yield Strength | 80,000 | -- | -- | -- | psi |
| Minimum Tensile Strength | 75,000 | -- | -- | -- | psi |
| **Dimensions** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Outside Diameter | 9.625 | 10.625 | 10.625 | 10.625 | in. |
| Wall Thickness | 0.395 | -- | -- | -- | in. |
| Inside Diameter | 8.835 | 8.835 | 8.835 | 8.835 | in. |
| Standard Drift | 8.679 | 8.679 | 8.679 | 8.679 | in. |
| Alternate Drift | 8.750 | 8.750 | 8.750 | 8.750 | in. |
| Nominal Linear Weight, T&C | 40.00 | -- | -- | -- | lbs/ft |
| Plain End Weight | 38.97 | -- | -- | -- | lbs/ft |
| **Performance** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Minimum Collapse Pressure | 2,570 | 2,570 | 2,570 | 2,570 | psi |
| Minimum Internal Yield Pressure | 3,950 | 3,950 | 3,950 | 3,950 | psi |
| Minimum Pipe Body Yield Strength | 630.00 | -- | -- | -- | 1000 lbs |
| Joint Strength | -- | 714 | 520 | 452 | 1000 lbs |
| Reference Length | -- | 11,898 | 8,665 | 7,529 | ft |
| **Make-Up Data** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Make-Up Loss | -- | 4.81 | 4.75 | 3.38 | in. |
| Minimum Make-Up Torque | -- | -- | 3,900 | 3,390 | ft-lbs |
| Maximum Make-Up Torque | -- | -- | 6,500 | 5,650 | ft-lbs |



# DWC/C-IS MS™

## Connection Data Sheet

| OD (in.) | WEIGHT (lbs./ft.) | WALL (in.) | GRADE | API DRIFT (in.) | RBW% | CONNECTION |
|---|---|---|---|---|---|---|
| 5.500 | Nominal: 20.00<br>Plain End: 19.83 | 0.361 | VST P110EC | 4.653 | 87.5 | DWC/C-IS MS |

| PIPE PROPERTIES | | |
|---|---|---|
| Outside Diameter | 5.500 | in. |
| Inside Diameter | 4.778 | in. |
| Nominal Area | 5.828 | sq.in. |
| Grade Type | API 5CT | |
| Min. Yield Strength | 125 | ksi |
| Max. Yield Strength | 140 | ksi |
| Min. Tensile Strength | 135 | ksi |
| Yield Strength | 729 | klb |
| Ultimate Strength | 787 | klb |
| Min. Internal Yield | 14,360 | psi |
| Collapse | 12,090 | psi |

| CONNECTION PROPERTIES | | |
|---|---|---|
| Connection Type | Semi-Premium T&C | |
| Connection O.D. (nom) | 6.115 | in. |
| Connection I.D. (nom) | 4.778 | in. |
| Make-Up Loss | 4.125 | in. |
| Coupling Length | 9.250 | in. |
| Critical Cross Section | 5.828 | sq.in. |
| Tension Efficiency | 100.0% | of pipe |
| Compression Efficiency | 100.0% | of pipe |
| Internal Pressure Efficiency | 100.0% | of pipe |
| External Pressure Efficiency | 100.0% | of pipe |

| CONNECTION PERFORMANCES | | |
|---|---|---|
| Yield Strength | 729 | klb |
| Parting Load | 787 | klb |
| Compression Rating | 729 | klb |
| Min. Internal Yield | 14,360 | psi |
| External Pressure | 12,090 | psi |
| Maximum Uniaxial Bend Rating | 104.2 | °/100 ft |
| Reference String Length w 1.4 Design Factor | 26,040 | ft |

| FIELD END TORQUE VALUES | | |
|---|---|---|
| Min. Make-up torque | 16,100 | ft.lb |
| Opti. Make-up torque | 17,350 | ft.lb |
| Max. Make-up torque | 18,600 | ft.lb |
| Min. Shoulder Torque | 1,610 | ft.lb |
| Max. Shoulder Torque | 12,880 | ft.lb |
| Min. Delta Turn | - | Turns |
| Max. Delta Turn | 0.200 | Turns |
| Maximum Operational Torque | 21,100 | ft.lb |
| Maximum Torsional Value (MTV) | 23,210 | ft.lb |

Need Help? Contact: tech.support@vam-usa.com

Reference Drawing: 8136PP Rev.01 & 8136BP Rev.01

Date: 12/03/2019

Time: 06:19:27 PM

For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

VAM USA
2107 CityWest Boulevard Suite 1300
Houston, TX 77042
Phone: 713-479-3200
Fax: 713-479-3234
VAM® USA Sales E-mail: VAMUSAsales@vam-usa.com
Tech Support Email: tech.support@vam-usa.com

**DWC Connection Data Sheet Notes:**

1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a given pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API Internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.
12. DWC/C family of connections are compatible with API Buttress BTC connections. Please contact tech.support@vam-usa.com for details on connection ratings and make-up.

# Pipe Body and API Connections Performance Data

10.750 40.50/0.350 J55

PDF

New Search »

« Back to Previous List

USC Metric

6/8/2015 10:14:05 AM

| Mechanical Properties | Pipe | BTC | LTC | STC | |
|---|---|---|---|---|---|
| Minimum Yield Strength | 55,000 | -- | -- | -- | psi |
| Maximum Yield Strength | 80,000 | -- | -- | -- | psi |
| Minimum Tensile Strength | 75,000 | -- | -- | -- | psi |
| **Dimensions** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Outside Diameter | 10.750 | 11.750 | -- | 11.750 | in. |
| Wall Thickness | 0.350 | -- | -- | -- | in. |
| Inside Diameter | 10.050 | 10.050 | -- | 10.050 | in. |
| Standard Drift | 9.894 | 9.894 | -- | 9.894 | in. |
| Alternate Drift | -- | -- | -- | -- | in. |
| Nominal Linear Weight, T&C | 40.50 | -- | -- | -- | lbs/ft |
| Plain End Weight | 38.91 | -- | -- | -- | lbs/ft |
| **Performance** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Minimum Collapse Pressure | 1,580 | 1,580 | -- | 1,580 | psi |
| Minimum Internal Yield Pressure | 3,130 | 3,130 | -- | 3,130 | psi |
| Minimum Pipe Body Yield Strength | 629.00 | -- | -- | -- | 1000 lbs |
| Joint Strength | -- | 700 | -- | 420 | 1000 lbs |
| Reference Length | -- | 11,522 | -- | 6,915 | ft |
| **Make-Up Data** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Make-Up Loss | -- | 4.81 | -- | 3.50 | in. |
| Minimum Make-Up Torque | -- | -- | -- | 3,150 | ft-lbs |
| Maximum Make-Up Torque | -- | -- | -- | 5,250 | ft-lbs |

VALLOUREC STAR 8.625 32# J55 S S2L2 DA 7.875 W/O# SLN # PO# MADE IN USA FT LB

vallourec

**API 5CT, 10th Ed. Connection Data Sheet**

| O.D. (in) | WEIGHT (lb/ft) | WALL (in) | GRADE | *API DRIFT (in) | RBW % |
|---|---|---|---|---|---|
| 8.625 | Nominal: 32.00<br>Plain End: 31.13 | 0.352 | J55 | 7.796 | 87.5 |

| Material Properties (PE) | | |
|---|---|---|
| **Pipe** | | |
| Minimum Yield Strength: | 55 | ksi |
| Maximum Yield Strength: | 80 | ksi |
| Minimum Tensile Strength: | 75 | ksi |
| **Coupling** | | |
| Minimum Yield Strength: | 55 | ksi |
| Maximum Yield Strength: | 80 | ksi |
| Minimum Tensile Strength: | 75 | ksi |

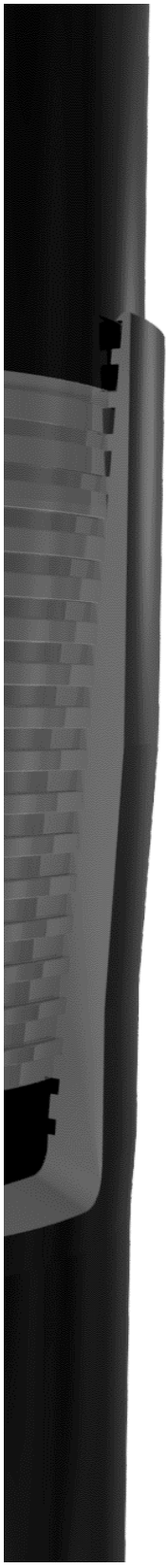
| Pipe Body Data (PE) | | |
|---|---|---|
| **Geometry** | | |
| Nominal ID: | 7.92 | inch |
| Nominal Area: | 9.149 | $in^2$ |
| *Special/Alt. Drift: | 7.875 | inch |
| **Performance** | | |
| Pipe Body Yield Strength: | 503 | kips |
| Collapse Resistance: | 2,530 | psi |
| Internal Yield Pressure: (API Historical) | 3,930 | psi |

| API Connection Data<br>Coupling OD: 9.625" | | |
|---|---|---|
| **STC Performance** | | |
| STC Internal Pressure: | 3,930 | psi |
| STC Joint Strength: | 372 | kips |
| **LTC Performance** | | |
| LTC Internal Pressure: | 3,930 | psi |
| LTC Joint Strength: | 417 | kips |
| **SC-BTC Performance - Cplg OD = 9.125"** | | |
| BTC Internal Pressure: | 3,930 | psi |
| BTC Joint Strength: | 503 | kips |

| API Connection Torque | | | | | |
|---|---|---|---|---|---|
| **STC Torque (ft-lbs)** | | | | | |
| Min: | 2,793 | Opti: | 3,724 | Max: | 4,655 |
| **LTC Torque (ft-lbs)** | | | | | |
| Min: | 3,130 | Opti: | 4,174 | Max: | 5,217 |
| **BTC Torque (ft-lbs)** | | | | | |
| *follow API guidelines regarding positional make up* | | | | | |

*Alt. Drift will be used unless API Drift is specified on order.

**If above API connections do not suit your needs, VAM® premium connections are available up to 100% of pipe body ratings.



Issued on: 10 Feb. 2021 by Wesley Ott

# VAM® SPRINT-SF
## Connection Data Sheet

| OD | Weight (lb/ft) | Wall Th. | Grade | API Drift: | Connection |
|---|---|---|---|---|---|
| 6 in. | Nominal: 24.50<br>Plain End: 23.95 | 0.400 in. | P110EC | 5.075 in. | **VAM® SPRINT-SF** |

| PIPE PROPERTIES | | |
|---|---|---|
| Nominal OD | 6.000 | in. |
| Nominal ID | 5.200 | in. |
| Nominal Cross Section Area | 7.037 | sqin. |
| Grade Type | High Yield | |
| Min. Yield Strength | 125 | ksi |
| Max. Yield Strength | 140 | ksi |
| Min. Ultimate Tensile Strength | 135 | ksi |

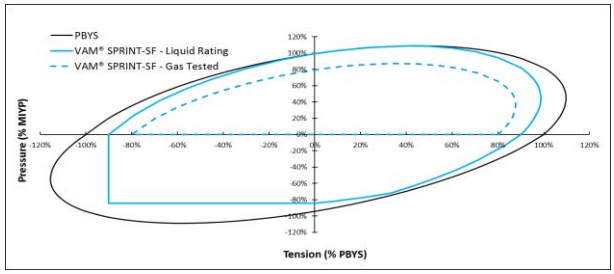
| CONNECTION PROPERTIES | | |
|---|---|---|
| Connection Type | Integral Semi-Flush | |
| Connection OD (nom): | 6.277 | in. |
| Connection ID (nom): | 5.146 | in. |
| Make-Up Loss | 5.386 | in. |
| Critical Cross Section | 6.417 | sqin. |
| Tension Efficiency | 91.0 | % of pipe |
| Compression Efficiency | 91.0 | % of pipe |
| Internal Pressure Efficiency | 100 | % of pipe |
| External Pressure Efficiency | 100 | % of pipe |

| CONNECTION PERFORMANCES | | |
|---|---|---|
| Tensile Yield Strength | 801 | klb |
| Compression Resistance | 801 | klb |
| Internal Yield Pressure | 14,580 | psi |
| Collapse Resistance | 12,500 | psi |
| Max. Structural Bending | 83 | °/100ft |
| Max. Bending with ISO/API Sealability | 30 | °/100ft |

* 87.5% RBW

| TORQUE VALUES | | |
|---|---|---|
| Min. Make-up torque | 21,750 | ft.lb |
| Opt. Make-up torque | 24,250 | ft.lb |
| Max. Make-up torque | 26,750 | ft.lb |
| Max. Torque with Sealability (MTS) | 53,000 | ft.lb |

VAM® SPRINT-SF is a semi-flush connection innovatively designed for extreme shale applications. Its high tension rating and ultra high torque capacity make it ideal to run a fill string length as production casing in shale wells with extended horizontal sections and tight clearance requirements.




Do you need help on this product? - Remember no one knows VAM® like VAM®

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singapore@vamfieldservice.com
australia@vamfieldservice.com

Over 140 VAM® Specialists available worldwide 24/7 for Rig Site Assistance

DWC/C-IS™

# Connection Data Sheet

| OD (in.) | WEIGHT (lbs./ft.) | WALL (in.) | GRADE | API DRIFT (in.) | RBW% | CONNECTION |
|---|---|---|---|---|---|---|
| 6.000 | Nominal: 22.30<br>Plain End: 21.70 | 0.360 | VST P110EC | 5.155 | 92.5 | DWC/C-IS |

## PIPE PROPERTIES

| | | |
|---|---|---|
| Nominal OD | 6.000 | in. |
| Nominal ID | 5.280 | in. |
| Nominal Area | 6.379 | sq.in. |
| Grade Type | API 5CT | |
| Min. Yield Strength | 125 | ksi |
| Max. Yield Strength | 140 | ksi |
| Min. Tensile Strength | 135 | ksi |
| Yield Strength | 797 | klb |
| Ultimate Strength | 861 | klb |
| Min. Internal Yield Pressure | 13,880 | psi |
| Collapse Pressure | 9,800 | psi |

## CONNECTION PROPERTIES

| | | |
|---|---|---|
| Connection Type | Semi-Premium T&C | |
| Connection OD (nom) | 6.650 | in. |
| Connection ID (nom) | 5.280 | in. |
| Make-Up Loss | 4.313 | in. |
| Coupling Length | 9.625 | in. |
| Critical Cross Section | 6.379 | sq.in. |
| Tension Efficiency | 100.0% | of pipe |
| Compression Efficiency | 100.0% | of pipe |
| Internal Pressure Efficiency | 100.0% | of pipe |
| External Pressure Efficiency | 100.0% | of pipe |

## CONNECTION PERFORMANCES

| | | |
|---|---|---|
| Yield Strength | 797 | klb |
| Parting Load | 861 | klb |
| Compression Rating | 797 | klb |
| Min. Internal Yield | 13,880 | psi |
| External Pressure | 9,800 | psi |
| Maximum Uniaxial Bend Rating | 47.7 | °/100 ft |
| Reference String Length w 1.4 Design Factor | 25,530 | ft. |

## FIELD END TORQUE VALUES

| | | |
|---|---|---|
| Min. Make-up torque | 17,000 | ft.lb |
| Opti. Make-up torque | 18,250 | ft.lb |
| Max. Make-up torque | 19,500 | ft.lb |
| Min. Shoulder Torque | 1,700 | ft.lb |
| Max. Shoulder Torque | 13,600 | ft.lb |
| Min. Delta Turn | - | Turns |
| Max. Delta Turn | 0.200 | Turns |
| Maximum Operational Torque | 24,200 | ft.lb |
| Maximum Torsional Value (MTV) | 26,620 | ft.lb |

Need Help? Contact: tech.support@vam-usa.com

Reference Drawing: 8135PP Rev.02 & 8135BP Rev.02

Date: 07/30/2020

Time: 07:50:47 PM

For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).



VAM® USA

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Tech Support Email: tech.support@vam-usa.com

DWC Connection Data Sheet Notes:
1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a given pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API Internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.
12. DWC/C family of connections are compatible with API Buttress BTC connections. Please contact tech.support@vam-usa.com for details on connection ratings and make-up.

# Salt Section Annular Clearance Variance Request

Daniel Moose

# Current Design (Salt Strings)

## 0.422” Annular clearance requirement

- Casing collars shall have a minimum clearance of 0.422 inches on all sides in the hole/casing annulus, with recognition that variances can be granted for justified exceptions.

- 12.25” Hole x 9.625”40# J55/HCK55 LTC Casing
  - 1.3125” Clearance to casing OD
  - 0.8125” Clearance to coupling OD
- 9.875” Hole x 8.75” 38.5# P110 Sprint-SF Casing
  - 0.5625” Clearance to casing OD
  - 0.433” Clearance to coupling OD

# Annular Clearance Variance Request

**EOG request permission to allow deviation from the 0.422” annulus clearance requirement for the intermediate (salt) section from Onshore Order #2 under the following conditions:**

- The variance is not applicable within the Potash Boundaries or Capitan Reef areas.
- Operator takes responsibility to get casing to set point in the event that the clearance causes stuck pipe issues

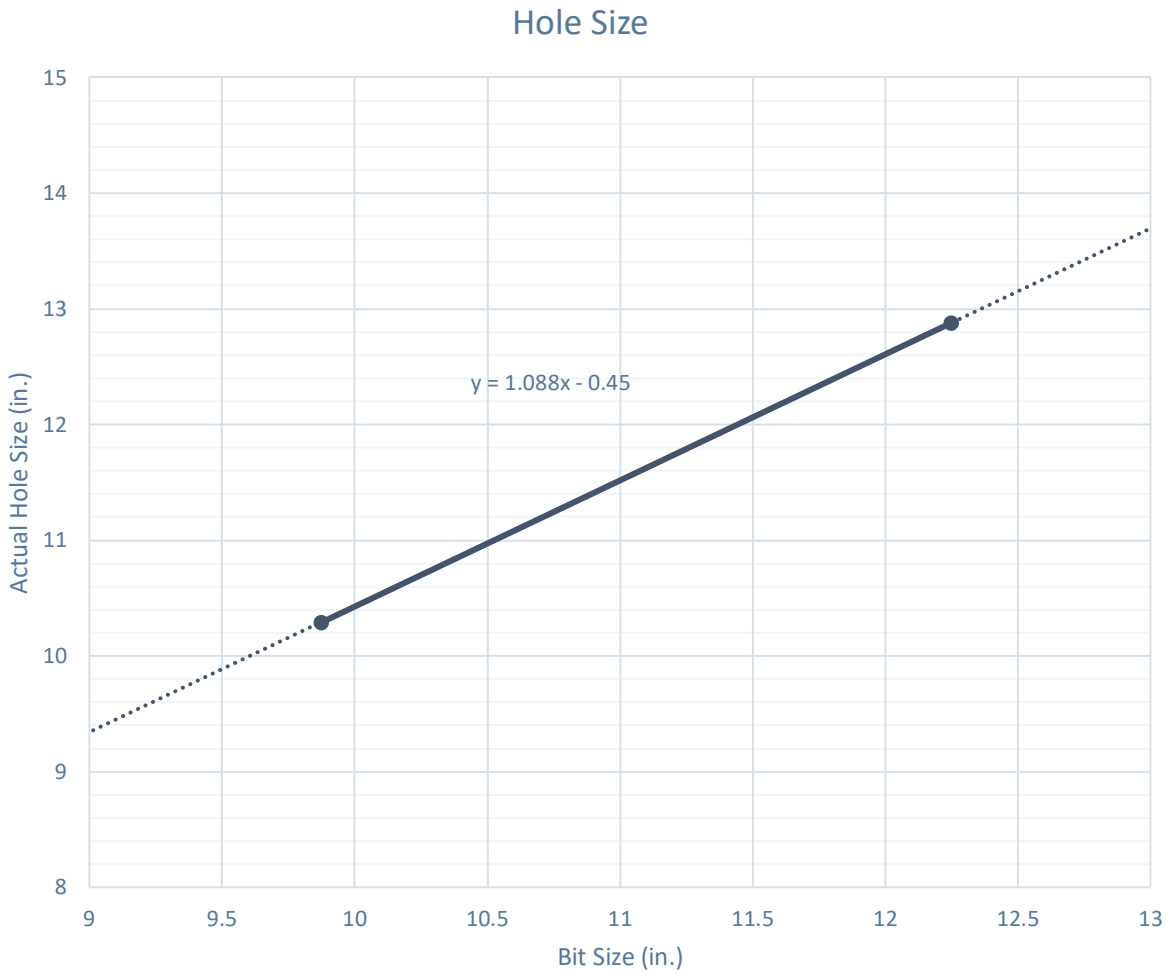
# Volumetric Hole Size Calculation

## Hole Size Calculations Off Cement Volumes

- Known volume of cement pumped
- Known volume of cement returned to surface
- Must not have had any losses
- Must have bumped plug

## Average Hole Size

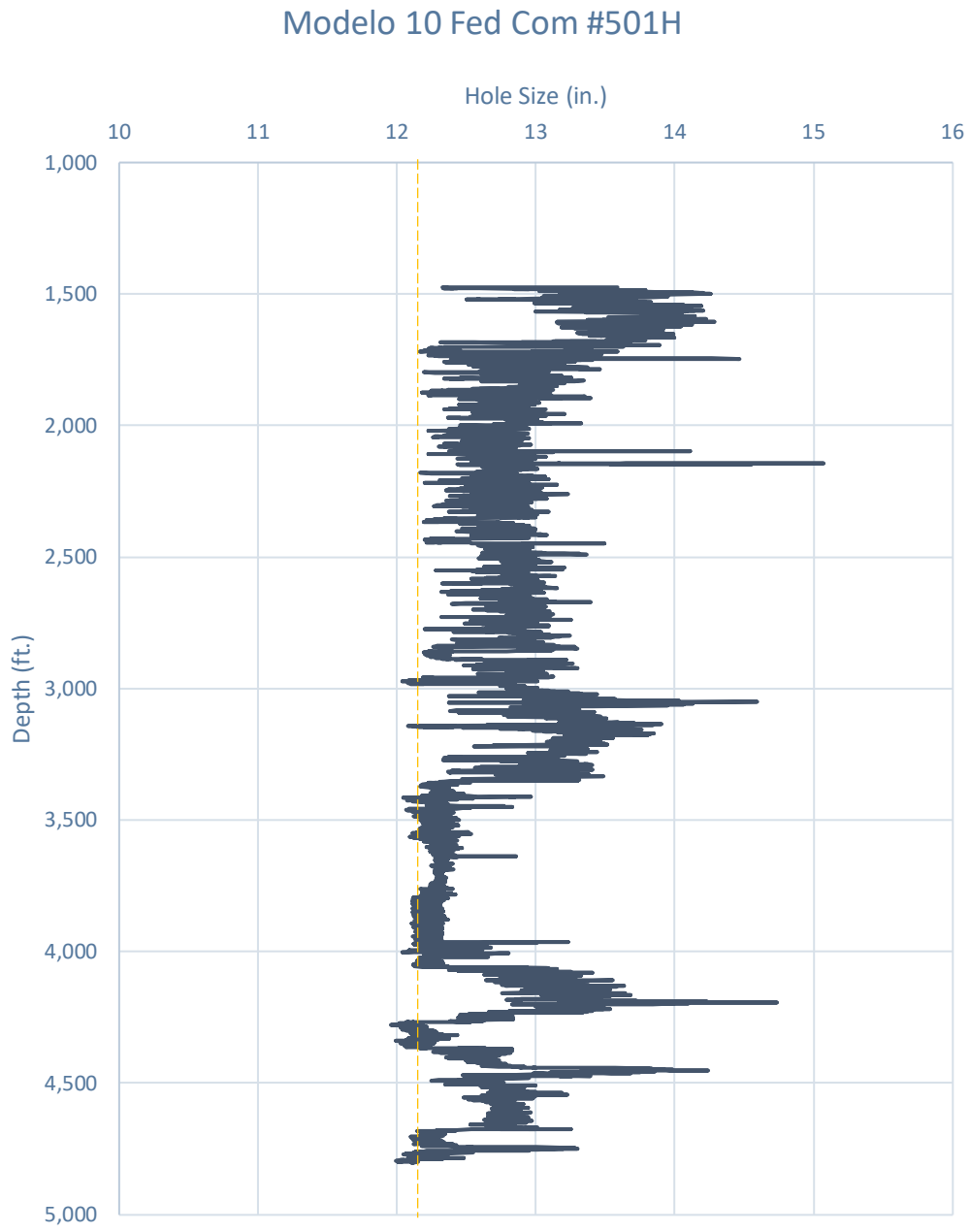
- 12.25” Hole
  - 12.88” Hole
    - 5.13% diameter increase
    - 10.52% area increase
  - 0.63” Average enlargement
  - 0.58” Median enlargement
  - 179 Well Count
- 9.875” Hole
  - 10.30” Hole
    - 4.24% diameter increase
    - 9.64% area increase
  - 0.42” Average enlargement
  - 0.46” Median enlargement
  - 11 Well Count



# Caliper Hole Size (12.25”)

## Average Hole Size

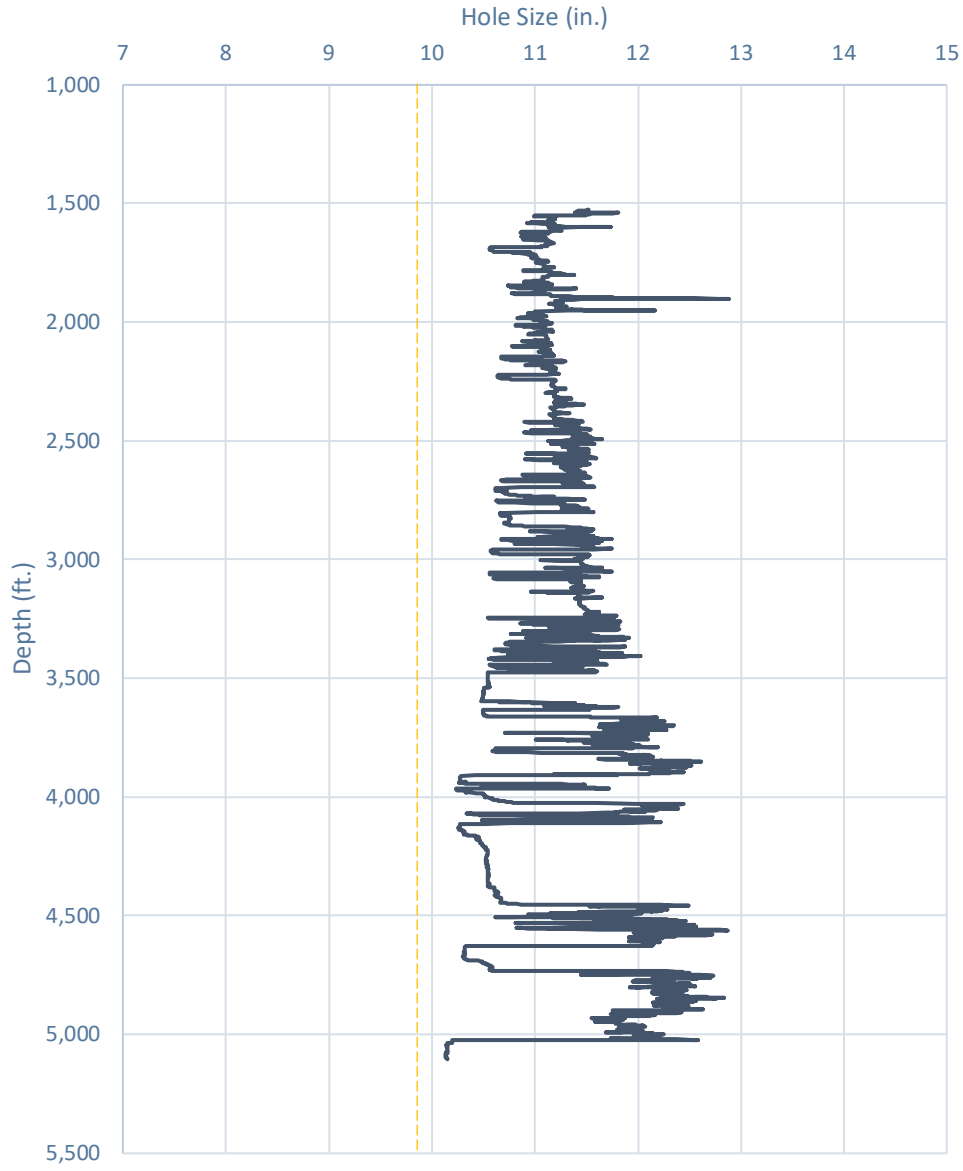
- 12.25” Bit
  - 12.76” Hole
    - 4.14% diameter increase
    - 8.44% area increase
  - 0.51” Average enlargement
  - 0.52” Median enlargement
  - Brine



# Caliper Hole Size (9.875”)

## Average Hole Size

- 9.875” Hole
  - 11.21” Hole
    - 13.54% diameter increase
    - 28.92% area increase
  - 1.33” Average enlargement
  - 1.30” Median enlargement
  - EnerLite



# Design A

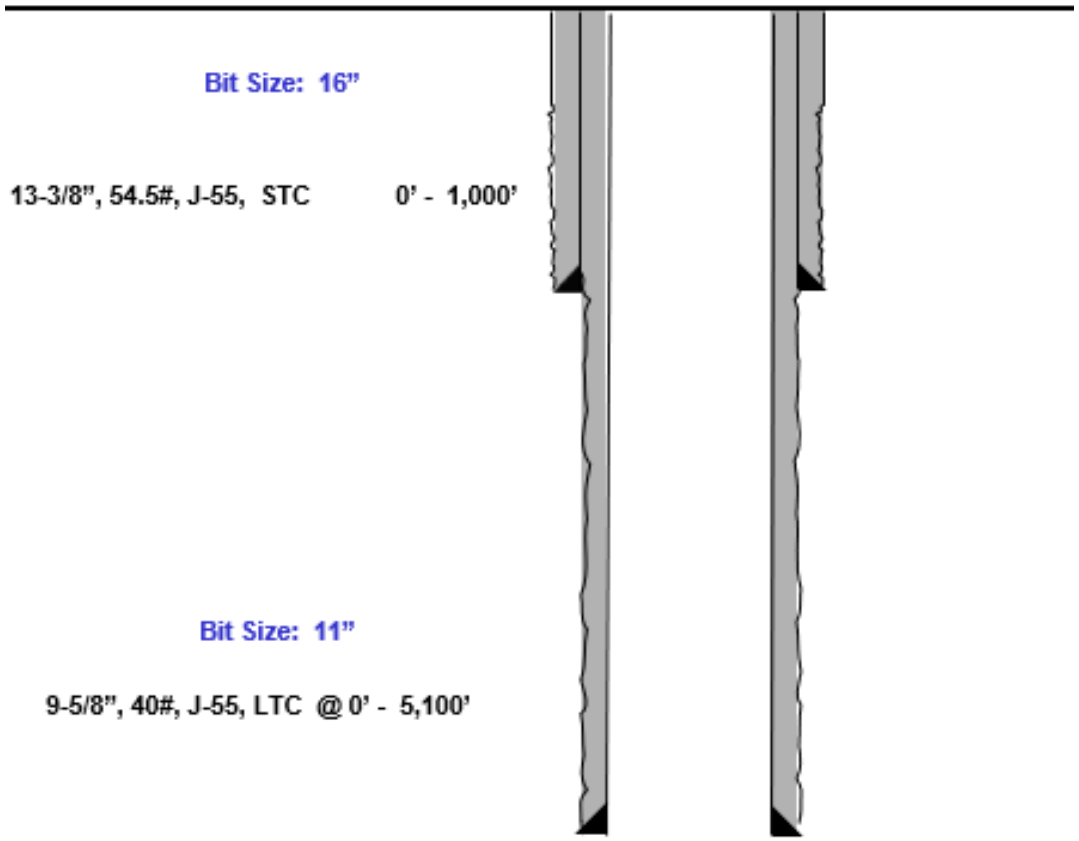
## Proposed 11” Hole with 9.625” 40# J55/HCK55 LTC Casing

- 11” Bit + 0.52” Average hole enlargement = 11.52” Hole Size
  - 0.9475” Clearance to casing OD

    $= \frac{11.52 - 9.625}{2}$
  - 0.4475” Clearance to coupling OD

    $= \frac{11.52 - 10.625}{2}$
- Previous Shoe – 13.375” 54.5# J55 STC
  - 0.995” Clearance to coupling OD (~1,200’ overlap)

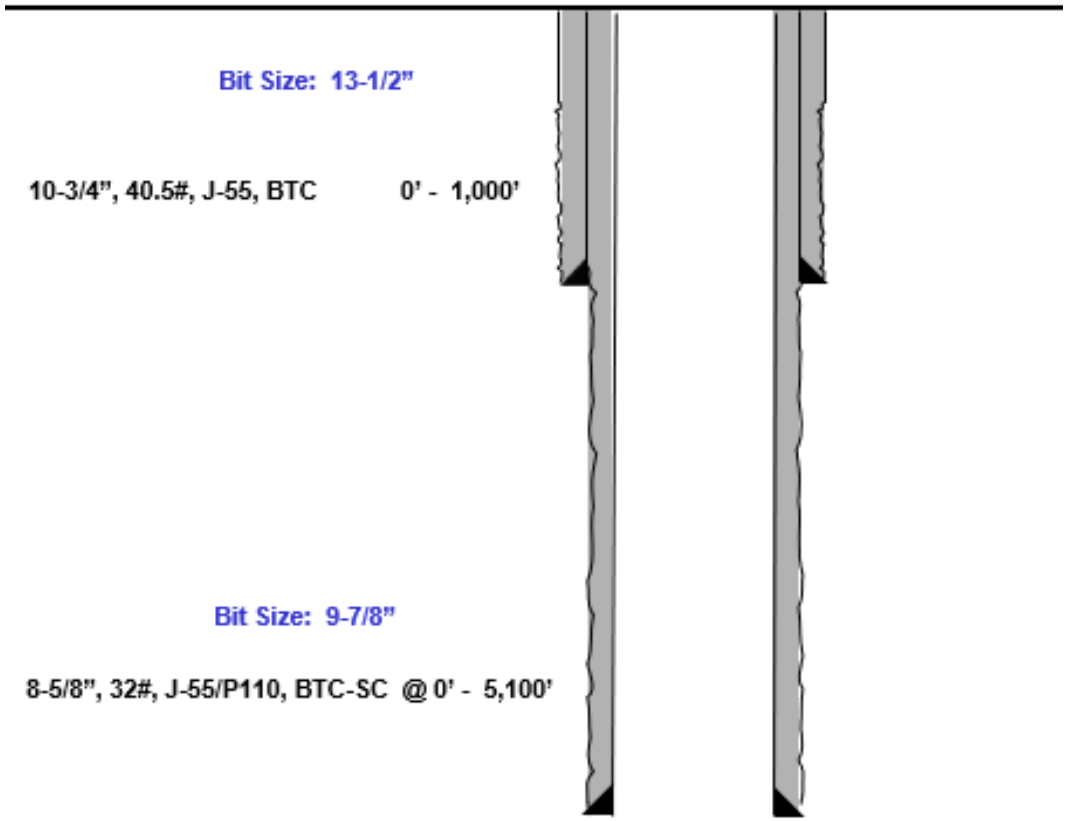
    $= \frac{12.615 - 10.625}{2}$



# Design B

## Proposed 9.875” Hole with 8.625” 32# J55/P110 BTC-SC Casing

- 9.875” Bit + 0.42” Average hole enlargement = 10.295” Hole Size
  - 0.835” Clearance to casing OD
    $$= \frac{10.295 - 8.625}{2}$$
  - 0.585” Clearance to coupling OD
    $$= \frac{10.295 - 9.125}{2}$$
- Previous Shoe – 10.75” 40.5# J55 STC
  - 0.4625” Clearance to coupling OD (~1,200’ overlap)
    $$= \frac{10.05 - 9.125}{2}$$



# Index

# Casing Spec Sheets

## PERFORMANCE DATA

**API LTC** 9.625 in 40.00 lbs/ft K55 HC

**Technical Data Sheet**

### Tubular Parameters

| | | | | | |
|---|---|---|---|---|---|
| Size | 9.625 | in | Minimum Yield | 55 | ksi |
| Nominal Weight | 40.00 | lbs/ft | Minimum Tensile | 95 | ksi |
| Grade | K55 HC | | Yield Load | 629 | kips |
| PE Weight | 38.94 | lbs/ft | Tensile Load | 1088 | kips |
| Wall Thickness | 0.395 | in | Min. Internal Yield Pressure | 3,950 | psi |
| Nominal ID | 8.835 | in | Collapse Pressure | 3600 | psi |
| Drift Diameter | 8.750 | in | | | |
| Nom. Pipe Body Area | 11.454 | in² | | | |

### Connection Parameters

| | | |
|---|---|---|
| Connection OD | 10.625 | in |
| Coupling Length | 10.500 | in |
| Threads Per Inch | 8 | tpi |
| Standoff Thread Turns | 3.50 | turns |
| Make-Up Loss | 4.750 | in |
| Min. Internal Yield Pressure | 3,950 | psi |

## Pipe Body and API Connections Performance Data

13.375 54.50/0.380 J55 PDF

New Search »

« Back to Previous List

USC Metric

6/8/2015 10:04:37 AM

| Mechanical Properties | Pipe | BTC | LTC | STC | |
|---|---|---|---|---|---|
| Minimum Yield Strength | 55,000 | -- | -- | -- | psi |
| Maximum Yield Strength | 80,000 | -- | -- | -- | psi |
| Minimum Tensile Strength | 75,000 | -- | -- | -- | psi |
| **Dimensions** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Outside Diameter | 13.375 | 14.375 | -- | 14.375 | in. |
| Wall Thickness | 0.380 | -- | -- | -- | in. |
| Inside Diameter | 12.615 | 12.615 | -- | 12.615 | in. |
| Standard Drift | 12.459 | 12.459 | -- | 12.459 | in. |
| Alternate Drift | -- | -- | -- | -- | in. |
| Nominal Linear Weight, T&C | 54.50 | -- | -- | -- | lbs/ft |
| Plain End Weight | 52.79 | -- | -- | -- | lbs/ft |
| **Performance** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Minimum Collapse Pressure | 1,130 | 1,130 | -- | 1,130 | psi |
| Minimum Internal Yield Pressure | 2,740 | 2,740 | -- | 2,740 | psi |
| Minimum Pipe Body Yield Strength | 853.00 | -- | -- | -- | 1000 lbs |
| Joint Strength | -- | 909 | -- | 514 | 1000 lbs |
| Reference Length | -- | 11,125 | -- | 6,290 | ft |
| **Make-Up Data** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Make-Up Loss | -- | 4.81 | -- | 3.50 | in. |
| Minimum Make-Up Torque | -- | -- | -- | 3,860 | ft-lbs |
| Maximum Make-Up Torque | -- | -- | -- | 6,430 | ft-lbs |

# Casing Spec Sheets

## Pipe Body and API Connections Performance Data

10.750 40.50/0.350 J55 PDF

New Search »

« Back to Previous List

USC Metric

6/8/2015 10:14:05 AM

| Mechanical Properties | Pipe | BTC | LTC | STC | |
|---|---|---|---|---|---|
| Minimum Yield Strength | 55,000 | -- | -- | -- | psi |
| Maximum Yield Strength | 80,000 | -- | -- | -- | psi |
| Minimum Tensile Strength | 75,000 | -- | -- | -- | psi |
| **Dimensions** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Outside Diameter | 10.750 | 11.750 | -- | 11.750 | in. |
| Wall Thickness | 0.350 | -- | -- | -- | in. |
| Inside Diameter | 10.050 | 10.050 | -- | 10.050 | in. |
| Standard Drift | 9.894 | 9.894 | -- | 9.894 | in. |
| Alternate Drift | -- | -- | -- | -- | in. |
| Nominal Linear Weight, T&C | 40.50 | -- | -- | -- | lbs/ft |
| Plain End Weight | 38.91 | -- | -- | -- | lbs/ft |
| **Performance** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Minimum Collapse Pressure | 1,580 | 1,580 | -- | 1,580 | psi |
| Minimum Internal Yield Pressure | 3,130 | 3,130 | -- | 3,130 | psi |
| Minimum Pipe Body Yield Strength | 629.00 | -- | -- | -- | 1000 lbs |
| Joint Strength | -- | 700 | -- | 420 | 1000 lbs |
| Reference Length | -- | 11,522 | -- | 6,915 | ft |
| **Make-Up Data** | **Pipe** | **BTC** | **LTC** | **STC** | |
| Make-Up Loss | -- | 4.81 | -- | 3.50 | in. |
| Minimum Make-Up Torque | -- | -- | -- | 3,150 | ft-lbs |
| Maximum Make-Up Torque | -- | -- | -- | 5,250 | ft-lbs |

VALLOUREC STAR 8.625 32# J55 S S2L2 DA 7.875 W/O# SLN # PO# MADE IN USA FT LB

vallourec

API 5CT, 10th Ed. Connection Data Sheet

| O.D. (in) | WEIGHT (lb/ft) | WALL (in) | GRADE | *API DRIFT (in) | RBW % |
|---|---|---|---|---|---|
| 8.625 | Nominal: 32.00<br>Plain End: 31.13 | 0.352 | J55 | 7.796 | 87.5 |

| Material Properties (PE) | |
|---|---|
| **Pipe** | |
| Minimum Yield Strength: | 55 ksi |
| Maximum Yield Strength: | 80 ksi |
| Minimum Tensile Strength: | 75 ksi |
| **Coupling** | |
| Minimum Yield Strength: | 55 ksi |
| Maximum Yield Strength: | 80 ksi |
| Minimum Tensile Strength: | 75 ksi |

| Pipe Body Data (PE) | |
|---|---|
| **Geometry** | |
| Nominal ID: | 7.92 inch |
| Nominal Area: | 9.149 $in^2$ |
| *Special/Alt. Drift: | 7.875 inch |
| **Performance** | |
| Pipe Body Yield Strength: | 503 kips |
| Collapse Resistance: | 2,530 psi |
| Internal Yield Pressure: (API Historical) | 3,930 psi |

| API Connection Data<br>Coupling OD: 9.625" | |
|---|---|
| **STC Performance** | |
| STC Internal Pressure: | 3,930 psi |
| STC Joint Strength: | 372 kips |
| **LTC Performance** | |
| LTC Internal Pressure: | 3,930 psi |
| LTC Joint Strength: | 417 kips |
| **SC-BTC Performance - Cplg OD = 9.125"** | |
| BTC Internal Pressure: | 3,930 psi |
| BTC Joint Strength: | 503 kips |

| API Connection Torque | | | | | |
|---|---|---|---|---|---|
| **STC Torque (ft-lbs)** | | | | | |
| Min: | 2,793 | Opti: | 3,724 | Max: | 4,655 |
| **LTC Torque (ft-lbs)** | | | | | |
| Min: | 3,130 | Opti: | 4,174 | Max: | 5,217 |
| **BTC Torque (ft-lbs)** | | | | | |
| *follow API guidelines regarding positional make up* | | | | | |

*Alt. Drift will be used unless API Drift is specified on order.

**If above API connections do not suit your needs, VAM® premium connections are available up to 100% of pipe body ratings.



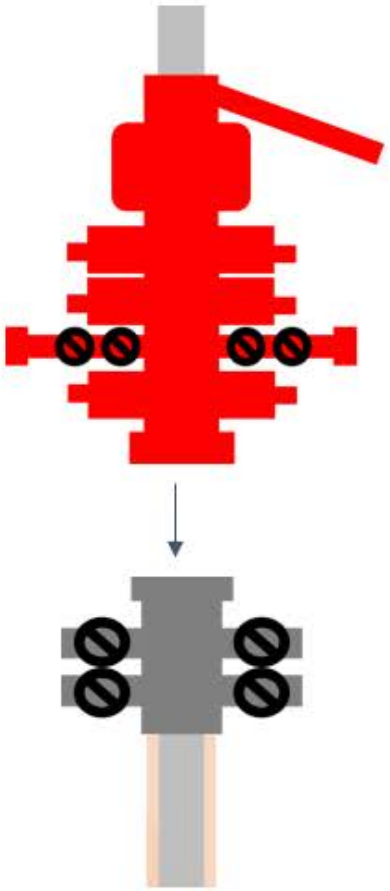
Rev 3, 7/30/2021 10/21/2022 15:24

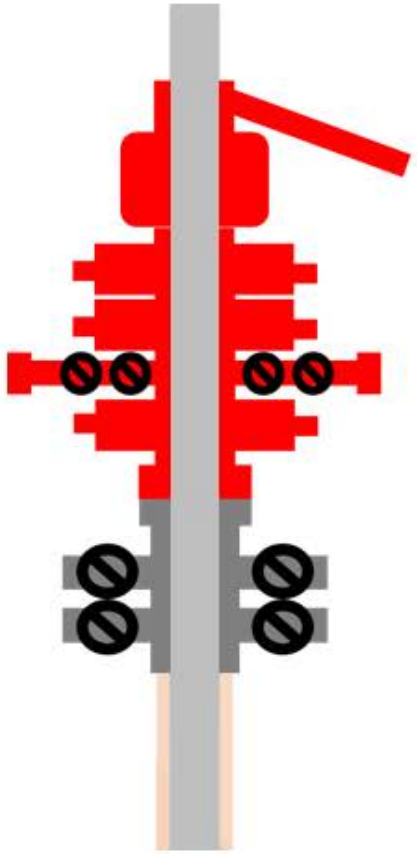
**Break-test BOP & Offline Cementing:**

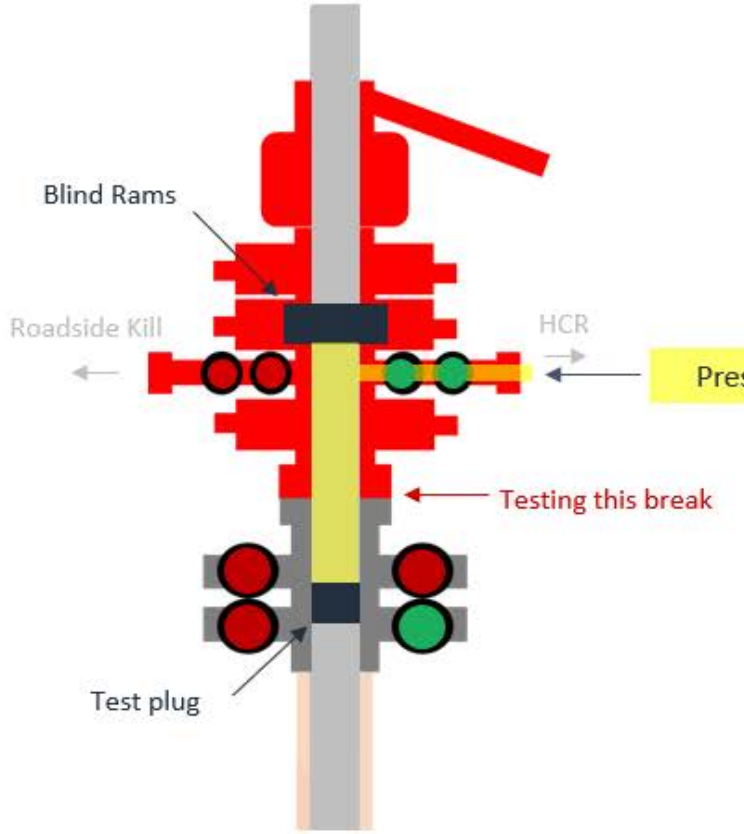
EOG Resources Inc. (EOG) respectfully requests a variance from the minimum standards for well control equipment testing of ECFR Title 43 Part 3172.6(b)(9)(iv) to allow a testing schedule of the blow out preventer (BOP) and blow out prevention equipment (BOPE) along with Batch Drilling & Offline cement operations to include the following:

- Full BOPE test at first installation on the pad.
- Full BOPE test every 21 days.
- This test will be conducted for 5M rated hole intervals only.
- Each rig requesting the break-test variance is capable of picking up the BOP without damaging components using winches, following API Standard 53, Well Control Equipment Systems for Drilling Wells (Fifth edition, December 2018, Annex C. Table C.4) which recognizes break testing as an acceptable practice.
- Function tests will be performed on the following BOP elements:
    - Annular à during each full BOPE test
    - Upper Pipe Rams à On trip ins where FIT required
    - Blind Rams à Every trip
    - Lower Pipe Rams à during each full BOPE test
- Break testing BOP and BOPE coupled with batch drilling operations and option to offline cement and/or remediate (if needed) any surface or intermediate sections, according to attached offline cementing support documentation.
- After the well section is secured, the BOP will be disconnected from the wellhead and walked with the rig to another well on the pad.
- TA cap will also be installed per Wellhead vendor procedure and pressure inside the casing will be monitored via the valve on the TA cap as per standard batch drilling ops.

# Break Test Diagram (HCR valve)



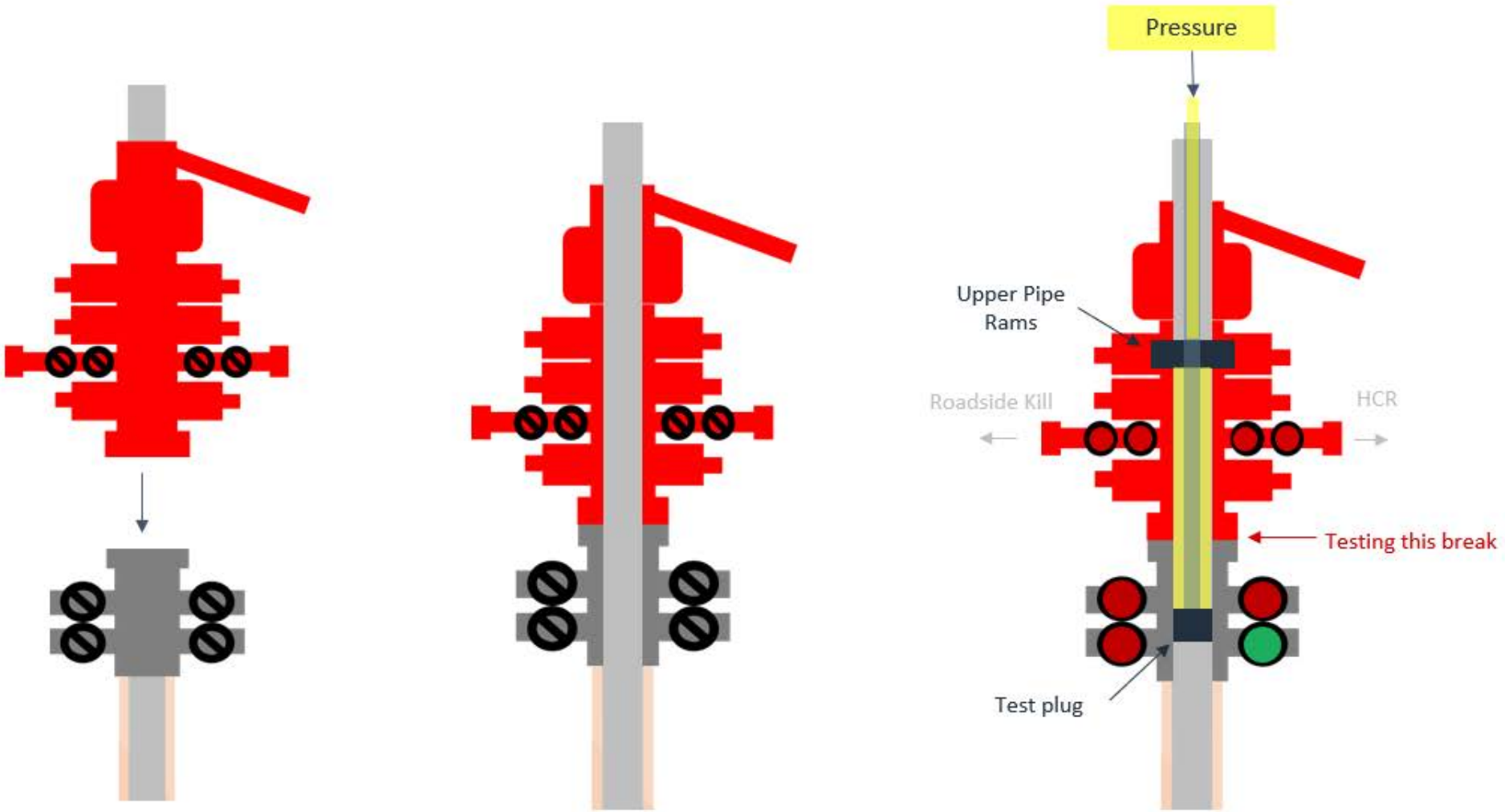





**Steps**

1. Set plug in wellhead (lower barrier)
2. Close Blind Rams (upper barrier)
3. Close roadside kill
4. Open HCR (pressure application)
5. Open wellhead valves below test plug to ensure if leak past test plug, pressure won't be applied to wellbore
6. Tie BOP testers high pressure line to main choke manifold crown valve
7. Pressure up to test break
8. Bleed test pressure from BOP testing unit

# Break Test Diagram (Test Joint)




**Steps**

1. Set plug in with test joint wellhead (lower barrier)
2. Close Upper Pipe Rams (upper barrier)
3. Close roadside kill
4. Close HCR
5. Open wellhead valves below test plug to ensure if leak past test plug, pressure won't be applied to wellbore
6. Tie BOP testers high pressure line to top of test joint
7. Pressure up to test break
8. Bleed test pressure from BOP testing unit

eog resources

Offline Intermediate Cementing Procedure 2/24/2022

## Cement Program

1. No changes to the cement program will take place for offline cementing.

## Summarized Operational Procedure for Intermediate Casing

1. Run casing as per normal operations. While running casing, conduct negative pressure test and confirm integrity of the float equipment back pressure valves.
    a. Float equipment is equipped with two back pressure valves rated to a minimum of 5,000 psi.
2. Land production casing on mandrel hanger through BOP.
    a. If casing is unable to be landed with a mandrel hanger, then the **casing will be cemented online**.
3. Break circulation and confirm no restrictions.
    a. Ensure no blockage of float equipment and appropriate annular returns.
    b. Perform flow check to confirm well is static.
4. Set pack-off
    a. If utilizing a fluted/ported mandrel hanger, ensure well is static on the annulus and inside the casing by filling the pipe with kill weight fluid, remove landing joint, and set annular packoff through BOP. Pressure test to 5,000 psi for 10 min.
    b. If utilizing a solid mandrel hanger, ensure well is static on the annulus and inside the casing by filling the pipe with kill weight fluid. Pressure test seals to 5,000 psi for 10 min. Remove landing joint through BOP.
5. After confirmation of both annular barriers and the two casing barriers, install TA plug and pressure test to 5,000 psi for 10 min. Notify the BLM with intent to proceed with nipple down and offline cementing.
    a. Minimum 4 hrs notice.
6. With the well secured and BLM notified, nipple down BOP and secure on hydraulic carrier or cradle.
    a. **Note, if any of the barriers fail to test, the BOP stack will not be nippled down until after the cement job has concluded and both lead and tail slurry have reached 500 psi.**
7. Skid/Walk rig off current well.
8. Confirm well is static before removing TA Plug.
    a. Cementing operations will not proceed until well is under control. (If well is not static, notify BLM and proceed to kill)
    b. Casing outlet valves will provide access to both the casing ID and annulus. Rig or third party pump truck will kill well prior to cementing.
    c. Well control plan can be seen in Section B, Well Control Procedures.
    d. If need be, rig can be moved back over well and BOP nippled back up for any further remediation.

e. Diagram for rig positioning relative to offline cementing can be seen in Figure 4.

9. Rig up return lines to take returns from wellhead to pits and rig choke.
    a. Test all connections and lines from wellhead to choke manifold to 5,000 psi high for 10 min.
    b. If either test fails, perform corrections and retest before proceeding.
    c. Return line schematics can be seen in Figure 3.
10. Remove TA Plug from the casing.
11. Install offline cement tool.
    a. Current offline cement tool schematics can be seen in Figure 1 (Cameron) and Figure 2 (Cactus).
12. Rig up cement head and cementing lines.
    a. Pressure test cement lines against cement head to 80% of casing burst for 10 min.
13. Break circulation on well to confirm no restrictions.
    a. If gas is present on circulation, well will be shut in and returns rerouted through gas buster.
    b. Max anticipated time before circulating with cement truck is 6 hrs.
14. Pump cement job as per plan.
    a. At plug bump, test casing to 0.22 psi/ft or 1500 psi, whichever is greater.
    b. If plug does not bump on calculated, shut down and wait 8 hrs or 500 psi compressive strength, whichever is greater before testing casing.
15. Confirm well is static and floats are holding after cement job.
    a. With floats holding and backside static:
        i. Remove cement head.
    b. If floats are leaking:
        i. Shut-in well and WOC (Wait on Cement) until tail slurry reaches 500 psi compressive strength and the casing is static prior to removing cement head.
    c. If there is flow on the backside:
        i. Shut in well and WOC until tail slurry reaches 500 psi compressive strength. Ensure that the casing is static prior to removing cement head.
16. Remove offline cement tool.
17. Install night cap with pressure gauge for monitoring.
18. Test night cap to 5,000 psi for 10 min.

**Example Well Control Plan Content**

## A. Well Control Component Table

The table below, which covers the cementing of the **5M MASP (Maximum Allowable Surface Pressure) portion of the well**, outlines the well control component rating in use. This table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the BOP nippled up to the wellhead.

Intermediate hole section, 5M requirement

| Component | RWP |
|---|---|
| Pack-off | 10M |
| Casing Wellhead Valves | 10M |
| Annular Wellhead Valves | 5M |
| TA Plug | 10M |
| Float Valves | 5M |
| 2” 1502 Lo-Torque Valves | 15M |

## B. Well Control Procedures

Well control procedures are specific to the rig equipment and the operation at the time the kick occurs. Below are the minimal high-level tasks prescribed to assure a proper shut-in while circulating and cementing through the Offline Cement Adapter.

General Procedure While Circulating

1. Sound alarm (alert crew).
2. Shut down pumps.
3. Shut-in Well (close valves to rig pits and open valve to rig choke line. Rig choke will already be in the closed position).
4. Confirm shut-in.
5. Notify tool pusher/company representative.

6. Read and record the following:
    a. SICP (Shut in Casing Pressure) and AP (Annular Pressure)
    b. Pit gain
    c. Time
    d. Regroup and identify forward plan to continue circulating out kick via rig choke and mud/gas separator. Circulate and adjust mud density as needed to control well.

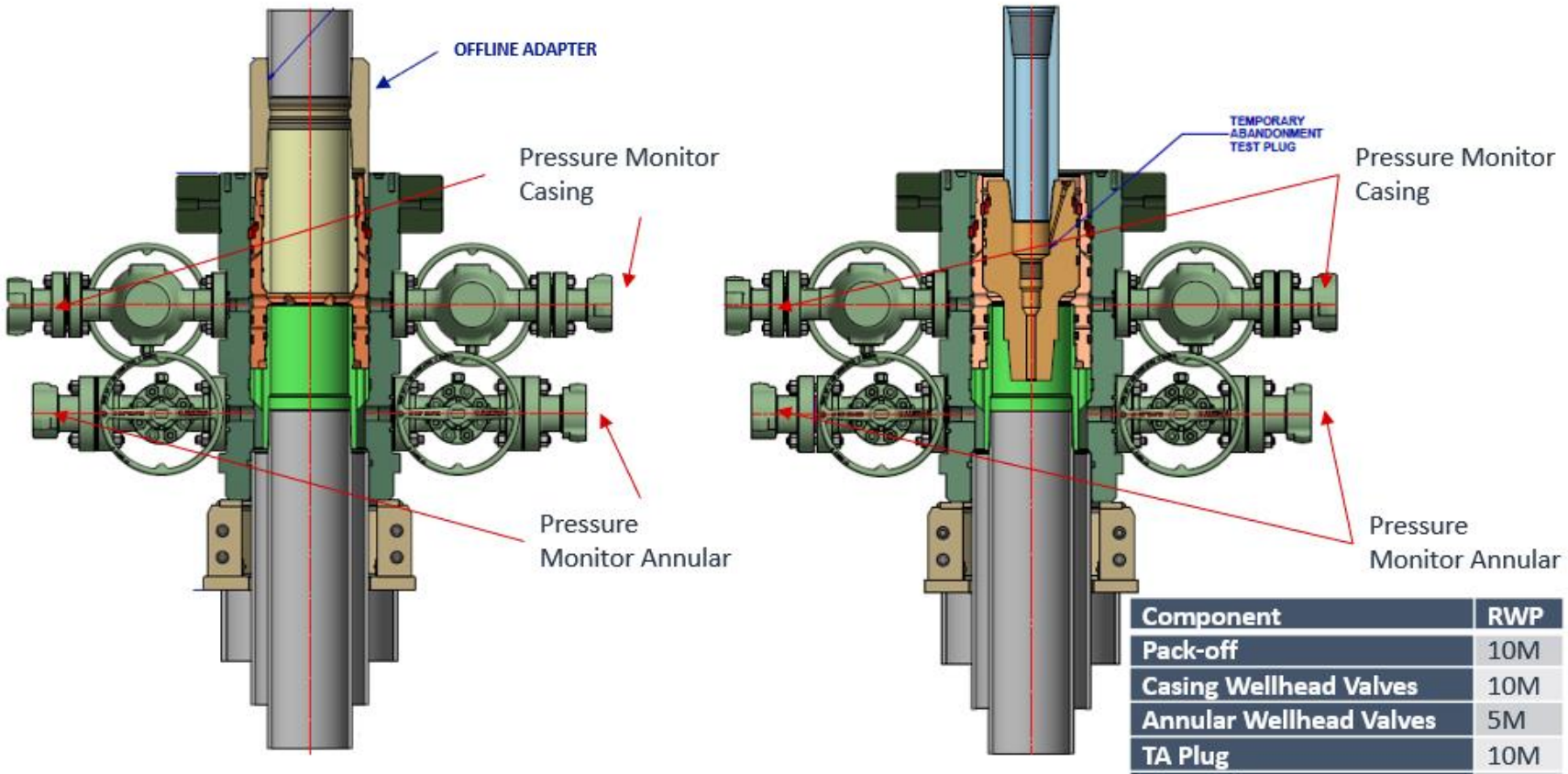
## General Procedure While Cementing

1. Sound alarm (alert crew).
2. Shut down pumps.
3. Shut-in Well (close valves to rig pits and open valve to rig choke line. Rig choke will already be in the closed position).
4. Confirm shut-in.
5. Notify tool pusher/company representative.
6. Open rig choke and begin pumping again taking returns through choke manifold and mud/gas separator.
7. Continue to place cement until plug bumps.
8. At plug bump close rig choke and cement head.
9. Read and record the following
    a. SICP and AP
    b. Pit gain
    c. Time
    d. Shut-in annulus valves on wellhead

## General Procedure After Cementing

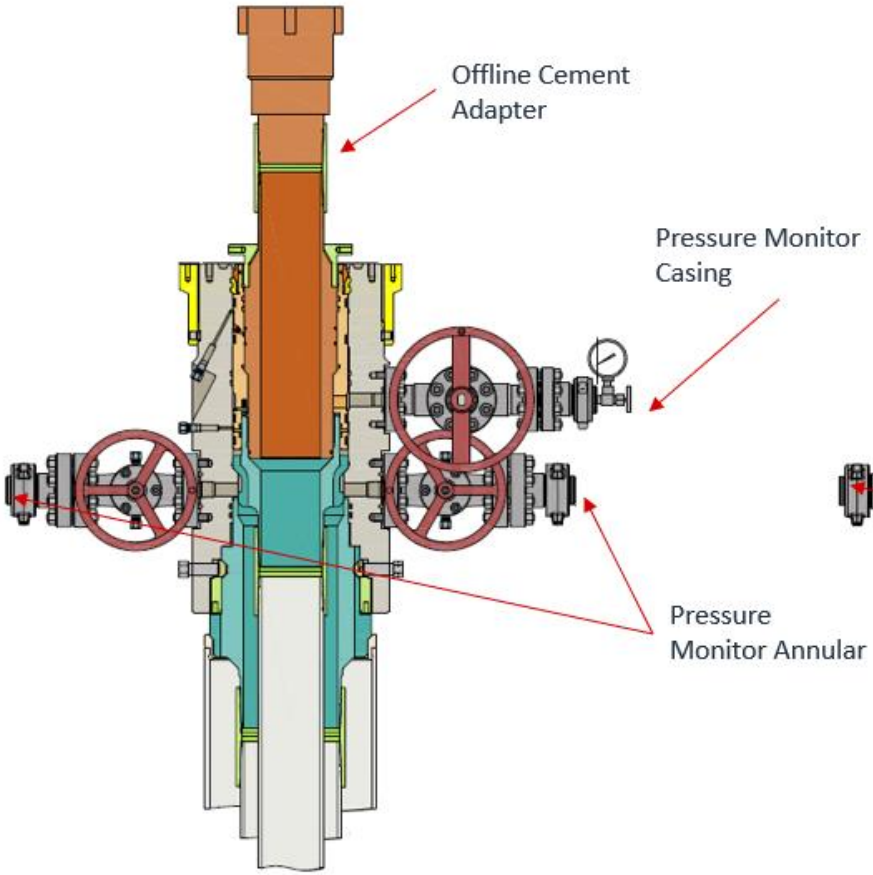
1. Sound alarm (alert crew).
2. Shut-in Well (close valves to rig pits and open valve to rig choke line. Rig choke will already be in the closed position).
3. Confirm shut-in.
4. Notify tool pusher/company representative.
5. Read and record the following:
    a. SICP and AP
    b. Pit gain
    c. Time
    d. Shut-in annulus valves on wellhead

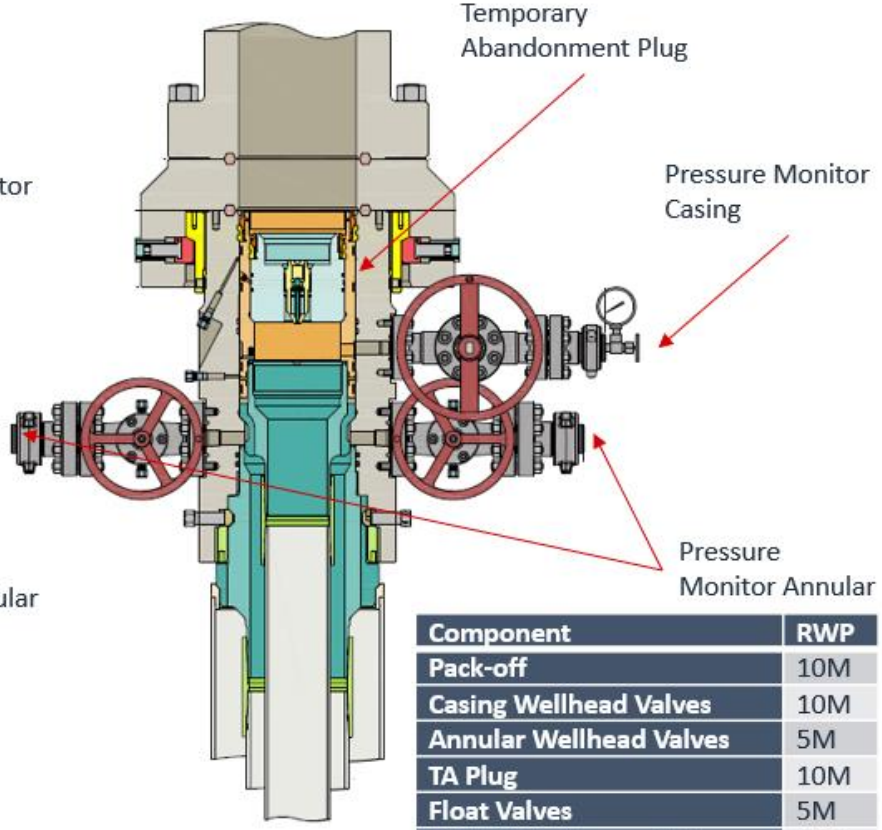
**Figure 1: Cameron TA Plug and Offline Adapter Schematic**




| Component | RWP |
|---|---|
| Pack-off | 10M |
| Casing Wellhead Valves | 10M |
| Annular Wellhead Valves | 5M |
| TA Plug | 10M |
| Float Valves | 5M |
| 2" 1502 Lo-Torque Valves | 15M |

**Figure 2: Cactus TA Plug and Offline Adapter Schematic**




| Component | RWP |
|---|---|
| Pack-off | 10M |
| Casing Wellhead Valves | 10M |
| Annular Wellhead Valves | 5M |
| TA Plug | 10M |
| Float Valves | 5M |
| 2" 1502 Lo-Torque Valves | 15M |

**Figure 3: Back Yard Rig Up**

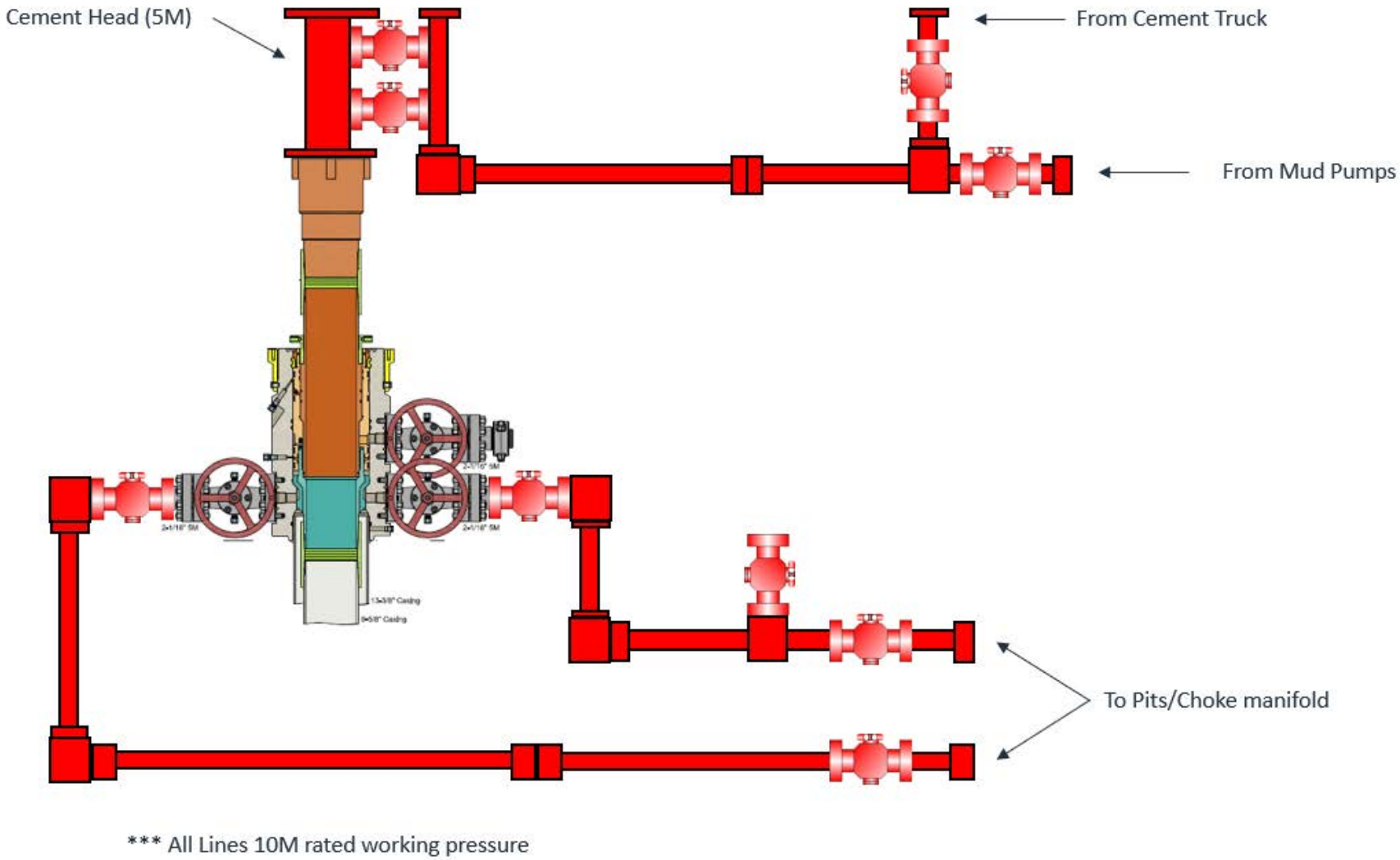
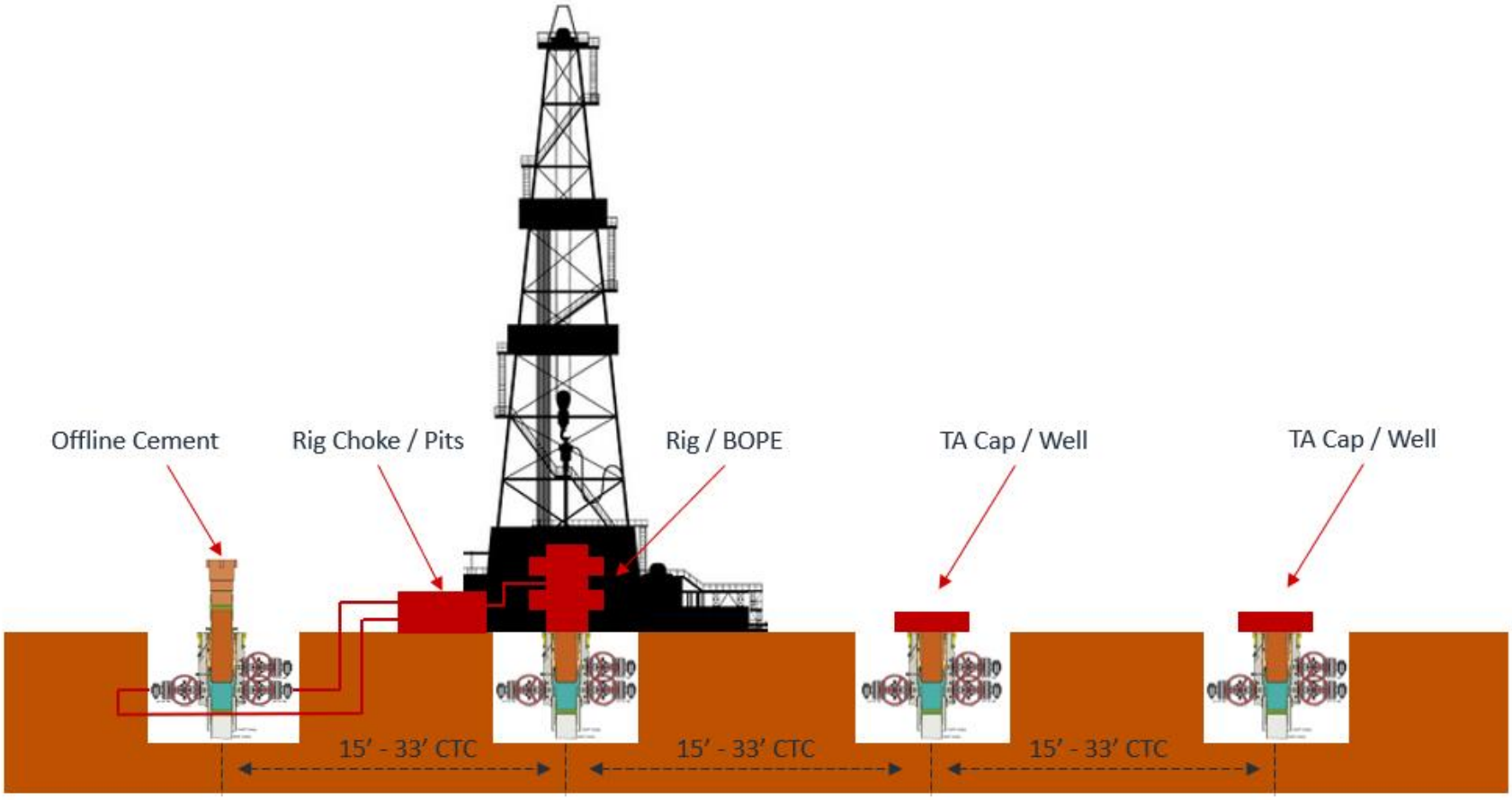


**Figure 4: Rig Placement Diagram**



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

CONDITIONS

Action 334151

## CONDITIONS

| | |
|---|---|
| Operator:<br>EOG RESOURCES INC<br>5509 Champions Drive<br>Midland, TX 79706 | OGRID:<br>7377 |
| | Action Number:<br>334151 |
| | Action Type:<br>[C-103] NOI Change of Plans (C-103A) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| pkautz | ALL PREVIOUS COA's APPLY | 7/12/2024 |