

Sante Fe Main Office  
Phone: (505) 476-3441

General Information  
Phone: (505) 629-6116

Online Phone Directory  
<https://www.emnrd.nm.gov/ocd/contact-us>

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

Form C-101  
August 1, 2011

Permit 382037

**APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE**

1. Operator Name and Address EOG RESOURCES INC 5509 Champions Drive Midland, TX 79706		2. OGRID Number 7377
4. Property Code 336936		3. API Number 30-025-54309
5. Property Name MAD ADDER 31 STATE COM		6. Well No. 301H

**7. Surface Location**

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
P	31	24S	33E		747	S	815	E	Lea

**8. Proposed Bottom Hole Location**

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
A	30	24S	33E	A	100	N	600	E	Lea

**9. Pool Information**

WC-025 G-07 S243225C:LWR BONE SPRIN	97964
-------------------------------------	-------

**Additional Well Information**

11. Work Type New Well	12. Well Type OIL	13. Cable/Rotary	14. Lease Type State	15. Ground Level Elevation 3506
16. Multiple N	17. Proposed Depth 20721	18. Formation Bone Spring	19. Contractor	20. Spud Date 2/15/2025
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

☒ We will be using a closed-loop system in lieu of lined pits

**21. Proposed Casing and Cement Program**

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surf	13	10.75	40.5	1000	330	0
Int1	9.875	8.625	32	5176	680	0
Prod	7.875	6	24.5	9936	1990	4676
Prod	6.75	5.5	20	20721	1990	4676

**Casing/Cement Program: Additional Comments**

--

**22. Proposed Blowout Prevention Program**

Type	Working Pressure	Test Pressure	Manufacturer
Double Ram	5000	3000	

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify I have complied with 19.15.14.9 (A) NMAC <input checked="" type="checkbox"/> and/or 19.15.14.9 (B) NMAC <input checked="" type="checkbox"/> if applicable.	<b>OIL CONSERVATION DIVISION</b>
Signature:	
Printed Name: Electronically filed by Patricia Donald	Approved By: Matthew Gomez
Title: Regulatory Specialist	Title:
Email Address: Patricia_Donald@eogresources.com	Approved Date: 2/5/2025      Expiration Date: 2/5/2027
Date: 1/22/2025      Phone: 432-488-7684	Conditions of Approval Attached

C-102  Submit Electronically Via OCD Permitting	State of New Mexico  Energy, Minerals & Natural Resources Department OIL CONSERVATION DIVISION	Revised July 9, 2024	
		Submittal Type:	<input checked="" type="checkbox"/> Initial Submittal
			<input type="checkbox"/> Amended Report
		<input type="checkbox"/> As Drilled	

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-025-54309	Pool Code 97964	Pool Name WC-025 G-07 S243225C; LWR BONE SPRIN
Property Code 336936	Property Name MAD ADDER 31 STATE COM	Well Number 301H
OGRID No. 7377	Operator Name EOG RESOURCES, INC.	Ground Level Elevation 3506'
Surface Owner: <input checked="" type="checkbox"/> State <input type="checkbox"/> Fee <input type="checkbox"/> Tribal <input type="checkbox"/> Federal		Mineral Owner: <input checked="" type="checkbox"/> State <input type="checkbox"/> Fee <input type="checkbox"/> Tribal <input type="checkbox"/> Federal

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the N/S	Feet from the E/W	Latitude	Longitude	County
P	31	24-S	33-E	-	747' S	815' E	N 32.1689369	W 103.6054643	LEA

Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the N/S	Feet from the E/W	Latitude	Longitude	County
A	30	24-S	33-E	-	100' N	600' E	N 32.1956429	W 103.6047999	LEA

Dedicated Acres 1274.56	Infill or Defining Well DEFINING	Defining Well API -	Overlapping Spacing Unit (Y/N) Y	Consolidated Code C
Order Numbers PENDING NSP			Well Setbacks are under Common Ownership: <input type="checkbox"/> Yes <input type="checkbox"/> No	

Kick Off Point (KOP)

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the N/S	Feet from the E/W	Latitude	Longitude	County
P	31	24-S	33-E	-	50' S	600' E	N 32.1670217	W 103.6047664	LEA



First Take Point (FTP)

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the N/S	Feet from the E/W	Latitude	Longitude	County
P	31	24-S	33-E	-	100' S	600' E	N 32.1671591	W 103.6047665	LEA

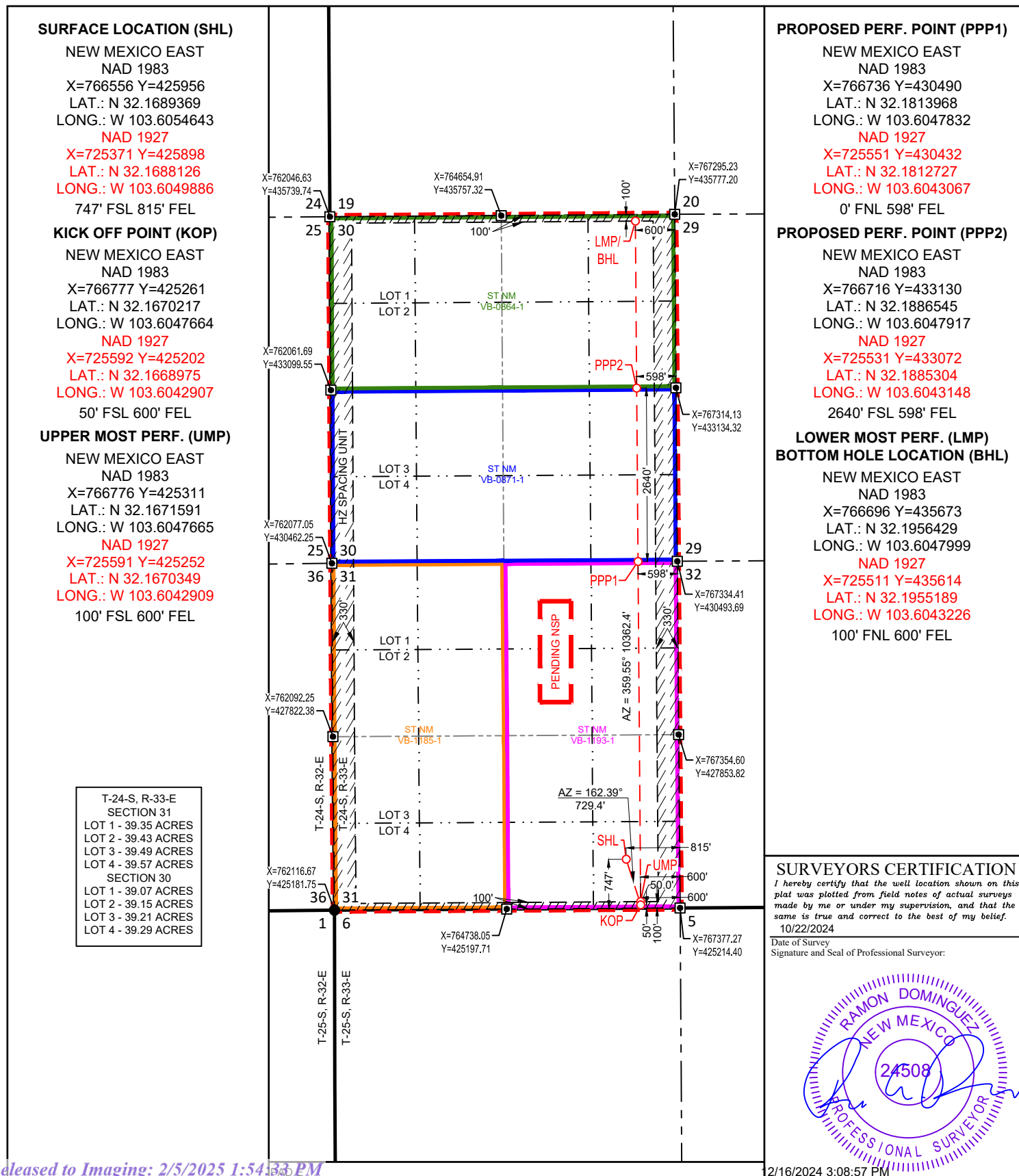
Last Take Point (LTP)

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the N/S	Feet from the E/W	Latitude	Longitude	County
A	30	24-S	33-E	-	100' N	600' E	N 32.1956429	W 103.6047999	LEA

Unitized Area or Area of Uniform Intrest COMM AGREEMENT	Spacing Unity Type <input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical	Ground Floor Elevation 3531'
--	--	---------------------------------

<b>OPERATOR CERTIFICATION</b>  <i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief; and, if the well is a vertical or directional well, 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 a working interest or unleased mineral interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</i>  <i>If this well is a horizontal well, I further certify that this organization has received The consent of at least one lessee or owner of a working interest or unleased mineral interest in each tract (in the target pool or formation) in which any part of the well's completed interval will be located or obtained a compulsory pooling order from the division.</i>   Signature KAYLA MCCONNELL  Date 01/06/25 Print Name KAYLA_MCCONNELL@EOGRESOURCES.COM E-mail Address		<b>SURVEYORS CERTIFICATION</b>  <i>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.</i>   Signature and Seal of Professional Surveyor Date 12/16/2024 3:08:56 PM Certificate Number Date of Survey 10/22/2024	
--	--	---	--

<u>C-102</u>  Submit Electronically Via OCD Permitting	State of New Mexico Energy, Minerals & Natural Resources Department <b>OIL CONSERVATION DIVISION</b>	Revised July 9, 2024	
		Submittal Type:	<input checked="checked" type="checkbox"/> Initial Submittal <input type="checkbox"/> Amended Report <input type="checkbox"/> As Drilled
Property Name and Well Number  <div style="text-align: center;">MAD ADDER 31 STATE COM 301H</div>			



Sante Fe Main Office  
Phone: (505) 476-3441

General Information  
Phone: (505) 629-6116

Online Phone Directory  
<https://www.emnrd.nm.gov/ocd/contact-us>

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

Form APD Conditions

Permit 382037

**PERMIT CONDITIONS OF APPROVAL**

Operator Name and Address: EOG RESOURCES INC [7377] 5509 Champions Drive Midland, TX 79706	API Number: 30-025-54309
	Well: MAD ADDER 31 STATE COM #301H

OCD Reviewer	Condition
matthew.gomez	A [C-103] Sub. Drilling (C-103N) is required within (10) days of spud.
matthew.gomez	Notify the OCD 24 hours prior to casing & cement.
matthew.gomez	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string.
matthew.gomez	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
matthew.gomez	Cement is required to circulate on both surface and intermediate1 strings of casing.
matthew.gomez	If cement does not circulate on any string, a Cement Bond Log (CBL) is required for that string of casing.
matthew.gomez	File As Drilled C-102 and a directional Survey with C-104 completion packet.
matthew.gomez	Administrative order required for non-standard spacing unit prior to production.
matthew.gomez	Operator is only approved for casing Design A. If Design B is needed or any other change, please submit form C-103A to make the changes.



## EOG Batch Casing

**Pad Name:** Mad Adder 31 State Com

SHL: Section 31, Township 24-S, Range 33-E, LEA County, NM

EOG requests for the below wells to be approved for all designs listed in the Blanket Casing Design ('EOG BLM Variance 5a - Alternate Shallow Casing Designs.pdf' OR 'EOG BLM Variance 5b - Alternate Deep Casing Designs.pdf') document. The MDs and TVDs for all intervals are within the boundary conditions. The max inclination and DLS are also within the boundary conditions. The directional plans for the wells are attached separately.

Well Name	API #	Surface		Intermediate		Production	
		MD	TVD	MD	TVD	MD	TVD
Mad Adder 31 State Com #101H	30-025-*****	1,000	1,000	5,352	5,132	20,043	9,634
Mad Adder 31 State Com #201H	30-025-*****	1,000	1,000	5,182	5,132	20,621	10,365
Mad Adder 31 State Com #202H	30-025-*****	1,000	1,000	5,162	5,132	20,600	10,365
Mad Adder 31 State Com #211H	30-025-*****	1,000	1,000	5,234	5,132	20,668	10,365
Mad Adder 31 State Com #301H	30-025-*****	1,000	1,000	5,176	5,132	20,721	10,470
Mad Adder 31 State Com #302H	30-025-*****	1,000	1,000	5,152	5,132	20,696	10,470
Mad Adder 31 State Com #401H	30-025-*****	1,000	1,000	5,336	5,132	21,145	10,750
Mad Adder 31 State Com #581H	30-025-*****	1,000	1,000	5,184	5,132	22,088	11,830
Mad Adder 31 State Com #582H	30-025-*****	1,000	1,000	5,338	5,132	22,227	11,830
Mad Adder 31 State Com #583H	30-025-*****	1,000	1,000	5,145	5,132	22,048	11,830



## EOG Batch Casing

### Variances

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

- EOG BLM Variance 2a - Intermediate Bradenhead Cement
- EOG BLM Variance 3d - Production Offline Cement
- EOG BLM Variance 3a\_b - BOP Break-test and Offline Intermediate Cement
- EOG BLM Variance 4a - Salt Section Annular Clearance
- EOG BLM Variance 5a - Alternate Shallow Casing Designs



## EOG Batch Casing

**GEOLOGIC NAME OF SURFACE FORMATION:**

Permian

**ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

Rustler	813'
Tamarisk Anhydrite	975'
Top of Salt	1,617'
Base of Salt	5,032'
Lamar	5,281'
Bell Canyon	5,312'
Cherry Canyon	6,321'
Brushy Canyon	7,856'
Bone Spring Lime	9,427'
Leonard (Avalon) Shale	9,458'
1st Bone Spring Sand	10,418'
2nd Bone Spring Shale	10,634'
2nd Bone Spring Sand	11,033'
3rd Bone Spring Carb	11,454'
3rd Bone Spring Sand	12,028'

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

Upper Permian Sands	0- 400'	Fresh Water
Bell Canyon	5,312'	Oil
Cherry Canyon	6,321'	Oil
Brushy Canyon	7,856'	Oil
Leonard (Avalon) Shale	9,458'	Oil
1st Bone Spring Sand	10,418'	Oil
2nd Bone Spring Shale	10,634'	Oil
2nd Bone Spring Sand	11,033'	Oil

No other Formations are expected to give up oil, gas or fresh water in measurable quantities. Surface fresh water sands will be protected by setting surface casing at 1,000' and circulating cement back to surface.

State of New Mexico  
Energy, Minerals and Natural Resources Department

Submit Electronically  
Via E-permitting

Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

## NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

### **Section 1 – Plan Description** **Effective May 25, 2021**

**I. Operator:** EOG Resources, Inc. **OGRID:** 7377 **Date:** 1/21/2025

**II. Type:** ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: \_\_\_\_\_

**III. Well(s):** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
MAD ADDER 31 STATE COM 301H		O-31-24S-33E	747' FSL & 815' FEL	+/- 1000	+/- 3500	+/- 3000

**IV. Central Delivery Point Name:** MAD ADDER 31 STATE COM CTB [See 19.15.27.9(D)(1) NMAC]

**V. Anticipated Schedule:** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
MAD ADDER 31 STATE COM 301H		01/30/25	03/26/25	04/1/25	05/1/25	05/15/25

**VI. Separation Equipment:** ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

**VII. Operational Practices:** ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

**VIII. Best Management Practices:** ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.



**Section 2 – Enhanced Plan****EFFECTIVE APRIL 1, 2022**

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☒ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

**IX. Anticipated Natural Gas Production:**

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

**X. Natural Gas Gathering System (NGGS):**

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

**XI. Map.** ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

**XII. Line Capacity.** The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

**XIII. Line Pressure.** Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

**XIV. Confidentiality:** ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

### **Section 3 - Certifications**

**Effective May 25, 2021**

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

***If Operator checks this box, Operator will select one of the following:***

**Well Shut-In.** ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

**Venting and Flaring Plan.** ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

### **Section 4 - Notices**

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature: <i>Kayla McConnell</i>
Printed Name: KAYLA MCCONNELL
Title: Regulatory Specialist
E-mail Address: KAYLA_MCCONNELL@EOGRESOURCES.COM
Date: 01/21/2025
Phone: (432) 265-6804
<b>OIL CONSERVATION DIVISION</b> <b>(Only applicable when submitted as a standalone form)</b>
Approved By:
Title:
Approval Date:
Conditions of Approval:

**Natural Gas Management Plan****Items VI-VIII****VI. Separation Equipment: Attach a complete description of how Operator will size separation equipment to optimize gas capture.**

- Separation equipment will be sized to provide adequate separation for anticipated rates.
- Adequate separation relates to retention time for Liquid – Liquid separation and velocity for Gas-Liquid separation.
- Collection systems are appropriately sized to handle facility production rates on all (3) phases.
- Ancillary equipment and metering is selected to be serviced without flow interruptions or the need to release gas from the well.

**VII. Operational Practices: Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F 19.15.27.8 NMAC.****Drilling Operations**

- All flare stacks will be properly sized. The flare stacks will be located at a minimum 100' from the nearest surface hole location on the pad.
- All natural gas produced during drilling operations will be flared, unless there is an equipment malfunction and/or to avoid risk of an immediate and substantial adverse impact on safety and the environment, at which point the gas will be vented.

**Completions/Recompletions Operations**

- New wells will not be flowed back until they are connected to a properly sized gathering system.
- The facility will be built/sized for maximum anticipated flowrates and pressures to minimize waste.
- For flowback operations, multiple stages of separation will be used as well as excess VRU and blowers to make sure waste is minimized off the storage tanks and facility.
- During initial flowback, the well stream will be routed to separation equipment.
- At an existing facility, when necessary, post separation natural gas will be flared until it meets pipeline specifications, at which point it will be turned into a collection system.
- At a new facility, post separation natural gas will be vented until storage tanks can safely function, at which point it will be flared until it meets pipeline spec.

**Production Operations**

- Weekly AVOs will be performed on all facilities.
- All flares will be equipped with auto-ignition systems and continuous pilot operations.
- After a well is stabilized from liquid unloading, the well will be turned back into the collection system.
- All plunger lift systems will be optimized to limit the amount of waste.
- All tanks will have automatic gauging equipment installed.
- Leaking thief hatches found during AVOs will be cleaned and properly re-sealed.

**Performance Standards**

- Production equipment will be designed to handle maximum anticipated rates and pressure.
- All flared gas will be combusted in a flare stack that is properly sized and designed to ensure proper combustion.
- Weekly AVOs will be performed on all wells and facilities that produce more than 60 Mcfd.

**Measurement & Estimation**

- All volume that is flared and vented that is not measured will be estimated.
- All measurement equipment for flared volumes will conform to API 14.10.
- No meter bypasses will be installed.

- When metering is not practical due to low pressure/low rate, the vented or flared volume will be estimated.

**VIII. Best Management Practices: Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.**

- During downhole well maintenance, EOG will use best management practices to vent as minimally as possible.
- Prior to the commencement of any maintenance, the tank or vessel will be isolated from the rest of the facilities.
- All valves upstream of the equipment will be closed and isolated.
- After equipment has been isolated, the equipment will be blown down to as low a pressure as possible into the collection system.
- If the equipment being maintained cannot be relieved into the collection system, it shall be released to a tank where the vapor can either be captured or combusted if possible.
- After downhole well maintenance, natural gas will be flared until it reaches pipeline specification.



## **Midland**

**Lea County, NM (NAD 83 NME)  
Mad Adder 31 State Com  
#301H**

**OH**

**Plan: Plan #0.1 RT**

## **Standard Planning Report**

**06 January, 2025**



## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

<b>Project</b>	Lea County, NM (NAD 83 NME)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	New Mexico Eastern Zone		

Site	Mad Adder 31 State Com				
Site Position:		Northing:	426,421.00 usft	Latitude:	32° 10' 12.858 N
From:	Map	Easting:	765,325.00 usft	Longitude:	103° 36' 33.958 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "		

Well	#301H					
Well Position	+N/-S	0.0 usft	Northing:	425,956.00 usft	Latitude:	32° 10' 8.174 N
	+E/-W	0.0 usft	Easting:	766,556.00 usft	Longitude:	103° 36' 19.673 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,506.0 usft
Grid Convergence:	0.39 °					

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	1/6/2025	6.14	59.72	47,086.15593836

<b>Design</b>	Plan #0.1 RT				
<b>Audit Notes:</b>					
<b>Version:</b>		<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	0.83	

<b>Plan Survey Tool Program</b>	<b>Date</b>	1/6/2025			
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
1	0.0	20,720.6 Plan #0.1 RT (OH)	EOG MWD+IFR1		
			MWD + IFR1		



## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,846.0	6.92	162.36	1,845.1	-19.9	6.3	2.00	2.00	0.00	162.36	
7,553.3	6.92	162.36	7,510.9	-675.1	214.7	0.00	0.00	0.00	0.00	
7,899.2	0.00	0.00	7,856.0	-695.0	221.0	2.00	-2.00	0.00	180.00	
10,035.7	0.00	0.00	9,992.5	-695.0	221.0	0.00	0.00	0.00	0.00	KOP(Mad Adder 31 S
10,256.2	26.46	358.85	10,205.2	-645.0	220.0	12.00	12.00	-0.52	358.85	FTP(Mad Adder 31 St
10,785.7	90.00	359.58	10,469.9	-217.6	215.2	12.00	12.00	0.14	0.81	
15,537.4	90.00	359.58	10,470.0	4,534.0	180.0	0.00	0.00	0.00	0.00	Fed Perf 1(Mad Adde
18,177.5	90.00	359.56	10,470.0	7,174.0	160.0	0.00	0.00	0.00	-84.10	Fed Perf 2(Mad Adde
20,720.6	90.00	359.54	10,470.0	9,717.0	140.0	0.00	0.00	0.00	-98.72	PBHL(Mad Adder 31 :





## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	2.00	162.36	1,600.0	-1.7	0.5	-1.7	2.00	2.00	0.00
1,700.0	4.00	162.36	1,699.8	-6.7	2.1	-6.6	2.00	2.00	0.00
1,800.0	6.00	162.36	1,799.5	-15.0	4.8	-14.9	2.00	2.00	0.00
1,846.0	6.92	162.36	1,845.1	-19.9	6.3	-19.8	2.00	2.00	0.00
1,900.0	6.92	162.36	1,898.8	-26.1	8.3	-26.0	0.00	0.00	0.00
2,000.0	6.92	162.36	1,998.0	-37.6	11.9	-37.4	0.00	0.00	0.00
2,100.0	6.92	162.36	2,097.3	-49.0	15.6	-48.8	0.00	0.00	0.00
2,200.0	6.92	162.36	2,196.6	-60.5	19.2	-60.2	0.00	0.00	0.00
2,300.0	6.92	162.36	2,295.9	-72.0	22.9	-71.7	0.00	0.00	0.00
2,400.0	6.92	162.36	2,395.1	-83.5	26.5	-83.1	0.00	0.00	0.00
2,500.0	6.92	162.36	2,494.4	-95.0	30.2	-94.5	0.00	0.00	0.00
2,600.0	6.92	162.36	2,593.7	-106.5	33.8	-106.0	0.00	0.00	0.00
2,700.0	6.92	162.36	2,692.9	-117.9	37.5	-117.4	0.00	0.00	0.00
2,800.0	6.92	162.36	2,792.2	-129.4	41.2	-128.8	0.00	0.00	0.00
2,900.0	6.92	162.36	2,891.5	-140.9	44.8	-140.2	0.00	0.00	0.00
3,000.0	6.92	162.36	2,990.8	-152.4	48.5	-151.7	0.00	0.00	0.00
3,100.0	6.92	162.36	3,090.0	-163.9	52.1	-163.1	0.00	0.00	0.00
3,200.0	6.92	162.36	3,189.3	-175.3	55.8	-174.5	0.00	0.00	0.00
3,300.0	6.92	162.36	3,288.6	-186.8	59.4	-185.9	0.00	0.00	0.00
3,400.0	6.92	162.36	3,387.8	-198.3	63.1	-197.4	0.00	0.00	0.00
3,500.0	6.92	162.36	3,487.1	-209.8	66.7	-208.8	0.00	0.00	0.00
3,600.0	6.92	162.36	3,586.4	-221.3	70.4	-220.2	0.00	0.00	0.00
3,700.0	6.92	162.36	3,685.7	-232.7	74.0	-231.6	0.00	0.00	0.00
3,800.0	6.92	162.36	3,784.9	-244.2	77.7	-243.1	0.00	0.00	0.00
3,900.0	6.92	162.36	3,884.2	-255.7	81.3	-254.5	0.00	0.00	0.00
4,000.0	6.92	162.36	3,983.5	-267.2	85.0	-265.9	0.00	0.00	0.00
4,100.0	6.92	162.36	4,082.7	-278.7	88.6	-277.4	0.00	0.00	0.00
4,200.0	6.92	162.36	4,182.0	-290.1	92.3	-288.8	0.00	0.00	0.00
4,300.0	6.92	162.36	4,281.3	-301.6	95.9	-300.2	0.00	0.00	0.00
4,400.0	6.92	162.36	4,380.6	-313.1	99.6	-311.6	0.00	0.00	0.00
4,500.0	6.92	162.36	4,479.8	-324.6	103.2	-323.1	0.00	0.00	0.00
4,600.0	6.92	162.36	4,579.1	-336.1	106.9	-334.5	0.00	0.00	0.00
4,700.0	6.92	162.36	4,678.4	-347.5	110.5	-345.9	0.00	0.00	0.00
4,800.0	6.92	162.36	4,777.6	-359.0	114.2	-357.3	0.00	0.00	0.00
4,900.0	6.92	162.36	4,876.9	-370.5	117.8	-368.8	0.00	0.00	0.00
5,000.0	6.92	162.36	4,976.2	-382.0	121.5	-380.2	0.00	0.00	0.00
5,100.0	6.92	162.36	5,075.5	-393.5	125.1	-391.6	0.00	0.00	0.00
5,200.0	6.92	162.36	5,174.7	-404.9	128.8	-403.0	0.00	0.00	0.00



## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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)
5,300.0	6.92	162.36	5,274.0	-416.4	132.4	-414.5	0.00	0.00	0.00
5,400.0	6.92	162.36	5,373.3	-427.9	136.1	-425.9	0.00	0.00	0.00
5,500.0	6.92	162.36	5,472.5	-439.4	139.7	-437.3	0.00	0.00	0.00
5,600.0	6.92	162.36	5,571.8	-450.9	143.4	-448.8	0.00	0.00	0.00
5,700.0	6.92	162.36	5,671.1	-462.3	147.0	-460.2	0.00	0.00	0.00
5,800.0	6.92	162.36	5,770.4	-473.8	150.7	-471.6	0.00	0.00	0.00
5,900.0	6.92	162.36	5,869.6	-485.3	154.3	-483.0	0.00	0.00	0.00
6,000.0	6.92	162.36	5,968.9	-496.8	158.0	-494.5	0.00	0.00	0.00
6,100.0	6.92	162.36	6,068.2	-508.3	161.6	-505.9	0.00	0.00	0.00
6,200.0	6.92	162.36	6,167.4	-519.8	165.3	-517.3	0.00	0.00	0.00
6,300.0	6.92	162.36	6,266.7	-531.2	168.9	-528.7	0.00	0.00	0.00
6,400.0	6.92	162.36	6,366.0	-542.7	172.6	-540.2	0.00	0.00	0.00
6,500.0	6.92	162.36	6,465.3	-554.2	176.2	-551.6	0.00	0.00	0.00
6,600.0	6.92	162.36	6,564.5	-565.7	179.9	-563.0	0.00	0.00	0.00
6,700.0	6.92	162.36	6,663.8	-577.2	183.5	-574.5	0.00	0.00	0.00
6,800.0	6.92	162.36	6,763.1	-588.6	187.2	-585.9	0.00	0.00	0.00
6,900.0	6.92	162.36	6,862.4	-600.1	190.8	-597.3	0.00	0.00	0.00
7,000.0	6.92	162.36	6,961.6	-611.6	194.5	-608.7	0.00	0.00	0.00
7,100.0	6.92	162.36	7,060.9	-623.1	198.1	-620.2	0.00	0.00	0.00
7,200.0	6.92	162.36	7,160.2	-634.6	201.8	-631.6	0.00	0.00	0.00
7,300.0	6.92	162.36	7,259.4	-646.0	205.4	-643.0	0.00	0.00	0.00
7,400.0	6.92	162.36	7,358.7	-657.5	209.1	-654.4	0.00	0.00	0.00
7,500.0	6.92	162.36	7,458.0	-669.0	212.7	-665.9	0.00	0.00	0.00
7,553.3	6.92	162.36	7,510.9	-675.1	214.7	-672.0	0.00	0.00	0.00
7,600.0	5.98	162.36	7,557.3	-680.1	216.3	-676.9	2.00	-2.00	0.00
7,700.0	3.98	162.36	7,656.9	-688.4	218.9	-685.2	2.00	-2.00	0.00
7,800.0	1.98	162.36	7,756.8	-693.4	220.5	-690.1	2.00	-2.00	0.00
7,899.2	0.00	0.00	7,856.0	-695.0	221.0	-691.7	2.00	-2.00	0.00
8,000.0	0.00	0.00	7,956.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,100.0	0.00	0.00	8,056.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,200.0	0.00	0.00	8,156.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,300.0	0.00	0.00	8,256.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,400.0	0.00	0.00	8,356.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,500.0	0.00	0.00	8,456.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,600.0	0.00	0.00	8,556.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,700.0	0.00	0.00	8,656.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,800.0	0.00	0.00	8,756.8	-695.0	221.0	-691.7	0.00	0.00	0.00
8,900.0	0.00	0.00	8,856.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,000.0	0.00	0.00	8,956.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,100.0	0.00	0.00	9,056.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,200.0	0.00	0.00	9,156.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,300.0	0.00	0.00	9,256.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,400.0	0.00	0.00	9,356.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,500.0	0.00	0.00	9,456.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,600.0	0.00	0.00	9,556.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,700.0	0.00	0.00	9,656.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,800.0	0.00	0.00	9,756.8	-695.0	221.0	-691.7	0.00	0.00	0.00
9,900.0	0.00	0.00	9,856.8	-695.0	221.0	-691.7	0.00	0.00	0.00
10,000.0	0.00	0.00	9,956.8	-695.0	221.0	-691.7	0.00	0.00	0.00
10,035.7	0.00	0.00	9,992.5	-695.0	221.0	-691.7	0.00	0.00	0.00
10,050.0	1.71	358.85	10,006.8	-694.8	221.0	-691.5	12.00	12.00	0.00
10,075.0	4.71	358.85	10,031.7	-693.4	221.0	-690.1	12.00	12.00	0.00
10,100.0	7.71	358.85	10,056.6	-690.7	220.9	-687.4	12.00	12.00	0.00
10,125.0	10.71	358.85	10,081.2	-686.7	220.8	-683.4	12.00	12.00	0.00



## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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)	
10,150.0	13.71	358.85	10,105.7	-681.4	220.7	-678.1	12.00	12.00	0.00	
10,175.0	16.72	358.85	10,129.8	-674.8	220.6	-671.6	12.00	12.00	0.00	
10,200.0	19.72	358.85	10,153.5	-667.0	220.4	-663.8	12.00	12.00	0.00	
10,225.0	22.72	358.85	10,176.8	-658.0	220.3	-654.7	12.00	12.00	0.00	
10,250.0	25.72	358.85	10,199.6	-647.7	220.1	-644.5	12.00	12.00	0.00	
10,256.2	26.46	358.85	10,205.2	-645.0	220.0	-641.8	12.00	12.00	0.00	
10,275.0	28.72	358.92	10,221.9	-636.3	219.8	-633.1	12.00	12.00	0.35	
10,300.0	31.72	358.99	10,243.5	-623.7	219.6	-620.5	12.00	12.00	0.30	
10,325.0	34.72	359.06	10,264.4	-610.0	219.4	-606.8	12.00	12.00	0.25	
10,350.0	37.72	359.11	10,284.5	-595.3	219.1	-592.0	12.00	12.00	0.22	
10,375.0	40.72	359.16	10,303.9	-579.5	218.9	-576.2	12.00	12.00	0.19	
10,400.0	43.72	359.20	10,322.4	-562.7	218.7	-559.5	12.00	12.00	0.17	
10,425.0	46.72	359.24	10,340.0	-544.9	218.4	-541.7	12.00	12.00	0.15	
10,450.0	49.72	359.27	10,356.7	-526.3	218.2	-523.1	12.00	12.00	0.14	
10,475.0	52.72	359.30	10,372.3	-506.8	217.9	-503.6	12.00	12.00	0.12	
10,500.0	55.72	359.33	10,387.0	-486.5	217.7	-483.3	12.00	12.00	0.11	
10,525.0	58.72	359.36	10,400.5	-465.5	217.4	-462.3	12.00	12.00	0.11	
10,550.0	61.72	359.38	10,412.9	-443.8	217.2	-440.6	12.00	12.00	0.10	
10,575.0	64.72	359.41	10,424.2	-421.5	217.0	-418.3	12.00	12.00	0.09	
10,600.0	67.72	359.43	10,434.3	-398.6	216.7	-395.5	12.00	12.00	0.09	
10,625.0	70.72	359.45	10,443.1	-375.3	216.5	-372.1	12.00	12.00	0.09	
10,650.0	73.72	359.47	10,450.8	-351.5	216.3	-348.3	12.00	12.00	0.08	
10,675.0	76.72	359.49	10,457.1	-327.3	216.1	-324.1	12.00	12.00	0.08	
10,700.0	79.72	359.51	10,462.2	-302.8	215.9	-299.7	12.00	12.00	0.08	
10,725.0	82.72	359.53	10,466.1	-278.1	215.6	-275.0	12.00	12.00	0.08	
10,750.0	85.72	359.55	10,468.6	-253.2	215.4	-250.1	12.00	12.00	0.08	
10,775.0	88.72	359.57	10,469.8	-228.3	215.3	-225.2	12.00	12.00	0.08	
10,785.7	90.00	359.58	10,469.9	-217.6	215.2	-214.5	12.00	12.00	0.08	
10,800.0	90.00	359.58	10,469.9	-203.3	215.1	-200.2	0.00	0.00	0.00	
10,900.0	90.00	359.58	10,469.9	-103.3	214.3	-100.2	0.00	0.00	0.00	
11,000.0	90.00	359.58	10,469.9	-3.3	213.6	-0.2	0.00	0.00	0.00	
11,100.0	90.00	359.58	10,469.9	96.7	212.8	99.8	0.00	0.00	0.00	
11,200.0	90.00	359.58	10,469.9	196.7	212.1	199.7	0.00	0.00	0.00	
11,300.0	90.00	359.58	10,469.9	296.7	211.4	299.7	0.00	0.00	0.00	
11,400.0	90.00	359.58	10,469.9	396.7	210.6	399.7	0.00	0.00	0.00	
11,500.0	90.00	359.58	10,469.9	496.7	209.9	499.7	0.00	0.00	0.00	
11,600.0	90.00	359.58	10,469.9	596.7	209.1	599.7	0.00	0.00	0.00	
11,700.0	90.00	359.58	10,469.9	696.7	208.4	699.6	0.00	0.00	0.00	
11,800.0	90.00	359.58	10,469.9	796.7	207.7	799.6	0.00	0.00	0.00	
11,900.0	90.00	359.58	10,469.9	896.7	206.9	899.6	0.00	0.00	0.00	
12,000.0	90.00	359.58	10,469.9	996.7	206.2	999.6	0.00	0.00	0.00	
12,100.0	90.00	359.58	10,469.9	1,096.7	205.4	1,099.5	0.00	0.00	0.00	
12,200.0	90.00	359.58	10,469.9	1,196.7	204.7	1,199.5	0.00	0.00	0.00	
12,300.0	90.00	359.58	10,469.9	1,296.7	204.0	1,299.5	0.00	0.00	0.00	
12,400.0	90.00	359.58	10,469.9	1,396.7	203.2	1,399.5	0.00	0.00	0.00	
12,500.0	90.00	359.58	10,469.9	1,496.7	202.5	1,499.4	0.00	0.00	0.00	
12,600.0	90.00	359.58	10,469.9	1,596.7	201.7	1,599.4	0.00	0.00	0.00	
12,700.0	90.00	359.58	10,469.9	1,696.7	201.0	1,699.4	0.00	0.00	0.00	
12,800.0	90.00	359.58	10,470.0	1,796.7	200.3	1,799.4	0.00	0.00	0.00	
12,900.0	90.00	359.58	10,470.0	1,896.7	199.5	1,899.3	0.00	0.00	0.00	
13,000.0	90.00	359.58	10,470.0	1,996.7	198.8	1,999.3	0.00	0.00	0.00	
13,100.0	90.00	359.58	10,470.0	2,096.7	198.0	2,099.3	0.00	0.00	0.00	
13,200.0	90.00	359.58	10,470.0	2,196.7	197.3	2,199.3	0.00	0.00	0.00	
13,300.0	90.00	359.58	10,470.0	2,296.7	196.6	2,299.2	0.00	0.00	0.00	



## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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)	
13,400.0	90.00	359.58	10,470.0	2,396.7	195.8	2,399.2	0.00	0.00	0.00	
13,500.0	90.00	359.58	10,470.0	2,496.6	195.1	2,499.2	0.00	0.00	0.00	
13,600.0	90.00	359.58	10,470.0	2,596.6	194.3	2,599.2	0.00	0.00	0.00	
13,700.0	90.00	359.58	10,470.0	2,696.6	193.6	2,699.2	0.00	0.00	0.00	
13,800.0	90.00	359.58	10,470.0	2,796.6	192.9	2,799.1	0.00	0.00	0.00	
13,900.0	90.00	359.58	10,470.0	2,896.6	192.1	2,899.1	0.00	0.00	0.00	
14,000.0	90.00	359.58	10,470.0	2,996.6	191.4	2,999.1	0.00	0.00	0.00	
14,100.0	90.00	359.58	10,470.0	3,096.6	190.6	3,099.1	0.00	0.00	0.00	
14,200.0	90.00	359.58	10,470.0	3,196.6	189.9	3,199.0	0.00	0.00	0.00	
14,300.0	90.00	359.58	10,470.0	3,296.6	189.2	3,299.0	0.00	0.00	0.00	
14,400.0	90.00	359.58	10,470.0	3,396.6	188.4	3,399.0	0.00	0.00	0.00	
14,500.0	90.00	359.58	10,470.0	3,496.6	187.7	3,499.0	0.00	0.00	0.00	
14,600.0	90.00	359.58	10,470.0	3,596.6	186.9	3,598.9	0.00	0.00	0.00	
14,700.0	90.00	359.58	10,470.0	3,696.6	186.2	3,698.9	0.00	0.00	0.00	
14,800.0	90.00	359.58	10,470.0	3,796.6	185.5	3,798.9	0.00	0.00	0.00	
14,900.0	90.00	359.58	10,470.0	3,896.6	184.7	3,898.9	0.00	0.00	0.00	
15,000.0	90.00	359.58	10,470.0	3,996.6	184.0	3,998.8	0.00	0.00	0.00	
15,100.0	90.00	359.58	10,470.0	4,096.6	183.2	4,098.8	0.00	0.00	0.00	
15,200.0	90.00	359.58	10,470.0	4,196.6	182.5	4,198.8	0.00	0.00	0.00	
15,300.0	90.00	359.58	10,470.0	4,296.6	181.8	4,298.8	0.00	0.00	0.00	
15,400.0	90.00	359.58	10,470.0	4,396.6	181.0	4,398.7	0.00	0.00	0.00	
15,500.0	90.00	359.58	10,470.0	4,496.6	180.3	4,498.7	0.00	0.00	0.00	
15,537.4	90.00	359.58	10,470.0	4,534.0	180.0	4,536.1	0.00	0.00	0.00	
15,600.0	90.00	359.58	10,470.0	4,596.6	179.5	4,598.7	0.00	0.00	0.00	
15,700.0	90.00	359.57	10,470.0	4,696.6	178.8	4,698.7	0.00	0.00	0.00	
15,800.0	90.00	359.57	10,470.0	4,796.6	178.1	4,798.7	0.00	0.00	0.00	
15,900.0	90.00	359.57	10,470.0	4,896.6	177.3	4,898.6	0.00	0.00	0.00	
16,000.0	90.00	359.57	10,470.0	4,996.6	176.6	4,998.6	0.00	0.00	0.00	
16,100.0	90.00	359.57	10,470.0	5,096.6	175.8	5,098.6	0.00	0.00	0.00	
16,200.0	90.00	359.57	10,470.0	5,196.6	175.1	5,198.6	0.00	0.00	0.00	
16,300.0	90.00	359.57	10,470.0	5,296.6	174.3	5,298.5	0.00	0.00	0.00	
16,400.0	90.00	359.57	10,470.0	5,396.6	173.6	5,398.5	0.00	0.00	0.00	
16,500.0	90.00	359.57	10,470.0	5,496.6	172.8	5,498.5	0.00	0.00	0.00	
16,600.0	90.00	359.57	10,470.0	5,596.6	172.1	5,598.5	0.00	0.00	0.00	
16,700.0	90.00	359.57	10,470.0	5,696.6	171.3	5,698.4	0.00	0.00	0.00	
16,800.0	90.00	359.57	10,470.0	5,796.6	170.5	5,798.4	0.00	0.00	0.00	
16,900.0	90.00	359.57	10,470.0	5,896.6	169.8	5,898.4	0.00	0.00	0.00	
17,000.0	90.00	359.56	10,470.0	5,996.6	169.0	5,998.4	0.00	0.00	0.00	
17,100.0	90.00	359.56	10,470.0	6,096.5	168.3	6,098.3	0.00	0.00	0.00	
17,200.0	90.00	359.56	10,470.0	6,196.5	167.5	6,198.3	0.00	0.00	0.00	
17,300.0	90.00	359.56	10,470.0	6,296.5	166.7	6,298.3	0.00	0.00	0.00	
17,400.0	90.00	359.56	10,470.0	6,396.5	166.0	6,398.3	0.00	0.00	0.00	
17,500.0	90.00	359.56	10,470.0	6,496.5	165.2	6,498.2	0.00	0.00	0.00	
17,600.0	90.00	359.56	10,470.0	6,596.5	164.5	6,598.2	0.00	0.00	0.00	
17,700.0	90.00	359.56	10,470.0	6,696.5	163.7	6,698.2	0.00	0.00	0.00	
17,800.0	90.00	359.56	10,470.0	6,796.5	162.9	6,798.2	0.00	0.00	0.00	
17,900.0	90.00	359.56	10,470.0	6,896.5	162.1	6,898.1	0.00	0.00	0.00	
18,000.0	90.00	359.56	10,470.0	6,996.5	161.4	6,998.1	0.00	0.00	0.00	
18,100.0	90.00	359.56	10,470.0	7,096.5	160.6	7,098.1	0.00	0.00	0.00	
18,177.5	90.00	359.56	10,470.0	7,174.0	160.0	7,175.6	0.00	0.00	0.00	
18,200.0	90.00	359.56	10,470.0	7,196.5	159.8	7,198.1	0.00	0.00	0.00	
18,300.0	90.00	359.56	10,470.0	7,296.5	159.1	7,298.0	0.00	0.00	0.00	
18,400.0	90.00	359.55	10,470.0	7,396.5	158.3	7,398.0	0.00	0.00	0.00	
18,500.0	90.00	359.55	10,470.0	7,496.5	157.5	7,498.0	0.00	0.00	0.00	



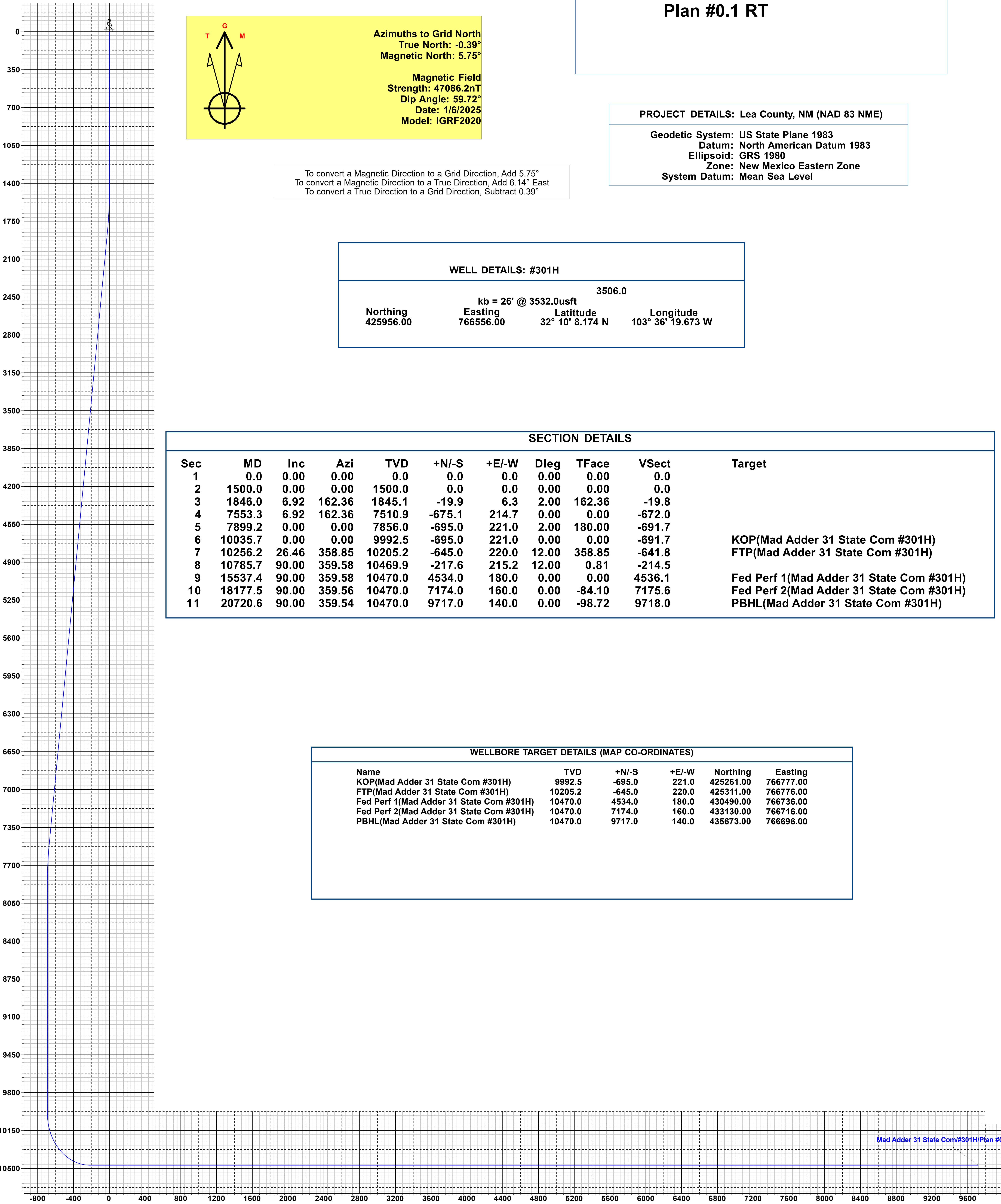
## Planning Report

<b>Database:</b>	PEDMB	<b>Local Co-ordinate Reference:</b>	Well #301H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	kb = 26' @ 3532.0usft
<b>Project:</b>	Lea County, NM (NAD 83 NME)	<b>MD Reference:</b>	kb = 26' @ 3532.0usft
<b>Site:</b>	Mad Adder 31 State Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#301H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.1 RT		

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)	
18,600.0	90.00	359.55	10,470.0	7,596.5	156.7	7,598.0	0.00	0.00	0.00	
18,700.0	90.00	359.55	10,470.0	7,696.5	155.9	7,697.9	0.00	0.00	0.00	
18,800.0	90.00	359.55	10,470.0	7,796.5	155.2	7,797.9	0.00	0.00	0.00	
18,900.0	90.00	359.55	10,470.0	7,896.5	154.4	7,897.9	0.00	0.00	0.00	
19,000.0	90.00	359.55	10,470.0	7,996.5	153.6	7,997.9	0.00	0.00	0.00	
19,100.0	90.00	359.55	10,470.0	8,096.5	152.8	8,097.8	0.00	0.00	0.00	
19,200.0	90.00	359.55	10,470.0	8,196.5	152.0	8,197.8	0.00	0.00	0.00	
19,300.0	90.00	359.55	10,470.0	8,296.5	151.2	8,297.8	0.00	0.00	0.00	
19,400.0	90.00	359.55	10,470.0	8,396.5	150.5	8,397.8	0.00	0.00	0.00	
19,500.0	90.00	359.55	10,470.0	8,496.5	149.7	8,497.8	0.00	0.00	0.00	
19,600.0	90.00	359.55	10,470.0	8,596.5	148.9	8,597.7	0.00	0.00	0.00	
19,700.0	90.00	359.55	10,470.0	8,696.5	148.1	8,697.7	0.00	0.00	0.00	
19,800.0	90.00	359.55	10,470.0	8,796.5	147.3	8,797.7	0.00	0.00	0.00	
19,900.0	90.00	359.55	10,470.0	8,896.5	146.5	8,897.7	0.00	0.00	0.00	
20,000.0	90.00	359.55	10,470.0	8,996.5	145.7	8,997.6	0.00	0.00	0.00	
20,100.0	90.00	359.55	10,470.0	9,096.5	144.9	9,097.6	0.00	0.00	0.00	
20,200.0	90.00	359.55	10,470.0	9,196.5	144.1	9,197.6	0.00	0.00	0.00	
20,300.0	90.00	359.54	10,470.0	9,296.5	143.3	9,297.6	0.00	0.00	0.00	
20,400.0	90.00	359.54	10,470.0	9,396.4	142.6	9,397.5	0.00	0.00	0.00	
20,500.0	90.00	359.54	10,470.0	9,496.4	141.8	9,497.5	0.00	0.00	0.00	
20,600.0	90.00	359.54	10,470.0	9,596.4	141.0	9,597.5	0.00	0.00	0.00	
20,700.0	90.00	359.54	10,470.0	9,696.4	140.2	9,697.5	0.00	0.00	0.00	
20,720.6	90.00	359.54	10,470.0	9,717.0	140.0	9,718.0	0.00	0.00	0.00	

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(Mad Adder 31 Stat - plan hits target center - Point	0.00	0.00	9,992.5	-695.0	221.0	425,261.00	766,777.00	32° 10' 1.282 N	103° 36' 17.157 W
FTP(Mad Adder 31 State - plan hits target center - Point	0.00	0.00	10,205.2	-645.0	220.0	425,311.00	766,776.00	32° 10' 1.777 N	103° 36' 17.165 W
PBHL(Mad Adder 31 Sts - plan hits target center - Point	0.00	0.00	10,470.0	9,717.0	140.0	435,673.00	766,696.00	32° 11' 44.318 N	103° 36' 17.279 W
Fed Perf 2(Mad Adder 3 - plan hits target center - Point	0.00	0.00	10,470.0	7,174.0	160.0	433,130.00	766,716.00	32° 11' 19.152 N	103° 36' 17.247 W
Fed Perf 1(Mad Adder 3 - plan hits target center - Point	0.00	0.00	10,470.0	4,534.0	180.0	430,490.00	766,736.00	32° 10' 53.027 N	103° 36' 17.222 W





Azimuths to Grid North  
True North: -0.39°  
Magnetic North: 5.75°

Magnetic Field  
Strength: 47086.2nT  
Dip Angle: 59.72°  
Date: 1/6/2025  
Model: IGRF2020

To convert a Magnetic Direction to a Grid Direction, Add 5.75°  
To convert a Magnetic Direction to a True Direction, Add 6.14° East  
To convert a True Direction to a Grid Direction, Subtract 0.39°

WELL DETAILS: #301H

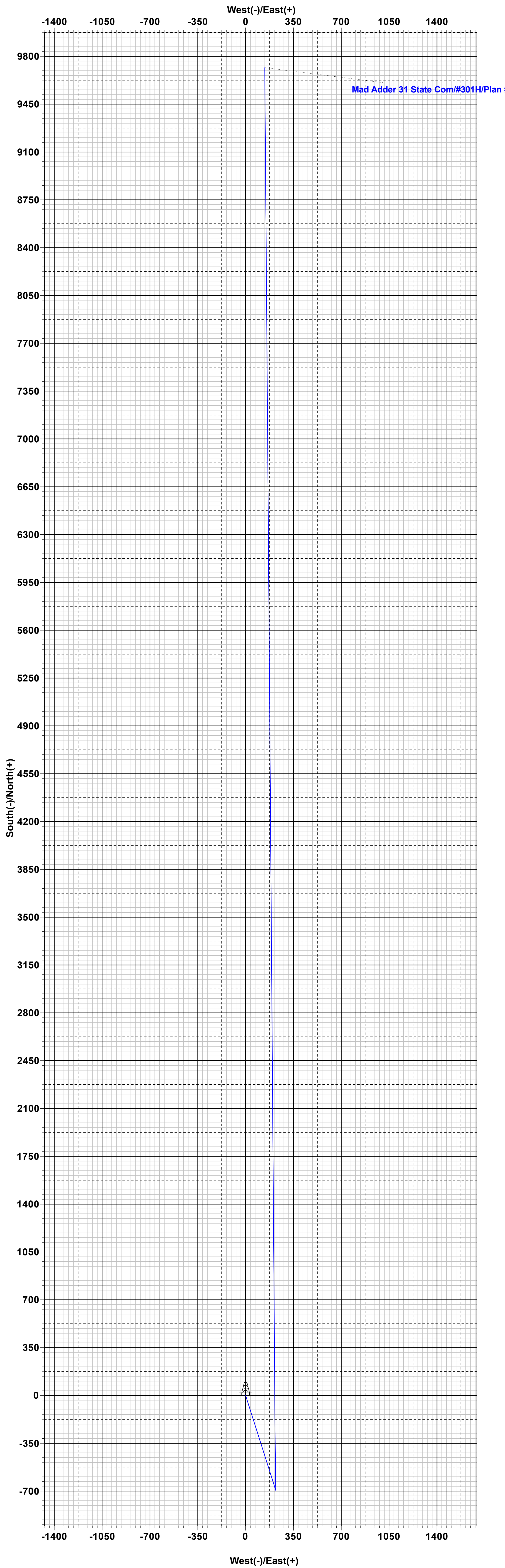
3506.0  
kb = 26' @ 3532.0usft  
Northing 425956.00 Easting 766556.00 Latitude 32° 10' 8.174 N Longitude 103° 36' 19.673 W

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	1500.0	0.00	0.00	1500.0	0.0	0.0	0.00	0.00	0.0	
3	1846.0	6.92	162.36	1845.1	-19.9	6.3	2.00	162.36	-19.8	
4	7553.3	6.92	162.36	7510.9	-675.1	214.7	0.00	0.00	-672.0	
5	7899.2	0.00	0.00	7856.0	-695.0	221.0	2.00	180.00	-691.7	
6	10035.7	0.00	0.00	9992.5	-695.0	221.0	0.00	0.00	-691.7	KOP(Mad Adder 31 State Com #301H)
7	10256.2	26.46	358.85	10205.2	-645.0	220.0	12.00	358.85	-641.8	FTP(Mad Adder 31 State Com #301H)
8	10785.7	90.00	359.58	10469.9	-217.6	215.2	12.00	0.81	-214.5	
9	15537.4	90.00	359.58	10470.0	4534.0	180.0	0.00	0.00	4536.1	Fed Perf 1(Mad Adder 31 State Com #301H)
10	18177.5	90.00	359.56	10470.0	7174.0	160.0	0.00	-84.10	7175.6	Fed Perf 2(Mad Adder 31 State Com #301H)
11	20720.6	90.00	359.54	10470.0	9717.0	140.0	0.00	-98.72	9718.0	PBHL(Mad Adder 31 State Com #301H)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
KOP(Mad Adder 31 State Com #301H)	9992.5	-695.0	221.0	425261.00	766777.00
FTP(Mad Adder 31 State Com #301H)	10205.2	-645.0	220.0	425311.00	766776.00
Fed Perf 1(Mad Adder 31 State Com #301H)	10470.0	4534.0	180.0	430490.00	766736.00
Fed Perf 2(Mad Adder 31 State Com #301H)	10470.0	7174.0	160.0	433130.00	766716.00
PBHL(Mad Adder 31 State Com #301H)	10470.0	9717.0	140.0	435673.00	766696.00



**Mad Adder 31 State Com 301H API #: 30-025-\*\*\*\*\* Variances**

EOG respectfully requests the below variances to be applied to the above well:

- Variance is requested to waive the centralizer requirements for the intermediate casing in the intermediate hole. An expansion additive will be utilized, in the cement slurry, for the entire length of the intermediate interval to maximize cement bond and zonal isolation.
- Variance is also requested to waive the centralizer requirements for the production casing in the production hole. An expansion additive will be utilized, in the cement slurry, for the entire length of the production interval to maximize cement bond and zonal isolation.
- Bradenhead will be the primary option for production cementing. EOG also requests to have the conventional option in place to accommodate for logistical or wellbore conditions. The tie back requirements will be met if the cement is pumped conventionally, and cement volumes will be adjusted accordingly. TOC will be verified by CBL.
- Variance is requested to use a co-flex line between the BOP and choke manifold (instead of using a 4" OD steel line).
- Variance is requested to use a 5,000 psi annular BOP with the 10,000 psi BOP stack.
- EOG Resources requests the option to contract a Surface Rig to drill, set surface casing, and Cement on the subject well. After WOC 8 hours or 500 psi compressive strength (whichever is greater), the Surface Rig will move off so the wellhead can be installed. A welder will cut the casing to the proper height and weld on the wellhead (both "A" and "B" sections). The weld will be tested to 1,500 psi. All valves will be closed and a wellhead cap will be installed (diagram attached). If the timing between rigs is such that EOG Resources would not be able to preset the surface, the Primary Rig will MIRU and drill the well in its entirety per the APD.

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

- EOG BLM Variance 3a\_b - BOP Break-test and Offline Intermediate Cement
- EOG BLM Variance 3c - Shallow Target Production Offline Bradenhead Cement
- EOG BLM Variance 3d - Production Offline Cement
- EOG BLM Variance 4a - Salt Section Annular Clearance
- EOG BLM Variance 5a - Alternate Shallow Casing Designs





**Intermediate Bradenhead Cement:**

EOG requests variance from minimum standards to pump a two stage cement job on the intermediate casing string with the first stage being pumped conventionally with the calculated top of cement at the Brushy Canyon and the second stage performed as 1000 sack bradenhead squeeze with planned cement from the Brushy Canyon to surface. If necessary, a top out consisting of Class C cement + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (2.30 yld, 12.91 ppg) will be executed as a contingency. Top of cement will be verified by Echo-meter.

EOG will include the Echo-meter verified fluid top and the volume of displacement fluid above the cement slurry in the annulus in all post-drill sundries on wells utilizing this cement program.

EOG will report to the BLM the volume of fluid (limited to 5 bbls) used to flush intermediate casing valves following backside cementing procedures.





**Shallow Target Offline Bradenhead:**

EOG Resources Inc. (EOG) respectfully requests a variance from the minimum standards to allow for offline bradenhead cementing of the production string after primary cementing operations have been completed. The primary cement job will be pumped conventionally (online) to top of the Brushy Canyon and will cover the target production intervals, and after production pack-off is set and tested, bradenhead will be pumped through casing valves between the production and intermediate casings (offline). For the bradenhead stage of production cementing, the barriers remain the same for offline cementing compared to performing it online.

The bradenhead will be the primary option for production cementing. EOG also requests to have the conventional option in place to accommodate for logistical or wellbore conditions. The tie back requirements will be met if the cement is pumped conventionally, and cement volumes will be adjusted accordingly. TOC will be verified by CBL.



# 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

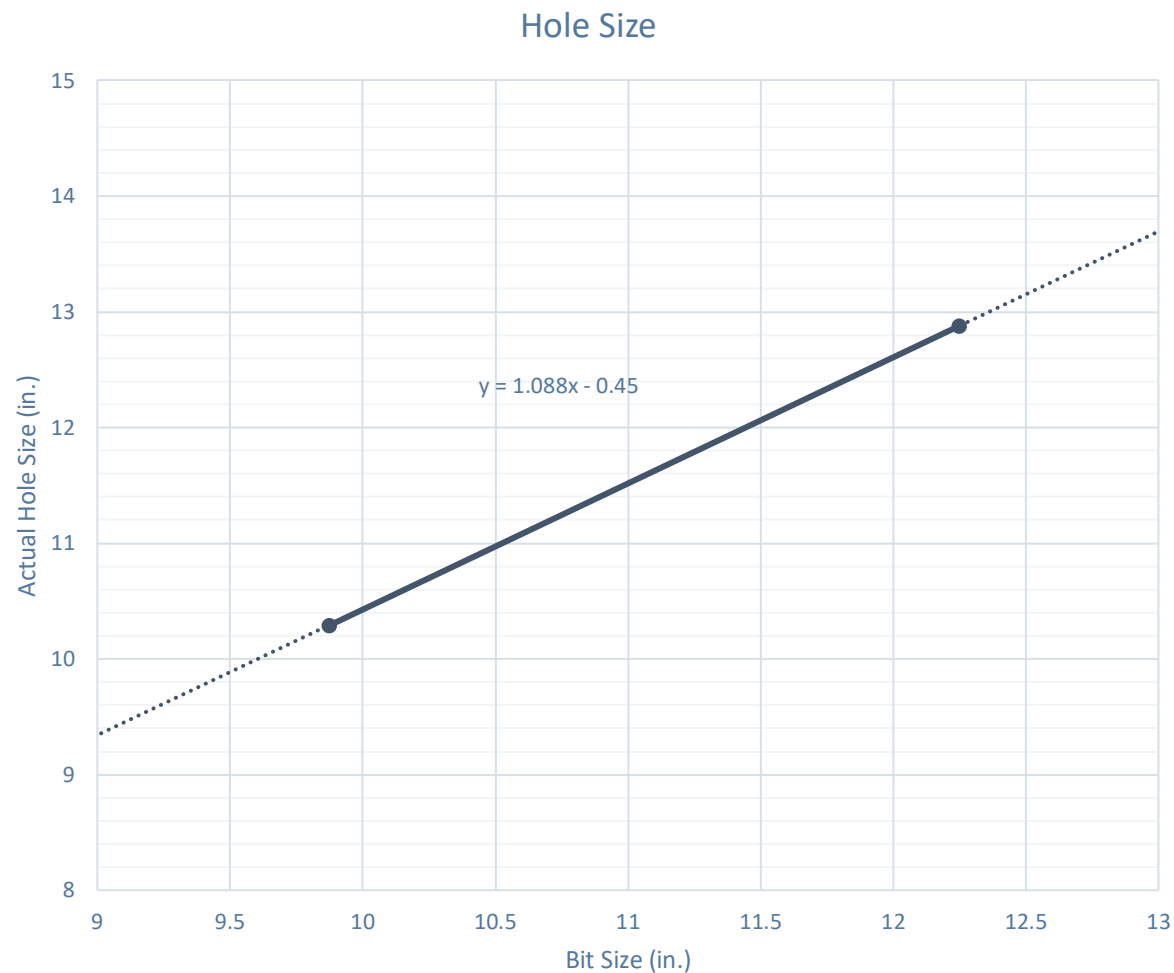
# Volumetric Hole Size Calculation

## 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

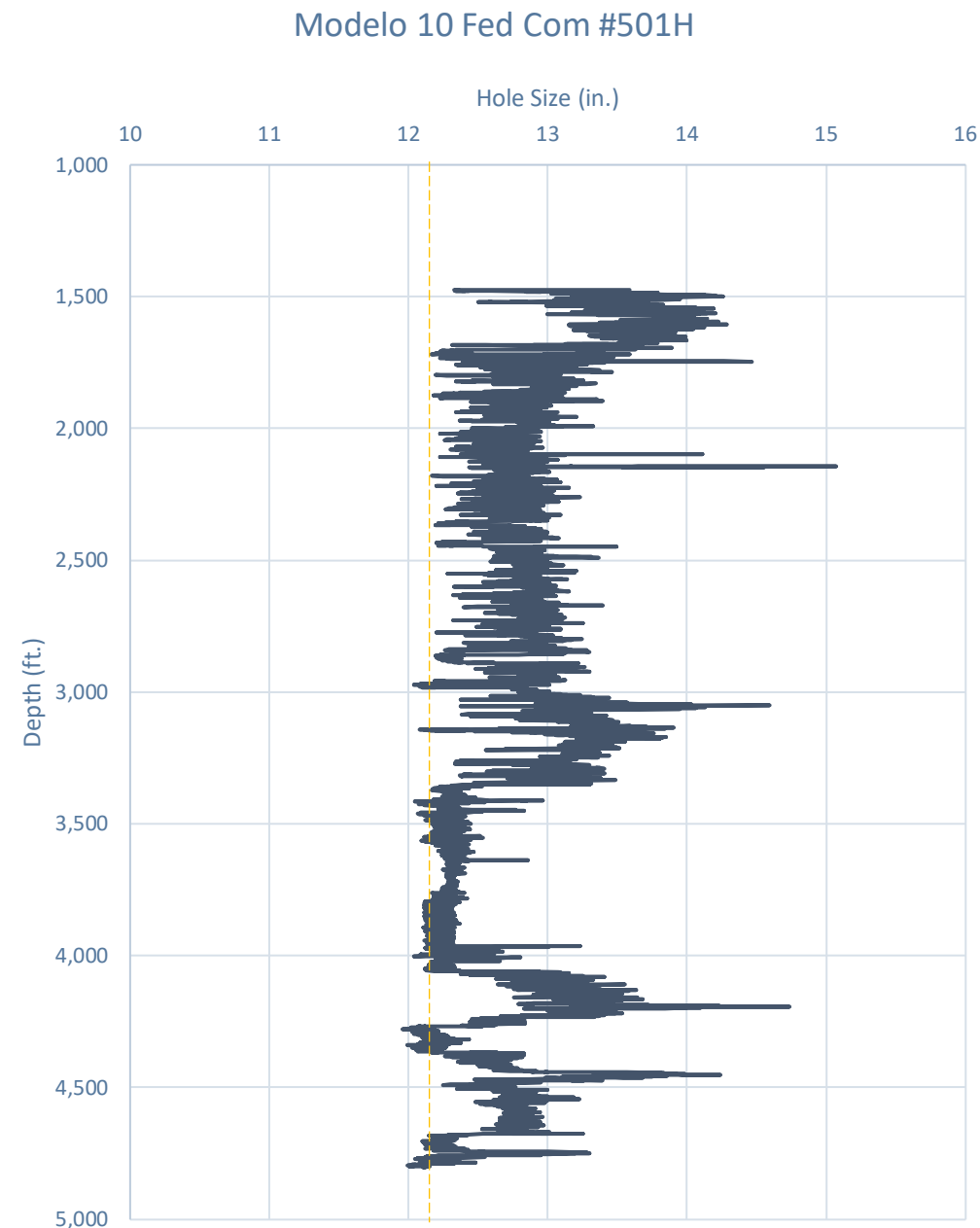
- 12.25" Hole
  - 12.88" Hole
    - 5.13% diameter increase
    - 10.52% area increase
  - 0.63" Average enlargement
  - 0.58" Median enlargement
  - 179 Well Count
- 9.875" Hole
  - 10.30" Hole
    - 4.24% diameter increase
    - 9.64% area increase
  - 0.42" Average enlargement
  - 0.46" Median enlargement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

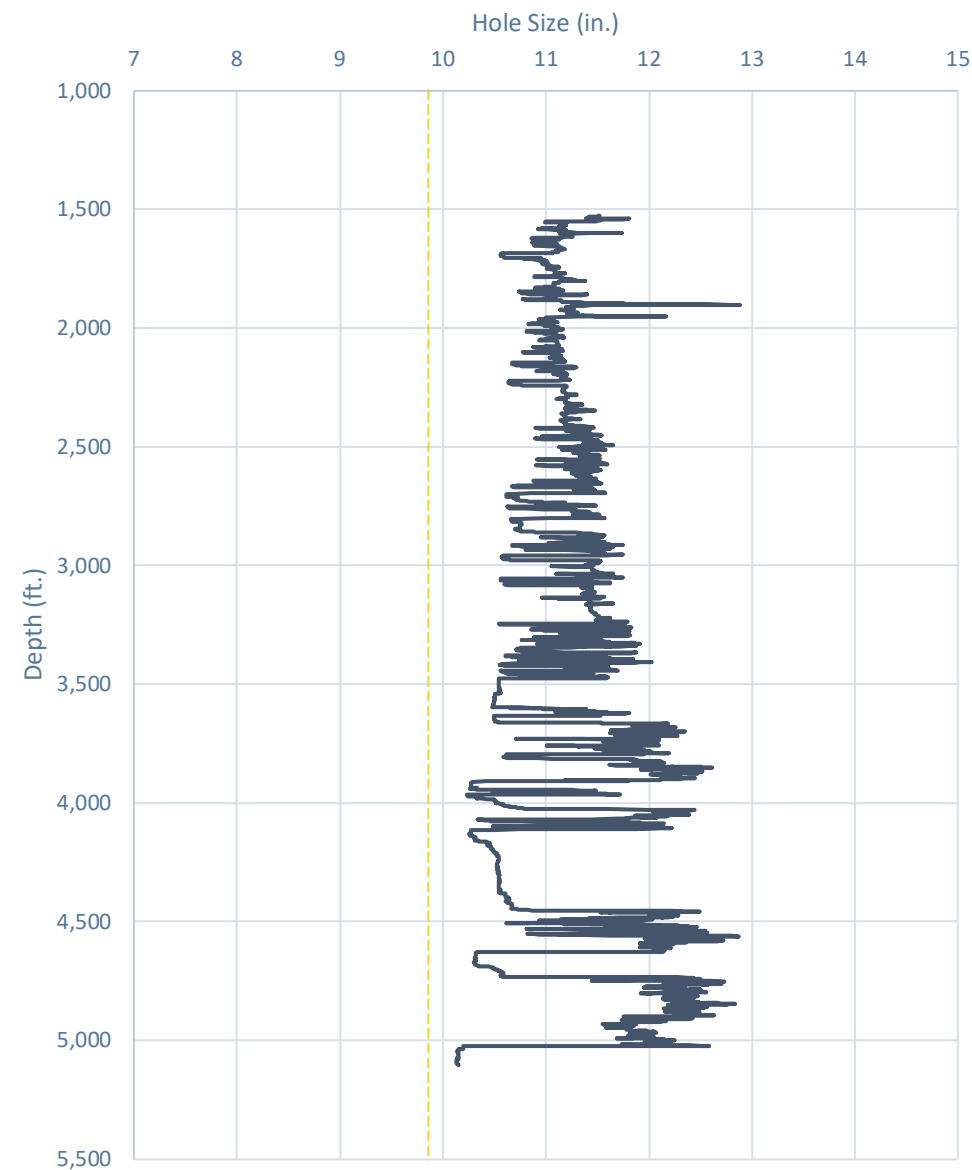


# Caliper Hole Size (9.875")

## 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

Whirling Wind 11 Fed Com #744H



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

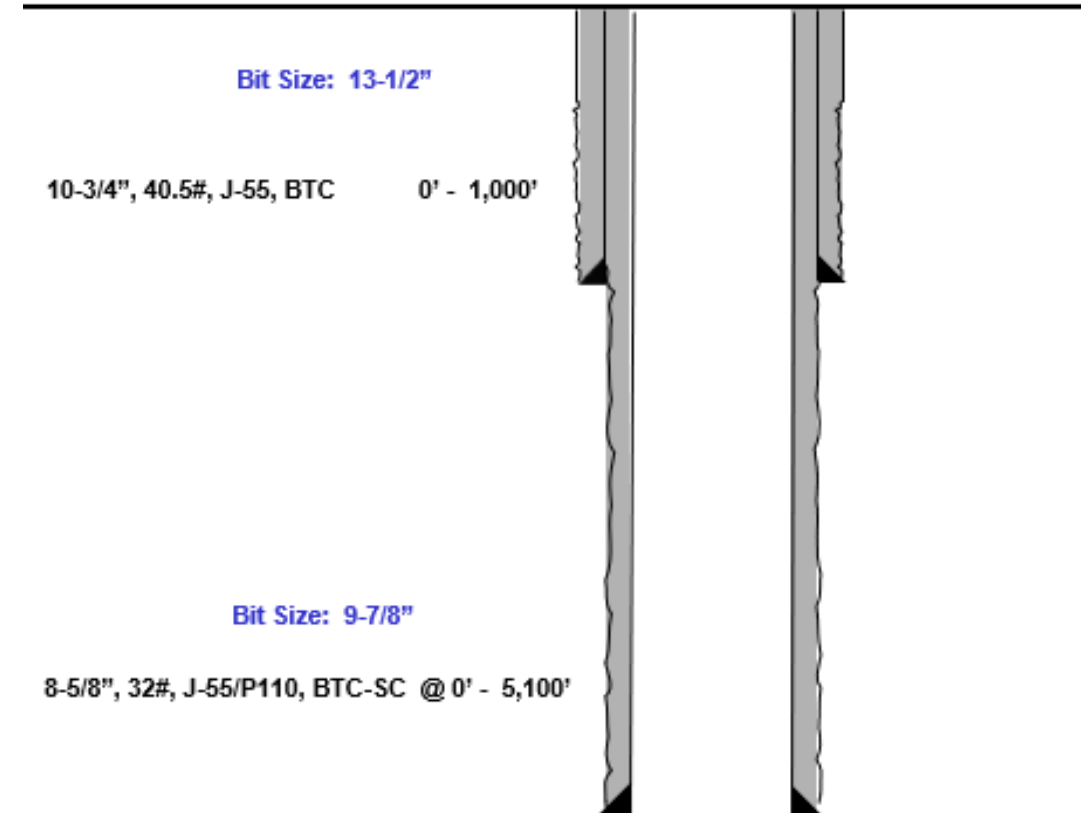




# Design B

## 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



### 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 Plain End: 31.13	0.352	J55	7.796	87.5

Material Properties (PE)		Pipe Body Data (PE)	
Pipe		Geometry	
Minimum Yield Strength:	55 ksi	Nominal ID:	7.92 inch
Maximum Yield Strength:	80 ksi	Nominal Area:	9.149 in <sup>2</sup>
Minimum Tensile Strength:	75 ksi	*Special/Alt. Drift:	7.875 inch
Coupling		Performance	
Minimum Yield Strength:	55 ksi	Pipe Body Yield Strength:	503 kips
Maximum Yield Strength:	80 ksi	Collapse Resistance:	2,530 psi
Minimum Tensile Strength:	75 ksi	Internal Yield Pressure: (API Historical)	3,930 psi

API Connection Data		API Connection Torque	
Coupling OD: 9.625"		STC Torque (ft-lbs)	
STC Performance		Min: 2,793 Opti: 3,724 Max: 4,655	
STC Internal Pressure:		LTC Torque (ft-lbs)	
STC Joint Strength:		Min: 3,130 Opti: 4,174 Max: 5,217	
LTC Performance		BTC Torque (ft-lbs)	
LTC Internal Pressure:		follow API guidelines regarding positional make up	
LTC Joint Strength:			
SC-BTC Performance - Cplg OD = 9.125"			
BTC Internal Pressure:			
BTC Joint Strength:			

\*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.

ALL INFORMATION IS PROVIDED BY VALLOUREC OR ITS AFFILIATES AT USER'S SOLE RISK, WITHOUT LIABILITY FOR LOSS, DAMAGE OR INJURY RESULTING FROM THE USE THEREOF, AND ON AN "AS IS" BASIS WITHOUT WARRANTY OR REPRESENTATION OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR PURPOSE, ACCURACY OR COMPLETENESS. THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON ESTIMATES THAT HAVE NOT BEEN VERIFIED OR TESTED. IN NO EVENT SHALL VALLOUREC OR ITS AFFILIATES BE RESPONSIBLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL LOSS OR DAMAGE (INCLUDING WITHOUT LIMITATION, LOSS OF USE, LOSS OF BARGAIN, LOSS OF REVENUE, PROFIT OR ANTICIPATED PROFIT) HOWEVER CAUSED OR ARISING, AND WHETHER SUCH LOSSES OR DAMAGES WERE FORESEEABLE OR VALLOUREC OR ITS AFFILIATES WERE ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Rev 3, 7/30/2021

10/21/2022 15:24



Annular Clearance Variance



## 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.

<b>Shallow Design Boundary Conditions</b>				
	Deepest MD (ft)	Deepest TVD (ft)	Max Inc (deg)	Max DLS (°/100usft)
Surface	2030	2030	0	0
Intermediate	7793	5650	40	8
Production	28578	12000	90	25



## Shallow Design A

## 4. CASING PROGRAM

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
16"	0	2,161	0	2,030	13-3/8"	54.5#	J-55	STC
11"	0	7,951	0	5,650	9-5/8"	40#	J-55	LTC
6-3/4"	0	29,353	0	12,000	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.

## 5. CEMENTING PROGRAM:

Depth	No. Sacks	Wt. ppg	Yld Ft <sup>3</sup> /sk	Slurry Description
2,030' 13-3/8"	570	13.5	1.73	Lead: Class C/H + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	160	14.8	1.34	Tail: Class C/H + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830')
8,050' 9-5/8"	760	12.7	2.22	Lead: Class C/H + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	250	14.8	1.32	Tail: Class C/H + 10% NaCl + 3% MagOx (TOC @ 6360')
29,353' 5-1/2"	1000	14.8	1.32	Bradenhead squeeze: Class C/H + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
	1480	13.2	1.52	Tail: Class C/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 @ Top of Brushy)

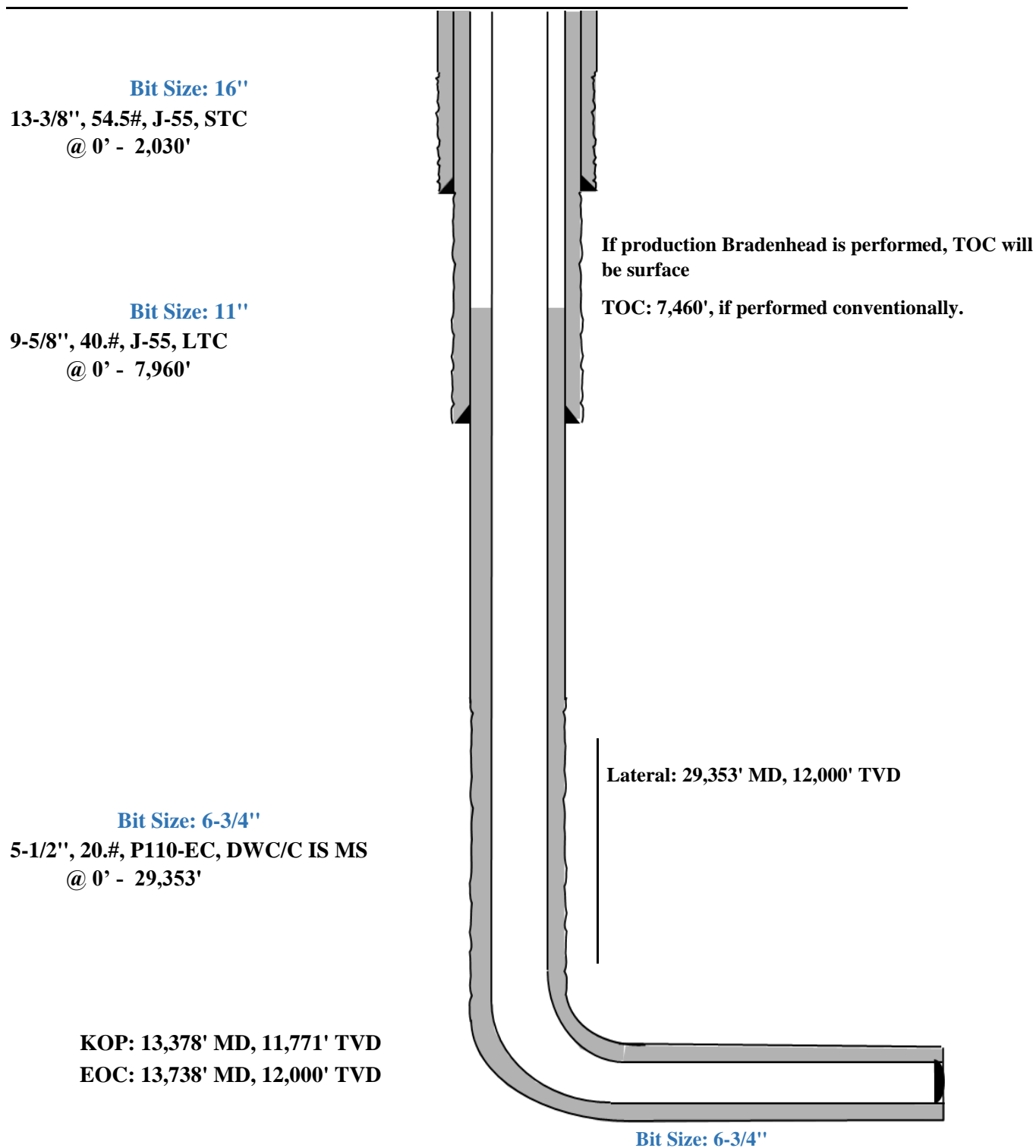


## Shallow Design A

Proposed Wellbore

KB: 3558'

GL: 3533'



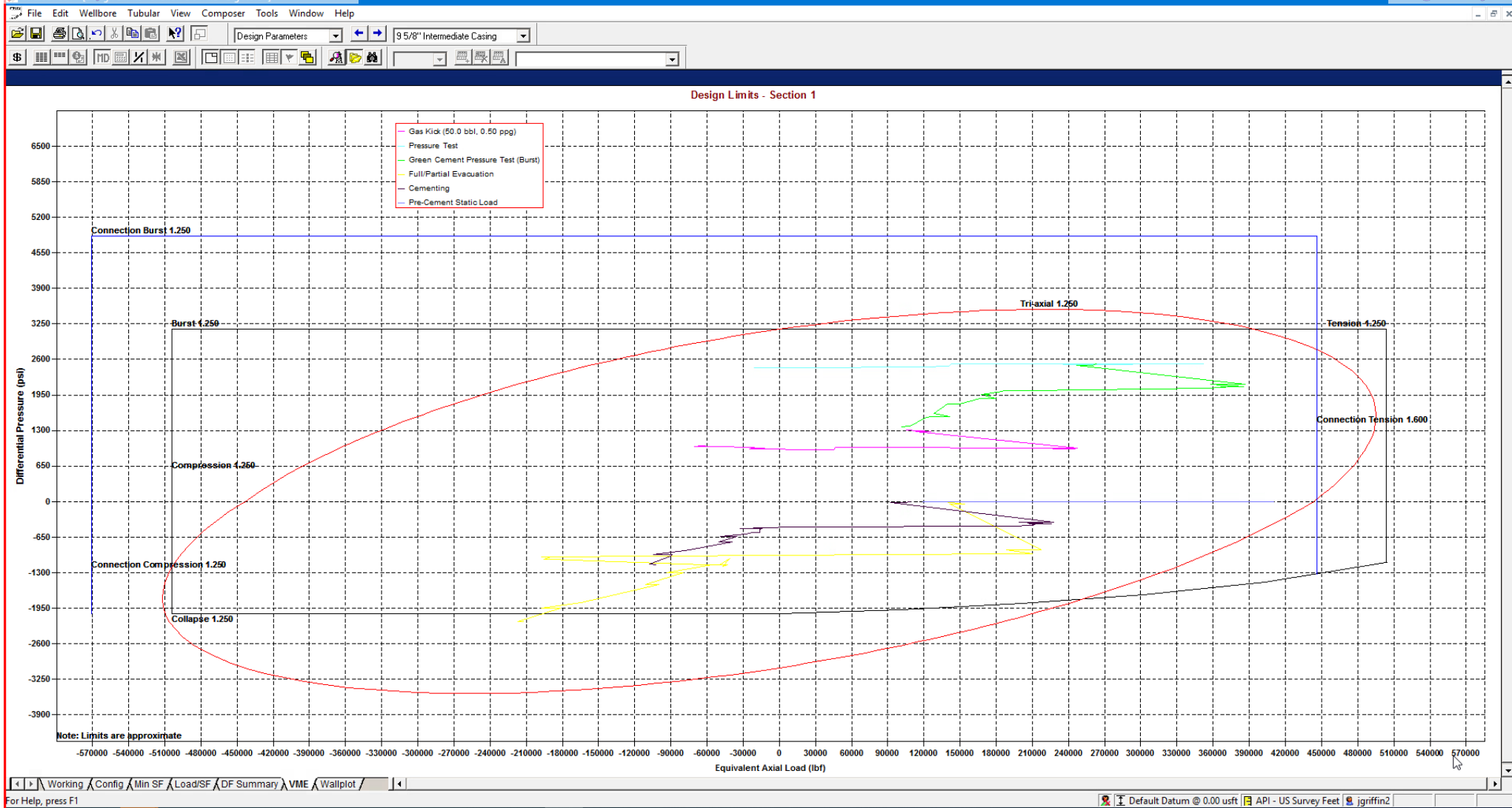
Triaxial Results														
	Depth (MD) (usft)	Axial Force (lbf)		Equivalent Axial Load (lbf)	Bending Stress at OD (psi)	Absolute Safety Factor				Temperature (°F)	Pressure (psi)		Addtl Pickup To Prevent Buck. (lbf)	Buckled Length (usft)
		Apparent (w/Bending)	Actual (w/o Bending)			Triaxial	Burst	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														

9-5/8" Intermediate Casing Pressure Test:

Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi

External Profile based off Pore Pressure: 2188 psi



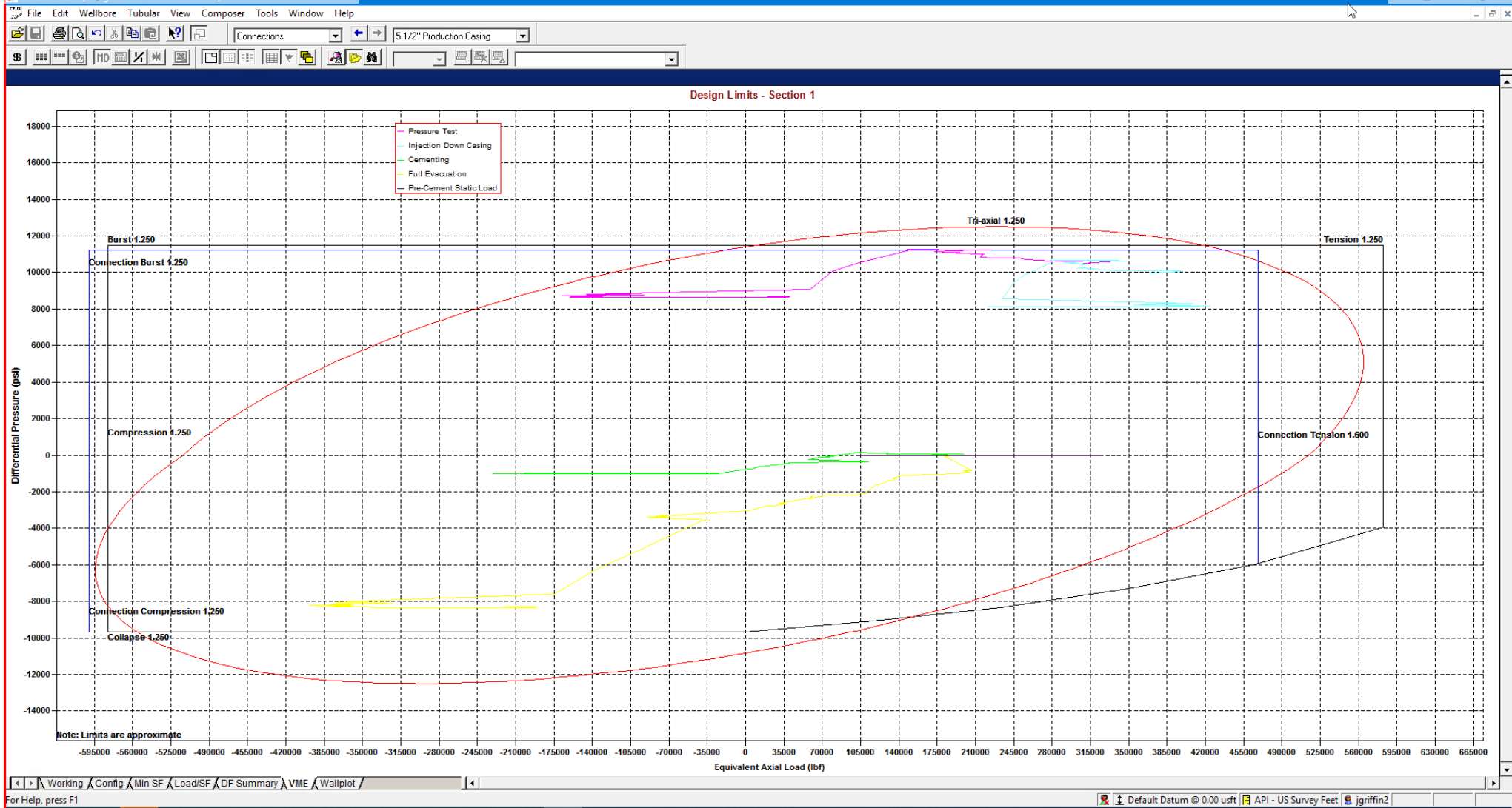


StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole \*]

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.



StressCheck - [String Summary - Shallow 3.0 Mile]

File Edit Wellbore Tubular View Composer Tools Window Help

Connections 5 1/2" Production Casing

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial	Triaxial	
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										
3										
4	F Conn Fracture									
5	( ) Compression									
6	(V) Vector Collapse Safety Factor									
7										
										Total = 446,902

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



## Shallow Design B

## 4. CASING PROGRAM

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
13-1/2"	0	2,161	0	2,030	10-3/4"	40.5#	J-55	STC
9-7/8"	0	7,951	0	5,650	8-5/8"	32#	J-55	BTC-SC
6-3/4"	0	29,353	0	12,000	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.

## 5. 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/H + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	140	14.8	1.34	Tail: Class C/H + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830')
8,050' 8-5/8"	470	12.7	2.22	Lead: Class C/H + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	210	14.8	1.32	Tail: Class C/H + 10% NaCl + 3% MagOx (TOC @ 6360')
29,353' 5-1/2"	1000	14.8	1.32	Bradenhead squeeze: Class C/H + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
	1480	13.2	1.52	Tail: Class C/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 @ Top of Brushy)

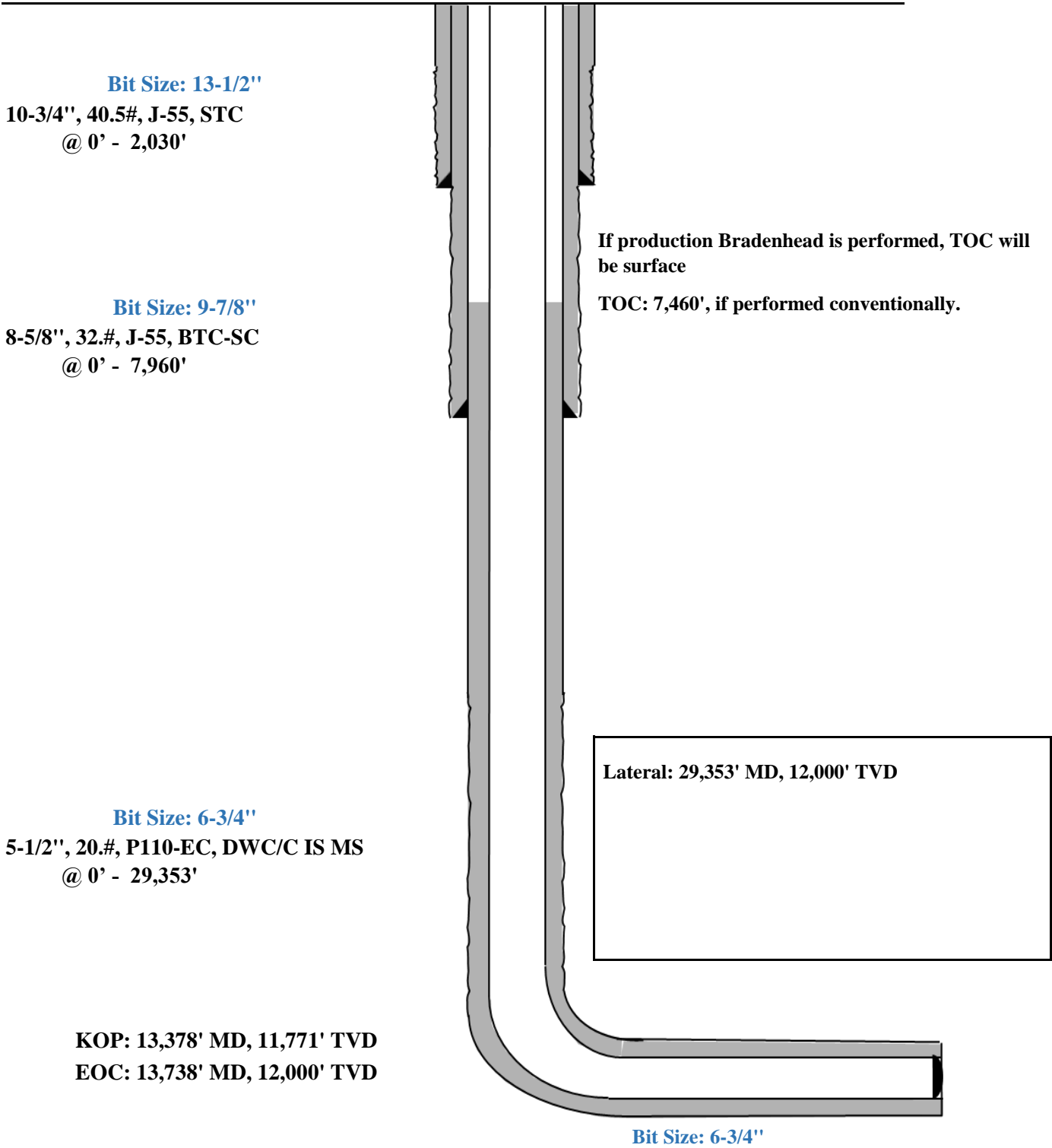


Shallow Casing Design B

Proposed Wellbore

KB: 3558'

GL: 3533'



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)		Addtl 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

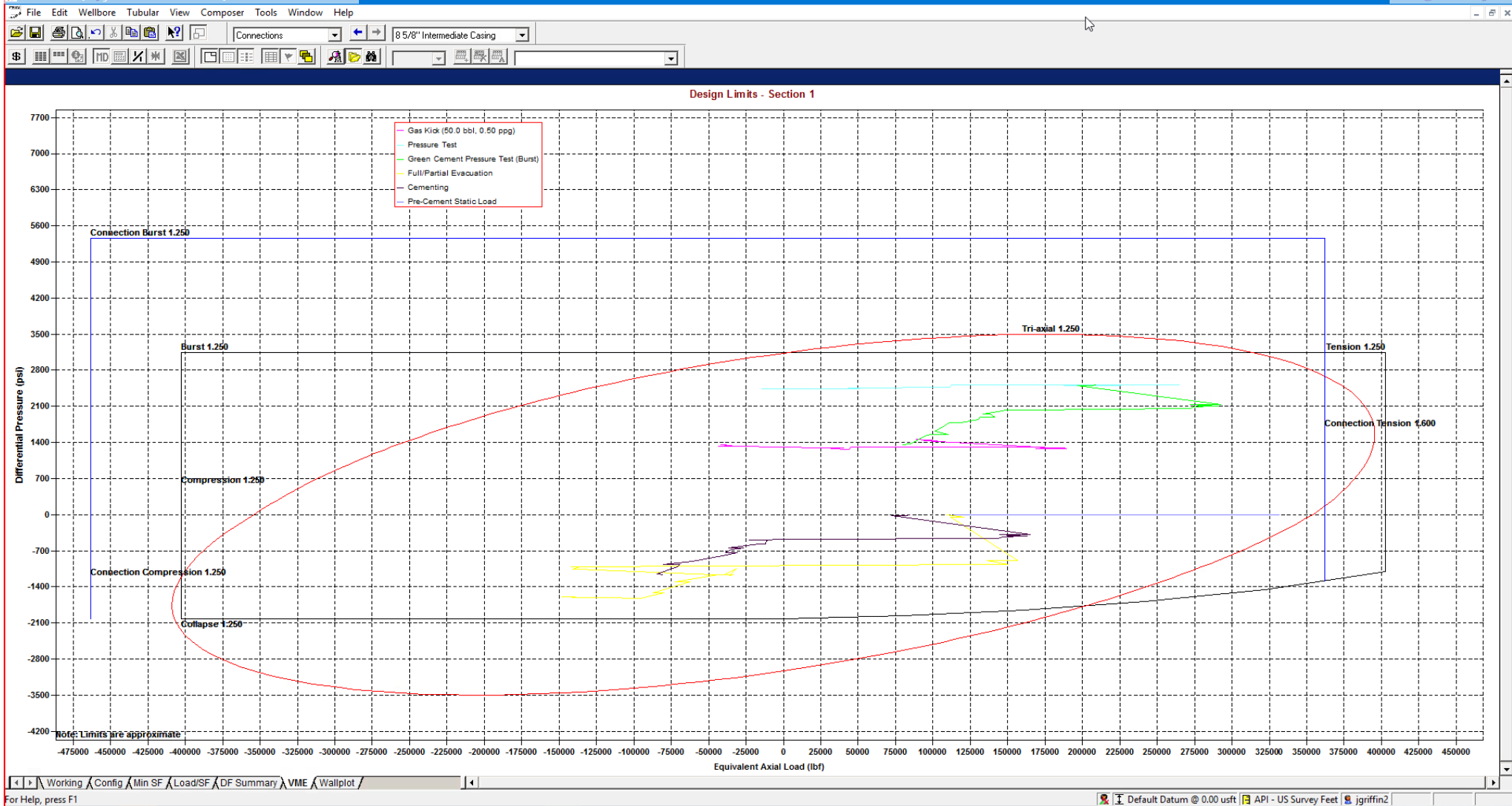
For Help, press F1

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

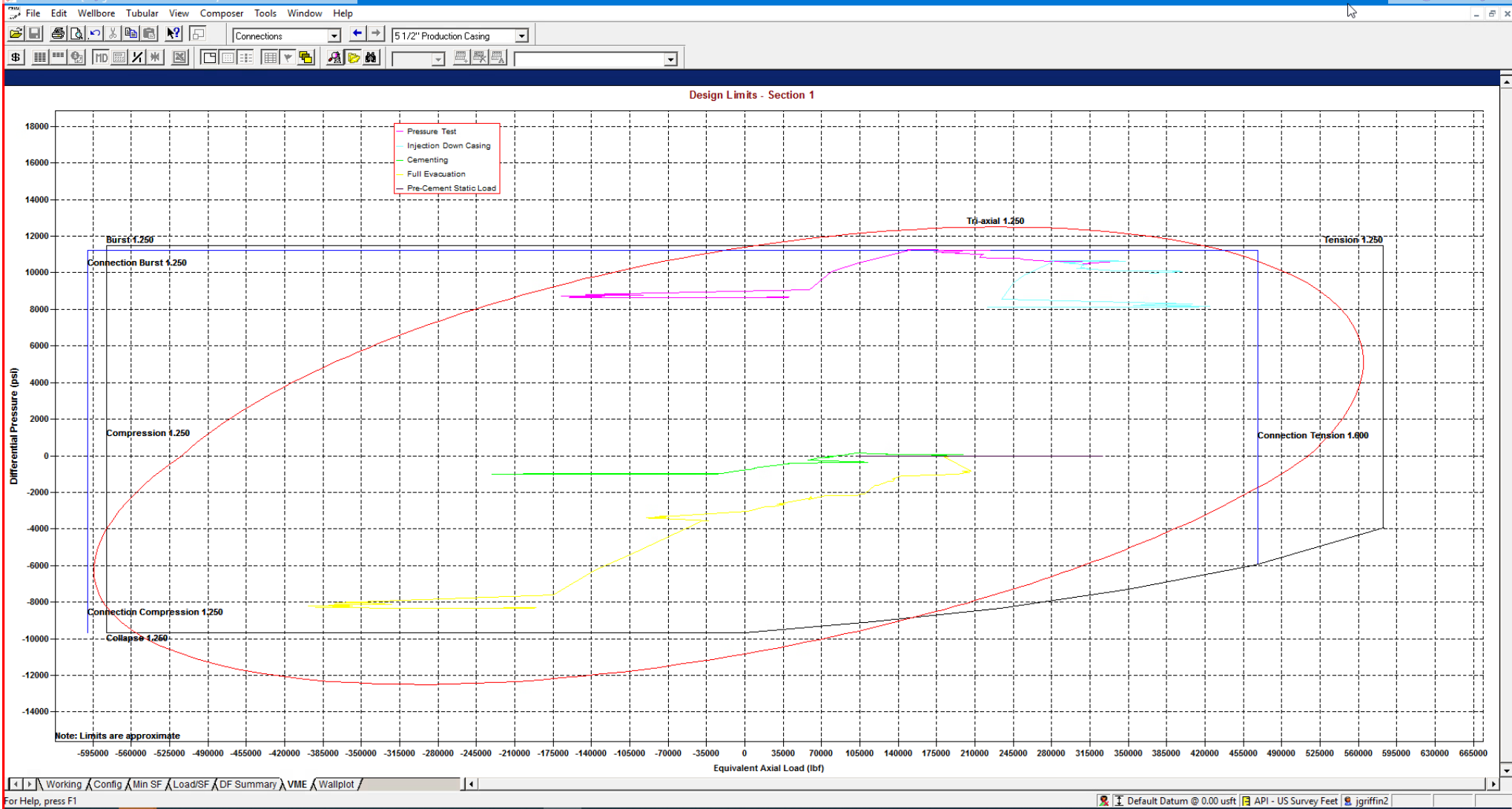


StressCheck - [String Summary - Shallow 3.0 Mile \*]

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	8 5/8", 32.000 ppg, 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.



StressCheck - [String Summary - Shallow 3.0 Mile]

File Edit Wellbore Tubular View Composer Tools Window Help

Connections 5 1/2" Production Casing

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial	Triaxial	
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										
3										
4	F Conn Fracture									
5	( ) Compression									
6	(V) Vector Collapse Safety Factor									
7										
										Total = 446,902

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





## Shallow Design C

## 4. CASING PROGRAM

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
16"	0	2,161	0	2,030	13-3/8"	54.5#	J-55	STC
11"	0	7,951	0	5,650	9-5/8"	40#	J-55	LTC
7-7/8"	0	29,353	0	12,000	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.

## 5. CEMENTING PROGRAM:

Depth	No. Sacks	Wt. ppg	Yld Ft <sup>3</sup> /sk	Slurry Description
2,030' 13-3/8"	570	13.5	1.73	Lead: Class C/H + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	160	14.8	1.34	Tail: Class C/H + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830')
8,050' 9-5/8"	760	12.7	2.22	Lead: Class C/H + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	250	14.8	1.32	Tail: Class C/H + 10% NaCl + 3% MagOx (TOC @ 6360')
29,353' 6"	1000	14.8	1.32	Bradenhead squeeze: Class C/H + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
	2500	13.2	1.52	Tail: Class C/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 @ Top of Brushy)



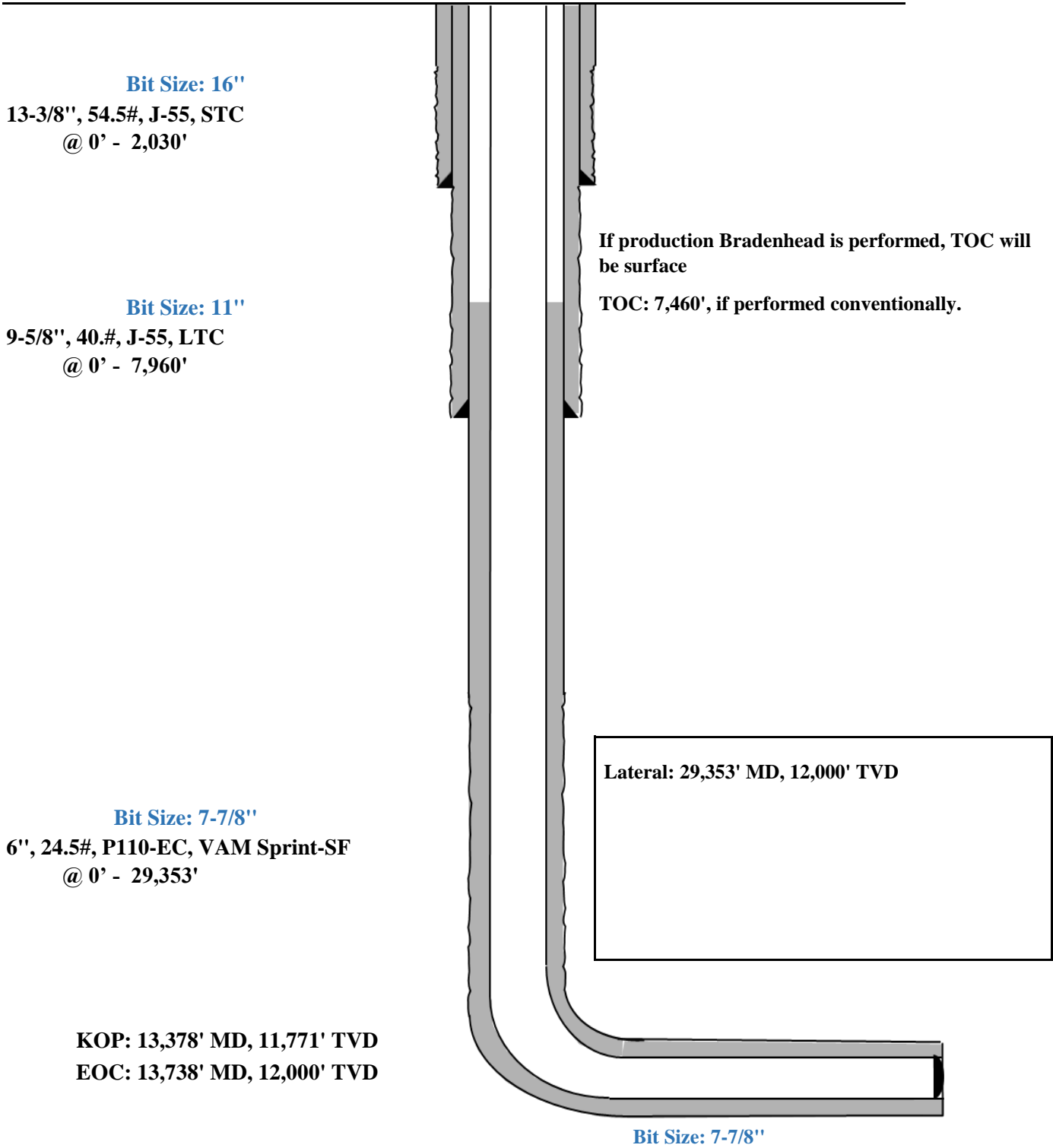


Shallow Design C

Proposed Wellbore

KB: 3558'

GL: 3533'

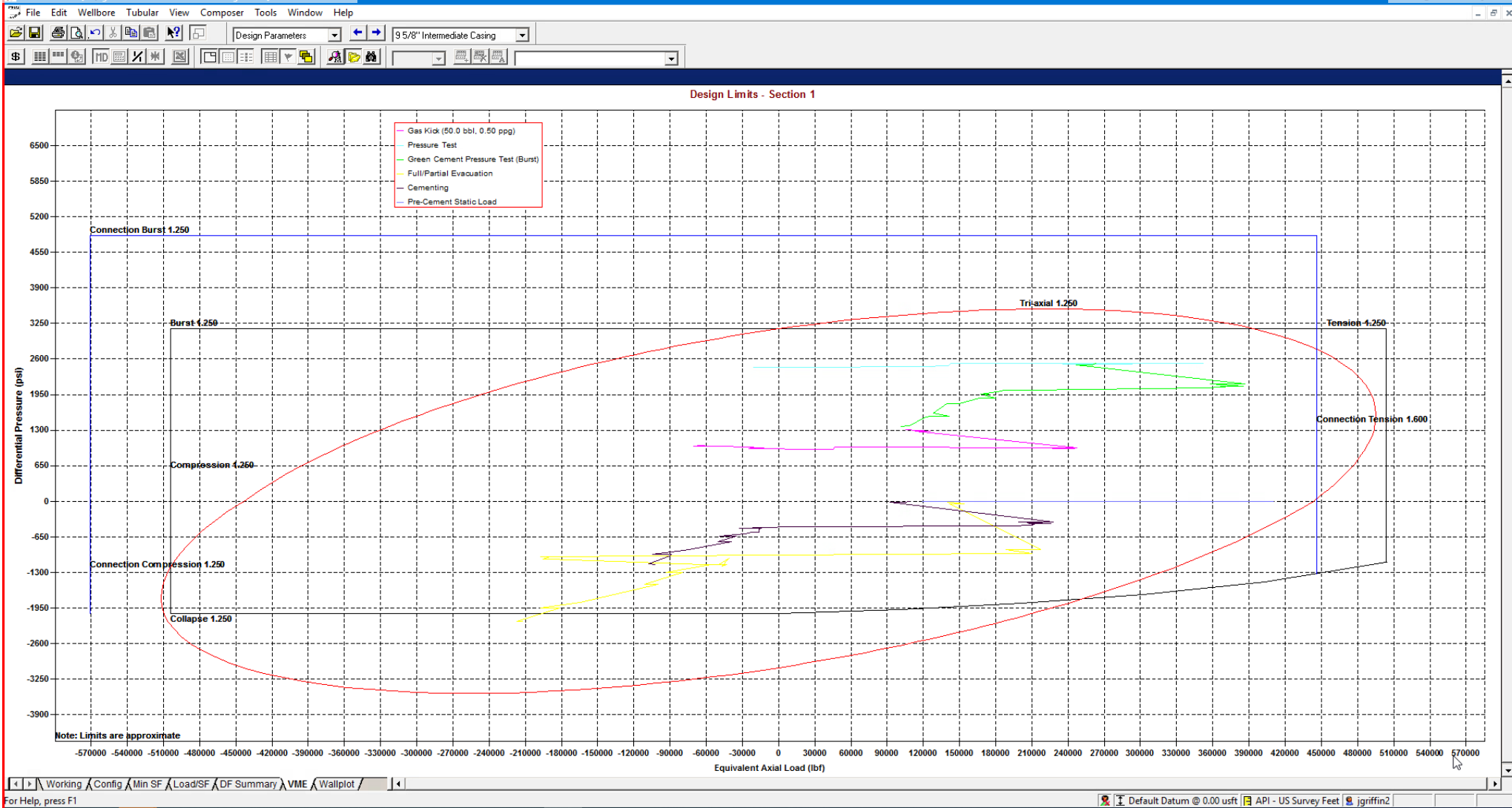


Triaxial Results														
	Depth (MD) (usft)	Axial Force (lbf)		Equivalent Axial Load (lbf)	Bending Stress at OD (psi)	Absolute Safety Factor				Temperature (°F)	Pressure (psi)		Addtl Pickup To Prevent Buck. (lbf)	Buckled Length (usft)
		Apparent (w/Bending)	Actual (w/o Bending)			Triaxial	Burst	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														

9-5/8" Intermediate Casing Pressure Test:

Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi

External Profile based off Pore Pressure: 2188 psi



StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole \*]

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.



StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole]\*

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial (1.75)	Triaxial	
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										
3										
4	( ) Compression									
5	(V) Vector Collapse Safety Factor									
6										
										Total = 541,493

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



## Shallow Design D

## 4. CASING PROGRAM

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
16"	0	2,161	0	2,030	13-3/8"	54.5#	J-55	STC
11"	0	7,951	0	5,650	9-5/8"	40#	J-55	LTC
7-7/8"	0	13,278	0	11,671	6"	22.3#	P110-EC	DWC/C IS
6-3/4"	13,278	29,353	11,671	12,000	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 Ft <sup>3</sup> /sk	Slurry Description
2,030' 13-3/8"	570	13.5	1.73	Lead: Class C/H + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	160	14.8	1.34	Tail: Class C/H + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830')
8,050' 9-5/8"	760	12.7	2.22	Lead: Class C/H + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	250	14.8	1.32	Tail: Class C/H + 10% NaCl + 3% MagOx (TOC @ 6360')
29,353' 6"	1000	14.8	1.32	Bradenhead squeeze: Class C/H + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
	2500	13.2	1.52	Tail: Class C/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 @ Top of Brushy)

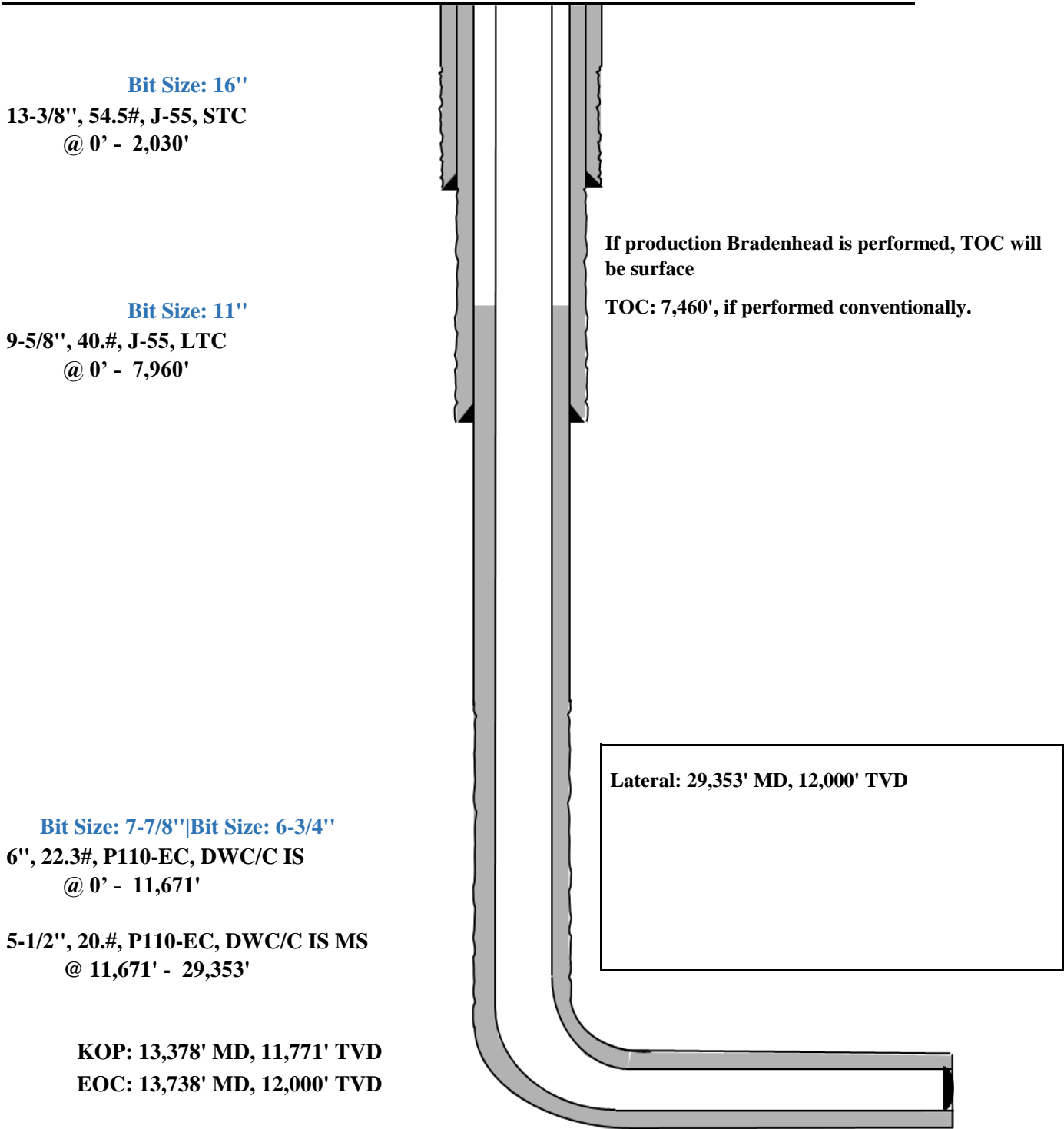


Shallow Design D

Proposed Wellbore

KB: 3558'

GL: 3533'



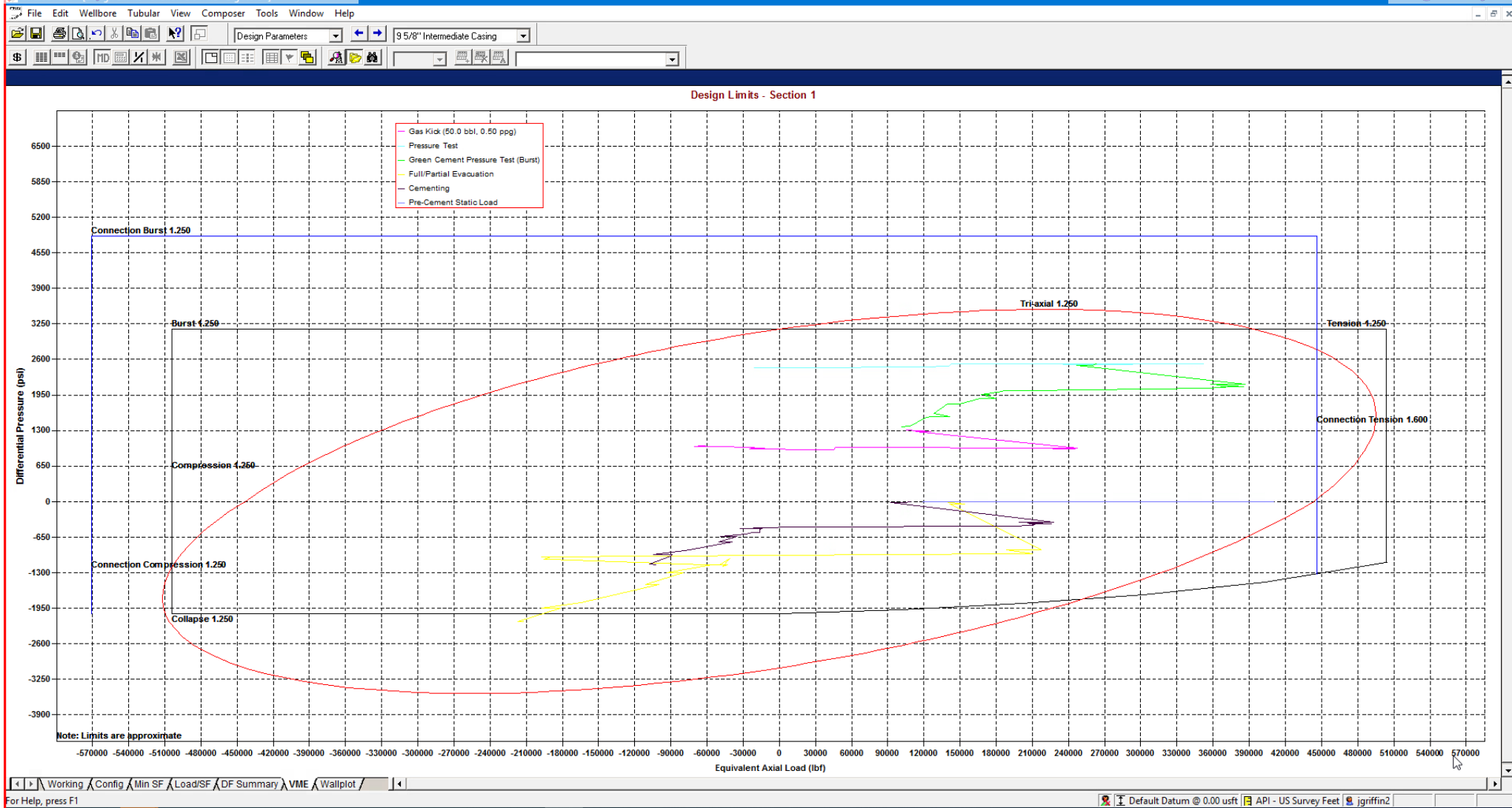
Triaxial Results														
	Depth (MD) (usft)	Axial Force (lbf)		Equivalent Axial Load (lbf)	Bending Stress at OD (psi)	Absolute Safety Factor				Temperature (°F)	Pressure (psi)		Add'l Pickup To Prevent Buck. (lbf)	Buckled Length (usft)
		Apparent (w/Bending)	Actual (w/o Bending)			Triaxial	Burst	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														

9-5/8" Intermediate Casing Pressure Test:

Internal Profile based off Surface Pressure + Hydrostatic: 4589 psi

External Profile based off Pore Pressure: 2188 psi





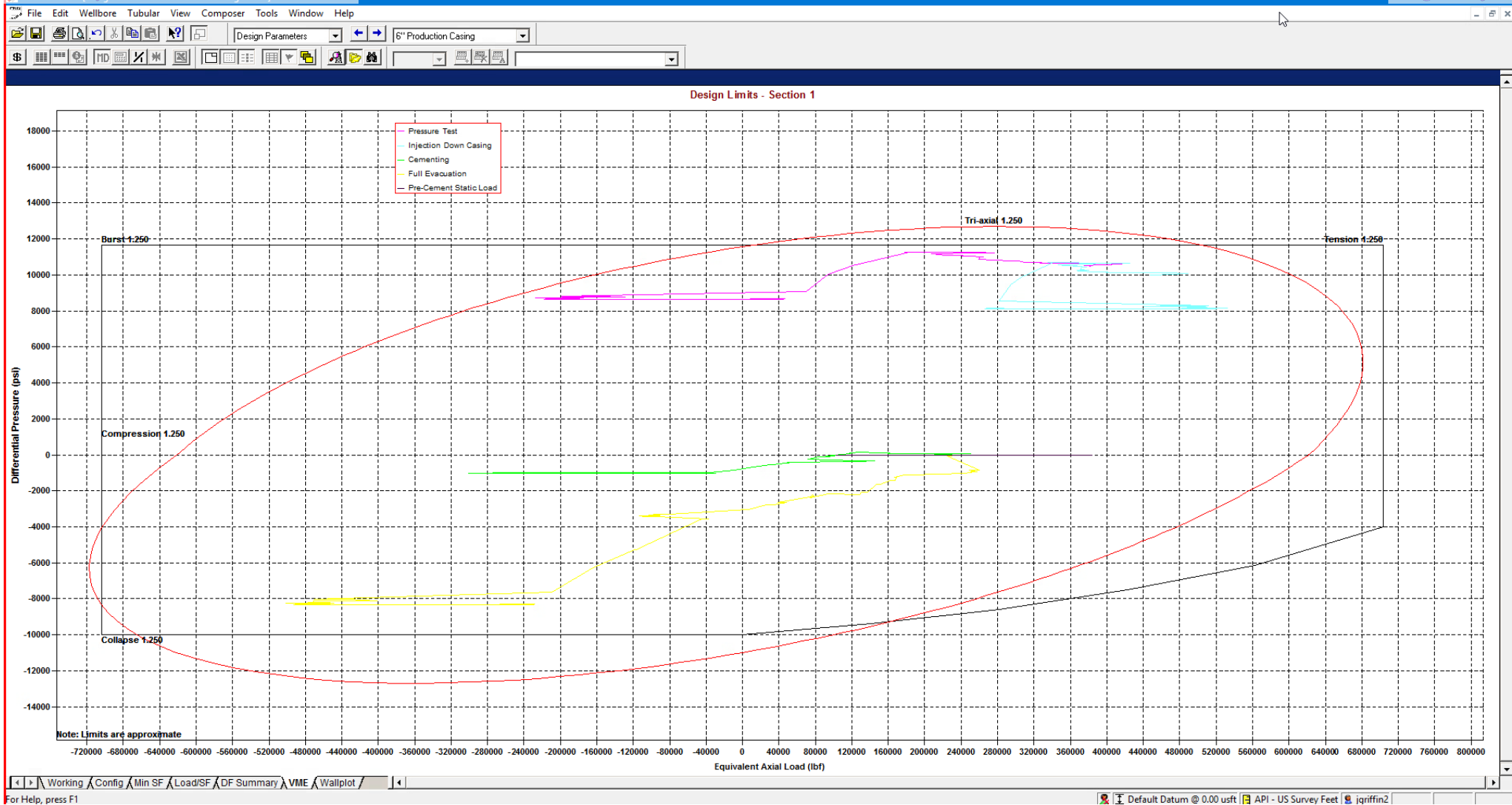
StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole \*]

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.



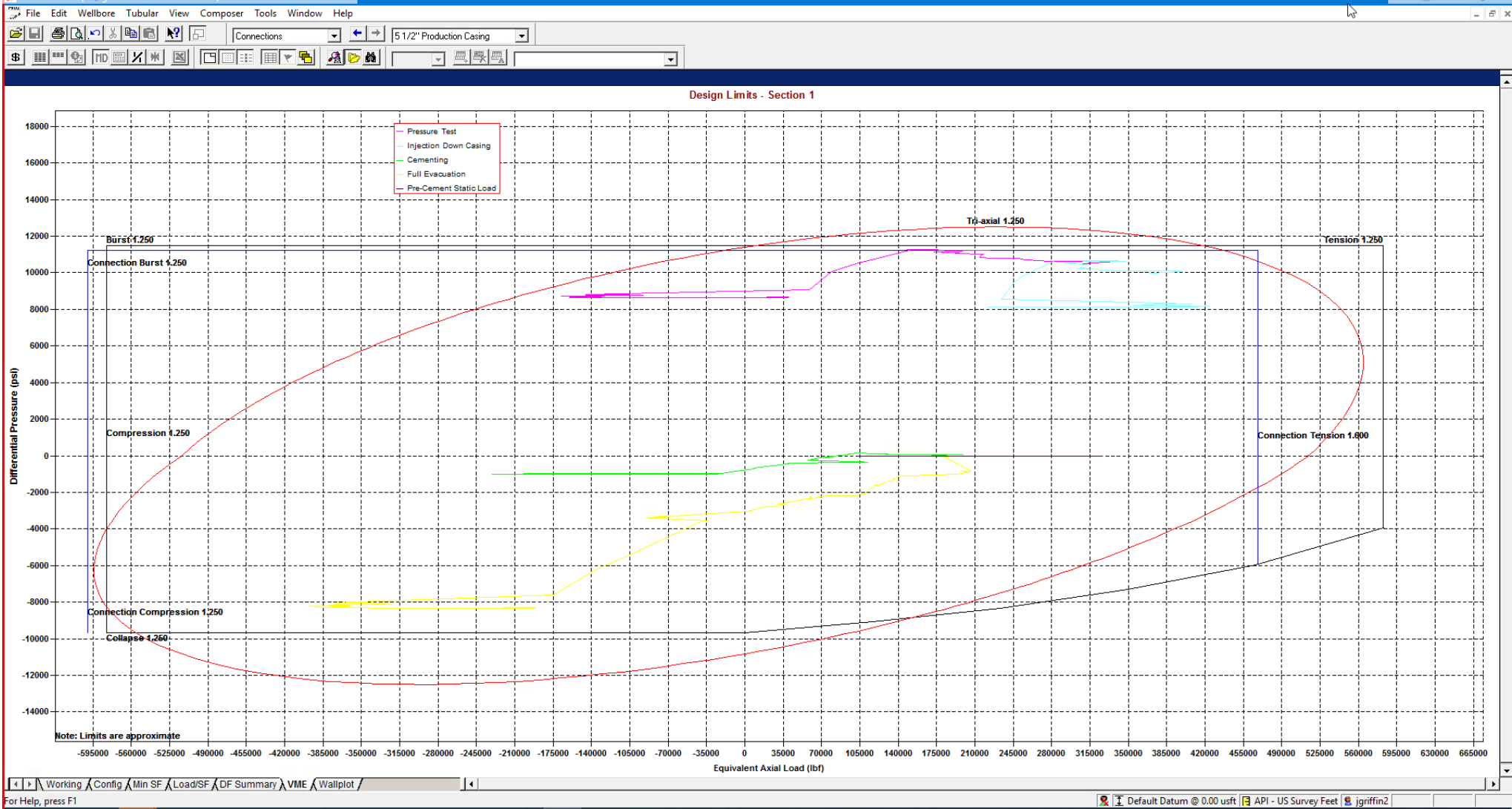


StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole]\*

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial (1.75)	Triaxial	
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										
3										
4	( ) Compression									
5	(V) Vector Collapse Safety Factor									
6										
										Total = 541,493

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



StressCheck - [String Summary - Shallow 3.0 Mile]

File Edit Wellbore Tubular View Composer Tools Window Help

Connections 5 1/2" Production Casing

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial	Triaxial	
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										
3										
4	F Conn Fracture									
5	( ) Compression									
6	(V) Vector Collapse Safety Factor									
7										
										Total = 446,902

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



## Shallow Casing Design E

## 1. CASING PROGRAM

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
13"	0	2,025	0	2,025	10-3/4"	40.5#	J-55	STC
9-7/8"	0	7,793	0	5,645	8-5/8"	32#	J-55	BTC-SC
7-7/8"	0	12,626	0	10,896	6"	24.5#	P110-EC	VAM Sprint-TC
6-3/4"	12,626	28,578	10,896	11,225	5-1/2"	20#	P110-EC	VAM Sprint SF

\*\*For highlighted rows above, variance is requested to run entire string of either 6" or 5-1/2" casing string above due to availability.

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 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.

## 2. CEMENTING PROGRAM:

Depth	No. Sacks	Wt. ppg	Yld Ft3/sk	Slurry Description
2,030' 10-3/4"	450	13.5	1.73	Lead: Class C/H + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	120	14.8	1.34	Tail: Class C/H + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1830')
7,890' 8-5/8"	460	12.7	2.22	Lead: Class C/H + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	210	14.8	1.32	Tail: Class C/H + 10% NaCl + 3% MagOx (TOC @ 6234')
28,578' 6"	1000	14.8	1.32	Bradenhead squeeze: Class C/H + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
	2410	13.2	1.52	Tail: Class C/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 @ 8140')

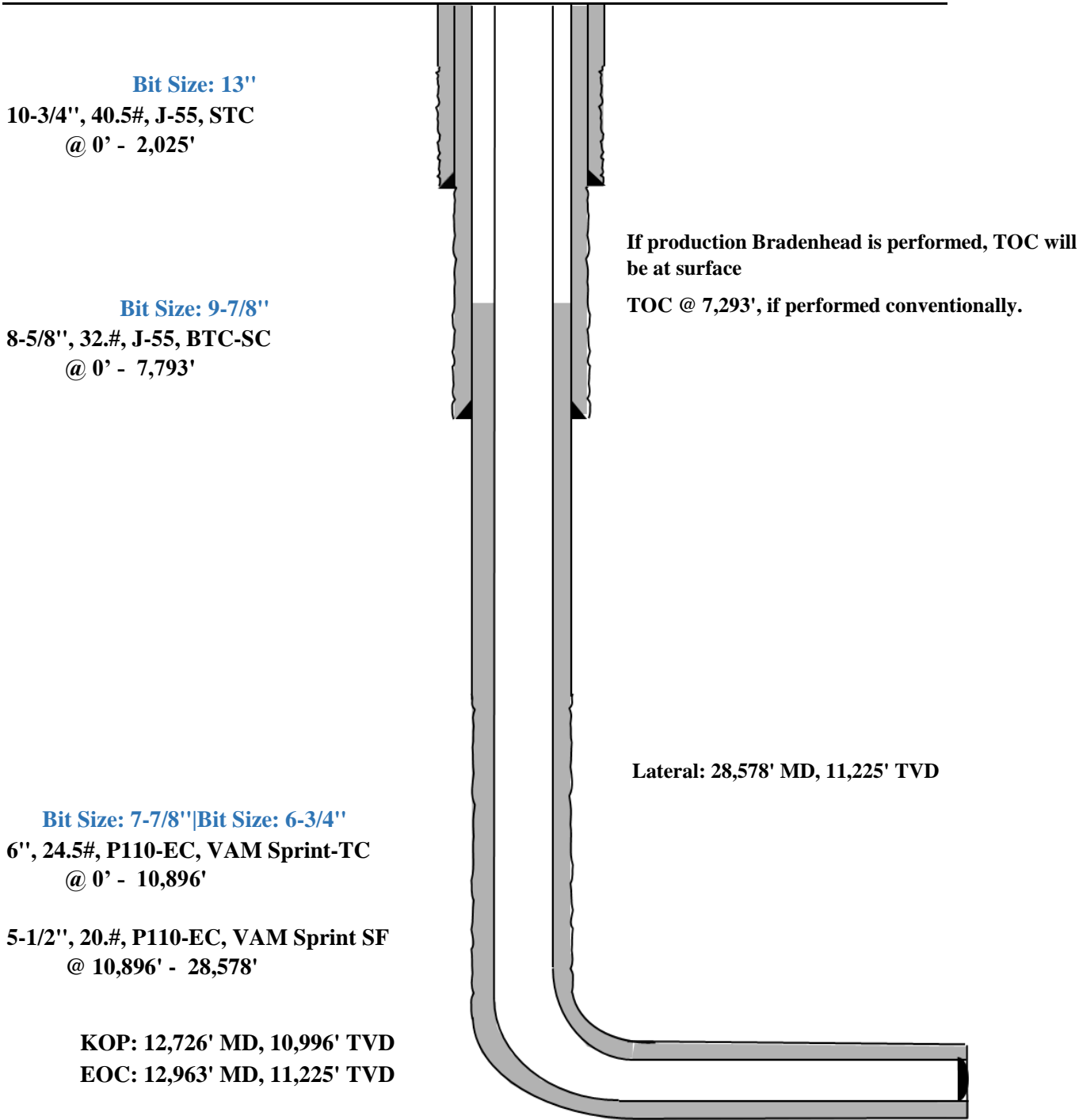


Shallow Casing Design E

Proposed Wellbore

KB: 3558'  
GL: 3533'

API: 30-025-\*\*\*\*\*



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)		Addtl 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

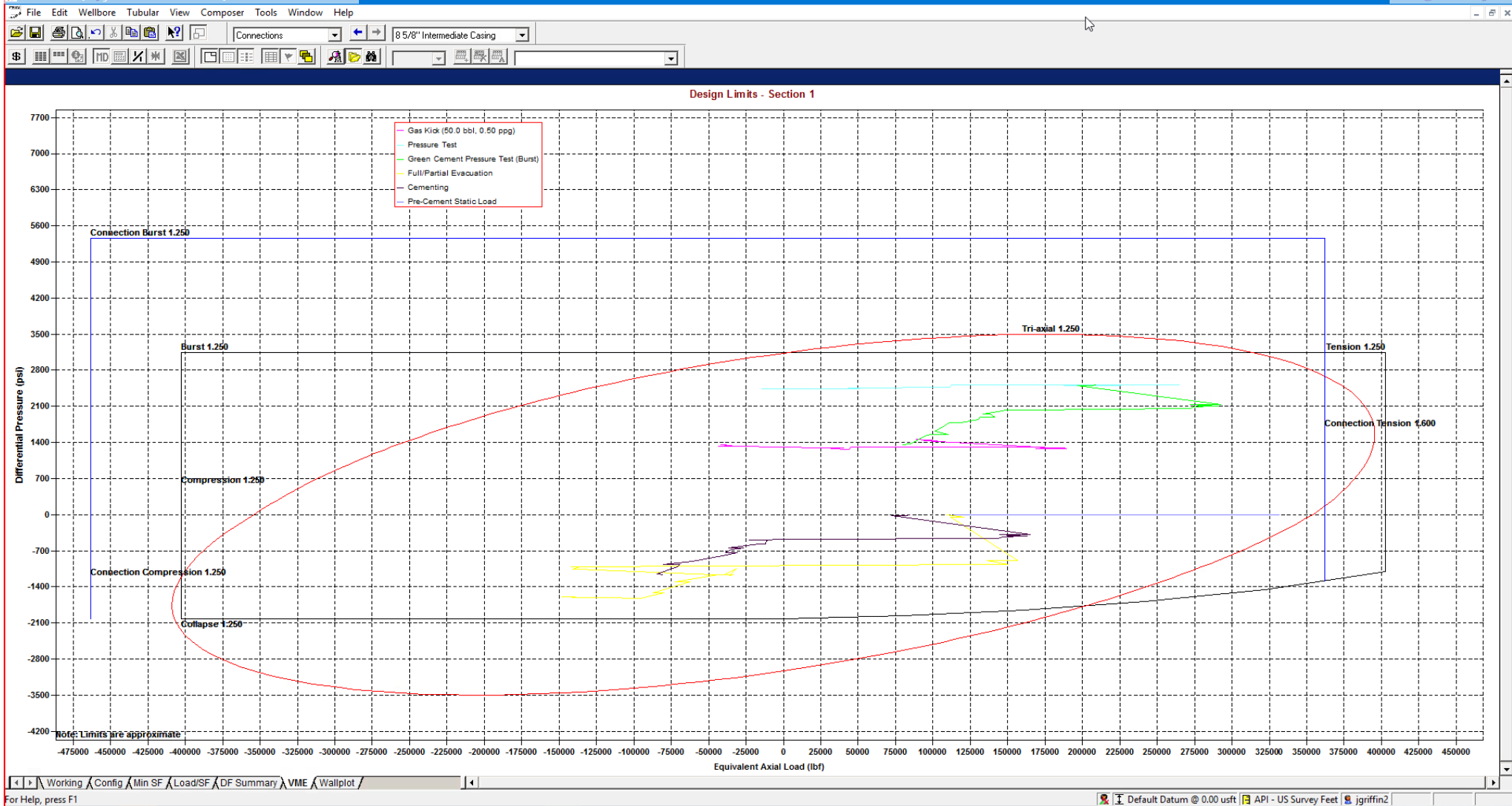
For help, press F1

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



StressCheck - [String Summary - Shallow 3.0 Mile \*]

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	8 5/8", 32.000 ppg, 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.



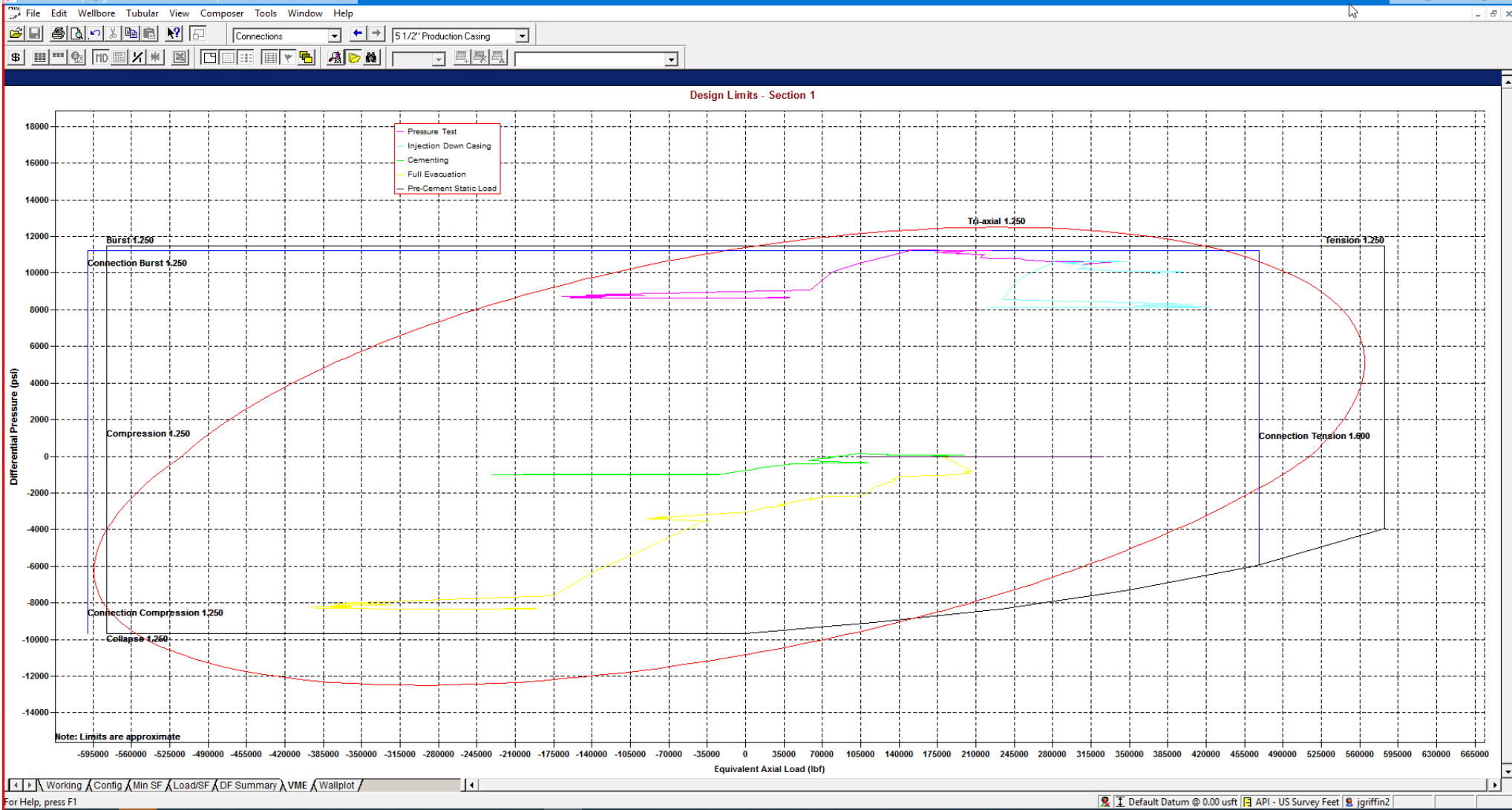
StressCheck - [String Summary - Shallow 3.0 Mile - Big Hole]\*

String Summary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial (1.75)	Triaxial	
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.





StringSummary

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse (V)	Axial	Triaxial	
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										
3										
4	F Conn Fracture									
5	( ) Compression									
6	(V) Vector Collapse Safety Factor									
7										
										Total = 446,902

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





### Shallow Casing Design 501H

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.

EOG requests variance from minimum standards to pump a two stage cement job on the production casing string with the first stage being pumped conventionally with the calculated top of cement at the top of the Brushy Canyon and the second stage performed as a 1000 sack bradenhead squeeze with planned cement from the Brushy Canyon to surface. If necessary, a top out consisting of 400 sacks of Class C cement + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (1.32 yld, 14.8 ppg) will be executed as a contingency. Top will be verified by Echo-meter.

Bradenhead will be the primary option for production cementing. EOG also requests to have the conventional option in place to accommodate for logistical or wellbore conditions. The tie back requirements will be met if the cement is pumped conventionally, and cement volumes will be adjusted accordingly. TOC will be verified by CBL.



### 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.



## **Appendix A - Spec Sheets**

New Search »

« Back to Previous List

Mechanical Properties	Pipe	BTC	LTC	STC	
Minimum Yield Strength	55,000	--	--	--	psi
Maximum Yield Strength	80,000	--	--	--	psi
Minimum Tensile Strength	75,000	--	--	--	psi
Dimenstons	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

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
Dimenstons	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



## Connection Data Sheet

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

PIPE PROPERTIES			CONNECTION PROPERTIES		
Outside Diameter	5.500	in.	Connection Type	Semi-Premium T&C	
Inside Diameter	4.778	in.	Connection O.D. (nom)	6.115	in.
Nominal Area	5.828	sq.in.	Connection I.D. (nom)	4.778	in.
Grade Type	API 5CT		Make-Up Loss	4.125	in.
Min. Yield Strength	125	ksi	Coupling Length	9.250	in.
Max. Yield Strength	140	ksi	Critical Cross Section	5.828	sq.in.
Min. Tensile Strength	135	ksi	Tension Efficiency	100.0%	of pipe
Yield Strength	729	klb	Compression Efficiency	100.0%	of pipe
Ultimate Strength	787	klb	Internal Pressure Efficiency	100.0%	of pipe
Min. Internal Yield	14,360	psi	External Pressure Efficiency	100.0%	of pipe
Collapse	12,090	psi			

CONNECTION PERFORMANCES			FIELD END TORQUE VALUES		
Yield Strength	729	klb	Min. Make-up torque	16,100	ft.lb
Parting Load	787	klb	Opti. Make-up torque	17,350	ft.lb
Compression Rating	729	klb	Max. Make-up torque	18,600	ft.lb
Min. Internal Yield	14,360	psi	Min. Shoulder Torque	1,610	ft.lb
External Pressure	12,090	psi	Max. Shoulder Torque	12,880	ft.lb
Maximum Uniaxial Bend Rating	104.2	°/100 ft	Min. Delta Turn	-	Turns
Reference String Length w 1.4 Design Factor	26,040	ft	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](mailto: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).

Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.

**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](mailto:VAMUSAsales@vam-usa.com)Tech Support Email: [tech.support@vam-usa.com](mailto: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](mailto:tech.support@vam-usa.com) for details on connection ratings and make-up.



Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.



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
Dimenstons	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





## 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 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 <sup>2</sup>
*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

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.

ALL INFORMATION IS PROVIDED BY VALLOUREC OR ITS AFFILIATES AT USER'S SOLE RISK, WITHOUT LIABILITY FOR LOSS, DAMAGE OR INJURY RESULTING FROM THE USE THEREOF; AND ON AN "AS IS" BASIS WITHOUT WARRANTY OR REPRESENTATION OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR PURPOSE, ACCURACY OR COMPLETENESS. THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON ESTIMATES THAT HAVE NOT BEEN VERIFIED OR TESTED. IN NO EVENT SHALL VALLOUREC OR ITS AFFILIATES BE RESPONSIBLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL LOSS OR DAMAGE (INCLUDING WITHOUT LIMITATION, LOSS OF USE, LOSS OF BARGAIN, LOSS OF REVENUE, PROFIT OR ANTICIPATED PROFIT) HOWEVER CAUSED OR ARISING, AND WHETHER SUCH LOSSES OR DAMAGES WERE FORESEEABLE OR VALLOUREC OR ITS AFFILIATES WERE ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Rev 3, 7/30/2021

10/21/2022 15:24

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

Issued on: 10 Feb. 2021 by Wesley Ott

# VAM® SPRINT-SF

## Connection Data Sheet

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

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

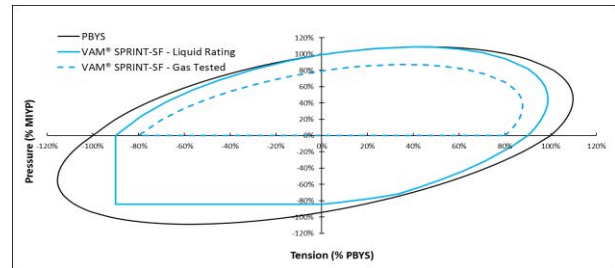
CONNECTION PROPERTIES		
Connection Type	Integral Semi-Flush	
Connection OD (nom):	6.277	in.
Connection ID (nom):	5.146	in.
Make-Up Loss	5.386	in.
Critical Cross Section	6.417	sqin.
Tension Efficiency	91.0	% of pipe
Compression Efficiency	91.0	% of pipe
Internal Pressure Efficiency	100	% of pipe
External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



canada@vamfieldservice.com  
usa@vamfieldservice.com  
mexico@vamfieldservice.com  
brazil@vamfieldservice.com

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

uk@vamfieldservice.com  
dubai@vamfieldservice.com  
nigeria@vamfieldservice.com  
angola@vamfieldservice.com

china@vamfieldservice.com  
baku@vamfieldservice.com  
singapore@vamfieldservice.com  
australia@vamfieldservice.com

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





## Connection Data Sheet

OD (in.)	WEIGHT (lbs./ft.)	WALL (in.)	GRADE	API DRIFT (in.)	RBW%	CONNECTION
6.000	Nominal: 22.30 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 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.

### 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

### 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](mailto: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).

Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.



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](mailto:VAMUSAsales@vam-usa.com)  
Tech Support Email: [tech.support@vam-usa.com](mailto: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](mailto:tech.support@vam-usa.com) for details on connection ratings and make-up.

Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.

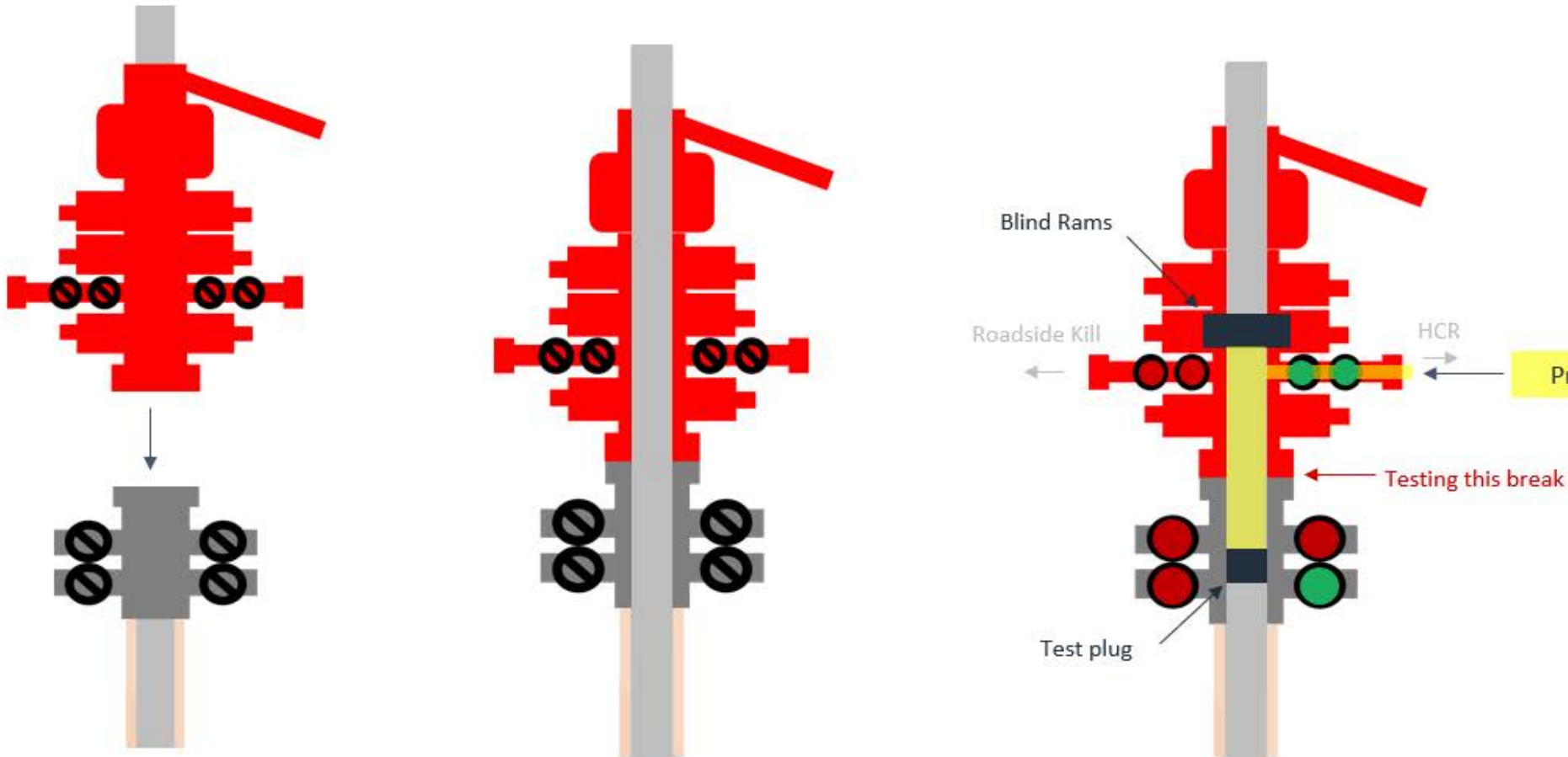


**Break-test BOP & Offline Cementing:**

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 30 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 ð during each full BOPE test
  - Upper Pipe Rams ð On trip ins where FIT required
  - Blind Rams ð Every trip
  - Lower Pipe Rams ð 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



The image consists of three sequential diagrams illustrating a well intervention process:

- Diagram 1 (Left):** Shows a red plug assembly positioned above a grey pipe. The plug has a central vertical section and two horizontal sections with black circles. A red line extends from the top right.
- Diagram 2 (Middle):** The red plug is shown moving down the grey pipe, indicated by a downward arrow. The plug is now partially inside the pipe.
- Diagram 3 (Right):** The red plug is fully seated at the bottom of the pipe. Labels include:
  - Upper Pipe Rams:** Points to the top of the red plug.
  - Roadside Kill:** Points to the left horizontal section of the plug.
  - HCR:** Points to the right horizontal section of the plug.
  - Testing this break:** Points to the central vertical section of the plug.
  - Test plug:** Points to the bottom of the plug.

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



Mad Adder 31 State Com 301H

747' FSL

815' FEL

Section 31

T-24-S, R-33-E

Wellbore

KB: 3531'

GL: 3506'

API: 30-025-\*\*\*\*\*

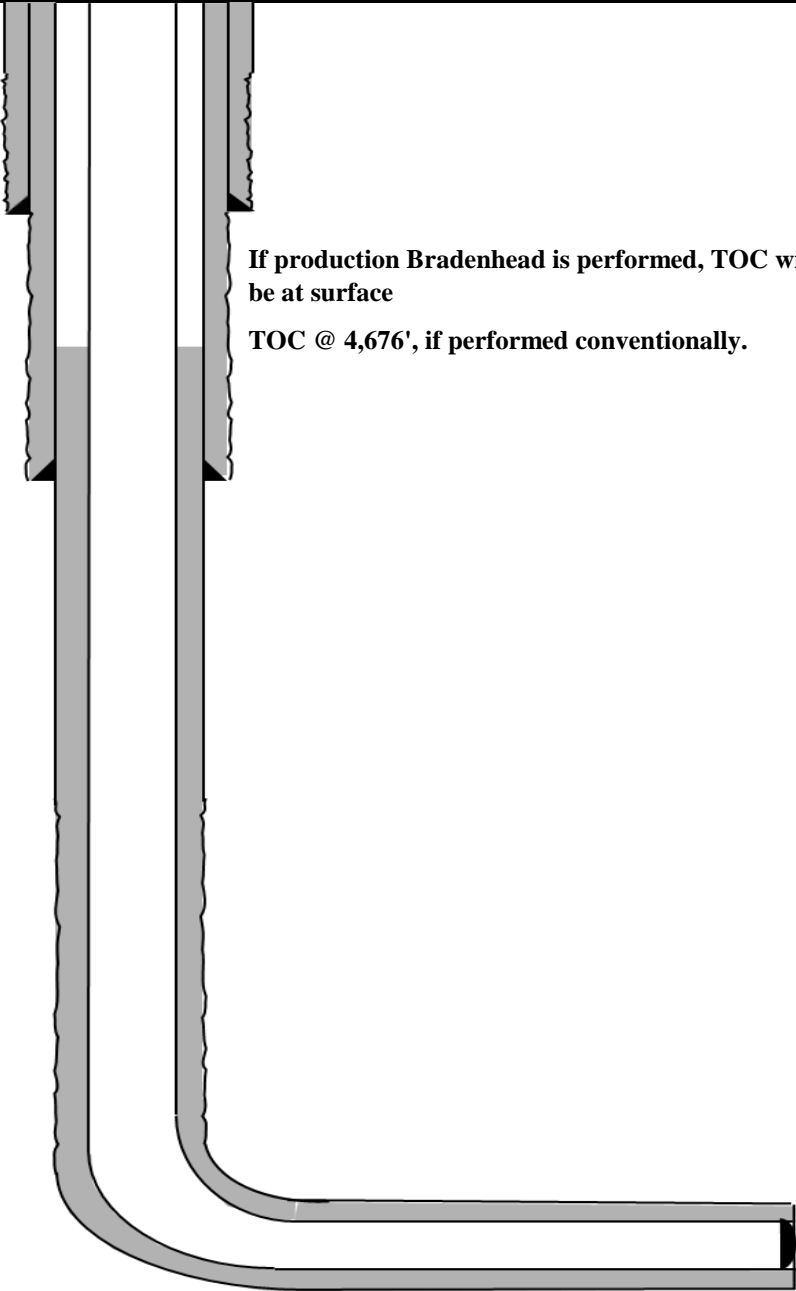
Bit Size: 13"  
10-3/4", 40.5#, J-55, STC  
@ 0' - 1,000'

Bit Size: 9-7/8"  
8-5/8", 32.#, J-55, BTC-SC  
@ 0' - 5,176'

Bit Size: 7-7/8" | Bit Size: 6-3/4"  
6", 24.5#, P110-EC, VAM Sprint-TC  
@ 0' - 9,893'

5-1/2", 20.#, P110-EC, VAM Sprint SF  
@ 9,893' - 20,721'

If production Bradenhead is performed, TOC will  
be at surface  
TOC @ 4,676', if performed conventionally.



KOP: 10,036' MD, 9,993' TVD  
EOC: 10,786' MD, 10,470' TVD

Lateral: 20,721' MD, 10,470' TVD  
BH Location: 100' FNL & 600' FEL  
Sec. 30  
T-24-S R-33-E





### Mad Adder 31 State Com 301H

#### Permit Information:

Well Name: Mad Adder 31 State Com 301H

Location: SHL: 747' FSL & 815' FEL, Section 31, T-24-S, R-33-E, LEA Co., N.M.

BHL: 100' FNL & 600' FEL, Section 30, T-24-S, R-33-E, LEA Co., N.M.

#### Casing Program:

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
13"	0	1,000	0	1,000	10-3/4"	40.5#	J-55	STC
9-7/8"	0	5,176	0	5,132	8-5/8"	32#	J-55	BTC-SC
7-7/8"	0	9,936	0	9,893	6"	24.5#	P110-EC	VAM Sprint-TC
6-3/4"	9,936	20,721	9,893	10,470	5-1/2"	20#	P110-EC	VAM Sprint SF

\*\*For highlighted rows above, variance is requested to run entire string of either or casing string above due to availability.

#### Cement Program:

Depth	No. Sacks	Wt. ppg	Yld Ft3/sk	Slurry Description
1,000'	230	13.5	1.73	Class C/H + additives (TOC @ Surface)
	100	14.8	1.34	Class C/H + additives
5,180'	430	12.7	1.11	Tail: Class C/H + additives + expansion additives (TOC @ Surface)
	250	14.8	1.5	Lead: Class C/H + additives (TOC @ 4,106')
20,721'	730	10.5	3.21	Lead: Class C/H + additives (TOC @ 4,676')
	1270	13.2	1.52	Tail: Class C/H + additives

#### Mud Program:

Section	Depth	Type	Weight (ppg)	Viscosity	Water Loss
Surface	0 – 1,000'	Fresh - Gel	8.6-9.2	28-34	N/c
Intermediate	1,000' – 5,130'	Brine	9.0-10.5	28-34	N/c
Production	5,130' – 20,721' Lateral	Oil Base	8.8-9.5	58-68	N/c - 6



## Mad Adder 31 State Com 301H

### TUBING REQUIREMENTS

EOG respectfully requests an exception to the following NMOCD rule:

- 19.15.16.10 Casing AND TUBING REQUIREMENTS:  
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.

**Mad Adder 31 State Com 301H****Hydrogen Sulfide Plan Summary**

A. All personnel shall receive proper H<sub>2</sub>S training in accordance with Onshore Order III.C.3.a.

B. Briefing Area: two perpendicular areas will be designated by signs and readily accessible.

C. Required Emergency Equipment:

■ Well control equipment

- a. Flare line 150' from wellhead to be ignited by flare gun.
- b. Choke manifold with a remotely operated choke.
- c. Mud/gas separator

■ Protective equipment for essential personnel.

Breathing apparatus:

- a. Rescue Packs (SCBA) — 1 unit shall be placed at each breathing area, 2 shall be stored in the safety trailer.
- b. Work/Escapes packs — 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
- c. Emergency Escape Packs — 4 packs shall be stored in the doghouse for emergency evacuation.

Auxiliary Rescue Equipment:

- a. Stretcher
- b. Two OSHA full body harness
- c. 100 ft 5/8 inch OSHA approved rope
- d. 1-20# class ABC fire extinguisher

■ H<sub>2</sub>S detection and monitoring equipment:

The stationary detector with three sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible @ 14 ppm. Calibrate a minimum of every 30 days or as needed. The sensors will be placed in the following places: Rig floor / Bell nipple / End of flow line or where well bore fluid is being discharged.

(Gas sample tubes will be stored in the safety trailer)

■ Visual warning systems.

- a. One color code condition sign will be placed at the entrance to the site reflecting the possible conditions at the site.
- b. A colored condition flag will be on display, reflecting the current condition at
- c. Two wind socks will be placed in strategic locations, visible from all angles.



■ Mud program:

The mud program has been designed to minimize the volume of H<sub>2</sub>S circulated to surface. The operator will have the necessary mud products to minimize hazards while drilling in H<sub>2</sub>S bearing zones.

■ Metallurgy:

All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H<sub>2</sub>S service.

■ Communication:

Communication will be via cell phones and land lines where available.



**Mad Adder 31 State Com #301H  
Emergency Assistance Telephone List**

**PUBLIC SAFETY:** **911 or**

Lea County Sheriff's Department (575) 396-3611

Rod Coffman

**Fire Department:**

Carlsbad (575) 885-3125

Artesia (575) 746-5050

**Hospitals:**

Carlsbad (575) 887-4121

Artesia (575) 748-3333

Hobbs (575) 392-1979

Dept. of Public Safety/Carlsbad (575) 748-9718

Highway Department (575) 885-3281

New Mexico Oil Conservation (575) 476-3440

NMOCD Inspection Group - South (575) 626-0830

U.S. Dept. of Labor (575) 887-1174

**EOG Resources, Inc.**

EOG / Midland Office (432) 686-3600

**Company Drilling Consultants:**

David Dominique Cell (985) 518-5839

Mike Vann Cell (817) 980-5507

**Drilling Engineer**

Stephen Davis Cell (432) 235-9789

Matt Day Cell (432) 296-4456

**Drilling Manager**

Branden Keener Office (432) 686-3752

Cell (210) 294-3729

**Drilling Superintendent**

Steve Kelly Office (432) 686-3706

Cell (210) 416-7894

**H&P Drilling**

H&P Drilling Office (432) 563-5757

H&P 651 Drilling Rig Rig (903) 509-7131

**Tool Pusher:**

Johnathan Craig Cell (817) 760-6374

Brad Garrett

**Safety:**

Brian Chandler (HSE Manager) Office (432) 686-3695

Cell (817) 239-0251