#### K

Received by OCD: 2/15/2024 1:52:15 PM						Page 1 of			
Form 3160-5 (June 2019)		UNITED STATES PARTMENT OF THE INT			5	O Expi	DRM APPROVED MB No. 1004-0137 res: October 31, 2021		
	BUR	EAU OF LAND MANAC	GEMENT		5.	Lease Serial No. NI	MNM108503		
	SUNDRY NOTICES AND REPORTS ON WELLS Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.						Tribe Name		
	SUBMIT IN	TRIPLICATE - Other instruction	ons on page	92	7.	7. If Unit of CA/Agreement, Name and/or No.			
1. Type of Well									
✓ Oil We					8.	Well Name and No.	ANTERO 14 FED COM/742H		
2. Name of Operator		CES INCORPORATED			9	API Well No. 30-02	5-51813		
3a. Address 1111 BA	GBY SKY LOB		. Phone No. ( 13) 651-700	(include area coa 10	F		R BONE SPRING		
4. Location of Well (F SEC 14/T25S/R33	-	R.,M., or Survey Description)				. Country or Parish, EA/NM	State		
	12. CHE	CK THE APPROPRIATE BOX	(ES) TO INE	DICATE NATUR	E OF NOTICE	, REPORT OR OTH	ER DATA		
TYPE OF SUB	MISSION			ТҮ	YPE OF ACTIO	N			
✓ Notice of Inten	t	Acidize	Deepo	en aulic Fracturing		Production (Start/Resume)       Water Shut-Off         Reclamation       Well Integrity			
Subsequent Rep	port	Casing Repair Change Plans		Construction and Abandon		complete Other nporarily Abandon			
Final Abandonr	ment Notice	Convert to Injection	Plug 1	Back	Water D	isposal			
the Bond under wh completion of the completed. Final A is ready for final in	nich the work wil involved operation abandonment Nor inspection.)	Il be perfonned or provide the Bo ons. If the operation results in a r	ond No. on fi multiple com requirements	le with BLM/BL	A. Required sub pletion in a new	osequent reports mus v interval, a Form 31	f all pertinent markers and zones. Attach to be filed within 30 days following 60-4 must be filed once testing has been ne operator has detennined that the site		
EOG respectfu	lly requests an	amendment to our approved	APD for this	s well to reflect	the following o	changes:			
Change name	from Antero 14	Fed Com 742H to Antero 14	Fed Com 1	02H.					
-		33-E, Sec 14, 2553' FSL, 149 33' FNL, 1304' FWL, Lea Co.		a Co., NM,					
•		33-E, Sec 11, 100' FNL, 1712 0' FNL, 2610' FEL, Lea Co., N		Co., NM,					
Continued on p	-								
14. I hereby certify that STAR HARRELL / F	d/Typed)	Regulato Title	ory Specialist						
(Electi Signature		Date 02/12/2024							
		THE SPACE F	OR FEDE	ERAL OR S	TATE OFIC	E USE			
Approved by									
CHRISTOPHER W	ALLS / Ph: (57	5) 234-2234 / Approved		Title Petr	roleum Engine		02/15/2024 Date		
Conditions of approval certify that the applican which would entitle the		or ase Office C	ARLSBAD						

Fitle 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States
any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction

(Instructions on page 2)

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DISTRICT I 1625 N. French Dr., Hobbs, NM 88240 Phone: (575) 393-0f20 DISTRICT II 811 S. First St., Artesia, NM 88210 Phone: (575) 748-1283 Fas: (575) 748-9720 DISTRICT III 1000 Rio Brazos Rd., Aztee, NM 87410 Phone: (505) 334-6178 Fas: (505) 334-6170 DISTRICT IV 1220 S. St. Francis Dr., Santa Fe, NM 87505 Phone: (505) 476-3460 Fas: (505) 476-3462

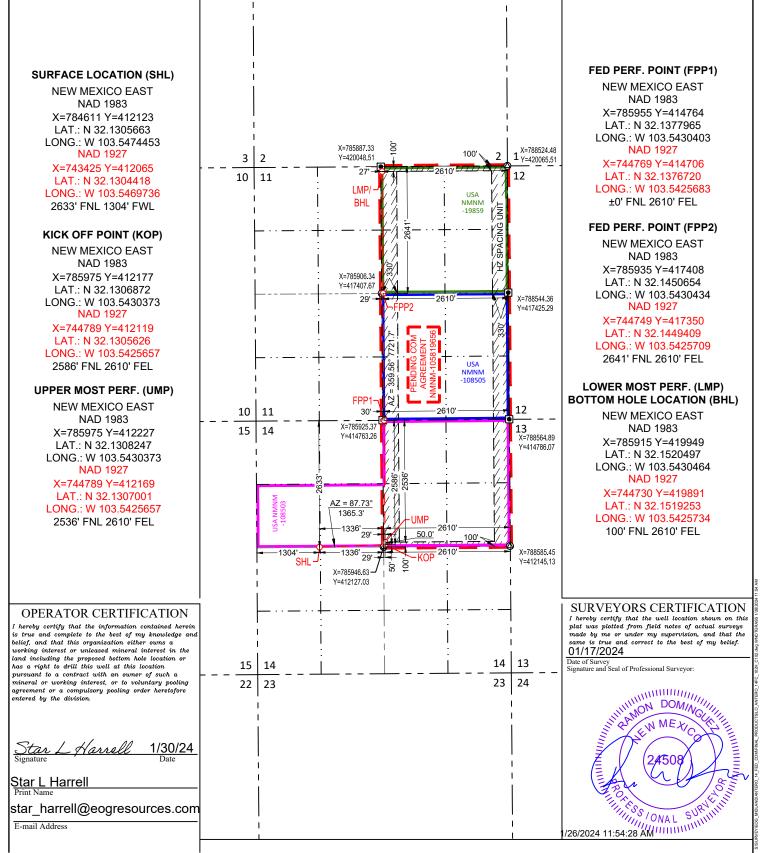
#### State of New Mexico Energy, Minerals & Natural Resources Department OIL CONSERVATION DIVISION 1220 South St. Francis Dr. Santa Fe, New Mexico 87505

□ AMENDED REPORT

#### WELL LOCATION AND ACREAGE DEDICATION PLAT

AI	PI Number			Pool Code							
30	0-025-51	813		97900		RED HILLS UPPER;BONE SPRING SHALE					
Property Co	de		Property Name						Well Number		
32648	1			A	NTERO 14 FE	D COM		10	2H		
OGRID No	o.				Operator Name			Elevatio	on		
7377				EC	G RESOURC	ES, INC.		33	57'		
	Surface Location										
UL or lot no.	Section	Townsh	ip Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County		
E	14	25-8	6 33-E	-	2633'	NORTH	1304'	WEST	LEA		
			Bott	om Hole I	Location If Diff	erent From Surfac	e				
UL or lot no.	Section	Townsh	ip Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County		
В	11	25-8	6 33-E	-	- 100' NORTH 2610' EAST LEA				LEA		
Dedicated Acres	Joint or	Infill	Consolidated Co	Consolidated Code Order No.							
480.00				PENDING COM AGREEMENT: NMNM-105819656							

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



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

Well Name: Antero 14 Fed Com 102H

Location: SHL: 2633' FNL & 1304' FWL, Section 14, T-25-S, R-33-E, Lea Co., N.M. BHL: 100' FNL & 2610' FEL, Section 11, T-25-S, R-33-E, Lea Co., N.M.

#### 1. CASING PROGRAM A:

Hole	Interval MD Interval		Interval TVD		Csg			
Size	From (ft)	To (ft)	From (ft)	To (ft)	OD	Weight	Grade	Conn
16"	0	1,250	0	1,250	13-3/8"	54.5#	J-55	STC
11"	0	5,163	0	4,990	9-5/8"	40#	J-55	LTC
6-3/4"	0	17,218	0	9,490	5-1/2"	20#	P110-EC	DWC/C IS MS

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 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.

Depth	No. Sacks	Wt.	Yld Ft3/sk	Slurry Description
1,250' 13-3/8''	330	13.5	1.73	Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	160	14.8	1.34	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1,050')
<b>4,990'</b> 9-5/8''	500	12.7	2.22	Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)
	170	14.8	1.32	Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 4,130')
17,218' 5-1/2''	320	10.5	3.21	Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 4,663')
	570	13.2	1.52	Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 9180')

#### 2. CEMENTING PROGRAM:

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

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

#### 3. MUD PROGRAM:

Depth (TVD)	Туре	Type Weight (ppg)		Water Loss
0 – 1,250'	Fresh - Gel	8.6-8.8	28-34	N/c
1,250' – 4,990'	Brine	9.0-10.5	28-34	N/c
4,990' - 17,218'	Oil Base	8.8-9.5	58-68	N/c - 6

#### 4. VARIANCE REQUESTS:

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

- BOP Break Testing for 5M Intermediate Intervals
- Offline Cementing for Surface and Intermediate Intervals
- Salt Interval Washout Annular Clearance

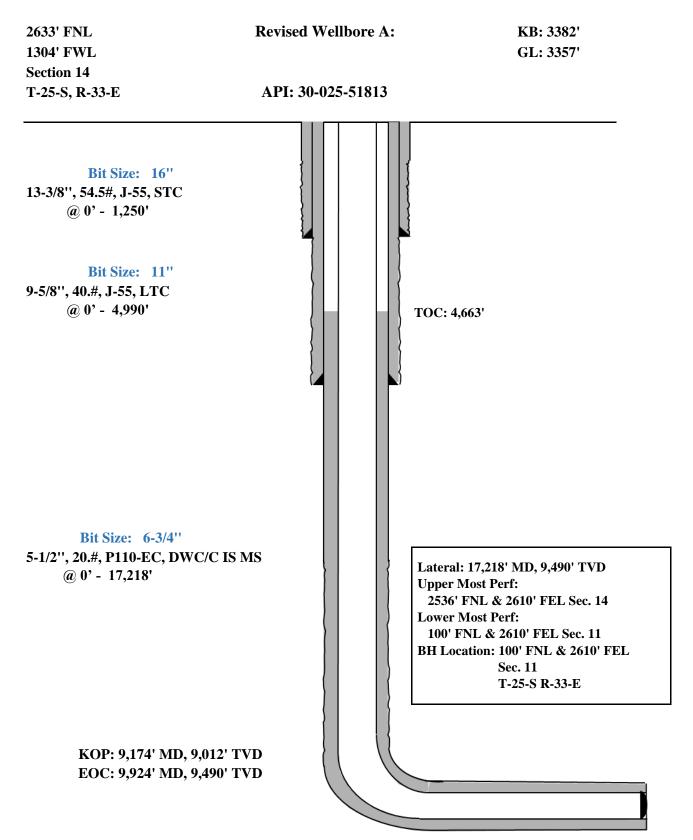


#### 5. TUBING REQUIREMENTS

EOG respectively requests an exception to the following NMOCD rule:

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

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



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

Well Name: Antero 14 Fed Com 102H

Location: SHL: 2633' FNL & 1304' FWL, Section 14, T-25-S, R-33-E, Lea Co., N.M. BHL: 100' FNL & 2610' FEL, Section 11, T-25-S, R-33-E, Lea Co., N.M.

#### 1. CASING PROGRAM B:

Hole	Interval MD		Interval MD Interval TVD		Csg			
Size	From (ft)	To (ft)	From (ft)	To (ft)	OD	Weight	Grade	Conn
13-1/2"	0	1,250	0	1,250	10-3/4"	40.5#	J-55	STC
9-7/8"	0	5,163	0	4,990	8-5/8"	32#	J-55	BTC-SC
6-3/4"	0	17,218	0	9,490	5-1/2"	20#	P110-EC	DWC/C IS MS

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

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

EOG requests permission to allow deviation from the 0.422" annulus clearance requirement for the intermediate (salt) section from 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.

		Wt.	Yld		
Depth	No. Sacks	ppg	Ft3/sk	Slurry Description	
1,250' 10-3/4''	410	13.5	1.73	Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl2 + 0.25 lb/sk Cello- Flake (TOC @ Surface)	
	110	14.8	1.34	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1,050')	
4,990' <sup>8-5/8''</sup>	390	12.7	2.22	Lead: Class C + 10% NaCl + 6% Bentonite Gel + 3% MagOx (TOC @ Surface)	
	660	14.8	1.32	Tail: Class C + 10% NaCL + 3% MagOx (TOC @ 4,130')	
17,218' <sub>5-1/2''</sub>	470	10.5	3.21	Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 4,663')	
	800	13.2	1.52	Tail: Class H + 5% NEX-020 + 0.2% NAC-102 + 0.15% NAS-725 + 0.5% NFL-549 + 0.2% NFP-703 + 1% NBE-737 + 0.3% NRT-241 (TOC @ 9180')	

#### 2. CEMENTING PROGRAM:

2633' 1304'	Revised Wellbore B:	KB: 3382' GL: 3357'
Section 14 T-25-S, R-33-E	API: 30-025-51813	
Bit Size: 13-1/2" 10-3/4", 40.5#, J-55, STC @ 0' - 1,250' Bit Size: 9-7/8" 8-5/8", 32.#, J-55, BTC-SC @ 0' - 4,990'		TOC: 4,490'
Bit Size: 6-3/4'' 5-1/2'', 20.#, P110-EC, DWC/C IS MS @ 0' - 17,218'	5	Lateral: 17,218' MD, 9,490' TVD Upper Most Perf: 2536' FNL & 2610' FEL Sec. 14 Lower Most Perf: 100' FNL & 2610' FEL Sec. 11 BH Location: 100' FNL & 2610' FEL Sec. 11 T-25-S R-33-E
KOP: 9,174' MD, 9,012' TVI EOC: 9,924' MD, 9,490' TVI		

.

#### GEOLOGIC NAME OF SURFACE FORMATION:

Permian

#### **ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

Rustler	1,150'
Tamarisk Anhydrite	1,225'
Top of Salt	1,500'
Base of Salt	4,890'
Lamar	5,065'
Bell Canyon	5,080'
Cherry Canyon	6,121'
Brushy Canyon	7,685'
Bone Spring Lime	9,240'
Leonard (Avalon) Shale	9,280'
1st Bone Spring Sand	10,215'
2nd Bone Spring Shale	10,440'
2nd Bone Spring Sand	10,810'
3rd Bone Spring Carb	11,270'
3rd Bone Spring Sand	11,875'
TD	9,490'

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

Upper Permian Sands	0-400'	Fresh Water
Bell Canyon	5,080'	Oil
Cherry Canyon	6,121'	Oil
Brushy Canyon	7,685'	Oil
Leonard (Avalon) Shale	9,280'	Oil
1st Bone Spring Sand	10,215'	Oil
2nd Bone Spring Shale	10,440'	Oil
2nd Bone Spring Sand	10,810'	Oil



# Midland

Lea County, NM (NAD 83 NME) Antero 14 Fed Com #102H

OH

Plan: Plan #0.2

# **Standard Planning Report**

29 January, 2024



eegie	oour oo						
Database: Company: Project: Site: Well: Well: Design:	PEDM Midland Lea County, NN Antero 14 Fed ( #102H OH Plan #0.2	•	ME)	TVD Referen MD Reference North Refere	e:	Well #102H kb = 26' @ 3384 kb = 26' @ 3384 Grid Minimum Curva	4.0usft
Project	Lea County, NM	(NAD 83 NM	1E)				
Geo Datum:	US State Plane 19 North American D New Mexico Easte	atum 1983		System Datun	1:	Mean Sea Level	
Site	Antero 14 Fed C	om					
Site Position: From: Position Uncertainty:	Мар	0.0 usft	Northing: Easting: Slot Radius:	783,931	00 usft Latitud 00 usft Longitu 8/16 "		32° 7' 50.590 N 103° 32' 58.705 W
Well	#102H						
Well Position	+N/-S +E/-W	0.0 usft 0.0 usft	Northing: Easting:		412,123.00 usft 784,611.00 usft	Latitude: Longitude:	32° 7' 50.036 N 103° 32' 50.802 W
Position Uncertainty Grid Convergence:		0.0 usft 0.42 °	Wellhead Elev	vation:	usft	Ground Level:	3,357.0 usft
Wellbore	ОН						
Magnetics	Model Name	9	Sample Date	Declinatio (°)	n	Dip Angle (°)	Field Strength (nT)
	IGRF	2020	5/1/2023		6.31	59.76	47,245.88737751
Design	Plan #0.2						
Audit Notes:							
Version:			Phase:	PLAN	Tie On Dep	oth:	0.0
Vertical Section:		(L	rom (TVD) ısft)	+N/-S (usft)	+E/-W (usft)		ection (°)
		(	0.0	0.0	0.0	ç	9.46
Plan Survey Tool Pro Depth From (usft)	Depth To	Date 1/29/2 urvey (Wellb		Tool Name	Rema	arks	
1 0.0	17,218.3 PI	an #0.2 (OH)	)	EOG MWD+IFR1 MWD + IFR1			



Plan Sections

Target	TFO (°)	Turn Rate (°/100usft)	Build Rate (°/100usft)	Dogleg Rate (°/100usft)	+E/-W (usft)	+N/-S (usft)	Vertical Depth (usft)	Azimuth (°)	Inclination (°)	Measured Depth (usft)
-	.,									
ļ	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
l	0.00	0.00	0.00	0.00	0.0	0.0	1,470.0	0.00	0.00	1,470.0
i -	87.73	0.00	2.00	2.00	85.6	3.4	2,165.3	87.73	14.05	2,172.3
1	0.00	0.00	0.00	0.00	1,278.4	50.6	6,936.7	87.73	14.05	7,090.8
I	180.00	0.00	-2.00	2.00	1,364.0	54.0	7,632.0	0.00	0.00	7,793.1
KOP(Antero 14 Fed	0.00	0.00	0.00	0.00	1,364.0	54.0	9,012.5	0.00	0.00	9,173.6
FTP(Antero 14 Fed	0.00	0.00	12.00	12.00	1,364.0	104.0	9,225.2	0.00	26.46	9,394.0
i	-0.53	-0.09	12.00	12.00	1,361.5	531.4	9,489.9	359.52	90.00	9,923.6
Fed Perf 1(Antero 1	0.00	0.00	0.00	0.00	1,344.0	2,641.0	9,490.0	359.52	90.00	12,033.2
Fed Perf 2(Antero 1	88.08	0.00	0.00	0.00	1,324.0	5,285.0	9,490.0	359.61	90.00	14,677.3
PBHL(Antero 14 Fe	-91.37	0.00	0.00	0.00	1,304.0	7,826.0	9,490.0	359.49	90.00	17,218.3

**Released to Imaging: 3/15/2024 2:22:56 PM** 



Database:	PEDM	Local Co-ordinate Reference:	Well #102H
Company:	Midland	TVD Reference:	kb = 26' @ 3384.0usft
Project:	Lea County, NM (NAD 83 NME)	MD Reference:	kb = 26' @ 3384.0usft
Site:	Antero 14 Fed Com	North Reference:	Grid
Well:	#102H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ОН		
Design:	Plan #0.2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,470.0	0.00	0.00	1,470.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.60	87.73	1,500.0	0.0	0.0	0.0	2.00	2.00	0.00
1,600.0	2.60	87.73	1,600.0	0.0	2.9	0.0	2.00	2.00	0.00
1,700.0	4.60	87.73	1,699.8	0.4	9.2	1.9	2.00	2.00	0.00
1,800.0	6.60	87.73	1,799.3	0.4	9.2 19.0	3.9	2.00	2.00	0.00
-									
1,900.0	8.60	87.73	1,898.4	1.3	32.2	6.5	2.00	2.00	0.00
2,000.0	10.60	87.73	1,997.0	1.9	48.8	9.9	2.00	2.00	0.00
2,100.0	12.60	87.73	2,094.9	2.7	68.9	14.0	2.00	2.00	0.00
2,172.3	14.05	87.73	2,165.3	3.4	85.6	17.4	2.00	2.00	0.00
2,200.0	14.05	87.73	2,192.2	3.7	92.3	18.8	0.00	0.00	0.00
2,300.0	14.05	87.73	2,289.2	4.6	116.6	23.7	0.00	0.00	0.00
2,400.0	14.05	87.73	2,386.2	5.6	140.8	28.6	0.00	0.00	0.00
2,500.0	14.05	87.73	2,483.2	6.5	165.1	33.6	0.00	0.00	0.00
2,600.0	14.05	87.73	2,580.2	7.5	189.3	38.5	0.00	0.00	0.00
2,700.0	14.05	87.73	2,677.2	8.5	213.6	43.4	0.00	0.00	0.00
2 900 0	14.05	87.73	2,774.2	9.4	237.8	48.4	0.00	0.00	0.00
2,800.0	14.05	87.73	2,774.2	9.4 10.4	262.1	40.4 53.3		0.00	0.00
2,900.0							0.00		
3,000.0	14.05	87.73	2,968.2	11.3	286.3	58.2	0.00	0.00	0.00
3,100.0	14.05	87.73	3,065.2	12.3	310.6	63.2	0.00	0.00	0.00
3,200.0	14.05	87.73	3,162.3	13.3	334.8	68.1	0.00	0.00	0.00
3,300.0	14.05	87.73	3,259.3	14.2	359.1	73.0	0.00	0.00	0.00
3,400.0	14.05	87.73	3,356.3	15.2	383.3	78.0	0.00	0.00	0.00
3,500.0	14.05	87.73	3,453.3	16.1	407.6	82.9	0.00	0.00	0.00
3,600.0	14.05	87.73	3,550.3	17.1	431.8	87.8	0.00	0.00	0.00
3,700.0	14.05	87.73	3,647.3	18.1	456.1	92.8	0.00	0.00	0.00
3,800.0	14.05	87.73	3,744.3	19.0	480.3	97.7	0.00	0.00	0.00
3,900.0	14.05	87.73	3,841.3	20.0	504.6	102.6	0.00	0.00	0.00
4,000.0	14.05	87.73	3,938.3	20.9	528.8	107.6	0.00	0.00	0.00
4,100.0	14.05	87.73	4,035.3	21.9	553.1	112.5	0.00	0.00	0.00
4,200.0	14.05	87.73	4,132.4	22.9	577.3	117.4	0.00	0.00	0.00
-									
4,300.0	14.05	87.73	4,229.4	23.8	601.6	122.4	0.00	0.00	0.00
4,400.0	14.05	87.73	4,326.4	24.8	625.8	127.3	0.00	0.00	0.00
4,500.0	14.05	87.73	4,423.4	25.7	650.1	132.2	0.00	0.00	0.00
4,600.0	14.05	87.73	4,520.4	26.7	674.3	137.2	0.00	0.00	0.00
4,700.0	14.05	87.73	4,617.4	27.7	698.6	142.1	0.00	0.00	0.00
4,800.0	14.05	87.73	4,714.4	28.6	722.9	147.0	0.00	0.00	0.00
4,900.0	14.05	87.73	4,811.4	29.6	747.1	152.0	0.00	0.00	0.00
5,000.0	14.05	87.73	4,908.4	30.5	771.4	156.9	0.00	0.00	0.00
5,100.0	14.05	87.73	5,005.4	31.5	795.6	161.8	0.00	0.00	0.00
-,			-,						

1/29/2024 4:27:41PM



Database:	PEDM	Local Co-ordinate Reference:	Well #102H
Company:	Midland	TVD Reference:	kb = 26' @ 3384.0usft
Project:	Lea County, NM (NAD 83 NME)	MD Reference:	kb = 26' @ 3384.0usft
Site:	Antero 14 Fed Com	North Reference:	Grid
Well:	#102H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,200.0	14.05	87.73	5,102.5	32.5	819.9	166.8	0.00	0.00	0.00
5,300.0	14.05	87.73	5,199.5	33.4	844.1	171.7	0.00	0.00	0.00
5,400.0	14.05	87.73	5,296.5	34.4	868.4	176.6	0.00	0.00	0.00
5,500.0	14.05	87.73	5,393.5	35.3	892.6	181.6	0.00	0.00	0.00
5,600.0	14.05	87.73	5,490.5	36.3	916.9	186.5	0.00	0.00	0.00
5,700.0	14.05	87.73	5,587.5	37.3	941.1	191.4	0.00	0.00	0.00
5,800.0	14.05	87.73	5,684.5	38.2	965.4	196.4	0.00	0.00	0.00
5,900.0	14.05	87.73	5,781.5	39.2	989.6	201.3	0.00	0.00	0.00
6,000.0	14.05	87.73	5,878.5	40.1	1,013.9	206.2	0.00	0.00	0.00
6,100.0	14.05	87.73	5,975.5	41.1	1,038.1	211.2	0.00	0.00	0.00
6,200.0	14.05	87.73	6,072.6	42.1	1,062.4	216.1	0.00	0.00	0.00
6,300.0	14.05	87.73	6,169.6	43.0	1,086.6	221.0	0.00	0.00	0.00
	14.05	87.73	,	43.0		221.0	0.00	0.00	0.00
6,400.0			6,266.6		1,110.9				
6,500.0	14.05	87.73	6,363.6	44.9	1,135.1	230.9	0.00	0.00	0.00
6,600.0	14.05	87.73	6,460.6	45.9	1,159.4	235.8	0.00	0.00	0.00
6,700.0	14.05	87.73	6,557.6	46.9	1,183.6	240.8	0.00	0.00	0.00
6,800.0	14.05	87.73	6,654.6	47.8	1,207.9	245.7	0.00	0.00	0.00
6,900.0	14.05	87.73	6,751.6	48.8	1,232.1	250.6	0.00	0.00	0.00
7,000.0	14.05	87.73	6,848.6	49.7	1,256.4	255.6	0.00	0.00	0.00
7,090.8	14.05	87.73	6,936.7	50.6	1,278.4	260.0	0.00	0.00	0.00
7,100.0	13.86	87.73	6,945.6	50.7	1,280.6	260.5	2.00	-2.00	0.00
7,200.0	11.86	87.73	7,043.1	51.6	1,302.9	265.0	2.00	-2.00	0.00
7,300.0	9.86	87.73	7,141.3	52.3	1,321.7	268.8	2.00	-2.00	0.00
7,400.0	7.86	87.73	7,240.1	52.9	1,337.1	272.0	2.00	-2.00	0.00
7,500.0	5.86	87.73	7,339.4	53.4	1,349.0	274.4	2.00	-2.00	0.00
7,600.0	3.86	87.73	7,439.1	53.7	1,357.5	276.1	2.00	-2.00	0.00
7,700.0	1.86	87.73	7,538.9	53.9	1,362.5	277.1	2.00	-2.00	0.00
7,793.1	0.00	0.00	7,632.0	54.0	1,364.0	277.5	2.00	-2.00	0.00
7,800.0	0.00	0.00	7,638.9	54.0	1,364.0	277.5	0.00	0.00	0.00
7,900.0	0.00	0.00	7,738.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,000.0	0.00	0.00	7,838.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,100.0	0.00	0.00	7,938.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,200.0	0.00	0.00	8,038.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,300.0	0.00	0.00	8,138.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,400.0	0.00	0.00	8,238.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,500.0	0.00	0.00	8,338.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,600.0	0.00	0.00	8,438.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,700.0	0.00	0.00	8,538.9	54.0	1,364.0	277.5	0.00	0.00	0.00
8,800.0	0.00	0.00	8,638.9	54.0 54.0	1,364.0	277.5	0.00	0.00	0.00
8,800.0 8,900.0	0.00	0.00	8,738.9	54.0 54.0	1,364.0	277.5	0.00	0.00	0.00
8,900.0 9,000.0	0.00	0.00	8,838.9	54.0 54.0	1,364.0	277.5	0.00	0.00	0.00
9,100.0	0.00	0.00	8,938.9	54.0	1,364.0	277.5	0.00	0.00	0.00
9,173.6	0.00	0.00	9,012.5	54.0	1,364.0	277.5	0.00	0.00	0.00
9,175.0	0.17	0.00	9,013.9	54.0	1,364.0	277.5	12.00	12.00	0.00
9,200.0	3.17	0.00	9,038.9	54.7	1,364.0	278.2	12.00	12.00	0.00
9,225.0	6.17	0.00	9,063.8	56.8	1,364.0	280.2	12.00	12.00	0.00
9,250.0	9.17	0.00	9,088.6	60.1	1,364.0	283.5	12.00	12.00	0.00
9,250.0 9,275.0	12.17	0.00	9,088.8 9,113.1	64.7	1,364.0	288.0	12.00	12.00	0.00
9,300.0	15.17	0.00	9,137.4	70.6	1,364.0	293.9	12.00	12.00	0.00
9,325.0	18.17	0.00	9,161.4	77.8	1,364.0	300.9	12.00	12.00	0.00
9,350.0	21.17	0.00	9,184.9	86.2	1,364.0	309.2	12.00	12.00	0.00
9,375.0	24.17	0.00	9,208.0	95.9	1,364.0	318.7	12.00	12.00	0.00
9,394.0	26.46	0.00	9,225.2	104.0	1,364.0	326.8	12.00	12.00	0.00

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Database:	PEDM	Local Co-ordinate Reference:	Well #102H
Company:	Midland	TVD Reference:	kb = 26' @ 3384.0usft
Project:	Lea County, NM (NAD 83 NME)	MD Reference:	kb = 26' @ 3384.0usft
Site:	Antero 14 Fed Com	North Reference:	Grid
Well:	#102H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ОН		
Design:	Plan #0.2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,425.0	30.17	359.93	9,252.4	118.7	1,364.0	341.2	12.00	12.00	-0.22
9,450.0	33.17	359.89	9,273.7	131.8	1,364.0	354.2	12.00	12.00	-0.18
	55.17		3,213.1	101.0		554.2			
9,475.0	36.17	359.85	9,294.3	146.0	1,363.9	368.2	12.00	12.00	-0.15
9,500.0	39.17	359.81	9,314.1	161.3	1,363.9	383.3	12.00	12.00	-0.13
9,525.0	42.17	359.79	9,333.0	177.6	1,363.8	399.3	12.00	12.00	-0.12
9,550.0	45.17	359.76	9,351.1	194.9	1,363.8	416.3	12.00	12.00	-0.10
9,575.0	48.17	359.74	9,368.3	213.0	1,363.7	434.3	12.00	12.00	-0.09
			,						
9,600.0	51.17	359.71	9,384.4	232.1	1,363.6	453.1	12.00	12.00	-0.09
9,625.0	54.17	359.69	9,399.6	252.0	1,363.5	472.6	12.00	12.00	-0.08
9,650.0	57.17	359.68	9,413.7	272.6	1,363.4	493.0	12.00	12.00	-0.07
9,675.0	60.17	359.66	9,426.7	294.0	1,363.3	514.0	12.00	12.00	-0.07
9,700.0	63.17	359.64	9,438.6	316.0	1,363.1	535.7	12.00	12.00	-0.06
0 705 0	00.47	250.02	0 4 4 0 0			550.0	10.00		0.00
9,725.0	66.17	359.63	9,449.2	338.6	1,363.0	558.0	12.00	12.00	-0.06
9,750.0	69.17	359.61	9,458.7	361.7	1,362.8	580.8	12.00	12.00	-0.06
9,775.0	72.17	359.60	9,467.0	385.3	1,362.7	604.0	12.00	12.00	-0.06
9,800.0	75.17	359.59	9,474.0	409.3	1,362.5	627.6	12.00	12.00	-0.05
9,825.0	78.17	359.57	9,479.8	433.6	1,362.3	651.6	12.00	12.00	-0.0
9,850.0	81.17	359.56	9,484.3	458.2	1,362.1	675.8	12.00	12.00	-0.0
9,875.0	84.17	359.55	9,487.5	483.0	1,361.9	700.2	12.00	12.00	-0.0
9,900.0	87.17	359.54	9,489.4	507.9	1,361.7	724.8	12.00	12.00	-0.0
9,923.6	90.00	359.52	9,489.9	531.4	1,361.5	748.0	12.00	12.00	-0.0
10,000.0	90.00	359.52	9,489.9	607.9	1,360.9	823.3	0.00	0.00	0.0
10,100.0	90.00	359.52	9,490.0	707.9	1,360.1	921.8	0.00	0.00	0.0
10,200.0	90.00	359.52	9,490.0	807.9	1,359.2	1,020.3	0.00	0.00	0.0
		359.52	9,490.0	907.9		1,118.8	0.00	0.00	0.0
10,300.0	90.00				1,358.4				
10,400.0	90.00	359.52	9,490.0	1,007.9	1,357.6	1,217.3	0.00	0.00	0.0
10,500.0	90.00	359.52	9,490.0	1,107.9	1,356.7	1,315.8	0.00	0.00	0.0
10,600.0	90.00	359.52	9,490.0	1,207.9	1,355.9	1,414.3	0.00	0.00	0.0
10,700.0	90.00	359.52	9,490.0	1,307.9	1,355.1	1,512.8	0.00	0.00	0.0
10,800.0	90.00	359.52	9,490.0	1,407.8	1,354.3	1,611.3	0.00	0.00	0.0
10,900.0	90.00	359.52	9,490.0	1,507.8	1,353.4	1,709.8	0.00	0.00	0.0
11,000.0	90.00	359.52	9,490.0	1,607.8	1,352.6	1,808.3	0.00	0.00	0.0
11,000.0									
11,100.0	90.00	359.52	9,490.0	1,707.8	1,351.8	1,906.8	0.00	0.00	0.0
11,200.0	90.00	359.52	9,490.0	1,807.8	1,350.9	2,005.3	0.00	0.00	0.0
11,300.0	90.00	359.52	9,490.0	1,907.8	1,350.1	2,103.8	0.00	0.00	0.0
11,400.0	90.00	359.52	9,490.0	2,007.8	1,349.3	2,202.3	0.00	0.00	0.0
11,500.0	90.00	359.52	9,490.0	2,107.8	1,348.4	2,300.8	0.00	0.00	0.0
11,600.0	90.00	359.52	9,490.0	2,207.8	1,347.6	2,399.3	0.00	0.00	0.0
11,700.0	90.00	359.52	9,490.0	2,307.8	1,346.8	2,497.8	0.00	0.00	0.0
11,800.0	90.00	359.52	9,490.0	2,407.8	1,345.9	2,596.3	0.00	0.00	0.0
11,900.0	90.00	359.52	9,490.0	2,507.8	1,345.1	2,694.8	0.00	0.00	0.0
12,000.0	90.00	359.52	9,490.0	2,607.8	1,344.3	2,793.3	0.00	0.00	0.0
			9,490.0	2,641.0		2,826.0	0.00	0.00	0.0
12,033.2	90.00	359.52			1,344.0				
12,100.0	90.00	359.53	9,490.0	2,707.8	1,343.4	2,891.8	0.00	0.00	0.00
12,200.0	90.00	359.53	9,490.0	2,807.8	1,342.6	2,990.3	0.00	0.00	0.00
12,300.0	90.00	359.53	9,490.0	2,907.8	1,341.8	3,088.8	0.00	0.00	0.0
12,400.0	90.00	359.54	9,490.0	3,007.8	1,341.0	3,187.3	0.00	0.00	0.0
12,500.0	90.00	359.54	9,490.0	3,107.8	1,340.2	3,285.8	0.00	0.00	0.0
12,500.0	90.00	359.54	9,490.0	3,207.8	1,339.4	3,384.3	0.00	0.00	0.0
12,600.0	90.00	359.54 359.55	9,490.0 9,490.0	3,207.8		3,364.3 3,482.8			0.00
				,	1,338.6		0.00	0.00	
12,800.0	90.00	359.55	9,490.0	3,407.8	1,337.8	3,581.3	0.00	0.00	0.00
12,900.0	90.00	359.55	9,490.0	3,507.8	1,337.0	3,679.8	0.00	0.00	0.00
13,000.0	90.00	359.56	9,490.0	3,607.8	1,336.2	3,778.3	0.00	0.00	0.00
13,100.0	90.00	359.56	9,490.0	3,707.8	1,335.5	3,876.8	0.00	0.00	0.00

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COMPASS 5000.16 Build 100

.



Database:	PEDM	Local Co-ordinate Reference:	Well #102H
Company:	Midland	TVD Reference:	kb = 26' @ 3384.0usft
Project:	Lea County, NM (NAD 83 NME)	MD Reference:	kb = 26' @ 3384.0usft
Site:	Antero 14 Fed Com	North Reference:	Grid
Well:	#102H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.2		

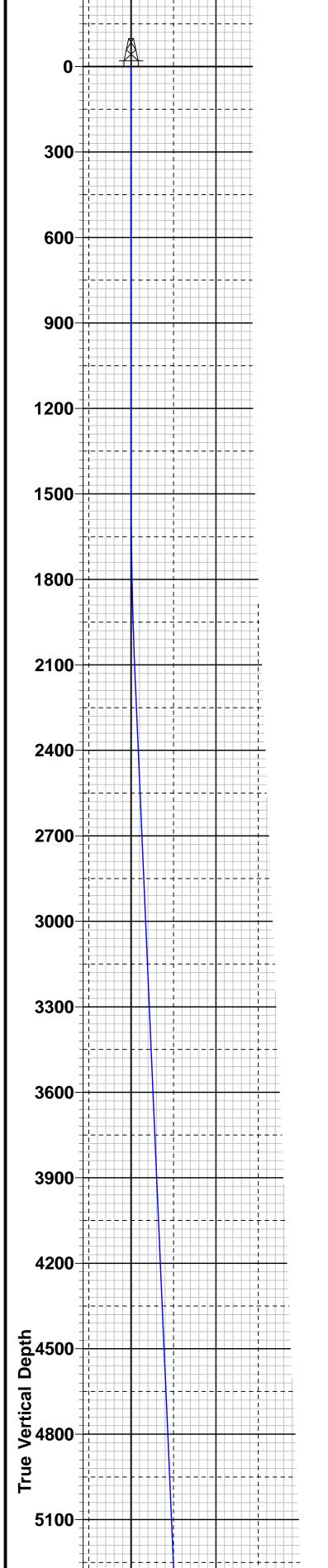
Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,200.0	90.00	359.56	9,490.0	3,807.8	1,334.7	3,975.4	0.00	0.00	0.00
13,300.0	90.00	359.56	9,490.0	3,907.8	1,333.9	4,073.9	0.00	0.00	0.00
13,400.0	90.00	359.57	9,490.0	4,007.8	1,333.2	4,172.4	0.00	0.00	0.00
13,500.0	90.00	359.57	9,490.0	4,107.8	1,332.4	4,270.9	0.00	0.00	0.00
13,600.0	90.00	359.57	9,490.0	4,207.8	1,331.7	4,369.4	0.00	0.00	0.00
13,700.0	90.00	359.58	9,490.0	4,307.8	1,330.9	4,467.9	0.00	0.00	0.00
13,800.0	90.00	359.58	9,490.0	4,407.8	1,330.2	4,566.4	0.00	0.00	0.00
13,900.0	90.00	359.58	9,490.0	4,507.7	1,329.5	4,665.0	0.00	0.00	0.00
14,000.0	90.00	359.59	9,490.0	4,607.7	1,328.7	4,763.5	0.00	0.00	0.00
14,100.0	90.00	359.59	9,490.0	4,707.7	1,328.0	4,862.0	0.00	0.00	0.00
14,200.0	90.00	359.59	9,490.0	4,807.7	1,327.3	4,960.5	0.00	0.00	0.00
14,300.0	90.00	359.60	9,490.0	4,907.7	1,326.6	5,059.0	0.00	0.00	0.00
14,400.0	90.00	359.60	9,490.0	5,007.7	1,325.9	5,157.6	0.00	0.00	0.00
14,500.0	90.00	359.60	9.490.0	5.107.7	1,325.2	5,256.1	0.00	0.00	0.00
14,600.0	90.00	359.60	9,490.0	5,207.7	1,325.2	5,354.6	0.00	0.00	0.00
14,600.0	90.00	359.61	9,490.0 9,490.0	5,207.7	1,324.5	5,354.6 5,430.7	0.00	0.00	0.00
14,677.3	90.00	359.61	9,490.0 9,490.0	5,285.0 5,307.7	1,324.0	5,430.7 5,453.1	0.00	0.00	0.00
14,700.0	90.00	359.61	9,490.0 9,490.0	5,307.7 5,407.7	1,323.8	5,453.1 5,551.7	0.00	0.00	0.00
14,900.0	90.00	359.60	9,490.0	5,507.7	1,322.5	5,650.2	0.00	0.00	0.00
15,000.0	90.00	359.59	9,490.0	5,607.7	1,321.8	5,748.7	0.00	0.00	0.00
15,100.0	90.00	359.59	9,490.0	5,707.7	1,321.0	5,847.2	0.00	0.00	0.00
15,200.0	90.00	359.58	9,490.0	5,807.7	1,320.3	5,945.7	0.00	0.00	0.00
15,300.0	90.00	359.58	9,490.0	5,907.7	1,319.6	6,044.3	0.00	0.00	0.00
15,400.0	90.00	359.58	9,490.0	6,007.7	1,318.9	6,142.8	0.00	0.00	0.00
15,500.0	90.00	359.57	9,490.0	6,107.7	1,318.1	6,241.3	0.00	0.00	0.00
15,600.0	90.00	359.57	9,490.0	6,207.7	1,317.4	6,339.8	0.00	0.00	0.00
15,700.0	90.00	359.56	9,490.0	6,307.7	1,316.6	6,438.3	0.00	0.00	0.00
15,800.0	90.00	359.56	9,490.0	6,407.7	1,315.8	6,536.8	0.00	0.00	0.00
15,900.0	90.00	359.55	9,490.0	6,507.7	1,315.0	6,635.3	0.00	0.00	0.00
16,000.0	90.00	359.55	9,490.0	6,607.7	1,314.3	6,733.8	0.00	0.00	0.00
16,100.0	90.00	359.54	9,490.0	6,707.7	1,313.5	6,832.4	0.00	0.00	0.00
16,200.0	90.00	359.54	9,490.0	6,807.7	1,312.7	6,930.9	0.00	0.00	0.00
16,300.0	90.00	359.53	9,490.0	6,907.7	1,311.8	7,029.4	0.00	0.00	0.00
16,400.0	90.00	359.53	9,490.0	7,007.7	1,311.0	7,127.9	0.00	0.00	0.00
16,500.0	90.00	359.52	9,490.0	7,107.7	1,310.2	7,226.4	0.00	0.00	0.00
16,600.0	90.00	359.52	9,490.0	7,207.7	1,309.4	7,324.9	0.00	0.00	0.00
16,700.0	90.00	359.52	9,490.0	7,307.7	1,308.5	7,423.4	0.00	0.00	0.00
16,800.0	90.00	359.51	9,490.0	7,407.7	1,307.7	7,521.9	0.00	0.00	0.00
16.900.0	90.00	359.50	9,490.0	7.507.7	1.306.8	7.620.3		0.00	0.00
- ,			-,	,	,	,	0.00		
17,000.0	90.00	359.50	9,490.0	7,607.7	1,305.9	7,718.8	0.00	0.00	0.00
17,100.0	90.00	359.49	9,490.0	7,707.7	1,305.1	7,817.3	0.00	0.00	0.00
17,200.0	90.00	359.49	9,490.0	7,807.7	1,304.2	7,915.8	0.00	0.00	0.00
17,218.3	90.00	359.49	9,490.0	7,826.0	1,304.0	7,933.9	0.00	0.00	0.00



Database: Company: Project: Site: Well: Wellbore: Design:	PEDM Midland Lea County, Antero 14 Fe #102H OH Plan #0.2	NM (NAD 83 ed Com	NME)		TVD Refere MD Referen North Refer	ice:	kb = 2 Grid	#102H 26' @ 3384.0usft 26' @ 3384.0usft num Curvature	
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(Antero 14 Fed Co - plan hits target ce - Point		0.00	9,012.5	54.0	1,364.0	412,177.00	785,975.0	00 32° 7' 50.472 N	103° 32' 34.936 W
FTP(Antero 14 Fed Cor - plan hits target ce - Point		0.00	9,225.2	104.0	1,364.0	412,227.00	785,975.0	00 32° 7' 50.967 N	103° 32' 34.931 W
Fed Perf 1(Antero 14 Fe - plan hits target ce - Point		0.00	9,490.0	2,641.0	1,344.0	414,764.00	785,955.0	00 32° 8' 16.072 N	103° 32' 34.947 W
PBHL(Antero 14 Fed Co - plan hits target ce - Point		0.00	9,490.0	7,826.0	1,304.0	419,949.00	785,915.0	00 32° 9' 7.382 N	103° 32' 34.970 W
Fed Perf 2(Antero 14 Fe - plan hits target ce - Point		0.00	9,490.0	5,285.0	1,324.0	417,408.00	785,935.0	00 32° 8' 42.237 N	103° 32' 34.954 W

# **leogresources**



5400-

5700-

6000-

6300-

6600-

6900-

7200-

7500-

7800-

8100

8400-

8700-

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## Lea County, NM (NAD 83 NME) West(-)/East(+) 600 900 300 -600 1200 Antero 14 Fed Com #102H 7800-Plan #0.2 7500-True North: -0.42° 7200-**Magnetic Field** Strength: 47245.9nT Dip Angle: 59.76° Date: 5/1/2023 6900 Model: IGRF2020 PROJECT DETAILS: Lea County, NM (NAD 83 NME) -++ Geodetic System: US State Plane 1983 6600-Datum: North American Datum 1983 Ellipsoid: GRS 1980 Zone: New Mexico Eastern Zone System Datum: Mean Sea Level 6300-

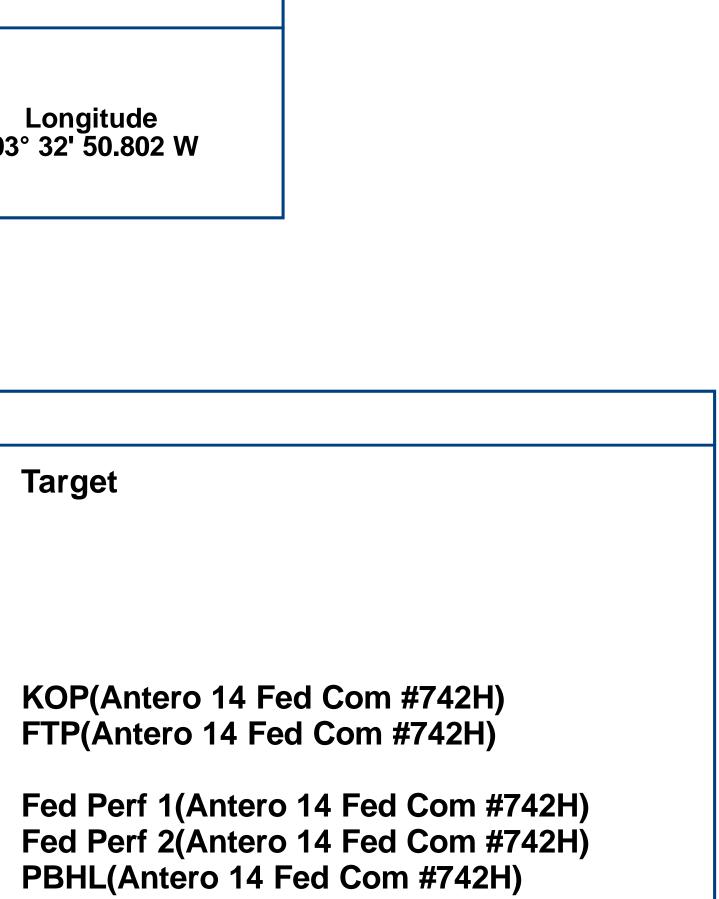
6000-

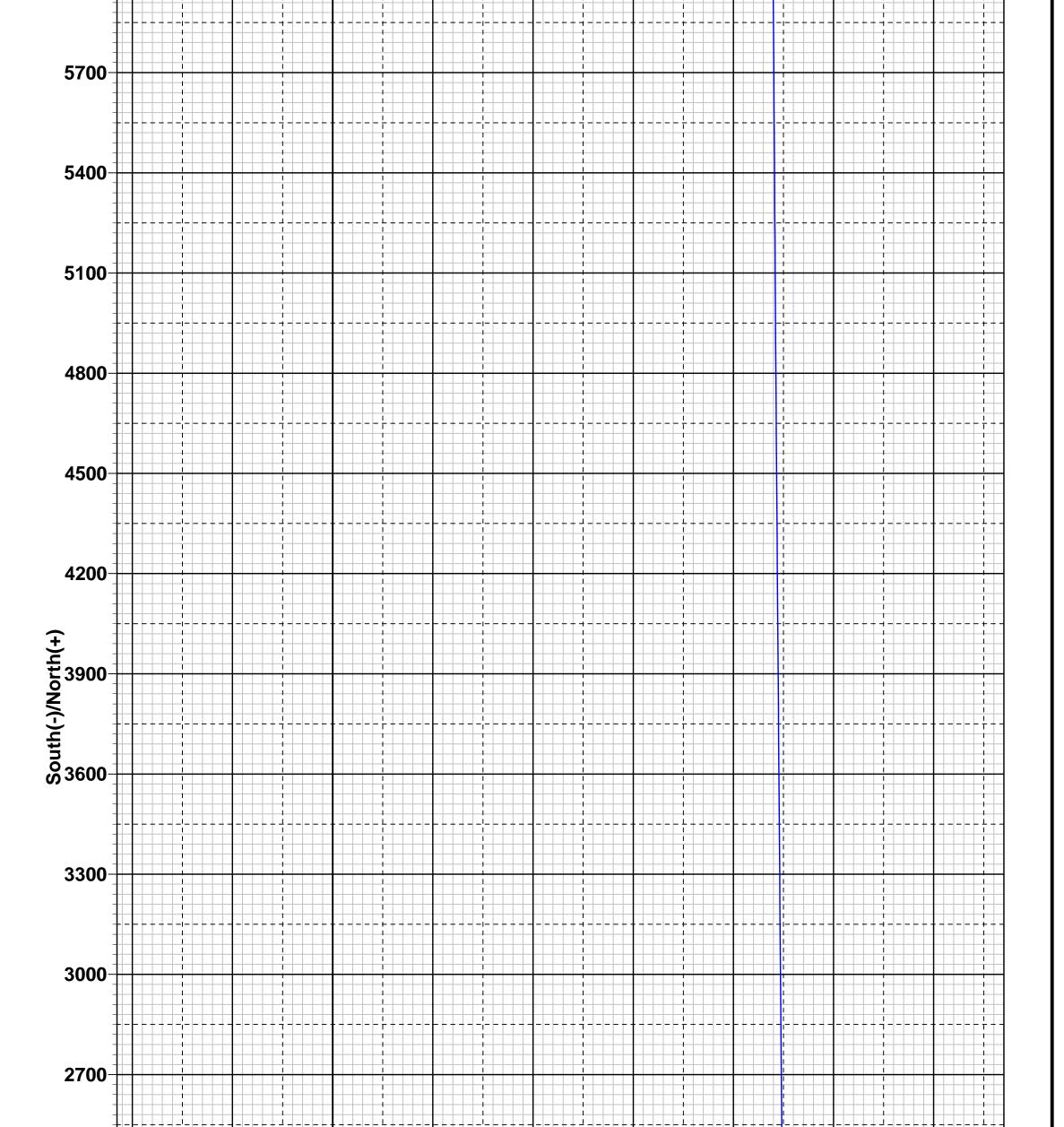
**Azimuths to Grid North** Magnetic North: 5.89°

To convert a Magnetic Direction to a Grid Direction, Add 5.89° To convert a Magnetic Direction to a True Direction, Add 6.31° East To convert a True Direction to a Grid Direction, Subtract 0.42°

	WELL DETAILS	:#102H	
		3357.	0
	kb = 26' @	2 3384.0usft	
Northing	Easting	Latittude	Longitude
412123.00	784611.00	32° 7' 50.036 N	103° 32' 50.802 W

		SECTION DETAILS								
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1470.0	0.00	0.00	1470.0	0.0	0.0	0.00	0.00	0.0	
3	2172.3	14.05	87.73	2165.3	3.4	85.6	2.00	87.73	17.4	
4	7090.8	14.05	87.73	6936.7	50.6	1278.4	0.00	0.00	260.0	
5	7793.1	0.00	0.00	7632.0	54.0	1364.0	2.00	180.00	277.5	
6	9173.6	0.00	0.00	9012.5	54.0	1364.0	0.00	0.00	277.5	
7	9394.0	26.46	0.00	9225.2	104.0	1364.0	12.00	0.00	326.8	
8	9923.6	90.00	359.52	9489.9	531.4	1361.5	12.00	-0.53	748.0	
9	12033.2	90.00	359.52	9490.0	2641.0	1344.0	0.00	0.00	2826.0	
10	14677.3	90.00	359.61	9490.0	5285.0	1324.0	0.00	88.08	5430.7	
11	17218.3	90.00	359.49	9490.0	7826.0	1304.0	0.00	-91.37	7933.9	





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West(-)/East(+)

600

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+ +

900

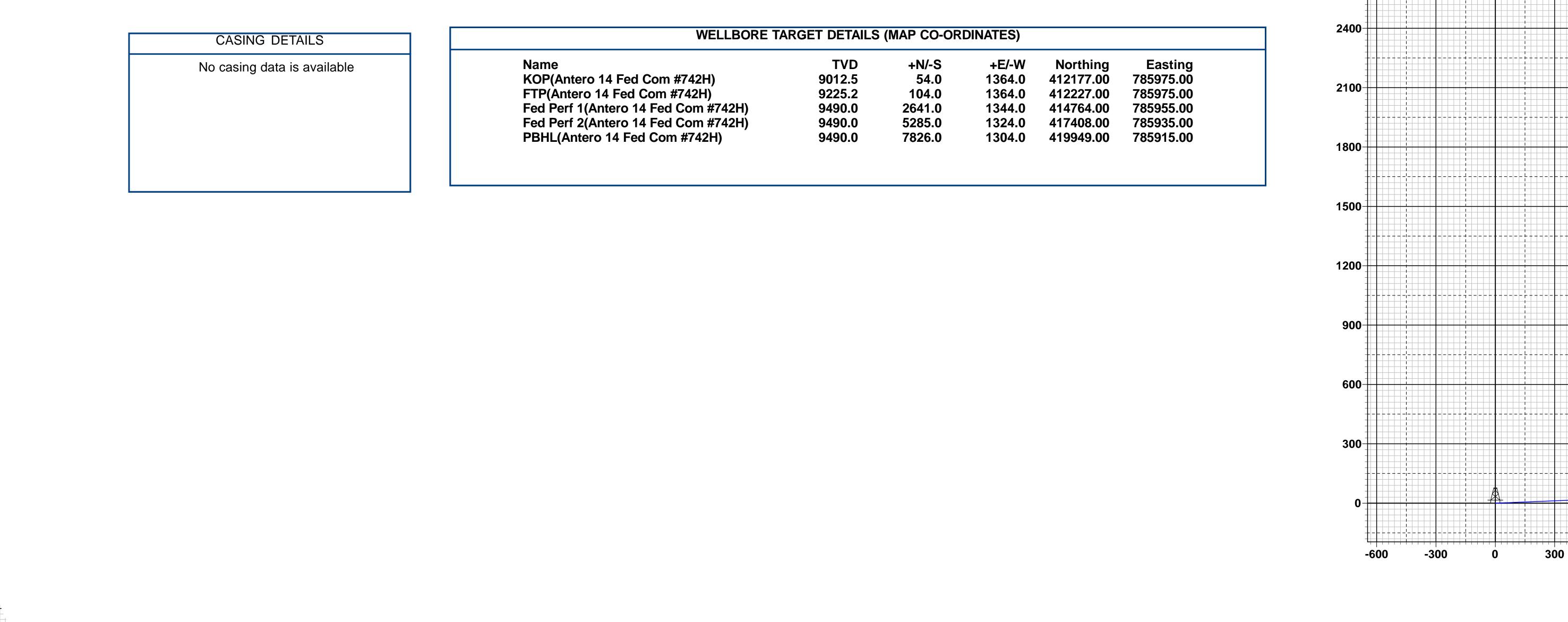
1200

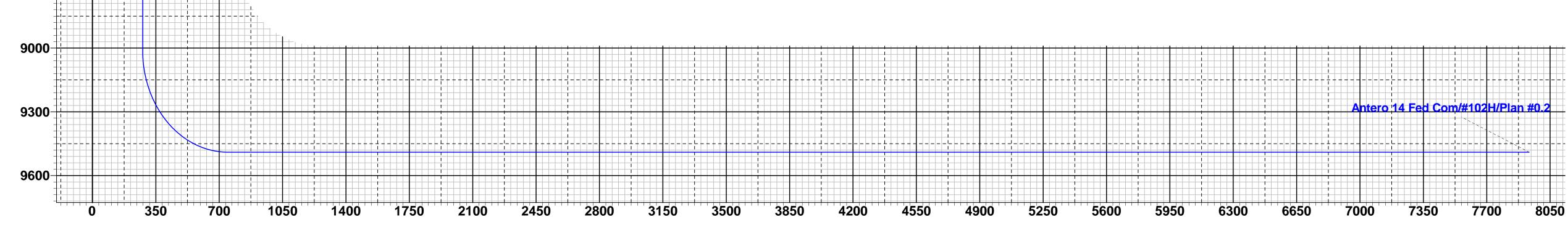
1500

1500

1800

Antero 14 Fed





Vertical Section at 9.46°

Lea County, NM (NAD 83 NME) Antero 14 Fed Com #102H OH Plan #0.2 16:27, January 29 2024

1800

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## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	EOG RESOURCES INCORPORATED
WELL NAME & NO.:	ANTERO 14 FED COM 102H
SURFACE HOLE FOOTAGE:	2633'/N & 1304'/W
BOTTOM HOLE FOOTAGE	100'/N & 2610'/E
LOCATION:	Section 14, T.25 S., R.33 E.
COUNTY:	Lea County, New Mexico

#### COA

H2S	• Yes	O No	
Potash	• None	O Secretary	© R-111-P
Cave/Karst Potential	• Low	O Medium	O High
Cave/Karst Potential	Critical		
Variance	O None	• Flex Hose	O Other
Wellhead	Conventional	• Multibowl	O Both
Wellhead Variance	O Diverter		
Other	□4 String	Capitan Reef	□ WIPP
Other	□ Fluid Filled	🗆 Pilot Hole	□ Open Annulus
Cementing	□ Contingency	EchoMeter	Primary Cement
	Cement Squeeze		Squeeze
Special Requirements	Water Disposal	COM	🗆 Unit
Special Requirements	□ Batch Sundry		
Special Requirements	Break Testing	✓ Offline	Casing
Variance		Cementing	Clearance

#### A. CASING

#### **Primary Casing Design:**

- 1. The **13-3/8** inch surface casing shall be set at approximately **1,250** feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

- b. Wait on cement (WOC) time for a primary cement job will be a minimum of  $\underline{8}$ <u>hours</u> or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
- d. If cement falls back, remedial cementing will be done prior to drilling out that string.
- 2. The **9-5/8** inch intermediate casing shall be set at approximately **4,990** feet **TVD**.
  - Mud weight could brine up to 10.2ppg. Reviewed and OK
  - Keep casing full during run for collapse SF

The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

#### **Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above.
- 3. The **5-1/2** inch production casing shall be set at approximately **17,218** feet. The minimum required fill of cement behind the **5-1/2** inch production casing is:

#### **Option 1 (Single Stage):**

• Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

#### Alternative Design:

- 1. The **10-3/4** inch surface casing shall be set at approximately **1,250** feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of  $\underline{8}$ <u>hours</u> or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that

string.

2. The **8-5/8** inch intermediate casing shall be set at approximately **4,990** feet **TVD**. **Mud weight can brine up to 10.2ppg and is OK.** The minimum required fill of cement behind the **8-5/8** inch intermediate casing is:

#### **Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above.
- 3. The **5-1**/2 inch production casing shall be set at approximately **17,218** feet. The minimum required fill of cement behind the **5-1**/2 inch production casing is:

#### **Option 1 (Single Stage):**

• Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

#### (Note: For a minimum 5M BOPE or less (Utilizing a 10M BOPE system) BOPE Break Testing Variance

- BOPE Break Testing is ONLY permitted for 5M BOPE or less. (Annular preventer must be tested to a minimum of 70% of BOPE working pressure and shall be higher than the MASP)
- BOPE Break Testing is NOT permitted to drilling the production hole section.
- Variance only pertains to the intermediate hole-sections and no deeper than the Bone Springs formation.
- While in transfer between wells, the BOPE shall be secured by the hydraulic carrier or cradle.
- Any well control event while drilling require notification to the BLM Petroleum Engineer (**575-706-2779**) prior to the commencement of any BOPE Break Testing operations.
- A full BOPE test is required prior to drilling the first deep intermediate hole section. If any subsequent hole interval is deeper than the first, a full BOPE test will be required. (200' TVD tolerance between intermediate shoes is allowable).
- The BLM is to be contacted (575-689-5981 Lea County) 4 hours prior to BOPE tests.
- As a minimum, a full BOPE test shall be performed at 21-day intervals.
- In the event any repairs or replacement of the BOPE is required, the BOPE shall test as per 43 CFR part 3170 Subpart 3172.
- If in the event break testing is not utilized, then a full BOPE test would be conducted.

#### **Offline Cementing**

Offline cementing OK for surface and intermediate intervals. Notify the BLM prior to the commencement of any offline cementing procedure.

#### **Casing Clearance:**

- Overlap OK
- Salt annular variance in place.

Operator shall clean up cycles until wellbore is clear of cuttings and any large debris, ensure cutting sizes are adequate "coffee ground or less" before cementing.

#### **GENERAL REQUIREMENTS**

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)
  - Eddy County

**EMAIL** or call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,

**BLM\_NM\_CFO\_DrillingNotifications@BLM.GOV** (575) 361-2822

- Lea CountyCall the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575) 689-5981
- 1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
  - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
  - b. When the operator proposes to set surface casing with Spudder Rig
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per **43 CFR part 3170 Subpart 3172** as soon as 2nd Rig is rigged up on well.
- 2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

#### A. CASING

- 1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
- <u>Wait on cement (WOC) for Potash Areas:</u> After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least <u>24</u> <u>hours</u>. WOC time will be recorded in the driller's log. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.
- 3. <u>Wait on cement (WOC) for Water Basin:</u> After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least <u>8 hours</u>. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
- 4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
- 5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
- 6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

- 7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
- 8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

#### B. PRESSURE CONTROL

- All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in 43 CFR part 3170 Subpart 3172 and API STD 53 Sec. 5.3.
- 2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
- 3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
- 4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. Whenever any seal subject to test pressure is broken, all the tests in **43 CFR part 3170 Subpart 3172** must be followed.
  - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

- 5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead cement), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
  - b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the cement plug. The BOPE test can be initiated after bumping the cement plug with the casing valve open. (only applies to single stage cement jobs, prior to the cement setting up.)
  - c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer and can be initiated immediately with the casing valve open. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to 43 CFR part 3170 Subpart 3172 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
  - d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
  - e. The results of the test shall be reported to the appropriate BLM office.
  - f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
  - g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to

the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per 43 CFR part 3170 Subpart 3172.

#### C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**KPI** 2/12/2024



# 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

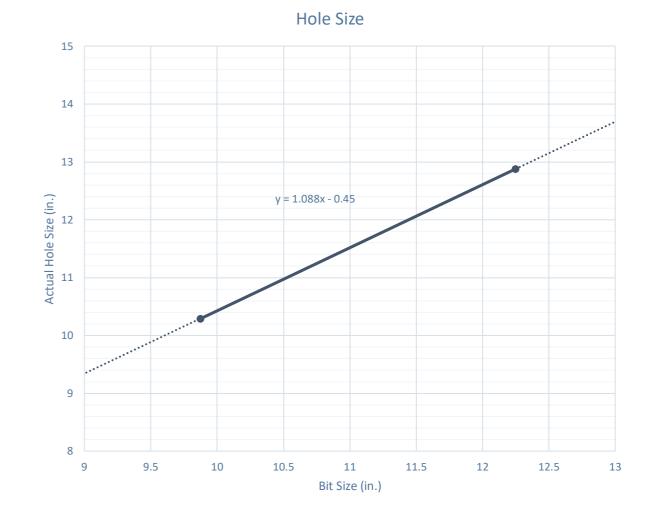
# **Volumetric Hole Size Calculation**

## **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**

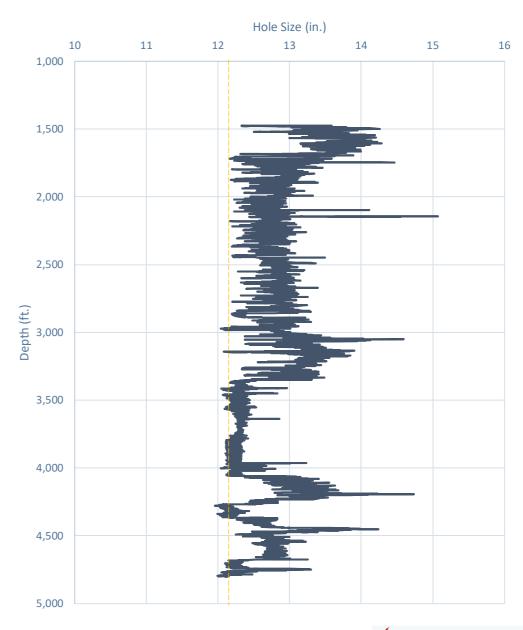
- 12.25" Hole
  - 12.88" Hole
    - 5.13% diameter increase
    - 10.52% area increase
  - 0.63" Average enlargement
  - 0.58" Median enlargement
  - 179 Well Count
- 9.875" Hole
  - 10.30" Hole
    - 4.24% diameter increase
    - 9.64% area increase
  - 0.42" Average enlargement
  - 0.46" Median enlargement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

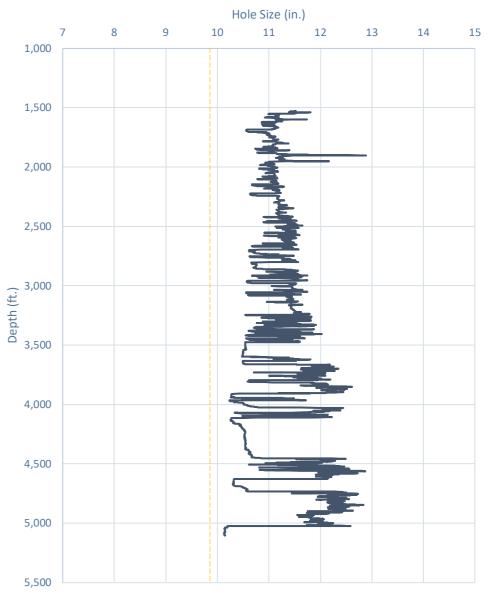


Modelo 10 Fed Com #501H

# 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

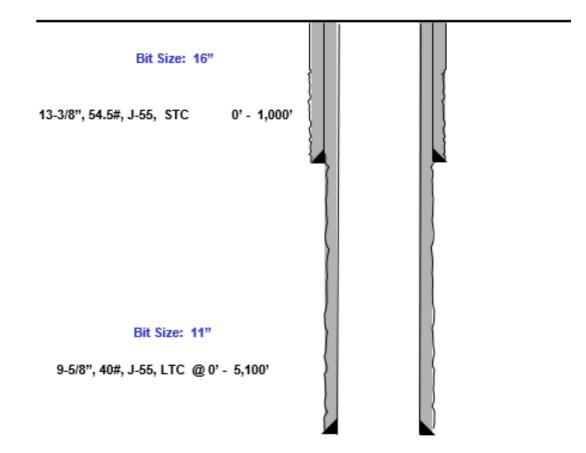
- 11" Bit + 0.52" Average hole enlargement = 11.52" Hole Size
  - 0.9475" Clearance to casing OD

$$=\frac{11.52-9.625}{2}$$
• 0.4475" Clearance to

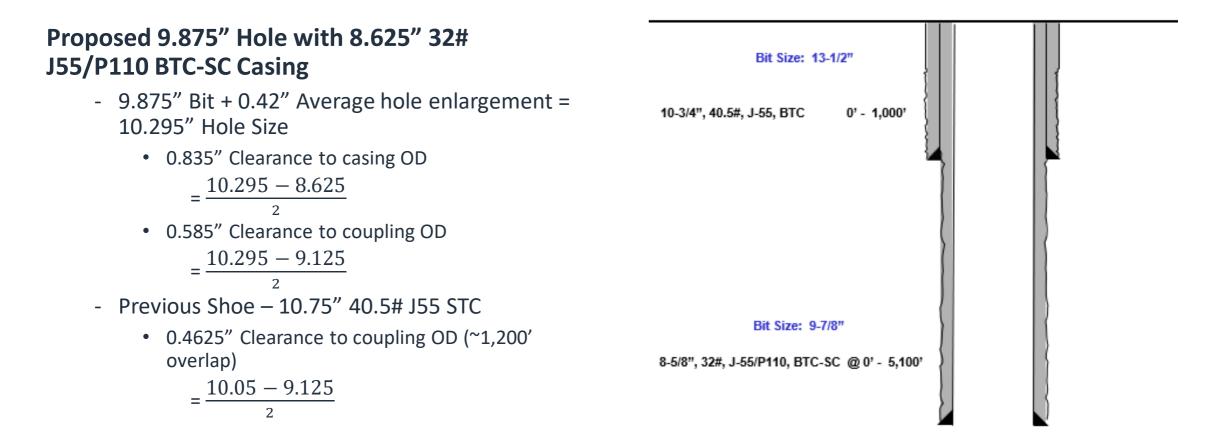
4475" Clearance to coupling OD  $= \frac{11.52 - 10.625}{11.52}$ 

- 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**







.

# **Casing Spec Sheets**

#### **PERFORMANCE DATA**

API LTC		
Technical	Data	Sheet

9.625 in 40.00 lbs/ft

K55 HC

#### 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

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Mechanical Properties	Ptpe	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	Ptpe	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	Ptpe	BTC	LTC	STC	
Make-Up Loss	-	4.81	-	3.50	in.
Minimum Make-Up Torque	-	-	-	3,860	fl-lbs
Maximum Make-Up Torque	-	-	-	6,430	ft-lbs

Annular Clearance Variance

# **Casing Spec Sheets**

### Pipe Body and API Connections Performance Data

10.750 40.50/0.350 J55					PD
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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	втс	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	втс	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	втс	LTC	STC	
Make-Up Loss	-	4.81		3.50	in.
Minimum Make-Up Torque		-		3,150	ft-lbs
Maximum Make-Up Torque	-	-	-	5,250	fl-lbs

<b>O.D.</b> (in					API	5CT, 1	0th Ed. Co	onnect	tion Data	a She
8.625	) WEIGHT (I Nominal: Plain End:	b/ft) 32.00 31.13	WALL (i 0.352		GR/ J5		* <b>API DRIF</b> 7.796	· ' /	<b>RBV</b> 87	
	Material Propert	ties (PE)				F	ipe Body	Data (I	PE)	
	Pipe				Geometry					
	n Yield Strength:	55	ksi		Nomin	al ID:			7.92 i	
	n Yield Strength:		ksi		Nomin	al Area	:		9.149 i	in <sup>2</sup>
Minimun	n Tensile Strength:		ksi		*Speci	al/Alt. D			7.875 i	inch
	Coupling	,					Perform			
	n Yield Strength:		ksi		•		ld Strength	n:	503 I	•
Maximu	m Yield Strength:	80	ksi			se Resi Yield Pre	stance:		2,530	psi
Minimun	n Tensile Strength:	75	ksi		(API His		550re.		3,930	psi
	API Connectio Coupling OD: 9					AP	l Connect	ion To	rque	
STC Performance						STC Torqu	ıe (ft-lk	os)		
STC Inte	ernal Pressure:	3,930	psi		Min:	2,793	Opti:	3,724	Max:	4,65
STC Joi	nt Strength:	372	kips							
LTC Performance				LTC Torque (ft-lbs)						
LTC Inte	rnal Pressure:	3,930	psi		Min:	3,130	Opti:	4,174	Max:	5,21
	nt Strength:		kips							
SC-BTC	Performance - C	plg OD =	9.125"			1	BTC Torqu	ıe (ft-lk	os)	
	ernal Pressure:	3,930	psi		follow	v API gui	delines rega	rding pos	sitional ma	ke up
BTC Inte	at Strength:	503	kips							
BTC Inte BTC Joi	n ouengui.				∆PI Drift i	ie enocifio	d on order			
	-	*Alt. Drift will	be used unl	essi		is specifie	a on oraci.			

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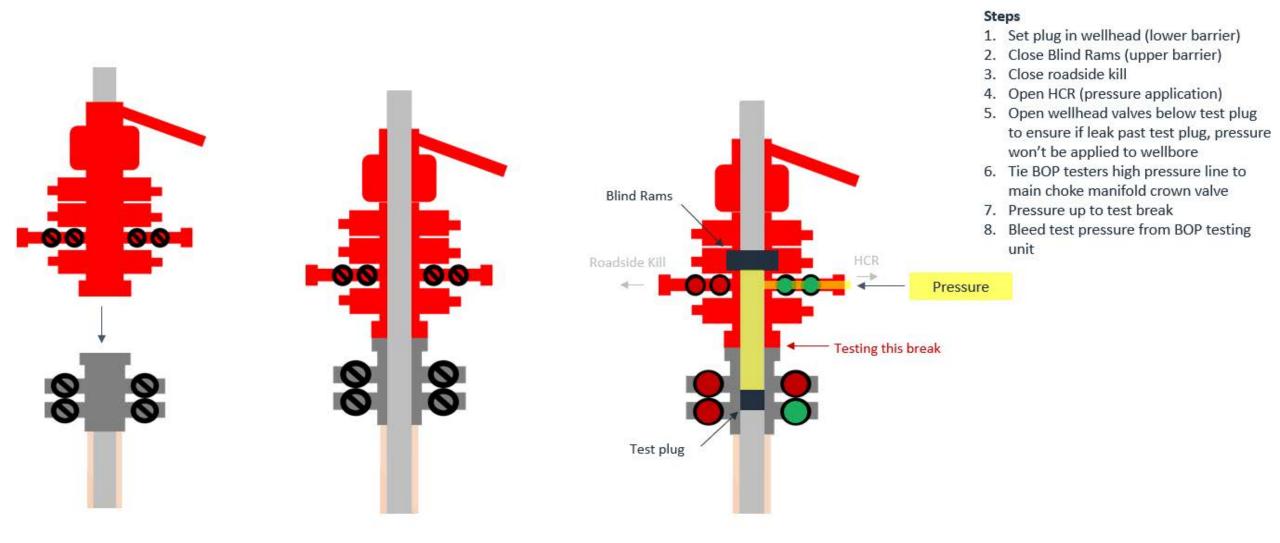


## **Break-test BOP & Offline Cementing:**

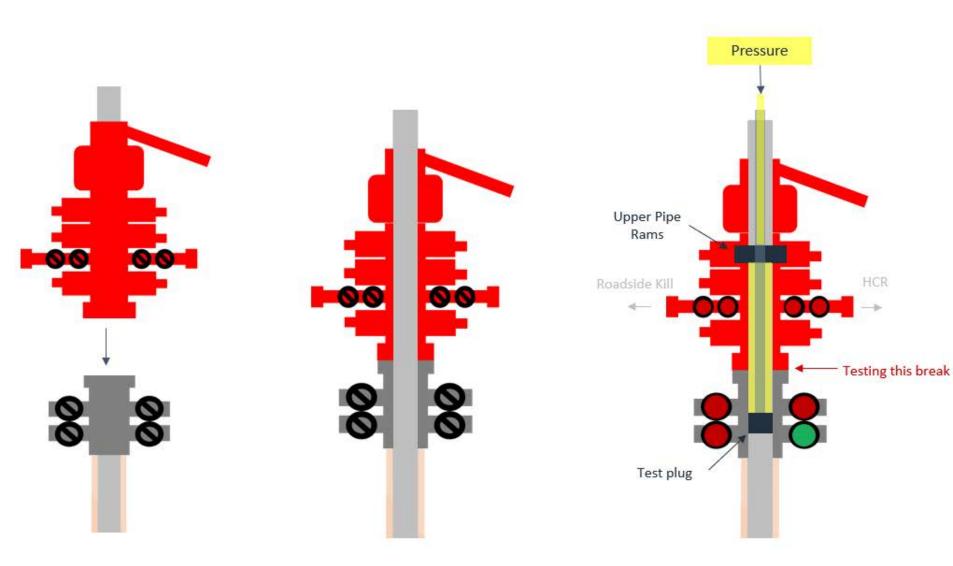
EOG Resources Inc. (EOG) respectfully requests a variance from the minimum standards for well control equipment testing of ECFR Title 43 Part 3172.6(b)(9)(iv) to allow a testing schedule of the blow out preventer (BOP) and blow out prevention equipment (BOPE) along with Batch Drilling & Offline cement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

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

# **Break Test Diagram (HCR valve)**



# **Break Test Diagram (Test Joint)**



# Steps

- 1. Set plug in with test joint wellhead (lower barrier)
- 2. Close Upper Pipe Rams (upper barrier)
- 3. Close roadside kill
- 4. Close HCR
- 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

# **Seog resources** Offline Intermediate Cementing Procedure

### **Cement Program**

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

### Summarized Operational Procedure for Intermediate Casing

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

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Offline Intermediate Cementing Procedure

- e. Diagram for rig positioning relative to offline cementing can be seen in Figure 4.
- 9. Rig up return lines to take returns from wellhead to pits and rig choke.
  - a. Test all connections and lines from wellhead to choke manifold to 5,000 psi high for 10 min.
  - b. If either test fails, perform corrections and retest before proceeding.
  - c. Return line schematics can be seen in Figure 3.
- 10. Remove TA Plug from the casing.
- 11. Install offline cement tool.
  - a. Current offline cement tool schematics can be seen in Figure 1 (Cameron) and Figure 2 (Cactus).
- 12. Rig up cement head and cementing lines.
  - a. Pressure test cement lines against cement head to 80% of casing burst for 10 min.
- 13. Break circulation on well to confirm no restrictions.
  - a. If gas is present on circulation, well will be shut in and returns rerouted through gas buster.
  - b. Max anticipated time before circulating with cement truck is 6 hrs.
- 14. Pump cement job as per plan.
  - a. At plug bump, test casing to 0.22 psi/ft or 1500 psi, whichever is greater.
  - b. If plug does not bump on calculated, shut down and wait 8 hrs or 500 psi compressive strength, whichever is greater before testing casing.
- 15. Confirm well is static and floats are holding after cement job.
  - a. With floats holding and backside static:
    - i. Remove cement head.
  - b. If floats are leaking:
    - i. Shut-in well and WOC (Wait on Cement) until tail slurry reaches 500 psi compressive strength and the casing is static prior to removing cement head.
  - c. If there is flow on the backside:
    - i. Shut in well and WOC until tail slurry reaches 500 psi compressive strength. Ensure that the casing is static prior to removing cement head.
- 16. Remove offline cement tool.
- 17. Install night cap with pressure gauge for monitoring.
- 18. Test night cap to 5,000 psi for 10 min.

#### **Example Well Control Plan Content**

#### A. Well Control Component Table

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

Intermediate hole section, 5M requirement

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

#### **B. Well Control Procedures**

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

#### **General Procedure While Circulating**

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

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# **S**eog resources

Offline Intermediate Cementing Procedure

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

# **General Procedure While Cementing**

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

# General Procedure After Cementing

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

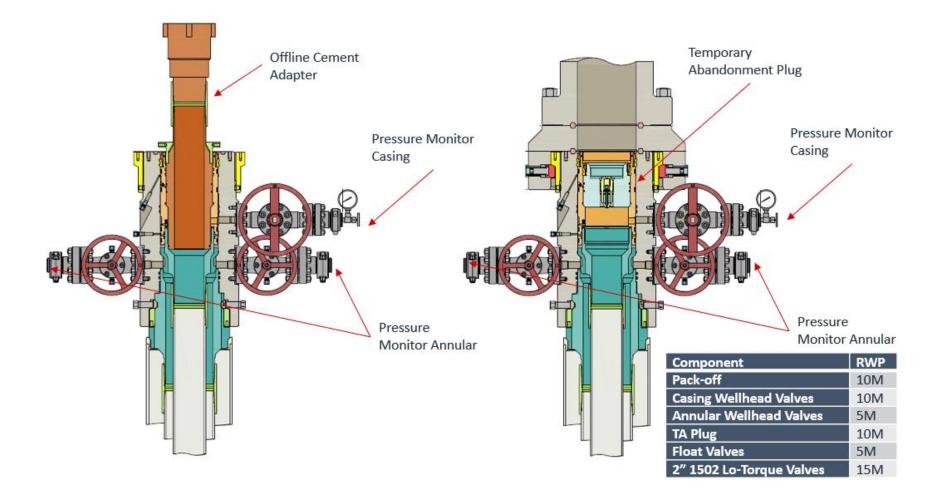
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# **Seog resources** Offline Intermediate Cementing Procedure

Figure 1: Cameron TA Plug and Offline Adapter Schematic



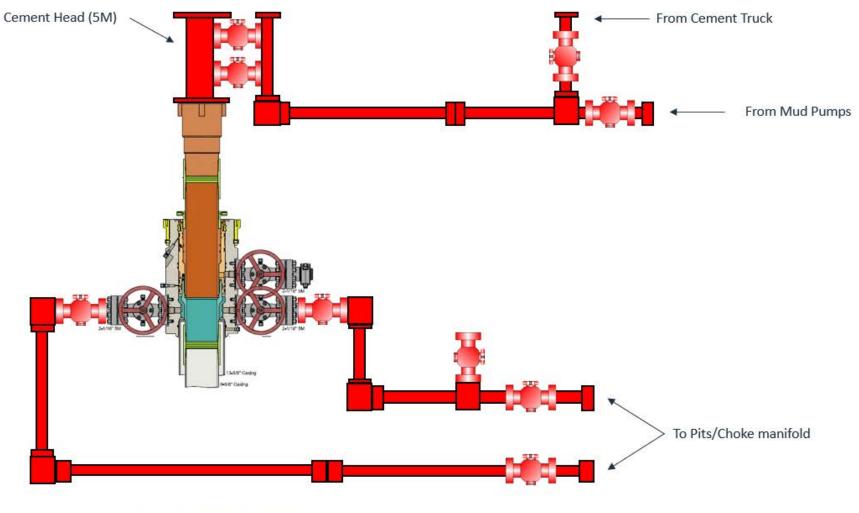
**Offline Intermediate Cementing Procedure** 



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# **Seog resources** Offline Intermediate Cementing Procedure

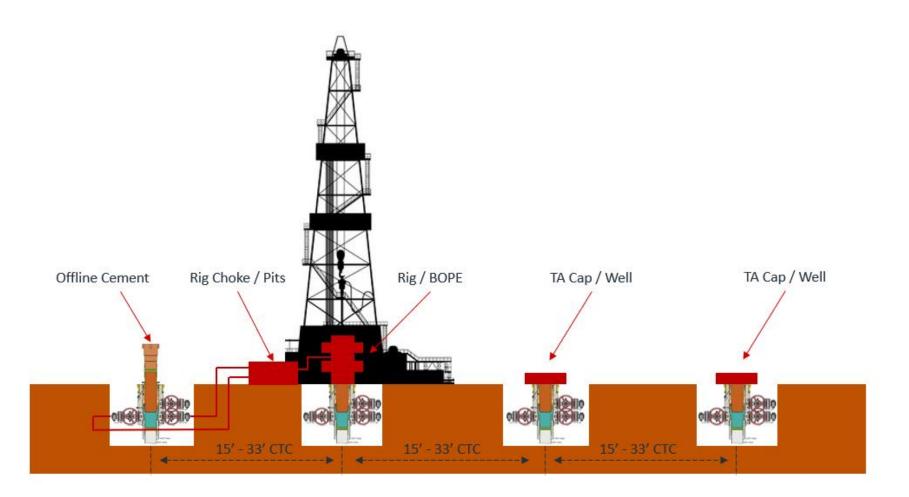




\*\*\* All Lines 10M rated working pressure

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

CONDITIONS

	OGRID:		
EOG RESOURCES INC	7377		
5509 Champions Drive	Action Number:		
Midland, TX 79706	314929		
	Action Type:		
	[C-103] NOI Change of Plans (C-103A)		
CONDITIONS			

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

CONDITIONS

Action 314929

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