

Form 3160-5 (June 2019)	UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT	FORM APPROVED OMB No. 1004-0137 Expires: October 31, 2021
<b>SUNDRY NOTICES AND REPORTS ON WELLS</b> <i>Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.</i>		5. Lease Serial No. NMNM0438001
		6. If Indian, Allottee or Tribe Name

SUBMIT IN TRIPLICATE - Other instructions on page 2		7. If Unit of CA/Agreement, Name and/or No.
1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		8. Well Name and No. DEEP ELEM 4 FED COM/778H
2. Name of Operator EOG RESOURCES INCORPORATED		9. API Well No. 30-015-54084
3a. Address 1111 BAGBY SKY LOBBY 2, HOUSTON, TX 770	3b. Phone No. (include area code) (713) 651-7000	10. Field and Pool or Exploratory Area PURPLE SAGE; WOLFCAMP (GAS)
4. Location of Well (Footage, Sec., T.,R.,M., or Survey Description) SEC 4/T26S/R31E/NMP		11. Country or Parish, State EDDY/NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA				
TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input type="checkbox"/> Other
	<input checked="" type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

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

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

Deep Elem 4 Fed Com 778H API #: 30-015-54084

Change SHL from T-26-S, R-31-E, Sec 4, 577' FSL, 855' FWL, Eddy Co., NM,  
to T-26-S, R-31-E, Sec 4, 517' FSL, 810' FWL, Eddy Co., N.M.

Change BHL from T-26-S, R-31-E, Sec 16, 230' FSL, 330' FWL, Eddy Co., NM,  
  
to T-26-S, R-31-E, Sec 16, 230' FSL, 2205' FWL, Eddy Co., N.M.

Update casing and cement program to current design. Batch Sundry #2777328

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed) STAR HARRELL / Ph: (432) 848-9161	Title Regulatory Specialist
Signature (Electronic Submission)	Date 03/07/2024

THE SPACE FOR FEDERAL OR STATE OFFICE USE		
Approved by CHRISTOPHER WALLS / Ph: (575) 234-2234 / Approved	Title Petroleum Engineer	Date 03/12/2024
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office CARLSBAD	

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

(Instructions on page 2)

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



### Deep Elem 4 Fed Com 778H

#### Revised Permit Information 01/31/2024:

Well Name: Deep Elem 4 Fed Com 778H

Location: SHL: 517' FSL & 810' FWL, Section 4, T-26-S, R-31-E, Eddy Co., N.M.

BHL: 230' FSL & 2205' FWL, Section 16, T-26-S, R-31-E, Eddy Co., N.M.

#### CASING PROGRAM:

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
12-1/4"	0	1,240	0	1,240	9-5/8"	36#	J-55	LTC
8-3/4"	0	10,488	0	10,230	7-5/8"	29.7#	ICYP-110	MO FXL
6-3/4"	0	9,988	0	9,730	5-1/2"	20#	P110-EC	DWC/C IS MS
6-3/4"	9,988	10,488	9,730	10,230	5-1/2"	20#	P110-EC	VAM Sprint SF
6-3/4"	10,488	23,218	10,230	12,489	5-1/2"	20#	P110-EC	DWC/C IS MS

Variance is requested to waive the centralizer requirements for the 7-5/8" casing in the 8-3/4" hole size. An expansion additive will be utilized, in the cement slurry, for the entire length of the 8-3/4" 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.

Variance is also requested to waive the annular clearance requirements for the 5-1/2" casing by 7-5/8" casing annulus to the proposed top of cement.

EOG requests permission to allow deviation from the 0.422" annulus clearance requirement from Onshore Order #2 under the following conditions:

- Annular clearance to meet or exceed 0.422" between intermediate casing ID and production casing coupling only on the first 500' overlap between both casing strings.
- Annular clearance less than 0.422" is acceptable for the production open hole section.

#### CEMENTING PROGRAM:

Depth	No. Sacks	Wt. ppg	Yld Ft3/sk	Slurry Description
1,240' 9-5/8"	340	13.5	1.73	Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	80	14.8	1.34	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1,040')
10,230' 7-5/8"	490	14.2	1.11	1st Stage (Tail): Class C + 0.6% Halad-9 + 0.45% HR-601 + 3% Microbond (TOC @ 6,070')
	1040	14.8	1.5	2nd Stage (Bradenhead squeeze): Class C + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
23,218' 5-1/2"	2170	13.2	1.41	Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 9,730')

**Deep Elem 4 Fed Com 778H**

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

EOG requests variance from minimum standards to pump a two stage cement job on the 7-5/8" intermediate casing string with the first stage being pumped conventionally with the calculated top of cement at the Brushy Canyon (6,270') 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 40 sacks 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 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.

**MUD PROGRAM:**

Measured Depth	Type	Weight (ppg)	Viscosity	Water Loss
0 – 1,240'	Fresh - Gel	8.6-8.8	28-34	N/c
1,240' – 10,230'	Brine	9.0-10.5	28-34	N/c
10,230' – 12,236'	Oil Base	8.7-9.4	58-68	N/c - 6
12,236' – 23,218' Lateral	Oil Base	10.0-14.0	58-68	4 - 6



## Deep Elem 4 Fed Com 778H

### 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.



## Deep Elem 4 Fed Com 778H

517' FSL  
810' FWL  
Section 4  
T-26-S, R-31-E

Revised Wellbore

KB: 3316'  
GL: 3291'

API: 30-015-54084

**Bit Size: 12-1/4"**  
9-5/8", 36#, J-55, LTC,  
@ 0' - 1,240'

**Bit Size: 8-3/4"**  
7-5/8", 29.7#, ICYP-110, MO FXL,  
@ 0' - 10,230'

**Bit Size: 6-3/4"**  
5-1/2", 20.#, P110-EC, DWC/C IS MS  
@ 0' - 9,730'  
5-1/2", 20.#, P110-EC, VAM Sprint SF  
@ 9,730' - 10,230'  
5-1/2", 20.#, P110-EC, DWC/C IS MS  
@ 10,230' - 23,218'

KOP: 12,236' MD, 9,618' TVD  
EOC: 12,986' MD, 10,191' TVD

TOC: 9,988' MD, 9,730' TVD

Lateral: 23,218' MD, 12,489' TVD  
Upper Most Perf:  
330' FNL & 2205' FWL Sec. 4  
Lower Most Perf:  
230' FSL & 2205' FWL Sec. 16  
BH Location: 230' FSL & 2205' FWL  
Sec. 16  
T-26-S R-31-E



## Deep Elem 4 Fed Com 778H

### Design B

### CASING PROGRAM:

Hole Size	Interval MD		Interval TVD		Csg OD	Weight	Grade	Conn
	From (ft)	To (ft)	From (ft)	To (ft)				
13"	0	1,240	0	1,240	10-3/4"	40.5#	J-55	STC
9-7/8"	0	10,488	0	10,230	8-3/4"	38.5#	P110-EC	SLIJ II NA
7-7/8"	0	23,218	0	12,489	6"	24.5#	P110-EC	VAM Sprint-SF

Variance is requested to waive the centralizer requirements for the 8-3/4" 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" 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.

Variance is also requested to waive the annular clearance requirements for the 6" casing by 8-3/4" casing annulus to the proposed top of cement.

EOG requests permission to allow deviation from the 0.422" annulus clearance requirement from Onshore Order #2 under the following conditions:

- Annular clearance to meet or exceed 0.422" between intermediate casing ID and production casing coupling only on the first 500' overlap between both casing strings.
- Annular clearance less than 0.422" is acceptable for the production open hole section.

### CEMENTING PROGRAM:

Depth	No. Sacks	Wt. ppg	Yld Ft3/sk	Slurry Description
1,240' 10-3/4"	320	13.5	1.73	Lead: Class C + 4.0% Bentonite Gel + 0.5% CaCl <sub>2</sub> + 0.25 lb/sk Cello-Flake (TOC @ Surface)
	70	14.8	1.34	Tail: Class C + 0.6% FL-62 + 0.25 lb/sk Cello-Flake + 0.2% Sodium Metasilicate (TOC @ 1,040')
10,230' 8-3/4"	560	14.2	1.11	1st Stage (Tail): Class C + 0.6% Halad-9 + 0.45% HR-601 + 3% Microbond (TOC @ 6,070')
	1180	14.8	1.5	2nd Stage (Bradenhead squeeze): Class C + 3% Salt + 1% PreMag-M + 6% Bentonite Gel (TOC @ surface)
23,218' 6"	1880	13.2	1.31	Lead: Class H + 0.4% Halad-344 + 0.35% HR-601 + 3% Microbond (TOC @ 9,730')

**Deep Elem 4 Fed Com 778H**

EOG requests variance from minimum standards to pump a two stage cement job on the 8-3/4" intermediate casing string with the first stage being pumped conventionally with the calculated top of cement at the Brushy Canyon (6,270') 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 182 sacks 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 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.

**VARIANCE REQUESTS:**

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

Variances requested include (supporting documents attached):

- BOP Break Testing for 5M Intermediate Intervals (EOG BLM Variance 3a\_b)
- Offline Cementing for Surface and Intermediate Intervals (EOG BLM Variance 3a\_b)
- Intermediate Bradenhead Cement (EOG BLM Variance 2a)





Deep Elem 4 Fed Com 778H

517' FSL  
810' FWL  
Section 4  
T-26-S, R-31-E

Proposed Wellbore  
  
API: 30-015-54084

KB: 3316'  
GL: 3291'

Bit Size: 13"  
10-3/4", 40.5#, J-55, STC,  
@ 0' - 1,240'

Bit Size: 9-7/8"  
8-3/4" 38.5#, P110-EC, SLIJ II NA,  
@ 0' - 10,230'

Bit Size: 7-7/8"  
6", 24.5#, P110-EC, VAM Sprint-SF,  
@ 0' - 23,218'

KOP: 12,236' MD, 9,618' TVD  
EOC: 12,986' MD, 10,191' TVD

TOC: 9,988' MD, 9,730' TVD

Lateral: 23,218' MD, 12,489' TVD  
Upper Most Perf:  
330' FNL & 2205' FWL Sec. 4  
Lower Most Perf:  
230' FSL & 2205' FWL Sec. 16  
BH Location: 230' FSL & 2205' FWL  
Sec. 16  
T-26-S R-31-E



## Deep Elem 4 Fed Com 778H

### GEOLOGIC NAME OF SURFACE FORMATION:

Permian

### ESTIMATED TOPS OF IMPORTANT GEOLOGICAL MARKERS:

Rustler	1,124'
Tamarisk Anhydrite	1,215'
Top of Salt	1,477'
Base of Salt	3,730'
Lamar	3,837'
Bell Canyon	4,091'
Cherry Canyon	5,010'
Brushy Canyon	6,270'
Bone Spring Lime	7,983'
Leonard (Avalon) Shale	8,114'
1st Bone Spring Sand	8,965'
2nd Bone Spring Shale	9,216'
2nd Bone Spring Sand	9,626'
3rd Bone Spring Carb	10,126'
3rd Bone Spring Sand	10,887'
Wolfcamp	11,280'
TD	12,489'

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

Upper Permian Sands	0- 400'	Fresh Water
Bell Canyon	4,091'	Oil
Cherry Canyon	5,010'	Oil
Brushy Canyon	6,270'	Oil
Leonard (Avalon) Shale	8,114'	Oil
1st Bone Spring Sand	8,965'	Oil
2nd Bone Spring Shale	9,216'	Oil
2nd Bone Spring Sand	9,626'	Oil

# Midland

Eddy County, NM (NAD 83 NME)

Deep Elem 4 Fed Com

#778H

OH

Plan: Plan #0.3

## Standard Planning Report

04 March, 2024

Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Well #778H
Company:	Midland	TVD Reference:	KB = 25' @ 3315.0usft
Project:	Eddy County, NM (NAD 83 NME)	MD Reference:	KB = 25' @ 3315.0usft
Site:	Deep Elem 4 Fed Com	North Reference:	Grid
Well:	#778H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.3		

Project	Eddy County, NM (NAD 83 NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		Using geodetic scale factor

Site	Deep Elem 4 Fed Com		
Site Position:		Northing:	388,239.00 usft
From:	Map	Easting:	713,374.00 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 3' 58.075 N
		Longitude:	103° 46' 40.657 W

Well	#778H					
Well Position	+N/-S	0.0 usft	Northing:	388,234.00 usft	Latitude:	32° 3' 58.201 N
	+E/-W	0.0 usft	Easting:	709,899.00 usft	Longitude:	103° 47' 21.041 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,290.0 usft
Grid Convergence:		0.29 °				

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	7/8/2020	6.74	59.75	47,476.75804546

Design	Plan #0.3				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	172.49	

Plan Survey Tool Program	Date	3/4/2024			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.0	23,218.1	Plan #0.3 (OH)	EOG MWD+IFR1	
				MWD + IFR1	

Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Well #778H
Company:	Midland	TVD Reference:	KB = 25' @ 3315.0usft
Project:	Eddy County, NM (NAD 83 NME)	MD Reference:	KB = 25' @ 3315.0usft
Site:	Deep Elem 4 Fed Com	North Reference:	Grid
Well:	#778H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.3		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,277.7	19.55	99.20	2,258.8	-26.4	163.1	2.00	2.00	0.00	99.20	
5,516.9	19.55	99.20	5,311.2	-199.7	1,233.3	0.00	0.00	0.00	0.00	
6,494.5	0.00	0.00	6,270.0	-226.1	1,396.4	2.00	-2.00	0.00	180.00	
12,236.0	0.00	0.00	12,011.5	-226.1	1,396.4	0.00	0.00	0.00	0.00	KOP (Deep Elem 4 Fe
12,985.9	89.98	179.81	12,489.0	-703.4	1,397.9	12.00	12.00	23.98	179.81	
13,118.7	89.98	179.81	12,489.0	-836.2	1,398.3	0.00	0.00	0.00	0.00	FTP (Deep Elem 4 Fe
23,118.1	90.02	179.69	12,489.0	-10,835.5	1,441.2	0.00	0.00	0.00	-75.75	LTP (Deep Elem 4 Fe
23,218.1	89.98	179.16	12,489.0	-10,935.5	1,442.2	0.53	-0.03	-0.53	-93.25	PBHL (Deep Elem 4 F

Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Well #778H
Company:	Midland	TVD Reference:	KB = 25' @ 3315.0usft
Project:	Eddy County, NM (NAD 83 NME)	MD Reference:	KB = 25' @ 3315.0usft
Site:	Deep Elem 4 Fed Com	North Reference:	Grid
Well:	#778H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	2.00	99.20	1,400.0	-0.3	1.7	0.5	2.00	2.00	0.00
1,500.0	4.00	99.20	1,499.8	-1.1	6.9	2.0	2.00	2.00	0.00
1,600.0	6.00	99.20	1,599.5	-2.5	15.5	4.5	2.00	2.00	0.00
1,700.0	8.00	99.20	1,698.7	-4.5	27.5	8.0	2.00	2.00	0.00
1,800.0	10.00	99.20	1,797.5	-7.0	43.0	12.5	2.00	2.00	0.00
1,900.0	12.00	99.20	1,895.6	-10.0	61.8	18.0	2.00	2.00	0.00
2,000.0	14.00	99.20	1,993.1	-13.6	84.0	24.5	2.00	2.00	0.00
2,100.0	16.00	99.20	2,089.6	-17.7	109.6	31.9	2.00	2.00	0.00
2,200.0	18.00	99.20	2,185.3	-22.4	138.4	40.3	2.00	2.00	0.00
2,277.7	19.55	99.20	2,258.8	-26.4	163.1	47.5	2.00	2.00	0.00
2,300.0	19.55	99.20	2,279.8	-27.6	170.5	49.6	0.00	0.00	0.00
2,400.0	19.55	99.20	2,374.1	-32.9	203.5	59.3	0.00	0.00	0.00
2,500.0	19.55	99.20	2,468.3	-38.3	236.5	68.9	0.00	0.00	0.00
2,600.0	19.55	99.20	2,562.5	-43.6	269.6	78.5	0.00	0.00	0.00
2,700.0	19.55	99.20	2,656.8	-49.0	302.6	88.1	0.00	0.00	0.00
2,800.0	19.55	99.20	2,751.0	-54.3	335.7	97.8	0.00	0.00	0.00
2,900.0	19.55	99.20	2,845.2	-59.7	368.7	107.4	0.00	0.00	0.00
3,000.0	19.55	99.20	2,939.5	-65.0	401.7	117.0	0.00	0.00	0.00
3,100.0	19.55	99.20	3,033.7	-70.4	434.8	126.6	0.00	0.00	0.00
3,200.0	19.55	99.20	3,127.9	-75.7	467.8	136.3	0.00	0.00	0.00
3,300.0	19.55	99.20	3,222.2	-81.1	500.9	145.9	0.00	0.00	0.00
3,400.0	19.55	99.20	3,316.4	-86.4	533.9	155.5	0.00	0.00	0.00
3,500.0	19.55	99.20	3,410.6	-91.8	566.9	165.1	0.00	0.00	0.00
3,600.0	19.55	99.20	3,504.9	-97.1	600.0	174.7	0.00	0.00	0.00
3,700.0	19.55	99.20	3,599.1	-102.5	633.0	184.4	0.00	0.00	0.00
3,800.0	19.55	99.20	3,693.3	-107.8	666.0	194.0	0.00	0.00	0.00
3,900.0	19.55	99.20	3,787.6	-113.2	699.1	203.6	0.00	0.00	0.00
4,000.0	19.55	99.20	3,881.8	-118.5	732.1	213.2	0.00	0.00	0.00
4,100.0	19.55	99.20	3,976.0	-123.9	765.2	222.9	0.00	0.00	0.00
4,200.0	19.55	99.20	4,070.3	-129.2	798.2	232.5	0.00	0.00	0.00
4,300.0	19.55	99.20	4,164.5	-134.6	831.2	242.1	0.00	0.00	0.00
4,400.0	19.55	99.20	4,258.7	-139.9	864.3	251.7	0.00	0.00	0.00
4,500.0	19.55	99.20	4,353.0	-145.3	897.3	261.3	0.00	0.00	0.00
4,600.0	19.55	99.20	4,447.2	-150.6	930.4	271.0	0.00	0.00	0.00
4,700.0	19.55	99.20	4,541.4	-156.0	963.4	280.6	0.00	0.00	0.00
4,800.0	19.55	99.20	4,635.7	-161.3	996.4	290.2	0.00	0.00	0.00
4,900.0	19.55	99.20	4,729.9	-166.7	1,029.5	299.8	0.00	0.00	0.00
5,000.0	19.55	99.20	4,824.1	-172.0	1,062.5	309.5	0.00	0.00	0.00
5,100.0	19.55	99.20	4,918.4	-177.4	1,095.5	319.1	0.00	0.00	0.00
5,200.0	19.55	99.20	5,012.6	-182.7	1,128.6	328.7	0.00	0.00	0.00

## Planning Report

<b>Database:</b>	PEDM	<b>Local Co-ordinate Reference:</b>	Well #778H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	KB = 25' @ 3315.0usft
<b>Project:</b>	Eddy County, NM (NAD 83 NME)	<b>MD Reference:</b>	KB = 25' @ 3315.0usft
<b>Site:</b>	Deep Elem 4 Fed Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#778H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.3		

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	19.55	99.20	5,106.8	-188.1	1,161.6	338.3	0.00	0.00	0.00	
5,400.0	19.55	99.20	5,201.1	-193.4	1,194.7	347.9	0.00	0.00	0.00	
5,500.0	19.55	99.20	5,295.3	-198.8	1,227.7	357.6	0.00	0.00	0.00	
5,516.9	19.55	99.20	5,311.2	-199.7	1,233.3	359.2	0.00	0.00	0.00	
5,600.0	17.89	99.20	5,389.9	-203.9	1,259.6	366.9	2.00	-2.00	0.00	
5,700.0	15.89	99.20	5,485.6	-208.6	1,288.3	375.2	2.00	-2.00	0.00	
5,800.0	13.89	99.20	5,582.2	-212.7	1,313.7	382.6	2.00	-2.00	0.00	
5,900.0	11.89	99.20	5,679.7	-216.2	1,335.7	389.0	2.00	-2.00	0.00	
6,000.0	9.89	99.20	5,777.9	-219.3	1,354.3	394.5	2.00	-2.00	0.00	
6,100.0	7.89	99.20	5,876.7	-221.7	1,369.6	398.9	2.00	-2.00	0.00	
6,200.0	5.89	99.20	5,976.0	-223.6	1,381.4	402.3	2.00	-2.00	0.00	
6,300.0	3.89	99.20	6,075.6	-225.0	1,389.8	404.8	2.00	-2.00	0.00	
6,400.0	1.89	99.20	6,175.5	-225.8	1,394.8	406.2	2.00	-2.00	0.00	
6,494.5	0.00	0.00	6,270.0	-226.1	1,396.4	406.7	2.00	-2.00	0.00	
6,500.0	0.00	0.00	6,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
6,700.0	0.00	0.00	6,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,000.0	0.00	0.00	6,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,100.0	0.00	0.00	6,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,200.0	0.00	0.00	6,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,300.0	0.00	0.00	7,075.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,400.0	0.00	0.00	7,175.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,500.0	0.00	0.00	7,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,600.0	0.00	0.00	7,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,700.0	0.00	0.00	7,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,800.0	0.00	0.00	7,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
7,900.0	0.00	0.00	7,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,000.0	0.00	0.00	7,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,100.0	0.00	0.00	7,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,200.0	0.00	0.00	7,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,300.0	0.00	0.00	8,075.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,400.0	0.00	0.00	8,175.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,500.0	0.00	0.00	8,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,800.0	0.00	0.00	8,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
8,900.0	0.00	0.00	8,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,000.0	0.00	0.00	8,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,100.0	0.00	0.00	8,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,200.0	0.00	0.00	8,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,075.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,175.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
10,000.0	0.00	0.00	9,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
10,100.0	0.00	0.00	9,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
10,200.0	0.00	0.00	9,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
10,300.0	0.00	0.00	10,075.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	
10,400.0	0.00	0.00	10,175.5	-226.1	1,396.4	406.7	0.00	0.00	0.00	

Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Well #778H
Company:	Midland	TVD Reference:	KB = 25' @ 3315.0usft
Project:	Eddy County, NM (NAD 83 NME)	MD Reference:	KB = 25' @ 3315.0usft
Site:	Deep Elem 4 Fed Com	North Reference:	Grid
Well:	#778H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.3		

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)
10,500.0	0.00	0.00	10,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
10,600.0	0.00	0.00	10,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
10,700.0	0.00	0.00	10,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
10,800.0	0.00	0.00	10,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
10,900.0	0.00	0.00	10,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,000.0	0.00	0.00	10,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,100.0	0.00	0.00	10,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,200.0	0.00	0.00	10,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,300.0	0.00	0.00	11,075.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,400.0	0.00	0.00	11,175.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,500.0	0.00	0.00	11,275.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,600.0	0.00	0.00	11,375.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,700.0	0.00	0.00	11,475.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,800.0	0.00	0.00	11,575.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
11,900.0	0.00	0.00	11,675.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
12,000.0	0.00	0.00	11,775.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
12,100.0	0.00	0.00	11,875.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
12,200.0	0.00	0.00	11,975.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
12,236.0	0.00	0.00	12,011.5	-226.1	1,396.4	406.7	0.00	0.00	0.00
12,250.0	1.67	179.81	12,025.5	-226.3	1,396.4	406.9	12.00	12.00	0.00
12,275.0	4.67	179.81	12,050.4	-227.6	1,396.4	408.3	12.00	12.00	0.00
12,300.0	7.67	179.81	12,075.3	-230.3	1,396.4	410.9	12.00	12.00	0.00
12,325.0	10.67	179.81	12,099.9	-234.3	1,396.4	414.9	12.00	12.00	0.00
12,350.0	13.67	179.81	12,124.4	-239.6	1,396.4	420.1	12.00	12.00	0.00
12,375.0	16.67	179.81	12,148.5	-246.1	1,396.4	426.6	12.00	12.00	0.00
12,400.0	19.67	179.81	12,172.3	-253.9	1,396.5	434.3	12.00	12.00	0.00
12,425.0	22.67	179.81	12,195.6	-263.0	1,396.5	443.3	12.00	12.00	0.00
12,450.0	25.67	179.81	12,218.4	-273.2	1,396.5	453.4	12.00	12.00	0.00
12,475.0	28.67	179.81	12,240.6	-284.6	1,396.6	464.8	12.00	12.00	0.00
12,500.0	31.67	179.81	12,262.2	-297.2	1,396.6	477.2	12.00	12.00	0.00
12,525.0	34.67	179.81	12,283.1	-310.9	1,396.6	490.8	12.00	12.00	0.00
12,550.0	37.67	179.81	12,303.3	-325.6	1,396.7	505.4	12.00	12.00	0.00
12,575.0	40.67	179.81	12,322.7	-341.4	1,396.7	521.1	12.00	12.00	0.00
12,600.0	43.67	179.81	12,341.2	-358.2	1,396.8	537.7	12.00	12.00	0.00
12,625.0	46.67	179.81	12,358.8	-375.9	1,396.8	555.3	12.00	12.00	0.00
12,650.0	49.67	179.81	12,375.5	-394.5	1,396.9	573.8	12.00	12.00	0.00
12,675.0	52.67	179.81	12,391.2	-414.0	1,397.0	593.1	12.00	12.00	0.00
12,700.0	55.67	179.81	12,405.8	-434.3	1,397.0	613.2	12.00	12.00	0.00
12,725.0	58.67	179.81	12,419.4	-455.3	1,397.1	634.1	12.00	12.00	0.00
12,750.0	61.67	179.81	12,431.8	-477.0	1,397.2	655.6	12.00	12.00	0.00
12,775.0	64.67	179.81	12,443.1	-499.3	1,397.2	677.7	12.00	12.00	0.00
12,800.0	67.67	179.81	12,453.2	-522.2	1,397.3	700.4	12.00	12.00	0.00
12,825.0	70.67	179.81	12,462.1	-545.5	1,397.4	723.5	12.00	12.00	0.00
12,850.0	73.67	179.81	12,469.7	-569.3	1,397.5	747.1	12.00	12.00	0.00
12,875.0	76.67	179.81	12,476.1	-593.5	1,397.6	771.1	12.00	12.00	0.00
12,900.0	79.67	179.81	12,481.2	-617.9	1,397.6	795.4	12.00	12.00	0.00
12,925.0	82.67	179.81	12,485.1	-642.6	1,397.7	819.9	12.00	12.00	0.00
12,950.0	85.67	179.81	12,487.6	-667.5	1,397.8	844.5	12.00	12.00	0.00
12,975.0	88.67	179.81	12,488.8	-692.5	1,397.9	869.3	12.00	12.00	0.00
12,985.9	89.98	179.81	12,489.0	-703.4	1,397.9	880.1	12.00	12.00	0.00
13,000.0	89.98	179.81	12,489.0	-717.5	1,398.0	894.1	0.00	0.00	0.00
13,100.0	89.98	179.81	12,489.0	-817.5	1,398.3	993.3	0.00	0.00	0.00
13,118.7	89.98	179.81	12,489.0	-836.2	1,398.3	1,011.9	0.00	0.00	0.00
13,200.0	89.99	179.81	12,489.0	-917.5	1,398.6	1,092.5	0.00	0.00	0.00



## Planning Report

<b>Database:</b>	PEDM	<b>Local Co-ordinate Reference:</b>	Well #778H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	KB = 25' @ 3315.0usft
<b>Project:</b>	Eddy County, NM (NAD 83 NME)	<b>MD Reference:</b>	KB = 25' @ 3315.0usft
<b>Site:</b>	Deep Elem 4 Fed Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#778H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.3		

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)	
13,300.0	89.99	179.81	12,489.0	-1,017.5	1,398.9	1,191.7	0.00	0.00	0.00	
13,400.0	89.99	179.81	12,489.1	-1,117.5	1,399.3	1,290.8	0.00	0.00	0.00	
13,500.0	89.99	179.81	12,489.1	-1,217.5	1,399.6	1,390.0	0.00	0.00	0.00	
13,600.0	89.99	179.81	12,489.1	-1,317.5	1,399.9	1,489.2	0.00	0.00	0.00	
13,700.0	89.99	179.81	12,489.1	-1,417.5	1,400.3	1,588.4	0.00	0.00	0.00	
13,800.0	89.99	179.81	12,489.2	-1,517.5	1,400.6	1,687.6	0.00	0.00	0.00	
13,900.0	89.99	179.80	12,489.2	-1,617.5	1,400.9	1,786.8	0.00	0.00	0.00	
14,000.0	89.99	179.80	12,489.2	-1,717.5	1,401.3	1,885.9	0.00	0.00	0.00	
14,100.0	89.99	179.80	12,489.2	-1,817.5	1,401.6	1,985.1	0.00	0.00	0.00	
14,200.0	89.99	179.80	12,489.3	-1,917.5	1,402.0	2,084.3	0.00	0.00	0.00	
14,300.0	89.99	179.80	12,489.3	-2,017.5	1,402.3	2,183.5	0.00	0.00	0.00	
14,400.0	89.99	179.80	12,489.3	-2,117.5	1,402.7	2,282.7	0.00	0.00	0.00	
14,500.0	89.99	179.80	12,489.3	-2,217.5	1,403.0	2,381.9	0.00	0.00	0.00	
14,600.0	89.99	179.80	12,489.3	-2,317.5	1,403.4	2,481.1	0.00	0.00	0.00	
14,700.0	89.99	179.80	12,489.4	-2,417.5	1,403.7	2,580.3	0.00	0.00	0.00	
14,800.0	89.99	179.79	12,489.4	-2,517.5	1,404.1	2,679.4	0.00	0.00	0.00	
14,900.0	89.99	179.79	12,489.4	-2,617.5	1,404.5	2,778.6	0.00	0.00	0.00	
15,000.0	89.99	179.79	12,489.4	-2,717.5	1,404.8	2,877.8	0.00	0.00	0.00	
15,100.0	89.99	179.79	12,489.4	-2,817.5	1,405.2	2,977.0	0.00	0.00	0.00	
15,200.0	89.99	179.79	12,489.4	-2,917.5	1,405.5	3,076.2	0.00	0.00	0.00	
15,300.0	89.99	179.79	12,489.5	-3,017.5	1,405.9	3,175.4	0.00	0.00	0.00	
15,400.0	89.99	179.79	12,489.5	-3,117.5	1,406.3	3,274.6	0.00	0.00	0.00	
15,500.0	89.99	179.79	12,489.5	-3,217.5	1,406.7	3,373.8	0.00	0.00	0.00	
15,600.0	89.99	179.78	12,489.5	-3,317.5	1,407.0	3,473.0	0.00	0.00	0.00	
15,700.0	89.99	179.78	12,489.5	-3,417.5	1,407.4	3,572.1	0.00	0.00	0.00	
15,800.0	89.99	179.78	12,489.5	-3,517.5	1,407.8	3,671.3	0.00	0.00	0.00	
15,900.0	89.99	179.78	12,489.5	-3,617.5	1,408.2	3,770.5	0.00	0.00	0.00	
16,000.0	89.99	179.78	12,489.5	-3,717.5	1,408.6	3,869.7	0.00	0.00	0.00	
16,100.0	89.99	179.78	12,489.6	-3,817.5	1,408.9	3,968.9	0.00	0.00	0.00	
16,200.0	89.99	179.78	12,489.6	-3,917.5	1,409.3	4,068.1	0.00	0.00	0.00	
16,300.0	89.99	179.78	12,489.6	-4,017.5	1,409.7	4,167.3	0.00	0.00	0.00	
16,400.0	89.99	179.77	12,489.6	-4,117.5	1,410.1	4,266.5	0.00	0.00	0.00	
16,500.0	90.00	179.77	12,489.6	-4,217.5	1,410.5	4,365.7	0.00	0.00	0.00	
16,600.0	90.00	179.77	12,489.6	-4,317.5	1,410.9	4,464.9	0.00	0.00	0.00	
16,700.0	90.00	179.77	12,489.6	-4,417.5	1,411.3	4,564.1	0.00	0.00	0.00	
16,800.0	90.00	179.77	12,489.6	-4,517.5	1,411.7	4,663.3	0.00	0.00	0.00	
16,900.0	90.00	179.77	12,489.6	-4,617.5	1,412.1	4,762.4	0.00	0.00	0.00	
17,000.0	90.00	179.77	12,489.6	-4,717.5	1,412.5	4,861.6	0.00	0.00	0.00	
17,100.0	90.00	179.77	12,489.6	-4,817.5	1,412.9	4,960.8	0.00	0.00	0.00	
17,200.0	90.00	179.77	12,489.6	-4,917.5	1,413.3	5,060.0	0.00	0.00	0.00	
17,300.0	90.00	179.76	12,489.6	-5,017.5	1,413.7	5,159.2	0.00	0.00	0.00	
17,400.0	90.00	179.76	12,489.6	-5,117.4	1,414.1	5,258.4	0.00	0.00	0.00	
17,500.0	90.00	179.76	12,489.7	-5,217.4	1,414.6	5,357.6	0.00	0.00	0.00	
17,600.0	90.00	179.76	12,489.7	-5,317.4	1,415.0	5,456.8	0.00	0.00	0.00	
17,700.0	90.00	179.76	12,489.7	-5,417.4	1,415.4	5,556.0	0.00	0.00	0.00	
17,800.0	90.00	179.76	12,489.7	-5,517.4	1,415.8	5,655.2	0.00	0.00	0.00	
17,900.0	90.00	179.76	12,489.7	-5,617.4	1,416.2	5,754.4	0.00	0.00	0.00	
18,000.0	90.00	179.76	12,489.7	-5,717.4	1,416.7	5,853.6	0.00	0.00	0.00	
18,100.0	90.00	179.75	12,489.7	-5,817.4	1,417.1	5,952.8	0.00	0.00	0.00	
18,200.0	90.00	179.75	12,489.7	-5,917.4	1,417.5	6,052.0	0.00	0.00	0.00	
18,300.0	90.00	179.75	12,489.7	-6,017.4	1,417.9	6,151.2	0.00	0.00	0.00	
18,400.0	90.00	179.75	12,489.7	-6,117.4	1,418.4	6,250.4	0.00	0.00	0.00	
18,500.0	90.00	179.75	12,489.7	-6,217.4	1,418.8	6,349.6	0.00	0.00	0.00	
18,600.0	90.00	179.75	12,489.7	-6,317.4	1,419.3	6,448.8	0.00	0.00	0.00	

## Planning Report

<b>Database:</b>	PEDM	<b>Local Co-ordinate Reference:</b>	Well #778H
<b>Company:</b>	Midland	<b>TVD Reference:</b>	KB = 25' @ 3315.0usft
<b>Project:</b>	Eddy County, NM (NAD 83 NME)	<b>MD Reference:</b>	KB = 25' @ 3315.0usft
<b>Site:</b>	Deep Elem 4 Fed Com	<b>North Reference:</b>	Grid
<b>Well:</b>	#778H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #0.3		

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)
18,700.0	90.00	179.75	12,489.7	-6,417.4	1,419.7	6,548.0	0.00	0.00	0.00
18,800.0	90.00	179.75	12,489.6	-6,517.4	1,420.1	6,647.2	0.00	0.00	0.00
18,900.0	90.00	179.75	12,489.6	-6,617.4	1,420.6	6,746.4	0.00	0.00	0.00
19,000.0	90.00	179.74	12,489.6	-6,717.4	1,421.0	6,845.6	0.00	0.00	0.00
19,100.0	90.00	179.74	12,489.6	-6,817.4	1,421.5	6,944.8	0.00	0.00	0.00
19,200.0	90.00	179.74	12,489.6	-6,917.4	1,421.9	7,044.0	0.00	0.00	0.00
19,300.0	90.00	179.74	12,489.6	-7,017.4	1,422.4	7,143.2	0.00	0.00	0.00
19,400.0	90.00	179.74	12,489.6	-7,117.4	1,422.8	7,242.4	0.00	0.00	0.00
19,500.0	90.00	179.74	12,489.6	-7,217.4	1,423.3	7,341.6	0.00	0.00	0.00
19,600.0	90.00	179.74	12,489.6	-7,317.4	1,423.7	7,440.8	0.00	0.00	0.00
19,700.0	90.00	179.74	12,489.6	-7,417.4	1,424.2	7,540.0	0.00	0.00	0.00
19,800.0	90.01	179.73	12,489.6	-7,517.4	1,424.7	7,639.2	0.00	0.00	0.00
19,900.0	90.01	179.73	12,489.6	-7,617.4	1,425.1	7,738.4	0.00	0.00	0.00
20,000.0	90.01	179.73	12,489.6	-7,717.4	1,425.6	7,837.6	0.00	0.00	0.00
20,100.0	90.01	179.73	12,489.6	-7,817.4	1,426.1	7,936.8	0.00	0.00	0.00
20,200.0	90.01	179.73	12,489.5	-7,917.4	1,426.5	8,036.0	0.00	0.00	0.00
20,300.0	90.01	179.73	12,489.5	-8,017.4	1,427.0	8,135.2	0.00	0.00	0.00
20,400.0	90.01	179.73	12,489.5	-8,117.4	1,427.5	8,234.4	0.00	0.00	0.00
20,500.0	90.01	179.73	12,489.5	-8,217.4	1,428.0	8,333.6	0.00	0.00	0.00
20,600.0	90.01	179.72	12,489.5	-8,317.4	1,428.4	8,432.8	0.00	0.00	0.00
20,700.0	90.01	179.72	12,489.5	-8,417.4	1,428.9	8,532.0	0.00	0.00	0.00
20,800.0	90.01	179.72	12,489.5	-8,517.4	1,429.4	8,631.2	0.00	0.00	0.00
20,900.0	90.01	179.72	12,489.5	-8,617.4	1,429.9	8,730.4	0.00	0.00	0.00
21,000.0	90.01	179.72	12,489.4	-8,717.4	1,430.4	8,829.6	0.00	0.00	0.00
21,100.0	90.01	179.72	12,489.4	-8,817.4	1,430.9	8,928.8	0.00	0.00	0.00
21,200.0	90.01	179.72	12,489.4	-8,917.4	1,431.4	9,028.0	0.00	0.00	0.00
21,300.0	90.01	179.72	12,489.4	-9,017.4	1,431.9	9,127.2	0.00	0.00	0.00
21,400.0	90.01	179.72	12,489.4	-9,117.4	1,432.4	9,226.4	0.00	0.00	0.00
21,500.0	90.01	179.71	12,489.4	-9,217.4	1,432.9	9,325.6	0.00	0.00	0.00
21,600.0	90.01	179.71	12,489.3	-9,317.4	1,433.4	9,424.8	0.00	0.00	0.00
21,700.0	90.01	179.71	12,489.3	-9,417.4	1,433.9	9,524.0	0.00	0.00	0.00
21,800.0	90.01	179.71	12,489.3	-9,517.4	1,434.4	9,623.2	0.00	0.00	0.00
21,900.0	90.01	179.71	12,489.3	-9,617.4	1,434.9	9,722.4	0.00	0.00	0.00
22,000.0	90.01	179.71	12,489.3	-9,717.4	1,435.4	9,821.7	0.00	0.00	0.00
22,100.0	90.01	179.71	12,489.2	-9,817.4	1,435.9	9,920.9	0.00	0.00	0.00
22,200.0	90.01	179.71	12,489.2	-9,917.4	1,436.4	10,020.1	0.00	0.00	0.00
22,300.0	90.01	179.70	12,489.2	-10,017.4	1,436.9	10,119.3	0.00	0.00	0.00
22,400.0	90.01	179.70	12,489.2	-10,117.4	1,437.4	10,218.5	0.00	0.00	0.00
22,500.0	90.01	179.70	12,489.2	-10,217.4	1,437.9	10,317.7	0.00	0.00	0.00
22,600.0	90.01	179.70	12,489.1	-10,317.4	1,438.5	10,416.9	0.00	0.00	0.00
22,700.0	90.01	179.70	12,489.1	-10,417.4	1,439.0	10,516.1	0.00	0.00	0.00
22,800.0	90.01	179.70	12,489.1	-10,517.4	1,439.5	10,615.3	0.00	0.00	0.00
22,900.0	90.01	179.70	12,489.1	-10,617.4	1,440.0	10,714.5	0.00	0.00	0.00
23,000.0	90.01	179.70	12,489.0	-10,717.4	1,440.6	10,813.7	0.00	0.00	0.00
23,100.0	90.02	179.69	12,489.0	-10,817.4	1,441.1	10,912.9	0.00	0.00	0.00
23,118.1	90.02	179.69	12,489.0	-10,835.5	1,441.2	10,930.9	0.00	0.00	0.00
23,200.0	89.99	179.26	12,489.0	-10,917.4	1,442.0	11,012.2	0.53	-0.03	-0.53
23,218.1	89.98	179.16	12,489.0	-10,935.5	1,442.2	11,030.2	0.53	-0.03	-0.53

Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Well #778H
Company:	Midland	TVD Reference:	KB = 25' @ 3315.0usft
Project:	Eddy County, NM (NAD 83 NME)	MD Reference:	KB = 25' @ 3315.0usft
Site:	Deep Elem 4 Fed Com	North Reference:	Grid
Well:	#778H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #0.3		

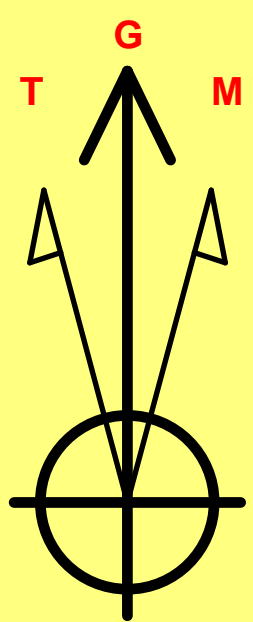
Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
KOP (Deep Elem 4 Fed - plan hits target center - Point	0.00	0.00	12,011.5	-226.1	1,396.4	388,008.00	711,295.00	32° 3' 55.894 N	103° 47' 4.831 W
PBHL (Deep Elem 4 Fec - plan hits target center - Point	0.00	0.00	12,489.0	-10,935.5	1,442.2	377,300.00	711,341.00	32° 2' 9.927 N	103° 47' 4.929 W
LTP (Deep Elem 4 Fed C - plan hits target center - Point	0.00	0.00	12,489.0	-10,835.5	1,441.2	377,400.00	711,340.00	32° 2' 10.916 N	103° 47' 4.935 W
FTP (Deep Elem 4 Fed C - plan hits target center - Point	0.00	0.00	12,489.0	-836.2	1,398.3	387,398.00	711,297.00	32° 3' 49.858 N	103° 47' 4.844 W



Eddy County, NM (NAD 83 NME)

Deep Elem 4 Fed Com #778H

Plan #0.3



Azimuths to Grid North  
True North: -0.29°  
Magnetic North: 6.45°

Magnetic Field  
Strength: 47476.8nT  
Dip Angle: 59.75°  
Date: 7/8/2020  
Model: IGRF2020

To convert a Magnetic Direction to a Grid Direction, Add 6.45°  
To convert a Magnetic Direction to a True Direction, Add 6.74° East  
To convert a True Direction to a Grid Direction, Subtract 0.29°

PROJECT DETAILS: Eddy County, NM (NAD 83 NME)

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

WELL DETAILS: #778H

KB = 25' @ 3315.0usft 3290.0  
Northing 388234.00 Easting 709899.00 Latitude 32° 3' 58.201 N Longitude 103° 47' 21.041 W

SECTION DETAILS

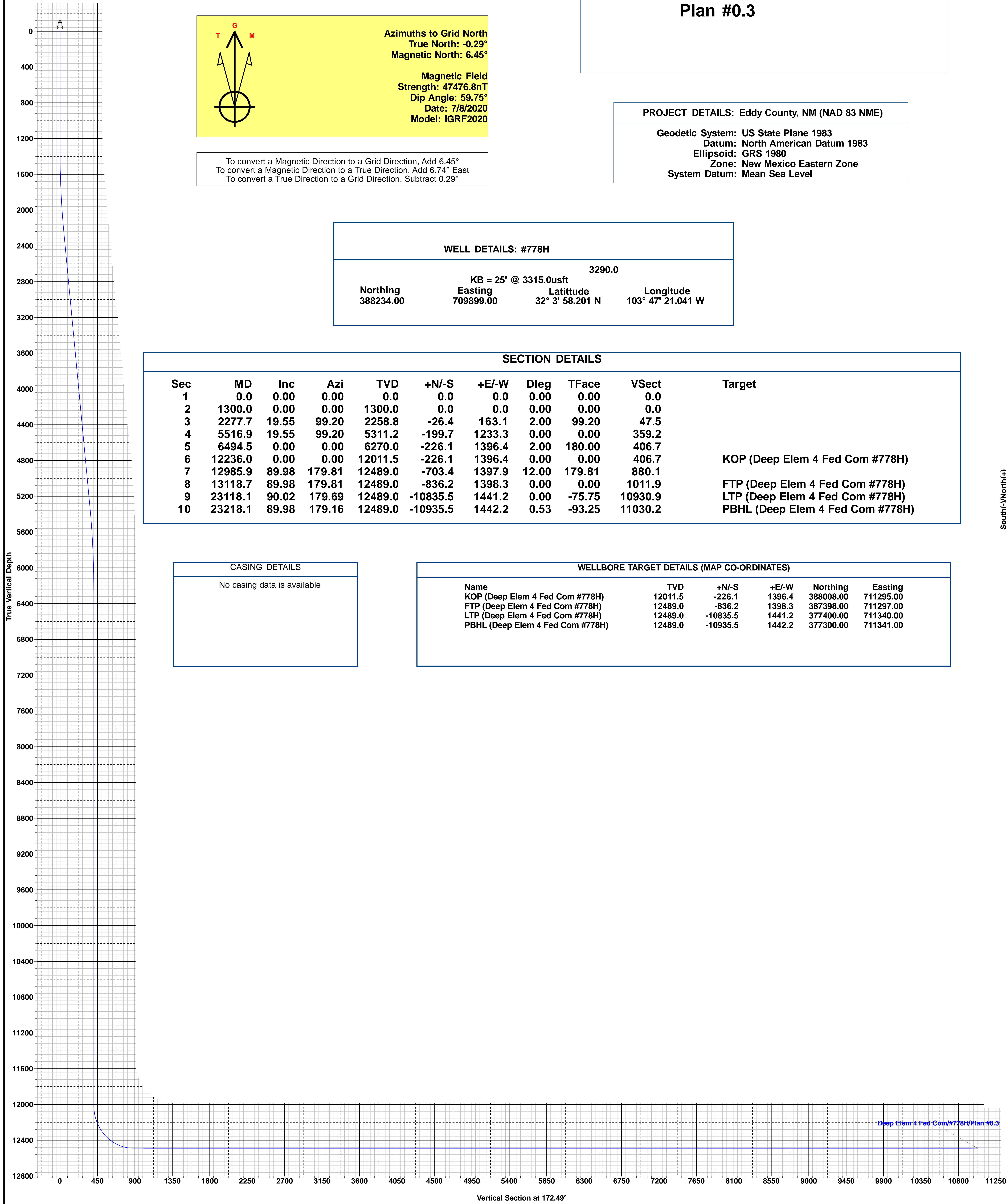
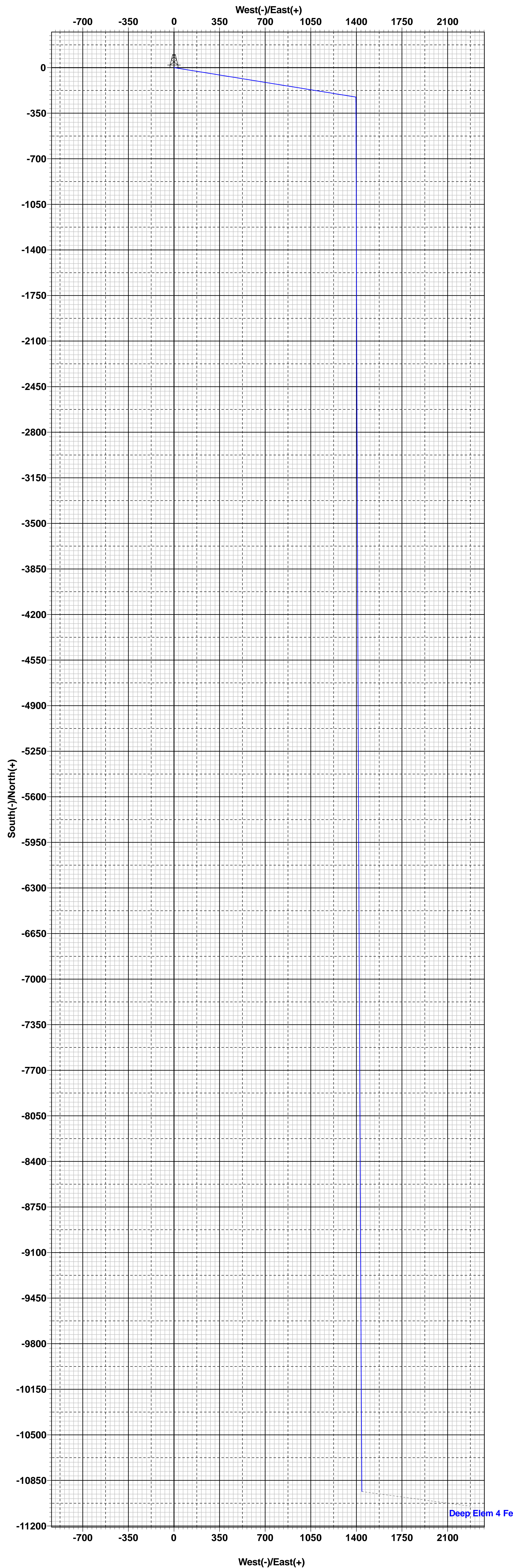
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1300.0	0.00	0.00	1300.0	0.0	0.0	0.00	0.00	0.0	
3	2277.7	19.55	99.20	2258.8	-26.4	163.1	2.00	99.20	47.5	
4	5516.9	19.55	99.20	5311.2	-199.7	1233.3	0.00	0.00	359.2	
5	6494.5	0.00	0.00	6270.0	-226.1	1396.4	2.00	180.00	406.7	
6	12236.0	0.00	0.00	12011.5	-226.1	1396.4	0.00	0.00	406.7	KOP (Deep Elem 4 Fed Com #778H)
7	12985.9	89.98	179.81	12489.0	-703.4	1397.9	12.00	179.81	880.1	
8	13118.7	89.98	179.81	12489.0	-836.2	1398.3	0.00	0.00	1011.9	FTP (Deep Elem 4 Fed Com #778H)
9	23118.1	90.02	179.69	12489.0	-10835.5	1441.2	0.00	-75.75	10930.9	LTP (Deep Elem 4 Fed Com #778H)
10	23218.1	89.98	179.16	12489.0	-10935.5	1442.2	0.53	-93.25	11030.2	PBHL (Deep Elem 4 Fed Com #778H)

CASING DETAILS

No casing data is available

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting
KOP (Deep Elem 4 Fed Com #778H)	12011.5	-226.1	1396.4	388008.00	711295.00
FTP (Deep Elem 4 Fed Com #778H)	12489.0	-836.2	1398.3	387398.00	711297.00
LTP (Deep Elem 4 Fed Com #778H)	12489.0	-10835.5	1441.2	377400.00	711340.00
PBHL (Deep Elem 4 Fed Com #778H)	12489.0	-10935.5	1442.2	377300.00	711341.00



## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL - SUNDRY

OPERATOR'S NAME:	EOG RESOURCES INCORPORATED
WELL NAME & NO.:	DEEP ELEM 4 FED COM 778H
SURFACE HOLE FOOTAGE:	517'/S & 810'/W
BOTTOM HOLE FOOTAGE:	230'/S & 2205'/W
LOCATION:	Section 4, T.26 S., R.31 E.
COUNTY:	Eddy County, New Mexico

**ALL PREVIOUS COAs STILL APPLY**

COA

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input checked="" type="radio"/> Low	<input type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Wellhead Variance	<input type="radio"/> Diverter		
Other	<input type="checkbox"/> 4 String	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Pilot Hole	<input type="checkbox"/> Open Annulus
Cementing	<input type="checkbox"/> Contingency Cement Squeeze	<input type="checkbox"/> EchoMeter	<input checked="" type="checkbox"/> Primary Cement Squeeze
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit
Special Requirements	<input type="checkbox"/> Batch Sundry		
Special Requirements Variance	<input checked="" type="checkbox"/> Break Testing	<input checked="" type="checkbox"/> Offline Cementing	<input checked="" type="checkbox"/> Casing Clearance

### A. CASING

#### Primary Casing Design:

1. The **9-5/8** inch surface casing shall be set at approximately **1240** feet (a minimum of 70 feet (Eddy 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 **8**



- hours** 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 **7-5/8** inch intermediate casing shall be set at approximately **10,230** feet **TVD**. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is:

**Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

**Option 2:**

Operator has proposed to cement in two stages by conventionally cementing the first stage and performing a bradenhead squeeze on the second stage, contingent upon no returns to surface.

**Operator has proposed to pump down 9-5/8" X 7-5/8" annulus. Operator must top out cement after the bradenhead squeeze and verify cement to surface. Operator can also check TOC with Echo-meter. CBL must be run from TD of the 7-5/8" casing to surface if confidence is lacking on the quality of the bradenhead squeeze cement job. Submit results to BLM.**

**If cement does not tie-back into the previous casing shoe, a third stage remediation BH may be performed. The appropriate BLM office shall be notified.**

**Bradenhead squeeze in the production interval is only as an edge case remediation measure and is NOT approved in this COA. If production cement job experiences losses and a bradenhead squeeze is needed for tie-back, BLM Engineering should be notified prior to job with volumes and planned wellbore schematic. CBL will be needed when this occurs.**

3. The **5-1/2** inch production casing shall be set at approximately **23,218** 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.

**Alternate Casing Design:**

1. The **10-3/4** inch surface casing shall be set at approximately **1240** feet (a minimum of 70 feet (Eddy County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface.
  - e. 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.
  - f. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
  - g. 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.
  - h. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The **8-3/4** inch intermediate casing shall be set at approximately **10,230** feet **TVD**. **KEEP CASING AT LEAST HALF FULL FOR COLLAPSE SF.** The minimum required fill of cement behind the **8-3/4** inch intermediate casing is:

**Option 1 (Single Stage):**

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

**Option 2:**

Operator has proposed to cement in two stages by conventionally cementing the first stage and performing a bradenhead squeeze on the second stage, contingent upon no returns to surface.

**Operator has proposed to pump down 10-3/4" X 8-3/4" annulus. Operator must top out cement after the bradenhead squeeze and verify cement to surface. Operator can also check TOC with Echo-meter. CBL must be run from TD of the 8-3/4" casing to surface if confidence is lacking on the quality of the bradenhead squeeze cement job. Submit results to BLM.**

**If cement does not tie-back into the previous casing shoe, a third stage remediation BH may be performed. The appropriate BLM office shall be notified.**

**Bradenhead squeeze in the production interval is only as an edge case remediation measure and is NOT approved in this COA. If production cement job experiences losses and a bradenhead squeeze is needed for tie-back, BLM Engineering should be notified prior to job with volumes and planned wellbore schematic. CBL will be needed when this occurs.**

3. The 5-1/2 inch production casing shall be set at approximately 23,218 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 (575-361-2822 Eddy 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**

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

**Casing Clearance:**

Overlap OK



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](mailto:BLM_NM_CFO_DrillingNotifications@BLM.GOV)  
(575) 361-2822

☒ Lea County

Call 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.
2. Wait on cement (WOC) for Potash Areas: 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 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: 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 8 hours. 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

1. 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 3/10/2024

**Deep Elem 4 Fed Com 778H API #: 30-015-54084 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.

- 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 2a - Intermediate Bradenhead Cement

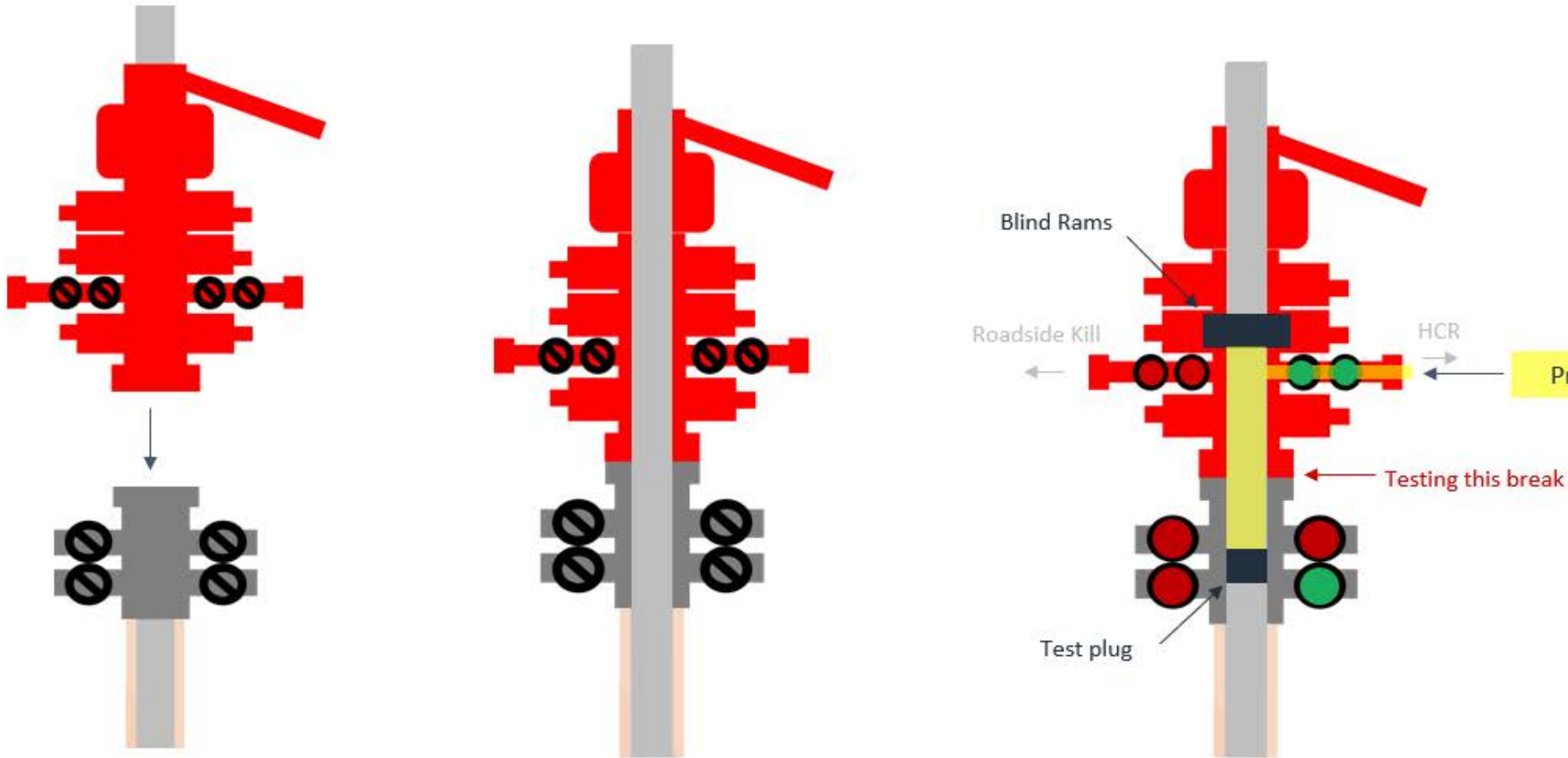
**Break-test BOP & Offline Cementing:**

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 ÷ during each full BOPE test
  - Upper Pipe Rams ÷ On trip ins where FIT required
  - Blind Rams ÷ Every trip
  - Lower Pipe Rams ÷ during each full BOPE test
- Break testing BOP and BOPE coupled with batch drilling operations and option to offline cement and/or remediate (if needed) any surface or intermediate sections, according to attached offline cementing support documentation.
- After the well section is secured, the BOP will be disconnected from the wellhead and walked with the rig to another well on the pad.
- TA cap will also be installed per Wellhead vendor procedure and pressure inside the casing will be monitored via the valve on the TA cap as per standard batch drilling ops.



# Break Test Diagram (HCR valve)



## Steps

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



# Break Test Diagram (Test Joint)



## Steps

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



## Offline Intermediate Cementing Procedure

2/24/2022

**Cement Program**

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

**Summarized Operational Procedure for Intermediate Casing**

1. Run casing as per normal operations. While running casing, conduct negative pressure test and confirm integrity of the float equipment back pressure valves.
  - a. Float equipment is equipped with two back pressure valves rated to a minimum of 5,000 psi.
2. Land production casing on mandrel hanger through BOP.
  - a. If casing is unable to be landed with a mandrel hanger, then the **casing will be cemented online**.
3. Break circulation and confirm no restrictions.
  - a. Ensure no blockage of float equipment and appropriate annular returns.
  - b. Perform flow check to confirm well is static.
4. Set pack-off
  - a. If utilizing a fluted/ported mandrel hanger, ensure well is static on the annulus and inside the casing by filling the pipe with kill weight fluid, remove landing joint, and set annular packoff through BOP. Pressure test to 5,000 psi for 10 min.
  - b. If utilizing a solid mandrel hanger, ensure well is static on the annulus and inside the casing by filling the pipe with kill weight fluid. Pressure test seals to 5,000 psi for 10 min. Remove landing joint through BOP.
5. After confirmation of both annular barriers and the two casing barriers, install TA plug and pressure test to 5,000 psi for 10 min. Notify the BLM with intent to proceed with nipple down and offline cementing.
  - a. Minimum 4 hrs notice.
6. With the well secured and BLM notified, nipple down BOP and secure on hydraulic carrier or cradle.
  - a. **Note, if any of the barriers fail to test, the BOP stack will not be nipped 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 nipped back up for any further remediation.



## Offline Intermediate Cementing Procedure

2/24/2022

- 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.



Offline Intermediate Cementing Procedure

2/24/2022

## Example Well Control Plan Content

### A. Well Control Component Table

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



## Offline Intermediate Cementing Procedure

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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



## Offline Intermediate Cementing Procedure

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Figure 1: Cameron TA Plug and Offline Adapter Schematic







## Offline Intermediate Cementing Procedure

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Figure 2: Cactus TA Plug and Offline Adapter Schematic





## Offline Intermediate Cementing Procedure

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Figure 3: Back Yard Rig Up







Offline Intermediate Cementing Procedure

2/24/2022

Figure 4: Rig Placement Diagram





**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.

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

General Information  
Phone: (505) 629-6116

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

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

CONDITIONS

Action 322807

CONDITIONS

Operator: EOG RESOURCES INC 5509 Champions Drive Midland, TX 79706	OGRID: 7377
	Action Number: 322807
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
ward.rikala	Work was performed without OCD approval.	12/12/2025