

NM OIL CONSERVATION

Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ARTESIA DISTRICT

NOV 21 2014

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

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.

5. Lease Serial No.
NMNM0559539

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.
JAMES FEDERAL 21H

9. API Well No.
30-025-41362-00-X1

10. Field and Pool, or Exploratory
SAND DUNES

11. County or Parish, and State
LEA COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

CIMAREX ENERGY COMPANY OF CO

Contact: HOPE KNAULS
E-Mail: hknauls@cimarex.com

3a. Address

600 NORTH MARIENFELD STREET, SUITE 600
MIDLAND, TX 79701

3b. Phone No. (include area code)

Ph: 918.295.1763

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 29 T23S R32E NWNE 185FNL 1980FEL
32.165630 N Lat, 103.414033 W Lon

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

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

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 recompleat 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 performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

CIMAREX ENERGY CO RESPECTFULLY REQUESTS APPROVAL TO CHANGE THE DIRECTIONAL PLAN

Approved:
KOP 10272
EOC 11023
MD 15317
TVD 10750

Surface Casing 13-3/8" 48# H-40 STC
Production Casing 5-1/2" 17# P-110 LTC/BTC
BOP: 3M below surface, 5M below intermediate

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #277831 verified by the BLM Well Information System
For CIMAREX ENERGY COMPANY OF CO, sent to the Hobbs
Committed to AFMSS for processing by JENNIFER MASON on 11/14/2014 (15JAM0022SE)

Name (Printed/Typed) HOPE KNAULS

Title REGULATORY TECH

Signature

(Electronic Submission)

Date 11/10/2014

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By

Title

Date

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

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

DEC 11 2014

Additional data for EC transaction #277831 that would not fit on the form

32. Additional remarks, continued

Proposed:

KOP 8723

EOC 9816

MD 13915

TVD 9400

Surface Casing 13-3/8" 48# H-40/J-55 Hybrid STC

Production Casing 5-1/2" 17# L-80 LTC/BTC

BOP: 2M below surface, 3M below intermediate (No FIT below intermediate)

PLEASE SEE ATTACHMENTS.

Drilling 17-1/2" hole
below 13 3/8" Casing

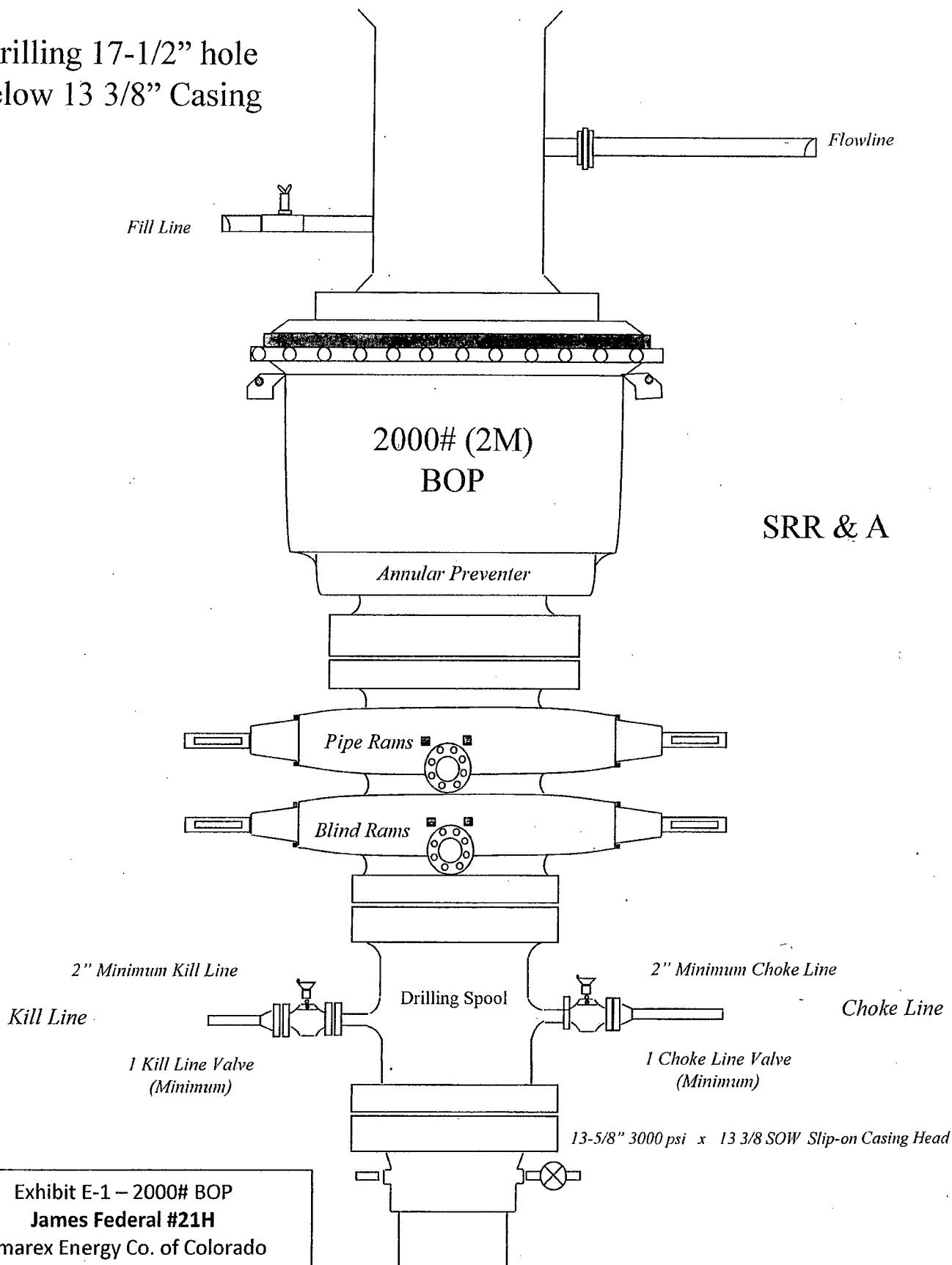
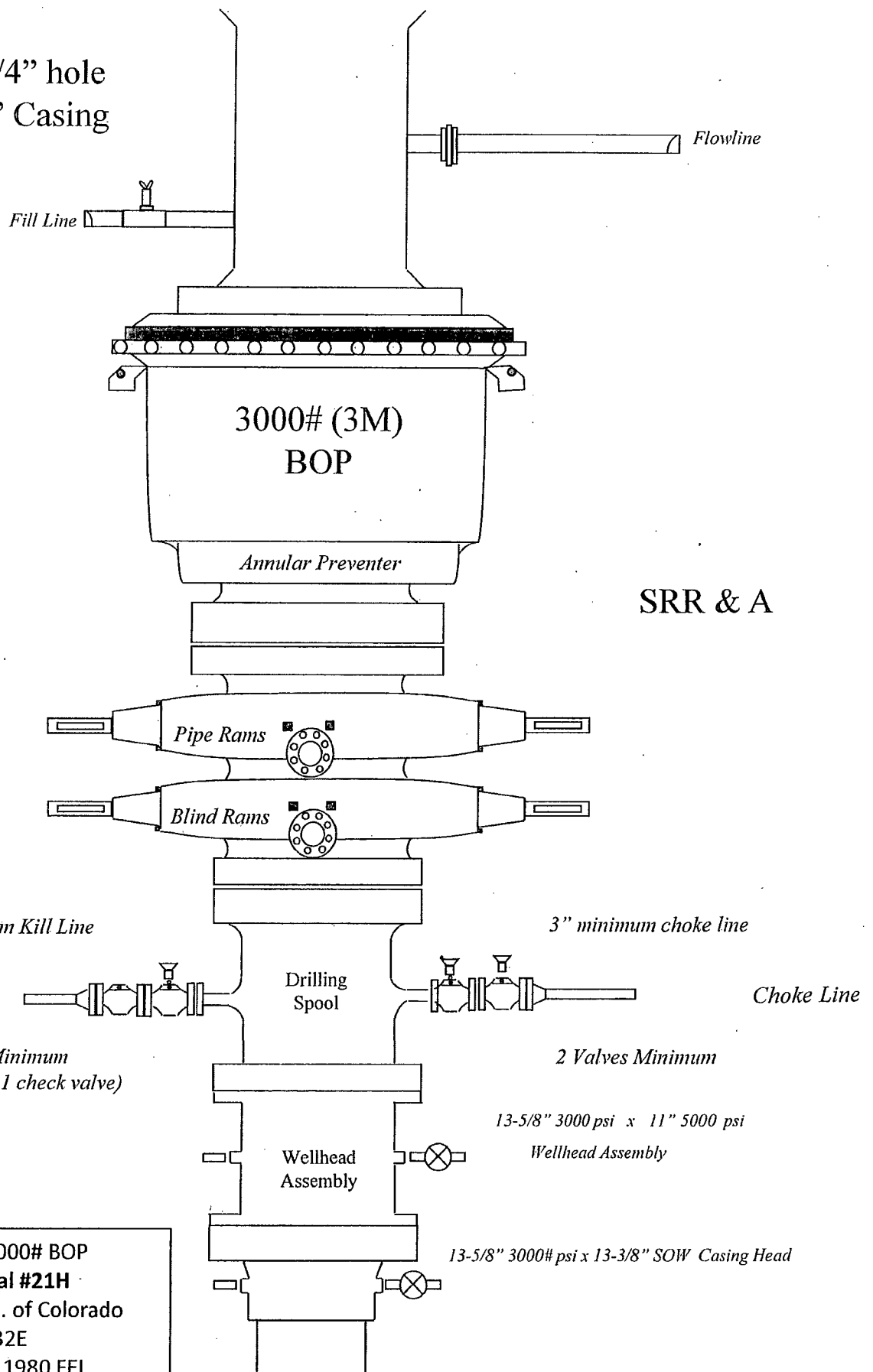


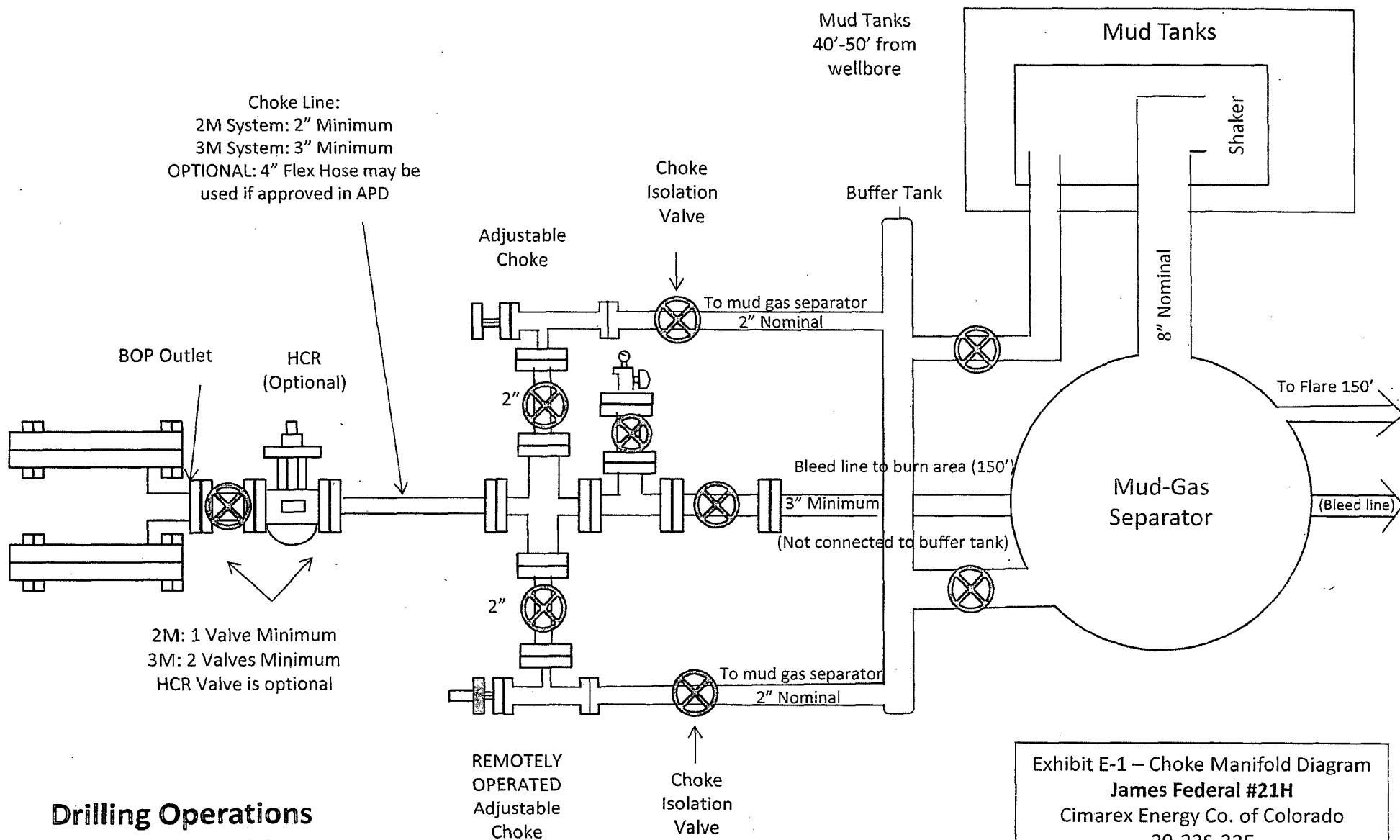
Exhibit E-1 – 2000# BOP
James Federal #21H
Cimarex Energy Co. of Colorado
29-23S-32E
SHL 185 FNL & 1980 FEL
BHL 330 FSL & 1980 FEL
Lea County, NM

Drilling 8-3/4" hole
below 5 1/2" Casing



SRR & A

Exhibit E-1 – 3000# BOP
James Federal #21H
Cimarex Energy Co. of Colorado
29-23S-32E
SHL 185 FNL & 1980 FEL
BHL 330 FSL & 1980 FEL
Lea County, NM



Drilling Operations **Choke Manifold** **2M/3M Service**

Exhibit E-1 – Choke Manifold Diagram
James Federal #21H
 Cimarex Energy Co. of Colorado
 29-23S-32E
 SHL 185 FNL & 1980 FEL
 BHL 330 FSL & 1980 FEL
 Lea County, NM



Cimarex Energy Co.

Location: Lea County, NM
Field: (James Federal) Sec 29, TS 23 S, R 32 E
Facility: Federal 29 James 21

Slot: No. 21 SHL
Well: No. 21
Wellbore: No. 21 PWB



Postreference wellpath is REM-AD	
True vertical depths are referenced to Rig on No. 21 SHL (KB)	Grid System: NAD83 / TLM New Mexico SP, Eastern Zone (3001), US feet
Measured depths are referenced to Rig on No. 21 SHL (KB)	North Reference: Grid north
Rig on No. 21 SHL (KB) to Mean Sea Level: 3714 feet	Scale: True distance
Mean Sea Level to Mud line (At Slot No. 21 SHL): -3689 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: ahr/ell on 11/7/2014

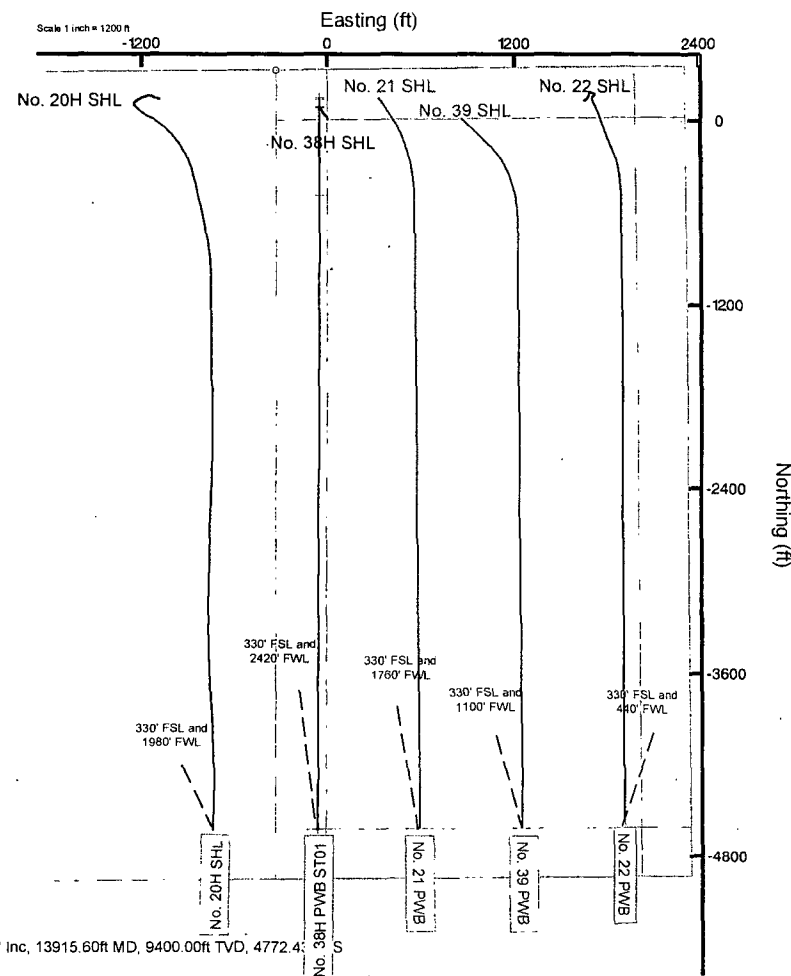
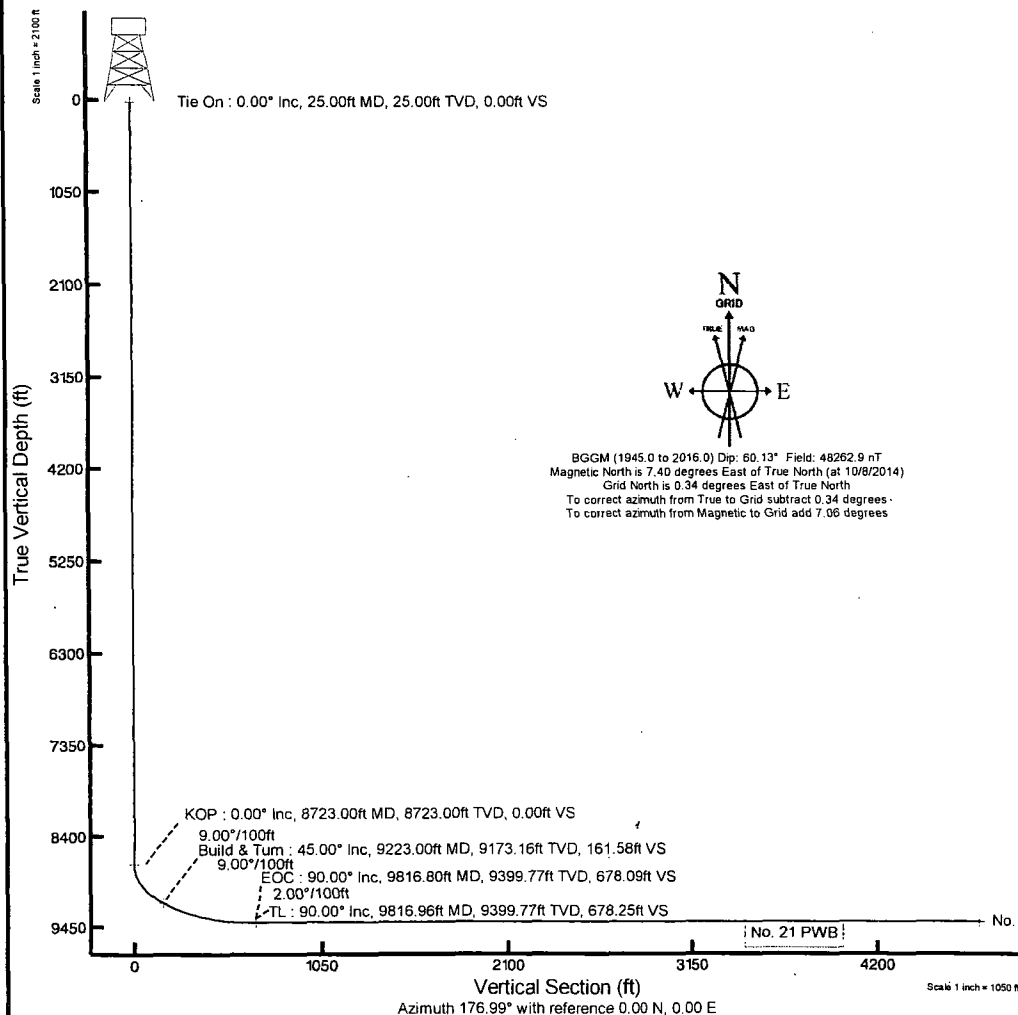
Location Information					
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
Federal 29 James 21	738749.400	467023.400	32°16'56.301"N	103°41'40.333"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
No. 21 SHL	0.00	0.00	738749.400	467023.400	32°16'56.301"N
Rig on No. 21 SHL (KB) to Mud line (At Slot No. 21 SHL)					25ft
Mean Sea Level to Mud line (At Slot No. 21 SHL)					-3689ft
Rig on No. 21 SHL (KB) to Mean Sea Level					3714ft

Targets							
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
James 29 Federal 21 PWB	13915.60	9400.00	-4765.63	250.91	738749.40	467023.40	32°16'56.301"N

Tie-On Position							
MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)
25.00	0.000	147.050	25.00	0.00	0.00	738749.40	467023.40

Bottom Hole Location							
MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)
13915.60	89.997	179.680	9400.00	-4765.63	250.91	738749.40	467023.40

Well Profile Data							
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (ft/100ft)
Tie On	25.00	0.000	147.050	25.00	0.00	0.00	0.00
KOP	8723.00	0.000	147.050	8723.00	0.00	0.00	0.00
Build & Turn	9223.00	45.000	147.050	9173.16	-156.47	101.42	9.00
EOC	9816.80	80.000	179.680	9399.77	-667.10	226.58	9.00
TL	9816.96	89.997	179.680	9399.77	-667.26	226.58	2.00
No. 21 PBHL	13915.60	89.997	179.680	9400.00	-4765.63	250.91	0.00





Planned Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

REPORT SETUP INFORMATION			
Projection System	NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet	Software System	WellArchitect® 4.0.0
North Reference	Grid	User	Abraall
Scale	0.999954	Report Generated	11/7/2014 at 4:06:30 PM
Convergence at slot	0.34° East	Database/Source file	WA_Midland/No. 21_PWB.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W
Facility Reference Pt			738749.40	467023.40	32°16'56.301"N	103°41'40.333"W
Field Reference Pt			165000.00	0.00	30°59'39.893"N	105°32'03.866"W

WELLPATH DATUM			
Calculation method	Minimum curvature	Rig on No. 21 SHL (KB) to Facility Vertical Datum	25.00ft
Horizontal Reference Pt	Slot	Rig on No. 21 SHL (KB) to Mean Sea Level	3714.00ft
Vertical Reference Pt	Rig on No. 21 SHL (KB)	Rig on No. 21 SHL (KB) to Mud Line at Slot (No. 21 SHL)	25.00ft
MD Reference Pt	Rig on No. 21 SHL (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	176.99°



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

WELLPATH DATA (145 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
0.00†	0.000	147.050	0.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
25.00	0.000	147.050	25.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	Tie On
125.00†	0.000	147.050	125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
225.00†	0.000	147.050	225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
325.00†	0.000	147.050	325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
425.00†	0.000	147.050	425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
525.00†	0.000	147.050	525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
625.00†	0.000	147.050	625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
725.00†	0.000	147.050	725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
825.00†	0.000	147.050	825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
925.00†	0.000	147.050	925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1025.00†	0.000	147.050	1025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1125.00†	0.000	147.050	1125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1225.00†	0.000	147.050	1225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1325.00†	0.000	147.050	1325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1425.00†	0.000	147.050	1425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1525.00†	0.000	147.050	1525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1625.00†	0.000	147.050	1625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1725.00†	0.000	147.050	1725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1825.00†	0.000	147.050	1825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
1925.00†	0.000	147.050	1925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2025.00†	0.000	147.050	2025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2125.00†	0.000	147.050	2125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2225.00†	0.000	147.050	2225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2325.00†	0.000	147.050	2325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2425.00†	0.000	147.050	2425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2525.00†	0.000	147.050	2525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2625.00†	0.000	147.050	2625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2725.00†	0.000	147.050	2725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2825.00†	0.000	147.050	2825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
2925.00†	0.000	147.050	2925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3025.00†	0.000	147.050	3025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3125.00†	0.000	147.050	3125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3225.00†	0.000	147.050	3225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3325.00†	0.000	147.050	3325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3425.00†	0.000	147.050	3425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3525.00†	0.000	147.050	3525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3625.00†	0.000	147.050	3625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3725.00†	0.000	147.050	3725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3825.00†	0.000	147.050	3825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
3925.00†	0.000	147.050	3925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4025.00†	0.000	147.050	4025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4125.00†	0.000	147.050	4125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4225.00†	0.000	147.050	4225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4325.00†	0.000	147.050	4325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	



Planned Wellpath Report

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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

WELLPATH DATA (145 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
4425.00†	0.000	147.050	4425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4525.00†	0.000	147.050	4525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4625.00†	0.000	147.050	4625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4725.00†	0.000	147.050	4725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4825.00†	0.000	147.050	4825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
4925.00†	0.000	147.050	4925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5025.00†	0.000	147.050	5025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5125.00†	0.000	147.050	5125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5225.00†	0.000	147.050	5225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5325.00†	0.000	147.050	5325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5425.00†	0.000	147.050	5425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5525.00†	0.000	147.050	5525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5625.00†	0.000	147.050	5625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5725.00†	0.000	147.050	5725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5825.00†	0.000	147.050	5825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
5925.00†	0.000	147.050	5925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6025.00†	0.000	147.050	6025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6125.00†	0.000	147.050	6125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6225.00†	0.000	147.050	6225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6325.00†	0.000	147.050	6325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6425.00†	0.000	147.050	6425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6525.00†	0.000	147.050	6525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6625.00†	0.000	147.050	6625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6725.00†	0.000	147.050	6725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6825.00†	0.000	147.050	6825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
6925.00†	0.000	147.050	6925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7025.00†	0.000	147.050	7025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7125.00†	0.000	147.050	7125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7225.00†	0.000	147.050	7225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7325.00†	0.000	147.050	7325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7425.00†	0.000	147.050	7425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7525.00†	0.000	147.050	7525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7625.00†	0.000	147.050	7625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7725.00†	0.000	147.050	7725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7825.00†	0.000	147.050	7825.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
7925.00†	0.000	147.050	7925.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8025.00†	0.000	147.050	8025.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8125.00†	0.000	147.050	8125.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8225.00†	0.000	147.050	8225.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8325.00†	0.000	147.050	8325.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8425.00†	0.000	147.050	8425.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8525.00†	0.000	147.050	8525.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8625.00†	0.000	147.050	8625.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	
8723.00	0.000	147.050	8723.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	0.00	KOP
8725.00†	0.180	147.050	8725.00	0.00	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W	9.00	



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

WELLPATH DATA (145 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
8825.00†	9.180	147.050	8824.56	7.07	-6.84	4.43	738753.83	467016.56	32°16'56.233"N	103°41'40.282"W	9.00	
8925.00†	18.180	147.050	8921.63	27.54	-26.67	17.29	738766.68	466996.73	32°16'56.036"N	103°41'40.133"W	9.00	
9025.00†	27.180	147.050	9013.80	60.92	-58.99	38.24	738787.63	466964.41	32°16'55.715"N	103°41'39.892"W	9.00	
9125.00†	36.180	147.050	9098.81	106.38	-103.01	66.77	738816.17	466920.39	32°16'55.277"N	103°41'39.562"W	9.00	
9223.00	45.000	147.050	9173.16	161.58	-156.47	101.42	738850.81	466866.94	32°16'54.746"N	103°41'39.163"W	9.00	Build & Turn
9225.00†	45.134	147.220	9174.57	162.81	-157.66	102.19	738851.58	466865.75	32°16'54.735"N	103°41'39.154"W	9.00	
9325.00†	52.092	154.847	9240.70	230.25	-223.30	138.21	738887.61	466800.11	32°16'54.083"N	103°41'38.739"W	9.00	
9425.00†	59.455	161.117	9296.95	308.38	-299.91	168.98	738918.37	466723.51	32°16'53.323"N	103°41'38.386"W	9.00	
9525.00†	67.076	166.486	9341.92	395.26	-385.60	193.73	738943.12	466637.82	32°16'52.474"N	103°41'38.103"W	9.00	
9625.00†	74.857	171.274	9374.53	488.75	-478.28	211.85	738961.24	466545.15	32°16'51.556"N	103°41'37.899"W	9.00	
9725.00†	82.733	175.719	9393.95	586.56	-575.64	222.90	738972.29	466447.79	32°16'50.592"N	103°41'37.777"W	9.00	
9816.80	90.000	179.660	9399.77	678.09	-667.10	226.58	738975.96	466356.33	32°16'49.686"N	103°41'37.740"W	9.00	EOC
9816.96	89.997	179.660	9399.77	678.25	-667.26	226.58	738975.97	466356.17	32°16'49.685"N	103°41'37.740"W	2.00	TL
9825.00†	89.997	179.660	9399.77	686.28	-675.30	226.62	738976.01	466348.13	32°16'49.605"N	103°41'37.740"W	0.00	
9925.00†	89.997	179.660	9399.78	786.17	-775.30	227.22	738976.61	466248.14	32°16'48.616"N	103°41'37.740"W	0.00	
10025.00†	89.997	179.660	9399.78	886.07	-875.30	227.81	738977.20	466148.14	32°16'47.626"N	103°41'37.740"W	0.00	
10125.00†	89.997	179.660	9399.79	985.96	-975.30	228.41	738977.79	466048.15	32°16'46.637"N	103°41'37.740"W	0.00	
10225.00†	89.997	179.660	9399.79	1085.85	-1075.30	229.00	738978.39	465948.16	32°16'45.647"N	103°41'37.740"W	0.00	
10325.00†	89.997	179.660	9399.80	1185.74	-1175.29	229.59	738978.98	465848.16	32°16'44.658"N	103°41'37.740"W	0.00	
10425.00†	89.997	179.660	9399.80	1285.63	-1275.29	230.19	738979.58	465748.17	32°16'43.668"N	103°41'37.740"W	0.00	
10525.00†	89.997	179.660	9399.81	1385.52	-1375.29	230.78	738980.17	465648.18	32°16'42.679"N	103°41'37.740"W	0.00	
10625.00†	89.997	179.660	9399.82	1485.41	-1475.29	231.37	738980.76	465548.18	32°16'41.689"N	103°41'37.740"W	0.00	
10725.00†	89.997	179.660	9399.82	1585.30	-1575.29	231.97	738981.36	465448.19	32°16'40.700"N	103°41'37.740"W	0.00	
10825.00†	89.997	179.660	9399.83	1685.19	-1675.28	232.56	738981.95	465348.20	32°16'39.710"N	103°41'37.740"W	0.00	
10925.00†	89.997	179.660	9399.83	1785.09	-1775.28	233.16	738982.54	465248.20	32°16'38.721"N	103°41'37.740"W	0.00	
11025.00†	89.997	179.660	9399.84	1884.98	-1875.28	233.75	738983.14	465148.21	32°16'37.731"N	103°41'37.740"W	0.00	
11125.00†	89.997	179.660	9399.84	1984.87	-1975.28	234.34	738983.73	465048.22	32°16'36.742"N	103°41'37.741"W	0.00	
11225.00†	89.997	179.660	9399.85	2084.76	-2075.28	234.94	738984.33	464948.22	32°16'35.752"N	103°41'37.741"W	0.00	
11325.00†	89.997	179.660	9399.85	2184.65	-2175.28	235.53	738984.92	464848.23	32°16'34.763"N	103°41'37.741"W	0.00	
11425.00†	89.997	179.660	9399.86	2284.54	-2275.27	236.12	738985.51	464748.24	32°16'33.773"N	103°41'37.741"W	0.00	
11525.00†	89.997	179.660	9399.87	2384.43	-2375.27	236.72	738986.11	464648.24	32°16'32.784"N	103°41'37.741"W	0.00	
11625.00†	89.997	179.660	9399.87	2484.32	-2475.27	237.31	738986.70	464548.25	32°16'31.794"N	103°41'37.741"W	0.00	
11725.00†	89.997	179.660	9399.88	2584.22	-2575.27	237.91	738987.29	464448.26	32°16'30.805"N	103°41'37.741"W	0.00	
11825.00†	89.997	179.660	9399.88	2684.11	-2675.27	238.50	738987.89	464348.26	32°16'29.815"N	103°41'37.741"W	0.00	
11925.00†	89.997	179.660	9399.89	2784.00	-2775.27	239.09	738988.48	464248.27	32°16'28.826"N	103°41'37.741"W	0.00	
12025.00†	89.997	179.660	9399.89	2883.89	-2875.26	239.69	738989.08	464148.28	32°16'27.836"N	103°41'37.741"W	0.00	
12125.00†	89.997	179.660	9399.90	2983.78	-2975.26	240.28	738989.67	464048.28	32°16'26.847"N	103°41'37.741"W	0.00	
12225.00†	89.997	179.660	9399.91	3083.67	-3075.26	240.87	738990.26	463948.29	32°16'25.857"N	103°41'37.741"W	0.00	
12325.00†	89.997	179.660	9399.91	3183.56	-3175.26	241.47	738990.86	463848.29	32°16'24.868"N	103°41'37.741"W	0.00	
12425.00†	89.997	179.660	9399.92	3283.45	-3275.26	242.06	738991.45	463748.30	32°16'23.878"N	103°41'37.741"W	0.00	
12525.00†	89.997	179.660	9399.92	3383.34	-3375.25	242.66	738992.04	463648.31	32°16'22.889"N	103°41'37.741"W	0.00	
12625.00†	89.997	179.660	9399.93	3483.24	-3475.25	243.25	738992.64	463548.31	32°16'21.899"N	103°41'37.741"W	0.00	
12725.00†	89.997	179.660	9399.93	3583.13	-3575.25	243.84	738993.23	463448.32	32°16'20.909"N	103°41'37.741"W	0.00	
12825.00†	89.997	179.660	9399.94	3683.02	-3675.25	244.44	738993.82	463348.33	32°16'19.920"N	103°41'37.741"W	0.00	
12925.00†	89.997	179.660	9399.94	3782.91	-3775.25	245.03	738994.42	463248.33	32°16'18.930"N	103°41'37.741"W	0.00	



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

WELLPATH DATA (145 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	DLS [°/100ft]	Comments
13025.00†	89.997	179.660	9399.95	3882.80	-3875.25	245.62	738995.01	463148.34	32°16'17.941"N	103°41'37.741"W	0.00	
13125.00†	89.997	179.660	9399.96	3982.69	-3975.24	246.22	738995.61	463048.35	32°16'16.951"N	103°41'37.741"W	0.00	
13225.00†	89.997	179.660	9399.96	4082.58	-4075.24	246.81	738996.20	462948.35	32°16'15.962"N	103°41'37.741"W	0.00	
13325.00†	89.997	179.660	9399.97	4182.47	-4175.24	247.41	738996.79	462848.36	32°16'14.972"N	103°41'37.741"W	0.00	
13425.00†	89.997	179.660	9399.97	4282.36	-4275.24	248.00	738997.39	462748.37	32°16'13.983"N	103°41'37.741"W	0.00	
13525.00†	89.997	179.660	9399.98	4382.26	-4375.24	248.59	738997.98	462648.37	32°16'12.993"N	103°41'37.741"W	0.00	
13625.00†	89.997	179.660	9399.98	4482.15	-4475.24	249.19	738998.57	462548.38	32°16'12.004"N	103°41'37.741"W	0.00	
13725.00†	89.997	179.660	9399.99	4582.04	-4575.23	249.78	738999.17	462448.39	32°16'11.014"N	103°41'37.741"W	0.00	
13825.00†	89.997	179.660	9399.99	4681.93	-4675.23	250.37	738999.76	462348.39	32°16'10.025"N	103°41'37.741"W	0.00	
13915.60	89.997	179.660	9400.00	4772.43	-4765.83	250.91	739000.30	462257.80	32°16'09.128"N	103°41'37.741"W	0.00	No. 21 PBHL

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
1) James 29 Federal 21 PBHL	13915.60	9400.00	-4765.83	250.91	739000.30	462257.80	32°16'09.128"N	103°41'37.741"W	point

SURVEY PROGRAM - Ref Wellbore: No. 21 PWB Ref Wellpath: Rev-A.0

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	13915.60	NaviTrak (Standard)		No. 21 PWB



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

REPORT SETUP INFORMATION

Projection System	NAD83 / TM New Mexico SP, Eastern Zone (3001), US feet	Software System	WellArchitect® 4.0.0
North Reference	Grid	User	Abraall
Scale	0.999954	Report Generated	11/7/2014 at 4:08:32 PM
Convergence at slot	0.34° East	Database/Source file	WA_Midland/No. 21_PWB_CR.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	0.00	0.00	738749.40	467023.40	32°16'56.301"N	103°41'40.333"W
Facility Reference Pt			738749.40	467023.40	32°16'56.301"N	103°41'40.333"W
Field Reference Pt			165000.00	0.00	30°59'39.893"N	105°32'03.866"W

WELLPATH DATUM

Calculation method	Minimum Curvature	Rig on No. 21 SHL (KB) to Facility Vertical Datum	25.00ft
Horizontal Reference Pt	Slot	Rig on No. 21 SHL (KB) to Mean Sea Level	3714.00ft
Vertical Reference Pt	Rig on No. 21 SHL (KB)	Rig on No. 21 SHL (KB) to Mud Line at Slot (No. 21 SHL)	25.00ft
MD Reference Pt	Rig on No. 21 SHL (KB)		
Field Vertical Reference	Mean Sea Level		

POSITIONAL UNCERTAINTY CALCULATION SETTINGS

Ellipse Confidence Limit	3.00 Std Dev	Ellipse Start MD	25.00ft	Surface Position Uncertainty	included
Declination	7.40° East of TN	Dip Angle	60.13°	Mag Field Strength	48263 nT
Slot Surface Uncertainty @1SD		Horizontal	0.100ft	Vertical	0.100ft
Facility Surface Uncertainty @1SD		Horizontal	8.200ft	Vertical	1.000ft

Positional Uncertainty values in the WELLPATH DATA table are the projection of the ellipsoid of uncertainty onto the vertical and horizontal planes

ANTI-COLLISION RULE

Rule Name	Baker Hughes Stop Drilling	Rule Based On	Ratio
Plane of Rule	Closest Approach	Threshold Value	1.00
Subtract Casing & Hole Size	yes	Apply Cone of Safety	no

SURVEY PROGRAM - Ref Wellbore: No. 21 PWB Ref Wellpath: Rev-A.0

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	13915.60	NaviTrak (Standard)		No. 21 PWB



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CALCULATION RANGE & CUTOFF

From: 25.00ft MD	To: 13915.60ft MD	C-C Cutoff: (none)
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OFFSET WELL CLEARANCE SUMMARY (4 Offset Wellpaths selected) Ratios are calculated in Closest Approach plane

Offset Facility	Offset Slot	Offset Well	Offset Wellbore	Offset Wellpath	C-C Clearance Distance			ACR Separation Ratio			
					Ref MD [ft]	Min C-C Clear Dist [ft]	Diverging from MD [ft]	Ref MD of Min Ratio [ft]	Min Ratio	Min Ratio Dvrg from [ft]	ACR Status
James 29 Federal 39	No. 39 SHL	No. 39	No. 39 PWB	Rev-B.0	9357.17	491.19	13915.60	13915.60	2.12	13915.60	PASS
James Federal No. 38	No. 38H SHL	No. 38H AWB ST01	No. 38H PWB ST01	Rev B.0 ST01	1390.63	355.34	8723.00	13915.60	2.14	13915.60	PASS
James Federal No. 22	No. 22 SHL	No. 22	No. 22 AWB	No. 22 AWP	9512.50	1269.46	12825.00	13915.60	4.34	13915.60	PASS
James 29 Federal No. 20H	No. 20H SHL	No. 20H	No. 20H SHL	No. 20H SHL	10369.38	1317.43	13525.00	13915.60	4.67	13915.60	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Facility: James 29 Federal 39 Slot: No. 39 SHL Well: No. 39 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
25.00	25.00	0.00	0.00	22.00	25.00	-139.51	530.83	104.73	548.85	24.60	22.31	PASS
125.00†	125.00	0.00	0.00	122.00	125.00	-139.51	530.83	104.73	548.85	49.21	11.15	PASS
225.00†	225.00	0.00	0.00	222.00	225.00	-139.51	530.83	104.73	548.85	49.22	11.15	PASS
325.00†	325.00	0.00	0.00	322.00	325.00	-139.51	530.83	104.73	548.85	49.25	11.14	PASS
425.00†	425.00	0.00	0.00	422.00	425.00	-139.51	530.83	104.73	548.85	49.29	11.14	PASS
525.00†	525.00	0.00	0.00	522.00	525.00	-139.51	530.83	104.73	548.85	49.33	11.13	PASS
625.00†	625.00	0.00	0.00	622.00	625.00	-139.51	530.83	104.73	548.85	49.39	11.11	PASS
725.00†	725.00	0.00	0.00	722.00	725.00	-139.51	530.83	104.73	548.85	49.46	11.10	PASS
825.00†	825.00	0.00	0.00	822.00	825.00	-139.51	530.83	104.73	548.85	49.54	11.08	PASS
925.00†	925.00	0.00	0.00	922.00	925.00	-139.51	530.83	104.73	548.85	49.63	11.06	PASS
1025.00†	1025.00	0.00	0.00	1022.00	1025.00	-139.51	530.83	104.73	548.85	49.72	11.04	PASS
1125.00†	1125.00	0.00	0.00	1122.00	1125.00	-139.51	530.83	104.73	548.85	49.83	11.01	PASS
1225.00†	1225.00	0.00	0.00	1222.00	1225.00	-139.51	530.83	104.73	548.85	49.95	10.99	PASS
1325.00†	1325.00	0.00	0.00	1322.00	1325.00	-139.51	530.83	104.73	548.85	50.08	10.96	PASS
1425.00†	1425.00	0.00	0.00	1422.00	1425.00	-139.51	530.83	104.73	548.85	50.22	10.93	PASS
1525.00†	1525.00	0.00	0.00	1522.00	1525.00	-139.51	530.83	104.73	548.85	50.37	10.90	PASS
1625.00†	1625.00	0.00	0.00	1622.00	1625.00	-139.51	530.83	104.73	548.85	50.53	10.86	PASS
1725.00†	1725.00	0.00	0.00	1722.00	1725.00	-139.51	530.83	104.73	548.85	50.70	10.83	PASS
1825.00†	1825.00	0.00	0.00	1822.00	1825.00	-139.51	530.83	104.73	548.85	50.87	10.79	PASS
1925.00†	1925.00	0.00	0.00	1922.00	1925.00	-139.51	530.83	104.73	548.85	51.06	10.75	PASS
2025.00†	2025.00	0.00	0.00	2022.00	2025.00	-139.51	530.83	104.73	548.85	51.26	10.71	PASS
2125.00†	2125.00	0.00	0.00	2122.00	2125.00	-139.51	530.83	104.73	548.85	51.46	10.67	PASS
2225.00†	2225.00	0.00	0.00	2222.00	2225.00	-139.51	530.83	104.73	548.85	51.68	10.62	PASS
2325.00†	2325.00	0.00	0.00	2322.00	2325.00	-139.51	530.83	104.73	548.85	51.90	10.57	PASS
2425.00†	2425.00	0.00	0.00	2422.00	2425.00	-139.51	530.83	104.73	548.85	52.14	10.53	PASS
2525.00†	2525.00	0.00	0.00	2522.00	2525.00	-139.51	530.83	104.73	548.85	52.38	10.48	PASS
2625.00†	2625.00	0.00	0.00	2622.00	2625.00	-139.51	530.83	104.73	548.85	52.63	10.43	PASS
2725.00†	2725.00	0.00	0.00	2722.00	2725.00	-139.51	530.83	104.73	548.85	52.89	10.38	PASS
2825.00†	2825.00	0.00	0.00	2822.00	2825.00	-139.51	530.83	104.73	548.85	53.15	10.33	PASS
2925.00†	2925.00	0.00	0.00	2922.00	2925.00	-139.51	530.83	104.73	548.85	53.43	10.27	PASS
3025.00†	3025.00	0.00	0.00	3022.00	3025.00	-139.51	530.83	104.73	548.85	53.72	10.22	PASS
3125.00†	3125.00	0.00	0.00	3122.00	3125.00	-139.51	530.83	104.73	548.85	54.01	10.16	PASS
3225.00†	3225.00	0.00	0.00	3222.00	3225.00	-139.51	530.83	104.73	548.85	54.31	10.11	PASS
3325.00†	3325.00	0.00	0.00	3322.00	3325.00	-139.51	530.83	104.73	548.85	54.62	10.05	PASS
3425.00†	3425.00	0.00	0.00	3422.00	3425.00	-139.51	530.83	104.73	548.85	54.93	9.99	PASS
3525.00†	3525.00	0.00	0.00	3522.00	3525.00	-139.51	530.83	104.73	548.85	55.25	9.93	PASS
3625.00†	3625.00	0.00	0.00	3622.00	3625.00	-139.51	530.83	104.73	548.85	55.59	9.87	PASS
3725.00†	3725.00	0.00	0.00	3722.00	3725.00	-139.51	530.83	104.73	548.85	55.92	9.81	PASS
3825.00†	3825.00	0.00	0.00	3822.00	3825.00	-139.51	530.83	104.73	548.85	56.27	9.75	PASS
3925.00†	3925.00	0.00	0.00	3922.00	3925.00	-139.51	530.83	104.73	548.85	56.62	9.69	PASS
4025.00†	4025.00	0.00	0.00	4022.00	4025.00	-139.51	530.83	104.73	548.85	56.98	9.63	PASS
4125.00†	4125.00	0.00	0.00	4122.00	4125.00	-139.51	530.83	104.73	548.85	57.34	9.57	PASS
4225.00†	4225.00	0.00	0.00	4222.00	4225.00	-139.51	530.83	104.73	548.85	57.72	9.51	PASS
4325.00†	4325.00	0.00	0.00	4322.00	4325.00	-139.51	530.83	104.73	548.85	58.10	9.45	PASS
4425.00†	4425.00	0.00	0.00	4422.00	4425.00	-139.51	530.83	104.73	548.85	58.48	9.39	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Facility: James 29 Federal 39 Slot: No. 39 SHL Well: No. 39 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
4525.00†	4525.00	0.00	0.00	4522.00	4525.00	-139.51	530.83	104.73	548.85	58.87	9.32	PASS
4625.00†	4625.00	0.00	0.00	4622.00	4625.00	-139.51	530.83	104.73	548.85	59.27	9.26	PASS
4725.00†	4725.00	0.00	0.00	4722.00	4725.00	-139.51	530.83	104.73	548.85	59.67	9.20	PASS
4825.00†	4825.00	0.00	0.00	4822.00	4825.00	-139.51	530.83	104.73	548.85	60.08	9.13	PASS
4925.00†	4925.00	0.00	0.00	4922.00	4925.00	-139.51	530.83	104.73	548.85	60.50	9.07	PASS
5025.00†	5025.00	0.00	0.00	5022.00	5025.00	-139.51	530.83	104.73	548.85	60.92	9.01	PASS
5125.00†	5125.00	0.00	0.00	5122.00	5125.00	-139.51	530.83	104.73	548.85	61.35	8.95	PASS
5225.00†	5225.00	0.00	0.00	5222.00	5225.00	-139.51	530.83	104.73	548.85	61.78	8.88	PASS
5325.00†	5325.00	0.00	0.00	5322.00	5325.00	-139.51	530.83	104.73	548.85	62.22	8.82	PASS
5425.00†	5425.00	0.00	0.00	5422.00	5425.00	-139.51	530.83	104.73	548.85	62.66	8.76	PASS
5525.00†	5525.00	0.00	0.00	5522.00	5525.00	-139.51	530.83	104.73	548.85	63.11	8.70	PASS
5625.00†	5625.00	0.00	0.00	5622.00	5625.00	-139.51	530.83	104.73	548.85	63.56	8.64	PASS
5725.00†	5725.00	0.00	0.00	5722.00	5725.00	-139.51	530.83	104.73	548.85	64.02	8.57	PASS
5825.00†	5825.00	0.00	0.00	5822.00	5825.00	-139.51	530.83	104.73	548.85	64.48	8.51	PASS
5925.00†	5925.00	0.00	0.00	5922.00	5925.00	-139.51	530.83	104.73	548.85	64.94	8.45	PASS
6025.00†	6025.00	0.00	0.00	6022.00	6025.00	-139.51	530.83	104.73	548.85	65.42	8.39	PASS
6125.00†	6125.00	0.00	0.00	6122.00	6125.00	-139.51	530.83	104.73	548.85	65.89	8.33	PASS
6225.00†	6225.00	0.00	0.00	6222.00	6225.00	-139.51	530.83	104.73	548.85	66.37	8.27	PASS
6325.00†	6325.00	0.00	0.00	6322.00	6325.00	-139.51	530.83	104.73	548.85	66.86	8.21	PASS
6425.00†	6425.00	0.00	0.00	6422.00	6425.00	-139.51	530.83	104.73	548.85	67.34	8.15	PASS
6525.00†	6525.00	0.00	0.00	6522.00	6525.00	-139.51	530.83	104.73	548.85	67.84	8.09	PASS
6625.00†	6625.00	0.00	0.00	6622.00	6625.00	-139.51	530.83	104.73	548.85	68.33	8.03	PASS
6725.00†	6725.00	0.00	0.00	6722.00	6725.00	-139.51	530.83	104.73	548.85	68.83	7.97	PASS
6825.00†	6825.00	0.00	0.00	6822.00	6825.00	-139.51	530.83	104.73	548.85	69.34	7.92	PASS
6925.00†	6925.00	0.00	0.00	6922.00	6925.00	-139.51	530.83	104.73	548.85	69.85	7.86	PASS
7025.00†	7025.00	0.00	0.00	7022.00	7025.00	-139.51	530.83	104.73	548.85	70.36	7.80	PASS
7125.00†	7125.00	0.00	0.00	7122.00	7125.00	-139.51	530.83	104.73	548.85	70.87	7.74	PASS
7225.00†	7225.00	0.00	0.00	7222.00	7225.00	-139.51	530.83	104.73	548.85	71.39	7.69	PASS
7325.00†	7325.00	0.00	0.00	7322.00	7325.00	-139.51	530.83	104.73	548.85	71.92	7.63	PASS
7425.00†	7425.00	0.00	0.00	7422.00	7425.00	-139.51	530.83	104.73	548.85	72.44	7.58	PASS
7525.00†	7525.00	0.00	0.00	7522.00	7525.00	-139.51	530.83	104.73	548.85	72.97	7.52	PASS
7625.00†	7625.00	0.00	0.00	7622.00	7625.00	-139.51	530.83	104.73	548.85	73.50	7.47	PASS
7725.00†	7725.00	0.00	0.00	7722.00	7725.00	-139.51	530.83	104.73	548.85	74.04	7.41	PASS
7825.00†	7825.00	0.00	0.00	7822.00	7825.00	-139.51	530.83	104.73	548.85	74.58	7.36	PASS
7925.00†	7925.00	0.00	0.00	7922.00	7925.00	-139.51	530.83	104.73	548.85	75.12	7.31	PASS
8025.00†	8025.00	0.00	0.00	8022.00	8025.00	-139.51	530.83	104.73	548.85	75.66	7.25	PASS
8125.00†	8125.00	0.00	0.00	8122.00	8125.00	-139.51	530.83	104.73	548.85	76.21	7.20	PASS
8225.00†	8225.00	0.00	0.00	8222.00	8225.00	-139.51	530.83	104.73	548.85	76.76	7.15	PASS
8325.00†	8325.00	0.00	0.00	8322.00	8325.00	-139.51	530.83	104.73	548.85	77.31	7.10	PASS
8425.00†	8425.00	0.00	0.00	8422.00	8425.00	-139.51	530.83	104.73	548.85	77.87	7.05	PASS
8525.00†	8525.00	0.00	0.00	8522.00	8525.00	-139.51	530.83	104.73	548.85	78.43	7.00	PASS
8625.00†	8625.00	0.00	0.00	8622.00	8625.00	-139.51	530.83	104.73	548.85	78.99	6.95	PASS
8723.00	8723.00	0.00	0.00	8720.00	8723.00	-139.51	530.83	104.73	548.85	79.54	6.90	PASS
8725.00†	8725.00	0.00	0.00	8722.00	8725.00	-139.51	530.83	104.73	548.85	79.55	6.90	PASS
8825.00†	8824.56	-6.84	4.43	8788.13	8791.09	-140.52	531.87	104.22	545.14	80.03	6.81	PASS



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REFERENCE WELL PATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Facility: James 29 Federal 39 Slot: No. 39 SHL Well: No. 39 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
8925.00†	8921.63	-26.67	17.29	8843.06	8845.62	-145.01	536.52	102.84	537.95	80.60	6.67	PASS
9025.00†	9013.80	-58.99	38.24	8898.15	8899.45	-153.08	544.88	100.52	527.84	80.93	6.52	PASS
9125.00†	9098.81	-103.01	66.77	8953.46	8952.14	-164.71	556.92	97.17	515.33	81.06	6.36	PASS
9223.00	9173.16	-156.47	101.42	9007.96	9002.28	-179.51	572.26	92.80	501.42	81.11	6.18	PASS
9225.00†	9174.57	-157.66	102.19	9009.07	9003.29	-179.85	572.61	92.70	501.13	81.11	6.18	PASS
9325.00†	9240.70	-223.30	138.21	9065.05	9052.42	-198.45	591.87	86.87	491.80	80.99	6.07	PASS
9357.17†	9259.94	-246.83	148.72	9083.12	9067.70	-205.14	598.80	84.71	491.19	81.05	6.06	PASS
9425.00†	9296.95	-299.91	168.98	9120.71	9098.50	-220.11	614.31	79.84	494.03	81.38	6.07	PASS
9525.00†	9341.92	-385.60	193.73	9175.12	9140.46	-244.15	639.20	72.38	508.96	82.50	6.17	PASS
9625.00†	9374.53	-478.28	211.85	9227.31	9177.50	-269.67	665.64	65.31	536.90	84.28	6.37	PASS
9725.00†	9393.95	-575.64	222.90	9276.39	9209.19	-295.69	692.58	59.20	577.16	86.51	6.67	PASS
9816.80	9399.77	-667.10	226.58	9378.98	9266.78	-357.70	750.35	59.43	622.70	90.47	6.88	PASS
9816.96	9399.77	-667.26	226.58	9379.36	9266.98	-357.96	750.55	59.45	622.78	90.48	6.88	PASS
9825.00†	9399.77	-675.30	226.62	9398.99	9277.02	-371.38	760.76	60.36	626.68	91.08	6.88	PASS
9925.00†	9399.78	-775.30	227.22	9785.54	9396.61	-710.00	883.37	84.32	659.40	100.04	6.59	PASS
10025.00†	9399.78	-875.30	227.81	9947.19	9400.15	-871.40	887.90	89.66	660.10	103.58	6.37	PASS
10125.00†	9399.79	-975.30	228.41	10047.19	9400.14	-971.40	888.49	89.66	660.09	106.98	6.17	PASS
10225.00†	9399.79	-1075.30	229.00	10147.19	9400.14	-1071.40	889.08	89.66	660.09	110.62	5.97	PASS
10325.00†	9399.80	-1175.29	229.59	10247.19	9400.14	-1171.40	889.67	89.66	660.08	114.50	5.77	PASS
10425.00†	9399.80	-1275.29	230.19	10347.19	9400.13	-1271.40	890.26	89.66	660.08	118.58	5.57	PASS
10525.00†	9399.81	-1375.29	230.78	10447.19	9400.13	-1371.40	890.85	89.66	660.08	122.85	5.37	PASS
10625.00†	9399.82	-1475.29	231.37	10547.19	9400.12	-1471.39	891.44	89.66	660.07	127.28	5.19	PASS
10725.00†	9399.82	-1575.29	231.97	10647.19	9400.12	-1571.39	892.03	89.66	660.07	131.87	5.01	PASS
10825.00†	9399.83	-1675.28	232.56	10747.19	9400.12	-1671.39	892.62	89.66	660.07	136.59	4.83	PASS
10925.00†	9399.83	-1775.28	233.16	10847.19	9400.11	-1771.39	893.21	89.66	660.06	141.44	4.67	PASS
11025.00†	9399.84	-1875.28	233.75	10947.19	9400.11	-1871.39	893.80	89.66	660.06	146.40	4.51	PASS
11125.00†	9399.84	-1975.28	234.34	11047.19	9400.11	-1971.38	894.39	89.66	660.05	151.45	4.36	PASS
11225.00†	9399.85	-2075.28	234.94	11147.19	9400.10	-2071.38	894.98	89.66	660.05	156.60	4.21	PASS
11325.00†	9399.85	-2175.28	235.53	11247.19	9400.10	-2171.38	895.57	89.66	660.05	161.82	4.08	PASS
11425.00†	9399.86	-2275.27	236.12	11347.19	9400.09	-2271.38	896.16	89.66	660.04	167.12	3.95	PASS
11525.00†	9399.87	-2375.27	236.72	11447.19	9400.09	-2371.38	896.75	89.66	660.04	172.49	3.83	PASS
11625.00†	9399.87	-2475.27	237.31	11547.19	9400.09	-2471.38	897.34	89.66	660.04	177.87	3.71	PASS
11725.00†	9399.88	-2575.27	237.91	11647.19	9400.08	-2571.37	897.93	89.66	660.03	183.40	3.60	PASS
11825.00†	9399.88	-2675.27	238.50	11747.19	9400.08	-2671.37	898.52	89.66	660.03	188.93	3.49	PASS
11925.00†	9399.89	-2775.27	239.09	11847.19	9400.08	-2771.37	899.11	89.66	660.03	194.51	3.39	PASS
12025.00†	9399.89	-2875.26	239.69	11947.19	9400.07	-2871.37	899.70	89.66	660.02	200.13	3.30	PASS
12125.00†	9399.90	-2975.26	240.28	12047.19	9400.07	-2971.37	900.29	89.66	660.02	205.79	3.21	PASS
12225.00†	9399.91	-3075.26	240.87	12147.19	9400.06	-3071.37	900.88	89.66	660.01	211.49	3.12	PASS
12325.00†	9399.91	-3175.26	241.47	12247.19	9400.06	-3171.36	901.47	89.66	660.01	217.22	3.04	PASS
12425.00†	9399.92	-3275.26	242.06	12347.19	9400.06	-3271.36	902.06	89.66	660.01	222.98	2.96	PASS
12525.00†	9399.92	-3375.25	242.66	12447.19	9400.05	-3371.36	902.65	89.66	660.00	228.76	2.89	PASS
12625.00†	9399.93	-3475.25	243.25	12547.19	9400.05	-3471.36	903.24	89.66	660.00	234.58	2.81	PASS
12725.00†	9399.93	-3575.25	243.84	12647.19	9400.04	-3571.36	903.83	89.66	660.00	240.41	2.75	PASS
12825.00†	9399.94	-3675.25	244.44	12747.19	9400.04	-3671.36	904.42	89.66	659.99	246.27	2.68	PASS
12925.00†	9399.94	-3775.25	245.03	12847.19	9400.04	-3771.35	905.01	89.66	659.99	252.16	2.62	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Facility: James 29 Federal 39 Slot: No. 39 SHL Well: No. 39 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
13025.00†	9399.95	-3875.25	245.62	12947.19	9400.03	-3871.35	905.60	89.66	659.99	258.06	2.56	PASS
13125.00†	9399.96	-3975.24	246.22	13047.19	9400.03	-3971.35	906.19	89.66	659.98	263.97	2.50	PASS
13225.00†	9399.96	-4075.24	246.81	13147.19	9400.03	-4071.35	906.78	89.66	659.98	269.91	2.45	PASS
13325.00†	9399.97	-4175.24	247.41	13247.19	9400.02	-4171.35	907.37	89.66	659.97	275.86	2.39	PASS
13425.00†	9399.97	-4275.24	248.00	13347.19	9400.02	-4271.34	907.96	89.66	659.97	281.83	2.34	PASS
13525.00†	9399.98	-4375.24	248.59	13447.19	9400.01	-4371.34	908.55	89.66	659.97	287.81	2.29	PASS
13625.00†	9399.98	-4475.24	249.19	13547.19	9400.01	-4471.34	909.14	89.66	659.96	293.80	2.25	PASS
13725.00†	9399.99	-4575.23	249.78	13647.19	9400.01	-4571.34	909.73	89.66	659.96	299.80	2.20	PASS
13825.00†	9399.99	-4675.23	250.37	13747.19	9400.00	-4671.34	910.32	89.66	659.96	305.82	2.16	PASS
13915.60	9400.00	-4765.83	250.91	13836.18	9400.00	-4760.33	910.84	89.52	659.95	311.28	2.12	PASS

POSITIONAL UNCERTAINTY - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Slot Surface Uncertainty @1SD	Horizontal	0.100ft	Vertical	0.100ft
Facility Surface Uncertainty @1SD	Horizontal	8.200ft	Vertical	1.000ft

SURVEY PROGRAM - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	13836.18	AT Curve (Short Spaced)		No. 39 PWB

OFFSET WELLPATH MD REFERENCE - Offset Wellbore: No. 39 PWB Offset Wellpath: Rev-B.0

MD Reference: Rig on No. 39 SHL (KB)	Offset TVD & local coordinates use Reference Wellpath settings (See WELLPATH DATUM on page 1 of this report)
Ellipse Start MD	25.00ft



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Facility: James Federal No. 38 Slot: No. 38H SHL Well: No. 38H AWB ST01 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
25.00	25.00	0.00	0.00	25.00	25.00	-148.21	-328.92	245.74	360.76	49.20	7.33	PASS
125.00†	125.00	0.00	0.00	127.16	127.15	-146.95	-328.91	245.93	360.25	49.21	7.32	PASS
225.00†	225.00	0.00	0.00	227.89	227.87	-145.95	-328.43	246.04	359.41	49.22	7.30	PASS
325.00†	325.00	0.00	0.00	327.63	327.60	-144.51	-328.23	246.24	358.64	49.24	7.28	PASS
425.00†	425.00	0.00	0.00	427.26	427.22	-143.30	-328.15	246.41	358.08	49.28	7.27	PASS
525.00†	525.00	0.00	0.00	527.14	527.10	-142.01	-328.03	246.59	357.46	49.32	7.25	PASS
625.00†	625.00	0.00	0.00	626.58	626.53	-140.90	-327.95	246.75	356.94	49.37	7.23	PASS
725.00†	725.00	0.00	0.00	726.89	726.83	-139.75	-327.98	246.92	356.52	49.43	7.21	PASS
825.00†	825.00	0.00	0.00	826.12	826.05	-138.41	-328.04	247.12	356.05	49.50	7.19	PASS
925.00†	925.00	0.00	0.00	925.34	925.27	-137.05	-328.44	247.35	355.88	49.58	7.18	PASS
1025.00†	1025.00	0.00	0.00	1026.24	1026.15	-135.56	-328.86	247.60	355.71	49.67	7.16	PASS
1125.00†	1125.00	0.00	0.00	1125.62	1125.52	-133.98	-329.24	247.86	355.46	49.77	7.14	PASS
1225.00†	1225.00	0.00	0.00	1225.37	1225.26	-132.43	-329.82	248.12	355.41	49.87	7.13	PASS
1325.00†	1325.00	0.00	0.00	1325.26	1325.13	-130.90	-330.37	248.39	355.36	49.99	7.11	PASS
1390.63†	1390.63	0.00	0.00	1390.29	1390.16	-130.02	-330.70	248.54	355.34	50.07	7.10	PASS
1425.00†	1425.00	0.00	0.00	1424.64	1424.50	-129.61	-330.89	248.61	355.37	50.11	7.09	PASS
1525.00†	1525.00	0.00	0.00	1523.91	1523.77	-128.68	-331.57	248.79	355.67	50.24	7.08	PASS
1625.00†	1625.00	0.00	0.00	1623.85	1623.70	-127.47	-332.39	249.02	356.00	50.38	7.07	PASS
1725.00†	1725.00	0.00	0.00	1723.86	1723.69	-126.27	-333.28	249.25	356.40	50.53	7.05	PASS
1825.00†	1825.00	0.00	0.00	1823.81	1823.63	-125.24	-334.04	249.45	356.75	50.69	7.04	PASS
1925.00†	1925.00	0.00	0.00	1923.18	1923.00	-124.17	-334.92	249.66	357.21	50.86	7.02	PASS
2025.00†	2025.00	0.00	0.00	2023.05	2022.85	-123.11	-335.96	249.88	357.81	51.03	7.01	PASS
2125.00†	2125.00	0.00	0.00	2122.73	2122.52	-122.17	-336.97	250.07	358.44	51.22	7.00	PASS
2225.00†	2225.00	0.00	0.00	2221.33	2221.11	-121.25	-338.21	250.28	359.31	51.41	6.99	PASS
2325.00†	2325.00	0.00	0.00	2321.62	2321.38	-120.30	-339.70	250.50	360.39	51.61	6.98	PASS
2425.00†	2425.00	0.00	0.00	2421.22	2420.97	-119.46	-341.10	250.70	361.44	51.81	6.98	PASS
2525.00†	2525.00	0.00	0.00	2522.05	2521.78	-118.41	-342.53	250.93	362.44	52.03	6.97	PASS
2625.00†	2625.00	0.00	0.00	2622.13	2621.85	-117.23	-343.84	251.17	363.29	52.25	6.95	PASS
2725.00†	2725.00	0.00	0.00	2721.23	2720.93	-116.01	-345.35	251.43	364.33	52.48	6.94	PASS
2825.00†	2825.00	0.00	0.00	2822.30	2821.98	-114.63	-346.78	251.71	365.24	52.73	6.93	PASS
2925.00†	2925.00	0.00	0.00	2921.99	2921.65	-113.24	-348.23	251.99	366.20	52.97	6.91	PASS
3025.00†	3025.00	0.00	0.00	3022.89	3022.53	-111.80	-349.42	252.26	366.88	53.23	6.89	PASS
3125.00†	3125.00	0.00	0.00	3121.73	3121.35	-110.04	-350.89	252.59	367.76	53.49	6.88	PASS
3225.00†	3225.00	0.00	0.00	3222.02	3221.61	-108.06	-352.54	252.96	368.75	53.76	6.86	PASS
3325.00†	3325.00	0.00	0.00	3322.87	3322.42	-105.86	-354.06	253.35	369.56	54.04	6.84	PASS
3425.00†	3425.00	0.00	0.00	3422.44	3421.95	-103.30	-355.53	253.80	370.24	54.33	6.82	PASS
3525.00†	3525.00	0.00	0.00	3522.26	3521.71	-100.65	-357.24	254.27	371.17	54.62	6.80	PASS
3625.00†	3625.00	0.00	0.00	3622.49	3621.89	-97.81	-358.90	254.76	372.01	54.92	6.77	PASS
3725.00†	3725.00	0.00	0.00	3721.08	3720.42	-94.93	-360.67	255.26	372.98	55.22	6.75	PASS
3825.00†	3825.00	0.00	0.00	3821.53	3820.80	-91.79	-362.79	255.80	374.25	55.54	6.74	PASS
3925.00†	3925.00	0.00	0.00	3920.60	3919.80	-88.67	-364.78	256.34	375.44	55.85	6.72	PASS
4025.00†	4025.00	0.00	0.00	4022.58	4021.71	-85.62	-366.77	256.86	376.64	56.18	6.70	PASS
4125.00†	4125.00	0.00	0.00	4123.02	4122.11	-82.99	-368.19	257.30	377.43	56.51	6.68	PASS
4225.00†	4225.00	0.00	0.00	4224.34	4223.39	-80.54	-369.35	257.70	378.03	56.85	6.65	PASS
4325.00†	4325.00	0.00	0.00	4323.87	4322.90	-78.53	-370.30	258.03	378.54	57.19	6.62	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Facility: James Federal No. 38 Slot: No. 38H SHL Well: No. 38H AWB ST01 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
4425.00†	4425.00	0.00	0.00	4425.61	4424.63	-77.14	-370.91	258.25	378.85	57.54	6.58	PASS
4525.00†	4525.00	0.00	0.00	4526.01	4525.02	-76.27	-371.13	258.39	378.89	57.89	6.54	PASS
4625.00†	4625.00	0.00	0.00	4626.05	4625.06	-75.66	-371.24	258.48	378.87	58.25	6.50	PASS
4725.00†	4725.00	0.00	0.00	4726.09	4725.10	-75.14	-371.33	258.56	378.85	58.61	6.46	PASS
4825.00†	4825.00	0.00	0.00	4826.01	4825.02	-74.73	-371.38	258.62	378.83	58.98	6.42	PASS
4925.00†	4925.00	0.00	0.00	4925.30	4924.31	-74.56	-371.50	258.65	378.91	59.35	6.38	PASS
5025.00†	5025.00	0.00	0.00	5024.55	5023.56	-74.55	-371.81	258.66	379.21	59.73	6.35	PASS
5125.00†	5125.00	0.00	0.00	5124.58	5123.59	-74.55	-372.19	258.67	379.59	60.11	6.32	PASS
5225.00†	5225.00	0.00	0.00	5224.37	5223.38	-74.49	-372.59	258.69	379.97	60.50	6.28	PASS
5325.00†	5325.00	0.00	0.00	5323.44	5322.45	-74.19	-373.18	258.76	380.49	60.89	6.25	PASS
5425.00†	5425.00	0.00	0.00	5422.77	5421.77	-73.70	-374.09	258.86	381.30	61.29	6.22	PASS
5525.00†	5525.00	0.00	0.00	5522.72	5521.71	-73.02	-375.09	258.98	382.14	61.69	6.19	PASS
5625.00†	5625.00	0.00	0.00	5623.60	5622.59	-72.36	-376.03	259.11	382.94	62.10	6.17	PASS
5725.00†	5725.00	0.00	0.00	5723.50	5722.48	-71.77	-376.73	259.21	383.51	62.52	6.13	PASS
5825.00†	5825.00	0.00	0.00	5823.66	5822.63	-71.16	-377.53	259.33	384.19	62.93	6.10	PASS
5925.00†	5925.00	0.00	0.00	5924.26	5923.23	-70.63	-378.18	259.42	384.73	63.36	6.07	PASS
6025.00†	6025.00	0.00	0.00	6023.58	6022.55	-69.97	-378.83	259.54	385.25	63.78	6.04	PASS
6125.00†	6125.00	0.00	0.00	6129.82	6128.76	-68.45	-379.51	259.78	385.66	64.10	6.02	PASS
6225.00†	6225.00	0.00	0.00	6231.08	6229.66	-59.94	-379.64	261.03	384.37	64.35	5.97	PASS
6325.00†	6325.00	0.00	0.00	6330.70	6328.90	-51.26	-379.79	262.31	383.25	64.60	5.93	PASS
6425.00†	6425.00	0.00	0.00	6430.32	6428.14	-42.58	-379.94	263.61	382.33	64.86	5.89	PASS
6525.00†	6525.00	0.00	0.00	6529.94	6527.38	-33.90	-380.09	264.90	381.61	65.13	5.86	PASS
6625.00†	6625.00	0.00	0.00	6629.56	6626.63	-25.22	-380.24	266.21	381.08	65.41	5.83	PASS
6725.00†	6725.00	0.00	0.00	6729.18	6725.87	-16.54	-380.40	267.51	380.76	65.70	5.80	PASS
6825.00†	6825.00	0.00	0.00	6828.75	6825.13	-8.68	-380.53	268.69	380.63	65.99	5.77	PASS
6925.00†	6925.00	0.00	0.00	6928.66	6924.93	-4.11	-380.61	269.38	380.63	66.28	5.74	PASS
7025.00†	7025.00	0.00	0.00	7028.74	7025.00	-2.95	-380.63	269.56	380.64	66.57	5.72	PASS
7125.00†	7125.00	0.00	0.00	7128.74	7125.00	-2.95	-380.63	269.56	380.64	66.85	5.69	PASS
7225.00†	7225.00	0.00	0.00	7228.74	7225.00	-2.95	-380.63	269.56	380.64	67.14	5.67	PASS
7325.00†	7325.00	0.00	0.00	7328.74	7325.00	-2.95	-380.63	269.56	380.64	67.43	5.64	PASS
7425.00†	7425.00	0.00	0.00	7428.74	7425.00	-2.95	-380.63	269.56	380.64	67.73	5.62	PASS
7525.00†	7525.00	0.00	0.00	7528.74	7525.00	-2.95	-380.63	269.56	380.64	68.04	5.59	PASS
7625.00†	7625.00	0.00	0.00	7628.74	7625.00	-2.95	-380.63	269.56	380.64	68.35	5.57	PASS
7725.00†	7725.00	0.00	0.00	7728.74	7725.00	-2.95	-380.63	269.56	380.64	68.67	5.54	PASS
7825.00†	7825.00	0.00	0.00	7828.74	7825.00	-2.95	-380.63	269.56	380.64	68.99	5.52	PASS
7925.00†	7925.00	0.00	0.00	7928.74	7925.00	-2.95	-380.63	269.56	380.64	69.32	5.49	PASS
8025.00†	8025.00	0.00	0.00	8028.74	8025.00	-2.95	-380.63	269.56	380.64	69.65	5.46	PASS
8125.00†	8125.00	0.00	0.00	8128.74	8125.00	-2.95	-380.63	269.56	380.64	69.99	5.44	PASS
8225.00†	8225.00	0.00	0.00	8228.74	8225.00	-2.95	-380.63	269.56	380.64	70.34	5.41	PASS
8325.00†	8325.00	0.00	0.00	8328.74	8325.00	-2.95	-380.63	269.56	380.64	70.69	5.38	PASS
8425.00†	8425.00	0.00	0.00	8428.74	8425.00	-2.95	-380.63	269.56	380.64	71.04	5.36	PASS
8525.00†	8525.00	0.00	0.00	8528.74	8525.00	-2.95	-380.63	269.56	380.64	71.40	5.33	PASS
8625.00†	8625.00	0.00	0.00	8628.74	8625.00	-2.95	-380.63	269.56	380.64	71.77	5.30	PASS
8723.00	8723.00	0.00	0.00	8726.74	8723.00	-2.95	-380.63	269.56	380.64	72.13	5.28	PASS
8725.00†	8725.00	0.00	0.00	8728.74	8725.00	-2.95	-380.63	269.56	380.65	72.14	5.28	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Facility: James Federal No. 38 Slot: No. 38H SHL Well: No. 38H AWB ST01 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
8825.00†	8824.56	-6.84	4.43	8828.27	8824.43	-5.92	-380.65	270.14	385.09	72.57	5.31	PASS
8925.00†	8921.63	-26.67	17.29	8927.37	8921.93	-23.11	-380.75	270.51	398.05	73.17	5.44	PASS
9025.00†	9013.80	-58.99	38.24	9025.34	9014.54	-54.75	-380.94	270.58	419.20	73.79	5.68	PASS
9125.00†	9098.81	-103.01	66.77	9121.33	9099.54	-99.17	-381.21	270.49	448.00	74.46	6.02	PASS
9223.00	9173.16	-156.47	101.42	9213.00	9173.60	-153.06	-381.53	270.41	482.96	75.22	6.42	PASS
9225.00†	9174.57	-157.66	102.19	9214.85	9175.01	-154.25	-381.54	270.40	483.73	75.24	6.43	PASS
9325.00†	9240.70	-223.30	138.21	9308.07	9241.41	-219.56	-381.93	270.41	520.15	76.16	6.83	PASS
9425.00†	9296.95	-299.91	168.98	9403.27	9298.65	-295.52	-382.38	270.46	551.38	77.51	7.11	PASS
9525.00†	9341.92	-385.60	193.73	9500.40	9344.71	-380.92	-382.89	270.47	576.65	79.27	7.27	PASS
9625.00†	9374.53	-478.28	211.85	9599.12	9377.68	-473.87	-383.45	270.42	595.32	81.50	7.30	PASS
9725.00†	9393.95	-575.64	222.90	9698.85	9396.00	-571.80	-384.03	270.36	606.94	84.16	7.21	PASS
9816.80	9399.77	-667.10	226.58	9790.64	9399.62	-663.45	-384.58	270.34	611.16	86.90	7.03	PASS
9816.96	9399.77	-667.26	226.58	9790.80	9399.62	-663.61	-384.58	270.34	611.17	86.91	7.03	PASS
9825.00†	9399.77	-675.30	226.62	9798.84	9399.62	-671.65	-384.63	270.34	611.26	87.15	7.01	PASS
9925.00†	9399.78	-775.30	227.22	9898.83	9399.63	-771.64	-385.22	270.34	612.45	90.38	6.78	PASS
10025.00†	9399.78	-875.30	227.81	9998.82	9399.64	-871.63	-385.82	270.34	613.64	93.91	6.53	PASS
10125.00†	9399.79	-975.30	228.41	10098.82	9399.65	-971.62	-386.42	270.34	614.84	97.72	6.29	PASS
10225.00†	9399.79	-1075.30	229.00	10198.81	9399.66	-1071.62	-387.02	270.34	616.03	101.78	6.05	PASS
10325.00†	9399.80	-1175.29	229.59	10298.80	9399.67	-1171.61	-387.61	270.34	617.22	106.05	5.82	PASS
10425.00†	9399.80	-1275.29	230.19	10398.79	9399.68	-1271.60	-388.21	270.34	618.41	110.51	5.60	PASS
10525.00†	9399.81	-1375.29	230.78	10498.79	9399.69	-1371.59	-388.81	270.34	619.60	115.15	5.38	PASS
10625.00†	9399.82	-1475.29	231.37	10598.78	9399.70	-1471.58	-389.41	270.34	620.79	119.93	5.18	PASS
10725.00†	9399.82	-1575.29	231.97	10698.77	9399.71	-1571.57	-390.00	270.34	621.98	124.85	4.98	PASS
10825.00†	9399.83	-1675.28	232.56	10798.77	9399.71	-1671.56	-390.60	270.34	623.17	129.89	4.80	PASS
10925.00†	9399.83	-1775.28	233.16	10898.76	9399.72	-1771.55	-391.20	270.34	624.36	135.03	4.62	PASS
11025.00†	9399.84	-1875.28	233.75	10998.75	9399.73	-1871.54	-391.80	270.34	625.56	140.26	4.46	PASS
11125.00†	9399.84	-1975.28	234.34	11098.74	9399.74	-1971.54	-392.39	270.34	626.75	145.57	4.31	PASS
11225.00†	9399.85	-2075.28	234.94	11198.74	9399.75	-2071.53	-392.99	270.34	627.94	150.96	4.16	PASS
11325.00†	9399.85	-2175.28	235.53	11298.73	9399.76	-2171.52	-393.59	270.34	629.13	156.42	4.02	PASS
11425.00†	9399.86	-2275.27	236.12	11398.72	9399.77	-2271.51	-394.19	270.34	630.32	161.93	3.89	PASS
11525.00†	9399.87	-2375.27	236.72	11498.72	9399.78	-2371.50	-394.78	270.34	631.51	167.50	3.77	PASS
11625.00†	9399.87	-2475.27	237.31	11598.71	9399.79	-2471.49	-395.38	270.34	632.70	173.12	3.65	PASS
11725.00†	9399.88	-2575.27	237.91	11698.70	9399.80	-2571.48	-395.98	270.34	633.89	178.78	3.55	PASS
11825.00†	9399.88	-2675.27	238.50	11798.69	9399.81	-2671.47	-396.57	270.34	635.09	184.48	3.44	PASS
11925.00†	9399.89	-2775.27	239.09	11898.69	9399.82	-2771.46	-397.17	270.34	636.28	190.22	3.34	PASS
12025.00†	9399.89	-2875.26	239.69	11998.68	9399.83	-2871.46	-397.77	270.34	637.47	196.00	3.25	PASS
12125.00†	9399.90	-2975.26	240.28	12098.67	9399.83	-2971.45	-398.37	270.34	638.66	201.80	3.16	PASS
12225.00†	9399.91	-3075.26	240.87	12198.67	9399.84	-3071.44	-398.96	270.34	639.85	207.63	3.08	PASS
12325.00†	9399.91	-3175.26	241.47	12298.66	9399.85	-3171.43	-399.56	270.34	641.04	213.49	3.00	PASS
12425.00†	9399.92	-3275.26	242.06	12398.65	9399.86	-3271.42	-400.16	270.34	642.23	219.37	2.93	PASS
12525.00†	9399.92	-3375.25	242.66	12498.65	9399.87	-3371.41	-400.76	270.34	643.42	225.27	2.86	PASS
12625.00†	9399.93	-3475.25	243.25	12598.64	9399.88	-3471.40	-401.35	270.34	644.61	231.19	2.79	PASS
12725.00†	9399.93	-3575.25	243.84	12698.63	9399.89	-3571.39	-401.95	270.34	645.81	237.13	2.72	PASS
12825.00†	9399.94	-3675.25	244.44	12798.62	9399.90	-3671.38	-402.55	270.34	647.00	243.09	2.66	PASS
12925.00†	9399.94	-3775.25	245.03	12898.62	9399.91	-3771.38	-403.15	270.34	648.19	249.06	2.60	PASS



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REFERENCE WELL PATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Facility: James Federal No. 38 Slot: No. 38H SHL Well: No. 38H AWB ST01 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
13025.00†	9399.95	-3875.25	245.62	12998.61	9399.92	-3871.37	-403.74	270.34	649.38	255.05	2.55	PASS
13125.00†	9399.96	-3975.24	246.22	13098.60	9399.93	-3971.36	-404.34	270.34	650.57	261.05	2.49	PASS
13225.00†	9399.96	-4075.24	246.81	13198.60	9399.94	-4071.35	-404.94	270.34	651.76	267.07	2.44	PASS
13325.00†	9399.97	-4175.24	247.41	13298.59	9399.94	-4171.34	-405.53	270.34	652.95	273.10	2.39	PASS
13425.00†	9399.97	-4275.24	248.00	13398.58	9399.95	-4271.33	-406.13	270.34	654.14	279.14	2.34	PASS
13525.00†	9399.98	-4375.24	248.59	13498.57	9399.96	-4371.32	-406.73	270.34	655.33	285.19	2.30	PASS
13625.00†	9399.98	-4475.24	249.19	13598.57	9399.97	-4471.31	-407.33	270.34	656.53	291.25	2.25	PASS
13725.00†	9399.99	-4575.23	249.78	13698.56	9399.98	-4571.30	-407.92	270.34	657.72	297.32	2.21	PASS
13825.00†	9399.99	-4675.23	250.37	13798.55	9399.99	-4671.30	-408.52	270.34	658.91	303.39	2.17	PASS
13915.60	9400.00	-4765.83	250.91	13889.15	9400.00	-4761.89	-409.06	270.34	659.99	308.91	2.14	PASS

POSITIONAL UNCERTAINTY - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Slot Surface Uncertainty @1SD	Horizontal	0.100ft	Vertical	0.100ft
Facility Surface Uncertainty @1SD	Horizontal	8.200ft	Vertical	1.000ft

SURVEY PROGRAM - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	6033.45	ISCWSA MWD, Rev. 2 (Standard)		No. 38H AWB
6033.45	13898.69	AT Curve (Short Spaced)		No. 38H PWB ST01

OFFSET WELLPATH MD REFERENCE - Offset Wellbore: No. 38H PWB ST01 Offset Wellpath: Rev B.0 ST01

MD Reference: Rig on No. 38H SHL (KB)	Offset TVD & local coordinates use Reference Wellpath settings (See WELLPATH DATUM on page 1 of this report)
Ellipse Start MD	25.00ft



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Facility: James Federal No. 22 Slot: No. 22 SHL Well: No. 22 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
25.00	25.00	0.00	0.00	25.98	24.98	-26.90	1319.96	91.17	1320.24	49.20	26.83	PASS
125.00†	125.00	0.00	0.00	123.89	122.89	-26.54	1320.06	91.15	1320.33	49.21	26.83	PASS
225.00†	225.00	0.00	0.00	225.07	224.06	-25.85	1320.18	91.12	1320.43	49.22	26.83	PASS
325.00†	325.00	0.00	0.00	323.88	322.87	-25.07	1320.29	91.09	1320.53	49.25	26.81	PASS
425.00†	425.00	0.00	0.00	422.20	421.19	-24.30	1320.58	91.05	1320.81	49.28	26.80	PASS
525.00†	525.00	0.00	0.00	522.37	521.35	-23.34	1320.79	91.01	1321.01	49.32	26.78	PASS
625.00†	625.00	0.00	0.00	620.46	619.45	-22.79	1321.22	90.99	1321.43	49.37	26.77	PASS
725.00†	725.00	0.00	0.00	721.00	719.98	-22.38	1321.60	90.97	1321.80	49.43	26.74	PASS
825.00†	825.00	0.00	0.00	820.21	819.19	-21.95	1322.01	90.95	1322.21	49.50	26.71	PASS
925.00†	925.00	0.00	0.00	921.01	919.99	-21.24	1322.45	90.92	1322.63	49.58	26.68	PASS
1025.00†	1025.00	0.00	0.00	1018.17	1017.15	-20.47	1322.91	90.89	1323.09	49.66	26.64	PASS
1125.00†	1125.00	0.00	0.00	1114.91	1113.88	-19.71	1323.62	90.85	1323.81	49.76	26.61	PASS
1225.00†	1225.00	0.00	0.00	1216.22	1215.18	-18.92	1324.45	90.82	1324.62	49.86	26.56	PASS
1325.00†	1325.00	0.00	0.00	1314.31	1313.26	-18.13	1325.25	90.78	1325.43	49.98	26.52	PASS
1425.00†	1425.00	0.00	0.00	1412.35	1411.30	-17.67	1326.20	90.76	1326.39	50.10	26.48	PASS
1525.00†	1525.00	0.00	0.00	1511.90	1510.84	-17.20	1327.25	90.74	1327.44	50.23	26.43	PASS
1625.00†	1625.00	0.00	0.00	1610.55	1609.48	-16.38	1328.36	90.71	1328.55	50.37	26.38	PASS
1725.00†	1725.00	0.00	0.00	1709.10	1708.02	-15.27	1329.58	90.66	1329.78	50.52	26.32	PASS
1825.00†	1825.00	0.00	0.00	1808.92	1807.83	-14.37	1330.90	90.62	1331.09	50.68	26.27	PASS
1925.00†	1925.00	0.00	0.00	1909.87	1908.77	-13.56	1332.11	90.58	1332.28	50.84	26.20	PASS
2025.00†	2025.00	0.00	0.00	2005.84	2004.72	-12.52	1333.47	90.54	1333.68	51.01	26.14	PASS
2125.00†	2125.00	0.00	0.00	2106.62	2105.48	-11.17	1335.02	90.48	1335.21	51.20	26.08	PASS
2225.00†	2225.00	0.00	0.00	2207.26	2206.09	-9.60	1336.42	90.41	1336.58	51.39	26.01	PASS
2325.00†	2325.00	0.00	0.00	2308.47	2307.28	-7.92	1337.91	90.34	1338.06	51.59	25.93	PASS
2425.00†	2425.00	0.00	0.00	2410.84	2409.63	-6.29	1339.09	90.27	1339.20	51.80	25.85	PASS
2525.00†	2525.00	0.00	0.00	2508.29	2507.06	-4.74	1340.31	90.20	1340.44	52.02	25.77	PASS
2625.00†	2625.00	0.00	0.00	2607.99	2606.73	-2.68	1341.70	90.12	1341.82	52.24	25.69	PASS
2725.00†	2725.00	0.00	0.00	2707.96	2706.67	-0.68	1343.04	90.03	1343.17	52.47	25.60	PASS
2825.00†	2825.00	0.00	0.00	2811.66	2810.34	1.77	1344.37	89.92	1344.45	52.72	25.50	PASS
2925.00†	2925.00	0.00	0.00	2908.38	2907.02	4.16	1345.46	89.82	1345.59	52.96	25.41	PASS
3025.00†	3025.00	0.00	0.00	3010.62	3009.20	7.00	1346.80	89.70	1346.91	53.22	25.31	PASS
3125.00†	3125.00	0.00	0.00	3107.57	3106.10	10.11	1347.99	89.57	1348.16	53.48	25.21	PASS
3225.00†	3225.00	0.00	0.00	3208.79	3207.25	13.64	1349.36	89.42	1349.54	53.76	25.11	PASS
3325.00†	3325.00	0.00	0.00	3309.27	3307.66	17.28	1350.62	89.27	1350.84	54.04	25.00	PASS
3425.00†	3425.00	0.00	0.00	3412.37	3410.71	20.17	1351.79	89.15	1352.02	54.32	24.89	PASS
3525.00†	3525.00	0.00	0.00	3517.24	3515.56	22.15	1352.68	89.06	1352.89	54.62	24.77	PASS
3625.00†	3625.00	0.00	0.00	3620.80	3619.10	23.95	1353.21	88.99	1353.43	54.92	24.64	PASS
3725.00†	3725.00	0.00	0.00	3721.58	3719.86	25.68	1353.59	88.91	1353.85	55.22	24.52	PASS
3825.00†	3825.00	0.00	0.00	3822.82	3821.09	27.44	1353.89	88.84	1354.17	55.54	24.38	PASS
3925.00†	3925.00	0.00	0.00	3922.89	3921.14	29.22	1354.13	88.76	1354.45	55.86	24.25	PASS
4025.00†	4025.00	0.00	0.00	4022.25	4020.48	31.22	1354.39	88.68	1354.76	56.18	24.11	PASS
4125.00†	4125.00	0.00	0.00	4120.47	4118.69	33.09	1354.72	88.60	1355.14	56.51	23.98	PASS
4225.00†	4225.00	0.00	0.00	4213.90	4212.11	34.07	1355.29	88.56	1355.78	56.82	23.86	PASS
4325.00†	4325.00	0.00	0.00	4307.53	4305.72	34.77	1356.45	88.53	1357.03	57.15	23.75	PASS
4425.00†	4425.00	0.00	0.00	4406.25	4404.43	35.07	1357.92	88.52	1358.52	57.49	23.63	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Facility: James Federal No. 22 Slot: No. 22 SHL Well: No. 22 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
4525.00†	4525.00	0.00	0.00	4501.07	4499.24	34.83	1359.45	88.53	1360.14	57.82	23.52	PASS
4625.00†	4625.00	0.00	0.00	4597.04	4595.18	33.95	1361.53	88.57	1362.28	58.17	23.42	PASS
4725.00†	4725.00	0.00	0.00	4697.37	4695.48	32.83	1363.73	88.62	1364.45	58.53	23.31	PASS
4825.00†	4825.00	0.00	0.00	4796.94	4795.03	31.73	1365.92	88.67	1366.62	58.89	23.21	PASS
4925.00†	4925.00	0.00	0.00	4895.15	4893.20	31.04	1368.25	88.70	1368.97	59.26	23.10	PASS
5025.00†	5025.00	0.00	0.00	4994.85	4992.87	30.73	1370.57	88.72	1371.29	59.64	22.99	PASS
5125.00†	5125.00	0.00	0.00	5095.60	5093.60	30.20	1372.92	88.74	1373.61	60.02	22.88	PASS
5225.00†	5225.00	0.00	0.00	5194.14	5192.11	29.83	1375.22	88.76	1375.94	60.41	22.78	PASS
5325.00†	5325.00	0.00	0.00	5304.90	5302.84	29.00	1377.45	88.79	1377.94	60.82	22.65	PASS
5425.00†	5425.00	0.00	0.00	5406.27	5404.20	28.42	1379.03	88.82	1379.48	61.22	22.53	PASS
5525.00†	5525.00	0.00	0.00	5504.91	5502.83	27.79	1380.57	88.85	1381.03	61.62	22.41	PASS
5625.00†	5625.00	0.00	0.00	5604.88	5602.78	27.05	1382.27	88.88	1382.71	62.03	22.29	PASS
5725.00†	5725.00	0.00	0.00	5711.18	5709.07	26.35	1383.70	88.91	1384.04	62.46	22.16	PASS
5825.00†	5825.00	0.00	0.00	5816.32	5814.20	25.53	1384.78	88.94	1385.05	62.88	22.03	PASS
5925.00†	5925.00	0.00	0.00	5917.57	5915.44	25.08	1385.43	88.96	1385.69	63.31	21.89	PASS
6025.00†	6025.00	0.00	0.00	6018.43	6016.30	24.65	1386.16	88.98	1386.41	63.73	21.75	PASS
6125.00†	6125.00	0.00	0.00	6119.10	6116.96	23.89	1386.75	89.01	1386.98	64.16	21.62	PASS
6225.00†	6225.00	0.00	0.00	6216.41	6214.27	23.43	1387.40	89.03	1387.64	64.59	21.48	PASS
6325.00†	6325.00	0.00	0.00	6322.21	6320.07	22.74	1388.08	89.06	1388.27	65.04	21.35	PASS
6425.00†	6425.00	0.00	0.00	6414.57	6412.43	22.14	1388.61	89.09	1388.85	65.46	21.22	PASS
6525.00†	6525.00	0.00	0.00	6521.45	6519.30	21.40	1389.41	89.12	1389.59	65.92	21.08	PASS
6625.00†	6625.00	0.00	0.00	6623.77	6621.62	20.40	1389.77	89.16	1389.93	66.38	20.94	PASS
6725.00†	6725.00	0.00	0.00	6728.46	6726.30	19.48	1389.83	89.20	1389.96	66.84	20.80	PASS
6825.00†	6825.00	0.00	0.00	6827.84	6825.68	18.70	1389.77	89.23	1389.89	67.29	20.65	PASS
6925.00†	6925.00	0.00	0.00	6927.03	6924.87	17.99	1389.75	89.26	1389.86	67.75	20.51	PASS
7025.00†	7025.00	0.00	0.00	7026.97	7024.81	17.56	1389.80	89.28	1389.91	68.22	20.37	PASS
7125.00†	7125.00	0.00	0.00	7131.49	7129.32	17.33	1389.68	89.29	1389.80	68.70	20.23	PASS
7225.00†	7225.00	0.00	0.00	7245.18	7243.01	16.38	1388.90	89.32	1389.11	69.19	20.08	PASS
7325.00†	7325.00	0.00	0.00	7344.50	7342.30	14.87	1387.47	89.39	1387.66	69.66	19.92	PASS
7425.00†	7425.00	0.00	0.00	7434.88	7432.68	14.04	1386.65	89.42	1386.74	70.12	19.78	PASS
7525.00†	7525.00	0.00	0.00	7547.17	7544.95	12.64	1385.79	89.48	1385.99	70.62	19.62	PASS
7625.00†	7625.00	0.00	0.00	7645.28	7643.04	11.17	1384.39	89.54	1384.55	71.10	19.47	PASS
7725.00†	7725.00	0.00	0.00	7751.12	7748.86	10.07	1382.81	89.58	1383.05	71.60	19.32	PASS
7825.00†	7825.00	0.00	0.00	7852.76	7850.48	8.86	1381.00	89.63	1381.26	72.09	19.16	PASS
7925.00†	7925.00	0.00	0.00	7953.47	7951.16	7.54	1379.09	89.69	1379.36	72.59	19.00	PASS
8025.00†	8025.00	0.00	0.00	8050.29	8047.95	6.14	1377.38	89.75	1377.58	73.08	18.85	PASS
8125.00†	8125.00	0.00	0.00	8148.22	8145.87	4.88	1375.85	89.80	1376.01	73.57	18.70	PASS
8225.00†	8225.00	0.00	0.00	8245.73	8243.36	3.72	1374.39	89.85	1374.52	74.07	18.56	PASS
8325.00†	8325.00	0.00	0.00	8340.41	8338.02	2.37	1373.39	89.90	1373.46	74.56	18.42	PASS
8425.00†	8425.00	0.00	0.00	8440.14	8437.74	0.88	1372.40	89.96	1372.46	75.07	18.28	PASS
8525.00†	8525.00	0.00	0.00	8534.49	8532.07	-1.00	1371.70	90.04	1371.72	75.57	18.15	PASS
8625.00†	8625.00	0.00	0.00	8627.40	8624.96	-2.56	1371.46	90.11	1371.47	76.06	18.03	PASS
8723.00	8723.00	0.00	0.00	8719.27	8716.82	-4.13	1371.68	90.17	1371.70	76.55	17.92	PASS
8725.00†	8725.00	0.00	0.00	8721.36	8718.91	-4.16	1371.69	90.17	1371.71	76.55	17.92	PASS
8825.00†	8824.56	-6.84	4.43	8809.79	8807.29	-6.52	1372.23	89.99	1367.91	76.91	17.79	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Facility: James Federal No. 22 Slot: No. 22 SHL Well: No. 22 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
8925.00†	8921.63	-26.67	17.29	8863.53	8860.62	-12.86	1373.65	89.42	1357.81	77.40	17.54	PASS
9025.00†	9013.80	-58.99	38.24	8908.08	8904.26	-21.29	1376.54	88.39	1343.31	77.82	17.26	PASS
9125.00†	9098.81	-103.01	66.77	8955.02	8949.44	-32.97	1381.51	86.95	1325.05	78.23	16.94	PASS
9223.00	9173.16	-156.47	101.42	9004.10	8995.52	-48.31	1388.51	85.20	1303.78	78.67	16.57	PASS
9225.00†	9174.57	-157.66	102.19	9005.34	8996.67	-48.73	1388.70	85.16	1303.32	78.68	16.56	PASS
9325.00†	9240.70	-223.30	138.21	9065.70	9051.37	-72.01	1399.02	83.16	1283.89	79.22	16.21	PASS
9425.00†	9296.95	-299.91	168.98	9131.42	9107.74	-103.17	1411.87	81.01	1272.50	80.14	15.88	PASS
9512.50†	9336.96	-374.46	190.99	9203.40	9164.19	-144.93	1427.51	79.48	1269.46	81.29	15.62	PASS
9525.00†	9341.92	-385.60	193.73	9208.08	9167.69	-147.86	1428.57	79.10	1269.53	81.46	15.58	PASS
9625.00†	9374.53	-478.28	211.85	9267.85	9210.47	-187.07	1442.79	76.69	1275.51	83.02	15.36	PASS
9725.00†	9393.95	-575.64	222.90	9322.26	9246.06	-225.55	1457.33	74.17	1291.62	84.82	15.23	PASS
9816.80	9399.77	-667.10	226.58	9362.96	9270.43	-255.84	1469.36	71.69	1315.44	86.55	15.20	PASS
9816.96	9399.77	-667.26	226.58	9363.03	9270.47	-255.90	1469.38	71.69	1315.49	86.56	15.20	PASS
9825.00†	9399.77	-675.30	226.62	9366.82	9272.63	-258.77	1470.56	71.49	1317.97	86.71	15.20	PASS
9925.00†	9399.78	-775.30	227.22	9874.00	9419.92	-725.56	1560.56	87.86	1334.42	93.88	14.21	PASS
10025.00†	9399.78	-875.30	227.81	9997.60	9442.12	-847.12	1563.23	88.79	1336.39	97.46	13.71	PASS
10125.00†	9399.79	-975.30	228.41	10076.00	9450.15	-925.04	1565.28	87.85	1338.76	100.76	13.29	PASS
10225.00†	9399.79	-1075.30	229.00	10207.62	9451.34	-1056.55	1569.93	89.20	1342.05	105.06	12.77	PASS
10325.00†	9399.80	-1175.29	229.59	10319.34	9450.06	-1168.26	1570.87	89.70	1342.24	109.34	12.28	PASS
10425.00†	9399.80	-1275.29	230.19	10432.76	9450.71	-1281.67	1570.76	90.27	1341.56	113.85	11.78	PASS
10525.00†	9399.81	-1375.29	230.78	10536.32	9452.52	-1385.21	1570.10	90.42	1340.39	118.39	11.32	PASS
10625.00†	9399.82	-1475.29	231.37	10649.05	9454.85	-1497.91	1568.77	90.97	1338.72	123.23	10.86	PASS
10725.00†	9399.82	-1575.29	231.97	10768.83	9456.46	-1617.64	1565.77	91.82	1335.68	128.31	10.41	PASS
10825.00†	9399.83	-1675.28	232.56	10884.02	9458.15	-1732.74	1561.36	92.48	1331.32	133.45	9.98	PASS
10925.00†	9399.83	-1775.28	233.16	10949.01	9459.31	-1797.68	1559.36	90.97	1327.72	137.91	9.63	PASS
11025.00†	9399.84	-1875.28	233.75	11042.16	9461.55	-1890.80	1558.41	90.67	1326.19	142.92	9.28	PASS
11125.00†	9399.84	-1975.28	234.34	11141.07	9462.95	-1989.69	1557.03	90.62	1324.27	148.10	8.94	PASS
11225.00†	9399.85	-2075.28	234.94	11253.67	9462.04	-2102.28	1555.57	91.17	1322.37	153.59	8.61	PASS
11325.00†	9399.85	-2175.28	235.53	11346.04	9460.93	-2194.62	1553.88	90.84	1319.90	158.82	8.31	PASS
11425.00†	9399.86	-2275.27	236.12	11459.65	9460.58	-2308.20	1551.81	91.43	1317.50	164.47	8.01	PASS
11525.00†	9399.87	-2375.27	236.72	11558.88	9462.11	-2407.38	1549.32	91.40	1314.47	169.92	7.74	PASS
11625.00†	9399.87	-2475.27	237.31	11671.65	9467.60	-2519.94	1545.19	91.96	1310.39	175.62	7.46	PASS
11725.00†	9399.88	-2575.27	237.91	11737.45	9471.83	-2585.58	1543.58	90.45	1307.70	180.58	7.24	PASS
11825.00†	9399.88	-2675.27	238.50	11815.07	9475.64	-2663.09	1543.49	89.47	1307.24	185.74	7.04	PASS
11925.00†	9399.89	-2775.27	239.09	11915.79	9475.31	-2763.81	1544.68	89.50	1307.81	191.41	6.83	PASS
12025.00†	9399.89	-2875.26	239.69	12015.31	9472.94	-2863.29	1545.62	89.48	1308.03	197.11	6.64	PASS
12125.00†	9399.90	-2975.26	240.28	12103.89	9470.27	-2951.82	1546.92	88.97	1308.74	202.60	6.46	PASS
12225.00†	9399.91	-3075.26	240.87	12213.87	9467.27	-3061.73	1548.87	89.41	1309.80	208.60	6.28	PASS
12325.00†	9399.91	-3175.26	241.47	12303.50	9464.65	-3151.30	1550.20	88.95	1310.55	214.17	6.12	PASS
12425.00†	9399.92	-3275.26	242.06	12415.38	9465.26	-3263.17	1551.88	89.47	1311.51	220.24	5.95	PASS
12525.00†	9399.92	-3375.25	242.66	12514.37	9465.92	-3362.16	1552.80	89.43	1311.87	226.05	5.80	PASS
12625.00†	9399.93	-3475.25	243.25	12613.29	9466.18	-3461.07	1553.84	89.38	1312.34	231.89	5.66	PASS
12725.00†	9399.93	-3575.25	243.84	12724.70	9464.58	-3572.46	1554.59	89.88	1312.35	238.02	5.51	PASS
12825.00†	9399.94	-3675.25	244.44	12821.38	9461.49	-3669.09	1554.85	89.73	1311.87	243.87	5.38	PASS
12925.00†	9399.94	-3775.25	245.03	12899.22	9459.64	-3746.89	1556.00	88.76	1312.64	249.31	5.27	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Facility: James Federal No. 22 Slot: No. 22 SHL Well: No. 22 Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
13025.00†	9399.95	-3875.25	245.62	12995.17	9459.56	-3842.82	1558.24	88.59	1314.37	255.15	5.15	PASS
13125.00†	9399.96	-3975.24	246.22	13094.73	9460.71	-3942.34	1560.60	88.57	1316.20	261.08	5.04	PASS
13225.00†	9399.96	-4075.24	246.81	13181.51	9461.35	-4029.09	1563.19	87.99	1318.62	266.70	4.94	PASS
13325.00†	9399.97	-4175.24	247.41	13285.51	9461.68	-4133.03	1566.68	88.17	1321.39	272.78	4.84	PASS
13425.00†	9399.97	-4275.24	248.00	13393.35	9462.37	-4240.82	1569.69	88.51	1323.61	278.97	4.74	PASS
13525.00†	9399.98	-4375.24	248.59	13489.37	9462.87	-4336.81	1572.26	88.34	1325.71	284.87	4.65	PASS
13625.00†	9399.98	-4475.24	249.19	13584.14	9462.44	-4431.52	1575.34	88.11	1328.35	290.75	4.57	PASS
13725.00†	9399.99	-4575.23	249.78	13691.87	9460.58	-4539.18	1578.58	88.45	1330.66	296.99	4.48	PASS
13825.00†	9399.99	-4675.23	250.37	13794.70	9457.24	-4641.92	1581.45	88.57	1332.72	303.13	4.40	PASS
13915.60†	9400.00	-4765.83	250.91	13853.00	9455.14	-4700.16	1582.97	87.18	1334.82	307.72	4.34	PASS

POSITIONAL UNCERTAINTY - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Slot Surface Uncertainty @1SD	Horizontal	0.100ft	Vertical	0.100ft
Facility Surface Uncertainty @1SD	Horizontal	8.200ft	Vertical	1.000ft

WELLPATH COMPOSITION - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
25.00	8715.00	ISCWSA MWD, Rev. 2 (Standard)	Xtreme MWD <117-8715>	No. 22 AWB
8715.00	9580.00	NaviTrak (Standard)	BHI MWD NaviTrak <8734 - 9580>	No. 22 AWB
9580.00	13804.00	NaviTrak (Standard)	BHI NaviGamma <9674-13804>	No. 22 AWB
13804.00	13853.00	Blind Drilling (std)	Projection to bit	No. 22 AWB

OFFSET WELLPATH MD REFERENCE - Offset Wellbore: No. 22 AWB Offset Wellpath: No. 22 AWP

MD Reference: Rig on No. 22 SHL (KB)	Offset TVD & local coordinates use Reference Wellpath settings (See WELLPATH DATUM on page 1 of this report)
Ellipse Start MD	25.00ft



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**BAKER
HUGHES**

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Facility: James 29 Federal No. 20H Slot: No. 20H SHL Well: No. 20H Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
25.00	25.00	0.00	0.00	-4.00	25.00	-12.90	-1411.47	269.48	1411.53	24.60	57.37	PASS
125.00†	125.00	0.00	0.00	98.50	127.50	-12.61	-1411.40	269.49	1411.46	49.21	28.68	PASS
225.00†	225.00	0.00	0.00	204.51	233.51	-12.35	-1410.99	269.50	1411.07	49.22	28.67	PASS
325.00†	325.00	0.00	0.00	302.17	331.16	-12.44	-1410.42	269.50	1410.48	49.25	28.64	PASS
425.00†	425.00	0.00	0.00	398.70	427.69	-12.50	-1410.12	269.49	1410.18	49.28	28.62	PASS
525.00†	525.00	0.00	0.00	495.94	524.94	-12.44	-1410.04	269.49	1410.09	49.32	28.59	PASS
625.00†	625.00	0.00	0.00	591.67	620.66	-12.51	-1410.15	269.49	1410.21	49.37	28.56	PASS
725.00†	725.00	0.00	0.00	685.24	714.23	-12.39	-1410.65	269.50	1410.74	49.43	28.54	PASS
825.00†	825.00	0.00	0.00	779.68	808.67	-12.15	-1411.61	269.51	1411.76	49.49	28.52	PASS
925.00†	925.00	0.00	0.00	878.59	907.58	-11.88	-1412.71	269.52	1412.87	49.57	28.50	PASS
1025.00†	1025.00	0.00	0.00	970.94	999.91	-11.44	-1414.13	269.54	1414.40	49.65	28.49	PASS
1125.00†	1125.00	0.00	0.00	1066.15	1095.10	-11.09	-1416.00	269.55	1416.35	49.74	28.47	PASS
1225.00†	1225.00	0.00	0.00	1168.55	1197.48	-10.73	-1418.21	269.57	1418.52	49.85	28.46	PASS
1325.00†	1325.00	0.00	0.00	1275.76	1304.68	-10.56	-1419.86	269.57	1420.05	49.97	28.42	PASS
1425.00†	1425.00	0.00	0.00	1375.21	1404.11	-10.34	-1421.34	269.58	1421.53	50.09	28.38	PASS
1525.00†	1525.00	0.00	0.00	1475.94	1504.83	-9.72	-1422.75	269.61	1422.93	50.22	28.33	PASS
1625.00†	1625.00	0.00	0.00	1572.36	1601.24	-8.98	-1424.24	269.64	1424.46	50.36	28.28	PASS
1725.00†	1725.00	0.00	0.00	1671.38	1700.24	-8.38	-1425.99	269.66	1426.23	50.51	28.24	PASS
1825.00†	1825.00	0.00	0.00	1773.95	1802.79	-7.71	-1427.66	269.69	1427.85	50.67	28.18	PASS
1925.00†	1925.00	0.00	0.00	1874.65	1903.48	-7.41	-1429.19	269.70	1429.38	50.83	28.12	PASS
2025.00†	2025.00	0.00	0.00	1971.20	2000.02	-7.11	-1430.71	269.72	1430.95	51.00	28.06	PASS
2125.00†	2125.00	0.00	0.00	2070.52	2099.32	-6.88	-1432.54	269.73	1432.79	51.18	27.99	PASS
2225.00†	2225.00	0.00	0.00	2171.24	2200.03	-6.59	-1434.30	269.74	1434.53	51.38	27.92	PASS
2325.00†	2325.00	0.00	0.00	2271.07	2299.84	-6.37	-1436.05	269.75	1436.28	51.57	27.85	PASS
2425.00†	2425.00	0.00	0.00	2368.89	2397.64	-6.03	-1437.82	269.76	1438.09	51.77	27.78	PASS
2525.00†	2525.00	0.00	0.00	2465.51	2494.25	-5.33	-1439.77	269.79	1440.11	51.98	27.70	PASS
2625.00†	2625.00	0.00	0.00	2568.55	2597.26	-4.77	-1441.90	269.81	1442.17	52.21	27.62	PASS
2725.00†	2725.00	0.00	0.00	2662.88	2691.57	-4.37	-1443.88	269.83	1444.27	52.43	27.55	PASS
2825.00†	2825.00	0.00	0.00	2767.70	2796.35	-3.69	-1446.15	269.85	1446.44	52.68	27.46	PASS
2925.00†	2925.00	0.00	0.00	2865.89	2894.53	-2.90	-1448.16	269.89	1448.48	52.92	27.37	PASS
3025.00†	3025.00	0.00	0.00	2964.08	2992.68	-1.84	-1450.29	269.93	1450.65	53.17	27.28	PASS
3125.00†	3125.00	0.00	0.00	3062.50	3091.07	-0.49	-1452.54	269.98	1452.94	53.43	27.20	PASS
3225.00†	3225.00	0.00	0.00	3163.57	3192.10	0.75	-1454.90	270.03	1455.27	53.69	27.10	PASS
3325.00†	3325.00	0.00	0.00	3266.74	3295.24	2.16	-1457.05	270.09	1457.36	53.97	27.00	PASS
3425.00†	3425.00	0.00	0.00	3365.54	3394.01	3.58	-1459.15	270.14	1459.48	54.25	26.90	PASS
3525.00†	3525.00	0.00	0.00	3466.61	3495.05	5.00	-1461.23	270.20	1461.55	54.54	26.80	PASS
3625.00†	3625.00	0.00	0.00	3565.87	3594.28	6.47	-1463.28	270.25	1463.61	54.84	26.69	PASS
3725.00†	3725.00	0.00	0.00	3663.72	3692.10	7.45	-1465.38	270.29	1465.77	55.13	26.59	PASS
3825.00†	3825.00	0.00	0.00	3760.00	3788.35	8.49	-1467.65	270.33	1468.13	55.44	26.48	PASS
3925.00†	3925.00	0.00	0.00	3857.88	3886.19	9.40	-1470.19	270.37	1470.73	55.75	26.38	PASS
4025.00†	4025.00	0.00	0.00	3957.41	3985.68	10.52	-1472.82	270.41	1473.38	56.07	26.28	PASS
4125.00†	4125.00	0.00	0.00	4060.15	4088.38	11.80	-1475.49	270.46	1476.00	56.40	26.17	PASS
4225.00†	4225.00	0.00	0.00	4158.05	4186.24	12.69	-1477.93	270.49	1478.49	56.73	26.06	PASS
4325.00†	4325.00	0.00	0.00	4256.74	4284.90	13.29	-1480.58	270.51	1481.18	57.06	25.96	PASS
4425.00†	4425.00	0.00	0.00	4368.43	4396.55	13.70	-1483.23	270.53	1483.57	57.43	25.83	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Facility: James 29 Federal No. 20H Slot: No. 20H SHL Well: No. 20H Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
4525.00†	4525.00	0.00	0.00	4462.71	4490.81	13.77	-1485.22	270.53	1485.68	57.77	25.72	PASS
4625.00†	4625.00	0.00	0.00	4571.62	4599.70	12.80	-1487.33	270.49	1487.60	58.15	25.58	PASS
4725.00†	4725.00	0.00	0.00	4665.71	4693.76	12.13	-1489.14	270.47	1489.52	58.50	25.46	PASS
4825.00†	4825.00	0.00	0.00	4761.22	4789.25	11.64	-1491.26	270.45	1491.74	58.85	25.35	PASS
4925.00†	4925.00	0.00	0.00	4864.32	4892.32	11.16	-1493.74	270.43	1494.14	59.24	25.22	PASS
5025.00†	5025.00	0.00	0.00	4961.95	4989.92	10.84	-1495.87	270.42	1496.32	59.61	25.10	PASS
5125.00†	5125.00	0.00	0.00	5060.87	5088.81	10.47	-1498.26	270.40	1498.74	59.99	24.98	PASS
5225.00†	5225.00	0.00	0.00	5155.88	5183.79	9.87	-1500.69	270.38	1501.29	60.37	24.87	PASS
5325.00†	5325.00	0.00	0.00	5266.96	5294.83	9.01	-1503.43	270.34	1503.76	60.79	24.74	PASS
5425.00†	5425.00	0.00	0.00	5355.09	5382.93	8.07	-1505.55	270.31	1506.16	61.15	24.63	PASS
5525.00†	5525.00	0.00	0.00	5467.71	5495.51	6.49	-1508.24	270.25	1508.55	61.59	24.49	PASS
5625.00†	5625.00	0.00	0.00	5568.38	5596.15	5.45	-1510.16	270.21	1510.44	61.99	24.36	PASS
5725.00†	5725.00	0.00	0.00	5663.38	5691.13	4.84	-1512.16	270.18	1512.55	62.39	24.24	PASS
5825.00†	5825.00	0.00	0.00	5762.88	5790.60	3.72	-1514.35	270.14	1514.75	62.81	24.12	PASS
5925.00†	5925.00	0.00	0.00	5859.21	5886.89	2.42	-1516.77	270.09	1517.25	63.22	24.00	PASS
6025.00†	6025.00	0.00	0.00	5974.95	6002.59	0.70	-1519.15	270.03	1519.32	63.69	23.86	PASS
6125.00†	6125.00	0.00	0.00	6098.38	6126.00	-0.43	-1520.04	269.98	1520.04	64.16	23.69	PASS
6225.00†	6225.00	0.00	0.00	6177.98	6205.58	1.23	-1520.28	270.05	1520.41	64.55	23.55	PASS
6325.00†	6325.00	0.00	0.00	6256.75	6284.34	0.94	-1521.96	270.04	1522.51	64.94	23.45	PASS
6425.00†	6425.00	0.00	0.00	6351.56	6379.09	0.03	-1524.82	270.00	1525.51	65.37	23.34	PASS
6525.00†	6525.00	0.00	0.00	6450.05	6477.52	-1.76	-1527.71	269.93	1528.44	65.81	23.23	PASS
6625.00†	6625.00	0.00	0.00	6551.75	6579.17	-2.79	-1530.97	269.90	1531.66	66.26	23.11	PASS
6725.00†	6725.00	0.00	0.00	6655.75	6683.12	-3.25	-1533.86	269.88	1534.43	66.73	22.99	PASS
6825.00†	6825.00	0.00	0.00	6761.42	6788.76	-4.18	-1536.59	269.84	1537.03	67.20	22.87	PASS
6925.00†	6925.00	0.00	0.00	6859.65	6886.94	-6.04	-1538.92	269.78	1539.40	67.66	22.75	PASS
7025.00†	7025.00	0.00	0.00	6972.87	7000.13	-7.78	-1541.27	269.71	1541.49	68.16	22.62	PASS
7125.00†	7125.00	0.00	0.00	7059.74	7086.97	-9.05	-1543.03	269.66	1543.53	68.59	22.50	PASS
7225.00†	7225.00	0.00	0.00	7136.43	7163.60	-10.38	-1545.47	269.62	1546.72	69.00	22.42	PASS
7325.00†	7325.00	0.00	0.00	7257.42	7284.50	-11.82	-1549.88	269.56	1550.45	69.54	22.30	PASS
7425.00†	7425.00	0.00	0.00	7366.56	7393.62	-12.72	-1552.19	269.53	1552.56	70.04	22.17	PASS
7525.00†	7525.00	0.00	0.00	7448.79	7475.81	-13.76	-1554.36	269.49	1555.20	70.47	22.07	PASS
7625.00†	7625.00	0.00	0.00	7556.16	7583.11	-15.84	-1557.48	269.42	1558.13	70.98	21.95	PASS
7725.00†	7725.00	0.00	0.00	7661.32	7688.22	-18.21	-1560.05	269.33	1560.59	71.48	21.83	PASS
7825.00†	7825.00	0.00	0.00	7762.97	7789.83	-19.61	-1562.43	269.28	1562.95	71.97	21.72	PASS
7925.00†	7925.00	0.00	0.00	7865.93	7892.74	-21.69	-1564.55	269.21	1565.04	72.47	21.60	PASS
8025.00†	8025.00	0.00	0.00	7964.87	7991.64	-23.64	-1566.61	269.14	1567.14	72.97	21.48	PASS
8125.00†	8125.00	0.00	0.00	8061.12	8087.86	-24.73	-1568.71	269.10	1569.34	73.46	21.36	PASS
8225.00†	8225.00	0.00	0.00	8172.19	8198.90	-26.39	-1571.16	269.04	1571.60	73.99	21.24	PASS
8325.00†	8325.00	0.00	0.00	8276.86	8303.54	-28.08	-1572.59	268.98	1572.99	74.51	21.11	PASS
8425.00†	8425.00	0.00	0.00	8379.15	8405.79	-30.55	-1573.88	268.89	1574.29	75.02	20.99	PASS
8525.00†	8525.00	0.00	0.00	8464.25	8490.84	-33.15	-1575.24	268.80	1575.95	75.49	20.88	PASS
8625.00†	8625.00	0.00	0.00	9638.99	9428.17	-374.15	-1245.85	253.28	1528.79	72.60	21.06	PASS
8723.00	8723.00	0.00	0.00	9654.04	9432.05	-387.22	-1239.48	252.65	1479.53	74.32	19.91	PASS
8725.00†	8725.00	0.00	0.00	9654.31	9432.11	-387.46	-1239.37	252.64	1478.57	74.36	19.88	PASS
8825.00†	8824.56	-6.84	4.43	9668.68	9435.39	-400.20	-1233.60	252.37	1435.46	76.11	18.86	PASS



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REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Facility: James 29 Federal No. 20H Slot: No. 20H SHL Well: No. 20H Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
8925.00†	8921.63	-26.67	17.29	9685.86	9438.67	-415.80	-1227.18	252.64	1402.65	77.89	18.01	PASS
9025.00†	9013.80	-58.99	38.24	9710.02	9442.34	-438.20	-1218.90	253.22	1381.25	79.62	17.35	PASS
9125.00†	9098.81	-103.01	66.77	9736.61	9445.44	-463.26	-1210.62	254.25	1371.73	81.25	16.88	PASS
9223.00	9173.16	-156.47	101.42	9764.96	9447.79	-490.40	-1202.75	255.64	1373.97	82.75	16.60	PASS
9225.00†	9174.57	-157.66	102.19	9765.58	9447.83	-490.99	-1202.59	255.67	1374.12	82.78	16.60	PASS
9325.00†	9240.70	-223.30	138.21	9809.22	9449.85	-533.29	-1192.06	256.88	1381.84	84.36	16.38	PASS
9425.00†	9296.95	-299.91	168.98	9888.78	9451.69	-610.71	-1173.84	256.97	1386.98	86.58	16.02	PASS
9525.00†	9341.92	-385.60	193.73	9970.73	9453.70	-690.51	-1155.29	257.26	1387.56	88.94	15.60	PASS
9625.00†	9374.53	-478.28	211.85	10037.84	9455.78	-756.05	-1141.01	258.40	1383.47	91.20	15.17	PASS
9725.00†	9393.95	-575.64	222.90	10111.00	9458.00	-827.79	-1126.86	259.42	1374.61	93.73	14.67	PASS
9816.80	9399.77	-667.10	226.58	10177.90	9459.26	-893.63	-1115.06	260.42	1361.93	96.14	14.17	PASS
9816.96	9399.77	-667.26	226.58	10178.01	9459.26	-893.74	-1115.04	260.42	1361.90	96.15	14.16	PASS
9825.00†	9399.77	-675.30	226.62	10183.65	9459.31	-899.30	-1114.11	260.52	1360.62	96.35	14.12	PASS
9925.00†	9399.78	-775.30	227.22	10251.71	9459.05	-966.54	-1103.60	261.82	1345.79	98.91	13.61	PASS
10025.00†	9399.78	-875.30	227.81	10308.06	9458.42	-1022.43	-1096.51	263.66	1333.76	101.34	13.16	PASS
10125.00†	9399.79	-975.30	228.41	10362.69	9457.93	-1076.82	-1091.38	265.60	1324.96	103.82	12.76	PASS
10225.00†	9399.79	-1075.30	229.00	10415.23	9457.70	-1129.27	-1088.30	267.65	1319.67	106.31	12.41	PASS
10325.00†	9399.80	-1175.29	229.59	10481.15	9457.70	-1195.16	-1086.61	269.14	1317.63	109.18	12.07	PASS
10369.38†	9399.80	-1219.67	229.86	10513.96	9457.78	-1227.97	-1086.27	269.64	1317.43	110.58	11.91	PASS
10425.00†	9399.80	-1275.29	230.19	10559.95	9457.90	-1273.97	-1086.20	270.06	1317.67	112.49	11.71	PASS
10525.00†	9399.81	-1375.29	230.78	10650.86	9457.70	-1364.87	-1086.65	270.45	1318.74	116.26	11.34	PASS
10625.00†	9399.82	-1475.29	231.37	10746.58	9457.33	-1460.58	-1087.65	270.64	1320.36	120.28	10.98	PASS
10725.00†	9399.82	-1575.29	231.97	10851.00	9457.14	-1565.00	-1088.69	270.45	1321.94	124.57	10.61	PASS
10825.00†	9399.83	-1675.28	232.56	10966.84	9456.32	-1680.83	-1089.09	269.76	1322.87	129.28	10.23	PASS
10925.00†	9399.83	-1775.28	233.16	11099.92	9455.03	-1813.89	-1086.88	268.33	1321.75	134.62	9.82	PASS
11025.00†	9399.84	-1875.28	233.75	11180.84	9454.18	-1894.78	-1085.14	269.15	1320.15	138.61	9.52	PASS
11125.00†	9399.84	-1975.28	234.34	11282.09	9452.98	-1996.01	-1083.70	269.10	1319.27	143.31	9.21	PASS
11225.00†	9399.85	-2075.28	234.94	11368.94	9451.93	-2082.85	-1082.81	269.67	1318.79	147.63	8.93	PASS
11325.00†	9399.85	-2175.28	235.53	11456.28	9451.05	-2170.18	-1082.76	270.22	1319.29	152.01	8.68	PASS
11425.00†	9399.86	-2275.27	236.12	11541.06	9450.28	-2254.96	-1083.59	270.88	1320.83	156.36	8.45	PASS
11525.00†	9399.87	-2375.27	236.72	11629.68	9449.68	-2343.56	-1085.41	271.37	1323.44	160.88	8.23	PASS
11625.00†	9399.87	-2475.27	237.31	11731.07	9448.91	-2444.91	-1087.93	271.31	1326.50	165.86	8.00	PASS
11725.00†	9399.88	-2575.27	237.91	11832.51	9447.85	-2546.32	-1090.20	271.25	1329.29	170.87	7.78	PASS
11825.00†	9399.88	-2675.27	238.50	11916.76	9446.78	-2630.54	-1092.47	271.93	1332.55	175.33	7.60	PASS
11925.00†	9399.89	-2775.27	239.09	12008.38	9445.42	-2722.08	-1096.02	272.28	1336.95	180.08	7.42	PASS
12025.00†	9399.89	-2875.26	239.69	12125.55	9444.44	-2839.17	-1100.21	271.54	1341.12	185.75	7.22	PASS
12125.00†	9399.90	-2975.26	240.28	12222.67	9444.29	-2936.25	-1102.85	271.66	1344.43	190.73	7.05	PASS
12225.00†	9399.91	-3075.26	240.87	12335.61	9444.25	-3049.15	-1105.52	271.11	1347.37	196.34	6.86	PASS
12325.00†	9399.91	-3175.26	241.47	12427.13	9444.48	-3140.65	-1107.62	271.47	1350.27	201.18	6.71	PASS
12425.00†	9399.92	-3275.26	242.06	12530.52	9444.98	-3244.01	-1110.03	271.32	1353.20	206.49	6.55	PASS
12525.00†	9399.92	-3375.25	242.66	12627.32	9445.67	-3340.77	-1112.55	271.46	1356.42	211.58	6.41	PASS
12625.00†	9399.93	-3475.25	243.25	12768.74	9447.10	-3482.17	-1114.18	269.71	1358.27	218.31	6.22	PASS
12725.00†	9399.93	-3575.25	243.84	12897.83	9448.71	-3611.23	-1111.94	268.48	1357.14	224.52	6.04	PASS
12825.00†	9399.94	-3675.25	244.44	13019.38	9450.21	-3732.68	-1107.40	267.57	1353.99	230.49	5.87	PASS
12925.00†	9399.94	-3775.25	245.03	13121.79	9451.15	-3834.99	-1102.98	267.46	1350.30	235.93	5.72	PASS



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REFERENCE WELLPATH IDENTIFICATION			
Operator	Cimarex Energy Co.	Slot	No. 21 SHL
Area	Lea County, NM	Well	No. 21
Field	(James Federal) Sec 29, TS 23 S, R 32 E	Wellbore	No. 21 PWB
Facility	Federal 29 James 21		

CLEARANCE DATA - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Facility: James 29 Federal No. 20H Slot: No. 20H SHL Well: No. 20H Threshold Value=1.00 † = interpolated/extrapolated station

Ref MD [ft]	Ref TVD [ft]	Ref North [ft]	Ref East [ft]	Offset MD [ft]	Offset TVD [ft]	Offset North [ft]	Offset East [ft]	Horiz Bearing [°]	C-C Clear Dist [ft]	ACR MASD [ft]	Sep Ratio	ACR Status
13025.00†	9399.95	-3875.25	245.62	13232.38	9452.41	-3945.45	-1097.68	267.01	1346.16	241.61	5.57	PASS
13125.00†	9399.96	-3975.24	246.22	13331.90	9453.87	-4044.82	-1092.28	267.03	1341.39	247.00	5.43	PASS
13225.00†	9399.96	-4075.24	246.81	13414.60	9453.94	-4127.42	-1088.40	267.76	1337.32	251.93	5.31	PASS
13325.00†	9399.97	-4175.24	247.41	13503.27	9453.67	-4216.04	-1085.52	268.25	1334.63	257.03	5.19	PASS
13425.00†	9399.97	-4275.24	248.00	13593.15	9454.03	-4305.88	-1082.93	268.68	1332.38	262.15	5.08	PASS
13525.00†	9399.98	-4375.24	248.59	13673.99	9453.88	-4386.71	-1081.64	269.51	1331.37	266.95	4.99	PASS
13625.00†	9399.98	-4475.24	249.19	13754.16	9453.70	-4466.88	-1081.57	270.36	1331.87	271.69	4.90	PASS
13725.00†	9399.99	-4575.23	249.78	13837.04	9453.58	-4549.75	-1082.63	271.10	1333.73	276.48	4.82	PASS
13825.00†	9399.99	-4675.23	250.37	13921.24	9453.35	-4633.92	-1084.75	271.77	1336.83	281.31	4.75	PASS
13915.60	9400.00	-4765.83	250.91	14027.36	9453.69	-4740.01	-1087.20	271.11	1339.44	286.91	4.67	PASS

POSITIONAL UNCERTAINTY - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Slot Surface Uncertainty @1SD	Horizontal	0.100ft	Vertical	0.100ft
Facility Surface Uncertainty @1SD	Horizontal	8.200ft	Vertical	1.000ft

WELLPATH COMPOSITION - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
0.00	13985.00	ISCWSA MWD, Rev. 2 (Standard)	Pathfinder MWD <85.08-13985>	No. 20H SHL
13985.00	14067.00	Blind Drilling (std)	Projection to bit	No. 20H SHL

OFFSET WELLPATH MD REFERENCE - Offset Wellbore: No. 20H SHL Offset Wellpath: No. 20H SHL

MD Reference: Rig on No. 20H SHL (RT)	Offset TVD & local coordinates use Reference Wellpath settings (See WELLPATH DATUM on page 1 of this report)
Ellipse Start MD	0.00ft

PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Cimarex Energy Co
LEASE NO.:	NM0559539
WELL NAME & NO.:	21H James Federal
SURFACE HOLE FOOTAGE:	185' FNL & 1980' FEL
BOTTOM HOLE FOOTAGE	330' FSL & 1760' FEL
LOCATION:	Section 29, T.23 S., R.32 E., NMPM
COUNTY:	Lea County, New Mexico
API:	30-025-41362

I. DRILLING

A. DRILLING OPERATIONS 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)

☒ **Lea County**

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 393-3612

1. **Although Hydrogen Sulfide has not been reported in the area, it is always a potential hazard. If Hydrogen Sulfide is encountered, report measured amounts and formations to the BLM.**
2. 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. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. 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 is located, this does not include the dog house or stairway area.

4. 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.

B. CASING

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.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time prior to drilling out for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. IF OPERATOR DOES NOT HAVE THE WELL SPECIFIC CEMENT DETAILS ONSITE PRIOR TO PUMPING THE CEMENT FOR EACH CASING STRING, THE WOC WILL BE 30 HOURS. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possible water and brine flows in the Salado and Castile Groups.
Possible lost circulation in the Delaware and Bone Spring.

1. The **13-3/8** inch surface casing shall be set at approximately **1300** feet (in a **competent bed below the Magenta Dolomite, which is a member of the Rustler**) 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 is to include the lead cement slurry.**
 - 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 minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Centralizers approved as written.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

☒ Cement should tie-back at least 500 feet into previous casing string. Operator shall provide method of verification.

4. 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.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. Variance approved to use flex line from BOP to choke manifold. 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.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.
 - a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **3000 (3M)** psi.
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 when specified); 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. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 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 (18 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).

- c. 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.
- d. The results of the test shall be reported to the appropriate BLM office.
- e. 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.**
- f. 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.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. 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.

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