

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0137  
Expires: January 31, 2018

**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.  
NMNM132062

6. If Indian, Allottee or Tribe Name

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

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

1. Type of Well <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		8. Well Name and No. BLACK RIVER 25 FED COM 2H	
2. Name of Operator CIMAREX ENERGY COMPANY		9. API Well No. 30-015-43377-00-X1	
3a. Address 600 N MARIENFELD STE 600 MIDLAND, TX 79701		10. Field and Pool or Exploratory Area WILDCAT	
3b. Phone No. (include area code) Ph: 432-620-1936		11. County or Parish, State EDDY COUNTY, NM	
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 25 T24S R26E SESW 192FSL 2167FWL			

**Carlsbad Field Office**  
**Artesia**

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

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other Change to Original APD
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

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

Cimarex Energy respectfully requests approval to change the BHL for the Black River 25 Federal Com #2H well as follows:

BHL: 330' FNL & 2090' FEL, Sec. 24, 24S, 26E  
TD: 18725' MD; 8713' TVD.

Casing & Cmt Program Change:  
Casing:  
Tapered string: 7", 29#, L80, LTC csg set @ 0 - 8386'  
5-1/2", 17#, L80, BTC set @ 8386-18725'

Cement: Lead: 340 sx Class H, 10.30 ppg, 3.64 yld; tail w/ 1495 sx Class H, 14.2 ppg, 1.30 yld.

**RECEIVED**

**JUL 23 2019**

**DISTRICT//ARTESIA/O.C.D.**

*All previous COAs still apply.*

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

Electronic Submission #470019 verified by the BLM Well Information System  
For CIMAREX ENERGY COMPANY, sent to the Carlsbad  
Committed to AFMSS for processing by PRISCILLA PEREZ on 06/24/2019 (19PP2546SE)

Name (Printed/Typed) TERRI STATHEM	Title MANAGER REGULATORY COMPLIANCE
Signature (Electronic Submission)	Date 06/20/2019

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By <u>ZOTA STEVENS</u>	Title <u>PETROLEUM ENGINEER</u>	Date <u>06/25/2019</u>
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Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Carlsbad

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

*Ref 10-29-19*

**Additional data for EC transaction #470019 that would not fit on the form**

**32. Additional remarks, continued**

TOC @ 1800'.

Please see attached C102, Directional Plan, & Drilling Plan.

**1. Geological Formations**

TVD of target 8,713  
MD at TD 18,725

Pilot Hole TD N/A  
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Salado (top Salt)	1225	N/A	
Castille (Base Salt)	1822	N/A	
Bell Canyon (Top Delaware)	2020	Hydrocarbons	
Cherry Canyon	2983	Hydrocarbons	
Brushy Canyon	3989	Hydrocarbons	
Bone Spring	5528	Hydrocarbons	
1st Bone Spring Sand	6474	Hydrocarbons	
2nd Bone Spring Sand	6889	Hydrocarbons	
3rd Bone Spring Carb	7286	Hydrocarbons	
Harkey Sandstone	7673	Hydrocarbons	
Base Harkey Sandstone	7866	Hydrocarbons	
3rd Bone Spring Sand	8286	Hydrocarbons	
top Wolfcamp	8614	Hydrocarbons	
Wolfcamp target	8713	Hydrocarbons	
Top Wolfcamp A Shale	8837	Hydrocarbons	

**2. Casing Program**

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	400	400	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	4.04	9.45	16.77
12 1/4	0	2000	2000	9-5/8"	36.00	J-55	LT&C	1.90	3.32	6.29
8 3/4	0	8386	8386	7"	29.00	L-80	LT&C	1.61	1.87	3.96
8 3/4	8386	18725	8713	5-1/2"	17.00	L-80	BT&C	1.39	1.71	71.42
BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet

TVD was used on all calculations.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	N
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	N
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	N
Is 2nd string set 100' to 600' below the base of salt?	N
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	N
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	N
Is AC Report included?	N

**3. Cementing Program**

Casing	# Sks	Wt. lb/gal	Yld. ft <sup>3</sup> /sack	H <sub>2</sub> O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	78	14.80	1.34	6.32	9.5	Lead: Class C + LCM
	195	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	381	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	117	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	340	10.30	3.64	22.18		Lead: Tuned Light + LCM
	1495	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface		31
Intermediate		49
Production	1800	25

**4. Pressure Control Equipment**

A variance is requested for the use of a diverter on the surface casing. See attached for schematic.					
BOP installed and tested before drilling which hole?	Size	Min. Required WP	Type		Tested To
12 1/4	13 5/8	2M	Annular	X	50% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
X	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?

**5. Mud Program**

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 400'	FW Spud Mud	8.30 - 8.80	30-32	N/C
400' to 2000'	Brine Water	9.70 - 10.20	30-32	N/C
2000' to 18725'	Cut Brine or OBM	9.50 - 10.00	27-70	N/C

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

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
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**6. Logging and Testing Procedures**

Logging, Coring and Testing	
X	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No logs are planned based on well control or offset log information.
	Drill stem test?
	Coring?

Additional Logs Planned	Interval

**7. Drilling Conditions**

Condition	
BH Pressure at deepest TVD	4530 psi
Abnormal Temperature	No

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

X	H2S is present
X	H2S plan is attached

**8. Other Facets of Operation**

**9. Wellhead**

A multi-bowl wellhead system will be utilized.

After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 5000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 5000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office.

The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative.

All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

The casing string utilizing steel body pack-off will be tested to 70% of casing burst.

If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

District I  
1623 W. French Dr., Hobbs, NM 88240  
Phone: (505) 393-6164 Fax: (505) 393-0929  
District II  
511 S. First St., Artesia, NM 88210  
Phone: (505) 748-4383 Fax: (505) 748-9720  
District III  
1000 Rio Theater Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3160 Fax: (505) 476-3162

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

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

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

LAPI Number 30-015-43377	Pool Code 98220	Pool Name Purple Sage, Wolfcamp (Gas)
Property Code 315262	Property Name BLACK RIVER 25 FEDERAL.COM	Well Number 211
FIGUID No. 215099	Operator Name CIMAREX ENERGY CO.	Elevation 3312.8'

"Surface Location

BL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	25	24 S	26 E		192	SOUTH	2167	WEST	EDDY

"Bottom Hole Location If Different From Surface

BL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	24	24 S	26 E		330	NORTH	2090	EAST	EDDY
Dedicated Acres 640		Joint or Infill		Consolidation Code		Order No.			

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

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	S09°47'43"E	1042.45'

NOTE:  
• Distances referenced on plat to section lines are perpendicular.  
• Date of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°07'02.74"

- ⊙ = SURFACE HOLE LOCATION
- ◇ = LANDING POINT/FIRST TAKE POINT
- = BOTTOM HOLE LOCATION/LAST TAKE POINT

NAD 83 (SURFACE HOLE LOCATION)	
LATITUDE = 32°10'53.05" (32.181411)	LONGITUDE = 104°14'53.23" (104.248119)
NAD 27 (SURFACE HOLE LOCATION)	
LATITUDE = 32°10'52.65" (32.181292)	LONGITUDE = 104°14'51.43" (104.247619)
STATE PLANE NAD 83 (N.M. EAST)	
N: 429712.53 E: 567700.99	
STATE PLANE NAD 27 (N.M. EAST)	
N: 429684.19 E: 526518.33	

NAD 83 (BHL/FTP)	
LATITUDE = 32°12'32.63" (32.209064)	LONGITUDE = 104°14'41.12" (104.244266)
NAD 27 (BHL/FTP)	
LATITUDE = 32°12'32.20" (32.208944)	LONGITUDE = 104°14'39.33" (104.244258)
STATE PLANE NAD 83 (N.M. EAST)	
N: 439802.47 E: 568732.71	
STATE PLANE NAD 27 (N.M. EAST)	
N: 439774.63 E: 527530.18	

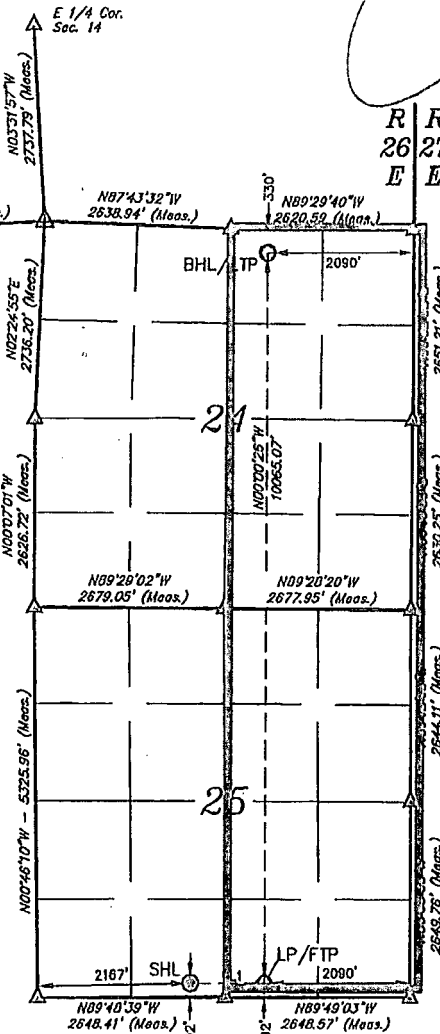


SCALE

REV: 2 06-18-19 D.J.S. (BHL CHANGE)

△ = SECTION CORNERS LOCATED.

△ = SECTION CORNERS RE-ESTABLISHED. (Not Set on Ground.)



"OPERATOR CERTIFICATION"  
I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest or to a voluntary pooling agreement or other arrangement in accordance with the provisions of the Oil and Gas Conservation Act.  
Signature: *Terri Stathem* Date: 6/20/19  
Printed Name: Terri Stathem  
E-mail Address: stathem@cimarex.com

"SURVEYOR CERTIFICATION"  
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.  
August 22, 2014  
Date of Survey  
Signature and Seal of Professional Surveyor:  
  
Certificate Number:

BHL 32.209064  
104.244266

Rev 10-29-19



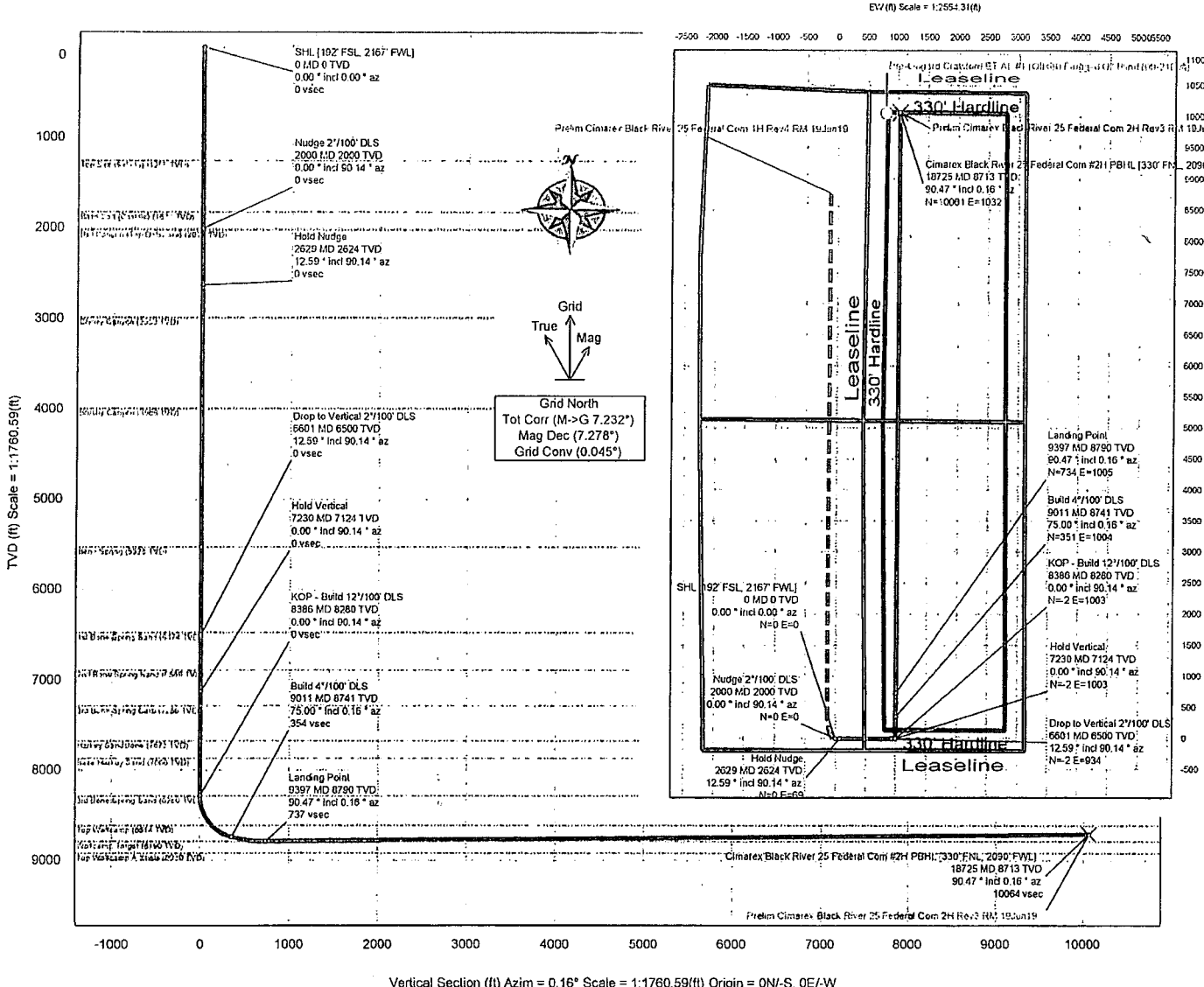


# Cimarex Rev 3



<b>Borehole:</b> Original Borehole	<b>Well:</b> Cimarex Black River 25 Federal Com 2H	<b>Field:</b> NM Eddy County (NAD 83)	<b>Structure:</b> Cimarex Black River 25 Federal Com 2H
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<b>Gravity &amp; Magnetic Parameters</b>		<b>Surface Location</b>		<b>Miscellaneous</b>	
Model: HOGM 2019	Dip: 55.833°	Date: 15-Jun-2019	Lat: N 32 10 63.00	Northing: 429742.5311US	Grid Conv: 0.0451°
MagDec: 7.278°	FS: 47E01.345mT	Gravity FS: 559.44mgals(19.68345 Daved)	Lon: W 104 14 63.33	Eastng: 657700.5311US	Scale Fact: 0.95959329



Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL (192' FSL, 2167' FWL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Top Salt (Salado)	1255.00	0.00	90.14	1255.00	0.00	0.00	0.00	0.00
Base Salt (Castile)	1822.00	0.00	90.14	1822.00	0.00	0.00	0.00	0.00
Nudge 2'/100' DLS	2000.00	0.00	90.14	2000.00	0.00	0.00	0.00	0.00
Bell Canyon (Top Delaware)	2020.00	0.40	90.14	2020.00	0.00	0.00	0.07	2.00
Hold Nudge	2629.41	12.59	90.14	2624.36	0.03	-0.16	68.86	2.00
Cherry Canyon	2998.88	12.59	90.14	2993.00	0.07	-0.36	148.95	0.00
Brushy Canyon	4027.66	12.59	90.14	3989.00	0.17	-0.89	373.60	0.00
Bone Spring	5604.57	12.59	90.14	5528.00	0.33	-1.72	717.28	0.00
1st Bone Spring Sand	6573.87	12.59	90.14	6474.00	0.42	-2.22	928.53	0.00
Drop to Vertical 2'/100' DLS	6600.51	12.59	90.14	6500.00	0.42	-2.23	934.33	0.00
2nd Bone Spring Sand	6994.30	4.71	90.14	6889.00	0.45	-2.38	993.51	2.00
Hold Vertical	7229.92	0.00	90.14	7124.36	0.46	-2.40	1003.20	2.00
3rd Bone Spring Carb	7391.56	0.00	90.14	7286.00	0.46	-2.40	1003.20	0.00
Hairkey Sandstone	7778.56	0.00	90.14	7673.00	0.46	-2.40	1003.20	0.00
Base Hairkey Sand	7971.56	0.00	90.14	7866.00	0.46	-2.40	1003.20	0.00
KOP - Build 12'/100' DLS	8385.61	0.00	90.14	8280.05	0.46	-2.40	1003.20	0.00
3rd Bone Spring Sand	8391.56	0.71	0.16	8386.00	0.49	-2.36	1003.20	12.00
Top Wolfcamp	8755.45	44.38	0.16	8614.00	136.68	133.62	1003.58	12.00
Build 4'/100' DLS	9010.61	75.00	0.16	8741.24	354.34	351.49	1004.20	12.00
Wolfcamp Target	9373.79	89.53	0.16	8790.00	713.25	710.40	1005.22	4.00
Wolfcamp Target	9397.43	90.47	0.16	8790.00	736.89	734.04	1005.29	4.00
Landing Point	9397.43	90.47	0.16	8790.00	736.90	734.04	1005.29	4.00
Cimarex Black River 25 Federal Com #2H PBHL (330' FNL, 2090' FWL)	18724.61	90.47	0.16	8713.00	10063.76	10060.87	1031.82	0.00
Top Wolfcamp A Shale	NaN			8920.00				



**Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19 Proposal  
Geodetic Report  
(Def Plan)**



Report Date: June 19, 2019 - 10:46 AM  
 Client: Cimarex  
 Field: NM Eddy County (NAD 83)  
 Structure / Slot: Cimarex Black River 25 Federal Com 2H / Cimarex Black River 25 Federal Com 2H  
 Well: Cimarex Black River 25 Federal Com 2H  
 Borehole: Original Borehole  
 UWI / API#: Unknown / Unknown  
 Survey Name: Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19  
 Survey Date: June 19, 2019  
 Tort / AHD / DDI / ERD Ratio: 115.649 ° / 11066.506 ft / 6.436 / 1.259  
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet  
 Location Lat / Long: N 32° 10' 53.08041", W 104° 14' 53.22605"  
 Location Grid N/E Y/X: N 429742.530 ftUS, E 567700.990 ftUS  
 CRS Grid Convergence Angle: 0.0454 °  
 Grid Scale Factor: 0.99990989  
 Version / Patch: 2.10.760.0

Survey / DLS Computation: Minimum Curvature / Lubinski  
 Vertical Section Azimuth: 0.163 ° (Grid North)  
 Vertical Section Origin: 0.000 ft, 0.000 ft  
 TVD Reference Datum: RKB  
 TVD Reference Elevation: 3338.800 ft above MSL  
 Seabed / Ground Elevation: 3312.800 ft above MSL  
 Magnetic Declination: 7.278 °  
 Total Gravity Field Strength: 998.4396mgn (9.80665 Based)  
 Gravity Model: GARM  
 Total Magnetic Field Strength: 47809.345 nT  
 Magnetic Dip Angle: 59.829 °  
 Declination Date: June 19, 2019  
 Magnetic Declination Model: HDGM 2019  
 North Reference: Grid North  
 Grid Convergence Used: 0.0454 °  
 Total Corr Mag North->Grid North: 7.2324 °  
 Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [192' FSL, 2167' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
Nudge 2"/100' DLS	2000.00	0.00	90.14	2000.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
Hold Nudge	2629.41	12.59	90.14	2624.36	0.03	-0.16	68.86	2.00	429742.37	567769.85	N 32 10 53.08	W 104 14 52.42
Drop to Vertical 2"/100' DLS	6600.51	12.59	90.14	6500.00	0.42	-2.23	934.33	0.00	429740.30	568635.24	N 32 10 53.05	W 104 14 42.35
Hold Vertical	7229.92	0.00	90.14	7124.36	0.46	-2.40	1003.20	2.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
KOP - Build 12"/100' DLS	8385.61	0.00	90.14	8280.05	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Build 4"/100' DLS	9010.61	75.00	0.16	8741.24	354.34	351.49	1004.20	12.00	430093.99	568705.10	N 32 10 56.55	W 104 14 41.54
Landing Point	9397.43	90.47	0.16	8790.00	736.90	734.04	1005.29	4.00	430476.50	568706.19	N 32 11 0.34	W 104 14 41.52
Cimarex Black River 25 Federal Com #2H PBHL [330' FNL, 2090' FWL]	18724.61	90.47	0.16	8713.00	10063.76	10060.87	1031.82	0.00	439802.47	568732.71	N 32 12 32.63	W 104 14 41.12

Survey Type: Def Plan

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Survey Error Model: Survey Program:	ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma											

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	26.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19
	1	26.000	18724.612	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Prelim Cimarex Black River 25 Federal



# Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19 Proposal Geodetic Report (Def Plan)



Report Date:	June 19, 2019 - 10:45 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	0.163 ° (Grid North)
Field:	NM Eddy County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Black River 25 Federal Com 2H / Cimarex Black River 25 Federal Com 2H	TVD Reference Datum:	RKB
Well:	Cimarex Black River 25 Federal Com 2H	TVD Reference Elevation:	3338.800 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	3312.800 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	7.278 °
Survey Name:	Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19	Total Gravity Field Strength:	998.4396mgn (9.80665 Based)
Survey Date:	June 19, 2019	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	115.649 ° / 11066.506 ft / 6.436 / 1.259	Total Magnetic Field Strength:	47809.345 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	59.829 °
Location Lat / Long:	N 32° 10' 53.08041", W 104° 14' 53.22605"	Declination Date:	June 19, 2019
Location Grid N/E Y/X:	N 429742.530 ftUS, E 567700.990 ftUS	Magnetic Declination Model:	HDGM 2019
CRS Grid Convergence Angle:	0.0454 °	North Reference:	Grid North
Grid Scale Factor:	0.99990989	Grid Convergence Used:	0.0454 °
Version / Patch:	2.10.760.0	Total Corr Mag North->Grid North:	7.2324 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [192' FSL, 2167' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	100.00	0.00	90.14	100.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	200.00	0.00	90.14	200.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	300.00	0.00	90.14	300.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	400.00	0.00	90.14	400.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	500.00	0.00	90.14	500.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	600.00	0.00	90.14	600.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	700.00	0.00	90.14	700.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	800.00	0.00	90.14	800.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	900.00	0.00	90.14	900.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1000.00	0.00	90.14	1000.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1100.00	0.00	90.14	1100.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1200.00	0.00	90.14	1200.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
Top Salt (Salado)	1255.00	0.00	90.14	1255.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1300.00	0.00	90.14	1300.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1400.00	0.00	90.14	1400.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1500.00	0.00	90.14	1500.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1600.00	0.00	90.14	1600.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1700.00	0.00	90.14	1700.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1800.00	0.00	90.14	1800.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
Base Salt (Castille)	1822.00	0.00	90.14	1822.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
	1900.00	0.00	90.14	1900.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Nudge 2°/100' DLS	2000.00	0.00	90.14	2000.00	0.00	0.00	0.00	0.00	429742.53	567700.99	N 32 10 53.08	W 104 14 53.23
Bell Canyon (Top Delaware)	2020.00	0.40	90.14	2020.00	0.00	0.00	0.07	2.00	429742.53	567701.06	N 32 10 53.08	W 104 14 53.23
	2100.00	2.00	90.14	2099.98	0.00	0.00	1.75	2.00	429742.53	567702.73	N 32 10 53.08	W 104 14 53.21
	2200.00	4.00	90.14	2199.84	0.00	-0.02	6.98	2.00	429742.51	567707.97	N 32 10 53.08	W 104 14 53.14
	2300.00	6.00	90.14	2299.45	0.01	-0.04	15.69	2.00	429742.49	567716.68	N 32 10 53.08	W 104 14 53.04
	2400.00	8.00	90.14	2398.70	0.01	-0.07	27.88	2.00	429742.46	567728.87	N 32 10 53.08	W 104 14 52.90
	2500.00	10.00	90.14	2497.47	0.02	-0.10	43.52	2.00	429742.43	567744.51	N 32 10 53.08	W 104 14 52.72
	2600.00	12.00	90.14	2595.62	0.03	-0.15	62.60	2.00	429742.38	567763.59	N 32 10 53.08	W 104 14 52.50
Hold Nudge	2629.41	12.59	90.14	2624.36	0.03	-0.16	68.86	2.00	429742.37	567769.85	N 32 10 53.08	W 104 14 52.42
	2700.00	12.59	90.14	2693.25	0.04	-0.20	84.25	0.00	429742.33	567785.23	N 32 10 53.08	W 104 14 52.25
	2800.00	12.59	90.14	2790.85	0.05	-0.25	106.04	0.00	429742.28	567807.02	N 32 10 53.08	W 104 14 51.98
	2900.00	12.59	90.14	2888.44	0.06	-0.31	127.84	0.00	429742.22	567828.82	N 32 10 53.08	W 104 14 51.74
Cherry Canyon	2996.88	12.59	90.14	2983.00	0.07	-0.36	148.95	0.00	429742.17	567849.93	N 32 10 53.08	W 104 14 51.49
	3000.00	12.59	90.14	2986.04	0.07	-0.36	149.63	0.00	429742.17	567850.61	N 32 10 53.08	W 104 14 51.49
	3100.00	12.59	90.14	3083.64	0.08	-0.41	171.43	0.00	429742.12	567872.40	N 32 10 53.08	W 104 14 51.23
	3200.00	12.59	90.14	3181.23	0.09	-0.46	193.22	0.00	429742.07	567894.19	N 32 10 53.07	W 104 14 50.98
	3300.00	12.59	90.14	3278.83	0.10	-0.51	215.01	0.00	429742.02	567915.98	N 32 10 53.07	W 104 14 50.72
	3400.00	12.59	90.14	3376.42	0.11	-0.57	236.81	0.00	429741.96	567937.78	N 32 10 53.07	W 104 14 50.47
	3500.00	12.59	90.14	3474.02	0.12	-0.62	258.60	0.00	429741.91	567959.57	N 32 10 53.07	W 104 14 50.22
	3600.00	12.59	90.14	3571.62	0.13	-0.67	280.40	0.00	429741.86	567981.36	N 32 10 53.07	W 104 14 49.96
	3700.00	12.59	90.14	3669.21	0.14	-0.72	302.19	0.00	429741.81	568003.15	N 32 10 53.07	W 104 14 49.71
	3800.00	12.59	90.14	3766.81	0.15	-0.77	323.98	0.00	429741.76	568024.94	N 32 10 53.07	W 104 14 49.46
	3900.00	12.59	90.14	3864.41	0.16	-0.83	345.78	0.00	429741.70	568046.74	N 32 10 53.07	W 104 14 49.20
	4000.00	12.59	90.14	3962.00	0.17	-0.88	367.57	0.00	429741.65	568068.53	N 32 10 53.07	W 104 14 48.95
Brushy Canyon	4027.66	12.59	90.14	3989.00	0.17	-0.89	373.60	0.00	429741.64	568074.56	N 32 10 53.07	W 104 14 48.88
	4100.00	12.59	90.14	4059.60	0.18	-0.93	389.37	0.00	429741.60	568090.32	N 32 10 53.07	W 104 14 48.70
	4200.00	12.59	90.14	4157.19	0.19	-0.98	411.16	0.00	429741.55	568112.11	N 32 10 53.07	W 104 14 48.44
	4300.00	12.59	90.14	4254.79	0.20	-1.04	432.96	0.00	429741.49	568133.91	N 32 10 53.07	W 104 14 48.19
	4400.00	12.59	90.14	4352.39	0.21	-1.09	454.75	0.00	429741.44	568155.70	N 32 10 53.07	W 104 14 47.93
	4500.00	12.59	90.14	4449.98	0.22	-1.14	476.54	0.00	429741.39	568177.49	N 32 10 53.07	W 104 14 47.68
	4600.00	12.59	90.14	4547.58	0.23	-1.19	498.34	0.00	429741.34	568199.28	N 32 10 53.06	W 104 14 47.43
	4700.00	12.59	90.14	4645.18	0.24	-1.24	520.13	0.00	429741.29	568221.07	N 32 10 53.06	W 104 14 47.17
	4800.00	12.59	90.14	4742.77	0.25	-1.30	541.93	0.00	429741.23	568242.87	N 32 10 53.06	W 104 14 46.92
	4900.00	12.59	90.14	4840.37	0.26	-1.35	563.72	0.00	429741.18	568264.66	N 32 10 53.06	W 104 14 46.67
	5000.00	12.59	90.14	4937.96	0.27	-1.40	585.51	0.00	429741.13	568286.45	N 32 10 53.06	W 104 14 46.41
	5100.00	12.59	90.14	5035.56	0.28	-1.45	607.31	0.00	429741.08	568308.24	N 32 10 53.06	W 104 14 46.16
	5200.00	12.59	90.14	5133.16	0.29	-1.50	629.10	0.00	429741.03	568330.04	N 32 10 53.06	W 104 14 45.91
	5300.00	12.59	90.14	5230.75	0.30	-1.56	650.90	0.00	429740.97	568351.83	N 32 10 53.06	W 104 14 45.65
	5400.00	12.59	90.14	5328.35	0.31	-1.61	672.69	0.00	429740.92	568373.62	N 32 10 53.06	W 104 14 45.40
	5500.00	12.59	90.14	5425.94	0.32	-1.66	694.49	0.00	429740.87	568395.41	N 32 10 53.06	W 104 14 45.15
	5600.00	12.59	90.14	5523.54	0.33	-1.71	716.28	0.00	429740.82	568417.20	N 32 10 53.06	W 104 14 44.89
Bone Spring	5604.57	12.59	90.14	5528.00	0.33	-1.72	717.28	0.00	429740.82	568418.20	N 32 10 53.06	W 104 14 44.88
	5700.00	12.59	90.14	5621.14	0.33	-1.76	738.07	0.00	429740.77	568439.00	N 32 10 53.06	W 104 14 44.64
	5800.00	12.59	90.14	5718.73	0.34	-1.82	759.87	0.00	429740.71	568460.79	N 32 10 53.06	W 104 14 44.38
	5900.00	12.59	90.14	5816.33	0.35	-1.87	781.66	0.00	429740.66	568482.58	N 32 10 53.06	W 104 14 44.13
	6000.00	12.59	90.14	5913.93	0.36	-1.92	803.46	0.00	429740.61	568504.37	N 32 10 53.06	W 104 14 43.88
	6100.00	12.59	90.14	6011.52	0.37	-1.97	825.25	0.00	429740.56	568526.16	N 32 10 53.05	W 104 14 43.62
	6200.00	12.59	90.14	6109.12	0.38	-2.03	847.04	0.00	429740.50	568547.96	N 32 10 53.05	W 104 14 43.37
	6300.00	12.59	90.14	6206.71	0.39	-2.08	868.84	0.00	429740.45	568569.75	N 32 10 53.05	W 104 14 43.12
	6400.00	12.59	90.14	6304.31	0.40	-2.13	890.63	0.00	429740.40	568591.54	N 32 10 53.05	W 104 14 42.86
	6500.00	12.59	90.14	6401.91	0.41	-2.18	912.43	0.00	429740.35	568613.33	N 32 10 53.05	W 104 14 42.61
1st Bone Spring Sand	6573.87	12.59	90.14	6474.00	0.42	-2.22	928.53	0.00	429740.31	568629.43	N 32 10 53.05	W 104 14 42.42
	6600.00	12.59	90.14	6499.50	0.42	-2.23	934.22	0.00	429740.30	568635.13	N 32 10 53.05	W 104 14 42.36
Drop to Vertical 2°/100' DLS	6600.51	12.59	90.14	6500.00	0.42	-2.23	934.33	0.00	429740.30	568635.24	N 32 10 53.05	W 104 14 42.35

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	6700.00	10.60	90.14	6597.46	0.43	-2.28	954.33	2.00	429740.25	568655.23	N 32 10 53.05	W 104 14 42.12
	6800.00	8.60	90.14	6696.05	0.44	-2.32	971.00	2.00	429740.21	568671.90	N 32 10 53.05	W 104 14 41.93
	6900.00	6.60	90.14	6795.17	0.45	-2.35	984.22	2.00	429740.18	568685.12	N 32 10 53.05	W 104 14 41.77
2nd Bone	6994.30	4.71	90.14	6889.00	0.45	-2.38	993.51	2.00	429740.15	568694.41	N 32 10 53.05	W 104 14 41.67
Spring Sand	7000.00	4.60	90.14	6894.69	0.45	-2.38	993.98	2.00	429740.15	568694.87	N 32 10 53.05	W 104 14 41.66
	7100.00	2.60	90.14	6994.48	0.45	-2.39	1000.25	2.00	429740.14	568701.15	N 32 10 53.05	W 104 14 41.59
	7200.00	0.60	90.14	7094.44	0.46	-2.40	1003.04	2.00	429740.13	568703.94	N 32 10 53.05	W 104 14 41.56
Hold Vertical	7229.92	0.00	90.14	7124.36	0.46	-2.40	1003.20	2.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	7300.00	0.00	90.14	7194.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
3rd Bone Spring	7391.56	0.00	90.14	7286.00	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Carb	7400.00	0.00	90.14	7294.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	7500.00	0.00	90.14	7394.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	7600.00	0.00	90.14	7494.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	7700.00	0.00	90.14	7594.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Harkey	7778.56	0.00	90.14	7673.00	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Sandstone	7800.00	0.00	90.14	7694.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	7900.00	0.00	90.14	7794.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Base Harkey	7971.56	0.00	90.14	7866.00	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
Sand	8000.00	0.00	90.14	7894.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	8100.00	0.00	90.14	7994.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	8200.00	0.00	90.14	8094.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
	8300.00	0.00	90.14	8194.44	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
KOP - Build	8385.61	0.00	90.14	8280.05	0.46	-2.40	1003.20	0.00	429740.13	568704.09	N 32 10 53.05	W 104 14 41.55
12°/100' DLS												
3rd Bone Spring	8391.56	0.71	0.16	8286.00	0.49	-2.36	1003.20	12.00	429740.17	568704.09	N 32 10 53.05	W 104 14 41.55
Sand	8400.00	1.73	0.16	8294.44	0.67	-2.18	1003.20	12.00	429740.35	568704.10	N 32 10 53.05	W 104 14 41.55
	8500.00	13.73	0.16	8393.35	14.09	11.24	1003.24	12.00	429753.77	568704.13	N 32 10 53.18	W 104 14 41.55
	8600.00	25.73	0.16	8487.31	47.79	44.93	1003.33	12.00	429787.46	568704.23	N 32 10 53.52	W 104 14 41.55
	8700.00	37.73	0.16	8572.21	100.28	97.42	1003.48	12.00	429839.94	568704.38	N 32 10 54.04	W 104 14 41.55
Top Wolfcamp	8755.45	44.38	0.16	8614.00	136.68	133.82	1003.58	12.00	429876.34	568704.48	N 32 10 54.40	W 104 14 41.55
	8800.00	49.73	0.16	8644.34	169.27	166.42	1003.68	12.00	429908.93	568704.57	N 32 10 54.72	W 104 14 41.55
	8900.00	61.73	0.16	8700.55	251.76	248.90	1003.91	12.00	429991.41	568704.81	N 32 10 55.54	W 104 14 41.54
	9000.00	73.73	0.16	8738.38	344.13	341.27	1004.17	12.00	430083.77	568705.07	N 32 10 56.45	W 104 14 41.54
Build 4°/100'	9010.81	75.00	0.16	8741.24	354.34	351.49	1004.20	12.00	430093.99	568705.10	N 32 10 56.55	W 104 14 41.54
DLS	9100.00	78.58	0.16	8761.67	441.36	438.50	1004.45	4.00	430180.99	568705.35	N 32 10 57.41	W 104 14 41.53
	9200.00	82.58	0.16	8778.04	539.99	537.13	1004.73	4.00	430279.61	568705.63	N 32 10 58.39	W 104 14 41.53
	9300.00	86.58	0.16	8797.49	639.52	636.66	1005.01	4.00	430379.13	568705.91	N 32 10 59.37	W 104 14 41.53
Wolfcamp												
Target	9373.79	89.53	0.16	8790.00	713.25	710.40	1005.22	4.00	430452.86	568706.12	N 32 11 0.10	W 104 14 41.52
Wolfcamp												
Target	9397.43	90.47	0.16	8790.00	736.90	734.04	1005.29	4.00	430476.50	568706.19	N 32 11 0.34	W 104 14 41.52
Landing Point	9400.00	90.47	0.16	8789.98	739.47	736.61	1005.30	0.00	430479.07	568706.20	N 32 11 0.36	W 104 14 41.52
	9500.00	90.47	0.16	8789.15	839.46	836.61	1005.58	0.00	430579.06	568706.48	N 32 11 1.35	W 104 14 41.52
	9600.00	90.47	0.16	8788.33	939.46	936.60	1005.87	0.00	430679.05	568706.76	N 32 11 2.34	W 104 14 41.51
	9700.00	90.47	0.16	8787.50	1039.46	1036.60	1006.15	0.00	430779.03	568707.05	N 32 11 3.33	W 104 14 41.51
	9800.00	90.47	0.16	8786.68	1139.45	1136.59	1006.44	0.00	430879.02	568707.33	N 32 11 4.32	W 104 14 41.51
	9900.00	90.47	0.16	8785.85	1239.45	1236.59	1006.72	0.00	430979.01	568707.62	N 32 11 5.31	W 104 14 41.50
	10000.00	90.47	0.16	8785.03	1339.45	1336.59	1007.00	0.00	431078.99	568707.90	N 32 11 6.30	W 104 14 41.50
	10100.00	90.47	0.16	8784.20	1439.44	1436.58	1007.29	0.00	431178.98	568708.19	N 32 11 7.29	W 104 14 41.49
	10200.00	90.47	0.16	8783.37	1539.44	1536.58	1007.57	0.00	431278.97	568708.47	N 32 11 8.28	W 104 14 41.49
	10300.00	90.47	0.16	8782.55	1639.44	1636.58	1007.86	0.00	431378.95	568708.75	N 32 11 9.27	W 104 14 41.48

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (fUS)	Easting (fUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	10400.00	90.47	0.16	8781.72	1739.43	1736.57	1008.14	0.00	431478.94	568709.04	N 32 11 10.26	W 104 14 41.48
	10500.00	90.47	0.16	8780.90	1839.43	1836.57	1008.43	0.00	431578.93	568709.32	N 32 11 11.25	W 104 14 41.46
	10600.00	90.47	0.16	8780.07	1939.43	1936.56	1008.71	0.00	431678.92	568709.61	N 32 11 12.24	W 104 14 41.47
	10700.00	90.47	0.16	8779.25	2039.42	2036.56	1009.00	0.00	431778.90	568709.89	N 32 11 13.22	W 104 14 41.47
	10800.00	90.47	0.16	8778.42	2139.42	2136.56	1009.28	0.00	431878.89	568710.18	N 32 11 14.21	W 104 14 41.46
	10900.00	90.47	0.16	8777.60	2239.42	2236.55	1009.56	0.00	431978.88	568710.46	N 32 11 15.20	W 104 14 41.46
	11000.00	90.47	0.16	8776.77	2339.41	2336.55	1009.85	0.00	432078.86	568710.75	N 32 11 16.19	W 104 14 41.45
	11100.00	90.47	0.16	8775.94	2439.41	2436.55	1010.13	0.00	432178.85	568711.03	N 32 11 17.18	W 104 14 41.45
	11200.00	90.47	0.16	8775.12	2539.41	2536.54	1010.42	0.00	432278.84	568711.31	N 32 11 18.17	W 104 14 41.45
	11300.00	90.47	0.16	8774.29	2639.40	2636.54	1010.70	0.00	432378.82	568711.60	N 32 11 19.16	W 104 14 41.44
	11400.00	90.47	0.16	8773.47	2739.40	2736.53	1010.99	0.00	432478.81	568711.88	N 32 11 20.15	W 104 14 41.44
	11500.00	90.47	0.16	8772.64	2839.40	2836.53	1011.27	0.00	432578.80	568712.17	N 32 11 21.14	W 104 14 41.43
	11600.00	90.47	0.16	8771.82	2939.39	2936.53	1011.55	0.00	432678.79	568712.45	N 32 11 22.13	W 104 14 41.43
	11700.00	90.47	0.16	8770.99	3039.39	3036.52	1011.84	0.00	432778.77	568712.74	N 32 11 23.12	W 104 14 41.42
	11800.00	90.47	0.16	8770.17	3139.39	3136.52	1012.12	0.00	432878.76	568713.02	N 32 11 24.11	W 104 14 41.42
	11900.00	90.47	0.16	8769.34	3239.38	3236.51	1012.41	0.00	432978.75	568713.30	N 32 11 25.10	W 104 14 41.42
	12000.00	90.47	0.16	8768.51	3339.38	3336.51	1012.69	0.00	433078.73	568713.59	N 32 11 26.09	W 104 14 41.41
	12100.00	90.47	0.16	8767.69	3439.37	3436.51	1012.98	0.00	433178.72	568713.87	N 32 11 27.08	W 104 14 41.41
	12200.00	90.47	0.16	8766.86	3539.37	3536.50	1013.26	0.00	433278.71	568714.16	N 32 11 28.07	W 104 14 41.40
	12300.00	90.47	0.16	8766.04	3639.37	3636.50	1013.55	0.00	433378.69	568714.44	N 32 11 29.06	W 104 14 41.40
	12400.00	90.47	0.16	8765.21	3739.36	3736.50	1013.83	0.00	433478.68	568714.73	N 32 11 30.05	W 104 14 41.39
	12500.00	90.47	0.16	8764.39	3839.36	3836.49	1014.11	0.00	433578.67	568715.01	N 32 11 31.04	W 104 14 41.39
	12600.00	90.47	0.16	8763.56	3939.36	3936.49	1014.40	0.00	433678.66	568715.29	N 32 11 32.02	W 104 14 41.39
	12700.00	90.47	0.16	8762.74	4039.35	4036.48	1014.68	0.00	433778.64	568715.58	N 32 11 33.01	W 104 14 41.38
	12800.00	90.47	0.16	8761.91	4139.35	4136.48	1014.97	0.00	433878.63	568715.86	N 32 11 34.00	W 104 14 41.38
	12900.00	90.47	0.16	8761.08	4239.35	4236.48	1015.25	0.00	433978.62	568716.15	N 32 11 34.99	W 104 14 41.37
	13000.00	90.47	0.16	8760.26	4339.34	4336.47	1015.54	0.00	434078.60	568716.43	N 32 11 35.98	W 104 14 41.37
	13100.00	90.47	0.16	8759.43	4439.34	4436.47	1015.82	0.00	434178.59	568716.72	N 32 11 36.97	W 104 14 41.36
	13200.00	90.47	0.16	8758.61	4539.34	4536.46	1016.10	0.00	434278.58	568717.00	N 32 11 37.96	W 104 14 41.36
	13300.00	90.47	0.16	8757.78	4639.33	4636.46	1016.39	0.00	434378.56	568717.29	N 32 11 38.95	W 104 14 41.36
	13400.00	90.47	0.16	8756.96	4739.33	4736.46	1016.67	0.00	434478.55	568717.57	N 32 11 39.94	W 104 14 41.35
	13500.00	90.47	0.16	8756.13	4839.33	4836.45	1016.96	0.00	434578.54	568717.85	N 32 11 40.93	W 104 14 41.35
	13600.00	90.47	0.16	8755.31	4939.32	4936.45	1017.24	0.00	434678.53	568718.14	N 32 11 41.92	W 104 14 41.34
	13700.00	90.47	0.16	8754.48	5039.32	5036.45	1017.53	0.00	434778.51	568718.42	N 32 11 42.91	W 104 14 41.34
	13800.00	90.47	0.16	8753.65	5139.32	5136.44	1017.81	0.00	434878.50	568718.71	N 32 11 43.90	W 104 14 41.33
	13900.00	90.47	0.16	8752.83	5239.31	5236.44	1018.10	0.00	434978.49	568718.99	N 32 11 44.89	W 104 14 41.33
	14000.00	90.47	0.16	8752.00	5339.31	5336.43	1018.38	0.00	435078.47	568719.28	N 32 11 45.88	W 104 14 41.33
	14100.00	90.47	0.16	8751.18	5439.31	5436.43	1018.66	0.00	435178.46	568719.56	N 32 11 46.87	W 104 14 41.32
	14200.00	90.47	0.16	8750.35	5539.30	5536.43	1018.95	0.00	435278.45	568719.84	N 32 11 47.86	W 104 14 41.32
	14300.00	90.47	0.16	8749.53	5639.30	5636.42	1019.23	0.00	435378.43	568720.13	N 32 11 48.85	W 104 14 41.31
	14400.00	90.47	0.16	8748.70	5739.30	5736.42	1019.52	0.00	435478.42	568720.41	N 32 11 49.84	W 104 14 41.31
	14500.00	90.47	0.16	8747.88	5839.29	5836.42	1019.80	0.00	435578.41	568720.70	N 32 11 50.82	W 104 14 41.30
	14600.00	90.47	0.16	8747.05	5939.29	5936.41	1020.09	0.00	435678.39	568720.98	N 32 11 51.81	W 104 14 41.30
	14700.00	90.47	0.16	8746.22	6039.29	6036.41	1020.37	0.00	435778.38	568721.27	N 32 11 52.80	W 104 14 41.30
	14800.00	90.47	0.16	8745.40	6139.28	6136.40	1020.65	0.00	435878.37	568721.55	N 32 11 53.79	W 104 14 41.29
	14900.00	90.47	0.16	8744.57	6239.28	6236.40	1020.94	0.00	435978.36	568721.83	N 32 11 54.78	W 104 14 41.29
	15000.00	90.47	0.16	8743.75	6339.28	6336.40	1021.22	0.00	436078.34	568722.12	N 32 11 55.77	W 104 14 41.28
	15100.00	90.47	0.16	8742.92	6439.27	6436.39	1021.51	0.00	436178.33	568722.40	N 32 11 56.76	W 104 14 41.28
	15200.00	90.47	0.16	8742.10	6539.27	6536.39	1021.79	0.00	436278.32	568722.69	N 32 11 57.75	W 104 14 41.27
	15300.00	90.47	0.16	8741.27	6639.27	6636.38	1022.08	0.00	436378.30	568722.97	N 32 11 58.74	W 104 14 41.27
	15400.00	90.47	0.16	8740.45	6739.26	6736.38	1022.36	0.00	436478.29	568723.26	N 32 11 59.73	W 104 14 41.27
	15500.00	90.47	0.16	8739.62	6839.26	6836.38	1022.65	0.00	436578.28	568723.54	N 32 12 0.72	W 104 14 41.26
	15600.00	90.47	0.16	8738.80	6939.26	6936.37	1022.93	0.00	436678.26	568723.83	N 32 12 1.71	W 104 14 41.26
	15700.00	90.47	0.16	8737.97	7039.25	7036.37	1023.21	0.00	436778.25	568724.11	N 32 12 2.70	W 104 14 41.25
	15800.00	90.47	0.16	8737.14	7139.25	7136.37	1023.50	0.00	436878.24	568724.39	N 32 12 3.69	W 104 14 41.25
	15900.00	90.47	0.16	8736.32	7239.25	7236.36	1023.78	0.00	436978.23	568724.68	N 32 12 4.68	W 104 14 41.24
	16000.00	90.47	0.16	8735.49	7339.24	7336.36	1024.07	0.00	437078.21	568724.96	N 32 12 5.67	W 104 14 41.24
	16100.00	90.47	0.16	8734.67	7439.24	7436.35	1024.35	0.00	437178.20	568725.25	N 32 12 6.66	W 104 14 41.24



Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19 Anti-Collision Summary Report

Analysis Date-24hr Time:	June 19, 2019 - 10:46	Analysis Method:	3D Least Distance
Client:	Cimarex	Reference Trajectory:	Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19 (Def Plan)
Field:	NM Eddy County (NAD 83)	Depth Interval:	Every 10.00 Measured Depth (ft)
Structure:	Cimarex Black River 25 Federal Com 2H	Rule Set:	D&M AntiCollision Standard S002 v5.1/5.2
Slot:	Cimarex Black River 25 Federal Com 2H	Min Pts:	All local minima indicated.
Well:	Cimarex Black River 25 Federal Com 2H	Version / Patch:	2.10.760.0
Borehole:	Original Borehole	Database \ Project:	US1153APP452.dir.slb.com\drilling-NM Eddy County 2.10
Scan MD Range:	0.00ft ~ 18724.61ft		

**Trajectory Error Model:** ISCWSA0 3-D 95.000% Confidence 2.7955 sigma, for subject well. For offset wells, error model version is specified with each well respectively.

Offset Trajectories Summary

**Offset Selection Criteria**

Wellhead distance scan: Restricted within 59735.11 ft  
 Selection filters: Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans  
 - All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		

Results highlighted: Sep-Factor separation <= 1.50 ft

Prelim Cimarex Black River 25 Federal Com 2H Rev3 RM 19Jun19 (Def Plan)												
40.00	32.36	38.19	7.64	N/A	MAS = 9.86 (m)	0.00	0.00	CtCt<=15m<15.00				Warning Alert
40.00	32.36	38.19	7.64	171883.76	MAS = 9.86 (m)	26.00	26.00					Enter Alert
40.00	32.36	26.02	7.64	3.14	MAS = 9.86 (m)	2000.00	2000.00					WRP
40.01	32.36	25.99	7.66	3.13	MAS = 9.86 (m)	2010.00	2010.00					MinPts
40.28	32.36	28.11	7.92	3.11	MAS = 9.86 (m)	2040.00	2040.00					MINPT-O-EOU
70.73	32.36	55.11	38.37	4.99	MAS = 9.86 (m)	2420.00	2418.50	OSF>5.00				MinPt-O-SF
1043.20	68.26	997.09	974.94	23.51	OSF 1.50	8270.00	8164.44					Exit Alert
1043.97	68.37	997.79	975.60	23.49	OSF 1.50	8320.00	8214.44					MinPts
1145.96	219.94	998.73	926.02	7.87	OSF 1.50	17430.00	8723.69					MinPt-O-SF
1146.01	219.96	998.77	926.05	7.87	OSF 1.50	17440.00	8723.61					MinPts
1729.67	158.03	1623.71	1571.64	16.59	OSF 1.50	18724.61	8713.00					MinPt-O-SF
												TD

Pre-Original Crawford ET AL #1 (Offset) Plugged Oil Blind (0ft 2100ft) (Def Survey)												
10088.16	32.81	10085.66	10055.35	N/A	MAS = 10.00 (m)	0.00	0.00					Pass
10087.93	32.81	10085.40	10055.12	303674.90	MAS = 10.00 (m)	26.00	26.00					Surface
10087.00	647.19	9654.71	9439.81	23.46	OSF 1.50	2230.00	2229.75					MinPt-O-SF
10086.93	647.18	9654.65	9439.75	23.46	OSF 1.50	2270.00	2269.60					MinPt-O-SF
8983.11	449.45	8682.65	8533.66	30.14	OSF 1.50	12590.00	8763.64					MinPts
6517.24	225.66	6365.97	6291.59	43.79	OSF 1.50	18724.61	8713.00					MinPt-O-SF
												MinPts