Form 3160-5
(June 2015)

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.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM132062

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
BLACK RIVER 25 FED 4H

2. Name of Operator
CIMAREX ENERGY COMPANY

Contact: AMITHY E CRAWFORD
E-Mail: acrawford@cimarex.com

9. API Well No.
30-015-43675-00-X1

3a. Address
202 S CHEYENNE AVE SUITE 1000
TULSA, OK 74103.4346

3b. Phone No. (include area code)
Ph: 432-620-1909

10. Field and Pool or Exploratory Area
WILDCAT

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 25 T24S R26E SESE 50FSL 544FEL

11. County or Parish, State
EDDY COUNTY, NM

12. CHECK THE 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	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ 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 respectfully requests approval to change the BHL there by changing the directional plan. No additional disturbance is required for the well pad.
Approved:
BHL: 330 FNL & 660 FEL Sec 25 24S 26E

Proposed
BHL: 330 FNL & 380 FEL Sec 24 24S 26E ✓ TD

Cimarex also respectfully requests approval to drill the well as a wolfcamp therefore changing the directional plan.

Please see attached plat, directional prelim, Drilling plan and BOP diagrams for changes.

All previous COAs still apply. Liner excess is ~8%

RECEIVED
AUG 07 2018
DISTRICT II-ARTESIA O.C.D.

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

Electronic Submission #420350 verified by the BLM Well Information System
For CIMAREX ENERGY COMPANY, sent to the Carlsbad
Committed to AFMSS for processing by PRISCILLA PEREZ on 05/21/2018 (18PP1778SE)

Name *(Printed/Typed)* AMITHY E CRAWFORD — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 05/16/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS — Title PETROLEUM ENGINEER — Date 07/16/2018

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Carlsbad

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

(Instructions on page 2)

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

RJP 8-8-18.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos 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) 476-3460 Fax: (505) 476-3462

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

1 API Number	2 Pool Code	3 Pool Name
30-015 -43675	98220	Purple Sage, Wolfcamp (gas)

4 Property Code	5 Property Name	6 Well Number
315262	BLACK RIVER 25 FEDERAL COM	4H

7 OGRID No.	8 Operator Name	9 Elevation
215099	CIMAREX ENERGY CO.	3391.2'

10 Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	25	24 S	26 E		50	SOUTH	544	EAST	EDDY

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	24	24 S	26 E		330	NORTH	380	EAST	EDDY

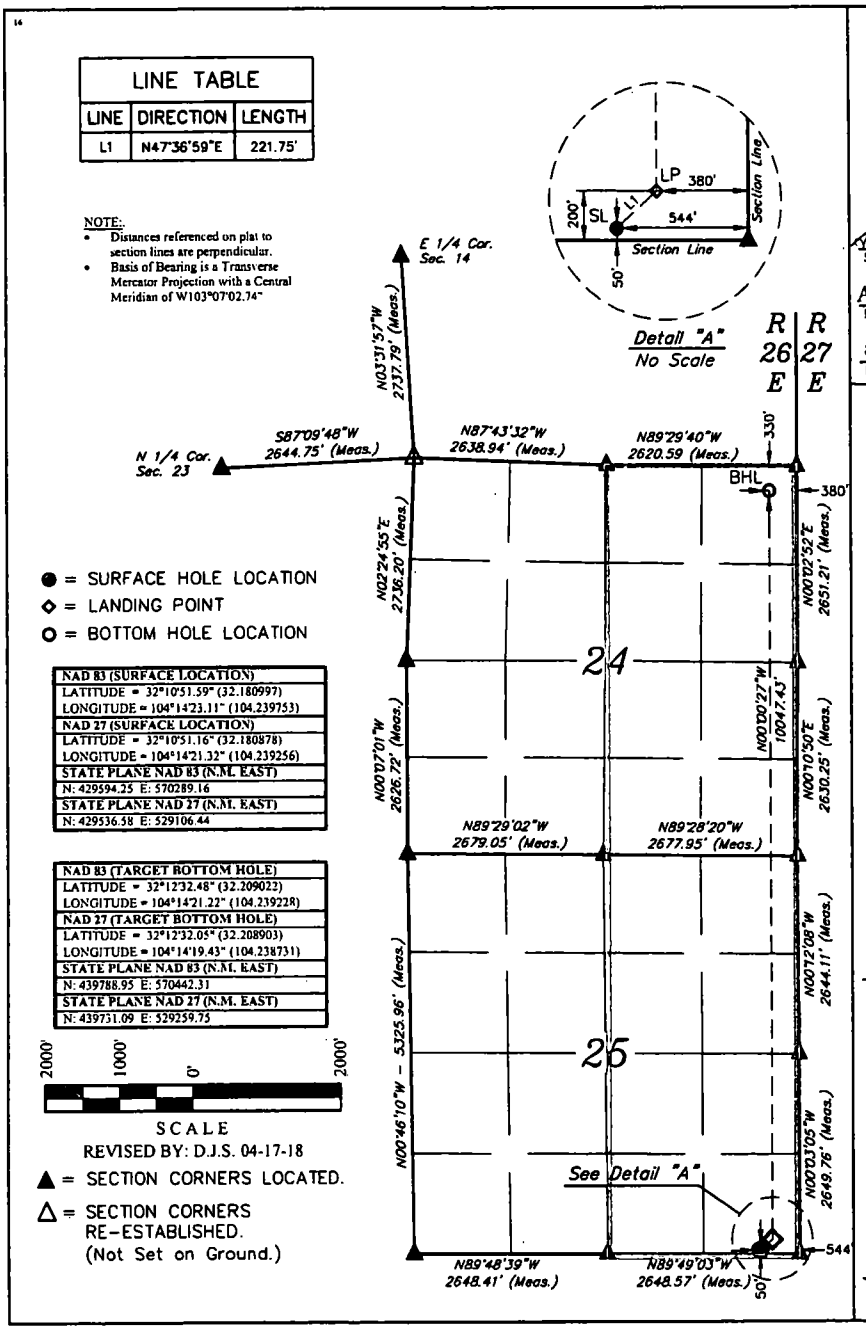
12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
640			

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.

16

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N47°36'59"E	221.75'

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



● = SURFACE HOLE LOCATION
◇ = LANDING POINT
○ = BOTTOM HOLE LOCATION

NAD 83 (SURFACE LOCATION)
LATITUDE = 32°10'51.59" (32.180997)
LONGITUDE = 104°14'23.11" (104.239753)
NAD 27 (SURFACE LOCATION)
LATITUDE = 32°10'51.16" (32.180878)
LONGITUDE = 104°14'21.32" (104.239256)
STATE PLANE NAD 83 (N.M. EAST)
N: 429594.25 E: 570289.16
STATE PLANE NAD 27 (N.M. EAST)
N: 429536.58 E: 529106.44

NAD 83 (TARGET BOTTOM HOLE)
LATITUDE = 32°12'32.48" (32.209022)
LONGITUDE = 104°14'21.22" (104.239228)
NAD 27 (TARGET BOTTOM HOLE)
LATITUDE = 32°12'32.05" (32.208903)
LONGITUDE = 104°14'19.43" (104.238731)
STATE PLANE NAD 83 (N.M. EAST)
N: 439788.95 E: 570442.31
STATE PLANE NAD 27 (N.M. EAST)
N: 439731.09 E: 529259.75

2000' 1000' 0 2000'

SCALE

REVISED BY: D.J.S. 04-17-18

▲ = SECTION CORNERS LOCATED.

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

17 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 a compulsory pooling order heretofore entered by the division.

Amithy Crawford 5/4/2018
Signature Date

Amithy Crawford
Printed Name

acrawford@cimarex.com
E-mail Address

18 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:

PAUL BUCHELE NEW MEXICO 23782 PROFESSIONAL SURVEYOR 04-17-18

Certificate Number:

RP 8-8-18

1. Geological Formations

TVD of target 8,803
MD at TD 18,765

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Salado (top Salt)	1362	N/A	
Castille (Base Salt)	1927	N/A	
Bell Canyon (top Delaware)	2136	Hydrocarbons	
Cherry Canyon	3063	Hydrocarbons	
Brushy Canyon	4089	Hydrocarbons	
Bone Spring	5649	Hydrocarbons	
1st Bone Spring Sand	6615	Hydrocarbons	
2nd Bone Spring Sand	7063	Hydrocarbons	
3rd Bone Spring Carb	7407	Hydrocarbons	
Harkey Sandston	7763	Hydrocarbons	
Base Harkey Sandstone	7956	Hydrocarbons	
3rd bone Spring Sand	8376	Hydrocarbons	
top Wolfcamp	8704	Hydrocarbons	
Wolfcamp Target	8803	Hydrocarbons	
Top Wolfcamp A Shale	8927	N/A	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	400	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	4.04	9.45	16.77
12 1/4	0	2116	9-5/8"	36.00	J-55	ST&C	1.80	3.14	7.40
8 3/4	0	8255	7"	26.00	N-80	LT&C	1.40	1.87	2.27
8 3/4	8255	9327	7"	26.00	N-80	BT&C	1.31	1.76	42.39
6	8255	18765	4-1/2"	11.60	P-110	BT&C	1.53	2.17	57.73
				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?	Y
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

3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft3/sack	H2O 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	404	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	124	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	338	10.30	3.64	22.18		Lead: Tuned Light + LCM
	137	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Completion System	686	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface	0	31
Intermediate	0	49
Production	1672	23
Completion System	9327	10

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	3M	Annular	X	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	X	
			Other		
6	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram		
			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 2116'	Brine Water	9.70 - 10.20	30-32	N/C
2116' to 9327'	FW/Cut Brine	8.50 - 9.00	30-32	N/C
9327' to 18765'	Oil Based Mud	10.30 - 10.80	50-70	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

6. Logging and Testing Procedures

	Logging, Coring and Testing
X	Will run GR/CNL fromTD 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	4943 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.

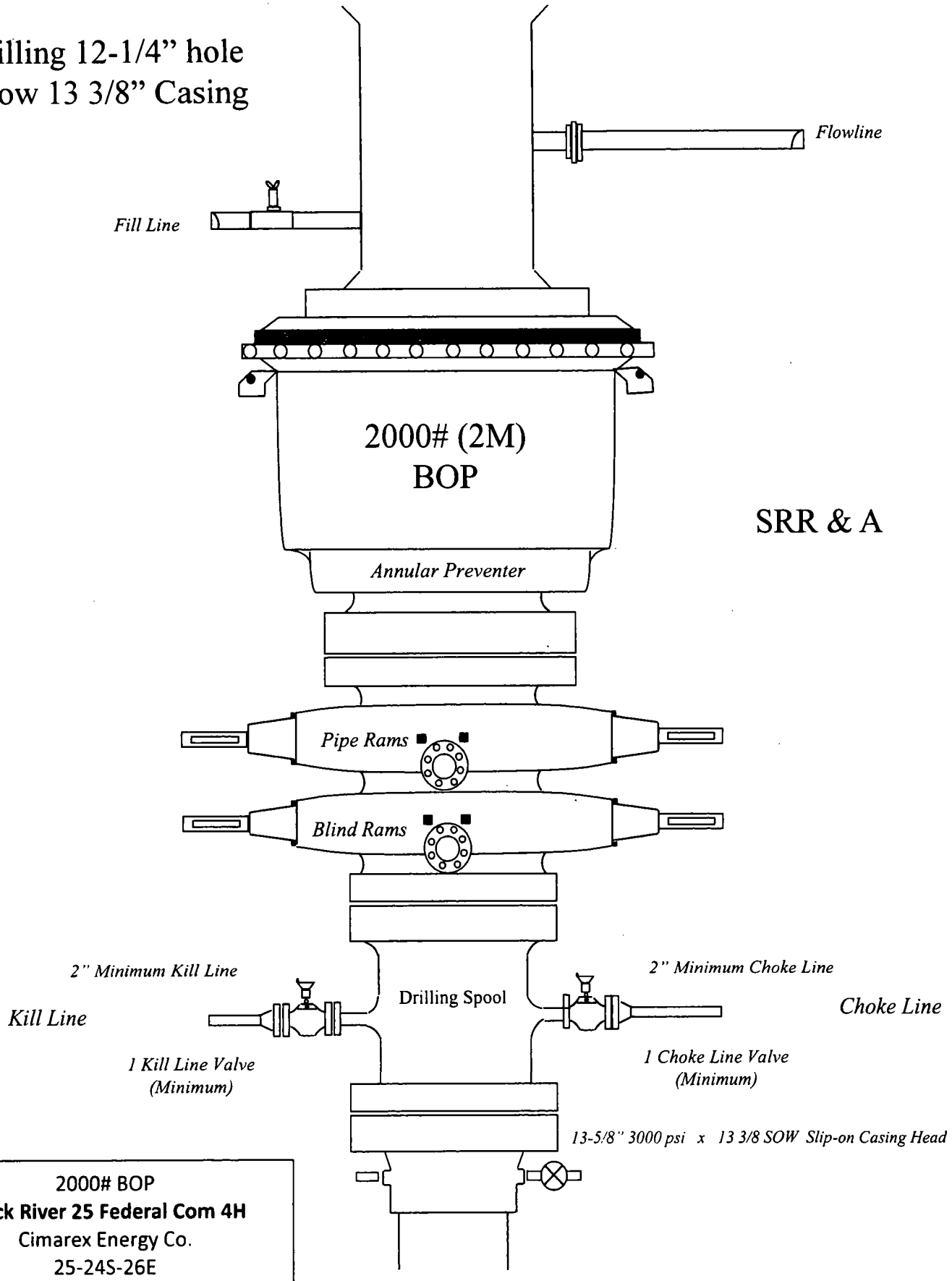
A solid steel body pack-off will be utilized after running and cementing the production casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

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.

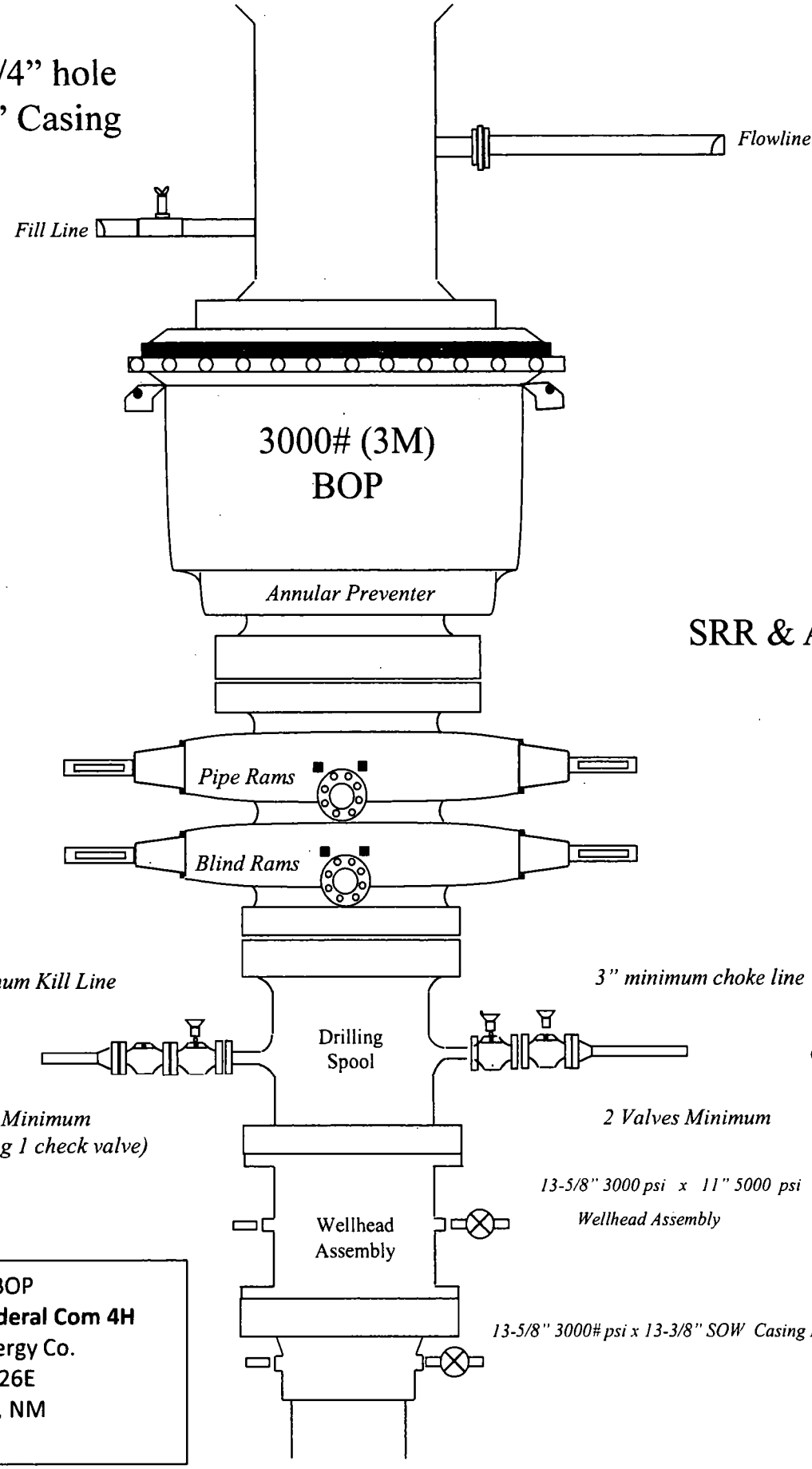
If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

Drilling 12-1/4" hole
below 13 3/8" Casing



2000# BOP
Black River 25 Federal Com 4H
Cimarex Energy Co.
25-24S-26E
Eddy Co., NM

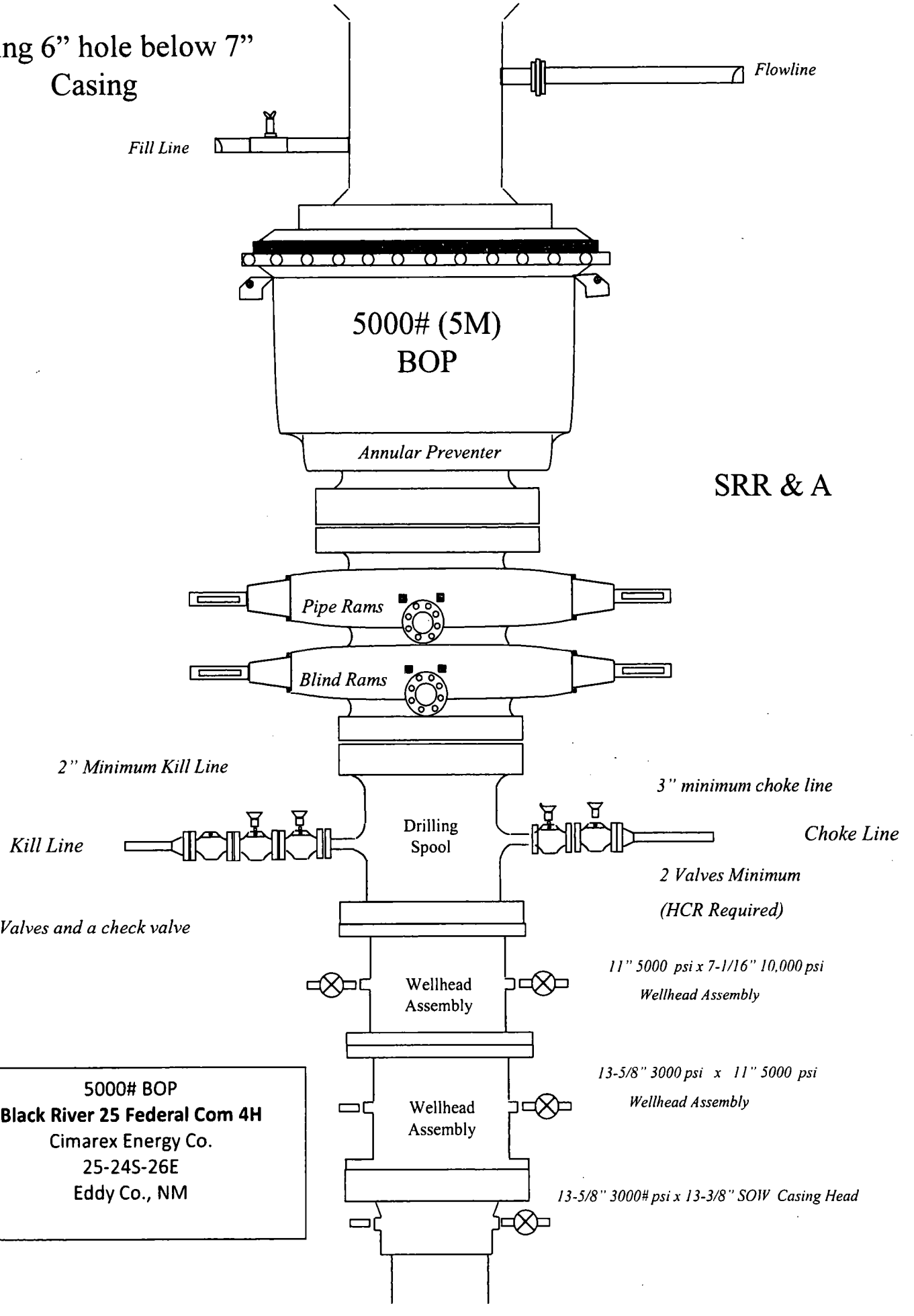
Drilling 8-3/4" hole
below 9 5/8" Casing



SRR & A

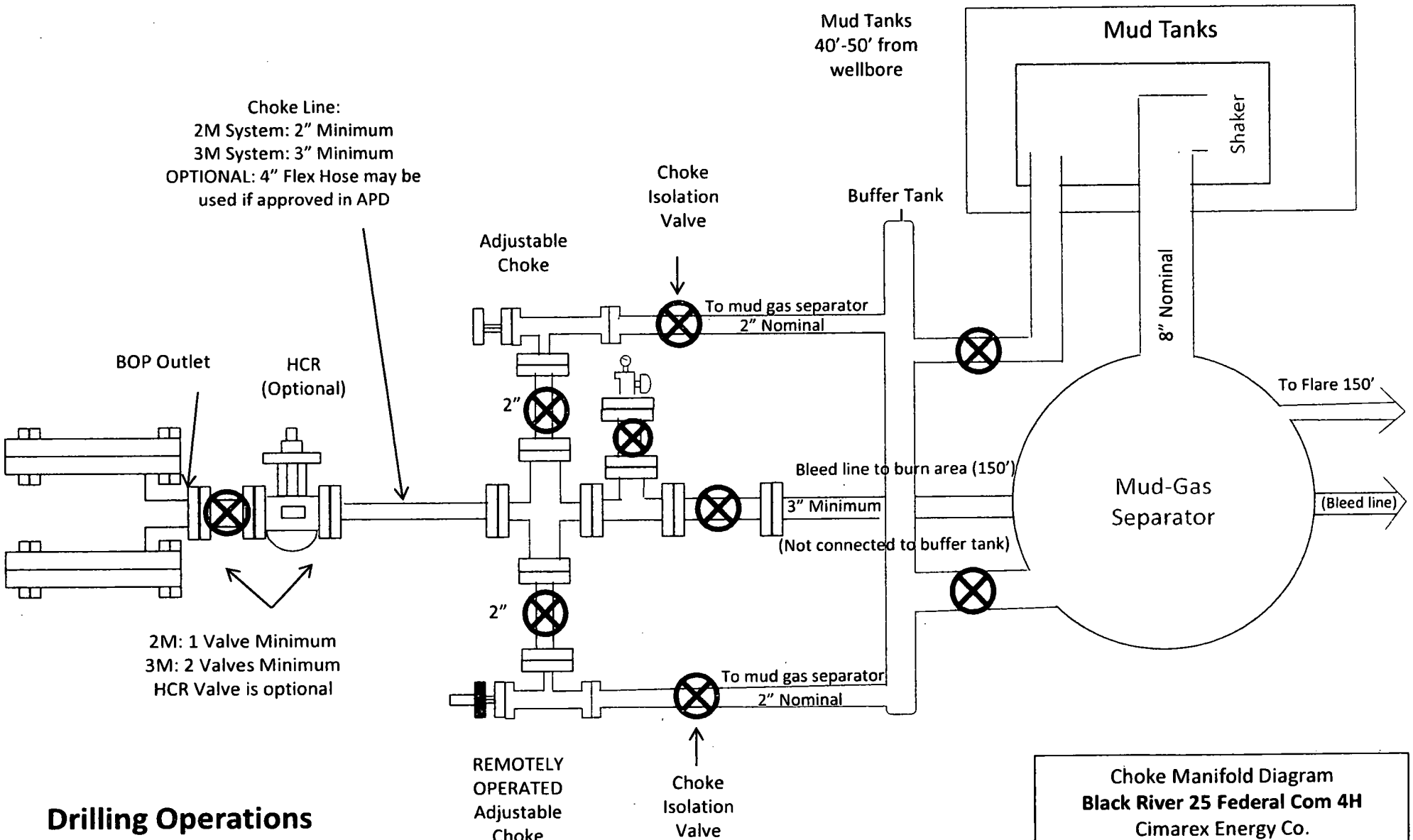
3000# BOP
Black River 25 Federal Com 4H
Cimarex Energy Co.
25-24S-26E
Eddy Co., NM

Drilling 6" hole below 7" Casing



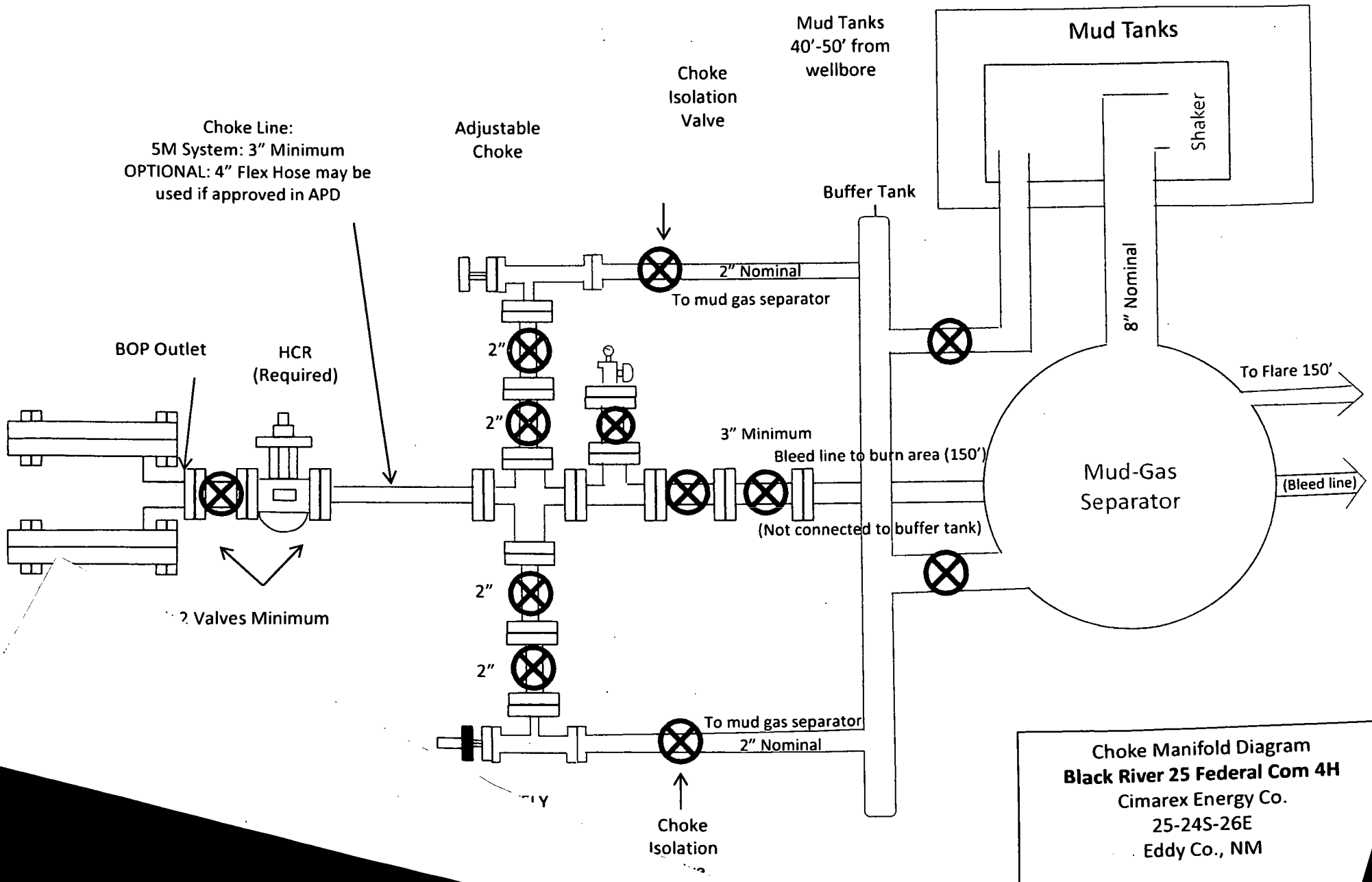
SRR & A

5000# BOP
Black River 25 Federal Com 4H
Cimarex Energy Co.
25-24S-26E
Eddy Co., NM



Drilling Operations
Choke Manifold
2M/3M Service

Choke Manifold Diagram
Black River 25 Federal Com 4H
Cimarex Energy Co.
25-24S-26E
Eddy Co., NM



Choke Manifold Diagram
Black River 25 Federal Com 4H
Cimarex Energy Co.
25-24S-26E
Eddy Co., NM

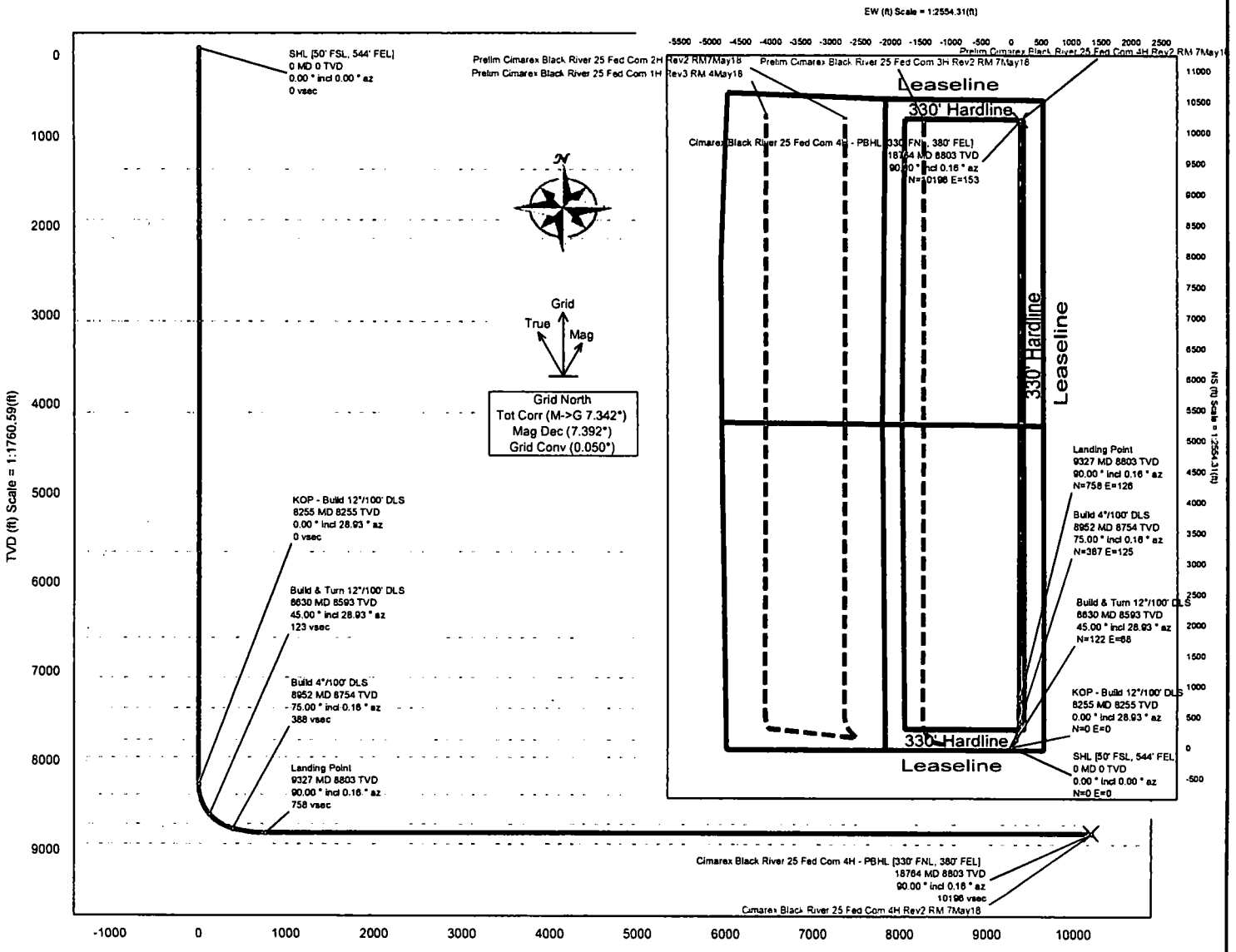
Schlumberger

Cimarex Rev 2

CIMAREX

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Black River 25 Fed Com 4H	NM Eddy County (NAD 83)	Cimarex Black River 25 Fed Com 4H

Gravity & Magnetic Parameters					Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	HDGM 2018	Dip:	59.884°	Date:	07-May-2018	Lat:	N 32 10 51.59	Northing:	429584.25ftUS	Grid Conv:	0.0498°	Slot:	Cimarex Black River 25 Fed Com 4H	TVD Ref:	RKB(3417.2ft above MSL)
MagDec:	7.392°	FS:	47930.623nT	Gravity FS:	998.431mgn (9.80665 Based)	Lon:	W 104 14 23.11	Easting:	570269.16ftUS	Scale Fact:	0.99991065	Plan:	Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18		



Vertical Section (ft) Azim = 0.16° Scale = 1:1760.59(ft) Origin = 0N/-S, 0E/-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [50' FSL, 544' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Top Salt (Salado)	1362.00	0.00	28.93	1362.00	0.00	0.00	0.00	0.00
Base Salt (Castile)	1927.00	0.00	28.93	1927.00	0.00	0.00	0.00	0.00
Bell Canyon (Top Delaware)	2136.00	0.00	28.93	2136.00	0.00	0.00	0.00	0.00
Cherry Canyon	3063.00	0.00	28.93	3063.00	0.00	0.00	0.00	0.00
Brushy Canyon	4089.00	0.00	28.93	4089.00	0.00	0.00	0.00	0.00
Bone Spring	5649.00	0.00	28.93	5649.00	0.00	0.00	0.00	0.00
1st Bone Spring Sand	6615.00	0.00	28.93	6615.00	0.00	0.00	0.00	0.00
2nd Bone Spring Sand	7063.00	0.00	28.93	7063.00	0.00	0.00	0.00	0.00
3rd Bone Spring Carb	7407.00	0.00	28.93	7407.00	0.00	0.00	0.00	0.00
Harkey Sandstone	7763.00	0.00	28.93	7763.00	0.00	0.00	0.00	0.00
Base Harkey Sand	7956.00	0.00	28.93	7956.00	0.00	0.00	0.00	0.00
KOP - Build 12°/100' DLS	8255.15	0.00	28.93	8255.15	0.00	0.00	0.00	0.00
3rd Bone Spring Sand	8377.33	14.66	28.93	8376.00	13.63	13.61	7.52	12.00
Build & Turn 12°/100' DLS	8630.15	45.00	28.93	8592.77	122.59	122.39	67.65	12.00
Top Wolfcamp	8815.88	61.61	10.19	8704.00	262.38	262.04	114.45	12.00
Build 4°/100' DLS	8951.66	75.00	0.16	8754.19	387.59	387.24	125.27	12.00
Landing Point	9326.66	90.00	0.16	8803.00	758.32	757.97	126.33	4.00
Cimarex Black River 25 Fed Com 4H - PBHL [330' FNL, 380' FEL]	18764.37	90.00	0.16	8803.00	10196.03	10195.64	153.16	0.00
Top Wolfcamp A Shale	NaN			8927.00				

Schlumberger

CIMAREX

Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18 Proposal
Geodetic Report
(Non-Def Plan)

Report Date:	May 07, 2018 - 01:26 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	0.183 ° (Grid North)
Field:	NM Eddy County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Black River 25 Fed Com 4H / Cimarex Black River 25 Fed Com 4H	**TVD Reference Datum:**	RKB
Well:	Cimarex Black River 25 Fed Com 4H	**TVD Reference Elevation:**	3417.200 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3391.200 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.392 °
Survey Name:	Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18	**Total Gravity Field Strength:**	998.4310mgn (9.80665 Based)
Survey Date:	May 07, 2018	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	98.581 ° / 10222.033 ft / 6.332 / 1.161	**Total Magnetic Field Strength:**	47930.523 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.884 °
Location Lat / Long:	N 32° 10' 51.59173", W 104° 14' 23.11081"	**Declination Date:**	May 07, 2018
Location Grid N/E Y/X:	N 429594.250 ftUS, E 570289.160 ftUS	**Magnetic Declination Model:**	HDGM 2018
CRS Grid Convergence Angle:	0.0498 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991005	**Grid Convergence Used:**	0.0498 °
Version / Patch:	2.10.715.0	**Total Corr Mag North->Grid North:**	7.3422 °
		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 [50' FSL, 544' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	100.00	0.00	28.93	100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	200.00	0.00	28.93	200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	300.00	0.00	28.93	300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	400.00	0.00	28.93	400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	500.00	0.00	28.93	500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	600.00	0.00	28.93	600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	700.00	0.00	28.93	700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	800.00	0.00	28.93	800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	900.00	0.00	28.93	900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1000.00	0.00	28.93	1000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1100.00	0.00	28.93	1100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1200.00	0.00	28.93	1200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1300.00	0.00	28.93	1300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Top Salt (Salado)	*1362.00*	*0.00*	*28.93*	*1362.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	1400.00	0.00	28.93	1400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1500.00	0.00	28.93	1500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1600.00	0.00	28.93	1600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1700.00	0.00	28.93	1700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1800.00	0.00	28.93	1800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	1900.00	0.00	28.93	1900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Base Salt (Castille)	*1927.00*	*0.00*	*28.93*	*1927.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	2000.00	0.00	28.93	2000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2100.00	0.00	28.93	2100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Bell Canyon (Top Delaware)	*2136.00*	*0.00*	*28.93*	*2136.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	2200.00	0.00	28.93	2200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2300.00	0.00	28.93	2300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2400.00	0.00	28.93	2400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2500.00	0.00	28.93	2500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2600.00	0.00	28.93	2600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2700.00	0.00	28.93	2700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2800.00	0.00	28.93	2800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	2900.00	0.00	28.93	2900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3000.00	0.00	28.93	3000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Cherry Canyon	*3063.00*	*0.00*	*28.93*	*3063.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	3100.00	0.00	28.93	3100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3200.00	0.00	28.93	3200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3300.00	0.00	28.93	3300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3400.00	0.00	28.93	3400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3500.00	0.00	28.93	3500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3600.00	0.00	28.93	3600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3700.00	0.00	28.93	3700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3800.00	0.00	28.93	3800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	3900.00	0.00	28.93	3900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4000.00	0.00	28.93	4000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Brushy Canyon	*4089.00*	*0.00*	*28.93*	*4089.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	4100.00	0.00	28.93	4100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4200.00	0.00	28.93	4200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4300.00	0.00	28.93	4300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4400.00	0.00	28.93	4400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4500.00	0.00	28.93	4500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4600.00	0.00	28.93	4600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4700.00	0.00	28.93	4700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4800.00	0.00	28.93	4800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	4900.00	0.00	28.93	4900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5000.00	0.00	28.93	5000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5100.00	0.00	28.93	5100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5200.00	0.00	28.93	5200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5300.00	0.00	28.93	5300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5400.00	0.00	28.93	5400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5500.00	0.00	28.93	5500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5600.00	0.00	28.93	5600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Bone Spring	*5649.00*	*0.00*	*28.93*	*5649.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	5700.00	0.00	28.93	5700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5800.00	0.00	28.93	5800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	5900.00	0.00	28.93	5900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6000.00	0.00	28.93	6000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6100.00	0.00	28.93	6100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6200.00	0.00	28.93	6200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6300.00	0.00	28.93	6300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6400.00	0.00	28.93	6400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6500.00	0.00	28.93	6500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6600.00	0.00	28.93	6600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11

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 ° ' ")
1st Bone Spring Sand	*6615.00*	*0.00*	*28.93*	*6615.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	6700.00	0.00	28.93	6700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6800.00	0.00	28.93	6800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	6900.00	0.00	28.93	6900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7000.00	0.00	28.93	7000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
2nd Bone Spring Sand	*7063.00*	*0.00*	*28.93*	*7063.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	7100.00	0.00	28.93	7100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7200.00	0.00	28.93	7200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7300.00	0.00	28.93	7300.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7400.00	0.00	28.93	7400.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
3rd Bone Spring Carb	*7407.00*	*0.00*	*28.93*	*7407.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	7500.00	0.00	28.93	7500.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7600.00	0.00	28.93	7600.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7700.00	0.00	28.93	7700.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Harkey Sandstone	*7763.00*	*0.00*	*28.93*	*7763.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	7800.00	0.00	28.93	7800.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	7900.00	0.00	28.93	7900.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Base Harkey Sand	*7956.00*	*0.00*	*28.93*	*7956.00*	*0.00*	*0.00*	*0.00*	*0.00*	*429594.25*	*570289.16*	*N 32 10 51.59*	*W 104 14 23.11*
	8000.00	0.00	28.93	8000.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	8100.00	0.00	28.93	8100.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	8200.00	0.00	28.93	8200.00	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
KOP - Build 12°/100' DLS	8255.15	0.00	28.93	8255.15	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
	8300.00	5.38	28.93	8299.93	1.84	1.84	1.02	12.00	429596.09	570290.18	N 32 10 51.61	W 104 14 23.10
3rd Bone Spring Sand	*8377.33*	*14.66*	*28.93*	*8376.00*	*13.63*	*13.61*	*7.52*	*12.00*	*429607.86*	*570296.68*	*N 32 10 51.73*	*W 104 14 23.02*
	8400.00	17.38	28.93	8397.79	19.11	19.08	10.55	12.00	429613.33	570299.71	N 32 10 51.78	W 104 14 22.99
	8500.00	29.38	28.93	8489.41	53.84	53.75	29.71	12.00	429648.00	570318.87	N 32 10 52.12	W 104 14 22.76
	8600.00	41.38	28.93	8570.79	104.50	104.34	57.67	12.00	429698.58	570346.82	N 32 10 52.62	W 104 14 22.44
Build & Turn 12°/100' DLS	8630.15	45.00	28.93	8592.77	122.59	122.39	67.65	12.00	429716.63	570356.80	N 32 10 52.80	W 104 14 22.32
	8700.00	50.89	20.88	8638.58	169.66	169.41	89.29	12.00	429763.64	570378.44	N 32 10 53.27	W 104 14 22.07
	8800.00	60.09	11.50	8696.26	248.73	248.42	111.84	12.00	429842.64	570400.99	N 32 10 54.05	W 104 14 21.81
Top Wolfcamp	*8815.88*	*61.61*	*10.19*	*8704.00*	*262.36*	*262.04*	*114.45*	*12.00*	*429856.26*	*570403.60*	*N 32 10 54.18*	*W 104 14 21.78*
	8900.00	69.84	3.76	8738.59	338.40	338.05	123.61	12.00	429932.27	570412.76	N 32 10 54.94	W 104 14 21.67
Build 4°/100' DLS	8951.66	75.00	0.16	8754.19	387.59	387.24	125.27	12.00	429981.45	570414.42	N 32 10 55.42	W 104 14 21.65
	9000.00	76.93	0.16	8765.91	434.49	434.13	125.40	4.00	430028.34	570414.55	N 32 10 55.89	W 104 14 21.65
	9100.00	80.93	0.16	8785.10	532.61	532.25	125.68	4.00	430126.46	570414.83	N 32 10 56.86	W 104 14 21.64
	9200.00	84.93	0.16	8797.40	631.83	631.47	125.97	4.00	430225.67	570415.11	N 32 10 57.84	W 104 14 21.64
	9300.00	88.93	0.16	8802.75	731.67	731.31	126.25	4.00	430325.49	570415.40	N 32 10 58.83	W 104 14 21.63
Landing Point	9326.66	90.00	0.16	8803.00	758.32	757.97	126.33	4.00	430352.15	570415.47	N 32 10 59.09	W 104 14 21.63
	9400.00	90.00	0.16	8803.00	831.67	831.31	126.53	0.00	430425.48	570415.68	N 32 10 59.82	W 104 14 21.63
	9500.00	90.00	0.16	8803.00	931.67	931.31	126.82	0.00	430525.47	570415.97	N 32 11 0.81	W 104 14 21.63
	9600.00	90.00	0.16	8803.00	1031.67	1031.31	127.10	0.00	430625.46	570416.25	N 32 11 1.80	W 104 14 21.62
	9700.00	90.00	0.16	8803.00	1131.67	1131.31	127.39	0.00	430725.45	570416.54	N 32 11 2.79	W 104 14 21.62
	9800.00	90.00	0.16	8803.00	1231.67	1231.31	127.67	0.00	430825.44	570416.82	N 32 11 3.77	W 104 14 21.61
	9900.00	90.00	0.16	8803.00	1331.67	1331.31	127.96	0.00	430925.43	570417.10	N 32 11 4.76	W 104 14 21.61
	10000.00	90.00	0.16	8803.00	1431.67	1431.31	128.24	0.00	431025.42	570417.39	N 32 11 5.75	W 104 14 21.60
	10100.00	90.00	0.16	8803.00	1531.67	1531.31	128.52	0.00	431125.42	570417.67	N 32 11 6.74	W 104 14 21.60
	10200.00	90.00	0.16	8803.00	1631.67	1631.31	128.81	0.00	431225.41	570417.96	N 32 11 7.73	W 104 14 21.60
	10300.00	90.00	0.16	8803.00	1731.67	1731.31	129.09	0.00	431325.40	570418.24	N 32 11 8.72	W 104 14 21.59
	10400.00	90.00	0.16	8803.00	1831.67	1831.30	129.38	0.00	431425.39	570418.53	N 32 11 9.71	W 104 14 21.59
	10500.00	90.00	0.16	8803.00	1931.67	1931.30	129.66	0.00	431525.38	570418.81	N 32 11 10.70	W 104 14 21.58
	10600.00	90.00	0.16	8803.00	2031.67	2031.30	129.95	0.00	431625.37	570419.09	N 32 11 11.69	W 104 14 21.58
	10700.00	90.00	0.16	8803.00	2131.67	2131.30	130.23	0.00	431725.36	570419.38	N 32 11 12.68	W 104 14 21.57
	10800.00	90.00	0.16	8803.00	2231.67	2231.30	130.52	0.00	431825.35	570419.66	N 32 11 13.67	W 104 14 21.57
	10900.00	90.00	0.16	8803.00	2331.67	2331.30	130.80	0.00	431925.34	570419.95	N 32 11 14.66	W 104 14 21.57
	11000.00	90.00	0.16	8803.00	2431.67	2431.30	131.08	0.00	432025.33	570420.23	N 32 11 15.65	W 104 14 21.56
	11100.00	90.00	0.16	8803.00	2531.67	2531.30	131.37	0.00	432125.32	570420.52	N 32 11 16.64	W 104 14 21.56
	11200.00	90.00	0.16	8803.00	2631.67	2631.30	131.65	0.00	432225.31	570420.80	N 32 11 17.63	W 104 14 21.55
	11300.00	90.00	0.16	8803.00	2731.67	2731.30	131.94	0.00	432325.30	570421.08	N 32 11 18.62	W 104 14 21.55
	11400.00	90.00	0.16	8803.00	2831.67	2831.30	132.22	0.00	432425.29	570421.37	N 32 11 19.61	W 104 14 21.54
	11500.00	90.00	0.16	8803.00	2931.67	2931.30	132.51	0.00	432525.28	570421.65	N 32 11 20.60	W 104 14 21.54
	11600.00	90.00	0.16	8803.00	3031.67	3031.30	132.79	0.00	432625.27	570421.94	N 32 11 21.59	W 104 14 21.53
	11700.00	90.00	0.16	8803.00	3131.67	3131.30	133.07	0.00	432725.26	570422.22	N 32 11 22.58	W 104 14 21.53
	11800.00	90.00	0.16	8803.00	3231.67	3231.30	133.36	0.00	432825.25	570422.51	N 32 11 23.56	W 104 14 21.53
	11900.00	90.00	0.16	8803.00	3331.67	3331.30	133.64	0.00	432925.24	570422.79	N 32 11 24.55	W 104 14 21.52
	12000.00	90.00	0.16	8803.00	3431.67	3431.30	133.93	0.00	433025.23	570423.08	N 32 11 25.54	W 104 14 21.52
	12100.00	90.00	0.16	8803.00	3531.67	3531.30	134.21	0.00	433125.22	570423.36	N 32 11 26.53	W 104 14 21.51
	12200.00	90.00	0.16	8803.00	3631.67	3631.30	134.50	0.00	433225.21	570423.64	N 32 11 27.52	W 104 14 21.51
	12300.00	90.00	0.16	8803.00	3731.67	3731.30	134.78	0.00	433325.20	570423.93	N 32 11 28.51	W 104 14 21.50
	12400.00	90.00	0.16	8803.00	3831.67	3831.30	135.07	0.00	433425.19	570424.21	N 32 11 29.50	W 104 14 21.50
	12500.00	90.00	0.16	8803.00	3931.67	3931.30	135.35	0.00	433525.18	570424.50	N 32 11 30.49	W 104 14 21.50
	12600.00	90.00	0.16	8803.00	4031.67	4031.30	135.63	0.00	433625.18	570424.78	N 32 11 31.48	W 104 14 21.49
	12700.00	90.00	0.16	8803.00	4131.67	4131.30	135.92	0.00	433725.17	570425.07	N 32 11 32.47	W 104 14 21.49
	12800.00	90.00	0.16	8803.00	4231.67	4231.30	136.20	0.00	433825.16	570425.35	N 32 11 33.46	W 104 14 21.48
	12900.00	90.00	0.16	8803.00	4331.67	4331.29	136.49	0.00	433925.15	570425.63	N 32 11 34.45	W 104 14 21.48
	13000.00	90.00	0.16	8803.00	4431.67	4431.29	136.77	0.00	434025.14	570425.92	N 32 11 35.44	W 104 14 21.47
	13100.00	90.00	0.16	8803.00	4531.67	4531.29	137.06	0.00	434125.13	570426.20	N 32 11 36.43	W 104 14 21.47
	13200.00	90.00	0.16	8803.00	4631.67	4631.29	137.34	0.00	434225.12	570426.49	N 32 11 37.42	W 104 14 21.47
	13300.00	90.00	0.16	8803.00	4731.67	4731.29	137.62	0.00	434325.11	570426.77	N 32 11 38.41	W 104 14 21.46
	13400.00	90.00	0.16	8803.00	4831.67	4831.29	137.91	0.00	434425.10	570427.06	N 32 11 39.40	W 104 14 21.46
	13500.00	90.00	0.16	8803.00	4931.67	4931.29	138.19	0.00	434525.09	570427.34	N 32 11 40.39	W 104 14 21.45
	13600.00	90.00	0.16	8803.00	5031.67	5031.29	138.48	0.00	434625.08	570427.63	N 32 11 41.38	W 104 14 21.45
	13700.00	90.00	0.16	8803.00	5131.67	5131.29	138.76	0.00	434725.07	570427.91	N 32 11 42.37	W 104 14 21.44
	13800.00	90.00	0.16	8803.00	5231.67	5231.29	139.05	0.00	434825.06	570428.19	N 32 11 43.36	W 104 14 21.44
	13900.00	90.00	0.16	8803.00	5331.67	5331.29	139.33	0.00	434925.05	570428.48	N 32 11 44.34	W 104 14 21.44
	14000.00	90.00	0.16	8803.00	5431.67	5431.29	139.62	0.00	435025.04	570428.76	N 32 11 45.33	W 104 14 21.43
	14100.00	90.00	0.16	8803.00	5531.67	5531.29	139.90	0.00	435125.03	570429.05	N 32 11 46.32	W 104 14 21.43
	14200.00	90.00	0.16	8803.00	5631.67	5631.29	140.18	0.00	435225.02	570429.33	N 32 11 47.31	W 104 14 21.42
	14300.00	90.00	0.16	8803.00	5731.67	5731.29	140.47	0.00	435325.01	570429.62	N 32 11 48.30	W 104 14 21.42
	14400.00	90.00	0.16	8803.00	5831.67	5831.29	140.75	0.00	435425.00	570429.90	N 32 11 49.29	W 104 14 21.41
	14500.00	90.00	0.16	8803.00	5931.67	5931.29	141.04	0.00	435524.99	570430.18	N 32 11 50.28	W 104 14 21.41
	14600.00	90.00	0.16	8803.00	6031.67	6031.29	141.32	0.00	435624.98	570430.47	N 32 11 51.27	W 104 14 21.41
	14700.00	90.00	0.16	8803.00	6131.67	6131.29	141.61	0.00	435724.97	570430.75	N 32 11 52.26	W 104 14 21.40
	14800.00	90.00	0.16	8803.00	6231.67	6231.29	141.89	0.00	435824.96	570431.04	N 32 11 53.25	W 104 14 21.40
	14900.00	90.00	0.16	8803.00	6331.67	6331.29	142.17	0.00	435924.95	570431.32	N 32 11 54.24	W 104 14 21.39
	15000.00	90.00	0.16	8803.00	6431.67	6431.29	142.46	0.00	436024.94	570431.61	N 32 11 55.23	W 104 14 21.39
	15100.00	90.00	0.16	8803.00	6531.67	6531.29	142.74	0.00	436124.94	570431.89	N 32 11 56.22	W 104 14 21.38
	15200.00	90.00	0.16	8803.00	6631.67	6631.29	143.03	0.00	436224.93	570432.17	N 32 11 57.21	W 104 14 21.38
	15300.00	90.00	0.16	8803.00	6731.67	6731.29	143.31	0.00	436324.92	570432.46	N 32 11 58.20	W 104 14 21.37
	15400.00	90.00	0.16	8803.00	6831.67	6831.28	143.60	0.00	436424.91	570432.74	N 32 11 59.19	W 104 14 21.37
	15500.00	90.00	0.16	8803.00	6931.67	6931.28	143.88	0.00	436524.90	570433.03	N 32 12 0.18	W 104 14 21.37

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 ° ' ")
	15600.00	90.00	0.16	8803.00	7031.67	7031.28	144.17	0.00	436624.89	570433.31	N 32 12 1.17	W 104 14 21.36
	15700.00	90.00	0.16	8803.00	7131.67	7131.28	144.45	0.00	436724.88	570433.60	N 32 12 2.16	W 104 14 21.36
	15800.00	90.00	0.16	8803.00	7231.67	7231.28	144.73	0.00	436824.87	570433.88	N 32 12 3.15	W 104 14 21.35
	15900.00	90.00	0.16	8803.00	7331.67	7331.28	145.02	0.00	436924.86	570434.17	N 32 12 4.13	W 104 14 21.35
	16000.00	90.00	0.16	8803.00	7431.67	7431.28	145.30	0.00	437024.85	570434.45	N 32 12 5.12	W 104 14 21.34
	16100.00	90.00	0.16	8803.00	7531.67	7531.28	145.59	0.00	437124.84	570434.73	N 32 12 6.11	W 104 14 21.34
	16200.00	90.00	0.16	8803.00	7631.67	7631.28	145.87	0.00	437224.83	570435.02	N 32 12 7.10	W 104 14 21.34
	16300.00	90.00	0.16	8803.00	7731.67	7731.28	146.16	0.00	437324.82	570435.30	N 32 12 8.09	W 104 14 21.33
	16400.00	90.00	0.16	8803.00	7831.67	7831.28	146.44	0.00	437424.81	570435.59	N 32 12 9.08	W 104 14 21.33
	16500.00	90.00	0.16	8803.00	7931.67	7931.28	146.72	0.00	437524.80	570435.87	N 32 12 10.07	W 104 14 21.32
	16600.00	90.00	0.16	8803.00	8031.67	8031.28	147.01	0.00	437624.79	570436.16	N 32 12 11.06	W 104 14 21.32
	16700.00	90.00	0.16	8803.00	8131.67	8131.28	147.29	0.00	437724.78	570436.44	N 32 12 12.05	W 104 14 21.31
	16800.00	90.00	0.16	8803.00	8231.67	8231.28	147.58	0.00	437824.77	570436.72	N 32 12 13.04	W 104 14 21.31
	16900.00	90.00	0.16	8803.00	8331.67	8331.28	147.86	0.00	437924.76	570437.01	N 32 12 14.03	W 104 14 21.31
	17000.00	90.00	0.16	8803.00	8431.67	8431.28	148.15	0.00	438024.75	570437.29	N 32 12 15.02	W 104 14 21.30
	17100.00	90.00	0.16	8803.00	8531.67	8531.28	148.43	0.00	438124.74	570437.58	N 32 12 16.01	W 104 14 21.30
	17200.00	90.00	0.16	8803.00	8631.67	8631.28	148.72	0.00	438224.73	570437.86	N 32 12 17.00	W 104 14 21.29
	17300.00	90.00	0.16	8803.00	8731.67	8731.28	149.00	0.00	438324.72	570438.15	N 32 12 17.99	W 104 14 21.29
	17400.00	90.00	0.16	8803.00	8831.67	8831.28	149.28	0.00	438424.71	570438.43	N 32 12 18.98	W 104 14 21.28
	17500.00	90.00	0.16	8803.00	8931.67	8931.28	149.57	0.00	438524.71	570438.71	N 32 12 19.97	W 104 14 21.28
	17600.00	90.00	0.16	8803.00	9031.67	9031.28	149.85	0.00	438624.70	570439.00	N 32 12 20.96	W 104 14 21.28
	17700.00	90.00	0.16	8803.00	9131.67	9131.28	150.14	0.00	438724.69	570439.28	N 32 12 21.95	W 104 14 21.27
	17800.00	90.00	0.16	8803.00	9231.67	9231.28	150.42	0.00	438824.68	570439.57	N 32 12 22.94	W 104 14 21.27
	17900.00	90.00	0.16	8803.00	9331.67	9331.27	150.71	0.00	438924.67	570439.85	N 32 12 23.93	W 104 14 21.26
	18000.00	90.00	0.16	8803.00	9431.67	9431.27	150.99	0.00	439024.66	570440.14	N 32 12 24.91	W 104 14 21.26
	18100.00	90.00	0.16	8803.00	9531.67	9531.27	151.27	0.00	439124.65	570440.42	N 32 12 25.90	W 104 14 21.25
	18200.00	90.00	0.16	8803.00	9631.67	9631.27	151.56	0.00	439224.64	570440.71	N 32 12 26.89	W 104 14 21.25
	18300.00	90.00	0.16	8803.00	9731.67	9731.27	151.84	0.00	439324.63	570440.99	N 32 12 27.88	W 104 14 21.25
	18400.00	90.00	0.16	8803.00	9831.67	9831.27	152.13	0.00	439424.62	570441.27	N 32 12 28.87	W 104 14 21.24
	18500.00	90.00	0.16	8803.00	9931.67	9931.27	152.41	0.00	439524.61	570441.56	N 32 12 29.86	W 104 14 21.24
	18600.00	90.00	0.16	8803.00	10031.67	10031.27	152.70	0.00	439624.60	570441.84	N 32 12 30.85	W 104 14 21.23
	18700.00	90.00	0.16	8803.00	10131.67	10131.27	152.98	0.00	439724.59	570442.13	N 32 12 31.84	W 104 14 21.23
Cimarex Black River 25 Fed Com 4H - PBHL [330' FNL, 380' FEL]	18764.37	90.00	0.16	8803.00	10196.03	10195.64	153.16	0.00	439788.95	570442.31	N 32 12 32.48	W 104 14 21.22

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

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 Fed Com 4H Rev2 RM 7May18
	1	26.000	18764.366	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Prelim Cimarex Black River 25 Fed Com

Schlumberger

CIMAREX

Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18 Proposal
Geodetic Report
(Non-Def Plan)

Report Date:	May 07, 2018 - 01:26 PM	**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 Fed Com 4H / Cimarex Black River 25 Fed Com 4H	**TVD Reference Datum:**	RKB
Well:	Cimarex Black River 25 Fed Com 4H	**TVD Reference Elevation:**	3417.200 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3391.200 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.392 °
Survey Name:	Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18	**Total Gravity Field Strength:**	998.4310mgn (9.80665 Based)
Survey Date:	May 07, 2018	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	98.581 ° / 10222.033 ft / 6.332 / 1.161	**Total Magnetic Field Strength:**	47930.523 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.884 °
Location Lat / Long:	N 32° 10' 51.59173", W 104° 14' 23.11081"	**Declination Date:**	May 07, 2018
Location Grid N/E Y/X:	N 429594.250 ftUS, E 570289.160 ftUS	**Magnetic Declination Model:**	HDGM 2018
CRS Grid Convergence Angle:	0.0498 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99991005	**Grid Convergence Used:**	0.0498 °
Version / Patch:	2.10.715.0	**Total Corr Mag North->Grid North:**	7.3422 °
		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 [50' FSL, 544' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
KOP - Build 12°/100' DLS	8255.15	0.00	28.93	8255.15	0.00	0.00	0.00	0.00	429594.25	570289.16	N 32 10 51.59	W 104 14 23.11
Build & Turn 12°/100' DLS	8830.15	45.00	28.93	8592.77	122.59	122.39	67.65	12.00	429716.63	570356.80	N 32 10 52.80	W 104 14 22.32
Build 4°/100' DLS	8951.66	75.00	0.16	8754.19	387.59	387.24	125.27	12.00	429981.45	570414.42	N 32 10 55.42	W 104 14 21.65
Landing Point	9326.66	90.00	0.16	8803.00	758.32	757.97	126.33	4.00	430352.15	570415.47	N 32 10 59.09	W 104 14 21.63
Cimarex Black River 25 Fed Com 4H - PBHL [330' FNL, 380' FEL]	18784.37	90.00	0.16	8803.00	10196.03	10195.64	153.16	0.00	439788.95	570442.31	N 32 12 32.48	W 104 14 21.22

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

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 Fed Com 4H Rev2 RM 7May18
	1	26.000	18784.366	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Prelim Cimarex Black River 25 Fed Com

Schlumberger

CIMAREX

Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18 Anti-Collision Summary Report

Analysis Date-24hr Time:	May 07, 2018 - 14:23	**Analysis Method:**	3D Least Distance
Client:	Cimarex	**Reference Trajectory:**	Prelim Cimarex Black River 25 Fed Com 4H Rev2 RM 7May18 (Non-Def Plan)
Field:	NM Eddy County (NAD 83)	**Depth Interval:**	Every 10.00 Measured Depth (ft)
Structure:	Cimarex Black River 25 Fed Com 4H	**Rule Set:**	D&M AntiCollision Standard S002 v5.1/5.2
Slot:	Cimarex Black River 25 Fed Com 4H	**Min Pts:**	All local minima indicated.
Well:	Cimarex Black River 25 Fed Com 4H	**Version / Patch:**	2.10.715.0
Borehole:	Original Borehole	**Database \ Project:**	US1153APP452.dir.slb.com\drilling-NM Eddy County 2.10
Scan MD Range:	0.00ft - 18764.37ft		

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: Not performed!
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	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
Results highlighted: Sep-Factor separation <= 1.50 ft													
Prelim Cimarex Black River 25 Fed Com 3H Rev2 RM 7May18 (Non-Def Plan)													Pass
	1097.25	32.81	1094.75	1064.44	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
	1096.76	32.81	1094.20	1063.95	20335.48	MAS = 10.00 (m)	20.00	20.00					MinPt-O-SF
	1096.68	32.81	1094.14	1063.87	24249.95	MAS = 10.00 (m)	26.00	26.00					WRP
	1096.63	77.80	1043.92	1018.82	21.79	OSF1.50	8070.00	8070.00					MinPt-CtCt
	1096.63	77.89	1043.87	1018.74	21.77	OSF1.50	8080.00	8080.00					MINPT-O-EOU
	1096.68	77.94	1043.88	1018.73	21.76	OSF1.50	8090.00	8090.00					MinPt-O-ADP
	1098.29	78.20	1045.33	1020.09	21.71	OSF1.50	8150.00	8150.00					MinPt-O-SF
	1599.81	259.47	1425.99	1340.33	9.32	OSF1.50	18764.37	8803.00					MinPts
Prelim Cimarex Black River 25 Fed Com 2H Rev2 RM7May18 (Non-Def Plan)													Pass
	2593.84	32.81	2591.34	2561.03	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
	2593.18	32.81	2590.59	2560.37	28241.28	MAS = 10.00 (m)	26.00	26.00					MinPt-O-SF
	2592.65	78.83	2539.26	2513.82	50.90	OSF1.50	8200.00	8200.00					MinPt-CtCt
	2592.68	78.90	2539.23	2513.76	50.85	OSF1.50	8210.00	8210.00					MINPT-O-EOU
	2592.70	78.95	2539.23	2513.75	50.82	OSF1.50	8220.00	8220.00					MinPt-O-ADP
	2600.05	79.55	2546.18	2520.50	50.57	OSF1.50	8350.00	8349.38					MinPt-O-SF
	2912.30	258.83	2738.92	2653.48	17.03	OSF1.50	18764.37	8803.00					MinPts
Prelim Cimarex Black River 25 Fed Com 1H Rev3 RM 4May18 (Non-Def Plan)													Pass
	2633.72	32.81	2631.22	2600.91	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
	2633.07	32.81	2630.48	2600.26	29172.92	MAS = 10.00 (m)	26.00	26.00					MinPt-O-SF
	2632.55	32.81	2620.83	2599.74	285.02	MAS = 10.00 (m)	1570.00	1570.00					MinPts
	2632.60	32.81	2620.73	2599.79	280.72	MAS = 10.00 (m)	1600.00	1600.00					MINPT-O-EOU
	4041.20	77.32	3988.83	3963.89	80.97	OSF1.50	8540.00	8523.40					MinPt-O-SF
	4231.85	87.55	4172.79	4144.44	74.60	OSF1.50	9580.00	8803.00					MinPt-CtCt
	4231.99	252.16	4063.06	3979.84	25.41	OSF1.50	18764.37	8803.00					MinPts