

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Carlsbad Field Office

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.
NMLC064200

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No. **322649**
RIVERBOAT 12/1 W0PA FED COM 1H9. API Well No.
30-015-4530510. Field and Pool or Exploratory Area
PURPLE SAGE WOLFCAMP11. County or Parish, State
EDDY COUNTY, NM**SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

CIMAREX ENERGY CO.

Contact: AMITHY E CRAWFORD

E-Mail: acrawford@cimarex.com

3a. Address

600 N. MARIENFELD SUITE 600
MIDLAND, TX 79701

3b. Phone No. (include area code)

Ph: 432-620-1909

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

Sec 12 T24S R26E 285FSL 449FEL

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

TYPE OF SUBMISSION

TYPE OF ACTION

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

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 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 to change the SHL of the Riverboat 12/1 W0PA Federal Com 1H well. The move will be located within the already approved pad and there will no new surface disturbance. ✓

Cimarex Respectfully requests to change the drilling program as approved in the original APD in its entirety. Changes to the Casing program, Cement program, Mud program, BOPs ect. were made. Please update COAs for the new drilling program attached.

The Rig layout, including v-door and flare line may change depending on rig availability. The pad dimensions and orientation will remain the same. There will be no additional disturbance if a rig layout change is necessary to accommodate the drilling rig.

SHL

Surface good 11-5-2018 BR

NM OIL CONSERVATION
ARTESIA DISTRICT

NOV 14 2018

RECEIVED

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

Electronic Submission #441221 verified by the BLM Well Information System
For CIMAREX ENERGY CO., sent to the Carlsbad
Committed to AFMSS for processing by MUSTAFA HAQUE on 10/25/2018 ()

Name (Printed/Typed) AMITHY E CRAWFORD

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 10/25/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By

Title

Date

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

Office

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

(Instructions on page 2)

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

RIP 11-20-18.

Additional data for EC transaction #441221 that would not fit on the form

32. Additional remarks, continued

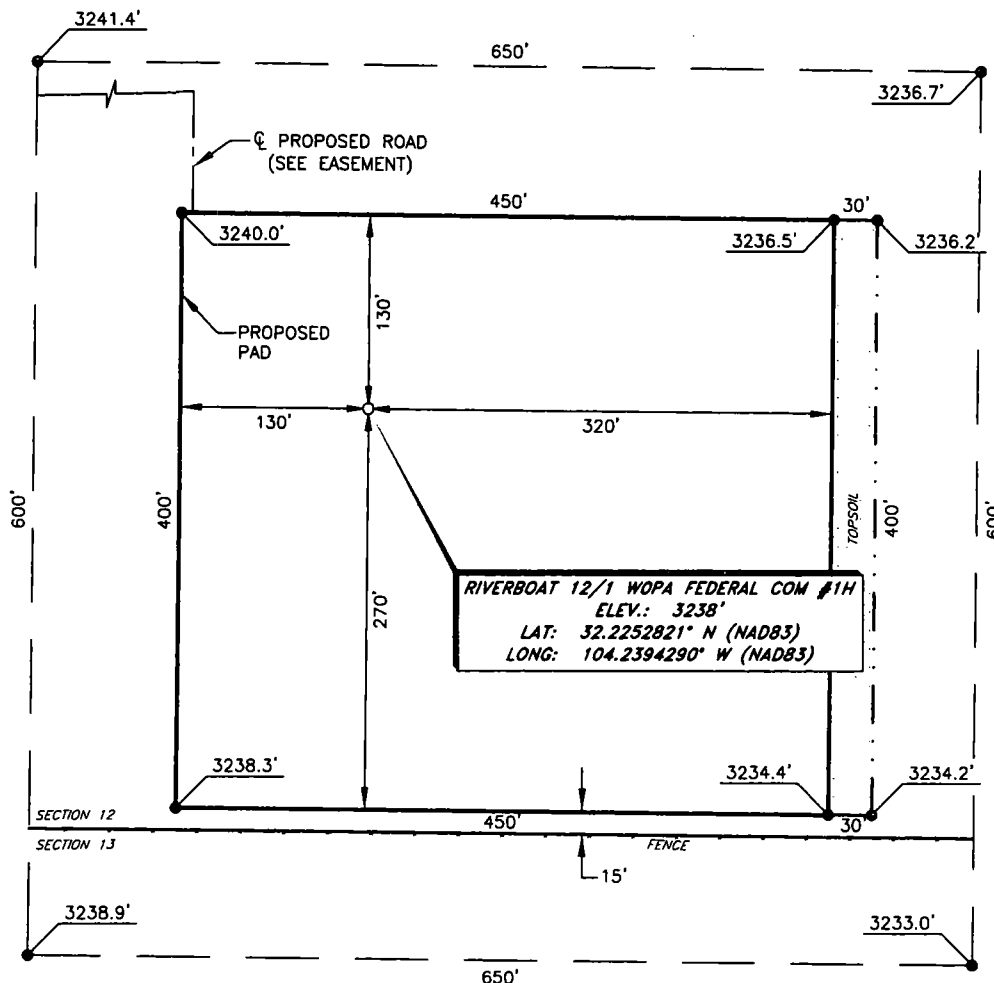
Current

215' FSL & 380' FEL of Section 12, T24S, R26E Eddy Co NM

Proposed

285' FSL & 449' FEL of Section 12, T24S, R26E Eddy Co NM

CIMAREX ENERGY COMPANY
RIVERBOAT 12/1 WOPA FEDERAL COM #1H
(285' FSL & 449' FEL)
SECTION 12, T24S, R28E
N. M. P. M., EDDY CO., NEW MEXICO



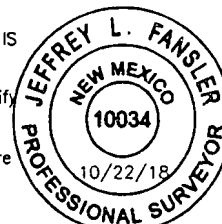
DIRECTIONS TO LOCATION

From the intersection of C.R. 396 (Black River Village Rd.) & C.R. 763 (Bounds Rd.)
go Northeast on C.R. 763 for approx. 1.3 miles;
Turn right onto lease road and go Southeast for approx. 0.8 miles;
Road curves, continue Northeast for approx. 0.1 miles;
Road curves, continue East for approx. 0.2 miles to proposed road;
Turn right onto proposed road and go East for approx. 0.6 miles;
Turn right and go South approx. 80 feet to proposed pad.

THIS IS NOT A BOUNDARY SURVEY, APPARENT PROPERTY CORNERS AND
PROPERTY LINES ARE SHOWN FOR INFORMATION ONLY, BOUNDARY DATA IS
SHOWN FROM A PREVIOUS SURVEY REFERENCED HEREON.

I, Jeffrey L. Fansler, a N. M. Professional Surveyor, hereby certify
that I prepared this plat from an actual survey made on the
ground under my direct supervision, said survey and plat meet
the Min. Stds. for Land Surveying in the State of N. M. and are
true and correct to the best of my knowledge and belief.

Jeffrey L. Fansler
Jeffrey L. Fansler NM PS 10034



SCALE: 1" = 100'
0 50' 100'

BEARINGS ARE GRID NAD 83
NM EAST
DISTANCES ARE HORIZ. GROUND.

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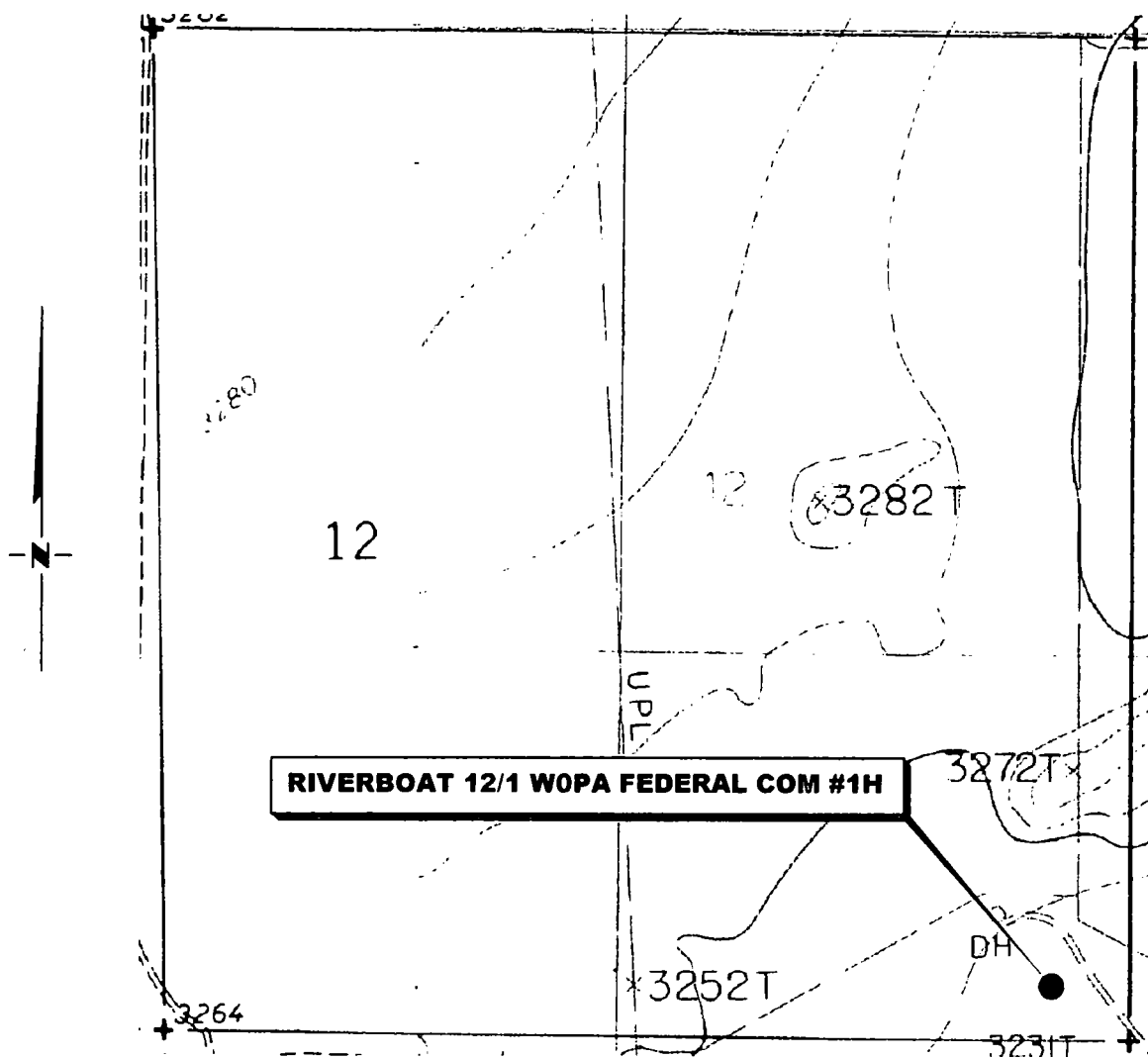
NO.	REVISION	DATE
JOB NO.:	LS18101186	
DWG. NO.:	4-18101186	

RRC

701 S. CECIL STREET, HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'
DATE: 10-19-2018
SURVEYED BY: AB/RU
DRAWN BY: AiAC
APPROVED BY: JLF
SHEET : 1 OF 1

LOCATION VERIFICATION MAP



*SECTION 12, TWP. 24 SOUTH, RGE. 26 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO*

OPERATOR: Cimarex Energy Company
LEASE: Riverboat 12/1 WOPA Federal Com
WELL NO.: 1H
ELEVATION: 3238'

LOCATION: 285' FSL & 449' FEL
CONTOUR INTERVAL: 10'
USGS TOPO. SOURCE MAP:
Bond Draw, NM (P. E. 1985)

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NO.	REVISION	DATE
JOB NO.: LS18101186		
DWG. NO.: 2-18101186		

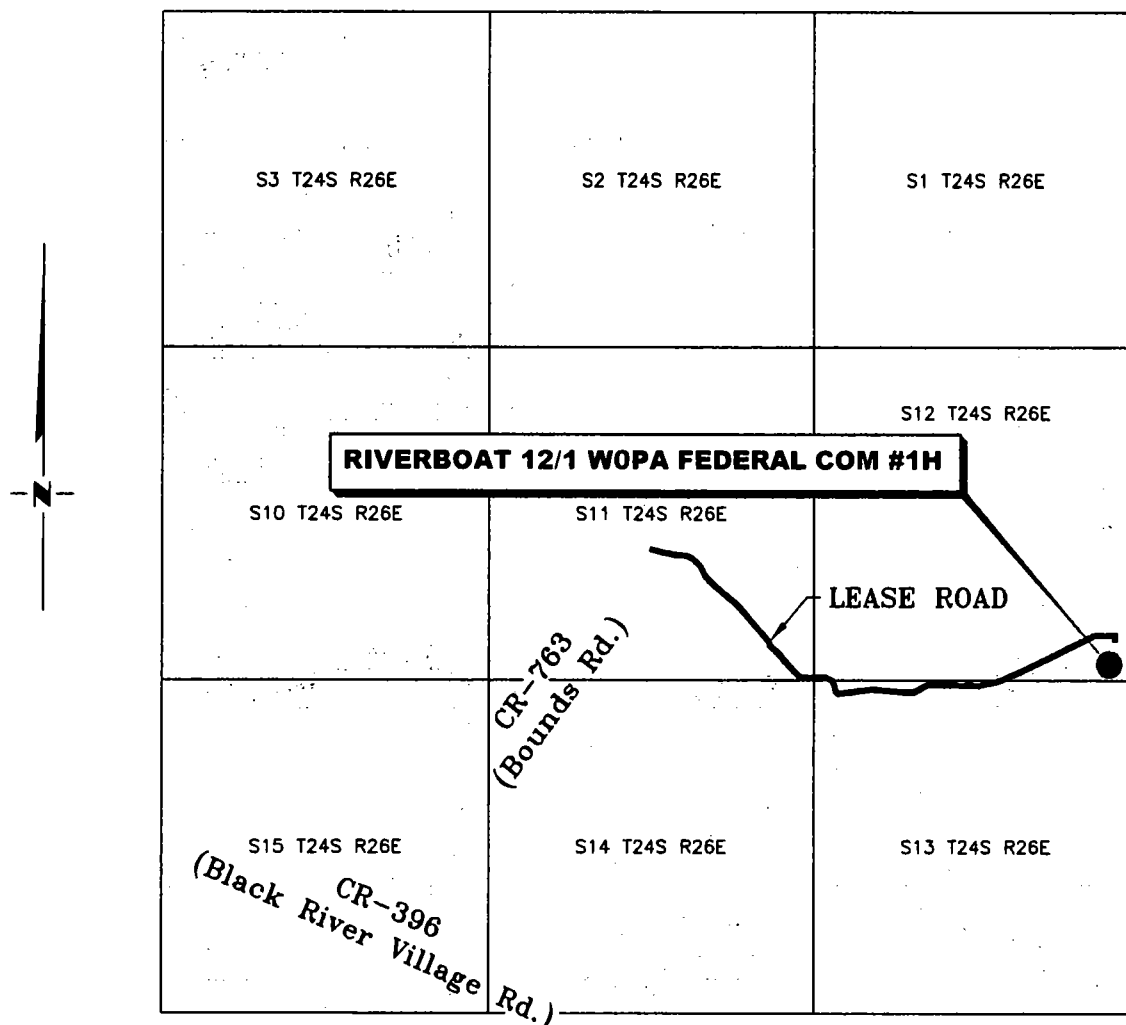
RRC

701 S. CECIL STREET, HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
DATE: 10-19-2018
SURVEYED BY: AB/RU
DRAWN BY: AiAC
APPROVED BY: JLF
SHEET: 1 OF 1

VICINITY MAP

NOT TO SCALE



**SECTION 12, TWP. 24 SOUTH, RGE. 26 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO**

OPERATOR: Cimarex Energy Company
LEASE: Riverboat 12/1 WOPA Federal Com
WELL NO.: 1H

LOCATION: 285' FSL & 449' FEL
ELEVATION: 3238'

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NO.	REVISION	DATE
JOB NO.:	LS18101186	
DWG. NO.:	3-18101186	

RRC

701 S. CECIL STREET, HOBBS, NM 88240 (575) 964-8200

SCALE: N. T. S.
DATE: 10-19-2018
SURVEYED BY: AB/RU
DRAWN BY: AiAC
APPROVED BY: JLF
SHEET: 1 OF 1

1. Geological Formations

TVD of target 8,843

Pilot Hole TD N/A

MD at TD 18,544

Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Salado	1030	N/A	
Castille	1660	N/A	
Bell Canyon	2000	Hydrocarbons	
Cherry Canyon	2874	Hydrocarbons	
Brushy Canyon	3792	Hydrocarbons	
Bone Spring	5372	Hydrocarbons	
1st Bone Spring SS	6386	Hydrocarbons	
2nd Bone Spring SS	6918	Hydrocarbons	
3rd Bone Spring Carb	7054	Hydrocarbons	
Top Harkey SS	7801	Hydrocarbons	
3rd Bone Spring SS	8306	Hydrocarbons	
Wolfcamp	8666	Hydrocarbons	
Wolfcamp Y SS	8752	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	425	425	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	3.76	8.80	15.78
12 1/4	0	1980	1980	9-5/8"	36.00	J-55	LT&C	1.92	3.35	6.36
8 3/4	0	8263	8263	7"	26.00	L-80	LT&C	1.40	1.87	2.25
8 3/4	8263	8888	8724	7"	26.00	N-80	BT&C	1.33	1.77	50.39
6	8263	18544	18544	4-1/2"	11.60	P-110	BT&C	1.57	2.22	54.55
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
Is AC Report included?	N

3. Cementing Program

Casing	# Sk	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	98	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	375	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	116	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	334	10.30	3.64	22.18		Lead: Tuned Light + LCM
	80	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Completion System	702	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	32
Intermediate	0	50
Production	1780	24
Completion System	8888	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	X	
			Double Ram	X	
			Other		
8 3/4	13 5/8	3M	Annular	X	50% of working pressure
			Blind Ram		3M
			Pipe Ram	X	
			Double Ram	X	
			Other		
6	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 425'	FW Spud Mud	8.40 - 8.90	30-32	N/C
425' to 1980'	Brine Water	9.70 - 10.20	30-32	N/C
1980' to 8888'	FW/Cut Brine	8.50 - 9.00	30-32	N/C
9252' to 18544'	OBM	10.00 - 10.50	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 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
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7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	4828 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	H ₂ S is present
X	H ₂ S 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.

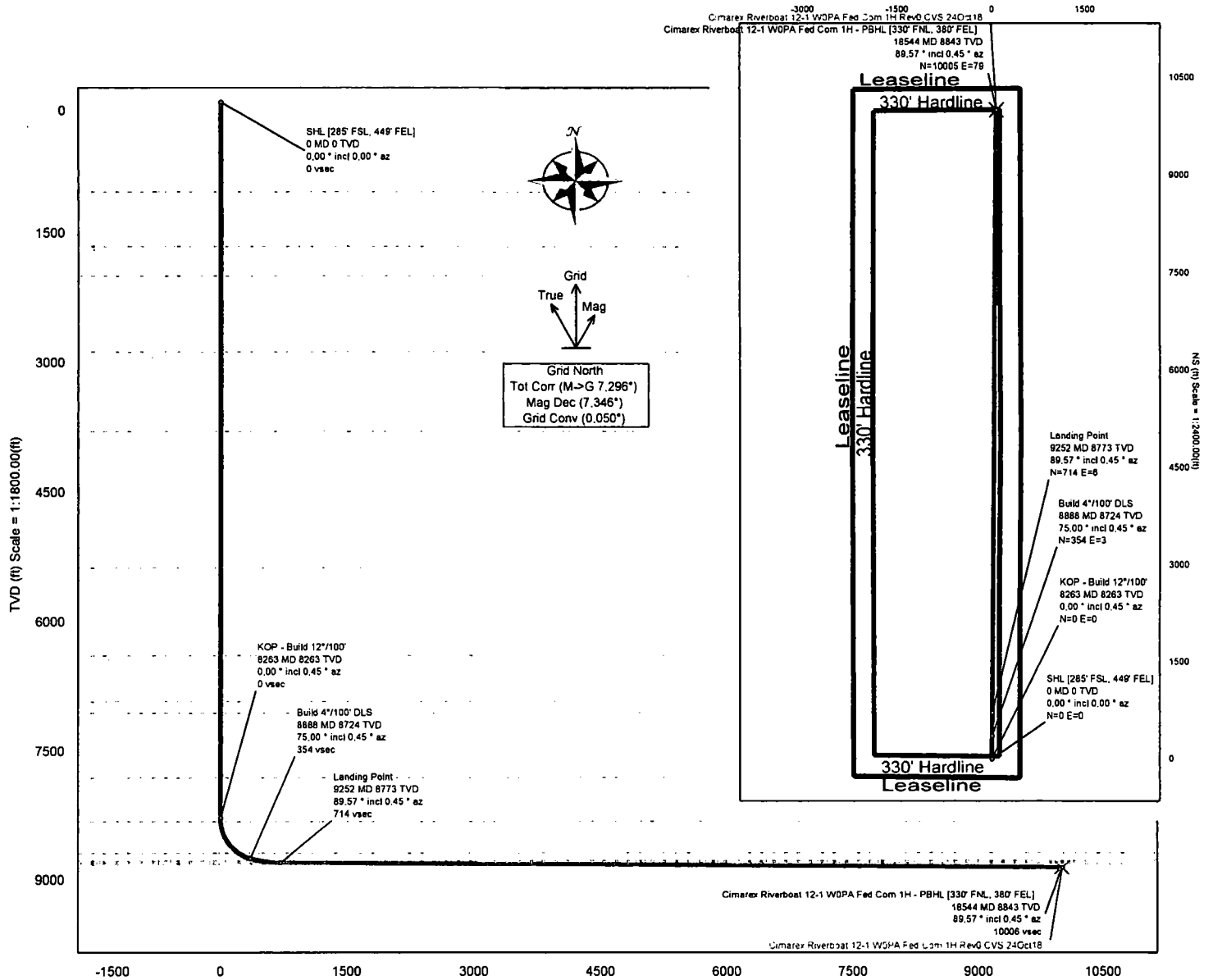
The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

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.

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Riverboat 12-1 WOPA Fed Com 1H	NM Eddy County (NAD 83)	Cimarex Riverboat 12-1 WOPA Fed Com 1H

Gravity & Magnetic Parameters				Surface Location				Miscellaneous			
Model:	HDDM 2018	Dip:	59.919°	Date:	24-Oct-2018	Lat:	N 32 13 31.02	Northing:	446704.1105	Grid Conv:	0.0501*
MagDec:	7.346°	FB:	47894.833nT	Gravity FB:	998.482mg (9.80665 Based)	Lon:	W 104 14 21.84	Easting:	570376.3105	Scale Fact:	0.99991008
								Miscellaneous			
								Shot: Riverboat 12-1			
								WOPA Fed Com 1H			
								Plan: Cimarex Riverboat 12-1 WOPA Fed Com 1H Rev0 CVS 24Oct18			
								EW (ft) Scale = 1:2400.00(ft)			



Vertical Section (ft) Azim = 0.45° Scale = 1:1800.00(ft) Origin = 0N/-S, 0E/-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL (285' FSL, 449' FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salado (Top Salt)	1030.00	0.00	0.45	1030.00	0.00	0.00	0.00	0.00
Castile (Base Salt)	1680.00	0.00	0.45	1680.00	0.00	0.00	0.00	0.00
Bell Canyon (Top Delaware)	2000.00	0.00	0.45	2000.00	0.00	0.00	0.00	0.00
Cherry Canyon	2874.00	0.00	0.45	2874.00	0.00	0.00	0.00	0.00
Brushy Canyon	3792.00	0.00	0.45	3792.00	0.00	0.00	0.00	0.00
Top Bone Spring	5372.00	0.00	0.45	5372.00	0.00	0.00	0.00	0.00
Top 1st BSPG SS	6386.00	0.00	0.45	6386.00	0.00	0.00	0.00	0.00
Top 2nd BSPG SS	6918.00	0.00	0.45	6918.00	0.00	0.00	0.00	0.00
Top 3rd BSPG Carb	7054.00	0.00	0.45	7054.00	0.00	0.00	0.00	0.00
Top Harkey SS	7801.00	0.00	0.45	7801.00	0.00	0.00	0.00	0.00
KOP - Build 12'/100'	8263.04	0.00	0.45	8263.04	0.00	0.00	0.00	0.00
Top 3rd BSPG SS	8306.06	5.16	0.45	8306.00	1.94	1.94	0.02	12.00
Top Wolfcamp	8742.71	57.56	0.45	8666.00	221.35	221.34	1.74	12.00
Build 4'/100' DLS	8888.04	75.00	0.45	8724.29	353.89	353.88	2.78	12.00
Wolfcamp "Y" SS	9017.21	80.17	0.45	8752.00	479.99	479.98	3.77	4.00
Wolfcamp "Y" SS Tgt	9251.91	89.55	0.45	8773.00	713.49	713.46	5.61	4.00
Landing Point	9252.25	89.57	0.45	8773.00	713.83	713.81	5.61	4.00
Base "Y" SS	11906.88	89.57	0.45	8793.00	3368.38	3368.28	26.49	0.00
Cimarex Riverboat 12-1 WOPA Fed Com 1H - PBHL [330' FNL, 380' FEL]	18544.31	89.57	0.45	8843.00	10005.83	10005.32	78.71	0.00

Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18 Proposal

Geodetic Report

(Non-Def Plan)



Report Date:	October 24, 2018 - 04:51 PM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	0.451 ° (Grid North)
Field:	NM Eddy County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Riverboat 12-1 W0PA Fed Com 1H / Cimarex Riverboat 12-1 W0PA Fed Com 1H	TVD Reference Datum:	RKB
Well:	Cimarex Riverboat 12-1 W0PA Fed Com 1H	TVD Reference Elevation:	3258.000 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	3238.000 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	7.346 °
Survey Name:	Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18	Total Gravity Field Strength:	998.4518mgm (9.80885 Based)
Survey Date:	October 24, 2018	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	89.588 ° / 10005.629 ft / 6.274 / 1.131	Total Magnetic Field Strength:	47894.833 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	59.919 °
Location Lat / Long:	N 32° 13' 31.01543", W 104° 14' 21.94474"	Declination Date:	October 24, 2018
Location Grid N/E Y/X:	N 445704.100 RUS, E 570375.300 RUS	Magnetic Declination Model:	HDGM 2018
CRS Grid Convergence Angle:	0.0501 °	North Reference:	Grid North
Grid Scale Factor:	0.99991006	Grid Convergence Used:	0.0501 °
Version / Patch:	2.10.740.0	Total Corr Mag North->Grid North:	7.2980 °
		Local Coord Referenced To:	Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS ("/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
SHL [285' FSL, 449' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	100.00	0.00	0.45	100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	200.00	0.00	0.45	200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	300.00	0.00	0.45	300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	400.00	0.00	0.45	400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	500.00	0.00	0.45	500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	600.00	0.00	0.45	600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	700.00	0.00	0.45	700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	800.00	0.00	0.45	800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	900.00	0.00	0.45	900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1000.00	0.00	0.45	1000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Salado (Top Sail)</i>	1030.00	0.00	0.45	1030.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1100.00	0.00	0.45	1100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1200.00	0.00	0.45	1200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1300.00	0.00	0.45	1300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1400.00	0.00	0.45	1400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1500.00	0.00	0.45	1500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1600.00	0.00	0.45	1600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Castile (Base Sail)</i>	1660.00	0.00	0.45	1660.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1700.00	0.00	0.45	1700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1800.00	0.00	0.45	1800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	1900.00	0.00	0.45	1900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Bell Canyon (Top Delaware)</i>	2000.00	0.00	0.45	2000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2100.00	0.00	0.45	2100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2200.00	0.00	0.45	2200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2300.00	0.00	0.45	2300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2400.00	0.00	0.45	2400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2500.00	0.00	0.45	2500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2600.00	0.00	0.45	2600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2700.00	0.00	0.45	2700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2800.00	0.00	0.45	2800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Cherry Canyon</i>	2874.00	0.00	0.45	2874.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	2900.00	0.00	0.45	2900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3000.00	0.00	0.45	3000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3100.00	0.00	0.45	3100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3200.00	0.00	0.45	3200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3300.00	0.00	0.45	3300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3400.00	0.00	0.45	3400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3500.00	0.00	0.45	3500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3600.00	0.00	0.45	3600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3700.00	0.00	0.45	3700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Brushy Canyon</i>	3792.00	0.00	0.45	3792.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3800.00	0.00	0.45	3800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	3900.00	0.00	0.45	3900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4000.00	0.00	0.45	4000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4100.00	0.00	0.45	4100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4200.00	0.00	0.45	4200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4300.00	0.00	0.45	4300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4400.00	0.00	0.45	4400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4500.00	0.00	0.45	4500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4600.00	0.00	0.45	4600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4700.00	0.00	0.45	4700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4800.00	0.00	0.45	4800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	4900.00	0.00	0.45	4900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5000.00	0.00	0.45	5000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5100.00	0.00	0.45	5100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5200.00	0.00	0.45	5200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5300.00	0.00	0.45	5300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
<i>Top Bone Spring</i>	5372.00	0.00	0.45	5372.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5400.00	0.00	0.45	5400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94

...Original Borehole\Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18

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 ° ' ")
	5500.00	0.00	0.45	5500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5600.00	0.00	0.45	5600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5700.00	0.00	0.45	5700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5800.00	0.00	0.45	5800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	5900.00	0.00	0.45	5900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6000.00	0.00	0.45	6000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6100.00	0.00	0.45	6100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6200.00	0.00	0.45	6200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6300.00	0.00	0.45	6300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
Top 1st BSPG SS	6388.00	0.00	0.45	6388.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6400.00	0.00	0.45	6400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6500.00	0.00	0.45	6500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6600.00	0.00	0.45	6600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6700.00	0.00	0.45	6700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6800.00	0.00	0.45	6800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
Top 2nd BSPG SS	6900.00	0.00	0.45	6900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	6918.00	0.00	0.45	6918.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7000.00	0.00	0.45	7000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
Top 3rd BSPG Carb	7054.00	0.00	0.45	7054.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7100.00	0.00	0.45	7100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7200.00	0.00	0.45	7200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7300.00	0.00	0.45	7300.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7400.00	0.00	0.45	7400.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7500.00	0.00	0.45	7500.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7600.00	0.00	0.45	7600.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7700.00	0.00	0.45	7700.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7800.00	0.00	0.45	7800.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
Top Harkey SS	7801.00	0.00	0.45	7801.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	7900.00	0.00	0.45	7900.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	8000.00	0.00	0.45	8000.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	8100.00	0.00	0.45	8100.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	8200.00	0.00	0.45	8200.00	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
KOP - Build 12"/100'	8263.04	0.00	0.45	8263.04	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
	8300.00	4.44	0.45	8298.98	1.43	1.43	0.01	12.00	445705.53	570375.31	N 32 13 31.03	W 104 14 21.94
Top 3rd BSPG SS	8306.06	5.18	0.45	8306.00	1.94	1.94	0.02	12.00	445706.04	570375.32	N 32 13 31.03	W 104 14 21.94
	8400.00	16.44	0.45	8398.13	19.51	19.51	0.15	12.00	445723.61	570375.45	N 32 13 31.21	W 104 14 21.94
	8500.00	28.44	0.45	8490.39	57.60	57.60	0.45	12.00	445761.70	570375.75	N 32 13 31.59	W 104 14 21.94
	8600.00	40.44	0.45	8572.72	114.04	114.04	0.90	12.00	445818.13	570376.20	N 32 13 32.14	W 104 14 21.93
	8700.00	52.44	0.45	8641.51	186.37	186.37	1.46	12.00	445860.45	570376.76	N 32 13 32.88	W 104 14 21.93
Top Wolfcamp	8742.71	57.56	0.45	8666.00	221.35	221.34	1.74	12.00	445925.42	570377.04	N 32 13 33.21	W 104 14 21.92
	8800.00	64.44	0.45	8693.76	271.42	271.42	2.13	12.00	445975.49	570377.43	N 32 13 33.70	W 104 14 21.92
Build 4"/100' DLS	8888.04	75.00	0.45	8724.24	353.89	353.88	2.78	12.00	446057.94	570378.08	N 32 13 34.52	W 104 14 21.91
	8900.00	75.48	0.45	8727.28	365.45	365.44	2.87	4.00	446069.51	570378.17	N 32 13 34.63	W 104 14 21.91
	9000.00	79.48	0.45	8748.96	483.05	483.04	3.64	4.00	446167.10	570378.94	N 32 13 35.80	W 104 14 21.90
Wolfcamp "Y" SS	9017.21	80.17	0.45	8752.00	479.99	479.98	3.77	4.00	446184.03	570379.07	N 32 13 35.76	W 104 14 21.90
	9100.00	83.48	0.45	8763.77	561.93	561.91	4.41	4.00	446265.96	570379.71	N 32 13 36.58	W 104 14 21.89
	9200.00	87.48	0.45	8771.66	661.80	661.58	5.20	4.00	446365.62	570380.50	N 32 13 37.56	W 104 14 21.88
Wolfcamp "Y" SS Tgt	9251.91	89.55	0.45	8773.00	713.49	713.46	5.61	4.00	446417.50	570380.91	N 32 13 38.08	W 104 14 21.87
Landing Point	9252.25	89.57	0.45	8773.00	713.83	713.81	5.61	4.00	446417.84	570380.91	N 32 13 38.08	W 104 14 21.87
	9300.00	89.57	0.45	8773.36	761.58	761.55	5.98	0.00	446465.58	570381.28	N 32 13 38.55	W 104 14 21.87
	9400.00	89.57	0.45	8774.12	861.57	861.55	6.77	0.00	446565.57	570382.07	N 32 13 39.54	W 104 14 21.86
	9500.00	89.57	0.45	8774.87	961.57	961.54	7.56	0.00	446665.55	570382.86	N 32 13 40.53	W 104 14 21.85
	9600.00	89.57	0.45	8775.62	1061.57	1061.54	8.34	0.00	446765.54	570383.64	N 32 13 41.52	W 104 14 21.84
	9700.00	89.57	0.45	8776.38	1161.57	1161.53	9.13	0.00	446865.52	570384.43	N 32 13 42.51	W 104 14 21.83
	9800.00	89.57	0.45	8777.13	1261.56	1261.52	9.92	0.00	446965.51	570385.22	N 32 13 43.50	W 104 14 21.82
	9900.00	89.57	0.45	8777.88	1361.56	1361.52	10.70	0.00	447065.49	570386.00	N 32 13 44.49	W 104 14 21.81
	10000.00	89.57	0.45	8778.64	1461.56	1461.51	11.49	0.00	447165.48	570386.79	N 32 13 45.48	W 104 14 21.80
	10100.00	89.57	0.45	8779.39	1561.55	1561.51	12.28	0.00	447265.46	570387.58	N 32 13 46.47	W 104 14 21.79
	10200.00	89.57	0.45	8780.14	1661.55	1661.50	13.06	0.00	447365.45	570388.36	N 32 13 47.46	W 104 14 21.78
	10300.00	89.57	0.45	8780.90	1761.55	1761.49	13.85	0.00	447465.43	570389.15	N 32 13 48.45	W 104 14 21.77
	10400.00	89.57	0.45	8781.65	1861.55	1861.49	14.64	0.00	447565.42	570389.94	N 32 13 49.43	W 104 14 21.76
	10500.00	89.57	0.45	8782.40	1961.54	1961.48	15.42	0.00	447665.40	570390.72	N 32 13 50.42	W 104 14 21.75
	10600.00	89.57	0.45	8783.16	2061.54	2061.48	16.21	0.00	447765.39	570391.51	N 32 13 51.41	W 104 14 21.74
	10700.00	89.57	0.45	8783.91	2161.54	2161.47	17.00	0.00	447865.37	570392.30	N 32 13 52.40	W 104 14 21.72
	10800.00	89.57	0.45	8784.66	2261.53	2261.47	17.78	0.00	447965.36	570393.08	N 32 13 53.39	W 104 14 21.71
	10900.00	89.57	0.45	8785.42	2361.53	2361.46	18.57	0.00	448065.34	570393.87	N 32 13 54.38	W 104 14 21.70
	11000.00	89.57	0.45	8786.17	2461.53	2461.45	19.36	0.00	448165.33	570394.66	N 32 13 55.37	W 104 14 21.69
	11100.00	89.57	0.45	8786.92	2561.53	2561.45	20.14	0.00	448265.31	570395.44	N 32 13 56.36	W 104 14 21.68
	11200.00	89.57	0.45	8787.68	2661.52	2661.44	20.93	0.00	448365.30	570396.23	N 32 13 57.35	W 104 14 21.67
	11300.00	89.57	0.45	8788.43	2761.52	2761.44	21.72	0.00	448465.28	570397.02	N 32 13 58.34	W 104 14 21.66
	11400.00	89.57	0.45	8789.18	2861.52	2861.43	22.50	0.00	448565.27	570397.80	N 32 13 59.33	W 104 14 21.65
	11500.00	89.57	0.45	8789.93	2961.52	2961.42	23.29	0.00	448665.25	570398.59	N 32 14 0.32	W 104 14 21.64
	11600.00	89.57	0.45	8790.69	3061.51	3061.42	24.08	0.00	448765.24	570399.38	N 32 14 1.31	W 104 14 21.63
	11700.00	89.57	0.45	8791.44	3161.51	3161.41	24.86	0.00	448865.22	570400.16	N 32 14 2.30	W 104 14 21.62
	11800.00	89.57	0.45	8792.19	3261.51	3261.41	25.65	0.00	448965.21	570400.95	N 32 14 3.29	W 104 14 21.61
	11900.00	89.57	0.45	8792.95	3361.50	3361.40	26.44	0.00	449065.19	570401.74	N 32 14 4.28	W 104 14 21.60
Base "Y" SS	11906.88	89.57	0.45	8793.00	3368.38	3368.28	26.49	0.00	449072.07	570401.79	N 32 14 4.34	W 104 14 21.60
	12000.00	89.57	0.45	8793.70	3461.50	3461.39	27.22	0.00	449165.18	570402.52	N 32 14 5.27	W 104 14 21.59
	12100.00	89.57										

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 ° ' ")
	12500.00	89.57	0.45	8797.47	3961.49	3961.38	31.16	0.00	449885.10	570408.48	N 32 14 10.21	W 104 14 21.54
	12600.00	89.57	0.45	8798.22	4061.48	4061.38	31.94	0.00	449785.08	570407.24	N 32 14 11.20	W 104 14 21.53
	12700.00	89.57	0.45	8798.97	4161.48	4161.35	32.73	0.00	449885.07	570408.03	N 32 14 12.19	W 104 14 21.52
	12800.00	89.57	0.45	8799.73	4261.48	4261.35	33.52	0.00	449985.05	570408.81	N 32 14 13.18	W 104 14 21.51
	12900.00	89.57	0.45	8800.48	4361.48	4361.34	34.30	0.00	450085.04	570409.60	N 32 14 14.17	W 104 14 21.50
	13000.00	89.57	0.45	8801.23	4461.47	4461.33	35.09	0.00	450185.02	570410.39	N 32 14 15.16	W 104 14 21.49
	13100.00	89.57	0.45	8801.99	4561.47	4561.33	35.88	0.00	450285.01	570411.17	N 32 14 16.15	W 104 14 21.48
	13200.00	89.57	0.45	8802.74	4661.47	4661.32	36.66	0.00	450384.99	570411.96	N 32 14 17.14	W 104 14 21.47
	13300.00	89.57	0.45	8803.49	4761.46	4761.32	37.45	0.00	450484.98	570412.75	N 32 14 18.13	W 104 14 21.46
	13400.00	89.57	0.45	8804.25	4861.46	4861.31	38.24	0.00	450584.96	570413.53	N 32 14 19.12	W 104 14 21.45
	13500.00	89.57	0.45	8805.00	4961.46	4961.30	39.02	0.00	450684.95	570414.32	N 32 14 20.11	W 104 14 21.44
	13600.00	89.57	0.45	8805.75	5061.46	5061.30	39.81	0.00	450784.93	570415.11	N 32 14 21.10	W 104 14 21.43
	13700.00	89.57	0.45	8806.51	5161.45	5161.29	40.60	0.00	450884.92	570415.89	N 32 14 22.09	W 104 14 21.42
	13800.00	89.57	0.45	8807.26	5261.45	5261.29	41.38	0.00	450984.90	570416.88	N 32 14 23.08	W 104 14 21.41
	13900.00	89.57	0.45	8808.01	5361.45	5361.28	42.17	0.00	451084.89	570417.47	N 32 14 24.07	W 104 14 21.40
	14000.00	89.57	0.45	8808.77	5461.44	5461.28	42.96	0.00	451184.87	570418.25	N 32 14 25.06	W 104 14 21.39
	14100.00	89.57	0.45	8809.52	5561.44	5561.27	43.74	0.00	451284.86	570419.04	N 32 14 26.04	W 104 14 21.38
	14200.00	89.57	0.45	8810.27	5661.44	5661.26	44.53	0.00	451384.84	570419.83	N 32 14 27.03	W 104 14 21.37
	14300.00	89.57	0.45	8811.03	5761.44	5761.26	45.32	0.00	451484.83	570420.61	N 32 14 28.02	W 104 14 21.36
	14400.00	89.57	0.45	8811.78	5861.43	5861.25	46.10	0.00	451584.81	570421.40	N 32 14 29.01	W 104 14 21.35
	14500.00	89.57	0.45	8812.53	5961.43	5961.25	46.89	0.00	451684.80	570422.19	N 32 14 30.00	W 104 14 21.34
	14600.00	89.57	0.45	8813.29	6061.43	6061.24	47.68	0.00	451784.78	570422.97	N 32 14 30.99	W 104 14 21.33
	14700.00	89.57	0.45	8814.04	6161.42	6161.23	48.46	0.00	451884.77	570423.76	N 32 14 31.98	W 104 14 21.32
	14800.00	89.57	0.45	8814.79	6261.42	6261.23	49.25	0.00	451984.75	570424.55	N 32 14 32.97	W 104 14 21.31
	14900.00	89.57	0.45	8815.55	6361.42	6361.22	50.04	0.00	452084.74	570425.33	N 32 14 33.96	W 104 14 21.30
	15000.00	89.57	0.45	8816.30	6461.42	6461.22	50.82	0.00	452184.72	570426.12	N 32 14 34.95	W 104 14 21.29
	15100.00	89.57	0.45	8817.05	6561.41	6561.21	51.61	0.00	452284.71	570426.91	N 32 14 35.94	W 104 14 21.28
	15200.00	89.57	0.45	8817.81	6661.41	6661.20	52.40	0.00	452384.69	570427.69	N 32 14 36.93	W 104 14 21.27
	15300.00	89.57	0.45	8818.56	6761.41	6761.20	53.18	0.00	452484.68	570428.48	N 32 14 37.92	W 104 14 21.26
	15400.00	89.57	0.45	8819.31	6861.40	6861.19	53.97	0.00	452584.66	570429.27	N 32 14 38.91	W 104 14 21.25
	15500.00	89.57	0.45	8820.07	6961.40	6961.19	54.76	0.00	452684.65	570430.05	N 32 14 39.90	W 104 14 21.24
	15600.00	89.57	0.45	8820.82	7061.40	7061.18	55.55	0.00	452784.63	570430.84	N 32 14 40.89	W 104 14 21.23
	15700.00	89.57	0.45	8821.57	7161.40	7161.17	56.33	0.00	452884.62	570431.63	N 32 14 41.88	W 104 14 21.22
	15800.00	89.57	0.45	8822.33	7261.39	7261.17	57.12	0.00	452984.60	570432.41	N 32 14 42.87	W 104 14 21.21
	15900.00	89.57	0.45	8823.08	7361.39	7361.16	57.91	0.00	453084.59	570433.20	N 32 14 43.85	W 104 14 21.20
	16000.00	89.57	0.45	8823.83	7461.39	7461.16	58.69	0.00	453184.57	570433.99	N 32 14 44.84	W 104 14 21.19
	16100.00	89.57	0.45	8824.58	7561.38	7561.15	59.48	0.00	453284.56	570434.77	N 32 14 45.83	W 104 14 21.18
	16200.00	89.57	0.45	8825.34	7661.38	7661.14	60.27	0.00	453384.54	570435.56	N 32 14 46.82	W 104 14 21.17
	16300.00	89.57	0.45	8826.09	7761.38	7761.14	61.05	0.00	453484.53	570436.35	N 32 14 47.81	W 104 14 21.15
	16400.00	89.57	0.45	8826.85	7861.38	7861.13	61.84	0.00	453584.51	570437.13	N 32 14 48.80	W 104 14 21.14
	16500.00	89.57	0.45	8827.60	7961.37	7961.13	62.63	0.00	453684.49	570437.92	N 32 14 49.79	W 104 14 21.13
	16600.00	89.57	0.45	8828.35	8061.37	8061.12	63.41	0.00	453784.48	570438.71	N 32 14 50.78	W 104 14 21.12
	16700.00	89.57	0.45	8829.11	8161.37	8161.12	64.20	0.00	453884.46	570439.49	N 32 14 51.77	W 104 14 21.11
	16800.00	89.57	0.45	8829.86	8261.36	8261.11	64.99	0.00	453984.45	570440.28	N 32 14 52.76	W 104 14 21.10
	16900.00	89.57	0.45	8830.61	8361.36	8361.10	65.77	0.00	454084.43	570441.07	N 32 14 53.75	W 104 14 21.09
	17000.00	89.57	0.45	8831.37	8461.36	8461.10	66.56	0.00	454184.42	570441.85	N 32 14 54.74	W 104 14 21.08
	17100.00	89.57	0.45	8832.12	8561.36	8561.09	67.35	0.00	454284.40	570442.64	N 32 14 55.73	W 104 14 21.07
	17200.00	89.57	0.45	8832.87	8661.35	8661.09	68.13	0.00	454384.39	570443.43	N 32 14 56.72	W 104 14 21.06
	17300.00	89.57	0.45	8833.63	8761.35	8761.08	68.92	0.00	454484.37	570444.21	N 32 14 57.71	W 104 14 21.05
	17400.00	89.57	0.45	8834.38	8861.35	8861.07	69.71	0.00	454584.36	570445.00	N 32 14 58.70	W 104 14 21.04
	17500.00	89.57	0.45	8835.13	8961.34	8961.07	70.49	0.00	454684.34	570445.79	N 32 14 59.69	W 104 14 21.03
	17600.00	89.57	0.45	8835.89	9061.34	9061.06	71.28	0.00	454784.33	570446.57	N 32 15 0.68	W 104 14 21.02
	17700.00	89.57	0.45	8836.64	9161.34	9161.06	72.07	0.00	454884.31	570447.36	N 32 15 1.66	W 104 14 21.01
	17800.00	89.57	0.45	8837.39	9261.34	9261.05	72.85	0.00	454984.30	570448.15	N 32 15 2.65	W 104 14 21.00
	17900.00	89.57	0.45	8838.15	9361.33	9361.04	73.64	0.00	455084.28	570448.93	N 32 15 3.64	W 104 14 20.99
	18000.00	89.57	0.45	8838.90	9461.33	9461.04	74.43	0.00	455184.27	570449.72	N 32 15 4.63	W 104 14 20.98
	18100.00	89.57	0.45	8839.65	9561.33	9561.03	75.21	0.00	455284.25	570450.51	N 32 15 5.62	W 104 14 20.97
	18200.00	89.57	0.45	8840.41	9661.33	9661.03	76.00	0.00	455384.24	570451.29	N 32 15 6.61	W 104 14 20.96
	18300.00	89.57	0.45	8841.16	9761.32	9761.02	76.79	0.00	455484.22	570452.08	N 32 15 7.60	W 104 14 20.95
	18400.00	89.57	0.45	8841.91	9861.32	9861.01	77.57	0.00	455584.21	570452.86	N 32 15 8.59	W 104 14 20.94
	18500.00	89.57	0.45	8842.67	9961.32	9961.01	78.36	0.00	455684.19	570453.65	N 32 15 9.58	W 104 14 20.93

Cimarex
Riverboat 12-1
WOPA Fed Com
1H - PBHL [330'
FNL, 380' FEL]

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	20.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Riverboat 12-1 WOPA Fed Com 1H Rev0 CVS 24Oct18
	1	20.000	18544.314	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Riverboat 12-1 WOPA Fed Com

...Original Borehole\Cimarex Riverboat 12-1 WOPA Fed Com 1H Rev0 CVS 24Oct18

Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18 Proposal
Geodetic Report
 (Non-Def Plan)



Report Date:	October 24, 2018 - 04:51 PM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	0.451 ° (Grid North)
Field:	NM Eddy County (NAD 83)	Vertical Section Origin:	0.000 ft. 0.000 ft
Structure / Slot:	Cimarex Riverboat 12-1 W0PA Fed Com 1H / Cimarex Riverboat 12-1 W0PA Fed Com 1H	TVD Reference Datum:	RKB
Well:	Cimarex Riverboat 12-1 W0PA Fed Com 1H	TVD Reference Elevation:	3258.000 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	3238.000 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	7.348 °
Survey Name:	Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18	Total Gravity Field Strength:	998.4518mgn (9.80665 Based)
Survey Date:	October 24, 2018	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	89.588 ° / 10005.629 ft / 0.274 / 1.131	Total Magnetic Field Strength:	47894.833 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	59.919 °
Location Lat / Long:	N 32° 13' 31.01543", W 104° 14' 21.94474"	Declination Date:	October 24, 2018
Location Grid N/E Y/X:	N 445704.100 ftUS, E 570375.300 ftUS	Magnetic Declination Model:	HDGM 2018
CRS Grid Convergence Angle:	0.0501 °	North Reference:	Grid North
Grid Scale Factor:	0.99991008	Grid Convergence Used:	0.0501 °
Version / Patch:	2.10.740.0	Total Corr Mag North->Grid North:	7.2960 °
		Local Coord Referenced To:	Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (ftUS)	Eastings (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [285' FSL, 448' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
KOP - Build 12"/100'	8283.04	0.00	0.45	8283.04	0.00	0.00	0.00	0.00	445704.10	570375.30	N 32 13 31.02	W 104 14 21.94
Build 4"/100' DLS	8888.04	75.00	0.45	8724.24	353.89	353.88	2.78	12.00	446057.94	570378.08	N 32 13 34.52	W 104 14 21.91
Landing Point	9252.25	89.57	0.45	8773.00	713.83	713.81	5.61	4.00	446417.84	570380.91	N 32 13 38.08	W 104 14 21.87
Cimarex Riverboat 12-1 W0PA Fed Com 1H - PBHL [330' FNL, 380' FEL]	18544.31	89.57	0.45	8843.00	10005.63	10005.32	78.71	0.00	455708.50	570454.00	N 32 15 10.02	W 104 14 20.93

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	20.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Riverboat 12-1 W0PA Fed Com 1H Rev0 CVS 24Oct18
	1	20.000	18544.314	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Riverboat 12-1 W0PA Fed Com

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

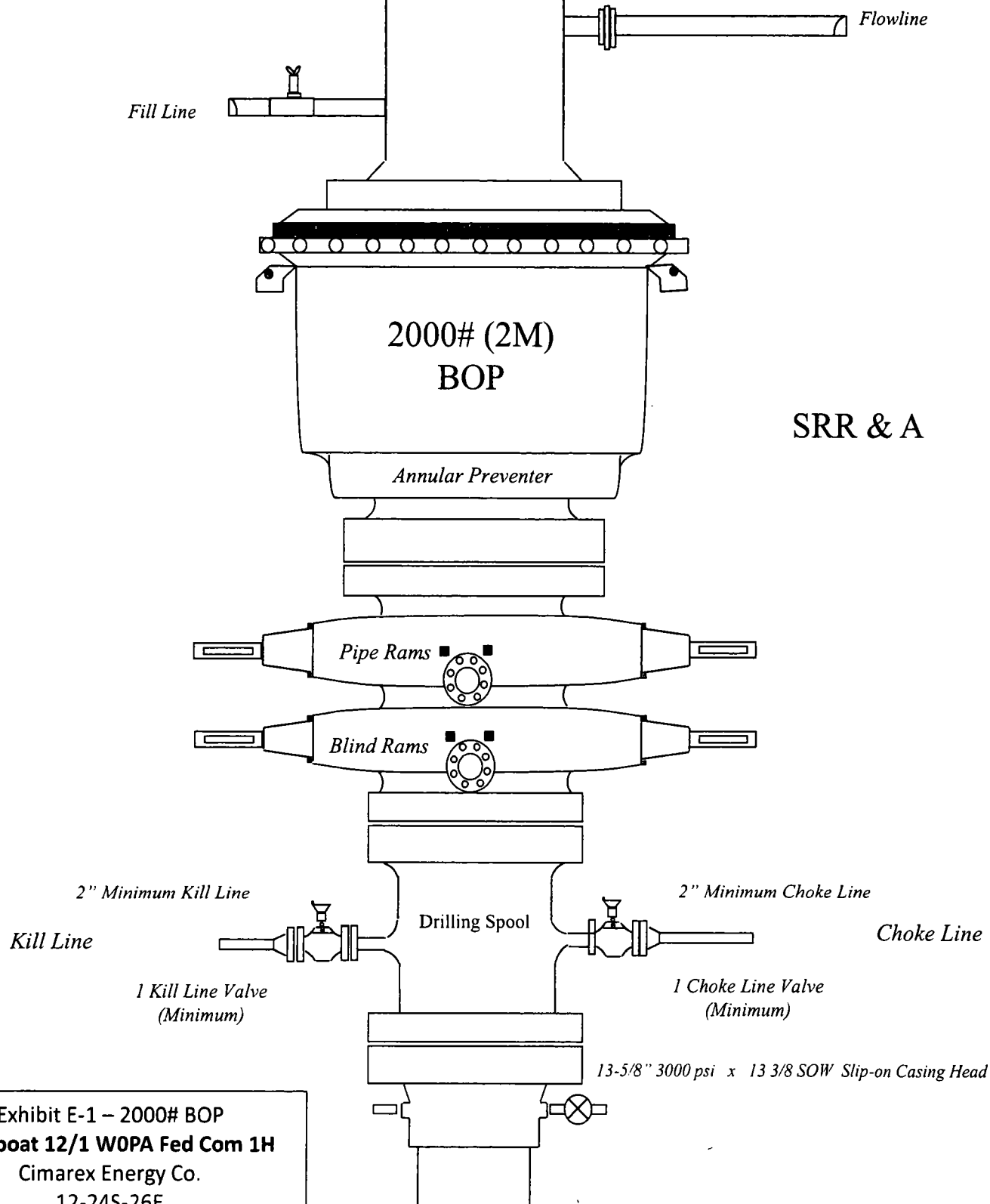
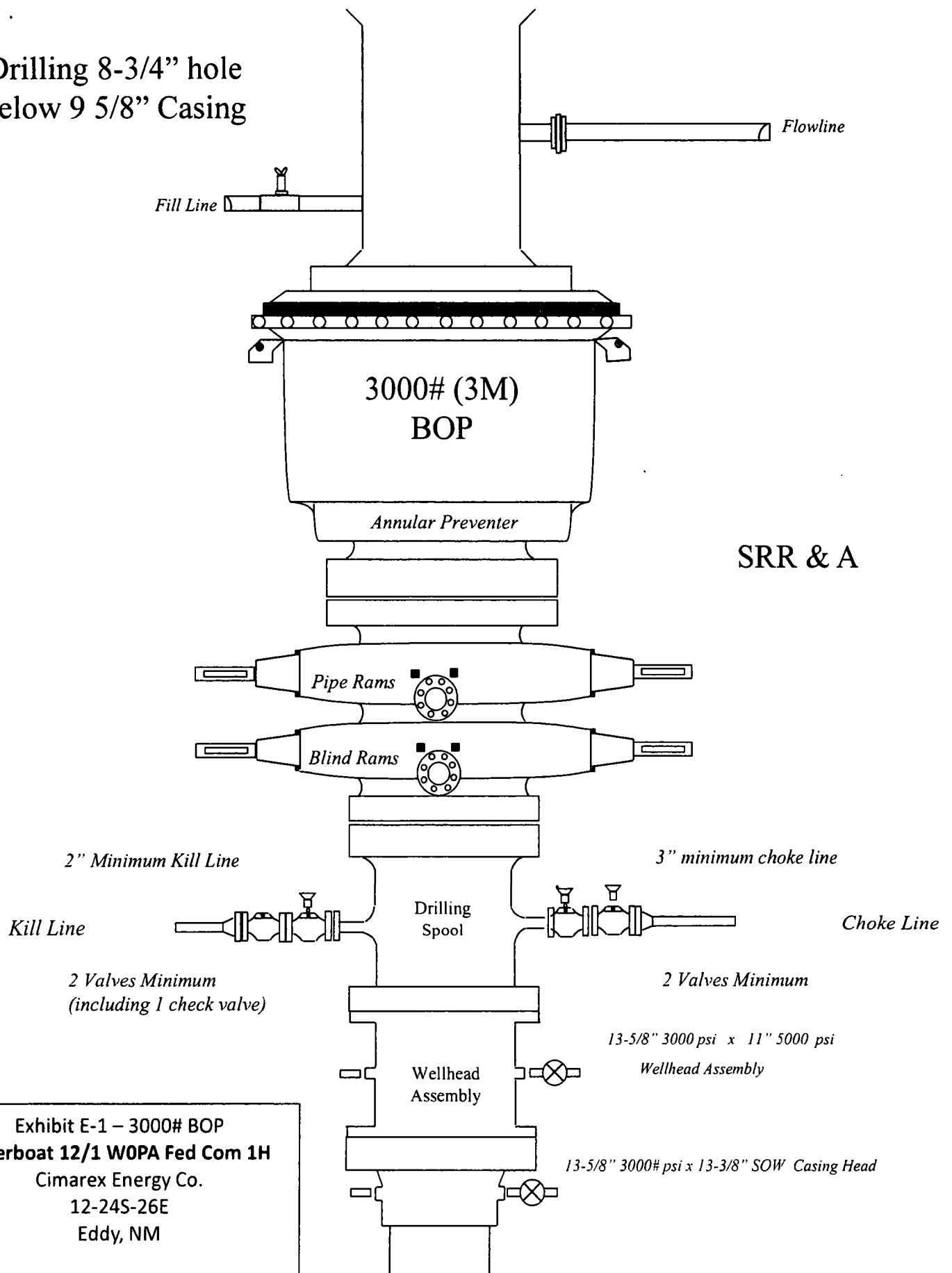


Exhibit E-1 – 2000# BOP
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM

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



SRR & A

Exhibit E-1 – 3000# BOP
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM

Drilling 6" hole below 7"
Casing

Fill Line

Flowline

5000# (5M)
BOP

Annular Preventer

SRR & A

Pipe Rams

Blind Rams

2" Minimum Kill Line

Kill Line

Drilling
Spool

3" minimum choke line

Choke Line

2 Valves and a check valve

2 Valves Minimum
(HCR Required)

Wellhead
Assembly

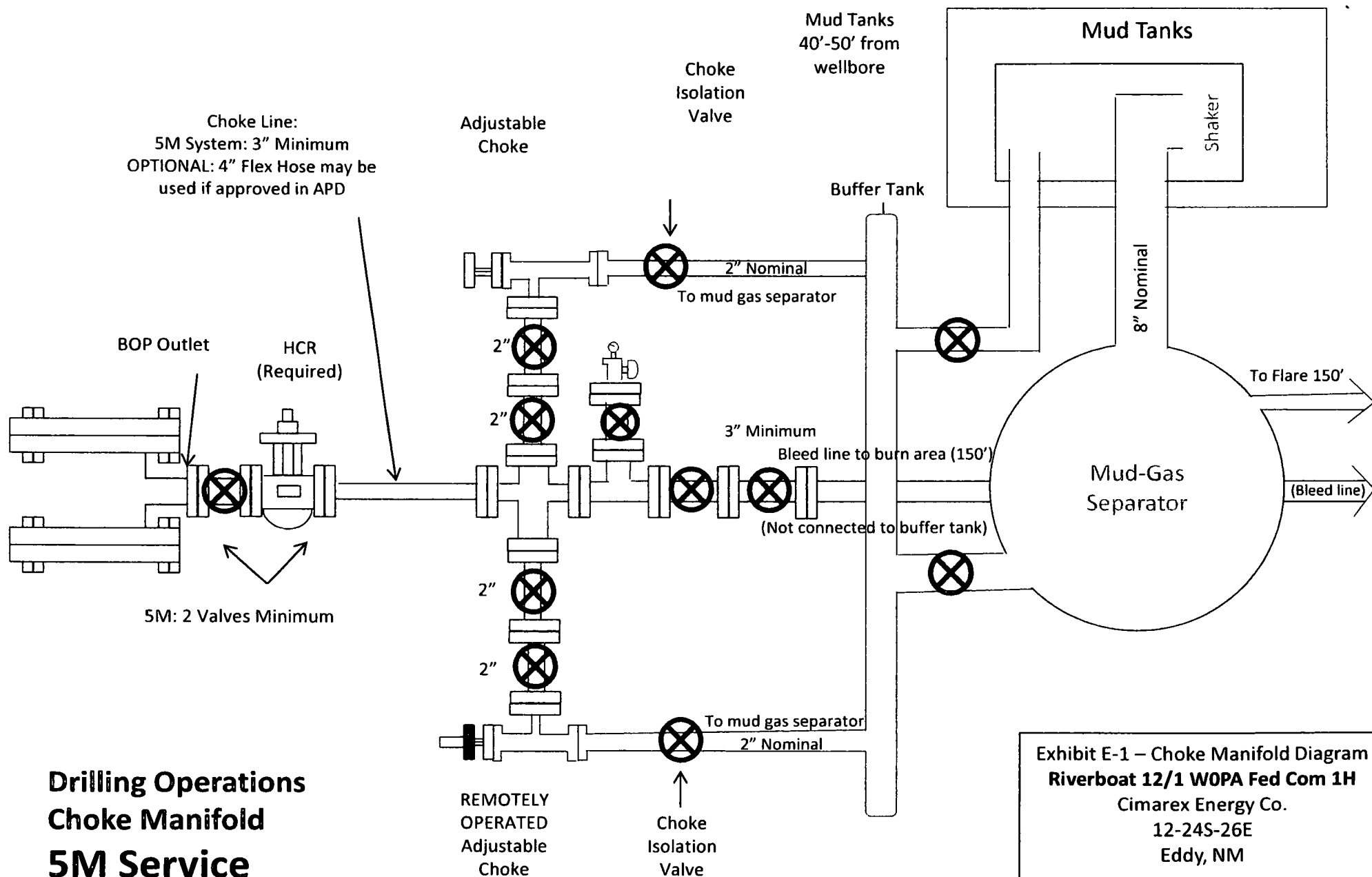
11" 5000 psi x 7-1/16" 10,000 psi
Wellhead Assembly

Wellhead
Assembly

13-5/8" 3000 psi x 11" 5000 psi
Wellhead Assembly

13-5/8" 3000# psi x 13-3/8" SOW Casing Head

Exhibit E-1 – 5000# BOP
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM



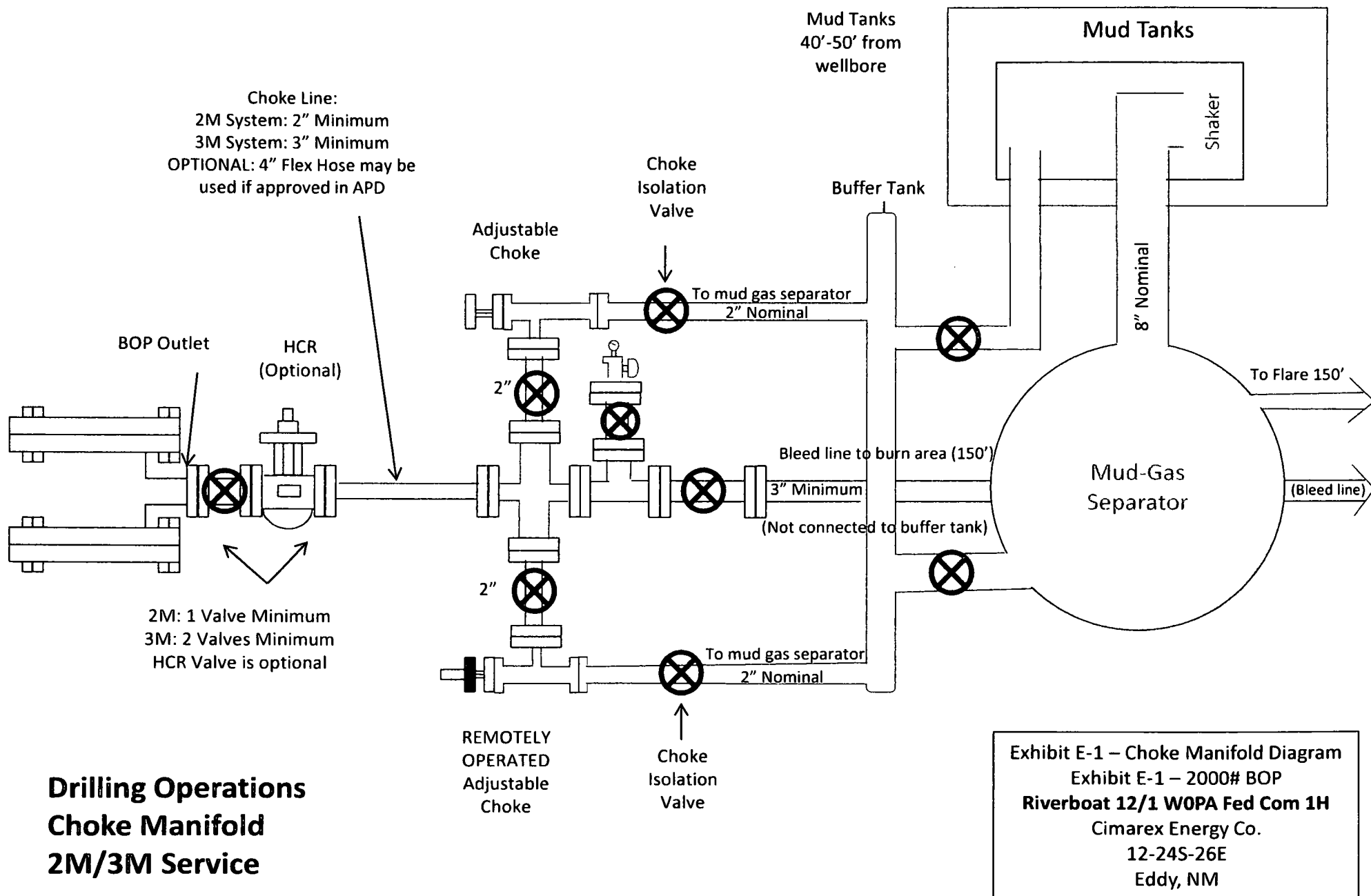


Exhibit F – Co-Flex Hose
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM

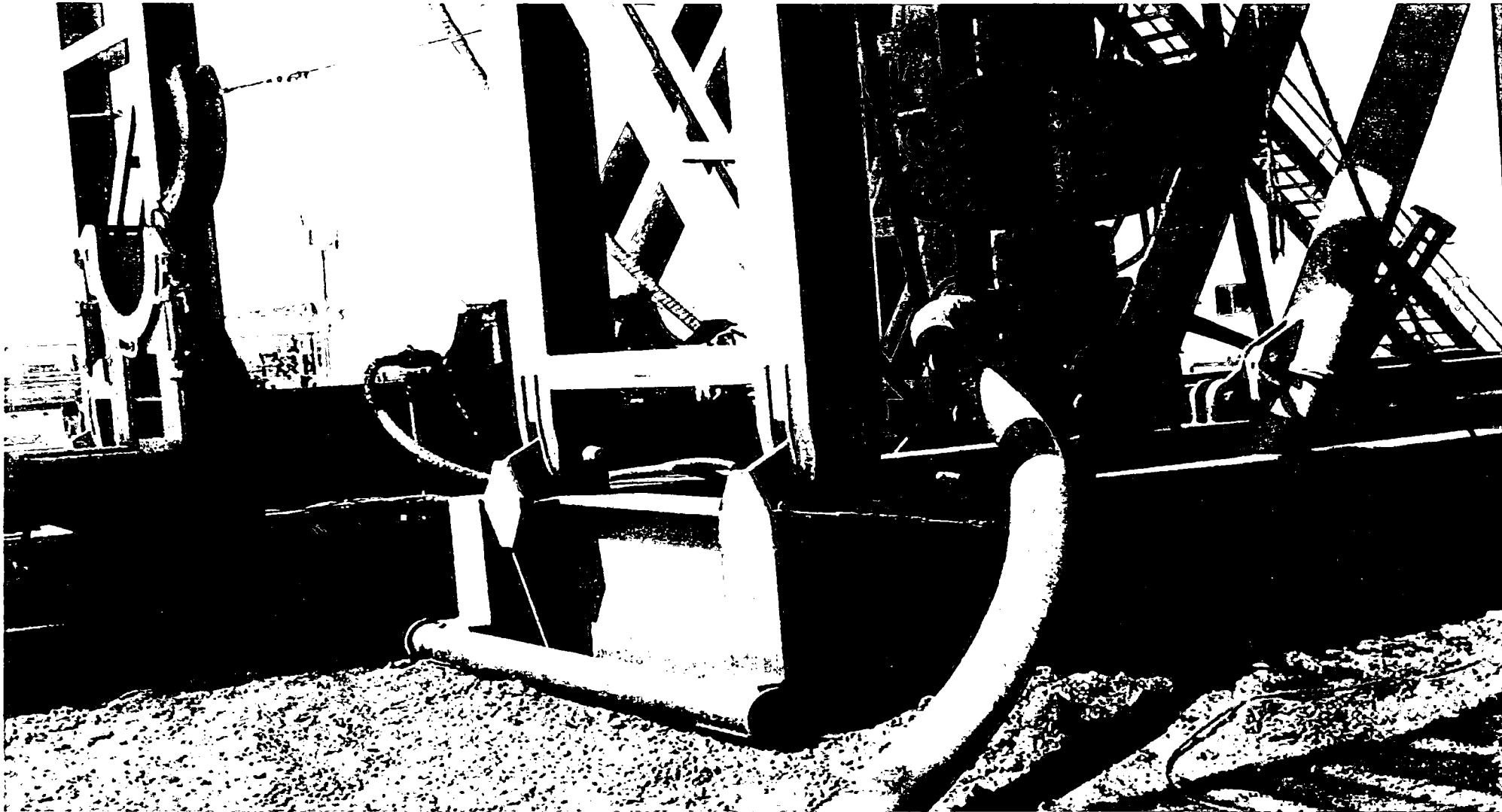


Exhibit F-1 – Co-Flex Hose Hydrostatic Test

Riverboat 12/1 WOPA Fed Com 1H

Cimarex Energy Co.

12-24S-26E

Eddy, NM



Midwest Hose & Specialty, Inc.

INTERNAL HYDROSTATIC TEST REPORT		
Customer: Oderco Inc		P.O. Number: odyd-271
HOSE SPECIFICATIONS		
Type: Stainless Steel Armor Choke & Kill Hose	Hose Length: 45'ft.	
I.D. 4 INCHES	O.D. 9 INCHES	
WORKING PRESSURE 10,000 PSI	TEST PRESSURE 15,000 PSI	BURST PRESSURE 0 PSI
COUPLINGS		
Stem Part No. OKC OKC	Ferrule No. OKC OKC	
Type of Coupling: Swage-It		
PROCEDURE		
<u>Hose assembly pressure tested with water at ambient temperature.</u>		
TIME HELD AT TEST PRESSURE 15 MIN.	ACTUAL BURST PRESSURE: 0 PSI	
Hose Assembly Serial Number: 79793	Hose Serial Number: OKC	
Comments:		
Date: 3/8/2011	Tested: <i>[Signature]</i>	Approved: <i>[Signature]</i>



Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Graph

Customer: Houston

Pick Ticket #: 94260

Hose Specifications

Hose Type
CSK

Length
45'

Time of Fittings
41/16 10K

Counting Method
Swage

I.D.
4"

O.D.
6.09"

Die Size
6.38"

Final O.D.
6.75"

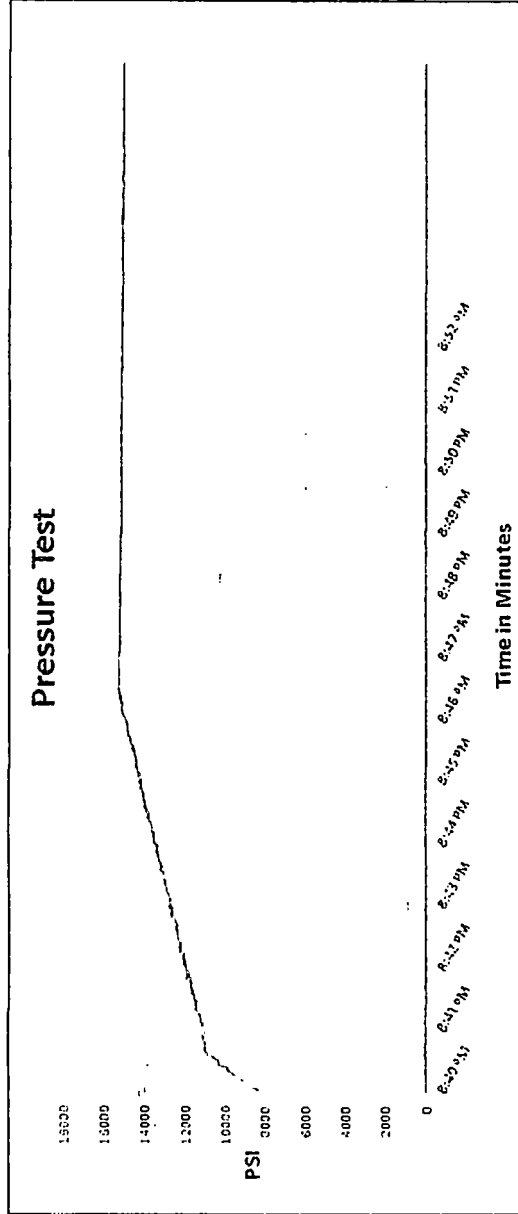
Working Pressure
10000 PSI

Burst Pressure
Standard Safety Multiplier Applies

Hose Serial #
5544

Hose Assembly Serial #
79793

Pressure Test



Test Pressure 15000 PSI
Time Held at Test Pressure 11 Minutes
Actual Burst Pressure 15463 PSI
Peak Pressure 15463 PSI

Comments: Hose assembly pressure tested with water at ambient temperature.

Tested By: Zac McConnell

Approved By: Kim Thomas

[Signature]

[Signature]

March 3, 2011

Exhibit F-2 – Co-Flex Hose
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM



Midwest Hose & Specialty, Inc.

Certificate of Conformity

Customer:

DEM

PO

ODYD-271

SPECIFICATIONS

Sales Order

79793

Dated:

3/8/2011

We hereby certify that the material supplied
for the referenced purchase order to be true
according to the requirements of the purchase
order and current industry standards

Supplier:

Midwest Hose & Specialty, Inc.
10640 Tanner Road
Houston, Texas 77041

Comments:

Approved:

David H. H. H.

Date:

3/8/2011



Exhibit F -3- Co-Flex Hose
Riverboat 12/1 WOPA Fed Com 1H
Cimarex Energy Co.
12-24S-26E
Eddy, NM

Specification Sheet Choke & Kill Hose

The Midwest Hose & Specialty Choke & Kill hose is manufactured with only premium components. The reinforcement cables, inner liner and cover are made of the highest quality material to handle the tough drilling applications of today's industry. The end connections are available with API flanges, API male threads, hubs, hammer unions or other special fittings upon request. Hose assembly is manufactured to API 7K. This assembly is wrapped with fire resistant vermiculite coated fiberglass insulation, rated at 2000 degrees with stainless steel armor cover.

Working Pressure:	5,000 or 10,000 psi working pressure
Test Pressure:	10,000 or 15,000 psi test pressure
Reinforcement:	Multiple steel cables
Cover:	Stainless Steel Armor
Inner Tube:	Petroleum resistant, Abrasion resistant
End Fitting:	API flanges, API male threads, threaded or butt weld hammer unions, unbolt and other special connections
Maximum Length:	110 Feet
ID:	2-1/2", 3", 3-1/2", 4"
Operating Temperature:	-22 deg F to +180 deg F (-30 deg C to +82 deg C)

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CIMAREX ENERGY COMPANY
LEASE NO.:	NMLC064200
WELL NAME & NO.:	1H – RIVERBOAT 12/1 W0PA FED COM
SURFACE HOLE FOOTAGE:	285'/S & 449'/E
BOTTOM HOLE FOOTAGE:	330'/N & 380'/E
LOCATION:	Section 12., T24S., R.26E., NMP
COUNTY:	EDDY County, New Mexico

COA

H2S	☐ Yes	☒ No	
Potash	☒ None	☐ Secretary	☐ R-111-P
Cave/Karst Potential	☐ Low	☒ Medium	☐ High
Variance	☐ None	☒ Flex Hose	☐ Other
Wellhead	☐ Conventional	☒ Multibowl	☐ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP

A. Hydrogen Sulfide

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **425** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement).

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Additional cement maybe required. Excess calculates to 22%.**
- Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.
- ❖ In High Cave/Karst Areas if cement does not circulate to surface on the first two casing strings , the cement on the 3rd casing string must come to surface.
3. The minimum required fill of cement behind the **7** inch production casing is:
- Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification.
4. The minimum required fill of cement behind the **4-1/2** inch production liner is:
Cement should tie-back 100' into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

GENERAL REQUIREMENTS

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

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

☒ Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)

☒ Eddy County
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a

digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

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

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOC requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before

cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

ZS 110418

Medium

13 3/8 Segment	surface csg in a #/ft	17 1/2 Grade	inch hole. Coupling	Joint	Design Factors Collapse	Burst	SURFACE Length	Weight
"A"	48.00	H 40	ST&C	15.78	3.92	1.65	425	20,400
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,026				Tail Cmt	does	circ to sfc.	Totals:	425 20,400

Comparison of Proposed to Minimum Required Cement Volumes

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	293	469	350	34	8.90	614	2M	1.56

9 5/8 Segment	casing inside the #/ft	13 3/8 Grade	Coupling	Joint	Design Factors Collapse	Burst	INTERMEDIATE Length	Weight
"A"	36.00	J 55	LT&C	6.36	1.93	0.86	1,980	71,280
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	1,980	71,280

The cement volume(s) are intended to achieve a top of

0

ft from surface or a

425

overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	491	860	666	29	10.20	2159	3M	0.81

Burst Frac Gradient(s) for Segment(s): A, B, C, D = 1.78, b, c, d

All > 0.70, OK.

7 Segment	casing inside the #/ft	9 5/8 Grade	Coupling	Joint	Design Factors Collapse	Burst	PRODUCTION Length	Weight
"A"	26.00	L 80	LT&C	2.25	1.4	1.5	8,263	214,838
"B"	26.00	N 80	BUTT	382.53	1.34	1.5	625	16,250
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,261						Totals:	8,888	231,088

B would be:

50.39

1.33 if it were a vertical wellbore.

No Pilot Hole Planned

MTD 8888

Max VTD 8724

Csg VD 8724

Curve KOP 8263

Dogleg° 75

Severity° -1

MEOC 0

The cement volume(s) are intended to achieve a top of

1780

ft from surface or a

200

overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 3/4	0.1503	414	1320	1081	22	9.00	2878	3M	0.55

Class 'H' tail cmt yld > 1.20

4 1/2 Segment	Liner w/top @ #/ft	8263 Grade	Coupling	Joint	Design Factors Collapse	Burst	LINER Length	Weight
"A"	13.50	P 110	LT&C	2.01	2	2.57	989	13,352
"B"	13.50	P 110	LT&C	3.19	2.21	2.57	9,292	125,442
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,945						Totals:	10,281	138,794

Aegment Design Factors would be:

2.83

2.21 if it were a vertical wellbore.

No Pilot Hole Planned

MTD 18544

Max VTD 8843

Csg VD 8843

Curve KOP 8263

Dogleg° 90

Severity° 9

MEOC 9252

The cement volume(s) are intended to achieve a top of

8263

ft from surface or a

625

overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
6 1/8	0.0942	702	1615	923	75	10.50			0.56

Class 'H' tail cmt yld > 1.20

Capitan Reef est top XXXX.