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

HOBBS OCD
SEP 03 2019
RECEIVED

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other	5. Lease Serial No. NMNM26394
	6. If Indian, Allottee or Tribe Name
	7. If Unit or CA/Agreement, Name and/or No.
	8. Well Name and No. CASCADE 28 FEDERAL 86H
2. Name of Operator CIMAREX ENERGY COMPANY Contact: AMITHY E CRAWFORD E-Mail: acrawford@cimarex.com	9. API Well No. 30-025-46314-00-X1
3a. Address 600 N. MARIENFELD SUITE 600 MIDLAND, TX 79701 3b. Phone No. (include area code) Ph: 432-620-1900	10. Field and Pool or Exploratory Area RED HILLS
4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)* Sec 28 T25S R33E NWNE 390FNL 1380FEL 32.107723 N Lat, 103.573242 W Lon	11. County or Parish, State LEA 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 to change the BHL and the formation to Wolfcamp thereby changing the drilling plan and directional plan attached.

No new surface disturbance.

Previously Approved BHL:
330' FSL & 1026' FEL Sec 28 25S 33E

Proposed BHL:
100' FSL & 750' FEL Sec 28 25S 33E

OCD Hobbs

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

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

Electronic Submission #481235 verified by the BLM Well Information System
For CIMAREX ENERGY COMPANY, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 08/30/2019 (19PP3003SE)

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

Signature (Electronic Submission) — Date 08/29/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By JEROMY PORTER — Title PETROLEUM ENGINEER — Date 09/04/2019

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 Hobbs

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 ****

Additional data for EC transaction #481235 that would not fit on the form

32. Additional remarks, continued

Please see attached C-102, Directional plans, Drilling Plan, BOP Diagrams, and wellsite layout.

Revisions to Operator-Submitted EC Data for Sundry Notice #481235

	Operator Submitted	BLM Revised (AFMSS)
Sundry Type:	APDCH NOI	APDCH NOI
Lease:	NMNM26394	NMNM26394
Agreement:		
Operator:	CIMAREX ENERGY CO. 600 N. MARIENFELD, SUITE 600 MIDLAND, TX 79701 Ph: 432-620-1909	CIMAREX ENERGY COMPANY 600 N. MARIENFELD SUITE 600 MIDLAND, TX 79701 Ph: 432.620.1938
Admin Contact:	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909
Tech Contact:	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909	AMITHY E CRAWFORD REGULATORY ANALYST E-Mail: acrawford@cimarex.com Ph: 432-620-1909
Location: State: County:	 NM LEA	 NM LEA
Field/Pool:	BOBCAT DRAW; UPR WOLFCAMP	RED HILLS
Well/Facility:	CASCADE 28 FEDERAL 86H Sec 28 T25S R33E 390FNL 1380FEL	CASCADE 28 FEDERAL 86H Sec 28 T25S R33E NWNE 390FNL 1380FEL 32.107723 N Lat, 103.573242 W Lon

Schlumberger

Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19 Proposal Geodetic Report

(Def Plan)

CIMAREX

Report Date:	August 28, 2019 - 11:46 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	179.470 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Cascade 28 Federal 86H / Cimarex Cascade 28 Federal 86H	**TVD Reference Datum:**	RKB
Well:	Cimarex Cascade 28 Federal 86H	**TVD Reference Elevation:**	3391.600 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3365.600 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.617 °
Survey Name:	Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19	**Total Gravity Field Strength:**	998.4372mgn (9.80665 Based)
Survey Date:	August 28, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	104.932 ° / 5420.708 ft / 5.891 / 0.432	**Total Magnetic Field Strength:**	47746.438 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.709 °
Location Lat / Long:	N 32° 6' 27.79806", W 103° 34' 23.68479"	**Declination Date:**	August 28, 2019
Location Grid N/E Y/X:	N 403755.320 ftUS, E 776682.710 ftUS	**Magnetic Declination Model:**	HDGM 2019
CRS Grid Convergence Angle:	0.4040 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99997253	**Grid Convergence Used:**	0.4040 °
Version / Patch:	2.10.760.0	**Total Corr Mag North->Grid North:**	6.2128 °
		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 [390' FNL, 1380' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	100.00	0.00	89.70	100.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	200.00	0.00	89.70	200.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	300.00	0.00	89.70	300.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	400.00	0.00	89.70	400.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	500.00	0.00	89.70	500.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	600.00	0.00	89.70	600.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	700.00	0.00	89.70	700.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	800.00	0.00	89.70	800.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	900.00	0.00	89.70	900.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
Rustler	*994.00*	*0.00*	*89.70*	*994.00*	*0.00*	*0.00*	*0.00*	*0.00*	*403755.32*	*776682.71*	*N 32 6 27.80*	*W 103 34 23.68*
	1000.00	0.00	89.70	1000.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1100.00	0.00	89.70	1100.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1200.00	0.00	89.70	1200.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1300.00	0.00	89.70	1300.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
Top of Salt	*1328.00*	*0.00*	*89.70*	*1328.00*	*0.00*	*0.00*	*0.00*	*0.00*	*403755.32*	*776682.71*	*N 32 6 27.80*	*W 103 34 23.68*
	1400.00	0.00	89.70	1400.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1500.00	0.00	89.70	1500.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1600.00	0.00	89.70	1600.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1700.00	0.00	89.70	1700.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1800.00	0.00	89.70	1800.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	1900.00	0.00	89.70	1900.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2000.00	0.00	89.70	2000.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2100.00	0.00	89.70	2100.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2200.00	0.00	89.70	2200.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2300.00	0.00	89.70	2300.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2400.00	0.00	89.70	2400.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2500.00	0.00	89.70	2500.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2600.00	0.00	89.70	2600.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
Nudge 2°/100' DLS	2700.00	0.00	89.70	2700.00	0.00	0.00	0.00	0.00	403755.32	776682.71	N 32 6 27.80	W 103 34 23.68
	2800.00	2.00	89.70	2799.98	0.01	0.01	1.75	2.00	403755.33	776684.46	N 32 6 27.80	W 103 34 23.66
	2900.00	4.00	89.70	2899.84	0.03	0.04	6.98	2.00	403755.36	776689.69	N 32 6 27.80	W 103 34 23.60
	3000.00	6.00	89.70	2999.45	0.06	0.08	15.69	2.00	403755.40	776698.40	N 32 6 27.80	W 103 34 23.50
Hold Nudge	3059.15	7.18	89.70	3058.21	0.09	0.12	22.48	2.00	403755.44	776705.19	N 32 6 27.80	W 103 34 23.42
	3100.00	7.18	89.70	3098.74	0.11	0.15	27.59	0.00	403755.47	776710.30	N 32 6 27.80	W 103 34 23.36
	3200.00	7.18	89.70	3197.95	0.16	0.21	40.09	0.00	403755.53	776722.80	N 32 6 27.80	W 103 34 23.22
	3300.00	7.18	89.70	3297.17	0.21	0.28	52.60	0.00	403755.60	776735.31	N 32 6 27.80	W 103 34 23.07
	3400.00	7.18	89.70	3396.38	0.26	0.34	65.10	0.00	403755.66	776747.81	N 32 6 27.80	W 103 34 22.93
	3500.00	7.18	89.70	3495.60	0.31	0.41	77.61	0.00	403755.73	776760.31	N 32 6 27.80	W 103 34 22.78
	3600.00	7.18	89.70	3594.82	0.36	0.47	90.11	0.00	403755.79	776772.82	N 32 6 27.80	W 103 34 22.64
	3700.00	7.18	89.70	3694.03	0.41	0.54	102.61	0.00	403755.86	776785.32	N 32 6 27.80	W 103 34 22.49
	3800.00	7.18	89.70	3793.25	0.46	0.61	115.12	0.00	403755.93	776797.82	N 32 6 27.80	W 103 34 22.35
	3900.00	7.18	89.70	3892.46	0.51	0.67	127.62	0.00	403755.99	776810.33	N 32 6 27.80	W 103 34 22.20
	4000.00	7.18	89.70	3991.68	0.56	0.74	140.12	0.00	403756.06	776822.83	N 32 6 27.80	W 103 34 22.06
	4100.00	7.18	89.70	4090.89	0.61	0.80	152.63	0.00	403756.12	776835.33	N 32 6 27.80	W 103 34 21.91
	4200.00	7.18	89.70	4190.11	0.66	0.87	165.13	0.00	403756.19	776847.84	N 32 6 27.80	W 103 34 21.76
	4300.00	7.18	89.70	4289.32	0.71	0.94	177.64	0.00	403756.26	776860.34	N 32 6 27.79	W 103 34 21.62
	4400.00	7.18	89.70	4388.54	0.76	1.00	190.14	0.00	403756.32	776872.84	N 32 6 27.79	W 103 34 21.47
	4500.00	7.18	89.70	4487.75	0.81	1.07	202.64	0.00	403756.39	776885.35	N 32 6 27.79	W 103 34 21.33
	4600.00	7.18	89.70	4586.97	0.86	1.13	215.15	0.00	403756.45	776897.85	N 32 6 27.79	W 103 34 21.18
	4700.00	7.18	89.70	4686.18	0.91	1.20	227.65	0.00	403756.52	776910.35	N 32 6 27.79	W 103 34 21.04
	4800.00	7.18	89.70	4785.40	0.96	1.27	240.15	0.00	403756.59	776922.86	N 32 6 27.79	W 103 34 20.89
	4900.00	7.18	89.70	4884.61	1.01	1.33	252.66	0.00	403756.65	776935.36	N 32 6 27.79	W 103 34 20.75
Base of Salt	*4936.68*	*7.18*	*89.70*	*4921.00*	*1.02*	*1.36*	*257.24*	*0.00*	*403756.68*	*776939.95*	*N 32 6 27.79*	*W 103 34 20.69*
Bell Canyon	*4973.97*	*7.18*	*89.70*	*4958.00*	*1.04*	*1.38*	*261.91*	*0.00*	*403756.70*	*776944.61*	*N 32 6 27.79*	*W 103 34 20.64*
	5000.00	7.18	89.70	4983.83	1.06	1.40	265.16	0.00	403756.72	776947.86	N 32 6 27.79	W 103 34 20.60
	5100.00	7.18	89.70	5083.04	1.10	1.46	277.67	0.00	403756.78	776960.37	N 32 6 27.79	W 103 34 20.46
	5200.00	7.18	89.70	5182.26	1.15	1.53	290.17	0.00	403756.85	776972.87	N 32 6 27.79	W 103 34 20.31
	5300.00	7.18	89.70	5281.47	1.20	1.60	302.67	0.00	403756.92	776985.37	N 32 6 27.79	W 103 34 20.17
	5400.00	7.18	89.70	5380.69	1.25	1.66	315.18	0.00	403756.98	776997.88	N 32 6 27.79	W 103 34 20.02
	5500.00	7.18	89.70	5479.90	1.30	1.73	327.68	0.00	403757.05	777010.38	N 32 6 27.79	W 103 34 19.88
	5600.00	7.18	89.70	5579.12	1.35	1.79	340.18	0.00	403757.11	777022.88	N 32 6 27.79	W 103 34 19.73
	5700.00	7.18	89.70	5678.33	1.40	1.86	352.69	0.00	403757.18	777035.39	N 32 6 27.79	W 103 34 19.58
	5800.00	7.18	89.70	5777.55	1.45	1.92	365.19	0.00	403757.24	777047.89	N 32 6 27.79	W 103 34 19.44
	5900.00	7.18	89.70	5876.76	1.50	1.99	377.69	0.00	403757.31	777060.39	N 32 6 27.79	W 103 34 19.29
	6000.00	7.18	89.70	5975.98	1.55	2.06	390.20	0.00	403757.38	777072.90	N 32 6 27.79	W 103 34 19.15
Cherry Canyon	*6056.46*	*7.18*	*89.70*	*6032.00*	*1.58*	*2.09*	*397.26*	*0.00*	*403757.41*	*777079.96*	*N 32 6 27.79*	*W 103 34 19.07*
	6100.00	7.18	89.70	6075.19	1.60	2.12	402.70	0.00	403757.44	777085.40	N 32 6 27.79	W 103 34 19.00
	6200.00	7.18	89.70	6174.41	1.65	2.19	415.21	0.00	403757.51	777097.90	N 32 6 27.79	W 103 34 18.86
	6300.00	7.18	89.70	6273.63	1.70	2.25	427.71	0.00	403757.57	777110.41	N 32 6 27.79	W 103 34 18.71
	6400.00	7.18	89.70	6372.84	1.75	2.32	440.21	0.00	403757.64	777122.91	N 32 6 27.79	W 103 34 18.57
	6500.00	7.18	89.70	6472.06	1.80	2.39	452.72	0.00	403757.71	777135.41	N 32 6 27.79	W 103 34 18.42
	6600.00	7.18	89.70	6571.27	1.85	2.45	465.22	0.00	403757.77	777147.92	N 32 6 27.79	W 103 34 18.28
	6700.00	7.18	89.70	6670.49	1.90	2.52	477.72	0.00	403757.84	777160.42	N 32 6 27.79	W 103 34 18.13
	6800.00	7.18	89.70	6769.70	1.95	2.58	490.23	0.00	403757.90	777172.92	N 32 6 27.79	W 103 34 17.99

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 ° ' ")
	6900.00	7.18	89.70	6868.92	2.00	2.65	502.73	0.00	403757.97	777185.43	N 32 6 27.79	W 103 34 17.84
	7000.00	7.18	89.70	6968.13	2.05	2.72	515.24	0.00	403758.04	777197.93	N 32 6 27.79	W 103 34 17.69
	7100.00	7.18	89.70	7067.35	2.10	2.78	527.74	0.00	403758.10	777210.43	N 32 6 27.79	W 103 34 17.55
	7200.00	7.18	89.70	7166.56	2.15	2.85	540.24	0.00	403758.17	777222.94	N 32 6 27.79	W 103 34 17.40
	7300.00	7.18	89.70	7265.78	2.20	2.91	552.75	0.00	403758.23	777235.44	N 32 6 27.79	W 103 34 17.26
	7400.00	7.18	89.70	7364.99	2.25	2.98	565.25	0.00	403758.30	777247.94	N 32 6 27.79	W 103 34 17.11
	7500.00	7.18	89.70	7464.21	2.30	3.05	577.75	0.00	403758.37	777260.45	N 32 6 27.79	W 103 34 16.97
Brushy Canyon	*7550.19*	*7.18*	*89.70*	*7514.00*	*2.32*	*3.08*	*584.03*	*0.00*	*403758.40*	*777268.72*	*N 32 6 27.79*	*W 103 34 16.89*
	7600.00	7.18	89.70	7563.42	2.35	3.11	590.26	0.00	403758.43	777272.95	N 32 6 27.79	W 103 34 16.82
	7700.00	7.18	89.70	7662.64	2.40	3.18	602.76	0.00	403758.50	777285.45	N 32 6 27.79	W 103 34 16.68
Drop to Vertical 2°/100' DLS	7737.66	7.18	89.70	7700.00	2.42	3.20	607.47	0.00	403758.52	777290.16	N 32 6 27.79	W 103 34 16.62
	7800.00	5.94	89.70	7761.93	2.45	3.24	614.59	2.00	403758.56	777297.28	N 32 6 27.79	W 103 34 16.54
	7900.00	3.94	89.70	7861.56	2.48	3.28	623.20	2.00	403758.60	777305.89	N 32 6 27.79	W 103 34 16.44
	8000.00	1.94	89.70	7961.42	2.50	3.31	628.32	2.00	403758.63	777311.01	N 32 6 27.79	W 103 34 16.38
Hold Vertical	8098.81	0.00	89.70	8058.21	2.51	3.32	629.95	2.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8100.00	0.00	89.70	8061.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8200.00	0.00	89.70	8161.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8300.00	0.00	89.70	8261.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8400.00	0.00	89.70	8361.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8500.00	0.00	89.70	8461.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8600.00	0.00	89.70	8561.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8700.00	0.00	89.70	8661.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8800.00	0.00	89.70	8761.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	8900.00	0.00	89.70	8861.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9000.00	0.00	89.70	8961.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
Bone Spring Lime	*9076.60*	*0.00*	*89.70*	*9038.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	9100.00	0.00	89.70	9061.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
Leonard Shale	*9114.60*	*0.00*	*89.70*	*9076.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	9200.00	0.00	89.70	9161.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9300.00	0.00	89.70	9261.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
Avalon Shale	*9352.60*	*0.00*	*89.70*	*9314.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	9400.00	0.00	89.70	9361.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9500.00	0.00	89.70	9461.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9600.00	0.00	89.70	9561.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9700.00	0.00	89.70	9661.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9800.00	0.00	89.70	9761.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	9900.00	0.00	89.70	9861.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10000.00	0.00	89.70	9961.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
1st Bone Spring Sand	*10087.60*	*0.00*	*89.70*	*10049.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	10100.00	0.00	89.70	10061.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10200.00	0.00	89.70	10161.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10300.00	0.00	89.70	10261.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
2nd Bone Spring Carb	*10301.60*	*0.00*	*89.70*	*10263.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	10400.00	0.00	89.70	10361.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10500.00	0.00	89.70	10461.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10600.00	0.00	89.70	10561.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
2nd Bone Spring Sand	*10654.60*	*0.00*	*89.70*	*10616.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	10700.00	0.00	89.70	10661.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10800.00	0.00	89.70	10761.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	10900.00	0.00	89.70	10861.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11000.00	0.00	89.70	10961.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
3rd Bone Spring Carb	*11085.60*	*0.00*	*89.70*	*11047.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	11100.00	0.00	89.70	11061.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11200.00	0.00	89.70	11161.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11300.00	0.00	89.70	11261.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11400.00	0.00	89.70	11361.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11500.00	0.00	89.70	11461.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11600.00	0.00	89.70	11561.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11700.00	0.00	89.70	11661.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
3rd Bone Spring Sand	*11752.60*	*0.00*	*89.70*	*11714.00*	*2.51*	*3.32*	*629.95*	*0.00*	*403758.64*	*777312.64*	*N 32 6 27.79*	*W 103 34 16.36*
	11800.00	0.00	89.70	11761.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	11900.00	0.00	89.70	11861.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	12000.00	0.00	89.70	11961.40	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
KOP - Build 12°/100' DLS	12068.66	0.00	89.70	12030.07	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
	12100.00	3.76	179.47	12061.38	3.53	2.29	629.96	12.00	403757.61	777312.65	N 32 6 27.78	W 103 34 16.36
	12200.00	15.76	179.47	12159.75	20.46	-14.63	630.12	12.00	403740.69	777312.81	N 32 6 27.61	W 103 34 16.36
Top Wolfcamp	*12205.46*	*16.42*	*179.47*	*12165.00*	*21.97*	*-16.14*	*630.13*	*12.00*	*403739.18*	*777312.82*	*N 32 6 27.59*	*W 103 34 16.36*
Wolfcamp X Sand	*12226.45*	*18.93*	*179.47*	*12185.00*	*28.34*	*-22.51*	*630.19*	*12.00*	*403732.81*	*777312.88*	*N 32 6 27.53*	*W 103 34 16.36*
	12300.00	27.76	179.47	12252.46	57.46	-51.63	630.46	12.00	403703.69	777313.15	N 32 6 27.24	W 103 34 16.36
Wolfcamp Y Sand	*12316.59*	*29.75*	*179.47*	*12267.00*	*65.44*	*-59.61*	*630.54*	*12.00*	*403695.71*	*777313.23*	*N 32 6 27.16*	*W 103 34 16.36*
Wolfcamp Upper A1	*12385.30*	*38.00*	*179.47*	*12324.00*	*103.71*	*-97.87*	*630.89*	*12.00*	*403657.45*	*777313.58*	*N 32 6 26.79*	*W 103 34 16.36*
	12400.00	39.76	179.47	12335.44	112.93	-107.10	630.97	12.00	403648.22	777313.67	N 32 6 26.69	W 103 34 16.36
	12500.00	51.76	179.47	12405.08	184.44	-178.61	631.64	12.00	403576.72	777314.33	N 32 6 25.99	W 103 34 16.36
	12600.00	63.76	179.47	12458.33	268.87	-263.03	632.42	12.00	403492.30	777315.11	N 32 6 25.15	W 103 34 16.35
Wolfcamp Middle A1	*12610.81*	*65.06*	*179.47*	*12463.00*	*278.62*	*-272.78*	*632.51*	*12.00*	*403482.54*	*777315.20*	*N 32 6 25.05*	*W 103 34 16.35*
Build 4°/100' DLS	12693.66	75.00	179.47	12491.26	356.39	-350.55	633.23	12.00	403404.78	777315.92	N 32 6 24.29	W 103 34 16.35
	12700.00	75.25	179.47	12492.89	362.52	-356.68	633.28	4.00	403398.66	777315.97	N 32 6 24.22	W 103 34 16.35
	12800.00	79.25	179.47	12514.95	460.03	-454.19	634.19	4.00	403301.15	777316.88	N 32 6 23.26	W 103 34 16.35
	12900.00	83.25	179.47	12530.15	558.85	-553.00	635.10	4.00	403202.34	777317.79	N 32 6 22.28	W 103 34 16.35
	13000.00	87.25	179.47	12538.42	658.49	-652.63	636.02	4.00	403102.71	777318.71	N 32 6 21.30	W 103 34 16.34
MA1 Target	*13054.53*	*89.43*	*179.47*	*12540.00*	*712.99*	*-707.13*	*636.53*	*4.00*	*403048.21*	*777319.22*	*N 32 6 20.76*	*W 103 34 16.34*
MA1 Target Landing Point	13082.80	90.57	179.47	12540.00	741.27	-735.41	636.79	4.00	403019.94	777319.48	N 32 6 20.48	W 103 34 16.34
	13100.00	90.57	179.47	12539.83	758.46	-752.60	636.95	0.00	403002.74	777319.64	N 32 6 20.31	W 103 34 16.34
	13200.00	90.57	179.47	12538.84	858.46	-852.59	637.87	0.00	402902.75	777320.56	N 32 6 19.32	W 103 34 16.34
	13300.00	90.57	179.47	12537.86	958.45	-952.58	638.80	0.00	402802.77	777321.49	N 32 6 18.33	W 103 34 16.34
	13400.00	90.57	179.47	12536.87	1058.45	-1052.57	639.72	0.00	402702.78	777322.41	N 32 6 17.34	W 103 34 16.33
	13500.00	90.57	179.47	12535.88	1158.44	-1152.56	640.65	0.00	402602.79	777323.34	N 32 6 16.35	W 103 34 16.33
	13600.00	90.57	179.47	12534.89	1258.44	-1252.55	641.57	0.00	402502.80	777324.26	N 32 6 15.36	W 103 34 16.33
	13700.00	90.57	179.47	12533.91	1358.43	-1352.55	642.50	0.00	402402.81	777325.19	N 32 6 14.37	W 103 34 16.33
	13800.00	90.57	179.47	12532.92	1458.43	-1452.54	643.42	0.00	402302.83	777326.11	N 32 6 13.38	W 103 34 16.32
	13900.00	90.57	179.47	12531.93	1558.42	-1552.53	644.35	0.00	402202.84	777327.04	N 32 6 12.39	W 103 34 16.32
	14000.00	90.57	179.47	12530.95	1658.42	-1652.52	645.27	0.00	402102.85	777327.96	N 32 6 11.40	W 103 34 16.32
	14100.00	90.57	179.47	12529.96	1758.41	-1752.51	646.20	0.00	402002.86	777328.89	N 32 6 10.41	W 103 34 16.32
	14200.00	90.57	179.47	12528.97	1858.41	-1852.50	647.12	0.00	401902.87	777329.81	N 32 6 9.42	W 103 34 16.31
	14300.00	90.57	179.47	12527.98	1958.40	-1952.49	648.05	0.00	401802.89	777330.74	N 32 6 8.43	W 103 34 16.31

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 ° ' ")
	14400.00	90.57	179.47	12527.00	2058.40	-2052.48	648.97	0.00	401702.90	777331.66	N 32 6 7.44	W 103 34 16.31
	14500.00	90.57	179.47	12526.01	2158.39	-2152.47	649.90	0.00	401602.91	777332.59	N 32 6 6.45	W 103 34 16.31
	14600.00	90.57	179.47	12525.02	2258.39	-2252.46	650.82	0.00	401502.92	777333.51	N 32 6 5.46	W 103 34 16.30
	14700.00	90.57	179.47	12524.04	2358.38	-2352.45	651.75	0.00	401402.94	777334.44	N 32 6 4.47	W 103 34 16.30
	14800.00	90.57	179.47	12523.05	2458.38	-2452.45	652.67	0.00	401302.95	777335.36	N 32 6 3.49	W 103 34 16.30
	14900.00	90.57	179.47	12522.06	2558.37	-2552.44	653.60	0.00	401202.96	777336.29	N 32 6 2.50	W 103 34 16.30
	15000.00	90.57	179.47	12521.07	2658.37	-2652.43	654.52	0.00	401102.97	777337.21	N 32 6 1.51	W 103 34 16.29
	15100.00	90.57	179.47	12520.09	2758.36	-2752.42	655.45	0.00	401002.98	777338.14	N 32 6 0.52	W 103 34 16.29
	15200.00	90.57	179.47	12519.10	2858.36	-2852.41	656.37	0.00	400903.00	777339.06	N 32 5 59.53	W 103 34 16.29
	15300.00	90.57	179.47	12518.11	2958.35	-2952.40	657.30	0.00	400803.01	777339.99	N 32 5 58.54	W 103 34 16.29
	15400.00	90.57	179.47	12517.13	3058.35	-3052.39	658.22	0.00	400703.02	777340.91	N 32 5 57.55	W 103 34 16.28
	15500.00	90.57	179.47	12516.14	3158.34	-3152.38	659.15	0.00	400603.03	777341.84	N 32 5 56.56	W 103 34 16.28
	15600.00	90.57	179.47	12515.15	3258.34	-3252.37	660.07	0.00	400503.04	777342.76	N 32 5 55.57	W 103 34 16.28
	15700.00	90.57	179.47	12514.17	3358.33	-3352.36	661.00	0.00	400403.06	777343.69	N 32 5 54.58	W 103 34 16.28
	15800.00	90.57	179.47	12513.18	3458.33	-3452.35	661.92	0.00	400303.07	777344.61	N 32 5 53.59	W 103 34 16.27
	15900.00	90.57	179.47	12512.19	3558.32	-3552.34	662.85	0.00	400203.08	777345.54	N 32 5 52.60	W 103 34 16.27
	16000.00	90.57	179.47	12511.20	3658.32	-3652.34	663.77	0.00	400103.09	777346.46	N 32 5 51.61	W 103 34 16.27
	16100.00	90.57	179.47	12510.22	3758.31	-3752.33	664.70	0.00	400003.10	777347.39	N 32 5 50.62	W 103 34 16.27
	16200.00	90.57	179.47	12509.23	3858.31	-3852.32	665.62	0.00	399903.12	777348.31	N 32 5 49.63	W 103 34 16.26
	16300.00	90.57	179.47	12508.24	3958.30	-3952.31	666.55	0.00	399803.13	777349.24	N 32 5 48.64	W 103 34 16.26
	16400.00	90.57	179.47	12507.26	4058.30	-4052.30	667.47	0.00	399703.14	777350.16	N 32 5 47.65	W 103 34 16.26
	16500.00	90.57	179.47	12506.27	4158.29	-4152.29	668.40	0.00	399603.15	777351.09	N 32 5 46.66	W 103 34 16.26
	16600.00	90.57	179.47	12505.28	4258.29	-4252.28	669.32	0.00	399503.16	777352.01	N 32 5 45.67	W 103 34 16.25
	16700.00	90.57	179.47	12504.29	4358.28	-4352.27	670.25	0.00	399403.18	777352.94	N 32 5 44.69	W 103 34 16.25
	16800.00	90.57	179.47	12503.31	4458.28	-4452.26	671.17	0.00	399303.19	777353.86	N 32 5 43.70	W 103 34 16.25
	16900.00	90.57	179.47	12502.32	4558.28	-4552.25	672.10	0.00	399203.20	777354.79	N 32 5 42.71	W 103 34 16.25
	17000.00	90.57	179.47	12501.33	4658.27	-4652.24	673.02	0.00	399103.21	777355.71	N 32 5 41.72	W 103 34 16.24
	17100.00	90.57	179.47	12500.35	4758.27	-4752.23	673.95	0.00	399003.23	777356.64	N 32 5 40.73	W 103 34 16.24
Cimarex Cascade 28 Federal 86H - PBHL [100' FSL, 750' FEL]	17134.99	90.57	179.47	12500.00	4793.25	-4787.22	674.27	0.00	398968.24	777356.98	N 32 5 40.38	W 103 34 16.24

Survey Type: 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 / Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19
	1	26.000	17134.990	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Cascade 28 Federal 86H Rev1

Schlumberger

CIMAREX

Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19 Anti-Collision Summary Report

Analysis Date-24hr Time:	August 28, 2019 - 11:47	**Analysis Method:**	3D Least Distance
Client:	Cimarex	**Reference Trajectory:**	Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19 (Def Plan)
Field:	NM Lea County (NAD 83)	**Depth Interval:**	Every 10.00 Measured Depth (ft)
Structure:	Cimarex Cascade 28 Federal 86H	**Rule Set:**	NAL Procedure: D&M AntiCollision Standard S002
Slot:	Cimarex Cascade 28 Federal 86H	**Min Pts:**	All local minima indicated.
Well:	Cimarex Cascade 28 Federal 86H	**Version / Patch:**	2.10.760.0
Borehole:	Original Borehole	**Database \ Project:**	US1153APP452.dir.slb.com\drilling-NM Lea County 2.10
Scan MD Range:	0.00ft - 17134.99ft		

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

Offset Trajectories Summary

Offset Selection Criteria
Wellhead distance scan: Restricted within 58145.49 ft
Selection filters: Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans
- All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

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

Results highlighted: Sep-Factor separation <= 1.50 ft

Curtis Hankamer Conley Federal #1 Plugged Oil Bind 0ft-5039ft (Def Survey) — Fail Major

790.43	32.81	787.93	757.62	N/A	MAS = 10.00 (m)	0.00	0.00				Surface
789.73	32.81	787.15	756.92	10115.35	MAS = 10.00 (m)	20.00	20.00				MinPt-O-SF
789.62	32.81	787.05	756.81	11802.39	MAS = 10.00 (m)	26.00	26.00				WRP
789.54	239.28	629.18	550.25	4.99	OSF1.50	840.00	840.00	OSF<5.00			Enter Alert
789.54	792.57	260.32	-3.03	1.49	OSF1.50	2600.00	2600.00		OSF<1.50		Enter Minor
715.78	1077.21	-3.22	-361.43	1.00	OSF1.50	3510.00	3505.52			OSF<1.00	Enter Major
535.48	1570.49	-512.43	-1035.01	0.51	OSF1.50	5110.00	5092.96				MinPts
534.79	1569.32	-512.35	-1034.54	0.51	OSF1.50	5120.00	5102.89				MinPt-O-SF
533.84	1562.55	-508.77	-1026.70	0.51	OSF1.50	5150.00	5132.65				MinPt-CtCt
710.04	1064.96	-0.76	-354.91	1.00	OSF1.50	5020.00	5598.96			OSF>1.00	Exit Major
847.44	856.46	275.64	-9.02	1.48	OSF1.50	5810.00	5787.47		OSF>1.50		Exit Minor
1431.43	436.52	1139.58	994.91	4.94	OSF1.50	6480.00	6452.21	OSF>5.00			Exit Alert
7538.67	235.71	7380.70	7302.96	48.47	OSF1.50	13710.00	12533.81				MINPT-O-EOU
7616.84	332.03	7396.66	7286.81	34.67	OSF1.50	14190.00	12529.07				MinPt-O-ADP
8694.20	525.01	8143.37	7869.20	15.85	OSF1.50	17134.99	12500.00				MinPt-O-SF

Cimarex Cascade 28 Federal 85H Rev1 RM 28Aug19 (Def Plan) — Fail Minor

20.06	16.49	17.56	3.56	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00			Enter Alert
19.99	16.49	17.49	3.50	N/A	MAS = 5.03 (m)	26.00	26.00				WRP
19.99	20.00	5.63	-0.01	1.50	OSF1.50	1920.00	1920.00		OSF<1.50		Enter Minor
19.99	25.46	2.18	-5.47	1.14	OSF1.50	2500.00	2500.00				MinPt-CtCt
20.05	25.61	2.14	-5.56	1.14	OSF1.50	2520.00	2520.00				MinPts
26.14	26.59	7.58	-0.45	1.47	OSF1.50	2690.00	2690.00		OSF>1.50		Exit Minor
96.51	30.78	75.16	65.73	4.99	OSF1.50	4090.00	4080.97	OSF>5.00			Exit Alert
419.96	80.13	365.70	339.83	8.07	OSF1.50	11880.00	11821.40				MinPts
420.18	80.20	365.68	339.98	8.06	OSF1.50	11930.00	11891.40				MinPt-O-SF
487.89	148.38	388.14	339.51	4.99	OSF1.50	16240.00	12508.83	OSF<5.00			Enter Alert
487.89	174.12	370.98	313.77	4.24	OSF1.50	17134.99	12500.00				MinPts

Cimarex Cascade 28 Federal 89H Rev0 RM 9Mar18 (Non-Def Plan) — Fail Minor

100.08	32.81	97.58	67.27	N/A	MAS = 10.00 (m)	0.00	0.00				Surface
100.07	32.81	97.57	67.26	109785.84	MAS = 10.00 (m)	26.00	26.00				WRP
72.50	32.81	57.18	39.69	5.46	MAS = 10.00 (m)	2310.00	2310.00				MinPts
72.58	32.81	57.10	39.77	5.40	MAS = 10.00 (m)	2340.00	2340.00				MINPT-O-EOU
75.25	32.81	58.93	42.44	5.25	MAS = 10.00 (m)	2500.00	2500.00				MinPt-O-SF
106.69	33.78	83.34	72.91	5.00	OSF1.50	4260.00	4249.64	OSF<5.00			Enter Alert
176.05	63.51	132.87	112.54	4.27	OSF1.50	7737.66	7700.00				MinPt-O-SF
176.97	65.89	132.21	111.08	4.13	OSF1.50	8250.00	8211.40				MinPt-CtCt
177.23	66.64	131.97	110.59	4.09	OSF1.50	8340.00	8301.40				MINPT-O-EOU
177.51	66.97	132.03	110.54	4.07	OSF1.50	8380.00	8341.40				MinPt-O-ADP
181.20	66.97	134.38	112.22	4.03	OSF1.50	8620.00	8581.40				MinPt-O-SF
202.83	85.97	144.68	116.85	3.90	OSF1.50	11910.00	11871.40				MinPts
76.00	76.40	24.24	-0.40	1.49	OSF1.50	12300.00	12252.46		OSF<1.50		Enter Minor
69.13	82.89	13.04	-13.76	1.24	OSF1.50	12360.00	12303.66				MinPt-CtCt
69.23	83.15	12.97	-13.92	1.24	OSF1.50	12370.00	12311.79				MinPts
78.78	78.80	23.39	-2.05	1.48	OSF1.50	12430.00	12357.89		OSF>1.50		Exit Minor
144.91	145.09	47.35	-0.18	1.50	OSF1.50	16220.00	12509.03		OSF<1.50		Enter Minor
139.02	166.78	27.00	-27.76	1.25	OSF1.50	16910.00	12502.22				MinPt-CtCt
139.63	168.07	26.75	-28.44	1.24	OSF1.50	16920.00	12502.12				MinPts
157.20	163.52	47.35	-6.32	1.44	OSF1.50	16980.00	12501.53		OSF>1.50		Exit Minor
267.40	129.07	180.53	138.34	3.14	OSF1.50	17134.99	12500.00				TD

Cimarex Cascade 28 Federal 88H Rev0 RM 9Mar18 (Non-Def Plan) — Warning Alert

84.91	32.81	82.41	52.10	N/A	MAS = 10.00 (m)	0.00	0.00				Surface
84.88	32.81	82.38	52.07	N/A	MAS = 10.00 (m)	26.00	26.00				WRP
86.90	32.81	52.79	34.09	5.55	MAS = 10.00 (m)	2080.00	2080.00				MinPts
86.93	32.81	52.73	34.13	5.50	MAS = 10.00 (m)	2100.00	2100.00				MINPT-O-EOU
88.35	32.81	53.70	35.54	5.42	MAS = 10.00 (m)	2190.00	2190.00				MinPt-O-SF
193.26	59.74	152.60	133.52	5.00	OSF1.50	7190.00	7156.84	OSF<5.00			Enter Alert
202.50	65.10	158.26	137.40	4.79	OSF1.50	7750.00	7712.25				MinPt-O-SF
212.81	65.78	168.12	147.03	4.89	OSF1.50	7980.00	7941.43	OSF>5.00			Exit Alert
415.38	88.29	357.02	329.09	7.39	OSF1.50	11910.00	11871.40				MinPts
370.08	84.10	313.19	285.99	6.78	OSF1.50	12360.00	12303.66				MinPt-CtCt
370.11	84.14	313.18	285.96	6.75	OSF1.50	12370.00	12311.79				MinPts
370.19	84.18	313.24	286.01	6.75	OSF1.50	12380.00	12319.80				MinPt-O-SF
395.09	120.42	313.98	274.67	4.99	OSF1.50	15020.00	12520.88	OSF<5.00			Enter Alert
388.89	169.67	274.95	219.23	3.47	OSF1.50	16910.00	12502.22				MinPt-CtCt
389.51	171.50	274.34	218.01	3.44	OSF1.50	16930.00	12502.02				MINPT-O-EOU
390.20	172.27	274.51	217.92	3.43	OSF1.50	16940.00	12501.92				MinPt-O-ADP

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		
	392.34	173.55	275.81	218.79	3.42	OSF1.50	16960.00	12501.73				MinPt-O-SF	
	450.26	171.21	335.29	279.05	3.98	OSF1.50	17134.99	12500.00				TD	
Cimarex Cascade 28 Federal 90H Rev0 RM 9Mar18 (Non-Def Plan)													Warning Alert
	116.65	32.81	114.15	83.84	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	116.64	32.81	114.14	83.83	85619.48	MAS = 10.00 (m)	26.00	26.00				WRP	
	83.60	32.81	66.74	50.79	5.65	MAS = 10.00 (m)	2570.00	2570.00				MinPts	
	83.78	32.81	66.54	50.97	5.61	MAS = 10.00 (m)	2640.00	2640.00				MINPT-O-EOU	
	85.85	32.81	67.87	53.05	5.38	MAS = 10.00 (m)	2800.00	2799.98				MinPt-O-SF	
	264.44	61.27	209.43	183.17	4.99	OSF1.50	12120.00	12081.30	OSF<5.00			Enter Alert	
	233.12	82.38	177.37	150.75	4.33	OSF1.50	12340.00	12287.03				MinPt-O-SF	
	232.92	82.29	177.23	150.64	4.33	OSF1.50	12350.00	12295.40				MinPt-O-ADP	
	232.84	82.17	177.23	150.67	4.34	OSF1.50	12360.00	12303.66				MinPts	
	245.31	75.99	193.82	169.32	4.96	OSF1.50	12530.00	12422.90	OSF>5.00			Exit Alert	
	272.96	83.75	216.29	189.21	4.99	OSF1.50	14730.00	12523.74	OSF<5.00			Enter Alert	
	262.60	140.27	168.15	122.23	2.63	OSF1.50	16900.00	12502.32				MinPts	
	348.96	108.89	275.53	240.07	4.88	OSF1.50	17134.99	12500.00				TD	
Cimarex Red Hills 28 Federal Com #1 (Offset) Gas Inc Only 08-17555ft (Def Survey)													Warning Alert
	2116.13	32.81	2113.63	2083.32	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	2116.02	32.81	2113.50	2083.21	130680.49	MAS = 10.00 (m)	10.00	10.00				MinPt-O-SF	
	2115.93	32.81	2113.42	2083.12	273624.48	MAS = 10.00 (m)	26.00	26.00				WRP	
	2115.56	32.81	2108.20	2082.75	434.69	MAS = 10.00 (m)	230.00	230.00				MinPts	
	2116.05	41.94	2086.25	2073.10	80.34	OSF1.50	650.00	650.00				MinPt-CtCt	
	2123.93	116.56	2045.39	2007.37	27.90	OSF1.50	2250.00	2250.00				MinPt-CtCt	
	2125.73	140.97	2030.81	1984.75	23.00	OSF1.50	2710.00	2710.00				MinPt-CtCt	
	2129.52	165.10	2025.26	1974.41	20.91	OSF1.50	2980.00	2979.55				MINPT-O-EOU	
	2141.24	168.26	2028.23	1972.97	19.35	OSF1.50	3250.00	3247.56				MinPt-O-ADP	
	2196.72	215.20	2052.42	1981.51	15.47	OSF1.50	4150.00	4140.60				MinPt-O-ADP	
	2282.51	283.53	2092.66	1998.98	12.17	OSF1.50	5460.00	5460.06				MinPt-O-ADP	
	2448.90	430.07	2161.36	2018.83	8.58	OSF1.50	8340.00	8301.40				MinPt-CtCt	
	2444.34	531.71	2089.03	1912.63	6.92	OSF1.50	10280.00	10241.40				MinPt-CtCt	
	2148.01	648.09	1715.07	1499.92	4.99	OSF1.50	12730.00	12500.22	OSF<5.00			Enter Alert	
	1511.21	651.19	1078.25	860.02	3.49	OSF1.50	14280.00	12628.38				MinPts	
	2164.48	651.49	1729.31	1512.98	5.00	OSF1.50	15810.00	12513.08	OSF>5.00			Exit Alert	
	3247.57	651.62	2812.32	2595.94	7.50	OSF1.50	17134.99	12500.00				TD	
Tidewater Oil Annie R Bass Federal #1 (Offset) Plugged Oil Bond 0ft-5081ft (Def Survey)													Warning Alert
	4292.08	32.81	4289.58	4259.27	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	4291.86	32.81	4289.34	4259.05	179431.52	MAS = 10.00 (m)	26.00	26.00				MinPt-O-SF	
	4266.01	1282.65	3410.07	2983.36	5.00	OSF1.50	4180.00	4170.26	OSF<5.00			Enter Alert	
	4250.43	1584.16	3193.48	2666.27	4.03	OSF1.50	5180.00	5162.42				MinPt-O-SF	
	4250.38	1584.13	3193.45	2666.25	4.03	OSF1.50	5190.00	5172.34				MinPts	
	4250.35	1584.04	3193.48	2666.31	4.03	OSF1.50	5210.00	5192.18				MinPt-CtCt	
	4720.41	1419.83	3773.02	3300.58	4.99	OSF1.50	7260.00	7226.09	OSF>5.00			Exit Alert	
	7517.85	300.45	7316.82	7217.50	37.84	OSF1.50	15190.00	12519.20				MinPt-O-ADP	
	7431.38	198.14	7299.76	7235.24	67.55	OSF1.50	15740.00	12513.77				MINPT-O-EOU	
	7376.50	103.31	7306.79	7273.19	109.72	OSF1.50	16640.00	12504.89				MinPt-CtCt	
	7392.99	166.30	7281.29	7226.69	67.68	OSF1.50	17134.99	12500.00				MinPts	
Cimarex Cascade 28 Federal 91H Rev0 RM 9Mar18 (Non-Def Plan)													Pass
	134.20	32.81	131.70	101.39	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	134.19	32.81	131.69	101.38	118543.70	MAS = 10.00 (m)	26.00	26.00				WRP	
	113.71	32.81	98.24	80.90	7.43	MAS = 10.00 (m)	2590.00	2590.00				MinPts	
	113.97	32.81	95.85	81.16	7.14	MAS = 10.00 (m)	2700.00	2700.00				MINPT-O-EOU	
	115.40	32.81	96.85	82.59	7.04	MAS = 10.00 (m)	2800.00	2799.98				MinPt-O-SF	
	587.68	90.10	506.78	477.58	9.68	OSF1.50	11920.00	11881.40				MinPt-O-SF	
	535.15	87.52	475.97	447.63	9.40	OSF1.50	12290.00	12243.56				MinPt-O-SF	
	533.84	87.10	474.94	446.74	9.42	OSF1.50	12350.00	12295.40				MinPts	
	533.80	87.01	474.95	446.78	9.43	OSF1.50	12360.00	12303.66				MinPt-CtCt	
	547.45	147.75	448.11	399.69	5.63	OSF1.50	16900.00	12502.32				MinPts	
	594.36	136.77	502.34	457.59	6.61	OSF1.50	17134.99	12500.00				TD	

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Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19 Proposal Geodetic Report

(Def Plan)

CIMAREX

Report Date:	August 28, 2019 - 11:47 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	179.470 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Cascade 28 Federal 86H / Cimarex Cascade 28 Federal 86H	**TVD Reference Datum:**	RKB
Well:	Cimarex Cascade 28 Federal 86H	**TVD Reference Elevation:**	3391.600 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3365.600 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.617 °
Survey Name:	Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19	**Total Gravity Field Strength:**	998.4372mgn (9.80665 Based)
Survey Date:	August 28, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	104.932 ° / 5420.708 ft / 5.891 / 0.432	**Total Magnetic Field Strength:**	47746.438 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.709 °
Location Lat / Long:	N 32° 6' 27.79806", W 103° 34' 23.68479"	**Declination Date:**	August 28, 2019
Location Grid N/E Y/X:	N 403755.320 ftUS, E 776882.710 ftUS	**Magnetic Declination Model:**	HDGM 2019
CRS Grid Convergence Angle:	0.4040 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99997253	**Grid Convergence Used:**	0.4040 °
Version / Patch:	2.10.760.0	**Total Corr Mag North->Grid North:**	6.2128 °
		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 [390' FNL, 1380' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	403755.32	776882.71	N 32 6 27.80	W 103 34 23.68
Nudge 2°/100' DLS	2700.00	0.00	89.70	2700.00	0.00	0.00	0.00	0.00	403755.32	776882.71	N 32 6 27.80	W 103 34 23.68
Hold Nudge	3059.15	7.18	89.70	3058.21	0.09	0.12	22.48	2.00	403755.44	776705.19	N 32 6 27.80	W 103 34 23.42
Drop to Vertical 2°/100' DLS	7737.66	7.18	89.70	7700.00	2.42	3.20	607.47	0.00	403758.52	777290.16	N 32 6 27.79	W 103 34 16.62
Hold Vertical	8096.81	0.00	89.70	8058.21	2.51	3.32	629.95	2.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
KOP - Build 12°/100' DLS	12088.66	0.00	89.70	12030.07	2.51	3.32	629.95	0.00	403758.64	777312.64	N 32 6 27.79	W 103 34 16.36
Build 4°/100' DLS	12693.66	75.00	179.47	12491.26	356.39	-350.55	633.23	12.00	403404.78	777315.92	N 32 6 24.29	W 103 34 16.35
Landing Point Cimarex Cascade 28 Federal 86H - PBHL [100' FSL, 750' FEL]	13082.60	90.57	179.47	12540.00	741.27	-735.41	636.79	4.00	403019.94	777319.48	N 32 6 20.48	W 103 34 16.34
	17134.99	90.57	179.47	12500.00	4793.25	-4787.22	674.27	0.00	398968.24	777356.96	N 32 5 40.38	W 103 34 16.24

Survey Type: 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 / Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19
	1	26.000	17134.990	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Cascade 28 Federal 86H Rev1

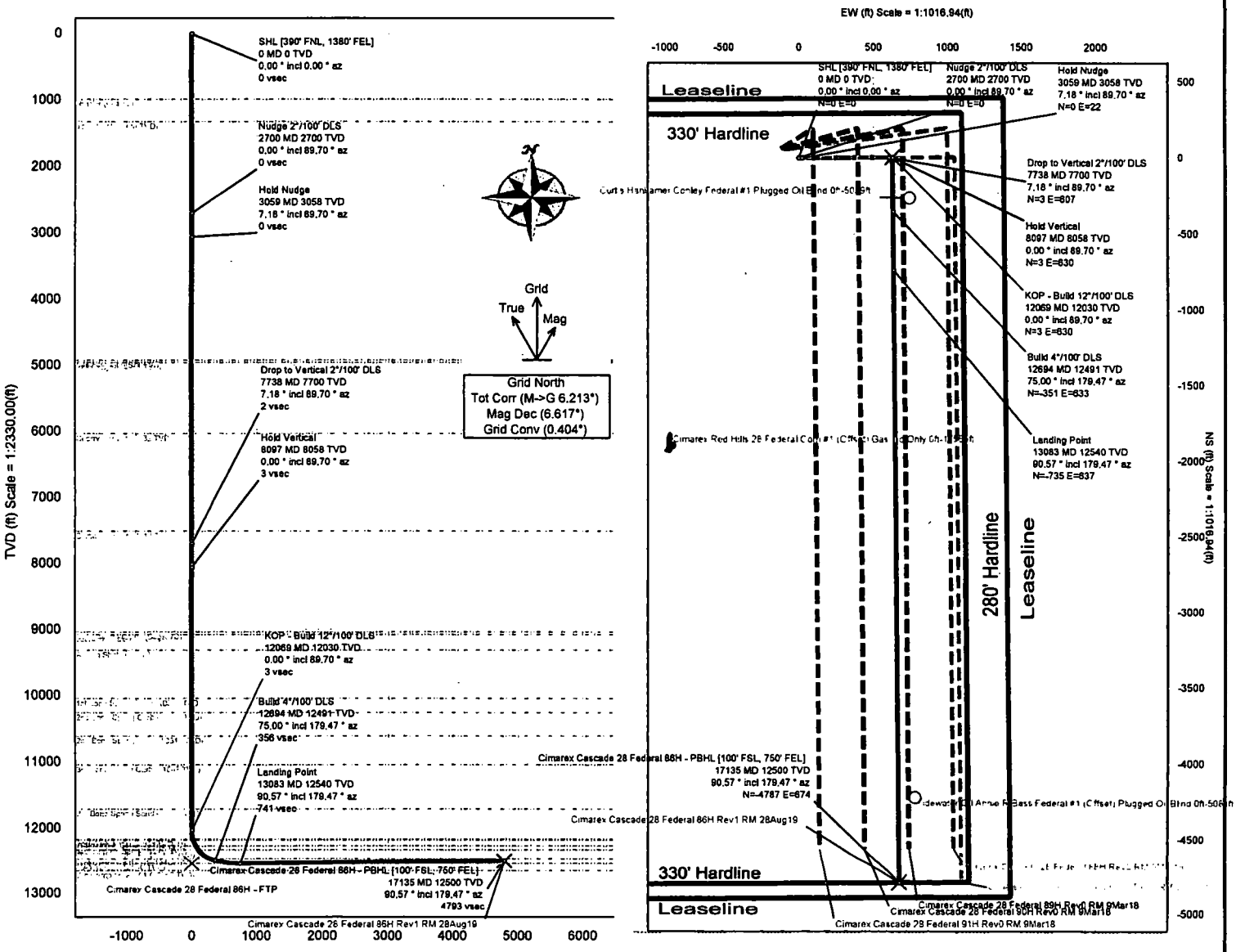
Schlumberger

Cimarex Rev 1

CIMAREX

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Cascade 28 Federal 86H	NM Lea County (NAD 83)	Cimarex Cascade 28 Federal 86H

Gravity & Magnetic Parameters				Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous	
Model:	HDGM 2019	Dip: 59.709°	Date: 29-Aug-2019	Lat: N 32 6 27.80	Northing: 403758.32ftUS	Grid Conv: 0.404°			Slot: Cimarex Cascade 28 Federal 86H	TVD Ref: RKB(3391.6ft above MSL)
MagDec: 6.617°	FS: 47748.438nT	Gravity FS: 999.437mgn (9.80665 Based)		Lon: W 103 34 23.68	Easting: 776582.71ftUS	Scale Fact: 0.99987253			Plan: Cimarex Cascade 28 Federal 86H Rev1 RM 28Aug19	



Vertical Section (ft) Azim = 179.47° Scale = 1:2330.00(ft) Origin = 0N/-S, 0E/-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [390' FNL, 1380' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rustler	994.00	0.00	89.70	994.00	0.00	0.00	0.00	0.00
Top of Salt	1328.00	0.00	89.70	1328.00	0.00	0.00	0.00	0.00
Nudge 2°/100' DLS	2700.00	0.00	89.70	2700.00	0.00	0.00	0.00	0.00
Hold Nudge	3059.15	7.18	89.70	3058.21	0.09	0.12	22.48	2.00
Base of Salt	4936.68	7.18	89.70	4921.00	1.02	1.38	257.24	0.00
Bell Canyon	4973.97	7.18	89.70	4958.00	1.04	1.38	261.91	0.00
Cherry Canyon	6056.46	7.18	89.70	6032.00	1.58	2.09	397.26	0.00
Brushy Canyon	7550.19	7.18	89.70	7514.00	2.32	3.08	584.03	0.00
Drop to Vertical 2°/100' DLS	7737.66	7.18	89.70	7700.00	2.42	3.20	607.47	0.00
Hold Vertical	8096.81	0.00	89.70	8058.21	2.51	3.32	629.95	2.00
Bone Spring Lime	9076.60	0.00	89.70	9038.00	2.51	3.32	629.95	0.00
Leonard Shale	9114.60	0.00	89.70	9076.00	2.51	3.32	629.95	0.00
Avalon Shale	9352.60	0.00	89.70	9314.00	2.51	3.32	629.95	0.00
1st Bone Spring Sand	10087.60	0.00	89.70	10049.00	2.51	3.32	629.95	0.00
2nd Bone Spring Carb	10301.60	0.00	89.70	10263.00	2.51	3.32	629.95	0.00
2nd Bone Spring Sand	10654.60	0.00	89.70	10616.00	2.51	3.32	629.95	0.00
3rd Bone Spring Carb	11085.60	0.00	89.70	11047.00	2.51	3.32	629.95	0.00
3rd Bone Spring Sand	11752.60	0.00	89.70	11714.00	2.51	3.32	629.95	0.00
KOP - Build 12°/100' DLS	12068.66	0.00	89.70	12030.07	2.51	3.32	629.95	0.00
Top Wolfcamp	12205.48	16.42	179.47	12165.00	21.97	-16.14	630.13	12.00
Wolfcamp X Sand	12226.45	18.93	179.47	12185.00	28.34	-22.51	630.18	12.00
Wolfcamp Y Sand	12316.59	29.75	179.47	12267.00	65.44	-59.61	630.54	12.00
Wolfcamp Upper A1	12385.30	38.00	179.47	12324.00	103.71	-97.87	630.89	12.00
Wolfcamp Middle A1	12610.81	65.06	179.47	12463.00	278.62	-272.78	632.51	12.00
Build 4°/100' DLS	12693.66	75.00	179.47	12491.26	356.39	-350.55	633.23	12.00
MA1 Target	13054.53	89.43	179.47	12540.00	712.99	-707.13	636.53	4.00
MA1 Target	13082.80	90.57	179.47	12540.00	741.26	-735.40	636.79	4.00
Landing Point	13082.80	90.57	179.47	12540.00	741.27	-735.41	636.79	4.00
Cimarex Cascade 28 Federal 86H - PBHL [100' FSL, 750' FEL]	17134.99	90.57	179.47	12500.00	4793.25	-4787.22	674.27	0.00
Wolfcamp Lower A1	NaN			12658.00				

1. Geological Formations

TVD of target 12,500
MD at TD 17,135

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	994	N/A	
Top of Salt	1328	N/A	
Lamar	4920	N/A	
Bell Canyon	4958	N/A	
Cherry Canyon	6032	N/A	
Brushy Canyon	7514	Hydrocarbons	
Bone Spring Lime	9005	Hydrocarbons	
Leonard Shale	9076	Hydrocarbons	
Avalon Shale	9314	Hydrocarbons	
1st Bone Spring Sand	10049	Hydrocarbons	
2nd Bone Spring Carb	10263	Hydrocarbons	
2nd Bone Spring Sand	10616	Hydrocarbons	
3rd Bone Spring Carb	11047	Hydrocarbons	
3rd Bone Spring Sand	11714	Hydrocarbons	
Wolfcamp	12165	Hydrocarbons	
Wolfcamp (Target)	12540	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
14 3/4	0	1045	1045	10-3/4"	45.50	J-55	BT&C	4.37	7.49	15.04
9 7/8	0	12694	12491	7-5/8"	29.70	L-80	BT&C	2.33	1.12	1.79
6 3/4	0	12010	12010	5-1/2"	20.00	L-80	LT&C	1.13	1.18	1.85
6 3/4	~~8723~~ 12010	17135	12500	5"	18.00	P-110	BT&C	1.66	1.68	65.76
					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

Request Variance for 5-1/2" x 7-5/8" annular clearance. The portion that does not meet clearance will not be cemented

	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?	Y

3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft3/sack	H2O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	406	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	109	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate Stage 1	600	10.30	3.64	22.18		Lead: Tuned Light + LCM
	207	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Intermediate Stage 2	789	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
Production	407	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

DV tool with possible annular casing packer as needed is proposed at a depth of +/- 4,920'.

Casing String	TOC	% Excess
Surface	0	45
Intermediate Stage 1	4920	47
Intermediate Stage 2	0	40
Production	12070	25

Cimarex request the ability to perform casing integrity tests after plug bump of cement job.

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
9 7/8	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		
6 3/4	13 5/8	10M	Annular	X	50% of working pressure
			Blind Ram		10M
			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 1045'	FW Spud Mud	8.30 - 8.80	30-32	N/C
1045' to 12694'	Brine Diesel Emulsion	9.00 - 9.50	30-35	N/C
12694' to 17135'	OBM	12.00 - 12.50	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.

The Brine Emulsion is completely saturated brine fluid that ties diesel into itself to lower the weight of the fluid. The drilling fluid is completely salt saturated.

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	
	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.
X	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	8125 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 10-3/4" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 10000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 10000 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.

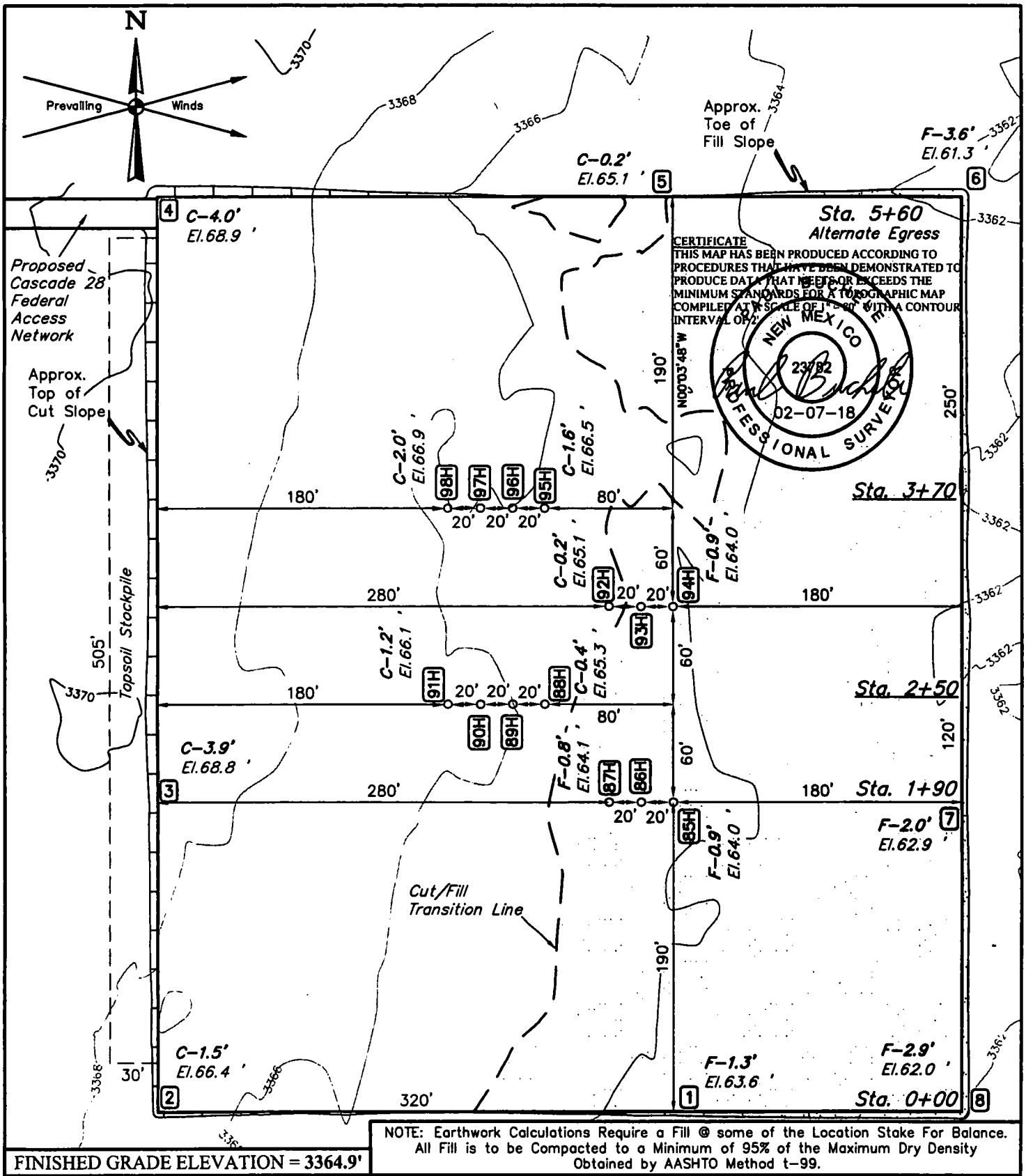
The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative.

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 10000 psi.

All casing strings will be tested as per Onshore Order No.2 to atleast 0.22 psi/ft or 1,500 whichever is greater and not to exceed 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.



CERTIFICATE
THIS MAP HAS BEEN PRODUCED ACCORDING TO PROCEDURES THAT HAVE BEEN DEMONSTRATED TO PRODUCE DATA THAT MEETS OR EXCEEDS THE MINIMUM STANDARDS FOR A TOPOGRAPHIC MAP COMPILED AT A SCALE OF 1" = 80' WITH A CONTOUR INTERVAL OF 2'.

NEW MEXICO
23782
PROFESSIONAL SURVEYOR
02-07-18

FINISHED GRADE ELEVATION = 3364.9'

NOTE: Earthwork Calculations Require a Fill @ some of the Location Stake For Balance. All Fill is to be Compacted to a Minimum of 95% of the Maximum Dry Density Obtained by AASHTO Method t-99.

NOTES:

- Flare pit is to be located a min. of 100' from the wellhead.
- Contours shown at 2' intervals.
- Cut/Fill slopes 1 1/2:1 (Typ. except where noted)
- Underground utilities shown on this sheet are for visualization purposes only, actual locations to be determined prior to construction.

CIMAREX ENERGY CO.

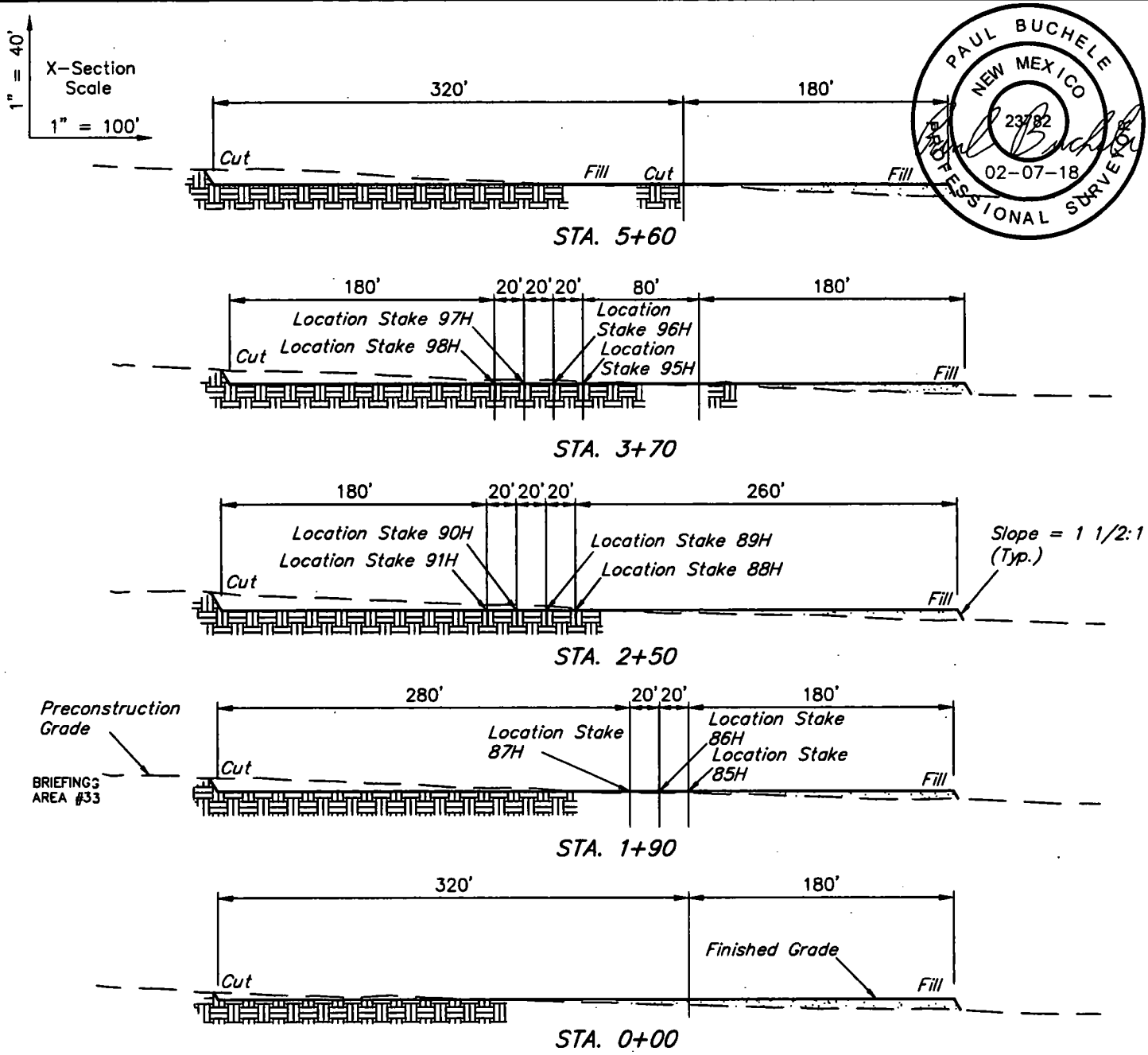
CASCADE 28 FEDERAL W2E2 85H Pad
NW 1/4 NE 1/4, SECTION 28, T25S, R33E, N.M.P.M.
LEA COUNTY, NEW MEXICO

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

SURVEYED BY	C.T., C.H.	01-24-18	SCALE
DRAWN BY	J.A.	02-07-18	1" = 80'

LOCATION LAYOUT **EXHIBIT J**



PAUL BUCHELE
NEW MEXICO
23782
02-07-18
PROFESSIONAL SURVEYOR

APPROXIMATE EARTHWORK QUANTITIES	
(4") TOPSOIL STRIPPING	3,550 Cu. Yds.
REMAINING LOCATION	8,870 Cu. Yds.
TOTAL CUT	**12,420 Cu. Yds.**
FILL	**8,870 Cu. Yds.**
EXCESS MATERIAL	3,550 Cu. Yds.
TOPSOIL & PIT BACKFILL	3,550 Cu. Yds.
EXCESS UNBALANCE (After Interim Rehabilitation)	**0 Cu. Yds.**

APPROXIMATE SURFACE DISTURBANCE AREAS		
	DISTANCE	**ACRES**
WELL SITE DISTURBANCE	NA	±6.889
60' WIDE FLOW LINE R-O-W DISTURBANCE	±849.98'	±1.171
60' WIDE FLOW LINE LATERAL "A" R-O-W DISTURBANCE	±150.12'	±0.207
TOTAL SURFACE USE AREA		**±8.267**

NOTES:

- Fill quantity includes 5% for compaction.
- Cut/Fill slopes 1 1/2:1 (Typ. except where noted)

CIMAREX ENERGY CO.

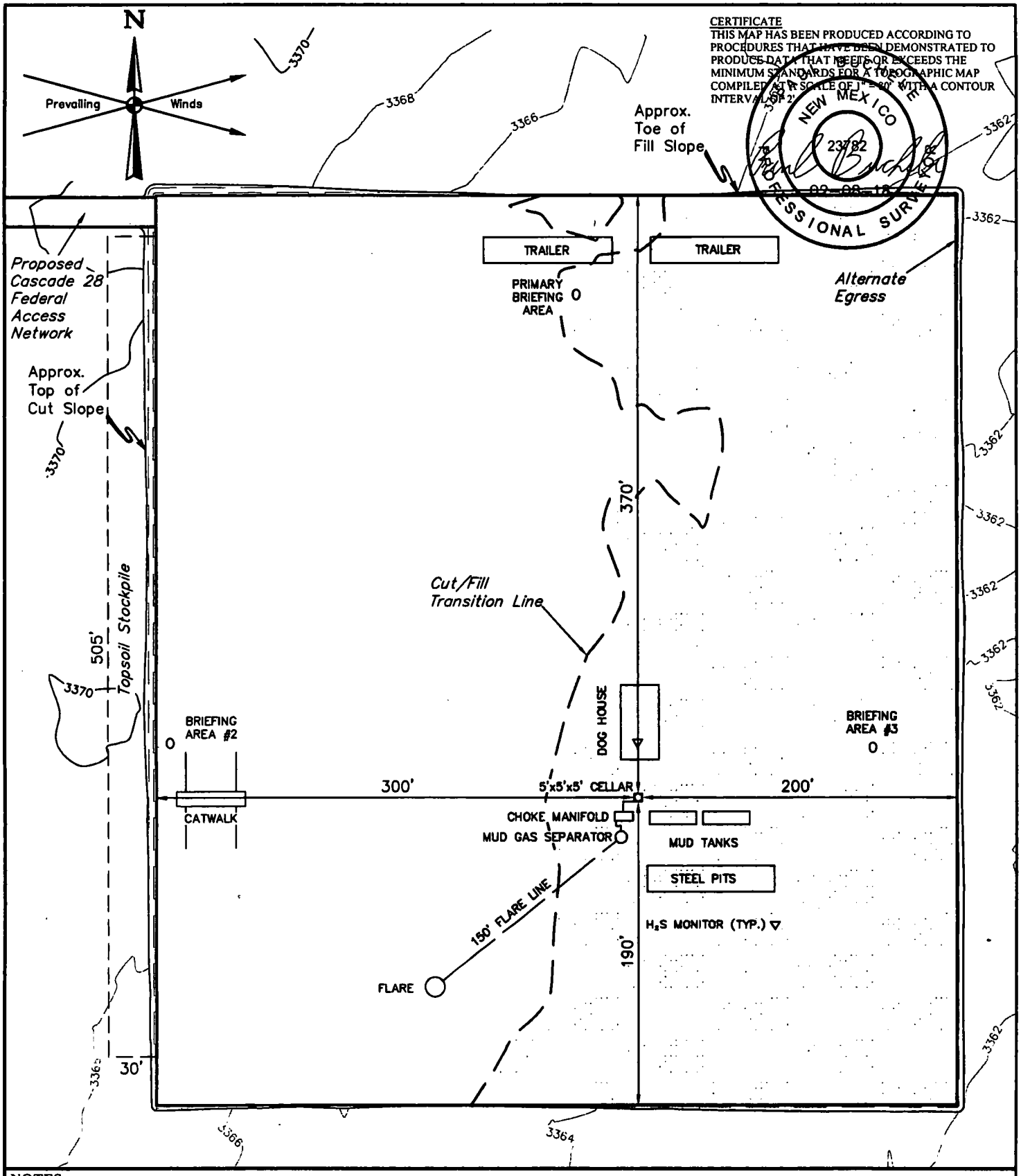
CASCADE 28 FEDERAL W2E2 85H Pad
NW 1/4 NE 1/4, SECTION 28, T25S, R33E, N.M.P.M.
LEA COUNTY, NEW MEXICO

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

SURVEYED BY	C.T., C.H.	01-24-18	SCALE
DRAWN BY	J.A.	02-07-18	AS SHOWN

TYPICAL CROSS SECTIONS EXHIBIT J



NOTES:

- Contours shown at 2' intervals.

CIMAREX ENERGY CO.

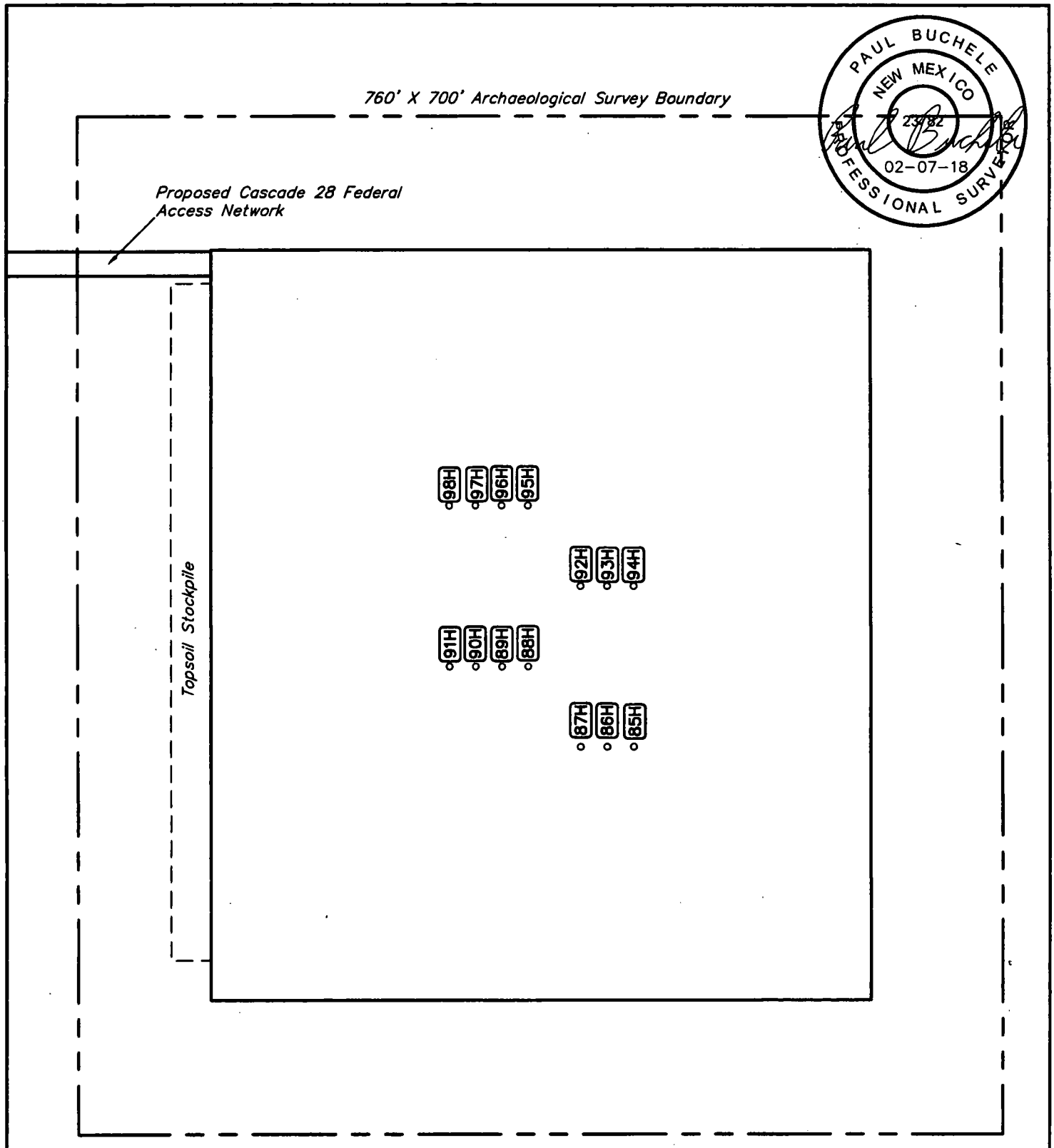
CASCADE 28 FEDERAL W2E2 85H Pad, #86H
390' FNL 1380' FEL
NW 1/4 NE 1/4, SECTION 28, T25S, R33E, N.M.P.M.
LEA COUNTY, NEW MEXICO

SURVEYED BY	C.T., C.H.	01-24-18	SCALE
DRAWN BY	J.A.	02-07-18	1" = 80'

TYPICAL RIG LAYOUT EXHIBIT K

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017



PAUL BUCHELE
NEW MEXICO
23782
02-07-18
PROFESSIONAL SURVEYOR

NOTES:

CIMAREX ENERGY CO.

CASCADE 28 FEDERAL W2E2 85H Pad
NW 1/4 NE 1/4, SECTION 28, T25S, R33E, N.M.P.M.
LEA COUNTY, NEW MEXICO

UINTAH ENGINEERING & LAND SURVEYING

UELS, LLC
Corporate Office * 85 South 200 East
Vernal, UT 84078 * (435) 789-1017

SURVEYED BY	C.T., C.H.	01-24-18	SCALE
DRAWN BY	J.A.	02-07-18	1" = 50'

ARCHAEOLOGICAL SURVEY BOUNDARY **EXHIBIT L**

Drilling 9 7/8" hole
below 10 3/4" Casing

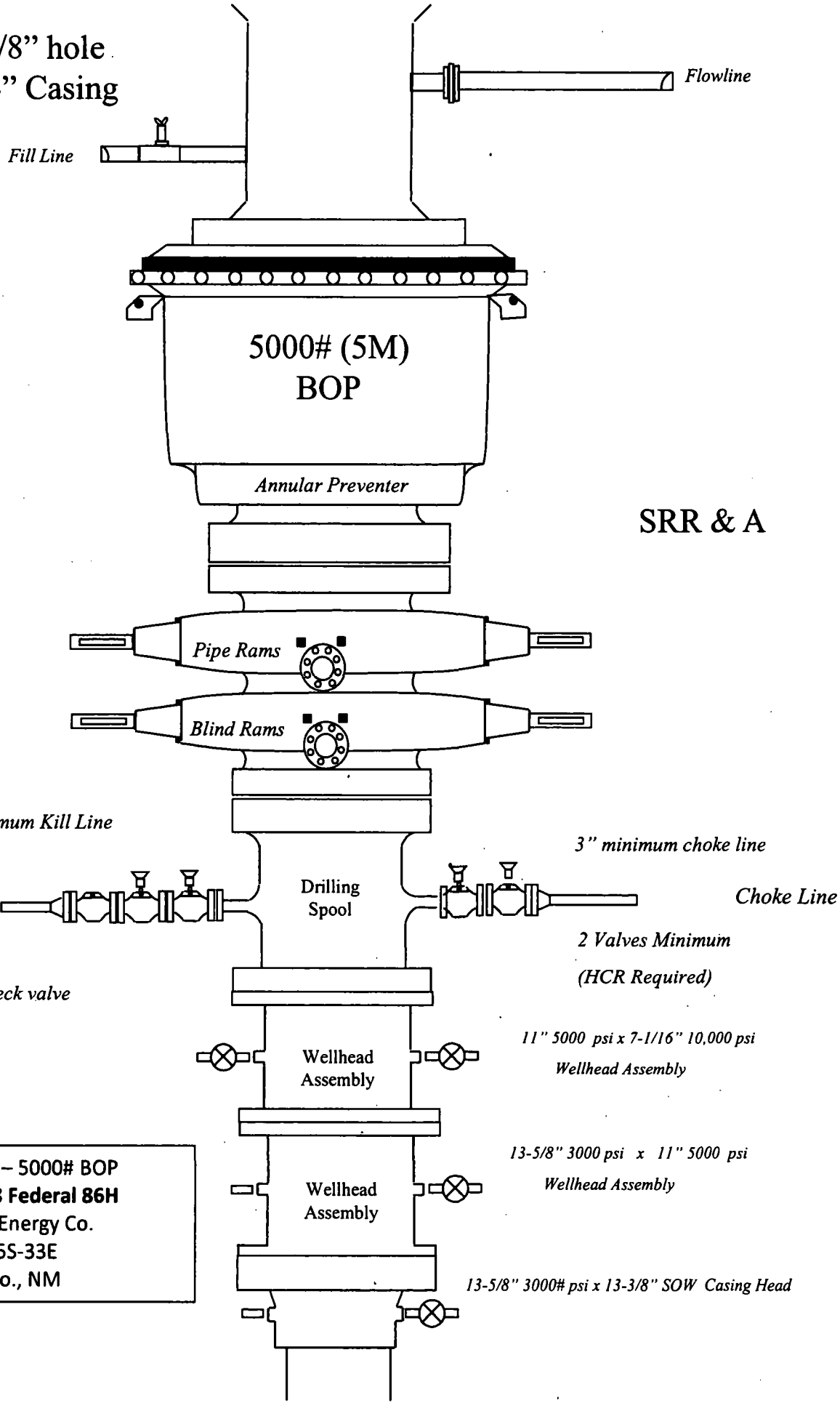
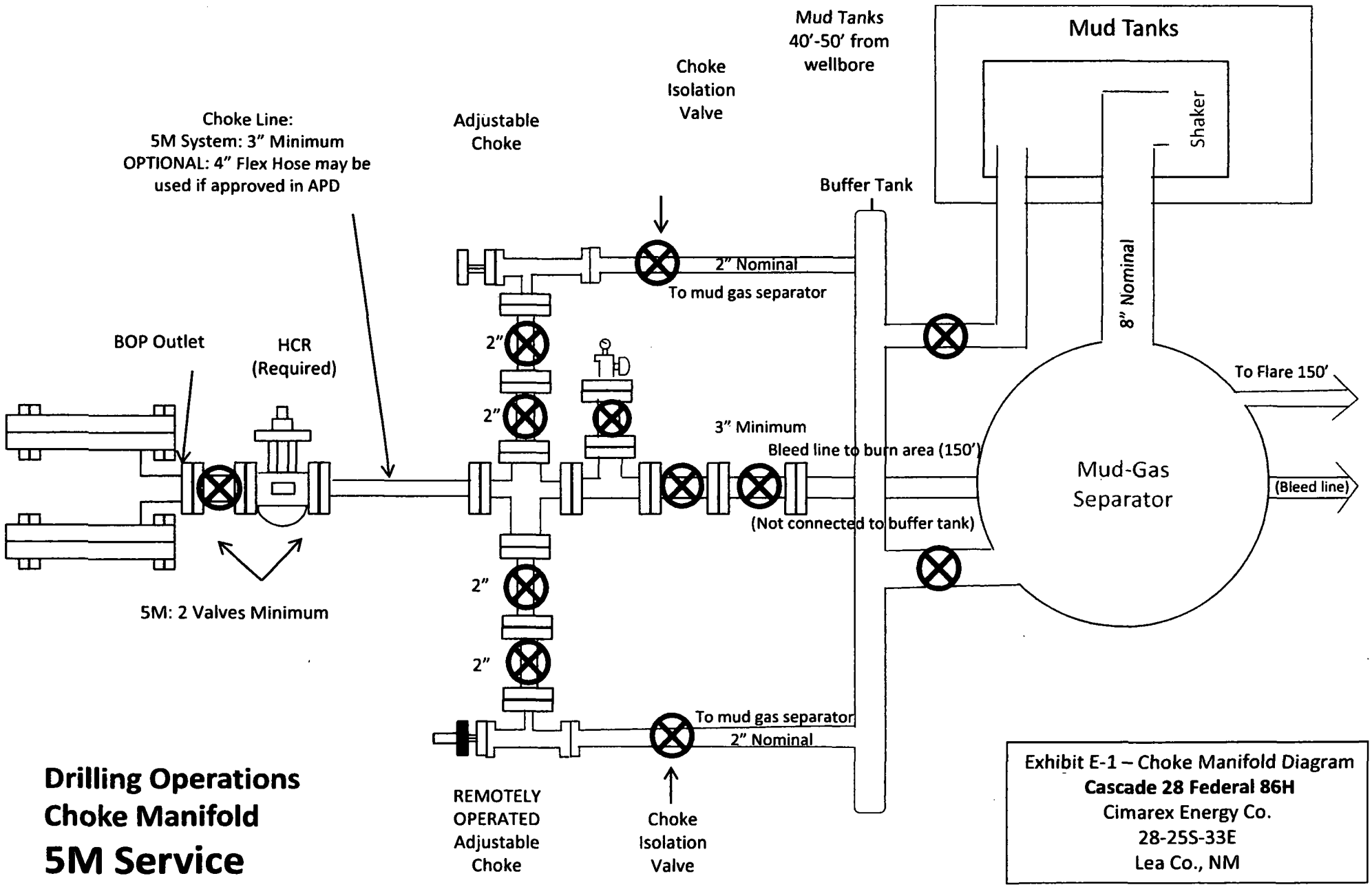


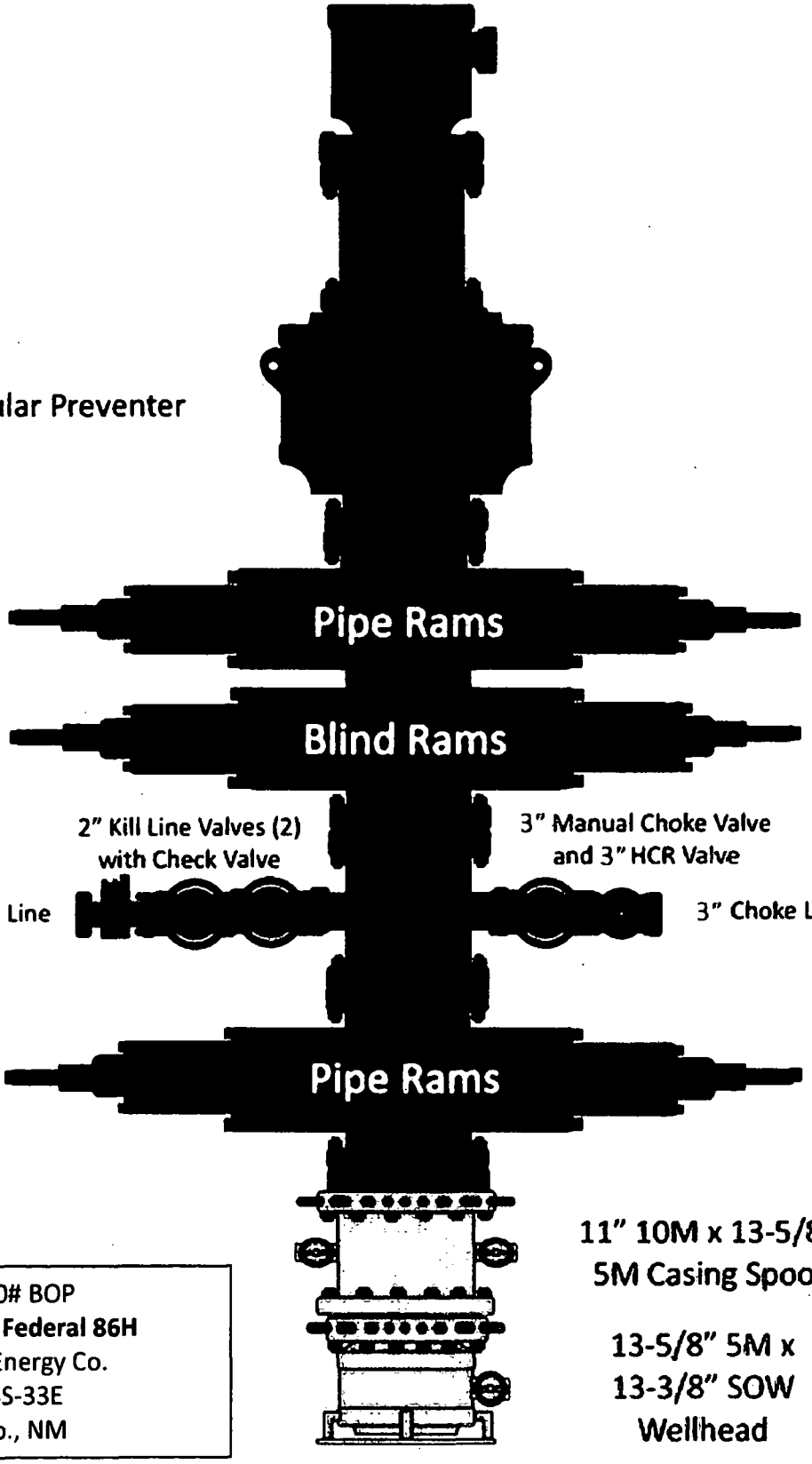
Exhibit E-1 – 5000# BOP
Cascade 28 Federal 86H
Cimarex Energy Co.
28-25S-33E
Lea Co., NM



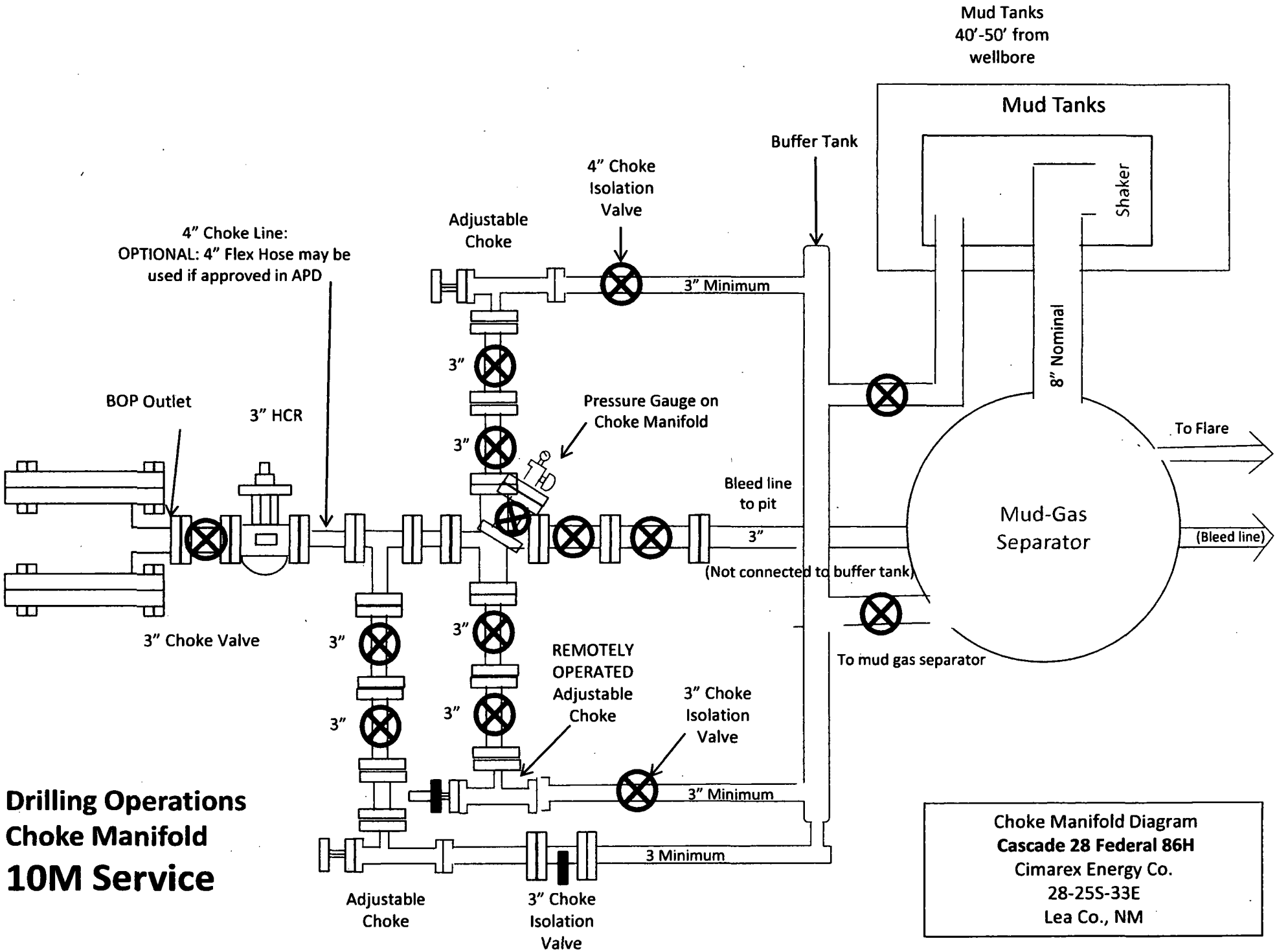
Drilling Operations
Choke Manifold
5M Service

Exhibit E-1 – Choke Manifold Diagram
Cascade 28 Federal 86H
Cimarex Energy Co.
28-25S-33E
Lea Co., NM

Drilling 6 3/4" Hole
Below 7 5/8" Casing



10,000# BOP
Cascade 28 Federal 86H
Cimarex Energy Co.
28-25S-33E
Lea Co., NM



Drilling Operations
Choke Manifold
10M Service

Choke Manifold Diagram
Cascade 28 Federal 86H
Cimarex Energy Co.
28-25S-33E
Lea Co., NM

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**CIMAREX ENERGY COMPANY**
LEASE NO.:	**NMNM26394**
WELL NAME & NO.:	**CASCADE 28 FEDERAL 86H**
SURFACE HOLE FOOTAGE:	**390' FNL & 1380' FEL**
BOTTOM HOLE FOOTAGE	**100' FSL & 750' FEL**
LOCATION:	**Section 28, T. 25 S., R 33 E., NMPM**
COUNTY:	**LEA 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
Other	☑ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☐ COM	☐ Unit

A. CASING

1. The **10-3/4** inch surface casing shall be set at approximately **1045** feet (a minimum of **25 feet (Lea County)** 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.

Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

2. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is:

   Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

   a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

   b. Second stage above DV tool:

      - Cement to surface. If cement does not circulate, contact the appropriate BLM office.
        Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

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

   - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

B. 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.

3. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi. **Variance is approved to use a 5000 (5M) Annular which shall be tested to 5000 (5M) psi.**

   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.

JJP09042019

GENERAL REQUIREMENTS

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

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

☒ Eddy County
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 intergrity 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 intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

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

6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in 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: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

    a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
    b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
    c. Manufacturer representative shall install the test plug for the initial BOP test.
    d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
    e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead 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 not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

e. The results of the test shall be reported to the appropriate BLM office.

f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500

feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

Drilling 6 3/4" Hole
Below 7 5/8" Casing