

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
Well Number: 30H	Type of Well: OIL WELL	Allottee or Tribe Name:
Lease Number: NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Notice of Intent

Type of Submission: Notice of Intent	Type of Action APD Change
Date Sundry Submitted: 02/08/2021	Time Sundry Submitted: 08:20
Date proposed operation will begin: 02/13/2021	

Procedure Description: Cimarex Energy respectfully requests approval to change BHL, casing design, and perform offline cementing for the Vaca Draw 20-17 Federal 30H well. Proposed BHL: 100' FNL & 440' FWL Sec. 17, 25S, 33E
Offline Cmt Procedure: 7" Intermediate Casing 1. Land casing on solid body mandrel hanger 2. Engage pack-off and lock-ring 3. Install BPV 4. Skid rig 5. Check for pressure and remove BPV 6. Circulate down casing, taking returns through casing valves 7. Pump lead and tail cement 8. Displace cement and bump the plug 9. Ensure floats are holding pressure 10. RD cement crew 11. Install BPV and TA cap Please see attached previously approved detailed plan and diagram for review. Additional Attachments C102, BOP, Directional Plan, Drilling Plan

Application

Received by OCD: 3/11/2021 9:21:05 AM

Page 2 of 64

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Section 1 - General

APD ID: 10400034304	Tie to previous NOS?	Submission Date:
BLM Office: CARLSBAD	User:	Title:
Federal/Indian APD: FED	Is the first lease penetrated for production Federal or Indian? FED	
Lease number: NMNM26394	Lease Acres:	
Surface access agreement in place?	Allotted?	Reservation:
Agreement in place? NO	Federal or Indian agreement:	
Agreement number:		
Agreement name:		
Keep application confidential? Y		
Permitting Agent? NO	APD Operator: CIMAREX ENERGY COMPANY	
Operator letter of designation:		

Operator Info

Operator Organization Name: CIMAREX ENERGY COMPANY		
Operator Address: 600 N MARIENFELD STREET ST SUITE 600		Zip: 79701
Operator PO Box:		
Operator City: MIDLAND	State: TX	
Operator Phone: (432)571-7800		
Operator Internet Address: tstathem@cimarex.com		

Section 2 - Well Information

Well in Master Development Plan? NO	Master Development Plan name:	
Well in Master SUPO? NO	Master SUPO name:	
Well in Master Drilling Plan? NO	Master Drilling Plan name:	
Well Name: VACA DRAW 20-17 FEDERAL	Well Number: 30H	Well API Number: 3002546114
Field/Pool or Exploratory? Field and Pool	Field Name: WOLFCAMP	Pool Name: WC-025 G-06 S253329D
Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL		
Is the proposed well in a Helium production area? N	Use Existing Well Pad? YES	New surface disturbance? Y
Type of Well Pad: MULTIPLE WELL	Multiple Well Pad Name: VACA Number: E2W2 PAD	
Well Class: HORIZONTAL	DRAW 20-17 FEDERAL Number of Legs: 1	
Well Work Type: Drill		
Well Type: OIL WELL		
Describe Well Type:		

Received by OCD: 3/11/2021 9:21:05 AM

Page 3 of 64

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Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 24 MilesDistance to nearest well: 20 FTDistance to lease line: 331 FT

Reservoir well spacing assigned acres Measurement: 640 Acres

Well plat: Vaca_Draw_20_17_Fed_30H_C102_Plat_20180924104412.pdf

Well work start Date: 02/01/2019Duration: 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83Vertical Datum: NAVD88

Survey number:Reference Datum:

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
SHL Leg #1	331	FSL	127 1	FW L	25S	33E	20	Aliquot SWS W	32.10974 1	- 103.5987 44	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 026394	342 1	0	0	
KOP Leg #1	331	FSL	127 1	FW L	25S	33E	20	Aliquot SWS W	32.10974 17	- 103.5987 444	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 026394	- 603 6	945 7	945 7	
PPP Leg #1-1	331	FSL	127 1	FW L	25S	33E	20	Aliquot SWS W	32.10974 17	- 103.5987 444	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 026394	- 561 1	903 2	903 2	
EXIT Leg #1	100	FNL	121 1	FW L	25S	33E	17	Aliquot NWN W	32.13758 1	- 103.5989 27	LEA	NEW MEXI CO	NEW MEXI CO	F	NMNM 026394	- 651 9	198 65	994 0	

Received by OCD: 3/11/2021 9:21:05 AM

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Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce from this lease?
BHL Leg #1	100	FNL	1211	FWL	25S	33E	17	Aliquot NWNW	32.137581	-103.598927	LEA	NEW MEXICO	NEW MEXICO	F	NMNM026394	-6519	19865	9940	

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1514436	RUSTLER	3421	935	935		USEABLE WATER	N
1514437	SALADO	2123	1298	1298		NONE	N
1514435	CASTILE	-1293	4714	4714		NONE	N
1514427	LAMAR	-1488	4909	4909		NONE	N
1514432	BELL CANYON	-1516	4937	4937		NONE	N
1514433	CHERRY CANYON	-2569	5990	5990		NONE	N
1514434	BRUSHY CANYON	-4115	7536	7536		NATURAL GAS, OIL	N
1514430	BONE SPRING	-5611	9032	9032		NATURAL GAS, OIL	Y
1514438	BONE SPRING 1ST	-6590	10011	10011		NATURAL GAS, OIL	N
1514428	BONE SPRING 2ND	-7162	10583	10583		NATURAL GAS, OIL	N
1514431	BONE SPRING 3RD	-8301	11722	11722		OIL	N
1514429	WOLFCAMP	-8768	12189	12189		NATURAL GAS, OIL	N

Section 2 - Blowout Prevention

Received by OCD: 3/11/2021 9:21:05 AM

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Allottee or Tribe Name:

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Unit or CA Number:

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Pressure Rating (PSI): 2M Rating Depth: 4917

Equipment: A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

Testing Procedure: 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 3000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 3000 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 3000 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.

Choke Diagram Attachment:

BOP Diagram Attachment:

Pressure Rating (PSI): 3M Rating Depth: 19865

Equipment: A BOP consisting of three rams, including one blind ram and two pipe rams and one annular preventer. An accumulator that meets the requirements in Onshore Order #2 for the pressure rating of the BOP stack. A rotating head may be installed as needed. A Kelly clock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

Requesting Variance? YES

Variance request: Co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used. Variance to include Hammer Union connections on lines downstream of the buffer tank only.

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Received by OCD: 3/11/2021 9:21:05 AM

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Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type
1	SURFACE	17.5	13.375	NEW	NON API	N	0	985	0	985	0	985	985	H-40	48	ST&C	1.64	3.84	BUOY	6.81	BUOY
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	4917	0	4917	0	4917	4917	J-55	40	LT&C	1.46	1.51	BUOY	2.64	BUOY
3	PRODUCTION	8.75	5.5	NEW	API	N	0	9457	0	9457	0	9457	9457	L-80	20	LT&C	2	2.08	BUOY	2.09	BUOY
4	PRODUCTION	8.75	5.5	NEW	API	N	9457	19865	9457	9940			10408	L-80	20	BUTT	1.9	1.93	BUOY	48.24	BUOY

Casing Attachments

Casing ID: 1 String Type: SURFACE

Inspection Document:

Spec Document:

Vaca_Draw_20_17_Fed_30H_Surf_Casing_Spec_Sheet_20180925075723.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_30H_Casing_Assumptions_20180924105518.pdf

Received by OCD: 3/11/2021 9:21:05 AM

Well Name: VACA DRAW 20-17
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Casing Attachments

Casing ID: 2 String Type:INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_30H_Casing_Assumptions_20180924105502.pdf

Casing ID: 3 String Type:PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_30H_Casing_Assumptions_20180924105444.pdf

Casing ID: 4 String Type:PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Vaca_Draw_20_17_Fed_30H_Casing_Assumptions_20180924105425.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
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Received by OCD: 3/11/2021 9:21:05 AM

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Type of Well: OIL WELL

Allottee or Tribe Name:

Lease Number: NMNM26394

Unit or CA Name:

Unit or CA Number:

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String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	985	415	1.72	13.5	713	50	Class C	Bentonite
SURFACE	Tail		0	985	195	1.34	14.8	260	25	Class C	LCM
INTERMEDIATE	Lead		0	4917	935	1.88	12.9	1756	50	35:65 (Poz:C)	Salt, Bentonite
INTERMEDIATE	Tail		0	4917	288	1.34	14.8	385	25	Class C	LCM
PRODUCTION	Lead		0	9457	409	3.64	10.3	1486	25	Tuned Light	LCM
PRODUCTION	Tail		0	9457	2225	1.3	14.2	2892	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS
PRODUCTION	Lead		9457	1986 5	409	3.64	10.3	1486	25	Tuned Light	LCM
PRODUCTION	Tail		9457	1986 5	2225	1.3	14.2	2892	10	50:50 (Poz:H)	Salt, Bentonite, Fluid Loss, Dispersant, SMS

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials will be kept on location at all times in order to combat lost circulation or unexpected kicks. In order to run DSTs, open hole logs, and casing, the viscosity and water loss may have to be adjusted in order to meet these needs.

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	985	SPUD MUD	8.3	8.8							
985	4917	SALT SATURATED	9.7	10.2							

Received by OCD: 3/11/2021 9:21:05 AM

Page 9 of 64

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4917	1986 5	OTHER : FW/Cut Brine	8.5	9							

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

No DST Planned

List of open and cased hole logs run in the well:

CNL,DS,GR

Coring operation description for the well:

n/a

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4651 Anticipated Surface Pressure: 2464.19

Anticipated Bottom Hole Temperature(F): 169

Anticipated abnormal pressures, temperatures, or potential geologic hazards? YES

Describe:

Lost circulation may be encountered in the Delaware mountain group. Abnormal pressure as well as hole stability issues may be encountered in the Wolfcamp.

Contingency Plans geoharzards description:

Lost circulation material will be available, as well as additional drilling fluid along with the fluid volume in the drilling rig pit system. Drilling fluid can be mixed on location or mixed in vendor mud plant and trucked to location if needed. Sufficient barite will be available to maintain appropriate mud weight for the Wolfcamp interval.

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Vaca_Draw_20_17_Fed_30H_H2S_Plan_20180924110138.pdf

Received by OCD: 3/11/2021 9:21:05 AM

Page 10 of 64

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
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Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Vaca_Draw_20_17_Fed_30H_Directional_Plan_20180924110207.pdf
Vaca_Draw_20_17_Fed_30H_AC_Report_20180924110202.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Vaca_Draw_20_17_Fed_30H_Drilling_Plan_20180924110238.pdf
Vaca_Draw_20_17_Fed_30H_Gas_Capture_20180924110300.pdf
Vaca_Draw_20_17_Fed_30H_Flex_Hose_20180924110252.pdf

Other Variance attachment:

Vaca_Draw_20_17_Fed_30H_Multibowl_Procedure_20180924110221.pdf
Vaca_Draw_20_17_Fed_30H_Multibowl_Wellhead_20180924110225.pdf

SUPO

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

Vaca_Draw_20_17_Fed_Existing_Road_ROW_Approved_9_6_13_20190204074806.pdf

Existing Road Purpose: ACCESS

Row(s) Exist? YES

ROW ID(s)

ID: NM-130688

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Vaca_Draw_20_17_Fed_E2W2_Pad_Road_ROW_20190301074933.pdf

New road type: COLLECTOR

Length: 127 Feet Width (ft.): 30

Max slope (%): 20 Max grade (%): 6

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 18

Received by OCD: 3/11/2021 9:21:05 AM

Page 11 of 64

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New road access erosion control: The side slopes of any drainage channels or swales that are crossed will be re-contoured to original grade and compacted and mulched as necessary to avoid erosion. Where steeper slopes cannot be avoided, water bars or silt fence will be constructed, mulch/rip-rap applied, or other measures employed as necessary to control erosion. Hay bales, straw waddles or silt fence may also be installed to control erosion as needed. All disturbed areas will be seeded with a mix appropriate for the area unless specified otherwise by the landowner.

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Turnout? N

Access surfacing type: GRAVEL

Access topsoil source: ONSITE

Access surfacing type description:

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Push off and stockpile alongside the location.

Access other construction information:

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: CULVERT,LOW WATER,OTHER

Drainage Control comments: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.

Road Drainage Control Structures (DCS) description: N/A

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Received by OCD: 3/11/2021 9:21:05 AM

Page 12 of 64

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Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Vaca_Draw_20_17_Fed_E2W2_Pad_Road_ROW_20190301074933.pdf

New road type:

Length:

Width (ft.):

Max slope (%):

Max grade (%):

Army Corp of Engineers (ACOE) permit required?

ACOE Permit Number(s):

New road travel width:

New road access erosion control:

New road access plan or profile prepared?

New road access plan attachment:

Access road engineering design?

Access road engineering design attachment:

Turnout?

Access surfacing type:

Access topsoil source:

Access surfacing type description:

Access onsite topsoil source depth:

Offsite topsoil source description:

Onsite topsoil removal process:

Access other construction information:

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing:

Drainage Control comments:

Road Drainage Control Structures (DCS) description:

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Received by OCD: 3/11/2021 9:21:05 AM

Page 13 of 64

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
Well Number: 30H	Type of Well: OIL WELL	Allottee or Tribe Name:
Lease Number: NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Vaca_Draw_20_17_Fed_E2W2_Pad_Road_ROW_20190301074933.pdf

New road type:

Length:

Width (ft.):

Max slope (%):

Max grade (%):

Army Corp of Engineers (ACOE) permit required?

ACOE Permit Number(s):

New road travel width:

New road access erosion control:

New road access plan or profile prepared?

New road access plan attachment:

Access road engineering design?

Access road engineering design attachment:

Turnout?

Access surfacing type:

Access topsoil source:

Access surfacing type description:

Access onsite topsoil source depth:

Offsite topsoil source description:

Onsite topsoil removal process:

Access other construction information:

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing:

Drainage Control comments:

Road Drainage Control Structures (DCS) description:

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Received by OCD: 3/11/2021 9:21:05 AM

Page 14 of 64

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Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

Vaca_Draw_20_17_Fed_E2W2_Pad_Mile_Radius_Existing_Wells_20180924110423.pdf

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: Approved Existing batteries will be utilized for this project. Vaca Draw 20-17 Federal CTB was approved in the Vaca Draw 20-17 Fed 8H APD. Vaca Draw 20-17 Federal West CTB was approved in the Vaca Draw 20-17 Fed 5H Sundry.

Production Facilities map:

Vaca_Draw_20_17_Fed_CTB_and_West_CTB_Exisitng_CTB_Layouts_20180924110435.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type:	MUNICIPAL		
Water source use type:	SURFACE CASING INTERMEDIATE/PRODUCTION CASING		
Source latitude:		Source longitude:	
Source datum:			
Water source permit type:	WATER RIGHT		
Permit Number:			
Water source transport method:	PIPELINE TRUCKING		
Source land ownership:	STATE		
Source transportation land ownership:	STATE		
Water source volume (barrels):	5000	Source volume (acre-feet):	0.6444655
Source volume (gal):	210000		

Water source and transportation map:

Vaca_Draw_20_17_Fed_E2W2_Pad_Drilling_Water_Route_20180924110450.pdf

Water source comments:

New water well? NO

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
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US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

New Water Well Info

Well latitude:	Well Longitude:	Well datum:
Well target aquifer:		
Est. depth to top of aquifer(ft):	Est thickness of aquifer:	
Aquifer comments:		
Aquifer documentation:		
Well depth (ft):	Well casing type:	
Well casing outside diameter (in.):	Well casing inside diameter (in.):	
New water well casing?	Used casing source:	
Drilling method:	Drill material:	
Grout material:	Grout depth:	
Casing length (ft.):	Casing top depth (ft.):	
Well Production type:	Completion Method:	
Water well additional information:		
State appropriation permit:		
Additional information attachment:		

Section 6 - Construction Materials

Using any construction materials: YES

Construction Materials description: The drilling and testing operations will be conducted on a watered and compacted native soil grade. Soft spots will be covered with caliche, free of large rocks (3" diameter). Upon completion as a commercial producer the location will be covered with caliche, free of large rocks (3" dia.) from an existing privately owned gravel pit.

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drilling Fluids, drill cuttings, water and other waste produced from the well during drilling operations.

Amount of waste: 15000 barrels

Waste disposal frequency : Weekly

Safe containment description: n/a

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL

Disposal type description:

Disposal location description: Haul to R360 commercial Disposal

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Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations

Amount of waste: 32500 pounds

Waste disposal frequency : Weekly

Safe containment description: n/a

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL **Disposal location ownership:** COMMERCIAL
FACILITY

Disposal type description:

Disposal location description: Windmill Spraying Service hauls trash to Lea County Landfill

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? NO

Description of cuttings location

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Received by OCD: 3/11/2021 9:21:05 AM

Page 17 of 64

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Section 9 - Well Site Layout

Well Site Layout Diagram:

Vaca_Draw_20_17_Fed_30H_Wellsite_Layout_20180924110528.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: VACA DRAW 20-17 FEDERAL

Multiple Well Pad Number: E2W2 PAD

Recontouring attachment:

Vaca_Draw_20_17_Fed_E2W2_Pad_Interim_Reclaim_20180924110549.pdf

Drainage/Erosion control construction: To control and prevent potentially contaminated precipitation from leaving the pad site, a perimeter berm and settlement pond will be installed. Contaminated water will be removed from pond, stored in waste tanks, and disposed of at a state approved facility. Standing water or puddles will not be allowed. Drainage ditches would be established and maintained on the pad and along access roads to divert water away from operations. Natural drainage areas disturbed during construction would be re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured to near original condition prior to construction. Erosion Control Best Management Practices would be used where necessary and consist of seeding, fiber rolls, water bars, silt fences, and temporary diversion dikes. Areas disturbed during construction that are no longer needed for operations would be obliterated, re-contoured, and reclaimed to near original condition to re-establish natural drainage.

Drainage/Erosion control reclamation: All disturbed and re-contoured areas would be reseeded according to specifications. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Well pad proposed disturbance (acres): 6.91	Well pad interim reclamation (acres): 3.63	Well pad long term disturbance (acres): 3.36
Road proposed disturbance (acres): 0.087	Road interim reclamation (acres): 0	Road long term disturbance (acres): 0.087
Powerline proposed disturbance (acres): 0	Powerline interim reclamation (acres): 0	Powerline long term disturbance (acres): 0
Pipeline proposed disturbance (acres): 2.119	Pipeline interim reclamation (acres): 0	Pipeline long term disturbance (acres): 2.119
Other proposed disturbance (acres): 3.4	Other interim reclamation (acres): 0	Other long term disturbance (acres): 3.4
Total proposed disturbance: 12.516	Total interim reclamation: 3.63	Total long term disturbance: 8.966

Disturbance Comments: Flowline: 1538 Gas lift: 1538 Access Road: 127 Temp fresh water line: 14,855'

Reconstruction method: After well plugging, all disturbed areas would be returned to the original contour or a contour that blends with the surrounding landform including roads unless the surface owner requests that they be left intact. In consultation with the surface owners it will be determined if any gravel or similar materials used to reinforce an area are to be removed, buried, or left in place during final reclamation. Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated. As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching, or fertilizing. Reclamation, Re-vegetation, and Drainage: All disturbed and re-contoured areas would be reseeded using techniques outlined under Phase I and II of this plan or as specified by the land owner. Approved seed mixtures would be certified weed free and consist of grasses, forbs, or shrubs similar to the surrounding area. Compacted soil areas may need to be

Received by OCD: 3/11/2021 9:21:05 AM

Page 18 of 64

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US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

obliterated and reclaimed to near natural conditions by re-contouring all slopes to facilitate and re-establish natural drainage.

Topsoil redistribution: Salvaged topsoil, if any, would be re-spread evenly over the surfaces to be re-vegetated.

Soil treatment: As necessary, the soil surface would be prepared to provide a seedbed for re-establishment of desirable vegetation. Site preparation may include gouging, scarifying, dozer track-walking, mulching or fertilizing.

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed Summary

Seed Type

Pounds/Acre

Total pounds/Acre:

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Amithy

Last Name: Crawford

Phone: (432)620-1909

Email: acrawford@cimarex.com

Received by OCD: 3/11/2021 9:21:05 AM

Page 19 of 64

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
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Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Received by OCD: 3/11/2021 9:21:05 AM

Page 20 of 64

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US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Section 12 - Other Information

Right of Way needed? YES	Use APD as ROW? YES
ROW Type(s): 281001 ROW - ROADS,288100 ROW – O&G Pipeline,289001 ROW- O&G Well Pad,FLPMA (Powerline),Other	

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? YES

Previous Onsite information: Onsite with BLM (Jeff Robertson) and Cimarex (Barry Hunt) on July 24, 2018.

Other SUPO Attachment

Vaca_Draw_20_17_Fed_30H_Packet_for_Jeff_20190301075231.pdf

Vaca_Draw_20_17_Fed_30H_SUPO_20190301075233.pdf

Vaca_Draw_20_17_Fed_Temp_Water_Route_20180924110643.pdf

Vaca_Draw_20_17_Fed_E2W2_Pad_Public_Access_20180924110632.pdf

Vaca_Draw_20_17_Fed_E2W2_Pad_Flow_Gas_lift_ROW_20180924110625.pdf

Vaca_Draw_20_17_Fed_E2W2_Pad_Road_Description_20180924110635.pdf

PWD

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Well Name: VACA DRAW 20-17 FEDERAL	Well Location: T25S / R33E / SEC 20 / SWSW / 32.109741 / -103.598744	County or Parish/State: LEA / NM
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Lease Number: NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD disturbance (acres): **PWD surface owner:**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Received by OCD: 3/11/2021 9:21:05 AM

Page 22 of 64

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Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: Injection well name:

Assigned injection well API number? Injection well API number:

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Received by OCD: 3/11/2021 9:21:05 AM

Page 23 of 64

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Lease Number: NMNM26394	Unit or CA Name:	Unit or CA Number:
US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Operator Certification

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Signed on: 02/08/2021

Title:

Street Address:

City: State: Zip:

Phone:

Email address:

Field Representative

Received by OCD: 3/11/2021 9:21:05 AM

Page 24 of 64

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US Well Number: 300254611400X1	Well Status: Approved Application for Permit to Drill	Operator: CIMAREX ENERGY COMPANY

Representative Name:

Street Address:

City: State: Zip:

Phone:

Email address:

NOI Attachments

Procedure Description

- Vaca_Draw_20_17_Fed_30HBOPS___Multibowl_20210208202010.pdf
- Vaca_Draw_20_17_Fed_30H_Surf_Casing_Spec_Sheet_20210208201939.pdf
- Vaca_Draw_20_17_Fed_30H_C102_BHL_20210208201907.pdf
- Vaca_Draw_20_17_Federal_30H_Prelims_20210208201849.pdf
- Vaca_Draw_20_17_Fed_30HBOPS___Multibowl_20210208201828.pdf
- Vaca_Draw_20_17_Fed_30H_Drilling_Plan_20210208201804.pdf
- Vaca_Draw_20_17_Offline_cmt_7_in_csg_20210125092934.pdf

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Operator Certification

I certify that the foregoing is true and correct. 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. Electronic submission of Sundry Notices through this system satisfies regulations requiring a submission of Form 3160-5 or a Sundry Notice.

Operator Electronic Signature: STATHEM	Signed on: FEB 08, 2021 08:20 PM
Name: CIMAREX ENERGY COMPANY	
Title: Mngr Regulatory Compliance	
Street Address: 600 N MARIENFELD STREET ST SUITE 600	
City: MIDLAND	State: TX
Phone: (432) 571-7800	
Email address: tstathem@cimarex.com	

Field Representative

Representative Name:		
Street Address:		
City:	State:	Zip:
Phone:		
Email address:		

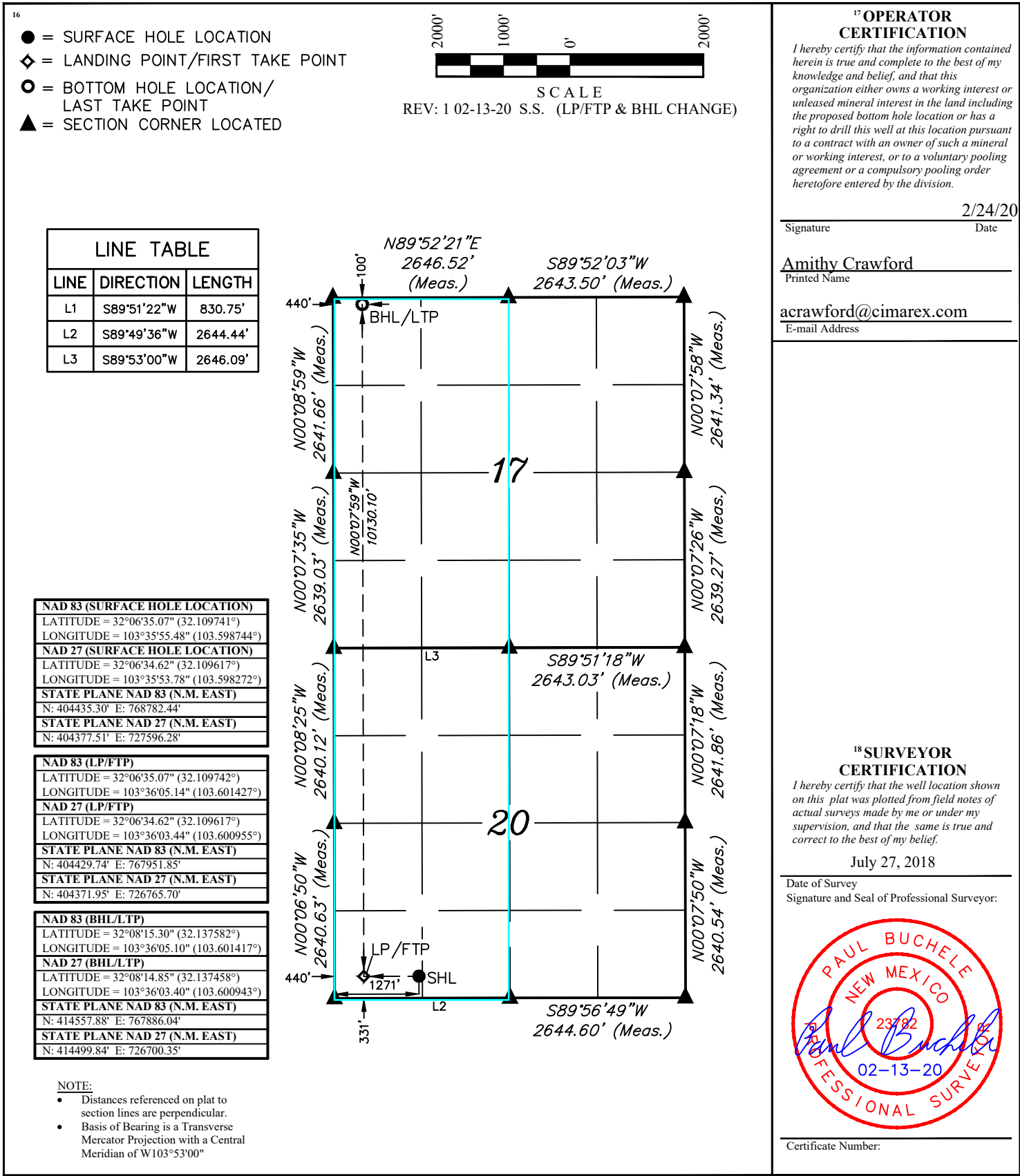
BLM Point of Contact

BLM POC Name: ZOTA M STEVENS	BLM POC Title: Petroleum Engineer
BLM POC Phone: 5752345998	BLM POC Email Address: ZSTEVENS@BLM.GOV
Disposition: Approved	Disposition Date: 02/11/2021
Signature: Zota Stevens	

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

☐ AMENDED REPORT

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



1. Geological Formations

TVD of target 10,400

Pilot Hole TD N/A

MD at TD 20,612

Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	935	N/A	
Top of Salt	1298	N/A	
Base of Salt	4714	N/A	
Lamar	4909	N/A	
Bell Canyon	4937	N/A	
Cherry Canyon	5990	N/A	
Brushy Canyon	7536	Hydrocarbons	
Bone Spring	9032	Hydrocarbons	
Bone Spring Target	9940	Hydrocarbons	
1st Bone Spring Sand	10011	Hydrocarbons	
2nd Bone Spring Sand	10583	Hydrocarbons	
3rd Bone Spring Sand	11722	Hydrocarbons	
Wolfcamp	12189	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	985	985	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.64	3.84	6.81
12 1/4	0	4800	4800	9-5/8"	40.00	J-55	LT&C		1.55	2.71
8 3/4	0	9061	9061	7"	29.00	L-80	LT&C	1.66	1.92	1.96
8 3/4	9061	10500	10350	7"	29.00	L-80	BT&C	1.45	1.68	18.08
6	8961	20612	10400	4-1/2"	13.50	P-110	BT&C	2.20	2.55	21.72
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

Cimarex Energy Co., Vaca Draw 20-17 Federal 30H

	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.	N
Is premium or uncommon casing planned? If yes attach casing specification sheet.	Y
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	639	14.80	1.34	9.15	9.5	Tail: Class C + LCM
Intermediate	912	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
	281	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	333	10.30	3.64	22.18		Lead: Tuned Light + LCM
	94	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Completion System	750	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

DV tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0	25
Intermediate	0	44
Production	4600	51
Completion System	10300	10

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
12 1/4	13 5/8	2M	Annular	X	50% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			Double Ram	X	
			Other		
6	13 5/8	5M	Annular		50% of working pressure
			Blind Ram		5M
			Pipe Ram		
			Double Ram		
			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.

	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 985'	FW Spud Mud	8.30 - 8.80	30-32	N/C
985' to 4800'	Brine Water	9.70 - 10.20	30-32	N/C
				N/C
	Cut Brine or OBM	8.50 - 9.00	27-70	N/C
10755' to 20612'	OBM	8.50 - 9.00	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
-------------------------	----------

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	4867 psi
Abnormal Temperature	No

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

X	H2S is present
X	H2S plan is attached

8. Other Facets of Operation**9. Wellhead**

A multi-bowl wellhead system will be utilized.

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

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

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

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

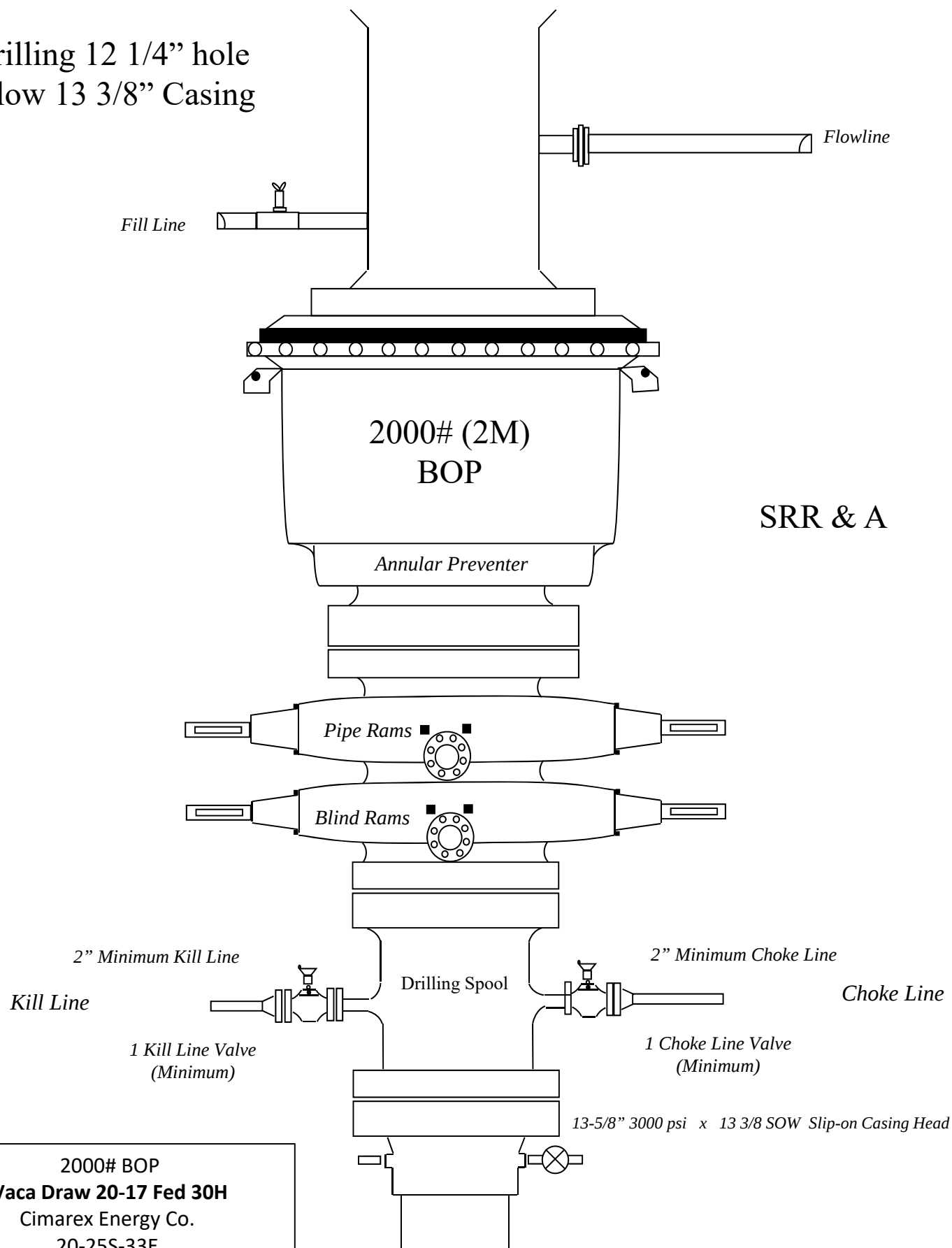
A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 5000 psi.

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

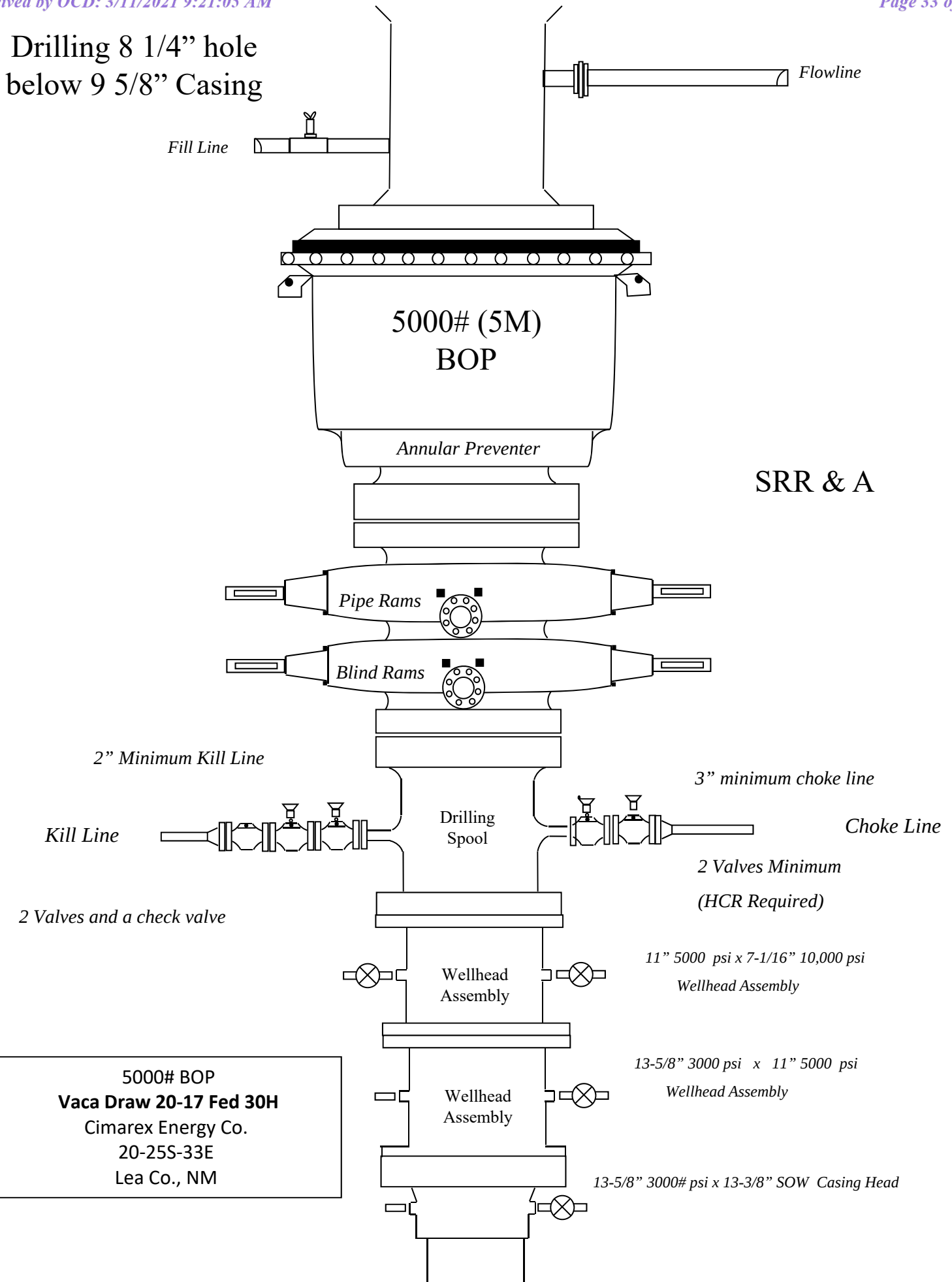
All casing strings will be tested as per Onshore Order No.2 to at least 0.22 psi/ft or 1,500 whichever is greater and not to exceed 70% of casing burst.

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

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



Drilling 8 1/4" hole
below 9 5/8" Casing



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 Minimum
(HCR Required)

2 Valves and a check valve

Wellhead
Assembly

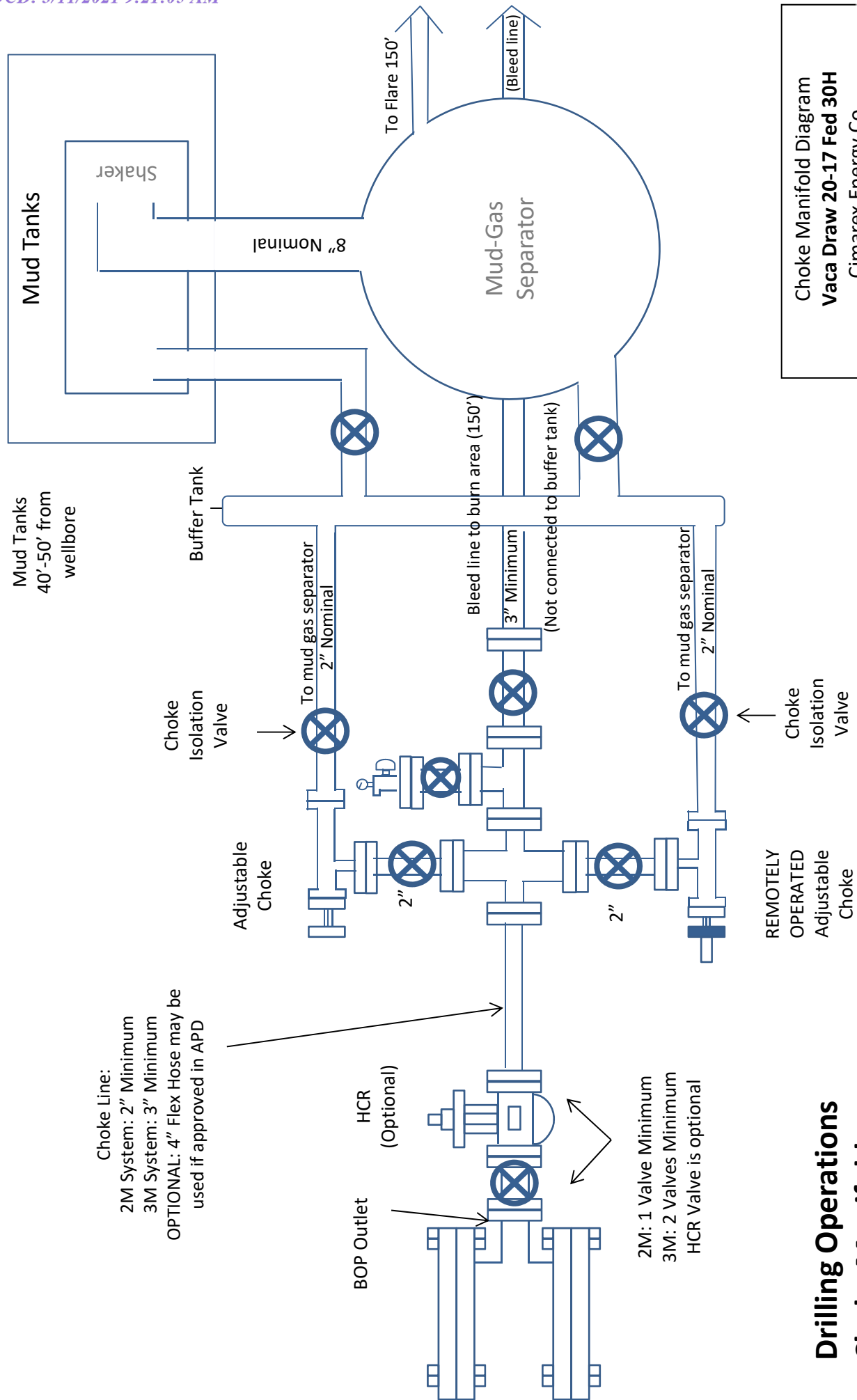
11" 5000 psi x 7-1/16" 10,000 psi
Wellhead Assembly

Wellhead
Assembly

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

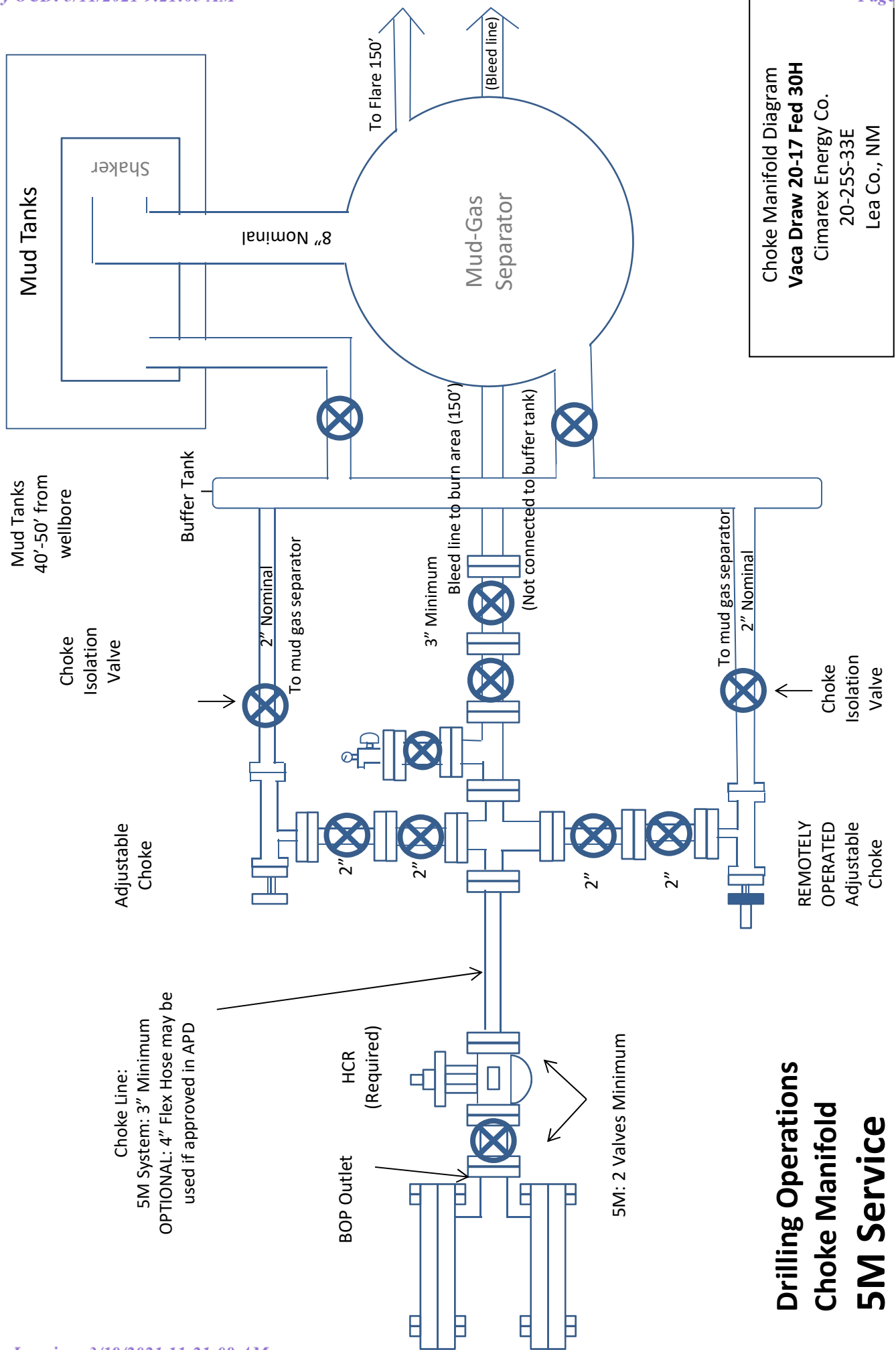
13-5/8" 3000# psi x 13-3/8" SOW Casing Head

5000# BOP
Vaca Draw 20-17 Fed 30H
Cimarex Energy Co.
20-25S-33E
Lea Co., NM

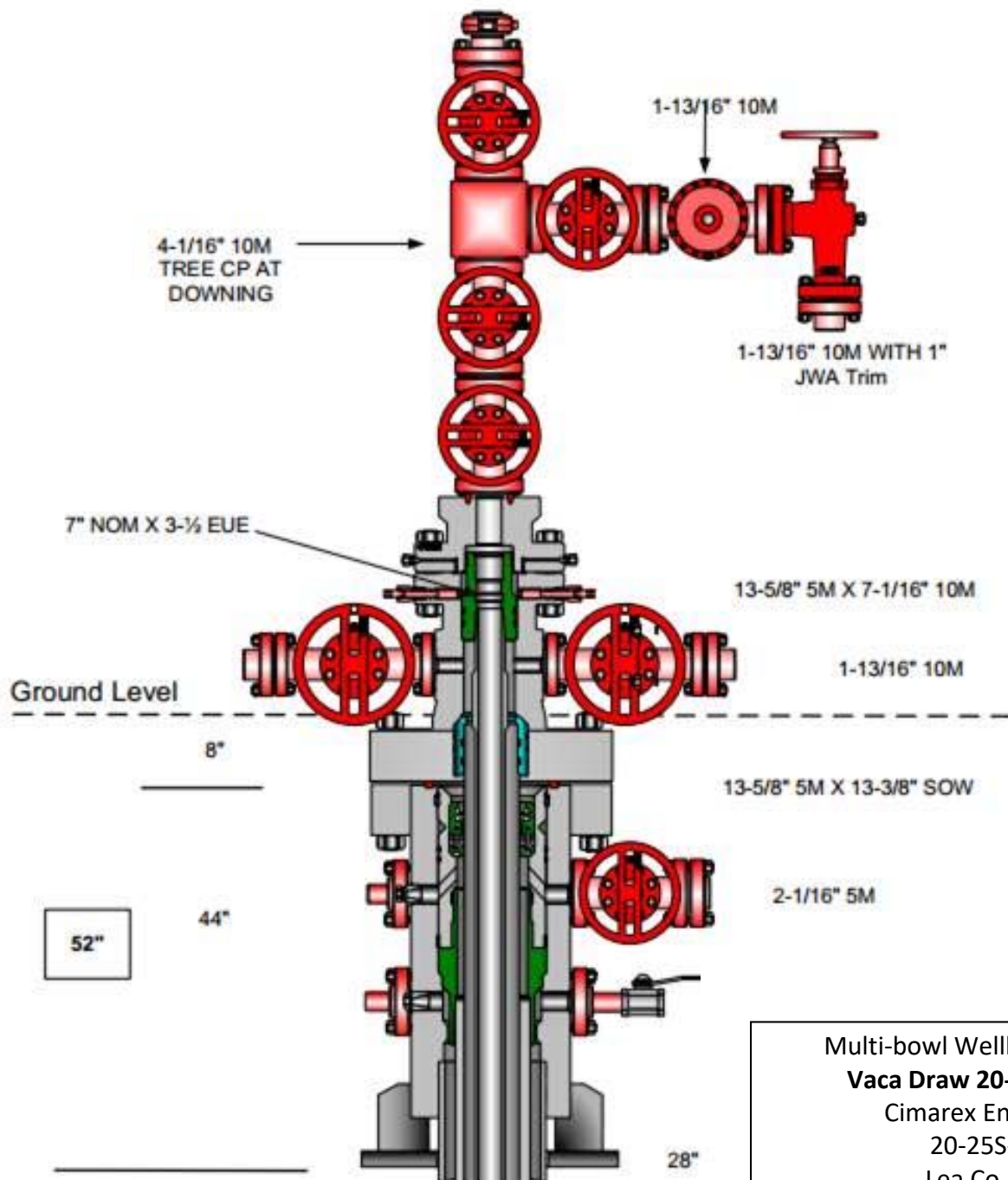


Choke Manifold Diagram
Vaca Draw 20-17 Fed 30H
 Cimarex Energy Co.
 20-25S-33E
 Lea Co., NM

Drilling Operations
Choke Manifold
2M/3M Service



Multi-bowl Wellhead Diagram



Multi-bowl Wellhead Diagram
Vaca Draw 20-17 Fed 30H
 Cimarex Energy Co.
 20-25S-33E
 Lea Co., NM

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	985	985	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.64	3.84	6.81
12 1/4	0	4800	4800	9-5/8"	40.00	J-55	LT&C		1.55	2.71
8 3/4	0	9061	9061	7"	29.00	L-80	LT&C	1.66	1.92	1.96
8 3/4	9061	10500	10350	7"	29.00	L-80	BT&C	1.45	1.68	18.08
6	8961	20612	10400	4-1/2"	13.50	P-110	BT&C	2.20	2.55	21.72
BLM Minimum Safety Factor								1.125	1	1.6 Dry 1.8 Wet



Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20 Proposal

Geodetic Report

(Def Plan)



Report Date: February 20, 2020 - 05:30 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #30H / New Slot
Well: Vaca Draw 20-17 Federal #30H
Borehole: Vaca Draw 20-17 Federal #30H
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20
Survey Date: September 19, 2018
Tort / AHD / DDI / ERD Ratio: 115.296 ° / 11109.772 ft / 6.405 / 1.068
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.06876", W 103° 35' 55.47930"
Location Grid N/E Y/X: N 404435.300 ftUS, E 768782.440 ftUS
CRS Grid Convergence Angle: 0.3905 °
Grid Scale Factor: 0.99996834
Version / Patch: 2.10.787.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.628 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3447.100 ft above MSL
Seabed / Ground Elevation: 3421.100 ft above MSL
Magnetic Declination: 6.573 °
Total Gravity Field Strength: 998.4295mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47698.252 nT
Magnetic Dip Angle: 59.691 °
Declination Date: February 20, 2020
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3905 °
Total Corr Mag North->Grid North: 6.1830 °
Local Coord Referenced To: Well Head

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 [331' FSL, 1271' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	100.00	0.00	252.50	100.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	200.00	0.00	252.50	200.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	300.00	0.00	252.50	300.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	400.00	0.00	252.50	400.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	500.00	0.00	252.50	500.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	600.00	0.00	252.50	600.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	700.00	0.00	252.50	700.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	800.00	0.00	252.50	800.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	900.00	0.00	252.50	900.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
Rustler	935.00	0.00	252.50	935.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1000.00	0.00	252.50	1000.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1100.00	0.00	252.50	1100.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1200.00	0.00	252.50	1200.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
Top of Salt	1298.00	0.00	252.50	1298.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1300.00	0.00	252.50	1300.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1400.00	0.00	252.50	1400.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1500.00	0.00	252.50	1500.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1600.00	0.00	252.50	1600.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1700.00	0.00	252.50	1700.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1800.00	0.00	252.50	1800.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	1900.00	0.00	252.50	1900.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
Nudge 2°/100' DLS	2000.00	0.00	252.50	2000.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
	2100.00	2.00	252.50	2099.98	-0.51	-0.52	-1.66	2.00	404434.78	768780.78	N 32 6 35.06	W 103 35 55.50
	2200.00	4.00	252.50	2199.84	-2.06	-2.10	-6.66	2.00	404433.20	768775.78	N 32 6 35.05	W 103 35 55.56
	2300.00	6.00	252.50	2299.45	-4.62	-4.72	-14.97	2.00	404430.58	768767.47	N 32 6 35.02	W 103 35 55.65
	2400.00	8.00	252.50	2398.70	-8.21	-8.38	-26.59	2.00	404426.92	768755.85	N 32 6 34.99	W 103 35 55.79
Hold Nudge	2500.00	10.00	252.50	2497.47	-12.82	-13.09	-41.51	2.00	404422.21	768740.93	N 32 6 34.94	W 103 35 55.96
	2600.00	10.00	252.50	2595.95	-17.93	-18.31	-58.07	0.00	404416.99	768724.37	N 32 6 34.89	W 103 35 56.16
	2700.00	10.00	252.50	2694.43	-23.05	-23.53	-74.63	0.00	404411.77	768707.81	N 32 6 34.84	W 103 35 56.35
	2800.00	10.00	252.50	2792.91	-28.16	-28.75	-91.19	0.00	404406.55	768691.25	N 32 6 34.79	W 103 35 56.54
	2900.00	10.00	252.50	2891.39	-33.27	-33.97	-107.75	0.00	404401.33	768674.69	N 32 6 34.74	W 103 35 56.73
	3000.00	10.00	252.50	2989.87	-38.39	-39.20	-124.31	0.00	404396.11	768658.13	N 32 6 34.69	W 103 35 56.93
	3100.00	10.00	252.50	3088.35	-43.50	-44.42	-140.87	0.00	404390.88	768641.57	N 32 6 34.64	W 103 35 57.12
	3200.00	10.00	252.50	3186.83	-48.62	-49.64	-157.44	0.00	404385.66	768625.01	N 32 6 34.59	W 103 35 57.31
	3300.00	10.00	252.50	3285.31	-53.73	-54.86	-174.00	0.00	404380.44	768608.45	N 32 6 34.54	W 103 35 57.51
	3400.00	10.00	252.50	3383.79	-58.84	-60.08	-190.56	0.00	404375.22	768591.89	N 32 6 34.49	W 103 35 57.70
	3500.00	10.00	252.50	3482.27	-63.96	-65.30	-207.12	0.00	404370.00	768575.33	N 32 6 34.44	W 103 35 57.89
	3600.00	10.00	252.50	3580.75	-69.07	-70.53	-223.68	0.00	404364.78	768558.77	N 32 6 34.39	W 103 35 58.09
	3700.00	10.00	252.50	3679.23	-74.19	-75.75	-240.24	0.00	404359.55	768542.21	N 32 6 34.34	W 103 35 58.28
	3800.00	10.00	252.50	3777.72	-79.30	-80.97	-256.80	0.00	404354.33	768525.65	N 32 6 34.28	W 103 35 58.47
	3900.00	10.00	252.50	3876.20	-84.41	-86.19	-273.36	0.00	404349.11	768509.09	N 32 6 34.23	W 103 35 58.66
	4000.00	10.00	252.50	3974.68	-89.53	-91.41	-289.93	0.00	404343.89	768492.52	N 32 6 34.18	W 103 35 58.86
	4100.00	10.00	252.50	4073.16	-94.64	-96.63	-306.49	0.00	404338.67	768475.96	N 32 6 34.13	W 103 35 59.05
	4200.00	10.00	252.50	4171.64	-99.76	-101.86	-323.05	0.00	404333.45	768459.40	N 32 6 34.08	W 103 35 59.24
	4300.00	10.00	252.50	4270.12	-104.87	-107.08	-339.61	0.00	404328.23	768442.84	N 32 6 34.03	W 103 35 59.44
	4400.00	10.00	252.50	4368.60	-109.98	-112.30	-356.17	0.00	404323.00	768426.28	N 32 6 33.98	W 103 35 59.63
	4500.00	10.00	252.50	4467.08	-115.10	-117.52	-372.73	0.00	404317.78	768409.72	N 32 6 33.93	W 103 35 59.82
	4600.00	10.00	252.50	4565.56	-120.21	-122.74	-389.29	0.00	404312.56	768393.16	N 32 6 33.88	W 103 36 0.01
	4700.00	10.00	252.50	4664.04	-125.33	-127.96	-405.85	0.00	404307.34	768376.60	N 32 6 33.83	W 103 36 0.21
Base of Salt	4750.73	10.00	252.50	4714.00	-127.92	-130.61	-414.25	0.00	404304.69	768368.20	N 32 6 33.80	W 103 36 0.31
	4800.00	10.00	252.50	4762.52	-130.44	-133.19	-422.41	0.00	404302.12	768360.04	N 32 6 33.78	W 103 36 0.40
	4900.00	10.00	252.50	4861.00	-135.56	-138.41	-438.98	0.00	404296.90	768343.48	N 32 6 33.73	W 103 36 0.59
Lamar	4948.74	10.00	252.50	4909.00	-138.05	-140.95	-447.05	0.00	404294.35	768335.41	N 32 6 33.70	W 103 36 0.69
Bell Canyon	4977.17	10.00	252.50	4937.00	-139.50	-142.44	-451.76	0.00	404292.87	768330.70	N 32 6 33.69	W 103 36 0.74
	5000.00	10.00	252.50	4959.48	-140.67	-143.63	-455.54	0.00	404291.67	768326.92	N 32 6 33.68	W 103 36 0.79
	5100.00	10.00	252.50	5057.97	-145.78	-148.85	-472.10	0.00	404286.45	768310.36	N 32 6 33.63	W 103 36 0.98
	5200.00	10.00	252.50	5156.45	-150.90	-154.07	-488.66	0.00	404281.23	768293.80	N 32 6 33.58	W 103 36 1.17
	5300.00	10.00	252.50	5254.93	-156.01	-159.30	-505.22	0.00	404276.01	768277.24	N 32 6 33.53	W 103 36 1.37
	5400.00	10.00	252.50	5353.41	-161.13	-164.52	-521.78	0.00	404270.79	768260.68	N 32 6 33.48	W 103 36 1.56
	5500.00	10.00	252.50	5451.89	-166.24	-169.74	-538.34	0.00	404265.57	768244.12	N 32 6 33.43	W 103 36 1.75
	5600.00	10.00	252.50	5550.37	-171.35	-174.96	-554.90	0.00	404260.35	768227.56	N 32 6 33.37	W 103 36 1.94
	5700.00	10.00	252.50	5648.85	-176.47	-180.18	-571.46	0.00	404255.12	768211.00	N 32 6 33.32	W 103 36 2.14
	5800.00	10.00	252.50	5747.33	-181.58	-185.40	-588.03	0.00	404249.90	768194.43	N 32 6 33.27	W 103 36 2.33
	5900.00	10.00	252.50	5845.81	-186.70	-190.63	-604.59	0.00	404244.68	768177.87	N 32 6 33.22	W 103 36 2.52
	6000.00	10.00	252.50	5944.29	-191.81	-195.85	-621.15	0.00	404239.46	768161.31	N 32 6 33.17	W 103 36 2.72
Cherry Canyon	6046.41	10.00	252.50	5990.00	-194.18	-198.27	-628.83	0.00	404237.04	768153.63	N 32 6 33.15	W 103 36 2.81
	6100.00	10.00	252.50	6042.77	-196.92	-201.07	-637.71	0.00	404234.24	768144.75	N 32 6 33.12	W 103 36 2.91
	6200.00	10.00	252.50	6141.25	-202.04	-206.29	-654.27	0.00	404229.02	768128.19	N 32 6 33.07	W 103 36 3.10
Drop to Vertical 2°/100' DLS	6259.65	10.00	252.50	6200.00	-205.09	-209.41	-664.15	0.00	404225.90	768118.31	N 32 6 33.04	W 103 36 3.22
	6300.00	9.19	252.50	6239.78	-207.07	-211.43	-670.56	2.00	404223.88	768111.90	N 32 6 33.02	W 103 36 3.29
	6400.00	7.19	252.50	6338.76	-211.27	-215.71	-684.15	2.00	404219.59	768098.31	N 32 6 32.98	W 103 36 3.45
	6500.00	5.19	252.50	6438.17	-214.44	-218.96	-694.44	2.00	404216.35	768088.02	N 32 6 32.95	W 103 36 3.

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 ° ' ")
Hold Vertical	6759.65	0.00	252.50	6697.47	-217.91	-222.49	-705.66	2.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	6800.00	0.00	252.50	6737.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	6900.00	0.00	252.50	6837.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7000.00	0.00	252.50	6937.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7100.00	0.00	252.50	7037.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7200.00	0.00	252.50	7137.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7300.00	0.00	252.50	7237.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7400.00	0.00	252.50	7337.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7500.00	0.00	252.50	7437.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
Brushy Canyon	7598.19	0.00	252.50	7536.00	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7600.00	0.00	252.50	7537.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7700.00	0.00	252.50	7637.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7800.00	0.00	252.50	7737.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	7900.00	0.00	252.50	7837.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8000.00	0.00	252.50	7937.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8100.00	0.00	252.50	8037.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8200.00	0.00	252.50	8137.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8300.00	0.00	252.50	8237.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8400.00	0.00	252.50	8337.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8500.00	0.00	252.50	8437.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8600.00	0.00	252.50	8537.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8700.00	0.00	252.50	8637.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8800.00	0.00	252.50	8737.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	8900.00	0.00	252.50	8837.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9000.00	0.00	252.50	8937.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
Bone Spring	9094.19	0.00	252.50	9032.00	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9100.00	0.00	252.50	9037.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
Leonard Shale	9149.19	0.00	252.50	9087.00	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9200.00	0.00	252.50	9137.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9300.00	0.00	252.50	9237.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
Avalon Shale	9374.19	0.00	252.50	9312.00	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9400.00	0.00	252.50	9337.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9500.00	0.00	252.50	9437.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9600.00	0.00	252.50	9537.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9700.00	0.00	252.50	9637.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9800.00	0.00	252.50	9737.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	9900.00	0.00	252.50	9837.81	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
KOP - Build 12"/100' DLS	9961.16	0.00	252.50	9898.98	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91 W 103 36 3.70	
	10000.00	4.66	329.39	9937.77	-216.54	-221.13	-706.46	12.00	404214.17	768076.00	N 32 6 32.93 W 103 36 3.71	
1st Bone Spring Sand	10074.24	13.57	329.39	10011.00	-206.39	-211.02	-712.44	12.00	404224.28	768070.02	N 32 6 33.03 W 103 36 3.78	
	10100.00	16.66	329.39	10035.87	-200.59	-205.24	-715.86	12.00	404230.06	768066.60	N 32 6 33.09 W 103 36 3.82	
	10200.00	28.66	329.39	10127.98	-167.37	-172.15	-735.45	12.00	404263.16	768047.02	N 32 6 33.41 W 103 36 4.04	
Build & Turn 12"/100' DLS	10252.83	35.00	329.39	10172.84	-143.31	-148.18	-749.63	12.00	404287.13	768032.84	N 32 6 33.65 W 103 36 4.21	
	10300.00	39.73	334.52	10210.33	-117.95	-122.91	-763.01	12.00	404312.40	768019.45	N 32 6 33.90 W 103 36 4.36	
2nd Bone Spring Carb	10316.69	41.45	336.09	10223.00	-108.06	-113.04	-767.55	12.00	404322.26	768014.92	N 32 6 34.00 W 103 36 4.41	
	10400.00	50.30	342.60	10280.98	-51.99	-57.11	-788.36	12.00	404378.19	767994.11	N 32 6 34.56 W 103 36 4.65	
	10500.00	61.28	348.49	10337.15	28.11	22.86	-808.69	12.00	404458.16	767973.78	N 32 6 35.35 W 103 36 4.88	
	10600.00	72.46	353.23	10376.39	118.84	113.50	-823.11	12.00	404548.80	767959.36	N 32 6 36.25 W 103 36 5.04	
	10700.00	83.74	357.41	10396.98	216.24	210.85	-831.01	12.00	404646.14	767951.46	N 32 6 37.21 W 103 36 5.12	
Landing Point	10755.30	90.00	359.63	10400.00	271.42	266.02	-832.43	12.00	404701.31	767950.04	N 32 6 37.76 W 103 36 5.14	
	10800.00	90.00	359.63	10400.00	316.12	310.72	-832.72	0.00	404746.01	767949.75	N 32 6 38.20 W 103 36 5.14	
	10900.00	90.00	359.63	10400.00	416.12	410.72	-833.37	0.00	404846.00	767949.10	N 32 6 39.19 W 103 36 5.14	
	11000.00	90.00	359.63	10400.00	516.12	510.71	-834.02	0.00	404946.00	767948.45	N 32 6 40.18 W 103 36 5.14	
	11100.00	90.00	359.63	10400.00	616.12	610.71	-834.67	0.00	405045.99	767947.80	N 32 6 41.17 W 103 36 5.13	
	11200.00	90.00	359.63	10400.00	716.12	710.71	-835.32	0.00	405145.99	767947.15	N 32 6 42.16 W 103 36 5.13	
	11300.00	90.00	359.63	10400.00	816.12	810.71	-835.96	0.00	405245.98	767946.50	N 32 6 43.15 W 103 36 5.13	
	11400.00	90.00	359.63	10400.00	916.12	910.71	-836.61	0.00	405345.97	767945.85	N 32 6 44.14 W 103 36 5.13	
	11500.00	90.00	359.63	10400.00	1016.12	1010.70	-837.26	0.00	405445.97	767945.20	N 32 6 45.13 W 103 36 5.13	
	11600.00	90.00	359.63	10400.00	1116.12	1110.70	-837.91	0.00	405545.96	767944.56	N 32 6 46.12 W 103 36 5.13	
	11700.00	90.00	359.63	10400.00	1216.12	1210.70	-838.56	0.00	405645.96	767943.91	N 32 6 47.11 W 103 36 5.13	
	11800.00	90.00	359.63	10400.00	1316.12	1310.70	-839.21	0.00	405745.95	767943.26	N 32 6 48.09 W 103 36 5.13	
	11900.00	90.00	359.63	10400.00	1416.12	1410.70	-839.86	0.00	405845.95	767942.61	N 32 6 49.08 W 103 36 5.13	
	12000.00	90.00	359.63	10400.00	1516.12	1510.69	-840.51	0.00	405945.94	767941.96	N 32 6 50.07 W 103 36 5.13	
	12100.00	90.00	359.63	10400.00	1616.12	1610.69	-841.16	0.00	406045.94	767941.31	N 32 6 51.06 W 103 36 5.13	
	12200.00	90.00	359.63	10400.00	1716.12	1710.69	-841.81	0.00	406145.93	767940.66	N 32 6 52.05 W 103 36 5.13	
	12300.00	90.00	359.63	10400.00	1816.12	1810.69	-842.46	0.00	406245.93	767940.01	N 32 6 53.04 W 103 36 5.13	
	12400.00	90.00	359.63	10400.00	1916.12	1910.68	-843.11	0.00	406345.92	767939.36	N 32 6 54.03 W 103 36 5.13	
	12500.00	90.00	359.63	10400.00	2016.12	2010.68	-843.76	0.00	406445.91	767938.71	N 32 6 55.02 W 103 36 5.13	
	12600.00	90.00	359.63	10400.00	2116.12	2110.68	-844.41	0.00	406545.91	767938.06	N 32 6 56.01 W 103 36 5.13	
	12700.00	90.00	359.63	10400.00	2216.12	2210.68	-845.05	0.00	406645.90	767937.41	N 32 6 57.00 W 103 36 5.13	
	12800.00	90.00	359.63	10400.00	2316.12	2310.68	-845.70	0.00	406745.90	767936.76	N 32 6 57.99 W 103 36 5.13	
	12900.00	90.00	359.63	10400.00	2416.12	2410.67	-846.35	0.00	406845.89	767936.11	N 32 6 58.98 W 103 36 5.13	
	13000.00	90.00	359.63	10400.00	2516.12	2510.67	-847.00	0.00	406945.89	767935.47	N 32 6 59.97 W 103 36 5.13	
	13100.00	90.00	359.63	10400.00	2616.12	2610.67	-847.65	0.00	407045.88	767934.82	N 32 7 0.96 W 103 36 5.13	
	13200.00	90.00	359.63	10400.00	2716.12	2710.67	-848.30	0.00	407145.88	767934.17	N 32 7 1.95 W 103 36 5.13	
	13300.00	90.00	359.63	10400.00	2816.12	2810.67	-848.95	0.00	407245.87	76793		

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 ° ' ")
	16300.00	90.00	359.63	10400.00	5816.12	5810.60	-868.43	0.00	410245.71	767914.04	N 32 7 32.62	W 103 36 5.12
	16400.00	90.00	359.63	10400.00	5916.12	5910.60	-869.08	0.00	410345.70	767913.39	N 32 7 33.61	W 103 36 5.12
	16500.00	90.00	359.63	10400.00	6016.12	6010.60	-869.73	0.00	410445.70	767912.74	N 32 7 34.60	W 103 36 5.12
	16600.00	90.00	359.63	10400.00	6116.12	6110.60	-870.38	0.00	410545.69	767912.09	N 32 7 35.59	W 103 36 5.12
	16700.00	90.00	359.63	10400.00	6216.12	6210.59	-871.03	0.00	410645.68	767911.44	N 32 7 36.58	W 103 36 5.12
	16800.00	90.00	359.63	10400.00	6316.12	6310.59	-871.68	0.00	410745.68	767910.79	N 32 7 37.57	W 103 36 5.11
	16900.00	90.00	359.63	10400.00	6416.12	6410.59	-872.33	0.00	410845.67	767910.14	N 32 7 38.56	W 103 36 5.11
	17000.00	90.00	359.63	10400.00	6516.12	6510.59	-872.97	0.00	410945.67	767909.49	N 32 7 39.55	W 103 36 5.11
	17100.00	90.00	359.63	10400.00	6616.12	6610.59	-873.62	0.00	411045.66	767908.85	N 32 7 40.54	W 103 36 5.11
	17200.00	90.00	359.63	10400.00	6716.12	6710.58	-874.27	0.00	411145.66	767908.20	N 32 7 41.53	W 103 36 5.11
	17300.00	90.00	359.63	10400.00	6816.12	6810.58	-874.92	0.00	411245.65	767907.55	N 32 7 42.52	W 103 36 5.11
	17400.00	90.00	359.63	10400.00	6916.12	6910.58	-875.57	0.00	411345.65	767906.90	N 32 7 43.51	W 103 36 5.11
	17500.00	90.00	359.63	10400.00	7016.12	7010.58	-876.22	0.00	411445.64	767906.25	N 32 7 44.50	W 103 36 5.11
	17600.00	90.00	359.63	10400.00	7116.12	7110.57	-876.87	0.00	411545.64	767905.60	N 32 7 45.49	W 103 36 5.11
	17700.00	90.00	359.63	10400.00	7216.12	7210.57	-877.52	0.00	411645.63	767904.95	N 32 7 46.48	W 103 36 5.11
	17800.00	90.00	359.63	10400.00	7316.12	7310.57	-878.17	0.00	411745.62	767904.30	N 32 7 47.47	W 103 36 5.11
	17900.00	90.00	359.63	10400.00	7416.12	7410.57	-878.82	0.00	411845.62	767903.65	N 32 7 48.46	W 103 36 5.11
	18000.00	90.00	359.63	10400.00	7516.12	7510.57	-879.47	0.00	411945.61	767903.00	N 32 7 49.45	W 103 36 5.11
	18100.00	90.00	359.63	10400.00	7616.12	7610.56	-880.12	0.00	412045.61	767902.35	N 32 7 50.44	W 103 36 5.11
	18200.00	90.00	359.63	10400.00	7716.12	7710.56	-880.77	0.00	412145.60	767901.70	N 32 7 51.42	W 103 36 5.11
	18300.00	90.00	359.63	10400.00	7816.12	7810.56	-881.42	0.00	412245.60	767901.05	N 32 7 52.41	W 103 36 5.11
	18400.00	90.00	359.63	10400.00	7916.12	7910.56	-882.07	0.00	412345.59	767900.40	N 32 7 53.40	W 103 36 5.11
	18500.00	90.00	359.63	10400.00	8016.12	8010.56	-882.71	0.00	412445.59	767899.76	N 32 7 54.39	W 103 36 5.11
	18600.00	90.00	359.63	10400.00	8116.12	8110.55	-883.36	0.00	412545.58	767899.11	N 32 7 55.38	W 103 36 5.11
	18700.00	90.00	359.63	10400.00	8216.12	8210.55	-884.01	0.00	412645.58	767898.46	N 32 7 56.37	W 103 36 5.11
	18800.00	90.00	359.63	10400.00	8316.12	8310.55	-884.66	0.00	412745.57	767897.81	N 32 7 57.36	W 103 36 5.11
	18900.00	90.00	359.63	10400.00	8416.12	8410.55	-885.31	0.00	412845.56	767897.16	N 32 7 58.35	W 103 36 5.11
	19000.00	90.00	359.63	10400.00	8516.12	8510.55	-885.96	0.00	412945.56	767896.51	N 32 7 59.34	W 103 36 5.11
	19100.00	90.00	359.63	10400.00	8616.12	8610.54	-886.61	0.00	413045.55	767895.86	N 32 8 0.33	W 103 36 5.11
	19200.00	90.00	359.63	10400.00	8716.12	8710.54	-887.26	0.00	413145.55	767895.21	N 32 8 1.32	W 103 36 5.11
	19300.00	90.00	359.63	10400.00	8816.12	8810.54	-887.91	0.00	413245.54	767894.56	N 32 8 2.31	W 103 36 5.11
	19400.00	90.00	359.63	10400.00	8916.12	8910.54	-888.56	0.00	413345.54	767893.91	N 32 8 3.30	W 103 36 5.11
	19500.00	90.00	359.63	10400.00	9016.12	9010.53	-889.21	0.00	413445.53	767893.26	N 32 8 4.29	W 103 36 5.11
	19600.00	90.00	359.63	10400.00	9116.12	9110.53	-889.86	0.00	413545.53	767892.61	N 32 8 5.28	W 103 36 5.11
	19700.00	90.00	359.63	10400.00	9216.12	9210.53	-890.51	0.00	413645.52	767891.96	N 32 8 6.27	W 103 36 5.10
	19800.00	90.00	359.63	10400.00	9316.12	9310.53	-891.16	0.00	413745.52	767891.31	N 32 8 7.26	W 103 36 5.10
	19900.00	90.00	359.63	10400.00	9416.12	9410.53	-891.80	0.00	413845.51	767890.67	N 32 8 8.25	W 103 36 5.10
	20000.00	90.00	359.63	10400.00	9516.12	9510.52	-892.45	0.00	413945.50	767890.02	N 32 8 9.24	W 103 36 5.10
	20100.00	90.00	359.63	10400.00	9616.12	9610.52	-893.10	0.00	414045.50	767889.37	N 32 8 10.23	W 103 36 5.10
	20200.00	90.00	359.63	10400.00	9716.12	9710.52	-893.75	0.00	414145.49	767888.72	N 32 8 11.22	W 103 36 5.10
	20300.00	90.00	359.63	10400.00	9816.12	9810.52	-894.40	0.00	414245.49	767888.07	N 32 8 12.20	W 103 36 5.10
	20400.00	90.00	359.63	10400.00	9916.12	9910.52	-895.05	0.00	414345.48	767887.42	N 32 8 13.19	W 103 36 5.10
	20500.00	90.00	359.63	10400.00	10016.12	10010.51	-895.70	0.00	414445.48	767886.77	N 32 8 14.18	W 103 36 5.10
	20600.00	90.00	359.63	10400.00	10116.12	10110.51	-896.35	0.00	414545.47	767886.12	N 32 8 15.17	W 103 36 5.10
Cimarex Vaca Draw 20-17 Federal #30H - PBHL [100' FNL, 440' FWL]	20612.41	90.00	359.63	10400.00	10128.53	10122.92	-896.43	0.00	414557.88	767886.04	N 32 8 15.30	W 103 36 5.10

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	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #30H / Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20
	1	26.000	20612.409	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #30H / Cimarex Vaca Draw 20-17 Federal



Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20 Anti-Collision Summary Report

Analysis Date-24hr Time: February 20, 2020 - 17:30

Client: Cimarex Energy

Field: NM Lea County (NAD 83)

Structure: Cimarex Vaca Draw 20-17 Federal #30H

Slot: New Slot

Well: Vaca Draw 20-17 Federal #30H

Borehole: Vaca Draw 20-17 Federal #30H

Scan MD Range: 0.00ft ~ 20612.41ft

Analysis Method: 3D Least Distance

Reference Trajectory: Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20 (Def Plan)

Depth Interval: Every 10.00 Measured Depth (ft)

Rule Set: NAL Procedure: D&M AntiCollision Standard S002

Min Pts: All local minima indicated.

Version / Patch: 2.10.787.0

Database \ Project: us1153APP452.DIR.SLB.COMIDRILLING-NM Lea County 2.10

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

Offset Trajectories Summary

Offset Selection Criteria

Wellhead distance scan: Not performed!

Selection filters: Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans

- All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

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

Results highlighted: Sep-Factor separation <= 1.50 ft

Cimarex Vaca Draw 20-17 Federal #14H Rev0 RM 20Jan20 (Non-Def Plan)													Fail Major
683.29	32.81	682.00	650.48	N/A		MAS = 10.00 (m)	0.00	0.00					Surface
683.29	32.81	681.99	650.48	109626.33		MAS = 10.00 (m)	26.00	26.00					WRP
683.29	32.81	669.88	650.48	56.28		MAS = 10.00 (m)	1990.00	1990.00					MinPts
682.95	32.81	669.24	650.14	54.89		MAS = 10.00 (m)	2120.00	2119.96					MinPt-O-SF
199.68	61.01	158.50	138.67	5.00		OSF1.50	9150.00	9087.81	OSF<5.00				Enter Alert
199.68	66.60	154.78	133.09	4.57		OSF1.50	9880.00	9817.81					MinPt-CtCt
199.72	66.60	154.76	133.03	4.56		OSF1.50	9890.00	9827.81					MinPts
199.89	66.79	154.86	133.10	4.58		OSF1.50	9900.00	9837.81					MinPt-O-SF
183.47	56.05	145.67	127.41	4.99		OSF1.50	10410.00	10287.29	OSF>5.00				Exit Alert
108.33	32.81	86.86	75.52	5.39		MAS = 10.00 (m)	10820.00	10400.00					MinPt-O-SF
102.89	32.81	82.72	70.06	5.38		MAS = 10.00 (m)	10890.00	10400.00					MINPT-O-EOU
102.80	32.81	81.12	69.99	4.98		MAS = 10.00 (m)	11020.00	10400.00	OSF<5.00				Enter Alert
102.80	102.88	33.78	-0.08	1.50		OSF1.50	13560.00	10400.00		OSF<1.50			Enter Minor
102.80	153.72	-0.11	-50.92	1.00		OSF1.50	15240.00	10400.00			OSF<1.00		Enter Major
102.80	318.09	-109.69	-215.29	0.48		OSF1.50	20612.41	10400.00					MinPts

Cimarex Vaca Draw 20-17 Federal #31H Rev1 RM 20Feb20 (Def Plan)													Warning Alert
19.99	16.24	18.70	3.74	N/A		MAS = 4.95 (m)	0.00	0.00	CtCt<=15m<15.00				Enter Alert
19.98	16.24	18.70	3.74	N/A		MAS = 4.95 (m)	26.00	26.00					WRP
19.98	19.54	6.52	0.44	1.54		OSF1.50	2000.00	2000.00					MinPt-CtCt
20.00	19.61	6.50	0.39	1.53		OSF1.50	2010.00	2010.00					MINPT-O-EOU
20.05	19.67	6.51	0.38	1.53		OSF1.50	2020.00	2020.00					MinPts
69.69	21.95	54.63	47.74	4.97		OSF1.50	2540.00	2536.86	OSF>5.00				Exit Alert
609.47	57.12	570.95	552.34	16.34		OSF1.50	9970.00	9907.81					MinPts
613.76	57.83	574.78	555.93	16.29		OSF1.50	10050.00	9987.30					MinPt-O-SF
801.88	241.64	640.36	560.25	5.00		OSF1.50	17210.00	10400.00	OSF<5.00				Enter Alert
801.88	348.84	568.89	453.04	3.46		OSF1.50	20610.00	10400.00					MinPt-CtCt
801.88	348.92	568.84	452.98	3.43		OSF1.50	20612.41	10400.00					MinPts

Cimarex Vaca Draw 20-17 Federal #29H Rev1 RM 20Feb20 (Def Plan)													Warning Alert
20.02	16.27	18.74	3.75	N/A		MAS = 4.96 (m)	0.00	0.00	CtCt<=15m<15.00				Enter Alert
20.02	16.27	18.73	3.75	N/A		MAS = 4.96 (m)	26.00	26.00					WRP
20.02	16.27	9.71	3.75	2.07		MAS = 4.96 (m)	1500.00	1500.00					MinPts
20.04	16.27	9.68	3.76	2.07		MAS = 4.96 (m)	1510.00	1510.00					MINPT-O-EOU
20.17	16.27	9.72	3.89	2.06		MAS = 4.96 (m)	1530.00	1530.00					MinPt-O-SF
52.92	16.93	41.20	35.99	4.95		OSF1.50	1940.00	1940.00	OSF>5.00				Exit Alert
89.93	27.92	70.89	62.01	4.99		OSF1.50	4190.00	4161.79	OSF<5.00				Enter Alert
79.04	48.25	46.45	30.79	2.48		OSF1.50	6270.00	6210.19					MinPt-CtCt
79.09	48.38	46.40	30.70	2.48		OSF1.50	6290.00	6229.91					MinPts
79.16	48.45	46.43	30.70	2.48		OSF1.50	6300.00	6239.78					MinPt-O-SF
103.59	58.98	63.83	44.60	2.66		OSF1.50	10220.00	10145.32					MinPts
103.76	59.13	63.91	44.63	2.66		OSF1.50	10230.00	10153.83					MinPt-O-SF
200.54	62.11	158.70	138.43	4.91		OSF1.50	10450.00	10311.04	OSF>5.00				Exit Alert
650.40	196.11	519.23	454.29	5.00		OSF1.50	16470.00	10400.00	OSF<5.00				Enter Alert
650.40	322.97	434.66	327.43	3.03		OSF1.50	20612.41	10400.00					MinPts

Cimarex Vaca Draw 20-17 Federal #16H Rev0 RM 20Jan20 (Non-Def Plan)													Warning Alert
643.43	32.81	642.15	610.63	N/A		MAS = 10.00 (m)	0.00	0.00					Surface
643.43	32.81	642.14	610.63	160565.29		MAS = 10.00 (m)	26.00	26.00					WRP
86.67	32.81	67.78	53.86	4.94		MAS = 10.00 (m)	4050.00	4023.92	OSF<5.00				Enter Alert
44.11	32.81	23.90	11.30	2.26		MAS = 10.00 (m)	4290.00	4260.27					MinPts
44.16	32.81	23.89	11.35	2.26		MAS = 10.00 (m)	4300.00	4270.12					MinPts
101.60	32.81	80.17	68.79	4.98		MAS = 10.00 (m)	4590.00	4555.71	OSF>5.00				Exit Alert
725.46	54.38	688.78	671.09	20.46		OSF1.50	8930.00	8867.81					MINPT-O-EOU
725.51	54.43	688.79	671.08	20.44		OSF1.50	8940.00	8877.81					MinPt-O-ADP
729.84	55.09	692.68	674.75	20.31		OSF1.50	9010.00	9017.81					MinPt-O-SF
1348.86	44.59	1318.70	1304.27	46.68		OSF1.50	10980.00	10400.00					MinPt-CtCt
1348.86	328.67	1129.32	1020.19	6.17		OSF1.50	20612.41	10400.00					MinPts

Cimarex Vaca Draw 20-17 Federal #15H Rev0 RM 20Jan20 (Non-Def Plan)													Warning Alert
663.38	32.81	662.09	630.57	N/A		MAS = 10.00 (m)	0.00	0.00					Surface
663.38	32.81	662.09	630.57	148996.38		MAS = 10.00 (m)	26.00	26.00					WRP
97.19	32.81	76.10	64.38	4.92		MAS = 10.00 (m)	4510.00	4476.93	OSF<5.00				Enter Alert
68.40	32.86	46.06	35.54	3.19		OSF1.50	4760.00	4723.13					MinPts
68.49	32.95	46.10	35.55	3.18		OSF1.50	4770.00	4732.98					MinPt-O-SF

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
111.13	34.77	87.52	76.35	4.92		OSF1.50	5070.00	5028.42	OSF>5.00			Exit Alert	
520.56	58.55	481.05	462.00	13.60		OSF1.50	9590.00	9527.81				MinPts	
522.38	58.98	482.63	463.39	13.55		OSF1.50	9670.00	9607.81	OSF<5.00			MinPt-O-SF	
738.85	222.56	590.05	516.29	5.00		OSF1.50	17000.00	10400.00				Enter Alert	
738.85	335.95	514.45	402.90	3.31		OSF1.50	20610.00	10400.00				MinPt-CtCt	
738.85	336.02	514.40	402.83	3.31		OSF1.50	20612.41	10400.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #1H ST01 Off-21966ft
(Def Survey)

Warning Alert

683.19	32.81	682.06	650.38	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
683.16	32.81	682.01	650.35	42086.68	MAS = 10.00 (m)	26.00	26.00					WRP	
681.43	32.81	679.09	648.62	563.65	MAS = 10.00 (m)	300.00	300.00					MinPts	
681.94	32.81	678.89	649.13	353.81	MAS = 10.00 (m)	430.00	430.00					MINPT-O-EQU	
714.65	32.81	704.61	681.84	80.19	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF	
318.45	33.93	295.39	284.52	14.59	OSF1.50	6300.00	6239.78					MinPt-O-SF	
316.27	33.35	293.60	282.92	14.74	OSF1.50	6450.00	6388.42					MinPt-O-ADP	
316.21	33.27	293.59	282.93	14.77	OSF1.50	6470.00	6408.31					MINPT-O-EQU	
316.18	33.20	293.62	282.98	14.81	OSF1.50	6490.00	6428.21					MinPt-CtCt	
347.38	36.42	322.67	310.95	14.77	OSF1.50	8370.00	8307.81					MINPT-O-EQU	
347.67	36.76	322.74	310.91	14.64	OSF1.50	8470.00	8407.81					MinPt-O-ADP	
349.48	38.05	323.69	311.43	14.20	OSF1.50	8950.00	8887.81					MinPt-O-ADP	
351.13	40.04	324.02	311.10	13.54	OSF1.50	9460.00	9397.81					MinPt-CtCt	
143.11	44.85	112.57	98.25	4.93	OSF1.50	10440.00	10305.34		OSF<5.00			Enter Alert	
112.30	44.86	81.79	67.44	3.85	OSF1.50	10540.00	10354.99					MinPts	
145.83	45.86	114.84	99.96	4.86	OSF1.50	10630.00	10384.58		OSF>5.00			Exit Alert	
1985.01	69.00	1938.63	1916.01	43.84	OSF1.50	12520.00	10400.00					MinPt-CtCt	
1982.67	73.52	1933.27	1909.14	41.06	OSF1.50	12680.00	10400.00					MinPt-CtCt	
1983.16	74.98	1932.80	1908.18	40.26	OSF1.50	12740.00	10400.00					MINPT-O-EQU	
1983.57	75.46	1932.89	1908.10	40.01	OSF1.50	12760.00	10400.00					MinPt-O-ADP	
1987.91	88.93	1928.25	1898.98	33.94	OSF1.50	13220.00	10400.00					MinPt-CtCt	
1990.98	95.71	1926.00	1895.28	31.56	OSF1.50	13470.00	10400.00					MINPT-O-EQU	
1993.16	98.45	1927.15	1894.71	30.70	OSF1.50	13570.00	10400.00					MinPt-O-ADP	
2001.17	106.93	1929.50	1894.24	28.36	OSF1.50	13840.00	10400.00					MinPt-CtCt	
2002.17	110.48	1928.14	1891.68	27.45	OSF1.50	13970.00	10400.00					MINPT-O-EQU	
1993.41	124.77	1909.85	1868.63	24.17	OSF1.50	14440.00	10400.00					MinPt-CtCt	
1994.05	126.58	1909.30	1867.50	23.83	OSF1.50	14510.00	10400.00					MINPT-O-EQU	
1994.68	127.31	1909.43	1867.37	23.70	OSF1.50	14540.00	10400.00					MinPt-O-ADP	
1998.64	136.60	1907.19	1862.04	22.12	OSF1.50	14840.00	10400.00					MinPt-CtCt	
1999.66	139.82	1906.07	1859.84	21.62	OSF1.50	14960.00	10400.00					MINPT-O-EQU	
2000.98	141.41	1906.33	1859.57	21.38	OSF1.50	15020.00	10400.00					MinPt-O-ADP	
2006.98	147.81	1908.06	1859.17	20.51	OSF1.50	15240.00	10400.00					MinPt-O-ADP	
2009.79	153.08	1907.40	1856.77	19.84	OSF1.50	15410.00	10400.00					MINPT-O-EQU	
2010.30	162.59	1901.53	1847.71	18.67	OSF1.50	15720.00	10400.00					MinPt-CtCt	
2008.91	179.81	1888.66	1829.10	16.86	OSF1.50	16300.00	10400.00					MinPt-CtCt	
1997.71	193.90	1868.01	1803.72	15.53	OSF1.50	16770.00	10400.00					MinPt-CtCt	
1998.98	198.52	1866.26	1800.46	15.18	OSF1.50	16930.00	10400.00					MINPT-O-EQU	
1999.34	198.98	1866.31	1800.36	15.15	OSF1.50	16950.00	10400.00					MinPt-O-ADP	
2025.20	222.53	1876.56	1802.76	13.71	OSF1.50	17730.00	10400.00					MinPt-CtCt	
2011.91	242.83	1849.65	1769.09	12.48	OSF1.50	18400.00	10400.00					MinPt-CtCt	
1995.08	281.39	1807.11	1713.69	10.67	OSF1.50	19690.00	10400.00					MinPt-CtCt	
1996.28	284.92	1805.96	1711.36	10.55	OSF1.50	19820.00	10400.00					MINPT-O-EQU	
1997.67	288.86	1804.72	1708.82	10.41	OSF1.50	19940.00	10400.00					MinPt-CtCt	
1998.05	290.08	1804.31	1708.00	10.37	OSF1.50	19990.00	10400.00					MINPT-O-EQU	
1998.41	290.51	1804.36	1707.90	10.35	OSF1.50	20010.00	10400.00					MinPt-O-ADP	
1999.12	302.05	1797.37	1697.07	9.96	OSF1.50	20380.00	10400.00					MinPt-CtCt	
1999.33	302.60	1797.18	1696.67	9.94	OSF1.50	20410.00	10400.00					MINPT-O-EQU	
1999.50	302.84	1797.23	1696.66	9.94	OSF1.50	20420.00	10400.00					MinPt-O-ADP	
2003.95	304.30	1800.70	1699.64	9.91	OSF1.50	20520.00	10400.00					MinPt-O-SF	
2012.47	305.00	1808.75	1707.46	9.93	OSF1.50	20612.41	10400.00					TD	

Cimarex Vaca Draw 20-17
Federal #1H Surcon Off-12740
(Def Survey)

Warning Alert

683.19	32.81	681.21	650.38	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
683.16	32.81	681.16	650.35	42034.51	MAS = 10.00 (m)	26.00	26.00					WRP	
681.43	32.81	678.24	648.62	562.95	MAS = 10.00 (m)	300.00	300.00					MinPts	
681.94	32.81	678.04	649.13	353.37	MAS = 10.00 (m)	430.00	430.00					MINPT-O-EQU	
714.65	32.81	703.77	681.84	80.07	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF	
318.45	34.78	294.54	283.67	14.55	OSF1.50	6300.00	6239.78					MinPt-O-SF	
316.27	34.20	292.75	282.07	14.70	OSF1.50	6450.00	6388.42					MinPt-O-ADP	
316.21	34.12	292.74	282.08	14.73	OSF1.50	6470.00	6408.31					MINPT-O-EQU	
316.18	34.06	292.77	282.14	14.77	OSF1.50	6490.00	6428.21					MinPt-CtCt	
347.38	37.27	321.82	310.11	14.74	OSF1.50	8370.00	8307.81					MINPT-O-EQU	
347.67	37.61	321.89	310.07	14.61	OSF1.50	8470.00	8407.81					MinPt-O-ADP	
349.48	38.90	322.84	310.58	14.17	OSF1.50	8950.00	8887.81					MinPt-O-ADP	
351.13	40.89	323.17	310.25	13.51	OSF1.50	9460.00	9397.81					MinPt-CtCt	
143.11	45.70	111.72	97.41	4.90	OSF1.50	10440.00	10305.34		OSF<5.00			Enter Alert	
112.30	45.71	80.94	66.59	3.82	OSF1.50	10540.00	10354.99					MinPts	
145.83	46.71	113.99	99.11	4.83	OSF1.50	10630.00	10384.58		OSF>5.00			Exit Alert	
10087.01	49.79	10053.16	10037.22	316.41	OSF1.50	20612.41	10400.00					TD	

Cimarex Vaca Draw 20-17
Federal #5H Final MWD(Surcon
Corrected) (Def Survey)

Warning Alert

663.28	32.81	661.30	630.47	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
663.26	32.81	661.28	630.46	75061.82	MAS = 10.00 (m)	26.00	26.00					WRP
661.45	32.81	657.23	628.64	294.48	MAS = 10.00 (m)	550.00	550.00					MinPts
661.53	32.81	656.44	628.73	211.47	MAS = 10.00 (m)	760.00	760.00					MinPts
661.74	32.81	656.11	628.93	180.81	MAS = 10.00 (m)	870.00	870.00					MINPT-O-EQU
664.02	32.81	654.88	631.21	92.44	MAS = 10.00 (m)	1650.00	1650.00					MinPts
664.10	32.81	654.74	631.29	89.71	MAS = 10.00 (m)	1700.00	1700.00					MINPT-O-EQU
671.71	32.81	660.94	638.90	76.24	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF
280.00	34.01	256.66	245.99	13.02	OSF1.50	6230.00	6170.80					MinPt-CtCt
280.05	34.15	256.63	245.91	12.97	OSF1.50	6250.00	6190.49					MINPT-O-EQU
280.11	34.21	256.64	245.90	12.94	OSF1.50	6259.65	6200.00					MinPt-O-ADP
280.20	34.23	256.72	245.97	12.94	OSF1.50	6270.00	6210.19					MinPt-O-SF
295.18	33.67	272.07	261.50	13.88	OSF1.50	7540.00	7477.81					MinPt-CtCt
295.19	33.72	272.05	261.47	13.86	OSF1.50	7560.00	7497.81					MINPT-O-EQU
295.23	33.77	272.06	261.46	13.84	OSF1.50	7580.00	7517.81					MinPt-O-ADP
287.49	38.27	261.32	249.23	11.80	OSF1.50	8990.00	8927.81					MinPt-CtCt
287.55	38.71	261.09	248.84	11.66	OSF1.50	9110.00	9047.81					MinPt-CtCt
287.31	40.25	259.82	247.06	11.18	OSF1.50	9470.00	9407.81					MinPts

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
287.35	40.31	259.82	247.04	11.17		OSF1.50	9480.00	9417.81				MinPt-O-ADP	
289.34	40.77	261.50	248.57	11.14		OSF1.50	9560.00	9497.81				MinPt-O-SF	
546.05	36.26	521.22	509.80	23.81		OSF1.50	10470.00	10321.98				MinPt-O-SF	
431.88	39.13	405.13	392.75	17.36		OSF1.50	11230.00	10400.00				MinPt-CtCt	
432.02	39.68	404.92	392.36	17.12		OSF1.50	11260.00	10400.00				MINPT-O-EOU	
432.30	40.01	404.96	392.28	16.97		OSF1.50	11280.00	10400.00				MinPt-O-ADP	
426.75	58.66	386.99	368.10	11.24		OSF1.50	12010.00	10400.00				MinPt-CtCt	
422.93	72.36	374.03	350.57	8.97		OSF1.50	12500.00	10400.00				MinPt-CtCt	
417.23	88.78	357.39	328.45	7.18		OSF1.50	13060.00	10400.00				MinPt-CtCt	
418.04	90.88	356.80	327.16	7.02		OSF1.50	13140.00	10400.00				MINPT-O-EOU	
410.96	106.92	339.02	304.04	5.85		OSF1.50	13700.00	10400.00				MinPt-CtCt	
411.10	122.63	328.69	288.47	5.09		OSF1.50	14220.00	10400.00				MinPt-CtCt	
411.89	125.10	327.83	286.79	4.99		OSF1.50	14310.00	10400.00	OSF<5.00			Enter Alert	
413.22	164.23	303.07	248.99	3.80		OSF1.50	15630.00	10400.00				MinPt-CtCt	
413.02	174.28	296.17	238.74	3.58		OSF1.50	15970.00	10400.00				MinPt-CtCt	
411.72	183.95	288.43	227.77	3.38		OSF1.50	16300.00	10400.00				MinPt-CtCt	
413.36	208.40	273.77	204.96	2.99		OSF1.50	17120.00	10400.00				MinPt-CtCt	
414.20	224.40	263.94	189.80	2.78		OSF1.50	17640.00	10400.00				MinPt-CtCt	
414.74	226.28	263.22	188.45	2.76		OSF1.50	17710.00	10400.00				MINPT-O-EOU	
416.78	251.06	248.75	165.72	2.50		OSF1.50	18530.00	10400.00				MinPt-CtCt	
415.25	260.47	240.95	154.78	2.40		OSF1.50	18850.00	10400.00				MinPt-CtCt	
426.00	293.93	229.33	132.07	2.18		OSF1.50	19960.00	10400.00				MINPT-O-EOU	
425.95	306.30	221.09	119.65	2.09		OSF1.50	20380.00	10400.00				MinPts	
484.34	270.68	303.22	213.66	2.69		OSF1.50	20612.41	10400.00				TD	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #13H
MWD Off-22542ft (Surcon
Corrected) (Def Survey)

Pass

540.61	32.81	538.63	507.80	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
540.61	32.81	538.63	507.80	N/A	MAS = 10.00 (m)	10.00	10.00					MinPts	
540.61	32.81	538.63	507.80	110045.41	MAS = 10.00 (m)	26.00	26.00					WRP	
540.88	32.81	538.23	508.07	801.38	MAS = 10.00 (m)	190.00	190.00					MINPT-O-EOU	
61.54	32.81	48.51	28.73	5.10	MAS = 10.00 (m)	3700.00	3679.23					MinPts	
61.57	32.81	48.52	28.76	5.08	MAS = 10.00 (m)	3710.00	3689.08					MinPt-O-SF	
942.80	34.84	919.20	907.96	41.90	OSF1.50	7560.00	7497.81					MinPt-O-SF	
961.38	35.47	937.36	925.91	41.94	OSF1.50	7740.00	7677.81					MinPt-O-SF	
981.52	36.09	957.08	945.43	42.08	OSF1.50	7940.00	7877.81					MinPt-O-SF	
1084.98	45.66	1054.16	1039.32	36.51	OSF1.50	10000.00	9937.77					MinPt-CtCt	
1085.01	45.71	1054.16	1039.30	36.47	OSF1.50	10010.00	9947.73					MinPts	
1093.48	46.41	1062.17	1047.07	36.13	OSF1.50	10150.00	10082.93					MinPt-O-SF	
1098.76	46.63	1067.30	1052.13	36.13	OSF1.50	10190.00	10119.15					MinPt-O-SF	
2435.39	81.23	2380.91	2354.16	45.50	OSF1.50	12670.00	10400.00					MinPt-CtCt	
2438.92	91.14	2377.83	2347.77	40.56	OSF1.50	13040.00	10400.00					MINPT-O-EOU	
2441.08	93.74	2378.26	2347.34	39.46	OSF1.50	13140.00	10400.00					MinPt-O-ADP	
2458.48	109.38	2385.23	2349.10	34.01	OSF1.50	13670.00	10400.00					MinPt-CtCt	
2459.26	111.86	2384.35	2347.40	33.26	OSF1.50	13770.00	10400.00					MINPT-O-EOU	
2466.75	124.59	2383.37	2342.17	29.92	OSF1.50	14210.00	10400.00					MINPT-O-EOU	
2455.58	149.19	2395.79	2306.39	24.84	OSF1.50	15040.00	10400.00					MinPt-CtCt	
2453.66	161.82	2345.45	2291.84	22.87	OSF1.50	15470.00	10400.00					MinPt-CtCt	
2454.49	164.30	2344.63	2290.19	22.53	OSF1.50	15570.00	10400.00					MINPT-O-EOU	
2452.30	174.35	2335.74	2277.95	21.21	OSF1.50	15890.00	10400.00					MinPt-CtCt	
2449.78	193.43	2320.50	2256.35	19.09	OSF1.50	16530.00	10400.00					MinPt-CtCt	
2449.39	198.78	2316.55	2250.62	18.57	OSF1.50	16710.00	10400.00					MinPt-CtCt	
2448.46	212.16	2306.69	2236.29	17.38	OSF1.50	17160.00	10400.00					MinPt-CtCt	
2449.18	214.36	2305.94	2234.82	17.21	OSF1.50	17250.00	10400.00					MINPT-O-EOU	
2445.78	233.37	2289.87	2212.41	15.78	OSF1.50	17870.00	10400.00					MinPt-CtCt	
2430.27	272.56	2248.24	2157.71	13.42	OSF1.50	19180.00	10400.00					MinPt-CtCt	
2430.12	277.94	2244.50	2152.18	13.16	OSF1.50	19360.00	10400.00					MinPt-CtCt	
2427.65	311.01	2219.99	2116.65	11.74	OSF1.50	20460.00	10400.00					MinPt-CtCt	
2427.13	315.98	2216.18	2111.20	11.58	OSF1.50	20612.41	10400.00					MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #8H MWD
Off-22328ft (Surcon Corrected)
(Def Survey)

Pass

560.60	32.81	559.47	527.79	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
560.60	32.81	559.47	527.79	N/A	MAS = 10.00 (m)	10.00	10.00					MinPts
560.60	32.81	559.47	527.80	113435.72	MAS = 10.00 (m)	26.00	26.00					WRP
561.15	32.81	558.80	528.34	460.95	MAS = 10.00 (m)	320.00	320.00					MinPts
562.02	32.81	558.32	529.21	218.21	MAS = 10.00 (m)	600.00	600.00					MINPT-O-EOU
556.79	32.81	548.83	523.99	81.37	MAS = 10.00 (m)	1560.00	1560.00					MinPts
556.91	32.81	548.69	524.10	78.42	MAS = 10.00 (m)	1610.00	1610.00					MINPT-O-EOU
97.38	32.81	82.33	64.58	6.91	MAS = 10.00 (m)	4460.00	4427.69					MinPts
97.78	32.81	82.63	64.97	6.90	MAS = 10.00 (m)	4490.00	4457.23					MinPt-O-SF
594.45	32.81	572.20	561.64	28.09	OSF1.50	7720.00	7657.81					MinPt-O-SF
611.32	33.70	588.47	577.61	28.10	OSF1.50	8010.00	7947.81					MinPt-O-SF
628.13	34.54	604.73	593.59	28.15	OSF1.50	8280.00	8217.81					MinPt-O-SF
634.70	34.91	611.05	599.79	28.13	OSF1.50	8380.00	8317.81					MinPt-O-SF
674.69	41.66	646.54	633.03	24.93	OSF1.50	9950.00	9887.81					MinPt-CtCt
674.70	41.70	646.52	633.00	24.90	OSF1.50	9961.16	9898.98					MINPT-O-EOU
674.73	41.74	646.52	632.99	24.88	OSF1.50	9970.00	9907.81					MinPt-O-ADP
681.59	42.48	652.89	639.11	24.69	OSF1.50	10120.00	10054.90					MinPt-O-SF
2100.53	79.63	2047.12	2020.90	40.04	OSF1.50	12720.00	10400.00					MinPt-CtCt
2100.31	83.24	2044.49	2017.08	38.28	OSF1.50	12850.00	10400.00					MinPt-CtCt
2101.18	85.77	2043.68	2015.42	37.16	OSF1.50	12950.00	10400.00					MINPT-O-EOU
2103.21	91.14	2042.13	2012.07	34.98	OSF1.50	13130.00	10400.00					MinPt-CtCt
2104.02	101.70	2035.89	2002.32	31.32	OSF1.50	13500.00	10400.00					MinPt-CtCt
2103.28	110.93	2028.99	1992.34	28.68	OSF1.50	13820.00	10400.00					MinPt-CtCt
2103.01	117.92	2024.07	1985.09	26.96	OSF1.50	14060.00	10400.00					MinPt-CtCt
2102.32	130.52	2014.98	1971.80	24.33	OSF1.50	14490.00	10400.00					MinPt-CtCt
2100.65	138.15	2008.23	1962.51	22.96	OSF1.50	14750.00	10400.00					MinPt-CtCt
2101.37	140.12	2007.62	1961.24	22.64	OSF1.50	14830.00	10400.00					MINPT-O-EOU
2103.58	143.31	2007.71	1960.26	22.16	OSF1.50	14940.00	10400.00					MINPT-O-EOU
2105.42	145.48	2008.10	1959.94	21.85	OSF1.50	15020.00	10400.00					MinPt-O-ADP
2108.24	151.14	2007.15	1957.10	21.05	OSF1.50	15190.00	10400.00					MinPt-CtCt
2089.89	175.58	1972.51	1914.31	17.95	OSF1.50	16020.00	10400.00					MinPt-CtCt
2090.42	177.23	1971.94	1913.19	17.78	OSF1.50	16090.00	10400.00					MINPT-O-EOU
2090.80	177.68	1972.01	1913.11	17.74	OSF1.50	16110.00	10400.00					MinPt-O-ADP
2134.27	194.66	2004.17	1939.61	16.52	OSF1.50	16680.00	10400.00					MINPT-O-EOU
2133.38	203.47	1997.40	1929.91	15.80	OSF1.50	16960.00	10400.00					MinPt-CtCt
2133.99	205.44	1996.70	1928.54	15.65	OSF1.50	17040.00	10400.00					MINPT-O-EOU

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Cl-Cl (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
2135.00	206.66	1996.90	1928.34	15.56		OSF1.50	17090.00	10400.00				MinPt-O-ADP	
2137.59	211.41	1996.32	1926.18	15.23		OSF1.50	17240.00	10400.00				MINPT-O-EOU	
2138.62	212.68	1996.50	1925.94	15.15		OSF1.50	17290.00	10400.00				MinPt-O-ADP	
2112.75	242.78	1950.57	1869.97	13.10		OSF1.50	18280.00	10400.00				MinPt-CtCt	
2112.65	246.06	1948.28	1866.59	12.92		OSF1.50	18390.00	10400.00				MinPt-CtCt	
2102.74	257.43	1930.79	1845.31	12.29		OSF1.50	18770.00	10400.00				MinPt-CtCt	
2103.18	258.84	1930.30	1844.35	12.23		OSF1.50	18830.00	10400.00				MINPT-O-EOU	
2103.74	259.52	1930.40	1844.22	12.20		OSF1.50	18860.00	10400.00				MinPt-O-ADP	
2106.74	268.62	1927.33	1838.12	11.80		OSF1.50	19140.00	10400.00				MinPt-CtCt	
2107.26	270.32	1926.71	1836.93	11.73		OSF1.50	19210.00	10400.00				MINPT-O-EOU	
2108.03	271.27	1926.85	1836.76	11.69		OSF1.50	19250.00	10400.00				MinPt-O-ADP	
2108.34	277.97	1922.70	1830.37	11.41		OSF1.50	19450.00	10400.00				MinPt-CtCt	
2090.34	310.44	1883.06	1779.80	10.13		OSF1.50	20530.00	10400.00				MinPt-CtCt	
2090.80	312.63	1882.05	1778.17	10.03		OSF1.50	20612.41	10400.00				MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #7H MWD
Ofc-2254ft (Surcon Corrected)
(Def Survey)

Pass

580.60	32.81	579.42	547.79	N/A		MAS = 10.00 (m)	0.00	0.00				MinPts	
580.62	32.81	579.43	547.81	57408.00		MAS = 10.00 (m)	26.00	26.00				WRP	
580.68	32.81	579.42	547.87	7217.16		MAS = 10.00 (m)	50.00	50.00				MINPT-O-EOU	
592.89	32.81	582.68	560.08	64.61		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
152.33	32.81	134.22	119.52	8.87		MAS = 10.00 (m)	5270.00	5225.38				MinPts	
152.37	32.81	134.19	119.56	8.83		MAS = 10.00 (m)	5290.00	5245.08				MINPT-O-EOU	
154.58	32.81	135.91	121.77	8.71		MAS = 10.00 (m)	5410.00	5363.26				MinPt-O-SF	
265.82	39.29	239.27	226.52	10.38		OSF1.50	9660.00	9597.81				MinPt-CtCt	
265.82	39.34	239.25	226.48	10.37		OSF1.50	9670.00	9607.81				MINPT-O-EOU	
265.85	39.38	239.25	226.48	10.36		OSF1.50	9680.00	9617.81				MinPt-O-ADP	
262.99	41.77	234.79	221.22	9.65		OSF1.50	10180.00	10110.23				MinPt-CtCt	
263.00	41.82	234.77	221.18	9.64		OSF1.50	10190.00	10119.15				MinPts	
263.56	41.98	235.23	221.59	9.62		OSF1.50	10220.00	10145.32				MinPt-O-SF	
2145.23	73.07	2096.19	2072.16	44.62		OSF1.50	12620.00	10400.00				MINPT-O-EOU	
2146.06	74.06	2096.30	2072.00	44.03		OSF1.50	12660.00	10400.00				MinPt-O-ADP	
2153.74	83.76	2097.57	2069.98	39.01		OSF1.50	13000.00	10400.00				MINPT-O-EOU	
2153.70	91.19	2092.58	2062.51	35.80		OSF1.50	13250.00	10400.00				MinPt-CtCt	
2153.02	96.35	2088.46	2056.67	33.85		OSF1.50	13430.00	10400.00				MinPt-CtCt	
2152.76	105.09	2082.37	2047.67	31.00		OSF1.50	13730.00	10400.00				MinPt-CtCt	
2153.52	107.38	2081.61	2046.14	30.35		OSF1.50	13820.00	10400.00				MINPT-O-EOU	
2154.38	108.37	2081.80	2046.01	30.08		OSF1.50	13860.00	10400.00				MinPt-O-ADP	
2156.27	111.88	2081.36	2044.39	29.15		OSF1.50	13960.00	10400.00				MinPt-CtCt	
2156.72	113.02	2081.05	2043.70	28.86		OSF1.50	14010.00	10400.00				MINPT-O-EOU	
2157.12	113.47	2081.14	2043.64	28.75		OSF1.50	14030.00	10400.00				MinPt-O-ADP	
2164.37	118.21	2085.23	2046.16	27.68		OSF1.50	14190.00	10400.00				MINPT-O-EOU	
2164.62	118.47	2085.32	2046.15	27.62		OSF1.50	14200.00	10400.00				MinPt-O-ADP	
2171.06	123.54	2088.37	2047.52	26.56		OSF1.50	14370.00	10400.00				MINPT-O-EOU	
2168.98	137.42	2077.04	2031.56	23.84		OSF1.50	14820.00	10400.00				MinPt-CtCt	
2169.52	139.08	2076.47	2030.44	23.55		OSF1.50	14890.00	10400.00				MINPT-O-EOU	
2175.25	145.46	2077.95	2029.79	22.57		OSF1.50	15120.00	10400.00				MinPt-O-ADP	
2193.67	173.39	2077.75	2020.28	19.08		OSF1.50	16040.00	10400.00				MinPt-CtCt	
2195.59	186.89	2070.67	2008.70	17.71		OSF1.50	16490.00	10400.00				MinPt-CtCt	
2198.13	202.50	2062.80	1995.63	16.35		OSF1.50	17010.00	10400.00				MinPt-CtCt	
2192.56	218.56	2046.52	1974.00	15.11		OSF1.50	17550.00	10400.00				MinPt-CtCt	
2192.23	229.66	2038.80	1962.57	14.37		OSF1.50	17920.00	10400.00				MinPt-CtCt	
2185.19	261.96	2010.22	1923.23	12.55		OSF1.50	19000.00	10400.00				MinPt-CtCt	
2185.22	265.24	2008.07	1919.98	12.40		OSF1.50	19110.00	10400.00				MinPt-CtCt	
2186.44	279.97	1999.47	1906.47	11.75		OSF1.50	19600.00	10400.00				MinPt-CtCt	
2185.66	286.33	1994.45	1899.33	11.48		OSF1.50	19810.00	10400.00				MinPt-CtCt	
2182.25	301.27	1981.07	1880.98	10.90		OSF1.50	20310.00	10400.00				MinPt-CtCt	
2181.95	306.36	1977.40	1875.61	10.71		OSF1.50	20480.00	10400.00				MinPt-CtCt	
2182.41	310.24	1975.25	1872.17	10.58		OSF1.50	20612.41	10400.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #6H MWD Final(Surcon
Corrected) (Def Survey)

Pass

643.36	32.81	641.38	610.55	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
643.34	32.81	641.35	610.53	50522.23		MAS = 10.00 (m)	26.00	26.00				WRP	
639.39	32.81	634.25	606.58	201.81		MAS = 10.00 (m)	740.00	740.00				MinPts	
640.20	32.81	633.94	607.39	149.33		MAS = 10.00 (m)	1000.00	1000.00				MINPT-O-EOU	
238.28	32.81	217.90	205.47	12.88		MAS = 10.00 (m)	5580.00	5530.67				MinPts	
238.35	32.81	217.82	205.54	12.77		MAS = 10.00 (m)	5620.00	5570.07				MINPT-O-EOU	
255.49	33.83	232.28	221.66	11.94		OSF1.50	6250.00	6190.49				MinPt-O-SF	
269.73	32.81	247.64	236.92	13.32		MAS = 10.00 (m)	6920.00	6857.81				MinPts	
269.85	32.81	247.60	237.04	13.21		MAS = 10.00 (m)	7030.00	6967.81				MINPT-O-EOU	
270.37	32.98	247.72	237.38	12.99		OSF1.50	7370.00	7307.81				MinPt-O-ADP	
263.45	37.00	238.12	226.45	11.20		OSF1.50	8720.00	8657.81				MinPt-CtCt	
263.49	37.08	238.10	226.40	11.17		OSF1.50	8740.00	8677.81				MINPT-O-EOU	
263.52	37.13	238.11	226.39	11.16		OSF1.50	8750.00	8687.81				MinPt-O-ADP	
264.69	37.47	239.05	227.22	11.14		OSF1.50	8820.00	8757.81				MinPt-O-SF	
1183.53	32.81	1162.19	1150.73	61.03		MAS = 10.00 (m)	10610.00	10379.31				MinPt-O-SF	
1132.28	37.91	1106.29	1094.31	47.18		OSF1.50	11270.00	10400.00				MinPt-CtCt	
1133.85	45.06	1103.16	1088.80	39.42		OSF1.50	11560.00	10400.00				MINPT-O-EOU	
1134.81	46.20	1103.35	1088.61	38.43		OSF1.50	11610.00	10400.00				MinPt-O-ADP	
1147.11	58.28	1107.63	1088.87	30.53		OSF1.50	12060.00	10400.00				MINPT-O-EOU	
1148.63	72.05	1099.94	1076.58	24.55		OSF1.50	12540.00	10400.00				MinPt-CtCt	
1138.62	97.33	1073.08	1041.29	17.88		OSF1.50	13430.00	10400.00				MinPt-CtCt	
1132.52	143.94	1035.90	988.58	11.95		OSF1.50	14990.00	10400.00				MinPt-CtCt	
1132.00	157.98	1026.02	974.02	10.87		OSF1.50	15460.00	10400.00				MinPt-CtCt	
1131.09	167.81	1018.56	963.28	10.21		OSF1.50	15790.00	10400.00				MinPt-CtCt	
1133.33	233.99	976.68	899.35	7.31		OSF1.50	18010.00	10400.00				MinPt-CtCt	
1133.06	239.45	972.76	893.61	7.14		OSF1.50	18190.00	10400.00				MinPt-CtCt	
1132.80	244.01	969.46	888.78	7.01		OSF1.50	18340.00	10400.00				MinPt-CtCt	
1132.63	250.69	964.84	881.94	6.82		OSF1.50	18560.00	10400.00				MinPt-CtCt	
1131.31	261.59	956.25	869.72	6.53		OSF1.50	18920.00	10400.00				MinPt-CtCt	
1128.98	280.40	941.39	848.58	6.07		OSF1.50	19550.00	10400.00				MinPt-CtCt	
1131.84	303.36	928.94	828.49	5.62		OSF1.50	20320.00	10400.00				MinPt-CtCt	
1132.04	305.28	927.86	826.76	5.59		OSF1.50	20390.00	10400.00				MinPts	
1132.14	305.34	927.93	826.81	5.59		OSF1.50	20400.00	10400.00				MinPt-O-SF	
1155.08	301.35	953.53	853.74	5.78		OSF1.50	20612.41	10400.00				TD	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status	
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major			
Final Surveys - Cimarex Vaca Draw 20-17 Federal #2H MWD 0ft-22179ft (Surcon Corrected) (Def Survey)														Pass
	642.00	32.81	640.98	609.19	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
	641.97	32.81	640.95	609.16	N/A	MAS = 10.00 (m)	10.00	10.00					MinPts	
	641.97	32.81	640.95	609.16	606257.80	MAS = 10.00 (m)	26.00	26.00					WRP	
	642.46	32.81	636.20	609.65	122.46	MAS = 10.00 (m)	1240.00	1240.00					MinPts	
	641.78	32.81	631.65	608.97	70.34	MAS = 10.00 (m)	2000.00	2000.00					MinPts	
	641.80	32.81	631.64	608.99	70.17	MAS = 10.00 (m)	2010.00	2010.00					MINPT-O-EOU	
	643.58	32.81	633.23	610.77	68.87	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF	
	780.49	32.81	769.07	747.68	74.98	MAS = 10.00 (m)	2970.00	2960.33					MinPt-O-SF	
	965.78	32.81	952.04	932.97	75.88	MAS = 10.00 (m)	3930.00	3905.74					MinPt-O-SF	
	1020.47	32.81	1006.12	987.66	76.48	MAS = 10.00 (m)	4210.00	4181.49					MinPt-O-SF	
	1403.59	32.85	1381.36	1370.75	66.10	OSF1.50	6259.65	6200.00					MinPt-O-SF	
	1499.55	38.40	1473.61	1461.15	60.13	OSF1.50	9350.00	9287.81					MINPT-O-EOU	
	1499.92	39.05	1473.54	1460.87	59.13	OSF1.50	9540.00	9477.81					MINPT-O-EOU	
	1499.96	39.10	1473.55	1460.86	59.04	OSF1.50	9560.00	9497.81					MinPt-O-ADP	
	1503.05	40.60	1475.64	1462.45	56.93	OSF1.50	9961.16	9898.98					MINPT-O-EOU	
	1503.10	40.66	1475.66	1462.45	56.84	OSF1.50	9970.00	9907.81					MinPt-O-ADP	
	1544.98	42.99	1515.98	1501.99	55.18	OSF1.50	10300.00	10210.33					MinPt-O-SF	
	1602.43	44.35	1572.52	1558.08	55.44	OSF1.50	10640.00	10386.94					MinPt-O-SF	
	1614.05	44.65	1583.95	1569.41	55.46	OSF1.50	10720.00	10398.77					MinPt-O-SF	
	1621.20	44.83	1590.97	1576.36	55.47	OSF1.50	10770.00	10400.00					MinPt-O-SF	
	1629.43	45.05	1599.06	1584.38	55.49	OSF1.50	10820.00	10400.00					MinPt-O-SF	
	2535.07	79.24	2481.91	2455.83	48.58	OSF1.50	12520.00	10400.00					MinPt-CtCt	
	2533.65	85.99	2476.00	2447.66	44.69	OSF1.50	12770.00	10400.00					MinPt-CtCt	
	2534.88	89.39	2474.96	2445.49	42.99	OSF1.50	12910.00	10400.00					MINPT-O-EOU	
	2534.51	95.84	2470.29	2438.67	40.06	OSF1.50	13130.00	10400.00					MinPt-CtCt	
	2535.06	97.67	2469.62	2437.39	39.32	OSF1.50	13210.00	10400.00					MINPT-O-EOU	
	2539.20	103.86	2469.64	2435.35	37.01	OSF1.50	13430.00	10400.00					MINPT-O-EOU	
	2540.43	105.32	2469.89	2435.12	36.51	OSF1.50	13490.00	10400.00					MinPt-O-ADP	
	2546.46	131.48	2458.48	2414.98	29.26	OSF1.50	14380.00	10400.00					MinPt-CtCt	
	2552.18	146.60	2454.12	2405.58	26.28	OSF1.50	14920.00	10400.00					MINPT-O-EOU	
	2557.15	157.40	2451.89	2399.75	24.51	OSF1.50	15290.00	10400.00					MINPT-O-EOU	
	2550.19	169.71	2436.71	2380.47	22.66	OSF1.50	15690.00	10400.00					MinPt-CtCt	
	2550.64	170.99	2436.32	2379.65	22.50	OSF1.50	15750.00	10400.00					MINPT-O-EOU	
	2550.98	171.41	2436.38	2379.58	22.44	OSF1.50	15770.00	10400.00					MinPt-O-ADP	
	2548.18	201.04	2413.82	2347.14	19.10	OSF1.50	16750.00	10400.00					MinPt-CtCt	
	2548.83	203.21	2413.03	2345.62	18.90	OSF1.50	16840.00	10400.00					MINPT-O-EOU	
	2549.38	203.86	2413.14	2345.52	18.84	OSF1.50	16870.00	10400.00					MinPt-O-ADP	
	2560.87	217.73	2415.39	2343.15	17.72	OSF1.50	17310.00	10400.00					MinPt-CtCt	
	2563.17	224.17	2413.39	2338.99	17.22	OSF1.50	17550.00	10400.00					MINPT-O-EOU	
	2558.70	239.41	2398.76	2319.29	16.09	OSF1.50	18040.00	10400.00					MinPt-CtCt	
	2559.25	240.96	2398.28	2318.29	15.99	OSF1.50	18110.00	10400.00					MINPT-O-EOU	
	2559.80	241.62	2398.40	2318.18	15.95	OSF1.50	18140.00	10400.00					MinPt-O-ADP	
	2555.51	254.61	2385.44	2300.89	15.11	OSF1.50	18550.00	10400.00					MinPt-CtCt	
	2556.17	256.45	2384.87	2299.72	15.00	OSF1.50	18630.00	10400.00					MINPT-O-EOU	
	2558.80	259.60	2385.40	2299.20	14.84	OSF1.50	18750.00	10400.00					MinPt-O-ADP	
	2560.92	262.58	2385.54	2298.34	14.68	OSF1.50	18840.00	10400.00					MINPT-O-EOU	
	2562.05	263.85	2385.82	2298.20	14.61	OSF1.50	18890.00	10400.00					MinPt-O-ADP	
	2540.33	292.09	2345.27	2248.23	13.08	OSF1.50	19800.00	10400.00					MinPt-CtCt	
	2540.73	293.35	2344.84	2247.39	13.03	OSF1.50	19860.00	10400.00					MINPT-O-EOU	
	2542.15	295.02	2345.15	2247.13	12.96	OSF1.50	19930.00	10400.00					MinPt-O-ADP	
	2534.49	308.69	2328.37	2225.80	12.35	OSF1.50	20350.00	10400.00					MinPt-CtCt	
	2534.88	309.96	2327.89	2224.89	12.30	OSF1.50	20410.00	10400.00					MINPT-O-EOU	
	2535.37	310.62	2327.96	2224.75	12.28	OSF1.50	20440.00	10400.00					MinPt-O-ADP	
	2540.51	316.78	2329.03	2223.78	12.06	OSF1.50	20612.41	10400.00					MinPts	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #3H MWD 0ft-22454' (Surcon Corrected) (Def Survey)														Pass
	661.94	32.81	660.81	629.13	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
	661.91	32.81	660.78	629.10	N/A	MAS = 10.00 (m)	10.00	10.00					MinPts	
	661.92	32.81	660.78	629.11	114068.92	MAS = 10.00 (m)	26.00	26.00					WRP	
	662.00	32.81	660.76	629.19	6472.61	MAS = 10.00 (m)	60.00	60.00					MINPT-O-EOU	
	658.56	32.81	654.79	625.75	239.09	MAS = 10.00 (m)	650.00	650.00					MinPts	
	658.60	32.81	654.76	625.80	232.77	MAS = 10.00 (m)	670.00	670.00					MINPT-O-EOU	
	665.73	32.81	657.58	632.92	93.26	MAS = 10.00 (m)	1640.00	1640.00					MinPts	
	665.83	32.81	657.47	633.02	90.51	MAS = 10.00 (m)	1690.00	1690.00					MINPT-O-EOU	
	674.38	32.81	664.54	641.57	76.38	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF	
	1658.98	32.81	1637.26	1626.17	80.11	MAS = 10.00 (m)	6259.65	6200.00					MinPt-O-SF	
	1903.97	42.33	1875.41	1861.64	69.10	OSF1.50	9990.00	9927.80					MinPts	
	1933.46	43.92	1903.84	1889.54	67.56	OSF1.50	10252.83	10172.84					MinPt-O-SF	
	2046.71	46.86	2015.13	1999.85	66.94	OSF1.50	10960.00	10400.00					MinPt-O-SF	
	2057.70	47.09	2025.97	2010.61	66.97	OSF1.50	11010.00	10400.00					MinPt-O-SF	
	2952.09	98.89	2885.83	2853.20	45.21	OSF1.50	13200.00	10400.00					MinPt-CtCt	
	2953.03	101.75	2884.87	2851.28	43.94	OSF1.50	13320.00	10400.00					MINPT-O-EOU	
	2955.86	105.06	2885.49	2850.80	42.59	OSF1.50	13450.00	10400.00					MinPt-O-ADP	
	2964.78	123.56	2882.08	2841.22	36.27	OSF1.50	14070.00	10400.00					MinPt-CtCt	
	2965.27	128.50	2879.28	2836.78	34.87	OSF1.50	14240.00	10400.00					MinPt-CtCt	
	2966.05	130.81	2878.51	2835.23	34.26	OSF1.50	14340.00	10400.00					MINPT-O-EOU	
	2966.83	131.73	2878.68	2835.10	34.03	OSF1.50	14380.00	10400.00					MinPt-O-ADP	
	2970.69	135.64	2879.93	2835.05	33.08	OSF1.50	14520.00	10400.00					MinPt-O-ADP	
	2977.97	147.36	2879.40	2830.61	30.51	OSF1.50	14910.00	10400.00					MINPT-O-EOU	
	2967.14	182.75	2844.98	2784.39	24.48	OSF1.50	16090.00	10400.00					MinPt-CtCt	
	2966.80	199.07	2833.75	2767.72	22.46	OSF1.50	16640.00	10400.00					MinPt-CtCt	
	2967.77	207.11	2829.37	2760.66	21.59	OSF1.50	16910.00	10400.00					MinPt-CtCt	
	2965.12	270.15	2784.69	2694.96	16.52	OSF1.50	19020.00	10400.00						

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Cl-Cl (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
680.30	32.81	676.55	647.49	383.30		MAS = 10.00 (m)	450.00	450.00				MINPT-O-EOU	
763.58	32.81	752.26	730.78	81.48		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
1081.42	32.81	1068.87	1048.61	102.12		MAS = 10.00 (m)	3280.00	3265.62				MinPt-O-SF	
1165.34	32.81	1152.05	1132.53	102.88		MAS = 10.00 (m)	3560.00	3541.36				MinPt-O-SF	
1949.75	34.85	1925.85	1914.90	88.88		OSF1.50	6259.65	6200.00				MinPt-O-SF	
2316.37	44.46	2286.07	2271.91	81.73		OSF1.50	9720.00	9657.81				MinPt-CiCl	
2316.38	44.53	2286.04	2271.85	81.59		OSF1.50	9740.00	9677.81				MINPT-O-EOU	
2316.41	44.57	2286.04	2271.84	81.52		OSF1.50	9750.00	9687.81				MinPt-O-ADP	
2316.95	45.41	2286.01	2271.53	79.95		OSF1.50	9961.16	9898.98				MinPt-CiCl	
2316.95	45.46	2285.99	2271.50	79.87		OSF1.50	9970.00	9907.81				MinPts	
2363.23	47.25	2331.07	2315.98	78.24		OSF1.50	10300.00	10210.33				MinPt-O-SF	
2511.11	51.10	2476.39	2460.01	76.61		OSF1.50	11170.00	10400.00				MinPt-O-SF	
2527.41	51.42	2492.47	2475.99	76.62		OSF1.50	11230.00	10400.00				MinPt-O-SF	
10383.38	62.83	10340.83	10320.54	255.89		OSF1.50	20612.41	10400.00				TD	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #4H ST01
MWD Off-22279ft (Surcon
Corrected) (Def Survey)

Pass

681.82	32.81	680.65	649.01	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
681.78	32.81	680.60	648.98	160071.99		MAS = 10.00 (m)	26.00	26.00				WRP	
680.24	32.81	677.43	647.43	415.12		MAS = 10.00 (m)	420.00	420.00				MinPts	
680.30	32.81	677.35	647.49	383.76		MAS = 10.00 (m)	450.00	450.00				MINPT-O-EOU	
763.58	32.81	753.12	730.78	80.98		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
1081.42	32.81	1069.73	1048.61	101.50		MAS = 10.00 (m)	3280.00	3265.62				MinPt-O-SF	
1165.34	32.81	1152.94	1132.53	102.52		MAS = 10.00 (m)	3560.00	3541.36				MinPt-O-SF	
1258.70	32.81	1245.59	1225.89	104.30		MAS = 10.00 (m)	3890.00	3866.35				MinPt-O-SF	
1949.75	33.91	1926.79	1915.84	88.98		OSF1.50	6259.65	6200.00				MinPt-O-SF	
2316.37	43.55	2286.98	2272.81	81.70		OSF1.50	9720.00	9657.81				MinPt-CiCl	
2316.38	43.63	2286.95	2272.75	81.56		OSF1.50	9740.00	9677.81				MINPT-O-EOU	
2316.41	43.67	2286.95	2272.74	81.49		OSF1.50	9750.00	9687.81				MinPt-O-ADP	
2316.95	44.48	2286.94	2272.46	79.98		OSF1.50	9961.16	9898.98				MinPt-CiCl	
2316.95	44.51	2286.92	2272.43	79.90		OSF1.50	9970.00	9907.81				MinPts	
2363.23	46.34	2331.99	2316.89	78.24		OSF1.50	10300.00	10210.33				MinPt-O-SF	
2511.11	50.20	2477.30	2460.92	76.61		OSF1.50	11170.00	10400.00				MinPt-O-SF	
2527.41	50.51	2493.39	2476.90	76.61		OSF1.50	11230.00	10400.00				MinPt-O-SF	
3145.58	98.37	3079.68	3047.22	48.44		OSF1.50	13110.00	10400.00				MinPt-CiCl	
3146.39	100.98	3078.78	3045.46	47.21		OSF1.50	13220.00	10400.00				MINPT-O-EOU	
3148.57	115.41	3071.30	3033.16	41.26		OSF1.50	13720.00	10400.00				MinPt-CiCl	
3153.22	130.58	3065.87	3022.69	36.50		OSF1.50	14270.00	10400.00				MINPT-O-EOU	
3156.05	144.97	3059.07	3011.08	32.87		OSF1.50	14750.00	10400.00				MinPt-CiCl	
3154.93	159.67	3048.15	2995.26	29.81		OSF1.50	15250.00	10400.00				MinPt-CiCl	
3153.28	169.31	3040.06	2983.96	28.09		OSF1.50	15580.00	10400.00				MinPt-CiCl	
3154.14	171.91	3039.18	2982.19	27.67		OSF1.50	15690.00	10400.00				MINPT-O-EOU	
3113.78	220.16	2966.69	2893.63	21.30		OSF1.50	17300.00	10400.00				MinPt-CiCl	
3114.30	221.61	2966.20	2892.65	21.16		OSF1.50	17370.00	10400.00				MINPT-O-EOU	
3114.83	222.28	2966.32	2892.58	21.11		OSF1.50	17400.00	10400.00				MinPt-O-ADP	
3130.30	237.12	2971.85	2893.18	19.88		OSF1.50	17900.00	10400.00				MinPts	
3147.64	246.70	2982.85	2900.94	19.21		OSF1.50	18240.00	10400.00				MINPT-O-EOU	
3134.90	274.10	2951.84	2860.80	17.21		OSF1.50	19110.00	10400.00				MinPt-CiCl	
3136.04	277.30	2950.85	2858.74	17.02		OSF1.50	19240.00	10400.00				MINPT-O-EOU	
3137.27	278.77	2951.08	2858.50	16.94		OSF1.50	19300.00	10400.00				MinPt-O-ADP	
3139.35	283.64	2949.93	2855.71	16.65		OSF1.50	19450.00	10400.00				MINPT-O-EOU	
3140.30	284.80	2950.11	2855.50	16.59		OSF1.50	19500.00	10400.00				MinPt-O-ADP	
3136.82	305.84	2932.60	2830.98	15.43		OSF1.50	20170.00	10400.00				MinPt-CiCl	
3141.76	318.45	2929.13	2823.31	14.84		OSF1.50	20612.41	10400.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #10H Rev0 RM 1May17
(Non-Def Plan)

Pass

739.23	32.81	737.26	706.43	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
739.21	32.81	737.23	706.40	N/A		MAS = 10.00 (m)	26.00	26.00				WRP	
739.21	32.81	725.07	706.40	60.64		MAS = 10.00 (m)	2000.00	2000.00				MinPts	
739.23	32.81	725.05	706.42	60.43		MAS = 10.00 (m)	2010.00	2010.00				MINPT-O-EOU	
1426.24	53.32	1390.03	1372.92	41.61		OSF1.50	6300.00	6239.78				MinPt-O-SF	
1462.64	78.21	1409.83	1384.41	28.73		OSF1.50	9970.00	9907.81				MinPts	
1478.17	79.88	1424.26	1398.29	28.42		OSF1.50	10160.00	10092.12				MinPt-O-SF	
2735.08	407.78	2462.56	2327.29	10.10		OSF1.50	20410.00	10400.00				MINPT-O-EOU	
2735.35	408.12	2462.61	2327.23	10.10		OSF1.50	20430.00	10400.00				MinPt-O-ADP	
2740.70	409.75	2466.88	2330.95	10.07		OSF1.50	20560.00	10400.00				MinPt-O-SF	
2744.60	410.16	2470.50	2334.44	10.08		OSF1.50	20612.41	10400.00				TD	

Cimarex Vaca Draw 20-17
Federal #11H Rev0 RM 1May17
(Non-Def Plan)

Pass

759.24	32.81	757.26	726.43	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
759.21	32.81	757.23	726.40	N/A		MAS = 10.00 (m)	26.00	26.00				WRP	
759.21	32.81	745.08	726.40	62.29		MAS = 10.00 (m)	2000.00	2000.00				MinPts	
759.23	32.81	745.05	726.42	62.07		MAS = 10.00 (m)	2010.00	2010.00				MINPT-O-EOU	
1446.03	53.32	1409.83	1392.71	42.19		OSF1.50	6300.00	6239.78				MinPt-O-SF	
1482.43	78.24	1429.61	1404.19	29.12		OSF1.50	9970.00	9907.81				MinPts	
1498.02	79.88	1444.11	1418.14	28.81		OSF1.50	10160.00	10092.12				MinPt-O-SF	
2840.96	414.18	2564.18	2426.77	10.33		OSF1.50	20420.00	10400.00				MINPT-O-EOU	
2841.11	414.35	2564.21	2426.78	10.33		OSF1.50	20430.00	10400.00				MinPt-O-ADP	
2846.90	416.20	2568.78	2430.70	10.30		OSF1.50	20570.00	10400.00				MinPt-O-SF	
2850.02	416.57	2571.64	2433.44	10.30		OSF1.50	20612.41	10400.00				TD	

Cimarex Vaca Draw 20-17
Federal #12H Rev0 RM 1May17
(Non-Def Plan)

Pass

779.22	32.81	777.24	746.41	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	
779.19	32.81	777.21	746.38	N/A		MAS = 10.00 (m)	26.00	26.00				WRP	
779.19	32.81	765.06	746.38	63.93		MAS = 10.00 (m)	2000.00	2000.00				MinPts	
779.21	32.81	765.03	746.40	63.71		MAS = 10.00 (m)	2010.00	2010.00				MINPT-O-EOU	
1465.81	53.32	1429.60	1412.49	42.77		OSF1.50	6300.00	6239.78				MinPt-O-SF	
1502.20	78.24	1449.38	1423.96	29.51		OSF1.50	9970.00	9907.81				MinPts	
1519.50	79.97	1465.53	1439.53	29.19		OSF1.50	10170.00	10101.22				MinPt-O-SF	
2920.93	418.38	2641.35	2502.55	10.51		OSF1.50	20420.00	10400.00				MINPT-O-EOU	
2921.08	418.55	2641.38	2502.53	10.51		OSF1.50	20430.00	10400.00				MinPt-O-ADP	
2927.37	420.59	2646.32	2506.79	10.48		OSF1.50	20580.00	10400.00				MinPt-O-SF	
2929.74	420.89	2648.49	2508.85	10.48		OSF1.50	20612.41	10400.00				TD	



Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20 Proposal Geodetic Report (Def Plan)



Report Date: February 20, 2020 - 05:30 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #30H / New Slot
Well: Vaca Draw 20-17 Federal #30H
Borehole: Vaca Draw 20-17 Federal #30H
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20
Survey Date: September 19, 2018
Tort / AHD / DDI / ERD Ratio: 115.296 ° / 11109.772 ft / 6.405 / 1.068
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.06876", W 103° 35' 55.47930"
Location Grid N/E Y/X: N 404435.300 ftUS, E 768782.440 ftUS
CRS Grid Convergence Angle: 0.3905 °
Grid Scale Factor: 0.99996834
Version / Patch: 2.10.787.0

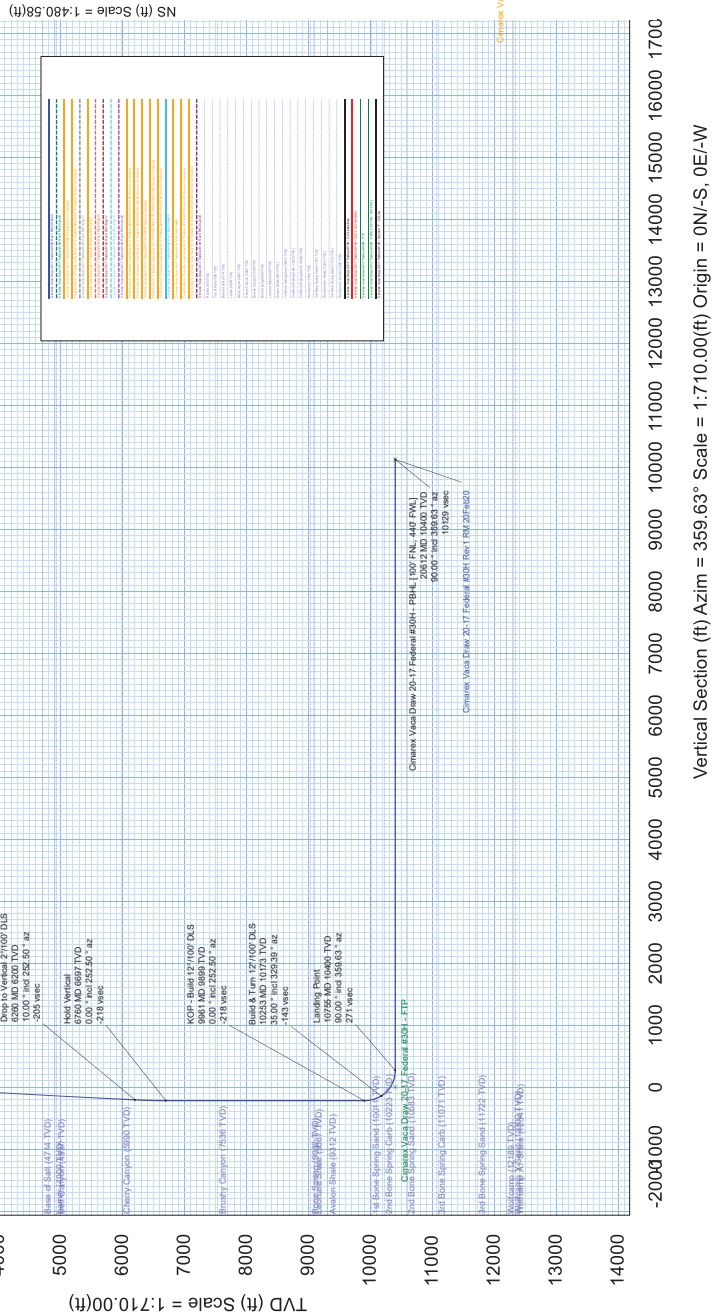
Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.628 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3447.100 ft above MSL
Seabed / Ground Elevation: 3421.100 ft above MSL
Magnetic Declination: 6.573 °
Total Gravity Field Strength: 998.4295mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47698.252 nT
Magnetic Dip Angle: 59.691 °
Declination Date: February 20, 2020
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3905 °
Total Corr Mag North->Grid North: 6.1830 °
Local Coord Referenced To: Well Head

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 [331' FSL, 1271' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
Nudge 2"/100'	2000.00	0.00	252.50	2000.00	0.00	0.00	0.00	0.00	404435.30	768782.44	N 32 6 35.07	W 103 35 55.48
Hold Nudge	2500.00	10.00	252.50	2497.47	-12.82	-13.09	-41.51	2.00	404422.21	768740.93	N 32 6 34.94	W 103 35 55.96
Drop to Vertical	6259.65	10.00	252.50	6200.00	-205.09	-209.41	-664.15	0.00	404225.90	768118.31	N 32 6 33.04	W 103 36 3.22
2"/100' DLS	6759.65	0.00	252.50	6697.47	-217.91	-222.49	-705.66	2.00	404212.81	768076.81	N 32 6 32.91	W 103 36 3.70
Hold Vertical	9961.16	0.00	252.50	9898.98	-217.91	-222.49	-705.66	0.00	404212.81	768076.81	N 32 6 32.91	W 103 36 3.70
KOP - Build	10252.83	35.00	329.39	10172.84	-143.31	-148.18	-749.63	12.00	404287.13	768032.84	N 32 6 33.65	W 103 36 4.21
12"/100' DLS	10755.30	90.00	359.63	10400.00	271.42	266.02	-832.43	12.00	404701.31	767950.04	N 32 6 37.76	W 103 36 5.14
Build & Turn												
12"/100' DLS												
Landing Point												
Cimarex Vaca												
Draw 20-17												
Federal #30H -	20612.41	90.00	359.63	10400.00	10128.53	10122.92	-896.43	0.00	414557.88	767886.04	N 32 8 15.30	W 103 36 5.10
PBHL [100' FNL, 440' FWL]												

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	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #30H / Cimarex Vaca Draw 20-17 Federal #30H Rev1 RM 20Feb20
	1	26.000	20612.409	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #30H / Cimarex Vaca Draw 20-17 Federal



[Print](#)



Vaca Draw 20-17 Fed 30H Surface Casing Spec Sheet

OCTG Performance Data

Casing Performance

Availability: ERW

Pipe Body Geometry

Outside Diameter:	13.375 in	Inside Diameter:	12.715 in
Wall Thickness:	0.330 in	Cross Section Area:	13.524 sq in
Nominal Weight:	48.00 lb/ft	Drift Diameter:	12.559 in
Plain End Weight:	46.02 lb/ft	Alternate Drift Diameter:	-

Pipe Body Performance

Grade:	H40	Collapse Strength (ERW):	740 psi
Pipe Body Yield Strength:	541000 lbf	Collapse Strength (SMLS):	-

SC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	3220 lb·ft	2420 lb·ft	4030 lb·ft
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	1730 psi
Joint Strength:	322000 lbf		

LC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	-
Joint Strength:	-		

BC Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	-
Joint Strength:	-		

PE Connection

Connection Geometry

	Optimum	Minimum	Maximum
Make Up Torque:	-	-	-
Coupling Outside Diameter:	14.375 in		

Connection Performance

Grade:	H40	Minimum Internal Yield Pressure:	1730 psi
Joint Strength:	-		



Cimarex Energy Offline Cementing 7" Casing Information for
Sundry Approval Plan REV0



CIMAREX ENERGY CO. NYSE LISTED: XEC

Cementing Operational Workflow

Conventional Cementing

1. Land casing on fluted mandrel hanger
2. Circulate down casing, taking returns through BOP stack
3. Pump lead and tail cement
4. Displace cement and bump the plug
5. Ensure floats are holding pressure
6. RD cement crew
7. Install packoff to isolate pressure
8. Install BPV and skid rig

Offline Cementing

1. Land casing on **solid body** mandrel hanger
 - a) Engage packoff and locking
2. Install BPV
3. Skid rig
4. Check for pressure and remove BPV
5. Circulate down casing, taking returns through casing valves
6. Pump lead and tail cement
7. Displace cement and bump the plug
8. Ensure floats are holding pressure
9. RD cement crew
10. Install BPV and TA cap

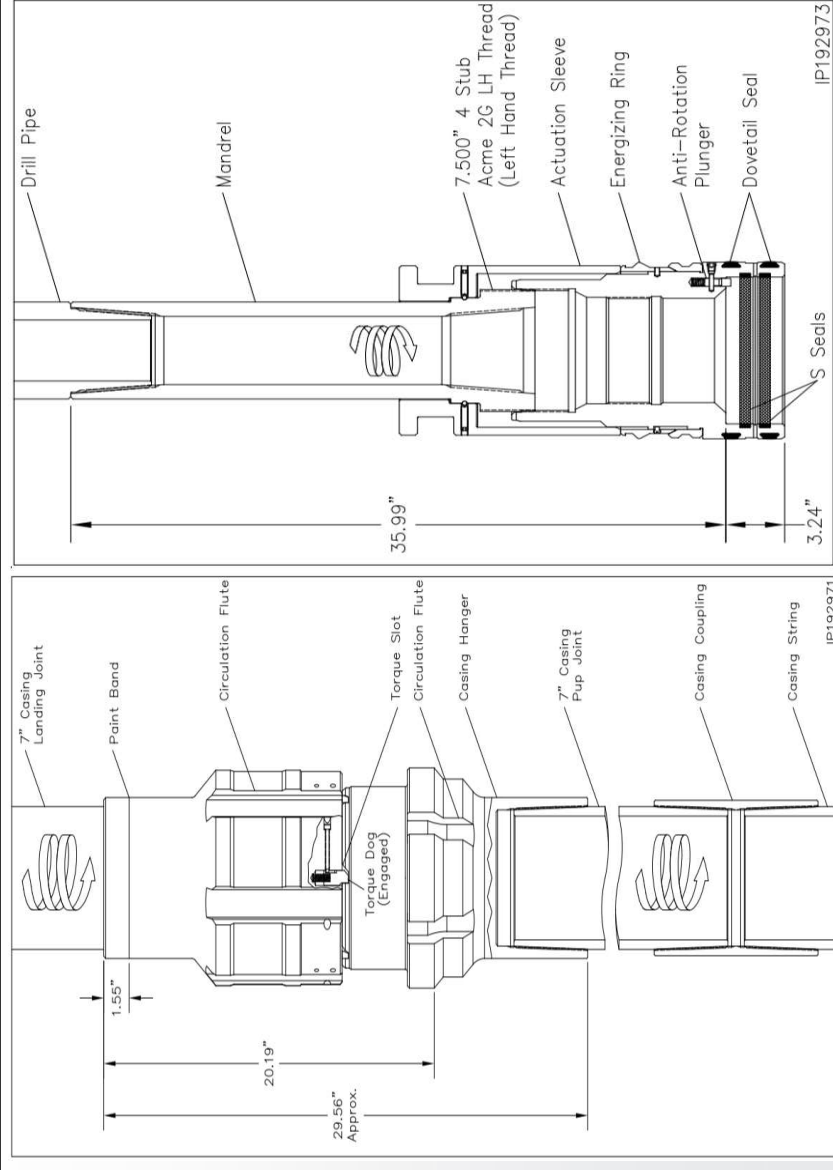


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SLIDE TITLE HERE | 2

Conventional Cementing Equipment-Fluted Mandrel

- Fluted Hanger allows returns up past the hanger body
- Returns throughout cement job flow up through BOP stack and into flowline
- Packoff is installed **after** cement job to isolate pressure above and below hanger
- Lockring engaged during packoff installation

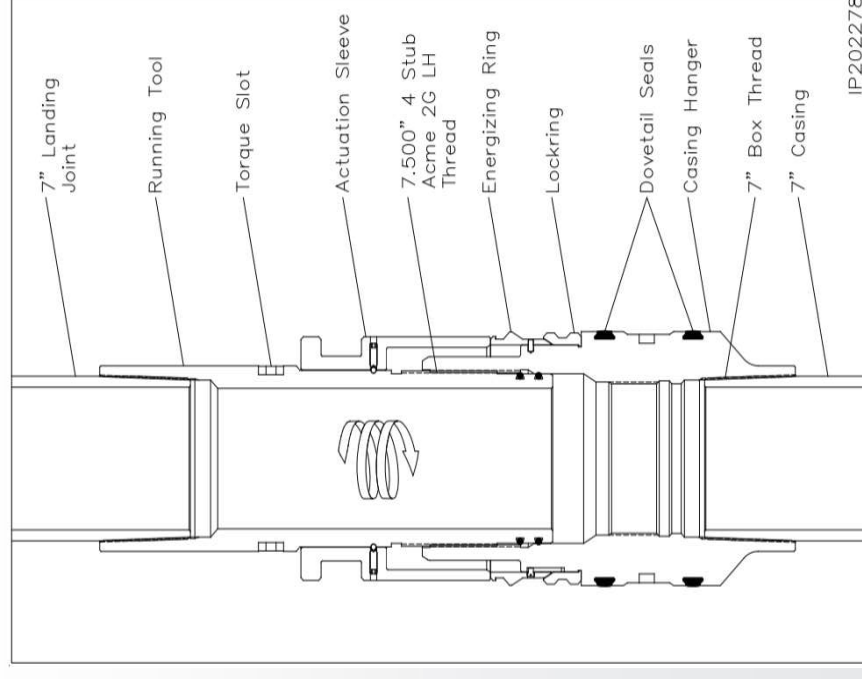


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SLIDE TITLE HERE | 3

Offline Cementing Equipment-Solid Body Mandrel Hanger

- Solid Body Mandrel Hanger allows for casing to be landed and pressure isolated in one step, **prior** to cementing
- Lockring is engaged to lock casing in place
- Casing is isolated and returns throughout cement job flow through the casing valves and through flowback iron independent of rig



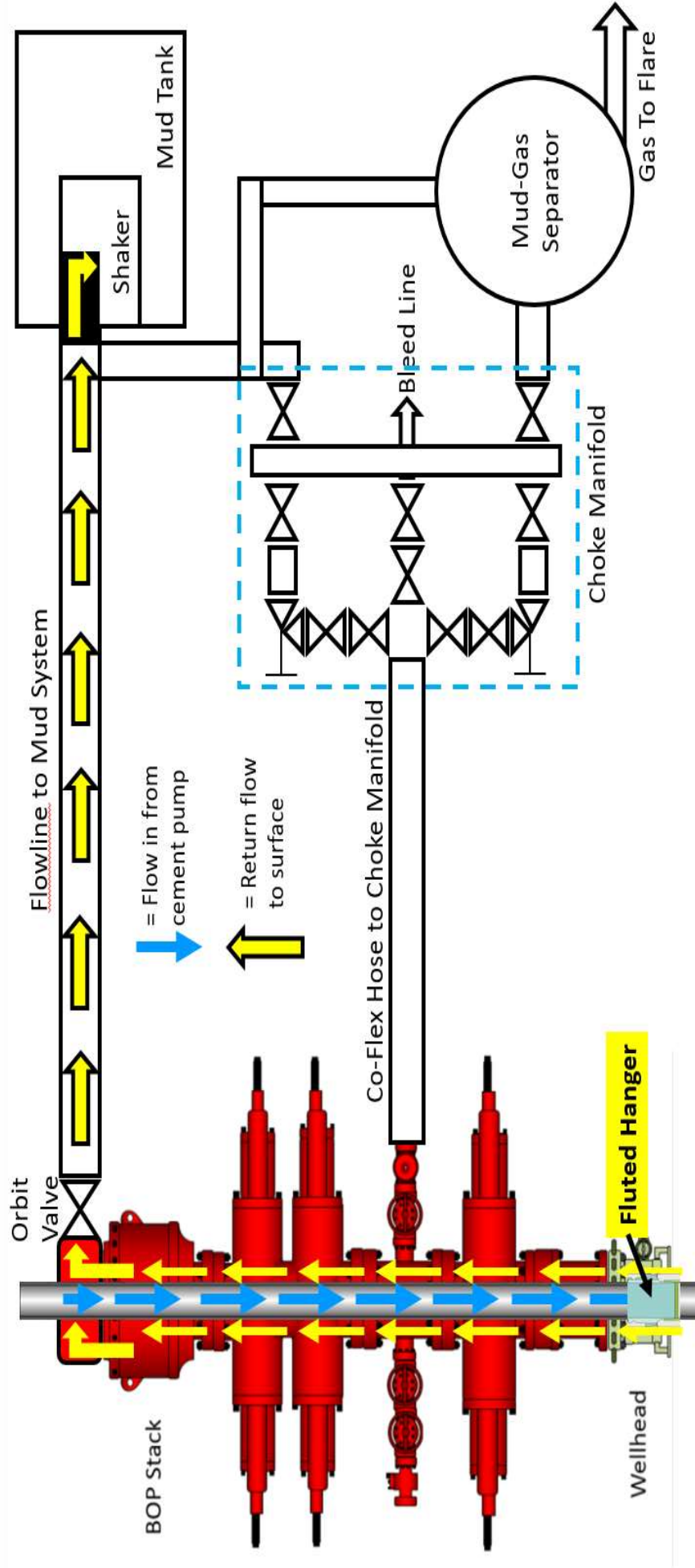
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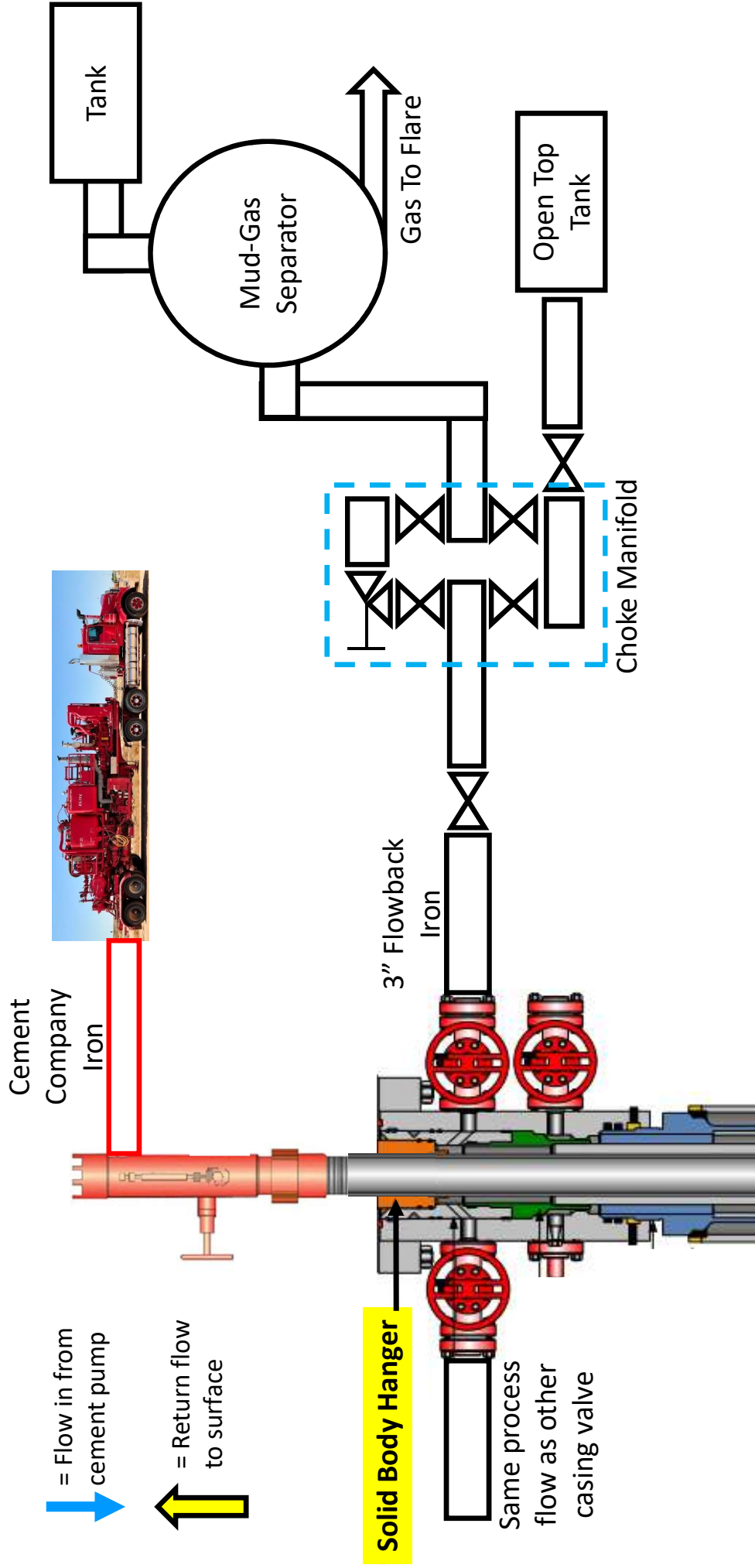
Conventional Cementing Flow Diagram



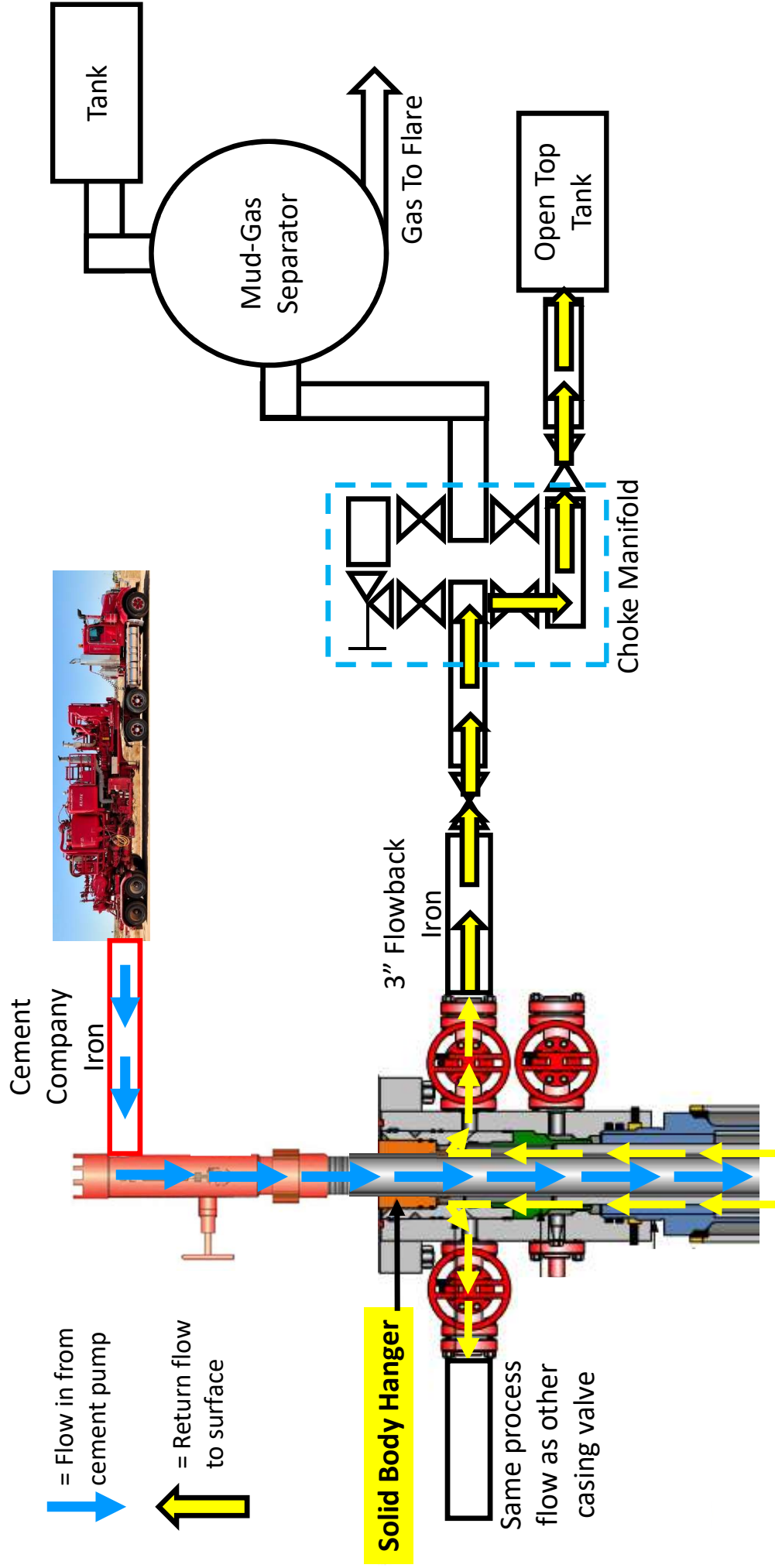
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Offline Cementing -- Intermediate Casing

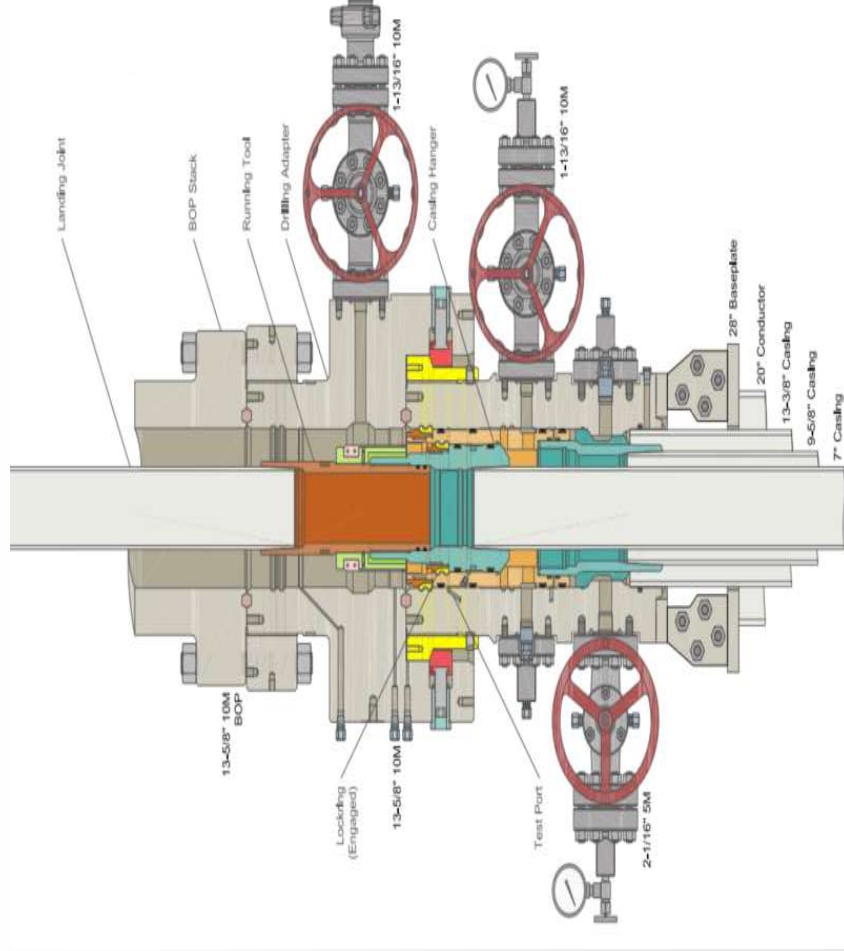


Offline Cementing -- Intermediate Casing



Offline Cementing Progression

- Run 7" casing
- Land 11" nominal x 7" hanger
- Test casing hanger
- Energize 11" nom x 7" hanger lock ring and pull test
- Re-test casing hanger
- Barriers & Procedures after landing casing before setting packoff
 - 10K BOP & 5K Annular-Internal and Annular barrier
 - Kill Weight Fluid in annulus and casing (ensure well is static before setting solid body packoff) Internal and Annular barrier
 - **If well is not static we WILL NOT set solid body packoff.**
 - 10K float collar-Internal Barrier
 - 10k float Shoe-Internal Barrier
 - **After circulating a 1.5 casing capacities to ensure full column of mud and no entrained gas pumps will be shut off and floats checked for flow**

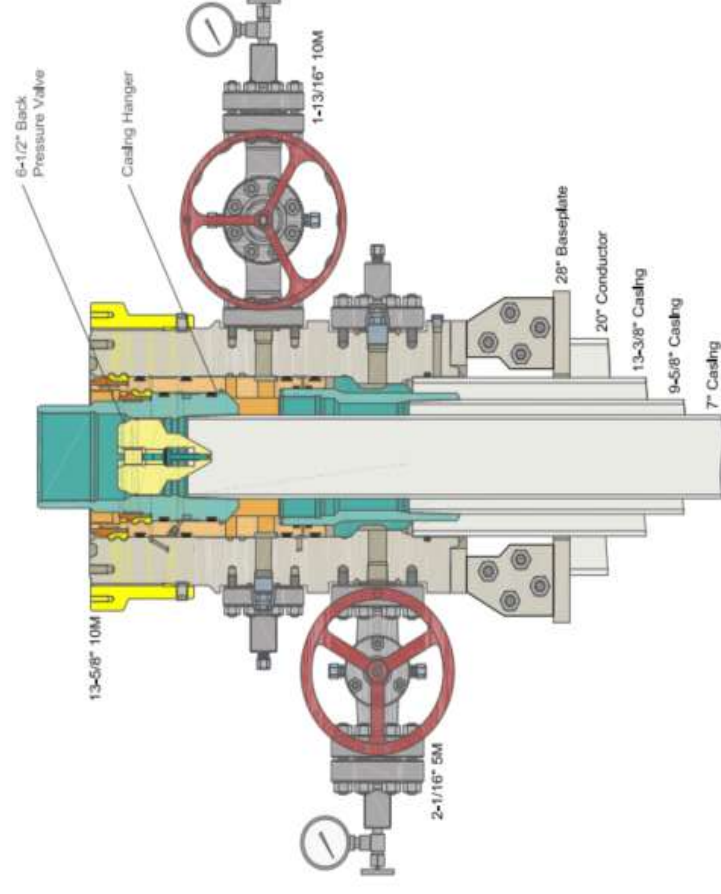


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SLIDE TITLE HERE | 9

Offline Cementing Progression

- Pick up running tool with 6-1/2" nominal Back Pressure valve run into well and set
- Barriers and procedures **BEFORE** removing BOP's
 - Kill weight Fluid in annulus-Annular Barrier
 - Solid Body Packoff-Annular Barrier
 - 10K Float Equipment-Internal Barrier
 - 10K Back pressure valve installed with BOP still on well-Internal Barrier
 - BPV will be tested before it arrives on location by Cactus

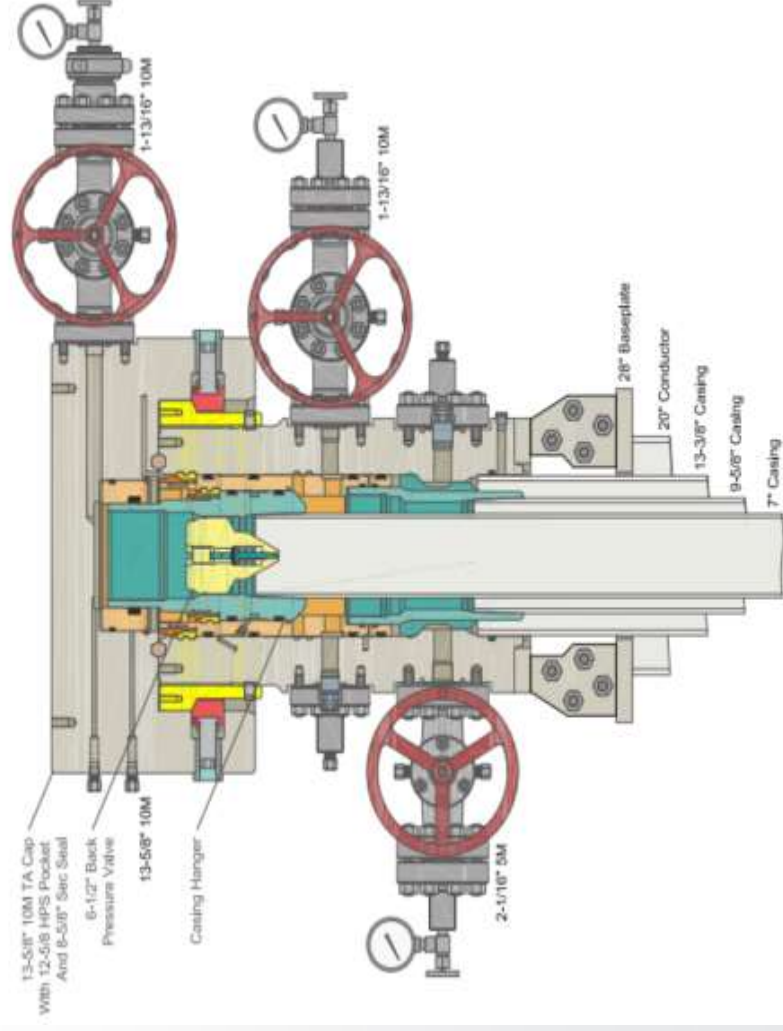


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SLIDE TITLE HERE | 10

Offline Cementing Progression

- Nipple down BOP
- Nipple up TA Cap and test
- Skid Drilling Rig
- Barriers and procedures **AFTER** removing BOP's
 - Kill weight Fluid in annulus-Annular Barrier
 - Solid Body Packoff-Annular Barrier
 - 10K Float Equipment-Internal Barrier
 - 10K Back pressure valve-Internal Barrier
 - 10K rated TA cap with Valve-Internal Barrier

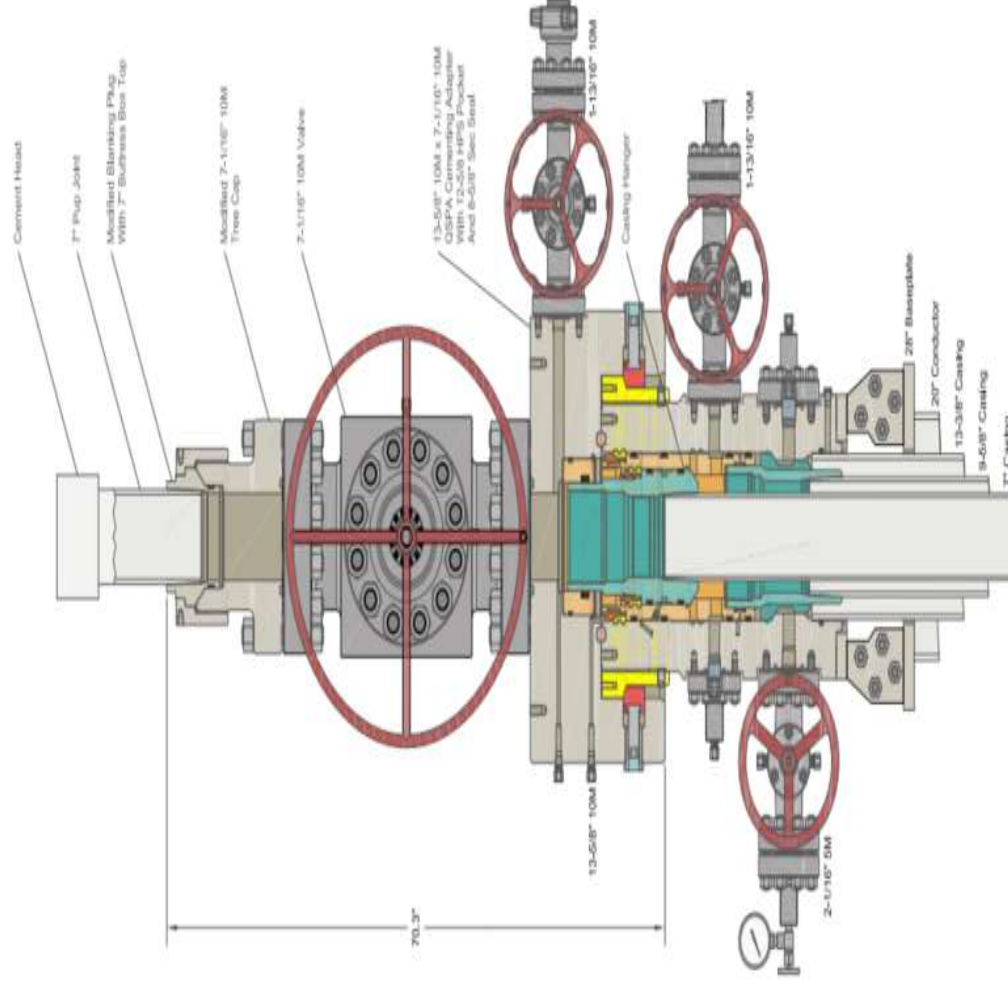


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SLIDE TITLE HERE | 11

Offline Cementing Progression

- Check Pressure on TA Cap and remove
- Install adaptor with Gate valve for off line cementing and test
- Rig up flowback iron independent of rig
- Retrieve Back Pressure Valve
- Shut in well
- Rig up to cement and pump job
- NU 10K TA cap after cement job
- Barriers and procedures before rigging up cementing equipment
 - Address well and ensure no pressure on TA cap
 - Ability to pump into well through casing valves on backside to kill if needed
- Kill weight Fluid in annulus-Annular barrier
- Solid Body Packoff-Annular barrier
- 10K Float Equipment-Internal Barrier
- 10K Back pressure valve-Internal Barrier



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SLIDE TITLE HERE | 12

Offline Cementing Risk and COA Compliance

- All testing and breaks tested in accordance with Onshore Order # 2 and COA's
- If no cement to surface, bradenhead squeeze still possible with offline cementing equipment
- Time from skid rig to offline cementing ops typically 24 hours
- **Conditions where we would not Offline Cement**
 - Well is flowing
- All wellhead equipment rated to 10K maintaining APD compliant
 - 10K flowback iron independent of rig circulating system
 - 10K Back Pressure Valve
 - 10K Gate Valve & TA combo for second barrier during operations
 - 10K 1-13/16 Valve coming off TA cap
 - 10K TA Cap



CIMAREX ENERGY CO. NYSE LISTED: XEC

SLIDE TITLE HERE | 13

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 20508

CONDITIONS OF APPROVAL

Operator: CIMAREX ENERGY CO. Suite 600 Midland, TX79701	600 N. Marienfeld Street	OGRID: 215099	Action Number: 20508	Action Type: C-103A
OCD Reviewer pkautz	Condition None			