Rcvd 6/15/20 – District I

Form 3160-4
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: July 31, 2010

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5. Lease Serial No. NMNM26394

1a. Type of Well ☒ Oil Well ☐ Gas Well ☐ Dry ☐ Other
b. Type of Completion ☒ New Well ☐ Work Over ☐ Deepen ☐ Plug Back ☐ Diff. Resvr.
Other _____

6. If Indian, Allottee or Tribe Name

7. Unit or CA Agreement Name and No.

2. Name of Operator: CIMAREX ENERGY COMPANY — Contact: FATIMA VASQUEZ — E-Mail: fvasquez@cimarex.com

8. Lease Name and Well No.: VACA DRAW 20 17 FEDERAL 44H

3. Address: 600 N MARIENFELD ST SUITE 600, MIDLAND, TX 79701

3a. Phone No. (include area code): Ph: 432.620.1933

9. API Well No.: 30-025-46117

4. Location of Well (Report location clearly and in accordance with Federal requirements)*
At surface: SWSE 390FSL 2120FEL 32.109903 N Lat, 103.592615 W Lon Sec 20 T25S R33E Mer NMP
At top prod interval reported below: SWSE 710FSL 1633FEL 32.110775 N Lat, 103.591044 W Lon Sec 17 T25S R33E Mer
At total depth: NWNE 101FNL 1636FEL 32.137575 N Lat, 103.591036 W Lon

10. Field and Pool, or Exploratory: UPPER BONE SPRING

11. Sec., T., R., M., or Block and Survey or Area: Sec 20 T25S R33E Mer

12. County or Parish: LEA

13. State: NM

14. Date Spudded: 08/27/2019

15. Date T.D. Reached: 11/07/2019

16. Date Completed ☐ D & A ☒ Ready to Prod. 02/01/2020

17. Elevations (DF, KB, RT, GL)*: 3407 GL

18. Total Depth: MD 19884 TVD 10024

19. Plug Back T.D.: MD 19841 TVD 10024

20. Depth Bridge Plug Set: MD TVD

21. Type Electric & Other Mechanical Logs Run (Submit copy of each): RCBL

22. Was well cored? ☒ No ☐ Yes (Submit analysis)
Was DST run? ☒ No ☐ Yes (Submit analysis)
Directional Survey? ☐ No ☒ Yes (Submit analysis)

23. Casing and Liner Record *(Report all strings set in well)*

Hole Size	Size/Grade	Wt. (#/ft.)	Top (MD)	Bottom (MD)	Stage Cementer Depth	No. of Sks. & Type of Cement	Slurry Vol. (BBL)	Cement Top*	Amount Pulled
17.500	13.375 J-55	48.0	0	1068		875		0	
12.250	9.625 J-55	40.0	0	4935		1875		0	
8.750	7.000 P-110	29.0	0	9087					
6.125	4.500 P-110CY	11.6	8501	19884		830		10179	
8.750	7.000 L-80	26.0	9087	10379		915		0	

24. Tubing Record

Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)
3.500	8465	8465						

25. Producing Intervals / 26. Perforation Record

	Formation	Top	Bottom	Perforated Interval	Size	No. Holes	Perf. Status
A)	BONE SPRING	9114		10124 TO 19795	0.410	975	PRODUCING
B)							
C)							
D)							

27. Acid, Fracture, Treatment, Cement Squeeze, Etc.

Depth Interval	Amount and Type of Material
10124 TO 19795	389,478 BBLS TOTAL FLUID & 19,513,151# SAND

28. Production - Interval A

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
02/01/2020	02/26/2020	24	→	1482.0	2346.0	3633.0	47.8		GAS LIFT

Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas:Oil Ratio	Well Status
44	978	661.0	→	1482	2346	3633	1583	POW

28a. Production - Interval B

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						

Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas:Oil Ratio	Well Status
			→					

(See Instructions and spaces for additional data on reverse side)

ELECTRONIC SUBMISSION #509674 VERIFIED BY THE BLM WELL INFORMATION SYSTEM

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

28b. Production - Interval C

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						

Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas:Oil Ratio	Well Status
			→					

28c. Production - Interval D

Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						

Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas:Oil Ratio	Well Status
			→					

29. Disposition of Gas *(Sold, used for fuel, vented, etc.)*
SOLD

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries.

31. Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc.	Name	Top Meas. Depth
BELL CANYON	4969	6048	SANDSTONE; WATER	RUSTLER	1001
CHERRY CANYON	6048	7525	SANDSTONE; WATER	TOP OF SALT	1341
BRUSHY CANYON	7525	9114	SANDSTONE; WATER	LAMAR	4935
BONE SPRING	9114		LS/SHALE; OIL, WATER, GAS	BELL CANYON	4969
				CHERRY CANYON	6048
				BRUSHY CANYON	7525
				BONE SPRING	9114

32. Additional remarks (include plugging procedure):

33. Circle enclosed attachments:

1. Electrical/Mechanical Logs (1 full set req'd.)
2. Geologic Report
3. DST Report
4. Directional Survey
5. Sundry Notice for plugging and cement verification
6. Core Analysis
7 Other:

34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions):

Electronic Submission #509674 Verified by the BLM Well Information System.
For CIMAREX ENERGY COMPANY, sent to the Hobbs

Name *(please print)* FATIMA VASQUEZ Title REGULATORY ANALYST

Signature (Electronic Submission) Date 04/05/2020

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 fradulent statements or representations as to any matter within its jurisdiction.

**** ORIGINAL ** ORIGINAL ** ORIGINAL ** ORIGINAL ** ORIGINAL ** ORIGINAL ** ORIGINAL ****

Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Rcvd 6/15/20 – District I

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

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM26394

6. If Indian, Allottee or Tribe Name

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

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

8. Well Name and No.
VACA DRAW 20-17 FEDERAL 44H

2. Name of Operator
CIMAREX ENERGY COMPANY
Contact: FATIMA VASQUEZ
E-Mail: fvasquez@cimarex.com

9. API Well No.
30-025-46117

3a. Address
600 N MARIENFELD ST SUITE 600
MIDLAND, TX 79701

3b. Phone No. (include area code)
Ph: 432-620-1933

10. Field and Pool or Exploratory Area
UPPER BONE SPRING

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 20 T25S R33E SWSE 390FSL 2120FEL
32.109903 N Lat, 103.592615 W Lon

11. County or Parish, State
LEA COUNTY, NM

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

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

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

Cimarex competed this well as follows:

11/20/2019 Test csg to 9900 psi for 30 min. Good test.
12/03/2019 to
12/19/2019 Perf Bone Spring @ 10,124'-19,795', 975 holes, .41". Frac w/ 389,478 bbls total fluid & 19,513,151# sand.
01/10/2020 DO plugs.
01/11/2020 Continue DO plugs & CO to PBTD. SI well.
01/21/2020 RIH w/ 3-1/2" 9.3# L-80 8rd EUE tbg, pkr & GLVs, set @ 8465'. SI well & secure.
02/01/2020 Turn to production.

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

Electronic Submission #509673 verified by the BLM Well Information System
For CIMAREX ENERGY COMPANY, sent to the Hobbs

Name *(Printed/Typed)* FATIMA VASQUEZ — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 04/05/2020

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ Title _____ Date _____

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

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

(Instructions on page 2)

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

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

HOBBS OCD
FEB 10 2020
RECEIVED

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

☒ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
30-025-46117	97994	WC-025 G-06 S253329D; UPR BONE SPRING

4 Property Code	5 Property Name	6 Well Number
319775	VACA DRAW 20-17 FEDERAL	44H

7 OGRID No.	8 Operator Name	9 Elevation
215099	CIMAREX ENERGY CO.	3406.7'

10 Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	20	25S	33E		390	SOUTH	2120	EAST	LEA

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	17	25S	33E		101	NORTH	1636	EAST	LEA

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

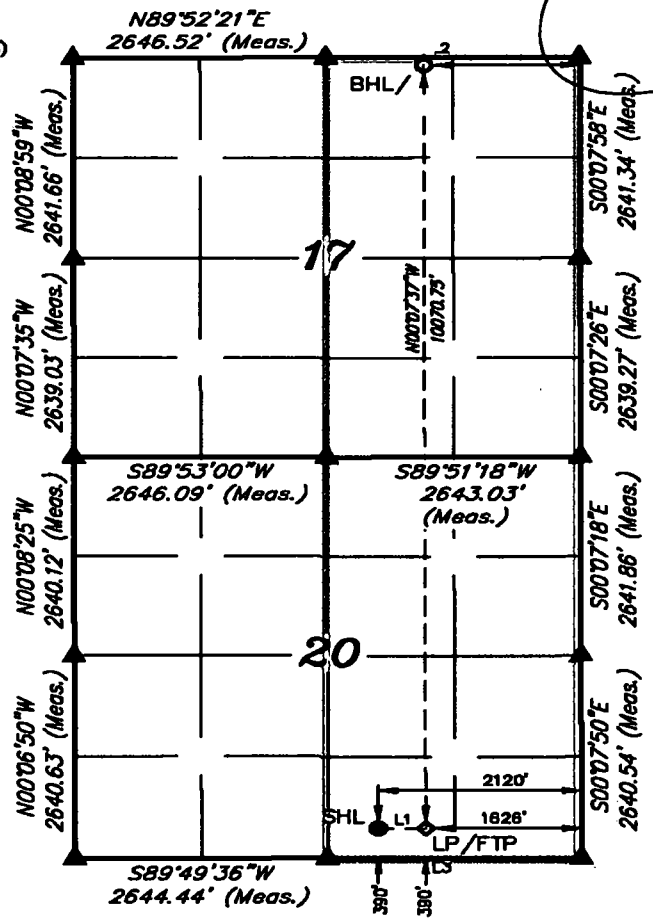
No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

16

● = SURFACE HOLE LOCATION
◇ = LANDING POINT/FIRST TAKE POINT
○ = BOTTOM HOLE LOCATION/ LAST TAKE POINT
▲ = SECTION CORNER LOCATED

2000' 1000' 0 2000'

SCALE
DRAWN BY: C.D. 09-10-18
REV: 1 R.J. 06-19-19 (BHL CHANGE)



NAD 83 (SURFACE HOLE LOCATION)
LATITUDE = 32°06'33.65" (32.109903°)
LONGITUDE = 103°13'33.41" (103.592615°)
NAD 27 (SURFACE HOLE LOCATION)
LATITUDE = 32°06'33.20" (32.109779°)
LONGITUDE = 103°13'31.71" (103.592143°)
STATE PLANE NAD 83 (N.M. EAST)
N: 404507.21' E: 770679.88'
STATE PLANE NAD 27 (N.M. EAST)
N: 404449.43' E: 729493.71'

NOTE:
- Distances referenced on plat to section lines are perpendicular.
- Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 2/7/2020

Terri Stathem

Printed Name

Tstathem@cimarex.com

E-mail Address

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

July 25, 2018

Date of Survey

Signature and Seal of Professional Surveyor:

PAUL BUCHELE
NEW MEXICO
23782
06-19-19
PROFESSIONAL SURVEYOR

Certificate Number:

Intent [ ] As Drilled [X]

API #
30-025-46117

Operator Name:	Property Name:	Well Number
Cimarex Energy Co. (215099)	Vaca Draw 20-17 Federal	44H

Kick Off Point (KOP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
O	20	25S	33E		356	South	1568	East	Lea

Latitude	Longitude	NAD
32.1098	-103.590833	83

First Take Point (FTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
O	20	25S	33E		710	South	1633	East	Lea

Latitude	Longitude	NAD
32.110775	-103.591044	83

Last Take Point (LTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
B	17	25S	33E		190	North	1636	East	Lea

Latitude	Longitude	NAD
32.137222	-103.591036	83

Is this well the defining well for the Horizontal Spacing Unit? YES

Is this well an infill well? NO

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #

Operator Name:	Property Name:	Well Number
Cimarex Energy Co.		

KZ 06/29/2018

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources

Rcvd 6/15/20 – District I

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-104
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

[1] Operator name and Address	[2] OGRID Number
Cimarex Energy Co. 600 N. Marienfeld St. Suite 600 Midland, TX 79701	215099
	[3] Reason for Filing Code/ Effective Date NW / 02/01/2020

[4] API Number	[5] Pool Name	[6] Pool Code
30-025-46117	WC-025 G-06 S253329D; Upper Bone Spring	97994 KZ
[7] Property Code	**[8] Property Name**	**[9] Well Number**
319775	Vaca Draw 20-17 Federal	44H

II. [10] Surface Location

Ul or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South Line	Feet from the	East/West line	County
O	20	25S	33E		390	South	2120	East	Lea

[11] Bottom Hole Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	20	25S	33E		101	North	1636	East	Lea

[12] Lse Code	[13] Producing Method Code	[14] Gas Connection Date	[15] C-129 Permit Number	[16] C-129 Effective Date	[17] C-129 Expiration Date
F	F	02/01/2020			

III. Oil and Gas Transporters

[18] Transporter OGRID	[19] Transporter Name and Address	[20] O/G/W
21778	Sunoco R&M PO Box 2039 Tulsa OK 74102	O
320009	Enlink Midstream Operating, LP 1722 Routh St., Suite 1300 Dallas, TX 75201	G

IV. Well Completion Data

[21] Spud Date	[22] Ready Date	[23] TD	[24] PBTD	[25] Perforations	[26] DHC, MC
08/27/2019	02/01/2020	19,884'	19,841'	10,124'-19,795'	

[27] Hole Size	[28] Casing & Tubing Size	[29] Depth Set	[30] Sacks Cement
17-1/2"	13-3/8"	1068'	875 sx - TOC @ 0
12-1/4"	9-5/8"	4935'	1875 sx - TOC @ 0
8-3/4"	7"	10,379'	915 sx - TOC @ 0'
6-1/8"	4-1/2"	19,884'	830 sx - TOC @ 10,179'

V. Well Test Data

[31] Date New Oil	[32] Gas Delivery Date	[33] Test Date	[34] Test Length	[35] Tbg. Pressure	[36] Csg. Pressure
02/01/2020	02/01/2020	02/26/2020	24	978	661
[37] Choke Size	**[38] Oil**	**[39] Water**	**[40] Gas**		**[41] Test Method**
44	1482	3633	2346		P

[42] I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief.

Signature: Fatima Vasquez

Printed name: Fatima Vasquez

Title: Regulatory Analyst

E-mail Address: fvasquez@cimarex.com

Date: 04/04/2020

Phone: (432) 620-1933

OIL CONSERVATION DIVISION

Approved by: Patricia Martinez

Title: LM II

Approval Date: 6/15/20

Rcvd 6/15/20 - District I

Schlumberger

Cimarex Energy

Final PvA

CIMAREX

Borehole:	Well:	Field:	Structure:
Vaca Draw 20-17 Federal #44H	Vaca Draw 20-17 Federal #44H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #44H

Gravity & Magnetic Parameters						Surface Location						Miscellaneous			
Model:	HDGM 2019	Dip:	59.705°	Date:	23-Oct-2019	Lat:	N 32 6 35.65	Northing:	404507.21ftUS	Grid Conv:	0.3937°	Slot:	New Slot	TVD Ref:	RKB(3432.7ft above MSL)
MagDec:	6.606°	FS:	47733.623nT	Gravity FS:	998.432mgn (9.80665 Based)	Lon:	W 103 35 33.41	Easting:	770679.88ftUS	Scale Fact:	0.99996933	Plan:	Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected)		

NAD83 New Mexico State Plane, Eastern Zone, US Feet

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [390' FSL, 2120' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First SLB Survey	9460.00	2.12	190.16	9425.13	-36.59	-32.99	553.40	0.76
KOP	9512.41	4.65	315.34	9477.49	-36.21	-32.63	551.78	13.68
Section Line Crossing [1627' FEL]	14703.30	89.09	0.74	10036.23	4888.49	4891.59	461.62	0.93
Final Survey	19841.00	90.10	0.10	10024.83	10024.86	10027.80	419.55	0.65
TD, PTB [101' FNL, 1636' FEL]	19884.00	90.10	0.10	10024.76	10067.86	10070.80	419.63	0.00

Grid
True
Mag

Grid North
Tot Corr (M->G 6.212°)
Mag Dec (6.606°)
Grid Conv (0.394°)

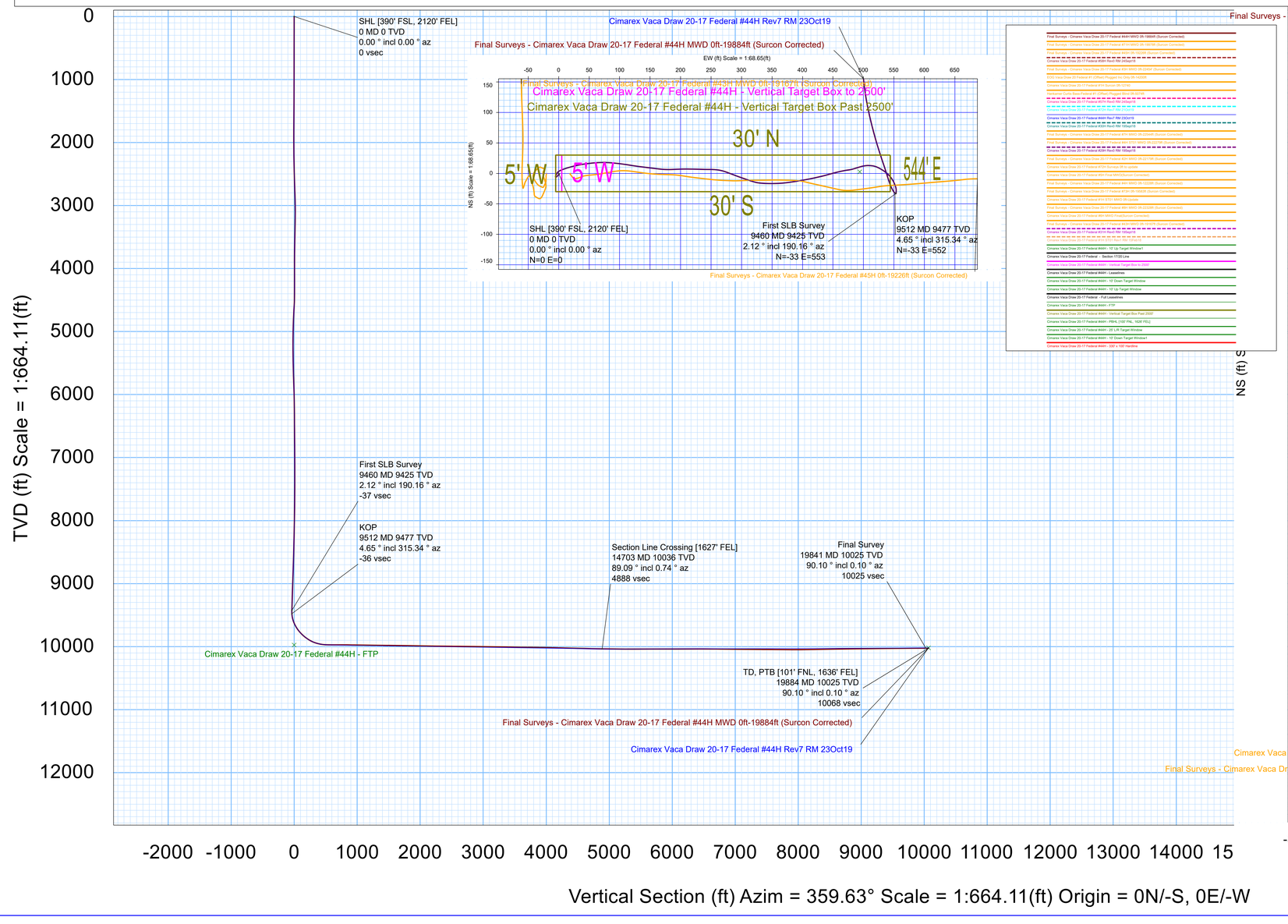
D
E
C

CONTROLLED

Plan ref	Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected)
Drawing ref	
Copy number	of 3
Date	11-Nov-2019

1	Client	
2	Client	
3	Office	
4	Office	

Copy number for



Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected)
Final Surveys - Cimarex Vaca Draw 20-17 Federal #7TH MWD 0ft-19578ft (Surcon Corrected)
Final Surveys - Cimarex Vaca Draw 20-17 Federal #45H MWD 0ft-19226ft (Surcon Corrected)
Cimarex Vaca Draw 20-17 Federal #58H Rev0 RM 19Sept18
Final Surveys - Cimarex Vaca Draw 20-17 Federal #3H MWD 0ft-22434ft (Surcon Corrected)
Final Surveys - Cimarex Vaca Draw 20-17 Federal #7H MWD 0ft-22544ft (Surcon Corrected)
EOC Vaca Draw 20 Federal #1 (Offset) Plugged Inc Only 0ft-14200ft
Hankamer Curtis Bass Federal #1 (Offset) Plugged Blind 0ft-3074ft
Cimarex Vaca Draw 20-17 Federal #4H MWD 0ft-22720ft (Surcon Corrected)
Cimarex Vaca Draw 20-17 Federal #4H Rev0 RM 19Sept18
Cimarex Vaca Draw 20-17 Federal #4H Rev1 RM 23Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev2 RM 24Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev3 RM 25Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev4 RM 28Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev5 RM 29Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev6 RM 30Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev7 RM 31Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev8 RM 01Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev9 RM 02Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev10 RM 03Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev11 RM 04Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev12 RM 05Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev13 RM 06Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev14 RM 07Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev15 RM 08Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev16 RM 09Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev17 RM 10Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev18 RM 11Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev19 RM 12Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev20 RM 13Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev21 RM 14Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev22 RM 15Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev23 RM 16Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev24 RM 17Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev25 RM 18Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev26 RM 19Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev27 RM 20Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev28 RM 21Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev29 RM 22Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev30 RM 23Nov19
Cimarex Vaca Draw 20-17 Federal #4H Rev31 RM 24Nov19
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Cimarex Vaca Draw 20-17 Federal #4H Rev50 RM 13Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev51 RM 14Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev52 RM 15Dec19
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Cimarex Vaca Draw 20-17 Federal #4H Rev54 RM 17Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev55 RM 18Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev56 RM 19Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev57 RM 20Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev58 RM 21Dec19
Cimarex Vaca Draw 20-17 Federal #4H Rev59 RM 22Dec19
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Cimarex Vaca Draw 20-17 Federal #4H Rev66 RM 29Dec19
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Cimarex Vaca Draw 20-17 Federal #4H Rev358 RM 16Oct19
Cimarex Vaca Draw 20-17 Federal #4H Rev359 RM 17Oct19
Cimarex Vaca Draw 20-17

Schlumberger

Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected) Survey Geodetic Report

(Def Survey)

Report Date:	November 11, 2019 - 10:17 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex Energy	**Vertical Section Azimuth:**	359.628 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Vaca Draw 20-17 Federal #44H / New Slot	**TVD Reference Datum:**	RKB
Well:	Vaca Draw 20-17 Federal #44H	**TVD Reference Elevation:**	3432.700 ft above MSL
Borehole:	Vaca Draw 20-17 Federal #44H	**Seabed / Ground Elevation:**	3406.700 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.606 °
Survey Name:	Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected)	**Total Gravity Field Strength:**	998.4316mgn (9.80665 Based)
Survey Date:	August 26, 2019	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	246.044 ° / 10728.924 ft / 6.718 / 1.068	**Total Magnetic Field Strength:**	47733.623 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.705 °
Location Lat / Long:	N 32° 6' 35.65184", W 103° 35' 33.41344"	**Declination Date:**	October 23, 2019
Location Grid N/E Y/X:	N 404507.210 ftUS, E 770679.880 ftUS	**Magnetic Declination Model:**	HDGM 2019
CRS Grid Convergence Angle:	0.3937 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99996933	**Grid Convergence Used:**	0.3937 °
Version / Patch:	2.10.782.0	**Total Corr Mag North->Grid North:**	6.2120 °
		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 ° ' ")	Closure Azimuth (°)	Closure (ft)
SHL [390' FSL, 2120' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404507.21	770679.88	N 32 6 35.65	W 103 35 33.41	0.00	0.00
	169.00	0.11	192.17	169.00	-0.16	-0.16	-0.03	0.07	404507.05	770679.85	N 32 6 35.65	W 103 35 33.41	192.17	0.16
	299.00	0.12	151.64	299.00	-0.40	-0.40	0.00	0.06	404506.81	770679.88	N 32 6 35.65	W 103 35 33.41	179.40	0.40
	481.00	0.16	94.48	481.00	-0.59	-0.59	0.35	0.08	404506.62	770680.23	N 32 6 35.65	W 103 35 33.41	149.38	0.68
	572.00	0.15	132.48	572.00	-0.68	-0.68	0.56	0.11	404506.53	770680.44	N 32 6 35.65	W 103 35 33.41	140.33	0.88
	662.00	0.15	154.69	662.00	-0.87	-0.86	0.70	0.06	404506.35	770680.58	N 32 6 35.64	W 103 35 33.41	141.01	1.11
	754.00	0.13	164.09	754.00	-1.08	-1.07	0.78	0.03	404506.14	770680.66	N 32 6 35.64	W 103 35 33.40	144.00	1.33
	844.00	0.11	224.74	844.00	-1.24	-1.23	0.75	0.14	404505.98	770680.63	N 32 6 35.64	W 103 35 33.40	148.79	1.44
	939.00	0.09	205.52	939.00	-1.37	-1.37	0.65	0.04	404505.84	770680.53	N 32 6 35.64	W 103 35 33.41	154.52	1.51
	1001.00	0.03	128.18	1001.00	-1.42	-1.42	0.64	0.14	404505.79	770680.52	N 32 6 35.64	W 103 35 33.41	155.64	1.56
	1221.00	0.37	220.31	1221.00	-2.00	-2.00	0.23	0.17	404505.21	770680.11	N 32 6 35.63	W 103 35 33.41	173.48	2.01
	1316.00	0.45	222.02	1315.99	-2.51	-2.51	-0.22	0.09	404504.70	770679.66	N 32 6 35.63	W 103 35 33.42	185.01	2.52
	1505.00	0.56	231.14	1504.99	-3.63	-3.64	-1.44	0.07	404503.57	770678.44	N 32 6 35.62	W 103 35 33.43	201.54	3.91
	1600.00	0.65	222.56	1599.98	-4.31	-4.33	-2.16	0.13	404502.88	770677.72	N 32 6 35.61	W 103 35 33.44	206.55	4.84
	1789.00	0.65	230.82	1788.97	-5.77	-5.79	-3.72	0.05	404501.42	770676.16	N 32 6 35.59	W 103 35 33.46	212.69	6.88
	1883.00	0.47	251.16	1882.96	-6.23	-6.25	-4.50	0.28	404500.96	770675.38	N 32 6 35.59	W 103 35 33.47	215.71	7.70
	1977.00	0.38	334.26	1976.96	-6.07	-6.10	-5.00	0.60	404501.11	770674.88	N 32 6 35.59	W 103 35 33.47	219.33	7.88
	2072.00	0.42	337.48	2071.96	-5.46	-5.49	-5.27	0.05	404501.72	770674.61	N 32 6 35.60	W 103 35 33.48	223.79	7.61
	2166.00	0.85	20.19	2165.96	-4.49	-4.52	-5.16	0.65	404502.69	770674.72	N 32 6 35.61	W 103 35 33.47	228.77	6.86
	2261.00	1.09	28.53	2260.94	-3.04	-3.07	-4.48	0.29	404504.14	770675.40	N 32 6 35.62	W 103 35 33.47	235.64	5.43
	2355.00	1.22	30.32	2354.92	-1.39	-1.42	-3.55	0.14	404505.79	770676.33	N 32 6 35.64	W 103 35 33.45	248.26	3.82
	2450.00	1.68	24.25	2449.89	0.74	0.73	-2.47	0.51	404507.94	770677.41	N 32 6 35.66	W 103 35 33.44	286.40	2.57
	2544.00	2.55	56.46	2543.83	3.14	3.14	-0.16	1.53	404510.35	770679.72	N 32 6 35.68	W 103 35 33.42	357.09	3.14
	2638.00	4.71	67.13	2637.64	5.76	5.79	5.14	2.40	404513.00	770685.02	N 32 6 35.71	W 103 35 33.35	41.58	7.75
	2733.00	6.58	73.00	2732.17	8.81	8.90	13.94	2.06	404516.11	770693.82	N 32 6 35.74	W 103 35 33.25	57.44	16.54
	2827.00	8.61	76.11	2825.34	12.00	12.17	25.92	2.20	404519.38	770705.80	N 32 6 35.77	W 103 35 33.11	64.86	28.63
	2921.00	9.03	81.22	2918.23	14.72	14.98	40.04	0.95	404522.19	770719.92	N 32 6 35.80	W 103 35 32.95	69.49	42.75
	3016.00	9.46	83.90	3012.00	16.59	16.95	55.17	0.64	404524.16	770735.05	N 32 6 35.82	W 103 35 32.77	72.92	57.72
	3110.00	9.62	89.18	3104.70	17.42	17.88	70.71	0.95	404525.09	770750.59	N 32 6 35.82	W 103 35 32.59	75.81	72.94
	3205.00	9.80	94.99	3198.34	16.73	17.29	86.70	1.05	404524.50	770766.58	N 32 6 35.82	W 103 35 32.40	78.72	88.41
	3394.00	8.24	99.71	3385.00	12.85	13.61	116.08	0.91	404520.82	770795.95	N 32 6 35.78	W 103 35 32.06	83.31	116.87
	3488.00	7.88	97.58	3478.07	10.78	11.62	129.10	0.50	404518.83	770808.98	N 32 6 35.76	W 103 35 31.91	84.86	129.63
	3677.00	7.37	96.66	3665.40	7.51	8.51	153.99	0.28	404515.72	770833.86	N 32 6 35.73	W 103 35 31.62	86.84	154.22
	3772.00	6.60	96.91	3759.70	6.07	7.14	165.46	0.81	404514.35	770845.33	N 32 6 35.71	W 103 35 31.49	87.53	165.61
	3866.00	7.09	91.21	3853.03	5.22	6.37	176.62	0.89	404513.58	770856.50	N 32 6 35.70	W 103 35 31.36	87.93	176.74

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	3961.00	6.85	86.98	3947.33	5.32	6.55	188.14	0.60	404513.76	770868.01	N 32 6 35.70	W 103 35 31.23	88.01	188.25
	4149.00	6.81	90.15	4133.99	5.74	7.11	210.48	0.20	404514.32	770890.36	N 32 6 35.71	W 103 35 30.97	88.07	210.60
	4244.00	7.42	91.00	4228.26	5.54	6.99	222.25	0.65	404514.20	770902.12	N 32 6 35.71	W 103 35 30.83	88.20	222.36
	4338.00	8.72	92.03	4321.33	5.10	6.63	235.44	1.39	404513.84	770915.31	N 32 6 35.70	W 103 35 30.68	88.39	235.53
	4433.00	7.61	89.42	4415.36	4.82	6.44	248.93	1.23	404513.65	770928.80	N 32 6 35.70	W 103 35 30.52	88.52	249.01
	4527.00	8.31	98.10	4508.46	3.84	5.54	261.88	1.48	404512.75	770941.75	N 32 6 35.69	W 103 35 30.37	88.79	261.93
	4622.00	9.79	110.84	4602.28	-0.09	1.70	276.22	2.61	404508.91	770956.09	N 32 6 35.65	W 103 35 30.20	89.65	276.23
	4716.00	8.70	110.60	4695.06	-5.53	-3.64	290.35	1.16	404503.57	770970.22	N 32 6 35.60	W 103 35 30.04	90.72	290.37
	4810.00	7.18	108.79	4788.16	-10.00	-8.04	302.56	1.64	404499.17	770982.43	N 32 6 35.55	W 103 35 29.90	91.52	302.67
	4869.00	6.81	109.58	4846.72	-12.41	-10.40	309.35	0.65	404496.81	770989.22	N 32 6 35.53	W 103 35 29.82	91.93	309.52
	4983.00	6.10	105.25	4960.00	-16.34	-14.26	321.56	0.75	404492.95	771001.43	N 32 6 35.49	W 103 35 29.68	92.54	321.88
	5078.00	6.67	94.62	5054.41	-18.18	-16.03	331.93	1.38	404491.18	771011.80	N 32 6 35.47	W 103 35 29.56	92.76	332.32
	5267.00	7.28	88.66	5242.01	-18.94	-16.63	354.84	0.50	404490.58	771034.71	N 32 6 35.46	W 103 35 29.29	92.68	355.23
	5456.00	7.93	81.90	5429.35	-16.98	-14.52	379.72	0.58	404492.70	771059.59	N 32 6 35.48	W 103 35 29.00	92.19	380.00
	5550.00	8.05	80.60	5522.44	-15.08	-12.53	392.64	0.23	404494.68	771072.50	N 32 6 35.50	W 103 35 28.85	91.83	392.84
	5645.00	8.10	79.73	5616.50	-12.88	-10.25	405.79	0.14	404496.96	771085.65	N 32 6 35.52	W 103 35 28.70	91.45	405.91
	5740.00	8.38	77.62	5710.52	-10.29	-7.57	419.13	0.43	404499.64	771099.00	N 32 6 35.55	W 103 35 28.54	91.03	419.20
	5834.00	8.47	76.40	5803.50	-7.28	-4.47	432.55	0.21	404502.74	771112.42	N 32 6 35.58	W 103 35 28.39	90.59	432.57
	5929.00	8.43	73.85	5897.47	-3.79	-0.89	446.04	0.40	404506.32	771125.91	N 32 6 35.61	W 103 35 28.23	90.11	446.04
	6023.00	6.59	76.81	5990.66	-0.72	2.26	457.91	2.00	404509.47	771137.78	N 32 6 35.64	W 103 35 28.09	89.72	457.92
	6118.00	4.96	79.07	6085.18	1.25	4.28	467.25	1.73	404511.49	771147.12	N 32 6 35.66	W 103 35 27.98	89.48	467.27
	6212.00	3.59	82.19	6178.91	2.37	5.45	474.16	1.48	404512.66	771154.02	N 32 6 35.67	W 103 35 27.90	89.34	474.19
	6307.00	2.08	79.50	6273.79	3.06	6.17	478.80	1.60	404513.38	771158.66	N 32 6 35.68	W 103 35 27.85	89.26	478.84
	6401.00	1.81	75.29	6367.74	3.73	6.86	481.91	0.32	404514.07	771161.78	N 32 6 35.69	W 103 35 27.81	89.18	481.96
	6496.00	1.88	72.94	6462.69	4.55	7.69	484.85	0.11	404514.90	771164.72	N 32 6 35.69	W 103 35 27.78	89.09	484.91
	6590.00	1.74	71.67	6556.64	5.43	8.60	487.68	0.15	404515.81	771167.55	N 32 6 35.70	W 103 35 27.74	88.99	487.76
	6779.00	1.67	74.43	6745.56	7.04	10.24	493.06	0.06	404517.45	771172.92	N 32 6 35.72	W 103 35 27.68	88.81	493.17
	6873.00	1.65	72.28	6839.52	7.80	11.02	495.67	0.07	404518.23	771175.53	N 32 6 35.73	W 103 35 27.65	88.73	495.79
	6968.00	1.64	77.51	6934.48	8.49	11.73	498.30	0.16	404518.94	771178.16	N 32 6 35.73	W 103 35 27.62	88.65	498.44
	7062.00	1.46	80.82	7028.45	8.96	12.21	500.79	0.21	404519.42	771180.66	N 32 6 35.74	W 103 35 27.59	88.60	500.94
	7156.00	1.61	81.94	7122.41	9.32	12.58	503.28	0.16	404519.79	771183.15	N 32 6 35.74	W 103 35 27.56	88.57	503.44
	7250.00	1.60	87.14	7216.38	9.55	12.84	505.90	0.16	404520.05	771185.76	N 32 6 35.74	W 103 35 27.53	88.55	506.06
	7438.00	1.69	94.16	7404.30	9.45	12.77	511.29	0.12	404519.98	771191.15	N 32 6 35.74	W 103 35 27.47	88.57	511.45
	7533.00	1.86	97.15	7499.25	9.13	12.47	514.21	0.20	404519.68	771194.08	N 32 6 35.74	W 103 35 27.43	88.61	514.37
	7627.00	1.83	102.79	7593.21	8.59	11.95	517.19	0.20	404519.16	771197.05	N 32 6 35.73	W 103 35 27.40	88.68	517.33
	7816.00	1.82	114.82	7782.11	6.63	10.02	522.86	0.20	404517.23	771202.72	N 32 6 35.72	W 103 35 27.33	88.90	522.95
	7910.00	1.88	116.14	7876.06	5.30	8.72	525.60	0.08	404515.93	771205.46	N 32 6 35.70	W 103 35 27.30	89.05	525.67
	8004.00	1.80	122.30	7970.01	3.82	7.25	528.23	0.23	404514.46	771208.09	N 32 6 35.69	W 103 35 27.27	89.21	528.28
	8099.00	1.88	119.98	8064.96	2.23	5.67	530.84	0.12	404512.88	771210.70	N 32 6 35.67	W 103 35 27.24	89.39	530.87
	8287.00	2.02	128.74	8252.86	-1.42	2.06	536.10	0.17	404509.27	771215.96	N 32 6 35.64	W 103 35 27.18	89.78	536.10
	8476.00	2.15	133.77	8441.73	-5.99	-2.48	541.25	0.12	404504.73	771221.12	N 32 6 35.59	W 103 35 27.12	90.26	541.26
	8570.00	2.04	139.22	8535.67	-8.50	-4.97	543.62	0.24	404502.24	771223.48	N 32 6 35.57	W 103 35 27.09	90.52	543.64
	8758.00	2.19	149.26	8723.54	-14.14	-10.59	547.64	0.21	404496.62	771227.50	N 32 6 35.51	W 103 35 27.05	91.11	547.74
	8853.00	2.31	152.94	8818.47	-17.42	-13.85	549.44	0.20	404493.36	771229.30	N 32 6 35.48	W 103 35 27.03	91.44	549.62
	9042.00	2.06	160.86	9007.33	-24.04	-20.45	552.29	0.21	404486.76	771232.15	N 32 6 35.41	W 103 35 26.99	92.12	552.67
	9136.00	1.82	165.87	9101.28	-27.09	-23.50	553.21	0.31	404483.71	771233.07	N 32 6 35.38	W 103 35 26.98	92.43	553.70
	9231.00	1.46	174.20	9196.24	-29.76	-26.16	553.70	0.45	404481.05	771233.56	N 32 6 35.36	W 103 35 26.98	92.71	554.31
	9326.00	1.65	184.44	9291.20	-32.33	-28.73	553.71	0.35	404478.48	771233.57	N 32 6 35.33	W 103 35 26.98	92.97	554.46
	9402.00	1.81	181.10	9367.17	-34.62	-31.02	553.61	0.25	404476.19	771233.47	N 32 6 35.31	W 103 35 26.98	93.21	554.47
First SLB Survey	9460.00	2.12	190.16	9425.13	-36.59	-32.99	553.40	0.76	404474.22	771233.26	N 32 6 35.29	W 103 35 26.98	93.41	554.38
	9491.00	2.10	288.74	9456.12	-36.96	-33.38	552.76	10.32	404473.83	771232.62	N 32 6 35.28	W 103 35 26.99	93.46	553.77
KOP	*9512.41*	*4.65*	*315.34*	*9477.49*	*-36.21*	*-32.63*	*551.78*	*13.68*	*404474.58*	*771231.64*	*N 32 6 35.29*	*W 103 35 27.00*	*93.38*	*552.74*
	9523.00	6.04	319.77	9488.04	-35.48	-31.90	551.12	13.68	404475.31	771230.98	N 32 6 35.30	W 103 35 27.01	93.31	552.04
	9555.00	9.97	327.61	9519.72	-31.84	-28.28	548.54	12.72	404478.93	771228.41	N 32 6 35.33	W 103 35 27.04	92.95	549.27
	9602.00	15.97	338.99	9565.51	-22.33	-18.79	544.04	13.82	404488.42	771223.90	N 32 6 35.43	W 103 35 27.09	91.98	544.37
	9649.00	22.11	343.20	9609.92	-7.78	-4.28	539.16	13.38	404502.93	771219.02	N 32 6 35.57	W 103 35 27.15	90.45	539.18
	9696.00	27.25	341.23	9652.61	10.93	14.39	533.14	11.07	404521.60	771213.00	N 32 6 35.76	W 103 35 27.21	88.45	533.33
	9744.00	32.93	342.25	9694.12	33.83	37.24	525.62	11.88	404544.45	771205.48	N 32 6 35.98	W 103 35 27.30	85.95	526.94
	9791.00	37.15	344.57	9732.60	59.74	63.10	517.94	9.41	404570.31	771197.81	N 32 6 36.24	W 103 35 27.39	83.05	521.77
	9839.00	41.60	346.91	9769.70	89.29	92.61	510.48	9.77	404599.82	771190.34	N 32 6 36.53	W 103 35 27.47	79.72	518.81
	9887.00	45.79	350.51	9804.40	121.84	125.12	504.03	10.15	404632.32	771183.89	N 32 6 36.86	W 103 35 27.54	76.06	519.32
	9934.00	50.11	354.77	9835.88	156.46	159.71	499.60	11.39	404666.92	771179.47	N 32 6 37.20	W 103 35 27.59	72.27	524.51
	9981.00	54.00	355.37	9864.77	193.40	196.63	496.42	8.34	404703.83	771176.29	N 32 6 37.56	W 103 35 27.63	68.39	533.95
	10029.00	58.22	354.22	9891.53	233.10	236.30	492.80	9.01	404743.50	771172.66	N 32 6 37.96	W 103 35 27.67	64.38	546.52
	10077.00	63.34	353.76	9914.96	274.77	277.95	488.41	10.70	404785.15	771168.27	N 32 6 38.37	W 103 35 27.71	60.36	561.96
	10124.00	69.68	355.04	9933.68	317.68	320.83	484.22	13.72	404828.03	771164.08	N 32 6 38.79	W 103 35 27.76	56.47	580.86
	10171.00	74.34	358.87	9948.20	362.31	365.44	481.86	12.58	404872.64	771161.73	N 32 6 39.24	W 103 35 27.78	52.82	604.77

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	10218.00	78.30	2.08	9959.32	407.95	411.09	482.25	10.72	404918.29	771162.12	N 32 6 39.69	W 103 35 27.77	49.55	633.69
	10313.00	88.01	2.77	9970.62	502.05	505.22	486.25	10.25	405012.41	771166.11	N 32 6 40.62	W 103 35 27.72	43.90	701.20
	10419.00	89.97	4.43	9972.49	607.77	610.98	492.90	2.42	405118.17	771172.76	N 32 6 41.66	W 103 35 27.63	38.89	785.02
	10514.00	90.17	3.24	9972.38	702.51	705.77	499.25	1.27	405212.96	771179.12	N 32 6 42.60	W 103 35 27.55	35.28	864.50
	10609.00	89.21	2.59	9972.89	797.35	800.64	504.08	1.22	405307.83	771183.95	N 32 6 43.54	W 103 35 27.49	32.19	946.11
	10704.00	89.38	2.00	9974.06	892.24	895.56	507.89	0.65	405402.74	771187.75	N 32 6 44.48	W 103 35 27.44	29.56	1029.55
	10799.00	89.31	3.09	9975.15	987.11	990.46	512.11	1.15	405497.64	771191.97	N 32 6 45.42	W 103 35 27.38	27.34	1115.02
	10894.00	89.31	359.10	9976.29	1082.05	1085.41	513.92	4.20	405592.59	771193.78	N 32 6 46.36	W 103 35 27.35	25.34	1200.93
	10988.00	88.83	357.44	9977.82	1176.01	1179.36	511.08	1.84	405686.53	771190.95	N 32 6 47.29	W 103 35 27.38	23.43	1285.34
	11178.00	89.45	355.42	9980.67	1365.68	1368.95	499.26	1.11	405876.12	771179.12	N 32 6 49.16	W 103 35 27.50	20.04	1457.15
	11273.00	89.42	355.27	9981.60	1460.41	1463.64	491.55	0.16	405970.80	771171.41	N 32 6 50.10	W 103 35 27.58	18.56	1543.97
	11368.00	89.42	356.76	9982.57	1555.22	1558.40	484.94	1.57	406065.56	771164.81	N 32 6 51.04	W 103 35 27.65	17.29	1632.11
	11463.00	89.28	358.39	9983.64	1650.15	1653.31	480.93	1.72	406160.46	771160.79	N 32 6 51.98	W 103 35 27.69	16.22	1721.83
	11574.00	88.83	359.01	9985.48	1761.12	1764.26	478.41	0.69	406271.41	771158.27	N 32 6 53.08	W 103 35 27.71	15.17	1827.97
	11653.00	89.11	358.70	9986.90	1840.10	1843.23	476.83	0.53	406350.38	771156.69	N 32 6 53.86	W 103 35 27.72	14.50	1903.91
	11747.00	89.42	359.08	9988.10	1934.08	1937.21	475.01	0.52	406444.35	771154.87	N 32 6 54.79	W 103 35 27.74	13.78	1994.59
	11842.00	89.14	358.67	9989.29	2029.07	2032.18	473.14	0.52	406539.32	771153.01	N 32 6 55.73	W 103 35 27.75	13.11	2086.53
	11937.00	88.62	358.97	9991.15	2124.04	2127.14	471.19	0.63	406634.28	771151.05	N 32 6 56.67	W 103 35 27.77	12.49	2178.70
	12031.00	89.38	359.05	9992.79	2218.02	2221.11	469.56	0.81	406728.25	771149.43	N 32 6 57.60	W 103 35 27.78	11.94	2270.20
	12126.00	89.24	0.61	9993.94	2313.01	2316.10	469.28	1.65	406823.24	771149.15	N 32 6 58.54	W 103 35 27.77	11.45	2363.17
	12221.00	89.55	3.65	9994.94	2407.90	2411.02	472.81	3.22	406918.15	771152.68	N 32 6 59.48	W 103 35 27.72	11.10	2456.94
	12315.00	89.21	4.72	9995.96	2501.60	2504.76	479.67	1.19	407011.89	771159.54	N 32 7 0.40	W 103 35 27.64	10.84	2550.28
	12410.00	89.66	3.40	9996.89	2596.30	2599.52	486.40	1.47	407106.64	771166.26	N 32 7 1.34	W 103 35 27.55	10.60	2644.63
	12505.00	89.21	1.24	9997.83	2691.19	2694.43	490.24	2.32	407201.55	771170.11	N 32 7 2.28	W 103 35 27.50	10.31	2738.66
	12600.00	89.24	0.08	9999.12	2786.16	2789.41	491.34	1.22	407296.53	771171.20	N 32 7 3.22	W 103 35 27.48	9.99	2832.35
	12695.00	89.66	1.39	10000.03	2881.14	2884.40	492.55	1.45	407391.51	771172.42	N 32 7 4.16	W 103 35 27.46	9.69	2926.15
	12790.00	89.52	2.06	10000.71	2976.07	2979.35	495.41	0.72	407486.46	771175.28	N 32 7 5.10	W 103 35 27.42	9.44	3020.26
	12885.00	89.42	0.57	10001.59	3071.02	3074.32	497.59	1.57	407581.43	771177.46	N 32 7 6.04	W 103 35 27.38	9.19	3114.33
	12979.00	88.18	359.71	10003.55	3165.00	3168.30	497.82	1.61	407675.40	771177.69	N 32 7 6.97	W 103 35 27.37	8.93	3207.17
	13074.00	89.59	358.79	10005.40	3259.97	3263.27	496.58	1.77	407770.37	771176.44	N 32 7 7.91	W 103 35 27.38	8.65	3300.83
	13169.00	88.97	358.22	10006.60	3354.95	3358.23	494.10	0.89	407865.33	771173.97	N 32 7 8.85	W 103 35 27.40	8.37	3394.38
	13264.00	88.97	358.16	10008.30	3449.90	3453.16	491.10	0.06	407960.26	771170.97	N 32 7 9.79	W 103 35 27.43	8.09	3487.91
	13359.00	88.66	357.09	10010.27	3544.82	3548.06	487.17	1.17	408055.15	771167.03	N 32 7 10.73	W 103 35 27.47	7.82	3581.35
	13454.00	89.83	356.86	10011.52	3639.71	3642.92	482.15	1.26	408150.01	771162.02	N 32 7 11.67	W 103 35 27.52	7.54	3674.69
	13548.00	89.59	357.85	10012.00	3733.63	3736.81	477.82	1.08	408243.90	771157.68	N 32 7 12.60	W 103 35 27.56	7.29	3767.24
	13647.00	89.86	359.04	10012.47	3832.61	3835.78	475.13	1.23	408342.86	771154.99	N 32 7 13.57	W 103 35 27.58	7.06	3865.09
	13742.00	88.28	357.64	10014.01	3927.57	3930.72	472.38	2.22	408437.80	771152.24	N 32 7 14.51	W 103 35 27.61	6.85	3959.00
	13837.00	88.59	357.49	10016.61	4022.47	4025.60	468.34	0.36	408532.67	771148.21	N 32 7 15.45	W 103 35 27.65	6.64	4052.75
	13932.00	88.83	359.22	10018.75	4117.42	4120.53	465.62	1.84	408627.60	771145.48	N 32 7 16.39	W 103 35 27.67	6.45	4146.75
	14027.00	88.66	359.70	10020.83	4212.40	4215.50	464.72	0.54	408722.57	771144.59	N 32 7 17.33	W 103 35 27.67	6.29	4241.04
	14122.00	88.80	0.22	10022.93	4307.37	4310.48	464.66	0.57	408817.55	771144.52	N 32 7 18.27	W 103 35 27.67	6.15	4335.45
	14217.00	88.76	0.09	10024.96	4402.35	4405.46	464.91	0.14	408912.52	771144.78	N 32 7 19.21	W 103 35 27.66	6.02	4429.92
	14312.00	88.52	359.10	10027.21	4497.32	4500.43	464.24	1.07	409007.49	771144.11	N 32 7 20.15	W 103 35 27.66	5.89	4524.31
	14406.00	88.73	359.96	10029.47	4591.29	4594.39	463.47	0.94	409101.45	771143.34	N 32 7 21.08	W 103 35 27.66	5.76	4617.71
	14501.00	88.07	358.93	10032.12	4686.25	4689.35	462.55	1.29	409196.41	771142.42	N 32 7 22.02	W 103 35 27.66	5.63	4712.11
	14596.00	89.11	359.47	10034.46	4781.22	4784.31	461.23	1.23	409291.37	771141.09	N 32 7 22.96	W 103 35 27.67	5.51	4806.49
	14691.00	89.00	0.81	10036.02	4876.20	4879.30	461.46	1.42	409386.35	771141.32	N 32 7 23.90	W 103 35 27.66	5.40	4901.07
Section Line Crossing [1627' FEL]	*14703.30*	*89.09*	*0.74*	*10036.23*	*4888.49*	*4891.59*	*461.62*	*0.93*	*409398.64*	*771141.49*	*N 32 7 24.02*	*W 103 35 27.65*	*5.39*	*4913.33*
	14786.00	89.72	0.29	10037.09	4971.18	4974.29	462.37	0.93	409481.33	771142.23	N 32 7 24.84	W 103 35 27.64	5.31	4995.73
	14881.00	89.28	359.97	10037.91	5066.17	5069.28	462.58	0.57	409576.33	771142.45	N 32 7 25.78	W 103 35 27.63	5.21	5090.34
	14976.00	89.28	0.28	10039.11	5161.16	5164.27	462.79	0.33	409671.31	771142.66	N 32 7 26.72	W 103 35 27.62	5.12	5184.97
	15071.00	90.03	359.90	10039.68	5256.15	5259.27	462.94	0.89	409766.31	771142.81	N 32 7 27.66	W 103 35 27.61	5.03	5279.61
	15261.00	90.00	359.16	10039.63	5446.15	5449.26	461.38	0.39	409956.29	771141.25	N 32 7 29.54	W 103 35 27.61	4.84	5468.76
	15356.00	90.58	1.56	10039.15	5541.14	5544.25	461.98	2.60	410051.28	771141.84	N 32 7 30.48	W 103 35 27.60	4.76	5563.47
	15546.00	89.83	358.77	10038.47	5731.11	5734.23	462.53	1.52	410241.25	771142.39	N 32 7 32.36	W 103 35 27.58	4.61	5752.85
	15641.00	90.14	1.06	10038.49	5826.10	5829.22	462.39	2.43	410336.24	771142.25	N 32 7 33.30	W 103 35 27.57	4.54	5847.53
	15736.00	89.79	359.79	10038.55	5921.09	5924.22	463.09	1.39	410431.24	771142.95	N 32 7 34.24	W 103 35 27.56	4.47	5942.29
	15831.00	90.31	0.27	10038.47	6016.08	6019.22	463.14	0.74	410526.23	771143.00	N 32 7 35.18	W 103 35 27.55	4.40	6037.01
	16021.00	89.97	1.03	10038.01	6206.05	6209.20	465.30	0.44	410716.21	771145.16	N 32 7 37.06	W 103 35 27.51	4.29	6226.61
	16210.00	90.38	358.65	10037.43	6395.04	6398.19	464.77	1.28	410905.19	771144.63	N 32 7 38.93	W 103 35 27.50	4.15	6415.05
	16305.00	90.07	358.28	10037.06	6490.02	6493.15	462.22	0.51	411000.15	771142.09	N 32 7 39.87	W 103 35 27.52	4.07	6509.58
	16400.00	89.59	357.34	10037.34	6584.97	6588.08	458.59	1.11	411095.08	771138.46	N 32 7 40.81	W 103 35 27.55	3.98	6604.02
	16495.00	89.79	358.88	10037.85	6679.93	6683.03	455.46	1.63	411190.02	771135.32	N 32 7 41.75	W 103 35 27.58	3.90	6698.53
	16590.00	88.66	356.73	10039.14	6774.86	6777.94	451.82	2.56	411284.93	771131.69	N 32 7 42.69	W 103 35 27.62	3.81	6792.98
	16685.00	89.83	357.37	10040.39	6869.76	6872.80	446.93	1.40	411379.79	771126.80	N 32 7 43.63	W 103 35 27.67	3.72	6887.32

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 ° ' ")	Closure Azimuth (°)	Closure (ft)
	16875.00	89.52	357.73	10041.47	7059.63	7062.63	438.81	0.25	411569.61	771118.68	N 32 7 45.51	W 103 35 27.75	3.56	7076.25
	16970.00	89.42	359.33	10042.34	7154.60	7157.59	436.37	1.69	411664.56	771116.24	N 32 7 46.45	W 103 35 27.77	3.49	7170.88
	17065.00	89.48	358.66	10043.26	7249.59	7252.57	434.71	0.71	411759.54	771114.57	N 32 7 47.39	W 103 35 27.78	3.43	7265.59
	17160.00	89.48	1.50	10044.12	7344.58	7347.56	434.84	2.99	411854.53	771114.71	N 32 7 48.33	W 103 35 27.77	3.39	7360.41
	17255.00	89.83	3.31	10044.69	7439.46	7442.47	438.83	1.94	411949.43	771118.69	N 32 7 49.27	W 103 35 27.72	3.37	7455.39
	17350.00	89.55	0.17	10045.20	7534.38	7537.41	441.71	3.32	412044.37	771121.58	N 32 7 50.20	W 103 35 27.67	3.35	7550.34
	17444.00	89.76	0.13	10045.77	7628.38	7631.41	441.96	0.23	412138.37	771121.82	N 32 7 51.14	W 103 35 27.66	3.31	7644.19
	17540.00	89.28	0.40	10046.58	7724.37	7727.40	442.40	0.57	412234.36	771122.27	N 32 7 52.08	W 103 35 27.65	3.28	7740.06
	17635.00	89.42	359.14	10047.65	7819.36	7822.39	442.02	1.33	412329.35	771121.89	N 32 7 53.02	W 103 35 27.65	3.23	7834.87
	17730.00	89.79	0.80	10048.31	7914.35	7917.39	441.97	1.79	412424.34	771121.84	N 32 7 53.96	W 103 35 27.64	3.20	7929.71
	17825.00	90.28	0.88	10048.25	8009.33	8012.38	443.36	0.52	412519.32	771123.23	N 32 7 54.90	W 103 35 27.62	3.17	8024.63
	17920.00	91.13	0.76	10047.08	8104.30	8107.36	444.72	0.90	412614.30	771124.59	N 32 7 55.84	W 103 35 27.59	3.14	8119.55
	18015.00	90.83	0.90	10045.46	8199.27	8202.33	446.10	0.35	412709.28	771125.96	N 32 7 56.78	W 103 35 27.57	3.11	8214.46
	18107.00	90.69	0.60	10044.24	8291.24	8294.32	447.30	0.36	412801.26	771127.17	N 32 7 57.69	W 103 35 27.55	3.09	8306.37
	18200.00	90.93	0.88	10042.92	8384.21	8387.30	448.50	0.40	412894.24	771128.37	N 32 7 58.61	W 103 35 27.53	3.06	8399.28
	18293.00	90.86	0.99	10041.47	8477.18	8480.28	450.02	0.14	412987.21	771129.89	N 32 7 59.53	W 103 35 27.50	3.04	8492.21
	18385.00	91.31	359.62	10039.73	8569.15	8572.26	450.51	1.57	413079.19	771130.38	N 32 8 0.44	W 103 35 27.49	3.01	8584.09
	18569.00	90.72	358.56	10036.47	8753.11	8756.20	447.59	0.66	413263.13	771127.45	N 32 8 2.26	W 103 35 27.51	2.93	8767.63
	18661.00	90.93	358.02	10035.14	8845.08	8848.15	444.84	0.63	413355.07	771124.71	N 32 8 3.17	W 103 35 27.53	2.88	8859.33
	18753.00	90.89	358.63	10033.68	8937.04	8940.10	442.15	0.66	413447.02	771122.02	N 32 8 4.08	W 103 35 27.56	2.83	8951.03
	18846.00	90.79	358.96	10032.32	9030.02	9033.07	440.20	0.37	413539.98	771120.06	N 32 8 5.00	W 103 35 27.57	2.79	9043.79
	18938.00	90.65	358.89	10031.16	9122.01	9125.05	438.47	0.17	413631.96	771118.34	N 32 8 5.91	W 103 35 27.58	2.75	9135.57
	19030.00	90.21	358.43	10030.47	9213.99	9217.02	436.32	0.69	413723.93	771116.19	N 32 8 6.83	W 103 35 27.60	2.71	9227.34
	19214.00	90.31	358.56	10029.64	9397.95	9400.95	431.49	0.09	413907.85	771111.36	N 32 8 8.65	W 103 35 27.64	2.63	9410.85
	19306.00	90.62	358.38	10028.89	9489.93	9492.92	429.03	0.39	413999.82	771108.90	N 32 8 9.56	W 103 35 27.67	2.59	9502.61
	19399.00	90.45	358.56	10028.02	9582.91	9585.88	426.55	0.27	414092.78	771106.42	N 32 8 10.48	W 103 35 27.69	2.55	9595.36
	19583.00	90.48	358.84	10026.53	9766.88	9769.83	422.38	0.15	414276.72	771102.24	N 32 8 12.30	W 103 35 27.72	2.48	9778.95
	19674.00	90.52	359.09	10025.73	9857.87	9860.81	420.73	0.28	414367.69	771100.60	N 32 8 13.20	W 103 35 27.73	2.44	9869.78
Final Survey	19841.00	90.10	0.10	10024.83	10024.86	10027.80	419.55	0.65	414534.68	771099.42	N 32 8 14.85	W 103 35 27.73	2.40	10036.57
TD, PTB [101' FNL, 1636' FEL]	19884.00	90.10	0.10	10024.76	10067.86	10070.80	419.63	0.00	414577.68	771099.49	N 32 8 15.27	W 103 35 27.73	2.39	10079.54

Survey Type: Def Survey

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)	Survey Tool Type	Borehole / Survey
	1	0.000	26.000	1/98.425	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-
	1	26.000	1068.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	1068.000	4949.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	4949.000	10379.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	10379.000	19884.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw