

**STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION**

**APPLICATION OF CAZA PETROLEUM, LLC
FOR COMPULSORY POOLING, EDDY COUNTY,
NEW MEXICO.**

Case No. 16360 (re-opened)

VERIFIED STATEMENT OF RICHARD CARROLL

Richard Carroll, being duly sworn upon his oath, deposes and states:

1. I am over the age of 18, and have personal knowledge of the matters stated herein. I have been qualified by the Division as an expert petroleum geologist.

2. I am a geologist for Caza Petroleum, LLC ("Caza"), and I am familiar with the geological matters involved in this case. I have been qualified by the Division as an expert petroleum geologist.

3. The following geological plats are attached hereto:

(a) Attachment A is a structure map of the Wolfcamp Z. It shows that structure dips gently to the east. It also shows Wolfcamp Sand and Wolfcamp Shale wells in the vicinity of the proposed wells, and a line of cross-section.

(b) Attachment B is an isopach of the Wolfcamp Z zone. The Wolfcamp Z has consistent thickness across the well unit.

(c) Attachment C is a west-to-east cross section. The well logs on the cross-section give a representative sample of the Wolfcamp formation in this area. The target zone for the well is an upper Wolfcamp sand.

4. I conclude from the maps that:

(a) The horizontal spacing unit is justified from a geologic standpoint.

(b) The target Wolfcamp Z zone is continuous across the well unit.

(c) Each quarter section in the unit will contribute more or less equally to production.

(d) There is no faulting or other geologic impediment which will affect the drilling of the subject well.

EXHIBIT 

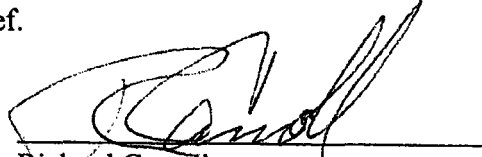
5. Other Wolfcamp wells drilled in this area are drilled with both standup and laydown units. Caza sees no difference in production whether wells are standup or laydown.

6. Attachment D is the proposed horizontal well plan for the 4H well. The producing interval of the well will be orthodox.

VERIFICATION

STATE OF TEXAS)
) ss.
COUNTY OF HARRIS)

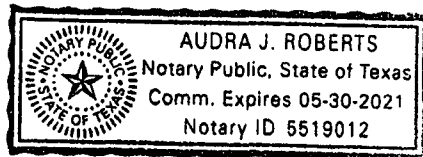
Richard Carroll, being duly sworn upon his oath, deposes and states that: He is a geologist for Caza Petroleum, LLC; he is authorized to make this verification on its behalf; he has read the foregoing statement, and knows the contents thereof; and the same is true and correct to the best of his knowledge, information, and belief.


Richard Carroll

SUBSCRIBED AND SWORN TO before me this 9th day of January, 2019 by Richard Carroll.

My Commission Expires: 5-30-21


Notary Public





Forehand Ranch North

Eddy County, New Mexico

Wolfcamp Z Target Centerline Structure

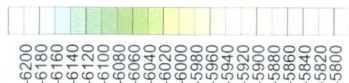
TVDS

CONTOURS

VFMP_Z_TARGET (RFC) - WOLF CAMP Z TARGET CENTER LINE

FMTOPSWFMP_Z_TARGET RFC.GRD

Contour Interval = 20



By RFC

0 1,000 2,000

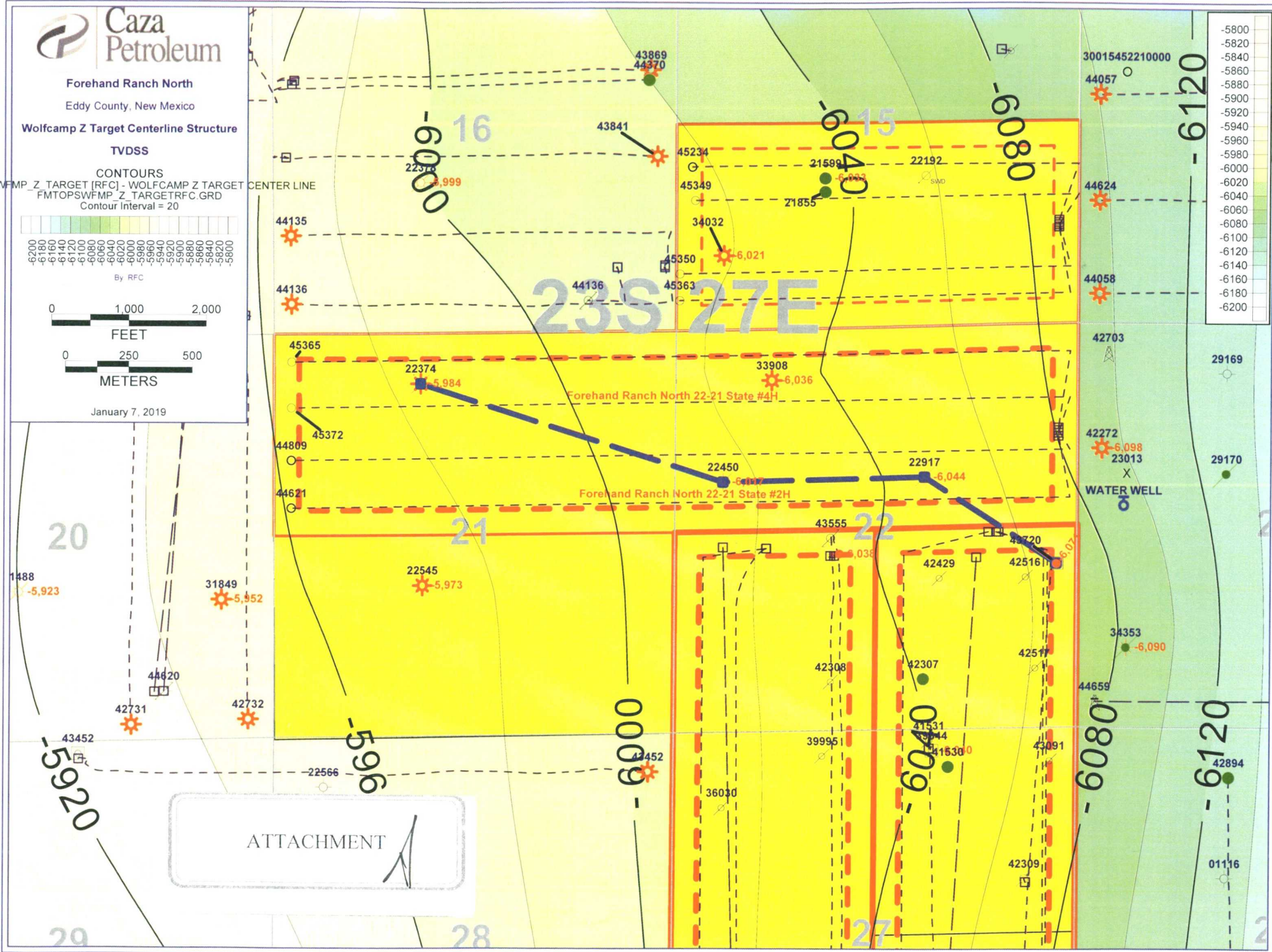
FEET

0 250 500

METERS

January 7, 2019

ATTACHMENT





Forehand Ranch North

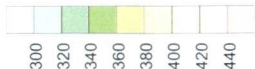
Eddy County, New Mexico

Wolfcamp A Isopach

CONTOURS

OLITHS - WOLF CAMP A ISOPACH (RFC) - WOLF CAMP TO WOLF CAMP B OR
OFACHS AND ISOLITHSWOLF CAMP A ISOPACH RFC.GRD

Contour Interval = 20



REMARKS

Top of Wolfcamp to Top of Wolfcamp B

By RFC

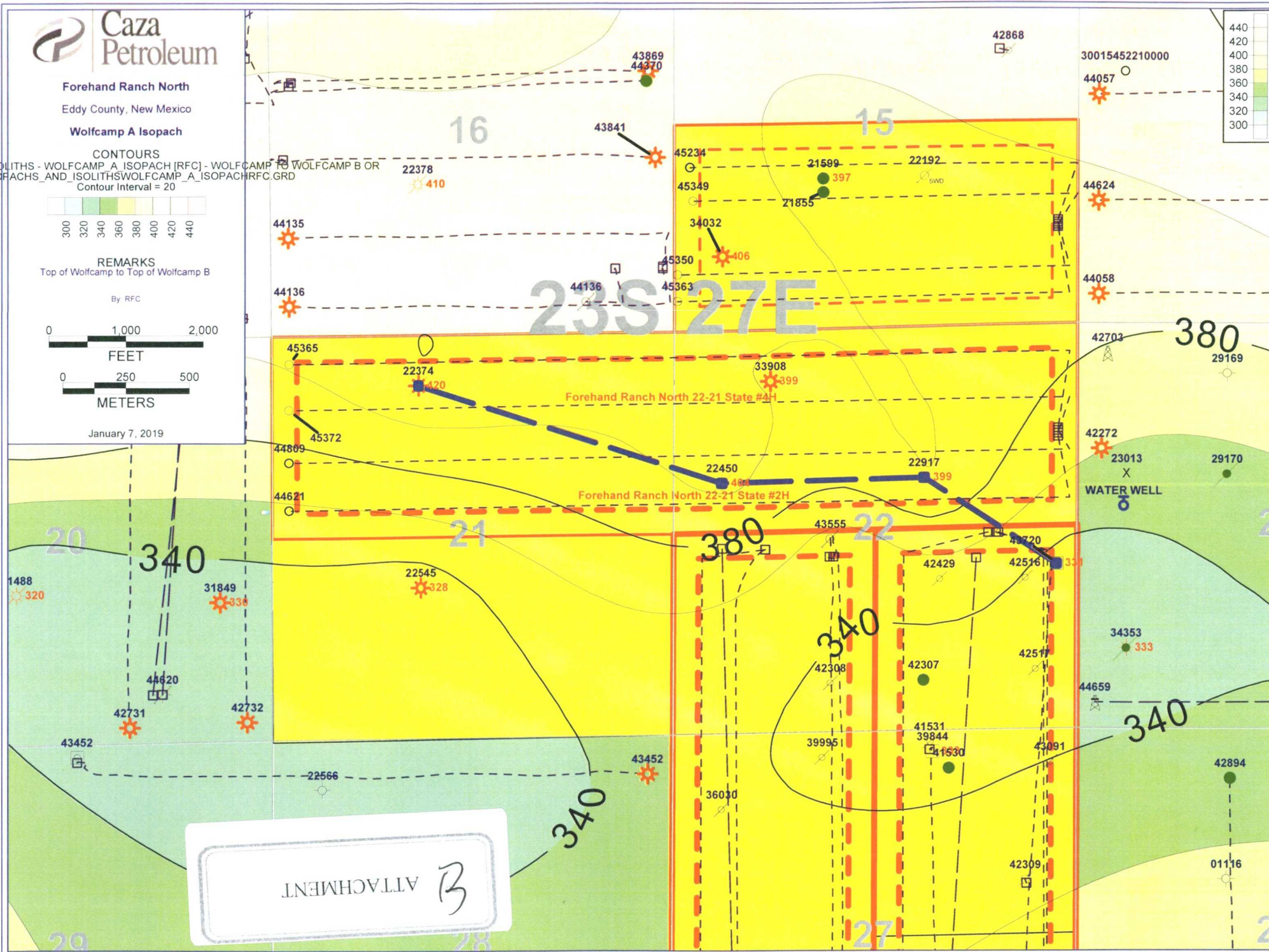
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FEET

0 250 500

METERS

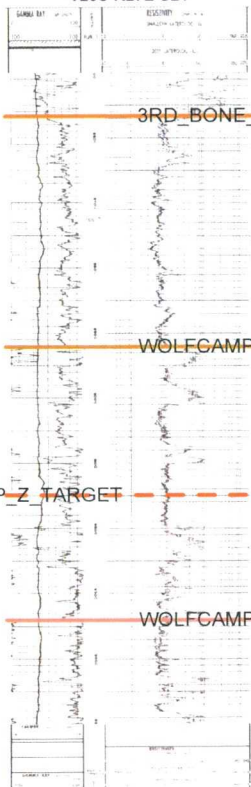
January 7, 2019



A

30015223740000

ELEV_KB : 3,164

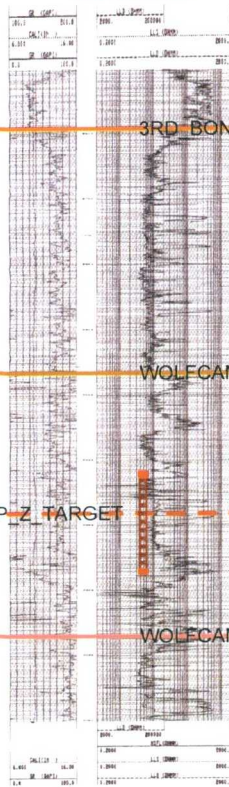
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MOBIL 21 STATE1
T23S R27E S21

TD : 12,300
CUMOIL : 647
CUMGAS : 1,500,292
CUMWTR : 1,500

<4.170FT>

30015224500000

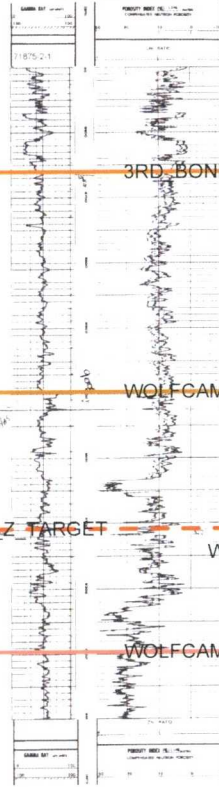
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YATES HARVEY E COMPANY
AMOCO STATE 221
T23S R27E S22

TD : 12,350
CUMOIL : 0
CUMGAS : 679,877
CUMWTR : 92,695

30015229170000

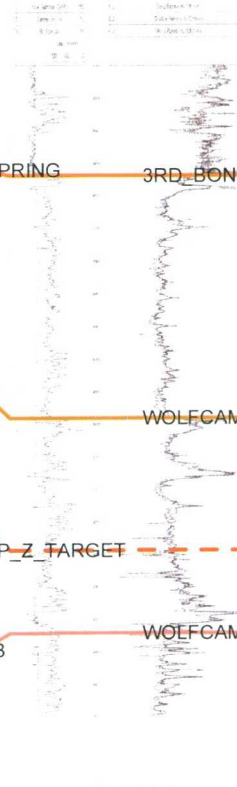
ELEV_KB : 3,163

YATES HARVEY E COMPANY
AMOCO 22 STATE2
T23S R27E S22

TD : 12,370
CUMOIL : 1,868
CUMGAS : 530,617
CUMWTR : 343

30015437200000

ELEV_KB : 3,170

CAZA OPERATING LLC
FOREHAND 22 FEDERAL COM006H
T23S R27E S22

TD : 10,311

Exhibit _____ Page _____

ATTACHMENT C

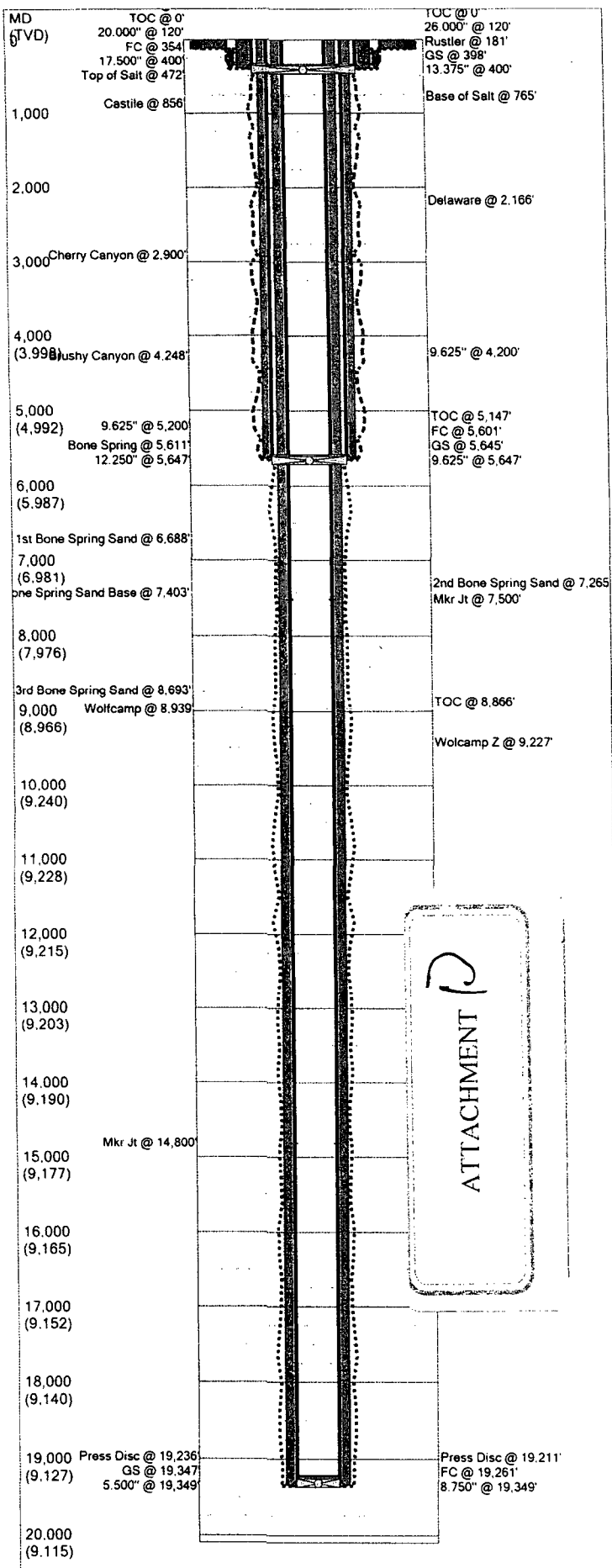


Forehand Ranch North
Eddy County, New Mexico
Xsection of the Wolfcamp Z Target

Horizontal Scale = 245.6
Vertical Scale = 50.0
Vertical Exaggeration = 4.9x

By: RFC

September 4, 2018 2:08 PM



Last Updated: 12/24/2018 09:38 AM



Field Name		Lease Name		Well No.	
Forehand Ranch North		Forehand Ranch North 22-21 State Com		4H	
County		State		API No.	
Eddy		New Mexico		30-015-45372	
Version	Version Tag				
1		Planned			
GL (ft)	KB (ft)	Section	Township/Block		Range/Survey
3,140.0	3,162.0	22	23S		27E
Operator		Well Status		Latitude	Longitude
Caza Operating		Planned		32.294022	-104.170287
Dist. N/S (ft)		N/S Line	Dist. E/W (ft)		E/W Line
1440		FNL	250		FEL
			SECTION		
Prop Num			Spud Date		Comp. Date
320546					
Additional Information					
OGRID		Pool Name and Code		Well Type	
249099		Purple Sage; Wolcamp (98220)		Hz, Oil	
				640	
Prepared By		Updated By		Last Updated	
Steve Morris		Steve Morris		12/24/2018 9:38 AM	
Hole Summary					
Date	Diam. (in)	Top (MD ft)	Bottom (MD ft)	Comments	
	26.000	0	120		
	17.500	120	400		
	12.250	400	5,647		
	8.750	5,647	19,349		
Tubular Summary					
Date	Description	O.D. (in)	Wt (lb/ft)	Grade	Top (MD ft)
	Conductor Casing	20.000	94.00	H40	0
	Surface Casing	13.375	54.50	J55	0
	Intermediate Casing	9.625	40.00	J55	0
	Intermediate Casing	9.625	40.00	L80	4,200
	Intermediate Casing	9.625	40.00	HCL80	5,200
	Production Casing	5.500	20.00	P110	0
Casing Cement Summary					
C	Date	No. Sx	Csg. O.D. (in)	Top (MD ft)	Bottom (MD ft)
		100	20.000	0	120
		420	13.375	0	400
		1,723	9.625	0	5,147
		232	9.625	5,147	5,647
		1,605	5.500	0	8,866
		1,761	5.500	8,866	19,349
Tools/Problems Summary					
Date	Tool Type	O.D. (in)	I.D. (in)	Top (MD ft)	Bottom (MD ft)
	FC	13.375	0.000	354	
	GS	13.375	0.000	398	
	FC	9.625	0.000	5,601	
	GS	9.625	0.000	5,645	
	Mkr Jt	5.500	0.000	7,500	7,521
	Mkr Jt	5.500	0.000	14,800	14,821

Date	Tool Type	O.D. (in)	I.D. (in)	Top (MD ft)	Bottom (MD ft)
	Press Disc	5.500	0.000	19,211	0
	Press Disc	5.500	0.000	19,236	0
	FC	5.500	0.000	19,261	0
	GS	5.500	0.000	19,347	0

Formation Tops Summary

Formation	Top (TVD ft)	Comments
Rustler	181	
Top of Salt	472	
Base of Salt	765	
Castile	856	
Delaware	2,166	
Cherry Canyon	2,900	
Brushy Canyon	4,248	
Bone Spring	5,611	
1st Bone Spring Sand	6,688	
2nd Bone Spring Sand	7,265	
2nd Bone Spring Sand Base	7,403	
3rd Bone Spring Sand	8,693	
Wolfcamp	8,939	
Wolfcamp Z	9,227	

Field Name		Lease Name		Well No.	County	State	API No.	
Forehand Ranch North		Forehand Ranch North 22-21 State Com		4H	Eddy	New Mexico	30015453720000	
Version	Version Tag				Spud Date	Comp. Date	GL (ft)	KB (ft)
1	Planned						3,140.0	3,162.0
Section	Township/Block	Range/Survey	Dist. N/S (ft)	N/S Line	Dist. E/W (ft)	E/W Line	Footage From	
22	23S	27E	1,440	FNL	250	FEL	SECTION	
Operator			Well Status		Latitude	Longitude	Prop Num	
Caza Operating			Planned		32.294022	-104.170287	320546	
OGRID		Pool Name and Code	Well Type			Dedicated Acres		
249099		Purple Sage; Wolfcamp (98220)	Hz, Oil			640		
Last Updated		Prepared By			Updated By			
12/24/2018 9:38 AM		Steve Morris			Steve Morris			
Additional Information								

Hole Summary

Date	Diam. (in)	Top (MD ft)	Bottom (MD ft)	Comments
	26.000	0	120	
	17.500	120	400	
	12.250	400	5,647	
	8.750	5,647	19,349	

Tubular Summary

Date	Description	No. Jts	O.D. (in)	Wt (lb/ft)	Grade	Coupling	Top (MD ft)	Bottom (MD ft)	Comments
	Conductor Casing	5	20.000	94.00	H40		0	120	
	Surface Casing	51	13.375	54.50	J55	STC	0	400	
	Intermediate Casing	91	9.625	40.00	J55	LTC	0	4,200	
	Intermediate Casing	34	9.625	40.00	L80	LTC	4,200	5,200	
	Intermediate Casing	45	9.625	40.00	HCL80	LTC	5,200	5,647	
	Production Casing	476	5.500	20.00	P110	GBCD	0	19,349	

Casing Cement Summary

C	Date	No. Sx	Yield (ft ³ /sk)	Vol. (ft ³)	Csg. O.D. (in)	Top (MD ft)	Bottom (MD ft)	Description	Comments
		100	1.35	135	20.000	0	120		
		420	1.35	416	13.375	0	400	14.8ppg Class C HalCem	100% Excess
		1,723	1.87	3,222	9.625	0	5,147	12.9ppg Class C EconoCem	100% Excess
		232	1.35	313	9.625	5,147	5,647	14.8ppg Class C HalCem	100% Excess
		1,605	2.79	4,548	5.500	0	8,866	11.5ppg Class H EconoCem H	100% Excess
		1,761	2.16	3,804	5.500	8,866	19,349	14.5ppg Class H NeoCem AS	50% Excess

Tools/Problems Summary

Date	Tool Type	O.D. (in)	I.D. (in)	Top (MD ft)	Bottom (MD ft)	Description	Comments
	Float Collar	13.375	0.000	354	0		
	Guide Shoe	13.375	0.000	398	0		
	Float Collar	9.625	0.000	5,601	0		
	Guide Shoe	9.625	0.000	5,645	0		
	Marker Joint	5.500	0.000	7,500	7,521		
	Marker Joint	5.500	0.000	14,800	14,821		
	Pressure Disc	5.500	0.000	19,211	0		
	Pressure Disc	5.500	0.000	19,236	0		
	Float Collar	5.500	0.000	19,261	0		
	Guide Shoe	5.500	0.000	19,347	0		

Formation Top Summary

Formation Name	Top(TVD ft)	Comments
Rustler	181	
Top of Salt	472	

Formation Name	Top(TVD ft)	Comments
Base of Salt	765	
Castile	856	
Delaware	2,166	
Cherry Canyon	2,900	
Brushy Canyon	4,248	
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2nd Bone Spring Sand Base	7,403	
3rd Bone Spring Sand	8,693	
Wolfcamp	8,939	
Wolfcamp Z	9,227	

Field Name		Lease Name				Well No.	County	State	API No.
Forehand Ranch North		Forehand Ranch North 22-21 State Com				4H	Eddy	New Mexico	30015453720000
Version	Version Tag					Spud Date	Comp. Date	G.L. (ft)	K.B. (ft)
1	Planned							3,140.0	3,162.0
Sec.	Township/Block	Range/Survey	Dist. N/S (ft)	N/S Line	Dist. E/W (ft)	E/W Line	Footage From	Latitude	Longitude
22	23S	27E	1440	FNL	250	FEL		32.294022	-104.170287
Well Status		PropNum	Operator		Last Updated		Prepared By		Updated By
Planned		320546	Caza Operating		12/24/2018 9:38:11 AM		Steve Morris		Steve Morris
Additional Information									

