noble energy

Well Summary

11/28/2018

Well Name: LF RANCH 41-09

Well Header

Well Name	API	District	Orig KB Elev (ft)	Gr Elev (ft)
LF RANCH 41-09	05-123-21188	15	4,648	4,636

County/Parish	State/Province	Spud Date	TD Date	Rig Release Date	First Prod	First Gas Sales	Current PBTD (ftKB)	TD (max) (ftK
WELD	COLORADO	11/9/2002	11/14/2002	11/15/2002	12/31/2002		ORIGINAL HOLE - 7,176.0	7,260.0

Wellbore Sections

Section Des	Size (in)	Act Top, MD (ftKB)	Act Btm, MD (ftKB)
SURFACE	12 1/4	12	686
PRODUCTION	7 7/8	686	7,260

Casing

Casing Description	Centralizers	Top, MD (ftKB)	Set Depth (ftKB)	Length (ft)	String Grade	OD (in)	ID (in)
Surface		12.0	686.0	674.00	?	8 5/8	8.10
Production		12.0	7,251.0	7,239.00	LS-80	4 1/2	4.00

Cement

Description	Top Depth (ftKB)	Bottom Depth (ftKB)	Amount (sacks)	Class
Courtesy Plug	2,000.0	2,500.0	145	G Neat
Courtesy Plug	2,402.0	2,500.0	10	G Neat
Courtesy Plug	2,270.0	2,400.0	10	G Neat
J Sand CIBP Dump Bail	6,977.0	7,002.0	2	G Neat
Niobrara CIBP Balance Plug	6,013.0	6,278.0	20	G Neat
Production Casing Cement	6,102.0	7,251.0	170	PREMIUM
Shoe Plug	886.0	936.0	5	G Neat
Shoe Plug	12.0	886.0	290	G Neat
Surface Casing Cement	12.0	686.0	480	NEAT

Formations

Formation Name	Final Top MD (ftKB)
FOX HILLS BASE EST	252.0
FOXHILLS-BASE PROD	253.7
UPPER PIERRE AQUIFER-TOP PROD	430.9
UPPER PIERRE AQUIFER-BASE PROD	1,402.0
A SAND-TOP PROD	2,249.4
A SAND-BASE PROD	2,853.2
PARKMAN	3,387.7
SUSSEX-TOP PROD	3,836.0
SUSSEX	4,149.0
SUSSEX-BASE PROD	4,239.7
SHANNON-TOP PROD	4,635.4
SHANNON	4,723.0
SHANNON-BASE PROD	4,874.9
TEEPEE BUTTES	5,605.0
INTRA SHARON SPGS MK	6,265.9
SHARON SPRING MKR	6,267.4
NIO A CHALK	6,319.0
NIOBRARA	6,319.0
NIOBRARA-TOP PROD	6,319.0
NIO A MARL	6,329.3
NIOBRARA A	6,369.0
NIO B CHALK	6,372.9

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Formations

Formation Name	Final Top MD (ftKB)
NIO B MARL	6,412.9
NIO C CHALK	6,457.7
NIOBRARA B	6,458.0
NIO C MARL	6,483.5
NIO D CHALK	6,521.0
NIOBRARA C	6,550.0
NIO FT HAYS	6,550.4
CODELL	6,575.9
FORT HAYS	6,576.0
CARLILE	6,588.7
GREENHORN	6,985.0
D SAND	7,029.0
J SAND	7,045.0
MOWRY	7,046.0
J-3 SAND	7,128.0
FOX HILLS BASE EST	
FOX HILLS BASE EST	

Logs

Date	Type	Top Depth, MD (ftKB)	Bottom Depth, MD (ftKB)	Cased?
11/14/2002	TRIPLE COMBO	686.0	7,258.0	No
12/16/2002	CBL/CCL/GR	5,971.0	7,216.0	Yes

Top & Bottom Perforation & Frac Sleeve Depths

Min Top Depth (ftKB)	Max Btm Depth (ftKB)
7,052.0	7,096.0
6,578.0	6,589.0
6,320.0	6,410.0

Perforations

Linked Zone	Zone Bench/Stage	Top Depth (ftKB)	Bottom Depth (ftKB)	Shot Dens (shots/ft)	Gun Size (in)	Est Hole Dia (in)	Chg Sz (g)	Phasing (°)	Sum of Entered Shot Total
		2,500.00	2,500.00	6.0					0
NIOBRARA, ORIGINAL HOLE	A	6,320.00	6,328.00	6.0	3 1/8	0.420	23.0		48
NIOBRARA, ORIGINAL HOLE	B	6,398.00	6,410.00	6.0	3 1/8	0.420	23.0		72
CODELL, ORIGINAL HOLE		6,578.00	6,589.00	4.0					44
J SAND, ORIGINAL HOLE		7,052.00	7,056.00	4.0					16
J SAND, ORIGINAL HOLE		7,082.00	7,096.00	4.0					56
Total (Sum)									**236**

Frac Sleeve Depths

Item Description	Top Depth (ftKB)	Bottom Depth (ftKB)

Stimulations

Stage Number	Link to Fluid System	Sum of Clean Volume (bbl)	Sum of Slurry Volume (bbl)	Stage Description
1	Gelled Water, FRACGEL	0.00	2,119.00	
1	Gelled Water, Silverstim	0.00	2,968.00	
1	Acid, 15% HCl	0.00	24.00	
2	Slick Water, Slick Water	0.00	1,669.00	

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Stimulations

Stage Number	Link to Fluid System	Sum of Clean Volume (bbl)	Sum of Slurry Volume (bbl)	Stage Description
3	Gelled Water, Silverstim	0.00	2,384.00	
Total (Sum)		**0.00**	**9,164.00**	

Interval Depths

Min Top Depth (ftKB)	Max Btm Depth (ftKB)
7,052.0	7,096.0
6,578.0	6,589.0
6,320.0	6,410.0

Desciption	Sand Type	Sand Size	Amount (lb)	Comment
Proppant		20/40		CHEMICAL AND MECHANICAL PROBLEMS; SHUT-DOWN DUE TO HIGH VISCOSITY
Proppant		20/40		
Proppant	Ottawa	30/50		
Proppant	SB Excel	12/20		

Tubing Strings

Run Date	Tubing Description	Set Depth (ftKB)	String Max Nominal OD (i	String Grade	String Length (ft)
7/27/2006	Tubing	7,027.0	2 3/8	J-55	7,015.00

Other In Hole

Description	OD (in)	Top Depth (ftKB)	Bottom Depth (ftKB)	Comment
Cast Iron Bridge Plug	4	7,002.0	7,004.0	
Cast Iron Bridge Plug	4	6,278.0	6,280.0	
Cement Retainer	4	2,400.0	2,402.0	