

30-015-43995

KAISER-FRANCIS OIL COMPANY

Kaiser-Francis Oil Company

Eddy County, NM (NAD 27 NME
(WILLOW LAKE) SEC 14_T-24-S_R-28-E
Willow Lake WA 15 #1H

OWB

Plan: Plan #1

Standard Planning Report

19 December, 2017



Planning Report



Database: EDM 10_13
Company: Kaiser-Francis Oil Company
Project: Eddy County, NM (NAD 27 NME
(WILLOW LAKE)SEC 14_T-24-S_R-28-E
Site:
Well: Willow Lake WA 15 #1H
Wellbore: OWB
Design: Plan #1

Local Co-ordinate Reference: Well Willow Lake WA 15 #1H
TVD Reference: KB @ 3020.0usft
MD Reference: KB @ 3020.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy County, NM (NAD 27 NME		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site (WILLOW LAKE)SEC 14_T-24-S_R-28-E

Site Position: **From:** Map **Northing:** 442,504.29 usft **Latitude:** 32° 12' 58.602 N
Easting: 582,722.59 usft **Longitude:** 104° 3' 57.069 W
Position Uncertainty: 0.0 usft **Slot Radius:** 13-3/16 " **Grid Convergence:** 0.14 °

Well Willow Lake WA 15 #1H

Well Position **+N/-S** 0.0 usft **Northing:** 442,504.29 usft **Latitude:** 32° 12' 58.602 N
+E/-W 0.0 usft **Easting:** 582,722.59 usft **Longitude:** 104° 3' 57.069 W
Position Uncertainty 0.0 usft **Wellhead Elevation:** 0.0 usft **Ground Level:** 2,995.0 usft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/18/17	7.13	59.97	47,832

Design Plan #1

Audit Notes:

Version: **Phase:** PLAN **Tie On Depth:** 0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	272.31

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,151.7	3.03	6.85	3,151.7	4.0	0.5	2.00	2.00	0.00	6.85	
6,653.3	3.03	6.85	6,648.3	188.0	22.6	0.00	0.00	0.00	0.00	
6,805.1	0.00	0.00	6,800.0	192.0	23.1	2.00	-2.00	0.00	180.00	
9,001.7	0.00	0.00	8,996.6	192.0	23.1	0.00	0.00	0.00	0.00	KOP (Willow Lake \
9,002.1	0.00	0.00	8,997.0	192.0	23.1	0.00	0.00	0.00	0.00	
9,902.1	90.00	270.18	9,570.0	193.8	-549.9	10.00	10.00	-9.98	270.18	FTP (Willow Lake V
14,520.3	90.00	270.18	9,570.0	208.3	-5,168.0	0.00	0.00	0.00	0.00	LTP (Willow Lake V

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Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,605.0	0.00	0.00	2,605.0	0.0	0.0	0.0	0.00	0.00	0.00
Base Salt (Top Delaware)									
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
NUDGE - Build 2.00									
3,100.0	2.00	6.85	3,100.0	1.7	0.2	-0.1	2.00	2.00	0.00
3,151.7	3.03	6.85	3,151.7	4.0	0.5	-0.3	2.00	2.00	0.00
HOLD - 3501.6 at 3151.7 MD									
3,200.0	3.03	6.85	3,199.9	6.5	0.8	-0.5	0.00	0.00	0.00
3,300.0	3.03	6.85	3,299.7	11.8	1.4	-0.9	0.00	0.00	0.00
3,353.4	3.03	6.85	3,353.0	14.6	1.8	-1.2	0.00	0.00	0.00
Top Cherry Canyon									
3,400.0	3.03	6.85	3,399.6	17.0	2.0	-1.4	0.00	0.00	0.00
3,500.0	3.03	6.85	3,499.4	22.3	2.7	-1.8	0.00	0.00	0.00
3,600.0	3.03	6.85	3,599.3	27.5	3.3	-2.2	0.00	0.00	0.00
3,700.0	3.03	6.85	3,699.2	32.8	3.9	-2.6	0.00	0.00	0.00
3,800.0	3.03	6.85	3,799.0	38.1	4.6	-3.0	0.00	0.00	0.00
3,900.0	3.03	6.85	3,898.9	43.3	5.2	-3.5	0.00	0.00	0.00
4,000.0	3.03	6.85	3,998.7	48.6	5.8	-3.9	0.00	0.00	0.00
4,100.0	3.03	6.85	4,098.6	53.8	6.5	-4.3	0.00	0.00	0.00
4,200.0	3.03	6.85	4,198.5	59.1	7.1	-4.7	0.00	0.00	0.00
4,300.0	3.03	6.85	4,298.3	64.3	7.7	-5.1	0.00	0.00	0.00
4,400.0	3.03	6.85	4,398.2	69.6	8.4	-5.6	0.00	0.00	0.00
4,500.0	3.03	6.85	4,498.0	74.9	9.0	-6.0	0.00	0.00	0.00
4,600.0	3.03	6.85	4,597.9	80.1	9.6	-6.4	0.00	0.00	0.00

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,689.2	3.03	6.85	4,687.0	84.8	10.2	-6.8	0.00	0.00	0.00
Top Brushy Canyon									
4,700.0	3.03	6.85	4,697.8	85.4	10.3	-6.8	0.00	0.00	0.00
4,800.0	3.03	6.85	4,797.6	90.6	10.9	-7.2	0.00	0.00	0.00
4,900.0	3.03	6.85	4,897.5	95.9	11.5	-7.7	0.00	0.00	0.00
5,000.0	3.03	6.85	4,997.3	101.1	12.2	-8.1	0.00	0.00	0.00
5,100.0	3.03	6.85	5,097.2	106.4	12.8	-8.5	0.00	0.00	0.00
5,200.0	3.03	6.85	5,197.1	111.6	13.4	-8.9	0.00	0.00	0.00
5,300.0	3.03	6.85	5,296.9	116.9	14.0	-9.3	0.00	0.00	0.00
5,400.0	3.03	6.85	5,396.8	122.2	14.7	-9.7	0.00	0.00	0.00
5,500.0	3.03	6.85	5,496.6	127.4	15.3	-10.2	0.00	0.00	0.00
5,600.0	3.03	6.85	5,596.5	132.7	15.9	-10.6	0.00	0.00	0.00
5,700.0	3.03	6.85	5,696.4	137.9	16.6	-11.0	0.00	0.00	0.00
5,800.0	3.03	6.85	5,796.2	143.2	17.2	-11.4	0.00	0.00	0.00
5,900.0	3.03	6.85	5,896.1	148.4	17.8	-11.8	0.00	0.00	0.00
5,929.0	3.03	6.85	5,925.0	150.0	18.0	-12.0	0.00	0.00	0.00
Top Lower Brushy Canyon									
6,000.0	3.03	6.85	5,995.9	153.7	18.5	-12.3	0.00	0.00	0.00
6,100.0	3.03	6.85	6,095.8	159.0	19.1	-12.7	0.00	0.00	0.00
6,124.2	3.03	6.85	6,120.0	160.2	19.3	-12.8	0.00	0.00	0.00
Top Mobil Sand									
6,200.0	3.03	6.85	6,195.7	164.2	19.7	-13.1	0.00	0.00	0.00
6,249.4	3.03	6.85	6,245.0	166.8	20.0	-13.3	0.00	0.00	0.00
Top 1st Bone Springs Lime									
6,300.0	3.03	6.85	6,295.5	169.5	20.4	-13.5	0.00	0.00	0.00
6,400.0	3.03	6.85	6,395.4	174.7	21.0	-13.9	0.00	0.00	0.00
6,500.0	3.03	6.85	6,495.2	180.0	21.6	-14.4	0.00	0.00	0.00
6,600.0	3.03	6.85	6,595.1	185.2	22.3	-14.8	0.00	0.00	0.00
6,653.3	3.03	6.85	6,648.3	188.0	22.6	-15.0	0.00	0.00	0.00
DROP - -2.00									
6,700.0	2.10	6.85	6,695.0	190.1	22.8	-15.2	2.00	-2.00	0.00
6,805.1	0.00	0.00	6,800.0	192.0	23.1	-15.3	2.00	-2.00	0.00
HOLD - 2196.6 at 6805.1 MD									
6,900.0	0.00	0.00	6,894.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,000.0	0.00	0.00	6,994.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,100.0	0.00	0.00	7,094.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,200.0	0.00	0.00	7,194.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,215.1	0.00	0.00	7,210.0	192.0	23.1	-15.3	0.00	0.00	0.00
1st Bone Springs Sand									
7,300.0	0.00	0.00	7,294.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,400.0	0.00	0.00	7,394.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,458.1	0.00	0.00	7,453.0	192.0	23.1	-15.3	0.00	0.00	0.00
2nd Bone Springs Lime									
7,500.0	0.00	0.00	7,494.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,600.0	0.00	0.00	7,594.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,700.0	0.00	0.00	7,694.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,800.0	0.00	0.00	7,794.9	192.0	23.1	-15.3	0.00	0.00	0.00
7,900.0	0.00	0.00	7,894.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,000.0	0.00	0.00	7,994.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,012.1	0.00	0.00	8,007.0	192.0	23.1	-15.3	0.00	0.00	0.00
2nd Bone Springs Sand									
8,100.0	0.00	0.00	8,094.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,200.0	0.00	0.00	8,194.9	192.0	23.1	-15.3	0.00	0.00	0.00

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,300.0	0.00	0.00	8,294.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,300.1	0.00	0.00	8,295.0	192.0	23.1	-15.3	0.00	0.00	0.00
Mid 2nd Bone Springs Lime									
8,400.0	0.00	0.00	8,394.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,500.0	0.00	0.00	8,494.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,600.0	0.00	0.00	8,594.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,611.1	0.00	0.00	8,606.0	192.0	23.1	-15.3	0.00	0.00	0.00
Lower 2nd Bone Springs Sand (Harkey)									
8,700.0	0.00	0.00	8,694.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,794.9	192.0	23.1	-15.3	0.00	0.00	0.00
8,883.1	0.00	0.00	8,878.0	192.0	23.1	-15.3	0.00	0.00	0.00
3rd Bone Springs Lime									
8,900.0	0.00	0.00	8,894.9	192.0	23.1	-15.3	0.00	0.00	0.00
9,001.7	0.00	0.00	8,996.6	192.0	23.1	-15.3	0.00	0.00	0.00
KOP (Willow Lake WA 15 #1H)									
9,002.1	0.00	0.00	8,997.0	192.0	23.1	-15.3	0.00	0.00	0.00
KOP - DLS 10.00 TFO 270.18									
9,050.0	4.79	270.18	9,044.9	192.0	21.1	-13.3	10.00	10.00	0.00
9,100.0	9.79	270.18	9,094.5	192.0	14.7	-7.0	10.00	10.00	0.00
9,101.6	9.95	270.18	9,096.0	192.1	14.5	-6.7	10.00	10.00	0.00
3rd Bone Springs Sand									
9,150.0	14.79	270.18	9,143.3	192.1	4.1	3.6	10.00	10.00	0.00
9,200.0	19.79	270.18	9,191.0	192.1	-10.8	18.5	10.00	10.00	0.00
9,250.0	24.79	270.18	9,237.3	192.2	-29.7	37.4	10.00	10.00	0.00
9,300.0	29.79	270.18	9,281.7	192.3	-52.6	60.3	10.00	10.00	0.00
9,350.0	34.79	270.18	9,324.0	192.3	-79.3	87.0	10.00	10.00	0.00
9,400.0	39.79	270.18	9,363.7	192.4	-109.6	117.3	10.00	10.00	0.00
9,450.0	44.79	270.18	9,400.7	192.5	-143.3	150.9	10.00	10.00	0.00
9,500.0	49.79	270.18	9,434.6	192.7	-180.0	187.6	10.00	10.00	0.00
9,524.5	52.24	270.18	9,450.0	192.7	-199.0	206.6	10.00	10.00	0.00
Top Wolfcamp (Wolfcamp A)									
9,550.0	54.79	270.18	9,465.2	192.8	-219.5	227.1	10.00	10.00	0.00
9,567.4	56.53	270.18	9,475.0	192.8	-233.9	241.5	10.00	10.00	0.00
Top Wolfcamp A - X Sand									
9,600.0	59.79	270.18	9,492.2	192.9	-261.6	269.1	10.00	10.00	0.00
9,637.5	63.54	270.18	9,510.0	193.0	-294.6	302.2	10.00	10.00	0.00
Base Wolfcamp A - X Sand									
9,650.0	64.79	270.18	9,515.4	193.1	-305.8	313.4	10.00	10.00	0.00
9,700.0	69.79	270.18	9,534.7	193.2	-352.0	359.4	10.00	10.00	0.00
9,722.2	72.01	270.18	9,542.0	193.3	-373.0	380.4	10.00	10.00	0.00
Top Wolfcamp A - Y Sand									
9,750.0	74.79	270.18	9,549.9	193.4	-399.6	407.0	10.00	10.00	0.00
9,800.0	79.79	270.18	9,560.9	193.5	-448.3	455.8	10.00	10.00	0.00
9,850.0	84.79	270.18	9,567.6	193.7	-497.9	505.3	10.00	10.00	0.00
9,902.1	90.00	270.18	9,570.0	193.8	-549.9	557.2	10.00	10.00	0.00
EOC/FTP - Start 4618.2 hold at 9902.1 MD - FTP (Willow Lake WA 15 #1H)									
10,000.0	90.00	270.18	9,570.0	194.1	-647.8	655.1	0.00	0.00	0.00
10,100.0	90.00	270.18	9,570.0	194.4	-747.8	755.0	0.00	0.00	0.00
10,200.0	90.00	270.18	9,570.0	194.8	-847.8	854.9	0.00	0.00	0.00
10,300.0	90.00	270.18	9,570.0	195.1	-947.8	954.9	0.00	0.00	0.00
10,400.0	90.00	270.18	9,570.0	195.4	-1,047.8	1,054.8	0.00	0.00	0.00
10,500.0	90.00	270.18	9,570.0	195.7	-1,147.8	1,154.7	0.00	0.00	0.00

Planning Report



Database: EDM 10_13
Company: Kaiser-Francis Oil Company
Project: Eddy County, NM (NAD 27 NME
Site: (WILLOW LAKE) SEC 14_T-24-S_R-28-E
Well: Willow Lake WA 15 #1H
Wellbore: OWB
Design: Plan #1

Local Co-ordinate Reference: Well Willow Lake WA 15 #1H
TVD Reference: KB @ 3020.0usft
MD Reference: KB @ 3020.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,600.0	90.00	270.18	9,570.0	196.0	-1,247.8	1,254.7	0.00	0.00	0.00
10,700.0	90.00	270.18	9,570.0	196.3	-1,347.8	1,354.6	0.00	0.00	0.00
10,800.0	90.00	270.18	9,570.0	196.6	-1,447.8	1,454.5	0.00	0.00	0.00
10,900.0	90.00	270.18	9,570.0	197.0	-1,547.8	1,554.5	0.00	0.00	0.00
11,000.0	90.00	270.18	9,570.0	197.3	-1,647.8	1,654.4	0.00	0.00	0.00
11,100.0	90.00	270.18	9,570.0	197.6	-1,747.8	1,754.3	0.00	0.00	0.00
11,200.0	90.00	270.18	9,570.0	197.9	-1,847.8	1,854.2	0.00	0.00	0.00
11,300.0	90.00	270.18	9,570.0	198.2	-1,947.8	1,954.2	0.00	0.00	0.00
11,400.0	90.00	270.18	9,570.0	198.5	-2,047.8	2,054.1	0.00	0.00	0.00
11,500.0	90.00	270.18	9,570.0	198.8	-2,147.8	2,154.0	0.00	0.00	0.00
11,600.0	90.00	270.18	9,570.0	199.2	-2,247.8	2,254.0	0.00	0.00	0.00
11,700.0	90.00	270.18	9,570.0	199.5	-2,347.8	2,353.9	0.00	0.00	0.00
11,800.0	90.00	270.18	9,570.0	199.8	-2,447.8	2,453.8	0.00	0.00	0.00
11,900.0	90.00	270.18	9,570.0	200.1	-2,547.8	2,553.8	0.00	0.00	0.00
12,000.0	90.00	270.18	9,570.0	200.4	-2,647.8	2,653.7	0.00	0.00	0.00
12,100.0	90.00	270.18	9,570.0	200.7	-2,747.8	2,753.6	0.00	0.00	0.00
12,200.0	90.00	270.18	9,570.0	201.0	-2,847.8	2,853.6	0.00	0.00	0.00
12,202.1	90.00	270.18	9,570.0	201.0	-2,849.9	2,855.7	0.00	0.00	0.00
QTR SEC LN @ 12202.1' MD									
12,300.0	90.00	270.18	9,570.0	201.4	-2,947.8	2,953.5	0.00	0.00	0.00
12,400.0	90.00	270.18	9,570.0	201.7	-3,047.8	3,053.4	0.00	0.00	0.00
12,500.0	90.00	270.18	9,570.0	202.0	-3,147.8	3,153.4	0.00	0.00	0.00
12,600.0	90.00	270.18	9,570.0	202.3	-3,247.8	3,253.3	0.00	0.00	0.00
12,700.0	90.00	270.18	9,570.0	202.6	-3,347.8	3,353.2	0.00	0.00	0.00
12,800.0	90.00	270.18	9,570.0	202.9	-3,447.8	3,453.1	0.00	0.00	0.00
12,900.0	90.00	270.18	9,570.0	203.2	-3,547.8	3,553.1	0.00	0.00	0.00
13,000.0	90.00	270.18	9,570.0	203.6	-3,647.8	3,653.0	0.00	0.00	0.00
13,100.0	90.00	270.18	9,570.0	203.9	-3,747.8	3,752.9	0.00	0.00	0.00
13,200.0	90.00	270.18	9,570.0	204.2	-3,847.8	3,852.9	0.00	0.00	0.00
13,300.0	90.00	270.18	9,570.0	204.5	-3,947.8	3,952.8	0.00	0.00	0.00
13,400.0	90.00	270.18	9,570.0	204.8	-4,047.8	4,052.7	0.00	0.00	0.00
13,500.0	90.00	270.18	9,570.0	205.1	-4,147.8	4,152.7	0.00	0.00	0.00
13,600.0	90.00	270.18	9,570.0	205.4	-4,247.8	4,252.6	0.00	0.00	0.00
13,700.0	90.00	270.18	9,570.0	205.8	-4,347.8	4,352.5	0.00	0.00	0.00
13,800.0	90.00	270.18	9,570.0	206.1	-4,447.8	4,452.5	0.00	0.00	0.00
13,900.0	90.00	270.18	9,570.0	206.4	-4,547.8	4,552.4	0.00	0.00	0.00
14,000.0	90.00	270.18	9,570.0	206.7	-4,647.8	4,652.3	0.00	0.00	0.00
14,100.0	90.00	270.18	9,570.0	207.0	-4,747.8	4,752.3	0.00	0.00	0.00
14,200.0	90.00	270.18	9,570.0	207.3	-4,847.8	4,852.2	0.00	0.00	0.00
14,300.0	90.00	270.18	9,570.0	207.6	-4,947.8	4,952.1	0.00	0.00	0.00
14,400.0	90.00	270.18	9,570.0	208.0	-5,047.8	5,052.0	0.00	0.00	0.00
14,500.0	90.00	270.18	9,570.0	208.3	-5,147.8	5,152.0	0.00	0.00	0.00
14,520.3	90.00	270.18	9,570.0	208.3	-5,168.0	5,172.2	0.00	0.00	0.00

LTP at 14520.3 - LTP (Willow Lake WA 15 #1H)

Planning Report



Database: EDM 10_13
Company: Kaiser-Francis Oil Company
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Site: (WILLOW LAKE)SEC 14_T-24-S_R-28-E
Well: Willow Lake WA 15 #1H
Wellbore: OWB
Design: Plan #1

Local Co-ordinate Reference: Well Willow Lake WA 15 #1H
TVD Reference: KB @ 3020.0usft
MD Reference: KB @ 3020.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KOP (Willow Lake W/ - plan hits target center - Point	0.00	0.00	8,996.6	192.0	23.1	442,696.31	582,745.67	32° 13' 0.502 N	104° 3' 56.794 W
FTP (Willow Lake WA - plan hits target center - Point	0.00	0.00	9,570.0	193.8	-549.9	442,698.08	582,172.70	32° 13' 0.534 N	104° 4' 3.464 W
LTP (Willow Lake WA - plan misses target center by 0.1usft at 14520.3usft MD (9570.0 TVD, 208.3 N, -5168.0 E) - Rectangle (sides W60.0 H4,614.8 D20.0)	0.00	90.18	9,570.0	208.2	-5,168.0	442,712.52	577,554.56	32° 13' 0.786 N	104° 4' 57.221 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,605.0	2,605.0	Base Salt (Top Delaware)		0.00	
3,353.4	3,353.0	Top Cherry Canyon		0.00	
4,689.2	4,687.0	Top Brushy Canyon		0.00	
5,929.0	5,925.0	Top Lower Brushy Canyon		0.00	
6,124.2	6,120.0	Top Mobil Sand		0.00	
6,249.4	6,245.0	Top 1st Bone Springs Lime		0.00	
7,215.1	7,210.0	1st Bone Springs Sand		0.00	
7,458.1	7,453.0	2nd Bone Springs Lime		0.00	
8,012.1	8,007.0	2nd Bone Springs Sand		0.00	
8,300.1	8,295.0	Mid 2nd Bone Springs Lime		0.00	
8,611.1	8,606.0	Lower 2nd Bone Springs Sand (Hari		0.00	
8,883.1	8,878.0	3rd Bone Springs Lime		0.00	
9,101.6	9,096.0	3rd Bone Springs Sand		0.00	
9,524.5	9,450.0	Top Wolfcamp (Wolfcamp A)		0.00	
9,567.4	9,475.0	Top Wolfcamp A - X Sand		0.00	
9,637.5	9,510.0	Base Wolfcamp A - X Sand		0.00	
9,722.2	9,542.0	Top Wolfcamp A - Y Sand		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,000.0	3,000.0	0.0	0.0	NUDGE - Build 2.00
3,151.7	3,151.7	4.0	0.5	HOLD - 3501.6 at 3151.7 MD
6,653.3	6,648.3	188.0	22.6	DROP - -2.00
6,805.1	6,800.0	192.0	23.1	HOLD - 2196.6 at 6805.1 MD
9,002.1	8,997.0	192.0	23.1	KOP - DLS 10.00 TFO 270.18
9,902.1	9,570.0	193.8	-549.9	EOC/FTP - Start 4618.2 hold at 9902.1 MD
12,202.1	9,570.0	201.0	-2,849.9	QTR SEC LN @ 12202.1' MD
14,520.3	9,570.0	208.3	-5,168.0	LTP at 14520.3