

HOBBS OCD
OCT 18 2018
RECEIVED

KAISER-FRANCIS OIL COMPANY

Lea County, NM (NAD27) NMEZ

Bell Lake Unit South

#419A

ST1

Design: ST1

Standard Survey Report

07 April, 2018

Survey Report

Company: KAISER-FRANCIS OIL COMPANY	Local Co-ordinate Reference: Well #419A
Project: Lea County, NM (NAD27) NMEZ	TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
Site: Bell Lake Unit South	MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
Well: #419A	North Reference: Grid
Wellbore: ST1	Survey Calculation Method: Minimum Curvature
Design: ST1	Database: EDM 5000.14 Single User Db

Project Lea County, NM (NAD27) NMEZ		
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 Bell Lake Unit South, Centered on 402H		
Site Position:	Northing: 454,918.69 usft	Latitude: 32° 14' 53.357 N
From: Map	Easting: 747,375.70 usft	Longitude: 103° 31' 59.456 W
Position Uncertainty: 0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.43 °

Well #419A		
Well Position +N/-S 0.00 usft	Northing: 453,910.09 usft	Latitude: 32° 14' 43.356 N
+E/-W 0.00 usft	Easting: 747,646.50 usft	Longitude: 103° 31' 56.391 W
Position Uncertainty 0.00 usft	Wellhead Elevation: usft	Ground Level: 3,631.00 usft

Wellbore ST1		
Magnetics	Model Name	Sample Date
	IGRF2015	03/23/18
	Declination (°)	Dip Angle (°)
	6.85	60.08
		Field Strength (nT)
		47,874.84622903

Design ST1		
Audit Notes:		
Version: 1.0	Phase: ACTUAL	Tie On Depth: 11,467.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)
	0.00	0.00
	+E/-W (usft)	Direction (°)
	0.00	359.62

Survey Program	Date 04/07/18	
From (usft)	To (usft)	Survey (Wellbore)
176.00	11,467.00	Survey #1 - VON MWD (OH)
11,562.00	20,077.00	Survey #2 - ST1 (ST1)
20,160.00	20,160.00	Survey #3 - PTB (ST1)
		Tool Name
		MWD
		MWD
		BLIND
		Description
		OWSG MWD - Standard
		OWSG MWD - Standard
		OWSG BLIND

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SHL(BLUS#219H) - SHL(BLUS#319H)									
176.00	0.52	98.03	176.00	-0.11	0.79	-0.12	0.30	0.30	0.00
237.00	0.77	115.00	236.99	-0.32	1.44	-0.33	0.51	0.41	27.82
329.00	0.85	95.88	328.98	-0.65	2.68	-0.67	0.30	0.09	-20.78
423.00	0.70	93.37	422.98	-0.76	3.94	-0.79	0.16	-0.16	-2.67
516.00	0.63	108.14	515.97	-0.95	5.00	-0.99	0.20	-0.08	15.88
610.00	0.86	113.37	609.96	-1.39	6.13	-1.43	0.25	0.24	5.56
704.00	0.67	97.15	703.95	-1.74	7.33	-1.79	0.30	-0.20	-17.26

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
Project: Lea County, NM (NAD27) NMEZ
Site: Bell Lake Unit South
Well: #419A
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Well #419A
TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

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)
798.00	0.48	104.54	797.95	-1.91	8.25	-1.96	0.22	-0.20	7.86
891.00	0.52	101.07	890.95	-2.09	9.04	-2.15	0.05	0.04	-3.73
985.00	0.31	108.05	984.94	-2.25	9.70	-2.31	0.23	-0.22	7.43
1,078.00	0.47	106.30	1,077.94	-2.43	10.31	-2.50	0.17	0.17	-1.88
1,172.00	0.27	138.34	1,171.94	-2.71	10.83	-2.78	0.30	-0.21	34.09
1,266.00	0.31	134.78	1,265.94	-3.05	11.16	-3.13	0.05	0.04	-3.79
1,364.00	0.32	84.89	1,363.94	-3.21	11.62	-3.29	0.27	0.01	-50.91
1,458.00	0.11	39.32	1,457.94	-3.12	11.93	-3.20	0.27	-0.22	-48.48
1,552.00	1.17	336.64	1,551.93	-2.17	11.61	-2.25	1.20	1.13	-66.68
1,647.00	1.38	339.94	1,646.91	-0.20	10.83	-0.28	0.23	0.22	3.47
1,741.00	0.42	239.86	1,740.90	0.69	10.15	0.62	1.61	-1.02	-106.47
1,835.00	0.47	198.02	1,834.89	0.15	9.73	0.08	0.34	0.05	-44.51
1,930.00	0.93	180.44	1,929.89	-1.00	9.60	-1.06	0.53	0.48	-18.51
2,024.00	1.03	172.53	2,023.87	-2.60	9.71	-2.66	0.18	0.11	-8.41
2,119.00	0.89	160.00	2,118.86	-4.14	10.07	-4.20	0.26	-0.15	-13.19
2,213.00	0.71	149.37	2,212.85	-5.32	10.62	-5.39	0.25	-0.19	-11.31
2,308.00	0.39	163.96	2,307.85	-6.14	11.01	-6.21	0.37	-0.34	15.36
2,402.00	0.28	121.77	2,401.84	-6.57	11.29	-6.64	0.28	-0.12	-44.88
2,496.00	0.04	217.27	2,495.84	-6.72	11.47	-6.79	0.30	-0.26	101.60
2,591.00	0.13	38.83	2,590.84	-6.66	11.51	-6.73	0.18	0.09	-187.83
2,685.00	0.24	333.13	2,684.84	-6.40	11.49	-6.48	0.24	0.12	-69.89
2,780.00	0.17	262.10	2,779.84	-6.24	11.26	-6.32	0.26	-0.07	-74.77
2,874.00	0.68	150.38	2,873.84	-6.75	11.40	-6.82	0.81	0.54	-118.85
2,969.00	1.02	149.46	2,968.83	-7.96	12.11	-8.04	0.36	0.36	-0.97
3,063.00	0.78	142.78	3,062.82	-9.19	12.92	-9.28	0.28	-0.26	-7.11
3,157.00	0.83	159.70	3,156.81	-10.34	13.54	-10.43	0.26	0.05	18.00
3,252.00	0.97	157.76	3,251.80	-11.73	14.09	-11.82	0.15	0.15	-2.04
3,346.00	1.05	154.25	3,345.78	-13.24	14.76	-13.34	0.11	0.09	-3.73
3,441.00	1.53	162.60	3,440.76	-15.24	15.52	-15.34	0.54	0.51	8.79
3,535.00	1.48	169.72	3,534.73	-17.63	16.11	-17.74	0.21	-0.05	7.57
3,629.00	1.18	212.70	3,628.70	-19.64	15.80	-19.74	1.08	-0.32	45.72
3,724.00	2.05	201.36	3,723.66	-22.04	14.66	-22.14	0.97	0.92	-11.94
3,818.00	0.52	234.15	3,817.64	-23.86	13.70	-23.95	1.74	-1.63	34.88
3,913.00	0.51	29.65	3,912.64	-23.75	13.56	-23.83	1.06	-0.01	163.68
4,007.00	0.50	351.85	4,006.63	-22.98	13.71	-23.07	0.35	-0.01	-40.21
4,102.00	0.82	0.99	4,101.63	-21.89	13.66	-21.98	0.35	0.34	9.62
4,196.00	0.94	6.53	4,195.62	-20.45	13.76	-20.54	0.16	0.13	5.89
4,290.00	0.81	11.23	4,289.61	-19.03	13.98	-19.12	0.16	-0.14	5.00
4,385.00	1.71	62.61	4,384.58	-17.72	15.37	-17.82	1.43	0.95	54.08
4,479.00	1.84	99.70	4,478.54	-17.33	18.10	-17.45	1.21	0.14	39.46
4,574.00	0.83	138.12	4,573.52	-18.10	20.06	-18.23	1.36	-1.06	40.44
4,668.00	0.82	220.52	4,667.51	-19.12	20.08	-19.25	1.16	-0.01	87.66
4,762.00	1.57	146.20	4,761.49	-20.70	20.36	-20.83	1.66	0.80	-79.06

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
 Project: Lea County, NM (NAD27) NMEZ
 Site: Bell Lake Unit South
 Well: #419A
 Wellbore: ST1
 Design: ST1

Local Co-ordinate Reference: Well #419A
 TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.14 Single User Db

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)
4,857.00	1.57	113.55	4,856.46	-22.30	22.28	-22.45	0.93	0.00	-34.37
4,951.00	2.62	105.90	4,950.40	-23.40	25.52	-23.57	1.15	1.12	-8.14
5,045.00	0.73	136.71	5,044.35	-24.43	28.00	-24.61	2.16	-2.01	32.78
5,140.00	0.71	181.50	5,139.35	-25.45	28.40	-25.64	0.58	-0.02	47.15
5,234.00	0.94	147.39	5,233.34	-26.69	28.80	-26.88	0.57	0.24	-36.29
5,329.00	0.64	156.09	5,328.33	-27.83	29.43	-28.02	0.34	-0.32	9.16
5,423.00	0.98	151.48	5,422.32	-29.01	30.03	-29.21	0.37	0.36	-4.90
5,518.00	0.67	130.42	5,517.31	-30.09	30.84	-30.29	0.45	-0.33	-22.17
5,612.00	0.48	128.89	5,611.30	-30.69	31.57	-30.90	0.20	-0.20	-1.63
5,706.00	0.67	134.07	5,705.30	-31.32	32.27	-31.53	0.21	0.20	5.51
5,801.00	0.98	116.76	5,800.29	-32.07	33.39	-32.29	0.42	0.33	-18.22
5,895.00	0.83	96.49	5,894.28	-32.51	34.79	-32.74	0.37	-0.16	-21.56
5,990.00	1.96	185.67	5,989.25	-34.21	35.31	-34.44	2.23	1.19	93.87
6,084.00	3.53	167.43	6,083.15	-38.63	35.78	-38.87	1.89	1.67	-19.40
6,178.00	3.84	168.00	6,176.95	-44.53	37.07	-44.78	0.33	0.33	0.61
6,273.00	3.33	167.39	6,271.77	-50.34	38.33	-50.59	0.54	-0.54	-0.64
6,367.00	3.29	168.31	6,365.61	-55.64	39.47	-55.90	0.07	-0.04	0.98
6,461.00	3.38	166.95	6,459.45	-60.99	40.64	-61.25	0.13	0.10	-1.45
6,556.00	3.30	167.12	6,554.29	-66.38	41.89	-66.66	0.08	-0.08	0.18
6,650.00	3.33	166.11	6,648.13	-71.67	43.14	-71.95	0.07	0.03	-1.07
6,745.00	3.02	160.22	6,742.98	-76.70	44.65	-76.99	0.47	-0.33	-6.20
6,839.00	2.97	158.64	6,836.86	-81.30	46.38	-81.60	0.10	-0.05	-1.68
6,933.00	2.90	161.94	6,930.73	-85.83	48.00	-86.14	0.19	-0.07	3.51
7,028.00	2.61	158.95	7,025.62	-90.13	49.52	-90.46	0.34	-0.31	-3.15
7,122.00	2.70	161.94	7,119.52	-94.23	50.98	-94.57	0.18	0.10	3.18
7,216.00	2.43	160.84	7,213.43	-98.22	52.32	-98.56	0.29	-0.29	-1.17
7,311.00	2.50	161.28	7,308.34	-102.08	53.65	-102.44	0.08	0.07	0.46
7,405.00	2.36	154.73	7,402.26	-105.78	55.13	-106.14	0.33	-0.15	-6.97
7,500.00	2.65	154.60	7,497.16	-109.53	56.91	-109.90	0.31	0.31	-0.14
7,594.00	2.00	156.66	7,591.09	-113.00	58.49	-113.38	0.70	-0.69	2.19
7,688.00	2.54	146.73	7,685.01	-116.25	60.28	-116.64	0.71	0.57	-10.56
7,783.00	4.06	151.17	7,779.85	-120.95	63.06	-121.37	1.62	1.60	4.67
7,877.00	3.92	153.06	7,873.63	-126.73	66.12	-127.17	0.20	-0.15	2.01
7,972.00	3.99	153.46	7,968.40	-132.58	69.07	-133.04	0.08	0.07	0.42
8,066.00	3.34	159.30	8,062.21	-138.07	71.50	-138.54	0.80	-0.69	6.21
8,160.00	3.49	161.10	8,156.04	-143.34	73.39	-143.82	0.20	0.16	1.91
8,255.00	2.99	156.00	8,250.89	-148.34	75.34	-148.83	0.61	-0.53	-5.37
8,349.00	3.05	152.93	8,344.76	-152.80	77.47	-153.32	0.18	0.06	-3.27
8,444.00	2.44	151.35	8,439.65	-156.83	79.59	-157.35	0.65	-0.64	-1.66
8,538.00	2.58	156.49	8,533.56	-160.53	81.39	-161.06	0.28	0.15	5.47
8,632.00	2.27	152.97	8,627.47	-164.12	83.08	-164.67	0.37	-0.33	-3.74
8,727.00	1.85	146.38	8,722.41	-167.08	84.79	-167.64	0.51	-0.44	-6.94
8,821.00	1.71	148.71	8,816.37	-169.54	86.36	-170.11	0.17	-0.15	2.48
8,916.00	1.32	137.59	8,911.33	-171.56	87.83	-172.14	0.51	-0.41	-11.71

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
 Project: Lea County, NM (NAD27) NMEZ
 Site: Bell Lake Unit South
 Well: #419A
 Wellbore: ST1
 Design: ST1

Local Co-ordinate Reference: Well #419A
 TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.14 Single User Db

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)
9,011.00	1.24	134.34	9,006.31	-173.08	89.30	-173.67	0.11	-0.08	-3.42
9,105.00	1.02	139.26	9,100.29	-174.43	90.58	-175.03	0.26	-0.23	5.23
9,199.00	0.97	157.06	9,194.28	-175.80	91.43	-176.40	0.33	-0.05	18.94
9,294.00	0.70	141.76	9,289.27	-176.99	92.11	-177.60	0.37	-0.28	-16.11
9,388.00	1.69	153.32	9,383.25	-178.68	93.08	-179.30	1.08	1.05	12.30
9,483.00	1.87	161.01	9,478.20	-181.40	94.22	-182.02	0.31	0.19	8.09
9,577.00	2.09	145.81	9,572.14	-184.27	95.68	-184.90	0.60	0.23	-16.17
9,672.00	2.40	137.50	9,667.07	-187.17	98.00	-187.81	0.47	0.33	-8.75
9,766.00	1.21	135.96	9,761.02	-189.33	100.02	-189.99	1.27	-1.27	-1.64
9,860.00	0.90	123.00	9,855.01	-190.45	101.33	-191.11	0.41	-0.33	-13.79
9,955.00	1.25	112.45	9,949.99	-191.25	102.91	-191.93	0.42	0.37	-11.11
10,049.00	1.30	109.59	10,043.97	-192.00	104.86	-192.69	0.09	0.05	-3.04
10,143.00	1.32	113.50	10,137.94	-192.79	106.86	-193.49	0.10	0.02	4.16
10,238.00	1.15	121.90	10,232.92	-193.73	108.67	-194.44	0.26	-0.18	8.84
10,332.00	1.41	115.44	10,326.90	-194.72	110.52	-195.45	0.32	0.28	-6.87
10,427.00	1.38	126.47	10,421.87	-195.90	112.49	-196.65	0.28	-0.03	11.61
10,521.00	1.56	132.53	10,515.84	-197.44	114.34	-198.20	0.25	0.19	6.45
10,616.00	1.72	132.05	10,610.80	-199.27	116.36	-200.04	0.17	0.17	-0.51
10,710.00	1.89	109.99	10,704.75	-200.75	118.86	-201.53	0.76	0.18	-23.47
10,805.00	1.49	107.22	10,799.71	-201.65	121.51	-202.45	0.43	-0.42	-2.92
10,899.00	1.18	116.54	10,893.69	-202.44	123.55	-203.26	0.40	-0.33	9.91
10,993.00	1.06	122.73	10,987.67	-203.34	125.14	-204.17	0.18	-0.13	6.59
11,088.00	1.25	137.41	11,082.65	-204.58	126.58	-205.42	0.37	0.20	15.45
11,181.00	0.95	157.15	11,175.63	-206.04	127.57	-206.88	0.52	-0.32	21.23
11,276.00	0.51	149.06	11,270.63	-207.13	128.09	-207.97	0.47	-0.46	-8.52
11,351.00	0.56	123.70	11,345.62	-207.62	128.57	-208.47	0.32	0.07	-33.81
11,467.00	1.09	118.60	11,461.61	-208.46	130.01	-209.32	0.46	0.46	-4.40
11,562.00	1.10	131.57	11,556.59	-209.50	131.49	-210.37	0.26	0.01	13.65
11,656.00	12.18	303.28	11,649.94	-204.63	123.84	-205.45	14.12	11.79	182.67
KOP: 11656.00' MD, 11649.30' TVD									
11,750.00	30.63	305.52	11,737.08	-185.11	95.81	-185.74	19.64	19.63	2.38
11,844.00	37.83	313.52	11,814.79	-151.29	55.35	-151.65	9.02	7.66	8.51
11,876.00	40.46	317.04	11,839.61	-136.93	41.15	-137.20	10.76	8.22	11.00
11,907.00	42.22	320.20	11,862.88	-121.56	27.63	-121.74	8.81	5.68	10.19
11,939.00	44.08	323.10	11,886.23	-104.40	14.06	-104.49	8.50	5.81	9.06
11,970.00	46.91	325.39	11,907.96	-86.45	1.15	-86.46	10.54	9.13	7.39
12,002.00	48.96	327.41	11,929.40	-66.66	-11.99	-66.58	7.94	6.41	6.31
12,033.00	51.14	328.07	11,949.31	-46.57	-24.67	-46.40	7.22	7.03	2.13
12,065.00	52.70	329.17	11,969.04	-25.06	-37.78	-24.81	5.58	4.88	3.44
12,096.00	53.58	331.10	11,987.64	-3.55	-50.13	-3.22	5.73	2.84	6.23
12,127.00	55.58	332.51	12,005.60	18.71	-62.06	19.12	7.44	6.45	4.55
12,178.00	59.75	334.36	12,032.88	57.25	-81.31	57.79	8.73	8.18	3.63
12,210.00	62.37	335.77	12,048.36	82.64	-93.11	83.26	9.05	8.19	4.41

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
Project: Lea County, NM (NAD27) NMEZ
Site: Bell Lake Unit South
Well: #419A
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Well #419A
TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

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)
12,241.00	64.50	336.91	12,062.23	108.04	-104.24	108.73	7.62	6.87	3.68
12,273.00	66.12	337.35	12,075.59	134.82	-115.54	135.59	5.21	5.06	1.38
12,304.00	67.82	337.70	12,087.72	161.19	-126.44	162.02	5.58	5.48	1.13
12,336.00	68.06	338.67	12,099.74	188.72	-137.46	189.63	2.91	0.75	3.03
12,367.00	68.30	339.37	12,111.26	215.59	-147.77	216.57	2.23	0.77	2.26
12,399.00	68.54	342.18	12,123.03	243.68	-157.56	244.72	8.20	0.75	8.78
12,430.00	69.93	345.17	12,134.02	271.50	-165.71	272.59	10.07	4.48	9.65
12,461.00	71.00	346.40	12,144.39	299.82	-172.88	300.96	5.09	3.45	3.97
12,493.00	72.65	348.25	12,154.37	329.48	-179.55	330.66	7.53	5.16	5.78
12,524.00	75.77	349.65	12,162.81	358.75	-185.26	359.97	10.96	10.06	4.52
12,556.00	78.87	352.03	12,169.83	389.57	-190.23	390.82	12.10	9.69	7.44
12,587.00	81.55	355.45	12,175.10	419.93	-193.55	421.20	13.89	8.65	11.03
12,614.18	82.67	356.95	12,178.83	446.79	-195.34	448.07	6.83	4.12	5.50
FTP(BLS#419A)									
12,619.00	82.87	357.21	12,179.44	451.57	-195.58	452.85	6.83	4.13	5.49
12,650.00	84.32	358.18	12,182.90	482.35	-196.82	483.64	5.62	4.68	3.13
12,745.00	86.06	359.06	12,190.87	576.98	-199.10	578.29	2.05	1.83	0.93
EOC: 12745.00' MD, 12190.23' TVD, 86.06° INC, 359.06° AZ, 584.64' VS									
12,839.00	86.80	358.88	12,196.72	670.78	-200.78	672.10	0.81	0.79	-0.19
12,933.00	88.43	358.35	12,200.63	764.67	-203.05	766.00	1.82	1.73	-0.56
13,028.00	90.67	359.41	12,201.38	859.64	-204.91	860.98	2.61	2.36	1.12
13,122.00	86.54	0.86	12,203.66	953.59	-204.69	954.93	4.66	-4.39	1.54
13,216.00	87.73	0.55	12,208.36	1,047.46	-203.54	1,048.79	1.31	1.27	-0.33
13,311.00	84.65	359.94	12,214.67	1,142.24	-203.13	1,143.56	3.30	-3.24	-0.64
13,405.00	82.96	359.15	12,224.82	1,235.68	-203.87	1,237.01	1.98	-1.80	-0.84
13,500.00	87.92	359.23	12,232.37	1,330.34	-205.21	1,331.68	5.22	5.22	0.08
13,594.00	88.23	358.18	12,235.53	1,424.27	-207.33	1,425.61	1.16	0.33	-1.12
13,689.00	89.00	359.23	12,237.82	1,519.21	-209.48	1,520.57	1.37	0.81	1.11
13,783.00	88.54	357.30	12,239.84	1,613.14	-212.32	1,614.52	2.11	-0.49	-2.05
13,878.00	88.45	357.39	12,242.34	1,708.01	-216.72	1,709.41	0.13	-0.09	0.09
13,972.00	88.52	357.48	12,244.82	1,801.88	-220.93	1,803.31	0.12	0.07	0.10
14,066.00	88.54	0.38	12,247.23	1,895.82	-222.68	1,897.26	3.08	0.02	3.09
14,161.00	89.26	2.31	12,249.06	1,990.77	-220.45	1,992.19	2.17	0.76	2.03
14,255.00	86.08	1.96	12,252.88	2,084.62	-216.95	2,086.01	3.40	-3.38	-0.37
14,307.00	84.28	1.52	12,257.25	2,136.41	-215.38	2,137.79	3.56	-3.46	-0.85
14,401.00	85.68	0.90	12,265.47	2,230.03	-213.40	2,231.39	1.63	1.49	-0.66
14,496.00	88.91	1.08	12,269.95	2,324.89	-211.76	2,326.25	3.41	3.40	0.19
14,590.00	88.93	0.99	12,271.73	2,418.86	-210.07	2,420.20	0.10	0.02	-0.10
14,684.00	88.91	0.38	12,273.50	2,512.84	-208.94	2,514.17	0.65	-0.02	-0.65
14,779.00	86.65	359.94	12,277.18	2,607.76	-208.68	2,609.09	2.42	-2.38	-0.46
14,873.00	87.18	0.29	12,282.24	2,701.62	-208.49	2,702.94	0.68	0.56	0.37
14,968.00	87.40	359.59	12,286.73	2,796.51	-208.59	2,797.84	0.77	0.23	-0.74
15,062.00	89.09	0.55	12,289.61	2,890.47	-208.47	2,891.78	2.07	1.80	1.02
15,157.00	89.04	0.38	12,291.16	2,985.45	-207.70	2,986.76	0.19	-0.05	-0.18

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
 Project: Lea County, NM (NAD27) NMEZ
 Site: Bell Lake Unit South
 Well: #419A
 Wellbore: ST1
 Design: ST1

Local Co-ordinate Reference: Well #419A
 TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.14 Single User Db

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)
15,251.00	87.70	0.64	12,293.83	3,079.41	-206.87	3,080.71	1.45	-1.43	0.28
15,346.00	89.31	2.66	12,296.31	3,174.33	-204.13	3,175.61	2.72	1.69	2.13
15,440.00	90.19	3.72	12,296.72	3,268.18	-198.90	3,269.42	1.47	0.94	1.13
15,534.00	88.49	2.57	12,297.80	3,362.02	-193.74	3,363.24	2.18	-1.81	-1.22
15,566.00	87.44	1.43	12,298.94	3,393.98	-192.63	3,395.19	4.84	-3.28	-3.56
15,629.00	85.92	358.53	12,302.59	3,456.87	-192.65	3,458.07	5.19	-2.41	-4.60
15,723.00	86.56	357.92	12,308.75	3,550.62	-195.55	3,551.84	0.94	0.68	-0.65
15,817.00	88.85	357.21	12,312.52	3,644.45	-199.54	3,645.70	2.55	2.44	-0.76
15,912.00	88.34	356.60	12,314.85	3,739.29	-204.67	3,740.56	0.84	-0.54	-0.64
16,007.00	90.67	356.77	12,315.67	3,834.12	-210.16	3,835.43	2.46	2.45	0.18
16,101.00	92.10	357.48	12,313.39	3,927.97	-214.88	3,929.31	1.70	1.52	0.76
16,196.00	92.23	359.32	12,309.81	4,022.86	-217.53	4,024.21	1.94	0.14	1.94
16,290.00	89.37	358.88	12,308.49	4,116.83	-219.01	4,118.19	3.08	-3.04	-0.47
16,384.00	87.79	359.85	12,310.82	4,210.79	-220.05	4,212.16	1.97	-1.68	1.03
16,479.00	86.34	359.14	12,315.69	4,305.66	-220.88	4,307.03	1.70	-1.53	-0.75
16,573.00	88.25	359.32	12,320.12	4,399.54	-222.14	4,400.92	2.04	2.03	0.19
16,668.00	85.92	358.79	12,324.95	4,494.40	-223.71	4,495.78	2.52	-2.45	-0.56
16,762.00	86.54	358.00	12,331.13	4,588.16	-226.34	4,589.56	1.07	0.66	-0.84
16,857.00	87.84	357.65	12,335.79	4,682.97	-229.94	4,684.39	1.42	1.37	-0.37
16,951.00	88.45	357.21	12,338.83	4,776.83	-234.15	4,778.28	0.80	0.65	-0.47
17,046.00	91.86	358.79	12,338.58	4,871.75	-237.46	4,873.22	3.96	3.59	1.66
17,140.00	91.73	358.88	12,335.63	4,965.69	-239.38	4,967.17	0.17	-0.14	0.10
17,235.00	91.86	0.20	12,332.66	5,060.64	-240.14	5,062.12	1.40	0.14	1.39
17,329.00	90.14	359.23	12,331.02	5,154.62	-240.61	5,156.10	2.10	-1.83	-1.03
17,424.00	90.85	0.02	12,330.20	5,249.61	-241.23	5,251.09	1.12	0.75	0.83
17,518.00	89.51	359.67	12,329.90	5,343.61	-241.48	5,345.09	1.47	-1.43	-0.37
17,613.00	84.76	358.18	12,334.65	5,438.44	-243.26	5,439.93	5.24	-5.00	-1.57
17,736.00	84.32	356.51	12,346.35	5,560.75	-248.93	5,562.27	1.40	-0.36	-1.36
17,830.00	91.18	359.14	12,350.04	5,654.54	-252.49	5,656.09	7.81	7.30	2.80
17,925.00	91.57	0.46	12,347.76	5,749.51	-252.82	5,751.06	1.45	0.41	1.39
18,019.00	92.05	359.94	12,344.79	5,843.46	-252.49	5,845.01	0.75	0.51	-0.55
18,114.00	89.97	0.29	12,343.12	5,938.44	-252.30	5,939.99	2.22	-2.19	0.37
18,208.00	91.18	1.78	12,342.17	6,032.42	-250.60	6,033.95	2.04	1.29	1.59
18,302.00	93.61	3.80	12,338.25	6,126.21	-246.03	6,127.71	3.36	2.59	2.15
18,397.00	91.04	3.54	12,334.39	6,220.93	-239.96	6,222.39	2.72	-2.71	-0.27
18,491.00	91.46	1.78	12,332.34	6,314.80	-235.60	6,316.23	1.92	0.45	-1.87
18,586.00	90.71	0.81	12,330.54	6,409.76	-233.45	6,411.17	1.29	-0.79	-1.02
18,680.00	91.37	0.29	12,328.84	6,503.74	-232.55	6,505.14	0.89	0.70	-0.55
18,775.00	85.57	0.81	12,331.37	6,598.66	-231.64	6,600.05	6.13	-6.11	0.55
18,869.00	87.48	359.94	12,337.07	6,692.48	-231.02	6,693.87	2.23	2.03	-0.93
18,964.00	89.79	358.97	12,339.33	6,787.44	-231.93	6,788.83	2.64	2.43	-1.02
19,058.00	90.16	359.41	12,339.37	6,881.43	-233.26	6,882.83	0.61	0.39	0.47
19,153.00	90.60	0.46	12,338.74	6,976.43	-233.36	6,977.82	1.20	0.46	1.11

Survey Report

Company: KAISER-FRANCIS OIL COMPANY
Project: Lea County, NM (NAD27) NMEZ
Site: Bell Lake Unit South
Well: #419A
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Well #419A
TVD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
MD Reference: RKB @ 3654.00usft (Cactus 171 - KB=23')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

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)
19,247.00	91.24	358.79	12,337.23	7,070.41	-233.98	7,071.81	1.90	0.68	-1.78
19,341.00	92.52	359.41	12,334.15	7,164.35	-235.45	7,165.75	1.51	1.36	0.66
19,436.00	91.22	359.76	12,331.05	7,259.29	-236.14	7,260.70	1.42	-1.37	0.37
19,530.00	88.01	358.97	12,331.68	7,353.27	-237.18	7,354.68	3.52	-3.41	-0.84
19,625.00	84.12	359.94	12,338.20	7,448.02	-238.09	7,449.44	4.22	-4.09	1.02
19,719.00	86.56	358.27	12,345.84	7,541.69	-239.55	7,543.11	3.14	2.60	-1.78
19,814.00	86.34	358.09	12,351.72	7,636.46	-242.56	7,637.90	0.30	-0.23	-0.19
19,908.00	86.49	359.32	12,357.60	7,730.25	-244.68	7,731.70	1.32	0.16	1.31
20,003.00	86.43	359.06	12,363.46	7,825.06	-246.02	7,826.52	0.28	-0.06	-0.27
20,077.00	88.80	359.06	12,366.54	7,898.98	-247.24	7,900.45	3.20	3.20	0.00
Final MWD Survey: 20077.00' MD, 12365.90' TVD									
20,160.00	88.80	359.06	12,368.28	7,981.95	-248.60	7,983.42	0.00	0.00	0.00
BHL: 20160.00' MD, 12368.28' TVD, 88.80° INC, 359.06° AZ, 7981.95' +N/-S, -248.60' +E/-W, 7983.42' VS - 330' FNL / 355' FWL - PBHL(BLS#									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,656.00	11,649.94	-204.63	123.84	KOP: 11656.00' MD, 11649.30' TVD
12,745.00	12,190.87	576.98	-199.10	EOC: 12745.00' MD, 12190.23' TVD, 86.06° INC, 359.06° AZ, 584.64' VS
20,077.00	12,366.54	7,898.98	-247.24	Final MWD Survey: 20077.00' MD, 12365.90' TVD
20,160.00	12,368.28	7,981.95	-248.60	BHL: 20160.00' MD, 12368.28' TVD, 88.80° INC, 359.06° AZ, 7981.95' +N/-S, -
20,160.00	12,368.28	7,981.95	-248.60	330' FNL / 355' FWL

Checked By: _____ Approved By: _____ Date: _____