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Kaiser-Francis Oil Company

DISTRICT II-ARTESIA O.C.D.

30-015-43998

Kaiser-Francis Oil Company

Eddy County, NM

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

Willow Lake WA 15 #1H

OWB

Design: AWB

Standard Survey Report

04 April, 2018

 **INTREPID**

Intrepid

Survey Report



Company:	Kaiser-Francis Oil Company	Local Co-ordinate Reference:	Well Willow Lake WA 15 #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3020.0usft
Site:	(WILLOW LAKE) SEC 14_T-24-S_R-28-E	MD Reference:	KB @ 3020.0usft
Well:	Willow Lake WA 15 #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWB	Database:	EDM 5000.1 Single User Db

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

Well	Willow Lake WA 15 #1H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 12' 57.613 N
		Longitude:	104° 3' 57.072 W
		Ground Level:	2,995.0 usft

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	03/21/17	7.21	59.98	47,908.16687947

Design	AWB				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	273.41	

Survey Program	Date 04/04/18				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
403.0	2,668.0	Intrepid MWD (OWB)	MWD	MWD - Standard	
3,005.0	9,085.0	SLB MWD (OWB)	MWD	MWD - Standard	
9,167.0	14,768.0	Intrepid MWD II (OWB)	MWD	MWD - Standard	

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	
403.0	2.80	51.00	402.8	6.2	7.7	-7.3	0.69	0.69	0.00	
495.0	2.40	39.90	494.7	9.1	10.6	-10.1	0.70	-0.43	-12.07	
589.0	0.80	39.80	588.7	11.1	12.3	-11.6	1.70	-1.70	-0.11	
682.0	1.20	253.40	681.7	11.3	11.8	-11.1	2.06	0.43	-157.42	
772.0	2.40	246.10	771.7	10.3	9.2	-8.5	1.35	1.33	-8.11	
863.0	1.90	259.60	862.6	9.2	5.9	-5.4	0.78	-0.55	14.84	
953.0	1.30	256.20	952.6	8.7	3.5	-3.0	0.67	-0.67	-3.78	
1,044.0	1.40	267.80	1,043.5	8.4	1.4	-0.9	0.32	0.11	12.75	

Intrepid

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Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
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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)
1,134.0	0.90	254.00	1,133.5	8.2	-0.4	0.9	0.63	-0.56	-15.33
1,226.0	0.90	281.30	1,225.5	8.1	-1.8	2.3	0.46	0.00	29.67
1,317.0	0.70	284.40	1,316.5	8.4	-3.0	3.5	0.22	-0.22	3.41
1,408.0	0.40	233.50	1,407.5	8.4	-3.8	4.3	0.60	-0.33	-55.93
1,502.0	0.50	212.10	1,501.5	7.8	-4.3	4.8	0.21	0.11	-22.77
1,596.0	0.30	282.90	1,595.5	7.5	-4.8	5.2	0.52	-0.21	75.32
1,690.0	0.30	169.30	1,689.5	7.4	-5.0	5.4	0.53	0.00	-120.85
1,784.0	0.10	110.70	1,783.5	7.1	-4.9	5.3	0.28	-0.21	-62.34
1,878.0	0.40	312.80	1,877.5	7.3	-5.0	5.4	0.53	0.32	-167.98
1,973.0	0.30	122.70	1,972.5	7.4	-5.0	5.5	0.73	-0.11	178.84
2,068.0	0.50	171.90	2,067.5	6.8	-4.8	5.2	0.40	0.21	51.79
2,162.0	0.80	133.40	2,161.5	6.0	-4.2	4.6	0.55	0.32	-40.96
2,256.0	1.10	119.40	2,255.5	5.1	-3.0	3.3	0.40	0.32	-14.89
2,350.0	0.50	120.50	2,349.4	4.4	-1.8	2.1	0.64	-0.64	1.17
2,444.0	0.60	176.50	2,443.4	3.7	-1.5	1.7	0.56	0.11	59.57
2,538.0	0.70	142.70	2,537.4	2.8	-1.1	1.2	0.41	0.11	-35.96
2,633.0	0.20	185.90	2,632.4	2.1	-0.7	0.9	0.60	-0.53	45.47
2,668.0	0.70	152.90	2,667.4	1.9	-0.7	0.8	1.55	1.43	-94.29
TIE TO INTREPID									
3,005.0	3.88	58.40	3,004.2	6.0	10.0	-9.6	1.19	0.94	-28.04
3,099.0	5.12	57.83	3,097.9	9.9	16.3	-15.6	1.32	1.32	-0.61
3,194.0	6.04	56.55	3,192.4	15.0	24.0	-23.1	0.98	0.97	-1.35
3,288.0	6.18	54.94	3,285.9	20.6	32.3	-31.0	0.24	0.15	-1.71
3,382.0	6.28	55.20	3,379.3	26.4	40.6	-39.0	0.11	0.11	0.28
3,477.0	6.60	50.20	3,473.7	32.9	49.1	-47.1	0.68	0.34	-5.26
3,571.0	7.08	49.23	3,567.1	40.1	57.6	-55.2	0.53	0.51	-1.03
3,664.0	7.86	47.40	3,659.3	48.2	66.7	-63.7	0.88	0.84	-1.97
3,759.0	8.30	37.91	3,753.3	58.0	75.7	-72.1	1.48	0.46	-9.99
3,853.0	9.34	30.90	3,846.2	69.9	83.7	-79.4	1.59	1.11	-7.46
3,948.0	10.26	24.58	3,939.9	84.2	91.2	-86.1	1.49	0.97	-6.65
4,042.0	9.98	19.89	4,032.4	99.5	97.5	-91.4	0.93	-0.30	-4.99
4,137.0	9.01	15.14	4,126.1	114.4	102.2	-95.2	1.31	-1.02	-5.00
4,231.0	8.41	13.07	4,219.0	128.2	105.7	-97.9	0.72	-0.64	-2.20
4,326.0	7.52	7.91	4,313.1	141.1	108.1	-99.5	1.20	-0.94	-5.43
4,420.0	7.58	4.39	4,406.3	153.4	109.4	-100.1	0.50	0.06	-3.74
4,514.0	7.22	0.21	4,499.5	165.5	109.9	-99.9	0.69	-0.38	-4.45
4,609.0	6.79	355.62	4,593.8	177.0	109.5	-98.8	0.74	-0.45	-4.83
4,703.0	6.36	350.46	4,687.2	187.7	108.2	-96.9	0.78	-0.46	-5.49
4,797.0	5.93	345.20	4,780.6	197.5	106.1	-94.2	0.75	-0.46	-5.60
4,892.0	5.41	337.67	4,875.2	206.4	103.2	-90.7	0.95	-0.55	-7.93
4,987.0	4.73	336.58	4,969.8	214.2	99.9	-87.0	0.72	-0.72	-1.15
5,081.0	3.90	333.24	5,063.5	220.6	97.0	-83.6	0.92	-0.88	-3.55
5,175.0	2.89	331.92	5,157.4	225.5	94.4	-80.8	1.08	-1.07	-1.40

Intrepid

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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)
5,269.0	2.49	330.46	5,251.3	229.4	92.3	-78.5	0.43	-0.43	-1.55
5,364.0	1.68	322.58	5,346.2	232.3	90.4	-76.4	0.90	-0.85	-8.29
5,458.0	1.35	322.07	5,440.2	234.3	88.9	-74.8	0.35	-0.35	-0.54
5,552.0	1.24	317.59	5,534.1	235.9	87.5	-73.3	0.16	-0.12	-4.77
5,647.0	1.26	4.77	5,629.1	237.7	86.9	-72.6	1.05	0.02	49.66
5,742.0	3.20	42.99	5,724.0	240.7	88.8	-74.3	2.47	2.04	40.23
5,836.0	5.48	52.82	5,817.8	245.3	94.2	-79.4	2.54	2.43	10.46
5,931.0	5.25	44.68	5,912.3	251.1	100.9	-85.7	0.84	-0.24	-8.57
6,026.0	5.07	39.65	6,007.0	257.5	106.6	-91.1	0.51	-0.19	-5.29
6,120.0	4.69	31.11	6,100.6	263.9	111.2	-95.3	0.87	-0.40	-9.09
6,215.0	4.85	22.38	6,195.3	271.0	114.8	-98.4	0.78	0.17	-9.19
6,404.0	5.28	3.22	6,383.6	287.1	118.3	-101.0	0.92	0.23	-10.14
6,498.0	5.23	356.44	6,477.2	295.6	118.3	-100.5	0.66	-0.05	-7.21
6,593.0	5.58	350.31	6,571.8	304.5	117.2	-98.9	0.71	0.37	-6.45
6,688.0	2.63	326.43	6,666.5	310.9	115.2	-96.5	3.52	-3.11	-25.14
6,782.0	0.38	274.25	6,760.5	312.7	113.7	-94.9	2.57	-2.39	-55.51
6,877.0	0.00	233.36	6,855.5	312.7	113.4	-94.6	0.40	-0.40	0.00
6,972.0	0.34	179.19	6,950.5	312.5	113.4	-94.6	0.36	0.36	0.00
7,067.0	0.06	194.13	7,045.5	312.1	113.4	-94.6	0.30	-0.29	15.73
7,162.0	0.23	187.36	7,140.5	311.9	113.4	-94.6	0.18	0.18	-7.13
7,256.0	0.28	255.68	7,234.5	311.6	113.1	-94.4	0.31	0.05	72.68
7,351.0	0.11	234.54	7,329.5	311.5	112.8	-94.1	0.19	-0.18	-22.25
7,444.0	0.13	210.89	7,422.5	311.4	112.7	-94.0	0.06	0.02	-25.43
7,539.0	0.29	96.43	7,517.5	311.3	112.9	-94.2	0.38	0.17	-120.48
7,633.0	0.16	344.26	7,611.5	311.4	113.1	-94.4	0.40	-0.14	-119.33
7,728.0	0.33	118.58	7,706.5	311.4	113.3	-94.6	0.48	0.18	141.39
7,822.0	0.24	166.71	7,800.5	311.0	113.6	-94.9	0.26	-0.10	51.20
7,917.0	0.25	62.73	7,895.5	310.9	113.8	-95.1	0.41	0.01	-109.45
8,012.0	0.28	196.83	7,990.5	310.8	113.9	-95.2	0.51	0.03	141.16
8,107.0	0.18	135.40	8,085.5	310.5	114.0	-95.3	0.26	-0.11	-64.66
8,201.0	0.13	283.71	8,179.5	310.4	114.0	-95.3	0.32	-0.05	157.78
8,295.0	0.16	202.00	8,273.5	310.3	113.8	-95.1	0.20	0.03	-86.93
8,390.0	0.20	142.42	8,368.5	310.1	113.9	-95.2	0.19	0.04	-62.72
8,484.0	0.25	155.05	8,462.5	309.7	114.0	-95.4	0.07	0.05	13.44
8,579.0	0.28	128.35	8,557.5	309.4	114.3	-95.7	0.13	0.03	-28.11
8,673.0	0.33	91.42	8,651.5	309.3	114.8	-96.2	0.21	0.05	-39.29
8,767.0	0.30	120.78	8,745.5	309.1	115.2	-96.6	0.17	-0.03	31.23
8,862.0	0.13	71.69	8,840.5	309.0	115.6	-97.0	0.25	-0.18	-51.67
8,947.0	0.55	184.53	8,925.5	308.7	115.6	-97.0	0.72	0.49	132.75
9,042.0	0.83	205.27	9,020.5	307.6	115.3	-96.8	0.39	0.29	21.83
9,085.0	1.18	212.14	9,063.4	306.9	114.9	-96.4	0.86	0.81	15.98
TIE TO SLB									
9,167.0	4.00	271.70	9,145.4	306.3	111.6	-93.2	4.33	3.44	72.63
9,214.0	8.00	262.90	9,192.1	305.9	106.7	-88.3	8.71	8.51	-18.72

Intrepid

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9,262.0	13.40	270.00	9,239.2	305.5	97.8	-79.5	11.56	11.25	14.79
9,293.0	16.50	271.70	9,269.2	305.7	89.9	-71.5	10.10	10.00	5.48
9,352.0	23.30	270.90	9,324.6	306.1	69.8	-51.4	11.53	11.53	-1.36
9,384.0	28.60	268.50	9,353.4	306.0	55.8	-37.5	16.88	16.56	-7.50
9,416.0	34.50	267.40	9,380.7	305.4	39.1	-20.8	18.52	18.44	-3.44
9,447.0	40.00	266.10	9,405.3	304.3	20.3	-2.2	17.92	17.74	-4.19
9,479.0	45.80	265.50	9,428.8	302.7	-1.4	19.4	18.17	18.13	-1.88
9,510.0	51.70	265.20	9,449.2	300.8	-24.6	42.5	19.05	19.03	-0.97
9,571.0	59.40	270.30	9,483.7	298.9	-74.8	92.5	14.38	12.62	8.36
9,634.0	65.10	272.90	9,513.0	300.5	-130.5	148.2	9.76	9.05	4.13
9,666.0	69.20	272.90	9,525.4	302.0	-159.9	177.6	12.81	12.81	0.00
9,697.0	75.60	272.20	9,534.8	303.3	-189.4	207.2	20.76	20.65	-2.26
9,728.0	80.40	270.70	9,541.2	304.1	-219.7	237.5	16.19	15.48	-4.84
9,728.1	80.40	270.70	9,541.3	304.1	-219.8	237.6	0.00	0.00	0.00
Sec 14 & 15 Crossing @ 9728.1'MD, 2262'FSL									
9,760.0	81.50	270.20	9,546.3	304.3	-251.3	269.0	3.78	3.45	-1.57
9,807.0	81.70	269.30	9,553.1	304.1	-297.8	315.4	1.94	0.43	-1.91
9,855.0	82.00	268.50	9,560.0	303.2	-345.3	362.8	1.76	0.63	-1.67
9,950.0	86.20	268.00	9,569.7	300.3	-439.8	456.9	4.45	4.42	-0.53
10,044.0	88.60	267.60	9,574.0	296.7	-533.6	550.3	2.59	2.55	-0.43
10,060.3	88.84	267.74	9,574.3	296.1	-549.9	566.5	1.72	1.49	0.85
FTP @ 10060.3'MD, 2252'FSL & 330'FEL									
10,138.0	90.00	268.40	9,575.1	293.5	-627.5	643.9	1.72	1.49	0.85
10,233.0	90.60	268.00	9,574.6	290.5	-722.5	738.5	0.76	0.63	-0.42
10,327.0	90.90	268.40	9,573.4	287.5	-816.4	832.1	0.53	0.32	0.43
10,422.0	90.90	270.10	9,571.9	286.3	-911.4	926.8	1.79	0.00	1.79
10,517.0	88.00	270.20	9,572.8	286.5	-1,006.4	1,021.7	3.05	-3.05	0.11
10,611.0	88.30	270.70	9,575.9	287.3	-1,100.3	1,115.5	0.62	0.32	0.53
10,706.0	88.60	270.70	9,578.4	288.4	-1,195.3	1,210.4	0.32	0.32	0.00
10,801.0	90.00	270.00	9,579.6	289.0	-1,290.3	1,305.2	1.65	1.47	-0.74
10,895.0	91.30	270.30	9,578.5	289.3	-1,384.3	1,399.0	1.42	1.38	0.32
10,989.0	91.50	270.50	9,576.2	289.9	-1,478.3	1,492.9	0.30	0.21	0.21
11,084.0	90.30	271.40	9,574.7	291.5	-1,573.2	1,587.8	1.58	-1.26	0.95
11,179.0	90.20	271.70	9,574.3	294.1	-1,668.2	1,682.7	0.33	-0.11	0.32
11,274.0	91.60	272.40	9,572.8	297.4	-1,763.1	1,777.7	1.65	1.47	0.74
11,368.0	91.00	273.30	9,570.7	302.1	-1,857.0	1,871.7	1.15	-0.64	0.96
11,464.0	89.50	272.40	9,570.3	306.9	-1,952.8	1,967.7	1.82	-1.56	-0.94
11,558.0	89.80	272.30	9,570.8	310.7	-2,046.8	2,061.6	0.34	0.32	-0.11
11,669.0	89.00	271.20	9,572.0	314.1	-2,157.7	2,172.6	1.23	-0.72	-0.99
11,764.0	88.70	268.30	9,573.9	313.7	-2,252.7	2,267.4	3.07	-0.32	-3.05
11,858.0	88.90	268.20	9,575.9	310.9	-2,346.6	2,361.0	0.24	0.21	-0.11
11,953.0	91.30	268.70	9,575.7	308.3	-2,441.6	2,455.6	2.58	2.53	0.53
12,048.0	92.80	269.40	9,572.3	306.7	-2,536.5	2,550.3	1.74	1.58	0.74

Intrepid

Survey Report



Company:	Kaiser-Francis Oil Company	Local Co-ordinate Reference:	Well Willow Lake WA 15 #1H
Project:	Eddy County, NM	TVD Reference:	KB @ 3020.0usft
Site:	(WILLOW LAKE) SEC 14_T-24-S_R-28-E	MD Reference:	KB @ 3020.0usft
Well:	Willow Lake WA 15 #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWB	Database:	EDM 5000.1 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)
12,142.0	90.30	269.50	9,569.8	305.8	-2,630.4	2,644.0	2.66	-2.66	0.11
12,237.0	89.00	268.10	9,570.4	303.8	-2,725.4	2,738.7	2.01	-1.37	-1.47
12,331.0	88.80	268.10	9,572.2	300.7	-2,819.4	2,832.3	0.21	-0.21	0.00
12,425.0	90.50	268.30	9,572.7	297.8	-2,913.3	2,925.9	1.82	1.81	0.21
12,520.0	91.20	268.20	9,571.3	294.8	-3,008.2	3,020.5	0.74	0.74	-0.11
12,614.0	91.20	268.40	9,569.4	292.1	-3,102.2	3,114.1	0.21	0.00	0.21
12,709.0	92.10	268.00	9,566.6	289.1	-3,197.1	3,208.6	1.04	0.95	-0.42
12,803.0	92.00	268.60	9,563.3	286.3	-3,291.0	3,302.2	0.65	-0.11	0.64
12,898.0	91.30	270.00	9,560.5	285.1	-3,385.9	3,396.9	1.65	-0.74	1.47
12,993.0	93.80	270.30	9,556.3	285.4	-3,480.8	3,491.7	2.65	2.63	0.32
13,087.0	95.40	271.20	9,548.8	286.6	-3,574.5	3,585.2	1.95	1.70	0.96
13,181.0	94.30	270.90	9,540.8	288.3	-3,668.2	3,678.8	1.21	-1.17	-0.32
13,275.0	93.30	271.40	9,534.6	290.2	-3,761.9	3,772.5	1.19	-1.06	0.53
13,370.0	90.80	270.10	9,531.2	291.4	-3,856.9	3,867.4	2.97	-2.63	-1.37
13,465.0	91.40	270.00	9,529.4	291.5	-3,951.8	3,962.2	0.64	0.63	-0.11
13,559.0	91.00	269.20	9,527.4	290.9	-4,045.8	4,056.0	0.95	-0.43	-0.85
13,654.0	90.10	268.10	9,526.5	288.6	-4,140.8	4,150.6	1.50	-0.95	-1.16
13,749.0	93.10	269.60	9,523.8	286.7	-4,235.7	4,245.3	3.53	3.16	1.58
13,845.0	94.10	271.40	9,517.8	287.6	-4,331.5	4,341.0	2.14	1.04	1.88
13,940.0	94.50	271.60	9,510.7	290.0	-4,426.2	4,435.6	0.47	0.42	0.21
14,034.0	95.00	271.80	9,502.9	292.8	-4,519.9	4,529.3	0.57	0.53	0.21
14,129.0	92.60	271.10	9,496.6	295.2	-4,614.6	4,624.0	2.63	-2.53	-0.74
14,223.0	89.30	269.70	9,495.0	295.9	-4,708.6	4,717.8	3.81	-3.51	-1.49
14,317.0	90.30	269.40	9,495.4	295.1	-4,802.6	4,811.6	1.11	1.06	-0.32
14,411.0	90.90	269.00	9,494.4	293.8	-4,896.6	4,905.4	0.77	0.64	-0.43
14,504.0	90.70	269.80	9,493.1	292.9	-4,989.5	4,998.1	0.89	-0.22	0.86
14,599.0	94.30	270.50	9,488.9	293.1	-5,084.4	5,092.9	3.86	3.79	0.74
14,682.0	96.60	271.20	9,481.1	294.3	-5,167.0	5,175.4	2.90	2.77	0.84
LAST SVY									
14,682.8	96.60	271.20	9,481.0	294.3	-5,167.8	5,176.2	0.00	0.00	0.00
LTP @ 14682.8'MD, 2235'FSL & 330'FWL									
14,768.0	96.60	271.20	9,471.2	296.1	-5,252.5	5,260.8	0.00	0.00	0.00
PTB @ 14768'MD, 2237'FSL & 245.4'FWL									

Intrepid

Survey Report



Company:	Kaiser-Francis Oil Company	Local Co-ordinate Reference:	Well Willow Lake WA 15 #1H
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Site:	(WILLOW LAKE) SEC 14_T-24-S_R-28-E	MD Reference:	KB @ 3020.0usft
Well:	Willow Lake WA 15 #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWB	Database:	EDM 5000.1 Single User Db

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
LTP (Willow Lake WA - actual wellpath misses target center by 14.0usft at 14682.8usft MD (9481.0 TVD, 294.3 N, -5167.8 E) - Rectangle (sides W60.0 H1,288.1 D20.0)	1.84	90.18	9,483.0	308.2	-5,168.0	442,712.52	577,554.56	32° 13' 0.786 N	104° 4' 57.221 W
WP #2 (Willow Lake V - actual wellpath misses target center by 14.4usft at 13391.0usft MD (9530.9 TVD, 291.5 N, -3877.9 E) - Rectangle (sides W60.0 H1,290.0 D20.0)	0.94	90.18	9,524.0	304.2	-3,877.8	442,708.48	578,844.75	32° 13' 0.716 N	104° 4' 42.202 W
WP #1 (Willow Lake V - actual wellpath misses target center by 12.1usft at 12097.6usft MD (9570.5 TVD, 306.2 N, -2586.1 E) - Rectangle (sides W60.0 H2,035.9 D20.0)	0.41	90.18	9,560.0	300.1	-2,585.7	442,704.45	580,136.79	32° 13' 0.646 N	104° 4' 27.163 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,595.6	2,595.0	Base Salt (Top Delaware)			
3,347.5	3,345.0	Top Cherry Canyon			
4,699.8	4,684.0	Top Brushy Canyon			
5,923.6	5,905.0	Top Lower Brushy Canyon			
6,129.4	6,110.0	Top Mobil Sand			
6,249.8	6,230.0	Top 1st Bone Spring Lime			
7,231.5	7,210.0	1st Bone Spring Sand			
7,476.5	7,455.0	2nd Bone Spring Lime			
8,031.5	8,010.0	2nd Bone Spring Sand			
8,311.5	8,290.0	Mid 2nd Bone Spring Lime			
8,626.5	8,605.0	Lower 2nd Bone Spring Sand (Hark)			
8,896.5	8,875.0	3rd Bone Spring Lime			
8,958.5	8,937.0	Break Sand			
9,116.6	9,095.0	3rd Bone Spring Sand			
9,421.3	9,385.0	3rd Bone Spring - Basal Sand			
9,503.3	9,445.0	Top Wolfcamp (Wolfcamp A)			
9,552.6	9,474.0	Top Wolfcamp A - X Sand			
9,626.9	9,510.0	Base Wolfcamp A - X Sand			
9,751.5	9,545.0	Top Wolfcamp A - Y Sand			

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,668.0	2,667.4	1.9	-0.7	TIE TO INTREPID
9,085.0	9,063.4	306.9	114.9	TIE TO SLB
9,728.1	9,541.3	304.1	-219.8	Sec 14 & 15 Crossing @ 9728.1'MD, 2262'FSL
10,060.3	9,574.3	296.1	-549.9	FTP @ 10060.3'MD, 2252'FSL & 330'FEL
14,682.0	9,481.1	294.3	-5,167.0	LAST SVY
14,682.8	9,481.0	294.3	-5,167.8	LTP @ 14682.8'MD, 2235'FSL & 330'FWL
14,768.0	9,471.2	296.1	-5,252.5	PTB @ 14768'MD, 2237'FSL & 245.4'FWL

Intrepid
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Design:	AWB	Database:	EDM 5000.1 Single User Db

Checked By: _____ Approved By: _____ Date: _____