

Unit Petroleum

Reno County, Kansas [NAD 83]

Section 21 T25S-R10W

Overall 2-21H

OH

Design: OH

Standard Survey Report

08 May, 2014



Company:	Unit Petroleum	Local Co-ordinate Reference:	Well Overall 2-21H
Project:	Reno County, Kansas [NAD 83]	TVD Reference:	14' KB @ 1775.00usft (UDI 331)
Site:	Section 21 T25S-R10W	MD Reference:	14' KB @ 1775.00usft (UDI 331)
Well:	Overall 2-21H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Reno County, Kansas [NAD 83]		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Kansas Southern Zone		Using geodetic scale factor

Site	Section 21 T25S-R10W				
Site Position:		Northing:	1,744,692.00 usft	Latitude:	37° 51' 14.555 N
From:	Map	Easting:	1,333,899.00 usft	Longitude:	98° 25' 31.097 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.05 °

Well	Overall 2-21H					
Well Position	+N/-S	0.00 usft	Northing:	1,744,692.00 usft	Latitude:	37° 51' 14.555 N
	+E/-W	0.00 usft	Easting:	1,333,899.00 usft	Longitude:	98° 25' 31.097 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,761.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/17/2014	4.61	65.75	52,032

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	359.80	

Survey Program	Date	5/8/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
76.66	3,181.30	Gyro (OH)	CB-GYRO-MS	Camera based gyro multishot	
3,229.00	8,520.00	MWD (OH)	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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
76.66	0.75	279.82	76.66	0.09	-0.49	0.09	0.98	0.98	0.00	
170.74	1.50	298.86	170.72	0.78	-2.18	0.79	0.88	0.80	20.24	
264.82	1.39	313.74	264.77	2.17	-4.08	2.18	0.41	-0.12	15.82	
358.90	1.14	314.58	358.83	3.61	-5.57	3.63	0.27	-0.27	0.89	
452.98	1.27	354.40	452.89	5.31	-6.34	5.33	0.88	0.14	42.33	
547.06	1.31	35.24	546.95	7.22	-5.82	7.24	0.96	0.04	43.41	
641.14	0.99	44.37	641.01	8.68	-4.63	8.70	0.39	-0.34	9.70	
735.22	0.85	355.34	735.08	9.96	-4.12	9.97	0.82	-0.15	-52.12	
829.30	0.82	17.57	829.15	11.30	-3.98	11.31	0.34	-0.03	23.63	



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)	
923.38	0.50	331.37	923.22	12.30	-3.97	12.31	0.63	-0.34	-49.11	
1,017.46	0.60	242.92	1,017.30	12.44	-4.60	12.45	0.82	0.11	-94.02	
1,111.54	0.71	284.42	1,111.37	12.36	-5.61	12.38	0.51	0.12	44.11	
1,205.82	0.55	204.47	1,205.65	12.09	-6.36	12.11	0.87	-0.17	-84.80	
1,299.70	0.41	193.08	1,299.52	11.35	-6.62	11.38	0.18	-0.15	-12.13	
1,393.78	0.11	280.12	1,393.60	11.04	-6.79	11.06	0.45	-0.32	92.52	
1,487.86	0.46	133.65	1,487.68	10.80	-6.60	10.82	0.59	0.37	-155.69	
1,581.94	0.53	111.66	1,581.76	10.38	-5.93	10.40	0.21	0.07	-23.37	
1,676.02	0.35	188.56	1,675.84	9.93	-5.57	9.95	0.60	-0.19	81.74	
1,770.10	0.58	202.91	1,769.91	9.21	-5.79	9.23	0.27	0.24	15.25	
1,864.18	0.36	238.89	1,863.99	8.62	-6.23	8.64	0.38	-0.23	38.24	
1,958.26	0.32	218.23	1,958.07	8.26	-6.65	8.28	0.14	-0.04	-21.96	
2,052.34	0.41	198.72	2,052.15	7.73	-6.92	7.76	0.16	0.10	-20.74	
2,146.42	0.15	118.63	2,146.23	7.35	-6.92	7.38	0.44	-0.28	-85.13	
2,240.50	0.15	47.92	2,240.31	7.38	-6.72	7.40	0.18	0.00	-75.16	
2,334.58	0.18	25.49	2,334.39	7.59	-6.56	7.62	0.08	0.03	-23.84	
2,428.66	0.19	125.35	2,428.47	7.64	-6.37	7.66	0.30	0.01	106.14	
2,522.74	0.11	272.74	2,522.55	7.55	-6.34	7.57	0.31	-0.09	156.66	
2,616.82	0.24	296.41	2,616.62	7.64	-6.60	7.67	0.16	0.14	25.16	
2,710.90	0.14	259.87	2,710.70	7.71	-6.89	7.73	0.16	-0.11	-38.84	
2,804.98	0.34	349.25	2,804.78	7.96	-7.06	7.99	0.39	0.21	95.00	
2,899.06	0.04	40.24	2,898.86	8.26	-7.09	8.29	0.34	-0.32	54.20	
2,993.14	0.17	76.57	2,992.94	8.32	-6.93	8.35	0.15	0.14	38.62	
3,087.22	0.30	69.30	3,087.02	8.44	-6.56	8.46	0.14	0.14	-7.73	
3,181.30	0.27	62.51	3,181.10	8.63	-6.14	8.65	0.05	-0.03	-7.22	
3,229.00	0.20	8.30	3,228.80	8.76	-6.03	8.79	0.47	-0.15	-113.65	
3,260.00	0.20	37.70	3,259.80	8.86	-5.99	8.88	0.33	0.00	94.84	
3,292.00	0.50	0.60	3,291.80	9.04	-5.95	9.06	1.13	0.94	-115.94	
3,323.00	2.40	350.70	3,322.79	9.82	-6.05	9.84	6.16	6.13	-31.94	
3,355.00	5.10	344.40	3,354.72	11.85	-6.54	11.87	8.52	8.44	-19.69	
3,387.00	7.80	351.70	3,386.51	15.37	-7.24	15.40	8.80	8.44	22.81	
3,418.00	10.80	357.80	3,417.10	20.36	-7.66	20.38	10.17	9.68	19.68	
3,450.00	13.80	356.80	3,448.36	27.16	-7.98	27.19	9.40	9.38	-3.13	
3,482.00	17.20	356.60	3,479.20	35.70	-8.48	35.73	10.63	10.63	-0.63	
3,513.00	21.40	357.80	3,508.45	45.93	-8.97	45.96	13.61	13.55	3.87	
3,545.00	26.00	359.50	3,537.74	58.79	-9.25	58.82	14.53	14.38	5.31	
3,577.00	30.80	0.70	3,565.88	74.00	-9.21	74.03	15.10	15.00	3.75	
3,609.00	34.50	1.30	3,592.82	91.26	-8.91	91.29	11.61	11.56	1.88	
3,640.00	37.00	1.30	3,617.98	109.36	-8.50	109.39	8.06	8.06	0.00	
3,672.00	39.70	1.60	3,643.07	129.21	-7.99	129.24	8.46	8.44	0.94	
3,704.00	42.40	1.30	3,667.20	150.22	-7.46	150.24	8.46	8.44	-0.94	
3,736.00	44.70	1.20	3,690.39	172.26	-6.98	172.28	7.19	7.19	-0.31	
3,767.00	46.50	1.00	3,712.08	194.40	-6.56	194.42	5.82	5.81	-0.65	

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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)
3,798.00	48.60	1.30	3,733.00	217.27	-6.10	217.29	6.81	6.77	0.97
3,830.00	50.60	1.20	3,753.74	241.63	-5.57	241.65	6.25	6.25	-0.31
3,861.00	52.60	2.20	3,773.00	265.91	-4.84	265.93	6.93	6.45	3.23
3,893.00	54.80	2.60	3,791.94	291.68	-3.76	291.69	6.95	6.88	1.25
3,908.00	55.50	2.50	3,800.51	303.98	-3.21	303.99	4.70	4.67	-0.67
3,924.00	55.80	2.40	3,809.54	317.17	-2.65	317.18	1.94	1.88	-0.63
3,956.00	56.30	2.20	3,827.41	343.70	-1.58	343.70	1.65	1.56	-0.63
3,988.00	56.50	1.80	3,845.12	370.34	-0.65	370.34	1.21	0.63	-1.25
4,020.00	56.70	1.40	3,862.73	397.04	0.09	397.04	1.22	0.63	-1.25
4,050.00	57.80	1.70	3,878.96	422.26	0.78	422.26	3.76	3.67	1.00
4,083.00	61.80	1.60	3,895.56	450.76	1.60	450.76	12.12	12.12	-0.30
4,115.00	66.60	1.80	3,909.48	479.55	2.45	479.54	15.01	15.00	0.63
4,147.00	71.10	1.70	3,921.03	509.38	3.36	509.36	14.07	14.06	-0.31
4,179.00	72.60	0.30	3,930.99	539.78	3.89	539.76	6.27	4.69	-4.38
4,211.00	73.70	359.30	3,940.27	570.40	3.78	570.39	4.56	3.44	-3.13
4,242.00	75.60	358.60	3,948.48	600.29	3.23	600.28	6.50	6.13	-2.26
4,274.00	79.40	358.70	3,955.40	631.52	2.50	631.51	11.88	11.88	0.31
4,306.00	82.50	358.40	3,960.43	663.11	1.70	663.10	9.73	9.69	-0.94
4,329.00	85.10	358.20	3,962.92	685.96	1.02	685.95	11.34	11.30	-0.87
4,383.00	89.90	359.20	3,965.27	739.88	-0.20	739.87	9.08	8.89	1.85
4,445.00	90.40	358.70	3,965.11	801.87	-1.34	801.87	1.14	0.81	-0.81
4,506.00	90.50	358.60	3,964.63	862.85	-2.77	862.85	0.23	0.16	-0.16
4,567.00	90.50	358.40	3,964.10	923.82	-4.37	923.83	0.33	0.00	-0.33
4,630.00	90.30	358.30	3,963.66	986.80	-6.19	986.81	0.35	-0.32	-0.16
4,692.00	90.50	358.00	3,963.23	1,048.76	-8.19	1,048.78	0.58	0.32	-0.48
4,754.00	91.20	358.20	3,962.31	1,110.72	-10.24	1,110.75	1.17	1.13	0.32
4,814.00	90.80	358.70	3,961.26	1,170.69	-11.87	1,170.72	1.07	-0.67	0.83
4,877.00	89.80	0.30	3,960.93	1,233.68	-12.41	1,233.72	2.99	-1.59	2.54
4,940.00	90.10	0.20	3,960.98	1,296.68	-12.14	1,296.72	0.50	0.48	-0.16
5,002.00	89.90	0.30	3,960.98	1,358.68	-11.87	1,358.72	0.36	-0.32	0.16
5,064.00	90.10	359.70	3,960.98	1,420.68	-11.87	1,420.71	1.02	0.32	-0.97
5,125.00	90.40	359.50	3,960.72	1,481.68	-12.30	1,481.71	0.59	0.49	-0.33
5,187.00	90.60	359.40	3,960.18	1,543.67	-12.89	1,543.71	0.36	0.32	-0.16
5,249.00	89.70	359.50	3,960.01	1,605.67	-13.49	1,605.71	1.46	-1.45	0.16
5,310.00	90.30	359.30	3,960.01	1,666.67	-14.12	1,666.71	1.04	0.98	-0.33
5,371.00	91.00	358.60	3,959.32	1,727.65	-15.24	1,727.69	1.62	1.15	-1.15
5,433.00	91.60	358.40	3,957.92	1,789.61	-16.86	1,789.66	1.02	0.97	-0.32
5,495.00	90.40	358.90	3,956.83	1,851.59	-18.33	1,851.64	2.10	-1.94	0.81
5,556.00	90.50	358.10	3,956.35	1,912.56	-19.92	1,912.62	1.32	0.16	-1.31
5,618.00	90.80	358.60	3,955.65	1,974.53	-21.71	1,974.60	0.94	0.48	0.81
5,679.00	88.70	358.80	3,955.92	2,035.51	-23.09	2,035.58	3.46	-3.44	0.33
5,741.00	88.20	358.90	3,957.59	2,097.48	-24.33	2,097.55	0.82	-0.81	0.16
5,803.00	87.40	358.40	3,959.97	2,159.41	-25.79	2,159.49	1.52	-1.29	-0.81

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Well:	Overall 2-21H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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5,864.00	89.10	358.70	3,961.84	2,220.36	-27.34	2,220.45	2.83	2.79	0.49	
5,926.00	89.80	359.10	3,962.43	2,282.35	-28.53	2,282.44	1.30	1.13	0.65	
5,987.00	89.70	359.40	3,962.70	2,343.34	-29.33	2,343.43	0.52	-0.16	0.49	
6,049.00	90.50	358.90	3,962.59	2,405.34	-30.25	2,405.43	1.52	1.29	-0.81	
6,111.00	90.50	359.10	3,962.05	2,467.32	-31.33	2,467.42	0.32	0.00	0.32	
6,172.00	91.30	359.50	3,961.09	2,528.31	-32.07	2,528.41	1.47	1.31	0.66	
6,234.00	90.90	358.40	3,959.90	2,590.29	-33.21	2,590.39	1.89	-0.65	-1.77	
6,295.00	90.50	358.10	3,959.16	2,651.26	-35.07	2,651.36	0.82	-0.66	-0.49	
6,357.00	90.60	358.10	3,958.56	2,713.22	-37.13	2,713.33	0.16	0.16	0.00	
6,419.00	90.50	358.20	3,957.96	2,775.18	-39.13	2,775.30	0.23	-0.16	0.16	
6,480.00	88.20	357.80	3,958.66	2,836.14	-41.26	2,836.26	3.83	-3.77	-0.66	
6,542.00	89.00	357.40	3,960.17	2,898.06	-43.85	2,898.20	1.44	1.29	-0.65	
6,604.00	89.40	357.40	3,961.04	2,959.99	-46.66	2,960.14	0.65	0.65	0.00	
6,667.00	90.10	357.10	3,961.31	3,022.92	-49.69	3,023.08	1.21	1.11	-0.48	
6,727.00	90.70	357.10	3,960.89	3,082.84	-52.72	3,083.01	1.00	1.00	0.00	
6,789.00	91.00	356.90	3,959.97	3,144.75	-55.97	3,144.93	0.58	0.48	-0.32	
6,851.00	91.40	356.20	3,958.68	3,206.62	-59.70	3,206.81	1.30	0.65	-1.13	
6,912.00	90.20	355.90	3,957.82	3,267.47	-63.90	3,267.68	2.03	-1.97	-0.49	
6,974.00	90.40	355.60	3,957.50	3,329.30	-68.49	3,329.52	0.58	0.32	-0.48	
7,036.00	90.30	355.20	3,957.12	3,391.10	-73.47	3,391.34	0.67	-0.16	-0.65	
7,098.00	90.40	354.90	3,956.74	3,452.87	-78.82	3,453.12	0.51	0.16	-0.48	
7,159.00	90.60	355.00	3,956.21	3,513.63	-84.18	3,513.90	0.37	0.33	0.16	
7,221.00	91.10	354.40	3,955.29	3,575.36	-89.91	3,575.65	1.26	0.81	-0.97	
7,282.00	89.70	354.70	3,954.86	3,636.08	-95.70	3,636.39	2.35	-2.30	0.49	
7,344.00	89.80	354.70	3,955.13	3,697.81	-101.43	3,698.14	0.16	0.16	0.00	
7,406.00	89.80	354.70	3,955.35	3,759.55	-107.16	3,759.90	0.00	0.00	0.00	
7,468.00	90.40	354.40	3,955.24	3,821.27	-113.05	3,821.64	1.08	0.97	-0.48	
7,530.00	90.40	354.50	3,954.81	3,882.97	-119.04	3,883.36	0.16	0.00	0.16	
7,591.00	90.20	354.50	3,954.49	3,943.69	-124.89	3,944.10	0.33	-0.33	0.00	
7,653.00	89.90	354.20	3,954.44	4,005.39	-130.99	4,005.82	0.68	-0.48	-0.48	
7,714.00	90.20	353.80	3,954.38	4,066.06	-137.37	4,066.51	0.82	0.49	-0.66	
7,776.00	90.40	353.50	3,954.06	4,127.67	-144.23	4,128.15	0.58	0.32	-0.48	
7,838.00	90.90	353.60	3,953.35	4,189.28	-151.19	4,189.78	0.82	0.81	0.16	
7,900.00	89.50	354.10	3,953.14	4,250.92	-157.83	4,251.44	2.40	-2.26	0.81	
7,961.00	89.70	354.00	3,953.56	4,311.59	-164.16	4,312.14	0.37	0.33	-0.16	
8,023.00	90.30	354.10	3,953.56	4,373.25	-170.58	4,373.82	0.98	0.97	0.16	
8,085.00	90.70	354.40	3,953.02	4,434.94	-176.79	4,435.53	0.81	0.65	0.48	
8,146.00	91.40	354.40	3,951.91	4,495.64	-182.75	4,496.25	1.15	1.15	0.00	
8,208.00	90.60	354.90	3,950.82	4,557.36	-188.53	4,557.99	1.52	-1.29	0.81	
8,270.00	90.50	354.60	3,950.23	4,619.09	-194.20	4,619.74	0.51	-0.16	-0.48	
8,332.00	90.80	354.80	3,949.52	4,680.83	-199.93	4,681.49	0.58	0.48	0.32	
8,393.00	90.90	354.50	3,948.62	4,741.55	-205.61	4,742.24	0.52	0.16	-0.49	
8,409.93	91.02	354.46	3,948.34	4,758.40	-207.24	4,759.10	0.76	0.72	-0.24	
Overall 2-21H PBHL										



Company:	Unit Petroleum	Local Co-ordinate Reference:	Well Overall 2-21H
Project:	Reno County, Kansas [NAD 83]	TVD Reference:	14' KB @ 1775.00usft (UDI 331)
Site:	Section 21 T25S-R10W	MD Reference:	14' KB @ 1775.00usft (UDI 331)
Well:	Overall 2-21H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)	
8,476.00	91.50	354.30	3,946.88	4,824.14	-213.71	4,824.86	0.76	0.72	-0.24	
Last MWD Survey										
8,520.00	91.50	354.30	3,945.73	4,867.91	-218.08	4,868.64	0.00	0.00	0.00	
Projection to TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
8,476.00	3,946.88	4,824.14	-213.71	Last MWD Survey	
8,520.00	3,945.73	4,867.91	-218.08	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____