

30-025-42684

Read & Stevens INC

Lea County, NM (NAD 83)

SEC. 3, T20S-R34E

North Lea #3 Fed 4H

Wellbore #1

HOBBES ()

NOV 29 2018

RECEIVED

Design: Wellbore #1

Standard Survey Report

27 August, 2018

Survey Report

Company:	Read & Stevens INC	Local Co-ordinate Reference:	Well North Lea #3 Fed 4H
Project:	Lea County, NM (NAD 83)	TVD Reference:	KB=20' @ 3681.0ft (McVay 4)
Site:	SEC. 3, T20S-R34E	MD Reference:	KB=20' @ 3681.0ft (McVay 4)
Well:	North Lea #3 Fed 4H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	SEC. 3, T20S-R34E			
Site Position:		Northing:	586,163.01 usft	Latitude: 32.60894
From:	Lat/Long	Easting:	784,123.26 usft	Longitude: -103.54488
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence: 0.42 °

Well	North Lea #3 Fed 4H, ACTIVE			
Well Position	+N-S	0.0 ft	Northing: 586,008.71 usft	Latitude: 32.60857
	+E-W	0.0 ft	Easting: 781,482.17 usft	Longitude: -103.55346
Position Uncertainty	0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level: 3,661.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	HDGM	8/13/2018	(°) 6.63	(°) 60.57	(nT) 48,207

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	179.60	

Survey Program	Date 8/27/2018				
From	To	Survey (Wellbore)	Tool Name	Description	
(ft)	(ft)				
193.0	15,460.0	MWD Surveys (Wellbore #1)	MWD	Fixed:v2:standard declination	

Survey										
Measured	Inclination	Azimuth	Vertical	+N-S	+E-W	Vertical	Dogleg	Build	Turn	
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate	
(ft)			(ft)			(ft)	(°/100usft)	(°/100usft)	(°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
193.0	0.53	183.19	193.0	-0.9	0.0	0.9	0.27	0.27	0.00	
First MWD Survey @ 193'MD										
373.0	0.57	190.83	373.0	-2.6	-0.3	2.6	0.05	0.02	4.24	
552.0	0.75	210.92	552.0	-4.5	-1.0	4.5	0.16	0.10	11.22	
732.0	0.70	194.53	732.0	-6.6	-1.9	6.5	0.12	-0.03	-9.11	
913.0	1.14	196.90	912.9	-9.3	-2.7	9.3	0.24	0.24	1.31	
1,093.0	1.14	197.34	1,092.9	-12.8	-3.8	12.7	0.00	0.00	0.24	
1,273.0	1.32	211.49	1,272.9	-16.2	-5.4	16.2	0.20	0.10	7.86	
1,455.0	1.05	220.81	1,454.8	-19.3	-7.6	19.2	0.18	-0.15	5.12	
1,590.0	1.23	223.97	1,589.8	-21.3	-9.4	21.2	0.14	0.13	2.34	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,737.0	0.88	210.26	1,736.8	-23.4	-11.0	23.3	0.29	-0.24	-9.33	
1,925.0	1.14	200.15	1,924.7	-26.4	-12.4	26.3	0.17	0.14	-5.38	
2,114.0	0.92	238.56	2,113.7	-28.9	-14.4	28.8	0.37	-0.12	20.32	
2,208.0	1.10	237.24	2,207.7	-29.8	-15.8	29.7	0.19	0.19	-1.40	
2,302.0	0.70	244.71	2,301.7	-30.6	-17.0	30.4	0.44	-0.43	7.95	
2,491.0	0.35	309.93	2,490.7	-30.7	-18.5	30.6	0.34	-0.19	34.51	
2,679.0	0.35	3.54	2,678.7	-29.7	-18.9	29.6	0.17	0.00	28.52	
2,868.0	0.70	51.00	2,867.7	-28.4	-18.0	28.3	0.28	0.19	25.11	
3,056.0	1.10	41.07	3,055.6	-26.4	-15.9	26.2	0.23	0.21	-5.28	
3,245.0	1.76	39.66	3,244.6	-22.8	-12.9	22.7	0.35	0.35	-0.75	
3,433.0	0.84	54.87	3,432.5	-19.7	-9.9	19.7	0.52	-0.49	8.09	
3,621.0	0.12	110.94	3,620.5	-19.0	-8.6	19.0	0.41	-0.38	29.82	
3,810.0	0.75	173.52	3,809.5	-20.3	-8.3	20.3	0.37	0.33	33.11	
3,998.0	1.01	179.15	3,997.5	-23.2	-8.1	23.1	0.15	0.14	2.99	
4,187.0	0.92	185.30	4,186.5	-26.4	-8.2	26.3	0.07	-0.05	3.25	
4,375.0	1.36	190.31	4,374.4	-30.1	-8.8	30.0	0.24	0.23	2.66	
4,564.0	1.41	183.28	4,563.4	-34.6	-9.3	34.5	0.09	0.03	-3.72	
4,752.0	1.41	184.24	4,751.3	-39.2	-9.6	39.1	0.01	0.00	0.51	
4,945.0	1.45	178.79	4,944.3	-44.0	-9.7	44.0	0.07	0.02	-2.82	
5,132.0	1.45	186.62	5,131.2	-48.7	-10.0	48.7	0.11	0.00	4.19	
5,318.0	1.27	182.40	5,317.2	-53.1	-10.3	53.1	0.11	-0.10	-2.27	
5,421.0	1.67	172.03	5,420.1	-55.8	-10.1	55.7	0.46	0.39	-10.07	
5,535.0	1.27	126.32	5,534.1	-58.2	-8.9	58.1	1.05	-0.35	-40.10	
5,721.0	1.14	353.52	5,720.1	-57.5	-7.4	57.5	1.19	-0.07	-71.40	
5,908.0	1.14	354.84	5,907.0	-53.8	-7.8	53.8	0.01	0.00	0.71	
6,096.0	1.23	353.70	6,095.0	-50.0	-8.2	49.9	0.05	0.05	-0.61	
6,285.0	1.23	332.95	6,283.9	-46.1	-9.4	46.1	0.23	0.00	-10.98	
6,473.0	0.88	314.41	6,471.9	-43.3	-11.3	43.3	0.26	-0.19	-9.86	
6,661.0	0.35	270.11	6,659.9	-42.3	-12.9	42.2	0.36	-0.28	-23.56	
6,849.0	0.79	350.88	6,847.9	-41.0	-13.7	41.0	0.43	0.23	42.96	
7,035.0	0.48	357.65	7,033.9	-39.0	-13.9	38.9	0.17	-0.17	3.64	
7,222.0	0.18	42.39	7,220.9	-38.0	-13.8	37.9	0.20	-0.16	23.93	
7,408.0	0.53	30.70	7,406.9	-37.0	-13.1	37.0	0.19	0.19	-6.28	
7,594.0	0.30	120.50	7,592.9	-36.6	-12.3	36.5	0.33	-0.12	48.28	
7,780.0	0.31	240.84	7,778.9	-37.0	-12.3	37.0	0.28	0.01	64.70	
7,874.0	1.36	26.65	7,872.9	-36.2	-12.0	36.1	1.73	1.12	155.12	
7,967.0	1.93	9.78	7,965.8	-33.6	-11.2	33.6	0.80	0.61	-18.14	
8,153.0	1.89	1.17	8,151.7	-27.5	-10.7	27.4	0.16	-0.02	-4.63	
8,339.0	1.54	10.48	8,337.6	-22.0	-10.1	21.9	0.24	-0.19	5.01	
8,432.0	2.73	17.78	8,430.6	-18.6	-9.2	18.6	1.31	1.28	7.85	
8,525.0	2.24	17.16	8,523.5	-14.8	-8.0	14.7	0.53	-0.53	-0.67	
8,619.0	1.85	14.61	8,617.4	-11.6	-7.1	11.5	0.43	-0.41	-2.71	
8,712.0	1.76	17.87	8,710.4	-8.7	-6.3	8.7	0.15	-0.10	3.51	

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MD Reference: KB=20' @ 3681.0ft (McVay 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,805.0	1.23	0.90	8,803.4	-6.4	-5.8	6.4	0.74	-0.57	-18.25	
8,899.0	0.57	324.87	8,897.3	-5.0	-6.1	5.0	0.89	-0.70	-38.33	
8,992.0	1.58	0.55	8,990.3	-3.3	-6.3	3.3	1.25	1.09	38.37	
9,085.0	1.49	8.64	9,083.3	-0.9	-6.1	0.8	0.25	-0.10	8.70	
9,179.0	1.45	353.17	9,177.3	1.5	-6.1	-1.6	0.42	-0.04	-16.46	
9,272.0	1.14	345.87	9,270.2	3.6	-6.5	-3.6	0.38	-0.33	-7.85	
9,365.0	1.32	342.18	9,363.2	5.5	-7.0	-5.6	0.21	0.19	-3.97	
9,458.0	1.54	329.79	9,456.2	7.6	-8.0	-7.7	0.41	0.24	-13.32	
9,552.0	1.45	326.27	9,550.2	9.7	-9.3	-9.8	0.14	-0.10	-3.74	
9,645.0	1.14	328.21	9,643.1	11.5	-10.4	-11.5	0.34	-0.33	2.09	
9,738.0	1.45	331.64	9,736.1	13.3	-11.5	-13.4	0.34	0.33	3.69	
9,832.0	1.01	322.93	9,830.1	15.0	-12.5	-15.1	0.51	-0.47	-9.27	
9,925.0	0.53	304.13	9,923.1	15.9	-13.4	-16.0	0.58	-0.52	-20.22	
10,019.0	0.40	223.18	10,017.1	15.9	-14.0	-16.0	0.65	-0.14	-86.12	
10,112.0	0.35	176.86	10,110.1	15.4	-14.2	-15.5	0.32	-0.05	-49.81	
10,162.0	0.57	169.48	10,160.1	15.0	-14.1	-15.1	0.45	0.44	-14.76	
10,205.0	0.79	180.73	10,203.1	14.5	-14.1	-14.6	0.60	0.51	26.16	
10,251.0	3.12	156.03	10,249.0	13.0	-13.6	-13.1	5.27	5.07	-53.70	
10,299.0	7.43	159.46	10,296.8	8.9	-11.9	-9.0	9.00	8.98	7.15	
10,346.0	13.10	166.66	10,343.1	0.9	-9.6	-0.9	12.35	12.06	15.32	
10,392.0	15.12	169.83	10,387.7	-10.1	-7.4	10.1	4.70	4.39	6.89	
10,438.0	18.07	170.44	10,431.7	-23.1	-5.1	23.0	6.42	6.41	1.33	
10,485.0	20.04	175.98	10,476.2	-38.3	-3.4	38.3	5.69	4.19	11.79	
10,531.0	22.59	178.00	10,519.0	-55.0	-2.5	55.0	5.77	5.54	4.39	
10,575.0	26.90	177.91	10,559.0	-73.4	-1.8	73.4	9.80	9.80	-0.20	
10,607.0	31.08	177.21	10,587.0	-88.9	-1.2	88.9	13.11	13.06	-2.19	
10,638.0	35.69	175.37	10,612.8	-105.9	-0.1	105.9	15.22	14.87	-5.94	
10,669.0	40.13	173.87	10,637.3	-124.8	1.7	124.9	14.63	14.32	-4.84	
10,700.0	43.87	174.93	10,660.3	-145.5	3.8	145.5	12.28	12.06	3.42	
10,731.0	47.38	177.12	10,682.0	-167.6	5.3	167.6	12.40	11.32	7.06	
10,762.0	51.34	179.15	10,702.2	-191.1	6.0	191.1	13.71	12.77	6.55	
10,793.0	54.42	179.88	10,720.9	-215.8	6.2	215.8	10.11	9.94	2.35	
10,824.0	57.76	179.76	10,738.2	-241.5	6.3	241.6	10.78	10.77	-0.39	
10,855.0	61.49	179.32	10,753.9	-268.3	6.5	268.3	12.09	12.03	-1.42	
10,887.0	65.54	178.27	10,768.1	-296.9	7.1	296.9	12.99	12.66	-3.28	
10,918.0	68.75	176.86	10,780.2	-325.4	8.4	325.5	11.17	10.35	-4.55	
10,949.0	72.04	175.89	10,790.6	-354.6	10.2	354.6	11.01	10.61	-3.13	
10,980.0	76.18	175.28	10,799.0	-384.3	12.5	384.4	13.49	13.35	-1.97	
11,013.0	79.82	176.33	10,805.9	-416.5	14.9	416.6	11.46	11.03	3.18	
11,044.0	80.75	177.39	10,811.1	-447.0	16.5	447.1	4.51	3.00	3.42	
11,075.0	80.35	178.18	10,816.2	-477.5	17.7	477.7	2.83	-1.29	2.55	
11,137.0	81.67	178.35	10,825.9	-538.7	19.6	538.9	2.15	2.13	0.27	
11,184.0	83.12	179.06	10,832.1	-585.3	20.6	585.5	3.43	3.09	1.51	

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Design:	Wellbore #1	Database:	EDM 5000.1

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11,230.0	84.53	179.41	10,837.1	-631.0	21.2	631.2	3.16	3.07	0.76	
11,292.0	85.93	179.94	10,842.2	-692.8	21.6	693.0	2.41	2.26	0.85	
11,324.0	86.86	180.29	10,844.3	-724.8	21.5	724.9	3.10	2.91	1.09	
11,365.0	88.09	180.55	10,846.1	-765.7	21.2	765.9	3.07	3.00	0.63	
11,417.0	89.27	180.64	10,847.3	-817.7	20.7	817.8	2.28	2.27	0.17	
11,510.0	89.01	180.82	10,848.7	-910.7	19.5	910.8	0.34	-0.28	0.19	
11,604.0	89.23	181.26	10,850.1	-1,004.7	17.8	1,004.8	0.52	0.23	0.47	
11,697.0	90.15	179.23	10,850.6	-1,097.7	17.4	1,097.8	2.40	0.99	-2.18	
11,790.0	90.81	179.58	10,849.8	-1,190.6	18.4	1,190.7	0.80	0.71	0.38	
11,883.0	89.36	180.11	10,849.7	-1,283.6	18.6	1,283.7	1.66	-1.56	0.57	
11,976.0	88.92	179.85	10,851.1	-1,376.6	18.6	1,376.7	0.55	-0.47	-0.28	
12,069.0	89.89	178.97	10,852.0	-1,469.6	19.6	1,469.7	1.41	1.04	-0.95	
12,110.0	89.19	179.06	10,852.4	-1,510.6	20.3	1,510.7	1.72	-1.71	0.22	
12,162.0	88.53	179.67	10,853.4	-1,562.6	20.9	1,562.7	1.73	-1.27	1.17	
12,211.0	89.41	179.85	10,854.3	-1,611.6	21.1	1,611.7	1.83	1.80	0.37	
12,274.0	90.33	179.94	10,854.4	-1,674.6	21.2	1,674.7	1.47	1.46	0.14	
12,367.0	90.37	180.11	10,853.9	-1,767.6	21.2	1,767.7	0.19	0.04	0.18	
12,460.0	90.02	180.02	10,853.5	-1,860.6	21.1	1,860.7	0.39	-0.38	-0.10	
12,554.0	89.67	180.73	10,853.8	-1,954.6	20.4	1,954.7	0.84	-0.37	0.76	
12,648.0	89.67	179.58	10,854.3	-2,048.6	20.2	2,048.7	1.22	0.00	-1.22	
12,741.0	89.36	180.73	10,855.1	-2,141.6	19.9	2,141.7	1.28	-0.33	1.24	
12,836.0	89.01	179.06	10,856.5	-2,236.6	20.1	2,236.6	1.80	-0.37	-1.76	
12,930.0	89.98	178.71	10,857.3	-2,330.5	21.9	2,330.6	1.10	1.03	-0.37	
13,024.0	89.67	179.41	10,857.6	-2,424.5	23.5	2,424.6	0.81	-0.33	0.74	
13,119.0	89.01	180.20	10,858.7	-2,519.5	23.8	2,519.6	1.08	-0.69	0.83	
13,213.0	89.85	180.02	10,859.6	-2,613.5	23.6	2,613.6	0.91	0.89	-0.19	
13,308.0	89.67	180.64	10,860.0	-2,708.5	23.1	2,708.6	0.68	-0.19	0.65	
13,402.0	89.41	181.25	10,860.8	-2,802.5	21.5	2,802.6	0.71	-0.28	0.65	
13,497.0	89.71	180.20	10,861.5	-2,897.5	20.3	2,897.6	1.15	0.32	-1.11	
13,591.0	89.32	180.82	10,862.3	-2,991.5	19.5	2,991.5	0.78	-0.41	0.66	
13,686.0	89.14	179.94	10,863.6	-3,086.5	18.9	3,086.5	0.95	-0.19	-0.93	
13,780.0	89.93	178.35	10,864.3	-3,180.4	20.3	3,180.5	1.89	0.84	-1.69	
13,875.0	89.89	179.15	10,864.5	-3,275.4	22.3	3,275.5	0.84	-0.04	0.84	
13,969.0	90.55	178.35	10,864.1	-3,369.4	24.4	3,369.5	1.10	0.70	-0.85	
14,063.0	90.46	178.97	10,863.3	-3,463.4	26.6	3,463.5	0.67	-0.10	0.66	
14,157.0	89.80	179.41	10,863.1	-3,557.4	27.9	3,557.5	0.84	-0.70	0.47	
14,252.0	89.14	179.67	10,864.0	-3,652.3	28.7	3,652.5	0.75	-0.69	0.27	
14,346.0	88.79	179.76	10,865.7	-3,746.3	29.1	3,746.4	0.38	-0.37	0.10	
14,441.0	89.01	179.58	10,867.5	-3,841.3	29.7	3,841.4	0.30	0.23	-0.19	
14,535.0	89.93	179.15	10,868.4	-3,935.3	30.7	3,935.4	1.08	0.98	-0.46	
14,629.0	90.24	179.67	10,868.2	-4,029.3	31.7	4,029.4	0.64	0.33	0.55	
14,724.0	90.37	180.38	10,867.7	-4,124.3	31.7	4,124.4	0.76	0.14	0.75	
14,817.0	91.12	181.34	10,866.5	-4,217.3	30.3	4,217.4	1.31	0.81	1.03	
14,912.0	90.68	181.78	10,865.0	-4,312.2	27.7	4,312.3	0.65	-0.46	0.46	

Survey Report

Company: Read & Stevens INC
Project: Lea County, NM (NAD 83)
Site: SEC. 3, T20S-R34E
Well: North Lea #3 Fed 4H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well North Lea #3 Fed 4H
TVD Reference: KB=20' @ 3681.0ft (McVay 4)
MD Reference: KB=20' @ 3681.0ft (McVay 4)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,006.0	89.63	180.63	10,864.8	-4,406.2	25.7	4,406.3	1.66	-1.12	-1.22
15,100.0	88.18	179.67	10,866.6	-4,500.2	25.4	4,500.2	1.85	-1.54	-1.02
15,195.0	87.78	179.76	10,869.9	-4,595.1	25.9	4,595.2	0.43	-0.42	0.09
15,250.6	87.34	179.97	10,872.3	-4,650.7	26.1	4,650.7	0.88	-0.80	0.37
LTP @ 15250'MD (330'FSL)									
15,289.0	87.03	180.11	10,874.2	-4,689.0	26.0	4,689.1	0.88	-0.80	0.37
15,383.0	86.64	180.82	10,879.4	-4,782.9	25.3	4,782.9	0.86	-0.41	0.76
Last MWD Survey @ 15383'MD									
15,460.0	86.64	180.82	10,883.9	-4,859.7	24.2	4,859.8	0.00	0.00	0.00
PTB @ TD @ 15460'MD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N-S (ft)	+E-W (ft)	
193.0	193.0	-0.9	0.0	First MWD Survey @ 193'MD
15,250.6	10,872.3	-4,650.7	26.1	LTP @ 15250'MD (330'FSL)
15,383.0	10,879.4	-4,782.9	25.3	Last MWD Survey @ 15383'MD
15,460.0	10,883.9	-4,859.7	24.2	PTB @ TD @ 15460'MD

Checked By: _____ Approved By: _____ Date: _____