



Chevron

**Lea County, NM (NAD27 NME)
Salado Draw 29 26 33 Fed Com
4H - Slot 4H**

OH / Job 1514337

Survey: Phoenix MWD Surveys

Standard Survey Report

13 November, 2015





Phoenix Technology Services LP

Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well 4H - Slot 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3243.00usft (Pace X30)
Site:	Salado Draw 29 26 33 Fed Com	MD Reference:	RKB @ 3243.00usft (Pace X30)
Well:	4H	North Reference:	Grid
Wellbore:	OH / Job 1514337	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pace X30)	Database:	Compass 5000 GCR

Project	Lea County, NM (NAD27 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		Salado Draw 29 26 33 Fed Com			
Site Position:		Northing:	372,173.00 usft	Latitude:	32° 1' 15.91374 N
From:	Map	Easting:	727,838.00 usft	Longitude:	103° 35' 53.52012 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.39 °

Well	4H - Slot 4H					
Well Position	+N/-S	0.00 usft	Northing:	372,174.00 usft	Latitude:	32° 1' 15.91858 N
	+E/-W	0.00 usft	Easting:	727,913.00 usft	Longitude:	103° 35' 52.64893 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,216.00 usft

Wellbore	OH / Job 1514337				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/7/2015	7.02	59.75	48,070

Design	Surveys (Pace X30)				
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	172.45	

Survey Program	Date 11/13/2015				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
158.00	16,619.00	Phoenix MWD Surveys (OH / Job 1514337)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM	

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	
158.00	0.89	167.68	157.99	-1.20	0.26	1.22	0.56	0.56	0.00	
First Phoenix Survey										
314.00	0.87	176.76	313.98	-3.56	0.59	3.61	0.09	-0.01	5.82	
501.00	0.96	183.14	500.95	-6.55	0.58	6.57	0.07	0.05	3.41	
687.00	0.92	180.38	686.93	-9.60	0.49	9.58	0.03	-0.02	-1.48	
795.00	1.15	180.71	794.91	-11.55	0.47	11.51	0.21	0.21	0.31	
948.00	1.01	183.39	947.88	-14.43	0.37	14.35	0.10	-0.09	1.75	
1,125.00	0.81	210.65	1,124.86	-17.06	-0.36	16.87	0.27	-0.11	15.40	
1,303.00	1.29	54.06	1,302.85	-16.97	0.62	16.90	1.16	0.27	-87.97	
1,480.00	1.30	47.00	1,479.80	-14.43	3.70	14.79	0.09	0.01	-3.99	



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Site:	Salado Draw 29 26 33 Fed Com	MD Reference:	RKB @ 3243.00usft (Pace X30)
Well:	4H	North Reference:	Grid
Wellbore:	OH / Job 1514337	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pace X30)	Database:	Compass 5000 GCR

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)
1,658.00	1.57	41.87	1,657.75	-11.24	6.81	12.03	0.17	0.15	-2.88
1,835.00	1.74	37.04	1,834.67	-7.29	10.04	8.54	0.12	0.10	-2.73
2,012.00	2.11	56.06	2,011.57	-3.32	14.36	5.18	0.41	0.21	10.75
2,189.00	3.16	88.97	2,188.39	-1.41	21.95	4.28	1.02	0.59	18.59
2,367.00	2.46	86.50	2,366.18	-1.09	30.66	5.11	0.40	-0.39	-1.39
2,544.00	2.38	87.96	2,543.02	-0.73	38.13	5.73	0.06	-0.05	0.82
2,721.00	2.40	83.55	2,719.87	-0.18	45.48	6.16	0.10	0.01	-2.49
2,898.00	2.13	76.22	2,896.73	1.02	52.36	5.87	0.22	-0.15	-4.14
3,075.00	2.66	88.38	3,073.58	1.92	59.66	5.94	0.41	0.30	6.87
3,253.00	2.73	89.46	3,251.38	2.07	68.03	6.88	0.05	0.04	0.61
3,430.00	3.17	88.48	3,428.14	2.24	77.14	7.91	0.25	0.25	-0.55
3,607.00	6.14	84.93	3,604.54	3.21	91.46	8.83	1.69	1.68	-2.01
3,785.00	6.64	81.50	3,781.43	5.57	111.12	9.07	0.35	0.28	-1.93
3,962.00	6.41	80.88	3,957.29	8.65	131.00	8.63	0.14	-0.13	-0.35
4,139.00	6.24	80.28	4,133.21	11.84	150.23	7.99	0.10	-0.10	-0.34
4,317.00	6.71	81.91	4,310.07	14.94	170.06	7.53	0.28	0.26	0.92
4,494.00	6.95	85.49	4,485.82	17.23	190.98	8.00	0.28	0.14	2.02
4,672.00	7.17	88.15	4,662.47	18.44	212.82	9.67	0.22	0.12	1.49
4,787.00	7.06	88.19	4,776.58	18.90	227.05	11.09	0.10	-0.10	0.03
4,952.00	6.36	83.03	4,940.45	20.32	246.26	12.20	0.56	-0.42	-3.13
5,130.00	7.55	83.18	5,117.14	22.91	267.66	12.44	0.67	0.67	0.08
5,307.00	7.36	80.79	5,292.65	26.10	290.40	12.26	0.21	-0.11	-1.35
5,484.00	6.98	77.20	5,468.26	30.30	312.07	10.95	0.33	-0.21	-2.03
5,662.00	8.96	75.02	5,644.53	36.28	336.01	8.17	1.13	1.11	-1.22
5,839.00	9.61	79.74	5,819.22	42.48	363.87	5.68	0.57	0.37	2.67
6,017.00	9.43	83.16	5,994.77	46.86	392.97	5.16	0.33	-0.10	1.92
6,194.00	9.34	80.65	6,169.40	50.92	421.53	4.89	0.24	-0.05	-1.42
6,371.00	10.64	86.86	6,343.72	54.15	452.02	5.69	0.95	0.73	3.51
6,548.00	10.26	92.93	6,517.79	54.24	484.08	9.81	0.66	-0.21	3.43
6,725.00	8.93	90.40	6,692.31	53.34	513.57	14.58	0.79	-0.75	-1.43
6,903.00	8.41	86.64	6,868.27	54.00	540.38	17.44	0.43	-0.29	-2.11
7,080.00	8.25	84.04	7,043.41	56.08	565.93	18.74	0.23	-0.09	-1.47
7,258.00	8.73	79.29	7,219.46	59.92	591.90	18.35	0.48	0.27	-2.67
7,435.00	8.78	78.65	7,394.40	65.07	618.35	16.71	0.06	0.03	-0.36
7,612.00	8.44	82.35	7,569.40	69.46	644.46	15.79	0.37	-0.19	2.09
7,790.00	9.10	88.97	7,745.32	71.45	671.49	17.36	0.68	0.37	3.72
7,968.00	8.70	80.44	7,921.19	73.94	698.84	18.49	0.77	-0.22	-4.79
8,145.00	9.68	86.59	8,095.92	77.05	726.89	19.09	0.78	0.55	3.47
8,322.00	9.01	87.85	8,270.57	78.45	755.60	21.47	0.40	-0.38	0.71
8,500.00	9.10	88.74	8,446.35	79.29	783.60	24.32	0.09	0.05	0.50
8,677.00	7.84	91.27	8,621.42	79.33	809.66	27.71	0.74	-0.71	1.43
8,727.00	6.93	91.92	8,671.00	79.15	816.09	28.72	1.83	-1.82	1.30
8,787.00	7.22	99.15	8,730.55	78.43	823.43	30.40	1.56	0.48	12.05



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Survey Report



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Site:	Salado Draw 29 26 33 Fed Com	MD Reference:	RKB @ 3243.00usft (Pace X30)
Well:	4H	North Reference:	Grid
Wellbore:	OH / Job 1514337	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pace X30)	Database:	Compass 5000 GCR

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)
8,831.00	11.22	117.13	8,773.98	76.04	829.97	33.64	11.10	9.09	40.86
8,876.00	17.71	125.87	8,817.53	70.02	839.42	40.84	15.18	14.42	19.42
8,920.00	23.49	132.10	8,858.71	60.21	851.36	52.13	14.03	13.14	14.16
8,964.00	25.91	145.99	8,898.71	46.35	863.26	67.44	14.25	5.50	31.57
9,009.00	28.97	159.41	8,938.68	27.98	872.60	86.88	15.29	6.80	29.82
9,053.00	33.65	168.04	8,976.28	6.05	878.88	109.44	14.71	10.64	19.61
9,097.00	38.84	172.55	9,011.76	-19.58	883.20	135.41	13.25	11.80	10.25
9,142.00	42.67	174.32	9,045.85	-48.76	886.54	164.78	8.89	8.51	3.93
9,186.00	47.02	175.67	9,077.04	-79.66	889.23	195.76	10.12	9.89	3.07
9,230.00	53.11	173.51	9,105.27	-113.22	892.44	229.46	14.34	13.84	-4.91
9,274.00	58.86	170.60	9,129.88	-149.32	897.51	265.91	14.17	13.07	-6.61
9,319.00	65.99	169.64	9,150.70	-188.59	904.36	305.74	15.96	15.84	-2.13
9,363.00	71.98	172.78	9,166.47	-229.16	910.61	346.78	15.15	13.61	7.14
9,407.00	76.29	175.37	9,178.50	-271.24	914.97	389.07	11.31	9.80	5.89
9,452.00	79.24	176.34	9,188.03	-315.10	918.15	432.96	6.89	6.56	2.16
9,479.00	81.44	175.54	9,192.56	-341.65	920.03	459.53	8.66	8.15	-2.96
9,568.00	85.46	178.48	9,202.72	-429.92	924.63	547.64	5.58	4.52	3.30
9,657.00	88.46	179.06	9,207.44	-518.76	926.54	635.96	3.43	3.37	0.65
9,745.00	90.53	178.75	9,208.21	-606.74	928.22	723.40	2.38	2.35	-0.35
9,834.00	89.08	179.49	9,208.51	-695.72	929.59	811.79	1.83	-1.63	0.83
9,923.00	88.49	179.29	9,210.40	-784.70	930.53	900.12	0.70	-0.66	-0.22
10,011.00	90.03	179.18	9,211.54	-872.68	931.71	987.50	1.75	1.75	-0.13
10,100.00	91.93	181.32	9,210.02	-961.66	931.32	1,075.65	3.22	2.13	2.40
10,188.00	90.81	181.04	9,207.91	-1,049.61	929.51	1,162.61	1.31	-1.27	-0.32
10,277.00	90.56	182.86	9,206.85	-1,138.55	926.48	1,250.38	2.06	-0.28	2.04
10,365.00	90.48	183.40	9,206.05	-1,226.42	921.68	1,336.85	0.62	-0.09	0.61
10,454.00	90.61	182.25	9,205.20	-1,315.30	917.29	1,424.39	1.30	0.15	-1.29
10,543.00	88.91	179.15	9,205.58	-1,404.28	916.20	1,512.45	3.97	-1.91	-3.48
10,631.00	87.62	178.14	9,208.24	-1,492.21	918.28	1,599.90	1.86	-1.47	-1.15
10,720.00	89.02	178.78	9,210.85	-1,581.14	920.67	1,688.37	1.73	1.57	0.72
10,808.00	89.94	181.42	9,211.65	-1,669.13	920.52	1,775.57	3.18	1.05	3.00
10,897.00	87.98	178.82	9,213.26	-1,758.10	920.33	1,863.75	3.66	-2.20	-2.92
10,985.00	88.13	178.62	9,216.25	-1,846.03	922.30	1,951.17	0.28	0.17	-0.23
11,074.00	88.23	179.48	9,219.08	-1,934.97	923.77	2,039.54	0.97	0.11	0.97
11,163.00	89.30	180.64	9,220.99	-2,023.95	923.68	2,127.73	1.77	1.20	1.30
11,251.00	89.16	182.17	9,222.18	-2,111.91	921.52	2,214.65	1.75	-0.16	1.74
11,340.00	87.93	179.73	9,224.44	-2,200.86	920.05	2,302.64	3.07	-1.38	-2.74
11,429.00	87.73	180.17	9,227.81	-2,289.80	920.12	2,390.81	0.54	-0.22	0.49
11,518.00	89.36	179.06	9,230.07	-2,378.76	920.72	2,479.08	2.22	1.83	-1.25
11,606.00	92.75	180.09	9,228.45	-2,466.73	921.38	2,566.38	4.03	3.85	1.17
11,695.00	90.98	178.32	9,225.55	-2,555.67	922.61	2,654.71	2.81	-1.99	-1.99
11,784.00	89.72	176.89	9,225.01	-2,644.58	926.33	2,743.34	2.14	-1.42	-1.61
11,872.00	86.70	176.17	9,227.76	-2,732.37	931.65	2,831.06	3.53	-3.43	-0.82



Phoenix Technology Services LP

Survey Report



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Site:	Salado Draw 29 26 33 Fed Com	MD Reference:	RKB @ 3243.00usft (Pace X30)
Well:	4H	North Reference:	Grid
Wellbore:	OH / Job 1514337	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pace X30)	Database:	Compass 5000 GCR

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)	
11,961.00	88.13	175.89	9,231.77	-2,821.06	937.81	2,919.80	1.64	1.61	-0.31	
12,050.00	90.17	178.50	9,233.09	-2,909.93	942.16	3,008.47	3.72	2.29	2.93	
12,138.00	91.37	180.54	9,231.91	-2,997.92	942.90	3,095.79	2.69	1.36	2.32	
12,227.00	89.41	178.61	9,231.30	-3,086.90	943.56	3,184.09	3.09	-2.20	-2.17	
12,316.00	92.02	177.36	9,230.19	-3,175.83	946.69	3,272.66	3.25	2.93	-1.40	
12,404.00	90.45	176.72	9,228.29	-3,263.69	951.23	3,360.35	1.93	-1.78	-0.73	
12,493.00	89.81	177.75	9,228.09	-3,352.58	955.52	3,449.04	1.36	-0.72	1.16	
12,582.00	88.91	178.30	9,229.09	-3,441.52	958.59	3,537.62	1.19	-1.01	0.62	
12,670.00	88.29	179.62	9,231.24	-3,529.48	960.19	3,625.02	1.66	-0.70	1.50	
12,759.00	89.75	182.23	9,232.76	-3,618.45	958.75	3,713.03	3.36	1.64	2.93	
12,848.00	88.57	182.81	9,234.06	-3,707.35	954.84	3,800.64	1.48	-1.33	0.65	
12,937.00	90.14	184.77	9,235.07	-3,796.14	948.96	3,887.90	2.82	1.76	2.20	
13,025.00	91.15	184.19	9,234.08	-3,883.87	942.08	3,973.96	1.32	1.15	-0.66	
13,114.00	91.82	182.66	9,231.77	-3,972.67	936.77	4,061.30	1.88	0.75	-1.72	
13,202.00	88.60	179.12	9,231.45	-4,060.64	935.40	4,148.32	5.44	-3.66	-4.02	
13,291.00	89.47	183.64	9,232.95	-4,149.58	933.26	4,236.20	5.17	0.98	5.08	
13,380.00	91.37	184.32	9,232.29	-4,238.35	927.08	4,323.40	2.27	2.13	0.76	
13,469.00	91.46	180.51	9,230.09	-4,327.23	923.33	4,411.02	4.28	0.10	-4.28	
13,557.00	89.72	176.28	9,229.19	-4,415.17	925.80	4,498.52	5.20	-1.98	-4.81	
13,646.00	87.25	176.69	9,231.54	-4,503.96	931.25	4,587.26	2.81	-2.78	0.46	
13,735.00	88.01	176.46	9,235.22	-4,592.73	936.56	4,675.95	0.89	0.85	-0.26	
13,824.00	85.72	177.34	9,240.09	-4,681.46	941.37	4,764.54	2.76	-2.57	0.99	
13,913.00	86.08	177.38	9,246.45	-4,770.13	945.46	4,852.99	0.41	0.40	0.04	
14,001.00	86.28	179.08	9,252.31	-4,857.89	948.17	4,940.35	1.94	0.23	1.93	
14,090.00	87.96	179.11	9,256.79	-4,946.77	949.58	5,028.63	1.89	1.89	0.03	
14,178.00	87.31	178.27	9,260.42	-5,034.67	951.58	5,116.04	1.21	-0.74	-0.95	
14,267.00	88.44	178.47	9,263.72	-5,123.57	954.11	5,204.50	1.29	1.27	0.22	
14,356.00	91.01	178.98	9,264.15	-5,212.54	956.09	5,292.96	2.94	2.89	0.57	
14,445.00	92.15	178.26	9,261.69	-5,301.48	958.24	5,381.41	1.51	1.28	-0.81	
14,533.00	94.09	177.62	9,256.90	-5,389.29	961.40	5,468.87	2.32	2.20	-0.73	
14,622.00	94.09	176.90	9,250.55	-5,477.96	965.64	5,557.33	0.81	0.00	-0.81	
14,710.00	91.87	179.16	9,245.98	-5,565.77	968.66	5,644.78	3.60	-2.52	2.57	
14,799.00	90.03	179.18	9,244.50	-5,654.75	969.95	5,733.16	2.07	-2.07	0.02	
14,888.00	87.59	179.52	9,246.35	-5,743.72	970.96	5,821.49	2.77	-2.74	0.38	
14,976.00	88.13	179.39	9,249.64	-5,831.65	971.79	5,908.77	0.63	0.61	-0.15	
15,065.00	89.61	179.76	9,251.39	-5,920.63	972.45	5,997.06	1.71	1.66	0.42	
15,153.00	88.49	178.85	9,252.85	-6,008.61	973.52	6,084.42	1.64	-1.27	-1.03	
15,242.00	89.30	179.99	9,254.57	-6,097.59	974.42	6,172.75	1.57	0.91	1.28	
15,331.00	88.49	181.13	9,256.28	-6,186.56	973.55	6,260.84	1.57	-0.91	1.28	
15,420.00	88.13	181.57	9,258.91	-6,275.50	971.45	6,348.73	0.64	-0.40	0.49	
15,508.00	88.46	182.91	9,261.53	-6,363.39	968.02	6,435.41	1.57	0.38	1.52	
15,597.00	89.58	182.10	9,263.05	-6,452.29	964.13	6,523.03	1.55	1.26	-0.91	
15,686.00	86.67	181.09	9,265.96	-6,541.20	961.65	6,610.84	3.46	-3.27	-1.13	
15,775.00	86.75	180.28	9,271.07	-6,630.04	960.59	6,698.77	0.91	0.09	-0.91	



Phoenix Technology Services LP

Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well 4H - Slot 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3243.00usft (Pace X30)
Site:	Salado Draw 29 26 33 Fed Com	MD Reference:	RKB @ 3243.00usft (Pace X30)
Well:	4H	North Reference:	Grid
Wellbore:	OH / Job 1514337	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pace X30)	Database:	Compass 5000 GCR

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)
15,863.00	86.98	180.31	9,275.88	-6,717.91	960.14	6,785.82	0.26	0.26	0.03
15,952.00	88.54	181.32	9,279.36	-6,806.83	958.87	6,873.80	2.09	1.75	1.13
16,041.00	91.40	182.10	9,279.41	-6,895.78	956.22	6,961.63	3.33	3.21	0.88
16,129.00	88.96	180.69	9,279.13	-6,983.74	954.07	7,048.56	3.20	-2.77	-1.60
16,218.00	88.93	179.00	9,280.77	-7,072.73	954.31	7,136.80	1.90	-0.03	-1.90
16,307.00	89.39	178.84	9,282.07	-7,161.70	955.99	7,225.22	0.55	0.52	-0.18
16,395.00	86.86	177.72	9,284.95	-7,249.60	958.63	7,312.71	3.14	-2.88	-1.27
16,484.00	84.99	176.46	9,291.28	-7,338.26	963.14	7,401.19	2.53	-2.10	-1.42
16,561.00	85.32	176.44	9,297.78	-7,414.84	967.89	7,477.73	0.43	0.43	-0.03
Final Phoenix Survey				-7,472.53	971.48	7,535.39	0.00	0.00	0.00
16,619.00									
Projection to TD									

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
158.00	157.99	-1.20	0.26	First Phoenix Survey	
16,561.00	9,297.78	-7,414.84	967.89	Final Phoenix Survey	
16,619.00	9,302.51	-7,472.53	971.48	Projection to TD	

Checked By: _____ Approved By: _____ Date: _____