

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1411428

ENERGY COMPANY

Chevron

WELL NAME

Hayhurst 16-25-27 State #4H

COUNTY & STATE

Eddy, NM

API WELL NUMBER

30-015-42553

PROPOSED DIRECTION

179.75°

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
0.00	.00 ft	0.00	0.00	.00 ft	.00 ft	Surface

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
10-Sep-14	236.00 ft	0.95	273.35

SURVEY INSTRUMENT

TYPE

Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
12-Oct-14	12,289.00 ft	91.06°	182.53°

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
12-Oct-14	12,349.00 ft	91.06°	182.53°

Eli Haley

PRINT YOUR NAME ABOVE

Eli Haley

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	
	7.4
DECLINATION OR GRID	GRID

10/13/2014

TODAY'S DATE

MWD SUPERVISOR 1

Benjamin Maulding

DIRECTIONAL DRILLER 1

Brooks Volentine

MWD SUPERVISOR 2

Michael Rachal

DIRECTIONAL DRILLER 2

James Thames

12329 Cutten Rd., Houston, Texas 777066

(713)337-0600 (Voice), (713)337-0599 (Fax)



Chevron

Eddy County NM (NAD27 NME)

Hayhurst 16-25-27 State

#4H

WB1/Job #1411428

Survey: Pheonix MWD Survey

Standard Survey Report

23 October, 2014





Phoenix Technology Services

Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3218.00usft (Ensign 767)
Site:	Hayhurst 16-25-27 State	MD Reference:	KB @ 3218.00usft (Ensign 767)
Well:	#4H	North Reference:	Grid
Wellbore:	WB1/Job #1411428	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 767)	Database:	Compass 5000 GCR epdm

Project	Eddy 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	Hayhurst 16-25-27 State		
Site Position:		Northing:	413,517.00 usft
From:	Map	Easting:	543,787.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 8' 12.46493 N
		Longitude:	104° 11' 30.73979 W
		Grid Convergence:	0.08 °

Well	#4H		
Well Position	+N/-S	0.00 usft	Northing: 413,525.00 usft
	+E/-W	0.00 usft	Easting: 544,531.00 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 8' 12.53435 N
		Longitude:	104° 11' 22.08668 W
		Ground Level:	3,187.00 usft

Wellbore	WB1/Job #1411428		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010_14	8/01/14	7.48
			Dip Angle (°) 59.92
			Field Strength (nT) 48,185

Design	Surveys (Ensign 767)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction (°) 179.75

Survey Program	Date 10/23/14		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
236.00	12,349.00	Phoenix MWD Survey (WB1/Job #141142)	PHX+MWD+IGRF
			Description PHX+MWD+IGRF v3:standard declination

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
236.00	0.95	273.35	235.99	0.11	-1.95	-0.12	0.40	0.40	0.00
First Phoenix MWD Survey									
416.00	1.10	259.99	415.96	-0.10	-5.14	0.08	0.16	0.08	-7.42
597.00	1.13	277.29	596.93	-0.17	-8.63	0.14	0.19	0.02	9.56
777.00	1.04	285.61	776.89	0.49	-11.96	-0.54	0.10	-0.05	4.62
961.00	1.32	285.29	960.86	1.50	-15.61	-1.57	0.15	0.15	-0.17
1,152.00	1.36	289.03	1,151.80	2.82	-19.88	-2.90	0.05	0.02	1.96
1,342.00	1.50	286.02	1,341.74	4.24	-24.40	-4.35	0.08	0.07	-1.58
1,532.00	0.64	15.12	1,531.72	5.95	-26.51	-6.07	0.85	-0.45	46.89
1,722.00	0.89	65.39	1,721.70	7.59	-24.89	-7.70	0.36	0.13	26.46



Phoenix Technology Services
Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3218.00usft (Ensign 767)
Site:	Hayhurst 16-25-27 State	MD Reference:	KB @ 3218.00usft (Ensign 767)
Well:	#4H	North Reference:	Grid
Wellbore:	WB1/Job #1411428	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 767)	Database:	Compass 5000 GCR epdm

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)
1,912.00	2.70	83.75	1,911.60	8.69	-19.10	-8.77	0.99	0.95	9.66
2,093.00	2.38	76.12	2,092.43	10.06	-11.22	-10.11	0.26	-0.18	-4.22
2,282.00	1.97	59.40	2,281.29	12.65	-4.61	-12.67	0.40	-0.22	-8.85
2,473.00	2.18	57.27	2,472.17	16.29	1.27	-16.28	0.12	0.11	-1.12
2,663.00	0.83	185.57	2,662.12	16.87	4.18	-16.85	1.46	-0.71	67.53
2,853.00	1.02	186.77	2,852.10	13.82	3.84	-13.81	0.10	0.10	0.63
3,043.00	1.09	214.97	3,042.07	10.66	2.61	-10.65	0.27	0.04	14.84
3,234.00	1.02	221.99	3,233.04	7.91	0.43	-7.91	0.08	-0.04	3.68
3,424.00	1.26	219.67	3,423.00	5.04	-2.03	-5.05	0.13	0.13	-1.22
3,615.00	1.29	210.80	3,613.95	1.58	-4.48	-1.60	0.10	0.02	-4.64
3,805.00	1.29	226.52	3,803.90	-1.73	-7.12	1.70	0.19	0.00	8.27
3,995.00	1.26	226.78	3,993.86	-4.63	-10.20	4.58	0.02	-0.02	0.14
4,185.00	1.19	222.60	4,183.81	-7.51	-13.05	7.46	0.06	-0.04	-2.20
4,375.00	1.42	218.95	4,373.76	-10.80	-15.87	10.73	0.13	0.12	-1.92
4,565.00	1.54	215.40	4,563.70	-14.71	-18.83	14.62	0.08	0.06	-1.87
4,755.00	1.26	227.33	4,753.64	-18.20	-21.84	18.11	0.21	-0.15	6.28
4,945.00	1.15	237.09	4,943.60	-20.66	-24.98	20.55	0.12	-0.06	5.14
5,136.00	1.13	217.07	5,134.57	-23.20	-27.72	23.08	0.21	-0.01	-10.48
5,325.00	1.22	199.70	5,323.53	-26.58	-29.53	26.45	0.19	0.05	-9.19
5,515.00	1.01	263.79	5,513.50	-28.67	-31.87	28.53	0.63	-0.11	33.73
5,705.00	2.56	305.99	5,703.40	-26.35	-36.97	26.19	1.02	0.82	22.21
5,894.00	4.71	288.39	5,892.02	-21.43	-47.75	21.22	1.27	1.14	-9.31
5,990.00	6.67	275.11	5,987.55	-19.68	-57.05	19.44	2.45	2.04	-13.83
6,084.00	2.13	268.79	6,081.24	-19.24	-64.23	18.95	4.85	-4.83	-6.72
6,180.00	1.28	90.56	6,177.23	-19.28	-64.95	19.00	3.55	-0.89	-185.66
6,274.00	3.11	58.49	6,271.16	-17.96	-61.72	17.69	2.27	1.95	-34.12
6,369.00	3.09	63.67	6,366.02	-15.48	-57.23	15.23	0.30	-0.02	5.45
6,464.00	2.41	53.42	6,460.91	-13.15	-53.33	12.92	0.88	-0.72	-10.79
6,558.00	1.77	40.94	6,554.85	-10.88	-50.79	10.66	0.83	-0.68	-13.28
6,653.00	3.07	55.15	6,649.76	-8.32	-47.74	8.11	1.50	1.37	14.96
6,749.00	2.55	51.25	6,745.65	-5.51	-43.97	5.32	0.58	-0.54	-4.06
6,841.00	1.71	42.50	6,837.55	-2.22	-40.35	2.04	0.68	-0.64	-6.63
6,937.00	1.34	36.69	6,933.52	-0.26	-38.71	0.09	0.42	-0.39	-6.05
7,030.00	1.39	33.04	7,025.51	0.36	-38.27	-0.53	0.31	0.16	-11.41
7,120.00	1.51	24.15	7,115.50	1.05	-37.90	-1.21	0.82	0.39	-28.68
7,212.00	1.67	82.63	7,208.49	1.49	-37.27	-1.66	4.87	0.50	182.75
7,304.00	6.36	136.45	7,300.41	0.27	-35.58	-0.42	17.31	14.66	168.19
7,395.00	10.48	145.86	7,391.07	-3.31	-32.81	3.17	13.97	13.29	30.35
7,487.00	13.86	143.44	7,482.35	-8.80	-28.90	8.67	10.68	10.56	-7.56
7,579.00	18.25	141.69	7,573.09	-15.81	-23.51	15.71	13.80	13.72	-5.47
7,671.00	22.87	142.96	7,663.04	-24.71	-16.65	24.64	14.50	14.44	3.97
7,762.00	26.37	146.31	7,751.22	-35.25	-9.20	35.21	12.15	11.29	10.81
7,852.00	28.58	150.79	7,837.84	-47.06	-2.00	47.06	10.08	7.37	14.93



Phoenix Technology Services Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3218.00usft (Ensign 767)
Site:	Hayhurst 16-25-27 State	MD Reference:	KB @ 3218.00usft (Ensign 767)
Well:	#4H	North Reference:	Grid
Wellbore:	WVB1/Job #1411428	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 767)	Database:	Compass 5000 GCR epdm

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)
7,324.00	30.75	155.80	7,305.65	-61.21	5.09	61.23	10.29	6.78	15.66
7,354.00	32.28	159.19	7,331.23	-75.70	11.08	75.74	7.80	5.10	11.30
7,388.00	34.36	164.42	7,359.64	-93.43	16.89	93.50	10.43	6.12	15.38
7,419.00	36.05	169.69	7,384.98	-110.84	20.87	110.93	11.21	5.45	17.00
7,451.00	37.14	174.68	7,410.67	-129.72	23.45	129.83	9.90	3.41	15.59
7,481.00	38.91	179.49	7,434.31	-148.17	24.37	148.27	11.50	5.90	16.03
7,490.81	40.01	179.59	7,441.88	-154.40	24.42	154.51	11.21	11.19	0.98
HL Crossing: 7490.81 MD									
7,512.00	42.38	179.78	7,457.83	-168.36	24.50	168.46	11.21	11.19	0.91
7,544.00	45.85	179.10	7,480.80	-190.63	24.72	190.73	10.94	10.84	-2.13
7,576.00	49.49	181.10	7,502.35	-214.28	24.67	214.38	12.28	11.38	6.25
7,608.00	52.96	183.51	7,522.38	-239.20	23.65	239.30	12.33	10.84	7.53
7,640.00	56.11	184.65	7,540.95	-265.19	21.79	265.28	10.26	9.84	3.56
7,671.00	61.94	184.96	7,556.90	-291.67	19.57	291.75	18.83	18.81	1.00
7,703.00	66.82	185.24	7,570.73	-320.40	17.00	320.47	15.27	15.25	0.88
7,735.00	70.94	184.97	7,582.26	-350.12	14.35	350.18	12.90	12.88	-0.84
7,766.00	76.01	183.83	7,591.07	-379.74	12.07	379.79	16.73	16.35	-3.68
7,797.00	80.73	183.40	7,597.32	-410.04	10.16	410.08	15.29	15.23	-1.39
7,829.00	82.31	183.55	7,602.04	-441.63	8.24	441.66	4.96	4.94	0.47
7,861.00	83.58	183.70	7,605.97	-473.32	6.23	473.35	4.00	3.97	0.47
7,892.00	85.29	183.40	7,608.97	-504.12	4.32	504.13	5.60	5.52	-0.97
7,986.00	86.56	181.54	7,615.66	-597.79	0.28	597.78	2.39	1.35	-1.98
7,988.00	86.55	181.51	7,615.78	-599.78	0.23	599.78	1.38	-0.51	-1.28
HL Crossing Out: 7988 MD									
8,081.00	86.08	180.32	7,621.75	-692.57	-1.26	692.56	1.38	-0.51	-1.28
8,113.00	86.87	179.43	7,623.72	-724.51	-1.19	724.50	3.71	2.47	-2.78
8,144.00	87.73	178.69	7,625.18	-755.47	-0.68	755.46	3.66	2.77	-2.39
8,176.00	88.46	178.56	7,626.24	-787.45	0.09	787.44	2.32	2.28	-0.41
8,207.00	88.91	178.51	7,626.96	-818.43	0.88	818.43	1.46	1.45	-0.16
8,225.00	88.89	178.37	7,627.30	-836.42	1.37	836.42	0.79	-0.09	-0.78
HL Crossing In: 8225 MD									
8,239.00	88.88	178.26	7,627.57	-850.41	1.78	850.41	0.79	-0.09	-0.78
8,270.00	89.66	178.02	7,627.97	-881.39	2.79	881.40	2.63	2.52	-0.77
8,365.00	90.59	178.08	7,627.76	-976.34	6.02	976.35	0.98	0.98	0.06
8,460.00	90.98	178.16	7,626.46	-1,071.27	9.14	1,071.30	0.42	0.41	0.08
8,555.00	90.76	178.30	7,625.02	-1,166.22	12.07	1,166.26	0.27	-0.23	0.15
8,649.00	90.87	178.74	7,623.68	-1,260.18	14.50	1,260.23	0.48	0.12	0.47
8,744.00	91.73	177.72	7,621.52	-1,355.11	17.43	1,355.17	1.40	0.91	-1.07
8,839.00	90.90	177.96	7,619.34	-1,450.01	21.01	1,450.09	0.91	-0.87	0.25
8,934.00	91.82	178.56	7,617.09	-1,544.94	23.90	1,545.03	1.16	0.97	0.63
9,028.00	91.68	178.96	7,614.22	-1,638.87	25.93	1,638.97	0.45	-0.15	0.43
9,123.00	90.36	179.56	7,612.53	-1,733.85	27.16	1,733.95	1.53	-1.39	0.63
9,218.00	89.24	179.34	7,612.86	-1,828.84	28.07	1,828.95	1.20	-1.18	-0.23
9,312.00	89.66	178.80	7,613.76	-1,922.82	29.59	1,922.94	0.73	0.45	-0.57



Phoenix Technology Services
Survey Report



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Site:	Hayhurst 16-25-27 State	MD Reference:	KB @ 3218.00usft (Ensign 767)
Well:	#4H	North Reference:	Grid
Wellbore:	WB1/Job #1411428	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 767)	Database:	Compass 5000 GCR epdm

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)	
9,407.00	90.00	178.96	7,614.04	-2,017.81	31.45	2,017.92	0.40	0.36	0.17	
9,502.00	90.17	178.83	7,613.90	-2,112.79	33.28	2,112.91	0.23	0.18	-0.14	
9,597.00	90.87	179.54	7,613.04	-2,207.77	34.63	2,207.90	1.05	0.74	0.75	
9,691.00	90.17	180.40	7,612.19	-2,301.77	34.68	2,301.90	1.18	-0.74	0.91	
9,786.00	91.26	180.54	7,611.00	-2,396.76	33.90	2,396.88	1.16	1.15	0.15	
9,881.00	92.97	179.97	7,607.50	-2,491.69	33.48	2,491.81	1.90	1.80	-0.60	
9,976.00	92.15	179.95	7,603.25	-2,586.59	33.55	2,586.71	0.86	-0.86	-0.02	
10,070.00	90.62	180.51	7,600.98	-2,680.56	33.17	2,680.68	1.73	-1.63	0.60	
10,165.00	89.58	179.08	7,600.81	-2,775.55	33.51	2,775.67	1.86	-1.09	-1.51	
10,260.00	88.80	178.23	7,602.16	-2,870.52	35.74	2,870.65	1.21	-0.82	-0.89	
10,355.00	90.56	176.63	7,602.69	-2,965.41	40.00	2,965.56	2.50	1.85	-1.68	
10,450.00	91.54	177.10	7,600.95	-3,060.25	45.19	3,060.42	1.14	1.03	0.49	
10,545.00	91.82	178.30	7,598.16	-3,155.14	49.00	3,155.32	1.30	0.29	1.26	
10,639.00	91.15	180.32	7,595.73	-3,249.09	50.14	3,249.28	2.26	-0.71	2.15	
10,734.00	90.62	180.99	7,594.26	-3,344.07	49.05	3,344.26	0.90	-0.56	0.71	
10,829.00	90.17	181.88	7,593.60	-3,439.04	46.67	3,439.21	1.05	-0.47	0.94	
10,924.00	90.22	181.41	7,593.28	-3,534.00	43.94	3,534.16	0.50	0.05	-0.49	
11,019.00	89.64	182.05	7,593.40	-3,628.96	41.08	3,629.10	0.91	-0.61	0.67	
11,114.00	89.72	181.86	7,593.93	-3,723.90	37.83	3,724.03	0.22	0.08	-0.20	
11,208.00	89.05	182.62	7,594.94	-3,817.82	34.16	3,817.93	1.08	-0.71	0.81	
11,303.00	88.29	182.75	7,597.14	-3,912.69	29.71	3,912.78	0.81	-0.80	0.14	
11,398.00	87.71	181.59	7,600.46	-4,007.56	26.12	4,007.64	1.36	-0.61	-1.22	
11,493.00	89.55	178.59	7,602.73	-4,102.52	25.97	4,102.59	3.70	1.94	-3.16	
11,588.00	90.84	177.76	7,602.40	-4,197.47	28.99	4,197.55	1.61	1.36	-0.87	
11,683.00	90.95	177.46	7,600.92	-4,292.37	32.96	4,292.48	0.34	0.12	-0.32	
11,778.00	92.69	177.55	7,597.90	-4,387.23	37.09	4,387.35	1.83	1.83	0.09	
11,872.00	92.01	178.42	7,594.05	-4,481.09	40.39	4,481.23	1.17	-0.72	0.93	
11,967.00	91.48	179.45	7,591.16	-4,576.03	42.16	4,576.17	1.22	-0.56	1.08	
12,061.00	90.73	180.28	7,589.34	-4,670.01	42.38	4,670.15	1.19	-0.80	0.88	
12,156.00	92.10	181.80	7,587.00	-4,764.96	40.65	4,765.09	2.15	1.44	1.60	
12,171.10	92.00	181.91	7,586.46	-4,780.04	40.17	4,780.17	0.98	-0.67	0.72	
HL Crossing: 12171.10' MD										
12,251.00	91.46	182.48	7,584.05	-4,859.85	37.11	4,859.96	0.98	-0.67	0.72	
12,289.00	91.06	182.53	7,583.21	-4,897.80	35.45	4,897.91	1.06	-1.05	0.13	
Final Phoenix MWD Survey										
12,349.00	91.06	182.53	7,582.10	-4,957.73	32.80	4,957.83	0.00	0.00	0.00	
Projection to TD										



Phoenix Technology Services
Survey Report



Company:	Chevron	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3218.00usft (Ensign 767)
Site:	Hayhurst 16-25-27 State	MD Reference:	KB @ 3218.00usft (Ensign 767)
Well:	#4H	North Reference:	Grid
Wellbore:	WB1/Job #1411428	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 767)	Database:	Compass 5000 GCR epdm

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
236.00	235.99	0.11	-1.95	First Phoenix MWD Survey
7,490.81	7,441.88	-154.40	24.42	HL Crossing: 7490.81' MD
7,988.00	7,615.78	-599.78	0.23	HL Crossing Out: 7988' MD
8,225.00	7,627.30	-836.42	1.37	HL Crossing In: 8225' MD
12,171.10	7,586.46	-4,780.04	40.17	HL Crossing: 12171.10' MD
12,289.00	7,583.21	-4,897.80	35.45	Final Phoenix MWD Survey
12,349.00	7,582.10	-4,957.73	32.80	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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