

Chesapeake Operating Inc.

Lea County, NM (NAD27)
Kiehne Ranch 15-26-32 USA 1H
Job # 1210543
Rig: Latshaw 14

Survey: Phoenix MWD Surveys

Survey Report

07 July, 2012

SUR: M-15-26s-32e, 100/S & 400/W
BHL: D-15-26s-32e, 343/N & 371/W
API # 30-025-40602

HOBBS OCD

NOV 05 2012
ELG 11-6-2012
RECEIVED

Chesapeake
Operating Inc.

Survey Report

COMPASS

Company:	Chesapeake Operating, Inc.			Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM (NAD27)			TVD Reference:	WELL @ 3167.00usft (Latshaw 14)
Site:	Kiehne Ranch 15-26-32 USA 1H			MD Reference:	WELL @ 3167.00usft (Latshaw 14)
Well:	Job # 1210543			North Reference:	Grid
Wellbore:	Rig: Latshaw 14			Survey Calculation Method:	Minimum Curvature
Design:	Surveys			Database:	GCR DB v5000

Project:	Lea County, NM (NAD27)		
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:	Kiehne Ranch 15-26-32 USA 1H				
Site Position:		Northing:	377,353.00 usft	Latitude:	32° 2' 8.5952 N
From:	Map	Easting:	705,667.00 usft	Longitude:	103° 40' 10.6648 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.35 °

Well:	Job #:1210543					
Well Position	+N/-S	0.00 usft	Northing:	377,353.00 usft	Latitude:	32° 2' 8.5952 N
	+E/-W	0.00 usft	Easting:	705,667.00 usft	Longitude:	103° 40' 10.6648 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	22.00 usft	Ground Level:	3,145.00 usft

Wellbore:	Rig: Latshaw 14				
------------------	-----------------	--	--	--	--

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	06/14/12	7.49	59.97	48,394

Design:	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	359.83	

Survey Program	Date:	07/07/12			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
200.00	14,100.00	Phoenix MWD Surveys (Rig: Latshaw 14)	MWD	MWD - Standard	

Survey Report

Company:	Chesapeake Operating, Inc.	Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM (NAD27)	TVD Reference:	WELL @ 3167.00usft (Latshaw 14)
Site:	Kiehne Ranch 15-26-32 USA 1H	MD Reference:	WELL @ 3167.00usft (Latshaw 14)
Well:	Job # 1210543	North Reference:	Grid
Wellbore:	Rig - Latshaw 14	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	GCR DB v5000

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	-3,167.00	0.00	0.00	0.00	0.00	0.00	377,353.00	705,667.00
200.00	0.80	21.00	-2,967.01	199.99	1.30	0.50	1.30	0.40	377,354.30	705,667.50
First Phoenix MWD Survey, 200'										
400.00	0.40	359.80	-2,767.02	399.98	3.31	1.00	3.30	0.23	377,356.31	705,668.00
545.00	0.10	255.60	-2,622.02	544.98	3.78	0.87	3.78	0.30	377,356.78	705,667.87
764.00	0.50	203.80	-2,403.02	763.98	2.86	0.30	2.86	0.20	377,355.86	705,667.30
955.00	1.10	187.90	-2,212.04	954.96	0.28	-0.29	0.28	0.33	377,353.28	705,666.71
1,145.00	1.00	183.50	-2,022.07	1,144.93	-3.18	-0.64	-3.18	0.07	377,349.82	705,666.36
1,335.00	0.80	183.60	-1,832.10	1,334.90	-6.16	-0.82	-6.16	0.11	377,346.84	705,666.18
1,526.00	0.60	183.80	-1,641.11	1,525.89	-8.49	-0.97	-8.49	0.10	377,344.51	705,666.03
1,716.00	0.40	181.10	-1,451.12	1,715.88	-10.14	-1.05	-10.14	0.11	377,342.86	705,665.95
1,906.00	0.50	189.50	-1,261.12	1,905.88	-11.63	-1.20	-11.62	0.06	377,341.37	705,665.80
2,097.00	0.50	190.10	-1,070.13	2,096.87	-13.27	-1.48	-13.26	0.00	377,339.73	705,665.52
2,288.00	0.50	195.40	-879.14	2,287.86	-14.89	-1.85	-14.89	0.02	377,338.11	705,665.15
2,478.00	0.40	177.70	-689.14	2,477.86	-16.35	-2.04	-16.35	0.09	377,336.65	705,664.96
2,668.00	0.40	201.90	-499.15	2,667.85	-17.63	-2.27	-17.63	0.09	377,335.37	705,664.73
2,858.00	0.50	204.90	-309.16	2,857.84	-19.00	-2.86	-18.99	0.05	377,334.00	705,664.14
3,049.00	0.30	131.90	-118.16	3,048.84	-20.09	-2.84	-20.08	0.26	377,332.91	705,664.16
3,239.00	0.90	89.50	71.83	3,238.83	-20.41	-0.98	-20.41	0.37	377,332.59	705,666.02
3,429.00	1.70	71.30	261.78	3,428.78	-19.49	3.18	-19.50	0.47	377,333.51	705,670.18
3,620.00	1.50	69.70	452.71	3,619.71	-17.72	8.21	-17.74	0.11	377,335.28	705,675.21
3,810.00	1.20	77.20	642.65	3,809.65	-16.41	12.48	-16.45	0.18	377,336.59	705,679.48
4,000.00	1.10	91.10	832.62	3,999.62	-16.01	16.25	-16.05	0.16	377,336.99	705,683.25
4,191.00	1.80	124.60	1,023.56	4,190.56	-17.75	20.55	-17.81	0.56	377,335.25	705,687.55
4,355.00	1.30	115.70	1,187.50	4,354.50	-20.01	24.35	-20.09	0.34	377,332.99	705,691.35
4,600.00	1.10	109.40	1,432.44	4,599.44	-22.00	29.07	-22.09	0.10	377,331.00	705,696.07
4,791.00	1.20	99.30	1,623.40	4,790.40	-22.93	32.77	-23.03	0.12	377,330.07	705,699.77

Survey Report

Company:	Chesapeake Operating Inc.	Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM (NAD27)	TVD Reference:	WELL @ 3167.00usft (Latshaw 14)
Site:	Kiehne Ranch 15-26-32 USA 1H	MD Reference:	WELL @ 3167.00usft (Latshaw 14)
Well:	Job # 1210543	North Reference:	Grid
Wellbore:	Rig Latshaw 14	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	GCR DB.v5000

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
4,981.00	1.10	97.10	1,813.37	4,980.37	-23.48	36.55	-23.59	0.06	377,329.52	705,703.55
5,171.00	1.00	96.20	2,003.33	5,170.33	-23.88	40.00	-24.00	0.05	377,329.12	705,707.00
5,362.00	1.00	105.50	2,194.30	5,361.30	-24.51	43.27	-24.64	0.08	377,328.49	705,710.27
5,552.00	0.60	114.40	2,384.29	5,551.29	-25.36	45.77	-25.50	0.22	377,327.64	705,712.77
5,742.00	0.60	107.90	2,574.28	5,741.28	-26.08	47.62	-26.22	0.04	377,326.92	705,714.62
5,933.00	0.50	79.30	2,765.27	5,932.27	-26.23	49.39	-26.38	0.15	377,326.77	705,716.39
6,123.00	0.30	85.00	2,955.26	6,122.26	-26.04	50.70	-26.19	0.11	377,326.96	705,717.70
6,313.00	0.20	118.00	3,145.26	6,312.26	-26.15	51.49	-26.30	0.09	377,326.85	705,718.49
6,504.00	0.50	190.40	3,336.26	6,503.26	-27.12	51.64	-27.28	0.25	377,325.88	705,718.64
6,694.00	0.40	202.70	3,526.25	6,693.25	-28.55	51.23	-28.70	0.07	377,324.45	705,718.23
6,885.00	0.80	211.80	3,717.24	6,884.24	-30.30	50.27	-30.45	0.21	377,322.70	705,717.27
7,075.00	1.30	219.40	3,907.21	7,074.21	-33.09	48.20	-33.24	0.27	377,319.91	705,715.20
7,266.00	1.00	234.60	4,098.17	7,265.17	-35.73	45.47	-35.87	0.22	377,317.27	705,712.47
7,456.00	0.80	244.50	4,288.15	7,455.15	-37.26	42.92	-37.39	0.13	377,315.74	705,709.92
7,646.00	1.10	249.80	4,478.12	7,645.12	-38.47	40.01	-38.58	0.16	377,314.53	705,707.01
7,837.00	1.00	243.30	4,669.09	7,836.09	-39.85	36.80	-39.96	0.08	377,313.15	705,703.80
8,027.00	1.30	231.40	4,859.05	8,026.05	-41.94	33.64	-42.04	0.20	377,311.06	705,700.64
8,217.00	1.70	244.20	5,048.99	8,215.99	-44.51	29.41	-44.60	0.27	377,308.49	705,696.41
8,407.00	1.70	246.50	5,238.90	8,405.90	-46.86	24.29	-46.93	0.04	377,306.14	705,691.29
8,598.00	2.20	245.70	5,429.79	8,596.79	-49.50	18.35	-49.55	0.26	377,303.50	705,685.35
8,720.00	2.50	262.20	5,551.69	8,718.69	-50.82	13.58	-50.86	0.60	377,302.18	705,680.58
8,795.00	5.20	308.20	5,626.53	8,793.53	-48.94	9.29	-48.97	5.20	377,304.06	705,676.29
8,827.00	9.10	320.60	5,658.27	8,825.27	-46.09	6.54	-46.11	13.04	377,306.91	705,673.54
8,859.00	12.80	324.90	5,689.69	8,856.69	-41.23	2.90	-41.24	11.83	377,311.77	705,669.90
8,890.00	16.00	329.90	5,719.71	8,886.71	-34.72	-1.22	-34.72	11.07	377,318.28	705,665.78
8,922.00	18.50	336.70	5,750.27	8,917.27	-26.24	-5.44	-26.23	10.02	377,326.76	705,661.56
8,954.00	20.80	341.60	5,780.41	8,947.41	-16.19	-9.24	-16.16	8.84	377,336.81	705,657.76

Survey Report

Company:	Chesapeake Operating Inc.	Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM, (NAD27)	TVD Reference:	WELL @ 3167.00usft (Latshaw,14)
Site:	Kiehne Ranch 15-26-32 USA 1H	MD Reference:	WELL @ 3167.00usft (Latshaw,14)
Well:	Job # 1210543	North Reference:	Gnd
Wellbore:	Rig - Latshaw 14	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	GCR-DB v5000

Survey												
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)		
8,985.00	22.50	344.60	5,809.22	8,976.22	-5.24	-12.56	-5.21	6.54	377,347.76	705,654.44		
9,017.00	24.80	343.50	5,838.53	9,005.53	7.10	-16.09	7.14	7.32	377,360.10	705,650.91		
9,049.00	27.70	343.00	5,867.23	9,034.23	20.65	-20.17	20.71	9.09	377,373.65	705,646.83		
9,081.00	29.60	342.50	5,895.31	9,062.31	35.30	-24.72	35.37	5.98	377,388.30	705,642.28		
9,112.00	31.50	341.90	5,922.01	9,089.01	50.30	-29.54	50.39	6.21	377,403.30	705,637.46		
9,144.00	33.00	341.00	5,949.07	9,116.07	66.49	-34.98	66.59	4.92	377,419.49	705,632.02		
9,176.00	34.70	341.50	5,975.64	9,142.64	83.36	-40.70	83.48	5.38	377,436.36	705,626.30		
9,207.00	37.80	342.10	6,000.64	9,167.64	100.78	-46.43	100.91	10.07	377,453.78	705,620.57		
9,239.00	39.90	342.20	6,025.56	9,192.56	119.88	-52.58	120.04	6.57	377,472.88	705,614.42		
9,271.00	42.50	342.50	6,049.64	9,216.64	139.97	-58.97	140.14	8.15	377,492.97	705,608.03		
9,302.00	44.90	342.20	6,072.05	9,239.05	160.37	-65.46	160.57	7.77	377,513.37	705,601.54		
9,334.00	48.30	342.30	6,094.03	9,261.03	182.51	-72.55	182.73	10.63	377,535.51	705,594.45		
9,366.00	51.60	343.00	6,114.62	9,281.62	205.89	-79.85	206.13	10.45	377,558.89	705,587.15		
9,398.00	54.50	344.10	6,133.85	9,300.85	230.42	-87.08	230.68	9.47	377,583.42	705,579.92		
9,430.00	57.90	344.50	6,151.65	9,318.65	256.01	-94.28	256.29	10.68	377,609.01	705,572.72		
9,461.00	62.00	345.20	6,167.17	9,334.17	281.91	-101.28	282.21	13.37	377,634.91	705,565.72		
9,493.00	66.20	346.10	6,181.15	9,348.15	309.79	-108.41	310.11	13.37	377,662.79	705,558.59		
9,525.00	71.40	347.30	6,192.71	9,359.71	338.82	-115.27	339.16	16.62	377,691.82	705,551.73		
9,556.00	76.60	349.30	6,201.26	9,368.26	367.99	-121.30	368.34	17.88	377,720.99	705,545.70		
9,588.00	82.50	351.10	6,207.06	9,374.06	398.98	-126.65	399.36	19.25	377,751.98	705,540.35		
9,619.00	88.30	354.60	6,209.54	9,376.54	429.62	-130.49	430.01	21.83	377,782.62	705,536.51		
9,651.00	92.90	359.00	6,209.21	9,376.21	461.56	-132.28	461.95	19.89	377,814.56	705,534.72		
9,746.00	94.40	359.90	6,203.16	9,370.16	556.36	-133.19	556.75	1.84	377,909.36	705,533.81		
9,841.00	94.10	2.40	6,196.12	9,363.12	651.07	-131.29	651.45	2.64	378,004.07	705,535.71		
9,937.00	92.60	2.90	6,190.51	9,357.51	746.80	-126.86	747.17	1.65	378,099.80	705,540.14		
10,032.00	91.50	2.90	6,187.11	9,354.11	841.61	-122.05	841.97	1.16	378,194.61	705,544.95		
10,127.00	91.20	2.20	6,184.87	9,351.87	936.49	-117.83	936.84	0.80	378,289.49	705,549.17		

Survey Report

Company:	Chesapeake Operating Inc.	Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM (NAD27)	TVD Reference:	WELL @ 3167.00usft (Latshaw 14)
Site:	Kiehne Ranch 15-26-32 USA 1H	MD Reference:	WELL @ 3167.00usft (Latshaw 14)
Well:	Job # 1210543	North Reference:	Gnd
Wellbore:	Rig: Latshaw 14	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	GCR DB v5000

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,222.00	91.30	2.00	6,182.80	9,349.80	1,031.41	-114.35	1,031.74	0.24	378,384.41	705,552.65
10,317.00	91.40	1.90	6,180.56	9,347.56	1,126.32	-111.12	1,126.65	0.15	378,479.32	705,555.88
10,412.00	91.10	1.00	6,178.49	9,345.49	1,221.27	-108.71	1,221.59	1.00	378,574.27	705,558.29
10,507.00	90.40	2.70	6,177.25	9,344.25	1,316.21	-105.65	1,316.52	1.94	378,669.21	705,561.35
10,603.00	90.30	2.60	6,176.66	9,343.66	1,412.10	-101.21	1,412.40	0.15	378,765.10	705,565.79
10,698.00	88.70	1.70	6,177.49	9,344.49	1,507.03	-97.64	1,507.31	1.93	378,860.03	705,569.36
10,793.00	90.80	2.40	6,177.90	9,344.90	1,601.96	-94.24	1,602.24	2.33	378,954.96	705,572.76
10,888.00	91.10	3.60	6,176.33	9,343.33	1,696.82	-89.27	1,697.07	1.30	379,049.82	705,577.73
10,983.00	89.10	3.50	6,176.16	9,343.16	1,791.63	-83.39	1,791.87	2.11	379,144.63	705,583.61
11,078.00	88.00	3.10	6,178.57	9,345.57	1,886.44	-77.92	1,886.66	1.23	379,239.44	705,589.08
11,173.00	87.40	2.60	6,182.38	9,349.38	1,981.25	-73.21	1,981.45	0.82	379,334.25	705,593.79
11,269.00	91.00	4.10	6,183.72	9,350.72	2,077.05	-67.60	2,077.25	4.06	379,430.05	705,599.40
11,364.00	91.30	3.30	6,181.81	9,348.81	2,171.84	-61.47	2,172.01	0.90	379,524.84	705,605.53
11,459.00	89.80	3.00	6,180.90	9,347.90	2,266.69	-56.25	2,266.84	1.61	379,619.69	705,610.75
11,554.00	87.40	1.90	6,183.22	9,350.22	2,361.56	-52.19	2,361.71	2.78	379,714.56	705,614.81
11,649.00	86.90	2.00	6,187.95	9,354.95	2,456.39	-48.96	2,456.52	0.54	379,809.39	705,618.04
11,744.00	87.40	1.60	6,192.67	9,359.67	2,551.22	-45.98	2,551.35	0.67	379,904.22	705,621.02
11,839.00	87.00	0.50	6,197.31	9,364.31	2,646.09	-44.24	2,646.21	1.23	379,999.09	705,622.76
11,934.00	87.60	359.40	6,201.79	9,368.79	2,740.99	-44.32	2,741.11	1.32	380,093.99	705,622.68
12,029.00	89.10	358.80	6,204.52	9,371.52	2,835.93	-45.81	2,836.05	1.70	380,188.93	705,621.19
12,124.00	88.80	0.30	6,206.26	9,373.26	2,930.91	-46.56	2,931.04	1.61	380,283.91	705,620.44
12,220.00	88.80	359.60	6,208.27	9,375.27	3,026.89	-46.64	3,027.01	0.73	380,379.89	705,620.36
12,315.00	88.50	358.70	6,210.51	9,377.51	3,121.85	-48.05	3,121.98	1.00	380,474.85	705,618.95
12,410.00	88.50	358.40	6,213.00	9,380.00	3,216.79	-50.46	3,216.92	0.32	380,569.79	705,616.54
12,505.00	86.70	357.70	6,216.98	9,383.98	3,311.64	-53.69	3,311.79	2.03	380,664.64	705,613.31
12,600.00	88.30	357.20	6,221.12	9,388.12	3,406.46	-57.91	3,406.61	1.76	380,759.46	705,609.09
12,695.00	89.70	357.20	6,222.78	9,389.78	3,501.33	-62.55	3,501.50	1.47	380,854.33	705,604.45

Survey Report

Company:	Chesapeake Operating, Inc.	Local Co-ordinate Reference:	Well Job # 1210543
Project:	Lea County, NM (NAD27)	TVD Reference:	WELL @ 3167.00usft (Latshaw 14)
Site:	Kiehne Ranch, 15-26-32 USA 1H	MD Reference:	WELL @ 3167.00usft (Latshaw 14)
Well:	Job # 1210543	North Reference:	Grid
Wellbore:	Rig: Latshaw 14	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	GCR-DB v5000

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
12,790.00	89.90	357.90	6,223.11	9,390.11	3,596.24	-66.61	3,596.42	0.77	380,949.24	705,600.39
12,885.00	91.20	359.80	6,222.20	9,389.20	3,691.21	-68.52	3,691.40	2.42	381,044.21	705,598.48
12,980.00	91.30	359.30	6,220.12	9,387.12	3,786.18	-69.26	3,786.37	0.54	381,139.18	705,597.74
13,075.00	91.40	358.40	6,217.89	9,384.89	3,881.14	-71.17	3,881.33	0.95	381,234.14	705,595.83
13,170.00	91.60	359.80	6,215.40	9,382.40	3,976.09	-72.66	3,976.29	1.49	381,329.09	705,594.34
13,266.00	89.70	1.20	6,214.31	9,381.31	4,072.07	-71.82	4,072.27	2.46	381,425.07	705,595.18
13,361.00	89.80	0.30	6,214.72	9,381.72	4,167.06	-70.58	4,167.25	0.95	381,520.06	705,596.42
13,456.00	90.00	1.40	6,214.89	9,381.89	4,262.05	-69.17	4,262.24	1.18	381,615.05	705,597.83
13,551.00	89.90	1.40	6,214.97	9,381.97	4,357.02	-66.85	4,357.20	0.11	381,710.02	705,600.15
13,646.00	90.20	2.70	6,214.89	9,381.89	4,451.96	-63.45	4,452.13	1.40	381,804.96	705,603.55
13,741.00	89.40	2.70	6,215.22	9,382.22	4,546.85	-58.97	4,547.01	0.84	381,899.85	705,608.03
13,836.00	89.80	2.70	6,215.88	9,382.88	4,641.74	-54.50	4,641.89	0.42	381,994.74	705,612.50
13,932.00	89.60	2.30	6,216.39	9,383.39	4,737.65	-50.31	4,737.78	0.47	382,090.65	705,616.69
14,027.00	89.70	1.90	6,216.97	9,383.97	4,832.59	-46.83	4,832.70	0.43	382,185.59	705,620.17
14,049.00	89.80	1.80	6,217.06	9,384.06	4,854.57	-46.12	4,854.69	0.64	382,207.57	705,620.88
14,100.00	89.80	1.80	6,217.24	9,384.24	4,905.55	-44.52	4,905.66	0.00	382,258.55	705,622.48

Projection to TD, 14100'

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
200.00	199.99	1.30	0.50	First Phoenix MWD Survey, 200'
14,100.00	9,384.24	4,905.55	-44.52	Projection to TD, 14100'