

30-015-39714

CAVALOZ DRILLING

P.O. BOX 1500 (575) 3910699 FAX (575) 391- 3824 HOBBS, NEW MEXICO 88241

INCLINATION REPORT

DATE: 2/20/12

WELL NAME AND NUMBER KIOWA ST #2
LOCATION EDDY COUNTY
OPERATOR: COG LLC
DRILLING CONTRACTOR: CAVALOZ DRILLING RIG #1

THE UNDERSIGNED HEREBY CERTIFIES THAT HE IS AN AUTHORIZED REPRESENTATIVE OF THE DRILLING CONTRACTOR WHO DRILLED THE ABOVE DESCRIBED WELL AND THAT HE HAS CONDUCTED DEVIATION TEST AND OBTAINED THE FOLLOWING RESULTS:

DEGREE	DEPTH	DEGREE	DEPTH	DEGREE	DEPTH
0.2	233				
0.2	470				
0.4	841				

DRILLING CONTRACTOR:
CAVALOZ DRILLING

BY: Bob Wegner
BOB WEGNER
DRILLING SUPERINTENDENT

SUBSCRIBED AND SWORN TO BEFORE ME ON THE 22nd DAY OF Feb, 2012

MY COMMISSION EXPIRES:

03/01/15

Jessica Bueno



OFFICIAL SEAL
JESSICA BUENO
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires: 03/01/15



Company: COG Operating (Concho)

Lease/Well: Kiowa State/2

Location: S 36, T 17S, R 27E

Rig Name: Cavaloz #1

State/County: New Mexico/Eddy

Latitude: 32.79

GRID North is 0.05 Degrees East of True North

VS-Azi: 0.00 Degrees



RKB : 12 Feet Elevation=3596 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: kiowa state #2_ed.ut

Minimum Curvature Method

Report Date/Time: 2/23/2012 / 10:48

Vaughn Energy Services

Midland, TX

432-563-5444

Surveyor: Zach Garcia

Kiowa State 2 / API 30-015-39714

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.29	3.15	100.00	0.25	0.01	0.25	3.15	0.29
200.00	0.16	357.03	200.00	0.64	0.02	0.64	1.84	0.13
300.00	0.14	345.50	300.00	0.90	-0.02	0.90	358.90	0.04
400.00	0.23	334.35	400.00	1.20	-0.13	1.20	353.60	0.10
500.00	0.21	354.30	500.00	1.56	-0.24	1.58	351.29	0.08
600.00	0.13	335.32	600.00	1.84	-0.30	1.87	350.62	0.10
700.00	0.21	315.91	700.00	2.08	-0.48	2.13	346.97	0.10
805.00	0.70	266.66	804.99	2.18	-1.26	2.52	330.08	0.55

COG Operating, LLC

Eddy County, NM

Kiowa State #2

Kiowa State #2

Wellbore #1

Survey: MWD Survey #1

Standard Survey Report

20 February, 2012



Black Viper Energy

Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Site Kiowa State #2
Project:	Eddy County, NM	TVD Reference:	WELL @ 3596.00ft (Original Well Elev)
Site:	Kiowa State #2	MD Reference:	WELL @ 3596.00ft (Original Well Elev)
Well:	Kiowa State #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 1 Single User Db

Project:	Eddy County, NM		
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: Kiowa State #2, Sec 39 T-17-S R-27-E					
Site Position:		Northing:	652,003.70 ft	Latitude:	32° 47' 32.664 N
From:	Map	Easting:	530,027.70 ft	Longitude:	104° 14' 8.239 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.05 °

Well:	Kiowa State #2					
Well Position	+N/-S	0 00 ft	Northing:	652,003 70 ft	Latitude:	32° 47' 32 664 N
	+E/-W	0 00 ft	Easting:	530,027 70 ft	Longitude:	104° 14' 8 239 W
Position Uncertainty		0 00 ft	Wellhead Elevation:	ft	Ground Level:	3,596.00 ft

Wellbore		Wellbore #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/14/2012	7 85	60 58	48,816

Design:	Wellbore #1			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 805 00
Vertical Section	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0 00	0 00	0 00	330 10

Survey Program		Date	2/20/2012		
From	To				
(ft)	(ft)	Survey (Wellbore)	Tool Name	Description	
100 00	805 00	Gyro Survey #1 (OH)			
892 00	4,948 00	MWD Survey #1 (Wellbore #1)			

Survey										
Measured			Vertical			Vertical	Dogleg	Build	Turn	
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Section	Rate	Rate	Rate	
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)	(°/100ft)	
805.00	0.70	266.66	804.99	2.19	-1.25	2.52	0.00	0.00	0.00	
892.00	0.40	277.10	891.99	2.19	-2.09	2.94	0.36	-0.34	12.00	
986.00	1.50	125.30	985.98	1.52	-1.41	2.02	1.98	1.17	-161.49	
1,080.00	2.90	137.30	1,079.91	-0.94	1.21	-1.41	1.56	1.49	12.77	
1,173.00	4.30	138.00	1,172.72	-5.26	5.14	-7.12	1.51	1.51	0.75	
1,268.00	5.70	145.00	1,267.36	-11.77	10.23	-15.30	1.60	1.47	7.37	
1,363.00	7.00	144.70	1,361.78	-20.36	16.28	-25.76	1.37	1.37	-0.32	
1,457.00	7.10	145.50	1,455.06	-29.82	22.88	-37.26	0.15	0.11	0.85	
1,550.00	7.30	145.30	1,547.33	-39.41	29.50	-48.87	0.22	0.22	-0.22	
1,644.00	6.50	148.10	1,640.65	-48.84	35.71	-60.14	0.92	-0.85	2.98	

Black Viper Energy

Survey Report



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Site:	Kiowa State #2	MD Reference:	WELL @ 3596 00ft (Original Well Elev)
Well:	Kiowa State #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000 1 Single User Db

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N/S (ft)	E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
1,739 00	6 80	147 50	1,735 01	-58 15	41 57	-71.13	0 32	0 32	-0 63	
1,831 00	7 10	147 90	1,826 33	-67 56	47 52	-82 26	0 33	0 33	0 43	
1,925 00	6 80	148 00	1,919 64	-77 20	53 56	-93 62	0 32	-0 32	0 11	
2,019 00	7 00	147 90	2,012 96	-86 77	59 55	-104 91	0 21	0 21	-0 11	
2,114 00	6 40	148 90	2,107.31	-96 21	65 36	-115 99	0 64	-0 63	1 05	
2,209 00	5 80	145 80	2,201 78	-104 71	70 79	-126 07	0 72	-0 63	-3 26	
2,302 00	6 40	142 30	2,294 25	-112 70	76.60	-135 89	0 76	0 65	-3 76	
2,397.00	6 70	139 20	2,388 63	-121 09	83 46	-146 58	0.49	0 32	-3 26	
2,492 00	7 00	138 50	2,482 95	-129 62	90.92	-157 69	0.33	0 32	-0 74	
2,586 00	6 80	144 10	2,576 27	-138 41	97 98	-168 83	0 75	-0 21	5 96	
2,680 00	7 00	143 40	2,669 59	-147 52	104 66	-180 06	0 23	0 21	-0 74	
2,774 00	7 20	144.30	2,762 87	-156 90	111 51	-191 61	0 24	0 21	0 96	
2,868 00	6 80	145 90	2,856 17	-166 29	118 07	-203 02	0 47	-0 43	1 70	
2,962 00	7 10	146 60	2,949 48	-175.75	124 39	-214.37	0.33	0 32	0 74	
3,057 00	6 60	142 90	3,043 80	-185 01	130 91	-225 64	0 70	-0 53	-3 89	
3,151.00	7 00	146 00	3,137 14	-194 07	137 37	-236 72	0 58	0 43	3 30	
3,245 00	6 20	141 60	3,230 52	-202 79	143 73	-247 45	1 01	-0 85	-4 68	
3,340 00	6 50	142 60	3,324 93	-211 08	150 18	-257 85	0 34	0 32	1 05	
3,435 00	6 80	143 20	3,419 29	-219 86	156 82	-268.77	0 32	0 32	0 63	
3,529.00	7 00	143 40	3,512 61	-228 91	163 56	-279 98	0 21	0 21	0 21	
3,622 00	7 30	143 00	3,604 89	-238 18	170 50	-291 47	0 33	0 32	-0 43	
3,716 00	7 60	143 50	3,698.10	-247 95	177 79	-303 58	0 33	0 32	0 53	
3,810 00	7 40	146 30	3,791 29	-257 98	184 85	-315 79	0 44	-0 21	2 98	
3,904 00	7 10	148 10	3,884 54	-267 95	191 27	-327 64	0 40	-0 32	1 91	
3,999 00	6 60	146 30	3,978 86	-277 48	197.41	-338 95	0 57	-0 53	-1 89	
4,092 00	6 90	145 50	4,071 22	-286 53	203 54	-349 85	0 34	0 32	-0 86	
4,185 00	6 50	143 80	4,163 58	-295.38	209 81	-360 65	0 48	-0 43	-1 83	
4,278 00	6 70	141 70	4,255 97	-303 88	216 28	-371 25	0 34	0 22	-2.26	
4,373 00	6 60	143 10	4,350 33	-312 60	222 99	-382 15	0 20	-0 11	1 47	
4,466 00	6 60	141.70	4,442 71	-321 07	229 51	-392 75	0 17	0 00	-1 51	
4,560 00	6 20	145 70	4,536 12	-329 50	235 72	-403 15	0 64	-0 43	4 26	
4,655 00	6 50	146 30	4,630.54	-338 21	241 60	-413 63	0 32	0 32	0 63	
4,750 00	6 00	145 00	4,724 98	-346.75	247 43	-423 94	0 55	-0 53	-1 37	
4,843 00	5 80	140 70	4,817 48	-354 37	253 19	-433 42	0 52	-0 22	-4 62	
4,904 00	5 90	141 20	4,878 17	-359 20	257 11	-439.56	0 18	0 16	0 82	
4,948 00	5 90	141 20	4,921 93	-362 72	259 94	-444 03	0 00	0 00	0 00	

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Survey Report



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Well:	Kiowa State #2	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM;5000 1 Single User.Db

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
892 00	891 99	2 19	-2 09	First MWD Survey
4,904 00	4,878 17	-359 20	257 11	Last MWD Survey
4,948 00	4,921 93	-362 72	259 94	Proj to Bit

Checked By _____	Approved By _____	Date. _____
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