

COG OPERATING

30-015-38250

Crow Flats
Eddy County, NM
Blackhawk "11" Federal Com #1
VH - Job #32K0111034

Survey: Actual

SDI Standard Survey Report

16 January, 2011



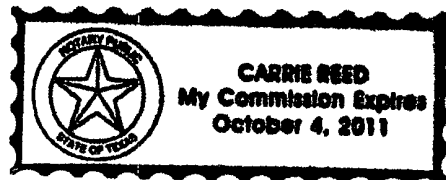
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 16th of January, 2011.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report

Company:	COG OPERATING	Local Co-ordinate Reference:	Well Blackhawk "11" Federal Com #1
Project:	Crow Flats	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Blackhawk "11" Federal Com #1	North Reference:	Grid
Wellbore:	VH - Job #32K0111034	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0111034	Database:	EDM-Regulatory

Project	Crow Flats		
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	Eddy County, NM				
Site Position:		Northing:	702,847.68 usft	Latitude:	32° 55' 55.470 N
From:	Lat/Long	Easting:	555,058.52 usft	Longitude:	104° 9' 13.980 W
Position Uncertainty:	0.0 usft	Slot Radius:	0"	Grid Convergence:	0.10 °

Well:		Blackhawk "11" Federal Com #1, Directional (Pathfinder)				
Well Position	+N/-S	0 0 usft	Northing:	702,847 68 usft	Latitude:	32° 55' 55.470 N
	+E/-W	0.0 usft	Easting:	555,058 52 usft	Longitude:	104° 9' 13.980 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0.0 usft

Wellbore	VH - Job #32K0111034				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2010	1/13/2011	8.02	60.76	49,078

Design					VH - Job #32K0111034							
Audit Notes:												
Version:		1 0		Phase:		ACTUAL		Tie On Depth:		0 0		
Vertical Section:		Depth From (TVD)			+N/-S			+E/-W			Direction	
		(usft)			(usft)			(usft)			(°)	
		0.0			0 0			0 0			91.27	

Survey Program	Date 1/16/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	6,762.0	Actual (VH - Job #32K0111034)	Keeper	Keeper Gyro

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.38	243.66	100.0	-0.1	-0.3	243.66	0.3	
200.0	0.73	6.53	200.0	0.3	-0.5	302.98	0.6	
300.0	1.21	357.21	300.0	2.0	-0.5	346.11	2.1	
400.0	1.32	356.82	400.0	4.2	-0.6	351.71	4.3	
500.0	1.39	358.02	499.9	6.6	-0.7	353.75	6.6	
600.0	1.49	359.89	599.9	9.1	-0.8	355.19	9.1	
700.0	1.46	0.43	699.9	11.7	-0.8	356.28	11.7	
800.0	1.37	6.71	799.8	14.1	-0.6	357.53	14.2	
900.0	1.42	12.88	899.8	16.5	-0.2	359.33	16.5	
1,000.0	1.47	11.91	999.8	19.0	0.3	1.05	19.0	
1,100.0	1.30	12.76	1,099.7	21.4	0.9	2.31	21.4	

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Wellbore:	VH - Job #32K0111034	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0111034	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.0	1.39	12.48	1,199.7	23.7	1.4	3.33	23.7
1,300.0	1.17	15.38	1,299.7	25.8	1.9	4.23	25.9
1,400.0	1.28	18.21	1,399.7	27.9	2.5	5.18	28.0
1,500.0	1.20	21.48	1,499.6	29.9	3.3	6.22	30.1
1,600.0	1.21	23.91	1,599.6	31.8	4.1	7.29	32.1
1,700.0	1.17	23.22	1,699.6	33.7	4.9	8.27	34.1
1,800.0	1.19	21.34	1,799.6	35.6	5.7	9.06	36.1
1,900.0	1.08	20.25	1,899.6	37.5	6.4	9.66	38.0
2,000.0	0.98	18.06	1,999.5	39.2	7.0	10.09	39.8
2,100.0	0.99	19.79	2,099.5	40.8	7.5	10.46	41.5
2,200.0	0.87	17.75	2,199.5	42.4	8.1	10.77	43.1
2,300.0	0.90	13.27	2,299.5	43.8	8.5	10.93	44.7
2,400.0	0.75	10.41	2,399.5	45.3	8.8	10.97	46.1
2,500.0	0.68	14.88	2,499.5	46.5	9.0	11.01	47.3
2,600.0	0.54	20.97	2,599.5	47.5	9.4	11.15	48.4
2,700.0	0.50	25.77	2,699.5	48.3	9.7	11.37	49.3
2,800.0	0.54	29.36	2,799.5	49.1	10.1	11.66	50.2
2,900.0	0.41	23.13	2,899.5	49.9	10.5	11.90	51.0
3,000.0	0.29	17.65	2,999.5	50.4	10.7	12.01	51.6
3,100.0	0.39	35.13	3,099.5	51.0	11.0	12.18	52.1
3,200.0	0.42	36.00	3,199.5	51.5	11.4	12.49	52.8
3,300.0	0.41	34.79	3,299.5	52.1	11.8	12.79	53.4
3,400.0	0.41	27.61	3,399.5	52.7	12.2	13.03	54.1
3,500.0	0.36	23.43	3,499.5	53.3	12.5	13.18	54.8
3,600.0	0.39	7.36	3,599.5	54.0	12.7	13.21	55.4
3,700.0	0.43	9.19	3,699.5	54.7	12.8	13.14	56.1
3,800.0	0.40	2.50	3,799.4	55.4	12.8	13.05	56.9
3,900.0	0.37	22.70	3,899.4	56.0	13.0	13.04	57.5
4,000.0	0.25	359.74	3,999.4	56.5	13.1	13.05	58.0
4,100.0	0.19	342.60	4,099.4	56.9	13.1	12.91	58.4
4,200.0	0.16	306.73	4,199.4	57.2	12.9	12.71	58.6
4,300.0	0.17	292.19	4,299.4	57.3	12.6	12.44	58.7
4,400.0	0.12	330.28	4,399.4	57.5	12.5	12.23	58.8
4,500.0	0.17	264.27	4,499.4	57.5	12.3	12.02	58.8
4,600.0	0.13	291.37	4,599.4	57.6	12.0	11.78	58.8
4,700.0	0.17	285.44	4,699.4	57.6	11.8	11.52	58.8
4,800.0	0.28	304.72	4,799.4	57.8	11.4	11.16	58.9
4,900.0	0.28	307.18	4,899.4	58.1	11.0	10.73	59.1
5,000.0	0.30	306.82	4,999.4	58.4	10.6	10.29	59.4
5,100.0	0.29	295.96	5,099.4	58.7	10.2	9.83	59.5
5,200.0	0.08	315.75	5,199.4	58.8	9.9	9.55	59.7
5,300.0	0.12	86.56	5,299.4	58.9	10.0	9.59	59.7
5,400.0	0.10	88.75	5,399.4	58.9	10.1	9.77	59.8
5,500.0	0.13	59.54	5,499.4	59.0	10.3	9.94	59.9

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Well:	Blackhawk "11" Federal Com #1	North Reference:	Grid
Wellbore:	VH - Job #32K0111034	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0111034	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.0	0 18	70 19	5,599.4	59 1	10 6	10.15	60 0
5,700 0	0 25	59.02	5,699.4	59 2	10 9	10.43	60 2
5,800.0	0 29	62 81	5,799.4	59 5	11.3	10 78	60.5
5,900 0	0 67	76 85	5,899.4	59.7	12 1	11 47	60 9
6,000.0	1 31	86 17	5,999.4	59 9	13.8	12 99	61 5
6,100 0	1.75	75 47	6,099.4	60 4	16 4	15 23	62.6
6,200.0	1 93	74.01	6,199.3	61.2	19.5	17.70	64 3
6,300.0	1 96	81.40	6,299.3	61 9	22.8	20 25	66.0
6,400.0	1 73	88.70	6,399.2	62 2	26 0	22 71	67.5
6,500 0	1 61	92 34	6,499.2	62 2	29.0	24 96	68 6
6,600 0	1 36	73 90	6,599.1	62.5	31 5	26.76	70 0
6,700 0	1 42	75 02	6,699.1	63.1	33.8	28 19	71 6
6,762.0	1.44	79.70	6,761.1	63 5	35.4	29 12	72 7



Scientific Drilling
Directional Drilling Operations

Project: Crow Flats
Eddy County, NM
Well: Blackhawk "11" Federal Com #1
Wellbore: VH - Job #32K0111034
Design: VH - Job #32K0111034

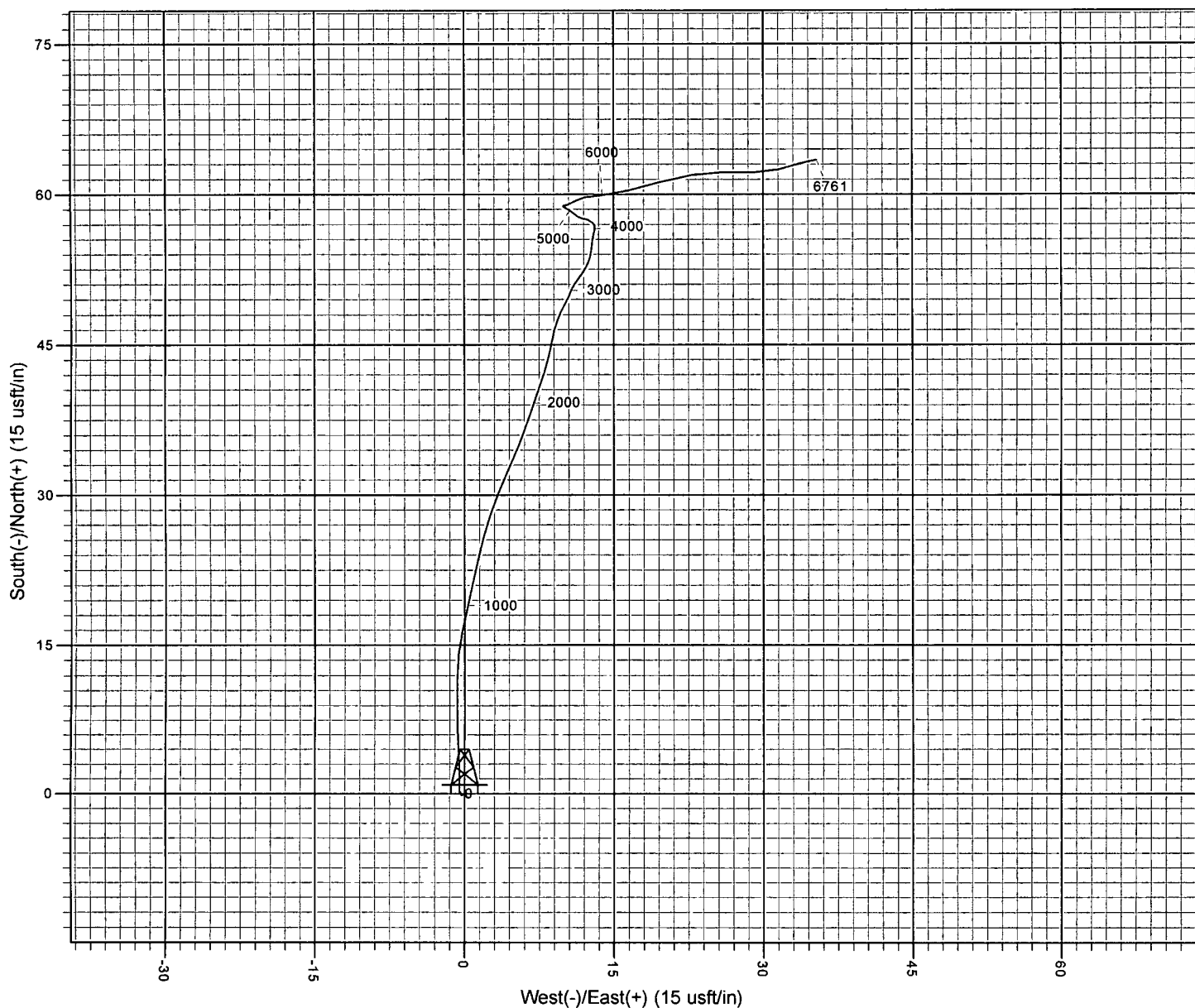


Azimuths to Grid North
True North: -0.10°
Magnetic North: 7.93°

Magnetic Field
Strength: 49077.8snT
Dip Angle: 60.76°
Date: 1/13/2011
Model: BGGM2010

WELL DETAILS: Blackhawk "11" Federal Com #1
WELL @ 0.0usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	702847.68	555058.52	32° 55' 55.470 N	104° 9' 13.980 W	



PROJECT DETAILS: Crow Flats
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 55' 55.470 N
Longitude: 104° 9' 13.980 W
Positional Uncertainty: 0.0
Convergence: 0.10
Local North: Grid