COG OPERATING

Red Lake
Eddy County, NM
MC State #1
VH - Job #32K09121148

Survey: Gyro

SDI Standard Survey Report

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

_____

Notarized this date _____ of _____, 2012.

_____
Notary Signature
County of Midland
State of Texas

Scientific Drilling

Scientific Drilling International, Inc.

SDI Standard Survey Report

Scientific Drilling

Company:	COG OPERATING	**Local Co-ordinate Reference:**	Well MC State #1
Project:	Red Lake	**TVD Reference:**	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	**MD Reference:**	WELL @ 0.00usft (Original Well Elev)
Well:	MC State #1	**North Reference:**	Grid
Wellbore:	VH - Job #32K09121148	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K09121148	**Database:**	EDM-Regulatory

Project Red Lake

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:**	662,078 62 usft	**Latitude:**	32° 49' 12 000 N
From:	Lat/Long	**Easting:**	557,856.84 usft	**Longitude:**	104° 8' 42 000 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0 10 °

Well MC State #1, Vertical

Well Position	**+N/-S**	0 00 usft	**Northing:**	662,078.62 usft	**Latitude:**	32° 49' 12.000 N
	+E/-W	0 00 usft	**Easting:**	557,856.84 usft	**Longitude:**	104° 8' 42 000 W
Position Uncertainty		0 00 usft	**Wellhead Elevation:**	usft	**Ground Level:**	0 00 usft

Wellbore VH - Job #32K09121148

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	09/13/12	7 74	60.61	48,812

Design VH - Job #32K09121148

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	205.29

Survey Program **Date** 10/15/12

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	4,950 00	Gyro (VH - Job #32K09121148)	Keeper	Keeper Gyro

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0 00	0 00	0.00	0 00	0.00	0.00	0.00	0.00
100 00	1.11	295 98	99.99	0.42	-0.87	295 98	0.97
200 00	1.13	299.44	199.97	1 33	-2.60	297.15	2 92
300.00	1.17	295.31	299 95	2.25	-4 38	297 23	4 93
400 00	0.78	301 67	399 94	3.05	-5.88	297.39	6.63
500.00	0.62	328 31	499.93	3 87	-6 75	299.81	7.78
600 00	0 59	334.57	599 93	4 79	-7 25	303.45	8.69
700 00	0 50	321 97	699.92	5 60	-7 74	305.88	9 56
800 00	0.45	306 73	799.92	6 18	-8 33	306 58	10 37
900.00	0 43	301.70	899.92	6 61	-8.96	306 42	11 13
1,000.00	0.38	269.38	999.91	6.80	-9.61	305.30	11 78
1,100.00	0 54	257 20	1,099 91	6.70	-10.40	302.77	12.37

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Well:	MC State #1	**North Reference:**	Grid
Wellbore:	VH - Job #32K09121148	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K09121148	**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 00	0 54	268.52	1,199.91	6.58	-11 33	300 14	13.10
1,300.00	0 61	262.96	1,299.90	6.50	-12.33	297.80	13.94
1,400 00	0.62	264.07	1,399.90	6 38	-13 40	295.47	14.84
1,500 00	0.55	263.19	1,499.89	6.27	-14.41	293.50	15 72
1,600.00	0.64	258 34	1,599.88	6 10	-15.44	291.56	16.60
1,700.00	0.72	257 58	1,699.88	5.85	-16.60	289 42	17.60
1,800 00	0.84	254 94	1,799 87	5 52	-17.92	287.14	18.75
1,900.00	0 83	254 67	1,899 86	5.14	-19.33	284.90	20 00
2,000.00	0.78	253 07	1,999 85	4.75	-20.68	282 95	21 21
2,100 00	0.74	245 18	2,099.84	4.28	-21.91	281 06	22 33
2,200.00	0 87	246 13	2,199.83	3.71	-23 19	279 08	23 49
2,300 00	0 64	252.18	2,299.82	3.23	-24.42	277 53	24 63
2,400.00	0 50	254.58	2,399.82	2.94	-25 37	276 61	25 54
2,500.00	0.44	224.59	2,499.81	2 55	-26 06	275 59	26.19
2,600 00	0.55	219.28	2,599.81	1 91	-26 63	274.09	26 70
2,700 00	0 71	214.22	2,699.80	1 02	-27 29	272.15	27.31
2,800.00	0.82	210 52	2,799.79	-0 11	-28.00	269 78	28 00
2,900 00	0.70	201 84	2,899 78	-1.29	-28.59	267.42	28 62
3,000 00	0.71	200 70	2,999 78	-2 44	-29 04	265.20	29.14
3,100.00	0.67	204.24	3,099 77	-3.55	-29.49	263.14	29 71
3,200.00	0.79	199 95	3,199 76	-4 73	-29.97	261.03	30.34
3,300 00	0.82	195 21	3,299.75	-6.07	-30.39	258.71	30 99
3,400 00	0 97	195.23	3,399 74	-7.58	-30.80	256.18	31 72
3,500.00	0 91	177.68	3,499 73	-9 19	-30.99	253 49	32 33
3,600.00	1.40	180.22	3,599.71	-11 20	-30 97	250.11	32.93
3,700.00	1 38	178.33	3,699.68	-13.63	-30 94	246 23	33.80
3,800 00	1.62	177.06	3,799.64	-16.24	-30 83	242.22	34.84
3,900.00	2.13	157.03	3,899.59	-19 36	-30.03	237 18	35.73
4,000.00	2 40	157.79	3,999.51	-23.01	-28 51	231 09	36 64
4,100 00	2.43	159.52	4,099 42	-26 94	-26 98	225 04	38.13
4,200 00	2 24	160.93	4,199.34	-30 77	-25 60	219.76	40 03
4,300.00	1.78	166.42	4,299.28	-34 13	-24 60	215 78	42.07
4,400 00	1.54	171.36	4,399.24	-36 97	-24.03	213.03	44.09
4,500 00	1 42	177.90	4,499.20	-39 53	-23 78	211.03	46.14
4,600 00	1 36	173 58	4,599.17	-41.95	-23.60	209.37	48.14
4,700 00	1.28	182.05	4,699.15	-44 25	-23 51	207.99	50.10
4,800 00	1.24	186 19	4,799.12	-46 44	-23 67	207 01	52 12
4,900 00	1 64	181 08	4,899 09	-48.94	-23.81	205.94	54.43
4,950 00	1.43	173.61	4,949 07	-50.28	-23 76	205 29	55 61