

30-015-30944

COG OPERATING

Empire, Yeso
Eddy County, NM
State S-19 #14
VH - Job #32K0712947



Survey: Gyro

SDI Standard Survey Report

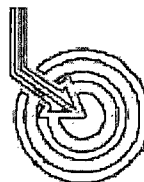
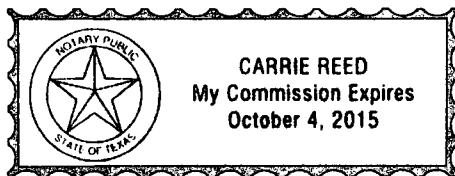
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 3rd of August, 2012.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well State S-19 #14
Project:	Empire, Yeso	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	State S-19 #14	North Reference:	True
Wellbore:	VH - Job #32K0712947	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0712947	Database:	EDM-Regulatory

Project	Empire, Yeso		
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:	660,277.32 usft
From:	Lat/Long	Easting:	567,076.75 usft
Position Uncertainty:	0.00 usft	Slot Radius:	0"
		Latitude:	32° 48' 54.000 N
		Longitude:	104° 6' 54.000 W
		Grid Convergence:	0.12 °

Well	State S-19 #14, Vertical		
Well Position	+N/-S	0.00 usft	Northing: 661,737.06 usft
	+E/-W	0.00 usft	Easting: 569,224.21 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 8.400 N
		Longitude:	104° 6' 28.800 W
		Ground Level:	0.00 usft

Wellbore	VH - Job #32K0712947		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2000	12/31/04	8.86
			Dip Angle (°)
			60.89
			Field Strength (nT)
			49,746

Design	VH - Job #32K0712947		
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 (°)
			219.96

Survey Program	Date 08/12/12		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.00	5,280.00	Gyro (VH - Job #32K0712947)	Keeper
			Description
			Keeper Gyro

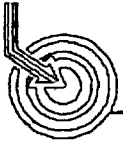
Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.32	22.54	100.00	0.26	0.11	22.54	0.28
200.00	0.61	50.07	200.00	0.86	0.62	35.97	1.06
300.00	0.58	55.61	299.99	1.49	1.45	44.28	2.07
400.00	0.46	54.93	399.99	2.00	2.19	47.63	2.97
500.00	0.54	65.74	499.98	2.43	2.95	50.59	3.82
600.00	0.53	66.32	599.98	2.81	3.81	53.61	4.73
700.00	0.50	78.35	699.97	3.08	4.66	56.53	5.58
800.00	0.40	97.11	799.97	3.12	5.43	60.09	6.26
900.00	0.43	111.93	899.97	2.94	6.12	64.35	6.79
1,000.00	0.21	105.91	999.97	2.75	6.65	67.53	7.20
1,100.00	0.23	69.97	1,099.97	2.77	7.01	68.46	7.54

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Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	State S-19 #14	North Reference:	True
Wellbore:	VH - Job #32K0712947	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0712947	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	0.32	99.75	1,199.97	2.79	7.48	69.54	7.98
1,300.00	0.25	143.07	1,299.96	2.57	7.88	71.95	8.29
1,400.00	0.39	159.40	1,399.96	2.08	8.13	75.69	8.40
1,500.00	0.46	186.62	1,499.96	1.36	8.21	80.60	8.32
1,600.00	0.39	230.86	1,599.96	0.74	7.90	84.61	7.93
1,700.00	0.29	226.90	1,699.96	0.36	7.45	87.26	7.46
1,800.00	0.47	205.09	1,799.95	-0.19	7.09	91.51	7.09
1,900.00	0.63	211.49	1,899.95	-1.03	6.63	98.81	6.71
2,000.00	0.82	209.07	1,999.94	-2.12	5.99	109.49	6.36
2,100.00	0.89	214.12	2,099.93	-3.39	5.21	123.05	6.22
2,200.00	1.04	220.52	2,199.92	-4.72	4.19	138.45	6.31
2,300.00	1.10	230.56	2,299.90	-6.02	2.86	154.64	6.67
2,400.00	1.31	244.85	2,399.88	-7.12	1.08	171.38	7.20
2,500.00	1.60	244.17	2,499.84	-8.21	-1.21	188.40	8.30
2,600.00	1.54	231.16	2,599.81	-9.66	-3.52	199.99	10.28
2,700.00	1.53	226.86	2,699.77	-11.42	-5.54	205.87	12.69
2,800.00	1.45	229.74	2,799.74	-13.15	-7.48	209.62	15.13
2,900.00	1.46	228.84	2,899.70	-14.81	-9.40	212.41	17.54
3,000.00	1.43	218.65	2,999.67	-16.62	-11.14	213.83	20.01
3,100.00	1.38	214.84	3,099.64	-18.58	-12.61	214.15	22.45
3,200.00	1.24	219.24	3,199.62	-20.41	-13.98	214.41	24.74
3,300.00	1.33	222.83	3,299.59	-22.10	-15.45	214.96	26.96
3,400.00	1.48	225.85	3,399.56	-23.85	-17.17	215.75	29.38
3,500.00	1.65	223.44	3,499.52	-25.79	-19.08	216.50	32.09
3,600.00	1.65	218.19	3,599.48	-27.97	-20.96	216.85	34.95
3,700.00	1.24	203.92	3,699.45	-30.09	-22.29	216.53	37.45
3,800.00	1.25	209.27	3,799.43	-32.03	-23.27	215.99	39.59
3,900.00	1.35	212.15	3,899.40	-33.98	-24.43	215.71	41.85
4,000.00	1.30	226.22	3,999.38	-35.76	-25.87	215.88	44.14
4,100.00	1.72	224.64	4,099.34	-37.61	-27.74	216.41	46.74
4,200.00	1.84	223.32	4,199.29	-39.85	-29.90	216.88	49.82
4,300.00	2.00	226.21	4,299.24	-42.23	-32.26	217.38	53.14
4,400.00	1.84	231.49	4,399.18	-44.43	-34.78	218.05	56.42
4,500.00	2.03	230.46	4,499.12	-46.56	-37.40	218.77	59.72
4,600.00	1.88	235.70	4,599.06	-48.61	-40.12	219.53	63.03
4,700.00	1.97	228.26	4,699.01	-50.68	-42.76	220.15	66.31
4,800.00	2.23	221.87	4,798.94	-53.27	-45.34	220.40	69.96
4,900.00	2.63	216.11	4,898.85	-56.58	-47.99	220.31	74.19
5,000.00	2.28	221.04	4,998.76	-59.93	-50.65	220.20	78.47
5,100.00	2.43	217.45	5,098.68	-63.11	-53.24	220.15	82.57
5,200.00	2.29	218.98	5,198.59	-66.35	-55.79	220.06	86.69
5,280.00	2.19	215.23	5,278.53	-68.84	-57.68	219.96	89.81

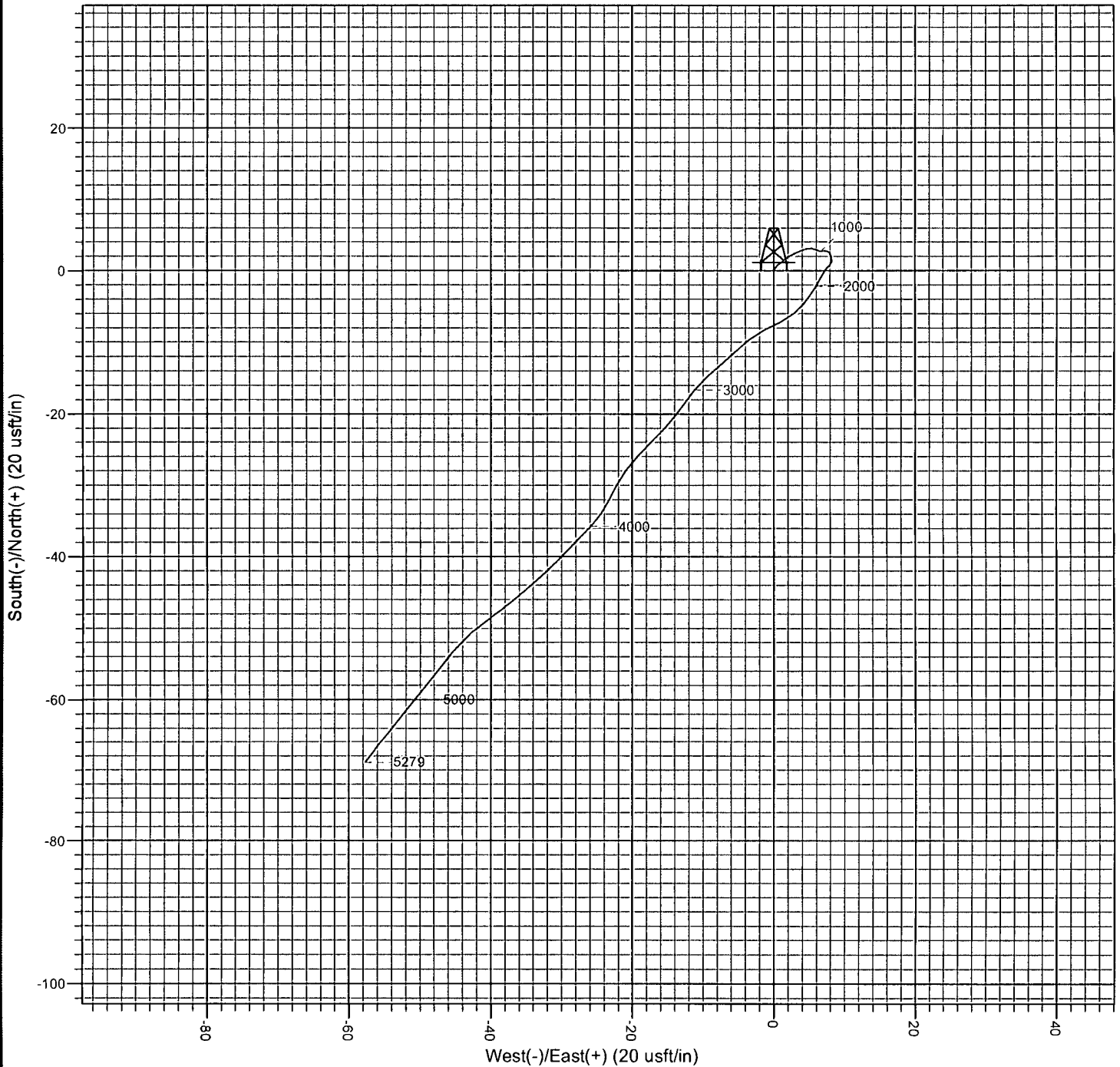


Scientific Drilling

Project: Empire, Yeso
Eddy County, NM
Well: State S-19 #14
Wellbore: VH - Job #32K0712947
Design: VH - Job #32K0712947

WELL DETAILS: State S-19 #14
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	661737.06	569224.21	32° 49' 8.400 N	104° 6' 28.800 W	



PROJECT DETAILS: Empire, Yeso	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 48' 54.000 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 104° 6' 54.000 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.12
System Datum: Mean Sea Level	Local North: True