

30-015-31279



COG OPERATING

Empire, Yeso

Eddy County, NM

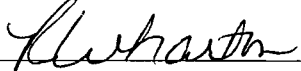
State S-19 #16

Vh - Job #32K08121039

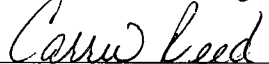
Survey: Gyro

SDI Standard Survey Report

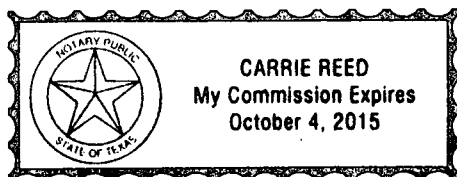
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 21st of August, 2012.



Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well State S-19 #16
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 #16	North Reference:	True
Wellbore:	Vh - Job #32K08121039	Survey Calculation Method:	Minimum Curvature
Design:	Vh - Job #32K08121039	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	Latitude:	32° 48' 54.000 N
From:	Lat/Long	Easting:	567,076.75 usft	Longitude:	104° 6' 54.000 W
Position Uncertainty:	0.00 usft	Slot Radius:	0"	Grid Convergence:	0.12 °

Well	State S-19 #16, Vertical					
Well Position	+N/-S	0.00 usft	Northing:	662,098.27 usft	Latitude:	32° 49' 12.000 N
	+E/-W	0.00 usft	Easting:	567,994.61 usft	Longitude:	104° 6' 43.200 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft

Wellbore		Vh - Job #32K08121039			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	08/21/12	7.74	60.62	48,822

Design	Vh - Job #32K08121039			
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	158.42

Survey Program		Date	09/23/12		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	5,235.00	Gyro (Vh - Job #32K08121039)	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	0.68	343.56	100.00	0.57	-0.17	343.56	0.59
200.00	1.09	326.41	199.99	1.93	-0.86	335.94	2.11
300.00	1.25	316.64	299.96	3.52	-2.14	328.71	4.11
400.00	0.68	318.78	399.95	4.76	-3.28	325.43	5.78
500.00	0.66	332.32	499.94	5.71	-3.94	325.43	6.94
600.00	0.68	324.27	599.94	6.70	-4.55	325.83	8.10
700.00	0.53	322.66	699.93	7.55	-5.18	325.57	9.16
800.00	0.60	331.88	799.93	8.38	-5.70	325.77	10.14
900.00	0.54	339.46	899.92	9.29	-6.12	326.63	11.12
1,000.00	0.47	333.77	999.92	10.09	-6.46	327.37	11.99
1,100.00	0.32	347.20	1,099.92	10.73	-6.71	328.01	12.66

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Well:	State S-19 #16	North Reference:	True
Wellbore:	Vh - Job #32K08121039	Survey Calculation Method:	Minimum Curvature
Design:	Vh - Job #32K08121039	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	0.01	73.96	1,199.91	11.01	-6.76	328.45	12.92	
1,300.00	0.22	230.85	1,299.91	10.89	-6.90	327.64	12.89	
1,400.00	0.32	187.20	1,399.91	10.49	-7.08	325.98	12.66	
1,500.00	0.42	198.94	1,499.91	9.87	-7.24	323.74	12.24	
1,600.00	0.54	196.88	1,599.91	9.07	-7.49	320.44	11.77	
1,700.00	0.79	188.15	1,699.90	7.94	-7.73	315.77	11.08	
1,800.00	0.81	196.16	1,799.89	6.58	-8.02	309.34	10.37	
1,900.00	0.98	190.33	1,899.88	5.06	-8.37	301.13	9.78	
2,000.00	0.79	190.22	1,999.87	3.54	-8.65	292.24	9.34	
2,100.00	1.02	189.75	2,099.85	1.98	-8.92	282.52	9.14	
2,200.00	0.65	174.53	2,199.84	0.54	-9.02	273.42	9.03	
2,300.00	0.79	174.78	2,299.84	-0.71	-8.90	265.43	8.93	
2,400.00	0.60	176.91	2,399.83	-1.92	-8.81	257.70	9.02	
2,500.00	0.51	167.15	2,499.82	-2.88	-8.68	251.66	9.15	
2,600.00	0.50	135.35	2,599.82	-3.62	-8.28	246.36	9.04	
2,700.00	0.80	128.25	2,699.81	-4.37	-7.42	239.54	8.61	
2,800.00	0.86	134.22	2,799.80	-5.32	-6.34	229.98	8.27	
2,900.00	1.03	137.29	2,899.79	-6.50	-5.19	218.58	8.32	
3,000.00	1.23	136.83	2,999.77	-7.95	-3.85	205.82	8.83	
3,100.00	1.29	132.64	3,099.75	-9.49	-2.28	193.52	9.76	
3,200.00	1.46	130.50	3,199.72	-11.08	-0.49	182.51	11.09	
3,300.00	1.38	133.90	3,299.69	-12.75	1.35	173.95	12.82	
3,400.00	1.29	139.73	3,399.66	-14.44	2.95	168.47	14.74	
3,500.00	1.10	140.16	3,499.64	-16.03	4.29	165.03	16.60	
3,600.00	1.28	138.50	3,599.62	-17.61	5.64	162.23	18.49	
3,700.00	1.13	148.36	3,699.59	-19.28	6.90	160.31	20.48	
3,800.00	1.19	150.74	3,799.57	-21.03	7.93	159.35	22.47	
3,900.00	1.42	153.93	3,899.55	-23.05	8.98	158.72	24.74	
4,000.00	1.19	159.61	3,999.52	-25.14	9.88	158.53	27.01	
4,100.00	1.25	168.43	4,099.50	-27.18	10.46	158.94	29.12	
4,200.00	1.23	166.63	4,199.48	-29.29	10.93	159.53	31.26	
4,300.00	1.20	167.68	4,299.45	-31.36	11.40	160.02	33.37	
4,400.00	1.19	170.99	4,399.43	-33.41	11.79	160.56	35.42	
4,500.00	1.10	162.76	4,499.41	-35.35	12.24	160.91	37.41	
4,600.00	1.06	170.91	4,599.39	-37.18	12.67	161.19	39.28	
4,700.00	1.19	157.70	4,699.37	-39.05	13.21	161.32	41.22	
4,800.00	0.82	156.83	4,799.36	-40.67	13.88	161.15	42.97	
4,900.00	0.60	143.13	4,899.35	-41.75	14.48	160.87	44.19	
5,000.00	0.80	149.11	4,999.34	-42.77	15.15	160.49	45.37	
5,100.00	1.14	141.66	5,099.33	-44.14	16.13	159.93	47.00	
5,200.00	1.28	127.79	5,199.31	-45.61	17.63	158.87	48.90	
5,235.00	1.19	127.62	5,234.30	-46.07	18.22	158.42	49.54	

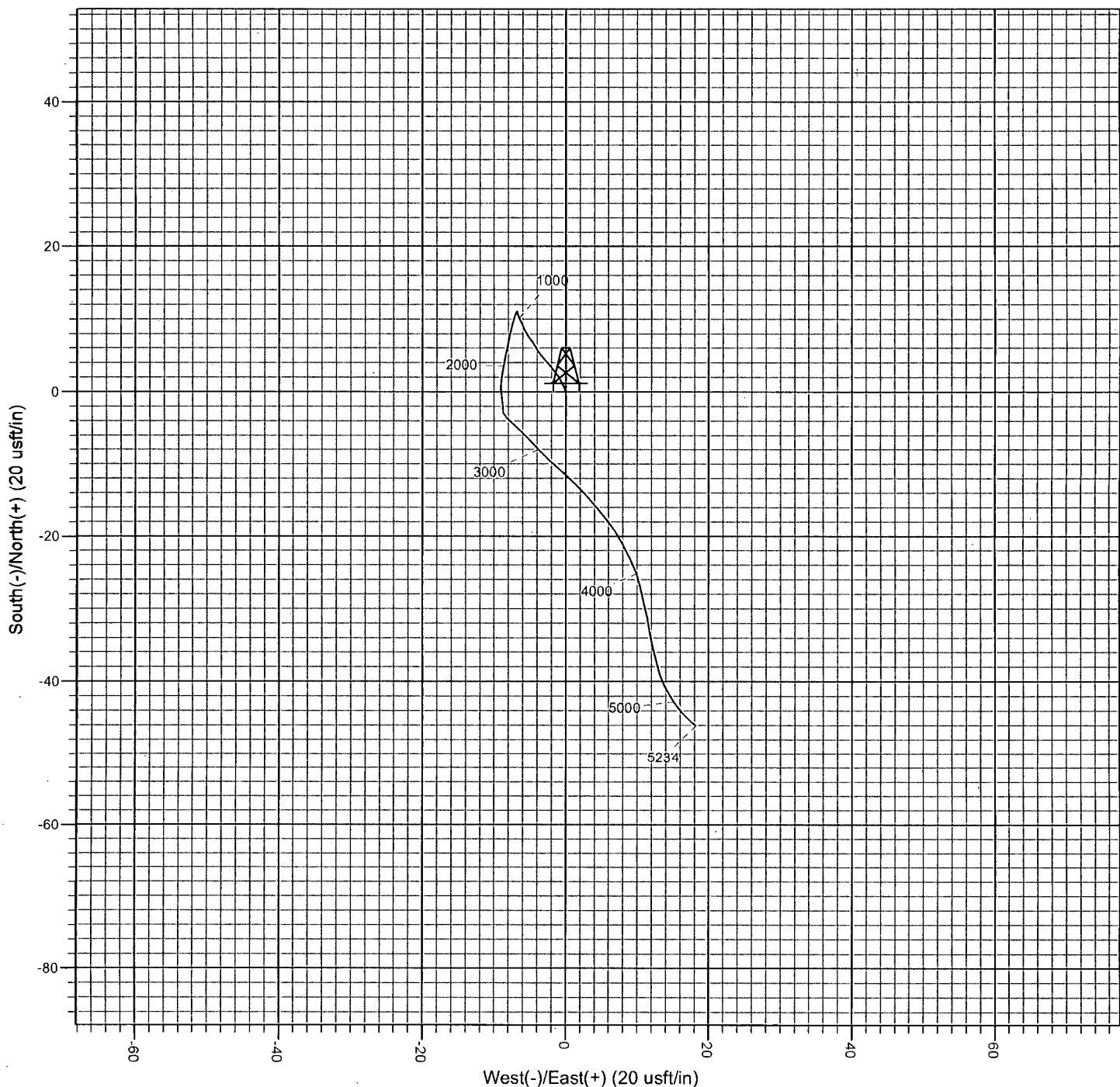


Scientific Drilling

Project: Empire, Yeso
Eddy County, NM
Well: State S-19 #16
Wellbore: Vh - Job #32K08121039
Design: Vh - Job #32K08121039

WELL DETAILS: State S-19 #16
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	662098.27	567994.61	32° 49' 12.000 N	104° 6' 43.200 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