

COG OPERATING

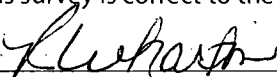
30-015-27260

Grayburg Jackson
Eddy County, NM
GJ West Coop #109
VH - Job #32K111214449

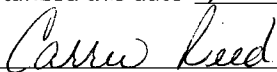
Survey: Gyro

SDI Standard Survey Report

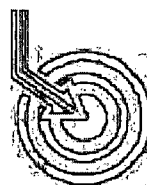
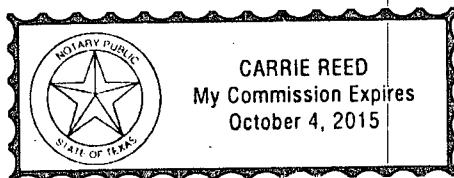
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 17th of December, 2012.



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 GJ West Coop #109
Project:	Grayburg Jackson	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	GJ West Coop #109	North Reference:	Grid
Wellbore:	VH - Job #32K111214449	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K111214449	Database:	EDM-Regulatory

Project:	Grayburg Jackson	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Eddy County, NM		
Site Position:		Northing:	665,097.06 usft
From:	Lat/Long	Easting:	601,778.12 usft
Position Uncertainty:	0.00 usft	Slot Radius:	0"
		Latitude:	32° 49' 40.800 N
		Longitude:	104° 0' 7.200 W
		Grid Convergence:	0.18 °

Well:	GJ West Coop #109, Vertical					
Well Position	+N/-S	0.00 usft	Northing:	658,852.07 usft	Latitude:	32° 48' 39.600 N
	+E/-W	0.00 usft	Easting:	580,290.92 usft	Longitude:	104° 4' 19.200 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft	

Wellbore	VH - Job #32K111214449				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/30/12	7.68	60.61	48,794

Design:		VH - Job #32K111214449	
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
			(°)
			302.51

Survey Program	Date	12/16/12		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	5,485.00	Gyro (VH - Job #32K111214449)	Keeper	Keeper Gyro

Survey								
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance	
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.41	313.20	100.00	0.24	-0.26	313.20	0.36	
200.00	0.53	320.05	200.00	0.84	-0.82	315.89	1.18	
300.00	0.59	319.07	299.99	1.59	-1.45	317.54	2.15	
400.00	0.39	47.33	399.99	2.21	-1.54	325.10	2.69	
500.00	0.30	64.32	499.99	2.55	-1.05	337.56	2.76	
600.00	0.42	106.58	599.98	2.56	-0.47	349.67	2.60	
700.00	0.30	165.36	699.98	2.20	-0.05	358.72	2.20	
800.00	0.44	214.62	799.98	1.63	-0.20	352.98	1.65	
900.00	0.44	218.24	899.98	1.02	-0.66	327.11	1.21	
1,000.00	0.43	230.38	999.98	0.48	-1.18	291.87	1.28	
1,100.00	0.35	238.60	1,099.97	0.08	-1.73	272.53	1.74	

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Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	GJ West Coop #109	North Reference:	Grid
Wellbore:	VH - Job #32K111214449	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K111214449	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	232.53	1,199.97	-0.25	-2.22	263.50	2.23
1,300.00	0.49	256.46	1,299.97	-0.52	-2.85	259.62	2.90
1,400.00	0.60	295.07	1,399.96	-0.40	-3.74	263.89	3.76
1,500.00	0.64	294.10	1,499.96	0.05	-4.73	270.60	4.73
1,600.00	0.77	295.27	1,599.95	0.56	-5.84	275.51	5.87
1,700.00	0.68	306.63	1,699.94	1.20	-6.93	279.87	7.03
1,800.00	0.77	293.26	1,799.94	1.82	-8.02	282.81	8.23
1,900.00	0.99	297.28	1,899.92	2.49	-9.41	284.80	9.73
2,000.00	1.02	289.15	1,999.91	3.17	-11.02	286.07	11.46
2,100.00	1.01	285.83	2,099.89	3.71	-12.70	286.26	13.23
2,200.00	1.50	287.20	2,199.87	4.33	-14.80	286.32	15.42
2,300.00	1.25	291.46	2,299.84	5.12	-17.07	286.70	17.82
2,400.00	1.22	291.33	2,399.82	5.91	-19.07	287.20	19.97
2,500.00	1.27	292.54	2,499.79	6.72	-21.09	287.67	22.13
2,600.00	1.40	297.09	2,599.77	7.70	-23.20	288.36	24.45
2,700.00	1.31	302.72	2,699.74	8.87	-25.25	289.36	26.76
2,800.00	1.12	300.44	2,799.71	9.99	-27.05	290.26	28.84
2,900.00	1.10	298.18	2,899.70	10.93	-28.74	290.83	30.75
3,000.00	1.10	309.61	2,999.68	12.00	-30.33	291.59	32.62
3,100.00	0.89	318.51	3,099.66	13.19	-31.58	292.67	34.23
3,200.00	0.83	307.46	3,199.65	14.22	-32.67	293.51	35.63
3,300.00	0.89	305.52	3,299.64	15.11	-33.88	294.03	37.10
3,400.00	0.96	306.03	3,399.63	16.05	-35.19	294.52	38.68
3,500.00	1.07	300.39	3,499.61	17.02	-36.67	294.89	40.43
3,600.00	1.16	303.21	3,599.59	18.04	-38.32	295.21	42.36
3,700.00	1.13	305.41	3,699.57	19.17	-39.97	295.62	44.33
3,800.00	1.04	310.61	3,799.55	20.33	-41.47	296.12	46.18
3,900.00	1.03	305.86	3,899.54	21.45	-42.88	296.57	47.95
4,000.00	0.92	301.13	3,999.52	22.39	-44.30	296.81	49.64
4,100.00	0.86	298.14	4,099.51	23.16	-45.65	296.90	51.19
4,200.00	0.78	309.56	4,199.50	23.95	-46.84	297.08	52.60
4,300.00	0.74	318.38	4,299.49	24.86	-47.79	297.49	53.87
4,400.00	0.90	313.83	4,399.48	25.89	-48.79	297.95	55.23
4,500.00	0.85	318.00	4,499.47	26.98	-49.85	298.43	56.68
4,600.00	0.95	335.99	4,599.46	28.29	-50.68	299.17	58.04
4,700.00	0.96	335.35	4,699.45	29.81	-51.37	300.13	59.39
4,800.00	0.99	346.87	4,799.43	31.41	-51.91	301.18	60.68
4,900.00	0.68	332.79	4,899.42	32.78	-52.38	302.04	61.79
5,000.00	0.72	344.43	4,999.41	33.92	-52.82	302.70	62.77
5,100.00	0.17	14.02	5,099.41	34.67	-52.95	303.21	63.29
5,200.00	0.13	200.48	5,199.41	34.70	-52.96	303.24	63.32
5,300.00	0.21	257.99	5,299.41	34.56	-53.18	303.02	63.42
5,400.00	0.38	268.03	5,399.41	34.51	-53.69	302.73	63.82
5,485.00	0.68	291.90	5,484.40	34.69	-54.44	302.51	64.55

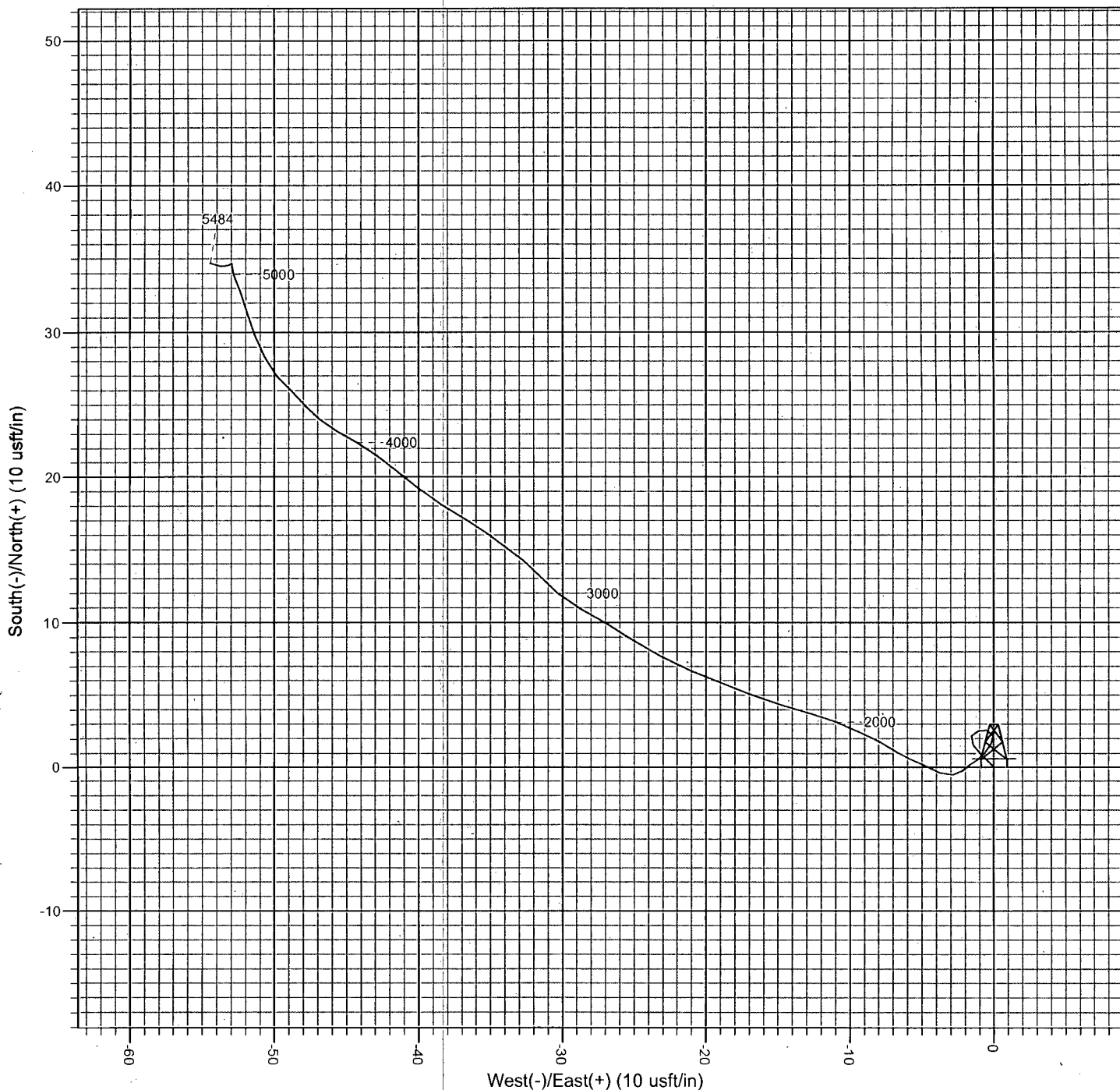


Scientific Drilling

Project: Grayburg Jackson
Eddy County, NM
Well: GJ West Coop #109
Wellbore: VH - Job #32K111214449
Design: VH - Job #32K111214449

WELL DETAILS: GJ West Coop #109
WELL @ 0.00usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	658852.07	580290.92	32° 48' 39.600 N	104° 4' 19.200 W	



PROJECT DETAILS: Grayburg Jackson	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 49' 40.800 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 104° 0' 7.200 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.18
System Datum: Mean Sea Level	Local North: Grid