

COG OPERATING

30-015-31018

Loco Hills Paddock
Eddy County, NM
Imperial State #3
VH - Job #320113-KW-106

Survey: Gyro

SDI Standard Survey Report

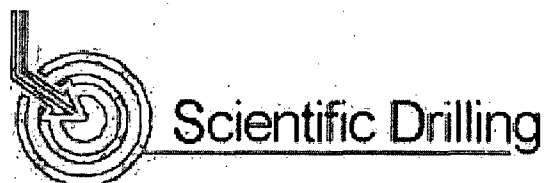
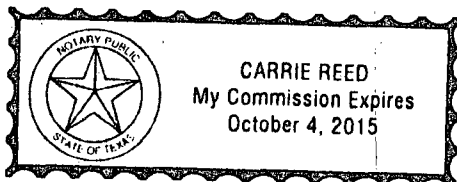
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

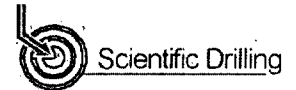
Notarized this date 11th of February, 2013.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Imperial State #3
Project:	Loco Hills Paddock	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	Imperial State #3	North Reference:	True
Wellbore:	VH - Job #320113-KW-106	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #320113-KW-106	Database:	EDM-Regulatory

Project	Loco Hills Paddock		
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:	667,685.64 usft	Latitude:	32° 50' 6.000 N
From:	Lat/Long	Easting:	614,363.49 usft	Longitude:	103° 57' 39.600 W
Position Uncertainty:	0.00 usft	Slot Radius:	0"	Grid Convergence:	0.20 °

Well	Imperial State #3, Vertical					
Well Position	+N/-S	0.00 usft	Northing:	666,581.44 usft	Latitude:	32° 49' 55.200 N
	+E/-W	0.00 usft	Easting:	610,681.35 usft	Longitude:	103° 58' 22.800 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft

Wellbore	VH - Job #320113-KW-106				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	01/28/13	7.62	60.64	48,801

Design	VH - Job #320113-KW-106			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	124.47

Survey Program:	Date 02/12/13				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.00	5,745.00	Gyro (VH - Job #320113-KW-106)	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	0.22	57.93	100.00	0.10	0.16	57.93	0.19	
200.00	0.52	132.42	200.00	-0.10	0.66	98.80	0.67	
300.00	0.84	103.56	299.99	-0.58	1.71	108.76	1.80	
400.00	0.59	117.60	399.98	-0.99	2.88	109.00	3.04	
500.00	0.57	142.52	499.98	-1.62	3.64	114.07	3.98	
600.00	0.66	133.97	599.97	-2.42	4.35	119.06	4.98	
700.00	0.82	113.22	699.96	-3.10	5.43	119.75	6.25	
800.00	1.04	101.24	799.95	-3.56	6.97	117.04	7.83	
900.00	1.90	79.73	899.92	-3.44	9.49	109.92	10.10	
1,000.00	2.12	74.90	999.86	-2.66	12.91	101.66	13.18	
1,100.00	2.11	74.51	1,099.79	-1.69	16.47	95.86	16.56	

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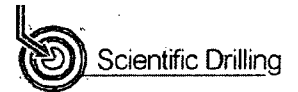


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Wellbore:	VH - Job #320113-KW-106	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #320113-KW-106	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.00	1.83	84.19	1,199.73	-1.04	19.83	92.99	19.86
1,300.00	1.63	91.11	1,299.68	-0.90	22.84	92.26	22.86
1,400.00	1.29	101.46	1,399.65	-1.15	25.37	92.60	25.40
1,500.00	1.24	105.12	1,499.63	-1.66	27.52	93.45	27.57
1,600.00	0.91	124.82	1,599.61	-2.40	29.21	94.69	29.31
1,700.00	0.64	137.39	1,699.60	-3.26	30.24	96.15	30.42
1,800.00	0.22	144.72	1,799.60	-3.83	30.73	97.10	30.97
1,900.00	0.19	153.23	1,899.60	-4.13	30.92	97.61	31.19
2,000.00	0.26	227.02	1,999.60	-4.44	30.83	98.19	31.14
2,100.00	0.32	225.90	2,099.60	-4.78	30.46	98.93	30.83
2,200.00	0.30	220.70	2,199.59	-5.18	30.09	99.76	30.53
2,300.00	0.30	214.31	2,299.59	-5.59	29.77	100.64	30.29
2,400.00	0.44	234.22	2,399.59	-6.03	29.31	101.63	29.93
2,500.00	0.60	245.21	2,499.59	-6.48	28.52	102.79	29.25
2,600.00	0.67	245.80	2,599.58	-6.94	27.52	104.15	28.38
2,700.00	0.74	240.73	2,699.57	-7.49	26.42	105.83	27.46
2,800.00	0.71	249.50	2,799.56	-8.02	25.28	107.61	26.52
2,900.00	0.54	250.66	2,899.56	-8.40	24.25	109.10	25.66
3,000.00	0.50	256.79	2,999.55	-8.65	23.38	110.31	24.93
3,100.00	0.47	263.15	3,099.55	-8.80	22.55	111.32	24.21
3,200.00	0.56	265.34	3,199.55	-8.89	21.66	112.32	23.41
3,300.00	0.58	267.21	3,299.54	-8.95	20.66	113.43	22.52
3,400.00	0.68	271.45	3,399.54	-8.96	19.56	114.62	21.52
3,500.00	0.74	264.08	3,499.53	-9.02	18.33	116.19	20.43
3,600.00	0.63	255.87	3,599.52	-9.22	17.15	118.25	19.47
3,700.00	0.63	252.61	3,699.51	-9.51	16.10	120.59	18.70
3,800.00	0.57	225.92	3,799.51	-10.02	15.21	123.38	18.22
3,900.00	0.43	220.15	3,899.51	-10.66	14.61	126.10	18.09
4,000.00	0.30	242.76	3,999.50	-11.06	14.14	128.04	17.95
4,100.00	0.14	281.05	4,099.50	-11.16	13.79	128.99	17.74
4,200.00	0.08	275.56	4,199.50	-11.13	13.60	129.30	17.57
4,300.00	0.15	177.83	4,299.50	-11.25	13.53	129.75	17.60
4,400.00	0.23	250.25	4,399.50	-11.45	13.35	130.63	17.59
4,500.00	0.55	260.74	4,499.50	-11.60	12.69	132.44	17.19
4,600.00	0.68	255.99	4,599.49	-11.82	11.64	135.45	16.59
4,700.00	0.40	306.68	4,699.49	-11.75	10.78	137.47	15.95
4,800.00	0.50	294.25	4,799.49	-11.37	10.10	138.37	15.21
4,900.00	0.48	327.77	4,899.48	-10.83	9.48	138.81	14.40
5,000.00	0.51	25.31	4,999.48	-10.08	9.45	136.84	13.81
5,100.00	0.35	94.74	5,099.48	-9.70	9.94	134.29	13.89
5,200.00	0.50	93.58	5,199.48	-9.75	10.68	132.39	14.46
5,300.00	0.20	48.91	5,299.47	-9.66	11.25	130.66	14.83
5,400.00	0.19	340.02	5,399.47	-9.39	11.33	129.67	14.71
5,500.00	0.41	350.12	5,499.47	-8.89	11.21	128.41	14.30

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Wellbore:	VH - Job #320113-KW-106	Survey Calculation Method:	Minimum Curvature
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Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.00	0.38	27.97	5,599.47	-8.24	11.30	126.10	13.99
5,700.00	0.14	337.24	5,699.47	-7.83	11.41	124.48	13.84
5,745.00	0.22	284.74	5,744.47	-7.76	11.30	124.47	13.71

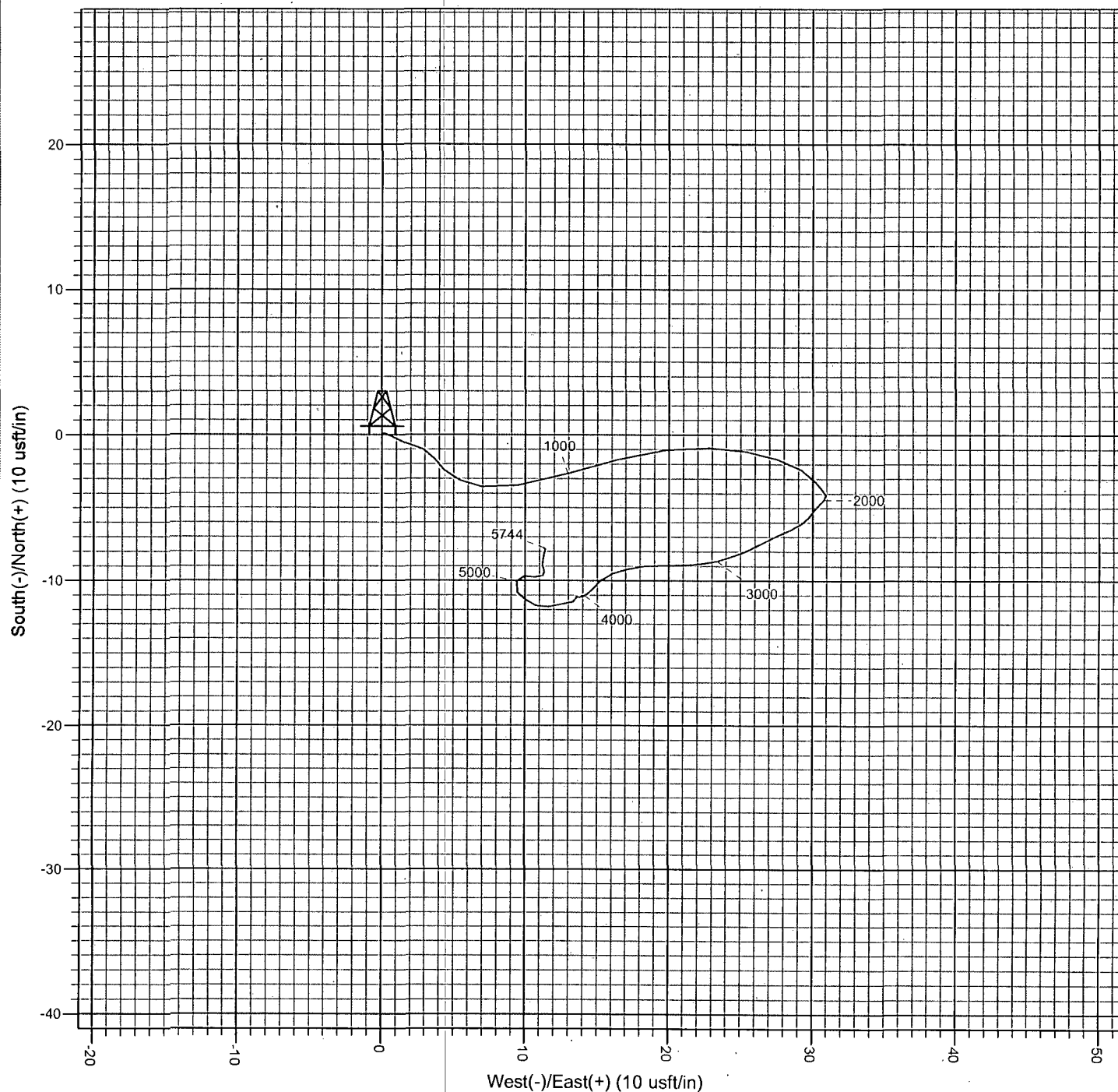


Scientific Drilling

Project: Loco Hills Paddock
Eddy County, NM
Well: Imperial State #3
Wellbore: VH - Job #320113-KW-106
Design: VH - Job #320113-KW-106

WELL DETAILS: Imperial State #3
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	666581.44	610681.35	32° 49' 55.200 N	103° 58' 22.800 W	



PROJECT DETAILS: Loco Hills Paddock	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 50' 6.000 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 103° 57' 39.600 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.20
System Datum: Mean Sea Level	Local North: True