

30-08-30591

COG OPERATING

Loco Hills
Eddy County, NM
Pawnee State #1
VH - Job #32K0611523

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NMOCD ARTESIA

Survey: Actual

SDI Standard Survey Report

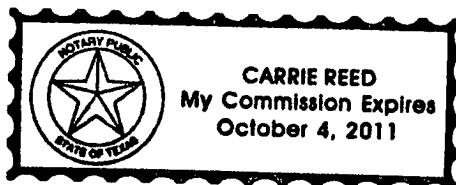
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 22nd of July, 2011.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Pawnee State #1
Project:	Loco Hills	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Pawnee State #1	North Reference:	Grid
Wellbore:	VH - Job #32K0611523	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0611523	Database:	EDM-Regulatory

Project	Loco Hills		
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:	665,851.73 usft	Latitude:	32° 49' 48.000 N
From:	Lat/Long	Easting:	610,069.49 usft	Longitude:	103° 58' 30.000 W
Position Uncertainty:	0.0 usft	Slot Radius:	0"	Grid Convergence:	0.19 °

Well	Pawnee State #1, Vertical					
Well Position	+N/-S	0 0 usft	Northing:	668,036 67 usft	Latitude:	32° 50' 9 600 N
	+E/-W	0 0 usft	Easting:	610,676 39 usft	Longitude:	103° 58' 22 800 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0 0 usft

Wellbore	VH - Job #32K0611523				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/6/2011	7.82	60.68	48,969

Design		VH - Job #32K0611523		
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 0 0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 0	0 0	0 0	22 50

Survey Program	Date	7/21/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	5,887.0	Actual (VH - Job #32K0611523)	Keeper	Keeper Gyro	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.49	109.24	100.0	-0.1	0.4	109.24	0.4	
200.0	0.67	102.02	200.0	-0.4	1.4	106.31	1.4	
300.0	0.64	75.08	300.0	-0.4	2.5	98.71	2.5	
400.0	1.04	39.01	400.0	0.5	3.6	82.61	3.6	
500.0	1.19	36.32	500.0	2.0	4.8	67.23	5.2	
600.0	1.24	24.49	599.9	3.8	5.9	56.79	7.0	
700.0	1.41	24.61	699.9	5.9	6.8	48.94	9.0	
800.0	1.56	35.09	799.9	8.2	8.1	44.79	11.5	
900.0	1.69	62.65	899.8	10.0	10.2	45.69	14.3	
1,000.0	1.78	76.87	999.8	11.0	13.0	49.84	17.0	
1,100.0	1.69	83.12	1,099.7	11.5	16.0	54.25	19.7	

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Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200 0	1 44	92 88	1,199 7	11 6	18 7	58 14	22 0	
1,300 0	1 30	91 58	1,299 7	11 5	21 1	61 34	24 1	
1,400 0	0 33	64 15	1,399 7	11 6	22 5	62 66	25 3	
1,500 0	0 52	63 49	1,499 7	12 0	23 2	62 69	26 1	
1,600 0	0 40	50 63	1,599 7	12 4	23 8	62 55	26 9	
1,700 0	0 45	58 27	1,699 7	12 8	24 4	62 34	27 6	
1,800 0	0 33	345 61	1,799 7	13 3	24 7	61 71	28 1	
1,900 0	0 47	325 92	1,899 7	13 9	24 4	60 31	28 1	
2,000 0	0 42	315 20	1,999 7	14 5	23 9	58 75	28 0	
2,100 0	0 43	323 58	2,099 7	15 1	23 4	57 25	27 9	
2,200 0	0 48	330 87	2,199 6	15 7	23 0	55 62	27 9	
2,300 0	0 76	307 38	2,299 6	16 5	22 3	53 45	27 7	
2,400 0	0 74	302 64	2,399 6	17 3	21 2	50 85	27 3	
2,500 0	0 73	300 85	2,499 6	17 9	20 1	48 28	27 0	
2,600 0	0 69	311 56	2,599 6	18 7	19 1	45 69	26 7	
2,700 0	0 66	317 63	2,699 6	19 5	18 3	43 17	26 7	
2,800 0	0 70	314 08	2,799 6	20 3	17 5	40 63	26 8	
2,900 0	0 48	301 64	2,899 6	21 0	16 7	38 44	26 8	
3,000 0	0 43	303 90	2,999 6	21 4	16 0	36 75	26 7	
3,100 0	0 56	345 88	3,099 6	22 1	15 6	35 15	27 0	
3,200 0	0 82	7 01	3,199 6	23 3	15 5	33 70	28 0	
3,300 0	1 03	14 67	3,299 6	24 9	15 8	32 51	29 5	
3,400 0	1 22	18 03	3,399 6	26 7	16 4	31 52	31 4	
3,500 0	1 16	18 28	3,499 5	28 7	17 0	30 69	33 4	
3,600 0	0 99	24 46	3,599 5	30 5	17 7	30 19	35 2	
3,700 0	0 80	16 18	3,699 5	31 9	18 3	29 79	36 8	
3,800 0	0 72	8 90	3,799 5	33 2	18 6	29 21	38 0	
3,900 0	0 68	22 65	3,899 5	34 4	18 9	28 79	39 2	
4,000 0	0 67	19 77	3,999 5	35 5	19 3	28 57	40 4	
4,100 0	0 79	9 29	4,099 5	36 7	19 6	28 13	41 6	
4,200 0	0 91	27 76	4,199 5	38 1	20 1	27 83	43 1	
4,300 0	1 13	35 90	4,299 4	39 6	21 1	28 01	44 8	
4,400 0	1 06	19 08	4,399 4	41 3	21 9	28 00	46 7	
4,500 0	0 81	18 75	4,499 4	42 8	22 5	27 69	48 3	
4,600 0	0 87	1 35	4,599 4	44 2	22 7	27 18	49 7	
4,700 0	0 75	14 63	4,699 4	45 6	22 9	26 65	51 1	
4,800 0	0 49	350 17	4,799 4	46 7	23 0	26 22	52 0	
4,900 0	0 43	318 23	4,899 4	47 4	22 7	25 56	52 5	
5,000 0	0 31	320 55	4,999 4	47 9	22 2	24 92	52 8	
5,100 0	0 33	328 41	5,099 4	48 3	21 9	24 40	53 1	
5,200 0	0 13	246 22	5,199 4	48 5	21 7	24 06	53 1	
5,300 0	0 12	230 17	5,299 4	48 4	21 5	23 93	53 0	
5,400 0	0 19	253 61	5,399 4	48 3	21 2	23 74	52 8	
5,500 0	0 18	276 66	5,499 4	48 3	20 9	23 44	52 6	

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Design:	VH - Job #32K0611523	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600 0	0 33	336 36	5,599 4	48 6	20 7	23 04	52 8
5,700 0	0 27	350 64	5,699 4	49 1	20 5	22 68	53 2
5,800 0	0 39	20 67	5,799 4	49 6	20 6	22 54	53 7
5,887 0	0 28	17 07	5,886 4	50 1	20 7	22 50 +	54.2



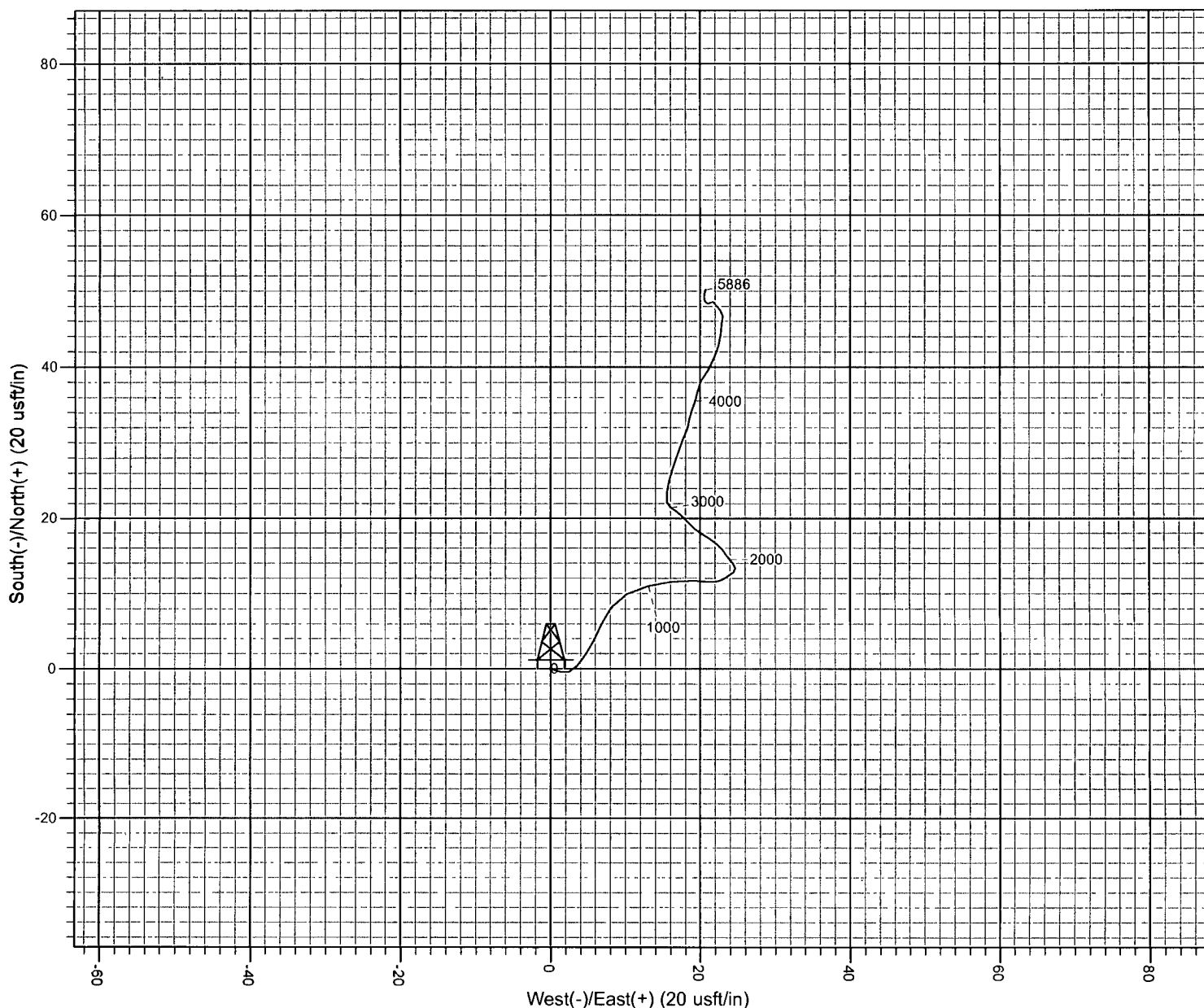
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Azimuths to Grid North
 True North -0 20°
 Magnetic North 7 63°
 Magnetic Field
 Strength 48968 9nT
 Dip Angle 60 68°
 Date 6/6/2011
 Model IGRF2010

WELL DETAILS: Pawnee State #1
 WELL @ 0.0usft (Original Well Elev)
 Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	668036.67	610676.39	32° 50' 9.600 N	103° 58' 22.800 W	



PROJECT DETAILS: Loco Hills
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
 Site Centre Latitude: 32° 49' 48.000 N
 Longitude: 103° 58' 30.000 W
 Positional Uncertainty: 0.0
 Convergence: 0.19
 Local North: Grid