

COG OPERATING

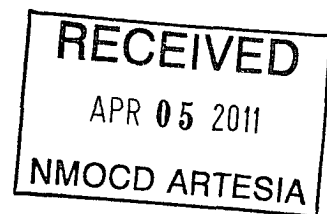
Hay Hollow
Eddy County, NM
SRO 9 State #1H
VH - Job #32K1210968

30-015-38257

Survey: Actual

SDI Standard Survey Report

16 December, 2010



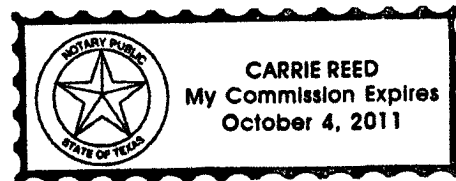
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notorized this date 31st of December, 2010.

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 SRO 9 State #1H
Project:	Hay Hollow	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	SRO 9 State #1H	North Reference:	Grid
Wellbore:	VH - Job #32K1210968	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1210968	Database:	EDM-Regulatory

Project	Hay Hollow		
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:	386,239.33 usft	Latitude:	32° 3' 42.020 N
From:	Lat/Long	Easting:	572,312.98 usft	Longitude:	104° 5' 59.660 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.12 °

Well	SRO 9 State #1H, Directional (Pathfinder)					
Well Position	+N/-S	0.0 usft	Northing:	386,239.33 usft	Latitude:	32° 3' 42.020 N
	+E/-W	0.0 usft	Easting:	572,312.98 usft	Longitude:	104° 5' 59.660 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	0.0 usft

Wellbore	VH - Job #32K1210968				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	BGGM2010	12/10/2010	7.93	59.96	48,565

Design	VH - Job #32K1210968				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	135.80	

Survey Program	Date	12/16/2010			
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.0	9,505.0	Actual (VH - Job #32K1210968)	Keeper	Keeper Gyro	

Survey								
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance	
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0	
100.0	0.25	192.98	100.0	-0.2	0.0	192.98	0.2	
200.0	0.73	202.03	200.0	-1.0	-0.3	198.35	1.1	
300.0	1.31	214.19	300.0	-2.6	-1.2	205.52	2.8	
400.0	1.13	225.68	400.0	-4.2	-2.6	211.51	4.9	
500.0	0.90	254.62	499.9	-5.1	-4.0	218.40	6.5	
600.0	0.89	257.66	599.9	-5.5	-5.5	225.45	7.8	
700.0	0.69	269.63	699.9	-5.6	-6.9	230.82	8.9	
800.0	0.69	284.17	799.9	-5.5	-8.1	235.87	9.8	
900.0	0.64	292.87	899.9	-5.1	-9.2	240.88	10.5	
1,000.0	0.56	307.26	999.9	-4.6	-10.1	245.47	11.1	
1,100.0	0.33	302.89	1,099.9	-4.2	-10.7	248.82	11.5	

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Well:	SRO 9 State #1H	North Reference:	Grid
Wellbore:	VH - Job #32K1210968	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1210968	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.0	0.42	318.31	1,199.9	-3.7	-11.2	251.62	11.8
1,300.0	0.56	13.39	1,299.9	-3.0	-11.3	255.30	11.7
1,400.0	0.72	30.50	1,399.9	-2.0	-10.9	259.82	11.1
1,500.0	0.92	61.74	1,499.9	-1.0	-9.9	264.01	9.9
1,600.0	0.98	63.83	1,599.9	-0.3	-8.4	268.09	8.4
1,700.0	1.30	65.37	1,699.8	0.6	-6.6	274.93	6.6
1,800.0	2.38	67.66	1,799.8	1.8	-3.7	296.61	4.1
1,900.0	2.25	82.65	1,899.7	2.9	0.2	4.19	2.9
2,000.0	2.00	86.39	1,999.6	3.2	3.9	50.33	5.1
2,100.0	2.03	91.54	2,099.6	3.3	7.4	66.02	8.1
2,200.0	2.22	91.31	2,199.5	3.2	11.1	73.92	11.6
2,300.0	1.84	87.72	2,299.4	3.2	14.7	77.60	15.0
2,400.0	1.35	90.71	2,399.4	3.3	17.4	79.37	17.7
2,500.0	0.97	114.27	2,499.4	2.9	19.4	81.46	19.6
2,600.0	0.88	111.77	2,599.4	2.3	20.9	83.77	21.0
2,700.0	0.79	120.06	2,699.4	1.6	22.2	85.75	22.2
2,800.0	0.78	122.85	2,799.4	0.9	23.4	87.71	23.4
2,900.0	0.68	129.36	2,899.3	0.2	24.4	89.56	24.4
3,000.0	0.53	131.38	2,999.3	-0.5	25.2	91.13	25.2
3,100.0	0.42	135.19	3,099.3	-1.1	25.8	92.35	25.8
3,200.0	0.44	133.09	3,199.3	-1.6	26.3	93.44	26.4
3,300.0	0.36	159.81	3,299.3	-2.1	26.7	94.58	26.8
3,400.0	0.23	178.79	3,399.3	-2.6	26.8	95.61	27.0
3,500.0	0.21	164.89	3,499.3	-3.0	26.9	96.39	27.1
3,600.0	0.17	147.86	3,599.3	-3.3	27.0	97.00	27.2
3,700.0	0.15	176.63	3,699.3	-3.6	27.1	97.51	27.3
3,800.0	0.26	343.09	3,799.3	-3.5	27.0	97.34	27.3
3,900.0	0.10	15.49	3,899.3	-3.2	27.0	96.73	27.2
4,000.0	0.44	232.14	3,999.3	-3.3	26.7	97.12	26.9
4,100.0	0.66	223.59	4,099.3	-4.0	26.0	98.72	26.3
4,200.0	0.66	221.87	4,199.3	-4.8	25.2	100.84	25.7
4,300.0	0.71	235.88	4,299.3	-5.6	24.3	102.98	25.0
4,400.0	0.64	222.46	4,399.3	-6.4	23.5	105.20	24.3
4,500.0	0.77	225.90	4,499.3	-7.3	22.6	107.79	23.7
4,600.0	1.01	210.59	4,599.3	-8.5	21.7	111.37	23.3
4,700.0	1.14	203.48	4,699.3	-10.1	20.8	115.99	23.2
4,800.0	1.24	194.94	4,799.2	-12.1	20.1	121.01	23.5
4,900.0	1.35	183.36	4,899.2	-14.3	19.8	125.90	24.4
5,000.0	1.30	179.11	4,999.2	-16.6	19.7	130.12	25.8
5,100.0	1.34	186.27	5,099.2	-18.9	19.6	133.97	27.3
5,200.0	1.25	177.32	5,199.1	-21.2	19.6	137.29	28.8
5,300.0	1.34	172.61	5,299.1	-23.4	19.8	139.87	30.6
5,400.0	1.36	172.70	5,399.1	-25.8	20.1	142.11	32.7
5,500.0	1.45	173.11	5,499.1	-28.2	20.4	144.18	34.8

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Well:	SRO 9 State #1H	North Reference:	Grid
Wellbore:	VH - Job #32K1210968	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1210968	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	1.55	176.56	5,599.0	-30.8	20.6	146.24	37.1
5,700.0	1.68	182.39	5,699.0	-33.6	20.6	148.49	39.4
5,800.0	1.91	184.69	5,798.9	-36.8	20.4	150.95	42.0
5,900.0	2.02	187.79	5,898.9	-40.2	20.0	153.48	44.9
6,000.0	1.75	182.29	5,998.8	-43.4	19.7	155.56	47.7
6,100.0	1.73	184.68	6,098.8	-46.5	19.6	157.17	50.4
6,200.0	1.25	171.98	6,198.7	-49.0	19.6	158.23	52.8
6,300.0	0.79	201.31	6,298.7	-50.8	19.5	159.00	54.4
6,400.0	0.17	135.76	6,398.7	-51.5	19.3	159.42	55.0
6,500.0	0.21	43.89	6,498.7	-51.5	19.6	159.19	55.1
6,600.0	0.26	66.82	6,598.7	-51.3	19.9	158.78	55.0
6,700.0	0.38	121.40	6,698.7	-51.4	20.4	158.34	55.3
6,800.0	1.31	201.08	6,798.7	-52.6	20.3	158.92	56.4
6,900.0	1.04	195.76	6,898.7	-54.5	19.6	160.22	57.9
7,000.0	1.34	139.39	6,998.7	-56.3	20.1	160.33	59.8
7,100.0	1.70	107.43	7,098.6	-57.6	22.3	158.84	61.8
7,200.0	0.83	97.81	7,198.6	-58.2	24.4	157.21	63.1
7,300.0	0.39	221.14	7,298.6	-58.5	24.9	156.93	63.6
7,400.0	0.86	274.18	7,398.6	-58.7	24.0	157.81	63.4
7,500.0	0.80	45.80	7,498.6	-58.2	23.7	157.83	62.8
7,600.0	0.88	40.80	7,598.6	-57.1	24.7	156.60	62.2
7,700.0	1.16	51.71	7,698.6	-55.9	26.0	155.05	61.7
7,800.0	0.98	50.75	7,798.6	-54.7	27.5	153.36	61.2
7,900.0	0.45	55.93	7,898.5	-54.0	28.5	152.21	61.0
8,000.0	0.32	40.81	7,998.5	-53.5	29.0	151.59	60.9
8,100.0	0.49	75.74	8,098.5	-53.2	29.6	150.96	60.9
8,200.0	1.31	58.48	8,198.5	-52.5	30.9	149.50	61.0
8,300.0	2.20	53.06	8,298.5	-50.8	33.5	146.62	60.8
8,400.0	1.78	50.97	8,398.4	-48.6	36.2	143.35	60.6
8,500.0	1.35	23.22	8,498.4	-46.6	37.9	140.89	60.0
8,600.0	1.25	22.11	8,598.4	-44.5	38.7	138.95	59.0
8,700.0	1.05	19.85	8,698.3	-42.6	39.5	137.20	58.1
8,800.0	1.04	4.48	8,798.3	-40.8	39.8	135.72	57.1
8,900.0	0.71	8.68	8,898.3	-39.3	40.0	134.51	56.1
9,000.0	0.91	293.67	8,998.3	-38.4	39.4	134.28	55.0
9,100.0	0.15	112.11	9,098.3	-38.1	38.8	134.53	54.4
9,200.0	0.21	152.42	9,198.3	-38.3	39.0	134.53	54.7
9,300.0	0.46	151.61	9,298.3	-38.9	39.2	134.71	55.2
9,400.0	0.46	183.90	9,398.3	-39.6	39.4	135.14	55.9
9,500.0	0.36	212.75	9,498.3	-40.3	39.2	135.77	56.2
9,505.0	0.33	239.63	9,503.3	-40.3	39.2	135.80	56.2



Project: Hay Hollow
Eddy County, NM
Well: SRO 9 State #1H
Wellbore: VH - Job #32K1210968
Design: VH - Job #32K1210968

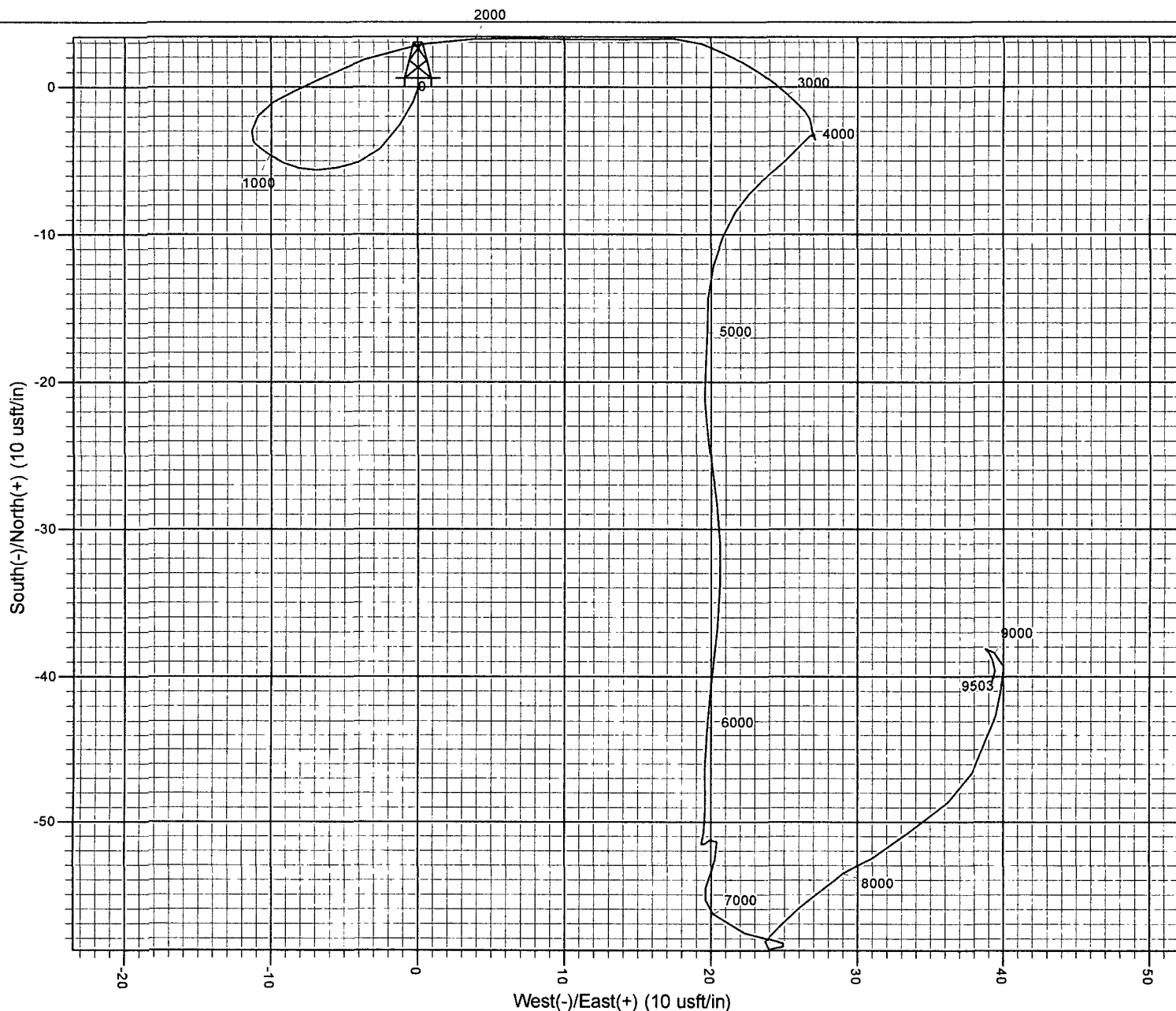


Azimuths to Grid North
True North: -0.12°
Magnetic North: 7.81°

Magnetic Field
Strength: 48564.9nT
Dip Angle: 59.96°
Date: 12/10/2010
Model: BGGM2010

WELL DETAILS: SRO 9 State #1H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	386239.33	572312.98	$32^\circ 3' 42.020\text{ N}$	$104^\circ 5' 59.660\text{ W}$	



PROJECT DETAILS: Hay Hollow
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: $32^\circ 3' 42.020\text{ N}$
Longitude: $104^\circ 5' 59.660\text{ W}$
Positional Uncertainty: 0.0
Convergence: 0.12
Local North: Grid