

COG OPERATING

30-015-37836

Willow Lake

Eddy County, NM

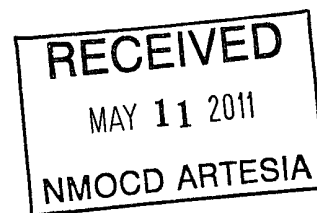
Showstopper 17 Federal Com #9H

VH - Job #32K0111063

Survey: Actual

SDI Standard Survey Report

27 January, 2011



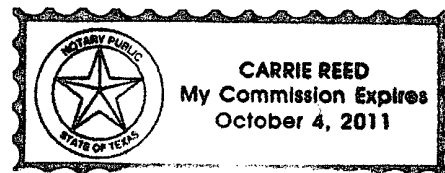
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notarized this date 27th of January, 2011.

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 Showstopper 17 Federal Com #9H
Project:	Willow Lake	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Showstopper 17 Federal Com #9H	North Reference:	Grid
Wellbore:	VH - Job #32K0111063	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0111063	Database:	EDM-Regulatory

Project	Willow Lake		
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:	403,498.21 usft	Latitude:	32° 6' 32.400 N
From:	Lat/Long	Easting:	589,895.33 usft	Longitude:	104° 2' 34.800 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.15 °

Well	Showstopper 17 Federal Com #9H, Directional (DDC)					
Well Position	+N/-S	0.0 usft	Northing:	408,637.53 usft	Latitude:	32° 7' 22.861 N
	+E/-W	0.0 usft	Easting:	603,806.28 usft	Longitude:	103° 59' 52.876 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	0.0 usft

Wellbore	VH - Job #32K0111063				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	BGGM2010	1/23/2011	(°)	(°)	(nT)
			7.88	60.03	48,603

Design	VH - Job #32K0111063				
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	356.94	

Survey Program	Date 1/27/2011				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.0	3,610.0	Actual (VH - Job #32K0111063)	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	0.53	11.36	100.0	0.5	0.1	11.36	0.5	
200.0	0.58	20.19	200.0	1.4	0.4	14.48	1.4	
300.0	1.07	73.13	300.0	2.1	1.4	33.81	2.6	
400.0	1.87	102.14	400.0	2.1	3.9	62.29	4.4	
500.0	2.28	110.26	499.9	1.0	7.4	82.10	7.4	
600.0	3.04	127.63	599.8	-1.3	11.3	96.46	11.4	
700.0	3.44	138.13	699.6	-5.1	15.4	108.40	16.3	
800.0	3.01	142.80	799.5	-9.5	19.0	116.43	21.3	
900.0	2.69	145.85	899.3	-13.5	21.9	121.60	25.8	
1,000.0	2.31	147.92	999.2	-17.1	24.3	125.18	29.8	
1,100.0	2.20	139.68	1,099.2	-20.3	26.6	127.33	33.5	

Scientific Drilling International, Inc.

SDI Standard Survey Report

Company: COG OPERATING
Project: Willow Lake
Site: Eddy County, NM
Well: Showstopper 17 Federal Com #9H
Wellbore: VH - Job #32K0111063
Design: VH - Job #32K0111063

Local Co-ordinate Reference: Well Showstopper 17 Federal Com #9H
TVD Reference: WELL @ 0.0usft (Original Well Elev)
MD Reference: WELL @ 0.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	2.17	145.06	1,199.1	-23.3	29.0	128.85	37.2	
1,300.0	1.84	147.84	1,299.0	-26.2	30.9	130.34	40.5	
1,400.0	1.77	127.98	1,399.0	-28.6	33.0	130.89	43.6	
1,500.0	1.56	138.26	1,498.9	-30.5	35.1	131.01	46.5	
1,600.0	1.03	143.09	1,598.9	-32.3	36.5	131.43	48.7	
1,700.0	0.40	125.31	1,698.9	-33.2	37.4	131.60	50.0	
1,800.0	0.49	97.08	1,798.9	-33.4	38.1	131.28	50.7	
1,900.0	0.40	126.65	1,898.9	-33.7	38.8	130.98	51.4	
2,000.0	0.45	180.14	1,998.9	-34.3	39.1	131.28	52.0	
2,100.0	0.75	200.60	2,098.9	-35.3	38.8	132.27	52.5	
2,200.0	0.70	197.56	2,198.9	-36.5	38.4	133.53	53.0	
2,300.0	0.84	133.95	2,298.9	-37.6	38.8	134.12	54.0	
2,400.0	0.97	120.41	2,398.9	-38.5	40.0	133.91	55.5	
2,500.0	1.37	106.59	2,498.8	-39.3	41.9	133.16	57.4	
2,600.0	1.67	101.03	2,598.8	-39.9	44.5	131.91	59.8	
2,700.0	1.94	104.88	2,698.8	-40.6	47.5	130.52	62.5	
2,800.0	1.90	104.91	2,798.7	-41.5	50.8	129.25	65.6	
2,900.0	1.51	104.03	2,898.7	-42.2	53.7	128.21	68.3	
3,000.0	1.29	104.05	2,998.6	-42.8	56.0	127.39	70.5	
3,100.0	1.17	97.72	3,098.6	-43.2	58.1	126.64	72.4	
3,200.0	1.19	96.12	3,198.6	-43.5	60.2	125.85	74.2	
3,300.0	1.41	98.88	3,298.6	-43.8	62.4	125.05	76.2	
3,400.0	1.23	88.00	3,398.5	-43.9	64.7	124.17	78.2	
3,500.0	1.21	80.41	3,498.5	-43.7	66.8	123.20	79.9	
3,600.0	1.15	68.26	3,598.5	-43.2	68.8	122.11	81.2	
3,610.0	1.18	77.80	3,608.5	-43.1	69.0	122.00	81.4	



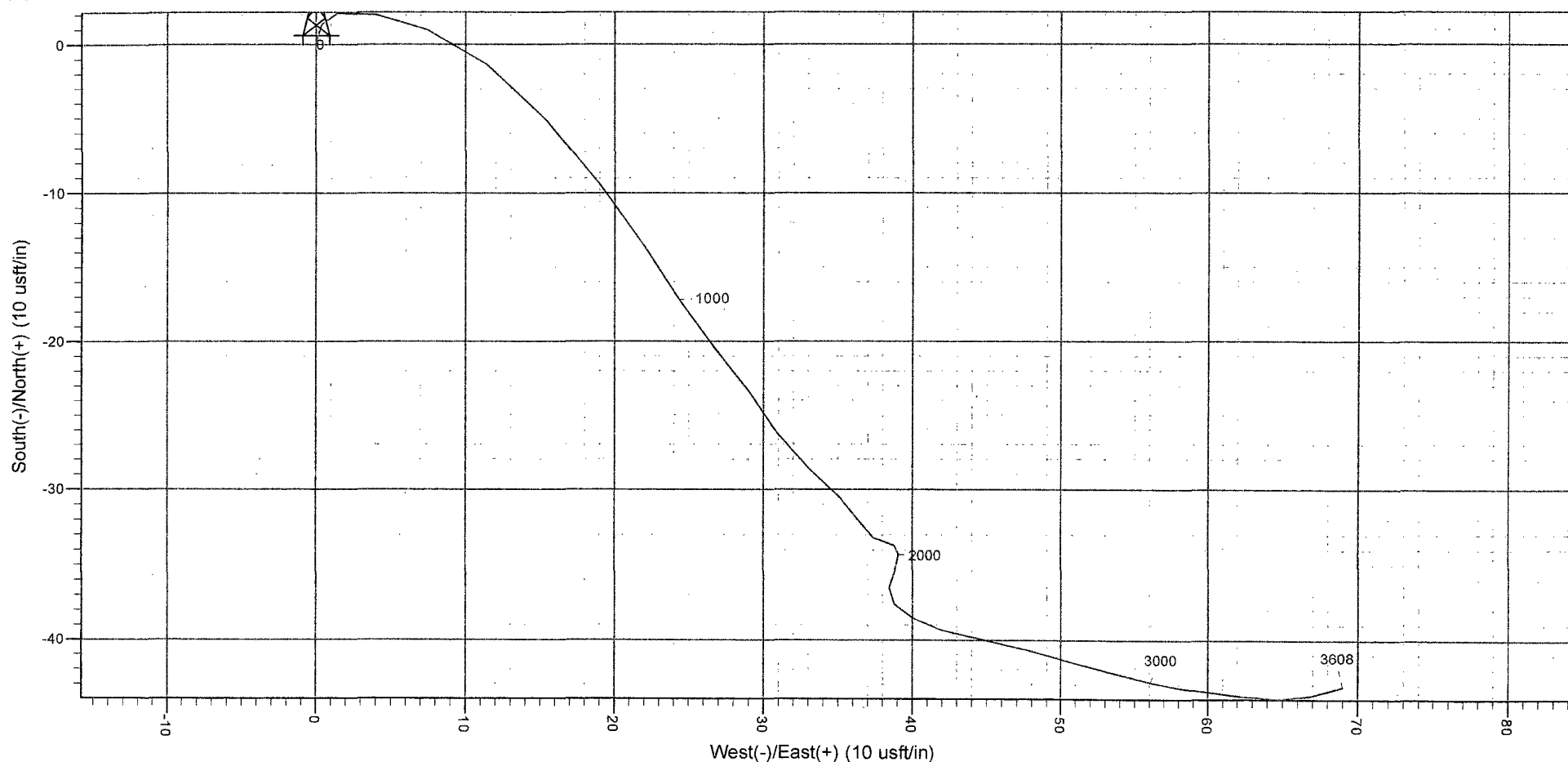
Project: Willow Lake
Eddy County, NM
Well: Showstopper 17 Federal Com #9H
Wellbore: VH - Job #32K0111063
Design: VH - Job #32K0111063



Azimuths to Grid North
True North: -0.18°
Magnetic North: 7.70°
Magnetic Field
Strength: 48602.6snT
Dip Angle: 60.03°
Date: 1/23/2011
Model: BGGM2010

WELL DETAILS: Showstopper 17 Federal Com #9H
WELL @ 0.0usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	408637.53	603806.28	32° 7' 22.861 N	103° 59' 52.876 W	



PROJECT DETAILS: Willow Lake
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° 6' 32.400 N
Longitude: 104° 2' 34.800 W
Positional Uncertainty: 0.0
Convergence: 0.15
Local North: Grid