

30-015-37426

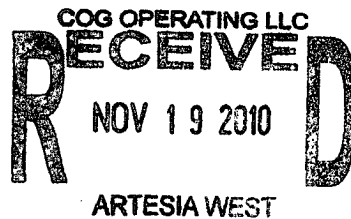
COG OPERATING

WC Bone Spring

Site #1

SRO State Unit Com #14H

VH - Job #32K1010804



Survey: Actual

SDI Standard Survey Report

25 October, 2010

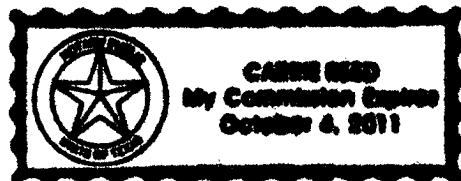
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notorized this date 10th of November, 2010.

Carmen 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 State Unit Corn #14H
Project:	WC Bone Spring	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Site #1	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	SRO State Unit Corn #14H	North Reference:	Grid
Wellbore:	VH - Job #32K1010804	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010804	Database:	EDM-Regulatory

Project	WC Bone Spring		
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	Site #1		
Site Position:		Northing:	391,811.97 usft
From:	Lat/Long	Easting:	572,493.48 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 4' 37.166 N
		Longitude:	104° 5' 57.422 W
		Grid Convergence:	0.12 °

Well	SRO State Unit Corn #14H, Directional (Pathfinder)		
Well Position	+N-S	0.0 usft	Latitude: 32° 3' 5.221 N
	+E-W	0.0 usft	Longitude: 104° 4' 54.604 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Ground Level:	0.0 usft

Wellbore	VH - Job #32K1010804				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2010	10/20/2010	7.94	59.95	48,576

Design	VH - Job #32K1010804			
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	89.38

Survey Program	Date	10/25/2010		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	6,190.0	Actual (VH - Job #32K1010804)	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	0.38	171.56	100.0	-0.3	0.0	171.56	0.3	
200.0	1.05	185.11	200.0	-1.6	0.0	179.43	1.6	
300.0	1.62	176.97	300.0	-3.9	0.0	179.87	3.9	
400.0	1.61	177.53	399.9	-6.7	0.1	178.77	6.7	
500.0	1.63	178.25	499.9	-9.5	0.2	178.51	9.5	
600.0	2.43	158.14	599.8	-12.9	1.1	175.22	13.0	
700.0	2.56	165.06	699.7	-17.0	2.4	171.83	17.2	
800.0	2.36	173.73	799.6	-21.3	3.2	171.31	21.5	
900.0	1.71	179.99	899.6	-24.8	3.5	172.03	25.0	
1,000.0	1.44	182.56	999.5	-27.5	3.4	172.93	27.7	
1,100.0	1.30	174.21	1,099.5	-29.9	3.5	173.38	30.1	

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Site:	Site #1	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	SRO State Unit Com #14H	North Reference:	Grid
Wellbore:	VH - Job #32K1010804	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010804	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	1.33	168.69	1,199.5	-32.2	3.8	173.24	32.4
1,300.0	1.31	175.38	1,299.5	-34.5	4.1	173.16	34.7
1,400.0	1.03	167.33	1,399.4	-36.5	4.4	173.08	36.7
1,500.0	0.72	155.56	1,499.4	-37.9	4.9	172.67	38.2
1,600.0	0.74	153.38	1,599.4	-39.1	5.4	172.09	39.5
1,700.0	0.82	148.39	1,699.4	-40.3	6.1	171.39	40.7
1,800.0	1.11	112.86	1,799.4	-41.3	7.4	169.88	41.9
1,900.0	1.23	98.21	1,899.4	-41.8	9.3	167.43	42.8
2,000.0	1.18	105.88	1,999.3	-42.2	11.4	164.93	43.7
2,100.0	1.39	92.60	2,099.3	-42.6	13.6	162.31	44.7
2,200.0	1.50	93.90	2,199.3	-42.7	16.1	159.35	45.6
2,300.0	1.55	96.32	2,299.3	-42.9	18.7	156.42	46.8
2,400.0	1.19	106.93	2,399.2	-43.4	21.1	154.09	48.2
2,500.0	0.79	92.49	2,499.2	-43.7	22.8	152.50	49.3
2,600.0	0.66	94.63	2,599.2	-43.8	24.0	151.25	50.0
2,700.0	0.63	96.73	2,699.2	-43.9	25.1	150.20	50.6
2,800.0	0.77	87.62	2,799.2	-43.9	26.4	149.04	51.2
2,900.0	0.55	85.64	2,899.2	-43.9	27.5	147.91	51.8
3,000.0	0.63	71.19	2,999.2	-43.7	28.5	146.86	52.1
3,100.0	0.40	52.18	3,099.2	-43.3	29.3	145.89	52.3
3,200.0	0.24	75.13	3,199.2	-43.0	29.8	145.30	52.3
3,300.0	0.08	351.86	3,299.2	-42.9	30.0	145.05	52.3
3,400.0	0.21	227.70	3,399.2	-42.9	29.8	145.21	52.3
3,500.0	0.48	241.72	3,499.2	-43.3	29.3	145.87	52.3
3,600.0	0.35	244.09	3,599.2	-43.6	28.7	146.66	52.2
3,700.0	0.60	266.58	3,699.2	-43.8	27.9	147.49	51.9
3,800.0	0.65	282.33	3,799.2	-43.7	26.8	148.45	51.2
3,900.0	0.70	278.15	3,899.1	-43.5	25.6	149.45	50.5
4,000.0	0.58	286.82	3,999.1	-43.2	24.6	150.39	49.7
4,100.0	0.86	279.75	4,099.1	-43.0	23.3	151.48	48.9
4,200.0	0.91	262.50	4,199.1	-42.9	21.8	153.07	48.2
4,300.0	0.83	257.29	4,299.1	-43.2	20.3	154.81	47.7
4,400.0	0.71	249.58	4,399.1	-43.6	19.0	156.41	47.5
4,500.0	0.56	237.96	4,499.1	-44.0	18.0	157.73	47.6
4,600.0	0.67	239.38	4,599.1	-44.6	17.1	159.00	47.8
4,700.0	0.78	216.91	4,699.1	-45.4	16.2	160.37	48.2
4,800.0	0.80	215.92	4,799.1	-46.6	15.4	161.71	49.0
4,900.0	0.69	204.60	4,899.1	-47.7	14.7	162.83	49.9
5,000.0	0.75	227.28	4,999.1	-48.7	14.0	163.95	50.6
5,100.0	1.22	248.67	5,099.0	-49.5	12.5	165.80	51.0
5,200.0	1.19	244.78	5,199.0	-50.3	10.6	168.11	51.4
5,300.0	0.92	247.93	5,299.0	-51.1	8.9	170.10	51.8
5,400.0	0.71	233.53	5,399.0	-51.7	7.7	171.57	52.3
5,500.0	0.70	228.66	5,499.0	-52.5	6.7	172.72	52.9

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Site:	Site #1	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	SRO State Unit Corn #14H	North Reference:	Grid
Wellbore:	VH - Job #32K1010804	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1010804	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	0.87	227.91	5,599.0	-53.4	5.7	173.92	53.7	
5,700.0	0.82	223.61	5,699.0	-54.4	4.6	175.14	54.6	
5,800.0	0.74	225.34	5,799.0	-55.4	3.7	176.20	55.5	
5,900.0	0.82	244.30	5,898.9	-56.2	2.6	177.38	56.2	
6,000.0	1.04	238.83	5,998.9	-57.0	1.2	178.84	57.0	
6,100.0	1.00	239.10	6,098.9	-57.9	-0.4	180.37	57.9	
6,190.0	1.25	236.89	6,188.9	-58.8	-1.9	181.82	58.8	

Checked By: _____ Approved By: _____ Date: _____



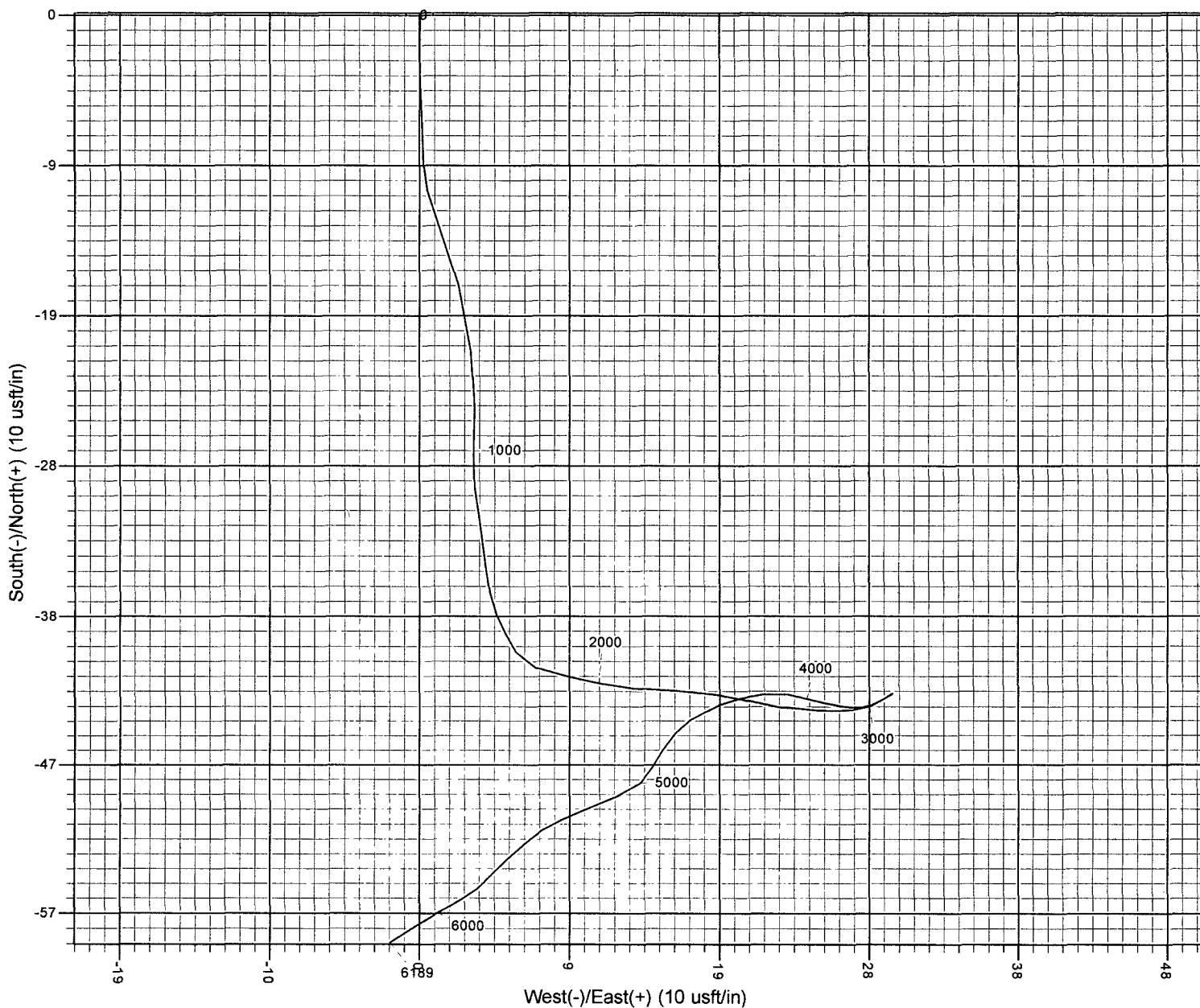
Project: WC Bone Spring
 Site #1
 Well: SRO State Unit Com #14H
 Wellbore: VH - Job #32K1010804
 Design: VH - Job #32K1010804



Azimuths to Grid North
 True North: -0.13°
 Magnetic North: 7.81°
 Magnetic Field
 Strength: 48575.9snT
 Dip Angle: 59.95°
 Date: 10/20/2010
 Model: BGGM2010

WELL DETAILS: SRO State Unit Com #14H
 WELL @ 0.0usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	382533.56	577919.86	$32^\circ 3' 5.221^\circ \text{N}$	$104^\circ 4' 54.604^\circ \text{W}$	



PROJECT DETAILS: WC Bone Spring
 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: Site #1
 Site Centre Latitude: $32^\circ 4' 37.166^\circ \text{N}$
 Longitude: $104^\circ 5' 57.422^\circ \text{W}$
 Positional Uncertainty: 0.0
 Convergence: 0.12
 Local North: Grid