

30-015-38225

COG OPERATING

WC Williams Sink
Eddy County, NM
Dirty Dozen State Com #3H
VH - Job #32K1110888

Survey: Actual

SDI Standard Survey Report

28 November, 2010

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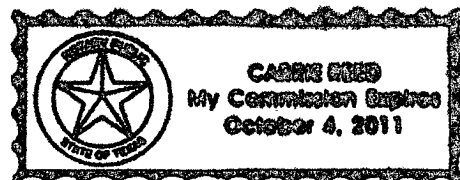
This survey is correct to the best of my knowledge and is supported by actual field data.

Blurbarton

Notorized this date 8th of December 2010.

Carrin 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 Dirty Dozen State Com #3H
Project:	WC Williams Sink	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Dirty Dozen State Com #3H	North Reference:	Grid
Wellbore:	VH - Job #32K1110888	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1110888	Database:	EDM-Regulatory

Project	WC Williams Sink		
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:	590,747.97 usft
From:	Lat/Long	Easting:	659,585.60 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 37' 22.800 N
		Longitude:	103° 48' 54.000 W
		Grid Convergence:	0.28 °

Well	Dirty Dozen State Com #3H, Directional (Pathfinder)		
Well Position	+N/-S	0.0 usft	Northing: 587,677.50 usft
	+E/-W	0.0 usft	Easting: 659,298.50 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 36' 52.430 N
		Longitude:	103° 48' 57.532 W
		Ground Level:	0.0 usft

Wellbore	VH - Job #32K1110888				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	BGGM2010	11/13/2010	(°)	(°)	(nT)
			7.86	60.53	48,947

Design	VH - Job #32K1110888			
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	88.41

Survey Program	Date 11/28/2010			
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.0	8,832.0	Actual (VH - Job #32K1110888)	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	0.29	88.77	100.0	0.0	0.3	88.77	0.3	
200.0	0.09	130.87	200.0	0.0	0.6	94.10	0.6	
300.0	0.18	181.25	300.0	-0.2	0.6	111.83	0.7	
400.0	0.36	206.51	400.0	-0.7	0.5	145.19	0.8	
500.0	0.53	202.51	500.0	-1.4	0.2	173.44	1.4	
600.0	0.63	199.06	600.0	-2.3	-0.2	184.79	2.4	
700.0	0.67	178.12	700.0	-3.4	-0.4	185.91	3.5	
800.0	0.71	167.36	800.0	-4.6	-0.2	182.49	4.6	
900.0	0.87	147.26	900.0	-5.9	0.3	176.65	5.9	
1,000.0	0.94	143.72	1,000.0	-7.2	1.2	170.20	7.3	
1,100.0	0.95	142.81	1,099.9	-8.5	2.2	165.32	8.8	

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Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Dirty Dozen State Com #3H	North Reference:	Grid
Wellbore:	VH - Job #32K1110888	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K1110888	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	0.93	143.33	1,199.9	-9.8	3.2	161.87	10.3
1,300.0	0.79	147.14	1,299.9	-11.0	4.1	159.76	11.8
1,400.0	0.81	143.10	1,399.9	-12.2	4.9	158.22	13.1
1,500.0	0.66	127.83	1,499.9	-13.1	5.7	156.31	14.3
1,600.0	0.72	115.46	1,599.9	-13.7	6.8	153.74	15.3
1,700.0	0.95	101.82	1,699.9	-14.2	8.1	150.09	16.3
1,800.0	1.80	83.52	1,799.9	-14.2	10.5	143.38	17.6
1,900.0	2.72	78.60	1,899.8	-13.5	14.4	133.16	19.8
2,000.0	3.46	77.25	1,999.6	-12.4	19.7	122.17	23.2
2,100.0	3.78	76.00	2,099.4	-10.9	25.8	112.92	28.0
2,200.0	3.79	77.12	2,199.2	-9.4	32.2	106.22	33.6
2,300.0	3.42	78.32	2,299.0	-8.0	38.4	101.83	39.2
2,400.0	3.46	79.74	2,398.8	-6.9	44.3	98.86	44.8
2,500.0	3.08	85.38	2,498.7	-6.1	49.9	97.02	50.3
2,600.0	2.19	80.90	2,598.6	-5.6	54.5	95.90	54.8
2,700.0	1.64	62.13	2,698.5	-4.7	57.6	94.62	57.8
2,800.0	1.29	55.54	2,798.5	-3.3	59.8	93.20	59.9
2,900.0	1.18	56.10	2,898.4	-2.1	61.6	91.99	61.6
3,000.0	1.10	63.35	2,998.4	-1.1	63.3	91.03	63.3
3,100.0	1.07	65.83	3,098.4	-0.3	65.0	90.28	65.0
3,200.0	1.08	84.17	3,198.4	0.2	66.8	89.87	66.8
3,300.0	1.76	79.81	3,298.4	0.5	69.3	89.57	69.3
3,400.0	2.02	64.97	3,398.3	1.5	72.4	88.78	72.4
3,500.0	2.18	43.22	3,498.2	3.7	75.3	87.21	75.4
3,600.0	2.06	35.79	3,598.2	6.5	77.6	85.20	77.9
3,700.0	2.01	36.40	3,698.1	9.4	79.7	83.28	80.3
3,800.0	1.80	37.16	3,798.1	12.1	81.7	81.61	82.6
3,900.0	1.47	42.48	3,898.0	14.2	83.5	80.32	84.7
4,000.0	1.32	38.82	3,998.0	16.1	85.1	79.29	86.6
4,100.0	1.14	36.54	4,098.0	17.8	86.4	78.37	88.2
4,200.0	1.08	34.98	4,197.9	19.4	87.6	77.53	89.7
4,300.0	0.92	30.89	4,297.9	20.8	88.5	76.76	90.9
4,400.0	0.87	30.99	4,397.9	22.2	89.3	76.07	92.0
4,500.0	0.84	30.34	4,497.9	23.4	90.1	75.41	93.1
4,600.0	1.03	12.66	4,597.9	25.0	90.6	74.61	94.0
4,700.0	0.99	2.08	4,697.9	26.7	90.9	73.63	94.7
4,800.0	1.08	4.09	4,797.9	28.5	91.0	72.61	95.3
4,900.0	1.42	9.06	4,897.8	30.7	91.2	71.43	96.3
5,000.0	1.56	12.72	4,997.8	33.2	91.7	70.10	97.6
5,100.0	2.58	13.97	5,097.7	36.7	92.6	68.36	99.6
5,200.0	2.41	21.92	5,197.6	40.9	93.9	66.49	102.4
5,300.0	2.09	31.81	5,297.6	44.4	95.7	65.12	105.4
5,400.0	1.82	39.98	5,397.5	47.1	97.6	64.23	108.4
5,500.0	1.43	52.57	5,497.5	49.1	99.6	63.77	111.1

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Company: COG OPERATING
Project: WC Williams Sink
Site: Eddy County, NM
Well: Dirty Dozen State Com #3H
Wellbore: VH - Job #32K1110888
Design: VH - Job #32K1110888

Local Co-ordinate Reference: Well Dirty Dozen State Com #3H
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)
5,600.0	1.02	54.17	5,597.4	50.4	101.4	63.57	113.2
5,700.0	0.56	59.90	5,697.4	51.1	102.5	63.48	114.6
5,800.0	0.18	85.01	5,797.4	51.4	103.1	63.50	115.2
5,900.0	0.31	259.93	5,897.4	51.4	103.0	63.49	115.1
6,000.0	0.41	282.55	5,997.4	51.4	102.4	63.33	114.5
6,100.0	0.48	283.85	6,097.4	51.6	101.6	63.08	113.9
6,200.0	0.51	290.88	6,197.4	51.8	100.8	62.78	113.3
6,300.0	0.47	292.68	6,297.4	52.2	100.0	62.45	112.8
6,400.0	0.50	313.99	6,397.4	52.6	99.3	62.08	112.4
6,500.0	0.50	326.23	6,497.4	53.3	98.7	61.65	112.2
6,600.0	0.58	331.25	6,597.4	54.1	98.2	61.17	112.2
6,700.0	0.16	324.23	6,697.4	54.6	97.9	60.84	112.1
6,800.0	0.26	221.19	6,797.4	54.6	97.7	60.80	111.9
6,900.0	0.29	165.56	6,897.4	54.2	97.6	60.97	111.6
7,000.0	0.53	162.77	6,997.4	53.5	97.8	61.33	111.5
7,100.0	0.73	185.73	7,097.4	52.4	97.9	61.83	111.0
7,200.0	0.81	205.07	7,197.4	51.1	97.5	62.33	110.1
7,300.0	0.79	214.79	7,297.4	49.9	96.8	62.72	108.9
7,400.0	0.81	228.86	7,397.4	48.9	95.9	62.98	107.6
7,500.0	1.18	227.92	7,497.4	47.7	94.6	63.22	106.0
7,600.0	1.26	226.54	7,597.3	46.3	93.0	63.54	103.9
7,700.0	1.30	230.78	7,697.3	44.8	91.4	63.87	101.8
7,800.0	1.40	221.05	7,797.3	43.2	89.7	64.29	99.5
7,900.0	2.27	189.47	7,897.2	40.3	88.6	65.52	97.3
8,000.0	2.63	179.16	7,997.1	36.1	88.3	67.78	95.3
8,100.0	2.64	178.32	8,097.0	31.5	88.4	70.40	93.8
8,200.0	2.60	181.22	8,196.9	26.9	88.4	73.07	92.4
8,300.0	2.60	178.64	8,296.8	22.4	88.4	75.80	91.2
8,400.0	2.33	173.11	8,396.7	18.1	88.7	78.48	90.5
8,500.0	2.02	168.65	8,496.7	14.3	89.3	80.88	90.4
8,600.0	1.86	171.31	8,596.6	11.0	89.9	83.02	90.5
8,700.0	1.52	181.69	8,696.6	8.1	90.1	84.88	90.4
8,800.0	1.40	182.79	8,796.5	5.5	90.0	86.49	90.1
8,832.0	1.34	188.57	8,828.5	4.8	89.9	86.97	90.0



Scientific Drilling
Directional Drilling Operations

Project: WC Williams Sink
Eddy County, NM
Well: Dirty Dozen State Com #3H
Wellbore: VH - Job #32K1110888
Design: VH - Job #32K1110888

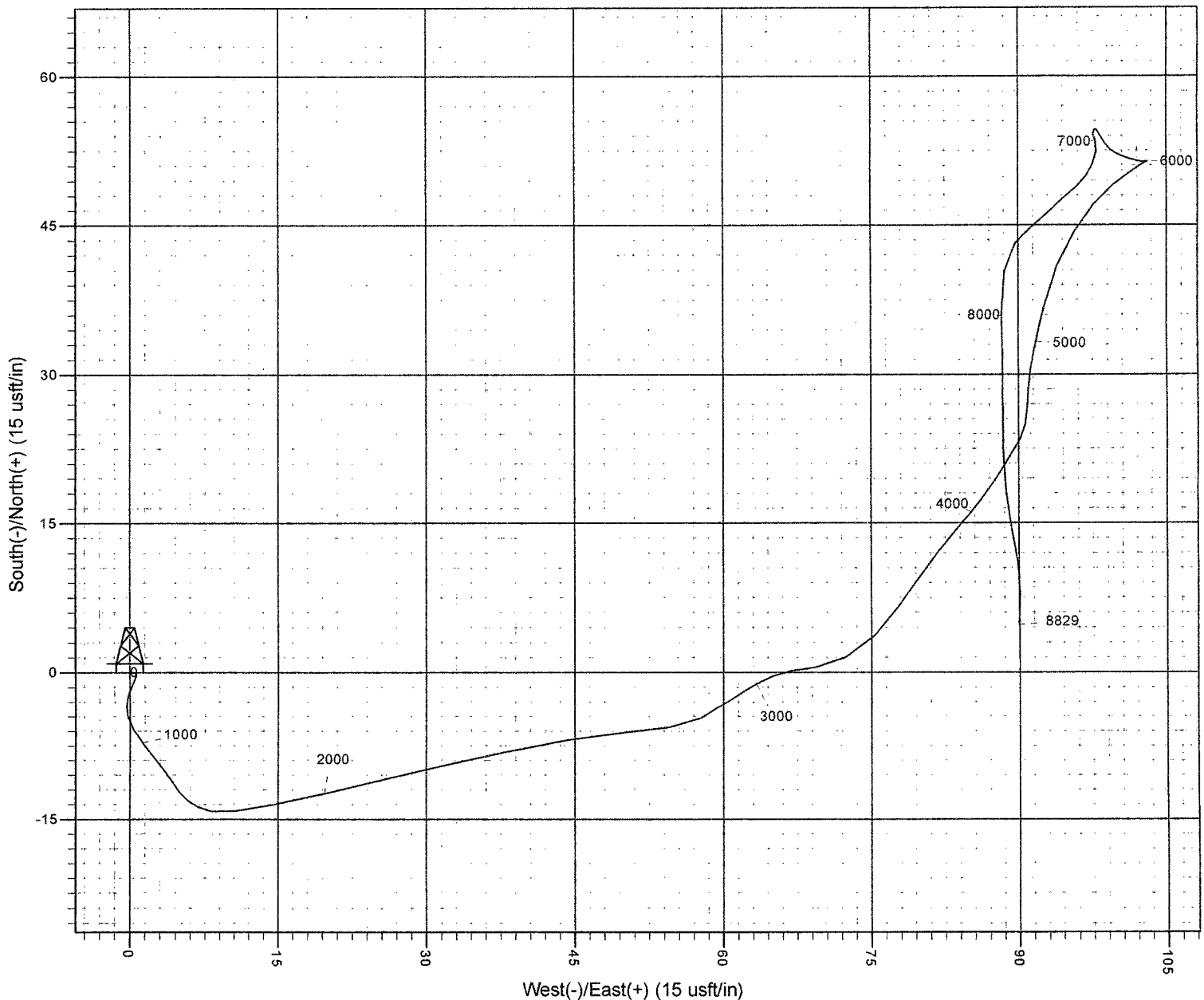


Azimuths to Grid North
True North: -0.28°
Magnetic North: 7.58°

Magnetic Field
Strength: 48947.1nT
Dip Angle: 60.53°
Date: 11/13/2010
Model: BGGM2010

WELL DETAILS: Dirty Dozen State Com #3H
WELL @ 0.0usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	587677.50	659298.50	32° 36' 52.430 N	103° 48' 57.532 W	



PROJECT DETAILS: WC Williams Sink
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° 37' 22.800 N
Longitude: 103° 48' 54.000 W
Positional Uncertainty: 0.0
Convergence: 0.28
Local North: Grid