

Results of Directional Survey

API number:	30-005-27999		
OGRID:		Operator:	COG OPERATING LLC
		Property:	HERCULES FEDERAL COM # 1H

surface	ULSTR:	E	15	T	15S	R	31E
				1980	FNL	330	FWL

BH Loc	ULSTR:	H	15	T	15S	R	31E
13180	MD	8801.8	TVD	1921	FNL	4945	FWL

Top Perf/OH	ULSTR:	E	15	T	15S	R	31E
9168	MD	8788.0	TVD	1959	FNL	934	FWL

Bot Perf/OH	ULSTR:	H	15	T	15S	R	31E
12709	MD	8795.6	TVD	1924	FNL	4474	FWL

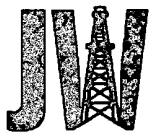
	MD	N/S	E/W	VD
	9137	21.79	573.15	8789.31
TOP PERFS/OH	9168	21.08	604.12	8788.03
	9173	20.96	609.11	8787.82
	12682	56.61	4116.71	8795.15
BOT PERFS/OH	12709	56.34	4143.71	8795.57
	12715	56.28	4149.71	8795.66

NEXT TO LAST	12840	56.26	4274.69	8797.47
LAST READING	12873	56.52	4307.69	8797.89
TD	13180	58.94	4614.69	8801.80

Surface Location	1980	FN	330	FW
Projected BHL	1921	FN	4945	FW
Location of				
Top Perfs/OH	1959	FN	934	FW
Bottom Perfs/OH	1924	FN	4474	FW

SUMMARY of Subsurface Locations

Surface Location	E-15-15S-31E	1980	FN	330	FW	Vert. Depth
Top Perfs/OH	E-15-15S-31E	1959	FN	934	FW	8788.03
Bottom Perfs/OH	H-15-15S-31E	1924	FN	4474	FW	8795.57
Projected TD	H-15-15S-31E	1921	FN	4945	FW	8801.80



DRILLING INC. Oil Well Drilling Contractor

Post Office Box 160 Artesia, New Mexico 88211-0160 Office (575) 748-8704 Fax (575) 748-8719

August 30, 2010

COG Operating LLC
550 W. Texas, Suite 1300
Midland, Texas 79701

Re: Hercules Fed Com # 1H
Sec. 15, T-15-S, R-31-E
Chaves County, New Mexico

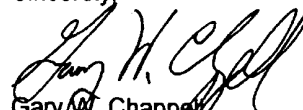
Attn: John Coffman

The following is a Deviation Survey on the referenced well in Chaves County, New Mexico:

194' - 1°	4155' - 0.75°
371' - 0.75°	4617' - 1°
549' - 1°	5116' - 0.75°
856' - 1°	5460' - 1°
1131' - 0.75°	5802' - 1°
1444' - 0.75°	6116' - 1.5°
1786' - 1.5°	6426' - 1°
2041' - 1°	6771' - 1°
2316' - 1°	7112' - 1°
2639' - 1°	7425' - 1°
2940' - 0.75°	7801' - 1°
3252' - 0.75°	7938' - 1.25°
3567' - 0.75°	
3850' - 0.75°	

SUR @ E-15-15s-31e, 1980/N & 330/W
BHL @ H-15-15s-31e, 1921/N & 4945/W
API # 30-005-27999

Sincerely,

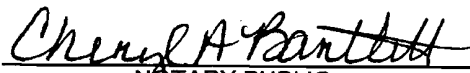

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 30th day of August, 2010 by Gary W. Chappell.

MY COMMISSION EXPIRES

4-29-12


NOTARY PUBLIC



OFFICIAL SEAL
CHERYL A. BARTLETT
NOTARY PUBLIC-STATE OF NEW MEXICO

My commission expires: 4-29-12



Job Number: 70000002WTWT
 Company: COG Operating
 Lease/Well: Hercules Fed Com #1
 Location: Chaves Co.
 Rig Name: JW #2
 RKB: ☐
 G.L. or M.S.L.: ☐

State/Country: N.M. , USA
 Declination: 7.86
 Grid: ☐
 File name: C:\DOCUME~1\ADMINI~1\DESKTOP\COG-70-1\COG002.SVY
 Date/Time: 08-Sep-10 / 06:54
 Curve Name: as drilled

SUR @ E-15-15s-31e, 1980/N & 330/W
 BHL @ H-15-15s-31e, 1921/N & 4945/W
 API # 30-005-27999

Pathfinder Energy Services

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 89.67
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

RECEIVED
 JAN 14 2011
 HOBBSOCD

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
Tie in to Gyro Survey.									
8000.00	.72	78.62	7999.74	19.06	3.19	3.30	19.33	9.50	.00
Pathfinder MWD Survey									
8055.00	.70	69.91	8054.74	19.24	3.84	3.96	19.62	11.30	.20
8087.00	.79	73.04	8086.73	19.38	4.24	4.35	19.83	12.34	.31
8119.00	.70	73.96	8118.73	19.49	4.64	4.75	20.04	13.38	.28
8151.00	.79	70.85	8150.73	19.62	5.03	5.15	20.26	14.39	.31
8183.00	.88	73.75	8182.72	19.76	5.48	5.59	20.51	15.49	.31
8215.00	.79	72.36	8214.72	19.90	5.92	6.04	20.76	16.58	.29
8246.00	1.67	71.02	8245.71	20.11	6.56	6.67	21.15	18.06	2.84
8278.00	4.75	68.78	8277.66	20.74	8.23	8.35	22.31	21.65	9.63
8310.00	6.95	68.12	8309.49	21.94	11.26	11.39	24.66	27.17	6.88
8342.00	9.41	69.60	8341.16	23.57	15.51	15.65	28.22	33.35	7.71

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
8374.00	12.49	72.09	8372.58	25.55	21.26	21.41	33.24	39.76	9.74
8406.00	14.86	72.80	8403.67	27.83	28.47	28.63	39.81	45.65	7.42
8436.00	16.53	73.89	8432.55	30.15	36.25	36.42	47.15	50.25	5.65
8468.00	19.35	74.31	8462.99	32.85	45.73	45.92	56.30	54.31	8.82
8500.00	22.42	80.65	8492.89	35.27	56.86	57.06	66.91	58.18	11.90
8531.00	26.64	81.33	8521.08	37.28	69.57	69.78	78.93	61.81	13.64
8563.00	30.16	84.61	8549.23	39.12	84.67	84.89	93.27	65.20	12.03
8595.00	34.12	86.73	8576.32	40.39	101.64	101.87	109.37	68.33	12.87
8627.00	37.28	88.48	8602.30	41.16	120.29	120.53	127.14	71.11	10.38
8659.00	41.50	90.80	8627.03	41.27	140.59	140.83	146.52	73.64	13.97
8691.00	45.64	92.08	8650.21	40.70	162.63	162.86	167.65	75.95	13.23
8723.00	49.86	93.96	8671.72	39.44	186.28	186.50	190.41	78.04	13.88
8755.00	54.26	93.68	8691.39	37.76	211.45	211.67	214.80	79.87	13.77
8787.00	58.12	92.87	8709.20	36.25	237.99	238.20	240.74	81.34	12.24
8819.00	62.17	91.98	8725.12	35.08	265.72	265.91	268.02	82.48	12.88
8851.00	65.51	91.98	8739.23	34.09	294.42	294.61	296.38	83.40	10.44
8883.00	69.47	92.37	8751.48	32.96	323.95	324.14	325.62	84.19	12.43
8915.00	72.37	93.18	8761.94	31.50	354.15	354.33	355.55	84.92	9.37
8946.00	75.89	93.43	8770.41	29.78	383.92	384.08	385.07	85.56	11.38
8978.00	78.52	93.06	8777.50	28.01	415.07	415.23	416.02	86.14	8.30
9010.00	82.22	92.75	8782.85	26.41	446.57	446.72	447.35	86.61	11.60
9041.00	84.94	92.29	8786.32	25.06	477.35	477.48	478.00	86.99	8.90
9073.00	85.91	92.11	8788.87	23.84	509.22	509.35	509.78	87.32	3.08
9105.00	89.96	91.79	8790.02	22.75	541.17	541.30	541.65	87.59	12.70
9137.00	92.59	91.64	8789.31	21.79	573.15	573.27	573.56	87.82	8.23
9173.00	92.15	91.02	8787.82	20.96	609.11	609.22	609.47	88.03	2.11
9205.00	91.89	90.84	8786.69	20.44	641.09	641.19	641.41	88.17	.99
9237.00	91.98	90.96	8785.61	19.93	673.06	673.17	673.36	88.30	.47
9269.00	91.98	90.48	8784.51	19.53	705.04	705.14	705.31	88.41	1.50
9301.00	91.89	90.10	8783.43	19.37	737.02	737.12	737.28	88.49	1.22
9334.00	92.15	89.72	8782.26	19.42	770.00	770.10	770.25	88.56	1.39
9367.00	91.89	89.63	8781.10	19.61	802.98	803.08	803.22	88.60	.83
9399.00	91.28	89.54	8780.22	19.84	834.97	835.07	835.20	88.64	1.93
9431.00	90.75	89.16	8779.65	20.20	866.96	867.06	867.20	88.66	2.04

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
9463.00	91.01	88.52	8779.16	20.85	898.95	899.05	899.19	88.67	2.16
9495.00	91.19	88.97	8778.54	21.55	930.94	931.04	931.19	88.67	1.51
9527.00	90.92	89.25	8777.95	22.05	962.93	963.04	963.18	88.69	1.22
9559.00	90.84	89.21	8777.46	22.48	994.92	995.03	995.17	88.71	.28
9593.00	91.36	89.49	8776.81	22.87	1028.91	1029.03	1029.17	88.73	1.74
9624.00	91.10	89.88	8776.14	23.04	1059.90	1060.02	1060.15	88.75	1.51
9656.00	90.57	89.96	8775.68	23.08	1091.90	1092.01	1092.14	88.79	1.68
9686.00	90.84	89.90	8775.31	23.12	1121.90	1122.01	1122.14	88.82	.92
9719.00	90.84	89.55	8774.83	23.28	1154.89	1155.01	1155.13	88.85	1.06
9751.00	90.13	89.59	8774.55	23.52	1186.89	1187.01	1187.12	88.86	2.22
9783.00	89.08	89.28	8774.77	23.83	1218.89	1219.01	1219.12	88.88	3.42
9814.00	89.52	89.17	8775.15	24.25	1249.88	1250.00	1250.12	88.89	1.46
9846.00	88.99	88.51	8775.57	24.90	1281.87	1282.00	1282.12	88.89	2.65
9877.00	89.34	87.91	8776.02	25.87	1312.86	1312.98	1313.11	88.87	2.24
9909.00	89.34	87.54	8776.39	27.14	1344.83	1344.96	1345.10	88.84	1.16
9942.00	89.34	87.18	8776.77	28.66	1377.79	1377.93	1378.09	88.81	1.09
9974.00	89.43	87.20	8777.11	30.23	1409.75	1409.90	1410.07	88.77	.29
10006.00	89.43	87.21	8777.43	31.79	1441.71	1441.87	1442.06	88.74	.03
10037.00	89.60	87.52	8777.69	33.21	1472.68	1472.84	1473.05	88.71	1.14
10068.00	89.78	87.67	8777.86	34.51	1503.65	1503.82	1504.05	88.69	.76
10101.00	89.69	87.75	8778.01	35.83	1536.62	1536.80	1537.04	88.66	.36
10132.00	89.43	87.73	8778.25	37.05	1567.60	1567.78	1568.04	88.65	.84
10165.00	89.52	87.84	8778.56	38.33	1600.57	1600.77	1601.03	88.63	.43
10199.00	89.52	87.97	8778.84	39.57	1634.55	1634.75	1635.03	88.61	.38
10230.00	88.90	87.92	8779.27	40.68	1665.52	1665.73	1666.02	88.60	2.01
10263.00	88.11	88.35	8780.13	41.76	1698.50	1698.71	1699.01	88.59	2.73
10294.00	88.02	88.34	8781.18	42.65	1729.46	1729.68	1729.99	88.59	.29
10327.00	88.37	88.43	8782.21	43.58	1762.44	1762.66	1762.97	88.58	1.10
10358.00	88.11	88.73	8783.17	44.35	1793.41	1793.64	1793.96	88.58	1.28
10391.00	88.02	88.71	8784.28	45.08	1826.38	1826.61	1826.94	88.59	.28
10422.00	88.37	88.84	8785.26	45.75	1857.36	1857.59	1857.92	88.59	1.20
10455.00	88.29	88.81	8786.22	46.42	1890.34	1890.58	1890.91	88.59	.26
10486.00	88.20	89.23	8787.17	46.95	1921.32	1921.56	1921.89	88.60	1.38
10517.00	88.29	89.03	8788.12	47.42	1952.30	1952.54	1952.88	88.61	.71

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
10547.00	88.46	89.17	8788.97	47.90	1982.29	1982.53	1982.87	88.62	.73
10581.00	89.34	89.72	8789.62	48.22	2016.28	2016.52	2016.86	88.63	3.05
10614.00	90.48	90.63	8789.67	48.12	2049.28	2049.52	2049.84	88.65	4.42
10646.00	90.84	91.91	8789.30	47.41	2081.27	2081.51	2081.81	88.69	4.15
10678.00	90.31	92.47	8788.98	46.19	2113.24	2113.47	2113.75	88.75	2.41
10707.00	88.55	92.68	8789.27	44.89	2142.21	2142.43	2142.68	88.80	6.11
10739.00	88.72	92.85	8790.03	43.35	2174.16	2174.38	2174.60	88.86	.75
10771.00	89.60	92.62	8790.50	41.82	2206.12	2206.33	2206.52	88.91	2.84
10803.00	90.13	92.17	8790.58	40.48	2238.10	2238.29	2238.46	88.96	2.17
10835.00	89.78	91.37	8790.60	39.49	2270.08	2270.27	2270.42	89.00	2.73
10867.00	89.43	90.45	8790.82	38.99	2302.07	2302.26	2302.40	89.03	3.08
10902.00	89.16	89.66	8791.26	38.95	2337.07	2337.26	2337.40	89.05	2.39
10932.00	89.16	89.30	8791.69	39.22	2367.07	2367.25	2367.39	89.05	1.20
10966.00	89.43	89.38	8792.11	39.62	2401.06	2401.25	2401.39	89.05	.83
10996.00	89.43	89.38	8792.41	39.94	2431.06	2431.25	2431.39	89.06	.00
11030.00	89.08	89.40	8792.85	40.30	2465.05	2465.25	2465.38	89.06	1.03
11060.00	89.25	89.31	8793.29	40.64	2495.05	2495.24	2495.38	89.07	.64
11094.00	89.78	89.61	8793.58	40.96	2529.05	2529.24	2529.38	89.07	1.79
11125.00	90.84	89.78	8793.41	41.13	2560.04	2560.24	2560.37	89.08	3.46
11158.00	90.48	89.45	8793.03	41.35	2593.04	2593.24	2593.37	89.09	1.48
11188.00	90.57	89.48	8792.76	41.63	2623.04	2623.24	2623.37	89.09	.32
11219.00	90.48	89.42	8792.47	41.92	2654.04	2654.23	2654.37	89.10	.35
11250.00	90.97	89.25	8792.08	42.28	2685.03	2685.23	2685.36	89.10	1.67
11283.00	90.84	89.68	8791.56	42.59	2718.03	2718.23	2718.36	89.10	1.36
11316.00	90.66	89.96	8791.13	42.70	2751.02	2751.22	2751.35	89.11	1.01
11347.00	90.31	90.11	8790.86	42.68	2782.02	2782.22	2782.35	89.12	1.23
11379.00	90.57	90.19	8790.62	42.59	2814.02	2814.22	2814.34	89.13	.85
11410.00	90.48	90.27	8790.33	42.47	2845.02	2845.22	2845.34	89.14	.39
11443.00	90.48	90.41	8790.06	42.27	2878.02	2878.21	2878.33	89.16	.42
11473.00	90.22	90.33	8789.87	42.08	2908.02	2908.21	2908.32	89.17	.91
11503.00	90.57	90.20	8789.67	41.94	2938.02	2938.21	2938.31	89.18	1.24
11536.00	90.22	90.06	8789.44	41.87	2971.01	2971.21	2971.31	89.19	1.14
11569.00	90.22	89.61	8789.31	41.96	3004.01	3004.21	3004.31	89.20	1.36
11601.00	90.31	89.25	8789.17	42.28	3036.01	3036.20	3036.31	89.20	1.16

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
11633.00	90.22	89.49	8789.02	42.63	3068.01	3068.20	3068.31	89.20	.80
11665.00	90.31	89.62	8788.87	42.88	3100.01	3100.20	3100.30	89.21	.49
11697.00	90.04	89.70	8788.77	43.07	3132.01	3132.20	3132.30	89.21	.88
11726.00	89.69	89.33	8788.84	43.31	3161.01	3161.20	3161.30	89.21	1.76
11761.00	90.13	89.00	8788.90	43.82	3196.00	3196.20	3196.30	89.21	1.57
11796.00	90.22	89.00	8788.79	44.44	3231.00	3231.20	3231.30	89.21	.26
11827.00	89.60	88.69	8788.84	45.06	3261.99	3262.20	3262.30	89.21	2.24
11858.00	89.60	88.35	8789.05	45.86	3292.98	3293.19	3293.30	89.20	1.10
11891.00	89.96	87.87	8789.18	46.95	3325.96	3326.18	3326.29	89.19	1.82
11922.00	89.69	87.78	8789.27	48.13	3356.94	3357.16	3357.28	89.18	.92
11954.00	89.52	87.26	8789.50	49.51	3388.91	3389.14	3389.27	89.16	1.71
11986.00	89.78	87.21	8789.69	51.05	3420.87	3421.11	3421.25	89.14	.83
12019.00	90.40	87.61	8789.64	52.55	3453.84	3454.08	3454.24	89.13	2.24
12050.00	90.48	88.14	8789.40	53.69	3484.81	3485.06	3485.23	89.12	1.73
12082.00	90.22	88.53	8789.21	54.62	3516.80	3517.06	3517.22	89.11	1.46
12113.00	90.04	88.86	8789.14	55.33	3547.79	3548.05	3548.22	89.11	1.21
12144.00	90.13	88.73	8789.09	55.98	3578.78	3579.05	3579.22	89.10	.51
12175.00	90.04	89.07	8789.04	56.58	3609.78	3610.04	3610.22	89.10	1.13
12206.00	90.22	89.15	8788.97	57.06	3640.77	3641.04	3641.22	89.10	.64
12238.00	89.16	89.61	8789.15	57.41	3672.77	3673.04	3673.22	89.10	3.61
12270.00	89.16	89.54	8789.62	57.64	3704.77	3705.04	3705.22	89.11	.22
12302.00	89.08	89.75	8790.11	57.84	3736.76	3737.03	3737.21	89.11	.70
12333.00	89.60	89.78	8790.46	57.97	3767.76	3768.03	3768.21	89.12	1.68
12365.00	89.34	89.83	8790.76	58.08	3799.76	3800.03	3800.20	89.12	.83
12396.00	88.99	90.07	8791.21	58.10	3830.76	3831.03	3831.20	89.13	1.37
12428.00	89.08	89.87	8791.75	58.12	3862.75	3863.02	3863.19	89.14	.69
12460.00	88.81	89.53	8792.34	58.29	3894.74	3895.02	3895.18	89.14	1.36
12491.00	89.34	89.95	8792.84	58.43	3925.74	3926.01	3926.18	89.15	2.18
12524.00	89.78	90.16	8793.09	58.40	3958.74	3959.01	3959.17	89.15	1.48
12555.00	89.25	90.51	8793.36	58.22	3989.74	3990.01	3990.16	89.16	2.05
12587.00	89.43	90.92	8793.72	57.82	4021.73	4022.00	4022.15	89.18	1.40
12620.00	88.81	90.60	8794.23	57.38	4054.73	4054.99	4055.13	89.19	2.11
12649.00	89.25	90.74	8794.72	57.04	4083.72	4083.98	4084.12	89.20	1.59
12682.00	89.25	90.74	8795.15	56.61	4116.71	4116.97	4117.10	89.21	.00

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
12715.00	88.99	90.42	8795.66	56.28	4149.71	4149.96	4150.09	89.22	1.25
12747.00	89.25	90.39	8796.15	56.05	4181.70	4181.96	4182.08	89.23	.82
12778.00	88.99	89.95	8796.63	55.96	4212.70	4212.95	4213.07	89.24	1.65
12810.00	89.25	89.66	8797.12	56.07	4244.70	4244.95	4245.07	89.24	1.22
12840.00	89.43	89.61	8797.47	56.26	4274.69	4274.95	4275.06	89.25	.62
12873.00	89.08	89.50	8797.89	56.52	4307.69	4307.94	4308.06	89.25	1.11

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JAN 14 2011
HOBBSOC

COG OPERATING

Wildcat

Chaves County, NM

Hercules Federal Com #1H

VH - Job #32K0810633

SUR @ E-15-15s-31e, 1980/N & 330/W
BHL @ H-15-15s-31e, 1921/N & 4945/W
API # 30-005-27999

Survey: Actual

SDI Standard Survey Report

30 August, 2010

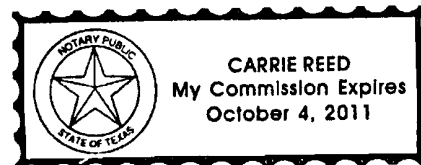
This survey is correct to the best of my knowledge and is supported by actual field data.

Richardson

Notorized this date 24th of September, 2010.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report

Company: COG OPERATING
Project: Wildcat
Site: Chaves County, NM
Well: Hercules Federal Com #1H
Wellbore: VH - Job #32K0810633
Design: VH - Job #32K0810633

Local Co-ordinate Reference: Well Hercules Federal Com #1H
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

Project	Wildcat		
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		

Well	Hercules Federal Com #1H, Directional (Pathfinder)				
Well Position	+N/-S	0.0 usft	Northing:	734,340.73 usft	Latitude: 33° 1' 3.720 N
	+E/-W	0.0 usft	Easting:	658,232.66 usft	Longitude: 103° 49' 1.620 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level: 0.0 usft

Wellbore	VH - Job #32K0810633				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2000	12/31/2004	8.74	61.13	49,903

Design	VH - Job #32K0810633				
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	89.67	

Survey Program	Date	8/30/2010			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,019.0	Actual (VH - Job #32K0810633)	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	0.12	245.73	100.0	0.0	-0.1	245.73	0.1	
200.0	0.03	13.32	200.0	-0.1	-0.2	251.85	0.2	
300.0	0.09	190.28	300.0	-0.1	-0.2	239.77	0.2	
400.0	0.12	165.29	400.0	-0.3	-0.2	211.78	0.3	
500.0	0.21	118.93	500.0	-0.5	0.0	179.20	0.5	
600.0	0.07	297.64	600.0	-0.5	0.1	168.21	0.6	
700.0	0.20	212.55	700.0	-0.7	0.0	183.04	0.7	
800.0	0.07	168.72	800.0	-0.9	-0.1	187.69	0.9	
900.0	0.12	326.83	900.0	-0.8	-0.2	190.95	0.9	
1,000.0	0.14	248.15	1,000.0	-0.8	-0.3	202.68	0.9	
1,100.0	0.22	139.94	1,100.0	-1.0	-0.3	198.07	1.0	
1,200.0	0.17	111.92	1,200.0	-1.2	-0.1	182.96	1.2	
1,300.0	0.17	167.37	1,300.0	-1.4	0.1	175.55	1.4	
1,400.0	0.12	252.39	1,400.0	-1.6	0.0	178.50	1.6	
1,500.0	0.32	319.69	1,500.0	-1.4	-0.2	189.80	1.4	
1,600.0	0.40	305.07	1,600.0	-1.0	-0.7	215.94	1.2	

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Design: VH - Job #32K0810633

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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)
1,700.0	0.26	285.51	1,700.0	-0.7	-1.2	239.51	1.4
1,800.0	0.18	5.93	1,800.0	-0.5	-1.4	250.67	1.5
1,900.0	0.29	4.08	1,900.0	-0.1	-1.4	266.40	1.4
2,000.0	0.79	72.72	2,000.0	0.4	-0.7	297.82	0.8
2,100.0	1.21	66.43	2,100.0	1.0	0.9	42.81	1.4
2,200.0	1.20	62.34	2,199.9	1.9	2.8	55.94	3.4
2,300.0	1.23	62.51	2,299.9	2.9	4.7	58.43	5.5
2,400.0	1.02	56.16	2,399.9	3.9	6.4	58.75	7.5
2,500.0	1.03	56.97	2,499.9	4.9	7.9	58.33	9.3
2,600.0	0.78	51.35	2,599.9	5.8	9.2	57.78	10.8
2,700.0	0.64	55.73	2,699.9	6.5	10.2	57.32	12.1
2,800.0	0.47	66.13	2,799.9	7.0	11.0	57.53	13.0
2,900.0	0.45	66.37	2,899.9	7.3	11.7	58.03	13.8
3,000.0	0.45	75.71	2,999.9	7.6	12.5	58.72	14.6
3,100.0	0.37	66.97	3,099.9	7.8	13.2	59.33	15.3
3,200.0	0.32	62.07	3,199.9	8.1	13.7	59.53	15.9
3,300.0	0.26	59.14	3,299.9	8.3	14.1	59.57	16.4
3,400.0	0.25	72.53	3,399.9	8.5	14.5	59.73	16.8
3,500.0	0.26	56.79	3,499.9	8.7	14.9	59.85	17.3
3,600.0	0.14	42.12	3,599.9	8.9	15.2	59.69	17.6
3,700.0	0.19	12.93	3,699.9	9.1	15.3	59.18	17.8
3,800.0	0.12	335.07	3,799.9	9.4	15.3	58.47	18.0
3,900.0	0.14	323.88	3,899.9	9.6	15.2	57.75	18.0
4,000.0	0.15	301.26	3,999.9	9.8	15.0	56.99	17.9
4,100.0	0.20	275.89	4,099.9	9.8	14.7	56.25	17.7
4,200.0	0.18	284.56	4,199.9	9.9	14.4	55.50	17.5
4,300.0	0.20	266.22	4,299.8	9.9	14.1	54.81	17.2
4,400.0	0.16	227.92	4,399.8	9.8	13.8	54.56	16.9
4,500.0	0.19	209.64	4,499.8	9.6	13.6	54.85	16.7
4,600.0	0.22	228.00	4,599.8	9.3	13.4	55.18	16.3
4,700.0	0.27	199.26	4,699.8	9.0	13.2	55.77	15.9
4,800.0	0.29	206.98	4,799.8	8.5	13.0	56.73	15.5
4,900.0	0.26	240.27	4,899.8	8.2	12.7	57.16	15.1
5,000.0	0.35	293.48	4,999.8	8.2	12.2	56.12	14.7
5,100.0	0.23	259.19	5,099.8	8.3	11.7	54.78	14.3
5,200.0	0.47	262.12	5,199.8	8.2	11.1	53.65	13.8
5,300.0	0.28	262.45	5,299.8	8.1	10.5	52.29	13.2
5,400.0	0.45	285.23	5,399.8	8.2	9.8	50.34	12.8
5,500.0	0.34	264.33	5,499.8	8.2	9.2	48.07	12.3
5,600.0	0.40	262.64	5,599.8	8.2	8.5	46.26	11.8
5,700.0	0.54	294.70	5,699.8	8.3	7.8	43.00	11.4
5,800.0	0.44	315.60	5,799.8	8.8	7.1	38.77	11.3
5,900.0	0.38	307.97	5,899.8	9.3	6.5	35.17	11.3
6,000.0	0.48	319.41	5,999.8	9.8	6.0	31.48	11.5

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
6,100.0	0.69	332.73	6,099.8	10.6	5.4	27.10	11.9
6,200.0	0.58	340.64	6,199.8	11.7	5.0	23.23	12.7
6,300.0	0.45	332.44	6,299.8	12.5	4.7	20.44	13.3
6,400.0	0.48	320.76	6,399.8	13.1	4.2	17.73	13.8
6,500.0	0.56	320.22	6,499.8	13.8	3.6	14.67	14.3
6,600.0	0.40	332.65	6,599.8	14.5	3.2	12.24	14.9
6,700.0	0.52	310.69	6,699.8	15.1	2.6	9.92	15.4
6,800.0	0.60	304.29	6,799.8	15.7	1.9	6.79	15.8
6,900.0	0.46	300.32	6,899.8	16.2	1.1	3.85	16.3
7,000.0	0.33	289.91	6,999.8	16.5	0.5	1.65	16.5
7,100.0	0.39	301.22	7,099.8	16.8	-0.1	359.71	16.8
7,200.0	0.42	285.91	7,199.8	17.1	-0.7	357.55	17.1
7,300.0	0.51	282.95	7,299.8	17.3	-1.5	354.99	17.3
7,400.0	0.24	308.77	7,399.8	17.5	-2.1	353.12	17.6
7,500.0	0.45	54.43	7,499.8	17.9	-2.0	353.75	18.0
7,600.0	0.45	87.01	7,599.8	18.1	-1.2	356.07	18.2
7,700.0	0.53	80.86	7,699.8	18.2	-0.4	358.75	18.2
7,800.0	0.80	72.83	7,799.8	18.5	0.7	2.25	18.5
7,900.0	0.68	76.32	7,899.7	18.8	2.0	5.97	18.9
8,000.0	0.72	78.62	7,999.7	19.1	3.2	9.40	19.4
8,019.0	0.84	70.84	8,018.7	19.2	3.4	10.09	19.5