

Results of Directional Survey

API number:	30-025-38726		
OGRID:		Operator:	COG OPERATING LLC
		Property:	BC FEDERAL # 21

surface	ULSTR:	F	19	T	17S	R	32E
			2410	FN	2060	FW	

BH Loc	ULSTR:	F	19	T	17S	R	32E
			2312	FN	2291	FW	

	MD	N/S	E/W	VD
	5240	42.70	147.52	5235.22
TOP PERFS/OH	5300	44.54	149.93	5295.14
	5302	44.60	150.01	5297.14
	6571	83.91	211.63	6563.92
BOT PERFS/OH	6630	86.53	215.19	6622.76
	6634	86.71	215.43	6626.75

NEXT TO LAST	6824	94.52	226.12	6816.28
LAST READING	6848	95.51	227.42	6840.23
TD	6908	97.99	230.67	6900.11

Surface Location	2410	FN	2060	FW
Projected BHL	2312	FN	2291	FW
Location of				
Top Perfs/OH	2365	FN	2210	FW
Bottom Perfs/OH	2323	FN	2275	FW

SUMMARY of Subsurface Locations

Surface Location	F-19-17S-32E	2410	FN	2060	FW	Vert. Depth
Top Perfs/OH	F-19-17S-32E	2365	FN	2210	FW	5295.14
Bottom Perfs/OH	F-19-17S-32E	2323	FN	2275	FW	6622.76
Projected TD	F-19-17S-32E	2312	FN	2291	FW	6900.11

SUR: F-19-17s-32e, 2410/N & 2060/W
 BHL: F-19-17s-32e, 2312/N & 2291/W
 API # 30-025-38726



Survey Report

Report Date: October 24, 2008 Client: COG Operating, LLC. Field: Lea County, NM Structure / Slot: BC Federal #21 / BC Federal #21 Well: BC Federal #21 Borehole: BC Federal #21 UWI/API#: Survey Name / Date: BC Federal #21_gyro / October 21, 2008 Tort / AHD / DDI / ERD ratio: 5.318° / 37.97 ft / 2.305 / 0.013 Grid Coordinate System: NAD27 New Mexico State Planes, Eastern Zone, US Feet Location Lat/Long: N 32 49 14.456, W 103 48 26.193 Location Grid N/E Y/X: N 662677 400 ftUS, E 661606 800 ftUS Grid Convergence Angle: +0.28513499° Grid Scale Factor: 0.99993900	Survey / DLS Computation Method: Minimum Curvature / Lubinski Vertical Section Azimuth: 67.990° Vertical Section Origin: N 0.000 ft, E 0.000 ft TVD Reference Datum: RKB TVD Reference Elevation: 0.0 ft relative to Sea Bed / Ground Level Elevation: 0.000 ft relative to Magnetic Declination: 8.048° Total Field Strength: 49267.821 nT Magnetic Dip: 60.779° Declination Date: October 21, 2008 Magnetic Declination Model: IGRF 2005 North Reference: Grid North Total Corr Mag North -> Grid North: +7.763° Local Coordinates Referenced To: Well Head
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Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.97M
	100.00	0.41	160.97	100.00	-0.02	-0.34	0.12	0.36	160.97	0.41	151.41M
	200.00	0.31	151.41	200.00	-0.01	-0.91	0.36	0.98	158.35	0.12	127.33M
	300.00	0.25	127.33	300.00	0.14	-1.28	0.67	1.45	152.59	0.13	166.45M
	400.00	0.21	166.45	400.00	0.22	-1.59	0.88	1.82	151.04	0.16	136.94M
	500.00	0.26	136.94	499.99	0.27	-1.94	1.08	2.22	150.87	0.13	149.89M
	600.00	0.35	149.89	599.99	0.40	-2.37	1.39	2.75	149.62	0.11	160.32M
	700.00	0.37	160.32	699.99	0.43	-2.94	1.65	3.37	150.67	0.07	152.85M
	800.00	0.30	152.85	799.99	0.44	-3.47	1.88	3.95	151.60	0.08	156.11M
	900.00	0.50	156.11	899.99	0.48	-4.11	2.17	4.65	152.09	0.20	159.52M
	1000.00	0.44	159.52	999.98	0.48	-4.86	2.49	5.46	152.93	0.07	143.95M
	1100.00	0.50	143.95	1099.98	0.58	-5.58	2.88	6.27	152.71	0.14	138.73M
	1200.00	0.35	138.73	1199.98	0.78	-6.16	3.33	7.00	151.57	0.15	134.67M
	1300.00	0.32	134.67	1299.98	0.99	-6.58	3.73	7.57	150.44	0.04	148.29M
	1400.00	0.49	148.29	1399.97	1.18	-7.14	4.16	8.27	149.80	0.19	111.46M
	1500.00	0.42	111.46	1499.97	1.52	-7.64	4.72	8.98	148.28	0.30	60.64M
	1600.00	0.78	60.64	1599.97	2.46	-7.44	5.66	9.35	142.76	0.61	66.72M
	1700.00	1.13	66.72	1699.95	4.12	-6.72	7.16	9.82	133.19	0.36	59.94M
	1800.00	1.28	59.94	1799.93	6.21	-5.77	9.03	10.72	122.58	0.21	64.34M
	1900.00	1.24	64.34	1899.90	8.39	-4.74	10.97	11.95	113.38	0.10	73.26M
	2000.00	1.14	73.26	1999.88	10.47	-3.99	12.90	13.50	107.18	0.21	78.50M
	2100.00	1.10	78.50	2099.86	12.40	-3.51	14.79	15.20	103.35	0.11	100.68M
	2200.00	1.01	100.68	2199.85	14.09	-3.48	16.60	16.96	101.84	0.42	98.70M
	2300.00	1.15	98.70	2299.83	15.69	-3.80	18.46	18.84	101.62	0.14	103.98M
	2400.00	1.34	103.98	2399.81	17.50	-4.23	20.58	21.01	101.61	0.22	102.98M
	2500.00	1.31	102.98	2499.78	19.38	-4.77	22.83	23.33	101.80	0.04	107.09M
	2600.00	1.02	107.09	2599.76	21.01	-5.29	24.80	25.36	102.04	0.30	108.54M
	2700.00	1.02	108.54	2699.74	22.38	-5.83	26.49	27.13	102.42	0.03	113.26M
	2800.00	1.13	113.26	2799.73	23.75	-6.51	28.24	28.98	102.97	0.14	115.00M
	2900.00	1.17	115.00	2899.71	25.14	-7.33	30.07	30.95	103.69	0.05	117.17M
	3000.00	1.11	117.17	2999.69	26.47	-8.20	31.86	32.90	104.43	0.07	---

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
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Survey Report

Report Date: November 4, 2008	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: COG Operating, LLC.	Vertical Section Azimuth: 67.990°
Field: Lea County, NM	Vertical Section Origin: N 0.000 ft, E 0.000 ft
Structure / Slot: BC Federal #21 / BC Federal #21	TVD Reference Datum: RKB
Well: BC Federal #21	TVD Reference Elevation: 0.0 ft relative to
Borehole: BC Federal #21	Sea Bed / Ground Level Elevation: 0.000 ft relative to
UWI/API#:	Magnetic Declination: 8.048°
Survey Name / Date: BC Federal #21_surveys / October 23, 2008	Total Field Strength: 49267.292 nT
Tort / AHD / DDI / ERD ratio: 38.358° / 271.99 ft / 4.019 / 0.039	Magnetic Dip: 60.779°
Grid Coordinate System: NAD27 New Mexico State Planes, Eastern Zone, US Feet	Declination Date: October 23, 2008
Location Lat/Long: N 32 49 14.456, W 103 48 26.193	Magnetic Declination Model: IGRF 2005
Location Grid N/E Y/X: N 662677.400 ftUS, E 661606.800 ftUS	North Reference: Grid North
Grid Convergence Angle: +0.28513499°	Total Corr Mag North -> Grid North: +7.763°
Grid Scale Factor: 0.99993900	Local Coordinates Referenced To: Well Head

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
Tie-In	3000.00	1.11	117.17	2999.69	26.47	-8.20	31.86	32.90	104.43	0.07	125.60M
	3084.00	1.10	125.60	3083.67	27.43	-9.04	33.24	34.45	105.22	0.19	148.50M
	3254.00	1.50	148.50	3253.63	28.67	-11.89	35.73	37.65	108.40	0.38	143.60M
	3274.00	1.40	143.60	3273.62	28.77	-12.31	36.01	38.06	108.87	0.80	135.70M
	3305.00	1.60	135.70	3304.61	29.03	-12.92	36.54	38.76	109.48	0.93	112.30M
	3337.00	2.20	112.30	3336.59	29.64	-13.48	37.42	39.77	109.81	3.03	93.10M
	3368.00	3.10	93.10	3367.56	30.83	-13.75	38.81	41.17	109.51	4.04	88.40M
	3401.00	3.50	88.40	3400.51	32.58	-13.77	40.70	42.97	108.69	1.46	90.20M
	3432.00	3.80	90.20	3431.44	34.42	-13.74	42.68	44.84	107.85	1.04	92.30M
	3469.00	3.60	92.30	3468.37	36.61	-13.79	45.06	47.13	107.02	0.65	82.80M
	3496.00	3.30	82.80	3495.32	38.13	-13.73	46.68	48.66	106.39	2.39	70.80M
	3527.00	3.20	70.80	3526.27	39.86	-13.33	48.38	50.19	105.41	2.21	75.40M
	3559.00	3.30	75.40	3558.22	41.67	-12.81	50.12	51.73	104.34	0.87	65.80M
	3590.00	3.60	65.80	3589.16	43.52	-12.18	51.87	53.28	103.22	2.10	58.90M
	3622.00	3.90	58.90	3621.09	45.60	-11.21	53.72	54.88	101.79	1.69	51.00M
	3654.00	4.40	51.00	3653.01	47.85	-9.88	55.60	56.47	100.07	2.37	53.20M
	3718.00	3.70	53.20	3716.85	52.19	-7.09	59.17	59.59	96.84	1.12	55.10M
	3782.00	4.10	55.10	3780.70	56.42	-4.55	62.70	62.86	94.15	0.66	54.60M
	3845.00	3.80	54.60	3843.55	60.65	-2.05	66.24	66.28	91.77	0.48	60.10M
	3908.00	2.90	60.10	3906.44	64.26	-0.05	69.33	69.33	90.04	1.52	60.30M
	3972.00	3.10	60.30	3970.35	67.58	1.62	72.23	72.25	88.72	0.31	59.00M
	4035.00	3.50	59.00	4033.25	71.16	3.45	75.36	75.44	87.38	0.65	53.50M
	4099.00	3.70	53.50	4097.12	75.09	5.69	78.70	78.90	85.87	0.62	48.20M
	4162.00	3.50	48.20	4160.00	78.87	8.18	81.76	82.17	84.29	0.62	55.20M
	4226.00	3.60	55.20	4223.88	82.67	10.63	84.87	85.53	82.86	0.69	62.60M
	4289.00	4.80	62.60	4286.71	87.22	12.97	88.83	89.78	81.69	2.09	64.40M
	4352.00	5.80	64.40	4349.44	93.02	15.56	94.05	95.32	80.61	1.61	40.23R
	4415.00	6.00	66.00	4412.10	99.49	18.27	99.92	101.58	79.64	0.41	166.20R
	4479.00	5.10	68.50	4475.80	105.68	20.67	105.63	107.63	78.93	1.46	29.14L
	4542.00	5.30	67.30	4538.54	111.39	22.82	110.92	113.24	78.37	0.36	140.65R
	4605.00	4.70	73.60	4601.30	116.87	24.68	116.08	118.67	78.00	1.29	167.22L
	4669.00	3.00	66.10	4665.16	121.15	26.09	120.12	122.93	77.74	2.76	13.04L
	4733.00	3.70	63.60	4729.05	124.88	27.69	123.51	126.57	77.36	1.12	7.13L
	4796.00	4.30	62.60	4791.89	129.26	29.68	127.42	130.83	76.89	0.96	164.84R
	4860.00	3.90	64.20	4855.73	133.82	31.73	131.51	135.29	76.43	0.65	151.45R
	4922.00	3.70	65.90	4917.59	137.92	33.47	135.24	139.32	76.10	0.37	136.32L
	4986.00	2.90	47.80	4981.49	141.51	35.40	138.32	142.78	75.65	2.04	53.50M
	5050.00	2.60	53.50	5045.41	144.43	37.35	140.69	145.56	75.13	0.63	49.90M

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Mag / Grav Tool Face (deg)
	5113.00	2.60	49.90	5108.35	147.17	39.12	142.93	148.19	74.69	0.26	52.00M
	5176.00	2.50	52.00	5171.29	149.85	40.89	145.11	150.76	74.26	0.22	54.10M
	5240.00	2.90	54.10	5235.22	152.77	42.70	147.52	153.57	73.86	0.64	51.30M
	5302.00	2.90	51.30	5297.14	155.79	44.60	150.01	156.50	73.44	0.23	55.00M
	5366.00	2.80	55.00	5361.06	158.86	46.50	152.55	159.49	73.05	0.33	49.50M
	5430.00	3.00	49.50	5424.98	161.98	48.49	155.11	162.51	72.64	0.54	53.50M
	5493.00	3.00	53.50	5487.89	165.14	50.54	157.69	165.59	72.23	0.33	67.10M
	5556.00	3.00	67.10	5550.80	168.38	52.16	160.53	168.79	72.00	1.13	71.10M
	5620.00	2.80	71.10	5614.72	171.62	53.32	163.55	172.03	71.94	0.44	65.90M
	5683.00	3.00	65.90	5677.64	174.80	54.49	166.51	175.20	71.88	0.52	66.60M
	5747.00	3.10	66.60	5741.55	178.20	55.86	169.63	178.59	71.77	0.17	72.10M
	5811.00	3.00	72.10	5805.46	181.60	57.06	172.81	181.99	71.73	0.48	60.80M
	5874.00	2.60	60.80	5868.39	184.67	58.27	175.63	185.04	71.65	1.08	65.20M
	5937.00	2.50	65.20	5931.32	187.46	59.54	178.12	187.81	71.52	0.35	56.80M
	6000.00	2.40	56.80	5994.27	190.12	60.84	180.47	190.45	71.37	0.59	47.10M
	6063.00	3.30	47.10	6057.19	193.11	62.80	182.91	193.39	71.05	1.62	50.00M
	6127.00	3.60	50.00	6121.07	196.74	65.34	185.80	196.95	70.62	0.54	58.70M
	6190.00	3.70	58.70	6183.94	200.63	67.67	189.05	200.79	70.30	0.89	54.50M
	6254.00	3.80	54.50	6247.81	204.73	69.97	192.54	204.86	70.03	0.46	55.80M
	6317.00	4.30	55.80	6310.65	209.07	72.51	196.19	209.16	69.72	0.81	53.80M
	6381.00	4.30	53.80	6374.47	213.74	75.28	200.11	213.80	69.38	0.23	49.10M
	6445.00	4.40	49.10	6438.29	218.39	78.30	203.90	218.42	68.99	0.58	57.00M
	6508.00	4.40	57.00	6501.10	223.05	81.20	207.76	223.06	68.65	0.96	53.00M
	6571.00	4.20	53.00	6563.92	227.65	83.91	211.63	227.65	68.37	0.57	54.20M
	6634.00	4.40	54.20	6626.75	232.22	86.71	215.43	232.22	68.08	0.35	57.20M
	6698.00	3.80	57.20	6690.58	236.69	89.29	219.20	236.69	67.84	1.00	51.20M
	6761.00	4.10	51.20	6753.43	240.90	91.84	222.71	240.90	67.59	0.81	52.50M
	6824.00	3.80	52.50	6816.28	245.07	94.52	226.12	245.08	67.32	0.50	52.70M
	6848.00	4.00	52.70	6840.23	246.64	95.51	227.42	246.66	67.22	0.84	---
Projected TD	6908.00	4.00	52.70	6900.08	250.68	98.05	230.75	250.72	66.98	0.00	---