



HOBBS OCD

AUG 15 2016

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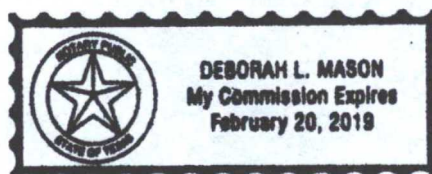
State of New Mexico
County of Lea

I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 04/28/2016 through 05/08/2016 conduct or supervise the taking of a MWD survey from a depth of 2467 feet to a depth of 12465 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating LLC for Pan Head Fee #23H Well API 30-015-42756 in Lea County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared Donald D. Mason, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.



Notary Public's Signature



HOTEL 200

AUG 15 2016

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COG Operating LLC

Lea County, NM (NAD-27 2015)

Pan Head Fee #23H

API #: 30-025-42756

SHL: 245' FNL, 1910' FWL, Sec 11, T17S, R32E, Unit C

PP: 330' FNL, 1664' FWL, Sec 11, T17S, R32E, Unit C

BHL: 966' FNL, 1665' FWL, Sec 14, T17S, R32E, Unit C

Design: BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C

Standard Survey Report

09 May, 2016





Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Pan Head Fee #23H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4177.00usft (Patriot 6)
Site:	Pan Head Fee #23H	MD Reference:	KB @ 4177.00usft (Patriot 6)
Well:	SHL: 245' FNL, 1910' FWL, Sec 11, T17S, R32E, Unit C	North Reference:	Grid
Wellbore:	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD-27 2015)		
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	Pan Head Fee #23H				
Site Position:		Northing:	675,469.60 usft	Latitude:	32° 51' 19.937 N
From:	Map	Easting:	682,519.70 usft	Longitude:	103° 44' 20.291 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.32 °

Well	SHL: 245' FNL, 1910' FWL, Sec 11, T17S, R32E, Unit C					
Well Position	+N/-S	0.00 usft	Northing:	675,469.60 usft	Latitude:	32° 51' 19.937 N
	+E/-W	0.00 usft	Easting:	682,519.70 usft	Longitude:	103° 44' 20.291 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,159.00 usft

Wellbore	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/13/2016	7.21	60.63	48,412

Design	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	181.98	

Survey Program	Date	5/9/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	2,348.00	VES Gyro #1 (BHL: 966' FNL, 1668' FWL,	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
2,467.00	12,465.00	TDS MWD #2 (BHL: 966' FNL, 1668' FWL	MWD	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.31	190.53	100.00	-0.27	-0.05	0.27	0.31	0.31	0.00	
200.00	0.20	185.76	200.00	-0.71	-0.12	0.71	0.11	-0.11	-4.77	
300.00	0.41	158.14	300.00	-1.21	0.00	1.21	0.25	0.21	-27.62	
400.00	0.56	202.62	399.99	-1.99	-0.06	2.00	0.39	0.15	44.48	
500.00	0.06	349.66	499.99	-2.39	-0.25	2.40	0.61	-0.50	147.04	
600.00	0.07	7.54	599.99	-2.28	-0.25	2.29	0.02	0.01	17.88	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Pan Head Fee #23H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4177.00usft (Patriot 6)
Site:	Pan Head Fee #23H	MD Reference:	KB @ 4177.00usft (Patriot 6)
Well:	SHL: 245' FNL, 1910' FWL, Sec 11, T17S, R32E, Unit C	North Reference:	Grid
Wellbore:	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
700.00	0.18	225.24	699.99	-2.33	-0.36	2.34	0.24	0.11	-142.30
800.00	0.26	160.03	799.99	-2.66	-0.39	2.67	0.25	0.08	-65.21
900.00	0.09	48.79	899.99	-2.82	-0.26	2.82	0.30	-0.17	-111.24
1,000.00	0.18	49.47	999.99	-2.66	-0.08	2.66	0.09	0.09	0.68
1,100.00	0.15	61.85	1,099.99	-2.50	0.16	2.49	0.05	-0.03	12.38
1,200.00	0.40	1.67	1,199.99	-2.09	0.28	2.08	0.35	0.25	-60.18
1,300.00	0.28	343.87	1,299.99	-1.51	0.23	1.50	0.16	-0.12	-17.80
1,400.00	0.31	326.65	1,399.99	-1.04	0.01	1.04	0.09	0.03	-17.22
1,500.00	0.48	340.91	1,499.98	-0.42	-0.28	0.43	0.20	0.17	14.26
1,600.00	0.29	354.65	1,599.98	0.22	-0.44	-0.21	0.21	-0.19	13.74
1,700.00	0.26	348.59	1,699.98	0.70	-0.51	-0.68	0.04	-0.03	-6.06
1,800.00	0.41	19.69	1,799.98	1.26	-0.43	-1.24	0.23	0.15	31.10
1,900.00	0.69	47.88	1,899.97	2.00	0.14	-2.00	0.38	0.28	28.19
2,000.00	0.89	66.03	1,999.96	2.72	1.29	-2.76	0.32	0.20	18.15
2,100.00	1.05	61.31	2,099.95	3.47	2.81	-3.57	0.18	0.16	-4.72
2,200.00	1.44	55.86	2,199.93	4.62	4.65	-4.78	0.41	0.39	-5.45
2,300.00	1.39	82.71	2,299.90	5.48	6.89	-5.71	0.66	-0.05	26.85
2,348.00	1.38	87.22	2,347.88	5.58	8.05	-5.85	0.23	-0.02	9.40
Tie-In to VES Gyro									
2,467.00	1.60	89.80	2,466.84	5.66	11.14	-6.04	0.19	0.18	2.17
First TDS MWD Survey									
2,530.00	1.20	79.60	2,529.82	5.78	12.67	-6.21	0.75	-0.63	-16.19
2,626.00	1.60	349.50	2,625.80	7.28	13.41	-7.74	2.08	0.42	-93.85
2,721.00	3.80	324.50	2,720.70	11.14	11.34	-11.53	2.57	2.32	-26.32
2,816.00	6.50	312.80	2,815.31	17.36	5.57	-17.54	3.04	2.84	-12.32
2,911.00	8.10	309.60	2,909.53	25.28	-3.53	-25.15	1.74	1.68	-3.37
3,006.00	7.80	302.20	3,003.62	32.98	-14.15	-32.48	1.12	-0.32	-7.79
3,102.00	6.50	294.30	3,098.88	38.69	-24.61	-37.82	1.69	-1.35	-8.23
3,196.00	6.70	289.60	3,192.25	42.72	-34.63	-41.50	0.61	0.21	-5.00
3,292.00	7.30	294.60	3,287.54	47.14	-45.45	-45.54	0.89	0.63	5.21
3,387.00	6.50	305.50	3,381.85	52.77	-55.31	-50.83	1.61	-0.84	11.47
3,482.00	5.60	317.60	3,476.33	59.32	-62.82	-57.11	1.64	-0.95	12.74
3,577.00	5.70	321.80	3,570.87	66.45	-68.86	-64.03	0.45	0.11	4.42
3,672.00	6.30	319.80	3,665.35	74.14	-75.14	-71.50	0.67	0.63	-2.11
3,767.00	7.30	318.70	3,759.68	82.65	-82.49	-79.75	1.06	1.05	-1.16
3,862.00	6.70	311.00	3,853.97	90.82	-90.66	-87.64	1.17	-0.63	-8.11
3,958.00	5.50	309.70	3,949.43	97.44	-98.42	-93.98	1.26	-1.25	-1.35
4,053.00	5.50	309.00	4,043.99	103.21	-105.46	-99.51	0.07	0.00	-0.74
4,148.00	6.00	309.00	4,138.51	109.20	-112.86	-105.24	0.53	0.53	0.00
4,243.00	7.30	310.50	4,232.87	116.25	-121.31	-111.98	1.38	1.37	1.58
4,338.00	6.60	308.40	4,327.17	123.56	-130.18	-118.98	0.78	-0.74	-2.21
4,434.00	5.50	310.10	4,422.63	129.95	-138.02	-125.10	1.16	-1.15	1.77

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Design:	BHL: 966' FNL, 1668' FWL, Sec 14, T17S, R32E, Unit C	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,529.00	5.90	314.20	4,517.16	136.28	-145.00	-131.19	0.60	0.42	4.32
4,624.00	7.00	317.10	4,611.56	143.93	-152.44	-138.57	1.21	1.16	3.05
4,720.00	6.80	311.90	4,706.87	152.01	-160.66	-146.37	0.68	-0.21	-5.42
4,815.00	5.80	309.40	4,801.29	158.81	-168.55	-152.89	1.09	-1.05	-2.63
4,910.00	6.00	309.50	4,895.79	165.02	-176.09	-158.83	0.21	0.21	0.11
5,006.00	6.90	312.10	4,991.18	172.07	-184.24	-165.61	0.99	0.94	2.71
5,101.00	5.60	308.70	5,085.62	178.80	-192.09	-172.05	1.42	-1.37	-3.58
5,196.00	5.60	305.60	5,180.16	184.40	-199.48	-177.39	0.32	0.00	-3.26
5,290.00	6.40	308.90	5,273.65	190.35	-207.29	-183.08	0.93	0.85	3.51
5,386.00	7.20	311.60	5,368.97	197.71	-215.95	-190.13	0.90	0.83	2.81
5,480.00	8.10	314.00	5,462.13	206.22	-225.12	-198.32	1.02	0.96	2.55
5,576.00	7.30	310.60	5,557.27	214.89	-234.62	-206.65	0.96	-0.83	-3.54
5,671.00	6.20	305.60	5,651.61	221.80	-243.37	-213.26	1.31	-1.16	-5.26
5,761.00	2.60	303.40	5,741.33	225.76	-249.03	-217.02	4.00	-4.00	-2.44
5,856.00	0.20	215.20	5,836.30	226.81	-250.92	-218.00	2.74	-2.53	-92.84
5,919.00	1.60	162.10	5,899.29	225.88	-250.72	-217.08	2.36	2.22	-84.29
5,951.00	4.00	167.90	5,931.25	224.36	-250.34	-215.58	7.54	7.50	18.13
5,983.00	6.70	175.90	5,963.10	221.41	-249.98	-212.64	8.73	8.44	25.00
6,015.00	9.30	178.40	5,994.79	216.96	-249.77	-208.20	8.20	8.13	7.81
6,047.00	12.60	180.30	6,026.20	210.89	-249.72	-202.13	10.37	10.31	5.94
6,078.00	16.50	181.00	6,056.20	203.10	-249.81	-194.35	12.59	12.58	2.26
6,110.00	19.90	181.10	6,086.60	193.11	-250.00	-184.36	10.63	10.63	0.31
6,142.00	22.80	181.20	6,116.40	181.46	-250.23	-172.71	9.06	9.06	0.31
6,174.00	25.80	181.40	6,145.56	168.30	-250.53	-159.54	9.38	9.38	0.63
6,205.00	28.70	181.10	6,173.12	154.11	-250.84	-145.35	9.37	9.35	-0.97
6,237.00	31.80	180.00	6,200.76	137.99	-250.99	-129.24	9.84	9.69	-3.44
6,269.00	35.50	179.10	6,227.39	120.26	-250.84	-111.53	11.67	11.56	-2.81
6,300.00	39.30	179.10	6,252.01	101.44	-250.54	-92.72	12.26	12.26	0.00
6,332.00	42.70	179.60	6,276.16	80.45	-250.31	-71.76	10.67	10.63	1.56
6,364.00	45.90	179.70	6,299.06	58.11	-250.17	-49.43	10.00	10.00	0.31
6,396.00	49.30	179.30	6,320.63	34.48	-249.96	-25.82	10.66	10.63	-1.25
6,428.00	53.00	178.90	6,340.70	9.57	-249.57	-0.94	11.60	11.56	-1.25
6,459.00	56.70	178.40	6,358.55	-15.77	-248.97	24.36	12.01	11.94	-1.61
6,491.00	60.40	178.30	6,375.24	-43.05	-248.18	51.60	11.57	11.56	-0.31
6,523.00	63.80	178.20	6,390.21	-71.32	-247.32	79.82	10.63	10.63	-0.31
6,539.33	65.38	178.31	6,397.22	-86.06	-246.87	94.54	9.70	9.68	0.65
As-Drilled PP									
6,554.00	66.80	178.40	6,403.16	-99.46	-246.49	107.92	9.70	9.68	0.64
6,586.00	69.20	178.30	6,415.15	-129.12	-245.63	137.53	7.51	7.50	-0.31
6,618.00	72.30	178.40	6,425.70	-159.31	-244.76	167.67	9.69	9.69	0.31
6,649.00	76.00	179.20	6,434.17	-189.12	-244.14	197.45	12.19	11.94	2.58
6,681.00	79.60	179.50	6,440.93	-220.39	-243.79	228.68	11.29	11.25	0.94

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6,713.00	83.30	179.90	6,445.68	-252.03	-243.62	260.30	11.63	11.56	1.25
6,745.00	86.50	180.10	6,448.53	-283.90	-243.62	292.15	10.02	10.00	0.63
6,776.00	88.50	180.00	6,449.88	-314.87	-243.65	323.10	6.46	6.45	-0.32
6,808.00	89.20	179.70	6,450.52	-346.86	-243.56	355.07	2.38	2.19	-0.94
6,903.00	91.00	179.70	6,450.36	-441.86	-243.07	449.99	1.89	1.89	0.00
6,998.00	91.20	179.30	6,448.53	-536.84	-242.24	544.88	0.47	0.21	-0.42
7,093.00	90.50	178.90	6,447.12	-631.81	-240.75	639.75	0.85	-0.74	-0.42
7,188.00	89.90	180.50	6,446.79	-726.81	-240.25	734.67	1.80	-0.63	1.68
7,283.00	89.80	178.90	6,447.04	-821.80	-239.75	829.60	1.69	-0.11	-1.68
7,349.00	91.70	179.00	6,446.18	-887.78	-238.54	895.49	2.88	2.88	0.15
7,413.00	90.40	179.30	6,445.00	-951.76	-237.59	959.40	2.08	-2.03	0.47
7,508.00	88.50	179.90	6,445.92	-1,046.75	-236.93	1,054.31	2.10	-2.00	0.63
7,603.00	88.60	179.80	6,448.32	-1,141.72	-236.68	1,149.22	0.15	0.11	-0.11
7,698.00	88.60	179.80	6,450.64	-1,236.69	-236.35	1,244.12	0.00	0.00	0.00
7,793.00	89.60	179.60	6,452.13	-1,331.68	-235.85	1,339.03	1.07	1.05	-0.21
7,888.00	89.80	179.80	6,452.63	-1,426.68	-235.35	1,433.96	0.30	0.21	0.21
7,984.00	90.10	180.20	6,452.71	-1,522.68	-235.35	1,529.90	0.52	0.31	0.42
8,079.00	90.40	180.60	6,452.30	-1,617.67	-236.02	1,624.86	0.53	0.32	0.42
8,174.00	90.70	181.30	6,451.39	-1,712.65	-237.59	1,719.84	0.80	0.32	0.74
8,269.00	90.50	180.50	6,450.39	-1,807.64	-239.08	1,814.82	0.87	-0.21	-0.84
8,364.00	90.50	180.30	6,449.56	-1,902.63	-239.75	1,909.78	0.21	0.00	-0.21
8,460.00	89.90	179.30	6,449.23	-1,998.63	-239.41	2,005.71	1.21	-0.63	-1.04
8,555.00	89.50	178.90	6,449.73	-2,093.61	-237.92	2,100.58	0.60	-0.42	-0.42
8,650.00	90.40	179.80	6,449.81	-2,188.61	-236.84	2,195.48	1.34	0.95	0.95
8,745.00	89.60	178.70	6,449.81	-2,283.60	-235.60	2,290.37	1.43	-0.84	-1.16
8,840.00	89.70	178.80	6,450.39	-2,378.57	-233.53	2,385.22	0.15	0.11	0.11
8,936.00	90.20	178.90	6,450.47	-2,474.55	-231.60	2,481.08	0.53	0.52	0.10
9,031.00	89.00	179.20	6,451.14	-2,569.53	-230.02	2,575.95	1.30	-1.26	0.32
9,127.00	89.80	179.50	6,452.14	-2,665.52	-228.94	2,671.84	0.89	0.83	0.31
9,222.00	90.40	179.90	6,451.98	-2,760.52	-228.44	2,766.76	0.76	0.63	0.42
9,317.00	88.90	179.00	6,452.56	-2,855.51	-227.53	2,861.67	1.84	-1.58	-0.95
9,412.00	89.80	179.20	6,453.63	-2,950.49	-226.03	2,956.54	0.97	0.95	0.21
9,508.00	90.60	179.80	6,453.30	-3,046.49	-225.20	3,052.45	1.04	0.83	0.63
9,603.00	89.40	178.80	6,453.30	-3,141.48	-224.04	3,147.34	1.64	-1.26	-1.05
9,699.00	90.10	179.20	6,453.72	-3,237.46	-222.36	3,243.21	0.84	0.73	0.42
9,794.00	90.60	179.70	6,453.14	-3,332.45	-221.45	3,338.11	0.74	0.53	0.53
9,889.00	90.90	179.80	6,451.89	-3,427.44	-221.03	3,433.03	0.33	0.32	0.11
9,984.00	89.40	179.00	6,451.64	-3,522.43	-220.04	3,527.93	1.79	-1.58	-0.84
10,080.00	89.90	178.90	6,452.23	-3,618.42	-218.28	3,623.80	0.53	0.52	-0.10
10,175.00	90.40	179.40	6,451.98	-3,713.40	-216.87	3,718.68	0.74	0.53	0.53
10,270.00	91.20	179.50	6,450.66	-3,808.39	-215.96	3,813.58	0.85	0.84	0.11
10,369.00	89.50	179.30	6,450.05	-3,907.38	-214.92	3,912.47	1.73	-1.72	-0.20



TDS
Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD-27 2015)
Site: Pan Head Fee #23H
Well: SHL: 245' FNL, 1910' FWL, Sec 11, T17S,
R32E, Unit C
Wellbore: BHL: 966' FNL, 1668' FWL, Sec 14, T17S,
R32E, Unit C
Design: BHL: 966' FNL, 1668' FWL, Sec 14, T17S,
R32E, Unit C

Local Co-ordinate Reference: Site Pan Head Fee #23H
TVD Reference: KB @ 4177.00usft (Patriot 6)
MD Reference: KB @ 4177.00usft (Patriot 6)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,465.00	90.20	179.60	6,450.30	-4,003.37	-214.00	4,008.38	0.79	0.73	0.31
10,560.00	91.20	179.90	6,449.14	-4,098.36	-213.59	4,103.30	1.10	1.05	0.32
10,655.00	89.70	180.20	6,448.40	-4,193.36	-213.67	4,198.24	1.61	-1.58	0.32
10,751.00	90.40	180.20	6,448.31	-4,289.36	-214.00	4,294.19	0.73	0.73	0.00
10,846.00	91.20	180.30	6,446.99	-4,384.35	-214.42	4,389.14	0.85	0.84	0.11
10,941.00	88.90	179.60	6,446.90	-4,479.34	-214.34	4,484.07	2.53	-2.42	-0.74
11,036.00	89.80	179.80	6,447.98	-4,574.33	-213.84	4,578.99	0.97	0.95	0.21
11,131.00	90.50	180.50	6,447.73	-4,669.33	-214.09	4,673.94	1.04	0.74	0.74
11,228.00	89.20	180.40	6,447.99	-4,766.32	-214.85	4,770.90	1.34	-1.34	-0.10
11,323.00	89.80	181.00	6,448.81	-4,861.31	-216.01	4,865.87	0.89	0.63	0.63
11,418.00	89.10	181.10	6,449.73	-4,956.29	-217.75	4,960.86	0.74	-0.74	0.11
11,514.00	89.60	181.00	6,450.82	-5,052.27	-219.51	5,056.84	0.53	0.52	-0.10
11,609.00	88.20	178.70	6,452.84	-5,147.24	-219.26	5,151.74	2.83	-1.47	-2.42
11,704.00	88.60	179.10	6,455.29	-5,242.19	-217.44	5,246.57	0.60	0.42	0.42
11,799.00	89.00	179.80	6,457.28	-5,337.16	-216.53	5,341.46	0.85	0.42	0.74
11,894.00	88.10	179.00	6,459.69	-5,432.12	-215.53	5,436.33	1.27	-0.95	-0.84
11,989.00	88.60	179.40	6,462.42	-5,527.07	-214.21	5,531.18	0.67	0.53	0.42
12,084.00	88.70	179.50	6,464.66	-5,622.04	-213.29	5,626.06	0.15	0.11	0.11
12,179.00	90.00	178.80	6,465.74	-5,717.02	-211.89	5,720.93	1.55	1.37	-0.74
12,274.00	90.90	180.00	6,464.99	-5,812.01	-210.89	5,815.83	1.58	0.95	1.26
12,369.00	91.00	179.80	6,463.42	-5,907.00	-210.73	5,910.75	0.24	0.11	-0.21
Final MWD Survey									
12,465.00	91.00	179.80	6,461.74	-6,002.99	-210.39	6,006.67	0.00	0.00	0.00
Projection to Bit/TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,348.00	2,347.88	5.58	8.05	Tie-In to VES Gyro
2,467.00	2,466.84	5.66	11.14	First TDS MWD Survey
6,539.33	6,397.22	-86.06	-246.87	As-Drilled PP
12,369.00	6,463.42	-5,907.00	-210.73	Final MWD Survey
12,465.00	6,461.74	-6,002.99	-210.39	Projection to Bit/TD

Checked By:

Deborah L. Mason

Approved By:

Paul J. [Signature]

Date:

7/13/2016

