

Deviation Summary

PICEANCE VLY

1 General

1.1 Customer Information

Company	PICEANCE VLY
Representative	
Address	

1.2 Well/Wellbore Information

Well	GM 12-21	Wellbore No.	
Wellbore Legal Name	GM 12-21	Common Wellbore Name	GM 12-21
Project	GV 20-06S-096W	Site	GM 442-20 Pad
Vertical Section Azimuth	82.79 (°)	North reference	
Origin N/S		Origin E/W	
Spud date	9/6/2014	UWI	GM 12-21
Active datum	KB @5,596.0ft (above Mean Sea Level)		

2 Survey Name

2.1 Survey Name: Survey #1

Survey Name	Survey #1	Company	Scientific Drilling
Date Started	9/7/2014	Ended	
Tool Name	MWD	Engineer	

2.1.1 Tie On Point

MD (ft)	Inc. (°)	Azi. (°)	TVD (ft)	N/S (ft)	E/W (ft)
0.0	0.00	0.00	0.00	0.00	0.00

2.1.2 Survey Stations

Date	Type	MD (ft)	Inc. (°)	Azi. (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. sec. (ft)	DLS (°/100usft)	Builld Rate (°/100usft)	Turn (°/100usft)	Tface (°)
9/7/2014	Tie On	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9/7/2014	NORMAL	74.0	0.18	86.31	74.00	0.01	0.12	0.12	0.24	0.24	0.00	86.31
	NORMAL	165.0	2.02	89.30	164.98	0.04	1.86	1.85	2.02	2.02	3.29	3.28
	NORMAL	256.0	4.49	83.67	255.83	0.45	7.01	7.01	2.73	2.71	-6.19	349.81
	NORMAL	346.0	7.30	81.56	345.34	1.68	16.17	16.25	3.13	3.12	-2.34	354.54
	NORMAL	437.0	9.77	81.39	435.33	3.68	29.52	29.75	2.71	2.71	-0.19	359.33
	NORMAL	527.0	11.79	82.18	523.73	6.08	46.18	46.58	2.25	2.24	0.88	4.57
	NORMAL	618.0	14.87	85.43	612.27	8.27	67.04	67.55	3.48	3.38	3.57	15.26
	NORMAL	709.0	17.77	83.41	699.60	10.80	92.48	93.10	3.25	3.19	-2.22	347.95
	NORMAL	780.0	19.79	82.41	766.81	13.63	115.16	115.96	2.88	2.85	-1.41	350.47
	NORMAL	870.0	22.81	81.18	850.66	18.32	147.51	148.64	3.39	3.36	-1.37	351.01
	NORMAL	961.0	25.05	81.45	933.83	23.89	183.99	185.53	2.46	2.46	0.30	2.92
	NORMAL	1,039.0	25.50	81.27	1,004.36	28.89	216.92	218.83	0.59	0.58	-0.23	350.23
9/8/2014	NORMAL	1,147.0	27.03	78.91	1,101.21	37.14	263.98	266.56	1.71	1.42	-2.19	324.62
	NORMAL	1,242.0	26.64	81.01	1,185.98	44.62	306.20	309.38	1.08	-0.41	2.21	113.30
	NORMAL	1,336.0	26.32	81.36	1,270.12	51.04	347.62	351.28	0.38	-0.34	0.37	154.16
	NORMAL	1,430.0	25.59	84.23	1,354.64	56.21	388.42	392.41	1.55	-0.78	3.05	121.45
9/9/2014	NORMAL	1,524.0	25.15	84.08	1,439.58	60.32	428.49	432.67	0.47	-0.47	-0.16	188.24
	NORMAL	1,618.0	25.56	82.47	1,524.52	65.03	468.46	472.92	0.85	0.44	-1.71	300.01
	NORMAL	1,713.0	24.45	83.55	1,610.62	69.93	508.32	513.07	1.26	-1.17	1.14	158.13
	NORMAL	1,807.0	24.52	81.92	1,696.17	74.85	546.96	552.03	0.72	0.07	-1.73	275.17

2.1.2 Survey Stations (Continued)

Date	Type	MD (ft)	Inc. (")	Azi. (")	TVD (ft)	N/S (ft)	E/W (ft)	V. sec. (ft)	DLS (°/100usft)	Build Rate (°/100usft)	Turn (°/100usft)	Tface (")
9/9/2014	NORMAL	1,901.0	24.88	83.39	1,781.57	79.87	585.91	591.30	0.76	0.38	1.56	60.30
	NORMAL	1,997.0	25.85	85.03	1,868.31	84.01	626.83	632.41	1.25	1.01	1.71	36.66
	NORMAL	2,091.0	25.17	85.87	1,953.15	87.23	667.18	672.85	0.82	-0.72	0.89	152.37
	NORMAL	2,185.0	25.88	86.01	2,037.97	90.09	707.58	713.29	0.76	0.76	0.15	4.92
	NORMAL	2,278.0	25.46	83.62	2,121.80	93.73	747.70	753.55	1.20	-0.45	-2.57	246.84
	NORMAL	2,374.0	25.30	83.79	2,208.53	98.24	788.60	794.69	0.18	-0.17	0.18	155.59
	NORMAL	2,468.0	25.79	85.74	2,293.34	101.93	828.96	835.20	1.04	0.52	2.07	60.65
	NORMAL	2,562.0	25.71	84.07	2,378.01	105.58	869.63	876.00	0.80	-0.09	-1.84	263.15
	NORMAL	2,657.0	24.23	85.50	2,464.13	109.26	909.56	916.08	1.69	-1.56	1.57	157.65
	NORMAL	2,751.0	25.06	81.36	2,549.57	113.76	948.47	955.25	2.04	0.88	-4.40	293.79
	NORMAL	2,846.0	24.97	79.51	2,635.66	120.43	988.08	995.38	0.83	-0.09	-1.95	262.60
	NORMAL	2,940.0	24.53	78.18	2,721.03	128.04	1,026.69	1,034.64	0.75	-0.47	-1.41	231.08
	NORMAL	3,033.0	23.86	80.93	2,805.86	134.96	1,064.16	1,072.69	1.41	-0.72	2.96	121.98
	NORMAL	3,127.0	24.42	81.11	2,891.64	140.96	1,102.13	1,111.11	0.60	0.60	0.19	7.57
	NORMAL	3,222.0	24.48	80.00	2,978.12	147.42	1,140.92	1,150.40	0.49	0.06	-1.17	276.94
	NORMAL	3,316.0	23.60	82.07	3,063.97	153.39	1,178.74	1,188.67	1.30	-0.94	2.20	137.16
	NORMAL	3,409.0	22.95	84.47	3,149.40	157.71	1,215.22	1,225.41	1.24	-0.70	2.58	125.53
	NORMAL	3,503.0	22.27	83.43	3,236.18	161.51	1,251.16	1,261.54	0.84	-0.72	-1.11	209.98
	NORMAL	3,597.0	20.41	83.51	3,323.73	165.41	1,285.14	1,295.74	1.98	-1.98	0.09	179.14
	NORMAL	3,691.0	19.96	82.79	3,411.95	169.27	1,317.35	1,328.17	0.55	-0.48	-0.77	208.56
	NORMAL	3,784.0	18.64	83.91	3,499.73	172.84	1,347.87	1,358.91	1.47	-1.42	1.20	164.86
9/10/2014	NORMAL	3,879.0	17.94	84.96	3,589.93	175.74	1,377.55	1,388.71	0.81	-0.74	1.11	155.29
	NORMAL	3,975.0	17.50	83.82	3,681.37	178.59	1,406.62	1,417.92	0.58	-0.46	-1.19	217.72
	NORMAL	4,066.0	16.70	82.93	3,768.35	181.67	1,433.20	1,444.67	0.92	-0.88	-0.98	197.69
	NORMAL	4,160.0	15.94	83.16	3,858.56	184.87	1,459.42	1,471.08	0.81	-0.81	0.24	175.25
	NORMAL	4,254.0	15.30	86.62	3,949.09	187.14	1,484.62	1,496.37	1.20	-0.68	3.68	126.15
	NORMAL	4,347.0	14.51	81.62	4,038.96	189.56	1,508.39	1,520.26	1.62	-0.85	-5.38	236.04
	NORMAL	4,440.0	13.77	84.21	4,129.15	192.38	1,530.93	1,542.97	1.05	-0.80	2.78	140.72
	NORMAL	4,534.0	13.09	84.44	4,220.58	194.54	1,552.66	1,564.80	0.73	-0.72	0.24	175.62
	NORMAL	4,627.0	12.05	85.93	4,311.35	196.25	1,572.82	1,585.02	1.17	-1.12	1.60	163.41
	NORMAL	4,722.0	10.99	83.99	4,404.43	197.90	1,591.72	1,603.97	1.19	-1.12	-2.04	199.13
	NORMAL	4,818.0	10.55	86.10	4,498.74	199.45	1,609.59	1,621.89	0.62	-0.46	2.20	139.17
	NORMAL	4,911.0	9.09	81.36	4,590.38	201.14	1,625.35	1,637.74	1.79	-1.57	-5.10	206.65
	NORMAL	5,005.0	8.38	81.77	4,683.29	203.23	1,639.47	1,652.01	0.76	-0.76	0.44	175.19
	NORMAL	5,099.0	7.95	84.01	4,776.33	204.89	1,652.71	1,665.36	0.57	-0.46	2.38	144.61
	NORMAL	5,194.0	7.24	83.67	4,870.50	206.24	1,665.20	1,677.91	0.75	-0.75	-0.36	183.45
	NORMAL	5,289.0	6.95	81.62	4,964.77	207.73	1,676.83	1,689.65	0.41	-0.31	-2.16	220.11
	NORMAL	5,383.0	6.37	83.94	5,058.14	209.11	1,687.64	1,700.54	0.68	-0.62	2.47	156.26
	NORMAL	5,477.0	4.79	77.27	5,151.69	210.53	1,696.66	1,709.67	1.81	-1.68	-7.10	199.02
	NORMAL	5,572.0	4.83	77.04	5,246.35	212.30	1,704.43	1,717.59	0.05	0.04	-0.24	334.14
	NORMAL	5,666.0	4.84	77.14	5,340.02	214.07	1,712.15	1,725.48	0.01	0.01	0.11	40.18
9/11/2014	NORMAL	5,666.0	4.84	77.14	5,340.02	214.07	1,712.15	1,725.48	0.00	0.00	0.00	0.00
	NORMAL	5,759.0	3.07	76.25	5,432.79	215.54	1,718.39	1,731.86	1.90	-1.90	-0.96	181.54
	NORMAL	5,853.0	1.93	102.63	5,526.71	215.79	1,722.38	1,735.85	1.69	-1.21	28.06	147.40
	NORMAL	5,947.0	1.50	101.78	5,620.66	215.19	1,725.13	1,738.50	0.46	-0.46	-0.90	182.96
	NORMAL	6,041.0	1.58	123.07	5,714.63	214.23	1,727.42	1,740.65	0.61	0.09	22.65	92.77
	NORMAL	6,134.0	0.87	130.92	5,807.61	213.07	1,729.03	1,742.10	0.78	-0.76	8.44	170.61
	NORMAL	6,228.0	0.78	149.57	5,901.60	212.05	1,729.89	1,742.83	0.30	-0.10	19.84	117.70
	NORMAL	6,322.0	1.01	177.42	5,995.59	210.67	1,730.25	1,743.01	0.52	0.24	29.63	76.53
	NORMAL	6,416.0	0.89	186.39	6,089.58	209.12	1,730.21	1,742.77	0.20	-0.13	9.54	133.33
	NORMAL	6,510.0	1.28	215.65	6,183.56	207.54	1,729.52	1,741.89	0.71	0.41	31.13	70.08
9/12/2014	NORMAL	6,604.0	1.27	219.78	6,277.54	205.89	1,728.24	1,740.41	0.10	-0.01	4.39	98.27
	NORMAL	6,698.0	1.78	211.69	6,371.50	203.84	1,726.80	1,738.73	0.59	0.54	-8.61	333.03
	NORMAL	6,793.0	2.00	213.21	6,466.45	201.20	1,725.12	1,736.73	0.24	0.23	1.60	13.60
	NORMAL	6,887.0	1.93	209.50	6,560.40	198.44	1,723.44	1,734.72	0.15	-0.07	-3.95	239.33
	NORMAL	6,981.0	2.35	207.59	6,654.33	195.36	1,721.77	1,732.67	0.45	0.45	-2.03	349.41

2.1.2 Survey Stations (Continued)

Date	Type	MD (ft)	Inc. (°)	Azi. (°)	TVD (ft)	N/S (ft)	E/W (ft)	V. sec. (ft)	DLS (°/100usft)	Build Rate (°/100usft)	Turn (°/100usft)	Tface (°)
9/12/2014	NORMAL	7,076.0	2.59	206.68	6,749.24	191.71	1,719.90	1,730.36	0.26	0.25	-0.96	350.26
	NORMAL	7,170.0	2.37	204.23	6,843.15	188.04	1,718.15	1,728.16	0.26	-0.23	-2.61	204.51
	NORMAL	7,296.0	2.11	213.63	6,969.06	183.73	1,715.80	1,725.29	0.36	-0.21	7.46	129.92
	NORMAL	7,361.0	2.11	213.63	7,034.01	181.74	✓ 1,714.47	✓ 1,723.72	0.00	0.00	0.00	0.00