

1 General

1.1 Customer Information

Company	PICEANCE VLY
Representative	
Address	

1.2 Well/Wellbore Information

Well	PA 442-21	Wellbore No.	00
Wellbore Legal Name	PA 442-21	Common Wellbore Name	PA 442-21
Project	PA 21-06S-095W	Site	PA 22-21 Pad
Vertical Section Azimuth	84.86 (°)	North reference	True
Origin N/S		Origin E/W	
Spud date	11/21/2013	UWI	PA 442-21
Active datum	KB @6,056.0ft (above Mean Sea Level)		

2 Survey Name

2.1 Survey Name: Survey #1

Survey Name	Survey #1	Company	
Date Started	11/20/2013	Ended	12/5/2013
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)	Build Rate (°/100usft)	Turn (°/100usft)	Tface (°)
11/20/2013	Tie On	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11/21/2013	NORMAL	103.0	0.35	122.78	103.00	-0.17	0.26	0.25	0.34	0.34	0.00	122.78
	NORMAL	132.0	1.23	61.70	132.00	-0.07	0.61	0.60	3.81	3.03	-210.62	282.81
	NORMAL	162.0	1.67	63.19	161.99	0.28	1.29	1.31	1.47	1.47	4.97	5.64
	NORMAL	193.0	2.38	72.77	192.97	0.67	2.30	2.36	2.53	2.29	30.90	30.33
	NORMAL	223.0	2.55	84.90	222.94	0.92	3.56	3.63	1.82	0.57	40.43	78.07
	NORMAL	253.0	2.46	80.51	252.91	1.08	4.86	4.94	0.71	-0.30	-14.63	242.69
	NORMAL	284.0	2.73	83.94	283.88	1.27	6.25	6.34	1.00	0.87	11.06	31.63
	NORMAL	314.0	3.61	84.20	313.83	1.44	7.90	8.00	2.93	2.93	0.87	1.07
	NORMAL	344.0	3.96	82.79	343.77	1.67	9.87	9.98	1.21	1.17	-4.70	344.40
	NORMAL	375.0	4.84	80.86	374.68	2.01	12.23	12.36	2.88	2.84	-6.23	349.49
	NORMAL	405.0	5.54	82.00	404.55	2.41	14.91	15.06	2.36	2.33	3.80	8.95
	NORMAL	436.0	6.33	83.14	435.39	2.82	18.09	18.27	2.58	2.55	3.68	9.05
11/22/2013	NORMAL	505.0	7.47	83.97	503.89	3.75	26.32	26.55	1.66	1.65	1.20	5.41
	NORMAL	596.0	9.49	91.08	593.89	4.23	39.71	39.93	2.50	2.22	7.81	30.98
	NORMAL	687.0	11.39	88.19	683.38	4.37	56.19	56.36	2.17	2.09	-3.18	343.17
	NORMAL	778.0	13.36	89.41	772.26	4.76	75.69	75.81	2.18	2.16	1.34	8.16
	NORMAL	869.0	14.51	88.10	860.58	5.25	97.60	97.67	1.31	1.26	-1.44	344.02
	NORMAL	959.0	15.65	87.31	947.48	6.19	120.99	121.06	1.29	1.27	-0.88	349.40
	NORMAL	1,054.0	17.80	85.81	1,038.46	7.86	148.28	148.38	2.31	2.26	-1.58	347.93
	NORMAL	1,150.0	20.00	82.47	1,129.28	11.08	179.19	179.46	2.55	2.29	-3.48	332.23

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 (°)
11/22/2013	NORMAL	1,245.0	22.99	81.59	1,217.66	15.92	213.66	214.22	3.17	3.15	-0.93	353.43
	NORMAL	1,340.0	24.79	82.56	1,304.52	21.22	251.76	252.65	1.94	1.89	1.02	12.76
	NORMAL	1,436.0	26.73	85.02	1,390.98	25.70	293.23	294.35	2.31	2.02	2.56	29.97
	NORMAL	1,531.0	27.91	84.93	1,475.38	29.52	336.66	337.95	1.24	1.24	-0.09	357.96
	NORMAL	1,626.0	30.37	85.37	1,558.35	33.42	382.76	384.21	2.60	2.59	0.46	5.17
	NORMAL	1,721.0	32.35	85.28	1,639.47	37.45	432.03	433.65	2.08	2.08	-0.09	358.61
11/23/2013	NORMAL	1,817.0	33.89	85.90	1,719.87	41.48	484.32	486.09	1.64	1.60	0.65	12.67
	NORMAL	1,912.0	35.74	85.28	1,797.86	45.66	538.40	540.32	1.98	1.95	-0.65	348.91
	NORMAL	2,007.0	37.32	84.84	1,874.19	50.53	594.73	596.87	1.69	1.66	-0.46	350.41
	NORMAL	2,103.0	38.90	85.11	1,949.73	55.72	653.75	656.12	1.65	1.65	0.28	6.13
	NORMAL	2,198.0	41.80	86.16	2,022.12	60.38	715.08	717.61	3.14	3.05	1.11	13.60
	NORMAL	2,294.0	43.60	86.95	2,092.67	64.28	780.06	782.68	1.96	1.88	0.82	16.87
	NORMAL	2,360.0	43.69	87.13	2,140.43	66.64	825.55	828.20	0.23	0.14	0.27	54.14
11/25/2013	NORMAL	2,484.0	44.97	85.99	2,228.13	71.85	912.04	914.81	1.22	1.03	-0.92	327.69
	NORMAL	2,579.0	43.87	84.14	2,296.98	77.55	978.28	981.29	1.79	-1.16	-1.95	228.99
	NORMAL	2,675.0	44.22	83.61	2,365.99	84.68	1,044.64	1,048.02	0.53	0.36	-0.55	313.34
	NORMAL	2,770.0	44.92	82.65	2,433.66	92.65	1,110.83	1,114.66	1.02	0.74	-1.01	315.75
	NORMAL	2,865.0	43.82	83.00	2,501.57	100.95	1,176.74	1,181.05	1.19	-1.16	0.37	167.58
	NORMAL	2,961.0	43.60	82.30	2,570.97	109.44	1,242.53	1,247.34	0.55	-0.23	-0.73	245.29
	NORMAL	3,056.0	43.60	83.26	2,639.76	117.67	1,307.52	1,312.80	0.70	0.00	1.01	90.35
	NORMAL	3,150.0	43.52	84.76	2,707.88	124.43	1,371.94	1,377.57	1.10	-0.09	1.60	94.97
	NORMAL	3,246.0	43.52	84.14	2,777.50	130.83	1,437.73	1,443.67	0.44	0.00	-0.65	269.78
	NORMAL	3,341.0	43.08	85.20	2,846.63	136.88	1,502.60	1,508.82	0.89	-0.46	1.12	121.57
	NORMAL	3,437.0	43.21	85.20	2,916.68	142.37	1,568.02	1,574.47	0.14	0.14	0.00	0.00
	NORMAL	3,532.0	43.34	85.37	2,985.85	147.73	1,632.92	1,639.59	0.18	0.14	0.18	41.94
	NORMAL	3,627.0	42.46	84.76	3,055.44	153.29	1,697.35	1,704.26	1.02	-0.93	-0.64	205.04
	NORMAL	3,723.0	41.58	85.55	3,126.76	158.72	1,761.38	1,768.52	1.07	-0.92	0.82	149.29
	NORMAL	3,819.0	42.59	84.14	3,198.00	164.51	1,825.46	1,832.86	1.44	1.05	-1.47	316.38
	NORMAL	3,914.0	42.42	84.05	3,268.04	171.11	1,889.31	1,897.04	0.19	-0.18	-0.09	199.65
	NORMAL	4,010.0	43.30	83.00	3,338.41	178.48	1,954.19	1,962.32	1.18	0.92	-1.09	320.55
	NORMAL	4,106.0	42.81	82.82	3,408.56	186.57	2,019.22	2,027.82	0.53	-0.51	-0.19	194.01
	NORMAL	4,201.0	44.00	83.00	3,477.57	194.62	2,084.00	2,093.06	1.26	1.25	0.19	6.00
	NORMAL	4,296.0	43.87	84.23	3,545.99	201.95	2,149.51	2,158.96	0.91	-0.14	1.29	99.10
11/26/2013	NORMAL	4,393.0	43.03	85.55	3,616.41	207.90	2,215.95	2,225.66	1.28	-0.87	1.36	133.26
	NORMAL	4,488.0	43.16	84.76	3,685.78	213.38	2,280.62	2,290.56	0.58	0.14	-0.83	283.25
	NORMAL	4,583.0	42.68	84.05	3,755.35	219.69	2,345.00	2,355.25	0.72	-0.51	-0.75	224.95
	NORMAL	4,679.0	42.15	83.35	3,826.22	226.79	2,409.36	2,419.99	0.74	-0.55	-0.73	221.44
	NORMAL	4,774.0	42.11	83.00	3,896.68	234.37	2,472.64	2,483.69	0.25	-0.04	-0.37	260.20
	NORMAL	4,868.0	42.33	82.12	3,966.29	242.55	2,535.27	2,546.81	0.67	0.23	-0.94	290.08
	NORMAL	4,964.0	41.10	83.88	4,037.95	250.34	2,598.67	2,610.65	1.77	-1.28	1.83	137.06
	NORMAL	5,059.0	39.91	84.84	4,110.19	256.41	2,660.07	2,672.34	1.41	-1.25	1.01	152.71
	NORMAL	5,155.0	38.20	86.34	4,184.73	261.08	2,720.37	2,732.82	2.04	-1.78	1.56	151.65
	NORMAL	5,250.0	36.66	87.04	4,260.17	264.42	2,778.01	2,790.53	1.68	-1.62	0.74	164.83
	NORMAL	5,346.0	34.99	87.31	4,338.01	267.19	2,834.13	2,846.67	1.75	-1.74	0.28	174.70
	NORMAL	5,441.0	33.32	86.16	4,416.62	270.21	2,887.38	2,899.97	1.88	-1.76	-1.21	200.66
	NORMAL	5,537.0	31.65	84.93	4,497.59	274.21	2,938.78	2,951.53	1.87	-1.74	-1.28	201.07
	NORMAL	5,632.0	29.98	84.84	4,579.18	278.54	2,987.25	3,000.19	1.76	-1.76	-0.09	181.54
	NORMAL	5,728.0	28.22	85.81	4,663.06	282.36	3,033.78	3,046.87	1.90	-1.83	1.01	165.42
11/27/2013	NORMAL	5,824.0	25.63	85.64	4,748.65	285.60	3,077.12	3,090.33	2.70	-2.70	-0.18	181.63
	NORMAL	5,919.0	24.44	86.25	4,834.72	288.45	3,117.22	3,130.53	1.28	-1.25	0.64	168.04
	NORMAL	6,015.0	23.30	85.81	4,922.51	291.13	3,155.97	3,169.37	1.20	-1.19	-0.46	188.68
	NORMAL	6,110.0	23.16	86.52	5,009.81	293.64	3,193.36	3,206.83	0.33	-0.15	0.75	116.89
	NORMAL	6,206.0	21.41	84.14	5,098.63	296.57	3,229.64	3,243.22	2.05	-1.82	-2.48	206.18
11/28/2013	NORMAL	6,298.0	20.22	82.82	5,182.76	300.19	3,261.41	3,275.19	1.42	-1.32	-1.47	200.90
	NORMAL	6,392.0	20.26	83.26	5,272.83	304.22	3,294.38	3,308.39	0.16	0.04	0.46	75.48
	NORMAL	6,487.0	20.79	83.44	5,361.80	308.08	3,327.46	3,341.68	0.56	0.56	0.19	6.87

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 (°)
11/28/2013	NORMAL	6,582.0	20.53	81.94	5,450.69	312.34	3,360.71	3,375.17	0.62	-0.27	-1.58	243.14
	NORMAL	6,678.0	19.91	82.30	5,540.77	316.89	3,393.57	3,408.32	0.66	-0.65	0.38	168.82
	NORMAL	6,774.0	18.64	84.84	5,631.39	320.46	3,425.05	3,439.99	1.58	-1.32	2.65	147.76
11/29/2013	NORMAL	6,869.0	17.27	85.55	5,721.76	322.92	3,454.23	3,469.27	1.46	-1.44	0.75	171.26
	NORMAL	6,965.0	17.10	83.70	5,813.48	325.57	3,482.47	3,497.63	0.60	-0.18	-1.93	251.84
	NORMAL	7,061.0	14.86	83.88	5,905.76	328.43	3,508.74	3,524.06	2.33	-2.33	0.19	178.82
11/30/2013	NORMAL	7,154.0	13.28	85.46	5,995.97	330.55	3,531.25	3,546.66	1.75	-1.70	1.70	167.10
	NORMAL	7,250.0	9.54	87.04	6,090.06	331.83	3,550.19	3,565.64	3.91	-3.90	1.65	176.00
	NORMAL	7,344.0	5.80	90.47	6,183.20	332.20	3,562.72	3,578.16	4.01	-3.98	3.65	174.72
12/1/2013	NORMAL	7,440.0	2.55	100.05	6,278.93	331.79	3,569.68	3,585.05	3.45	-3.39	9.98	172.64
	NORMAL	7,536.0	0.83	305.01	6,374.91	331.81	3,571.21	3,586.58	3.46	-1.79	-161.50	186.06
	NORMAL	7,631.0	1.58	304.57	6,469.89	332.95	3,569.57	3,585.05	0.79	0.79	-0.46	359.07
	NORMAL	7,726.0	2.02	295.17	6,564.84	334.40	3,566.98	3,582.59	0.56	0.46	-9.89	321.38
	NORMAL	7,822.0	2.42	281.54	6,660.77	335.53	3,563.46	3,579.19	0.69	0.42	-14.20	300.21
	NORMAL	7,917.0	2.29	275.04	6,755.69	336.10	3,559.60	3,575.40	0.31	-0.14	-6.84	240.82
	NORMAL	8,013.0	2.33	273.28	6,851.61	336.38	3,555.75	3,571.58	0.08	0.04	-1.83	298.54
	NORMAL	8,109.0	2.07	272.93	6,947.54	336.58	3,552.07	3,567.94	0.27	-0.27	-0.36	182.78
	NORMAL	8,204.0	1.45	243.75	7,042.49	336.13	3,549.27	3,565.12	1.13	-0.65	-30.72	221.33
	NORMAL	8,300.0	1.50	262.30	7,138.46	335.43	3,546.94	3,562.73	0.50	0.05	19.32	93.35
12/2/2013	NORMAL	8,397.0	2.64	274.34	7,235.40	335.43	3,543.45	3,559.26	1.25	1.18	12.41	26.97
	NORMAL	8,492.0	0.40	18.22	7,330.37	335.91	3,541.38	3,557.23	2.91	-2.36	109.35	171.92
12/3/2013	NORMAL	8,588.0	0.53	52.59	7,426.36	336.50	3,541.83	3,557.74	0.31	0.14	35.80	82.86
	NORMAL	8,683.0	0.35	79.13	7,521.36	336.82	3,542.47	3,558.40	0.28	-0.19	27.94	144.21
	NORMAL	8,779.0	0.18	122.02	7,617.36	336.79	3,542.88	3,558.81	0.26	-0.18	44.68	150.68
	NORMAL	8,875.0	0.18	252.01	7,713.36	336.67	3,542.87	3,558.78	0.34	0.00	135.41	154.99
	NORMAL	8,970.0	0.18	247.18	7,808.36	336.56	3,542.59	3,558.49	0.02	0.00	-5.08	267.59
	NORMAL	9,065.0	0.26	161.93	7,903.36	336.30	3,542.52	3,558.40	0.32	0.08	-89.74	238.55
	NORMAL	9,161.0	0.44	230.13	7,999.36	335.86	3,542.30	3,558.15	0.44	0.19	71.04	103.30
	NORMAL	9,257.0	0.57	235.23	8,095.35	335.35	3,541.63	3,557.43	0.14	0.14	5.31	21.64
	NORMAL	9,352.0	0.79	218.44	8,190.35	334.57	3,540.83	3,556.57	0.31	0.23	-17.67	309.23
	NORMAL	9,448.0	1.50	227.40	8,286.33	333.20	3,539.49	3,555.11	0.76	0.74	9.33	18.66
	NORMAL	9,543.0	1.80	229.78	8,381.29	331.39	3,537.44	3,552.90	0.32	0.32	2.51	14.06
	NORMAL	9,639.0	2.90	238.74	8,477.20	329.16	3,534.21	3,549.49	1.20	1.15	9.33	22.98
12/4/2013	NORMAL	9,734.0	3.03	244.02	8,572.08	326.81	3,529.90	3,544.99	0.32	0.14	5.56	67.20
	NORMAL	9,830.0	3.30	240.76	8,667.93	324.35	3,525.21	3,540.09	0.34	0.28	-3.40	324.68
	NORMAL	9,890.0	3.60	235.84	8,727.82	322.45	3,522.14	3,536.87	0.70	0.50	-8.20	312.90
	NORMAL	9,940.0	3.60	235.84	8,777.72	320.69	3,519.55	3,534.12	0.00	0.00	0.00	0.00