

## 1 General

### 1.1 Customer Information

Company	PICEANCE VLY
Representative	
Address	

### 1.2 Well/Wellbore Information

Well	PA 441-21	Wellbore No.	00
Wellbore Legal Name	PA 441-21	Common Wellbore Name	PA 441-21
Project	PA 21-06S-095W	Site	PA 22-21 Pad
Vertical Section Azimuth	65.21 (°)	North reference	True
Origin N/S		Origin E/W	
Spud date	12/20/2013	UWI	PA 441-21
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	12/19/2013	Ended	1/1/2014
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)	Buidl Rate (°/100usft)	Turn (°/100usft)	Tface (°)
12/19/2013	Tie On	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12/20/2013	NORMAL	101.0	1.41	39.90	100.99	0.95	0.80	1.12	1.40	1.40	0.00	39.90
	NORMAL	130.0	2.02	50.10	129.98	1.55	1.42	1.94	2.34	2.10	35.17	31.74
	NORMAL	160.0	2.29	73.83	159.96	2.06	2.40	3.04	3.08	0.90	79.10	85.25
	NORMAL	191.0	2.02	88.33	190.93	2.25	3.54	4.16	1.96	-0.87	46.77	123.47
	NORMAL	221.0	2.29	71.72	220.91	2.45	4.64	5.24	2.26	0.90	-55.37	284.93
	NORMAL	251.0	3.08	67.24	250.88	2.95	5.95	6.64	2.72	2.63	-14.93	342.88
	NORMAL	282.0	3.96	67.76	281.82	3.68	7.71	8.54	2.84	2.84	1.68	2.34
	NORMAL	312.0	5.19	63.11	311.73	4.69	9.88	10.93	4.28	4.10	-15.50	340.89
	NORMAL	342.0	6.42	62.93	341.57	6.06	12.58	13.96	4.10	4.10	-0.60	359.06
	NORMAL	372.0	7.74	63.90	371.34	7.71	15.89	17.66	4.42	4.40	3.23	5.66
	NORMAL	403.0	8.89	61.08	402.02	9.79	19.86	22.14	3.93	3.71	-9.10	339.08
	NORMAL	434.0	10.21	64.51	432.59	12.13	24.44	27.27	4.64	4.26	11.06	25.02
	NORMAL	464.0	11.17	64.86	462.06	14.51	29.47	32.84	3.21	3.20	1.17	4.04
	NORMAL	494.0	11.44	65.57	491.48	16.98	34.81	38.72	1.01	0.90	2.37	27.62
	NORMAL	524.0	11.88	66.01	520.86	19.46	40.34	44.78	1.50	1.47	1.47	11.64
	NORMAL	555.0	13.11	66.88	551.13	22.14	46.49	51.49	4.01	3.97	2.81	9.13
	NORMAL	582.0	14.52	65.30	577.35	24.76	52.38	57.93	5.41	5.22	-5.85	344.25
	NORMAL	612.0	14.60	67.50	606.38	27.78	59.29	65.47	1.86	0.27	7.33	82.84
	NORMAL	643.0	15.84	64.34	636.30	31.10	66.71	73.61	4.81	4.00	-10.19	324.68
	NORMAL	673.0	16.89	65.04	665.08	34.71	74.35	82.06	3.56	3.50	2.33	10.97

## 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 (°)
12/20/2013	NORMAL	703.0	17.07	65.65	693.77	38.37	82.32	90.82	0.84	0.60	2.03	44.99
12/21/2013	NORMAL	717.0	17.23	64.88	707.15	40.10	86.07	94.95	1.98	1.14	-5.50	304.80
	NORMAL	777.0	19.16	63.74	764.15	48.23	102.94	113.68	3.27	3.22	-1.90	349.01
	NORMAL	869.0	22.37	63.74	850.16	62.66	132.19	146.28	3.49	3.49	0.00	0.00
	NORMAL	959.0	25.06	62.42	932.55	79.06	164.45	182.45	3.05	2.99	-1.47	348.23
	NORMAL	1,054.0	28.13	64.44	1,017.49	98.04	202.50	224.95	3.37	3.23	2.13	17.32
	NORMAL	1,150.0	31.74	64.88	1,100.67	118.53	245.79	272.84	3.77	3.76	0.46	3.67
	NORMAL	1,245.0	34.73	66.99	1,180.13	139.73	293.33	324.89	3.37	3.15	2.22	22.03
	NORMAL	1,340.0	37.98	67.17	1,256.63	161.65	345.20	381.17	3.42	3.42	0.19	1.95
	NORMAL	1,436.0	39.69	65.59	1,331.40	185.78	400.34	441.35	2.06	1.78	-1.65	329.29
	NORMAL	1,530.0	41.36	64.62	1,402.85	211.50	455.74	502.42	1.90	1.78	-1.03	338.95
12/22/2013	NORMAL	1,643.0	42.20	63.39	1,487.12	244.50	523.40	577.69	1.04	0.74	-1.09	315.25
	NORMAL	1,739.0	41.98	64.53	1,558.36	272.75	581.22	642.02	0.83	-0.23	1.19	106.48
	NORMAL	1,834.0	42.59	63.83	1,628.64	300.59	638.75	705.93	0.81	0.64	-0.74	322.07
	NORMAL	1,929.0	41.32	64.88	1,699.29	328.09	696.00	769.43	1.53	-1.34	1.11	151.46
	NORMAL	2,025.0	41.27	64.97	1,771.42	354.94	753.39	832.78	0.08	-0.05	0.09	130.13
	NORMAL	2,120.0	41.19	64.00	1,842.87	381.91	809.89	895.39	0.68	-0.08	-1.02	262.50
	NORMAL	2,215.0	38.90	64.97	1,915.59	408.24	865.04	956.50	2.50	-2.41	1.02	165.13
	NORMAL	2,311.0	39.56	66.55	1,989.95	433.16	920.40	1,017.21	1.25	0.69	1.65	57.17
	NORMAL	2,406.0	40.35	66.29	2,062.77	457.57	976.31	1,078.20	0.85	0.83	-0.27	347.97
12/23/2013	NORMAL	2,501.0	40.70	65.06	2,134.99	482.99	1,032.56	1,139.93	0.92	0.37	-1.29	293.18
	NORMAL	2,597.0	41.14	65.06	2,207.53	509.51	1,089.58	1,202.81	0.46	0.46	0.00	0.00
	NORMAL	2,692.0	41.36	66.55	2,278.95	535.18	1,146.71	1,265.44	1.06	0.23	1.57	77.94
	NORMAL	2,787.0	40.84	66.73	2,350.54	559.94	1,204.04	1,327.87	0.56	-0.55	0.19	167.25
	NORMAL	2,882.0	39.82	66.55	2,422.96	584.32	1,260.48	1,389.33	1.08	-1.07	-0.19	186.45
	NORMAL	2,978.0	39.96	65.15	2,496.62	609.51	1,316.66	1,450.89	0.95	0.15	-1.46	278.33
	NORMAL	3,073.0	40.66	65.76	2,569.06	635.03	1,372.56	1,512.35	0.85	0.74	0.64	29.64
	NORMAL	3,168.0	39.52	65.76	2,641.74	660.15	1,428.34	1,573.52	1.20	-1.20	0.00	180.00
	NORMAL	3,263.0	41.63	64.62	2,713.90	686.09	1,484.42	1,635.31	2.35	2.22	-1.20	340.20
	NORMAL	3,359.0	41.36	63.30	2,785.80	714.01	1,541.57	1,698.89	0.95	-0.28	-1.38	252.35
	NORMAL	3,454.0	41.49	64.88	2,857.04	741.47	1,598.10	1,761.73	1.11	0.14	1.66	83.50
	NORMAL	3,549.0	41.54	64.00	2,928.17	768.64	1,654.91	1,824.69	0.62	0.05	-0.93	274.57
	NORMAL	3,644.0	41.67	63.39	2,999.21	796.59	1,711.45	1,887.75	0.45	0.14	-0.64	287.57
	NORMAL	3,739.0	40.00	66.03	3,071.09	823.14	1,767.60	1,949.85	2.53	-1.76	2.78	135.04
	NORMAL	3,835.0	39.96	66.20	3,144.65	848.12	1,824.00	2,011.53	0.12	-0.04	0.18	110.18
	NORMAL	3,930.0	41.14	67.17	3,216.83	872.58	1,880.71	2,073.26	1.41	1.24	1.02	28.49
	NORMAL	4,026.0	40.09	66.47	3,289.71	897.15	1,938.16	2,135.73	1.19	-1.09	-0.73	203.19
	NORMAL	4,121.0	41.10	65.94	3,361.84	922.09	1,994.72	2,197.54	1.12	1.06	-0.56	340.95
	NORMAL	4,216.0	40.75	64.53	3,433.62	948.16	2,051.23	2,259.77	1.04	-0.37	-1.48	248.72
	NORMAL	4,311.0	40.84	65.85	3,505.54	974.20	2,107.57	2,321.83	0.91	0.09	1.39	84.54
	NORMAL	4,407.0	40.57	65.67	3,578.32	999.91	2,164.65	2,384.44	0.31	-0.28	-0.19	203.43
	NORMAL	4,502.0	39.91	63.56	3,650.84	1,026.20	2,220.09	2,445.79	1.59	-0.69	-2.22	243.36
12/24/2013	NORMAL	4,597.0	39.74	66.20	3,723.81	1,052.03	2,275.17	2,506.62	1.79	-0.18	2.78	96.75
	NORMAL	4,693.0	39.74	64.97	3,797.63	1,077.40	2,331.05	2,567.99	0.82	0.00	-1.28	269.53
	NORMAL	4,788.0	39.16	63.74	3,870.98	1,103.52	2,385.47	2,628.35	1.02	-0.61	-1.29	232.95
	NORMAL	4,883.0	38.95	63.92	3,944.76	1,129.92	2,439.19	2,688.19	0.25	-0.22	0.19	151.70
	NORMAL	4,978.0	37.93	67.26	4,019.17	1,154.33	2,492.95	2,747.23	2.43	-1.07	3.52	117.46
	NORMAL	5,073.0	36.97	67.52	4,094.59	1,176.54	2,546.27	2,804.95	1.02	-1.01	0.27	170.75
	NORMAL	5,168.0	36.35	67.26	4,170.80	1,198.35	2,598.63	2,861.63	0.67	-0.65	-0.27	193.95
	NORMAL	5,264.0	34.68	65.67	4,248.94	1,220.60	2,649.76	2,917.38	1.99	-1.74	-1.66	208.30
	NORMAL	5,359.0	33.10	65.15	4,327.80	1,242.64	2,697.93	2,970.35	1.69	-1.66	-0.55	190.18
	NORMAL	5,455.0	33.36	64.27	4,408.10	1,265.11	2,745.49	3,022.95	0.57	0.27	-0.92	297.96
	NORMAL	5,551.0	33.85	64.44	4,488.05	1,288.11	2,793.39	3,076.08	0.52	0.51	0.18	10.94
	NORMAL	5,646.0	32.84	66.29	4,567.42	1,309.88	2,840.85	3,128.29	1.51	-1.06	1.95	135.57
	NORMAL	5,742.0	33.06	66.11	4,647.97	1,330.95	2,888.62	3,180.50	0.25	0.23	-0.19	335.93
12/25/2013	NORMAL	5,836.0	31.39	65.32	4,727.49	1,351.56	2,934.31	3,230.62	1.83	-1.78	-0.84	193.82

## 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 (°)
12/25/2013	NORMAL	5,932.0	29.63	65.50	4,810.20	1,371.84	2,978.63	3,279.36	1.84	-1.83	0.19	177.11
	NORMAL	6,027.0	28.04	65.76	4,893.42	1,390.75	3,020.36	3,325.17	1.68	-1.67	0.27	175.60
	NORMAL	6,122.0	26.11	64.71	4,978.00	1,408.85	3,059.63	3,368.41	2.09	-2.03	-1.11	193.44
12/26/2013	NORMAL	6,218.0	25.71	64.62	5,064.35	1,426.80	3,097.54	3,410.35	0.42	-0.42	-0.09	185.57
	NORMAL	6,314.0	24.44	64.09	5,151.30	1,444.40	3,134.22	3,451.03	1.34	-1.32	-0.55	189.79
	NORMAL	6,409.0	22.77	64.00	5,238.35	1,461.05	3,168.42	3,489.06	1.76	-1.76	-0.09	181.20
	NORMAL	6,504.0	22.46	64.88	5,326.05	1,476.81	3,201.38	3,525.59	0.48	-0.33	0.93	132.90
	NORMAL	6,600.0	22.86	64.44	5,414.63	1,492.64	3,234.80	3,562.57	0.45	0.42	-0.46	336.83
	NORMAL	6,696.0	20.84	65.76	5,503.73	1,507.70	3,267.20	3,598.30	2.17	-2.10	1.38	166.94
	NORMAL	6,791.0	19.03	67.08	5,593.04	1,520.67	3,296.88	3,630.68	1.96	-1.91	1.39	166.66
	NORMAL	6,887.0	17.80	67.17	5,684.12	1,532.46	3,324.82	3,660.99	1.28	-1.28	0.09	178.72
	NORMAL	6,983.0	15.52	65.41	5,776.09	1,543.50	3,350.02	3,688.50	2.43	-2.38	-1.83	191.64
	NORMAL	7,078.0	14.59	65.50	5,867.82	1,553.75	3,372.47	3,713.18	0.98	-0.98	0.09	178.60
	NORMAL	7,172.0	13.10	67.34	5,959.09	1,562.77	3,393.07	3,735.66	1.65	-1.59	1.96	164.43
	NORMAL	7,267.0	12.75	66.47	6,051.68	1,571.10	3,412.62	3,756.90	0.42	-0.37	-0.92	208.65
12/27/2013	NORMAL	7,363.0	12.57	67.61	6,145.35	1,579.31	3,431.99	3,777.93	0.32	-0.19	1.19	126.33
	NORMAL	7,459.0	12.57	67.96	6,239.05	1,587.21	3,451.33	3,798.80	0.08	0.00	0.36	90.17
	NORMAL	7,554.0	11.87	71.21	6,331.90	1,594.23	3,470.16	3,818.84	1.03	-0.74	3.42	137.08
	NORMAL	7,650.0	11.25	69.19	6,425.95	1,600.74	3,488.27	3,838.00	0.77	-0.65	-2.10	212.15
	NORMAL	7,745.0	9.41	71.74	6,519.41	1,606.47	3,504.30	3,854.97	2.00	-1.94	2.68	167.30
	NORMAL	7,840.0	8.92	64.36	6,613.20	1,612.09	3,518.32	3,870.05	1.34	-0.52	-7.77	243.76
	NORMAL	7,936.0	7.38	65.94	6,708.22	1,617.82	3,530.66	3,883.65	1.62	-1.60	1.65	172.51
	NORMAL	8,031.0	7.12	66.82	6,802.46	1,622.63	3,541.64	3,895.64	0.30	-0.27	0.93	157.31
12/28/2013	NORMAL	8,127.0	5.80	69.10	6,897.85	1,626.70	3,551.64	3,908.43	1.40	-1.38	2.38	170.13
	NORMAL	8,223.0	5.41	66.91	6,993.39	1,630.20	3,560.34	3,915.79	0.46	-0.41	-2.28	207.66
12/29/2013	NORMAL	8,319.0	4.18	59.44	7,089.06	1,633.76	3,567.52	3,923.80	1.43	-1.28	-7.78	203.23
	NORMAL	8,414.0	3.34	58.56	7,183.85	1,636.96	3,572.86	3,929.99	0.89	-0.88	-0.93	183.49
	NORMAL	8,510.0	2.07	51.26	7,279.74	1,639.51	3,576.60	3,934.45	1.37	-1.32	-7.60	191.55
	NORMAL	8,605.0	2.02	54.95	7,374.68	1,641.54	3,579.31	3,937.76	0.15	-0.05	3.88	112.63
12/31/2013	NORMAL	8,701.0	1.54	63.21	7,470.64	1,643.09	3,581.84	3,940.72	0.57	-0.50	8.60	155.96
	NORMAL	8,796.0	1.19	31.66	7,565.61	1,644.51	3,583.50	3,942.81	0.86	-0.37	-33.21	229.82
	NORMAL	8,892.0	0.83	19.44	7,661.60	1,646.01	3,584.25	3,944.13	0.43	-0.38	-12.73	204.88
	NORMAL	8,987.0	0.53	18.48	7,756.59	1,647.08	3,584.62	3,944.91	0.32	-0.32	-1.01	181.69
	NORMAL	9,083.0	0.26	342.09	7,852.59	1,647.71	3,584.70	3,945.24	0.37	-0.28	-37.91	205.69
	NORMAL	9,179.0	0.40	235.57	7,948.59	1,647.73	3,584.35	3,944.94	0.56	0.15	-110.96	225.74
	NORMAL	9,274.0	0.88	225.37	8,043.58	1,647.03	3,583.56	3,943.92	0.52	0.51	-10.74	341.51
	NORMAL	9,369.0	1.63	215.18	8,138.56	1,645.41	3,582.26	3,942.07	0.82	0.79	-10.73	338.29
	NORMAL	9,465.0	2.11	221.24	8,234.50	1,642.96	3,580.31	3,939.27	0.54	0.50	6.31	25.44
	NORMAL	9,561.0	2.64	220.98	8,330.42	1,639.97	3,577.70	3,935.64	0.55	0.55	-0.27	358.71
	NORMAL	9,656.0	3.08	221.42	8,425.30	1,636.40	3,574.57	3,931.31	0.46	0.46	0.46	3.08
	NORMAL	9,752.0	2.77	229.33	8,521.18	1,632.95	3,571.11	3,926.72	0.53	-0.32	8.24	131.43
	NORMAL	9,847.0	2.42	232.23	8,616.08	1,630.23	3,567.78	3,922.56	0.39	-0.37	3.05	160.88
	NORMAL	9,942.0	2.81	232.23	8,710.98	1,627.57	3,564.35	3,918.33	0.41	0.41	0.00	0.00
	NORMAL	10,038.0	3.08	232.67	8,806.85	1,624.57	3,560.44	3,913.52	0.28	0.28	0.46	5.01
	NORMAL	10,085.0	3.21	233.37	8,853.78	1,623.02	3,558.38	3,911.00	0.29	0.28	1.49	16.81
	NORMAL	10,135.0	3.21	233.37	8,903.71	1,621.35	3,556.14	3,908.26	0.00	0.00	0.00	0.00