Company Name: Jay-Bee Oil & Gas Happy #5 Tyler County Rig: Nomac #81 Created By: Will Jircik Date: 3/27/2017	Happy #5 Tyler County Q170336 & AM-170277 Design #1	PROJECT DETAILS: Tyler County Geodetic System: US State Plane 1983 Datum: North American Datum 1983 Ellipsoid: GRS 1980 Zone: West Virginia Northern Zone System Datum: Mean Sea Level

WELL DETAILS: Happy #5

+N/-S	+E/-W	Northing	Easting	Ground Level: 1253.0 Latitude	Longitude
0.0	0.0	355713.26	1615405.50	39° 28' 11.546 N	80° 45' 2.918 W

05/03/2019

QES DIRECTIONAL DRILLING

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Happy #5 - plan hits target center	7067.6	5883.6	-1627.4	361598.66	1613778.10	39° 29' 9.468 N	80° 45' 24.717 W

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
5995.7	0.45	273.31	5993.2	31.5	-109.8	59.6	120.9	Gyro Tie-In @ 5995.6' MD / 5993.1 TVD
12853.0	90.20	343.70	7051.9	5881.8	-1634.3	6104.6	6186.0	TD @ 12853' MD / 7052' TVD

RECEIVED
Office of Oil and Gas
MAR 04 2019
WV Department of
Environmental Protection

05/03/2019

Jay-Bee Oil & Gas

Tyler County
Happy Pad
Happy #5

Wellbore #1

Survey: MWD Surveys

QES Survey Report

27 March, 2017

QES DIRECTIONAL DRILLING

05/03/2019

Quintana Energy Services
11390 FM 830
Willis, TX 77318
Phone: (936) 856-4332
Fax: (936) 856-8678

Survey Certification Sheet

Company	Job Number	Date
Jay-Bee Oil & Gas, Inc.	AM-170227	3/27/2017

Lease	Well Name	County & State
Jack Hair et al	Happy #5	Tyler County, WV

API No.	Survey Depth Range	Survey Type
47-095-22229	5995.7 feet to 12853 feet MD	MWD

Sidetrack Information	Directional Supervisor/Surveyor
N/A	Steve Spicer

Certification Statement

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by Quintana Energy Services (QES). This report represents a true and correct directional survey of this well based on the original data obtained at the well site. Wellbore coordinates are calculated using minimum curvature.

Christopher Hughes

Digitally signed by Christopher Hughes
DN: cn=Christopher Hughes, o=QES, ou=compliance, email=chrish@qeslp.com, c=US
Date: 2017.03.29 09:40:03 -05'00'

Christopher Hughes
MWD Compliance Manager
Quintana Energy Services

Survey Report

Company:	Jay-Bee Oil & Gas	**Local Co-ordinate Reference:**	Well Happy #5
Project:	Tyler County	**TVD Reference:**	Well @ 1274.1usft (Nomac #81)
Site:	Happy Pad	**MD Reference:**	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Project	Tyler County		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	West Virginia Northern Zone		

Site	Happy Pad				
Site Position:		**Northing:**	355,679.62 usft	**Latitude:**	39° 28' 11.215 N
From:	Map	**Easting:**	1,615,403.34 usft	**Longitude:**	80° 45' 2.938 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.80 °

Well	Happy #5					
Well Position	**+N/-S**	0.0 usft	**Northing:**	355,713.08 usft	**Latitude:**	39° 28' 11.546 N
	+E/-W	0.0 usft	**Easting:**	1,615,405.50 usft	**Longitude:**	80° 45' 2.916 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	1,253.5 usft

Wellbore	Wellbore #1			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	3/10/2017	-8.58	66.74	52,049

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	344.54	

Survey Program **Date** 3/27/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
20.6	5,995.6	Gyro (Wellbore #1)	Good_gyro	Good Gyro
6,019.0	12,853.0	MWD Surveys (Wellbore #1)	MWD default	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)
5,995.6	0.45	273.31	5,993.1	31.5	-109.8	59.6	0.00	0.00	0.00
Gyro Tie-In @ 5995.6' MD / 5993.1 TVD									
5,995.7	0.45	273.31	5,993.2	31.5	-109.8	59.6	0.00	0.00	0.00
6,019.0	0.40	284.20	6,016.5	31.5	-110.0	59.7	0.41	-0.21	46.74
6,113.0	0.40	269.90	6,110.5	31.6	-110.6	59.9	0.11	0.00	-15.21
6,208.0	0.40	242.10	6,205.5	31.4	-111.3	59.9	0.20	0.00	-29.26
6,303.0	0.30	229.70	6,300.5	31.1	-111.8	59.8	0.13	-0.11	-13.05
6,335.0	0.30	233.00	6,332.5	31.0	-111.9	59.7	0.05	0.00	10.31
6,366.0	0.30	266.40	6,363.5	30.9	-112.0	59.7	0.56	0.00	107.74
6,398.0	1.80	327.30	6,395.5	31.4	-112.4	60.2	5.23	4.69	190.31

Survey Report

Company:	Jay-Bee Oil & Gas	**Local Co-ordinate Reference:**	Well Happy #5
Project:	Tyler County	**TVD Reference:**	Well @ 1274.1usft (Nomac #81)
Site:	Happy Pad	**MD Reference:**	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

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)
6,430.0	4.10	335.60	6,427.5	32.8	-113.1	61.8	7.29	7.19	25.94
6,461.0	6.90	338.60	6,458.3	35.6	-114.3	64.7	9.08	9.03	9.68
6,493.0	9.20	340.40	6,490.0	39.8	-115.8	69.2	7.23	7.19	5.63
6,524.0	11.50	343.30	6,520.5	45.1	-117.5	74.8	7.61	7.42	9.35
6,556.0	13.60	343.30	6,551.7	51.7	-119.5	81.7	6.56	6.56	0.00
6,588.0	15.80	344.70	6,582.7	59.5	-121.8	89.8	6.96	6.88	4.38
6,619.0	17.80	345.80	6,612.4	68.2	-124.1	98.8	6.53	6.45	3.55
6,651.0	19.40	345.70	6,642.7	78.1	-126.6	109.0	5.00	5.00	-0.31
6,683.0	21.00	345.80	6,672.7	88.8	-129.3	120.0	5.00	5.00	0.31
6,714.0	22.90	346.60	6,701.5	100.0	-132.0	131.6	6.20	6.13	2.58
6,746.0	24.70	346.90	6,730.8	112.6	-135.0	144.5	5.64	5.63	0.94
6,777.0	26.60	347.40	6,758.7	125.7	-138.0	157.9	6.17	6.13	1.61
6,821.0	30.20	349.40	6,797.4	146.2	-142.2	178.8	8.46	8.18	4.55
6,868.0	36.70	350.90	6,836.6	171.7	-146.6	204.6	13.94	13.83	3.19
6,915.0	44.80	352.50	6,872.2	202.0	-151.0	235.0	17.38	17.23	3.40
6,963.0	49.60	353.90	6,904.8	237.0	-155.1	269.8	10.23	10.00	2.92
7,010.0	53.90	354.80	6,933.9	273.7	-158.7	306.1	9.27	9.15	1.91
7,058.0	56.60	354.70	6,961.2	313.0	-162.3	344.9	5.63	5.63	-0.21
7,105.0	58.90	356.80	6,986.3	352.6	-165.3	383.9	6.18	4.89	4.47
7,153.0	65.40	358.10	7,008.7	395.0	-167.2	425.3	13.75	13.54	2.71
7,200.0	70.70	358.80	7,026.3	438.6	-168.3	467.6	11.36	11.28	1.49
7,248.0	77.60	358.50	7,039.4	484.7	-169.4	512.3	14.39	14.38	-0.63
7,295.0	83.10	357.90	7,047.3	531.0	-170.9	557.3	11.77	11.70	-1.28
7,343.0	87.20	357.80	7,051.3	578.8	-172.7	603.9	8.54	8.54	-0.21
7,390.0	90.20	357.90	7,052.4	625.7	-174.4	649.6	6.39	6.38	0.21
7,437.0	89.60	358.00	7,052.5	672.7	-176.1	695.3	1.29	-1.28	0.21
7,532.0	87.60	354.80	7,054.8	767.5	-182.1	788.2	3.97	-2.11	-3.37
7,627.0	87.60	350.60	7,058.8	861.6	-194.1	882.2	4.42	0.00	-4.42
7,722.0	88.40	348.20	7,062.1	954.9	-211.6	976.8	2.66	0.84	-2.53
7,817.0	88.90	344.00	7,064.3	1,047.1	-234.4	1,071.7	4.45	0.53	-4.42
7,912.0	93.70	346.60	7,062.2	1,138.9	-258.5	1,166.6	5.75	5.05	2.74
8,007.0	93.20	346.20	7,056.4	1,231.1	-280.8	1,261.4	0.67	-0.53	-0.42
8,102.0	90.70	345.50	7,053.2	1,323.1	-304.0	1,356.3	2.73	-2.63	-0.74
8,197.0	90.60	346.20	7,052.1	1,415.2	-327.2	1,451.3	0.74	-0.11	0.74
8,292.0	90.50	346.30	7,051.2	1,507.5	-349.8	1,546.2	0.15	-0.11	0.11
8,386.0	89.40	344.20	7,051.3	1,598.4	-373.7	1,640.2	2.52	-1.17	-2.23
8,481.0	88.60	344.70	7,053.0	1,689.9	-399.2	1,735.2	0.99	-0.84	0.53
8,576.0	88.70	343.30	7,055.2	1,781.2	-425.4	1,830.2	1.48	0.11	-1.47
8,671.0	90.20	342.80	7,056.1	1,872.1	-453.1	1,925.1	1.66	1.58	-0.53
8,766.0	89.80	342.20	7,056.1	1,962.7	-481.6	2,020.1	0.76	-0.42	-0.63
8,861.0	89.80	342.90	7,056.4	2,053.3	-510.1	2,115.0	0.74	0.00	0.74
8,955.0	89.30	342.90	7,057.2	2,143.2	-537.8	2,209.0	0.53	-0.53	0.00
9,050.0	88.80	342.60	7,058.8	2,233.9	-565.9	2,303.9	0.61	-0.53	-0.32

Survey Report

Company:	Jay-Bee Oil & Gas	**Local Co-ordinate Reference:**	Well Happy #5
Project:	Tyler County	**TVD Reference:**	Well @ 1274.1usft (Nomac #81)
Site:	Happy Pad	**MD Reference:**	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

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)
9,145.0	89.70	343.60	7,060.0	2,324.8	-593.5	2,398.9	1.42	0.95	1.05
9,240.0	90.60	343.00	7,059.8	2,415.7	-620.8	2,493.8	1.14	0.95	-0.63
9,335.0	90.10	341.60	7,059.2	2,506.2	-649.7	2,588.8	1.56	-0.53	-1.47
9,429.0	90.90	342.60	7,058.4	2,595.7	-678.6	2,682.7	1.36	0.85	1.06
9,524.0	90.80	343.80	7,056.9	2,686.6	-706.1	2,777.6	1.27	-0.11	1.26
9,619.0	90.80	344.70	7,055.6	2,778.0	-731.9	2,872.6	0.95	0.00	0.95
9,714.0	89.90	344.80	7,055.0	2,869.7	-756.8	2,967.6	0.95	-0.95	0.11
9,809.0	89.40	346.70	7,055.6	2,961.8	-780.2	3,062.6	2.07	-0.53	2.00
9,904.0	88.30	342.10	7,057.5	3,053.2	-805.8	3,157.5	4.98	-1.16	-4.84
9,999.0	90.50	345.30	7,058.5	3,144.4	-832.4	3,252.5	4.09	2.32	3.37
10,093.0	90.50	346.00	7,057.7	3,235.4	-855.7	3,346.5	0.74	0.00	0.74
10,188.0	90.10	345.10	7,057.2	3,327.4	-879.4	3,441.5	1.04	-0.42	-0.95
10,283.0	89.80	345.10	7,057.3	3,419.2	-903.8	3,536.5	0.32	-0.32	0.00
10,378.0	89.80	345.60	7,057.6	3,511.2	-927.9	3,631.4	0.53	0.00	0.53
10,473.0	90.90	349.00	7,057.0	3,603.8	-948.8	3,726.3	3.76	1.16	3.58
10,567.0	89.90	345.60	7,056.4	3,695.5	-969.4	3,820.2	3.77	-1.06	-3.62
10,662.0	89.80	343.80	7,056.6	3,787.1	-994.5	3,915.2	1.90	-0.11	-1.89
10,756.0	90.70	344.20	7,056.2	3,877.5	-1,020.4	4,009.2	1.05	0.96	0.43
10,851.0	89.90	340.90	7,055.7	3,968.1	-1,048.9	4,104.1	3.57	-0.84	-3.47
10,945.0	90.50	341.30	7,055.4	4,057.0	-1,079.3	4,197.9	0.77	0.64	0.43
11,040.0	90.50	340.30	7,054.6	4,146.7	-1,110.6	4,292.7	1.05	0.00	-1.05
11,135.0	90.40	344.00	7,053.8	4,237.1	-1,139.7	4,387.6	3.90	-0.11	3.89
11,230.0	89.50	342.80	7,053.9	4,328.2	-1,166.8	4,482.6	1.58	-0.95	-1.26
11,325.0	89.70	347.10	7,054.6	4,419.9	-1,191.5	4,577.6	4.53	0.21	4.53
11,420.0	89.80	344.50	7,055.0	4,512.0	-1,214.8	4,672.6	2.74	0.11	-2.74
11,515.0	90.30	343.60	7,054.9	4,603.3	-1,240.9	4,767.5	1.08	0.53	-0.95
11,609.0	90.80	344.70	7,054.0	4,693.8	-1,266.6	4,861.5	1.29	0.53	1.17
11,704.0	89.80	344.00	7,053.5	4,785.2	-1,292.2	4,956.5	1.28	-1.05	-0.74
11,798.0	91.30	342.30	7,052.6	4,875.2	-1,319.4	5,050.5	2.41	1.60	-1.81
11,893.0	91.10	341.30	7,050.6	4,965.4	-1,349.1	5,145.4	1.07	-0.21	-1.05
11,987.0	90.90	342.70	7,049.0	5,054.8	-1,378.1	5,239.3	1.50	-0.21	1.49
12,083.0	89.10	341.10	7,049.0	5,146.0	-1,408.0	5,335.1	2.51	-1.88	-1.67
12,178.0	89.10	341.60	7,050.5	5,236.0	-1,438.3	5,430.0	0.53	0.00	0.53
12,272.0	89.10	340.90	7,051.9	5,325.0	-1,468.5	5,523.8	0.74	0.00	-0.74
12,367.0	89.50	342.20	7,053.1	5,415.1	-1,498.6	5,618.7	1.43	0.42	1.37
12,462.0	90.30	343.80	7,053.3	5,506.0	-1,526.4	5,713.6	1.88	0.84	1.68
12,557.0	89.50	342.60	7,053.4	5,596.9	-1,553.8	5,808.6	1.52	-0.84	-1.26
12,651.0	90.40	344.70	7,053.5	5,687.1	-1,580.3	5,902.6	2.43	0.96	2.23
12,746.0	90.70	345.10	7,052.6	5,778.8	-1,605.0	5,997.6	0.53	0.32	0.42
12,811.0	90.20	343.70	7,052.1	5,841.4	-1,622.5	6,062.6	2.29	-0.77	-2.15
TD @ 12853' MD / 7052' TVD									
12,853.0	90.20	343.70	7,051.9	5,881.8	-1,634.3	6,104.6	0.00	0.00	0.00

Survey Report

Company:	Jay-Bee Oil & Gas	**Local Co-ordinate Reference:**	Well Happy #5
Project:	Tyler County	**TVD Reference:**	Well @ 1274.1usft (Nomac #81)
Site:	Happy Pad	**MD Reference:**	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5,995.7	5,993.2	31.5	-109.8	Gyro Tie-In @ 5995.6' MD / 5993.1 TVD
12,853.0	7,051.9	5,881.8	-1,634.3	TD @ 12853' MD / 7052' TVD

Checked By: _____ Approved By: _____ Date: _____