



Jay-Bee Oil & Gas

Tyler County
Happy Pad
Happy #5A

Wellbore #1

Survey: MWD Survey

QES Survey Report

13 April, 2017



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-170338	4/13/2017

Lease	Well Name	County & State
N/A	Happy #5A	Tyler County, WV

API No.	Survey Depth Range	Survey Type
47-095-02230	5920.6 feet to 13495 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: 2017.04.13 11:25:16 -05'00'

Christopher Hughes
 MWD Compliance Manager
 Quintana Energy Services



Survey Report

05/03/2019



Company:	Jay-Bee Oil & Gas	Local Co-ordinate Reference:	Well Happy #5A
Project:	Tyler County	TVD Reference:	Well @ 1274.1usft (Nomac #81)
Site:	Happy Pad	MD Reference:	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5A	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 #5A					
Well Position	+N/-S	0.0 usft	Northing:	355,725.88 usft	Latitude:	39° 28' 11.674 N
	+E/-W	0.0 usft	Easting:	1,615,413.30 usft	Longitude:	80° 45' 2.819 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	3/27/2017	-8.58	66.73	52,043

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	351.57	

Survey Program	Date 4/13/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
20.6	5,920.0	Gyro (Wellbore #1)	Good_gyro	Good Gyro
5,963.0	13,495.0	MWD Survey (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)	
Gyro Tie-in @ 5921' MD / 5917' TVD										
5,920.6	0.46	293.15	5,917.3	70.2	51.6	61.9	0.00	0.00	0.00	
5,963.0	0.70	284.50	5,959.7	70.3	51.2	62.1	0.60	0.57	-20.40	
6,011.0	0.60	304.10	6,007.7	70.5	50.7	62.3	0.50	-0.21	40.83	
6,058.0	2.90	82.40	6,054.7	70.8	51.7	62.5	7.17	4.89	294.26	
6,106.0	6.40	87.20	6,102.5	71.1	55.6	62.2	7.33	7.29	10.00	
6,153.0	9.80	87.30	6,149.1	71.4	62.2	61.5	7.23	7.23	0.21	
6,201.0	13.20	86.00	6,196.1	72.0	71.7	60.7	7.10	7.08	-2.71	
6,248.0	17.40	87.10	6,241.4	72.7	84.1	59.6	8.96	8.94	2.34	
6,296.0	20.80	89.50	6,286.8	73.2	99.8	57.8	7.27	7.08	5.00	



Survey Report

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Site:	Happy Pad	MD Reference:	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5A	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)
6,343.0	25.00	92.70	6,330.1	72.8	118.1	54.7	9.32	8.94	6.81
6,391.0	28.80	94.90	6,372.9	71.3	139.7	50.1	8.18	7.92	4.58
6,438.0	33.10	97.20	6,413.2	68.7	163.8	44.0	9.49	9.15	4.89
6,485.0	38.10	99.40	6,451.4	64.8	190.8	36.1	10.98	10.64	4.68
6,532.0	43.60	100.80	6,486.9	59.4	221.1	26.3	11.86	11.70	2.98
6,580.0	48.80	103.40	6,520.1	52.1	254.9	14.1	11.52	10.83	5.42
6,627.0	54.50	104.50	6,549.3	43.2	290.7	0.1	12.27	12.13	2.34
6,674.0	59.60	105.60	6,574.8	32.9	328.7	-15.6	11.03	10.85	2.34
6,721.0	61.50	99.40	6,598.0	24.1	368.7	-30.2	12.18	4.04	-13.19
6,769.0	61.90	93.90	6,620.7	19.2	410.6	-41.2	10.12	0.83	-11.46
6,816.0	61.70	87.60	6,642.9	18.7	452.0	-47.8	11.82	-0.43	-13.40
6,864.0	61.50	82.30	6,665.8	22.4	494.0	-50.3	9.72	-0.42	-11.04
6,911.0	61.10	78.00	6,688.4	29.4	534.6	-49.3	8.07	-0.85	-9.15
6,959.0	60.60	74.00	6,711.8	39.5	575.3	-45.2	7.35	-1.04	-8.33
7,006.0	59.70	69.80	6,735.2	52.2	614.0	-38.4	7.98	-1.91	-8.94
7,054.0	58.90	65.60	6,759.7	67.9	652.2	-28.5	7.71	-1.67	-8.75
7,101.0	58.40	60.50	6,784.1	86.0	688.0	-15.8	9.33	-1.06	-10.85
7,149.0	58.60	54.60	6,809.2	108.0	722.5	0.9	10.49	0.42	-12.29
7,196.0	59.30	48.80	6,833.5	132.9	754.1	20.9	10.68	1.49	-12.34
7,244.0	59.90	43.90	6,857.8	161.5	784.0	44.8	8.89	1.25	-10.21
7,291.0	60.50	37.70	6,881.2	192.3	810.6	71.4	11.52	1.28	-13.19
7,339.0	62.20	31.60	6,904.2	227.0	834.6	102.2	11.70	3.54	-12.71
7,386.0	63.90	26.10	6,925.5	263.7	854.7	135.5	11.04	3.62	-11.70
7,433.0	65.20	20.10	6,945.7	302.7	871.4	171.7	11.85	2.77	-12.77
7,480.0	67.00	14.20	6,964.8	343.7	884.0	210.4	12.10	3.83	-12.55
7,528.0	69.20	9.70	6,982.7	387.3	893.2	252.1	9.83	4.58	-9.38
7,575.0	71.80	4.70	6,998.4	431.2	898.8	294.8	11.45	5.53	-10.64
7,623.0	73.50	0.60	7,012.7	477.0	900.9	339.7	8.89	3.54	-8.54
7,670.0	75.20	356.70	7,025.4	522.2	899.8	384.6	8.77	3.62	-8.30
7,718.0	80.20	353.00	7,035.6	568.9	895.6	431.4	12.85	10.42	-7.71
7,765.0	85.40	349.60	7,041.5	615.0	888.5	478.0	13.19	11.06	-7.23
7,813.0	88.00	346.20	7,044.3	661.8	878.5	525.9	8.91	5.42	-7.08
7,860.0	89.80	344.00	7,045.2	707.2	866.4	572.5	6.05	3.83	-4.68
7,907.0	90.20	343.40	7,045.2	752.3	853.2	619.1	1.53	0.85	-1.28
8,002.0	89.40	340.80	7,045.5	842.7	824.0	712.8	2.86	-0.84	-2.74
8,097.0	89.60	341.10	7,046.3	932.5	793.0	805.2	0.38	0.21	0.32
8,192.0	89.60	339.80	7,047.0	1,022.0	761.2	899.4	1.37	0.00	-1.37
8,286.0	88.20	340.60	7,048.8	1,110.4	729.4	991.5	1.72	-1.49	0.85
8,381.0	89.00	340.20	7,051.1	1,199.9	697.5	1,084.7	0.94	0.84	-0.42
8,475.0	90.60	340.50	7,051.4	1,288.4	665.9	1,176.9	1.73	1.70	0.32
8,570.0	89.10	340.10	7,051.7	1,377.9	633.9	1,270.1	1.63	-1.58	-0.42
8,664.0	89.80	339.30	7,052.6	1,466.0	601.3	1,362.0	1.13	0.74	-0.85
8,759.0	90.80	338.40	7,052.1	1,554.6	567.0	1,454.7	1.42	1.05	-0.95



Survey Report

Company:	Jay-Bee Oil & Gas	Local Co-ordinate Reference:	Well Happy #5A
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Site:	Happy Pad	MD Reference:	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5A	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)	
8,853.0	89.50	340.00	7,051.9	1,642.5	533.6	1,546.5	2.19	-1.38	1.70	
8,947.0	88.10	340.80	7,053.8	1,731.0	502.1	1,638.7	1.72	-1.49	0.85	
9,042.0	88.60	340.20	7,056.6	1,820.5	470.4	1,731.9	0.82	0.53	-0.63	
9,137.0	90.20	344.10	7,057.5	1,910.9	441.3	1,825.6	4.44	1.68	4.11	
9,232.0	91.90	345.80	7,055.8	2,002.7	416.6	1,919.9	2.53	1.79	1.79	
9,327.0	90.70	344.00	7,053.7	2,094.3	391.9	2,014.3	2.28	-1.26	-1.89	
9,422.0	89.60	343.60	7,053.4	2,185.6	365.4	2,108.4	1.23	-1.16	-0.42	
9,516.0	90.10	343.40	7,053.7	2,275.7	338.7	2,201.5	0.57	0.53	-0.21	
9,611.0	88.60	342.50	7,054.7	2,366.5	310.8	2,295.4	1.84	-1.58	-0.95	
9,706.0	88.80	341.40	7,056.9	2,456.8	281.4	2,389.0	1.18	0.21	-1.16	
9,800.0	89.50	340.40	7,058.3	2,545.6	250.6	2,481.4	1.30	0.74	-1.06	
9,895.0	89.50	338.20	7,059.1	2,634.5	217.1	2,574.2	2.32	0.00	-2.32	
9,990.0	91.30	340.50	7,058.4	2,723.4	183.6	2,667.0	3.07	1.89	2.42	
10,084.0	90.90	340.70	7,056.6	2,812.0	152.4	2,759.3	0.48	-0.43	0.21	
10,179.0	90.30	342.40	7,055.6	2,902.1	122.3	2,852.8	1.90	-0.63	1.79	
10,274.0	88.70	343.20	7,056.5	2,992.9	94.2	2,946.7	1.88	-1.68	0.84	
10,368.0	89.00	341.60	7,058.4	3,082.4	65.8	3,039.5	1.73	0.32	-1.70	
10,463.0	89.60	340.30	7,059.5	3,172.2	34.8	3,132.9	1.51	0.63	-1.37	
10,558.0	90.40	338.60	7,059.5	3,261.2	1.4	3,225.7	1.98	0.84	-1.79	
10,653.0	89.50	340.50	7,059.6	3,350.2	-31.8	3,318.7	2.21	-0.95	2.00	
10,748.0	89.90	343.40	7,060.1	3,440.5	-61.2	3,412.3	3.08	0.42	3.05	
10,843.0	90.20	342.60	7,060.0	3,531.4	-89.0	3,506.2	0.90	0.32	-0.84	
10,937.0	89.80	339.30	7,060.0	3,620.2	-119.6	3,598.6	3.54	-0.43	-3.51	
11,032.0	90.30	342.60	7,059.9	3,710.0	-150.6	3,692.0	3.51	0.53	3.47	
11,127.0	90.30	344.60	7,059.4	3,801.1	-177.5	3,786.1	2.11	0.00	2.11	
11,222.0	90.80	343.40	7,058.5	3,892.4	-203.6	3,880.2	1.37	0.53	-1.26	
11,317.0	89.20	344.10	7,058.5	3,983.6	-230.2	3,974.3	1.84	-1.68	0.74	
11,412.0	89.40	343.30	7,059.7	4,074.8	-256.9	4,068.4	0.87	0.21	-0.84	
11,507.0	89.30	340.10	7,060.8	4,165.0	-286.7	4,162.0	3.37	-0.11	-3.37	
11,602.0	90.00	338.90	7,061.3	4,254.0	-320.0	4,254.9	1.46	0.74	-1.26	
11,697.0	90.60	344.40	7,060.8	4,344.1	-349.9	4,348.4	5.82	0.63	5.79	
11,792.0	90.60	343.90	7,059.9	4,435.5	-375.8	4,442.6	0.53	0.00	-0.53	
11,887.0	88.80	343.60	7,060.4	4,526.7	-402.4	4,538.8	1.92	-1.89	-0.32	
11,982.0	89.70	343.60	7,061.6	4,617.8	-429.2	4,630.8	0.95	0.95	0.00	
12,076.0	90.90	343.80	7,061.1	4,708.0	-455.6	4,723.9	1.29	1.28	0.21	
12,171.0	89.10	342.10	7,061.1	4,798.8	-483.5	4,817.9	2.61	-1.89	-1.79	
12,266.0	90.90	344.20	7,061.1	4,889.7	-511.0	4,911.8	2.91	1.89	2.21	
12,360.0	90.50	344.40	7,060.0	4,980.2	-536.4	5,005.1	0.48	-0.43	0.21	
12,455.0	89.10	342.90	7,060.3	5,071.4	-563.2	5,099.2	2.16	-1.47	-1.58	
12,550.0	87.10	341.40	7,063.4	5,161.8	-592.3	5,192.8	2.63	-2.11	-1.58	
12,645.0	87.70	342.00	7,067.7	5,251.9	-622.1	5,286.3	0.89	0.63	0.63	
12,740.0	87.90	339.60	7,071.4	5,341.5	-653.3	5,379.6	2.53	0.21	-2.53	
12,835.0	91.00	340.70	7,072.3	5,430.8	-685.5	5,472.7	3.46	3.26	1.16	



Survey Report



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Site:	Happy Pad	MD Reference:	Well @ 1274.1usft (Nomac #81)
Well:	Happy #5A	North Reference:	Grid
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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)	
12,930.0	92.20	341.50	7,069.7	5,520.7	-716.3	5,566.0	1.52	1.26	0.84	
13,024.0	90.50	339.80	7,067.4	5,609.3	-747.4	5,658.3	2.56	-1.81	-1.81	
13,119.0	91.40	338.90	7,065.9	5,698.2	-780.9	5,751.1	1.34	0.95	-0.95	
13,214.0	90.90	338.90	7,064.0	5,786.8	-815.1	5,843.8	0.53	-0.53	0.00	
13,309.0	90.10	337.60	7,063.1	5,875.1	-850.3	5,936.2	1.61	-0.84	-1.37	
13,404.0	90.60	338.90	7,062.5	5,963.3	-885.5	6,028.7	1.47	0.53	1.37	
13,437.0	90.70	338.70	7,062.2	5,994.1	-897.5	6,060.9	0.68	0.30	-0.61	
TD @ 13495' MD / 7062' TVD										
13,495.0	90.70	338.70	7,061.5	6,048.1	-918.5	6,117.4	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
5,920.6	5,917.3	70.2	51.6	Gyro Tie-in @ 5921' MD / 5917' TVD	
13,495.0	7,061.5	6,048.1	-918.5	TD @ 13495' MD / 7062' TVD	

Checked By: _____ Approved By: _____ Date: _____

Company Name: Jay-Bee Oil & Gas
 Happy #5A
 Tyler County
 Rig: Nomic #81
 Created By: Will Jirck
 Date: 4/13/2017

Happy #5A
 Tyler County
 Q170406 & AM-170338
 Design #2

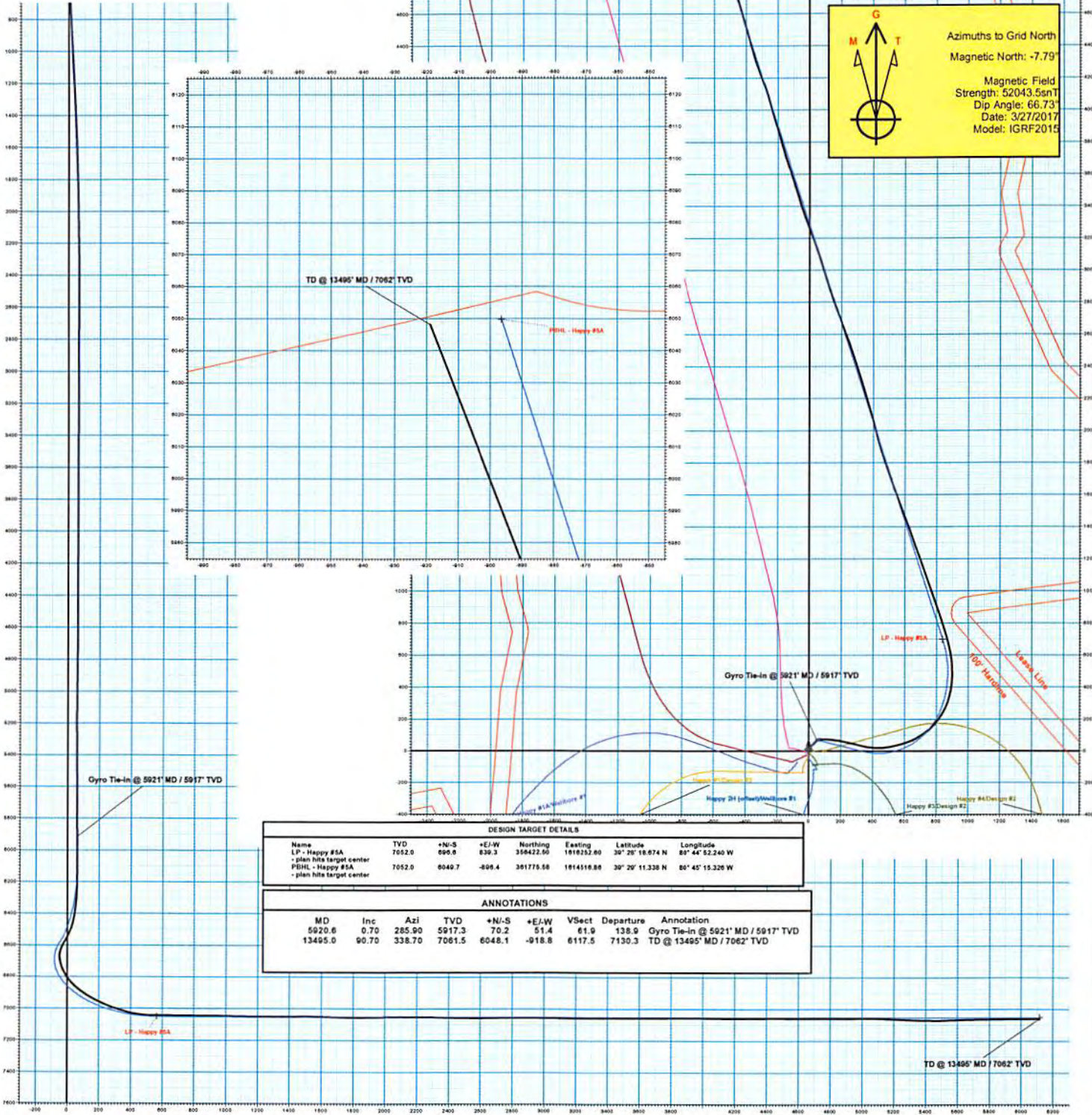
PROJECT DETAILS: Tyler County

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 #5A

Ground Level: 1253.5
 Northing: 358725.66
 Easting: 1815413.30
 Latitude: 39° 28' 11.874 N
 Longitude: 80° 45' 2.818 W

05/03/2019



G
M ↑ **T**
 Azimuths to Grid North
 Magnetic North: -7.79'
 Magnetic Field Strength: 52043.5nT
 Dip Angle: 66.73'
 Date: 3/27/2017
 Model: IGRF2015

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
LP - Happy #5A - plan hita target center	7052.0	699.8	836.3	358422.66	1818252.60	39° 28' 18.874 N	80° 44' 52.240 W
PBHL - Happy #5A - plan hita target center	7052.0	6040.7	-808.4	361775.58	1814516.84	39° 20' 11.338 N	80° 45' 15.326 W

ANNOTATIONS								
MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation
5920.6	0.70	285.90	5917.3	79.2	51.4	61.9	138.9	Gyro Tie-in @ 5921' MD / 5917' TVD
13495.0	90.70	338.70	7061.5	6048.1	-018.8	6117.5	7130.3	TD @ 13495' MD / 7062' TVD

Vertical Section at 351.57" (200 usf/in)