



GASTAR EXPLORATION USA, INC.

Location: Wetzel County, WV
 Field: Wetzel
 Facility: Lackawanna Pad

Wellbore: Lackawanna 2H (PWB)

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02/16/2018

Production depths (Lackawanna Unit 2H Block 0)	Grid System: NAD83 (1717) Zone 17 UTM Meters
True vertical depths are referenced to Mean Horn 777 (RKH)	** Wellbore was benchmarked from adjacent gasline datum.
Measured depths are referenced to Mean Horn 777 (RKH)	North Reference Grid north
Mean Horn 777 (RKH) to Mean Sea Level: 1322 feet	Scale: True surface
Mean Sea Level to Mean Sea Level: 1322 feet	Depth is in feet
Coordinates as linked referenced to NAD	Created by: cadwin on 2017/02/10
	Database: WVA_GIS_LASST (RKH)_02H

Location Information

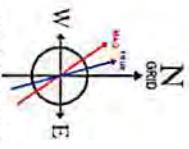
Facility Name	Grid East (m)	Grid North (m)	Latitude	Longitude
Lackawanna Unit Prod	512,301.90	4,284,025.26	39°30'22.2481"N	80°51'24.1187"W
Slot	Local N (ft)	Local E (ft)	Local N (m)	Local E (m)
Slot #2	-19.08	-0.88	512,301.90	4,284,025.26
Mean Horn 777 (RKH) to Mean Sea Level (EGC Block #2)	1322			
Mean Sea Level to Mean Sea Level (M Sea Level)	1322			
Mean Horn 777 (RKH) to Mean Sea Level	1322			

Well Profile Data

Design Comment	MD (ft)	Inc. (°)	As (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (ft/100ft)	VS (ft)
On	2775.00	0.200	189.140	2774.93	-7.13	5.38	0.00	-8.72
Proj Bot	2804.00	0.280	189.140	2803.93	-7.27	5.14	0.00	-8.84
End of Target	3101.07	0.200	189.140	3101.00	-8.76	5.10	0.00	-10.09
End of 3D Arc (L)	3301.47	20.735	26.384	3786.41	101.81	60.54	3.00	66.77
LP	6501.46	20.735	26.384	6313.35	958.78	465.44	0.00	584.44
LP	7474.73	80.500	335.045	6847.87	1664.75	313.03	0.00	1308.91
PBHE	13574.73	90.500	335.045	8784.84	7195.94	-2240.51	0.00	7488.88

APS EM <8-7/8> (2775)(2803-5420) : 0.33° Inc. 2803.00ft MD, 2802.93ft TVD, -8.81ft VS

API: 47-103-02983-0000
 BHI Job #: 6741081
 Rig: Noah Horn 777
 Duration: 10/30/2014-11/3/2014

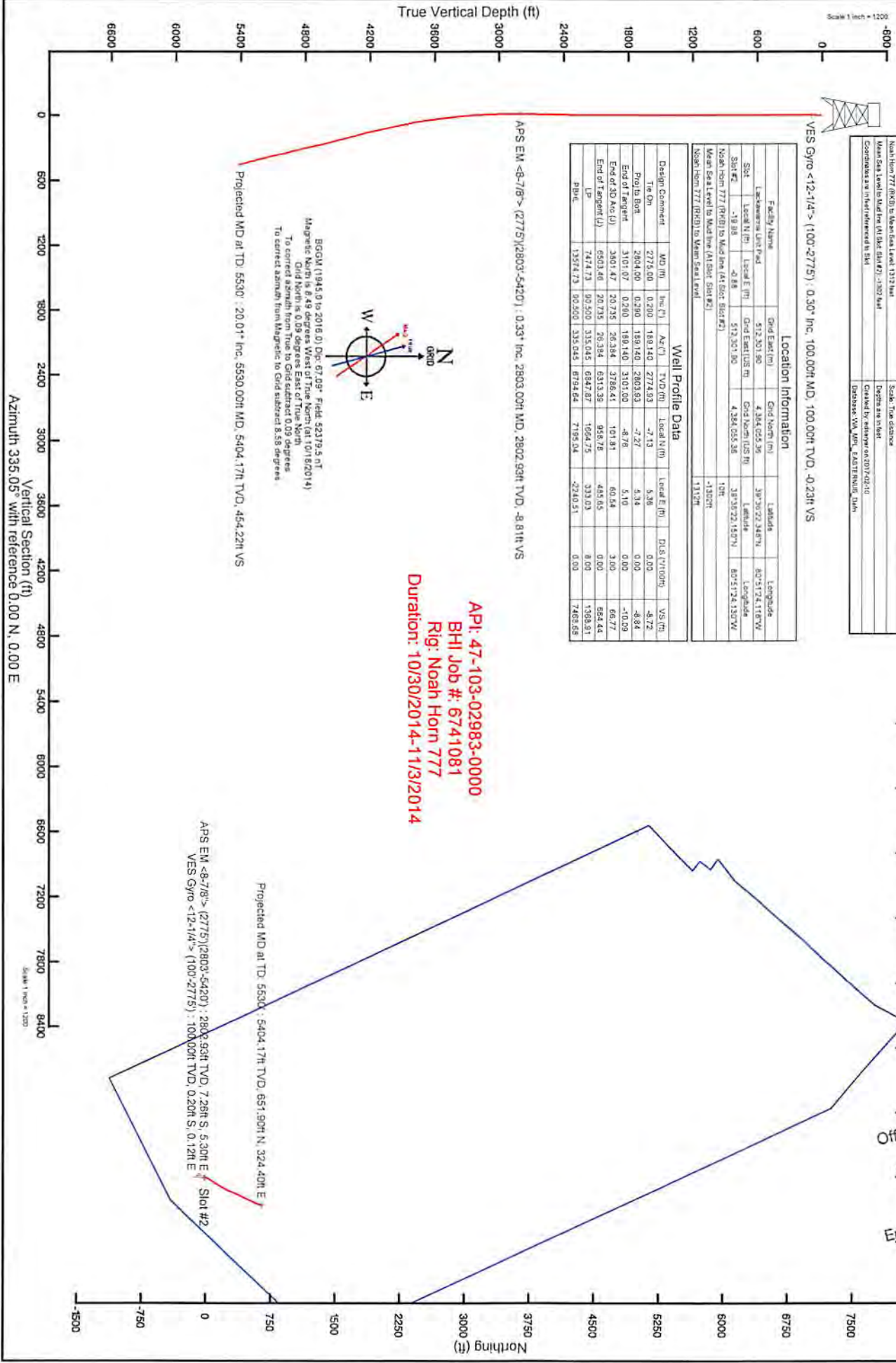


BGMN (1945.0 to 2016.0) Dec 67.09° Field 43379.5, NT
 Magnetic North is 8.48 degrees West of True North (61.10182014)
 Grid North is 0.09 degrees East of True North
 To correct azimuth from True to Grid subtract 0.09 degrees
 To correct azimuth from Magnetic to Grid subtract 8.58 degrees

Projected MD at TD: 5530 : 20.01° Inc. 5530.00ft MD, 5404.17ft TVD, 454.22ft VS

APS EM <8-7/8> (2775)(2803-5420) : 2802.93ft TVD, 7.28ft S, 5.30ft E
 VES Gyro <12-1/4> (100-2775) : 100.00ft TVD, 0.20ft S, 0.12ft E

Projected MD at TD: 5530 : 5404.17ft TVD, 651.90ft N, 324.40ft E



Vertical Section (ft)
 Azimuth 335.05° with reference 0.00 N, 0.00 E

Actual Wellpath Report (CSV ver.)
 Prepared by Baker Hughes
 Software System: WellArchitect 4.0.1

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REFERENCE WELLPATH IDENTIFICATION			
Operator	GASTAR EXPLORATION USA INC.	Slot	Slot #2
Area	Marshall County, WV	Well	Lackawanna 2H
Field	Marshall	Wellbore	Lackawanna 2H (AWB)
Facility	Lackawanna Unit	Wellpath	Lackawanna 2H (AWP) Proj: 5,530'
		Sidetrack	(none)

WELLPATH DATA † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [M]	Grid North [M]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]
0.00	0.00	150.03	0.00	0.00	0.00	0.00	512301.9	4384055.4	39°36'22.150"N	80°51'24.130"W	0.00	0.00	0.00
10.00	0.00	150.03	10.00	0.00	0.00	0.00	512301.9	4384055.4	39°36'22.150"N	80°51'24.130"W	0.00	0.00	0.00
100.00	0.30	150.03	100.00	-0.23	-0.20	0.12	512301.9	4384055.4	39°36'22.148"N	80°51'24.128"W	0.24	150.03	0.33
200.00	0.08	161.88	200.00	-0.56	-0.50	0.27	512301.9	4384055.2	39°36'22.145"N	80°51'24.126"W	0.57	151.48	0.22
300.00	0.15	200.75	300.00	-0.73	-0.69	0.25	512301.9	4384055.1	39°36'22.143"N	80°51'24.126"W	0.73	160.31	0.10
400.00	0.10	247.94	400.00	-0.81	-0.84	0.12	512301.8	4384055.1	39°36'22.142"N	80°51'24.128"W	0.85	172.00	0.11
500.00	0.26	228.01	500.00	-0.87	-1.03	-0.13	512301.8	4384055.0	39°36'22.140"N	80°51'24.131"W	1.03	187.29	0.17
600.00	0.19	219.88	600.00	-1.01	-1.30	-0.41	512301.7	4384054.9	39°36'22.137"N	80°51'24.135"W	1.37	197.29	0.08
700.00	0.29	194.90	700.00	-1.28	-1.68	-0.58	512301.6	4384054.8	39°36'22.134"N	80°51'24.137"W	1.77	199.01	0.14
800.00	0.16	131.77	800.00	-1.60	-2.01	-0.54	512301.6	4384054.7	39°36'22.130"N	80°51'24.136"W	2.08	194.97	0.26
900.00	0.15	207.61	900.00	-1.81	-2.22	-0.50	512301.7	4384054.7	39°36'22.128"N	80°51'24.136"W	2.28	192.55	0.19
1000.00	0.19	180.75	1000.00	-2.04	-2.50	-0.56	512301.6	4384054.6	39°36'22.125"N	80°51'24.137"W	2.57	192.56	0.09
1100.00	0.21	127.10	1099.99	-2.35	-2.78	-0.41	512301.7	4384054.5	39°36'22.123"N	80°51'24.135"W	2.81	188.46	0.18
1200.00	0.15	109.45	1199.99	-2.60	-2.94	-0.14	512301.8	4384054.4	39°36'22.121"N	80°51'24.131"W	2.94	182.81	0.08
1300.00	0.23	99.01	1299.99	-2.80	-3.01	0.18	512301.9	4384054.4	39°36'22.120"N	80°51'24.127"W	3.02	176.63	0.09
1400.00	0.22	75.36	1399.99	-2.95	-2.99	0.56	512302.0	4384054.4	39°36'22.121"N	80°51'24.122"W	3.05	169.38	0.09
1500.00	0.21	67.67	1499.99	-2.99	-2.88	0.92	512302.1	4384054.5	39°36'22.122"N	80°51'24.118"W	3.02	162.32	0.03
1600.00	0.29	106.09	1599.99	-3.17	-2.88	1.33	512302.2	4384054.5	39°36'22.122"N	80°51'24.113"W	3.17	155.19	0.18
1700.00	0.11	251.18	1699.99	-3.32	-2.98	1.48	512302.3	4384054.4	39°36'22.121"N	80°51'24.111"W	3.33	153.54	0.39
1800.00	0.42	304.67	1799.99	-3.00	-2.80	1.09	512302.1	4384054.5	39°36'22.123"N	80°51'24.116"W	3.00	158.74	0.37
1900.00	0.48	292.72	1899.99	-2.37	-2.43	0.40	512301.9	4384054.6	39°36'22.126"N	80°51'24.124"W	2.46	170.61	0.11
2000.00	0.28	298.07	1999.98	-1.87	-2.15	-0.20	512301.7	4384054.7	39°36'22.129"N	80°51'24.132"W	2.16	185.32	0.20
2100.00	0.21	170.74	2099.98	-1.85	-2.22	-0.39	512301.7	4384054.7	39°36'22.128"N	80°51'24.134"W	2.25	189.89	0.44
2200.00	0.57	127.49	2199.98	-2.47	-2.70	0.04	512301.8	4384054.5	39°36'22.124"N	80°51'24.129"W	2.70	179.20	0.44
2300.00	0.74	123.13	2299.98	-3.45	-3.36	0.97	512302.1	4384054.3	39°36'22.117"N	80°51'24.117"W	3.50	163.84	0.18
2400.00	0.99	117.89	2399.96	-4.69	-4.11	2.28	512302.5	4384054.1	39°36'22.110"N	80°51'24.100"W	4.70	151.04	0.26
2500.00	1.06	121.95	2499.95	-6.15	-5.01	3.83	512303.0	4384053.8	39°36'22.101"N	80°51'24.081"W	6.30	142.62	0.10

Actual Wellpath Report (CSV ver.)
 Prepared by Baker Hughes
 Software System: WellArchitect 4.0.1

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WELLPATH DATA † = interpolated/extrapolated station													
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [M]	Grid North [M]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]
2600.00	0.64	140.88	2599.94	-7.47	-5.93	4.96	512303.3	4384053.5	39°36'22.092"N	80°51'24.066"W	7.73	140.08	0.50
2700.00	0.38	172.53	2699.93	-8.33	-6.69	5.36	512303.4	4384053.3	39°36'22.084"N	80°51'24.061"W	8.57	141.32	0.37
2775.00	0.29	189.14	2774.93	-8.72	-7.13	5.36	512303.4	4384053.2	39°36'22.080"N	80°51'24.061"W	8.92	143.05	0.18
2803.00	0.33	221.29	2802.93	-8.81	-7.26	5.30	512303.4	4384053.1	39°36'22.078"N	80°51'24.062"W	8.98	143.88	0.63
2835.00	0.45	238.13	2834.93	-8.87	-7.39	5.13	512303.4	4384053.1	39°36'22.077"N	80°51'24.064"W	9.00	145.25	0.51
2866.00	0.43	249.74	2865.93	-8.87	-7.50	4.92	512303.3	4384053.1	39°36'22.076"N	80°51'24.067"W	8.97	146.75	0.29
2897.00	0.74	248.79	2896.93	-8.85	-7.61	4.62	512303.2	4384053.0	39°36'22.075"N	80°51'24.071"W	8.90	148.74	1.00
2929.00	0.93	259.29	2928.92	-8.77	-7.73	4.17	512303.1	4384053.0	39°36'22.074"N	80°51'24.076"W	8.79	151.65	0.76
2992.00	0.87	270.95	2991.92	-8.44	-7.82	3.19	512302.8	4384052.9	39°36'22.073"N	80°51'24.089"W	8.45	157.80	0.31
3054.00	1.59	328.39	3053.90	-7.38	-7.08	2.27	512302.5	4384053.2	39°36'22.080"N	80°51'24.101"W	7.44	162.22	2.16
3118.00	2.23	355.71	3117.87	-5.33	-5.08	1.71	512302.3	4384053.8	39°36'22.100"N	80°51'24.108"W	5.36	161.38	1.71
3149.00	3.10	3.26	3148.84	-4.03	-3.64	1.71	512302.3	4384054.2	39°36'22.114"N	80°51'24.108"W	4.03	154.80	3.02
3181.00	3.92	6.23	3180.78	-2.33	-1.69	1.88	512302.4	4384054.8	39°36'22.133"N	80°51'24.105"W	2.53	131.96	2.62
3213.00	4.54	8.47	3212.69	-0.34	0.65	2.19	512302.5	4384055.5	39°36'22.157"N	80°51'24.102"W	2.28	73.51	2.00
3244.00	4.88	7.87	3243.58	1.80	3.17	2.55	512302.6	4384056.3	39°36'22.182"N	80°51'24.097"W	4.07	38.83	1.11
3276.00	5.67	8.66	3275.45	4.26	6.08	2.97	512302.7	4384057.2	39°36'22.210"N	80°51'24.091"W	6.77	26.07	2.48
3307.00	6.61	9.62	3306.27	7.00	9.35	3.50	512302.9	4384058.2	39°36'22.243"N	80°51'24.085"W	9.99	20.53	3.05
3339.00	7.36	13.49	3338.03	10.12	13.16	4.29	512303.1	4384059.3	39°36'22.280"N	80°51'24.074"W	13.84	18.05	2.77
3370.00	8.16	17.01	3368.75	13.31	17.20	5.39	512303.4	4384060.6	39°36'22.320"N	80°51'24.060"W	18.02	17.42	3.00
3401.00	9.07	21.74	3399.40	16.63	21.57	6.94	512303.9	4384061.9	39°36'22.363"N	80°51'24.040"W	22.66	17.85	3.72
3433.00	9.94	25.63	3430.96	20.11	26.40	9.07	512304.6	4384063.4	39°36'22.411"N	80°51'24.013"W	27.92	18.96	3.38
3464.00	10.57	29.91	3461.46	23.45	31.28	11.65	512305.4	4384064.9	39°36'22.459"N	80°51'23.980"W	33.38	20.42	3.19
3495.00	11.37	31.29	3491.90	26.78	36.35	14.65	512306.3	4384066.4	39°36'22.509"N	80°51'23.942"W	39.20	21.95	2.72
3526.00	11.95	30.05	3522.26	30.32	41.74	17.85	512307.2	4384068.1	39°36'22.563"N	80°51'23.901"W	45.40	23.15	2.04
3557.00	12.45	30.30	3552.56	34.07	47.41	21.14	512308.2	4384069.8	39°36'22.618"N	80°51'23.858"W	51.91	24.03	1.62
3589.00	12.74	32.36	3583.79	37.94	53.37	24.77	512309.4	4384071.6	39°36'22.677"N	80°51'23.812"W	58.83	24.90	1.67
3620.00	13.70	32.67	3613.97	41.75	59.34	28.58	512310.5	4384073.4	39°36'22.736"N	80°51'23.763"W	65.87	25.72	3.11
3652.00	14.77	33.37	3644.98	45.92	65.94	32.87	512311.8	4384075.4	39°36'22.801"N	80°51'23.708"W	73.68	26.50	3.39
3683.00	16.22	34.93	3674.86	50.17	72.79	37.52	512313.2	4384077.5	39°36'22.869"N	80°51'23.649"W	81.89	27.27	4.87
3715.00	16.74	36.06	3705.54	54.65	80.18	42.79	512314.8	4384079.8	39°36'22.942"N	80°51'23.581"W	90.89	28.09	1.91
3747.00	17.87	35.75	3736.09	59.28	87.89	48.38	512316.5	4384082.1	39°36'23.018"N	80°51'23.510"W	100.32	28.83	3.54
3778.00	18.93	34.89	3765.51	64.14	95.88	54.03	512318.3	4384084.5	39°36'23.097"N	80°51'23.437"W	110.05	29.40	3.53
3810.00	20.62	33.39	3795.62	69.70	104.84	60.10	512320.1	4384087.3	39°36'23.185"N	80°51'23.359"W	120.84	29.82	5.51

Actual Wellpath Report (CSV ver.)
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3905.00	21.63	28.60	3884.24	88.89	134.18	77.69	512325.5	4384096.2	39°36'23.475"N	80°51'23.134"W	155.05	30.07	2.10
3999.00	19.16	32.20	3972.34	107.55	162.45	94.21	512330.5	4384104.8	39°36'23.754"N	80°51'22.923"W	187.79	30.11	2.95
4094.00	20.99	31.71	4061.57	125.36	190.12	111.46	512335.8	4384113.3	39°36'24.027"N	80°51'22.702"W	220.38	30.38	1.93
4189.00	20.57	29.17	4150.39	144.49	219.17	128.54	512341.0	4384122.1	39°36'24.314"N	80°51'22.483"W	254.08	30.39	1.05
4284.00	22.20	26.04	4238.85	165.57	249.87	144.55	512345.8	4384131.5	39°36'24.617"N	80°51'22.278"W	288.67	30.05	2.09
4379.00	21.36	21.04	4327.07	188.89	282.15	158.64	512350.1	4384141.3	39°36'24.936"N	80°51'22.097"W	323.69	29.35	2.14
4474.00	21.33	24.47	4415.56	212.15	314.02	172.01	512354.2	4384151.0	39°36'25.251"N	80°51'21.925"W	358.05	28.71	1.31
4569.00	21.36	21.78	4504.05	235.25	345.81	185.59	512358.3	4384160.7	39°36'25.565"N	80°51'21.751"W	392.46	28.22	1.03
4664.00	21.04	25.06	4592.62	258.07	377.33	199.23	512362.5	4384170.3	39°36'25.876"N	80°51'21.576"W	426.70	27.83	1.29
4758.00	20.36	28.40	4680.56	278.68	407.00	214.16	512367.1	4384179.3	39°36'26.169"N	80°51'21.385"W	459.90	27.75	1.45
4853.00	20.32	27.78	4769.63	298.53	436.13	229.70	512371.8	4384188.2	39°36'26.457"N	80°51'21.186"W	492.92	27.78	0.23
4947.00	20.98	24.06	4857.60	319.45	465.94	244.17	512376.2	4384197.3	39°36'26.751"N	80°51'21.000"W	526.04	27.66	1.56
5041.00	20.58	23.14	4945.48	341.53	496.49	257.53	512380.3	4384206.6	39°36'27.053"N	80°51'20.829"W	559.31	27.42	0.55
5136.00	19.60	24.20	5034.70	363.10	526.38	270.62	512384.3	4384215.7	39°36'27.348"N	80°51'20.661"W	591.87	27.21	1.10
5230.00	20.99	30.50	5122.87	382.97	555.27	285.63	512388.8	4384224.5	39°36'27.633"N	80°51'20.469"W	624.43	27.22	2.75
5325.00	20.60	20.75	5211.71	404.30	585.57	300.19	512393.3	4384233.7	39°36'27.933"N	80°51'20.282"W	658.04	27.14	3.66
5420.00	20.01	19.84	5300.81	427.50	616.49	311.63	512396.8	4384243.2	39°36'28.238"N	80°51'20.135"W	690.78	26.82	0.70
5530.00	20.01	19.84	5404.17	454.22	651.90	324.40	512400.6	4384254.0	39°36'28.588"N	80°51'19.971"W	728.15	26.46	0.00