



Thurman Speece BRK 5H
 Brooke County, WV
 SDC 41

Plan vs Actual



Plan Data for Thurman Speece BRK 5H

MD (USft)	Inc (°)	Az (°)	TVD (USft)	+W/-S (USft)	+E/-W (USft)	VSec (DLSU)	Position offsets from Slot centre	DLS	Tooface Comments
4976.00	5.68	51.05	4959.22	236.49	288.98	142.15	0.62	31.5	Last WFT SVY
5184.80	5.68	51.05	5166.99	249.48	305.05	149.90	0.00	0.0	Curve KOP 7° DLS
6111.52	70.00	26.10	5862.49	720.78	569.13	526.56	7.00	334.0	Build/Turn 9° DLS
6684.93	90.70	337.82	5964.00	1265.51	571.16	1044.50	9.00	287.8	Landing Point
16660.50	90.70	337.82	5842.00	10501.92	-3195.25	10977.25	0.00	0.0	PBHL TSSH

Target Set Information:

Name	TVD (USft)	+W/-S (USft)	+E/-W (USft)	Northing (USft)	Eastng (USft)	Lat (°)	Long (°)
LP TSSH	5964.00	1165.79	611.82	1459722.92	1755494.66	40.192841	-80.587921
PBHL	5842.00	10501.92	-3195.25	14606559.05	1751687.59	40.218526	-80.601403

Plan Data for Thurman Speece BRK 5H

Field: SOUTHWESTERN_BROOKE CO, WV UTM MAD 83 (17N)
Map Unit: USFT
Projected Coordinate System: NAD83 / UTM zone 17N

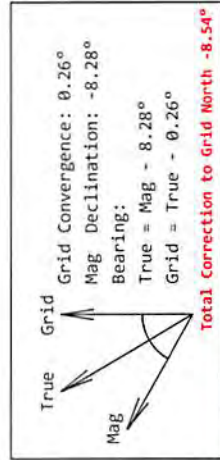
Site: Thurman Speece BRK Pad
Unit: USFeet
TVD Reference: Vertical Reference Datum (VRD)
Company Name: SOUTHWESTERN ENERGY
Position: Northing: 14596029.99USft Latitude: 40.189573°
 Easting: 1754875.81USft Longitude: -80.590157°
 North Reference: Grid Grid Convergence: 0.26°
 Elevation Above VRD: 1139.50USft

Slot: Thurman Speece BRK 5H
Position: Offset is from Site centre
 +N/-S: 27.14USft Northing: 14596057.13USft Latitude: 40.189647°
 +E/-W: 7.03USft Easting: 1754882.84USft Longitude: -80.590131°
 Elevation Above VRD: 1139.50USft

Well: Thurman Speece BRK 5H
 Type: Main-Well
 File Number:

Plan Folder: P2
Plan: P2:V1
Vertical Section: Position offset of origin from Slot centre:
 +N/-S: -0.00USft Azimuth: 343.08°
 +E/-W: -0.00USft

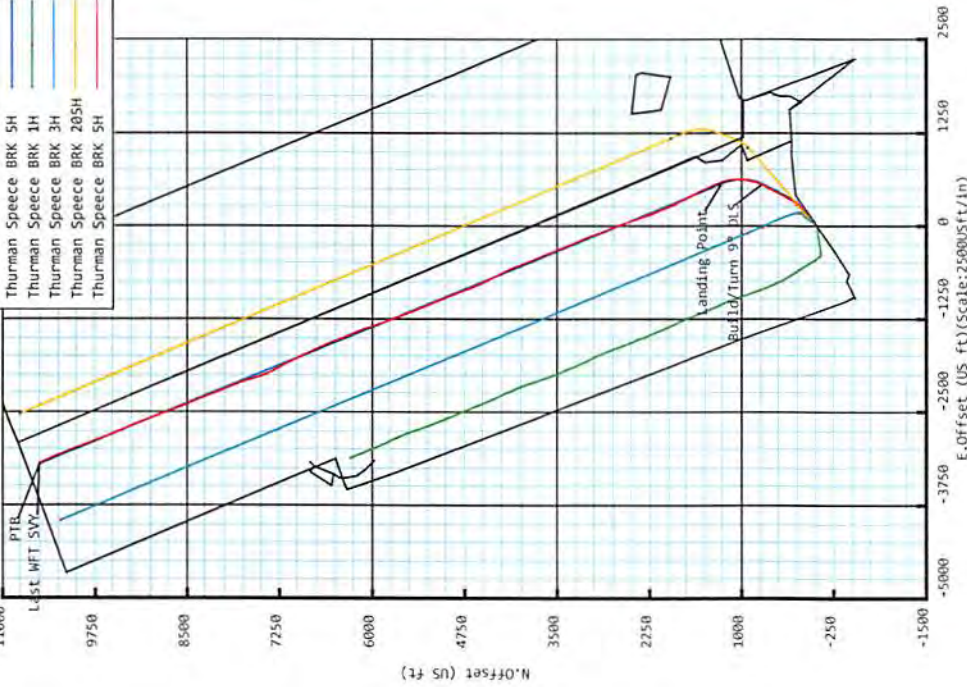
Model: Field Strength: Declination: Dip: Date:
 HDGM 52680(NT) -8.28° 67.67° 2017-08-11



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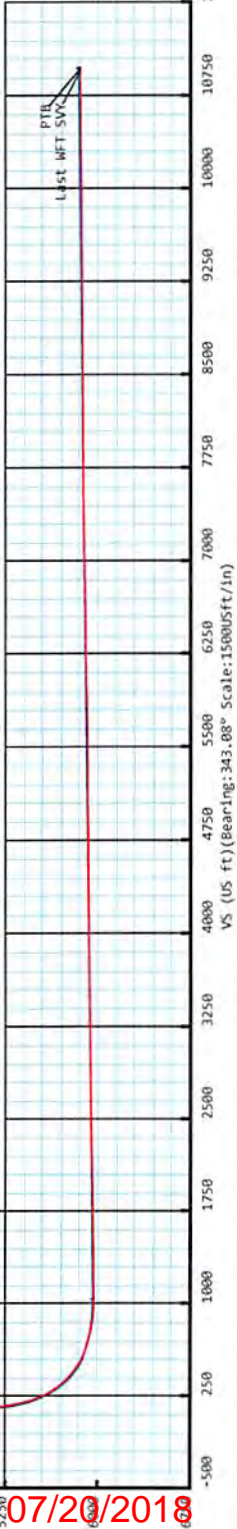
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Plan Data for Thurman Speece BRK 5H

Name	TVD (USft)	SS (USft)	MD (USft)
Onondaga Limestone	-4824.00	0.00	-1.00
Base of Fresh Water	263.50	902.00	263.50
Pittsburgh Coal	342.50	823.00	342.50
Top of Salt Water	645.54	570.00	645.54
Maxton	1160.50	5.00	1161.62
Big Lime	1325.50	-160.00	1327.47
Big Injun	1518.50	-353.00	1521.35
Base Big Injun	1633.50	-468.00	1636.85
Berea	1972.50	-807.00	1977.11
Upper Rhinestreet	5418.50	-4253.00	5445.48
Lower Rhinestreet	5525.50	-4360.00	5566.40
Basal Rhinestreet	5586.50	-4421.00	5640.40
Cashua	5656.50	-4491.00	5732.16
Middlesex	5706.50	-4541.00	5804.11
Lower Middlesex	5730.50	-4565.00	5841.28
Burket	5768.50	-4603.00	5904.88
Tully	5784.50	-4619.00	5933.89
Mahantango	5838.50	-4673.00	6047.18
Levanna	5937.50	-4772.00	6386.67
Upper Marcellus	5947.50	-4782.00	6444.57

Weatherford
 Date: 20 October 2017
 Drawing By: Gary Rhodes
 Office Name: Midcon DS
 Address: 7725 W. Reno Ave, Ste. #220
 Oklahoma City, OK 73127
 Phone: +1.405.720.4257



07/20/2018

**5D Survey Report**

SOUTHWESTERN ENERGY

Field Name: *SOUTHWESTERN_BROOKE CO, WV UTM NAD 83
(17N)*

Site Name: *Thurman Speece BRK Pad*

Well Name: *Thurman Speece BRK 5H*

Survey: *Definitive survey*

28 October 2017

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Weatherford

Thurman Speece BRK 5H

Map Units: US ft **Company Name:** SOUTHWESTERN ENERGY

Field Name: Vertical Reference Datum (VRD):
SOUTHWESTER
N_BROOKE CO,
WV UTM NAD 83
(17N)
Projected Coordinate System: NAD83 / UTM zone 17N
Comment:

Site: **Units:** US ft **North Reference:** Grid **Convergence Angle:** 0.26
Position: **Northing:** 14596029.99 US ft **Latitude:** 40° 11' 22.46"
Easting: 1754875.81 US ft **Longitude:** -80° 35' 24.56"
Elevation above Field Reference: 1139.50 US ft
Comment:

Slot: **Position (Relative to Site Centre)**
+N/-S: 27.14 US ft **Northing:** 14596057.13 US ft **Latitude:** 40°11'22.73"
+E/-W: 7.03 US ft **Easting:** 1754882.84 US ft **Longitude:** -80°35'24.47"
Elevation above Field Reference: 1139.50 US ft
Comment:

Well: **Type:** Main well **UWI:**
File Number: **Comment:**
Closure Distance: 10977.3 US ft **Closure Azimuth:** 343.12°
Vertical Section: Position of Origin (Relative to Slot centre)
+N/-S: -0.00 US ft **+E/-W:** -0.00 US ft **Az:** 343.08°

Drill floor: Survey Name: Definitive Survey

Rig Height (Drill Floor): 26.00 us ft **Elevation above Field Reference:** 1165.50 us ft **Inclination:** 0.00° **Azimuth:** 0.00°
WV Department of Environmental Protection

Survey Name: Definitive Survey

Date: 10/Aug/2017 **Survey Tool:** See Survey **Comment:** **Company:**
Tool Ranges below.

Magnetic Model:

Model Name: HDGM **Date:** 11/Aug/2017 **Field Strength:** 52680.0nT **Declination:** -8.28° **Dip:** 67.67°

Tie Point:

MD: 0.00 US ft **Inclination:** 0.00° **Azimuth:** 0.00° **TVD:** -0.00 US ft **North Offset:** -0.00 US ft **East Offset:** 0.00 US ft

Survey Tool Ranges:

Name	Start MD(usFt)	End MD(usFt)	Source Survey
MFAC_US_V2	0.00	353.00	WFT MWD_01-MFAC
MFAC_US_V2	353.00	512.00	WFT MWD_02-MFAC
MWD	512.00	1635.00	WFT MWD_02-MWD
MWD	1635.00	4976.00	WFT MWD_03
MWD	4976.00	5093.00	WFT MWD_04

SD Survey Report

Survey Tool Ranges:

Name	Start MD(usft)	End MD(usft)	Source Survey
MWD	5093.00	16669.00	WFT MWD_05

Wellpath created using minimum curvature.

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)

MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment
0.00	0.00	0.00	-0.00	-0.00	-0.00	0.00	14596057.13	1754882.84	0.00	
26.00	0.00	0.00	26.00	-0.00	-0.00	0.00	14596057.13	1754882.84	0.00	
152.00	0.17	216.90	152.00	-0.11	-0.15	-0.11	14596056.98	1754882.73	0.13	
240.00	0.32	210.76	240.00	-0.35	-0.47	-0.32	14596056.66	1754882.52	0.17	
328.00	0.18	248.22	328.00	-0.53	-0.73	-0.57	14596056.40	1754882.27	0.24	
353.00	0.27	170.48	353.00	-0.59	-0.80	-0.60	14596056.33	1754882.24	1.16	
423.00	0.28	131.90	423.00	-0.90	-1.08	-0.44	14596056.05	1754882.40	0.26	
512.00	0.67	98.13	511.99	-1.31	-1.30	0.23	14596055.83	1754883.07	0.52	
599.00	1.31	83.03	598.98	-1.70	-1.25	1.73	14596055.88	1754884.57	0.79	
686.00	2.02	76.44	685.94	-1.96	-0.77	4.20	14596056.36	1754887.04	0.84	
774.00	2.52	65.74	773.87	-1.80	0.39	7.47	14596057.52	1754890.31	0.74	
860.00	2.94	52.00	859.78	-0.77	2.53	10.94	14596059.66	1754893.78	0.90	
948.00	4.08	49.97	947.61	1.27	5.93	15.11	14596063.06	1754897.95	1.30	
1037.00	4.61	51.95	1036.36	3.81	10.17	20.35	14596067.30	1754903.19	0.62	
1125.00	5.17	53.57	1124.03	6.41	14.70	26.33	14596071.83	1754909.17	0.66	
1212.00	5.96	51.60	1210.62	9.37	19.84	33.02	14596076.97	1754915.86	0.93	
1299.00	5.88	45.45	1297.16	13.09	25.77	39.74	14596082.90	1754922.58	0.73	
1387.00	5.35	34.91	1384.74	17.72	32.30	45.30	14596089.43	1754928.14	1.31	
1475.00	5.53	29.56	1472.34	23.17	39.35	49.74	14596096.48	1754932.58	0.61	
1563.00	5.56	31.40	1559.93	28.93	46.68	54.05	14596103.81	1754936.89	0.20	
1635.00	4.89	27.31	1631.63	33.44	52.38	57.28	14596109.51	1754940.12	1.06	
1736.00	4.56	31.83	1732.29	39.18	59.62	61.37	14596116.75	1754944.21	0.49	
1824.00	4.72	40.70	1820.00	43.42	65.33	65.57	14596122.46	1754948.41	0.83	
1912.00	5.63	51.56	1907.65	46.94	70.76	71.32	14596127.89	1754954.16	1.51	
1998.00	5.17	52.35	1993.26	49.86	75.75	77.69	14596132.88	1754960.53	0.54	
2087.00	3.92	55.89	2081.98	52.18	79.91	83.38	14596137.04	1754966.22	1.44	
2174.00	4.60	49.19	2168.74	54.47	83.85	88.48	14596140.98	1754971.32	0.97	
2261.00	5.51	49.46	2255.40	57.56	88.85	94.30	14596145.98	1754977.14	1.05	
2349.00	5.89	54.69	2342.97	60.68	94.21	101.19	14596151.34	1754984.03	0.73	
2436.00	5.78	55.11	2429.52	63.44	99.29	108.43	14596156.42	1754991.27	0.14	
2524.00	5.61	55.46	2517.08	66.11	104.27	115.61	14596161.40	1754998.45	0.20	
2613.00	5.44	55.69	2605.67	68.68	109.11	122.68	14596166.24	1755005.52	0.19	
2701.00	5.56	55.88	2693.26	71.19	113.85	129.65	14596170.98	1755012.49	0.14	
2789.00	5.33	57.71	2780.87	73.53	118.43	136.64	14596175.56	1755019.48	0.33	
2877.00	4.48	59.03	2868.54	75.45	122.38	143.04	14596179.51	1755025.88	0.97	
2964.00	4.33	56.88	2955.29	77.19	125.92	148.70	14596183.05	1755031.54	0.26	
3050.00	4.08	49.35	3041.06	79.33	129.69	153.74	14596186.82	1755036.58	0.70	
3137.00	4.50	50.86	3127.81	81.87	133.86	158.74	14596190.99	1755041.58	0.50	
3226.00	5.08	53.39	3216.50	84.51	138.41	164.61	14596195.54	1755047.45	0.69	
3314.00	5.05	52.76	3304.16	87.17	143.08	170.82	14596200.21	1755053.66	0.07	
3402.00	5.01	49.94	3391.82	90.03	147.90	176.84	14596205.03	1755059.68	0.28	
3491.00	5.14	54.05	3480.47	92.85	152.74	183.05	14596209.87	1755065.89	0.43	
3578.00	5.01	52.64	3567.13	95.45	157.33	189.22	14596214.46	1755072.06	0.21	
3666.00	4.76	46.35	3654.81	98.44	162.18	194.92	14596219.31	1755077.76	0.67	
3754.00	4.86	51.04	3742.50	101.48	167.05	200.46	14596224.18	1755083.30	0.46	
3842.00	4.60	52.73	3830.20	104.10	171.53	206.16	14596228.66	1755089.00	0.34	
3931.00	4.64	54.19	3918.91	106.51	175.80	211.92	14596232.93	1755094.76	0.14	
4019.00	4.64	48.38	4006.62	109.15	180.24	217.47	14596237.37	1755100.31	0.57	
4107.00	4.80	51.55	4094.33	111.99	184.90	223.01	14596242.03	1755105.85	0.35	
4195.00	4.94	51.99	4182.01	114.70	189.52	228.88	14596246.65	1755111.72	0.16	
4284.00	5.33	50.01	4270.65	117.70	194.54	235.07	14596251.67	1755117.91	0.48	
4372.00	5.74	56.24	4358.24	120.58	199.61	241.86	14596256.74	1755124.70	0.83	

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5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment
4459.00	6.69	59.01	4444.73	123.07	204.64	249.82	14596261.77	1755132.66	1.14	
4547.00	6.87	52.18	4532.11	126.19	210.50	258.37	14596267.63	1755141.21	0.94	
4635.00	5.14	52.01	4619.63	129.49	216.16	265.64	14596273.29	1755148.48	1.97	
4724.00	5.31	50.96	4708.26	132.47	221.20	271.98	14596278.33	1755154.82	0.22	
4811.00	4.90	44.43	4794.91	135.77	226.39	277.71	14596283.52	1755160.55	0.82	
4899.00	5.27	48.54	4882.57	139.25	231.75	283.37	14596288.88	1755166.21	0.59	
4976.00	5.68	51.05	4959.22	142.15	236.49	288.98	14596293.62	1755171.82	0.62	
4998.00	5.74	52.07	4981.11	142.95	237.85	290.69	14596294.98	1755173.53	0.54	
5093.00	5.43	54.75	5075.66	146.07	243.36	298.11	14596300.49	1755180.95	0.43	
5125.00	4.70	53.02	5107.53	146.99	245.03	300.40	14596302.16	1755183.24	2.33	
5157.00	4.76	43.40	5139.42	148.10	246.78	302.36	14596303.91	1755185.20	2.48	
5189.00	6.78	26.30	5171.26	150.14	249.44	304.11	14596306.57	1755186.95	8.22	
5237.00	10.29	20.85	5218.72	155.59	255.99	306.89	14596313.12	1755189.73	7.50	
5286.00	13.04	23.56	5266.71	163.26	265.15	310.66	14596322.28	1755193.50	5.72	
5334.00	15.12	27.26	5313.26	171.87	275.68	315.69	14596332.81	1755198.53	4.72	
5382.00	17.57	28.43	5359.32	181.45	287.61	322.01	14596344.74	1755204.85	5.15	
5430.00	20.91	27.68	5404.63	192.64	301.57	329.44	14596358.70	1755212.28	6.98	
5478.00	24.73	27.48	5448.87	205.92	318.07	338.05	14596375.20	1755220.89	7.96	
5526.00	28.84	28.58	5491.71	221.21	337.16	348.23	14596394.29	1755231.07	8.62	
5574.00	32.36	29.57	5533.02	238.18	358.50	360.11	14596415.63	1755242.95	7.41	
5622.00	35.94	29.59	5572.73	256.72	381.93	373.41	14596439.06	1755256.25	7.46	
5670.00	40.02	28.42	5610.56	277.27	407.76	387.71	14596464.89	1755270.55	8.63	
5718.00	43.78	27.85	5646.28	299.92	436.03	402.82	14596493.16	1755285.66	7.87	
5766.00	46.91	27.01	5680.02	324.34	466.34	418.54	14596523.47	1755301.38	6.64	
5814.00	50.20	26.73	5711.78	350.31	498.43	434.80	14596555.56	1755317.64	6.87	
5863.00	53.78	26.48	5741.95	378.30	532.94	452.09	14596590.07	1755334.93	7.32	
5911.00	57.30	26.57	5769.11	407.03	568.35	469.76	14596625.48	1755352.60	7.33	
5959.00	59.98	27.62	5794.08	436.50	604.83	488.43	14596661.96	1755371.27	5.89	
6007.00	62.45	28.22	5817.20	466.32	642.00	508.13	14596699.13	1755390.97	5.26	
6056.00	65.46	28.74	5838.71	497.23	680.69	529.12	14596737.82	1755411.96	6.22	
6104.00	68.68	27.43	5857.41	528.49	719.69	549.92	14596776.82	1755432.76	7.16	
6151.00	69.72	22.87	5874.11	561.09	759.45	568.59	14596816.58	1755451.43	9.34	
6199.00	71.36	18.47	5890.10	596.95	801.78	584.55	14596858.91	1755467.39	9.29	
6247.00	73.00	15.12	5904.80	634.96	845.52	597.74	14596902.65	1755480.58	7.47	
6295.00	74.58	11.47	5918.20	674.78	890.37	608.33	14596947.50	1755491.17	8.01	
6343.00	76.62	7.49	5930.14	716.41	936.21	615.98	14596993.34	1755498.82	9.09	
6391.00	77.64	4.01	5940.83	759.59	982.77	620.67	14597039.90	1755503.51	7.38	
6439.00	79.33	0.77	5950.42	803.97	1029.75	622.62	14597086.88	1755505.46	7.49	
6487.00	81.77	357.30	5958.30	849.48	1077.08	621.82	14597134.21	1755504.66	8.76	
6535.00	84.13	354.55	5964.19	895.92	1124.59	618.43	14597181.72	1755501.27	7.52	
6583.00	86.54	351.03	5968.10	943.07	1172.04	612.43	14597229.17	1755495.27	8.87	
6632.00	88.64	346.92	5970.16	991.75	1220.08	603.07	14597277.21	1755485.91	9.41	
6680.00	89.94	341.03	5970.75	1039.72	1266.19	589.82	14597323.32	1755472.66	12.56	
6728.00	90.99	337.89	5970.37	1087.62	1311.13	572.98	14597368.26	1755455.82	6.90	
6824.00	90.80	335.86	5968.87	1183.04	1399.40	535.29	14597456.53	1755418.13	2.12	
6920.00	90.31	335.07	5967.94	1278.18	1486.73	495.43	14597543.86	1755378.27	0.97	
7007.00	90.55	334.72	5967.28	1364.30	1565.51	458.52	14597622.64	1755341.36	0.49	
7093.00	90.86	333.88	5966.22	1449.28	1642.99	421.22	14597700.12	1755304.06	1.04	
7180.00	90.86	333.47	5964.92	1535.10	1720.96	382.65	14597778.09	1755265.49	0.47	
7267.00	91.23	333.92	5963.33	1620.92	1798.94	344.10	14597856.07	1755226.94	0.67	
7354.00	90.92	334.04	5961.70	1706.81	1877.11	305.94	14597934.24	1755188.78	0.38	
7441.00	90.74	336.74	5960.44	1793.01	1956.19	269.72	14598013.32	1755152.56	3.11	
7526.00	90.68	338.53	5959.39	1877.62	2034.79	237.38	14598091.92	1755120.22	2.11	
7613.00	90.99	336.67	5958.12	1964.21	2115.21	204.23	14598172.34	1755087.07	2.17	
7700.00	90.99	338.51	5956.61	2050.79	2195.62	171.07	14598252.75	1755053.91	2.11	
7786.00	91.54	338.96	5954.72	2136.52	2275.75	139.89	14598332.88	1755022.73	0.83	
7873.00	91.54	340.91	5952.38	2223.36	2357.43	110.05	14598414.56	1754992.89	2.24	
7960.00	90.80	340.99	5950.60	2310.28	2439.65	81.66	14598496.78	1754964.50	0.86	
8046.00	90.74	340.77	5949.45	2396.21	2520.90	53.49	14598578.03	1754936.33	0.27	

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5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (%/100US ft)	Comment
8133.00	90.68	339.98	5948.37	2483.10	2602.84	24.28	14598659.97	1754907.12	0.91	
8220.00	91.05	339.58	5947.05	2569.95	2684.47	-5.79	14598741.60	1754877.05	0.63	
8306.00	90.68	340.00	5945.76	2655.80	2765.16	-35.50	14598822.29	1754847.34	0.65	
8393.00	90.80	339.05	5944.63	2742.62	2846.66	-65.92	14598903.79	1754816.92	1.10	
8480.00	90.25	338.73	5943.83	2829.38	2927.82	-97.26	14598984.95	1754785.58	0.73	
8567.00	90.80	338.50	5943.04	2916.12	3008.82	-128.98	14599065.95	1754753.86	0.69	
8654.00	90.62	338.70	5941.96	3002.84	3089.82	-160.72	14599146.95	1754722.12	0.31	
8740.00	90.80	337.68	5940.89	3088.52	3169.66	-192.67	14599226.79	1754690.17	1.20	
8827.00	90.68	336.71	5939.77	3175.06	3249.85	-226.39	14599306.98	1754656.45	1.12	
8913.00	90.31	337.71	5939.03	3260.60	3329.13	-259.70	14599386.26	1754623.14	1.24	
9000.00	90.68	338.69	5938.28	3347.28	3409.90	-292.01	14599467.03	1754590.83	1.20	
9089.00	90.62	338.05	5937.27	3435.97	3492.63	-324.81	14599549.76	1754558.03	0.72	
9178.00	90.74	338.10	5936.21	3524.63	3575.19	-358.04	14599632.32	1754524.80	0.15	
9265.00	90.74	338.33	5935.09	3611.31	3655.97	-390.32	14599713.10	1754492.52	0.26	
9352.00	90.93	338.58	5933.82	3698.01	3736.88	-422.27	14599794.01	1754460.57	0.36	
9439.00	90.74	338.49	5932.55	3784.73	3817.84	-454.10	14599874.97	1754428.74	0.24	
9526.00	90.62	338.24	5931.52	3871.43	3898.70	-486.18	14599955.83	1754396.66	0.32	
9614.00	90.71	338.59	5930.50	3959.13	3980.53	-518.55	14600037.66	1754364.29	0.41	
9701.00	90.31	338.42	5929.72	4045.85	4061.47	-550.42	14600118.60	1754332.42	0.50	
9788.00	90.55	336.15	5929.07	4132.40	4141.72	-584.02	14600198.85	1754298.82	2.62	
9875.00	90.92	333.24	5927.95	4218.45	4220.35	-621.20	14600277.48	1754261.64	3.37	
9962.00	90.49	332.84	5926.88	4304.11	4297.89	-660.64	14600355.02	1754222.20	0.68	
10048.00	90.31	333.33	5926.28	4388.81	4374.57	-699.56	14600431.70	1754183.28	0.61	
10135.00	90.93	332.97	5925.34	4474.50	4452.19	-738.86	14600509.32	1754143.98	0.82	
10222.00	90.92	335.49	5923.94	4560.44	4530.52	-776.67	14600587.65	1754106.17	2.90	
10309.00	90.25	337.13	5923.05	4646.83	4610.18	-811.62	14600667.31	1754071.22	2.04	
10396.00	90.37	339.04	5922.58	4733.49	4690.89	-844.09	14600748.02	1754038.75	2.20	
10482.00	90.74	340.39	5921.74	4819.34	4771.55	-873.91	14600828.68	1754008.93	1.63	
10569.00	90.55	339.38	5920.76	4906.20	4853.24	-903.82	14600910.37	1753979.02	1.18	
10655.00	90.71	338.41	5919.82	4991.96	4933.46	-934.79	14600990.59	1753948.05	1.14	
10744.00	90.74	337.17	5918.69	5080.57	5015.85	-968.43	14601072.98	1753914.41	1.39	
10831.00	90.00	337.03	5918.13	5167.10	5095.99	-1002.28	14601153.12	1753880.56	0.87	
10918.00	90.37	337.75	5917.85	5253.67	5176.31	-1035.73	14601233.44	1753847.11	0.93	
11004.00	90.68	337.08	5917.06	5339.24	5255.71	-1068.75	14601312.84	1753814.09	0.86	
11091.00	90.12	339.19	5916.45	5425.91	5336.44	-1101.15	14601393.57	1753781.69	2.51	
11178.00	90.43	337.29	5916.04	5512.60	5417.24	-1133.40	14601474.37	1753749.44	2.21	
11265.00	90.55	338.91	5915.29	5599.26	5497.95	-1165.85	14601555.08	1753716.99	1.87	
11351.00	90.25	339.77	5914.69	5685.08	5578.42	-1196.19	14601635.55	1753686.65	1.06	
11438.00	91.17	339.65	5913.61	5771.92	5660.01	-1226.36	14601717.14	1753656.48	1.07	
11525.00	90.86	339.50	5912.07	5858.74	5741.53	-1256.72	14601798.66	1753626.12	0.40	
11611.00	91.17	339.87	5910.55	5944.58	5822.17	-1286.57	14601879.30	1753596.27	0.56	
11698.00	91.05	340.73	5908.86	6031.46	5904.06	-1315.89	14601961.19	1753566.95	1.00	
11785.00	91.30	341.25	5907.08	6118.38	5986.30	-1344.22	14602043.43	1753538.62	0.66	
11872.00	91.23	340.31	5905.16	6205.29	6068.43	-1372.86	14602125.56	1753509.98	1.08	
11958.00	90.80	339.47	5903.64	6291.14	6149.17	-1402.42	14602206.30	1753480.42	1.10	
12045.00	90.86	336.12	5902.38	6377.75	6229.70	-1435.29	14602286.83	1753447.55	3.85	
12132.00	90.86	336.10	5901.07	6464.10	6309.24	-1470.52	14602366.37	1753412.32	0.02	
12218.00	90.80	338.69	5899.82	6549.66	6388.62	-1503.57	14602445.75	1753379.27	3.01	
12305.00	90.80	339.51	5898.61	6636.44	6469.88	-1534.60	14602527.01	1753348.24	0.94	
12392.00	90.86	338.43	5897.35	6723.21	6551.08	-1565.82	14602608.21	1753317.02	1.24	
12479.00	90.74	336.53	5896.13	6809.78	6631.43	-1599.14	14602688.56	1753283.70	2.19	
12566.00	90.92	335.80	5894.87	6896.14	6711.00	-1634.29	14602768.13	1753248.55	0.86	
12652.00	90.74	335.72	5893.63	6981.43	6789.41	-1669.59	14602846.54	1753213.25	0.23	
12739.00	91.23	335.42	5892.13	7067.67	6868.61	-1705.57	14602925.74	1753177.27	0.66	
12826.00	90.68	334.73	5890.68	7153.81	6947.50	-1742.23	14603004.63	1753140.61	1.01	
12913.00	90.86	333.27	5889.51	7239.71	7025.68	-1780.36	14603082.81	1753102.48	1.69	
13000.00	91.23	332.21	5887.93	7325.28	7103.01	-1820.20	14603160.14	1753062.64	1.29	
13087.00	90.93	333.08	5886.29	7410.82	7180.26	-1860.17	14603237.39	1753022.67	1.06	
13173.00	90.68	330.97	5885.08	7495.21	7256.20	-1900.51	14603313.33	1752982.33	2.47	

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SD Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	VS (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (P/100US ft)	Comment
13260.00	90.35	331.89	5884.30	7580.42	7332.60	-1942.11	14603389.73	1752940.73	1.12	
13347.00	90.26	336.12	5883.83	7666.31	7410.78	-1980.23	14603467.91	1752902.61	4.86	
13434.00	89.82	340.54	5883.77	7752.99	7491.61	-2012.35	14603548.74	1752870.49	5.11	
13520.00	90.68	343.40	5883.40	7838.96	7573.38	-2038.97	14603630.51	1752843.87	3.47	
13607.00	90.49	343.32	5882.51	7925.95	7656.73	-2063.88	14603713.86	1752818.96	0.24	
13693.00	90.49	341.74	5881.77	8011.94	7738.76	-2089.69	14603795.89	1752793.15	1.84	
13780.00	90.37	339.21	5881.12	8098.84	7820.75	-2118.77	14603877.88	1752764.07	2.91	
13867.00	90.37	336.99	5880.56	8185.51	7901.46	-2151.22	14603958.59	1752731.62	2.55	
13953.00	90.80	337.50	5879.68	8271.06	7980.77	-2184.48	14604037.90	1752698.36	0.78	
14040.00	90.49	339.17	5878.70	8357.75	8061.61	-2216.59	14604118.74	1752666.25	1.95	
14127.00	90.19	338.47	5878.18	8444.51	8142.73	-2248.03	14604199.86	1752634.81	0.88	
14214.00	90.62	337.91	5877.57	8531.19	8223.50	-2280.35	14604280.63	1752602.49	0.81	
14300.00	90.31	338.18	5876.87	8616.85	8303.26	-2312.50	14604360.39	1752570.34	0.48	
14387.00	90.86	338.41	5875.98	8703.55	8384.09	-2344.67	14604441.22	1752538.17	0.69	
14473.00	90.56	337.83	5874.92	8789.22	8463.89	-2376.72	14604521.02	1752506.12	0.76	
14562.00	90.43	338.41	5874.15	8877.88	8546.48	-2409.89	14604603.61	1752472.95	0.67	
14649.00	90.31	339.08	5873.59	8964.63	8627.56	-2441.42	14604684.69	1752441.42	0.78	
14735.00	90.49	339.07	5872.99	9050.42	8707.88	-2472.14	14604765.01	1752410.70	0.21	
14822.00	90.55	339.31	5872.20	9137.21	8789.20	-2503.04	14604846.33	1752379.80	0.28	
14909.00	90.25	339.55	5871.59	9224.03	8870.65	-2533.61	14604927.78	1752349.23	0.44	
14995.00	90.37	339.38	5871.12	9309.86	8951.19	-2563.78	14605008.32	1752319.06	0.24	
15082.00	90.74	338.97	5870.28	9396.65	9032.50	-2594.71	14605089.63	1752288.13	0.63	
15168.00	90.56	338.38	5869.31	9482.40	9112.61	-2625.98	14605169.74	1752256.86	0.72	
15255.00	90.00	337.78	5868.88	9569.06	9193.31	-2658.46	14605250.44	1752224.38	0.94	
15342.00	90.31	337.69	5868.65	9655.68	9273.83	-2691.42	14605330.96	1752191.42	0.37	
15428.00	90.18	337.42	5868.28	9741.28	9353.31	-2724.25	14605410.44	1752158.59	0.35	
15515.00	90.19	337.46	5868.00	9827.86	9433.65	-2757.63	14605490.78	1752125.21	0.05	
15605.00	90.37	337.37	5867.56	9917.42	9516.75	-2792.20	14605573.88	1752090.64	0.22	
15692.00	90.37	338.69	5866.99	10004.08	9597.43	-2824.74	14605654.56	1752058.10	1.52	
15778.00	90.53	340.00	5866.32	10089.89	9677.90	-2855.08	14605735.03	1752027.76	1.53	
15865.00	90.49	339.69	5865.54	10176.75	9759.57	-2885.05	14605816.70	1751997.79	0.36	
15952.00	90.74	338.80	5864.61	10263.55	9840.92	-2915.88	14605898.05	1751966.96	1.06	
16039.00	90.31	338.70	5863.81	10350.30	9922.00	-2947.41	14605979.13	1751935.43	0.51	
16125.00	90.18	339.09	5863.45	10436.07	10002.23	-2978.38	14606059.36	1751904.46	0.48	
16212.00	90.49	338.71	5862.94	10522.83	10083.39	-3009.70	14606140.52	1751873.14	0.56	
16299.00	90.18	338.36	5862.43	10609.56	10164.36	-3041.53	14606221.49	1751841.31	0.54	
16385.00	90.37	337.51	5862.02	10695.21	10244.06	-3073.84	14606301.19	1751809.00	1.01	
16472.00	90.37	336.61	5861.45	10781.73	10324.17	-3107.75	14606381.30	1751775.09	1.03	
16559.00	90.18	335.83	5861.04	10868.10	10403.79	-3142.83	14606460.92	1751740.01	0.92	
16646.00	90.18	336.39	5860.76	10954.46	10483.33	-3178.06	14606540.46	1751704.78	0.64	Last WFT SVY
16669.00	90.18	336.39	5860.69	10977.30	10504.41	-3187.27	14606561.54	1751695.57	0.00	PTB

Formation Points: (Relative to Slot centre)(TVD relative to Drill Floor)										
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	Name	Comment	
N/A	5.55	52.56	5980.50	17.04	29.44	14596074.17	1754912.28	Onondaga Limestone		
263.50	0.27	216.88	263.50	-0.57	-0.38	14596056.56	1754882.46	Base of Fresh Water		
342.50	0.19	193.64	342.50	-0.76	-0.60	14596056.37	1754882.24	Pittsburgh Coal		
474.50	0.49	105.82	474.50	-1.22	-0.14	14596055.91	1754882.70	Top of Salt Water		
1115.43	5.11	53.41	1114.50	14.19	25.64	14596071.32	1754908.48	Maxton		
1351.60	5.54	39.39	1349.50	29.62	43.27	14596086.75	1754926.11	Big Lime		
1576.63	5.43	30.70	1573.50	47.79	54.72	14596104.92	1754937.56	Big Injun		
1652.93	4.83	28.07	1649.50	53.73	57.98	14596110.86	1754940.82	Base Big Injun		
1977.15	5.28	52.15	1972.50	74.59	76.19	14596131.72	1754959.03	Berea		
5447.06	22.27	27.60	5420.50	307.14	332.35	14596364.27	1755215.19	Upper Rhinestreet		
5567.48	31.88	29.45	5527.50	355.48	358.40	14596412.61	1755241.24	Lower Rhinestreet		

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5641.68	37.61	29.08	5588.50	392.20	379.18	14596449.33	1755262.02	Basal Rhinstreet	
5735.08	44.89	27.54	5658.50	446.60	408.37	14596503.73	1755291.21	Cashaqua	
5808.89	49.85	26.76	5708.50	494.93	433.04	14596552.06	1755315.88	Middlesex	
5847.22	52.63	26.56	5732.50	521.63	446.44	14596578.76	1755329.28	Lower Middlesex	
5913.58	57.44	26.63	5770.50	570.29	470.73	14596627.42	1755353.57	Burket	
5922.94	57.97	26.84	5775.50	577.35	474.29	14596634.48	1755357.13	Tully	
6034.37	64.13	28.51	5829.50	663.51	519.74	14596720.64	1755402.58	Mahantango	
6335.98	76.32	8.07	5928.50	929.45	615.06	14596986.58	1755497.90	Levanna	
6380.18	77.41	4.79	5938.50	972.23	619.86	14597029.36	1755502.70	Upper Marcellus	

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