

SOUTHWESTERN ENERGY

Location: Wetzel County, WV
 Slot: Slot #201
 Field: Wetzel
 Well: William Ritchea WTZ 201H
 Facility: William Ritchea WTZ 201H.PWB

Plot reference wellpath is William Ritchea WTZ 201H PWB Ex-01
 True vertical depths are referenced to Rig on Slot #201 (RKB)
 Measured depths are referenced to Rig on Slot #201 (RKB)
 North References: Grid north
 Scale: True distance
 Depths are in feet
 Coordinates are in feet referenced to Slot
 Grid System: NAD83 / UTM Zone 17 North, US feet
 Created by: thomsuzc on 5/4/2015



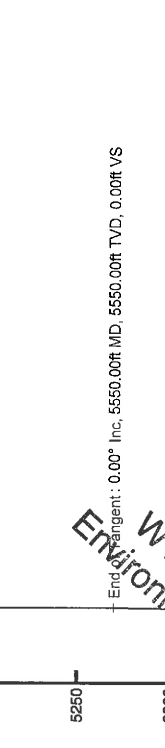
Tie On : 0.00° Inc, 22.00ft MD, 22.00ft TVD, 0.00ft VS

End of Build : 91.32° Inc, 15743.44ft MD, 7341.09ft TVD, -186.89ft VS
 William Ritchea WTZ 201H LP Rev-2
 PBHL : 91.32° Inc, 15743.44ft MD, 7397.42ft TVD, 7266.96ft VS



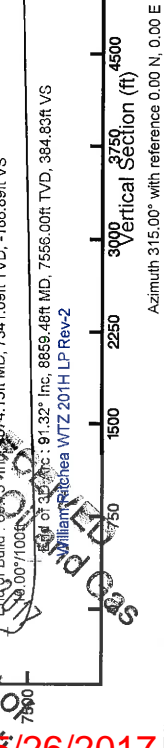
Tie On : 0.00° Inc, 22.00ft MD, 22.00ft TVD, 0.00ft VS

End of Build : 91.32° Inc, 15743.44ft MD, 7341.09ft TVD, -186.89ft VS
 William Ritchea WTZ 201H LP Rev-2
 PBHL : 91.32° Inc, 15743.44ft MD, 7397.42ft TVD, 7266.96ft VS



Tie On : 0.00° Inc, 22.00ft MD, 22.00ft TVD, 0.00ft VS

End of Build : 91.32° Inc, 15743.44ft MD, 7341.09ft TVD, -186.89ft VS
 William Ritchea WTZ 201H LP Rev-2
 PBHL : 91.32° Inc, 15743.44ft MD, 7397.42ft TVD, 7266.96ft VS



Tie On : 0.00° Inc, 22.00ft MD, 22.00ft TVD, 0.00ft VS

End of Build : 91.32° Inc, 15743.44ft MD, 7341.09ft TVD, -186.89ft VS
 William Ritchea WTZ 201H LP Rev-2
 PBHL : 91.32° Inc, 15743.44ft MD, 7397.42ft TVD, 7266.96ft VS



Well Profile Data

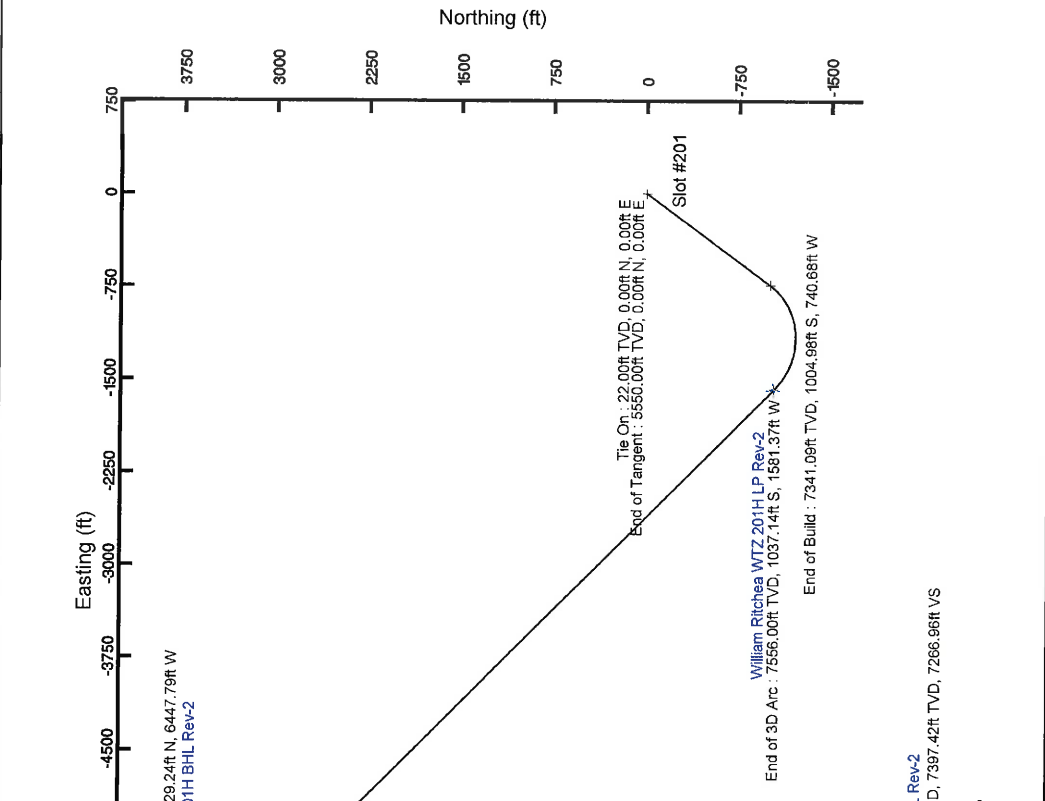
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (°/100ft)	VS (ft)
Tie On	22.00	0.000	216.391	22.00	0.00	0.00	0.00	0.00
End of Tangent	5550.00	0.000	216.391	5550.00	0.00	0.00	0.00	0.00
End of Build	7874.15	69.765	216.391	7341.09	-1004.98	-740.68	3.00	-186.89
End of 3D Arc	8859.48	91.320	315.000	7556.00	-1037.14	-1581.37	10.00	-384.83
PBHL	15743.44	91.320	315.000	7397.42	-3829.24	-6447.79	0.00	7266.96

Location Information

Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
William Ritchea WTZ Pad	1736263.630	14406607.520	39°40'10.587"N	80°39'33.797"W
Slot	Local N (ft)	Local E (ft)	Latitude	Longitude
Slot #201	1.40	-13.80	39°40'10.582"N	80°39'33.973"W
Rig on Slot #201 (RKB) to Mud line (At Slot: Slot #201)	1736249.840	14406608.920	22ft	
Mean Sea Level to Mud line (At Slot: Slot #201)			-1564ft	
Rig on Slot #201 (RKB) to Mean Sea Level			1586ft	

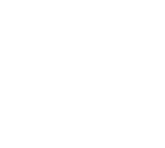
Targets

Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
William Ritchea WTZ 201H BHL Rev-2	15743.44	7397.42	3829.24	-6447.79	1736045.98	1440406.86	39°40'08.859"N	80°40'06.285"W
William Ritchea WTZ 201H LP Rev-2	8859.48	7556.00	-1037.14	-1581.37	1734669.09	1446352.19	39°40'00.811"N	80°39'54.265"W



Scale 1 inch = 1500 ft

William Ritchea WTZ 201H BHL Rev-2
 William Ritchea WTZ 201H LP Rev-2
 William Ritchea WTZ 201H LP Rev-2
 William Ritchea WTZ 201H BHL Rev-2
 William Ritchea WTZ 201H LP Rev-2
 William Ritchea WTZ 201H LP Rev-2
 William Ritchea WTZ 201H LP Rev-2



BOGM (1945.0 to 2016.0) Dip: 67.07° Field: 5232.4 nT
 Magnetic North is 8.64 degrees West of True North (84.41172015)
 To correct azimuth from True to Grid subtract 8.22 degrees
 To correct azimuth from Magnetic to Grid subtract 8.86 degrees

Office of Oil and Gas
 WV Department of Environmental Protection
 FEB 10 2015
 Accepted
 Environmental Protection
 WV Department of Environmental Protection
 Office of Oil and Gas
 Accepted
 FEB 10 2015

10/19/2017

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY		
Area	Wetzel County, WV	Slot	Slot #201
Field	Wetzel	Well	William Ritchea WTZ 201H
Facility	William Ritchea WTZ Pad	Wellbore	William Ritchea WTZ 201H PWB

REPORT SETUP INFORMATION

Projection System	NAD83 / UTM Zone 17 North, US feet		
North Reference	Grid	User	WellArchitect® 4.0.1
Scale	0.999611	Report Generated	Thomsuzc 5/4/2015 at 9:55:29 AM
Convergence at slot	0.22° East	Database/Source file	WA_Eastern_US/William Ritchea WTZ_201H_PWB.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	1.40	-13.80	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W
Facility Reference Pt			1736263.63	14406607.52	39°40'10.567"N	80°39'33.797"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.478"W

WELLPATH DATUM

Calculation method	Minimum curvature		
Horizontal Reference Pt	Slot	Rig on Slot #201 (RKB) to Facility Vertical Datum	
Vertical Reference Pt	Rig on Slot #201 (RKB)	Rig on Slot #201 (RKB) to Mean Sea Level	
MD Reference Pt	Rig on Slot #201 (RKB)	Rig on Slot #201 (RKB) to Mud Line at Slot (Slot #201)	
Field Vertical Reference	Mean Sea Level	Section Origin	N 0.00, E 0.00 ft
		Section Azimuth	315.00°

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
0.00†	0.000	216.391	0.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
22.00	0.000	216.391	22.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
122.00†	0.000	216.391	122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
222.00†	0.000	216.391	222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
322.00†	0.000	216.391	322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
422.00†	0.000	216.391	422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
522.00†	0.000	216.391	522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
622.00†	0.000	216.391	622.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
722.00†	0.000	216.391	722.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
822.00†	0.000	216.391	822.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
922.00†	0.000	216.391	922.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1022.00†	0.000	216.391	1022.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1122.00†	0.000	216.391	1122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1222.00†	0.000	216.391	1222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1322.00†	0.000	216.391	1322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1422.00†	0.000	216.391	1422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1522.00†	0.000	216.391	1522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1622.00†	0.000	216.391	1622.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1722.00†	0.000	216.391	1722.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1822.00†	0.000	216.391	1822.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
1922.00†	0.000	216.391	1922.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2022.00†	0.000	216.391	2022.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2122.00†	0.000	216.391	2122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2222.00†	0.000	216.391	2222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2322.00†	0.000	216.391	2322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2422.00†	0.000	216.391	2422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2522.00†	0.000	216.391	2522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2622.00†	0.000	216.391	2622.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2722.00†	0.000	216.391	2722.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
2822.00†	0.000	216.391	2822.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00

Environmental Protection
Office
FEB 26 2017
WV Dept of Environmental Protection
Oil and Gas

05/26/2017

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
2922.00†	0.000	216.391	2922.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3022.00†	0.000	216.391	3022.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3122.00†	0.000	216.391	3122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3222.00†	0.000	216.391	3222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3322.00†	0.000	216.391	3322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3422.00†	0.000	216.391	3422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3522.00†	0.000	216.391	3522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3622.00†	0.000	216.391	3622.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3722.00†	0.000	216.391	3722.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3822.00†	0.000	216.391	3822.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
3922.00†	0.000	216.391	3922.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4022.00†	0.000	216.391	4022.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4122.00†	0.000	216.391	4122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4222.00†	0.000	216.391	4222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4322.00†	0.000	216.391	4322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4422.00†	0.000	216.391	4422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4522.00†	0.000	216.391	4522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4622.00†	0.000	216.391	4622.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4722.00†	0.000	216.391	4722.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4822.00†	0.000	216.391	4822.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
4922.00†	0.000	216.391	4922.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5022.00†	0.000	216.391	5022.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5122.00†	0.000	216.391	5122.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5222.00†	0.000	216.391	5222.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5322.00†	0.000	216.391	5322.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5422.00†	0.000	216.391	5422.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5522.00†	0.000	216.391	5522.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5550.00	0.000	216.391	5550.00	0.00	0.00	0.00	1736249.84	14406608.92	39°40'10.582"N	80°39'33.973"W	0.00	0.000	0.00	0.00	0.00
5622.00†	2.161	216.391	5621.98	-0.20	-1.09	-0.81	1736249.03	14406607.83	39°40'10.571"N	80°39'33.983"W	1.36	216.391	3.00	3.00	0.00
5722.00†	5.162	216.391	5721.77	-1.16	-6.23	-4.59	1736245.25	14406602.69	39°40'10.520"N	80°39'34.032"W	7.74	216.391	3.00	3.00	0.00

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
5822.00†	8.164	216.391	5821.08	-2.90	-15.57	-11.48	1736238.37	14406593.35	39°40'10.428"N	80°39'34.121"W	19.34	216.391	3.00	3.00	0.00
5922.00†	11.165	216.391	5919.65	-5.41	-29.08	-21.44	1736228.41	14406579.85	39°40'10.295"N	80°39'34.249"W	36.13	216.391	3.00	3.00	0.00
6022.00†	14.166	216.391	6017.21	-8.69	-46.73	-34.44	1736215.41	14406562.21	39°40'10.121"N	80°39'34.416"W	58.05	216.391	3.00	3.00	0.00
6122.00†	17.167	216.391	6113.48	-12.73	-68.47	-50.46	1736199.40	14406540.48	39°40'09.907"N	80°39'34.622"W	85.05	216.391	3.00	3.00	0.00
6222.00†	20.169	216.391	6208.21	-17.52	-94.23	-69.45	1736180.42	14406514.73	39°40'09.653"N	80°39'34.866"W	117.06	216.391	3.00	3.00	0.00
6322.00†	23.170	216.391	6301.13	-23.05	-123.95	-91.35	1736158.52	14406485.02	39°40'09.360"N	80°39'35.147"W	153.98	216.391	3.00	3.00	0.00
6422.00†	26.171	216.391	6391.99	-29.30	-157.55	-116.12	1736133.77	14406451.43	39°40'09.029"N	80°39'35.466"W	195.72	216.391	3.00	3.00	0.00
6522.00†	29.173	216.391	6480.54	-36.25	-194.93	-143.67	1736106.23	14406414.07	39°40'08.661"N	80°39'35.820"W	242.15	216.391	3.00	3.00	0.00
6622.00†	32.174	216.391	6566.54	-43.89	-235.99	-173.93	1736075.98	14406373.02	39°40'08.256"N	80°39'36.209"W	293.16	216.391	3.00	3.00	0.00
6722.00†	35.175	216.391	6649.75	-52.18	-280.62	-206.82	1736043.10	14406328.41	39°40'07.816"N	80°39'36.632"W	348.60	216.391	3.00	3.00	0.00
6822.00†	38.177	216.391	6729.95	-61.12	-328.70	-242.25	1736007.68	14406280.35	39°40'07.342"N	80°39'37.087"W	408.32	216.391	3.00	3.00	0.00
6922.00†	41.178	216.391	6806.90	-70.68	-380.09	-280.13	1735969.82	14406228.98	39°40'06.836"N	80°39'37.574"W	472.16	216.391	3.00	3.00	0.00
7022.00†	44.179	216.391	6880.41	-80.83	-434.65	-320.34	1735929.62	14406174.44	39°40'06.298"N	80°39'38.091"W	539.94	216.391	3.00	3.00	0.00
7122.00†	47.180	216.391	6950.27	-91.54	-492.23	-362.78	1735887.20	14406116.88	39°40'05.731"N	80°39'38.636"W	611.48	216.391	3.00	3.00	0.00
7222.00†	50.182	216.391	7016.29	-102.78	-552.69	-407.34	1735842.66	14406056.45	39°40'05.135"N	80°39'39.209"W	686.57	216.391	3.00	3.00	0.00
7322.00†	53.183	216.391	7078.28	-114.52	-615.84	-453.88	1735796.14	14405993.32	39°40'04.512"N	80°39'39.807"W	765.02	216.391	3.00	3.00	0.00
7422.00†	56.184	216.391	7136.09	-126.74	-681.51	-502.28	1735747.75	14405927.67	39°40'03.865"N	80°39'40.429"W	846.61	216.391	3.00	3.00	0.00
7522.00†	59.186	216.391	7189.54	-139.39	-749.54	-552.42	1735697.64	14405859.67	39°40'03.195"N	80°39'41.074"W	931.11	216.391	3.00	3.00	0.00
7622.00†	62.187	216.391	7238.49	-152.44	-819.72	-604.14	1735645.93	14405789.52	39°40'02.503"N	80°39'41.739"W	1018.30	216.391	3.00	3.00	0.00
7722.00†	65.188	216.391	7282.81	-165.85	-891.87	-657.32	1735592.78	14405717.40	39°40'01.792"N	80°39'42.422"W	1107.93	216.391	3.00	3.00	0.00
7822.00†	68.189	216.391	7322.38	-179.60	-965.79	-711.80	1735538.32	14405643.51	39°40'01.063"N	80°39'43.122"W	1199.75	216.391	3.00	3.00	0.00
7874.15	69.755	216.391	7341.09	-186.89	-1004.98	-740.68	1735509.45	14405604.34	39°40'00.677"N	80°39'43.493"W	1248.43	216.391	3.00	3.00	0.00
7922.00†	69.683	221.491	7357.69	-191.62	-1039.87	-768.88	1735481.27	14405569.46	39°40'00.333"N	80°39'43.856"W	1293.25	216.479	10.00	-0.15	10.66
8022.00†	70.008	232.140	7392.23	-188.64	-1103.99	-837.21	1735412.96	14405505.36	39°39'59.702"N	80°39'44.733"W	1385.54	217.175	10.00	0.33	10.65
8122.00†	70.964	242.702	7425.72	-168.38	-1154.64	-916.51	1735333.69	14405454.74	39°39'59.205"N	80°39'45.749"W	1474.17	218.441	10.00	0.96	10.56
8222.00†	72.510	253.108	7457.13	-131.45	-1190.26	-1004.37	1735245.87	14405419.13	39°39'58.856"N	80°39'46.874"W	1557.39	220.158	10.00	1.55	10.41
8322.00†	74.587	263.309	7485.52	-78.97	-1209.78	-1098.11	1735152.16	14405399.61	39°39'58.666"N	80°39'48.074"W	1633.84	222.230	10.00	2.08	10.20
8422.00†	77.119	273.288	7510.02	-12.53	-1212.61	-1194.89	1735055.42	14405396.78	39°39'58.642"N	80°39'49.312"W	1702.41	224.578	10.00	2.53	9.98
8522.00†	80.019	283.053	7529.88	65.84	-1198.66	-1291.77	1734958.58	14405410.73	39°39'58.784"N	80°39'50.550"W	1762.23	227.141	10.00	2.90	9.77
8622.00†	83.198	292.639	7544.51	153.76	-1168.35	-1385.80	1734864.58	14405441.03	39°39'59.087"N	80°39'51.751"W	1812.39	229.866	10.00	3.18	9.59

REFERENCE WELLPATH IDENTIFICATION

Operator	Slot #201
Area	William Ritchea WTZ 201H
Field	William Ritchea WTZ 201H PWB
Facility	Wellbore

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
8722.00†	86.562	302.095	7553.45	248.57	-1122.60	-1474.13	1734776.29	14405486.76	39°39'59.542"N	80°39'52.878"W	1852.92	232.709	10.00	3.36	9.46
8822.00†	90.019	311.484	7556.44	347.37	-1062.81	-1554.07	1734696.38	14405546.52	39°40'00.136"N	80°39'53.898"W	1882.74	235.632	10.00	3.46	9.39
8859.48	91.320	315.000	7556.00†	384.83	-1037.14	-1581.37	1734669.09	14405572.19	39°40'00.391"N	80°39'54.245"W	1891.13	236.741	10.00	3.47	9.38
8922.00†	91.320	315.000	7554.56	447.33	-992.95	-1625.57	1734624.91	14405616.36	39°40'00.829"N	80°39'54.808"W	1904.84	238.582	0.00	0.00	0.00
9022.00†	91.320	315.000	7552.26	547.30	-922.25	-1696.26	1734554.25	14405687.03	39°40'01.530"N	80°39'55.709"W	1930.76	241.467	0.00	0.00	0.00
9122.00†	91.320	315.000	7549.95	647.28	-851.56	-1766.95	1734483.58	14405757.69	39°40'02.231"N	80°39'56.610"W	1961.45	244.269	0.00	0.00	0.00
9222.00†	91.320	315.000	7547.65	747.25	-780.87	-1837.64	1734412.92	14405828.36	39°40'02.933"N	80°39'57.510"W	1996.67	246.978	0.00	0.00	0.00
9322.00†	91.320	315.000	7545.35	847.22	-710.18	-1908.33	1734342.25	14405899.02	39°40'03.634"N	80°39'58.411"W	2036.20	249.587	0.00	0.00	0.00
9422.00†	91.320	315.000	7543.04	947.20	-639.49	-1979.03	1734271.59	14405969.68	39°40'04.335"N	80°39'59.312"W	2079.78	252.093	0.00	0.00	0.00
9522.00†	91.320	315.000	7540.74	1047.17	-568.80	-2049.72	1734200.92	14406040.35	39°40'05.036"N	80°40'00.212"W	2127.17	254.491	0.00	0.00	0.00
9622.00†	91.320	315.000	7538.43	1147.14	-498.10	-2120.41	1734130.26	14406111.01	39°40'05.738"N	80°40'01.113"W	2178.13	256.780	0.00	0.00	0.00
9722.00†	91.320	315.000	7536.13	1247.12	-427.41	-2191.10	1734059.60	14406181.68	39°40'06.439"N	80°40'02.014"W	2232.40	258.962	0.00	0.00	0.00
9822.00†	91.320	315.000	7533.83	1347.09	-356.72	-2261.79	1733988.93	14406252.34	39°40'07.140"N	80°40'02.914"W	2289.75	261.037	0.00	0.00	0.00
9922.00†	91.320	315.000	7531.52	1447.06	-286.03	-2332.49	1733918.27	14406323.00	39°40'07.841"N	80°40'03.815"W	2349.96	263.009	0.00	0.00	0.00
10022.00†	91.320	315.000	7529.22	1547.04	-215.34	-2403.18	1733847.60	14406393.67	39°40'08.542"N	80°40'04.715"W	2412.81	264.880	0.00	0.00	0.00
10122.00†	91.320	315.000	7526.92	1647.01	-144.65	-2473.87	1733776.94	14406464.33	39°40'09.244"N	80°40'05.616"W	2478.10	266.654	0.00	0.00	0.00
10222.00†	91.320	315.000	7524.61	1746.98	-73.95	-2544.56	1733706.27	14406535.00	39°40'09.945"N	80°40'06.517"W	2545.64	268.335	0.00	0.00	0.00
10322.00†	91.320	315.000	7522.31	1846.96	-3.26	-2615.26	1733635.61	14406605.66	39°40'10.646"N	80°40'07.418"W	2615.26	269.929	0.00	0.00	0.00
10422.00†	91.320	315.000	7520.01	1946.93	67.43	-2685.95	1733564.94	14406676.32	39°40'11.347"N	80°40'08.318"W	2686.79	271.438	0.00	0.00	0.00
10522.00†	91.320	315.000	7517.70	2046.91	138.12	-2756.64	1733494.28	14406746.99	39°40'12.049"N	80°40'09.219"W	2760.10	272.868	0.00	0.00	0.00
10622.00†	91.320	315.000	7515.40	2146.88	208.81	-2827.33	1733423.62	14406817.65	39°40'12.750"N	80°40'10.120"W	2835.03	274.224	0.00	0.00	0.00
10722.00†	91.320	315.000	7513.09	2246.85	279.50	-2898.02	1733352.95	14406888.32	39°40'13.451"N	80°40'11.020"W	2911.47	275.509	0.00	0.00	0.00
10822.00†	91.320	315.000	7510.79	2346.83	350.20	-2968.72	1733282.29	14406958.98	39°40'14.152"N	80°40'11.921"W	2989.30	276.728	0.00	0.00	0.00
10922.00†	91.320	315.000	7508.49	2446.80	420.89	-3039.41	1733211.62	14407029.64	39°40'14.853"N	80°40'12.822"W	3068.41	277.884	0.00	0.00	0.00
11022.00†	91.320	315.000	7506.18	2546.77	491.58	-3110.10	1733140.96	14407100.31	39°40'15.555"N	80°40'13.722"W	3148.71	278.982	0.00	0.00	0.00
11122.00†	91.320	315.000	7503.88	2646.75	562.27	-3180.79	1733070.29	14407170.97	39°40'16.256"N	80°40'14.623"W	3230.11	280.025	0.00	0.00	0.00
11222.00†	91.320	315.000	7501.58	2746.72	632.96	-3251.48	1732999.63	14407241.64	39°40'16.957"N	80°40'15.524"W	3312.52	281.016	0.00	0.00	0.00
11322.00†	91.320	315.000	7499.27	2846.69	703.65	-3322.18	1732928.96	14407312.30	39°40'17.658"N	80°40'16.425"W	3395.88	281.959	0.00	0.00	0.00
11422.00†	91.320	315.000	7496.97	2946.67	774.35	-3392.87	1732858.30	14407382.96	39°40'18.359"N	80°40'17.325"W	3480.11	282.856	0.00	0.00	0.00
11522.00†	91.320	315.000	7494.67	3046.64	845.04	-3463.56	1732787.63	14407453.63	39°40'19.060"N	80°40'18.226"W	3565.16	283.711	0.00	0.00	0.00

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
11622.00†	91.320	315.000	7492.36	3146.61	915.73	-3534.25	1732716.97	14407524.29	39°40'19.762"N	80°40'19.127"W	3650.96	284.526	0.00	0.00	0.00
11722.00†	91.320	315.000	7490.06	3246.59	986.42	-3604.95	1732646.31	14407594.96	39°40'20.463"N	80°40'20.028"W	3737.47	285.303	0.00	0.00	0.00
11822.00†	91.320	315.000	7487.75	3346.56	1057.11	-3675.64	1732575.64	14407665.62	39°40'21.164"N	80°40'20.928"W	3824.63	286.045	0.00	0.00	0.00
11922.00†	91.320	315.000	7485.45	3446.53	1127.80	-3746.33	1732504.98	14407736.28	39°40'21.865"N	80°40'21.829"W	3912.41	286.754	0.00	0.00	0.00
12022.00†	91.320	315.000	7483.15	3546.51	1198.50	-3817.02	1732434.31	14407806.95	39°40'22.566"N	80°40'22.730"W	4000.76	287.432	0.00	0.00	0.00
12122.00†	91.320	315.000	7480.84	3646.48	1269.19	-3887.71	1732363.65	14407877.61	39°40'23.268"N	80°40'23.631"W	4089.64	288.080	0.00	0.00	0.00
12222.00†	91.320	315.000	7478.54	3746.45	1339.88	-3958.41	1732292.98	14407948.28	39°40'23.969"N	80°40'24.531"W	4179.03	288.700	0.00	0.00	0.00
12322.00†	91.320	315.000	7476.24	3846.43	1410.57	-4029.10	1732222.32	14408018.94	39°40'24.670"N	80°40'25.432"W	4268.88	289.295	0.00	0.00	0.00
12422.00†	91.320	315.000	7473.93	3946.40	1481.26	-4099.79	1732151.65	14408089.60	39°40'25.371"N	80°40'26.333"W	4359.18	289.865	0.00	0.00	0.00
12522.00†	91.320	315.000	7471.63	4046.37	1551.95	-4170.48	1732080.99	14408160.27	39°40'26.072"N	80°40'27.234"W	4449.89	290.412	0.00	0.00	0.00
12622.00†	91.320	315.000	7469.33	4146.35	1622.65	-4241.17	1732010.33	14408230.93	39°40'26.773"N	80°40'28.135"W	4540.99	290.937	0.00	0.00	0.00
12722.00†	91.320	315.000	7467.02	4246.32	1693.34	-4311.87	1731939.66	14408301.60	39°40'27.475"N	80°40'29.035"W	4632.45	291.441	0.00	0.00	0.00
12822.00†	91.320	315.000	7464.72	4346.29	1764.03	-4382.56	1731869.00	14408372.26	39°40'28.176"N	80°40'29.936"W	4724.26	291.925	0.00	0.00	0.00
12922.00†	91.320	315.000	7462.42	4446.27	1834.72	-4453.25	1731798.33	14408442.92	39°40'28.877"N	80°40'30.837"W	4816.39	292.391	0.00	0.00	0.00
13022.00†	91.320	315.000	7460.11	4546.24	1905.41	-4523.94	1731727.67	14408513.59	39°40'29.578"N	80°40'31.738"W	4908.84	292.840	0.00	0.00	0.00
13122.00†	91.320	315.000	7457.81	4646.22	1976.10	-4594.64	1731657.00	14408584.25	39°40'30.279"N	80°40'32.639"W	5001.57	293.272	0.00	0.00	0.00
13222.00†	91.320	315.000	7455.50	4746.19	2046.80	-4665.33	1731586.34	14408654.92	39°40'30.980"N	80°40'33.540"W	5094.57	293.688	0.00	0.00	0.00
13322.00†	91.320	315.000	7453.20	4846.16	2117.49	-4736.02	1731515.67	14408725.58	39°40'31.682"N	80°40'34.440"W	5187.84	294.090	0.00	0.00	0.00
13422.00†	91.320	315.000	7450.90	4946.14	2188.18	-4806.71	1731445.01	14408796.24	39°40'32.383"N	80°40'35.341"W	5281.35	294.477	0.00	0.00	0.00
13522.00†	91.320	315.000	7448.59	5046.11	2258.87	-4877.40	1731374.35	14408866.91	39°40'33.084"N	80°40'36.242"W	5375.09	294.850	0.00	0.00	0.00
13622.00†	91.320	315.000	7446.29	5146.08	2329.56	-4948.10	1731303.68	14408937.57	39°40'33.785"N	80°40'37.143"W	5469.05	295.211	0.00	0.00	0.00
13722.00†	91.320	315.000	7443.99	5246.06	2400.25	-5018.79	1731233.02	14409008.24	39°40'34.486"N	80°40'38.044"W	5563.22	295.560	0.00	0.00	0.00
13822.00†	91.320	315.000	7441.68	5346.03	2470.95	-5089.48	1731162.35	14409078.90	39°40'35.187"N	80°40'38.945"W	5657.60	295.897	0.00	0.00	0.00
13922.00†	91.320	315.000	7439.38	5446.00	2541.64	-5160.17	1731091.69	14409149.56	39°40'35.888"N	80°40'39.845"W	5752.16	296.223	0.00	0.00	0.00
14022.00†	91.320	315.000	7437.08	5545.98	2612.33	-5230.87	1731021.02	14409220.23	39°40'36.590"N	80°40'40.746"W	5846.90	296.538	0.00	0.00	0.00
14122.00†	91.320	315.000	7434.77	5645.95	2683.02	-5301.56	1730950.36	14409290.89	39°40'37.291"N	80°40'41.647"W	5941.81	296.843	0.00	0.00	0.00
14222.00†	91.320	315.000	7432.47	5745.92	2753.71	-5372.25	1730879.69	14409361.56	39°40'37.992"N	80°40'42.548"W	6036.89	297.139	0.00	0.00	0.00
14322.00†	91.320	315.000	7430.16	5845.90	2824.40	-5442.94	1730809.03	14409432.22	39°40'38.693"N	80°40'43.449"W	6132.12	297.425	0.00	0.00	0.00
14422.00†	91.320	315.000	7427.86	5945.87	2895.10	-5513.63	1730738.36	14409502.88	39°40'39.394"N	80°40'44.350"W	6227.50	297.703	0.00	0.00	0.00
14522.00†	91.320	315.000	7425.56	6045.84	2965.79	-5584.33	1730667.70	14409573.55	39°40'40.095"N	80°40'45.251"W	6323.02	297.972	0.00	0.00	0.00

Environmental Protection
 EPA Department of
 WV Department of
 Office of Planning
 08/26/2017

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

WELLPATH DATA (163 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
14622.00†	91.320	315.000	7423.25	6145.82	3036.48	-5655.02	1730597.04	14409644.21	39°40'40.796"N	80°40'46.152"W	6418.68	298.234	0.00	0.00	0.00
14722.00†	91.320	315.000	7420.95	6245.79	3107.17	-5725.71	1730526.37	14409714.88	39°40'41.498"N	80°40'47.053"W	6514.47	298.487	0.00	0.00	0.00
14822.00†	91.320	315.000	7418.65	6345.76	3177.86	-5796.40	1730455.71	14409785.54	39°40'42.199"N	80°40'47.953"W	6610.38	298.734	0.00	0.00	0.00
14922.00†	91.320	315.000	7416.34	6445.74	3248.55	-5867.09	1730385.04	14409856.20	39°40'42.900"N	80°40'48.854"W	6706.41	298.973	0.00	0.00	0.00
15022.00†	91.320	315.000	7414.04	6545.71	3319.25	-5937.79	1730314.38	14409926.87	39°40'43.601"N	80°40'49.755"W	6802.55	299.205	0.00	0.00	0.00
15122.00†	91.320	315.000	7411.74	6645.68	3389.94	-6008.48	1730243.71	14409997.53	39°40'44.302"N	80°40'50.656"W	6898.80	299.431	0.00	0.00	0.00
15222.00†	91.320	315.000	7409.43	6745.66	3460.63	-6079.17	1730173.05	14410068.20	39°40'45.003"N	80°40'51.557"W	6995.16	299.651	0.00	0.00	0.00
15322.00†	91.320	315.000	7407.13	6845.63	3531.32	-6149.86	1730102.38	14410138.86	39°40'45.704"N	80°40'52.458"W	7091.62	299.865	0.00	0.00	0.00
15422.00†	91.320	315.000	7404.82	6945.60	3602.01	-6220.56	1730031.72	14410209.52	39°40'46.405"N	80°40'53.359"W	7188.17	300.073	0.00	0.00	0.00
15522.00†	91.320	315.000	7402.52	7045.58	3672.70	-6291.25	1729961.06	14410280.19	39°40'47.106"N	80°40'54.260"W	7284.82	300.276	0.00	0.00	0.00
15622.00†	91.320	315.000	7400.22	7145.55	3743.40	-6361.94	1729890.39	14410350.85	39°40'47.808"N	80°40'55.161"W	7381.55	300.473	0.00	0.00	0.00
15722.00†	91.320	315.000	7397.91	7245.53	3814.09	-6432.63	1729819.73	14410421.52	39°40'48.509"N	80°40'56.062"W	7478.37	300.665	0.00	0.00	0.00
15743.44	91.320	315.000	7397.42 ²	7266.96	3829.24	-6447.79	1729804.58	14410436.66	39°40'48.659"N	80°40'56.255"W	7499.14	300.705	0.00	0.00	0.00

REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201
Area	Wetzel County, WV	Well	William Ritchea WTZ 201H
Field	Wetzel	Wellbore	William Ritchea WTZ 201H PWB
Facility	William Ritchea WTZ Pad		

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
2) William Ritchea WTZ 201H BHL Rev-2	15743.44	7397.42	3829.24	-6447.79	1729804.58	14410436.66	39°40'48.659"N	80°40'56.255"W	point
1) William Ritchea WTZ 201H LP Rev-2	8859.48	7556.00	-1037.14	-1581.37	1734669.09	14405572.19	39°40'00.391"N	80°39'54.245"W	point

SURVEY PROGRAM - Ref Wellbore: William Ritchea WTZ 201H PWB Ref Wellpath: William Ritchea WTZ 201H PWP Ex-01

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
22.00	15743.44	NaviTrak (Standard)		William Ritchea WTZ 201H PWB