

JAN 29 2021



Southwestern Energy

WV Department of  
Environmental Protection



<b>Borehole:</b> Original Borehole	<b>Well:</b> Franz Thoman OHI 10H	<b>Field:</b> WV Ohio County (NAD 83 UTM 17N)	<b>Structure:</b> SDC 40
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<b>Gravity &amp; Magnetic Parameters</b> Model: HDGM 2019 Dip: 67.31° Date: 23-Dec-2018 MagDec: -8.044° FS: 52377.434mT Gravity FS: 999.37mgals (9.80665 Based)	<b>Surface Location</b> NAD83 UTM Zone 17N, US Feet Lat: N 40 8 11.37 Northing: 14574674.99NUS Lon: W 80 39 35.81 Easting: 1735474.18NUS Grid Conv: 0.2192° Scale Fact: 0.99941633	<b>Miscellaneous</b> Franz Thoman OHI 10H Plan: Southwestern Energy Franz Thoman OHI 10H MWD 0' to 12833' MD TVD Ref: KB(1163.3ft above MSL)
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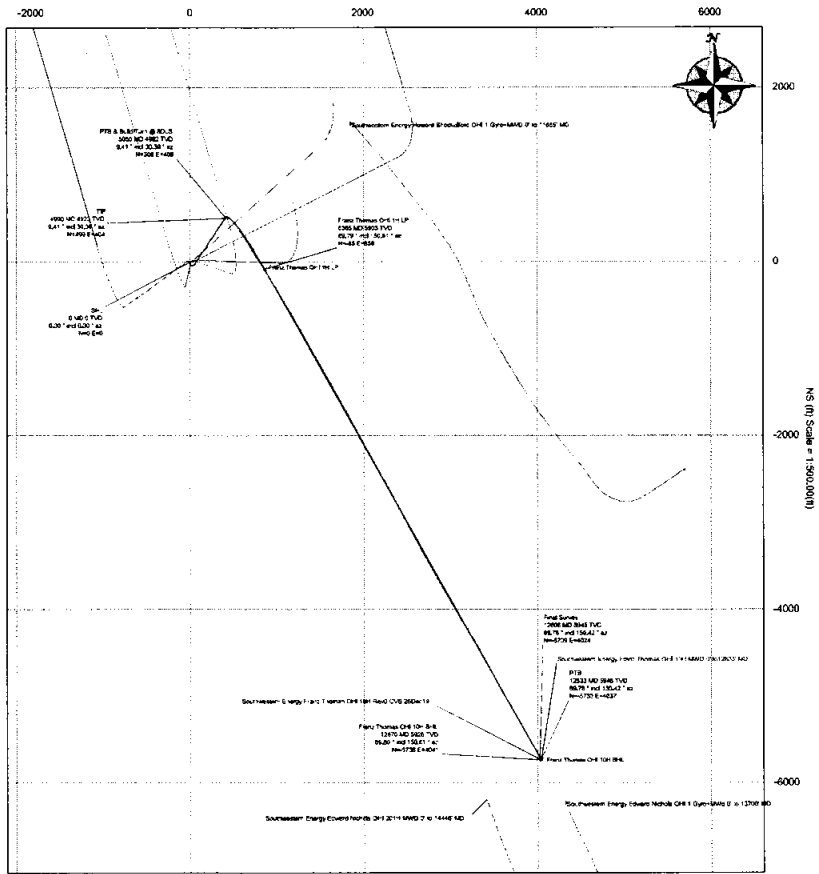
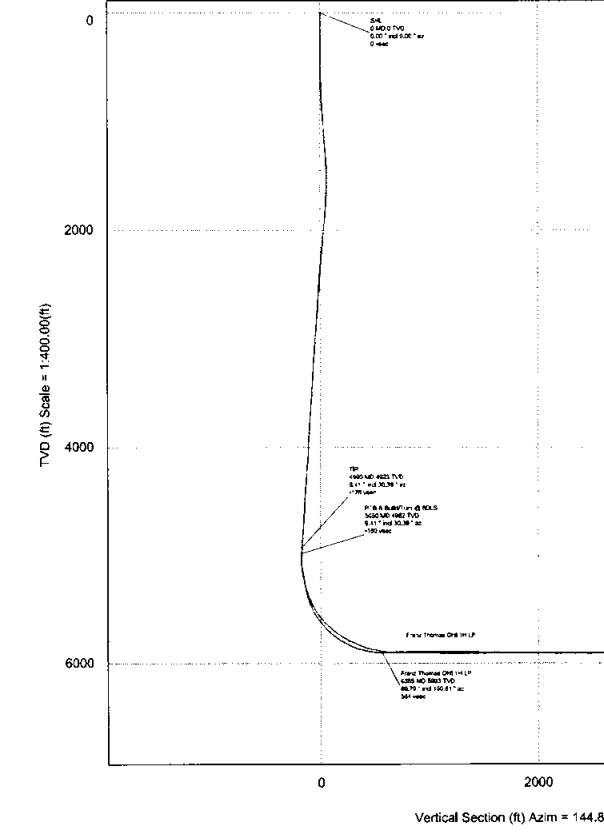
PRF	Seq.	Survey Tool	Vendor/Tool	Side Size (in)	String Size (in)	Expected MD From (ft)	MD To (ft)	Borehole Frequency (Hz)	EDU Size (mm)	EDU Size (mm)	EDU Size (mm)	Comments/Contingency
1	1	NAL_SMDCHDR_S-B-Depth Only		30	30	0	26	194.125	1.25"	1.25"		
1	2	NAL_SMDCHDR_S-B-Depth Only		30	30	26	26	Act. Str.	1.25"	1.25"		
1	3	NAL_SMDCHDR_S-B		30	30	26	1480	Act. Str.	17.338	8.205		
1	4	NAL_SMDCHDR_S-B		30	30	1480	17433	Act. Str.	251.634	14.890		

Point	MO	MOI	AZMI	TVD	VSEC	N195H	E115WH	DLB
Shk	0.30	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Final Survey	12803.00	66.78	153.42	12845.60	896.674	-1709.76	4023.94	1.20
PTS	12823.00	66.78	153.42	12845.61	896.674	-1709.76	4023.94	1.20

Grid  
True  
Mag

Grid North  
Tot Corr (M->G -8.266°)  
Mag Dec (-8.044°)  
Grid Conv (0.219°)

Target Description	Grid Coord	Local Coord
Target Name	Shape	Dimension
Franz Thoman OHI 10 LP	Point	N/A
Franz Thoman OHI 10H BHA	Point	N/A



**CONTROLLED**

Plan No: Franz Thoman OHI 10H MWD 0' to 12833'

Scale: 1:500

Date: 01/29/2021

Drawn By: [Signature]

Checked By: [Signature]

09/10/2021

Schlumberger

Southwestern Energy Franz Thoman OHI 10H MWD 0' to 12833' MD Survey Geodetic Report (Def Survey)

RECEIVED Office of Oil and Gas

JAN 29 2021

WV Department of Environmental Protection

Report Date: February 05, 2020 - 10:48 AM
Client: Southwestern Energy
Field: WV Ohio County (NAD 83 UTM 17N)
Structure / Slot: Southwestern Energy Franz Thoman OHI Pad / Franz Thoman OHI 10H
Well: Franz Thoman OHI 10H
Borehole: Original Borehole
UWI / APRI: Unknown / Unknown
Survey Name: Southwestern Energy Franz Thoman OHI 10H MWD 0' to 12833' MD
Survey Date: December 23, 2019
Tori AND / DOI / ERO Dates: 206.867 / 7994.889 N / 8.553 / 1.345
Coordinate Reference System: NAD83 UTM Zone 17N, US Feet
Location Lat / Long: N 40° 8' 11.9240", W 80° 39' 35.6112"
Magnetic Declination: -8.046°
North Reference: GRS North
Grid Scale Factor: 0.99991033
Version / Patch: 2.10.794.0

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVD55 (ft), VSECC (ft), NS (ft), EW (ft), DLS (ft), TF (ft), BR (ft), TR (ft), Northing (ftUS), Easting (ftUS), Latitude (°), Longitude (°), Directional (°), Difficulty Index. Contains detailed survey data points from 0 to 9370.00 MD.

09/10/2021

Comments	ID (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DL5 (ft/100ft)	TF	BR (ft/100ft)	TR (ft/100ft)	Northing (ft)	Eastings (ft)	Latitude (°)	Longitude (°)	Directional Difficulty Index	
8467.00	90.00	151.28	5903.04	4736.74	2699.90	-1923.26	1905.94	0.47	155.56L	0.18	-0.43	14574756.46	1737378.38	40.13139643	-80.65310234	5.95		
8560.00	88.78	151.16	5903.21	4739.91	2782.42	-2004.76	1900.73	0.26	167.17L	-0.24	-0.11	14574675.02	1737424.15	40.13135222	-80.65294330	5.97		
8652.00	88.99	150.98	5904.20	4740.90	2853.86	-2055.28	1995.23	0.88	124.51R	-0.86	-0.20	14574564.53	1737468.63	40.13081373	-80.65278528	5.98		
8745.00	88.88	151.14	5905.93	4742.83	2946.30	-2166.65	2040.22	0.21	88.75L	-0.12	0.17	14574513.19	1737515.61	40.13089898	-80.65262551	6.00		
8838.00	88.15	150.42	5907.52	4744.22	3038.78	-2247.80	2085.62	0.83	67.23R	0.30	-0.77	14574432.07	1737556.98	40.13046662	-80.65246432	6.02		
8930.00	89.50	151.23	5908.80	4745.30	3130.27	-2328.13	2130.46	0.35	154.6L	0.37	0.88	14574351.78	1737603.81	40.13024586	-80.65232507	6.03		
9022.00	89.10	151.04	5909.72	4746.42	3221.71	-2408.69	2174.87	0.48	36.87R	-0.43	-0.21	14574271.25	1737648.20	40.13002403	-80.65214739	6.05		
9115.00	89.22	151.13	5911.06	4747.78	3314.15	-2490.09	2219.83	0.16	73.25L	0.13	0.10	14574188.88	1737693.14	40.12980111	-80.65198774	6.06		
9208.00	89.50	150.20	5912.12	4748.92	3405.66	-2571.16	2265.38	1.04	121.18R	0.30	-1.00	14574108.85	1737738.89	40.12957709	-80.65182956	6.08		
9300.00	88.88	151.02	5913.42	4750.12	3498.18	-2651.31	2310.53	1.12	65.12R	-0.67	0.89	14574028.73	1737783.81	40.12935559	-80.65166564	6.09		
9393.00	88.78	152.86	5914.51	4751.21	3590.44	-2733.40	2354.20	2.30	82.21L	0.97	2.08	14573946.66	1737827.48	40.12913077	-80.65151062	6.11		
9486.00	88.72	151.40	5914.92	4751.82	3682.67	-2815.65	2397.61	1.68	78.08R	-0.06	-1.68	14573864.45	1737870.85	40.12890453	-80.65135657	6.13		
9579.00	89.03	153.01	5915.08	4751.79	3774.90	-2897.52	2440.97	1.07	115.6L	0.37	1.73	14573782.21	1737914.20	40.12867824	-80.65120265	6.14		
9671.00	88.83	152.53	5915.18	4751.88	3866.02	-2979.72	2483.07	0.58	108.37L	-0.25	-0.52	14573700.44	1737956.28	40.12845323	-80.65104828	6.16		
9763.00	88.61	151.89	5915.03	4752.33	3957.28	-3061.11	2525.96	0.74	89L	-0.24	-0.70	14573618.08	1737998.15	40.12822836	-80.65089402	6.17		
9855.00	89.61	151.48	5916.26	4752.96	4046.60	-3142.10	2569.59	0.45	14.74L	0.00	-0.45	14573536.13	1738042.77	40.12800357	-80.65074611	6.19		
9948.00	90.56	151.23	5916.12	4752.82	4140.98	-3223.72	2614.18	1.06	126.87L	1.02	-0.27	14573456.54	1738087.34	40.12778025	-80.65059874	6.20		
10041.00	90.50	151.15	5915.28	4751.96	4233.42	-3305.20	2658.99	0.11	99.48L	-0.06	-0.09	14573375.09	1738132.13	40.12755789	-80.65045272	6.21		
10133.00	90.45	150.85	5914.50	4751.20	4324.88	-3385.66	2703.59	0.33	87.27L	-0.05	-0.33	14573294.66	1738176.72	40.12733654	-80.65030636	6.22		
10226.00	90.39	150.38	5913.82	4750.52	4417.40	-3466.89	2749.22	0.51	92.69R	-0.08	-0.51	14573213.29	1738221.33	40.12711361	-80.65016033	6.24		
10318.00	90.34	151.46	5913.23	4749.83	4508.88	-3547.09	2793.54	1.18	96.86L	-0.05	-1.17	14573133.29	1738267.03	40.12689243	-80.6499957	6.25		
10411.00	90.17	150.37	5912.82	4749.52	4601.35	-3628.37	2839.14	1.19	137.48L	-0.18	-1.17	14573052.05	1738312.21	40.12666986	-80.64987805	6.26		
10503.00	89.33	149.60	5913.22	4749.92	4692.98	-3708.03	2885.16	1.24	64.51R	-0.81	-0.84	14572972.42	1738356.22	40.12644669	-80.64962961	6.28		
10596.00	89.38	150.12	5914.28	4750.96	4784.45	-3788.45	2931.86	0.56	170.68R	0.05	-0.56	14572892.03	1738404.89	40.12622843	-80.64949577	6.29		
10689.00	88.71	150.23	5915.81	4752.51	4878.20	-3868.12	2978.10	0.73	152.37L	-0.72	0.12	14572811.39	1738451.12	40.12600649	-80.64929554	6.30		
10782.00	87.87	149.79	5916.59	4753.29	4970.78	-3948.83	3024.57	1.02	2.91R	-0.80	-0.47	14572730.91	1738497.57	40.12578498	-80.64913052	6.32		
10871.00	89.05	149.85	5920.98	4757.68	5059.41	-4026.54	3069.29	1.33	6.03L	1.33	0.07	14572654.04	1738542.27	40.12557338	-80.64897168	6.33		
10962.00	90.28	149.72	5921.51	4758.21	5150.06	-4105.17	3115.09	1.36	80L	1.35	-0.14	14572575.43	1738586.05	40.12535704	-80.64880903	6.34		
11055.00	90.28	149.47	5921.06	4757.76	5242.74	-4185.38	3162.16	0.27	121.18L	0.00	-0.27	14572496.26	1738630.10	40.12513935	-80.64864186	6.35		
11147.00	89.33	147.96	5921.37	4758.07	5334.00	-4264.00	3209.53	1.94	123.87R	-1.03	-1.64	14572416.67	1738672.85	40.12492003	-80.64848214	6.37		
11240.00	88.82	148.72	5922.87	4758.57	5427.34	-4343.15	3258.74	0.98	100.46R	-0.55	0.82	14572337.55	1738717.64	40.12470223	-80.64832874	6.38		
11333.00	88.54	150.24	5925.02	4761.72	5520.00	-4423.24	3305.95	1.66	82.18R	-0.30	1.63	14572257.49	1738768.84	40.12448187	-80.64813104	6.39		
11425.00	88.77	151.91	5927.18	4763.88	5611.43	-4503.74	3350.43	1.83	107.88L	0.25	-1.82	14572177.02	1738823.30	40.12426942	-80.64797311	6.40		
11518.00	88.38	150.70	5929.48	4766.19	5702.80	-4585.29	3395.07	1.37	40.8R	-0.42	-1.30	14572095.50	1738879.93	40.12406077	-80.64781465	6.42		
11611.00	88.66	150.84	5931.89	4768.59	5795.27	-4666.46	3440.40	0.40	88.54L	0.30	0.26	14572014.36	1738931.23	40.12381277	-80.64765372	6.43		
11704.00	88.80	150.54	5934.11	4770.81	5888.74	-4747.57	3485.84	0.43	81.3L	-0.06	-0.43	14571933.29	1738988.66	40.12359962	-80.64749226	6.44		
11796.00	88.88	150.50	5936.14	4772.94	5980.27	-4827.84	3531.11	0.51	20.56R	0.30	-0.04	14571852.25	1739030.91	40.12339534	-80.64733166	6.45		
11889.00	88.84	150.53	5937.91	4774.61	6072.79	-4908.58	3576.87	0.07	19.88L	0.06	0.03	14571772.34	1739084.65	40.12318666	-80.64716916	6.46		
11982.00	89.38	150.37	5939.27	4775.97	6165.34	-4989.47	3622.73	0.50	92.68R	0.47	-0.17	14571691.48	1739138.00	40.12298210	-80.64700832	6.48		
12075.00	88.33	151.44	5940.28	4776.96	6254.83	-5068.11	3668.49	1.19	94L	-0.06	-1.19	14571612.87	1739193.24	40.12277077	-80.64685096	6.48		
12168.00	89.27	150.58	5941.41	4778.11	6346.28	-5148.58	3711.08	0.94	61.2R	-0.07	-0.93	14571532.44	1739248.81	40.12256400	-80.64669268	6.49		
12257.00	88.55	150.61	5942.36	4779.06	6438.81	-5229.58	3756.74	0.30	90L	0.30	0.03	14571451.45	1739298.45	40.12235632	-80.64653057	6.50		
12349.00	89.55	150.57	5943.09	4779.79	6530.34	-5309.73	3801.91	0.04	52.52R	0.00	-0.04	14571371.34	1739347.61	40.12214904	-80.64637018	6.50		
12442.00	89.78	150.87	5943.63	4780.33	6622.85	-5390.85	3847.40	0.41	20.56L	0.25	0.32	14571290.26	1739392.07	40.12191987	-80.64620870	6.51		
12535.00	89.84	150.81	5943.86	4780.56	6715.34	-5472.06	3892.71	0.18	148.38R	0.17	-0.08	14571209.08	1739435.37	40.12169455	-80.64604763	6.52		
12628.00	89.55	151.05	5944.27	4780.97	6807.81	-5553.34	3937.50	0.49	81.28R	-0.42	0.26	14571127.83	1739480.54	40.12147383	-80.64588741	6.53		
12720.00	88.61	151.44	5944.95	4781.65	6899.23	-5634.00	3982.15	0.43	80.54L	0.07	0.42	14571047.20	1739524.78	40.12121508	-80.64573032	6.54		
Final Survey	12806.00	89.78	150.42	5945.40	4782.10	6984.74	-5708.16	4023.94	1.20	HS	0.20	-1.19	14570972.07	1739569.54	40.12094417	-80.64558188	6.55	
PTB	12833.00	89.78	150.42	5945.51	4782.21	7011.61	-5732.64	4037.27	1.00	HS	0.20	0.00	14570948.60	1739590.87	40.12087957	-80.64553466	6.55	

Survey Type: Def Survey

Survey Error Model: ISONSA Rev 0 \*\*\* 3-D 95.000% Confidence 2.7855 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EQI Freq (ft)	Hole Size Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	28.000	198.425	30.000	NAL_MWD-NON_SLB-Depth Only	Original Borehole / Southwestern Energy Franz Thomas OHI 10H MWD 0' to 2833' MD
	1	26.000	28.000	Act Strs	30.000	NAL_MWD-NON_SLB-Depth Only	Original Borehole / Southwestern Energy Franz Thomas OHI 10H MWD 0' to 2833' MD
	1	26.000	4980.000	Act Strs	30.000	NAL_MWD-NON_SLB	Original Borehole / Southwestern Energy Franz Thomas OHI 10H
	1	4980.000	12833.000	Act Strs	30.000	NAL_MWD_1.0_DEC	Original Borehole / Southwestern Energy Franz Thomas OHI 10H