



Schlumberger Survey Report

Tuesday, January 14, 2020 10:08 PM, Report by DrillOps

General Information	
Client:	SWN Production Company, LLC
Field:	Panhandle
Well Name:	Franz Thoman OHI 1H

Job Location & Elevation	
Latitude:	40°8'12" N
Longitude:	80°39'35" W
Permanent Datum:	SeaLevel
Log Measured From:	DrillFloor
Elevation of Drill Floor:	1163.30 ft
Elevation of Ground:	1137.30 ft
Depth Source:	1163.30 DrillersDepth

MWD Survey Reference Criteria

Run1	
Geomag Model:	HDGM 2019
Location G:	999.37 mgn
Location B:	52374.01 nT
Magnetic Dip:	67.31 deg
Magnetic dec (+E/W-):	'-8.05 deg
Grid convergence (+E/W-):	0.22 deg
GTotal az corr (+E/W-):	'-8.27 deg
Calculation Date:	03-Jan-2020

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Survey List									
MD (ft)	Incl (deg)	Azim (deg)	TVD (ft)	V Sec (ft)	N/-S (ft)	E/-W (ft)	DLS (deg/100ft)	CLOSURE_DISTANCE (ft)	JRE_AZIMUTH (deg)

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2925	12.36	234.64	2878.65	-125.4	-266.13	-366.47	0.37	452.91	234.01
3018	12.33	234.86	2969.5	-130.66	-277.61	-382.7	0.06	472.79	234.04
3111	12.5	236.73	3060.32	-135.59	-288.85	-399.24	0.47	492.77	234.11
3201	12.72	234.51	3148.15	-140.5	-299.94	-415.45	0.59	512.41	234.17
3293	12.68	233.51	3237.9	-146.1	-311.83	-431.81	0.24	532.63	234.17
3386	12.82	231.01	3328.61	-152.39	-324.39	-448.04	0.61	553.14	234.09
3479	12.45	228.96	3419.36	-159.37	-337.46	-463.62	0.63	573.43	233.95
3572	11.8	229.84	3510.28	-166.28	-350.18	-478.45	0.73	592.91	233.8
3665	11.08	234.38	3601.44	-171.99	-361.52	-492.98	1.24	611.33	233.75
3757	12.13	239.03	3691.56	-176.24	-371.64	-508.46	1.53	629.8	233.84
3849	12.63	237.87	3781.42	-180.22	-381.96	-525.26	0.61	649.46	233.98
3940	12.56	240.64	3870.23	-183.95	-392.1	-542.31	0.67	669.21	234.13
4032	12.84	238.58	3959.98	-187.63	-402.34	-559.75	0.58	689.35	234.29
4125	13.25	234.31	4050.58	-192.59	-413.94	-577.23	1.13	710.31	234.35
4218	12.6	235.33	4141.22	-198.07	-425.93	-594.23	0.74	731.11	234.37
4310	12.66	232.81	4231	-203.62	-437.73	-610.51	0.6	751.22	234.36
4402	12.32	233.43	4320.82	-209.43	-449.68	-626.43	0.4	771.11	234.33
4493	12.45	231.45	4409.7	-215.34	-461.57	-641.89	0.49	790.62	234.28
4583	12.07	232.7	4497.65	-221.25	-473.32	-656.97	0.52	809.71	234.23
4675	12.1	240.86	4587.62	-225.68	-483.85	-673.04	1.86	828.91	234.29
4766	12.48	241.51	4676.53	-228.67	-493.18	-690.01	0.44	848.14	234.45
4858	12.1	234.08	4766.43	-232.81	-503.58	-706.56	1.77	867.65	234.52
4949	12.27	230.28	4855.38	-238.72	-515.35	-721.72	0.9	886.83	234.47
5008	11.73	233.56	4913.09	-242.55	-522.92	-731.37	1.47	899.08	234.44
5050	11.85	231.46	4954.21	-245.14	-528.15	-738.18	1.06	907.66	234.42
5142	10.1	208.37	5044.57	-253.53	-541.14	-749.4	5.1	924.35	234.17
5235	8.14	244.02	5136.46	-259.66	-551.2	-759.21	6.31	938.2	234.02
5328	11	303.04	5228.35	-253.26	-549.25	-772.6	10.45	947.93	234.59
5419	15.64	341.37	5317.05	-234.02	-532.85	-783.82	10.69	947.79	235.79
5511	23.25	339.59	5403.73	-203.42	-504.04	-794.13	8.29	940.58	237.6
5603	25.93	330.92	5485.99	-162.53	-466.9	-811.64	8.39	936.36	240.09
5696	27.06	298.94	5563.49	-112.07	-422.56	-837.42	7.75	937.99	243.22

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5785	43.77	331.19	5631.22	-55.28	-372.56	-866.12	7.72	942.85	246.73
5878	50.59	333.34	5694.4	12.26	-312.19	-897.79	7.52	950.52	250.83
5971	58.09	335.64	5748.59	87.41	-244.03	-930.24	8.31	961.72	255.3
6063	64.55	338.29	5792.72	167.95	-169.78	-961.75	7.46	976.62	259.99
6153	71.24	337.43	5826.57	251.22	-92.59	-993.18	7.48	997.49	264.67
6246	77.42	337.19	5851.68	340.62	-10.02	-1027.71	6.64	1027.76	269.44
6338	82.13	338.15	5868.01	431.05	73.7	-1062.1	5.23	1064.66	273.97
6431	86.53	342.56	5877.2	523.55	160.82	-1093.19	6.68	1104.96	278.37
6524	89.22	343.43	5880.65	616.35	249.68	-1120.37	3.04	1147.85	282.56
6616	90.11	343.98	5881.19	708.17	337.98	-1146.18	1.14	1194.97	286.43
6709	90.34	341.75	5880.83	801.05	426.85	-1173.57	2.41	1248.79	289.99
6802	90.06	340.24	5880.51	894.04	514.78	-1203.85	1.65	1309.3	293.15
6891	90.17	341.8	5880.34	983.02	598.94	-1232.79	1.75	1370.59	295.91
6984	90.17	343.35	5880.07	1075.93	687.67	-1260.64	1.67	1436	298.61
7077	90.78	343.54	5879.29	1168.77	776.81	-1287.14	0.69	1503.38	301.11
7169	90.39	341.41	5878.35	1260.68	864.53	-1314.84	2.34	1573.6	303.33
7262	90.28	342.1	5877.8	1353.64	952.86	-1343.95	0.75	1647.46	305.34
7355	90.39	343.39	5877.26	1446.53	1041.67	-1371.53	1.39	1722.25	307.22
7447	90.5	345.86	5876.54	1538.23	1130.37	-1395.92	2.68	1796.19	309
7540	90.78	345.56	5875.49	1630.78	1220.48	-1418.87	0.43	1871.57	310.7
7633	90.45	345.62	5874.49	1723.34	1310.55	-1442.01	0.37	1948.57	312.27
7726	90.39	345.99	5873.81	1815.88	1400.71	-1464.81	0.41	2026.74	313.72
7819	90.45	345.67	5873.13	1908.41	1490.88	-1487.58	0.35	2106.09	315.06
7911	90.45	345.44	5872.41	1999.99	1579.97	-1510.52	0.25	2185.86	316.29
8002	90.39	343.48	5871.75	2090.72	1667.64	-1534.9	2.16	2266.48	317.37
8094	90.56	344.86	5870.98	2182.48	1756.14	-1560	1.52	2348.96	318.38
8187	90.34	344.11	5870.25	2275.2	1845.75	-1584.88	0.85	2432.82	319.35
8280	90.45	343.95	5869.62	2367.98	1935.16	-1610.47	0.2	2517.62	320.23
8371	90.45	344.16	5868.91	2458.76	2022.65	-1635.46	0.22	2601.13	321.04
8464	90.5	343.76	5868.13	2551.54	2112.03	-1661.16	0.43	2687.03	321.81
8557	90.56	344.51	5867.27	2644.3	2201.48	-1686.58	0.8	2773.28	322.54
8649	90.58	344.61	5866.6	2736.02	2290.16	-1711.07	0.32	2858.78	323.24

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8742	90.5	344.39	5865.96	2828.74	2379.77	-1735.93	0.34	2945.64	323.89
8835	90.45	344.31	5865.19	2921.48	2469.32	-1761.02	0.11	3032.94	324.51
8927	90.39	344.19	5864.51	3013.24	2557.86	-1785.99	0.14	3119.69	325.08
9019	90.67	343.28	5863.66	3105.05	2646.18	-1811.76	1.03	3206.98	325.6
9112	90.39	343.16	5862.8	3197.9	2735.21	-1838.6	0.33	3295.73	326.09
9205	90.34	343.26	5862.21	3290.76	2824.25	-1865.47	0.13	3384.72	326.55
9297	90.34	344.56	5861.67	3382.55	2912.64	-1890.97	1.41	3472.64	327.01
9390	90.5	344.2	5860.98	3475.29	3002.2	-1916.01	0.42	3561.5	327.45
9483	90.22	344.59	5860.39	3568.03	3091.77	-1941.02	0.52	3650.56	327.88
9576	90.5	343.63	5859.8	3660.79	3181.22	-1966.47	1.08	3739.94	328.28
9668	90.5	344.46	5858.99	3752.57	3269.67	-1991.76	0.89	3828.56	328.65
9760	90.62	344.32	5858.09	3844.31	3358.27	-2016.52	0.19	3917.19	329.02
9852	90.5	343.4	5857.2	3936.1	3446.64	-2042.09	1.01	4006.18	329.35
9945	90.62	345.16	5856.29	4028.84	3536.16	-2067.28	1.89	4096.1	329.69
10038	90.62	344.69	5855.29	4121.51	3625.95	-2091.46	0.51	4185.9	330.02
10130	90.62	343.72	5854.3	4213.26	3714.47	-2116.51	1.05	4275.15	330.33
10223	91.07	344.76	5852.93	4306.01	3803.96	-2141.77	1.22	4365.47	330.62
10315	90.62	344.44	5851.58	4397.71	3892.65	-2166.2	0.6	4454.79	330.9
10408	90.56	343.43	5850.63	4490.49	3982.01	-2191.93	1.09	4545.44	331.17
10501	90.39	343.04	5849.85	4583.35	4071.06	-2218.76	0.46	4636.42	331.41
10593	91.01	346.22	5848.73	4675.04	4159.75	-2243.14	3.53	4726.01	331.66
10686	90.5	343.45	5847.5	4767.71	4249.49	-2267.45	3.03	4816.59	331.92
10779	90.56	343.06	5846.64	4860.56	4338.55	-2294.24	0.43	4907.8	332.13
10868	90.45	342.68	5845.86	4949.45	4423.6	-2320.45	0.44	4995.27	332.32
10959	91.18	344.3	5844.57	5040.28	4510.83	-2346.31	1.95	5084.56	332.52
11052	90.84	343.88	5842.93	5133.03	4600.26	-2371.79	0.58	5175.69	332.73
11145	91.06	343.92	5841.39	5225.82	4689.6	-2397.57	0.24	5266.94	332.92
11237	90.73	343.75	5839.95	5317.61	4777.95	-2423.18	0.41	5357.3	333.11
11330	90.67	342.8	5838.81	5410.45	4867.01	-2449.93	1.03	5448.85	333.28
11422	90.67	344.67	5837.73	5502.26	4955.32	-2475.7	2.03	5539.34	333.45
11515	90.73	343.15	5836.6	5595.04	5044.67	-2501.47	1.63	5630.81	333.62
11608	90.56	344.02	5835.55	5687.86	5133.87	-2527.75	0.94	5722.43	333.79

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11701	90.56	343.89	5834.64	5780.65	5223.24	-2553.46	0.13	5813.98	333.95
11793	90.39	343.51	5833.88	5872.46	5311.54	-2579.27	0.45	5904.67	334.1
11886	90.62	344.31	5833.06	5965.25	5400.9	-2605.05	0.89	5996.33	334.25
11979	90.62	344.03	5832.06	6058.01	5490.36	-2630.41	0.29	6087.95	334.4
12071	90.5	344.13	5831.16	6149.78	5578.83	-2655.65	0.16	6178.66	334.54
12161	90.73	344.78	5830.2	6239.51	5665.53	-2679.77	0.76	6267.33	334.69
12254	90.73	344.11	5829.01	6332.23	5755.12	-2704.71	0.72	6358.99	334.83
12347	90.95	344.38	5827.65	6424.98	5844.61	-2729.95	0.38	6450.75	334.96
12439	90.67	342.83	5826.35	6516.79	5932.86	-2755.92	1.71	6541.71	335.08
12532	90.62	343.64	5825.3	6609.65	6021.9	-2782.74	0.88	6633.77	335.2
12625	90.84	343.4	5824.12	6702.47	6111.08	-2809.11	0.36	6725.8	335.31
12718	90.17	342.48	5823.3	6795.35	6199.98	-2836.39	1.22	6817.98	335.42
12810	90.73	343.76	5822.58	6887.22	6288.01	-2863.1	1.51	6909.16	335.52
12903	90.5	342.32	5821.58	6980.09	6376.96	-2890.23	1.57	7001.36	335.62
12996	90.56	342.46	5820.72	7073.01	6465.6	-2918.37	0.16	7093.72	335.71
13088	90.62	342.61	5819.77	7164.92	6553.35	-2945.99	0.18	7185.07	335.79
13181	90.84	343.7	5818.59	7257.78	6642.35	-2972.94	1.19	7277.3	335.89
13273	90.78	342.17	5817.29	7349.65	6730.28	-2999.94	1.66	7368.61	335.98
13366	90.9	344.17	5815.93	7442.5	6819.29	-3026.86	2.16	7460.87	336.07
13459	90.34	341.66	5814.93	7535.37	6908.17	-3054.17	2.76	7553.2	336.15
13552	90.84	344.79	5813.97	7628.22	6997.2	-3081	3.41	7645.48	336.24
13644	90.67	343.62	5812.76	7719.97	7085.72	-3106.04	1.29	7736.59	336.33
13737	90.84	344.47	5811.53	7812.74	7175.13	-3131.6	0.94	7828.75	336.42
13826	90.73	345.5	5810.31	7901.4	7261.08	-3154.65	1.16	7916.76	336.52
13918	90.67	345.03	5809.19	7993.02	7350.05	-3178.05	0.52	8007.7	336.62
14011	90.9	344.67	5807.92	8085.69	7439.81	-3202.36	0.45	8099.74	336.71
14104	90.56	342.91	5806.74	8178.49	7529.1	-3228.31	1.92	8192.03	336.79
14196	90.73	344.81	5805.7	8270.28	7617.46	-3253.88	2.08	8283.33	336.87
14289	90.84	344.68	5804.43	8362.96	7707.18	-3278.34	0.19	8375.45	336.96
14379	90.73	343.96	5803.2	8452.71	7793.82	-3302.67	0.81	8464.71	337.03
14471	90.56	345.91	5802.16	8544.37	7882.65	-3326.58	2.13	8555.83	337.12
14564	90.56	343.66	5801.25	8637.04	7972.38	-3350.98	2.41	8648	337.2

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14656	90.62	344.76	5800.31	8728.8	8060.9	-3376.01	1.19	8739.31	337.28
14749	90.62	344.3	5799.31	8821.51	8150.53	-3400.82	0.5	8831.57	337.35
14842	90.56	345.58	5798.35	8914.17	8240.32	-3424.99	1.38	8923.76	337.43
14935	90.73	344.51	5797.31	9006.82	8330.17	-3448.99	1.16	9015.94	337.51
15027	91.46	345.19	5795.56	9098.48	8418.95	-3473.02	1.08	9107.18	337.58
15120	90.84	344.44	5793.69	9191.15	8508.69	-3497.38	1.04	9199.42	337.66
15213	90.95	343.05	5792.24	9283.94	8597.96	-3523.4	1.5	9291.89	337.72
15305	90.78	344.87	5790.84	9375.72	8686.36	-3548.82	1.99	9383.34	337.78
15398	90.84	345.26	5789.53	9468.36	8776.21	-3572.78	0.42	9475.58	337.85
15491	91.34	345.54	5787.75	9560.94	8866.19	-3596.22	0.62	9567.77	337.92
15583	91.01	342.75	5785.87	9652.68	8954.66	-3621.35	3.06	9659.2	337.98
15673	90.67	342.72	5784.55	9742.58	9040.6	-3648.06	0.37	9748.89	338.02
15766	90.73	343.84	5783.41	9835.42	9129.66	-3674.81	1.2	9841.49	338.07
15858	90.67	342.82	5782.29	9927.27	9217.78	-3701.2	1.1	9933.1	338.12
15951	90.67	344.31	5781.19	10020.09	9306.97	-3727.52	1.6	10025.67	338.17
16041	90.62	343.56	5780.18	10109.88	9393.45	-3752.43	0.83	10115.22	338.22
16130	90.39	343.44	5779.4	10198.72	9478.78	-3777.7	0.28	10203.84	338.27
16223	90.95	345.37	5778.31	10291.44	9568.35	-3802.7	2.16	10296.3	338.33
16316	90.78	344.87	5776.9	10384.07	9658.22	-3826.57	0.57	10388.64	338.39
16409	90.62	343.16	5775.76	10476.84	9747.62	-3852.18	1.85	10481.19	338.44
16501	90.84	343.43	5774.59	10568.69	9835.72	-3878.63	0.38	10572.85	338.48
16594	91.06	344.96	5773.05	10661.44	9925.19	-3903.96	1.66	10665.38	338.53
16687	90.67	345.64	5771.64	10754.04	10015.14	-3927.56	0.85	10757.73	338.59
16780	90.84	344.68	5770.41	10846.67	10105.03	-3951.37	1.05	10850.11	338.64
16872	90.06	343.36	5769.69	10938.45	10193.47	-3976.7	1.67	10941.7	338.69
16965	90.22	343.43	5769.47	11031.29	10282.59	-4003.28	0.2	11034.39	338.73
17057	90.11	343.6	5769.2	11123.13	10370.8	-4029.38	0.22	11126.07	338.77
17150	90.28	343.79	5768.88	11215.94	10460.06	-4055.49	0.27	11218.73	338.81
17243	90	343.64	5768.65	11308.75	10549.33	-4081.57	0.35	11311.39	338.85
17335	90.67	343.68	5768.11	11400.57	10637.61	-4107.46	0.73	11403.07	338.89
17428	90.78	342.9	5766.93	11493.42	10726.68	-4134.19	0.84	11495.79	338.92
17521	90.73	343.67	5765.7	11586.26	10815.74	-4160.93	0.83	11588.51	338.96

17613	90.34	340.85	5764.85	11678.19	10903.35	-4188.96	3.1	11680.35	338.98
17706	90.39	341.67	5764.26	11771.16	10991.42	-4218.84	0.89	11773.27	339
17798	90.39	342.51	5763.63	11863.1	11078.96	-4247.12	0.91	11865.14	339.03
17887	90.56	342.01	5762.89	11952.04	11163.73	-4274.24	0.6	11953.99	339.05
17980	90.39	341.77	5762.11	12044.99	11252.12	-4303.15	0.31	12046.88	339.07
18072	90.67	342.7	5761.26	12136.92	11339.72	-4331.22	1.05	12138.73	339.1
18165	90.45	342.21	5760.35	12229.83	11428.39	-4359.26	0.58	12231.57	339.12
18258	90.67	343.46	5759.44	12322.72	11517.24	-4386.7	1.37	12324.37	339.15
18350	90.45	342.23	5758.54	12414.61	11605.15	-4413.83	1.36	12416.17	339.18
18443	90.62	342.29	5757.68	12507.54	11693.72	-4442.17	0.19	12509.03	339.2
18536	90.67	342.61	5756.63	12600.45	11782.39	-4470.21	0.35	12601.88	339.22
18628	91.06	343.67	5755.24	12692.31	11870.42	-4496.89	1.23	12693.65	339.25
18721	90.73	342.06	5753.79	12785.18	11959.28	-4524.29	1.77	12786.46	339.28
18814	90.62	342.56	5752.69	12878.11	12047.87	-4552.55	0.56	12879.32	339.3
18906	90.9	342.86	5751.48	12970	12135.71	-4579.89	0.44	12971.15	339.32
18999	90.95	342.25	5749.98	13062.9	12224.42	-4607.77	0.66	13063.99	339.35
19091	90.84	343.51	5748.54	13154.78	12312.33	-4634.84	1.38	13155.81	339.37
19184	90.62	344.11	5747.36	13247.58	12401.63	-4660.77	0.69	13248.52	339.4
19277	90.73	343.52	5746.27	13340.37	12490.94	-4686.69	0.65	13341.24	339.43
19370	90.9	344.06	5744.95	13433.17	12580.23	-4712.65	0.61	13433.96	339.46
19462	91.29	343.97	5743.2	13524.94	12668.66	-4737.97	0.44	13525.66	339.49
19555	91.23	344.2	5741.16	13617.69	12758.08	-4763.46	0.25	13618.34	339.53
19647	91.57	343.54	5738.9	13709.46	12846.43	-4789.02	0.8	13710.05	339.56
19740	90.84	343.59	5736.95	13802.27	12935.61	-4815.32	0.79	13802.8	339.58
19830	91.23	344.53	5735.32	13892.03	13022.13	-4840.03	1.13	13892.51	339.61
19919	90.9	343.36	5733.67	13980.82	13107.64	-4864.65	1.37	13981.24	339.64
20012	91.18	344.37	5731.99	14073.6	13196.96	-4890.49	1.13	14073.97	339.67
20104	90.9	344.17	5730.32	14165.34	13285.5	-4915.44	0.37	14165.67	339.7
20197	91.01	343.77	5728.78	14258.11	13374.87	-4941.12	0.44	14258.4	339.72
20286	91.12	343.66	5727.12	14346.92	13460.29	-4966.07	0.17	14347.17	339.75
20379	90.67	343.26	5725.67	14439.74	13549.43	-4992.54	0.65	14439.96	339.77
20469	90.78	344.38	5724.52	14529.54	13635.86	-5017.61	1.25	14529.73	339.8

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20561	90.95	342.48	5723.13	14621.37	13724.02	-5043.84	2.07	14621.53	339.82
20654	91.01	343.74	5721.54	14714.23	13813	-5070.86	1.35	14714.36	339.84
20747	90.78	342.93	5720.09	14807.07	13902.08	-5097.52	0.9	14807.18	339.86
20835	90.9	344.15	5718.8	14894.89	13986.46	-5122.45	1.4	14894.99	339.89
20928	91.01	344.11	5717.25	14987.65	14075.9	-5147.88	0.13	14987.72	339.91
21021	90.84	343.21	5715.75	15080.46	14165.13	-5174.04	0.98	15080.51	339.93
21114	90.9	343.99	5714.34	15173.27	14254.34	-5200.3	0.84	15173.31	339.96
21206	90.78	343.25	5712.99	15265.08	14342.6	-5226.24	0.81	15265.11	339.98
21296	91.18	343.12	5711.45	15354.94	14428.74	-5252.26	0.46	15354.96	340
21389	91.46	343.73	5709.32	15447.76	14517.85	-5278.78	0.72	15447.77	340.02
21481	91.51	343.78	5706.94	15539.54	14606.15	-5304.51	0.08	15539.54	340.04
21571	91.18	343.02	5704.83	15629.36	14692.37	-5330.21	0.92	15629.36	340.06
21598	91.29	343.07	5704.25	15656.32	14718.19	-5338.08	0.45	15656.32	340.06
21629	91.29	343.07	5703.55	15687.27	14747.84	-5347.11	0.01	15687.27	340.07

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