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WV Department of
Environmental Protection

Actual Wellpath Report

Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

REPORT SETUP INFORMATION			
Projection System	NAD83 / UTM Zone 17 North, US feet	Software System	WellArchitect® 6.0
North Reference	Grid	User	Tranlam
Scale	0.999608	Report Generated	11/25/2024 at 9:33:48 PM
Convergence at slot	0.20° East	Database	WA_MPL_EASTERNUS_Defn

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	1.84	15.89	1725640.06	14521631.20	39°59'8.1198"N	80°41'44.7011"W
Facility Reference Pt			1725624.18	14521629.36	39°59'8.1022"N	80°41'44.9053"W
Field Reference Pt			0.00	0.00	0°00'0.0000"	85°29'19.4780"W

WELLPATH DATUM			
Calculation method	Minimum curvature	SDC 41 (KB) to Facility Vertical Datum	1353.20ft
Horizontal Reference Pt	Slot	SDC 41 (KB) to Mean Sea Level	1353.20ft
Vertical Reference Pt	SDC 41 (KB)	SDC 41 (KB) to Ground Level at Slot (405H)	26.00ft
MD Reference Pt	SDC 41 (KB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	338.52°



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WELLPATH DATA (342 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]
0.00†	0.000	14.280	0.00	0.00	0.00	0.00	1725640.06	14521631.20	39°59'8.1198"N	80°41'44.7011"W	0.00	0.000	0.00
26.00	0.000	14.280	26.00	0.00	0.00	0.00	1725640.06	14521631.20	39°59'8.1198"N	80°41'44.7011"W	0.00	0.000	0.00
202.00	0.290	14.280	202.00	0.36	0.43	0.11	1725640.17	14521631.63	39°59'8.1241"N	80°41'44.6997"W	0.45	14.280	0.16
239.00	0.280	29.490	239.00	0.49	0.60	0.18	1725640.24	14521631.80	39°59'8.1258"N	80°41'44.6988"W	0.63	16.449	0.21
329.00	0.170	42.250	329.00	0.69	0.89	0.38	1725640.44	14521632.09	39°59'8.1286"N	80°41'44.6963"W	0.97	22.844	0.13
417.00	0.270	14.700	417.00	0.92	1.19	0.52	1725640.58	14521632.39	39°59'8.1316"N	80°41'44.6944"W	1.30	23.464	0.16
507.00	0.160	288.400	507.00	1.17	1.43	0.45	1725640.51	14521632.63	39°59'8.1340"N	80°41'44.6953"W	1.50	17.447	0.34
598.00	0.150	331.460	598.00	1.37	1.58	0.27	1725640.33	14521632.78	39°59'8.1354"N	80°41'44.6975"W	1.60	9.814	0.13
688.00	0.130	296.150	688.00	1.56	1.73	0.13	1725640.18	14521632.93	39°59'8.1369"N	80°41'44.6994"W	1.73	4.142	0.10
733.00	0.270	293.560	733.00	1.67	1.79	-0.02	1725640.04	14521632.99	39°59'8.1375"N	80°41'44.7013"W	1.79	359.425	0.31
913.00	0.700	40.330	912.99	2.49	2.80	0.30	1725640.36	14521634.00	39°59'8.1475"N	80°41'44.6971"W	2.82	6.216	0.46
974.00	1.490	59.300	973.98	2.80	3.49	1.23	1725641.29	14521634.69	39°59'8.1543"N	80°41'44.6852"W	3.70	19.394	1.41
1066.00	3.960	76.100	1065.87	2.57	4.86	5.34	1725645.40	14521636.06	39°59'8.1677"N	80°41'44.6323"W	7.22	47.686	2.79
1157.00	5.040	81.610	1156.59	1.25	6.20	12.35	1725652.40	14521637.40	39°59'8.1807"N	80°41'44.5422"W	13.82	63.333	1.28
1249.00	4.920	83.100	1248.24	-0.66	7.26	20.26	1725660.31	14521638.46	39°59'8.1909"N	80°41'44.4405"W	21.52	70.276	0.19
1340.00	6.590	83.130	1338.78	-2.96	8.36	29.32	1725669.37	14521639.55	39°59'8.2014"N	80°41'44.3241"W	30.49	74.090	1.84
1430.00	9.760	81.530	1427.85	-5.98	10.10	42.00	1725682.04	14521641.30	39°59'8.2182"N	80°41'44.1612"W	43.19	76.478	3.53
1521.00	11.350	83.640	1517.31	-10.05	12.23	58.52	1725698.56	14521643.42	39°59'8.2387"N	80°41'43.9487"W	59.79	78.199	1.80
1611.00	13.050	85.540	1605.28	-15.34	14.00	77.46	1725717.49	14521645.19	39°59'8.2556"N	80°41'43.7054"W	78.71	79.756	1.94
1702.00	15.720	85.160	1693.42	-21.88	15.84	99.99	1725740.01	14521647.03	39°59'8.2730"N	80°41'43.4159"W	101.24	80.999	2.94
1792.00	17.310	83.310	1779.70	-28.79	18.43	125.44	1725765.45	14521649.62	39°59'8.2977"N	80°41'43.0888"W	126.78	81.643	1.86
1883.00	19.730	80.290	1865.98	-35.38	22.60	154.03	1725794.03	14521653.79	39°59'8.3379"N	80°41'42.7213"W	155.68	81.654	2.86
1977.00	21.860	79.910	1953.85	-42.07	28.34	186.90	1725826.89	14521659.53	39°59'8.3936"N	80°41'42.2988"W	189.04	81.378	2.27
2068.00	21.750	79.530	2038.34	-48.63	34.37	220.16	1725860.13	14521665.56	39°59'8.4520"N	80°41'41.8712"W	222.83	81.127	0.20
2159.00	23.000	78.230	2122.49	-54.85	41.06	254.15	1725894.11	14521672.24	39°59'8.5170"N	80°41'41.4343"W	257.44	80.822	1.48
2249.00	24.950	76.350	2204.72	-60.41	49.13	289.81	1725929.75	14521680.31	39°59'8.5955"N	80°41'40.9758"W	293.94	80.379	2.33
2340.00	26.340	77.360	2286.76	-66.12	58.08	328.16	1725968.09	14521689.25	39°59'8.6827"N	80°41'40.4827"W	333.26	79.964	1.60
2430.00	26.530	79.310	2367.35	-72.95	66.17	367.40	1726007.31	14521697.35	39°59'8.7614"N	80°41'39.9783"W	373.31	79.790	0.99
2521.00	25.600	81.560	2449.10	-81.20	72.83	406.81	1726046.71	14521704.00	39°59'8.8258"N	80°41'39.4716"W	413.28	79.850	1.49
2612.00	25.140	83.660	2531.32	-90.68	77.85	445.47	1726085.36	14521709.02	39°59'8.8741"N	80°41'38.9747"W	452.23	80.087	1.11



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Slot	405H		

WELLPATH DATA (342 stations)

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]
2702.00	25.260	83.670	2612.75	-100.69	82.08	483.56	1726123.43	14521713.25	39°59'8.9146"N	80°41'38.4853"W	490.48	80.367	0.13
2743.00	25.490	82.880	2649.80	-105.17	84.14	501.01	1726140.87	14521715.30	39°59'8.9343"N	80°41'38.2610"W	508.02	80.467	1.00
2840.00	25.970	81.030	2737.18	-114.94	90.03	542.70	1726182.55	14521721.20	39°59'8.9912"N	80°41'37.7252"W	550.12	80.580	0.96
2887.00	26.040	79.990	2779.42	-119.22	93.43	563.02	1726202.86	14521724.59	39°59'9.0241"N	80°41'37.4639"W	570.72	80.578	0.98
2977.00	25.280	82.470	2860.55	-127.79	99.38	601.53	1726241.35	14521730.54	39°59'9.0816"N	80°41'36.9689"W	609.69	80.618	1.46
3068.00	25.130	82.510	2942.89	-137.14	104.45	639.95	1726279.76	14521735.61	39°59'9.1304"N	80°41'36.4751"W	648.42	80.730	0.17
3158.00	25.310	84.160	3024.31	-146.95	108.90	678.04	1726317.83	14521740.05	39°59'9.1730"N	80°41'35.9857"W	686.73	80.876	0.81
3249.00	25.510	83.550	3106.51	-157.27	113.08	716.86	1726356.64	14521744.23	39°59'9.2130"N	80°41'35.4867"W	725.72	81.036	0.36
3341.00	24.960	83.060	3189.73	-167.28	117.65	755.82	1726395.58	14521748.80	39°59'9.2569"N	80°41'34.9861"W	764.92	81.152	0.64
3431.00	25.430	82.270	3271.16	-176.64	122.54	793.81	1726433.56	14521753.69	39°59'9.3039"N	80°41'34.4977"W	803.22	81.224	0.64
3522.00	25.940	82.760	3353.17	-186.18	127.68	832.92	1726472.65	14521758.83	39°59'9.3534"N	80°41'33.9951"W	842.65	81.285	0.61
3612.00	26.220	82.020	3434.01	-195.67	132.92	872.14	1726511.85	14521764.07	39°59'9.4038"N	80°41'33.4910"W	882.21	81.334	0.48
3703.00	25.730	82.560	3515.82	-205.15	138.27	911.63	1726551.33	14521769.41	39°59'9.4553"N	80°41'32.9834"W	922.06	81.376	0.60
3794.00	25.680	83.660	3597.81	-215.09	143.00	950.81	1726590.50	14521774.15	39°59'9.5008"N	80°41'32.4798"W	961.51	81.447	0.53
3886.00	25.370	81.800	3680.83	-224.83	148.02	990.13	1726629.80	14521779.16	39°59'9.5490"N	80°41'31.9744"W	1001.14	81.498	0.93
3976.00	25.490	81.060	3762.11	-233.46	153.78	1028.35	1726668.00	14521784.92	39°59'9.6046"N	80°41'31.4832"W	1039.78	81.495	0.38
4068.00	25.130	82.800	3845.28	-242.58	159.30	1067.29	1726706.93	14521790.44	39°59'9.6579"N	80°41'30.9828"W	1079.11	81.511	0.90
4158.00	25.280	85.600	3926.72	-252.94	163.17	1105.41	1726745.03	14521794.31	39°59'9.6948"N	80°41'30.4929"W	1117.39	81.603	1.34
4248.00	25.960	84.560	4007.87	-264.02	166.51	1144.18	1726783.79	14521797.65	39°59'9.7265"N	80°41'29.9946"W	1156.23	81.720	0.91
4339.00	25.020	82.380	4090.01	-274.14	170.95	1183.08	1726822.68	14521802.08	39°59'9.7691"N	80°41'29.4946"W	1195.37	81.778	1.46
4429.00	25.430	80.780	4171.43	-282.80	176.57	1221.02	1726860.60	14521807.70	39°59'9.8233"N	80°41'29.0070"W	1233.72	81.771	0.88
4521.00	26.230	81.210	4254.24	-291.46	182.84	1260.61	1726900.17	14521813.97	39°59'9.8839"N	80°41'28.4981"W	1273.80	81.747	0.89
4612.00	25.940	82.760	4335.97	-300.77	188.43	1300.23	1726939.78	14521819.55	39°59'9.9377"N	80°41'27.9889"W	1313.81	81.754	0.81
4704.00	25.790	83.020	4418.75	-310.74	193.39	1340.06	1726979.59	14521824.52	39°59'9.9855"N	80°41'27.4770"W	1353.94	81.788	0.20
4794.00	26.540	82.970	4499.53	-320.65	198.23	1379.44	1727018.96	14521829.36	39°59'10.0319"N	80°41'26.9708"W	1393.62	81.822	0.83
4887.00	27.090	81.740	4582.53	-330.68	203.82	1421.02	1727060.52	14521834.94	39°59'10.0857"N	80°41'26.4364"W	1435.56	81.838	0.84
4978.00	25.620	81.910	4664.07	-339.98	209.56	1461.01	1727100.49	14521840.68	39°59'10.1411"N	80°41'25.9224"W	1475.96	81.837	1.62
5069.00	24.870	82.800	4746.38	-349.25	214.73	1499.47	1727138.94	14521845.85	39°59'10.1909"N	80°41'25.4280"W	1514.77	81.850	0.92
5159.00	25.110	83.430	4827.95	-358.84	219.29	1537.22	1727176.67	14521850.40	39°59'10.2346"N	80°41'24.9429"W	1552.78	81.881	0.40
5251.00	25.050	82.400	4911.28	-368.53	224.10	1575.92	1727215.36	14521855.21	39°59'10.2808"N	80°41'24.4455"W	1591.77	81.907	0.48



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5341.00	26.090	83.680	4992.46	-378.28	228.80	1614.47	1727253.90	14521859.91	39°59'10.3259"N	80°41'23.9500"W	1630.61	81.934	1.31
5432.00	26.870	83.730	5073.91	-388.91	233.25	1654.80	1727294.21	14521864.35	39°59'10.3685"N	80°41'23.4317"W	1671.16	81.977	0.86
5522.00	26.840	83.280	5154.21	-399.42	237.84	1695.20	1727334.59	14521868.95	39°59'10.4125"N	80°41'22.9125"W	1711.80	82.013	0.23
5614.00	26.540	82.710	5236.41	-409.75	242.88	1736.21	1727375.59	14521873.99	39°59'10.4609"N	80°41'22.3854"W	1753.12	82.036	0.43
5704.00	26.600	82.940	5316.90	-419.69	247.91	1776.15	1727415.52	14521879.01	39°59'10.5092"N	80°41'21.8720"W	1793.37	82.054	0.13
5795.00	26.100	81.290	5398.45	-429.19	253.45	1816.16	1727455.51	14521884.55	39°59'10.5626"N	80°41'21.3578"W	1833.76	82.056	0.97
5887.00	25.550	80.320	5481.26	-437.72	259.85	1855.72	1727495.05	14521890.94	39°59'10.6244"N	80°41'20.8493"W	1873.83	82.029	0.75
5978.00	24.450	79.220	5563.73	-445.23	266.67	1893.57	1727532.88	14521897.76	39°59'10.6906"N	80°41'20.3628"W	1912.25	81.984	1.31
6102.00	23.540	82.060	5677.02	-455.80	274.89	1943.30	1727582.60	14521905.98	39°59'10.7701"N	80°41'19.7234"W	1962.65	81.949	1.19
6197.00	25.170	80.650	5763.56	-464.48	280.79	1982.03	1727621.31	14521911.88	39°59'10.8271"N	80°41'19.2257"W	2001.82	81.937	1.82
6292.00	25.180	60.160	5849.70	-465.79	294.16	2019.57	1727658.83	14521925.24	39°59'10.9579"N	80°41'18.7429"W	2040.88	81.713	9.13
6388.00	25.340	38.990	5936.70	-452.67	320.34	2050.27	1727689.52	14521951.41	39°59'11.2155"N	80°41'18.3472"W	2075.14	81.120	9.37
6483.00	29.680	22.990	6021.06	-425.82	357.86	2072.29	1727711.53	14521988.92	39°59'11.5856"N	80°41'18.0627"W	2102.96	80.202	8.99
6579.00	35.080	8.990	6102.21	-384.99	407.09	2085.91	1727725.15	14522038.13	39°59'12.0717"N	80°41'17.8855"W	2125.26	78.957	9.59
6674.00	42.230	1.760	6176.39	-332.03	466.08	2091.17	1727730.40	14522097.09	39°59'12.6543"N	80°41'17.8153"W	2142.48	77.435	8.89
6770.00	50.070	355.490	6242.88	-267.05	535.16	2089.26	1727728.50	14522166.15	39°59'13.3371"N	80°41'17.8367"W	2156.71	75.633	9.42
6865.00	57.740	350.670	6298.83	-192.80	611.25	2079.86	1727719.11	14522242.21	39°59'14.0894"N	80°41'17.9540"W	2167.82	73.623	9.05
6961.00	66.510	346.140	6343.69	-109.29	694.24	2062.70	1727701.95	14522325.17	39°59'14.9101"N	80°41'18.1708"W	2176.39	71.398	10.04
7056.00	74.540	343.290	6375.34	-20.33	780.54	2039.06	1727678.31	14522411.43	39°59'15.7638"N	80°41'18.4706"W	2183.34	69.053	8.91
7151.00	82.990	340.120	6393.84	72.61	868.91	2009.80	1727649.07	14522499.76	39°59'16.6380"N	80°41'18.8425"W	2189.59	66.620	9.48
7247.00	90.790	340.270	6399.04	168.36	959.02	1977.35	1727616.63	14522589.85	39°59'17.5297"N	80°41'19.2554"W	2197.64	64.126	8.13
7343.00	90.760	340.660	6397.74	264.29	1049.49	1945.25	1727584.54	14522680.28	39°59'18.4248"N	80°41'19.6637"W	2210.30	61.653	0.41
7438.00	90.020	338.870	6397.09	359.26	1138.62	1912.39	1727551.70	14522769.37	39°59'19.3068"N	80°41'20.0818"W	2225.69	59.231	2.04
7533.00	89.620	336.740	6397.39	454.25	1226.58	1876.51	1727515.83	14522857.29	39°59'20.1772"N	80°41'20.5389"W	2241.82	56.829	2.28
7628.00	89.620	338.610	6398.02	549.23	1314.45	1840.42	1727479.76	14522945.13	39°59'21.0469"N	80°41'20.9986"W	2261.62	54.465	1.97
7724.00	89.500	337.250	6398.76	645.22	1403.41	1804.36	1727443.71	14523034.06	39°59'21.9272"N	80°41'21.4580"W	2285.88	52.125	1.42
7819.00	90.390	339.450	6398.85	740.22	1491.70	1769.31	1727408.67	14523122.31	39°59'22.8010"N	80°41'21.9043"W	2314.22	49.866	2.50
7914.00	90.240	339.330	6398.33	835.20	1580.62	1735.87	1727375.25	14523211.20	39°59'23.6808"N	80°41'22.3299"W	2347.68	47.680	0.20
8010.00	90.390	339.290	6397.80	931.19	1670.43	1701.95	1727341.34	14523300.97	39°59'24.5695"N	80°41'22.7617"W	2384.74	45.536	0.16
8105.00	90.210	338.140	6397.30	1026.19	1758.94	1667.47	1727306.87	14523389.45	39°59'25.4454"N	80°41'23.2008"W	2423.70	43.471	1.23



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Actual Wellpath Report

Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
8200.00	90.210	339.130	6396.96	1121.19	1847.41	1632.86	1727272.28	14523477.89	39°59'26.3209"N	80°41'23.6415"W	2465.60	41.472	1.04
8295.00	90.330	339.630	6396.51	1216.18	1936.33	1599.40	1727238.83	14523566.76	39°59'27.2007"N	80°41'24.0673"W	2511.46	39.557	0.54
8391.00	90.270	339.190	6396.01	1312.16	2026.19	1565.64	1727205.09	14523656.60	39°59'28.0900"N	80°41'24.4971"W	2560.60	37.693	0.46
8486.00	90.210	339.300	6395.61	1407.15	2115.03	1531.98	1727171.43	14523745.39	39°59'28.9690"N	80°41'24.9256"W	2611.57	35.917	0.13
8581.00	90.670	339.130	6394.88	1502.14	2203.84	1498.27	1727137.74	14523834.17	39°59'29.8478"N	80°41'25.3548"W	2664.91	34.210	0.52
8677.00	90.790	339.170	6393.66	1598.13	2293.55	1464.10	1727103.58	14523923.84	39°59'30.7355"N	80°41'25.7897"W	2721.02	32.552	0.13
8772.00	90.760	339.300	6392.37	1693.11	2382.37	1430.42	1727069.92	14524012.63	39°59'31.6144"N	80°41'26.2185"W	2778.81	30.981	0.14
8867.00	90.790	339.380	6391.09	1788.10	2471.25	1396.91	1727036.42	14524101.48	39°59'32.4939"N	80°41'26.6451"W	2838.74	29.478	0.09
8962.00	90.860	339.280	6389.72	1883.08	2560.13	1363.38	1727002.90	14524190.32	39°59'33.3734"N	80°41'27.0720"W	2900.53	28.037	0.13
9057.00	91.040	339.280	6388.14	1978.06	2648.97	1329.77	1726969.31	14524279.13	39°59'34.2525"N	80°41'27.4998"W	2964.01	26.656	0.19
9153.00	91.130	340.000	6386.32	2074.02	2738.96	1296.38	1726935.93	14524369.08	39°59'35.1429"N	80°41'27.9248"W	3030.26	25.329	0.76
9248.00	90.950	339.470	6384.60	2168.98	2828.06	1263.48	1726903.04	14524458.15	39°59'36.0246"N	80°41'28.3435"W	3097.47	24.073	0.59
9344.00	90.700	339.220	6383.22	2264.96	2917.88	1229.62	1726869.20	14524547.93	39°59'36.9134"N	80°41'28.7746"W	3166.38	22.851	0.37
9446.00	90.640	339.010	6382.03	2366.95	3013.17	1193.26	1726832.85	14524643.19	39°59'37.8563"N	80°41'29.2375"W	3240.84	21.604	0.21
9541.00	90.700	339.130	6380.91	2461.94	3101.90	1159.33	1726798.93	14524731.88	39°59'38.7343"N	80°41'29.6696"W	3311.47	20.493	0.14
9638.00	90.670	339.290	6379.75	2558.92	3192.57	1124.90	1726764.52	14524822.52	39°59'39.6316"N	80°41'30.1079"W	3384.96	19.410	0.17
9734.00	90.700	339.000	6378.61	2654.91	3282.28	1090.72	1726730.36	14524912.19	39°59'40.5192"N	80°41'30.5430"W	3458.76	18.382	0.30
9830.00	90.640	339.220	6377.48	2750.90	3371.96	1056.50	1726696.14	14525001.83	39°59'41.4066"N	80°41'30.9788"W	3533.60	17.397	0.24
9926.00	90.550	339.060	6376.49	2846.89	3461.66	1022.31	1726661.97	14525091.50	39°59'42.2943"N	80°41'31.4140"W	3609.47	16.453	0.19
10021.00	90.730	339.240	6375.43	2941.88	3550.44	988.50	1726628.17	14525180.24	39°59'43.1727"N	80°41'31.8445"W	3685.48	15.558	0.27
10116.00	90.610	339.430	6374.32	3036.86	3639.32	954.98	1726594.66	14525269.09	39°59'44.0522"N	80°41'32.2713"W	3762.53	14.703	0.24
10211.00	90.730	339.540	6373.20	3131.84	3728.29	921.69	1726561.39	14525358.02	39°59'44.9326"N	80°41'32.6951"W	3840.53	13.886	0.17
10307.00	90.700	339.560	6372.01	3227.82	3818.23	888.15	1726527.86	14525447.93	39°59'45.8225"N	80°41'33.1220"W	3920.17	13.095	0.04
10402.00	90.730	339.040	6370.82	3322.80	3907.09	854.57	1726494.30	14525536.75	39°59'46.7018"N	80°41'33.5495"W	3999.46	12.338	0.55
10497.00	90.730	339.510	6369.61	3417.79	3995.94	820.96	1726460.69	14525625.56	39°59'47.5810"N	80°41'33.9775"W	4079.40	11.610	0.49
10593.00	90.730	338.630	6368.39	3513.77	4085.59	786.67	1726426.42	14525715.19	39°59'48.4682"N	80°41'34.4141"W	4160.64	10.899	0.92
10688.00	90.610	338.640	6367.28	3608.77	4174.06	752.06	1726391.82	14525803.62	39°59'49.3436"N	80°41'34.8549"W	4241.27	10.214	0.13
10784.00	90.670	339.240	6366.20	3704.76	4263.64	717.56	1726357.34	14525893.16	39°59'50.2300"N	80°41'35.2941"W	4323.60	9.553	0.63
10879.00	90.700	339.390	6365.07	3799.74	4352.51	684.01	1726323.80	14525982.00	39°59'51.1094"N	80°41'35.7214"W	4405.93	8.931	0.16
10974.00	90.760	339.120	6363.86	3894.73	4441.34	650.36	1726290.17	14526070.80	39°59'51.9884"N	80°41'36.1498"W	4488.71	8.331	0.29



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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
11069.00	90.760	339.290	6362.60	3989.71	4530.15	616.64	1726256.46	14526159.56	39°59'52.8671"N	80°41'36.5792"W	4571.92	7.751	0.18
11164.00	90.520	339.240	6361.54	4084.70	4618.99	583.01	1726222.84	14526248.37	39°59'53.7462"N	80°41'37.0074"W	4655.64	7.194	0.26
11260.00	90.420	338.840	6360.75	4180.69	4708.63	548.67	1726188.51	14526337.98	39°59'54.6333"N	80°41'37.4447"W	4740.49	6.646	0.43
11356.00	90.420	338.230	6360.05	4276.69	4797.97	513.54	1726153.40	14526427.28	39°59'55.5173"N	80°41'37.8921"W	4825.38	6.109	0.64
11451.00	90.420	338.510	6359.35	4371.68	4886.28	478.52	1726118.39	14526515.56	39°59'56.3912"N	80°41'38.3382"W	4909.66	5.593	0.29
11546.00	90.390	338.200	6358.68	4466.68	4974.58	443.48	1726083.37	14526603.82	39°59'57.2650"N	80°41'38.7845"W	4994.31	5.094	0.33
11641.00	90.460	338.300	6357.97	4561.68	5062.81	408.28	1726048.18	14526692.02	39°59'58.1381"N	80°41'39.2329"W	5079.25	4.611	0.13
11737.00	90.550	338.790	6357.13	4657.67	5152.16	373.17	1726013.08	14526781.33	39°59'59.0223"N	80°41'39.6802"W	5165.65	4.143	0.52
11832.00	90.330	338.100	6356.40	4752.67	5240.51	338.26	1725978.19	14526869.65	39°59'59.8966"N	80°41'40.1248"W	5251.42	3.693	0.76
11927.00	90.460	338.490	6355.74	4847.67	5328.77	303.13	1725943.07	14526957.87	40°00'0.7700"N	80°41'40.5723"W	5337.39	3.256	0.43
12022.00	90.490	338.450	6354.96	4942.66	5417.14	268.27	1725908.22	14527046.21	40°00'1.6444"N	80°41'41.0164"W	5423.78	2.835	0.05
12117.00	90.520	338.010	6354.12	5037.66	5505.36	233.04	1725873.01	14527134.39	40°00'2.5175"N	80°41'41.4652"W	5510.29	2.424	0.46
12213.00	90.490	338.580	6353.27	5133.65	5594.55	197.53	1725837.52	14527223.55	40°00'3.4001"N	80°41'41.9175"W	5598.04	2.022	0.59
12308.00	90.640	339.530	6352.34	5228.64	5683.27	163.58	1725803.57	14527312.23	40°00'4.2779"N	80°41'42.3500"W	5685.62	1.649	1.01
12403.00	90.520	338.540	6351.37	5323.63	5771.97	129.59	1725769.60	14527400.90	40°00'5.1557"N	80°41'42.7828"W	5773.43	1.286	1.05
12499.00	90.180	338.480	6350.79	5419.63	5861.30	94.42	1725734.44	14527490.19	40°00'6.0396"N	80°41'43.2308"W	5862.06	0.923	0.36
12595.00	90.180	338.430	6350.49	5515.63	5950.59	59.17	1725699.20	14527579.45	40°00'6.9232"N	80°41'43.6799"W	5950.88	0.570	0.05
12690.00	90.180	338.270	6350.19	5610.63	6038.89	24.12	1725664.17	14527667.71	40°00'7.7970"N	80°41'44.1264"W	6038.94	0.229	0.17
12786.00	90.150	338.200	6349.91	5706.63	6128.04	-11.48	1725628.59	14527756.83	40°00'8.6792"N	80°41'44.5799"W	6128.06	359.893	0.08
12881.00	90.150	338.330	6349.66	5801.63	6216.29	-46.66	1725593.42	14527845.04	40°00'9.5525"N	80°41'45.0281"W	6216.47	359.570	0.14
12976.00	90.210	338.470	6349.36	5896.63	6304.62	-81.63	1725558.46	14527933.34	40°00'10.4266"N	80°41'45.4736"W	6305.15	359.258	0.16
13071.00	90.270	338.450	6348.97	5991.62	6392.98	-116.51	1725523.60	14528021.67	40°00'11.3010"N	80°41'45.9179"W	6394.04	358.956	0.07
13167.00	90.240	337.540	6348.54	6087.62	6481.99	-152.48	1725487.64	14528110.64	40°00'12.1818"N	80°41'46.3762"W	6483.78	358.652	0.95
13262.00	90.270	338.440	6348.12	6182.61	6570.06	-188.08	1725452.05	14528198.68	40°00'13.0533"N	80°41'46.8299"W	6572.75	358.360	0.95
13358.00	90.180	339.120	6347.74	6278.61	6659.55	-222.83	1725417.32	14528288.13	40°00'13.9389"N	80°41'47.2724"W	6663.28	358.084	0.71
13453.00	90.240	338.020	6347.39	6373.61	6747.98	-257.54	1725382.63	14528376.53	40°00'14.8139"N	80°41'47.7146"W	6752.89	357.814	1.16
13548.00	90.150	338.470	6347.07	6468.61	6836.22	-292.75	1725347.43	14528464.72	40°00'15.6870"N	80°41'48.1632"W	6842.48	357.548	0.48
13644.00	90.300	338.550	6346.69	6564.61	6925.54	-327.91	1725312.27	14528554.01	40°00'16.5710"N	80°41'48.6112"W	6933.30	357.289	0.18
13739.00	90.580	338.340	6345.96	6659.60	7013.89	-362.82	1725277.39	14528642.33	40°00'17.4453"N	80°41'49.0559"W	7023.27	357.039	0.37
13834.00	90.670	338.670	6344.92	6754.60	7102.28	-397.62	1725242.59	14528730.69	40°00'18.3199"N	80°41'49.4993"W	7113.40	356.796	0.36



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Actual Wellpath Report

Ruth Keller MSH 405H awp Proj: 32178'

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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
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WELLPATH DATA (342 stations)

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]
13930.00	90.610	338.310	6343.85	6850.59	7191.59	-432.82	1725207.41	14528819.96	40°00'19.2036"N	80°41'49.9477"W	7204.60	356.556	0.38
14026.00	90.610	338.220	6342.83	6946.58	7280.76	-468.37	1725171.87	14528909.09	40°00'20.0860"N	80°41'50.4006"W	7295.81	356.319	0.09
14121.00	90.760	340.430	6341.69	7041.56	7369.63	-501.91	1725138.35	14528997.93	40°00'20.9654"N	80°41'50.8277"W	7386.70	356.104	2.33
14217.00	90.610	338.350	6340.55	7137.54	7459.47	-535.69	1725104.58	14529087.74	40°00'21.8544"N	80°41'51.2580"W	7478.68	355.892	2.17
14312.00	90.580	338.500	6339.56	7232.53	7547.81	-570.63	1725069.66	14529176.04	40°00'22.7286"N	80°41'51.7030"W	7569.35	355.677	0.16
14407.00	90.610	338.710	6338.57	7327.53	7636.26	-605.28	1725035.02	14529264.46	40°00'23.6038"N	80°41'52.1445"W	7660.21	355.468	0.22
14502.00	90.610	338.580	6337.56	7422.52	7724.73	-639.87	1725000.44	14529352.89	40°00'24.4793"N	80°41'52.5852"W	7751.19	355.265	0.14
14598.00	90.670	338.800	6336.49	7518.52	7814.17	-674.76	1724965.57	14529442.29	40°00'25.3642"N	80°41'53.0296"W	7843.24	355.065	0.24
14693.00	90.730	338.890	6335.33	7613.51	7902.76	-709.04	1724931.30	14529530.84	40°00'26.2408"N	80°41'53.4663"W	7934.50	354.873	0.11
14788.00	90.640	338.560	6334.19	7708.50	7991.28	-743.51	1724896.85	14529619.33	40°00'27.1168"N	80°41'53.9054"W	8025.79	354.685	0.36
14884.00	90.550	338.720	6333.20	7804.49	8080.68	-778.47	1724861.90	14529708.70	40°00'28.0014"N	80°41'54.3508"W	8118.09	354.497	0.19
14979.00	90.360	337.230	6332.44	7899.48	8168.74	-814.09	1724826.29	14529796.72	40°00'28.8728"N	80°41'54.8048"W	8209.20	354.309	1.58
15075.00	90.520	337.360	6331.70	7995.46	8257.30	-851.15	1724789.25	14529885.24	40°00'29.7492"N	80°41'55.2771"W	8301.05	354.115	0.21
15170.00	90.670	337.600	6330.72	8090.44	8345.05	-887.53	1724752.88	14529972.96	40°00'30.6176"N	80°41'55.7409"W	8392.11	353.929	0.30
15266.00	90.670	338.110	6329.60	8186.43	8433.96	-923.72	1724716.71	14530061.84	40°00'31.4975"N	80°41'56.2021"W	8484.39	353.750	0.53
15362.00	90.640	337.620	6328.50	8282.41	8522.88	-959.89	1724680.55	14530150.72	40°00'32.3774"N	80°41'56.6630"W	8576.76	353.574	0.51
15457.00	90.610	337.550	6327.46	8377.39	8610.69	-996.11	1724644.34	14530238.50	40°00'33.2465"N	80°41'57.1247"W	8668.12	353.401	0.08
15553.00	90.520	337.360	6326.51	8473.37	8699.35	-1032.91	1724607.55	14530327.13	40°00'34.1238"N	80°41'57.5939"W	8760.46	353.229	0.22
15648.00	90.890	337.580	6325.35	8568.35	8787.10	-1069.31	1724571.17	14530414.84	40°00'34.9921"N	80°41'58.0578"W	8851.92	353.062	0.45
15743.00	90.760	336.180	6323.98	8663.30	8874.46	-1106.61	1724533.89	14530502.16	40°00'35.8567"N	80°41'58.5334"W	8943.18	352.892	1.48
15839.00	90.950	337.390	6322.55	8759.24	8962.67	-1144.45	1724496.06	14530590.34	40°00'36.7297"N	80°41'59.0158"W	9035.44	352.723	1.28
15934.00	90.980	338.150	6320.95	8854.22	9050.60	-1180.38	1724460.14	14530678.23	40°00'37.5998"N	80°41'59.4738"W	9127.24	352.569	0.80
16029.00	90.950	337.690	6319.35	8949.20	9138.62	-1216.09	1724424.45	14530766.22	40°00'38.4708"N	80°41'59.9289"W	9219.17	352.420	0.49
16124.00	90.890	338.890	6317.82	9044.19	9226.86	-1251.22	1724389.33	14530854.43	40°00'39.3441"N	80°42'0.3766"W	9311.32	352.277	1.26
16220.00	90.820	339.030	6316.39	9140.17	9316.45	-1285.69	1724354.88	14530943.99	40°00'40.2306"N	80°42'0.8156"W	9404.75	352.143	0.16
16316.00	90.790	337.430	6315.04	9236.16	9405.60	-1321.29	1724319.29	14531033.09	40°00'41.1127"N	80°42'1.2693"W	9497.95	352.003	1.67
16411.00	90.700	336.900	6313.80	9331.12	9493.14	-1358.15	1724282.44	14531120.61	40°00'41.9791"N	80°42'1.7393"W	9589.80	351.858	0.57
16506.00	90.550	337.550	6312.77	9426.09	9580.73	-1394.92	1724245.69	14531208.16	40°00'42.8459"N	80°42'2.2081"W	9681.75	351.716	0.70
16601.00	90.640	337.440	6311.78	9521.07	9668.49	-1431.28	1724209.34	14531295.88	40°00'43.7143"N	80°42'2.6716"W	9773.86	351.579	0.15
16697.00	90.610	337.390	6310.73	9617.05	9757.12	-1468.15	1724172.49	14531384.48	40°00'44.5914"N	80°42'3.1416"W	9866.96	351.443	0.06



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Actual Wellpath Report

Ruth Keller MSH 405H awp Proj: 32178'

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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
16792.00	90.550	337.650	6309.77	9712.03	9844.90	-1504.47	1724136.18	14531472.22	40°00'45.4601"N	80°42'3.6046"W	9959.19	351.311	0.28
16888.00	90.610	338.400	6308.80	9808.02	9933.92	-1540.39	1724100.27	14531561.21	40°00'46.3410"N	80°42'4.0625"W	10052.64	351.186	0.78
16983.00	90.360	336.860	6308.00	9903.00	10021.77	-1576.55	1724064.13	14531649.02	40°00'47.2103"N	80°42'4.5233"W	10145.01	351.060	1.64
17080.00	90.580	337.380	6307.20	9999.97	10111.13	-1614.26	1724026.44	14531738.35	40°00'48.0947"N	80°42'5.0042"W	10239.18	350.929	0.58
17175.00	90.520	337.310	6306.29	10094.95	10198.80	-1650.85	1723989.86	14531825.98	40°00'48.9622"N	80°42'5.4706"W	10331.54	350.805	0.10
17270.00	90.580	337.490	6305.38	10189.92	10286.50	-1687.36	1723953.37	14531913.65	40°00'49.8301"N	80°42'5.9361"W	10423.97	350.684	0.20
17366.00	90.580	337.640	6304.40	10285.90	10375.23	-1723.99	1723916.75	14532002.34	40°00'50.7082"N	80°42'6.4031"W	10517.48	350.566	0.16
17462.00	90.890	337.930	6303.17	10381.89	10464.09	-1760.29	1723880.47	14532091.17	40°00'51.5876"N	80°42'6.8657"W	10611.12	350.451	0.44
17556.00	90.920	337.580	6301.69	10475.87	10551.09	-1795.87	1723844.90	14532178.13	40°00'52.4484"N	80°42'7.3193"W	10702.83	350.340	0.37
17650.00	90.760	337.310	6300.31	10569.84	10637.89	-1831.92	1723808.86	14532264.90	40°00'53.3074"N	80°42'7.7789"W	10794.47	350.229	0.33
17745.00	90.890	337.590	6298.94	10664.82	10725.61	-1868.35	1723772.45	14532352.59	40°00'54.1756"N	80°42'8.2433"W	10887.13	350.119	0.32
17839.00	91.530	339.170	6296.96	10758.79	10812.98	-1902.97	1723737.84	14532439.92	40°00'55.0401"N	80°42'8.6846"W	10979.15	350.019	1.81
17937.00	91.130	337.750	6294.68	10856.76	10904.11	-1938.94	1723701.88	14532531.01	40°00'55.9418"N	80°42'9.1429"W	11075.15	349.917	1.50
18035.00	91.070	337.710	6292.80	10954.73	10994.78	-1976.07	1723664.76	14532621.65	40°00'56.8391"N	80°42'9.6163"W	11170.95	349.811	0.07
18130.00	90.860	337.220	6291.20	11049.70	11082.51	-2012.48	1723628.38	14532709.35	40°00'57.7073"N	80°42'10.0804"W	11263.75	349.708	0.56
18225.00	90.980	335.460	6289.68	11144.62	11169.51	-2050.59	1723590.27	14532796.32	40°00'58.5683"N	80°42'10.5666"W	11356.19	349.597	1.86
18321.00	90.980	337.200	6288.03	11240.53	11257.42	-2089.13	1723551.75	14532884.19	40°00'59.4383"N	80°42'11.0581"W	11449.63	349.487	1.81
18416.00	91.350	338.460	6286.10	11335.50	11345.38	-2124.97	1723515.93	14532972.11	40°01'0.3087"N	80°42'11.5150"W	11542.66	349.392	1.38
18511.00	91.130	337.470	6284.05	11430.47	11433.42	-2160.60	1723480.31	14533060.12	40°01'1.1799"N	80°42'11.9692"W	11635.77	349.299	1.07
18607.00	90.730	337.550	6282.49	11526.45	11522.10	-2197.32	1723443.61	14533148.77	40°01'2.0575"N	80°42'12.4373"W	11729.75	349.203	0.42
18702.00	90.790	338.680	6281.23	11621.43	11610.25	-2232.73	1723408.21	14533236.88	40°01'2.9297"N	80°42'12.8886"W	11822.98	349.115	1.19
18798.00	90.730	338.690	6279.95	11717.43	11699.67	-2267.62	1723373.33	14533326.27	40°01'3.8146"N	80°42'13.3333"W	11917.40	349.031	0.06
18893.00	90.820	338.580	6278.67	11812.42	11788.14	-2302.22	1723338.74	14533414.70	40°01'4.6900"N	80°42'13.7743"W	12010.85	348.949	0.15
18988.00	90.760	338.300	6277.36	11907.41	11876.48	-2337.13	1723303.85	14533503.01	40°01'5.5641"N	80°42'14.2192"W	12104.26	348.867	0.30
19083.00	90.790	338.560	6276.07	12002.40	11964.82	-2372.05	1723268.94	14533591.31	40°01'6.4383"N	80°42'14.6642"W	12197.69	348.786	0.28
19179.00	90.760	338.880	6274.78	12098.39	12054.27	-2406.89	1723234.12	14533680.72	40°01'7.3233"N	80°42'15.1082"W	12292.21	348.708	0.33
19274.00	90.700	338.130	6273.57	12193.38	12142.65	-2441.70	1723199.32	14533769.07	40°01'8.1979"N	80°42'15.5518"W	12385.71	348.630	0.79
19369.00	90.610	335.900	6272.48	12288.34	12230.10	-2478.79	1723162.25	14533856.48	40°01'9.0633"N	80°42'16.0248"W	12478.77	348.543	2.35
19559.00	90.980	339.060	6269.84	12478.26	12405.57	-2551.54	1723089.52	14534031.89	40°01'10.7998"N	80°42'16.9525"W	12665.25	348.378	1.67
19654.00	90.950	337.860	6268.24	12573.25	12493.92	-2586.42	1723054.66	14534120.20	40°01'11.6740"N	80°42'17.3970"W	12758.83	348.304	1.26



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REFERENCE WELLPATH IDENTIFICATION			
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Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
19750.00	90.980	339.630	6266.63	12669.23	12583.37	-2621.21	1723019.88	14534209.62	40°01'12.5591"N	80°42'17.8404"W	12853.49	348.233	1.84
19844.00	91.040	339.680	6264.97	12763.20	12671.50	-2653.89	1722987.21	14534297.71	40°01'13.4311"N	80°42'18.2566"W	12946.43	348.171	0.08
19940.00	91.070	339.570	6263.20	12859.16	12761.48	-2687.31	1722953.81	14534387.65	40°01'14.3213"N	80°42'18.6823"W	13041.35	348.108	0.12
20035.00	90.980	339.570	6261.50	12954.13	12850.49	-2720.46	1722920.67	14534476.63	40°01'15.2020"N	80°42'19.1047"W	13135.29	348.047	0.09
20131.00	91.010	339.730	6259.83	13050.10	12940.48	-2753.84	1722887.30	14534566.59	40°01'16.0925"N	80°42'19.5299"W	13230.26	347.986	0.17
20226.00	91.220	339.560	6257.99	13145.06	13029.53	-2786.88	1722854.28	14534655.60	40°01'16.9736"N	80°42'19.9508"W	13324.24	347.927	0.28
20321.00	91.040	339.530	6256.11	13240.03	13118.52	-2820.07	1722821.10	14534744.56	40°01'17.8541"N	80°42'20.3737"W	13418.21	347.868	0.19
20417.00	91.100	339.860	6254.32	13335.99	13208.54	-2853.38	1722787.80	14534834.54	40°01'18.7448"N	80°42'20.7980"W	13513.23	347.810	0.35
20512.00	91.070	339.700	6252.52	13430.95	13297.67	-2886.21	1722754.99	14534923.64	40°01'19.6267"N	80°42'21.2162"W	13607.29	347.754	0.17
20607.00	90.920	339.340	6250.87	13525.92	13386.65	-2919.44	1722721.76	14535012.58	40°01'20.5071"N	80°42'21.6396"W	13701.30	347.697	0.41
20702.00	91.130	339.760	6249.17	13620.89	13475.65	-2952.63	1722688.59	14535101.55	40°01'21.3877"N	80°42'22.0624"W	13795.33	347.641	0.49
20798.00	91.040	339.670	6247.35	13716.85	13565.68	-2985.91	1722655.33	14535191.54	40°01'22.2784"N	80°42'22.4863"W	13890.41	347.587	0.13
20894.00	90.920	339.520	6245.71	13812.82	13655.64	-3019.37	1722621.88	14535281.47	40°01'23.1686"N	80°42'22.9126"W	13985.47	347.532	0.20
20989.00	91.010	339.610	6244.11	13907.79	13744.65	-3052.54	1722588.72	14535370.44	40°01'24.0493"N	80°42'23.3352"W	14079.54	347.478	0.13
21084.00	90.920	339.370	6242.51	14002.76	13833.62	-3085.82	1722555.46	14535459.37	40°01'24.9295"N	80°42'23.7592"W	14173.61	347.425	0.27
21180.00	90.980	339.310	6240.92	14098.74	13923.43	-3119.68	1722521.60	14535549.15	40°01'25.8182"N	80°42'24.1907"W	14268.65	347.371	0.09
21275.00	91.100	339.720	6239.20	14193.71	14012.41	-3152.92	1722488.38	14535638.09	40°01'26.6986"N	80°42'24.6142"W	14362.75	347.319	0.45
21370.00	91.040	339.800	6237.42	14288.67	14101.53	-3185.78	1722455.53	14535727.18	40°01'27.5803"N	80°42'25.0328"W	14456.91	347.270	0.11
21465.00	91.070	339.740	6235.67	14383.63	14190.65	-3218.63	1722422.70	14535816.27	40°01'28.4621"N	80°42'25.4513"W	14551.09	347.221	0.07
21561.00	91.070	339.580	6233.88	14479.60	14280.65	-3251.99	1722389.35	14535906.23	40°01'29.3526"N	80°42'25.8763"W	14646.24	347.171	0.17
21656.00	90.700	339.660	6232.41	14574.57	14369.69	-3285.07	1722356.28	14535995.24	40°01'30.2336"N	80°42'26.2978"W	14740.41	347.123	0.40
21751.00	90.760	339.530	6231.20	14669.54	14458.73	-3318.19	1722323.18	14536084.23	40°01'31.1145"N	80°42'26.7197"W	14834.59	347.075	0.15
21846.00	90.670	339.080	6230.02	14764.53	14547.59	-3351.76	1722289.62	14536173.06	40°01'31.9938"N	80°42'27.1475"W	14928.72	347.025	0.48
21942.00	90.890	339.560	6228.71	14860.51	14637.39	-3385.66	1722255.73	14536262.83	40°01'32.8824"N	80°42'27.5794"W	15023.85	346.976	0.55
22037.00	90.980	339.400	6227.16	14955.48	14726.35	-3418.96	1722222.45	14536351.76	40°01'33.7626"N	80°42'28.0037"W	15118.03	346.929	0.19
22133.00	91.660	338.030	6224.95	15051.45	14815.78	-3453.79	1722187.63	14536441.15	40°01'34.6474"N	80°42'28.4478"W	15213.02	346.878	1.59
22228.00	91.100	338.660	6222.66	15146.43	14904.05	-3488.84	1722152.59	14536529.38	40°01'35.5208"N	80°42'28.8945"W	15306.95	346.825	0.89
22323.00	91.160	338.550	6220.79	15241.41	14992.48	-3523.49	1722117.96	14536617.78	40°01'36.3959"N	80°42'29.3362"W	15400.96	346.775	0.13
22418.00	91.130	338.700	6218.89	15336.39	15080.93	-3558.11	1722083.35	14536706.20	40°01'37.2711"N	80°42'29.7775"W	15494.99	346.725	0.16
22514.00	91.070	338.710	6217.05	15432.37	15170.36	-3592.96	1722048.51	14536795.59	40°01'38.1560"N	80°42'30.2218"W	15590.04	346.676	0.06



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Environmental Protection

Actual Wellpath Report

Ruth Keller MSH 405H awp Proj: 32178'

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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
22609.00	91.290	338.790	6215.09	15527.35	15258.88	-3627.39	1722014.10	14536884.08	40°01'39.0319"N	80°42'30.6606"W	15684.12	346.628	0.25
22705.00	91.320	338.750	6212.90	15623.32	15348.35	-3662.14	1721979.36	14536973.50	40°01'39.9171"N	80°42'31.1036"W	15779.19	346.580	0.05
22800.00	91.350	338.620	6210.69	15718.30	15436.82	-3696.67	1721944.85	14537061.95	40°01'40.7926"N	80°42'31.5436"W	15873.27	346.533	0.14
22896.00	91.130	338.510	6208.61	15814.27	15526.16	-3731.74	1721909.79	14537151.25	40°01'41.6766"N	80°42'31.9908"W	15968.33	346.485	0.26
22991.00	91.040	338.240	6206.81	15909.26	15614.46	-3766.74	1721874.80	14537239.51	40°01'42.5503"N	80°42'32.4370"W	16062.37	346.437	0.30
23087.00	91.130	338.560	6205.00	16005.24	15703.70	-3802.08	1721839.48	14537328.72	40°01'43.4333"N	80°42'32.8875"W	16157.41	346.390	0.35
23182.00	91.160	338.670	6203.10	16100.22	15792.14	-3836.71	1721804.86	14537417.13	40°01'44.3084"N	80°42'33.3290"W	16251.53	346.345	0.12
23277.00	91.220	338.610	6201.12	16195.20	15880.60	-3871.30	1721770.28	14537505.55	40°01'45.1837"N	80°42'33.7700"W	16345.65	346.300	0.09
23373.00	91.130	338.710	6199.16	16291.18	15970.00	-3906.23	1721735.37	14537594.91	40°01'46.0683"N	80°42'34.2152"W	16440.79	346.255	0.14
23468.00	91.160	338.750	6197.26	16386.16	16058.51	-3940.69	1721700.92	14537683.39	40°01'46.9441"N	80°42'34.6545"W	16534.95	346.212	0.05
23564.00	91.070	338.340	6195.39	16482.14	16147.84	-3975.79	1721665.83	14537772.68	40°01'47.8280"N	80°42'35.1020"W	16630.08	346.168	0.44
23659.00	91.100	338.530	6193.59	16577.12	16236.17	-4010.71	1721630.93	14537860.98	40°01'48.7020"N	80°42'35.5471"W	16724.21	346.124	0.20
23754.00	91.900	338.830	6191.10	16672.09	16324.64	-4045.23	1721596.42	14537949.41	40°01'49.5774"N	80°42'35.9873"W	16818.38	346.082	0.90
23850.00	91.260	337.940	6188.46	16768.05	16413.86	-4080.58	1721561.08	14538038.59	40°01'50.4602"N	80°42'36.4380"W	16913.48	346.039	1.14
23946.00	90.980	338.590	6186.58	16864.03	16503.01	-4116.13	1721525.55	14538127.72	40°01'51.3424"N	80°42'36.8912"W	17008.58	345.995	0.74
24041.00	90.300	338.410	6185.52	16959.03	16591.40	-4150.94	1721490.75	14538216.06	40°01'52.2169"N	80°42'37.3350"W	17102.77	345.954	0.74
24136.00	90.300	337.760	6185.02	17054.02	16679.53	-4186.40	1721455.31	14538304.16	40°01'53.0890"N	80°42'37.7872"W	17196.88	345.910	0.68
24232.00	90.360	337.680	6184.47	17150.01	16768.36	-4222.79	1721418.93	14538392.96	40°01'53.9681"N	80°42'38.2513"W	17291.90	345.865	0.10
24328.00	90.330	338.720	6183.89	17246.01	16857.49	-4258.44	1721383.29	14538482.06	40°01'54.8500"N	80°42'38.7059"W	17387.05	345.823	1.08
24423.00	90.270	338.660	6183.39	17341.00	16946.00	-4292.97	1721348.78	14538570.52	40°01'55.7257"N	80°42'39.1461"W	17481.31	345.784	0.09
24519.00	90.240	338.610	6182.97	17437.00	17035.40	-4327.94	1721313.82	14538659.89	40°01'56.6104"N	80°42'39.5919"W	17576.57	345.745	0.06
24615.00	90.330	338.870	6182.49	17533.00	17124.86	-4362.75	1721279.03	14538749.32	40°01'57.4956"N	80°42'40.0357"W	17671.86	345.707	0.29
24710.00	90.270	338.610	6181.99	17628.00	17213.40	-4397.20	1721244.59	14538837.82	40°01'58.3716"N	80°42'40.4748"W	17766.16	345.670	0.28
24805.00	90.330	338.630	6181.49	17723.00	17301.86	-4431.83	1721209.98	14538926.25	40°01'59.2469"N	80°42'40.9164"W	17860.44	345.633	0.07
24900.00	90.240	338.590	6181.02	17818.00	17390.31	-4466.48	1721175.34	14539014.67	40°02'0.1221"N	80°42'41.3581"W	17954.73	345.596	0.10
24996.00	90.760	338.830	6180.18	17913.99	17479.76	-4501.33	1721140.50	14539104.08	40°02'1.0072"N	80°42'41.8025"W	18050.04	345.559	0.60
25091.00	90.550	338.600	6179.10	18008.98	17568.27	-4535.82	1721106.03	14539192.56	40°02'1.8830"N	80°42'42.2421"W	18144.36	345.523	0.33
25186.00	90.640	338.640	6178.11	18103.98	17656.73	-4570.45	1721071.41	14539280.98	40°02'2.7583"N	80°42'42.6836"W	18238.67	345.488	0.10
25282.00	90.550	338.710	6177.11	18199.97	17746.15	-4605.35	1721036.52	14539370.37	40°02'3.6431"N	80°42'43.1287"W	18333.99	345.452	0.12
25378.00	90.760	338.820	6176.02	18295.97	17835.63	-4640.12	1721001.76	14539459.81	40°02'4.5284"N	80°42'43.5720"W	18429.33	345.417	0.25



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Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)

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]
25475.00	90.580	338.610	6174.88	18392.96	17926.00	-4675.33	1720966.57	14539550.15	40°02'5.4226"N	80°42'44.0209"W	18525.67	345.382	0.29
25571.00	90.520	338.710	6173.96	18488.95	18015.42	-4710.27	1720931.65	14539639.53	40°02'6.3074"N	80°42'44.4663"W	18621.01	345.348	0.12
25668.00	90.460	338.460	6173.13	18585.95	18105.72	-4745.68	1720896.25	14539729.79	40°02'7.2009"N	80°42'44.9178"W	18717.33	345.313	0.27
25764.00	90.520	338.610	6172.31	18681.95	18195.06	-4780.81	1720861.13	14539819.09	40°02'8.0848"N	80°42'45.3657"W	18812.66	345.278	0.17
25861.00	90.550	338.640	6171.40	18778.94	18285.38	-4816.16	1720825.80	14539909.38	40°02'8.9786"N	80°42'45.8165"W	18909.01	345.244	0.04
25958.00	90.520	338.530	6170.50	18875.94	18375.68	-4851.58	1720790.39	14539999.65	40°02'9.8720"N	80°42'46.2681"W	19005.35	345.210	0.12
26054.00	90.550	338.630	6169.60	18971.93	18465.05	-4886.63	1720755.35	14540088.98	40°02'10.7563"N	80°42'46.7151"W	19100.71	345.177	0.11
26151.00	90.550	338.820	6168.67	19068.93	18555.43	-4921.83	1720720.17	14540179.33	40°02'11.6506"N	80°42'47.1638"W	19197.09	345.144	0.20
26249.00	90.520	338.590	6167.76	19166.92	18646.74	-4957.42	1720684.59	14540270.59	40°02'12.5540"N	80°42'47.6176"W	19294.47	345.112	0.24
26343.00	90.520	338.600	6166.90	19260.92	18734.25	-4991.72	1720650.30	14540358.07	40°02'13.4200"N	80°42'48.0550"W	19387.87	345.080	0.01
26438.00	90.490	338.650	6166.07	19355.92	18822.71	-5026.35	1720615.69	14540446.50	40°02'14.2953"N	80°42'48.4965"W	19482.26	345.049	0.06
26532.00	90.520	338.710	6165.24	19449.91	18910.27	-5060.52	1720581.53	14540534.03	40°02'15.1617"N	80°42'48.9322"W	19575.68	345.018	0.07
26626.00	90.520	338.540	6164.38	19543.91	18997.80	-5094.78	1720547.29	14540621.52	40°02'16.0277"N	80°42'49.3690"W	19669.10	344.988	0.18
26721.00	90.460	338.520	6163.57	19638.90	19086.21	-5129.55	1720512.53	14540709.89	40°02'16.9025"N	80°42'49.8124"W	19763.49	344.957	0.07
26815.00	90.520	338.760	6162.77	19732.90	19173.75	-5163.79	1720478.31	14540797.40	40°02'17.7687"N	80°42'50.2490"W	19856.92	344.927	0.26
26909.00	90.580	338.850	6161.87	19826.90	19261.39	-5197.77	1720444.34	14540885.00	40°02'18.6358"N	80°42'50.6823"W	19950.38	344.898	0.12
27004.00	90.490	338.550	6160.98	19921.89	19349.89	-5232.28	1720409.84	14540973.47	40°02'19.5115"N	80°42'51.1223"W	20044.83	344.869	0.33
27098.00	90.460	338.510	6160.20	20015.89	19437.37	-5266.68	1720375.45	14541060.91	40°02'20.3771"N	80°42'51.5610"W	20138.25	344.839	0.05
27193.00	90.520	338.450	6159.39	20110.88	19525.74	-5301.53	1720340.62	14541149.25	40°02'21.2515"N	80°42'52.0054"W	20232.67	344.810	0.09
27287.00	90.520	338.810	6158.53	20204.88	19613.27	-5335.78	1720306.38	14541236.75	40°02'22.1176"N	80°42'52.4421"W	20326.12	344.781	0.38
27382.00	90.520	338.650	6157.67	20299.87	19701.80	-5370.24	1720271.93	14541325.24	40°02'22.9935"N	80°42'52.8816"W	20420.59	344.753	0.17
27476.00	90.520	338.110	6156.82	20393.87	19789.18	-5404.87	1720237.32	14541412.59	40°02'23.8582"N	80°42'53.3232"W	20514.00	344.724	0.57
27571.00	90.490	338.630	6155.98	20488.87	19877.49	-5439.89	1720202.31	14541500.86	40°02'24.7319"N	80°42'53.7698"W	20608.42	344.695	0.55
27665.00	90.490	338.600	6155.18	20582.86	19965.01	-5474.16	1720168.05	14541588.35	40°02'25.5980"N	80°42'54.2069"W	20701.89	344.667	0.03
27759.00	90.240	338.620	6154.58	20676.86	20052.54	-5508.45	1720133.78	14541675.84	40°02'26.4640"N	80°42'54.6441"W	20795.37	344.640	0.27
27853.00	90.180	338.510	6154.23	20770.86	20140.04	-5542.80	1720099.45	14541763.31	40°02'27.3297"N	80°42'55.0821"W	20888.84	344.612	0.13
27947.00	90.270	338.650	6153.86	20864.86	20227.54	-5577.13	1720065.13	14541850.78	40°02'28.1956"N	80°42'55.5199"W	20982.32	344.585	0.18
28042.00	90.270	338.700	6153.42	20959.86	20316.04	-5611.67	1720030.60	14541939.24	40°02'29.0712"N	80°42'55.9604"W	21076.82	344.559	0.05
28136.00	90.300	338.570	6152.95	21053.86	20403.58	-5645.92	1719996.37	14542026.74	40°02'29.9373"N	80°42'56.3971"W	21170.32	344.533	0.14
28231.00	90.270	338.620	6152.48	21148.85	20492.02	-5680.59	1719961.71	14542115.15	40°02'30.8125"N	80°42'56.8393"W	21264.81	344.506	0.06



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Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 stations)													
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]
28325.00	90.240	338.760	6152.06	21242.85	20579.59	-5714.75	1719927.56	14542202.69	40°02'31.6790"N	80°42'57.2749"W	21358.32	344.481	0.15
28419.00	90.210	338.600	6151.69	21336.85	20667.16	-5748.92	1719893.40	14542290.22	40°02'32.5454"N	80°42'57.7107"W	21451.84	344.455	0.17
28514.00	90.120	338.670	6151.42	21431.85	20755.63	-5783.53	1719858.80	14542378.66	40°02'33.4208"N	80°42'58.1521"W	21546.36	344.430	0.12
28607.00	90.150	338.580	6151.20	21524.85	20842.23	-5817.43	1719824.92	14542465.23	40°02'34.2777"N	80°42'58.5844"W	21638.88	344.405	0.10
28702.00	90.120	338.650	6150.97	21619.85	20930.69	-5852.07	1719790.29	14542553.65	40°02'35.1529"N	80°42'59.0261"W	21733.40	344.379	0.08
28796.00	90.180	338.720	6150.73	21713.85	21018.26	-5886.24	1719756.14	14542641.19	40°02'36.0194"N	80°42'59.4619"W	21826.94	344.355	0.10
28891.00	90.150	338.250	6150.45	21808.85	21106.64	-5921.08	1719721.31	14542729.53	40°02'36.8939"N	80°42'59.9062"W	21921.44	344.330	0.50
28986.00	90.150	338.610	6150.20	21903.85	21194.99	-5956.00	1719686.40	14542817.85	40°02'37.7680"N	80°43'0.3517"W	22015.94	344.304	0.38
29080.00	90.180	338.640	6149.93	21997.85	21282.52	-5990.26	1719652.15	14542905.34	40°02'38.6341"N	80°43'0.7886"W	22109.48	344.280	0.05
29175.00	90.150	338.610	6149.66	22092.85	21370.99	-6024.89	1719617.54	14542993.77	40°02'39.5094"N	80°43'1.2302"W	22204.02	344.256	0.04
29269.00	90.180	338.580	6149.39	22186.85	21458.50	-6059.19	1719583.25	14543081.26	40°02'40.3754"N	80°43'1.6677"W	22297.56	344.232	0.05
29364.00	90.150	338.560	6149.12	22281.85	21546.94	-6093.90	1719548.56	14543169.65	40°02'41.2504"N	80°43'2.1104"W	22392.10	344.208	0.04
29459.00	90.120	338.720	6148.89	22376.85	21635.41	-6128.50	1719513.97	14543258.09	40°02'42.1258"N	80°43'2.5517"W	22486.65	344.185	0.17
29553.00	90.180	338.560	6148.65	22470.85	21722.95	-6162.74	1719479.74	14543345.60	40°02'42.9920"N	80°43'2.9884"W	22580.21	344.162	0.18
29647.00	90.150	338.580	6148.38	22564.85	21810.45	-6197.09	1719445.41	14543433.07	40°02'43.8577"N	80°43'3.4264"W	22673.77	344.138	0.04
29742.00	90.150	338.710	6148.13	22659.84	21898.93	-6231.68	1719410.83	14543521.51	40°02'44.7332"N	80°43'3.8676"W	22768.33	344.115	0.14
29836.00	90.120	338.530	6147.91	22753.84	21986.46	-6265.95	1719376.58	14543609.01	40°02'45.5992"N	80°43'4.3047"W	22861.90	344.093	0.19
29930.00	90.060	338.640	6147.76	22847.84	22073.97	-6300.27	1719342.27	14543696.48	40°02'46.4651"N	80°43'4.7424"W	22955.47	344.070	0.13
30025.00	90.180	338.610	6147.56	22942.84	22162.44	-6334.89	1719307.66	14543784.91	40°02'47.3404"N	80°43'5.1840"W	23050.04	344.048	0.13
30120.00	89.870	338.660	6147.52	23037.84	22250.91	-6369.50	1719273.06	14543873.35	40°02'48.2158"N	80°43'5.6254"W	23144.62	344.026	0.33
30215.00	89.960	338.730	6147.66	23132.84	22339.42	-6404.02	1719238.56	14543961.82	40°02'49.0915"N	80°43'6.0657"W	23239.21	344.004	0.12
30309.00	89.870	338.670	6147.80	23226.84	22427.00	-6438.16	1719204.43	14544049.37	40°02'49.9581"N	80°43'6.5011"W	23332.81	343.983	0.12
30402.00	89.840	338.660	6148.03	23319.84	22513.62	-6472.00	1719170.61	14544135.96	40°02'50.8152"N	80°43'6.9327"W	23425.41	343.962	0.03
30496.00	89.870	338.660	6148.27	23413.84	22601.18	-6506.21	1719136.41	14544223.48	40°02'51.6815"N	80°43'7.3690"W	23519.01	343.940	0.03
30684.00	89.840	338.570	6148.75	23601.84	22776.23	-6574.76	1719067.89	14544398.47	40°02'53.4136"N	80°43'8.2433"W	23706.21	343.898	0.05
30779.00	90.210	338.870	6148.70	23696.84	22864.75	-6609.24	1719033.43	14544486.95	40°02'54.2894"N	80°43'8.6831"W	23800.82	343.878	0.50
30873.00	90.300	338.530	6148.29	23790.84	22952.33	-6643.38	1718999.29	14544574.50	40°02'55.1560"N	80°43'9.1186"W	23894.44	343.857	0.37
30968.00	90.300	338.610	6147.79	23885.84	23040.76	-6678.09	1718964.60	14544662.89	40°02'56.0309"N	80°43'9.5613"W	23989.03	343.836	0.08
31062.00	90.300	338.670	6147.30	23979.84	23128.31	-6712.33	1718930.38	14544750.40	40°02'56.8971"N	80°43'9.9980"W	24082.65	343.816	0.06
31157.00	90.550	338.520	6146.59	24074.83	23216.75	-6747.00	1718895.72	14544838.81	40°02'57.7722"N	80°43'10.4403"W	24177.25	343.796	0.31



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Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

WELLPATH DATA (342 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]
31251.00	90.700	338.640	6145.57	24168.83	23304.25	-6781.32	1718861.41	14544926.28	40°02'58.6380"N	80°43'10.8781"W	24270.86	343.775	0.20
31346.00	90.580	338.660	6144.51	24263.82	23392.73	-6815.91	1718826.84	14545014.72	40°02'59.5134"N	80°43'11.3193"W	24365.47	343.756	0.13
31440.00	90.640	338.600	6143.51	24357.81	23480.26	-6850.16	1718792.60	14545102.22	40°03'0.3795"N	80°43'11.7561"W	24459.09	343.736	0.09
31534.00	90.610	338.580	6142.48	24451.81	23567.77	-6884.47	1718758.30	14545189.69	40°03'1.2453"N	80°43'12.1938"W	24552.71	343.716	0.04
31628.00	90.610	338.540	6141.48	24545.80	23655.26	-6918.83	1718723.96	14545277.15	40°03'2.1110"N	80°43'12.6321"W	24646.33	343.697	0.04
31723.00	90.670	338.650	6140.42	24640.80	23743.70	-6953.50	1718689.30	14545365.55	40°03'2.9860"N	80°43'13.0743"W	24740.95	343.677	0.13
31817.00	90.670	338.860	6139.32	24734.79	23831.31	-6987.56	1718655.26	14545453.12	40°03'3.8528"N	80°43'13.5088"W	24834.59	343.658	0.22
31911.00	90.610	338.490	6138.27	24828.78	23918.86	-7021.74	1718621.09	14545540.65	40°03'4.7192"N	80°43'13.9448"W	24928.23	343.640	0.40
32006.00	90.640	338.640	6137.23	24923.78	24007.29	-7056.45	1718586.39	14545629.04	40°03'5.5941"N	80°43'14.3876"W	25022.86	343.620	0.16
32101.00	90.640	338.720	6136.17	25018.77	24095.78	-7090.99	1718551.86	14545717.49	40°03'6.4696"N	80°43'14.8282"W	25117.50	343.602	0.08
32153.00	90.700	338.640	6135.56	25070.77	24144.22	-7109.89	1718532.96	14545765.91	40°03'6.9489"N	80°43'15.0693"W	25169.30	343.592	0.19
32178.00‡	90.700	338.640	6135.26	25095.77	24167.50	-7119.00	1718523.86	14545789.19	40°03'7.1793"N	80°43'15.1855"W	25194.21	343.587	0.00

HOLE & CASING SECTIONS - Ref Wellbore: Ruth Keller MSH 405H AWB Ref Wellpath: Ruth Keller MSH 405H awp Proj: 32178'

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
13.375in Casing	26.00	898.00	872.00	26.00	897.99	0.00	0.00	2.66	0.19
9.625in Casing	26.00	2815.00	2789.00	26.00	2714.70	0.00	0.00	88.38	531.90



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Ruth Keller MSH 405H awp Proj: 32178'
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REFERENCE WELLPATH IDENTIFICATION

Operator	EXPAND ENERGY	Well	Ruth Keller MSH 405H
Field	Marshall	API	47051025170000
Facility	Ruth Keller MSH Pad	Wellbore	Ruth Keller MSH 405H AWB
Slot	405H		

TARGETS

Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
Ruth Keller MSH 405H BHL rev 1	6055.00	24161.98	-7137.77	1718505.10	14545783.67	40°03'7.1253"N	80°43'15.4271"W	point
Ruth Keller MSH 405H LP rev 2	6403.00	961.04	1991.97	1727631.25	14522591.86	39°59'17.5491"N	80°41'19.0674"W	point

WELLPATH COMPOSITION - Ref Wellbore: Ruth Keller MSH 405H AWB Ref Wellpath: Ruth Keller MSH 405H awp Proj: 32178'

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore	Survey Date
26.00	733.00	Custom OWSG MWD+IFR1+SAG+FDIR (Approximation)	1 Total MWD IFR-MSA 17.5" 202' - 733'	Ruth Keller MSH 405H AWB	11/14/2024
733.00	2743.00	Custom OWSG MWD+IFR1+SAG+FDIR (Approximation)	2 Total MWD IFR-MSA 12.25" 913' - 2743'	Ruth Keller MSH 405H AWB	11/14/2024
2743.00	5978.00	Custom OWSG MWD+IFR1+SAG+FDIR (Approximation)	3 Total MWD IFR-MSA 8.75" 2840' - 5978'	Ruth Keller MSH 405H AWB	11/14/2024
5978.00	32178.00	Custom OWSG MWD+IFR1+SAG+FDIR (Approximation)	4 BH MWD IFR-MSA 8.5" 6102' - 32153'	Ruth Keller MSH 405H AWB	11/14/2024

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