

Gas Quality Reports

LS180 - Topeka 20" at Ottawa X-Over

Page 1 of 3

11/25/2019 - 2/25/2020

Gas Day	Gross Heating Value (HHV) (Btu/scf)	Net Heating Value (LHV) (Btu/scf)	Specific Gravity	Wobbe Index	Hydrocarbon Dewpoint (HCDP) (deg F)	N2 (mol%)	CO2 (mol%)	Methane (mol%)	Ethane (mol%)	Propane (mol%)	Isobutane (mol%)	N-Butane (mol%)	Isopentane (mol%)	N-Pentane (mol%)	C6 Plus (mol%)
11/25/2019	1,032.5	1,014.5	0.595	1,338.12	-144.84	1.920	0.541	92.186	5.115	0.212	0.006	0.010	0.002	0.002	0.005
11/26/2019	1,034.1	1,016.0	0.595	1,340.31	-144.32	1.853	0.513	92.197	5.206	0.206	0.006	0.010	0.002	0.002	0.005
11/27/2019	1,037.6	1,019.6	0.597	1,342.47	-140.95	1.876	0.493	91.839	5.462	0.289	0.011	0.018	0.003	0.003	0.006
11/28/2019	1,044.3	1,026.1	0.603	1,344.76	-71.12	2.038	0.472	91.055	5.743	0.598	0.027	0.046	0.007	0.006	0.007
11/29/2019	1,043.4	1,025.2	0.602	1,344.32	-72.67	2.036	0.467	91.156	5.684	0.567	0.026	0.044	0.007	0.006	0.007
11/30/2019	1,030.9	1,012.9	0.594	1,337.42	-146.04	1.965	0.498	92.399	4.895	0.216	0.006	0.011	0.002	0.002	0.005
12/01/2019	1,036.8	1,018.8	0.598	1,341.15	-140.90	1.938	0.499	91.834	5.358	0.324	0.013	0.022	0.004	0.003	0.006
12/02/2019	1,037.7	1,019.6	0.597	1,343.46	-141.50	1.825	0.475	91.946	5.457	0.263	0.009	0.016	0.003	0.003	0.005
12/03/2019	1,037.9	1,019.8	0.598	1,342.52	-140.62	1.893	0.487	91.811	5.457	0.309	0.012	0.020	0.003	0.003	0.005
12/04/2019	1,037.6	1,019.5	0.598	1,342.01	-140.24	1.949	0.467	91.850	5.307	0.372	0.015	0.026	0.004	0.004	0.006
12/05/2019	1,032.1	1,014.1	0.593	1,340.69	-145.67	1.791	0.470	92.801	4.644	0.238	0.013	0.026	0.005	0.006	0.007
12/06/2019	1,033.9	1,015.9	0.595	1,340.23	-143.17	1.901	0.481	92.370	4.857	0.338	0.015	0.026	0.004	0.004	0.006
12/07/2019	1,031.9	1,013.9	0.594	1,339.37	-145.50	1.879	0.477	92.604	4.732	0.265	0.011	0.020	0.004	0.003	0.005
12/08/2019	1,029.9	1,012.0	0.593	1,337.92	-147.27	1.878	0.497	92.720	4.676	0.198	0.008	0.013	0.003	0.003	0.005
12/09/2019	1,032.2	1,014.2	0.595	1,337.90	-144.33	2.004	0.487	92.270	4.903	0.293	0.011	0.020	0.003	0.003	0.005
12/10/2019	1,039.7	1,021.5	0.600	1,342.19	-137.33	2.015	0.480	91.607	5.296	0.514	0.025	0.043	0.007	0.006	0.008
12/11/2019	1,034.0	1,015.9	0.596	1,339.43	-142.21	1.978	0.475	92.281	4.813	0.383	0.019	0.033	0.006	0.005	0.008
12/12/2019	1,031.4	1,013.4	0.594	1,338.43	-145.28	1.951	0.466	92.574	4.659	0.302	0.013	0.022	0.004	0.004	0.006
12/13/2019	1,029.7	1,011.7	0.592	1,337.68	-146.96	1.928	0.467	92.793	4.515	0.254	0.011	0.020	0.004	0.004	0.006
12/14/2019	1,039.7	1,021.6	0.601	1,341.54	-71.36	2.056	0.489	91.543	5.267	0.546	0.027	0.048	0.007	0.007	0.009
12/15/2019	1,038.2	1,020.1	0.599	1,340.85	-73.62	2.051	0.482	91.723	5.141	0.509	0.026	0.045	0.007	0.007	0.008
12/16/2019	1,038.2	1,020.1	0.599	1,341.30	-74.25	2.020	0.478	91.802	5.102	0.504	0.026	0.046	0.007	0.007	0.009
12/17/2019	1,033.3	1,015.3	0.594	1,340.22	-143.64	1.915	0.453	92.468	4.788	0.317	0.015	0.027	0.005	0.005	0.007
12/18/2019	1,031.8	1,013.8	0.593	1,340.26	-146.25	1.850	0.444	92.700	4.753	0.216	0.009	0.016	0.003	0.003	0.006
12/19/2019	1,030.1	1,012.1	0.590	1,340.79	-148.56	1.734	0.438	93.149	4.479	0.170	0.007	0.012	0.003	0.003	0.006
12/20/2019	1,030.6	1,012.6	0.591	1,340.64	-147.79	1.751	0.452	93.020	4.565	0.179	0.007	0.013	0.003	0.003	0.006
12/21/2019	1,029.3	1,011.4	0.590	1,339.72	-148.69	1.756	0.459	93.153	4.430	0.166	0.008	0.014	0.004	0.004	0.007
12/22/2019	1,026.5	1,008.5	0.590	1,336.71	-150.38	1.845	0.473	93.278	4.212	0.158	0.007	0.013	0.003	0.003	0.007
12/23/2019	1,026.5	1,008.6	0.590	1,336.82	-150.42	1.849	0.466	93.267	4.228	0.157	0.007	0.013	0.003	0.003	0.007
12/24/2019	1,024.9	1,007.0	0.589	1,335.26	-151.36	1.873	0.485	93.393	4.052	0.162	0.008	0.014	0.004	0.003	0.007
12/25/2019	1,024.2	1,006.3	0.588	1,335.35	-152.41	1.861	0.465	93.520	3.987	0.139	0.006	0.010	0.003	0.003	0.006
12/26/2019	1,028.0	1,010.1	0.591	1,337.66	-148.93	1.837	0.476	93.135	4.319	0.194	0.009	0.015	0.004	0.004	0.008
12/27/2019	1,026.4	1,008.5	0.590	1,336.26	-150.00	1.873	0.477	93.264	4.150	0.196	0.009	0.016	0.004	0.004	0.007
12/28/2019	1,024.8	1,007.0	0.589	1,335.84	-151.80	1.854	0.463	93.473	4.027	0.151	0.007	0.011	0.003	0.003	0.007
12/29/2019	1,026.4	1,008.5	0.590	1,336.50	-150.22	1.858	0.473	93.285	4.168	0.178	0.008	0.015	0.004	0.004	0.007
12/30/2019	1,028.0	1,010.0	0.591	1,336.81	-148.40	1.896	0.482	93.030	4.322	0.226	0.010	0.018	0.004	0.004	0.007
12/31/2019	1,027.2	1,009.3	0.591	1,336.75	-149.16	1.865	0.482	93.182	4.218	0.208	0.010	0.019	0.004	0.004	0.008
01/01/2020	1,025.5	1,007.7	0.589	1,336.34	-150.92	1.829	0.475	93.479	3.987	0.188	0.010	0.018	0.004	0.004	0.008
01/02/2020	1,022.2	1,004.4	0.587	1,334.44	-154.16	1.858	0.454	93.870	3.602	0.178	0.009	0.016	0.004	0.003	0.007
01/03/2020	1,022.3	1,004.4	0.587	1,334.55	-154.28	1.857	0.450	93.857	3.640	0.161	0.008	0.014	0.004	0.003	0.007
01/04/2020	1,028.2	1,010.2	0.591	1,336.92	-147.67	1.921	0.466	93.068	4.202	0.285	0.014	0.026	0.005	0.005	0.008
01/05/2020	1,024.9	1,007.1	0.589	1,335.18	-150.71	1.929	0.453	93.422	3.922	0.227	0.011	0.020	0.004	0.004	0.007
01/06/2020	1,029.4	1,011.4	0.592	1,337.47	-146.48	1.930	0.467	92.937	4.281	0.322	0.016	0.029	0.005	0.005	0.008

Gas Quality Reports

LS180 - Topeka 20" at Ottawa X-Over

11/25/2019 - 2/25/2020

Gas Day	Gross Heating Value (HHV) (Btu/scf)	Net Heating Value (LHV) (Btu/scf)	Specific Gravity	Wobbe Index	Hydrocarbon Dewpoint (HCDP) (deg F)	N2 (mol%)	CO2 (mol%)	Methane (mol%)	Ethane (mol%)	Propane (mol%)	Isobutane (mol%)	N-Butane (mol%)	Isopentane (mol%)	N-Pentane (mol%)	C6 Plus (mol%)
01/07/2020	1,026.9	1,009.0	0.590	1,336.38	-148.88	1.913	0.459	93.261	4.035	0.277	0.014	0.025	0.005	0.005	0.007
01/08/2020	1,025.7	1,007.8	0.590	1,335.51	-149.76	1.937	0.453	93.365	3.924	0.267	0.014	0.025	0.005	0.005	0.008
01/09/2020	1,020.1	1,002.3	0.586	1,332.22	-155.63	1.930	0.461	93.925	3.500	0.152	0.007	0.013	0.003	0.003	0.007
01/10/2020	1,022.1	1,004.2	0.587	1,334.44	-154.40	1.880	0.435	93.868	3.611	0.173	0.008	0.014	0.003	0.003	0.006
01/11/2020	1,026.8	1,008.9	0.589	1,337.59	-149.72	1.832	0.443	93.461	3.962	0.250	0.013	0.023	0.004	0.004	0.007
01/12/2020	1,028.2	1,010.3	0.590	1,338.16	-148.52	1.853	0.444	93.217	4.184	0.252	0.012	0.022	0.004	0.004	0.007
01/13/2020	1,028.1	1,010.1	0.590	1,337.89	-147.97	1.867	0.444	93.293	4.038	0.287	0.017	0.033	0.006	0.007	0.009
01/14/2020	1,023.3	1,005.4	0.587	1,335.23	-152.61	1.886	0.425	93.775	3.665	0.202	0.010	0.020	0.004	0.004	0.008
01/15/2020	1,023.6	1,005.8	0.588	1,334.83	-151.97	1.918	0.437	93.640	3.743	0.215	0.011	0.020	0.004	0.004	0.008
01/16/2020	1,031.5	1,013.5	0.594	1,338.39	-144.36	1.959	0.466	92.652	4.485	0.363	0.019	0.034	0.006	0.006	0.008
01/17/2020	1,028.7	1,010.8	0.591	1,338.09	-147.69	1.883	0.444	93.119	4.228	0.270	0.014	0.025	0.005	0.005	0.008
01/18/2020	1,026.3	1,008.4	0.589	1,336.77	-150.31	1.876	0.443	93.345	4.100	0.198	0.009	0.016	0.003	0.003	0.007
01/19/2020	1,030.4	1,012.4	0.593	1,338.53	-145.49	1.916	0.450	92.924	4.305	0.322	0.019	0.038	0.007	0.008	0.010
01/20/2020	1,032.0	1,014.0	0.594	1,338.48	-143.67	1.968	0.471	92.566	4.558	0.363	0.019	0.035	0.006	0.006	0.009
01/21/2020	1,031.1	1,013.1	0.594	1,338.25	-144.74	1.957	0.462	92.714	4.442	0.353	0.018	0.034	0.006	0.006	0.009
01/22/2020	1,026.8	1,008.8	0.590	1,336.54	-149.45	1.900	0.455	93.240	4.136	0.223	0.011	0.019	0.004	0.004	0.007
01/23/2020	1,033.4	1,015.4	0.596	1,338.84	-142.05	2.023	0.459	92.365	4.641	0.428	0.022	0.040	0.007	0.006	0.009
01/24/2020	1,027.5	1,009.5	0.591	1,336.67	-148.37	1.929	0.451	93.157	4.135	0.271	0.014	0.025	0.005	0.005	0.008
01/25/2020	1,026.7	1,008.8	0.591	1,335.94	-148.92	1.950	0.455	93.168	4.123	0.252	0.012	0.023	0.004	0.005	0.007
01/26/2020	1,023.3	1,005.5	0.588	1,334.93	-152.90	1.921	0.420	93.628	3.838	0.161	0.007	0.013	0.003	0.003	0.006
01/27/2020	1,026.4	1,008.5	0.591	1,335.64	-149.26	1.979	0.443	93.137	4.160	0.236	0.011	0.020	0.004	0.004	0.007
01/28/2020	1,029.9	1,011.9	0.594	1,336.61	-145.43	2.033	0.463	92.659	4.444	0.335	0.017	0.031	0.005	0.005	0.008
01/29/2020	1,027.0	1,009.1	0.592	1,335.19	-148.03	2.012	0.463	93.009	4.180	0.276	0.014	0.027	0.005	0.005	0.008
01/30/2020	1,024.0	1,006.2	0.589	1,334.26	-151.17	1.980	0.441	93.441	3.873	0.217	0.011	0.021	0.004	0.004	0.008
01/31/2020	1,023.2	1,005.3	0.587	1,335.42	-153.14	1.886	0.411	93.768	3.732	0.165	0.008	0.015	0.003	0.004	0.007
02/01/2020	1,023.4	1,005.6	0.587	1,335.50	-152.73	1.886	0.416	93.735	3.752	0.171	0.008	0.017	0.003	0.004	0.008
02/02/2020	1,021.9	1,004.1	0.588	1,332.84	-153.19	1.997	0.440	93.621	3.729	0.174	0.009	0.015	0.004	0.003	0.008
02/03/2020	1,022.8	1,005.0	0.589	1,333.24	-152.51	1.977	0.460	93.492	3.865	0.170	0.008	0.015	0.003	0.003	0.007
02/04/2020	1,022.8	1,005.0	0.587	1,335.21	-153.47	1.873	0.420	93.822	3.682	0.165	0.008	0.015	0.003	0.004	0.007
02/05/2020	1,026.9	1,009.0	0.591	1,335.46	-148.03	1.986	0.463	93.111	4.079	0.295	0.016	0.029	0.005	0.006	0.009
02/06/2020	1,029.0	1,011.0	0.593	1,335.93	-145.92	2.031	0.473	92.776	4.314	0.336	0.018	0.033	0.006	0.006	0.009
02/07/2020	1,028.3	1,010.3	0.593	1,335.43	-146.53	2.043	0.470	92.818	4.284	0.318	0.016	0.031	0.006	0.006	0.009
02/08/2020	1,026.6	1,008.7	0.590	1,336.10	-148.99	1.933	0.451	93.250	4.058	0.250	0.013	0.024	0.005	0.005	0.009
02/09/2020	1,024.2	1,006.3	0.588	1,335.80	-152.05	1.886	0.422	93.637	3.832	0.182	0.008	0.016	0.003	0.004	0.008
02/10/2020	1,025.1	1,007.3	0.589	1,335.72	-150.72	1.915	0.439	93.440	3.952	0.207	0.010	0.020	0.004	0.004	0.008
02/11/2020	1,023.9	1,006.0	0.588	1,334.97	-151.91	1.922	0.435	93.568	3.847	0.186	0.009	0.018	0.004	0.004	0.008
02/12/2020	1,027.4	1,009.5	0.592	1,335.47	-147.47	2.011	0.461	93.013	4.144	0.304	0.016	0.031	0.006	0.006	0.009
02/13/2020	1,028.6	1,010.6	0.594	1,334.86	-145.52	2.082	0.486	92.719	4.274	0.359	0.020	0.037	0.007	0.007	0.009
02/14/2020	1,027.8	1,009.9	0.592	1,335.31	-146.82	2.034	0.467	92.925	4.180	0.322	0.017	0.033	0.006	0.006	0.009
02/15/2020	1,025.4	1,007.5	0.590	1,335.11	-150.33	1.957	0.452	93.275	4.062	0.214	0.009	0.017	0.004	0.004	0.007
02/16/2020	1,025.1	1,007.2	0.589	1,336.00	-150.93	1.902	0.431	93.487	3.924	0.211	0.010	0.019	0.004	0.004	0.008
02/17/2020	1,023.7	1,005.9	0.587	1,335.90	-152.84	1.870	0.414	93.717	3.802	0.163	0.007	0.014	0.003	0.003	0.007
02/18/2020	1,025.7	1,007.8	0.590	1,335.77	-150.22	1.945	0.433	93.327	4.029	0.221	0.010	0.020	0.004	0.004	0.007

TSP Name: Southern Star Central Gas Pipeline, Inc.

CSI048

TSP: 007906233

2/25/2020 12:15:21 AM

Gas Quality Reports

LS180 - Topeka 20" at Ottawa X-Over
11/25/2019 - 2/25/2020

Page 3 of 3

Gas Day	Gross Heating Value (HHV) (Btu/scf)	Net Heating Value (LHV) (Btu/scf)	Specific Gravity	Wobbe Index	Hydrocarbon Dewpoint (HCDP) (deg F)	N2 (mol%)	CO2 (mol%)	Methane (mol%)	Ethane (mol%)	Propane (mol%)	Isobutane (mol%)	N-Butane (mol%)	Isopentane (mol%)	N-Pentane (mol%)	C6 Plus (mol%)
02/19/2020	1,026.9	1,009.0	0.592	1,334.76	-148.04	2.046	0.462	92.920	4.254	0.262	0.013	0.025	0.005	0.005	0.007
02/20/2020	1,029.0	1,011.1	0.594	1,335.52	-145.55	2.071	0.470	92.697	4.346	0.341	0.018	0.035	0.006	0.006	0.009
02/21/2020	1,029.6	1,011.7	0.595	1,335.30	-144.39	2.110	0.476	92.589	4.353	0.385	0.022	0.041	0.007	0.007	0.010
02/22/2020	1,025.8	1,008.0	0.592	1,333.68	-148.50	2.086	0.461	92.980	4.156	0.258	0.013	0.026	0.005	0.006	0.009
02/23/2020	1,027.2	1,009.2	0.591	1,335.90	-148.22	1.988	0.445	93.030	4.268	0.214	0.011	0.022	0.005	0.006	0.012

NOTES:

Wobbe Index: Interchangeability constant calculated using the Gross (or Higher) Heating Value (HHV) divided by the square root of the Specific Gravity

Hydrocarbon Dewpoint (HCDP): Theoretically determined value using the Redlich-Kwong equation of state (EOS)

Selection: Business Unit ID = 70; Analysis_Key = 52764