

Gas Quality Reports

LS145 - So. Glavin at Ottawa X-Over

9/6/2019 - 12/6/2019

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%)
09/06/2019	1,048.2	1,030.0	0.606	1,346.88	-71.88	2.204	0.372	90.397	6.316	0.632	0.024	0.039	0.006	0.005	0.006
09/07/2019	1,063.7	1,045.1	0.614	1,357.19	-54.38	2.362	0.185	88.964	7.328	1.024	0.043	0.069	0.010	0.008	0.007
09/08/2019	1,056.0	1,037.7	0.609	1,352.90	-60.76	2.124	0.338	89.909	6.690	0.827	0.034	0.055	0.008	0.006	0.007
09/09/2019	1,055.8	1,037.4	0.611	1,350.88	-59.89	2.389	0.269	89.548	6.800	0.879	0.035	0.058	0.008	0.006	0.007
09/10/2019	1,058.4	1,040.0	0.613	1,352.21	-60.09	2.650	0.108	89.018	7.162	0.959	0.032	0.054	0.007	0.006	0.005
09/11/2019	1,035.6	1,017.5	0.598	1,339.11	-141.35	1.963	0.555	91.808	5.312	0.318	0.011	0.019	0.004	0.003	0.007
09/12/2019	1,031.7	1,013.7	0.596	1,335.86	-143.38	1.950	0.618	92.257	4.803	0.295	0.024	0.029	0.008	0.008	0.009
09/13/2019	1,028.2	1,010.3	0.594	1,334.58	-64.57	1.867	0.633	92.677	4.583	0.209	0.007	0.009	0.003	0.002	0.010
09/13/2019	1,053.2	1,034.9	0.623	1,334.70	-8.61	2.508	1.017	89.624	5.022	0.999	0.302	0.298	0.100	0.100	0.030
09/14/2019	1,030.2	1,012.3	0.594	1,336.30	-146.30	1.873	0.600	92.460	4.839	0.202	0.007	0.006	0.002	0.002	0.009
09/14/2019	1,030.2	1,012.3	0.594	1,336.30	-64.57	1.873	0.600	92.460	4.839	0.202	0.007	0.006	0.002	0.002	0.009
09/14/2019	1,053.2	1,034.8	0.623	1,334.72	-8.61	2.506	1.015	89.636	5.016	0.998	0.302	0.297	0.100	0.100	0.030
09/15/2019	1,031.7	1,013.7	0.595	1,337.49	-64.57	1.886	0.571	92.331	4.960	0.224	0.007	0.006	0.003	0.002	0.008
09/15/2019	1,053.2	1,034.9	0.623	1,334.72	-8.70	2.506	1.015	89.634	5.018	0.997	0.302	0.298	0.100	0.100	0.030
09/16/2019	1,031.7	1,013.7	0.595	1,337.49	-64.57	1.886	0.571	92.331	4.960	0.224	0.007	0.006	0.003	0.002	0.008
09/16/2019	1,053.2	1,034.9	0.623	1,334.72	-8.70	2.506	1.015	89.634	5.018	0.997	0.302	0.298	0.100	0.100	0.030
09/17/2019	1,038.5	1,020.4	0.599	1,342.20	-64.57	1.902	0.520	91.493	5.851	0.217	0.005	0.001	0.002	0.002	0.007
09/17/2019	1,053.2	1,034.9	0.623	1,334.72	-8.68	2.506	1.015	89.634	5.018	0.997	0.302	0.298	0.100	0.100	0.030
09/18/2019	1,035.8	1,017.8	0.596	1,341.44	-64.57	1.851	0.509	92.038	5.331	0.243	0.008	0.006	0.003	0.002	0.008
09/18/2019	1,053.2	1,034.9	0.623	1,334.70	-8.75	2.507	1.016	89.628	5.021	0.998	0.302	0.298	0.100	0.100	0.030
09/19/2019	1,040.5	1,022.4	0.599	1,344.55	-64.57	1.875	0.470	91.441	5.959	0.232	0.006	0.005	0.002	0.002	0.007
09/19/2019	1,053.2	1,034.9	0.623	1,334.70	-8.74	2.509	1.016	89.624	5.022	0.999	0.302	0.298	0.100	0.100	0.030
09/20/2019	1,036.2	1,018.2	0.598	1,339.75	-64.57	2.098	0.451	91.680	5.377	0.357	0.011	0.012	0.003	0.003	0.008
09/20/2019	1,053.2	1,034.9	0.623	1,334.73	-8.66	2.507	1.016	89.625	5.022	0.999	0.302	0.298	0.100	0.100	0.030
09/21/2019	1,053.2	1,034.9	0.609	1,349.92	-64.57	2.531	0.146	89.870	6.439	0.900	0.035	0.054	0.009	0.006	0.011
09/21/2019	1,053.3	1,035.0	0.623	1,334.75	-8.50	2.507	1.017	89.620	5.024	0.999	0.303	0.299	0.100	0.100	0.030
09/22/2019	1,060.3	1,041.9	0.616	1,351.40	-64.57	2.710	0.173	88.920	6.770	1.264	0.048	0.080	0.012	0.009	0.012
09/22/2019	1,053.2	1,034.9	0.623	1,334.69	-8.86	2.508	1.016	89.627	5.021	0.999	0.302	0.298	0.100	0.100	0.030
09/23/2019	1,035.5	1,017.5	0.598	1,338.76	-64.57	2.053	0.514	91.853	5.087	0.429	0.018	0.025	0.006	0.005	0.011
09/23/2019	1,053.3	1,035.0	0.623	1,334.76	-8.39	2.507	1.017	89.619	5.026	0.999	0.303	0.298	0.100	0.101	0.031
09/24/2019	1,036.3	1,018.3	0.599	1,339.00	-64.57	2.098	0.497	91.695	5.208	0.441	0.016	0.027	0.005	0.004	0.010
09/24/2019	1,053.3	1,034.9	0.623	1,334.72	-8.51	2.508	1.017	89.619	5.025	0.999	0.302	0.298	0.100	0.100	0.030
09/25/2019	1,031.7	1,013.7	0.595	1,337.08	-64.57	1.894	0.589	92.197	5.142	0.156	0.005	0.005	0.002	0.002	0.008
09/25/2019	1,053.2	1,034.9	0.623	1,334.72	-8.80	2.507	1.016	89.628	5.021	0.998	0.302	0.298	0.100	0.100	0.030
09/26/2019	1,031.7	1,013.7	0.595	1,337.08	-64.57	1.894	0.589	92.197	5.142	0.156	0.005	0.005	0.002	0.002	0.008
09/26/2019	1,053.2	1,034.9	0.623	1,334.72	-8.80	2.507	1.016	89.628	5.021	0.998	0.302	0.298	0.100	0.100	0.030
09/27/2019	1,032.4	1,014.4	0.599	1,334.30	-141.71	2.258	0.525	91.696	5.074	0.392	0.015	0.026	0.004	0.003	0.007
09/28/2019	1,036.4	1,018.4	0.601	1,337.42	-139.11	2.372	0.407	91.182	5.585	0.404	0.014	0.023	0.004	0.003	0.006
09/29/2019	1,046.1	1,027.9	0.604	1,345.56	-71.86	2.332	0.292	90.557	6.124	0.614	0.024	0.040	0.006	0.005	0.007
09/30/2019	1,038.1	1,020.0	0.600	1,339.88	-138.84	2.256	0.402	91.197	5.733	0.365	0.013	0.022	0.003	0.003	0.005
10/01/2019	1,033.1	1,015.1	0.597	1,337.01	-143.09	2.032	0.546	91.932	5.182	0.270	0.010	0.016	0.003	0.003	0.006
10/02/2019	1,042.4	1,024.2	0.601	1,344.52	-136.14	2.024	0.433	91.293	5.683	0.501	0.019	0.030	0.005	0.004	0.008
10/03/2019	1,032.1	1,014.2	0.595	1,337.94	-144.80	1.861	0.577	92.378	4.875	0.270	0.010	0.017	0.003	0.003	0.006

Gas Quality Reports

LS145 - So. Glavin at Ottawa X-Over

9/6/2019 - 12/6/2019

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%)
10/04/2019	1,033.3	1,015.3	0.597	1,337.87	-143.00	2.159	0.423	91.910	5.175	0.298	0.009	0.015	0.003	0.003	0.005
10/05/2019	1,028.6	1,010.8	0.591	1,337.83	-148.72	1.783	0.524	93.041	4.436	0.183	0.008	0.013	0.003	0.003	0.006
10/06/2019	1,035.0	1,017.0	0.597	1,339.36	-141.07	2.143	0.405	91.940	5.033	0.419	0.017	0.026	0.005	0.004	0.007
10/07/2019	1,029.3	1,011.3	0.591	1,338.46	-148.33	1.785	0.508	92.999	4.487	0.190	0.007	0.013	0.003	0.003	0.006
10/08/2019	1,036.8	1,018.8	0.597	1,342.39	-141.39	1.929	0.438	92.005	5.247	0.341	0.011	0.018	0.003	0.003	0.006
10/09/2019	1,041.8	1,023.6	0.604	1,340.39	-72.66	2.520	0.318	90.581	5.925	0.577	0.023	0.037	0.007	0.005	0.007
10/10/2019	1,030.7	1,012.8	0.596	1,334.60	-144.39	2.333	0.406	91.836	5.128	0.264	0.008	0.014	0.003	0.002	0.004
10/11/2019	1,033.6	1,015.6	0.596	1,339.35	-143.38	2.080	0.402	92.104	5.083	0.295	0.010	0.016	0.003	0.003	0.005
10/12/2019	1,051.7	1,033.4	0.608	1,348.64	-61.04	2.485	0.199	89.980	6.376	0.857	0.032	0.050	0.008	0.006	0.008
10/13/2019	1,027.0	1,009.2	0.594	1,332.87	-147.86	2.132	0.516	92.468	4.655	0.197	0.007	0.013	0.003	0.003	0.005
10/14/2019	1,042.2	1,024.0	0.602	1,342.81	-135.19	2.343	0.312	90.918	5.805	0.543	0.023	0.039	0.006	0.005	0.006
10/15/2019	1,037.9	1,019.9	0.602	1,338.28	-137.56	2.471	0.344	90.989	5.666	0.466	0.018	0.030	0.005	0.004	0.005
10/16/2019	1,045.3	1,027.1	0.604	1,344.58	-133.07	2.429	0.258	90.429	6.250	0.570	0.019	0.030	0.005	0.004	0.005
10/17/2019	1,048.3	1,030.1	0.605	1,348.04	-71.18	2.357	0.209	90.452	6.233	0.674	0.023	0.037	0.006	0.005	0.006
10/18/2019	1,045.1	1,027.0	0.607	1,341.90	-72.82	2.905	0.090	89.848	6.420	0.658	0.025	0.040	0.006	0.004	0.004
10/19/2019	1,038.1	1,020.0	0.600	1,340.67	-73.58	2.203	0.390	91.622	5.160	0.534	0.026	0.043	0.007	0.006	0.008
10/20/2019	1,055.4	1,037.0	0.610	1,350.87	-56.75	2.411	0.242	89.821	6.361	1.005	0.047	0.090	0.010	0.008	0.006
10/21/2019	1,033.5	1,015.5	0.597	1,337.51	-142.71	2.058	0.516	91.930	5.135	0.326	0.010	0.016	0.003	0.002	0.005
10/22/2019	1,044.3	1,026.1	0.602	1,345.93	-55.58	2.136	0.342	91.301	5.468	0.594	0.036	0.076	0.016	0.018	0.013
10/23/2019	1,035.6	1,017.6	0.600	1,336.64	-69.29	2.503	0.339	91.298	5.328	0.424	0.023	0.051	0.011	0.013	0.010
10/24/2019	1,038.6	1,020.6	0.599	1,341.55	-57.51	2.148	0.396	91.788	5.015	0.496	0.034	0.075	0.016	0.019	0.014
10/25/2019	1,046.7	1,028.4	0.604	1,347.21	-59.84	2.139	0.344	91.045	5.611	0.725	0.036	0.067	0.011	0.011	0.010
10/26/2019	1,043.3	1,025.2	0.606	1,340.32	-67.53	2.770	0.208	90.186	6.058	0.688	0.028	0.042	0.008	0.006	0.008
10/27/2019	1,038.9	1,020.8	0.602	1,338.62	-75.81	2.559	0.297	90.879	5.631	0.563	0.021	0.031	0.006	0.004	0.007
10/28/2019	1,049.4	1,031.1	0.611	1,342.36	-67.56	3.040	0.113	89.082	6.858	0.836	0.022	0.035	0.005	0.004	0.005
10/29/2019	1,063.5	1,045.0	0.616	1,354.56	-49.98	2.606	0.166	88.649	7.236	1.207	0.041	0.069	0.010	0.007	0.009
10/30/2019	1,053.2	1,034.9	0.611	1,346.87	-59.70	2.757	0.169	89.228	6.875	0.865	0.032	0.052	0.008	0.006	0.008
10/31/2019	1,049.7	1,031.5	0.608	1,346.08	-61.94	2.586	0.214	89.897	6.414	0.780	0.034	0.052	0.009	0.007	0.008
11/01/2019	1,048.5	1,030.3	0.608	1,345.16	-65.97	2.569	0.237	89.975	6.381	0.740	0.030	0.048	0.008	0.006	0.007
11/02/2019	1,045.3	1,027.1	0.605	1,343.81	-70.32	2.477	0.270	90.467	6.001	0.692	0.028	0.047	0.007	0.005	0.006
11/03/2019	1,050.9	1,032.7	0.609	1,346.45	-62.88	2.619	0.210	89.704	6.530	0.837	0.031	0.050	0.007	0.005	0.007
11/04/2019	1,049.2	1,031.0	0.608	1,345.38	-66.12	2.514	0.284	89.952	6.358	0.799	0.029	0.047	0.007	0.005	0.006
11/05/2019	1,033.2	1,015.2	0.595	1,338.87	-144.15	1.958	0.496	92.183	5.075	0.251	0.009	0.017	0.003	0.003	0.005
11/06/2019	1,040.6	1,022.5	0.602	1,341.67	-136.67	2.392	0.295	90.910	5.889	0.458	0.016	0.027	0.004	0.004	0.005
11/07/2019	1,039.3	1,021.2	0.599	1,342.60	-138.81	2.042	0.430	91.501	5.606	0.362	0.016	0.028	0.005	0.005	0.005
11/08/2019	1,053.5	1,035.2	0.608	1,351.24	-63.41	2.297	0.235	90.052	6.489	0.826	0.031	0.050	0.007	0.006	0.006
11/09/2019	1,056.8	1,038.4	0.612	1,351.11	-64.98	2.491	0.221	89.265	7.029	0.895	0.034	0.052	0.006	0.004	0.004
11/10/2019	1,059.5	1,041.1	0.613	1,353.55	-57.86	2.397	0.235	89.287	6.924	1.028	0.041	0.068	0.008	0.006	0.005
11/11/2019	1,045.5	1,027.3	0.602	1,347.42	-134.63	1.961	0.413	91.107	5.919	0.530	0.022	0.035	0.005	0.004	0.004
11/12/2019	1,051.2	1,032.9	0.605	1,351.60	-69.93	1.885	0.414	90.721	6.224	0.663	0.027	0.047	0.007	0.006	0.006
11/13/2019	1,060.5	1,042.0	0.612	1,355.13	-59.30	2.086	0.381	89.411	7.108	0.883	0.040	0.069	0.009	0.008	0.005
11/14/2019	1,057.4	1,039.0	0.611	1,352.34	-62.56	2.171	0.383	89.520	6.994	0.811	0.037	0.064	0.009	0.008	0.004
11/15/2019	1,061.4	1,042.9	0.613	1,355.30	-59.05	2.136	0.368	89.222	7.240	0.907	0.039	0.067	0.009	0.007	0.005

Gas Quality Reports

LS145 - So. Glavin at Ottawa X-Over

Page 3 of 3

9/6/2019 - 12/6/2019

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%)
11/16/2019	1,063.5	1,045.0	0.617	1,354.16	-55.74	2.428	0.308	88.559	7.532	1.022	0.045	0.083	0.010	0.008	0.004
11/17/2019	1,062.4	1,043.9	0.613	1,356.71	-58.04	2.159	0.305	89.230	7.229	0.949	0.040	0.067	0.009	0.007	0.005
11/18/2019	1,050.2	1,031.9	0.607	1,347.75	-71.56	2.496	0.194	89.903	6.672	0.657	0.024	0.039	0.006	0.005	0.005
11/19/2019	1,055.6	1,037.3	0.610	1,351.08	-62.35	2.441	0.219	89.461	6.974	0.800	0.031	0.053	0.008	0.007	0.006
11/20/2019	1,058.1	1,039.7	0.613	1,351.32	-59.64	2.565	0.203	88.991	7.247	0.876	0.035	0.061	0.009	0.008	0.005
11/21/2019	1,060.4	1,041.9	0.616	1,351.62	-47.58	2.400	0.368	88.963	7.105	0.962	0.052	0.104	0.018	0.017	0.010
11/22/2019	1,055.7	1,037.3	0.609	1,352.25	-60.85	2.236	0.290	89.772	6.816	0.762	0.034	0.063	0.010	0.010	0.007
11/23/2019	1,050.7	1,032.4	0.606	1,349.54	-71.69	2.265	0.263	90.183	6.583	0.626	0.024	0.039	0.006	0.005	0.005
11/24/2019	1,045.0	1,026.8	0.608	1,340.56	-131.62	2.912	0.157	89.567	6.737	0.557	0.021	0.037	0.005	0.005	0.002
11/25/2019	1,051.6	1,033.3	0.610	1,346.63	-67.40	2.733	0.148	89.375	6.916	0.736	0.028	0.046	0.007	0.006	0.005
11/26/2019	1,049.3	1,031.0	0.606	1,348.08	-73.49	2.266	0.298	90.289	6.426	0.650	0.021	0.036	0.005	0.004	0.005
11/27/2019	1,047.7	1,029.5	0.605	1,346.89	-132.09	2.316	0.280	90.317	6.462	0.560	0.020	0.032	0.005	0.004	0.004
11/28/2019	1,049.2	1,031.0	0.605	1,348.63	-72.95	2.223	0.295	90.394	6.387	0.621	0.024	0.040	0.006	0.005	0.005
11/29/2019	1,051.5	1,033.2	0.610	1,346.68	-62.74	2.711	0.153	89.478	6.807	0.743	0.032	0.052	0.009	0.007	0.007
11/30/2019	1,050.9	1,032.6	0.609	1,346.79	-65.81	2.637	0.178	89.666	6.660	0.758	0.031	0.051	0.008	0.006	0.006
12/01/2019	1,041.4	1,023.3	0.603	1,341.12	-135.72	2.464	0.303	90.622	6.099	0.452	0.017	0.029	0.005	0.004	0.004
12/02/2019	1,056.3	1,037.9	0.611	1,350.98	-60.51	2.448	0.240	89.440	6.856	0.890	0.038	0.069	0.008	0.006	0.005
12/03/2019	1,061.9	1,043.5	0.615	1,354.08	-56.51	2.432	0.259	88.796	7.409	0.964	0.042	0.075	0.010	0.008	0.005
12/04/2019	1,057.7	1,039.3	0.611	1,352.82	-59.43	2.147	0.381	89.645	6.804	0.893	0.041	0.069	0.009	0.007	0.006

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 = 48163