

Gas Quality Reports

LS455 - Springfield

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	1,037.2	1,019.1	0.592	1,348.49	-145.13	1.126	0.643	93.244	4.713	0.236	0.010	0.017	0.003	0.002	0.006
11/26/2019	1,034.5	1,016.5	0.592	1,344.04	-145.22	1.420	0.609	93.030	4.639	0.251	0.013	0.023	0.004	0.003	0.008
11/27/2019	1,032.4	1,014.5	0.592	1,342.24	-147.14	1.426	0.637	93.143	4.545	0.218	0.008	0.013	0.003	0.002	0.006
11/28/2019	1,035.7	1,017.7	0.598	1,339.27	-141.91	2.010	0.522	91.617	5.594	0.235	0.006	0.010	0.001	0.001	0.004
11/29/2019	1,033.9	1,015.9	0.595	1,340.10	-144.38	1.852	0.522	92.229	5.132	0.242	0.007	0.011	0.001	0.001	0.004
11/30/2019	1,034.1	1,016.1	0.595	1,341.14	-144.49	1.778	0.519	92.401	5.025	0.247	0.008	0.014	0.002	0.001	0.005
12/01/2019	1,035.7	1,017.7	0.593	1,345.21	-144.87	1.466	0.550	92.854	4.862	0.231	0.010	0.016	0.003	0.002	0.006
12/02/2019	1,036.4	1,018.4	0.594	1,345.01	-144.10	1.552	0.529	92.610	5.030	0.249	0.009	0.015	0.002	0.001	0.004
12/03/2019	1,037.6	1,019.6	0.595	1,345.20	-142.88	1.601	0.524	92.312	5.314	0.224	0.007	0.011	0.002	0.001	0.004
12/04/2019	1,036.5	1,018.4	0.596	1,342.35	-142.76	1.749	0.547	92.059	5.391	0.233	0.005	0.009	0.001	0.001	0.004
12/05/2019	1,036.9	1,018.8	0.594	1,344.92	-143.20	1.715	0.441	92.341	5.257	0.215	0.007	0.013	0.002	0.002	0.005
12/06/2019	1,030.8	1,012.8	0.596	1,335.52	-145.00	2.145	0.481	92.078	5.015	0.249	0.008	0.016	0.002	0.002	0.005
12/07/2019	1,031.4	1,013.4	0.593	1,338.86	-146.35	1.864	0.502	92.568	4.810	0.231	0.007	0.012	0.001	0.001	0.003
12/08/2019	1,032.8	1,014.9	0.593	1,341.53	-146.16	1.662	0.533	92.785	4.761	0.230	0.008	0.013	0.002	0.001	0.004
12/09/2019	1,035.5	1,017.5	0.592	1,345.51	-144.25	1.377	0.587	93.168	4.472	0.321	0.019	0.037	0.005	0.005	0.008
12/10/2019	1,032.8	1,014.9	0.591	1,343.23	-147.03	1.564	0.505	93.058	4.639	0.205	0.008	0.014	0.002	0.001	0.004
12/11/2019	1,030.8	1,012.8	0.591	1,340.52	-147.59	1.759	0.460	92.989	4.552	0.206	0.009	0.016	0.003	0.002	0.005
12/12/2019	1,032.4	1,014.4	0.593	1,340.59	-145.81	1.748	0.515	92.723	4.732	0.242	0.011	0.018	0.003	0.003	0.006
12/13/2019	1,028.2	1,010.3	0.592	1,336.86	-148.78	1.956	0.451	92.836	4.544	0.193	0.006	0.010	0.001	0.001	0.003
12/14/2019	1,030.9	1,013.0	0.594	1,337.67	-146.29	1.917	0.517	92.461	4.863	0.216	0.007	0.012	0.002	0.001	0.004
12/15/2019	1,032.8	1,014.8	0.590	1,344.29	-148.26	1.238	0.660	93.433	4.456	0.192	0.006	0.009	0.001	0	0.004
12/16/2019	1,031.6	1,013.6	0.591	1,342.06	-147.90	1.459	0.598	93.265	4.439	0.205	0.009	0.016	0.003	0.002	0.005
12/17/2019	1,031.6	1,013.7	0.590	1,343.50	-148.50	1.399	0.561	93.474	4.335	0.196	0.009	0.016	0.003	0.002	0.005
12/18/2019	1,032.6	1,014.7	0.590	1,344.39	-148.14	1.379	0.557	93.355	4.509	0.175	0.007	0.011	0.002	0.001	0.005
12/19/2019	1,032.6	1,014.7	0.592	1,342.32	-146.76	1.629	0.506	92.923	4.715	0.198	0.007	0.012	0.002	0.002	0.005
12/20/2019	1,032.6	1,014.6	0.592	1,342.46	-146.10	1.699	0.451	92.982	4.577	0.241	0.012	0.022	0.004	0.004	0.007
12/21/2019	1,034.9	1,016.9	0.594	1,343.33	-144.20	1.747	0.444	92.577	4.946	0.241	0.010	0.019	0.004	0.003	0.008
12/22/2019	1,031.5	1,013.5	0.592	1,340.58	-146.67	1.777	0.467	92.839	4.691	0.185	0.009	0.015	0.004	0.004	0.008
12/23/2019	1,029.6	1,011.7	0.591	1,339.20	-147.95	1.804	0.466	93.022	4.486	0.182	0.008	0.015	0.004	0.004	0.009
12/24/2019	1,029.0	1,011.1	0.591	1,338.29	-148.42	1.865	0.455	92.956	4.519	0.174	0.006	0.012	0.003	0.003	0.007
12/25/2019	1,028.2	1,010.4	0.592	1,336.49	-148.26	1.959	0.469	92.820	4.526	0.192	0.008	0.014	0.003	0.003	0.006
12/26/2019	1,031.3	1,013.3	0.593	1,339.72	-145.81	1.866	0.449	92.807	4.570	0.249	0.014	0.027	0.005	0.005	0.009
12/27/2019	1,026.7	1,008.9	0.590	1,336.58	-149.69	1.789	0.527	93.325	4.111	0.203	0.010	0.017	0.005	0.004	0.009
12/28/2019	1,033.0	1,015.0	0.594	1,340.84	-143.62	1.769	0.505	92.843	4.448	0.344	0.022	0.046	0.007	0.006	0.011
12/29/2019	1,029.4	1,011.5	0.591	1,338.46	-147.77	1.758	0.528	93.069	4.373	0.226	0.011	0.020	0.004	0.004	0.008
12/30/2019	1,033.2	1,015.2	0.592	1,342.56	-145.37	1.626	0.511	92.990	4.555	0.255	0.015	0.028	0.005	0.005	0.009
12/31/2019	1,030.7	1,012.7	0.590	1,341.46	-147.92	1.665	0.466	93.222	4.408	0.196	0.009	0.017	0.004	0.004	0.008
01/01/2020	1,029.4	1,011.5	0.590	1,340.24	-148.62	1.684	0.481	93.304	4.301	0.185	0.010	0.017	0.004	0.004	0.009
01/02/2020	1,028.3	1,010.4	0.590	1,338.39	-149.09	1.685	0.546	93.307	4.222	0.197	0.010	0.017	0.004	0.004	0.009
01/03/2020	1,029.2	1,011.3	0.591	1,339.06	-148.34	1.701	0.528	93.197	4.328	0.205	0.009	0.016	0.004	0.004	0.009
01/04/2020	1,029.6	1,011.7	0.590	1,340.90	-148.99	1.532	0.549	93.502	4.158	0.216	0.010	0.018	0.004	0.003	0.008
01/05/2020	1,025.6	1,007.8	0.588	1,337.98	-152.10	1.661	0.500	93.757	3.884	0.167	0.007	0.012	0.003	0.003	0.007
01/06/2020	1,026.9	1,009.1	0.588	1,339.08	-151.18	1.579	0.535	93.733	3.927	0.188	0.009	0.016	0.004	0.003	0.007

Gas Quality Reports

LS455 - Springfield
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	1,026.8	1,008.9	0.589	1,337.63	-149.87	1.809	0.458	93.460	4.001	0.219	0.012	0.023	0.005	0.004	0.008
01/08/2020	1,027.7	1,009.8	0.588	1,339.75	-150.68	1.595	0.511	93.656	4.007	0.195	0.009	0.016	0.003	0.003	0.006
01/09/2020	1,024.3	1,006.5	0.588	1,335.27	-152.17	1.940	0.423	93.428	4.031	0.153	0.005	0.010	0.002	0.002	0.005
01/10/2020	1,024.3	1,006.4	0.589	1,334.78	-152.02	1.975	0.425	93.342	4.084	0.152	0.005	0.009	0.002	0.002	0.005
01/11/2020	1,028.3	1,010.4	0.589	1,340.07	-149.46	1.645	0.480	93.630	3.937	0.253	0.013	0.026	0.004	0.004	0.007
01/12/2020	1,026.8	1,009.0	0.587	1,340.57	-152.18	1.556	0.465	93.913	3.875	0.160	0.007	0.013	0.003	0.003	0.006
01/13/2020	1,027.6	1,009.7	0.588	1,340.23	-150.99	1.610	0.472	93.715	3.984	0.183	0.008	0.016	0.003	0.003	0.006
01/14/2020	1,028.5	1,010.6	0.588	1,340.66	-150.27	1.518	0.537	93.677	4.033	0.196	0.009	0.017	0.004	0.004	0.006
01/15/2020	1,026.5	1,008.6	0.588	1,339.00	-151.69	1.507	0.573	93.871	3.824	0.185	0.009	0.017	0.004	0.004	0.007
01/16/2020	1,030.1	1,012.2	0.591	1,340.55	-147.58	1.641	0.515	93.335	4.191	0.258	0.014	0.027	0.005	0.005	0.009
01/17/2020	1,029.4	1,011.5	0.590	1,340.46	-148.43	1.726	0.442	93.345	4.212	0.226	0.011	0.022	0.004	0.004	0.008
01/18/2020	1,029.2	1,011.3	0.589	1,340.55	-149.13	1.696	0.450	93.364	4.260	0.192	0.008	0.016	0.003	0.003	0.007
01/19/2020	1,029.4	1,011.5	0.589	1,340.82	-149.38	1.517	0.558	93.526	4.154	0.206	0.009	0.017	0.004	0.003	0.006
01/20/2020	1,029.7	1,011.8	0.589	1,341.71	-148.85	1.554	0.496	93.585	4.089	0.224	0.012	0.023	0.005	0.005	0.009
01/21/2020	1,028.1	1,010.2	0.588	1,340.65	-150.46	1.580	0.484	93.704	4.005	0.186	0.009	0.016	0.004	0.004	0.008
01/22/2020	1,027.6	1,009.7	0.588	1,339.94	-150.52	1.633	0.473	93.676	3.987	0.189	0.009	0.017	0.004	0.004	0.008
01/23/2020	1,028.2	1,010.3	0.589	1,339.73	-149.80	1.684	0.469	93.495	4.115	0.197	0.009	0.017	0.003	0.003	0.008
01/24/2020	1,028.6	1,010.7	0.590	1,339.56	-149.24	1.742	0.452	93.353	4.209	0.204	0.009	0.017	0.003	0.004	0.007
01/25/2020	1,029.4	1,011.4	0.590	1,339.59	-148.37	1.733	0.483	93.219	4.304	0.218	0.010	0.019	0.004	0.004	0.007
01/26/2020	1,027.4	1,009.5	0.588	1,339.73	-151.22	1.538	0.540	93.734	3.977	0.180	0.007	0.013	0.003	0.003	0.006
01/27/2020	1,028.6	1,010.7	0.589	1,339.90	-149.85	1.629	0.510	93.441	4.196	0.193	0.007	0.013	0.003	0.003	0.005
01/28/2020	1,032.4	1,014.4	0.592	1,341.68	-145.74	1.708	0.480	92.979	4.494	0.281	0.014	0.027	0.004	0.004	0.007
01/29/2020	1,027.3	1,009.4	0.589	1,339.07	-150.47	1.714	0.457	93.575	4.011	0.202	0.009	0.018	0.003	0.004	0.006
01/30/2020	1,026.4	1,008.5	0.589	1,337.62	-150.66	1.776	0.468	93.512	4.005	0.197	0.009	0.018	0.004	0.004	0.007
01/31/2020	1,025.2	1,007.4	0.588	1,336.88	-152.01	1.777	0.470	93.617	3.929	0.177	0.007	0.013	0.003	0.003	0.005
02/01/2020	1,026.3	1,008.5	0.589	1,337.86	-151.43	1.743	0.475	93.515	4.069	0.174	0.006	0.011	0.002	0.002	0.004
02/02/2020	1,026.5	1,008.6	0.588	1,338.61	-151.67	1.650	0.501	93.659	3.987	0.177	0.006	0.012	0.002	0.002	0.004
02/03/2020	1,027.3	1,009.4	0.589	1,338.81	-150.63	1.682	0.492	93.545	4.049	0.196	0.009	0.015	0.003	0.003	0.005
02/04/2020	1,028.2	1,010.3	0.590	1,338.67	-149.49	1.717	0.507	93.299	4.249	0.194	0.008	0.014	0.003	0.003	0.006
02/05/2020	1,029.3	1,011.4	0.590	1,340.07	-148.08	1.731	0.455	93.369	4.134	0.250	0.014	0.028	0.005	0.005	0.009
02/06/2020	1,025.1	1,007.2	0.587	1,337.49	-151.80	1.800	0.417	93.741	3.826	0.172	0.009	0.018	0.004	0.004	0.010
02/07/2020	1,025.4	1,007.6	0.588	1,337.26	-151.14	1.832	0.421	93.623	3.895	0.182	0.009	0.019	0.004	0.004	0.010
02/08/2020	1,026.6	1,008.7	0.589	1,337.23	-150.13	1.861	0.439	93.355	4.119	0.186	0.008	0.016	0.003	0.004	0.009
02/09/2020	1,027.5	1,009.6	0.590	1,337.24	-149.32	1.894	0.447	93.119	4.312	0.196	0.007	0.013	0.003	0.003	0.007
02/10/2020	1,028.8	1,010.9	0.591	1,338.60	-148.28	1.864	0.433	93.104	4.335	0.219	0.010	0.020	0.003	0.004	0.007
02/11/2020	1,028.7	1,010.8	0.591	1,338.45	-147.96	1.873	0.433	93.131	4.273	0.236	0.012	0.024	0.004	0.004	0.009
02/12/2020	1,026.9	1,009.0	0.590	1,336.97	-149.52	1.900	0.438	93.245	4.163	0.208	0.010	0.019	0.004	0.004	0.008
02/13/2020	1,025.0	1,007.2	0.587	1,337.56	-151.86	1.752	0.444	93.812	3.761	0.182	0.010	0.020	0.004	0.004	0.010
02/14/2020	1,027.4	1,009.5	0.587	1,341.06	-151.21	1.497	0.494	93.981	3.799	0.180	0.010	0.019	0.004	0.004	0.011
02/15/2020	1,027.0	1,009.1	0.587	1,340.00	-150.94	1.571	0.492	93.878	3.821	0.187	0.010	0.020	0.004	0.005	0.011
02/16/2020	1,028.6	1,010.7	0.591	1,338.37	-148.59	1.822	0.467	93.134	4.324	0.215	0.008	0.015	0.003	0.003	0.007
02/17/2020	1,029.4	1,011.5	0.592	1,338.20	-147.88	1.934	0.427	92.836	4.556	0.220	0.006	0.012	0.002	0.002	0.004
02/18/2020	1,028.7	1,010.8	0.590	1,338.84	-148.73	1.850	0.427	93.120	4.369	0.198	0.008	0.016	0.003	0.003	0.006

TSP Name: Southern Star Central Gas Pipeline, Inc.

CSI048

TSP: 007906233

2/25/2020 12:15:30 AM

Gas Quality Reports

LS455 - Springfield
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	1,027.0	1,009.1	0.589	1,338.31	-149.94	1.823	0.417	93.473	4.047	0.189	0.011	0.021	0.005	0.005	0.010
02/20/2020	1,027.1	1,009.2	0.589	1,338.61	-150.07	1.800	0.419	93.497	4.047	0.187	0.010	0.021	0.004	0.005	0.009
02/21/2020	1,029.6	1,011.6	0.590	1,340.58	-147.87	1.756	0.419	93.330	4.223	0.211	0.012	0.025	0.005	0.006	0.013
02/22/2020	1,029.6	1,011.6	0.590	1,339.93	-147.34	1.817	0.414	93.225	4.262	0.214	0.013	0.028	0.006	0.007	0.014
02/23/2020	1,028.9	1,011.0	0.592	1,336.97	-147.59	1.988	0.445	92.732	4.602	0.199	0.007	0.014	0.003	0.003	0.007

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 = 58191