

Gas Quality Reports

LS400 - Oklahoma City to Blackwell
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	1,038.3	1,020.3	0.590	1,351.47	-145.50	1.224	0.453	93.243	4.834	0.233	0.005	0.007	0	0	0.002
09/07/2019	1,040.6	1,022.5	0.594	1,349.79	-142.19	1.373	0.516	92.490	5.354	0.244	0.007	0.011	0.001	0.001	0.002
09/08/2019	1,046.6	1,028.4	0.598	1,353.87	-138.12	1.248	0.565	91.921	5.966	0.268	0.010	0.017	0.002	0.001	0.003
09/09/2019	1,045.3	1,027.1	0.599	1,350.92	-138.09	1.461	0.545	91.641	6.034	0.299	0.007	0.010	0	0	0.002
09/10/2019	1,042.8	1,024.6	0.594	1,352.60	-141.40	1.245	0.517	92.482	5.493	0.250	0.005	0.006	0	0	0.002
09/11/2019	1,044.1	1,026.0	0.596	1,352.68	-140.10	1.272	0.537	92.213	5.701	0.259	0.006	0.009	0.001	0	0.002
09/12/2019	1,044.3	1,026.1	0.595	1,353.67	-140.44	1.246	0.504	92.328	5.653	0.251	0.007	0.010	0.001	0	0.002
09/13/2019	1,047.6	1,029.4	0.598	1,354.48	-137.75	1.304	0.525	91.690	6.226	0.237	0.006	0.008	0.001	0.001	0.002
09/14/2019	1,046.7	1,028.5	0.597	1,354.50	-138.48	1.292	0.504	91.909	6.026	0.249	0.008	0.011	0.001	0	0.002
09/15/2019	1,046.5	1,028.3	0.597	1,354.22	-138.80	1.290	0.514	91.863	6.109	0.210	0.005	0.006	0.001	0	0.002
09/16/2019	1,043.2	1,025.0	0.595	1,352.33	-141.25	1.359	0.469	92.183	5.814	0.168	0.003	0.003	0	0	0.001
09/17/2019	1,042.9	1,024.8	0.595	1,351.87	-141.26	1.373	0.477	92.166	5.809	0.165	0.003	0.005	0	0	0.002
09/18/2019	1,044.8	1,026.7	0.597	1,352.16	-139.55	1.428	0.485	91.776	6.129	0.174	0.003	0.004	0	0	0.002
09/19/2019	1,048.0	1,029.8	0.599	1,354.12	-136.32	1.389	0.502	91.610	6.189	0.255	0.012	0.025	0.005	0.006	0.007
09/20/2019	1,042.7	1,024.5	0.595	1,351.30	-141.36	1.371	0.502	92.129	5.837	0.152	0.003	0.004	0	0	0.002
09/21/2019	1,042.1	1,024.0	0.593	1,352.99	-142.30	1.270	0.457	92.596	5.477	0.180	0.006	0.009	0.001	0.001	0.003
09/22/2019	1,044.0	1,025.8	0.594	1,354.31	-141.39	1.174	0.508	92.430	5.699	0.179	0.004	0.004	0	0	0.001
09/23/2019	1,043.3	1,025.1	0.593	1,354.55	-142.35	1.073	0.539	92.665	5.553	0.162	0.003	0.003	0	0	0.002
09/24/2019	1,040.4	1,022.3	0.592	1,352.39	-144.45	1.174	0.500	92.880	5.297	0.143	0.003	0.003	0	0	0.001
09/25/2019	1,042.9	1,024.8	0.594	1,352.79	-141.73	1.246	0.509	92.406	5.649	0.179	0.004	0.006	0	0	0.002
09/26/2019	1,044.1	1,025.9	0.594	1,354.33	-141.29	1.140	0.533	92.450	5.672	0.196	0.004	0.004	0	0	0.001
09/27/2019	1,046.5	1,028.3	0.596	1,355.04	-139.07	1.178	0.542	92.094	5.920	0.253	0.005	0.005	0	0	0.002
09/28/2019	1,044.3	1,026.1	0.596	1,352.79	-140.54	1.226	0.567	92.122	5.907	0.169	0.003	0.004	0	0	0.002
09/29/2019	1,042.6	1,024.5	0.594	1,353.34	-142.41	1.177	0.517	92.545	5.603	0.149	0.003	0.004	0	0	0.001
09/30/2019	1,044.6	1,026.4	0.595	1,354.04	-140.86	1.162	0.549	92.265	5.855	0.159	0.003	0.004	0	0	0.002
10/01/2019	1,040.7	1,022.6	0.593	1,351.84	-143.64	1.192	0.527	92.756	5.359	0.156	0.004	0.005	0	0	0.002
10/02/2019	1,034.9	1,016.9	0.589	1,348.73	-148.35	1.206	0.507	93.488	4.656	0.133	0.003	0.004	0	0	0.001
10/03/2019	1,038.7	1,020.6	0.591	1,350.94	-145.34	1.137	0.549	93.123	5.003	0.172	0.005	0.007	0.001	0.001	0.002
10/04/2019	1,036.7	1,018.7	0.591	1,348.85	-145.61	1.275	0.511	93.220	4.763	0.188	0.011	0.019	0.004	0.004	0.005
10/05/2019	1,037.1	1,019.1	0.592	1,347.60	-144.64	1.386	0.518	92.898	4.956	0.208	0.009	0.014	0.003	0.002	0.005
10/06/2019	1,039.7	1,021.6	0.598	1,344.66	-140.46	1.703	0.552	91.786	5.677	0.249	0.009	0.015	0.003	0.002	0.004
10/07/2019	1,037.3	1,019.3	0.592	1,348.76	-145.20	1.339	0.494	92.991	4.961	0.194	0.006	0.009	0.001	0.001	0.004
10/08/2019	1,036.8	1,018.8	0.591	1,348.32	-145.85	1.283	0.537	93.060	4.933	0.168	0.005	0.009	0.001	0.001	0.003
10/09/2019	1,037.7	1,019.6	0.594	1,346.31	-144.11	1.472	0.550	92.472	5.315	0.178	0.004	0.006	0	0	0.002
10/10/2019	1,037.3	1,019.3	0.591	1,348.98	-145.70	1.295	0.510	93.007	5.014	0.157	0.005	0.008	0.001	0	0.002
10/11/2019	1,036.5	1,018.5	0.591	1,348.31	-146.22	1.274	0.535	93.100	4.925	0.147	0.005	0.008	0.001	0.001	0.004
10/12/2019	1,036.9	1,018.8	0.591	1,348.53	-145.90	1.276	0.533	93.068	4.945	0.158	0.006	0.009	0.001	0.001	0.003
10/13/2019	1,038.6	1,020.5	0.592	1,349.33	-144.25	1.352	0.492	92.807	5.132	0.194	0.007	0.011	0.001	0.001	0.004
10/14/2019	1,035.6	1,017.6	0.591	1,347.41	-146.56	1.365	0.496	93.101	4.855	0.168	0.005	0.007	0.001	0	0.003
10/15/2019	1,037.3	1,019.2	0.590	1,349.97	-145.79	1.251	0.482	93.224	4.835	0.179	0.008	0.013	0.002	0.002	0.004
10/16/2019	1,046.5	1,028.3	0.597	1,354.91	-56.40	1.277	0.480	92.581	5.025	0.476	0.039	0.077	0.016	0.015	0.015
10/17/2019	1,041.4	1,023.3	0.594	1,351.01	-140.69	1.341	0.494	92.723	5.009	0.355	0.027	0.037	0.006	0.003	0.005
10/18/2019	1,043.1	1,025.0	0.595	1,352.74	-140.28	1.246	0.516	92.612	5.237	0.327	0.022	0.031	0.004	0.002	0.003

Gas Quality Reports

LS400 - Oklahoma City to Blackwell
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%)
10/19/2019	1,036.3	1,018.3	0.591	1,347.50	-146.21	1.326	0.538	92.970	5.006	0.151	0.003	0.004	0	0	0.002
10/20/2019	1,040.1	1,022.0	0.595	1,348.27	-142.46	1.399	0.565	92.293	5.546	0.186	0.004	0.005	0	0	0.002
10/21/2019	1,049.9	1,031.6	0.601	1,354.11	-40.36	1.413	0.541	91.829	5.509	0.501	0.041	0.095	0.022	0.025	0.026
10/22/2019	1,048.4	1,030.2	0.599	1,355.17	-43.24	1.315	0.502	92.328	5.159	0.483	0.042	0.100	0.023	0.026	0.023
10/23/2019	1,046.7	1,028.5	0.599	1,352.18	-44.72	1.520	0.476	92.133	5.170	0.493	0.041	0.099	0.022	0.025	0.021
10/24/2019	1,036.5	1,018.5	0.595	1,344.09	-142.48	1.714	0.474	92.454	4.999	0.300	0.014	0.030	0.005	0.005	0.006
10/25/2019	1,036.9	1,018.9	0.591	1,348.72	-145.96	1.309	0.502	93.034	4.979	0.164	0.004	0.005	0	0	0.002
10/26/2019	1,039.6	1,021.5	0.594	1,348.28	-142.14	1.477	0.497	92.439	5.318	0.232	0.010	0.016	0.004	0.002	0.005
10/27/2019	1,047.2	1,028.9	0.598	1,353.97	-136.27	1.339	0.513	92.067	5.516	0.486	0.029	0.039	0.005	0.003	0.004
10/28/2019	1,048.8	1,030.6	0.599	1,354.64	-67.36	1.371	0.507	91.916	5.581	0.500	0.036	0.058	0.011	0.009	0.010
10/29/2019	1,041.8	1,023.7	0.599	1,345.53	-60.78	1.860	0.465	91.768	5.334	0.437	0.030	0.065	0.012	0.014	0.013
10/30/2019	1,037.9	1,019.9	0.595	1,345.34	-141.40	1.693	0.463	92.391	5.055	0.332	0.017	0.032	0.005	0.006	0.006
10/31/2019	1,033.6	1,015.7	0.593	1,341.93	-145.61	1.743	0.483	92.568	4.983	0.195	0.007	0.014	0.002	0.002	0.003
11/01/2019	1,037.8	1,019.8	0.594	1,346.50	-142.78	1.538	0.500	92.557	5.108	0.249	0.012	0.023	0.004	0.004	0.005
11/02/2019	1,038.8	1,020.7	0.595	1,346.77	-142.42	1.583	0.485	92.283	5.409	0.212	0.008	0.013	0.003	0.002	0.004
11/03/2019	1,038.2	1,020.1	0.593	1,348.21	-144.14	1.435	0.486	92.650	5.227	0.182	0.005	0.008	0.001	0.001	0.004
11/04/2019	1,036.6	1,018.6	0.594	1,345.44	-144.37	1.623	0.464	92.464	5.252	0.176	0.006	0.010	0.001	0.001	0.003
11/05/2019	1,037.8	1,019.7	0.591	1,350.17	-144.99	1.267	0.477	93.179	4.845	0.191	0.010	0.018	0.004	0.003	0.006
11/06/2019	1,038.5	1,020.5	0.595	1,346.70	-142.06	1.581	0.482	92.404	5.241	0.244	0.011	0.022	0.005	0.004	0.006
11/07/2019	1,044.8	1,026.6	0.596	1,353.81	-139.01	1.384	0.420	92.222	5.668	0.251	0.013	0.026	0.006	0.005	0.007
11/08/2019	1,047.9	1,029.7	0.597	1,356.06	-137.45	1.325	0.434	91.882	6.062	0.255	0.011	0.021	0.003	0.003	0.004
11/09/2019	1,040.2	1,022.1	0.595	1,348.41	-141.82	1.516	0.486	92.241	5.516	0.217	0.006	0.011	0.002	0.001	0.003
11/10/2019	1,038.2	1,020.1	0.597	1,343.35	-141.69	1.847	0.482	91.722	5.715	0.224	0.003	0.005	0	0	0.001
11/11/2019	1,045.5	1,027.3	0.596	1,354.54	-139.56	1.361	0.419	92.036	5.965	0.202	0.005	0.007	0.001	0.001	0.003
11/12/2019	1,045.6	1,027.4	0.596	1,354.13	-139.07	1.428	0.400	91.942	5.987	0.220	0.006	0.011	0.001	0.001	0.003
11/13/2019	1,047.7	1,029.5	0.598	1,355.31	-137.34	1.424	0.402	91.728	6.171	0.236	0.009	0.019	0.003	0.003	0.005
11/14/2019	1,046.0	1,027.8	0.597	1,353.98	-138.53	1.391	0.445	91.906	5.993	0.237	0.007	0.013	0.002	0.002	0.004
11/15/2019	1,044.6	1,026.4	0.597	1,352.07	-139.43	1.509	0.428	91.772	6.090	0.188	0.004	0.006	0	0	0.003
11/16/2019	1,040.2	1,022.1	0.598	1,345.41	-140.62	1.798	0.466	91.596	5.920	0.210	0.003	0.005	0	0	0.002
11/17/2019	1,042.8	1,024.6	0.596	1,350.50	-140.39	1.514	0.452	91.969	5.847	0.200	0.005	0.008	0.001	0.001	0.004
11/18/2019	1,042.8	1,024.7	0.598	1,348.15	-139.37	1.682	0.473	91.508	6.120	0.205	0.003	0.005	0	0	0.003
11/19/2019	1,046.0	1,027.8	0.597	1,353.71	-138.98	1.473	0.405	91.702	6.242	0.171	0.002	0.003	0	0	0.003
11/20/2019	1,046.7	1,028.5	0.597	1,354.48	-138.75	1.440	0.406	91.676	6.304	0.167	0.002	0.002	0	0	0.002
11/21/2019	1,046.4	1,028.2	0.596	1,354.83	-139.12	1.407	0.399	91.821	6.189	0.177	0.002	0.003	0	0	0.002
11/22/2019	1,046.1	1,027.9	0.596	1,354.56	-139.19	1.395	0.414	91.852	6.152	0.178	0.003	0.004	0	0	0.003
11/23/2019	1,045.3	1,027.2	0.596	1,353.97	-139.37	1.394	0.422	91.998	5.950	0.217	0.005	0.009	0.001	0.001	0.003
11/24/2019	1,043.3	1,025.2	0.595	1,352.06	-140.50	1.406	0.456	92.140	5.781	0.195	0.006	0.009	0.002	0.001	0.004
11/25/2019	1,041.6	1,023.4	0.595	1,350.85	-141.80	1.398	0.471	92.330	5.600	0.182	0.005	0.008	0.001	0	0.004
11/26/2019	1,043.4	1,025.3	0.596	1,351.33	-140.08	1.474	0.455	91.973	5.879	0.198	0.006	0.009	0.002	0.001	0.004
11/27/2019	1,046.6	1,028.4	0.597	1,354.57	-138.55	1.417	0.413	91.792	6.148	0.218	0.004	0.006	0	0	0.003
11/28/2019	1,047.1	1,028.8	0.597	1,355.27	-138.65	1.409	0.395	91.732	6.281	0.175	0.002	0.003	0	0	0.002
11/29/2019	1,047.3	1,029.1	0.597	1,355.31	-138.47	1.407	0.402	91.690	6.317	0.178	0.002	0.003	0	0	0.002
11/30/2019	1,045.6	1,027.4	0.597	1,353.55	-139.12	1.456	0.414	91.788	6.151	0.178	0.003	0.006	0	0	0.003

TSP Name: Southern Star Central Gas Pipeline, Inc.

CSI048

TSP: 007906233

12/6/2019 12:15:42 AM

Gas Quality Reports

LS400 - Oklahoma City to Blackwell
9/6/2019 - 12/6/2019

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%)
12/01/2019	1,046.4	1,028.2	0.597	1,354.53	-139.02	1.424	0.405	91.751	6.251	0.162	0.002	0.003	0	0	0.002
12/02/2019	1,045.6	1,027.4	0.597	1,353.42	-139.09	1.477	0.407	91.744	6.183	0.178	0.003	0.004	0	0	0.003
12/03/2019	1,040.9	1,022.8	0.595	1,349.11	-141.61	1.585	0.425	92.084	5.698	0.196	0.004	0.006	0	0	0.002
12/04/2019	1,036.7	1,018.7	0.593	1,346.70	-144.36	1.585	0.422	92.713	5.029	0.217	0.008	0.016	0.002	0.002	0.005

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 = 66333