Supporting Information for

Rebuttal to comments by Gurney et al., on “Carbon Dioxide Emission Tallies for 210 U.S. Coal-fired Power Plants: A Comparison of Two Accounting Methods.” *Journal of the Air & Waste Management Association*, 2014, 64(1): 73-79.

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ON THE TRANSFORMATION OF POWER PLANT EMISSIONS (tons CO₂) TO EMISSION RATES (lbs CO₂/MWh)

Table S1 shows the data that I used to make figures 2 and 3 in my rebuttal. Note that the percent difference values shown in figure 1 of Quick (2014) for the annual EIA and CAMD CO₂ emission tallies (tons) are the same as the percent difference values I calculated for the emission rates (lbs CO₂/MWh) (shown in figure 2 of my rebuttal). Moreover, as mentioned in my rebuttal, the percent difference values between CO₂ emission rates calculated using the net electric generation (reported with the EIA data) are also the same. Conversely, the differences for the log transformed emission tallies recommended by Gurney et al. (2014) are not the same as the differences between EIA and CAMD emission tallies, and consequently, are not useful proxies to evaluate these differences.

UNCERTAINTY AND PROPAGATION OF ERRORS

Figure 1S was constructed to illustrate the results where CO₂ emission rates for a hypothetical population of 210 power plants are measured by two instruments with measurement uncertainties of $\pm 2\%$ and $\pm 10.6\%$. Simulated measurement errors were calculated in EXCEL according to $\text{NORMINV}(\text{RAND}(), 0, (x/2))$ where x is the expanded uncertainty ($\pm 2\%$, $\pm 10.6\%$) and the result applied to the hypothetical CO₂ emission rates. The equation gives slightly different results every time it is applied, so typical results from multiple iterations are reported here (table 2S). Note that figure 1Sb shows attenuation bias (diminished slope and standard error) where the measurement with $\pm 10.6\%$ uncertainty is the independent value and the measurement with $\pm 2.0\%$ uncertainty is the dependent value.

Figure 1S. Attenuation bias is demonstrated for a hypothetical population of 210 power plants where the CO₂ emission rate (lb CO₂/MWh) is measured by two instruments with random measurement errors of 2.0% and 10.6%. Data from table 2S. Compare with figure 3 of Quick (2014).

REFERENCES

- Gurney K.R., J. Huang, and K. Coltin, 2014. Response to Jeffrey C. Quick: Carbon dioxide emission tallies for 210 U.S. coal-fired power plants: A comparison of two accounting methods, *J Air Waste Manage. Assoc.*, (this volume)
- Quick, J.C., 2014. Carbon dioxide emission tallies for 210 U.S. coal-fired power plants: A comparison of two accounting methods, *J Air Waste Manage. Assoc.*, 64(1): 73-79, doi:10.1080/10962247.2013.833146

Table 1S

Plant Name	EIA tons CO ₂	CAMD tons CO ₂	gross MWh (reported with CAMD data)	net MWh (reported with EIA data)	EIA lb CO ₂ per gross MWh	CAMD lb CO ₂ per gross MWh	EIA lb CO ₂ per net MWh	CAMD lb CO ₂ per net MWh	EIA log tons CO ₂	CAMD log tons CO ₂	% Diff. EIA & CAMD tons CO ₂	% Diff. EIA & CAMD lb CO ₂ per gross MWh	% Diff. EIA & CAMD lb CO ₂ per net MWh	% Diff. EIA & CAMD log tons CO ₂
Gorgas	5,462,580	5,695,994	5,638,415	5,207,454	1938	2020	2098	2188	6.737	6.756	4.184	4.184	4.184	0.2694
Colbert	3,417,824	3,242,688	3,251,773	2,940,204	2102	1994	2325	2206	6.534	6.511	-5.259	-5.259	-5.259	-0.3502
Widows Creek	5,366,455	5,278,828	5,152,302	4,688,202	2083	2049	2289	2252	6.730	6.723	-1.646	-1.646	-1.646	-0.1063
Dolet Hills	5,537,271	5,265,576	4,819,728	4,465,132	2298	2185	2480	2359	6.743	6.721	-5.030	-5.030	-5.030	-0.3245
Charles R Lowman	3,371,991	3,496,782	3,378,022	3,026,254	1996	2070	2228	2311	6.528	6.544	3.634	3.634	3.634	0.2415
Platte	697,548	766,309	653,988	591,667	2133	2343	2358	2590	5.844	5.884	9.394	9.394	9.394	0.6963
Whelan Energy Center	565,692	608,508	508,351	466,497	2226	2394	2425	2609	5.753	5.784	7.293	7.293	7.293	0.5493
Escalante	2,073,260	2,164,309	1,957,540	1,835,862	2118	2211	2259	2358	6.317	6.335	4.297	4.297	4.297	0.2951
Holcomb	2,976,221	2,892,501	2,861,304	2,655,821	2080	2022	2241	2178	6.474	6.461	-2.853	-2.853	-2.853	-0.1916
Cholla	7,672,238	8,441,262	7,953,153	7,236,124	1929	2123	2121	2333	6.885	6.926	9.545	9.545	9.545	0.6007
Oklaunion	3,272,912	3,296,878	3,024,106	2,813,612	2165	2180	2326	2344	6.515	6.518	0.730	0.730	0.730	0.0486
Seminole	7,228,225	7,687,792	7,641,867	7,097,411	1892	2012	2037	2166	6.859	6.886	6.162	6.162	6.162	0.3895
GRDA	8,110,985	8,509,161	7,329,008	6,840,435	2213	2322	2371	2488	6.909	6.930	4.791	4.791	4.791	0.3008
St Johns River Power Park	8,670,691	9,152,420	9,070,736	8,508,728	1912	2018	2038	2151	6.938	6.962	5.406	5.406	5.406	0.3379
Limestone	13,252,829	13,359,593	12,702,381	11,952,333	2087	2103	2218	2235	7.122	7.126	0.802	0.802	0.802	0.0489
Arapahoe	1,055,130	1,195,963	859,109	783,376	2456	2784	2694	3053	6.023	6.078	12.512	12.512	12.512	0.8993
Martin Drake	2,149,063	2,254,685	2,000,474	1,843,433	2149	2254	2332	2446	6.332	6.353	4.797	4.797	4.797	0.3285
Hayden	3,489,137	3,784,994	3,504,043	3,229,660	1991	2160	2161	2344	6.543	6.578	8.135	8.135	8.135	0.5388
Nucla	843,081	835,068	728,707	647,543	2314	2292	2604	2579	5.926	5.922	-0.955	-0.955	-0.955	-0.0700
Brandon Shores	7,127,070	6,860,722	7,155,183	6,644,359	1992	1918	2145	2065	6.853	6.836	-3.808	-3.808	-3.808	-0.2417
Big Bend	8,951,665	9,935,360	8,939,675	8,326,813	2003	2223	2150	2386	6.952	6.997	10.417	10.417	10.417	0.6492
Bowen	21,771,897	21,964,073	22,933,775	21,538,305	1899	1915	2022	2040	7.338	7.342	0.879	0.879	0.879	0.0520
Hammond	3,939,601	3,794,397	3,726,348	3,414,849	2114	2037	2307	2222	6.595	6.579	-3.755	-3.755	-3.755	-0.2476
Harlee Branch	6,630,437	6,523,396	6,819,998	6,433,027	1944	1913	2061	2028	6.822	6.814	-1.628	-1.628	-1.628	-0.1037
Jack McDonough	2,260,966	2,191,689	2,343,501	2,072,624	1930	1870	2182	2115	6.354	6.341	-3.112	-3.112	-3.112	-0.2129
E D Edwards	5,409,837	5,551,773	5,159,862	4,892,713	2097	2152	2211	2269	6.733	6.744	2.590	2.590	2.590	0.1669

Table 1S

Plant Name	EIA tons CO ₂	CAMD tons CO ₂	gross MWh (reported with CAMD data)	net MWh (reported with EIA data)	EIA lb CO ₂ per gross MWh	CAMD lb CO ₂ per gross MWh	EIA lb CO ₂ per net MWh	CAMD lb CO ₂ per net MWh	EIA log tons CO ₂	CAMD log tons CO ₂	% Diff. EIA & CAMD tons CO ₂	% Diff. EIA & CAMD lb CO ₂ per gross MWh	% Diff. EIA & CAMD lb CO ₂ per net MWh	% Diff. EIA & CAMD log tons CO ₂
Coffeen	4,921,104	4,988,725	4,535,052	4,218,224	2170	2200	2333	2365	6.692	6.698	1.365	1.365	1.365	0.0885
Meredosia	625,967	640,403	576,410	522,938	2172	2222	2394	2449	5.797	5.806	2.280	2.280	2.280	0.1707
Crawford	2,841,889	2,958,649	2,738,994	2,527,963	2075	2160	2248	2341	6.454	6.471	4.026	4.026	4.026	0.2706
Joliet 9	1,504,032	1,622,157	1,534,729	1,310,677	1960	2114	2295	2475	6.177	6.210	7.557	7.557	7.557	0.5302
Kincaid Generation LLC	7,985,648	7,947,158	7,368,618	6,849,578	2167	2157	2332	2320	6.902	6.900	-0.483	-0.483	-0.483	-0.0304
Powerton	10,729,654	11,290,860	10,021,124	9,334,808	2141	2253	2299	2419	7.031	7.053	5.097	5.097	5.097	0.3144
Waukegan	4,791,481	4,775,435	4,500,146	4,171,843	2129	2122	2297	2289	6.680	6.679	-0.335	-0.335	-0.335	-0.0218
Will County	5,795,341	6,023,494	5,480,585	5,111,395	2115	2198	2268	2357	6.763	6.780	3.861	3.861	3.861	0.2476
Fisk Street	1,857,075	1,823,798	1,783,493	1,661,647	2083	2045	2235	2195	6.269	6.261	-1.808	-1.808	-1.808	-0.1253
Joppa Steam	8,134,758	8,108,724	7,626,769	7,088,313	2133	2126	2295	2288	6.910	6.909	-0.321	-0.321	-0.321	-0.0201
Baldwin Energy Complex	13,744,322	12,688,952	12,960,858	12,185,940	2121	1958	2256	2083	7.138	7.103	-7.985	-7.985	-7.985	-0.4873
Havana	2,543,101	2,336,129	2,280,409	2,022,506	2230	2049	2515	2310	6.405	6.368	-8.484	-8.484	-8.484	-0.5772
Hennepin Power Station	2,352,568	2,500,938	2,308,746	2,129,126	2038	2166	2210	2349	6.372	6.398	6.114	6.114	6.114	0.4160
Vermilion	820,897	852,369	718,536	646,801	2285	2373	2538	2636	5.914	5.931	3.762	3.762	3.762	0.2759
Wood River	3,752,128	3,756,599	3,645,150	3,424,004	2059	2061	2192	2194	6.574	6.575	0.119	0.119	0.119	0.0079
Dallman	2,239,649	2,304,461	1,949,909	1,835,615	2297	2364	2440	2511	6.350	6.363	2.853	2.853	2.853	0.1949
State Line Energy	3,084,207	2,899,027	3,015,681	2,755,906	2045	1923	2238	2104	6.489	6.462	-6.190	-6.190	-6.190	-0.4153
Clifty Creek	8,956,484	8,043,058	9,055,094	8,353,045	1978	1776	2144	1926	6.952	6.905	-10.746	-10.746	-10.746	-0.6742
Tanners Creek	3,004,251	2,834,853	2,902,582	2,675,226	2070	1953	2246	2119	6.478	6.453	-5.802	-5.802	-5.802	-0.3899
Bailly	2,778,336	3,156,539	2,720,263	2,388,726	2043	2321	2326	2643	6.444	6.499	12.745	12.745	12.745	0.8565
Michigan City	2,360,220	2,278,556	2,256,474	2,103,012	2092	2020	2245	2167	6.373	6.358	-3.521	-3.521	-3.521	-0.2403
Whitewater Valley	238,578	238,458	209,982	185,879	2272	2271	2567	2566	5.378	5.377	-0.050	-0.050	-0.050	-0.0040
Frank E Ratts	1,686,806	1,736,888	1,699,470	1,583,267	1985	2044	2131	2194	6.227	6.240	2.926	2.926	2.926	0.2038
Milton L Kapp	954,735	948,370	864,315	752,182	2209	2195	2539	2522	5.980	5.977	-0.669	-0.669	-0.669	-0.0486
Walter Scott Jr Energy Center	11,991,257	11,567,986	12,074,854	11,238,242	1986	1916	2134	2059	7.079	7.063	-3.593	-3.593	-3.593	-0.2207

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George Neal North	7,012,826	6,948,606	6,790,790	6,333,679	2065	2046	2214	2194	6.846	6.842	-0.920	-0.920	-0.920	-0.0584
La Cygne	10,494,006	10,034,287	9,996,572	9,244,848	2100	2008	2270	2171	7.021	7.001	-4.479	-4.479	-4.479	-0.2775
Lawrence Energy Center	3,910,854	3,770,376	3,644,748	3,318,128	2146	2069	2357	2273	6.592	6.576	-3.658	-3.658	-3.658	-0.2413
Big Sandy	6,323,442	6,240,183	6,568,871	6,262,165	1925	1900	2020	1993	6.801	6.795	-1.325	-1.325	-1.325	-0.0847
Ghent	12,533,980	12,279,155	12,520,615	11,345,581	2002	1961	2209	2165	7.098	7.089	-2.054	-2.054	-2.054	-0.1258
Green River	727,387	736,314	665,912	625,461	2185	2211	2326	2354	5.862	5.867	1.220	1.220	1.220	0.0903
Mill Creek	11,044,721	10,578,847	11,397,902	10,374,395	1938	1856	2129	2039	7.043	7.024	-4.309	-4.309	-4.309	-0.2661
Paradise	14,918,665	14,181,087	15,505,248	14,253,946	1924	1829	2093	1990	7.174	7.152	-5.069	-5.069	-5.069	-0.3074
Shawnee	8,998,706	8,312,015	8,058,993	7,451,117	2233	2063	2415	2231	6.954	6.920	-7.934	-7.934	-7.934	-0.4970
Kenneth C Coleman	3,032,179	3,218,682	2,899,973	2,666,358	2091	2220	2274	2414	6.482	6.508	5.967	5.967	5.967	0.3991
Cooper	1,710,246	1,488,895	1,696,265	1,584,812	2016	1755	2158	1879	6.233	6.173	-13.838	-13.838	-13.838	-0.9704
Dale	998,236	1,052,064	892,283	821,272	2237	2358	2431	2562	5.999	6.022	5.251	5.251	5.251	0.3795
Morgantown Generating Plant	6,605,367	6,366,897	7,071,356	6,734,894	1868	1801	1962	1891	6.820	6.804	-3.677	-3.677	-3.677	-0.2344
B C Cobb	1,966,149	1,884,862	1,886,122	1,733,112	2085	1999	2269	2175	6.294	6.275	-4.222	-4.222	-4.222	-0.2918
Presque Isle	3,234,408	3,267,359	2,881,594	2,621,081	2245	2268	2468	2493	6.510	6.514	1.014	1.014	1.014	0.0676
J B Sims	370,612	341,096	324,784	281,051	2282	2100	2637	2427	5.569	5.533	-8.294	-8.294	-8.294	-0.6493
Eckert Station	1,181,333	1,259,538	986,132	897,526	2396	2555	2632	2807	6.072	6.100	6.408	6.408	6.408	0.4574
Syl Laskin	708,792	714,378	558,645	510,475	2538	2558	2777	2799	5.851	5.854	0.785	0.785	0.785	0.0583
Clay Boswell	7,084,176	7,555,496	6,747,666	6,152,653	2100	2239	2303	2456	6.850	6.878	6.439	6.439	6.439	0.4075
Allen S King	3,667,653	3,673,460	3,765,304	3,450,748	1948	1951	2126	2129	6.564	6.565	0.158	0.158	0.158	0.0105
Montrose	3,813,276	3,781,638	3,453,110	3,211,592	2209	2190	2375	2355	6.581	6.578	-0.833	-0.833	-0.833	-0.0550
Labadie	19,050,500	17,433,817	18,158,979	17,237,568	2098	1920	2210	2023	7.280	7.241	-8.862	-8.862	-8.862	-0.5304
Meramec	6,135,951	6,143,678	5,778,832	5,362,839	2124	2126	2288	2291	6.788	6.788	0.126	0.126	0.126	0.0081
Sioux	6,304,139	5,558,207	6,149,780	5,760,507	2050	1808	2189	1930	6.800	6.745	-12.576	-12.576	-12.576	-0.8076
New Madrid	7,949,367	7,314,367	7,463,564	7,246,811	2130	1960	2194	2019	6.900	6.864	-8.320	-8.320	-8.320	-0.5253
Thomas Hill	8,149,838	8,185,501	7,796,534	7,379,800	2091	2100	2209	2218	6.911	6.913	0.437	0.437	0.437	0.0274
J E Corette Plant	1,249,808	1,305,246	1,141,292	1,075,253	2190	2287	2325	2428	6.097	6.116	4.339	4.339	4.339	0.3087

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Sheldon	1,877,210	1,892,289	1,684,177	1,522,951	2229	2247	2465	2485	6.274	6.277	0.800	0.800	0.800	0.0554
North Omaha	3,539,652	3,689,137	3,311,481	3,038,952	2138	2228	2330	2428	6.549	6.567	4.136	4.136	4.136	0.2739
Reid Gardner	3,426,635	3,560,466	3,424,065	3,022,365	2002	2080	2268	2356	6.535	6.552	3.831	3.831	3.831	0.2543
Four Corners	16,359,699	16,082,992	16,804,764	15,639,501	1947	1914	2092	2057	7.214	7.206	-1.706	-1.706	-1.706	-0.1028
San Juan	13,329,731	13,382,358	12,854,366	11,718,003	2074	2082	2275	2284	7.125	7.127	0.394	0.394	0.394	0.0240
AES Greenidge LLC	492,651	455,795	476,354	438,199	2068	1914	2249	2080	5.693	5.659	-7.772	-7.772	-7.772	-0.5950
AES Cayuga	1,741,539	1,711,295	1,792,489	1,630,107	1943	1909	2137	2100	6.241	6.233	-1.752	-1.752	-1.752	-0.1220
C R Huntley Generating Station	2,251,710	2,073,693	2,144,634	2,027,633	2100	1934	2221	2045	6.353	6.317	-8.231	-8.231	-8.231	-0.5646
Dunkirk Generating Plant	3,028,478	2,892,703	2,774,155	2,624,513	2183	2085	2308	2204	6.481	6.461	-4.586	-4.586	-4.586	-0.3078
Cape Fear	1,895,382	1,695,034	1,878,298	1,741,876	2018	1805	2176	1946	6.278	6.229	-11.160	-11.160	-11.160	-0.7759
L V Sutton	2,797,206	2,493,934	2,578,870	2,420,289	2169	1934	2311	2061	6.447	6.397	-11.463	-11.463	-11.463	-0.7761
G G Allen	3,802,655	3,956,144	3,949,143	3,663,079	1926	2004	2076	2160	6.580	6.597	3.957	3.957	3.957	0.2608
Cliffside	3,357,123	3,245,654	3,496,993	3,269,340	1920	1856	2054	1986	6.526	6.511	-3.376	-3.376	-3.376	-0.2250
Marshall	12,204,082	12,743,288	13,415,076	12,689,771	1819	1900	1923	2008	7.087	7.105	4.323	4.323	4.323	0.2646
Leland Olds	5,137,239	4,903,635	4,552,766	4,197,430	2257	2154	2448	2336	6.711	6.691	-4.653	-4.653	-4.653	-0.3016
Milton R Young	6,031,100	5,894,956	5,467,012	5,018,507	2206	2157	2404	2349	6.780	6.770	-2.283	-2.283	-2.283	-0.1464
Cardinal	11,015,528	10,884,393	11,567,922	10,784,462	1904	1882	2043	2019	7.042	7.037	-1.198	-1.198	-1.198	-0.0739
Walter C Beckjord	5,672,285	5,440,766	5,546,895	5,085,615	2045	1962	2231	2140	6.754	6.736	-4.167	-4.167	-4.167	-0.2683
Ashtabula	684,926	724,953	679,392	609,503	2016	2134	2247	2379	5.836	5.860	5.678	5.678	5.678	0.4218
Avon Lake	3,186,890	3,002,674	3,255,888	3,099,597	1958	1844	2056	1937	6.503	6.478	-5.952	-5.952	-5.952	-0.3984
Eastlake	5,745,760	5,254,740	5,939,198	5,399,583	1935	1770	2128	1946	6.759	6.721	-8.927	-8.927	-8.927	-0.5756
Conesville	6,618,479	6,931,294	6,711,699	6,189,984	1972	2065	2138	2240	6.821	6.841	4.617	4.617	4.617	0.2936
Niles	340,299	330,254	319,293	282,572	2132	2069	2409	2337	5.532	5.519	-2.996	-2.996	-2.996	-0.2355
Muskingum River	7,402,954	7,028,070	7,655,324	7,299,585	1934	1836	2028	1926	6.869	6.847	-5.196	-5.196	-5.196	-0.3291
Portland	2,380,634	2,325,091	2,426,146	2,283,587	1962	1917	2085	2036	6.377	6.366	-2.361	-2.361	-2.361	-0.1609
PPL Montour	9,892,603	9,571,104	10,591,908	9,932,521	1868	1807	1992	1927	6.995	6.981	-3.304	-3.304	-3.304	-0.2053

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Armstrong Power Station	635,143	611,744	640,187	570,025	1984	1911	2228	2146	5.803	5.787	-3.753	-3.753	-3.753	-0.2813
Hatfields Ferry Power Station	9,390,888	9,678,982	9,639,879	9,052,402	1948	2008	2075	2138	6.973	6.986	3.021	3.021	3.021	0.1880
Mitchell Power Station	902,534	907,757	881,451	805,857	2048	2060	2240	2253	5.955	5.958	0.577	0.577	0.577	0.0421
McMeekin	992,407	900,706	1,064,318	971,837	1865	1693	2042	1854	5.997	5.955	-9.688	-9.688	-9.688	-0.7046
Wateree	3,450,665	3,306,685	3,616,917	3,356,751	1908	1828	2056	1970	6.538	6.519	-4.261	-4.261	-4.261	-0.2835
Williams	3,786,637	3,467,145	4,049,747	3,812,638	1870	1712	1986	1819	6.578	6.540	-8.809	-8.809	-8.809	-0.5836
Dolphus M Grainger	195,060	197,397	189,848	171,292	2055	2080	2278	2305	5.290	5.295	1.191	1.191	1.191	0.0977
Allen Steam Plant	5,609,414	5,210,346	5,453,578	4,962,440	2057	1911	2261	2100	6.749	6.717	-7.377	-7.377	-7.377	-0.4760
Bull Run	3,174,410	3,017,952	3,553,042	3,311,274	1787	1699	1917	1823	6.502	6.480	-5.053	-5.053	-5.053	-0.3382
Cumberland	16,231,721	15,878,721	16,966,734	15,873,340	1913	1872	2045	2001	7.210	7.201	-2.199	-2.199	-2.199	-0.1325
Gallatin	7,378,804	6,733,507	6,970,490	6,483,973	2117	1932	2276	2077	6.868	6.828	-9.145	-9.145	-9.145	-0.5804
John Sevier	3,915,784	3,739,016	3,930,738	3,609,040	1992	1902	2170	2072	6.593	6.573	-4.618	-4.618	-4.618	-0.3048
Kingston	2,259,893	2,161,561	2,131,875	1,898,827	2120	2028	2380	2277	6.354	6.335	-4.448	-4.448	-4.448	-0.3045
Big Brown	9,020,426	8,875,784	8,238,647	7,714,688	2190	2155	2339	2301	6.955	6.948	-1.616	-1.616	-1.616	-0.1010
Carbon	1,379,337	1,381,432	1,297,189	1,212,163	2127	2130	2276	2279	6.140	6.140	0.152	0.152	0.152	0.0107
Clinch River	1,723,090	1,627,085	1,646,834	1,525,809	2093	1976	2259	2133	6.236	6.211	-5.731	-5.731	-5.731	-0.4000
Bremo Bluff	1,012,636	971,016	1,001,830	921,622	2022	1938	2198	2107	6.005	5.987	-4.196	-4.196	-4.196	-0.3040
John E Amos	13,719,063	13,984,767	14,152,425	12,481,691	1939	1976	2198	2241	7.137	7.146	1.918	1.918	1.918	0.1167
Kanawha River	1,760,694	1,661,713	1,788,262	1,652,784	1969	1858	2131	2011	6.246	6.221	-5.784	-5.784	-5.784	-0.4031
Philip Sporn	2,698,881	2,448,633	2,701,101	2,495,273	1998	1813	2163	1963	6.431	6.389	-9.723	-9.723	-9.723	-0.6593
Albright	392,398	395,398	344,814	299,096	2276	2293	2624	2644	5.594	5.597	0.762	0.762	0.762	0.0591
Fort Martin Power Station	4,372,983	4,253,625	4,352,937	4,085,340	2009	1954	2141	2082	6.641	6.629	-2.767	-2.767	-2.767	-0.1811
Harrison Power Station	10,335,320	9,925,455	10,900,896	10,063,605	1896	1821	2054	1973	7.014	6.997	-4.046	-4.046	-4.046	-0.2509
Kammer	1,984,042	1,705,513	1,817,852	1,731,515	2183	1876	2292	1970	6.298	6.232	-15.098	-15.098	-15.098	-1.0487
Mitchell	9,364,373	9,446,783	10,171,661	9,389,850	1841	1857	1995	2012	6.971	6.975	0.876	0.876	0.876	0.0546

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South Oak Creek	4,814,403	5,085,314	4,817,205	4,424,817	1999	2111	2176	2299	6.683	6.706	5.473	5.473	5.473	0.3552
Edgewater	4,622,659	4,586,651	4,357,534	4,088,282	2122	2105	2261	2244	6.665	6.661	-0.782	-0.782	-0.782	-0.0510
Weston	6,282,902	6,023,793	6,491,685	6,080,663	1936	1856	2067	1981	6.798	6.780	-4.211	-4.211	-4.211	-0.2694
Genoa	1,941,440	1,853,100	1,838,705	1,753,686	2112	2016	2214	2113	6.288	6.268	-4.656	-4.656	-4.656	-0.3222
Dave Johnston	6,187,935	6,073,196	5,440,472	5,017,796	2275	2233	2466	2421	6.792	6.783	-1.872	-1.872	-1.872	-0.1198
Naughton	5,158,459	5,439,409	5,109,994	4,753,363	2019	2129	2170	2289	6.713	6.736	5.302	5.302	5.302	0.3425
John P Madgett	2,824,121	2,934,862	2,681,418	2,483,132	2106	2189	2275	2364	6.451	6.468	3.846	3.846	3.846	0.2586
Navajo	16,962,463	18,910,778	17,560,017	16,140,683	1932	2154	2102	2343	7.229	7.277	10.862	10.862	10.862	0.6510
James H Miller Jr	22,765,313	21,929,157	21,861,488	20,815,258	2083	2006	2187	2107	7.357	7.341	-3.742	-3.742	-3.742	-0.2211
Pleasants Power Station	5,958,923	6,218,815	6,359,535	5,767,553	1874	1956	2066	2156	6.775	6.794	4.268	4.268	4.268	0.2733
White Bluff	11,931,615	11,445,618	11,250,102	10,802,906	2121	2035	2209	2119	7.077	7.059	-4.158	-4.158	-4.158	-0.2555
Duck Creek	2,145,938	2,240,454	2,137,973	1,924,322	2007	2096	2230	2329	6.332	6.350	4.310	4.310	4.310	0.2952
Newton	8,742,977	8,656,566	8,437,993	7,983,696	2072	2052	2190	2169	6.942	6.937	-0.993	-0.993	-0.993	-0.0622
East Bend	4,596,880	4,500,291	4,700,142	4,278,054	1956	1915	2149	2104	6.662	6.653	-2.123	-2.123	-2.123	-0.1385
W H Zimmer	7,355,923	6,887,534	7,920,584	7,268,363	1857	1739	2024	1895	6.867	6.838	-6.577	-6.577	-6.577	-0.4170
Craig	10,015,328	10,438,701	10,116,835	9,425,415	1980	2064	2125	2215	7.001	7.019	4.140	4.140	4.140	0.2565
Coal Creek	10,798,771	10,652,494	9,816,560	9,133,982	2200	2170	2365	2332	7.033	7.027	-1.364	-1.364	-1.364	-0.0842
H L Spurlock	8,187,842	8,234,488	8,534,463	7,627,119	1919	1930	2147	2159	6.913	6.916	0.568	0.568	0.568	0.0357
Big Cajun 2	13,946,583	13,100,787	12,775,558	12,058,193	2183	2051	2313	2173	7.144	7.117	-6.254	-6.254	-6.254	-0.3810
R D Morrow	2,130,929	2,310,321	2,079,693	1,903,255	2049	2222	2239	2428	6.329	6.364	8.078	8.078	8.078	0.5531
Iatan	4,202,208	4,970,986	4,107,657	3,825,377	2046	2420	2197	2599	6.623	6.696	16.761	16.761	16.761	1.0956
Jeffrey Energy Center	15,559,101	15,010,383	14,290,398	12,921,886	2178	2101	2408	2323	7.192	7.176	-3.590	-3.590	-3.590	-0.2170
Colstrip	15,216,128	15,471,751	14,301,569	13,154,978	2128	2164	2313	2352	7.182	7.190	1.666	1.666	1.666	0.1007
Gerald Gentleman	10,959,616	11,168,622	10,610,527	10,000,998	2066	2105	2192	2234	7.040	7.048	1.889	1.889	1.889	0.1165
R M Schahfer	10,363,995	10,777,862	9,712,514	8,692,070	2134	2219	2385	2480	7.016	7.033	3.915	3.915	3.915	0.2421
Lewis & Clark	440,703	433,354	344,551	316,534	2558	2515	2785	2738	5.644	5.637	-1.682	-1.682	-1.682	-0.1295
Bruce Mansfield	17,353,179	17,387,860	18,949,455	17,390,613	1832	1835	1996	2000	7.239	7.240	0.200	0.200	0.200	0.0120

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Sooner	7,336,420	6,934,888	6,944,759	6,557,945	2113	1997	2237	2115	6.865	6.841	-5.627	-5.627	-5.627	-0.3567
Nebraska City	7,844,129	8,770,043	8,594,668	7,412,975	1825	2041	2116	2366	6.895	6.943	11.146	11.146	11.146	0.7004
Wyodak	3,421,104	3,323,474	3,036,154	2,713,256	2254	2189	2522	2450	6.534	6.522	-2.895	-2.895	-2.895	-0.1926
Boardman	3,348,730	3,304,645	3,365,683	3,200,200	1990	1964	2093	2065	6.525	6.519	-1.325	-1.325	-1.325	-0.0882
Gibson	19,720,120	18,135,539	20,495,764	18,901,781	1924	1770	2087	1919	7.295	7.259	-8.372	-8.372	-8.372	-0.4999
Gibbons Creek	3,687,675	3,517,858	3,590,421	3,426,910	2054	1960	2152	2053	6.567	6.546	-4.714	-4.714	-4.714	-0.3123
Flint Creek	3,233,196	3,042,813	3,000,278	2,828,214	2155	2028	2286	2152	6.510	6.483	-6.067	-6.067	-6.067	-0.4057
Welsh	12,209,971	11,739,977	11,129,047	10,660,735	2194	2110	2291	2202	7.087	7.070	-3.925	-3.925	-3.925	-0.2408
Martin Lake	20,204,321	19,571,666	18,353,042	17,065,647	2202	2133	2368	2294	7.305	7.292	-3.181	-3.181	-3.181	-0.1893
Monticello	18,336,391	17,308,550	16,192,563	15,177,809	2265	2138	2416	2281	7.263	7.238	-5.767	-5.767	-5.767	-0.3455
Rush Island	8,644,922	9,056,406	8,484,079	8,017,188	2038	2135	2157	2259	6.937	6.957	4.649	4.649	4.649	0.2907
Hunter	10,396,589	10,463,119	10,123,611	9,438,683	2054	2067	2203	2217	7.017	7.020	0.638	0.638	0.638	0.0395
Rockport	20,026,561	18,086,958	19,628,650	18,725,635	2041	1843	2139	1932	7.302	7.257	-10.178	-10.178	-10.178	-0.6077
Pleasant Prairie	8,656,383	8,948,919	7,989,638	7,244,545	2167	2240	2390	2471	6.937	6.952	3.323	3.323	3.323	0.2078
Coronado	6,148,597	6,454,945	6,264,508	5,575,038	1963	2061	2206	2316	6.789	6.810	4.861	4.861	4.861	0.3106
Coletto Creek	5,767,120	5,383,519	5,510,671	5,256,266	2093	1954	2194	2048	6.761	6.731	-6.880	-6.880	-6.880	-0.4431
Fayette Power Project	12,762,952	12,506,589	12,210,263	11,619,115	2091	2049	2197	2153	7.106	7.097	-2.029	-2.029	-2.029	-0.1241
J T Deely	4,978,817	5,229,280	4,857,414	4,611,461	2050	2153	2159	2268	6.697	6.718	4.907	4.907	4.907	0.3178
San Miguel	3,616,217	3,756,761	3,207,088	2,861,774	2255	2343	2527	2625	6.558	6.575	3.812	3.812	3.812	0.2522
Harrington	8,217,177	8,128,375	7,909,684	7,485,299	2078	2055	2196	2172	6.915	6.910	-1.087	-1.087	-1.087	-0.0683
Tolk	7,718,689	7,604,953	7,587,386	7,236,464	2035	2005	2133	2102	6.888	6.881	-1.484	-1.484	-1.484	-0.0936
Merom	8,014,700	7,860,648	7,982,883	7,575,021	2008	1969	2116	2075	6.904	6.895	-1.941	-1.941	-1.941	-0.1222
Pawnee	2,389,522	2,369,463	2,243,612	2,100,489	2130	2112	2275	2256	6.378	6.375	-0.843	-0.843	-0.843	-0.0574
Winyah	6,212,586	6,637,863	6,503,922	5,863,401	1910	2041	2119	2264	6.793	6.822	6.619	6.619	6.619	0.4224
Ottumwa	4,508,742	4,951,048	4,058,448	3,759,760	2222	2440	2398	2634	6.654	6.695	9.351	9.351	9.351	0.6089
Scherer	25,587,356	24,894,852	24,323,575	22,977,980	2104	2047	2227	2167	7.408	7.396	-2.744	-2.744	-2.744	-0.1610
Mountaineer	9,089,055	8,967,974	9,680,931	8,978,247	1878	1853	2025	1998	6.959	6.953	-1.341	-1.341	-1.341	-0.0837
Antelope Valley	8,423,266	8,307,336	7,423,025	6,942,247	2269	2238	2427	2393	6.925	6.919	-1.386	-1.386	-1.386	-0.0869
Intermountain Power Project	13,438,935	13,557,683	14,491,227	13,555,580	1855	1871	1983	2000	7.128	7.132	0.880	0.880	0.880	0.0536

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Independence	12,733,685	12,354,254	11,920,350	11,390,089	2136	2073	2236	2169	7.105	7.092	-3.025	-3.025	-3.025	-0.1851
Sandow No 4	5,366,039	5,067,549	4,705,547	4,297,157	2281	2154	2497	2359	6.730	6.705	-5.722	-5.722	-5.722	-0.3700
Louisa	5,394,807	4,842,821	5,116,191	4,728,795	2109	1893	2282	2048	6.732	6.685	-10.783	-10.783	-10.783	-0.6988
Sikeston Power Station	2,080,252	2,118,957	1,951,655	1,806,798	2132	2171	2303	2346	6.318	6.326	1.843	1.843	1.843	0.1266
Hugo	3,630,352	3,493,273	3,306,191	3,100,588	2196	2113	2342	2253	6.560	6.543	-3.849	-3.849	-3.849	-0.2551
Cope	2,510,763	2,463,593	2,706,218	2,557,159	1856	1821	1964	1927	6.400	6.392	-1.896	-1.896	-1.896	-0.1288
Clover	5,882,730	6,184,918	6,015,309	5,587,711	1956	2056	2106	2214	6.770	6.791	5.008	5.008	5.008	0.3208
George Neal South	4,476,026	4,464,849	4,241,320	3,980,138	2111	2105	2249	2244	6.651	6.650	-0.250	-0.250	-0.250	-0.0163
Bonanza	3,663,355	3,634,016	3,544,570	3,354,006	2067	2050	2184	2167	6.564	6.560	-0.804	-0.804	-0.804	-0.0532
Pirkey	4,172,552	3,916,050	3,721,111	3,462,031	2243	2105	2410	2262	6.620	6.593	-6.342	-6.342	-6.342	-0.4171
Columbia	7,367,007	7,368,235	6,890,164	6,481,444	2138	2139	2273	2274	6.867	6.867	0.017	0.017	0.017	0.0011
Belews Creek	14,054,273	13,996,750	15,708,266	14,664,329	1789	1782	1917	1909	7.148	7.146	-0.410	-0.410	-0.410	-0.0249
Jim Bridger	16,501,518	16,691,320	16,262,745	15,188,184	2029	2053	2173	2198	7.218	7.222	1.144	1.144	1.144	0.0688
Huntington	6,787,056	6,952,920	7,182,153	6,753,764	1890	1936	2010	2059	6.832	6.842	2.414	2.414	2.414	0.1534
General James M Gavin	19,238,982	20,126,750	20,677,237	19,160,246	1861	1947	2008	2101	7.284	7.304	4.510	4.510	4.510	0.2686
Ray D Nixon	1,816,900	1,834,553	1,717,659	1,592,766	2116	2136	2281	2304	6.259	6.264	0.967	0.967	0.967	0.0671
Coyote	3,069,393	3,139,270	2,661,660	2,498,609	2306	2359	2457	2513	6.487	6.497	2.251	2.251	2.251	0.1506
Springerville	9,149,769	8,669,961	9,309,641	8,474,234	1966	1863	2159	2046	6.961	6.938	-5.385	-5.385	-5.385	-0.3366
North Valmy	3,762,522	3,508,893	3,601,980	3,370,266	2089	1948	2233	2082	6.575	6.545	-6.976	-6.976	-6.976	-0.4620
Cheswick Power Plant	2,966,947	2,834,133	2,952,952	2,765,084	2009	1920	2146	2050	6.472	6.452	-4.579	-4.579	-4.579	-0.3078
Taconite Harbor Energy Center	1,320,600	1,438,593	1,149,317	1,058,263	2298	2503	2496	2719	6.121	6.158	8.553	8.553	8.553	0.6054
Wygen 1	906,821	912,626	791,631	719,103	2291	2306	2522	2538	5.958	5.960	0.638	0.638	0.638	0.0465
Hardin Generator Project	1,032,914	1,080,342	886,509	790,037	2330	2437	2615	2735	6.014	6.034	4.489	4.489	4.489	0.3237
TS Power Plant	1,218,491	1,314,215	1,274,859	1,169,957	1912	2062	2083	2247	6.086	6.119	7.559	7.559	7.559	0.5382
Wygen 2	977,943	986,125	834,948	766,943	2343	2362	2550	2572	5.990	5.994	0.833	0.833	0.833	0.0604

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
1,790	1814	1722
1,790	1820	1694
1,820	1811	1573
1,830	1795	1808
1,830	1825	1990
1,840	1825	1835
1,850	1850	1901
1,860	1860	1907
1,860	1840	1767
1,860	1871	1971
1,860	1833	1824
1,870	1859	1894
1,870	1850	1798
1,870	1861	1885
1,870	1895	1884

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
1,880	1882	1846
1,890	1866	1743
1,890	1880	1817
1,900	1892	1848
1,900	1887	2131
1,900	1907	1736
1,910	1923	1834
1,910	1941	2017
1,910	1889	1983
1,910	1910	1921
1,910	1899	1820
1,920	1905	1893
1,920	1890	1755
1,920	1896	2025
1,920	1929	1951
1,930	1925	1849
1,930	1954	1864
1,930	1945	1958
1,930	1928	1826
1,930	1930	1838
1,930	1934	1965
1,930	1921	2082
1,940	1936	1918
1,940	1902	1816
1,940	1935	2055
1,940	1913	2058
1,940	1930	1860
1,940	1932	1976
1,950	1942	2100

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
1,950	1949	2152
1,950	1959	1957
1,960	1968	1973
1,960	2002	2081
1,960	1983	1902
1,960	1966	2154
1,960	1976	2159
1,960	1928	1923
1,970	1950	1929
1,970	1953	2019
1,970	1992	1995
1,980	1959	1888
1,980	1993	2205
1,980	1985	2019
1,990	1984	1861
1,990	2010	2016
1,990	2000	1906
1,990	1982	2066
1,990	2005	1972
1,990	1976	2010
2,000	1998	1862
2,000	2007	2079
2,000	1964	2100
2,000	1998	2042
2,000	2010	1855
2,000	2007	1885
2,010	2006	2130
2,010	1999	2109
2,010	2021	2169

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
2,010	1996	1979
2,020	2038	2002
2,020	2035	2282
2,020	2021	1960
2,020	1990	1868
2,020	1993	2017
2,030	2045	2070
2,030	2064	1900
2,040	2042	2107
2,040	2057	2063
2,040	2024	2070
2,040	2063	2188
2,050	2015	1924
2,050	2012	2113
2,050	2050	2136
2,050	2074	2134
2,050	2061	2091
2,050	2066	2070
2,050	2043	1977
2,050	2022	2154
2,050	2069	1972
2,050	2056	2082
2,060	2046	2040
2,060	2054	2009
2,070	2064	1738
2,070	2085	1892
2,070	2079	2075
2,070	2040	2010
2,070	2094	2202

Table 2S

hypothetical (true) CO2 emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
2,070	2076	2220
2,070	2078	2026
2,080	2121	2131
2,080	2069	2183
2,080	2078	2132
2,080	2084	2088
2,080	2052	1993
2,080	2106	1871
2,080	2049	2241
2,090	2103	2030
2,090	2093	2117
2,090	2111	2411
2,090	2093	2128
2,090	2095	2248
2,090	2097	2144
2,090	2087	2160
2,090	2051	2133
2,100	2087	2197
2,100	2081	2058
2,100	2099	2134
2,100	2098	2069
2,100	2090	1736
2,100	2087	2276
2,100	2074	2221
2,110	2142	1937
2,110	2105	2193
2,110	2113	1908
2,110	2085	2126
2,110	2169	2321

Table 2S

hypothetical (true) CO2 emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
2,110	2111	2189
2,110	2112	2034
2,120	2136	2353
2,120	2106	2255
2,120	2106	2222
2,120	2121	2045
2,120	2133	2296
2,120	2118	2099
2,120	2128	2253
2,120	2105	1911
2,130	2134	2096
2,130	2126	2016
2,130	2116	2108
2,130	2150	2202
2,130	2128	2110
2,130	2107	2318
2,130	2126	2406
2,130	2156	2178
2,130	2136	2059
2,130	2099	2249
2,140	2161	2245
2,140	2122	1921
2,140	2133	2137
2,140	2156	2165
2,150	2161	2186
2,150	2124	2267
2,160	2135	2247
2,160	2128	2031
2,170	2184	2329

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
2,170	2137	2132
2,170	2172	2203
2,170	2193	2009
2,170	2178	2215
2,180	2147	2218
2,180	2207	2304
2,180	2171	2135
2,180	2156	2265
2,180	2193	2197
2,190	2177	2129
2,190	2214	2086
2,190	2205	2187
2,200	2216	2330
2,200	2214	2284
2,200	2208	2169
2,210	2227	2437
2,210	2208	2270
2,210	2176	2132
2,210	2214	2282
2,220	2210	2250
2,230	2224	2358
2,230	2220	2288
2,230	2220	2148
2,230	2243	2387
2,240	2212	2471
2,240	2272	2279
2,240	2212	2207
2,250	2250	2343
2,260	2227	2280

Table 2S

hypothetical (true) CO ₂ emission rates	with simulated 2% random measurement error	with simulated 10.6% random measurement error
2,260	2243	2368
2,260	2253	2104
2,270	2223	2080
2,270	2243	2076
2,270	2244	2213
2,280	2322	2237
2,280	2272	2283
2,280	2264	2115
2,280	2295	2334
2,290	2271	2281
2,300	2314	2278
2,300	2287	2091
2,300	2304	2239
2,310	2313	2294
2,310	2319	2358
2,330	2340	2110
2,340	2372	2319
2,400	2403	2436
2,460	2429	2452
2,540	2611	2534
2,560	2555	2470