Table A-9. National Sulfur Dioxide Emissions Estimates, 1980, 1985, 1989–2000 (thousand short tons)

Source Category	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Fuel Combustion	21,391	20,021	19,924	20,290	19,796	19,493	19,245	18,887	16,230	16,232	16,649	16,746	16,027	14,876
FUEL COMB. ELEC. UTIL.	17,469	16,272	16,215	15,909	15,784	15,416	15,189	14,889	12,080	12,730	13,195	13,416	12,653	11,389
Coal	16,073	15,630	15,404	15,220	15,087	14,824	14,527	14,313	11,603	12,206	12,615	12,470	11,826	10,723
bituminous	*NA*	*14,029*	*13,579*	*13,371*	*13,215*	*12,914*	*12,212*	*11,841*	*8,609*	*8,998*	*9,517*	*9,357*	*8,596*	*7,866*
subbituminous	NA	1,292	1,422	1,415	1,381	1,455	1,796	1,988	2,345	2,632	2,490	2,486	2,609	2,367
anthracite & lignite	*NA*	*309*	*404*	*434*	*491*	*455*	*519*	*484*	*649*	*576*	*608*	*627*	*621*	*489*
Oil	1,395	612	779	639	652	546	612	522	413	460	514	762	639	511
residual	*NA*	*604*	*765*	*629*	*642*	*537*	*601*	*512*	*408*	*454*	*509*	*756*	*631*	*502*
distillate	NA	8	14	10	10	9	10	10	5	6	5	6	7	8
Gas	1	1	1	1	1	1	1	1	9	7	6	6	7	9
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	4	4	121	123	88
Internal Combustion	NA	30	30	49	45	46	49	53	55	53	56	57	58	59
FUEL COMB. INDUSTRIAL	2,951	3,169	3,086	3,550	3,256	3,292	3,284	3,218	3,357	2,863	2,805	2,742	2,788	2,894
Coal	1,527	1,818	1,840	1,914	1,805	1,783	1,763	1,740	1,728	1,321	1,306	1,274	1,305	1,320
bituminous	1,058	1,347	1,384	1,050	949	1,005	991	988	1,003	885	877	858	878	889
subbituminous	326	28	29	50	53	60	67	77	81	63	63	61	64	64
anthracite & lignite	144	90	79	67	68	67	68	68	68	61	60	57	57	58
other	NA	353	348	746	735	650	636	606	576	312	306	298	306	309
Oil	1,065	862	812	927	779	801	809	777	912	807	764	738	754	806
residual	851	671	625	687	550	591	597	564	701	626	578	559	571	618
distillate	85	111	107	198	190	191	193	193	191	158	161	156	159	161
other	129	80	80	42	39	20	20	20	20	23	25	23	24	27
Gas	299	397	346	543	516	552	555	542	548	575	582	578	575	609
Other	60	86	82	158	142	140	140	141	147	140	134	133	135	140
Internal Combustion	NA	7	6	9	14	16	17	19	23	20	19	19	20	20
FUEL COMB. OTHER	971	579	624	831	755	784	772	780	793	639	649	588	586	593
Commercial/Institutional Coal	110	158	169	212	184	190	193	192	200	179	184	196	196	200
Commercial/Institutional Oil	637	239	274	425	376	396	381	391	397	308	314	250	245	252
Commercial/Institutional Gas	1	2	2	7	7	7	8	8	8	10	10	10	11	11
Misc. Fuel Comb. (Except Residential)	NA	1	1	6	6	6	6	6	5	6	6	6	6	6
Residential Wood	13	13	11	7	7	8	6	6	7	5	5	5	5	5
Residential Other	211	167	167	175	176	177	178	177	176	131	130	121	123	119
distillate oil	*157*	*128*	*132*	*137*	*141*	*144*	*145*	*145*	*144*	*108*	*106*	*97*	*98*	*95*
bituminous/subbituminous coal	*43*	*29*	*27*	*30*	*26*	*26*	*25*	*25*	*24*	*17*	*18*	*18*	*18*	*18*
other	*11*	*10*	*8*	*9*	*8*	*8*	*8*	*8*	*8*	*6*	*6*	*6*	*6*	*6*
Industrial Processes	3,807	2,467	2,010	1,900	1,720	1,758	1,723	1,675	1,638	1,408	1,458	1,463	1,457	1,498
CHEMICAL & ALLIED PRODUCT MFG	280	456	440	297	280	278	269	275	286	255	259	261	262	268
Organic Chemical Mfg	NA	16	17	10	9	9	9	8	8	4	4	4	4	5
Inorganic Chemical Mfg	271	354	334	214	208	203	191	194	199	173	176	178	179	183
sulfur compounds	271	346	326	211	205	199	187	189	195	171	174	176	177	181
other	NA	8	8	2	3	4	4	4	4	2	2	2	2	2
Polymer & Resin Mfg	NA	7	7	1	1	1	1	1	0	1	1	1	1	1
Agricultural Chemical Mfg	NA	4	4	5	4	4	4	4	5	1	1	1	1	1
Paint, Varnish, Lacquer, Enamel Mfg	NA	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	0
Pharmaceutical Mfg	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Chemical Mfg	10	76	77	67	57	60	64	68	74	76	76	77	76	78

Table A-9. National Sulfur Dioxide Emissions Estimates, 1980, 1985, 1989–2000 (thousand short tons) (continued)

Source Category	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
METALS PROCESSING	1,842	1,042	695	726	612	615	603	562	530	390	407	405	400	411
Nonferrous Metals Processing	1,279	853	513	517	435	438	431	391	361	267	276	274	271	278
copper	1,080	655	327	323	234	247	250	206	177	93	99	98	97	100
lead	34	121	113	129	135	131	122	128	126	112	113	114	114	116
aluminum	95	62	60	60	61	55	53	51	53	57	59	57	55	56
other	71	14	13	4	5	5	6	6	6	5	5	5	5	5
Ferrous Metals Processing	562	172	165	186	159	158	153	153	151	107	114	114	112	116
Metals Processing NEC	NA	18	17	22	18	18	19	19	18	17	17	17	16	17
PETROLEUM & RELATED INDUSTRIES	734	505	429	430	378	416	383	379	369	335	344	342	341	346
Oil & Gas Production	157	204	156	122	98	93	98	95	89	90	90	90	90	92
natural gas	157	202	155	120	96	92	96	93	88	89	90	89	89	92
other	NA	2	1	2	2	2	2	2	1	1	1	1	1	1
Petroleum Refineries & Related Industries	577	300	272	304	274	315	278	276	271	238	246	245	244	246
fluid catalytic cracking units	330	212	195	183	182	185	183	188	188	157	163	162	162	163
other	247	88	77	121	92	130	95	88	83	81	83	83	82	83
Asphalt Manufacturing	NA	1	1	4	7	7	7	8	9	8	8	8	7	7
OTHER INDUSTRIAL PROCESSES	918	425	405	399	396	396	392	398	403	390	409	415	414	432
Agriculture, Food, & Kindred Products	NA	3	3	3	3	3	3	3	3	4	4	4	5	5
Textiles, Leather, & Apparel Products	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood, Pulp & Paper, & Publishing Prods	223	131	136	116	123	119	113	109	114	101	105	107	109	113
Rubber & Miscellaneous Plastic Prods	NA	1	1	0	0	0	0	0	0	1	1	1	1	1
Mineral Products	694	286	261	275	267	270	272	282	282	270	285	288	284	299
cement mfg	630	192	172	181	165	168	170	167	171	171	181	183	179	189
other	64	95	89	94	102	102	102	114	111	99	103	105	105	109
Machinery Products	NA	0	0	0	0	1	0	1	1	0	0	0	0	0
Electronic Equipment	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Industrial Processes	NA	3	3	5	3	3	3	3	4	13	13	14	14	14
SOLVENT UTILIZATION	NA	1	1	0	0	1	1	1	1	1	1	1	1	1
Degreasing	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Graphic Arts	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Dry Cleaning	NA	NA	NA	NA	NA	0	NA	0	0	0	0	0	0	0
Surface Coating	NA	1	1	0	0	0	0	0	0	0	0	0	0	0
Other Industrial	NA	0	0	0	0	0	0	0	0	1	1	1	1	1
STORAGE & TRANSPORT	NA	4	5	7	10	9	5	2	2	5	5	5	5	5
Bulk Terminals & Plants	NA	NA	NA	0	1	1	0	0	0	1	1	1	1	1
Petroleum & Petroleum Product Storage	NA	0	0	5	7	0	0	0	0	0	0	0	0	0
Petroleum & Petroleum Product Transport	NA	1	1	0	0	0	0	0	0	1	1	2	2	2
Service Stations: Stage II	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	0	0	0
Organic Chemical Storage	NA	1	1	0	0	0	0	0	0	0	0	0	0	0
Organic Chemical Transport	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0
Inorganic Chemical Storage	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Inorganic Chemical Transport	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulk Materials Storage	NA	1	2	1	1	7	4	1	1	2	2	2	2	2

Table A-9. National Sulfur Dioxide Emissions Estimates, 1980, 1985, 1989–2000 (thousand short tons)

Source Category	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
WASTE DISPOSAL & RECYCLING	33	34	36	43	44	44	71	59	47	32	33	34	34	35
Incineration	21	25	28	32	32	32	51	42	35	26	27	28	28	29
industrial	NA	10	10	5	4	5	25	17	8	6	6	7	7	7
other	21	15	18	26	28	27	26	26	27	20	21	21	21	22
Open Burning	12	9	8	11	11	11	11	11	11	5	5	5	5	5
industrial	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
land clearing debris	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
other	12	8	7	10	10	11	11	11	11	5	5	5	5	5
POTW	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0
Industrial Waste Water	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0
TSDF	NA	NA	NA	0	0	0	0	0	0	0	0	0	0	0
Landfills	NA	0	0	0	0	0	0	0	0	1	1	1	1	1
industrial	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
other	NA	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	NA	0	0	0	1	1	8	6	0	0	0	0	0	0
Transportation	697	1,159	1,349	1,476	1,517	1,553	1,497	1,297	1,311	1,791	1,816	1,837	1,853	1,805
ON-ROAD VEHICLES	521	522	570	560	573	586	526	307	311	343	353	358	366	314
Light-Duty Gas Vehicles & Motorcycles	159	146	145	129	126	125	124	125	126	128	131	134	136	108
light-duty gas vehicles	158	145	145	128	126	125	124	124	126	128	130	134	136	107
motorcycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light-Duty Gas Trucks	50	55	58	69	81	87	90	92	93	85	89	90	94	75
light-duty gas trucks 1	33	36	38	45	52	56	58	59	60	62	65	66	69	55
light-duty gas trucks 2	16	19	21	24	29	31	32	32	32	22	23	24	24	20
Heavy-Duty Gas Vehicles	10	11	11	10	10	10	11	12	11	18	18	17	17	13
Diesels	303	311	356	352	356	364	300	79	82	112	117	117	119	118
NON-ROAD ENGINES AND VEHICLES	175	637	779	916	944	968	972	990	999	1,448	1,463	1,479	1,487	1,491
Non-Road Gasoline	NA	20	22	22	22	22	23	23	23	35	35	35	35	35
Non-Road Diesel	NA	407	488	509	529	549	570	590	610	459	474	490	497	516
Aircraft	6	6	7	11	11	11	11	11	11	8	8	8	8	8
Marine Vessels	117	143	193	251	259	258	249	252	239	887	887	887	887	872
Railroads	53	59	67	122	120	125	117	113	113	56	56	56	56	56
Non-Road Other	NA	1	2	2	2	2	2	2	2	3	3	3	4	4
MISCELLANEOUS	11	11	11	12	11	10	10	15	10	16	15	12	12	21
Agriculture & Forestry	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	0	0	0
Other Combustion	11	11	11	12	11	9	9	15	10	16	15	12	12	21
Fugitive Dust	NA	NA	NA	0	0	0	1	0	0	0	0	0	0	0
TOTAL ALL SOURCES	25,905	23,658	23,293	23,679	23,044	22,813	22,474	21,875	19,189	19,447	19,939	20,059	19,349	18,201

Note: Some columns may not sum to totals due to rounding.