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## **Appendix B**

### **TRI Release and Waste Management Data for Metals and Metal Compounds, 2000**

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## Appendix B – TRI Release and Waste Management Data for Metals and Metal Compounds, 2000

**Table B-1: TRI On-site and Off-site Releases of Metals and Metal Compounds, Original and New Industries, 2000**

Chemical		Total Air Emissions Pounds	Surface Water Discharges Pounds	On-site Releases							Releases Total On-site Releases Pounds	Off-site	Total On- and Off-site Releases Pounds
				Underground Injection		On-site Land Releases						Transfers Off-site to Disposal Pounds	
				Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds	Other Landfills Pounds	Land Treatment Pounds	Surface Impoundments Pounds	Other Disposal Pounds			
Aluminum* (CAS Number 7429-90-5)	O	1,598,143	4,798	0	0	65,002	2,407,851	0	0	3,409,299	7,485,093	8,037,720	15,522,813
	N	48,997	0	0	0	5,878,343	87,018	0	36,747	30,852	6,081,957	2,570,523	8,652,480
Antimony and antimony compounds	O	89,224	45,955	40,140	0	111,700	211,540	372	186,441	230,109	915,481	3,513,025	4,428,506
	N	13,939	35,154	0	670,064	1,365,762	223,659	38,000	9,648,219	12,727,300	24,722,097	303,259	25,025,356
Arsenic and arsenic compounds	O	69,530	4,797	68,949	0	1,023,547	1,307,133	250	5,642,472	207,567	8,324,245	2,120,279	10,444,525
	N	175,130	163,015	139,108	1,740,036	4,017,438	3,100,199	91,676	107,245,847	347,915,100	464,587,549	3,180,145	467,767,694
Barium and barium compounds	O	886,573	839,861	43	0	168,796	3,926,565	54,575	930,495	649,946	7,456,854	7,895,374	15,352,228
	N	2,315,842	930,602	70,254	2,099,400	14,851,370	89,126,303	2,119,460	74,531,256	66,176,902	252,221,389	43,363,538	295,584,927
Beryllium and beryllium compounds	O	4,905	320	0	0	2,251	84,193	5	35	0	91,709	19,010	110,719
	N	6,009	8,297	0	0	282,678	155,090	1	246,309	104,840	803,224	29,079	832,303
Cadmium and cadmium compounds	O	27,793	8,937	34	0	2,945	67,437	5	272,596	255,546	635,293	2,082,411	2,717,704
	N	4,791	610	69,250	110,000	1,752,337	7,706	0	2,049,970	2,434,390	6,429,054	570,897	6,999,951
Chromium and chromium compounds	O	935,437	128,819	1,442,973	0	210,334	7,187,963	11,158	3,159,395	3,522,328	16,598,407	21,484,633	38,083,039
	N	318,429	112,476	2,000,250	60,000	5,420,452	4,792,759	131,634	14,450,584	91,547,526	118,834,110	6,378,968	125,213,078
Cobalt and cobalt compounds	O	65,316	54,286	38,125	2	46,221	41,669	3,916	1,460	280,920	531,915	1,013,561	1,545,476
	N	46,218	26,760	0	18,001	279,852	1,314,193	27,613	3,392,032	10,225,506	15,330,175	349,974	15,680,149
Copper and copper compounds	O	2,310,303	123,960	317,812	0	464,078	25,522,521	124,478	8,666,516	25,442,703	62,972,371	23,483,719	86,456,090
	N	525,224	342,118	190,005	1,300,011	17,360,386	7,069,929	142,869	309,028,561	960,157,967	1,296,117,070	7,403,235	1,303,520,305
Lead and lead compounds	O	1,172,197	52,146	212,480	2,837	733,985	3,394,253	2,686	2,908,069	6,437,571	14,916,225	19,293,429	34,209,654
	N	313,636	42,943	57,523	8,300,001	19,821,875	7,299,969	86,718	106,142,782	192,959,404	335,024,851	4,856,148	339,880,999
Manganese and manganese compounds	O	2,593,885	5,265,050	9,513,796	250	1,616,348	38,195,632	721,360	15,291,848	6,232,722	79,430,891	55,991,256	135,422,147
	N	554,398	778,602	39,000	1,278,700	9,672,236	28,589,275	450,686	35,211,604	287,403,901	363,978,402	8,262,355	372,240,757
Mercury and mercury compounds	O	54,757	742	74	262	2,194	11,659	158	4,045	833	74,724	114,286	189,010
	N	109,736	1,560	1,858	9,520	89,104	34,415	3,716	990,361	2,151,796	3,392,066	735,586	4,127,653
Nickel and nickel compounds	O	999,594	104,250	157,763	0	61,963	1,810,985	8,056	1,520,529	916,510	5,579,650	10,593,131	16,172,781
	N	696,983	154,164	550,250	44,005	8,158,033	4,172,542	181,847	11,887,919	29,086,725	54,932,468	7,744,115	62,676,583

**Note:** On-site Releases are from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.

**Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, include to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI facilities that reported the amount as an on-site release.

**O:** Original industries. **N:** New Industries.

\* Only fume or dust forms are reportable.

\*\* Except when contained in an alloy.

## Appendix B – TRI Release and Waste Management Data for Metals and Metal Compounds, 2000



**Table B-1: TRI On-site and Off-site Releases of Metals and Metal Compounds, Original and New Industries, 2000 (continued)**

Chemical		Total Air Emissions Pounds		Surface Water Discharges Pounds		On-site Releases							Off-site	Total
						Underground Injection		On-site Land Releases						
						Class I Wells Pounds	Class II-V Wells Pounds	RCRA Subtitle C Landfills Pounds	Other Landfills Pounds	Land Treatment Pounds	Surface Impoundments Pounds	Other Disposal Pounds	Total On-site Releases Pounds	
Selenium and selenium compounds	O	131,209	4,833	27,699	0	2,279	73,260	250	105,089	91,108	435,727	168,975	604,702	
	N	511,201	52,234	40,246	0	3,197,446	416,013	47	488,086	2,993,876	7,699,149	1,664,066	9,363,215	
Silver and silver compounds	O	18,865	6,544	214	0	2,250	21,010	520	11,000	43,035	103,438	37,647	141,085	
	N	2,654	289	19,000	170,000	521,305	5,689	0	257,433	3,254,060	4,230,430	301,496	4,531,926	
Thallium and thallium compounds	O	1,950	342	0	0	3,651	56,855	0	118,000	5	180,803	281,341	462,144	
	N	10,958	2,293	0	0	293,180	471,733	12,856	862,769	2,023,856	3,677,645	892,071	4,569,716	
Vanadium** and vanadium compounds	O	129,020	306,049	1,201,104	0	9,665	3,763,734	3,521	1,855,448	2,345,414	9,613,955	1,637,538	11,251,493	
	N	2,117,442	286,507	0	0	699,108	10,885,734	366,740	18,579,127	37,565,824	70,500,482	5,824,130	76,324,612	
Zinc* and zinc compounds	O	6,919,000	924,736	246,135	1,106	4,893,852	23,917,193	96,018	9,269,059	64,435,256	110,702,356	180,480,323	291,182,679	
	N	3,855,871	373,379	311,363	22,021,842	40,142,330	15,496,407	299,473	325,976,502	363,173,330	771,650,497	11,410,634	783,061,131	
Total	O	18,007,700	7,876,426	13,267,341	4,457	9,421,062	112,001,453	1,027,328	49,942,497	114,500,872	326,049,135	338,247,657	664,296,792	
	N	11,627,458	3,311,003	3,488,107	37,821,580	133,803,235	173,248,633	3,953,336	1,021,026,108	2,411,933,155	3,800,212,615	105,840,219	3,906,052,834	

**Note:** On-site Releases are from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R.

**Off-site Releases** include metals and metal compounds transferred off-site for solidification/stabilization and for wastewater treatment, include to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI facilities that reported the amount as an on-site release.

O: Original industries. N: New Industries.

\* Only fume or dust forms are reportable.

\*\* Except when contained in an alloy.



## Appendix B – TRI Release and Waste Management Data for Metals and Metal Compounds, 2000

**Table B-2: TRI Off-site Releases of Metals and Metal Compounds, Original and New Industries, 2000**

Chemical		Storage Only <sup>a</sup> Pounds	Solidification /Stabilization Metals Only <sup>b</sup> Pounds	Wastewater Treatment (Excluding POTWs) Metals Only <sup>c</sup> Pounds	Transfers to POTWs Metals Only <sup>d</sup> Pounds	Under- ground Injection Pounds	Landfills/ Disposal Surface Impound- ments Pounds	Land Treatment Pounds	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker for Disposal Pounds	Unknown <sup>e</sup> Pounds	Off-site Releases
													Transfers Off-site to Disposal Pounds
Aluminum* (CAS Number 7429-90-5)	O	2,737,241	385,875	27,559	4,724	0	4,757,949	0	34,510	434,849	9,810	15	8,392,532
	N	0	0	0	0	0	2,569,006	0	0	1,517	0	0	2,570,523
Antimony and antimony compounds	O	27,442	433,524	19,760	86,479	4,352	2,770,207	6,803	62,972	81,689	142,506	122,000	3,757,734
	N	0	162,818	743	250	728	56,925	79,613	1,256	16,817	53,896	198	373,244
Arsenic and arsenic compounds	O	15,201	533,387	1,070	1,385	559,507	1,280,836	250	30,483	47,295	94,573	10,589	2,574,576
	N	250	710,962	157	757	19,250	2,323,679	28,451	123,400	117,501	11,890	2,110	3,338,407
Barium and barium compounds	O	40,518	2,608,025	16,218	399,212	26	4,607,538	115,033	1,057,447	299,883	280,891	182,511	9,607,303
	N	212,607	1,189,520	1,601	2,842	17,017	29,212,619	209,785	7,830,047	6,334,837	405,428	47,849	45,464,152
Beryllium and beryllium compounds	O	0	2,151	56	6	0	18,395	0	0	5	0	0	20,613
	N	0	0	0	0	0	42,880	0	1,949	250	0	0	45,079
Cadmium and cadmium compounds	O	0	522,760	173	3,148	261	596,726	6,650	103	13,687	1,176,245	41,380	2,361,133
	N	0	366,531	52	260	1,521	296,544	0	0	2,171	443	2,194	669,717
Chromium and chromium compounds	O	117,644	6,808,333	1,011,769	313,801	432,488	13,898,629	9,418	1,198,206	418,818	624,658	156,570	24,990,334
	N	1,069	1,031,691	161,270	13,201	22,414	4,681,603	66,057	385,783	261,356	122,901	176,544	6,923,889
Cobalt and cobalt compounds	O	4	100,717	6,517	22,728	260	506,250	149	6,873	18,046	235,971	139,564	1,037,079
	N	250	2,918	0	1	0	261,987	0	68,498	20,253	16,817	0	370,724
Copper and copper compounds	O	763,436	4,514,801	1,259,450	889,392	333,699	16,101,028	26,756	657,074	308,960	580,113	1,536,942	26,971,650
	N	68	1,757,367	31,447	8,524	29,610	5,056,297	71,051	431,995	297,682	38,181	11,763	7,733,985
Lead and lead compounds	O	77,877	13,024,896	47,907	38,764	7,723	15,700,790	8,178	147,525	193,378	2,242,563	65,118	31,554,719
	N	14,021	1,513,124	40,605	1,721	25,910	3,301,854	54,668	97,450	187,032	465,193	32,575	5,734,153

**Note:** Off-site Releases are from Section 6 (transfers off-site to disposal of Form R).

O: Original industries. N: New Industries.

\* Only fume or dust forms are reportable.

\*\* Except when contained in an alloy.

**a** Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

**b** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal compounds have been included in solidification/stabilization of metals and metal compounds in this report.

**c** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal compounds reported under code M60 have been included in transfers of metals and metal compounds to wastewater treatment.

**d** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

**e** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

## Appendix B – TRI Release and Waste Management Data for Metals and Metal Compounds, 2000



Table B-2: TRI Off-site Releases of Metals and Metal Compounds, Original and New Industries, 2000 (continued)

Chemical		Storage Only <sup>a</sup> Pounds	Solidification /Stabilization Metals Only <sup>b</sup> Pounds	Wastewater Treatment (Excluding POTWs) Metals Only <sup>c</sup> Pounds	Transfers to POTWs Metals Only <sup>d</sup> Pounds	Under- ground Injection Pounds	Landfills/ Disposal Surface Impound- ments Pounds	Land Treatment Pounds	Other Land Disposal Pounds	Other Off-site Management Pounds	Transfers to Waste Broker for Disposal Pounds	Unknown <sup>e</sup> Pounds	Off-site Releases
													Transfers Off-site to Disposal Pounds
Manganese and manganese compounds	O	96,240	14,916,905	2,781,781	643,792	14,919	38,474,129	319,472	1,942,140	3,214,175	590,502	72,796	63,066,851
	N	78,835	593,839	1,045	2,191	10,000	5,969,560	188,459	1,139,223	541,349	72,207	5,149	8,601,857
Mercury and mercury compounds	O	7,670	74,775	32	225	1	37,917	17	287	1,237	14,099	526	136,786
	N	2,453	354,308	6,762	98	51	371,920	499	1,676	5,874	3,230	14,817	761,688
Nickel and nickel compounds	O	118,219	2,083,758	357,213	185,180	175,770	8,469,672	14,465	268,483	230,108	579,362	131,345	12,613,575
	N	72,042	847,350	39,910	4,477	31,850	8,024,594	50,838	197,541	129,564	27,040	36,687	9,461,893
Selenium and selenium compounds	O	0	86,408	13,869	603	192	70,776	5	1,238	972	5	2,350	176,418
	N	0	391,092	85	0	505	1,272,037	0	17,868	645	213	39	1,682,484
Silver and silver compounds	O	6,730	3,136	429	4,936	0	12,342	0	540	618	10,891	3,403	43,025
	N	0	145,567	0	0	0	152,800	0	0	1,360	1,789	10	301,526
Thallium and thallium compounds	O	0	37,575	32	0	0	243,703	0	0	50	0	0	281,360
	N	0	371,698	0	0	0	469,315	0	250	50,735	81	0	892,079
Vanadium** and vanadium compounds	O	4,813	162,877	35,999	10,333	100	1,422,790	3,556	43,661	50,854	230	10,646	1,745,859
	N	230,851	156,103	510	29	10,000	3,803,532	71,338	692,176	1,000,084	94,551	96	6,059,270
Zinc* and zinc compounds	O	388,905	96,107,127	1,150,129	548,941	2,970,651	110,617,665	72,806	2,097,325	1,115,290	2,898,875	438,115	218,405,829
	N	22,200	1,011,592	90,438	6,198	57,000	9,330,255	60,716	629,510	397,199	16,358	66,568	11,688,034
<b>Total</b>	O	<b>4,401,940</b>	<b>142,407,030</b>	<b>6,729,963</b>	<b>3,153,650</b>	<b>4,499,949</b>	<b>219,587,344</b>	<b>583,558</b>	<b>7,548,867</b>	<b>6,429,914</b>	<b>9,481,293</b>	<b>2,913,870</b>	<b>407,737,377</b>
	N	<b>634,646</b>	<b>10,606,480</b>	<b>374,625</b>	<b>40,549</b>	<b>225,856</b>	<b>77,197,407</b>	<b>881,475</b>	<b>11,618,622</b>	<b>9,366,226</b>	<b>1,330,218</b>	<b>396,600</b>	<b>112,672,704</b>

**Note:** Off-site Releases are from Section 6 (transfers off-site to disposal of Form R).

O: Original industries. N: New Industries.

\* Only fume or dust forms are reportable.

\*\* Except when contained in an alloy.

**a** Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

**b** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal compounds have been included in solidification/stabilization of metals and metal compounds in this report.

**c** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal compounds reported under code M60 have been included in transfers of metals and metal compounds to wastewater treatment.

**d** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

**e** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).



## Appendix B – TRI Release and Waste Management Data for Metals and Metal Compounds, 2000

**Table B-3: Quantities of TRI Metals and Metal Compounds in Waste, Original and New Industries, 2000**

Chemical		Recycled		Energy Recovery		Treated		Quantity Released On-and Off-site Pounds	Total Production-related Waste Managed Pounds	Non-Production-related Waste Managed Pounds
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds			
Aluminum* (CAS Number 7429-90-5)	O	17,261,315	20,059,822	0	3,954	23,384,277	609,566	14,973,309	76,292,242	0
	N	0	0	0	0	185,900	1,512	8,564,225	8,751,637	0
Antimony and antimony compounds	O	8,528,567	6,183,023	0	17,821	481,154	339,384	4,201,666	19,751,615	58,147
	N	11,200	32,176	0	0	54,209	79,614	24,883,895	25,061,094	130,000
Arsenic and arsenic compounds	O	4,758,855	532,778	0	0	82,959	331,095	7,460,593	13,166,280	1,114,111
	N	142,700	9,965	0	0	0	113	464,891,093	465,043,871	2,237,800
Barium and barium compounds	O	35,980,449	3,694,729	57,134	11,818	5,002,081	1,871,505	15,424,120	62,041,836	50,983
	N	79,000	3,757,264	0	0	604,204	180,749	295,014,740	299,635,957	2,139,304
Beryllium and beryllium compounds	O	622,263	100,605	0	0	9	1,805	110,017	834,699	40
	N	9,709	0	0	0	0	0	844,699	854,408	0
Cadmium and cadmium compounds	O	3,292,444	945,990	0	0	34,068	125,272	2,802,446	7,200,220	28,937
	N	67,228	25,125	0	0	69,970	201,171	6,786,294	7,149,788	51,000
Chromium and chromium compounds	O	43,478,407	118,450,495	383,399	22,294	10,814,385	1,674,315	39,336,481	214,159,777	320,333
	N	172,697	1,226,944	0	12,000	278,967	689,746	106,328,683	108,709,037	19,022,846
Cobalt and cobalt compounds	O	6,048,100	9,936,398	0	6,203	1,648,799	38,612	1,371,605	19,049,718	103
	N	117,640	9,086	0	0	0	0	15,653,043	15,779,769	575
Copper and copper compounds	O	852,080,916	813,692,366	49,383	212,089	1,125,161	5,847,132	61,366,936	1,734,373,983	24,264,481
	N	4,681,195	5,257,729	0	0	174,958	104,344	1,168,847,955	1,179,066,181	141,537,702
Lead and lead compounds	O	642,730,075	281,412,059	13,815	6,375	3,161,142	4,277,430	44,408,101	976,008,998	2,376,487
	N	517,702	2,611,654	0	0	437,563	863,038	318,651,908	323,081,865	17,000,057
Manganese and manganese compounds	O	85,886,066	116,660,397	776	51,661	3,700,722	1,704,623	137,377,595	345,381,839	162,487
	N	619,231	905,570	0	0	83,513	78,990	352,817,848	354,505,152	20,211,092
Mercury and mercury compounds	O	586,765	60,060	78	88	792	3,559	195,062	846,404	11,544
	N	60,175	101,870	0	38	18,977	2,305	3,846,096	4,029,460	6,600
Nickel and nickel compounds	O	46,488,196	108,892,505	113,593	28,222	2,336,264	1,293,775	14,711,098	173,863,653	1,249,632
	N	927,323	1,799,696	0	0	125,053	311,071	61,439,367	64,602,510	2,203,011
Selenium and selenium compounds	O	604,363	32,588	0	0	498	86,533	488,924	1,212,906	29,106
	N	25,100	21,076	0	0	0	71,700	8,753,708	8,871,584	290,000
Silver and silver compounds	O	1,909,135	1,864,056	0	0	3,530	36,696	314,418	4,127,834	21,812
	N	280	13,589	0	0	0	3,681	4,159,817	4,177,367	240,000
Thallium and thallium compounds	O	221,400	8,700	0	0	0	58	452,946	683,104	4,300
	N	1,810	5	0	0	0	0	4,144,573	4,146,388	54,000
Vanadium** and vanadium compounds	O	1,463,848	3,493,326	8	0	46,762	71,566	10,604,209	15,679,719	51,967
	N	23,547	95,727	0	0	119,364	91	73,173,815	73,412,544	3,270,529
Zinc* and zinc compounds	O	89,060,245	341,016,512	144,790	300,741	11,265,400	11,839,554	317,614,793	771,242,035	4,426,365
	N	18,209,903	1,103,790	0	68,740	190,074	65,255	764,198,931	783,836,693	15,153,718
<b>Total</b>	<b>O</b>	<b>1,841,001,408</b>	<b>1,827,036,409</b>	<b>762,976</b>	<b>661,266</b>	<b>63,088,002</b>	<b>30,152,481</b>	<b>673,214,318</b>	<b>4,435,916,861</b>	<b>34,170,834</b>
	<b>N</b>	<b>25,666,440</b>	<b>16,971,266</b>	<b>0</b>	<b>80,778</b>	<b>2,342,752</b>	<b>2,653,380</b>	<b>3,683,000,690</b>	<b>3,730,715,305</b>	<b>223,548,234</b>

**Note:** Data are from Section 8 of Form R.

**O:** Original industries. **N:** New Industries.

\* Only fume or dust forms are reportable.

\*\* Except when contained in an alloy.