

Appendix B

Emission Inventory Data

The Proposed Amendments to the Airborne Toxic Control Measure for Chromium Electroplating and Chromic Acid Anodizing Operations

Date of Release: November 29, 2022

Date of Hearing: January 26, 2023

Staff quantified the emissions of hexavalent chromium from chrome plating facilities using chrome plating facility operation and activity data. The data was obtained from the local air districts and included permitted throughput in ampere-hours/year, actual throughput in ampere-hours/year, source test emission data in mg/ampere-hour, and the applicable ATCM emission limits for each chrome plating facility.

Staff used 2019 actual throughput data to estimate the amount of estimate emissions because 2019 was the last year that represented business as usual before the COVID-19 pandemic. Staff quantified emissions only from facilities that were still in operation in 2021. Permitted annual ampere hours were provided by the districts and were current as of the most recent update to each individual facility's permit to operate. If source test data was not available, ATCM limits were used to estimate emission rates. The formulas below shows how the potential emissions was calculated in Table 1.

Potential to emit = Permitted Annual Amp-hr X Emission Factor

The Table 1 shows the summary of emission data for all 113 chrome plating facilities operating in California as 2021.

Table 1. Summary of Emissions Data for Chrome Plating Facilities in California

District	Facility Type	Permitted Annual Throughput (amp-hrs) (Reported)	2019 Facility Reported Throughput (amp-hrs) (Reported)	ATCM Emission Factor	Potential to Emit (lb) ¹	2019 Emissions based on ATCM Emission Factors (lb/year) (Calculated) ²	Average Source Tested Emission Rate (mg/amp-hr) ³ (Reported)	Permitted Emissions based on Source Tested Emission Factors (lb/year) (Calculated) ⁴	2019 Emissions Based on Source Tested Emission Factors (lb/year) (Calculated) ⁵
South Coast AQMD	Anodizing	365,000	14,425	0.00150	0.00121	0.00005	0.000000029	2.33359E-08	9.2225E-10
South Coast AQMD	Anodizing	5,000,000	104,168	0.00150	0.01653	0.00034	0.000000029	3.19671E-07	6.65989E-09
South Coast AQMD	Anodizing	1,150,000	655,289	0.00150	0.00380	0.00217	0.000000029	7.35242E-08	4.18953E-08
South Coast AQMD	Anodizing	50,000	1,744	0.00150	0.00017	0.00001	0.000000029	3.19671E-09	1.11501E-10
South Coast AQMD	Anodizing	13,440,000	216,966	0.00150	0.04444	0.00072	0.000000029	8.59274E-07	1.38715E-08
South Coast AQMD	Anodizing	49,995	43,683	0.01000	0.00110	0.00014	0.000000029	3.19639E-09	2.79283E-09
South Coast AQMD	Anodizing	1,150,000	163,507	0.00150	0.00380	0.00054	0.000000029	7.35242E-08	1.04537E-08
South Coast AQMD	Anodizing	200,000	74,681	0.00150	0.00066	0.00025	0.000000029	1.27868E-08	4.77466E-09
South Coast AQMD	Anodizing	1,150,000	20,999	0.00150	0.00380	0.00017	0.000000029	6.39341E-08	3.22612E-09

District	Facility Type	Permitted Annual Throughput (amp-hrs) (Reported)	2019 Facility Reported Throughput (amp-hrs) (Reported)	ATCM Emission Factor	Potential to Emit (lb) ¹	2019 Emissions based on ATCM Emission Factors (lb/year) (Calculated) ²	Average Source Tested Emission Rate (mg/amp-hr) ³ (Reported)	Permitted Emissions based on Source Tested Emission Factors (lb/year) (Calculated) ⁴	2019 Emissions Based on Source Tested Emission Factors (lb/year) (Calculated) ⁵
South Coast AQMD	Anodizing	50,000	50,460	0.01000	0.00110	0.00005	0.000000029	3.19671E-09	1.46345E-10
South Coast AQMD	Anodizing	1,412,000	2,289	0.01000	0.03113	0.00070	0.000000029	9.0275E-08	1.35483E-08
South Coast AQMD	Anodizing	1,600,000	211,911	0.00150	0.00529	0.00073	0.000000029	3.19671E-08	1.41092E-08
South Coast AQMD	Anodizing	9,000,000	220,684	0.00150	0.02976	0.00019	0.000000029	0	3.6539E-09
South Coast AQMD	Anodizing		57,151	0.00150	0.00221	0.00221	0.000000029	1.02295E-07	4.27054E-08
South Coast AQMD	Anodizing	757,375	484,349	0.00150	0.00250	0.00015	0.000000029	5.74768E-09	2.98432E-09
South Coast AQMD	Anodizing	1,000,000	5,080	0.00150	0.00331	0.00160	0.000000029	5.75407E-07	3.09664E-08
South Coast AQMD	Anodizing	1,800,000	36,396	0.00150	0.00595	0.00002	0.000000029	0	3.24785E-10
South Coast AQMD	Anodizing		701,946	0.00150	0.00012	0.00012	0.000000029	4.84221E-08	2.32695E-09
South Coast AQMD	Anodizing		117,689	0.00150	0.00232	0.00232	0.000000029	6.39341E-08	4.48783E-08

District	Facility Type	Permitted Annual Throughput (amp-hrs) (Reported)	2019 Facility Reported Throughput (amp-hrs) (Reported)	ATCM Emission Factor	Potential to Emit (lb) ¹	2019 Emissions based on ATCM Emission Factors (lb/year) (Calculated) ²	Average Source Tested Emission Rate (mg/amp-hr) ³ (Reported)	Permitted Emissions based on Source Tested Emission Factors (lb/year) (Calculated) ⁴	2019 Emissions Based on Source Tested Emission Factors (lb/year) (Calculated) ⁵
South Coast AQMD	Anodizing	6,000,000	22,615	0.00150	0.01984	0.00039	0.000000029	1.15081E-07	7.52434E-09
South Coast AQMD	Anodizing	1,150,000	388,833	0.00150	0.00380	0.00007	0.000000029	0	1.44587E-09
South Coast AQMD	Anodizing	500,000	29,198	0.01000	0.01102	0.00129	0.000000029	3.83605E-07	2.48597E-08
South Coast AQMD	Anodizing	50,000	288,742	0.00150	0.00017	0.00010	0.000000029	7.35242E-08	1.86675E-09
South Coast AQMD	Anodizing		23,658	0.00150	0.00095	0.00095	0.000000029	3.19671E-08	1.84605E-08
South Coast AQMD	Anodizing	13,000,000	667,959	0.00150	0.04299	0.00052	0.000000029	3.19671E-09	1.51255E-09
Ventura County APCD	Anodizing	89,900	2,125,298	0.00150	0.00030	0.00007	0.000000029	8.31143E-07	1.34255E-09
Bay Area AQMD	Hard	114,500,000	46,678	0.00150	0.37864	0.00703	0.000000029	1.27868E-06	1.35879E-07
San Joaquin Valley APCD	Decorative	10,000,000	16,687	0.01000	0.22046	0.00134	0.00047788	8.42837E-05	0.000426347
South Coast AQMD	Decorative	89,856,000	206,929	0.00150	0.29714	0.00014	0.00047788	0.001316932	4.34451E-05

District	Facility Type	Permitted Annual Throughput (amp-hrs) (Reported)	2019 Facility Reported Throughput (amp-hrs) (Reported)	ATCM Emission Factor	Potential to Emit (lb) ¹	2019 Emissions based on ATCM Emission Factors (lb/year) (Calculated) ²	Average Source Tested Emission Rate (mg/amp-hr) ³ (Reported)	Permitted Emissions based on Source Tested Emission Factors (lb/year) (Calculated) ⁴	2019 Emissions Based on Source Tested Emission Factors (lb/year) (Calculated) ⁵
South Coast AQMD	Decorative	500,000	29,378	0.01000	0.01102	0.00212	0.00047788	0.001211578	0.000673911
South Coast AQMD	Decorative	748,800	404,678	0.00150	0.00248	0.00033	0.00047788	0.00526773	0.000104237
South Coast AQMD	Decorative	500,000	41,237	0.01000	0.01102	0.00009	0.00047788	0	2.77578E-05
South Coast AQMD	Decorative	20,000	639,660	0.01000	0.00044	0.00143	0.00047788	0	0.000456408
South Coast AQMD	Decorative	80,000	98,939	0.00150	0.00026	0.00431	0.00047788	0.016565956	0.001374463
South Coast AQMD	Decorative	1,600,000	26,347	0.00150	0.00529	0.00006	0.00047788	0.000526773	1.75805E-05
South Coast AQMD	Decorative	50,000	433,211	0.01000	0.00110	0.00036	0.00047788	0.000754381	0.000114202
South Coast AQMD	Decorative	1,250,000	1,304,607	0.00150	0.00413	0.00077	0.00047788	0.027392194	0.000245487
South Coast AQMD	Decorative	15,000,000	108,398	0.00150	0.04960	0.00068	0.00047788	0.001053546	0.000218009
South Coast AQMD	Decorative	1,150,000	233,010	0.01000	0.02535	0.00185	0.00047788	0	0.000588865

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South Coast AQMD	Decorative		558,936	0.00150	0.00310	0.00310	0.00047788	0.013148253	0.000987867
South Coast AQMD	Decorative	1,000,000	937,659	0.00150	0.00331	0.00019	0.00047788	0.001211578	6.04683E-05
South Coast AQMD	Decorative	5,000,000	57,395	0.00150	0.01653	0.00010	0.00047788	0.000210709	3.09511E-05
San Diego County APCD	Decorative	50,000	19,230	0.01000	0.00110	0.00006	0.00047788	0.000526773	2.02597E-05
South Coast AQMD	Decorative		3,729,115	0.00150	0.01233	0.01233	0.00047788	0.063212755	0.003928794
Bay Area AQMD	Decorative	50,000	15,391	0.01000	0.00110	0.00244	0.01	0.220462442	0.002443187
Bay Area AQMD	Decorative	45,500	8,423	0.01000	0.00100	0.00001	0.01	0.001102312	1.26325E-05
Bay Area AQMD	Decorative	20,000	16	0.01000	0.00044	0.03274	0.01	1.980987319	0.032744228
South Coast AQMD	Decorative	200,000	4,185	0.01000	0.00441	0.00101	0.01	0.011023122	0.00100985
South Coast AQMD	Decorative	2,149,056	9,785	0.00150	0.00711	0.00051	0.01	0.000440925	0.000514118

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South Coast AQMD	Decorative	17,628	19,080	0.01000	0.00039	0.00553	0.01	0.035273991	0.005532549
South Coast AQMD	Decorative	15,724,000	27,524	0.00150	0.05200	0.00032	0.01	0.001102312	0.00031632
South Coast AQMD	Decorative	41,328,000	110,821	0.00150	0.13667	0.00000	0.01	0.001102312	1.84527E-07
San Joaquin Valley APCD	Decorative	500,000	11,946	0.00150	0.00165	0.02165	0.01	0.330693663	0.021653623
South Coast AQMD	Decorative	716,040	4,081,180	0.00150	0.00237	0.00271	0.01	0	0.00270805
South Coast AQMD	Decorative	26,000,000	12,619	0.00150	0.08598	0.00022	0.01	0.001102312	0.000215722
San Joaquin Valley APCD	Decorative	1,000,000	6,340	0.00150	0.00331	0.00034	0.01	0.001102312	0.000339314
South Coast AQMD	Decorative		573	0.01000	0.00019	0.00019	0.01	0.001003104	0.000185696
South Coast AQMD	Decorative	50,000	1,485,252	0.01000	0.00110	0.00000	0.01	0.000440925	3.5274E-07

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South Coast AQMD	Decorative		45,806	0.00150	0.00046	0.00046	0.01	0.004409249	0.000455718
South Coast AQMD	Decorative	20,000	23,320	0.00150	0.00007	0.00000	0.01	0.000440925	0
South Coast AQMD	Decorative		250,952	0.00150	0.00034	0.00034	0.01	0	0.000335015
South Coast AQMD	Decorative	12,480,000	14,348	0.00150	0.04127	0.00008	0.01	0.001102312	8.15711E-05
Feather River AQMD	Decorative	20,000	8	0.01000	0.00044	0.00008	0.01	0.000440925	7.74264E-05
San Joaquin Valley APCD	Decorative	20,000	982,191	0.01000	0.00044	0.00026	0.01	0.000440925	0.000263364
San Diego County APCD	Decorative	50,000	122,835	0.01000	0.00110	0.00042	0.01	0.001102312	0.000420642
Sacramen to Metro AQMD	Decorative	200,000	20,671	0.00150	0.00066	0.00009	0.01	0.001102312	9.22635E-05
Bay Area AQMD	Decorative	50,000	-	0.01000	0.00110	0.00060	0.01	0.001102312	0.000600716

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South Coast AQMD	Decorative	50,000	15,196	0.01000	0.00110	0.00013	0.01	0.008046879	0.00013047
South Coast AQMD	Decorative	53,800	3,700	0.01000	0.00119	0.08997	0.01	0	0.089974691
South Coast AQMD	Decorative	365,000	3,512	0.00150	0.00121	0.00028	0.01	0.000440925	0.000278202
South Coast AQMD	Decorative	500,000	27,248	0.00150	0.00165	0.00005	0.01	0.000440925	5.0993E-05
San Joaquin Valley APCD	Decorative	20,000	5,918	0.01000	0.00044	0.00007	0.01	0.000440925	6.63812E-05
South Coast AQMD	Decorative	60,000,000	2,313	0.00150	0.19841	0.00014	0.01	0.00035274	0.000139773
South Coast AQMD	Decorative	20,000	3,011	0.00150	0.00007	0.00061	0.01	0.001102312	0.000606801
South Coast AQMD	Decorative	20,000	20,539	0.01000	0.00044	0.00045	0.01	0.001102312	0.000452808
San Joaquin Valley APCD	Decorative	16,000	12,710,000	0.01000	0.00035	0.01056	0.000588214	0.019451874	0.004140422

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San Diego County APCD	Decorative	50,000	10,380,000	0.01000	0.00110	0.01570	0.000588214	0.044972732	0.006157743
South Coast AQMD	Decorative	50,000	5,560,000	0.01000	0.00110	0.02449	0.000588214	0	0.00960221
Bay Area AQMD	Hard	44,000,000	203,876	0.00150	0.14550	0.00040	0.000588214	0.000648396	0.000158016
Bay Area AQMD	Hard	38,600,000	8,838,733	0.00150	0.12765	0.01347	0.000588214	0.019451874	0.005280487
Bay Area AQMD	Hard	35,000,000	161,003	0.00150	0.11574	0.04203	0.000588214	0.057058829	0.016482221
Bay Area AQMD	Hard	3,000,000	780,258	0.00150	0.00992	0.20251	0.000588214	0	0.079414489
Bay Area AQMD	Hard	60,000,000	5,383,523	0.00150	0.19841	0.19161	0.000588214	0.329385061	0.075139044
San Diego County APCD	Hard		2,097,849	0.01000	0.01248	0.01248	0.000588214	0.170735579	0.004894851
San Joaquin Valley APCD	Hard	12,000,000	3,774,586	0.00150	0.03968	0.00469	0.000588214	0.004193329	0.001840038
San Joaquin Valley APCD	Hard		3,192,820	0.00150	0.10289	0.10289	0.000588214	0.193118202	0.04034904

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San Joaquin Valley APCD	Hard	9,984,000	4,748,445	0.00150	0.03302	0.25829	0.000588214	0	0.101284751
Sacramen to Metro AQMD	Hard	131,660,000	7,404,590	0.00150	0.43539	0.00135	0.000588214	0.000314926	0.000529927
South Coast AQMD	Hard	15,000,000	121,852	0.00150	0.04960	0.03433	0.000588214	0.050056155	0.013460697
South Coast AQMD	Hard	34,680,000	4,071,963	0.00150	0.11468	0.02083	0.000588214	0.135136057	0.008167859
South Coast AQMD	Hard	500,000	61,239,208	0.00150	0.00165	0.15688	0.000588214	0.077807495	0.061521286
South Coast AQMD	Hard	15,000,000	57,942,267	0.00150	0.04960	0.00258	0.000588214	0	0.001011832
South Coast AQMD	Hard		1,418,916	0.00150	0.03372	0.03372	0.000588214	0.169931568	0.013221745
South Coast AQMD	Hard	254,000,000	31,114,514	0.00150	0.83995	0.04878	0.000588214	0.162098947	0.019130381
South Coast AQMD	Hard	3,233,618	78,104,109	0.00150	0.01069	0.00338	0.000588214	0.055984713	0.001324732

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South Coast AQMD	Hard	148,920,000	408,645	0.00150	0.49246	0.01780	0.000588214	0	0.006981307
South Coast AQMD	Hard	15,000,000	6,298,513	0.00150	0.04960	0.03149	0.000588214	0.100967923	0.012349775
South Coast AQMD	Hard		47,441,152	0.00150	0.00242	0.00024	0.000588214	6.48396E-05	1.42219E-05
South Coast AQMD	Hard	242,850	10,195,736	0.00150	0.00080	0.01839	0.000588214	0.045387705	0.007210161
South Coast AQMD	Hard	104,208,000	14,752,086	0.00150	0.34461	0.00027	0.000588214	0.004588049	0.000105877
South Coast AQMD	Hard	60,000,000	1,021,546	0.00150	0.19841	0.00694	0.000588214	0.012947167	0.002720473
South Coast AQMD	Hard	131,040,000	9,523,331	0.00150	0.43334	0.06183	0.000588214	0	0.024244422
South Coast AQMD	Hard	30,000,000	10,967	0.00150	0.09921	0.04922	0.000588214	0.735929221	0.019299485
South Coast AQMD	Hard	125,000,000	81,645	0.00150	0.41336	0.00000	0.000588214	2.59358E-05	0
South Coast AQMD	Hard	43,171,712	18,695,697	0.00150	0.14276	0.04409	0.000588214	0.002593583	0.017288715

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South Coast AQMD	Hard	77,859,792	14,882,488	0.00150	0.25747	0.00067	0.000588214	0.003890375	0.000264385
South Coast AQMD	Hard		-	0.01000	0.02923	0.02923	0.000588214	0.077807495	0.011461995
South Coast AQMD	Hard	567,500,000	13,331,915	0.00150	1.87667	0.38518	0.000588214	0.149649748	0.151045201
South Coast AQMD	Hard	2,000,000	116,476,081	0.00150	0.00661	0.03597	0.000588214	0.004538771	0.014104095
South Coast AQMD	Hard	115,400,000	10,876,146	0.00150	0.38162	0.00053	0.000588214	0.007780749	0.000208787
South Coast AQMD	Hard	3,500,000	4,766,382	0.00150	0.01157	0.10508	0.0000041	0.000108468	4.30831E-05
South Coast AQMD	Hard	29,883,290	107,434,648	0.00150	0.09882	0.35528			
South Coast AQMD	Hard	363,100,000	5,450,000	0.00150	1.20074	0.01802			
Total					10.19259	2.55505		5.37702	0.90148

¹Used the potential to emit lbs (ATCM limit) if no numbers for permitted amp-hrs were provided by the district

²2019 Emission based on ATCM= 2019 Total Amp-hr X ATCM Emission Rate Limit (mg/ap-hr) X Conversion Factor (mg to lb)

³Sources testing numbers in this column are calculated based on the source test results shown in the table below. Source test results were applied to all plating operation are assumed to apply to the

⁴Permitted Emissions Based on Source Testing = Permitted Amp-hr X Source Testing Emission (mg/ap-hr) X Conversion Factor (mg to lb)

⁵2019 Emissions Based on Source Testing = 2019 Total Amp-hr X Source Testing Emission (mg/ap-hr) X Conversion Factor (mg to lb)

Table 2 below shows the results from 14 sources tests performed on six types of chrome plating tanks.

Table 2. Source Testing Results

Plating Type	Emission Control Method	Test Emission Rate (average)	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7
Decorative with Add-on	Add-on	0.00047788	0.00032	0.0008836	0.00023				
Decorative with Fume Suppressant only	Fume Suppressant only	0.01	0.01						
Hard with Add-on	Add-on	0.000588214	0.00045	0.00011	0.001	0.00034	0.00063	0.0002875	0.0013
Hard with Covers	Merlin	0.0000041	0.0000041						
Anodizing	HEPA	0.000000029	0.000000029						
Hard (Passivation)	HEPA	0.0002	0.0002						