

Appendix F

Results of Emission Testing Program

Table VI-1
Sigma Plating Company, Inc. Hoist Line Decorative Chromium Plating Tank
Sampling Dates – January 9, 10, & 17, 2003

Sampling Location	Plating Tank Exhaust					
Sample Number	SI-02	SI-03	SI-07			
Sampling Date	1/9/2003	1/10/2003	1/17/2003			
Plating Tank Data						
Totalizer (amp-hours)	12,468	9,080	4,634			
Production Rate (amp-hrs/hr)	2,078	1,892	1,655			
Stack Data						
Temperature (°F)	69	63	67			
Velocity (ft/sec)	57	53	58			
Static Pressure ("H ₂ O)	-4.4	-4.4	-4.4			
Stack Area (sq. ft.)	0.994	0.994	0.994			
Flow Rate (DSCFM)	3300	3100	3400			
Moisture (% of v/v)	0.7	0.9	0.1			
Sampling Data						
Sampling Time (minutes)	360	288	168			
Sample Volume (DSCF)	428.10	326.64	191.63			
Chromium Data (ng/sample)						
Total Chromium	3.5E+6	2.8E+6	1.9E+5			
Hexavalent Chromium	1.4E+6	6.8E+5	7.8E+4			
Isokinetic Rate (%)	104	106	98			
EMISSIONS						
Concentration (ng/dscf)						
Total Chromium	8.2E+3	8.6E+3	1.0E+3			
Hexavalent Chromium	3.3E+3	2.1E+3	4.1E+3			
Emission Rate (mg/hr)						
Total Chromium	1600	1600	210			
Hexavalent Chromium	660	390	83			
Emissions Factors (mg/amp-hr)¹						
Total Chromium	0.77	0.85	0.13			
Hexavalent Chromium	0.32	0.21	0.05			

DSCF means dry standard cubic feet. Standard conditions are 68 F and 29.92 inches Hg.

DSCFM means dry standard cubic feet per minute.

¹ Emissions Factors (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Table VI-2						
Sigma Plating Company, Inc. Hoist Line Decorative Chromium Plating Tank Mist Eliminator						
Sampling Dates – January 14, 15, & 16, 2003						
Sampling Location	Upstream of Mist Eliminator	Downstream of Mist Eliminator	Upstream of Mist Eliminator	Downstream of Mist Eliminator	Upstream of Mist Eliminator	Downstream of Mist Eliminator
Test Number	SI-04 ¹	SO-04 ³	SI-05	SO-05	SI-06	SO-06
Sampling Date	1/14/2003		1/15/2003		1/16/2003	
Plating Tank Data						
Totalizer (amp-hrs)	6,059 ³		8,874		9,002	
Production Rate (amp-hrs/hr)	1,010		1,479		1,500	
Stack Data						
Temperature (°F)	69	67	72	72	76	72
Velocity (ft/sec)	59	66	59	65	59	61
Static Pressure ("H ₂ O)	-4.4	-7.4	-4.4	-7.4	-4.4	-7.4
Stack Area (sq. ft.)	0.994	0.994	0.994	0.994	0.994	0.994
Flow Rate (DSCFM)	3400	3800	3400	3700	3400	3500
Moisture (% of v/v)	1.0	1.0	0.6	0.8	0.2	0.5
Sampling Data						
Sampling Time (minutes)	360	360	360	360	360	360
Sample Volume (DSCF)	238.39	280.24	253.58	273.84	249.54	257.45
Chromium Data (ng/sample)						
Total Chromium	2.1E+6	2.4E+3	4.2E+4	7.0E+3	5.9E+3	5.5E+3
Hexavalent Chromium	9.5E+5	2.5+E3	2.9E+4	5.6E+3	3.2E+3	4.2E+3
Isokinetic Rate (%)	100.1	106.4	106.1	105.3	105.3	105.0
EMISSIONS						
Concentration (ng/dscf)						
Total Chromium	8600	8.7	170	26	24	21
Hexavalent Chromium	4000	9.1	120	20	13	16
Emission Rate (mg/hr)						
Total Chromium	1800	2.0	34	5.7	4.8	4.5
Hexavalent Chromium	820	2.1	24	4.6	2.6	3.5
Mist Eliminator Control Efficiency (%)²						
Total Chromium	99.9		83.2		6.3	
Hexavalent Chromium	99.7		80.8		--³	
Emission Factor (mg/amp-hr)⁴						
Total Chromium	1.78	2.0E-3	2.3E-2	3.9E-3	3.2E-3	3.0E-3
Hexavalent Chromium	0.81	2.1E-3	1.6E-2	3.1E-3	1.7E-3	2.3E-3

DSCF means dry standard cubic feet. Standard conditions are 68 F and 29.92 inches Hg.

DSCFM means dry standard cubic feet per minute.

1 Hoist line operations were suspended for ~4 hours during Run 04. Emissions sampling runs were suspended for 2 of the 4 hours.

2 **Efficiency** = [(Inlet, SI – Outlet, SO) / Inlet, SI] * 100

3 Efficiency could not be calculated

4 **Emissions Factors** (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Date	Run	Freeboard (inches)	Chromic Acid Concentration (oz/gal)	Temperature (°F)
1/09/03	SI-O2	3.0 – 3.0	34.4	112-113
1/10/03	SI-O3	3.0 - 2.75	33.96	112
1/17/03	SI-O7	5.0 - 4.9	33.07	109
1/14/03	SI-O4 & SO-O4	5.0 - 5.2	34.18	110
1/15/03	SI-O5 & SO-O5	4.2 – 4.5	32.85	109
1/16/03	SI-O6 & SO-O6	4.5 – 4.5	32.63	109-110

Note:

- Freeboard space was measured at the beginning and end of the day.
- Chromic acid concentration samples were taken once a day.
- Temperature was measured throughout the day.

Date	Run	Amperes	Volts	Ampere-Hours
1/09/03	SI-O2	5,200 – 6,600	6.75 – 7.5	12,468
1/10/03	SI-O3	5,000 – 6,200	6.5 – 7.5	9,080
1/17/03	SI-O7	2,800 – 6,700	5.4 – 6.8	4,634
1/14/03	SI-O4 & SO-O4	3,400 – 6,200	5.2 – 7.2	6,059
1/15/03	SI-O5 & SO-O5	4,000 – 5,800	6.0 – 6.6	8,874
1/16/03	SI-O6 & SO-O6	3,500 – 6,200	5.8 – 6.2	9,002

Note: Plating amperes varied at the beginning and end of plating as well as with plating of different parts.

Date	Sample	Operator Stalagmometer Reading	SCAQMD Stalagmometer Reading	SCAQMD Tensiometer Reading
1/09/03	SI-O2	34.7 - 41.5	40.0 – 43.2	28.4 – 29.5
1/10/03	SI-O3	30.7 - 31.3	29.0 – 32.6	23.6 – 24.9
1/17/03	SI-O7	41.5 - 35.5	40.1 – 40.2	28.5 – 27.6
1/14/03	SI-O4 & SO-O4	32.4 - 35.5	34.8 – 35.5	25.3 – 26.0
1/15/03	SI-O5 & SO-O5	38.7 - 37.8	39.9 – 40.2	27.9 – 28.7
1/16/03	SI-O6 & SO-O6	42.6 - 43.7	43.5 – 44.6	29.7 – 29.0

Table VI-3						
Sigma Plating Company, Inc. Hoist Line Indoor Ambient Metals						
Sampling Dates – January 8 - 10 & 14 – 16, 2003						
Sampling Dates	1/8/2003*	1/9/2003	1/10/2003	1/14/2003	1/15/2003	1/16/2003
Metals (ng/m³)						
Total Chromium	1,836	131	391	346	285	157
Manganese	68	19	52	71	110	45
Iron	10,430	2,153	4,164	7,099	15,127	3,134
Nickel	3,090	271	695	1,010	1,243	430
Cobalt	1.8	<1	1.6	2	1.9	1.2
Copper	253	55	155	268	192	125
Zinc	472	80	231	395	320	146
Arsenic	1.1	<1	<1	2.2	1.9	<1
Strontium	23	5.3	19	22	23	14
Molybdenum	1.8	<1	2.1	3.9	25	3.2
Tin	44	5.3	11	16	11	30
Antimony	7.2	1.8	7.5	11	15	8
Lead	811	42	122	126	67	47

* January 8 was windy and dusty which may account for the higher concentrations.

Table VI-1					
ARB METHOD 425 TEST RESULTS					
Excello Plating Company, Inc. Decorative Chrome Plating Tank					
Sampling Location	Plating Tank Exhaust				
Sample Number	E-1	E-2	E-3		
Sampling date	03/05/03	03/06/03	03/07/03		
Plating Tank Data					
Totalizer, amp-hours	786	1515	1452		
Production Rate (amp-hrs/hr)	151	252	242		
Stack Data					
Temperature (deg.F)	70.0	70.5	71.3		
Velocity (ft/sec)	23.1	23.1	23.1		
Static Pressure ("H2O)	0.05	0.05	0.05		
Stack Area (sq.ft.)	0.785	0.785	0.785		
Flow Rate (DSCFM)	1064	1068	1064		
Moisture (% of v/v)	0.46	0.23	0.43		
Sampling Data					
Sampling Time (minutes)	312	360	360		
Sample Volume (DSCF)	298.79	356.31	356.11		
Isokinetic Rate (%)	89.8	92.4	92.8		
Chromium Data (ng/sample)					
Total Chromium	4062	6366	3504		
Hexavalent Chromium	3508	6701	2740		
EMISSIONS					
Average of Runs E-2 and E-3 *					
Concentration (ng/DSCF)					
Total Chromium	13.59	17.866	9.840	13.85	
Hexavalent Chromium	11.74	18.808	7.693	13.25	
Emission Rate (mg/hr)					
Total Chromium	0.868	1.145	0.628	0.887	
Hexavalent Chromium	0.750	1.205	0.491	0.848	
Emission Factors (mg/amp-hr)					
Total Chromium	5.74E-03	4.54E-03	2.60E-03	3.57E-03	
Hexavalent Chromium	4.96E-03	4.77E-03	2.03E-03	3.40E-03	

* Notes: Isokinetic rate for run E-1 was less than 90%.

DSCF = Dry Standard Cubic Feet; DSCFM = DSCF per Minute.

Table VI-2 Excello Plating Company, Inc. Indoor, Ambient Hexavalent Chromium Levels			
Sample Number	E-1-A	E-2-A	E-3-A
Sample Date	3/5/2003	3/6/2003	3/7/2003
Sampling Time (minutes)	405	400	396
Volume Collected (Liters)	4042.2	4012.1	3972.0
Cr (VI) collected (nanograms)	888.6	790.7	421.0
Concentration (ng/m ³)	219.8	197.1	106.0

Table VI-3 Parameters Measured During Testing				
	Date	3/05/03	3/06/03	3/07/03
	Run	E1	E2	E3
Freeboard (inches)		3.75 - 4.25	3.75 - 3.50	4.0 - 4.0
Chromic Acid Concentration (oz/gal)		43.0	45.9	45.3
Temperature (°F)		111.2	110.6	112
Amperes		150	250	250
Volts		3	3	3
Ampere-Hours		786	1,515	1,452

Note:

- Freeboard space was measured at the beginning and end of the day.
- Chromic acid concentration samples were taken once a day.
- Temperature was measured throughout the day.
- Plating amperes varied at the beginning and end of plating as well as with plating of different parts.

Table VI-4 Surface Tension (dynes/cm) Readings Beginning and End of Each Day				
Date	Run	Anachem Lab Reading	SCAQMD Stalagmometer Reading	SCAQMD Tensiometer Reading
3/05/03	E1	26.6	31.5 - 33.8	23.5 - 24.0
3/06/03	E2	26.8	31.3 - 34.9	23.1 - 24.2
3/07/03	E3	25.7	33.9 - 34.0	23.9 - 24.5

Table VI-1 ARB METHOD 425 TEST RESULTS Van Nuys Plating Company - Decorative Chrome Plating Tank						
Sampling Location	Plating Tank Exhaust					
Sample Number	V-1	V-2	V-3			
Sampling date	04/09/03	04/10/03	04/11/03			
Plating Tank Data						
Totalizer, amp-hours	669	819	781			
Production Rate (amp-hrs/hr)	112	123	130			
Stack Data						
Temperature (deg.F)	77.8	74.0	70.9			
Velocity (ft/sec)	16.3	16.5	16.5			
Static Pressure ("H2O)	-0.98	-0.98	-0.98			
Stack Area (sq.ft.)	0.785	0.785	0.785			
Flow Rate (DSCFM)	728	743	756			
Moisture (% of v/v)	0.69	1.05	1.42			
Sampling Data						
Sampling Time (minutes)	360	400	360			
Sample Volume (DSCF)	260.94	293.17	279.10			
Isokinetic Rate (%)	99.3	98.5	102.3			
Chromium Data (ng/sample)						
Total Chromium	1.10E+05	1.68E+05	1.30E+05			
Hexavalent Chromium	1.05E+05	1.46E+05	1.11E+05			
EMISSIONS						
				Averages		
Concentration (ng/DSCF)						
Total Chromium	421.1	573.2	464.7	486.3		
Hexavalent Chromium	402.2	497.0	397.4	432.2		
Emission Rate (mg/hr)						
Total Chromium	18.40	25.54	21.08	21.67		
Hexavalent Chromium	17.57	22.14	18.03	19.25		
Emission Factors (mg/amp-hr)						
Total Chromium	0.165	0.208	0.162	0.178		
Hexavalent Chromium	0.158	0.180	0.139	0.159		

DSCF = Dry Standard Cubic Feet; DSCFM = DSCF per Minute.

Table VI-II						
Van Nuys Plating Company, Inc.						
Indoor, Ambient Hexavalent Chromium Levels						
Sample Number		V-2A	V-3A	V-4A	V-5A	V-6A
Sample Date		4/9/2003	4/9/2003	4/10/2003	4/10/2003	4/11/2003
Sampling Time (minutes)		77	123	400	396	328
Volume Collected (Liters)		791.4	1264.1	4130.7	4128.6	3387.2
Cr (VI) collected (nanograms)		3.0	9.4	15.2	0.7	13.7
Concentration (ng/m ³)		3.8	7.4	3.7	0.7	4.1
Daily averages		5.6		2.2		4.1

Table VI-1						
Alta Plating Decorative Chromium Plating Tank						
Sampling Dates – January 27-29 & February 2-4, 2004						
Sampling Location	40 dynes/cm Surface Tension			30 dynes/cm Surface Tension		
Sample Number	A-11	A-12	A-13	A-21	A-22	A-23
Sampling Date	1/27/2004	1/28/2004	1/29/2004	2/2/2004	2/3/2004	2/4/2004
Plating Tank Data						
Totalizer (amp-hours)	183	537	393	390	382	383
Production Rate (amp-hrs/hr)	30.5	67.1	65.5	65.0	63.7	63.8
Freeboard (inches to overflow)*	5.8 -4.5	4.0 - 4.2	4.0 - 4.0	4.75 - 5.0	4.0 - 4.5	4.5 - 4.9
Surface Tension (dynes/cm)*	39.3 – 39.9	40.7 – 39.3	40.1 – 39.7	30.8 – 28.9	30.5 – 28.9	29.2 – 28.4
Chromic Acid Conc. (oz/gal)	37.7	34.3	35.9	35.1	34.5	34.6
Bath Temperature (°F)	110	110	109	104	109	109
Stack Data						
Stack Temperature (°F)	63	62	61	62	62	61
Velocity (ft/sec)	23	21	21	21	20	21
Static Pressure ("H ₂ O)	-0.28	-0.25	-0.25	-0.27	-0.25	-0.26
Stack Area (sq. ft.)	0.785	0.785	0.785	0.785	0.785	0.785
Flow Rate (DSCFM)	1102	983	984	972	958	982
Moisture (% of v/v)	1.0	1.0	0.9	1.0	1.2	1.0
Sampling Data						
Sampling Time (minutes)	360	480	360	360	360	360
Sample Volume (DSCF)	390.14	485.60	378.17	353.49	349.45	359.83
Chromium Data (ng/sample)						
Total Chromium	3110	4810	5220	1450	2860	1520
Hexavalent Chromium	2250	3330	3840	1113	2462	980
Isokinetic Rate (%)	101	105	109	103	104	104
EMISSIONS						
Concentration (ng/dscf)						
Total Chromium	7.97	9.90	13.8	4.10	8.18	4.23
Hexavalent Chromium	5.77	6.86	10.2	3.15	7.05	2.72
Emission Rate (mg/hr)						
Total Chromium	0.53	0.58	0.82	0.24	0.47	0.25
Hexavalent Chromium	0.38	0.41	0.60	0.18	0.41	0.16
Emissions Factors (mg/amp-hr)**						
Total Chromium	0.017	0.009	0.012	0.004	0.007	0.004
Hexavalent Chromium	0.012	0.006	0.009	0.003	0.006	0.003

DSCF & DSCFM means dry standard cubic feet and dry standard cubic feet per minute at 68 F and 29.92 inches Hg.

* Paired numbers show "start " - "end" of sample run results (i.e. Run A-11 started at 5.8 in. & 39.3 dyne/cm).

** **Emissions Factors** (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Table VI-2a
Alta Plating Company
Indoor Ambient Hexavalent Chromium
40 dyne/cm Surface Tension

Sample Number:	A-11-A	A-12-A	A-13-A
Sample Date:	1/27/2004	1/28/2004	1/29/2004
Sampling Time (minutes)	226	422	310
Volume Collected (liters)	2260	4220	3100
Cr (VI) collected (nanograms)	160	120	32
Indoor Ambient Concentration (ng/m³)	70	28	10

Table VI-2b
Alta Plating Company
Indoor Ambient Hexavalent Chromium
30 dyne/cm Surface Tension

Sample Number:	A-21-A	A-22-A	A-23-A
Sample Date:	2/2/2004	2/3/2004	2/4/2004
Sampling Time (minutes)	353	313	350
Volume Collected (liters)	3530	3130	3500
Cr (VI) collected (nanograms)	63	50	33
Indoor Ambient Concentration (ng/m³)	18	16	9.3

Background Indoor Ambient Sampling Results: Facility 4

Table VI-2c
Alta Plating Company
Indoor Ambient Hexavalent Chromium

Ambient Results with Plating Tank Capture Hood Removed*

Sample Number:	A-33-A	A-32-A	A-31-A**	A-30-A
Sample Date:	2/5/2004	2/6/2004	2/8/2004	2/9/2004
Sampling Time (minutes)	339	450	1747**	368
Volume Collected (liters)	3390	4500	17470	3680
Cr (VI) collected (nanograms)	270	190	69	210
Totalizer, amp-hours	130	182	**	172
Indoor Ambient Concentration (ng/m³)	79	41	3.9	57

* - These indoor ambient samples were collected after emissions sampling of the plating tank was completed and the plating tank capture hood removed.

** - Sample A-31-A was collected on a Sunday when Alta was not plating. However, the sampler failed to shut off automatically. It was shut down manually at 8:00 am Monday - after Alta began plating.

Table VI-1 Sherm's Custom Plating Decorative Chromium Plating Tank Results Sampling Dates--March 9, 10, & 11, 2004			
Sampling Location	Chromium Plating tank	Chromium Plating tank	Chromium Plating tank
Sample Date	March 9, 2004	March 10, 2004	March 11, 2004
Sample Number	S-1	S-2	S-3
Plating Tank Data			
Totalizer (amp-hours)	415	459	425
Production Rate (amp-hrs/hr)	69.2	76.5	81.7
Freeboard (inches to overflow)*	5.0-4.9	3.0-3.5	4.0-4.0
Chromic Acid Conc. (oz/gal)	34.2	32.6	Not Done
Temperature (°F)	109.5	109.8	109.8
Surface Tension (dynes/cm)*	35.6-35.9	37.5-35.9	37.8-37.9
Stack Data			
Stack Temp. (°F)	75	75	72
Velocity (ft/sec)	19.49	22.19	20.33
Static Pressure ("H ₂ O)	-0.23	-0.29	-0.19
Stack Area (sq. ft.)	0.785	0.785	0.785
Flow Rate (DSCFM)	904	1030	943
Moisture (% of v/v)	1.1	0.6	1.0
Sampling Data			
Sampling Time (minutes)	360	360	312
Sampling Volume (DSCF)	330.08	360.50	295.40
Chromium Data (ng/sample)			
Total Chromium	19,440	22,600	22,730
Hexavalent Chromium	19,413	21,490	23,693
Isokinetic Ratio(%)	103.9	99.6	102.9
EMISSIONS			
Concentration (ng/DSCF)			
Total Chromium	58.89	62.69	76.95
Hexavalent Chromium	58.81	59.61	80.21
Emission Rate (mg/hr)			
Total Chromium	3.19	3.87	4.35
Hexavalent Chromium	3.19	3.68	4.54
Emission Factors (mg/amp-hr)**			
Total Chromium	0.046	0.051	0.053
Hexavalent Chromium	0.046	0.048	0.056

DSCF means dry standard cubic feet at 68°F and 29.92" Hg. DSCFM means dry standard cubic feet per minute.

*Paired values separated by a hyphen are "start-end" of day measurements.

**Emission Factor = Emission rate/Production rate.

Table VI-2a
Sherm's Custom Plating
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

Ambient sampling during source testing with the hood in place

Sample Number:	S1-A	S2-A	S3-A
Sample Date:	03/09/2004	03/10/2004	03/11/2004
Sampling Time (minutes)	300	335	300*
Volume Collected (liters)	3000	3350	3000
Cr (VI) Collected (nanograms)	200	130	190
Indoor Ambient Concentration (ng/m ³)	67	39	65

* Note: Difference between the annotated start and stop time does not equal 300 minutes. It is assumed the start time was written incorrectly since the sampling interval is read directly from the PQ-100.

Background Indoor Ambient Sampling Results: Facility 5

Table VI-2b
Sherm's Custom Plating
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

Ambient sampling after source testing with the hood removed

Sample Number:	S11-A	S12-A	S13-A
Sample Date:	03/19/2004	03/20/2004	03/21/2004
Sampling Time (minutes)	393	417	340
Volume Collected (liters)	3930	4170	3400
Cr (VI) Collected (nanograms)	390	870	410
Indoor Ambient Concentration (ng/m ³)	100	210	120

Table VI-2			
Clovis Specialty Decorative Chromium Plating Tank Test Week 2 (Clovis2)			
Sampling Dates – October 19-21, 2004			
Sampling Location			
Sample Number	C21	C22	C23
Sampling Date	10/19/04	10/20/04	10/21/04
Plating Tank Data			
Totalizer (amp-hours)	331	382	360
Production Rate (amp-hrs/hr)	159	191	180
Freeboard (inches to overflow)*	4.375	4.875	4.375
Surface Tension (dynes/cm)	44.1	41.6	42.2
Chromic Acid Conc. (oz/gal)	30.2	30.2	30.2
Bath Temperature (°F)	106	110	112
Stack Data			
Stack Temperature (°F)	68	67	63
Velocity (ft/sec)	20.68	20.40	19.84
Static Pressure ("H ₂ O)	-0.22	-0.22	-0.24
Stack Area (sq. ft.)	0.785	0.785	0.785
Flow Rate (DSCFM)	945	931	922
Moisture (% of v/v)	1.3	1.3	1.1
Sampling Data			
Sampling Time (minutes)	125	120	120
Sample Volume (DSCF)	118.65	111.03	111.23
Chromium Data (ng/sample)			
Total Chromium	20,990	12,960	18,670
Hexavalent Chromium	21,800	11,280	20,570
Isokinetic Rate (%)	102.9	101.9	103.1
EMISSIONS			
Concentration (ng/dscf)			
Total Chromium	177	117	168
Hexavalent Chromium	184	102	185
Emission Rate (mg/hr)			
Total Chromium	10.0	6.5	9.3
Hexavalent Chromium	10.4	5.7	10.2
Emissions Factors (mg/amp-hr)**			
Total Chromium	0.063	0.034	0.052
Hexavalent Chromium	0.065	0.030	0.057

DSCF & DSCFM means dry standard cubic feet and dry standard cubic feet per minute at 68 F and 29.92 inches Hg.

* Measured at the start of the plating day.

** **Emissions Factors** (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Background Indoor Ambient Sampling Results: Facility 6

Table A1-1b
Clovis Specialty
Indoor Ambient Hexavalent Chromium

(without Capture Hood)

Sample Number:	C4-A	C5-A	C6-A	C7-A
Sample Date:	6/1/2004	6/2/2004	6/3/2004	6/4/2004
Sampling Time (minutes)	1,403	1,317	1,115	470
Volume Collected (liters)	14,030	13,068	11,150	4,653
Plating Tank Amp-hours	1	72	22	51
Cr (VI) collected (nanograms)	1700	3600	1500	2100
Indoor Ambient Concentration (ng/m³)	120	280	130	460

Table A2-1a
Clovis Specialty Plating – Test Week 2
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

*(Ambient sampling on rectifier during source testing **with** capture hood in place.)*

Sample Number:	C20-RA	C21-RA	C22-RA	C23-RA
Sample Date:	10/18/04	10/19/04	10/20/04	10/21/04
Sampling Time (minutes)	196	308	143	132
Volume Sampled (liters)	1960	3080	1430	1320
Cr (VI) Collected (ng/sample)	300	5000	470	1800
Indoor Ambient Concentration (ng/m ³)	150	1600	330	1300

This rectifier is next to the plating tank, but outside the source test capture hood.

Table A2-1b
Clovis Specialty Plating – Test Week 2
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

*(2nd parallel ambient sampling during source testing **with** capture hood in place.)*

Sample Number:	C20-CA	C21-CA	C22-CA	C23-CA
Sample Date:	10/18/04	10/19/04	10/20/04	10/21/04
Sampling Time (minutes)	188	308	139	**
Volume Sampled (liters)	1880	3050	1380	**
Cr (VI) Collected (ng/sample)	270	1700	700	810
Indoor Ambient Concentration (ng/m ³)	150	560	510	**

CA samples parallel RA samples above - away from the tank and rectifier, but in the same room. RA samples were collected at the same location as Week 1 indoor samples.

** Air Volume data not recorded. Indoor concentration can not be calculated.

Table VI-3			
Clovis Specialty Decorative Chromium Plating Tank Test Week 3 (Clovis 3)			
Sampling Dates – May 24-25, 2005			
Sampling Location			
Sample Number	C31	C32	C33
Sampling Date	5/24/05	5/25/05 AM	5/25/05 PM
Plating Tank Data			
Totalizer (amp-hours)	385	309	316
Production Rate (amp-hrs/hr)	192.5	154.5	158
Freeboard (inches to overflow)*	5 5/8	5 5/8	5 5/8
Surface Tension (dynes/cm)	36.6	32.7	22.1 (fume suppressant added before sampling)
Chromic Acid Conc. (oz/gal)	25.0	25.0	25.0
Bath Temperature (°F)	108	110	110
Stack Data			
Stack Temperature (°F)	91	86	92
Velocity (ft/sec)	19.8	18.6	18.9
Static Pressure ("H ₂ O)	-0.20	-0.21	-0.20
Stack Area (sq. ft.)	0.785	0.785	0.785
Flow Rate (DSCFM)	871	828	836
Moisture (% of v/v)	1.2	1.0	0.7
Sampling Data			
Sampling Time (minutes)	120	120	120
Sample Volume (DSCF)	103	96.9	97.8
Chromium Data (ng/sample)			
Total Chromium	19,800	14,284	18,390
Hexavalent Chromium	19,690	13,284	18,100
Isokinetic Rate (%)	101.2	100.0	99.8
EMISSIONS			
Concentration (ng/dscf)			
Total Chromium	192	147	188
Hexavalent Chromium	191	137	185
Emission Rate (mg/hr)			
Total Chromium	10	7.3	9.4
Hexavalent Chromium	10	6.8	9.3
Emissions Factors (mg/amp-hr)**			
Total Chromium	0.052	0.047	0.059
Hexavalent Chromium	0.052	0.044	0.059

DSCF & DSCFM means dry standard cubic feet and dry standard cubic feet per minute at 68 F and 29.92 inches Hg.

* Measured at the start of the plating day.

** **Emissions Factors** (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Table A3-1a
Clovis Specialty Plating – Test Week 3
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

*(Ambient indoor sampling on rectifier during source testing **with** capture hood in place.)*

Sample Number:	C30-RA	C31-RA	C32-RA	C33-RA
Sample Date:	5/24/05	5/24/05	5/25/05	5/25/05
Sampling Time (minutes)	264	122	128	125
Volume Sampled (liters)	2640	1220	1280	1250
Cr (VI) Collected (ng/sample)	5837	1964	646	1069
Indoor Ambient Concentration (ng/m ³)	2,200	1,600	510	860

This rectifier is next to the plating tank, but outside the source test capture hood.

Table A3-1b
Clovis Specialty Plating – Test Week 3
Indoor (PQ-100) Ambient Hexavalent Chromium Sampling Results

*(Ambient indoor sampling during source testing **with** capture hood in place.)*

Sample Number:		C31-CA	C32-CA	C33-CA
Sample Date:		5/24/05	5/25/05	5/25/05
Sampling Time (minutes)		132	129	121
Volume Sampled (liters)		1320	1290	1210
Cr (VI) Collected (ng/sample)		1425	978	1067
Indoor Ambient Concentration (ng/m ³)		1,100	760	880

CA samples parallel RA samples above - away from the tank and rectifier, but in the same room. RA samples were collected at the same location as Clovis 1 indoor samples.

Table VI-4			
Clovis Specialty Decorative Chromium Plating Tank Test Week 4 (Clovis 4)			
Sampling Dates – June 29-30, 2005			
Sampling Location			
Sample Number	C41	C42	C43
Sampling Date	6/29/05	6/30/05	6/30/05
Plating Tank Data			
Totalizer (amp-hours)	356	299	345
Production Rate (amp-hrs/hr)	178	149.5	172.5
Freeboard (inches to overflow)*	4.5	4.0	4.0
Surface Tension (dynes/cm)	31.5	31.5	31.5
Chromic Acid Conc. (oz/gal)	28.2	28.2	28.2
Bath Temperature (°F)	105.6	108.6	107.6
Stack Data			
Stack Temperature (°F)	87.5	87.5	95
Velocity (ft/sec)	21.6	19.0	19.8
Static Pressure ("H ₂ O)	-0.24	-0.17	-0.20
Stack Area (sq. ft.)	0.785	0.785	0.785
Flow Rate (DSCFM)	955	837	864
Moisture (% of v/v)	1.3	1.6	1.3
Sampling Data			
Sampling Time (minutes)	120	120	120
Sample Volume (DSCF)	111	100	102
Chromium Data (ng/sample)			
Total Chromium	40,860	14,900	29,290
Hexavalent Chromium	29,910	9,890	25,020
Isokinetic Rate (%)	99.3	102	101
EMISSIONS			
Concentration (ng/dscf)			
Total Chromium	368	149	287
Hexavalent Chromium	269	99	245
Emission Rate (mg/hr)			
Total Chromium	21	7.5	15
Hexavalent Chromium	15	5.0	13
Emissions Factors (mg/amp-hr)**			
Total Chromium	0.12	0.050	0.086
Hexavalent Chromium	0.087	0.033	0.074

DSCF & DSCFM means dry standard cubic feet and dry standard cubic feet per minute at 68 F and 29.92 inches Hg.

* Measured at the start of the plating day.

** **Emissions Factors** (mg/amp-hr) = Emission Rate (mg/hr) / Plating Tank Production Rate (amp-hrs/hr)

Table A4-1
Clovis Specialty Plating (Clovis 4) Test
Indoor Ambient Hexavalent Chromium Results

(with Capture Hood over Plating Tank)

Sample Collection: JUNE 2005

Filter ID	Air Volume liters	Cr(VI) ng/ml	Cr(VI) ng recovered	Cr(VI)		Plating Tank Total amp-hrs
				ng/liter	ng/m ³	
C41-RA	1,330	98.68	1480	1.113	1113	356
C41-CA	1,320	206.81	3102	2.350	2350	"
C41-CAC	136	21.67	325	2.390	2390	"
C42-RA	1,570	46.91	704	0.448	448	299
C42-CA	1,540	122.14	1832	1.190	1190	"
42-CAC	171					"
C43-RA	1,200	63.13	947	0.789	789	345
C43-CA	1,190	101.59	1524	1.281	1281	"
C43-CAC	131	12.91	194	1.481	1481	"

extraction volume = ~15 ml.

- RA sampler was located on the plating tank rectifier and next to the sampling hood.
- CA sampler was located behind and on the opposite side of the sampling hood.
- CAC sampler was located ~1 meter from CA sampler but sampled at 1 lpm instead of 10 lpm.

Table VI			
Walker's Custom Chrome Chromium Plating Tank			
Sampling Dates – February 15-23, 2006			
Sampling Location			
Sample Number	W-11	W-12	W-13
Sampling Date	2/15/06	2/16/06	2/17/06
Plating Tank Data			
Totalizer (amp-hours)	331	300	300
Production Rate (amp-hrs/hr)	165.5	75	75
Freeboard (inches to overflow)	4.75	4.5	5
Surface Tension (dynes/cm)	35.1	35.4	35.4
Chromic Acid Conc. (oz/gal)	34.8	34.8	34.8
Bath Temperature (°F)	90-100	92-105	98-107
Stack Data			
Stack Temperature (°F)	65	61	61
Velocity (ft/sec)	19.2	20.2	21.6
Static Pressure ("H ₂ O)	-0.26	-0.24	-0.25
Stack Area (sq. ft.)	0.785	0.785	0.785
Flow Rate (DSCFM)	899	958	1000
Moisture (% of v/v)	0.7	0.5	0.9
Sampling Data			
Sampling Time (minutes)	120	240	240
Sample Volume (DSCF)	110.56	233.10	235.72
Chromium Data (ng/sample)			
Total Chromium	1700	5090	4680
Hexavalent Chromium	1262	3232	3610
Isokinetic Rate (%)	105	104	101
EMISSIONS			
Concentration (ng/dscm)			
Total Chromium	543	771	701
Hexavalent Chromium	403	490	541
Emission Rate (mg/hr)			
Total Chromium	0.83	1.25	1.19
Hexavalent Chromium	0.62	0.80	0.92
Emissions Factors (mg/amp-hr)			
Total Chromium	0.0050	0.017	0.016
Hexavalent Chromium	0.0037	0.011	0.012

Standard Conditions = 68° F and 29.92 in. Hg. DSCF = dry standard cubic feet. DSCM = dry standard cubic meter. DSCFM = dry standard cubic feet per minute.