Air Pollution Control Division
Small Business Assistance Program

INSPECTOR'S GUIDANCE MANUAL
Chromium Electroplating and Chromium Anodizing

Regulation Number 8, Part E
Incorporating by Reference:
40 C.F.R. Part 63, Subpart N

Developed by:
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Stationary Sources Program
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1. Inspector Requirements

The following is a synopsis of what an Inspector must do at a chromium electroplating or chromium anodizing facility during an inspection. This synopsis is only to provide an overview; an Inspector should obtain a copy of the inspection checklists developed specifically for hard chromium electroplating, decorative chromium electroplating, and chromium anodizing sources. Table 1.1 is a summary of the requirements for each type of chromium electroplating or chromium anodizing facility.

1.1 Determine the type of facility (Table 1.2)
- 1.1.1 Hard chromium electroplating facility
- 1.1.2 Decorative chromium electroplating facility
- 1.1.3 Chromium anodizing facility
- 1.1.4 Exempt facility or tank
  - 1.1.4.1 Research or laboratory facility or tank
  - 1.1.4.2 Tanks with chromium solution but no electrolic process
  - 1.1.4.3 Tanks associated with chromium electroplating but where no chromium electroplating or chromium anodizing occurs

1.2 Determine whether the source is existing, new, or reconstructed
- 1.2.1 Existing source if commenced construction before February 8, 2012
- 1.2.2 New or reconstructed source if commenced construction or reconstruction on or after February 8, 2012

1.3 Determine the size of the facility
- 1.3.1 Hard chromium facility: large or small depending upon rectifier capacity; major or area source depending upon the potential to emit hazardous air pollutants
- 1.3.2 Decorative chromium facility: major or area source depending upon the potential to emit hazardous air pollutants
- 1.3.3 Chromium anodizing facility: major or area source depending upon the potential to emit hazardous air pollutants

1.4 Determine the type of air pollution control device
- 1.4.1 Add-on air pollution control device
  - 1.4.1.1 Composite mesh pad system
  - 1.4.1.2 Fiber bed mist eliminator
  - 1.4.1.3 Packed bed scrubber
- 1.4.2 Chemical fume suppressant or mist suppressant control devices
  - 1.4.2.1 Foam blanket
  - 1.4.2.2 Wetting agent as additive
  - 1.4.2.3 Wetting agent as ingredient

1.5 Determine the emission limit for the source depending upon the number of tanks affected, type of facility, size of the facility, and the type of air pollution control device used (Tables 1.3 and 1.4)
- 1.5.1 Single tank

1.5.1.1 Hard chromium: large (XX mg/dscm); small (XX mg/dscm)
1.5.1.2 Decorative chromium: hexavalent solution (XX mg/dscm or surface tension); trivalent solution (XX mg/dscm or surface tension); trivalent solution with wetting agent as ingredient of bath (no standard)
1.5.1.3 Chromium anodizing: XX mg/dscm or surface tension
1.5.2 Multiple tanks (see Table 1.4)
1.5.2.1 Hard chromium
1.5.2.2 Decorative chromium
1.5.2.3 Chromium anodizing

1.6 Determine whether the source met the required emission limit by the compliance date (see Table 1.5)
1.6.1 Hard chromium electroplating: September 19, 2014, or immediately
1.6.2 Chromium anodizing: September 19, 2014, or immediately
1.6.3 Decorative chromium electroplating: September 19, 2014, or immediately

1.7 Determine if the owner or operator has an operation and maintenance plan, follows the operation and maintenance plan, and properly maintains the facility
1.7.1 Tanks
1.7.2 Air pollution control equipment work practice standards (see Table 1.6)
1.7.3 Air pollution monitoring equipment

1.8 Determine whether the owner or operator did an initial performance test by the required time and gave proper initial notification to the US EPA and the Division, or is exempt
1.8.1 Required dates (see Table 1.7)
1.8.2 Site specific plan and performance test report
1.8.3 Sent or are sending a copy of the results to the United States Environmental Protection Agency ("EPA") and the Air Pollution Control Division ("Division")

1.9 Determine if the owner or operator complies with the ongoing compliance monitoring requirements
1.9.1 Ongoing compliance monitoring
1.9.1.1 Ongoing compliance monitoring is technically done properly
1.9.1.2 Ongoing compliance monitoring is done with correct frequency (see Table 1.8)
1.9.1.3 Proper operating parameter values are used (see Table 1.9)
1.9.2 Results of ongoing compliance monitoring demonstrate the source is in compliance

1.10 Determine if the owner or operator maintains the proper recordkeeping
1.10.1 Inspection and maintenance records
1.10.2 Malfunction reports
1.10.3 Performance test results
1.10.4 Monitoring data
1.10.5 Excess emission reports

1.10.6 Process records
1.10.7 Trivalent chromium bath records
1.10.8 Miscellaneous reports

1.11 Determine if the owner or operator properly reports to the US EPA and/or the Division (Table 1.10)
1.11.1 Notification of construction or reconstruction
1.11.2 Initial notification
1.11.3 Notification of initial performance test
1.11.4 Notification of performance test results
1.11.5 Notification of compliance status
1.11.6 Ongoing compliance status reports
1.11.7 Trivalent chromium bath reports

Table 1.1
Requirements for Hard Chromium Electroplating, Decorative Chromium Electroplating, and Chromium Anodizing Facilities

Type of Source	Emission Limits (single tank)	Compliance Dates for Emission Limits	O&M Plan	Initial Perf. Test	Ongoing Monitoring	Record keeping	Reporting
Open Surface Hard Chromium Electroplating Tanks • Large, existing • Small, existing • New	• 0.011 mg/dscm • 0.015 mg/dscm • 0.006 mg/dscm • or surface tension	After 9/21/2015, shall not add PFOS-based fume suppressants • 9/19/14 • 9/19/14 • Initial startup after 9/19/12 – immediately upon startup	Yes – plan no later than the compliance date After 3/19/13, housekeeping procedures in 63.342 Table 2	Yes – report results no later than 90 days following the completion of the test	Yes, according to the type of air pollution control technique used to comply with the emission limitation	Yes	Initial startup before 1/25/1995 notify no later than 190 days after 1/25/1995 Initial startup after 1/25/1995 notify no later than 30 days after construction or reconstruction & notify of actual date of startup within 30 days after If performance testing notify of compliance no later than 90 days following – to WebFIRE
Enclosed Hard Chromium Electroplating Tanks • Large, existing • Small, existing • New	• 0.011 mg/dscm • 0.015 mg/dscm • 0.006 mg/dscm • or surface tension	After 9/21/2015, shall not add PFOS-based fume suppressants • 9/19/14 • 9/19/14 • Initial startup after 9/19/12 – immediately upon startup	Yes – plan no later than the compliance date After 3/19/13, housekeeping procedures in 63.342 Table 2	Yes – report results no later than 90 days following the completion of the test	Yes, according to the type of air pollution control technique used to comply with the emission limitation	Yes	Initial startup before 1/25/1995 notify no later than 190 days after 1/25/1995 Initial startup after 1/25/1995 notify no later than 30 days after construction or reconstruction & notify of actual date of startup within 30 days after If performance testing notify of compliance no later than 90 days following – to WebFIRE
Enclosed Hard Chromium	OR Mass rate of total chromium in		Yes – plan no later	Yes – report results	Yes, according to the type	Yes	Initial startup before 1/25/1995 notify no later than

Electroplating Tanks • Large, existing • Small, existing • New	exhaust not exceeding max allowable rate • 63.344(f)(1)(i) • 63.344(f)(1)(ii) • 63.344(f)(1)(iii) • or surface tension	• 9/19/14 • 9/19/14 • Initial startup after 9/19/12 – immediately upon startup	than the compliance date After 3/19/13, housekeeping procedures in 63.342 Table 2	no later than 90 days following the completion of the test	of air pollution control technique used to comply with the emission limitation		190 days after 1/25/1995 Initial startup after 1/25/1995 notify no later than 30 days after construction or reconstruction & notify of actual date of startup within 30 days after If performance testing notify of compliance no later than 90 days following – to WebFIRE
Decorative Chromium Electroplating Tanks Using Chromic Acid Bath and Chromium Anodizing Tanks • Existing • New • Reconstructed	Chromic acid baths standards shall not be met by a reducing agent to change the chromium from hexavalent to trivalent • 0.007 mg/dscm • 0.006 mg/dscm • 0.006 mg/dscm • or surface tension	After 9/21/15, shall not add PFOS-based fume suppressants • 9/19/14 • 9/19/14 • Initial startup after 9/19/12 – immediately upon startup	Yes – plan no later than the compliance date After 3/19/13, housekeeping procedures in 63.342 Table 2	Yes – report results no later than 90 days following the completion of the test	Yes, according to the type of air pollution control technique used to comply with the emission limitation	Yes	Initial startup before 1/25/1995 notify no later than 190 days after 1/25/1995 Initial startup after 1/25/1995 notify no later than 30 days after construction or reconstruction & notify of actual date of startup within 30 days after If performance testing notify of compliance no later than 90 days following – to WebFIRE
Decorative Chromium Electroplating Tanks Using a Trivalent Chromium Bath • Existing • New • Reconstructed	Recordkeeping/reporting of 63.346(b)(14) and 63.347(i) but NOT work practices of 63.342(f) or continuous monitoring of 63.343(c) – subject to	After 9/21/15, shall not add PFOS-based fume suppressants		No	Yes, according to the type of air pollution control technique used to comply with the emission limitation	Yes	Initial notification within 180 days after 1/25/1995 Notify of compliance status no later than 30 days after 9/19/2014

	Decorative Chromium Electroplating Tanks Using Chromic Acid Bath and Chromium Anodizing Tanks if wetting agent not incorporated as a bath ingredient						
(surface tension alt) All EXCEPT Decorative Using a Trivalent Chromium Bath – using a chemical fume suppressant containing a wetting agent	Surface tension of electroplating or anodizing bath not exceeding 40 dynes/cm (by stalagmometer) or 33 dynes/cm (by tensiometer)			No, if meets surface tension limits			Notify of compliance status no later than 30 days after 9/19/2014
Affected source located at a • Major source • Area source							Report ongoing compliance status, may reduce frequency • Semiannually • Annually

Table 1.2
Functions and Process Parameters Associated with Chromium Electroplating and Anodizing Tanks

Type of Operation	Functions	Process Parameters
Hard chromium electroplating	Provides a surface with functional properties such as wear resistance, low coefficient of friction, hardness, and corrosion resistance	Federal specifications: • Plate thickness 1.3 to 760 microns • Current density 150 to 600 A/ft^2 • Plating time 20 minutes to 36 hours Other parameters: • Chromic acid concentration 30 to 50 oz/gal • Sulfuric acid concentration 0.3 to 0.5 oz/gal • Solution temperature 120 to 150 °F
Decorative chromium electroplating	Provides a bright surface with wear and tarnish resistance	Federal specifications: • Plate thickness 0.003 to 2.5 microns (chromic acid bath) or 0.13 to 25 microns (trivalent chromium bath) • Current density 50 to 220 A/ft^2 • Plating time 0.5 to 5 minutes Other parameters: • Chromic acid concentration 30 to 50 oz/gal • Sulfuric acid concentration 0.3 to 0.5 oz/gal • Solution temperature 100 to 115 °F
Chromium anodizing	Provides corrosion resistance or electrical insulation	Federal specifications: • Chromic acid concentrations of 6.67 to 13.3 oz/gal Other parameters: • Film thickness 0.02 to 0.05 microns • Current density 144 to 720 A/ft^2 • Anodizing time 30 to 60 minutes • Solution temperature 90 to 95 °F • pH 0.5 to 0.85 • Voltage 20 to 40 volts

Table 1.4
Emission Limits for Chromium Electroplating Tanks – Multiple Sources/Tanks

Group of tanks with any one tank operating	Common add-on air pollution control device	Each tank performs same type of operation	Each tank subject to the same emission limits	Control device controls nonaffected tanks	Required emission limits
Hard chromium, Decorative chromium, Chromium anodizing	Yes	Yes	Yes	No	63.342(c), (d), or (e) [a]
Hard chromium, Decorative chromium, Chromium anodizing	Yes	Yes	Yes	Yes	63.344(e)(3) [b]
Hard chromium, Decorative chromium, Chromium anodizing	Yes	No	Yes	Yes or no	63.344(e)(4) [c]
Hard chromium, Decorative chromium, Chromium anodizing	Yes	Yes	No	Yes or no	63.344(e)(4) [c]

[a] 63.342(c) standards for open or enclosed surface hard chromium electroplating tanks, (d) standards for decorative chromium electroplating tanks using a chromic acid bath and chromium anodizing tanks, (e) standards for decorative chromium electroplating tanks using a trivalent chromium bath (see Table 1.1)

[b] Special compliance provisions for multiple sources, performing the same type of operation, subject to the same emission limits, and controlled by a common add-on air pollution control device (also controlling emissions from sources not affected by these standards):

(i) Calculate the cross-sectional area of each inlet duct, including those not affected by the standard

(ii) Determine the total sample time per test run by dividing the total inlet area from all tanks connected to the control system by the total inlet area for all ducts associated with the affected source, then multiple this number by two hours; this calculated time is the minimum sample time required per test run

(iii) Perform Method 306 or 306A testing and calculate an outlet mass emission rate

(iv) Determine the total ventilation rate from the affected sources by using equation:

$$VR_{tot} \times IDA_i / \Sigma IA_{total} = VR_{inlet}$$

where VR_{tot} is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by mass of the Method 306 or 306A testing; IDA_i is the total inlet duct area for all ducts associated with affected sources; ΣIA_{total} is the sum of all inlet duct areas from both affected and nonaffected sources; and VR_{inlet} is the total ventilation rate from all inlet ducts associated with affected sources.

(v) Establish the allowable mass emission rate of the system (AMR_{sys}) in milligrams of total chromium per hour (mg/hr) using equation:

$$\Sigma VR_{inlet} \times EL \times 60 \text{ minutes/hour} = AMR_{sys}$$

where ΣVR_{inlet} is the total ventilation rate in dscm/min from the affected sources and EL is the applicable emission limitation from 40 C.F.R. 63.342 in mg/dscm. The allowable mass emission rate (AMR_{sys}) calculated should be equal to or more than the outlet three-run average mass emission rate determined from Method 306 or 306A testing in order for the source to be in compliance with the standard.

[c] Special compliance provisions for multiple sources, performing different types of operations, and controlled by a common add-on air pollution control device (that may or may not also be controlling emissions from sources not affected by these standards) OR multiple sources, performing same types of operations, subject to different emission limits, and controlled by a common add-on air pollution control device:

(i) Calculate the cross-sectional area of each inlet duct, including those not affected by the standard

(ii) Determine the total sample time per test run by dividing the total inlet area from all tanks connected to the control system by the total inlet area for all ducts associated with the affected source, then multiple this number by two hours; this calculated time is the minimum sample time required per test run

(iii) Perform Method 306 or 306A testing and calculate an outlet mass emission rate

(iv) Determine the total ventilation rate from the affected sources by using equation:

$$VR_{tot} \times IDA_i / \Sigma IA_{total} = VR_{inlet,a}$$

where VR_{tot} is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by mass of the Method 306 or 306A testing; IDA_i is the total inlet duct area for all ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation; ΣIA_{total} is the sum of all inlet duct areas from both affected and nonaffected sources; and $VR_{inlet,a}$ is the total ventilation rate from all inlet ducts conveying chromic acid from each type of affected source performing the same operation, or each type of affected source subject to the same emission limitation.

(v) Establish the allowable mass emission rate in mg/hr for each type of affected source that is controlled by the add-on air pollution control device using the appropriate equation:

$$VR_{hc1} \times EL_{hc1} \times 60 \text{ minutes/hour} = AMR_{hc1}$$
$$VR_{hc2} \times EL_{hc2} \times 60 \text{ minutes/hour} = AMR_{hc2}$$
$$VR_{dc} \times EL_{dc} \times 60 \text{ minutes/hour} = AMR_{dc}$$
$$VR_{ca} \times EL_{ca} \times 60 \text{ minutes/hour} = AMR_{ca}$$

where hc applies to the total centilation rates for all hard chromium electroplating tanks subject to the same emission limitation; dc applies to the total of ventilation rates for the decorative chromium electroplating tanks; ca applies to the tltal of ventilation rates for the chromium anodizing tanks; and EL is the applicable emission limitation from 40 C.F.R. 63.342 in mg/dscm. There are two equations for hard chromium electroplating tanks because different emission limitations may apply (e.g., a new tank versus an existing, small tank).

(vi) Establish the allowable mass emission rate (AMR_{sys}) in mg/hr for the system using the equation 8, including each type of affected source as appropriate:

$$AMR_{hc1} + AMR_{hc2} + AMR_{dc} + AMR_{ca} = AMR_{sys}$$

The allowable mass emission rate calculated from this equation should be equal to or more than the outlet three-run average mass emission rate determined from Method 306 or 306A testing in order for the source to be in compliance with the standards.

Table 1.6
Summary of Operation and Maintenance Practices

Control Device	Work Practice Standards	Time Required
Composite Mesh Pad System	1. Visually inspect device to ensure there is proper drainage, no chromic acid buildup on the pads, and no evidence of chemical attack on the structural integrity of the device. 2. Visually inspect back portion of the mesh pad closest to the fan to ensure there is no breakthrough of chromic acid mist. 3. Visually inspect ductwork from tank to the control device to ensure there are no leaks. 4. Perform washdown of the composite mesh pads in accordance with manufacturer's recommendations.	1. 1/quarter 2. 1/quarter 3. 1/quarter 4. Per manufacturer
Packed Bed Scrubber System	1. Visually inspect device to ensure there is proper drainage, no chromic acid buildup on the backed beds, and no evidence of chemical attack on the structural integrity of the device. 2. Visually inspect back portion of the chevron blade mist eliminator to ensure that it is dry and there is no breakthrough of chromic acid mist. 3. Visually inspect ductwork from tank to the control device to ensure there are no leaks. 4. Add fresh makeup water to the top of the packed bed.[a,b]	1. 1/quarter 5. 1/quarter 6. 1/quarter 7. Whenever makeup is added
CMP/PBS System	Same as for CMP system	Same as for CMP system
Fiber-Bed Mist Eliminator[c]	1. Visually inspect fiber-bed unit and prefiltered device to ensure there is proper drainage, no chromic acid buildup, and no evidence of chemical attack on the structural integrity. 2. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks. 3. Perform washdown of fiber elements in accordance with the manufacturer's recommendations.	1. 1/quarter 2. 1/quarter 3. 1/quarter 4. Per manufacturer
Other devices	To be proposed by the source for approval by the EPA.	To be proposed by the source
Monitoring Equipment		
Pilot Tube	Backflush with water, or remove from duct and rinse with fresh water. Replace and rotate 180 ° to the ensure same zero reading. Check pilot tube ends for damage, replace if cracked or fatigued.	1/quarter
Stalagmometer	Follow manufacturer's recommendations.	

[a] If greater than 50 percent of the scrubber water is drained (e.g., for maintenance purposes), makeup water may be added to the scrubber basin.

[b] For horizontal-flow scrubbers, top is defined as the section of the unit directly above the packaging media such that the makeup water would flow perpendicular to the air flow through the packing. For vertical-flow units, the top is defined as the area downstream of the packing material such that the makeup water would flow countercurrent to the air flow through the unit.
[c] Work practice standards for the control device installed upstream of the fiber-bed mist eliminator to prevent plugging do not apply as long as the work practice standards for the fiber-bed unit are followed.

Table 1.7
Housekeeping Practices

For	You must:	At this minimum frequency
1. Any substance used in an affected chromium electroplating or chromium anodizing tank that contains hexavalent chromium.	a. Store the substance in a closed container in an enclosed storage area or building; and b. Use a closed container when transporting the substance from the enclosed storage area.	a. At all times, except when transferring the substance to and from the container. b. Whenever transporting the substance, except when transferring the substance to and from the container.
2. Each affected tank, to minimize spills of bath solution that result from dragout. Note: this measure does not require the return of contaminated bath solution to the tank. This requirement applies only as the parts are removed from the tank. Once away from the tank area, any spilled solution must be handled as in item 4.	a. Install drip trays that collect and return to the tank any bath solution that drips or drains from parts as the parts are removed from the tank; or b. Contain and return to the tank any bath solution that drains or drips from parts as the parts are removed; or c. Collect and treat in an onsite wastewater treatment plant any bath solution that drains or drips from parts as the parts are removed.	a. Prior to operating the tank. b. Whenever removing parts from an affected tank. c. Whenever removing parts from an affected tank.
3. Each spraying operation for removing excess chromic acid from parts removed from, and occurring over, an affected tank.	Install a splash guard to minimize overspray during spraying operations and ensure that any hexavalent chromium laden liquid captured by the splash guard is returned to the electroplating or anodizing tank.	Prior to any such spraying operation.
4. Each operation that involves the handling or use of any substance used in an affected chromium electroplating or chromium anodizing tank that contains hexavalent chromium.	Begin cleanup, or otherwise contain, all spills of the substance. Note: substances that fall or flow into drip trays, pans, sumps, or other containment areas are not considered spills.	Within 1 hour of the spill.
5. Surfaces within the enclosed storage area, open floor area, walkways around affected tanks contaminated with haxavalent chromium from an affected chromium electroplating or chromium anodizing tank.	a. Clean the surfaces using one or more of the following: HEPA vacuuming; hand-wiping with a damp cloth; wet mopping; hose down or rise with potable water that is collected in a wastewater collection system; other cleaning method approved by the permitting authority; or	a. At least once every 7 days if one or more electroplating or anodizing tanks were used, or at least after every 40 hours of operation of one or more affected electroplating or anodizing tanks, whichever is later.

	b. Apply a non-toxic chemical dust suppressant to the surfaces.	b. According to manufacturer's recommendations.
6. All buffing, grinding, or polishing operations located in the same room as electroplating or anodizing operations.	Separate the operation from any affected electroplating or anodizing operation by installing a physical barrier; the barrier may take the form of plastic strip curtains.	Prior to beginning the buffing, grinding, or polishing operation.
7. All chromium or chromium-containing wastes generated from housekeeping activities.	Store, dispose, recover, or recycle the wastes using practices that do not lead to fugitive dust and in accordance with hazardous waste requirements.	At all time.

Table 1.8
Summary of Ongoing Monitoring Requirements & Operating Parameter Values

Air Pollution Control System	Site Specific Operating Parameter [a]	Monitoring Frequency	Method Used to Establish Acceptable Values
Composite Mesh Pad System	Pressure drop across system, not during auto washdown cycles	Daily	Range of pressure drops during 3 performance tests; OR $\pm$ 2" H_2O column above the average pressure drop measured during one performance test.
Packed Bed Scrubber	Pressure drop across system & velocity pressure at system inlet	Daily	Range of velocity pressures during 3 performance tests; OR $\pm$ 1" H_2O column above the average velocity pressure and 10% above the average velocity pressure measured during one performance test.
Packed Bed Scrubber/Composite Mesh Pad System	Pressure drop across the mesh-pad system	Daily	see CMP
Fiber Bed Mist Eliminator	Pressure drop across eliminator & pressure drop across the control device located upstream of the fiber bed that prevents plugging	Daily	Range of pressure drops during 3 performance tests; OR $\pm$ 1" H_2O column above the average pressure drop measured during one performance test.
Wetting Agent or Combination Wetting Agent/Foam Blanket Fume Suppressants	Surface tension, using Method 306A	Every 4 hours [b,c]	Maximum value established during Method 306B Appendix A test; OR forgo test and accept 40 dynes/cm (stalagmometer) or 33 dynes/cm (tensiometer).

Foam Blanket-type Fume Suppressant	Foam blanket thickness	Every hour [d,e]	Minimum foam blanket thickness established during the performance test; OR 2.54 cm (1 inch).

[a] Acceptable values for these monitored parameters are established during initial performance testing.
[b] If there are no exceedances of the maximum surface tension after 40 hours of operation, then the monitoring frequency can be decreased to once every 8 hours. If there are no exceedances in the next 40 hours, then the frequency can be decreased to once every 40 hours. If an exceedance occurs at any time after that, then the initial monitoring schedule of every 4 hours must be resumed.
[c] The initial schedule must be resumed for every new tank solution.
[d] The initial schedule must be resumed for every new tank solution.
[e] If there are no exceedances of the minimum foam blanket thickness after 40 hours of operation, then the monitoring frequency can be decreased to once every 4 hours. If there are no exceedances for the next 40 hours, then the frequency can be decreased to once every 8 hours. If an exceedance occurs after that, then the initial monitoring schedule of every hour must be resumed.

2. Introduction to the Chromium Electroplating and Anodizing Regulations

The 1990 Clean Air Act ("CAA") Amendments require the maximum degree of reduction in emissions of certain hazardous air pollutants that the U.S. Environmental Protection Agency ("EPA") determines is achievable for new or existing sources in the category or subcategory to which the emission standard applies. This reduction scheme is known as the maximum achievable control technology ("MACT") standards.

Chromium electroplating and chromium anodizing are within a listed category and in 1995, the EPA promulgated the National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks ("Chromium NESHAP"), codified at 40 C.F.R. Part 63, Subpart N. The 1995 NESHAP regulated emissions of chromium compounds from three major and are source categories: hard chromium electroplating, decorative chromium electroplating, and chromium anodizing.

The CAA requires the EPA to review regulations for hazardous air pollutants no less frequently than every eight years.[1] The EPA completed the risk and technical reviews for the Chromium NESHAP and promulgated revisions to Subpart N on September 19, 2012. EPA determined it was appropriate to lower the emissions and surface tensions limits for new and existing hard chromium electroplating, decorative electroplating, and chromium anodizing sources. EPA also promulgated housekeeping requirements to minimize fugitive emissions from affected sources, eliminated the use of fume suppressants containing perfluorooctane sulfonic acid ("PFOS"), and amended the requirements for testing, monitoring, reporting, and recordkeeping.

The Air Pollution Control Division ("Division") has incorporated by reference Subpart N into Colorado Regulation Number 8, Part E; thus the Division is responsible for implementing and enforcing the Chromium NESHAP in Colorado.

[1] CAA § 112(d)(6)

3. Introduction to Chromium Electroplating

3.1 Introduction

Chromium electroplating is a process by which a layer of chromium is electrodeposited on a base material. Electrolysis is the production of chemical changes by passage of an electric current through an electrolyte solution. The chromium layer is deposited on the base metal through the chemical charge created by the electric current passing through the solution. However, chromium plating generates hydrogen and oxygen at the electrodes. Small droplets of chromium from the plating bath are formed when the hydrogen and oxygen gas bubbles break the surface of the solution. The chromium droplets constitute hazardous air pollutants, which can be removed from the air by an air pollution control device.

3.2 Types of Chromium Electroplating Sources

An Inspector must assess what type of electroplating system is being inspected, based upon the function served and the process parameters, as each type of system has unique sets of federal requirements. See Table 1.2 for the functions and process parameters associated with the types of electroplating facilities.

3.2.1 Chromium Anodizing or Chromic Acid Anodizing

The chromium anodizing source category consists of facilities that use chromic acid (chromium anhydride CrO_3) to form an oxide layer on aluminum. This process provides a surface resistant to corrosion. Some products these facilities plate include aircraft parts, such as wings and landing gear, and architectural structures that are subject to high stress and corrosive conditions.

After September 21, 2015, PFOS-based fume suppressants cannot be added to an affected chromium anodizing tank.

3.2.2 Decorative Chromium Electroplating

The decorative chromium electroplating source category consists of facilities that plate base materials such as brass, steel, aluminum, or plastic with layers of copper and nickel, followed by a thin layer of chromium. This process provides a bright, tarnish and wear resistant surface. Some products these facilities plate include automotive trim, metal furniture, bicycles, hand tools, and plumbing fixtures.

There are two types of processes available for decorative chromium electroplating facilities. The first is the use of the hexavalent chromium process, utilizing chromic acid solutions. Hexavalent chromium is the most toxic form of chromium. The second is the use of a trivalent chromium electroplating process, utilizing trivalent chromium plating baths instead of a chromic acid solution. An owner or operator using the trivalent process where the trivalent bath has a wetting agent as an ingredient, the owner or operator must comply with fewer requirements. If the trivalent bath does not incorporate a wetting agent as an ingredient of the bath, the owner or operator must comply with the requirements as if a hexavalent process was used. An owner or operator ceases to use the trivalent bath with a

wetting agent as an ingredient of the bath, the owner or operator must comply with the emission limits for a hexavalent process within one year and must report the change in process within 30 days.[2]

Owners or operators may be interested in learning more about the trivalent process because trivalent chromium is less toxic than hexavalent chromium and the use of the process may eliminate certain regulatory requirements. The functional advantages of trivalent chromium include: higher cathode efficiencies, which lead to less chromium emissions; better throwing power, which means greater production rates; lower current densities required; which requires less energy; lower concentration levels, which results in less chromium waste; and the anodes do not discompose. The disadvantages include: color differences, not address through the addition of additives; lesser corrosion resistance in hard coating applications; greater cost of the chemicals; and greater required control, especially with respect to metallic impurities.

After September 21, 2015, PFOS-based fume suppressants cannot be added to an affected decorative chromium electroplating tank.

3.3.3 Hard Chromium Electroplating

The hard chromium electroplating source category consists of facilities that plate base metals with a thick layer of chromium using an electrolytic process. This process provides a finish that is resistant to wear, abrasion, heat, and corrosion. Some products these facilities plate include large cylinders and industrial rolls used in construction equipment and printing presses, hydraulic cylinders and rods, zinc die castings, plastic molds, engine components, and marine hardware.

The hard chromium electroplating source category is further divided into large and small facilities. Large facilities are facilities with a cumulative annual rectifier capacity equal to or greater than 60 million ampere-hours per year. Small facilities are facilities with a cumulative annual rectifier capacity less than 60 million ampere-hours per year. Small hard chromium electroplating tanks constructed or reconstructed on or before December 16, 1993, are subject to the previous Chromium NESHAP standards and any small tank constructed or reconstructed after December 16, 1993, is subject to the new Chromium NESHAP standards.

The size of a hard chromium electroplating facility is based upon the hard chromium capacity within the boundaries of the entire facility. An owner or operator may demonstrate size through the definitions in Section 63.341(a) or a facility with a maximum cumulative potential rectifier capacity of 60 million amperes-hour/year or more may be considered small if the actual cumulative rectifier capacity is less than 60 million amperes-hour/year. An owner or operator can show this alternative by either (A) records from the previous annual capacity showing less than 60 million amperes-hour/year using a nonresettable ampere-hour meter as well as monthly records of actual ampere-hour usage for each 12-month rolling period, or (B) a federally enforceable limit on the maximum cumulative potential rectifier capacity and maintaining monthly records on a 12-month rolling period to demonstrate the limit has not been exceeded. A small facility that increases its maximum cumulative potential rectifier capacity or its actual cumulative rectifier capacity such that the facility becomes a large facility, the facility must comply

[2] Subpart N § 63.342(e)(4)

with the emissions limits for large facilities within one year after the monthly records show the large designation is met.

Maximum cumulative potential rectifier means the summation of the total installed rectifier capacity associated with the hard chromium electroplating tanks at a facility, expressed in amperes, multiplied by the maximum potential operating schedule of 8,400 hours per year and 0.7, which assumes that electrodes are energized 70 percent of the total operating time; based on operating 24 hours per day, 7 days per week, 50 days per year.[3] To calculate the annual maximum cumulative potential rectifier capacity for a facility, add the total installed rectifier capacities associated with all the hard chromium tanks (C_R) and multiply this sum by 8,400 hours per day and 0.7 percent.

$$\Sigma(C_R) \times 8400 \times 0.7 = \text{ampere hours/year}$$

An Inspector can request the owner or operator provide proof of the rectifier capacity for each tank. If the owner or operator does not know the rectifier capacity, the owner or operator should contact the manufacturer or sales and distribution company from which the system was purchased and request that information.

After September 21, 2015, PFOS-based fume suppressants cannot be added to an affected open surface or enclosed hard chromium electroplating tank.

3.3.4 Exempt Tanks

The Chromium NESHAP exempts certain types of sources including: process tanks associated with a chromium electroplating or chromium anodizing process where the electroplating or anodizing does not take place; tanks that contain a chromium solution but where the electrolytic process does not occur; and research and laboratory operations.

[3] Subpart N § 63.341(a)

4. Source Categories

Federal hazardous air pollutant regulations are based on the type of source. The EPA defines new sources, reconstructed sources, existing sources, major sources, and area or minor sources. Therefore, both the size of the source and when the source was built determine what federal requirement applies. Whether a source is new, reconstructed, or existing determines what and when the owner or operator must be in compliance with. The emission limits for "new sources" are typically more stringent than for "existing sources" because of technological advances in air pollution control devices or work practices and the often difficulties or expensive of changing existing processes.

4.1 New, Reconstructed, and Existing Sources

A new affected source is an affected hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced after February 8, 2012.[4] This date is the date of the supplemental proposed revisions to the Chromium NESHAP.

A reconstructed source means the fixed capital cost of replacing components at an affected or previously nonaffected facility exceeds 50 percent of the fixed capital cost required to construct a comparable new source and it is technologically and economically feasible for the reconstructed source to meet the applicable standards.[5]

An existing affected source is a hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced on or before February 8, 2012.[6]

In addition, commenced construction means an owner or operator has undertaken a continuous program of construction or reconstruction (on-site fabrication, erection, or installation of an affected source) or that an owner or operator has entered into a contractual obligation to undertake and complete a continuous program of construction or reconstruction.[7]

4.2 Major and Area Sources

The difference between a major and an area source is based on the source's potential to emit hazardous air pollutants. The potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design.[8] Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on the hours of operations or types of material combusted, stored, or processed, shall be treated as part of the source design if the limitation or effect on emissions is federally enforceable.

A major source is a stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air

[4] Subpart N Section 63.341(a)
[5] Part 63, Subpart A, § 63.2
[6] Subpart N Section 63.341(a)
[7] Part 63, Subpart A, § 63.2
[8] Part 63, Subpart A, § 63.2

pollutant or 25 tons per year or more of any combination of hazardous air pollutants.[9] An area source is a stationary source of hazardous air pollutants that emits or has the potential to emit less than 10 tons per year of any hazardous air pollutant or 25 tons per year of any combination of hazardous air pollutants. Under the Chromium NESHAP, an area source is exempt from the obligation to obtain a permit under 40 C.F.R. Parts 70 or 71, so long as the source is not required to obtain permit for a reason other than the status as an area source.[10] If the actual or potential emissions of hazardous air pollutants of an existing area source increase such that an area source becomes a major source, the owner or operator must comply with the provisions for major sources.

[9] Part 63, Subpart A, § 63.2
[10] Subpart N § 63.341(e)

5. Air Pollution Control Techniques

An air pollution control technique is any method used to reduce chromium emissions from chromium electroplating and chromium anodizing tanks, such as add-on air pollution control devices or chemical fume suppressants. Add-on air pollution control devices are equipment installed in the ventilation system of chromium electroplating and anodizing tanks for the purposes of collecting and containing chromium emissions from the tank(s). Chemical fume suppressants create a layer of foam across the surface of a solution when current is applied to that solution.

The control technique used determines the requirements with which a source must comply. Specifically, the emission limits of a facility are based on the level of control that can be maintained using a certain control technique. The method used to establish an operating parameter value and compliance monitoring also depends upon the air pollution control device utilized. The type of control device can also affect the type of work practice requirements an operating must conduct. Therefore, an Inspector must determine which control device the owner or owner or operator utilizes.

The EPA recognizes certain typical control efficiencies for each type of control device. However, the Inspector and the owner or operator must be aware that actual performance levels may vary from these typical values, depending upon such factor as the inlet conditions and how well the control devices are operated and maintained.

5.1 Add-on Air Pollution Control Devices

5.1.1 Composite Mesh Pad System ("CMP")

The CMP removes small particles (< 5 um or 0.2 mils) that were not effectively controlled by other devices. A CMP typically consists of three stages of interlocking fiber layers densely packed between two supporting grids. The layers of material are arranged so that the smallest diameter fiber layer located in the center of the pad and progressively larger diameter layers are located on both sides of the center layer. Particles collide with and attach to the fiber surfaces on the first larger diameter layer. The captured particles then combine into larger drops as they travel through the small diameter fiber layers into the center of the mesh pad. The larger particles then either drain to the bottom of the unit or are reentrained in the gas stream, which are then captured by the second large diameter fiber layer.

CMP systems also incorporate a larger particle removal system upstream from the composite mesh pad to reduce the plugging potential of the pad. The large particle removal system can either be a series of larger diameter fiber layers or a packed bed scrubber section. Typical removal efficiencies associated with this control device are greater than ninety nine percent.

5.1.2 Fiber Bed Mist Eliminator ("FBME")

A FBME removes contaminants from a gas stream through the mechanisms of inertial impaction and Brownian diffusion. A FBME is designed for horizontal, concurrent gas liquid flow through one or more fiber beds. Each fiber bed consisting of a hollow cylinder formed from two concentric screens and may be made of glass, ceramic plastic, or metal. The

contaminated gas stream flows toward the downstream face of the bed. The acid mist in the gas stream impacts on the surface of the fibers and drains down the outer face of the bed to the sump while the clean gas flows up and out of the top of the unit.

A FBME is typically installed downstream from another control device to reduce the plugging potential of the device. The EPA believed in implementing the 1995 Chromium NESHAP that the FBME system could achieve the same emission limits as a CMP system or chemical fume suppressant.

5.1.3 Packed Bed Scrubber ("PBS")

A PBS reduces emissions of chromic acid mist from electroplating and anodizing tanks. A PBS consists of a single or double packed bed that contains material onto which the chromic acid drops attach. The gas stream is wetting by spraying water against the flow of the gas to make the drops larger. The gas stream then passes through the packed bed(s) where drops attach to the packing media. The packing material must be periodically washed using an overhead weir. The packed bed is usually followed by a mist eliminator comprised of a single chevron blade mist eliminator to remove any water entrained from the packed bed. Treated gases then pass through an induced draft fan and out of the stack of an exhaust vent. The scrubber water is usually recirculated and periodically discharged to the electroplating tanks as makeup solution.

A PBS has a typical efficiency of ninety seven percent for decorative chromium electroplating and anodizing tanks and ninety nine percent for hard chromium electroplating tanks.

5.1.4 Packed Bed Scrubber and Composite Mesh Pad System ("PBS/CMP")

This system is a combination of the PBS and the CMP system.

5.2 Chemical Fume Suppressant

A chemical fume suppressant, also called mist suppressant, is a chemical agent that reduces or suppresses fumes or mists at the surface of an electroplating or anodizing bath. Chemical fume suppressants are added directly to the bath solution to reduce or inhibit misting and include: wetting agents, foam blankets, and combinations of wetting agents and foam blankets.

Chemical fume suppressants are widely used in decorative chromium electroplating and chromic acid anodizing operations but less frequently used in hard chromium electroplating operations. Disadvantages of chemical fume suppressants include the tendency to aggravate pitting and a risk of explosion if the foam blanket is too thick and entraps hydrogen gas. Advantages of chemical fume suppressants include the minimization of plating solution evaporation losses, low cost of chromium emission control, no impact on energy consumption, and no impact on solid waste generation.

Chemical fume suppressants typically reduce chromium emissions by more than ninety nine percent.

5.2.1 Foam Blanket

A foam blanket generates a layer of foam across the surface of a solution when current is applies to the solution. The agitation produced by the hydrogen and oxygen gas bubbles generating during electroplating form the foam blanket. Foam blankets do not prevent the formation of chromic acid gas but trap the hydrogen and water mist. Once formed, the foam blanket is usually maintained at a thickness of 1.3 to 2.5 cm and covers the entire surface of the bath. A foam blanket thicker than 5 cm may collect hydrogen gas, resulting in an explosion. A foam blanket less than 1.3 cm will not trap the hydrogen and water mist, thus the chrome mist.

5.2.2 Wetting Agent

A wetting agent is a commercially available chemical fume suppressant that materially reduces the surface tension of a liquid. A reduced surface tension means less mist because gases escaping at the surface of the solution with less of a "bursting" effect.

5.3 Add-on Air Pollution Control Device and Chemical Fume Suppressant

Sources may also utilize a combination of add-on control devices and chemical fume suppressants to increase the effectiveness of the chromium emission control.

6. Requirements for Major and Area Sources

Major chromium electroplating or chromium anodizing tanks must obtain a Title V operating permit, comply with applicable emission limits, comply with applicable work practices, conduct an initial performance test, conduct ongoing compliance monitoring, keep records, and comply with applicable record requirements. Area sources must comply with these same provisions but are not required to obtain a Title V operating permit, unless required for a reason other than the Chromium NESHAP.

The standards discussed below that apply to chromic acid baths cannot be met by using a reducing agent to change the form of chromium from hexavalent to trivalent.

6.1 Operating Permit

Major chromium electroplating or chromium anodizing tanks obtain a Title V operating permit from the Division. The Division elected to defer the requirements of the Title V operating permit program for area sources.

6.2 Emission Limits and Compliance Dates (see Tables 1.1 and 1.4)

6.2.1 Emission Limits

The Chromium NESHAP specifies emission limits as the concentration of chromium in milligrams per dry standard cubic meter ("mg/dscm") of exhaust air. Open surface hard chromium electroplating, enclosed hard chromium electroplating tanks, and decorative chromium electroplating tanks using a chromic acid bath using chemical fume suppressants containing wetting agents may alternatively show the tank meets the emission limits by maintaining a surface tension that does not exceed 40 dynes per centimeter if measured by a stalagmometer or 33 dynes per centimeter if measured by a tensiometer. The emission limits apply during periods of tank operation, startup, and shutdown. The emission limits do not apply during periods of malfunction; however, work practice standards must still be followed.

Decorative chromium electroplating tanks using a trivalent chromium bath are subject to slightly different requirements. If the trivalent chromium bath incorporates a wetting agent as a bath ingredient, the owner or operator is subject to recordkeeping and reporting but not operation and maintenance requirements or continuous monitoring. If the trivalent chromium bath does not incorporate a wetting agent as a bath ingredient, the owner or operator is subject to the standards applicable to decorative chromium electroplating tanks using a chromic acid bath and chromium anodizing tanks.

A facility may have multiple tanks onsite. The tanks may be controlled by the same or different air pollution control devices. The tanks may also differ between existing and new, and therefore subject to different requirements. In addition, the tanks may perform different operations. Finally, the air pollution control device may also control a source which is unaffected by the Chromium NESHAP. The Inspector should look to Table 1.4 to determine what emission limits apply to multiple tank sites.

6.2.2 Compliance Dates

Existing affected sources must be in compliance with the Chromium NESHAP by September 19, 2014. Owners or operators of new or reconstructed sources with an initial startup after September 19, 2012, must comply with the Chromium NESHAP immediately upon startup. Owners or operators of an area source that increase actual or potential emissions such that the area source becomes a major source must comply with the requirements for major sources immediately upon becoming a major source. An owner or operator of an existing hard chromium electroplating tank at a small, hard chromium electroplating facility that increases its maximum or actual cumulative potential rectifier capacity such that the facility becomes a large facility must comply with the requirements for large facilities within one year after the month in which monthly records show the small facility has become a large facility. An owner or operator of a decorative chromium electroplating tank that uses a trivalent chromium bath incorporating a wetting agent that ceases using the trivalent process must comply with the applicable emission limits within one year of switching bath operation.

An owner or operator of an affected source may request a one year extension of compliance from the Division. The request must be submitted no later than six months after the affected source's compliance date.

The new Chromium NESHAP also requires all owners and operators to cease adding PFOS-based fume suppressants to any electroplating tank after September 21, 2015. The EPA determined that PFOS is persistent, bioaccumlative, and toxic.

6.3 Operation and Maintenance Standards and Housekeeping (see Tables 1.6 and 1.7)

All owners or operators of open surface or enclosed hard chromium electroplating tanks and decorative chromium electroplating tanks using a chromic acid bath and chromium anodizing tanks must comply with operation and maintenance practices. The new Chromium NESHAP also requires specific housekeeping procedures. The operation and maintenance requirements ensure the air pollution control systems are properly maintained and operated. And, the housekeeping procedures minimize fugitive emissions from affected sources.

The operation and maintenance practices required owners or operators to operate and maintain affected sources, including air pollution control devices, in a manner consistent with good air pollution control practices at all times. See Table 1.6 for the specific operation and maintenance standards. The operation and maintenance practices also require malfunctions be corrected as soon as practicable. Owners and operators must also prepare an operation and maintenance plan that: specifies and includes a checklist for the operation and maintenance criteria for the affected source, air pollution control device, and process and control system monitoring equipment; procedures to ensure the equipment or process malfunctions due to poor maintenance do not occur; and a systematic procedure for identifying malfunctions of process equipment, air pollution control devices, process and control system monitoring equipment, and implementing corrective actions. An owner or operator may use applicable standard operating procedure manuals, OSHA plans, or other existing plans if the requirements for operation and maintenance plans in the Chromium NESHAP are met. Operation and maintenance plans must be revised within 45 days after an inadequately addressed malfunction occurs. Owners and operators must also report actions taken during malfunctions that are inconsistent with the operation and

maintenance plan by phone within two working days and by letter within seven working days.

Operation and maintenance requirements are enforceable independent of emissions limitations or other requirements in relevant standards; therefore, and Inspector can issue a Notice of Violation if an owner or operator fails to comply with an operation or maintenance standard or have an operation and maintenance plan. An Inspector may request monitoring results, review the operation and maintenance plan, and inspect the source to determine whether acceptable operation and maintenance procedures are used. If an operation and maintenance plan does not meet address a malfunction that has occurred, fails to provide for the proper operation of the source or air pollution control device, or does not provide for adequate corrective procedures, the EPA or Division may require the owner or operator to make changes to the operation and maintenance plan.

6.4 Initial Performance Testing

Initial performance testing is one of the components required to demonstrate than an owner or operator is meeting the applicable emission limits. An initial performance test determines if the chromium emissions from the affected source are the same or different than the emission limits set in the Chromium NESHAP. An initial performance test also establishes the values or ranges of values for the air pollution control system operating parameters.

An initial performance test is not required if the affected source is a hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank; uses a wetting agent in the plating or anodizing bath; and the owner or operator complies with the applicable surface tension limits or demonstrates continuous compliance monitoring. An initial performance test is also not required for decorative chromium electroplating tanks using a trivalent chromium bath that incorporates a wetting agent as a bath ingredient.

An owner or operator must submit in writing to the Division the intent to conduct a performance test at least 60 calendar days before the test is scheduled. Reports of performance test results must be submitted to the Division no later than 90 days after the test.

Concerning initial performance test, an Inspector must determine whether the owner or operator has met the reporting and recordkeeping requirements, notified the Division of the performance test, developed a test plan, and send performance test results to the Division. An Inspector must also determine whether the Division reviewed the test results and gave the source a final determination of compliance. Addendum G contains an example form for notification of performance tests.

6.4.1 Test Methods

The Chromium NESHAP identifies the test methods for initial performance tests as Method 306 or 306A, the California Air Resources Board Method 425, and Method 306B. An owner or operator may use an alternative test method if the method has been validated using Method 301 and approved by the Division.

6.4.2 Site Specific Test Plan and Test Report

The owner or operator shall develop a specific test plan and provide such plan to the EPA or the Division prior to testing if requested. The test plan must describe the proposed initial performance testing program and include a test program summary, the test schedule, data quality objectives, and both an internal and external quality assurance program. The internal quality assurance program shall include the activities planned by routine operators and analysts to assess the test data precision.

Performance test results must be documented in a reporting containing: a brief process description; sampling location description(s); a description of sampling and analytical procedures and any modifications to standard procedures; test results; quality assurance procedures and results; records of operating conditions during the test, preparation of standards, and calibration procedures; raw data sheets for field sampling and field and laboratory analysis; documentation of calculations; and any other information required by the test method.

6.4.3 Monitoring Requirements

An owner or operator must conduct monitoring applicable to the type of air pollution control technique used. As an alternative to daily monitoring, an owner or operator may install a continuous pressure monitoring system. A summary of the ongoing monitoring requirements and operating parameter values is provided in Table 1.8.

6.4.4 Time Requirement for Initial Performance Test

Performance tests must be performed within 180 days of the compliance date. An owner or operator must submit in writing to the Division the intent to conduct a performance test at least 60 calendar days before the test is scheduled. Reports of performance test results must be submitted to the Division no later than 90 days after the test.

- Existing affected sources, test before March 17, 2015.
- New or reconstructed sources with initial startup after September 19, 2012, test within 180 days of startup.
- Existing area source that increases potential or actual emission such that it becomes a major source, test within 180 days of becoming a major source.
- New area source constructed or reconstructed after February 8, 2012 that increases potential or actual emission such that it becomes a major source, test within 180 days of becoming a major source.
- Existing hard chromium electroplating tank located at a small, hard chromium electroplating facility that increases maximum or actual cumulative potential rectifier capacity such that the facility becomes a large, hard chromium electroplating facility, test within 1 year and 180 days after the month in which the large designation is met.

An Inspector should determine whether the owner or operator met the time requirement and sent the notification for the initial performance test.

6.4.5 Applicability of Previous Test Results

If an owner or operator conducts performance testing at startup to obtain a state operating permit, the results of the testing may be used to demonstrate compliance if the test methods and procedures identified in the Chromium NESHAP were used; the performance test was conducted during representative operating conditions; the performance test report contains the required elements; sufficient data establishes operating parameter value(s) corresponding to compliance with the standards; the test was conducted after January 25, 1995; as of September 19, 2012, the source was operating under conditions representative of conditions during testing; and the permitting authority approves such use of the test results.

If an owner or operator cannot establish that the previous test meets each of these criteria, the owner or operator must retest. The Division will determine whether the owner or operator met the criteria. However, an Inspector should determine whether the owner or operator is attempting to meet these criteria or if the Division determined the owner or operator's previous test did meet the criteria.

6.5 Ongoing Compliance Monitoring

An owner or operator must conduct monitoring, according to the type of air pollution control technique used, to demonstrate continuous compliance. My monitoring and recording the appropriate operating parameters and comparing the monitored values to the value(s) established during the initial performance test(s), the owner, operator, and Inspector can determine whether the source is in continuous compliance with the emission limits. Operation of an affected source at values outside of the values established during the initial performance test shall constitute noncompliance with the emission standards. See Table 1.8 for monitoring requirements.

6.5.1 Monitoring Requirements for Add-on Air Pollution Control Devices

If an owner or operator uses a composite mesh-pad system, packed-bed scrubber system, packed-bed scrubber/composite mesh-pad system, or fiber-bed mist eliminator, the owner or operator must monitor the pressure drop and/or the velocity pressure on a daily basis.

The owner or operator using a composite mesh-pad system must monitor and record the pressure drop across the composite mesh-pad system once each day the source is operating. To be in compliance, the composite mesh-pad system must be operated within $\pm$ 2 inches of water column of the pressure drop value or range established during the initial performance test(s). The owner or operator using a packed-bed scrubber/composite mesh-pad system shall also comply with this monitoring requirement. However, this compliance requirement does not apply during automatic washdown cycles of the composite mesh-pad system. Addendum A details how to measure pressure drop.

The owner or operator using a packed-bed scrubber system must monitor and record the velocity pressure at the inlet to the packed-bed system and the pressure drop across the scrubber system once each day the source is operating. To be in compliance, the scrubber system must be operated within $\pm$ 10 percent of the velocity pressure and $\pm$ inch

of water column of the pressure drop value or range established during the initial performance test(s).

The owner or operator using a fiber-bed mist eliminator must monitor and record the pressure drop across the fiber-bed mist eliminator and the control device installed upstream to prevent plugging once each day the source is operating. To be in compliance, the fiber-bed mist eliminator and the upstream control device must be operated within ± 1 inch of water column of the pressure drop value or range established during the initial performance test(s).

As an alternative to daily monitoring, an owner or operator may install a continuous pressure monitoring system.

6.5.2 Monitoring Requirements for Chemical Fume Suppressants

The owner or operator using a wetting agent in the electroplating or anodizing bath must monitor the surface tension of the electroplating g or anodizing bath. To be in compliance, the surface tension must be less than the value established during the performance test or greater than 40 dynes/cm, as measured by a stalagmometer, or 33 dynes/cm, as measured by a tensiometer. The surface tension must be measured once every four hours during operation for the first forty hours of tank operation. If no exceedances occur, the surface tension may be measured every 8 hours of tank operation for another forty hours. If there are still no exceedances, surface tension may be measured once every 40 hours of tank operation. However, once an exceedance occurs, the original monitoring schedule must be followed. In addition, once a bath solution is drained and a new solution added, the original monitoring schedule must be followed.

An Inspector should not that the surface tension cannot be measured if there are external vibrations, such as heavy machinery operating nearby. In addition, the temperature and surface tension are on a relational curve; therefore, the owner or operator must keep the sample temperature the same as the bath temperature when measuring surface tension. Addendum C provides more details concerning the devices used to measure surface tension.

The owner or operating using a foam blanket in the electroplating or anodizing bath must monitor the foam blanket thickness of the bath. To be in compliance, the foam blanket thickness must be at least 2.54 cm (1 inch). However, a foam blanket that is greater than 5 cm may collect hydrogen gas and cause an explosion. The foam blanket thickness must be measured once every one hour of tank operation for the first forty hours of tank operation. If no exceedances occur, the foam blanket thickness may be measured every four hours of tank operation for another forty hours. If there are still no exceedances, the foam blanket thickness may be measured every eight hours of tank operation. However, once an exceedance occurs, the original monitoring schedule must be followed.

The owner or operator uses both a fume suppressant and add-on control device to comply with the emission limits, the owner or operator must monitor the parameters described for the applicable add-on control device and fume suppressant. If the owner or operator uses both air pollution control techniques but only one is required to meet the emission limits, the owner or operator shall follow the monitoring requirements for the technique used to achieve compliance. For either scenario, the owner or operator must also comply with the applicable work practice standards.

6.5.3 Monitoring Requirements for Multiple Tanks Attached to One Control System

See Table 1.4 for special compliance provisions for multiple sources controlled by a common add-on air pollution control device.

6.6 Recordkeeping

The owner or operator must meet recordkeeping requirements in the Chromium NESHAP and in 40 C.F.R. Part 63, Subpart A, as listed in Table 1 of the Chromium NESHAP. Records must be maintained in a form suitable and readily available for inspection and review for at least five years with at least the most recent two years on site.

6.6.1 Inspection and Maintenance Records

The owner or operator must keep inspection records of the add-on air pollution control device, if used, and monitoring equipment that document that the operations and maintenance practices have occurred. The documentation can be in a checklist form identifying the device inspected, the date of inspection, a brief description of the working condition of the device, and any corrective actions. Addendum D provides example checklists for a composite mesh-pad system, packed bed scrubber, and fiber-bed mist eliminator.

The owner or operator must also keep records of all maintenance performed on the source, add-on air pollution control device, and monitoring equipment. Important items to document include contractor invoices, date and time of service, and the maintenance performed. Thorough and complete records will lead to an excellent preventative maintenance program.

6.6.2 Malfunction Reports

The owner or operator must keep records of the occurrence, duration, and cause of each process, add-on air pollution control, and monitoring equipment malfunctions. The owner or operator must also record actions taken to minimize emissions during periods of malfunction including corrective actions to restore process and equipment to normal operation. These records will assist an Inspector to determine whether the actions were actually taken and whether the operation and maintenance plan was revised, if required.

6.6.3 Performance Test Results

The owner or operator must keep records of the performance test reports and all measurements used to determine the conditions and compliance of the performance test. The report must describe the process and document the sampling location, procedures, operating conditions, quality assurance procedures, and test results. An example form for performance test results is provided in Addendum K.

6.6.4 Monitoring Data Records

The owner or operator must keep records of monitoring data used to demonstrate compliance with the standard including the date and time the data is collected. The monitoring requirements for each of the air pollution control techniques are listed in Table 1.8. An example of a monitoring data form for a packed bed scrubber is provided in Addendum E.

6.6.5 Excess Emissions Records

The owner or operator must keep records of the date and time of each period of excess emissions that occurs during malfunction of process, add-on air pollution control, or monitoring equipment, as indicated by monitoring data. The owner or operator must also keep records of the date and time of each period of excess emissions that occurs during periods other than malfunction of process, add-on air pollution control, or monitoring equipment, as indicated by monitoring data. In addition, the excess emissions reports must be included in the owner or operator's ongoing compliance status report.

The Division requires major sources with reported exceedances to submit quarterly ongoing compliance reports instead of semiannual reports. And, the Division requires area sources with reported exceedances to submit semiannual ongoing compliance reports instead of annual reports. In addition, the owner or operator must complete log sheets that support the explanation of the exceedance. The example monitoring data form in Addendum E provides a space to record the start and end times of excess emissions periods.

6.6.6 Process Records

The owner or operator must keep records of the total process operating time during the reporting period. If the owner or operator is using fume suppressants to comply with the standards, the owner or operator must keep records of the date and time a that fume suppressants are added to the electroplating or anodizing bath as well as the fume suppressant manufacturer and product name.

If the owner or operator is using rectifier capacity to determine facility size, the owner or operator must keep records of the actual cumulative rectifier capacity and the total capacity of hard chromium electroplating tanks extended during each month of the total reporting period.

If the owner or operators is using a trivalent chromium bath incorporating a wetting agent as a bath ingredient, the owner or operator must keep records of the bath components purchased with the wetting agent clearly identified as a bath constituent.

6.6.7 Miscellaneous Records

If a waiver of recordkeeping or reporting has been granted, the owner or operator must keep any information demonstrating the source is meeting the requirements of the waiver. And, the owner or operator must keep all documentation supporting the required notification and reports.

6.7 Reporting

The owner or operator must submit required reports to the Division and the EPA by mail, fax, or other courier. If reports are submitted by mail, they must be postmarked on or before the specified date. If reports are sent by other methods, they must be received on or before the specified date. Reports may be submitted by electronic media if acceptable to the Division and the EPA. An Inspector should determine whether the owner or operator has met all of the required deadlines for reporting.

6.7.1 Notification of Construction or Reconstruction

After January 25, 1995, a new or reconstructed source must submit a notification of construction or reconstruction to the Division and the EPA prior to construction or reconstruction. The notification must include the owner or operator's name, title, and address; the source address; notification of intent to construct or reconstruct; a statement that the Chromium NESHAP is the basis for the notification; the expected commencement and completion dates; the anticipated date of startup; the type or process operation; a description of the air pollution control technique; and a estimate of emissions.

If the owner or operator will reconstruct a source, notification shall also include a description of the source and components to be replaced; present and proposed emission control technique; an estimate of the fixed capital cost of the replacements compared to a comparable new source; the estimated life of the source after the replacements; and any economic or technical limitations the source may have in complying with the standards. However, if the notification declares there are no economic or technical limitations to prevent the source from complying with the standards, the owner or operator does not need to submit the estimate of costs; estimated life; or the discussion of economic or technical limitations.

Under the Chromium NESHAP, construction or reconstruction may commence upon submission of a complete notification. If construction or reconstruction begins after January 25, 1995, the notification must be submitted as soon as practical before construction or reconstruction. If construction or reconstruction had commenced but initial startup did not occur before January 25, 1995, the notification must be submitted as soon as practicable before startup but no later than 60 days after January 25, 1995. However, the Division requires an owner or operator obtain a Division construction permit prior to commencing construction.

An example of a form for the notification of construction or reconstruction is provided in Addendum F.

6.7.2 Initial Notification

The owner or operator of an affected source with an initial startup before January 25, 1995, must submit an initial notification that the source is subject to the Chromium NESHAP no later than 180 days after January 25, 1995. The notification must include the name, title, and address of the owner or operator; the address of the source; a statement that the Chromium NESHAP is the basis for the notification; the applicable emission limit and compliance date; a brief description of the source and type of process operation performed; the maximum potential cumulative potential rectifier capacity for sources performing hard chromium electroplating, and whether the facility is large or small; and whether the source is located at a major or area source.

The owner or operator of a new or reconstructed source with an initial startup after January 25, 1995, must submit an initial notification stating the date when construction or reconstruction was commenced. If construction or reconstruction occurred before January 25, 1995, the notification must be submitted with the notification of construction or reconstruction. If construction or reconstruction occurred after January 25, 1995, the notification must be submitted within 30 days of the date of construction or reconstruction. And, a notification of the actual date of startup must be submitted within 30 days after such date.

An example of an initial notification form is provided in Addendum G.

6.7.3 Notification of Initial Performance Test, Initial Performance Test Results, and Notification of Compliance Status

The owner or operator must notify the Division and the EPA of the intent to conduct a performance test at least 60 days before the test is scheduled. This notification will allow the Division or the EPA to observe the test should the Division or the EPA feel observation is necessary. In the event the owner or operator is unable to conduct the performance test as scheduled, the owner or operator must notify the Division and the EPA as soon as practicable prior to the scheduled test date and specify when the test is rescheduled.

The owner or operator must notify the Division and the EPA each time an affected source becomes subject to the Chromium NESHAP. The notification must include the applicable emission limits and methods used to determine compliance; the test report if a performance test is required; the type and quality of hazardous air pollutants emitted if the owner or operator is utilizing the special compliance provisions for multiple sources controlled by a common add-on air pollution control device; specific operating parameter values or ranges corresponding to compliance with the emission limits; methods used to determine compliance; descriptions of each air pollution control technique for each emission point; a statement that the owner or operator has an operation and maintenance plan; records to support the determination that the facility is small if the owner or operator is determining facility size based on actual cumulative rectifier capacity; and a statement that the owner or operator has complied with the Chromium NESHAP. This notification must be submitted to the Division and the EPA no later than 90 days following the performance test, if required. And, within 60 days after the performance test, the owner or operator must submit the results to EPA's WebFIRE database using the Compliance and Emissions Data Reporting Interface accessed through the EPA's Central Data Exchange.

An example form for notification of a performance test is provided in Addendum H. An example of a notification of compliance form is provided in Addendum I.

6.7.4 Ongoing Compliance Status Reports

Once an owner or operator has made the appropriate notifications and completed the recordkeeping requirements, semiannual or annual ongoing compliance reports must be compiled and submitted to the Division and the EPA.

6.7.4.1 Major Sources

The owner or operator of a source located at a major source must submit a summary report to the Division and the EPA documenting the ongoing compliance of the source. The summary report must include the company name and source address; identify the operating parameters monitored for compliance determinations; applicable emissions limits and operating parameter values or range; beginning and end dates of the reporting period; type of process performed; total operating time during the reporting period; the actual cumulative rectifier capacity if the owner or operator is using capacity to determine facility size; summary of operating parameter values including duration of excess emissions; certification that the operation and maintenance practices were followed; documentation when the operation and maintenance plan was not followed; changes since the last reporting period; number, duration, and description of malfunctions and corrective actions taken; name, title, and signature of the responsible official; and date of the report.

Ongoing compliance status reports for major sources must be submitted semiannually unless the Division or the EPA determines more frequent reporting is necessary. However, monitoring data showing an emission limit exceedance must be submitted quarterly until the owner or operator requests the reporting frequency be reduced. If the owner or operator can show one full year of compliance and continued compliance with recordkeeping and monitoring, and the Division or the EPA do not object, the owner or operator may reduce quarterly reporting to semiannual reporting.

6.7.4.2 Area Sources

The owner or operator of a source located at an area source must submit a summary report documenting ongoing compliance to the Division and the EPA. The report must include the same information as a major source summary report, listed above.

Ongoing compliance status reports for area sources must be submitted annually unless the Division or the EPA determines more frequent reporting is necessary; the owner or operator reports and exceedance; or the total duration of excess emissions is 1% or greater of the total operating time for the reporting period or the total duration of malfunctions of add-on air pollution control devices and monitoring equipment is 5% or greater of the total operating time, in which case the report must be submitted semiannually. However, an owner or operator may request the reporting frequency be reduced if the owner or operator can show one full year of compliance and continued compliance with recordkeeping and monitoring, and the Division or the EPA do not object.

6.7.5 Trivalent Chromium Bath Reports

The owner or operator of a source utilizing a trivalent chromium bath that incorporates a wetting agent as a bath ingredient must submit an initial notification to the Division and the EPA July 24, 1995. The notification must include the information required for other affected sources, see 6.7.3 above; a statement that a trivalent chromium process that incorporates a wetting agent will be used to comply with the standards; and a list of the bath components that comprise the trivalent chromium bath with the wetting agent clearly identified. The owner or operator must submit a notification of compliance status by October 18, 2014, or immediately upon startup for a new or reconstructed source with an initial startup date after September 19, 2012.

In addition, an owner or operator must submit a report describing the change in process and new emission limit, if applicable; the initial notification; and the applicable reporting requirements within 30 days of changing to a trivalent chromium electroplating process.

7. Pollution Prevention Measures

In 1990, the Pollution Prevention Act established a new national policy for environmental protection, "that pollution should be prevented or reduced at the source whenever feasible." Congress determined that reducing the waste at the source minimizes the cost of treatment and the transfer of pollution as well as strengthens economic competiveness through more efficient use of raw materials. EPA determined the crucial steps towards achieving a sustainable society under the Pollution Prevention Program are to prevent pollution at the source, promote the use of greener substances, and conserve natural resources.

EPA's 2010-2014 Prevention Pollution Program Strategic Plan identifies five goals for the Pollution Prevention Program: (1) reduce the generation of greenhouse gas emissions to mitigate climate change; (2) reduce the manufacture and use of hazardous materials to improve human and ecological health; (3) reduce the use of water and conserve other natural resources to protect ecosystems; (4) create business efficiencies that derive economic benefits and improve environmental performance; and (5) institutionalize and integrate pollution prevention practices through government services, policies, and initiatives.

The Chromium NESHAP incorporates several pollution prevention measures such as the use of chemical fume suppressants, which inhibit chromium emissions at the electroplating or anodizing tank. The Chromium NESHAP also encourages the use of a trivalent chromium electroplating process instead of the more toxic traditional hexavalent chromium process. And, the Chromium NESHAP prohibits owners and operators of open surface or enclosed hard chromium electroplating tanks, chromium anodizing tanks, and decorative chromium electroplating tanks using a trivalent chromium bath from adding PFOS-based fume suppressants, which has been shown to be persistent, bioaccumulative, and toxic, after September 21, 2015.

8. Glossary of Terms

Actual emissions: means the actual rate of emissions of a pollutant, but does not include excess emissions from a malfunction, or startups and shutdowns associated with a malfunction. Actual emissions shall be calculated using the source's actual operating rates, and types of materials processed, stored, or combusted during the selected time period.

Add-on pollution control device: means equipment installed in the ventilation system of chromium electroplating and anodizing tanks for the purposes of collecting and containing chromium emissions from the tank(s).

Affected source: each chromium electroplating or chromium anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.

Air pollution control technique: means any method, such as an add-on air pollution control device or a chemical fume suppressant, that is used to reduce chromium emissions from chromium electroplating and chromium anodizing tanks.

Ampere: the constant current which if maintained in two straight parallel conductors of infinite length, of negligible circular cross section, and placed one meter apart in vacuum, would produce between the conductors a force equal to 2×10^{-7} newton per meter of length.

Area source: a stationary source of hazardous air pollutants that is not a major source as defined.

Base material: means the metal or metal alloy that comprises the workpiece.

Bath component: means the trade or brand name of each component(s) in trivalent chromium plating baths. For trivalent chromium baths, the bath composition is proprietary in most cases. Therefore, the trade or brand name for each component(s) can be used; however, the chemical name of the wetting agent contained in that component must be identified.

Chemical fume suppressant: means any chemical agent that reduces or suppresses fumes or mists at the surface of an electroplating or anodizing bath; another term is mist suppressant.

Chromic acid: means the common name for chromium anhydride (CrO_3).

Chromium anodizing: means the electrolytic process by which an oxide layer is produced on the surface of a base metal for functional purposes (e.g. corrosion resistance or electrical insulation) using a chromic acid solution. In chromium anodizing, the part to be anodized acts as the anode in the solution, with a concentration typically ranging from 50 to 100 grams per liter (g/L), serves as the electrolyte.

Chromium anodizing tank: means the receptacle or container along with the following accompanying internal and external components needed for chromium anodizing: rectifiers fitted with controls to allow for voltage adjustments, head exchanger equipment, circulation pumps, and air agitation systems.

Chromium electroplating tank: means the receptacle or container along with the following internal and external components needed for chromium electroplating: rectifiers, anodes, heat exchanger equipment, circulation pumps, and air agitation systems.

Commenced: means, with respect to construction or reconstruction of an affected source, that an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or reconstruction

Compliance date: means the date by which an affected source is required to be in compliance with a relevant standard, limitation, prohibition, or any federally enforceable requirement established by the Administrator (or a State with an approved permit program) pursuant to section 112 of the Act.

Composite mesh pad system: means an add-on air pollution control device typically consisting of several mesh pad stages. The purpose of the first stage is to remove large particles. Smaller particles are removed in the second stage, which consists of the composite mesh pad. A final stage may remove any reentrained particles not collected by the composite mesh pad.

Construction: means the on-site fabrication, erection, or installation of an affected source. Construction does not include the removal of all equipment comprising an affected source from an existing location and reinstallation of such equipment at a new location. The owner or operator of an existing affected source that is relocated may elect not to reinstall minor ancillary equipment including, but not limited to, piping, ductwork, and valves. However, removal and reinstallation of an affected source will be construed as reconstruction if it satisfies the criteria for reconstruction as defined in this section. The costs of replacing minor ancillary equipment must be considered in determining whether the existing affected source is reconstructed. Continuous emission monitoring system (CEMS) means the total equipment that may be required to meet the data acquisition and availability requirements of this part, used to sample, condition (if applicable), analyze, and provide a record of emissions.

Contains hexavalent chromium: means the substance consists of or contains 0.1% or greater by weight chromium trioxide, chromium (VI) oxide, chromic acid, or chromic anhydride.

Decorative chromium electroplating: means the process by which a thin layer of chromium (typically 0.003 to 2.5 microns) is electrodeposited on a base metal, plastic, or undercoating to provide a bright surface with wear and tarnish resistance. In this process, the part(s) serves as the cathode in the electrolytic cell and the solution serves as the electrolyte. Typical current density applied during this process ranges from 540 to 2,400

amperes per square meter (A/m^2) for total plating times ranging between 0.5 and 5 minutes.

Dry standard cubic meter (dscm): a meter cubed of air pollutant emissions from a source with the water removed.

Dyne: unit of force equal to the force that produces an acceleration of one centimeter per second per second on a mass of one gram.

Electroplating or anodizing bath: means the electrolytic solution used as the conducting medium in which the flow of current is accompanied by movement of metal ions for the purposes of electroplating metal out of the solution onto a workplace or for oxidizing the base material.

Emission limitation: means, for the purposes of Subpart N, the concentration of total chromium allowed to be emitted expressed in milligrams per dry standard cubic meter (mg/dscm), or the allowable surface tension expressed in dynes per centimeter (dynes/cm).

Enclosed hard chromium electroplating tank: means a chromium electroplating tank that is equipped with an enclosed hood and ventilated at half the rate or less that of an open surface tank of the same surface area.

Existing affected source: means an affected hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced on or before February 8, 2012.

Facility: means the major or area source at which chromium electroplating or chromium anodizing is performed.

Fiber bed mist eliminator: means an add-on air pollution control device that removes contaminants from a gas stream through the mechanisms of inertial impaction and Brownian diffusion. These devices are typically installed downstream of another control device, which serves to prevent plugging, and consist of one or more fiber beds. Each bed consists of a hollow cylinder formed from two concentric screens; the fiber between the screens may be fabricated from glass, ceramic, plastic, or metal.

Foam blanket: means the type of chemical fume suppressant that generates a layer of foam across the surface of a solution when current is applies to that solution.

Hard chromium electroplating, or industrial chromium electroplating: means a process by which a thick layer of chromium (typically 1.3 to 760 microns) is electrodeposited on a base material to provide a surface with functional properties such as wear resistance, a low coefficient of friction, hardness, and corrosion resistance. In this process, the part serves as the cathode in the electrolytic cell and the solution serves as the electrolyte. Hard chromium electroplating process is performed at current densities typically ranging from

1,600 to 6,500 A/m^2 for total plating times ranging from 20 minutes to 36 hours depending upon the desired plate thickness.

Hazardous air pollutant: means any air pollutant listed in or pursuant to CAA Section 112(b).

Hexavalent chromium: means the form of chromium in a valence state of +6.

Large, hard chromium electroplating facility: means a facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity greater than or equal to 60 million ampere-hours per year (amp-hr/yr).

Major source: means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

Malfunction: means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Maximum achievable control technology ("MACT"): emission limitations based upon the best demonstrated control technology or practices to be applied to major sources emitting one or more of the federally listed hazardous air pollutants.

Maximum cumulative potential rectifier capacity: means the summation of the total installed rectifier capacity associated with the hard chromium electroplating tanks at a facility, expressed in amperes, multiplied by the maximum potential operating schedule of 8,400 hours per year and 0.7, which assumes that electrodes are energized 70% of the total operating time. The maximum potential operating schedule is based on operating 24 hours per day, 7 days per week, 50 weeks per year.

New affected source: means an affected hard chromium electroplating tank, decorative chromium electroplating tank, or chromium anodizing tank, the construction or reconstruction of which commenced after February 8, 2012.

Open surface hard chromium electroplating tank: means a chromium electroplating tank that is ventilated at a rate consistent with good ventilation practices for open tanks.

Operating parameter value: means a minimum or maximum value established for a control device or process parameter which, if achieved by itself or in combination with one or more other operating parameter values, determines that an owner or operator is in continual compliance with the applicable emission limitation or standard.

Owner or operator: means any person who owns, leases, operates, controls, or supervises a stationary source.

Packed bed scrubber: means an add-on air pollution control device consisting of a single or double packed bed that contains packing media on which the chromic acid droplets impinge. The packed-bed section of the scrubber is followed by a mist eliminator to remove any water entrained from the packed-bed section.

Perfluorooctane sulfonic acid ("PFSO") based fume suppressant: means a fume suppressant that contains 1% or greater PFOS by weight.

Permitting authority: means (1) the state air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70 of this chapter; or (2) The Administrator, in the case of EPA-implemented permit programs under title V of the Act (42 U.S.C. 7661).

Potential to emit: means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

Process parameter: the parameters set during the initial performance test(s). If a source operates within the process parameters, it is assumed the source is meeting the emission limit requirements.

Reconstruction: means the replacement of components of an affected or a previously nonaffected source to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s).

Rectifier: a device in which current flows more readily in one direction than the other, thus changing an alternating current into a direct current.

Research or laboratory operation: means an operation whose primary purpose is for research and development of new processes and products, that is conducted under the close supervision of technically trained personnel, and that is not involved in the manufacture of products for commercial sale in commerce, except in a de minimis manner.

Responsible official: means (1) for a corporation: a president, secretary, treasurer, vice president, or other similar person in charge of principal business function, policy, or decision-making functions, or a duly authorized representative if responsible for the overall operation of one or more manufacturing, production, or operating facilities and either (i) the facilities employ more than 250 persons or have gross annual sales or expenditures exceeding $25 million (1980 dollars) or (ii) the delegation of authority is approved by the

Administrator; (2) for a partnership or sole proprietorship: a general partner or proprietor; (3) for a municipality, state, federal, other public agency: a principal executive officer or ranking elected official; (4) for affected sources subject to a Title V permit: (i) the designated representative in so far as actions, standards, requirements, or prohibitions under Title IV are concerned and (ii) the designated representative for any other purposes under part 70.

Shutdown: means the cessation of operation of an affected source or portion of an affected source for any purpose.

Small, hard chromium electroplating facility: means a facility that performs hard chromium electroplating and has a maximum cumulative potential rectifier capacity less than 60 million amp-hr/yr.

Stalagmometer: means an instrument used to measure the surface tension of a solution by determining the mass of a solution by determining the mass of a drop of liquid by weighing a known number of drops or by counting the number of drops obtained from a given volume of liquid.

Startup: means the setting in operation of an affected source or portion of an affected source for any purpose.

Stationary source: means any building, structure, facility, or installation which emits or may emit any air pollutant.

Surface tension: means the property, due to molecular forces, that exists in the surface film of all liquids and tends to prevent liquid from spreading.

Tank operation: means the time in which current and/or voltage is being applied to a chromium electroplating applied to a chromium electroplating tank or a chromium anodizing tank.

Tensiometer: means an instrument used to measure the surface tension of a solution by determining the amount of force needed to pull a ring from the liquid surface. The amount of force is proportional to the surface tension.

Title V operating permit: means any permit issued, renewed, or revised pursuant to Federal or State regulations established to implement title V of the Act (42 U.S.C. 7661). A title V permit issued by a State permitting authority is called a part 70 permit in this part.

Trivalent chromium: means the form of chromium in a valence state of +3.

Trivalent chromium electroplating process: means the process used for electrodeposition of a thin layer of chromium onto a base material using a trivalent chromium solution instead of a chromic acid solution.

Wetting agent: means the type of commercially available chemical fume suppressant that materially reduces the surface tension of a liquid.

Addendum A
Measuring Pressure Drop and Velocity Pressure

1.0 Measuring Pressure Drop

To measure the pressure drop across an add-on air pollution control device:

First, install pressure taps at any of the following locations:

1) at the inlet and outlet of the control system; the inlet tap should be installed in the ductwork just prior to the control device and the corresponding outlet pressure tap should be installed on the outlet side of the control device prior to the blower; or
2) on each side of the packed bed within the control system or on each side of each mesh pad within the control system; or
3) on the front side of the first mesh pad and back side of the last mesh pad within the system.

The pressure taps must be sited at locations that are free from pluggage (clogs or obstructions) and away from anything that changes the flow (i.e., cyclonic demisters, baffle, reduction in diameter, expansion in diameter, fan). The pressure taps must also be situated such that no air outside the system can infiltrate at the measurement site and bias the measurement. The operator must follow the manufacturer's recommendations closely. Thus, the operator must have the manufacturer's directions on hand demonstrating how to put the pressure taps on properly. An Inspector can request the directions to determine whether the operator is properly attaching the pressure taps.

Pressure taps must be constructed of either polyethylene, polybutylene, or other nonreactive materials. Nonreactive plastic tubing shall be used to connect the pressure taps to the device used to measure the pressure drop. The following pressure gauges can be used to monitor the pressure drop: magnahelic gauge, inclined manometer, or "U" tube manometer. Prior to connecting any pressure lines to the pressure gauge(s), every gauge must be zeroed out. No calibration of the pressure gauges is required.

Second, connect the negative side of the pressure gauge to a pressure tap on the downstream side of the control device or composite mesh pad (the side closest to the stack outlet). Connect the positive side of the pressure gauge to a pressure tap located just upstream (the side closest to the process) of the control device or composite mesh pad. The pressure gauge should now read the pressure drop across the control device or individual composite mesh pad.

2.0 Measuring Velocity Pressure

To measure the velocity pressure at the inlet to an add-on air pollution control device:

First, locate a piece of duct that connects the hooding of the plating tank(s) with the control device and determine the diameter of that duct. If it is a round duct, simply

measure across the opening. If it is a square or rectangular duct, the diameter is measured by the following equation:

$$D = \frac{2LW}{(L+W)}$$

L = length
W = width

Second, multiply the diameter by 2.5.

Third, determine if there is a straight duct equaling or exceeding the diameter multiplied by 2.5. This distance is necessary is because the test port (opening for measurement) must be located where the flow is in a straight lined path (laminar flow). There cannot be any bends or obstructions in the duct used to measure the velocity pressure.

Fourth, if there is a straight duct equaling or exceeding the diameter multiplied by 2.5, multiply the diameter by 0.5. Take that measurement and measure that distance back from the opening down the duct, this is where the port (opening for measurement) should be located.

```
Inlet to duct      ____________________ D x 2.5 ____________________ Duct opening to control device
--------> (flow)                          D
                                                  <-- D x .5 -->
                   ____________________________________________
                                                  port
                                          D x 2
```

Fifth, if there is not a straight, unobstructed length of duct equaling the diameter multiplied by 2.5, then multiply the unobstructed length by 0.2. Take that measurement and measure that distance back from the opening down the duct, this is where the port (opening for measurement) should be located.

```
Inlet to duct      ____________________ D x 2.5 ____________________ Duct opening to control device
--------> (flow)                          D
                                                  <-- D x .2 -->
                   ____________________________________________
                                                  port
                                          D x .8                D x .2
```

Sixth, insert the s-type pitot tube into the duct through the port (opening for measurement). The pitot tube must be used according to manufacturer's directions. An Inspector can ask for the manufacturer manual when determining whether the operator is properly taking velocity pressure measurements.

Seventh, conduct a twelve point velocity traverse of the duct to the control device along a single axis (according to Method 2, found at 40 CFR part 60, appendix A) using the s-type pitot tube. This means the operator should mark twelve pieces of tape up the pitot tube (EPA Method 1). These twelve points are where the operator will take readings. The operator will place the pitot tube in the port and stop at the first tape and measure the velocity pressure value and record that value. This will continue for the next eleven pieces of tape on the pitot tube.

Eighth, determine the square root of each of the individual twelve velocity pressure values recorded, write them in the record book, and average the twelve values.

Ninth, look at the twelve square root values and determines which value is closest to the average value. The chosen square root value is the point of average velocity. (The velocity pressure value measured for this point during the initial performance test will be used as the reference for future monitoring. The pitot tube should be located at this point for all daily measurements of velocity pressure.)

Note: The operator does not need to measure the barometric pressure and duct temperature at each traverse point, but it is recommended by the EPA.

Addendum B
US EPA Method 306B
Surface Tension Measurements and Recordkeeping for Tanks Used at Decorative Chromium Electroplating and Anodizing Facilities

Method 306B - Surface Tension Measurement and Recordkeeping for Chromium Plating Tanks Used at Electroplating and Anodizing Facilities

1. Applicability and Principle

1.1 Applicability. This method is applicable to all decorative plating and anodizing operations where a wetting agent is used in the tank as the primary mechanism for reducing emissions from the surface of the solution.

1.2 Principle. During an electroplating or anodizing operation, gas bubbles generated during the process rise to the surface of the tank liquid and burst. Upon bursting, tiny droplets of chromic acid become entrained in ambient air. The addition of a wetting agent to the tank bath reduces the surface tension of the liquid and diminishes the formation of these droplets.

2. Apparatus

2.1 Stalagmometer. Any commercially available stalagmometer or equivalent surface tension measuring device may be used to measure the surface tension of the plating or anodizing tank liquid.

2.2 Preciser tensiometer. A Preciser tensiometer may be used to measure the surface tension of the tank liquid provided the procedures specified in ASTM Method D 1331-89 are followed.

3. Procedure

3.1 The surface tension of the tank bath may be measured by using a tensiometer, a stalagmometer, or any other device suitable for measuring surface tension in dynes per centimeter. If the tensiometer is used, the instructions given in ASTM Method D 1331-89 must be followed. If a stalagmometer or other device is used, the instructions that came with the measuring device must be followed.

3.2 Measurements of the bath surface tension are done using a progressive system which minimizes the number of surface tension measurements required when the proper surface tension is maintained. Initially, measurements must be made every 4 hours of tank operation for the first 40 hours of tank operation after the compliance date. Once there are no exceedances during 40 hours of tank operation, measurements may be conducted once every 8 hours of tank operation. Once there are no exceedances during 40 hours of tank operation, measurements may be conducted once every 40 hours of tank operation on

an on-going basis, until an exceedance occurs. The maximum time interval for measurements is once every 40 hours of tank operation.

If a measurement of the surface tension of the solution is above the operating parameter, the time interval reverts back to the original monitoring schedule of once every 4 hours. A subsequent decrease in frequency would then be allowed according to the previous paragraph.

4. Recordkeeping

4.1 Log book of surface tension measurements and fume suppressant additions. The surface tension of the plating or anodizing tank bath must be measured as specified in section 3.2. The measurements must be recorded in the log book. In addition to the record of surface tension measurements, the frequency of fume suppressant maintenance additions and the amount of fume suppressant added during each maintenance addition must be recorded in the log book. The log book must be readily available for inspection by regulatory personnel.

4.2 Instructions for apparatus used in measuring surface tension. A copy of the instructions for the apparatus used for measuring the surface tension of the plating or anodizing bath must be included with the log book. If a Preciser tensiometer is used, a copy of ASTM Method D 1331-89 must be included with the log book. If a stalagmometer or other surface tension measuring device is used, the instructions that came with the apparatus must be included with the log book.

Addendum C
Conducting Surface Tension Measurements for Compliance with the Chromium NESHAP

1.0 Introduction

Surface tension is the property of a liquid in contact with air or vapor that makes it behave as if it were covered with a thin membrane under tension. This "tension" at the surface results from intermolecular forces within the solution that cause the exposed surface to contract to the smallest possible area because a molecule in the interior of a solution interacts with other molecules equally from all sides, whereas a molecule at the surface of liquid is only affected by the molecules below it. The property of surface tension is responsible for the formation of liquid droplets, soap bubbles, and menisci. Surface tension is defined as the force acting over the surface of the solution per unit length of the surface perpendicular to the force. It is usually measured in dynes per centimeter.

The EPA included the surface tension requirement in the Chromium NESHAP because gas bubbles generated during chromium plating rise to the surface of the tank solution and burst thus emitting tiny droplets of chromic acid into the air. The greater the surface tension of a solution, the larger the droplets will become. Surfactants (wetting agents) reduce the surface tension of a liquid and diminish the formation of these droplets. Most fume suppressants contain a surfactant.

1.1 EPA's Method 306B

The Chromium NESHAP allows decorative chromium plating operations to demonstrate compliance by a surface tension at least 40 dynes per centimeter, measured by a stalagmometer, or 33 dynes per centimeter, measured by a tensiometer. The surface tension of water is approximately 73 dynes per centimeter and the surface tension of a 33 ounce per gallon chromium electroplating solution (without a fume suppressant) has a surface tension around 70 dynes per centimeter.

1.2 Frequency of Measurements

Frequent surface tension measurements of the electroplating bath are required initially, up to once every 4 hours for the first 40 hours of operation. The frequency of measurements may decrease as compliance is maintained. If at any time one measurement is higher than 40 or 33 dynes per centimeter, depending on measurement technique, the initial frequency of measurements must resume.

1.3 Techniques of Measurement

There are dynamic and static ways of measuring surface tension. Dynamic techniques measure the way the surface tension of a fluid changes in relation to the surface tension of a different fluid, such as measurements taken by a stalagmometer. Static techniques of measurement examine surface tension in equilibrium, such as those taken by a tensiometer.

Method 306B allows surface tension to be measured by using a stalagmometer, a tensiometer, or "any other device suitable for measuring surface tension." The instructions from the manufacturer of the device must be kept with the log book.

2.0 Tensiometer

The oldest and most familiar method of measuring surface tension is with the du Nouy precision tensiometer, the ring method. Tensiometers are essentially torsion balances that apply a slowly increasing force to a platinum-iridium ring in contact with the surface of the liquid being measured. The tensiometer pulls on the ring on the surface of the solution by applying a torque to a fine wire and measures the force it takes to "break" it from the surface. An arm of steel tubing clamped to the center of the torsion wire applies the force to the ring suspended from its outer end. This force is proportional to surface tension and indicated upon a graduated scale. When the scale is calibrated it provides readings in dynes of force per centimeter. If an operator uses a tensiometer, the EPA requires the operator follow the standard test method ASTM D1331-56.

To use a tensiometer for surface tension measurements, and operator must have:

- a tensiometer with an undamaged platinum ring,
- a clean sampling container,
- a Bunsen burner,
- a pair of forceps,
- a calculator,
- a calibrating weight,
- a thermometer,
- 50 mL of plating solution, and
- 50 mL of methyl alcohol (flammable).

To obtain an accurate measurement using a tensiometer, the platinum ring must be free of dirt and bends. The platinum ring is the most critical component of the tensiometer and should always be handled with forceps. Prior to beginning the test, the operator should rinse the ring once with methyl alcohol and then three times with deionized water. Then it should be placed over the flame of a Bunsen burner (or similar source of heat) for a short time. The ring should be cool prior to the test.

2.1 Calibration of a Tensiometer

The tensiometer must be calibrated. The operator may first need to adjust the length of the torsion arm so that the dial scale will read directly in dynes per centimeter. The tensiometer must be level (bolt to flat platform or clamp to the bench top being used). Slowly pull the wire tight with the tension knob and adjust the reading and the vernier to zero. Insert the platinum metal ring in the holder and carefully place an accurately measured weight (500 mg to 800 mg) across the ring. Turn the read adjusting screw until the index level of the arm is opposite the reference line of the mirror. The operator should then record the dial reading. The following equation is used to calibrate a tensiometer:

$$y = (M \times g) / 2L$$

(y - surface tension in dynes per centimeter; M - weight placed on ring in grams; g - gravity constant (980.3 in Chicago); L - circumference of ring (usually 4 centimeters)).

If the reading is greater than the calculated value, the torsion arm must be shortened. If the reading is less than the calculated value, the arm needs to be lengthened. After adjusting the arm, the operator should recalibrate the tensiometer until the recorded value matches the calculated value.

2.2 Procedure to Use a Tensiometer

Prior to beginning a test, the operator should note the concentration of the chromium plating solution and the quantity of surfactant used. The plating solution must also be physically homogeneous, particularly with solutions containing surface-active material, in order to avoid unrepresentative measurements. The operator should record and report the temperature of the liquid and the date that the bath was last made-up. The surface tension of the chromium plating solution and other liquids increases as the temperature decreases, and visa-versa.

After the operator has cleaned and calibrated the tensiometer:

1) verify that the tensiometer is level and insert the clean platinum ring,
2) place the solution to be tested into a clean sample vessel onto the sample platform,
3) raise the platform with the adjusting screw until the ring is submerged,
4) once the ring is submerged, lower the platform slowly, while simultaneously applying torsion to the wire with the dial adjusting knob,
5) these simultaneous adjustments must be carefully proportioned so that the ring system remains constantly in its zero position,
6) as the "breaking point" between the solution and the ring approaches, the operator must make slower, smaller, and more careful adjustments to the tensiometer, and
7) when the solution "breaks" (when it detaches from the ring), the operator must stop making adjustments and record the dial reading.

The operator must take at least two measurements and more if the variation is large.

2.3 Calculation of Surface Tension with a Tensiometer

The dial reading is actually an uncorrected or "apparent" surface tension reading. The reading must be corrected for the resistance at the contours of the liquid surface in the area of the ring at the instant of breakaway. This resistance causes a slightly higher surface tension reading. This correcting factor ("F"), is usually too small to vary the whole number measured directly from the tensiometer.

2.4 Advantages and Disadvantages in Using a Tensiometer

The du Nouy tensiometer is the easiest and most accurate method of measuring surface tension. It only requires a small amount of solution for the measurement. However, it can be very expensive to purchase a tensiometer. Basic models are $2,000 to $3,000, but can run as much as $12,000 for more sophisticated pieces. In addition, the

operator must take extreme care to avoid any damage to the platform ring. Even a slight bend in the ring can be costly ($300 to replace). Another limitation is that there cannot be any vibrations during testing. If there are machines that vibrate in the facility, it can cause the solution to "break" sooner, thus yielding erroneous tensiometer readings.

Other types of tensiometers are typically more expensive than the du Nouy tensiometer. The Wilhelmy Plate uses a vertical plate of known perimeter that is attached to a balance and measures the force due to wetting. The Bubble Pressure measures the maximum pressure of a bubble produced in the fluid and relates this pressure to surface tension. The Pendant Drop is similar to the stalagmometer, but analyzes the geometry of each drop optically and relates this to surface tension.

3.0 Stalagmometer

A stalagmometer is a piece of equipment that uses a "dripping" technique for measuring surface tension, also known as the "drop weight" method of measuring surface tension because drops of solution from the tip of the stalagmometer are counted to measure the surface tension of the solution. A stalagmometer is basically a pipette with a wide flat tip that allows large droplets of reproducible size to form slowly and finally drop. The weight of each drop is calculable from the total volume of the pipette, from the number of drops that fall, and from the density of the sample. For practical purposes however, it is easier to count the drops which fall, the density of the sample, and the surface tension of water which is used as a reference liquid for factory standardization of the stalagmometer.

A surface tension reading using a stalagmometer takes approximately a half hour, including cleaning of the equipment. Cleaning of the stalagmometer is crucial to getting an accurate reading. In order set up for this test, the operator must have the following equipment:

1) one stalagmometer,
2) one ring stand,
3) one rubber bulb with a three way valve,
4) one thermometer clamp,
5) one base stand,
6) one hydrometer for chromium,
7) six 150 mL beakers,
8) gloves and personal protective equipment, and
9) a device for counting droplets (optional).

Most suppliers of stalagmometers will be able to provide the operator with a "package" for a little more money that includes the base stand, ring stand, thermometer clamp, rubber bulb, and any other equipment needed. The operator must have the following solutions:

1) 150 mL chromium plating solution taken directly from the bath,
2) 150 mL concentrated nitric acid,
3) 150 mL methyl alcohol, and
4) 150 mL deionized water.

Due to the use of concentrated nitric acid and other chemicals, the operator should wear the appropriate personal protective equipment and conduct the test underneath a ventilated hood.

3.1 Cleaning the Stalagmometer

A clean stalagmometer is crucial to a successful surface tension reading. The operator should have directions on cleaning from the manufacturer. To clean the stalagmometer, it is placed into the stand and under a ventilated fume hood, 150 mL of concentrated nitric acid is placed into the beaker. The lower end of the stalagmometer is immersed deep into the beaker of nitric acid. The rubber bulb is squeezed and placed on the top end of the stalagmometer. The operator carefully releases the bulb and slowly draws in the nitric acid past the top etched line on the stalagmometer. The nitric acid remains in the stalagmometer for five minutes. The operator then raises the stalagmometer in the stand so that the lower tip is out of the nitric acid solution, removes the bulb, and drains the solution back into the beaker. The stalagmometer can be turned upside down for faster draining, but care must be taken not to spill any solution. After the nitric acid is drained, the stalagmometer is rinsed, using the same procedure above, three to four times with deionized water until the inside of the stalagmometer is "water break" free, and again with methyl alcohol and allowed to dry completely (about five minutes).

3.2 Test Procedure

First a 150 mL beaker is filled with solution taken directly from the chromium plating tank. The specific gravity of the chromium plating solution is measured using a hydrometer. This measurement will be used in the calculation so it must be written down.

Second, using the same procedure for cleaning the stalagmometer, the lower tip of the stalagmometer is immersed deep into the chromium solution. The tip of the stalagmometer is wiped by touching it against the side of a beaker. The finger tip is released to allow the solution to drain, and the operator counts the drops of solution that fall into the beaker. This must be done until the solution in the stalagmometer reaches the bottom etched line. The operator must record the number of drops.

3.3 Calculating Surface Tension with a Stalagmometer

After the test is conducted, the operator should have recorded: the number of drops counted; the water drop number engraved on the stalagmometer; the density of the sample measured with the hydrometer; the density of water at 25□C; and the surface tension of water at 25□ C. Surface tension measured with a stalagmometer can be calculated with the following equation:

$$S = \frac{(Sw)\ (Nw)\ (D)}{(N)}$$

S = surface tension of the sample in dynes / centimeter
Sw = surface tension of water (73)
N = number of drops of sample counted
Nw = water drop number engraved on the stalagmometer

D = density of sample in grams / mL

3.4 Advantages and Disadvantages of Stalagmometers

Stalagmometers are inexpensive, easy to use, and easy to replace. Unfortunately, the process may take up to an hour to complete, because of the cleaning and calculations that are required. For those facilities that will be monitoring every four hours, the time factor for conducting this type of test may not be cost effective.

Addendum D
Sample Operation and Maintenance Checklists

Operation and Maintenance Checklist for Composite Mesh-Pad Systems or Combination Packed-Bed Scrubber and Composite Mesh Pad Systems

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location:_____

Control Device ID No.:_____

Installation Date: ___/___/___ Date of Last Performance Test: ___/___/

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing)

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Inlet and outlet transition zones				
Spray nozzles				
Packed-bed section				
Mesh pads				
Drain lines				

Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Pressure lines connected				
Pressure drop monitor calibrated				

Control Device Maintenance	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Washdown of pads				
Other: (specify)[1]				

[1] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Operation and Maintenance Checklist
for packed-bed scrubbers

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location:_____

Control Device ID No.:_____

Installation Date: ___/___/___ Date of Last Performance Test: ___/___/

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing)

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Inlet and outlet transition zones				
Spray nozzles				
Packed-bed section				
Overhead weir				

Drain lines				
Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Pressure lines connected				
Pressure drop monitor calibrated				
Pitot tube[1]				

[1] Backflush with water, or remove from the duct and rinse with fresh water. Replace in the duct and rotate 180 degrees to ensure that the same zero reading is obtained. Check pitot tube ends for damage. Replace pitot tube if cracked or fatigued.

Control Device Maintenance	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Other: (specify)[2]				

[2] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Operation and Maintenance Checklist
for Fiber-Bed Mist Eliminators

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name / Location:_____

Control Device ID No.:_____

Installation Date: ___/___/___ Date of Last Performance Test: ___/___/

Tanks Ducted to Control System:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing)

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes)

Control Device Inspection	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___	Date: ___/___/___
Inlet and outlet transition zones				

Spray nozzles				
Fiber beds				
Prefiltering device				
Drain lines				
Fan motor				
Fan vibration				

Monitoring Equipment Inspection	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Pressure lines connected				
Pressure drop monitor calibrated				

Control Device Maintenance	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Washdown of fiber beds				
Other: (specify)[1]				

[1] For example: replaced nozzles, adjusted fan motor, replaced recirculation pump, etc.

Corrective Actions:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Operation and Maintenance Checklist
for Surface Tension Measurements

Note: This checklist contains only the minimum requirements and does not include all of the system checks that need to be performed to ensure proper operation of the control system. Facilities should incorporate information recommended by the control system vendor.

Plant Name /
Location:_____
Type of Surface Tension Measurement Equipment
Used:_____

Date of Last Performance Test: ___/___/

Tanks at Which Surface Tension Measurements Taken:

Tank ID #	Type of Tank (i.e., hard chrome, decorative chrome, or chrome anodizing)

Inspection and Maintenance Checklist: (insert Inspector's initials in boxes) List the manufacturer's recommendations on maintenance of surface tension measurement equipment if not already included.

Tensiometer Equipment Inspection During Test	Date: ___/___/	Date: ___/___/	Date: ___/___/	Date: ___/___/
Tensiometer is calibrated				
Thermometer is operational				
Tensiometer is level				
Platinum ring is clean and undamaged				
Solution placed in clean sample vessel				

During adjustments ring system in constantly in zero position				
Operator stops making adjustments as solution "breaks"				
Other:				
Other:				
Stalagmometer Equipment Inspection during Test	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /
Stalagmometer is clean to manufacturer's specifications				
Ring stand is clean and undamaged				
Rubber bulb is clean and undamaged				
50 mL beaker is clean and undamaged				
Other:				
Other:				

Other Equipment Used to Measure Surface Tension	Date: ___/ /	Date: ___/ /	Date: ___/ /	Date: ___/ /

Equipment Malfunction and Corrective Action Records: The brief description of the corrective action taken, if it is inconsistent with the O&M plan, must include: occurrence, duration, and cause of any malfunction of the process, air pollution control device, and monitoring equipment.

1) Identify equipment that malfunctioned:

Date of malfunction: ___/___/___ Duration of malfunction: from ___/___/___ to ___/___/

Cause of malfunction:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

2) Identify equipment that malfunctioned:

Date of malfunction: ___/___/___ Duration of malfunction: from ___/___/___ to ___/___/

Cause of malfunction:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____Supervisor informed (yes/no):

Description:

3) Identify equipment that malfunctioned:

Date of malfunction: ___/___/___ Duration of malfunction: from ___/___/___ to ___/___/

Cause of malfunction:

Describe actions taken and maintenance performed to correct any deficiencies.

Date: ___/___/___ Initials: _____ Supervisor informed (yes/no):

Description:

Addendum E
Sample Monitoring Data Forms

Daily Monitoring Data Log for
Packed-Bed Scrubber with a Composite Mesh Pad System or Composite Mesh Pad System

Plant Name /
Location:_____
Air Pollution Control System: _____ Control Device ID No.:_____

All facilities must determine applicable operating parameter range for their packed-bed scrubber and composite mesh pad system to ensure the tank is meeting the applicable emission limit. These operating parameters should be determined during the initial performance test.

Applicable range established during the initial performance test:_____

Mo/Yr	Pressure drop across system	
Date	Inches of water column or PSI	Initials
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		

28		
29		
30		
31		

Daily Monitoring Data Log for Packed-Bed Scrubber

Plant Name / Location:_____

Air Pollution Control System: _____ Control Device ID No.:_____

All facilities must determine applicable operating parameter range for their packed-bed scrubber and composite mesh pad system to ensure the tank is meeting the applicable emission limit. These operating parameters should be determined during the initial performance test.

Applicable range established during the initial performance test across system:_____
Applicable range established during the initial performance test at system inlet:_____

Mo/Yr Date	Pressure drop across system measured in inches of water column or PSI	Velocity pressure at system inlet measured in inches of water column or PSI	Initials
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
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29			

30			
31			

Daily Monitoring Data Log for Fiber Bed Mist Eliminator

Plant Name /
Location:_____
Air Pollution Control System: _____ Control Device ID No.:_____

All facilities must determine applicable operating parameter range for their fiber bed mist eliminators to ensure the tank is meeting the applicable emission limit. These operating parameters should be determined during the initial performance test. Monitor the daily pressure drop across the mist eliminator and across the control device located upstream of the fiber bed.

Applicable range established during the initial performance test across mist eliminator:_____
Applicable range established during the initial performance test across control device located upstream of the fiber bed that prevents plugging:_____

Mo/Yr Date	Pressure drop across mist eliminator measured in inches of water column or PSI	Velocity pressure across the control device located upstream measured in inches of water column or PSI	Initials
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			

28			
29			
30			
31			

Daily Monitoring Data Log for Foam Blanket Fume Suppressant

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

One Hour Log Sheet for Foam Blanket Thickness

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
1			inches	
2			inches	
3			inches	
4			inches	
5			inches	
6			inches	
7			inches	
8			inches	
9			inches	
10			inches	
11			inches	
12			inches	
13			inches	
14			inches	
15			inches	
16			inches	
17			inches	
18			inches	
19			inches	
20			inches	
21			inches	
22			inches	
23			inches	
24			inches	
25			inches	
26			inches	
27			inches	
28			inches	
29			inches	
30			inches	
31			inches	
32			inches	
33			inches	
34			inches	
35			inches	
36			inches	

37			inches	
38			inches	
39			inches	
40			inches	

Four Hour Monitoring Data Log for Foam Blanket Fume Suppressant

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

Four Hour Log Sheet for Foam Blanket Thickness

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
0*			inches	
4			inches	
8			inches	
12			inches	
16			inches	
20			inches	
24			inches	
28			inches	
32			inches	
36			inches	
40			inches	

* For 0 hour reading carry 40 hour reading over from hourly log sheet.

Eight Hour Monitoring Data Log for Foam Blanket Fume Suppressant

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

Eight Hour Log Sheet for Foam Blanket Thickness

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
0*			inches	
8			inches	
16			inches	
24			inches	
32			inches	
40			inches	

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
8			inches	
16			inches	
24			inches	
32			inches	
40			inches	

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
8			inches	
16			inches	
24			inches	
32			inches	
40			inches	

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
8			inches	
16			inches	
24			inches	
32			inches	
40			inches	

Hours	Day/Mo/Yr	Time	Foam Blanket Thickness	Initials
8			inches	
16			inches	

24			inches	
32			inches	
40			inches	

* For 0 hour reading carry 40 hour reading over from hourly log sheet.

Four Hour Monitoring Data Log for Surface Tension

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

Four Hour Log Sheet for Surface Tension

Hours	Day/Mo/Yr	Time	Surface Tension	Initials
4			dynes/cm	
8			dynes/cm	
12			dynes/cm	
16			dynes/cm	
20			dynes/cm	
24			dynes/cm	
28			dynes/cm	
32			dynes/cm	
36			dynes/cm	
40			dynes/cm	

Eight Hour Monitoring Data Log for Surface Tension

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

Eight Hour Log Sheet for Surface Tension

Hours	Day/Mo/Yr	Time	Surface Tension	Initials
0*			dynes/cm	
8			dynes/cm	
16			dynes/cm	
24			dynes/cm	
32			dynes/cm	
40			dynes/cm	

* For 0 hour reading carry 40 hour reading over from four hour log sheet.

Forty Hour Monitoring Data Log for Surface Tension

Plant Name /
Location:_____

Step 1: for the first 40 hours, record foam blanket thickness every hour. If there are no exceedances, move to Step 2. If there is an exceedance, repeat Step 1.

Step 2: for the next 40 hours, record the foam blanket thickness every 4 hours. If there are no exceedances, move to Step 3. If there is an exceedance, repeat Step 1.

Step 3: every 8 hours of operation, record the foam blanket thickness, for as long as the tank is in use. Each new tank of solution added, repeat Step 1. If there is an exceedance, repeat Step 1.

Forty Hour Log Sheet for Surface Tension

Hours	Day/Mo/Yr	Time	Surface Tension	Initials
0*			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
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Week of			dynes/cm	
Week of			dynes/cm	

Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	
Week of			dynes/cm	

* For 0 hour reading carry 40 hour reading over from eight hour log sheet.

Exceedance Documentation Log for Periods of Excess Emissions

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Initials: _____
Start: _____
End: _____
Corrective action taken:

Addendum F
Sample Notification of Construction or Reconstruction

Notification of Construction or Reconstruction

Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

1. This form is being completed because (indicate yes/no)

_____ A chromium electroplating and/or chromium anodizing tank is being constructed.
_____ A chromium electroplating and/or chromium anodizing tank is being reconstructed.

2. Print or type the following for each plant in which a chromium electroplating and/or chromium anodizing tank is being constructed or reconstructed.

Owner/Operator/Title:_____

____

Street

Address:_____

City: _____ State:

Zip code: _____Plant Name:

Plant Phone Number: _____ _____Plant Contact/Title:

_____

Plant Address (if different from owner/operator's):

_____

City: _____ State:
Zip code: _____

3. Complete this section for each tank for which construction or reconstruction is planned. If additional lines are required make copies of this page.

Tank ID #	Type of tank	Expected start date for const/reconst	Expected end date for const/reconst	Anticipated startup date	Type of control technique to be used[1]	Control System ID #	Estimated total chromium emissions after control is applied[2]

[1] Attach design information from vendor, including design drawings and design capacity.

[2] Attach engineering calculations to support estimate. These calculations may be from the vendor. Emissions estimates should be expressed in units consistent with the emission limits in the regulation.

Example Response:

Tank ID #	Type of tank	Expected start date for const/reconst	Expected end date for const/reconst	Anticipated startup date	Type of control technique to be used[1]	Control System ID #	Estimated total chromium emissions after control is applied[2]
1	hard chrome plating	10/94	1/95	1/95	composite mesh system	5	0.01 mg/dscm
2	decorative chrome plating	2/95	6/95	6/95	wetting agent fume suppressant	N/A	will meet 45 dynes/cm

4. Indicate (yes/no) which of the following will apply after construction or reconstruction occurs.

_____Tanks are located at a facility that is a major source.
_____Tanks are located at a facility that is an area source.

(Note: a major source is a facility that emits greater than 10 tons per year of any one hazardous air pollutant (HAP) or 25 tons per year of multiple HAPs. All other sources are area sources. The major/area source determination is based upon all HAP emission points inside the facility fence line, not just the chromium electroplating and anodizing tanks.)

5. Indicate (yes/no) which of the following apply if hard chromium electroplating tanks are being constructed or reconstructed.

_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr, determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr, determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.
_____The facility wishes to accept a federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

6. Attach a brief description of the proposed emission control technique(s), including design drawings, design capacity, and emissions estimates with supporting calculations.

7. If reconstructing, attach a brief description of the source and the components to be replaced.

8. Complete the following if reconstruction will occur and the facility believes that there are economic or technical limitations to prevent the facility from complying with all relevant standards or requirements.

   a. Attach a discussion of any economic or technical limitations of complying with the relevant standards or requirements, sufficiently detailed to demonstrate how these limitations will affect the facility's ability to comply.

   b. Provide an estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new source:
   Replacement: $ _____; New source $ _____.

   c. Provide the estimated life of the source after the replacements.

9. Print or type the name and title of the Responsible Officer for the facility:
   (Name) _____
   (Title) _____

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

(Signature of Responsible Official) _____

(Date) ___/___/___

Addendum G
Sample Initial Notification Report

Initial Notification Report

Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title:_____

____

Street

Address:_____

City: _____ State:

Zip code: _____Plant Name:

Plant Phone Number: _____ _____Plant Contact/Title:

_____

Plant Address (if different from owner/operator's):

_____

City: _____ State:
Zip code: _____

1. Complete this section for all affected tanks using a chromic acid bath. If only trivalent chromium baths are used at the facility, go to section number 2.

   Complete the following table; if additional lines are required, make copies of this page.

Tank ID#	Type of tank	Startup date[1]	Total installed rectifier capacity (amps)	Description of parts plated	Applicable emission limit	Compliance date[2]

[1] New or reconstructed tanks with an initial startup date after 1/25/95 must submit a Notification of Construction / Reconstruction form and notify the Administrator of the date construction / reconstruction commenced and the actual startup date.
[2] Compliance dates for existing tanks: September 19, 2014
Compliance dates for new or reconstructed tanks with an initial startup after September 19, 2012: immediately upon startup

Example Response:

Tank ID#	Type of tank	Startup date	Total installed rectifier capacity (amperes)	Description of parts plated	Applicable emission limit	Compliance date
1	Chrome anodizing	1/1/85	5,000	Aircraft landing gear	45 dynes/cm or 0.01 mg/dscm	1/25/97
2	Hard chrome plating	1/1/85	10,000	Pistons	0.015 mg/dynes	1/25/97
3	Hard chrome plating	1/1/95	12,000	Pistons	0.015 mg/dynes	1/25/95
4	Hard chrome plating	3/1/95	12,000	Pistons	0.015 mg/dynes	3/1/95

Indicate (yes/no) which applies:
_____Tanks are located at a facility that is a major source
_____Tanks are located at a facility that is an area source

(Note: a major source is a facility that emits greater than 10 tons per year of any one hazardous air pollutant (HAP) or 25 tons per year of multiple HAPs. All other sources are area sources. The major / area source determination is based upon all HAP emission points inside the facility fence line, not just the chromium electroplating and anodizing tanks.)

Indicate which of the following apply if hard chromium electroplating tanks are operated in this facility.

_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.
_____Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.
_____The facility wishes to accept a Federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks.

2. Complete this section for all decorative chromium electroplating tanks using a trivalent chromium bath. If only chromic acid baths are used at the facility, do not complete this section and go to section number 3. Complete the following table, and if additional lines are required make copies of this page.

Tank ID #	Startup date[1]	Description of parts plated	Compliance date[2]

[1] New or reconstructed tanks with an initial startup date after 1/25/95 must submit a Notification of Construction / Reconstruction form and notify the Administrator of the date construction / reconstruction commenced and the actual startup date in accordance with 40 CFR 63.347 (c)(2).

[2] Compliance dates for existing tanks, tanks which commenced operation on or before 12/16/93: 1/25/96

Compliance dates for new tanks, tanks for which construction or reconstruction commenced after 12/16/93:

If initial startup occurred between 12/16/93 and 1/25/95 1/25/95

If initial startup occurred after 1/25/95 upon startup

Provide a brief description of the trivalent chromium electroplating process used at your facility. Attach a process flow diagram for each plating line.

Indicate which of the following applies to this facility (indicate yes/no):

_____The trivalent process used at this facility incorporates a wetting agent

_____The trivalent process used at this facility does not incorporate a wetting agent

List below (or attach) the trivalent chromium bath components and clearly identify the wetting agent.

3. Print or type the name and title of the Responsible Officer for the facility:

(Name) _____

(Title) _____

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

(Signature of Responsible Official) _____

(Date) ___/___/___

Addendum H
Sample Notification of Performance Test

Notification of Performance Test

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title:_____

____

Street

Address:_____

City: _____ State:

Zip code: _____Plant Name:

Plant Phone Number: _____ _____Plant Contact/Title:

_____

Plant Address (if different from owner/operator's):

_____

City: _____ State:
Zip code: _____

2. Complete the following table, if additional lines are required make copies of this page.

Type of control technique	Control System ID #	ID # of tank ducted to control system	Type of tank	Date of performance test

Example response:

Type of control technique	Control System ID #	ID # of tank ducted to control system	Type of tank	Date of performance test
composite mesh-pad system	10	1	Hard chrome plating	5/15/97

		2	Hard chrome plating	
		3	Hard chrome plating	
packed-bed scrubber	11	4	Hard chrome plating	5/18/97
		5	Hard chrome plating	
wetting agent fume suppressant	N/A	6	Chrome anodizing	none required

Addendum I
Sample Notification of Compliance Status

Notification of Compliance Status

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title:_____

_____

Street

Address:_____

City: _____ State:

Zip code: _____ Plant Name: _____ Plant

Phone Number: _____ _____Plant Contact/Title:

_____

Plant Address (if different from owner/operator's):

_____

City: _____ State:_____ Zip code: _____

2. Complete the following table, if additional lines are required make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Method to determine compliance[1]	Test method followed	Type and quantity of HAP emitted[2]

[1] If a performance test was conducted, submit the test report to the Division and the EPA.
[2] If compliance procedures are being followed, attach the calculations needed to support the emission limits expressed in mg/hr.

Example response:

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Method to determine compliance[1]	Test method followed	Type and quantity of HAP emitted[2]
1	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	performance test	EPA Method 306	Cr 0.009 mg/dscm
2	chrome anodizing	45 dynes/cm	wetting agent fume suppressant	N/A	surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	decorative chrome plating	0.01 mg/dscm	foam blanket	N/A	performance test	EPA Method 306A	Cr 0.005 mg/dscm

3. Complete the following table for each control technique used. If additional lines are needed, make copies of this page.

Control system ID #	Tank ID # (s)	Range of site-specific operating parameter values[1]			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness

[1] If the applicable monitoring and reporting requirements to demonstrate continuous compliance differ from the Chromium NESAHP, attach a description. Parameter value ranges are established through initial performance tests and correspond to emissions at or below the standard(s).

Example response:

Control system ID #	Tank ID # (s)	Range of site-specific operating parameter values[1]			
		Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness
10	1	7 in. w.c. ± 1 in.	N/A	N/A	N/A

N/A	2	N/A	N/A	☐45 dynes/cm	N/A
N/A	3	N/A	N/A	N/A	☐1 inch

4. Complete the following if hard chromium electroplating tanks are operated (indicate yes/no).

_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr, determined by multiplying the sum of the total installed rectifier capacity (amperes) by 8,400 hrs/yr and by 0.7 for each tank.
_____The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr, determined by multiplying the sum of the total installed rectifier capacity (amperes) by 8,400 hrs/yr and by 0.7 for each tank.
_____Records indicate that the facility's previous twelve-month cumulative current usage for the hard chromium electroplating tanks was less than 60 million amp-hr.
_____The facility accepts a federally-enforceable limit of less than 60 million amp-hr/yr on the maximum cumulative potential rectifier capacity.

5. Indicate (yes/no) which item describes the facility's compliance status.

_____The facility is in compliance with the provisions of 40 CFR Part 63, Subpart N.
_____The facility is not in compliance with the provisions of 40 CFR Part 63, Subpart N.

6. Print or type the name and title of the Responsible Officer for the facility:

(Name) _____
(Title) _____

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

(Signature of Responsible Official) _____

(Date) ___/___/___

Addendum J
Sample Ongoing Compliance Status Report

Ongoing Compliance Status Report

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title:_____

_____

Street

Address:_____

City: _____ State:

Zip code: _____Plant Name:

Plant Phone Number: _____ _____Plant

Contact/Title: _____

Plant Address (if different from owner/operator's):

_____

City: _____ State:
Zip code: _____

2. Complete the following table, if additional lines are required make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Operating parameter monitored to demonstrate compliance[1]	Acceptable value or range or values for monitored parameter(s)	Total operating time during reporting period

Example response:

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Operating parameter monitored to demonstrate compliance[1]	Acceptable value or range or values for monitored parameter(s)	Total operating time during reporting period
1	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	pressure drop	7 in. w.c. ± 1 in.	1,040 hr
2	chrome anodizing	45 dynes/cm	wetting agent fume suppressant	N/A	surface tension	□45 dynes/cm	1,040 hr
3	hard chrome plating	0.015 mg/dscm	composite mesh-pad system	10	pressure drop	7 in. w.c. ± 1 in.	1,040 hr

3. Identify the beginning and ending dates of the reporting period:

Beginning: _____/_____/_____

Ending: _____/_____/

4. For hard chromium electroplating tanks that are demonstrating they are a small facility by maintaining the actual cumulative rectifier capacity at less than 60 million amp-hr/yr, complete the following table for this reporting period.

Tank ID #	Ampere-hours consumed by month						Total ampere-hours consumed during reporting period
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	
Total for all tanks							

Example response:

Tank ID #	Ampere-hours consumed by month						Total ampere-hours consumed during reporting period
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	

1	400,000	400,000	400,000	200,000	200,000	200,000	1,800,000
3	300,000	300,000	300,000	300,000	300,000	300,000	1,800,000
Total for all tanks	700,000	700,000	700,000	500,000	500,000	500,000	3,600,000

4. Attach all monitoring data forms for the reporting period. Based on the data on excess emissions and the data on operating times, calculate the following hours:

Hours _____ Percent of total operating time _____

Duration of excess emissions caused by:

Process upsets _____

Control equipment malfunctions _____

Other known causes _____

Unknown causes _____

Total duration of excess emissions _____

6. Indicate (yes/no) which applies.

_____During this reporting period, the operation and maintenance practices were followed in accordance with the operation and maintenance plan for this source.

_____During this reporting period, the operation and maintenance practices were not followed in accordance with the operation and maintenance plan for this source.

7. If the operation and maintenance plan was not followed during the reporting period, please provide an explanation of the reasons for not following the provisions in the plan, an assessment of whether any excess emissions and/or parameter monitoring exceedances are believed to have occurred, and a copy of the appropriate records documenting that the operation and maintenance plan was not followed. Please state whether or not the plan is being revised accordingly.

8. Please describe any changes in monitoring, processes, or controls since the last reporting period.

9. Print or type the name and title of the Responsible Officer for the facility:

   (Name) _____
   (Title) _____

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

(Signature of Responsible Official) _____

(Date) ___/___/___

Addendum K
Initial Performance Test Result Report

Initial Performance Test Results Report

1. Complete one form for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title:

_____

Street Address:

_____

City: _____ State:

Zip code:_____

Plant Name: _____ Plant Phone Number:

_____

Plant Contact/Title:

_____

Plant Address (if different from owner/operator's):

_____

City: _____ State:
Zip code:_____

2. Complete the following table, if additional lines are required make copies of this page.

Tank ID #	Type of tank	Applicable emission limit	Type of control technique	Control System ID #	Operating parameter monitored to demonstrate compliance	Acceptable value or range or values for monitored parameter(s)	Result of Initial Performance Test

3. Describe the sampling location:

4. Sampling and analysis procedures and any modifications made to the standard procedures (type of surface tension measurement process used: stalagmometer, tensiometer, other):

5. Describe internal and external quality assurance program:

6. Complete the following table, if additional lines are required make copies of this page.

Tank ID#	Operating conditions during testing	Preparation for testing	Calibration procedures followed
Example:			
01	No unnecessary vibrations Tank at normal operations	Equipment cleaned Equipment setup properly	Manufacturer's recommended procedures

7. _____ The surface tension of tank No. _____ is equal to or below 40 or 33 dynes/cm, depending on measurement technique, as of the initial performance test date.

_____ The surface tension of tank No. _____ is equal to or below 40 or 33 dynes/cm, depending on measurement technique, as of the initial performance test date.

_____ The surface tension of tank No. _____ is equal to or below 40 or 33 dynes/cm, depending on measurement technique, as of the initial performance test date.

8. Print or type the name and title of the Responsible Officer for the facility:

(Name) _____
(Title) _____

A Responsible Official can be:
1) President, vice-president, secretary, or treasurer of the company owning the plant
2) Owner of the plant;
3) Plant engineer or supervisor;
4) Government official if the plant is owned by Federal, State, City, or County government; or
5) Ranking military officer if the plant is located in a military base

I Certify that information contained in this report to be accurate and true to the best of my knowledge:

(Signature of Responsible Official) _____

(Date) ___/___/___