

**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Parts 9 and 63**

[AD-FRL-5115-7]

RIN 2060-AC14

**National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks**

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

**SUMMARY:** Pursuant to section 112 of the Clean Air Act as amended in 1990 (the Act), this action promulgates final standards that limit the discharge of chromium compound air emissions from existing and new hard chromium electroplating, decorative chromium electroplating, and chromium anodizing tanks at major and area sources. Chromium compounds are among the 189 hazardous air pollutants (HAP) listed for regulation under section 112 of the Act. Hard and decorative chromium electroplating and chromium anodizing tanks have been identified by the EPA as significant emitters of chromium compounds to the atmosphere. The purpose of the final rule is to reduce chromium compound air emissions from the source categories identified above. All affected sources must limit emissions to the level of the maximum achievable control technology (MACT). The EPA is also finalizing Methods 306, 306A, and 306B with these standards.

**DATES:** *Effective Date:* January 25, 1995.

*Incorporation by Reference.* The incorporation by reference of certain publications in this standard is approved by the Director of the Office of the Federal Register as of January 25, 1995.

*Judicial Review.* Under section 307(b)(1) of the Act, judicial review of national emission standards for hazardous air pollutants (NESHAP) is available only by filing a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this final rule. Under section 307(b)(2) of the Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by the EPA to enforce these requirements.

**ADDRESSES:** *Docket.* Docket No. A-88-02, containing information considered by the EPA in developing the promulgated NESHAP for hard and decorative chromium electroplating and

chromium anodizing tanks is available for public inspection and copying between 8 a.m. and 5:30 p.m., Monday through Friday, except for Federal holidays, at the EPA's Air and Radiation Docket and Information Center, Room M1500, U. S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460; telephone (202) 260-7548. A reasonable fee may be charged for copying.

*Background Information Document.* A background information document (BID) for the promulgated NESHAP may be obtained from the docket; the U. S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone (919) 541-2777; or from National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia 22161, telephone (703) 487-4650. Please refer to "Chromium Emissions from Chromium Electroplating and Chromic Acid Anodizing Operations—Background Information for Promulgated Standards" (EPA-453/R-94-082b). The BID contains a summary of the public comments made on the proposed standards and EPA responses to the comments.

**FOR FURTHER INFORMATION CONTACT:** Mr. Lalit Banker of the Emission Standards Division (MD-13), U. S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone (919) 541-5420.

**SUPPLEMENTARY INFORMATION:** The information presented in this preamble is organized as follows:

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**I. Background**

Section 112(b) of the Act lists 189 HAP and requires the EPA to establish national emission standards for all major sources and some area sources of those HAP. Among the listed pollutants are chromium compounds. On July 16, 1992 (57 FR 31576), the EPA published a list of major and area sources for which NESHAP are to be promulgated and on December 3, 1993 (58 FR 83941), the EPA published a schedule for promulgation of those standards. The hard and decorative chromium electroplating and chromium anodizing source categories are included in the list of major and area sources for which the EPA is to establish national emission standards by November 1994.

This NESHAP was proposed in the **Federal Register** on December 16, 1993 (58 FR 65768). A public hearing on this rule was conducted on January 20, 1994. In addition, 62 letters commenting on the proposed rule were received during the public comment period, and 3 late comments were received.

**II. Summary****A. Summary of Promulgated Standards**

The final rule applies to major and area sources performing hard chromium electroplating, decorative chromium electroplating, and chromium anodizing. The affected source is each chromium electroplating or chromium anodizing tank. The emission limitations for each of these source categories are summarized in Table 1. These emission limitations apply only during tank operation, including periods of startup and shutdown. The emission limitation for all new hard chromium electroplating tanks, and for existing hard chromium electroplating tanks that are located at large, hard chromium electroplating facilities is based on the use of a composite mesh-pad system. The emission limitation for existing hard chromium electroplating tanks located at small, hard chromium electroplating facilities is based on the use of a packed-bed scrubber. For all existing and new sources performing decorative chromium electroplating and all existing and new sources performing chromium anodizing, the standard is based on the use of fume suppressants. Even though these technologies formed the bases for the standards, any technology can be used as long as it is demonstrated to meet the prescribed emission limitation. All area and major sources must limit emissions to the level of the maximum achievable control technology (MACT).

TABLE 1.—STANDARDS FOR CHROMIUM ELECTROPLATING AND CHROMIUM ANODIZING TANKS BASED ON MACT

Type of tank	Emission limitations	
	Small	Large
<b>Hard Chromium Plating Tanks</b>		
All existing tanks .....	0.03 mg/dscm (1.3×10 <sup>-5</sup> gr/dscf) .....	0.015 mg/dscm (6.6×10 <sup>-6</sup> gr/dscf)
All new tanks .....	0.015 mg/dscm (6.6×10 <sup>-6</sup> gr/dscf) .....	0.015 mg/dscm (6.6×10 <sup>-6</sup> gr/dscf)
<b>Decorative Chromium Plating Tanks Using a Chromic Acid Bath</b>		
All new and existing tanks .....	0.01 mg/dscm <sup>a</sup> (4.4×10 <sup>-6</sup> gr/dscf)	
<b>Chromium Anodizing Tanks</b>		
All new and existing tanks .....	0.01 mg/dscm <sup>a</sup> (4.4×10 <sup>-6</sup> gr/dscf)	

<sup>a</sup> In accordance with § 63.342(d)(2), owners or operators using a fume suppressant containing a wetting agent as a control technique can meet an alternate emission limitation of 45 dynes/cm (3.1×10<sup>-3</sup> lb/ft).

Owners and operators of all affected sources are also subject to work practice standards, which require them to complete an operation and maintenance (O&M) plan that contains the minimum elements of § 63.342(f)(3) and Table 2.

TABLE 2.—SUMMARY OF WORK PRACTICE STANDARDS

Control technique	Work practice standards	Frequency
Composite mesh-pad (CMP) system.	<ol style="list-style-type: none"> <li>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.</li> <li>2. Visually inspect back portion of the mesh pad closet to the fan to ensure there is no breakthrough of chromic acid mist.</li> <li>3. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks.</li> <li>4. Perform washdown of the composite mesh-pads in accordance with manufacturers recommendations.</li> </ol>	<ol style="list-style-type: none"> <li>1. 1/quarter.</li> <li>2. 1/quarter.</li> <li>3. 1/quarter.</li> <li>4. Per manufacturer.</li> </ol>
Packed-bed scrubber (PBS) .....	<ol style="list-style-type: none"> <li>1. Visually inspect device to ensure there is proper drainage, no chromic acid buildup on the packed beds, and no evidence of chemical attack on the structural integrity of the device.</li> <li>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.</li> <li>3. Same as number 3 above .....</li> <li>4. Add fresh makeup water to the top of the packed bed<sup>a,b</sup> .....</li> </ol>	<ol style="list-style-type: none"> <li>1. 1/quarter.</li> <li>2. 1/quarter.</li> <li>3. 1/quarter.</li> <li>4. Whenever makeup is added.</li> </ol>
PBS/CMP system .....	<ol style="list-style-type: none"> <li>1. Same as for CMP system .....</li> <li>2. Same as for CMP system .....</li> <li>3. Same as for CMP system .....</li> <li>4. Same as for CMP system .....</li> </ol>	<ol style="list-style-type: none"> <li>1. 1/quarter.</li> <li>2. 1/quarter.</li> <li>3. 1/quarter.</li> <li>4. Per manufacturer.</li> </ol>
Fiber-bed mist eliminator <sup>c</sup> .....	<ol style="list-style-type: none"> <li>1. Visually inspect fiber-bed unit and prefiltering device to ensure there is proper drainage, no chromic acid buildup in the units, and no evidence of chemical attack on the structural integrity of the devices.</li> <li>2. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks.</li> <li>3. Perform washdown of fiber elements in accordance with manufacturers recommendations.</li> </ol>	<ol style="list-style-type: none"> <li>1. 1/quarter.</li> <li>2. 1/quarter.</li> <li>3. Per manufacturer.</li> </ol>
Air pollution control device (APCD) not listed in rule.	To be proposed by the source for approval by the Administrator .....	To be proposed by the source for approval by the Administrator.

**Monitoring Equipment**

Pitot tube .....	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.	1/quarter.
Stalagmometer .....	Follow manufacturers recommendations.	

<sup>a</sup> 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.

<sup>b</sup> For horizontal-flow scrubbers, top is defined as the section of the unit directly above the packing 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.

<sup>c</sup> 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.

All existing sources performing hard chromium electroplating and chromium anodizing must comply with the emission limitations within 2 years of January 25, 1995. All existing sources performing decorative chromium electroplating must comply with the emission limitations within 1 year of

January 25, 1995. All new and reconstructed sources must comply immediately upon startup. Sources must demonstrate initial compliance with the prescribed emission limitation in accordance with §§ 63.343(b) and 63.344. Continuous compliance is demonstrated through the

monitoring required by § 64.343(c), as summarized in Table 3. As indicated in this table, the type of compliance monitoring performed is based on the type of control technique used to comply with the emission limitation, not the type of source being controlled.

TABLE 3.—SUMMARY OF MONITORING REQUIREMENTS

Control technique	Initial compliance test	Parameter(s) for compliance monitoring	Frequency of compliance monitoring
Composite mesh-pad (CMP) system.	Yes .....	Pressure drop across the unit .....	1/day.
Packed-bed scrubber (PSB)	Yes .....	Velocity pressure at the inlet of the control system and pressure drop across the unit.	1/day.
PBS/CMP system .....	Yes .....	Pressure drop across the unit .....	1/day
Fiber-bed mist eliminator .....	Yes .....	Pressure drop across the fiber-bed mist eliminator and the pressure drop across the upstream control device used to prevent plugging.	1/day.
Wetting agent-type fume suppressant.	Yes (Unless the criteria of § 63.343(b)(2) are met).	Surface tension .....	Once every 4 hours. <sup>a</sup>
Foam blankets .....	Yes .....	Foam thickness .....	Once per hour. <sup>a</sup>
Air pollution control device (APCD) not listed in rule.	Yes .....	To be proposed by the source for approval by Administrator.	N/A.

<sup>a</sup>Frequency can be decreased according to § 63.343 (c)(5)(ii) and (c)(6)(ii) of subpart N.

Owners or operators of affected sources are required to keep the records required by § 63.346 to document compliance with these standards. Records include those associated with

the work practice standards, performance test results, compliance monitoring data, duration of exceedances, and records to support a Federally-enforceable limit on facility

size. Reports must also be periodically submitted. Table 4 summarizes the reports to be submitted and the reporting timeframes.

TABLE 4.—SUMMARY OF REPORTING REQUIREMENTS

Section in Subpart N	Description	Timeframe for submittal
§ 63.345(b) .....	Notification of construction or reconstruction .....	Depends on when source was constructed—see § 63.345(b)(5).
§ 63.347(c)(1) .....	Initial notification .....	180 days after the effective date.
§ 63.347(c)(2) .....	—Notification of when construction commenced .....	—Within 30 days of commencement for sources built after effective date, or with notification required by § 63.345(b) if built prior to effective date.
	—Notification of actual startup .....	—Within 30 days of startup.
§ 63.347(d) .....	Notification of performance test .....	At least 60 days prior to test.
§ 63.347(e) .....	Notification of compliance status .....	Within 90 days of performance test (if a test is conducted) or within 30 days of compliance date.
§ 63.347(f) .....	Notification of performance test results .....	Within 90 days of performance test.
§ 63.347(g) .....	Compliance status reports for major sources .....	2 times/yr, or 4 times/yr if exceedances occur or if requested by Administrator.
§ 63.347(h) .....	Compliance status reports for area sources .....	Complete once/yr and maintain on site, or 2 times/yr if exceedances occur or if requested by Administrator.
§ 63.347(i) .....	—Initial notification for users of TVC baths .....	—Within 180 days of effective date.
	—Notification of compliance status for users of TVC baths ...	—Within 30 days of compliance date.
	—Notification of process change .....	—Within 30 days of process change.

**B. Summary of Major Changes Since Proposal**

In response to public comments received and additional analyses performed by the EPA, the following

changes have been made to the final rule since proposal:

1. The emission limits associated with the control technologies that form the bases for the standards have been revised. The emission limit based on the use of a composite mesh-pad system is

0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of exhaust air. The emission limit based on the use of a fume suppressant is 0.01 mg/dscm. The emission limit based on the use of a packed-bed scrubber is unchanged (0.03 mg/dscm).

TABLE 3.—SUMMARY OF MONITORING REQUIREMENTS

Control technique	Initial compliance test	Parameter(s) for compliance monitoring	Frequency of compliance monitoring
Composite mesh-pad (CMP) system.	Yes .....	Pressure drop across the unit .....	1/day.
Packed-bed scrubber (PBS)	Yes .....	Velocity pressure at the inlet of the control system and pressure drop across the unit.	1/day.
PBS/CMP system .....	Yes .....	Pressure drop across the unit .....	1/day.
Fiber-bed mist eliminator .....	Yes .....	Pressure drop across the fiber-bed mist eliminator and the pressure drop across the upstream control device used to prevent plugging.	1/day.
Wetting agent-type fume suppressant.	Yes (Unless the criteria of § 63.343(b)(2) are met).	Surface tension .....	Once every 4 hours. <sup>a</sup>
Foam blankets .....	Yes .....	Foam thickness .....	Once per hour. <sup>a</sup>
Air pollution control device (APCD) not listed in rule.	Yes .....	To be proposed by the source for approval by Administrator.	N/A

<sup>a</sup> Frequency can be decreased according to § 63.343 (c)(5)(ii) and (c)(6)(ii) of subpart N.

TABLE 4.—SUMMARY OF REPORTING REQUIREMENTS

Section in subpart N	Description	Timeframe for submittal
§ 63.345(b) .....	Notification of construction or reconstruction .....	Depends on when source was constructed—see § 63.345(b)(5). 180 days after the effective date.
§ 63.347(c)(1) .....	Initial notification .....	—Within 30 days of commencement for sources built after effective date, or with notification required by § 63.345(b) if built prior to effective date.
§ 63.347(c)(2) .....	—Notification of when construction commenced .....	—Within 30 days of startup.
	—Notification of actual startup .....	—Within 30 days of startup.
§ 63.347(d) .....	Notification of performance test .....	At least 60 days prior to test.
§ 63.347(e) .....	Notification of compliance status .....	Within 90 days of performance test (if a test is conducted) or within 30 days of compliance date.
§ 63.347(f) .....	Notification of performance test results .....	Within 90 days of performance test.
§ 63.347(g) .....	Compliance status reports for major sources .....	2 times/yr, or 4 times/yr if exceedances occur or if requested by Administrator.
§ 63.347(h) .....	Compliance status reports for area sources .....	Complete once/yr and maintain on site, or 2 times/yr if exceedances occur or if requested by Administrator.
§ 63.347(i) .....	—Initial notification for users of TVC baths .....	—Within 180 days of effective date.
	—Notification of compliance status for users of TVC baths.	—Within 30 days of compliance date.
	—Notification of process change .....	—Within 30 days of process change.

2. Owners or operators of decorative chromium electroplating tanks using a trivalent chromium process that incorporates a wetting agent are required only to submit the notifications required by § 63.347(i) with subsequent notifications required if the process is changed or replaced.

3. Existing sources performing hard chromium electroplating and chromium anodizing must comply with the standard within 2 years after January 25, 1995. Existing sources performing decorative chromium electroplating must comply with the standard within 1 year after January 25, 1995.

4. The monitoring, reporting, and recordkeeping requirements for affected sources have been reduced to the extent possible while still allowing the EPA to determine the compliance status on a continuous basis. Special consideration has been given to area sources.

5. Table 1 of subpart N clarifies which sections of the General Provisions apply

to sources subject to subpart N and which sections do not.

The rationale for the above changes is discussed in detail in section V of this preamble, which summarizes the major comments received on the proposed rule and the EPA's response to these comments. This section also discusses major comments that were received but that did not result in changes to the final rule.

**III. Summary of Environmental, Energy, Cost, and Economic Impacts**

*A. Environmental and Energy Impacts*

The environmental and energy impacts for the sources covered by this rulemaking are unchanged from proposal because the bases of the MACT standards have not changed.

*B. Cost Impacts*

The annualized cost of control for the sources covered by this rulemaking remain unchanged from proposal

because the bases of the MACT standards have not changed.

The monitoring, reporting, and recordkeeping burden in the final rule has decreased from the proposed requirements. Likewise, the costs of monitoring, reporting, and recordkeeping have also decreased. The on-going, annual cost of the final monitoring, reporting, and recordkeeping is approximately 160,000 hours for hard chromium electroplaters, 29,000 hours for decorative chromium electroplaters using a trivalent chromium plating process, 260,000 hours for other decorative chromium electroplaters, and 70,000 hours for chromium anodizers. Nationwide annual costs for these source categories are \$3.5 million for hard chromium electroplaters, \$640,000 for decorative chromium electroplaters using a trivalent chromium plating process, \$5.8 million for other decorative chromium electroplaters, and \$1.6 million for chromium anodizers. These numbers

are reduced from the nationwide annual costs associated with monitoring, reporting, and recordkeeping in the proposed rule of \$8.6 million for hard chromium electroplaters, \$1.6 million for decorative chromium electroplaters using a trivalent chromium plating process, \$14 million for other decorative chromium electroplaters, and \$3.8 million for chromium anodizers.

#### C. Economic Impacts

The economic impacts for the sources covered by this rulemaking are unchanged from proposal because the basis of the MACT standards have not changed.

#### IV. Public Participation

Prior to proposal of the chromium electroplating and anodizing rule, meetings of the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) were held on January 30 and November 19, 1991. These meetings were open to the public, and each attendee was given an opportunity to comment on the draft rule.

The proposed rule was published in the **Federal Register** on December 16, 1993 (58 FR 65768). The preamble to the proposal discussed the availability of the proposal BID (Chromium Electroplating NESHAP—Background Information for Proposed Standards (Volume I: EPA-453/R-93-030a and Volume II: EPA-453/R-93-030b)), which describes in detail the regulatory alternatives considered and the impacts associated with those alternatives. Public comments were solicited at the time of proposal, and copies of the proposal BID were made available to interested parties.

The public comment period officially ended on March 14, 1994. A public hearing was held on January 20, 1994. In addition, 62 comment letters were received during the public comment period; 3 late comments were also received. The comments were carefully considered, and where determined to be appropriate by the Administrator, changes were made in the final rule.

#### V. Significant Comments and Responses

Comments on the proposed rule were received from industry, environmental groups, and State and local regulatory agencies. A detailed discussion of these comments and responses can be found in the promulgation BID (see ADDRESSES section). The summary of comments and responses in the promulgation BID serves as the basis for the revisions that have been made to the rule between proposal and promulgation.

#### A. Selection of Source Categories and Pollutants To Be Regulated

Six commenters said that maximum cumulative potential rectifier capacity was an inappropriate parameter for determining facility size. Sources may have excess rectifier capacity to handle atypical applications, for safety purposes, or for other reasons, but may routinely operate at a significantly lower rectifier output. Several commenters urged the EPA to consider alternatives to the maximum potential rectifier capacity specified, such as actual annual ampere-hour usage, raising the maximum potential ampere-hour limit for small sources to 100 million amp-hr/yr, allowing sources to multiply the maximum potential rectifier capacity by 0.75 to account for oversizing, or allowing sources to accept Federally-enforceable limits on their rectifier capacity that would allow them to be categorized as "small" facilities.

Although the cutoff between small and large hard chromium electroplating facilities has not been changed, the EPA has included two provisions in the final rule to allow sources to use actual rectifier capacity or to limit their potential rectifier capacity. The first provision is available to facilities whose production records show that the previous annual, actual rectifier capacity was less than 60 million amp-hr/yr. Under this provision, hard chromium electroplating facilities may determine their size by using actual cumulative rectifier capacity in lieu of the maximum potential capacity if nonresettable, amp-hr meters are used on affected tanks. The final rule (§ 63.346(b)(12) and § 63.347(c)(1)(vi)) requires that records of amp-hr usage be kept.

The final rule also allows all sources performing hard chromium electroplating to establish Federally-enforceable limits on their rectifier capacity to allow facilities to comply with the standards for small, hard chromium electroplating tanks, even if those facilities have potential rectifier capacities that exceed the 60 million amp-hr/yr cutoff. A Federally-enforceable limit is obtained through the title V permit that is required by § 63.340(e) of the final rule. Records are required in accordance with § 63.346(b)(12) and § 63.347(c)(1)(viii) to document that the Federally-enforceable limit is being maintained.

The final rule has also been clarified to state that only the rectifiers associated with hard chromium electroplating should be used to determine maximum cumulative potential rectifier capacity.

Comments were received regarding other processes conducted by this source category that were not identified in the process description. One commenter pointed out a distinction among decorative chromium electroplating processes: Black chromium and white chromium. The commenter stated that black chromium electroplating is more like hard chromium electroplating in terms of process parameters, and the commenter recommended that black chromium electroplating be subject to the same requirements as hard chromium electroplating processes. Other commenters noted that the proposed rule did not cover a hard chromium electroplating method that uses lower amperage and a longer electroplating time (less amperage per square foot than decorative electroplating process) such that emissions are lower.

In the final rule, the definitions of hard chromium electroplating, decorative chromium electroplating, and chromium anodizing have been expanded, and are now expressed in terms of process parameters as well as by function. Regardless of what name a facility has assigned to its process, for the purposes of the regulation, the process will be regulated according to its function, bath operating parameters, and desired plating characteristics. Therefore, black decorative chromium electroplaters would likely be subject to the standards for hard chromium electroplaters based on plating characteristics. The EPA will provide States with additional guidance on these types of applicability issues in the enabling document.

The commenters that use a low-amperage electroplating process were concerned that such a process would not be allowed by the rule, even though emissions from this process are low. Although the process does differ from other hard chromium electroplating processes in that a lower amperage is used, the rule does not preclude the use of this process or any other technique to meet the applicable emission limitation. The rule does require that the technique be demonstrated through performance testing conducted in accordance with the test methods and procedures identified in the final rule, and that compliance monitoring be conducted to determine continuous compliance.

#### B. Selection of MACT/GACT Approach

Ten commenters questioned the Agency's decision to regulate area sources with MACT. A number of these commenters disagreed that the chromium compound toxicity data alone was justification for regulating

area sources as stringently as major sources. Other commenters stated that the costs to area sources regulated with MACT was unduly burdensome, particularly if those sources would be subject to title V. Two commenters suggested that the EPA apply GACT standards to small facilities to allow the Agency to focus its resources on facilities posing the greatest impact, or establish a threshold below which sources would be subject to GACT. Another commenter questioned the EPA's decision to apply MACT to area sources on the grounds that the Act does not intend a residual risk analysis for area sources. This commenter noted that it was important to have separate standards for area sources even if GACT was as stringent as MACT to preserve the intent of section 112(d).

In determining whether to apply MACT or GACT to the area sources in this source category, the EPA considered the toxicity of chromium compounds emitted from such sources and the availability of controls. The EPA has concluded that MACT should be applied to all area sources in all source categories. The basis for this decision is the toxicity of chromium compounds. The potency of hexavalent chromium, which is categorized as a Group A carcinogen, is well documented, and at least three epidemiological studies have shown a strong association between lung cancer and occupational exposures to mixtures of trivalent and hexavalent chromium. Therefore, the Agency has concluded that all chromium compounds emitted to the air should be considered toxic until adequate data are available to determine otherwise.

In selecting MACT over GACT for all area sources, the EPA also evaluated the availability of control technologies and the cost of compliance for area sources. The control technologies that form the bases for MACT are widely available.

Although § 112(d)(5) of the Act does allow an alternative standard for area sources, the EPA interprets this paragraph as authorizing the Administrator to establish GACT standard for area sources when the imposition of MACT is determined to be unreasonable. For the source categories subject to subpart N, the Agency considers it reasonable to apply MACT to area sources.

### *C. Selection of MACT for Hard Chromium Electroplating Tanks*

#### 1. Selection of the MACT Floor

Four commenters suggested that the MACT floor for new hard chromium electroplating tanks should be based on the use of a fiber-bed mist eliminator

(FBME) because this is the best technology in use.

The EPA has gathered additional information since proposal in response to public comments received. Based on this information, a total of five facilities are known to be using FBME to control chromium emissions from affected hard chromium electroplating and chromium anodizing tanks. These five facilities represent different sizes of hard chromium electroplating and chromium anodizing operations.

Emission test data were obtained from four of the five facilities using FBME (see Item No. IV-B-01 of Docket A-88-02). The emission test data available from one facility were incomplete and could not be used to assess the performance of fiber-bed units. The test results from the other facilities were adequate to evaluate the performance of FBME. However, after a thorough evaluation, it was determined that the limited data are not sufficient to establish an emission limit which must be met on a continuous long-term basis. In one case, the data were inadequate because only a single traverse was made when two should have been performed. In the other cases, the quantity of emissions captured during sampling was too small to meet Agency guidelines on minimum quantification levels. These data, therefore, must be treated as qualitative rather than quantitative results and may not be used to establish achievable emission limits. Based on this qualitative assessment, it appears that FBME offer excellent control potential.

In evaluating control technologies, the Agency also must consider the sustainability of any performance level. The EPA is concerned with the long-term performance of these systems because of the tendency of the fiber beds to plug. In other contexts, most vendors of FBME systems do not recommend their use as primary pollution control systems. Rather, they recommend that coarse prefiltering be provided upstream of the fiber beds to prevent plugging. The prefiltering devices range from a series of mesh pads to a complete packed-bed scrubber unit. At present, there are no long-term data available to assess any actual deterioration or operational problems associated with FBME. Fiber-bed mist eliminators to control chromium electroplating and anodizing tanks have only recently been installed as a result of local air district requirements; therefore, it is unlikely that any long-term data are available.

Because of the uncertainties in both the measured FBME performance data and the potential long-term variability of the system performance, the

Administrator cannot at this time determine that a more stringent emission limit could be achieved based on the application of FBME technology for new hard chromium plating or chromium anodizing operations. Therefore, the final MACT performance level of new hard chromium electroplating and chromium anodizing tanks is unchanged from the proposal. However, the limited data do suggest that FBME systems can achieve the emission limits established for composite mesh-pad systems and fume suppressants. Because this standard is a performance standard, the use of a specific technology is not mandatory; therefore, any system that meets or exceeds the required performance level may be used.

In order to facilitate the use of FBME to achieve compliance with the standard, monitoring provisions have been included in the final rule for use with FBME. (See discussion in section V.H.) The test methods in the proposed rule are suitable for demonstrating compliance with the standard regardless of the control technology employed.

#### 2. Regulatory Alternatives Considered

Eight commenters suggested that the EPA was too limiting in the regulatory alternatives for hard chromium electroplating operations. These commenters believed that the EPA should allow sources in this subcategory to use fume suppressants to comply with the standard, instead of locking sources into a control technology, such as packed-bed scrubbers. Four of the commenters also proposed that the EPA allow new and existing hard chromium electroplating operations the option of meeting the same surface tension limit allowed for decorative chromium electroplating operations that use a wetting agent-type fume suppressant.

The EPA has selected an emission limit format to provide sources with the flexibility to choose the emission control strategy best suited to their facility. The regulation only requires that any strategy selected meet the emission limits set out in the rule. As such, hard chromium electroplating sources can use fume suppressants to achieve compliance with the standard, as long as initial compliance testing demonstrates that the emission limit stipulated in the standard is being achieved. As discussed later in this preamble, however, on-going compliance monitoring is control-technique specific. As such, the owner or operator of any source that uses a fume suppressant to comply with an emission limitation shall monitor surface tension or foam blanket

thickness, as appropriate, to demonstrate continuous compliance.

### 3. Selection of MACT

Several commenters remarked that the standard for existing hard chromium electroplaters is inappropriate. Nine commenters stated that the standard was too stringent for large, hard chromium electroplaters; small, hard chromium electroplaters; or both. The arguments against regulating existing hard chromium electroplaters as stringently as that proposed were primarily that the costs associated with the standard were unduly burdensome and did not justify the resulting environmental benefit, and the emission concentration limits specified in the proposed rule were not consistently achievable using the control devices upon which the standards are based.

Five commenters, on the other hand, indicated that the standard for small, hard chromium electroplaters was too lenient. The arguments presented by the commenters who supported a more stringent standard for small, hard chromium electroplaters were that the residual risk associated with emissions from these sources warranted more stringent controls, the Agency's interpretation of the MACT floor was flawed (i.e.; should be based on a straight average, not a median); and the control efficiency for packed-bed scrubbers is overstated, as are the cost impacts for a standard based on the use of composite mesh-pad systems.

In setting an emission standard, the Act directs the Administrator to take into account costs, nonair quality health and environmental impacts, and energy requirements. To fulfill this requirement for existing hard chromium electroplating sources, the EPA evaluated the cost, impact, and benefit of a standard based on the use of a packed-bed scrubber as well as a standard based on the use of a composite mesh-pad system. The Agency's estimate of the incremental cost effectiveness of requiring all sources to meet a standard based on composite mesh-pad systems compared to one based on packed-bed scrubbers is approximately \$3.7 million per Megagram of chromium controlled (\$/Mg) for large sources and \$10.7 million/Mg for small sources.

Based on the EPA's economic analysis, a standard based on the use of composite mesh-pad systems by all sources would not cause adverse economic effects on large sources that currently use packed-bed scrubbers. Due to economies of scale, the economic impacts on larger facilities are consistently less than those on small

facilities. As a result, larger facilities will have a greater ability to pass on control costs. Although these costs may seem high, the EPA believes the toxicity of chromium justifies these costs. In consideration of the potential adverse impacts to small sources, the final rule requires a less stringent standard for small sources than large sources, which is based on the use of packed-bed scrubbers rather than composite mesh-pad systems. [See Chapter 5 of the New Technology Document ("Technical Assessment of New Emission Control Technologies Used in the Hard Chromium Electroplating Industry;" EPA-453/R-93-031) for a detailed discussion of EPA's economic analysis for these systems.]

The EPA considers the emission limitation based on the use of composite mesh-pad systems to be representative of and consistently achievable with well-maintained units. No data were submitted to support an alternate emission limitation. (For further discussion of the emission limitations, see section V.F.)

Regarding the comments that the proposed standard for small, hard chromium electroplaters was too lenient, the Agency believes that the MACT floor is properly based on the use of packed-bed scrubbers for this source category. The EPA promulgated a final rule on June 6, 1994 (57 FR 29196) that presents the Agency's interpretation of section 112(d)(A) of the Act regarding the basis for the MACT floor. Under this interpretation, the Agency considers the emission limitations achieved by the best performing 12 percent of existing sources and arrives at the MACT floor by selecting the median of the values, rather than a straight average. This interpretation was followed in establishing the MACT floor for small, hard chromium electroplaters. The Agency considers any discussion of the risk remaining from small, hard chromium electroplaters to be premature at this time.

In accordance with section 112(f) of the Act, if a significant residual risk from small, hard chromium electroplating operations regulated by MACT is found, the Agency is required to promulgate standards to mitigate that risk. The EPA recognizes the potential hazards of chromium emissions from small sources and has chosen to regulate area sources with MACT rather than GACT. The EPA also considers its cost and impact analysis for small, hard chromium electroplaters to be sound. The EPA estimated retrofit costs based on information from vendors who supply the equipment to the industry, and therefore estimates are

representative of the control costs incurred by affected sources. The EPA considers the efficiency assigned to packed-bed scrubbers for purposes of calculating impacts to be representative of that achieved by well-maintained and well-operated units controlling emissions from hard chromium electroplating tanks. As with comments on the emission limit based on composite mesh-pad systems, no data supporting alternate emission limits for a standard based on packed-bed scrubbers were submitted.

### D. Selection of MACT for Decorative Chromium Electroplating and Chromium Anodizing Tanks

#### 1. Regulation of the Trivalent Chromium Plating Process

Eleven commenters disagreed that decorative chromium electroplating tanks that use a trivalent chromium process should be regulated by the proposed rule. Many of the commenters felt that the EPA had insufficient data to conclude that the risk associated with this process warranted regulation of those sources. Four commenters found fault with the EPA's supporting data and noted that the level of hexavalent chromium in a trivalent chromium bath that corresponds to the EPA's estimate of hexavalent emissions from that bath would far exceed that level of hexavalent chromium that would destroy the trivalent bath. Three other commenters stated that use of the trivalent chromium process should be encouraged by the EPA, because trivalent processes result in less total chromium in process wastewater and less sludge generation. One of the commenters suggested regulating trivalent chromium electroplating processes under GACT to eliminate some of the burden associated with the reporting, recordkeeping, and monitoring requirements specified in the proposed rule.

Twelve commenters responded to the EPA's request for comment on whether the trivalent chromium electroplating process should be required for new sources. The majority of these commenters did not think that this should be a requirement because the process was not technically feasible for the full range of decorative chromium electroplating operations. Two commenters pointed out inconsistencies in the EPA's reasoning; the EPA can only require trivalent chromium baths if it recognizes the difference in toxicity between hexavalent and trivalent chromium.

The EPA has reconsidered the technical basis for regulating tanks

using the trivalent chromium electroplating process and the feasibility of requiring such a process for new sources. During development of the proposed standards, the EPA evaluated the trivalent chromium electroplating process as a pollution prevention alternative. Chromic acid is not present in the plating solution in the trivalent chromium processes, and hexavalent chromium is regarded as a bath contaminant in these processes. In addition, all of the trivalent chromium plating solutions with which EPA is familiar contain a wetting agent as an inherent bath component. That is, the wetting agent is part of the plating solution purchased from the vendor; it is not added separately by the end user.

With a trivalent chromium plating process, the potential emissions of chromium in any form are much lower because the concentration of total chromium in trivalent chromium baths is approximately four times lower than the total chromium concentration in chromic acid baths. Trivalent chromium processes greatly reduce emissions of the most potent form of chromium (hexavalent), and significantly lower emissions of chromium in other forms. In addition to reduction of air emissions, the use of trivalent chromium processes results in lower chromium concentrations in process wastewaters and, consequently, reduces the amount of sludge generated. Based on a source test conducted by the EPA, total chromium emissions from a trivalent chromium bath are approximately 99 percent less than those from a traditional, uncontrolled decorative hexavalent chromium bath. Hexavalent chromium emissions from a trivalent chromium bath were found to be approximately equivalent to those emitted from a decorative hexavalent chromium bath controlled by adding a wetting agent.

Although chromium emissions from the trivalent chromium process were low, the EPA had not anticipated the presence of hexavalent chromium in emissions from the trivalent electroplating process nor the level of total chromium emissions. Given that the Act lists all forms of chromium on the HAP list, the EPA considered the trivalent chromium electroplating process as a source of chromium emissions as well as an emission control alternative for the chromic acid electroplating process. Based on the emission test results, a decorative hexavalent chromium bath controlled by adding a wetting agent had equivalent hexavalent chromium emissions and less total chromium emissions than a trivalent chromium

plating bath. (As previously stated, for trivalent chromium baths, the wetting agent is inherent to the solution; it does not need to be added by the user.) In addition, the trivalent chromium process may not be technically feasible for all decorative chromium electroplating applications. Therefore, the final rule does not require the use of a trivalent chromium electroplating process for either existing or new decorative chromium electroplating tanks.

The EPA has decided to regulate sources that use trivalent chromium baths in the final rule. It is not clear whether the EPA data accurately reflect emissions from the trivalent chromium electroplating process, or if the analytical integrity of the data is suspect. In light of the ambiguity of the air emissions data, and given the other environmental benefits from the trivalent chromium process, the EPA has decided to regulate these baths differently from hexavalent chromium electroplating baths.

The final rule requires users of trivalent chromium baths to submit an initial notification and a notification of compliance status certifying that a trivalent chromium bath is being used and identifying the bath components (specifically, the wetting agent). Subsequent notifications are required only if the process is changed, or if a new trivalent chromium process is introduced. Users of trivalent chromium baths must also keep records of bath chemicals purchased so the EPA can be assured that the bath contains a wetting agent. These notification and recordkeeping requirements apply only to those trivalent chromium baths that incorporate a wetting agent. The EPA has evaluated baths with this characteristic and found them to have the environmental benefits discussed above. Although such baths are not known to exist, the EPA has chosen to regulate trivalent chromium baths that do not incorporate a wetting agent in the same manner as decorative chromium baths using a chromic acid solution. The EPA believes that this will discourage the use of a trivalent chromium bath that does not have a wetting agent as an inherent bath component.

## 2. Selection of MACT for Decorative Chromium Electroplating Tanks

Three commenters suggested that the proposed emission limit of 0.003 mg/dscm for decorative chromium electroplaters using hexavalent chromium baths was too stringent. Two commenters did not think that a source using either a fume suppressant or a fume suppressant in conjunction with a

packed-bed scrubber could consistently meet a limit of 0.003 mg/dscm.

In response to the comments received at proposal, the EPA has reconsidered the basis for the emission limit of 0.003 mg/dscm for decorative chromium electroplating and chromium anodizing tanks. As stated in the preamble to the proposed rule, this emission limit was based on tests of a decorative chromium electroplating tank in which a combination wetting agent/foam blanket was used to control emissions. Tests had also been conducted on a decorative chromium electroplating tank using only a foam blanket for control. The chromium emission data for all types of fume suppressants ranged from 0.001 to 0.007 mg/dscm, with the wetting agent/foam blanket data ranging from 0.001 to 0.003 mg/dscm and the foam blanket data ranging from 0.003 to 0.007 mg/dscm. In evaluating whether the proposed emission limit of 0.003 mg/dscm should be revised in the final rule, the EPA reassessed the effect the test methods may have had on the emission data obtained. The analytical method used for the fume suppressant test was colorimetric spectroscopy. As more efficient control technologies (such as composite mesh-pad systems) were developed, a more sensitive analytical method was needed to measure the lower concentrations of chromium being emitted. Therefore, the more sensitive ion chromatography method was used in the later phases of emission testing for these standards involving add-on control devices.

By using the less sensitive colorimetric analytical method, it is unclear whether the variation found between the two types of fume suppressants was due to a performance difference in the fume suppressants or was an artifact of the analytical method used. The fact that there is overlap between the foam blanket and wetting agent/foam blanket data further indicates that this could be the case. (Both were able to achieve a limit of 0.003 mg/dscm in one instance.) Therefore, the EPA has concluded that the emission limit in the final rule should be based on the performance of both foam blankets and wetting agents. Accordingly, the emission limit selected for decorative chromium electroplating and chromium anodizing tanks in the final rule is 0.01 mg/dscm. This emission limit was selected by applying a safety factor to the highest measured data point (0.007 mg/dscm) to account for variations in sampling and analytical procedures. The selection of this emission limit is consistent with the methodology used to select emission limits based on other control



techniques, as is further discussed in section V.F.

### 3. Selection of MACT Floor/MACT for Chromium Anodizing Tanks

Three commenters questioned the MACT floor established by the EPA for sources performing chromium anodizing. The commenters stated that it did not appear that the EPA had sufficient data to perform a MACT floor analysis for these sources. Commenters stated that chromium anodizers and decorative chromium electroplaters that cannot use fume suppressants should be considered separately, and the MACT floor for such sources should be based on packed-bed scrubbers. Also, according to six commenters, the standard for chromium anodizing tanks is not achievable in all situations, especially when an add-on control device is used in lieu of fume suppressants. One commenter stated that unless the standard for chromium anodizing tanks controlled with add-on control devices is set at 0.03 mg/dscm, sources will have to use an add-on control device followed by a fiber-bed mist eliminator to achieve the emission limit.

The MACT floor for chromium anodizing sources was based on information available to the EPA on the source category. Information on the industry was obtained through survey questionnaires to both industry representatives and control system vendors, site visit reports, and available emission data. Although information was not available from all sources in the category, the EPA believes the information was sufficient to satisfy the requirements of section 112(d)(3) of the Act. The survey responses, which included some aerospace facilities, indicated that fume suppressants were the control technique used predominantly in the industry. Section 112(d)(3) of the Act prohibits the EPA from establishing a standard that is any less stringent than the MACT floor for a category or subcategory of sources. No technical reason was provided by industry, nor is one known to the EPA, for creating a separate subcategory of sources for which fume suppressants are not technically feasible. Thus, all new and existing sources performing chromium anodizing must meet either an emission limit of 0.01 mg/dscm or maintain the surface tension specified in the rule. The EPA believes that the revised chromium emission limit of 0.01 mg/dscm for chromium anodizing tanks in the final rule is achievable by sources using add-on control technology. Alternatively, the EPA believes that the compliance timeframe for existing

sources performing chromium anodizing in the final rule (2 years) will allow these sources to further investigate the feasibility of using fume suppressants.

### E. Selection of the Format of the Standard

Seven commenters stated that the format of the standard should be expressed as a process emission rate in milligrams of chromium emitted per amp-hour of operation (mg/amp-hr), which would be consistent with California rules, rather than as an emission concentration (mg/dscm). According to the commenters, concentration-based standards are flawed because they can be circumvented by dilution, concentration can vary from system to system, and source test data indicate that outlet concentrations vary widely for different inlet conditions. Several commenters also pointed out that emissions should be correlated to production rates because chromium emissions increase proportionately with increased current. Two other commenters suggested that the final rule specify acceptable process emission rates to avoid an equivalency evaluation.

Based on the Agency's evaluation, the available test data indicate that a process emission rate format will not ensure consistent compliance with the control level required by the standard. The concentration data collected by the EPA for the composite mesh-pad and packed-bed scrubber systems do not overlap; that is, composite mesh-pad systems consistently outperform packed-bed scrubbers. The process emission rate data, on the other hand do overlap; even though composite mesh-pad systems are a superior technology to packed-bed scrubbers, both sometimes achieve the same process emission rate. This occurs because two sources can be using the same control technology and achieving the same outlet emissions concentration, but the one with the higher current loading will have a lower process emission rate. Commenters contend that this is reasonable because the production rate, as measured in ampere-hours, is related to emissions. However, the amount of current supplied to the tank is an indicator of the amount of uncontrolled emissions from the tank, not the controlled emission level from the tank. Because of the differences in process emission rate-based and concentration-based standards, and the source-specific nature of process emission rate standards, the EPA cannot cite an equivalent process emission rate in the final rule.

Regarding the issue of circumvention of the standard through dilution of the emission stream, the EPA believes that dilution of the gas stream can be determined by reviewing test and permit data for a facility. The outlet air flow rate measured during testing should approximate the design air flow rate for the control system reported on the permit application. If the two values differ significantly, then an inspection of the control system can be made to determine if dilution air is being introduced. It is also possible for a facility to dilute the inlet gas stream to the control device by designing a system to ventilate the electroplating tanks at air flow rates substantially above those required for adequate ventilation. However, the increased installation and maintenance costs associated with such a system would outweigh the costs of complying with the standard without dilution. Further, § 63.4(b) of the General Provisions expressly prohibits dilution as a means to comply with an emission limit. Therefore, concerns of dilution of the air stream were not considered to outweigh the benefits of a concentration-based format for the standard.

Eight commenters disagreed with the EPA's decision to base the standard on emissions of total chromium rather than on emissions of hexavalent chromium. Two commenters suggested allowing sources to demonstrate compliance by testing for hexavalent chromium in lieu of total chromium.

The EPA decided to base the standard on total chromium because the HAP list identifies all chromium compounds, not just hexavalent chromium compounds. In addition, based on testing conducted by the EPA for these source categories, the available test data indicate that hexavalent and total chromium levels in the emission stream were essentially the same for chromic acid baths (varying within  $\pm 10$  percent in most instances). Because the EPA data base is mainly comprised of data measured as hexavalent chromium, the final rule does allow all sources using chromic acid baths to demonstrate compliance by measuring either hexavalent or total chromium for all sources.

### F. Selection of the Emission Limits

Many commenters stated that the emission limit based on the use of composite mesh-pad systems should be changed. Three commenters suggested lowering the emission limit that is based on the use of composite mesh-pad systems, stating that the EPA did not test the best systems available, and suggested levels ranging from 0.001 mg/dscm to 0.009 mg/dscm. Other

commenters stated that the proposed limit based on composite mesh-pad systems (0.013 mg/dscm) was too low. Five commenters stated that the proposed emission limit for packed-bed scrubbers was also too high, noting that some units tested by the EPA did not achieve this limit.

The proposed emission limit of 0.013 mg/dscm for large hard chromium electroplaters was based on tests that the EPA conducted on actual control devices operating under normal process conditions. Lower limits than the one selected for large sources were measured from these devices, but the EPA based the emission limit on the highest measured data point and believes that this limit is consistently achievable. Regarding the emission limit based on packed-bed scrubbers, the EPA did test some packed-bed scrubber systems that were not achieving the level of 0.03 mg/dscm required by the proposed standard. However, these devices were not optimized to achieve the higher removal efficiencies. Specifically, when scrubbers were operated with periodic or continuous washdown in which fresh water was supplied as makeup to the top of the bed, a limit of at least 0.03 mg/dscm was achieved. The final rule includes work practice standards that require the use of fresh water added to the top of the packed bed whenever makeup additions occur. Thus, packed-bed scrubbers that are operated in accordance with the requirements of the rule should be able to achieve a limit of 0.03 mg/dscm. The EPA does not think it is appropriate to substantially change the emission limits based on the use of composite mesh-pad systems or packed-bed scrubbers; the commenters did not provide data that supported their claim that different emission limits are more appropriate.

As discussed previously, the emission limit for decorative chromium electroplating tanks and chromium anodizing tanks has been changed to 0.01 mg/dscm in the final rule by applying a safety factor to the highest data point (0.007 mg/dscm) in the fume suppressant data base. Similarly, the emission limit that is based on packed-bed scrubbers is based on rounding the highest value (0.028 mg/dscm) in the packed-bed scrubber data base to 0.03 mg/dscm to incorporate a safety factor. Therefore, in the final rule, the emission limit that is based on the use of composite mesh-pad systems (0.013 mg/dscm) has been adjusted to 0.015 mg/dscm by applying a safety factor to the highest value (0.013 mg/dscm) in the data base to ensure that the limit is achievable on a consistent basis.

#### G. Selection of Compliance Dates

Several commenters stated that the proposed compliance dates for affected existing sources did not allow sufficient time to achieve compliance with the proposed rule. The majority of these commenters suggested compliance timeframes of 2 to 3 years. According to the commenters, the compliance period specified in the proposed rule did not allow enough time to inform and educate affected owners and operators; acquire capital; conduct research and test systems; identify, purchase, and install control equipment; develop startup, shutdown, and malfunction plans; train staff; build inventories; and establish reporting and recordkeeping systems.

The Agency agrees with the commenters that the compliance timeframes for affected sources should be increased. The EPA recognizes that some of the facilities within all of the source categories will have to investigate the technical feasibility of installing control devices or using other technologies at their facility to meet the standards. Also, many area sources are not yet aware that a rule is to be promulgated for their industry, and time is needed for them to be made aware of the requirements of this rule. Therefore, the EPA has extended the compliance date to 1 year after the promulgation date for existing decorative chromium electroplaters and 2 years after the promulgation date for existing hard chromium electroplaters and chromium anodizers. The EPA believes that the 1 year timeframe for decorative chromium electroplaters is sufficient because, based on the EPA's survey data, 80 percent of existing sources already use fume suppressants and very few will need to install add-on air pollution control devices. The EPA thinks that the compliance timeframes in the final rule will address commenters concerns and still ensure implementation of controls in a timely fashion. Due to the toxicity of chromium compounds and the importance of controlling chromium emissions to protect human health and the environment, the Agency decided against a compliance time longer than 2 years for any of the source categories affected.

To accommodate sources that cannot comply with the standard by the compliance date, § 63.6(i) of the General Provisions and § 63.343(a)(6) of subpart N allows a source to request a 1-year compliance extension, which must be submitted 6 months in advance of the compliance date identified in the regulation. This extension combined with the compliance timeframes in the

proposed rule could provide a total of 2 years for compliance for decorative chromium electroplaters and 3 years for compliance for hard chromium electroplaters and chromium anodizers.

#### H. Selection of Monitoring Requirements

Section 114(a)(3) of the Act requires enhanced monitoring and compliance certification of all major stationary sources. The annual compliance certifications certify whether compliance has been continuous or intermittent. Enhanced monitoring shall be capable of detecting deviations from each applicable emission limit or standard with sufficient representativeness, accuracy, precision, reliability, frequency, and timeliness to determine if compliance is continuous during a reporting period. The monitoring in this regulation satisfies the requirements of enhanced monitoring.

##### 1. Compliance Monitoring for Add-on Air Pollution Control Devices

Eleven comments addressed the suitability of measuring gas velocity to demonstrate on-going compliance when add-on air pollution control devices are used to comply with an emission limit. The commenters stated that measuring gas velocity is very complicated, redundant with measuring pressure drop, and not indicative of control device performance. Two commenters pointed out that no suitable testing point may be accessible, and a permanent measurement device may be fouled by chromic acid.

Several commenters remarked on the requirement for measuring chromium concentration in the scrubber water. Four of these commenters stated that there is no obvious relationship between scrubber water chromium concentration and scrubber performance. Other commenters indicated that measurement of chromium concentration in scrubber water with a hydrometer is not accurate.

In revising the proposed rule, the EPA recognizes that the measurement of gas velocity could be burdensome and that other control system parameters could potentially be used to determine on-going compliance. Therefore, in the final rule, sources using composite mesh-pad systems are required to monitor pressure drop across the device for compliance purposes. Based on information gathered by the EPA, pressure drop is directly related to composite mesh-pad system performance, measurement of pressure drop is straightforward, and some users of composite mesh-pad systems are currently monitoring pressure drop. The

EPA believes that this change makes the rule more flexible for regulated sources, while still ensuring that the EPA has a mechanism for determining compliance with the emission limits at any given time.

The final rule requires sources that use a packed-bed scrubber to meet the emission limit must measure the velocity pressure at the inlet to the control system as well as the pressure drop across the device. The relationship between pressure drop and packed-bed scrubber performance is less reliable than the relationship between pressure drop and composite mesh-pad system performance because of the lower pressure drop in packed-bed scrubbers. Therefore, the EPA also requires sources using packed-bed scrubbers to monitor the velocity pressure at the inlet to the control device. This requirement will ensure that the gas velocity through the control system is maintained in accordance with vendor recommendations and, along with the pressure drop monitoring, will ensure that the control system is properly operating.

The requirement that sources using packed-bed scrubbers monitor the chromium concentration in the scrubber water has been eliminated, because the EPA concluded that monitoring of the velocity pressure at the control device inlet and the pressure drop across the device was sufficient to demonstrate compliance with the emission limits when packed-bed scrubbers are used.

Compliance monitoring requirements for fiber-bed mist eliminators have been added in the final rule because these devices could likely be used to meet the emission limitations, and some fiber-bed mist eliminators are known to be in use. Sources that use a fiber-bed mist eliminator to meet the emission limit must measure the pressure drop across the fiber-bed unit, as well as the pressure drop across the control device upstream of the fiber-bed unit that is in place to prevent plugging.

As discussed above, several changes have been made to the monitoring requirements specified in the proposed rule based on the EPA's review of comments received on the proposed rule and further investigation of which process parameters relate best to proper performance of the control systems. The final compliance monitoring requirements are found in § 63.343(c) of the final rule.

## 2. Work Practice Standards for Add-on Air Pollution Control Devices

In the proposed rule, Operation and Maintenance (O&M) requirements for add-on air pollution control devices

consisted of adding makeup water to packed-bed scrubbers, requiring washdown of composite mesh pads, and various inspections for both types of control devices. The majority of comments focused on the requirements associated with makeup water for packed beds and washdown for composite mesh pads. Several commenters suggested alternatives for the requirements for adding makeup water to packed-bed scrubbers. The commenters disagreed that makeup water can or should be added to the top of the scrubber. Others questioned the need to use fresh water in scrubbers and composite mesh pads because doing so increased wastewater flows. Other commenters requested that the final rule define the term "fresh water."

In the final rule, the O&M requirements have been replaced with work practice standards that address O&M practices [§ 63.342(f)]. The final rule continues to require sources using packed-bed scrubbers to meet an emission limit and ensure that all makeup water is fresh and supplied to the unit at the top of the packed bed. The EPA considers this requirement essential to meeting the prescribed emission limit. During source testing conducted by the EPA to establish the performance level of packed-bed scrubbers, it was noted that a system equipped with an overhead spray system that periodically cleaned the packing with fresh water performed much better than a system without such cleaning. Based on those results, the EPA believes that without the requirement that makeup water be fresh and added to the top of the packed bed, scrubbers will not continuously meet the required emission limit even if the scrubber met the limit during the initial performance test and is operated within the appropriate ranges of pressure drop and velocity pressure. For clarification, the term fresh water is defined in the final rule.

There were 11 comments on the washdown requirements for composite mesh-pad systems. Several of these commenters indicated that the specified washdown frequency was either impractical, infeasible, or unnecessary. Seven commenters suggested washdown requirements for composite mesh-pad systems be site-specific, as recommended by vendors, or apply only if pressure drop determinations indicate the potential presence of chromic acid buildup. Two commenters indicated that the washdown water will likely exceed the quantity of water that can be recycled, thus resulting in a wastewater stream that needs to be treated.

In the final rule, the EPA has revised the requirement that sources complying with an emission limit by using a composite mesh-pad system perform washdown of the pads. The EPA believes that washdown is an essential part of composite mesh-pad system operation; if proper system maintenance such as washdown does not occur, there will be a decline in system performance. However, instead of specifying a washdown frequency, the revised rule specifies that washdown be conducted in accordance with manufacturers' recommendations as part of a facility's O&M plan. The EPA recognizes that vendor designs for these systems vary significantly, and the requirements for washdown are based on the design of the unit and the operation of the plating tanks. The frequency of washdown is dependent upon the position of the pad in the control unit. Pads located in the front portions of the unit are exposed to higher chromium concentrations and, therefore, require washdowns more frequently than those located in the back of the unit. Washdown practices recommended by manufacturers vary from continuous in some cases to a maximum of once every 1 to 2 weeks.

The EPA has also added work practice standards for fiber-bed mist eliminators in the final rule because these control devices are likely to meet the emission limitations, and are known to be in use by sources affected by these standards. The work practice standards identified for fiber-bed mist eliminators are analogous to those identified for the composite mesh-pad system. Washdown requirements for fiber-bed units will depend on the efficiency of the prefiltering device and the operation of the plating tanks. Fiber-bed units installed downstream of more efficient prefiltering systems, such as packed-bed scrubbers, will require less frequent washdown than those using a less effective prefiltering device because of the lower inlet loading to the unit. Most vendors of fiber-bed units recommended monitoring of the pressure drop as a means of gauging when the unit needs to be washed down. If an increase in pressure drop is observed, then the unit will be washed down to remove any chromium built up on the fiber elements.

## 3. Frequency of Monitoring for Add-on Air Pollution Control Devices

Fourteen commenters indicated that the daily monitoring of add-on air pollution control devices is unnecessary, particularly for small sources, and suggested that at least some of the monitoring be required on only a weekly, monthly, or quarterly basis.

Other commenters suggested that monitoring be tied to production rate, that monitoring be conducted only on days when electroplating is taking place, or that monitoring requirements be reduced after the source has been in compliance for 6 months. Commenters also requested that monitoring be required only during tank operation, and that tank operation be defined. Several commenters disagreed with the proposed inspection frequency because of increased exposure hazards to persons conducting the inspections or of anticipated down-time due to the inaccessibility of control systems.

In response to these comments and to minimize the burden on regulated sources, the EPA has reduced the burden associated with the compliance monitoring and work practice standards in the final rule. The final rule continues to require daily monitoring of pressure drop and velocity pressure for compliance, but the monitoring procedures specified in the rule are the minimum required to determine continuous compliance. Once the monitoring devices are in place, the only labor required is that needed to read the gauges. The frequency of inspections for compliance with the work practice standards has also been reduced or revised. In the final rule, the frequency of inspections has been reduced from monthly or daily to once every 3 months. The EPA believes that the inspections are still necessary to ensure that system degradation is not occurring over time, because gradual degradation may not be apparent from compliance monitoring alone. Some commenters noted that their systems were not accessible for inspection, or that the inspection would result in extended downtime. The compliance timeframes in the final rule should allow sources sufficient time to retrofit their systems to facilitate inspections, and the negative effects of any downtime are minimized by the reduced inspection frequency.

The final rule also has been clarified so that monitoring requirements apply only during tank operation; tank operation is defined in § 63.341.

#### 4. Compliance Monitoring Associated With Fume Suppressants

Regarding the use of wetting agent-type fume suppressants, seven commenters indicated that the requirement for maintaining surface tension below 40 dynes/cm for chromic acid baths is inappropriate. The reasons provided by the commenters were that a surface tension standard may not be prudent to demonstrate compliance, a direct correlation between exceedance

of parameters and emission limits has not been established, and the rule should allow sources to set their own compliance value for surface tension. Other commenters noted that the specified limit was either too low or was not consistent with manufacturers' recommendations.

Based on data collected by the EPA, the performance of an electroplating bath controlled with a wetting agent-type fume suppressant can be determined by the surface tension of the bath. Therefore, the EPA believes that there is a direct link between surface tension and emissions. The EPA also believes that it is necessary and appropriate to set a default value for surface tension in the rule. Based on the EPA's experience, many decorative chromium electroplating tanks are not ventilated, making source testing impossible without considerable retrofitting.

The EPA has increased the default surface tension limit from the proposed 40 dynes/cm to 45 dynes/cm based on information received during the comment period. However, if a facility believes that a different surface tension value is appropriate, the rule allows a source to conduct a performance test concurrently with surface tension monitoring to establish the maximum surface tension that corresponds to compliance with the emission limits. The source would subsequently monitor surface tension, with an exceedance occurring if the surface tension of the bath exceeded the value measured during the performance test.

Regarding foam blanket-type fume suppressants, several commenters were concerned about the technique for measuring foam blanket thickness and the potential hazards associated with this measurement. Another commenter stated that the stack testing requirement is unreasonable due to its excessive cost.

The EPA does not believe that it is necessary to specify a procedure because it is simply a depth measurement. Specifying a technique may also hinder the development of site-specific techniques to reduce worker exposure. The EPA believes that wetting agents are safer than foam blankets because foam blankets present a potential safety hazard. The foam traps the hydrogen gas and chromic acid mist in the foam layer; if these gases build up and a spark is generated, a hydrogen explosion will result. As a means of encouraging wetting agent use over foam blankets, sources using wetting agents do not have to conduct a performance test unless they want to set a surface tension limit other than the

default value of 45 dynes/cm. The EPA believes that the compliance timeframes in the final rule will allow sources that currently use foam blankets the opportunity to explore the use of wetting agents. Sources that wish to continue using foam blankets will be required to conduct a performance test.

#### 5. Frequency of Monitoring Associated With Fume Suppressants

There were over 20 comments related to the frequency of monitoring surface tension. Several of these commenters made recommendations for alternate monitoring schedules, ranging from daily to monthly monitoring, in place of the 4-hour schedule. Among the reasons cited for decreasing the surface tension monitoring frequency were that surface tension does not change on a daily or weekly basis, measuring surface tension is very time-consuming and could require someone full-time if there were multiple tanks, and frequent monitoring results in increased worker exposure.

Thirteen commenters provided remarks regarding the burden of hourly testing for sources using foam blankets. The commenters noted that foam blankets that are used according to manufacturer's instructions are designed to last 24 hours provided the air is not agitated at the surface near the anodes and freeboard height is adequate. Therefore, visual observation is adequate for determining foam blanket effectiveness. Other commenters stated that the excessive monitoring requirements for foam blankets discourage their use, yet several States recommend or require foam blankets with less testing and recordkeeping than that proposed by the EPA.

In response to comments and some data received, the EPA recognizes that the 4-hour surface tension monitoring frequency specified in the proposed rule may be burdensome, and in some cases, unnecessary. The EPA has insufficient data, however, to establish the monitoring frequency that is appropriate for each mode of bath operation. Therefore, the final rule allows a decrease in monitoring frequency if no exceedances occur. Section 63.343(c)(5)(ii)(B) specifies that the surface tension be measured once every 4-hours of tank operation for the first 40 hours of tank operation after the compliance date. If no exceedances occur, monitoring can occur once every 8 hours of tank operation. Once there are again no exceedances during 40 hours of tank operation, surface tension measurement may be conducted once every 40 hours of tank operation on an on-going basis, until an exceedance occurs. Once an exceedance of the

standard occurs or the electroplating solution is changed out, the original monitoring schedule must be resumed.

Likewise, the final rule contains allowances to decrease the frequency of monitoring foam blanket thickness. The proposed hourly frequency is based on the EPA's experience that foam blankets can deplete quickly and must be closely monitored. The final rule is unchanged in that sources using a foam blanket must conduct a performance test, and the initial monitoring frequency is once per hour. However, as with wetting agents, the final rule allows a decrease in monitoring frequency if no exceedances occur. Section 63.343(c)(6)(ii)(B) specifies that the foam blanket thickness be measured once every hour of tank operation for the first 40 hours of tank operation after the compliance date. If no exceedances occur, the time between monitoring may be increased to once every 4 hours of tank operation. Once there are no exceedances during 40 hours of tank operation, foam blanket thickness measurement may be conducted once every 8 hours of tank operation on an on-going basis. As with wetting agents, if there is an exceedance or if the electroplating bath is changed out, the original monitoring schedule must be resumed.

#### I. Selection of Test Methods

Three commenters requested that CARB Method 425 be evaluated for equivalency, and if determined to be equivalent, be identified as such in the rule. These commenters also stated that sources that have performed this test should not have to retest. Four commenters asked whether retesting will be required if sources have conducted performance tests previously using 306, 306A, or an equivalent test method.

Section 63.344(c)(2) identifies the conditions under which the CARB Method 425 is considered equivalent. Basically, the acceptability of this test method will depend upon the analysis rather than the sampling train or sampling procedure. Regarding the issue of whether retesting is required, § 63.344(b) of the final rule outlines the criteria that must be met for a previous source test to be acceptable.

Two commenters requested that the rule provide guidance on how to verify compliance when both chromium anodizing and hard chromium electroplating tanks are vented to a common control device. Three commenters pointed out that the regulation does not account for the situation in which chromium electroplating sources share a

ventilation system with nonchromium sources that could introduce dilution air. Three commenters noted that it is extremely difficult to reconfigure some existing systems in such a way that only the emissions from chromium electroplating or anodizing are tested.

There are basically two situations involving multiple tanks manifolded to one control system: (1) The multiple tanks include a chromium electroplating or chromium anodizing tank among other tanks not affected by the rule; or (2) the multiple tanks include chromium tanks performing different operations (e.g., electroplating and anodizing) or hard chromium tanks subject to different emission limits (e.g., a new tank and an existing small tank), which may or may not be controlled with nonaffected sources. Section 63.344(e) of the final rule includes compliance provisions for both of these situations.

#### J. Selection of Reporting and Recordkeeping Requirements

Several commenters stated that the frequency of recordkeeping and reporting outlined in the proposed rule was overly burdensome and suggested several alternatives. Seven commenters stated that the types of recordkeeping required by the rule are inappropriate. In general, the commenters remarked that records, such as the amount of chemicals used and purchased and the amount of fume suppressant material added do not indicate compliance. Two commenters stated that recordkeeping requirements be limited to only surface tension measurements because that measurement is the basis of compliance. One commenter indicated there is no environmental benefit to keeping records of gas velocities, pressure drops, washdown conditions, and scrubber water chromium concentrations. Two commenters stated that maintaining records at a facility for 5 years is excessive; a more appropriate length of time would be 3 years. One commenter suggested a minimum of 2 years.

Two commenters suggested that the reporting schedule be replaced with a requirement that the source submit an annual certification that necessary control parameters have been met, consistent with the annual certification requirements of title V. Another commenter indicated that sources should not be required to submit compliance reports if the source's permitting agency inspects the onsite records annually. Finally, one commenter suggested that the rule allow a reduced reporting frequency after 2 years if sources do not experience

exceedances of any State or Federal emission standards.

Seven commenters stated that the costs associated with the monitoring and recordkeeping constituted an unnecessary burden to both large and small facilities. These commenters also noted that the EPA underestimated the costs associated with monitoring, reporting, and recordkeeping. Two of the commenters stated that small businesses do not have the resources to keep extensive records. Another commenter pointed out that the EPA has recognized differences in large and small facilities in selecting MACT emission standards and should also recognize differences between large and small facilities in selecting reporting, recordkeeping, and permitting requirements.

To respond to comments received and to reduce the burden on the many area sources that will be subject to these standards, the monitoring, reporting, and recordkeeping requirements have been reduced in the final rule to the extent possible while still providing the EPA with the ability to determine a source's continuous compliance status. The recordkeeping requirements are contained in § 63.346 of the final rule. The EPA concurs that the records required to be kept should correspond specifically to that which is required to demonstrate compliance. As such, recordkeeping associated with fume suppressants requires only that sources maintain records of the date and time of surface tension or foam blanket thickness measurements, as appropriate, the value measured, and the date and time of additions of fume suppressant to the bath. Likewise, the recordkeeping associated with the add-on air pollution control devices is reduced to the extent that the monitoring requirements have been reduced. Sources will have to keep records of pressure drop and velocity pressure, as appropriate, as well as records to document adherence with the O&M plan required by § 63.342(f)(3).

The final rule is unchanged from proposal in that it requires that owners or operators of affected sources maintain records for a period of 5 years following each occurrence, measurement, maintenance, corrective action, report, or record. This requirement is consistent with the General Provisions and with the title V permit program. The EPA believes retention of records for 5 years allows the EPA to establish a source's history and pattern of compliance for purposes of determining the appropriate level of enforcement action.

The final rule also requires submission of on-going compliance status reports to document whether a

source has been in continuous compliance with the standards. The final rule contains different reporting schedules for major and area sources. Major sources are required to submit on-going compliance status reports semiannually, unless an exceedance occurs, at which time quarterly reports would be required. This change is analogous to the requirements of the final General Provisions, which had only been proposed at the time of this proposed rulemaking.

In an effort to reduce the burden on area sources, the final rule allows area sources to complete an annual compliance report, and allows the source to maintain the report on site, to be made available to the Administrator or permitting authority upon request. The EPA recognizes that many permitting authorities may not be equipped to handle reports from area sources, and that these sources may not be the sources of primary concern to the authority. However, the requirements in the final rule do not alleviate affected area sources from complying with the reporting requirements of State or Federal operating permit programs under title V. The rule does require that area sources submit reports semiannually if exceedances occur, or if required by the Administrator or permitting authority.

Sources using a trivalent chromium bath are only required to keep records of the bath ingredients purchased. These sources must submit an initial notification and notification of compliance status, but are not required to submit on-going compliance status reports.

As a result of the reduced monitoring, reporting, and recordkeeping in the final rule compared to the proposed rule, the costs of these activities have also been reduced. A comparison of the cost of the monitoring, reporting, and recordkeeping associated with the final and proposed rules was presented in section III.B of this preamble for each of the regulated source categories.

One commenter requested that the rule clearly state which sections of the General Provisions apply to chromium electroplating sources and which do not apply. To eliminate confusion concerning the applicability of the General Provisions to this source category, Table 1 of subpart N lists which of the General Provisions to part 63 apply and which do not apply to affected sources.

#### K. Operating Permit Program

Eleven commenters stated that area sources should not be required to obtain title V operating permits because the

costs for area sources to obtain title V permits would be overly burdensome, and the emissions from these sources may be insignificant. Three of these commenters suggested that the rule explicitly state that a permit is required only for applicable emissions units at nonmajor sources. Two commenters asked that a general permit be included in the final rule to reduce the burden for small facilities. Another commenter stated that a title V permit is not necessary because existing requirements are enforceable through State and local permits. This commenter and one other commenter pointed out that because area sources are not likely to be subject to multiple MACT standards or to employ emissions averaging and complex alternate operating scenarios, title V permits do not benefit the area sources.

Two commenters stated that in preparing their title V permit programs, States did not anticipate a need for emission-unit specific permits at nonmajor sources, and inclusion of nonmajor sources under title V will require that many local agencies revise their permit programs. Two other commenters stated that States will not have the resources for completing title V permits for area sources; some states have exempted nonmajor sources from their permitting programs until the nonmajor source permitting rule is promulgated in the late 1990's.

The EPA believes that requiring all sources that are subject to the standards, including area sources, to obtain title V operating permits is important because of the toxicity of chromium compounds and the close proximity of many of these sources to residential areas. The EPA believes that permitting area sources will not be overly burdensome to permitting authorities and affected sources for the reasons given below.

First, many States are already permitting these sources under their State permit programs. The preamble to the final part 70 rule states that "some nonmajor sources would already be permitted at the State level, and therefore would have some experience with the permitting process and completing permit applications." Therefore, a State would have little reason to defer title V permitting of sources that already have State operating permits. Second, the burden may be reduced significantly by issuing general permits to these sources. According to the preamble to the final part 70 rule, general permits "\* \* \* provide an alternative means for permitting sources for which the procedures of the normal permitting process would be overly burdensome,

such as area sources under section 112\* \* \*" Under this option, States would develop a single general permit for this source category and issue it to individual sources; or alternatively, a letter or certification may be used. The burden would also be reduced by using general permits because public participation and the EPA and affected State review is only necessary when the initial general permit is drafted and issued. When subsequent general permits are issued to individual sources, these activities are not required. Finally, States are developing small business assistance programs (SBAP's) to assist these types of sources with the permitting process that will be funded using the annual fees collected from permitted sources. Small businesses may also be eligible for reduced permitting fees. Also, the EPA is developing a guidance document, scheduled to be completed by January 1995, which will include sample forms for monitoring, recordkeeping, and reporting requirements, and a simplified general operating permit.

Under title V, sources must include information on all emission points (except those considered insignificant under the State or local permit program) in their permit application. However, only these emission points that are subject to regulation will be addressed in the permit.

## VI. Administrative Requirements

### A. Docket

The docket for this rulemaking is A-88-02. The docket is an organized and complete file of all the information submitted to or otherwise considered by the EPA in the development of this rulemaking. The principal purposes of the docket are: (1) To allow interested parties a means to identify and locate documents so that they can effectively participate in the rulemaking process; and (2) to serve as the record in case of judicial review (except for interagency review materials) [section 307(d)(7)(A) of the Act]. The docket is available for public inspection at the EPA's Air and Radiation Docket and Information Center, the location of which is given in the ADDRESSES section of this notice.

### B. Executive Order 12866

Under Executive Order 12866 [58 FR 51735 (October 4, 1993)], the Agency must determine whether the regulatory action is "significant" and therefore subject to OMB review and the requirements of the Executive Order. The Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of the Executive Order 12866, the Office of Management and Budget (OMB) has notified the EPA that this action is a "significant regulatory action" within the meaning of the Executive Order. For this reason, this action was sent to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

**C. Paperwork Reduction Act**

Information collection requirements associated with this rule have been approved by OMB under the provisions of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*, and have been assigned OMB control number 2060-0327. An Information Collection Request (ICR) document has been prepared by the EPA (ICR No. 1611.02) to reflect the changed information requirements of the final rule and has been submitted to OMB for review. A copy may be obtained from Sandy Farmer, Information Policy Branch, EPA, 401 M Street, SW. (2136), Washington, DC 20460, or by calling (202) 260-2740.

The public reporting burden for this collection of information is estimated to average 34 hours per respondent in the first year, 117 hours per respondent in the second year, and 297 hours per respondent in the third year. This estimate includes the time required for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The burden is greatest in the second and third years because this is when performance tests will be conducted. An on-going burden of 104 hours per respondent is representative of the burden following the third year.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to

Chief, Information Policy Branch, EPA, 401 M Street, SW. (2136), Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for EPA."

**D. Regulatory Flexibility Act**

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires that a Regulatory Flexibility Analysis be performed for all rules that have "significant impact on a substantial number of small entities." If a preliminary analysis indicates that a proposed regulation would have a significant economic impact on 20 percent or more of small entities, then a regulatory flexibility analysis must be prepared.

Present Regulatory Flexibility Act guidelines define an economic impact as significant if it meets one of the following criteria:

(1) Compliance increases annual production costs by more than 5 percent, assuming costs are passed on to consumers;

(2) Compliance costs as a percentage of sales for small entities are at least 10 percent more than compliance costs as a percentage of sales for large entities;

(3) Capital costs of compliance represent a "significant" portion of capital available to small entities, considering internal cash flow plus external financial capabilities; or

(4) Regulatory requirements are likely to result in closures of small entities.

Using the Small Business Administration's definition of a small business for SIC Code 3471 of less than 500 employees, it has been determined that none of the above criteria are triggered. In the hard chromium electroplating source category, the number of small businesses is estimated to be 1,170. None of the regulatory alternatives considered will significantly impact 20 percent of this operation. For example, the estimated number of closures is approximated as less than 5 percent. Likewise, the standards for decorative chromium electroplaters and chromium anodizers would not cause any of the above criteria to be triggered.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this rule will not have a significant economic impact on a substantial number of small business entities because the number of small business entities that would be affected is not significant.

**E. Miscellaneous**

In accordance with section 117 of the Act, publication of this promulgated

rule was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

This regulation will be reviewed 8 years from the date of promulgation. This review will include an assessment of such factors as evaluation of the residual health risks, any overlap with other programs, the existence of alternative methods, enforceability, improvements in emission control technology and health data, and the recordkeeping and reporting requirements.

**List of Subjects in 40 CFR Parts 9 and 63**

Environmental protection, Air pollution control, Hazardous substances, Incorporation by reference, Reporting and recordkeeping requirements.

Dated: November 22, 1994.

**Carol M. Browner,**  
*Administrator.*

For the reasons set out in the preamble, title 40, Chapter I of the Code of Federal Regulations is amended as set forth below.

**PART 9—[AMENDED]**

1. The authority citation for part 9 continues to read as follows:

**Authority:** 7 U.S.C. 135 *et seq.*, 1235-136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601-2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1321, 1326, 1330, 1344, 1345 (d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971-1975; Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-1, 300j-2, 300j-3, 300j-4, 300j-9, 1857 *et seq.*, 6901-6992k, 7401-7671q, 7542, 9601-9657, 11023, 11048.

2. Section 9.1 is amended by adding a new entry to the table under the indicated heading in numerical order to read as follows:

**§ 9.1 OMB approvals under the Paperwork Reduction Act.**

40 CFR citation	OMB control No.
* * * * *	
* * * * *	
National Emission Standards for Hazardous Air Pollutants for Source Categories:	
* * * * *	
63.345-63.347 .....	2060-0327
* * * * *	



**PART 63—[AMENDED]**

1. The authority citation for part 63 continues to read as follows:

**Authority:** 42 U.S.C. 7401 *et seq.*

2. Section 63.14 is amended by adding paragraphs (b) (4) and (5) to read as follows:

**§ 63.14 Incorporation by reference.**

\* \* \* \* \*

(b) \* \* \*

(4) ASTM D 1193-77, Standard Specification for Reagent Water, IBR approved for Method 306, section 4.1.1 and section 4.4.2, of appendix A to part 63.

(5) ASTM D 1331-89, Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents, IBR approved for Method 306B, section 2.2, section 3.1, and section 4.2, of appendix A to part 63.

\* \* \* \* \*

3. By adding a new subpart N to read as follows:

**Subpart N—National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks**

Sec.

- 63.340 Applicability and designation of sources.
- 63.341 Definitions and nomenclature.
- 63.342 Standards.
- 63.343 Compliance provisions.
- 63.344 Performance test requirements and test methods.
- 63.345 Provisions for new and reconstructed sources.
- 63.346 Recordkeeping requirements.
- 63.347 Reporting requirements.

**Table 1 to Subpart N of Part 63—General Provisions Applicability to Subpart N**

**Subpart N—National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks**

**§ 63.340 Applicability and designation of sources.**

(a) The affected source to which the provisions of this subpart apply is each chromium electroplating or chromium anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating, or chromium anodizing.

(b) Owners or operators of affected sources subject to the provisions of this subpart must also comply with the requirements of subpart A of this part, according to the applicability of subpart A of this part to such sources, as identified in Table 1 of this subpart.

(c) Process tanks associated with a chromium electroplating or chromium

anodizing process, but in which neither chromium electroplating nor chromium anodizing is taking place, are not subject to the provisions of this subpart. Examples of such tanks include, but are not limited to, rinse tanks, etching tanks, and cleaning tanks. Likewise, tanks that contain a chromium solution, but in which no electrolytic process occurs, are not subject to this subpart. An example of such a tank is a chrome conversion coating tank where no electrical current is applied.

(d) Affected sources in which research and laboratory operations are performed are exempt from the provisions of this subpart when such operations are taking place.

(e) The owner or operator of an affected source subject to the requirements of this subpart is required to obtain a title V permit from the permitting authority in which the affected source is located.

**§ 63.341 Definitions and nomenclature.**

(a) *Definitions.* Terms used in this subpart are defined in the Act, in subpart A of this part, or in this section. For the purposes of subpart N of this part, if the same term is defined in subpart A of this part and in this section, it shall have the meaning given in this section.

*Add-on air 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).

*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.

*Base metal* 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 for fume suppressant is mist suppressant.

*Chromic acid* means the common name for chromium anhydride (CrO<sub>3</sub>).

*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 electrical circuit, and the chromic acid solution, with a concentration typically ranging from 50 to 100 grams per liter (g/L), serves as the electrolyte.

*Chromium electroplating or chromium anodizing tank* means the receptacle or container in which hard or decorative chromium electroplating or chromium anodizing occurs.

*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.

*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<sup>2</sup>) for total plating times ranging between 0.5 to 5 minutes.

*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 workpiece or for oxidizing the base material.

*Emission limitation* means, for the purposes of this subpart, 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).

*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 applied to that solution.

*Fresh water* means water, such as tap water, that has not been previously used in a process operation or, if the water has been recycled from a process operation, it has been treated and meets the effluent guidelines for chromium wastewater.

*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<sup>2</sup> for total plating times ranging from 20 minutes to 36 hours depending upon the desired plate thickness.

*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).

*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 percent 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.

*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.

*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.

*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.

*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 a device used to measure the surface tension of a solution.

*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 tank or a chromium anodizing tank.

*Tensiometer* means a device used to measure the surface tension of a solution.

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

*Trivalent chromium 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 chemical fume suppressant that reduces the surface tension of a liquid.

(b) *Nomenclature.* The nomenclature used in this subpart has the following meaning:

(1) AMR=the allowable mass emission rate from each type of affected source subject to the same emission limitation in milligrams per hour (mg/hr).

(2) AMR<sub>sys</sub>=the allowable mass emission rate from affected sources controlled by an add-on air pollution control device controlling emissions from multiple sources in mg/hr.

(3) EL=the applicable emission limitation from § 63.342 in milligrams per dry standard cubic meter (mg/dscm).

(4) IA<sub>total</sub>=the sum of all inlet duct areas from both affected and nonaffected sources in meters squared.

(5) IDA<sub>i</sub>=the total inlet area for all ducts associated with affected sources in meters squared.

(6) IDA<sub>i,a</sub>=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 in meters squared.

(7) VR=the total of ventilation rates for each type of affected source subject to the same emission limitation in dry standard cubic meters per minute (dscm/min).

(8) VR<sub>inlet,a</sub>=the total ventilation rate from all inlet ducts associated with affected sources in dscm/min.

(9) VR<sub>inlet,a</sub>=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 in dscm/min.

(10) VR<sub>tot</sub>=the average total ventilation rate for the three test runs as determined at the outlet by means of the Method 306 in appendix A of this part testing in dscm/min.

#### § 63.342 Standards.

(a) Each owner or operator of an affected source subject to the provisions of this subpart shall comply with these requirements on and after the compliance dates specified in § 63.343(a). All affected sources are regulated by applying maximum achievable control technology.

(b) *Applicability of emission limits.*

(1) The emission limitations in this section apply only during tank operation, and also apply during periods of startup and shutdown as these are routine occurrences for affected sources subject to this subpart. The emission limitations do not apply during periods of malfunction, but the work practice standards that address operation and maintenance and that are required by paragraph (f) of this section must be followed during malfunctions.

(2) If an owner or operator is controlling a group of tanks with a common add-on air pollution control device, the emission limitations of paragraphs (c), (d), and (e) of this section apply whenever any one affected source is operated. The emission limitation that applies to the group of affected sources is:

(i) The emission limitation identified in paragraphs (c), (d), and (e) of this section if the affected sources are performing the same type of operation (e.g., hard chromium electroplating), are subject to the same emission limitation, and are not controlled by an add-on air pollution control device also controlling nonaffected sources;

(ii) The emission limitation calculated according to § 63.344(e)(3) if affected sources are performing the same type of operation, are subject to the same emission limitation, and are controlled with an add-on air pollution control device that is also controlling nonaffected sources; and

(iii) The emission limitation calculated according to § 63.344(e)(4) if affected sources are performing different types of operations, or affected sources are performing the same operations but subject to different emission limitations, and are controlled with an add-on air pollution control device that may also be controlling emissions from nonaffected sources.

(c)(1) *Standards for hard chromium electroplating tanks.* During tank operation, each owner or operator of an existing, new, or reconstructed affected source shall control chromium emissions discharged to the atmosphere from that affected source by not allowing the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed:

(i) 0.015 milligrams of total chromium per dry standard cubic meter (mg/dscm) of ventilation air ( $6.6 \times 10^{-6}$  grains per dry standard cubic foot [gr/dscf]); or

(ii) 0.03 mg/dscm ( $1.3 \times 10^{-5}$  gr/dscf) if the hard chromium electroplating tank is an existing affected source and is located at a small, hard chromium electroplating facility.

(2)(i) An owner or operator may demonstrate the size of a hard chromium electroplating facility through the definitions in § 63.341(a). Alternatively, an owner or operator of a facility with a maximum cumulative potential rectifier capacity of 60 million amp-hr/yr or more may be considered small if the actual cumulative rectifier capacity is less than 60 million amp-hr/yr as demonstrated using the following procedures:

(A) If records show that the facility's previous annual actual rectifier capacity was less than 60 million amp-hr/yr, by using nonresettable ampere-hr meters and keeping monthly records of actual ampere-hr usage for each 12-month rolling period following the compliance date in accordance with § 63.346(b)(12). The actual cumulative rectifier capacity for the previous 12-month rolling period shall be tabulated monthly by adding the capacity for the current month to the capacities for the previous 11 months; or

(B) By accepting a Federally-enforceable limit on the maximum cumulative potential rectifier capacity of a hard chromium electroplating facility through the title V permit required by § 63.340(e), and by

maintaining monthly records in accordance with § 63.346(b)(12) to demonstrate that the limit has not been exceeded. The actual cumulative rectifier capacity for the previous 12-month rolling period shall be tabulated monthly by adding the capacity for the current month to the capacities for the previous 11 months.

(ii) Once the monthly records required to be kept by § 63.346(b)(12) and by this paragraph show that the actual cumulative rectifier capacity over the previous 12-month rolling period corresponds to the large designation, the owner or operator is subject to the emission limitation identified in paragraph (c)(1)(i) of this section, in accordance with the compliance schedule of § 63.343(a)(5).

(d) *Standards for decorative chromium electroplating tanks using a chromic acid bath and chromium anodizing tanks.* During tank operation, each owner or operator of an existing, new, or reconstructed affected source shall control chromium emissions discharged to the atmosphere from that affected source by either:

(1) Not allowing the concentration of total chromium in the exhaust gas stream discharged to the atmosphere to exceed 0.01 mg/dscm ( $4.4 \times 10^{-6}$  gr/dscf); or

(2) If a chemical fume suppressant containing a wetting agent is used, by not allowing the surface tension of the electroplating or anodizing bath contained within the affected source to exceed 45 dynes per centimeter (dynes/cm) ( $3.1 \times 10^{-3}$  pound-force per foot [lb<sub>f</sub>/ft]) at any time during operation of the tank.

(e) *Standards for decorative chromium electroplating tanks using a trivalent chromium bath.* (1) Each owner or operator of an existing, new, or reconstructed decorative chromium electroplating tank that uses a trivalent chromium bath that incorporates a wetting agent as a bath ingredient is subject to the recordkeeping and reporting requirements of §§ 63.346(b)(14) and 63.347(i), but are not subject to the work practice requirements of paragraph (f) of this section, or the continuous compliance monitoring requirements in § 63.343(c). The wetting agent must be an ingredient in the trivalent chromium bath components purchased from vendors.

(2) Each owner or operator of an existing, new, or reconstructed decorative chromium electroplating tank that does not incorporate a wetting agent as a bath ingredient is subject to the standards of paragraph (d) of this section.

(3) Each owner or operator of existing, new, or reconstructed decorative chromium electroplating tank that had been using a trivalent chromium bath that incorporates a wetting agent and ceases using this type of bath must fulfill the reporting requirements of § 63.347(i)(3) and comply with the applicable emission limitation within the timeframe specified in § 63.343(a)(7).

(f) *Work practice standards.* The work practice standards of this section address operation and maintenance practices. All owners or operators subject to the standards in paragraphs (c) and (d) of this section are subject to these work practice standards.

(1)(i) At all times, including periods of startup, shutdown, and malfunction, owners or operators shall operate and maintain any affected source, including associated air pollution control devices and monitoring equipment, in a manner consistent with good air pollution control practices, consistent with the operation and maintenance plan required by paragraph (f)(3) of this section.

(ii) Malfunctions shall be corrected as soon as practicable after their occurrence in accordance with the operation and maintenance plan required by paragraph (f)(3) of this section.

(iii) Operation and maintenance requirements established pursuant to section 112 of the Act are enforceable independent of emissions limitations or other requirements in relevant standards.

(2)(i) Determination of whether acceptable operation and maintenance procedures are being used will be based on information available to the Administrator, which may include, but is not limited to, monitoring results; review of the operation and maintenance plan, procedures, and records; and inspection of the source.

(ii) Based on the results of a determination made under paragraph (f)(2)(i) of this section, the Administrator may require that an owner or operator of an affected source make changes to the operation and maintenance plan required by paragraph (f)(3) of this section for that source. Revisions may be required if the Administrator finds that the plan:

(A) Does not address a malfunction that has occurred;

(B) Fails to provide for the operation of the affected source, the air pollution control techniques, or the control system and process monitoring equipment during a malfunction in a manner consistent with good air pollution control practices; or

(C) Does not provide adequate procedures for correcting malfunctioning process equipment, air pollution control techniques, or monitoring equipment as quickly as practicable.

(3) *Operation and maintenance plan.*

(i) The owner or operator of an affected source subject to the work practices of paragraph (f) of this section shall prepare an operation and maintenance plan to be implemented no later than the compliance date. The plan shall be incorporated by reference into the source's title V permit and shall include the following elements:

(A) The plan shall specify the operation and maintenance criteria for the affected source, the add-on air pollution control device (if such a device is used to comply with the emission limits), and the process and control system monitoring equipment, and shall include a standardized checklist to document the operation and maintenance of this equipment;

(B) For sources using an add-on air pollution control device or monitoring equipment to comply with this subpart, the plan shall incorporate the work practice standards for that device or monitoring equipment, as identified in Table 1 of this section, if the specific equipment used is identified in Table 1 of this section;

(C) If the specific equipment used is not identified in Table 1 of this section, the plan shall incorporate proposed work practice standards. These proposed work practice standards shall be submitted to the Administrator for approval as part of the submittal required under § 63.343(d);

(D) The plan shall specify procedures to be followed to ensure that equipment or process malfunctions due to poor maintenance or other preventable conditions do not occur; and

(E) The plan shall include a systematic procedure for identifying

malfunctions of process equipment, add-on air pollution control devices, and process and control system monitoring equipment and for implementing corrective actions to address such malfunctions.

(ii) If the operation and maintenance plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction at the time the plan is initially developed, the owner or operator shall revise the operation and maintenance plan within 45 days after such an event occurs. The revised plan shall include procedures for operating and maintaining the process equipment, add-on air pollution control device, or monitoring equipment during similar malfunction events, and a program for corrective action for such events.

(iii) Recordkeeping associated with the operation and maintenance plan is identified in § 63.346(b). Reporting associated with the operation and maintenance plan is identified in § 63.347 (g) and (h) and paragraph (f)(3)(iv) of this section.

(iv) If actions taken by the owner or operator during periods of malfunction are inconsistent with the procedures specified in the operation and maintenance plan required by paragraph (f)(3)(i) of this section, the owner or operator shall record the actions taken for that event and shall report such actions within 2 working days after commencing actions inconsistent with the plan. This report shall be followed by a letter within 7 working days after the end of the event, unless the owner or operator makes alternative reporting arrangements, in advance, with the Administrator.

(v) The owner or operator shall keep the written operation and maintenance plan on record after it is developed to be made available for inspection, upon request, by the Administrator for the life of the affected source or until the source

is no longer subject to the provisions of this subpart. In addition, if the operation and maintenance plan is revised, the owner or operator shall keep previous (i.e., superseded) versions of the operation and maintenance plan on record to be made available for inspection, upon request, by the Administrator for a period of 5 years after each revision to the plan.

(vi) To satisfy the requirements of paragraph (f)(3) of this section, the owner or operator may use applicable standard operating procedure (SOP) manuals, Occupational Safety and Health Administration (OSHA) plans, or other existing plans, provided the alternative plans meet the requirements of this section.

(g) The standards in this section that apply to chromic acid baths shall not be met by using a reducing agent to change the form of chromium from hexavalent to trivalent.

**§ 63.343 Compliance provisions.**

(a) *Compliance dates.* (1) The owner or operator of an existing affected source shall comply with the emission limitations in § 63.342 as follows:

(i) No later than 1 year after January 25, 1995, if the affected source is a decorative chromium electroplating tank; and

(ii) No later than 2 years after January 25, 1995, if the affected source is a hard chromium electroplating tank or a chromium anodizing tank.

(2) The owner or operator of a new or reconstructed affected source that has an initial startup after January 25, 1995, shall comply immediately upon startup of the source. The owner or operator of a new or reconstructed affected source that has an initial startup after December 16, 1993 but before January 25, 1995, shall follow the compliance schedule of § 63.6(b) (3) and (4).

TABLE 1 TO § 63.342.—SUMMARY OF WORK PRACTICE STANDARDS

Control technique	Work practice standards	Frequency
Composite mesh-pad (CMP) 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.	1. 1/quarter.
	2. Visually inspect back portion of the mesh pad closest to the fan to ensure there is no breakthrough of chromic acid mist.	2. 1/quarter.
	3. Visually inspect ductwork from tank to the control device to ensure there are no leaks.	3. 1/quarter.
	4. Perform washdown of the composite mesh-pads in accordance with manufacturers recommendations.	4. Per manufacturer.
Packed-bed scrubber (PSB) .....	1. Visually inspect device to ensure there is proper drainage, no chromic acid buildup on the packed beds, and no evidence of chemical attack on the structural integrity of the device.	1. 1/quarter.
	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.	2. 1/quarter.
	3. Same as number 3 above .....	3. 1/quarter.

TABLE 1 TO § 63.342.—SUMMARY OF WORK PRACTICE STANDARDS—Continued

Control technique	Work practice standards	Frequency
PBS/CMP system .....	4. Add fresh makeup water to the top of the packed bed <sup>a, b</sup> .....	4. Whenever makeup is added. 1. 1/quarter. 2. 1/quarter. 3. 1/quarter. 4. Per manufacturer.
Fiber-bed mist eliminator <sup>c</sup> .....	1. Same as for CMP system .....	1. 1/quarter.
	2. Same as for CMP system .....	2. 1/quarter.
	3. Same as for CMP system .....	3. 1/quarter.
	4. Same as for CMP system .....	4. Per manufacturer.
	1. Visually inspect fiber-bed unit and prefiltering device to ensure there is proper drainage, no chromic acid buildup in the units, and no evidence of chemical attack on the structural integrity of the devices.	1. 1/quarter.
	2. Visually inspect ductwork from tank or tanks to the control device to ensure there are no leaks.	2. 1/quarter.
	3. Perform washdown of fiber elements in accordance with manufacturers recommendations.	3. Per manufacturer.
Air pollution control device (APCD) not listed in rule.	To be proposed by the source for approval by the Administrator .....	To be proposed by the source for approval by the Administrator.
Monitoring Equipment		
Pitot tube .....	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.	1/quarter.
Stalagmometer .....	Follow manufacturers recommendations .....	

<sup>a</sup> 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.

<sup>b</sup> For horizontal-flow scrubbers, top is defined as the section of the unit directly above the packing 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.

<sup>c</sup> 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.

(3) The owner or operator of an existing area source that increases actual or potential emissions of hazardous air pollutants such that the area source becomes a major source must comply with the provisions for existing major sources, including the reporting provisions of § 63.347(g), immediately upon becoming a major source.

(4) The owner or operator of a new area source (i.e., an area source for which construction or reconstruction was commenced after December 16, 1993) that increases actual or potential emissions of hazardous air pollutants such that the area source becomes a major source must comply with the provisions for new major sources, immediately upon becoming a major source.

(5) An owner or operator of an existing hard chromium electroplating tank or tanks located at a small, hard chromium electroplating facility that increases its maximum cumulative potential rectifier capacity, or its actual cumulative rectifier capacity, such that the facility becomes a large, hard chromium electroplating facility must comply with the requirements of § 63.342(c)(1)(i) for all hard chromium electroplating tanks at the facility no later than 1 year after the month in which monthly records required by

§§ 63.342(c)(2) and 63.346(b)(12) show that the large designation is met.

(6) *Request for an extension of compliance.* An owner or operator of an affected source or sources that requests an extension of compliance shall do so in accordance with this paragraph and the applicable paragraphs of § 63.6(i). When the owner or operator is requesting the extension for more than one affected source located at the facility, then only one request may be submitted for all affected sources at the facility.

(i) The owner or operator of an existing affected source who is unable to comply with a relevant standard under this subpart may request that the Administrator (or a State, when the State has an approved part 70 permit program and the source is required to obtain a part 70 permit under that program, or a State, when the State has been delegated the authority to implement and enforce the emission standard for that source) grant an extension allowing the owner or operator up to 1 additional year to comply with the standard for the affected source. The owner or operator of an affected source who has requested an extension of compliance under this paragraph and is otherwise required to obtain a title V permit for the source shall apply for such permit or apply to

have the title V permit revised to incorporate the conditions of the extension of compliance. The conditions of an extension of compliance granted under this paragraph will be incorporated into the owner or operator's title V permit for the affected source(s) according to the provisions of 40 CFR part 70 or 40 CFR part 71, whichever is applicable.

(ii) Any request under this paragraph for an extension of compliance with a relevant standard shall be submitted in writing to the appropriate authority not later than 6 months before the affected source's compliance date as specified in this section.

(7) An owner or operator of a decorative chromium electroplating tank that uses a trivalent chromium bath that incorporates a wetting agent, and that ceases using the trivalent chromium process, must comply with the emission limitation now applicable to the tank within 1 year of switching bath operation.

(b) *Methods to demonstrate initial compliance.* (1) Except as provided in paragraphs (b)(2) and (b)(3) of this section, an owner or operator of an affected source subject to the requirements of this subpart is required to conduct an initial performance test as required under § 63.7, using the

procedures and test methods listed in § 63.7 and § 63.344.

(2) If the owner or operator of an affected source meets all of the following criteria, an initial performance test is not required to be conducted under this subpart:

(i) The affected source is a decorative chromium electroplating tank or a chromium anodizing tank; and

(ii) A wetting agent is used in the plating or anodizing bath to inhibit chromium emissions from the affected source; and

(iii) The owner or operator complies with the applicable surface tension limit of § 63.342(d)(2) as demonstrated through the continuous compliance monitoring required by paragraph (c)(5)(ii) of this section.

(3) If the affected source is a decorative chromium electroplating tank using a trivalent chromium bath, and the owner or operator is subject to the provisions of § 63.342(e), an initial performance test is not required to be conducted under this subpart.

(c) *Monitoring to demonstrate continuous compliance.* The owner or operator of an affected source subject to the emission limitations of this subpart shall conduct monitoring according to the type of air pollution control technique that is used to comply with the emission limitation. The monitoring required to demonstrate continuous compliance with the emission limitations is identified in this section for the air pollution control techniques expected to be used by the owners or operators of affected sources.

(1) *Composite mesh-pad systems.* (i) During the initial performance test, the owner or operator of an affected source, or a group of affected sources under common control, complying with the emission limitations in § 63.342 through the use of a composite mesh-pad system shall determine the outlet chromium concentration using the test methods and procedures in § 63.344(c), and shall establish as a site-specific operating parameter the pressure drop across the system, setting the value that corresponds to compliance with the applicable emission limitation, using the procedures in § 63.344(d)(5). An owner or operator may conduct multiple performance tests to establish a range of compliant pressure drop values, or may set as the compliant value the average pressure drop measured over the three test runs of one performance test and accept  $\pm 1$  inch of water column from this value as the compliant range.

(ii) On and after the date on which the initial performance test is required to be completed under § 63.7, the owner or operator of an affected source, or group

of affected sources under common control, shall monitor and record the pressure drop across the composite mesh-pad system once each day that any affected source is operating. To be in compliance with the standards, the composite mesh-pad system shall be operated within  $\pm 1$  inch of water column of the pressure drop value established during the initial performance test, or shall be operated within the range of compliant values for pressure drop established during multiple performance tests.

(2) *Packed-bed scrubber systems.* (i) During the initial performance test, the owner or operator of an affected source, or group of affected sources under common control, complying with the emission limitations in § 63.342 through the use of a packed-bed scrubber system shall determine the outlet chromium concentration using the procedures in § 63.344(c), and shall establish as site-specific operating parameters the pressure drop across the system and the velocity pressure at the common inlet of the control device, setting the value that corresponds to compliance with the applicable emission limitation using the procedures in § 63.344(d) (4) and (5). An owner or operator may conduct multiple performance tests to establish a range of compliant operating parameter values. Alternatively, the owner or operator may set as the compliant value the average pressure drop and inlet velocity pressure measured over the three test runs of one performance test, and accept  $\pm 1$  inch of water column from the pressure drop value and  $\pm 10$  percent from the velocity pressure value as the compliant range.

(ii) On and after the date on which the initial performance test is required to be completed under § 63.7, the owner or operator of an affected source, or group of affected sources under common control, shall monitor and record the velocity pressure at the inlet to the packed-bed scrubber and the pressure drop across the scrubber system once each day that any affected source is operating. To be in compliance with the standards, the scrubber system shall be operated within  $\pm 10$  percent of the velocity pressure value established during the initial performance test, and within  $\pm 1$  inch of water column of the pressure drop value established during the initial performance test, or within the range of compliant operating parameter values established during multiple performance tests.

(3) *Packed-bed scrubber/composite mesh-pad system.* The owner or operator of an affected source, or group of affected sources under common control, that uses a packed-bed scrubber

in conjunction with a composite mesh-pad system to meet the emission limitations of § 63.342 shall comply with the monitoring requirements for composite mesh-pad systems as identified in paragraph (c)(1) of this section.

(4) *Fiber-bed mist eliminator.* (i) During the initial performance test, the owner or operator of an affected source, or group of affected sources under common control, complying with the emission limitations in § 63.342 through the use of a fiber-bed mist eliminator shall determine the outlet chromium concentration using the procedures in § 63.344(c), and shall establish as a site-specific operating parameter the pressure drop across the fiber-bed mist eliminator and the pressure drop across the control device installed upstream of the fiber bed to prevent plugging, setting the value that corresponds to compliance with the applicable emission limitation using the procedures in § 63.344(d)(5). An owner or operator may conduct multiple performance tests to establish a range of compliant pressure drop values, or may set as the compliant value the average pressure drop measured over the three test runs of one performance test and accept  $\pm 1$  inch of water column from this value as the compliant range.

(ii) On and after the date on which the initial performance test is required to be completed under § 63.7, the owner or operator of an affected source, or group of affected sources under common control, shall monitor and record the pressure drop across the fiber-bed mist eliminator, and the control device installed upstream of the fiber bed to prevent plugging, once each day that any affected source is operating. To be in compliance with the standards, the fiber-bed mist eliminator and the upstream control device shall be operated within  $\pm 1$  inch of water column of the pressure drop value established during the initial performance test, or shall be operated within the range of compliant values for pressure drop established during multiple performance tests.

(5) *Wetting agent-type or combination wetting agent-type/foam blanket fume suppressants.* (i) During the initial performance test, the owner or operator of an affected source complying with the emission limitations in § 63.342 through the use of a wetting agent in the electroplating or anodizing bath shall determine the outlet chromium concentration using the procedures in § 63.344(c). The owner or operator shall establish as the site-specific operating parameter the surface tension of the bath using Method 306B, appendix A of

this part, setting the maximum value that corresponds to compliance with the applicable emission limitation. In lieu of establishing the maximum surface tension during the performance test, the owner or operator may accept 45 dynes/cm as the maximum surface tension value that corresponds to compliance with the applicable emission limitation. However, the owner or operator is exempt from conducting a performance test only if the criteria of paragraph (b)(2) of this section are met.

(ii) On and after the date on which the initial performance test is required to be completed under § 63.7, the owner or operator of an affected source shall monitor the surface tension of the electroplating or anodizing bath. Operation of the affected source at a surface tension greater than the value established during the performance test, or greater than 45 dynes/cm if the owner or operator is using this value in accordance with paragraph (c)(5)(i) of this section, shall constitute noncompliance with the standards. The surface tension shall be monitored according to the following schedule:

(A) The surface tension shall be measured once every 4 hours during operation of the tank with a stalagmometer or a tensiometer as specified in Method 306B, appendix A of this part.

(B) The time between monitoring can be increased if there have been no exceedances. The surface tension shall be measured once 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, surface tension measurement may be conducted once every 8 hours of tank operation. Once there are no exceedances during 40 hours of tank operation, surface tension measurement may be conducted once every 40 hours of tank operation on an ongoing basis, until an exceedance occurs. The minimum frequency of monitoring allowed by this subpart is once every 40 hours of tank operation.

(C) Once an exceedance occurs as indicated through surface tension monitoring, the original monitoring schedule of once every 4 hours must be resumed. A subsequent decrease in frequency shall follow the schedule laid out in paragraph (c)(5)(ii)(B) of this section. For example, if an owner or operator had been monitoring an affected source once every 40 hours and an exceedance occurs, subsequent monitoring would take place once every 4 hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation, monitoring can occur

once every 8 hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation on this schedule, monitoring can occur once every 40 hours of tank operation.

(iii) Once a bath solution is drained from the affected tank and a new solution added, the original monitoring schedule of once every 4 hours must be resumed, with a decrease in monitoring frequency allowed following the procedures of paragraphs (c)(5)(ii) (B) and (C) of this section.

(6) *Foam blanket-type fume suppressants.* (i) During the initial performance test, the owner or operator of an affected source complying with the emission limitations in § 63.342 through the use of a foam blanket in the electroplating or anodizing bath shall determine the outlet chromium concentration using the procedures in § 63.344(c), and shall establish as the site-specific operating parameter the thickness of the foam blanket, setting the minimum thickness that corresponds to compliance with the applicable emission limitation. In lieu of establishing the minimum foam blanket thickness during the performance test, the owner or operator may accept 2.54 centimeters (1 inch) as the minimum foam blanket thickness that corresponds to compliance with the applicable emission limitation. All foam blanket measurements must be taken in close proximity to the workpiece or cathode area in the plating tank(s).

(ii) On and after the date on which the initial performance test is required to be completed under § 63.7, the owner or operator of an affected source shall monitor the foam blanket thickness of the electroplating or anodizing bath. Operation of the affected source at a foam blanket thickness less than the value established during the performance test, or less than 2.54 cm (1 inch) if the owner or operator is using this value in accordance with paragraph (c)(6)(i) of this section, shall constitute noncompliance with the standards. The foam blanket thickness shall be measured according to the following schedule:

(A) The foam blanket thickness shall be measured once every 1 hour of tank operation.

(B) The time between monitoring can be increased if there have been no exceedances. The foam blanket thickness shall be measured once every hour of tank operation for the first 40 hours of tank operation after the compliance date. Once there are no exceedances for 40 hours of tank operation, foam blanket thickness measurement may be conducted once every 4 hours of tank operation. Once

there are no exceedances during 40 hours of tank operation, foam blanket thickness measurement may be conducted once every 8 hours of tank operation on an ongoing basis, until an exceedance occurs. The minimum frequency of monitoring allowed by this subpart is once per 8 hours of tank operation.

(C) Once an exceedance occurs as indicated through foam blanket thickness monitoring, the original monitoring schedule of once every hour must be resumed. A subsequent decrease in frequency shall follow the schedule laid out in paragraph (c)(6)(ii)(B) of this section. For example, if an owner or operator had been monitoring an affected source once every 8 hours and an exceedance occurs, subsequent monitoring would take place once every hour of tank operation. Once an exceedance does not occur for 40 hours of tank operation, monitoring can occur once every 4 hours of tank operation. Once an exceedance does not occur for 40 hours of tank operation on this schedule, monitoring can occur once every 8 hours of tank operation.

(iii) Once a bath solution is drained from the affected tank and a new solution added, the original monitoring schedule of once every hour must be resumed, with a decrease in monitoring frequency allowed following the procedures of paragraphs (c)(6)(ii) (B) and (C) of this section.

(7) *Fume suppressant/add-on control device.* (i) If the owner or operator of an affected source uses both a fume suppressant and add-on control device and both are needed to comply with the applicable emission limit, monitoring requirements as identified in paragraphs (c) (1) through (6) of this section, and the work practice standards of Table 1 of § 63.342, apply for each of the control techniques used.

(ii) If the owner or operator of an affected source uses both a fume suppressant and add-on control device, but only one of these techniques is needed to comply with the applicable emission limit, monitoring requirements as identified in paragraphs (c) (1) through (6) of this section, and work practice standards of Table 1 of § 63.342, apply only for the control technique used to achieve compliance.

(8) *Use of an alternative monitoring method.* (i) Requests and approvals of alternative monitoring methods shall be considered in accordance with § 63.8(f)(1), (f)(3), (f)(4), and (f)(5).

(ii) After receipt and consideration of an application for an alternative monitoring method, the Administrator may approve alternatives to any

monitoring methods or procedures of this subpart including, but not limited to, the following:

(A) Alternative monitoring requirements when installation or use of monitoring devices specified in this subpart would not provide accurate measurements due to interferences caused by substances within the effluent gases; or

(B) Alternative locations for installing monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.

(d) An owner or operator who uses an air pollution control device not listed in this section shall submit a description of the device, test results collected in accordance with § 63.344(c) verifying the performance of the device for reducing chromium emissions to the atmosphere to the level required by this subpart, a copy of the operation and maintenance plan referenced in § 63.342(f) including proposed work practice standards, and appropriate operating parameters that will be monitored to establish continuous compliance with the standards. The monitoring plan submitted identifying the continuous compliance monitoring is subject to the Administrator's approval.

**§ 63.344 Performance test requirements and test methods.**

(a) *Performance test requirements.* Performance tests shall be conducted using the test methods and procedures in this section and § 63.7. Performance test results shall be documented in complete test reports that contain the information required by paragraphs (a)(1) through (a)(9) of this section. The test plan to be followed shall be made available to the Administrator prior to the testing, if requested.

- (1) A brief process description;
- (2) Sampling location description(s);
- (3) A description of sampling and analytical procedures and any modifications to standard procedures;
- (4) Test results;
- (5) Quality assurance procedures and results;
- (6) Records of operating conditions during the test, preparation of standards, and calibration procedures;
- (7) Raw data sheets for field sampling and field and laboratory analyses;
- (8) Documentation of calculations; and
- (9) Any other information required by the test method.

(b)(1) If the owner or operator of an affected source conducts performance testing at startup to obtain an operating

permit in the State in which the affected source is located, the results of such testing may be used to demonstrate compliance with this subpart if:

(i) The test methods and procedures identified in paragraph (c) of this section were used during the performance test;

(ii) The performance test was conducted under representative operating conditions for the source;

(iii) The performance test report contains the elements required by paragraph (a) of this section; and

(iv) The owner or operator of the affected source for which the performance test was conducted has sufficient data to establish the operating parameter value(s) that correspond to compliance with the standards, as required for continuous compliance monitoring under § 63.343(c).

(2) The results of tests conducted prior to December 1991 in which Method 306A, appendix A of this part, was used to demonstrate the performance of a control technique are not acceptable.

(c) *Test methods.* Each owner or operator subject to the provisions of this subpart and required by § 63.343(b) to conduct an initial performance test shall use the test methods identified in this section to demonstrate compliance with the standards in § 63.342.

(1) Method 306 or Method 306A, "Determination of Chromium Emissions From Decorative and Hard Chromium Electroplating and Anodizing Operations," appendix A of this part shall be used to determine the chromium concentration from hard or decorative chromium electroplating tanks or chromium anodizing tanks. The sampling time and sample volume for each run of Methods 306 and 306A, appendix A of this part shall be at least 120 minutes and 1.70 dscm (60 dscf), respectively. Methods 306 and 306A, appendix A of this part allow the measurement of either total chromium or hexavalent chromium emissions. For the purposes of this standard, sources using chromic acid baths can demonstrate compliance with the emission limits of § 63.342 by measuring either total chromium or hexavalent chromium. Hence, the hexavalent chromium concentration measured by these methods is equal to the total chromium concentration for the affected operations.

(2) The California Air Resources Board (CARB) Method 425 (which is available by contacting the California Air Resources Board, 1102 Q Street, Sacramento, California 95814) may be used to determine the chromium concentration from hard and decorative

chromium electroplating tanks and chromium anodizing tanks if the following conditions are met:

(i) If a colorimetric analysis method is used, the sampling time and volume shall be sufficient to result in 33 to 66 micrograms of catch in the sampling train.

(ii) If Atomic Absorption Graphite Furnace (AAGF) or Ion Chromatography with a Post-column Reactor (ICPCR) analyses were used, the sampling time and volume should be sufficient to result in a sample catch that is 5 to 10 times the minimum detection limit of the analytical method (i.e., 1.0 microgram per liter of sample for AAGF and 0.5 microgram per liter of sample for ICPCR).

(iii) In the case of either paragraph (c)(2) (i) or (ii) of this section, a minimum of 3 separate runs must be conducted. The other requirements of § 63.7 that apply to affected sources, as indicated in Table 1 of this subpart, must also be met.

(3) Method 306B, "Surface Tension Measurement and Recordkeeping for Tanks Used at Decorative Chromium Electroplating and Anodizing Facilities," appendix A of this part shall be used to measure the surface tension of electroplating and anodizing baths.

(4) Alternate test methods may also be used if the method has been validated using Method 301, appendix A of this part and if approved by the Administrator. Procedures for requesting and obtaining approval are contained in § 63.7(f).

(d) *Establishing site-specific operating parameter values.* (1) Each owner or operator required to establish site-specific operating parameters shall follow the procedures in this section.

(2) All monitoring equipment shall be installed such that representative measurements of emissions or process parameters from the affected source are obtained. For monitoring equipment purchased from a vendor, verification of the operational status of the monitoring equipment shall include execution of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

(i) Specifications for differential pressure measurement devices used to measure velocity pressure shall be in accordance with section 2.2 of Method 2 (40 CFR part 60, appendix A).

(ii) Specification for differential pressure measurement devices used to measure pressure drop across a control system shall be in accordance with manufacturer's accuracy specifications.

(3) The surface tension of electroplating and anodizing baths shall

be measured using Method 306B, "Surface Tension Measurement and Recordkeeping for Tanks used at Decorative Chromium Electroplating and Anodizing Facilities," appendix A of this part. This method should also be followed when wetting agent type or combination wetting agent/foam blanket type fume suppressants are used to control chromium emissions from a hard chromium electroplating tank and surface tension measurement is conducted to demonstrate continuous compliance.

(4) The owner or operator of a source required to measure the velocity pressure at the inlet to an add-on air pollution control device in accordance with § 63.343(c)(2), shall establish the site-specific velocity pressure as follows:

(i) Locate a velocity traverse port in a section of straight duct that connects the hooding on the plating tank or tanks with the control device. The port shall be located as close to the control system as possible, and shall be placed a minimum of 2 duct diameters downstream and 0.5 diameter upstream of any flow disturbance such as a bend, expansion, or contraction (see Method 1, 40 CFR part 60, appendix A). If 2.5 diameters of straight duct work does not exist, locate the port 0.8 of the duct diameter downstream and 0.2 of the duct diameter upstream from any flow disturbance.

(ii) A 12-point velocity traverse of the duct to the control device shall be conducted along a single axis according to Method 2 (40 CFR part 60, appendix A) using an S-type pitot tube; measurement of the barometric pressure and duct temperature at each traverse point is not required, but is suggested. Mark the S-type pitot tube as specified in Method 1 (40 CFR part 60, appendix A) with 12 points. Measure the velocity pressure ( $\Delta p$ ) values for the velocity points and record. Determine the square root of the individual velocity point  $\Delta p$  values and average. The point with the square root value that comes closest to the average square root value is the point of average velocity. The  $\Delta p$  value measured for this point during the performance test will be used as the reference for future monitoring.

(5) The owner or operator of a source required to measure the pressure drop across the add-on air pollution control device in accordance with § 63.343(c) (1) through (4) may establish the pressure drop in accordance with the following guidelines:

(i) Pressure taps shall be installed at any of the following locations:

(A) 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 on the downstream side of the blower;

(B) On each side of the packed bed within the control system or on each side of each mesh pad within the control system; or

(C) On the front side of the first mesh pad and back side of the last mesh pad within the control system.

(ii) Pressure taps shall be sited at locations that are:

(A) Free from pluggage as possible and away from any flow disturbances such as cyclonic demisters.

(B) Situated such that no air infiltration at measurement site will occur that could bias the measurement.

(iii) Pressure taps shall be constructed of either polyethylene, polybutylene, or other nonreactive materials.

(iv) Nonreactive plastic tubing shall be used to connect the pressure taps to the device used to measure pressure drop.

(v) Any of the following pressure gauges can be used to monitor pressure drop: a magnehelic gauge, an inclined manometer, or a "U" tube manometer.

(vi) Prior to connecting any pressure lines to the pressure gauge(s), each gauge should be zeroed. No calibration of the pressure gauges is required.

(e) *Special compliance provisions for multiple sources controlled by a common add-on air pollution control device.*

(1) This section identifies procedures for measuring the outlet chromium concentration from an add-on air pollution control device that is used to control multiple sources that may or may not include sources not affected by this subpart.

(2) When multiple affected sources performing the same type of operation

(e.g., all are performing hard chromium electroplating), and subject to the same emission limitation, are controlled with an add-on air pollution control device that is not controlling emissions from any other type of affected operation or from any nonaffected sources, the applicable emission limitation identified in § 63.342 must be met at the outlet of the add-on air pollution control device.

(3) When multiple affected sources performing the same type of operation and subject to the same emission limitation are controlled with a common add-on air pollution control device that is also controlling emissions from sources not affected by these standards, the following procedures should be followed to determine compliance with the applicable emission limitation in § 63.342:

(i) Calculate the cross-sectional area of each inlet duct (i.e., uptakes from each hood) 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 affected sources, and then multiply this number by 2 hours. The calculated time is the minimum sample time required per test run.

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

(iv) Determine the total ventilation rate from the affected sources by using equation 1:

$$VR_{tot} \times \frac{IDA_i}{\sum IA_{total}} = VR_{inlet} \quad (1)$$

where  $VR_{tot}$  is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 testing;  $IDA_i$  is the total inlet area for all ducts associated with affected sources;  $IA_{total}$  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 2:

$$\sum VR_{inlet} \times EL \times 60 \text{ minutes/hours} = AMR_{sys} \quad (2)$$

where  $\sum VR_{inlet}$  is the total ventilation rate in dscm/min from the affected sources, and EL is the applicable emission limitation from § 63.342 in

mg/dscm. The allowable mass emission rate ( $AMR_{sys}$ ) calculated from equation 2 should be equal to or less than the outlet three-run average mass emission rate

determined from Method 306 testing in order for the source to be in compliance with the standard.



(4) When multiple affected sources performing different types of operations (e.g., hard chromium electroplating, decorative chromium electroplating, or chromium anodizing) are 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 if the affected sources controlled by the common add-on air pollution control device perform the same operation but are subject to different emission limitations (e.g., because one is a new hard chromium plating tank and one is an existing small, hard chromium plating tank), the following procedures should be followed to determine compliance with the applicable emission limitation in § 63.342:

(i) Follow the steps outlined in paragraphs (e)(3)(i) through (e)(3)(iii) of this section.

(ii) Determine the total ventilation rate for each type of affected source using equation 3:

$$VR_{tot} \times \frac{IDA_{i,a}}{\sum IA_{total}} = VR_{inlet,a} \quad (3)$$

where  $VR_{tot}$  is the average total ventilation rate in dscm/min for the three test runs as determined at the outlet by means of the Method 306 testing;  $IDA_{i,a}$  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;  $IA_{total}$  is the sum of all 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.

(iii) 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 equation 4, 5, 6, or 7 as appropriate:

$$VR_{hc1} \times EL_{hc1} \times 60 \text{ minutes/hour} = AMR_{hc1} \quad (4)$$

$$VR_{hc2} \times EL_{hc2} \times 60 \text{ minutes/hour} = AMR_{hc2} \quad (5)$$

$$VR_{dc} \times EL_{dc} \times 60 \text{ minutes/hour} = AMR_{dc} \quad (6)$$

$$VR_{ca} \times EL_{ca} \times 60 \text{ minutes/hour} = AMR_{ca} \quad (7)$$

where "hc" applies to the total of ventilation 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 total of ventilation rates for the chromium anodizing tanks, and EL is the applicable emission limitation from § 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).

(iv) Establish the allowable mass emission rate (AMR) in mg/hr for the system using equation 8, including each type of affected source as appropriate:

$$AMR_{hc1} + AMR_{hc2} + AMR_{dc} + AMR_{ca} = AMR_{sys} \quad (8)$$

The allowable mass emission rate calculated from equation 8 should be equal to or less than the outlet three-run average mass emission rate determined from Method 306 testing in order for the source to be in compliance with the standards.

(5) Each owner or operator that uses the special compliance provisions of this paragraph to demonstrate compliance with the emission limitations of § 63.342 shall submit the measurements and calculations to support these compliance methods with the notification of compliance status required by § 63.347(e).

(6) Each owner or operator that uses the special compliance provisions of this section to demonstrate compliance with the emission limitations of § 63.342 shall repeat these procedures if a tank is added or removed from the control system regardless of whether that tank is a nonaffected source. If the new nonaffected tank replaces an existing nonaffected tank of the same size and is connected to the control system through the same size inlet duct then this procedure does not have to be repeated.

**§ 63.345 Provisions for new and reconstructed sources.**

(a) This section identifies the preconstruction review requirements for new and reconstructed affected sources that are subject to, or become subject to, this subpart.

(b) *New or reconstructed affected sources.* The owner or operator of a new or reconstructed affected source is subject to § 63.5(a), (b)(1), (b)(5), (b)(6), and (f)(1), as well as the provisions of this paragraph.

(1) After January 25, 1995, whether or not an approved permit program is effective in the State in which an affected source is (or would be) located, no person may construct a new affected source or reconstruct an affected source subject to this subpart, or reconstruct a source such that it becomes an affected source subject to this subpart, without submitting a notification of construction

or reconstruction to the Administrator. The notification shall contain the information identified in paragraphs (b) (2) and (3) of this section, as appropriate.

(2) The notification of construction or reconstruction required under paragraph (b)(1) of this section shall include:

(i) The owner or operator's name, title, and address;

(ii) The address (i.e., physical location) or proposed address of the affected source if different from the owner's or operator's;

(iii) A notification of intention to construct a new affected source or make any physical or operational changes to an affected source that may meet or has been determined to meet the criteria for a reconstruction as defined in § 63.2;

(iv) An identification of subpart N of this part as the basis for the notification;

(v) The expected commencement and completion dates of the construction or reconstruction;

(vi) The anticipated date of (initial) startup of the affected source;

(vii) The type of process operation to be performed (hard or decorative chromium electroplating, or chromium anodizing);

(viii) A description of the air pollution control technique to be used to control emissions from the affected source, such as preliminary design drawings and design capacity if an add-on air pollution control device is used; and

(ix) An estimate of emissions from the source based on engineering calculations and vendor information on control device efficiency, expressed in units consistent with the emission limits of this subpart. Calculations of emission estimates should be in sufficient detail to permit assessment of the validity of the calculations.

(3) If a reconstruction is to occur, the notification required under paragraph (b)(1) of this section shall include the following in addition to the information required in paragraph (b)(2) of this section:

(i) A brief description of the affected source and the components to be replaced;

(ii) A brief description of the present and proposed emission control technique, including the information required by paragraphs (b)(2) (viii) and (ix) of this section;

(iii) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new source;

(iv) The estimated life of the affected source after the replacements; and

(v) A discussion of any economic or technical limitations the source may

have in complying with relevant standards or other requirements after the proposed replacements. The discussion shall be sufficiently detailed to demonstrate to the Administrator's satisfaction that the technical or economic limitations affect the source's ability to comply with the relevant standard and how they do so.

(vi) If in the notification of reconstruction, the owner or operator designates the affected source as a reconstructed source and declares that there are no economic or technical limitations to prevent the source from complying with all relevant standards or requirements, the owner or operator need not submit the information required in paragraphs (b)(3) (iii) through (v) of this section.

(4) The owner or operator of a new or reconstructed affected source that submits a notification in accordance with paragraphs (b) (1) through (3) of this section is not subject to approval by the Administrator. Construction or reconstruction is subject only to notification and can begin upon submission of a complete notification.

(5) *Submittal timeframes.* After January 25, 1995, whether or not an approved permit program is effective in the State in which an affected source is (or would be) located, an owner or operator of a new or reconstructed affected source shall submit the notification of construction or reconstruction required by paragraph (b)(1) of this section according to the following schedule:

(i) If construction or reconstruction commences after January 25, 1995, the notification shall be submitted as soon as practicable before the construction or reconstruction is planned to commence.

(ii) If the construction or reconstruction had commenced and initial startup had not occurred before January 25, 1995, the notification shall be submitted as soon as practicable before startup but no later than 60 days after January 25, 1995.

#### § 63.346 Recordkeeping requirements.

(a) The owner or operator of each affected source subject to these standards shall fulfill all recordkeeping requirements outlined in this section and in the General Provisions to 40 CFR part 63, according to the applicability of subpart A of this part as identified in Table 1 of this subpart.

(b) The owner or operator of an affected source subject to the provisions of this subpart shall maintain the following records for such source:

(1) Inspection records for the add-on air pollution control device, if such a device is used, and monitoring

equipment, to document that the inspection and maintenance required by the work practice standards of § 63.342(f) and Table 1 of § 63.342 have taken place. The record can take the form of a checklist and should identify the device inspected, the date of inspection, a brief description of the working condition of the device during the inspection, and any actions taken to correct deficiencies found during the inspection.

(2) Records of all maintenance performed on the affected source, the add-on air pollution control device, and monitoring equipment;

(3) Records of the occurrence, duration, and cause (if known) of each malfunction of process, add-on air pollution control, and monitoring equipment;

(4) Records of actions taken during periods of malfunction when such actions are inconsistent with the operation and maintenance plan;

(5) Other records, which may take the form of checklists, necessary to demonstrate consistency with the provisions of the operation and maintenance plan required by § 63.342(f)(3);

(6) Test reports documenting results of all performance tests;

(7) All measurements as may be necessary to determine the conditions of performance tests, including measurements necessary to determine compliance with the special compliance procedures of § 63.344(e);

(8) Records of monitoring data required by § 63.343(c) that are used to demonstrate compliance with the standard including the date and time the data are collected;

(9) The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions, as indicated by monitoring data, that occurs during malfunction of the process, add-on air pollution control, or monitoring equipment;

(10) The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions, as indicated by monitoring data, that occurs during periods other than malfunction of the process, add-on air pollution control, or monitoring equipment;

(11) The total process operating time of the affected source during the reporting period;

(12) Records of the actual cumulative rectifier capacity of hard chromium electroplating tanks at a facility expended during each month of the reporting period, and the total capacity expended to date for a reporting period, if the owner or operator is using the

actual cumulative rectifier capacity to determine facility size in accordance with § 63.342(c)(2);

(13) For sources using fume suppressants to comply with the standards, records of the date and time that fume suppressants are added to the electroplating or anodizing bath;

(14) For sources complying with § 63.342(e), records of the bath components purchased, with the wetting agent clearly identified as a bath constituent contained in one of the components;

(15) Any information demonstrating whether a source is meeting the requirements for a waiver of recordkeeping or reporting requirements, if the source has been granted a waiver under § 63.10(f); and

(16) All documentation supporting the notifications and reports required by § 63.9, § 63.10, and § 63.347.

(c) All records shall be maintained for a period of 5 years in accordance with § 63.10(b)(1).

#### § 63.347 Reporting requirements.

(a) The owner or operator of each affected source subject to these standards shall fulfill all reporting requirements outlined in this section and in the General Provisions to 40 CFR part 63, according to the applicability of subpart A as identified in Table 1 of this subpart. These reports shall be made to the Administrator at the appropriate address as identified in § 63.13 or to the delegated State authority.

(1) Reports required by subpart A of this part and this section may be sent by U.S. mail, fax, or by another courier.

(i) Submittals sent by U.S. mail shall be postmarked on or before the specified date.

(ii) Submittals sent by other methods shall be received by the Administrator on or before the specified date.

(2) If acceptable to both the Administrator and the owner or operator of an affected source, reports may be submitted on electronic media.

(b) The reporting requirements of this section apply to the owner or operator of an affected source when such source becomes subject to the provisions of this subpart.

(c) *Initial notifications.* (1) The owner or operator of an affected source that has an initial startup before January 25, 1995, shall notify the Administrator in writing that the source is subject to this subpart. The notification shall be submitted no later than 180 calendar days after January 25, 1995, and shall contain the following information:

(i) The name, title, and address of the owner or operator;

(ii) The address (i.e., physical location) of each affected source;

(iii) A statement that subpart N of this part is the basis for this notification;

(iv) Identification of the applicable emission limitation and compliance date for each affected source;

(v) A brief description of each affected source, including the type of process operation performed;

(vi) For sources performing hard chromium electroplating, the maximum potential cumulative potential rectifier capacity;

(vii) For sources performing hard chromium electroplating, a statement of whether the affected source(s) is located at a small or a large, hard chromium electroplating facility and whether this will be demonstrated through actual or maximum potential cumulative rectifier capacity;

(viii) For sources performing hard chromium electroplating tanks, a statement of whether the owner or operator of an affected source(s) will limit the maximum potential cumulative rectifier capacity in accordance with § 63.342(c)(2) such that the hard chromium electroplating facility is considered small; and

(ix) A statement of whether the affected source is located at a major source or an area source as defined in § 63.2.

(2) The owner or operator of a new or reconstructed affected source that has an initial startup after January 25, 1995 shall submit an initial notification (in addition to the notification of construction or reconstruction required by § 63.345(b) as follows:

(i) A notification of the date when construction or reconstruction was commenced, shall be submitted simultaneously with the notification of construction or reconstruction, if construction or reconstruction was commenced before January 25, 1995;

(ii) A notification of the date when construction or reconstruction was commenced, shall be submitted no later than 30 calendar days after such date, if construction or reconstruction was commenced after January 25, 1995; and

(iii) A notification of the actual date of startup of the source shall be submitted within 30 calendar days after such date.

(d) *Notification of performance test.*

(1) The owner or operator of an affected source shall notify the Administrator in writing of his or her intention to conduct a performance test at least 60 calendar days before the test is scheduled to begin to allow the Administrator to have an observer present during the test. Observation of the performance test by the Administrator is optional.

(2) In the event the owner or operator is unable to conduct the performance test as scheduled, the provisions of § 63.7(b)(2) apply.

(e) *Notification of compliance status.*

(1) A notification of compliance status is required each time that an affected source becomes subject to the requirements of this subpart.

(2) Before a title V permit has been issued to the owner or operator of an affected source, each time a notification of compliance status is required under this part, the owner or operator of an affected source shall submit to the Administrator a notification of compliance status, signed by the responsible official (as defined in § 63.2) who shall certify its accuracy, attesting to whether the affected source has complied with this subpart. After a title V permit has been issued to the owner or operator of an affected source, the notification of compliance status shall be submitted to the appropriate permitting authority. The notification shall list for each affected source:

(i) The applicable emission limitation and the methods that were used to determine compliance with this limitation;

(ii) If a performance test is required by this subpart, the test report documenting the results of the performance test, which contains the elements required by § 63.344(a), including measurements and calculations to support the special compliance provisions of § 63.344(e) if these are being followed;

(iii) The type and quantity of hazardous air pollutants emitted by the source reported in mg/dscm or mg/hr if the source is using the special provisions of § 63.344(e) to comply with the standards. (If the owner or operator is subject to the construction and reconstruction provisions of § 63.345 and had previously submitted emission estimates, the owner or operator shall state that this report corrects or verifies the previous estimate.) For sources not required to conduct a performance test in accordance with § 63.343(b), the surface tension measurement may fulfill this requirement;

(iv) For each monitored parameter for which a compliant value is to be established under § 63.343(c), the specific operating parameter value, or range of values, that corresponds to compliance with the applicable emission limit;

(v) The methods that will be used to determine continuous compliance, including a description of monitoring and reporting requirements, if methods differ from those identified in this subpart;

(vi) A description of the air pollution control technique for each emission point;

(vii) A statement that the owner or operator has completed and has on file the operation and maintenance plan as required by the work practice standards in § 63.342(f);

(viii) If the owner or operator is determining facility size based on actual cumulative rectifier capacity in accordance with § 63.342(c)(2), records to support that the facility is small. For existing sources, records from any 12-month period preceding the compliance date shall be used or a description of how operations will change to meet a small designation shall be provided. For new sources, records of projected rectifier capacity for the first 12-month period of tank operation shall be used;

(ix) A statement by the owner or operator of the affected source as to whether the source has complied with the provisions of this subpart.

(3) For sources required to conduct a performance test by § 63.343(b), the notification of compliance status shall be submitted to the Administrator no later than 90 calendar days following completion of the compliance demonstration required by § 63.7 and § 63.343(b).

(4) For sources that are not required to complete a performance test in accordance with § 63.343(b), the notification of compliance status shall be submitted to the Administrator no later than 30 days after the compliance date specified in § 63.343(a).

(f) *Reports of performance test results.*

(1) Before a title V permit has been issued to the owner or operator of an affected source, the owner or operator shall report to the Administrator the results of any performance test conducted as required by § 63.7 or § 63.343(b). After a title V permit has been issued to the owner or operator of an affected source, the owner or operator should report performance test results to the appropriate permitting authority.

(2) Reports of performance test results shall be submitted no later than 90 days following the completion of the performance test, and shall be submitted as part of the notification of compliance status required by paragraph (e) of this section.

(g) *Ongoing compliance status reports for major sources.* (1) The owner or operator of an affected source that is located at a major source site shall submit a summary report to the Administrator to document the ongoing compliance status of the affected source. The report shall contain the information identified in paragraph (g)(3) of this

section, and shall be submitted semiannually except when:

(i) The Administrator determines on a case-by-case basis that more frequent reporting is necessary to accurately assess the compliance status of the source; or

(ii) The monitoring data collected by the owner or operator of the affected source in accordance with § 63.343(c) show that the emission limit has been exceeded, in which case quarterly reports shall be submitted. Once an owner or operator of an affected source reports an exceedance, ongoing compliance status reports shall be submitted quarterly until a request to reduce reporting frequency under paragraph (g)(2) of this section is approved.

(2) *Request to reduce frequency of ongoing compliance status reports.* (i) An owner or operator who is required to submit ongoing compliance status reports on a quarterly (or more frequent basis) may reduce the frequency of reporting to semiannual if all of the following conditions are met:

(A) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods), the ongoing compliance status reports demonstrate that the affected source is in compliance with the relevant emission limit;

(B) The owner or operator continues to comply with all applicable recordkeeping and monitoring requirements of subpart A of this part and this subpart; and

(C) The Administrator does not object to a reduced reporting frequency for the affected source, as provided in paragraphs (g)(2) (ii) and (iii) of this section.

(ii) The frequency of submitting ongoing compliance status reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change, and the Administrator does not object to the intended change. In deciding whether to approve a reduced reporting frequency, the Administrator may review information concerning the source's entire previous performance history during the 5-year recordkeeping period prior to the intended change, or the recordkeeping period since the source's compliance date, whichever is shorter. Records subject to review may include performance test results, monitoring data, and evaluations of an owner or operator's conformance with emission limitations and work practice standards. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the

Administrator disapproves the owner or operator's request to reduce reporting frequency, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(iii) As soon as the monitoring data required by § 63.343(c) show that the source is not in compliance with the relevant emission limit, the frequency of reporting shall revert to quarterly, and the owner shall state this exceedance in the ongoing compliance status report for the next reporting period. After demonstrating ongoing compliance with the relevant emission limit for another full year, the owner or operator may again request approval from the Administrator to reduce the reporting frequency as allowed by paragraph (g)(2) of this section.

(3) *Contents of ongoing compliance status reports.* The owner or operator of an affected source for which compliance monitoring is required in accordance with § 63.343(c) shall prepare a summary report to document the ongoing compliance status of the source. The report must contain the following information:

(i) The company name and address of the affected source;

(ii) An identification of the operating parameter that is monitored for compliance determination, as required by § 63.343(c);

(iii) The relevant emission limitation for the affected source, and the operating parameter value, or range of values, that correspond to compliance with this emission limitation as specified in the notification of compliance status required by paragraph (e) of this section;

(iv) The beginning and ending dates of the reporting period;

(v) A description of the type of process performed in the affected source;

(vi) The total operating time of the affected source during the reporting period;

(vii) If the affected source is a hard chromium electroplating tank and the owner or operator is limiting the maximum cumulative rectifier capacity in accordance with § 63.342(c)(2), the actual cumulative rectifier capacity expended during the reporting period, on a month-by-month basis;

(viii) A summary of operating parameter values, including the total duration of excess emissions during the

reporting period as indicated by those values, the total duration of excess emissions expressed as a percent of the total source operating time during that reporting period, and a breakdown of the total duration of excess emissions during the reporting period into those that are due to process upsets, control equipment malfunctions, other known causes, and unknown causes;

(ix) A certification by a responsible official, as defined in § 63.2, that the work practice standards in § 63.342(f) were followed in accordance with the operation and maintenance plan for the source;

(x) If the operation and maintenance plan required by § 63.342(f)(3) was not followed, an explanation of the reasons for not following the provisions, an assessment of whether any excess emission and/or parameter monitoring exceedances are believed to have occurred, and a copy of the report(s) required by § 63.342(f)(3)(iv) documenting that the operation and maintenance plan was not followed;

(xi) A description of any changes in monitoring, processes, or controls since the last reporting period;

(xii) The name, title, and signature of the responsible official who is certifying the accuracy of the report; and

(xiii) The date of the report.

(4) When more than one monitoring device is used to comply with the continuous compliance monitoring required by § 63.343(c), the owner or operator shall report the results as required for each monitoring device. However, when one monitoring device is used as a backup for the primary monitoring device, the owner or operator shall only report the results from the monitoring device used to meet the monitoring requirements of this subpart. If both devices are used to meet these requirements, then the owner or operator shall report the results from each monitoring device for the relevant compliance period.

(h) *Ongoing compliance status reports for area sources.* The requirements of this paragraph do not alleviate affected area sources from complying with the requirements of State or Federal operating permit programs under 40 CFR part 71.

(1) The owner or operator of an affected source that is located at an area source site shall prepare a summary report to document the ongoing compliance status of the affected source. The report shall contain the information identified in paragraph (g)(3) of this section, shall be completed annually and retained on site, and made available to the Administrator upon request. The report shall be completed annually

except as provided in paragraph (h)(2) of this section.

(2) *Reports of exceedances.* (i) If both of the following conditions are met, semiannual reports shall be prepared and submitted to the Administrator:

(A) The total duration of excess emissions (as indicated by the monitoring data collected by the owner or operator of the affected source in accordance with § 63.343(c)) is 1 percent or greater of the total operating time for the reporting period; and

(B) The total duration of malfunctions of the add-on air pollution control device and monitoring equipment is 5 percent or greater of the total operating time.

(ii) Once an owner or operator of an affected source reports an exceedance as defined in paragraph (h)(2)(i) of this section, ongoing compliance status reports shall be submitted semiannually until a request to reduce reporting frequency under paragraph (h)(3) of this section is approved.

(iii) The Administrator may determine on a case-by-case basis that the summary report shall be completed more frequently and submitted, or that the annual report shall be submitted instead of being retained on site, if these measures are necessary to accurately assess the compliance status of the source.

(3) *Request to reduce frequency of ongoing compliance status reports.* (i) An owner or operator who is required to submit ongoing compliance status reports on a semiannual (or more frequent) basis, or is required to submit its annual report instead of retaining it on site, may reduce the frequency of reporting to annual and/or be allowed to maintain the annual report onsite if all of the following conditions are met:

(A) For 1 full year (e.g., 2 semiannual or 4 quarterly reporting periods), the ongoing compliance status reports demonstrate that the affected source is in compliance with the relevant emission limit;

(B) The owner or operator continues to comply with all applicable recordkeeping and monitoring

requirements of subpart A of this part and this subpart; and

(C) The Administrator does not object to a reduced reporting frequency for the affected source, as provided in paragraphs (h)(3) (ii) and (iii) of this section.

(ii) The frequency of submitting ongoing compliance status reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change, and the Administrator does not object to the intended change. In deciding whether to approve a reduced reporting frequency, the Administrator may review information concerning the source's previous performance history during the 5-year recordkeeping period prior to the intended change, or the recordkeeping period since the source's compliance date, whichever is shorter. Records subject to review may include performance test results, monitoring data, and evaluations of an owner or operator's conformance with emission limitations and work practice standards. Such information may be used by the Administrator to make a judgement about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce reporting frequency, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(iii) As soon as the monitoring data required by § 63.343(c) show that the source is not in compliance with the relevant emission limit, the frequency of reporting shall revert to semiannual, and the owner shall state this exceedance in the ongoing compliance status report for the next reporting period. After demonstrating ongoing compliance with the relevant emission limit for another full year, the owner or

operator may again request approval from the Administrator to reduce the reporting frequency as allowed by paragraph (h)(3) of this section.

(i) *Reports associated with trivalent chromium baths.* The requirements of this paragraph do not alleviate affected sources from complying with the requirements of State or Federal operating permit programs under title V. Owners or operators complying with the provisions of § 63.342(e) are not subject to paragraphs (a) through (h) of this section, but must instead submit the following reports:

(1) Within 180 days after January 25, 1995, submit an initial notification that includes:

(i) The same information as is required by paragraphs (c)(1) (i) through (v) of this section; and

(ii) A statement that a trivalent chromium process that incorporates a wetting agent will be used to comply with § 63.342(e); and

(iii) The list of bath components that comprise the trivalent chromium bath, with the wetting agent clearly identified; and

(2) Within 30 days of the compliance date specified in § 63.343(a), a notification of compliance status that contains an update of the information submitted in accordance with paragraph (i)(1) of this section or a statement that the information is still accurate; and

(3) Within 30 days of a change to the trivalent chromium electroplating process, a report that includes:

(i) A description of the manner in which the process has been changed and the emission limitation, if any, now applicable to the affected source;

(ii) If a different emission limitation applies, the applicable information required by paragraph (c)(1) of this section; and

(iii) The notification and reporting requirements of paragraphs (d), (e), (f), (g), and (h) of this section, which shall be submitted in accordance with the schedules identified in those paragraphs.

TABLE 1 TO SUBPART N OF PART 63.—GENERAL PROVISIONS APPLICABILITY TO SUBPART N

General provisions reference	Applies to subpart N	Comment
63.1(a)(1) .....	Yes .....	Additional terms defined in § 63.341; when overlap between subparts A and N occurs, subpart N takes precedence.
63.1(a)(2) .....	Yes	Subpart N clarifies the applicability of each paragraph in subpart A to sources subject to subpart N.
63.1(a)(3) .....	Yes	
63.1(a)(4) .....	Yes .....	
63.1(a)(6) .....	Yes	
63.1(a)(7) .....	Yes	
63.1(a)(8) .....	Yes	

TABLE 1 TO SUBPART N OF PART 63.—GENERAL PROVISIONS APPLICABILITY TO SUBPART N—Continued

General provisions reference	Applies to subpart N	Comment
63.1(a)(10) .....	Yes	
63.1(a)(11) .....	Yes .....	§ 63.347(a) of subpart N also allows report submissions via fax and on electronic media.
63.1(a)(12)–(14) .....	Yes	
63.1(b)(1) .....	No .....	§ 63.340 of subpart N specifies applicability.
63.1(b)(2) .....	Yes	
63.1(b)(3) .....	No .....	This provision in subpart A is being deleted. Also, all affected area and major sources are subject to subpart N; there are no exemptions.
63.1(c)(1) .....	Yes .....	Subpart N clarifies the applicability of each paragraph in subpart A to sources subject to subpart N.
63.1(c)(2) .....	Yes .....	Subpart N specifies permit requirements for area sources.
63.1(c)(4) .....	Yes	
63.1(c)(5) .....	No .....	Subpart N clarifies that an area source that becomes a major source is subject to the requirements for major sources.
63.1(e) .....	Yes	
63.2 .....	Yes .....	Additional terms defined in § 63.341; when overlap between subparts A and N occurs, subpart N takes precedence.
63.3 .....	Yes .....	Other units used in subpart N are defined in that subpart.
63.4 .....	Yes	
63.5(a) .....	Yes .....	Except replace the term “source” and “stationary source” in § 63.5(a)(1) and (2) of subpart A with “affected resources.”
63.5(b)(1) .....	Yes	
63.5(b)(3) .....	Yes .....	Applies only to major affected sources.
63.5(b)(4) .....	No .....	Subpart N (§ 63.345) specifies requirements for the notification of construction or reconstruction for affected sources that are not major.
63.5(b)(5) .....	Yes	
63.5(b)(6) .....	Yes	
63.5(d)(1)(i) .....	No .....	§ 63.345(c)(5) of subpart N specifies when the application or notification shall be submitted.
63.5(d)(1)(ii) .....	Yes .....	Applies to major affected sources that are new or reconstructed.
63.5(d)(1)(iii) .....	Yes .....	Except information should be submitted with the Notification of Compliance Status required by § 63.347(e) of subpart N.
63.5(d)(2) .....	Yes .....	Applies to major affected sources that are new or reconstructed except: (1) replace “source” in § 63.5(d)(2) of subpart A with “affected source”; and (2) actual control efficiencies are submitted with the Notification of Compliance Status required by § 63.347(e).
63.5(d)(3)–(4) .....	Yes .....	Applies to major affected sources that are new or reconstructed.
63.5(e) .....	Yes .....	Applies to major affected sources that are new or reconstructed.
63.5(f)(1) .....	Yes .....	Except replace “source” in § 63.5(f)(1) of subpart A with “affected source.”
63.5(f)(2) .....	No .....	New or reconstructed affected sources shall submit the request for approval of construction or reconstruction under § 63.5(f) of subpart A by the deadline specified in § 63.345(c)(5) of subpart N.
63.6(a) .....	Yes	
63.6(b)(1)–(2) .....	Yes .....	Except replace “source” in § 63.6(b)(1)–(2) of part A with “affected source.”
63.6(b)(3)–(4) .....	Yes	
63.6(b)(5) .....	Yes .....	Except replace “source” in § 63.6(b)(5) of subpart A with “affected source.”
63.6(b)(7) .....	No .....	Provisions for new area sources that become major sources are contained in § 63.343(a)(4) of subpart N.
63.6(c)(1)–(2) .....	Yes .....	Except replace “source” in § 63.6(c)(1)–(2) of subpart A with “affected source.”
63.6(c)(5) .....	No .....	Compliance provisions for existing area sources that become major sources are contained in § 63.343(a)(3) of subpart N.
63.6(e) .....	No .....	§ 63.342(f) of subpart N contains work practice standards (operation and maintenance requirements) that override these provisions.
63.6(f)(1) .....	No .....	§ 63.342(b) of subpart N specifies when the standards apply.
63.6(f)(2)(i)–(ii) .....	Yes	
63.6(f)(2)(iii) .....	No .....	§ 63.344(b) of subpart N specifies instances in which previous performance test results for existing sources are acceptable.
63.6(f)(2)(iv) .....	Yes	
63.6(f)(2)(v) .....	Yes	
63.6(f)(3) .....	Yes	
63.6(g) .....	Yes	
63.6(h) .....	No .....	Subpart N does not contain any opacity or visible emission standards.
63.6(i)(1) .....	Yes	
63.6(i)(2) .....	Yes .....	Except replace “source” in § 63.6(i)(2)(i) and (ii) of subpart A with “affected source.”
63.6(i)(3) .....	Yes	
63.6(i)(4)(i) .....	No .....	§ 63.343(a)(6) of subpart N specifies the procedures for obtaining an extension of compliance and the date by which such requests must be submitted.
63.6(i)(4)(ii) .....	Yes	
63.6(i)(5) .....	Yes	
63.6(i)(6)(i) .....	Yes .....	This paragraph only references “paragraph (i)(4) of this section” for compliance extension provisions. But, § 63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.6(i)(6)(ii) .....	Yes	
63.6(i)(7) .....	Yes	

TABLE 1 TO SUBPART N OF PART 63.—GENERAL PROVISIONS APPLICABILITY TO SUBPART N—Continued

General provisions reference	Applies to subpart N	Comment
63.6(i)(8) .....	Yes .....	This paragraph only references "paragraphs (i)(4) through (i)(6) of this section" for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.6(i)(9) .....	Yes .....	This paragraph only references "paragraphs (i)(4) through (i)(6) of this section" and "paragraphs (i)(4) and (i)(5) of this section" for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.6(i)(10)(i)–(iv) .....	Yes .....	This paragraph only references "paragraph (i)(4)" for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.6(i)(10)(v)(A) .....	Yes .....	
63.6(i)(10)(v)(B) .....	Yes .....	This paragraph only references "paragraph (i)(4)(i) or (i)(5) of this section" for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.6(i)(11) .....	Yes .....	
63.6(i)(12)(i) .....	Yes .....	
63.6(i)(12)(ii)–(iii) .....	Yes .....	
63.6(i)(13) .....	Yes .....	
63.6(i)(14) .....	Yes .....	§63.347(d) of subpart N requires notification prior to the performance test. §63.344(a) of subpart N requires submission of a site-specific test plan upon request.
63.6(i)(16) .....	Yes .....	
63.6(j) .....	Yes .....	
63.7(a)(1) .....	Yes .....	
63.7(a)(2)(i)–(vi) .....	Yes .....	
63.7(a)(2)(ix) .....	Yes .....	
63.7(a)(3) .....	Yes .....	
63.7(b)(1) .....	No .....	
63.7(b)(2) .....	Yes .....	
63.7(c) .....	No .....	
63.7(d) .....	Yes .....	Except replace "source" in the first sentence of §63.7(d) of subpart A with "affected source." Subpart N also contains test methods specific to affected sources covered by that subpart. §63.344(c)(2) of subpart N identifies CARB Method 425 as acceptable under certain conditions. Subpart N identifies the items to be reported in the compliance test [§63.344(a)] and the time-frame for submitting the results [§63.347(f)].
63.7(e) .....	Yes .....	
63.7(f) .....	Yes .....	
63.7(g)(1) .....	No .....	
63.7(g)(3) .....	Yes .....	
63.7(h)(1)–(2) .....	Yes .....	This paragraph only references "§63.6(i)" for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension.
63.7(h)(3)(i) .....	Yes .....	
63.7(h)(3)(ii)–(iii) .....	Yes .....	
63.7(h)(4)–(5) .....	Yes .....	
63.8(a)(1) .....	Yes .....	
63.8(a)(2) .....	No .....	Work practice standards are contained in §63.342(f) of subpart N.
63.8(a)(4) .....	No .....	
63.8(b)(1) .....	Yes .....	§63.344(d) of subpart N specifies the monitoring location when there are multiple sources. §63.347(g)(4) of subpart N identifies reporting requirements when multiple monitors are used. Subpart N requires proper maintenance of monitoring devices expected to be used by sources subject to subpart N.
63.8(b)(2) .....	No .....	
63.8(b)(3) .....	No .....	
63.8(c)(1)(i) .....	No .....	
63.8(c)(1)(ii) .....	No .....	
63.8(c)(1)(iii) .....	No .....	§63.343(f)(2) identifies the criteria for whether O&M procedures are acceptable.
63.8(c)(2)–(3) .....	No .....	
63.8(c)(4)–(7) .....	No .....	§63.344(d)(2) requires appropriate use of monitoring devices.
63.8(d) .....	No .....	
63.8(e) .....	No .....	Maintenance of monitoring devices is required by §§63.342(f) and 63.344(d)(2) of subpart N. There are no performance evaluation procedures for the monitoring devices expected to be used to comply with subpart N.
63.8(f)(1) .....	Yes .....	
63.8(f)(2) .....	No .....	Instances in which the Administrator may approve alternatives to the monitoring methods and procedures of subpart N are contained in §63.343(c)(8) of subpart N.
63.8(f)(3) .....	Yes .....	
63.8(f)(4) .....	Yes .....	
63.8(f)(5) .....	Yes .....	
63.8(f)(6) .....	No .....	
63.8(g) .....	No .....	Subpart N does not require the use of CEM's. Monitoring data does not need to be reduced for reporting purposes because subpart N requires measurement once/day.
63.9(a) .....	Yes .....	§63.343(a)(3) of subpart N requires area sources to comply with major source provisions if an increase in HAP emissions causes them to become major sources.
63.9(b)(1)(i)–(ii) .....	No .....	
63.9(b)(1)(iii) .....	No .....	
63.9(b)(2) .....	No .....	§63.347(c)(2) of subpart N specifies initial notification requirements for new or reconstructed affected sources.
63.9(b)(3) .....	No .....	
		§63.347(c)(1) of subpart N specifies the information to be contained in the initial notification.
		§63.347(c)(2) of subpart N specifies notification requirements for new or reconstructed sources that are not major affected sources.

TABLE 1 TO SUBPART N OF PART 63.—GENERAL PROVISIONS APPLICABILITY TO SUBPART N—Continued

General provisions reference	Applies to subpart N	Comment
63.9(b)(4) .....	No	
63.9(b)(5) .....	No	
63.9(c) .....	Yes .....	This paragraph only references “§63.6(i)(4) through §63.6(i)(6)” for compliance extension provisions. But, §63.343(a)(6) of subpart N also contains provisions for requesting a compliance extension. Subpart N provides a different timeframe for submitting the request than §63.6(i)(4).
63.9(d) .....	Yes .....	This paragraph only references “the notification dates established in paragraph (g) of this section.” But, §63.347 of subpart N also contains notification dates.
63.9(e) .....	No .....	Notification of performance test is required by §63.347(d) of subpart N.
63.9(f) .....	No	
63.9(g) .....	No .....	Subpart N does not require a performance evaluation or relative accuracy test for monitoring devices.
63.9(h)(1)–(3) .....	No .....	§63.347(e) of subpart N specifies information to be contained in the notification of compliance status and the timeframe for submitting this information.
63.9(h)(5) .....	No .....	Similar language has been incorporated into §63.347(e)(2)(iii) of subpart N.
63.9(h)(6) .....	Yes	
63.9(i) .....	Yes	
63.9(j) .....	Yes	
63.10(a) .....	Yes	
63.10(b)(1) .....	Yes	
63.10(b)(2) .....	No .....	§63.346(b) of subpart N specifies the records that must be maintained.
63.10(b)(3) .....	No .....	Subpart N applies to major and area sources.
63.10(c) .....	No .....	Applicable requirements of §63.10(c) have been incorporated into §63.346(b) of subpart N.
63.10(d)(1) .....	Yes	
63.10(d)(2) .....	No .....	§63.347(f) of subpart N specifies the timeframe for reporting performance test results.
63.10(d)(3) .....	No .....	Subpart N does not contain opacity or visible emissions standards.
63.10(d)(4) .....	Yes	
63.10(d)(5) .....	No .....	§63.342(f)(3)(iv) and §63.347(g)(3) of subpart N specify reporting associated with malfunctions.
63.10(e) .....	No .....	§63.347(g) and (h) of subpart N specify the frequency of periodic reports of monitoring data used to establish compliance. Applicable requirements of §63.10(e) have been incorporated into §63.347(g) and (h).
63.10(f) .....	Yes	
63.11 .....	No .....	Flares will not be used to comply with the emission limits.
63.12–63.15 .....	Yes	

3. Appendix A to part 63 is amended by adding Methods 306 and 306a in numerical order to read as follows:

**Appendix A to part 63—Test Methods**

\* \* \* \* \*

**Method 306—Determination of Chromium Emissions From Decorative and Hard Chromium Electroplating and Anodizing Operations**

**1. Applicability and Principle**

1.1 Applicability. This method applies to the determination of chromium (Cr) in emissions from decorative and hard chrome electroplating facilities and anodizing operations.

1.2 Principle. (a) A sample is extracted isokinetically from the source using an unheated Method 5 sampling train (40 CFR part 60, appendix A), with a glass nozzle and probe liner, but with the filter omitted. The Cr emissions are collected in an alkaline solution: 0.1 N sodium hydroxide (NaOH) or 0.1 N sodium bicarbonate (NaHCO<sub>3</sub>). The collected samples remain in the alkaline solution until analysis. Samples with high Cr concentrations may be analyzed using inductively coupled plasma emission spectrometry (ICP) at 267.72 nm. Alternatively, if improved detection limits are required, a portion of the alkaline impinger solution is digested with nitric acid and analyzed by graphite furnace atomic

absorption spectroscopy (GFAAS) at 357.9 nm.

(b) If it is desirable to determine hexavalent chromium (Cr<sup>+6</sup>) emissions, the samples may be analyzed using an ion chromatograph equipped with a post-column reactor (IC/PCR) and a visible wavelength detector. To increase sensitivity for trace levels of Cr<sup>+6</sup>, a preconcentration system can be used in conjunction with the IC/PCR.

**2. Range, Sensitivity, Precision, and Interferences**

2.1 Range. The recommended analytical range for each of the three analytical techniques is given below. The upper limit of all three techniques can be extended indefinitely by appropriate dilution.

2.1.1 GFAAS Range. As reported in Method 7191 of SW-846 (Citation 5 in Bibliography), the optimum concentration range for GFAAS is 5 to 100 µg Cr/l of concentrated analyte.

2.1.2 ICP Range. A linear response curve for ICP can be obtained in the range of 10 to at least 500 µg Cr/l of absorbing solution.

2.1.3 IC/PCR Range. In 40 CFR part 266, appendix IX, the lower limit of the detection range for IC/PCR when employing a preconcentration procedure is reported to be about 0.1 µg Cr<sup>+6</sup>/l of absorbing solution.

**2.2 Sensitivity.**

**2.2.1 Analytical Sensitivity.**

2.2.1.1 ICP Analytical Sensitivity. The minimum detection limit for ICP, as reported in Method 6010A of SW-846, is 7 µg Cr/l.

2.2.1.2 GFAAS Analytical Sensitivity. The minimum detection limit for GFAAS, as reported in Method 7191 of SW-846, is 1 µg Cr/l.

2.2.1.3 IC/PCR Analytical Sensitivity. The minimum detection limit for IC/PCR with a preconcentrator, as reported in 40 CFR part 266, appendix IX is 0.05 µg Cr<sup>+6</sup>/l.

2.2.2 In-stack Sensitivity. The in-stack sensitivity depends upon the analytical detection limit, the volume of stack gas sampled, and the total volume of the impinger absorbing solution plus the rinses. Using the analytical detection limits given in sections 2.2.1.1, 2.2.1.2, and 2.2.1.3; a stack gas sample volume of 1.7 dscm; and a total liquid sample volume of 500 ml; the corresponding in-stack detection limits are 0.0021 mg Cr/dscm for ICP, 0.00015 mg Cr/dscm for GFAAS, and 0.000015 mg Cr<sup>+6</sup>/dscm for IC/PCR with preconcentration. However, it is recommended that the concentration of Cr in the analytical solutions be at least five times the analytical detection limit to optimize sensitivity in the analyses. Using this guideline and the same assumptions for impinger sample volume and stack gas sample volume (500 ml and 1.7 dscm, respectively), the recommended minimum stack concentrations for optimum sensitivity are 0.0103 mg Cr/dscm for ICP, 0.00074 mg Cr/dscm for GFAAS, and 0.000074 mg Cr<sup>+6</sup>/dscm for IC/PCR with preconcentration. If required, the in-stack detection limits can be improved by either increasing the stack gas sample volume,



reducing the volume of the digested sample for GFAAS, improving the analytical detection limits, or any combination of the three.

2.3 Precision. The following precision data have been reported for the three analytical methods. In the case of the GFAAS there is also bias data. In all cases, when sampling precision is combined with analytical precision, the resulting overall precision may be lower.

2.3.1 GFAAS Precision. As reported in Method 7191 of SW-846, in a single laboratory (EMSL), using Cincinnati, Ohio tap water spiked at concentrations of 19, 48, and 77  $\mu\text{g Cr/l}$ , the standard deviations were  $\pm 0.1$ ,  $\pm 0.2$ , and  $\pm 0.8$ , respectively. Recoveries at these levels were 97 percent, 101 percent, and 102 percent, respectively.

2.3.2 ICP Precision. As reported in Method 6010A of SW-846, in an EPA round-robin Phase 1 study, seven laboratories applied the ICP technique to acid/distilled water matrices that had been spiked with various metal concentrates. For true values of 10, 50, and 150  $\mu\text{g Cr/l}$ ; the mean reported values were 10, 50, and 149  $\mu\text{g Cr/l}$ ; and the mean percent relative standard deviations were 18, 3.3, and 3.8 percent, respectively.

2.3.3 IC/PCR Precision. As reported in 40 CFR part 266, appendix IX, the precision of the IC/PCR with sample preconcentration is 5 to 10 percent; the overall precision for sewage sludge incinerators emitting 120 ng/dscm of  $\text{Cr}^{+6}$  and 3.5  $\mu\text{g/dscm}$  of total Cr is 25 percent and 9 percent for  $\text{Cr}^{+6}$  and total Cr, respectively; and for hazardous waste incinerators emitting 300 ng/dscm of  $\text{Cr}^{+6}$  the precision is 20 percent.

#### 2.4 Interferences.

2.4.1 GFAAS Interferences. Low concentrations of calcium and/or phosphate may cause interferences; at concentrations above 200  $\mu\text{g/l}$ , calcium's effect is constant and eliminates the effect of phosphate. Calcium nitrate is therefore added to the concentrated analyte to ensure a known constant effect. Other matrix modifiers recommended by the instrument manufacturer may also be suitable. Nitrogen should not be used as the purge gas due to cyanide band interference. Background correction may be required because of possible significant levels of nonspecific absorption and scattering at the 357.9 nm analytical wavelength. Zeeman or Smith-Hieftje background correction is recommended to correct for interferences due to high levels of dissolved solids in the alkaline impinger solutions.

#### 2.4.2 ICP Interferences.

2.4.2.1 ICP Spectral Interferences. (a) Spectral interferences are caused by:

- (1) Overlap of a spectral line from another element;
- (2) Unresolved overlap of molecular band spectra;
- (3) Background contribution from continuous or recombination phenomena; and

(4) Stray light from the line emission of high-concentration elements.

(b) Spectral overlap may be compensated for by computer correcting the raw data after monitoring and measuring the interfering element. At the 267.72-nm Cr analytical wavelength, iron, manganese, and uranium are potential interfering elements.

Background and stray light interferences can usually be compensated for by a background correction adjacent to the analytical line. Unresolved overlap requires the selection of an alternative Cr wavelength. Consult the instrument manufacturer's operation manual for interference correction procedures.

2.4.2.2 ICP Physical Interferences. High levels of dissolved solids in the samples may cause significant inaccuracies due to salt buildup at the nebulizer and torch tips. This problem can be controlled by diluting the sample or providing for extended rinse times between sample analyses. Standards are prepared in the same matrix as the samples (i.e., 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ ).

2.4.2.3 ICP Chemical Interferences. These include molecular compound formation, ionization effects and solute vaporization effects, and are usually not significant in ICP, especially if the standards and samples are matrix matched.

2.4.3 IC/PCR Interferences. Components in the sample matrix may cause  $\text{Cr}^{+6}$  to convert to trivalent chromium ( $\text{Cr}^{+3}$ ) or cause  $\text{Cr}^{+3}$  to convert to  $\text{Cr}^{+6}$ . The chromatographic separation of  $\text{Cr}^{+6}$  using ion chromatography reduces the potential for other metals to interfere with the post-column reaction. For the IC/PCR analysis, only compounds that coelute with  $\text{Cr}^{+6}$  and affect the diphenylcarbazide reaction will cause interference. Periodic analyses of reagent water blanks are used to demonstrate that the analytical system is essentially free of contamination. Sample cross-contamination that can occur when high-level and low-level samples or standards are analyzed alternately is eliminated by thorough purging of the sample loop. Purging can easily be achieved by increasing the injection volume of the samples to ten times the size of the sample loop.

### 3. Apparatus

3.1 Sampling Train. A schematic of the sampling train used in this method is shown in Figure 306-1. The train is the same as Method 5, section 2.1 (40 CFR part 60, appendix A), except that the filter is omitted, and quartz or borosilicate glass must be used for the probe nozzle and liner in place of stainless steel. It is not necessary to heat the probe liner. Probe fittings of plastic such as Teflon, polypropylene, etc. are recommended over metal fittings to prevent contamination. If desired, a single combined probe nozzle and liner may be used, but such a single glass piece is *not* a requirement of this methodology. Use 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$  in the impingers in place of water.

3.2 Sample Recovery. Same as Method 5, section 2.2 (40 CFR part 60, appendix A), with the following exceptions:

3.2.1 Probe-Liner and Probe-Nozzle Brushes. Brushes are not necessary for sample recovery. If a probe brush is used, it must be nonmetallic.

3.2.2 Sample Recovery Solution. Use 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ , whichever was used as the impinger absorbing solution, in place of acetone to recover the sample.

3.2.3 Sample Storage Containers. Polyethylene, with leak-free screw cap, 500 ml or 1,000 ml.

3.2.4 Filtration Apparatus for IC/PCR. Teflon, or equivalent, filter holder and 0.45  $\mu\text{m}$  acetate, or equivalent, filter.

3.3 Analysis. For analysis, the following equipment is needed.

#### 3.3.1 General.

3.3.1.1 Phillips Beakers. (Phillips beakers are preferred, but regular beakers can also be used.)

#### 3.3.1.2 Hot Plate.

3.3.1.3 Volumetric Flasks. Class A, various sizes as appropriate.

#### 3.3.1.4 Assorted Pipettes.

#### 3.3.2 Analysis by GFAAS.

3.3.2.1 Chromium Hollow Cathode Lamp or Electrodeless Discharge Lamp.

3.3.2.2 Graphite Furnace Atomic Absorption Spectrophotometer.

#### 3.3.3 Analysis by ICP.

3.3.3.1 ICP Spectrometer. Computer-controlled emission spectrometer with background correction and radio frequency generator.

3.3.3.2 Argon Gas Supply. Welding grade or better.

#### 3.3.4 Analysis by IC/PCR.

3.3.4.1 IC/PCR System. High performance liquid chromatograph pump, sample injection valve, post-column reagent delivery and mixing system, and a visible detector, capable of operating at 520 nm, all with a nonmetallic (or inert) flow path. An electronic peak area mode is recommended, but other recording devices and integration techniques are acceptable provided the repeatability criteria and the linearity criteria for the calibration curve described in section 6.4.1 can be satisfied. A sample loading system will be required if preconcentration is employed.

3.3.4.2 Analytical Column. A high performance ion chromatograph (HPIC) nonmetallic column with anion separation characteristics and a high loading capacity designed for separation of metal chelating compounds to prevent metal interference. Resolution described in section 5.5 must be obtained. A nonmetallic guard column with the same ion-exchange material is recommended.

3.3.4.3 Preconcentration Column. An HPIC nonmetallic column with acceptable anion retention characteristics and sample loading rates as described in section 5.5.

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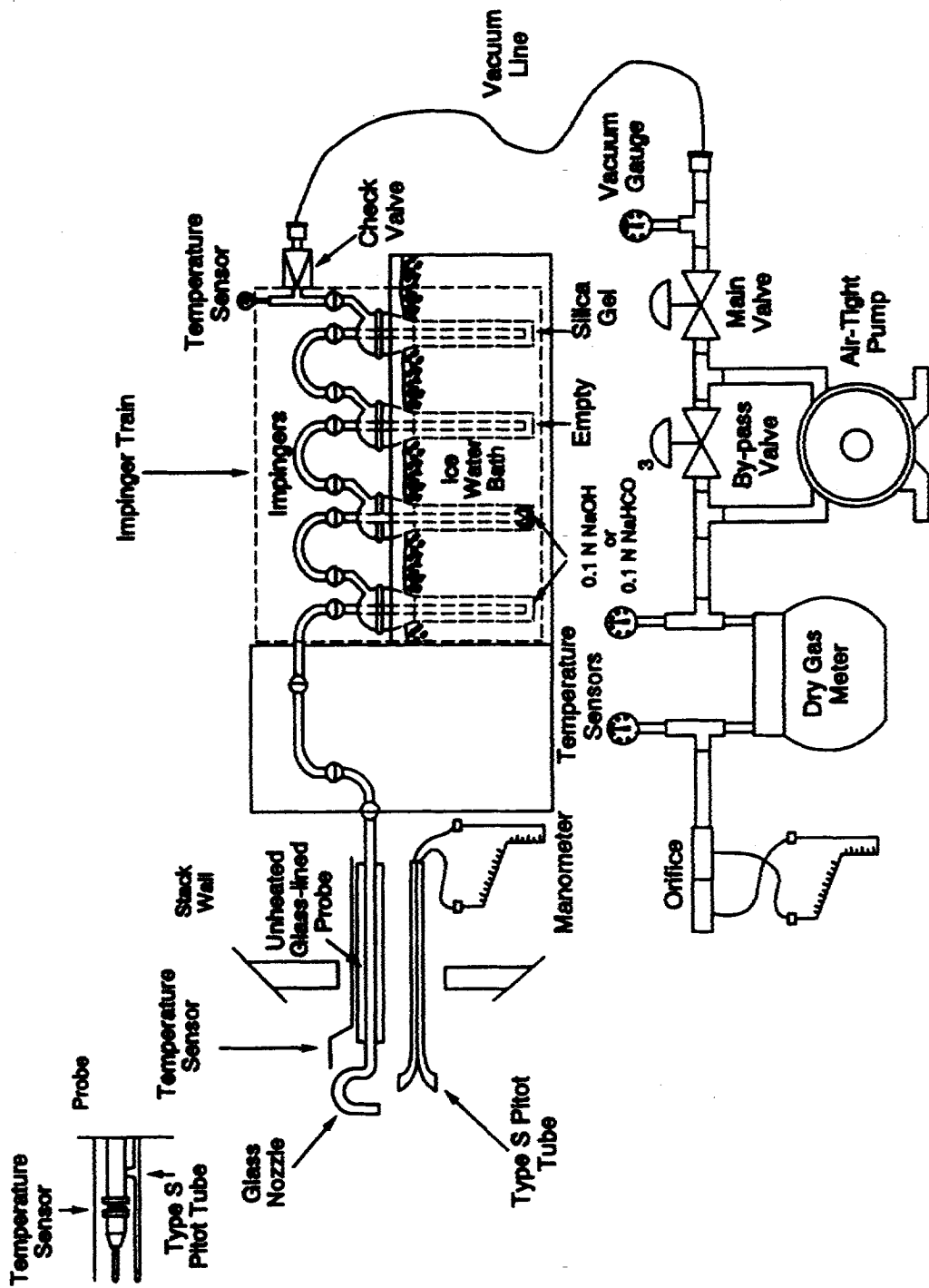


Figure 306-1. Sampling Train Schematic.

3.3.4.4 0.45- $\mu\text{m}$  Filter Cartridge. For the removal of insoluble material. To be used just prior to sample injection/analysis.

#### 4. Reagents

Unless otherwise indicated, all reagents shall conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society (ACS reagent grade). Where such specifications are not available, use the best available grade.

##### 4.1 Sampling.

4.1.1 Water. Reagent water that conforms to ASTM Specification D1193-77, Type II (incorporated by reference—see § 63.14). It is recommended that water blanks be checked prior to preparing sampling reagents to ensure that the Cr content is less than the analytical detection limit.

4.1.2 Sodium Hydroxide (NaOH) Absorbing Solution, 0.1 N or Sodium Bicarbonate ( $\text{NaHCO}_3$ ) Absorbing Solution, 0.1 N. Dissolve 4.0 g of sodium hydroxide in 1 l of water, or dissolve 8.5 g of sodium bicarbonate in 1 l of water.

##### 4.2 Sample Recovery.

4.2.1 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ . See section 4.1.2. Use the same solution for recovery as was used in the impingers.

4.2.2 pH Indicator Strip, for IC/PCR. pH indicator capable of determining the pH of solutions between the pH range of 7 and 12, at 0.5 pH intervals.

##### 4.3 Sample Preparation and Analysis.

4.3.1 Nitric Acid ( $\text{HNO}_3$ ), Concentrated, for GFAAS. Trace metals grade or better  $\text{HNO}_3$  must be used for reagent preparation. The ACS reagent grade  $\text{HNO}_3$  is acceptable for cleaning glassware.

4.3.2  $\text{HNO}_3$ , 1.0 percent (v/v), for GFAAS. Add, with stirring, 10 ml of concentrated  $\text{HNO}_3$  to 800 ml of water. Dilute to 1,000 ml with water. This reagent shall contain less than 0.001 mg Cr/l.

4.3.3 Calcium Nitrate  $\text{Ca}(\text{NO}_3)_2$  Solution (10  $\mu\text{g}$  Ca/ml) for GFAAS. Prepare the solution by weighing 36 mg of  $\text{Ca}(\text{NO}_3)_2$  into a 1 l volumetric flask. Dilute with water to 1 l.

4.3.4 Matrix Modifier, for GFAAS. See instrument manufacturer's manual for suggested matrix modifier.

4.3.5 Chromatographic Eluent, for IC/PCR. The eluent used in the analytical system is ammonium sulfate based. Prepare by adding 6.5 ml of 29 percent ammonium hydroxide ( $\text{NH}_4\text{OH}$ ) and 33 g of ammonium sulfate ( $(\text{NH}_4)_2\text{SO}_4$ ) to 500 ml of reagent water. Dilute to 1 l with reagent water and mix well. Other combinations of eluents and/or columns may be employed provided peak resolution, as described in section 5.5, repeatability and linearity, as described in section 6.4.1, and analytical sensitivity are acceptable.

4.3.6 Post-Column Reagent, for IC/PCR. An effective post-column reagent for use with the chromatographic eluent described in section 4.3.5 is a diphenylcarbazide (DPC) based system. Dissolve 0.5 g of 1,5-diphenylcarbazide in 100 ml of ACS grade methanol. Add 500 ml of reagent water

containing 50 ml of 96 percent spectrophotometric grade sulfuric acid. Dilute to 1 l with reagent water.

4.3.7 Chromium Standard Stock Solution (1,000 mg/l). Procure a certified aqueous standard or dissolve 2.829 g of potassium dichromate ( $\text{K}_2\text{Cr}_2\text{O}_7$ ) in water and dilute to 1 l.

4.3.8 Calibration Standards for GFAAS. Chromium solutions for GFAAS calibration shall be prepared to contain 1.0 percent (v/v)  $\text{HNO}_3$ . The zero standard shall be 1.0 percent (v/v)  $\text{HNO}_3$ . Calibration standards should be prepared daily by diluting the Cr standard stock solution (section 4.3.7) with 1.0 percent  $\text{HNO}_3$ . Use at least four standards to make the calibration curve. Suggested levels are 0, 5, 50, and 100  $\mu\text{g}$  Cr/l.

4.3.9 Calibration Standards for ICP or IC/PCR. Prepare calibration standards for ICP or IC/PCR by diluting the Cr standard stock solution (section 4.3.7) with 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ , whichever was used as the impinger absorbing solution, to achieve a matrix similar to the actual field samples. Suggested levels are 0, 25, 50, and 100  $\mu\text{g}$  Cr/l for ICP, and 0, 0.5, 5, and 10  $\mu\text{g}$   $\text{Cr}^{+6}$ /l for IC/PCR.

##### 4.4 Glassware Cleaning Reagents.

4.4.1  $\text{HNO}_3$ , Concentrated. The ACS reagent grade or equivalent.

4.4.2 Water. Reagent water that conforms to ASTM Specification D1193-77, Type II, (incorporated by reference—see § 63.14).

4.4.3  $\text{HNO}_3$ , 10 percent (v/v). Add with stirring 500 ml of concentrated  $\text{HNO}_3$  to a flask containing approximately 4,000 ml of water. Dilute to 5,000 ml with water. Mix well. The reagent shall contain less than 2  $\mu\text{g}$  Cr/l.

#### 5. Procedure

5.1 Sampling. (a) Same as Method 5, section 4.1 (40 CFR part 60, appendix A), except omit the filter and filter holder from the sampling train, use a glass nozzle and probe liner, do not heat the probe, place 100 ml of 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$  in each of the first two impingers, and record the data for each run on a data sheet such as the one shown in Figure 306-2.

(b) Clean all glassware prior to sampling in hot soapy water designed for laboratory cleaning of glassware. Next, rinse the glassware three times with tap water, followed by three additional rinses with reagent water. Then soak all glassware in 10 percent (v/v)  $\text{HNO}_3$  solution for a minimum of 4 hours, rinse three times with reagent water, and allowed to air dry. Cover all glassware openings where contamination can occur with Parafilm, or equivalent, until the sampling train is assembled for sampling.

(c) If the sample is going to be analyzed for  $\text{Cr}^{+6}$  using IC/PCR, determine the pH of the solution in the first impinger at the end of the sampling run using a pH indicator strip. The pH of the solution should be greater than 8.5. If not, the concentration of the NaOH or  $\text{NaHCO}_3$  impinger absorbing solution should be increased to 0.5 N and the sample should be rerun.

5.2 Sample Recovery. Follow the basic procedures of Method 5, section 4.2, with the

exceptions noted below; a filter is not recovered from this train.

5.2.1 Container No. 1. Measure the volume of the liquid in the first, second, and third impingers and quantitatively transfer into a labelled sample container. Use approximately 200 to 300 ml of 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$  to rinse the probe nozzle, probe liner, three impingers, and connecting glassware; add this rinse to the same container.

5.2.2 Container No. 2 (Reagent Blank). Place approximately 500 ml of 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$  absorbing solution in a labeled sample container.

5.2.3 Sample Filtration for IC/PCR. If the sample is to be analyzed for  $\text{Cr}^{+6}$  by IC/PCR, it must be filtered immediately following recovery to remove any insoluble matter. Nitrogen gas may be used as a pressure assist to the filtration process. Filter the entire contents of Container No. 1 through a 0.45- $\mu\text{m}$  acetate filter (or equivalent), and collect the filtrate in a 1,000 ml graduated cylinder. Rinse the sample container with reagent water three separate times, pass these rinses through the filter, and add the rinses to the sample filtrate. Determine the final volume of the filtrate and rinses and return them to the rinsed polyethylene sample container.

5.2.4 Sample Preservation. Refrigerate samples upon receipt. (Containers Nos. 1 and 2).

5.3 Sample Preparation and Analysis for GFAAS. For analysis by GFAAS, an acid digestion of the alkaline impinger solution is required. Two types of blanks are required for the analysis. The calibration blank is used in establishing the analytical curve, and the reagent blank is used to assess possible contamination resulting from the sample processing. The 1.0 percent  $\text{HNO}_3$  is the calibration blank. The 0.1 N NaOH solution or the 0.1 N  $\text{NaHCO}_3$  from section 5.2.2 is the reagent blank. The reagent blank must be carried through the complete analytical procedure, including the acid digestion, and must contain the same acid concentration in the final solution as the sample solutions.

5.3.1 Acid Digestion for GFAAS. (a) In a beaker, add 10 ml of concentrated  $\text{HNO}_3$  to a sample aliquot of 100 ml taken for analysis. Cover the beaker with a watch glass. Place the beaker on a hot plate and reflux the sample down to near dryness. Add another 5 ml of concentrated  $\text{HNO}_3$  to complete the digestion. Carefully reflux the sample volume down to near dryness. Wash down the beaker walls and watch glass with reagent water. The final concentration of  $\text{HNO}_3$  in the solution should be 1 percent (v/v). Transfer the digested sample to a 50 ml volumetric flask. Add 0.5 ml of concentrated  $\text{HNO}_3$ , and 1 ml of the 10  $\mu\text{g}$ /ml of  $\text{Ca}(\text{NO}_3)_2$ .

(b) Dilute to 50 ml with reagent water. A different final volume may be used, based on the expected Cr concentration, but the  $\text{HNO}_3$  concentration must be maintained at 1 percent (v/v).

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Plant \_\_\_\_\_  
 Location \_\_\_\_\_  
 Operator \_\_\_\_\_  
 Date \_\_\_\_\_  
 Run No. \_\_\_\_\_  
 Sample box No. \_\_\_\_\_  
 Meter box No. \_\_\_\_\_  
 Meter  $\Delta H@$  \_\_\_\_\_  
 C factor \_\_\_\_\_  
 Pitot tube coefficient,  $C_p$  \_\_\_\_\_

SCHEMATIC OF STACK CROSS SECTION

Ambient temperature \_\_\_\_\_  
 Barometric pressure \_\_\_\_\_  
 Assumed moisture, % \_\_\_\_\_  
 Probe length, (ft.) \_\_\_\_\_  
 Nozzle identification No. \_\_\_\_\_  
 Average calibrated nozzle diameter, (in.) \_\_\_\_\_  
 Leak rate, (cfm) \_\_\_\_\_  
 Static pressure, (in. Hg) \_\_\_\_\_

Traverse point number	Sampling time (min.)	Vacuum (in. Hg)	Stack temperature (T <sub>s</sub> ) (°F)	Velocity head ( $\Delta P_s$ ) (in. H <sub>2</sub> O)	Pressure differential across orifice meter (in. H <sub>2</sub> O)	Gas meter reading (ft <sup>3</sup> )	Gas sample temperature at dry gas meter		Temperature of gas leaving condenser or last impinger (°F)
							Inlet (°F)	Outlet (°F)	
Total							Avg.	Avg.	
Average							Avg.	Avg.	

Figure 306-2. Chromium Field Data Sheet.

5.3.2 Sample Analysis by GFAAS. (a) The 357.9-nm wavelength line shall be used. Follow the manufacturer's operating instructions for all other spectrophotometer parameters.

(b) Furnace parameters suggested by the manufacturer should be employed as guidelines. Since temperature-sensing mechanisms and temperature controllers can vary between instruments and/or with time, the validity of the furnace parameters must be periodically confirmed by systematically altering the furnace parameters while analyzing a standard. In this manner, losses of analyte due to higher-than-necessary temperature settings or losses in sensitivity due to less than optimum settings can be minimized. Similar verification of furnace parameters may be required for complex sample matrices. Calibrate the GFAAS system following the procedures specified in section 6.

(c) Inject a measured aliquot of digested sample into the furnace and atomize. If the concentration found exceeds the calibration range, the sample should be diluted with the calibration blank solution (1.0 percent  $\text{HNO}_3$ ) and reanalyzed. Consult the operator's manual for suggested injection volumes. The use of multiple injections can improve accuracy and help detect furnace pipetting errors.

(d) Analyze a minimum of one matrix-matched reagent blank per sample batch to determine if contamination or any memory effects are occurring. Analyze a calibration blank and a midpoint calibration check standard after approximately every 10 sample injections.

(e) Calculate the Cr concentrations:

(1) By the method of standard additions (see operator's manual),

(2) From the calibration curve, or

(3) Directly from the instrument's concentration readout. All dilution or concentration factors must be taken into account. All results should be reported in  $\mu\text{g Cr/ml}$  with up to three significant figures.

5.4 Sample Analysis by ICP. (a) The ICP measurement is performed directly on the alkaline impinger solution; acid digestion is not necessary provided the samples and standards are matrix matched. However, ICP should only be used when the solution analyzed has a Cr concentration greater than  $35 \mu\text{g/l}$ .

(b) Two types of blanks are required for the analysis. The calibration blank is used in establishing the analytical curve, and the reagent blank is used to assess possible contamination resulting from sample processing. Use either 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ , whichever was used for the impinger absorbing solution, for the calibration blank. The calibration blank can be prepared fresh in the laboratory; it does not have to be from the same batch of solution that was used in the field. Prepare a sufficient quantity to flush the system between standards and samples. The reagent blank (section 5.2.2) is a sample of the impinger solution used for sample collection that is collected in the field during the testing program.

(c) Set up the instrument with proper operating parameters including wavelength,

background correction settings (if necessary), and interfering element correction settings (if necessary). The instrument must be allowed to become thermally stable before beginning performance of measurements (usually requiring at least 30 min of operation prior to calibration). During this warmup period, the optical calibration and torch position optimization may be performed (consult the operator's manual).

(d) Calibrate the instrument according to the instrument manufacturer's recommended procedures, and the procedures specified in section 6.3. Before analyzing the samples, reanalyze the highest calibration standard as if it were a sample. Concentration values obtained should not deviate from the actual values by more than 5 percent, or the established control limits, whichever is lower (see sections 6 and 7). If they do, follow the recommendations of the instrument manufacturer to correct for this condition.

(e) Flush the system with the calibration blank solution for at least 1 min before the analysis of each sample or standard. Analyze the midpoint calibration standard and the calibration blank after each 10 samples. Use the average intensity of multiple exposures for both standardization and sample analysis to reduce random error.

(f) Dilute and reanalyze samples that are more concentrated than the linear calibration limit or use an alternate, less sensitive Cr wavelength for which quality control data are already established.

(g) If dilutions are performed, the appropriate factors must be applied to sample values. All results should be reported in  $\mu\text{g Cr/ml}$  with up to three significant figures.

5.5 Sample Analyses by IC/PCR. (a) The  $\text{Cr}^{+6}$  content of the sample filtrate is determined by IC/PCR. To increase sensitivity for trace levels of chromium, a preconcentration system is also used in conjunction with the IC/PCR.

(b) Prior to preconcentration and/or analysis, filter all field samples through a  $0.45\text{-}\mu\text{m}$  filter. This filtration should be conducted just prior to sample injection/analysis.

(c) The preconcentration is accomplished by selectively retaining the analyte on a solid absorbent (as described in section 3.4.3.3), followed by removal of the analyte from the absorbent. Inject the sample into a sample loop of the desired size (use repeated loadings or a larger size loop for greater sensitivity). The  $\text{Cr}^{+6}$  is collected on the resin bed of the column. Switch the injection valve so that the eluent displaces the concentrated  $\text{Cr}^{+6}$  sample, moving it off the preconcentration column and onto the IC anion separation column. After separation from other sample components, the  $\text{Cr}^{+6}$  forms a specific complex in the post-column reactor with the DPC reaction solution, and the complex is detected by visible absorbance at a wavelength of 520 nm. The amount of absorbance measured is proportional to the concentration of the  $\text{Cr}^{+6}$  complex formed. Compare the IC retention time and the absorbance of the  $\text{Cr}^{+6}$  complex with known  $\text{Cr}^{+6}$  standards analyzed under identical conditions to provide both qualitative and quantitative analyses.

(d) Two types of blanks are required for the analysis. The calibration blank is used in establishing the analytical curve, and the reagent blank is used to assess possible contamination resulting from sample processing. Use either 0.1 N NaOH or 0.1 N  $\text{NaHCO}_3$ , whichever was used for the impinger solution, for the calibration blank. The calibration blank can be prepared fresh in the laboratory; it does not have to be from the same batch of solution that was used in the field. The reagent blank (section 5.2.2) is a sample of the impinger solution used for sample collection that is collected in the field during the testing program.

(e) Prior to sample analysis, establish a stable baseline with the detector set at the required attenuation by setting the eluent flow rate at approximately 1 ml/min and the post-column reagent flow rate at approximately 0.5 ml/min. Note: As long as the ratio of eluent flow rate to PCR flow rate remains constant, the standard curve should remain linear. Inject a sample of reagent water to ensure that no  $\text{Cr}^{+6}$  appears in the water blank.

(f) First, inject the calibration standards prepared, as described in section 4.3.9 to cover the appropriate concentration range, starting with the lowest standard first. Next, inject, in duplicate, the calibration reference standard (as described in section 7.3.1), followed by the reagent blank (section 5.2.2), and the field samples. Finally, repeat the injection of the calibration standards to assess instrument drift. Measure areas or heights of the  $\text{Cr}^{+6}$ /DPC complex chromatogram peaks. The response for replicate, consecutive injections of samples must be within 5 percent of the average response, or the injection should be repeated until the 5 percent criterion can be met. Use the average response (peak areas or heights) from the duplicate injections of calibration standards to generate a linear calibration curve. From the calibration curve, determine the concentrations of the field samples employing the average response from the duplicate injections.

## 6. Calibration

6.1 Sampling Train Calibration. Perform all of the calibrations described in Method 5, section 5 (40 CFR part 60, appendix A). The alternate calibration procedures described in section 7 of Method 5 (40 CFR part 60, appendix A) may also be used.

6.2 GFAAS Calibration. Either run a series of chromium standards and a calibration blank and construct a calibration curve by plotting the concentrations of the standards against the absorbencies, or using the method of standard additions, plot added concentration versus absorbance. For instruments that read directly in concentration, set the curve corrector to read out the proper concentration, if applicable. This is customarily performed automatically with most instrument computer-based data systems.

6.2.1 GFAAS Calibration Curve. If a calibration curve is used, it should be prepared daily with a minimum of a calibration blank and three standards. Calibration standards for total chromium should start with 1 percent v/v  $\text{HNO}_3$  with

no chromium for the calibration blank, with appropriate increases in total chromium concentration for the other calibration standards (see section 4.3.9.). Calibration standards should be prepared fresh daily.

6.3 ICP Calibration. Calibrate the instrument according to the instrument manufacturer's recommended procedures, using a calibration blank and three standards for the initial calibration. Calibration standards should be prepared fresh daily, as described in section 4.3.9. Be sure that samples and calibration standards are matrix matched. Flush the system with the calibration blank between each standard. Use the average intensity of multiple exposures for both standardization and sample analysis to reduce random error.

6.4 IC/PCR Calibration. Prepare a calibration curve using the calibration blank and three calibration standards prepared fresh daily as described in section 4.3.9. Run the standards with the field samples as described in section 5.5.

## 7. Quality Control

### 7.1 GFAAS Quality Control

7.1.1 GFAAS Calibration Reference Standards. If a calibration curve is used, it must be verified by use of at least one calibration reference standard (made from a reference material or other independent standard material) at or near the mid-range of the calibration curve. The calibration reference standard must be measured within 10 percent of its true value for the curve to be considered valid. The curve must be validated before sample analyses are performed.

7.1.2 GFAAS Check Standards. (a) Run a check standard and a calibration blank after approximately every 10 sample injections, and at the end of the analytical run. These standards are run, in part, to monitor the life and performance of the graphite tube. Lack of reproducibility or a significant change in the signal for the check standard indicates that the graphite tube should be replaced. Check standards can be the mid-range calibration standard or the reference standard. The results of the check standard shall agree within 10 percent of the expected value. If not, terminate the analyses, correct the problem, recalibrate the instrument, and reanalyze all samples analyzed subsequent to the last acceptable check standard analysis.

(b) The results of the calibration blank are to agree within three standard deviations of the mean blank value. If not, repeat the analysis two more times and average the results. If the average is not within three standard deviations of the background mean, terminate the analyses, correct the problem, recalibrate, and reanalyze all samples analyzed subsequent to the last acceptable calibration blank analysis.

7.1.3 GFAAS Duplicate Samples. Run one duplicate sample for every 20 samples, (or one per source test, whichever is more frequent). Duplicate samples are brought through the whole sample preparation and analytical process separately. Duplicate samples shall agree within 10 percent.

7.1.4 GFAAS Matrix Spiking. Spiked samples shall be prepared and analyzed daily to ensure that correct procedures are being

followed and that all equipment is operating properly. Spiked sample recovery analyses should indicate a recovery for the Cr spike of between 75 and 125 percent. Spikes are added prior to any sample preparation. Cr levels in the spiked sample should provide final solution concentrations that fall within the linear portion of the calibration curve.

7.1.5 GFAAS Method of Standard Additions. Whenever sample matrix problems are suspected and standard/sample matrix matching is not possible or whenever a new sample matrix is being analyzed, the method of standard additions shall be used for the analysis of all extracts. Section 5.4.2 of Method 12 (40 CFR part 60, appendix A) specifies a performance test to determine if the method of standard additions is necessary.

7.1.6 GFAAS Reagent Blank Samples. Analyze a minimum of one matrix-matched reagent blank (section 5.2.2) per sample batch to determine if contamination or memory effects are occurring. The results should agree within three standard deviations of the mean blank value.

### 7.2 ICP Quality Control.

7.2.1 ICP Interference Check. Prepare an interference check solution to contain known concentrations of interfering elements that will provide an adequate test of the correction factors in the event of potential spectral interferences. Two potential interferences, iron and manganese, may be prepared as 1,000 µg/ml and 200 µg/ml solutions, respectively. The solutions should be prepared in dilute HNO<sub>3</sub> (1-5 percent). Particular care must be taken to ensure that the solutions and/or salts used to prepare the solutions are of ICP grade purity (i.e., that no measurable Cr contamination exists in the salts/solutions). Commercially prepared interfering element check standards are available. Verify the interelement correction factors every three months by analyzing the interference check solution. The correction factors are calculated according to the instrument manufacturer's directions. If interelement correction factors are used properly, no false Cr should be detected.

7.2.2 ICP Calibration Reference Standards. Prepare a calibration reference standard in the same alkaline matrix as the calibration standards; it should be at least 10 times the instrumental detection limit. This reference standard should be prepared from a different Cr stock solution source than that used for preparation of the calibration curve standards and is used to verify the accuracy of the calibration curve. Prior to sample analysis, analyze at least one reference standard. The calibration reference standard must be measured within 10 percent of its true value for the curve to be considered valid. The curve must be validated before sample analyses are performed.

7.2.3 ICP Check Standards. Run a check standard and a calibration blank after every 10 samples, and at the end of the analytical run. Check standards can be the mid-range calibration standard or the reference standard. The results of the check standard shall agree within 10 percent of the expected value; if not, terminate the analyses, correct the problem, recalibrate the instrument, and rerun all samples analyzed subsequent to the

last acceptable check standard analysis. The results of the calibration blank are to agree within three standard deviations of the mean blank value. If not, repeat the analysis two more times and average the results. If the average is not within three standard deviations of the background mean, terminate the analyses, correct the problem, recalibrate, and reanalyze all samples analyzed subsequent to the last acceptable calibration blank analysis.

7.2.4 ICP Duplicate Samples. Analyze one duplicate sample for every 20 samples, (or one per source test, whichever is more frequent). Duplicate samples are brought through the whole sample preparation and analytical process. Duplicate samples shall agree within 10 percent.

7.2.5 ICP Reagent Blank Samples. Analyze a minimum of one matrix-matched reagent blank (section 5.2.2) per sample batch to determine if contamination or memory effects are occurring. The results should agree within three standard deviations of the mean blank value.

### 7.3 IC/PCR Quality Control.

7.3.1 IC/PCR Calibration Reference Standards. Prepare a calibration reference standard in the same alkaline matrix as the calibration standards at a concentration that is at or near the mid-point of the calibration curve. This reference standard should be prepared from a different Cr stock solution source than that used for preparing the calibration curve standards. The reference standard is used to verify the accuracy of the calibration curve. Prior to sample analysis, analyze at least one reference standard. The results of this analysis of the reference standard must be within 10 percent of the true value of the reference standard for the calibration curve to be considered valid. The curve must be validated before sample analyses are performed.

7.3.2 IC/PCR Check Standards. (a) Run the calibration blank and calibration standards with the field samples as described in section 5.5. For each standard, determine the peak areas (recommended) or the peak heights, calculate the average response from the duplicate injections, and plot the average response against the Cr+6 concentration in µg/l. The individual responses for each calibration standard determined before and after field sample analysis must be within 5 percent of the average response for the analysis to be valid. If the 5 percent criteria is exceeded, excessive drift and/or instrument degradation may have occurred, and must be corrected before further analyses are performed.

(b) Employing linear regression, calculate a predicted value for each calibration standard using the average response for the duplicate injections. Each predicted value must be within 7 percent of the actual value for the calibration curve to be considered acceptable. If not acceptable, remake and/or rerun the calibration standards. If the calibration curve is still unacceptable, reduce the range of the curve.

7.3.3 IC/PCR Duplicate Samples. Analyze one duplicate sample for every 20 samples, (or one per source test, whichever is more frequent). Duplicate samples are brought through the whole sample preparation and

analytical process. Duplicate samples shall agree within 10 percent.

7.3.4 ICP Reagent Blank Samples. Analyze a minimum of one matrix-matched reagent blank (section 5.2.2) per sample batch to determine if contamination or memory effects are occurring. The results should agree within three standard deviations of the mean blank value.

#### 8. Emission Calculations

Carry out the calculations, retaining one extra decimal figure beyond that of the acquired data. Round off figures after final calculations.

8.1 Total Cr in Sample. Calculate  $M_{Cr}$ , the total  $\mu\text{g}$  Cr in each sample, as follows:

$$M_{Cr} = (V_{ml}) (C_s) (F) (D) \quad \text{Eq. 306-1}$$

where:  
 $V_{ml}$  = Volume of impinger contents plus rinses, ml.

$C_s$  = Concentration of Cr in sample solution,  $\mu\text{g}$  Cr/ml.

F = Dilution factor.

= Volume of aliquot after dilution, ml;

Volume of aliquot before dilution, ml

D = Digestion factor.

= Volume of sample aliquot after digestion, ml; Volume of sample aliquot submitted to digestion, ml

8.2 Average Dry Gas Meter Temperature and Average Orifice Pressure Drop. Same as Method 5, section 6.2.

8.3 Dry Gas Volume, Volume of Water Vapor, Moisture Content. Same as Method 5, sections 6.3, 6.4, and 6.5, respectively.

8.4 Cr Emission Concentration. Calculate  $C_{Cr}$ , the Cr concentration in the stack gas, in mg/dscm on a dry basis, corrected to standard conditions, as follows:

$$C_{Cr} = (10^{-3} \text{ mg}/\mu\text{g}) (M_{Cr}/V_{m(\text{std})}) \quad \text{Eq. 306-2}$$

where:  
 $V_{m(\text{std})}$  = Gas sample volume measured by the dry gas meter, corrected to dry standard conditions, dscm.

8.5 Isokinetic Variation, Acceptable Results. Same as Method 5, sections 6.11 and 6.12, respectively.

#### 9. Bibliography

1. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," U. S. Environmental Protection Agency Publication SW-846, 2nd Edition, July 1982.

2. Cox, X.B., R.W. Linton, and F.E. Butler. Determination of Chromium Speciation in Environmental Particles—A Multitechnique Study of Ferrochrome Smelter Dust. Accepted for publication in Environmental Science and Technology.

3. Same as Bibliography of Method 5, Citations 2 to 5 and 7.

4. California Air Resources Board, "Determination of Total Chromium and Hexavalent Chromium Emissions from Stationary Sources." Method 425, September 12, 1990.

5. "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", U. S. Environmental Protection Agency Publication SW-846, 3rd Edition, November 1986 as amended by Update I, November 1990.

#### Method 306A—Determination of Chromium Emissions From Decorative and Hard Chromium Electroplating and Anodizing Operations

##### 1. Applicability and Principle

1.1 Applicability. This method applies to the determination of chromium (Cr) in emissions from decorative and hard chromium electroplating facilities and anodizing operations. The method is less expensive and less complex to conduct than Method 306 of this appendix. Correctly applied, the precision and bias of the sample results will be comparable to those obtained with the isokinetic Method 306 of this appendix. This method is applicable under ambient moisture, air, and temperature conditions.

1.2 Principle. A sample is extracted from the source at a constant sampling rate determined by a critical orifice and collected in a probe and impingers. The sampling time at the sampling traverse points is varied

according to the stack gas velocity at each point to obtain a proportional sample. The concentration is determined by the same analytical procedures used in Method 306 of this appendix: inductively-coupled plasma emission spectrometry (ICP), graphite furnace atomic absorption spectrometry (GFAAS), or ion chromatography with a post-column reactor (IC/PCR).

##### 2. Range, Sensitivity, Precision, and Interferences

Same as Method 306, section 2 of this appendix.

##### 3. Apparatus

Note: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

3.1 Sampling Train. A schematic of the sampling train is shown in Figure 306A-1. The components of the train are available commercially, but some fabrication and assembly are required. If Method 306 equipment is available, the sampling train may be assembled as specified in Method 306 of this appendix and the sampling rate of the meter box set at the delta  $H_{\text{e}}$  specified for the calibrated orifice; this train is then operated as specified in this method.

3.1.1 Probe Nozzle/Tubing and Sheath. Use approximately 1/4 in. inner diameter (ID) glass or rigid plastic tubing about 8 in. long with a short 90° bend at one end to form the nozzle. Grind a slight taper on the nozzle end before making the bend. Attach the nozzle to flexible tubing of sufficient length to collect a sample from the stack. Use a straight piece of larger diameter rigid tubing (such as metal conduit or plastic water pipe) to form a sheath that begins about 1 in. from the 90° bend on the nozzle and encases the flexible tubing.

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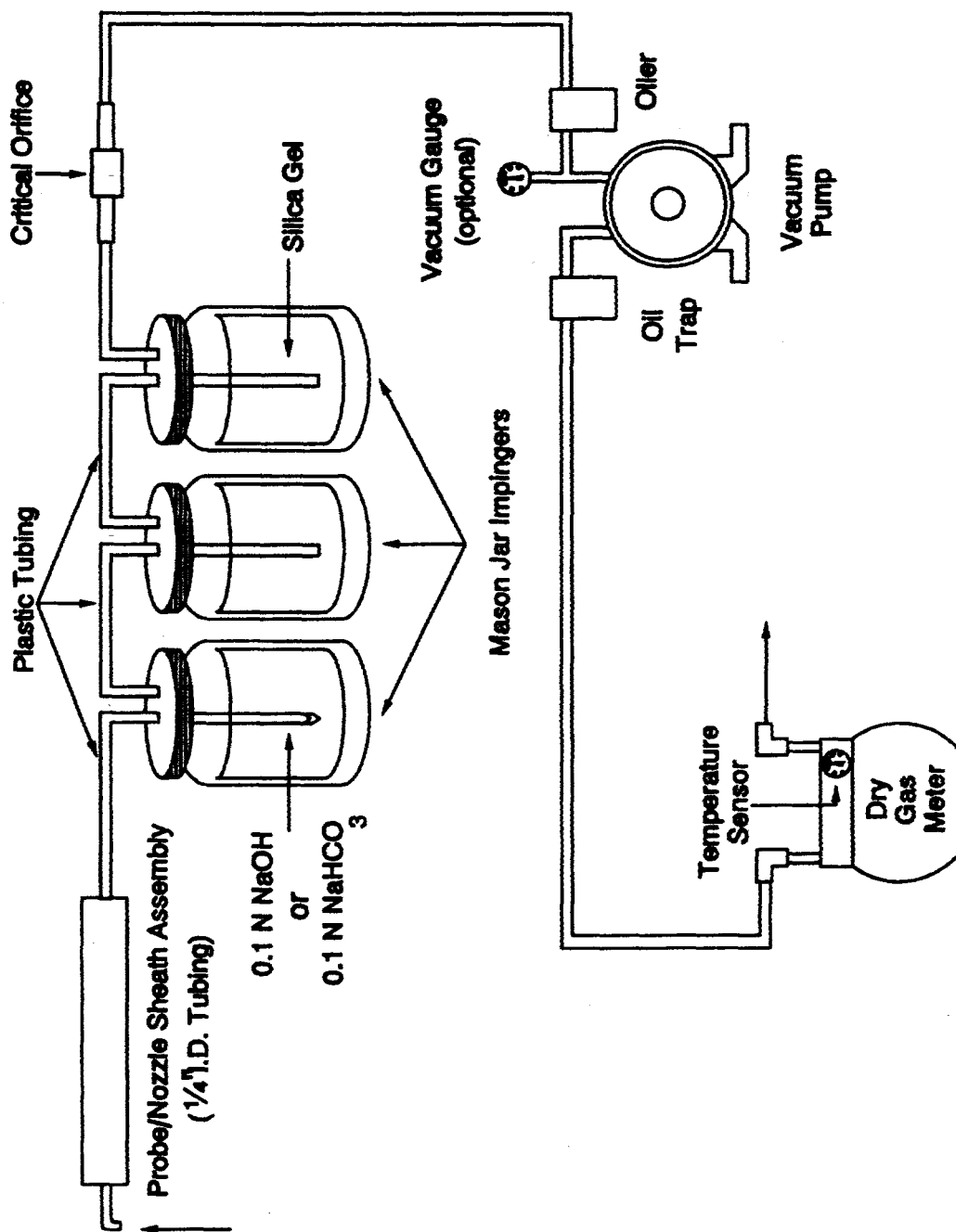


Figure 306A-1. Sampling Train Schematic.



3.1.2 S-Type Pitot. Same as Method 2, section 3 (40 CFR part 60, appendix A).

3.1.3 Sample Line. Use thick wall flexible plastic tubing (e.g., polyethylene, polypropylene, or polyvinylchloride) about 1/4 in. to 3/8 in. ID to connect the train components. A combination of rigid plastic tubing and thin wall flexible tubing may be used as long as neither tubing collapses when leak-checking the train. Metal tubing cannot be used.

3.1.4 Impingers. One quart capacity "Mason" glass canning jars with vacuum seal lids are used. Three impingers are required: the first is for collecting the absorbing solution, the second is empty and is used to collect any absorbing solution carried over from the first impinger, and the third contains the drying agent. Install leak-tight inlet and outlet tubes in the lids of each impinger for assembly with the train. The tubes may be made of approximately 1/4 in. ID glass or rigid plastic tubing. For the inlet tube of the first impinger, heat the glass or plastic tubing and draw until the tubing separates. Cut the tip off until the tip orifice is 3/32 in. in diameter. When fabricating the first impinger, place the tip orifice 3/16 in. above the bottom of the jar when assembled. For the second impinger, the inlet tube need not be drawn and sized, but the tip should be approximately 2 in. above the bottom of the jar. The inlet tube of the third impinger should extend to about 1/2 in. above the bottom of the jar. Locate the outlet tube end of all impingers about 1/2 in. beneath the bottom of the lid.

3.1.5 Manometer. Inclined/vertical type, or equivalent device, as described in section 2.2 of Method 2 (40 CFR part 60, appendix A).

3.1.6 Critical Orifice. The critical orifice is a small restriction in the sample line (approximately 1/16 in. in diameter) that is located upstream of the vacuum pump and

sets the sample rate at about 0.75 cfm. An orifice can be made of 3/32 in. brass tubing approximately 9/16 in. long sealed inside larger diameter, approximately 5/16 in., brass tubing to serve as a critical orifice giving a constant sample flow. Materials other than brass can be used to construct the critical orifice as long as the flow through the sampling train is approximately 0.75 cfm.

3.1.7 Connecting Hardware. Standard pipe and fittings, 1/4 in. or 1/8 in., are used to install the vacuum pump and dry gas meter in the sampling train.

3.1.8 Pump Oiler. A glass oil reservoir with a wick mounted at the vacuum pump inlet lubricates the pump vanes. The oiler should be an inline type and not vented to the atmosphere.

3.1.9 Vacuum Pump. Gast Model 0522-V103-G18DX, or equivalent, capable of delivering at least 1.5 cfm at 15 in. Hg vacuum.

3.1.10 Oil Trap. An empty glass oil reservoir without wick is mounted at pump outlet to prevent oil from reaching the dry gas meter.

3.1.11 Dry Gas Meter. A Rockwell model 175-s test meter, or equivalent, with a thermometer installed to monitor meter temperature. The dry gas meter must be capable of measuring volume to within 2 percent.

3.2 Sample Recovery.

3.2.1 Wash Bottles. These are glass or inert plastic, 500 or 1000 ml, with spray tube.

3.2.2 Sample Containers. The first mason jar impinger of the sampling train serves as the sample container. A new lid and plastic wrap are substituted for the impinger inlet/outlet assembly.

3.3 Analysis. Same as Method 306, section 3.3 of this appendix.

#### 4. Reagents

4.1 Sampling. Same as Method 306, section 4.1 of this appendix.

4.2 Sample Recovery. Same as Method 306, section 4.2 of this appendix.

#### 5. Procedure

##### 5.1 Sampling.

##### 5.1.1 Pretest Preparation.

5.1.1.1 Port Location. Locate the sampling ports as specified in section 2.1 of Method 1 (40 CFR part 60, appendix A). Use a total of 24 sampling points for round ducts and 25 points for rectangular ducts. Locate the sampling points as specified in section 2.3 of Method 1 (40 CFR part 60, Appendix A). Mark the pitot and sampling probe with thin strips of tape to permit velocity and sample traversing. For ducts less than 12 in. in diameter, use a total of 16 points.

5.1.1.2 Velocity Pressure Traverse. (a) Perform a velocity pressure traverse before the first sample run. Figure 306A-2 may be used to record velocity pressure data. If testing occurs over several days, perform the traverse at the beginning of each day. Perform velocity pressure traverses as specified in section 3 of Method 2 (40 CFR part 60, appendix A), but record only the  $\Delta p$  (velocity head) values for each sampling point.

(b) Check for cyclonic flow during the first traverse to verify that it does not exist; if cyclonic flow does exist, make sure that the absolute average angle of misalignment does not exceed 20°. If the average angle of misalignment exceeds 20° at an outlet location, install straightening vanes to eliminate the cyclonic flow. If it is necessary to test an inlet location where cyclonic flow exists, it may not be possible to install straightening vanes. In this case, a variation of the alignment method must be used. This must be approved by the Administrator.

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Plant \_\_\_\_\_  
 Date \_\_\_\_\_ Time \_\_\_\_\_  
 Location \_\_\_\_\_  
 Operator(s) \_\_\_\_\_  
 Beginning stack temperature, °F \_\_\_\_\_  
 Ending stack temperature, °F \_\_\_\_\_  
 Average stack temperature, °F \_\_\_\_\_

Schematic of Points

Circle one:

Before Run 1

Before Run 2

Before Run 3

After Run No.

Traverse Point Number	Cyclonic Flow Angle (Degrees)	$\Delta p$	$\sqrt{\Delta p}$	$\frac{\sqrt{\Delta p} \times 5 \text{ min}}{(\sqrt{\Delta p})_{\text{avg}}} = \text{Numerical Minutes}$	Decimal Part of Minute x 60 = Seconds	Whole Minutes + Seconds = Sample Time
Avg			Avg			

Figure 306A-2. Velocity Traverse and Point Sample Time Calculation Sheet.

5.1.1.3 Point Sampling Times. Since the sampling rate of the train is held constant by the critical orifice, it is necessary to calculate specific sampling times for each point in order to obtain a proportional sample. If all sampling can be completed in a single day,

it is necessary to calculate the point sampling times only once. If sampling occurs over several days, recalculate the point sample times each day using velocity traverse data obtained earlier in the day. Determine the average of the  $\Delta p$  values obtained during the

velocity traverse (Figure 306A-2). Calculate the sampling times for each point using Equation 306A-1. Convert the decimal parts of minutes to seconds. If the stack diameter is less than 12 in., use 7.5 minutes in place of 5 minutes in the equation and 16 sampling points.

$$\text{Minutes at point } n = \frac{\sqrt{\text{Point } n \Delta p}}{(\sqrt{\Delta p})_{\text{avg}}} \times 5 \text{ minutes} \quad \text{Eq. 306A-1}$$

Where:

n=Sampling point number.

$\Delta p$ =Velocity head measured by Type-S pitot tube, in. H<sub>2</sub>O

5.1.1.4 Preparation of Sampling Train. Assemble the sampling train as shown in Figure 306A-1. Secure the nozzle-liner assembly to the sheath to prevent slipping when sampling. Before charging, rinse the first mason jar impinger with either 0.1 N sodium hydroxide (NaOH) or 0.1 N sodium bicarbonate (NaHCO<sub>3</sub>); discard the solution.

Put 250 ml of 0.1 N NaOH or 0.1 N NaHCO<sub>3</sub> absorbing solution into the first mason jar impinger. Similarly, rinse the second mason jar impinger and leave empty. Put silica gel into the third mason jar impinger until the impinger is half full. Place the impingers into an ice bath and check to ensure that the lids are tight.

5.1.1.5 Train Leak Check Procedure. Wait until the ice has cooled the impingers before sampling. Next, seal the nozzle with a finger covered by a piece of clear plastic wrap and

turn on the pump. The vacuum in the line between the pump and the critical orifice must be at least 15 in. Hg. Observe any leak rate on the dry gas meter. The leak rate should not exceed 0.02 cfm.

5.1.2 Sampling Train Operation.

5.1.2.1 Record all pertinent process and sampling data on the data sheet (see Figure 306A-3). Ensure that the process operation is suitable for sample collection.

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Plant \_\_\_\_\_  
 Sampling Site \_\_\_\_\_  
 Total Cr catch,  $M_{Cr}$ ,  $\mu g$  \_\_\_\_\_  
 Avg dry gas meter temp,  $T_m$ , °F \_\_\_\_\_  
 Meter correction factor,  $Y_m$  \_\_\_\_\_  
 Meter volume,  $V_m$ ,  $ft^3$  \_\_\_\_\_  
 Barometric press,  $P_{bar}$ , in. Hg \_\_\_\_\_  
 Start clock time \_\_\_\_\_  
 Stop clock time \_\_\_\_\_

Date \_\_\_\_\_ Run Number \_\_\_\_\_  
 Operator \_\_\_\_\_  
 Stack radius,  $r$ , in. \_\_\_\_\_  
 Avg sq. rt.  $\Delta p$ ,  $(\sqrt{\Delta P})_{avg}$ , in.  $H_2O$  \_\_\_\_\_  
 Stack temp,  $T_s$ , °F \_\_\_\_\_  
 Leak rate before run, cfm \_\_\_\_\_  
 Leak rate after run, cfm \_\_\_\_\_  
 Stop meter volume,  $ft^3$  \_\_\_\_\_  
 Start meter volume,  $ft^3$  \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Point No.	Sample (Min/Sec)	Gas Meter Temp (°F)

Point No.	Sample (Min/Sec)	Gas Meter Temp (°F)

$$C_{Cr} = \frac{(M_{Cr}) (T_m + 460)}{(499.8) (Y_m) (V_m) (P_{bar})}$$

$$kg/hr = (C_{Cr}) (0.0001597) (r^2) (\sqrt{\Delta P})_{avg} \sqrt{\frac{(T_s + 460)}{(P_{bar}) (28.73)}}$$

mg/cubic meter, ( $C_{Cr}$ ) \_\_\_\_\_

(Optional) kg/hr \_\_\_\_\_

Figure 306A-3. Chromium Constant Sampling Rate Field Data Sheet.

5.1.2.2 Place the probe/nozzle into the duct at the first sampling point and turn on the pump. A minimum vacuum of 15 in. Hg or 0.47 atmosphere between the critical orifice and pump is required to maintain critical flow. Sample for the time interval previously determined for that point. Move to the second point and sample for the time interval determined for that point; sample all points on the traverse in this manner. Keep ice around the impingers during the run. Complete the traverse and turn off the pump. Move to the next sampling port and repeat. Record the final dry gas meter reading. (NOTE: If an approximate mass emission rate is desired, record the stack temperature before and after the run.)

5.1.2.3 Post Test Leak Check. Remove the probe assembly and flexible tubing from the first impinger. Do not cover the nozzle. Seal the inlet tube of the first impinger with a finger covered by clear plastic wrap and turn on the pump. The vacuum in the line between the pump and the critical orifice must be at least 15 in. Hg. Observe any leak rate on the dry gas meter. If the leak rate exceeds 0.02 cfm, reject the run. If the leak rate is acceptable, take the probe assembly and impinger assembly to the sample recovery area.

5.2 Sample Recovery.

5.2.1 Container No. 1. (a) After the train has been moved to the sample recovery area, disconnect the tubing that joins the first impinger with the second.

(b) The first impinger jar is also used as the sample container jar. Unscrew the lid from the first impinger jar. Lift the inlet/outlet tube assembly almost out of the jar, and using the wash bottle, rinse the outside of the impinger tip that was immersed in the

impinger jar with extra absorbing solution; rinse the inside of the tip as well.

(c) Recover the second impinger by removing the lid and pouring any contents from the second impinger into the first impinger. Rinse the second impinger including the inside and outside of the impinger stem as well as any connecting plastic tubing with extra absorbing solution and place the rinse into the first impinger.

(d) Hold the nozzle and connecting plastic tubing in a vertical position so that the tubing forms a "U." Using the wash bottle, partially fill the tubing with sampling reagent. Raise and lower the end of the plastic tubing several times to cause the reagent to contact the major portion of the internal parts of the assembly thoroughly. Do not raise the solution level too high or part of the sample will be lost. Place the nozzle end of the assembly over the mouth of the first impinger jar (sample container) and elevate the plastic tubing so that the solution flows rapidly out of the nozzle. Perform this procedure three times. Next, repeat the recovery procedure but allow the solution to flow rapidly out the open end of the plastic tubing into the first impinger jar.

(e) Place a piece of clear plastic wrap over the mouth of the first impinger jar. Use a standard lid and band assembly to seal the jar. Label the jar with the sample number and mark the liquid level to gauge any losses during handling.

5.2.2 Container No. 2 (Reagent Blank). Place approximately 500 ml of the 0.1 N NaOH or 0.1 N NaHCO<sub>3</sub> absorbing solution in a labeled sample container.

5.2.3 Sample Filtration for IC/PCR. If the sample is to be analyzed for Cr<sup>+6</sup> by IC/PCR, it must be filtered immediately following

recovery as described in section 5.2.3 of Method 306 of this appendix.

5.3 Analysis. Sample preparation and analysis procedures are identical to Method 306, section 5.3 of this appendix.

6. Calibration

6.1 Dry Gas Meter. (a) Dry gas meter calibrations may be performed by either the manufacturer, a firm who provides calibration services, or the tester. The dry gas meter calibration coefficient (Y<sub>m</sub>) must be determined prior to initial use of the meter, and must be checked following each field use.

(b) If the dry gas meter is new, the manufacturer will have specified the Y<sub>m</sub> for the meter. The manufacturer may also have included a calibration orifice and a data sheet with the meter that may be used for calibration purposes. The sheet will specify a standard cubic foot volume and a sample time, and these values were determined when the orifice was used to set the initial Y<sub>m</sub> for the meter. The Y<sub>m</sub> may be checked by disconnecting the critical orifice in the sampling train and replacing it with the calibration orifice. The inlet side of the calibration orifice is open to the atmosphere and is not reconnected to the sample train. Record the initial dry gas meter volume and meter temperature. Turn on the pump and operate it for the number of minutes specified by the manufacturer's data sheet. Stop the pump and record the final dry gas meter volume and temperature. Subtract the start volume from the stop volume and average the temperatures. Check the Y<sub>m</sub> for the dry gas meter after the test by using the following equation:

$$Y = \frac{Ft.^3_m (T_m + 460)}{17.647 (Ft.^3_{pt}) (P_{bar})}$$

Where:

Ft.<sup>3</sup><sub>m</sub>=Cubic feet given by meter manufacturer  
T<sub>m</sub>=Temperature of meter in degrees Fahrenheit

Ft.<sup>3</sup><sub>pt</sub>=Cubic feet from dry gas meter, post test  
P<sub>bar</sub>=Barometric pressure in inches of mercury

Compare the Y<sub>m</sub> just calculated with the Y<sub>m</sub> given by the manufacturer:

$$\frac{Y_m \text{ (manufacturer)}}{Y_m \text{ (calculated after test)}}$$

If this value is between 0.95 and 1.05, the Y<sub>m</sub> of the meter is acceptable. If the value lies outside the specified range, the test series

shall either be voided, or calculations for the test series shall be performed using whichever meter coefficient value (i.e., before and after) that gives the lower value of total sample volume. Return the dry gas meter to the manufacturer for recalibration. The calibration may also be conducted as specified in section 5.3.1 or section 7 of Method 5 (40 CFR part 60, appendix A), except that it is only necessary to check the calibration at an approximate flow rate of 0.75 cfm. The calibration of the dry gas meter must be checked after each field use in the same manner. If the values of Y<sub>m</sub> obtained before and after a test series differ by more than 5%, the test series shall either be voided, or calculations for the test series

shall be performed using whichever meter coefficient value (i.e., before or after) that gives the lower value of total sample volume.

6.2 GFAA Spectrometer. Same as Method 306, section 6.2 of this appendix.

6.3 ICP Spectrometer. Same as Method 306, section 6.3 of this appendix.

7. Quality Control

Same as Method 306, section 7 of this appendix.

8. Calculations

8.1 Pollutant Concentration. Calculate C<sub>Cr</sub>, the Cr concentration in the stack gas, in mg/dscm on a dry basis as follows:

$$C_{Cr} = \frac{(M_{Cr})(T_m + 460)}{(499.8)(Y_m)(V_m)(P_{bar})} \quad \text{Eq. 306A-2}$$

where:

M<sub>Cr</sub>=Amount of Cr in sample from Method 306 of this appendix, Eq. 306-1, µg.

T<sub>m</sub>=Dry gas meter temperature, °F.

$Y_m$ =Dry gas meter correction factor, dimensionless.

$V_m$ =Dry gas meter volume, ft<sup>3</sup>.  
 $P_{bar}$ =Barometric pressure, in. Hg.

8.2 Approximate Mass Emission Rate (Optional). Calculate an approximate mass emission rate of Cr in kg/hr using the following equation:

$$\text{kg/hr} = (0.0001597) (C_{Cr}) (r^2) (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s + 460)}{(P_{bar})}} (28.73) \quad \text{Eq. 306A-3}$$

where:

$r$ =Radius of stack, in.

$(\sqrt{\Delta p})_{avg}$ =Average of  $\sqrt{\Delta p}$  values.

$T_s$ =Stack temperature, °F.

$P_{bar}$ =Barometric pressure, in. Hg.

$C_{Cr}$ =Concentration of Cr, mg/dscm.

**Note:** The emission rate calculated using Equation 306A-3 is based on an assumed moisture content of 2%.

### 9. Bibliography

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### Method 306-B—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, Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents (incorporated by reference—see § 63.14) are followed.

#### 3. Procedure

3.1 The surface tension of the tank bath may be measured by using a Preciser tensiometer, a stalagmometer or any other device suitable for measuring surface tension in dynes per centimeter. If the Preciser tensiometer is used, the instructions given in ASTM Method D 1331-89, Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents (incorporated by reference—see § 63.14) must be followed. If a stalagmometer or other device is used to measure surface tension, the instructions that came with the measuring device must be followed.

3.2 (a) 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.

(b) If a measurement of the surface tension of the solution is above the 40 dynes per centimeter limit, 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 will be recorded in the log book. The log book will be readily available for inspection by regulatory personnel.

4.2 Instructions for apparatus used in measuring surface tension. Also included with the log book must be a copy of the instructions for the apparatus used for measuring the surface tension of the plating or anodizing bath. If a Preciser tensiometer is used, a copy of ASTM Method D 1331-89, Standard Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents (incorporated by reference—see § 63.14) must be included with the log book.

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