

United States  
Environmental Protection  
Agency

Office of Air Quality  
Planning and Standards  
Research Triangle Park, NC 27711

EPA-453/R-94-082b  
November 1994

---

Air

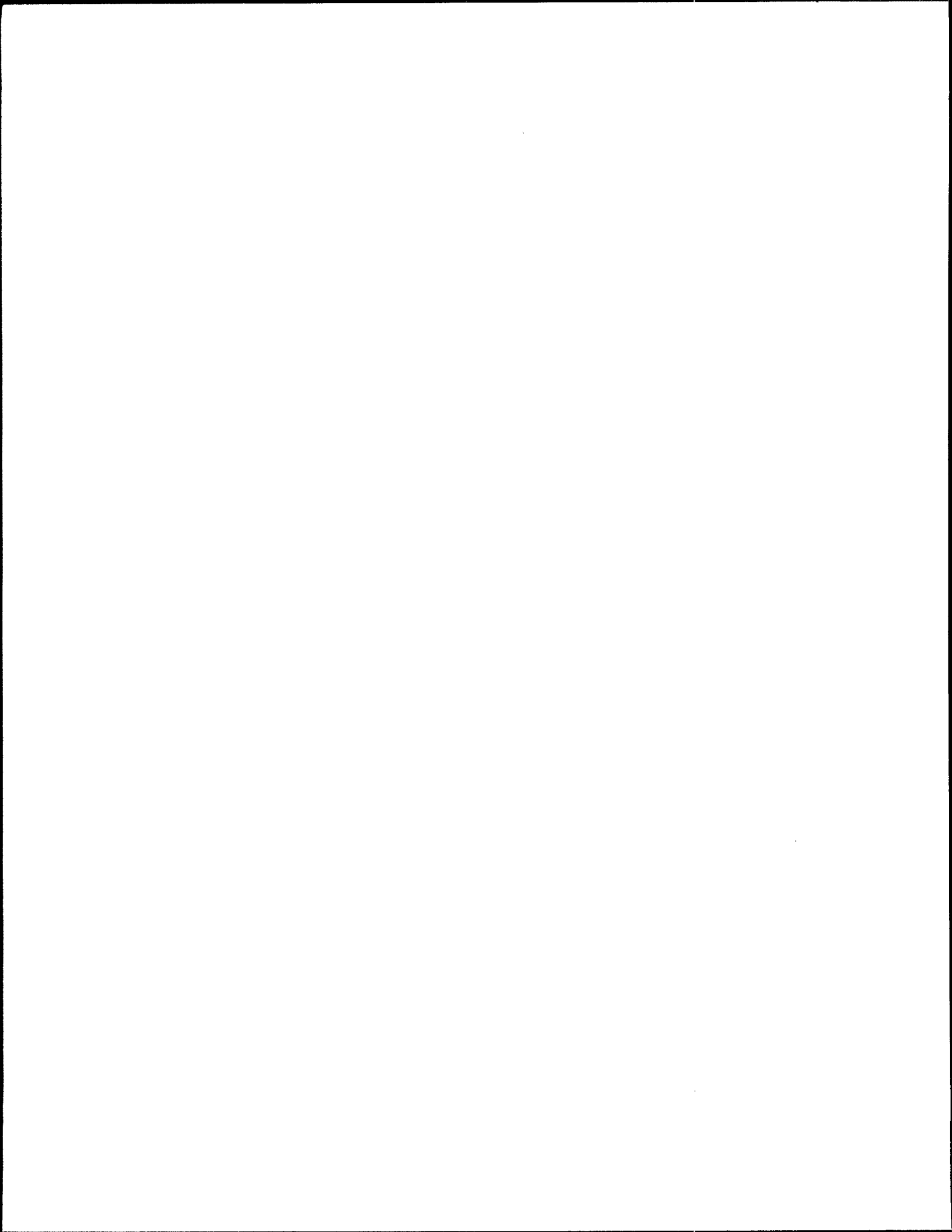
---



# **Chromium Emissions from Chromium Electroplating and Chromic acid Anodizing Operations -- Background Information for Promulgated Standards**

# **NESHAP**





November 1994

**Chromium Emissions from Chromium  
Electroplating and Chromic Acid  
Anodizing Operations--Background  
Information for Promulgated  
Standards**

This report has been reviewed by the Emission Standards Division of the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use. Copies of this report are available through the Library Services Office (MD-35), U. S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; from the Office of Air Quality Planning and Standards Technology Transfer Network, U. S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; or, for a fee, from the National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia 22161.

Publication No. EPA-453/R-94-082b



ENVIRONMENTAL PROTECTION AGENCY

Chromium Emissions from Chromium Electroplating  
and Chromic Acid Anodizing Operations--Background  
Information for Promulgated Standards

Prepared by:



Bruce Jordan  
Director, Emission Standards Division  
U. S. Environmental Protection Agency  
Research Triangle Park, North Carolina 27711

11/17/94  
(Date)

1. The subject national emission standards limit emissions of chromium compounds from existing and new chromium electroplating and chromium anodizing tanks. The standards implement section 112 of the Clean Air Act as amended in 1990 and are based on the Administrator's determination of July 16, 1992 (57 FR 31576) that chromium electroplating and chromium anodizing tanks generate a large amount of chromium compounds, a hazardous air pollutant listed in section 112(b) of the Act.
2. Copies of this document have been sent to the following Federal Departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy; the National Science Foundation; the Council on Environmental Quality; members of the State and Territorial Air Pollution Program Administrators; the Association of Local Air Pollution Control Officials; EPA Regional Administrators; Office of Management and Budget; and other interested parties.
3. For additional information contact:  
  
Mr. Lalit Banker (MD-13)  
Organic Chemicals Group  
U. S. Environmental Protection Agency  
Research Triangle Park, NC 27711  
Telephone: (919) 541-5420
4. Copies of this document may be obtained from:  
  
U. S. EPA Library (MD-35)  
Research Triangle Park, NC 27711  
  
National Technical Information Service  
5285 Port Royal Road  
Springfield, Virginia 22161



# TABLE OF CONTENTS

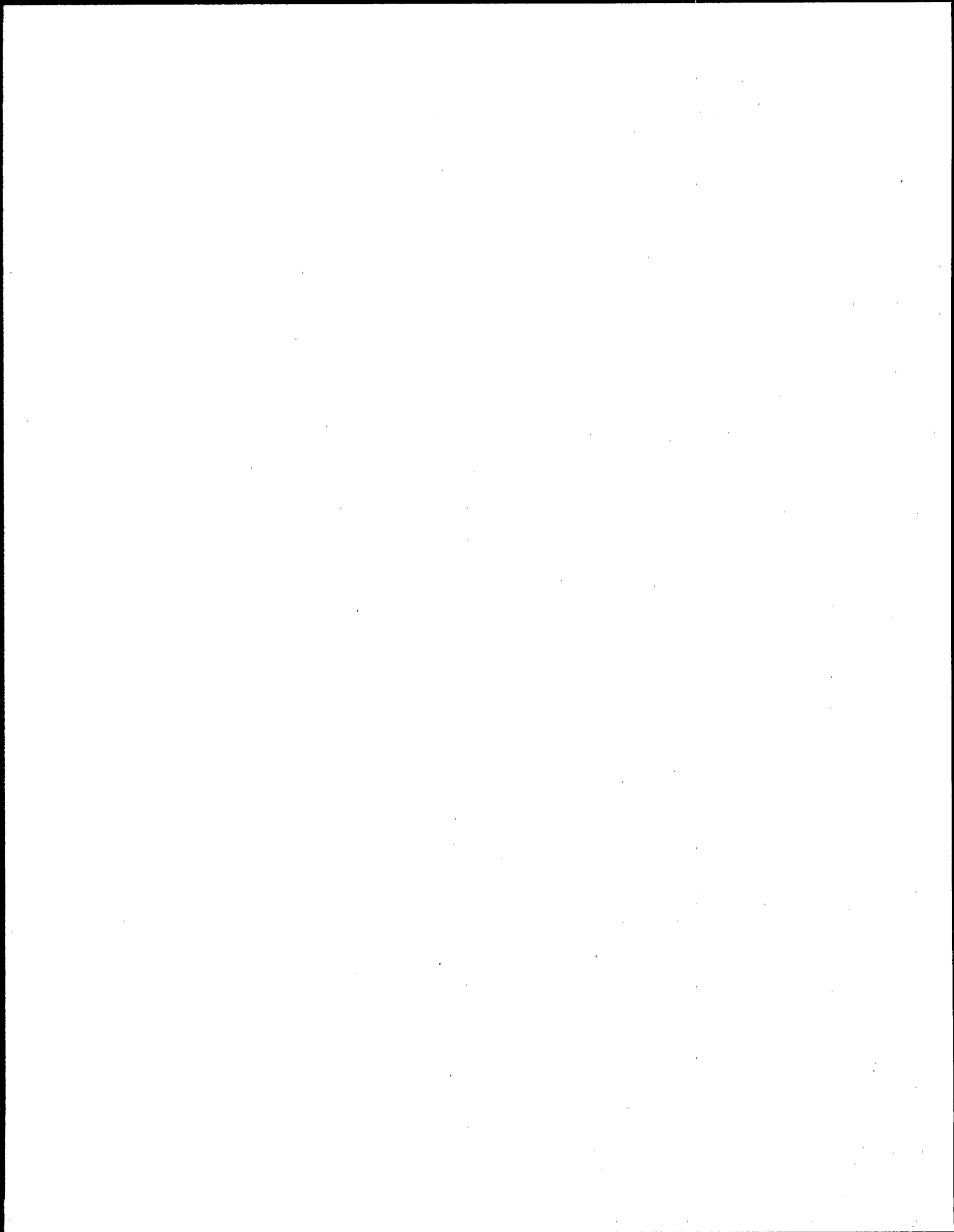
	<u>Page</u>
1.0 SUMMARY . . . . .	1-1
1.1 SUMMARY OF CHANGES SINCE PROPOSAL . . . . .	1-1
1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTIONS . . . . .	1-3
2.0 SUMMARY OF PUBLIC COMMENTS . . . . .	2-1
2.1 NESHAP DECISION PROCESS . . . . .	2-4
2.2 PROCESS DESCRIPTION AND DESCRIPTION OF CONTROL TECHNOLOGIES . . . . .	2-6
2.3 SELECTION OF POLLUTANTS AND SOURCE CATEGORIES TO BE REGULATED . . . . .	2-12
2.3.1 Selection of Pollutants to be Regulated . . . . .	2-12
2.3.2 Selection of Source Categories to be Regulated . . . . .	2-14
2.4 SELECTION OF MACT/GACT APPROACH . . . . .	2-22
2.5 SELECTION OF MACT FOR HARD CHROMIUM ELECTROPLATING TANKS . . . . .	2-26
2.5.1 Selection of the MACT Floor . . . . .	2-26
2.5.2 Regulatory Alternatives Considered . . . . .	2-30
2.5.3 Selection of MACT . . . . .	2-36
2.6 SELECTION OF MACT FOR DECORATIVE CHROMIUM ELECTROPLATING AND CHROMIUM ANODIZING TANKS . . . . .	2-47
2.6.1 Decorative Chromium Electroplating-- Trivalent Chromium Electroplating Process . . . . .	2-47
2.6.2 Decorative Chromium Electroplaters-- Chromic Acid Electroplating Process . . . . .	2-53
2.6.3 Chromium Anodizing Operations . . . . .	2-58
2.7 SELECTION OF THE FORMAT OF THE STANDARD . . . . .	2-63
2.8 SELECTION OF THE EMISSION LIMITS . . . . .	2-70
2.9 SELECTION OF DEFINITION OF SOURCE . . . . .	2-73
2.10 SELECTION OF COMPLIANCE DATES . . . . .	2-76
2.11 SELECTION OF MONITORING REQUIREMENTS . . . . .	2-83
2.11.1 Enhanced Compliance Monitoring for Packed-Bed Scrubber and Composite Mesh-pad Systems . . . . .	2-83
2.11.2 Selection of Proposed Operation and Maintenance Requirements for Packed-Bed Scrubber and Composite Mesh-Pad Systems . . . . .	2-92
2.11.3 Frequency of Monitoring . . . . .	2-101
2.11.4 Alternate Compliance Monitoring for Sources Using Fume Suppressants . . . . .	2-106
2.11.5 Monitoring Requirements--General . . . . .	2-116
2.12 SELECTION OF TEST METHODS . . . . .	2-119
2.12.1 Test Methods 306 and 306A . . . . .	2-119
2.12.2 Demonstrating Compliance When Using Fume Suppressants . . . . .	2-127
2.12.3 Demonstrating Compliance When Using Add-On Controls . . . . .	2-129

# TABLE OF CONTENTS (continued)

	<u>Page</u>
2.13 SELECTION OF REPORTING AND RECORDKEEPING REQUIREMENTS . . . . .	2-137
2.13.1 Reporting/Recordkeeping Associated With Fume Suppressants . . . . .	2-137
2.13.2 Reporting Frequency . . . . .	2-138
2.13.3 Reporting and Recordkeeping Requirements--General . . . . .	2-140
2.13.4 Requirements of the General Provisions . . . . .	2-146
2.14 OPERATING PERMIT PROGRAM . . . . .	2-148
2.15 WORDING OF THE REGULATION . . . . .	2-150
2.16 MISCELLANEOUS . . . . .	2-155

# LIST OF TABLES

	<u>Page</u>
TABLE 2-1. PUBLIC COMMENTS RECEIVED . . . . .	2-2
TABLE 2-2. SUMMARY OF COMPLIANCE MONITORING REQUIREMENTS AND WORK PRACTICE STANDARDS FOR THE FINAL RULE . . . . .	2-88



## 1.0 SUMMARY

On December 16, 1993, the Environmental Protection Agency (EPA) proposed national emission standards for hazardous air pollutants (NESHAP) for major and area sources performing hard chromium electroplating, decorative chromium electroplating, and chromium anodizing. A total of 62 comment letters were received from industry, trade associations, regulatory agencies, and environmental groups during the public comment period. As a result of these comments, additional information was gathered, evaluated, and incorporated into the EPA's responses to the comments. The comments and responses are summarized in this document. The comments and additional information gathered are contained in the project docket and serve as the basis for the revisions made to the standards between proposal and promulgation.

### 1.1 SUMMARY OF CHANGES SINCE PROPOSAL

In response to public comments and as a result of the EPA reevaluation, changes have been made to the proposed standards. Significant changes are summarized below. All changes that have been made to the regulation are explained fully in the responses to the comments.

The following are expected to be the significant changes discussed, listed in approximate order from most to least significant:

1. Emission limits based on the control techniques that form the basis for MACT 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.

2. Monitoring, reporting, and recordkeeping burden for decorative chromium electroplating tanks using a trivalent chromium process that incorporates a wetting agent has been substantially reduced.

3. The compliance date for all hard chromium electroplaters and chromium anodizers is 2 years after promulgation of the standards. The compliance date for decorative chromium electroplaters is 1 year after promulgation of the standards.

4. Monitoring requirements have been changed. Monitoring provisions have been added for fiber-bed mist eliminators. Also, the initial frequency of monitoring surface tension and foam blanket thickness has not been reduced, but the final rule allows a reduction in frequency if no exceedances occurred during a given timeframe.

5. The operation and maintenance requirements in the proposed rule have been revised, and are now work practice standards.

6. Reporting and recordkeeping requirements have been revised. The requirements of this rule and the interrelation of these requirements with the General Provisions have been clarified. The relationship between subpart N and subpart A is presented in Table 1 of the rule.

7. Measurement of hexavalent chromium in lieu of total chromium is allowed to demonstrate compliance with the emission limits. A measurement method for hexavalent chromium is specified (ion chromatography using a post column reactor [ICPCR]).

8. Comments were solicited on regulating wastewater from control devices used to comply with the standard. Based on comments received, no regulation of wastewater is included in the final rule.

9. The applicability of the standard has been clarified. Hard chromium electroplating sources can use actual rectifier

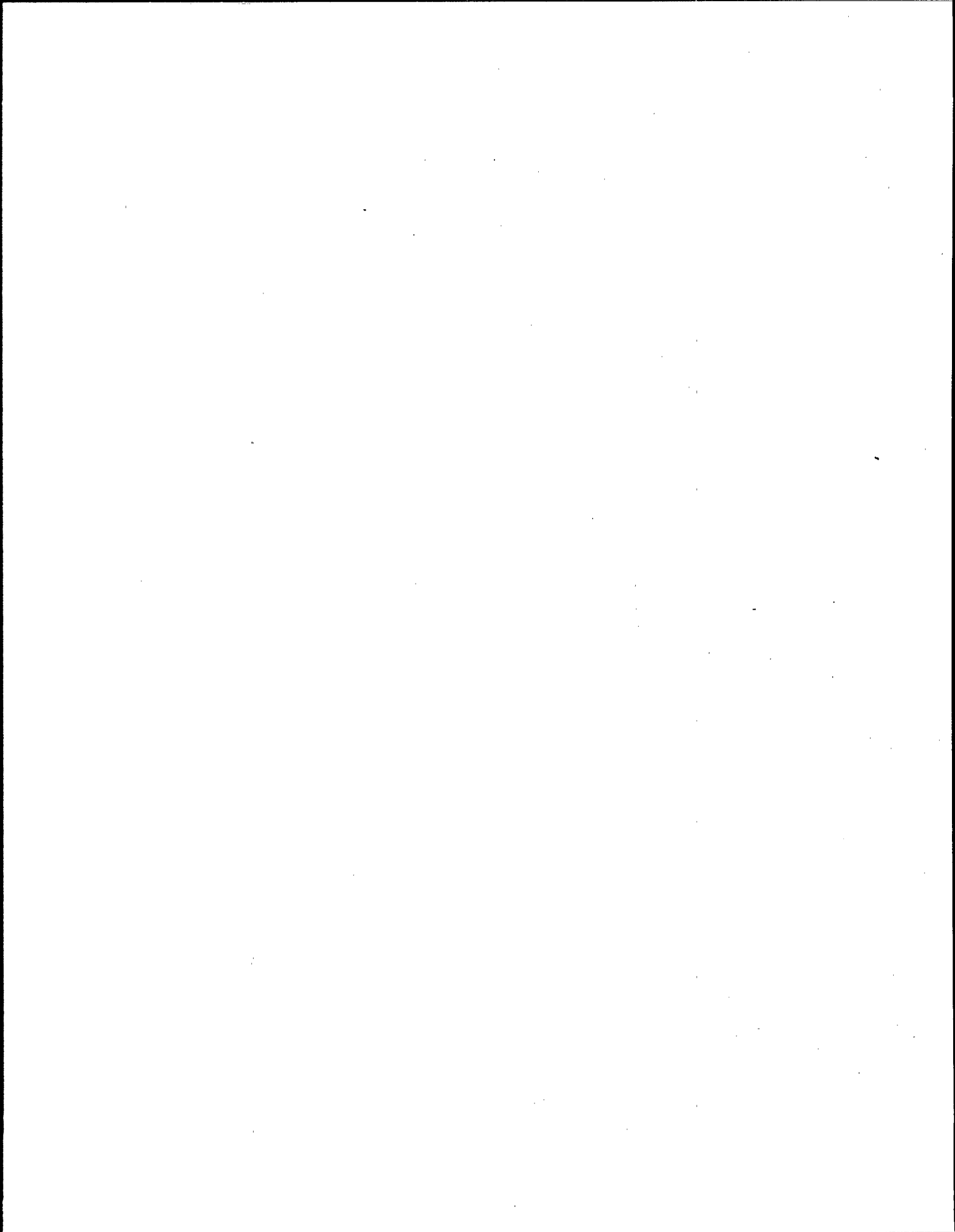


capacity to determine whether they are small or large if the capacity is recorded by nonresettable ampere-hour (amp-hr) meters or if their source has accepted a Federally-enforceable limit in the title V permit. Also, the final rule exempts tanks used and qualified for research and development purposes.

10. Definitions have been revised where necessary to clarify requirements of the rule.

#### 1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTIONS

The cost, economic, and environmental impacts to sources are unchanged from proposal because the technologies that form the basis of the MACT standards have not changed. The monitoring, reporting, and recordkeeping costs associated with the final rule have been reduced from proposal and are presented in Section 2.13.3.



## 2.0 SUMMARY OF PUBLIC COMMENTS

A total of 62 letters commenting on the proposed regulation and the background information document for the proposed standards were received during the public comment period. Three late comments were also received and were considered in finalizing this regulation. Comments from the public hearing on the proposed standards were recorded, and a transcript of the hearing was placed in the project docket. A list of commenters, their affiliations, and the EPA document number of Docket A-88-02 assigned to their correspondence is given in Table 2-1.

For the purpose of orderly presentation, the comments have been categorized under the following topics:

1. NESHAP Decision Process;
2. Process Description and Description of Control Technologies;
3. Selection of Pollutants and Source Categories to be Regulated;
4. Selection of MACT/GACT Approach;
5. Selection of MACT for Hard Chromium Electroplating Tanks;
6. Selection of MACT for Decorative Chromium Electroplating and Chromium Anodizing Tanks;
7. Selection of the Format of the Standard;
8. Selection of the Emission Limits;
9. Selection of Definition of Source;
10. Selection of Compliance Dates;
11. Selection of Monitoring Requirements;
12. Selection of Test Methods;
13. Selection of Reporting and Recordkeeping Requirements;

TABLE 2-1. PUBLIC COMMENTS RECEIVED

Commenter	Affiliation	Document No. <sup>a</sup>
M. Corbin	Puget Sound Air Pollution Control Agency	IV-D-01
D. Martin	Plumbing Manufacturers Institute	IV-D-02
C. O'Neill	Washington State Department of Ecology	IV-D-03
W. Schott	Kimre, Inc.	IV-D-04
W. Wenske	Kohler Company	IV-D-05
A. MacInnes	United Airlines	IV-D-06
D. Driesen	Natural Resources Defense Council	IV-D-07
C. Garland	Arkansas Department of Pollution Control and Ecology	IV-D-08
S. Jetter	Fort Recovery Industries, Inc.	IV-D-09
B. Bateman	Bay Area Air Quality Management District	IV-D-10
J. Tyler	Crown Plating, Inc.	IV-D-11
K. Tyler	Crown Plating, Inc.	IV-D-12
W. Schott	Kimre, Inc.	IV-D-13
K. Kurucz	Lockheed Missiles and Space Company	IV-D-14
J. O'Brien	Lockheed Corporation	IV-D-15
L. Hill	Hill Air Force Base	IV-D-16
L. Liszewski	Kodak	IV-D-17
G. Hannabarger	Rohr, Inc.	IV-D-18
J. Walton E. Blankenship	Tennessee Department of Environment and Conservation	IV-D-19
D. Theiler	Wisconsin Department of Natural Resources	IV-D-20
B. Harthoorn	Deere and Company	IV-D-21
D. Foster	Delta Faucet Company	IV-D-22
R. Schenker	General Electric Company	IV-D-23
L. Strohm	General Motors	IV-D-24
J. Lamancusa	Lacks Enterprises, Inc.	IV-D-25
J. Cullen	Masco Corporation	IV-D-26
E. Smith	Reynolds Metals Company	IV-D-27
G. Bender	RR Donnelley and Sons Company	IV-D-28
K. Yiin	Stanley Mechanics Tools	IV-D-29
A. Turnbull	Turnbull and Associates, Inc.	IV-D-30
D. Preston	Varnum, Riddering, Schmidt, and Howlett	IV-D-31
J. Keithley	Crown Plating, Inc.	IV-D-32
M. Tyler	Hard Chrome Specialties, Inc.	IV-D-33
J. Keithley	Hard Chrome Specialties, Inc.	IV-D-34
A. Roy	Allied Signal	IV-D-35
R. Curtis	American Airlines	IV-D-36

TABLE 2-1. (continued)

Commenter	Affiliation	Document No. <sup>a</sup>
E. Munsell	Department of the Navy	IV-D-37
A. Brooks	KCH Services, Inc.	IV-D-38
D. Drake	Michigan Department of Natural Resources	IV-D-39
W. O'Sullivan	New Jersey Department of Environmental Protection and Energy	IV-D-40
T. Allen	New York State Department of Environmental Conservation	IV-D-41
M. Bradley	Northeast States for Coordinated Air Use Management (NESCAUM)	IV-D-42
D. Theiler R. Colby	State and Territorial Air Pollution Program Administrators, and Association of Local Air Pollution Control Officials (STAPPA/ALAPCO)	IV-D-43
L. Carothers	United Technologies	IV-D-44
L. Thorvig	Minnesota Pollution Control Agency	IV-D-45
C. Huston	Iowa Waste Reduction Center	IV-D-46
G. Rountree	Aerospace Industries Association	IV-D-47
J. Graham	Atotech, Inc.	IV-D-48
W. Ellsworth	National Chromium	IV-D-49
H. Buffington	Snap-on Tools	IV-D-50
L. Zitko	ChromeTech, Inc.	IV-D-51
H. Kimball	Boeing	IV-D-52
P. Leyden	South Coast Air Quality Management District	IV-D-53
B. Breisinger	Alcoa Company of America	IV-D-54
G. Danielson	Merlin Enterprises	IV-D-55
F. Chiappone	Bausch and Lomb	IV-D-56
B. McGarvey	National Aeronautics and Space Administration	IV-D-57
W. Sonntag	National Association of Metal Finishers and The American Electroplaters and Surface Finishers Society	IV-D-58
D. Martin	Plumbing Manufacturers Institute	IV-D-59
J. Keithley	Crown Plating, Inc.	IV-D-60
R. Kennealy	United Defense	IV-D-61
R. Kennealy	United Defense	IV-D-62
R. Pelletier	U. S. Department of Energy	IV-G-01 <sup>b</sup>
D. Driesen	Natural Resources Defense Council	IV-G-02 <sup>b</sup>
M. Lake	San Diego County Air Pollution Control District	IV-G-03 <sup>b</sup>

<sup>a</sup>Docket No. A-88-02.<sup>b</sup>Late comment.

14. Operating Permit Program;
15. Wording of the Regulation; and
16. Miscellaneous.

In some instances, several comments are presented individually, but only one response has been written to reply to all of the comments because the issues the comments raise are interrelated.

## 2.1 NESHAP DECISION PROCESS

Comment: Four commenters (IV-D-07, IV-D-43, IV-D-45, IV-G-02) agreed with the EPA's interpretation of the statutory language in section 112(d)(3) of the Clean Air Act (the Act) concerning the MACT floor for existing sources. That is, they agreed that the MACT floor for existing sources is properly determined by first identifying the best performing 12 percent of the existing sources, then determining the average emission limitation achieved by these sources. One commenter (IV-G-02) noted that had Congress intended for the floor to be set at the 88th percentile, they would have stated this. Five commenters (IV-D-14, IV-D-15, IV-D-17, IV-D-28, IV-D-36) disagreed, stating that the MACT floor should be set by looking at the average emission limits achieved by each of the best performing 12 percent of existing sources, and be based on the lowest (i.e., the 88th percentile). Three commenters (IV-D-14, IV-D-15, IV-D-17) supported this interpretation by pointing out that the EPA could always select a MACT standard that is more stringent than the floor. Another commenter (IV-D-36) supported this interpretation by pointing out that when such an approach is taken, one always arrives at an emission limit that corresponds to a technology (see discussion of next comment).

Comment: Three commenters (IV-D-07, IV-D-17, IV-D-28) disagreed with the EPA's interpretation of "average." That is, when determining the MACT floor, the average is calculated as the arithmetic mean. When, however, an average calculated by this method does not correspond to a technology, the median is considered the average. Two of the commenters (IV-D-17, IV-D-28) noted that this interpretation seems contrary to Congress'

intent. Earlier versions of the Act identified the top 10 and 15 percent. In the latter case, it is unlikely that they would have meant the 93.5 percentile (IV-D-17). Likewise, this interpretation would infer that slight distributional variations among data points should dramatically impact the MACT floor (IV-D-28). Finally, one commenter (IV-D-07) argued that if an arithmetic average does not correspond to a technology, the EPA may select a MACT standard more stringent than the floor.

Response: On June 6, 1994 (57 FR 29196), the EPA promulgated a final rule that presents the Agency's interpretation of section 112(d)(A) of the Act regarding the basis for the MACT floor. Under this interpretation, which is referred to as the "Higher Floor Interpretation," the Agency considers the emission limitations achieved by the best performing 12 percent of existing sources and arrives at the MACT floor by averaging those emission limitations. Furthermore, the Agency interprets "average" to mean a measure of central tendency such as the arithmetic mean or median. For example, if a source category included fewer than 30 existing sources, the Agency would consider the five best performing sources. If those sources achieve emission reductions of 99, 98, 95, 94, and 93 percent, the arithmetic mean of the five values would be 95.8 percent. Because this value does not correspond to an actual control efficiency being achieved, the Agency could set the MACT floor at 95 percent, which is the median of the five values.

The Agency has concluded that if Congress had intended the EPA to set the MACT floor as the lowest reduction achieved by the best performing 12 percent of existing sources, section 112(d)(A) would have been worded differently. For example, Congress could have expressed such a meaning by requiring the floor to be set at "the emission limitation achieved by all sources within the best performing 12 percent" or at "the emission limitation achieved by the least efficient member of the best performing 12 percent." Therefore, the Agency believes that such an interpretation, which is referred to as the "Lower Floor Interpretation," requires that

words or concepts, which are not stated explicitly in the statute, be added or inferred. Furthermore, the Higher Floor Interpretation is supported by section 112(d)(3)(B), which requires the MACT floor for existing sources in categories or subcategories with fewer than 30 sources to be no less stringent than the "average emission limitation achieved by the best performing 5 sources." To infer a Lower Floor Interpretation from this provision, Congress would have used language such as "the emission limitation achieved by the 5th best performing source."

Comment: One commenter (IV-D-02) asked for an explanation of the EPA's authority for enforcing the final rule, and of the civil and/or criminal penalties for any violations of the standard.

Response: Section 113 of the Act allows the EPA to assess a civil penalty of not more than \$25,000 per day per violation of the Act. Section 113 also allows the EPA to assess criminal penalties for each day of a violation for knowing violations of the Act.

## 2.2 PROCESS DESCRIPTION AND DESCRIPTION OF CONTROL TECHNOLOGIES

Comment: Eight commenters (IV-D-12, IV-D-22, IV-D-32, IV-D-33, IV-D-34, IV-D-47, IV-D-52, IV-D-56) provided comments on the process description. One commenter (IV-D-22) questioned the statement that chromic acid is emitted in significant quantities from all hard chromium electroplating and anodizing tanks, and most decorative chromium electroplating tanks, given the fact that the industry as a whole barely qualifies as a major source.

Two commenters (IV-D-47, IV-D-52) wished to clarify the EPA's discussion of the boric-sulfuric acid anodizing process that the EPA identified as a potential new process to replace chromium anodizing. Both commenters stated that this process cannot be assumed to have widespread applicability. Also, there are other nonchromate processes besides boric-sulfuric acid anodizing that are being evaluated. Based on this, the commenters felt that the use of such processes should not be



mandated; that is, air pollution control device use should continue to be allowed.

One commenter (IV-D-56) pointed out a distinction among decorative chromium electroplating processes: black chromium and white chromium. White chromium electroplating is the decorative chromium electroplating process described in the proposed rule. Black chromium electroplating is more like hard chromium electroplating in terms of process parameters, and the commenter recommended that black chromium electroplating be regulated with hard chromium electroplating processes.

The other commenters (IV-D-12, IV-D-32, IV-D-33, IV-D-34) pointed out that the proposed rule does not account for all hard chromium electroplating processes. For example, one hard chromium electroplating method uses low amperage and a longer electroplating time (less amperage per square foot than decorative electroplating processes) such that emissions are lower. These facilities suggested that the EPA has been led to believe that this is not a viable process by larger facilities, because mostly smaller facilities use such a process. This group of commenters also noted that the terminology used in the proposed rule is incorrect. Proper terminology would differentiate between industrial chromium electroplating and decorative chromium electroplating.

Response: The process descriptions that were provided in the preamble to the proposed rule were intended to provide an overview. More detailed process descriptions are provided in Chapter 3 of the proposal background information document (BID) developed for this standard.

The EPA stated on page 65771 of the proposal preamble that "... Chromic acid, a hexavalent chromium compound, is emitted in significant quantities from all hard chromium electroplating and anodizing tanks and from most decorative chromium electroplating tanks." The EPA believes that this is a valid statement, especially when the toxicity of hexavalent chromium is considered. Even though the total quantity of emissions may be small compared to emissions of other pollutants, the cancer

potency of hexavalent chromium warrants that the quantity of emissions be considered significant.

In describing the chromium anodizing process, the EPA also described some research that focuses on the use of a sulfuric-boric acid anodizing process to replace chromium anodizing in some instances. The EPA recognizes that research is being conducted on replacement processes other than this one, and that such processes are not sufficiently developed for use in production. So, while the EPA encourages continued research in this area, the final rule does not mandate this or any other replacement process for chromium anodizing.

Comments were received regarding other processes (e.g., the black decorative chromium electroplating process and the low-amperage hard chromium electroplating process) conducted by this source category that were not included in the process description. In developing the standards, the EPA focused on the operations that were widely regarded as being representative of the source category. The final rule also discusses standards in terms of hard chromium electroplating, decorative chromium electroplating, and chromium anodizing. However, the definitions of these processes have been expanded, and are now expressed in terms of process parameters as well as by function. For example, electroplating and anodizing operations are characterized in terms of electroplating thickness achieved, current density, and electroplating time, as appropriate. Therefore, 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. For example, based on the description provided by the commenter, black decorative chromium electroplaters would be subject to the standards for hard chromium electroplaters based on plating characteristics. The expanded definitions for each subcategory will most likely alleviate confusion concerning the applicability of the standard. The EPA will provide States with additional guidance on these

types of applicability issues in the enabling document for this rule.

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. The process does differ from other hard chromium electroplating processes in that a lower amperage process is used. However, the rule does not preclude the use of this process or any other technique to meet the applicable emission limit. 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.

Comment: Seven commenters (IV-D-04, IV-D-06, IV-D-10, IV-D-13, IV-D-43, IV-D-47, IV-D-55) provided comments on the description of the add-on air pollution control devices such as packed-bed scrubbers and composite mesh-pad systems. One company (IV-D-13) noted that the proper terminology is one that refers to a composite mesh-pad system, not a composite mesh pad, because high levels of control require a system of several composite mesh pads. The commenter goes on to provide a detailed description of a multistage system and the function of each stage. This same commenter also stated that their company should be named in the rule because the system described uses the company's patented design.

Another commenter (IV-D-06) noted an inaccuracy in the EPA's control device description; the statement that a fiber-bed mist eliminator is only installed at a government facility is inaccurate. This commenter identified a commercial facility that employs such a control device.

Several commenters (IV-D-10, IV-D-13, IV-D-43, and IV-D-47) stated that the control efficiencies identified in the proposed rule are overstated. According to the commenters, removal efficiencies for packed-bed scrubbers may be as low as 50 percent (IV-D-10, IV-D-43) and are only as high as 90 percent (IV-D-10, IV-D-43), 95 percent (IV-D-47), or 97 percent (IV-D-13). Two

commenters (IV-D-10, IV-D-43) also noted that the efficiency of composite mesh-pad systems were overstated, and that they were more likely in the range of 60 to 95 percent.

One commenter (IV-D-55) stated that the proposed rule failed to identify all of the possible control systems that could be used to control chromium emissions from hard chromium electroplating tanks. This commenter described the Merlin mist control system and provided test reports to demonstrate that this system can achieve the control levels required by the proposed rule.

Response: In the final preamble and rule, the EPA has used the terms composite mesh pad and composite mesh-pad system consistently. Although the EPA gathered information based on mesh pads developed by Kimre, Inc., it is not the EPA's policy to endorse certain products or recommend them for use. In response to comments received on the efficiency of composite mesh pad and packed-bed scrubber systems, the EPA recognizes that efficiencies will vary depending on the actual system. For example, a system with a lower inlet loading will have a lower overall control efficiency. Also, the manner in which a system is operated will affect its efficiency. Given the potential problems in identifying an overall control efficiency for these systems, the final rule requires that an outlet concentration, not an efficiency, be achieved. The control efficiencies specified in the proposed rule are typical for well-operated and well-maintained systems operating at typical conditions. The EPA has included some work practice standards in the final rule [§ 63.342(f)] to facilitate optimal control device operation to meet the emission limits.

A benefit of expressing the standard in terms of a concentration format is that it provides sources with flexibility in terms of choosing the control device to meet the standard. Therefore, if a system, such as the Merlin mist control system, is tested using the specified method and procedures and meets the applicable concentration limit, it can be used to comply with the rule. The EPA does not have the resources to test every possible

control system that could be used to achieve compliance with the standard; testing focused on the major types of control equipment that were thought to achieve the best emission reduction.

Since the time of proposal, the EPA has confirmed that other fiber-bed mist eliminators, in addition to the one that was discussed at proposal, exist. The existence of multiple fiber-bed mist eliminators is discussed in more detail in Section 2.5.1, Selection of the MACT Floor for Hard Chromium Electroplating Tanks.

Comment: Four commenters (IV-D-22, IV-D-32, IV-D-34, IV-D-58) provided comments on chemical fume suppressants as a control technology. One commenter (IV-D-22) noted that, contrary to the EPA's description, his experience was that electroplating baths that use fume suppressants do usually have ventilation systems. The other three commenters disagreed with the EPA's opinion on the potential negative aspects of foam blanket-type fume suppressants. Two commenters (IV-D-32, IV-D-34) stated that the explosion potential of certain fume suppressants could be minimized by an effective safety training program. Another commenter (IV-D-58) disagreed that fume suppressants cause process and product problems for hard chromium electroplaters and pointed to data that show that inlet chromium emissions to a scrubber were effectively reduced by using fume suppressants in a hard chromium electroplating bath.

Response: In describing fume suppressants and tanks in which fume suppressants are used in the preamble to the proposed rule and the BID, the EPA described what was found to be true based on their information gathering. Thus, it may be true that it is one facility's experience that all sources that use fume suppressants are ventilated. However, this facility may not be familiar with sources located in other areas of the country, or of smaller size, etc., that do not have ventilation. Likewise, when discussing the use of fume suppressants in hard chromium electroplating tanks, it has been the EPA's experience that they are not generally used because of performance problems. However, this does not mean that fume suppressants are never used, or that

fume suppressants that can be successfully used in hard chromium electroplating tanks do not exist. In fact, on page 65781 of the proposal preamble, the EPA describes the test results referred to by commenter IV-D-58. Two systems are described--one in which fume suppressants were used prior to a mist eliminator and one in which a fume suppressant was used prior to a packed-bed scrubber. When the fume suppressant was used in the tank controlled by an older packed-bed scrubber, the use of the fume suppressant enhanced the overall control of the system. In the case of the fume suppressant being used prior to a new mist eliminator, only a slight decrease in outlet emissions was observed. These data suggest that fume suppressants can be used to enhance the control level achieved by older control systems. Because the rule requires sources to meet an emission standard rather than specifying a particular type of control equipment, nothing precludes the owner or operator from using any control scenarios, such as those described in the proposal preamble, as long as the standard is achieved.

In the preamble to the proposed rule, the EPA discusses the potential safety hazards of foam blankets, a type of fume suppressant. Foam blankets trap the hydrogen gas and chromic acid mist in the foam layer. When heavy foam layers develop, hydrogen gases can build up in the foam; if a spark is generated, a hydrogen explosion can occur. The EPA agrees that foam blankets can be used safely, but also believes that the potential hazards of foam blankets should be known. The rule does not preclude the use of foam blankets as long as the applicable emission limit is met.

## 2.3 SELECTION OF POLLUTANTS AND SOURCE CATEGORIES TO BE REGULATED

### 2.3.1 Selection of Pollutants to be Regulated

Comment: In presenting the health effects data that led to the listing of the chromium electroplating and chromium anodizing area source categories, the EPA requested comments on whether there was a basis for removing any of the categories and subcategories covered by the proposed regulation from the source

category list. Comments were solicited primarily because the EPA proposed regulation of decorative chromium electroplaters using the trivalent chromium electroplating process. The EPA was specifically interested in whether the delisting criteria of section 112(c)(9) could be met, or alternatively, if it would be appropriate to conduct a health assessment under section 112(c)(3) prior to creating this subcategory and adding it to the source category list. Two commenters (IV-D-26, IV-D-59) responded specifically to this request for comment and stated that the EPA should conduct a health assessment under section 112(c)(3) to determine the health effects of trivalent chromium prior to creating a subcategory regulating this process. Both commenters argued that until such an assessment is made, the trivalent chromium process should not be addressed in the rule. Another commenter (IV-D-24) asserted that the rule must acknowledge the fundamental toxicological differences between trivalent and hexavalent chromium; the same commenter contends that there are no data indicating that trivalent chromium is carcinogenic. In addition to these three commenters, many other commenters disagreed with the EPA's decision to regulate decorative chromium electroplating sources that use the trivalent chromium electroplating processes. Their comments did not specifically respond to the request pertaining to information on a section 112(c)(3) health assessment. These more general comments are presented in Section 2.6.1 of this document, which discusses selection of MACT for decorative chromium electroplaters using a trivalent chromium electroplating process.

Response: The EPA has determined that the delisting criteria of section 112(c)(9) cannot be met at this time for trivalent chromium electroplating processes and that conducting a health assessment under section 112(c)(3) cannot be justified in light of the limited data available for trivalent chromium. Specifically, the EPA is aware of health concern issues associated with trivalent chromium exposure that would not allow the statutory criteria of section 112(c)(9) nor section (112)(c)(3) to be met. The testing of trivalent chromium

compounds is significantly more limited than that available for hexavalent chromium and is considered inconclusive at this time. The currently available trivalent chromium toxicological studies have not shown dose-related increases in carcinogenic response; however, trivalent chromium compounds exhibit genotoxic potential. Of additional concern is the in vivo reduction of hexavalent chromium to trivalent chromium which is believed to be important in chromium's mechanism of carcinogenicity. There are also reports that under certain environmental conditions, trivalent chromium can oxidize to the hexavalent state.

#### 2.3.2 Selection of Source Categories to be Regulated

Comment: The EPA separated the decorative chromium electroplating source category into two subcategories: electroplating baths using a chromic acid electroplating process and electroplating baths using a trivalent chromium electroplating process. The distinction between the subcategories was based on process differences. One commenter (IV-D-22) disagreed with one of the differences cited by the EPA; i.e., that additional posttreatment and rinsing tanks may be needed with trivalent chromium processes. The commenter pointed out that trivalent chromium baths do not always have more rinse tanks or have post dips. According to this commenter, trivalent solutions rinse better than hexavalent solutions.

Response: In creating a subcategory, the EPA discusses characteristics that generally distinguish one subcategory from another. It has been the EPA's experience that additional posttreatment and rinsing tanks are required in some trivalent chromium applications. In an industry as large and diverse as chromium electroplating, however, the EPA is aware of the fact that some trivalent chromium applications may not require additional rinses. The description of the trivalent chromium process in the proposed preamble was written generally so that all known trivalent chromium processes would be covered by the description. In addition, the regulatory definition for the trivalent chromium process, not the process description, is the determining factor in deciding the applicable requirements in the



final rule. The definition used in the proposed rule defined the trivalent chromium process as a process used for electro-deposition of a thin layer of chromium onto a base material using a trivalent chromium solution instead of a chromic acid solution. In the definition, no mention is made of the other process tanks used in the trivalent chromium electroplating line; therefore, any process using a trivalent chromium solution to deposit chromium onto a base metal would be subject to the requirements in the final rule for the trivalent chromium process, regardless of the existence of rinse or posttreatment tanks.

Comment: Six commenters (IV-F-01 [Altmayer, McRae, Sonntag], IV-D-51, IV-D-58, IV-D-59) said that maximum cumulative potential rectifier capacity was an inappropriate parameter for determining facility size. Commenters pointed out that sources may have excess capacity for any of the following reasons:

1. Sources have purchased used equipment that is larger than actually necessary;
2. The rectifier is sized to accommodate either the largest piece plated, striking that is performed at the beginning of the process at high current densities, or some nonchromium application that requires more capacity than chromium electroplating;
3. The rectifier may be oversized to prevent chromium burn or DC power supply failure or because actual capacity needs are unknown; or
4. In full-scale production, more rectifier capacity may be needed than in test or pilot operations.

One commenter (IV-D-58) indicated that using maximum potential rectifier capacity would unfairly cause small facilities with multiple tanks to be counted as large, even though it is not customary to use all of the tanks at once. Two other commenters (IV-D-17, IV-D-46) stated that if maximum potential rectifier capacity was used as the size determinant, the rule would have to be more clear that it is only the rectifiers associated with chromium electroplating that are of concern. Finally, one commenter (IV-D-47) said that the

distinction between small and large sources was not sufficient because MACT was proposed for both categories, and the EPA has made no determination as to what level of chromium emissions constitutes an adverse effect on human health or the environment.

Ten commenters (IV-F-01 [Altmayer], IV-D-17, IV-D-21, IV-D-28, IV-D-31, IV-D-36, IV-D-46, IV-D-51, IV-D-58, IV-D-59) urged the EPA to explore alternatives to maximum potential rectifier capacity for determining facility size. Commenters suggested using actual annual ampere-hour usage, perhaps over the most recent 12-month period, which could be demonstrated by using nonresettable ampere-hour meters or through facility records. Other commenters suggested raising the maximum potential ampere-hour limit for small sources to 100 million amp-hr/yr (IV-D-46), or allowing sources to multiply the maximum potential rectifier capacity by 0.75 to account for oversizing (IV-D-51). Two commenters (IV-D-21, IV-D-28) suggested that, at a minimum, the rule should clearly indicate how sources could accept Federally-enforceable limits on their rectifier capacity that would allow them to remain "small."

Response: The distinction between small and large hard chromium electroplating facilities in the final rule has not been changed from the proposed level of a maximum cumulative potential rectifier capacity of 60 million amp-hr/yr. The EPA has, however, included provisions in the final rule to allow sources to use actual rectifier capacity or to limit their potential rectifier capacity.

The final rule allows hard chromium electroplating facilities to determine their size by using actual cumulative rectifier capacity in lieu of the maximum potential capacity if nonresettable ampere-hour meters are used on the chromium electroplating tanks. The EPA believes that the use of such meters will provide an accurate accounting of the rectifier capacity consumed in a given year. Also, the final rule has been clarified to state that only the rectifiers associated with hard chromium electroplating should be used to determine maximum cumulative potential rectifier capacity.

The final rule also allows sources to establish Federally-enforceable limits on their rectifier capacity through the title V operating permit program. For example, a source may exceed the 60 million amp-hr/yr cutoff based on maximum capacity, and therefore be considered large. This source may, however, have excess capacity onsite for any of the reasons provided by the commenters. In such a case, the source may agree to a Federally-enforceable limit that would restrict the actual cumulative capacity used to less than 60 million amp-hr/yr. A Federally-enforceable limit is obtained through the title V permit that is required by § 63.340(e) of the final rule.

To demonstrate compliance with an actual cumulative rectifier capacity limit, sources are required to keep monthly records of the actual cumulative rectifier capacity, and report these records, in accordance with §§ 63.346(b) and 63.347(g) or (h). Once a source exceeds an actual cumulative rectifier capacity of 60 million amp-hr/yr for any 12-month period or less, the source is considered large and subject to the existing source MACT standard for large sources. A subsequent reduction in rectifier capacity would not result in less stringent requirements; the standard for large sources would continue to apply. Once a monthly record during the 12-month reporting period indicates that a source has exceeded the rectifier capacity of 60 million amp-hr/yr, the source has 1 year from that month to come into compliance with the requirements for large existing sources.

The EPA disagrees that the size distinction between small and large hard chromium electroplating facilities "is not sufficient." The size distinction was made to more effectively evaluate the burden of the rule on small sources, given the large number of small sources in this source category. The EPA considers the issue of applying MACT to sources to be different than the issue of size distinctions. The rationale for applying MACT to these sources is discussed in detail in Section 2.4.

Comment: Five commenters addressed the applicability of the rule to the source category in general. One commenter (IV-D-60)

indicated that the EPA was incorrect to establish subcategories based on type of deposit (hard chromium versus decorative chromium electroplating). Instead, this commenter stated that subcategories should be based on the amperage used in a process, similar to the California regulations. Another commenter (IV-D-18) indicated that coating (including chromium anodizing) in the aerospace industry was to be covered under the control techniques guideline (CTG) and NESHAP that were currently under development for the industry and, therefore, should not also be covered by this rule. One other commenter did not see his process described in the proposed rule and was not sure how it fit into the subcategories in the regulation. This commenter (IV-D-35) described a process involving an alkaline solution used to provide a chromate layer on copper foil. According to the commenter, the alkaline solution is made up in part by using a small amount of chromic acid that is subsequently neutralized. The commenter stated that there are no emissions to the atmosphere from this process, nor are air pollution control devices or fume suppressants appropriate for it. As such it should not be covered by the rule; this could be accomplished by defining a chromic acid solution in terms of its pH. The commenter also urged the EPA not to require any recordkeeping to document that such a process is being used because the facility would then be subject to the NESHAP and to title V permitting.

One commenter (IV-G-01) cites the notice of the initial list of source categories (57 FR 31576), which states that only those processes that use chromic acid in an electrolytic cell to deposit chromium metal or to form an oxide film on a product are covered. This commenter requested that the EPA clarify that chromic acid and/or sodium dichromate used in conjunction with sulfuric acid for parts cleaning is not classified as chromium anodizing even though the surface of the base metal may be oxidized.

Response: The EPA disagrees that the type of deposit (i.e., hard chromium versus decorative chromium) is an inappropriate basis for subcategories. The EPA believes that

subcategories based on the amperage in a process would be difficult to establish. In finalizing this MACT standard, however, the EPA recognized that the definitions provided for hard chromium electroplating, decorative chromium electroplating, and chromium anodizing may have been vague for some operations. In the final rule, the EPA has revised these definitions to express the various chromium electroplating and anodizing operations in terms of process parameters such as plating thickness achieved, current density, and plating or anodizing time. The definitions are clear that electroplating and anodizing operations are performed as part of a process; as such, cleaning activities that involve chromic acid would not be included. The EPA believes that the revised definitions will assist affected sources and regulators in determining which category is most appropriate for a given process, regardless of the name assigned to that process. If the chromic acid concentration and other process parameters associated with the alkaline solution described by commenter IV-D-35 were inconsistent with the description of the chromium electroplating or anodizing tanks, the source is not subject to the regulation. If a source is not subject to the regulation, no recordkeeping burden is imposed by this rule. However, State or local permitting agencies may need documentation to show that the rule is not applicable.

There appears to be some confusion surrounding the applicability of this rule to the aerospace industry. A CTG and a NESHAP covering coating operations in the aerospace industry are under development by the Agency; the aerospace NESHAP is expected to be promulgated by the summer of 1995. Neither the aerospace NESHAP nor the CTG includes requirements for chromium electroplating and anodizing operations. Those operations are covered by this standard. It is not unusual for large facilities, such as aerospace facilities, to be covered by more than one MACT standard. Often, the EPA develops standards to control operations that are conducted across many industries, and are performed in a relatively uniform fashion. For example, the

EPA has promulgated standards that apply to industrial process cooling towers that could be located at many different types of manufacturing facilities.

Comment: Four commenters (IV-D-24, IV-D-47, IV-D-52, IV-D-58) recommended that research and nonproduction operations be exempted from the rule as allowed by section 112(c)(7) of the Act.

Response: The final rule exempts research or laboratory operations as allowed by section 112(c)(7). For the purposes of this rule, a research or laboratory source is defined as any stationary source whose primary purpose is to conduct research and development into new processes and products, where such source is operated under the close supervision of technically trained personnel and is not engaged in the manufacture of products for commercial sale in commerce, except in a de minimis manner.

Comment: Eleven commenters (IV-D-23, IV-D-24, IV-D-27, IV-D-28, IV-D-32, IV-D-34, IV-D-42, IV-D-47, IV-D-52, IV-D-58, IV-G-01) suggested that the EPA should consider applying the rule differently to area sources. One commenter (IV-D-42) suggested that the EPA establish a lesser quantity emission rate to distinguish area and major sources based on the potency of hexavalent chromium.

On the other hand, other commenters stated that the EPA should establish a de minimis emission level, below which sources would not be subject to the rule. One commenter (IV-D-23) pointed to a previous decision that demonstrates that the EPA has the authority to establish such cutoffs (e.g., Alabama Power Co. v. Costle). Another (IV-D-47) stated that section 112(d)(1) allows the EPA to establish such exemptions. Other commenters proposed various cutoff levels: 5 to 10 pounds (IV-D-47), 1 million amp-hrs/yr (IV-D-47, IV-D-52), 0.013 tons of emissions (IV-D-28), and less than 10 employees (IV-D-32, IV-D-34). Another commenter (IV-D-27) proposed that sources in this subcategory that fall below a de minimis level (e.g., 5 million Amp-hr/yr) be exempt from the regulation. One commenter

(IV-D-47) suggested that the EPA perform a risk assessment to determine the level below which the health risk is de minimis, or below which the cost of compliance exceeds the benefit of emission reduction.

Response: Although this rule regulates both area and major sources, the EPA has considered the potential burden on small sources (most of which will also be area sources) by regulating small, hard chromium electroplating facilities differently from large, hard chromium electroplating facilities. Also, for all source categories, the monitoring, reporting, and recordkeeping requirements have been greatly reduced. The EPA does not support a de minimis cutoff below which sources would not be subject to this rule because, for this source category, the EPA has determined that emissions from area sources present, in the aggregate, a threat of an adverse effect to human health or the environment. For this reason, area sources performing chromium electroplating and anodizing were placed on the list of area sources to be regulated (57 FR 31588).

On the other hand, the establishment of a lesser quantity emission rate for the source category would only decrease the population of area sources while increasing the population of major sources. Further, because of the risk potential of hexavalent chromium, the EPA has concluded that it is important to regulate all sources with MACT. (See discussion in Section 2.4.) The application of MACT to all sources results in equivalent control levels being applied to all sources. At this time, the EPA is not proposing to establish, for this rulemaking, a lesser quantity emission rate for chromium emissions from this source category. The EPA is still evaluating a lesser quantity emission rate for other sources of chromium emissions, but no decisions have been made to date. An Advance Notice of Proposed Rulemaking will soon be issued on this topic.

Comment: One commenter (IV-D-18) states that the rule should exempt facilities that are complying with a similar State or local rule that requires that chromium emissions be controlled by 95 percent.

Response: There are several State and local regulations that require control of chromium emissions from chromium electroplating and chromium anodizing tanks. Some of these regulations are expressed in terms of a control efficiency or in terms of mass emissions per amp-hr of operation (mg/amp-hr); as such the requirements are not directly comparable to this rule. If a source is subject to a State or local rule, it is also subject to this NESHAP. However, States may revise their rules to make them consistent with this rule. Alternatively, States may choose to have their regulations determined equivalent by the EPA. If a source is currently controlling emissions from chromium electroplating and anodizing tanks to comply with a State or local rule, they may have sufficient control in place to meet this standard as well. Given the toxicity of chromium compounds, the EPA does not support the exemption of any sources within the regulated source categories. The toxicity of chromium compounds is discussed in more detail in the following section.

#### 2.4 SELECTION OF MACT/GACT APPROACH

Comment: Four commenters (IV-D-07, IV-D-40, IV-D-41, IV-D-45) agreed with the EPA that it was appropriate to regulate area sources with MACT standards. One of these commenters (IV-D-07) noted that the EPA could not legally exempt sources emitting 9 tons of chromium without examining the cumulative HAP emissions of the entire facility, not just the chromium electroplating processes. Ten commenters (IV-D-22, IV-D-24, IV-D-28, IV-D-32, IV-D-34, IV-D-43, IV-D-47, IV-D-58, IV-D-59, IV-D-69) questioned this approach, however, for various reasons. One commenter (IV-D-22) did not see how the EPA could apply MACT to area sources when the source category as a whole barely qualifies as a major source. Five commenters questioned "... the high toxicity of chromium compounds ..." as the basis for applying MACT. Two of these commenters (IV-D-24, IV-D-58) noted that different forms of chromium (hexavalent and trivalent) need to be considered separately, especially when determining whether to regulate all sources under MACT. A third commenter (IV-D-60) provided information to support his claim that research to



establish the potential risk associated with chromium compounds is flawed and is not intended to establish real risk. Two commenters (IV-D-32, IV-D-34) stated that the risk of hexavalent chromium to humans has never been accurately assessed.

Two commenters noted that the cost to area sources subject to MACT is significant. One (IV-D-58) stated that the EPA failed to consider the costs for area sources. The same commenter compared this industry to the dry cleaning industry in which area sources were regulated by GACT. Another commenter (IV-D-43) noted that MACT could be an unnecessary burden on area sources particularly if they are required to obtain title V operating permits. (See related discussion in Section 2.14.) One commenter (IV-D-24) 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.

Three commenters (IV-D-24, IV-D-47, IV-D-58) suggested specific changes in the way the EPA applies MACT. One commenter (IV-D-58) suggested that the EPA apply GACT standards to small, existing hard chromium electroplaters, decorative chromium electroplaters, and chromium anodizers to allow the EPA to focus its resources on facilities posing the greatest impact. Another commenter (IV-D-47) suggested that the EPA establish a threshold below which sources would be subject to GACT. Finally, one commenter (IV-D-24) pointed out 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).

Response: In determining whether to apply MACT or GACT to the area sources performing hard chromium electroplating, decorative chromium electroplating, and chromium anodizing, the EPA considered the toxicity of chromium compounds emitted from such sources and the availability of controls for sources in the source categories.

In the final rule, all area sources continue to be regulated by MACT standards. The basis for applying MACT to area sources is that hexavalent chromium is emitted in significant quantities from most source categories and is a known human carcinogen. In

addition, the EPA believes all chromium compound emissions should be considered toxic because adequate data are not available to determine otherwise. At least three epidemiological studies have shown a strong association of lung cancer and occupational exposures to mixtures of hexavalent and trivalent chromium. Even though hexavalent chromium is a known human carcinogen, it remains unclear whether any of the observed association is due to trivalent chromium. Trivalent chromium is a necessary dietary nutrient; however, there is some evidence to indicate that hexavalent chromium is reduced in part to trivalent chromium in vivo. The link between hexavalent and trivalent chromium in vivo is of concern. Very limited data suggest that trivalent chromium may have respiratory effects on humans. No data on chronic or subchronic effects of inhaled trivalent chromium in animals is currently available. Due to the uncertainties associated with the toxicity of trivalent chromium, the EPA has chosen to regulate sources using a trivalent chromium process with MACT.

The toxicity of hexavalent chromium is well established; hexavalent chromium is a highly potent, known human carcinogen. Even though total emissions of hexavalent chromium from the source categories are low relative to emissions of other pollutants (such as solvents) from other source categories, the EPA decided that MACT rather than GACT would be applied. The EPA believes that this decision is justified because, given the cancer potency, the residual risk analysis may still reveal a risk greater than one in a million for facilities using hexavalent chromium. The EPA did not think it was prudent to establish a threshold based on risk below which sources were subject to GACT given the potency of hexavalent chromium and uncertainties in the toxicity data base discussed above. As one commenter points out, the EPA has applied GACT in other rulemakings, such as the dry cleaning NESHA. However, the pollutant of concern in that instance was perchloroethylene, which is much less potent than hexavalent chromium.

In selecting MACT over GACT for 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 basis for MACT are widely available and, as such, would likely have been selected as GACT for most of the area source categories. One exception is the large, hard chromium electroplating source category, for which packed-bed scrubbers may have been a possible alternative for GACT for existing sources. In the EPA's analysis, however, a standard based on composite mesh-pad technology was found to be reasonable for large, hard chromium electroplaters. The final rule does, however, allow existing small, hard chromium electroplaters to meet an emission limit that is based on packed-bed scrubbers; most of these small sources will also be area sources. The EPA had determined that those existing area sources that fit the "small" designation could experience economic hardship if forced to meet a standard based on composite mesh-pad technology, especially if a packed-bed scrubber system was already in place.

In light of comments received at proposal, the EPA has reduced the monitoring, reporting, and recordkeeping requirements for all sources (see discussion in sections 2.11 and 2.13, respectively), which will further alleviate the burden on area sources. Also, the compliance timeframe for decorative chromium electroplaters has been increased to 1 year, and the compliance timeframe for hard chromium electroplaters and chromium anodizers has been increased to 2 years. These timeframes will allow existing area sources more time to obtain the capital necessary to purchase controls, train employees, and to implement monitoring, reporting, and recordkeeping systems.

Many commenters point to section 112(d) of the Act to support their reasoning that all area sources should be regulated by GACT. Section 112(d)(5) does indeed allow an alternative standard for area sources. The EPA, however, interprets this paragraph as authorizing the Administrator to establish GACT standards for area sources when the imposition of MACT is determined to be unreasonable. The Agency considers the application of MACT to area sources in this source category to be reasonable based on the risks of chromium compounds and the

results of the cost analysis, as discussed above. The EPA believes that its interpretation is supported by section 112(f), which discusses the need for the EPA to investigate and report to Congress on residual risk remaining from sources regulated under section 112(d). Section 112(f)(5) excludes area sources regulated by GACT under section 112(d)(5) from this analysis. If the intent of the Act was for all area sources to be regulated by GACT and not subject to a residual risk analysis, it would not be necessary for section 112(f)(5) to exclude only those area sources regulated by GACT.

## 2.5 SELECTION OF MACT FOR HARD CHROMIUM ELECTROPLATING TANKS

### 2.5.1 Selection of the MACT Floor

Comment: Four commenters (IV-D-10, IV-D-41, IV-D-42, IV-D-43) suggested that the MACT floor for new hard chromium electroplating and chromium anodizing tanks should be based on the use of a fiber-bed mist eliminator (FBME) because this is the best technology in use. All of these commenters disagreed with EPA's rationale for not requiring this technology as MACT for new sources; they noted that the Act does not exclude government installations, and in any event nongovernment installations exist. One commenter (IV-D-41) knew of two such installations in New York State, and was told by a vendor of FBME that 60 units had been installed by them nationwide.

Response: The EPA has further investigated the prevalence of FBME in response to comments received at proposal. As discussed above, one commenter (IV-D-41) indicated that two FBME had been installed in the State of New York and a total of 60 units had been installed nationwide. The two installations in New York are described as "four-stage polypropylene pad de-misters," indicating that there is some confusion in control device terminology. The description given to the two installations in New York is representative of a composite mesh-pad system, not a FBME. As described in the preamble to the proposed rule, FBME are typically installed downstream of an existing control device and consist of hollow cylinders formed from two concentric screens. The annular space between the

cylinders is filled with fibers, which are typically glass, ceramic, plastic, or metallic materials. The EPA has also contacted the vendor referenced by commenter IV-D-41 as having 60 fiber-bed units installed nationwide. Again, it appears as if the term fiber bed is being used to describe what is actually a composite mesh-pad system. The vendor confirmed with EPA that they were discussing the installation of composite mesh-pad systems with commenter IV-D-41, not fiber-bed systems.

One other commenter also indicated that additional facilities were using FBME to control chromium emissions from hard chromium electroplating and chromium anodizing tanks (IV-D-10). In addition, all four commenters stated that FBME should be considered as the basis for MACT for new sources. Based on information gathered by EPA since proposal, 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). However, after a thorough evaluation, it was determined that none of the emission test data available were adequate to establish an emission limit based on the use of fiber-bed units.

The test results from one facility were incomplete to assess the performance of fiber-bed units. The test results from the other facilities were adequate to evaluate the performance of FBME; however, the limited data are not sufficient to establish an emission limit which must be met on a continuous long-term basis based on the use of FBME. In one case, at both the inlet and outlet, only one sample port was installed. At the inlet, only a single point was sampled. At the outlet, only one traverse was made, when two traverses should have been performed. Based on EPA's previous experience in sampling at electroplating facilities, sampling a single point or a single traverse is not

acceptable for providing accurate and representative emissions data.

In order to use emissions test results for the purposes of establishing emission limits, the Agency also requires that the quantity of emissions captured by the sample catch exceed the detection limit of the analytical method by a factor of five. This requirements ensures that the measured data are accurate to within 10 percent. Data from the remaining two facilities fall below this guideline. Therefore, the data must be treated as qualitative rather than quantitative results; they 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. As discussed above, the Agency does not have data to establish emission limits associated with the FBME technology. In addition, 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 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 MACT

standard is 0.015 mg/dscm for new hard chromium electroplating operations and is 0.01 mg/dscm for new chromium anodizing operations. [See discussion of emission limits in Section 2.8.] As set forth in the proposal, these emission limits were based on the performance level which could be achieved by composite mesh-pad systems and fume suppressants, respectively. These emission limits correspond to an overall emission reduction of 99.8 percent for composite mesh-pad systems and 99.5 percent for fume suppressants. Based on available data, the Administrator has been unable to conclusively determine that the performance achieved in practice by the FBME is superior, considering long-term performance, to that of either the composite mesh-pad system or fume suppressants. Therefore, the final MACT performance level of new hard chromium electroplating and chromium anodizing operations 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, either system (or any which meets or exceeds this performance level) may be used for control of emissions from new hard chromium electroplating and chromium anodizing operations.

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. The pressure drop across the fiber-bed unit is identified as the compliance monitoring parameter because of the relationship between pressure drop and the performance of the unit. Performance of the fiber-bed unit will decrease as a result of plugging of the bed if the water spray system is not activated in response to an increase in the pressure drop. Therefore, it is required that the pressure drop be monitored and recorded once per day in the final rule. Any deviation outside the established parameter range would constitute a violation of the standard. The test methods in the

proposed rule are suitable for demonstrating compliance with the standard, regardless of the control technology employed.

Comment: Two commenters (IV-D-07, IV-D-43) disagreed with the methodology used by the EPA in calculating the floor. One commenter (IV-D-43) pointed out that the calculation should be a straight arithmetic average, not a median, and account for the five percent of the facilities using the composite mesh-pad system. As such, the MACT floor would be 0.023 mg/dscm as presented in the preamble to the proposed rule. The other commenter (IV-D-07) also noted that in determining the floor, the EPA can only exclude sources achieving low emission levels due to very recent BACT and LAER determinations. The EPA, according to this commenter, may not exclude other sources achieving these emission levels from the floor determination without positive information that these levels came about because of BACT or LAER determinations. The commenter points to section 112(d) as the source of this information.

Response: The EPA believes that the use of a median for determining the average emission limitation is warranted, as discussed in Section 2.1.

#### 2.5.2 Regulatory Alternatives Considered

Comment: Eight commenters (IV-F-01 [Altmayer], IV-D-12, IV-D-17, IV-D-21, IV-D-48, IV-D-49, IV-D-53, IV-D-58) suggested that the EPA was too limiting in the regulatory alternatives for hard chromium electroplating operations. These commenters said that the EPA should have accounted for sources (especially small sources) in this subcategory that could use fume suppressants to comply with the standard, instead of locking sources into a control technology such as a packed-bed scrubber. Four commenters (IV-D-17, IV-D-48, IV-D-49, IV-D-58) 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 using a wetting agent-type fume suppressant. One of these commenters (IV-D-17) contended that the EPA did not present sufficient evidence to support that fume suppressants in hard chromium tanks



are less effective than those in decorative chromium tanks. Two commenters (IV-D-48, IV-D-58) further argued that there are fume suppressants available that do not cause pitting in hard chromium electroplating tanks (brochure provided); one of these fume suppressants works by forming a foam blanket only near the anode and cathode. According to one commenter (IV-D-48), the South Coast Air Quality Management District (SCAQMD) has approved the use of such a fume suppressant in conjunction with poly balls for controlling chromium emissions from hard chromium electroplating tanks.

Response: The EPA has selected an emission limit format in order 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 compliance testing and ongoing compliance monitoring demonstrates that the emission limit required by the standard is being achieved.

The Agency allows decorative chromium electroplating and chromium anodizing sources to achieve a surface tension limit in lieu of conducting a performance test if the criteria of § 63.343(b)(2) or (3) are met. This provision was included in the standard because the EPA recognized that some decorative chromium electroplating and chromium anodizing tanks do not have ventilation stacks such that a source test could be performed. This is not the case with hard chromium electroplating tanks. Given the quantity of chromium emitted from a hard chromium electroplating tank, it is the Agency's experience that all such tanks have ventilation systems to meet Occupational Safety and Health Administration (OSHA) requirements. Thus, testing to demonstrate initial compliance with the standard should not be an implementation problem for facilities with hard chromium electroplating tanks that wish to use fume suppressants.

The EPA has revised the rule to clarify that monitoring requirements are a function of the control technique used, and

are not source category-specific. Thus, the rule requires all sources using fume suppressants with wetting agents, or foam blankets to monitor the surface tension or foam thickness, respectively, to demonstrate continuous compliance with the standards regardless of the source category. The value of the monitoring parameter used for ongoing compliance determinations is either (1) specified in the final rule; e.g., a source may accept a minimum foam blanket thickness of 1 inch as compliant; or (2) set during the initial compliance test; e.g., if a source using a foam blanket chooses to set the compliant foam thickness value. The monitoring frequency, and recordkeeping and reporting associated with monitoring, that is identified in the proposed rule is also control technique-specific.

Comment: One commenter (IV-D-24) suggested that the section of the proposed rule that allows alternate control technologies (§ 63.343(d)) also specify the timeframe within which the EPA would approve the alternate technology.

Response: The installation of alternative control technologies do not have to be approved under the final rule. It is only necessary for the monitoring parameter that will be used to ensure continual compliance with the standard be approved, or if an alternative test method is used to demonstrate initial compliance, the alternative test method must first be approved by the governing agency. As stated in section 63.343(d) of the proposed (and final) rule, sources using air pollution control devices not listed in the section are required to submit, among other things, verification of performance and appropriate operating parameters to be monitored to establish compliance with the standards. The testing procedures used for verification would likely be consistent with those laid out in § 63.344(c) of the final rule. If not, the alternate test procedures must be submitted for approval in accordance with § 63.7(f) of the General Provisions. Section 63.7(c)(3) specifies that the Administrator will approve or deny the alternate test procedures within 30 days of receipt of the test plan and any supplementary information requested by the Administrator. If alternate

monitoring requirements are requested, these alternate requirements should be requested in accordance with § 63.343(c)(8) of this rule and § 63.8(f)(4)(i) of subpart A. The Administrator, as stated in § 63.8(f)(5)(i), will approve or deny the alternate monitoring methods within 30 days of receipt of the alternate plan and any supplementary information requested.

Comment: Several commenters responded to the EPA's solicitation for comment on the feasibility of limiting or prohibiting wastewater discharges from sources covered by the proposed rule. Two commenters (IV-D-40, IV-D-43) stated that wastewater recycling should be incorporated into the rule. However, 21 commenters did not think that wastewater should be regulated. Thirteen commenters (IV-D-06, IV-D-14, IV-D-15, IV-D-17, IV-D-22, IV-D-26, IV-D-31, IV-D-37, IV-D-47, IV-D-52, IV-D-58, IV-D-59, IV-D-61) noted that recirculated scrubber water and washdown water cannot always be returned to the electroplating bath because of the potential for contamination. This is especially a concern when multiple process tanks performing different operations (decorative chromium electroplating, chromium anodizing, nonchromium operations, etc.) are vented to the same control system. In lieu of recirculation, scrubber water is routed to an on site wastewater treatment plant prior to being discharged to the POTW. One commenter (IV-D-29) pointed out that to alleviate contamination concerns, recirculated water would have to be treated prior to reuse, but that such a practice would itself generate a significant quantity of waste. Two commenters (IV-D-14, IV-D-37) noted that the mass loading of chromium in the scrubber water is typically low and can be sent directly to a POTW. Other comments questioning the EPA's rationale for regulating wastewater pointed out that:

1. The economic incentive to recycle already exists (IV-F-01 [Altmayer], IV-D-09, IV-D-23, IV-D-61);
2. There may not be capacity in the process to accept additional water volume (IV-D-58);

3. The use of a scrubber for its secondary evaporative benefits is questionable because any benefit would likely be offset by increased energy consumption (IV-D-26, IV-D-59);

4. The EPA may not have statutory authority to regulate wastewater or any source that does not cause air emissions (IV-D-17, IV-D-18, IV-D-23); and

5. There is limited benefit to regulating a source that is already regulated by an effluent standard (IV-D-17). Finally, three commenters were concerned that a rule limiting or prohibiting wastewater discharge may be too narrowly defined. For example, one commenter (IV-D-36) pointed out that a rule covering wastewater discharge would have to include more options than the two proposed by the Agency because there are other potential uses for recycled water. Another commenter (IV-D-51) noted that it was not prudent to regulate wastewater because the EPA is not familiar with all existing or future technologies, or the larger matter of total waste minimization for an entire industry. The third commenter (IV-D-61) suggested that the EPA should wait until technology that eliminates the discharge of wastewater becomes available and affordable to industry before requiring industry to comply with wastewater standards that may lead to lower-quality products or price increases.

Response: In the preamble to the proposed rule, the EPA solicited comments on a possible standard in which sources would be required to recirculate scrubber water until it reaches a certain chromium concentration; then, the water could be discharged. An even more stringent requirement presented by the EPA for comment was one in which sources would not be allowed to discharge any wastewater resulting from the use of composite mesh-pad and packed-bed scrubber systems. The benefit of such requirements is that the quantity of chromium-containing wastewater would be reduced.

The comments received at proposal offered many technical reasons for why neither of these requirements would be feasible for many sources. In light of these comments, the EPA has reevaluated the alternatives associated with wastewater. There

appear to be many instances in which recirculation of wastewater is not technically feasible because it could introduce contamination into the plating baths. Also, there are some facilities that have indicated that they do not have capacity to accommodate all recycled water. In soliciting comments on the wastewater requirement, the EPA assumed that the requirement would be technically feasible for sources and therefore performed at minimal or no costs. In light of comments received, the technical feasibility of the wastewater requirements is uncertain, and the EPA has therefore chosen not to include such a requirement in the final rule.

Even though not regulated by this NESHAP, wastewater sources from chromium electroplating and chromium anodizing tanks are not unregulated. The Agency recognizes the environmental benefits of reducing wastewater containing chromium. The Office of Water is currently revising effluent guidelines that apply to the chromium electroplating and chromium anodizing sources. The Office of Water is currently investigating "end of pipe" limits that apply to chromium emission sources, as well as in-plant methods to limit the quantity of wastewater that can be discharged. These guidelines are scheduled to be proposed in two separate phases, with Phase I to be proposed in the Fall of 1994, and promulgated by May 1996. Phase I will cover facilities that sell products in the following market sectors: aerospace, aircraft, electronic equipment, hardware, mobile industrial equipment, ordnance, and stationary industrial equipment. Phase II is scheduled to be proposed by December 1997 and promulgated by December 1999 and will cover sources that sell products in the following markets: bus and truck, household equipment, instruments, motor vehicles, office machines, precious and nonprecious metals and instruments, railroad, and shipbuilding. After completion of these two phases, all sources in the source categories subject to this NESHAP will be covered by a revised wastewater effluent guideline.

### 2.5.3 Selection of MACT

Comment: Four commenters (IV-D-13, IV-D-24, IV-D-31, IV-D-58) had questions on the EPA's cost and economic impact analysis that was considered in selecting MACT for hard chromium electroplating operations. One commenter (IV-D-13) stated that the cost to retrofit existing control equipment was overstated. Two commenters (IV-D-24, IV-D-58) thought that the EPA's analysis was flawed for several reasons. First, these commenters thought that costs were understated because the EPA did not consider the cost of shutdown for a facility to permit, install, and test an air pollution control device. One of these commenters (IV-D-24) estimated that their cost would be greater than \$100,000/lb of chromium reduction, much greater than the \$1,850/lb estimated by the EPA. The other (IV-D-58) noted that the costs did not account for the fact that multiple control devices would be necessary to meet the standards. These commenters also felt that the cost analysis was flawed because it assumed that all forms of chromium have the same toxicity. Thus, the EPA has overestimated health benefits and underestimated the cost per pound of pollutant reduced. Finally, one commenter (IV-D-31) questioned the EPA's statement that the majority of cost increases resulting from additional emission controls can be passed on to customers. The commenter wanted to know the basis of this statement, and the framework for the conclusion that product prices will increase by less than 1 percent.

Response: The EPA considers the cost estimates presented in the preamble to the proposed rule to be generally representative of industry costs to achieve compliance with the rule. The EPA recognizes that in an industry of over 5,000 sources, there is going to be variation in the cost to achieve compliance with the standard. The costs developed by the EPA are not intended to represent every facility within the source category, but are intended to represent the source category in general. Whereas commenter IV-D-24 feels that costs will be much higher than those estimated by the EPA, there are likely other sources whose costs will be lower.

Regarding the comment that the EPA underestimated costs because it did not account for the need for multiple control devices, the Agency did account for the fact that medium and large-sized facilities have more than one tank and would therefore require more than one control device per facility. The EPA assumed that at such facilities, multiple tanks could be manifolded to one control device, thus saving on capital costs, but did not assume only one control device would be needed when large numbers of tanks are present. (For more details on costing methodology, refer to Chapter 5 of the proposal BID and to the New Technology Document.) Regarding the comment that the EPA overestimated retrofit costs, these costs were supplied by vendors to the industry. The commenter is a supplier of composite mesh pads who sells the pads to vendors that actually install control systems. Although his costs to vendors may be less than those presented in the proposal preamble, end users purchase equipment from vendors, not the original equipment component supplier, and will therefore incur those costs charged by the vendors.

To clarify the cost estimates presented, these costs are installed costs and thus do account for the cost of installation. Shutdown costs (i.e., downtime) were not included because, based on information received by the EPA, the majority of shops with multiple tanks have several control system configurations for controlling the tanks, and one system can be operated while the other system is being upgraded or replaced. In addition, facilities have the option of installing the equipment during a normal shutdown of the plant. Data gathered on the industry indicate that facilities typically shutdown twice a year for a one week period. A problem with shutdown may exist for small shops or shops that operate 365 days per year and have only one control system. However, measures such as increased production prior to shutdown could be used to minimize production losses. Although the costs of performance testing are not included as part of equipment expenditures, the effect of these costs was considered by the EPA in selecting the level of the standards.

Also, in response to commenters that stated that the EPA overestimated environmental benefits, the EPA estimated the costs per quantity of hexavalent chromium removed in developing impacts for the standard. This was done because all chromium emitted from chromic acid electroplating and anodizing tanks was assumed to be hexavalent chromium.

The EPA's analysis of the economic impacts of the standard indicated that final product prices will increase by less than 1 percent. Because it would not be feasible to analyze the impact of the regulation on all products that are chrome plated, the EPA's Economic Impact Analysis (EIA) examined the impacts on five different products. Of these five, three of the products are hard chromium electroplated: automobile parts, industrial rolls, and hydraulic cylinders. For each product analyzed, the EIA provided estimates of the original plating cost and both the percentage increase and the actual dollar increase in electroplating cost. Then, if possible, the EIA used the increased cost of electroplating, along with an estimated price of the final product, to estimate a price increase for the final product. Using this methodology, the EIA arrived at the conclusion that the final product price would not exceed 1 percent for any of the products analyzed.

The percentage increase in electroplating costs estimated in the EIA did exceed one percent in some instances. However, the EIA indicated that these cost increases could be passed on to the consumer for the following reasons. The primary reason is because the demand for most electroplated products is a derived demand. In other words, the parts that are electroplated are intermediate goods in the production of the final product. As a result, the estimated increase in electroplating cost is such a small percentage of the total cost of producing the final product that the producer of the final product could raise the final product price minimally (less than one percent) to recover the cost increase associated with purchasing the electroplated parts. Another factor that should make it easier for hard chromium electroplaters to pass cost increases is that there are limited



substitutes available for hard chromium electroplated parts. Thus, customers are less able to switch to a different product when faced with higher prices for hard chromium electroplating. (For more details on the EIA, refer to Chapter 8 of the proposal BID and to the New Technology Document.)

Comment: Six commenters (IV-D-17, IV-D-24, IV-D-28, IV-D-31, IV-D-36, IV-D-58) stated that the proposed standard for large, existing hard chromium electroplaters is inappropriate. Four commenters (IV-D-17, IV-D-24, IV-D-28, IV-D-58) did not think that sources that had installed packed-bed scrubbers prior to proposal of the rule should have to upgrade to composite mesh-pad systems. The commenters did not believe that such an upgrade was cost justified; one (IV-D-17) stated that large facilities would have at least as much difficulty in obtaining capital as small facilities. One of these commenters (IV-D-28) also pointed to the language of section 112(d)(3) to justify that requiring this upgrade is inconsistent with the Act; sources with packed-bed scrubbers meet the requirement that existing sources be subject to a control requirement no less stringent than the MACT floor.

Other commenters (IV-D-31, IV-D-36) also agreed that the standard should be set at the MACT floor because: (1) the improvement in air emissions over the MACT floor is minimal but cost and energy impacts are not; (2) the data on the number of control systems and their effectiveness is from vendors hoping to mandate their systems; and (3) a level of 0.013 mg/dscm is not consistently achievable with composite mesh-pad systems under the normal range of operating conditions. Another commenter (IV-D-58) agreed with this last point and cited test data to show that a level of 0.013 mg/dscm could only be met if composite mesh pads are preceded by process controls such as fume suppressants or another air pollution control device. This same commenter did not believe that the data provided by the EPA supported the EPA's position that the standard is based on the best performing 12 percent of sources. One commenter (IV-D-24) noted that the selection rationale for MACT was inappropriate because the EPA

established MACT based on lab test data or vendor values rather than actual control values, which is contrary to the CAA's language that the emission control level be "achieved in practice." This same commenter also felt that the EPA had not sufficiently investigated the parameters (emission reductions achievable, cost of control, and economic impacts) on which the selection of MACT was based.

Response: Section 112(d)(3) of the Act requires the EPA to set emission standards for existing sources that are no less stringent than, but may be more stringent than, the average emission limitation achieved by the best performing 12 percent of existing sources. The EPA interprets this passage to clearly indicate that sources that are meeting this floor level can potentially be subject to more stringent standards requiring additional controls. This same section of the Act states that this "floor" emission limitation shall be set by the Administrator based on the sources for which the Administrator has emissions data. For this source category, the EPA surveyed both industry and vendors to determine the types and approximate numbers of control systems in use. The EPA did not, however, use vendor data to establish the emission limit. The proposed emission limit of 0.013 mg/dscm was based on tests that the EPA conducted on composite mesh-pad systems operating under normal process conditions. Lower limits than the one selected 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. (The emission limit in the final rule has been revised to 0.015 mg/dscm. See discussion in Section 2.8, Selection of the Emission Limits.) The data cited by commenter IV-D-58 are based on an older mesh-pad technology that was tested prior to the new composite mesh-pad designs and could not be used in setting a standard based on the use of composite mesh-pad technology.

In setting an emission standard, the Act further directs the Administrator to take into account the cost, nonair quality health and environmental impacts, and energy requirements in

establishing these standards. To fulfill this requirement, the EPA evaluated the cost, impact, and benefit of requiring large hard chromium electroplating sources with existing packed-bed scrubbers to achieve a level of control corresponding to the use of a composite mesh-pad system. Requiring all sources to achieve such a level results in additional emission control of approximately 1.2 mg/yr, with additional energy requirements of 31,850 megawatt hours per year (MWh/yr) and an additional 38 cubic meters (m<sup>3</sup>) of solid waste. (These numbers are nationwide estimates.) The incremental cost effectiveness of requiring all sources to meet a standard based on composite mesh-pad systems compared to allowing sources with packed-bed scrubbers to continue to use these devices is approximately \$4.2 million per Mg of chromium controlled. Although this cost may seem high, the EPA believes the toxicity of chromium justifies these costs. The cost analysis for composite mesh-pad technology accounted for the fact that all composite mesh-pad designs use either a packed bed or other coarser mesh pad prior to the composite mesh pad to reduce loading and prevent plugging. All composite mesh-pad systems are single units that combine both control strategies; thus, the cost analysis was performed on the whole unit.

Based on the EPA's economic analysis, the requirement that large, hard chromium electroplaters meet a standard based on composite mesh-pad technology would not cause adverse economic effects on large facilities that currently use packed-bed scrubbers. Due to economies of scale, the relative impacts (e.g., the percentage increase in electroplating cost) on larger facilities are consistently smaller than those on small facilities. As a result, it will be easier for larger facilities to pass on control costs. Financial institutions should recognize this when making decisions concerning whether to grant capital to a larger chromium electroplating facility. In addition, the capital availability analysis that was done for small electroplaters indicated that as the revenue of a facility increases, the ability of the facility to obtain capital also

increases. Because larger facilities tend to generate more revenue, their ability to obtain the necessary capital should be enhanced. Finally, a larger facility may have more options available to raise the necessary capital (e.g., internal financing). (See Chapter 5 of the New Technology Document for a detailed discussion of EPA's economic analysis for these systems.)

It is also important to keep in mind that the final rule is expressed in terms of an emission limit, not a technology. As discussed in the preamble to the proposed rule, the EPA tested a system in which a foam blanket was used on a hard chromium electroplating tank to reduce emissions going to the packed-bed scrubber. Emissions from the outlet of the scrubber were measured as 0.008 mg/dscm, which would achieve compliance with the level of 0.015 mg/dscm required by the final rule for hard chromium electroplating tanks. Also, a source may retrofit an existing packed-bed scrubber to add a composite mesh-pad component, in lieu of replacing the system with a new composite mesh-pad system.

Comment: Five commenters (IV-F-01 [Sonntag], IV-D-24, IV-D-27, IV-D-53, IV-D-58) stated that the proposed standard for small, existing hard chromium electroplaters is too stringent. Three commenters (IV-F-01 [Sonntag], IV-D-24, IV-D-58) disagreed that small existing sources could meet the standard even if they were equipped with packed-bed scrubbers. These commenters questioned the rationale for basing the standard on ideal conditions, especially when the EPA's own data indicate that control equipment not operating under these conditions would not meet the standard. Another commenter (IV-D-53) noted that the regulation required even very small sources to install a control device, which they believed was an undue burden. In lieu of such a requirement, this commenter proposed that the EPA allow small sources to use an approved mist suppressant.

Response: 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 EPA also notes that the selection of the emission limit for packed-bed scrubbers was based on the highest emission level obtained during any of the tests. The final rule requires the use of fresh water added to the top of the packed bed whenever makeup additions occur as one of the work practice standards identified in Table 2 of the final rule. 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.

As mentioned in a previous response, the emission limit of 0.03 mg/dscm for small, hard chromium electroplaters does not require these sources to install any particular type of control equipment. A fume, or mist, suppressant can be used if it meets the 0.03 mg/dscm emission limit, as could any other control technique that meets the limit.

In addition, the Agency has considered potential adverse impacts to small sources by requiring a less stringent standard for small, hard chromium electroplaters than the larger ones, and by reducing the monitoring, reporting, and recordkeeping requirements for all sources. (See Sections 2.11 and 2.13, respectively.)

Comment: Five commenters (IV-F-01 [Schott], IV-D-07, IV-D-13, IV-D-30, IV-D-39) stated that the proposed standard for small, existing hard chromium electroplaters was too lenient. One commenter (IV-D-07) noted that the proper interpretation of the MACT floor is a straight average, and as such is 0.023 mg/dscm (see discussion in Section 2.5.1). Therefore, the EPA could not legally establish an emission limit of 0.03 mg/dscm; the appropriate standard is 0.013 mg/dscm (more stringent than the floor level of 0.023 mg/dscm).

Two other commenters (IV-F-01 [Schott], IV-D-39) indicated that the risk remaining after the proposed MACT was applied to small sources warranted more stringent controls, and that the

residual risk analysis to be conducted 8 years after the standard would necessitate a more stringent standard. Two commenters (IV-D-13, IV-D-30) thought that the EPA's rationale for selecting MACT for small, hard chromium electroplaters was flawed from both a technical feasibility and cost basis. One of these commenters (IV-D-30) stated that packed-bed scrubbers are an inappropriate design improperly evolving from vapor/liquid mass transfer and are not good controls for mist elimination. The other commenter (IV-D-13) stated that the EPA's cost-effectiveness rationale is flawed because it overstates the cost of retrofitting packed-bed scrubbers, as well as the efficiency of these devices; the efficiency is actually 97 percent, not 99 percent.

Response: As discussed in Section 2.1, NESHAP Decision Process, the Agency believes that the MACT floor is properly based on the median level of control (use of packed-bed scrubbers) for the hard chromium electroplating source category.

The Agency considers any discussion of the residual risk from small, hard chromium electroplaters to be premature at this time. Under the Act, standards are first set based on control technology; risk is considered as a factor when deciding to regulate area sources with a MACT or a GACT standard. Following the establishment of technology-based standards, the Act has provisions to set risk-based standards if the residual risk remaining after implementation of the standard is determined to be significant. In developing the technology-based standard for sources that emit hexavalent chromium (a known carcinogen) and trivalent chromium, the EPA regulated sources with MACT to ensure that a residual risk analysis will be conducted. Currently, the EPA has insufficient information to determine if the residual risk remaining after the implementation of the standard will warrant development of a risk-based standard.

The EPA also considers its cost analysis for small, hard chromium electroplaters to be sound. As stated in a response to a previous comment, the EPA based its retrofit costs on information from vendors who supply the equipment to the industry. Commenter IV-D-13 may be correct in stating that

vendors receive equipment for a lower cost than indicated in the proposal preamble, but the costs incurred by affected sources are the costs charged by vendors.

The EPA disagrees with the assertion that packed-bed scrubbers are not good controls for mist elimination. While composite mesh-pad systems may be superior technology, packed-bed scrubbers have been tested by the EPA and can consistently achieve emission limits of 0.03 mg/dscm, which represents a 99 percent reduction from uncontrolled emissions in a typical situation. The EPA recognizes the shortcomings in expressing the control efficiency as an indication of a technology's efficiency, which is why percent reduction was not chosen as the format of the standard. The control efficiency of any particular device varies according to the inlet loading such that any one device may only achieve an efficiency of 97 percent or less; however, if the scrubber is properly operated and maintained, the emission level of 0.03 mg/dscm can still be achieved at the outlet.

Comment: Two commenters (IV-D-41, IV-D-61) asked for clarification on various aspects of the rule. One commenter (IV-D-41) wanted to know if MACT was at least equivalent to BACT established by the California Air Resources Board (CARB), which requires 95 percent control (or a maximum emission rate of 0.15 mg/amp-hr) for small facilities; a 99.8 percent efficiency (or a maximum emission rate of 0.006 mg/amp-hr) for sources emitting greater than 10 lb/yr with controls; and a 99 percent control (or a maximum emission rate of 0.03 mg/amp-hr) for all other sources. This commenter felt that if the proposed standard was not equivalent to 99 percent control, it could not be MACT. This same commenter noted that the proposed standard does not meet health risk-based ambient guidelines. According to this commenter, a hard chromium electroplating source emitting 0.03 mg/dscm of hexavalent chromium exceeds New York's ambient guideline concentration of  $2 \times 10^{-5}$  ug/m<sup>3</sup> by two orders of magnitude. Finally, this commenter requested clarification on the control technology that forms the basis for MACT. This commenter questioned whether the proposed standard of

0.013 mg/dscm for hard chromium electroplating represents the use of mist suppressant controls plus scrubbers with high-efficiency mist eliminators, or can it be achieved using a four-stage high-efficiency fiber mist pad air cleaning system. A second commenter (IV-D-61) noted that the proposed rule was unclear as to whether the air pollution control device must operate 24 hr/d, or only during tank operation.

Response: The EPA cannot state whether the final NESHAP for this source category is equivalent to the CARB standards. The format of those standards is mg/amp-hr, which is not directly comparable to the concentration-based format of the this rule. (See discussion in Section 2.7, Selection of the Format of the Standard.) A source that operates at a high amperage may achieve a limit expressed in terms of mg/amp-hr, yet may be emitting high levels of chromium in terms of the concentration (mg/dscm).

The basis for MACT for small and large hard chromium electroplaters is packed-bed scrubbers and composite mesh-pad systems, respectively. When typical inlet conditions are assumed, packed-bed scrubbers can control 99 percent of emissions from hard chromium electroplating sources while composite mesh-pad systems can control up to 99.8 percent. However, as noted above, control efficiencies can vary from system to system. Also as noted above, even though MACT was based on the use of specific controls, any control technique can be used to meet the standard as long as it is demonstrated through performance testing.

In terms of meeting health risk-based standards, MACT standards developed in accordance with section 112(d) of the Act are technology-based, not risk-based. The EPA considered risk for this source category by regulating all area sources covered by these standards with MACT. Thus, an analysis will be conducted in accordance with section 112(f) to determine the residual risk from these sources.

In response to the second commenter, the final rule has been clarified to require control of chromium emissions only during tank operation; tank operation has also been defined.



Comment: One commenter (IV-D-39) suggested that the proposed rule should specify ventilation system design to prevent excess fugitive emissions or dilution, or the EPA should issue guidance concerning this to the States.

Response: Based on EPA's experience, hard chromium electroplating sources have to adhere to strict OSHA standards to protect workers at these facilities. Hard chromium electroplating tanks must be properly ventilated in order to meet OSHA and, as such, the EPA does not think it is necessary to include ventilation guidelines in the MACT standards as well. The OSHA requirements specify that the exposure level to workers not exceed  $0.05 \text{ mg/m}^3$  over a normal 8-hour workday and a 40-hour work week for water soluble hexavalent chromium. As explained in the preamble to the proposed rule, one concern with a concentration standard is that dilution of the exhaust gases can occur. Possible dilution of the exhaust can be checked by regulators by comparing the air flow measured during testing with the design air flow specified for the system in the source's construction or operating permit, or in manufacturer's specifications. Such a circumvention of the standard is also expressly prohibited by § 63.4(b) of the General Provisions; dilution of the air stream would cause a source owner or operator to be subject to enforcement action.

## 2.6 SELECTION OF MACT FOR DECORATIVE CHROMIUM ELECTROPLATING AND CHROMIUM ANODIZING TANKS

### 2.6.1 Decorative Chromium Electroplating--Trivalent Chromium Electroplating Process

Comments: Two commenters (IV-D-10, IV-D-43) stated that the preamble to the proposed rule should have a more detailed discussion of how the MACT floor for this subcategory was determined.

Eleven commenters (IV-F-01 [Altmayer, Sonntag], IV-D-01, IV-D-02, IV-D-03, IV-D-22, IV-D-25, IV-D-53, IV-D-58, IV-D-59) questioned why the EPA was including those decorative chromium tanks that use a trivalent chromium process in the proposed rule; these commenters do not believe this process should be regulated.

Many of the commenters (IV-D-01, IV-D-03, IV-D-25, IV-D-53, IV-D-58, IV-D-59) felt that the EPA's decision to regulate trivalent chromium based on its risk was flawed, and that the EPA had insufficient data to reach this conclusion. Two commenters (IV-F-01 [Altmayer], IV-D-58) pointed out that trivalent chromium baths meet OSHA requirements without ventilation. One of these commenters (IV-D-58) provided an epidemiological study discussing the toxicity of chromium. This same commenter stated that the toxicity of trivalent and hexavalent chromium should be considered separately when addressing health effects and determining whether to regulate all sources under MACT. Four commenters (IV-F-01 [Altmayer], IV-D-02, IV-D-22, IV-D-58) questioned why the EPA once considered requiring trivalent chromium baths for new sources and are now regulating them equally with hexavalent chromium baths. Finally, three commenters (IV-D-01, IV-D-03, IV-D-53) stated that use of the trivalent chromium process should be encouraged by the EPA, not discouraged through regulation, because trivalent processes result in less total chromium in process wastewater and less sludge generation.

Four commenters (IV-F-01 [Altmayer], IV-D-22, IV-D-25, IV-D-58) found fault with the data supporting the EPA's reasoning for regulating trivalent chromium baths. The commenters noted that the level of hexavalent chromium identified by the EPA from a trivalent chromium bath (0.004 mg/dscm) would require that hexavalent chromium be present in the bath at a level of 8 percent. The commenters point out that the presence of only a few parts per million (ppm) of hexavalent chromium in a trivalent bath will destroy the bath; this suggests that the presence of hexavalent chromium was due to analytical integrity.

There were ten comments (IV-F-01 [Bortoli, Sonntag], IV-D-01, IV-D-02, IV-D-03, IV-D-22, IV-D-25, IV-D-26, IV-D-58, IV-D-59) concerning specific requirements of the proposed regulation. These commenters pointed out that the reporting, recordkeeping, and monitoring requirements eliminate the incentive for facilities to switch to a trivalent chromium

electroplating process; according to the preamble, the "no action" alternative proposed by the EPA will result in \$1.6 million in reporting and recordkeeping. One commenter (IV-D-22) stated that the EPA recognizes that adding just wetting agents alone to a trivalent chromium bath can jeopardize the operation; this commenter questioned why the monitoring and reporting is necessary. Another commenter (IV-D-59) questioned how this burden can be justified in light of the fact that sources using a trivalent chromium electroplating process comprise only 10 percent of the decorative chromium electroplating subcategory, and they already have significant regulatory burden due to Clean Water Act requirements. Two commenters (IV-D-01, IV-D-03) noted that facilities using the trivalent chromium electroplating process are already using fume suppressants and should therefore not be regulated further. One commenter (IV-F-01 [Sonntag]) suggested regulating trivalent chromium electroplating processes under GACT to eliminate some of the burden.

One commenter (IV-D-02) asked for clarification on the proposed regulation. This commenter asked whether sources using the trivalent chromium electroplating process have to meet both the compliance monitoring and the operation and maintenance requirements in the proposed rule if they employ only fume suppressants and not an air pollution control device. The same commenter also stated that although the EPA had previously indicated that this was not the intent, the proposed rule is written such that sources have to meet both the surface tension limit and an emission standard.

Twelve commenters responded to the EPA's request for comment on whether the trivalent chromium electroplating process should be required for new sources. Two commenters (IV-D-01, IV-D-03) thought that this would be reasonable in situations where the process would be technically feasible. However, the remaining ten commenters (IV-F-01 [Sonntag], IV-D-09, IV-D-10, IV-D-22, IV-D-26, IV-D-29, IV-D-40, IV-D-43, IV-D-57, IV-D-59) did not think that this should be a requirement. Four commenters

(IV-D-26, IV-D-29, IV-D-57, IV-D-59) did not think that the process was technically feasible for the full range of decorative chromium electroplating. One of these commenters pointed out that decorative chromium platers using a trivalent chromium bath need stringent process controls and possible proprietary processes to achieve a finish comparable to a chromic acid bath. Three commenters (IV-D-22, IV-D-26, IV-D-29) stated that requiring a trivalent chromium electroplating process for new sources would force manufacturing overseas, and that this problem is accentuated by a narrow source definition in which each tank is considered a source. Two commenters (IV-D-10, IV-D-59) 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. In the preamble to the proposed rule, the EPA discusses the adverse environmental impacts of trivalent chromium, but then suggests requiring this process for new sources. Finally, one commenter (IV-D-40) suggested that it is not necessary to require the trivalent chromium process for new sources as long as other requirements are met, and the source demonstrates that the residual risk is negligible.

Response: The EPA has reconsidered the requirements associated with regulation of decorative chromium electroplating tanks using a trivalent chromium electroplating process. Specifically, the EPA has examined the technical basis for including these tanks in the rule and the technical feasibility of requiring such a process for new sources.

During development of the proposed standards, the EPA evaluated the trivalent chromium electroplating process and considered requiring this process for all new decorative chromium electroplating tanks. The trivalent chromium electroplating process is considered to be 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 electroplating 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, hexavalent chromium emissions were present at a concentration of 0.004 mg/dscm, and total chromium emissions were present at an average concentration of 0.023 mg/dscm. 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 are approximately equivalent to those emitted from a hexavalent chromium bath using 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 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.

Commenters indicated that the levels of hexavalent chromium emissions identified in the EPA test results must be erroneous because levels such as these would have contaminated the trivalent chromium plating bath. Therefore, 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 addition, no additional control measures beyond the use of the wetting agent in the bath were identified for trivalent chromium processes. Therefore, in light of the ambiguity of the air emissions data from trivalent chromium process and the other environmental benefits of the trivalent chromium process (less wastewater and sludge generated), the EPA has decided to regulate these baths differently from hexavalent chromium electroplating baths. The EPA has revised the final rule so that users of trivalent chromium baths are required only to submit initial notifications certifying that a trivalent chromium bath is being used, and to keep records of bath chemicals purchased. Subsequent notifications are required only if the process is changed, or if a new trivalent chromium process is introduced.

The final rule does make a distinction between types of trivalent chromium electroplating baths. The minimal 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. However, the EPA cannot be certain that a trivalent chromium bath will not be developed that does not contain a wetting agent as a bath ingredient. Therefore, the final rule regulates 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.

#### 2.6.2 Decorative Chromium Electroplaters--Chromic Acid Electroplating Process

Comment: Three commenters questioned the EPA's rationale for setting the MACT floor for this subcategory. Two commenters (IV-D-10, IV-D-43) thought more rationale was required to explain why the use of fume suppressants in conjunction with a packed-bed scrubber was not a more stringent control option than fume suppressants alone, and thus, the MACT floor for new sources. Another commenter (IV-D-50) stated that the EPA's standard development process ignored the 12 percent criteria set out in section 112(d)(2) of the Act in setting a standard for 2,800 decorative chromium electroplaters.

Response: The EPA received surveys from 63 decorative chromium electroplating operations, which had a total tank population of 102 decorative chromium electroplating tanks. In addition, 11 decorative chromium electroplating operations were visited. Section 112(d)(3) instructs the EPA to establish the minimum emission limitation (i.e., the MACT floor) based on the average emission limitation achieved by the best performing 12 percent of the existing sources for which the Administrator has emissions information (emphasis added). The EPA recognizes that the decorative chromium electroplating source category is large, but is directed to use the information available in establishing the MACT floor for the source category.

Through analysis of this background information, the EPA concluded that approximately 15 percent of decorative chromium electroplating operations were uncontrolled, 40 percent use fume suppressants, 40 percent use fume suppressants in conjunction with packed-bed scrubbers, and 5 percent use only packed-bed scrubbers. Source testing was conducted to establish the effectiveness of the fume suppressants used by sources in this

source category. Wetting agent-type fume suppressants were found to result in outlet concentrations ranging from 0.001 mg/dscm to 0.003 mg/dscm. Foam blanket fume suppressants were found to result in outlet concentrations ranging from 0.003 mg/dscm to 0.007 mg/dscm. Although tests were not conducted on sources using packed-bed scrubbers in conjunction with fume suppressants, the EPA does not think that in this application the packed-bed scrubbers provide any significant additional environmental benefit. When packed-bed scrubbers are installed on decorative chromium electroplating tanks, they are typically used as evaporators to reduce the wastewater treatment burden. Rinse waters (contaminated with chromium) are recirculated through the scrubber until their volume is reduced. The inlet concentration to a scrubber used for a tank that is already controlled with fume suppressants would be very small. Likewise, the particle size of any remaining pollutants is small. These factors combine to make any additional contaminant removal in the scrubber difficult. There are insufficient data available to quantify any improvement in overall emissions; therefore, the EPA based the MACT floor on the use of fume suppressants alone.

Comment: Two commenters asked for clarification of the proposed standard. One commenter (IV-D-41) noted that the standard does not meet health risk-based ambient guidelines. For example, a source emitting 0.003 mg/dscm of hexavalent chromium exceeds New York's ambient guideline concentration of  $2 \times 10^{-5}$  ug/m<sup>3</sup> by an order of magnitude. This same commenter requested an explanation on how the proposed rule compares to BACT established by CARB, which requires a 95 percent control efficiency or a 0.15 mg/amp-hr emission limit. The second commenter (IV-D-45) suggested that § 63.342(b)-(d) be clarified; as it is currently written, the rule assumes that either an air pollution control device or fume suppressant will be used, and uncontrolled tanks can remain uncontrolled.

Response: As explained in a previous response in Section 2.5, Selection of MACT for Hard Chromium Electroplating Operations, MACT standards developed in accordance with



section 112(d) of the Act are technology-based, not risk-based. The EPA considered risk for this source category by regulating all area sources with MACT standards. Thus, an analysis will be conducted in accordance with section 112(f) to determine the residual risk that remains from area sources. If considerable risk is found to remain, the source category can be subjected to residual risk standards.

The EPA cannot state whether the final NESHAP for this source category is equivalent to the BACT standards established by CARB. The format of the CARB standards is mg/amp-hr, which is not directly comparable to the concentration-based format of this rule. A source that operates at a high amperage may achieve a limit expressed in terms of mg/amp-hr, yet may be emitting high levels of chromium in terms of the concentration (mg/dscm). The basis for MACT for decorative chromium electroplating tanks is the use of fume suppressants. Data indicate that when these fume suppressants are used according to manufacturers recommendations, control efficiencies of greater than 99.5 percent are achieved.

Sections 63.342(c) and (d) of the final rule express standards in terms of an emission limit and a surface tension limit. The rule has been clarified to state that the emission limit applies to all sources, regardless of the control method used (if any). Sources using wetting agent-type fume suppressants to meet the standard are allowed to demonstrate initial compliance by measuring surface tension if the criteria of § 63.343(b)(2) are met. This compliance method has been allowed because it is the EPA's experience that sources performing decorative chromium electroplating and chromium anodizing may not have ventilation stacks to the atmosphere, making source testing impractical.

Comment: Two commenters suggested changes to the proposed rule. One commenter (IV-F-01 [Sonntag]) proposed that decorative chromium electroplaters using either a chromic acid or trivalent chromium bath be regulated by GACT. Another commenter (IV-D-41) suggested that the rule contain specific ventilation design criteria because the efficiency of mist suppressants is highly

variable. This commenter proposed that the rule require high-efficiency slot exhaust designed in accordance with the specifications in the American Conference of Governmental Industrial Hygienists industrial ventilation manual, with the use of high efficiency air cleaning equipment and high efficiency de-misters capable of 99 percent control.

Response: The EPA does not believe that it is appropriate to regulate new or existing area sources performing decorative chromium electroplating operations with GACT due to the toxicity of chromium compounds and the availability of control techniques. (See discussion in Section 2.4.) As discussed in Section 2.6.1, regulation of sources using the trivalent chromium electroplating process has been revised such that the regulatory burden for sources using a trivalent chromium bath that incorporates a wetting agent has been substantially reduced. However, as discussed in Section 2.4, regulation by MACT is appropriate given the toxicity of chromium compounds in general. Also, the technologies that form the basis for MACT are widely available and will not cause undue burden on any source.

Regarding the suggestion that ventilation specifications be added to the rule, the EPA believes that this is unnecessary because sources covered by this standard are also covered by OSHA guidelines. If a fume suppressant, or any control technique, is not properly operated such that workers are being exposed to chromic acid fumes, the source is in violation of OSHA. In addition, the EPA has established monitoring techniques that would ensure that the chromium electroplating or anodizing processes are operated properly at all times with appropriate fume suppressants. Therefore, it is the EPA's opinion that to specify ventilation requirements in this rule would be redundant.

Comment: Three comments pertained specifically to the proposed emission limit of 0.003 mg/dscm. One commenter (IV-D-58) proposed that sources that choose to use an air pollution control device in lieu of fume suppressants be allowed to meet a limit of 0.03 mg/dscm. Two commenters (IV-D-50, IV-D-58) 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. One of these commenters (IV-D-50) supplied test results to support this claim. One commenter (IV-D-09) requested further justification for the 0.003 mg/dscm proposed standard; this commenter noted that the EPA had previously proposed a level of 0.01 mg/dscm.

Response: As a result of comments received at proposal, the EPA has reconsidered 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 analytical 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. At one time, the EPA had considered (but had never proposed) an emission limit of 0.01 mg/dscm which was based on applying a safety factor to the highest measured emission limit (0.007 mg/dscm) in the data base. After further consideration, the EPA did not include the foam blanket data when setting the proposed emission limit because it was thought that these data may indicate that foam blankets are less effective than wetting agents in reducing chromium emissions.

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 (that is, one foam blanket test resulted in the same emission limit as one of the wetting agent/foam blanket tests [0.003 mg/dscm]) further indicates that this could be the case. Therefore, the EPA 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 variation in the 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. (See discussion in Section 2.8, Selection of Emission Limits.)

#### 2.6.3 Chromium Anodizing Operations

Comment: Three commenters (IV-D-14, IV-D-47, IV-D-58) questioned the MACT floor established by the EPA for sources performing chromium anodizing. Two commenters (IV-D-47, IV-D-58) stated that it did not appear that the EPA had sufficient data to perform a MACT floor analysis for these sources, and that the final rule should not include a MACT standard for chromium anodizing sources unless additional data are gathered or higher emission rates are allowed. The third commenter (IV-D-14) noted that the emission limit for the top 12 percent is surprisingly low and should be reevaluated. Alternatively, this commenter suggested that anodizing tanks in the aerospace industry be considered a separate subcategory because fume suppressants are not always feasible. Another commenter (IV-G-01) also stated that chromium anodizers, as well as decorative chromium

electroplaters, that cannot use fume suppressants should be considered separately. This commenter states that the MACT floor for such sources should be based on packed-bed scrubbers.

Response: The MACT floor for existing chromium anodizing sources was based on information available to 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, EPA believes the information was sufficient to satisfy the requirements of section 112(d)(3) of the Act. The industry survey, which included some aerospace facilities, indicated that fume suppressants were the control technique predominantly used in the industry. Data based on tests at decorative chromium electroplating tanks were used to establish the efficiency of fume suppressants; in that sense, data was transferred from one source category to another. As stated in the previous response, the emission limit associated with fume suppressants has been raised from 0.003 mg/dscm to 0.01 mg/dscm. No technical reason was provided by industry, nor is one known by 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 an emission limit of 0.01 mg/dscm (or maintain the surface tension specified in the rule).

Comment: Six commenters (IV-D-14, IV-D-17, IV-D-36, IV-D-44, IV-D-47, IV-D-58) did not think that the standard for chromium anodizing tanks was achievable in all situations, especially when an add-on control device was used in lieu of fume suppressants. Two commenters (IV-D-47, IV-D-58) cited test data to support this claim. One commenter stated that tests of sources in the SCAQMD indicate that a level of 0.003 mg/dscm is not consistently achieved by using fume suppressants (IV-D-58). Test data were provided by commenter IV-D-47 for sources performing chromium anodizing and using add-on controls. One commenter (IV-D-58) suggested that the standard for chromium

anodizing tanks controlled with add-on control devices be set at 0.03 mg/dscm. Otherwise, this commenter believes that sources will have to use an air pollution control device followed by a state-of-the-art fiber-bed mist eliminator.

Response: The MACT floor for existing and new chromium anodizing sources is based on the use of fume suppressants. The EPA selected this technology as the basis for MACT for all existing and new sources. The emission limit associated with the use of fume suppressants has been established as 0.01 mg/dscm in the final rule. 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. The EPA has explored the possibility that sources performing decorative chromium electroplating and chromium anodizing operations that cannot use fume suppressants may constitute a separate subcategory. Thus, a separate MACT floor would be established for the subcategory, and MACT selected based on a cost-benefit analysis of selecting a standard more stringent than the floor for this subcategory. However, as discussed in Section 2.6.2 for decorative chromium electroplaters, the EPA could not establish that a distinct subcategory based on the technical infeasibility of fume suppressants existed within the chromium anodizing source category. The EPA was informed by commenters that fume suppressants were not feasible for all operations, but information was not provided on the technical reasons for this. For instance, two commenters alluded to the fact that fume suppressants may not be feasible for adhesive bonding applications because corrosion protection failure may result from the change in bath chemistry. However, in a follow-up letter, one of these commenters conceded that other factors may have caused corrosion failures. Due to the lack of data, the EPA could not conclusively state that there is a separate subcategory for which fume suppressants are not technically feasible.

The data submitted by commenter IV-D-47 were evaluated by EPA to determine the performance level of scrubber systems controlling emissions from chromium anodizing tanks. Post-

control emissions from the four scrubbers for which there were data range between 0.0026 and 0.033 mg/dscm. One of the scrubber systems met the proposed limit of 0.003 mg/dscm; two of the four scrubber systems would meet the emission limit of 0.01 mg/dscm in the final rule. The operation and maintenance practices associated with the systems tested are not known. Implementation of the work practice standards in § 63.342(f) may result in all systems achieving a level of 0.01 mg/dscm.

The EPA believes that the revised emission limit of 0.01 mg/dscm in the final rule makes it easier for sources to comply using add-on control technology. Also, commenters indicated that they would like to use fume suppressants but would need time to test the feasibility of the fume suppressants for their application, and in the case of government contractors, obtain permission for their use. The EPA believes that the extended compliance time of 2 years for the chromium anodizing source category will allow sources more time to explore the possibility of using fume suppressants. Also, this timeframe will allow sources that prefer to use air pollution control devices time to optimize their systems.

Comment: There were four comments related to the efficiency of fume suppressants in chromium anodizing tanks. Three commenters (IV-D-01, IV-D-03, IV-D-43) stated that allowing fume suppressants for the control of large chromium anodizing tanks should be reevaluated; some tanks are very large and may require more control. One of these commenters supplied source test data to support this statement. Another commenter (IV-D-47) indicated that the EPA had overstated the control efficiency of fume suppressants; the commenter felt that the control efficiency was closer to 95 percent. Based on an uncontrolled emission rate of  $2.59 \times 10^{-4}$  gr/dscf, a control efficiency of 99.5 percent would be needed to meet the proposed standard.

Response: The EPA did not propose a standard expressed in terms of control efficiency for the very reason cited by commenters; the efficiency of fume suppressants vary according to the electroplating or anodizing tank operation. Based on source

tests conducted by the EPA, fume suppressants used on "typical" decorative chromium electroplating tanks in accordance with manufacturers specifications can reduce over 99.5 percent of emissions when compared to an uncontrolled tank. The outlet concentrations measured during these tests ranged between 0.001 and 0.007 mg/dscm. If the uncontrolled tank had lower emissions, the same controlled outlet concentration could result but the overall efficiency would be lower. Thus, this rule requires sources to measure an outlet concentration, not a control efficiency.

The emission limit for chromium anodizing tanks was based on tests of decorative chromium electroplating tanks in which fume suppressants were used. However, the EPA believes that the final emission limit of 0.01 mg/dscm is appropriate for both decorative chromium electroplating and chromium anodizing operations. In response to the commenters that were concerned that the use of fume suppressants was not sufficiently stringent for large chromium anodizing tanks, data available to the EPA indicate that an uncontrolled chromium anodizing tank has total chromium emissions typically ranging from 0.54 to 1.6 mg/dscm, with an average of 0.97 mg/dscm. These uncontrolled emission rates are similar to those seen for decorative chromium electroplating (see Chapter 3 of the Proposal BID). Therefore, the EPA believes that fume suppressants will be equally effective for both chromium anodizing and decorative chromium electroplating tanks.

Comment: One commenter (IV-D-14) stated that sources should have the option of using reducing agents in wet scrubbers to convert hexavalent chromium to trivalent chromium.

Response: Both the proposed and final rules regulate chromium compounds, not just hexavalent chromium. Therefore, using a reducing agent to change the form of the chromium from hexavalent to trivalent is not allowed by the final rule.

Comment: There were two comments related to the impact of the proposed regulation. One commenter (IV-D-14) stated that in the impact analysis the EPA erroneously assumed that all sources can use fume suppressants to meet the standard. Because this is



not the case, the analysis should include costs for emission control equipment. Another commenter (IV-D-47) was concerned that the EPA had underestimated the impact of the rule on small sources performing chromium anodizing to support the aerospace industry. To minimize the impact, this commenter suggested a reduction in monitoring and recordkeeping for small sources.

Response: In calculating impacts for the proposed rule, the EPA did assume that all sources performing decorative chromium electroplating and chromium anodizing operations would use fume suppressants to comply with the rule. The EPA still thinks that the vast majority of sources will opt to use fume suppressants; all of the commenters that stated that they could not use fume suppressants had a control device in place. The industry did not supply information on the number and types of sources that could not use fume suppressants. The EPA thinks that there is only a small portion of the industry that would be unable to use fume suppressants. Also, the extended compliance time may allow sources that thought they could not use fume suppressants time to test additional fume suppressants that may be viable. For these reasons, the EPA believes that capital expenditures for the decorative chromium electroplating and chromium anodizing source categories will be minimal.

Of course, all source categories will experience costs associated with testing, monitoring, reporting, and record-keeping. The EPA has revised these requirements to minimize the burden on area sources. (See discussion of Selection of Monitoring and Reporting and Recordkeeping Requirements in Sections 2.11 and 2.13, respectively.)

## 2.7 SELECTION OF THE FORMAT OF THE STANDARD

Comment: Seven commenters (IV-D-07, IV-D-10, IV-D-41, IV-D-42, IV-D-47, IV-D-50, IV-D-53) stated that the format of the standard should be expressed as milligrams of chromium emitted per amp-hour of operation (mg/amp-hr), not mg/dscm. According to the commenters, concentration-based standards are flawed because they can be circumvented by dilution (IV-D-10, IV-D-41, IV-D-53); concentration can vary from system to system depending on the

design flow rate (IV-D-10, IV-D-41); and source test data indicate that outlet concentrations do vary widely over various inlet conditions (IV-D-07).

Five commenters (IV-D-10, IV-D-14, IV-D-41, IV-D-47, IV-D-53) pointed out that California's rule is expressed as mg/amp-hr and requested that EPA maintain consistency with the California rule. According to one commenter (IV-D-10), this request is reasonable because, in general, process emission rate standards result in lower emissions than the proposed concentration-based standards. Another commenter (IV-D-53) provided calculations to demonstrate that sources that meet the concentration limit will also meet California's process emission rate. Two commenters (IV-D-10, IV-D-14) were concerned that some well-controlled sources that currently meet the process emission rate standard would have to install additional controls to meet the concentration limit. Finally, one commenter (IV-D-41) pointed out that the California standards address the problem of residual risk, and the EPA should therefore relate their standard to the California standard.

Two commenters (IV-D-10, IV-D-50) stated that emissions should be correlated to production rates because chromium emissions increase proportionately with increased current; whereas ventilation air flow is not related to electroplating bath operation.

One commenter (IV-D-42) stated that a mg/amp-hr format is the most appropriate because that is the one permitting agencies will use. Another commenter (IV-D-53) stated that a process emission rate is readily enforceable and can be verified without requiring a source test; the commenter did not expand on how this would be possible.

Two commenters (IV-D-10, IV-D-42) suggested that, at a minimum, the final rule should recognize process emission rates as acceptable, and identify acceptable alternatives to avoid an equivalency evaluation.

Response: The majority of commenters felt that the format of the standard should be changed from a concentration format to

a process emission rate format. However, available test data indicate that a process emission rate format will not ensure that the control level required by the standard will be achieved consistently. A comparison of the composite mesh-pad systems and packed-bed scrubber data sets reveals that there is no overlap in the concentration data sets; however, there is overlap in the process emission rate data sets. For example, the most stringent limit for existing hard chromium electroplaters is 0.015 mg/dscm and is based on the use of composite mesh-pad systems. The concentration data on which this emission limit is based ranges between 0.003 and 0.013 mg/dscm; whereas, the process emission rates for this same data set varies from 0.002 to 0.090 mg/Amp-hr. The data set associated with the use of packed-bed scrubbers with periodic or continuous washdown shows a variation in concentration from 0.021 to 0.028 mg/dscm; the process emission rates for the same data set vary from 0.068 to 0.219 mg/Amp-hr. A concentration format ensures that the appropriate control technology is employed because the concentration data sets are mutually exclusive between the two technologies. Therefore, a concentration-based format was selected. This data analysis also refutes one commenter's statement that process emission rate standards result in lower emissions than the proposed concentration-based standards. As evident from the data presented above, both packed-bed scrubbers and composite mesh-pad systems can achieve similar process emission rates; however, composite mesh-pad systems are a superior technology and result in lower emissions than packed-bed scrubber systems. Because of the data overlaps in the process emission rates, the EPA also cannot establish in the final rule process emission rate limits that would be considered equivalent to the concentration limits presently in the rule.

Some commenters were concerned that a concentration-based standard would be easily circumvented through dilution of the emission stream. The EPA examined concerns over dilution of the exhaust gases as a means of circumventing the standards prior to selecting concentration as the format for the standard. In

considering the effects of dilution, it was determined that the dilution of the gas stream at the outlet of the control system is more of a concern than any dilution taking place at the inlet to the control systems because the control systems operate as relatively constant outlet devices. (That is, the concentration at the outlet is relatively independent of the inlet loading.) Dilution of the gas stream at the outlet of the control system can be addressed by a review of the test data and permit data from a given facility. The 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 costs associated with heating the room air in the electroplating shop, supplying additional makeup air, oversizing the control system for the dilution air, and the increased maintenance cost of such a system would outweigh the costs of complying with the standard without dilution. In addition, as stated previously, the control systems function as constant outlet control devices; therefore, the introduction of dilution air at the inlet to the control system would not substantially bias the outlet emission level except in cases of large volumes of dilution air being added. Further, § 63.4(b) of the General Provisions expressly prohibits dilution as a means to comply with an emission limit. Violations of this provision would cause the EPA to bring an enforcement action against the owner or operator of the source. Therefore, concerns of dilution of the air stream were not considered to be significant enough to warrant changing the format of the standard.

Other commenters stated that emissions should be correlated to production rates because chromium emissions increase proportionately with increased current; whereas ventilation air

flow is not related to electroplating bath operation. The commenters are correct in stating that the production rate, as measured by 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. As shown previously, the controlled mass emission rate is not directly related to the amount of current supplied to the tank. As stated in the proposal preamble, the process emission rate is based on the outlet mass emission rate and the current supplied to the plating tank. The outlet mass emission rate varies depending on the chromium concentration and the exhaust gas flow rate. Because the outlet chromium concentration levels do not vary significantly with the current loading to the plating tank, facilities that operate at high current loadings would have a much lower process emission rate than facilities that operate at low current loadings even though both facilities have applied the same control technology and may be controlled to the same emissions level. Conversely, facilities that have a low process emission rate could have higher emissions than intended by the standards because of a high inlet loading (high current loading) to the control device. Therefore, the EPA does not consider the use of process emission rates as an appropriate format for the standard.

One commenter pointed out that because the California standards address the problem of residual risk, the standard should be related to the California standard. As mentioned in previous comment responses, MACT standards are based on the control technologies used in the industry and risk is not considered in selecting the level of the standard. However, risk may be considered in determining whether or not an area source is regulated with MACT or GACT. Residual risk impacts are addressed when a MACT standard is reviewed as required by section 112(f).

Other comments received suggest that a mg/Amp-hr format is the one permitting agencies will use and that a process emission rate is readily enforceable and can be verified without requiring

a source test. Regardless of the format of the standard, all sources subject to an emission limit would be required to perform an initial source test to demonstrate compliance. It is unclear how a process emission rate standard would eliminate the need for compliance testing. Sources would need to demonstrate compliance with a standard expressed in terms of mg/Amp-hr; the selection of the format of the standard does not affect the need for compliance testing. Further, in all source tests, the concentration of emissions at the outlet is measured. Other formats, such as the process emission rate format, build on these data. Therefore, no additional testing burden is imposed by the concentration format.

Based on the data collected on this industry, the EPA believes that a concentration format is the most appropriate format for this standard. Therefore, no change to the format of the standard has been made in the final rule.

Comment: Eight commenters (IV-D-10, IV-D-14, IV-D-24, IV-D-32, IV-D-34, IV-D-47, IV-D-53, IV-D-58) disagreed with the EPA's decision to base the standard on emissions of total chromium rather than on emissions of hexavalent chromium. Five commenters (IV-D-10, IV-D-14, IV-D-24, IV-D-53, IV-D-58) contended that there are limited data to support the toxicity of trivalent chromium, and thus to include it in the total chromium number. Two other commenters (IV-D-32, IV-D-34) stated that data show that an average of 30 percent of the total chromium will be trivalent chromium emissions. Two other commenters (IV-D-47, IV-D-53) agreed, stating that the rule should focus on hexavalent chromium because hexavalent chromium emissions are lower than total chromium emissions, and hexavalent chromium is truly the compound of concern. One commenter (IV-D-53) pointed out that the EPA Report 68-D-90155 gives the ratio of hexavalent chromium emissions to total chromium emissions as 85 percent. One commenter (IV-D-58) explained that hexavalent chromium emissions are lower than total chromium emissions because hexavalent chromic acid mist is very reactive and unstable.

Two commenters suggested alternate compliance methods to account for the difference between hexavalent and total chromium emissions. One commenter (IV-D-47) stated that sources should be allowed to demonstrate compliance by testing for hexavalent chromium in lieu of total chromium. Another commenter (IV-D-24) suggested that if a source exceeds the standards based on its total chromium emissions, the source should then be allowed to test for hexavalent chromium to demonstrate compliance.

Response: Several commenters questioned the validity of basing the standard on total chromium rather than hexavalent chromium. The EPA selected 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, there is little difference between total and hexavalent chromium emitted from the processes. The compound emitted from these electroplating and anodizing baths is chromic acid, a hexavalent compound of chromium. For tests where samples were analyzed for both hexavalent and total chromium, it was shown that, considering the precision of the sampling and analytical methods used, the hexavalent and total chromium levels were essentially the same for chromic acid baths (varying within  $\pm 10$  percent in most instances). In some cases, the hexavalent chromium amount was more than the total chromium amount as a result of the higher sensitivity of the hexavalent chromium analytical technique. Because the EPA data base is mainly comprised of data measured as hexavalent chromium, the final rule does allow sources to demonstrate compliance with the total chromium emission limits through the measurement of either hexavalent or total chromium for all sources. The final rule also incorporates acceptable analytical methods for hexavalent chromium into Methods 306 and 306A.

Comment: One commenter (IV-D-42) suggested that the format should be flexible because States will also be requiring sources to meet health risk-based standards.

Response: A concentration-based format is flexible and should not interfere with any health risk-based standards set by

States. During source tests, the concentration of the emission stream is determined as the building block for other formats. Therefore, the concentration at the outlet will be known prior to calculating other formats such as mass rate or process emission rates.

Comment: One commenter (IV-D-16) questioned how compliance would be determined if tank utilization is low; that is, would facilities be penalized by inspectors suggesting that sources are diluting their airflow.

Response: Initial compliance tests must be conducted while the electroplating tanks are operated at or near maximum capacity. If a source can meet the standard under maximum operating conditions, then the standard would continue to be met under normal or low tank utilization periods. In addition, the ventilation rate for any given tank or series of tanks is determined based on the dimensions and surface area of the electroplating tank. The ventilation rate remains constant regardless of the number of parts placed in the tank or tank utilization. Operating a tank at its ventilation rate under low utilization periods should not be considered as dilution by an inspector.

## 2.8 SELECTION OF THE EMISSION LIMITS

Comment: Two commenters (IV-D-24, IV-D-50) stated that an insufficient number of production operations were tested for the EPA to establish an emission limit. One commenter (IV-D-24) pointed out that out of 5,000 facilities, only 13 hard chromium, 3 decorative chromium, and no chromium anodizing sources were tested. This commenter suggests that additional tests be conducted. The other commenter (IV-D-50) concurred that the EPA's data base is insufficient to support either the numeric standards or the surface tension limits. This commenter suggested that the proposed standard be issued as an interim rule until more data are gathered and a justified standard set. Two commenters (IV-D-11, IV-D-33) stated that the standards are based on false assumptions, not data.



Response: The EPA believes that the data base of testing information is suitable for setting the emission limits and surface tension limit in the final rule. Section 112(d)(3) of the Act directs the Administrator to establish an emission limitation using the emissions information available. To establish the level of control appropriate for the source categories covered by this rule, the EPA surveyed over 120 operations that represented 215 hard chromium electroplating tanks, 102 decorative chromium electroplating tanks, and 31 chromium anodizing tanks. Additional information was obtained from site visits to numerous hard and decorative chromium electroplating and chromium anodizing facilities. The EPA also conducted performance tests at 10 facilities representing 13 hard chromium and 3 decorative chromium electroplating tanks to establish the performance level of controls used in the industry. These test results, not assumptions, were used to establish the emission limits. Finally, the rule is proposed for public comment before it is finalized by the EPA and before sources are required to comply. In response to comments received during this public comment period, the EPA has further evaluated the emission limits, and revised them when appropriate as described in Section 2.6.2 and below.

Comment: Four commenters (IV-F-01 [Schott], IV-D-13, IV-D-30, IV-D-50) representing three companies stated that the emission limit should be changed for hard chromium plating operations. Three commenters suggested changing the emission limit that is based on the use of composite mesh-pad systems. One commenter (IV-F-01 [Schott]) stated that the control level should be based on optimum design, as well as cost, energy consumption, and environmental impact, and suggested a level of 0.006 mg/dscm. In a subsequent letter (IV-D-13), this same commenter stated that the EPA did not test the best systems available and suggested a level of 0.009 mg/dscm, which in the EPA's data base is the worst result achieved by the best system. Another commenter (IV-D-30) agreed that the best systems were not tested and that the standard as written penalizes companies that

have installed high-efficiency units. Therefore, this commenter suggested a level of 0.001 mg/dscm to correspond with the use of composite mesh-pad systems. Finally, one commenter (IV-D-50) suggested that numeric limits be based on 95 percent removal of uncontrolled emissions.

Response: The EPA does not think it is appropriate to lower the emission limit that is based on the use of composite mesh-pad systems. The commenters did not provide any data to support their claim that the emission limit consistently achievable with a composite mesh-pad system is 0.001 mg/dscm, 0.006 mg/dscm, or 0.009 mg/dscm. After meeting with the commenters (IV-D-13, IV-D-30), the EPA agreed to contact a State agency that the commenters suggested would have data to support such a limit. The data were requested, received, and evaluated, but did not support a lower limit.

As was discussed in Section 2.6.2, the emission limit for all decorative chromium electroplating tanks and chromium anodizing tanks at all existing and new sources has been changed to 0.01 mg/dscm in the final rule. This limit is based on applying a safety factor to the highest data point (0.007 mg/dscm) in the fume suppressant data base. Likewise, as described in the preamble to the proposed rule, 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. To be consistent in setting the emission limit that is based on the use of composite mesh-pad systems, the emission limit of 0.013 mg/dscm has been changed to 0.015 mg/dscm in the final rule. As with the other emission limits, this emission limit is based on applying a safety factor to the highest value (0.013 mg/dscm) in the data base of information on composite mesh-pad systems to ensure that the limit is consistently achievable.

Regarding the suggestion that the numeric limit be based on a 95 percent control efficiency, for the reasons described in the preamble to the proposed rule, the EPA does not believe that

using a percent efficiency format is the best method for evaluating the performance of control techniques for these source categories. For the devices expected to be used by sources covered by these standards, a relatively constant outlet concentration results. Therefore, percent reduction is not a good indicator of performance because it depends on the inlet conditions as well as the outlet conditions. A numeric limit based on percent reduction could penalize facilities with low inlet loading, while facilities with high inlet loadings could meet the 95 percent efficiency but be emitting larger quantities of chromium. For these reasons, it would also be impossible to select a numeric limit that is based on a 95 percent control efficiency.

## 2.9 SELECTION OF DEFINITION OF SOURCE

Comment: Three commenters (IV-D-06, IV-D-17, IV-D-24) thought that the proposed source definition did not adequately address the situation in which multiple tanks are tied to a single control device. One commenter (IV-D-06) thought that the manner in which this situation was addressed in the preamble to the proposed rule was confusing. In a situation with multiple tanks tied to a common control device, this commenter asked if compliance would be achieved if emissions from the new tank in combination with emissions from existing tanks do not exceed the required emission levels at the exit of the emissions control system. Two commenters (IV-D-17, IV-D-24) suggested alleviating the potential confusion by selecting a broader definition of source for facilities controlling multiple tanks with one control device. The source could be defined as the population of tanks connected to a single control system, or a group of tanks associated with a single electroplating system in a designated subcategory (i.e., each electroplating line). Alternatively, when multiple tanks are tied to one control system, new source MACT could be triggered if greater than 50 percent of the tanks existing at the time of proposal have been replaced or added (IV-D-17). One commenter (IV-D-07) thought the rule should clarify that new tanks at existing sources are subject to new

source MACT even if they are tied into an existing control system.

Five commenters stated that the source definition is too narrow; three of these commenters (IV-D-22, IV-D-26, IV-D-59) suggested that the source be defined as the plant. Commenters pointed out that a broad definition of source reduces the recordkeeping burden (IV-D-26), whereas the narrow definition results in burdensome compliance testing and monitoring (IV-D-57). One commenter (IV-G-01) pointed out that a narrow definition of source will subject a facility to the preconstruction review requirements of § 63.5, even in the case of a single tank being added at a major source. One commenter (IV-D-59) was also concerned that, should the EPA require the use of trivalent chromium baths as new source MACT, the narrow definition of source could result in an existing hexavalent chromium bath having to be replaced by a trivalent chromium bath once it has been consumed or contaminated.

Response: In the final rule, the affected source continues to be defined as each chromium electroplating or chromium anodizing tank. If an additional tank is tied into an existing control system and the reconstruction criteria are met, that new tank would have to meet the requirements for new source MACT. As discussed in Section 2.12.3, the final rule contains procedures for demonstrating compliance when multiple tanks are controlled by one control system. Alternately, a source may choose to control the new or reconstructed tank separately. The EPA believes that identifying affected sources in terms of the control strategy used to comply with the standard will make enforcement of the rule difficult.

The final rule also clarifies the reporting and recordkeeping requirements for affected sources. In general, the reporting and recordkeeping requirements in the final rule would not vary according to the affected source definition. Regarding the preconstruction review requirements of § 63.5 of subpart A, the final rule overrides these requirements in § 63.345. Section 63.345 of the final rule requires notification of

construction or reconstruction of an affected source (i.e., the tank). The EPA believes that this requirement is reasonable because many tanks are controlled separately, and the permitting authority will need information on the control strategy. If the new or reconstructed tank is to be tied into an existing control scheme, the requirements of § 63.345 should not be difficult to fulfill. Also, this section does not require approval for construction or reconstruction. These activities may begin once a complete notification of construction or reconstruction is submitted.

Comment: Two commenters (IV-D-07, IV-D-28) suggested that the discussion of definition of source be clarified. One commenter (IV-D-07) thought the rule should clarify that the narrow new source definition applies to new and modified area sources as well as major sources. The second commenter requested an explanation of the control requirements if a facility has one tank controlled with a packed-bed scrubber and then adds another tank. The commenter stated the new tank would obviously require a composite mesh-pad system for control and questioned whether controls for the existing tank would also have to be upgraded.

Response: Section 63.340(a) of the final rule states that the affected source is each hard chromium electroplating, decorative chromium electroplating, and chromium anodizing tank. The affected source definition does not differentiate between new and existing sources, or between major and area sources; the same affected source definition applies to all sources.

If an existing facility has one tank that is tied to a packed-bed scrubber and adds another tank to be controlled by a separate control system, only the new tank would have to be controlled by a composite mesh-pad system (or some control technique that achieves an equivalent control level). If the new tank is to be tied into the existing control device, the new tank would still need to achieve the higher control level. The compliance method to be followed in this situation is outlined in § 63.344(e) of the final rule.

## 2.10 SELECTION OF COMPLIANCE DATES

Comment: Several commenters stated that the proposed compliance timeframe of 1 year for hard chromium electroplating operations is insufficient. The following reasons were given:

1. It is insufficient time to inform and educate responsible parties, install equipment, and train operators (IV-F-01 [Altmayer], IV-D-58);
2. More time is needed to account for design, bidding, installation, and testing (IV-D-17, IV-D-21, IV-D-27, IV-D-44, IV-D-47, IV-D-52);
3. At government installations, more time is needed to procure funding, submit a control plan, award a contract, install, and test (IV-D-37, IV-G-01);
4. Sources need time to build up inventories to account for downtime during retrofit (IV-D-24);
5. Large sources will have large expenditures for the equipment and personnel necessary to do testing, reporting, and recordkeeping (IV-D-57);
6. Budgeting, test planning, testing, and results evaluation will take more than 1 year (IV-D-16); and
7. There may not be a sufficient supply of control devices for all of the existing sources nationwide (IV-D-47, IV-D-49).

Eight commenters recommended 2 years for compliance (IV-D-21, IV-D-27, IV-D-37, IV-D-44, IV-D-47, IV-D-49, IV-D-52, IV-D-57). Five commenters recommended 3 years for compliance (IV-F-01 [Altmayer], IV-D-17, IV-D-24, IV-D-57, IV-D-58). One commenter (IV-D-37) suggested having a tiered compliance approach, whereby uncontrolled sources would have to use a foam blanket or poly balls within 6 months and install MACT within 2 years. Also, this commenter felt that facilities that have installed controls in the absence of a Federal standard should be allowed 2 years to meet MACT requirements.

Comment: Two commenters pointed to previous regulatory actions as reasons why the proposed timeframe of 1 year for hard chromium electroplaters is inappropriate. One commenter (IV-D-23) suggested that sources will need at least 24 months to

estimate emissions; identify appropriate technology; order, install, and test equipment; and comply with the General Provisions and title V. This same commenter pointed out that the EPA has established a 24-month compliance period in the halogenated solvents NESHAP and does not think that the EPA adequately explains why a shorter timeframe was proposed for this rule. Another commenter (IV-D-17) also pointed out that other, higher priority source categories such as those covered by the HON have been given 3 years to comply.

Comment: One commenter (IV-D-43) stated that the proposed timeframe of 1 year for hard chromium electroplaters does not give States sufficient time to submit requests for equivalency. This same commenter suggested that no notification or compliance dates should be prior to 1 year after promulgation so that sources are not confused as to who is the implementing agency (Federal, State, or local).

Comment: Several commenters stated that the proposed compliance timeframe of 3 months for decorative chromium electroplaters and chromium anodizers was insufficient for the following reasons:

1. Trade associations need time to educate their members (IV-F-01 [Altmayer, Sonntag], IV-D-19, IV-D-58);
2. Equipment may have to be purchased, the lead time to purchase equipment is greater than 120 days, and employees must be trained to use a stalagmometer (IV-F-01 [Altmayer], IV-D-22, IV-D-58);
3. Facilities will have to research the appropriate wetting agent, test, and develop a startup/shutdown/malfunction plan (IV-D-26, IV-D-35, IV-D-59);
4. The compliance timeframe does not consider decorative chromium platers and chromium anodizers that may have to install, test, and possibly upgrade add-on controls (IV-F-01 [Altmayer], IV-D-09, IV-D-14, IV-D-25, IV-D-40, IV-D-43, IV-D-44, IV-D-47, IV-D-58, IV-D-59, IV-D-61);

5. Large sources will have large expenditures for equipment and personnel to do testing, reporting, and recordkeeping (IV-D-57);

6. Emissions from anodizing tanks are low, and there should therefore be no urgency (IV-D-14);

7. Most of the facilities are area sources and will need more time to comply (IV-D-42);

8. In the aerospace industry, additional time will be needed because fume suppressants must be tested to verify that they do not interfere with other steps or affect the mechanical and fatigue properties necessary when chromium anodizing is used as a pretreatment for adhesive bonding, and government contractors must get government approval prior to changing a process (IV-D-47, IV-D-52, IV-D-58);

9. The use of fume suppressants would have to be approved by European customers (IV-D-54); and

10. A 3-month timeframe does not give States time to submit requests for equivalency (IV-D-43).

Compliance timeframes ranging from 6 months to 3 years were suggested by commenters (IV-F-01 [Altmayer], IV-D-14, IV-D-19, IV-D-24, IV-D-22, IV-D-26, IV-D-35, IV-D-40, IV-D-45, IV-D-47, IV-D-52, IV-D-54, IV-D-57, IV-D-58, IV-D-59). Two commenters (IV-D-58, IV-D-61) suggested that sources that have to install add-on controls be given the same compliance timeframe as hard chromium electroplating operations.

Response: The Agency agrees with the commenters that the compliance timeframes for hard chromium electroplating, decorative chromium electroplating, and chromium anodizing 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 at their facility to meet the standards. Also, some sources performing decorative chromium electroplating and chromium anodizing will have to investigate the feasibility of using fume suppressants. Likewise, some hard chromium electroplating sources that have control systems that may not



quite meet the standard may want to investigate using fume suppressants in conjunction with a control device as a way to meet the standards. Also, many area sources are not yet aware that a rule is to be promulgated for their industry, and the EPA and various trade associations/industry groups need an opportunity to notify these facilities of the new requirements.

Based on these and the other reasons provided by the commenters, 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 existing chromium anodizers. The EPA believes that the 1 year timeframe for decorative chromium electroplaters is sufficient rather than 2 years because, based on EPA's survey of the industry, 80 percent of these sources are already using fume suppressants. The EPA believes that very few sources will need to install add-on control devices because fume suppressants are widely applicable to this source category. In addition, should a source have to install an add-on air pollution control device, there are procedures in place for requesting an extension of compliance, if necessary [§ 63.6(i) and 63.343(a)(6) of subpart A]. A larger percentage of hard chromium electroplating and chromium anodizing source categories, on the other hand, will need to evaluate and implement control techniques to meet the emission limitations. Therefore, a 2 year compliance timeframe is identified for existing sources in these source categories. The EPA thinks that the timeframes in the final rule will address commenters concerns, and still ensure implementation of controls in a timely fashion.

Although the Act allows up to 3 years for an existing source to comply with a standard, the EPA does not think that a 3-year compliance time is necessary or prudent in this case. A longer compliance time has not been allowed due to the toxicity of chromium compounds and the importance of controlling chromium emissions to protect human health and the environment. Also, the types of control techniques that are expected to be used to

comply with the standards are readily available within the 1- or 2-year compliance timeframes.

There may be some special situations in which sources require additional time to comply with the rule. For example, government installations covered by this rule have indicated that they will need extra time to procure funding and to implement changes. Also, for defense contractors, it is expected that a new procedure or process (e.g., inclusion of a fume suppressant) for electroplating or anodizing operations will require government approval prior to its use. Based on industry comments, a minimum of 18 months is required to verify a new process change such as the use of fume suppressants in addition to the time necessary for implementation.

The EPA recognizes that unique compliance considerations such as these may exist. Therefore, as previously stated, § 63.6(i) of the General Provisions discusses mechanisms by which a source can be granted an extension of compliance with the emission standards. This section allows a source to request a 1-year extension for compliance. In the General Provisions, the request must be submitted 12 months in advance of the compliance date identified in the regulation. In § 63.343(a)(6) of the final rule, the extension must be submitted no later than 6 months before the compliance date for the source. If granted, this extension combined with the compliance timeframes in the proposed rule provides a total of 2 years for compliance for decorative chromium electroplaters and 3 years for compliance for hard chromium electroplaters and chromium anodizers. This same section of the General Provisions allows an extension to sources that have complied with BACT or LAER requirements specifically related to chromium compounds prior to promulgation of this rule. Such sources may be granted an extension of the compliance date for up to 5 years after the date on which such installation was achieved if the requirements of § 63.6(i)(2)(ii) of subpart A are met.

Some commenters, specifically military installations, have indicated that 5 years would be the minimum timeframe needed for

them to comply with the rule. The EPA believes that the extensions described above that are allowed by the General Provisions may offer some relief. At best, the EPA could extend the compliance time up to 3 years which is the maximum allowable. However, the EPA did not think that the compliance timeframe should be increased beyond 2 years to accommodate these facilities due to the toxicity of chromium compounds and the provisions for obtaining extensions to compliance time under the General Provisions.

Comment: Four commenters (IV-D-27, IV-D-36, IV-D-47, IV-D-52) found the proposed rule confusing in its description of the relationship between the compliance timeframe and the timeframe for completing a performance test. One commenter (IV-D-27) found confusing the statement that the compliance timeframe is 1 year, but that sources have 120 days following that to conduct a performance test. This commenter had understood that the test would have to be conducted and monitoring parameters set within the 1 year timeframe. Another commenter (IV-D-36) stated that the General Provisions should allow testing before the effective date. Two commenters (IV-D-47, IV-D-52) pointed out that the compliance time specified in § 63.342(a) presents a dual requirement that sources must comply within 1 year or at the end of the compliance test, whichever is shorter. These commenters point out that such a clause is a disincentive for sources to comply early in the compliance period, especially if sources have to shut down their operations if they fail the compliance test. A single compliance time is suggested.

Response: As previously discussed, the compliance time specified in the final rule has been changed to 1 year from the effective date (i.e., promulgation date) for existing decorative chromium electroplaters and 2 years from the effective date for existing hard chromium electroplaters and chromium anodizers. The compliance time for new sources is still immediately upon startup. Since proposal of this rule, the General Provisions to part 63 have also been promulgated (59 FR 12408).

Section 63.7(a)(2) requires that source testing be conducted within 180 days after the compliance date. A source must be in compliance by the compliance date (e.g., install control equipment, set up recordkeeping system, etc.) but does not have to demonstrate compliance through a performance test, nor conduct compliance monitoring, until 180 days after the compliance date. This point is clarified in the final rule.

In addition, neither this NESHAP nor the General Provisions forbid performance testing prior to the effective date of this standard. Typically, sources wait until promulgation of the rule to be certain that all changes made from proposal to the final rule have been accounted for in a facility's compliance efforts. Some facilities may have a control system in place prior to promulgation, and may also have tested it prior to the promulgation date to fulfill State permitting requirements. The EPA recognizes that it would be costly to repeat a performance test after promulgation of a Federal rule if a representative test had recently been conducted. Section 63.344(b) of the final rule allows a source to use the results of a performance test conducted by the source at startup to obtain a State operating permit, as long as the following conditions are met:

1. The test methods and procedures identified in § 63.344(c) of the final rule were used during the performance test;
2. The performance test was conducted under representative operating conditions for the source;
3. The performance test report contains the elements required by § 63.344(a); and
4. The owner or operator of the affected source for which the performance test was conducted has sufficient data to establish the operating parameter values that corresponds to compliance with the standards, as required for continuous compliance monitoring under § 63.343(c) of subpart N.

Regarding the dual compliance date, it was not the EPA's intent to penalize sources that conduct a performance test prior to the deadlines specified in this rule and in the General

Provisions. Section 63.342(a) of the final rule has been clarified; emission limits must not be exceeded on or after the compliance date specified in § 63.343(a) for the affected source. A facility may conduct its performance test at any time prior to the compliance date, but the facility would not be in violation due to exceedances until the actual compliance date itself.

Comment: One commenter (IV-D-47) suggested that if a system fails to meet the standard upon initial testing, the rule should allow additional time to investigate and correct the problem. The commenter points to the treatment, storage, and disposal facilities (TSDF) rule (56 FR 33490, section 265.1081) as an example.

Response: The final rule allows a 2-year compliance timeframe, and the General Provisions allow an additional 180 days after the compliance date for a source to demonstrate compliance through a performance test. If a test is conducted prior to the compliance deadline and fails, the source can retest up until the compliance deadline without violating the standard. The EPA believes that the timeframe for compliance specified in the final rule is sufficient, and no additional time is necessary to allow sources to investigate control device problems and retest.

## 2.11 SELECTION OF MONITORING REQUIREMENTS

### 2.11.1 Enhanced Compliance Monitoring for Packed-Bed Scrubber and Composite Mesh-pad Systems

Comment: There were 11 (IV-D-06, IV-D-10, IV-D-14, IV-D-23, IV-D-24, IV-D-27, IV-D-36, IV-D-37, IV-D-43, IV-D-47, IV-D-53) comments on the suitability of measuring gas velocity to demonstrate ongoing compliance.

One commenter (IV-D-24) stated that, in general, the EPA has not demonstrated the correlation between the monitoring parameters and compliance. Four commenters (IV-D-14, IV-D-23, IV-D-27, IV-D-36) stated that measurement of both gas velocity and pressure drop is redundant because they are proportional; one of these commenters (IV-D-27) indicated that gas velocity measurement should not be required because it is a more

complicated measurement than pressure drop. Three commenters (IV-D-06, IV-D-10, IV-D-43) stated that, in their opinion, gas velocity is not related to scrubber performance. According to one commenter (IV-D-36), only a major malfunction of the scrubber would cause a change in gas velocity.

One commenter (IV-D-23) suggested daily pressure drop measurements be required in lieu of daily gas velocity measurements. Two commenters (IV-D-47, IV-D-53) suggested installing an air pressure differential gauge across the scrubber to monitor air flow, which can be recorded once per day. One of these commenters (IV-D-53) suggested that the operating permit should state the maximum and minimum for the velocity or pressure drop.

Nine commenters (IV-D-06, IV-D-16, IV-D-20, IV-D-28, IV-D-36, IV-D-37, IV-D-38, IV-D-43, IV-D-53) stated that there would be difficulties in implementing the gas velocity monitoring requirements. Two commenters (IV-D-06, IV-D-16) stated that the measurement method for gas velocity is laborious. Two commenters (IV-D-16, IV-D-36) pointed out that a source may not be able to access an area for measurement and a permanent measurement device may be fouled by chromic acid. One of these commenters (IV-D-16) stated that it was unreasonable to require testing for all combinations of tank operation and duct flows that can occur; testing at maximum amperage and air flow should be sufficient. This commenter also indicated that air flows at each tank can change daily due to the addition of makeup air and seasonal changes of air pressure. This commenter and one other commenter (IV-D-53) each suggested that gas velocity should be measured at the entrance to the control device, not at each tank. One commenter (IV-D-38) stated that air velocity should be monitored in the stack after discharge of the fan to allow the pitot tube to stay clean, and not be measured prior to the control device.

Two commenters (IV-D-28, IV-D-37) suggested that the rule clarify how the acceptable gas velocity ranges are to be established; development of a protocol is needed. These commenters also stated that no compliance test can fully examine

the range of gas velocities and evaluate their impact on control performance, especially if the system is designed to operate at a constant velocity (IV-D-37). This same commenter (IV-D-37) suggested that velocity measurements can vary based on ambient conditions, operator error, differences in pitot tubes, etc.; therefore, the rule should specify an allowable variance from that measured during the performance test, e.g.,  $\pm 5$  percent. Likewise, one commenter (IV-D-49) recommended that the regulation specify an acceptable pressure drop variance of  $\pm 33$  percent. Another commenter (IV-D-27) indicated that during performance testing, the accuracy of the measurement device should be accounted for when establishing ranges for the monitoring parameters.

One commenter (IV-D-38) suggested that for facilities that cannot afford an automatic monitoring and recording system, a simple alternative should be considered. For example, because pressure drop is the primary indicator of proper operation, a facility could measure pressure drop with a photohelic gauge which contains a set of relays to perform a function, i.e., an alarm or a system shutdown. The commenter suggests that an automatic or manual washdown for composite mesh-pad systems and a conductivity control system for packed-bed scrubber systems could be used in conjunction with this.

Six commenters made remarks regarding the measurement of chromium concentration in the scrubber water. Four commenters (IV-D-10, IV-D-24, IV-D-36, IV-D-43) stated that there is no obvious relationship between scrubber water chromium concentration and scrubber performance. Another commenter (IV-D-53) said further research is necessary to establish such a relationship. This commenter suggested that the scrubber water chromium concentration limitation be determined on a case-by-case basis and also suggested that in lieu of scrubber water chromium concentration, the regulation should require a minimum scrubbing recirculation rate to the packed-bed scrubber. One commenter (IV-D-47) indicated that it would be more appropriate to monitor the pH of the scrubber water and to record this information once

per day. One commenter (IV-D-24) requested that the requirement for measuring scrubber water chromium concentration be eliminated because the hydrometer is not accurate and the process parameters do not change on a daily basis.

Ten commenters (IV-D-06, IV-D-10, IV-D-24, IV-D-27, IV-D-28, IV-D-38, IV-D-43, IV-D-44) provided comments on the difficulty of measuring the chromium concentration in the scrubber water. Three commenters (IV-D-06, IV-D-24, IV-D-27) indicated that measurement of the chromium concentration in the scrubber water with a hydrometer is not accurate. Three commenters (IV-D-10, IV-D-28, IV-D-43) requested that the rule identify a simpler measurement method. One commenter (IV-D-44) indicated that use of a hydrometer to measure scrubber water concentration is impractical when the scrubber is also used for control of phosphoric acid or pickling baths. Another commenter (IV-D-38) suggested that a conductivity control system should be identified as an alternate method of measurement.

Two commenters (IV-D-10, IV-D-43) stated that small, hard chromium electroplaters should be exempt from the scrubber water chromium concentration measurement requirement unless these requirements are made more flexible; one of these commenters (IV-D-10) suggested a threshold level of less than 60,000,000 amp-hr/yr. One commenter (IV-D-45) indicated that a default compliant scrubber water chromium concentration should not be specified and that sources should set their own value.

Response: The proposed rule included compliance monitoring provisions in § 63.343(b) and (c). The intent of compliance monitoring is to monitor a process parameter that is directly linked to control device performance. In the proposed rule, sources using a composite mesh-pad system to comply with the emission limits would monitor gas velocity to determine compliance with these limits. For sources using a packed-bed scrubber, it was proposed that gas velocity and concentration of chromium in the scrubber water be monitored to determine compliance with the emission limits. The proposed rule also contained operation and maintenance (O&M) provisions in



§ 63.345(b) and (c) that were not intended to determine compliance with the emission limits, but to ensure that the control device was properly maintained. The EPA added the O&M provisions because poor maintenance could result in system degradation over time, and eventually, system breakdown that would not be immediately obvious through compliance monitoring.

The final rule continues to require compliance monitoring [§ 63.343(c)], but the O&M provisions have been replaced with work practice standards [§ 63.342(f)], which address O&M practices. Requirements for the compliance monitoring and the work practice standards are summarized in Table 2-2. As indicated in Table 2-2, there have been changes to these requirements from proposal. Changes have been made to address commenters' concerns while still providing the EPA with the ability to determine the compliance of a source at any time. The parameters identified for compliance monitoring have changed 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.

For sources complying with the emission limits for hard chromium electroplating, decorative chromium electroplating, or chromium anodizing by using a composite mesh-pad system, the final rule requires that the pressure drop across the control system be monitored daily to determine compliance with the emission limits. During the initial performance test, sources using composite mesh-pad systems will determine the outlet chromium concentration, and will also determine the average value of pressure drop across the device that corresponds to a compliant emission limit. Subsequent operation outside of  $\pm 1$  inch of  $H_2O$  of this pressure drop range constitutes noncompliance with the emission limits. In lieu of accepting this default compliant range, owners or operators may conduct multiple performance tests to establish a range of compliant pressure drop values.

In developing the proposed rule, the EPA chose gas velocity as the process parameter to monitor for compliance when a

TABLE 2-2. SUMMARY OF COMPLIANCE MONITORING REQUIREMENTS AND WORK PRACTICE STANDARDS FOR THE FINAL RULE

Control technique	Initial compliance test	Parameter(s) for compliance monitoring	Frequency of compliance monitoring	Work practice standards	Frequency
Composite mesh-pad (CMP) system	Yes	Pressure drop	1/day	<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 closest 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 manufacturer's 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)	Yes	Velocity pressure at the inlet of control system and pressure drop across device	1/day	<ol style="list-style-type: none"> <li>1. Same as (1) for CMP system.</li> <li>2. Visually inspect back portion of chevron blade mist eliminator to ensure that it is dry and there is no breakthrough of chromic acid mist.</li> <li>3. Same as (3) for CMP system.</li> <li>4. Add fresh makeup water to the top of packed bed.</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	Yes	Pressure drop across unit	1/day	<ol style="list-style-type: none"> <li>1. Same as (1) for CMP system.</li> <li>2. Same as (2) for CMP system.</li> <li>3. Same as (3) for CMP system.</li> <li>4. Same as (4) 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. 1/quarter</li> </ol>
Fiber-bed mist eliminator	Yes	Pressure drop across unit and the pressure drop across the upstream control device used to prevent plugging	1/day	<ol style="list-style-type: none"> <li>1. Visually inspect both the 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 element in accordance with manufacturer 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>
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>	N/A	N/A
Foam blankets	Yes	Foam thickness	Once per hour <sup>a</sup>	N/A	N/A
Air pollution control device (APCD) not listed in rule	Yes	To be proposed by source for approval by Administrator	N/A	To be proposed by 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.

composite mesh-pad system was used because the control system is designed to operate within a specific gas velocity range. Operation of the control system outside of this velocity range can lead to performance problems. 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 ongoing compliance. 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, the pressure drop is directly related to composite mesh-pad system performance. Also, based on comments received, measurement of pressure drop is straightforward, and is, in fact, currently being monitored by some users of composite mesh-pad systems. 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 compliance monitoring for packed-bed scrubbers in the final rule is slightly different than that for composite mesh-pad systems. As indicated in Table 2-2, a source using a packed-bed scrubber to meet an 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 requires sources using packed-bed scrubbers to also monitor the velocity pressure at the inlet to the control device. This requirement will ensure that the gas velocity through the control system is being maintained in accordance with vendor recommendations and, along with the pressure drop monitoring, will ensure that the source is in compliance with the standard.

The requirement that sources using packed-bed scrubbers monitor the chromium concentration in the scrubber water has been

eliminated. Upon further review of the proposed monitoring requirements, 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. It is unlikely that the chromium concentration in the scrubber water would increase to the level identified in the proposed rule (45 g/L [6 oz/gal]) because of the industry practice to recycle the scrubber water as plating bath make-up water. Also, most sources using packed-bed scrubbers will be small sources; in revising the regulation, the EPA worked towards reducing the burden on small sources wherever feasible.

Compliance monitoring requirements for fiber-bed mist eliminators have been added in the final rule. For sources complying with the emission limits for hard chromium electroplating, decorative chromium electroplating, or chromium anodizing by using a fiber-bed mist eliminator, the rule requires that the pressure drop across both the fiber-bed mist-eliminator and the upstream control system used to prevent plugging be monitored daily to determine compliance with the emission limits. During the initial performance test, sources using fiber-bed mist eliminators will determine the outlet chromium concentration, and will also determine the average value of pressure drop across the fiber-bed mist eliminator and upstream control device that corresponds to a compliant emission limit. Subsequent operation outside of  $\pm 1$  inch of water column of this pressure drop range constitutes noncompliance with the emission limits. In lieu of accepting this default compliant range, owners or operators may conduct multiple performance tests to establish a range of compliant pressure drop values.

Many commenters requested guidance on how to measure the process parameters to determine compliance. The final rule includes a method that sources must use for establishing the velocity pressure. The rule also contains procedures for establishing the pressure drop across the unit that sources may use if they wish. The methods identified are straightforward and

can be performed at a low cost to the plants. For example, the velocity pressure at the inlet to the control device can be monitored by permanently mounting a plastic type-S pitot tube that is connected to a magnahelic gauge that records the velocity pressure. To measure the pressure drop, pressure taps can be located on both sides of the packed bed, mesh pads, or fiber beds, as appropriate. Tubing connected to these two taps can then be sent to another magnahelic gauge. The EPA has installed such a system and has found that corrosion problems associated with chromic acid are alleviated by using a plastic pitot tube and plastic pressure taps instead of metal. Once the monitoring devices are installed, the only labor required is the recording of the magnahelic readings. Alternately, a strip chart recorder could be used with the gauges, and high/low alarms used to indicate when values were close to exceeding the compliant ranges. Once the pitot tube is in place, the magnahelic gauge connected to the pitot tube can then be "zeroed." The magnahelic gauge would then be monitored once a day to ensure no change in the velocity pressure has occurred. The final rule (Table 2) also specifies work practice standards for pitot tubes.

One requirement that is consistent between the proposed and final rules is the requirement that sources set the values for the operating parameters to be monitored for compliance. The EPA does not think it is appropriate to identify the actual values for the compliant operating parameters in the rule. Each control device is different depending on the manufacturer, the age, the type of process operation being controlled, maintenance procedures, etc. The EPA does believe, however, that it is reasonable to specify an allowable variance because it would be very difficult for an owner or operator to establish a variance during one, three-run performance test. In the final rule, an owner or operator is out of compliance with the standard if the pressure drop varies by  $\pm 1$  inch of water column from the average operating parameter value established during the initial performance test. Likewise, an owner or operator is out of compliance with the standard if the velocity pressure varies by

± 10 percent from the average operating parameter value established during the initial performance test. In lieu of accepting these default compliant ranges, an owner or operator can set the compliant range of operating parameter values by conducting multiple performance tests.

Comment: Two commenters (IV-D-20, IV-D-43) suggested that § 63.343(b), which requires determination of outlet chromium concentration in an initial performance test and monitoring of gas velocity and scrubber concentration, should apply to all tanks, not just hard chromium electroplating tanks. Otherwise, sections 63.345(b) and (c), which refer to maintenance practices for composite mesh-pad and packed-bed scrubber systems, respectively, are not enforceable.

Response: The rule has been revised to clarify that monitoring requirements are based on the type of control technique used, not on the type of tank operated. Therefore, the same monitoring applies regardless of whether the control device is being used to control chromium emissions from a hard chromium electroplating tank, decorative chromium electroplating tank, or a chromium anodizing tank.

Comment: One commenter (IV-D-20) noted that the preamble states that pressure drop measurement will be used as an indication of noncompliance but will not be a noncompliance trigger; this exclusion is not evident in the rule.

Response: As stated above, the compliance monitoring requirements have been revised so that pressure drop monitoring is required in lieu of gas velocity monitoring. Table 2 in the final rule specifies work practice standards, and § 63.343(c) specifies monitoring requirements to determine continuous compliance with the emission limits.

#### 2.11.2 Selection of Proposed Operation and Maintenance Requirements for Packed-Bed Scrubber and Composite Mesh-Pad Systems

2.11.2.1 Maintenance Requirements for Packed-Bed Scrubbers. One commenter (IV-D-59) indicated that wastewater requirements for packed-bed type washers are unreasonable, but did not

elaborate on the specific "wastewater requirements" to which he was referring. Three commenters (IV-D-14, IV-D-37, IV-D-38) suggested the EPA revise the requirement for adding makeup water at the top of the scrubber because makeup is typically added to the scrubber basin or at the front of the scrubber. One of these commenters (IV-D-37) stated that some scrubber systems are vertical and some are horizontal and suggested that the term top be further clarified; this commenter questioned whether the term top refers to the upstream or downstream side. Another commenter (IV-D-24) indicated that the location for addition of make-up water should not be specified in the rule. One commenter (IV-D-58) noted that several scrubber manufacturers have indicated that the requirement to supply fresh makeup water at the top of the scrubber unit is either impossible or not recommended for their equipment.

Three commenters (IV-D-21, IV-D-37, IV-D-51) questioned whether washdown water for the composite mesh pads and makeup water additions for scrubbers can be done with electroplating rinse instead of fresh water. One of these commenters (IV-D-21) pointed out that wastewater would be increased by using fresh water. This commenter also questioned whether shutdown of the control system is desirable because OSHA regulations may be exceeded during this time. Another of these commenters (IV-D-37) stated that use of fresh water deters pollution prevention practices; according to another (IV-D-51), the concentration of chromium in the rinse water will be much less than that on the pad and should therefore be acceptable. This commenter also stated that for composite mesh-pad systems that contain three pads, the fluid from the second stage is recirculated and used to clean the front pad; the concentration of this recirculated fluid is usually below 100 mg/L.

One commenter (IV-D-29) requested that section 63.345(b)(3) and (c)(3) be revised to state, "When makeup additions occur, \*ensure that all makeup water is fresh or lower in total dissolved solids (TDS) (2,000 ppm or less) and total chromium (400 ppm or less) and supplied either to the top of the packed bed or its

reservoir." One commenter (IV-D-37) asked that the term fresh water be defined in the rule.

Response: Section 63.345(c)(3) of the proposed rule erroneously required that sources using composite mesh-pad systems ensure that all makeup water is fresh and supplied to the unit at the top of the packed bed whenever makeup additions occur. This requirement was intended for packed-bed scrubbers only and has been corrected in the final rule.

In light of comments received on the proposed O&M monitoring requirements, the EPA has included the O&M requirements as work practice standards in § 63.342(f) the final rule, and has reduced the burden to the extent possible while still ensuring that units will be properly maintained. In the final rule, the inspections to ensure proper drainage, no chromic acid buildup, and no chemical attack on the structural integrity, and the inspection of the chevron-blade mist eliminator remains, but the frequency of inspections has been reduced from daily or monthly to quarterly. An additional quarterly inspection has been added, however; owners or operators must inspect ductwork from the affected source(s) to the control device to ensure that there are no leaks. These requirements apply to all add-on air pollution control devices.

The final rule continues to require sources using packed-bed scrubbers to meet an emission limitation ensure that all makeup water is fresh and supplied to the unit at the top of the packed bed whenever makeup additions occur. 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. Therefore, the EPA conducted a test to determine the affect of periodic and continuous washdown of the packed bed on system performance. In this test, emissions were measured when no overhead washdown occurred, when periodic washdown occurred, and when continuous washdown occurred. Clean



water was used in the washdowns. The tests showed that the emissions from the scrubber were reduced when periodic washdown occurred, yet continuous washdown did not offer substantial additional benefit over periodic washdown. (Test results are described in detail in Chapter 4 of the Proposal BID.) Packed-bed scrubber systems that did not incorporate this washdown technique could not meet the emission limit in the rule.

Based on the above results, the EPA decided that the rule should require periodic washdown of packed-bed scrubbers with fresh water whenever makeup additions occur because such systems offer additional environmental benefit. (The final rule defines fresh water.) Makeup water is added to replace water that has been evaporated in the scrubber system, to replace scrubber water recycled to the plating tanks, or to replace water discharged to the wastewater treatment system. Therefore, there is no increase in the wastewater burden on the facility. Water from the scrubber will continue to be recycled to the electroplating bath to make up for electroplating bath evaporative losses. The only difference is that the water that would then be added to the scrubber as makeup must be fresh and added to the top. If electroplating rinse water meets the definition of fresh provided in the final rule, it can be used.

To further clarify the makeup water requirement, top has been defined in the rule for horizontal-flow scrubbers 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 would refer to the area downstream of the packing material such that the makeup water would flow countercurrent to the air flow through the unit. The EPA believes that if the requirement that makeup water be fresh and added to the top of the packed bed is not included, scrubbers will not continuously meet the required emission limit, even if the scrubber met the limit during the initial performance test and the pressure drop and velocity pressure measurements are within the appropriate ranges. Therefore, the washdown

requirement was added as a work practice standard that serves as another means of ensuring compliance with the standard.

Based on comments received, there seems to be some confusion related to implementing this periodic washdown with fresh water. Contrary to commenters concerns, the scrubber system does not have to be turned off in order to wash down the packed bed. Also, the EPA does not think that substantial retrofit would be required to incorporate periodic washdown of the packed bed. During the source test to determine the effect of periodic washdown, the EPA retrofitted an existing scrubber using readily available equipment at minimal cost.

#### 2.11.2.2 Maintenance Requirements for Composite Mesh-Pad Systems.

Comment: Eleven commenters (IV-F-01 [Schott, Kimre], IV-D-16, IV-D-17, IV-D-23, IV-D-24, IV-D-37, IV-D-38, IV-D-49, IV-D-51, IV-D-58) provided comments on the washdown requirements for composite mesh-pad systems.

Three commenters (IV-D-38, IV-D-51, IV-D-58) indicated that a 10-minute wash is not appropriate for every unit. Two of these commenters (IV-D-38, IV-D-58) also noted that although the rule requires shutdown of the fan for washdown, some units are cleaned better with the exhaust fan on. One commenter (IV-D-51) noted that tests performed on one composite mesh-pad unit indicate that there is no further benefit to washdown after 1 1/2 minutes. Four commenters (IV-D-16, IV-D-17, IV-D-37, IV-D-58) said daily washdown is not feasible if electroplating time exceeds 24 hours. Another commenter (IV-D-17) indicated that if multiple tanks are connected to a control device, it is likely that at least one will always be operating, and shutting down the control system for washdown would ruin work in progress. This commenter recommended deleting the washdown requirements. Seven commenters (IV-F-01 [Schott, Kimre], IV-D-23, IV-D-24, IV-D-37, IV-D-38, IV-D-58) suggested washdown requirements for composite mesh-pad systems be site-specific, as recommended by vendors, or only if pressure drop determinations indicate the potential presence of chromic acid buildup (IV-D-23).

Two commenters (IV-D-16, IV-D-37) indicated that some composite mesh-pad systems have automatic daily washdown and suggested that such systems be excluded from the requirements. Another commenter (IV-D-38) recommended that daily recordkeeping of washdown times and durations not be required if the source demonstrates that a well-designed and functioning automatic washdown control panel is being used. One commenter (IV-D-24) stated that systems with automatic washdown are difficult to inspect on a monthly basis. Another commenter (IV-D-49) noted that, regarding the monthly inspection, chromic acid should never be present in the back portion of the pad but moisture will be present when washdown occurs from the back of the pad.

Two commenters (IV-D-23, IV-D-51) suggested 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. One of these commenters (IV-D-51) stated that the volume of fluid from washdown and reclaimed rinse waters cannot exceed the volume of water evaporated by the electroplating tank (in an attempt to eliminate wastewater). This commenter also noted it is desirable to use rinsewater as makeup water in the electroplating tank because fresh water can then be added to the rinse tank, thus reducing chromium concentration and exposure. In addition to the requirement for daily spray cleaning of composite mesh-pad systems, commenter IV-D-51 stated that the first mesh pad should be immersed in a rinse tank at a frequency of once per week to once per month, depending on the system. According to this commenter, mesh pads should always be removable to facilitate immersion cleaning and to facilitate visual inspection and repair or replacement.

Response: 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 on a daily basis. Instead, the final rule requires that washdown of the pads in a composite mesh-pad system occur in accordance with manufacturer's recommendations as part of a facility's O&M plan required by the work practice standards [§ 63.342(f)]. 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. 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. Therefore, a specific washdown frequency is not included in the final rule. 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 in the back of the unit. Washdown practices recommended by manufacturers vary from continuous in some cases to a maximum of once every one to two weeks. Also, as noted in the previous response, the monthly inspections of the composite mesh-pad systems have been changed to quarterly inspections.

As previously stated, in the final rule monitoring and work practice requirements for fiber-bed mist eliminators have also been added. A washdown requirement, similar to that for composite mesh-pad systems, is included for fiber-bed units. 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 recommend 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.

#### 2.11.2.3 Operation and Maintenance Requirements--General

Comment: Eight commenters (IV-D-01, IV-D-03, IV-D-09, IV-D-17, IV-D-24, IV-D-45, IV-D-47, IV-D-49) provided comments on the appropriateness of O&M requirements in general. Two commenters (IV-D-01, IV-D-03) suggested that the O&M plan requirements be made more general to make them applicable to sources complying with either a control device, a fume

suppressant, or both. One commenter (IV-D-09) questioned whether the EPA has justification for setting standards for O&M requirements of scrubbers used at decorative chromium facilities because none of the decorative chromium facilities tested use scrubbers.

One commenter (IV-D-47) stated the maintenance practices are burdensome and would require reconfiguration of most systems. This commenter also suggested that only vendor-recommended operating parameters should be monitored on a routine basis. In addition to these comments, this commenter also suggested that more appropriate monitoring could include the following measurements that would be recorded once each day: (1) airflow, (2) recirculating spray water and make-up water flow rates, and (3) pH of scrubber water.

One commenter (IV-D-17) indicated that requiring a source to notify supervisory personnel immediately upon identifying a malfunction is unnecessary because the General Provisions require sources to affect a repair of a malfunction as soon as is practicable. Another commenter (IV-D-45) requested that, in addition to the maintenance practices specified, the rule also specify procedures to follow if something is found to be wrong.

Response: The final rule has more detailed requirements for the O&M plan required by the work practice standards, some of which refer to all sources regardless of control technique, and others that are control technique-specific. The requirements for the O&M plan in the final rule have been made more detailed than the requirements in the proposed rule, because these requirements are overriding § 63.6(e)(3) of the General Provisions. This section of the General Provisions requires a startup, shutdown, malfunction plan, which in many respects is not applicable to this source category. Therefore, the O&M plan incorporates those parts that are applicable, and has some additional requirements specific to this source category. The requirements of the O&M plan are outlined in § 63.342(f)(3) of the final rule.

The EPA disagrees that the work practice standards are burdensome and will require substantial reconfiguration of

control systems. The final rule has reduced the frequency of maintenance inspections and has revised some of the other work practice standards to make them less burdensome. As stated above, the EPA believes that the retrofit that will be required to incorporate work practice standards can be accomplished at minimal cost to the facility. The EPA also believes that the work practice standards specified for the various control devices are justified, even if the devices evaluated and tested by the EPA were not used to control decorative chromium electroplating baths. Proper maintenance of the control devices that are likely to be used by this source category is not dependent on the type of electroplating or anodizing bath being controlled.

Comment: One commenter (IV-D-24) suggested several changes to § 63.345(a)(1)-(3), including use of the term velocity pressure traverse in place of velocity traverse and use of static pressure in place of velocity pressure. Other changes that this commenter suggested for the gas velocity measurement include (1) addition of instructions for ducts with larger diameters; (2) addition of barometric pressure and duct temperature measurements; (3) removal of the temperature requirement of 70°F because tank temperature would have to be decreased, and the measurement would not reflect actual operating conditions; and (4) use of the term velocity points in place of velocity pressure readings and use of the term traverse test point to obtain the traverse point of average velocity pressure. Another commenter (IV-D-28) recommended deleting the requirement that stack temperature must be approximately 70°F during initial performance testing of the velocity traverse because this temperature cannot be controlled or adjusted. One commenter (IV-D-37) asked that alternate velocity measurements be allowed, such as the use of manometers that measure static pressure to indicate changes in ventilation. Another commenter (IV-D-38) suggested that use of an air velocity magnahelic gauge is appropriate. This commenter also suggested that pressure drop could be measured using a pressure differential magnahelic gauge located inside the building at a convenient area for visual monitoring.

Response: As discussed previously, gas velocity is no longer considered as a continuous monitoring requirement for control systems. However, the final rule does require that the velocity pressure at the inlet to the control system be measured once per day to ensure compliance with the emission limit for users of packed-bed scrubbers. The comments above are based on the need to do a velocity traverse every day and to calculate velocities; this is not required in the final rule. In addition, the stack temperature specification of 70°F was selected because the gas temperature would reach that temperature value at some time of the day every day of the year. However, the final rule does not contain this temperature requirement.

Comment: Two commenters (IV-D-17, IV-D-28) requested that the preparation of the O&M plan be linked to the compliance date. As the rule currently reads, the O&M plan must be implemented within 90 days of the effective date while hard chromium sources have 1 year in which to comply; this suggests that sources may have to develop a plan for a control device prior to its being installed.

Response: The final rule has been clarified so that implementation of the O&M plan is tied to the compliance date, not the effective date, of the standards.

#### 2.11.3 Frequency of Monitoring

Comment: Fourteen commenters indicated that the required frequency of monitoring is inappropriate. One commenter (IV-D-59) explained that daily monitoring of gas velocity is unreasonable because it takes considerable time, equipment, and training. Two other commenters (IV-D-14, IV-D-61) said the rule should state that daily monitoring is only required when the tank is in operation. One commenter (IV-D-36) suggested velocity measurements be done quarterly because pressure drop would be measured daily. Another commenter (IV-D-06) suggested that the ventilation systems should be checked annually as is consistent with CAL/OSHA.

Two commenters (IV-D-06, IV-D-36) stated that the monitoring, recordkeeping, and reporting requirements are

excessive and daily monitoring is not necessary for nonvariable control systems such as packed-bed scrubbers and composite mesh-pad systems; one of these commenters (IV-D-36) stated that, in general, quarterly monitoring is sufficient. Another commenter (IV-D-28) indicated that weekly monitoring would be sufficient. Another commenter (IV-D-09) agreed, stating that daily monitoring of steady state control systems is too frequent.

One commenter (IV-D-14) suggested that the maintenance schedule for the control equipment should be consistent with the manufacturer's recommendations; for example, some manufacturers recommend monthly pressure drop readings. This commenter also recommended that monitoring should be part of normal preventive maintenance that occurs annually, monthly, or weekly depending on the parameter. One commenter (IV-D-16) stated that the monitoring requirements in the rule would require a full time position to measure and record air flow information. One commenter (IV-D-57) indicated that daily monitoring is excessive for small sources and suggested that this requirement be reduced if the source can show that compliance can be maintained with less frequent monitoring.

One commenter (IV-D-10) suggested monitoring be tied to production rate or throughput (amp-hr/yr). Three commenters (IV-D-23, IV-D-24, IV-D-28) suggested monitoring should only be conducted on the days when electroplating operations are taking place, and one of these commenters (IV-D-24) requested that the tank be considered in operation only when the current is actually applied to the bath. One commenter (IV-D-14) suggested monitoring frequency be established through the O&M plan, which is reviewed by the local air district. One commenter (IV-D-44) indicated that monitoring frequency should be reduced after compliance has been demonstrated for 6 months as is allowed in 40 CFR part 61 subpart V, and another commenter (IV-D-27) suggested this reduction in monitoring frequency specifically for monitoring of the scrubber water concentration.

Comment: Six commenters indicated that the required frequency of monitoring chromium concentration in the scrubber



water is inappropriate. One commenter (IV-D-09) noted that for scrubber systems, NPDES only requires weekly monitoring of wastewater discharge. Another commenter (IV-D-27) also suggested that the specified frequency for measuring scrubber water concentration should be weekly. This commenter indicated that daily monitoring of scrubber water is excessive and expensive, costing \$200 per day per scrubber unit. One commenter (IV-D-37) pointed out that it would take most scrubber systems a very long time to reach a level of 45 g/L, and therefore, daily monitoring is overly conservative. This commenter also suggested that monitoring occur monthly or before any complete turnover of scrubber water volume, whichever is earlier. One commenter (IV-D-36) stated that daily measurement of scrubber water concentration is not necessary if a system is automated such that waters with a chromium concentration greater than that specified in the proposed rule are not discharged. Another commenter (IV-D-14) suggested that daily measurement of scrubber water concentration is inappropriate for a continuous discharge system and should only be required for batch discharge. Another commenter (IV-D-17) stated that daily measurement is not necessary for systems that only have one pass of water through the scrubber because the chromium concentration would not be near the concentration limit.

Comment: One commenter (IV-F-01 [Sonntag]) stated that the paperwork, testing, and sampling burden is excessive, especially the O&M plan and the 10-minute washdown requirement for the composite mesh-pad system. One commenter (IV-D-61) suggested the rule clarify that daily washdown needs to occur only when the tanks are operating. One commenter (IV-D-24) indicated that measuring pressure drop daily is excessive and should be measured only weekly. Another commenter (IV-D-57) stated that daily monitoring is excessive for small sources and should be reduced if a source can show that compliance can be maintained with less frequent monitoring. Two commenters (IV-D-17, IV-D-58) suggested O&M requirements should be consistent with the manufacturer's

recommendations and should not require hourly or daily inspections, measurements, or recordkeeping.

Comment: One commenter (IV-D-58) suggested inspections should only occur if other factors indicate the equipment is malfunctioning. Two commenters (IV-D-17, IV-D-58) asked that inspection of packed-bed scrubber, chevron-blade mist eliminator, and composite mesh-pad systems be changed to semiannual and pointed out that daily monitoring results in increased exposure hazards to persons conducting the inspections. Three commenters (IV-D-24, IV-D-47, IV-D-49) pointed out that some control systems (i.e., packed-bed scrubber systems) are inaccessible and that inspections will result in down-time; therefore, the inspection frequency should be an annual requirement or should be dropped. One of these commenters (IV-D-24) explained that baffle-type chevron-blade mist eliminators would have to be removed (down-time is 2 to 3 days) and suggested that this requirement be eliminated. Another (IV-D-49) stated that visual inspection of the pad, which is required by §63.345(c)(2), should occur on a monthly, not a daily, basis.

Response: As stated above, the compliance monitoring and work practice standards (which were O&M requirements in the proposed rule) have been reduced to minimize the burden on regulated sources. 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 minimal. Once the monitoring devices are in place, the labor required is only that needed to read the gauges. Compliance monitoring for sources using packed-bed scrubbers has been reduced in that these sources are not required by the final rule to measure the chromium concentration in the scrubber water (see discussion in Section 2.11.1).

The frequency of inspections associated with the work practice standards has also been reduced or revised. The proposed rule required that inspection of the control device for drainage, chromic acid buildup and system integrity occur once per month. Also, the back portion of the mesh pads (for

composite mesh-pad systems) or the chevron-blade mist eliminator (for packed-bed scrubbers) was to occur once per day. These requirements remain in the final rule, but the frequency of both has been reduced to once per quarter (every 3 months). (A similar inspection has also been added for users of fiber-bed mist eliminators.) 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 indicated by the compliance monitoring. The EPA also believes that the reduction in frequency will minimize the burden on affected sources. Some commenters noted that their systems were not accessible for inspection, or that the inspection would result in extended downtime. The compliance timeframe in the final rule should allow sources sufficient time to retrofit their systems, if necessary, so that inspections can occur. The negative effects of any downtime are minimized by inspection frequency being reduced to once per quarter.

Other aspects of the work practice standards have been revised. For example, daily washdown of composite mesh pads is no longer required; instead, manufacturers recommendations are to be followed. In the proposed rule, pressure drop measurement was specified as an O&M monitoring requirement in addition to the compliance monitoring. In the final rule, pressure drop is required for compliance monitoring purposes only.

Several commenters noted that in terms of monitoring and compliance with the emission limit, the proposed rule was unclear as to whether a facility must comply with the rule at all times or only when the tank is operated. The final rule has been clarified so that requirements apply only during tank operation. Further, tank operation has been defined as any time that current and/or voltage is being applied to a chromium electroplating or chromium anodizing tank or any one affected tank in a series of chromium electroplating or anodizing tanks ventilated to a common control system.

#### 2.11.4 Alternate Compliance Monitoring for Sources Using Fume Suppressants

##### 2.11.4.1 Appropriateness of Surface Tension Value for TVC Baths.

Comment: Five commenters suggested that the requirement for maintaining surface tension below 55 dynes/cm for trivalent chromium baths is inappropriate. One commenter (IV-D-59) indicated that the surface tension limits should be eliminated. This commenter and one other (IV-F-01 [Altmayer]) pointed out that, typically, surface tension is approximately 40 dynes/cm. These commenters indicated that the electroplating process would not operate properly unless the surface tension was maintained properly, and therefore the surface tension should not be regulated. One commenter (IV-F-01 [Sonntag]) questioned why surface tension is regulated if it is an inherent bath property. One commenter (IV-D-22) stated that a 55 dynes/cm limit may not be practical for optimum operation; this commenter indicated that the EPA data in this regard may be coincidental and adequate research has not been done to demonstrate that all commercially available TVC processes operate best at this surface tension. Two other commenters (IV-D-22, IV-D-26) also noted that surface tensions above 40 dynes/cm result in unacceptable electroplating quality. These commenters stated that monitoring the surface tension every 4 hours to show that it remains below 55 dynes/cm is unnecessary.

Response: As discussed in Section 2.6.1, the regulatory burden on owners or operators of decorative chromium electroplating tanks that use a trivalent chromium electroplating process has been greatly reduced if the trivalent bath incorporates a wetting agent. There are no monitoring requirements associated with such baths in the final rule. For those trivalent chromium processes that do not incorporate a wetting agent as part of the process, the requirements for decorative chromium electroplaters using a chromic acid bath apply. That is, monitoring of the bath surface tension is necessary to maintain a level of 45 dynes/cm, or monitoring must

be conducted to demonstrate an emission control limit of 0.01 mg/dscm if an add-on air pollution control device is used.

2.11.4.2 Appropriateness of Surface Tension for Chromic Acid Baths.

Comment: Seven commenters (IV-D-09, IV-D-10, IV-D-24, IV-D-43, IV-D-45, IV-D-47, IV-D-52) indicated that the requirement for maintaining surface tension below 40 dynes/cm for chromic acid baths is inappropriate. Two commenters (IV-D-10, IV-D-43) indicated that a surface tension standard may not be prudent to demonstrate compliance. One commenter (IV-D-24) stated that a direct correlation between exceedance of parameters and the emission limit has not been established. One commenter (IV-D-45) suggested that a default compliant surface tension should not be specified by the rule and that sources should set their own compliance value.

Two commenters (IV-D-09, IV-G-01) stated that the 40 dynes/cm limit is too low. Two other commenters (IV-D-47, IV-D-52) stated that vendors recommend a 40-45 dynes/cm range and that the rule should state that the surface tension be consistent with manufacturers' recommendations.

Response: There are two types of fume suppressants that are expected to be used to comply with the final rule: wetting agents and foam blankets. Sources can use one or the other of these to inhibit chromic acid emissions, or may use them in combination. Wetting agents inhibit misting by lowering the surface tension of the electroplating or anodizing bath; thus, there is a direct relationship between surface tension and wetting agent performance. Foam blankets, on the other hand, limit mists by trapping the mist under a layer of foam; the surface tension is not reduced. Section 63.342(b)(2) of the proposed rule allowed decorative chromium electroplating sources using fume suppressants to comply with the standard to meet a surface tension of 40 dynes/cm in lieu of meeting the emission limit. This section should have allowed the surface tension limit only for those sources using wetting agents, or a

combination wetting agent/foam blanket. The final rule is clear in this requirement.

The EPA 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 had proposed a default surface tension limit of 40 dynes/cm, but has increased this value to 45 dynes/cm based on information submitted at proposal regarding the surface tension ranges recommended by vendors of wetting agents. 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 value of the bath was greater than that measured during the performance test.

Comment: Two commenters (IV-D-09, IV-D-59) noted that the rule appears to penalize owners using fume suppressants in conjunction with a control device in that both the surface tension and the control device must be monitored. Two commenters (IV-D-09, IV-G-01) stated that monitoring requirements should be selected by these sources and should be less frequent than for those with only one control method. Another commenter (IV-D-59) stated that it is unclear which monitoring method applies if a source measures surface tension in association with fume suppressant use and also has an air pollution control device.

Response: The final rule is clear in that the monitoring requirements of the source are associated with the control technique that is being used to meet the emission limits or surface tension limits. For example, a source may be using both a wetting agent and a packed-bed scrubber on a decorative chromium electroplating bath. If the wetting agent alone meets the standards (i.e., lowers the surface tension to below 45 dynes/cm), testing and monitoring of the control device is not

necessary. If however, a source is using a foam blanket and a packed-bed scrubber to control emissions from a hard chromium electroplating tank, and both control techniques are necessary to meet the prescribed emission limit, the monitoring and testing associated with both the foam blanket and the scrubber must be performed.

#### 2.11.4.3 Frequency of Monitoring Surface Tension.

Comment: Twenty-one commenters (IV-F-01 [Altmayer, Wenskel], IV-D-02, IV-D-05, IV-D-09, IV-D-10, IV-D-17, IV-D-18, IV-D-22, IV-D-24, IV-D-25, IV-D-26, IV-D-35, IV-D-47, IV-D-48, IV-D-53, IV-D-57, IV-D-58, IV-D-59, IV-D-61, IV-G-01) provided comments related to the frequency of monitoring surface tension. Several of these commenters made recommendations for more appropriate monitoring schedules, ranging from daily to monthly monitoring, in place of the 4-hour schedule.

One commenter (IV-D-02) asked the basis for the 4-hour monitoring schedule. One commenter (IV-D-18) stated that monitoring every 4 hours is burdensome and suggested once per month as an alternative. Two commenters (IV-F-01 [Altmayer], IV-D-09) indicated that monitoring surface tension every 4 hours is onerous because it is time-consuming to perform the measurement. These commenters suggested the frequency be decreased if a continuous feed system is used or if there has been compliance over the 4-hour period. Three commenters (IV-D-24, IV-D-53, IV-D-57) recommended once per operational day as an appropriate schedule; one of these commenters indicated that testing requires 45 minutes to complete (IV-D-53) and another indicated 0.5 to 1.5 hours (IV-D-59) is needed for testing. One commenter (IV-D-05) stated that calibration and analysis of one sample with a stalagmometer will take 1.5 to 1.75 hours, and monitoring every 4 hours could conceivably occupy someone full-time if there are multiple tanks.

Three commenters (IV-D-01 [Wenskel], IV-D-05, IV-D-17) suggested that a statistically significant increase or change in surface tension should be the trigger for increasing the measurement frequency; one commenter (IV-D-47) stated that

surface tension does not change day-to-day or week-to-week. Two commenters (IV-D-10, IV-D-43) stated that the monitoring schedule for fume suppressants or alternate technologies (i.e., foam) should be set through permit review and be based on amp-hrs of throughput, not on operating time. Another commenter (IV-D-58) stated that the manufacturer's recommendations should be followed and that, generally, daily or weekly testing is appropriate. One commenter (IV-D-10) suggested that monitoring be based on rectifier throughput. One commenter (IV-D-22) noted that frequent monitoring results in increased exposure of workers to hexavalent chromium.

Several commenters noted specific situations in which monitoring every 4 hours is excessive. Three commenters (IV-D-26, IV-D-48, IV-D-59) stated that sampling every 4 hours is not necessary when chromium additions are performed automatically; weekly sampling is sufficient in this situation (IV-D-26, IV-D-59). One commenter (IV-D-25) indicated that if a source uses a fluorocarbon chemical and provides evaporative recovery of chromium dragout, surface tension changes occur very slowly. The wetting agent is returned to the bath and is virtually indestructible; in this situation, daily measurement is sufficient. One commenter (IV-D-35) stated that their operation is continuous with constant operation characteristics, and if the alkaline baths are also covered by the rule, it would be more appropriate to monitor once per day or when a new production is introduced into the system.

One commenter (IV-D-22) indicated that because decorative platers and anodizers make up only 10 percent of the emissions, the proposed paperwork that applies to them is overkill; for these sources, monitoring of baths once per week is sufficient.

Two commenters (IV-D-05, IV-D-17) stated that sampling frequency should be dependent upon the surface tension a source is attempting to maintain. Sampling every 4 hours is appropriate when surface tension is maintained between 38-40 dynes/cm. If the surface tension is between 36-38 dynes/cm, daily sampling is sufficient, and if it is less than 36 dynes/cm, then weekly



sampling is sufficient. According to one commenter, the language in section 63.345(d) should be modified to reflect this dependency (IV-D-05).

Two commenters (IV-D-18, IV-D-61) requested that the rule clarify whether surface tension measurement occurs only during hours of operation or whenever the tank is available for use; the former of these would be preferred.

Response: The final rule specifies that monitoring of surface tension should initially be done once every 4 hours, but that the frequency may be decreased if no exceedances occur during 40 hours of tank operation. The EPA had originally proposed monitoring every 4 hours based on testing that indicated that the surface tension tended to increase at that point unless additional wetting agent was added. In response to comments received, the EPA recognizes that this frequency may be burdensome, and in some cases, unnecessary. However, the EPA has insufficient data to establish the monitoring frequency that is appropriate for each mode of bath operation. Instead, the final rule allows a decrease in monitoring frequency if no exceedances occur. Section 63.343(c)(5)(ii) specifies that if no exceedances occur during 40 hours of tank operation, monitoring can occur once every 8 hours of tank operation. If there are again no exceedances during 40 hours of tank operation, monitoring can then occur once every 40 hours of tank operation. The minimum frequency allowed by the rule is once every 40 hours of tank operation. Also, once an exceedance occurs, the original monitoring schedule of once every 4 hours must be resumed. A subsequent decrease in monitoring frequency can occur according to the criteria identified above. Likewise, if the bath solution is changed out, the schedule must begin again at once every 4 hour. Documentation must be maintained on site to verify the number of exceedances and that the appropriate monitoring schedule is being followed.

As stated in a previous response, the final rule is clear that the emission limitations only apply during tank operation.

Also, surface tension monitoring would only be required during those times that the tank is operating.

#### 2.11.4.4 Surface Tension Measurement Technique.

Comment: Four commenters provided comments on the measurement technique for surface tension of tank baths. One commenter (IV-D-09) suggested that stalagmometers, which are used to measure surface tension, are not easy to use. Another commenter (IV-D-22) stated that stalagmometers are time consuming to set up, calibrate, and make a determination, and that tensiometers, an alternative measurement device, are expensive. This commenter and one other (IV-F-01 [Altmayer]) indicated that alternative surface tension measurement methods that have equivalent accuracy and repeatability should be allowed. One commenter (IV-D-05) suggested that Method 306B reflect different sampling intervals for different ranges of surface tension.

Response: Measurement of the surface tension of tank baths with a stalagmometer has been performed during several source tests. For those commenters who believe that the stalagmometer is not easy to use, section 3.1 of Method 306B states "...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..."

The time interval for measuring surface tension has been changed from once every 4 hour of tank operation to a progressive system that minimizes measurements if the proper surface tension is maintained. This system is described in section 3.2 of Method 306B, and the maximum measurement interval is once every 40 hours.

For proper tank operation, the EPA believes that the surface tension of the liquid in the tank must be maintained at 45 dynes per centimeter or less. The surface tension of the tank solution will fall into one of two categories: 45 dynes per centimeter or less and greater than 45 dynes per centimeter. Different sampling intervals for different ranges of surface tension would

mean little and unnecessarily complicate the measurement procedure.

#### 2.11.4.5 Testing and Monitoring Requirements for Sources Using Foam Blankets.

Comment: Thirteen commenters (IV-F-01 [Altmayer], IV-D-02, IV-D-10, IV-D-20, IV-D-22, IV-D-25, IV-D-26, IV-D-37, IV-D-43, IV-D-52, IV-D-57, IV-D-59, IV-G-01) provided remarks regarding the burden of hourly testing for sources using foam blankets. Commenters also questioned the testing method and recommended alternative testing schedules.

Two commenters (IV-D-37, IV-D-43) stated that hourly monitoring is excessive. Foam blankets that are used according to operator's instructions are designed to last 24 hour, as long as air agitation does not surface near the anodes and freeboard height is adequate. These commenters said visual observation is adequate for determining foam blanket effectiveness. One of these commenters (IV-D-37) indicated that the rule could specify the volume and frequency for additions of foam blankets based on the surface area of the tank or the rule could specify that manufacturer's recommendations be followed.

One commenter (IV-D-22) stated that hourly monitoring of thickness is an undue burden and can be substituted with the use of automated feeders and ampere-hour monitoring. Another commenter (IV-D-57) also stated that this is burdensome and noted that other monitoring within the rule is proposed on a daily basis. One commenter (IV-D-02) questioned the basis for requiring hourly monitoring for foam blanket thickness. One commenter (IV-D-52) indicated that the same level of environmental protection could be achieved through weekly monitoring.

Two commenters (IV-D-26, IV-D-59) suggested that it is obvious that the EPA is trying to discourage the use of foam blankets; these commenters note that several States recommend or require foam blankets with less testing and recordkeeping than that proposed by the EPA. These commenters stated that the EPA should consider eliminating the performance test requirement and

should encourage foam blankets when wetting agents are not feasible. Another commenter (IV-D-37) also indicated that foam blankets are discouraged because of the burdensome monitoring requirements; this is inappropriate because foam blankets are effective pollution prevention techniques. One commenter (IV-F-01 [Altmayer]) stated that the rule should not distinguish between foam blankets and wetting agents. Two other commenters (IV-D-10, IV-D-43) suggested the EPA increase the rule's flexibility by allowing suppressant foams and plastic balls as equivalent methods.

One commenter (IV-D-37) recommended that the rule not require hourly monitoring of foam blankets when the tank is unattended (i.e., overnight). Two other commenters (IV-D-25, IV-D-37) also requested that exemptions be made for foam blanket measurement for those times when the tank is idle, and time should be allowed for the foam blanket to build up after the tank has been left idle.

Two commenters (IV-D-02, IV-G-01) requested that the EPA describe the method for measuring foam blanket thickness on trivalent or hexavalent chromium baths. Two commenters (IV-D-20, IV-D-43) requested that the rule clarify how sources using foam blankets should establish the outlet chromium concentration, especially if the tanks are not ventilated. Another commenter (IV-D-59) stated that the stack testing requirement is unreasonable as it can cost up to \$10,000. Two commenters (IV-D-20, IV-D-43) suggested section 63.343(b) specify that sources complying by use of a foam blanket should establish a foam blanket thickness as a site-specific operating parameter as opposed to establishing a single default limit. These commenters note that if section 63.343(d), which requests information on alternate air pollution control devices that a source may be using to achieve compliance, applies to foam blankets, then foam blankets must be classified as air pollution control devices.

Response: 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, if there are no exceedances of foam blanket thickness for 40 hours of tank operation, monitoring can occur once every 4 hours. If there are no exceedances for 40 more hours of tank operation, monitoring can occur once every 8 hours. The minimum frequency specified for foam blankets is once per 8 hour of tank operation. As with wetting agents, if there is an exceedance, the original monitoring frequency of once per hour must be resumed. A subsequent decrease in monitoring frequency can occur in accordance with the criteria outlined above. If the bath solution is changed out, the initial monitoring schedule of once per hour must be resumed. The maximum frequency of 1 hour is based on the EPA's experience that foam blankets can deplete quickly and must be closely monitored.

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 increased compliance timeframes 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, and perform the necessary retrofit to accommodate such a test. It is also important to note that sources using a foam blanket in combination with a wetting agent can demonstrate compliance through the surface tension limit.

Several commenters were concerned about the technique for measuring foam blanket thickness, and the potential hazards associated with this measurement. 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. For example, a plastic ball of 1-in. radius may be

marked at the center and allowed to float on the liquid in the tank. The foam blanket measurement could then consist of ensuring that the foam is at the same level as the mark on the plastic ball.

The final rule specifies that sources using foam blankets are to establish foam thickness as the site-specific operating parameter, and set the value of this parameter during the initial performance test. Alternately, the default thickness of 1 inch could be used as the compliant thickness. As such, § 63.343(d), which specifies procedures to establish compliance monitoring for control methods not identified in the rule, does not apply.

#### 2.11.5 Monitoring Requirements--General

Comment: One commenter (IV-D-02) questioned how the \$14 million and \$1.6 million cost estimates were reached by the EPA in predicting the rule's economic impact on industry to meet the monitoring, recordkeeping, and reporting requirements for compliance with chromic acid emission standards for hexavalent or with surface tension levels for trivalent chromium. One commenter (IV-D-28) found it unreasonable that in the EPA's cost estimates, monitoring and recordkeeping constitute 28 percent of the total annual cost. A commenter from the aerospace industry (IV-D-47) is concerned that the small businesses that supply products to the aerospace industry will not be able to afford the technology to meet the standards. According to this commenter, the impact of the regulation will be greater than the EPA's estimate unless the standard is adjusted and the monitoring and recordkeeping requirements are reduced. This commenter also stated that the burden of monitoring, reporting, and recordkeeping is underestimated and it will likely require 600 hours per year per source. Another commenter (IV-D-58) suggested that the complicated monitoring, recordkeeping, and stack measurement methods place an unreasonable economic burden on small sources.

Response: The burden of monitoring, reporting, and recordkeeping are estimated by the EPA based on the number of measurements and records an owner would have to take, and the

time to file reports to the permitting agency. The estimates presented in the proposal preamble also include the burden of the initial performance test, and for a certain number of facilities, repeat tests in the event of failure.

As described in this section and in Section 2.13, the monitoring, reporting, and recordkeeping requirements in the final rule are less than what were proposed. The EPA reduced the burden specifically due to the many area sources that will be subject to these standards. The ongoing yearly cost of the final monitoring, reporting, and recordkeeping is approximately 159,100 hours (or \$3.5 million) for hard chromium electroplaters, 289,300 hours (or \$6.4 million) for decorative chromium electroplaters, and 70,200 hours (or \$1.6 million) for chromium anodizers. The EPA believes that the monitoring, reporting, and recordkeeping has been reduced to the extent possible while still providing the EPA with the ability to determine a source's compliance status.

Comment: One commenter (IV-G-01) requested that the EPA clarify the monitoring to be performed when hard chromium electroplating and chromium anodizing are performed in the same tank. This commenter stated that in such situations the tank should be considered in compliance if the surface tension limit is met.

Response: As clarified in the final rule, the monitoring requirements are specific to the type of control technique used, not the type of tank operation. If hard chromium electroplating and chromium anodizing are performed in the same tank, and a wetting agent (or combination foam blanket/wetting agent) are used to control emissions from the bath during both modes of operation, surface tension monitoring is appropriate. However, in accordance with the final rule, an initial performance test would have to be conducted to demonstrate that the emission limit is met when hard chromium electroplating is taking place.

Comment: Three commenters (IV-D-10, IV-D-42, IV-D-43) suggested that the permitting agencies be allowed to identify suitable monitoring for affected sources in their jurisdiction.

One of these commenters (IV-D-10) recommended the frequency of monitoring be based on permit review or a subcategory-specific basis and also suggested that the requirements could be subject to one-time public and Federal comment.

One commenter (IV-D-58) recommended the EPA develop a two-tiered approach to monitoring requirements: one tier would be low-burden for those sources that do initial performance testing, O&M plans, and maintain compliance, and the second tier would be more rigorous for sources that need more scrutiny or could be used as an enforcement option for the EPA. This commenter also suggested facility certifications for small facilities through industry-developed recommended-best-practices and automated monitoring or recordkeeping could be employed in lieu of the proposed requirements. This commenter recommended that technical and compliance assistance for small businesses be utilized under section 507 of the Act.

Response: The EPA recognizes that many State and local air pollution control agencies have established monitoring, reporting, and recordkeeping requirements for the sources covered by the proposed standards. However, the EPA is required to establish the minimum monitoring, reporting, and recordkeeping requirements in the Federal rule that are necessary to determine a source's compliance status at any given time. State and local agencies reserve the right to require other types of monitoring, reporting, and recordkeeping in addition to the requirements of the Federal rule.

The final rule contains fewer monitoring, reporting, and recordkeeping requirements than the proposed rule and should therefore alleviate some of the burden on small sources. The EPA believes that any tiered compliance requirements would further complicate the rule, making compliance by small sources more difficult. In regard to the EPA actions for small businesses under section 507, the EPA is developing an enabling document to accompany the rule, and the Small Business Administration is developing a pamphlet to assist small businesses. Both of these



documents are intended to help sources understand the requirements of the rule and implement the rule.

Comment: Two commenters (IV-D-20, IV-D-43) suggested that all performance test requirements establishing site-specific operating parameters should be in one section of the rule, such as section 63.343. One commenter (IV-D-24) suggested a specific set of monitoring requirements be developed to address systems using multiple technologies.

Response: The final rule has been reorganized so that testing and monitoring requirements have been made more clear, and also addresses sources that are using multiple technologies to comply with the rule. All compliance monitoring requirements are contained in § 63.343. All performance testing requirements are in § 63.344.

Comment: One commenter (IV-D-61) pointed out that although the term "operation of the tank" is referred to throughout the monitoring requirements, the term is not defined. This term could have several meanings, such as when the tank is heated to a specific temperature, when it is charged, or when it contains electroplating material. The commenter recommended that tank operation be defined as when the contents of the tank reaches a temperature greater than room temperature.

Response: In the final rule, tank operation is defined as any time that current and/or voltage is being applied to a single chromium electroplating or chromium anodizing tank or to any one of a series of such tanks that are ventilated to a common control device.

## 2.12 SELECTION OF TEST METHODS

### 2.12.1 Test Methods 306 and 306A

Comment: One commenter (IV-D-17) noted that Method 306 presents difficulties when the sample contains significant quantities of dissolved salts. To alleviate this problem, the commenter suggested the EPA modify Method 306 to allow use of a nitric acid/hydrogen peroxide matrix in lieu of the sodium hydroxide/bicarbonate matrix. Another commenter (IV-D-53) indicated that sodium hydroxide causes analytical difficulties

and recommended using a 0.1 N solution. This commenter also recommended that if a nitric acid solution is used, it should also be used for calibration standards to minimize matrix effects. The test methods in 40 CFR part 266, appendix IX and SW846 Method 6010 should be allowed by the EPA as an equivalent method (IV-D-17).

Comment: Two commenters (IV-D-10, IV-D-24) indicated that the methods proposed in the rule for determining chromium emissions do not have detection limits low enough to determine compliance with the standard. Both of these commenters indicated that Method 306 is not appropriate for determining emissions at very low levels and that the EPA provides no guidance on extending the duration of the test run (increasing the sample volume of air collected) or limiting the volume of probe wash (less solvent) to decrease the level of detection for the method. The other commenter (IV-D-24) pointed out that the proposed emission standards for hard chromium sources are below the detection limits of the proposed ICP analytical method. In fact, using ICP with a concentration of 50 ug/L as a minimum requirement, the method detects chromium concentrations at values of 8 times greater than the standard. This commenter also pointed out that the minimum detection limits for ICP and GFAAS are not within the linear ranges for these methods.

Another commenter (IV-D-53) suggested use of an ICP/MS system as an alternative method for detecting low concentrations.

Response: One commenter (IV-D-17) referred to the difficulty of analysis when the sample contains significant quantities of dissolved salts, and suggested using nitric acid/hydrogen peroxide matrix in lieu of the sodium hydroxide/bicarbonate matrix. If the dissolved salts make analysis difficult, it has not made it difficult enough that the labs that have done our analyses (and written the analysis methods) have felt it necessary to point this out as a problem. If a nitric acid/hydrogen peroxide matrix is superior to the sodium hydroxide/bicarbonate matrix for analysis purposes, the commenter may verify this possibility by performing a Method 301

evaluation. The comment on the 0.1 N solution is difficult to respond to because we use 0.1 N sodium hydroxide already and the reference in the letter (IV-D-53) was not specific. Other commenters recommending nitric acid in the analysis may also use Method 301 to verify the validity of their suggestions. The analytical method in 40 CFR part 266 (ICPCR) will be allowed for hexavalent chromium analysis.

Other commenters stated that the methods proposed for determining emissions do not have detection limits low enough to determine compliance with the standard. This comment doesn't make any sense because EPA used these analytical methods to set the standard (see Docket No: A-88-02 for an explanation of why the colorimetric method was dropped in lieu of atomic absorption graphite furnace (AAGF) or ion chromatography using a post column reactor (ICPCR)). The reasons for using AAGF and ICPCR was to increase the accuracy of the analytical technique and still maintain a reasonable sample time. The suitability of the detection limits can be illustrated with the following example when using AAGF on an outlet location (ICPCR is even more sensitive than AAGF).

A 2 hour sample would collect about 90 cubic feet of sample. This 90 cubic feet is equal to 90 cubic feet times 0.02832 cubic meters per cubic foot which equals 2.5488 cubic meters. If the concentration of total chromium in this 2.5488 cubic meters of sample were at the limit of the standard for large hard chromium platers (0.013 mg/dscm), the sample would contain:

$$2.5488 \text{ m}^3 (0.013 \text{ mg/dscm}) = 33.1 \text{ micrograms} \\ \text{of total chromium}$$

The sensitivity of the AAGF method is 1 microgram per 1,000 milliliters. A sample containing 5 to 10 micrograms would be quantifiable if the total sample collected was contained in 1 liter or less of solution. The maximum quantity of sample solution would probably not exceed 800 milliliters, so 4 to 8 micrograms collected would be sufficient for a reliable

analysis at the level of the standard, the 33.1 micrograms of sample collected is 4 to 8 times the minimum catch for quantifiability.

Perhaps the commenters were referring to the diphenylcarbazine colorimetric method, or the ICP method. The colorimetric method was replaced in 1991 because it was not sensitive enough for some of the more recently developed control systems. The ICP method which is mentioned in Method 306 is good for large concentrations of chromium, such as that collected at the inlet to the control system. It is not suitable for measuring outlet concentration that are very close to the standard. The point about the length of the test is a valid one, and we will specify a 2 hour test time at a sampling rate of about 0.75 dscfm.

A commenter also stated that the minimum detection limits for ICP and AAGF analysis methods were not within the linear ranges for those methods. The detectable limits do not have to be within the linear range. The quantifiable limits, however, are within the linear range. As mentioned before, the ICP method is acceptable only for high concentration samples. The AAGF analysis can detect 1 microgram per liter of total chromium. A concentration of 5 to 10 micrograms per liter is quantifiable. It is not likely that the impinger solutions and sample rinse collected following sampling would exceed 1 liter. The combined impinger solutions and sample rinse would probably be between 500 and 800 milliliters. It is also not likely that less than 4 to 8 micrograms of chromium would be caught in a 2 hour sample that was taken at an extremely well controlled outlet. If the sample catch is less than 4 to 8 micrograms of chromium (per 800 milliliters of sample solution), or if the chromium cannot be detected in a sample, the source would be well below the emission limits established in the standard.

Comment: Five commenters (IV-D-10, IV-D-24, IV-D-37, IV-D-49, IV-D-53) suggested changes or additions for Methods 306, 306A, and 306C. [Note: There is no method 306C in the proposed

rule. The commenter appears to be referring to section 5.1.1.2--Velocity Traverse section in Method 306A.]

One commenter (IV-D-24) requested that the EPA provide a margin of error to reflect the precision of the sampling methods and analytical test methods. One commenter (IV-D-10) suggested the addition of a colorimetric analysis to Method 306 to provide hexavalent chromium in addition to total chromium. This would prevent a source that is subject to a State emission standard based on hexavalent chromium from having to perform two source tests. One commenter (IV-D-37) made the following suggestions for Method 306: (1) the method should state that probe heat is not necessary; (2) the method should state that use of probe and nozzle brushes during recovery is unnecessary; and (3) the method should suggest specific recovery procedures that minimize sample volume.

One commenter (IV-D-53) made several remarks concerning Methods 306 and 306A. For section 5 of Method 306, the commenter suggested that trip blanks be used rather than reagent blanks because the trip blanks provide more indication of contamination problems. The results of blank runs should be reported if the method does not specify a maximum acceptable blank level. The commenter also suggested using more than 10 ml of acid to acidify 300 ml of 0.1 N sodium hydroxide. Also, the amount of dilution allowed in bringing a sample into calibration range should be limited. For section 7 of Method 306, the commenter recommends a standard check every ten injections, or every set, whichever is greater. According to the commenter, a quality control check standard that is closer to the limit of detection would detect nonlinearities on the lower end of the calibration curve; a factor of 20 times the limit of detection may be more appropriate than 100 times the limit of detection for a quality control check standard. For Method 306A, the commenter recommends that flexible tubing containing phthalate plasticizers not be used for chromium sampling trains as it is mechanically sticky and possibly reactive. One commenter (IV-D-10) indicated that Method 306A would seem to result in only minimal cost savings

compared to Method 306 and should be reevaluated before being approved.

Another commenter (IV-D-49) suggested that Method 306C should contain provisions for a 33 percent increase in pressure in addition to the provisions for a 33 percent decrease in pressure that the method currently contains. This commenter also indicated that some newer control devices are basically extensions of the hood ducting and may not have one diameter between the hood and control device for insertion of the pitot tube; an alternative velocity measurement point for Method 306C should be specified.

Response: One commenter requested that the EPA provide a margin of error to reflect the precision of the sampling methods and analytical test methods. It is the EPA's opinion that providing a margin of error to reflect the precision of the sampling methods and analytical test methods would cost money, take time, and would be nonproductive in view of the fact that future testing and analysis will be performed in a manner consistent with that used to gather the data to establish the standard. Another commenter also suggested adding a colorimetric method to the analysis section of Method 306. The EPA has found that the diphenylcarbazide colorimetric method the commenter is probably referring to does not have the sensitivity required to measure the low chromium concentrations found in the outlet stack gases. However, the EPA has added the use of the ion chromatography with a post-column reactor as an acceptable analytical method for determining the hexavalent chromium concentration in the exhaust stack.

One commenter made the following suggestions for Method 306:

- (1) the method should state that probe heat is not necessary;
- (2) the method should state that use of probe and nozzle brushes during recovery is unnecessary; and (3) the method should suggest specific recovery procedures that minimize sample volume.

In reviewing these comments, the EPA agreed that any mention of probe heat and probe and nozzle brushes for sample recovery will be deleted from the method. Regarding specific recovery

procedures to minimize sample volume, the EPA believes that the analytical methods have sufficient sensitivity to detect small quantities of chromic acid collected and no procedures are necessary to minimize sample volumes. On the contrary, the EPA believes such procedures could increase the risk of missing part of the sample collected. The EPA checked the sensitivity of the methods against 1 liter of collected sample solution in order to determine if longer sample times were necessary to ensure sufficient sample collection. The results of this sensitivity indicated that a 2-hour sample collects a sufficient quantity of chromic acid mist for accurate determination of concentration in mg/dscm.

Another commenter indicated that Method 306A would result in minimal cost savings to the industry. For the response to this comment, please refer to section 2.12.3.1. In addition, another commenter (IV-D-49) suggested that Method 306C should contain provisions for a 33 percent increase in pressure in addition to the provisions for a 33 percent decrease in pressure that the method currently contains. Please refer to the response to comments on Method 306A in section 2.11.2.3 for the response to this comment. The monitoring equipment (magnahelic gauges and pitot tubes) are used to assess system operation, and accuracy is not as important as reproducibility. A magnahelic gauge is easy to adjust by securely mounting the gauge and adjusting the gauge to "zero."

Comment: Three commenters (IV-D-10, IV-D-14, IV-D-47) 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. Two of these commenters (IV-D-14, IV-D-47) and one other (IV-D-15) pointed out that ion chromatography is the preferred analytical method and should be cited as equivalent in the rule. One of these commenters (IV-D-10) indicated that Method 306A is not acceptable for demonstrating compliance with California chromium electroplating emission limits.

Four commenters (IV-D-06, IV-D-10, IV-D-14, IV-D-27) asked whether retesting will be required if sources have done previous performance testing using 306, 306A, or an equivalent test method.

Response: The CARB Method 425 train is almost identical to the Method 306 train except that a filter is used between the third and fourth impingers. The catch on these filters is usually nondetectable. There is no need to evaluate the CARB sampling train for equivalency. The analytical method used after the sample is collected needs to be considered. In the early days of the NESHAP development, the analysis for hexavalent chromium using either the Method 306 train or the CARB 425 train was the diphenylcarbazide colorimetric method. As control device efficiency improved, the colorimetric method was not sensitive enough to ensure accuracy without going to excessively long sampling times. The acceptability of previously performed CARB Method 425 tests will depend upon the analysis rather than the sampling train or the sampling procedure. For CARB tests using the colorimetric method for analysis, the sample catch will have to be at least 5 times the minimum detection limit to be acceptable. The CARB method is sensitive to 0.33 micrograms per 100 milliliters. To ensure that the data are accurate to within  $\pm 10$  percent accuracy, the concentration at the detector would have to be 5 times 0.33 micrograms per 100 milliliters or 1.65 micrograms per 100 milliliters. Because the sample is diluted to  $1/2$  the original concentration prior to analysis, the sample solution recovered from the train must contain 3.30 micrograms per 100 milliliters, or 0.033 micrograms per milliliter. If the sample meets these concentration requirements, the colorimetric method of analysis for hexavalent chromium, and consequently, the results, may be accepted. If the sample does not meet these criteria, it is not possible to assure  $\pm 10$  percent accuracy. If another type of analysis is used, such as atomic absorption graphite furnace for total chromium, or ion chromatography with a post column reactor for hexavalent chromium, there should be no problem using CARB Method 425.



One commenter said that ion chromatography was the preferred analytical method, and this is true if this means ion chromatography with a post column reactor (ICPCR). Ion chromatography with a post column reactor is the preferred method, but finding a laboratory with this analytical capability is difficult. Nonetheless, the final rule will be revised to include ICPCR as an acceptable analytical method.

The commenter who stated that Method 306A was unsuitable for demonstrating compliance with the California standard was incorrect. The commenter suggested that Method 306A should be thoroughly compared with Method 306 before it is officially approved. Method 306A has been carefully compared against Method 306 and is, in fact, suitable for showing compliance with the California standard.

Four commenters asked whether retesting will be required if sources have done previous performance testing with Method 306, 306A or an equivalent test method. Tests using other equivalent sampling methods for chromium emissions should be reviewed by the Agency prior to determining whether or not another test should be performed in accordance with § 63.344(c)(4) of subpart N and § 63.7(f) of subpart A. Facilities that use Method 306A prior to December 1991 will have to retest.

#### 2.12.2 Demonstrating Compliance When Using Fume Suppressants

Comment: Two commenters (IV-D-22, IV-D-59) questioned whether facilities will have to measure emissions to support meeting the emission standard for fume suppressants. Language in the preamble to the proposed rule on pages 65772 and 65774 implies that facilities using fume suppressants are expected to achieve a specific outlet concentration.

Response: The final rule includes a dual standard for sources performing decorative chromium electroplating and chromium anodizing operations. These sources must either: (1) discharge no greater than 0.01 mg/dscm of total chromium to the atmosphere, or (2) operate the electroplating or anodizing tank such that the surface tension does not exceed 45 dynes/cm. With the first alternative, a source must conduct a source test

in accordance with the methods identified in the rule to demonstrate that the emission limit of 0.01 mg/dscm is not being exceeded. It is assumed that a source complying with the first alternative is using an add-on control device or a foam blanket. With the second alternative, a source must measure surface tension to demonstrate initial compliance; ongoing compliance is also demonstrated through surface tension measurement in accordance with the monitoring procedures in § 63.343(c) of the final rule. In this latter case, an initial performance test is not required if the criteria of § 63.343(b)(2) are met. That is, the source is a decorative chromium electroplating or chromium anodizing tank, a fume suppressant containing wetting agents is used to limit chromium emissions, and the owner or operator of the source accepts 45 dynes/cm as the surface tension value that demonstrates compliance with the standard. The rule is written as an either/or alternative; that is, only the emission limit or the surface tension limit must be met. It was not the EPA's intent to require a source test if the criteria of § 63.343(b)(2) are met. The EPA recognizes that for some decorative chromium electroplaters and chromium anodizers source testing is not feasible because ventilation stacks do not exist. Therefore, the surface tension alternative is provided.

One exception to the above conditions is the case in which sources using wetting agent-type fume suppressants want to establish a surface tension limit other than the 45 dynes/cm limit in the final rule. In such a case, a source would have to conduct a performance test to establish the alternate surface tension value that corresponds to the emission limit of 0.01 mg/dscm.

Sources performing hard chromium electroplating that use a fume suppressant (either a wetting agent, a foam blanket, or a combination) to comply with the standard will have to conduct an initial performance test to demonstrate compliance with the standard. The EPA did not fully evaluate the use of fume suppressants to reduce emissions from hard chromium electroplating tanks because only a limited number of operations

used this technique. Also, there were safety concerns associated with their use, as well as the fact that fume suppressants are not universally applicable to all types of hard chromium plating operations. Therefore, all hard chromium electroplating tanks, regardless of the type of control technique employed (e.g., APCD, fume suppressant, or combination) must conduct an initial compliance test. All hard chromium electroplating tanks will have ventilation stacks to comply with OSHA requirements. Thus, source testing will not be as burdensome as it would be for decorative chromium electroplating and chromium anodizing tanks that may not have ventilation systems. Ongoing compliance monitoring will be the same for all tanks using fume suppressants, requiring sources to monitor bath surface tension if a wetting agent is used and foam blanket thickness if a foam blanket is used.

### 2.12.3 Demonstrating Compliance When Using Add-On Controls

#### 2.12.3.1 Impacts of Stack Testing.

Comment: Five commenters addressed the burdens associated with stack testing. Two commenters (IV-D-06, IV-D-40) stated that stack testing is burdensome and can cost up to \$8,000 (IV-D-06) or more than \$10,000 (IV-D-40). One commenter (IV-D-59) stated that stack testing costs could close some decorative chromium electroplating sources. Another commenter (IV-D-47) suggested that stack testing be minimized because not all control systems were designed to allow easy measurement of outlet concentration, and alterations that may be necessary to enable the performance of the testing (e.g., stack may need to be extended) could be significant. One commenter (IV-D-53) stated that the proposed method requires burdensome, yearly testing and indicated that the process emission rate (mg/amp-hr) can be used to demonstrate the correlation between compliance and the applicable emission limit. This commenter states that with a mg/amp-hr limit, compliance can be easily verified without a source test. Another commenter (IV-D-42) stated that the EPA needs to specify the initial performance test to demonstrate compliance and set enforceable operating parameters and to

evaluate the economic impact of such requirements because these requirements may significantly hinder small sources.

Response: Based on the comments received at proposal, there appears to be some confusion surrounding the stack testing requirements. First, an annual test is not required. All sources are required to conduct an initial performance test within 180 days after the compliance date in accordance with § 63.7 of the General Provisions to part 63, unless the criteria of § 63.343(b)(2) are met. After the initial test, ongoing compliance is demonstrated by performing compliance monitoring in accordance with § 63.343(c) of the final rule. In terms of modifications necessary to conduct a performance test, the method in the rule requires that the stack height be 2.5 times the stack diameter, not 8 times as thought by commenter IV-D-47. The EPA has estimated the cost to conduct performance tests at all sizes of sources and this cost was considered in selecting the standard. The EPA recognizes that testing may be a burden for some sources, and has pursued methods to reduce this burden. For example, in developing the proposed rule, the EPA found that the analytical methods for measuring chromium emissions were expensive, and the number of laboratories qualified to do the testing limited. Therefore, the EPA developed and proposed Method 306A, which is simpler and less expensive than other methods. Based on a review of stack testing costs, the EPA has determined that the cost for stack testing is approximately \$4,500 per stack. The EPA is aware of firms that may charge as much as \$8,000 to \$10,000 per stack. However, it is up to the owner of the electroplating facility to ensure they are paying a fair competitive price for the stack test. In addition, the EPA is aware of the fact that even \$4,500 per stack could be burdensome to some small plating shops. Furthermore, if the initial test reveals that the control device is inadequate, and modifications must be made to the system, the cost of an additional test is incurred. To respond to these concerns, the EPA developed the alternative Method 306A. The cost of fabricating a Method 306A sampling train is about \$600. A pitot

tube (which can later be used for enhanced monitoring), a manometer, and chemicals should run another \$50. Three sampling runs will take about 15 hour, which at \$12/hour would cost \$180. The analysis of three samples and a blank would cost about \$60/sample for a total chromium analysis and would cost about \$80/sample for a hexavalent chromium analysis. The cost of having the company perform its own test is:

Sampling train:	\$600.00
Pitot, manometer, chemicals:	\$50.00
Labor	\$180.00
Analysis	<u>\$320.00</u>
Total	\$1150.00

The company also gets to keep the equipment. Additional testing then costs \$500 for labor and analysis plus about \$10 for chemicals, or \$510.

If the company does its own testing and performs only one test, it saves \$3,350 over having a testing firm do the work. If two tests are needed, the company saves the original \$3,350 plus \$3,990 or \$7,340. If the company has more than one stack, it would definitely pay the company to do its own testing. A major airline company used Method 306A to test its plating tanks and saved over \$33,000 in source testing costs.

When the final rule is in place, there will probably be some companies that will rent Method 306A equipment. Stack testing firms may also use Method 306A for sampling sources and still use their isokinetic equipment. This should be less expensive for the plater because Method 306A is less labor intensive and easier to perform than Method 306. There may also be equipment manufacturing companies that will sell assembled trains ready for use.

Another way to alleviate the expense of testing so many platers would be for one of the trade associations to set up its own source sampling group, dedicated to sampling the electroplating and anodizing industry. A competent individual well versed in chromium sampling and knowledgeable of the methods could head up such a group and save the industry considerable

money. To further assist sources in using the Method 306A sampling train, the EPA has developed a video entitled "Construction and Operation of the EPA Method 306A Sampling Train and Practical Suggestions for Monitoring of Electroplating and Anodizing Facilities." This tape will be available in January 1995 for a nominal fee through North Carolina State University, Registrar, Environmental Programs, Box 7513, Raleigh, NC 27695-7513. The telephone number is (919) 515-4659; the fax number is (919) 515-4386.

Also, the EPA believes that extending the compliance time to 1 year for decorative chromium electroplaters and 2 years for hard chromium electroplaters and chromium anodizers will provide sources with more time to obtain capital for both control device purchase and performance testing. Finally, § 63.344(b) of subpart N allows sources to fulfill the initial compliance test requirements for this standard by submitting compliance test results from tests conducted at startup in accordance with State operating permits. The test must have been conducted using the EPA-approved test methods and procedures in subpart N. This provision may offer some relief to sources that have recently conducted performance tests.

One commenter (IV-D-53) also suggests that an annual source test is necessary to demonstrate compliance with a concentration-based standard, whereas compliance with a mg/amp-hr standard can be demonstrated without a performance test. As explained above, an annual test is not necessary. Also, the format of the standard is irrelevant to performance test requirements. For the reasons described in Section 2.7, Selection of the Format of the Standard, the EPA has promulgated a rule expressed in mg/dscm. However, even if the rule had been expressed in mg/amp-hr, the EPA would have required a source test to demonstrate initial compliance and parametric monitoring to demonstrate ongoing compliance. Thus, the format of the standard has no bearing on the source test requirements.

In regard to the comment that the EPA should specify the initial performance test and set enforceable operating

parameters, the final rule explicitly requires an initial performance test except as allowed by § 63.343(b)(2) and (3). The EPA has also specified which operating parameters correlate to compliance with the emission limit. For example, the pressure drop is directly related to the performance of a composite mesh-pad system. The EPA does not, however, think it is appropriate to identify the operating parameter value. The final rule allows sources to set the operating parameter value during the initial performance test because each control system is different depending on its design, age, operation, and condition. Rather than hindering small sources, the EPA believes that this condition lends flexibility to all sources. The final rule does specify default compliant ranges. For example, a source is in compliance if the measured pressure drop value is within  $\pm 1$  inch of water column from the average value established during the initial performance test, and a source is in compliance if the measured velocity pressure value is within  $\pm 10$  percent of the average value established during the initial performance test. These ranges have been specified because EPA recognizes that it would be difficult to set a range of compliant operating parameter values during one performance test. For those owners or operators that wish to establish their own range of compliant operating parameter values, the final rule allows them to do this by conducting multiple performance tests. The following comment and response discuss the importance of compliance testing for all sources, regardless of size.

Comment: One commenter (IV-D-57) suggested that at large sources where many tanks have identical design, a compliance test protocol that requires a source to test a percentage of the comparable tanks may be more practical. Two commenters (IV-D-27, IV-D-36) requested that the EPA allow a source to test one representative unit to demonstrate compliance for several similar units. Another commenter (IV-D-40) suggested that the EPA certify commonly used control devices based on the EPA's test methods to avoid compliance testing by small businesses.

Response: The EPA does not believe that representative testing is adequate to demonstrate that each source is in compliance with the standard. Therefore, the final rule requires that each source conduct a performance test to demonstrate compliance with the emission limit, unless the source is performing decorative chromium electroplating or chromium anodizing and is complying with the surface tension limit. Based on the EPA's experience testing control devices in use in this industry, a device's performance will vary based on its age, its condition, and the manner in which it is maintained and operated. A performance test is also necessary for sources to establish the values for the operating parameters that will be monitored to establish continuous compliance. For example, a source operating a composite mesh-pad system will have to establish the pressure drop value that corresponds to the emission limit.

2.12.3.2 Control Systems Controlling Multiple Tanks.

Comment: Two commenters (IV-D-36, IV-D-44) 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 (IV-D-17, IV-D-47, IV-D-61) 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; these commenters questioned where the emissions should be measured. Three commenters (IV-D-47, IV-D-52, IV-D-61) noted that it is extremely difficult to reconfigure the existing system such that only the air from chromium electroplating or anodizing will be tested. One of these commenters (IV-D-61) indicated that tanks cannot be selectively turned off to accommodate individual testing; some air flow would still come from each tank.

Response: 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 the same type of tanks subject to different emission limits (e.g., a new hard chromium electroplating tank with an existing small, hard chromium electroplating tank). The final rule includes compliance provisions for either of these situations.

In the first situation, a chromium electroplating or anodizing tank is tied to a control system that is also controlling tanks that are not covered by this rule. In such a case, the nonaffected tanks may be turned off, but air flow will still result from each tank thus diluting the chromium measured at the outlet from the control device. The final rule contains a new procedure for estimating emissions for these special cases.

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:

1. Calculate the cross-sectional area of each inlet duct (i.e., uptakes from each hood) including those not affected by the standard.
2. 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 an affected source, and then multiply this number by 2 hours. The calculated time is the minimum sample time required per test run.
3. Perform Method 306 testing and calculate an outlet mass emission rate.
4. 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 ducts associated with the affected sources.

5. Establish the allowable mass emission rate of the system ( $AMR_{sys}$ ) in milligrams of total chromium per hour (mg/hr) using equation 2:

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

where  $\Sigma VR_{inlet}$  is the total ventilation rate in dscm/min from the affected sources, and EL is the applicable emission limitation. The allowable mass emission rate 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.

The second situation likely to be encountered in industry is one in which affected sources in two different source categories, or sources in the same source category (i.e., hard chromium plating) but subject to different emission limits (i.e., new versus existing small tanks), are tied into the common control device. For example, a control system may be controlling emissions from a hard chromium electroplating tank, a chromium anodizing tank, and other nonaffected sources. A similar procedure as outlined above is followed, except that the allowable mass rate is the sum of the chromium mass emission rates calculated by equation 1 for each source category or group of affected sources subject to the same emission limitation. For example, assume that a control device controls emissions from a chromium anodizing tank with a ventilation rate of 140 dscm/min and a hard chromium electroplating tank at a large facility with a ventilation rate of 75 dscm/min. The allowable chromium mass emission rate is calculated as:

$$[(140 \text{ dscm/min})(0.01 \text{ mg/dscm}) + (75 \text{ dscm/min})(0.015 \text{ mg/dscm})] * 60 \text{ min/hr} = 152 \text{ mg/hr}$$

The calculation is based on a 0.01 mg/dscm limit for the chromium anodizing tank and a 0.015 mg/dscm limit for the hard chromium electroplating tank. Thus, the allowable chromium mass emission rate is 152 mg/hr.

The allowable chromium mass emission rate and operating parameter values established for a control system that controls multiple tanks described by either of the above situations are valid only for that specific control system and tank configuration. Therefore, if a tank is added to or removed from the control system, a performance test must again be conducted to establish the allowable mass rate and the operating parameter values. This must be done whether or not the tank added or removed is an affected tank; although nonaffected tanks will not affect the allowable chromium mass emission rate, the operating parameter value would be different. Retesting would not be required if a nonaffected tank is replaced with a tank that is the same size and is connected to the control system through the same size inlet duct.

## 2.13 SELECTION OF REPORTING AND RECORDKEEPING REQUIREMENTS

### 2.13.1 Reporting/Recordkeeping Associated With Fume Suppressants

Comment: Seven commenters (IV-D-17, IV-D-24, IV-D-26, IV-D-37, IV-D-45, IV-D-58, IV-D-59) stated that the types of records that the rule requires sources to maintain are inappropriate.

Five commenters (IV-D-17, IV-D-24, IV-D-26, IV-D-45, IV-D-59) pointed out that requiring facilities to maintain records of the amount of chemicals used and purchased does not indicate compliance and should not be required. Another commenter (IV-D-37) suggested that this requirement be made more flexible by allowing sources to retain copies of purchase orders, packing slips, etc., because in some large procurement systems, the purchaser does not receive copies of the invoices.

Four commenters (IV-D-24, IV-D-26, IV-D-58, IV-D-59) indicated that requiring facilities to maintain records of the frequency of maintenance additions and the amount of fume suppressant material added is not related to compliance and should not be required.

Two commenters (IV-D-26, IV-D-59 ) stated that recordkeeping requirements be limited to only surface tension measurements because this measurement is the basis of compliance.

Response: In finalizing the rule, the EPA attempted to reduce the recordkeeping burden to the extent possible, while still requiring sources to maintain sufficient records to demonstrate compliance. The recordkeeping requirements are contained in § 63.346 of the final rule. Recordkeeping associated with fume suppressants requires that sources maintain records of the date and time of surface tension or foam blanket thickness measurements, as appropriate, and the value measured, and the date and time of additions of fume suppressants to the bath. The EPA concurs that the records required to be kept should correspond specifically to that which is required to demonstrate compliance. As such, records of fume suppressant purchases and the amount added to the bath are no longer required.

#### 2.13.2 Reporting Frequency

Comment: Six companies (IV-D-06, IV-D-07, IV-D-10, IV-D-18, IV-D-27, IV-G-01) provided comments on the reporting frequency.

Five commenters suggested that the frequency of reporting outlined in the proposed rule was burdensome. One of these commenters (IV-D-06) indicated that neither quarterly nor semiannual reporting is necessary; two commenters (IV-D-18, IV-G-01) suggested that this 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. One of the commenters (IV-D-27) suggested semiannual compliance reporting would be appropriate because it is consistent with the title V operating permit program. Another of these four commenters

(IV-D-10) indicated that sources should not have to submit compliance reports if the source's permitting agency inspects the onsite records on an annual basis.

One commenter (IV-D-07) suggested that the rule require quarterly reporting until 2 years pass without exceedances of any state or federal emission standards; after 2 years pass without an exceedance, the source would be allowed to report semiannually until a subsequent exceedance.

Response: The final rule requires submission of ongoing 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 ongoing compliance status reports semiannually, unless an exceedance occurs. If an exceedance occurs, quarterly reports are required. This change reflects changes made to the General Provisions, which were only a proposal when this rule was proposed. For major sources, the reporting requirements in the final rule are analogous to those in the final General Provisions.

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 are not 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.

The rule also contains provisions for a reduction in reporting frequency for those major and area sources that are required to submit quarterly and semiannual reports, respectively. These sources must have 1 full year of compliance

with the standards, and request to have reporting frequency decreased. The Administrator (or permitting authority) may grant or deny the request.

### 2.13.3 Reporting and Recordkeeping Requirements--General

Comment: Seven commenters (IV-D-10, IV-D-22, IV-D-23, IV-D-36, IV-D-47, IV-D-52, IV-D-58) indicated that the reporting and recordkeeping requirements of the proposed rule are burdensome for both small and large facilities and suggested the EPA consider the impact of these requirements.

Two commenters (IV-D-10, IV-D-43) explained that small businesses do not have the resources to keep extensive records and to submit reports. According to these commenters, extensive data may be necessary to maintain federal enforceability, but the data is not needed for small businesses because the EPA is unlikely to seek enforceable action against such a small firm. One commenter (IV-D-58) said that the complicated monitoring, recordkeeping, and stack measurement methods place an unreasonable economic burden on small sources. One commenter (IV-D-22) indicated that the EPA's reporting and recordkeeping cost estimate of \$14 million does not account for the negative financial impact on small shops that do not have personnel available to perform testing every four hour.

Another commenter (IV-D-47) suggested that the EPA's estimate of the burden of monitoring, reporting, and recordkeeping has been underestimated and provided an industry estimate of 600 hours per year per source for these requirements. This commenter pointed out that, based on the EPA's estimate of recording and recordkeeping costs, for chromium anodizing sources alone, the reporting and recordkeeping requirements will cost almost \$1 million per ton of reduction. The commenter also indicated that the aerospace industry is concerned that the small businesses that supply products to the aerospace industry will not be able to afford the technology to meet the standards. The impact of the regulation will be greater than the EPA's estimate unless the standard is adjusted and the monitoring and recordkeeping requirements are reduced. This commenter stated

that the EPA should consider eliminating most of the reporting and recordkeeping requirements for area sources.

One commenter (IV-D-23) pointed out that the EPA has recognized differences in large and small facilities in selecting MACT emission standards. The EPA should also recognize differences between large and small facilities in selecting reporting, recordkeeping, and permitting requirements. The commenter suggested the following for small, hard chromium platers: (1) exemption (especially for sources using batch operations) from startup/shutdown requirements of the proposed General Provisions; (2) exemption from extensive preconstruction review requirements (even though the proposed General Provisions include area sources, the intent of the Act was to include construction and reconstruction of major sources only); and (3) exemption from obtaining a title V permit.

One commenter (IV-D-36) explained that reporting and recordkeeping will also be substantial for large companies where multiple sets of records will be maintained at multiple facilities across the nation. One commenter (IV-D-52) indicated there is no environmental benefit to keeping records of gas velocities, pressure drops, washdown conditions, and scrubber water chromium concentrations.

Response: The EPA recognizes that the reporting and recordkeeping contained in the proposed rule could be burdensome for many sources, especially area sources. Given the large number of area sources in these source categories, the final rule contains reporting and recordkeeping requirements that are substantially reduced from those required at proposal. Specifically, the amount of records that a source is required to maintain has been reduced, the frequency of reporting has been reduced (especially for area sources), and the requirements of the General Provisions have been further evaluated to assess their applicability to these source categories. Where requirements of the General Provisions were considered redundant or confusing, subpart N has overridden the requirement as specified in Table 1 of the final rule. For example, the

requirements of § 63.6(e) of the General Provisions associated with the startup, shutdown, and malfunction plan have been overridden. Sources subject to subpart N are required instead to complete an O&M plan in accordance with § 63.342(f)(3), with fewer elements than that required by the startup, shutdown, malfunction plan. Also, the preconstruction review requirements of the General Provisions have been overridden, and instead more straightforward preconstruction review requirements are contained in subpart N. Finally, as previously described in Section 2.11, the monitoring requirements have been reduced where possible.

The EPA estimates that, on an ongoing basis, the impacts of the revised reporting and recordkeeping requirements are \$3.5 million and 159,100 hours per year for hard chromium electroplating operations, \$6.4 million and 289,300 hours per year for decorative chromium electroplating operations, and \$1.6 million and 70,200 hours per year for chromium anodizing operations. This is compared to the impacts of the proposed rule of \$8.6 million and 388,400 hours per year for hard chromium electroplating operations, \$15.6 million and 706,200 hour per year for decorative chromium electroplating operations, and \$3.8 million and 171,500 hour per year for chromium anodizing operations.

Comment: Two commenters (IV-D-10, IV-D-43) stated that state and local permitting agencies should be allowed to determine appropriate reporting and recordkeeping requirements, especially for area sources because enforcement actions against area sources are the responsibility of local agencies. These commenters also recommended that no reports be submitted for a set period of time following promulgation; one commenter suggested 6 months (IV-D-10) and the other suggested 1 year (IV-D-43) as an appropriate timeframe. This would allow State and local agencies an opportunity to request and assume delegation of the air toxics program and to minimize the confusion on the part of sources as to which agency has authority.



Response: The EPA is required to identify the minimum reporting and recordkeeping requirements that are necessary to determine compliance with subpart N. State and local agencies may choose to require additional reporting and recordkeeping if they feel it is necessary to determine the compliance status of a source. States that currently have existing regulations for chromium electroplating and anodizing tanks may submit their programs to the EPA for approval as equivalent in accordance with subpart E of part 63.

In the final rule, the first report that must be submitted is the initial notification report required by § 63.347(c), which is due to the Administrator 180 days after the effective date. The report may be submitted to the permitting authority, if the authority has been granted approval to implement and enforce this rule. The compliance date for existing sources subject to this rule is 1 year from the effective date for decorative chromium electroplaters (i.e., November 1995) and 2 years from the effective date for hard chromium electroplaters and chromium anodizers (i.e., November 1996). The EPA believes that this timeframe is sufficient for States to apply for implementation and enforcement responsibilities for this rule.

Comment: One commenter (IV-D-10) suggested the length of time a facility is required to keep records should depend on its inspection frequency; however, records should be maintained for a minimum of 2 years. A tiered approach to reporting frequency based on the facility's emission level could also be adopted. Two commenters (IV-D-24, IV-D-58) stated that maintaining records at a facility for 5 years is excessive; a more appropriate length of time would be 3 years.

Response: The final rule 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 unchanged from the proposed rule because it is consistent with the General Provisions and with the title V permit program. As stated in the preamble to the final General Provisions, 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. Allowing the destruction of potential evidence of violations may prevent the EPA from pursuing the worst violators.

Comment: One commenter (IV-D-20) asked that section 63.9(b) specify that all sources are allowed to report potential rectifier capacity or some other parameter in lieu of chromium emission estimates.

Response: Section 63.9(b) of subpart A requires an initial notification, but does not require that the emissions from the affected source be estimated. In any event, § 63.9(b) has been overridden by § 63.347(c) of the final rule. This section requires identification of facility name and address, a statement that subpart N is the basis for the notification, a description of affected sources and the applicable emission limitation for the source, and a statement of whether the source is located at a major or area source as defined in § 63.2 of subpart A. For owners or operators performing hard chromium electroplating, the maximum potential rectifier capacity associated with these operations must also be reported so the Administrator (or permitting authority) knows if the source(s) is located at a small or large, hard chromium electroplating facility. The initial notification does not require an emissions estimate because the affected sources in these source categories are relatively uniform in terms of emissions potential.

Comment: One commenter (IV-D-38) explained that automatic/continuous monitoring of conductivity, washdown timer, magnahelic gauges, etc. may be equipped with a transmitter and programmable logic controller system to provide printing and storage of parameters that can be maintained via computer hard drive. If the EPA approves the use of such a monitoring system, software can be written to accomplish the storage of data on the computer hard drive.

Response: Section 63.10(b)(1) of subpart A, which applies to sources covered by subpart N, specifies the manner in which

records should be kept. In accordance with this provision, files must be maintained for at least 5 years following each occurrence, measurement, maintenance, corrective action, report, or record. The most recent 2 years of data must be retained on site; the remaining 3 years, however, may be retained off site. Such files may be maintained on microfilm, computer, floppy disk, magnetic tape disks, or microfiche.

Comment: Six commenters (IV-D-01, IV-D-03, IV-D-08, IV-D-19, IV-D-20, IV-D-22) suggested the EPA develop user-friendly reporting forms to facilitate the reporting requirements of the rule. One of these commenters (IV-D-08) also suggested that because the formal rule is difficult to understand as written, the EPA should produce an easy to follow guidance document to accompany the rule. Another commenter (IV-D-20) indicated that the rule (or preamble or Fact Sheet) should contain a chronological listing of compliance and reporting requirements that incorporates requirements of both the chromium electroplating NESHAP and the General Provisions.

Response: The EPA is developing an enabling document to accompany the rule, and the Small Business Administration is developing a pamphlet assist small businesses. Both of these documents are intended to help sources understand the requirements of the rule and implement the rule.

Comment: One commenter (IV-D-20) requested that the reporting dates for the initial notification of compliance status and for the initial performance test referenced in § 63.9(h)(4) of the proposed General Provisions be revised. Notification of compliance status is due within 45 days of compliance date, however the performance test is not due until 120 days after the compliance date; the emission data gathered during the performance test will be necessary for submission of compliance status.

Response: In the General Provisions, the notification of compliance status is required to be submitted within 60 days following the completion of the required performance testing, as is stated in § 63.9(h)(2)(ii), not 60 days from the compliance

date. Subpart N overrides this requirement to allow sources additional time to submit the notification of compliance status. Additional time may be required for the many sources in these source categories to obtain performance test results. A shorter timeframe may result in owners or operators having to pay extra to obtain analytical results within 60 days.

Section 63.347(e)(3) of the final rule requires the notification of compliance status be submitted 90 days following completion of the performance test required by § 63.7 of subpart A and § 63.343(b) of the final rule if a performance test is required. The results of performance testing are also due no later than 90 days after completion of the test. Thus, the timeframes are consistent. If a performance test is not required (e.g., sources meet the requirements of § 63.343(b)(2) or (3)), the compliance status report must be submitted no later than 30 days after the compliance date.

#### 2.13.4 Requirements of the General Provisions

Comment: One commenter (IV-D-23) requested that the rule clearly state which sections of the General Provisions apply to chromium electroplating sources and which do not.

Response: Table 1 has been added to the final rule. This table identifies which sections of the General Provisions apply to sources subject to subpart N, and which do not. If a requirement in the General Provisions is overridden by a requirement in subpart N, the applicable section in subpart N is cited.

Comment: Three commenters (IV-D-20, IV-D-28, IV-D-43) noted that the proposed rule does not contain any requirements for continuous monitoring systems but subsequently requires a continuous monitoring system performance report in § 63.347(c). Two of these commenters (IV-D-20, IV-D-43) asked whether the EPA intended to refer to section 504(a) of the Act or part 70 of the General Provisions. One of the three commenters (IV-D-28) suggested deleting this reference from the rule.

Response: In the General Provisions, continuous monitoring systems (CMS) are intended to include continuous emission

monitors, continuous opacity monitors, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis. In accordance with this definition, monitoring of surface tension, foam blanket thickness, pressure drop, and velocity pressure would be considered CMS. The EPA recognizes that the term CMS could cause some confusion among owners or operators of affected sources. Therefore, subpart N has overridden the requirements in the General Provisions that deal with CMS and replaced them with requirements in subpart N that are more appropriate to these subcategories. As previously stated, Table 1 specifies which requirements of the General Provisions apply to sources subject to subpart N, which do not, and which have been overridden by a specific requirement in subpart N.

Comment: One commenter (IV-D-10) suggested that the initial notification requirement of section 63.7 of the General Provisions be waived for sources that hold operating permits with the State or local agency to reduce reporting burdens for the sources. In lieu of this requirement, the State or local agency would submit a list of affected sources to the EPA.

Response: The requirements for the initial notification that are contained in § 63.347(c) of the final rule are minimal. The EPA does not think it will be burdensome for sources to submit this report, especially those sources that hold operating permits. The information required in the initial notification has probably been compiled previously by such sources.

Comment: One commenter (IV-D-10) indicated that the timeframe for review of test plans that is provided in subpart A of part 63 of the General Provisions is inappropriate and should be overridden by the chromium electroplating rule.

Response: The final rule overrides the requirement that sources required to conduct a performance test prepare a site-specific test plan that meets the requirements of § 63.7(b)(1). Instead, § 63.344(a) identifies the minimum elements to be contained in test reports documenting the initial

performance test, which shall be made available to the Administrator upon request.

Comment: Given the implications of the General Provisions for this rule, one commenter (IV-D-23) stated that he reserved the right to submit additional comments on the proposed chromium electroplating NESHAP following final promulgation of the General Provisions.

Response: The preamble to the proposed subpart N and the proposed rule clearly stated that the General Provisions were proposed rules at the time, but that sources subject to subpart N would eventually have to comply with the General Provisions as promulgated. As such, comments regarding the General Provisions were to be made during the comment period for subpart A. Alternatively, owners or operators of sources affected by subpart N could have provided comments on the requirements of the proposed General Provisions during the comment period for subpart N.

#### 2.14 OPERATING PERMIT PROGRAM

Comment: Eleven commenters stated that area sources should not be required to obtain title V operating permits. Four commenters (IV-D-14, IV-D-23, IV-D-24, IV-D-47) suggested that the rule should exempt nonmajor sources from title V. One commenter (IV-D-15) suggested that the NESHAP be written so that it requires all sources to comply with the emission standards but does not require title V permits for area sources. Another commenter (IV-D-10) stated that a title V permit is not necessary because existing requirements are enforceable through State and local permits. This commenter and one other (IV-D-43) 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. This commenter also indicated that part 70 requires periodic review of the permit, and for area sources, this review would not result in significant changes from the original operating permit; periodic review is most useful for large, complex operations. Two commenters (IV-D-10, IV-D-22)

said it will be a cost burden for area sources to obtain title V permits, and the emissions from these sources may be insignificant (IV-D-22).

Four commenters (IV-D-10, IV-D-20, IV-D-23, IV-D-43) suggested that there should be an applicability threshold, or cut-off, for area sources required to obtain permits. One of these commenters (IV-D-10) suggested that the threshold be risk-based. Another of these commenters (IV-D-20) suggested that the threshold determination for title V permit applicability could be set at a later date after the EPA has received and reviewed the initial notifications of compliance status.

Two commenters (IV-D-14, IV-D-47) 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 (IV-D-08, IV-D-10) 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 (IV-D-10).

Finally, two commenters (IV-D-40, IV-D-43) asked that a general permit be included in the final rule to reduce the burden for small facilities.

Response: 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 the 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 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.

Comment: Three commenters (IV-D-14, IV-D-23, IV-D-47) suggested that in the event that nonmajor sources are included under title V permitting, the rule should explicitly state that a permit is required only for applicable emissions units at nonmajor sources.

Response: 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, applicable emission limitations only need to be identified for those emission points that are subject to regulation.

## 2.15 WORDING OF THE REGULATION

Comment: Several commenters requested changes or additions to the definitions of terms provided in section 63.341 of the regulation. One commenter (IV-D-45) suggested changes regarding



the definitions of the terms decorative chromium electroplating, hard chromium electroplating, and stalagmometer. According to this commenter, the text "...to provide a bright surface with wear and tarnish resistance" for decorative chromium electroplating and the text "...to provide a surface with wear resistance, a low coefficient of friction, hardness, and corrosion resistance" for hard chromium electroplating that are currently used in the definitions for these terms limit the applicability of the regulation; the regulation should apply regardless of the purpose of the electroplating. Also, this commenter stated that the term tensiometer should be defined separately from the term stalagmometer. Two other commenters (IV-D-17, IV-D-58) also suggested changes to the definitions for the terms hard and decorative chromium electroplating; they believed that these terms should emphasize the purpose of the electroplating operation. Decorative electroplating is done primarily to provide cosmetic effects and hard electroplating is done primarily to provide functional effects. According to the commenters, the definition of hard electroplating should also be written so that the applicability of only one of the listed functional effects would qualify the electroplating operation as hard chromium electroplating. These commenters also suggested that the definition for the term chromium electroplating be amended to include the electrodeposition of chromium onto undercoatings, in addition to the electrodeposition of chromium onto base metals or plastics as the definition currently reads.

Two commenters (IV-D-20, IV-D-43) requested clarification of the definitions for the terms air pollution control device and foam blanket and specifically questioned whether foam blankets are considered to be air pollution control devices according to the current definitions. In the instance that foam blankets are an air pollution control device, the final regulation should clearly identify them as such. Also, in this instance, the monitoring, recordkeeping, and reporting requirements for control devices should apply. However, nonapplicable requirements such as pressure drop monitoring should be excluded. Another

commenter (IV-D-24) asked that a definition for the term add-on air pollution control device be added.

Finally, one commenter (IV-D-41) pointed out that the proper terminology for referring to chromium electroplating emissions is "mist emissions," as is used by California and other agencies. According to this commenter, chromium emissions should not be referred to as "fumes," as the proposed rule currently is worded.

Response: As mentioned in previous sections of this document, the definitions for hard chromium electroplating, decorative chromium electroplating, and chromium anodizing have been revised. In addition to describing the function of each type of electroplating and anodizing, the definitions in the final rule express these electroplating and anodizing operations in terms of process parameters such as typical electroplating thickness achieved, current density, and electroplating time. The term tensiometer has also been added to the list of definitions. Another new term, "air pollution control technique," which includes methods such as fume suppressants that reduce or prevent chromium emissions, has also been added. A "foam blanket" is a type of fume suppressant and is considered to be an air pollution control technique. As previously discussed, the monitoring, reporting, and recordkeeping that applies to sources controlled with an air pollution control technique has been clarified in the final rule; requirements are control technique specific, not source category specific. The term air pollution control device has been changed to add-on air pollution control device, and refers to add-on equipment such as packed-bed scrubbers, composite mesh-pad systems, and fiber-bed mist eliminators. A definition for fiber-bed mist eliminator has been added in the final rule.

The final rule also contains a definition for fume suppressant; this definition clarifies that fume suppressants are considered the same as mist suppressants. It is the EPA's experience that both terms are used in the industry, and therefore a definition of fume suppressant was added to eliminate any confusion.

Comment: One commenter (IV-G-01) requested that the term facility in the proposed rule be consistent with the definition of major source under 40 CFR part 70. Otherwise, large industrial complexes that consist of multiple, distinct major sources under title V are treated as one source under Title III (of the CAA Amendments). One problem that would arise under the proposed rule is that maximum cumulative rectifier capacity would have to be calculated for the entire industrial complex and not just each major source.

Response: The definition of facility in subpart N is consistent with the definition of major source in subpart A.

Comment: Four commenters (IV-D-01, IV-D-03, IV-D-40, IV-D-43) suggested that allowable emission limits, alternative compliance procedures, compliance dates, monitoring requirements, recordkeeping requirements, and reporting requirements should be summarized in table format in the regulation in a manner similar to the summary tables in the preamble. The table format is easier to follow than the current written version.

Response: The Agency agrees that providing information in table format whenever possible in the rule is a convenient method for summarizing the requirements of the rule. However, requirements that are written in text format in the rule cannot be repeated in a table format because of potential inconsistencies between the text and table. Two tables have been included in the final rule that present requirements not found elsewhere in text. Table 1 specifies which requirements of the General Provisions apply, and Table 2 specifies the work practice standards. In addition, summary tables of the standards and the monitoring and reporting requirements are provided in the preamble.

Comment: Two commenters (IV-D-16 and IV-D-24) indicated that § 63.345(c) should refer to the O&M plan in section 63.342(e) rather than section 63.342(d), which refers to chromium anodizing tanks. Another commenter (IV-D-49) indicated that § 63.345(c)(3), which refers to the addition of makeup water for a packed-bed scrubber, is not applicable to the

composite mesh-pad system that is the subject of section 63.345(c). One commenter (IV-D-24) suggested that section 63.343, which references compliance and performance testing, should reference pressure drop measurement. This commenter also suggested that the wording of section 63.345(d) be consistent with the wording of section 63.345(e).

Response: The commenters are correct in that § 63.345(c) of the proposed rule should have referred to § 63.342(e), not § 63.342(d). The final rule is organized differently so all operation and maintenance requirements are included as work practices in § 63.342(f). Section 63.343 did not reference pressure drop measurement because, at proposal, pressure drop measurement was not being conducted for purposes of compliance. In the final rule, pressure drop measurement is being done for purposes of compliance and is required as such in § 63.343(c)(1) through (4). In a previous response in Section 2.11, the EPA acknowledged that § 63.345(c) erroneously required the addition of makeup water to the packed bed for composite mesh-pad systems. The addition of makeup water to the packed bed is a work practice standard only for owners or operators of packed-bed scrubbers, as is clear in § 63.342(f) and Table 2 of the final rule. Finally, consistent wording is used, as applicable, in the final rule.

Comment: One commenter (IV-D-33) requested that the EPA review the wording of the regulation. The commenter indicated that the wording of the regulation will cost the company a lot of money.

Response: The final version of the regulation differs from the proposed version. The EPA made changes to clarify applicability, and compliance, monitoring, recordkeeping, and reporting requirements. The EPA believes that the final regulation is clearer, and will be easier for sources to understand and implement.

Comment: One commenter (IV-D-21) suggested that the rule for hard chromium electroplating should clearly indicate that a source needs to meet the designated emission limit and not a specified control system design.

Response: The standards in the rule require a specific emission limitation (expressed as mg/dscm), and any control system may be used to meet these standards. Exceptions are the surface tension limits that are included as standards; surface tension limits are included for the specific situation in which a wetting agent-type fume suppressant is used to control chromium emissions from decorative chromium electroplating or chromium anodizing tanks. The preamble to the proposed rule described only those control technologies that the EPA assumed would be used by industry in meeting the emission limits. The fact that other control methods were not described in the proposal preamble does not preclude their use as long as the applicable emission limit is achieved.

#### 2.16 MISCELLANEOUS

Comment: One commenter suggested that an emissions averaging scheme be incorporated into the chromium electroplating NESHAP.

Response: The EPA does not think that there are opportunities for emissions averaging in this NESHAP. Typically, there are multiple emission points within a source category, and emissions averaging allows a source to average across these various emission points. In the chromium electroplating and chromium anodizing source categories, there is really only one emission point, the tank. One might suggest that averaging could occur by controlling one tank to a level higher than the standard to compensate for another tank that is controlled to a lesser degree. However, the EPA does not support leaving a tank uncontrolled even if another tank at the facility is controlled to a greater extent.

Comment: One commenter (IV-D-23) noted that the proposed rule differs significantly from the information that was presented at the National Air Pollution Control Techniques Advisory Committee (NAPCTAC) meeting. Specifically, at this meeting, the EPA stated that area and major sources would be regulated separately, with different technology requirements (i.e., MACT v. GACT). Also, according to this commenter, the EPA

stated that the compliance timeframe would be 3 years after promulgation for existing sources. At NAPCTAC, composite mesh pads were the basis of MACT for new hard chromium electroplaters only, not new and existing. Finally, the trivalent chromium electroplating process was identified as MACT for new decorative chromium electroplaters.

Response: The EPA presented the status of the chromium electroplating and chromium anodizing NESHAP at a briefing for the NAPCTAC on January 29 through 31, 1991. The purpose of the NAPCTAC briefing is for the EPA to present the current status of their regulatory actions to industry, regulatory agencies, environmental groups, and the public. The information that is presented at NAPCTAC briefings is subject to change based on public comments, comments received from the NAPCTAC panel, and additional information that may be gathered by the EPA in response to these comments. One of the major changes since NAPCTAC is that composite mesh-pad systems became much more widely used in the chromium electroplating industry. In the NAPCTAC briefing, the EPA stated that emerging add-on control technology (e.g., composite mesh pads) were being considered as a regulatory alternative that was more stringent than the MACT floor, and that such technologies may become demonstrated during the rulemaking process. The most recent cost-benefit analysis conducted by the EPA indicated that these devices are cost-effective for tanks at existing large, hard chromium electroplating facilities and all new hard chromium electroplating facilities. Therefore, they were selected as MACT for those categories. Regarding the regulation of decorative chromium electroplating facilities, for the reasons discussed in Section 2.6.1, the EPA concluded that there was insufficient information to select the trivalent chromium electroplating process as new source MACT for decorative chromium electroplating sources.

During the NAPCTAC briefing, GACT was presented as a possible alternative for regulating area sources. Regulation of area sources by GACT was considered for the source categories

covered by this rule, and, for the reasons discussed in Section 2.4, was not selected. At the time of the NAPCTAC briefing, these decisions had not been finalized. Likewise, section 112(i)(3) of the Act states that the EPA shall establish a compliance time for existing sources, which provides for compliance as expeditiously as practicable, but in no event is later than 3 years after the effective date of the standard. At the time of the NAPCTAC briefing, this information may have been presented because the compliance timeframe for the source categories covered by this NESHAP had not yet been selected. When the rule was to be proposed, the EPA selected the compliance dates. For the reasons discussed in Section 2.10, the compliance date in the final rule is 1 year from the effective date for existing decorative chromium electroplaters and 2 years from the effective date for existing hard chromium electroplaters and chromium anodizers covered by the standard.

Comment: Two commenters (IV-D-52, IV-D-58) suggested that the EPA educate small businesses on the requirements of this and other NESHAP through public outreach programs. One commenter (IV-D-58) pointed out that the provisions of section 507(b)(2) could be implemented to inform small businesses of the technical requirements of this rule.

Response: In order to aid small business in the requirements for stack testing, the EPA has prepared a videotape on how to build the Method 306A sampling train, how to operate the train, and how to make and install the enhanced monitoring equipment. The videotape is entitled "Construction and Operation of the EPA Method 306A Sampling Train and Practical Suggestions for Monitoring of Electroplating and Anodizing Facilities," and will be available in January 1995 for a nominal fee. The videotape is available through North Carolina State University, Registrar, Environmental Programs, Box 7513, Raleigh, NC 27695-7513. The telephone number is (919) 515-4659. The fax number is (919) 515-4386. In addition, articles on how to make and operate the testing and enhanced monitoring equipment will be written and published in trade journals of the industry such as

the *Plating and Surface Finishing* and *Metal Finishing*. Also, as previously stated, the EPA is developing an Enabling Document and the Small Business Administration is developing a pamphlet to help owners or operators understand and implement the rule.

Comment: One commenter (IV-D-19) stated that the EPA should promulgate the final rule by November 15, 1994 as scheduled.

Response: The final rule will be promulgated by November 23, 1994 in accordance with a consent decree reached between the Sierra Club and the EPA.

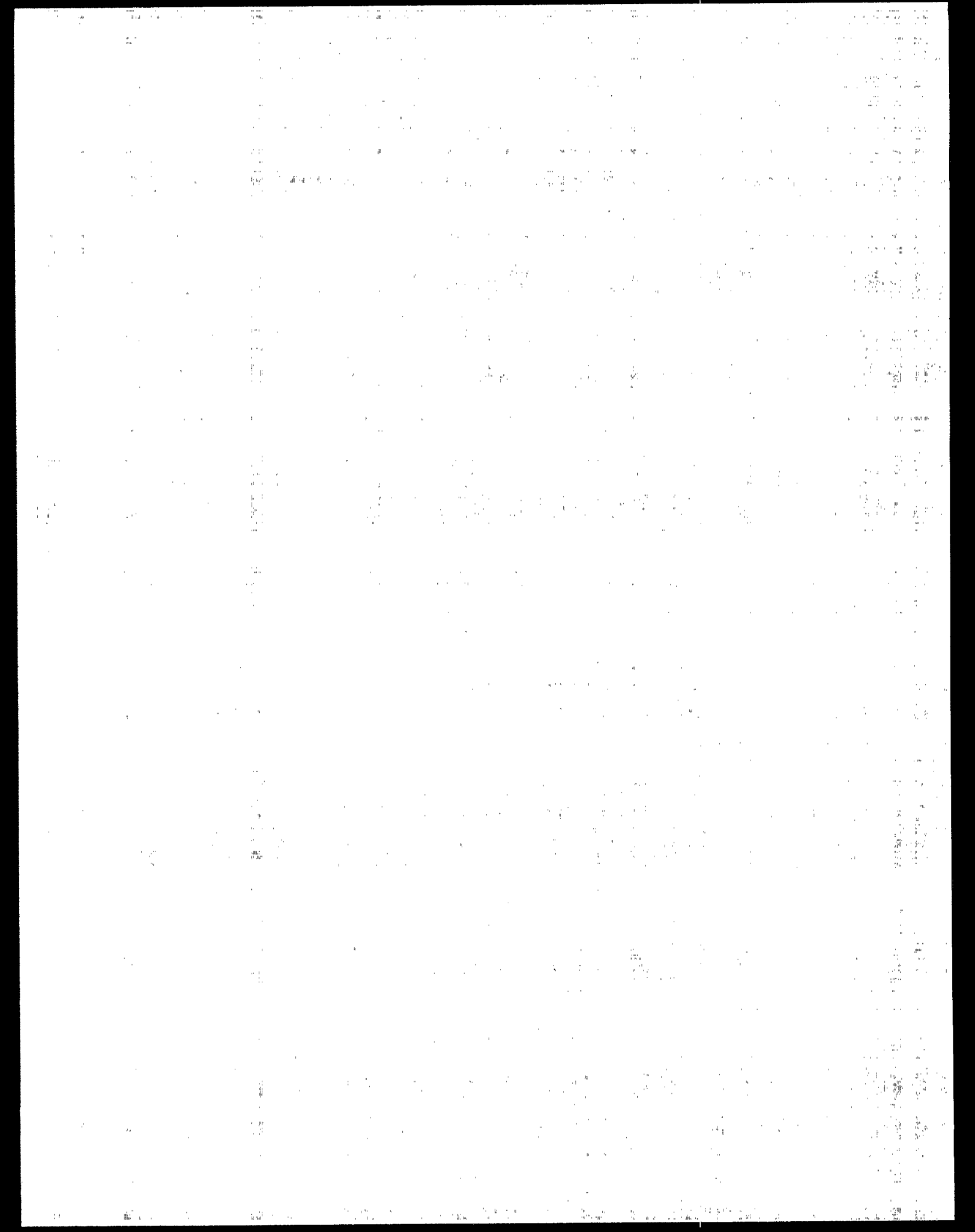
Comment: One commenter (IV-D-04) questioned whether they were on the mailing list because they did not receive a copy of the background information document (BID) for the proposed standards. Other commenters (IV-D-32, IV-D-34) requested a copy of an organization's public comments.

Response: Two documents, the BID for the proposed standards and the New Technology Document, were prepared to identify the information used in developing the proposed standard. The BID consists of two volumes, and is too lengthy to distribute to everyone on the mailing list. The BID and the new technology document can be obtained from the U. S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. These documents can also be retrieved from one of the EPA's electronic bulletin boards, the Technology Transfer Network (TTN). The TTN provides information and technology exchange in various areas of air pollution control. The service is free, except for the cost of the phone call. Dial (919) 541-5742 for up to a 14,400 bps modem. If more information on TTN is needed, call the HELP line at (919) 541-5384.

Copies of public comment letters are available for public inspection and copying between 8:00 a.m. and 5:30 p.m., Monday through Friday, at the EPA's Air and Radiation Docket and Information Center, Waterside Mall, Room 1500, 1st Floor, 401 M Street, S.W., Washington, DC 20460. The telephone number is



(202) 260-7548. The fax number is (202) 260-4400. When requesting information on this standard, refer to Docket No. A-88-02. Public comment letters are identified according to the nomenclature in Table 2-1. A reasonable fee may be charged for copying.



# TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

1. REPORT NO. EPA 453/R-94-082b		2.		3. RECIPIENT'S ACCESSION NO.	
4. TITLE AND SUBTITLE Chromium Emissions from Chromium Electroplating and Chromic Acid Anodizing Operations--Background Information for Promulgated Standards				5. REPORT DATE November 1994	
				6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Lalit Banker, ESD/Organic Chemicals Group				8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Emission Standards Division Office of Air Quality Planning and Standards U. S. Environmental Protection Agency Research Triangle Park, NC 27711				10. PROGRAM ELEMENT NO.	
				11. CONTRACT/GRANT NO.	
12. SPONSORING AGENCY NAME AND ADDRESS DAA for Air Quality Planning and Standards Office of Air and Radiation U. S. Environmental Protection Agency Research Triangle Park, NC 27711				13. TYPE OF REPORT AND PERIOD COVERED Final	
				14. SPONSORING AGENCY CODE EPA/200/04	
15. SUPPLEMENTARY NOTES					
16. ABSTRACT National emission standards to control emissions of chromium compounds from new and existing chromium electroplating and chromium anodizing tanks are being promulgated under section 112 of the Clean Air Act. This document summarizes public comments received during proposal and EPA's responses to these comments.					
17. KEY WORDS AND DOCUMENT ANALYSIS					
a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS		c. COSATI Field/Group	
Air pollution control Chromium Environmental protection National emission standards Hazardous air pollutants Electroplating Anodizing		Air pollution control Chromium Stationary sources			
18. DISTRIBUTION STATEMENT Release Unlimited		19. SECURITY CLASS (Report) Unclassified		21. NO. OF PAGES 170	
		20. SECURITY CLASS (Page) Unclassified		22. PRICE	

