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Effluent Limitations Guidelines and New Source Performance Standards for the Metal Products and Machinery Point Source Category; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 438

[FRL–7453–6]

RIN 2040–AB79

Effluent Limitations Guidelines and New Source Performance Standards for the Metal Products and Machinery Point Source Category

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA is publishing final regulations establishing Clean Water Act (CWA) technology-based effluent limitations guidelines for the metal products and machinery (MP&M) point source category. The metal products and machinery point source category includes facilities that manufacture, rebuild, or maintain metal products, parts, or machines. EPA is promulgating limitations and standards only for facilities that directly discharge wastewaters from oily operations in the Oily Wastes subcategory.

EPA expects compliance with this regulation to reduce the discharge of conventional pollutants by approximately 500,000 pounds per year. EPA estimates the annual cost of the rule will be $13.8 million (pre-tax $2001). EPA estimates that the annual benefits of the rule to be approximately $1.5 million ($2001).

DATES: This regulation shall become effective June 12, 2003.

ADDRESSES: The administrative record is available for inspection and copying at the Water Docket, located at the EPA Docket Center (EPA/DC) in the basement of the EPA West Building, Room B–102, 1301 Constitution Ave., NW., Washington, DC. The rule and key supporting materials are also electronically available via EPA Dockets (Edocket) at *http://www.epa.gov/edocket/* under Edocket number OW–2002–0033 or at *http://www.epa.gov/guide/mpm/.*

FOR FURTHER INFORMATION CONTACT: For technical information concerning today's final rule, contact Mr. Carey A. Johnston at (202) 566–1014 or Ms. Shari Z. Barash at (202) 566–0996. For economic information contact Mr. James Covington at (202) 566–1034.

SUPPLEMENTARY INFORMATION:

What Entities Are Potentially Regulated by This Final Rule?

Entities potentially regulated by this action include facilities that directly discharge wastewaters from oily operations and include the following types:

Category	Examples of regulated entities
Industry	Facilities that discharge wastewater from oily operations and manufacture, maintain, or rebuild metal parts, products or machines used in the following sectors: Aerospace, Aircraft, Bus & Truck, Electronic Equipment, Hardware, Household Equipment, Instruments, Mobile Industrial Equipment, Motor Vehicles, Office Machines, Ordnance, Precious Metals and Jewelry, Railroad, Ships and Boats, Stationary Industrial Equipment, and Miscellaneous Metal Products.
Government	State and local government facilities that discharge wastewater from oily operations and manufacture, maintain, or rebuild metal parts, products or machines in one of the sectors previously listed (*e.g.*, a town that operates its own bus, truck, and/or snow removal equipment maintenance facility). Federal facilities that discharge wastewater from oily operations and manufacture, maintain, or rebuild metal parts, products or machines.

Note: The term ''oily operations'' is defined at 40 CFR 438.2(f) and appendix B of part 438.
Note: See Appendix A of the TDD for a list of example NAICS and SIC codes that may apply to facilities regulated by MP&M.

EPA does not intend the preceding table to be exhaustive, but rather it provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the applicability criteria listed at 40 CFR 438.1 and 438.10 of today's rule. If you still have questions regarding the applicability of this action to a particular entity, consult one of the persons listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

How Can I Get Copies of This Document and Other Related Information?

EPA has established an official public docket for this action under Docket ID. No. OW–2002–0033. The official public docket is the collection of materials that is available for public viewing at the Water Docket in the EPA Docket Center (EPA/DC) in the basement of EPA West, Room B102, 1301 Constitution Ave., NW., Washington DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Water Docket is (202) 566–2426. For access to the docket materials, please call ahead to schedule an appointment. A reasonable fee may be charged for photocopying.

An electronic version of the public docket is available through EPA's electronic public docket and comment system, EPA Dockets. You may use EPA Dockets at *http://www.epa.gov/edocket/* to view public comments, access the index listing of the contents of the official public docket, and to access those documents in the public docket that are available electronically. Although not all docket materials may be available electronically, you may still access any of the publicly available docket materials through the docket facility previously identified. Once in the system, select ''search,'' then key in the appropriate docket identification number (OW–2002–0033).

Major supporting documents are also available in hard copy from the National Service Center for Environmental Publications (NSCEP), U.S. EPA/NSCEP, PO Box 42419, Cincinnati, Ohio, USA 45242–2419, (800) 490–9198, *http://www.epa.gov/ncepihom/.* You can obtain electronic copies of this preamble and rule as well as major supporting documents at EPA Dockets at *http://www.epa.gov/edocket/* and *http://www.epa.gov/guide/mpm.* The two major documents supporting the final regulations are:

- *''Development Document for the Final Effluent Limitations Guidelines and Standards for the Metal Products & Machinery Point Source Category''* [EPA–821–B–03–001] referred to in the preamble as the Technical Development Document (TDD): This document presents the technical information that formed the basis for EPA's decisions in today's final rule. The TDD describes, among other things, the data collection activities, the wastewater treatment

technology options considered by the Agency as the basis for effluent limitations guidelines and standards, the pollutants found in MP&M wastewaters, and the estimation of pollutant removals associated with certain pollutant control options.

• *''Economic, Environmental, and Benefits Analysis of the Final Metal Products & Machinery Rule''* [EPA–821–B–03–002] referred to in the preamble as the Economic, Environmental, and Benefits Analysis (EEBA): This document presents the methodology employed to assess economic impacts and environmental impacts and benefits of the final rule and the results of the analysis.

What Process Governs Judicial Review for Today's Final Rule?

In accordance with 40 CFR 23.2, today's rule is considered promulgated for the purposes of judicial review as of 1 p.m. Eastern Daylight Time, May 27, 2003. Under section 509(b)(1) of the Clean Water Act (CWA), judicial review of today's effluent limitations guidelines and standards may be obtained by filing a petition in the United States Circuit Court of Appeals for review within 120 days from the date of promulgation of these guidelines and standards. Under section 509(b)(2) of the CWA, the requirements of this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

What Are the Compliance Dates for Today's Final Rule?

Existing direct dischargers must comply with today's limitations based on the best practicable control technology currently available (BPT) and the best conventional pollutant control technology (BCT) as soon as their National Pollutant Discharge Elimination System (NPDES) permits include such limitations. New direct discharging sources must comply with applicable new source performance standards (NSPS) on the date the new sources begin discharging. For purposes of NSPS, a source is a new source if it commences construction after June 12, 2003.

How Does EPA Protect Confidential Business Information (CBI)?

EPA notes that certain information and data in the record supporting the final rule have been claimed as CBI and, therefore, EPA has not included these materials in the record that is available to the public in the Water Docket. Further, the Agency has withheld from disclosure some data not claimed as CBI because release of this information could indirectly reveal information claimed to be confidential. To support the rulemaking while preserving confidentiality claims, EPA is presenting in the public record certain information in aggregated form or, alternatively, is masking facility identities or employing other strategies. This approach assures that the information in the public record explains the basis for today's final rule without compromising CBI claims.

How Is This Preamble Organized?

The following outline is for the preamble to the final rule. It is written in plain language designed to help the reader understand the information in the final rule. This preamble contains a short summary of what was proposed, the key comments that the Environmental Protection Agency (EPA) received on the proposed rule, and the principal bases for EPA's decisions.

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I. Legal Authority

The U.S. Environmental Protection Agency is promulgating these regulations under the authority of sections 301, 304, 306, 307, 308, 402, and 501 of the Clean Water Act, 33 U.S.C. 1311, 1314, 1316, 1317, 1318, 1342, and 1361 and under authority of the Pollution Prevention Act of 1990 (PPA), 42 U.S.C. 13101 *et seq.,* Public Law 101–508, November 5, 1990.

II. Legislative Background

A. Clean Water Act

Congress adopted the Clean Water Act (CWA) to ''restore and maintain the chemical, physical, and biological integrity of the Nation's waters'' (section 101(a), 33 U.S.C. 1251(a)). To achieve this goal, the CWA prohibits the discharge of pollutants into navigable waters except in compliance with the statute. The Clean Water Act confronts the problem of water pollution on a number of different fronts. Its primary reliance, however, is on establishing restrictions on the types and amounts of pollutants discharged from various industrial, commercial, and public sources of wastewater.

Congress recognized that regulating only those sources that discharge effluent directly into the nation's waters would not be sufficient to achieve the CWA's goals. Consequently, the CWA requires EPA to promulgate nationally applicable pretreatment standards that restrict pollutant discharges from facilities that discharge wastewater through sewers flowing to publicly-owned treatment works (POTWs) (section 307(b) and (c), 33 U.S.C. 1317(b) and (c)). National pretreatment standards are established for those pollutants in wastewater from indirect dischargers which pass through, interfere with, or are otherwise incompatible with POTW operations. Generally, pretreatment standards are designed to ensure that wastewater from direct and indirect industrial dischargers are subject to similar levels of treatment. In addition, POTWs are required to develop and enforce local pretreatment limits applicable to their industrial indirect dischargers to satisfy any local requirements (*see* 40 CFR 403.5).

Direct dischargers must comply with effluent limitations in National Pollutant Discharge Elimination System (NPDES) permits; indirect dischargers must comply with pretreatment standards. These limitations and standards are established by regulation for categories of industrial dischargers and are based on the degree of control that can be achieved using various levels of pollution control technology.

1. Best Practicable Control Technology Currently Available (BPT)—Section 304(b)(1) of the CWA

In the regulations, EPA defines BPT effluent limitations for conventional, toxic, and non-conventional pollutants. Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD^5), total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease (O&G) as an additional conventional pollutant on July 30, 1979 (*see* 44 FR 44501). EPA has identified 65 pollutants and classes of pollutants as toxic pollutants, of which 126 specific substances have been designated priority toxic pollutants (*see* Appendix A to part 403, reprinted after 40 CFR 423.17). All other pollutants are considered to be non-conventional.

In specifying BPT, EPA looks at a number of factors. EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and such other factors as the EPA Administrator deems appropriate (CWA 304(b)(1)(B)). Traditionally, EPA establishes BPT effluent limitations based on the average of the best performances of facilities within the industry of various ages, sizes, processes or other common characteristics. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

2. Best Conventional Pollutant Control Technology (BCT)—Section 304(b)(4) of the CWA

The 1977 amendments to the CWA required EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. In addition to the other factors specified in section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two part ''cost-reasonableness'' test. EPA explained its methodology for the development of BCT limitations in July 1986 (*see* 51 FR 24974).

3. Best Available Technology Economically Achievable (BAT)—Section 304(b)(2) of the CWA

In general, BAT effluent limitations guidelines represent the best available economically achievable performance of plants in the industrial subcategory or category. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts, including energy requirements. The Agency retains considerable discretion in assigning the weight to be accorded these factors. BAT limitations may be based on effluent reductions attainable through changes in a facility's processes and operations. Where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved within a particular subcategory based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

4. New Source Performance Standards (NSPS)—Section 306 of the CWA

NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology. New sources have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the best available demonstrated control technology for all pollutants (*i.e.,* conventional, non-conventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

5. Pretreatment Standards for Existing Sources (PSES)—Section 307(b) of the CWA

PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of publicly-owned treatment works (POTWs), including sludge disposal methods at POTWs. Pretreatment standards for existing sources are technology-based and are analogous to BAT effluent limitations guidelines.

The General Pretreatment Regulations, which set forth the framework for the implementation of national pretreatment standards, are found at 40 CFR 403.

6. Pretreatment Standards for New Sources (PSNS)—Section 307(c) of the CWA

Like PSES, PSNS are designed to prevent the discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. PSNS are to be issued at the same time as NSPS. New indirect dischargers have the opportunity to incorporate into their plants the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

B. Pollution Prevention Act

The Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13101 *et seq.,* Public Law 101–508, November 5, 1990) ''declares it to be the national policy of the United States that pollution should be prevented or reduced whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever

feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or release into the environment should be employed only as a last resort * * *'' (Sec. 6602; 42 U.S.C. 13101 (b)). In short, preventing pollution before it is created is preferable to trying to manage, treat or dispose of it after it is created. The PPA directs the Agency to, among other things, ''review regulations of the Agency prior and subsequent to their proposal to determine their effect on source reduction'' (Sec. 6604; 42 U.S.C. 13103(b)(2)). EPA reviewed this effluent guideline for its incorporation of pollution prevention.

According to the PPA, source reduction reduces the generation and release of hazardous substances, pollutants, wastes, contaminants, or residuals at the source, usually within a process. The term source reduction ''include[s] equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control. The term 'source reduction' does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to or necessary for the production of a product or the providing of a service.'' 42 U.S.C. 13102(5). In effect, source reduction means reducing the amount of a pollutant that enters a waste stream or that is otherwise released into the environment prior to out-of-process recycling, treatment, or disposal.

In these final regulations, EPA supports pollution prevention technology by including pollution prevention in its technology basis for today's limitations and new source performance standards. This includes water conservation and re-use of lubricants and solvents.

C. Section 304(m) Requirements

Section 304(m) of the CWA, added by the Water Quality Act of 1987, requires EPA to establish schedules for: (1) Reviewing and revising existing effluent limitations guidelines and standards; and (2) promulgating new effluent guidelines. On January 2, 1990, EPA published an Effluent Guidelines Plan (*see* 55 FR 80), in which schedules were established for developing new and revised effluent guidelines for several industry categories, including the metal products and machinery industry. Natural Resources Defense Council, Inc., and Public Citizen, Inc., challenged the Effluent Guidelines Plan in a suit filed in the U.S. District Court for the District of Columbia, (*NRDC et al.,* v. *Browner,* Civ. No. 89–2980). On January 31, 1992, the Court entered a consent decree (the ''304(m) Decree''), which establishes schedules for, among other things, EPA's proposal and promulgation of effluent guidelines for a number of point source categories. The consent decree, as amended, requires EPA to take final action on the Metal Products and Machinery effluent guidelines by February 14, 2003.

III. Metal Products & Machinery Effluent Guidelines Rulemaking History

A. 1995 and 2001 Proposed Regulations

On May 30, 1995, EPA published a proposal entitled, ''Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Metal Products and Machinery'' (*see* 60 FR 28210). Throughout today's preamble, EPA refers to this 1995 proposal as the ''Phase I'' or the ''1995'' proposal for the Metal Products and Machinery industry. To make the regulation more manageable, EPA initially divided the industry into two phases based on industrial sectors. The Phase I proposal included the following industry sectors: Aerospace; Aircraft; Electronic Equipment; Hardware; Mobile Industrial Equipment; Ordnance; and Stationary Industrial Equipment. At that time, EPA planned to propose a rule for the Phase II sectors approximately three years after the MP&M Phase I proposal. Phase II sectors included: Bus & Truck, Household Equipment, Instruments, Job Shops, Motor Vehicles, Office Machines, Precious Metals and Jewelry, Printed Wiring Boards, Railroad, Ships and Boats, and Miscellaneous Metal Products.

EPA received over 350 public comments on the Phase I proposal. One area where commentors from all stakeholder groups (*i.e.,* industry, environmental groups, regulators) were in agreement was that EPA should not divide the industry into two separate regulations. Commentors raised concerns regarding the regulation of similar facilities with different compliance schedules and potentially different limitations solely based on whether they were in a Phase I or Phase II MP&M industrial sector. Furthermore, many facilities performed work in multiple sectors. In such cases, permit writers and control authorities (*e.g.,* POTWs) would need to decide which MP&M rule (Phase I or II) applied to a facility. EPA's responses to comments can be found in section 20.3 of the docket for the rule.

Based on these comments, EPA published a new proposal on January 3, 2001 (*see* 66 FR 424) which completely replaced the 1995 proposal. Throughout this preamble, EPA refers to this proposal as the ''2001'' proposal for the Metal Products and Machinery industry. In that notice, EPA proposed to establish new limitations and standards for approximately 10,000 facilities in the 18 industrial sectors (without any designation of ''Phase I'' or ''Phase II''). EPA also divided the industry into eight regulatory subcategories: General Metals, Metal Finishing Job Shops, Printed Wiring Board, Non-Chromium Anodizing, Steel Forming & Finishing, Oily Wastes, Railroad Line Maintenance, and Shipbuilding Dry Docks (*see* 66 FR 439 for a discussion on the development of EPA's proposed subcategorization scheme).

EPA found two basic types of waste streams in the industry: (1) Wastewater with high metals content (metal-bearing); and (2) wastewater with low concentration of metals, and high oil and grease content (oil-bearing). When looking at facilities generating metal-bearing wastewater (with or without oil-bearing wastewater), EPA identified five groups of facilities that could potentially be subcategorized by dominant product, raw materials used, and/or nature of the waste generated (*i.e.,* General Metals, Metal Finishing Job Shops, Printed Wiring Board, Non-Chromium Anodizing, and Steel Forming & Finishing). When evaluating facilities with only oil-bearing wastewater for potential further subcategorization, EPA identified two types of facilities (*i.e.,* Railroad Line Maintenance and Shipbuilding Dry Docks) that were different from the other facilities in the Oily Wastes subcategory based on size, location, and dominant product or activity. This subcategorization scheme allowed EPA to more accurately assess various technology options in terms of compliance costs, pollutant reductions, benefits, and economic impacts.

EPA proposed new limitations and standards for direct dischargers in all eight MP&M subcategories and proposed pretreatment standards for all indirect dischargers in three subcategories (*i.e.,* Metal Finishing Job Shops, Printed Wiring Board, and Steel Forming & Finishing); pretreatment standards for facilities above a certain wastewater flow volume in two subcategories (*i.e.,* General Metals and Oily Wastes); and no national pretreatment standards for facilities in three subcategories (*i.e.,* Non-Chromium

Anodizing, Railroad Line Maintenance, and Shipbuilding Dry Docks). EPA received over 1500 comment letters on the 2001 proposal. EPA's responses to the comments can be found in section 20.3 of the rulemaking.

B. June 2002 Notice of Data Availability

On June 5, 2002, EPA published a Notice of Data Availability (NODA) at 67 FR 38752. In the NODA, EPA discussed major issues raised in comments on the 2001 proposal; suggested revisions to the technical and economic methodologies used to estimate compliance costs, pollutant loadings, and economic and environmental impacts; presented the results of these suggested methodology changes and incorporation of new (or revised) data; and summarized the Agency's thinking on how these results could affect the Agency's final decisions.

The NODA also included a discussion of possible alternative options for certain subcategories based on comments, including an Environmental Management System (EMS) alternative in lieu of part 438 limitations and standards, and a discussion of ''upgrading'' facilities currently regulated under the Electroplating regulations (40 CFR part 413) to meet the Metal Finishing regulations (40 CFR part 433) (*see* 67 FR 38797). Finally, the NODA included preliminary revised effluent limitations and pretreatment standards for all eight proposed subcategories. EPA received over 300 comment letters on the NODA. EPA's responses to the comments can be found in section 20.3 of the docket for the rule.

IV. Summary of Significant Decisions

As the previous discussion of the development of this regulation explains, EPA proposed regulating discharges associated with a number of different operations in the MP&M industry. Thus, EPA proposed regulations that would have established new limitations and standards for approximately 10,000 facilities in 18 industrial sectors that EPA subcategorized in eight subcategories. Following its consideration of comments submitted to EPA as well as intensive scrutiny of the data used to develop the proposal, EPA has determined that it should only finalize regulations for the Oily Wastes subcategory. These regulations would affect approximately 2,400 facilities. The following material explains EPA's decisions underlying today's regulation. It discusses significant issues considered by EPA or raised by commentors on the May 1995 and January 2001 proposed rules and June 2002 NODA, and how EPA has resolved these issues in today's final rule.

A. Decisions Regarding the Content of the Regulation

The following discussion describes how EPA has subcategorized this industry in developing limitations and standards, and EPA's decisions about whether to subject particular subcategories to limitations and standards. It also identifies the pollution control technology EPA used as the basis for establishing limitations and standards. Next, this section discusses the applicability of the rule to iron and steel operations and to ''oily operations.'' The section also looks at the regulated pollutants and describes EPA decisions concerning the use of a ''pollution prevention'' alternative for complying with the final rule.

1. Subcategorization Structure

The CWA requires EPA, in developing effluent limitations guidelines and pretreatment standards that reflect the best available technology economically achievable to consider a number of different factors. Among others, these include the age of the equipment and facilities in the category, manufacturing processes employed, types of treatment technology to reduce effluent discharges, and the cost of effluent reductions (section 304(b)(2)(b) of the CWA, 33 U.S.C. 1314(b)(2)(B)). The statute also authorizes EPA to take into account other factors that the Administrator deems appropriate.

One way in which the Agency has taken some of these factors into account is by breaking down categories of industries into separate classes of similar characteristics. This recognizes the major differences among companies within an industry that may reflect, for example, different manufacturing processes or wastewater characteristics. One result of subdividing an industry by subcategories is to safeguard against overzealous regulatory standards, increase the confidence that the regulations are practicable, and diminish the need to address variations between facilities through a variance process (*Weyerhaeuser Co.* v. *Costle,* 590 F.2d 1011, 1053 (D.C. Cir. 1978)).

As discussed in section III.A of today's final rule, in 2001 EPA proposed to divide the MP&M industry into eight regulatory subcategories based on the manufacturing, maintenance or rebuilding operations performed at a facility (called ''unit operations'' in this preamble): General Metals, Metal Finishing Job Shops, Printed Wiring Board, Non-Chromium Anodizing, Steel Forming & Finishing, Oily Wastes, Railroad Line Maintenance, and Shipbuilding Dry Docks. Based on comments submitted on the proposed rule and NODA, EPA has refined today's final subcategorization structure for the analyses performed to support today's final rule. For the purposes of analyzing issues in developing the final rule, EPA retained the eight subcategory structure, but altered the placement of some operations within certain subcategories. For example, the subcategorization approach that EPA has used for analyses supporting today's final rule incorporates printed wiring board job shops in the Printed Wiring Board subcategory (as opposed to the Metal Finishing Job Shop subcategory, as proposed) and places printed wiring assembly facilities in the General Metals subcategory (*see* 67 FR 38756).

As discussed in the NODA, EPA also considered an additional subcategory for facilities that primarily perform zinc electroplating (''zinc platers''). Depending on whether or not these facilities operate as a captive or a job shop, EPA had proposed to include them as part of the General Metals or Metal Finishing Job Shop subcategories, respectively. The NODA explained that EPA was also considering: (1) Creating a separate subcategory for zinc platers; (2) segmenting zinc platers within the General Metals and Metal Finishing Job Shop subcategories for zinc platers; or (3) retaining the proposed subcategory structure and establishing numerical limitations and standards for zinc that would be achievable by zinc platers (*see* 67 FR 38756). Commentors on the NODA supported retaining the proposed subcategories as long as the record demonstrated that zinc platers could achieve the zinc numerical limitations and standards. They raised concerns that creating a separate subcategory or segment to address the limitations for one pollutant would be confusing and difficult to implement. EPA did not create a separate subcategory or segment for zinc platers in evaluating the data for the final rule. These zinc platers remain subject to parts 413 and/or 433.

Also, as discussed in the NODA, EPA considered establishing the Steel Forming and Finishing subcategory for wastewater discharges resulting from: (1) Steel forming and finishing operations (*e.g.,* cold forming on steel wire, rod, bar, pipe, and tube); and (2) continuous electroplating of flat steel products (*e.g.,* strip, sheet, and plate). EPA re-examined its database for facilities that perform continuous steel electroplating, and found that, contrary to its initial finding, continuous electroplaters do not perform operations similar to other facilities in this

subcategory (*i.e.,* steel forming and finishing facilities performing cold forming on steel wire, rod, bar, pipe, and tube). Thus, EPA included continuous electroplaters performing electroplating and coating operations in the General Metals subcategory for analyses supporting today's final rule.

Finally, as explained in section IV.B, based on comments and revisions to analytical databases, the Agency re-evaluated its technical and economic analyses for the final rule. EPA performed its re-evaluation of all proposed subcategories. As a result of this assessment, EPA decided to only establish effluent guidelines for the Oily Wastes subcategory.

2. Summary of Regulatory Decisions

The analyses for today's final rule incorporate database changes, additional data, and methodological changes as discussed in the NODA and in section IV.B of today's preamble. Based on EPA's analyses for today's final rule, EPA is establishing limitations and standards for one of the subcategories listed in the January 2001 proposed rule. For others, EPA has concluded that national limitations and standards are not warranted. In addition, EPA is not establishing pretreatment standards for existing or new sources for any of the subcategories in today's rule. Some of today's limitations and standards are based on the technology options that formed the basis for the proposal while others are based on modified technology options.

Table IV–1 Summarizes EPA's decisions for each subcategory considered for today's final rule and each regulatory level. Each of these decisions is further detailed in section VI of today's final rule.

TABLE IV–1.—SUMMARY OF FINAL REGULATORY DECISIONS

Subcategory considered	Final regulation		Section of today's final rule
	Discharger status (regulatory level)	Selected technology option	
General Metals	Direct Dischargers (BPT/BCT/BAT/NSPS)	No new or revised limitations or standards established.	VI.A.1–4
	Indirect Dischargers (PSES/PSNS)	No new or revised standards established	VI.A.5–6
Metal Finishing Job Shop	Direct Dischargers (BPT/BCT/BAT/NSPS)	No revised limitations or standards established.	VI.B.1–2
	Indirect Dischargers (PSES/PSNS)	No revised standards established	VI.B.3–4
Printed Wiring Board	Direct Dischargers (BPT/BCT/BAT/NSPS)	No revised limitations or standards established.	VI.C.1–2
	Indirect Dischargers (PSES/PSNS)	No revised standards established	VI.C.3–4
Non-Chromium Anodizing	Direct Dischargers (BPT/BCT/BAT/NSPS)	No revised limitations or standards established.	VI.D.1–2
	Indirect Dischargers (PSES/PSNS)	No revised standards established	VI.D.3
Steel Forming & Finishing	Direct Dischargers (BPT/BCT/BAT/NSPS)	No revised limitations or standards established.	VI.E.1–2
	Indirect Dischargers (PSES/PSNS)	No revised standards established	VI.E.3–4
Oily Wastes	Direct Dischargers (BPT/BCT/NSPS)	Pollution Prevention + Chemical Emulsion Breaking + Oil-Water Separation (Option 6).	VI.F.1–4
	Indirect Dischargers (PSES/PSNS)	No standards established	VI.F.5–6
Railroad Line Maintenance	Direct Dischargers (BPT/BCT/BAT/NSPS)	No limitations or standards established	VI.G.1–4
	Indirect Dischargers (PSES/PSNS)	No standards established	VI.G.5
Shipbuilding Dry Dock	Direct Dischargers (BPT/BCT/BAT/NSPS)	No limitations or standards established	VI.H.1
	Indirect Dischargers (PSES/PSNS)	No standards established	VI.H.2

3. Summary of Significant Applicability Decisions

a. Applicability of MP&M to Certain Iron and Steel Operations

EPA received comment regarding the inclusion of certain operations now subject to the Iron & Steel effluent guidelines (40 CFR part 420) within the proposed MP&M effluent guidelines. In the proposed MP&M rule, EPA refers to facilities with these operations as the Steel Forming & Finishing subcategory. Specifically, EPA proposed to move operations that produce finished products such as bars, wire, pipe and tubes, nails, chain link fencing, and steel rope into the MP&M rule (as the Steel Forming & Finishing subcategory) from stand-alone facilities, as well as from facilities that also have other operations that are currently regulated by the Iron & Steel effluent guidelines (*i.e.,* facilities that are making steel and producing wire and wire products and are subject to both ELGs through the combined wastestream formula).

Commentors stated that these operations and resulting wastewaters are comparable to those at facilities subject to the Iron and Steel Manufacturing effluent guidelines and that these discharges should remain subject to part 420 rather than today's rule. In addition, commentors stated that part 420 adequately protects the environment from discharges associated with these activities. Based on its analyses for this final rule, EPA has determined that limitations and standards for the proposed Steel Forming & Finishing subcategory based on MP&M Option 2 technology are not economically achievable. Therefore, today's final rule does not establish a Steel Forming & Finishing subcategory and accompanying limitations and standards. Thus, wastewaters generated by these operations remain subject to the Iron & Steel Manufacturing effluent limitations guidelines and standards (40 CFR part 420). Also, as discussed in section IV.A.1, EPA included continuous electroplaters in the General Metals subcategory for analyses supporting today's final rule.

b. Applicability to Certain Oily Operations

Today's final rule revises the proposed definition of ''oily operations'' by including additional operations (*see* 67 FR 38765). EPA is incorporating into the definition of ''oily operations'' the following unit operations and any associated rinses:

- Abrasive blasting;
- Adhesive bonding;
- Alkaline treatment without cyanide;
- Assembly/disassembly;

- Burnishing;
- Calibration;
- Electrical discharge machining;
- Iron phosphate conversion coating;
- Painting-spray or brush (including water curtains);
- Polishing;
- Thermal cutting;
- Tumbling/barrel finishing/mass finishing/vibratory finishing;
- Washing (finished products);
- Welding; and
- Wet air pollution control for organic constituents

EPA notes that this revision to the oily operations definition has the effect of moving 1,550 facilities from the General Metals subcategory to the Oily Wastes subcategory. See section V.B for the complete list of oily operations subject to regulation in today's final rule.

In addition, as discussed in the NODA, EPA is removing ''laundering'' from the definition of oily operations (*see* 67 FR 38766). EPA does not consider wastewater discharges from laundering (*e.g.,* uniforms) at MP&M facilities to be process wastewater under the MP&M final rule. The inclusion of laundering in the proposed definition of oily operations was an oversight which the Agency has now corrected for the final rule.

At proposal, EPA excluded bilge water (or any other wastewater) from ships that are afloat from the scope of the rule; however, bilge water was inadvertently included in the oily operations definition in the NODA (*see* 67 FR 38765). Today's final rule corrects this and removes bilge water from the definition of oily operations. Because EPA is not promulgating limitations and standards for the Shipbuilding Dry Dock subcategory, EPA also does not consider bilge water from ships in a dry dock or similar structure (*e.g.,* graving docks, building ways, marine railways and lift barges) a MP&M process wastewater.

c. Applicability to Certain Metal Drum Reconditioning and Cleaning Operations

At proposal EPA considered whether it should include wastewater generated from unit operations performed by drum reconditioners/cleaners to prepare metal drums for resale, reuse, or disposal in this rulemaking. These operations include chaining, caustic washing, acid cleaning, acid etching, impact deformation, leak testing, corrosion inhibition, shot blasting, and painting. In EPA's ''Preliminary Data Summary for Industrial Container and Drum Cleaning Industry'' (EPA–821–R–02–011), EPA did not identify any metal drum reconditioning or cleaning facilities that discharge directly to surface waters. The Agency estimates that the drum reconditioning facilities are either indirect or zero or alternative dischargers.

EPA solicited comment on whether these facilities would be more appropriately covered under the MP&M rule or under a new industrial category of effluent guidelines for drum reconditioners (*see* 66 FR 434). Commentors stated that these operations should not be subject to MP&M because drum reconditioning/cleaning wastewaters are more variable than MP&M wastewaters. EPA reviewed its database on drum reconditioning operations and wastewater characteristics. EPA found that its database is insufficient to evaluate the technical and economic achievability of the options considered for today's final rule. Therefore, EPA is not including drum reconditioning and cleaning operations as within the scope of this final rule.

4. Environmental Management Systems and the Pollution Prevention Alternative

In the proposed rule, EPA discussed the use of a compliance alternative (*i.e.*, the Pollution Prevention Alternative) for indirect dischargers in the Metal Finishing Job Shop (MFJS) subcategory (*see* 66 FR 511). The Pollution Prevention (P2) Alternative would act as a voluntary incentive for MFJS indirect dischargers that agreed to perform specific best management/pollution prevention practices. These MFJS indirect dischargers would be allowed to meet the pretreatment standards of part 433 in lieu of meeting the more stringent pretreatment standards of the proposed MP&M rule. Because EPA is not promulgating pretreatment standards that are more stringent than those in part 433 or part 413 for those facilities covered by part 413 pretreatment standards, EPA is not promulgating today the use of a compliance alternative for metal finishing job shops. EPA notes that many metal finishing jobs shops are currently employing best management/pollution prevention practices similar to those described in the proposal as part of the National Metal Finishing Strategic Goals Program.

As discussed in the NODA (*see* 67 FR 38798), EPA also considered an industry suggested alternative for the General Metals subcategory based on the use of an Environmental Management System (EMS) to mitigate economic impacts associated with today's rule. Similar in concept to the Pollution Prevention Alternative previously discussed, the EMS compliance alternative would act as a voluntary incentive for facilities that implemented an EMS which would include specific monitoring, controls, and recordkeeping. These facilities would be allowed to meet the limitations and standards of part 433 in lieu of meeting the more stringent limitations and standards of the proposed MP&M rule.

EPA received several comments on the EMS compliance alternative. Some commentors were in favor of the EMS compliance alternative and stated that: (1) The EMS compliance alternative is an innovative tool for continually enhancing environmental regulation; (2) an EMS does not replace the need for regulatory enforcement, but can be used as a tool to enhance a facility's environmental performance; and (3) requiring ISO 14001 adds another level of compliance assurance due to independent third party auditing. Other commentors were not in favor of this EMS compliance alternative and stated that: (1) The administrative and enforcement burden for pretreatment control authorities would be excessive as it could result in protracted discussions regarding the adequacy of the EMS; and (2) the EMS compliance alternative is overly restrictive and does not allow for variability found among MP&M industries and the POTWs to which they discharge. In particular, commentors noted that requiring ISO 14001 certification is extremely expensive and would have the effect of rendering this option untenable for any small business and many larger businesses as well.

EPA encourages the wide spread use of EMSs across a range of organizations and settings, with particular emphasis on adoption of EMSs to achieve improved environmental performance and compliance, pollution prevention through source reduction, and continual improvement (*see* EPA Position Statement on Environmental Management Systems, May 15, 2002, DCN 17848, section 24.4). However, EPA is not promulgating an EMS-based compliance alternative for facilities in the General Metals subcategory as EPA is not promulgating limitations and standards for the General Metals subcategory (*see* section VI.A).

B. Decisions Regarding Methodology

Sections 11 and 12 of the TDD provide detailed description of the methodologies used to develop compliance cost estimates and pollutant reductions for this final MP&M regulation. In addition, the EEBA for the final rule provides a detailed description of the economic impacts

and environmental benefits analyses and methodologies. This section of today's final rule summarizes the changes to the EPA Cost & Loadings Model and the changes in the economic impacts and benefits analyses methodologies. This section also discusses EPA's decisions regarding selection of facilities with ''BAT'' treatment technologies.

1. Changes to the EPA Cost & Loadings Methodology for MP&M Options

a. General Methodology Changes

Based on comments to the proposed rule and considerations discussed in the NODA (*see* 67 FR 38756), EPA made significant changes to the EPA Cost & Loadings Model used to estimate compliance costs and pollutant reductions at the national level for the technology options considered for today's final rule. EPA included all of the changes identified in the NODA (*e.g.,* review of survey discharge status and reviewed additional industry-supplied data) into the analyses for the final rule. EPA also stated in the NODA that we would also examine other potential changes in response to comments after publication of the NODA but before the final rule (*see* DCN 17804, section 16.0). This section provides additional information on EPA's final analyses with respect to these potential changes and any changes identified by NODA comments.

b. Assignment of Treatment-in-Place (TIP) Credit

EPA developed a computerized Cost & Loadings Model to estimate compliance costs and pollutant loadings for the various technology options. EPA estimates the baseline pollutant loadings (*i.e.,* pollutant loading prior to compliance with the MP&M regulations) from model facilities based on actual TIP at those facilities as determined by the site's response to EPA's questionnaire. EPA calculates the pollutant loads removed by the technology option under consideration as the difference between the pollutant loadings estimated for the option and the pollutant loadings estimated for the baseline conditions.

In general, commentors stated that EPA failed to extend proper TIP credit to facilities in the MP&M survey questionnaire database and overestimated pollutant discharge loadings. Based on comments received on the proposal and NODA, EPA has re-evaluated its assignment of TIP credit used for estimating baseline pollutant loadings for the final rule and has concluded that additional technologies are equivalent (or better than) the BAT technology options in the proposal and the NODA.

In the NODA, EPA assumed that end-of-pipe ion exchange would achieve cyanide removals equivalent to alkaline chlorination, a proposed BAT technology basis. Therefore, EPA set cyanide treatment credit for process lines with ion exchange as equivalent to alkaline chlorination. Commentors requested that EPA also provide credit for in-process ion exchange for cyanide removal and for metals removal. EPA reviewed the information supporting these comments and concluded that ion exchange, whether in-process or end-of-pipe would provide pollutant reductions that are equivalent to the corresponding BAT technology option. Therefore, for the analyses supporting the final rule, EPA provided TIP credit for all streams receiving end-of-pipe or in-process ion exchange treatment for cyanide and metals.

EPA also reviewed its NODA assumptions regarding TIP credit for gravity thickening and filter presses. In the NODA, EPA assumed that facilities with sludge thickening or a filter press had both components in place. Upon closer review of the survey questionnaires, EPA finds that facilities may pump their sludge directly from a clarifier to a filter press without using a sludge thickening step. Consequently, EPA no longer assumes all facilities using filter presses also operate gravity thickeners. EPA notes that it is equating ''sludge thickening tanks'' and ''sludge dryers'' with gravity thickening. For facilities indicating only gravity thickening or filter press, EPA has estimated costs associated with the addition of the necessary equipment.

At proposal EPA did not assume that facilities that indicated some form of oily wastewater treatment (*e.g.,* oil-water separator) would be performing chemical emulsion breaking (and receive TIP credit for chemical emulsion breaking) prior to oil water separation if they have emulsified oils. For the final rule analyses, EPA reviewed all questionnaires to ensure that the same TIP assignments were given to Phase I and Phase II questionnaire facilities. Based on this review, EPA is assuming for the final rule that facilities that indicated some form of oily wastewater treatment (*e.g.,* oil-water separator) are performing chemical emulsion breaking prior to oil-water separation if they have emulsified oils.

c. Pollutant Loadings Baseline for MP&M Options for Metal-Bearing Wastewater Subcategories

EPA received many comments on its estimation of baseline pollutant loadings and reductions for the various options. For treated streams, EPA estimated zero pollutant removals for pollutants that are already present in low concentrations (*i.e.,* are present at a concentration below the technology option long term average (LTA). For untreated streams, EPA estimated baseline loadings and pollutant removals based on unit operation pollutant concentrations, and did not adjust for local or Federal regulatory limits on the facility. Many commentors were concerned that EPA's use of unit operation-specific average concentrations to model the concentration of untreated wastewater streams would overestimate current pollutant loadings at facilities, particularly those currently regulated by parts 413 or 433 and at facilities that do not treat their wastewaters due to low initial concentrations. In the NODA, EPA presented information on corrections and other revisions made to the costs and pollutant loadings model, and solicited comment on a sensitivity analysis which assumed at baseline that all MP&M facilities currently regulated by existing effluent guidelines (*i.e.*, 40 CFR parts 413 and 433) are not discharging pollutant concentrations above their applicable effluent limitations guidelines and standards (*see* 67 FR 38762).

For the final rule, EPA implemented two strategies to estimate baseline loadings and removals more accurately for untreated, low concentration streams at model facilities. First, EPA evaluated discharge monitoring report (DMR) data available for direct discharger model facilities. If all pollutant concentrations measured, as indicated from the DMR data, were below the technology option limits, EPA estimated zero pollutant removals for the model facility. Second, EPA considered regulatory limits on the model facility. EPA assumed the pollutant concentrations discharged from each stream at sites regulated under part 433 were at least meeting the monthly average limits set by part 433.

Table IV–2 summarizes the new method and how EPA estimated baseline pollutant concentrations for its pollutant reduction estimates associated with the final rule MP&M technology options.

TABLE IV–2.—CURRENT POLLUTANT CONCENTRATIONS USED TO ESTIMATE POLLUTANT REDUCTIONS ASSOCIATED WITH THE MP&M TECHNOLOGY OPTIONS

	433 regulated parameters	433 unregulated parameters
Treated Wastewater Streams	LTAs from part 433	LTAs from Technology Option 2 of Today's rule.
Untreated Wastewater Streams Regulated by 413 or 433.	Monthly Average Limitations from part 433	Concentrations from Subcategory-Specific Unit Operations Data.
Untreated Wastewater Not Regulated by 413 or 433.	Concentrations from Subcategory-Specific Unit Operations Data.	Concentrations from Subcategory-Specific Unit Operations Data.

Note: See Section VI and Section 9 of the TDD for further discussion of Technology Option 2.
Note: EPA assigns Option 2 LTAs to all wastewater streams for all pollutant to model facilities TIP equal to or greater than BAT treatment

For the final rule, EPA assumed that facilities currently treating their wastewater discharges (regardless of their regulatory status) operate their wastewater treatment systems to achieve the long-term average concentrations of the part 433 regulations. Furthermore, in the case of pollutants of concern not regulated in part 433, EPA made the conservative assumption that facilities with wastewater treatment operate their wastewater treatment systems to achieve the long-term average concentrations for such pollutants from MP&M Option 2 (*see* section VI and section 9 of the TDD for further discussion of Technology Option 2).

For untreated streams at facilities currently regulated by parts 413 or 433 for the parameters regulated by part 433, EPA assumed for its evaluations for the final rule that facilities achieve the monthly average limitation of part 433. As discussed in the NODA, EPA concluded it is appropriate to use the monthly average limitation, as opposed to the long-term average concentration, for streams that are not being treated or for parameters that are not being targeted for treatment. Finally, for untreated streams (regardless of regulatory status) for the parameters not regulated by part 433, and for regulated parameters for untreated streams at facilities not subject to parts 413 or 433, EPA has assumed the baseline concentrations are equivalent to the raw waste load using subcategory-specific unit operations data.

For all direct discharging facilities in the General Metals subcategory, EPA has assumed the facilities achieve permit limits for non-conventional pollutants Chemical Oxygen Demand (COD), Total Kjeldahl Nitrogen (TKN), and Ammonia as Nitrogen (NH_3-N). EPA received several comments that the Agency overestimated concentrations of COD. While this parameter is not regulated by Parts 413 or 433, comments stated that it is typically regulated in National Pollutant Discharge Elimination System (NPDES) permits. Additionally, EPA notes that COD removals had a significant impact on the cost and removal comparison ratio ($/lb-removed) for the General Metals subcategory. While these parameters are also not regulated by Parts 413 or 433, limits for these parameters are found in EPA's Permit Compliance System (PCS). To reduce overestimation of pollutant removals for COD, TKN, and NH_3-N, EPA did not allow the pollutant concentrations discharged from the facility to exceed permit limits. EPA modeled the limits based on data from EPA's Permit Compliance System (PCS) for these types of facilities. Because EPA could not determine which sites in PCS were MP&M sites, for the purposes of this analysis, EPA calculated the average permit limit concentrations for process wastewater discharged from each facility in the 3000 series of SIC codes. Based on these data, EPA set the maximum concentration for the commingled MP&M wastewater discharged from each model site at 175, 35.67, and 19.3 milligrams per liter (mg/L) for COD, TKN, and NH_3-N, respectively (*see* DCN 17846, section 24.7).

d. Unit Operations Data

EPA used unit operations data from the questionnaires, sampling episodes, and commentors data, to estimate baseline pollutant loading for some untreated wastewaters at certain facilities. As described in section IV.B.1, and as discussed in the NODA (*see* 67 FR 38756), in response to proposal commentors, EPA changed its proposal methodology to account for subcategory-specific differences in pollutant concentrations for the same unit operations. EPA received additional comments on the unit operations data from commentors on the NODA. In particular, comments on the NODA focused on three specific areas: (1) Requests to subdivide the ''testing'' unit operation to better reflect various types of testing wastewaters; (2) requests to remove additional ''outliers'' from the data set used to estimate the average pollutant concentrations for certain unit operation; and (3) requests to re-evaluate the ratio of pollutant concentrations in unit operation baths and the corresponding rinse. For direct dischargers, EPA also compared the baseline pollutant loadings from the pollutant loading model to available Discharge Monitoring Report (DMR) data (*see* section IV.B.2.b).

For the proposed rule, EPA combined testing unit operations from wastewater sampling of hydraulic testing, hydrostatic testing, dye penetrant testing, and alpha-case detection into a single pollutant concentration set for the ''testing'' unit operation (UP–42). Commentors explained that EPA should not group all testing operations together because these operations produce non-similar wastewaters. For example, commentors noted that dye penetrant testing produces wastewater with high pollutant concentrations while hydrostatic testing produces wastewater with low pollutant concentrations, but very large flows.

For today's final rule, EPA re-evaluated its data sets. EPA has concluded that it should divide the testing unit operations into subcategory-specific unit operations. Furthermore, EPA found no clear indication that facilities continue to perform alpha-case detection. Consequently, EPA's final database included separate, subcategory-specific data for two testing operations: Hydrostatic and dye penetrant. EPA reviewed each survey questionnaire and made a case-by-case determination of which of the two types of testing is being performed at a site (if any). See section 12 of the TDD for more information.

EPA has also addressed commentors concerns regarding the ratio of pollutant concentrations in unit operation baths (*e.g.,* electroplating baths) and their corresponding rinses. EPA has reviewed all bath-rinse pairs and ensured for the final analysis that the data used do not include any cases where a rinse is more concentrated than its bath.

e. Site-Specific Data Revisions for Survey Facilities

EPA revised its questionnaire database to reflect detailed comments provided about specific facilities in EPA's questionnaire database. EPA uses information about facilities in the questionnaire database to estimate various costs and benefits (*e.g.*, compliance costs, pollutant reductions, economic impacts, non-water quality environmental impacts). For example, in some cases facilities that did not provide flow or production data for certain wastestreams at the time they submitted their questionnaire provided such information in their comments on the proposal or NODA. In other cases, facilities provided updated information about their: (1) Unit operations (*e.g.*, whether they currently have these UPs); (2) regulatory status (*e.g.*, whether they were currently covered by parts 413 or 433 regulations); (3) wastewater discharge status (*i.e.*, direct, indirect, or zero discharger); and (4) wastewater treatment technology.

As noted in section 3 of the TDD, EPA conducted several surveys, with the two major surveys occurring in 1990 and 1996. For proposal and NODA analyses EPA used both 1990 and 1996 as reference years to estimate costs and benefits associated with the various regulatory options. These two survey efforts provided information about the MP&M industry at two different times (*i.e.*, 1990 and 1996). Commentors suggested that EPA rely on more recent information and gave specific comments updating information concerning some facilities surveyed in the Phase I survey effort. EPA is using the later survey year, 1996, as the base year for the questionnaire database to more accurately reflect current conditions in the MP&M industry. EPA incorporated information about specific facilities from commentors into the questionnaire database when the information reflected facility conditions at or prior to 1996.

EPA did not incorporate information from commentors into its questionnaire database when the information reflected facility conditions post-1996. When commentors provided post-1996 information, EPA did, however, use this information for a sensitivity analysis for all subcategories where it is promulgating limitations or new source standards to assess recent trends in the industry. See DCN 17843, section 24.6.2, of the record for results and discussion of this sensitivity analysis.

f. Site Discharge Destination

EPA solicited comment in the NODA on its methodology for categorizing a facility as either a direct discharger (to surface water), an indirect discharger (to a POTW), or a zero or alternative discharger (no wastewater is discharged) based on its questionnaire database. Facilities that are zero or alternative dischargers do not incur costs to comply with the regulation. For the January 2001 proposal and NODA, EPA identified direct dischargers as facilities that discharge any MP&M process wastewater to surface waters and calculated compliance costs and pollutant loadings and reductions for all MP&M process wastewaters as direct discharges. Commentors said that EPA should alter its methodology to allow facilities multiple discharge destinations rather than only assign a facility to a single category or discharge destination (*i.e.*, allow facilities with some streams discharging to a POTW and other streams to surface waters). Commentors also noted that EPA had misclassified some indirect dischargers as direct dischargers and provided examples.

EPA agrees with commentors that its methodology should address facilities with multiple wastewater discharge destinations. Consequently, EPA revised its methodology for the final rule to allow facilities that have multiple discharge destinations to be ''split.'' For the purposes of estimating compliance costs and pollutant reductions, ''splitting'' a site means that EPA runs only those process wastewater streams that are discharged to the POTW through the EPA Cost & Loadings Model for indirect dischargers and runs only those process wastewater (not stormwater) streams that are discharged directly to surface waters through the model for direct dischargers. In addition to those facilities identified by commentors, EPA reviewed survey questionnaires for all facilities with multiple discharge destinations to determine if they should be designated as direct, indirect, or split (*see* DCN 17825, section 24.6.2).

In addition, in response to the comments that EPA incorrectly classified some facilities as direct dischargers, EPA also reviewed survey questionnaires for all facilities it had previously designated as direct to confirm their discharge status (*see* DCN 17826, section 24.6.2). This review altered the discharge status of a number of facilities (*see* section 11 of the final TDD for additional discussion of EPA's review). EPA's databases for the final rule reflects these changes. EPA also reviewed all direct discharges to ensure that EPA did not consider stormwater as a MP&M process wastewater in its analysis of compliance costs and pollutant loadings.

g. Monitoring Costs

EPA revised its monitoring cost estimate for today's final rule to reflect the final list of regulated pollutants and monitoring frequencies. For example, as discussed in section IV.B of the NODA (*see* 67 FR 38767) and section 7 of the TDD, EPA is not regulating total sulfide, molybdenum, manganese, tin, or toxic organics. See section 11 of the TDD for today's final rule for a detailed discussion of EPA's monitoring cost estimates for each subcategory.

2. Methodology for Determining Cost & Loadings for the 433 Upgrade Options

In the NODA, EPA also discussed alternative options, ''413 to 433 Upgrade Option'' and ''All to 433 Upgrade Option,'' and an associated simplified cost and loadings analysis for these upgrade options. EPA provided estimates of compliance costs, pollutant reductions, economic impacts and cost-effectiveness based on this simplified analysis. For today's final rule, EPA revised its upgrade option methodology and performed a more detailed analysis of compliance costs and pollutant reductions, incorporating many of the comments received on the NODA as previously discussed.

a. Determining Regulatory Status

EPA reviewed the regulatory status for each survey questionnaire (*i.e.*, to confirm whether a given facility was currently regulated by part 413, part 433, both, or neither). Based on the applicability section of part 413 and 433 (*see* 40 CFR 413.01 and 433.11(c) and (d)), EPA concluded that currently all surveyed facilities included in the database for the proposed Metal Finishing Job Shop and Printed Wiring Board subcategories are regulated by part 413 and/or part 433. EPA first used the date operations began at the facility (as reported in the survey questionnaire) to identify the appropriate regulation. EPA assumed a facility was subject to part 433 if it began operations after 1982 because part 413 only applies to indirect discharging facilities operating before 1982. Next, EPA reviewed effluent discharge data from the remaining facilities to determine if the facility was discharging MP&M process wastewater. Finally, for facilities for which EPA does not have effluent discharge data, EPA called the site or its control authority to determine the regulatory status.

b. Revised Methodology for Estimating Pollutant Loadings and Reductions: Upgrade Options

EPA developed a methodology to estimate the baseline pollutant loadings at facilities that would be affected by the upgrade: (1) facilities currently regulated by 413 only; and (2) facilities regulated by local limits or general pretreatment standards only (*i.e.*, ''local limits'' facilities). EPA also performed a sensitivity analyses on facilities regulated by both parts 413 and 433. Facilities ''regulated by local limits and general pretreatment standards only'' also include facilities regulated by other effluent guidelines except parts 413 or 433. EPA notes that facilities currently regulated by only part 433 would not be affected by the upgrade and EPA did not project pollutant removals or compliance costs for them.

EPA's pollutant loadings methodology also distinguishes between ''small'' and ''large'' platers currently regulated by part 413. Part 413 defines small platers as facilities discharging less than 10,000 gallons/day of process wastewater. When the part 413 regulations were promulgated, EPA made provisions to accommodate the economic condition of ''small'' platers by reducing the numbers of regulated metals and allowing an alternative requirements for cyanide, as amenable to alkaline chlorination instead of total cyanide. Consequently, EPA adjusted its pollutant loadings methodology for the upgrade options to account for the additional parameters that small platers would need to treat (*see* section 9 of the final TDD for details on EPA's methodology for small platers).

For treated streams at affected facilities, EPA revised methodology assumes the facilities operate their wastewater treatment systems to achieve the LTAs from part 413. This is consistent with EPA's guidance that facilities use LTAs (rather than limitations or standards) as a ''target'' to design their treatment systems. For untreated streams at affected facilities, EPA used the 4-day average limit for part 413. As discussed in the NODA, EPA concludes this is appropriate because these facilities are complying with existing standards at the end-of-pipe. In estimating toxic pollutant reductions for the upgrade options, EPA compared the baseline loadings for affected facilities to the resulting loadings if these affected facilities treated their wastewater to achieve the long-term average concentrations (for existing sources) for part 433.

For facilities in the General Metals subcategory that are not regulated by either part 413 or part 433 (*i.e.,* ''local limits facilities''), EPA altered its NODA methodology to incorporate actual local limits data and to include analysis of other pollutant parameters (*e.g.,* COD). Although EPA could not obtain actual local limits for all facilities, EPA gathered local limits data from 213 POTWs in 7 EPA Regions to develop national median local limit values. *See* DCN 17844, section 24.7, of the record for a listing of the data and the median value for each parameter. EPA used half the national median local limit values to approximate long-term average concentrations for all treated streams. EPA used the national median for all parameters regulated by part 413 in untreated streams. EPA applied the raw waste load based on the subcategory-specific unit operations data for all other parameters in untreated streams. EPA then estimated the pollutant loading reductions as described in the previous paragraph.

In the NODA, EPA considered two different upgrade options for indirect dischargers in the General Metals, Printed Wiring Boards, and Metal Finishing Job Shop subcategories. The first option upgrades all facilities regulated by part 413 (including both large and small platers) to meet part 433 standards. The second option upgrades only large platers regulated by part 413 and facilities not regulated by parts 413 or 433 (regulated by local limits) to meet part 433 standards. EPA rejected these upgrade options for existing indirect dischargers as: (1) Greater than 10% of existing indirect dischargers not covered by part 433 are projected to close at the upgrade option; or (2) the incremental compliance costs of the upgrade options were too great in terms of toxic removals (cost-effectiveness values (in 1981$) in excess of $420/PE). See section VI for further discussion on these upgrade options for the General Metals, Printed Wiring Boards, and Metal Finishing Job Shop subcategories.

For direct dischargers, EPA also compared the baseline pollutant loadings from the pollutant loading model to available Discharge Monitoring Report (DMR) data reflecting the measured values for the permitted parameters. EPA obtained DMR data for eighteen surveyed direct discharging facilities in EPA's questionnaire database for the General Metals subcategory. The MP&M model approach utilizing the revised baseline method used for the final rule, calculates lower baseline loadings for twelve of these eighteen direct discharging facilities than the loadings reported in DMR data (*see* DCN 17851, section 24.7). Based on this analysis, EPA has concluded that the MP&M model approach utilizing the revised baseline method used for the final rule does not excessively over- or underestimate baseline pollutant loadings and EPA's use of this model approach for today's final rule is a reasonable and appropriate basis for today's regulatory determinations.

c. TIP Changes for Upgrade

In evaluating the upgrade options analyzed for the final rule, EPA also provided TIP credit for hydroxide precipitation and clarification treatments for metal-bearing facilities that use dissolved air flotation (DAF) for metals removal (*e.g.,* settling). However, EPA notes that TIP credit for hydroxide precipitation and clarification credit to metal-bearing facilities using DAF for metals removal was not provided in evaluating options to achieve the more stringent proposed MP&M limits. EPA is concerned that DAF alone would not achieve the long-term average concentrations associated with the limitations and standards considered for the subcategories discharging metal-bearing wastewaters. Therefore, EPA included costs associated with installing hydroxide precipitation and clarification at these facilities for the final rule.

d. Revised Compliance Cost Estimates for Upgrade Analyses

Based on comments to the NODA and subsequent discussions with industry representatives, EPA revised its analysis for estimating the cost of compliance for upgrading facilities to meet the part 433 existing source limitations and standards. Section 11 of the final TDD describes EPA's final methodology in detail. In addition to the costs included in the NODA analysis, EPA's final methodology also includes costs to:

- Increase the size of the treatment train (*e.g.,* holding tanks, clarifier, gravity thickening, filter press) to treat additional wastewater (which had pollutant concentrations below the part 413 standards but not low enough to meet the option limits without treatment);
- Increase the amount of treatment chemicals to account for treating additional wastewaters and more stringent LTAs;
- Increase sludge handling and disposal costs due to the treatment of additional streams as well as the more stringent long-term averages in part 433;
- Install and operate additional automated controls such as ORP meters and pH meters;
- Provide additional operator training; and

• Increase analytical monitoring costs for small platers to monitor for the additional pollutants covered by part 433.

3. Revisions to Economic & Benefits Methodologies

For the final rule, EPA incorporated several important revisions to the economic impact and benefits methodologies from the NODA. Section V of the NODA provides a detailed discussion of all changes incorporated in the economic impact and benefits analyses after publication of the proposed MP&M rule (*see* 67 FR 38752). In addition, based on NODA comments the Agency further refined the moderate impact analysis. As previously discussed, the Economic, Environmental, and Benefits Analysis (EEBA) for the final rule provides a complete discussion of economic impact and benefits methodologies used in the final rule analyses.

a. Revisions Incorporated in the Economic Impact Methodology From the NODA

The major changes to the economic impact analyses incorporated from the NODA include: (1) Use of sector-specific thresholds for the moderate impact analysis tests (redefined in part c of this section); (2) use of a single test, based on net present value, to assess the potential for closures (this test excludes consideration of liquidation values for all MP&M facilities, including the 219 facilities that reported them in their response to the MP&M survey); and (3) use of estimated baseline capital outlays in the calculation of cash flow for the net present value test. Other changes to the economic impact methodology include: (1) Use of revised cost pass-through coefficients; (2) use of sector-specific price indices in updating survey data; (3) adjusting labor costs for facilities that report abnormally high labor costs; and (4) limiting post-compliance tax shields to no greater than reported baseline taxes.

b. Using Multiple Years of Data To Estimate Sector-Specific Moderate Impact Threshold Values

As part of its facility impact analysis, the Agency assesses whether facilities may incur moderate financial impacts—financial stress short of closure—from regulatory compliance. To assess the occurrence of moderate impacts, the Agency analyzes the change in two financial measures—(1) Pre-Tax Return on Assets (PTRA); and (2) Interest Coverage Ratio (ICR)—against threshold values (*e.g.,* after-tax compliance costs as a percentage of annual revenues) indicating weak, but still viable, financial performance.

At proposal, EPA used single threshold values of the financial measures for all MP&M sectors. Commentors argued that EPA used thresholds without providing any supporting information regarding their predictive value, the threshold values chosen, or their applicability. EPA finds that using threshold values that vary by industry better reflects the differences in business risks and operating circumstances by industry, and will provide more robust analysis of moderate impacts. In response to comments, EPA revised this approach for the NODA to use threshold values that varied by MP&M sector. For the NODA, EPA also considered using an alternative financial measure—Pre-Tax Operating Margin—instead of PTRA for the moderate impact analysis. Since the NODA, EPA continued to review its moderate impact analysis methodology, and for the final rule analysis, decided to retain the financial impact measures used at proposal: PTRA and ICR. Pre-tax return on assets provides stronger insight into operating financial performance and is a better indicator of a business' ability to attract capital and remain viable than operating margin. However, in contrast to the NODA, EPA decided to use multiple years of data for developing the threshold values for the final rule. Using multiple years of data increases the number of observations on which the moderate impact thresholds are based and reduces the likelihood that threshold values will reflect anomalous conditions that could arise from using only a single year of data.

EPA calculated the thresholds using income and financial structure information by 4-digit SIC code from the Risk Management Association (RMA) *Annual Statement Studies* for eight years from 1994 to 2001. The RMA data set provides quartile values derived from statements of commercial bank borrowers and loan applicants for firms having less than $250 million in total assets. EPA used the lowest 25 percentile values, by industry, from the RMA data set as the basis for the moderate impact thresholds. The RMA data set captures a limited industry segment, because the data set likely omits firms with too weak financial performance to seek bank loans and also omits firms that use the public securities markets or other non-bank sources to obtain capital. However, it is difficult to know what kind of bias, if any, is introduced into the analysis by these limitations. On balance, because EPA used impact thresholds based on the 25th percentile of values reported for borrowers and loan applicants, EPA estimates that the basis for the moderate impact thresholds is conservative—*i.e.,* we are more likely to err in finding that a business is in moderate financial stress than in finding that a facility is not in moderate financial stress.

EPA notes that RMA did not provide data for all 4-digit SIC codes associated with an MP&M sector. Therefore, for sectors with missing data for some 4-digit SIC codes, EPA calculated the weighted average of threshold values based only on those 4-digit SIC codes for which data were provided. This treatment assumes that the financial characteristics of the omitted SIC code segments are the same as the weighted average of SIC code segments that were included in the analysis for a given MP&M sector. *See* Chapter 5 of the EEBA for the final rule for a detailed discussion of the analysis of moderate impacts.

c. Revisions Incorporated in the Benefits Methodology from the NODA

Major revisions to the benefits methodology incorporated from the NODA include: (1) Changes to the human health methodology; (2) use of a weight-of-evidence approach in evaluating national benefit estimates; and (3) use of revised models in the Ohio case study analysis. EPA also uses revised data on characteristics of POTWs receiving discharges from the sample MP&M facilities, as discussed in the NODA.

Two revisions to the human health benefits methodology incorporated from the NODA include: (1) Use of revised assumptions and updated model parameters in the analysis of neurological effects from lead exposure in preschool children; and (2) use of a revised drinking water intake database for estimating human health effects from consumption of contaminated drinking water. The Agency did not incorporate cancer effects from exposure to lead in the final rule analysis because these effects appeared negligible.

The use of the weight-of-evidence approach for estimating national benefits is one of the most important revisions to the benefits methodology incorporated from the NODA. As discussed in the NODA, EPA traditionally estimates national level costs and benefits by extrapolating analytic results from sample facilities to the national level using sample facility survey weights. These sample facility weights are based on sample facility characteristics only and do not account for characteristics of water bodies receiving discharges from the sample MP&M facilities or for the size of the

population residing in the vicinity of the sample MP&M facilities. These additional variables, however, are likely to affect the occurrence and size of benefits associated with reduced discharges from MP&M facilities. Omission of benefit-related characteristics in designing the original sample frame may lead to conditional bias in benefit estimates. To validate the general conclusions that EPA draws from its main analysis based on the traditional benefit estimation method, EPA also estimated national level benefits for the final rule using two alternative extrapolation methods. Detailed discussion of the alternative extrapolation methods can be found in the NODA (*see* 67 FR 38752), section IX.E and F of this preamble, and in the EEBA for the final rule.

As discussed in the NODA, EPA submitted its case study analysis of recreational benefits for an official peer review. The peer review was favorable and concluded that EPA had done a competent job. Peer reviewers, however, provided several suggestions for further improvements in the analysis. The Agency made most of the recommended changes to the Ohio model, as discussed in the NODA (*see* 67 FR 38752). This revised model is used in the analysis supporting today's final rule.

However, EPA did not include multiple day trips in the benefit estimates from improvements in recreational opportunities due to reduced MP&M discharges, as it was suggested by the peer reviewers. The Ohio case study focuses on single day trips because data for single day trips are more complete and because the majority of recreational trips are single day trips. Thus, EPA estimated changes in per trip values from improved water quality for single day trips only. The Agency decided not to approximate welfare gain to participants in multi-day recreational trips based on the single-day trip values because multi-day recreational trips are likely to differ from single day trips for a number of reasons: overnight trips may include multiple purposes and destinations; the individual chooses not only to take a trip and the trip's destination, but the length of the trip; and the length of stay has costs that are not connected to travel costs. The Agency acknowledges that excluding multiple day trips from this analysis is likely to result in understatement of benefits from water quality improvements. Detailed discussion of the Ohio case study can be found in the EEBA for the final rule.

EPA did not incorporate changes to the recreational benefits methodology used in the national-level analysis from the NODA. In estimating benefits from improved boating and wildlife viewing opportunities for the final rule, EPA considers only individuals taking single day trips due to insufficient data on per multi-day trip benefits from water quality improvements. Both individuals taking single day trips and those who take multiple day trips to local water bodies were considered in the NODA analysis of recreational benefits. Similarly to the Ohio case study, excluding multiple day trips from the national analysis is likely to result in understatement of recreational benefits from water quality improvements.

d. POTW Administrative Cost and POTW Benefits Analyses

EPA received several comments to the proposal on the use of EPA's 1997 POTW survey in the analysis of POTW administrative costs and benefits from improved quality of sewage sludge. Commentors stated that EPA overestimated pollutant loadings, economic benefits, and environmental benefits associated with improved sludge quality. Commentors also stated that EPA underestimated the administrative costs associated with implementing the rule. They provided new information on POTW characteristics which EPA used to revise assumptions and its analysis of POTW administrative costs and benefits for the final rule. Specifically, the Association of Metropolitan Sewerage Agencies (AMSA) provided EPA with comments on the proposed MP&M rule and supplemented these comments with a spreadsheet database. The database contains data from an AMSA formulated survey and covers responses from 176 POTWs, representing 66 pretreatment programs. The AMSA survey was conducted to verify data from EPA's survey of POTWs, and therefore, included similar, although fewer, variables compared to EPA's survey.

EPA used some of the data provided in AMSA's survey to revise its own analyses of POTW administrative costs of the proposed MP&M rule. Elements of the administrative cost analysis include: (1) The estimated number of indirect dischargers; and (2) the unit costs of certain permitting activities, including permit implementation, sampling, and sample analysis. EPA found that although AMSA estimates of the number of indirect dischargers and the unit costs of permitting activities are consistent with the EPA's estimates used for the proposed rule analysis, their estimate neglected to take into account that not all MP&M indirect discharging facilities would have been required to meet the proposed standards. DCN 37500, section 25.4.1, provides comparisons between AMSA's and EPA's estimates. EPA added to its analysis using the AMSA data include: (1) Screening costs for POTWs that do not currently operate under a pretreatment program; and (2) oversight costs associated with implementing various regulatory options. The revised methodology for POTW administrative costs analysis is presented in EEBA Appendix F.

EPA also used the AMSA data to revise the POTW benefits methodology. Elements of the POTW benefits analysis EPA verified using the AMSA survey include: (1) Percentage of metal loadings contributed by MP&M facilities; and (2) the number of MP&M facilities served by POTWs.

AMSA also provided additional information on the number of POTWs (and percentage of total annual dry metric tons of POTW biosolids) currently meeting metals limitations in the ''Standards for the Use or Disposal of Sewage Sludge,'' (40 CFR part 503), and reasons why POTWs may choose to not land apply biosolids. These nationally-applicable standards set the general requirements, management practices, operational standards and monitoring and reporting requirements for the final use and disposal of biosolids. AMSA's survey data includes the following reasons for not land applying qualifying biosolids: (1) Land was not available for application of sewage biosolids; (2) other biosolids use/disposal practices were less expensive than land application; (3) pathogen/vector reduction requirements could not be met at an acceptable cost; and (4) local regulations or opposition to land application. EPA revised the POTW benefits methodology according to the results of the joint analysis of the EPA and AMSA surveys. The revised methodology for POTW benefits analyses is presented in EEBA Chapter 16.

4. Determining POTW Percent Removal Estimates

As discussed in the proposed rule, EPA solicited comment on potential changes to the methodology for estimating the pollutant reduction (*i.e.*, percent removal) used in EPA's pass through analysis for identifying pollutants requiring pretreatment standards (*see* 66 FR 476). For today's final rule, EPA has not changed the POTW pass-through analysis because EPA is not promulgating any new pretreatment standards for indirect dischargers.

V. Scope/Applicability of the Final Regulation

A. General Overview and Wastewaters Covered

As previously explained, today's final rule only applies to directly discharged wastewaters generated from oily operations at existing or new industrial facilities (including Federal, State and local government facilities). These facilities are engaged in manufacturing, rebuilding, or maintenance of metal parts, products or machines to be used in one of the following industrial sectors:

- Aerospace;
- Aircraft;
- Bus and Truck;
- Electronic Equipment;
- Hardware;
- Household Equipment;
- Instruments;
- Miscellaneous Metal Products;
- Mobile Industrial Equipment;
- Motor Vehicle;
- Office Machine;
- Ordnance;
- Precious Metals and Jewelry;
- Railroad;
- Ships and Boats; and
- Stationary Industrial Equipment.

EPA identified sixteen industrial sectors as comprising the MP&M category. These sectors manufacture, maintain and rebuild metal products under more than 200 different SIC codes (*see* the TDD for a listing of typical SIC codes and NAICs codes). EPA is not revising limitations and standards for three proposed industrial sectors (*e.g.*, Job Shops, Printed Wiring Board, and Steel Forming & Finishing).

Facilities in any one of the sixteen industrial sectors in the MP&M category are subject to this rule only if they directly discharge process wastewaters resulting from one or more of the following oily operations: Abrasive blasting; adhesive bonding; alkaline cleaning for oil removal; alkaline treatment without cyanide; aqueous degreasing; assembly/disassembly; burnishing; calibration; corrosion preventive coating (as specified at 40 CFR 438.2(c) and appendix B of part 438); electrical discharge machining; floor cleaning (in process area); grinding; heat treating; impact deformation; iron phosphate conversion coating; machining; painting-spray or brush (including water curtains); polishing; pressure deformation; solvent degreasing; steam cleaning; testing (*e.g.*, hydrostatic, dye penetrant, ultrasonic, magnetic flux); thermal cutting; tumbling/barrel finishing/mass finishing/vibratory finishing; washing (finished products); welding; wet air pollution control for organic constituents; and numerous sub-operations within those listed in this paragraph. In addition, process wastewater also results from associated rinses that remove materials that the preceding processes deposit on the surface of the workpiece. These oily operations are defined in section 4 of the TDD and appendix B of today's final rule. In addition, today's final rule does not apply to direct discharges of wastewaters that are otherwise covered by other effluent limitations guidelines.

As was the case at proposal, EPA defines process wastewater for the final rule to include wastewater discharges from the following activities: (1) Wastewater from air pollution control devices; and (2) washing vehicles only when it is a preparatory step prior to performing an oily operation (*e.g.*, prior to disassembly to perform engine maintenance or rebuilding). EPA has adopted this approach for the final rule due to the potential of these unit operations to produce significant quantities of pollutants in wastewaters (*see* 66 FR 433 to 434).

Not subject to this final rule are non-process wastewater discharges which include the following: Sanitary wastewater, non-contact cooling wastewater, laundering wastewater, and non-contact storm water. In addition, non-process wastewater also includes wastewater discharges from non-industrial sources such as residential housing, schools, churches, recreational parks, shopping centers, and wastewater discharges from gas stations, utility plants, and hospitals.

In addition to non-process wastewater, the final rule does not apply to wastewater generated from: (1) Gravure cylinder and metallic platemaking conducted within or for printing and publishing facilities; (2) bilge water on ships afloat; (3) electroplating-type operations during semiconductor wafer manufacturing or wafer fabrication processes occurring in a ''clean room'' environment; (4) the washing of cars, aircraft or other vehicles when it is performed only for aesthetic/cosmetic purposes; (5) MP&M operations at gasoline stations (SIC code 5541) or vehicle rental facilities (SIC code 7514 or 7519); or (6) unit operations performed by drum reconditioners/refurbishers to prepare metal drums for reuse. The final rule does not include these non-process wastewaters within the scope of the rule for the reasons explained in the preamble to the proposed rule (*see* 66 FR 433). EPA received no comments on the proposal or NODA that have caused the Agency to change its mind about the approach it proposed and has now adopted.

EPA is also not promulgating limitations and standards for facilities in the Shipbuilding Dry Dock subcategory. Today's final rule does not cover wastewater generated on-board ships and boats when they are afloat (that is, not in dry docks or similar structures), flooding water, and dry dock ballast water (*see* 66 FR 445). For U.S. military ships, EPA is in the process of establishing standards to regulate discharges of wastewater generated on-board these ships when they are in U.S. waters and are afloat under the Uniform National Discharge Standards (UNDS) pursuant to section 312(n) of the CWA (*see* 64 FR 25125, May 10, 1999).

Finally, today's rule does not apply to maintenance or repair of metal parts, products, or machines that takes place only as ancillary activities at facilities not included in the sixteen MP&M industrial sectors. EPA estimates that these ancillary repair and maintenance activities would typically discharge *de minimis* quantities of process wastewater. For example, wastewater discharges from repair of metal parts at oil and gas extraction facilities are not subject to today's final rule. The Agency finds that permit writers will establish limits using best professional judgment (BPJ) to regulate wastewater discharges from ancillary waste streams for direct dischargers (*see* 66 FR 433). EPA has not received any information during the rulemaking that would contradict this conclusion.

B. Subcategorization

For today's final rule, EPA is subcategorizing the MP&M point source category based on the unit operations described in more detail in section 4 of the TDD, and is establishing limitations and standards for direct dischargers in the Oily Wastes subcategory (subpart A).

The Oily Wastes subcategory applies to wastewaters generated from ''oily operations'' that are not otherwise covered by other effluent limitations guidelines. EPA has previously defined ''oily operations'' in section V.A and at 40 CFR 438.2(f) and appendix B of today's final rule.

Facilities engaged in the manufacture, overhaul or heavy maintenance of railroad engines, cars, car-wheel trucks, or similar parts or machines (''railroad overhaul or heavy maintenance facilities'') typically perform different unit operations than railroad line maintenance facilities. Railroad line maintenance facilities only perform one or more of the following unit operations including; Assembly/disassembly, floor

cleaning, maintenance machining (wheel truing), touch-up painting, and washing. Railroad overhaul or heavy maintenance facilities typically perform the following unit operations: Assembly/disassembly, floor cleaning, maintenance machining (wheel truing), touch-up painting, washing, abrasive blasting, alkaline cleaning, aqueous degreasing, corrosion preventive coating, electrical discharge machining, grinding, heat treating, impact deformation, painting, plasma arc machining, polishing, pressure deformation, soldering/brazing, stripping (paint), testing, thermal cutting, and welding. Wastewater discharges from railroad line maintenance facilities (as defined at 40 CFR 438.2(h)) are not subject to today's final rule. Wastewater discharges from railroad overhaul or heavy maintenance facilities (as defined at 40 CFR 438.2(i)) may be covered by subpart A of this part, the Metal Finishing Point Source Category (40 CFR part 433), or by other effluent limitations guidelines, as applicable.

VI. The Final Regulation

This section describes, by subcategory, the option(s) considered and selected for today's final rule. For each subcategory, EPA provides a discussion, as applicable, for the regulatory levels that EPA considered for regulation (*i.e.*, BPT, BCT, BAT, NSPS, PSES, PSNS). For a detailed discussion of all technology options considered in the development of today's final rule, see the proposal (*see* 66 FR 447), the NODA (*see* 67 FR 38797) or section 9 of the TDD for today's final rule.

Based on the record of information supporting the final MP&M rule, EPA has determined that the selected technology for the Oily Wastes subcategory is technically available. EPA used the appropriate technologies for developing today's limitations for existing direct dischargers (BPT and BCT) in one MP&M subcategory listed in the January 2001 proposal (Oily Wastes). EPA has also determined that each technology it selected as the basis for the final limitations or standards has effluent reductions commensurate with compliance costs and is economically achievable for the applicable subcategory. EPA also considered the age, size, processes, and other engineering factors pertinent to facilities in the scope of the final regulation for the purpose of evaluating the technology options. None of these factors provides a basis for selecting different technologies from those EPA has selected as its technology options for today's rule (*see* section 6 of the TDD for the final rule for further discussion of EPA's analyses of these factors).

EPA considered the use of a low-flow cutoff as the principal means for reducing economic impacts on small businesses and administrative burden for control authorities associated with certain treatment technologies it considered. EPA did not identify any regulatory scheme incorporating a low-flow cutoff for direct dischargers that would assist EPA in meeting these objectives. EPA notes that all direct dischargers require a NPDES discharge permit regardless of wastewater discharge flow volume.

The new source performance standards (NSPS) EPA is today establishing represent the greatest degree of effluent reduction achievable through the best available technology. In selecting its technology basis for today's new source standards (NSPS) for the Oily Wastes subcategory being promulgated today, EPA considered all of the factors specified in CWA section 306, including the cost of achieving effluent reductions. EPA used the appropriate technology option for developing today's standards for new direct dischargers in the Oily Wastes subcategory. The new source technology basis for the Oily Wastes subcategory is equivalent to the technology bases upon which EPA is setting BPT and BCT (*see* Chapter 9 of the EEBA). EPA has thoroughly reviewed the costs of such technologies and has concluded that such costs do not present a barrier to entry. The Agency also considered energy requirements and other non-water quality environmental impacts for the new source technology basis and found no basis for any different standards from those selected for NSPS. Therefore, EPA concluded that the NSPS technology basis chosen for the Oily Wastes subcategory constitute the best available demonstrated control technology. For a discussion on the compliance date for new sources, see section XI of today's final rule.

EPA decided not to establish limitations for existing sources for seven subcategories listed in the January 2001 proposal (General Metals, Metal Finishing Job Shops, Printed Wiring Boards, Non-Chromium Anodizers, Steel Forming & Finishing, Railroad Line Maintenance, and Shipbuilding Dry Dock). EPA also decided not to establish standards for new sources for the same seven subcategories. Finally, EPA decided not to establish standards for new and existing indirect dischargers (PSES and PSNS) for all eight subcategories listed in the January 2001 proposal. EPA's bases for not promulgating revised limitations and standards for these subcategories are explained in the following sections.

A. General Metals Subcategory

EPA is not revising or establishing any limitations or standards for facilities that would have been subject to this subcategory. Such facilities will continue to be regulated by the General Pretreatment Standards (part 403), local limits, permit limits, and parts 413 and/or 433, as applicable.

1. Best Practicable Control Technology Currently Available (BPT)

EPA proposed to establish BPT limitations for existing direct dischargers in the General Metals subcategory based on the Option 2 technology. EPA evaluated the cost of achieving effluent reductions, pollutant reductions, and the economic achievability of compliance with BPT limitations based on the Option 2 technology and the level of the pollutant reductions resulting from compliance with such limitations. EPA has decided not to establish BPT limitations for existing direct dischargers in the proposed General Metals subcategory. The 2001 proposal also contains detailed discussions on why EPA rejected BPT limitations based on other BPT technology options (*see* 66 FR 452). The information in the record for today's final rule provides no basis for EPA to change this conclusion.

EPA proposed Option 2 as a basis for establishing BPT limitations for the General Metals subcategory. Option 2 technology includes the following: (1) In-process flow control and pollution prevention; (2) segregation of wastewater streams; (3) preliminary treatment steps as necessary (including oils removal using chemical emulsion breaking and oil-water separation, alkaline chlorination for cyanide destruction, reduction of hexavalent chromium, and chelation breaking); (4) chemical precipitation using sodium hydroxide; (5) sedimentation using a clarifier; and (6) sludge removal (*i.e.*, gravity thickening and filter press). See section 9 of the TDD for today's final rule for additional technical details on the Option 2 technology.

Those facilities potentially regulated in the General Metals subcategory include facilities that are currently subject to effluent limitations guideline regulation under part 433 as well as facilities not currently subject to national regulation. Approximately 263 of the 266 existing General Metals direct dischargers (estimated from survey weights for 31 surveyed facilities) are currently covered by the Metal

Finishing effluent guidelines at part 433. The remaining three facilities (estimated from a survey weight for one surveyed facility) are currently directly discharging metal-bearing wastewaters (*e.g.*, salt bath descaling, UP–37) but are not covered by existing Metal Finishing effluent guidelines. EPA's review of discharge monitoring data and unit operations for this surveyed non-433 General Metals facility (with a survey weight of approximately three) indicates that this facility is already achieving part 433 limitations because this facility has discharges that closely mirror those required by part 433.

The facilities that are currently subject to part 433 regulations and those facilities achieving part 433 discharge levels, in most cases, have already installed effective pollution control technology that includes many of the components of the Option 2 technology. Approximately 30 percent of the direct discharging facilities in the General Metals subcategory currently employ chemical precipitation followed by a clarifier. Further, EPA estimates that compliance with BPT limitations based on the Option 2 technology would result in no closures of the existing direct dischargers in the General Metals subcategory. EPA also notes that the adoption of this level of control would also represent a further reduction in pollutants discharged into the environment by facilities in this subcategory. For facilities in the General Metals subcategory at Option 2, EPA estimates an annual compliance cost of $23.7 million (2001$). Using the method described in Table IV–2 to estimate baseline pollutant loadings, EPA estimates Option 2 pollutant removals of 417,477 pounds of conventional pollutants and 33,716 pounds of priority metal and organic pollutants from current discharges into the Nation's waters.

Evaluated under its traditional yardstick, EPA calculated that the effluent reductions are achieved at a cost of $18.1/pound-pollutant removed (2001$) for the General Metals subcategory at Option 2. To estimate all pounds of pollutant removed by Option 2 technology for direct dischargers in the General Metals subcategory, EPA used the method described in Table IV–2 to estimate baseline pollutant loadings, and the sum of Chemical Oxygen Demand (COD) pounds removed plus the sum of all metals pounds removed to measure the pollutant removal as compared to compliance costs. EPA used the combination of COD pounds removed plus the sum of all metals pounds removed to avoid any significant double counting of pollutants.

As previously stated, EPA received many comments on its estimation of baseline pollutant loadings and reductions for the various options presented in the January 2001 proposal. In response to these comments, EPA solicited comment in the June 2002 NODA on alternative methods to estimate baseline pollutant loadings. Commentors on the NODA were generally supportive of EPA's alternative methods to estimate baseline pollutant loadings. In particular, commentors noted that more accurate estimates of baseline pollutant loadings could be achieved by using DMR data. In response to these NODA comments, EPA combined the alternative methods in the NODA into the EPA Cost & Loadings Model for the final rule (*see* Table IV–2).

EPA also received comment on the parameter or parameters it should use for estimating total pounds removed by the selected technology option. EPA selected the sum of COD and all metals pounds removed for the final rule to compare effluent reductions and compliance costs. This approach avoided any significant double counting of pollutants and also provided a reasonable estimate of total pounds removed by Option 2 for the General Metals subcategory. As more fully described in the TDD, Option 2 technology segregates wastewaters into at least five different waste streams, each of which have one or two treatment steps. For example, segregated oily wastewaters have two treatment steps under Option 2 technology as they are first treated by chemical emulsion breaking/oil water separation and then by chemical precipitation and sedimentation. These segregated wastestreams can be loosely grouped together as either oily wastewaters or metal-bearing wastewaters. EPA use of COD pounds removed for Option 2 technology generally represents the removal of pollutants from the segregated oily wastewaters. EPA use of total metals pounds removed for Option 2 technology generally represents the removal of pollutants from the segregated metal-bearing wastewaters.

EPA also considered alternative parameters for calculating total pounds removed by Option 2 for the comparison of effluent reductions and compliance costs for the General Metals subcategory. In particular, EPA calculated a ratio of less than $14/pound-pollutant removed (2001$) for the General Metals subcategory at Option 2 when EPA used the highest set of pollutants removed per facility with no significant double counting of pollutants (*i.e.*, highest per facility pollutant removals of: (1) COD plus total metals; (2) oil and grease (as HEM) plus total metals; or (3) oil and grease (as HEM) plus TSS). EPA used the highest per facility pollutant removals as a confirmation of its primary method for calculating baseline pollutant loadings (*see* Table IV–2) and Option 2 for General Metals subcategory.

Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA has decided not to adopt BPT limitations based on Option 2 technology. A number of factors supports EPA's conclusion that BPT limitations based on Option 2 technology do not represent effluent reduction levels attainable by the best practicable technology currently available. As previously noted, a substantial number of facilities that would be subject to limitations as General Metals facilities are already regulated by BPT/BAT part 433 limitations and other facilities are *de facto* part 433 facilities if characterized by their discharges. Thus, establishing BPT limitations for a new General Metals subcategory would effectively revise existing BPT/BAT limitations with respect to those facilities. In the circumstances presented here where EPA, for a significant portion of an industry, is revising existing BPT/BAT limitations, further review of the character and cost of the effluent reductions achieved by Option 2 is warranted in deciding what is BPT technology. Such an examination shows that, while the Option 2 technology would remove additional pollutants at costs in the middle of the range EPA has traditionally determined are reasonable, the costs of the additional removals of toxic pollutants are substantially greater. EPA has now determined that, in the circumstances of this rulemaking, where a substantial portion of a subcategory is already subject to effluent limitations guidelines that achieve significant removal, it should not promulgate BPT limitations under consideration here because the limitations would achieve additional toxic removals at a cost ($1,000/PE in 1981$) substantially greater than that EPA has typically imposed for BAT technology in other industries (generally less than $200/PE in 1981$).

EPA also considered transferring limitations from existing Metal Finishing effluent guidelines (40 CFR part 433) to the General Metals subcategory. The technology basis for part 433 includes the following: (1)

Segregation of wastewater streams; (2) preliminary treatment steps as necessary (including oils removal using chemical emulsion breaking and oil-water separation, alkaline chlorination for cyanide destruction, reduction of hexavalent chromium, and chelation breaking); (3) chemical precipitation using sodium hydroxide; (4) sedimentation using a clarifier; and (5) sludge removal (*i.e.*, gravity thickening and filter press). *See* section 9 of the TDD for today's final rule for additional technical details on the part 433 technology basis.

Approximately 99% of the existing direct dischargers in the General Metals subcategory are currently covered by existing Metal Finishing effluent guidelines. The remaining 1% (an estimated three facilities nationwide based on the survey weight associated with one surveyed facility) are currently permitted to discharge metal-bearing wastewaters but are not covered by existing Metal Finishing effluent guidelines. EPA's review of discharge monitoring data and unit operations for this surveyed non-433 General Metals facility (with a survey weight of approximately three) indicates that this facility is subject to permit limitations established on a BPJ basis that are equivalent or more stringent than part 433 limitations. Transferring limitations from existing Metal Finishing effluent guidelines would likely result in no additional pollutant load reductions. Therefore, based on the lack of additional pollutant removals that are estimated, EPA is not promulgating BPT limitations transferred from existing Metal Finishing effluent limitations guidelines for the General Metals subcategory.

EPA is not revising or establishing BPT limitations for any facilities in this subcategory. Direct dischargers in the General Metals subcategory will remain regulated by permit limits and part 433, as applicable.

2. Best Conventional Pollutant Control Technology (BCT)

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considers whether there are technologies that achieve greater removals of conventional pollutants than adopted for BPT, and whether those technologies are cost-reasonable under the standards established by the CWA. EPA generally refers to the decision criteria as the ''BCT cost test.'' For a more detailed description of the BCT cost test and details of EPA's analysis, see Chapter 4 of the EEBA.

As EPA is not establishing any BPT limitations for the General Metals subcategory, EPA did not evaluate any technologies for the final rule that can achieve greater removals of conventional pollutants. Consequently, EPA is not establishing BCT limitations for the General Metals subcategory.

3. Best Available Technology Economically Achievable (BAT)

EPA proposed to establish BAT limitations for existing direct dischargers in the General Metals subcategory based on the Option 2 technology. As previously noted, EPA has decided not to establish BPT limitations based on Option 2 technology. The same reasons support not establishing BAT limitations based on the same technology. EPA evaluated the cost of effluent reductions, pollutant reductions, and the economic achievability of compliance with BAT limitations based on the Option 2 technology.

Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA determined that the costs of Option 2 are disproportionate to the toxic pollutant reductions (measured in pound-equivalents (PE)). The cost of achieving the effluent reduction (in 1981$) for Option 2 for direct dischargers in the General Metals subcategory is over $1,000/PE removed (*see* the EEBA and DCN 37900, section 26.0, for a discussion of the cost-effectiveness analysis). The costs associated with this technology are, as previously noted, substantially greater than the level EPA has traditionally determined are associated with available toxic pollutant control technology. EPA has determined that Option 2 technology is not the best available technology economically achievable for existing direct dischargers in the General Metals subcategory. EPA is not revising or establishing BAT limitations for this subcategory based Option 2 technology.

EPA also considered transferring BAT limitations from existing Metal Finishing effluent guidelines (40 CFR 433.14) to the General Metals subcategory. EPA's reviewed existing General Metals facilities and found that all are currently achieving part 433 BAT limitations. Transferring BAT limitations from existing Metal Finishing effluent guidelines would likely result in no additional pollutant load reductions and minimal incremental compliance costs (*see* section VI.A.1). Therefore, based on the lack of additional pollutant removals that are estimated, EPA is not promulgating BAT limitations transferred from existing Metal Finishing effluent limitations guidelines for the General Metals subcategory.

EPA is not revising or establishing BAT limitations for any facilities in this subcategory. Direct dischargers in the General Metals subcategory will remain regulated by permit limits and part 433, as applicable.

4. New Source Performance Standards (NSPS)

EPA proposed NSPS for the General Metals subcategory based on Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). Commentors stated that EPA had under-costed the Option 4 technology and that the compliance costs would be a barrier to entry for new facilities. In addition, commentors questioned the completeness of EPA's database on microfiltration, noting that EPA transferred standards for several pollutants from the Option 2 technology, based on lack of data. EPA reviewed its database for the Option 4 technology and agrees that its microfiltration database is insufficient to support a determination that the Option 4 limitations are technically achievable.

EPA also evaluated setting General Metals NSPS based on the Option 2 technology and assessed the financial burden to new General Metals direct dischargers. Specifically, EPA's ''barrier to entry'' analysis identified whether General Metals NSPS based on the Option 2 technology would pose sufficient financial burden as to constitute a material barrier to entry of new General Metals establishments into the MP&M point source category. Additionally, EPA reviewed its database for establishing General Metals NSPS based on the Option 2 technology as commentors indicated the proposed standards were not technically achievable.

In response to these comments, EPA reviewed all the information currently available on General Metals facilities employing the Option 2 technology basis. This review demonstrated that process wastewaters at General Metals facilities contain a wide variety of metals in significant concentrations. Commentors stated that single stage precipitation and solids separation step may not achieve sufficient removals for wastewaters that contain significant concentrations of a wide variety of metals—especially if the metals preferentially precipitate at disparate

pH ranges. Consequently, to address concerns raised by commentors, EPA also costed new sources to operate two separate chemical precipitation and solids separation steps in series. Two-stage chemical precipitation and solids separation allows General Metals facilities with multiple metals to control metal discharges to concentrations lower than single-stage chemical precipitation and solids separation over a wider pH range.

Applying this revised costing approach, EPA projects a barrier to entry for General Metals NSPS based on the Option 2 technology as 14% of General Metals direct dischargers have after-tax compliance costs between 1 to 3% of revenue, 22% have after-tax compliance costs between 3 to 5% of revenue, and 2% have after-tax compliance costs greater than 5% of revenue. Consequently, based on the compliance costs of the modified Option 2 technology EPA is today rejecting Option 2 technology as the basis for NSPS in the General Metals subcategory. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

EPA also considered transferring NSPS from existing Metal Finishing effluent guidelines (40 CFR 433.16) to the General Metals subcategory. EPA reviewed existing General Metals direct dischargers and found that all are currently either covered by or have permits based on the Metal Finishing limitations at 40 CFR part 433. EPA has no basis to conclude that new General Metals facilities would have less stringent requirements than existing facilities, particularly since, in the absence of promulgated NSPS, it is likely that permit writers would consult the part 433 requirements to establish BPJ limits. In addition, those new facilities which meet the applicability criteria for part 433 will be subject to the NSPS for that category. Therefore, transferring standards from these existing Metal Finishing effluent limitations guidelines would likely result in no additional pollutant load reductions.

Therefore, based on the lack of additional pollutant removals that are estimated, EPA is not promulgating NSPS for the General Metals subcategory. EPA is not revising or establishing NSPS for any facilities in this subcategory. Direct dischargers in the General Metals subcategory will remain regulated by permit limits and part 433, as applicable.

5. Pretreatment Standards for Existing Sources (PSES)

EPA proposed to establish PSES for existing indirect dischargers in the General Metals subcategory based on the Option 2 technology (*i.e.*, the same technology basis that EPA considered for BPT/BCT/BAT for this subcategory) with a ''low-flow'' exclusion of 1 million gallons per year (MGY) to reduce economic impacts on small businesses and administrative burden for control authorities. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA rejected promulgating PSES for existing indirect dischargers in the General Metals subcategory based on the Option 2 technology for the following reasons: (1) Many General Metals indirect dischargers are currently regulated by existing effluent guidelines (parts 413 or 433 or both, as applicable); (2) EPA estimates that compliance with PSES based on the Option 2 technology will result in the closure of approximately 4% of the existing indirect dischargers in this subcategory; and (3) EPA determined that the incremental toxic pollutant reductions are very expensive per pound removed (the cost-effectiveness value (in 1981$) for Option 2 for indirect dischargers in the General Metals subcategory is $432/PE).

This suggests to EPA that the identified technology is not truly ''available'' to this industry because it would remove a relatively small number of additional toxic pounds at a cost significantly greater than that EPA has typically determined is appropriate for other industries. EPA has determined that Option 2 technology is not the best available technology economically achievable for existing indirect dischargers in the General Metals subcategory. Therefore, EPA is not establishing PSES for this subcategory based on the Option 2 technology.

As discussed in the June 2002 NODA (*see* 67 FR 38798), EPA also considered a number of alternative options whose economic impacts would be less costly than Option 2 technology. These options potentially have compliance costs more closely aligned with toxic pollutant reductions. EPA considered the following alternative options for today's final rule:

Option A: No change in current regulation;

Option B: Option 2 with a higher low-flow exclusion;

Option C: Upgrading facilities currently covered by part 413 to the PSES of part 433; and

Option D: Upgrading all facilities covered by part 413, and those facilities covered by ''local limits only'' that discharge greater than a specified wastewater flow (*e.g.*, 1, 3, or 6.25 MGY) of process wastewater to the part 433 pretreatment standards for existing sources. Note that facilities regulated by ''local limits only'' are also regulated by the General Pretreatment Regulations (40 CFR part 403).

As discussed in section IV.B.1 of today's final rule, based on comments, EPA has revised its methodology for estimating compliance costs and pollutant loadings for Option 2, higher low-flow exclusions (Option B); and the ''upgrade'' options (Options C and D) previously described. Using information from this revised analysis, EPA concludes that all of these alternative options (Options B, C, and D) are either not available or not economically achievable. EPA rejected Options B, C, and D as: (1) Greater than 10% of existing indirect dischargers not covered by part 433 close at the upgrade option; or (2) toxic removals of the upgrade options are quite expensive (cost-effectiveness values (in 1981$) in excess of $420/PE), suggesting that these options are not truly available technologies for this industry segment. EPA consequently determined that none of the treatment options represented best available technology economically achievable. Therefore, EPA is not revising or establishing PSES for existing indirect dischargers in the General Metals subcategory (Option A). Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by local limits, general pretreatment standards (part 403), and parts 413 and/or 433, as applicable. EPA also notes that facilities regulated by parts 413 and/or 433 PSES must comply with part 433 PSNS if the changes to their facilities are determined to make them new sources.

6. Pretreatment Standards for New Sources (PSNS)

In 2001, EPA proposed pretreatment standards for new sources based on the Option 4 technology basis. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. As a result, for the final rule EPA considered

establishing PSNS in the General Metals subcategory based on the Option 2 technology (*i.e.*, the same technology basis that was considered for BPT/BCT/BAT for this subcategory) along with the same ''low-flow'' exemption of 1 MGY considered for existing sources.

For today's final rule EPA evaluated setting General Metals PSNS based on the Option 2 technology and assessed the financial burden to new General Metals indirect dischargers. Specifically, EPA's ''barrier to entry'' analysis identified whether General Metals PSNS based on the Option 2 technology would pose sufficient financial burden on new General Metals facilities to constitute a material barrier to entry into the MP&M point source category.

EPA projects a barrier to entry for General Metals PSNS based on the Option 2 technology as 14% of General Metals indirect dischargers have after-tax compliance costs between 1 to 3% of revenue and 20% have after-tax compliance costs between 3 to 5% of revenue. Consequently, EPA is today rejecting Option 2 technology as the basis for PSNS in the General Metals subcategory. EPA has selected ''no further regulation'' for new General Metals indirect dischargers and is not revising PSNS for new General Metals indirect dischargers. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by local limits, general pretreatment standards (part 403), and part 433, as applicable. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

B. Metal Finishing Job Shops Subcategory

EPA is not revising any limitations or standards for facilities that would have been subject to this subcategory. Such facilities will continue to be regulated by the General Pretreatment Standards (part 403), local limits, permit limits, and parts 413 and/or 433, as applicable.

1. BPT/BCT/BAT

EPA proposed to establish BPT/BCT/BAT for existing direct dischargers in the MFJS subcategory based on the Option 2 technology (*see* section VI.A for a description of Option 2). EPA evaluated the cost of effluent reductions, pollutant reductions, and the economic achievability of compliance with BPT/BCT/BAT limitations based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA determined that the compliance costs of the Option 2 technology are not economically achievable. EPA estimates that compliance with BPT/BCT/BAT limitations based on the Option 2 technology will result in the closure of 50% of the existing direct dischargers in this subcategory (12 of 24 existing MFJS direct dischargers). Consequently, EPA concludes that for existing direct dischargers in the MFJS subcategory, Option 2 is not the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable. EPA has decided not to establish new BPT, BCT, or BAT limitations for existing MFJS direct dischargers based on the Option 2 technology, which will remain subject to part 433.

2. New Source Performance Standards (NSPS)

EPA proposed to establish NSPS for new direct dischargers in the MFJS subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA rejected Option 4 technology as the basis for NSPS in the MFJS subcategory.

For today's final rule EPA evaluated setting MFJS NSPS based on the Option 2 technology and assessed the financial burden to new MFJS direct dischargers. Specifically, EPA's ''barrier to entry'' analysis identified whether MFJS NSPS based on the Option 2 technology would pose sufficient financial burden so as to constitute a material barrier to entry into the MP&M point source category. Additionally, EPA reviewed its database for establishing MFJS NSPS based on the Option 2 technology as commentors indicated the proposed standards were not technically achievable.

In response to these comments, EPA reviewed all the information currently available on MFJS facilities employing the Option 2 technology basis. This review demonstrated that process wastewaters at MFJS facilities contain a wide variety of metals in significant concentrations. Commentors stated that single stage precipitation and solids separation may not achieve sufficient removals for wastewaters that contain significant concentrations of a wide variety of metals—especially if the metals preferentially precipitate at disparate pH ranges. Consequently, to address concerns raised by commentors, EPA also costed new sources to operate two separate chemical precipitation and solids separation steps in series. Two-stage chemical precipitation and solids separation allows MFJS facilities with multiple metals to control metal discharges to concentrations lower than single-stage chemical precipitation and solids separation over a wider pH range.

Applying this revised costing approach, EPA projects a barrier to entry for MFJS NSPS based on the Option 2 technology as all MFJS direct dischargers have new source compliance costs that are greater than 5% of revenue. Consequently, EPA is today rejecting Option 2 technology as the basis for NSPS in the MFJS subcategory, and is not revising NSPS for new MFJS direct dischargers. Wastewater discharges from these facilities in this subcategory will remain regulated by local limits and part 433 NSPS as applicable. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

3. Pretreatment Standards for Existing Sources (PSES)

EPA proposed to establish PSES for existing indirect dischargers in the MFJS subcategory based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA determined that the costs of Option 2 are not economically achievable for existing indirect dischargers in the MFJS subcategory. EPA estimates that compliance with PSES based on the Option 2 technology will result in the closure of 46% of the existing indirect dischargers in this subcategory (589 of 1,270 existing MFJS indirect dischargers), which EPA considers to be too high. EPA has determined that Option 2 technology is not the best available technology economically achievable for existing indirect dischargers in the MFJS subcategory. Therefore, EPA is not establishing PSES for this subcategory based on the Option 2 technology.

As discussed in the January 2001 proposal (*see* 66 FR 551) and June 2002 NODA (*see* 67 FR 38801), EPA also considered a number of alternative options whose economic impacts would be less costly than Option 2 technology.

These options potentially have compliance costs more closely aligned with toxic pollutant reductions. EPA considered the following alternative options for today's final rule:

Option A: No change in current regulation;

Option B: Option 2 with a low-flow exclusion; and

Option C: Upgrading facilities currently covered by part 413 to the PSES of part 433.

Option D: Pollution Prevention Option.

All facilities in the MFJS subcategory are currently subject to part 413, part 433 or both.

As discussed in section IV.B.1 of today's final rule, based on comments, EPA has revised its methodology for estimating compliance costs and pollutant loadings for Option 2, low-flow exclusions (Option B), and the ''upgrade'' option (Option C) previously described. Using information from this revised analysis, EPA concludes that neither of these alternative options (Options B or C) are economically achievable. EPA rejected Options B and C as greater than 10% of existing indirect dischargers not covered by part 433 close at the upgrade option.

EPA also solicited comment in the January 2001 proposal on a pollution prevention alternative for indirect dischargers in this subcategory (Option D). Commentors supported option D and stated that the pollution prevention practices identified by EPA in the January 2001 proposal represent environmentally sound practices for the metal finishing industry. The commentors also stated that Option D should, however, be implemented on a voluntary basis similar to the National Metal Finishing Strategic Goals Program (*see* 66 FR 511). Control authorities also commented that Option D may increase their administrative burden because of additional review of facility operations and compliance with the approved pollution prevention plan, and enforcement of Option D may be more difficult than other options considered. EPA is not promulgating Option D for facilities in the MFJS subcategory for the final rule due to the increased administrative burden on pretreatment control authorities and potential problems enforcing Option D. Section 15 of the TDD describes many of the pollution prevention practices that were considered for Option D. These pollution prevention practices may be useful in helping facilities lower operating costs, improve environmental performance, and foster other important benefits.

EPA is not establishing PSES for existing indirect dischargers in the MFJS subcategory. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by general pretreatment standards (part 403), and parts 413 and/or 433, as applicable. EPA also notes that facilities regulated by parts 413 and/or 433 PSES must comply with part 433 PSNS if the changes to their facilities are determined to make them new sources.

4. Pretreatment Standards for New Sources (PSNS)

EPA proposed to establish PSNS for indirect dischargers in the MFJS subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA is today rejecting Option 4 technology as the basis for PSNS in the MFJS subcategory.

For today's final rule EPA evaluated setting MFJS PSNS based on the Option 2 technology and assessed the financial burden to new MFJS indirect dischargers. Specifically, EPA's 'barrier to entry' analysis identified whether MFJS PSNS based on the Option 2 technology would pose sufficient financial burden on new MFJS facilities to constitute a material barrier to entry into the MP&M point source category.

EPA projects a barrier to entry for MFJS PSNS based on the Option 2 technology as 8% of MFJS indirect dischargers have after-tax compliance costs between 1–3% of revenue, 5% have after-tax compliance costs between 3–5% of revenue, and 6% have after-tax compliance costs greater than 5% of revenue. Consequently, EPA is today rejecting Option 2 technology as the basis for PSNS in the MFJS subcategory, and is not revising PSNS for new MFJS indirect dischargers. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by local limits, general pretreatment standards (part 403), and part 433, as applicable. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

C. Printed Wiring Board Subcategory

EPA is not revising any limitations or standards for facilities that would have been subject to this subcategory. Such facilities will continue to be regulated by the General Pretreatment Standards (part 403), local limits, permit limits, and parts 413 and/or 433, as applicable.

1. BPT/BCT/BAT

EPA proposed to establish BPT/BCT/BAT for direct dischargers in the PWB subcategory based on the Option 2 technology (*see* section VI.A for a description of Option 2). EPA evaluated the cost of effluent reductions, pollutant reductions, and the economic achievability of compliance with BPT/BCT/BAT limitations based on the Option 2 technology. Based on revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA has concluded that revision of the national regulation is not warranted for this subcategory.

Based on MP&M survey information, EPA estimates that compliance with BPT/BCT/BAT limitations based on the Option 2 technology results in no closures of the existing eight direct dischargers in the PWB subcategory. However, EPA decided not to establish BPT/BAT limitations based on the Option 2 technology for the PWB subcategory for the following reasons: (1) EPA identified only eight existing PWB direct dischargers and all of these PWB direct dischargers are currently regulated by existing effluent guidelines (part 433); and (2) the costs of Option 2 are disproportionate to the estimated toxic pollutant reductions. EPA estimates compliance cost of $0.3 million (2001$) with only 186 toxic pound-equivalents (PE) being removed. This equates to a cost-effectiveness value (in 1981$) of approximately $900/PE. EPA concludes that for existing direct dischargers in the PWB subcategory, Option 2 is not the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable. EPA has decided not to establish new BPT, BCT, or BAT limitations for existing PWB direct dischargers based on the Option 2 technology, which will remain subject to part 433.

2. New Source Performance Standards (NSPS)

EPA proposed to establish NSPS for new direct dischargers in the PWB subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA

concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA is today rejecting Option 4 technology as the basis for NSPS in the PWB subcategory.

For today's final rule EPA evaluated setting PWB NSPS based on the Option 2 technology. EPA reviewed its database for establishing PWB NSPS based on the Option 2 technology as commentors indicated the proposed standards were not technically achievable. In response to these comments, EPA reviewed all the information currently available on PWB facilities employing the Option 2 technology basis. EPA now concludes that the PWBs Option 2 database can only be used to establish limitations for copper, nickel, and tin. In order to assess the difference between current NSPS requirements (from part 433) for PWB facilities and those under consideration here, EPA estimated the incremental quantities of copper, nickel, and tin that would be reduced if a new PWB facility were required to meet NSPS based on the Option 2 technology rather than NSPS based on 433. EPA analysis shows minimal amounts of pollutant reductions based on more stringent requirements on copper, nickel, and tin.

Consequently, EPA is today rejecting Option 2 technology as the basis for NSPS in the PWB subcategory based on the small incremental quantity of toxic pollutants that would be reduced in relation to existing requirements. EPA is not establishing NSPS for new PWB direct dischargers and is not revising existing NSPS for new PWB direct dischargers. Wastewater discharges from these facilities in this subcategory will remain regulated by permit limits and part 433 as applicable. *See* section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

3. Pretreatment Standards for Existing Sources (PSES)

EPA proposed to establish PSES for existing indirect dischargers in the PWB subcategory based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA rejected promulgating PSES for existing indirect dischargers in the PWB subcategory based on the Option 2 technology for the following reasons: (1) All PWB indirect dischargers are currently regulated by existing effluent guidelines (parts 413 or 433 or both, as applicable); (2) EPA estimates that compliance with PSES based on the Option 2 technology will result in the closure of 6.5% of the existing indirect dischargers in this subcategory (55 of 840 existing PWB indirect dischargers); and (3) EPA determined that the toxic pollutant reductions are very expensive per pound removed (the cost-effectiveness value (in 1981$) is $455/PE). EPA has determined that Option 2 technology is not the best available technology economically achievable for existing indirect dischargers in the PWB subcategory, therefore is not establishing PWB PSES based on the Option 2 technology.

As discussed in the June 2002 NODA (*see* 67 FR 38802), EPA also considered a number of alternative options whose economic impacts would be less costly than Option 2 technology. These options potentially have compliance costs more closely aligned with toxic pollutant reductions. EPA considered the following alternative options for today's final rule:

Option A: No change in current regulation;

Option B: Option 2 with a higher low-flow exclusion; and

Option C: Upgrading facilities currently covered by part 413 to the PSES of part 433

EPA notes that all facilities in the PWB subcategory are currently subject to part 413, part 433 or both.

As discussed in section IV.B.1 of today's final rule, based on comments, EPA has revised its methodology for estimating compliance costs and pollutant loadings for Option 2, higher low-flow exclusions (Option B); and the ''upgrade'' option (Options C) previously described. Using information from this revised analysis, EPA rejected Options B and C as: (1) Greater than 10% of existing indirect dischargers not covered by part 433 close at the upgrade option; or (2) the incremental compliance costs of the upgrade options were too great in terms of toxic removals (cost-effectiveness values (in 1981$) in excess of $833/PE). Therefore EPA is not revising PSES for existing indirect dischargers in the PWB subcategory. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by general pretreatment standards (part 403) and parts 413 and/or 433, as applicable. EPA also notes that facilities regulated by parts 413 and/or 433 PSES must comply with part 433 PSNS if the changes to their facilities are determined to make them new sources.

4. Pretreatment Standards for New Sources (PSNS)

EPA proposed to establish PSNS for indirect dischargers in the PWB subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA is today rejecting Option 4 technology as the basis for PSNS in the PWB subcategory.

For today's final rule EPA evaluated setting PWB PSNS based on the Option 2 technology and assessed the financial burden to new PWB indirect dischargers. Specifically, EPA's 'barrier to entry' analysis identified whether PWB PSNS based on the Option 2 technology would pose sufficient financial burden on new PWB facilities to constitute a material barrier to entry into the MP&M point source category.

EPA projects a barrier to entry for PWB PSNS based on the Option 2 technology as 3% of PWB indirect dischargers have after-tax compliance costs between 1 to 3% of revenue and 4% have after-tax compliance costs greater than 5% of revenue. Consequently, EPA is today rejecting Option 2 technology as the basis for PSNS in the PWB subcategory. EPA has selected ''no further regulation'' for new PWB indirect dischargers and is not revising PSNS for new PWB indirect dischargers. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by local limits, general pretreatment standards (part 403), and part 433, as applicable. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

D. Non-Chromium Anodizing Subcategory

EPA is not revising limitations or standards for any facilities that would have been subject to this subcategory. Such facilities will continue to be regulated by the General Pretreatment Standards (part 403), local limits, permit limits, and parts 413 and/or 433, as applicable.

1. BPT/BCT/BAT

As previously discussed, after publication of the June 2002 NODA EPA

conducted another review of all NCA facilities in the MP&M questionnaire database to determine the destination of discharged wastewater (*i.e.,* either directly to surface waters or indirectly to POTWs or both) and the applicability of the final rule to discharged wastewaters. As a result of this review, EPA did not identify any NCA direct discharging facilities or NCA facilities that do not discharge wastewater (*i.e.,* zero discharge or contract haulers) or do not use process water (dry facilities) in its rulemaking record. All of the NCA facilities in EPA's database are indirect dischargers. Therefore, EPA cannot evaluate treatment systems at direct dischargers. As a result, EPA transferred cost and pollutant loading data from the best performing indirect facilities in order to evaluate direct discharging limitations in this subcategory.

In 2001, EPA proposed to establish BPT/BCT/BAT limitations for direct dischargers in the NCA subcategory based on the Option 2 technology. EPA evaluated the cost of effluent reductions, quantity of pollutant reductions, and the economic achievability of compliance with BPT/BCT/BAT limitations based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, the costs of the Option 2 technology were disproportionate to the projected toxic pollutants reductions (cost-effectiveness values (in 1981$) in excess of $1,925/PE).

EPA decided not to establish BPT/BCT/BAT limitations based on the Option 2 technology for the NCA subcategory for following reasons: (1) EPA identified no NCA direct dischargers; and (2) the costs of Option 2 are disproportionate to the estimated toxic pollutant reductions (*i.e.,* $1,925/PE). EPA concludes that for existing direct dischargers in the NCA subcategory, Option 2 is not the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable. EPA has decided not to establish new BPT, BCT, or BAT limitations for existing NCA direct dischargers based on the Option 2 technology. EPA identified no NCA direct dischargers through its survey efforts. However, if such facilities do exist, they would be subject to part 433.

2. New Source Performance Standards (NSPS)

EPA proposed to establish NSPS for direct dischargers in the NCA subcategory based on the Option 2 technology. For today's final rule EPA evaluated setting NCA NSPS based on the Option 2 technology and assessed the financial burden to new NCA direct dischargers. Specifically, EPA's 'barrier to entry' analysis identified whether NCA NSPS based on the Option 2 technology would pose sufficient financial burden on new NCA facilities to constitute a material barrier to entry into the MP&M point source category.

EPA projects a barrier to entry for NCA NSPS based on the Option 2 technology as approximately 26% of NCA direct dischargers have new source compliance costs that are between 3% and 5% of revenue. Consequently, EPA is today rejecting Option 2 technology as the basis for NSPS in the NCA subcategory. EPA has selected ''no further regulation'' for new NCA direct dischargers and is not revising NSPS for new NCA direct dischargers, which will remain subject to part 433. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

3. Pretreatment Standards for Existing and New Sources (PSES/PSNS)

EPA proposed ''no further regulation'' for existing and new indirect dischargers in the NCA subcategory. EPA based this decision on the economic impacts to indirect dischargers associated with Option 2 and the small quantity of toxic pollutants discharged by facilities in this subcategory, even after a economically-achievable flow cutoff is applied (*see* 66 FR 467). For the reasons set out in the 2001 proposal, EPA has decided not to establish new regulations and is not establishing PSES or PSNS in the NCA subcategory. These facilities remain subject to parts 413 or 433, or both, as applicable. EPA also notes that facilities regulated by parts 413 and/or 433 PSES must comply with part 433 PSNS if the changes to their facilities are determined to make them new sources.

E. Steel Forming & Finishing Subcategory

EPA is not revising limitations or standards for any facilities that would have been subject to this subcategory. Such facilities will continue to be regulated by the General Pretreatment Standards (part 403), local limits, permit limits, and Iron & Steel effluent limitations guidelines (part 420) as applicable.

1. BPT/BCT/BAT

EPA proposed to establish BPT/BCT/BAT for existing direct dischargers in the SFF subcategory in this part (40 CFR part 438) based on the Option 2 technology (*see* section VI.A for a description of Option 2). For the final rule, EPA evaluated the cost of effluent reductions, pollutant reductions, and the economic achievability of compliance with BPT/BCT/BAT limitations based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA determined that the compliance costs of Option 2 are not economically achievable. EPA estimates that compliance with BPT/BCT/BAT limitations based on the Option 2 technology will result in the closure of 17% of the existing direct dischargers in this subcategory (7 of 41 existing SFF direct dischargers). EPA concludes that for existing direct dischargers in the SFF subcategory, Option 2 is not the best practicable control technology, best conventional pollutant control technology, or best available technology economically achievable, and therefore, EPA is not establishing new BPT, BCT, or BAT limitations for existing SFF direct dischargers based on the Option 2 technology. These facilities will remain subject to part 420.

2. New Source Performance Standards (NSPS)

EPA proposed to establish NSPS for new direct dischargers in the SFF subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA is today rejecting Option 4 technology as the basis for NSPS in the SFF subcategory. EPA has selected ''no further regulation'' for new SFF direct dischargers and is not revising NSPS for new SFF direct dischargers, which will remain subject to part 420.

3. Pretreatment Standards for Existing Sources (PSES)

EPA proposed to establish PSES for existing indirect dischargers in the SFF subcategory based on the Option 2 technology. Based on the revisions and corrections to the EPA Cost & Loadings

Model discussed in the NODA and in section IV.B.1 of today's final rule, EPA estimates that compliance with PSES based on the Option 2 technology will result in the closure of 9% of the existing indirect dischargers in this subcategory (10 of 112 existing SFF indirect dischargers). Option 2 technology is not economically achievable.

EPA has determined that Option 2 technology is not the best available technology economically achievable for existing indirect dischargers in the SFF subcategory, and therefore EPA is not revising PSES for this subcategory based on the Option 2 technology. Wastewater discharges to POTWs from these facilities will remain regulated by general pretreatment standards (part 403) and part 420.

4. Pretreatment Standards for New Sources (PSNS)

EPA proposed to establish PSNS for indirect dischargers in the SFF subcategory based on the Option 4 technology. Option 4 technology is similar to Option 2 (including Option 2 flow control and pollution prevention) but includes oils removal using ultrafiltration and solids separation by a microfilter (instead of a clarifier). As explained in section VI.A.4, EPA concluded its database is insufficient to support a determination that the Option 4 standards are technically achievable. Consequently, EPA is today rejecting Option 4 technology as the basis for PSNS in the SFF subcategory. EPA has selected ''no further regulation'' for new SFF indirect dischargers and is not revising PSNS for new SFF indirect dischargers. These facilities will remain subject to part 420.

F. Oily Wastes Subcategory

EPA is promulgating limitations and standards for existing and new direct dischargers in the Oily Wastes subcategory based on the proposed Option 6 technology (*see* section VI.F.1). EPA is not promulgating pretreatment standards for existing or new indirect dischargers in this subcategory.

1. Best Practicable Control Technology (BPT)

EPA is establishing BPT pH limitations and daily maximum limitations for two pollutants, oil and grease as hexane extractable material (O&G (as HEM)) and total suspended solids (TSS), for direct dischargers in the Oily Wastes subcategory based on the proposed technology option (Option 6). Option 6 technology includes the following treatment measures: (1) in-process flow control and pollution prevention; and (2) chemical emulsion breaking followed by oil water separation (*see* section 9 of the TDD for today's final rule for additional details on the Option 6 technology).

The Agency concluded that the Option 6 treatment technology represents the best practicable control technology currently available and should be the basis for the BPT Oily Wastes limitations for the following reasons. First, this technology is available technology readily applicable to all facilities in the Oily Wastes subcategory. Approximately 42% of the direct discharging facilities in the Oily Wastes subcategory currently employ the Option 6 technology. Second, the cost of compliance with these limitations in relation to the effluent reduction benefits is not wholly disproportionate. None of these wastewater discharges are currently subject to national effluent limitations guidelines and the final rule will control wastewater discharges from a significant number of facilities (2,382 facilities).

EPA estimates that compliance with BPT limitations based on Option 6 technology will result in no closures of the existing direct dischargers in the Oily Wastes subcategory. Moreover, the adoption of this level of control will represent a significant reduction in pollutants discharged into the environment by facilities in this subcategory. For facilities in the Oily Wastes subcategory at Option 6, EPA estimates an annual compliance cost of $13.8 million (pre-tax, 2001$) and 480,325 pounds of conventional pollutants removed from current discharges into the Nation's waters at a cost of $28.73/pound-pollutant removed (2001$) (*see* Table VII–1). EPA has, therefore, determined the total cost of effluent reductions employing the Option 6 technology are reasonable in relation to the effluent reduction benefits. (In estimating the pounds of pollutant removed by implementing Option 6 technology for direct dischargers in the Oily Wastes subcategory, EPA used the sum of O&G (measured as HEM) and TSS pounds removed to avoid any significant double counting of pollutants).

The 2001 proposal also contains detailed discussions explaining why EPA rejected BPT limitations based on other BPT technology options (*see* 66 FR 457). The information in the record for today's final rule provides no basis for EPA to change this conclusion.

In the 2001proposal, in addition to pH, O&G (as HEM), and TSS, EPA also proposed to regulate sulfide. In today's final rule, EPA has not established a sulfide limitation because it may serve as a treatment chemical (*see* TDD). EPA also proposed three alternatives to control discharges of toxic organics in MP&M process wastewaters: (1) Meet a numerical limit for the total sum of a list of specified organic pollutants (similar to the Total Toxic Organic (TTO) parameter used in the Metal Finishing Effluent Limitations Guidelines); (2) meet a numerical limit for Total Organic Carbon (TOC) as an indicator parameter; or (3) develop and certify the implementation of an organic chemicals management plan. EPA evaluated the analytical wastewater and treatment technology data from OWS facilities and concluded it should not establish a separate indicator parameter or control mechanism for toxic organics. Optimizing the separation of oil and grease from wastewater using the Option 6 technology will similarly optimize the removal of toxic organic pollutants amenable to this treatment technology. Consequently, EPA is effectively controlling toxic organics and other priority and non-conventional pollutant discharges in OWS process wastewaters by regulating O&G (as HEM).

In its analyses, EPA estimated that facilities will monitor once per month for O&G (as HEM) and TSS. EPA expects that 12 data points for each pollutant per year will yield a meaningful basis for establishing compliance with the promulgated limitations through long-term trends and short-term variability in O&G (as HEM) and TSS pollutant discharge loading patterns.

Although EPA is not changing the technology basis from that proposed, EPA is revising all of the proposed Oily Wastes subcategory BPT limitations. This is a result of a recalculation of the limitations after EPA revised the data sets used to calculate the promulgated limitations to reflect changes including corrections and additional data (*see* 67 FR 38754).

2. Best Conventional Pollutant Control Technology (BCT)

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considered whether there are technologies that achieve greater removals of conventional pollutants than adopted for BPT, and whether those technologies are cost-reasonable under the standards established by the CWA. EPA generally refers to the decision criteria as the ''BCT cost test.'' EPA is promulgating effluent limitations for conventional parameters (*e.g.,* pH, TSS, O&G) equivalent to BPT for this subcategory because it identified no technologies that can achieve greater removals of conventional pollutants

than the selected BPT technology basis that also pass the BCT cost test. EPA evaluated the addition of ultrafiltration technology to the BPT technology basis as a means to obtain further O&G reductions. However, this technology option failed the BCT cost test. For a more detailed description of the BCT cost test and details on EPA's analysis, see Chapter 4 of the EEBA.

3. Best Available Technology Economically Achievable (BAT)

EPA proposed to control toxic and non-conventional pollutants by establishing BAT limitations based on Option 6 technology. EPA has now decided not to establish BAT toxic and non-conventional limitations based on the Option 6 technology. As described in section VI.F.1, the BPT technology basis is readily available, and the limitations are cost reasonable. However the additional costs associated with compliance with Option 6-generated BAT limitations are not warranted. EPA has determined that these costs—primarily monitoring costs—are not warranted in view of the small quantity of additional effluent reduction (if any) the BAT limitations would produce. As explained above, EPA has determined that, the BPT limitation on O&G (measured as HEM) will effectively control toxic and non-conventional discharges in OWS process wastewaters. EPA has not identified any more stringent economically-achievable treatment technology option beyond BPT technology (Option 6) which it considered to represent BAT level of control applicable to Oily Wastes subcategory facilities.

For the reasons explained above, EPA has concluded that it should not establish BAT limitations for specific pollutant parameters for Oily Waste operations. EPA notes that permit writers retain the authority to establish, on a case-by-case basis under section 301(b)(1)(C) of the CWA, toxic effluent limitations that are necessary to meet State water quality standards.

4. New Source Performance Standards (NSPS)

EPA is promulgating NSPS that would control pH and the same conventional pollutants controlled at the BPT and BCT levels. The selected technology basis for NSPS for this subcategory for today's final rule is Option 6. This is unchanged from the proposal. EPA projects no barrier to entry for new source direct dischargers associated with Option 6 as: (1) Option 6 technology is currently used at existing direct dischargers (*i.e.,* Option 6 technology is technically available); and (2) there is no barrier to entry for new sources.

EPA evaluated the economic impacts for existing direct dischargers associated with compliance with limitations based on Option 6 and found Option 6 to be economically achievable (no closures projected). EPA expects compliance costs to be lower for new sources as new sources can use Option 6 technology without incurring retrofitting costs (as is required for some existing sources). Additionally, EPA projects no barrier to entry for OWS NSPS based on the Option 6 technology as approximately 97% of OWS direct dischargers have after-tax compliance costs less than 1% of revenue and 3% have after-tax compliance costs between 1 to 3% of revenue.

Consequently, EPA selected Option 6 technology as the basis for NSPS in the OWS. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

In addition, EPA also evaluated and rejected more stringent technology options for OWS NSPS (*i.e.,* Options 8 and 10). EPA reviewed its database for the Option 8 and 10 technologies and found that the database for Option 8 and 10 technologies is insufficient (*i.e.,* no available data) or the costs are not commensurate with the pollutant removals (*see* 66 FR 457). Since EPA's database did not contain Option 10 treatability data from oily subcategory facilities, EPA considered transferring limitations for Option 10 from the Shipbuilding Dry Docks or Railroad Line Maintenance subcategories. EPA ultimately rejected this approach, however, because influent wastewaters in the Shipbuilding Dry Docks or Railroad Line Maintenance subcategories are generally less concentrated and contain less pollutants than wastewaters discharged by OWS facilities.

5. Pretreatment Standards for Existing Sources (PSES)

EPA proposed to establish PSES for existing indirect dischargers in the Oily Wastes subcategory based on the Option 6 technology (*i.e.,* the same technology basis that is being promulgated for BPT/BCT/NSPS for this subcategory) with a ''low-flow'' exclusion of 2 MGY to reduce economic impacts on small businesses and administrative burden for control authorities. Based on the revisions and corrections to the EPA Cost & Loadings Model discussed in the NODA and in section IV.B.1 of today's final rule, and previously discussed, EPA determined that the toxic pollutant reductions are very expensive in dollars per toxic pounds removed. The cost-effectiveness value (in 1981$) for Option 6 for indirect dischargers in the Oily Wastes subcategory is in excess of $3,500/PE removed. This suggests that the technology is not truly ''available.'' EPA has determined that Option 6 technology with a 2 MGY low-flow cutoff is not the best available technology economically achievable for existing indirect dischargers in the OWS. Therefore, EPA is not establishing PSES for this subcategory based on Option 6 technology with a 2 MGY low-flow cutoff.

As discussed in the June 2002 NODA (*see* 67 FR 38804), EPA also considered alternative options for which economic impacts could be less costly than Option 6 technology with a 2 MGY low-flow cutoff. These options potentially have compliance costs more closely align with toxic pollutant reductions. EPA considered the following alternative options for today's final rule:

Option A: No regulation;

Option B: Option 6 with a higher low-flow exclusion;

As discussed in section IV.B.1 of today's final rule, based on comments, EPA has revised its methodology for estimating compliance costs and pollutant loadings for Option 6, and higher low-flow exclusions (Option B) previously described. Using information from this revised analysis, EPA concludes that none of the alternative low-flow exclusions (even as high as 6.25 MGY) represented ''available technology'' because the costs associated with these alternatives were not commensurate with the projected toxic pollutants reductions. Therefore, EPA is not establishing PSES for existing indirect dischargers in the Oily Wastes subcategory (Option A). Since EPA did not identify another technology basis that was more cost-effective, EPA is not promulgating PSES for existing indirect dischargers in the Oily Wastes subcategory. These facilities remain subject to the General Pretreatment regulations (40 CFR part 403) and local limits, as applicable.

6. Pretreatment Standards for New Sources (PSNS)

EPA proposed to establish PSNS for indirect dischargers in the Oily Wastes subcategory based on the Option 6 technology (*i.e.,* the same technology basis that is being promulgated for NSPS for this subcategory) with a ''low-flow'' exclusion of 2MGY to reduce economic impacts on small businesses

and reduce administrative burden to POTWs.

For today's final rule EPA evaluated setting OWS PSNS based on Option 6 technology and assessed the financial burden of OWS PSNS based on Option 6 technology on new OWS indirect dischargers. Specifically, EPA's 'barrier to entry' analysis identified whether OWS PSNS based on Option 6 technology would pose sufficient financial burden on new OWS facilities to constitute a material barrier to entry into the MP&M point source category.

EPA projects a barrier to entry for OWS PSNS based on Option 6 technology as approximately as 1% of OWS indirect dischargers have after-tax compliance costs between 1 to 3% of revenue and 5% have after-tax compliance costs between 3 to 5% of revenue. Consequently, EPA is today rejecting Option 6 technology as the basis for PSNS in the OWS. EPA has selected ''no further regulation'' for new OWS indirect dischargers and is not revising PSNS for new OWS indirect dischargers. Wastewater discharges to POTWs from facilities in this subcategory will remain regulated by local limits and general pretreatment standards (part 403), as applicable. See section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

G. Railroad Line Maintenance Subcategory

EPA is not establishing limitations or standards for any facilities that would have been subject to this subcategory. Permit writers and control authorities will establish controls using BPJ to regulate wastewater discharges from these facilities.

1. Best Practicable Control Technology (BPT)

For today's final rule EPA evaluated setting BPT limitations for two pollutants, TSS and O&G (as HEM), for direct dischargers in the RRLM subcategory based on a different technology basis from that proposed in 2001. EPA proposed Option 10 technology (*see* section VI.H.1 for a description) as the technology basis for BPT. However, as discussed in the NODA, EPA considered promulgating limitations for the final rule based on the Option 6 technology for the RRLM subcategory (*see* 67 FR 38804). Option 6 technology includes the following: (1) in-process flow control and pollution prevention; and (2) chemical emulsion breaking followed by oil water separation (*see* section 9 of the TDD for today's final rule for additional details on the Option 6 technology).

For the RRLM subcategory, EPA changed the technology basis considered for the final rule and eliminated consideration of regulating BOD_5 based on comments and data submitted by the American Association of Railroads (AAR). This organization is a trade association which currently represents all facilities in this subcategory. As discussed in the NODA (*see* 67 FR 38755), for each RRLM direct discharging facility known to them, AAR provided current permit limits, treatment-in-place, and summarized information on each facility's measured monthly average and daily maximum values. AAR also provided a year's worth of long-term monitoring data for each facility (*see* section 15.1 of the public record for the AAR surveys). This data shows that, contrary to EPA's initial findings in the 2001 proposal, most RRLM direct dischargers treat their wastewater by chemical emulsion breaking/oil water separation (Option 6). Based on this updated information, EPA is today rejecting Option 10 as the technology basis for BPT. The 2001 proposal also contains detailed discussions on why EPA rejected BPT limitations based on other BPT technology options (*see* 66 FR 451). The information in the record for today's final rule provides no basis for EPA to change this conclusion.

As previously discussed, after publication of the June 2002 NODA EPA also conducted another review of all RRLM facilities in the MP&M questionnaire database to determine the destination of discharged wastewater (*i.e.,* either directly to surface waters or indirectly to POTWs or both) and the applicability of the final rule to discharged wastewaters. As a result of this review, EPA determined its questionnaire database did not accurately represent direct dischargers in this subcategory. Consequently, for today's final rule EPA used the information supplied by AAR as a basis for its analyses and conclusions on direct dischargers in this subcategory.

AAR provided information on 27 facilities. EPA reviewed the information on each of these facilities to ensure they were direct dischargers, discharged wastewaters resulting from operations subject to this final rule, and discharged ''process'' wastewaters as defined by the final rule. As a result of this review, EPA concluded 18 of the facilities for which AAR provided information do not directly discharge wastewaters exclusively from oily operations (*see* section V.A). Therefore, EPA's final database consists of 9 direct discharging RRLM facilities. EPA considered promulgating BPT limitations for these 9 direct discharging RRLM facilities based on the Option 6 technology. The Agency made the following conclusions during its evaluation of Option 6 for this subcategory.

First, this technology is readily applicable to all facilities in the RRLM subcategory. All direct discharging facilities in the RRLM subcategory currently employ wastewater treatment equivalent or better than chemical emulsion breaking/oil water separation (Option 6). Second, EPA estimates that compliance with BPT limitations based on Option 6 technology will result in no closures of the existing direct dischargers in the RRLM subcategory. Moreover, none of the facilities identified by AAR are small businesses as defined by the Small Business Administration (SBA). Third, most of the RRLM facilities identified by AAR have NPDES daily maximum permit limitations for O&G (as HEM) and TSS as 15 and 45 mg/L, respectively. Based on AAR survey information, EPA concludes that these O&G (as HEM) and TSS daily maximum limits represent the average of the best performances of facilities utilizing Option 6 technology.

EPA evaluated the compliance costs and load reductions associated with establishing BPT daily maximum limitations equivalent to 15 and 45 mg/L for O&G (as HEM) and TSS, respectively. EPA concluded that all of the facilities identified by AAR currently meet a daily maximum oil and grease limit of 15 mg/L and most currently monitor once per month. Therefore, EPA estimates no pollutant load reductions and minimal incremental annualized compliance costs for the monitoring associated with a BPT daily maximum limitation equivalent to 15 mg/L for O&G (as HEM). For TSS, with the exception of one facility, all RRLM facilities identified by AAR currently meet a daily maximum limit of 45 mg/L. For this one facility, EPA estimates the TSS pollutant loadings reductions associated with a BPT daily maximum limitation equivalent to 45 mg/L to be less than 1 pound of TSS per day. Given the fact that the few facilities in this subcategory are already essentially achieving the limitations under consideration, EPA has determined that additional national regulation is not warranted. As a result of this analysis, EPA concludes that it is more appropriate to address permits limitations for this industry on a case-by-case basis and that additional national regulation of direct discharges

in the RRLM subcategory at this time is unwarranted.

2. Best Conventional Pollutant Control Technology (BCT)

In deciding whether to adopt more stringent limitations for BCT than BPT, EPA considers whether there are technologies that achieve greater removals of conventional pollutants than adopted for BPT, and whether those technologies are cost-reasonable under the standards established by the CWA. EPA generally refers to the decision criteria as the ''BCT cost test.'' For a more detailed description of the BCT cost test and details of EPA's analysis, see Chapter 4 of the EEBA.

For the reasons discussed above, EPA is not establishing BCT limitations for the RRLM subcategory.

3. Best Available Technology Economically Achievable (BAT)

As proposed, EPA is not establishing BAT regulations for the RRLM subcategory. EPA did not propose BAT regulations because the Agency concluded that facilities in this subcategory discharge very few pounds of toxic pollutants. EPA estimates that six facilities discharge 34 PE per year to surface waters, or about 6 PE per year per facility. The Agency based the loadings calculations on EPA sampling data, which found very few priority toxic pollutants at treatable levels in raw wastewater. EPA has received no data or information during the rulemaking that contradicts these conclusions. Therefore, nationally-applicable regulations for toxic and nonconventional pollutants are unnecessary at this time and direct dischargers will remain subject to permit limitations for toxic and nonconventional pollutants established on a case-by-case basis using BPJ.

4. New Source Performance Standards (NSPS)

EPA proposed setting NSPS based on Option 10 technology for this subcategory. For today's final rule EPA considered setting RRLM NSPS based on Option 10 technology and assessed the financial burden of RRLM NSPS based on Option 10 technology on new RRLM direct dischargers. Specifically, EPA's ''barrier to entry'' analysis identified whether RRLM NSPS based on Option 10 technology would pose sufficient financial burden as to constitute a material barrier to entry into the MP&M point source category.

EPA projects no barrier to entry for RRLM NSPS based on Option 10 technology as: (1) Option 10 technology is currently used at existing RRLM direct dischargers (*i.e.*, Option 10 technology is technically available); and (2) all RRLM direct dischargers have new source compliance costs that are less than 1% of revenue. However, EPA is not promulgating RRLM NSPS based on the Option 10 technology as EPA concludes that it is more appropriate to address limitations for this industry on a case-by-case basis and that national regulation of direct discharges in the RRLM subcategory at this time is unwarranted. *See* section 11 of the TDD for a description of how these new source compliance costs were developed and Chapter 9 of the EEBA for a description of the framework EPA used for the barrier to entry analysis and general discussion of the results.

5. Pretreatment Standards for Existing and New Sources (PSES/PSNS)

EPA proposed not to establish pretreatment standards for existing and new indirect dischargers in the RRLM subcategory based on the small quantity of toxic pollutants discharged to the environment (after POTW treatment) by facilities in this subcategory (*i.e.*, approximately 2 PE removed annually per facility (*see* 66 FR 470–471)). For the same reasons set out in the 2001 proposal, EPA is not promulgating pretreatment standards for existing or new indirect dischargers in this subcategory. These facilities remain subject to the General Pretreatment regulations (40 CFR part 403) and local limits.

H. Shipbuilding Dry Dock Subcategory

EPA is not establishing limitations or standards for any facilities that would have been subject to this subcategory. Permit writers and control authorities will establish controls using BPJ to regulate wastewater discharges from these facilities.

1. BPT/BCT/BAT/NSPS

At the time of the 2001 proposal, EPA identified 6 direct discharging shipbuilding dry dock facilities with multiple discharges. Based on the information in the database at that time, discharges from these facilities contained minimal concentrations of toxic organic and metals pollutants (<9 PE/facility), but substantial quantities of conventional pollutants, particularly oil and grease. Consequently, EPA proposed to establish BPT limitations and NSPS for only two pollutants, TSS and O&G (as HEM), for direct dischargers in the SDD subcategory based on Option 10 technology. This technology includes the following: (1) in-process flow control and pollution prevention; and (2) oil-water separation by chemical emulsion breaking and oil-water separation by dissolved air flotation (*see* section 9 of the TDD for today's final rule for additional details on the Option 10 technology). EPA proposed this technology basis because some existing SDD facilities use this technology and it projected significant reductions in conventional pollutants and determined these reductions were cost reasonable.

Following proposal, EPA received comments and supporting data indicating that its estimates of current pollutant discharges from this subcategory were overestimated. In particular, commentors claimed that current discharges of oil and grease were minimal and that national regulation was not warranted for this subcategory.

For today's final rule, EPA incorporated the additional information provided by commentors into its analysis. EPA continues to conclude that there are six direct discharging shipbuilding dry dock facilities. However, EPA now concludes that direct discharges from these facilities generally contain minimal levels of all pollutants. In particular, EPA's database indicates that regulation of oil and grease in direct discharges from shipbuilding dry docks is unwarranted because current oil and grease discharges from these facilities are not detectable (<5 mg/L) or nearly not detectable. EPA has similarly determined that it should not establish nationally applicable limitations and standards for TSS because TSS discharges are, on average, minimal. The data show that TSS discharges may increase episodically, particularly when the dry dock is performing abrasive blasting operations cleaning. However, EPA has concluded that these episodic discharges from six facilities do not warrant national regulation.

Therefore, nationally-applicable regulations for new and existing SDD direct dischargers are unnecessary at this time and these facilities will remain subject to permit limitations established on a case-by-case basis using BPJ.

2. Pretreatment Standards for Existing and New Sources (PSES/PSNS)

EPA proposed not to establish pretreatment standards for existing and new indirect dischargers in the SDD subcategory based on the small number of facilities in this subcategory and on the small quantity of toxic pollutants removed by the technology options evaluated by EPA at proposal (*i.e.*, less than 26 PE removed annually per facility (*see* 66 FR 471)). For the same reasons set out in the 2001 proposal,

EPA is not promulgating pretreatment standards for existing or new indirect dischargers in this subcategory. These facilities remain subject to the General Pretreatment regulations (40 CFR part 403) and local limits.

VII. Pollutant Reduction and Compliance Cost Estimates

A. Pollutant Reductions

Presented in this section are the pollutant reductions obtainable through the application of Option 6 technology that form the basis of the effluent limitations guidelines for the Oily Wastes subcategory promulgated today. This section summarizes these estimated reductions. Section 12 of the TDD includes the estimated pollutant reductions for options considered but not promulgated, and discusses the loadings determination methodology in detail.

Today's final rule does not establish PSES for any dischargers to POTWs in the MP&M point source category. Therefore, EPA does not project any pollutant reductions from POTWs as a result of today's rule. The following pollutant reductions are related to direct dischargers in the Oily Wastes subcategory.

1. Conventional Pollutant Reductions

The Agency estimates that this regulation will reduce discharges of TSS and O&G (as HEM) by approximately 500,000 pounds per year (*see* Table VII–1).

TABLE VII–1.—REDUCTION IN DIRECT DISCHARGE OF CONVENTIONAL POLLUTANTS AFTER IMPLEMENTATION OF BPT/BCT REGULATIONS PROMULGATED TODAY

Subcategory	Oil and grease pounds/year	Total suspended solids pounds/year	Oil and grease and total suspended solids pounds/year
Oily Wastes	396,079	84,246	480,325

2. Priority and Non-conventional Pollutant Reductions

The Agency did not estimate the reductions in priority and non-conventional metals and organic pollutants because the Agency did not have sufficient COD or other non-conventional data to estimate baseline pollutant discharges. The Agency does expect some non-conventional pollutant removals at OWS facilities complying with limitations and standards based on Option 6 technology.

B. Regulatory Costs

Presented in this section are the regulatory costs EPA projects through the application of Option 6 technology that form the basis of the effluent limitations guidelines for the Oily Wastes subcategory promulgated today. This section summarizes these estimated costs. Section 11 of the TDD includes the estimated regulatory costs for options considered but not promulgated, and discusses the costing methodology in detail.

This preamble, TDD, and EEBA express all cost estimates in this section in terms of 2001 dollars. The cost components reported in this section represent estimates of the investment cost of purchasing and installing equipment, the annual operating and maintenance costs associated with that equipment, additional land requirement costs associated with new equipment, and additional costs for discharge monitoring.

1. Direct Discharge Facilities

Table VII–2 shows the costs EPA estimated for existing direct dischargers in the Oily Wastes subcategory to comply with the BPT/BCT limitations promulgated today.

TABLE VII–2.—ESTIMATED COSTS FOR BPT/BCT

Subcategory	Number of facilities	Total capital and land costs (2001$, millions)	Annual O&M costs (2001$, millions)	Annualized compliance costs (2001$, millions)
Oily Wastes	2,382	6.5	13.1	13.8

2. Indirect Discharge Facilities

Because today's final rule does not establish PSES for any dischargers in the MP&M industry, EPA has not projected compliance costs for facilities that discharge indirectly to POTWs.

VIII. Economic Analyses

A. Introduction and Overview

This section of the preamble presents EPA's estimates of the private and social costs of the regulation, and the expected economic impacts of compliance with the regulation. Measures of economic impact include facility closures and associated losses in employment, firm-level impacts, impacts on government-owned facilities, local community impacts, and international trade. An analysis of impacts on small businesses supports EPA's compliance with the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA). Section XII.C of this preamble discusses RFA/SBREFA issues. EPA's complete assessment of costs and economic impacts including results for the alternative regulatory options can be found in ''*Economic, Environmental, & Benefit Analysis of the Final Metal Products & Machinery Rule''* (hereafter referred to as the ''EEBA'').

EPA based its regulatory decisions for the final MP&M rule in part on the findings from the facility impact analyses reported in the EEBA and discussed in this section. The economic impact analyses assess how facilities will be affected financially by the final MP&M rule. Key outputs of the facility impact analysis include expected facility closures in the MP&M industries, associated losses in employment, and the number of facilities experiencing financial stress short of closure (''moderate impacts''). The findings from the facility impact analysis also provide the basis for the following analyses:

- A firm-level analysis, which assesses the impact on the financial performance and condition of firms owning MP&M facilities;
- An analysis of impacts on government-owned facilities, which assesses the impact on the financial performance and condition of government entities that own and operate at least one MP&M site;
- An employment effects analysis, which assesses the increase in employment associated with compliance activities, the loss of employment due to facility closures, and the net effect on overall employment;
- A community impact analysis, which assesses the potential impact of employment changes in communities where MP&M facilities are located; and
- A foreign trade analysis, which assesses the effect of the regulation on the U.S. balance of trade.

EPA performed economic impact analyses for three groups of facilities, using different methodologies to evaluate impacts on each group. The three groups are:

- Privately-owned MP&M Facilities, including privately-owned facilities that do not perform railroad line maintenance and are not owned by governments. This major category includes privately-owned businesses in a wide range of sectors or industries, including the segment of facilities that manufacture and rebuild railroad equipment.
- Railroad line maintenance facilities that maintain and repair railroad track, equipment and vehicles.
- Government-owned MP&M facilities operated by municipalities, State agencies and other public sector entities such as State universities and Federal facilities. Many of these facilities repair, rebuild, and maintain buses, trucks, cars, utility vehicles (*e.g.*, snow plows and street cleaners), and light machinery.

The facility impact analysis starts with compliance cost estimates from the EPA engineering analysis and then calculates how these compliance costs would affect the financial condition of MP&M facilities. EPA made several changes to the facility impact methodology between proposal (*see* 66 FR 424) and final regulation. The NODA (*see* 67 FR 38752) and section IV.B.3 of this preamble document these changes, which to a large degree address comments on the proposal impact methodology. The major changes to the economic impact analyses include: (1) Using sector-specific thresholds for the moderate impact analysis tests; (2) using a single financial test, based on net present value, to assess the potential for closures (this test excludes consideration of liquidation values for all MP&M facilities, including the 219 facilities that reported them in their response to the MP&M survey); and (3) using estimated baseline capital outlays in the calculation of cash flow for the net present value test. Other changes to the economic impact methodology include: (1) Using revised cost pass-through coefficients; (2) using sector-specific price indices in updating survey data; and (3) limiting post-compliance tax shields to no greater than reported baseline taxes.

In conducting the facility impact analysis, EPA first eliminated from the analysis those facilities showing materially inadequate financial performance in the baseline, that is, in the absence of the rule. EPA judged these facilities, which are referred to as baseline closures, to be at substantial risk of financial failure regardless of any financial burdens that may result from the MP&M rule. Second, for the remaining facilities, EPA evaluated how compliance costs would likely affect facility financial health. In this analysis of compliance cost impact, EPA accounted for potential price increases that may help facilities cover the cost of compliance. EPA based its estimate of potential price increases on a cost pass-through analysis that estimates how prices might change in response to regulation-induced production cost increases. EPA identified a facility as a regulatory closure if it would have operated under baseline conditions but would fall below an acceptable financial performance level under the new regulatory requirements.

EPA also identified facilities that would likely incur moderate impacts from the rule but that are not expected to close as a result of the rule. EPA used a different methodology to assess moderate impacts for each of three types of MP&M facilities: privately-owned MP&M facilities, railroad line maintenance facilities, and government-owned facilities. EPA established thresholds for two measures of financial performance—interest coverage ratio and pre-tax return on assets—and compared the facilities' performance before and after compliance under each regulatory option with these thresholds. EPA attributes incremental moderate impacts to the rule if both financial ratios exceeded threshold values in the baseline (*i.e.*, there were no moderate impacts in the baseline), but at least one financial ratio fell below the threshold value in the post-compliance case. EPA refers the reader to the full EEBA report for a detailed discussion of the economic impact methodology used for each of these types of MP&M facilities.

B. Economic Costs of Technology Options by Subcategory

The TDD for the final rule presents EPA's engineering estimates of costs that will be incurred by facilities to comply with the final regulation, and the costs for other regulatory options. EPA adjusted the engineering costs from 1996 to 2001 dollars using the *Engineering News-Record* Construction Cost Index (CCI), and adjusted the costs to reflect the effect of taxes using a combined Federal/State corporate income tax rate of 39 percent. EPA calculated the annual equivalent of capital and other one-time costs by annualizing costs at a seven percent discount rate over an estimated 15-year equipment life.

The compliance costs of the rule are the costs incurred by those facilities that EPA estimates will continue to operate in compliance with the rule. Aggregate compliance costs presented in this section differ from the costs presented in sections VI and VII because they exclude costs for facilities that are baseline closures or that close due to regulatory requirements (*see* section VIII.D for estimates of baseline and post-compliance closures). Therefore, they represent only the compliance outlays of facilities that are estimated to continue operations. Section VIII.I presents EPA's estimates of social costs, which include costs for regulatory closures. Table VIII–1 shows the total annualized compliance costs by subcategory for the 2,382 OWS direct dischargers that are: (1) Subject to requirements; (2) make the necessary investments to meet the requirements; and (3) continue operating under the regulation. Facilities in all other subcategories are excluded from the final rule and have no incremental compliance costs.

Total annualized costs are the sum of the annual operating and maintenance costs and the annualized equivalent of capital and other one-time costs. Annualized pre-tax compliance costs in 2001 dollars are estimated at $13.8 million per year for the final rule.

TABLE VIII–1.—TOTAL ANNUALIZED FACILITY* COMPLIANCE COSTS FOR THE OILY WASTES SUBCATEGORY

[pre-tax, million $2001]

Subcategory	Final rule
Oily Wastes	$13.8

TABLE VIII–1.—TOTAL ANNUALIZED FACILITY* COMPLIANCE COSTS FOR THE OILY WASTES SUBCATEGORY—Continued

[pre-tax, million $2001]

Subcategory	Final rule
All Categories: Number of Facilities Operating in the Baseline**	2,382

*This table includes facility compliance costs only. Section VIII.I discusses the social costs of the rule. The estimates in this table exclude baseline and regulatory closures.

**This estimate can be found in section VIII.B.

C. Facility Level Economic Impacts of the Final Rule by Subcategory

1. Baseline Closure Analysis

Table VIII–2 summarizes the estimated baseline closures for direct dischargers. Based on its evaluation, EPA determined that 3,593 facilities (or 8.2 percent) of the estimated 43,858 discharging facilities are baseline closures. The 3,593 baseline closures include 3,511 indirect dischargers (97.7 percent) and 98 direct dischargers (2.7 percent). The total number of facilities classified as indirect and direct dischargers does not equal the total number of dischargers. Some facilities operate in more than one subcategory and have an indirect and direct discharging operation within the same facility. The facilities estimated to close in the baseline analysis are at substantial risk of financial failure independent of the regulation. These facilities were excluded from the post-compliance analysis of regulatory impacts. Data on facility start-ups and closures from the Census *Statistics of U.S. Businesses* indicate that between 6 and 12 percent of facilities in the major metal products manufacturing industries close in any given year. Therefore, EPA's analysis of baseline closures is consistent with this data.

TABLE VIII–2.—SUMMARY OF BASELINE CLOSURES

Subcategory	Total number of dischargers	Number of baseline closures	Percent of baseline closures %	Operating in baseline
General Metals	11,364	880	7.7	10,484
Metal Finishing Job Shops	1,542	50	3.2	1,491
Non-Chromium Anodizer	122	29	23.8	93
Oily Wastes	29,185	2,409	8.3	26,776
Printed Wiring Boards	848	239	28.2	609
Railroad Line Maintenance	826	0	0.0	831
Shipbuilding Dry Dock	14	0	0.0	14
All Subcategories*	43,858	3,593	8.2	40,265

***Note:** The reported total of facilities over all subcategories does not equal the sum of facilities by subcategory because some facilities operate in more than one subcategory and have an indirect and direct discharging operation within the same facility.

2. Facilities Subject to Regulatory Requirements

Of the estimated 40,265 discharging facilities open in the baseline, EPA estimates that 37,880 facilities (or 94 percent) will not be subject to the rule's requirements due to subcategory exclusions. The subcategory exclusions exempt 37,652 indirect dischargers in all subcategories and 259 direct dischargers in seven subcategories from the final rule.

TABLE VIII–3.—SUMMARY FACILITIES SUBJECT TO FINAL RULE

Subcategory	Operating in baseline	Number of facilities excluded	Percent of facilities excluded	Number of facilities subject to final rule
General Metals	10,484	10,484	100.0	0
Metal Finishing Job Shops	1,491	1,491	100.0	0
Non-Chromium Anodizer	93	93	100.0	0
Oily Wastes	26,776	24,394	91.1	2,382
Printed Wiring Boards	609	609	100.0	0
Railroad Line Maintenance	829	829	100.0	0
Shipbuilding Dry Dock	14	14	100.0	0
All Subcategories*	40,265	37,883	94.0	2,382

***Note:** The reported total of facilities over all subcategories does not equal the sum of facilities by subcategory because some facilities operate in more than one subcategory and have an indirect and direct discharging operation within the same facility.

3. Post-Compliance Impact Analysis

EPA estimates that none of the direct discharging facilities operating in the baseline regulation will close as a result of the MP&M rule. With no predicted facility closures, EPA expects no employment losses from the rule. EPA also expects that none of the 2,382 direct discharging facilities operating in the baseline and subject to regulatory requirements will experience moderate financial impacts due to the rule. Chapter 5 of the EEBA includes impact analysis results for alternative regulatory options that EPA considered in developing the final rule.

4. Summary of Facility Impacts

Table VIII–4 summarizes the results of the economic impact analysis for the final rule. EPA estimates that no facilities will close or experience moderate financial impacts. The table presents the annualized compliance cost on both a pre-tax and after-tax basis. The after-tax value represents the cost that privately-owned firms would incur in complying with the regulation because some of the costs are borne by the general tax-paying public through

the tax deduction permitted on privately-owned firms' compliance outlays. EPA's after-tax analyses (1) use a combined Federal/State tax rate of 39 percent, and (2) limit tax offsets to compliance costs to not exceed facility-level tax payments as reported in facility questionnaire responses.

TABLE VIII–4.—FACILITY IMPACTS FOR ALL FACILITIES

Number of Facilities Operating in Baseline	40,265
Number of facilities excluded from regulatory requirements	37,883
Number of facilities operating subject to regulatory requirements	2,382
Number of Closures (Severe Impacts)	0
Percent Closing (%)	0.0
Number of Additional Facilities with Moderate Impacts	0
Percent with Moderate Impacts (%)	0.0
Annualized Compliance Costs (pre-tax, million $2001)	$13.8
Annualized Compliance Costs (after tax, million $2001)	$11.9

D. Firm Level Impacts

EPA examined the impacts of the final rule on firms that own MP&M facilities, as well as on the financial condition of the facilities themselves. A firm that owns multiple MP&M facilities could experience adverse financial impacts at the firm level if its facilities are among those that incur significant impacts at the facility level. EPA also uses the firm-level analysis to compare impacts on small versus large firms, as required by the Regulatory Flexibility Act and the Small Business Regulatory Enforcement Fairness Act. Section XII.C of this preamble discusses RFA/SBREFA issues.

EPA compared compliance costs with revenue at the firm level as a measure of the relative burden of compliance costs. EPA applied this analysis only to MP&M facilities owned by privately-owned entities. (Section VIII.E discusses impacts on governments that own MP&M facilities.) EPA estimated firm-level compliance costs by summing costs for all facilities owned by the same firm that responded to the survey plus estimated compliance costs for additional facilities for which respondents submitted information.

The Agency was not able to estimate precisely at the national level the number of firms that own MP&M facilities, because the sample weights based on the survey design represent numbers of facilities rather than firms. Most privately-owned MP&M facilities that remain open in the baseline are single-facility firms, however. These firms can be analyzed using the survey weights. In addition, 278 survey respondents report being owned by a firm that owns more than one MP&M facility. For the firm-level analysis, EPA assigned these facilities, and their owning firms, a sample weight of one, since it is not known how many firms these 278 sample facilities represent. Chapter 9 of the EEBA presents EPA's analysis of firm-level impacts.

Table VIII–5 shows the results of the firm-level analysis. The results represent a total of 26,750 MP&M firms (26,472 + 278), owning 37,424 facilities (26,472 owned by single-facility firms plus 10,953 owned by multi-facility firms).

TABLE VIII–5.—FIRM LEVEL AFTER TAX ANNUAL COMPLIANCE COSTS AS A PERCENT OF ANNUAL REVENUES FOR PRIVATELY-OWNED BUSINESSES: SELECTED REGULATORY OPTION

Number of firms in the analysis*	Number and percent with after tax annual compliance costs/annual revenues equal to:					
	Less than 1%		1 to 3%		Over 3%	
	Number	Percent	Number	Percent	Number	Percent
26,750	26,750	100.0	0	0.0	0	0.0

* Single-site firms whose only MP&M facilities close in the baseline are excluded from the firm count. To be conservative, EPA included compliance costs for facilities that are owned by multi-site firms but predicted to be baseline closures in the facility impact analysis.

EPA's analysis shows that none of the firms in the analysis incur after-tax compliance costs equal to one percent or more of annual revenues. All firms incur compliance costs less than one percent of annual revenues.

This analysis is likely to overstate costs at the firm level because it does not account for actions a multi-facility firm might take to reduce its compliance costs under the regulation. These include consolidating and/or transferring functions among facilities to consolidate wet processes and take advantage of scale economies in wastewater treatment. In some instances, such compliance responses may result in loss of employment in some facilities and possible increases in employment in others. As discussed in Chapter 5 of the EEBA report, EPA is unable to account for and analyze the full range of possible compliance actions that a firm may consider and implement in response to regulation.

E. Impacts on Government-Owned Facilities

EPA surveyed government-owned MP&M facilities to assess the cost of the regulation on these facilities and the government entities that own them (*see* 66 FR 437). A government is judged to experience major budgetary impacts if it has: (1) One or more facilities with compliance costs exceeding one percent of the baseline cost of service; (2) total debt service costs (including costs to finance MP&M capital costs entirely with debt) exceeding 25 percent of baseline revenue; and (3) post-compliance total annualized pollution control costs per household exceeding one percent of median household income. EPA discusses the methodology for assessing impacts on government-owned facilities in more detail in Chapter 7 of the EEBA report (this methodology and the impact thresholds were also used to support EPA's analysis under the Unfunded Mandates Reform Act, discussed at section XII.D of this preamble). Table VIII–6 provides national estimates of the number of MP&M facilities operated by governments that are potentially subject to the regulation, by type and size of government.

Table VIII–7 summarizes the status of government-owned facilities, their compliance costs and measures of impacts on government that own MP&M facilities.

TABLE VIII–6.—NUMBER OF GOVERNMENT-OWNED FACILITIES BY TYPE AND SIZE OF GOVERNMENT ENTITY

Size of government	Municipal government	State government	County government	Regional governmental authority	Total
Large Governments (population >50,000)	618	377	781	46	1,823
Small Governments (population <= 50,000)	1,750	.....	212	.....	1,962
All Governments	2,368	377	993	46	3,785

TABLE VIII–7.—NUMBER OF REGULATED GOVERNMENT-OWNED FACILITIES, COMPLIANCE COSTS AND BUDGETARY IMPACTS BY REGULATORY OPTION

Total Number of Government-Owned Facilities	3,785
Number of Facilities exempted by subcategory exclusions	3,327
Number of Facilities subject to regulation	458
Compliance costs ($2001 million)	$8.99
Number of Facilities with compliance costs > one percent of baseline cost of service*	162
Number of Governments failing the ''impact on taxpayers'' criterion**	0
Number of Governments failing the ''impacts on government debt'' criterion***	0
Number of Governments failing all three impacts criteria†	0

* Annualized compliance costs as a percent of total facility costs and expenditures, including operating, overhead and debt service costs and expenses.

** Based on comparison of compliance costs for all facilities owned by the government to the income of households that are served by the relevant government. A government is judged to experience impacts if the regulation results in a ratio of total annualized pollution control costs per household to median household income that exceeds one percent, post-compliance. Includes existing pollution control costs plus the compliance costs due to the MP&M rule.

*** Based on comparison of total debt service costs (including costs to finance MP&M capital costs entirely with debt) with baseline government revenue. A government is judged to experience impacts if the rule causes its total debt service payments to exceed 25% of baseline revenue.

† A government is judged to experience major budgetary impacts if it has one or more facilities with costs of compliance above 1% of baseline cost of service and fails both the taxpayers impact and government debt impact tests.

Under the final rule, an estimated 162 government-owned facilities (4.3 percent of the total) would incur costs exceeding one percent of their baseline cost of service. The residual 95.7 percent of government-owned facilities incur no costs or incur costs so low as to be readily absorbed within existing budgets. None of the governments incur costs that cause them to exceed the thresholds for impacts on taxpayers or for government debt burden. EPA therefore concludes that the regulation will not impose major budgetary burdens on any of the governments that own MP&M facilities.

F. Community Level Impacts

EPA considered the potential impacts of changes in employment due to the regulation on the communities where MP&M facilities are located. EPA does not expect any adverse community employment effects because it anticipates no rule-driven facility closures and accordingly no job losses from the rule.

G. Foreign Trade Impacts

The foreign trade impacts analysis allocates the value of changes in output, for each facility that is projected to close, to exports, imports or domestic sales, based on the dominant source of competition in each market as reported in the surveys. EPA does not expect any material foreign trade impacts as a result of the final rule because no facility closures are expected. See Chapter 8 in the EEBA for a more detailed discussion of the foreign trade impact analysis and the resulting impacts of the alternative regulatory options on foreign trade.

H. Administrative Costs

EPA also assessed the costs incurred by governments to administer the rule. The final rule only regulates direct dischargers; therefore, EPA does not expect increases in administrative costs because the National Pollution Discharge Elimination System (NPDES) permit program requires that these facilities already hold permits. However, EPA did estimate costs to POTWs for alternative options that would have regulated indirect dischargers. See Chapter 7 in the EEBA for a discussion of these estimates.

I. Social Costs

1. Components of Social Costs

The social costs of regulatory actions are the opportunity costs to society of employing scarce resources in pollution control activity. The largest component of economic costs to society is the cost incurred by MP&M facilities for the labor, equipment, material, and other economic resources needed to comply with the regulation. EPA accounts for these costs on a pre-tax basis.

Social costs may also include lost producers' and consumers' surplus that result when the quantity of goods and services produced decreases as a result of the rule. Lost producers' surplus is measured as the difference between revenues earned and the cost of production for the lost production. Lost consumers' surplus is the difference between the price paid by consumers for the lost production and the maximum amount they would have been willing to pay for those goods and services. To accurately calculate lost producers' and consumers' surplus requires knowledge of the characteristics of market supply and demand for each affected industry. EPA instead calculated an upper-bound estimate of social compliance costs using the simplifying assumption that all facilities continue operating in compliance with the rule, and pay the associated compliance costs (*i.e.*, assuming that there are no regulation-related closures.) This framework provides an upper-bound estimate of social costs, because, for facilities predicted to close, continuing to operate and to incur compliance costs is more costly than closing the facility with associated lost producers' and consumers' surplus. For the final regulation, EPA estimated that no facilities would close because of the rule. As a result, the potential effect of consumers' and producers' surplus should not be of consequence in assessing social costs.

In addition to the resource costs to society associated with compliance, the estimated social cost also includes two other elements: the cost to local governments of implementing the rule

and the cost of any unemployment that may result from the regulation. The government administration costs include the costs to POTWs of permitting and compliance monitoring and enforcement activities. The unemployment-related costs include the cost of administering unemployment programs for workers who would lose employment, and an estimate of the amount that workers would be willing to pay to avoid involuntary unemployment.

2. Resource Cost of Compliance

The resource costs of compliance are the value of society's productive resources—including labor, equipment, and materials—consumed to achieve the reductions in effluent discharges required by the final rule. On the basis of a 7 percent discount rate, EPA estimates the annualized cost of compliance at $13.8 million (2001$). This value exceeds the cost that privately-owned firms would incur in complying with the regulation because: (1) Some of the costs are borne by the general tax-paying public through the tax deduction permitted on privately-owned firms' compliance outlays and (2) some costs are passed onto consumers in the form of price increases. Although these two categories of cost are not part of the financial burden on regulated industries, they are part of the regulation's overall cost to society. EPA also estimated the annualized cost of compliance using a 3 percent discount rate and, in conjunction, an assumed 3 percent opportunity cost of capital to society. At the 3 percent discount rate, EPA estimates the annualized cost of compliance at $13.7 million (2001$).

3. Cost of Administering the Regulation

As discussed in section VIII.I of this preamble, since the final rule only regulates direct dischargers, EPA does not expect increases in administrative costs because all direct dischargers already hold permits.

4. Social Cost of Unemployment

The loss of jobs associated with any facility closures would represent a social cost of the regulation. However, from its facility impact analysis, EPA estimates that no facilities will close as a result of the regulation. Accordingly, EPA estimates a zero cost of unemployment for the final regulation. The results of this analysis for alternative regulatory options where closures are predicted can be found in Chapter 6 of the EEBA.

5. Total Social Costs

Summing across all social costs results in a total annualized social cost estimate of $13.8 million ($2001), at a 7 percent discount rate, and $13.7 million, at a 3 percent discount rate, as shown in Table VIII–8.

TABLE VIII–8.—ANNUAL SOCIAL COSTS OF THE REGULATION

[Pre-tax, million $2001]

Social cost category	Annualized @ 3%	Annualized @ 7%
Resource Value of Compliance Costs (before-tax)	$13.7	$13.8
Government Administrative Costs	$0	$0
Social Costs of Unemployment	$0	$0
Total Social Costs	$13.7	$13.8

J. Cost and Removal Comparison Analysis

The Agency is promulgating BPT limitations for the Oily Wastes subcategory. Among the factors EPA must consider when promulgating BPT limitations, section 304(b)(1)(B) of the CWA directs EPA to consider the total incremental compliance costs of the BPT technology in relation to the effluent reductions achieved by the technology. This inquiry does not limit EPA's broad discretion to adopt BPT limitations based on available technology unless the required additional reductions are wholly out of proportion to the costs of achieving the additional effluent reduction.

One cost and removal comparison ratio used by EPA is the average cost per pound of pollutant removed by a BPT regulatory option. EPA measures the cost component as pre-tax total annualized costs ($2001). For the Oily Wastes subcategory, EPA measures the effluent reduction benefits as the summation of O&G (as HEM) and TSS to avoid significant double counting of pollutants. EPA analyses show that OWS facilities largely discharge conventional pollutants. Table VIII–9 shows the incremental compliance costs, the incremental pollutant reductions, and the resulting cost and removal comparison ratio.

TABLE VIII–9.—COST AND REMOVAL COMPARISON FOR THE OILY WASTES SUBCATEGORY

[$2001/lb pollutant removed]

Subcategory	Annualized cost ($2001) (millions)	Annual pounds of pollutant removed	Cost and removal comparison ($2001/lb pollutant removed)
Oily Wastes	13.8	480,325	28.73

K. Cost-Effectiveness Analysis

In the development of best available technology effluent limitations guidelines for removals of toxic pollutants, EPA evaluates the relative efficiency of alternative regulatory options in removing toxic pollutants from the effluent discharges to the nation's waters. Because EPA is today not promulgating Oily Wastes subcategory BAT limitations based on a more stringent technology than BPT technology, EPA is not providing a cost-effectiveness analysis for the final rule, which contains only BPT limitations (*see* section VIII.J for the cost and removal comparison analysis). EPA did perform a cost-effectiveness analysis for the alternative regulatory options that would have regulated indirect dischargers; the results of this analysis are reported in the EEBA and DCN 37900, section 26.0.

IX. Water Quality Analysis and Environmental Benefits

A. Introduction and Overview

This section presents EPA's estimates of the national environmental benefits of the final MP&M effluent guidelines. The benefits occur due to the reduction in facility discharges described in section VII. The methodologies used in the estimation of benefits of the final rule are largely similar to those used for estimating benefits of the proposed rule (*see* 66 FR 424). The Notice of Data Availability (*see* 67 FR 38752) and section IV.B of today's final rule discuss revisions made to these methodologies after the publication of the proposed rule. The EEBA provides EPA's complete benefit assessment for the final rule.

EPA estimated national benefits from the regulation on the basis of sample facility data. The Agency extrapolated findings from the sample facility analyses to the national level using two alternative extrapolation methods: (1) traditional extrapolation and (2) post-stratification extrapolation. Section A.2 of today's final rule and Appendix G of the EEBA discuss the extrapolation methods used in the benefits analysis in detail.

To supplement the national level analysis performed for the final MP&M regulation, EPA also conducted a detailed case study of the expected State-level costs and benefits of the MP&M rule in Ohio. For several important reasons, EPA judges that the Ohio case study is more robust than the national benefit analyses that EPA undertakes in support of effluent guideline development. These reasons include: (1) Use of more detailed data on MP&M facilities than is possible at the national level; (2) use of more detailed and accurate water quality data than are usually available; (3) more accurate accounting for the presence and effect of multiple discharges to the same reach; (4) inclusion of data on non-MP&M discharges in the baseline and post compliance; (5) use of a first-order decay model to estimate in-stream concentrations in downstream water bodies; and (6) inclusion of an additional recreational benefit category (swimming) in the analysis.

Sections B through G of today's final rule discuss the national level benefits analyses; section H presents the Ohio case study. These sections include results only for the final rule; however, the EEBA presents results for additional options evaluated.

1. Benefit Overview

Table IX–1 summarizes the benefits categories associated with the regulation and notes which categories EPA was able to quantify and monetize. The benefits include three broad classes: human health, ecological, and economic productivity benefits. Within these three broad classes, EPA was able to assess benefits with varying degrees of completeness and rigor. Where possible, EPA quantified the expected effects and estimated monetary values. Data limitations and limited understanding of how society values certain water quality changes prevented monetizing some benefit categories.

TABLE IX–1.—BENEFIT CATEGORIES ASSOCIATED WITH WATER QUALITY IMPROVEMENTS RESULTING FROM THE METAL PRODUCTS AND MACHINERY EFFLUENT GUIDELINE

Benefit Category	Quantified and monetized	Quantified and nonmonetized	Nonquantified and nonmonetized
Human Health Benefits:			
Reduced cancer risk due to ingestion of chemically-contaminated fish and unregulated pollutants in drinking water	X		
Reduced non-cancer adverse health effects (*e.g.,* reproductive, immunological, neurological, circulatory, or respiratory toxicity) due to ingestion of chemically-contaminated fish and unregulated pollutants in drinking water		X	
Reduced non-cancer adverse health effects from exposure to lead from consumption of chemically-contaminated fish	X		
Reduced health hazards from exposure to contaminants in waters used recreationally (*e.g.,* swimming)			X
Ecological Benefits:			
Reduced risk to aquatic life		X	
Enhanced water-based recreation, including fishing, boating, and near-water (wildlife viewing) activities	X		
Other enhanced water-based recreation, such as swimming, waterskiing, and white water rafting			X
Increased aesthetic benefits, such as enhancement of adjoining site amenities (*e.g.,* residing, working, traveling, and owning property near the water)			X
Non-user value (*i.e.,* existence, option, and bequest value)	X		
Reduced contamination of sediments			X
Economic Productivity Benefits: [a]			
Benefits to tourism industries from increased participation in water-based recreation			X
Improved commercial fisheries yields			X
Reduced water treatment costs for municipal drinking water, irrigation water, and industrial process and cooling water			X

[a] The final rule regulates direct dischargers only. Therefore the selected option does not affect POTW operation. EPA, however, includes this benefit category when analyzing alternative options which considered the regulation of indirect dischargers (See Chapter 19 of the EEBA for the benefits analysis of alternative options).

2. Extrapolation Methods

EPA traditionally estimates national level costs and benefits by extrapolating analytic results from sample facilities to the national level using sample facility weights. EPA's traditional sampling approach relies on information about the economic and technical characteristics of the regulated community. Although important for understanding the technical requirements and costs of a regulation, this sampling approach does not incorporate information that could significantly affect the occurrence and

distribution of regulatory benefits, such as characteristics of the receiving water body and the size of population that may benefit from reduced pollutant discharges. As a result, the traditional sampling approach likely yields benefit estimates that are less accurate than those that could be obtained by using a sampling framework that accounts for such benefit-receptor characteristics.

EPA recognizes that using a traditional extrapolation method to estimate national level benefits may lead to a large degree of uncertainty in benefits estimates. Therefore, in addition to the traditional extrapolation method used in the proposed rule (*see* 66 FR 424), EPA has estimated national level benefits for the final rule using an alternative extrapolation method as discussed in the NODA (*see* 67 FR 38752).

In this alternative extrapolation method, post-stratification sample weighting, EPA adjusted the original sample weights using two variables that are likely to affect the occurrence and size of benefits associated with reduced discharges from sample MP&M facilities: (1) receiving water body type and size; and (2) the size of the population residing in the vicinity of the sample facility. The Agency utilized a commonly used post-stratification method calling ''raking'' to adjust original sample weights to reflect these benefit pathway characteristics. EPA used data from three data sources—EPA's Permit Compliance System database (PCS), EPA's Reach File 1, and Census Data—to develop the adjusted weights. Because of data limitations, EPA restricted the re-weighting effort only to direct dischargers and excluded indirect dischargers. Therefore, EPA performed this alternative analysis for only the selected option.

EPA used the alternative benefit estimate to validate general conclusions that EPA drew from its main analysis based on the traditional extrapolation method. Appendix G of the EEBA provides detailed discussion of this alternative extrapolation method.

In the NODA, EPA also sought public comment on a proposed second alternative extrapolation method. In this extrapolation method, EPA proposed the extrapolation of the Ohio case study results to the national level based on three key factors that affect the occurrence and magnitude of benefits: (1) The estimated change in MP&M pollutant loadings; (2) the level of recreational activities on the reaches affected by MP&M discharges; and (3) income of the affected population. The Agency recognizes that this method is not rigorous for extrapolation to the national level. Therefore, EPA used this method only as a sensitivity analysis.

Sections IX.B through IX.E of this preamble present national level benefits that are estimated based on both sample facility weights used in the engineering and economic impact analysis (traditional extrapolation method) and sample facility weights adjusted by water body and population (post-stratification extrapolation). National level benefits estimated from the Ohio case study analysis are not presented in today's final rule. These estimates can be found in Appendix G of the EEBA report.

B. Reduced Human Health Risk

EPA estimates that the final rule will prevent discharge of 18 pounds per year of carcinogens and 119 pounds per year of lead. Also, the final rule will prevent discharge of an additional 6,900 pounds of 76 pollutants of concern that are known to cause adverse non-cancer human health effects. These reduced pollutant discharges from MP&M facilities generate human health benefits in a number of ways. The most important human health benefits stem from reduced risk of illness from consumption of contaminated fish, shellfish, and water.

EPA analyzed the following measures of human health-related benefits: reduced cancer risk from fish and water consumption; reduced risk of non-cancer adverse health effects from fish and water consumption; reduced lead-related adverse health effects in children and adults; and reduced occurrence of in-waterway pollutant concentrations in excess of levels of concern. The levels of concern include human health-based ambient water quality criteria (AWQC) or documented toxic effect levels for those chemicals not covered by AWQC. The Agency monetized only two of these health benefits: (1) Changes in the incidence of cancer resulting from reduced exposure to carcinogens in fish and drinking water and (2) changes in adverse non-cancer health effects in children and adults resulting from reduced exposure to lead in fish. EPA monetized human health benefits by estimating the change in the expected number of individuals experiencing adverse human health effects in the populations exposed to MP&M discharges. For carcinogens that have linear dose-response relationships, it is feasible to estimate the incremental cancer incidence in a population from the estimate of mean individual risk for the population and the number of individuals in the population. However, for health effects with non-linear dose-response relationships and thresholds (*e.g.,* non-cancer health effects), estimating population risk is computationally more complex and was not proposed (*see* Table IX–1).

The national-level analysis of human health benefits finds negligible monetized benefits from the final rule. However, because of significant simplifications in the national level analysis, this finding should be recognized as potentially having substantial error and should therefore be interpreted with caution. In particular, the national-level analysis: (1) Is based only on limited information on MP&M facilities at the national level; (2) accounts in only a very limited way for the presence and effect of joint discharges on the same reach; (3) omits data on non-MP&M discharges in the baseline and post compliance; and (4) omits consideration of the downstream effects of pollutant discharges.

In contrast to the national-level analysis, and as discussed in section IX.A. of today's final rule and Chapter 21 of the EEBA report, the methods and data used for the Ohio case study address a number of these analytic weaknesses. This more site-specific and detailed analysis finds that the final regulation would achieve $0.5 million (2001$) in health-related benefits in the State of Ohio alone. EPA estimates that this analysis provides a more accurate, albeit lower-bound, estimate of health-related benefits than indicated by the simpler national-level analysis. Moreover, given (1) that Ohio represents only about 6 percent of the total MP&M facility population and (2) that a substantial share of the total MP&M facility population is located in other States with similar water body and population characteristics (*e.g.,* the States of Illinois, Indiana, Michigan, Pennsylvania), it is reasonable to expect that additional human health benefits would be estimated for the remainder of the country if EPA were able to apply this more rigorous approach at the national level. Accordingly, EPA judges that the final rule's human health benefits are higher than its social costs.

1. Benefits From Reduced Incidence of Cancer

EPA assessed changes in the incidence of cancer cases from consumption of MP&M pollutants in fish tissue and drinking water. The Agency valued changes in incidence of cancer cases using a willingness-to-pay (WTP) of $6.5 million (2001$) for avoiding premature mortality. This estimate of the value of a statistical life saved is recommended in EPA's Guidelines for Preparing Economic Analysis. This estimate does not include

estimates of WTP to avoid morbidity prior to death.

EPA estimated aggregate cancer risk from contaminated drinking water for populations served by drinking water intakes on water bodies to which MP&M facilities discharge. EPA based this analysis on six carcinogenic pollutants for which drinking water criteria have not been published. This analysis excludes seven carcinogens for which drinking water criteria have been published. EPA assumed that public drinking water treatment systems will remove these seven pollutants from the public water supply. To the extent that treatment for these seven pollutants may cause incidental removals of the six pollutants without criteria, the analysis may overstate cancer-related benefits.

Calculated in-stream concentrations serve as a basis for estimating changes in cancer risk for populations served by affected drinking water intakes. EPA estimates that baseline MP&M discharges from in-scope facilities are associated with virtually zero annual cancer cases. The national-level analysis finds that the final regulation would lead to a marginal reduction in these cancer cases resulting from consumption of contaminated drinking water; correspondingly, monetary benefits estimated from reduced consumption of contaminated drinking water are essentially zero.

EPA also estimated cancer risk from the consumption of contaminated fish for recreational and subsistence anglers and their families. EPA based this analysis on thirteen carcinogenic pollutants found in MP&M effluent discharges. Estimated contaminant concentrations in fish tissue are a function of predicted in-stream pollutant concentrations and pollutant bioconcentration factors. EPA used data on numbers of licensed fishermen by state and county, presence of fish consumption advisories, number of fishing trips per person per year, and average household size to estimate the affected population of recreational and subsistence anglers and their families. The analysis uses different fish consumption rates for recreational and subsistence anglers to estimate the change in cancer risk among these populations.

EPA estimated that baseline MP&M discharges from in-scope facilities are associated with 0.03 annual cancer cases. The national-level analysis shows that final option would lead to a marginal reduction in cancer cases among recreational and subsistence angler populations. The monetary benefits estimated from consumption of less contaminated fish by these populations are essentially negligible.

The previous findings from the national analysis of changes in cancer risk associated with the final rule differ from the Ohio case study results. Based on the Ohio case study, the final option is expected to eliminate less than 0.01 cancer cases annually in the State of Ohio (*see* section IX.H of today's final rule for a detail). This reduction translates into approximately $14,500 (2001$) in annual benefits due to reduced cancer risk from consumption of contaminated fish tissue and drinking water. The difference in the findings of the national- and Ohio analyses results primarily from more comprehensive information on MP&M and non-MP&M facility discharges used in the Ohio case study analysis (*see* section IX.A. of today's final rule for additional details). The national-level analysis accounts only for the pollutant exposures from MP&M sample facilities. In contrast, the Ohio case study approach accounts for a broader baseline of pollutant exposure, including more thorough and detailed coverage of discharges from MP&M facilities and also estimated exposures from non-MP&M sources. As a result, this analysis more accurately reflects baseline health risk conditions.

2. Reductions in Non-Cancer Adverse Human Health Effects Other Than Those Related to Lead Exposure

The final rule can potentially generate non-cancer human health benefits (*e.g.,* reduction in systemic effects, reproductive toxicity, and developmental toxicity) from reduced contamination of fish tissue and drinking water sources. The common approach for assessing the risk of non-cancer health effects from the ingestion of a pollutant is to calculate a hazard quotient by dividing an individual's oral exposure to the pollutant, expressed as a pollutant dose in milligrams per kilogram body weight per day (mg/kg-day), by the pollutant's oral reference dose (RfD). An RfD is defined as an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure that likely would not result in the occurrence of adverse health effects in humans, including sensitive individuals, during a lifetime. Toxicologists typically establish an RfD by applying uncertainty factors to the lowest-or no-observed-adverse-effect level for the critical toxic effect of a pollutant.[1] A hazard quotient less than one means that the pollutant dose to which an individual is exposed is less than the RfD, and, therefore, presumed to be without appreciable risk of adverse human health effects. A hazard quotient greater than one means that the pollutant dose is greater than the RfD. Further, EPA guidance for assessing exposures to mixtures of pollutants recommends calculating a hazard index (HI) by summing the individual hazard quotients for those pollutants in the mixture that affect the same target organ or system (*e.g.,* the kidneys, the respiratory system).[2] HI values are interpreted similarly to hazard quotients; values below one are generally considered to suggest that exposures are not likely to result in appreciable risk of adverse health effects during a lifetime, and values above one are generally cause for concern, although an HI greater than one does not necessarily suggest a likelihood of adverse effects.

To evaluate the potential benefits of reducing the in-stream concentrations of 76 pollutants that cause non-cancer health effects, EPA estimated target organ-specific HIs for drinking water and fish ingestion exposures in both the baseline and post-compliance scenarios. Specifically, EPA calculated target-organ specific HIs for pollutants predicted in each MP&M discharge reach, such that one HI was calculated for each target organ/exposure pathway (fish consumption and drinking water)/reach combination. EPA then combined estimates of the numbers of individuals in the exposed populations with the HIs for the populations to determine how many individuals might be expected to realize reduced risk of non-cancer health effects in the post-compliance scenario. This analysis was limited in two primary ways. First, hazard indices estimated in this analysis may understate the actual potential for adverse health effects because possible additional sources of pollutants, such as background pollutants and MP&M pollutants from upstream dischargers, were not considered in the analysis. Second, EPA used mean individual exposure parameters and not the distribution of exposure parameters to estimate hazard indices for the populations affected by MP&M discharges.

The results of EPA's analysis suggest that hazard indices for individuals in the exposed populations may decrease

[1] U.S. EPA, 1993, ''Reference Dose (RfD): Description and Use in Health Risk Assessments, Background Document 1A,'' *http://www/epa.gov/iris/rfd.htm.*

[2] ''Supplementary Guidance for Conducting Health Risk Assessment of Chemical Mixtures. Risk Assessment Forum Technical Panel,'' EPA/630/R–00/002. U.S. EPA, August 2000. *http://www.epa.gov/nceawww1/pdfs/chem mix/chem mix 08 2001.pdf.*

after facilities comply with today's rule. Increases in the percentage of exposed populations that would be exposed to no risk of non-cancer adverse human health effects due to the MP&M discharges occur in both the fish and drinking water analyses. The shift to lower hazard indices should be considered in conjunction with the finding that the hazard indices for incremental exposures to pollutants discharged by MP&M facilities (for which reference doses are available) are less than one in the baseline analysis for the entire population associated with sample facilities. Whether the incremental shifts in hazard indices are significant in reducing absolute risks of non-cancer adverse human health effects is uncertain and will depend on the magnitude of contaminant exposures for a given population from risk sources not accounted for in this analysis.

3. Benefits From Reduced Exposure to Lead

EPA performed a separate analysis of benefits from reduced exposure to lead. This analysis differs from the analysis of non-cancer adverse human health effects from exposure to other MP&M pollutants because it is based on dose-response functions tied to specific health endpoints to which monetary values can be applied.

Many lead-related adverse health effects are relatively common and are chronic in nature. These effects include, but are not limited to, hypertension, coronary heart disease, and impaired cognitive function. Lead is harmful to individuals of all ages, but the effects of lead on children are of particular concern. Children's rapid rate of development makes them more susceptible to neurobehavioral effects from lead exposure. The neurobehavioral effects on children from lead exposure include hyperactivity, behavioral and attention difficulties, delayed mental development, and motor and perceptual skill deficits.

This analysis assessed benefits of reduced lead exposure from consumption of contaminated fish tissue to three sensitive populations: (1) Preschool age children; (2) pregnant women; and (3) adult men and women. This analysis uses blood-lead levels as a biomarker of lead exposure. EPA estimated baseline and post-compliance blood lead levels in the exposed populations and then used changes in these levels to estimate benefits in the form of avoided health damages.

EPA assessed neurobehavioral effects on children based on a dose response relationship for IQ decrements. Avoided neurological and cognitive damages are expressed as changes in overall IQ levels, including reduced incidence of extremely low IQ scores (<70, or two standard deviations below the mean) and reduced incidence of blood-lead levels above 20 µg/dL. The analysis uses the value of compensatory education that an individual would otherwise need and the impact of an additional IQ point on individuals' future earnings to value the avoided neurological and cognitive damages. The national-level analyses shows that implementation of the final option would not result in any changes in IQ loss across all exposed children. The final option does not reduce occurrences of extremely low IQ scores (<70) or incidences of blood-lead levels above 20 µg/dL.

Prenatal exposure to lead is an important route of exposure. Fetal exposure to lead in utero due to maternal blood-lead levels may result in several adverse health effects, including decreased gestational age, reduced birth weight, late fetal death, neurobehavioral deficits in infants, and increased infant mortality. To assess benefits to pregnant women, EPA estimated changes in the risk of infant mortality due to changes in maternal blood-lead levels during pregnancy. The national-level analysis shows that the final option does not result in changes in maternal blood lead levels during pregnancy and as a result does not reduce neonatal mortality.

The national-level analysis finds no benefits to children from reduced exposure to lead. However, as for the cancer risk analysis previously discussed, these findings differ from the more comprehensive analysis used in the Ohio case study. Using the case study approach, EPA estimates that the final regulation will yield annual lead-related benefits for children in Ohio of $422,113 (2001$). This benefit value includes three components. First, reduced lead exposure is estimated to reduce neonatal mortality by 0.024 cases annually with an annual value of $162,094 (2001$). Second, reduced lead exposure will avoid the loss of an estimated 26.96 IQ points among preschool children in Ohio, which translates into $253,934 (2001$) per year in benefits. Third, the annually avoided costs of compensatory education from incidence of IQ below 70 and blood-lead levels above 20 µg/dL among children amounts to approximately $5,345 (2001$).

Lead exposure has been shown to have adverse effects on the health of adults as well as children. The health effects in adults that EPA quantified all derive from lead's effects on blood pressure. Quantified health effects include increased incidence of hypertension (estimated for males only), initial coronary heart disease (CHD), strokes (initial cerebrovascular accidents and atherothrombotic brain infarctions), and premature mortality. This analysis does not include other health effects associated with elevated blood pressure and other adult health effects of lead, including nervous system disorders in adults, anemia, and possible cancer effects. EPA used cost of illness estimates (*i.e.,* medical costs and lost work time) to estimate monetary value of reduced incidence of hypertension, initial CHD, and strokes. EPA then used the value of a statistical life saved to value changes in risk of premature mortality. The national level analysis finds that the final rule will achieve no lead-related health benefits among adults.

Again, the national analysis results differ from the Ohio case study results. Using the case study approach, EPA estimates that the final regulation will achieve total lead-related benefits among Ohio adults of $117,393 (2001$). This value includes benefits from reduced hypertension among adult males: a reduction of an estimated 9.4 cases annually, with benefits of approximately $10,670 (2001$). In addition, reducing the incidence of initial CHD, strokes, and premature mortality among adult males and females in Ohio would result in estimated benefits of $963, $2,115, and $103,645, respectively.

Based on the national-level benefits analysis, EPA found that total benefits from reduced exposure to lead, for both children and adults, are negligible under the final rule. However, based on the Ohio case study findings, benefits for children and adults from reduced lead-related health effects to the final rule are estimated to total approximately $0.5 million (2001$) annually in the State of Ohio alone (*see* section H of today's final rule for detail). As in the cancer risk analysis, the difference in the national and Ohio-based results is primarily due to more comprehensive information on MP&M and non-MP&M facility discharges used in Ohio.

4. Reduced Exceedances of Health-Based AWQC

EPA also estimated the effect of MP&M facility discharges on the occurrence of pollutant concentrations in affected waterways that exceed human health-based AWQCs. In a conceptual sense, this analysis and its findings are not additive to the preceding analyses of change in cancer or lead-related health risks but are

another way of quantitatively characterizing the same possible benefit categories. This analysis compares the estimated baseline and post compliance in-stream pollutant concentrations in affected waterways to ambient water criteria for protection of human health. The comparison included AWQC for protection of human health through consumption of organisms and for consumption of organisms and water. Pollutant concentrations in excess of these values indicate potential risks to human health. Table IX–2 presents results of this analysis.

TABLE IX–2.—ESTIMATED MP&M DISCHARGE REACHES WITH MP&M POLLUTANT CONCENTRATIONS IN EXCESS OF AWQC LIMITS FOR PROTECTION OF HUMAN HEALTH

Regulatory status	Number of reaches with MP&M pollutant concentrations exceeding human health-based AWQC limits		Number of benefitting reaches			
			All AWQC exceedances eliminated		Number of AWQC exceedances reduced	
	For consumption of water and organisms	For consumption of organisms only	For consumption of water and organisms	For consumption of organisms only	For consumption of water and organisms	For consumption of organisms only
Selected Option: Traditional Extrapolation						
Baseline	78	21	N/A	N/A	N/A	N/A
Post-Compliance	78	21	0	0	0	0
Selected Option: Post-Stratification Extrapolation						
Baseline	112	21	N/A	N/A	N/A	N/A
Post-Compliance	112	21	0	0	0	0

Source: U.S. Environmental Protection Agency.

EPA estimates that in-stream concentrations of 4 pollutants (*i.e.,* arsenic, iron, manganese, and n-nitrosodimethylamine) will exceed human health criteria for consumption of water and organisms in 78 receiving reaches nationwide as the result of baseline MP&M pollutant discharges. EPA estimates that there are human health AWQC exceedances caused by n-nitrosodimethylamine (NDMA). However EPA did not consider NDMA pollutant reductions in its national benefits analyses because of the low number of detected values for that pollutant (*See* Chapter 7 of the TDD). EPA estimates that the final rule will not eliminate the occurrence of pollutant concentrations in excess of human health criteria for consumption of water and organisms and for consumption of organisms on any of the reaches on which baseline discharges are estimated to cause pollutant concentrations in excess of AWQC values.

5. Uncertainties and Assumptions of the Human Health Benefits Analysis

Because of the uncertainties and assumptions of EPA's analysis, the estimates of benefits presented in this section may either overstate or understate the benefits to recreational fishers, subsistence fishers, and members of the general population who consume drinking water obtained from intakes located downstream of MP&M discharges. Some of the major uncertainties and assumptions of EPA's analysis include the following:

- In estimating cancer risks and evaluating the risk of non-cancer health effects other than those related to lead exposure, EPA did not consider the potential for interactions between pollutants. EPA estimated cancer risk or non-cancer hazard attributable to each pollutant and summed the pollutant-specific estimates as appropriate (that is, EPA summed all pollutant-specific cancer risk estimates for each pathway of exposure, and summed pollutant-specific hazard quotients across target organs for each pathway of exposure). This approach does not account for the possibility that pollutants may interact synergistically or antagonistically such that the cancer potency or non-cancer hazard of the mixture of the pollutants is more or less than that calculated from the cancer potencies or RfDs of the individual pollutants.
- Population risk for cancer is based on mean exposure. Using mean exposure parameters for non-cancer could either over- or under-estimate HI exceedences.
- EPA's estimates of cancer cases were calculated using cancer potency factors that are upper bound estimates of cancer potency, potentially leading to overestimation of cancer risk.
- The analysis benefits from reduced incidence of cancer did not account for a cessation-lag, the time between when exposures are reduced and when reduction in risk occurs. Ignoring a cessation lag may lead to overestimation of cancer-related benefits.
- EPA assumed that the number of subsistence fishers would be an additional 5% of the licensed fishing population. This could be either an overestimate or underestimate of the actual number of subsistence fishers.
- Hazard indices estimated in this analysis may understate actual health risk because possible additional sources of pollutants, such as background pollutants and MP&M pollutants from upstream dischargers, were not considered in the analysis.

Additional details on methodology and the uncertainties and limitations of EPA's analysis of human health risk from the final effluent guidelines, particularly assumptions related to exposure parameters, are presented in Chapter 13 and Chapter 14 of the EEBA report.

C. Improved Ecological Conditions and Recreational Uses

EPA expects the final regulation to provide ecological benefits by improving the habitats or ecosystems (aquatic and terrestrial) affected by the MP&M industry's effluent discharges. Benefits associated with changes in aquatic life may include restoration of sensitive species, recovery of diseased species, changes in taste- and odor-producing algae, changes in dissolved oxygen (DO), increased assimilative capacity of affected waterways, and improved related recreational activities. These activities include swimming,

fishing, boating and wildlife observation that may be enhanced when risks to aquatic life are reduced and where perceivable water quality efforts associated with MP&M pollutants, such as turbidity, are reduced. Among these ecological benefits, EPA was able to estimate dollar values for improved recreational opportunities and for non-user benefits.

EPA expects the MP&M rule to improve aquatic species habitats by reducing concentrations of toxic contaminants such as aluminum, cadmium, copper, lead, mercury, silver, and zinc in water. These improvements may enhance the quality and value of water-based recreation, such as fishing, swimming, wildlife viewing, camping, waterfowl hunting, and boating. The benefits from improved water-based recreation would be seen as increases in the increased value participants derive from a day of recreation and the increased number of days that consumers of water-based recreation choose to visit the cleaner waterways. This analysis measures the economic benefit to society from water quality improvements based on the increased monetary value of recreational opportunities resulting from those improvements.

EPA assessed recreational benefits of reduced occurrence of pollutant concentrations exceeding aquatic life and human health AWQC values. EPA estimates that baseline in-stream concentrations of 9 pollutants (*i.e.,* aluminum, cadmium, copper, lead, manganese, mercury, nickel, silver, and zinc) will exceed the acute and chronic criterion for aquatic life in 353 reaches nationwide. The final rule eliminates concentrations in excess of aquatic life-based AWQCs on nine of these reaches. Section IX.4 of this preamble presents EPA's analysis of the effect of MP&M discharges on occurrence of pollutant concentrations in affected waterways in excess of human health-based AWQCs.

The analysis of recreational benefits combined the findings from the aquatic life benefits analysis and the human health AWQC exceedance analysis described previously. These analyses found that 394 stream reaches exceed chronic or acute aquatic life AWQC and/or human health AWQC values at the baseline discharge levels (*see* Table IX–3). EPA expects the final rule will eliminate exceedances on nine of these discharge reaches.

TABLE IX–3.—ESTIMATED MP&M DISCHARGE REACHES WITH MP&M POLLUTANT CONCENTRATIONS IN EXCESS OF AWQC LIMITS FOR PROTECTION OF HUMAN HEALTH OR AQUATIC SPECIES

Regulatory status	Number of reaches with MP&M pollutant concentrations exceeding AWQC limits					Number of benefitting reaches	
	Aquatic life		Human health		Total	All AWQC exceedances eliminated	AWQC exceedances reduced
	Chronic	Acute	H_2O and organisms	Organisms only			
Selected Option: Traditional Extrapolation							
Baseline	353	18	78	21	394	N/A	N/A
Post-Compliance	344	9	78	21	386	9	0
Selected Option: Post-Stratification Extrapolation							
Baseline	350	15	112	21	426	N/A	N/A
Post-Compliance	344	9	112	21	420	6	0

Removing water quality impairments would increase services provided by water resources to recreational users. EPA expects potential recreational users to benefit from improved recreational opportunities, including an increased number of available choices of recreational sites. For example, some of the streams that were not usable for recreation under the baseline discharge conditions may be newly included in the site choice set for recreational users from nearby counties. Streams that have been used for recreation under the baseline conditions can become more attractive for users making recreational trips more enjoyable. Individuals may also take trips more frequently if they enjoy their recreational activities more.

EPA attached a monetary value to these reduced exceedances based on increased values for three water-based recreation activities—fishing, boating, and wildlife viewing—and for non-user values. Because most benefitting reaches are close to densely populated areas, potential recreational users may also benefit from lower travel costs to the recreational sites in the vicinity of their home towns that were not previously suitable to water-based recreation. EPA applied a benefits transfer approach to estimate the total WTP, including both use and non-use values, for improvements in surface water quality. This approach builds upon a review and analysis of the surface water valuation literature.

EPA first estimated the baseline value of each recreational activity (*i.e.*, fishing, boating, and wildlife viewing) corresponding to the benefitting reach by multiplying the estimated annual person-days per reach by the estimated per-day values of water-based recreation. The baseline per-day values of water-based recreation are based on studies by Walsh *et. al* (1992) and Bergstrom and Cordell (1991) (*see* DCN 20444 and DCN 20427, section 8.5.2.4). The studies provide values per recreation day for a wide range of water-based activities, including fishing, boating, wildlife viewing, waterfowl hunting, camping, and picnicking. The mean values per recreational fishing, boating, and wildlife viewing day used in this analysis are $42.12, $48.30 and $26.28 (2001$) respectively. Applying facility weights and assuming over all benefitting reaches provides a total baseline value for a given recreational activity for MP&M reaches expected to benefit from the elimination of pollutant concentrations in excess of AWQC limits.

EPA then applied the percentage change in the recreational value of water resources implied by surface water valuation studies to estimate changes in values for all MP&M reaches in which the regulation eliminates AWQC exceedances by one or more MP&M pollutants. The Agency selected eight of the most comparable studies and calculated the changes in recreation values from water quality improvements (as percentage of the baseline) implied

by those studies. Sources of estimates included Lyke (1993), Jakus *et al.* (1997), Montgomery and Needleman (1997), Paneuf *et al.* (1998), Desvousges *et al.* (1987), Lant and Roberts (1990), Farber and Griner (2000), and Tudor *et al.* (2000) (*see* section 8.5.2.4 of the rulemaking record). EPA's reasoning for selecting each study is discussed in detail in Chapter 15 of the EEBA report. EPA took a simple mean of point estimates from all applicable studies to derive a central tendency value for percentage change in the water resource values due to water quality improvements. These studies yielded estimates of increased recreational value from water quality improvements expected from reduced MP&M discharges of 12, 9, and 18 percent for fishing, boating, and wildlife-viewing respectively. Using all possible applicable valuation studies in developing a benefit transfer approach to valuing changes in the recreational value of water resources from reduced MP&M discharges, makes unit values more likely to be nationally representative, and avoids the potential bias inherent in using a single study to make estimates at the national level.

Table IX–4 presents the estimated national recreational benefits of the final rule (2001$). *See* EEBA Chapter 15 for estimated recreational benefits for alternative regulatory options. The estimated increased value of recreational activities to users of water-based recreation is $537,197, $202,691, and $259,949 annually for fishing, boating, and wildlife viewing respectively. The recreational activities considered in this analysis are stochastically independent; EPA calculated the total user value of enhanced water-based recreation opportunities by summing over the three recreation categories. The estimated increase in the total user value is $999,838 annually.

EPA also estimated non-market non-user benefits. These non-market non-user benefits are not associated with current use of the affected ecosystem or habitat; instead, they arise from the value society places on improved water quality independent of planned uses or based on expected future use. Past studies have shown that non-user values are a sizable component of the total economic value of water resources. EPA estimated average changes in non-user value to equal one-half of the recreational use benefits (*see* Fisher, A. and R. Raucher, 1984; DCN 20431, section 8.5.2.4). The estimated increase in non-use value is $499,919 (2001$).

A recent literature review finds that non-use benefits are, on average, 1.9 to 2.5 times *all* use values, rather than 0.5 times *recreational benefits alone* as EPA has traditionally assumed for its non-use benefit estimates (*see* T. Brown, 1993; DCN 20426, section 8.5.2.4). EPA's method for estimating non-use benefits from water quality improvements resulting from reduced MP&M dischargers is therefore likely to understate the true value of non-use benefits.

TABLE IX–4.—ESTIMATED RECREATIONAL AND NON-USE BENEFITS FROM REDUCED MP&M DISCHARGES

[Thousands of 2001$]

Benefit type	Traditional extrapolation	Post-stratification extrapolation
Recreational Fishing	$537.20	$349.98
Recreational Boating	$202.69	$132.05
Recreational Wildlife Viewing	$259.95	$169.36
Non-Use Benefits (½ Recreational Benefits)	$499.92	$325.70
Total Recreational Benefits	$1,499.76	$977.09

Note: Categories may not sum to totals due to rounding of individual estimates for presentation purposes.

EPA calculated the total value of enhanced water-based recreation opportunities by summing over the three recreation categories and non-user value. The resulting increase in value of water resources to consumers of water-based recreation and non-users is $1,449,756 (2001$) annually.

Findings from the Ohio-case study analysis suggest that the benefits to consumers of water-based recreation may be substantially underestimated at the national level. EPA estimates recreational and non-use benefits to Ohio residents alone are $376,400 (2001$) annually. See section IX.H of today's final rule and Chapter 21 of the EEBA for a detailed discussion of the case study of recreational benefits in Ohio. Given that the in-scope MP&M facilities located in the State of Ohio account only for six percent of the total number of in-scope facilities, it is reasonable to expect that the benefits to Ohio residents do not account for such a large proportion of recreational benefits from the final rule nationwide. In addition to more accurately account for the presence and effect of MP&M and non-MP&M dischargers in Ohio, the following factors are likely to result in more comprehensive estimates of recreational benefits under the case study approach: (1) Use of an original travel cost study to value four recreational activities affected by the regulation: fishing, swimming, boating, and wild life viewing; (2) use of a first-order decay model to estimate in-stream concentrations in downstream water bodies; (3) ability to estimate welfare gain to recreational users from reduced discharges of nutrients such as Total Kjeldahl Nitrogen (TKN).

D. Effect on POTW Operations

The final rule only regulates direct dischargers. Therefore, the selected option does not affect POTW operation. For the alternative policy options that consider both direct and indirect dischargers, EPA evaluated two productivity measures associated with MP&M pollutants. The first measure is the reduction in pollutant interference at publicly-owned treatment works (POTWs). The second measure is pass-through of pollutants into the sludge, which limits options for POTW disposal of sewage sludge. These analyses are presented in EEBA Chapter 16.

E. Summary of Benefits

Using the national-level analysis approach, EPA estimates total benefits for the five monetized categories of approximately $1,500,000 (2001$) annually (*see* Table IX–5). EPA's complete benefit assessment can be found in EEBA for the final rule. The monetized benefits of the rule likely underestimates the total benefits of the rule because they omit various sources of benefits to society from reduced MP&M effluent discharges. Examples of benefit categories not reflected in these estimates include non-cancer health benefits other than benefits from reduced exposure to lead; other water-dependent recreational benefits, such as swimming and waterskiing benefits to recreational users from reduced concentration of conventional pollutants and nonconventional pollutants such as TKN; and reduced cost of drinking water treatment for the pollutants with drinking water criteria. In addition, as noted in the prior discussion, although the national-level benefits analysis finds negligible benefits from reduced health risk, the more rigorous analytic approach used for the Ohio case study found more benefits—approximately $0.5 million.

TABLE IX–5.—ESTIMATED BENEFITS FROM REDUCED MP&M DISCHARGES

[Annual Benefits—Thousands of 2001$]

Benefit category	Traditional extrapolation	Post-stratification extrapolation
1. Reduced Cancer Risk:		
Fish Consumption	$0.09	$0.13
Water Consumption	$0	$0
2. Reduced Risk from Exposure to Lead:		
Children	$0	$0
Adults	$0	$0
3. Avoided Sewage Sludge Disposal Costs [a]	N/A	N/A
4. Enhanced Fishing	$537.20	$349.98
5. Enhanced Boating	$202.69	$132.05
6. Enhanced Wildlife Viewing	$259.95	$169.36
7. Non-Use benefits (½ of Recreational Use Benefits)	$499.92	$325.70
Total monetized benefits	$1,499.85	$977.22

[a] Not applicable to the final rule.

F. National Cost-Benefit Comparison

The comparison of costs and benefits for the final rule is inevitably incomplete because EPA cannot value all of the benefits resulting from the final rule in dollar terms. A comparison of costs and benefits is thus limited by the lack of a comprehensive benefits valuation and also by uncertainties in the estimates. Bearing these limitations in mind, EPA presents a summary comparison of costs and benefits for the final rule in Table IX–6. The estimated social cost of the final rule is $13.8 million annually (2001$). The total benefits that can be valued in dollar terms in the categories traditionally analyzed for effluent guidelines range from around $977,000 to $1,500,000 annually (2001$), based on the alternative extrapolation methods.

As previously noted, EPA used more detailed information and a more comprehensive analytic method to estimate expected benefits of the final rule for the State of Ohio. This more rigorous analysis was undertaken to address certain issues in the national-level analysis and to supplement the national-level analysis performed for the final rule. The following section presents this analysis. The Ohio case study showed that the more rigorous analytic approach leads to a different conclusion from that found in the simpler, national-level analysis approach—in particular, that the estimated State-level benefits exceed the estimated State-level cost. As previously discussed, given (1) that Ohio accounts for only about 6 percent of total MP&M facilities, and (2) that other States with substantial numbers of MP&M facilities have similar population and water body characteristics to Ohio, EPA believes that use of the more rigorous approach nationally would yield a higher estimate of national benefits. On this basis, the Agency estimates that national benefits from the final rule may be comparable to its social costs.

TABLE IX–6.—COST-BENEFIT COMPARISON [THOUSANDS OF 2001$]

Category	Traditional extrapolation	Post-stratification extrapolation*
Social Cost of Regulation	$13,824.56	$13,824.56
Monetized Benefits	$1,499.85	$977.22
Net Benefits	(−$12,324.72)	(−$12,847.34)

*Post-Stratification extrapolation is applied to benefits estimates only.

G. Ohio Case Study

1. Overview

The Ohio Case Study Report presents a detailed case study of the expected State-level costs and benefits of the MP&M rule in Ohio. The case study assesses the costs and benefits of the final rule for facilities and water bodies located in Ohio. Ohio is among the ten States with the largest numbers of MP&M facilities. The State has a diverse water resource base and a more extensive water quality ecological database than many other States. EPA gathered data on MP&M facilities and on Ohio's baseline water quality conditions and water-based recreation activities to support the case study analysis. These data characterize current water quality conditions, water quality changes expected from the regulation, and the expected welfare changes from water quality improvements at water bodies affected by MP&M discharges. The case study also estimates the social costs of the final rule for facilities in Ohio and compares estimated social costs and benefits for the State.

The case study analysis supplements the national level analysis performed for the final MP&M regulation in two important ways. First, the analysis used improved data and methods to determine MP&M pollutant discharges from both MP&M facilities and other sources. In particular, EPA administered 1,600 screener questionnaires to augment information on the Ohio's MP&M facilities. The Agency also used information from the sampled MP&M facilities to estimate discharge characteristics of non-sampled MP&M facilities, as described in Appendix H of the EEBA report. The Agency assigned discharge characteristics to all non-MP&M industrial direct discharges based on the information provided in PCS. Second, the analysis used an original travel cost study to value four recreational uses of water resources affected by the regulation: swimming, fishing, boating, and near-water activities. The added detail provides a more complete and reliable analysis of water quality changes from reduced MP&M discharges. The study provides more complete estimates of changes in human welfare resulting from reduced health risk, enhanced recreational opportunities, and improved economic productivity.

EPA estimated human health benefits from reduced MP&M dischargers in Ohio using similar methodologies to those used for the national-level analysis. Section IX.B of this preamble summarizes these methodologies. Uncertainties and assumptions of EPA's

analysis of human health benefits are presented in section IX.B.5. Additional details on methodology and the uncertainties and limitations of EPA's analysis of reduced human health risk from the final effluent guidelines are presented in Chapter 13 and 14 of the EEBA report.

The case study analysis of recreational benefits combines water quality modeling with a random utility model (RUM) to assess how changes in water quality from the regulation will affect consumers' valuation of water resources. The RUM analysis addresses a wide range of pollutant types and effects, including water quality measures not often addressed in past recreational benefits studies. In particular, the model supports a more complete analysis of recreational benefits from reductions in nutrients and toxic pollutants (*i.e.*, priority pollutants and nonconventional pollutants with toxic effects).

EPA subjected this study to a formal peer review by experts in the natural resource valuation field. The peer review concluded that EPA had done a competent job, especially given the available data. As requested by the Agency, peer reviewers provided suggestions for further improvements in the analysis. Since the proposed rule analysis, the Agency made changes to the Ohio model and conducted additional sensitivity analyses suggested by the reviewers. The peer review report and EPA's response to peer reviewers' comments, along with the revised model, are in the docket for the rule.

2. Benefits for Ohio Case Study

The use of an original RUM in this case study allows the Agency to address limitations inherent in benefits transfer used in the analysis of recreational benefits at the national level. The use of benefits transfer often requires additional assumptions because water quality changes evaluated in the available recreation demand studies are only roughly comparable with the water quality measures evaluated for a particular rule. The RUM model estimates the effects of the specific water quality characteristics analyzed for the final MP&M regulation, such as presence of AWQC exceedances and concentrations of the nonconventional pollutant Total Kjeldahl Nitrogen (TKN). EPA estimates that this direct link between the water quality characteristics analyzed for the rule and the characteristics valued in the RUM analysis reduces uncertainty in benefit estimates and makes the analysis of recreational benefits more robust.

The final MP&M regulation affects a broad range of pollutants, some of which are toxic to human and aquatic life but are not directly observable (*i.e.*, priority and non-conventional pollutants). These unobservable toxic pollutants may degrade aquatic habitats, decrease the size and abundance of fish and other aquatic species, increase fish deformities, and change watershed species composition. Changes in toxic pollutant concentrations may therefore affect recreationists' valuation of water resources, even if consumers are unaware of changes in ambient pollutant concentrations.

The study used data from the National Demand Survey for Water-Based Recreation (NDS), conducted by U.S. EPA and the National Forest Service, to examine the effects of in-stream pollutant concentrations on consumers' decisions to visit a particular water body. The analysis estimated baseline and post-compliance water quality at recreation sites actually visited by the surveyed consumers and at all other sites within the consumers' choice set, visited or not. The RUM analysis of consumer behavior then estimated the effect of ambient water quality and other site characteristics on the total number of trips taken for different water-based recreation activities and the allocation of these trips among particular recreational sites. The RUM analysis is a travel cost model, in which the cost to travel to a particular recreational site represents the ''price'' of a visit.

EPA modeled two consumer decisions: (1) How many water-based recreational trips to take during the recreational season (the trip participation model); and (2) which recreation site to choose (the site choice model). Combining the trip frequency model's prediction of trips under the baseline and post-compliance scenarios and the site choice model's per-trip welfare measure provides a measure of total welfare. EPA calculated each individual's seasonal welfare gain for each recreation activity from post-compliance water quality changes, and then used Census data to aggregate the estimated welfare change to the State level. The sum of estimated welfare changes over the four recreation activities yielded estimates of total welfare gain.

EPA estimated other components of benefits in Ohio using similar methodologies to those used for the national-level analysis. In addition to the RUM study of recreational benefits, other analytical improvements included the following: (1) Use of more detailed data on MP&M facilities, obtained from the 1,600 additional surveys; (2) use of data on non-MP&M discharges to estimate current baseline conditions in the State; and (3) use of a first-order decay model to estimate in-stream concentrations in the Ohio water bodies in the baseline and post-compliance.

Appendix H of the EEBA Report describes the water quality model used in this analysis and the approach and data sources used to estimate total pollutant loadings from all industrial and municipal sources to Ohio's water bodies. The Agency has concluded that the added level of detail results in more robust benefit estimates.

Summing the monetary values over all benefit categories yields total monetized benefits of $930,400 (2001$) annually for the final rule, as shown in Table IX–7. Although more comprehensive than the national benefits analysis, the case study benefit estimates still omit important mechanisms by which society is likely to benefit from the final rule. Examples of benefit categories not reflected in the monetized benefits include non-cancer health benefits (other than lead-related benefits) and reduced costs of drinking water treatment.

TABLE IX–7.—ESTIMATED BENEFITS FROM REDUCED MP&M DISCHARGES FROM OHIO FACILITIES

[Annual benefits—thousands of 2001$]

Benefit category	Selected option
1. Reduced Cancer Risk:	
Fish Consumption:	$14.5
Water Consumption:	$0.00
2. Reduced Risk from Exposure to Lead:	
Children:	$422.11
Adults:	$117.39
3. Avoided Sewage Sludge Disposal Costs	$0.00
4. Enhanced Fishing	$153.10
5. Enhanced Swimming	$9.78
6. Enhanced Boating	$0.00
7. Enhanced Wildlife Viewing	$88.05
8. Non-Use benefits (½ of Recreational Use Benefits)	$125.47
Total Monetized Benefits	$930.4

3. Social Costs for Ohio Case Study

EPA also estimated the social costs of the final rule for MP&M facilities in Ohio. EPA relied on the results of the national analysis to predict the number of Ohio facilities that would close in the baseline and due to the final rule.

The MP&M regulations will not affect facilities that are baseline closures. Predicting the number of regulatory closures is necessary to estimate the costs and impacts of the regulation on industry and water quality. The screener

data collected for Ohio facilities did not provide financial data to perform facility financial impact analyses, as was done in the national analysis. EPA therefore used data from the national analysis to estimate the percentage of facilities that would close in the baseline and post-compliance. EPA assumed the ratio of facilities that close in the national analysis with the same discharge status, subcategory, and flow category would be comparable to closures for facilities in Ohio. For example, two percent of direct Oily Waste facilities discharging less than one MGY close in the baseline in the national data set.

EPA developed engineering estimates of compliance costs for each Ohio facility and annualized costs using a seven percent discount rate over a 15-year period. As in the national social cost analysis, EPA included compliance costs for facilities that close due to the rule and costs for facilities that continue to operate subject to the final regulation. Including costs for regulatory closures in effect calculates the social costs of compliance that would be incurred if every facility continued to operate post-regulation. In fact, some facilities may find it more economical to close, and calculating costs as if all facilities continue operating provides an upper bound estimate of social costs.

EPA used the same methods as used in the national social cost analysis to estimate other components of social costs for the Ohio case study. Section VIII of this preamble and Chapter 11 of the EEBA describe the methods used to estimate government administrative costs and the social costs of unemployment.

Table IX–8 shows the total estimated social costs of the final rule for Ohio facilities.

TABLE IX–8.—ANNUAL SOCIAL COSTS FOR OHIO FACILITIES: PROPOSED OPTION

[Thousands 2001$, costs annualized at 7%]

Component of social costs	Selected option
Resource value of compliance costs	$62.23
Government administrative costs	$0.00
Social cost of unemployment	$0.00
Total social cost	$62.23

4. Comparison of Monetized Benefits and Costs for Ohio Case Study

The Ohio case study shows substantial net positive benefits associated with the MP&M regulation. EPA estimates the social cost in Ohio of the final regulation to be $62,232 annually (2001$). The sum total of benefits that can be valued in dollar terms is $930,408 annually (2001$). Comparing the midpoint estimate of social costs ($62,232) with the midpoint estimate of monetizable benefits ($930,408) results in a net social benefit of $868,178. This represents a partial cost-benefit comparison because not all of the benefits resulting from the regulation can be valued in dollar terms (*e.g.*, changes in systemic health risk).

For the reasons previously discussed, EPA judges that the analytic approach and detailed data used for the Ohio case study provide a more robust and accurate benefits estimate than the data and approach used for the national-level analysis.

X. Non-Water Quality Environmental Impacts

Sections 304(b) and 306 of the Act require EPA to consider non-water quality environmental impacts (including energy requirements) associated with effluent limitations guidelines and standards. In accordance with these requirements, EPA has considered the potential impact of today's final regulation on air emissions, solid waste generation, and energy consumption.

While it is difficult to balance environmental impacts across all media and energy use, the Agency has determined that the benefits associated with compliance with the limitations and standards justify the multi-media impacts identified in this section (*see* section IX for a discussion on the environmental benefits associated with this regulation). For additional information on non-water quality impacts associated with today's regulation, *see* section 13 of the TDD.

A. Air Pollution

MP&M facilities generate wastewater that contain organic compounds. These organic compounds may be volatile organic compounds (VOCs), which contribute to the formation of ambient ozone, or hazardous air pollutants (HAPs) listed in section 112(b) of the Clean Air Act (CAA). These wastewaters often pass through a series of collection and treatment units that are open to the atmosphere and allow wastewater containing organic compounds to contact ambient air. Atmospheric exposure of the organic-containing wastewaters may result in the release of VOCs or organic HAPs from the wastewater.

The use of halogenated hazardous air pollutant solvent (methylene chloride, perchloroethylene, trichloroethylene, 1,1,1 trichloroethane, carbon tetrachloride and chloroform) for cleaning in the MP&M industry can create hazardous air pollutant emissions. The Agency has concluded that this regulation will not affect the use of halogenated hazardous air pollutant solvent in the MP&M industry. This regulation neither requires nor discourages the use of aqueous cleaners in lieu of halogenated hazardous air pollutant solvent.

Because today's final rule would not allow any less stringent control of VOCs or organic HAPs than is currently in place at MP&M facilities, EPA does not predict any net increase in air emissions from volatilization of organic pollutants due to today's action. As such, EPA expects no adverse air impacts are expected to occur as a result of today's regulation.

The Agency notes that it is developing National Emission Standards for Hazardous Air Pollutants (NESHAPs) under section 112 of the CAA to address air emissions of HAPs. Current and upcoming NESHAPs that may potentially affect HAP emitting activities at MP&M facilities considered during the development of this rule include:

- Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks;
- Halogenated Solvent Cleaning;
- Aerospace Manufacturing;
- Shipbuilding and Ship Repair (Surface Coating);
- Large Appliances (Surface Coating);
- Metal Furniture (Surface Coating);
- Automobile and Light-Duty Truck Manufacturing (Surface Coating); and
- Miscellaneous Metal Parts and Products (Surface Coating).

Finally, EPA notes that the energy requirements discussed in this section may result in increased emissions of combustion byproducts associated with energy production. Given the relatively small projected increases in energy use, EPA does not anticipate that this effect would be significant.

B. Solid Waste

As shown in Table X–1, EPA anticipates that waste oil generation will increase as a result of today's rule. The estimated increase of waste oil generation as a result of today's rule reflects better removal of oil and grease by the selected technology than is currently achieved.

TABLE X–1.—WASTE OIL GENERATION FOR OILY WASTES SUBCATEGORY

Option	Waste Oil Generated (million gallons/year)
Baseline (or current) Technology [1]	13.5
Option 6 Technology	15.9

Source: U.S. Environmental Protection Agency.

[1] EPA calculated the baseline sludge and waste oil generation using responses to the 1989 MP&M Phase I Questionnaire and the 1996 MP&M Phase II Detailed Questionnaires.

MP&M facilities usually either recycle waste oil on-site or off-site, or contract haul it for disposal as either a hazardous or nonhazardous waste. However, EPA notes that the inclusion of water conservation and pollution prevention in the technology basis for the Oily Wastes subcategory results in the generation of less waste oil than a technology basis that did not incorporate pollution prevention. EPA finds the overall increase in waste oil generation as acceptable.

C. Energy Requirements

EPA estimates that compliance with this regulation will result in a net increase in energy consumption at MP&M facilities. EPA presents the estimates of energy usage for the selected option in Table X–2.

TABLE X–2.—ENERGY REQUIREMENTS BY OPTION

Option	Energy required (kilowatt hrs/yr)
Baseline [1]	6,883,774
Selected Options	7,234,450

Source: U.S. Environmental Protection Agency.

[1] EPA calculated the baseline sludge and waste oil generation using responses to the 1989 MP&M Phase I Questionnaire and the 1996 MP&M Phase II Detailed Questionnaires. The final regulation does not include indirect discharging facilities.

By comparison, electric power generation facilities generated 3,123 billion kilowatt hours of electric power in the United States in 1997 (The Energy Information Administration, Electric Power Annual 1998 Volume 1, Table A1). Additional energy requirements for EPA's selected options are trivial (*i.e.*, significantly less than 0.01 percent of national requirements).

XI. Regulatory Implementation

The purpose of this section is to provide assistance and direction to permit writers and MP&M facilities to aid in their implementation of this regulation. This section also discusses the relationship of upset and bypass provisions, and variances and modification to the final limitations and standards. For additional implementation information, *see* section 15 of the TDD for today's final rule.

A. Implementation of the Limitations and Standards for Direct Dischargers

Effluent limitations and new source performance standards act as one of the primary mechanisms to control the discharges of pollutants to waters of the United States. Authorized States may also set permit limitations based on the capabilities of the treatment installed to ensure proper operation and maintenance of the treatment technology. These limitations and standards are applied to individual facilities through NPDES permits issued by the EPA or authorized States under section 402 of the Act.

In specific cases, the NPDES permitting authority may elect to establish permit limits for pollutants not covered by this regulation based on the capabilities of on-site treatment technologies. In addition, if State water quality standards or other provisions of State or Federal law require limits on pollutants not covered by this regulation (or require more stringent limits or standards on covered pollutants in order to achieve compliance), the permitting authority must apply those limitations or standards. *See* CWA section 301(b)(1)(C).

1. Compliance Dates for Existing and New Sources

New and reissued Federal and State NPDES permits to direct dischargers must include the effluent limitations promulgated today. The permits must require immediate compliance with such limitations. If the permitting authority wishes to provide a compliance schedule, it must do so through an enforcement mechanism.

New sources must comply with the new source standards (NSPS) of the MP&M rule at the time they commence discharging MP&M process wastewater. Because the final rule was not promulgated within 120 days of the proposed rule, the Agency considers a discharger a new source if its construction commences after June 12, 2003.

2. Applicability

In section V of this preamble and section 15 of the TDD, EPA provides details information on the applicability of this rule to various operations. Permit writers should closely examine all metal products and machinery operations and compare these operations against the applicability statement for today's rule (*see* 40 CFR 438.1) and section 1 of the TDD to determine if they are subject to the provisions of this rule.

3. Implementation for Facilities Subject to Multiple Effluent Limitations Guidelines

The regulations in today's final rule do not apply to wastewater discharges which are subject to the limitations and standards of other effluent limitations guidelines (*e.g.*, Metal Finishing (40 CFR part 433) or Iron and Steel Manufacturing (40 CFR part 420)).

4. Waiver for Pollutants Not Present

In May 2000, EPA promulgated a regulation to streamline the NPDES regulations (''Amendments to Streamline the National Pollutant Discharge Elimination System Program Regulations: Round Two'' (*see* 65 FR 30886; May 15, 2000)) which includes a monitoring waiver for direct dischargers subject to effluent guidelines. Direct discharge facilities may forego sampling of a guideline-limited pollutant if that discharger ''has demonstrated through sampling and other technical factors that the pollutant is not present in the discharge or is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger,'' (*see* 65 FR 30908; 40 CFR 122.44). EPA noted in the preamble to the final NPDES streamlining rule that it is providing a waiver from monitoring requirements, but not a waiver from the limit. In addition, the revision does not waive monitoring for any pollutants for which there are limits based on water quality standards. The waiver for direct dischargers lasts for the term of the NPDES permit and is not available during the term of the first permit issued to a discharger. Any request for this waiver must be submitted when applying for a reissued permit or modification of a reissued permit. Therefore, EPA is not including a monitoring waiver in today's final regulations for direct dischargers. When authorized by their permit writer, direct discharge facilities covered by any effluent guidelines (including today's rule) will be able to use the monitoring waiver contained in the NPDES streamlining final rule.

5. Compliance with the Limitations and Standards

The same basic procedures apply to the calculation of all limitations and standards for the OWS, regardless of whether the control level is BPT, BCT,

or NSPS. For simplicity, the following discussion refers only to effluent limitations guidelines; however, the discussion also applies to new source standards.

a. Definitions

The limitations for pollutants for the OWS, as presented in today's final rule, are provided as maximum daily discharge limitations. Definitions provided at 40 CFR 122.2 state that the ''maximum daily discharge limitation'' is the ''highest allowable 'daily discharge.' '' Daily discharge is defined as the '' 'discharge of a pollutant' measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.'' Section 10 of the TDD describes the data selection and calculations used to develop today's limitations.

b. Percentile Basis for Limits, Not Compliance

EPA promulgates limitations that facilities are capable of complying with at all times by properly operating and maintaining their processes and treatment technologies. EPA established these limitations on the basis of percentiles estimated using data from facilities with well-operated and controlled processes and treatment systems. However, because EPA uses a percentile basis, the issue of exceedances (*i.e.*, values that exceed the limitations) or excursions is often raised in public comments on limitations. For example, comments often suggest that EPA include a provision that allows a facility to be considered in compliance with permit limitations if its discharge exceeds the specified daily maximum limitations one day out of 100. As explained in section 10.4 of the TDD, these limitations were never intended to have the rigid probabilistic interpretation implied by such comments. The following discussion provides a brief overview of EPA's position on this issue.

EPA expects that all facilities subject to the limitations will design and operate their treatment systems to achieve the long-term average performance level on a consistent basis because facilities with well-designed and operated model technologies have demonstrated that this can be done. Facilities that are designed and operated to achieve the long-term average effluent levels used in developing the limitations should be capable of compliance with the limitations at all times, because the limitations incorporate an allowance for variability in effluent levels about the long-term average. The allowance for variability is based on control of treatment variability demonstrated in normal operations.

EPA recognizes that, as a result of today's rule, some dischargers may need to improve treatment systems, process controls, and/or treatment system operations in order to consistently meet limitations and standards in the final MP&M effluent guidelines. EPA finds that this consequence is consistent with the Clean Water Act statutory framework, which requires that discharge limitations reflect best practicable control technology currently available (BPT).

c. Limitations

EPA did not establish monthly average limitations for O&G (as HEM) and TSS because a monthly average limitation would be based on the assumption that a facility would be required to monitor more frequently than once a month. For the reasons set forth in section VI.F.1, EPA estimates that one monthly monitoring event is sufficient; however, if permitting authorities choose to require more frequent monitoring for O&G (as HEM) and TSS, they may set monthly average limitations and standards based on their BPJ (*see* 40 CFR 430.24(a)(1), footnote b).

d. Requirements of Laboratory Analysis

The permittee is responsible for communicating the requirements of the analysis to the laboratory, including the sensitivity required to meet the regulatory limits associated with each analyte of interest. In turn, the laboratory is responsible for employing the appropriate set of method options and a calibration range in which the concentration of the lowest non-zero standard represents a sample concentration lower than the regulatory limit for each analyte. It is the responsibility of the permittee to convey to the laboratory the required sensitivity to comply with the limitations (*see Sierra Club* v. *Union Oil,* 813 F.2d 1480, page 1492 (9th Cir. 1987)).

B. Upset and Bypass Provisions

A ''bypass'' is an intentional diversion of the streams from any portion of a treatment facility. An ''upset'' is an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. EPA's regulations concerning bypasses and upsets for direct dischargers are set forth at 40 CFR 122.41(m) and (n) and for indirect dischargers at 40 CFR 403.16 and 403.17.

C. Variances and Modifications

The CWA requires application of effluent limitations established pursuant to section 301 to all direct dischargers. However, the statute provides for the modification of these national requirements in a limited number of circumstances. Moreover, the Agency has established administrative mechanisms to provide an opportunity for relief from the application of the national effluent limitations guidelines for categories of existing sources for toxic, conventional, and nonconventional pollutants.

1. Fundamentally Different Factors Variances

EPA will develop effluent limitations or standards different from the otherwise applicable requirements if an individual discharging facility is fundamentally different with respect to factors considered in establishing the limitation of standards applicable to the individual facility. Such a modification is known as a ''fundamentally different factors'' (FDF) variance.

Early on, EPA, by regulation provided for the FDF modifications from the BPT effluent limitations, BAT limitations for toxic and nonconventional pollutants and BPT limitations for conventional pollutants for direct dischargers. For indirect dischargers, EPA provided for modifications from pretreatment standards. FDF variances for toxic pollutants were challenged judicially and ultimately sustained by the Supreme Court. (*Chemical Manufacturers Assn* v. *NRDC,* 479 U.S. 116 (1985)).

Subsequently, in the Water Quality Act of 1987, Congress added a new section 301(n) explicitly authorizing modifications of the otherwise applicable BAT effluent limitations or categorical pretreatment standards for existing sources if a facility is fundamentally different with respect to the factors specified at section 304 (other than costs) considered by EPA in establishing the effluent limitations or pretreatment standards. Section 301(n) also defined the conditions under which EPA may establish alternative requirements. Under section 301(n), an application for approval of FDF variance must be based solely on: (1) Information submitted during rulemaking raising the factors that are fundamentally different; or (2) information the applicant did not have an opportunity to submit. The alternate limitation or standard must be no less stringent than justified by the difference and must not result in

markedly more adverse non-water quality environmental impacts than the national limitation or standard.

EPA regulations at 40 CFR part 125 subpart D, authorizing the Regional Administrators to establish alternative limitations and standards, further detail the substantive criteria used to evaluate FDF variance requests for direct dischargers. Thus, 40 CFR 125.31(d) identifies six factors (*e.g.*, volume of process wastewater, age and size of a discharger's facility) that may be considered in determining if a facility is fundamentally different. The Agency must determine whether, on the basis of one or more of these factors, the facility in question is fundamentally different from the facilities and factors considered by EPA in developing the nationally applicable effluent guidelines. The regulation also lists four other factors (*e.g.*, infeasibility of installation within the time allowed or a discharger's ability to pay) that may not provide a basis for an FDF variance. In addition, under 40 CFR 125.31(b)(3), a request for limitations less stringent than the national limitation may be approved only if compliance with the national limitations would result in either: (a) A removal cost wholly out of proportion to the removal cost considered during development of the national limitations; or (b) a non-water quality environmental impact (including energy requirements) fundamentally more adverse than the impact considered during development of the national limits. The conditions for approval of a request to modify applicable pretreatment standards and factors considered are the same as those for direct dischargers.

The legislative history of section 301(n) underscores the necessity for the FDF variance applicant to establish eligibility for the variance. EPA's regulations at 40 CFR 125.32(b)(1) are explicit in imposing this burden upon the applicant. The applicant must show that the factors relating to the discharge controlled by the applicant's permit which are claimed to be fundamentally different are, in fact, fundamentally different from those factors considered by the EPA in establishing the applicable guidelines. The pretreatment regulations incorporate a similar requirement at 40 CFR 403.13(h)(9).

Facilities must submit all FDF variance applications to the appropriate Director (as defined at 40 CFR 122.2) no later than 180 days from the date the limitations or standards are established or revised (*see* CWA § 301(n)(2) and 40 CFR 122.21(m)(1)(i)(B)(2)). EPA regulations clarify that effluent limitations guidelines are ''established'' or ''revised'' on the date those effluent limitations guidelines are published in the **Federal Register** (*see* 40 CFR 122.21(m)(1)(i)(B)(2)). Therefore all facilities requesting FDF variances from the effluent limitations guidelines in today's final rule must submit all FDF variance applications to their Director (as defined at 40 CFR 122.2) no later than November 10, 2003.

An FDF variance is not available to a new source subject to NSPS.

2. Water Quality Variances

Section 301(g) of the CWA authorizes a variance from BAT effluent guidelines for certain non-conventional pollutants due to localized environmental factors so long as the discharge does not violate any water quality-based effluent limitations. These pollutants include ammonia, chlorine, color, iron, and phenols (as measured by the colorimetric 4-aminoantipyrine (4AAP) method). Dischargers subject to new or revised BAT limitations promulgated today for those pollutants may be eligible for a section 301(g) variance. Please note that section 301(g)(4)(c) requires the filing of section 301(g) variance applications pertaining to the new or revised limits not later than February 9, 2004. Existing section 301(g) variances for limitations not being revised today are not affected by today's action. This variance is not applicable to today's final rule as none of these parameters are regulated by today's final rule.

3. Permit Modifications

Even after EPA (or an authorized State) has issued a final permit to a direct discharger, the permit may still be modified under certain conditions. (When a permit modification is under consideration, however, all other permit conditions remain in effect.) A permit modification may be triggered in several circumstances. These could include a regulatory inspection or information submitted by the permittee which reveals the need for modification. Any interested person may request that a permit modification be made. There are two classifications of modifications: Major and minor. From a procedural standpoint, they differ primarily with respect to the public notice requirements. Major modifications require public notice while minor modifications do not. Virtually any modification that results in less stringent conditions is treated as a major modifications, with provisions for public notice and comment. Conditions that would necessitate a major modification of a permit are described at 40 CFR part 122.62. Minor modifications are generally non-substantive changes. The conditions for minor modification are described at 40 CFR part 122.63.

XII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

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

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

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

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

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

It has been determined that this rule is not a ''significant regulatory action'' under the terms of Executive Order 12866 and is therefore not subject to OMB review.

B. Paperwork Reduction Act

This action does not impose an information collection burden under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* This rule merely establishes technology-based discharge limitations and standards.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of

information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed at 40 CFR part 9 and 48 CFR chapter 15.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For assessing the impacts of today's rule on small entities, a small entity is defined as: (1) A small business according to the regulations of the Small Business Administration (SBA) at 13 CFR part 121.201, which define small businesses for Standard Industrial Classification (SIC) codes; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

To assess the potential economic impact of today's rule on small entities, EPA drew on: (1) A comparison of compliance costs to revenue; and (2) the firm and facility impact analyses discussed in section VIII of this preamble. First, EPA performed an analysis comparing annualized compliance costs to revenue for small entities at the firm level. EPA found that none of the small firms are estimated to incur compliance costs equaling or exceeding one percent of annual revenue. Second, EPA drew on the facility impact analysis, which estimated facility closures and other adverse changes to financial condition (referred to as ''moderate impacts''). See section VIII.D of today's rule for details of EPA's analysis of closures and moderate impacts for privately-owned businesses. This analysis indicated that the final rule would cause no regulated facilities owned by small entities to close or to incur moderate impacts. From these analyses, EPA determined that the final rule will not have a significant economic impact on a substantial number of small entities. See Chapter 10 of the final rule EEBA for a more detailed discussion of the economic impacts on small entities.

After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities.

In accordance with section 603 of the RFA, EPA prepared an initial regulatory flexibility analysis (IRFA) for the proposed rule and convened a Small Business Advocacy Review Panel to obtain advice and recommendations of representatives of the regulated small entities in accordance with section 609(b) of the RFA (*see* 66 FR 519). The January 2001 proposed rule (*see* 66 FR 523) presents a summary of the Panel's recommendations and the full Panel Report (*see* DCN 16127, section 11.2) presents a detailed discussion of the Panel's advice and recommendations.

D. Unfunded Mandates Reform Act

1. UMRA Requirements

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under UMRA section 202, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year.

Before promulgating an EPA rule for which a written statement is needed, UMRA section 205 generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted.

EPA is required by UMRA section 203 to develop a small government agency plan before it establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. The estimated total annualized before-tax costs of compliance are $13.8 million ($2001). On an after-tax basis the costs total $11.9 million ($2001), of which the private sector incurs $3.0 million ($2001) and state and local governments that perform MP&M activities incur $9.0 million ($2001). Thus, today's rule is not subject to the requirements of UMRA sections 202 and 205.

EPA also determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. The final regulation imposes no new administrative costs on small governments owning POTWs because the regulations does not establish pretreatment standards for POTWs with indirectly discharging government-owned facilities. With respect to the 280 small government-owned facilities, EPA determined that the costs of the final rule are not significant for small governments. Of these facilities, 140 incur no compliance costs under the final rule and the remaining 140 incur annualized costs that average approximately $25,000 per facility. The total compliance cost for all the small government-owned facilities incurring costs under the regulation is $3.5 million. EPA concluded that these compliance costs will have no significant budgetary impacts for any of the governments owning these facilities. In addition, EPA concluded that the final rule does not uniquely affect small governments because small and large governments are affected by the rule in the same way. Thus, today's rule is not subject to the requirements of UMRA section 203.

Although today's final rule does not contain a Federal mandate under UMRA, EPA did undertake an assessment of the impacts of the final rule on State and local governments as part of its decision-making process. The following section discusses some of the results of EPA's review. More detail may be found in the EEBA.

2. Analysis of Impacts on Government Entities

EPA estimates that the costs to government-owned facilities to comply

with today's final rule are approximately $9.0 million annually ($2001), which is below the threshold specified in § 202. EPA, nevertheless, assessed the impacts on State and local governments during the course of development of the rule. Generally, governments may incur two types of costs as a result of the proposed regulation: (1) Direct costs to comply with the rule for facilities owned by government entities; and (2) administrative costs to implement the regulation. Both types of costs are discussed below.

a. Compliance Costs for Government-Owned MP&M Facilities

As previously explained, EPA surveyed government-owned facilities to assess the cost of the regulation on these facilities and the government entities that own them. The survey responses support EPA's analysis of the budgetary impacts of the regulation. Survey information includes: The size and income of the populations served by the affected government entities; the government's current revenues by source, taxable property, debt, pollution control spending, and bond rating; and the costs, funding sources, and other characteristics of the MP&M facilities owned by each government entity. Table XII–1 provides national estimates of the government entities that operate MP&M facilities potentially subject to the regulation by size.

Table XII–2 summarizes the annualized compliance costs incurred by government entities by size.

TABLE XII–1.—NUMBER OF GOVERNMENT-OWNED FACILITIES BY TYPE AND SIZE OF GOVERNMENT ENTITY

Size of government and status under final option	Municipal government	State government	County government	Regional government authority	Total
Large Governments (population >50,000)					
Number of regulated government entities	26	129	23	0	178
Number of government entities with exclusions	592	248	758	46	1,645
Small Governments (population <=50,000)					
Number of regulated government entities	280	0	0	0	280
Number of government entities with exclusions	1,470	0	212	0	1,682
All Governments					
Number of regulated government entities	306	129	23	0	458
Number of government entities with exclusions	2,062	248	970	46	3,327
Total	2,368	377	993	46	3,785

TABLE XII–2.—NUMBER OF REGULATED GOVERNMENT-OWNED FACILITIES AND COMPLIANCE COSTS BY SIZE OF GOVERNMENT

[million, 2001$]

	Number of facilities	Costs
Regulated Facilities Owned by Large Governments	178	$5.5
Regulated Facilities Owned by Small Governments	280	$3.5
All Regulated Government-Owned Facilities	458	$9.0

The table shows that 280 regulated facilities (or 61 percent) of the regulated government entities are owned by small governments. These facilities incur $3.5 million annually in compliance costs with an average cost of $12,575 per facility. Larger governmental entities own the remaining 178 regulated facilities (or 39 percent). EPA estimates that facilities owned by the larger governmental entities incur $5.5 million in annual compliance costs with an average cost of $30,700 per facility.

EPA used the analysis described in Section VIII.E to estimate the impacts on government owned facilities. EPA judged a government to experience significant budgetary impacts if: (1) One or more facilities incur compliance costs exceeding 1% of the baseline cost of service, (2) total debt service costs—post-compliance, and including costs to finance MP&M capital costs entirely with debt—exceed 25% of baseline revenue, *and* (3) total annualized pollution control costs per household, post-compliance, exceed one percent of median household income. EPA estimated no significant impacts for any of these facilities, based on these budgetary criteria. Thus, EPA concluded that none of the affected governments are expected to incur significant budgetary impacts as a result of the regulation. However, EPA also considered whether the MP&M regulation may significantly or uniquely affect small governments.

b. Small Government Impacts

EPA estimates that small governments (*i.e.,* governments with a population of less than 50,000) own 1,962 MP&M facilities. The decision not to regulate indirect facilities will exclude 1,682 small government-owned MP&M facilities from additional requirements. Thus, the final regulation covers 280 small government-owned facilities. Of these facilities, 140 incur no compliance costs under the final rule, and the remaining 140 incur annualized costs that average approximately $25,000 per facility. The total compliance cost for all the small government-owned facilities incurring costs under this regulation is $3.5 million. Of the 280 facilities owned by small governments, 140 have costs greater than 1 percent of baseline cost of

service (measured as total facility costs and expenditures, including operating, overhead and debt service costs and expenses). None of the affected governments incur costs that cause them to exceed the thresholds for impacts on taxpayers or for government debt burden. EPA therefore estimated no significant budgetary impacts for any of the governments owning these facilities. In accordance with this finding, EPA determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments.

c. POTW Administrative Costs

Since all indirect dischargers are excluded from the final rule, EPA expects the rule to impose no new POTW administrative costs.

3. Consultation

In addition to private industry, stakeholders affected by this rule include State and local government regulators. During development of the proposed and final rule, EPA consulted with all of these stakeholder groups on topics such as options development, cost models, pollutants to be regulated, cost of the regulation, and compliance alternatives. Some stakeholders provided helpful comments on the cost models, technology options, pollution prevention techniques, and monitoring alternatives.

Because many MP&M facilities in the proposed rule were indirect dischargers, the Agency involved POTWs as they would have had to implement the rule. EPA consulted with POTWs individually and through the Association of Municipal Sewerage Agencies (AMSA). In addition, EPA consulted with Regional pretreatment coordinators and State and local regulators. However, EPA is not promulgating new or revised pretreatment standards in today's final rule. See the proposed rule preamble (*see* 66 FR 519) for a summary of these consultation activities.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled ''Federalism'' (*see* 64 FR 43255, August 10, 1999), requires Federal agencies to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. The rule establishes effluent limitations imposing requirements that apply to metal product and machinery facilities, as defined by this final rule, when they discharge wastewater. The rule applies to States and localities if they own and operate in-scope MP&M facilities that discharge directly to surface waters. EPA estimates that 458 facilities subject to the regulation are owned and operated by state and local governments. EPA estimates that these facilities will experience an impact of $0 to $125,000, with an average impact of $20,000 per year ($2001).

In addition, the final rule will affect State governments responsible for administering CWA permitting programs. The final rule, at most, imposes minimal administrative costs on States that have an authorized NPDES program. (These States must incorporate the new limitations and standards in new and reissued NPDES permits). This rule does not change the current status of this administrative burden because this rule does not impose any further regulation on any indirect dischargers. The total cost of today's final rule to state and local governments is $9.0 million ($2001). Thus, Executive Order 13132 does not apply to this rule.

Although Executive Order 13132 does not apply to this rule, EPA did consult with State and local government representatives in developing this rule. See 66 FR 525 for a discussion of consultation activities.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ''Consultation and Coordination with Indian Tribal Governments'' (*see* 65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure ''meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.'' ''Policies that have tribal implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes.''

This final rule does not have tribal implications. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. Based on the information collection efforts for this industry category, EPA does not expect any Indian tribal governments to own or operate in-scope MP&M facilities. In addition, EPA estimates few, if any, new facilities subject to the rule will be owned by tribal governments. Thus, Executive Order 13175 does not apply to this rule.

G. Executive Order 13045: Protection of Children From Environmental Health & Safety Risks

1. Executive Order 13045 Requirements

Executive Order 13045, ''Protection of Children from Environmental Health Risks and Safety Risks'' (*see* 62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be ''economically significant'' as defined under Executive Order 12866; and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate affect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This final rule is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866. Nevertheless, since the final rule is expected to reduce numerous pollutants, including lead, in fish tissue and drinking water that exceed human health criteria, EPA performed an analysis of children's health impacts reduced by the final rule.

2. Analysis of Children's Health Impacts

EPA assessed whether the final regulation will benefit children, including reducing health risk from exposure to MP&M pollutants from consumption of contaminated fish tissue and drinking water and improving recreational opportunities. The Agency was able to quantify only one category of benefits specific to children: avoided health damages to

pre-school age children from reduced exposure to lead. This analysis considered several measures of children's health benefits associated with lead exposure for children up to age six. Avoided neurological and cognitive damages were expressed as changes in three metrics: (1) Overall IQ levels; (2) the incidence of low IQ scores (<70); and (3) the incidence of blood-lead levels above 20 µg/dL. The Agency also assessed changes in the incidence of neonatal mortality from reduced maternal exposure to lead. EPA's methodology for assessing lead-related benefits to children is presented in the EEBA, Chapter 14. The Ohio case study analysis showed that the final rule is expected to yield $422,000 (2001$) in annual benefits to children in the State of Ohio from reduced neurological and cognitive damages and reduced incidence of neonatal mortality. On the other hand, the national-level analysis shows that benefits to children from reduced lead discharges are negligible nationwide. As noted in section IX of today's final rule, different findings from these two analyses are likely to be due to insufficient data and a more simplistic approach used in the national level analysis.

Children over age seven are also likely to benefit from reduced neurological and cognitive damages from reduced exposure to lead. Giedd *et al.* (1999) studied brain development among 10- to 18-year-old children and found substantial growth in brain development, mainly in the early teenage years (*see* DCN 20385, section 8.5.2.3). This research suggests that older children may be hypersensitive to lead exposure, as are children aged 0 to 7.

Additional benefits to children from reduced exposure to lead not quantified in this analysis may include prevention of the following adverse health effects: slowed or delayed growth, delinquent and anti-social behavior, metabolic effects, impaired heme synthesis, anemia, impaired hearing, and cancer (*see* DCN 20416, section 8.5.2.3).

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This rule is not subject to Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (*see* May 22, 2001; 66 FR 28355) because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act

As noted in the proposed rule, section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Public Law 104–113, section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

Today's final rule does not establish any technical standards, thus NTTAA does not apply to this rule. It should be noted, however, that this rulemaking requires direct dischargers to monitor for pH, TSS, and O&G (as HEM). All of these analytes can be measured by EPA methods that are specified in the tables at 40 CFR part 136.3.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

1. Executive Order 12898 Requirements

Executive Order 12898 requires that, to the greatest extent practicable and permitted by law, each Federal agency must make achieving environmental justice part of its mission. Executive Order 12898 requires that each Federal agency conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not exclude persons (including populations) from participation in, deny persons (including populations) the benefits of, or subject persons (including populations) to discrimination under, such programs, policies, and activities because of their race, color, or national origin.

2. Environmental Justice Analysis

EPA examined whether the final regulation will promote environmental justice in the areas affected by MP&M discharges. EPA analyzed the demographic characteristics of the populations residing in the counties affected by MP&M discharges to determine whether minority and or low-income populations are subject to disproportionally high environmental impacts. This analysis is based on information on the race, national origin, and income level of populations residing in counties traversed by reaches receiving discharges from the 32 sample MP&M facilities. EPA performed this analysis at the sample level only. The 32 sample facilities discharge to 32 unique reaches and are located in 46 counties in 12 States.

EPA compared demographic data from the 1990 Census for counties traversed by sample MP&M reaches with corresponding State-level data. The demographic characteristics that EPA analyzed include: percent African Americans, percent Native American, Eskimo, or Aleut, percent Asian of Pacific Islander, the percent of the population below the poverty level, and median income. This analysis shows that the socioeconomic characteristics of populations residing in counties abutting MP&M discharge reaches reflect corresponding State averages. As a result, EPA expects that environmental benefits resulting from the MP&M rule will not accrue to populations disproportionally based on race or national origin, and therefore will neither promote nor discourage environmental justice.

EPA also analyzed the human health impacts of the final regulation, including changes in cancer and systemic health risk to subsistence anglers. EPA determined that the reductions in these health risks resulting from the final regulation are negligible (*see* Chapter 17 of the EEBA for a detailed discussion of environmental justice analyses and alternative regulatory options).

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.,* as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register.** A major rule cannot take effect until 60 days after it is published in the **Federal Register.** This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective after June 12, 2003.

Appendix A To The Preamble: Abbreviations, Acronyms, and Other Terms Used in Today's Final Rule

Act—The Clean Water Act
Agency—U.S. Environmental Protection Agency
AWQC—Ambient Water Quality Criteria
BAT—Best available technology economically achievable, as defined by section 304(b)(2)(B) of the Act.
BCT—Best conventional pollutant control technology, as defined by section 304(b)(4) of the Act.
BMP—Best management practices, as defined by section 304(e) of the Act.
BPJ—Best professional judgment
BPT—Best practicable control technology currently available, as defined by section 304(b)(1) of the Act.
CAA—Clean Air Act (42 U.S.C. 7401 *et seq.,* as amended)
CBI—Confidential Business Information
CWA—Clean Water Act (33 U.S.C 1251 *et seq.,* as amended)
Conventional Pollutants—Constituents of wastewater as determined by section 304(a)(4) of the Act and the regulations thereunder 40 CFR 401.16, including pollutants classified as biochemical oxygen demand, suspended solids, oil and grease, fecal coliform, and pH.
CE—Cost-effectiveness (ratio of compliance costs (in 1981$) to the toxic pounds of pollutants removed (in terms of pound-equivalents (PE))
DAF—Dissolved Air Flotation
Direct Discharger—An industrial discharger that introduces wastewater to a water of the United States with or without treatment by the discharger.
EEBA—Economic, Environmental, and Benefits Analysis of the Final Metal Products & Machinery Rule (EPA–821–B–03–002)
Effluent Limitation—A maximum amount, per unit of time, production, volume or other unit, of each specific constituent of the effluent from an existing point source that is subject to limitation. Effluent limitations may be expressed as a mass loading or as a concentration in milligrams of pollutant per liter discharged.
End-of-Pipe Treatment—Refers to those processes that treat a plant waste stream for pollutant removal prior to discharge.
FTE—Full Time Equivalents (related to the number of employees)
HAP—Hazardous Air Pollutant
HEM—Hexane Extractable Material
Indirect Discharger—An industrial discharger that introduces wastewater into a publicly owned treatment works.
MACT—Maximum Achievable Control Technology (applicable to NESHAPs)
MFJS—Metal Finishing Job Shops subcategory
MGY—Million gallons per year
MP&M—Metal Products and Machinery point source category
NAICS—North American Industry Classification System
NCA—Non-Chromium Anodizers subcategory
NCEPI—EPA's National Center for Environmental Publications
NESHAP—National Emission Standards for Hazardous Air Pollutants
NODA—Notice of Data Availability (June 5, 2002; 67 FR 38752)
NRMRL—EPA's National Risk Management Research Laboratory (formerly RREL—EPA's Risk Reduction Engineering Laboratory)
Nonconventional Pollutants—Pollutants that have not been designated as either conventional pollutants or priority pollutants
NPDES—National Pollutant Discharge Elimination system, a Federal Program requiring industry dischargers, including municipalities, to obtain permits to discharge pollutants to the nation's water, under section 402 of the Act
OCPSF—Organic chemicals, plastics, and synthetic fibers manufacturing point source category (40 CFR part 414)
OMB—Office of Management and Budget
ORP—Oxidation-Reduction Potential
OWS—Oily Wastes subcategory
PE—Pound-equivalents (the units used to weight toxic pollutants)
POTW—Publicly owned treatment works
Priority Pollutants—The 126 pollutants listed at 40 CFR part 423, appendix A
PPA—Pollutant Prevention Act of 1990 (42 U.S.C. 13101 *et seq.,* Public Law 101–508, November 5, 1990)
PSES—Pretreatment Standards for existing sources of indirect discharges, under section 307(b) of the Act
PSNS—Pretreatment standards for new sources of indirect discharges, under sections 307(b) and (c) of the Act
PWB—Printed Wiring Board subcategory
RRLM—Railroad Line Maintenance subcategory
SBA—U.S. Small Business Administration
SIC—Standards Industrial Classification, a numerical categorization scheme used by the U.S. Department of Commerce to denote segments of industry
SFF—Steel Forming & Finishing subcategory
SGT—HEM—Silica Gel Treated—Hexane Extractable Material refers to the freon-free oil and grease method (EPA Method 1664) used to measure the portion of oil and grease that is similar to total petroleum hydrocarbons
SDD—Shipbuilding Dry Dock subcategory
SIU—Significant Industrial User as defined in the General Pretreatment Regulations (40 CFR part 403)
TDD—Development Document for the Final Effluent Limitations Guidelines and Standards for the Metal Products & Machinery Point Source Category (EPA–821–B–03–001)
TOC—Total Organic Carbon (EPA Method 415.1)
TOP—Total Organics Parameter
TRI—Toxic Release Inventory
TTO—Total Toxic Organics
TWF—Toxic Weighting Factor
VOC—Volatile Organic Compound

List of Subjects in 40 CFR Part 438

Environmental protection; Metal products and machinery; Waste treatment and disposal; Water pollution control.

Dated: February 14, 2003.

Christine Todd Whitman,

Administrator.

■ For the reasons set forth in this preamble, title 40, chapter I of the Code of Federal Regulations is amended as follows:

■ 1. A new part 438 is added to read as follows:

PART 438—METAL PRODUCTS AND MACHINERY POINT SOURCE CATEGORY

Sec.
438.1 General applicability.
438.2 General definitions.

Subpart A—Oily Wastes

438.10 Applicability.
438.12 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).
438.13 Effluent limitations attainable by application of the best control technology for conventional pollutants (BCT).
438.15 New source performance standards (NSPS).

Appendix A to part 438—Typical Products in Metal Products & Machinery Sectors

Appendix B to part 438—Oily Operations Definitions

Appendix C to part 438—Metal-Bearing Operations Definitions

Authority: 33 U.S.C. 1311, 1314, 1316, 1317, 1318, 1342 and 1361.

§ 438.1 General applicability.

(a) As defined more specifically in subpart A, except as provided in paragraphs (b) through (e) of this section, this part applies to process wastewater discharges from oily operations (as defined at § 438.2(f) and appendix B of this part) to surface waters from existing or new industrial facilities (including facilities owned and operated by Federal, State, or local governments) engaged in manufacturing, rebuilding, or maintenance of metal parts, products, or machines for use in the Metal Product & Machinery (MP&M) industrial sectors listed in this section. The MP&M industrial sectors consist of the following:

Aerospace;
Aircraft;
Bus and Truck;
Electronic Equipment;
Hardware;
Household Equipment;
Instruments;
Miscellaneous Metal Products;
Mobile Industrial Equipment;
Motor Vehicle;
Office Machine;

Ordnance;
Precious Metals and Jewelry;
Railroad;
Ships and Boats; or
Stationary Industrial Equipment.

(b) The regulations in this part do not apply to process wastewaters from metal-bearing operations (as defined at § 438.2(d) and appendix C of this part) or process wastewaters which are subject to the limitations and standards of other effluent limitations guidelines (*e.g.*, Metal Finishing (40 CFR part 433) or Iron and Steel Manufacturing (40 CFR part 420)). The regulations in this part also do not apply to process wastewaters from oily operations (as defined at § 438.2(f) and appendix B of this part) commingled with process wastewaters already covered by other effluent limitations guidelines or with process wastewaters from metal-bearing operations. This provision must be examined for each point source discharge at a given facility.

(c) Wastewater discharges resulting from the washing of cars, aircraft or other vehicles, when performed only for aesthetic or cosmetic purposes, are not subject to this part. Direct discharges resulting from the washing of cars, aircraft or other vehicles, when performed as a preparatory step prior to one or more successive manufacturing, rebuilding, or maintenance operations, are subject to this part.

(d) Wastewater discharges from railroad line maintenance facilities (as defined at § 438.2(h)) are not subject to this part. Wastewater discharges from railroad overhaul or heavy maintenance facilities (as defined at § 438.2(i)) may be covered by subpart A of this part, the Metal Finishing Point Source Category (40 CFR part 433), or by other effluent limitations guidelines, as applicable.

(e) The following wastewater discharges are not subject to this part:

(1) Non-process wastewater as defined at § 438.2(e).

(2) Wastewater discharges introduced into a Publicly Owned Treatment Works (POTW) or a Federally owned and operated Treatment Works Treating Domestic Sewage (TWTDS), as defined at 40 CFR 122.2.

(3) Process wastewater generated by maintenance and repair activities at gasoline service stations, passenger car rental facilities, or utility trailer and recreational vehicle rental facilities.

(4) Wastewater discharges generated from gravure cylinder preparation or metallic platemaking conducted within or for printing and publishing facilities.

(5) Wastewater discharges in or on dry docks and similar structures, such as graving docks, building ways, marine railways, lift barges at shipbuilding facilities (or shipyards), and ships that are afloat.

(6) Wastewater generated by facilities primarily performing drum reconditioning and cleaning to prepare metal drums for resale, reuse, or disposal.

§ 438.2 General definitions.

As used in this part:

(a) The general definitions and abbreviations at 40 CFR part 401 shall apply.

(b) The regulated parameters are listed with approved methods of analysis in Table 1B at 40 CFR 136.3, and are defined as follows:

(1) *O&G (as HEM)* means total recoverable oil and grease measured as n-hexane extractable material.

(2) *TSS* means total suspended solids.

(c) *Corrosion preventive coating* means the application of removable oily or organic solutions to protect metal surfaces against corrosive environments. Corrosion preventive coatings include, but are not limited to: petrolatum compounds, oils, hard dry-film compounds, solvent-cutback petroleum-based compounds, emulsions, water-displacing polar compounds, and fingerprint removers and neutralizers. Corrosion preventive coating does not include electroplating, or chemical conversion coating operations.

(d) *Metal-bearing operations* means one or more of the following: abrasive jet machining; acid pickling neutralization; acid treatment with chromium; acid treatment without chromium; alcohol cleaning; alkaline cleaning neutralization; alkaline treatment with cyanide; anodizing with chromium; anodizing without chromium; carbon black deposition; catalyst acid pre-dip; chemical conversion coating without chromium; chemical milling (or chemical machining); chromate conversion coating (or chromating); chromium drag-out destruction; cyanide drag-out destruction; cyaniding rinse; electrochemical machining; electroless catalyst solution; electroless plating; electrolytic cleaning; electroplating with chromium; electroplating with cyanide; electroplating without chromium or cyanide; electropolishing; galvanizing/hot dip coating; hot dip coating; kerfing; laminating; mechanical and vapor plating; metallic fiber cloth manufacturing; metal spraying (including water curtain); painting-immersion (including electrophoretic, ''E-coat''); photo imaging; photo image developing; photoresist application; photoresist strip; phosphor deposition; physical vapor deposition; plasma arc machining; plastic wire extrusion; salt bath descaling; shot tower—lead shot manufacturing; soldering; solder flux cleaning; solder fusing; solder masking; sputtering; stripping (paint); stripping (metallic coating); thermal infusion; ultrasonic machining; vacuum impregnation; vacuum plating; water shedder; wet air pollution control; wire galvanizing flux; and numerous sub-operations within those listed in this paragraph. In addition, process wastewater also results from associated rinses that remove materials that the preceding processes deposit on the surface of the workpiece. These metal-bearing operations are defined in appendix C of this part.

(e) *Non-process wastewater* means sanitary wastewater, non-contact cooling water, water from laundering, and non-contact storm water. Non-process wastewater for this part also includes wastewater discharges from non-industrial sources such as residential housing, schools, churches, recreational parks, shopping centers as well as wastewater discharges from gas stations, utility plants, and hospitals.

(f) *Oily operations* means one or more of the following: abrasive blasting; adhesive bonding; alkaline cleaning for oil removal; alkaline treatment without cyanide; aqueous degreasing; assembly/disassembly; burnishing; calibration; corrosion preventive coating (as defined in paragraph (c) of this section); electrical discharge machining; floor cleaning (in process area); grinding; heat treating; impact deformation; iron phosphate conversion coating; machining; painting-spray or brush (including water curtains); polishing; pressure deformation; solvent degreasing; steam cleaning; testing (*e.g.*, hydrostatic, dye penetrant, ultrasonic, magnetic flux); thermal cutting; tumbling/barrel finishing/mass finishing/vibratory finishing; washing (finished products); welding; wet air pollution control for organic constituents; and numerous sub-operations within those listed in this paragraph. In addition, process wastewater also results from associated rinses that remove materials that the preceding processes deposit on the surface of the workpiece. These oily operations are defined in appendix B of this part.

(g) *Process wastewater* means wastewater as defined at 40 CFR parts 122 and 401, and includes wastewater from air pollution control devices.

(h) *Railroad line maintenance facilities* means facilities specified at § 438.1 that only perform routine cleaning and light maintenance on railroad engines, cars, car-wheel trucks,

or similar parts or machines, and discharge wastewater exclusively from oily operations (as defined in paragraph (f) of this section and appendix B of this part). These facilities only perform one or more of the following operations: assembly/disassembly, floor cleaning, maintenance machining (wheel truing), touch-up painting, and washing.

(i) *Railroad overhaul or heavy maintenance facilities* means facilities engaged in the manufacture, overhaul, or heavy maintenance of railroad engines, cars, car-wheel trucks, or similar parts or machines. These facilities typically perform one or more of the operations in paragraph (h) of this section and one or more of the following operations: abrasive blasting, alkaline cleaning, aqueous degreasing, corrosion preventive coating, electrical discharge machining, grinding, heat treating, impact deformation, painting, plasma arc machining, polishing, pressure deformation, soldering/brazing, stripping (paint), testing, thermal cutting, and welding.

Subpart A—Oily Wastes

§ 438.10 Applicability.

(a) This subpart applies to process wastewater directly discharged from facilities specified at § 438.1.

(b) This subpart applies to process wastewater discharges from oily operations (as defined at § 438.2(f) and appendix B of this part).

(c) This subpart does not apply to process wastewater discharges from metal-bearing operations (as defined at § 438.2(d) and appendix C of this part).

§ 438.12 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided at 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BPT. Discharges must remain within the pH range 6 to 9 and must not exceed the following:

EFFLUENT LIMITATIONS

[BPT]

Regulated parameter	Maximum daily [1]
1. TSS	62
2. O&G (as HEM)	46

[1] mg/L (ppm).

§ 438.13 Effluent limitations attainable by application of the best control technology for conventional pollutants (BCT).

Except as provided at 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitation representing the application of BCT: Limitations for TSS, O&G (as HEM) and pH are the same as the corresponding limitation specified at § 438.12.

§ 438.15 New source performance standards (NSPS).

New point sources subject to this subpart must achieve the new source performance standards (NSPS) for TSS, O&G (as HEM), and pH, which are the same as the corresponding limitation specified at § 438.12. The performance standards apply with respect to each new point source that commences discharge after June 12, 2003.

Appendix A to Part 438—Typical Products in Metal Products and Machinery Sectors

AEROSPACE	AIRCRAFT	BUS & TRUCK
Guided Missiles & Space Vehicle	Aircraft Engines & Engine Parts	Bus Terminal & Service Facilities
Guided Missile & Space Vehicle Prop	Aircraft Frames Manufacturing	Courier Services, Except by Air Freight Truck Terminals, W/ or W/O Maintenance.
Other Space Vehicle & Missile Parts	Aircraft Parts & Equipment	Intercity & Rural Highways (Buslines)
	Airports, Flying Fields, & Services	Local & Suburban Transit (Bus & subway)
		Local Passenger. Trans. (Lim., Amb., Sight See)
		Local Trucking With Storage
		Local Trucking Without Storage
		Motor Vehicle Parts & Accessories
		School Buses
		Trucking
		Truck & Bus Bodies
		Truck Trailers

ELECTRONIC EQUIPMENT
Communications Equipment
Connectors for Electronic Applications
Electric Lamps
Electron Tubes
Electronic Capacitors
Electronic Coils & Transformers
Electronic Components
Radio & TV Communications Equipment
Telephone & Telegraph Apparatus

HARDWARE
Architectural & Ornamental Metal Work
Bolts, Nuts, Screws, Rivets & Washers
Crowns & Closures
Cutlery
Fabricated Metal Products
Fabricated Pipe & Fabricated Pipe Fittings
Fabricated Plate Work (Boiler Shops)
Fabricated Structural Metal
Fasteners, Buttons, Needles & Pins
Fluid Power Values & Hose Fittings
Hand & Edge Tools
Hand Saws & Saw Blades
Hardware
Heating Equipment, Except Electric
Industrial Furnaces & Ovens
Iron & Steel Forgings
Machine Tool Accessories & Measuring Devices
Machine Tools, Metal Cutting Types
Machine Tools, Metal Forming Types
Metal Shipping Barrels, Drums, Kegs, Pails
Metal Stampings
Power Driven Hand Tools
Prefabricated Metal Buildings & Components
Screw Machine Products
Sheet Metal Work
Special Dies & Tools, Die Sets, Jigs, Etc.
Steel Springs
Valves & Pipe Fittings
Wire Springs

HOUSEHOLD EQUIPMENT
Commercial, Ind. & Inst. Elec. Lighting Fixtures
Current-Carrying Wiring Devices
Electirc Housewares & Fans
Electric Lamps
Farm Freezers
Household Appliances
Household Cooking Equipment
Household Refrig. & Home & Farm Freezers
Household Laundry Equipment
Household Vacuum Cleaners
Lighting Equipment
Noncurrent-Carrying Wiring Devices
Radio & Television Repair Shops
Radio & Television Sets Except Commn. Types
Refrig. & Air Cond. Serv. & Repair Shops
Residential Electrical Lighting Fixtures

INSTRUMENTS
Analytical Instruments
Automatic Environmental Controls
Coating, Engraving, & Allied Services
Dental Equipment & Supplies
Ophthalmic Goods
Fluid Meters & Counting Devices
Instruments to Measure Electricity
Laboratory Apparatus & Furniture Manufacturing Industries
Measuring & Controlling Devices
Optical Instruments & Lenses
Orthopedic, Prosthetic, & Surgical Supplies
Pens, Mechanical Pencils, & Parts
Process Control Instruments
Search & Navigation Equipment
Surgical & Medical Instruments & Apparatus
Watches, Clocks, Associated Devices & Parts

MOBILE INDUSTRIAL EQUIPMENT
Construction Machinery & Equipment
Farm Machinery & Equipment
Garden Tractors & Lawn & Garden Equipment
Hoist, Industrial Cranes & Monorails
Industrial Trucks, Tractors, Trailers, Tanks & Tank Components
Mining machinery & equipment, except oil field

MOTOR VEHICLE
Auto Exhaust System Repair Shops
Automobile Dealers (new & used)
Auto. Dealers (Dunebuggy, Go-cart, Snowmobile)
Automobile Service (includes Diag. & Insp. Cntrs.)
Automotive Equipment
Automotive Glass Replacement Shops
Automotive Repairs Shops
Automotive Stampings
Automotive Transmission Repair Shops
Carburetors, Pistons Rings, Values
Electrical Equipment for Motor
General Automotive Repair Shops
Mobile Homes
Motor Vehicle & Automotive Bodies
Motor Vehicle Parts & Accessories
Motorcycle Dealers
Motorcycles
Passenger Car Leasing
Recreational & Utility Trailer Dealers
Taxicabs
Top & Body Repair & Paint Shops
Travel Trailers & Campers
Vehicles
Vehicular Lighting Equipment
Welding Shops (includes Automotive)

INSTRUMENTS OFFICE MACHINE
Calculating & Accounting Equipment
Computer Maintenance & Repair
Computer Peripheral Equipment
Computer Related Services
Computer Rental & Leasing
Computer Storage Devices
Computer Terminals
Electrical & Electronic Repair
Electronic Computers
Office Machines
Photographic Equipment & Supplies

ORDNANCE
Ammunition
Ordnance & Accessories
Small Arms
Small Arms Ammunition

PRECIOUS METALS & JEWELRY
Costume Jewelry
Jewelers' Materials & Lapidary Work
Jewelry, Precious Metal
Musical Instruments
Silverware, Plated Ware, & Stainless

RAILROAD	SHIPS & BOATS	STATIONARY INDUSTRIAL EQUIPMENT
Line-Haul Railroads	Boat Building & Repairing	Air & Gas Compressors
Railcars, Railway Systems	Deep Sea Domestic Transportation of Freight	Automatic Vending Machines
Switching & Terminal Stations	Deep Sea Passenger Transportation, Except by Ferry	Ball & Roller Bearings
	Freight Transportation on the Great Lakes	Blowers & Exhaust & Ventilation Fans
	Marinas	Commercial Laundry Equipment
	Ship Building & Repairing	Conveyors & Conveying Equipment
	Towing & Tugboat Service	Electric Industrial Apparatus
	Water Passenger Transportation Ferries	Elevators & Moving Stairways
	Water Transportation of Freight	Equipment Rental & Leasing
	Water Transportation Services	Food Product Machinery
		Fluid Power Cylinders & Actuators
		Fluid Power Pumps & Motors
		General Industrial Machinery
		Heavy Construction Equipment Rental
		Industrial Machinery
		Industrial Patterns
		Industrial Process Furnaces & Ovens
		Internal Combustion Engines
		Measuring & Dispensing Pumps
		Mechanical Power Transmission Equipment
		Metal Working Machinery
		Motors & Generators
		Oil Field Machinery & Equipment
		Packaging Machinery
		Paper Industries Machinery
		Printing Trades Machinery & Equipment
		Pumps & Pumping Equipment
		Refrigeration & Air & Heating Equipment
		Relays & Industrial Controls
		Rolling Mill Machinery & Equipment
		Scales & Balances, Except Laboratory
		Service Industry Machines
		Special Industry Machinery
		Speed Changers, High Speed Drivers & Gears
		Steam, Gas, Hydraulic Turbines, Generator Units
		Switchgear & Switchboard Apparatus
		Textile Machinery
		Transformers
		Welding Apparatus
		Woodworking Machinery
MISCELLANEOUS METAL PRODUCTS		
Miscellaneous Fabricated Wire Products		
Miscellaneous Metal Work		
Miscellaneous Repair Shops & Related Services		
Miscellaneous Transportation Equipment		

Appendix B to Part 438—Oily Operations Definitions

Note: The definitions in this appendix shall not be used to differentiate between the six ''core'' metal finishing operations (*i.e.*, Electroplating, Electroless Plating, Anodizing, Coating (chromating, phosphating, and coloring), Chemical Etching and Milling, and Printed Circuit Board Manufacture) and forty ''ancillary'' process operations listed at 40 CFR 433.10(a).

Abrasive Blasting involves removing surface film from a part by using abrasive directed at high velocity against the part. Abrasive blasting includes bead, grit, shot, and sand blasting, and may be performed either dry or with water. The primary applications of wet abrasive blasting include: Removing burrs on precision parts; producing satin or matte finishes; removing fine tool marks; and removing light mill scale, surface oxide, or welding scale. Wet blasting can be used to finish fragile items such as electronic components. Also, some aluminum parts are wet blasted to achieve a fine-grained matte finish for decorative purposes. In abrasive blasting, the water and abrasive typically are reused until the particle size diminishes due to impacting and fracture.

Adhesive Bonding involves joining parts using an adhesive material. Typically, an organic bonding compound is used as the adhesive. This operation usually is dry; however, aqueous solutions may be used as bonding agents or to contain residual organic bonding materials.

Alkaline Cleaning for Oil Removal is a general term for the application of an alkaline cleaning agent to a metal part to remove oil and grease during the manufacture, maintenance, or rebuilding of a metal product. This unit operation does not include washing of the finished products after routine use (as defined in ''Washing (Finished Products)'' in this appendix), or applying an alkaline cleaning agent to remove nonoily contaminants such as dirt and scale (as defined in ''Alkaline Treatment Without Cyanide'' in this appendix and ''Alkaline Treatment With Cyanide'' in appendix C of this part). Wastewater generated includes spent cleaning solutions and rinse waters.

(1) Alkaline cleaning is performed to remove foreign contaminants from parts. This operation usually is done prior to finishing (*e.g.*, electroplating).

(2) Emulsion cleaning is an alkaline cleaning operation that uses either complex chemical enzymes or common organic solvents (*e.g.,* kerosene, mineral oil, glycols, and benzene) dispersed in water with the aid of an emulsifying agent. The pH of the solvent usually is between 7 and 9, and, depending on the solvent used, cleaning is performed at temperatures from room temperature to 82 °C (180 °F). This operation often is used as a replacement for vapor degreasing.

Alkaline Treatment Without Cyanide is a general term used to describe the application of an alkaline solution not containing cyanide to a metal surface to clean the metal surface or prepare the metal surface for further surface finishing.

Aqueous Degreasing involves cleaning metal parts using aqueous-based cleaning chemicals primarily to remove residual oils and greases from the part. Residual oils can be from previous operations (*e.g.*, machine coolants), oil from product use in a dirty environment, or oil coatings used to inhibit corrosion. Wastewater generated by this operation includes spent cleaning solutions and rinse waters.

Assembly/Disassembly involves fitting together previously manufactured or rebuilt parts or components into a complete metal product or machine or taking a complete metal product or machine apart. Assembly/disassembly operations are typically dry; however, special circumstances can require water for cooling or buoyancy. Also, rinsing may be necessary under some conditions.

Burnishing involves finish sizing or smooth finishing a part (previously machined or ground) by displacing, rather than removing, minute surface irregularities with smooth point or line-contact, fixed or rotating tools. Lubricants or soap solutions can be used to cool the tools used in burnishing operations. Wastewater generated during burnishing include process solutions and rinse water.

Calibration is performed to provide reference points for the use of a product. This unit operation typically is dry, although water may be used in some cases (*e.g.*, pumping water for calibration of a pump). Water used in this unit operation usually does not contain additives.

Corrosion Preventive Coating involves applying removable oily or organic solutions to protect metal surfaces against corrosive environments. Corrosion preventive coatings include, but are not limited to: Petrolatum compounds, oils, hard dry-film compounds, solvent-cutback petroleum-based compounds, emulsions, water-displacing polar compounds, and fingerprint removers and neutralizers. Corrosion preventive coating does not include electroplating, or chemical conversion coating operations. Many corrosion preventive materials also are formulated to function as lubricants or as a base for paint. Typical applications include: Assembled machinery or equipment in standby storage; finished parts in stock or spare parts for replacement; tools such as drills, taps, dies, and gauges; and mill products such as sheet, strip, rod and bar. Wastewater generated during corrosion preventive coating includes spent process solutions and rinses. Process solutions are discharged when they become contaminated with impurities or are depleted of constituents. Corrosion preventive coatings typically do not require an associated rinse, but parts are sometimes rinsed to remove the coating before further processing.

Electrical Discharge Machining involves removing metals by a rapid spark discharge between different polarity electrodes, one the part and the other the tool, separated by a small gap. The gap may be filled with air or a dielectric fluid. This operation is used primarily to cut tool alloys, hard nonferrous alloys, and other hard-to-machine materials. Most electrical discharge machining processes are operated dry; however, in some cases, the process uses water and generates wastewater containing dielectric fluid.

Floor Cleaning (in Process Area) removes dirt, debris, and process solution spills from process area floors. Floors can be cleaned using wet or dry methods, such as vacuuming, mopping, dry sweeping, and hose rinsing. Non-process area floor cleaning in offices and other similar non-process areas is not included in this unit operation.

Grinding involves removing stock from a part by using abrasive grains held by a rigid or semirigid binder. Grinding shapes or deburrs the part. The grinding tool usually is a disk (the basic shape of grinding wheels), but can also be a cylinder, ring, cup, stick, strip, or belt. The most commonly used abrasives are aluminum oxide, silicon carbide, and diamond. The process may use a grinding fluid to cool the part and remove debris or metal fines. Wastewater generated during grinding includes spent coolants and rinses. Metal-working fluids become spent for a number of reasons, including increased biological activity (*i.e.*, the fluids become rancid) or decomposition of the coolant additives. Rinse waters typically are assimilated into the working fluid or treated on site.

Heat Treating involves modifying the physical properties of a part by applying controlled heating and cooling cycles. This operation includes tempering, carburizing, cyaniding, nitriding, annealing, aging, normalizing, austenitizing, austempering, siliconizing, martempering, and malleablizing. Parts are heated in furnaces or molten salt baths, and then may be cooled by quenching in aqueous solutions (*e.g.*, brine solutions), neat oils (pure oils with little or no impurities), or oil/water emulsions. Heat treating typically is a dry operation, but is considered a wet operation if aqueous quenching solutions are used. Wastewater includes spent quench water and rinse water.

Impact Deformation involves applying impact force to a part to permanently deform or shape it. Impact deformation may include mechanical processes such as hammer forging, shot peening, peening, coining, high-energy-rate forming, heading, or stamping. Natural and synthetic oils, light greases, and pigmented lubricants are used in impact deformation operations. Pigmented lubricants include whiting, lithapone, mica, zinc oxide, molybdenum disulfide, bentonite, flour, graphite, white lead, and soap-like materials. These operations typically are dry, but wastewater can be generated from lubricant discharge and from rinsing operations associated with the operation.

Iron Phosphate Conversion Coating is the process of applying a protective coating on the surface of a metal using a bath consisting of a phosphoric acid solution containing no metals (*e.g.*, manganese, nickel, or zinc) or a phosphate salt solution (*i.e.*, sodium or potassium salts of phosphoric acid solutions) containing no metals (*e.g.*, manganese, nickel, or zinc) other than sodium or potassium. Any metal concentrations in the bath are from the substrate.

Machining involves removing stock from a part (as chips) by forcing a cutting tool against the part. This includes machining processes such as turning, milling, drilling, boring, tapping, planing, broaching, sawing, shaving, shearing, threading, reaming, shaping, slotting, hobbing, and chamfering. Machining processes use various types of metal-working fluids, the choice of which depends on the type of machining being performed and the preference of the machine shop. The fluids can be categorized into four groups: Straight oil (neat oils), synthetic, semisynthetic, and water-soluble oil. Machining operations generate wastewater from working fluid or rinse water discharge. Metal-working fluids periodically are discarded because of reduced performance or development of a rancid odor. After machining, parts are sometimes rinsed to remove coolant and metal chips. The coolant reservoir is sometimes rinsed, and the rinse water is added to the working fluid.

Painting-Spray or Brush (Including Water Curtains) involves applying an organic coating to a part. Coatings such as paint, varnish, lacquer, shellac, and plastics are applied by spraying, brushing, roll coating, lithographing, powder coating, and wiping. Water is used in painting operations as a solvent (water-borne formulations) for rinsing, for cleanup, and for water-wash (or curtain) type spray booths. Paint spray booths typically use most of the water in this unit operation. Spray booths capture overspray (*i.e.*, paint that misses the product during application), and control the introduction of pollutants into the workplace and environment.

Polishing involves removing stock from a part using loose or loosely held abrasive grains carried to the part by a flexible support. Usually, the objective is to achieve a desired surface finish or appearance rather then to remove a specified amount of stock. Buffing is included in this unit operation, and usually is performed using a revolving cloth or sisal buffing wheel, which is coated with a suitable compound. Liquid buffing compounds are used extensively for large-volume production on semiautomated or automated buffing equipment. Polishing operations typically are dry, although liquid compounds and associated rinses are used in some polishing processes.

Pressure Deformation involves applying force (other than impact force) to permanently deform or shape a part. Pressure deformation may include rolling, drawing, bending, embossing, sizing, extruding, squeezing, spinning, necking, forming, crimping or flaring. These operations use natural and synthetic oils, light greases, and pigmented lubricants. Pigmented lubricants include whiting, lithapone, mica, zinc oxide, molybdenum disulfide, bentonite, flour, graphite, white lead, and soap-like materials. Pressure deformation typically is dry, but wastewater is sometimes generated from the discharge of lubricants or from rinsing associated with the process.

Solvent Degreasing removes oils and grease from the surface of a part using organic solvents, including aliphatic petroleum (*e.g.*, kerosene, naphtha), aromatics (*e.g.*, benzene, toluene), oxygenated hydrocarbons (*e.g.*,

ketones, alcohol, ether), and halogenated hydrocarbons (*e.g.*, 1,1,1-trichloroethane, trichloroethylene, methylene chloride). Solvent cleaning takes place in either the liquid or vapor phase. Solvent vapor degreasing normally is quicker than solvent liquid degreasing. However, ultrasonic vibration is sometimes used with liquid solvents to decrease the required immersion time of complex shapes. Solvent cleaning often is used as a precleaning operation prior to alkaline cleaning, as a final cleaning of precision parts, or as surface preparation for some painting operations. Solvent degreasing operations typically are not followed by rinsing, although rinsing is performed in some cases.

Steam Cleaning removes residual dirt, oil, and grease from parts after processing though other unit operations. Typically, additives are not used in this operation; the hot steam removes the pollutants. Wastewater is generated when the cleaned parts are rinsed.

Testing (e.g., hydrostatic, dye penetrant, ultrasonic, magnetic flux) involves applying thermal, electrical, mechanical, hydraulic, or other energy to determine the suitability or functionality of a part, assembly, or complete unit. Testing also may include applying surface penetrant dyes to detect surface imperfections. Other examples of tests frequently performed include electrical testing, performance testing, and ultrasonic testing; these tests typically are dry but may generate wastewater under certain circumstances. Testing usually is performed to replicate some aspect of the working environment. Wastewater generated during testing includes spent process solutions and rinses.

Thermal Cutting involves cutting, slotting, or piercing a part using an oxy-acetylene oxygen lance, electric arc cutting tool, or laser. Thermal cutting typically is a dry process, except for the use of contact cooling waters and rinses.

Tumbling/Barrel Finishing/Mass Finishing/Vibratory Finishing involves polishing or deburring a part using a rotating or vibrating container and abrasive media or other polishing materials to achieve a desired surface appearance. Parts to be finished are placed in a rotating barrel or vibrating unit with an abrasive media (*e.g.*, ceramic chips, pebbles), water, and chemical additives (*e.g.*, alkaline detergents). As the barrel rotates, the upper layer of the part slides toward the lower side of the barrel, causing the abrading or polishing. Similar results can be achieved in a vibrating unit, where the entire contents of the container are in constant motion, or in a centrifugal unit, which compacts the load of media and parts as the unit spins and generates up to 50 times the force of gravity. Spindle finishing is a similar process, where parts to be finished are mounted on fixtures and exposed to a rapidly moving abrasive slurry. Wastewater generated during barrel finishing includes spent process solutions and rinses. Following the finishing process, the contents of the barrel are unloaded. Process wastewater is either discharged continuously during the process, discharged after finishing, or collected and reused. The parts are sometimes given a final rinse to remove particles of abrasive media.

Washing (Finished Products) involves cleaning finished metal products after use or storage using fresh water or water containing a mild cleaning solution. This unit operation applies only to the finished products that do not require maintenance or rebuilding.

Welding involves joining two or more pieces of material by applying heat, pressure, or both, with or without filler material, to produce a metallurgical bond through fusion or recrystallization across the interface. This includes gas welding, resistance welding, arc welding, cold welding, electron beam welding, and laser beam welding. Welding typically is a dry process, except for the occasional use of contact cooling waters or rinses.

Wet Air Pollution Control for Organic Constituents involves using water to remove organic constituents that are entrained in air streams exhausted from process tanks or production areas. Most frequently, wet air pollution control devices are used with cleaning and coating processes. A common type of wet air pollution control is the wet packed scrubber consisting of a spray chamber that is filled with packing material. Water is continuously sprayed onto the packing and the air stream is pulled through the packing by a fan. Pollutants in the air stream are absorbed by the water droplets and the air is released to the atmosphere. A single scrubber often serves numerous process tanks.

Appendix C to Part 438—Metal-Bearing Operations Definitions

Note: The definitions in this appendix shall not be used to differentiate between the six ''core'' metal finishing operations (*i.e.*, Electroplating, Electroless Plating, Anodizing, Coating (chromating, phosphating, and coloring), Chemical Etching and Milling, and Printed Circuit Board Manufacture) and forty ''ancillary'' process operations listed at 40 CFR 433.10(a).

Abrasive Jet Machining includes removing stock material from a part by a high-speed stream of abrasive particles carried by a liquid or gas from a nozzle. Abrasive jet machining is used for deburring, drilling, and cutting thin sections of metal or composite material. Unlike abrasive blasting, this process operates at pressures of thousands of pounds per square inch. The liquid streams typically are alkaline or emulsified oil solutions, although water also can be used.

Acid Pickling Neutralization involves using a dilute alkaline solution to raise the pH of acid pickling rinse water that remains on the part after pickling. The wastewater from this operation is the acid pickling neutralization rinse water.

Acid Treatment With Chromium is a general term used to describe any application of an acid solution containing chromium to a metal surface. Acid cleaning, chemical etching, and pickling are types of acid treatment. Chromic acid is used occasionally to clean cast iron, stainless steel, cadmium and aluminum, and bright dipping of copper and copper alloys. Also, chromic acid solutions can be used for the final step in acid cleaning phosphate conversion coating systems. Chemical conversion coatings formulated with chromic acid are defined at ''Chromate Conversion Coating (or Chromating)'' in this appendix. Wastewater generated during acid treatment includes spent solutions and rinse waters. Spent solutions typically are batch discharged and treated or disposed of off site. Most acid treatment operations are followed by a water rinse to remove residual acid.

Acid Treatment Without Chromium is a general term used to describe any application of an acid solution not containing chromium to a metal surface. Acid cleaning, chemical etching, and pickling are types of acid treatment. Wastewater generated during acid treatment includes spent solutions and rinse waters. Spent solutions typically are batch discharged and treated or disposed of off site. Most acid treatment operations are followed by a water rinse to remove residual acid.

Alcohol Cleaning involves removing dirt and residue material from a part using alcohol.

Alkaline Cleaning Neutralization involves using a dilute acid solution to lower the pH of alkaline cleaning rinse water that remains on the part after alkaline cleaning. Wastewater from this operation is the alkaline cleaning neutralization rinse water.

Alkaline Treatment With Cyanide is the cleaning of a metal surface with an alkaline solution containing cyanide. Wastewater generated during alkaline treatment includes spent solutions and rinse waters. Alkaline treatment solutions become contaminated from the introduction of soils and dissolution of the base metal. They usually are treated and disposed of on a batch basis. Alkaline treatment typically is followed by a water rinse that is discharged to a treatment system.

Anodizing With Chromium involves producing a protective oxide film on aluminum, magnesium, or other light metal, usually by passing an electric current through an electrolyte bath in which the metal is immersed. Anodizing may be followed by a sealant operation. Chromic acid anodic coatings have a relatively thick boundary layer and are more protective than are sulfuric acid coatings. For these reasons, chromic acid is sometimes used when the part cannot be rinsed completely. These oxide coatings provide corrosion protection, decorative surfaces, a base for painting and other coating processes, and special electrical and mechanical properties. Wastewaters generated during anodizing include spent anodizing solutions, sealants, and rinse waters. Because of the anodic nature of the process, anodizing solutions become contaminated with the base metal being processed. These solutions eventually reach an intolerable concentration of dissolved metal and require treatment or disposal. Rinse water following anodizing, coloring, and sealing typically is discharged to a treatment system.

Anodizing Without Chromium involves applying a protective oxide film to aluminum, magnesium, or other light metal, usually by passing an electric current through an electrolyte bath in which the metal is immersed. Phosphoric acid, sulfuric acid, and boric acid are used in anodizing. Anodizing also may include sealant baths. These oxide coatings provide corrosion protection, decorative surfaces, a base for

painting and other coating processes, and special electrical and mechanical properties. Wastewater generated during anodizing includes spent anodizing solutions, sealants, and rinse waters. Because of the anodic nature of the process, anodizing solutions become contaminated with the base metal being processed. These solutions eventually reach an intolerable concentration of dissolved metal and require treatment or disposal. Rinse water following anodizing, coloring, and sealing steps typically is discharged to a treatment systems.

Carbon Black Deposition involves coating the inside of printed circuit board holes by dipping the circuit board into a tank that contains carbon black and potassium hydroxide. After excess solution dips from the circuit boards, they are heated to allow the carbon black to adhere to the board.

Catalyst Acid Pre-Dip uses rinse water to remove residual solution from a part after the part is processed in an acid bath. The wastewater generated in this unit operation is the rinse water.

Chemical Conversion Coating without Chromium is the process of applying a protective coating on the surface of a metal without using chromium. Such coatings are applied through phosphate conversion (except for ''Iron Phosphate Conversion Coating,'' see appendix B of this part), metal coloring, or passivation. Coatings are applied to a base metal or previously deposited metal to increase corrosion protection and lubricity, prepare the surface for additional coatings, or formulate a special surface appearance. This unit process includes sealant operations that use additives other than chromium.

(1) In phosphate conversion, coatings are applied for one or more of the following reasons: to provide a base for paints and other organic coatings; to condition surfaces for cold forming operations by providing a base for drawing compounds and lubricants; to impart corrosion resistance to the metal surface; or to provide a suitable base for corrosion-resistant oils or waxes. Phosphate conversion coatings are formed by immersing a metal part in a dilute solution of phosphoric acid, phosphate salts, and other reagents.

(2) Metal coloring by chemical conversion coating produces a large group of decorative finishes. Metal coloring includes the formation of oxide conversion coatings. In this operation, the metal surface is converted into an oxide or similar metallic compound, giving the part the desired color. The most common colored finishes are used on copper, steel, zinc, and cadmium.

(3) Passivation forms a protective coating on metals, particularly stainless steel, by immersing the part in an acid solution. Stainless steel is passivated to dissolve embedded iron particles and to form a thin oxide film on the surface of the metal. Wastewater generated during chemical conversion coating includes spent solutions and rinses (*i.e.*, both the chemical conversion coating solutions and post-treatment sealant solutions). These solutions commonly are discharged to a treatment system when contaminated with the base metal or other impurities. Rinsing normally follows each process step, except when a sealant dries on the part surface.

Chemical Milling (or Chemical Machining) involves removing metal from a part by controlled chemical attack, or etching, to produce desired shapes and dimensions. In chemical machining, a masking agent typically is applied to cover a portion of the part's surface; the exposed (unmasked) surface is then treated with the chemical machining solution. Wastewater generated during chemical machining includes spent solutions and rinses. Process solutions typically are discharged after becoming contaminated with the base metal. Rinsing normally follows chemical machining.

Chromate Conversion Coating (or Chromating) involves forming a conversion coating (protective coating) on a metal by immersing or spraying the metal with a hexavalent chromium compound solution to produce a hexavalent or trivalent chromium compound coating. This also is known as chromate treatment, and is most often applied to aluminum, zinc, cadmium or magnesium surfaces. Sealant operations using chromium also are included in this unit operation. Chromate solutions include two types: (1) those that deposit substantial chromate films on the substrate metal and are complete treatments themselves, and (2) those that seal or supplement oxide, phosphate, or other types of protective coatings. Wastewater generated during chromate conversion coating includes spent process solutions (*i.e.*, both the chromate conversion coating solutions and post-treatment sealant solutions) and rinses. These solutions typically are discharged to a treatment system when contaminated with the base metal or other impurities. Also, chromium-based solutions, which are typically formulated with hexavalent chromium, lose operating strength when the hexavalent chromium reduces to trivalent chromium during use. Rinsing normally follows each process step, except for sealants that dry on the surface of the part.

Chromium Drag-out Destruction is a unit operation performed following chromium-bearing operations to reduce hexavalent chromium that is ''dragged out'' of the process bath. Parts are dipped in a solution of a chromium-reducing chemical (*e.g.*, sodium metabisulfite) to prevent the hexavalent chromium from contaminating subsequent process baths. This operation typically is performed in a stagnant drag-out rinse tank that contains concentrated chromium-bearing wastewater.

Cyanide Drag-out Destruction involves dipping part in a cyanide oxidation solution (*e.g.*, sodium hypochloride) to prevent cyanide that is ''dragged out'' of a process bath from contaminating subsequent process baths. This operation typically is performed in a stagnant drag-out rinse tank.

Cyaniding Rinse is generated during cyaniding hardening of a part. The part is heated in a molten salt solution containing cyanide. Wastewater is generated when excess cyanide salt solution is removed from the part in rinse water.

Electrochemical Machining is a process in which the part becomes the anode and a shaped cathode is the cutting tool. By pumping electrolyte between the electrodes and applying a current, metal is rapidly but selectively dissolved from the part. Wastewater generated during electrochemical machining includes spent electrolytes and rinses.

Electroless Catalyst Solution involves adding a catalyst just prior to an electroless plating operation to accelerate the plating operation.

Electroless Plating involves applying a metallic coating to a part using a chemical reduction process in the presence of a catalysis. An electric current is not used in this operations. The metal to be plated onto a part typically is held in solution at high concentrations using a chelating agent. This plates all areas of the part to a uniform thickness regardless of the configuration of the part. Also, an electroless-plated surface is dense and virtually nonporous. Copper and nickel electroless plating operations are the most common. Sealant operations (*i.e.*, other than hot water dips) following electroless plating are considered separate unit operations if they include any additives. Wastewater generated during electroless plating includes spent process solutions and rinses. The wastewater contains chelated metals, which require separate preliminary treatment to break the metal chelates prior to conventional chemical precipitation. Rinsing follows most electroless plating processes to remove residual plating solution and prevent contamination of subsequent process baths.

Electrolytic Cleaning involves removing soil, scale, or surface oxides from a part by electrolysis. The part is one of the electrodes and the electrolyte is usually alkaline. Electrolytic alkaline cleaning and electrolytic acid cleaning are the two types of electrolytic cleaning.

(1) Electrolytic alkaline cleaning produces a cleaner surface than do nonelectrolytic methods of alkaline cleaning. This operation uses strong agitation, gas evolution in the solution, and oxidation-reduction reactions that occur during electrolysis. In addition, dirt particles become electrically charged and are repelled from the part surface.

(2) Electrolytic acid cleaning sometimes is used as a final cleaning before electroplating. Sulfuric acid is most frequently used as the electrolyte. As with electrolytic alkaline cleaning, the mechanical scrubbing effect from the evolution of gas enhances the effectiveness of the process.

Wastewater generated during electrolytic cleaning includes spent process solutions and rinses. Electrolytic cleaning solutions become contaminated during use due to the dissolution of the base metal and the introduction of pollutants. The solutions typically are batch discharged for treatment or disposal after they weaken. Rinsing following electrolytic cleaning removes residual cleaner to prevent contamination of subsequent process baths.

Electroplating with Chromium involves producing a chromium metal coating on a surface by electrodeposition. Electroplating provides corrosion protection, wear or erosion resistance, lubricity, electrical conductivity, or decoration. In electroplating, metal ions in acid, alkaline, or neutral solutions are reduced on the cathodic

surfaces of the parts being plated. Metal salts or oxides typically are added to replenish the solutions. Chromium trioxide often is added as a source of chromium. In addition to water and the metal being deposited, electroplating solutions often contain agents that form complexes with the metal being deposited, stabilizers to prevent hydrolysis, buffers for pH control, catalysts to assist in deposition, chemical aids to dissolve anodes, and miscellaneous ingredients that modify the process to attain specific properties. Sealant operations performed after this operation are considered separate unit operations if they include any additives (*i.e.*, other than hot water dips). Wastewater generated during electroplating includes spent process solutions and rinses. Electroplating solutions occasionally become contaminated during use due to the base metal dissolving and the introduction of other pollutants, diminishing the effectiveness of the electroplating solutions diminishes. Spent concentrated solutions typically are treated to remove pollutants and reused, processed in a wastewater treatment system, or disposed of off site. Rinse waters, including some drag-out rinse tank solutions, typically are treated on site.

Electroplating with Cyanide involves producing metal coatings on a surface by electrodeposition using cyanide. Electroplating provides corrosion protection, wear or erosion resistance, electrical conductivity, or decoration. In electroplating, metal ions in acid, alkaline, or neutral solutions are reduced on the cathodic surfaces of the parts being plated. The metal ions in solution typically are replenished by dissolving metal from anodes contained in inert wire or metal baskets. Sealant operations performed after this operation are considered separate unit operations if they include any additives (*i.e.*, any sealant operations other than hot water dips). In addition to water and the metal being deposited, electroplating solutions often contain agents that form complexes with the metal being deposited, stabilizers to prevent hydrolysis, buffers to control pH, catalysts to assist in deposition, chemical aids to dissolve anodes, and miscellaneous ingredients that modify the process to attain specific properties. Cyanide, usually in the form of sodium or potassium cyanide, frequently is used as a complexing agent for zinc, cadmium, copper, and precious metal baths. Wastewater generated during electroplating includes spent process solutions and rinses. Electroplating solutions occasionally become contaminated during use due to dissolution of the base metal and the introduction of other pollutants, diminishing the performance of the electroplating solutions. Spent concentrated solutions typically are treated to remove pollutants and reused, processed in a wastewater treatment system, or disposed of off site. Rinse waters, including some drag-out rinse tank solutions, typically are treated on site.

Electroplating without Chromium or Cyanide involves the production of metal coatings on a surface by electrodeposition, without using chromium or cyanide. Commonly electroplated metals include nickel, copper, tin/lead, gold, and zinc. Electroplating provides corrosion protection, wear or erosion resistance, lubricity, electrical conductivity, or decoration. In electroplating, metal ions in acid, alkaline, or neutral solutions are reduced on the cathodic surfaces of the parts being plated. The metal ions in solution typically are replenished by dissolving metal from anodes contained in inert wire or metal baskets. Sealant operations performed after this operation are considered separate unit operations if they include any additives (*i.e.*, any sealant operations other than hot water dips). In addition to water and the metal being deposited, electroplating solutions often contain agents that form complexes with the metal being deposited, stabilizers to prevent hydrolysis, buffers to control pH, catalysts to assist in deposition, chemical aids to dissolve anodes, and miscellaneous ingredients that modify the process to attain specific properties. Wastewater generated during electroplating without chromium or cyanide includes spent process solutions and rinses. Electroplating solutions occasionally become contaminated during use due to dissolution of the base metal and the introduction of other pollutants, diminishing the effectiveness of the electroplating solutions. Spent concentrated solutions typically are treated for pollutant removal and reused, processed in a wastewater treatment system, or disposed of off site. Rinse waters, including some drag-out rinse tank solutions, typically are treated on site.

Electropolishing involves producing a highly polished surface on a part using reversed electrodeposition in which the anode (part) releases some metal ions into the electrolyte to reduce surface roughness. When current is applied, a polarized film forms on the metal surface, through which metal ions diffuse. In this operation, areas of surface roughness on parts serve as high-current density areas and are dissolved at rates greater than the rates for smoother portions of the metal surface. Metals are electropolished to improve appearance, reflectivity, and corrosion resistance. Base metals processed by electropolishing include aluminum, copper, zinc, low-alloy steel, and stainless steel. Common electrolytes include sodium hydroxide and combinations of sulfuric acid, phosphoric acid, and chromic acid. Wastewater generated during electropolishing includes spent process solutions and rinses. Eventually, the concentration of dissolved metals increases to the point where the process becomes ineffective. Typically, a portion of the bath is decanted and either fresh chemicals are added or the entire solution is discharged to treatment and replaced with fresh chemicals. Rinsing can involve several steps and can include hot immersion or spray rinses.

Galvanizing/Hot Dip Coating involves using various processes to coat an iron or steel surface with zinc. In hot dipping, a base metal is coated by dipping it into a tank that contains a molten metal.

Hot Dip Coating involves applying a metal coating (usually zinc) to the surface of a part by dipping the part in a molten metal bath. Wastewater is generated in this operation when residual metal coating solution is removed from the part in rinse water.

Kerfing uses a tool to remove small amounts of metal from a product surface. Water and synthetic coolants may be used to lubricate the area between the tool and the metal, to maintain the temperature of the cutting tool, and to remove metal fines from the surface of the part. This operation generates oily wastewater that contains metal fines and dust.

Laminating involves applying a material to a substrate using heat and pressure.

Mechanical and Vapor Plating involves applying a metallic coating to a part. For mechanical plating, the part is rotated in a drum containing a water-based solution, glass beads, and metal powder. In vapor plating, a metallic coating is applied by atomizing the metal and applying an electric charge to the part, which causes the atomized (vapor phase) metal to adhere to the part. Wastewater generated in this operation includes spent solutions from the process bath and rinse water. Typically, the wastewater contains high concentrations of the applied metal.

Metallic Fiber Cloth Manufacturing involves weaving thin metallic fibers to create a mesh cloth.

Metal Spraying (Including Water Curtain) involves applying a metallic coating to a part by projecting molten or semimolten metal particles onto a substrate. Coatings can be sprayed from rod or wire stock or from powdered material. The process involves feeding the material (*e.g.*, wire) into a flame where it is melted. The molten stock then is stripped from the end of the wire and atomized by a high-velocity stream of compressed air or other gas that propels the material onto a prepared substrate or part. Metal spraying coatings are used in a wide range of special applications, including: insulating layers in applications such as induction heating coils; electromagnetic interference shielding; thermal barriers for rocket engines; nuclear moderators; films for hot isostatic pressing; and dimensional restoration of worn parts. Metal spraying is sometimes performed in front of a ''water curtain'' (a circulated water stream used to trap overspray) or a dry filter exhaust hood that captures the overspray and fumes. With water curtain systems, water is recirculated from a sump or tank. Wastewater is generated when the sump or tank is discharged periodically. Metal spraying typically is not followed by rinsing.

Painting-Immersion (Including Electrophoretic, ''E-coat'') involves applying an organic coating to a part using processes such autophoretic and electrophoretic painting.

(1) Autophoretic Painting involves applying an organic paint film by electrophoresis when a part is immersed in a suitable aqueous bath.

(2) Electrophoretic Painting is coating a part by making it either anodic or cathodic in a bath that is generally an aqueous emulsion of the organic coating material.

(3) Other Immersion Painting includes all other types of immersion painting such as dip painting.

Water is used in immersion paint operations as a carrier for paint particles and to rinse the part. Aqueous painting solutions

and rinses typically are treated through an ultrafiltration system. The concentrate is returned to the painting solution, and the permeate is reused as rinse water. Sites typically discharge a bleed stream to treatment. The painting solution and rinses are batch discharged periodically to treatment.

Photo Imaging is the process of exposing a photoresist-laden printed wiring board to light to impact the circuitry design to the board. Water is not used in this operation.

Photo Image Developing is an operation in which a water-based solution is used to develop the exposed circuitry in a photoresist-laden printed wiring board. Wastewater generated in this operation includes spent process solution and rinse water.

Photoresist Application is an operation that uses heat and pressure to apply a photoresist coating to a printed wiring board. Water is not used in this operation.

Photoresist Strip involves removing organic photoresist material from a printed wiring board using an acid solution.

Phosphor Deposition is the application of a phosphorescent coating to a part. Wastewater generated in this unit operation includes water used to keep the parts clean and wet while the coating is applied, and rinse water used to remove excess phosphorescent coating from the part.

Physical Vapor Deposition involves physically removing a material from a source through evaporation or sputtering, using the energy of the vapor particles in a vacuum or partial vacuum to transport the removed material, and condensing the removed material as a film onto the surface of a part or other substrate.

Plasma Arc Machining involves removing material or shaping a part by a high-velocity jet of high-temperature, ionized gas. A gas (nitrogen, argon, or hydrogen) is passed through an electric arc, causing the gas to become ionized, and heated to temperatures exceeding 16,650 °C (30,000 °F). The relatively narrow plasma jet melts and displaces the material in its path. Because plasma arc machining does not depend on a chemical reaction between the gas and the part, and because plasma temperatures are extremely high, the process can be used on almost any metal, including those that are resistant to oxygen-fuel gas cutting. The method is used mainly for profile cutting of stainless steel and aluminum alloys. Although plasma arc machining typically is a dry process, water is used for water injection plasma arc torches. In these cases, a constricted swirling flow of water surrounds the cutting arc. This operations also may be performed immersed in a water bath. In both cases, water is used to stabilize the arc, to cool the part, and to contain smoke and fumes.

Plastic Wire Extrusion involves applying a plastic material to a metal wire through an extrusion process.

Salt Bath Descaling involves removing surface oxides or scale from a part by immersing the part in a molten salt bath or hot salt solution. Salt bath descaling solutions can contain molten salts, caustic soda, sodium hydride, and chemical additives. Molten salt baths are used in a salt bath-water quench-acid dip sequence to remove oxides from stainless steel and other corrosion-resistant alloys. In this process, the part typically is immersed in the molten salt, quenched with water, and then dipped in acid. Oxidizing, reducing, or electrolytic salt baths can be used depending on the oxide to be removed. Wastewater generated during salt bath descaling includes spent process solutions, quenches, and rinses.

Shot Tower—Lead Shot Manufacturing involves dropping molten lead from a platform on the top of a tower through a sieve-like device and into a vat of cold water.

Soldering involves joining metals by inserting a thin (capillary thickness) layer of nonferrous filler metal into the space between them. Bonding results from the intimate contact produced by the metallic bond formed between the substrate metal and the solder alloy. The term soldering is used where the melting temperature of the filler is below 425 °C (800 °F). Some soldering operations use a solder flux, which is an aqueous or nonaqueous material used to dissolve, remove, or prevent the formation of surface oxides on the part. Except for the use of aqueous fluxes, soldering typically is a dry operation; however, a quench or rinse sometimes follows soldering to cool the part or remove excess flux or other foreign material from its surface. Recent developments in soldering technology have focused on fluxless solders and fluxes that can be cleaned off with water.

Solder Flux Cleaning involves removing residual solder flux from a printed circuit board using either an alkaline or alcohol cleaning solution.

Solder Fusing involves coating a tin-lead plated circuit board with a solder flux and then passing the board through a hot oil. The hot oil fuses the tin-lead to the board and creates a solder-like finish on the board.

Solder Masking involves applying a resistive coating to certain areas of a circuit board to protect the areas during subsequent processing.

Sputtering is a vacuum evaporation process in which portions of a coating material are physically removed from a substrate and deposited a thin film onto a different substrate.

Stripping (Paint) involves removing a paint (or other organic) coating from a metal basis material. Stripping commonly is performed as part of the manufacturing process to recover parts that have been improperly coated or as part of maintenance and rebuilding to restore parts to a usable condition. Organic coatings (including paint) are stripped using thermal, mechanical, and chemical means. Thermal methods include burn-off ovens, fluidized beds of sand, and molten salt baths. Mechanical methods include scraping and abrasive blasting (as defined in ''Abrasive Blasting'' in appendix B of this part). Chemical paint strippers include alkali solutions, acid solutions, and solvents (*e.g.*, methylene chloride). Wastewater generated during organic coating stripping includes process solutions (limited mostly to chemical paint strippers and rinses).

Stripping (Metallic Coating) involves removing a metallic coating from a metal basis material. Stripping is commonly part of the manufacturing process to recover parts that have been improperly coated or as part of maintenance and rebuilding to restore parts to a usable condition. Metallic coating stripping most often uses chemical baths, although mechanical means (*e.g.*, grinding, abrasive blasting) also are used. Chemical stripping frequently is performed as an aqueous electrolytic process. Wastewater generated during metallic coating stripping includes process solutions and rinses. Stripping solutions become contaminated from dissolution of the base metal. Typically, the entire solution is discharged to treatment. Rinsing is used to remove the corrosive film remaining on the parts.

Thermal Infusion uses heat to infuse metal powder or dust onto the surface of a part. Typically, thermal infusion is a dry operation. In some cases, however, water may be used to remove excess metal powder, metal dust, or molten metal.

Ultrasonic Machining involves forcing an abrasive liquid between a vibrating tool and a part. Particles in the abrasive liquid strike the part, removing any microscopic flakes on the part.

Vacuum Impregnation is used to reduce the porosity of the part. A filler material (usually organic) is applied to the surface of the part and polymerized under pressure and heat. Wastewater is generated in this unit operation when rinse water is used to remove residual organic coating from the part.

Vacuum Plating involves applying a thin layer of metal oxide onto a part using molten metal in a vacuum chamber.

Water Shedder involves applying a dilute water-based chemical compound to a part to accelerate drying. This operation typically is used to prevent a part from streaking when excess water remains on the part.

Wet Air Pollution Control involves using water to remove chemicals, fumes, or dusts that are entrained in air streams exhausted from process tanks or production areas. Most frequently, wet air pollution control devices are used with electroplating, cleaning, and coating processes. A common type of wet air pollution control is the wet packed scrubber consisting of a spray chamber that is filled with packing material. Water is continuously sprayed onto the packing and the air stream is pulled through the packing by a fan. Pollutants in the air stream are absorbed by the water droplets and the air is released to the atmosphere. A single scrubber often serves numerous process tanks; however, the air streams typically are segregated by source into chromium, cyanide, and acid/alkaline sources. Wet air pollution control can be divided into several suboperations, including:

(1) Wet Air Pollution Control for Acid Alkaline Baths;

(2) Wet Air Pollution Control for Cyanide Baths;

(3) Wet Air Pollution Control for Chromium-Bearing Baths; and

(4) Wet Air Pollution Control for Fumes and Dusts.

Wire Galvanizing Flux involves using flux to remove rust and oxide from the surface of steel wire prior to galvanizing. This provides

long-term corrosion protection for the steel wire.

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