

limitation for total sulfide based on potential POTW interference or upset associated with discharges of total sulfide from facilities in this subcategory. EPA is proposing limitations for TOC and TOP as part of a compliance alternative for organic pollutant discharges. (See Section XXI.C for a discussion of monitoring flexibility.) The Agency based these proposed limitations on the same four EPA sampling episodes that EPA discussed in Section XIII.A.3.

4. PSNS Analysis

Like NSPS, the Agency determined that the cost of compliance with PSNS based on Option 4 would make up 4.64 percent of a new facility's projected revenues and expects that this would not create a barrier to entry. EPA notes that this is a higher percentage than for other subcategories and solicits comment on whether EPA should consider Option 2 for these facilities.

E. NSPS for the Non-Chromium Anodizing Subcategory

1. Need for NSPS

EPA expects that new facilities in the Non-Chromium Anodizing subcategory will discharge similar quantities of the same pollutants that existing sources discharge. EPA notes that it did not identify any existing direct dischargers in this subcategory and that estimates of costs and pollutant loadings were transferred from the best performing indirect dischargers in this subcategory (see Section IX.C). Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.C.1).

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 2. As discussed in the BPT analysis for this subcategory, non-chromium anodizers discharge large quantities of aluminum but have very low levels of other metals in their wastewater. EPA determined that Option 2 is capable of removing most of the aluminum discharged by facilities in this subcategory and that any additional removals achieved by Option 4 are not justified by the additional cost.

The Agency also evaluated not proposing NSPS for facilities in this subcategory and instead continuing to require compliance with NSPS limitations established under 40 CFR part 433. However, the Agency has tentatively rejected this option because these new proposed NSPS limitations require an increased removal of TSS and

the Agency feels that the pollutants proposed for regulation here are more appropriate for the non-chromium anodizing industry. The NSPS limitations established in 40 CFR part 433 require facilities to meet an average monthly discharge of 31 mg/L of TSS and allow for a maximum daily discharge of 60 mg/L. These proposed MP&M limitations require non-chromium anodizers to meet an average monthly discharge for TSS of 22 mg/L and allow for a monthly maximum discharge of 52 mg/L. EPA believes that the costs associated with NSPS are justified by the additional removal of TSS from this subcategory. In addition, 40 CFR part 433 requires non-chromium anodizers to meet effluent limitations for 7 metal pollutants. EPA's data show that these seven metals are present only in very small quantities at non-chromium anodizing facilities. In 40 CFR part 433, EPA did not establish a limit for aluminum, the metal found in the largest quantity in non-chromium anodizers' wastewater. The Agency has determined that direct discharging facilities in the Non-Chromium Anodizing subcategory should have a limit for aluminum and thus is proposing to cover them here. The Agency notes that this will reduce the number of pollutants that non-chromium anodizers would have to monitor for.

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations for all of the pollutants that it proposed BPT and BAT limitations for in this subcategory. The NSPS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.36. (See Section XXI.C for a discussion of monitoring flexibility.)

4. NSPS Analysis

A barrier to entry analysis is typically performed for new facilities by using existing facilities as a model. However, there are no existing direct dischargers in this subcategory. Therefore, the Agency could not perform an economic analysis in order to determine if Option 2 presented a barrier to entry for new facilities in the Non-Chromium Anodizing subcategory.

F. PSNS for the Non-Chromium Anodizing Subcategory

1. Need for PSNS

EPA expects that new facilities in the Non-Chromium Anodizing subcategory will discharge similar quantities of the same pollutants that existing sources discharge and therefore EPA is not

proposing pretreatment standards for new sources for this subcategory for the same reasons it is not proposing PSES for this subcategory. See Section XII.F and VI.C.3.

G. NSPS for the Printed Wiring Board Subcategory

1. Need for NSPS

EPA expects that new facilities in the Printed Wiring Board subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.D.1).

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 4. The Agency determined that Option 4 is the best available demonstrated technology for the removal of pollutants in this subcategory. EPA's analytical data shows that Option 4 is capable of achieving much lower long term averages than Option 2 for several of the metal pollutants of concern. In addition, EPA's data shows that microfiltration greatly reduces the variability in the concentration of the metal pollutants in the treatment effluent. Although Option 4 costs \$162,000 more than Option 2 annually for a new facility with a wastewater flow of 25.5 MG (the wastewater flow for a representative direct discharging facility in the Printed Wiring Board subcategory), EPA is proposing Option 4 because of the lower levels of metal pollutants in the wastewater effluent. EPA is not proposing Option 4 for BPT/BAT because of the lack of significant overall additional removals and the fact that it removes less COD, O&G, and organic pollutants, relative to Option 2. EPA also requests comment on basing NSPS on Option 2.

The Agency also strongly considered proposing NSPS based on ultrafiltration for oil and grease removal and chemical precipitation followed by sedimentation for TSS and metals removal. This option is equivalent to BAT Option 2 with the oil/water separator replaced by an ultrafilter. The Agency is soliciting comment and data on this NSPS option for the final rule.

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations for all of the pollutants that it proposed BPT and BAT limitations for in this subcategory. The NSPS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.46.

(See Section XXI.C for a discussion of monitoring flexibility.) EPA based these proposed regulations on the same four EPA sampling episodes that it used to calculate NSPS for the General Metals subcategory. (See Section XIII.A.3). As mentioned above, EPA collected analytical wastewater treatment data from a printed wiring board manufacturer that employed this technology.

4. NSPS Analysis

The Agency also performed an economic analysis in order to determine if Option 4 presented a barrier to entry for new facilities in the Printed Wiring Board subcategory. EPA determined that the cost of compliance with NSPS based on Option 4 would make up only 0.02 percent of a new facility's projected revenues. Therefore, EPA concluded that NSPS based on Option 4 would not create a barrier to entry.

H. PSNS for the Printed Wiring Board Subcategory

1. Need for PSNS

EPA expects that new facilities in the Printed Wiring Board subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for PSNS regulation is the same as the need for PSES regulation. (See Section XII.G.1).

2. Selected PSNS Option

EPA is proposing Pretreatment Standards for New Sources for this subcategory based on BAT Option 4 for the same reasons it is proposing this option for NSPS. It is also requesting comment on PSNS based on Option 2. As was the case for PSES, EPA is not proposing a flow cutoff exclusion for this subcategory for the same reasons discussed in Section XII.G.2, but is requesting comment on a flow cutoff of 1 MGY, as with PSES.

The Agency also strongly considered proposing PSNS based on ultrafiltration for oil and grease removal and chemical precipitation followed by sedimentation for TSS and metals removal. This option is equivalent to BAT Option 2 with the oil/water separator replaced by an ultrafilter. The Agency is soliciting comment and data on this PSNS option for the final rule.

3. Calculation of PSNS Limitations

The Agency is proposing PSNS limitations for the same pollutants that it proposed PSES regulations. The PSNS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.47. EPA determined that all of the pollutants listed in § 438.47 (except for

Total Sulfide, TOC, and TOP) pass through POTWs. EPA is proposing a limitation for total sulfide based on potential POTW interference or upset associated with discharges of total sulfide from facilities in this subcategory. EPA is proposing limitations for TOC and TOP as part of a compliance alternative for organic pollutant discharges. (See Section XXI.C for a discussion of monitoring flexibility.) EPA determined that all of these pollutants pass through POTWs. The Agency based these proposed limitations on the same four EPA sampling episodes that EPA discussed in Section XIII.A.3. As mentioned above, EPA collected analytical wastewater treatment data from a printed wiring board manufacturer that employed this technology.

4. PSNS Analysis

Like NSPS, the Agency determined that the cost of compliance with PSNS based on Option 4 would make up only 0.20 percent of a new facility's projected revenues and concluded that this would not create a barrier to entry.

I. NSPS for the Steel Forming and Finishing Subcategory

1. Need for NSPS

EPA expects that new facilities in the Steel Forming and Finishing subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.E.1).

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 4. The Agency determined that Option 4 is the best available demonstrated technology for the removal of pollutants in this subcategory. EPA's analytical data shows that Option 4 is capable of achieving much lower long-term averages than Option 2 for several of the metal pollutants of concern. In addition, EPA's data shows that microfiltration greatly reduces the variability in the concentration of the metal pollutants in the treatment effluent. Although Option 4 costs \$42,400 more than Option 2 annually for a new facility with a wastewater flow of 18.4 MGY (the wastewater flow for a representative direct discharging facilities in the Steel Forming and Finishing subcategory), EPA determined that the additional cost of Option 4 are justified by the lower levels of metal pollutants in the wastewater effluent.

The Agency also strongly considered proposing NSPS based on ultrafiltration for oil and grease removal and chemical precipitation followed by a clarifier for TSS and metals removal. This option is equivalent to BAT Option 2 with the oil/water separator replaced by an ultrafilter. The Agency is soliciting comment and data on this NSPS option for the final rule.

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations for all of the pollutants that it proposed BPT and BAT limitations for in this subcategory. The NSPS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.56. (See Section XXI.C for a discussion of monitoring flexibility.) The Agency based these proposed limitations on the same four EPA sampling episodes that EPA discussed in Section XIII.A.3.

4. NSPS Analysis

The Agency also performed an economic analysis in order to determine if Option 4 presented a barrier to entry for new facilities in the Steel Forming and Finishing subcategory. EPA determined that the cost of compliance with NSPS based on Option 4 would make up only 0.14 percent of a new facility's projected revenues. Therefore, EPA concluded that NSPS based on Option 4 would not create a barrier to entry.

J. PSNS for the Steel Forming and Finishing Subcategory

1. Need for PSNS

EPA expects that new facilities in the Steel Forming and Finishing subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for PSNS regulation is the same as the need for PSES regulation. (See Section XII.H.1).

2. Selected PSNS Option

EPA is proposing Pretreatment Standards for New Sources for this subcategory based on BAT Option 4 for the same reasons it is proposing this option for NSPS. In addition, EPA is not proposing a flow cutoff exclusion for PSNS for this subcategory for the same reasons that it did not propose a flow cutoff for PSES, but is requesting comment on flow cutoffs of 1, 2, and 3 MGY as with PSES. (See Section XII.H.)

The Agency also strongly considered proposing PSNS based on ultrafiltration for oil and grease removal and chemical precipitation followed by sedimentation for TSS and metals removal. This option is equivalent to BAT Option 2 with the

oil/water separator replaced by an ultrafilter. The Agency is soliciting comment and data on this PSNS option for the final rule.

3. Calculation of PSNS Limitations

The Agency is proposing PSNS limitations for the same pollutants that it proposed PSES regulations. The PSNS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.57. EPA determined that all of the pollutants listed in § 438.57 (except for Total Sulfide, TOC, and TOP) pass through POTWs. EPA is proposing a limitation for total sulfide based on potential POTW interference or upset associated with discharges of total sulfide from facilities in this subcategory. EPA is proposing limitations for TOC and TOP as part of a compliance alternative for organic pollutant discharges. (See Section XXI.C for a discussion of monitoring flexibility.) The Agency based these proposed limitations on the same four EPA sampling episodes that EPA discussed in Section XIII.A.3.

4. PSNS Analysis

Like NSPS, the Agency determined that the cost of compliance with PSNS based on Option 4 would make up only 0.17 percent of a new facility's projected revenues and concluded that this would not create a barrier to entry.

K. NSPS for the Oily Wastes Subcategory

1. Need for NSPS

EPA expects that new facilities in the Oily Wastes subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.F.1).

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 6, oil-water separation by chemical emulsion breaking, gravity separation, and oil skimming. The Agency determined that Option 6 is the best available demonstrated technology for the removal of pollutants in this subcategory and is proposing this option for the same reasons it selected this option for BPT and BAT. (See Section IX.F.2).

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations equivalent to those proposed for BPT for this subcategory. The NSPS limitations for this subcategory can be

found in the proposed rule (which accompanies this preamble) at § 438.66. (See Section XXI.C for a discussion of monitoring flexibility.)

4. NSPS Analysis

Since EPA is proposing to set NSPS equal to BAT (Option 6) and this option is determined to be economically achievable for these facilities under BAT, EPA concluded that NSPS based on Option 6 would not create a barrier to entry.

L. PSNS for the Oily Wastes Subcategory

1. Need for PSNS

EPA expects that new facilities in the Oily Wastes subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for PSNS regulation is the same as the need for PSES regulation. (See Section XIII.I.1).

2. Selected PSNS Option

EPA is proposing Pretreatment Standards for New Sources for this subcategory based on BAT Option 6 for the same reasons it is proposing this option for NSPS. In addition, EPA is proposing a 2 MGY flow cutoff exclusion for PSNS with serious consideration of a 3 MGY flow cutoff as well. This is the same flow cutoff level that EPA is proposing for PSES for the existing indirect discharging facilities in the Oily Wastes subcategory. The Agency is proposing a 2 MGY flow cutoff for new indirect discharging facilities in the Oily Wastes subcategory based on the potential POTW permitting burden that would be associated with developing and then maintaining permits for new sources with low flows and the likelihood that these facilities discharge a small amount of pound-equivalents at these low flow rates. The Agency assumes that the pound-equivalents per facility for new facilities with flows below or equal to 2 MGY would be even lower than the 2 pound-equivalents per facility for similarly sized existing sources in this subcategory. The Agency concluded that a similar (or even smaller) amount of pollutant removal is not justified by the cost of the regulation for new indirect Oily Waste facilities discharging less than or equal to 2 MGY.

3. Calculation of PSNS Limitations

The Agency is proposing PSNS limitations equivalent to PSES for the same pollutants that it proposed PSES regulations. The PSNS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.67. (See Section XIII.I.3. for PSES discussion and see

Section XXI.C for a discussion of monitoring flexibility.)

4. PSNS Analysis

Since EPA is proposing to set PSNS equal to PSES (Option 6) and this option is determined to be economically achievable for these facilities under PSES, the Agency concluded that this would not create a barrier to entry.

M. NSPS for the Railroad Line Maintenance Subcategory

1. Need for NSPS

EPA expects that new facilities in the Railroad Line Maintenance subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.G.1.)

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 10, dissolved air flotation plus in-process flow control and pollution prevention. The Agency determined that Option 10 is the best available demonstrated technology for the removal of pollutants in this subcategory and is proposing this option for the same reasons it selected this option for BPT and BAT. (See Section IX.G.2).

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations equivalent to those proposed for BPT for this subcategory. The NSPS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.76. (See Section XXI.C for a discussion of monitoring flexibility.)

4. NSPS Analysis

EPA notes that railroad line maintenance facilities do not have revenue reported at the facility level, and it is therefore not possible to compare costs as a percent of facility revenue for new and existing facilities in this subcategory. In addition, EPA is proposing to set NSPS equal to BAT (Option 10) and has determined this option is economically achievable for these facilities under BAT, therefore, EPA concluded that NSPS based on Option 10 would not create a barrier to entry.

N. PSNS for the Railroad Line Maintenance Subcategory

1. Rationale for Not Proposing PSNS

EPA expects that new facilities in the Railroad Line Maintenance subcategory will discharge similar quantities of the

same pollutants that existing sources discharge. Therefore, EPA is proposing to not establish PSNS for this subcategory for the same reasons that it did not propose PSES. (See Section XII.J.1).

O. NSPS for the Shipbuilding Dry Dock Subcategory

1. Need for NSPS

EPA expects that new facilities in the Shipbuilding Dry Dock subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, the need for NSPS regulation is the same as the need for BPT regulation. (See Section IX.H.1).

2. Selected NSPS Option

EPA is proposing New Source Performance Standards for this subcategory based on BAT Option 10, dissolved air flotation plus in-process flow control and pollution prevention. The Agency determined that Option 10 is the best available demonstrated technology for the removal of pollutants in this subcategory and is proposing this option for the same reasons it selected this option for BPT. (See Section IX.H.2).

3. Calculation of NSPS Limitations

The Agency is proposing NSPS limitations equivalent to those proposed for BPT for this subcategory. The NSPS limitations for this subcategory can be found in the proposed rule (which accompanies this preamble) at § 438.76. (See Section XXI.C for a discussion of monitoring flexibility.)

4. NSPS Analysis

Since EPA is proposing to set NSPS equal to BAT (Option 10) and has determined that this option is economically achievable for these facilities under BAT, EPA concluded that NSPS based on Option 10 would not create a barrier to entry.

P. PSNS for the Shipbuilding Dry Dock Subcategory

1. Rationale for Not Proposing PSNS

EPA expects that new facilities in the Shipbuilding Dry Dock subcategory will discharge similar quantities of the same pollutants that existing sources discharge. Therefore, EPA is proposing to not establish PSNS for this subcategory for the same reasons that it did not propose PSES. (See Section XII.K.1)

XIV. Issues Related to the Methodology Used to Determine POTW Performance

For today's proposal, EPA used its traditional methodology to determine

POTW performance (percent removal) for toxic and non-conventional pollutants. POTW performance is a component of the pass-through methodology used to identify the pollutants to be regulated for PSES and PSNS. It is also a component of the analysis to determine net pollutant reductions (for both total pounds and toxic pound-equivalents) for various indirect discharge technology options. However, as discussed in more detail below, EPA is evaluating several issues related to its traditional methodology for determining POTW performance and solicits comments a variety of methodological changes.

A. Assessment of Acceptable POTWs

EPA developed the principal pass-through analysis for today's MP&M proposal by using data from all 50 POTWs that were part of the 50 POTW Study data base. Some of these POTWs were not operated to meet the secondary treatment requirements at 40 CFR part 133 for all portions of their wastestream. Most POTWs today have secondary treatment or better in place. EPA estimates that as of 1996, POTWs with at least secondary treatment in place service greater than 90 percent of the indirect discharging population. If the POTW removal calculations do not reflect the upgrades and system improvements that have occurred since the time of the 50 POTW Study, they would tend to under-estimate POTW removals. This would result in overestimating the pollutant reductions that are achieved through the regulation of indirect dischargers, thereby making the regulation appear more cost-effective for indirect dischargers than it is.

One partial solution to this methodological issue would be to evaluate individual treatment trains in the 50 POTW Study data base, and include only those treatment trains that achieved compliance with 40 CFR part 133 in the analysis of POTW pollutant removal rates. There were 29 treatment trains that achieved BOD₅ and TSS effluent concentrations between 15 mg/l and 45 mg/l during the sampling and could potentially be considered reflective of secondary treatment (based on 40 CFR 133.102 limitations of 30 mg/l monthly average and 45 mg/l weekly max for secondary treatment), and an additional 2 treatment trains were either trickling filters or waste stabilization ponds that achieved BOD₅ and TSS effluent concentrations between 40 mg/l and 65 mg/l and could potentially be considered equivalent to secondary treatment pursuant to 40 CFR 133.101(g) (based on 40 CFR 133.105 limitations of

45 mg/l monthly average and 65 mg/l weekly maximum). In addition, 15 treatment trains achieved BOD₅ and TSS effluent concentrations below 15 mg/l each, and could potentially be considered greater than secondary treatment.

Using data from these 46 treatment trains only would omit the worst performers in the 50 POTW Study that are probably not reflective of current performance. It might not fully correct, however, for additional upgrades and optimization that may have occurred over the past two decades.

B. Assessment of Acceptable Data

EPA developed the pass-through analysis that is the basis for today's proposal using POTW data editing criteria that are generally consistent with those used for the industry data. Specifically, EPA included only data from POTWs for which influent concentrations were 10 times the analytical minimum (quantitation) level (10xML) if available. If none of the average pollutant influent concentrations are at least 10 times the ML, then EPA retained only data from POTWs for which influent concentrations were 2 times the analytical minimum level. Because it is difficult to achieve the same pollutant reduction (in terms of percent) in a dilute wastestream as in a more concentrated wastestream, EPA believes that a 10 X ML editing criteria may overestimate the percent removals that are calculated for both industry and POTWs in the pass-through analysis.

As a general rule, more POTW data than industry data is eliminated through this editing criteria for the specific pollutants that are being examined. This is not surprising since the pass-through analysis would not even be performed on pollutants generally found at less than 10 times the method minimum level in industry since EPA would, in many cases, not require pretreatment for such low levels of a pollutant. As a result of this imbalance (pollutant influent levels at POTWs being less than pollutant influent levels to industrial pretreatment), EPA believes that it is possible that this editing criteria may bias the pass-through results by over-estimating POTW removals where influent concentrations are generally lower. This would result in underestimating the pollutant reductions that are achieved through the regulation of indirect dischargers thereby making the rule appear less cost-effective than it is. On the other hand, there may be little difference in percent removals across the range of

influent concentrations generally experienced by POTWs.

One potential solution to this methodological question would be to include data (for both indirect dischargers and POTWs) even if the influent concentration is not 10 times the analytical minimum level. This solution needs to be considered in context, however, with data handling criteria for effluent measurements of "non-detect" discussed below.

C. Assessment of Removals When Effluent Is Below the Analytical Method Minimum Level

EPA developed the pass-through analysis that is the basis for today's proposal using the analytical method minimum level as the effluent value when the pollutant was not detected in the effluent. This is the approach that is generally used when developing pollutant reduction estimates for the regulation, performing cost-effectiveness calculations, and developing effluent limitations. EPA believes that this methodology may underestimate the performance of the selected technology option for both direct and indirects. Once again, this would result in underestimating the removals estimated for direct dischargers, and thereby making the rule appear less cost-effective than it is. For indirect dischargers, EPA believes that the overall effect of using the minimum level for non-detect values for both industry and POTW data creates a bias for underestimating POTW removals in comparison to industry removals. This may result in an overestimation of pollutant removals by indirect dischargers, and may make the rule appear more cost-effective than it is. [Note that this problem is minimized by only using data with influent levels exceeding 10 X ML, because a non-detect assures that at least 90 percent of the pollutant has been removed. It is arguably less important that the true removal may be greater than 90 percent, rather than exactly 90 percent. Using a less stringent editing criteria of 2 X ML as discussed above would exacerbate this problem. If the influent were only 2 X ML, then removals greater than 50 percent could never be measured.]

One potential alternative would be to assume a value of one half of the minimum level for effluent values of non-detect. This approach would have to be applied uniformly for the indirect dischargers as well as the POTWs in order for the percent removal calculations to be reasonable.

For a more detailed discussion of alternative approaches to the POTW pass-through analysis, see the Appendix

to Section 7 of the Technical Development Document. EPA solicits comment on the significance of each of these methodological issues and the potential alternatives.

XV. Methodology for Estimating Costs and Pollutant Reductions

EPA estimated industry-wide compliance costs and pollutant loadings using model sites based on technical questionnaire respondents and a computerized design and cost model for the MP&M technology options (see Sections 11 and 12 of the Technical Development Document for a detailed discussion of EPA's MP&M Design & Cost Model). The Agency estimated industry-wide costs and pollutant loadings for several technology options based on technologies designed for each subcategory of model sites. EPA used these model sites to estimate costs for 63,000 MP&M wastewater-discharging sites nationwide using statistically calculated industry weights (*i.e.*, survey sample weights). EPA notes that once the low flow exclusion is applied, the number of sites expected to incur costs under the MP&M regulation is 10,300.

There are 890 sites which indicated that they were water dischargers on their technical questionnaire and provided EPA with enough data to include them in the cost model. EPA assessed each of the 890 sites selected to determine the unit operations, wastewater characteristics and treatment technologies currently in place at the sites.

Based on the information provided by the sites in their questionnaire responses, follow-up letters, and phone calls, EPA classified each wastewater stream by the type of unit operation (*e.g.*, machining, electroplating, acid treatment, etc.) and base metal type (*e.g.*, steel, aluminum, zinc, etc.). The Agency used the following additional questionnaire data to characterize process wastewater streams: wastewater discharge flow rate, production rate, operating schedule, and discharge destination. Many of the sites provided these data for all wastewater streams generated on site. For sites that did not provide complete data, EPA either estimated the missing data based on technical considerations specific to the site, or statistically imputed the data. The Agency modeled the concentration of each pollutant in each wastewater stream from field sampling of wastewater discharges from the unit operations at MP&M sites. EPA used questionnaire responses to identify the following information about end-of-pipe technologies in place at MP&M sites: the types of treatment units in place; the

unit operations discharging process wastewater to each treatment unit; and the operating schedule of each treatment unit.

EPA developed a computerized design and cost model to estimate compliance costs and pollutant loadings for the MP&M technology options, taking into account each site's level of treatment in place. As a conservative estimate for estimating baseline (prior to compliance with these proposed regulations) pollutant loadings, EPA assumed that all sites with treatment currently in place (including those sites not currently covered by the Metal Finishing regulations) were currently meeting the long-term average (LTA) concentrations (*i.e.*, design concentrations) for the pollutants limited under the Metal Finishing effluent guidelines (40 CFR part 433) with the exception of cyanide and were meeting the LTA concentrations achieved by EPA's sampled MP&M BAT facilities for cyanide and other pollutants of concern. For sites that did not report treatment in place, EPA based baseline pollutant loadings on EPA's unit operation-by-unit operation sampling data for raw wastewater. The Agency programmed the model with technology-specific modules which calculated the costs for various combinations of technologies included in the technology options for each subcategory. EPA based design and cost data on MP&M site data, literature data, and vendor data. The Agency developed technology-specific cost modules for the in-process pollution prevention and water use reduction technologies and end-of-pipe treatment technologies discussed in Section VII.A of this notice.

The model provided the following types of information for each technology designed for a model site: capital costs; operating and maintenance costs; electricity used and associated cost; sludge generation and associated disposal costs; waste oil generation and associated disposal costs; water use reduction and associated cost credit; chemical usage reduction and associated cost credit; effluent flow rate; and effluent pollutant concentrations. This data enabled EPA to develop site by site compliance costs and pollutant reductions for the costed sites.

If contract hauling of wastewater for off-site treatment and disposal was less costly than on-site treatment, EPA estimated costs assuming the model site would contract haul the wastewater. EPA made this assessment on a technology-specific basis. When estimating costs for sludge disposal, EPA assumed all sludge to be F006

listed (or other F-listed hazardous waste) hazardous waste under RCRA (40 CFR 261.31) and would, therefore, be disposed of off-site as hazardous waste. As a conservative estimate for the model, EPA did not allow the time for storage of the sludge prior to disposal to exceed 90 days, regardless of the facilities RCRA generator status (*i.e.*, exempt, small, large). EPA notes that on March 8, 2000 (65 FR 12377), the Agency published a final regulation in the **Federal Register** extending the accumulation time, under RCRA, for certain wastewater treatment sludges from electroplating processes to be held on-site without requiring a hazardous waste storage permit. Facilities implementing pollution prevention, recycling and metals recovery meeting certain requirements can accumulate F006 sludge for up to 180 days for large quantity generators (or 270 days for small quantity generators).

After estimation of capital and operating and maintenance costs, EPA calculated the total capital investment (TCI), and the total annualized cost (TAC). The Agency assumed that

facilities meeting local limitations or national effluent limitation guidelines and pretreatment standards will already incur monitoring costs. EPA solicits comment on the whether facilities will incur additional monitoring costs to comply with today's proposal (and how much that monitoring would cost). EPA has incorporated several options for adding additional flexibility in regards to monitoring (See Section XXI.C for a discussion on monitoring flexibility). EPA expects that these proposed flexibilities will decrease the overall burden and costs of analytical wastewater monitoring for facilities within the scope of this rule.

XVI. Economic Impact and Social Cost Analysis

A. Introduction

EPA's economic analyses are presented in the report titled "*Economic, Environmental, & Benefit Analysis of the Proposed Metal Products & Machinery Rule* [EPA-821-B-00-008] (hereafter referred to as the "EEBA"). This report presents the social costs and

benefits of the proposed rule and alternatives, and estimates the expected economic impacts of compliance with the proposed rule in terms of facility closures and associated losses in employment. Other measures of economic impact include firm-level impacts, local community impacts, international trade effects, employment effects, and effects on new MP&M facilities. 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). This section of the preamble summarizes the economic impact and social cost findings from the EEBA. The reader is referred to the full report for the details of these analyses.

EPA's determination of economic achievability are based on the findings reported in the EEBA and discussed below. The options analyzed consist of combinations of comparable technology options for the different subcategories. The three options analyzed in the economic analyses are defined as follows:

TABLE XVI-1.—REGULATORY OPTIONS CONSIDERED IN THE ECONOMIC ANALYSES

Subcategory	Proposed rule	Option 2/6/10	Option 4/8
General Metals	Technology option 2; 1 mgly flow cutoff for indirect dischargers.	Technology option 2	Technology option 4.
Metal Finishing Job Shop	Technology option 2	Technology option 2	Technology option 4.
Non-Chromium Anodizing	Technology option 2; no PSES/ PSNS for indirect dischargers.	Technology option 2	Technology option 4.
Printed Wiring Board	Technology option 2	Technology option 2	Technology option 4.
Steel Forming & Finishing	Technology option 2	Technology option 2	Technology option 4.
Oily Wastes	Technology option 6; 2 mgly flow cutoff for indirect dischargers.	Technology option 6	Technology option 8.
Railroad Line Maintenance	Technology option 10; no PSES/ PSNS for indirect dischargers.	Technology option 10	Technology option 8.
Shipbuilding Dry Dock	Technology option 10; no PSES/ PSNS for indirect dischargers.	Technology option 10	Technology option 8.

Technology options 1 through 10 are described in Section VIII.A. of the preamble.

Technology options 1, 3, 5, 7 and 9 (without pollution prevention) were not further analyzed, because they remove fewer pollutants and cost more than the comparable technology options with pollution prevention.

The economic impact analyses assess how facilities will be affected financially by the proposed 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 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 job losses caused by facility closures and job gains associated with compliance;

- A foreign trade analysis, which assesses the effect of the proposed rule on the U.S. balance of trade;

- A new source impact analysis, which assesses the effect of effluent guidelines on the costs and financial

viability of new facilities in the MP&M industries; and

- The Initial Regulatory Flexibility Analysis (IFRA), which assesses the economic and financial impacts of the proposed rule on small entities.

B. Facility Level Impacts

1. Facility Categories Analyzed

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

- Private MP&M Facilities. This group includes privately-owned facilities that do not perform railroad line maintenance and are not owned by governments. This major category

includes private businesses in a wide range of sectors or industries, including. This segment includes facilities that manufacture and rebuild railroad equipment. Only facilities that repair railroad track and equipment along the railroad line are not included.

- Railroad line maintenance facilities maintain and repair railroad track, equipment and vehicles.

- Government-owned facilities include MP&M facilities operated by municipalities, State agencies and other public sector entities such as State universities. Many of these facilities repair, rebuild, and maintain buses, trucks, cars, utility vehicles (e.g., snow plows and street cleaners), and light machinery.

The specific methodology used to assess impacts differs for each of the three types of MP&M facilities. In each case, EPA established thresholds for measures of financial performance and compared the facilities' performance before and after compliance with each regulatory option with these thresholds.

2. Data Sources for the Facility Impact Analysis

The economic analyses rely on data provided by the financial portion of the detailed questionnaire distributed to MP&M facilities by EPA under the authority of Section 308 of the Clean Water Act ("Section 308 Survey"). (See Section V.B for information on the MP&M survey questionnaires). The survey was conducted in two phases, covering different MP&M industries in each phase. The Phase I survey covered seven industry sectors and reported data for fiscal years 1987 to 1989. The Phase II survey covered an additional ten industry sectors (all remaining MP&M sectors except Steel Forming and Finishing, which was the subject of a separate survey) and reported data for fiscal years 1994 to 1996. The survey financial data were extrapolated to 1999 dollars using the Producer Price Index. The survey financial data included three years of income statements and balance sheets for the facility; the composition of revenues by customer type and MP&M business sector; estimated value of facility assets and liabilities in liquidation; borrowing costs; ownership of the facility; and total revenues and employment of the owning entity (if separate from the facility). The impacts assessed for these sample facilities were extrapolated to the national level using facility sample weights that are based on the sample design for the industrial detailed surveys.

Data for facilities in the railroad line maintenance subcategory came from a modified version of the Phase II survey

administered to railroad operating companies. The questionnaire was modified because railroad operating companies generally do not monitor financial performance or collect financial data at the facility level for line maintenance facilities. The railroad operating companies reported the number of MP&M facilities in each operating unit, and provided detailed operating company financial data and technical data for each line maintenance facility.

Data for the Steel Forming and Finishing Subcategory came from a 1997 Section 308 survey of iron and steel facilities. This survey requested financial data generally similar to that collected by the MP&M surveys, including income statements and balance sheets for Fiscal Years 1995–1997 for the facility and the parent firm.

Government-owned MP&M facilities provided data in response to a Phase II Section 308 survey of municipal and other government agency facilities. This survey requested information on fiscal year 1996 sources and amounts of revenue and debt levels for both the government entity and the MP&M facilities; and demographic data for the population served by the government entity.

In addition to the survey data, a number of secondary sources provided data for the analysis. Secondary source data were used to characterize background economic and financial conditions in the industries subject to the MP&M effluent guideline. Secondary sources used in the analysis include:

- Department of Commerce economic census and survey data, including the Censuses of Manufactures, Annual Surveys of Manufactures, and international trade data;
- The Benchmark Input-Output Tables of the United States, published by the Bureau of Economic Analysis in the Department of Commerce;
- Price index series from the Bureau of Labor Statistics, Department of Labor;
- U.S. Industry and Trade Outlook, published by McGraw-Hill and the U.S. Department of Commerce;
- Industry trade publications; and
- Financial publications, including the Value Line Investment Survey and Robert Morris Associates annual data summaries.

3. Methodology and Impact Measures for the Facility Level Analysis

a. Private MP&M Facilities

EPA performed two categories of financial analysis, one to assess the potential for facility closures and the

other to assess the potential for moderate financial impacts on MP&M facilities. These analyses considered facility financial condition in the absence of the rule (under baseline conditions) and changes in financial condition that would result from the proposed rule.

EPA used two financial tests to estimate closures among general MP&M facilities:

- After-Tax Cash Flow: EPA examined after-tax cash flow (ATCF) over a three year period to determine the financial condition of general MP&M facilities.

- Net Present Value: EPA also performed a net present value (NPV) test, which compared the liquidation value of each facility to the present value of expected future earnings. A business may close if the value of closing (its liquidation value) exceeds its value as an ongoing business (calculated as the present value of expected future earnings).

EPA determined that a facility is subject to severe financial stress and is a potential closure if ATCF is negative, since businesses generally cannot sustain negative cash flows for long periods of time. This test used the average of reported financial data over three fiscal years. Baseline cash flow is defined as the sum of reported net income and depreciation. The measure is widely used within industry in evaluating capital investment decisions because both net income and depreciation (which is an accounting offset against income, but not an actual cash expenditure) are potentially available to finance future investment. However, assuming that total baseline cash flow is available over an extended time horizon (for example, 15 years) to finance investments related to environmental compliance could overstate a site's ability to comply. In particular, the cost of existing capital equipment (not associated with regulatory compliance) is not netted out of cash flow, as it is of income through the subtraction of depreciation. Thus, any costs associated with either replacing existing capital equipment, or repaying money that was previously borrowed to pay for it, are omitted from the facility analysis. EPA requests comment on its use of cash flow as a measure of resources available to finance environmental compliance and suggestions for alternative methodologies. (See Section XXII of today's notice.)

Where estimates of liquidation values were available, EPA also conducted the NPV test. NPV is the present value of expected future earnings less the

liquidation value (including closure and post-closure costs) of the facility. If NPV is negative, then a business owner is financially better off closing the facility and liquidating its assets, rather than keeping the facility open. EPA estimated the present value of the facility's expected future earnings by discounting its annual after-tax cash flow over a fifteen-year period using a 7 percent discount rate. EPA presumed that a facility was a potential closure if the facility had an NPV less than zero.

Where liquidation values were available, facilities that failed *both* tests under baseline conditions are baseline closures. Facilities that pass at least one of the two tests in the baseline case but then fail both tests post-compliance were considered closures due to the rule. Where liquidation values were not provided by the survey, EPA applied only the ATCF test to identify baseline and regulatory closures.

In many past rules, EPA has used only the cash flow test to predict both baseline and regulatory closures. Using

both tests presents a higher hurdle and thus makes it less likely that a facility experiencing stress will be projected to close. Due to data limitations, both tests were used for only 18,913 (approximately a third) of the 58,421 private MP&M facilities considered in the analysis. For the remaining two-thirds of the facilities, only the after-tax cash flow test was used. Table XVI-2 shows the impacts on estimated closures of using both tests, rather than the cash flow test alone, to predict closures.

TABLE XVI-2.—BASELINE CLOSURES, REGULATORY CLOSURES, AND NATIONAL ESTIMATES OF COMPLIANCE COSTS FOR PRIVATE MP&M FACILITIES BY STATUS UNDER TESTS FOR CLOSURES: 18,913 FACILITIES FOR WHICH BOTH TESTS WERE USED

Closure test	Baseline closures	Facilities remaining open in the baseline	Status under proposed option	
			Regulatory closures	Pre-tax compliance costs (\$1999 million)
Fail ATCF Only	3,211	15,766	225	\$1,782.6
Fail NPV Only	4,243	14,734	244	1,657.2
Double Test: Fail ATCF and NPV Text	2,711	16,266	169	1,793.4

If the cash test alone had been used, about 500 additional baseline closures and 56 additional regulatory closures would have been projected for the proposed rule. Depending on the subcategories in which these facilities were located, this could have affected EPA's achievability determinations in some cases. EPA requests comment on its methodology for estimating facility closures for this rule.

All sellers in an affected market may benefit from higher prices when prices rise in response to compliance costs, whether or not they incur compliance costs under the rule. Some facilities that have very low compliance costs may even gain more from increased prices than they lose due to increased costs associated with the rule. The analysis takes into account the effect of price increases that are attributable to the regulation. The estimated price increases were generally less than 1 percent and in no case exceeded 2 percent.

EPA also identified private MP&M facilities that are not expected to close but that might nonetheless experience moderate financial impacts as a result of the rule. The analysis of moderate financial impacts examined two financial indicators:

- Pre-Tax Return on Assets (PTRA): The ratio of cash operating income to total assets measures the facility's profitability.

- Interest Coverage Ratio (ICR): The ratio of cash operating income to interest expenses measures the facility's ability to service its debt and borrow for capital investments.

These two measures are among the criteria that creditors and equity investors use to determine whether and under what terms to provide financing to a business. The PTRA and ICR also provide insight into the ability of a business to generate funds for compliance investments internally. A business may have some trouble obtaining financing if its profitability is low and its ability to pay its continuing interest expenses is uncertain. EPA compared baseline and post-compliance PTRA to an 8 percent threshold and ICR to a threshold of 4. A facility is considered subject to incremental moderate impacts attributable to the proposed regulation if its PTRA and its ICR both pass these thresholds in the baseline but it fails one or both of the tests after compliance with the rule. Facilities failing one of the tests in the baseline and both tests post-compliance were not counted as experiencing moderate impacts, but this may in some cases be indicative of moderate rule-related impacts as well.

EPA assumed that MP&M facilities would be able to recover some of their regulatory costs by raising prices to their customers. An analysis of the potential for cost recovery considered conditions in each individual MP&M industrial

sector industry (e.g. aircraft, aerospace, electronic equipment, etc.) Cost pass-through factors were estimated for each sector. The cost pass-through factor blends findings from two separate analyses to estimate a composite measure of pass-through potential:

- An econometric analysis of the historical relationship between output prices and changes in input costs; and
- An analysis of indicators of pass-through potential based on market structure and performance.

Market structure factors include:

- Market power based on the degree of horizontal and vertical integration;
- Extent of competition from foreign suppliers (in both domestic and export markets);
- Barriers to competition as indicated by above normal, risk-adjusted profitability; and
- Long term growth trends in the industry.

The analysis of pass-through potential indicates the percentage of compliance costs that EPA expects firms subject to regulation to recover from customers through increased prices. The estimated percentage price increases were very small for the proposed rule, ranging from 0.02 percent to less than two percent in different sectors. This analysis can be found in Appendix B of the EEBA.

Table XVI-3 summarizes the measures used to assess impacts for private MP&M facilities.

TABLE XVI-3.—SUMMARY OF FACILITY IMPACT METHODOLOGY FOR PRIVATE MP&M FACILITIES

Impact category	Description	Criteria	Significance of negative finding
Baseline Closure	Identifies facilities that are in jeopardy of financial failure independent of the proposed regulation.	1. After-tax cash flow (ATCF) negative? and 2. Liquidation value exceed going concern value (NPV test)?	Facilities failing both tests are considered baseline closures and excluded from subsequent analyses.
Post-Compliance Closure	Identifies facilities that are likely to close instead of implementing the pollution prevention and treatment systems required to comply with the rule.	1. Post-compliance after-tax cash flow (ATCF) negative? and 2. Liquidation value exceed post-compliance going concern value?	Facilities failing both tests are projected to close as the result of regulation—an incremental severe economic impact.
Moderate Financial Impacts	Identifies facilities that may have difficult financing compliance investments or on-going business investments as a result of the rule.	1. Decline in pre-tax return on assets (PTRA) to a level that jeopardizes access to financing? or 2. Decline in interest coverage ratio (ICR) to a level that jeopardizes access to financing?	Facilities passing both tests in the baseline but failing one or both tests post-compliance are considered to experience incremental moderate economic impacts attributable to the regulation.

b. Railroad Line Maintenance Facilities

Railroad operators are unlikely to evaluate the financial performance of repair and maintenance facilities as separate profit centers, and are therefore not likely to estimate revenues at the facility level. EPA conducted an analysis of impacts of these facilities at the railroad operating company level, and assessed whether the combined impact of compliance costs for the regulated facilities owned by each operating company would cause a deterioration in the company's financial performance. The analysis predicted that railroad line maintenance facilities would close only if the railroad operating company as a whole was predicted to close, based on the same closure tests described above for other private MP&M facilities. Railroad facilities other than the line maintenance facilities perform the same type of operations as other MP&M facilities and are included in the General Metals and Oily Wastes subcategories, depending on their MP&M activities.

c. Government-Owned Facilities

Governments with facilities affected by the proposed rule may take one of three actions in response to the rule:

- Replace one or more MP&M municipal facilities with a non-municipal provider for services;
- Discontinue these services altogether; or
- Pay for compliance and continue operations.

EPA assumed that all government-owned facilities would continue operating under the proposed rule. The economic impact analysis for these facilities evaluates whether a government entity would incur a major budgetary burden as a result of complying with the proposed rule. Like

private firms, governments could in some cases minimize the impact of the proposed rule on their budgets by discontinuing operations at the regulated facility, rather than paying the costs of compliance. Unlike the analysis for private sector MP&M facilities, the analysis of government impacts did not consider potential closures and therefore may overstate the impacts of the rule on governments that own MP&M facilities.

EPA evaluated impacts for government-owned facilities by performing three tests.

- Impacts on site-level cost of service:

This test assesses whether facility compliance costs would exceed one or more percent of the total baseline cost of service at that facility. EPA assumed that facilities can absorb compliance costs within their current budget if the costs do not exceed one percent of total costs in the baseline.

- Impacts on taxpayers: This test compared compliance costs to the income of households that are served by the relevant government, and that may support the government through taxes and fees. (If the government is a regional transit authority, for example, then the households included in this analysis are all households in the region that provides funding for the transit authority, as reported in the Phase II Section 308 survey.) A government might be expected to experience impacts if the ratio of total annualized pollution control costs per household to median household income exceeds one percent post-compliance. This comparison considered the government entity's existing pollution control costs plus the compliance costs incurred by all of its MP&M facilities under this rule. EPA uses this test in its Economic Guidance for Water Quality Standards as a screening measure to determine

when communities would incur "little economic impact" from total pollution control costs. EPA recognizes that most local governments receive at most a few percent of the income of their tax or fee base (and some receive much less). Thus, one percent of median income for pollution control costs alone may be a very significant share of the local government's total budget.

- Impact on government debt levels: This test assessed the impact of financing the capital costs of compliance on the government's overall debt burden. The government might be expected to experience impacts if financing all of the compliance capital investments would increase its total debt service payments to more than 25 percent of baseline revenue. This criterion is used in EPA's MUNIPAY model as a level beyond which debt service costs might adversely affect a community's credit-worthiness. EPA determined that a government facility that failed all three tests is likely to suffer severe adverse impacts as a result of the rule. As shown in Table XVI-12 below, no governments fail the latter two tests. However, 215 facilities failed the site-level cost of service test. The governments operating these facilities could experience some level of impacts as a result of the rule, if these facilities represent a significant cost to their budgets. Government owned facilities perform the same type of operations as other MP&M facilities and are included in the General Metals and Oily Wastes subcategories, depending on their MP&M activities.

4. Baseline Closure Analysis

The estimated baseline closures for both indirect and direct discharge facilities are summarized in Table XVI-4. Of the estimated 62,752 discharging facilities, 6.1 percent or 3,829 facilities

were assessed as baseline closures. The 3,829 baseline closures include 3,678 indirect dischargers, or 6.3 percent of indirect dischargers, and 151 direct dischargers, or 3.1 percent of direct dischargers. The facilities estimated to close in the baseline analysis are in

jeopardy of financial failure independent of the proposed rule. 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. EPA's estimate may therefore understate actual baseline closures somewhat.

TABLE XVI-4.—SUMMARY OF BASELINE CLOSURES

Subcategory	Total number of dischargers	Number of baseline closures	Percent of baseline closures	Operating in baseline
General Metals	29,975	3,199	10.7	* 26,776
Metal Finishing Job Shop	1,530	286	18.7	1,244
Non-Chromium Anodizing	190	40	21.1	150
Printed Wiring Board	635	3	0.5	632
Steel Forming & Finishing	153	6	3.9	147
Oily Wastes	29,425	295	1.0	29,130
Railroad Line Maintenance	832	0	0.0	832
Shipbuilding Dry Dock	11	0	0.0	11
All Categories	62,752	3,829	6.1	* 58,922

* Excludes 64 facilities that close under baseline conditions but that are expected to continue operating under the proposed rule.
 Note: may not sum to totals due to independent rounding.

Of the facilities closing in the baseline, 64 are projected to continue operating under the proposed rule because they qualify for the low flow cutoff (and therefore incur no compliance costs) but benefit from price increases caused by the rule. These 64 facilities are not considered in the remainder of the economic impact analysis.

5. Facility Level Costs by Subcategory

The Technical Development Document presents EPA's engineering estimates of costs that will be incurred by facilities to comply with the proposed rule and other regulatory options. EPA adjusted the engineering costs from 1996 to 1999 dollars using the *Engineering News-Record* Construction Cost Index (CCI), and adjusted the costs to reflect the effect of taxes using the maximum Federal income tax rate of 34 percent. The annual equivalent of capital and other

one-time costs is calculated 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 paid by those facilities that continue to operate in compliance with the rule. Aggregate compliance costs presented in this section differ from the costs presented in Section IX because they exclude costs for facilities that are baseline closures or that close due to regulatory requirements. They therefore represent only the compliance outlays of facilities that continue to operate. Section H presents EPA's estimates of social costs, which include costs for regulatory closures. Table XVI-5 shows the total annualized compliance costs by subcategory for the 9,577 dischargers (direct and indirect) that are subject to requirements, make the necessary investments to meet the requirements, and continue operating under the proposed rule. The table also presents

costs for Option 2/6/10 and Option 4/8, but results are discussed for only the proposed option to reduce the length of this document.

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 after-tax compliance costs are estimated to be \$1,328.9 million (\$1.33 billion)³ per year under the proposed rule, of which 13 percent is paid by direct dischargers and 87 percent is paid by indirect dischargers. A total of 49,147 indirect dischargers are excluded from regulation by the proposed exclusions and low flow cutoffs. Total compliance costs would be 36 percent higher under Option 2/6/10 (\$1,812 million per year paid by 57,641 facilities) and 120 percent higher under Option 4/8 (\$2,918 million per year paid by 55,959 facilities) than under the proposed rule.

TABLE XVI-5.—TOTAL ANNUALIZED FACILITY * COMPLIANCE COSTS BY SUBCATEGORY, DISCHARGE STATUS AND REGULATORY OPTION [After-tax, million \$1999]

Subcategory	Proposed rule		Option 2/6/10		Option 4/8	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
General Metals	\$132.3	\$969.9	\$132.3	\$1,295.8	\$195.1	\$1,885.5
Metal Finishing Job Shop	0.8	80.1	0.8	80.1	1.5	112.1
Non-Chromium Anodizing .....	.....	0.0	.....	17.5	.....	26.0
Printed Wiring Board	1.7	93.4	1.7	93.4	3.0	141.2
Steel Forming & Finishing	20.9	14.0	20.9	14.0	22.7	21.8
Oily Wastes	9.3	4.3	9.3	143.8	50.0	457.4
Railroad Line Maintenance	0.8	0.0	0.8	0.2	0.9	0.4

³ EPA notes that pre-tax annualized compliance costs are estimated to be \$1.98 billion (in 1999 dollars).

TABLE XVI-5.—TOTAL ANNUALIZED FACILITY * COMPLIANCE COSTS BY SUBCATEGORY, DISCHARGE STATUS AND REGULATORY OPTION—Continued
[After-tax, million \$1999]

Subcategory	Proposed rule		Option 2/6/10		Option 4/8	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Shipbuilding Dry Dock	1.4	0.0	1.4	0.1	0.4	0.1
All Categories: Annual Costs	167.2	1,161.7	167.2	1,644.9	273.6	2,644.5
All Categories: Number of Regulated Facilities Continuing to Operate Post-Regulation	4,633	4,944	4,633	53,008	4,615	51,344
Total Costs to Industry by Option, Directs + Indirects	\$1,328.9		\$1,812.1		\$2,918.1	

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

Note: May not sum to totals due to independent rounding.

6. Facility Level Impacts by Subcategory

The findings from the post-compliance impact analyses are summarized below, first for the PSES requirements considered for indirect discharging facilities, and then for the BAT/BPT options considered for direct discharging facilities. A third section summarizes the findings for both discharger classes. Impacts are discussed for only the proposed option, to reduce the length of the document; however, the tables present the results for Option 2/6/10 and Option 4/8. Impacts are not presented for Options 1, 3, 5, 7, and 9 (without pollution prevention) because these options remove fewer pollutants and cost more than the comparable Options 2, 4, 6, 8, and 10.

a. Indirect Dischargers

Of the 54,270 indirect discharging facilities subject to regulation after baseline closures, EPA estimates that 179 facilities or 0.3 percent could be expected to close as the result of the proposed rule, as shown in Table XVI-6. More than 90 percent of the indirect dischargers are excluded from the regulation by the low-flow cutoffs for the General Metals and Oily Wastes subcategories, and the exclusions for Non-Chromium Anodizers, Railroad Line Maintenance and Shipbuilding Dry Docks. The employment losses associated with the facility closures are estimated at 5,738 full-time equivalent (FTE) positions. The estimated losses in employment are probably substantial overestimates because the analysis does

not account for the likelihood that non-closing facilities will absorb some of the employment lost from closing facilities. The proposed rule also creates new employment demand to build, install, maintain and operate compliance equipment, which offset these job losses. These job gains are discussed in Section XVI-H.4.

Another 575 facilities, or one percent of the indirect dischargers operating in the baseline, are expected to experience moderate economic impacts under the proposed rule, as shown in Table XVI-7. Both closures and moderate impacts increase substantially for Option 2/6/10 and Option 4/8, compared to the proposed rule.

TABLE XVI-6.—INCREMENTAL SEVERE IMPACTS (FACILITY CLOSURES) ON INDIRECT DISCHARGERS

Subcategory	Total operating in baseline	Number of facility closures due to the rule		
		Proposed rule	Option 2/6/10	Option 4/8
General Metals	23,140	24	1,017	2,140
Metal Finishing Job Shops	1,231	128	128	393
Non-Chromium Anodizing	150	0	91	91
Printed Wiring Board	620	7	7	25
Steel Forming & Finishing	105	6	6	6
Oily Wastes	28,219	14	14	271
Railroad Line Maintenance	799	0	0	0
Shipbuilding Dry Dock	6	0	0	0
All Categories	54,270	179	1,262	2,925

Note: May not sum to totals due to independent rounding.

TABLE XVI-7.—INCREMENTAL MODERATE IMPACTS ON INDIRECT DISCHARGERS

Subcategory	Total operating in baseline	Number of facilities experiencing moderate impacts due to the rule		
		Proposed rule	Option 2/6/10	Option 4/8
General Metals	23,140	153	1,753	1,737
Metal Finishing Job Shops	1,231	117	117	117
Non-Chromium Anodizing	150	0	0	0
Printed Wiring Board	620	301	301	315
Steel Forming & Finishing	105	4	4	4
Oily Wastes	28,219	0	0	26
Railroad Line Maintenance	799	0	0	0
Shipbuilding Dry Dock	6	0	0	0

TABLE XVI-7.—INCREMENTAL MODERATE IMPACTS ON INDIRECT DISCHARGERS—Continued

Subcategory	Total operating in baseline	Number of facilities experiencing moderate impacts due to the rule		
		Proposed rule	Option 2/6/10	Option 4/8
All Categories	54,270	575	2,175	2,199

Note: May not sum to totals due to independent rounding.

Another 575 facilities, or one percent of the indirect dischargers operating in the baseline, are expected to experience moderate economic impacts under the proposed rule, as shown in Table XVI-7. Both closures and moderate impacts increase substantially for Option 2/6/10 and Option 4/8, compared to the proposed rule.

b. Direct Dischargers

Of the 4,653 direct discharging facilities subject to regulation after

baseline closures, EPA estimates that 20 facilities or 0.4 percent could be expected to close as the result of the proposed rule. These 20 are all General Metals facilities, and represent 0.6 percent of the 3,636 General Metals Direct Dischargers operating in the baseline. The employment losses associated with these facility closures are estimated at 178 FTEs. Again, estimated losses in employment associated with closures are likely to be overstated, because the analysis does

not account for the likelihood that non-closing facilities will absorb some of the employment from closing facilities. In addition, compliance requirements at facilities that continue to operate will lead to off-setting increases in employment.

Another 41 facilities, or 0.9 percent of the 4,653 direct dischargers operating in the baseline, would be expected to experience moderate financial impacts due to the rule, as shown in Table XVI-9.

TABLE XVI-8.—INCREMENTAL SEVERE IMPACTS (FACILITY CLOSURES) ON DIRECT DISCHARGERS

Subcategory	Total in baseline operating	Number of facility closures due to the rule		
		Proposed rule	Option 2/6/10	Option 4/8
General Metals	3,636	20	20	35
Metal Finishing Job Shops	12	0	0	0
Non-Chromium Anodizing* .....	.....	.....	.....	.....
Printed Wiring Board	11	0	0	0
Steel Forming & Finishing	43	0	0	2
Oily Wastes	911	0	0	0
Railroad Line Maintenance	34	0	0	0
Shipbuilding Dry Dock	6	0	0	0
All Categories	4,653	20	20	37

* EPA estimates that there are no facilities in the Non-Chromium Anodizing subcategory that discharge directly to surface waters.

Note: May not sum to totals due to independent rounding.

TABLE XVI-9.—INCREMENTAL MODERATE IMPACTS ON DIRECT DISCHARGERS

Subcategory	Total operating in the baseline	Number of facilities experiencing moderate impacts due to the rule		
		Proposed rule	Option 2/6/10	Option 4/8
General Metals	3,636	34	34	103
Metal Finishing Job Shops	12	0	0	0
Non-Chromium Anodizing* .....	.....	.....	.....	.....
Printed Wiring Board	11	0	0	0
Steel Forming & Finishing	43	7	7	7
Oily Wastes	911	0	0	0
Railroad Line Maintenance	34	0	0	0
Shipbuilding Dry Dock	6	0	0	0
All Categories	4,653	41	41	110

* EPA estimates that there are no facilities in the Non-Chromium Anodizing subcategory that discharge directly to surface waters.

Note: May not sum to totals due to independent rounding.

c. Summary of Facility Impacts

Table XVI-10 summarizes the results of the economic impact analysis for all facilities and for all regulatory options analyzed. Closures and moderate impacts under the proposed option are

substantially lower than in Option 2/6/10 and Option 4/8. Of the 616 facilities experiencing moderate impacts due to the proposed rule, 137 facilities fell below the threshold for pre-tax return on assets only, 38 fell below the interest coverage ratio threshold only, and 441

fell below both thresholds due to the rule. Job losses due to closures are more than off-set by job gains associated with compliance requirements under the proposed option. (See Section XVI-H.4 for a discussion of employment impacts.)

TABLE XVI-10.—SUMMARY OF INCREMENTAL FACILITY IMPACTS FOR ALL FACILITIES

Subcategory	Regulatory option		
	Proposed rule	Option 2/6/10	Option 4/8
Number of Facilities Operating in Baseline	58,922	58,922	58,922.
Number of Closures (severe impacts)	199	1,282	2,963.
Percent Closing	0.3	2.2	5.0.
Job losses due to closures (FTE-years)	5,916 (over 3 years)	16,834 (over 3 years)	48,070 (over 3 years).
Job gains due to compliance requirements (FTE-years).	8,487 (over 15 years)	12,023 (over 15 years)	27,535 (over 15 years).
Number of Additional Facilities with Moderate Impacts.	616	2,216	2,309.
Percent with Moderate Impacts	1.0	3.8	3.9.
Annualized Compliance Costs (pre-tax, billion \$1999).	\$1.98	\$2.67	\$4.18.
Annualized Compliance Costs (after-tax, billion \$1999).	\$1.33	\$1.81	\$2.92.

C. Firm Level Impacts

EPA examined the impacts of the proposed 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. The firm-level analysis is also used to compare impacts on small versus large firms, as required by the Regulatory Flexibility Act and the Small Business Regulatory Enforcement Fairness Act. (RFA/SBREFA issues are discussed in Section XX.C of this preamble.)

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 private entities. (Section XVI.D discusses impacts on governments that own MP&M facilities). The Phase I, Phase II industrial detailed, and Iron & Steel surveys identified the parent firm that owns each facility that responded to the survey. In addition, the Phase II industrial detailed survey requested that respondents provide information on other MP&M facilities owned by the same firm, on a voluntary basis. 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 the national numbers of firms that own

MP&M facilities precisely, because the sample weights based on the survey design represent numbers of facilities rather than firms. Most MP&M facilities (43,118 of 54,590, or 80 percent) are single-facility firms, however. These firms can be analyzed using the survey weights. In addition, there are 289 firms that own more than one sample facility. These firms are included in the analysis with a sample weight of one, since it is not known how many firms these 289 sample firms represent. EPA's analysis of firm-level impacts is presented in Chapter 9 of the EEBA.

Table XVI-11 shows the results of the firm-level analysis. The results represent a total of 43,407 MP&M firms (43,118 + 289), owning 54,590 facilities (43,118 owned by single-facility firms + 11,473 owned by multi-facility firms).

TABLE XVI-11.—FIRM LEVEL BEFORE-TAX ANNUAL COMPLIANCE COSTS AS A PERCENT OF ANNUAL REVENUES FOR PRIVATE SMALL BUSINESSES: PROPOSED RULE

Number of firms in the analysis*	Number and percent with before-tax annual compliance costs/annual revenues equal to:					
	Less than 1%		1-3%		Over 3%	
	Number	Percent	Number	Percent	Number	Percent
43,407	41,236	95	1,070	2.5	1,101	2.5

*Firms whose only MP&M facilities close in the baseline are excluded.

A small percentage (2.5 percent) of the firms in the analysis incur before-tax compliance costs equal to 3 percent or more of annual revenues. Ninety-five percent incur compliance costs less than 1 percent of annual revenues, and the remaining 2.5 percent incur costs between 1 and 3 percent of revenues. Of 2,171 firms in the analysis that incur costs greater than 1 percent of revenues, 636 are single-facility small firms that were reported in the facility impact analysis to close (161 firms) or

experience moderate impacts (475 firms) due to the rule.

This analysis is likely to overstate costs at the firm level for two reasons. First, it includes compliance costs for facilities that are projected to close due to the rule. The estimated compliance costs for these facilities are higher than the true cost to the firm of shutting down the facility, as illustrated by the detailed facility impact analysis that projects closures. Second, the analysis does not take account of actions a multi-facility firm might take to reduce its

compliance costs under the proposed rule. These include transferring functions among facilities to consolidate wet processes and take advantage of scale economies in wastewater treatment.

D. Impacts on Governments

The proposed MP&M rule will affect governments in two ways:

- Government-owned MP&M facilities may be directly affected by the MP&M regulation and therefore incur compliance costs; and

• Municipalities that own Publically Owned Treatment Works (POTWs) that receive influent from MP&M facilities subject to the regulation may incur additional costs to implement the proposed rule. These include costs associated with permitting MP&M facilities that have not been previously permitted, and with repermitting some MP&M facilities with existing control mechanisms (e.g., permits) earlier than would otherwise be required. In addition, POTWs may elect to issue mass-based control mechanisms to some MP&M facilities that currently have concentration-based control mechanisms, at an additional cost.

1. Impacts on Government-Owned Facilities

EPA administered a survey (the "Municipal Survey") to government-

owned facilities to assess the cost of the regulation on these facilities and the government entities that own them. (See Section V.B for a discussion of EPA's data collection efforts.) The survey requested information that provides the basis for EPA's analysis of the budgetary impacts of the proposed regulation, including 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.

EPA discusses the methodology for assessing impacts on government-owned facilities in more detail in Section XVI.B.3.c. In summary, EPA used three tests to assess whether

MP&M facility compliance costs would impose major budgetary impacts on the governments that own the facilities: impacts on site-level cost of service, impacts on taxpayers, and impacts on government debt. The first test assesses impacts at the facility level and the second two tests assess impacts at the government level. The Agency judged that a government would incur major budgetary impacts due to the rule if it failed all three tests.

The two government-level tests are applied incrementally. Governments that fail the test in the baseline are not considered to experience budgetary impacts attributable to the rule.

Table XVI-12 provides national estimates of the number of MP&M facilities operated by governments that are potentially subject to the proposed rule, by type and size of government.

TABLE XVI-12.—NUMBER OF GOVERNMENT-OWNED FACILITIES BY TYPE AND SIZE OF GOVERNMENT ENTITY

Size of government and status under proposed option	Municipal government	State government	County government	Regional governmental authority	Total
Large Governments (population > 50,000)	572	366	686	36	1,660
Small Governments (population <=50,000)	2,191	.....	481	.....	2,672
All Governments	2,763	366	1,167	36	4,332

Table XVI-13 summarizes the status of government-owned facilities under

the various regulatory options, their compliance costs and measures of

impacts on government that own MP&M facilities.

TABLE XVI-13.—NUMBER OF REGULATED GOVERNMENT-OWNED FACILITIES, COMPLIANCE COSTS AND BUDGETARY IMPACTS BY REGULATORY OPTION

	Proposed option	Option 2/6/10	Option 4/8
Total Number of Government-Owned Facilities	4,332	4,332	4,332
Number of facilities exempted by low-flow cutoff	3,603	.....	.....
Number of facilities subject to regulation	729	4,332	4,332
Compliance costs (\$1999 million)	\$14.1	\$64.8	\$224.7
Number of facilities with compliance costs > one percent of baseline cost of service*	215		
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 proposed rule 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.

Table XVI-13 shows that the proposed rule substantially reduces costs and impacts relative to the other options considered for government-owned facilities, because 3,603 (83 percent) of the facilities are exempted under the low flow cutoffs (110 General

Metals facilities and 3,492 Oily Wastes facilities.) Compliance costs would be more than 4½ times higher under Option 2/6/10 and 16 times higher under Option 4.

An estimated 215 government-owned facilities (5 percent of the total) would

incur costs under the proposed rule exceeding one percent of their baseline cost of service. Therefore, 95 percent of the government-owned facilities either incur no costs or are likely to be able to absorb the added costs within their 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 proposed rule will not impose major budgetary burdens on any of the governments that own MP&M facilities.

2. POTW Administrative Costs

EPA also evaluated the costs incurred by governments to administer the rule. The rule is not expected to impose any new administrative costs associated with direct dischargers, which are already permitted by States. However, control authorities will have to issue control mechanisms (e.g., permits) for the first time to some indirect discharging facilities and will have to accelerate repermitting for some indirect dischargers that currently hold control mechanisms.

The costs of issuing and enforcing permits and control mechanisms associated with the proposed rule are discussed in Section XVI.H.3 of this preamble. EPA is able to estimate total costs to POTWs, but is not able to estimate the costs to any one POTW, since it is not possible to determine what POTWs receive discharges from MP&M facilities except for those that responded to the surveys.

EPA estimates that POTWs as a whole will incur incremental average annualized costs over 15 years of between \$115,000 and \$912,000 under the proposed rule. The maximum expenditures by all affected POTWs in any one year will be between \$186,000 and \$1,607,000. These costs include issuing new control mechanisms (e.g., permits) to facilities that do not currently have permits, issuing mass-based permits to some facilities that currently have concentration-based permits, and repermitting some facilities sooner than would otherwise be required to meet the three-year compliance schedule. On average, a POTW's costs for the incremental permitting are only \$23 to \$184 per permitted MP&M indirect discharger under the proposed rule.

EPA is requiring mass-based permits/control mechanisms only for the Steel Forming & Finishing subcategory; permits/control mechanisms for other subcategories may be concentration-based. EPA is encouraging permit writers and control authorities to issue mass-based permits and control mechanisms, however, where appropriate and feasible. The analysis of permitting costs assumes for costing purposes that one-third of the new or reissued permits/control mechanisms in subcategories other than Steel Forming & Finishing will be mass-based.

EPA expects that these increases in costs will be partially offset by reductions in government administrative costs for facilities that are already permitted under local limits and that will be repermited under this rule. The proposed technical guidance provided by EPA as a part of this rulemaking may reduce the research required by permit writers/control authorities in developing permits and control mechanisms based on Best Professional Judgement (BPJ) for industrial dischargers not previously covered by a categorical standard or a water quality standard. Further, the establishment of discharge standards may reduce the frequency of evidentiary hearings. The promulgation of limitations may also enable EPA and the authorized States to cover more facilities under general permits. EPA did not estimate these cost savings to permitting authorities that may result from the rule.

E. Community Level Impacts

EPA considered the potential impacts of changes in employment due to the proposed rule on the communities where MP&M facilities are located. Changes in employment due to the rule include both job losses that occur when facilities close and job gains associated with facilities' compliance activities. EPA estimated that a total of 5,916 jobs would be lost at the 199 facilities projected to close under the proposed rule. At the same time, EPA estimated that manufacturing and installing compliance equipment would lead to 4,488 full-time equivalent (FTE) positions, and that operating and maintaining compliance systems would result in another 286 FTEs per year. Over a 15 year analysis period, the net effect of job gains and losses caused by the rule is an increase of 2,575 FTE-years or an average of 172 FTEs per year. This estimate assumes that workers that lose their job are unemployed for an average of one year, and that compliance investments and closures occur evenly over the first three years after promulgation. This estimate of employment impacts is likely to understate the net increase, because it ignores the fact that some production and employment lost at closing plants is likely to result in increased production and employment at other MP&M facilities. (EPA's analysis of employment impacts is discussed in more detail in Section XVI-H.4 below and in Chapter 6 of the EEBA.)

Given the projected overall increase in employment due to the proposed rule, EPA does not expect the rule to have significant impacts at the

community level. It is not possible to predict precisely where the job gains and losses will occur. However, facilities that are projected to close due to the rule have employment ranging from 2 to 205 FTEs. MP&M facilities tend to be located in industrialized urban areas, and closures of this size are not likely to have a major impact on a local economy.

F. Foreign Trade Impacts

U.S. MP&M producers as a group exported products with a value of \$380.3 billion in 1999. Imports to the U.S. of the same products in 1999 totaled \$539.1 billion, resulting in an overall net MP&M commodity trade deficit of \$153.8 billion. Some MP&M sectors contribute to a positive commodity trade balance (e.g. aircraft, with a \$37.0 billion positive balance in 1999). In other sectors, substantially more products are imported than exported (e.g. motor vehicles, with a net negative balance of \$96.8 billion.) Exports and imports by MP&M sector are discussed in Chapter 3 of the EEBA.

The proposed rule will have an impact on the balance of trade in MP&M products to the extent that prices for MP&M products increase and MP&M facilities reduce production. Imports may increase if domestic customers switch from domestic suppliers to foreign suppliers of MP&M products, and exports may decrease if foreign customers switch from purchasing U.S. exports to other suppliers. On the other hand, business lost by the regulated MP&M facilities due to their increased costs may be captured by other domestic producers.

Section XVI.B of this preamble and Chapter 5 of the EEBA describe EPA's analysis of changes in output that are expected to result from the proposed rule. EPA assessed the impact of these market-level changes on the U.S. balance of trade using information provided by the industrial general surveys on the source of competition in domestic and foreign markets. This analysis allocates the value of changes in output for each facility that is projected to close due to the rule to exports, imports or domestic sales, based on the predominant source of competition in each market reported in the surveys.

Table XVI-14 shows the results of this analysis. The table compares the projected changes in exports, imports and balance of trade (expressed in \$1999) to baseline 1999 values for both the MP&M industries and for the U.S. balance of trade in commodities as a whole. The projected changes in trade under the proposed rule have a very

small impact on the balance of trade. commodities would decline by less than the MP&M industries would decline by
 The total U.S. balance of trade in 0.01 percent and the balance of trade in 0.01 percent.

TABLE XVI-14.—PROPOSED RULE IMPACTS ON FOREIGN TRADE
 [Million \$1999]

	1999 value of exports	1999 value of imports	Balance of Trade
Baseline			
U.S. Commodity Trade	695,797	1,024,618	(328,821)
MP&M Industries	380,305	534,141	(153,836)
Post-Compliance			
Change Due to the Proposed Rule	0	21.1	(21.1)
Percent Change In U.S. Commodity Trade Balance	0%	<0.01%	<0.01%
Percent Change in MP&M Industries Trade Balance	0%	<0.01%	0.01%

Source: U.S. Census and U.S. Environmental Protection Agency.

G. Impacts on New Facilities

EPA assessed the impacts of the proposed rule on new facilities based on the characteristics of a model facility in each subcategory and (in some cases) discharge category (direct and indirect). Engineering estimates of compliance costs for Option 2/6/10 and Option 4/8 for a representative facility reflect the typical flow size and other technical characteristics of facilities in each category. (See the Technical Development Document.) Table XVI-15 lists the compliance costs and flow size for a representative model facility in each category, along with the regulatory option considered for each subcategory.

In absence of the MP&M rule, new sources in the Metal Finishing Job Shop and Printed Wiring Board subcategories would comply with 40 CFR part 433 new source requirements, and Steel Forming & Finishing new sources would

comply with 40 CFR part 420 new source requirements. Therefore, the analysis considers only the incremental costs of proposed MP&M new source requirements beyond those baseline requirements.

EPA estimated facility revenues for the model facilities based on the revenues reported for existing facilities in the Section 308 surveys. The analysis excludes facilities that are projected to close or to experience moderate economic impacts in the baseline, since the economic characteristics of these financially-weak facilities are unlikely to be representative of new facilities. EPA sorted the existing financially-sound facilities in each subcategory/discharge status by flow size, and identified facilities in each quartile based on flow size. The Agency then identified the flow size quartile that the hypothetical facility would fall into. Finally, EPA calculated the average

revenue for the existing facilities in that same flow size quartile, and assumed that the hypothetical new facility would have revenues equal to that average. Table XVI-15 shows the facility revenue estimated for each model facility.

EPA calculated compliance costs as a percentage of post-compliance revenues as a measure of impacts. The projected revenues include estimated prices increases due to the rule. The analysis assumes that new sources would benefit from the small price increases resulting from the proposed rule for existing sources, and applies the same percentage price increase to calculate post-regulation revenues for the new sources. Table XVI-15 shows before-tax annual compliance costs as a percent of facility post-regulation revenues.

Finally, Table XVI-15 presents the cost-to-revenue percentage estimated for new facilities in each subcategory.

TABLE XVI-15.—NEW SOURCE IMPACTS

Subcategory	Discharge status	Existing source options proposed	New source options considered ^a	Annualized compliance costs ^b (\$1999)	Facility Revenue ^c (\$1999)	New Source ACC as % of Revenue
General Metals	I	2	4	\$393,220	\$417,071,318	0.09
General Metals	D	2	4	167,342	398,818,659	0.04
Metal Finishing Job Shops	I	2	4	65,369	1,428,443	4.64
Metal Finishing Job Shops	D	2	4	70,735	5,089,823	1.41
Non-Chromium Anodizing	I	2	4	97,108	24,201,166	0.40
Oily Wastes	I	6	8	355,874	474,228,616	0.08
Oily Wastes	D	6	8	37,815	116,772,943	0.03
Printed Wiring Board	I	2	4	70,563	35,930,097	0.20
Printed Wiring Board	D	2	4	160,184	1,029,783,596	0.02
Railroad Line Maintenance	I&D	10	8	184,261	n.a.	n.a.
Shipbuilding Dry Dock	I&D	10	8	220,492	192,018,827	0.11
Steel Forming & Finishing	I	2	4	114,851	69,640,244	0.17
Steel Forming & Finishing	D	2	4	46,945	32,759,295	0.14

Note: Technology Options 1 through 10 are described in Section VIII.A of the preamble.

^a EPA is not proposing the new source option considered in this analysis for the Non-Chromium Anodizing, Oily Wastes, Railroad Line Maintenance, and Shipbuilding Dry Dock subcategories. See Section XIII for a discussion on new source options selection.

^b Incremental to baseline new source requirements (found in 40 CFR 433 and 420, as applicable) for Metal Finishing Job Shop, Printed Wiring Board and Steel Forming & Finishing new sources.

^c Equal to the average revenues of existing facilities in the same quartile based on flow size of the new source model facility, excluding existing facilities that close or experience moderate impacts in the baseline. Assumes the same percentage price increases for new as for existing sources under the proposed option.

^d Includes existing facilities in all flow categories that continue operating post-compliance.

New sources in all but the Metal Finishing Job Shop direct discharger subcategory incur costs that are below one percent of post-regulation revenues. Cost increases of this magnitude are unlikely to place new facilities at a competitive disadvantage relative to existing sources. Moreover, costs as a percentage of revenues are generally comparable for new sources and existing sources with which they will compete.

Railroad line maintenance facilities do not have revenue reported at the facility level, and it is therefore not possible to compare costs as a percent of facility revenue for new and existing facilities in this subcategory. The representative new source railroad line maintenance facility would incur annualized costs (\$184,261) that are somewhat higher than those incurred by existing facilities in this subcategory (which range from zero to \$122,042.)

See Section XIII for a discussion of new source options selection. EPA notes that it did not select the "New Source Option Considered" in Table XVI-15, above, for the Non-Chromium Anodizing, Oily Wastes, Railroad Line Maintenance, and Shipbuilding Dry Dock subcategories, but rather selected a lower cost option for new sources.

H. 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 proposed rule.

The social costs associated with the proposed MP&M regulation differ from the compliance costs estimated to assess impacts on the regulated facilities and firms, because of different treatment of taxes. Social costs include compliance costs that are considered on a before-tax basis. Privately-owned facilities are able to deduct the costs of compliance as business expenses, reduce their tax liability for a given level of revenue, and thereby share the burden of the costs with other taxpayers. The burden is shared with other taxpayers because the Federal government loses the money saved by industry through tax shields. The cost to society includes the costs borne by industry, as well as the cost borne by the Federal government through lost tax revenues. The cost to society, therefore, is higher than the cost to industry. The annualized lost Federal tax revenues can be calculated as the

difference between the annualized cost before and after tax shields.

Social costs 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. Calculating lost producers' and consumers' surplus accurately 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 provides an upper-bound estimate of social costs because, for facilities predicted to close, continuing to operate and incurring compliance costs is more costly than closing the facility with the lost producers' and consumers' surplus associated with the closure.

In addition to the resource costs to society associated with compliance, the estimated social cost includes two other cost elements: the cost to local governments of implementing the rule and the costs associated with unemployment that may result from the proposed 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—expended to achieve the reductions in effluent discharges required by the proposed rule. The social costs of these resources are higher than the costs incurred by facilities because facilities are able to deduct the costs from their taxable income. The costs to society, however, are the full value of the resources used, whether they are paid for by the regulated facilities or by all taxpayers in the form of lost tax revenues. EPA calculated

costs at a 7 percent rate. EPA included facilities predicted to close due to the rule when calculating social costs.

The estimated after-tax private compliance costs incurred by facilities, excluding costs for facilities that close, are \$1.3 billion. The estimated social value of these compliance costs, calculated before-tax assuming no regulatory closures, is \$2.0 billion. This represents the value to society of the resources that would be used to comply with the proposed rule if all facilities continued to operate rather than some closing due to the rule. This estimate represents an upper-bound social value of the compliance resources associated with the proposed rule.

3. Cost of Administering the Proposed Regulation

EPA estimated the cost to governments of administering the proposed regulation, including the use of labor and material resources to write permits/control mechanisms under the regulation and to conduct compliance monitoring and enforcement activities.

EPA does not expect increases in administrative costs for facilities that discharge their wastewater directly to surface water, because the National Pollution Discharge Elimination System (NPDES) permit program requires that these facilities hold permits. POTWs will incur additional permitting costs for indirect dischargers that do not already have a control mechanism (*e.g.*, permit) prior to implementation of the proposed rule.

Information on the baseline number of indirect dischargers with control mechanisms comes from the industrial detailed facility surveys, which reported the baseline permit status of each MP&M facility. (See Section V.B for a description of EPA's survey questionnaires.) EPA estimated costs and impacts for these facilities. Results of the impact analysis indicate that of the 58,922 MP&M facilities continuing to operate in the baseline (including 64 avoided baseline closures), 199 facilities are expected to close rather than comply with the regulation. Another 49,147 are excluded or fall below the proposed low flow cut-offs. Of the 9,577 facilities that are expected to continue operating and comply with the regulation, 4,633 facilities are direct dischargers and 4,944 are indirect dischargers. EPA estimates that 4,296 of the indirect dischargers already have permits or other control mechanisms (629 with concentration-based permits and 3,667 with mass-based permits) and that 648 indirect discharging facilities will be required to get a permit/control mechanism for the first time.

EPA conducted the POTW survey of 150 POTWs to support analysis of the administrative burdens imposed by the proposed rule on POTWs that receive discharges from MP&M facilities. The questionnaire requested detailed information on the costs of various activities per facility permitted, including estimated hours required to develop and issue permits/control mechanisms, provide technical guidance, inspect facilities, conduct sampling, review compliance reports, take enforcement actions, and repermit facilities. The survey requested this information for facilities of different sizes (based on flow). In addition, the survey requested information on the frequency with which specific administrative activities are required for activities that are not required for every permitted facility (such as conducting a public hearing). EPA used the POTW survey responses to estimate a range of permitting labor hour burdens and costs

per MP&M facility permitted, with separate estimates for concentration- and mass-based permits/control mechanisms. This analysis is presented in Appendix C of the EEBA.

Estimated annualized POTW administrative costs for each facility issued a new concentration-based control mechanism range from \$236 to \$1,890, and from \$240 to \$1,924 for each facility issued a new mass-based control mechanism, with the range depending on the complexity of the facility being permitted. EPA applied these costs per facility to the estimated number of facilities requiring new control mechanisms or conversion of a concentration-based to a mass-based control mechanism each year, to estimate the total administrative cost to permitting authorities. (See Section XXI.B for a discussion on implementation of the MP&M limitations and standards.)

EPA is requiring mass-based permits/control mechanisms only for the Steel

Forming and Finishing subcategory. For other subcategories, permit writers and control authorities can determine what type of permit/control mechanism to issue. EPA is encouraging POTWs to institute mass-based limits where possible, however. (See Section XXII.B.) For purposes of estimating costs, EPA assumed that all Steel Forming and Finishing and one-third of the permits/control mechanisms issued in other subcategories will be mass-based.

Table XVI-16 summarizes the estimated range of administrative costs that will be incurred by POTWs under the proposed rule. The estimates reflect the low and high estimates of permitting cost per facility, and take account of the need to repermit indirect dischargers with existing control mechanisms (e.g., permits) within the three year compliance period rather than on the normal five-year permitting schedule. These estimates are described in detail in Chapter 7 of the EEBA.

TABLE XVI-16.—POTW ADMINISTRATIVE COSTS: PROPOSED RULE

Number of facilities permitted:	
Converted from existing concentration-based to mass-based	* 223
Issued new concentration-based permit	* 432
Issued new mass-based permit	* 216
Repermitted 1-2 years earlier	4,073
Number of closing facilities with existing permits not requiring repermitting under the proposed rule	143
Total POTW Administrative Costs (net present value of incremental costs over 15 years) (million \$1999)	\$1.407-\$8.311
Total POTW Administrative Costs (annualized over 15 years @ 7% (million \$1999)	\$0.115-\$0.912

* Assumes that permitting authorities will chose to issue mass-based control mechanisms (e.g., permits) to 1/3 of the facilities requiring new permits, and 1/3 of the facilities with existing concentration-based permits, other than Steel Forming & Finishing. Mass-based permits are assumed for all 20 Steel Forming & Finishing facilities that currently have a concentration-based permit.

Total estimated government administration costs therefore range from \$0.1 to \$0.9 million (\$1999) annually. EPA expects that this increase in costs will be partially offset by reductions in government administrative costs for facilities that are already permitted under local limits and that will be re-permitted under this rule. The technical guidance provided by EPA as a part of this rulemaking may reduce the research required by permit writers and control authorities in developing Best Professional Judgement (BPJ) permits/control mechanisms for industrial dischargers not previously covered by a categorical standard or a water quality standard. Further, the establishment of discharge standards may reduce the frequency of evidentiary hearings. The promulgation of limitations may also enable EPA and the authorized States to cover more facilities under general permits. EPA did not estimate these cost savings to permitting authorities that may result from the rule.

4. Social Cost of Unemployment

The loss of jobs associated with facility closures represent a social cost of the proposed rule. The social cost of unemployment includes two components: the losses suffered by the workers that experience involuntary loss of employment, and the cost to the government of administering the unemployment compensation program for these workers.

EPA calculated the first cost of worker dislocation based on an estimate of the value that workers would pay to avoid an involuntary job loss. The estimate of the amount that workers would pay to avoid job losses was derived from hedonic studies of the compensation premium required by workers to accept jobs with a higher probability of unemployment. This framework has been used in the past to impute a trade-off between wages and job security (Topel, 1984; Adams, 1985). This estimate approximates a one-time willingness-to-pay to avoid an involuntary episode of unemployment

and reflects all monetary and non-monetary impacts of involuntary unemployment incurred by the worker. It does not include any offsets to the cost of unemployment such as unemployment compensation or the value of increased leisure time. EPA estimates that workers would be willing to pay between \$90,840 and \$119,900 (\$1999) to avoid a case of involuntary employment. Annualized over 15 years at a discount rate of 7 percent, this willingness to pay is between \$9,974 and \$13,164 per lost job. The cost associated with a projected loss of 5,916 jobs due to facility closures under the proposed rule therefore has an estimated annual social cost of \$59.0 million and \$77.9 million.

Unemployment as the result of regulation also imposes costs on society through the additional administrative burdens placed on the unemployment system. The cost of unemployment benefits themselves is not a social cost but instead a transfer payment within society from taxpayers to unemployed

workers. Administrative costs include the cost of processing unemployment claims, retraining workers, and placing workers in new jobs. Data obtained from the Interstate Conference of Employment Security Agencies indicated that the cost of administering an initial unemployment claim over the period averaged \$119 (\$1999). This cost includes total Federal and State funding for administering unemployment benefit programs but excludes the value of benefits. Based on these data, EPA assumed that the cost of administering unemployment programs for job losses caused by the MP&M regulation would amount to approximately \$120 per job

loss. Multiplying this figure by estimated loss of 5,916 jobs due to facility closures under the proposed regulation yields an additional \$709,920 in social costs. EPA annualized this value over the 15-year analysis period at the 3 percent social discount rate to yield an annual cost of \$77,945 (\$1999).

This estimate of social costs does not take into account the increased production and employment at MP&M facilities that continue to operate under the proposed rule. These facilities are likely to gain business when some facilities close due to the rule. In addition, the analysis does not reflect the jobs created by facilities' actions to

comply with the rule. The net effect of job losses due to facility closures and job gains associated with compliance activities is an increase of 2,575 FTE-years over 15 years. This estimate assumes that displaced workers remain unemployed for one year on average, and that all layoffs and compliance related investments occur over the first three years after promulgation. Table XVI-17 shows the timing of projected employment impacts, and the net effect on employment over 15 years. (EPA's estimates of the employment effects of the proposed rule are presented in Chapter 6 of the EEBA.)

TABLE XVI-17.—ESTIMATED DIRECT NET IMPACTS ON EMPLOYMENT OVER 15 YEARS, PROPOSED RULE
[Number of FTEs per year and total FTE-years]

Year	One-time manufacturing and installation ^a	Annual O&M ^a	Closures ^b	Net change in employment
1	1,496	95	1,972	(381)
2	1,496	190	1,972	(286)
3	1,496	286	1,972	(190)
4		286		286
5		286		286
6		286		286
7		286		286
8		286		286
9		286		286
10		286		286
11		286		286
12		286		286
13		286		286
14		286		286
15		286		286
Total FTE-years over 15 years	4,488	4,003	5,916	2,575

^a Assumes that one-third of facilities come into compliance in each of 3 years.

^b Assumes that one-third of the facilities projected to close do so in each of the first 3 years.

EPA calculated a range of social costs of changes in employment under the proposed rule, with the lower bound reflecting no net loss of employment and the upper bound considering only the 5,916 job losses resulting from closures. The social costs associated with unemployment were therefore estimated to range from zero to \$78.0 million, including an upper-bound \$77.9 million in worker's willingness to pay to avoid involuntary unemployment and less than \$0.1 million in the additional costs of administering

unemployment benefits. The estimated upper-bound employment-related social cost is likely to be substantially overstated, since it does not consider the social value of net increases in employment due to compliance activities and the increases in production that may occur at MP&M facilities that continue to operate post-compliance.

5. Total Social Costs

Summing across all social costs results in a total social cost estimate of

\$2.0 to \$2.1 billion annually (\$1999), as shown in Table XVI-18. This estimate represents an upper bound value of social costs, since it assumes that all facilities remain open and incur compliance costs rather than closing in some cases. This assumption is made only to calculate the resource value of compliance expenditures; closures are considered in calculating the social cost of unemployment.

TABLE XVI-18.—ANNUAL SOCIAL COSTS OF THE PROPOSED RULE
[Million \$1999, annualized @ 7%]

Social cost category	Lower bound estimate	Upper bound estimate
Resource Value of Compliance Costs (before-tax)	\$2,033.7	
Government Administrative Costs	\$0.1	\$0.9
Social Costs of Unemployment	0	\$78.0

TABLE XVI-18.—ANNUAL SOCIAL COSTS OF THE PROPOSED RULE—Continued
[Million \$1999, annualized @ 7%]

Social cost category	Lower bound estimate	Upper bound estimate
Total Social Costs	\$2,033.8	\$2,122.6

XVII. Cost-Effectiveness Analysis

A. Methodology

EPA performed a cost-effectiveness analysis of the alternative regulatory options for indirect dischargers (PSES) and direct dischargers (BAT). Cost-effectiveness analysis is used in the development of effluent limitations guidelines to evaluate the relative efficiency of alternative regulatory options in removing toxic pollutants from the effluent discharges to the nation's waters.

The cost-effectiveness of a regulatory option is defined as the incremental annual cost (in 1981 constant dollars) per incremental toxic-weighted pollutant removals for that option. This definition includes the following concepts:

- *Toxic-weighted removals.*

Pollutants differ in their toxicity. Therefore, the estimated reductions in pollution discharges, or pollutant removals, are adjusted for toxicity by multiplying the estimated removal quantity for each pollutant by a normalizing toxic weight (Toxic Weighting Factors). The toxic weight for each pollutant measures its toxicity relative to copper, with more toxic pollutants having higher toxic weights. The use of toxic weights allows the removals of different pollutants to be expressed on a constant toxicity basis as toxic pound-equivalents (lb-eq). The removal quantities for the different pollutants may then be summed to yield an aggregate measure of the reduction in toxicity-normalized pollutant discharges

that is achieved by a regulatory option. The cost-effectiveness analysis does not address the removal of conventional pollutants (oil and grease, biochemical oxygen demand, and total suspended solids), nor does it address the removal of bulk parameters, such as COD.

- *Annual costs.* The costs used in the cost-effectiveness analysis are the estimated annualized before-tax costs to comply with the alternative regulatory options. The cost to facilities to remove these pollutants will be less because the costs are tax deductible. The annual costs include the annual expenses for operating and maintaining compliance equipment, meeting monitoring requirements, and some pollution prevention activities. Annualized components include capital outlays for treatment systems.

- *Incremental calculations.* The incremental values are the changes in total annual compliance costs and changes in removals from the next less stringent option, or from the baseline if there is no less stringent option, where regulatory options are ranked by increasing levels of toxic-weighted removals. The resulting cost-effectiveness values for a given option are therefore expressed relative to another option or, for the least stringent option considered, relative to the baseline.

The result of the cost-effectiveness calculation represents the unit cost of removing the next pound-equivalent of pollutants and is expressed in constant 1981 dollars per toxic pound-equivalent

removed (\$/lb-eq) to allow comparisons with other options being considered. Although not required by the Clean Water Act, cost-effectiveness analysis is a useful tool for evaluating regulatory options that address toxic pollutants.

EPA performed the cost-effectiveness analysis for the MP&M regulation separately for indirect dischargers (subject to PSES) and direct dischargers (subject to BAT). The following sections summarize the results for the two classes of facilities. EPA notes that for all subcategories, it is proposing options only BPT or is setting BAT equal to BPT, as there is no additional technology used at BAT. The Agency does not use C-E analysis to assess options for BPT. Therefore, the C-E analysis for direct dischargers is presented only for informational purposes. See Section IX for a discussion of BPT cost-reasonableness.

B. Cost-Effectiveness Analysis for Indirect Dischargers

Table XVII-1 summarizes the cost-effectiveness analysis for the PSES regulatory options applicable to indirect dischargers. Annual compliance costs are shown in 1999 dollars and also in 1981 dollars. The regulatory options are listed in order of increasing stringency on the basis of the estimated toxic-weighted pollutant removals. Estimates of costs and pollutant removals do not include facilities that close in the baseline. (See Section XVI.B.4 for a discussion on the baseline closure analysis.)

TABLE XVII-1.—COST-EFFECTIVENESS FOR INDIRECT DISCHARGERS

Regulatory option	Annual before-tax compliance costs (excluding regulatory closures)			Weighted pollutant removals		Cost-effectiveness ratio (\$1981/lb-eq)
	Total cost (million \$1999)	Total cost (million \$1981)	Incremental cost (million \$1981)	Total removals (000 lbs-eq)	Incremental removals (000 lbs-eq)	
Proposed Option	1,730.1	1,009.2	1,009.2	9,372.3	9,372.3	108
Option 2/6/10	2,421.9	1,412.8	403.6	9,755.5	383.2	1,053
Option 4/8	3,795.1	2,213.8	801.0	9,936.9	181.4	4,416

As shown in Table XVII-1, the proposed option removes 9.4 million toxic-weighted pounds. The proposed option is the least stringent of those considered, and the incremental and

average cost-effectiveness is \$108 per pound-equivalent removed.

Option 2/6/10 would remove an additional 0.4 million toxic weighted pounds, at an incremental cost of \$0.38

billion (\$1981), for an incremental cost-effectiveness ratio of \$1,053 per pound-equivalent removed. The differences between the proposed option and Option 2/6/10 for indirect dischargers

include the proposed option's one million gallon per year cutoff for the General Metals subcategory, two million gallon per year cutoff for the Oily Wastes subcategory, and exclusion of new pretreatment standards for the Non-Chromium Anodizing, Railroad Line Maintenance and Shipbuilding Dry Dock subcategories. These provisions of

the proposed rule reduce before-tax compliance costs by 40 percent compared with Option 2/6/10, while losing 4 percent of the pound-equivalents removed. EPA discussed the rationale for the selected flow cutoffs for each subcategory in Section XII of today's proposal.

Option 4/8 would remove an additional 0.18 million pound-equivalents, as compared with Option 2/6/10, at an additional cost of \$0.8 billion (\$1981), or \$4,416 per pound-equivalent.

Table XVII-2 presents the results of the cost-effectiveness analysis for indirect dischargers by subcategory.

TABLE XVII-2.—COST-EFFECTIVENESS FOR INDIRECT DISCHARGERS BY SUBCATEGORY

Subcategory and regulatory option	Incremental before-tax compliance cost (million \$1981)	Incremental removals (lbs-eq)	Cost-effectiveness ratio (\$1981/lb-eq)
Printed Wiring Boards			
Proposed Option	81.17	1,195,260	68
Option 2/6/10 .....	.....	.....	.....
Option 4/8	40.87	8,010	5,103
Metal Finishing Job Shops			
Proposed Option	68.82	1,766,063	39
Option 2/6/10 .....	.....	.....	.....
Option 4/8	26.54	62,554	424
General Metals			
Proposed Option	844.52	6,216,887	136
Option 2/6/10	279.12	318,594	876
Option 4/8	487.21	103,514	4,707
Non-Chromium Anodizing			
Proposed Option .....	.....	.....	.....
Option 2/6/10	15.23	13,598	1,120
Option 4/8	7.27	434	16,756
Oily Wastes			
Proposed Option	2.52	14,140	178
Option 2/6/10	109.04	51,008	2,138
Option 4/8	232.35	5,885	39,484
Railroad Line Maintenance			
Proposed Option .....	.....	.....	.....
Option 2/6/10	0.15	17	8,560
Option 4/8	0.13	132	995
Shipbuilding Dry Dock			
Proposed Option .....	.....	.....	.....
Option 2/6/10	0.10	0	767,794
Option 4/8	0.00	26	0
Steel Forming and Finishing			
Proposed Option	12.19	179,900	68
Option 2/6/10 .....	.....	.....	.....
Option 4/8	6.63	865	7,659

The proposed option for indirect dischargers in the Printed Wiring Board, Metal Finishing Job Shops, and Steel Forming and Finishing subcategories is the same as Option 2/6/10. The proposed option includes a flow cutoff of one million and two million gallons

per year for General Metals and Oily Wastes, respectively. Therefore, there are no proposed pretreatment standards for all indirect dischargers that fall below those cutoffs. There are also no proposed pretreatment standards for indirect dischargers in the Non-

Chromium Anodizing, Railroad Line Maintenance and Shipbuilding Dry Dock subcategories. In developing regulatory options for indirect dischargers, EPA considered a range of possible exclusions from 1 mg/y to 6.25 mg/y for all subcategories. Information of

the cost-effectiveness for each regulatory option under each flow cutoff by subcategory can be found in "Analysis of Cost-Effectiveness by Flow Category", which is available in the rulemaking docket.

C. Cost-Effectiveness Analysis for Direct Dischargers

Table XVII-3 summarizes the cost-effectiveness analysis for the BAT regulatory options applicable to direct

dischargers and Table XVII-4 presents the analysis by subcategory. As before, regulatory options are ranked in order of increasing stringency.

TABLE XVII-3.—COST EFFECTIVENESS FOR DIRECT DISCHARGERS

Regulatory option	Annual before-tax compliance costs (excluding regulatory closures)			Weighted pollutant removals		Cost-effectiveness ratio (\$1981/lb-eq)
	Total cost (million \$1999)	Total cost (million \$1981)	Incremental cost (million \$1981)	Total removals (000 lbs-eq)	Incremental removals (000 lbs-eq)	
Proposed Option	245.8	143.4	143.4	\$1,333.6	1,333.6	107
Option 2/6/10	245.8	143.4	0.0	1,333.6	0.0	.....
Option 4/8	381.6	222.6	79.2	1366.7	33.1	2,391

The proposed BAT option for direct dischargers achieves removal of 1.3 million pounds on a toxic-weighted basis, with a cost-effectiveness of \$107 (\$1981). Because the only differences between Option 2/6/10 and the

proposed option occur for indirects (i.e. flow cutoffs and no regulation options), Option 2/6/10 is the same as the proposed option for direct dischargers. Option 4/8 would remove an additional 33,000 pound-equivalents, as compared with the proposed option, at

an additional cost of \$80 million (\$1981), or \$2,391 per pound-equivalent. Table XVII-4 presents the results of the cost-effectiveness analysis for direct dischargers by subcategory.

TABLE XVII-4.—COST-EFFECTIVENESS FOR DIRECT DISCHARGERS BY SUBCATEGORY

Subcategory and regulatory option	Incremental before-tax compliance cost (million \$1981)	Incremental removals (lbs-eq)	Cost-effectiveness ratio (\$1981/lb-eq)
Printed Wiring Boards			
Proposed Option	1.42	64,573	22
Option 2/6/10 .....	.....	.....	.....
Option 4/8	1.14	2,270	501
Metal Finishing Job Shops			
Proposed Option	0.69	14,194	49
Option 2/6/10 .....	.....	.....	.....
Option 4/8	0.52	265	1,968
General Metals			
Proposed Option	114.54	899,372	127
Option 2/6/10 .....	.....	.....	.....
Option 4/8	52.20	21,620	2,414
Non-Chromium Anodizing*			
Proposed Option	NA	NA	.....
Option 2/6/10	NA	NA	.....
Option 4/8	NA	NA	.....
Oily Wastes			
Option 4/8	**	**	**
Proposed Option	6.42	16,069	399
Option 2/6/10	0.00	0	.....
Railroad Line Maintenance			
Proposed Option	0.67	174	3,831
Option 2/6/10 .....	.....	.....	.....
Option 4/8	0.05	23	2,181
Shipbuilding Dry Dock			
Proposed Option	1.24	111	11,179

TABLE XVII-4.—COST-EFFECTIVENESS FOR DIRECT DISCHARGERS BY SUBCATEGORY—Continued

Subcategory and regulatory option	Incremental before-tax compliance cost (million \$1981)	Incremental removals (lbs-eq)	Cost-effectiveness ratio (\$1981/lb-eq)
Option 2/6/10 .....	.....	.....	.....
Option 4/8	*** -0.91	*** 335	*** -2,728
Steeling Forming and Finishing			
Proposed Option	18.39	339,147	54
Option 2/6/10 .....	.....	.....	.....
Option 4/8	1.28	8,977	143

* EPA estimates that there are no direct discharging Non-Chromium Anodizing facilities.
 ** Option 4/8 removes 15,703 lbs equivalent at a cost of \$31.34 million. The proposed option removes more lbs equivalent at a lower cost. The proposed option therefore dominates Option 4/8, and results are not shown here for Option 4/8.
 *** Option 4/8 removes more lb-eq. than the proposed option at a lower cost. See Section XVII-D for a discussion of the impacts of the proposed option on conventional pollutant removals. Option 4/8 removes 446 lbs-equivalent at a cost of \$0.33 million at an average cost-effectiveness incremental to baseline of \$740/lb-eq.

The proposed option is more stringent than Option 4/8 for the Oily Wastes subcategory, in that it removes more toxic-weighted pounds of pollutants and costs less than Option 4/8. It therefore dominates Option 4/8 from the perspective of toxic pollutant removals, and has an average cost per pound-equivalent removed of \$399 (\$1981). Again, EPA is proposing options only for BPT or is setting BAT equal to BPT for all subcategories, as there is no additional technology used at BAT. The Agency does not use C-E analysis to assess options for BPT. Therefore, the C-E analysis for direct dischargers is presented only for informational purposes.

Table XVII-4 shows a high cost-effectiveness for the Railroad Line Maintenance and the Shipbuilding Dry Dock subcategories. EPA is not proposing BAT limitations for these subcategories because of the small quantities of toxic pollutants in the wastewater from facilities in these subcategories. (See Section XI.) However, EPA is proposing BPT limitations for these subcategories in order to control the discharge of conventional pollutants. See Section IX for a discussion of BPT options selection and the results of the BPT cost-reasonableness analysis.

XVIII. 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 the

proposed regulation on energy consumption, air emissions, and solid waste generation.

While it is difficult to balance environmental impacts across all media and energy use, the Agency has determined that the impacts identified below are justified by the benefits associated with compliance with the limitations and standards (see Sections XIX and XX for a discussion on the environmental benefits associated with this proposed regulation).

A. Air Pollution

The Agency believes that the in-process and end-of-pipe technologies included in the technology options for this regulation do not generate air emissions. (See Section VIII for a discussion of the technology options.)

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 believes 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.

The Agency is developing National Emission Standards for Hazardous Air Pollutants (NESHAPs) under section 112 of the Clean Air Act (CAA) to address air emissions of the hazardous air pollutants (HAPs) listed in Title III of the CAA Amendments of 1990. Below, EPA lists the current and upcoming NESHAPs that may

potentially affect HAP emitting activities at MP&M facilities:

- 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).

B. Solid Waste

Solid waste generation includes hazardous and nonhazardous wastewater treatment sludge as well as waste oil removed in wastewater treatment. EPA estimates that compliance with this regulation will result in a decrease in wastewater treatment sludge and an increase in waste oil generated at MP&M facilities.

According to EPA's detailed questionnaires, the Agency estimates that MP&M facilities generate 267 million gallons (4 million cubic yards) of wastewater treatment sludge and 805 million gallons of waste oil from the treatment of wastewater. In Table XVIII.B-1, EPA presents the amount of wastewater treatment sludge and waste oil expected to be generated at the selected technology option. The table also shows the amount of wastewater treatment sludge and waste oil that would be generated by the selected technology option if EPA had not included pollution prevention as part of its selected technology option.

TABLE XVIII.B-1.—WASTE TREATMENT SLUDGE AND OIL GENERATION BY OPTION

Option	Wastewater treatment sludge generated (million gallons/year)	Waste oil generated (million gallons/year)
Baseline ¹	267	805
Proposed Options without water conservation and P2	207	2,000
Proposed Options with water conservation and P2	206	1,600

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.

As shown in Table XVII.B-1, wastewater treatment sludge generation decreased from baseline to the selected option without in-process flow control. EPA attributes the net decrease to the fact that this option includes sludge dewatering, which may result in a significant decrease in sludge generation for sites that have chemical precipitation and settling technologies without sludge dewatering in place at baseline. The Agency did not estimate additional sludge reduction at facilities which already have sludge dewatering in place at baseline. EPA does expect an increase of sludge production at MP&M facilities which do not have treatment in place and must install treatment as a result of the MP&M rule.

Table XVIII.B-1 shows that the water conservation and pollution prevention technologies included in the proposed options further reduce the amount of sludge generated. EPA expects these technologies to result in sludge reduction for the following reasons:

- Recycling of coolants and recycling of paint curtains reduce the mass of pollutants in treatment system influent streams, which in turn reduces the amount of sludge generated during metals removal;
- Bath maintenance practices, including good operational practices regarding drag out in plating processes, included in the proposed options, reduce the mass of metal pollutants discharged to treatment, which in turn reduces the amount of sludge generated during metals removal; and
- Water conservation technologies included in the proposed options reduces the discharge mass of metals present in the source water to a site (e.g., calcium, sodium), which in turn reduces the amount of sludge generated during removal of these metals.

EPA classifies many of the sludges generated at MP&M facilities as either a listed or characteristic hazardous waste under the Resource Conservation and

Recovery Act (RCRA) based on the following information:

- If the facility performs electroplating operations, EPA classifies the resulting sludge as an EPA hazardous waste number F006 (40 CFR 261.31). If the facility mixes the wastewater from these electroplating operations with other non-electroplating wastewater for treatment, then EPA still considers all of the sludge generated from the treatment of this commingled wastestream to be a listed hazardous waste F006, or
- If the sludge or waste oil from wastewater treatment exceeds the standards for the Toxicity Characteristic (i.e., is hazardous), or exhibits other RCRA-defined hazardous characteristics (i.e., reactive, corrosive, or flammable), EPA considers it a characteristic hazardous waste (40 CFR 261.24.)

It is also important to note that EPA does not include chemical conversion coating, electroless plating, and printing circuit board manufacturing under the F006 listing (51 FR 43351, December 2, 1986). And if the facility performs certain chemical conversion coating operations on aluminum, EPA classifies the resulting sludge as EPA hazardous waste number F019.

Additional federal, state, and local regulations may result in MP&M sludges being classified as hazardous wastes. Facilities should check with the applicable authorized (State or EPA Regional) authority to determine if other regulations apply.

Based on information collected during site visits and sampling episodes, the Agency believes that some of the solid waste generated would not be classified as hazardous. However, for purposes of compliance cost estimation, the Agency assumed that all solid waste generated as a result of the technology options would be hazardous.

As stated above in Section XV, EPA expects that the rule will reduce metal contaminants in the sludges generated by POTWs and will allow POTWs to

dispense of the lower metal content sludge by more environmentally beneficial methods.

EPA attributes the increase in waste oil generation from baseline to the proposed option to the removal of oil from MP&M wastewater prior to discharge to POTWs or surface waters. 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. The estimated increase of waste oil generation as a result of the MP&M proposed rule reflects a better removal of oil and grease by the proposed technology options than that being achieved at baseline and does not reflect an increase in overall oil generation at MP&M facilities. For the purpose of compliance cost estimation, EPA assumed that all MP&M facilities contract hauled waste oil for disposal; however, EPA expects that some facilities may recycle waste oil either on site or off site.

Table XVIII.B-1 shows that the inclusion of water conservation and pollution prevention in the proposed option results in the generation of less waste oil. EPA attributes this decrease in waste oil generation to the 80 percent reduction of coolant discharge using the recycling technology included in the proposed technology train. This system recovers and recycles oil-bearing machining coolants at the source, reducing the generation of spent coolant.

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 increased energy usage for the selected option in Table XVIII.C-1. The table also shows the amount of energy that would be required by the selected technology option if EPA had not included pollution prevention as part of its selected technology option. The in-process flow control and recycling technologies included in

EPA's proposed options reduce the amount of water use and in doing so also require energy. Therefore, the amount of energy required for the selected option incorporating pollution prevention and water conservation was slightly greater than the proposed option without pollution prevention and water conservation techniques.

TABLE XVIII.C-1.—ENERGY REQUIREMENTS BY OPTION

Option	Energy required (million kilowatt hrs/yr)
Baseline ¹	248
Proposed Options without water conservation and P2 ...	347
Proposed Options without water conservation and P2 ...	364

Source: U.S. Environmental Protection Agency.

¹EPA 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.

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 proposed options correspond to approximately 0.01 percent of national requirements. The increase in energy requirements due to the implementation of MP&M technologies will in turn cause an air emissions impact from the electric power generation facilities. The increase in air emissions is expected to be proportional to the increase in energy requirements or approximately 0.01 percent.

TABLE XVIII.C-1.—ENERGY REQUIREMENTS BY OPTION

Option	Energy required (million kilowatt hrs/yr)
Baseline ¹	248
Proposed Options without water conservation and P2 ...	347
Proposed Options without water conservation and P2 ...	364

Source: U.S. Environmental Protection Agency.

¹EPA 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.

By comparison, electric power generation facilities generated 3123 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 proposed options correspond to approximately 0.01 percent of national requirements. The increase in energy requirements due to the implementation of MP&M technologies will in turn cause an air emissions impact from the electric power generation facilities. The increase in air emissions is expected to be proportional to the increase in energy requirements or approximately 0.01 percent.

XIX. Water Quality, Sewage Sludge, and Other Environmental Impacts

A. Introduction

MP&M facilities nationwide currently discharge an estimated 5,025 million pounds of pollutants per year to publicly-owned treatment works (POTWs) and approximately 410 million pounds of pollutants directly to surface waters. MP&M facility effluents contain 42 priority or toxic pollutants, 86 nonconventional pollutants, and three conventional pollutants (biological oxygen demand (BOD), total suspended solids (TSS), and oil and grease (O&G)).

The release of these pollutants to our nation's surface water degrades aquatic environments, alters aquatic habitats, and affects the diversity and abundance of aquatic life. It can also increase the risks to the health of humans who ingest contaminated surface waters or eat contaminated fish and shellfish. A number of the pollutants commonly found in MP&M effluents also inhibit biological wastewater treatment systems or accumulate in sewage sludge.

Metals are a particular concern because of their prevalence in MP&M effluents. Metals are inorganic compounds that are generally non-volatile (with the notable exception of mercury) and are not broken down by biodegradation processes. Metals can accumulate in biological tissues, sequester into POTW sewage sludge, and contaminate soils and sediments when released to the environment. Some metals are quite toxic even when present at relatively low levels.

Of the 131 MP&M pollutants of concern for which loadings were estimated, 35 exhibit moderate to high toxicity to aquatic life; 77 are human non-cancer toxicants; 13 are classified as known or probable human carcinogens; 46 bioaccumulate in aquatic organisms and persist in the environment, and 35 are hazardous air pollutants (HAPs). HAPs are compounds which EPA believes may represent an unacceptable risk to human health if present in the air.

B. Beneficial Impacts of the MP&M Proposed Rule

Changes under the proposed rule include:

- Water quality changes;
- Reduced aquatic life impacts;
- Reduced POTW inhibitions;
- Reduced costs for sewage sludge disposal; and
- Reduced human health impacts.

The first three changes due to the proposed rule are discussed in this section, and the last two are discussed in Section XX. EPA estimated these changes for three options. This section presents results for the proposed option, Option 2/6/10 and Option 4/8. See Section VIII for a description of the options. Results are discussed for only the proposed option, however, to reduce the length of the document. Benefits were not estimated for Options 1, 3, 5, 7, and 9 (options without pollution prevention) because these options remove fewer pollutants and cost more than Option 2/6/10 and Option 4/8.

1. Water Quality Changes

EPA estimates that the proposed rule would substantially reduce pollutant discharges to the waters of the U.S. as shown by the loadings estimates in Table XIX-1 for five categories of pollutants. The regulation would result in total pollutant removals of 3,872 million pounds per year. These removals include a 30 million pound per-year reduction in eight sewage sludge contaminants and a 703 million pound per-year reduction in 89 pollutants causing inhibition of biological activity of sewage sludge. The regulation would reduce discharges of 35 HAPs by about one million pounds per-year. Discharges of pollutants that are known to be related to adverse acute and chronic effects on aquatic life would be reduced by 823 and 1,035 million pounds per year, respectively. These reductions result from increased wastewater treatment, pollution prevention, and regulatory closures. EPA estimated impacts of MP&M discharges on the quality of receiving waters using a model of the in-stream pollutant mixing and dilution process. A first order pollutant degradation model was used in the analysis of source water concentrations at the drinking water intake points. This model estimates in-stream concentrations for the initial discharge reach (*i.e.*, waterway) and for downstream reaches, taking into account dilution, adsorption, volatilization, and hydrolysis.

This analysis uses discharge information from 885 sample MP&M

facilities (excluding two sample facilities in Puerto Rico) that discharge directly or indirectly to 627 receiving waterways (544 rivers/streams, 55 bays/estuaries, and 28 lakes). Four of the 55 marine reaches were excluded from the in-stream water quality analysis due to data limitations.

EPA extrapolated the environmental assessment results for the sample facilities to the entire population of MP&M facilities nationwide. This extrapolation uses sample facility weights developed as part of the sampling plan. For additional information on sample weights see the Statistical Summary for the Metal Products & Machinery Industry Surveys in the Administrative record for today's rule.

EPA evaluated the national environmental impacts of reducing pollutant discharges from MP&M facilities to the nation's waterbodies for the proposed rule and for two alternative regulatory options. EPA considered only pollutant loadings from MP&M facilities to particular waterbodies and did not take background loadings from other sources into account, with one exception. The analysis of sewage sludge (biosolids) quality took background metal loadings into account. EPA used information from the POTW survey to estimate total metal loadings to a POTW of a given size (*i.e.*, small, medium, and large). See Section V.B for a description of the POTW survey. This estimate was based on the average number of small, medium, and large MP&M facilities discharging to a POTW in each size category and the percent contribution of

total metal loadings discharged from MP&M facilities.

2. Reduced POTW Impacts

EPA evaluated whether MP&M pollutants may interfere with publicly-owned treatment works (POTWs). Pollutants may impair POTW treatment effectiveness by inhibiting the biological activity of activated sludge. POTW inhibition and sludge values come from guidance published by EPA and other sources. The Agency also evaluated the reduced costs for managing and disposing of sewage sludge containing fewer pollutants or lower concentrations of pollutants. This is discussed in Section XX.D of today's proposal.

EPA estimated inhibition of POTW operations by comparing predicted POTW influent concentrations to available inhibition levels for 89 pollutants. At baseline discharge levels, EPA estimates that concentrations of 18 pollutants discharged from MP&M facilities exceed biological inhibition criteria at 515 POTWs nationwide. The proposed regulation would eliminate potential inhibition problems at 306 POTWs and reduce occurrence of pollutant concentrations in excess of inhibition criteria at 82 POTWs. POTWs may impose local limits to prevent inhibitions. If local limits are in place, the estimated reduction in potential inhibition problems at the affected POTWs is overstated. In this case, however, the estimated social cost of the MP&M regulation is also overstated.

3. Reduced Aquatic Life Impacts

EPA assessed the effect of baseline and post-compliance MP&M facility discharges on affected waterways by estimating the cases in which in-

waterway pollutant concentrations resulting from those discharges would exceed recommended acute and chronic Ambient Water Quality Criteria (AWQC) that protect aquatic life. Acute toxicity assesses the impacts of a pollutant from relatively short exposures, typically 48 and 96 hours for invertebrates and fish, respectively. Mortality is the endpoint of concern. Chronic toxicity assesses the impact of a pollutant after a longer exposure, typically from one week to several months. The endpoints of concern are one or more sublethal responses, such as changes in reproduction or growth in the affected organisms. Pollutant concentrations in excess of acute and chronic AWQC values indicate potential impacts to aquatic life.

The analysis compared baseline and post-compliance exceedences of aquatic life AWQC to determine the effects of the rule. These exceedences were modeled based on the estimated discharges from MP&M facilities and 7Q10 stream flow rates (7Q10 refers to the lowest consecutive seven day average with a recurrence interval of 10 years). Results show that baseline pollutant concentrations exceed acute AWQC in 878 reaches and chronic AWQC in 2,466 reaches nationally at baseline discharge levels. EPA estimates that the proposed option will eliminate concentrations in excess of acute and chronic criteria in 775 and 1,029 reaches, respectively. Results also show that an additional 903 receiving reaches will experience partial water quality improvements from reduced occurrence of some pollutant concentrations in excess of acute and/or chronic AWQC limits for protection of aquatic life.

TABLE XIX.1.—NATIONAL ESTIMATES OF MP&M FACILITY DISCHARGES

Category	MP&M discharges with potential POTW impacts			MP&M discharges exhibiting toxicity Aquatic Life	
	Activated sludge inhibition	Biosolids contaminants	HAP	Acute	Chronic
Baseline Loadings					
Number of Pollutants	89	8	35	107	116
Million lbs/yr	1,031	31.7	2.1	1,252	1,759
Remaining With the Proposed Option					
Million lbs/yr	328	1.61	1.11	430	723
Remaining With Option 2/6/10					
Million lbs/yr	266	0.54	0.89	364	647
Remaining With Option 4/8					
Million lbs/yr	484	0.43	1.05	595	895

TABLE XIX-2.—NATIONAL ESTIMATES OF MP&M POLLUTANTS, EXCEEDENCES & REDUCTIONS

	Baseline	Proposed option	Option 2/6/10	Option 4/8
POTW Impacts				
Number of POTWs with Inhibition Problems (18 pollutants > inhibition criteria)	515	209	123	123
Biosolids Contamination (8 pollutants):				
Number of POTWs	6,953	6,889	5,575	5,575
Non-qualifying Sewage Sludge (mill. of dry metric tons)	53.7	52.5	47.6	47.6
Receiving Water Impacts				
Number of Streams with Human Health AWQC Exceedences				
Number of pollutants:				
Water and organisms ^a	18	11	11	13
Organisms only ^b	6	5	5	5
Number of streams > AWQC for water and organisms	10,310	9,205	4,151	4,160
Number of streams > AWQC for organisms only	192	71	71	65
Number of Streams with Aquatic Life AWQC Exceedences				
Number of pollutants:				
Chronic	31	25	21	17
Acute	10	11	8	6
Number of streams > AWQC chronic	2,466	1,437	1,394	1,310
Number of streams > AWQC acute	878	103	61	52

^a Both drinking water and organism consumption are considered in developing these AWQC exceedences.

^b Only consumption of aquatic organisms is considered in these AWQC exceedences.

XX. Benefit Analysis

A. Overview of Benefits

This section presents EPA's estimates of the national environmental benefits of the proposed MP&M effluent guidelines. The benefits occur due to the reduction in facility discharges described in the preceding section. EPA's complete benefit assessment can be found in "Economic, Environmental, and Benefit Assessment of Proposed Metal Products and Machinery (MP&M) Rule."

Benefits analyses for past effluent guidelines have been limited in the range of benefits addressed, which has hindered EPA's ability to compare the benefits and costs of rules comprehensively. The Agency is working to improve its benefits analyses, including applying methodologies that have now become well established in the natural resources valuation field, but have not been used previously in the effluent guidelines program. EPA was particularly interested in expanding its benefits analyses for this rule to include water-based recreational activities other than fishing. The proposed MP&M rule addresses an industry with a large number of facilities located throughout the United States. These facilities are largely concentrated near large population centers and recreational sites.

Individuals in the U.S. are known to participate in a wide range of water-based recreational activities including fishing, swimming, boating, and near water activities such as wildlife viewing. Participation rates in each activity vary significantly from state to state depending on the availability and quality of water resources suitable for recreation, climate, and demographic characteristics of the user population. Wildlife viewing is most popular type of water-based recreation followed by fishing and swimming. The 1996 U.S. Fish and Wildlife Service survey showed that 62 million Americans enjoy wildlife viewing nationwide. In addition, 35 to 43 million people participate in recreational fishing and 34 million people take boating trips.

EPA has therefore expanded upon its traditional methodologies in the benefits analyses for the proposed MP&M rule. Past effluent guidelines analyses have included human health benefits, economic productivity benefits such as reduced costs for POTW sludge disposal, recreational benefits for fishing, and nonuse values. The additional analyses expands on the traditional analyses by estimating benefits to participants in boating, swimming and viewing (i.e., near-water recreation.) EPA used a benefit transfer approach based on four studies to estimate the increase in value to individuals who boat and participate in

viewing or near-water recreation at the national level. Three of these studies have been published in established economic journals, the other study is new and specific to the MP&M guideline. For this rule, EPA also conducted an original travel cost study in the State of Ohio, using the National Recreational Demand Survey (NDS) and a Random Utility Model (RUM) of recreational behavior, to estimate the changes in consumer valuation of water resources that would result from improvements in water quality. This study is presented in detail in Chapter 21 of the EEBA. A preliminary application of the travel cost study was reviewed by experts in the field of natural resource valuation, and the study has been presented at two professional meetings and will be subjected to a formal peer review in the coming year. The results of the previous review are available in the docket.

Because EPA has not yet resolved some anomalies in the extrapolation of these analyses to the national level, the monetized benefits for these new categories are not included in the summary statements of benefits for the proposed rule. EPA is including these analyses in the EEBA, however, to present the new methodologies and their results as applied to the MP&M rule for public comment, concurrent with seeking peer review of the travel cost study.

The new analyses projects benefits of \$500–\$900 million for enhanced wildlife viewing, \$265–\$672 million for recreational boating, and \$191 to \$1,066 million in additional non-use benefits (calculated as 1/4 to 2/3 of the additional recreational use benefits.) EPA notes that the methodology used results in projected benefits for 57 million wildlife viewers taking an average of 10 trips per year. This estimate (567 viewing days) is essentially the total number of single day trips as estimated by the national recreational demand survey (NDS). The methodology also predicts that 33 million individuals will each take an average 9 boating trips per year to sites benefiting from the rule. This amounts to 296 million boating days which is essentially all of the single day boating days nationally estimated from the NDS. Even though only about 5% of total reaches nationally are projected to benefit from the rule, 90% of the benefitting reaches are located in densely populated areas in the U.S., which is where the majority of the U.S.

population and recreational users are located, though not necessarily where they recreate. Although EPA is confident in the sample based results, EPA believes that the large numbers of viewers and boaters projected to benefit from the rule at the national level may indicate a need to revise its procedures for scaling up from sampled facilities to the national level. The simple extrapolation technique used in both the cost and benefit analyses, may have the unintended effect of overcounting the number of benefitting boaters and wildlife viewers. EPA is also specifically soliciting comment on several other methodological approaches used in new analyses including the benefits transfer of values from studies that did not specifically address boating and wildlife viewing to these activities, the extent to which activities such as recreational boating, and wildlife viewing are applicable to children, and the effect of omitting other non-MP&M sources of impairment on affected reaches from the analyses.

EPA may include additional categories of monetized benefits estimates based on these new methodologies, as revised based on comment and peer review, in its economic analyses of the final rule.

Table XX.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. This section also presents a case study for the State of Ohio which provides more detailed analyses of the regulation's expected benefits.

TABLE XX–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 systemic health hazards (e.g., reproductive, immunological, neurological, circulatory, or respiratory toxicity) due to ingestion of chemically-contaminated fish and unregulated pollutants in drinking water		X	
Reduced systemic health hazards from exposure to lead from consumption of chemically-contaminated fish	X		
Reduced cancer risk and health hazards from exposure to unregulated pollutants in chemically-contaminated sewage sludge			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	X		
Enhanced water-based recreation including near-water or viewing and boating	X		
Other enhanced water-based recreation such as swimming, waterskiing and white water rafting	In expanded analyses		
Increased aesthetic benefits such as enhancement of adjoining site amenities (e.g. residing, working, traveling, and owning property near the water)			X
Nonuser value (i.e., existence, option, and bequest value)	X		X
Reduced contamination of sediments			X
Reduced non-point source nitrogen contamination of water if sewage sludge is used as a substitute for chemical fertilizer on agricultural land			X
Satisfaction of a public preference for beneficial use of sewage sludge *			X
Economic Productivity Benefits			
Reduced sewage sludge disposal costs	X		
Reduced management practice and record-keeping costs for users of sewage sludge that meets exceptional quality criteria			X
Reduced interference with POTW operations		X	
Benefits to tourism industries from increased participation in water-based recreation			X

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

Benefit category	Quantified and monetized	Quantified and nonmonetized	Nonquantified and nonmonetized
Improved commercial fisheries yields	X
Addition of fertilizer to crops (nitrogen content of sewage sludge is available as a fertilizer when sludge is land applied) *	X
Improved crop yield (the organic matter in land-applied sewage sludge increases soil's water retention) *	X
Avoidance of costly siting processes for more controversial sewage sludge disposal methods (e.g., incinerators) because of greater use of land application	X
Reduced water treatment costs for municipal drinking water, irrigation water, and industrial process and cooling water	X

*Some of these benefit categories are accounted for and quantified under the "reduced sewage sludge disposal costs."

B. Reduced Human Health Risk

Reduced pollutant discharges from MP&M facilities generate human health benefits by a number of pathways. The most important human health benefits stem from reduced risk of illness from consumption of contaminated fish, aquatic organisms other than fish, and water. EPA analyzed human health benefits by estimating the change in the expected number of adverse human health events in the populations exposed to MP&M discharges. While some health effects such as cancer are relatively well understood and can be quantified and monetized in a benefits analyses, others such as systemic health effects are less well understood and may not be assessed with the same rigor or at all. (See Table XX-1.)

EPA analyzed the following measures of health-related benefits: reduced cancer risk from fish and water consumption; reduced risk of non-cancer toxic effects from fish and water consumption; lead-related health effects to 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 water quality criteria. The Agency monetized only two of these health benefits: (1) Changes in the incidence of cancer from fish and water consumption, and (2) changes in adverse health effects to children and adults from reduced lead exposure. The following discussion includes results only for the proposed option; however, the tables present the results for all options evaluated.

EPA estimates that the proposed option would eliminate approximately 2.29 cancer cases associated with consumption of MP&M pollutants in fish tissue and drinking water. The regulation would also result in the

removal of 0.86 million pounds (1.9 toxic lb-eq.) per year of lead. In addition, there will be a 142 million pound reduction in 77 pollutants that are known to be related to a wide range of human health endpoints not quantified or monetized for this benefits analyses. Monetized health benefits are expected to result in \$41.3 million (1999 \$) in benefits due to decreased human health risks under the proposed option.

The analyses of changes in human health risk described in this and the following sections ignore the potential for joint effects of more than one pollutant. Each pollutant is dealt with in isolation and the individual effects are summed. Therefore, this approach does not account for the possibility that several pollutants may combine in a synergistic fashion to yield more or less adverse effects to human health than indicated by the simple sum of their individual effects.

1. Benefits from Reduced Incidence of Cancer Cases

EPA estimated aggregate cancer risk from contaminated drinking water for populations served by drinking water intakes on waterbodies to which MP&M facilities discharge. This analyses is based on seven carcinogenic pollutants for which no published drinking water criteria are currently available. This analyses excludes six carcinogens for which drinking water criteria are available. EPA assumed that public drinking water treatment systems will remove these pollutants from the public water supply. To the extent that treatment for these six pollutants may cause incidental removals of the chemicals without criteria, the analyses 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 the proposed regulation would eliminate annually 2.24 cancer

cases associated with consumption of contaminated drinking water, or 44 percent of the cancer cases associated with baseline MP&M discharges.

EPA valued the reduced cancer cases using estimated willingness-to-pay values for avoiding premature mortality. The values used in this analyses are based on a range of values identified in the EPA Office of Policy Analysis' review of available studies. The mean value of avoiding one statistical death is estimated to be \$5.8 million. This estimate does not include estimates of morbidity prior to death.

EPA also estimated aggregate cancer risk from consuming contaminated fish for recreational and subsistence anglers and their families. This analyses is based on thirteen carcinogenic pollutants found in MP&M effluent discharges. Estimated contaminants in fish tissue reflect predicted in-stream pollutant concentrations and biological uptake factors. EPA used data on numbers of licensed fishermen by State and county, presence of fish consumption advisories, fishing activity rates, and average household size to estimate the affected population of recreational and subsistence anglers and their families. The analyses uses different fish consumption rates for recreational and subsistence anglers to estimate the change in cancer risk among these populations.

The proposed rule eliminates an estimated 0.05 cancer cases per year for combined recreational and subsistence angler populations, representing a reduction of about 36 percent from a baseline of about 0.13 cases. This translates into \$0.3 million (1999\$) in annual benefits due to reduced cancer risk from consumption of contaminated fish by these populations.

Total benefits from reduced incidence of cancer cases, including both drinking water and fish exposures are \$13.3 million (1999\$) annually (see Table XX-2).

TABLE XX-2.—ESTIMATED ANNUAL BENEFITS FROM AVOIDED CANCER CASES FROM FISH AND DRINKING WATER CONSUMPTION

Regulatory status	Drinking Water		Fish Consumption		Total	
	Annual cancer cases	Benefit value (million 1999\$)	Annual cancer cases	Benefit value (million 1999\$)	Annual cancer cases	Benefit value (million 1999\$)
Baseline						
Baseline	5.10	¹ N/A	0.126	N/A	5.23	N/A
Proposed Option						
Number of Cases/Value	2.86	\$13.0	0.081	\$0.3	2.94	\$13.3
Percent Reduction	43.9%	N/A	35.7%	N/A	43.9%	N/A
Option 2/6/10						
Number of Cases/Value	2.73	\$13.7	0.081	\$0.3	2.81	\$14.0
Percent Reduction	46.5%	N/A	35.7%	N/A	46.1%	N/A
Option 4/8						
Number of Cases/Value	2.73	\$13.8	0.062	\$0.4	2.79	\$14.2
Percent Reduction	46.5%	N/A	49.2%	N/A	46.5%	N/A

Source: U.S. Environmental Protection Agency.

¹ Not Applicable.

2. Reductions in Systemic Health Effects

EPA expects that the proposed rule would also generate a wide range of non-cancer health benefits (*e.g.*, systemic effects, reproductive toxicity, and developmental toxicity) from reduced contamination of fish tissue and drinking water sources. The change in exposure to pollutants through fish and water consumption relative to pollutant-specific health effects thresholds yields an additional measure of the human health benefits that are likely to result from the proposed regulation. EPA compared estimated in-stream pollutant concentrations for 77 systemic toxicants with risk reference doses to calculate a hazard score. The systemic hazard score is the sum of the ratios of pollutant quantities ingested to the daily reference dose for each pollutant. Values above or near one indicate the potential for health non-cancer hazards. The hazard score assumes that the combined effect of ingesting multiple pollutants is proportional to the sum of their effects individually.

The distribution of hazard scores was calculated for drinking water and fish consumption populations for baseline and post-compliance exposures. The results show movement in populations from higher risk values to lower risk values for both the fish and drinking water analyses. Substantial increases in the percentage of the exposed populations that would be exposed to

no risk of systemic health hazards occur in both analyses.

3. Benefits from Reduced Exposure to Lead

EPA performed a separate analyses of benefits from reduced exposure to lead. This analyses differs from the analyses of systemic health risk 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 any exposed individual, and the effects of lead on children are of particular concern. Children's rapid rate of development makes them more susceptible to neurobehavioral deficits resulting 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 analyses 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 analyses 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 mg/dL. The analyses uses the value of compensatory education that an individual would otherwise need and the impact an additional IQ point on individuals' future earnings to value the avoided neurological and cognitive damages. EPA estimated that implementation of the proposed rule would result in avoided IQ loss of 489 points across all exposed children. The estimated monetary value of avoided IQ loss is \$4.9 million (1999\$). In addition, reduced occurrences of extremely low IQ scores (<70) and reduced incidence of blood-lead levels above 20 mg/dL would result in a decrease in the annual cost of compensatory education for children with learning disabilities of \$0.1 million (1999\$).

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. This analyses used the estimated willingness-to-pay (WTP) to avoid a mortality to estimate the monetary benefit associated with reducing risks of neonatal mortality. The estimated monetary value of benefits from reduced neonatal mortality is \$9.33 million (1999\$).

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 was able to quantify all relate to 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 analyses 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 estimate changes in risk of premature mortality. The estimated monetary value of health benefits to adults is \$13.6 million (1999\$) (see Table XX-3).

Total benefits from reduced exposure to lead, including both children and adults are \$28.0 million (1999\$) annually under the proposed option.

TABLE XX-3.—NATIONAL ADULT LEAD BENEFITS
[Millions of 1999\$ per year]

Category	Proposed option		Option 2/6/10		Option 4/8	
	Reduced cases	Monetary value	Reduced cases	Monetary value	Reduced Cases	Monetary value
Men						
Hypertension	959.85	\$1.00	991.41	\$1.04	992.20	\$1.04
CHD	1.24	\$0.09	1.29	\$0.09	1.29	\$0.09
CBA	0.52	\$0.14	0.53	\$0.14	0.53	\$0.14
BI	0.29	\$0.08	0.30	\$0.08	0.30	\$0.08
Mortality	1.7	\$9.85	1.76	\$10.19	1.76	\$10.20
Women						
CHD	0.39	\$0.03	0.40	\$0.03	0.40	\$0.03
CBA	0.17	\$0.03	0.18	\$0.04	0.18	\$0.04
BI	0.10	\$0.02	0.11	\$0.02	0.11	\$0.02
Mortality	0.41	\$2.38	0.42	\$2.46	0.42	\$2.46
Total Benefits .....	.....	\$13.6	.....	\$14.08	.....	\$14.09

National Level Exposed Population:

(1) Hypertension: 428,363 men ages 20 to 74;

(2) Coronary heart disease, cerebrovascular accidents, brain infarction, and mortality: 173,386 men and 192,091 women ages 45-74.

4. Exceedences of Health-Based AWQC

EPA also estimated the effect of MP&M facility discharges by comparing pollutant concentrations in affected waterways to ambient water criteria for protection of human health. This analysis compares the estimated baseline and post-compliance in-stream pollutant concentrations with ambient water quality criteria (AWQC). 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. EPA modeling results show that baseline in-stream concentrations of 18 pollutants are estimated to exceed human health criteria for consumption of water and organisms in 10,310 receiving reaches nationwide. The proposed rule

eliminates concentrations in excess of the criteria for consumption of water and organisms on 1,105 of these reaches. EPA also estimates that the proposed rule eliminates the occurrence of concentrations in excess of human health criteria for consumption of organisms only on 121 of the 192 reaches on which baseline discharges are estimated to cause concentrations in excess of AWQC values. Results also show that 382 receiving reaches will experience partial water quality improvements from reduced occurrence of some pollutant concentrations in excess of AWQC limits for consumption of water and organisms.

C. Ecological, Recreational and Nonuser Benefits

EPA expects the proposed 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 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. Among these ecological benefits, EPA was able to estimate dollar values for improved recreational opportunities and for nonuser benefits.

EPA expects the MP&M rule to improve aquatic species habitats by reducing concentrations of toxic and conventional contaminants in water. These improvements should 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 or 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/or human health AWQC values. This analysis combined the findings from the aquatic life benefits analysis and the human health AWQC exceedence analysis described previously. These analyses found that 10,443 stream reaches exceed chronic or acute aquatic life AWQC and/or human

health AWQC values at the baseline discharge levels (see Table XIII-4). The proposed rule is expected to eliminate exceedences on 1,185 of these discharge reaches, leaving 9,258 reaches with concentrations of one or more pollutants that exceed AWQC limits. Of these 9,258 reaches, 1,837 reaches will experience partial water quality improvements from reduced occurrence of some pollutant concentrations in excess of AWQC limits.

TABLE XX-4.—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	
		All AWQC exceedences eliminated	Number of AWQC exceedences reduced
Baseline	10,443	.....	.....
Proposed option	9,258	1,185	1,837
Option 2/6/10	4,217	6,226	1,894
Option 4/8	4,226	6,217	1,866

EPA attached a monetary value to these reduced exceedences based on increased values for recreational fishing and for nonuser values. Since the benefitting reaches are close to densely populated areas potential recreational users may also benefit from reduced visit “price” to these sites (i.e., lower travel costs to good recreational sites). EPA applied a benefits transfer approach to estimate the total willingness to pay (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 water-based recreation for the benefitting reaches based on estimated annual person-days of recreational fishing. The baseline per-day values of water-based recreation are based on studies by Walsh et. al (1992) and Bergstrom and Cordell (1991). 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 value per recreational fishing day used in this analyses is \$39.62.

EPA then applied the percentage change in the recreational fishing 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 exceedences by one or more

MP&M pollutants. The Agency selected eight of the most comparable studies and calculated the changes in recreational fishing 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). 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.

This approach uses all possible applicable valuation studies, 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. These studies yielded estimates of increased recreational fishing value from water quality improvements expected from reduced MP&M discharges of 10 to 15 percent. The estimated national recreational benefits of the proposed rule (1999\$) are provided in Table XIII-5 below. Note that the benefits transfer approach used in this analyses is based on eight studies as opposed to one used in the previous rule.

The resulting average changes in participants’ valuation of water resources *per year* resulting from the MP&M rule is modest (\$18.12 per angler

per year). EPA applied these estimates to the portion of the population residing in each county that is traversed by (i.e., is adjacent to) a water body that benefits from the proposed MP&M rule. The portion of the anglers adjacent to the reach is calculated based on the number of fishing licenses sold in the relevant counties and the ratio of the benefitting reach length to the number of total reach miles in the county. The results were then extrapolated to the national level based on facility sample weights.

Removing water quality impairments would increase services provided by water resources to recreational users. Potential recreational users are expected 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 estimated that 20.2 million anglers will benefit from improved recreational opportunities because they live in counties that are traversed by reaches expected to benefit from the MP&M regulation. The results show that roughly half of the nation’s recreational

anglers will benefit from the proposed rule. These results partially stem from the concentration of MP&M facilities in all heavily populated areas. However, EPA recognizes that extrapolating from sample facility to national results introduces uncertainty in the analyses, and is continuing to explore ways to reduce this uncertainty. The Agency is requesting comment on the methods used to extrapolate sample results to

national benefit estimates. The extrapolation method used is described in detail in chapters 5 and 15 and appendix F of the EEBA.

EPA also estimated non-market nonuser benefits. These non-market nonuser 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 nonuser values are a sizable component of the total economic value of water resources. EPA estimated average changes in nonuser value to equal one-half of the recreational fishing benefits. The estimated increase in nonuser value is \$182.7 million (1999\$).

TABLE XX-5.—ESTIMATED RECREATIONAL FISHING AND NON-USE BENEFITS FROM REDUCED MP&M DISCHARGES
[Million 1999\$]

Benefit Type	Proposed option	Option 2/6/10	Option 4/8
Recreational Fishing	\$365.4	\$960.3	\$962.1
Nonuse Benefit (1/2 of Recreational Fishing)	182.7	480.2	481.1
Total Recreational Benefits	548.1	1,440.5	1,443.2

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 recreational fishing and nonuser value. The resulting increase in value of water resources to recreational anglers and nonusers is \$548.1 million, with an upper and lower bound range of \$294 to \$941 million (1999\$) annually.

D. Productivity Changes: Cleaner Sewage Sludge (Biosolids)

EPA evaluated two productivity measures associated with MP&M pollutants. The first measure was the pollutant interference at publicly-owned treatment works (POTWs) which were quantified but not monetized in Section XII. The second measure is pass-through of pollutants into the sludge which limits options for disposing of their sewage sludge. EPA quantified the reduced costs for managing and disposing of sewage sludge. This analyses relied on data from 147 POTW surveys. The survey provided information on sewage sludge use and disposal costs and practices, total metal loadings to the POTW, percentage of total metal loadings contributed by MP&M facilities, and the number of known MP&M dischargers to the POTW. The survey also provided information on the percentage of qualifying sludge that is not land applied and reasons for not land applying qualifying sludge.

EPA has promulgated regulations establishing standards for sewage sludge when it is applied to the land, disposed of at dedicated sites (surface disposal), and incinerated (40 CFR part 503). In addition, EPA has also established standards for sewage sludge when it is disposed of in municipal solid waste

landfills (40 CFR part 258). Disposing of sewage sludge containing lower levels of pollutants is less expensive than disposing of more contaminated sewage because these regulations restrict disposal options based on sludge pollutant levels. The POTW survey indicated that the costs of alternative use/disposal practices follow a consistent ordinal relationship. That is, certain use/disposal practices (e.g., incinerating sludge) are generally more expensive than other practices (e.g., land application).

EPA estimated baseline and post-compliance sludge concentrations of eight metals for POTWs receiving discharges from the sample MP&M facilities. EPA compared these concentrations with the relevant metal concentration limits for land application and surface disposal. In the baseline case, EPA estimated that concentrations of one or more metals at 6,953 POTWs would fail the land application limits.

EPA estimates that 62 POTWs will be able to select the lower-cost land application disposal based on estimated reductions in sludge contamination. An estimated 1.7 million dry metric tons (DMT) of sewage sludge would newly qualify for land application annually. EPA also estimated that 21 POTWs that previously met only the land application pollutant limit would, as a result of regulation, meet the more stringent land application concentration limits. EPA expects these POTWs to benefit through reduced record-keeping requirements and exemption from certain sludge management practices. The annual estimated cost savings for the POTWs expected to upgrade their

sludge disposal practices are \$61.3 million (1999\$).

This analyses includes an adjustment to the estimate of national sludge use/disposal cost benefits for POTWs located at cost-prohibitive distances from agricultural, forest, or disturbed lands suitable for sludge application. EPA assumed that 46 percent of sludge generated in the United States is generated by POTWs located too far from sites suitable for application sewage sludge to make these practices economical.

E. Total Estimated Benefits of the Proposed MP&M Rule

EPA estimates that total benefits for the five categories for which monetary estimates were possible are \$0.651 billion (1999\$) annually. EPA characterized uncertainty inherent in the benefits analyses by bounding benefit estimates. The low and upper bound benefit estimates of the proposed option are \$0.347 and \$1,144 billion (1999\$) annually. EPA's complete benefit assessment can be found in Economic, Environmental, and Benefit Assessment of Proposed Effluent Limitations and Guidelines for the Metal Products and Machinery Industry. The monetized benefits of the rule underestimate the total benefits of the rule because it omits various sources of benefits to society may from reduced MP&M effluent discharges. Examples of benefit categories not reflected in this estimate include: non-cancer health benefits other than benefits from reduced exposure to lead, other water dependent recreational benefits such as swimming, boating, wildlife viewing, and waterskiing, and reduced cost of

drinking water treatment for the pollutants with drinking water criteria.

TABLE XX-6.—ESTIMATED BENEFITS FROM REDUCED MP&M DISCHARGES
[Annual Benefits—Million 1999\$]

Benefit category	Proposed option	Option 2/6/10	Option 4/8
1. Reduced Cancer Risk:			
Fish Consumption	\$0.3	\$0.3	\$0.4
Water Consumption	13.0	13.7	13.8
2. Reduced Risk from Exposure to Lead:			
Children	14.4	14.8	14.9
Adults	13.6	14.1	14.1
3. Avoided Sewage Sludge Disposal Costs	61.3	68.5	127.4
4. Enhanced Fishing	365.4	960.7	962.7
5. Nonuse benefits (½ of Recreational Use Benefits)	182.7	480.4	481.3
Total Monetized Benefits	650.6	1,553.5	1,614.4

As previously mentioned, the EEBA includes national estimates for benefits in two other categories, enhanced boating and wildlife viewing. In addition, it also includes estimates from a travel cost analyses of recreational benefits from enhanced fishing, swimming, boating and wildlife viewing performed for the state of Ohio. The case study analyses supplements the national level analyses performed for the proposed MP&M regulation by using improved data and methods to determine MP&M pollutant discharges from both MP&M facilities and other sources and by estimating swimming, fishing, boating, and near-water activities. The random utility model (RUM) used in the analyses estimates the effects of the specific water quality characteristics analyzed for the proposed MP&M regulation (i.e., the presence of AWQC exceedances and concentrations of the nonconventional nutrient Total Kjeldahl Nitrogen.) The direct link between the water quality characteristics analyzed for the rule and the characteristics valued in the RUM analyses reduces uncertainty in benefit estimates and makes the analyses of recreational benefits more robust. This analyses is presented in Chapters 20, 21, and 22 of the EEBA.

F. Benefit-Cost Comparison

EPA cannot perform a complete benefit-cost comparison because not all of the benefits resulting from the proposed regulatory alternative can be valued in dollar terms. A comparison of costs and benefits is thus limited by the lack of a comprehensive benefits valuation and also by some uncertainties in the estimates. Nonetheless, EPA presents the following summary comparison of costs and benefits for the proposed rule. The social cost of the proposed rule is \$2.1

billion annually (1999\$). The total benefits that can be valued in dollar terms in the categories traditionally analyzed for effluent guidelines range from \$0.4 billion to \$1.1 billion annually (1999\$). EPA believes that the benefits of the proposed regulation justify the social costs.

XXI. Regulatory Implementation

A. Compliance Dates

As discussed in Section XII of this notice, EPA is proposing to establish a three-year deadline (from the date of publication of the final MP&M rule) for compliance with the MP&M pretreatment standards for existing sources (PSES). EPA is proposing a three-year deadline because design and construction of systems adequate for compliance with PSES will be a substantial undertaking for many MP&M sites. In addition, control authorities (e.g., POTWs) will need the time to develop the permits or other control mechanisms for their industrial users.

Once EPA finalizes the MP&M rule, these limitations will be reflected in NPDES permits issued to direct dischargers.

New sources must comply with the new source standards and limitations (PSNS and NSPS) of the MP&M rule (once it is finalized) at the time they commence discharging MP&M process wastewater. Because the final rule is not expected within 120 days of the proposed rule, the Agency considers a discharger a new source if its construction commences following promulgation of the final rule (40 CFR 122.2; 40 CFR 403.3). In addition, today's notice fully replaces the MP&M Phase I proposal, published on May 30, 1995. Therefore, compliance deadlines in that proposal would obviously no longer apply.

B. Implementation of Limitations and Standards

1. Concentration-Based Limitations and Standards

As discussed in Section II.D, EPA is proposing concentration-based limits for all subcategories except the Steel Forming & Finishing Subcategory for which EPA is proposing production-based limits (see Section XXI.B.2, below, for a discussion on the Steel Forming & Finishing Subcategory). Unlike the Phase I proposal, EPA is not proposing to require permit writers or control authorities (e.g., POTWs) to implement the limits on a mass basis for dischargers. Instead EPA is proposing to authorize permit writers and control authorities to use their best professional judgement to decide when it is most appropriate to implement mass-based limits. The NPDES regulations (40 CFR 122.45(f)) require permit writers to implement mass-based limitations for direct dischargers, but allows an exception when the limits are expressed in terms of other units of measurement (e.g., concentration) and the General Pretreatment Standards (40 CFR 403.6(d)) provides that the control authority may impose mass limitations on industrial users which are using dilution to meet applicable pretreatment requirements or where mass limitations are appropriate. EPA believes that this approach will reduce implementation burden on POTWs associated with implementing mass-based limits at all of their MP&M industrial users, but will still result in increased use of water conservation practices at the facilities where POTWs determine it is most appropriate. EPA believes that MP&M facilities that have been using the best pollution prevention and water conservation practices may also request that the permit writer or POTW use

mass-based limits in their permits or control mechanism. The Agency is providing detailed information on water use levels for specific unit operations in Section 15 of the Technical Development Document for today's proposal. EPA believes this information will be useful to permit writers and control authorities in those instances where they deem it appropriate to set mass-based limits.

2. Mass-Based Limitations and Standards

a. Background

The effluent limitations guidelines and standards for BPT, BAT, NSPS, PSES, and PSNS proposed today for the Steel Forming and Finishing Subcategory are expressed as mass limitations in pounds/1,000 pounds of product. The mass limitation is derived by multiplying an effluent concentration (determined from the analyses of treatment system performance) by an appropriate wastewater volume ("production-normalized flow") determined for each forming or finishing operation expressed in gallons/ton of product. EPA developed the production normalized flows used to develop the limits in the proposed rule from survey questionnaire responses from steel forming and finishing facilities. (The production-normalized flows are provided in the Technical Development Document.) However, EPA did not collect analytical wastewater samples from Steel Forming & Finishing facilities that used the Option 2 treatment technology (see Section VIII for a description of the technology options). EPA transferred the effluent concentrations used to develop the proposed Steel Forming & Finishing subcategory limitations and standards from those used for the General Metals subcategory. EPA believes that the wastewater characteristics of the General Metals subcategory closely resemble those of the Steel Forming & Finishing subcategory. The concentration-based limitations and standards for the General Metals subcategory are provided in Subpart A of the proposed codified regulation that accompanies this preamble. EPA will conduct analytical wastewater sampling of well-operated chemical precipitation and clarification systems at steel forming and finishing facilities post-proposal. EPA intends on developing limitations and standards for this subcategory for the final rule that would be based on the steel forming and finishing facilities in this subcategory.

A facility subject to today's proposed regulation can use a combination of

various treatment alternatives and/or water conservation practices to achieve a particular effluent limitation or standard. The model treatment systems (*i.e.*, Option 2 for BPT, BAT, BCT, and PSES and Option 4 for NSPS and PSNS, as described in Section VIII) illustrate at least one means available to achieve the proposed effluent limitations guidelines and standards.

As discussed above in Section XXI.B.1, both the NPDES permit regulations and the General Pretreatment Regulations discuss the use of mass-based limitations and standards. In order to convert the proposed effluent limitations and standards expressed as pounds/1,000 pounds of product to a monthly average or daily maximum permit limit, the permitting or control authority would use a production rate with units of tons/day. The NPDES permit regulations (Part 122.45(b)(2)) require that NPDES permit limits be based on a "reasonable measure of actual production." A similar requirement is found in the General Pretreatment regulations (40 CFR 403.6(c)(3)). As discussed in Section VI, facilities in the proposed MP&M Steel Forming & Finishing subcategory, are currently covered under the Iron & Steel Manufacturing Point Source Category regulations (40 CFR part 420). The production rates used for NPDES permitting for the iron and steel industry under 40 CFR part 420 have commonly been the highest annual average production from the prior five year period prorated to a daily basis, or the highest monthly production over the prior five years prorated to a daily basis. Stakeholders involved in EPA's proposed revision of the Iron and Steel effluent limitations guidelines and standards (which is being proposed under a separate notice) have indicated that (1) EPA should include the method used to determine appropriate production rates for calculating allowable mass loadings into the regulation for consistency, so that the permit writers can all use the same basis; and (2) EPA should use a high production basis, such as maximum monthly production over the previous five year period or maximum design production, in order to ensure that a facility will not be out of compliance during periods of high production.

Both the NPDES and General Pretreatment regulations require that, for existing sources, production-based effluent limitations guidelines and standards be based not on production capacity, but on a "reasonable measure of actual production." The current iron and steel regulation at 40 CFR 420.04

requires that the mass-based pretreatment requirements be based on a reasonable measure of actual production. That regulation provides two examples of what may constitute a reasonable measure of actual production: (1) the monthly average for the highest of the previous five years, or (2) the high month of the previous year. Both values are converted to a daily basis (*i.e.*, tons/day) for purposes of calculating monthly average and daily maximum mass-based permit effluent limitations.

Each of the above regulations requires that effluent limitations and pretreatment standards for new sources must be based on projected production. That approach is carried forward in this proposed regulation.

EPA believes that production rates used in some permits and control mechanisms have been derived in a manner that is not consistent with the term "reasonable measure of actual production" specified at 40 CFR 122.45(b)(2)(i), 403.6(c)(3), and 420.04. In some cases, maximum production rates for similar process units discharging to one treatment system were determined from different years or months, which may provide an unrealistically high measure of actual production. In EPA's view, this unrealistic estimate of production would occur if the different process units could not reasonably produce at these high rates simultaneously.

The ideal situation for the application of production-based effluent limitations and standards is where production is relatively constant from day-to-day or month-to-month. In this case, the production rate used for purposes of calculating the permit limitations would then be the average rate. However, in the case of the steel forming and finishing industry, production rates are not constant and vary significantly based on factors such as fluctuations in market demand for domestic products, maintenance, product changes, equipment failures, and facility modifications. As such, the typical production rate for individual facilities vary significantly over time, especially over the customary five-year life of a permit or control mechanism.

Although permits and control mechanisms can be modified, if necessary, during the five-year life of a permit or control mechanism, re-opening a permit can be very burdensome on the regulator and the facility. Therefore, the objective in determining a production estimate for a facility is to develop a reasonable measure of production which can reasonably be expected to prevail during

the next term of the permit or control mechanism. The production estimate is used in combination with the production-based limitations to establish a maximum mass of pollutant that may be discharged each day and month. However, if the permit or control mechanism production rate is based on the maximum month, then the permit could allow excessive discharges of pollutants during significant portions of the life of the permit/control mechanism. These excessive allowances may discourage facilities from ensuring optimal waste management, water conservation, and wastewater treatment practices during lower production periods. On the other hand, if the average production rate is based on an average derived from the highest year of production over the past five years, then facilities may have trouble ensuring that their waste management, water conservation, and wastewater treatment practices can accommodate shorter periods of higher production. This might require facilities to target a more stringent treatment level than that on which the limits and standards were based during these periods of high production. To accomplish this, facilities would likely have to develop more efficient treatment systems, greater hydraulic surge capacity, and better water conservation and waste management practices, or they may have to contract haul a portion of their wastewater to off-site disposal during these periods.

b. Alternatives for Establishing Permit Effluent Limitations and Standards

EPA is soliciting comment on several alternative approaches that may result in more stringent mass-based permits/control mechanisms for some facilities with better protection of the environment for the entire life of a permit/control mechanism and may result in higher costs. Each alternative requires that production from unit operations that do not generate or discharge process wastewater shall not be included in the calculation of operating rates.

Alternative A: This is the basis for today's proposed limits. It retains the essential requirements of the rule that EPA currently regulates Steel Forming and Finishing facilities under (40 CFR 420.04). However, today's proposal provides additional instructions for avoiding approaches that result in unrealistically high estimates of actual production by only considering production from all production units that could occur simultaneously (see § 438.58(b)). This may result in higher costs for those facilities with current

permit or control mechanism conditions based on production levels that are higher than levels that could occur simultaneously at multiple process units.

In determining the production rate for the Steel Forming and Finishing subcategory, EPA is proposing to require permit writers and control authorities to use the following protocols:

(1) For similar, multiple production lines with process waters treated in the same wastewater treatment system, the reasonable measure of production shall be determined from the combined production of the similar production lines during the same time period.

(2) For process wastewater treatment systems where wastewater from two or more different production lines are commingled in the same wastewater treatment system, the reasonable measure of production shall be determined separately for each production line (or combination of similar production lines) during the same time period.

Alternative B: The Agency is considering including in the rule a requirement for the permit writer/control authority to establish multi-tiered limits and pretreatment standards. Permit writers and control authorities currently use their best professional judgment for establishing multi-tiered permits. The Agency has issued guidance for use in considering multi-tiered permits (see chapter 5 of the "U.S. EPA NPDES Permit Writers" Manual," (EPA-833-8-96-003, December 1996) and chapter 7 of the "Industrial User Permitting Guidance Manual," (EPA 833/R-89-001, September 29, 1989)).

In situations where a single set of effluent limitations or standards are not appropriate for the permit's (or control mechanism's) entire period, a tiered permit/control mechanism may be established. One set of limits would apply for periods of average production along with other sets which take effect when there are significant changes in the average production rate. The guidance notes that a 10 to 15 percent deviation above or below the long-term average production rate is within the range of normal variability. Predictable changes in the long-term production higher than this range would warrant consideration of a tiered or multi-tiered permit/control mechanism. Based on EPA's limited data, the facilities in the Steel Forming and Finishing subcategory may have a variable production rate where the permit/control mechanism modification process is not fast enough to respond to

the need for higher or lower equivalent limits.

Alternative C: To provide a basis for deriving a permit/control mechanism production rate that is consistent with the term *reasonable measure of actual production* and that can be applied consistently for facilities in the Steel Forming and Finishing subcategory, EPA is also considering including a definition of "production" specific to this subcategory in the rule. The modified definition for use in developing the permit/control mechanism production basis would be the average daily operating rate for the year with the highest annual production over the past five years, taking into account the annual hours of operation of the production unit and the typical operating schedule of the production unit, as illustrated by the following example:

Highest annual production from previous five years: 3,570,000 tons.
Operating hours: 8,400 hours.
Hourly operating rate: 425 tons/hour.
Average daily operating rate (24 hour day): 10,200 tons/day.

The above example is for a process unit that is operated typically 24 hours per day with short-term outages for maintenance on a weekly or monthly basis. For facilities in the Steel Forming and Finishing subcategory that are operated typically less than 24 hours per day, the average daily operating rate must be determined based on the typical operating schedule (e.g., 8 hours per day for a facility operated one 8-hour turn (or shift) per day; 16 hours per day for a facility operated for two 8-hour turns per day). For example:

Highest annual production from previous five years: 980,000 tons.
Operating hours: 4,160 hours.
Hourly operating rate: 235.6 tons/hour.
Average daily operating rate (16 hour day): 3,769 tons/day.

In this example, EPA recognizes that the approach could cause problems for a facility that was operated 16 hours/day at the time the permit was issued and then wished to change to 24 hours/day based on unforeseen changes in market conditions. To address this issue, the approach could be combined with the tiered permit approach discussed above.

For multiple similar process units discharging to the same wastewater treatment system with one compliance point (e.g., two electroplating lines operated with one treatment system for process waters), the year with the highest annual production over the previous five years under Alternative C would be determined on the basis of the

sum of annual production for both electroplating lines. Then, based on this year's average daily operating rate, the daily production rates would be calculated as above independently for

each electroplating line using total annual production and annual operating hours for each line. The daily production values would be summed to calculate the average daily operating

rate for the combination of the two lines. For example, consider the following production data:

Year	Electroplating line A (tons)	Electroplating line B (tons)	Total (tons)
1995	1,859,000	1,305,000	3,155,000
1996	1,675,000	1,425,000	3,100,000
1997	1,760,000	1,406,000	3,166,000
1998	1,580,000	1,328,000	2,908,000
1999	1,825,000	1,380,000	3,205,000

Annual maximum production rates for each electroplating line and the combination of the two lines are *italicized*. In this example, 1999 was the maximum production year for the combination of the electroplating lines and the data from each line that year would be used to calculate the average daily operating rates. Had the 1995 data from Electroplating Line A and the 1996 data from Electroplating Line B been used in combination (3,275,000 tons),

an unrealistic measure of actual production might have resulted if the two electroplating lines could not produce at these high levels concurrently.

In contrast to the previous example, for multiple process units that are not similar, but have process wastewater commingled prior to treatment in one central wastewater treatment system with one compliance point, the year with the highest production over the

previous five years would be determined separately for each production unit (or combination of similar and different production units) with the highest annual production. For example, consider a situation where process wastewater for an electroplating line, a pressure deformation operation, and an acid pickling operation are discharged through one compliance point. Consider the following example:

Year	Electroplating (tons)	Pressure deformation (tons)	Acid pickling (tons)
1995	575,000	650,000	900,000
1996	650,000	700,000	1,000,000
1997	675,000	850,000	950,000
1998	750,000	825,000	1,125,000
1999	700,000	600,000	900,000

In this example, 1998 production data for the electroplating line, 1997 data from the pressure deformation operation, and 1998 data for the acid pickling operation would be used to develop the effluent limitations or pretreatment standards used in the permit/control mechanism.

Alternative D: The Agency is considering establishing production-based maximum monthly average effluent limitations and standards in combination with daily-maximum concentration-based effluent limitations and standards. Under this alternative, the maximum monthly average NPDES permit and pretreatment control mechanism mass basis requirements would be determined using the part 438 subpart E production-based standards in combination with a reasonable measure of actual production, such as Alternative C above. However, the daily-maximum requirements would be in the form of effluent concentrations that would be included in part 438 subpart E in lieu of the daily-maximum production-based mass effluent limitations guidelines and standards.

These daily maximum concentrations set out as effluent limitations guidelines and standards would be based on the long-term averages and variability factors derived from EPA sampling conducted post-proposal at steel forming and finishing facilities representative of BAT.

The Agency believes this approach would effectively address the potential issue cited above regarding short-term peaks in production under most circumstances. There would be no additional burden on the industry and permitting or control authorities for applying for and writing NPDES permits or pretreatment control mechanisms. Permitting and control authorities may need to revise their automated compliance tracking systems to account for both mass and concentration limitations at the same outfall, which is a common feature in many NPDES permits and pretreatment control mechanisms issued prior to this proposal.

EPA solicits comments on these alternatives to the proposed production bases for calculating effluent limitations

and pretreatment standards used in NPDES permits or control mechanisms. In particular, the Agency solicits comments on related costs and any technical difficulties that steel forming and finishing facilities might have in meeting limits during short periods of high production. EPA also solicits other options for consideration.

C. Monitoring Flexibility

1. Monitoring Waiver

EPA's Small Business Advocacy Review (SBAR) Panel encouraged EPA to "explore options for allowing certification in lieu of monitoring where an operator can determine, based on knowledge of the facility and its processes, that certain pollutants are not likely to be present or are adequately controlled." (See Section XXII.C for a discussion on the recommendations of the SBAR Panel). Other stakeholders expressed similar requests during public meetings with the Agency. Therefore, in an effort to reduce monitoring burden on facilities, EPA is proposing to allow MP&M indirect discharge facilities to

apply for a waiver that would allow them to reduce their monitoring burden (EPA discusses existing monitoring waivers available for direct dischargers later in this section). In order for a facility to receive a monitoring waiver, the facility would need to certify in writing to the control authority (*e.g.*, POTW) that the facility does not use, nor generate in any way, a pollutant (or pollutants) at its site and that the pollutant (or pollutants) is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger. The facility would need to base this certification on sampling data or other technical factors. The certification would not be a waiver from the pollutant numerical limit in the control mechanism (*i.e.*, permit). It would only be a waiver from the monitoring requirements. In addition, EPA would still require the industrial user to monitor for the specified pollutants as part of the Baseline Monitoring Report (§ 403.12(b)) and the 90-day Compliance Report (§ 403.12(d)). EPA believes control authorities can use the sampling data generated from the Baseline Monitoring Report and the 90-day Compliance Report in conjunction with technical information on the raw materials and chemical processes used at the facility to determine whether there is sufficient reason to allow the monitoring waiver for any of the MP&M limited pollutants. Although EPA expects this monitoring waiver to reduce burden overall, the Agency estimates the burden associated with preparing the certification statement and related documentation as required by the Paper Reduction Act (see Section XXII.A for burden estimates).

EPA is proposing that the certification statement be submitted at the same time indirect discharging MP&M facilities submit "periodic reports on continued compliance" as directed by the General Pretreatment Standards (40 CFR 403.12(e)). Indirect dischargers submit such reports twice per year (typically June and December). In addition, the certification would need to be signed by the same individual that is authorized to sign the periodic reports as described in the General Pretreatment Standards 403.12(l). This monitoring waiver would be similar to the waiver in the Proposed "Streamlining the General Pretreatment Regulations for Existing and New Sources of Pollution," 64 FR 39564; July 22, 1999 (commonly referred to as "Pretreatment Streamlining"). If EPA promulgates the final Pretreatment Streamlining regulations prior to the final MP&M effluent guidelines and

those regulations contain a similar provision then a waiver specific to MP&M facilities would be unnecessary.

EPA recently promulgated a regulation to streamline the NPDES regulations ("Amendments to Streamline the National Pollutant Discharge Elimination System Program Regulations: Round Two" (65 FR 30886; May 15, 2000)). These revisions include a similar 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." (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 under these revisions to the NPDES regulations must be submitted when applying for a reissued permit or modification of a reissued permit. Therefore, EPA is not proposing a monitoring waiver in the MP&M regulations for direct dischargers. When authorized by their permit writer, direct discharge facilities covered by any effluent guidelines (including MP&M) will be able to use the monitoring waiver contained in the NPDES streamlining final rule.

2. Monitoring Flexibility for Organic Pollutants

In an effort to reduce burden on MP&M facilities, EPA proposes three alternatives to allow for maximum flexibility while ensuring reductions in the amount of organic pollutants discharged from MP&M facilities. EPA is proposing to require MP&M facilities within the scope of this rule to either: (1) Meet a numerical limit for the total sum of a list of specific organic pollutants (similar to the Total Toxic Organics or TTO parameter used in the Metal Finishing Effluent Guidelines); (2) meet a numerical limit for TOC as an indicator parameter; or (3) develop and certify the implementation of an organic pollutant management plan.

As discussed in section II.D, EPA proposed using an organic pollutant

indicator parameter in the 1995 Phase I MP&M proposal. At that time, however, the Agency did not provide the alternative of monitoring for individual organic pollutants. In an effort to provide such an alternative, EPA reviewed the sampling data to identify individual organic pollutants for which the Agency could develop individual limits. Due to the variety of organic pollutants used across MP&M facilities, EPA determined that it would be burdensome to facilities and permit writers to have to determine which limits to apply to a facility. Instead, EPA is proposing an approach similar to the one used in the Metal Finishing Effluent Guidelines (40 CFR part 433). EPA developed a list of organic pollutants, called the Total Organics Parameter (TOP), using the list of organic priority pollutants and other nonconventional organic pollutants that met EPA's "pollutant of concern" criteria for this rule (see Section VII for a discussion on the selection of the MP&M pollutants of concern). Of the non-conventional organic chemicals on the MP&M pollutant of concern list, EPA included only those that were removed in appreciable quantities by the selected technology option (based on toxic weighted pound-equivalents) in two or more subcategories. See appendix B to part 438 of the proposed rule accompanying this notice for a list of organic pollutants that comprise the proposed Total Organics Parameter (TOP). EPA has derived the numerical limit for TOP based on the contribution of each of the organic pollutants on the list in Appendix B using the data collected during sampling and determined its limitation using the same statistical methodology used for other limits developed for this proposal (see Section VIII.B). In any case where the data for these pollutants indicated a level below the minimum level (*i.e.*, below quantitation), EPA used the minimum level for the specific pollutant in the summation of the total organics parameter limit. Facilities will only have to monitor for those TOP chemicals that are reasonably present (see XXI.C.1 for a discussion on monitoring waivers). Note that the TOP limit shall not be adjusted for those pollutants that are not reasonably present. EPA solicits comment on this methodology. For compliance purposes, pollutants that have been given a waiver (because they are not reasonably present) will be counted as zero in the TOP limit. For remaining pollutants, the reported value, when above the detection limit, shall be used in the TOP calculation. When a pollutant is

reported as a "non-detect" (*i.e.*, not found above the nominal quantitation value listed in appendix B of the proposed rule), the nominal quantitation value shall be used in the TOP calculation.

EPA considered using the same list of organic chemicals as in the Metal Finishing effluent guidelines Total Toxic Organics (TTO) list (40 CFR 433.11(e)), but rejected this approach. EPA did not include all parameters from the Metal Finishing TTO list because: (1) EPA did not find many of the TTO parameters in the wastewater sampled for the MP&M rule; (2) many of the listed organics are pesticides that are no longer manufactured (*e.g.*, DDT) and would not be used in MP&M operations; and (3) most facilities subject to the Metal Finishing TTO limits switched to the use of solvents (or aqueous cleaners) that do not contain the organic chemicals on the Metal Finishing TTO list.

As discussed above, EPA is also proposing to allow the use of an indicator parameter to measure the presence of organic pollutants in MP&M process wastewater. Facilities can monitor for the organic pollutants specified in the total organics parameter list (as discussed above) to demonstrate compliance with the TOP limit or they can monitor for Total Organic Carbon (TOC) and meet the TOC limit. EPA chose TOC as an indicator parameter because of its ability to measure all types of organic pollutants. EPA solicits comment on the use of TOC as an indicator pollutant for the organic pollutants typically found in wastewater discharges from MP&M facilities. EPA also requests comment on whether the Agency should allow facilities to choose an indicator pollutant from a given set of choices (*e.g.*, COD, Oil & Grease (as HEM), TOC, Total Petroleum Hydrocarbons (as SGT-HEM)). EPA found TOC to be the best general indicator parameter for measuring the sum of organic compounds in a wastestream. EPA notes, however, that to determine the best indicator parameter for a particular wastestream, a facility would need to consider the specific organic components found in its wastestreams.

Finally, EPA is proposing a third alternative to reduce monitoring burden—the use of an organic pollutant management plan. The organic pollutant management plan would need to specify, to the satisfaction of the permitting authority or control authority, the toxic and non-conventional organic constituents used at the facility; the disposal method used; the procedures in place for ensuring that

organic pollutants do not routinely spill or leak into the wastewater or that minimize the amount of organic pollutants used in the process; the procedures in place to manage the oxidation reduction potential (ORP) during cyanide destruction to control the formation of chlorinated organic byproducts; and the procedures to prevent the over dosage of dithiocarbamates when treating chelated wastewater. Facilities choosing to develop an organic pollutant management plan would need to certify that the procedures described in the plan are being implemented at the facility. Based on the current data base, EPA is concerned that wastewater generated by facilities in the Oily Wastes subcategory may require end-of-pipe treatment to reduce the concentrations of organic pollutants and that an organic management plan alone may not adequately control organic-bearing wastewater at facilities containing significant quantities of oil-bearing wastewater. Although EPA is proposing the use of the organics management plan be offered to Oily Wastes facilities, EPA solicits comment on whether sites with significant amounts of oil-bearing wastewater (for example, a facility in the Oily Waste subcategory) should be eligible for the use of an organic pollutant management plan in lieu of monitoring for TOP (Total Organics Parameter) or TOC (as an indicator).

3. Monitoring for Cyanide

For the General Metals, Metal Finishing Job Shop, Printed Wiring Board, and Steel Forming and Finishing subcategories, EPA is proposing to set a total cyanide limit. The point of compliance would be based on monitoring for total cyanide directly after cyanide treatment, before combining the cyanide treated effluent with other wastestreams. EPA is also proposing an alternative where a facility may take samples of final effluent, in order to meet the total cyanide limit, if the control authority adjusts the permit limits based on the dilution ratio of the cyanide wastestream flow to the effluent flow.

In addition, EPA has selected alkaline chlorination using sodium hypochlorite as the best available economically achievable technology for treating cyanide bearing wastewater from MP&M facilities. Not all cyanide however is amenable to alkaline chlorination due to "unavoidable" complexing with other compounds at the process source of the cyanide-bearing wastestreams. EPA believes that for some facilities it may be more accurate to monitor for the

portion of cyanide in their wastewater that is amenable to alkaline chlorination than to measure total cyanide which may include cyanide complexes that this technology is not likely to treat. Therefore, EPA is also proposing an alternative "amenable cyanide" limit for each of these subcategories which a facility may use directly after cyanide treatment (*e.g.*, before combining the cyanide treated effluent with other wastestreams). The Agency proposes to allow the use of this limit upon the agreement of the facility and its permit writer or control authority (*e.g.*, POTW). However, when segregated cyanide treatment is in place as a preliminary step prior to commingling wastewater for chemical precipitation, EPA would allow the amenable cyanide alternative limit to be measured at the end-of-pipe (*i.e.*, final effluent) if the control authority adjusts the permit limits based on the dilution ratio of the cyanide wastestream flow to the effluent flow. If facilities are not using cyanide destruction treatment on cyanide-bearing wastestreams prior to commingling with metal-bearing streams, additional complexing can occur. This additional complexing would render the cyanide "non-amenable" when it would otherwise be amenable to alkaline chlorination. EPA considers such complexing to be "avoidable" and would not allow the use of end-of-pipe monitoring for amenable cyanide when in-process cyanide destruction is not performed. (See the final Organic Chemicals, Plastics and Synthetic Fibers Category Effluent Limitations Guidelines for a discussion on non-amenable versus amenable cyanide; 57 FR 41836; September 11, 1992).

D. Pollution Prevention Alternative for the Metal Finishing Job Shops Subcategory

EPA is soliciting comment on a compliance alternative that the Agency is considering for the Metal Finishing Job Shops subcategory of this proposed regulation (See Section VI.C.3. of this preamble for a description of this subcategory). The purpose of a pollution prevention compliance alternative ("P2 Alternative") is to reduce economic impacts on the facilities in the Metal Finishing Job Shops subcategory and to take into consideration the activities and achievements of this Common Sense Initiative ("CSI") sector to test innovative approaches to environmental protection, which has culminated in the National Metal Finishing Strategic Goals Program.

The National Metal Finishing Strategic Goals Program ("SGP") was

developed out of EPA's sector based Common Sense Initiative. In 1994, EPA launched the CSI to promote "cleaner, cheaper, and smarter" environmental performance, using a non-adversarial, stakeholder consensus process to test innovative ideas and approaches. The SGP is a cooperative effort that involves all stakeholders (e.g., industry, regulators, environmental/citizen groups) to define a fundamentally different approach to environmental and public health protection by exploring a more flexible, cost-effective and environmentally protective solutions tailored to specific industry needs. The Metal Finishing SGP is a performance-based, voluntary program which includes commitments by the industry to meet multimedia environmental targets substantially reducing pollution from their operations beyond what is required by law. These goals will conserve water, energy and metals, and reduce hazardous emissions. The other stakeholders in this process (EPA, State and local regulators, and environmental/community groups) have also committed to working with the industry participants to help them meet their goals through compliance, technical, and financial assistance, removing regulatory and policy barriers, offering incentives, and an open dialogue as issues arise. (See <http://www.strategicgoals.org> for more information about the SGP and the Common Sense Initiative).

The SGP represents a long-term strategic vision for improved environmental protection by the entire metal finishing industry. The metal finishing industry's tangible commitment to work with the Agency lays the foundation for this pollution prevention (P2) compliance alternative.

The Agency is considering allowing indirect discharge facilities in the Metal Finishing Job Shops subcategory, with approval by their control authority (e.g., POTW), to demonstrate compliance with specified pollution prevention and water conservation practices (in addition to maintaining compliance with the existing Metal Finishing and Electroplating Effluent Guidelines or approved local water quality-based limits, whichever is more stringent) in lieu of meeting the requirements of the MP&M regulation. Facilities in the Metal Finishing Job Shops subcategory that do not wish to use the compliance alternative would need to meet the full requirements of the MP&M regulation as specified in today's proposed rule.

EPA solicits comment on whether to allow all facilities in the Metal Finishing Job Shops subcategory to comply with the P2 Alternative or

whether the P2 Alternative should only be available to facilities below a specified wastewater discharge volume. EPA has proposed low flow exclusions for indirect dischargers in the General Metals (1 MGY) and Oily Wastes (2 MGY) subcategories due to potential permitting burden on POTWs (see Sections II.D, VI.C and XII for a discussion on low flow exclusions).

One way that EPA is considering to specify pollution prevention and water conservation practices, without stifling innovation and advances, is to require facilities to choose practices from a larger list (or menu) of categories of specified practices (see below). EPA is considering requiring practices in all ten categories. The following is an example of the format and potential pollution prevention practices that EPA is considering for incorporation into the final MP&M rule:

Category 1. Must Use Practices That Reduce and/or Recover Drag-Out

To satisfy this requirement, facilities must implement three or more drag-out reduction practices or use at least one drag-out recovery (i.e., chemical recovery) technology listed below on all electroplating or surface finishing lines.

Drag-out Reduction Practices

- Lower process solution viscosity and/or surface tension by lowering chemical concentration, increasing bath temperature, or use wetting agents.
- Reduce drag-out volume by modifying rack/barrel design and perform rack maintenance to avoid solution trapping under insulation.
- Position parts on racks in a manner that avoids trapping solution.
- Reduce speed of rack/barrel withdraw from process solution and/or increase dwell time over process tank.
- Rotate barrels over process tank to improve drainage.
- Use spray/fog rinsing over the process tank (limited applicability).
- Use drip boards and return process solution to the process tank.
- Use drag-out tanks, where applicable, and return solution to the process tank.
- Work with customers to ensure that part design maximizes drainage

Drag-out Recovery

Use a chemical recovery technology to recover drag-out from wastewater.

- Evaporators
- Ion exchange
- Electrowinning
- Electrodialysis
- Reverse osmosis

Category 2. Must Use Good Rinse System Design for Water Conservation

To satisfy this requirement, facilities must implement three or more elements of good rinse system design listed below on all electroplating or surface finishing lines:

- Select the minimum size rinse tank in which the parts can be rinsed and use the same size for the entire plating line, where practical.
- Locate the water inlet and discharge points of the tank at opposite positions in the tank to avoid short-circuiting or use a flow distributor to feed the rinse water evenly.
- Use air agitation, mechanical mixing or other means of turbulence.
- Use spray/fog rinsing (less effective with hidden surfaces).
- Use multiple rinse tanks in a counter-flow configuration (i.e., counter-current cascade rinsing).
- Reuse rinse water multiple times in different rinse tanks for succeeding less critical rinsing

Category 3. Must Use Water Flow Control for Water Conservation

To satisfy this requirement, facilities must implement at least one effective method of water use control on all electroplating or surface finishing lines. Effective water use controls include, but are not limited to:

- Flow restrictors (Flow restrictors as a stand alone method of rinse water control are only effective with plating lines that have constant production rates, such as automatic plating machines. For other operations, there must also be a mechanism or procedure for stopping water flow during idle periods.)
- Conductivity controls
- Timer rinse controls
- Production activated control (e.g., spray systems activated when a rack or barrel enters/exits a rinse station)

Category 4. Must Segregate Non-Process Water From Process Water

To satisfy this requirement, facilities must not combine non-process water such as non-contact cooling water with process wastewater prior to wastewater treatment.

Category 5. Must Use Water Conservation Practices With Air Pollution Control Devices

To satisfy this requirement, facilities operating air pollution control devices with wet scrubbers must recirculate the scrubber water as appropriate (periodic blowdown is allowed, as needed). Where feasible, reuse scrubber water in process baths.

Category 6. Must Practice Good Housekeeping

To satisfy this requirement, facilities must demonstrate compliance with each of the requirements listed below:

- Perform preventative maintenance on all valves and fittings (*i.e.*, check for leaks and damage) and repair leaky valves and fittings in a timely manner.
- Inspect tanks and liners and repair or replace equipment as necessary to prevent ruptures and leaks. Use tank and liner materials that are appropriate for associated process solutions.
- Perform quick cleanup of leaks and spills in chemical storage and process areas.
- Remove metal buildup from racks and fixtures.

Category 7. Minimize the Entry of Oil Into Rinse Systems

To satisfy this requirement, facilities must do at least one of the practices listed below:

- Minimize the entry of oil into cleaning baths or use oil skimmers or other oil removal devices in cleaning baths when needed to prevent oil from entering rinse tanks.
- Work with customers to degrease parts prior to shipment to the plating facility to minimize the amount of oils on incoming materials.

Category 8. Must Sweep or Vacuum Dry Production Areas Prior to Rinsing With Water

To satisfy this requirement, facilities must sweep or vacuum dry production area floors prior to rinsing with water.

Category 9. Must Reuse Drum/Shipping Container Rinsate Directly in Process Tanks

To satisfy this requirement, when performing rinsing of raw material drums, storage drums, and/or shipping containers that contain pollutants regulated under the MP&M regulation, facilities must reuse the rinsate directly into process tanks or save for use in future production.

Category 10. Must Implement Environmental Management and Record Keeping System

To satisfy this requirement, facilities must meet the requirements listed below:

- Implement an environmental management program that includes, but is not limited to, the following elements:
 - Pollution prevention policy statement,
 - Environmental performance goals,
 - Pollution prevention assessment,
 - Pollution prevention plan,
 - Environmental tracking and record keeping system,

- Procedures to optimize control parameter settings (*e.g.*, ORP set point in cyanide destruction systems, optimum pH for chemical precipitation systems, etc.), and

- Statement delineating minimum training levels for wastewater treatment operators.

(EPA notes that it has developed a template for a metal finishing facility-specific Environmental Management System that is being used in conjunction with the SGP in EPA's Region 9 in California—see <http://www.strategicgoals.org/tools/home.htm> for information on this template).

The first two categories listed above involve practices and techniques for reducing drag-out. Drag-out is the film of chemical solution covering parts and fixtures as they exit process solutions. For many metal finishing operations, drag-out and the subsequent contamination of rinse waters is the major pollution control challenge. Reducing the formation of drag-out, minimizing the introduction of drag-out to rinse systems, and recovering drag-out are important pollution prevention measures. EPA believes that drag-out reduction and recovery may prevent a substantial pollutant loading of metals from being discharged to the POTW. However, EPA did not have sufficient information on the pollutant reductions, capital costs, and operating and maintenance costs associated with installation and operation of drag-out reduction and recovery technologies to include such equipment explicitly into the model that EPA uses to develop national estimates of compliance costs and pollutant reductions. Some aspects of drag-out reduction are captured in the flow rinse reduction modules of the cost and loadings model (see the Technical Development Document for a detailed discussion of the cost and loadings model). Good rinse design can reduce contamination of rinse water as well as reduce the volume of fresh water needed to perform the necessary rinsing. It also reduces the volume of wastewater requiring treatment, which in turn reduces costs and the volume of wastewater treatment sludge requiring disposal. EPA specifically solicits data on the pollutant reductions, capital costs, and operating and maintenance costs associated with installation and operation of drag-out reduction and recovery technologies.

EPA is considering allowing facilities complying with the P2 Alternative to substitute another pollution prevention practice for one listed above provided that the facility provides adequate justification for the modification in a written request submitted to the control

authority. Facility owners must certify compliance with the pollution prevention requirements twice per year and maintain records at the facility indicating how each category requirement has been satisfied.

Facilities choosing the P2 Alternative would also need to agree to make the practices enforceable. Reporting would occur in conjunction with their twice annual periodic reports on continued compliance under the General Pretreatment Regulations (40 CFR 403.12(e)).

EPA solicits comment on all aspects of the Pollution Prevention Alternative for the Metal Finishing Job Shops subcategory including the list of practices as well as the possible format for the alternative. More specifically, EPA requests comment on whether there are additional practices that should be listed, the costs of implementing this compliance alternative, the pollutant reduction associated with this alternative, and whether EPA should offer this alternative to other subcategories (even those not currently regulated by the Metal Finishing and Electroplating effluent guidelines). EPA also requests comments from local regulators on the implementation burden, the required documentation, and on the ability to enforce a P2 Alternative.

E. 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.

F. Variances and Modifications

The CWA requires application of effluent limitations established pursuant to section 301 or pretreatment standards of section 307 to all direct and indirect 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 and pretreatment standards 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 new section 301(n) of the Act explicitly to authorize 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 in section 304 (other than costs) from those considered by EPA in establishing the effluent limitations or pretreatment standard. 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. EPA regulations provide for an FDF variance for indirect dischargers at 40 CFR 403.13. 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).

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

2. Economic Variances

Section 301(c) of the CWA authorizes a variance from the otherwise applicable BAT effluent guidelines for nonconventional pollutants due to economic factors. The request for a variance from effluent limitations developed from BAT guidelines must normally be filed by the discharger during the public notice period for the draft permit. Other filing time periods may apply, as specified in 40 CFR 122.21(1)(2). Specific guidance for this type of variance is available from EPA's Office of Wastewater Management.

3. Water Quality Variances

Section 301(g) of the CWA authorizes a variance from BAT effluent guidelines for certain nonconventional pollutants due to localized environment factors.

These pollutants include ammonia, chlorine, color, iron, and total phenols.

4. 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 that 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 modification, with provisions for public notice and comment. Conditions that would necessitate a major modification of a permit are described in 40 CFR 122.62. Minor modifications are generally non-substantive changes. The conditions for minor modification are described in 40 CFR 122.63.

G. Relationship of Effluent Limitations and Pretreatment Standards to NPDES Permits and Local Limits

Effluent limitations and pretreatment standards act as a primary mechanism to control the discharges of pollutants to waters of the United States. These limitations and standards are applied to individual facilities through NPDES permits and local limits developed for POTWs issued by EPA or authorized States under section 402 of the Act and local pretreatment programs under section 307 of the Act.

The Agency has developed the limitations and standards for this proposed rule to cover the discharge of pollutants for this industrial category. In specific cases, the NPDES permitting authority or control authority (e.g., local POTW) may elect to establish technology-based permit limits or local limits for pollutants not covered by this regulation. 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 to achieve compliance), the permitting or control authority must apply those limitations or standards.

H. Best Management Practices

Sections 304(e) and 402(a) of the Act authorize the Administrator to prescribe "best management practices" (BMPs). (See 40 CFR 122.44(k)). EPA may develop BMPs that apply to all industrial sites or to a designated industrial category and may offer guidance to permit authorities in establishing management practices required by unique circumstances at a given plant. Dikes, curbs, and other control measures are being used at some MP&M sites to contain leaks and spills as part of good "housekeeping" practices. However, on a facility-by-facility basis a permit writer may choose to incorporate BMPs into the permit. See section 8 of the Technical Development Document for this proposed rule for a detailed discussion of pollution prevention and best management practices used in the MP&M industry.

XXII. Related Acts of Congress, Executive Orders, and Agency Initiatives

A. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document has been prepared by EPA (ICR No. 1980.01) and a copy may be obtained from Sandy Farmer by mail at Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW., Washington, DC 20460, by email at farmer.sandy@epa.gov, or by calling (202) 260-2740. A copy may also be downloaded off the internet at <http://www.epa.gov/icr>.

There are five areas for which EPA is proposing, or considering to collect information from, or requiring reporting or record keeping by MP&M facilities. In all cases, EPA believes the collection of information, reporting, or record keeping is an alternative (*i.e.*, voluntary) that will allow a reduction in overall burden to facilities since EPA intends for these activities to reduce or eliminate effluent sampling and analysis costs. EPA solicits comment on all estimates discussed below.

First, EPA is proposing to allow indirect discharging MP&M facilities (upon agreement with the control authority) to reduce their analytical monitoring burden for specified pollutants by filing a statement that certifies that those pollutants are not present in the discharge or are present

only at background levels from intake water and without any increase in the pollutants due to activities of the discharger (See § 438.4(e) and Section XXI.C.1 for a discussion of the monitoring waiver). EPA estimates the burden for reviewing analytical sampling data and other technical information required to make the certification (*e.g.*, raw material inventory logs, production information, product chemistry, and reports on source water) and for preparing the certification statement one time per permit cycle (*i.e.*, every 5 years) to be 24 hours. In developing the technical basis for the waiver, EPA is allowing the use of historical sampling data as well as sampling data generated for compliance reports required by the General Pretreatment Standards (40 CFR 403.12). Therefore, EPA does not anticipate additional monitoring burden associated with this waiver, particularly in comparison to the periodic compliance monitoring that is being replaced by this waiver. In addition, certification to receive a monitoring waiver under this proposed rule is voluntary. MP&M facilities may choose not to avail themselves of this optional reduction in monitoring. EPA estimates that 5,250 facilities will choose the monitoring waiver for some pollutants.

Second, EPA is proposing to allow facilities to implement an organic pollutant management plan as one alternative to meeting organic pollutant limits (or organic indicator limits). (See 438.4(b)). The organic pollutant management plan must specify, to the satisfaction of the permitting authority or control authority, the toxic and non-conventional organic constituents used at the facility; the disposal method used; the procedures in place for ensuring that organic pollutants do not routinely spill or leak into the wastewater or that minimize the amount of organic constituents used in the process; the procedures in place to manage the oxidation reduction potential (ORP) during cyanide destruction to control the formation of chlorinated organic byproducts; and the procedures to prevent the over dosage of dithiocarbamates when treating chelated wastewater. Facilities choosing to develop an organic pollutant management plan must certify that the procedures described in the plan are being implemented at the facility. EPA estimates the burden associated with preparing an organic pollutant management plan and an accompanying certification statement to be 50 hours. After the initial plan is approved, EPA estimates one additional hour of burden

(once per year for direct dischargers and twice per year for indirect dischargers) for facilities to verify that the plan is being implemented and to prepare the certification statement. However, EPA believes that facilities that are already regulated by the Metal Finishing Effluent Guidelines (40 CFR part 433) and that have a solvent management plan in place under those regulations will only require 20 hours to update their plan for the initial submittal. EPA estimates 7,200 facilities will choose to implement an organics management plan in lieu of monitoring.

Third, EPA is considering an alternate approach to the use of an organic indicator parameter (see Section XXI.C.2 for a discussion on the proposed organic indicator). EPA notes that this alternate approach is not being proposed in today's notice, but is being considered for the final rule. In this case, there would be some additional reporting and record keeping. MP&M facilities could choose an indicator pollutant parameter from a given set of choices. EPA would require facilities to demonstrate a correlation between the chosen indicator parameter and the regulated organic pollutants (*i.e.*, the TOP organic pollutants) found in their wastewater. EPA is soliciting comment on this approach and has estimated the burden of performing testing, analyzing analytical results, and keeping records that demonstrate a correlation between the regulated organic pollutants and the selected indicator parameter to be between 70 and 100 hours per facility once per permit cycle (*i.e.*, 5 years). If no major changes in processes or raw materials occur during that period, the demonstration would not have to be repeated for the next permit cycle. The Agency notes that the choice of an option would be voluntary. EPA has estimated less burden for direct dischargers than for indirect dischargers (*i.e.*, 70 hours versus 100 hours) because the direct dischargers typically have more advanced treatment in place and permit writers typically require them to monitor for the types of parameters that EPA is considering as indicators (*e.g.*, COD, Oil & Grease, TOC, TPH), and therefore, may have data available that demonstrates a correlation to the regulated organic pollutants. EPA estimates that given the choice, approximately 515 facilities would choose to demonstrate and use a site-specific organic pollutant indicator.

Fourth, EPA is considering whether to allow certain facilities in the Metal Finishing Job Shops subcategory to demonstrate compliance with specified pollution prevention and water conservation practices (in addition to

maintaining compliance with the existing Metal Finishing and Electroplating Effluent Guidelines) in lieu of meeting the requirements of the MP&M regulation. EPA notes that this alternate approach is not being proposed in today's notice, but is being considered for the final rule. Facilities in the Metal Finishing Job Shops subcategory that do not wish to use the compliance alternative would need to meet the full requirements of the MP&M regulation as specified in today's proposed rule (see section XXI.D for a discussion of the Pollution Prevention Alternative). EPA has estimated the burden associated with preparing the associated certification statements to be 30 minutes each. Facilities would submit certification statements one time initially (by the compliance deadline) and twice per year thereafter for indirect dischargers, or once per year for direct dischargers. In addition, EPA estimates the burden associated with record keeping and reporting for the other related compliance paperwork to be 40 hours one time for the period of the permit or control mechanism (*i.e.*, five years). EPA is also soliciting comment on whether facilities in other subcategories should have a similar alternative. EPA estimates that if the Pollution Prevention Alternative were available to facilities in the Metal Finishing Job Shops Subcategory, 1,360 facilities would choose this alternative. In addition, EPA estimates that there would be 550 additional respondents if a limited number of other subcategories were able to choose this compliance alternative.

Finally, EPA is proposing to set numerical limitations on the discharge of Total Sulfide from facilities in several subcategories. In an effort to reduce monitoring burden on indirect dischargers, EPA is considering (but not proposing) to allow a waiver for the monitoring of total sulfide (even when present), at the discretion of the POTW, when a facility demonstrates that the sulfides will not generate acidic or corrosive conditions and will not create conditions that enhance opportunities for release of hydrogen sulfide gas in the sewer/interceptor collection system or at the receiving POTW or otherwise interfere with the operation of the POTW. EPA estimates the burden associated to make such a demonstration is 100 hours. EPA would require this only one time per permit cycle and if no major changes in processes or raw materials occur during that period, the demonstration would not have to be repeated for the next permit cycle. EPA estimates that 4,420

facilities would be respondents under the total sulfide waiver if it were available.

The total burden for the two areas which are being proposed today is 437,070 hours for approximately 7,200 facilities [Note: approximately 5,200 facilities are expected to be respondents in both areas]. In addition, for the three areas that EPA is not proposing but is considering for the final rule, EPA estimates 565,595 hours for 6,845 respondents (some facilities may be respondents in more than one of the three areas). Labor costs are accounted for within the estimated burden hours. EPA estimates that there are no capital costs associated with these potential reporting and record keeping requirements. EPA estimates a reduction in the capital and operating and maintenance costs associated with monitoring to demonstrate compliance with numerical limits, particularly for the proposed monitoring waiver for indirect dischargers and the organics management plan.

In the cases discussed above, the data and information required by the proposed or considered information collection, reporting, or record keeping requirements can be claimed as confidential business information according to the regulations found in 40 CFR part 2. However, as specified at 40 CFR 2.302, effluent data submitted in response to these information and data requests can not be claimed as confidential.

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 in 40 CFR part 9 and 48 CFR Chapter 15.

The Agency requests comments on its need for this information, the accuracy

of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, Collection Strategies Division; U.S. Environmental Protection Agency (2822); 1200 Pennsylvania Ave., NW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th St., NW., Washington, DC 20503, marked "Attention: Desk Officer for EPA." Include the ICR number in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after January 3, 2001, a comment to OMB is best assured of having its full effect if OMB receives it by February 2, 2001. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

B. Unfunded Mandates Reform Act (UMRA)

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 section 202 of the UMRA, 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, section 205 of the UMRA 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 EPA did not adopt that alternative. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. 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.

Estimated total annualized before-tax costs of compliance for the proposed rule are \$2,034 million (\$1999). Of this total, \$2,020 million is incurred by the private sector and \$14 million is incurred by State and local governments that perform MP&M activities. Permitting authorities incur an additional \$0.115 to \$0.912 million to administer the rule, including labor costs to write permits and to conduct compliance monitoring and enforcement activities. Thus, EPA has determined that this rule contains 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. Accordingly, EPA has prepared under section 202 of the

UMRA a written statement which is summarized below.

2. Analysis of Impacts on Government Entities

Although the costs of implementation (and compliance for government-owned facilities) are approximately \$15 million annually (*i.e.*, below the threshold specified in section 202) MP&M is a large industrial category and EPA fully analyzed the impacts on State and local governments. The proposed MP&M Rule will affect governments in two ways:

- Government-owned MP&M facilities may be directly affected by the MP&M regulation and therefore incur compliance costs; and
- Municipalities that own Publicly Owned Treatment Works (POTWs) that receive influent from MP&M facilities subject to the regulation may incur additional costs to implement the proposed rule. These include costs associated with permitting MP&M facilities that have not been previously permitted, and with repermitting some MP&M facilities earlier than would otherwise be required. In addition, POTWs may elect to issue mass-based permits to some MP&M facilities that

currently have concentration-based permits, at an additional cost.

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

EPA administered a survey (the "Municipal Survey") to government-owned facilities to assess the cost of the regulation on these facilities and the government entities that own them. (See Section V.B for a discussion of EPA's data collection efforts.) The survey responses provide the basis for EPA's analysis of the budgetary impacts of the proposed regulation, including 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 XXII.B-1 provides national estimates of the government entities that operate MP&M facilities potentially subject to the proposed rule. Table XXII.B-2 summarizes the annualized compliance costs incurred by government entities by regulatory option.

TABLE XXII.B-1.—NUMBER OF GOVERNMENT-OWNED FACILITIES BY TYPE AND SIZE OF GOVERNMENT ENTITY

Size of government and Status under proposed option	Municipal government	State government	County government	Regional governmental authority	Total
Large Governments (population > 50,000)					
Number of government entities > flow cutoff	60	183	77	0	319
Number of government entities ≤ flow cutoff	512	183	610	36	1,341
Small Governments (population ≤ 50,000)					
Number of government entities > flow cutoff	410	.....	.....	.....	410
Number of government entities ≤ flow cutoff	1,781	.....	481	.....	2,262
All Governments					
Number of government entities > flow cutoff	470	183	77	0	729
Number of government entities ≤ flow cutoff	2,293	183	1,091	36	3,603
Total	2,763	366	1,167	36	4,332

TABLE XXII.B-2.—NUMBER OF REGULATED GOVERNMENT-OWNED FACILITIES AND COMPLIANCE COSTS BY SIZE OF GOVERNMENT AND REGULATORY OPTION

	Proposed option		Option 2/6/10		Option 4/8	
	Number of facilities subject to regulation	Compliance costs (million 1999\$)	Number of facilities subject to regulation	Compliance costs (million 1999\$)	Number of facilities subject to regulation	Compliance costs (million 1999\$)
Facilities Owned by Large Governments	319	\$11.3	1,660	31.5	1,660	\$101.3
Facilities Owned by Small Governments	410	2.6	2,672	33.3	2,672	123.4
All Government-Owned Facilities	729	13.9	4,332	64.8	4,332	224.7

Costs incurred by government-owned facilities, particularly for facilities

owned by small governments, are substantially lower under the proposed

rule than under the other two options considered. The lower costs result from

the exclusion of a large number of government-owned facilities under the proposed low flow cutoff.

b. Small Government Impacts

EPA's analysis also considered whether the proposed rule may significantly or uniquely affect small governments. Section XVI.B.3.c of today's notice describes the methodology used to assess budgetary impacts on governments. Briefly, EPA examined three measures to assess the affordability of new requirements. These three criteria incorporate measures of compliance costs (impacts on site-level cost of service), impacts on taxpayers, and impact on government debt levels.

EPA estimates that there are 2,672 facilities owned by small governments (*i.e.*, governments with a population of less than 50,000). The low flow exclusion in today's proposed rule will exclude 2,262 small government-owned MP&M facilities. Thus, the proposed rule covers 410 small government-owned facilities. Of these facilities, 140 incur no compliance costs under the proposed option, and the remaining 270 incur annualized costs that average less than \$10,000 per facility. The total compliance cost for all the small government-owned facilities incurring costs under today's proposed rule is \$2.6 million. Only 140 of the 270 facilities 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). EPA estimated no significant impacts for any of the governments owning these facilities, based on the three budgetary criteria mentioned above. EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. None of the affected governments are expected to incur significant budgetary impacts as a result of the proposed rule, and consequently, that the proposed rule will not significantly or uniquely affect small governments. Nonetheless, EPA did consult with small governments (see discussions on consultation in sections XXII.B.7 and XXII.C).

c. POTW Administrative Costs

EPA also analyzed the administrative costs incurred by local governments to implement the proposed rule. The results of this analysis are presented in section XVI.H.3. In summary, EPA estimates that POTWs will incur incremental average annualized costs over 15 years of between \$115,000 and \$912,000 under the proposed rule. The

maximum expenditures by all affected POTWs in any one year will be between \$186,000 and \$1,607,000. These costs include issuing new permits to facilities that do not currently have permits, issuing mass-based permits to some facilities that currently have concentration-based permits, and repermitting some facilities sooner than would otherwise be required to meet the three-year compliance schedule. On average, a POTW's costs for the incremental permitting are only \$23 to \$184 for the 4,944 MP&M facilities permitted under the proposed rule. EPA expects that these increases in costs will be partially offset by reductions in government administrative costs for facilities that are already permitted under local limits and that will be re-permitted under this rule.

3. Statutory Authority

The statutory authority for this rulemaking is as follows: 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 the Pollution Prevention Act of 1990, 42 U.S.C. 13101 *et seq.*, Pub L. 101-508, November 5, 1990. A consent decree with the Natural Resources Defense Council established a deadline of October 2000 for EPA to propose effluent limitations for this industry.

4. Costs and Benefits

The assessment of costs and benefits for this rule, including the assessment of costs to State, local, and Tribal governments and to the private sector, is discussed above and in Sections XVI (costs), XX (benefits) of this preamble. EPA prepared an extensive analysis of costs and benefits for private facilities and for governments, including analysis by size and by subcategory. In the most summarized form, EPA estimates the social cost of the proposed rule (which includes facility compliance costs) at \$2.0 to \$2.1 billion annually (\$1999). The total value of benefits that can be expressed in dollar terms ranges from \$0.4 billion to \$1.1 billion. As discussed in Section XX, EPA solicits comment on several expansions to these benefit estimates. In particular, EPA includes in the public record for today's proposal, an extensive analysis of additional categories of benefits, such as boating and wildlife viewing. EPA also estimated values for these new categories, but pending public comment and peer review, did not incorporate the results from the new methodologies into the total monetized benefits of the proposed rule.

The Federal resources (*i.e.*, water pollution control grants) which are

generally available for financial assistance to States are included in section 106 of the Clean Water Act. There are no Federal funds available to defray the costs of this rule on local governments.

5. Future Costs and Disproportionate Costs

The Unfunded Mandates Reform Act requires that EPA estimate, where accurate estimation is reasonably feasible, future compliance costs imposed by the rule and any disproportionate budgetary effects. EPA's estimates of the future compliance costs of this rule are discussed in detail in Section XVI.G of the preamble. Briefly, new sources in all but the Metal Finishing Job Shop direct discharger subcategory incur costs that are below one percent of post-regulation revenues, and costs for the Metal Finishing Job Shop indirect dischargers are less than three percent of estimated facility revenues. Cost increases of this magnitude are unlikely to place new facilities at a competitive disadvantage relative to existing sources. Moreover, costs as a percentage of revenues are generally comparable for new sources and existing sources with which they will compete.

EPA does not expect that the rule will have disproportionate budgetary effects on any particular areas of the country, particular governments or types of communities. The affected population of MP&M facilities is distributed throughout the country in settings from urban to rural, with more facilities likely to be located in larger urban areas. EPA therefore expects that the burden on governments to permit facilities under the rule, and the loss of employment due to closures caused by the rule, will be dispersed rather than concentrated in any specific area. Moreover, the proposed rule is expected to result in a net increase in employment over 15 years, when the employment associated with compliance activities is considered. A discussion of community impacts is included in Section XVI.

6. Effects on National Economy

The Unfunded Mandates Reform Act requires that EPA estimate the effect of this rule on the national economy where (1) accurate estimates are feasible and (2) the rule will have a "material" effect on the economy. EPA's estimates of the impact of this proposal on the national economy are described in Section XVI of this preamble and in the EEBA. The proposed rule is projected to result in closures or moderate financial impacts on a very small percentage of all MP&M

facilities, to result in only limited price increases in any MP&M sector, and to have a negligible impact on the U.S. balance of trade.

7. Consultation

In addition to private industry, our stakeholders include State and local government regulators. We 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 of the stakeholders provided helpful comments on the cost models, technology options, pollution prevention techniques, and monitoring alternatives.

Because many facilities affected by this proposal are indirect dischargers, the Agency involved POTWs as they will have to implement the rule. EPA consulted with POTWs individually and through the Association of Municipal Sewerage Agencies (AMSA). In addition, EPA consulted with pretreatment coordinators and State and local regulators.

The Agency collaborated with POTWs in selecting BAT facilities for EPA wastewater sampling and, in several cases, POTWs performed wastewater sampling and submitted the data to EPA for use in developing the rule. As described above and in Section V.B, EPA conducted the POTW survey to obtain estimates of POTW permitting costs and sludge disposal practices and costs. EPA assessed whether any impacts of the regulatory requirements in the rule might significantly or uniquely affect POTWs, especially small POTWs, and determined the degree to which POTWs would benefit from the regulation by having more options for sewage sludge disposal and decreased costs of disposing of the sludge.

EPA consulted with State and local regulators during three different public meetings. Their main comments focused on: (1) The potential burden on them to issue permits/control mechanisms for a large number of facilities that have not been permitted under effluent guidelines prior to this rule; (2) request for additional monitoring flexibilities; and (3) request to allow them to use concentration-based standards in the MP&M rule for those subcategories where it is difficult to obtain production or flow information at the process-level. EPA has incorporated many of their suggestions and addressed these

concerns throughout today's preamble (see Sections II.D, XII.C, and XXI).

8. Alternatives Considered

EPA believes that the proposed rule is the least burdensome and most cost-effective of the regulatory alternatives considered that still meets the objectives of the rule. EPA acknowledges that the rule will impose some burden, but EPA believes that the additional costs are justified due to the additional pollutant removals. The proposed low-flow cutoffs and subcategory exemptions reduce the number of facilities that require permitting by over 90 percent. Section XVI.H presents EPA's analysis of the facility impacts of the proposed rule, which shows that facility compliance costs would be 36 percent higher under Option 2/6/10 than under the proposed rule and 120 percent higher under Option 4/8. Section XVII presents EPA's analysis of the cost-effectiveness of the regulatory options, which shows that the proposed option is the most cost-effective of these three options.

C. Regulatory Flexibility Act (RFA) as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

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

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as (1) A small business according to the Regulations of the Small Business Administration (SBA) at 13 CFR 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) small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

In accordance with Section 603 of the RFA, EPA prepared an initial regulatory flexibility analysis (IRFA) that examines the impact of the proposed rule on small entities, along with regulatory alternatives that could reduce that impact. The IRFA is available for review in the public record (as Chapter 10 in the Economic, Environmental, and Benefits Analysis) and is summarized below.

1. Initial Regulatory Flexibility Analysis

a. Rationale, Objectives, and Legal Basis for Proposal

EPA's "Preliminary Data Summary for the Machinery Manufacturing and Rebuilding Industry" (EPA 440/1-89/106) identified the Metal Products and Machinery (MP&M) industry as one that is discharging wastestreams containing toxic pollutants to publicly owned treatment works and directly into the nation's surface waters. The volume and characteristics of these wastestreams are described more fully in Section VII of this notice. Due to the water quality, human health, and environmental concerns associated with these discharges, EPA selected the MP&M industry for the development of a new effluent guidelines regulation in 1990. The Agency develops categorical effluent limitations under authority of the Clean Water Act (33 U.S.C. 1251 *et seq.*). Section I of this notice discusses the legal basis for the proposed rule in more detail. Briefly, the Clean Water Act directs the Agency to reduce discharges of pollutants into the Nation's water and into publicly-owned treatment works. The objective of today's proposed rule is to reduce those discharges from the class of point sources in the MP&M industry.

b. Number and Type of Small Entities

A large number of the 63,000 MP&M facilities nationwide are owned by small entities. The small entities covered by this proposed rule are small businesses and small governmental jurisdictions. Table XXII.C-1 shows the total number of facilities operating in the baseline and the number owned by small entities. Overall, approximately 80 percent of all MP&M facilities are owned by small entities. However, it should be noted that the low flow exclusions in the proposed rule will exclude approximately 85 percent of the facilities owned by small entities.

TABLE XXII.C-1.—PERCENT OF MP&M FACILITIES OWNED BY SMALL ENTITIES

Type of Facility	Number of facilities operating in baseline	Number of facilities owned by small entities	Percent of facilities owned by small entities
Private MP&M*	54,591	44,773	82%
Government-Owned	4,332	2,672	62%
Total*	58,923	47,445	81%

* Excludes baseline closures.

The SBA definitions for small business use either employment-based or revenue-based standards, depending on the Standard Industrial Classification (SIC) code. The manufacturing sectors generally use employment-based standards, and most non-manufacturing sectors use revenue-based standards. MP&M facilities perform a wide variety

of activities, represented by over 200 SIC codes. To assess the impacts of the rule on small entities, for analytical purposes, these SIC codes were organized into 18 industry sectors, with some further distinctions by type of activity (*i.e.*, manufacturing or maintenance/repair). To select a small business definition for each sector, EPA

chose the SBA standard that was common to the most SIC Codes (*i.e.*, the mode of the distribution of SBA definitions) in a particular sector (or activity). Table XXII.C-2 lists the definitions by sector used in the impact assessment.

TABLE XXII.C-2.—SMALL BUSINESS DEFINITIONS FOR ANALYZING MP&M SECTORS

Sector and activity	Small business definition using the most common SBA standard for the SIC codes in each sector
Hardware	500 Employees.
Aircraft—Manufacturing	1,000 Employees.
Aircraft—Maintenance/Repair	\$5 Million.
Electronic Equipment	750 Employees.
Stationary Industrial Equip.—Manufacturing	500 Employees.
Stationary Industrial Equip.—Maint/Repair	\$5 Million.
Ordnance	1,000 Employees.
Aerospace	1,000 Employees.
Mobile Industrial Equip	500 Employees.
Instruments—Manufacturing	500 Employees.
Instruments—Maintenance/Repair	\$5 Million.
Precious Metals/Jewelry—Manufacturing	500 Employees.
Precious Metals/Jewelry—Maintenance/Repair	\$5 Million.
Ship—Manufacturing	1,000 Employees.
Ship—Maintenance/Repair	500 Employees.
Ship—Maintenance/Repair (SIC 449) ¹	\$5 Million.
Household Equip.—Manufacturing	500 Employees.
Household Equip.—Maintenance/Repair	\$5 Million.
Railroad—Manufacturing	1,000 Employees.
Railroad—Maintenance/Repair	1,500 Employees.
Motor Vehicle—Manufacturing	500 Employees.
Motor Vehicle—Maintenance/Repair	\$5 Million.
Motor Vehicle—Maintenance/Repair (SIC 5013) ²	100 Employees.
Bus & Truck—Manufacturing	500 Employees.
Bus & Truck—Maintenance/Repair	\$5 Million.
Office Machines—Manufacturing	1,000 Employees.
Office Machines—Maintenance/Repair	\$18 Million.
Steel Forming & Finishing	1,000 Employees.
Printed Circuit Boards	500 Employees.
Metal Finishing & Electroplating Job Shops	500 Employees.
Other Metal Products—Manufacturing	500 Employees.
Other Metal Products—Maintenance/Repair	\$5 Million.

Notes:

¹ SIC Code 449—Includes 4491 (Marine Cargo), 4492 (Towing & tugboat service), 4493 (Marinas), and 4499 (Water Transportation Services, nec).

² SIC Code 5013—Wholesale distribution of motor vehicle supplies, tools and equipment; and new motor vehicle parts.

c. Impacts on Small Entities

For small businesses, EPA drew on the firm and facility impact analyses discussed in Section XVI of this notice

to assess impacts on small entities. The analysis compared compliance costs to revenues for the small entities at the firm level. EPA also examined the

facility impact analysis results for facilities owned by small firms. The facility impact analysis estimated facility closures and other adverse

changes to financial conditions (denoted here as “moderate impacts”). See Section XVI.B of this notice for details on how EPA determines closures and moderate impacts for private businesses. The results from these analyses are discussed in more detail in the following paragraphs. Briefly, these analyses indicated that 941 of the small entities may incur costs equal to 3 percent or more of annual revenues, 181 facilities owned by small entities might close as a result of the proposed rule, and 492 facilities owned by small entities are likely to experience moderate financial impacts. The 181 small entity facility closures represent less than one-half of one percent of the facilities owned by small entities that are operating in the baseline. Although

the percentage of small facilities projected to incur impacts is quite small, the number, in absolute terms, was large enough for the Agency to conclude that a small business analysis was appropriate. After EPA considers comments and data received in response to this proposed rulemaking, especially with regard to the IRFA, the Panel’s recommendations, and alternatives that would reduce small entity impacts, EPA will adjust the rule as appropriate and it is possible that the final rule will not have a significant economic impact on a substantial number of small entities. Consequently, there is a possibility that the Agency may not prepare a final regulatory flexibility analysis and would certify the final rule.

i. Compliance Costs as a Percent of Firm Revenue

EPA compared compliance costs to revenues at the firm level as a measure of the relative burden of compliance costs. Table XXII.C-3 shows the results of this comparison. The Agency was not able to estimate national numbers of firms that own MP&M facilities precisely, because the sample weights based on the survey design represent numbers of facilities rather than firms. The results in Table XXII.C-3 are reasonable approximations, however, in that 95 percent of the facilities owned by small firms are single-facility firms, for which sample weights could be used.

TABLE XXII.C-3.—FIRM LEVEL BEFORE-TAX ANNUAL COMPLIANCE COSTS AS A PERCENT OF ANNUAL REVENUES FOR PRIVATE SMALL BUSINESSES

Number of small firms in the analysis	Number and percent with before-tax annual compliance costs annual revenues equal to:					
	Less than 1%		1-3%		Over 3%	
	Number	Percent	Number	Percent	Number	Percent
42,509	40,560	95.4%	1,008	2.4%	941	2.2%

Approximately 85 percent of the small entities are not projected to incur any costs to comply with the proposed rule because they are among the facilities covered by the low flow exclusions (See Section XII for discussion of the low flow exclusions). Even so, the IRFA includes a cost analysis for all small facilities. The results reported here account for the exclusions. More than 95 percent of small entities incur compliance costs

less than 1 percent of annual revenues. A small percentage (2 percent) of the small businesses in the analysis incur costs equal to 3 percent or more of annual revenues. (Results of the cost-to-sales ratios are presented in the EEBA.) Of the small firms that incur costs greater than 1 percent of revenues, 612 firms are projected by the facility impact analysis to close or experience moderate impacts.

ii. Facility Closures and Moderate Impacts

Table XXII.C-4 summarizes the results from the facility closure analysis for the proposed option for private facilities owned by small entities, by discharge status. Table XXII.C-4 also shows the number of facilities owned by small businesses that experience moderate impacts.

TABLE XXII.C-4.—CLOSURES AND MODERATE IMPACTS FOR PRIVATE FACILITIES OWNED BY SMALL ENTITIES

	All facilities	Indirect dischargers	Direct dischargers
Number of facilities operating in the baseline	44,773	41,536	3,237
Number of closures	181	161	20
Percent closing	0.40%	0.39%	0.62%
Number of facilities with moderate impacts	492	454	38
Percent with moderate impacts	1.1%	1.1%	1.2%

Again, approximately 85 percent of the facilities owned by small entities are not projected to incur any costs to comply with the proposed rule because they are among the facilities covered by the low flow exclusions. (See Section XII for discussion of the low flow exclusions.) The projected number of closures is very small compared to the large number of facilities owned by small entities. Less than one-half of one percent of the facilities owned by small

entities that are operating in the baseline are projected to close. The percentage of small entities experiencing moderate impacts is also low, at one percent. In regard to the baseline closure analysis, to put this information in context, 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. (See discussion in Chapter 5 of the Economic, Environmental, and Benefits Analysis.)

iii. Impacts on Small Governments

For small governments, EPA relied on the analysis described in Section XVI.B.3.c. EPA estimates that there are 2,672 facilities owned by small governments. The low flow exclusion in today’s proposed rule will exclude 2,262 of these small government-owned

MP&M facilities. Thus, the proposed rule covers 410 small government-owned facilities. Of these facilities, only 270 incur costs, and the average cost per facility is less than \$10,000. The total compliance cost for all the small government-owned facilities incurring costs under today's proposed rule is \$2.7 million. Only 140 of the 270 facilities 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). EPA estimated no significant impacts for any of these facilities, based on three budgetary criteria (*i.e.*, impacts on site-level cost of service, impacts on taxpayers, and impact on government debt levels) as described in Section XVI.B.3.c. Thus, EPA concluded that none of the affected governments are expected to incur significant budgetary impacts as a result of the proposed rule.

d. Alternatives to the Proposed Rule

EPA sought from the outset to design a regulation that would not unreasonably burden small entities. In particular, EPA considered a number of regulatory alternatives for indirect and direct dischargers, and conducted extensive analysis of wastewater flow exclusions. As detailed in Section XII of this notice, EPA selected a regulatory alternative that incorporates low flow exclusions for several subcategories. The primary alternatives to the proposal, while providing additional pollutant reductions, also increased the number of small entities covered. These alternatives would have resulted in additional small entity impacts. The results from the closure analysis and the cost-to-revenue analysis for these alternatives are included in the IRFA, but are not summarized in this section of today's notice. As a result of selecting the low flow exclusions, the proposed rule imposes substantially lower impacts on small entities than the other options. In particular, the low flow exclusion for indirect discharging facilities in two subcategories—the General Metals subcategory and the Oily Wastes subcategory—played a significant role in minimizing small business impacts. EPA estimates that there are over 26,000 facilities in the General Metals subcategory and over 28,000 in the Oily Wastes subcategory operating in the baseline, and that small entities comprise a large portion of these subcategories. The low flow exclusion for both of these subcategories will largely reduce the number of small entities affected by the MP&M proposed rule. For the General Metals subcategory, EPA is proposing a 1 MGY

flow cutoff for the reasons explained in Section XII.D. This low flow exclusion reduces the number of regulated facilities in this subcategory by 75 percent. The facilities that comprise the 75 percent are mostly small entities and represent only 6 percent of the total pollutants discharged by the facilities in this subcategory. For the Oily Wastes subcategory, EPA is proposing a 2 MGY flow cutoff for the reasons explained in Section XII. This low flow exclusion reduces the number of regulated facilities in this subcategory by 96 percent. The facilities that comprise the 96 percent are mostly small entities and represent 39 percent of the total pollutant discharged by the facilities in this subcategory. In Section XII, EPA presented its rationale for concluding that national pretreatment standards were not warranted for facilities discharging less than 2 MGY in this subcategory.

EPA considered and incorporated other types of alternatives, such as monitoring alternatives. These are summarized below and discussed more fully in Sections XXI.C and XXI.D of today's notice.

e. Reporting, Record Keeping and Other Compliance Requirements

There are five areas for which EPA is proposing to require, or considering requiring, reporting or record keeping by MP&M facilities: (1) Certification to waive monitoring for pollutants that are not present; (2) certification and implementation of an organic chemicals management plan in lieu of monitoring for organic pollutants; (3) demonstration of a correlation to a site-specific organic pollutant indicator parameter; (4) certification of a total sulfide monitoring waiver for indirect dischargers; and (5) demonstration of specified pollution prevention practices and compliance with existing regulations in lieu of compliance with the MP&M effluent guidelines for facilities in the Metal Finishing Job Shop subcategory and some facilities in other subcategories. In all cases, EPA believes the collection of information, reporting, or record keeping is an alternative (*i.e.*, voluntary) that will allow a reduction in overall burden to facilities since EPA intends for these activities to reduce or eliminate effluent sampling and analysis costs. Each of these five areas is briefly described below and is described in detail in section XXI, and the associated burden is discussed in section XXII.A.

Briefly, for the certification to waive monitoring for pollutants that are not present, EPA expects that facilities will need to review analytical sampling data and other technical information

required to make the certification (*e.g.*, raw material inventory logs, production information, product chemistry, and reports on source water). There is some additional effort required to prepare the certification statement one time per permit cycle (*i.e.*, every 5 years). EPA is allowing the use of historical sampling data as well as sampling data generated for compliance reports required by the General Pretreatment Standards (40 CFR 403.12) in the development of the certification statement. Therefore, EPA does not anticipate additional monitoring burden associated with this waiver, particularly in comparison to the periodic compliance monitoring that is being replaced by this waiver. A wastewater treatment operator or other qualified facility personnel who is familiar with the facility's processes, products and analytical monitoring reports can make the determination.

In terms of the certification and implementation of an organic chemicals management plan in lieu of monitoring for organic pollutants, facilities choosing to develop an organic pollutant management plan must certify that the procedures described in the plan are being implemented at the facility. EPA notes that development and implementation of the plan would likely require the attention of the wastewater treatment operator or plant manager. EPA believes that facilities covered by the Metal Finishing effluent guidelines (40 CFR part 433) with a solvent management plan in place under those regulations will only have to update their plan.

EPA is considering (but is not proposing) allowing the demonstration of a correlation to a site-specific organic pollutant indicator parameter as an alternate approach to the use of an organic indicator parameter (see section XXI.C.2 for a discussion on the proposed organic indicator). In this case, there would be some additional reporting and record keeping. Facilities would need to perform testing, analyze analytical results, and keep records that demonstrate a correlation between the regulated organic pollutants and the selected indicator parameter. EPA notes that direct dischargers may incur less burden than indirect dischargers because they typically have more advanced treatment in place and permit writers typically require them to monitor for the types of parameters that EPA is considering as indicators (*e.g.*, COD, Oil & Grease, TOC, and TPH); therefore, they may already have data available that demonstrates a correlation to the regulated organic pollutants. A wastewater treatment operator or other qualified facility personnel who is