ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 413, 433, 438, 463, 464, 467, and 471

[FRL–7221–4]

RIN 2040–AB79

Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Metal Products and Machinery Point Source Category; Notice of Data Availability

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of data availability.

SUMMARY: On January 3, 2001 (66 FR 424), EPA published a proposal to establish technology-based effluent limitations guidelines and pretreatment standards for the metal products and machinery (MP&M) point source category. The proposal would apply to approximately 10,000 facilities that manufacture, rebuild, or maintain metal products, parts, or machines in eight regulatory subcategories. EPA developed the proposal to address changes in the metal finishing and electroplating sectors over the last 20 years, including measures that reduce pollution. The proposal would establish national regulations for some industry sectors for the first time as well as increasing the degree of environmental protection from that achieved under the previous rules.

In the proposal, EPA specifically solicited comment on 43 issues in addition to the general comment solicitation. EPA received comments from various stakeholders, including State and local regulatory authorities, environmental groups, individual industrial facilities and industry groups, and private citizens.

This document presents a summary of data received in comments since the proposal and additional data collected by EPA and describes how these data may be used by EPA in developing final MP&M regulations.

EPA is evaluating how the comments and new data may change certain aspects of the proposal and how this information might affect the regulatory options considered for the proposal. EPA is also evaluating the underlying data and methodology that EPA uses to estimate the costs, pollutant load reductions, and financial impacts associated with the regulation in light of the comments and new information. The document describes EPA's current thinking on these subjects and presents information on how the new data and information received since proposal would affect the proposed limitations and standards. Today, EPA is making these data and new information available for public review and comment. EPA solicits public comment on the issues and information presented in this notice of data availability and in the administrative record supporting this document.

DATES: You must submit comments by July 22, 2002.

ADDRESSES: Public comments regarding this document should be submitted electronically to *mpm.comments@epa.gov.* You also may submit comments by mail to: Metal Products & Machinery Rule, Office of Water, Engineering and Analysis Division (4303T), USEPA, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. You should submit hand-deliveries (including overnight mail) to the Metal Products & Machinery Rule, USEPA, 1201 Constitution Ave, NW, Room 6231G EPA WEST, Washington, DC 20004. Please submit an original and three copies of your written comments and enclosures as well as any references cited in your comments. Commenters who want EPA to acknowledge receipt of their comments should enclose a self-addressed, stamped envelope. EPA will not accept facsimiles (faxes). For additional information on how to submit electronic comments see **SUPPLEMENTARY INFORMATION,** How to Submit Comments.

The public record for this action and the proposed rulemaking has been established under docket number W–99–23 and is located in the Water Docket East Tower Basement, Room EB57, 401 M Street SW, Washington, DC 20460. The record is available for inspection from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding legal holidays. For access to the docket materials, call (202) 260–3027 to schedule an appointment. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: For additional information, contact Mr. Carey A. Johnston at (202) 566–1014 or at the following e-mail address: *johnston.carey@epa.gov.*

SUPPLEMENTARY INFORMATION:

How To Submit Comments

Electronic comments must specify docket number W–99–23 and must be submitted as an ASCII, Microsoft Word 97 file, or Word Perfect 5/6/7/8/9 file avoiding the use of special characters and any form of encryption. EPA will also accept comments and data on disks in any of the above listed file format. You may file electronic comments on this action at many Federal Depository Libraries. No confidential business information (CBI) should be sent via e-mail.

Contents of This Document

I. Purpose of This Document

Today's document has several purposes. First, EPA is presenting a summary of new data and information submitted during the public comment period on the proposed MP&M regulations as well as data collected by EPA since proposal. Second, EPA discusses major issues raised in comments on the proposal and revisions in the data analyses resulting from these comments and the additional data. Third, the document summarizes EPA's current thinking on how this new information and suggestions made by commenters affect the analyses of the proposed rule. The document also summarizes the changes EPA is considering for the final rule in light of the new material. Finally, the document includes modified potential effluent limitations and pretreatment standards as revised to take account of the new data as well as revised information on the cost and removals associated with various treatment options.

EPA has incorporated into the data base used for developing the proposed MP&M effluent limitations and pretreatment standards a significant amount of new data and corrections to the proposal data. For a number of the subcategories proposed for regulation, these modifications have resulted in substantial changes in the estimated cost and pollutant removals associated with the treatment options considered at proposal. As a consequence, in several instances, the economic impact and cost effectiveness of the treatment options are now much higher than projected at proposal (Note that a ''high'' cost-effectiveness figure means an option is not very cost effective). In some cases, the proposed effluent limitations and pretreatment standards would have impacts greater than EPA has traditionally determined to be economically achievable. Furthermore, limiting the effluent limitations and standards to facilities with higher treatment flows—so-called flow cutoffs—would not appear to mitigate economic effects in any meaningful way for certain subcategories proposed for regulation. In light of these new results, EPA is seeking further comment on the regulatory options considered for the proposal as well as several other options for reducing the economic impact of the final rule.

The document includes seven main components:

(1) Discussion of new analytical data and information;

(2) Revisions to EPA's costs and pollutant loading model and methodologies that incorporate new data;

(3) Possible changes to the applicability of the rule, definitions, and selection of regulated pollutants for the final rule as a result of the new information;

(4) New information and revisions that EPA may use for its economic and benefit methodologies;

(5) New information and revisions that EPA may use for its statistical methodologies;

(6) Revised estimates of costs, loadings, economic impacts, benefits, and numerical limitations and standards; and

(7) Discussion of possible alternative options based on new data and information.

This document addresses these issues related to the proposed MP&M regulation. To the extent possible, today's document describes new analyses that may be performed by EPA and describes revisions EPA is considering to EPA's financial and engineering models, as well as possible new data or methodologies. By providing this information, it is EPA's intention to present the clearest picture of its current thinking about how the proposal may change as a result of the additional information it has obtained. It is EPA's hope that this information will encourage effective comment.

This document also contains a discussion of ways that EPA may reduce impacts and/or enhance flexibility of the regulation, including options to encourage implementation of environmental management systems (EMS) or ''no further regulation'' options for certain subcategories. EPA received comments concerning these matters and in this document requests further information. The document also outlines potential changes to the regulatory thresholds (e.g., ''low wastewater flow cutoff'') that were proposed to reduce impacts.

New data that EPA may use in its cost and economic models include estimates from EPA and industry wastewater sampling of MP&M unit operations of pollutant loading in raw wastewater and new information related to various EPA modeling assumptions. EPA also received more than 136 new data sets with proposal comments. EPA used 75 of these new data sets for developing numerical limitations.

Through this notice of data availability, EPA seeks further public comment on any and all aspects of the specific data and issues it has identified here. However, EPA is seeking public comment *only* on these specific data and issues. Nothing in today's document is intended to invite further discussion of other issues discussed in the MP&M proposal or to reopen the proposal in general for additional public comments. EPA continues to review the comments already submitted on the proposed rule and will address those comments, along with comments submitted on the data and issues identified in today's document, in the final rulemaking.

II. New Analytical Data and Information

There are three general areas of new analytical data: (1) EPA post-proposal sampling, (2) industry self-sampling, and (3) EPA's analytical method validation study. First, in response to public comments, EPA has performed a number of analytical wastewater sampling episodes since the publication of the proposed rule to collect additional data on raw wastewater loadings, treatment efficiencies, and treatment variability. In addition, facilities and industry trade associations submitted a large quantity of analytical water sampling data (''self-monitoring data'') along with their written comments on the MP&M proposal to EPA. Finally, as discussed in the proposed rule (66 FR 529), EPA has performed a study to validate EPA Analytical Methods 1624B/624 and 1625/625 for several organic pollutants that are part of the proposed ''Total Organics Parameter'' (TOP).

A. EPA Site Visits & Sampling Episodes

During the comment period and at the public meetings on the proposal, commenters raised concerns over the representativeness of EPA's database concerning metal finishing ''zinc'' platers, printed wiring board facilities, and the steel forming and finishing facilities. Based on these concerns EPA worked with industry trade associations to identify facilities in these groups that would be good candidates for EPA's post-proposal wastewater sampling program. EPA visited 6 metal finishing zinc platers (4 job shops, 2 captive), 8 printed wiring board facilities, 4 steel forming and finishing facilities, and 2 other MP&M facilities (i.e., metal finishing job shops that do not specialize in zinc plating). Based on the

information collected during the site visits, which included information on a variety of MP&M unit operations being performed, whether the site was employing technology considered to be ''Best Available Technology,'' sampling logistics, and production schedule, EPA selected facilities for analytical wastewater sampling. EPA performed wastewater sampling at 2 metal finishing zinc platers that operate as job shops, 3 printed wiring board facilities, and 2 steel forming and finishing facilities. EPA collected characterization samples of wastewater from typical MP&M operations and paired influent and effluent samples from each of these facilities' treatment systems. In addition, EPA obtained long-term monitoring data from all sampled sites for use in calculating new variability factors and long-term averages for revising numerical limits. EPA also obtained long-term monitoring data from several facilities that EPA visited but did not sample: two zinc platers that operate as captive facilities, one printed wiring board facility, and one steel forming and finishing facility. EPA is using these additional data sets and data used at proposal for revising numerical limits. Non-confidential versions of these Site Visit Reports (SVRs) and Sampling Episode Reports (SERs) can be found in sections 15.2 and 15.3 of the public record for this document (Docket Number W–99–23).

Although EPA does have survey questionnaires for the facilities in the Steel Forming & Finishing (SFF) Subcategory, EPA did not sample any SFF facilities prior to proposal. EPA did solicit data from such facilities. As explained in the proposal (66 FR 530), EPA is planning to revise the list of regulated pollutants and the numerical limitations for the SFF Subcategory based on post-proposal sampling data. For proposal, EPA based the selection of regulated pollutants and numerical limits on data from the General Metals subcategory. See section IV of today's document for a list of pollutants currently under consideration for regulation (*see* a memorandum entitled, ''Selection of Regulated Pollutants for the Steel Forming & Finishing Subcategory,'' section 16.2 of the public record, DCN 16876 for a discussion of the selection of regulated pollutants.)

As described in the proposed rule (66 FR 534), EPA solicited comment on the appropriate analytical method for analyzing total sulfide in wastewater from MP&M facilities. When EPA performed analytical testing on the wastewater samples collected post-proposal, EPA used three different analytical methods to detect total sulfide:

- Method 376.1, a titrimetric method that was used by EPA for the majority of its sulfide analyses for proposal;
- Method 376.2, a colorimetric method suggested by industry as an alternate choice and used by EPA for one sampling episode for proposal; and
- Method 4500–S^{-2} (E) from the 18th edition of Standard Methods for the Examination of Water and Wastewater, a titrimetric method similar to Method 376.1. Method 4500–S^{-2} (C), a pretreatment procedure, is recommended for reducing interferences (e.g., thiosulfate, sulfite, and various organic compounds) and/or concentrating the sample to achieve greater sensitivity. Method 4500–S^{-2} (E) was run using this pretreatment procedure in the post-proposal sampling program.

All three of these methods are currently approved at 40 CFR part 136 for compliance monitoring.

EPA collected sulfide data for 236 samples in seven post-proposal sampling episodes using all three of these sulfide methods (EPA Episode numbers 6455, 6456, 6457, 6458, 6461, 6462, and 6463). These samples were collected from both process wastewaters prior to treatment and effluent wastewater after treatment. Of those 236 samples, 156 samples (66%) had no sulfide detected by any of the three methods. The reported detection limits for the three methods differ as a function of the analytical techniques, and thus, EPA does not intend to investigate these results further.

One of the 236 samples had results for all three methods that were invalidated during the data review process because of extreme difficulties during the analysis. An additional 79 samples (33%) had sulfide detected by one or more of the three methods. These 79 samples will tell us the most about the performance of the methods in the MP&M wastewaters. Of those, only 12 samples had sulfide detected by all three methods, while the remaining 67 samples were a mixture of detected sulfide and non-detect results.

EPA provides a detailed review of these 67 samples with ''mixed results'' and the 12 samples with detects by all three methods in a document titled, ''Evaluation of Sulfide Results for Metal Products and Machinery Samples Analyzed by MCAWW Method 376.1, MCAWW Method 376.2, and Standard Method 4500–S^{-2} (E)'' (*see* section 16.2, DCN 16941).

Because the true concentrations of sulfide in these 236 samples are not known, it is not possible to state with certainty which of the three methods used in this study (DCN 16941) performs best overall. The results for the 236 samples in this study suggest that there are potential interferences with Method 376.1 that may be better addressed by either Method 376.2 or SM 4500–S^{-2} (E) and its associated sample pretreatment step. The fact that sulfide was not detected by any of the methods in approximately 66% of all the samples, suggests that the differences between the methods need to be viewed in the context of specific samples and sample types.

Of the 26 effluent samples where EPA detected sulfide by one or more of the three methods, eight samples were detected by all three methods. These results indicate that the performance of the three methods can be comparable in the sample type to which these methods are most often applied (*i.e.,* treated effluents), and in samples whose sulfide concentrations fall within the range of all three methods. The data from the other effluent samples and from the influents and unit process samples suggest that: (1) Method 376.2 may perform better than SM 4500–S^{-2} (E); and (2) when the sample pretreatment procedure in SM 4500–S^{-2} [C] is employed, SM 4500–S^{-2} (E), in turn, may perform better than Method 376.1.

B. Industry Submitted Data

In addition to their written comments, many MP&M facilities and a few POTWs submitted data to be used in developing the numerical limits for the final rule. EPA is using over 46 data sets of long-term self-monitoring compliance data from ''BAT'' facilities that met our criteria. In addition, EPA is using paired influent/effluent data received from an additional 37 ''BAT'' facilities and characterization data for MP&M unit operations (*i.e.,* in-plant raw wastewater) from three facilities.

EPA extensively reviewed the data submitted as comment to the proposed rule. EPA reviewed the data for completeness when compared to the ''Guidelines for Submission of Analytical Data'' in the proposed rule (66 FR 537). EPA contacted facilities to follow up on missing information when only a few items were not included (*e.g.,* a treatment flow diagram or identification of sampling points). For the 75 data sets of the 136 submitted with proposal comments, EPA has been able to include the data and use them for calculating the revised limits presented in today's document. Although EPA has used these data, it has also flagged certain data points to note any discrepancies, such as the analytical method not being an EPA

approved method or if there are questions pertaining to the QA/QC data. These flags may be used in the future to exclude certain data points. There are additional data submissions that EPA did not use in calculating today's revised limitations and standards because the Agency has not completed verifying that such data meets EPA's criteria for inclusion. Although not used, these data are included in the record for this document for purposes of public comment. EPA has fully explained how it will calculate long-term averages and variability factors for the final limitations and standards so commenters may determine the effect these data would have if included in the data base for the final rule. EPA will continue to contact facilities where major components were missing from the data submittal and will consider including these additional data sets now available in the record in the development of the limitations and standards for the final rule to the extent they meet EPA standards for inclusion.

EPA is using long-term monitoring data (*i.e.,* data used for compliance monitoring) from 31 General Metals facilities, 1 Metal Finishing Job Shop, 4 Zinc Platers, 2 Printed Wiring Boards, 3 SFF facilities, 3 Oily Wastes facilities, and 2 Shipbuilding Dry Docks. EPA is also using industry-submitted paired influent/effluent data from 26 General Metals facilities, 8 Metal Finishing Job Shops, 2 Zinc Platers, and one Oily Wastes facility. Data submitted with comments can be found in section 12.2.2 of the public record.

EPA requested data to aid in characterizing the concentrations of pollutants in wastewaters from MP&M processes (*i.e.,* unit operations). In addition to EPA's post-proposal sampling program, described above, EPA received unit operations sampling data for the following unit operations:

- UP 4: Acid Treatment without Chromium
- UP 4R: Acid Treatment without Chromium Rinse
- UP 5: Alkaline Cleaning for Oil Removal
- UP 5R: Alkaline Cleaning for Oil Removal Rinse
- UP 14: Chemical Conversion Coating without Chromium
- UP 16: Chromate Conversion Coating
- UP 16R: Chromate Conversion Coating Rinse
- UP 17: Corrosion Preventative Coating
- UP 17R: Corrosion Preventative Coating Rinse
- UP 24: Electroplating without Chromium or Cyanide
- UP 24R: Electroplating without Chromium or Cyanide Rinse
- UP 27: Grinding
- UP 33: Painting—Immersion (E-Coat)
- UP 83: Acid Pickling Neutralization
- UP 93: Iron Phosphate Conversion Coating
- UP 93R: Iron Phosphate Conversion Coating Rinse

EPA is using this data for two main purposes. First, EPA is using this data to supplement unit operations data used to estimate the pollutant loadings, by subcategory, contained in MP&M wastewaters prior to treatment. As discussed in section III.A of today's document, EPA is making every effort to use subcategory-specific unit operations data instead of estimating loadings by averaging the data by unit operations across subcategories.

Second, EPA is using this data to better define those operations which should be included in EPA's definition of ''oily operations'' used to differentiate the Oily Wastes Subcategory from the General Metals Subcategory. EPA received many comments on certain unit operations that, as proposed, would cause a facility to fall under the General Metals Subcategory instead of the Oily Wastes Subcategory. Commenters concluded that these unit operations are truly ''oily operations'' generating wastewater that contains little or no metals and would not be effectively treated using the recommended treatment for the General Metals Subcategory (*i.e.,* Option 2, which includes metal removal via chemical precipitation). Using the data that EPA received and a review of all unit operations data, EPA is considering incorporating into the definition of ''oily operations'' the following unit operations and any associated rinses (*see* section IV.A for a potential revision to the definition of ''oily operations''):

- UP 1: abrasive blasting
- UP 7: alkaline treatment without cyanide;
- UP 11: assembly/disassembly;
- UP 12: tumbling/barrel finishing/mass finishing/vibratory finishing;
- UP 13: burnishing;
- UP 18: electrical discharge machining;
- UP 35: polishing;
- UP 43: thermal cutting;
- UP 44: washing of final products;
- UP 45: welding;
- UP 46OR: wet air pollution control for organic constituents;
- UP 51: bilge water;
- UP 71: adhesive bonding;
- UP 72: calibration; and
- UP–93: iron phosphate conversion coating.

EPA is considering this revision based on the low levels of metals and similarity of wastewater characteristics to other ''oily operations,'' (*see* section IV of today's document for the potential revised definition of oily operations).

EPA also received data from the American Association of Railroads (AAR) which summarized the current permit limits, treatment-in-place (TIP), and the facilities' measured monthly average and average of daily maximum values for the last year for all known direct discharge railroad line maintenance facilities. More recently, this trade association provided the individual responses to their survey questionnaire. Each railroad line maintenance facility provided one year of long-term monitoring data (*see* section 15.1 of the public record for the AAR surveys). EPA is reviewing alternative options for the Railroad Line Maintenance Subcategory based on this data. See section IX.F of today's document for this discussion.

C. Analytical Method Validation Study and the Total Organics Parameter

In an effort to provide flexibility, EPA proposed three options for meeting limits related to organic chemicals. One option focused on the use of a surrogate parameter, Total Organics Parameter or TOP, to be used for monitoring organic pollutants in MP&M wastewater. In the proposal, the ''TOP'' consisted of 48 individual organic pollutants. To comply with the TOP limit, as proposed, a facility would monitor for all 48 pollutants (or a lesser number if a waiver was obtained for pollutants not present) and sum the measured values, using the nominal quantitation value for non-detects. As discussed in the proposed rule (66 FR 529), the following TOP analytes do not have approved EPA methods: Benzoic acid, carbon disulfide, 3,6-Dimethylphenanthrene, 2-Isopropylnaphthalene, 1-Methylfluorene, and 2-Methylnaphthalene. In addition, aniline and 1-Methylphenanthrene do not have procedures approved in 40 CFR part 136, but do have procedures that have been validated as attachments to EPA Methods 1625/625. With the exception of Benzoic Acid, EPA has performed a study to validate EPA Analytical Methods 1624B/624 and 1625/625 for these organic pollutants. EPA eliminated benzoic acid because of its low and highly variable recovery using EPA Methods 625 and 1625. Benzoic acid will be deleted from the list of organic pollutants that constitute the Total Organics Parameter.

In order to provide test methods for six additional semivolatile organic

pollutants (aniline, 3,6-dimethylphenanthrene, 2-isopropylnaphthalene, 1-methylfluorene, 2-methylnaphthalene, and 1-methylphenanthrene) and one additional volatile organic pollutant (carbon disulfide) in the MP&M industry final rule, EPA has developed and validated attachments to EPA Methods 624 and 1624B and validated revisions to the existing attachments to EPA Methods 625 and 1625. The attachments and revisions to the attachments are:

- Method 624, Attachment 1: Determination of Additional Volatile Pollutants, January 2001
- Method 625, Attachment 1, Revision A: Determination of Additional Semivolatile Pollutants, January 2001 (Method 625, Attachment 1A)
- Method 1624B, Attachment 1: Determination of Additional Volatile Pollutants, January 2001
- Method 1625B, Attachment 1, Revision A: Determination of Additional Semivolatile Pollutants, January 2001 (Method 1625B, Attachment 1A)

The validation study for each of the above methods attachments involve analyses of MP&M industry wastewater samples collected by EPA and sent to three separate laboratories for analyses by Methods 1624B and 1625B. Apart from the fact that Methods 1624B and 1625B contain analytes that are not found in Methods 624 and 625, the principal differences between these 1600 Series methods and their 600 Series counterparts is that the 1600 Series methods employ isotope dilution quantitation to determine the concentration of many of the target analytes. The concentration of the target analytes are determined using an internal standard quantitation procedure in the corresponding 600 Series methods. As a result, for the purposes of this study, instead of analyzing a sample once by Method 1624B and again by Method 624, it is both possible and practical to perform the analysis of a given sample once for Method 1624B using isotope dilution quantitation and then reprocess the resulting mass spectrometric data using the internal standard procedures employed in Method 624. The same situation applies to Methods 1625B and 625—one analytical run can provide data for both quantitation approaches.

The results of this validation effort have been used to develop method performance criteria for the seven new analytes in the attachments to Methods 1624B, 624, 1625, and 625. These criteria are specific to the use of these methods to demonstrate compliance with the MP&M final rule only. The final report for the study provides criteria for: method sensitivity, calibration linearity, labeled compound recovery (Methods 1624B and 1625), and matrix spike recovery (Methods 624 and 625). The interlaboratory study results and the revised attachments are included in the MP&M rulemaking record. See section VI.B. of today's document for a discussion on alternative approaches to calculating the TOP limit.

III. Revisions & Corrections to the Cost & Loadings Model

Based on proposal comments, EPA has revised several aspects of the Cost & Loadings Model used to develop estimates of compliance costs and pollutant loads. This section discusses the changes in methodology and corrections to the model and database for this document including: (1) Subcategorization of unit operations data; (2) pollutant specific revisions to the loadings and removals; (3) corrections to the coding in the model; (4) re-imputation of missing wastewater flows; and (5) several other issues on which EPA is soliciting comment. Section VI of today's document provides a more detailed discussion of the results of the re-analysis using the revised Cost & Loadings Model (and the revised associated input databases).

A. Subcategorization of Facilities and Unit Operations Data

This section discusses changes being considered to EPA's subcategorization scheme as well as changes to the way in which EPA is using the data that characterizes MP&M operations (*i.e.,* unit operations).

1. Changes in EPA's Subcategorization Scheme

In the proposal, EPA solicited comment on the proposed subcategorization scheme. Based on the comments received, EPA is considering placing Printed Wiring Board (PWB) facilities and Printed Wiring Board job shops in the same subcategory: Printed Wiring Board. At proposal, EPA placed the PWB job shops in the Metal Finishing Job Shops Subcategory based on the special economic conditions of job shops. However, information submitted by commenters indicates that PWB job shops are much more similar to PWB facilities than to metal finishing job shops when considering their wastewater characteristics and operations. For all analyses supporting today's document, EPA has placed the Printed Wiring Board job shops in the Printed Wiring Board Subcategory.

In addition, based on comments, EPA has reviewed the unit operations of Printed Wiring Assembly facilities and has determined that they are most similar to the facilities in the General Metals Subcategory. Printed wiring assembly facilities do not manufacture printed circuit boards, but do attach circuit boards to other structures. Therefore, they do not perform the operations typical of a printed wiring board facility (*e.g.,* applying photoresist, etching of the board, or stripping). EPA concluded that most printed wiring assembly facilities in the MP&M database were placed in the General Metals Subcategory for proposal. For this document, EPA has confirmed that all printed wiring assembly facilities are identified as General Metals facilities. Unless new information leads EPA to reconsider this determination, EPA will address the codified language for the applicability of the General Metals Subcategory of the final rule to reflect the inclusion of the printed wiring assembly facilities in the subcategory.

EPA received comments concerning the definition for ''oily operations'' used in the applicability statement of the Oily Wastes Subcategory. Commenters provided data on several MP&M unit operations which were not part of the ''oily operations'' definition in the proposed rule. The data show that there are low levels of metals in these unit operations. Based on the data received and a review of other unit operations containing only low concentrations of metals, EPA is considering whether to revise the proposed definition of ''oily operations'' used to define the Oily Wastes Subcategory (*see* sections II.B and IV.A). This change would result in the reclassification of several facilities to the Oily Waste Subcategory that were originally classified in the General Metals Subcategory at proposal (*see* section VII of today's document for the number of facilities now estimated in each subcategory).

Finally, EPA is considering whether to subcategorize or segment metal finishing zinc platers. EPA uses the term ''zinc platers'' to describe facilities where over 95% of their wastewaters are generated from zinc electroplating operations. These facilities typically do not perform copper, nickel, or chrome electroplating. However, most of these facilities follow their plating lines with chromium conversion coating lines. Currently, zinc platers can be found in the Metal Finishing Job Shops Subcategory (*i.e.,* job shop zinc platers) and the General Metals Subcategory (*i.e.,* captive shop zinc platers). The wastewater characteristics of zinc platers are different from other facilities

in these two subcategories, particularly with respect to their concentrations of zinc. Where non-zinc platers may have concentrations of 10–90 mg/l zinc in their wastewater prior to treatment, zinc platers have concentrations from 100–800 mg/l zinc in their wastewater prior to treatment. However, zinc platers have very low concentrations of other pollutants as compared to non-zinc platers. Therefore, EPA is considering subcategorizing zinc platers by either creating a separate subcategory for all zinc platers, or creating a segment within each of the two affected subcategories. EPA is also considering retaining the current structure. The use of a segment would allow for a separate numerical limitation for zinc for zinc platers while providing ease of implementation as it would allow them to remain in their appropriate current subcategory (*i.e.,* Metal Finishing Job Shops or General Metals). EPA is also considering no change to the current subcategorization scheme but adopting a new zinc limit that represents zinc levels achievable by zinc platers operating BAT treatment systems. In this case, EPA would use data from the sampling of zinc platers to set the zinc limit in the Metal Finishing Job Shops and General Metals subcateogries. EPA concluded that this approach would cause the least confusion for permit writers and be the easiest to implement; however, this approach would allow discharge of additional pounds of zinc to the environment from non-zinc platers in the current subcategories (*see* Table III.A–1). These additional pounds of zinc would have corresponding low pound-equivalents due to the low toxicity weighting factor (0.047) for zinc.

TABLE III.A–1.—INCREMENTAL POUNDS OF ZINC DISCHARGED TO THE ENVIRONMENT WHEN USING ONLY ZINC PLATER DATA FOR SETTING THE ZINC LIMITS FOR THE METAL FINISHING JOB SHOPS AND GENERAL METALS SUBCATEGORIES

Discharger status	Facility type	Number of facilities	Pounds	Pound-equivalents
Indirect	General Metals	10,787	8,200	385
	General Metals (> 1 MGY)[1]	2,055	7,491	352
	Metal Finishing Job Shops	1,165	1,895	89
Direct	General Metals	1,500	9,754	458
	Metal Finishing Job Shops	24	101	5

[1] Note: MGY: Million Gallons per Year

EPA solicits comment on whether: (1) Zinc platers should be in their own subcategory; (2) a segment within existing subcategories; or (3) no change in subcategorization with a zinc limitation that is achievable by zinc platers. EPA also solicits comment on the burden to permit writers and control authorities associated with each approach.

2. Subcategorization of Unit Operation Data

In the Cost & Loadings Model used for the proposed rule, EPA averaged all data for a specific unit operation (*e.g.,* UP23—electroplating with cyanide) regardless of the subcategory of the facility from which the data was collected. Therefore, cyanide concentrations from a metal finishing job shop's UP23 were averaged with cyanide concentrations from a printed wiring board's UP23, and with cyanide concentrations from a general metals facility's UP23. EPA received many comments demonstrating that the concentrations of cyanide in electroplating varied greatly between subcategories, and most importantly between metal finishing job shops and printed wiring boards. Similarly, EPA received comments that the concentration of copper and tin differed widely between printed wiring board facilities and other subcategories. Therefore, for this analysis EPA is applying concentration data from unit operations by subcategory to the extent possible.

EPA has segregated the existing unit operations concentration data, including data used for proposal and newly collected data, by subcategory. EPA performed post-proposal sampling (*see* section II.A) of many printed wiring board unit operations in an effort to distinguish printed wiring board data from other MP&M subcategories with metal-bearing wastewater. For example, at proposal EPA used an average cyanide concentration of 27,959 mg/l for UP23 for all metal-bearing subcategories; however, EPA has revised the Cost & Loadings Model to use a cyanide concentration for UP23 of 5,200 mg/l for metal finishing jobs shops and 430 mg/l for printed wiring boards based on data obtained from these operations (*see* section III.B.1).

In addition to segregating the unit operations data by subcategory, EPA has segregated the unit operations for the ''zinc plater'' segment of the Metal Finishing Job Shops and General Metals subcategories. Therefore, the unit operations (raw wastewater) of a model site that is a zinc plater would be credited with the appropriate level (*i.e.,* higher level) of zinc and appropriate levels (*i.e.,* very low or non-detect) of other pollutants.

EPA has also collected unit operation data that is specific to the steel forming and finishing subcategory so that modeled pollutant loadings will better reflect wastewater characteristics at those sites.

Finally, EPA received comment concerning the variability of the wastewaters sampled to represent the ''testing'' unit operation. EPA defines the testing unit operation as the application of thermal, electrical, mechanical, hydraulic, or other energy to determine the suitability or functionality of a part, assembly or complete unit. Commenters are concerned that wastewater concentrations from testing of one type (*e.g.,* automotive radiators) does not represent the same wastewater characteristics as testing of another type (*e.g.,* aircraft engines). EPA is considering whether or not to further divide the testing unit operation, particularly for the General Metals Subcategory, by industry sector or testing type (*e.g.,* hydrostatic, dye penetrant, ultrasonic, magnetic flux). EPA data show automotive radiator testing molybdenum, fluoride, and vanadium concentrations are 774 mg/l, 0 mg/l (not measured) and 0.004 mg/L respectively, while aircraft parts testing molybdenum, fluoride, and vanadium concentrations are 0.271 mg/l, 49,000 mg/l, and 215 mg/l respectively. EPA solicits comment on whether or not to subdivide the testing unit operation and ways to appropriately divide the Agency's data from this unit operation.

The methodology for subcategorization of unit operation concentrations and a discussion of

remaining data transfers from one subcategory to another are described in a memorandum in the public record, entitled '' MP&M Pollutant Loadings Subcategory-Specific Data,'' section 16.7, DCN 16759. EPA solicits comments on this approach.

B. Pollutant Specific Revisions to Loadings and Removals

EPA received comment on several pollutant-specific issues related to the pollutant loadings and removals generated by EPA's Cost & Loadings Model. In some cases, commenters questioned results from a specific sampling episode. For example some commenters stated that the misclassification of a cyanide electroplating sampling point led to an overestimation of cyanide pollutant loadings and removals. In other cases, commenters raised more general issues, such as the percent removal value assigned to boron (at proposal boron was set equal to the long term average (LTA) for boron, not using a percent removal) in the Cost & Loadings Model. EPA solicits comment on how EPA has tentatively addressed these issues. EPA is also reviewing several data points that commenters concluded to be ''outliers.'' In several cases EPA has addressed these issues and in other cases, due to the need to work with the facility in question, EPA is working toward resolving them for the final rule. Below is a discussion of the revisions being considered regarding the most prominent of the pollutant-specific issues: cyanide, tin, copper, sulfide, and boron. A detailed summary of all the pollutant-specific issues under review may be found in a memorandum entitled, ''MP&M Pollutant Loadings Methodology Changes from Proposal'' in the public record for this document, section 16.7, DCN 16764. EPA notes that the pollutant loadings and removals for the final rule will reflect the addition of EPA and appropriate industry submitted unit operations data to the model. (*see* section IV of today's document for a discussion on EPA's current views on possible changes to pollutants selected for regulation).

1. Cyanide

The major issue regarding cyanide pollutant loadings raised by commenters involves the misidentification of a single sampling point. Prior to proposal, EPA sampled at one facility what it concluded was cyanide electroplating rinse water (*i.e.,* UP23R). For the proposal, that data was averaged with other cyanide concentrations for the same unit operation (UP23R) to obtain an average cyanide concentration for use in the Cost & Loadings Model for that unit operation. Although the concentration of cyanide was considerably higher than other facility data for the same unit operation, a check of the site report, which had been reviewed by the facility, verified that sample point as a rinse water. Based on comments received and additional follow-up discussion with the sampled site, EPA now has determined that the actual sample was taken from a drag-out tank that follows the cyanide electroplating bath and that the drag-out tank water is recycled. Therefore, the concentration of cyanide in that tank is not characteristic of cyanide electroplating rinse water (*i.e.,* UP23R) and EPA has removed this cyanide concentration (and concentrations of all other pollutants from that sampling point) from the electroplating with cyanide rinse unit operation (UP23R) and has reclassified it as a drag-out rinse that is recycled (UP23RDO). This change has a significant effect on the average cyanide concentration used for the proposal in the cost and loadings model for that unit operation and the resulting cyanide pollutant concentration levels (5,042 mg/l to 3.6 mg/l for general metals). Further, EPA is now considering using unit operations concentration data on a subcategory-specific basis for the final rule (*see* section III.A.2 of today's document). The cyanide data point discussed here was taken at a general metals facility. Therefore, this data point would no longer affect the cyanide loadings for the metal finishing job shops, printed wiring board, non-chromium anodizing, or steel forming and finishing subcategories for the final rule. Following this approach, the current estimated cyanide concentrations for cyanide electroplating rinse (UP23R) are as follows: 58.8 mg/l for metal finishing job shops, 22.02 mg/l for printed wiring board, 22.02 mg/l for non-chromium anodizing, and 22.02 mg/l for steel forming and finishing. This document reflects these concentrations. See section VII of today's document for a discussion on the overall change in pollutant loadings and removals due to revisions to the Cost & Loadings Model.

2. Tin

The major issue regarding tin concentrations raised by commenters in the Cost & Loadings model involves the misclassification of a sampled unit operation containing a large concentration of tin. Prior to proposal, EPA sampled a unit operation that it classified as UP4R (acid treatment without chromium rinse). However, based on comment and subsequent review of the sampling episode report, EPA has concluded that this unit operation is different from UP4R. This unit operation involved the use of a catalyst solution for electroless plating operations and did not fit in any of EPA's current unit operation descriptions. Therefore, EPA created a new unit operation for electroless plating catalyst solutions (UP87) and assigned the data for tin and all other pollutants associated with that particular sampling point to the new unit operation.

EPA estimated tin concentrations for acid treatment without chromium rinse (UP4R) across all subcategories in the proposal at 256.2 mg/L. The current estimated tin concentrations for UP4R are as follows: 1.97 mg/l for metal finishing job shops, 0.0204 mg/l for printed wiring board, 0.0444 mg/L for general metals, and 0.0432 mg/L for zinc platers. This document reflects these revised concentrations. See section VII of today's document for a discussion on the overall change in pollutant loadings and removals due to revisions to the Cost & Loadings Model.

3. Copper

The factors discussed above related to cyanide and tin also would result in changes in pollutant loadings for copper. When EPA revised the cyanide and tin concentrations for those two sampling points, it also revised the concentrations for all pollutants associated with those sampling points, including copper. Copper loadings are also largely affected by the subcategorization of unit operations data and EPA's post-proposal sampling of three additional printed wiring board facilities. In EPA's view, the copper loadings for non-printed wiring board facilities would be reduced through the use of subcategory-specific unit operations data. Further EPA has concluded that the copper loadings for printed wiring board facilities would be more reflective of those facilities due to the incorporation of additional printed wiring board sampling data.

EPA estimated copper concentrations for acid treatment without chromium rinse (UP4R) across all subcategories in the proposal at 52.85 mg/L. The current estimated copper concentrations for UP4R are as follows: 7.97 mg/l for metal finishing job shops, 58.97 mg/l for printed wiring board, 9.49 mg/L for general metals, and 7.97 mg/L for zinc platers. This document reflects these revised concentrations. See section VII of today's document for a discussion on the overall change in pollutant loadings

and removals due to revisions to the Cost & Loadings Model.

4. Sulfide

EPA received many comments concerning EPA's estimate of pollutant removals for total sulfide and EPA's proposal to regulate total sulfide. Commenters stated that the pollutant removals associated with total sulfide were inflated due to the analytical method EPA used to test for total sulfide. Commenters concluded that the method used (EPA Method 376.1) may yield erroneous results because of matrix interference (i.e., erroneous analytical results for the pollutant of concern due to certain substances present in the sample). This may result in higher reported sulfide concentrations than what is actually in the wastewater. In addition, many of the data points used for total sulfide were transferred from data for the Oily Wastes Subcategory to other subcategories. Therefore, as discussed in section II.A of today's document, EPA is now using two additional methods (EPA Method 376.2 and Standard Method 4500–S^{-2}[E], 18th edition) to test for total sulfide. For the purposes of establishing unit operations concentrations for a specific sampling point for the Cost & Loadings Model for the NODA analyses, EPA averaged the data from Methods 376.2 and 4500–S^{-2} (E). For the final rule EPA currently intends to follow the recommendations in the memorandum titled, ''Evaluation of Sulfide Results for Metal Products and Machinery Samples Analyzed by MCAWW Method 376.1, MCAWW Method 376.2, and Standard Method 4500–S^{-2} (E)'' (*see* section 16.2, DCN 16941). The memorandum's recommendations are specific for unit operations, influent, and effluent concentration data.

EPA is considering the effects of these recommendations on loadings and solicits comments on this analysis. EPA is also now using subcategory-specific unit operations data, so that in all cases total sulfide concentrations would not be transferred from oil-bearing subcategories to metal-bearing subcategories. If no sulfide concentration was identified for unit operations within a subcategory, EPA set the sulfide concentration equal to zero for today's document, and is considering doing the same in the analysis for the final rule.

5. Boron

Although EPA did not propose to regulate boron, many commenters expressed concern with EPA's estimates of boron pollutant removals. Commenters state that boron is not removed in chemical precipitation systems and any removal is an artifact of the database. EPA has revisited the analysis regarding the removal of boron in chemical precipitation systems and has concluded that boron shows widely variable removals in two BAT treatment systems and is not removed at all (or has negative removals) in the remaining three BAT treatment systems (*see* section 16.7, DCN 16758). EPA has concluded that, in most cases at MP&M facilities, boron is in the dissolved anionic form (as borate) and cannot be removed by chemical precipitation.

For the purposes of estimating boron removals for today's document for subcategories where EPA is using chemical precipitation as the basis for limitations, EPA has made a change to the methodology. For today's document, EPA has set the pollutant removals for boron equal to zero. Therefore, EPA is not claiming any removal for boron from chemical precipitation systems.

EPA also considered a more site-specific approach where EPA would apply the boron removal percentage from a particular EPA sampling episode to all model facilities with similar characteristics to the sampled facility. For example, commenters stated that one reason EPA's boron removals were inflated was because removals were based on a facility that also performs porcelain enameling, where the wastewaters are commingled for treatment. The commenters stated that the porcelain frit was the cause for the relatively high boron removals (i.e., the boron is in solid form and can be removed by gravity separation) compared to facilities that are not also performing porcelain enameling. Therefore, in this example, EPA considered applying the boron removal based on the sampled facility with the porcelain enameling and MP&M wastewaters only to other model facilities in EPA's database that also conduct porcelain enameling operations. EPA reviewed all sites in EPA's questionnaire database and found six survey sites that reported being covered by the Porcelain Enameling effluent guidelines. Of these six sites only one site was discharging wastewater from MP&M and porcelain enameling operations and the percentage of wastewater from porcelain enameling operations was less than two percent of their wastewater volume. It is likely that the national estimate of boron removals using this approach, relative to the removals for other pollutants, would be close to zero. EPA solicits comment on the revised results and which approach EPA should use for the final rule to estimate boron removals.

EPA intends to conduct further review of boron removals in other treatment systems, such as Dissolved Air Flotation (DAF). DAF is currently the basis for the limitations in the Shipbuilding Dry Dock and Railroad Line Maintenance Subcategories. EPA has data from the MP&M database as well as data from other previous regulations indicating positive removals of boron from DAF systems. EPA will review the form of the boron present in wastewater from these subcategories (e.g., dissolved or insoluble) and examine the mechanism for removal.

EPA will also perform an assessment for the final rule investigating molybdenum removals via chemical precipitation similar to that used for boron. EPA may determine from this analysis that: (1) Molybdenum is present in MP&M wastewaters as a dissolved form which is not removable by chemical precipitation; or (2) there is a low level of incidental molybdenum removal for use in the Cost & Loads Model. There may be incidental removals when molybdenum adheres to oily wastewaters that are removed in the oil water separation step or other treatment steps (e.g., flocculation). For the analyses performed for today's document, EPA is using the average effluent concentration achieved for molybdenum by EPA sampled facilities. (*see* section IV of today's document for a discussion on molybdenum as a pollutant selected for regulation). EPA solicits comment on molybdenum being removed through oil water separation step or other treatment steps (e.g., flocculation).

C. Stream Code Corrections

This section describes how EPA intends to revise several parts of the computer format of the model and data entry corrections EPA will make based on comments received regarding the Cost & Loadings Model. All revisions and corrections discussed in this section, affecting approximately 5% of the stream codes, have been incorporated into the analyses supporting today's document.

There were two cases where EPA's Cost & Loadings Model did not correctly link unit operations (UP) ''extender'' codes in the stream identification field of the database. Extender codes are used to indicate a rinse (''R'') or can be used to indicate the presence of multiple lines. For example, if the facility had 3 different acid treatment without chromium rinse lines, the lines would be labeled UP 04R–1, 04R–2, 04R–3. When the model did not correctly link

with these codes it led to the mis-assignment of each stream for the purposes of determining whether or not the stream should receive credit for having treatment-in-place (TIP). Therefore, at proposal there were a number of rinses or multiple lines that were not given proper credit for TIP.

Another example is where a site's questionnaire indicated that UP04 (acid treatment bath without chromium) goes to treatment, but did not say whether or not UP04R (acid treatment rinse without chromium) went to treatment. For the proposal cost and load analysis, TIP credit was given for UP04, but not for UP04R. EPA has corrected the model used for today's document. In another example, a site's questionnaire indicated UP04R goes to treatment, but when multiple lines (UP04R–1, –2, –3) are present, TIP credit did not get conveyed in the proposal cost and loads analysis to the streams labeled UP04R–1, –2, –3. EPA notes that less than three percent of all streams required a change in TIP assignment due to this error.

Similarly, when converting from numeric to text format for use in running the Cost & Loadings Model, some streams converted as UP1R–1 and UP4R–1 instead of UP01R–1 and UP04R–1. This caused a mismatch in the model databases and those streams were not given proper TIP credit. EPA has corrected the model used for today's document.

EPA has also identified a few data entry errors that were limited in scope, but do affect the output of the Cost & Loadings Model. In one case, the facility completed an erroneous page in their questionnaire for the treatment unit at their facility (e.g., equalization/neutralization instead of chemical precipitation). In correcting this error, the reviewer did not transfer all of the affected unit operations from the erroneous page to new treatment unit page, and therefore, some unit operations did not get entered and did not receive TIP credit. EPA has corrected the model used for today's document.

In another case, the facility completed the unit operation page of their questionnaire but did not indicate to which treatment unit the unit operation discharged. Therefore, TIP credit was not given for that unit operation. Upon further review of these streams and comparison to treatment diagrams (which indicated to which treatment units these streams discharged), a correction was made to the data entry and TIP credit was given. EPA has carefully reviewed questionnaires for all sites where full or partial TIP credit was not given, and has corrected the model used for today's document, accordingly (*see* section III.E).

D. Change in Imputed Flows

EPA uses wastestream-specific flow (not total facility flow) and production information in the Cost & Loadings Model. A number of questionnaires were submitted without data for flow or production related to an individual wastestream. In some instances EPA contacted the facility to gather the information. If the data was not available or if EPA did not contact the facility, EPA imputed data using data from similar facilities in the questionnaire database. The 1,003 facilities in the database had 17,424 different lines (i.e., tanks), of which EPA imputed values for 6,129 lines at 797 facilities. These imputed values included production and/or production normalized flows (PNFs) for most municipality surveys, because the surveys did not request this information from them. This section describes the changes in the data and imputed values from the proposal. This section also describes some changes that EPA is considering for the final rule.

Commenters stated their concerns regarding several large flow values that were created through imputation. Commenters noted that in these cases the flow for the wastestream, when added with all other streams at the facility exceeded the facility's reported total flow (including non-MP&M process wastewater). Commenters suggested using a comparison of the summation of a facility's stream flows with the facility's reported total discharge flow as a ''reality check.'' EPA has used this ''reality check'' in the imputations for today's document. Each survey requested the total flow information in different ways. Phase I surveys required respondents to report on the total facility flow. Phase II surveys listed three different fields: MP&M Process Water, Process Water, Total Facility Water Use. EPA used the MP&M Process Water value if it was given by the facility. If this value was not given, EPA used the Process Water value. If neither of these values were reported, EPA used the Total Facility Water Use value.

When EPA examined the data before imputing any values, 10 percent of the facilities in the database had the sum of their individual streams exceed the total facility flow. EPA also identified stream flows that appeared to be incorrect. After identifying these inconsistencies, EPA reviewed its hard copies of the surveys to look for any information which would provide more accurate total flows (e.g., perhaps the site wrote in their own units of measure which need to be converted). Most occurrences were with Phase I sites that were surveyed between 1989 and 1990, where previous reviews of the total flow had not been pursued as vigorously as the stream flow information. Based upon its findings, EPA revised the individual stream flows and the total flows in the database. The sum of individual stream flows for a facility were then compared to the reported total flow. EPA scaled back the individual stream flows when the sum of the individual stream flows were greater than the total flow (*see* memorandum titled ''Revisions to the Technical Portion of the Imputation Methodology,'' section 16.6.1, DCN 27711). EPA also excluded recycle and pollution prevention streams as a basis for imputed values because the flows are often quite large, but usually are not completely discharged. In addition, EPA excluded contract hauling streams from the summation of individual streams, because they would not be included in the facility's reported total discharge flow.

After incorporating those changes into its database, EPA imputed values for individual streams where the flows were unknown. As a check on the imputed values, EPA then compared the total flow at each facility to the sum of all flow values (i.e., imputed and others) for the individual streams at that facility. As a result of these changes, EPA found only 32 facilities (i.e., less than four percent) where the summation of the reported and imputed individual flows exceeded the total reported flows. For these facilities, EPA has either revised the stream flows based upon engineering review or proportionally decreased the imputed flows to be less than the reported total flow.

For the final rule, EPA has determined that further improvements in the imputation strategy may be warranted and solicits comments on its ideas. In the current strategy, EPA assumes that all missing flows correspond to operations that discharge water and thus missing flows have imputed values that are always greater than zero. However, the surveys identified that some unit operations are frequently dry operations. For the final rule, EPA may assign some missing flow values to be zero (i.e., dry).

In addition, while the imputation procedure uses relevant information from similar operations at the facility when it has some reported and some missing values, these similar operations may include several different types of unit operations. In its review of the data, EPA observed that values were often identical between different lines (or

tanks) of the same unit operation and would often differ between unit operations at that facility. Thus, EPA makes every attempt to use relevant information from similar operations at the facility when it has some reported and some missing values, EPA has determined that placing more emphasis on the unit-level operations may be more appropriate in the intra-facility imputations for streams.

When intra-facility information could not be used, the imputation procedure used the median value of all of the lines within a ''unit grouping.'' Within each unit grouping, EPA combined similar unit operations based upon water usage characteristics and the number of lines associated with each operation. EPA then calculated the median value of the lines for each unit grouping. However, when it examined summary statistics such as the 10th and 90th percentiles for each unit grouping, EPA observed that the production-normalized flows and production were extremely variable within many unit groupings. For the final rule, EPA intends to investigate the causes for this variability for the final rule, and possibly re-define the unit groupings to be more homogeneous.

Also, for the final rule, EPA will consider facility and subcategory effects on the imputed values. As stated above, EPA noted that values within a facility tended to be similar. Thus, a facility with many lines in a particular unit operation would have more influence on the median value than a facility with fewer lines. For the final rule, EPA may consider using a single value from each facility rather than using the values from every line in that unit operation. Also, because it has observed some differences between subcategories with the same unit operation, EPA will investigate whether the imputation procedure should incorporate subcategorization in some way.

In a memorandum in the public record (*see* section 19.2, DCN 36081), EPA has described the current strategy, unit groupings, and assumptions, and indicated the changes that it may incorporate for the final rule. These changes will probably have little or no impact for most facilities. For others, it may increase or decrease the flows of the imputed streams. This may have the effect of lowering pollutant loadings with the inclusion of zero discharge unit operations. EPA solicits comment on the approaches outlined in the memorandum.

E. Changes Considered for Methodology for Treatment-In-Place Credits

For the proposed rule, EPA estimated the baseline pollutant loadings (i.e., pollutant loading prior to compliance with the MP&M regulations) from model facilities based on actual treatment-in-place at those sites based on questionnaire responses. If a model site had no treatment-in-place for their MP&M wastewaters or if a metal-bearing site only had pH adjustment, neutralization or equalization without any mechanism for sludge removal, EPA estimated baseline pollutant loadings based on raw wastewater data from EPA sampling episodes. If a site had some or all of its MP&M wastewater going through a treatment system (BAT system, equivalent, or better), EPA estimated baseline pollutant loadings, for those streams going through the system, based on the long-term average (LTA) effluent concentrations (i.e., design concentrations) from the Metal Finishing effluent guidelines (40 CFR part 433) for pollutants regulated by that regulation (with the exception of cyanide) and based on treatment system specific effluent concentration data (i.e., MP&M LTAs) from EPA sampling episodes for cyanide and the other MP&M pollutants of concern. Commentors raised questions about whether EPA was providing appropriate treatment-in-place credits for certain technologies in the proposal, and this subject is specifically addressed later in this document. In the case where a facility was treating some MP&M wastewaters using its on-site treatment system, but not others, EPA estimated the baseline pollutant loadings for the streams receiving treatment using the treatment-specific effluent concentrations described above and using the raw wastewater data for those streams not going through treatment in the baseline. In the MP&M Costs & Loads Model, such facilities are referred to as having ''partial treatment-in-place credit.'' The same holds true for facilities that may have a portion of a BAT system, such as alkaline chlorination for cyanide destruction, but do not perform further treatment for metals using chemical precipitation and clarification.

EPA then estimates pollutant loadings for the proposed option for each model site. When estimating the pollutant loadings for the proposed option, EPA assumed the site was meeting the long-term average (LTA) concentrations (i.e., design effluent concentrations) achieved by EPA's sampled MP&M BAT facilities. If a site is performing better at baseline (e.g., microfiltration for solids removal) than required by the MP&M proposed option (e.g., clarification), EPA assumed for the NODA analysis that the site will continue to operate with the superior technology for the EPA proposed option.

EPA calculates the pollutant loads removed by the proposed option as the difference between the pollutant loadings estimated for the proposed option and the pollutant loadings estimate for the baseline. This means that for sites which have treatment-in-place at the baseline that is the same or equivalent to the BAT treatment (i.e., sites with full TIP credit), EPA is claiming very little, if any, additional pollutant removal due to the MP&M regulation. EPA notes that the MP&M regulation may still show significant removals for those facilities that have equivalent ''end of pipe'' technologies or treatment units (e.g., metal removal via chemical precipitation) but not the BAT pollution prevention technologies (e.g., paint water curtain, counter-current cascade rinsing, machine coolant recycling). For these facilities, the ''end of pipe'' technologies may be equivalent, but EPA's modeling drastically increase the efficiencies of their system with the increased influent concentrations. For sites that have some MP&M wastewaters receiving treatment in the baseline (i.e., sites with partial TIP credit), the additional pollutant removal EPA is claiming is largely from their untreated streams. Finally, sites with no treatment-in-place or only pH adjustment, neutralization, or equalization without any mechanism to remove sludge (i.e., sites with no TIP credit) are the largest source of the pollutant reductions that EPA estimated for the proposed rule.

The two most prominent issues received in comments regarding treatment-in-place (TIP) credit (with exception of the stream code corrections to the Cost & Loadings Model discussed in section III.C above) dealt with giving TIP credit for alternative technologies, including ultrafiltration, and with EPA's methodology for calculating the baseline load for currently regulated facilities (*see* also section 16.4, DCN 16883).

1. Equivalency of Alternative Technology as BAT

When determining whether or not to provide a site with TIP credit for an existing treatment system, EPA reviewed the site's questionnaire for information to determine if the treatment system was equivalent (or better) than the proposed BAT technology. The proposed BAT technology for existing facilities in the metal-bearing subcategories consists of segregation of chelated wastes, hexavalent chromium reduction, when necessary, cyanide destruction by alkaline chlorination, when necessary,

chemical emulsion breaking for oils removals, incorporation of pollution prevention and water conservation practices, and chemical precipitation (by sodium hydroxide) followed by a lamella slant-plate clarifier and sludge removal.

When determining whether a treatment system was ''BAT,'' equivalent, or better than BAT for the purposes of determining treatment-in-place credit, EPA assumed that facilities that indicated chemical precipitation systems would also have a clarifier (even when they did not indicate this) and vice versa. However, EPA assumed that sites with metal-bearing wastestreams must have some mechanism for sludge removal to truly be operating a chemical precipitation and clarification system. EPA also assumed for the proposal and today's document that: (1) Facilities operating chemical precipitation followed by microfiltration or membrane to be at least equivalent to BAT; (2) facilities which indicated membranes for solids removal (i.e., microfiltration, reverse osmosis) also had chemical precipitation and are at least equivalent to BAT; and (3) facilities which indicated on their surveys ''pH-Adjustment'' followed by solids removal (e.g., clarification, membrane, microfiltration but not gravity settling) as if they were operating a chemical precipitation and clarification system for metals removal. EPA gave these facilities TIP credit at least as equivalent to BAT. EPA will investigate for the final rule which types of ''pH-Adjustment'' with solids removal, including types and amount of treatment chemicals, should be equated with BAT TIP credit or better. EPA solicits comment on this issue. For cyanide destruction systems, at proposal, EPA assumed that BAT was alkaline chlorination. EPA is considering in-process ion exchange for cyanide removal to be equivalent to alkaline chlorination for the final rule (*see* further discussion below). For sludge removal, EPA assumed that facilities with sludge thickening or a filter press had both components in place. In the case of oily wastes, sites with dissolved air flotation or ultrafiltration were considered to be at least equivalent to the BAT of chemical emulsion breaking for oil removal; however sites with only oil skimming were not considered to be BAT for oil removal.

EPA received several comments from facilities that use alternative treatments for metals removals. For example, many sites use ion exchange systems to reclaim gold from gold-cyanide wastestreams. Ion exchange systems have the ability to remove the cyanide from the wastestream to very low levels. Commenters requested that EPA provide TIP credit for use of ion exchange for removal of cyanide. At proposal, EPA did not make this allowance; EPA is considering this change in methodology for the final rule and has given TIP credit for end-of-pipe ion exchange systems for cyanide destruction in today's document and is also considering giving TIP credit for in-process ion exchange for cyanide destruction in the final rule. EPA is also considering giving full TIP credit for ion exchange for metals removals. EPA expects that granting TIP metals credit to plants with ion exchange will lower pollutant removal estimates from today's pollutant removal estimates. EPA requests comment on which alternative technologies, in addition to ion exchange, should be set as equivalent to cyanide destruction and to chemical precipitation followed by clarification.

2. Pollutant Loadings Baseline

As discussed above, EPA provided credit for achieving the long-term average concentrations of the Metal Finishing rule and the EPA BAT long-term average concentrations for facilities that received TIP credit, regardless of whether or not they are currently covered under the Metal Finishing (40 CFR part 433) or Electroplating (40 CFR part 413) effluent guidelines. However, commenters requested that EPA give baseline part 413 or part 433 limits credit to all facilities currently covered under these existing effluent guidelines even when their questionnaires indicate that there is no BAT TIP. Commenters argue that even without any indication of MP&M BAT TIP, these facilities must be meeting their limits under the existing regulations or else there would be large numbers of facilities in violation of their compliance requirements.

In an effort to address this issue, EPA has performed a sensitivity analysis on the baseline pollutant loadings (''Baseline 413/433 Analysis'') for today's document. In this analysis, EPA assumed that all sites currently regulated by part 413 and/or part 433 meet their existing limits at the point of compliance regardless of the treatment they have in place. EPA used the monthly average limits from the part 413 and part 433 regulations to estimate site-specific baseline pollutant loadings. EPA performed this analysis for all direct and indirect discharging facilities currently regulated by part 413 and/or part 433 in the following subcategories: General Metals, Metal Finishing Job Shops, Printed Wiring Board, Non-Chromium Anodizing, and Zinc Plater. EPA also performed an additional analysis to estimate the revised baseline for sites that would likely be meeting local limits equivalent to the part 433 limits. In the first baseline sensitivity analysis, EPA applied the following rules:

- If the facility is currently covered by part 413 and not by part 433, the effluent wastewater concentrations for cadmium, cyanide, chromium, copper, nickel, lead and zinc were set equal to the part 413 monthly average limits and the concentrations for other MP&M pollutants of concern remain as they were set in the standard Cost & Loadings Model, described earlier in this section.
- If the facility is covered by part 433 or by both part 413 and part 433, the effluent wastewater concentrations for the pollutants mentioned above (with the additional of silver) were set equal to the part 433 monthly average limits and the concentrations for other MP&M pollutants of concern remain as they were set in the standard Cost & Loadings Model, described earlier in this section.
- If the facility is not covered by either part 413 and/or part 433, the effluent wastewater concentrations remain as they were set in the standard Cost & Loadings Model, described earlier in this section.

In the additional baseline sensitivity analysis EPA used the concentration from the part 433 monthly average limits to estimate the baseline pollutant removals for cadmium, cyanide, chromium, copper, nickel, lead and zinc for sites that are in the above mentioned subcategories that are not currently covered by either part 413 and part 433 (i.e., sites meeting local limits in the General Metals and Zinc Plater subcategories) and used the concentrations for other MP&M pollutants of concern as they were set in the standard Cost & Loadings Model, described earlier in this section. This way, EPA can evaluate those facilities that are currently regulated by national effluent guidelines separately from those that are not.

Table III.E–1 provides EPA's national estimates of facilities that are solely regulated under the Electroplating (40 CFR part 413) regulations, or solely regulated under the Metal Finishing (40 CFR part 433) regulations, or regulated by both regulations using the combined wastestream formula. EPA solicits comments on these estimates.

TABLE III.E–1: NATIONAL ESTIMATES OF FACILITIES REGULATED UNDER THE MP&M NODA, ELECTROPLATING ELGS (40 CFR PART 413), METAL FINISHING ELGS (40 CFR PART 433), OR BOTH 40 CFR PART 413 AND 40 CFR PART 433.

MP&M Subcategory[a]	National estimate of facilities covered under MP&M NODA		National estimate of facilities covered only under 40 CFR Part 413		National estimate of facilities covered only under 40 CFR Part 433		National estimate of facilities covered under both 40 CFR Parts 413 and 433	
	Direct	Indirect	Direct	Indirect	Direct	Indirect	Direct	Indirect
General Metals (GM)[b, c]	1,500	2,055	91[e]	286	534	3,538	68	395
Metal Finishing Job Shops (MFJS)[d]	24	1,165	0	278	12	444	12	162
Printed Wiring Board	4	840	0	354	4	122	0	304
Zinc Platers (GM)	21	332	0	62	9	210	12	0
Zinc Platers (MFJS)	0	105	0	36	0	12	0	68
Non-Chromium Anodizing	35	0	0	0	24	19	0	0
Steel Forming and Finishing	41	112	0	4	13	23	0	0
Oily Wastes[c]	2,749	288	0	6	16	329	0	0
TOTAL	4,374	4,897	91	1,026	612	4,697	92	929

[a] EPA uses the term ''zinc platers'' to describe facilities where over 95% of their wastewaters are generated from zinc electroplating operations (*see* section III.A.1)
[b] These national estimates of General Metals facilities do not include Zinc Platers.
[c] The MP&M NODA national estimates include the General Metals and Oily Wastes flow cut-offs (1 MGY and 2 MGY, respectively) while the remaining national estimates for these subcategories do not.
[d] These national estimates of Metal Finishing Job Shops do not include Zinc Platers.
[e] These sites have both direct and indirect discharges but indicated coverage under part 413 in their survey response.

The results of the two ''Baseline 413/433 Sensitivity Analyses'' are presented by subcategory in Table III.E–2 below. The results are presented as pollutant removals in pound-equivalents removed per year by subcategory. EPA has estimated pollutant loadings/removals but did not estimate analogous changes in the compliance cost estimates. If this methodology is incorporated into the Cost & Loads Model for the final rule, EPA will provide pollutant removals, compliance costs, cost-effectiveness, economic impacts, and environmental benefits using this analysis. EPA solicits comment on the Baseline 413/433 Sensitivity Analyses and any other possible approaches to address the issue of baseline loadings for facilities currently covered by the Metal Finishing or Electroplating effluent guidelines. In addition, EPA solicits comment on the use of the monthly average limit from part 413 and/or part 433 as opposed to using the long-term average concentration (*see* discussion of rationale below as part of the discussion on the low concentration analysis).

TABLE III.E–2: RESULTS OF ''BASELINE 413/433'' SENSITIVITY ANALYSES

MP&M Subcategory	MP&M NODA Removals (lb-eq/yr)		Removals with change in baseline loads (lb-eq/year)[1]		Removals with change in baseline loads (lb-eq/year)[2]	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
General Metals (GM)	996,741	1,240,219	485,495	728,775	431,921	273,234
Metal Finishing Job Shops (MFJS)	1,652	93,190	1,282	35,550	1,282	32,130
Printed Wiring Board	186	153,653	186	63,227	186	41,832
Zinc Platers	937	123,210	160	19,414	160	19,414
Non–Chromium Anodizing	2,392,735	NA	2,387,268	NA	2,387,243	NA

[1] This analysis only changes the baseline for facilities currently regulated under part 413/433.
[2] This analysis changes the baseline for all sites, regulated and unregulated. NA—not applicable, EPA did not propose MP&M regulations for Non–Chromium Anodizing

EPA also received comment regarding facilities with low concentration raw wastewater characteristics that do not have treatment-in-place (TIP) for some or all of the their wastewater. Commenters state that such facilities do not have TIP because the pollutant loadings in their wastewaters are low enough to meet their current local limits or the Metal Finishing or Electroplating limits without end-of-pipe treatment. EPA's sampling program focused on facilities with TIP and these facilities may have wastewaters with significantly higher concentrations of pollutants than facilities with no TIP. EPA is considering segmenting these ''low concentration'' facilities in the Cost & Loadings Model for the final rule so that more representative raw wastewater concentrations may be applied to those facilities. Therefore, EPA is soliciting comment on this approach and concentration data at the unit operation level from these ''low concentration'' facilities, as well as other possible approaches. EPA notes that several of these ''low concentration'' facilities may now fall under the Oily Wastes Subcategory due to the change in the definition of ''oily operations'' being considered by EPA for the final rule. Facilities in the Oily Wastes Subcategory are not regulated for metals and have pollutant loadings that are specific to their subcategory.

EPA has performed a sensitivity analysis to identify the potential effect of segmenting the ''low concentration'' facilities in the General Metals, Metal Finishing Job Shops, Printed Wiring Board, Non-Chromium Anodizing, and Zinc Plater subcategories. In this sensitivity analysis, EPA substituted the Electroplating (40 CFR part 413) or

Metal Finishing (40 CFR part 433) monthly average limitations, as appropriate, for unit operation concentrations found in the Cost & Loadings Model for facilities with no treatment in-place. For facilities that indicated coverage under the part 413 regulations in their survey questionnaire, EPA used the limitations from part 413. For facilities that indicated coverage under the part 433 regulations or coverage under both part 413 and part 433, EPA used the limitations from part 433. For facilities that indicated no coverage by a national effluent guideline or coverage by another category's effluent guideline, EPA assumed these facilities would have local limitations equivalent to the limitations of the part 433 regulation and, therefore, used the limitations from part 433.

EPA used the monthly average limitations instead of the long-term effluent concentration (*i.e.*, design concentration) because the Agency concluded that it may be more appropriate as a facility with no treatment in-place is not targeting a design concentration (*i.e.*, there is no treatment system to design). EPA concluded that a facility is likely to use the monthly average as a determining factor in deciding whether the installation of treatment is necessary at their site. If the facility's discharge levels fall below the monthly average limit, EPA concluded that the facility is unlikely to expend the resources to install treatment. EPA's use of the monthly average limits from the part 413 and part 433 regulations results in higher estimates of baseline loadings for this sensitivity analysis than if EPA had used the part 413 and part 433 LTAs (*see* section 16.5.1, DCN 17802 for a comparison of part 413 and part 433 Limits and LTAs). EPA solicits comment on the use of the monthly average limit in the ''low concentration'' sensitivity analysis and in the ''Baseline 413/433'' sensitivity analysis discussed earlier in this section.

The results of this ''low concentration'' sensitivity analysis are given, below, in Table III.E–3. EPA solicits comment on the results of this sensitivity analysis for both direct and indirect discharge facilities and if this approach should be applied in the final rule. EPA also solicits comment on other possible approaches to address those facilities with low concentration raw wastewater characteristics and do not have treatment-in-place (TIP) for some or all of the their wastewater.

TABLE III.E–3: RESULTS OF ''LOW CONCENTRATION'' SENSITIVITY ANALYSIS

MP&M Subcategory	MP&M NODA Removals (lb-eq/yr)		Removals using the ''Low Concentration'' Analysis (lb-eq/yr)	
	Direct	Indirect	Direct	Indirect
General Metals (GM)	996,741	1,240,219	908,473	643,427
Metal Finishing Job Shops (MFJS)	1,652	93,190	1,652	54,135
Printed Wiring Board	186	153,653	186	148,742
Zinc Platers	937	123,210	335	31,286
Non-Chromium Anodizing	2,392,735	NA	2,387,268	NA

F. Revisions to the Cost Modules

In addition to the changes to the Cost & Loadings Model that affect the estimates of pollutant loadings and reductions, EPA has also revised several aspects of the costing portion of the model (''cost modules''). EPA has included explicit costs for increased analytical monitoring, incorporated the revised long-term average concentrations, and made several minor corrections to various cost modules. EPA is also considering the addition of a sand filter to the BAT technology option. All changes to the cost modules are fully described in a memorandum entitled, ''Cost Model Changes Incorporated into the MP&M Design and Cost Model Since Proposal,'' section 16.6.1 of the public record, DCN 16741.

1. Addition of Monitoring Costs

As discussed in the proposal (66 FR 478), EPA assumed that facilities meeting local limitations or national effluent guidelines and pretreatment standards will already incur monitoring costs. EPA did not include monitoring costs in the estimates of operating and maintenance costs for the proposal and solicited comments on that approach. EPA received many comments indicating that EPA needed to include monitoring costs as the proposed MP&M rule regulates several additional pollutants (e.g., tin, sulfide and lead) than previous applicable effluent guidelines. EPA is planning to incorporate monitoring costs into the cost modules for the final rule and has done so for the analyses presented in today's document. However, EPA concluded that the estimate used for today's document is conservative (i.e., potentially over-costed) as it applies an annual monitoring cost of $13,400 for all model sites; however, sulfide, tin, and/or lead are not proposed to be regulated in some subcategories (e.g., tin, lead, and sulfide were not proposed to be regulated for railroad line maintenance facilities or shipbuilding dry docks and tin and lead were not proposed for oily wastes facilities). For the final rule, EPA may apply the pollutant-specific additional monitoring costs to facilities in subcategories with proposed limits for tin, sulfide, and lead, as appropriate (e.g., if sulfide is not regulated in the metal-bearing subcategories, no cost for sulfide monitoring will be included at those facilities). EPA currently estimates the pollutant-specific additional annual cost of quick turn-around sample analysis for lead (by graphite furnace) to be approximately $2,500; for tin to be approximately $4,700; and for sulfide to be approximately $6,200 (*see* memorandum entitled, ''Incremental Monitoring and Analytical Costs at MP&M Facilities,'' section 16.6.1 of the public record, DCN 16733 for a discussion on the basis of this cost estimate).

2. Other Costing Changes

As discussed in section III of today's document, EPA is using over 82 new sets of additional data (7 new sets from EPA's sampling program and 75 new sets from industry submitted data) to revise the target effluent concentrations used for the MP&M Cost & Loadings Model. Facilities use target effluent concentrations (or Long Term Averages (LTAs)) for designing a wastewater treatment system. The revised LTAs used in the Cost & Loadings Model for today's document and the methodology to develop those LTAs can be found in a memorandum entitled, ''Cost Model LTA: Cost Model Procedure for Calculation Long Term Averages (LTAs)

for the MP&M Cost Model,'' section 16.5.1, DCN 16742.

In addition, EPA has reviewed the equations used for various pollution prevention cost modules (i.e., paint water curtain, counter-current cascade rinsing, machine coolant recycling) and has made several minor corrections. For example, EPA corrected an error in the equation to calculate labor and electrical costs in the machine coolant recycling cost module.

EPA is also reviewing data received in comments to enhance the pollution prevention cost modules to incorporate reductions associated with the practices of the Pollution Prevention Alternative for metal finishing job shops discussed in the preamble to the proposed rule (66 FR 512). EPA has also prepared a report summarizing the findings of several case studies and information from additional research on pollution prevention in the metal finishing industry. If EPA incorporates the Pollution Prevention Alternative into the final rule, EPA will use the data in this report and the data submitted by commenters to develop more comprehensive pollution prevention cost modules. See section 16.4 of the public record, DCN 16865 for the report entitled, ''Evaluation of the MP&M P2 Alternatives.''

3. Consideration of Additional Treatment to Existing Source BAT (Sand Filter)

EPA is considering the addition of a sand filter to follow the clarifier as BAT treatment technology for metal-bearing subcategories. EPA received many comments that the proposed limits were not consistently achievable by the proposed BAT technology. EPA has addressed this issue in several ways, including the collection of additional data and changes to the statistical methodology used for calculating numerical limits (*see* section VI of today's document for a discussion of revisions to the statistical methodologies). Commenters also suggested the use of a sand filter to further ensure that minor disruptions (or ''burps'') in the treatment system would not result in violation of the limits.

When sampling BAT treatment systems in the MP&M Phase I and Phase II sampling programs, EPA collected data for treatment efficiency of sand filters. EPA found that the concentrations of pollutants of concern exiting the clarifier and entering the sand filter were often below treatable levels or below detection. EPA concluded that this occurred due to the fact that the clarifiers at these facilities were performing exceedingly well. EPA has found that when there are treatable levels of pollutants in the sand filter influent, the sand filter has good treatment efficiency. Therefore, although the addition of a sand filter is not likely to have much effect, if any, on the achievable long-term average effluent concentrations, with the possible exception of total suspended solids, it would ensure consistent effluent quality. If EPA does add a sand filter for the final rule, EPA will also calculate the loadings reduced for both direct and indirect facilities.

EPA notes that such an addition would also increase the compliance cost for the rule. To add a sand filter to the existing treatment train, EPA has developed a cost module for sand filtration. See the Multimedia Filtration Cost Module (DCN 15823) in the public record for detailed information on the sand filtration cost module. EPA has estimated national costs for the proposed Option 2 technology plus the addition of a sand filter for each of the metal-bearing subcategories. In general the cost of the ''Option 2 + Sand Filter'' represents a 32% increase over the revised Option 2 cost presented in section VII.A of today's document (*see* a document entitled, ''Summary of Sand Filter Option Costs,'' in section 6.7.1 of the public record, DCN 15823). EPA solicits comment on the addition of a sand filter to the BAT proposed technology option for metal-bearing subcategories in order to consistently meet the MP&M limits and standards, and on the cost module and national cost estimates.

G. New Survey Weights

EPA has revised the survey weights used to generate national estimates for some Phase I sites used in the Cost & Loadings Model and is considering using these for the final rule. The proposal weights contributed 14,769 Phase 1 facilities to EPA's estimate of the total number of MP&M facilities; in contrast, the revised weights contribute 11,865 to the total. The revised sample weights adjust for additional zero dischargers, remove the overestimate bias for non-zero dischargers, and exclude ineligible facilities. Additional information is provided in DCN 36086, section 19.5 of the public record. The revisions to the Phase I estimates are partly based upon imputed flows. For the final rule, if the imputed flows are substantially different as a result of using the revised imputation strategy described in section III.D, EPA also may decide to revise the sample weights for the Phase I facilities.

IV. Changes Considered to Applicability, Definitions, and Regulated Pollutants

A. Changes Considered to Applicability and Definitions

EPA received comment on several aspects of the applicability of the proposed rule. This section discusses changes EPA is considering for the final rule including: (1) The definition of ''oily operations'' for the Oily Wastes Subcategory; (2) clarification of differences between the General Metals and Oily Wastes subcategories; (3) clarification of applicability language as it pertains to printed wiring board job shops and printed wiring assembly facilities; and (4) clarification to the definition of new sources and the ''grandfather'' clause for facilities currently regulated as new sources under 40 CFR part 433 or 420.

As discussed in section III.A.1 of today's document, EPA is considering revising the applicability of the Oily Wastes Subcategory based on changes to the proposed definition for ''oily operations.'' EPA notes that such a revision would also affect the applicability of the General Metals Subcategory. EPA received comments concerning the definition of ''oily operations'' used in the applicability statement of the Oily Wastes Subcategory. Commenters provided data on several MP&M unit operations which were not part of the ''oily operations'' definition in the proposed rule. The data demonstrate low levels of metals in these unit operations that would not require treatment for metals removal. Based on the data received and a review of other unit operations containing only low concentrations of metals, EPA is currently considering a revision of the definition to read as follows:

> Oily operations means one or more of the following: alkaline cleaning for oil removal, aqueous or solvent degreasing, corrosion preventative coating (as specified in § 438.61(b)); floor cleaning; grinding; heat treating; deformation by impact or pressure; machining; painting (spray or brush); steam cleaning; and testing (such as hydrostatic, dye penetrant, ultrasonic, magnetic flux); iron phosphate conversion coating; abrasive blasting, alkaline treatment without cyanide; assembly/disassembly; tumbling/barrel finishing/mass finishing/vibratory finishing; burnishing; electrical discharge machining; polishing, thermal cutting; washing of final products; welding; wet air pollution control for organic constituents; bilge water; adhesive bonding; and calibration.

EPA notes that iron phosphate conversion coating should be distinguished from zinc, manganese, or nickel phoshate conversion coating based on the constituents of the bath.

Manganese, nickel, or zinc phosphate conversion coating baths contain metals in addition to what may be added from the substrate. EPA solicits comment on the following definition: ''Iron phosphate conversion coating baths consist of a phosphoric acid solution containing no metals. Any metal concentrations in the bath are from the substrate.''

EPA notes that in addition to adding several low metal concentration unit operations to the definition under consideration, the Agency is also considering the removal of ''laundering'' from the definition. EPA does not consider wastewater discharges from laundering (uniforms, etc.) at MP&M facilities to be process wastewater under the MP&M rule. The inclusion of laundering in the proposed definition of oily operations was an oversight which the Agency intends to correct for the final rule.

EPA did not include sampling data from paint stripping and electrolytic cleaning due to the elevated levels of metal constituents from these sources. For this notice, EPA did not include these unit operations in the definition of oily operations. However, EPA solicits comment on whether paint stripping for non-lead based paints should be included in the definition of oily operations. EPA solicits comment on the definition of iron phosphate conversion coating as an oily wastes operation to distinguish it from other phosphate conversion coating operations such as zinc or manganese phosphatizing. EPA also solicits comment on the need for a definition of ''wet air pollution control for organic constituents'' to distinguish it from ''wet air pollution control for metals or fumes or dust.''

EPA is also clarifying the determination for placing a facility in the Oily Wastes or General Metals Subcategory. EPA notes that the determination for the Oily Wastes Subcategory depends on whether the facility discharges wastewater from only those operations considered as ''oily operations,'' as defined above. With the exception of mixed-use facilities, as proposed, a MP&M facility would fall under only one subcategory. If a facility is discharging wastewater from only ''oily operations,'' as defined above, then it would be in the Oily Wastes Subcategory. If a facility is discharging wastewater from oily operations and other MP&M operations, it would not be covered in the Oily Wastes Subcategory. If this facility is not a printed wiring board facility, metal finishing job shop, non-chromium anodizer, or steel forming & finishing facility, then it would be regulated under the General Metals Subcategory. If a facility was discharging wastewater from oily operations and performed, but did not discharge wastewater from, other MP&M operations, it would still be considered in the Oily Wastes Subcategory.

EPA received comment requesting clarification of whether or not wastewaters from MP&M-like operations, such as gravure cylinder and metallic platemaking, conducted within or for printing and publishing facilities were covered by the MP&M regulation. EPA excluded such facilities from the Electroplating (40 CFR 413.01(c)) and Metal Finishing (40 CFR 433.10(c)(1)) effluent guidelines. However, in the proposed MP&M rule, EPA did not discuss the applicability to these facilities. EPA did not include these facilities in the data collection efforts for the proposed regulation, and therefore, EPA's current intent is that the final rule would not apply to these facilities.

As discussed in section III.A of today's document, EPA has made some revision to the subcategorization of certain facilities. As discussed, EPA received comments that indicated that PWB job shops are more similar to PWB facilities than metal finishing shops and are therefore not properly categorized with the Metal Finishing Job Shops Subcategory. EPA also reviewed the operations of Printed Wiring Assembly facilities to determine whether it properly categorized these for proposal. As a result, EPA is considering a number of changes for the final rule in the categorization of such facilities. EPA's rationale for these changes is discussed in further detail in section III.A. EPA would place printed wiring board job shops in the Printed Wiring Board Subcategory instead of the Metal Finishing Job Shops Subcategory and would place printed wiring assembly facilities in the General Metals Subcategory.

EPA solicits comment on these intended revisions and whether or not EPA should include a definition to identify printed wiring assembly facilities in the General Metals Subcategory applicability statement. Commenters have suggested the following definition for Printed Wiring Assembly or Electronic Manufacturing Services facilities in the General Metals Subcategory:

> Contract electronics design and assembly, also known as electronics manufacturing service (EMS) facilities provide some or all of the following services: electronics design, electronics assembly, electronics testing, and product assembly for other company's electronics products. Electronics assembly is the practice of building up the electronic product by inserting electronic components onto/into a bare circuit board, soldering the components to the board, and in some cases applying a conformal coating and/or cleaning the completed assembly. Other manufacturing functions include testing, ''burn-in'' of the components, and box build. Bare boards are, along with electronics components, an input to the assembly process. The manufacture of bare circuit boards is not part of the assembly or EMS process.

As described in the proposed MP&M rule (66 FR 506), both indirect and direct dischargers would be ''new source'' under the new rule if construction commences following 60 days after publication of the final rule. EPA recognizes that, for indirect dischargers, this may be different from what was done in past effluent guidelines, where the proposal date was used to determine a new source.

In addition, EPA received comments regarding the confusion of the ''grandfather'' clause for facilities that are currently subject to new sources limitations and pretreatment standards under either 40 CFR part 433 or 40 CFR part 420. EPA included language in the proposal to provide a protection period for facilities currently subject to ''new source'' regulation. This language may be found in the codified portion of the proposal under the NSPS and PSNS (new source) sections for the General Metals, Metal Finishing Job Shop, Non-Chromium Anodizing, Printed Wiring Board, and Steel Forming & Finishing subcategories. EPA's intent was to include language to protect facilities that are currently regulated as new sources under other regulations from a requirement to comply with the Metal Products and Machinery limitations and standards for a period not greater than 10 years from the date of completion of the new source construction. Section 306(d) of the CWA provides that any point source which is constructed to meet new source performance standards shall not be subject to any more stringent standards of performance during a 10-year period beginning on the date of completion of such construction or another statutorily defined period whichever ends first. 33 U.S.C. 1316(d).

At the suggestion of some commenters, EPA is considering moving the grandfathering language it had proposed to the existing source provisions (BPT, BAT, PSES) of each relevant subcategory for the final rule. For example in the General Metals Subcategory proposed §§ 438.12 (BPT) and 438.14 (BAT) this change could appear as follows:

> (d) If a point source meets the applicability criteria in § 438.10, and construction was

commenced on that point source after [insert date 10 years prior to the date that is 60 days after the publication date of the final rule] but before [insert date that is 60 days after the publication date of the final rule], and it was subject to the provisions of 40 CFR 433.16, then the point source must continue to achieve the applicable standards specified in 40 CFR 433.16 until the expiration of the applicable time period specified in 40 CFR 122.29(d)(1). Thereafter, the source must achieve the applicable standards specified in this section.

Section 438.15 would be amended to add paragraph (e) as follows:

(e) If a source meets the applicability criteria in section 438.10, and construction was commenced on that source after [insert date 10 years prior to the date that is 60 days after the publication date of the final rule] but before [insert date that is 60 days after the publication date of the final rule], and it was subject to the provisions of 40 CFR 433.17, then the source must continue to achieve the applicable standards specified in 40 CFR 433.17 for ten years beginning on the date the source commenced discharge, or for the period of depreciation or amortization of the facility for the purposes of section 167 or 169 (or both) of the Internal Revenue Code, whichever is shorter. Thereafter, the source must achieve the applicable standards specified in this section.

Sections 438.16 (NSPS) and 438.17 (PSNS) would be amended by removing paragraph (a) and renumbering the remaining paragraphs. If EPA were to make this change for the final rule, it would make the appropriate changes for all effected subcategories. Finally, EPA has received comment regarding the transfer of certain operations from the existing Iron & Steel effluent guidelines (40 CFR part 420) to the proposed MP&M effluent guidelines. In the proposed MP&M rule, EPA refers to facilities with these operations as the Steel Forming & Finishing Subcategory. Specifically, EPA proposed to move the following operations from Iron & Steel to MP&M: surface finishing or cold forming of steel bar, rod, wire, pipe or tube; batch electroplating on steel; continuous electroplating or hot dip coating of long steel products (*e.g.* wire, rod, bar); batch hot dip coating of steel; and steel wire drawing. These operations produce finished products such as bars, wire, pipe and tubes, nails, chain link fencing, and steel rope. The Agency proposed to move these operations into the MP&M rule from stand-alone facilities, as well as from facilities that also have other operations that are currently regulated by the Iron & Steel effluent guidelines (i.e., facilities that are making steel and producing wire and wire products and are subject to both ELGs and the combined wastestream formula).

Since proposal, EPA revisited the record of the representative iron and steel finishing operations and compared the associated wastewater characteristics to those from the wire drawing facilities that were sampled under the MP&M rulemaking effort. EPA confirmed that the wastewater characteristics of the proposed transferred operations more closely resemble those from MP&M operations than those from representative iron and steel finishing operations. For instance, the average lead and zinc concentrations in wastewaters from the transferred wire drawing facilities are one to three orders of magnitude higher than those from representative iron and steel facilities. On the other hand, the concentrations for these pollutants are within the range of pollutant concentrations found in similar MP&M operations. Furthermore, most of the unit operations present in facilities being considered for transfer are the same as those found in the MP&M facilities, while only approximately 30% of these operations are the same as those found in the iron and steel facilities. EPA performed a comparison of flow rates between the transferred facilities and the proposed iron and steel finishing subcategory. The average flow rate from the proposed Iron & Steel Finishing subcategory is approximately half billion gallons per year, while the average flow rate from the transferred facilities is less than 30 million gallons per year (*see* Iron & Steel ELG record, Docket Number W–00–25, section 14.2, DCN #IS10740). EPA also notes that the average flow rate from the General Metals Subcategory of the MP&M rule is of the same order of magnitude as that from the transferred facilities. As a result of the above evaluations, EPA continues to conclude that the transferred operations would be more appropriately regulated under part 438, the MP&M effluent limitations guidelines and standards, in the Steel Forming & Finishing Subcategory. If EPA finalizes limitations and standards for the Steel Forming and Finishing subcategory of the MP&M regulation, EPA will also amend the applicability section of the iron and steel rulemaking to reflect this change. Until then, these operations continue to be regulated under part 420.

EPA also proposed moving certain electroplating operations currently subject to the Metal Finishing part 433 effluent limitations guidelines and standards into the revised part 420. Commenters on the Iron & Steel proposed rule strongly opposed the incorporation of the continuous electroplating of flat steel products (*e.g.,* sheet, strip, plate) into part 420, indicating the preference for electroplating operations of all types to be considered as a whole (*e.g.,* under the part 433 regulations or eventually the MP&M regulations). EPA proposed to regulate similar operations in the MP&M proposal in a number of subcategories. EPA decided not to include wastewater discharges from continuous electroplating of flat steel products in the final Iron & Steel regulations (signed on April 30, 2002). Wastewater discharges from these operations are currently subject to part 433 and EPA's present intention would be to include these in the Steel Forming & Finishing Subcategory of the final MP&M regulations. EPA will include these facilities in its analyses for the final rule. All non-confidential items pertaining to these facilities can be found in the public record for this document.

B. Changes Considered to the Pollutants Selected for Regulation

EPA received comments on several of the pollutants that were selected for regulation in the proposed rule. Based on new data from industry sources and EPA's data collection effort, EPA is considering whether to revise the list of pollutants selected for regulation. For example, EPA has also collected analytical data specific to the Steel Forming & Finishing Subcategory after proposal and is including this data in its analyses and in the MP&M rulemaking record.

1. Tin

EPA received comments regarding EPA's selection of tin as a regulated pollutant for metal-bearing subcategories. Many of the comments revolved around whether or not tin can be precipitated using EPA's proposed BAT technology that includes hydroxide precipitation. Of the 25 sites having tin data, 20 show tin removals greater than or equal to 95 percent. EPA's sampling data show a median removal of tin in BAT treatment systems of 98.6 percent. Analysis of the treatment systems employed by these sites shows that all but two use chemical precipitation followed by solids removal with either a clarifier or membrane filter. The two sites not using chemical precipitation list ultrafiltration, presumably for removal of oil and suspended solids, as their treatment technology.

Unlike other priority pollutant metals, tin does not readily form insoluble metal hydroxides in the chemical precipitation process. Based on information provided in the CRC

Handbook of Chemistry and Physics (68th Edition), there are two possible insoluble forms of tin that are produced during treatment of MP&M wastewater: tin sulfide (SnS) and tin phosphate ($Sn_3(PO_4)_2$). The CRC lists the solubility of tin sulfide at 0.02 mg/L. The CRC lists tin phosphate as insoluble, but provides no maximum concentration. According to another reference (Freeman, H.M., ''Standard Handbook of Hazardous Waste Treatment and Disposal, 1989), tin in metal-bearing wastewater is often found complexed with other constituents such as chelating agents present in electroless plating wastewater or cleaning solutions. Removal of the tin complex requires pH adjustment to break the tin-chelant bond followed by the reduction of tin to its elemental form.

Based on the information provided in the literature and gathered from the MP&M sampling episodes, no conclusions can be drawn regarding the excellent tin removals by the chemical precipitation systems sampled by EPA. The mechanism of tin removal is likely dependant on the chemistry of the influent wastewater, and involves a combination of sulfide precipitation, phosphate precipitation, and co-precipitation with other metals such as iron. EPA currently intends to retain tin as a regulated pollutant. EPA will reevaluate this intention if additional data received in comment indicates chemical precipitation followed by gravity settling will not meet the proposed effluent limit.

2. Total Sulfide

EPA also received many comments on its proposal to regulate total sulfide for many of the proposed subcategories. Commenters in the metal-bearing subcategories (i.e., general metals, metal finishing job shops, printed wiring boards, steel forming & finishing, and non-chromium anodizing) were concerned that regulation of sulfide would limit their ability to use sulfide-based chemistries in their treatment systems. Commenters pointed to other chemicals that EPA chose to not regulate based on their use as treatment chemicals (*e.g.,* aluminum, iron, calcium, magnesium, sodium, sulfate, chloride, ziram). Based on its use as a treatment chemical in the metal-bearing subcategories EPA intends to not regulate total sulfide for the metal-bearing subcategories in the final rule. EPA solicits comment on this change.

3. Molybdenum

EPA received comments regarding the selection of molybdenum as a regulated pollutant. Similar to the comments on tin, the comments revolved around whether or not molybdenum can be precipitated using hydroxide precipitation as is used in EPA's proposed BAT technology. EPA has reviewed literature to find out whether or not molybdenum will precipitate using either hydroxide or sulfide precipitation. and has found that molybdenum does not form metal hydroxide precipitates (*see* memorandum titled ''Molybdenum,'' section 16.2, DCN 17754). Molybdenum was observed at detectable concentrations in 283 of 1306 treatment system samples representing all 111 sampling episodes. The molybdenum raw waste concentrations ranged from 0.0007 to 40.3 mg/l. Effluent concentrations ranged from 0.0007 to 3.22 mg/L. Treatment effectiveness calculations of the chemical precipitation systems ranged from a negative 249% to a positive 71% removals (*see* memorandum titled ''Molybdenum,'' section 16.2, DCN 17754).

The sampled hydroxide precipitation treatment systems did not show a consistent ability to remove molybdenum from waste water. Molybdenum is, however, present is waste waters as described above and is removed incidentally in waste treatment systems. These removals may occur when molybdenum adheres to oily wastewaters that are removed in the oil water separation step or other treatment steps such as flocculation. EPA is reviewing these removal mechanisms for molybdenum. In addition to EPA's sampling data, airline industry submitted data demonstrates removals of molybdenum from BAT treatment systems with supplementary chemical additives between a negative 4% to a positive 85%. Therefore, EPA has included molybdenum removals in its estimates of pollutant reduction for the MP&M NODA. However, based on its inability to be treated by EPA's proposed hydroxide chemical precipitation technology, EPA is considering not regulating molybdenum in the final rule. EPA solicits comment on this change.

4. Steel Forming & Finishing Subcategory

As discussed in section II of today's document, EPA did not sample any BAT Steel Forming & Finishing facilities prior to proposal and solicited data from such facilities. Based on post-proposal sampling data collected for the Steel Forming & Finishing (SFF) Subcategory, EPA is considering the following pollutants for regulation of direct dischargers for this subcategory: chromium, copper, lead, nickel, zinc, manganese, molybdenum, tin, oil and grease (as HEM), and total suspended solids. EPA is considering the same pollutants as above for indirect dischargers except for oil and grease (as HEM) and total suspended solids. At proposal, EPA based the selection of pollutants for regulation for this subcategory on data transfers from the General Metals Subcategory. Of the pollutants proposed for regulation for the Steel Forming & Finishing Subcategory, EPA is considering to no longer regulate cadmium, cyanide, silver, total sulfide, organics (*e.g.,* TOP, TOC) as these pollutants are not found in SFF wastewater at treatable levels.

V. New Information and Consideration of Revision to Economic & Benefit Methodologies

A. Revised Cost Pass-Through and Market Structure Analysis

As discussed in Chapter 5 of the document titled, ''Economic, Environmental, and Benefits Analysis for the Proposed Metal Products & Machinery Rule,'' (EEBA) (EPA–821–B–00–008), and in response to comments received on the proposal economic impact analysis, EPA revised the analysis of cost pass-through potential for the 19 MP&M sectors. This analysis estimates how much of compliance-related cost increases a sector can be expected to pass on to its customers in higher prices. The analysis consists of two parts:

- An econometric analysis of the historical relationship of output prices to changes in input costs, and
- An analysis of market structure characteristics.

These two analyses together provide a cost pass-through coefficient for each sector. This analysis refines the methodology developed for the Phase 1 and proposal MP&M analyses in several places, and updates the data used through 1996, the base year of the regulatory analyses. Changes to reporting by NAICS codes for the Census economic data but not for price indices in 1997 prevented use of later years' data in this analysis. Today's document provides a summary of the revised analysis. More complete documentation is provided in section 17.2.1, DCN 35250, of the public record.

1. Econometric Analysis

EPA performed an econometric analysis of input costs and output prices to estimate cost pass-through elasticities for 18 of the 19 Phase I and Phase II MP&M Sectors. These elasticities indicate the changes in output prices by

sector that have occurred historically in relation to changes in the cost of production inputs.

EPA estimated the cost elasticity of price by regressing annual output price indices on annual input price indices. Use of historical data took into account the full range of possible mechanisms by which input costs affect output prices, including technical changes, substitution, non-competitive pricing mechanisms, imperfect information, and any other shifts or irregularities in the supply and demand functions.

The 19 MP&M industry sectors encompass 224 different SIC codes. EPA was able to estimate the cost elasticity of price based on historical data for only 170 manufacturing SIC codes. EPA could not estimate the cost elasticity of price for Aerospace and all non-manufacturing industries due to data limitations. The Agency assigned a cost pass-through coefficient to the aerospace sector based on the market structure analysis. EPA assumed zero cost pass-through for non-manufacturing industries because these industries tend to be more competitive due to lower entry barriers than in manufacturing industries.

The estimated parameters show that 16 of the 18 MP&M industrial sectors have been able to increase selling prices between 0.39 percent and 1.2 percent for every one percent increase in input costs. This means that some industrial sectors exhibit a potential for recovering only a fraction of the input price increase through an increase in the output price while other sectors have the ability to raise their output prices in excess of input price increases. The estimated input cost coefficients are negative for two industrial sectors: Printed Circuit Boards and Office Machines. In both of these sectors, output prices decreased as input costs increased. This negative relationship indicates that significant competition in these sectors combined with technological innovation have yielded market conditions with declining output prices regardless of the change in production input costs. Based on these findings, EPA assumes that the Printed Wiring Board and Office Machine sectors have zero cost pass-through ability. Estimated regression coefficients for the 18 industrial sectors are presented in section 17.2.1, DCN 35250, of the public record.

EPA assigned MP&M sectors to low, average, and high cost pass-through categories based on the results of the regression analysis. EPA then compared the classifications with the results of the market structure model.

2. Market Structure Analysis

EPA assessed the market structure characteristics of each MP&M sector, in order to validate the values for cost pass-through potential estimated in the regression analysis. How much of a cost increase a firm can pass on through higher prices depends on the relative market power of the firm and its customers. The market structure analysis assesses the relative market power enjoyed by firms in each MP&M sector and provides ordinal rankings that were used to validate the cost pass-through coefficients estimated by the econometric analysis. EPA analyzed five indicators of market power: concentration, import competition, export competition, long term growth, and barriers to entry and exit. Section 17.2.1, DCN 35250, of the public record provides detailed descriptions of the rationale for using these measures and the metrics and data sources EPA used to evaluate each measure. EPA only considered manufacturing firms; it excluded non-manufacturing firms due to data limitations. As noted above, EPA assigned zero cost pass-through ability to non-manufacturing firms.

EPA again assigned each sector to high, medium and low cost pass-through categories based on the results of the market structure analysis, and compared the results of this classification with the classification based on the regression analysis.

The two analyses classified 13 of the 19 sectors in the same cost pass-through (CPT) category (high, medium or low). For these sectors, the market structure analysis appears to validate the cost pass-through coefficient derived using the econometric analysis. No econometric estimate is available for the aerospace sector. EPA categorized this sector in the high CPT category based on the market structure analysis only and estimated its cost pass-through coefficient as the average CPT value for all sectors classified in the high category based on the regression analysis (excluding Mobile Industrial Equipment whose CPT coefficient was also revised based on the market structure analysis). For the remaining five sectors; however, the two analyses assign sectors to different cost pass-through categories. EPA undertook a more detailed analysis of these sectors' market structures to validate their cost pass-through coefficient. EPA based the choice of a cost pass-through coefficient for this document on this more detailed analysis for the following sectors: Job Shops, Other Metal Products, Aircraft, Motor Vehicle, and Mobile Industrial Equipment. In 4 cases (Job Shops, Other Metal Products, Motor Vehicle, and Aircraft), the more detailed market structure analysis confirmed the regression estimates of the econometric analysis, and in one case (Mobile Industrial Equipment) EPA rejected the classification based on the econometric analysis.

EPA assigned the Mobile Industrial Equipment sector to the high category by the econometric analysis and the average category by the market structure analysis. EPA concluded that this sector is more appropriately characterized by average cost pass-through because the sector has witnessed trends in recent years suggesting that firms in this sector lack strong ability to pass through cost increases. Specifically, growth rates in the construction industry and in the farm and machinery equipment industries began leveling or even declining in recent years after a sustained period of growth. These declining trends are not fully represented in the regression analysis because the last year of data for the analysis is 1996. EPA therefore revised the cost pass-through coefficient for this sector to equal the average cost pass-through value for all sectors classified in the average category based on the regression analysis.

Section 17.2.1, DCN 35250, of the public record provides the choice of a cost pass-through coefficient for this document selected for each sector. The specific values selected for each sector (high, average and low) are the regression elasticities for the 17 sectors where the regression results were confirmed by the market structure analysis (including the detailed analysis), and the average of the regression coefficients in the appropriate category (high, average or low) for the sector that was re-classified based on the market structure analysis (Mobile Industrial Equipment) and for Aerospace. The revised cost pass-through analysis resulted in a significantly lower cost pass-through coefficient of 0.57 for Job Shops than was used in the proposed rule analysis, and zero cost pass-through for Printed Wiring Boards, Office Machines, and all non-manufacturing facilities. In the analysis for proposal, EPA assumed that non-manufacturing facilities in a given sector had the same cost pass-through potential as manufacturing facilities in the same sector.

The estimated cost pass-through coefficients reflect sector-level cost pass-through potential. Cost increases that affect all facilities in an industry are more likely to be recovered through industry-wide price increases, whereas cases where only some facilities in an

industry incur cost increases are less likely to result in price increases. To account for the likelihood that cost pass-through ability will vary with the extent to which regulation-induced cost increases apply generally over production in a sector, the analysis adjusts the estimated cost pass-through potential for the estimated extent of industry coverage. Specifically, the analysis adjusts the cost pass-through potential by multiplying the estimated sector-wide cost pass-through coefficient by the fraction of a sector's production value that is expected to incur compliance costs.

Findings from the revised cost pass-through analysis in general are consistent with findings from the cost pass-through analysis reported by the industry associations, including Printed Wiring Board and Metal Finishers. Specifically, facilities belonging to the Printed Wiring Board subcategory were found to have zero cost pass-through potential. The Metal Finishing Job Shops Subcategory was found to have a low cost pass-through potential. EPA estimated new cost pass-through coefficients and adjusted them by the fraction of the sector's production value that is expected to incur compliance costs. The effect of these two changes decreased the cost pass-through coefficient assigned to the Job Shop subcategory from 0.91 at proposal to 0.25.

The estimated cost pass-through coefficients reflect industry-wide cost pass-through potential. Under conditions of perfect competition—including product homogeneity (i.e., products produced by one firm are perfect substitutes for products produced by other firms), and homogeneity of production technology and cost across firms—the price response to a general industry-wide change in production costs is likely to be industry-wide and similar across all firms. However, for a number of reasons, markets in modern manufacturing industry generally diverge to some degree from these perfect competition conditions. Example reasons include: variation in product quality; imperfectly competitive markets (*e.g.,* markets in which individual firms possess different degrees of market power); and segmented markets (*e.g.,* geographically segmented markets). In the presence of such imperfections, individual firms will very likely respond differently in their ability to pass on cost increases in higher output prices even when the production cost increase applies to all, or a substantial fraction, of an industry's production. To assess the sensitivity of the economic impact analysis results to the sector-wide cost pass-through estimates, EPA also conducted the economic impact analysis based on the assumption that no cost increases can be recovered through price increases. The Agency found that results for 17 of the 19 MP&M industrial sectors do not significantly vary when the zero cost pass-through assumption is used instead of the estimated cost pass-through capabilities. The only exceptions are the Metal Finishing Job Shop and Iron and Steel sectors. Assuming a zero cost pass-through coefficient for these sectors resulted in an increase in the number of severe impacts from 520 to 565 and 17 to 21, respectively, under the NODA option with methodology changes. Detailed results using zero cost pass-through assumption can be found in section 17.1.5, DCN 35060, of the public record. EPA solicits comment on these changes to the methodology for cost pass-through.

B. Consideration of Changes to Closure and Financial Stress Test Methodologies

1. Sector-Specific Thresholds for Evaluating Moderate Impacts

For the proposed rule analysis, EPA evaluated moderate impacts based on two measures of financial health: pre-tax return on assets (PTRA) and the interest coverage ratio (ICR). PTRA is a measure of profitability and measures the firm's ability to provide returns adequate to attract external capital or to justify reinvestment of the firm's own resources. ICR is a measure of the firm's ability to pay fixed interest costs, and affects the firm's ability to obtain debt financing. EPA used a single threshold for each measure (8 percent for PTRA and 4 for the ICR) to determine when a firm might experience financial stress in the proposed rule analysis. Commenters questioned this approach because a single threshold measure does not account for differences in the rates of return required to attract investment in different industries. For the final rule analysis, EPA is considering using sector-specific thresholds for these measures. Use of thresholds specific to each sector will account for industry differences in the factors that contribute to financial distress, such as the volatility of their earnings, and will improve the reliability of the analysis. For the analyses presented in section VII.A.3 of today's document, EPA has incorporated these changes into the methodology.

Risk Management Associates (RMA, formerly Robert Morris Associates) provides information on the distribution of selected financial ratios for specific industries, defined by SIC codes. The RMA data come from credit data submitted by RMA-member lending institutions. As a result, the RMA data may not include the most vulnerable firms in each industry, which are unlikely to be applying for loans. EPA used as a threshold the lowest fourth-quartile value for two financial indicators: (1) Pre-tax return on sales (PTRS) and (2) interest coverage ratio. EPA substituted PTRS for the pre-tax return on assets ratio used in the analysis for the proposed rule. In theory, return on assets is a more appropriate measure of financial performance as viewed by investors. RMA notes, however, that firms with heavily depreciated plant, large intangible assets, and unusual income or expense items can lead to distortions in the return-on-asset ratios. While the return-on-sales ratio can also be distorted by unusual income or expense items, it is not subject to distortions based on reported assets. EPA therefore chose the sales-based ratio as a more reliable comparison of financial performance within sectors. The twenty-fifth percentile is the value below which the lowest quarter of firms in each industry fall. It is important to note that these thresholds may indicate financial distress, but are not a reliable measure of potential closure. A quarter of the firms in each industry report values below the thresholds, many of which may continue to operate comfortably with those financial characteristics. The thresholds used are likely to overstate moderate impacts for the following reasons: (1) The RMA database may not include the most vulnerable firms in each industry; and (2) having values in the lowest fourth quartile may be adequate to support continued trouble-free operation for some firms.

EPA developed thresholds by weighting the RMA lowest quartile value for each SIC in a sector by the 1997 value of shipments for that SIC relative to the total 1997 sector value of shipments. The calculations were done separately for manufacturing and non-manufacturing SICs in those sectors that have both. The thresholds were weighted using 1997 value of shipments because data are available from the Census for all SICs for that year, while data for between-Census years are only reported for manufacturing SICs. EPA assumed that the value of shipment weights for 1997 would be similar to the weights for 1996, if 1996 value of shipments data were available for all SICs. The PTRS and ICR sector-specific thresholds can be found in section 17.5.1, DCN 35450, of the public record.

2. Use of Single Net Present Value Test To Assess Potential for Closures

For the proposed rule analysis, EPA estimated the potential for facility closures due to the regulation using two tests: negative Net Present Value (NPV) (based on going concern value minus liquidation value) for facilities that provided information on liquidation values (most Phase I facilities and Phase II facilities with flows greater than 1 million gallons per year), and negative After-Tax Cash Flow (ATCF). Facilities that failed both tests under baseline or post-compliance conditions are baseline or post-compliance closures, respectively. For facilities that did not provide liquidation values, EPA used only the ATCF test. Commenters questioned this use of a two-test approach for estimating closures in facilities for which it can be done both ways. For the final rule, EPA is considering using a single test for closures, based on the NPV of the facility.

NPV including liquidation values is conceptually an appropriate measure of long-term viability, for two reasons. First, a firm can have positive cash flow but still not be making a return sufficient to retain investment over time. The net present value test takes into account the return required for a facility to continue to attract sufficient investment to continue operating. Second, a firm's decision to close a facility can be influenced by the extent to which the facility's assets can be sold or put to other uses. In addition, firms consider the direct costs of closing the facility, which may include the costs of cleaning up contaminated sites, state requirements to treat contaminated sediments, legal fees, lease obligations, employee termination costs, and the like, when deciding whether to close a site. Both industry- and site-specific factors influence the value of a site's assets for other uses, including the transferability of fixed assets to other uses and current market demand for products in inventory.

Where estimates of liquidation value are available the most reasonable way to assess the potential for site closures is to compare the value of the site if it continues to operate (the net present value of the business as a ''going-concern'') with its value if it is closed (the liquidation value.) Net liquidation values (proceeds from closing less the costs of closing) can be either positive or negative. Facilities will be more likely to close, other things being equal, the higher their liquidation values and the lower their post-closure costs.

EPA requested information on site liquidation values in its Phase 2 economic surveys. Of the 938 sample MP&M facilities, 219 provided liquidation values in the survey. EPA attempted to estimate liquidation values where they were not reported but concluded that predicting liquidation values based on the facility-specific information provided by the surveys would add substantial uncertainty to the analysis. Estimates of liquidation value are available only for 23 percent of the sample facilities. Given EPA's belief that liquidation value estimates are substantially speculative and subject to considerable error, EPA intends for the final rule analysis, to calculate net present value based solely on the facility's value as a going concern and to not account for liquidation value as part of the net present value test. The Agency recognizes that assessing closures based only on going concern value may overstate the likelihood of closure where liquidation value is negative and understate the likelihood of closure where liquidation value is positive. EPA seeks comment on this approach. Analyses presented in section VII.A.3 of today's document include the use of a single test based on NPV excluding consideration of liquidation values.

To assess the sensitivity of the economic impact analysis results to the inclusion or exclusion of liquidation values, EPA also conducted its analysis including liquidation values in the NPV test for facilities that reported liquidation values. The Agency found that including liquidation values in the NPV test resulted in a decrease in the number of severe impacts for the Metal Finishing Job Shop, General Metals, and Oily Wastes subcategories from 520 to 348 and from 111 to 96 and from 1 to none, respectively. On the other hand, including liquidation values in the NPV test resulted in an increase in the number of severe impacts in the Printed Wiring Board subcategory from 55 to 83 under the NODA option. Other subcategories were not sensitive to inclusion of liquidation values in the NPV test. Detailed results using available liquidation values can be found in section 17.1.3, DCN 35050, of the public record.

3. Evaluation of Altman Z' as an Alternative Test for Moderate Impacts

Based on comments received, EPA is evaluating use of the Altman Z' test as an alternative to the PTRA and ICR tests for moderate impacts for the final rule. This test has been used in other ELGs, and it is commonly used as a predictor of bankruptcies. The Altman Z' test predicts firm bankruptcies based on a weighted set of firm financial ratios. The ratios and weights were developed in a multiple discriminant analysis of 33 publicly-traded firms that declared bankruptcy between 1945 and 1965 and another 33 non-bankrupt publicly-traded firms. The original model was later re-estimated to allow its use for privately-held firms, although the analysis was based on the same sample firms and financial data. The resulting model calculates a ''Z'' score as a combination of five financial ratios: working capital/total assets, retained earnings/total assets, earnings before interest and taxes (EBIT)/total assets, book value of net worth/total liabilities, and sales/total assets. ''Z'' scores of less than 1.23 indicate high potential for bankruptcy, scores above 2.90 indicate low potential for bankruptcy, and scores in between are indeterminate.

C. Consideration of Changes to Cash Flow Calculations

EPA received a number of comments on the calculation of cash flows used to assess the potential for closures and moderate impacts as a result of the rule. EPA is considering a number of changes to the calculation of cash flow to address these comments. These include incorporating a measure of normal capital outlays in baseline cash flow, limiting the recognition of tax shields associated with compliance costs, updating survey financial data to current dollars using sector-specific price indices, and adjusting the methods used to recognize the cost of financing compliance capital costs. EPA solicits comment on these issues.

1. Baseline Capital Outlays

Commenters expressed the view that EPA's economic impact analyses should take account of MP&M firms' regular need to replace and update their pollution control and other capital equipment. The commenters suggested using accounting depreciation data provided in the MP&M surveys as a proxy to include these expenditures in estimated cash flows.

EPA recognizes that cash outlays for capital replacement and additions are required for a firm to remain in business, and should be reflected in the cash flows used to assess economic impacts. However, the Agency does not conclude that accounting depreciation provides a reliable proxy for these continuing capital expenditures. Reported depreciation is a periodic accounting charge for capital assets acquired in the past, and may be either larger or smaller than annual future capital expenditures for several reasons.

Depreciation is based on historical cost, which may not equal the replacement cost of capital assets. In addition, reported depreciation is based on various accounting and tax reporting conventions that may bear little resemblance to the actual economic life and consumption of capital assets. Finally, a firm's capital outlay decisions are influenced by the quality of its investment opportunities, the financial health of the enterprise, and by general business conditions, which vary over time.

As an alternative approach, EPA developed a regression model of capital outlays that relates capital expenditures to a firm's financial characteristics and the general business environment. Specifically, the model relates a firm's historical capital expenditures to: firm-specific revenues, capital turnover rate, and capital intensity; capacity utilization in the relevant industry; and the economy-wide cost of debt capital and rate of change in the price of capital goods. This model can be used to estimate baseline continuing capital outlays for each MP&M facility, which can then be included in the discounted cash flow analyses used to assess facility economic impacts. EPA's goal is to estimate baseline cash flow for the business as it is (under steady-state conditions). EPA therefore estimated the model using data for a 10-year period that reflected a range of economic conditions. The Agency would use the estimated model in conjunction with MP&M facility characteristics and indicators of the general business environment for the relevant years to estimate facility capital expenditures. The analyses presented in section VII.A.3 of today's document include baseline capital outlays based on the regression model discussed above.

EPA seeks comment on the regression model and its use to calculate baseline capital expenditures. The regression model is described in detail in section 17.3.1, DCN 35350, of the public record.

2. Consideration of Tax Effects

Compliance costs are tax deductible for income tax purposes. Firms incurring these costs will therefore pay fewer taxes than they otherwise would pay, which partially offsets the negative impact of the compliance costs on firms' income. The proposed rule analysis assumed that firms would benefit by the full amount of tax shields on compliance costs, based on a standard assumed 34 percent marginal tax rate. Some commenters expressed concerns about MP&M firms' ability to make use of the full tax shield from compliance costs. In particular, firms may not be paying sufficient taxes in the baseline to take advantage of the tax shields in the year compliance costs are incurred. Some firms with lower net income may also be paying less than the assumed 34 percent marginal tax rate. While firms may be able to carry forward losses to reduce taxes in later years, EPA recognizes that the methods used in the proposed rule analysis to calculate tax benefits may overstate those benefits in some cases. This is more likely to be true for single-facility firms, whereas parent companies with multiple facilities might take current advantage of tax benefits from losses at individual facilities.

To address this issue, EPA is considering limiting the calculation of tax shields to no greater than the amount of tax paid by facilities in the baseline. For the purposes of the analyses presented in today's document, EPA has incorporated this change in methodology. As a result, the analysis assumes that facilities will not be able to offset an implicit negative tax liability against positive tax liability elsewhere in the firm's operations or to carry forward (or back) the negative income and its implicit negative tax liability to other positive income/positive tax liability operating periods. On average, this approach will overstate impacts on facilities, because some MP&M firms may be able to use tax shields that exceed baseline taxes at the affected facility, especially if the facility is owned by a multiple-site firm. EPA is also considering applying this limitation on tax benefits only to single-facility MP&M firms. The Agency seeks comments on this issue.

D. Updating Survey Data to Current Dollars

For the proposed rule analysis, EPA used the Producers Price Index (PPI) for all industrial goods to update Phase II MP&M survey data to 1996 values. Since that analysis was completed, EPA has compiled sector-specific PPI values and intends to use these values to update the survey data for the final rule analysis. The analyses presented in section VII.A.3 of today's document include the use of sector-specific price indexes. Detailed information on the methods used to calculated sector-specific PPIs and the results are provided in section 17.5.2, DCN 35460, of the public record.

E. Adjusting Abnormally High Labor Cost Estimates

Since proposal EPA found that the per-employee labor costs for certain privately held facilities are materially higher than the average over all facilities in the same subcategory. Labor costs for these facilities thus appear to be overstated and include ''excess owner compensation'' that, under a more precise accounting regime, would be recorded as facility profit. Including the excess owner compensation in the labor cost account reduces the apparent profitability of these facilities and increases the likelihood that they will fail the post-compliance closure test (if they passed the baseline closure test). To illustrate, one facility, a Job Shop, reported per employee labor cost of $71,000 that is nearly triple the average of other facilities in this industrial sector and its labor costs as a percent of reported total operating costs are also extremely high. This per-employee level of labor costs indicates that the owner of the facility may have reported the business' net income in compensation expense (i.e., as compensation to the owner that exceeds the fair market value of management services) instead of facility profit.

The Agency found that about two percent of the sample facilities report abnormally high labor costs. To estimate more accurately the profits for facilities that appear to overstate their labor cost, the Agency is considering adjusting reported facility labor costs based on Economic Census data. This adjustment involves the following steps. First, the Agency estimated average per-employee labor cost by establishment size for the MP&M sectors based on Economic Census data. Second, EPA identified facilities reporting per employee labor costs in excess of 1.5 times the average per employee labor cost, estimated for facilities in that sector and of that establishment size. For facilities with per-employee costs exceeding the 1.5-multiple-of-average threshold, the Agency revised the calculation of facility net present value based on the adjusted labor costs and used the revised facility value in the facility closure test. For the analyses presented in section VII.A.3 of today's document, EPA has incorporated these changes into the methodology. Section 17.5.3, DCN 35470, of the public record summarizes average per employee labor cost by establishment size for the MP&M sectors based on Economic Census data. EPA solicits comment on this approach and on the extent to which ''excess owner compensation'' occurs within various MP&M sectors.

F. New Information on POTW Administrative Costs

EPA received comments regarding the use of EPA's 1997 POTW survey. Commenters stated that EPA underestimated the administration costs

to POTWs to implement this rule. Commenters provided new information on POTW characteristics which EPA will use to refine its analysis of POTW administrative costs and benefits for the final rule. The Association of Metropolitan Sewage Agencies (AMSA) conducted a survey of the 150 POTWs included in EPA's 1997 POTW survey. Responses to the AMSA survey were received from 70 sewerage authorities representing 177 POTWs. The 177 POTWs responded to the AMSA survey correspond to 77 POTWs included in the EPA survey. In addition, the North Carolina Pretreatment Consortium conducted a survey of POTWs in that state. EPA is evaluating the results of these surveys, and will use the results as appropriate to verify and supplement information from the previous MP&M POTW survey on loadings, number of MP&M facilities served, and administrative costs. The AMSA and North Carolina Pretreatment Consortium surveys can be found in section 17.6 of the public record.

G. Human Health Benefits From Reduced Exposure to Lead

For the proposed rule analysis, EPA assessed benefits of reduced lead exposure from consumption of contaminated fish tissue to three population groups: (1) Preschool age children, (2) pregnant women, and (3) adult men and women. The quantified health effects in children included neurological effects to preschool children and neonatal mortality. The quantified health effects in adults all related to lead's affect on blood pressure (BP) and included incidence of hypertension in adult men, initial non-fatal coronary heart disease (CHD), non-fatal strokes (cerebrovascular accidents (CBA) and atherothrombotic brain infarctions (BI)), and premature mortality.

The health effect quantified for the proposed rule presented only a portion of the spectrum of adverse health effects potentially caused by exposure to lead, even at relatively low doses. Health effects related to lead that were not valued in the benefits calculations of the proposal include cancer, cognitive and behavioral effects in older children and adults, infertility in men and women, decreased physical growth in children, hematological and kidney effects, and peripheral nervous system effects. EPA continues to evaluate the available information to determine whether there is sufficient data to support a dose-response function for one or more of these additional lead effects on human health.

Since the proposed rule analysis was completed, EPA analyzed the data available on the carcinogenic effects of lead. EPA classified lead as a B2-probable human carcinogen based on ''sufficient'' animal evidence in its evaluation in 1989 and reported its findings in the IRIS file (IRIS 2002; *see* section 17.7.7, DCN 35740). Kidney tumors linked to lead exposure were the most common tumor type reported at statistically significant levels by EPA. EPA examined the supporting evidence for lead carcinogeneity (*e.g.,* animal assays and human epidemiological studies) and calculated a cancer potency value for lead. This value can be used when evaluating oral exposure to lead associated with consumption of contaminated food. EPA obtained the cancer potency value based on a study by the California Air Resources Board (CARB, 1997), which is supported by EPA in its IRIS file. The estimated cancer potency value for lead is 8.5×10^{-3} $(mg/kg/day)^{-1}$. A discussion of derivation of the lead cancer potency factor by the CARB appears in section 17.7.7, DCN 35740, of the public record. Based on the cancer potency factor of 8.5×10^{-3} $(mg/kg/day)^{-1}$ the regulatory options presented in the NODA would reduce the number of cancer cases associated with exposure to lead by 0.009 cases and result in annual monetized benefits of $0.06 million (1999$).

EPA also revised the analysis of neurological effects in preschool age children. Avoided neurological and cognitive damages from reduced exposure to lead 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 analysis of neurological effects in children relies on blood lead concentrations as a biomarker of lead exposure and a dose-response relationship between blood lead level and IQ decrements determined by Schwartz (Schwartz, 1994). For this rulemaking, we are using EPA's Integrated Exposure, Uptake, and Biokinetics (IEUBK) Model for Lead in Children to obtain both baseline and post-compliance distribution of blood levels in the population of exposed children. In estimating blood lead levels in the population of exposed children for the proposed rule analysis, EPA assumed that children are most sensitive to lead exposure up to age 7 (i.e., through age 6 or from 0 to 72 months) and that infants are introduced to fish at 11 months. EPA revised these assumptions for the NODA analysis based on recommendations from Dr. Mark Maddaloni, member of the EPA technical review workgroup for lead (*see* section 17.7.7, DCN 35741). First, for the final rule analysis, the Agency is considering a revised assumption that children are at risk from exposure to lead from 0 to 84 months. Second, since the proposed rule analysis, the Agency reviewed recommendations on infants' diets and found that children may be introduced to fish earlier than 11 months. Various child care organizations, including the National Network for Child Care *(http://www.nncc.org),* recommend introducing infants to fish between 6 and 12 months (*see* section 17.7.7, DCN 35742). Children from recreational and, in particular, subsistence fishing families may therefore start eating fish at an age earlier than 11 months. EPA is considering using the assumption for the final rule analysis that children of recreational and subsistence anglers are introduced to fish at 9 months. Finally for the proposed rule analysis, the Agency assumed that the bioavailability of lead in food is three percent. EPA based this assumption on recommendations made for the analysis of adult health effects (*see* section 17.7.7, DCN 35743). Using the bioavailability factor developed for adults in the analysis of children's health effects was incorrect because lead absorption rates are different in children and adults. As a result of this error, the estimated benefits from reduced exposure to lead were biased downward (*see* section VII). EPA is considering the use of the standard IEUBK assumption regarding lead bioavailability in food for the final rule analysis. According to the standard IEUBK assumptions, the bioavailability factor used in calculating blood lead levels in the population of exposed children changes from 0.03 to 0.5 for the NODA analysis. EPA is soliciting comment on the appropriateness of using the revised assumptions in the analysis of neurological effects in preschool age children.

H. Ohio Case Study

For the proposed rule, EPA 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. The case study supplements the national level analysis performed for the proposed MP&M regulation analysis by using additional

data on MP&M facilities, non-MP&M dischargers, and the baseline water quality in Ohio and methods to determine MP&M pollutant discharges from both MP&M facilities and other sources, and by estimating a state-specific model of recreational behavior for four water-based recreation activities (including fishing, boating, swimming, and wildlife viewing). The RUM used in the analysis estimates the effects of the specific water quality characteristics analyzed for the proposed MP&M regulation (i.e., the presence of ambient water quality criteria (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 analysis aimed at reducing uncertainty in benefit estimates and to make the analysis of recreational benefits more robust. Chapter 21 of the proposed rule EEBA presents this study in detail.

After the proposal, EPA submitted its RUM analysis for an official peer review using EPA's official peer review process. To review the analysis, EPA's contractor selected four well-respected resource economists with extensive experience in developing RUM models for valuing the effects of improving environmental quality on recreational decisions as shown by their publication in the Journal of Environmental Economics and Management, Land Economics, and the American Journal of Agricultural Economics or related journals. These individuals are (listed in alphabetical order):

- Dr. Michael W. Hanemann, Chancellor's Professor, Department of Agricultural and Resource Economics, and Goldman School of Public Policy, University of California;
- Dr. Daniel Hellerstein, USDA/ERS;
- Dr. John B. Loomis, Professor, Department of Agricultural and Resource Economics, Colorado State University, CO; and
- Dr. I. E. Strand Jr., Professor Department of Agricultural and Resource Economics, University of Maryland, College Park, MD.

The peer review concluded that EPA had done a competent job, especially given that the available data and that the methodology of the linked trip and RUM model is ''nearly the state of the art for the problem of estimating recreational benefits'' (J. Loomis, 2001; *see* DCN 35660). The reviewers also noted that EPA was quite conservative in its analysis and may have understated the recreation benefits of the environmental improvements due to the omission of multiple-day trips. As requested by the Agency, peer reviewers provided suggestions for further improvements in the analysis. Since the proposed rule analysis, the Agency made changes to the Ohio model and conducted additional sensitivity analyses suggested by the reviewers. The peer review report appears in section 17.7.3, DCN 35660, of the public record. EPA's response to peer reviewers' comments along with the revised model appears in section 17.7.3, DCN 35661, of the public record.

I. Recreational Benefits

For the proposed rule national analysis, EPA assessed recreational and non-use benefits from reduced effluent discharges and improved habitats or ecosystems for three water-based recreation activities: (1) Recreational fishing, (2) recreational boating, and (3) wildlife viewing. EPA used the National Demand Study data to estimate the number of person-days of boating and wildlife viewing in counties affected by MP&M discharges. EPA used county level fishing license data to estimate the number of recreational fishermen.

When estimating the percentage of state populations participating in recreational boating and wildlife viewing for the proposed rule, EPA considered only those persons who made single-day trips during the period specified in the survey. Accordingly, when estimating the average number of recreation days per person per year for each activity, EPA used the survey responses of only those individuals whose last trip for the activity was a single-day trip. EPA excluded multiple-day trips from the proposed rule analysis because these trips generally involve longer travel distances from a participant's home. In effect, EPA assumed that participants would be less aware of reductions in concentrations of MP&M pollutants in these farther-located water bodies.

Since completion of the proposed rule, EPA has revised its methodology for estimating person-days of recreational boating and wildlife viewing. EPA no longer restricts its analysis to single-day activities; instead, it considers all participants who took a single- or multiple-day trip close to their home. EPA made this change in response to peer reviewers' comments on the Ohio case study analysis. The peer review report appears in section 17.7.3, DCN 35660, of the public record. The revised analysis includes multiple-day trips that were within 120 miles one-way from a participant's home. The Agency concluded that participants will be sufficiently aware of improvements in the water quality of water bodies located within this distance to justify their inclusion in the benefits analysis for the final MP&M rule. EPA included multiple-day trips for an activity for only those participants whose last trip was within 120 miles one-way from their homes. EPA assumes that other multiple-day trips taken earlier in the year by these participants for the same activity were also within the 120-mile threshold and includes these trip days in the benefits analysis. For participants whose last multiple-day trip for an activity took them more than 120 miles from their homes, EPA assumes that all their prior multiple-day trips for this activity were also more than 120 miles from their homes and thus excludes them from the benefits analysis. Excluding from the analysis those recreational users who take multiple day trips farther than 120 miles from their homes may underestimate the total number of recreational users benefitting from water quality improvements if a site is a nationally important recreational area (*e.g.,* Great Lakes). However, the analysis could overstate the total number of recreational users by including all multiple day trips taken by residents of the counties affected by MP&M discharges because some of these trips can be taken to remote destinations.

The methodology revisions have increased the national estimates for total person-days of recreational boating and wildlife viewing. For reference purposes, an analysis of various characteristics of the National Demand Study data appears in section 17.7.4, DCN 35680, of the public record.

EPA solicits comment on the appropriateness of including recreational users who took multiple day trips in the vicinity of their home to assess the total number of recreational users benefitting from water quality changes associated with the MP&M rule.

J. POTW Characteristics

For the proposed rule analysis, EPA obtained information on characteristics of POTWs receiving discharges from the sample MP&M facilities from the EPA's Permit Compliance System (PCS) database. POTW characteristics that serve as input data into the environmental assessment analyses include POTW flow, location, and the receiving water body name and identification number. The PCS database, however, does not often provide POTW flow information if a POTW is classified as a minor discharger (i.e., if a POTW discharges less than two million gallons of wastewater per day). For the proposed

rule analysis, EPA set the POTW flow rate equal to the arithmetic mean flow among POTWs associated with the sample MP&M facilities in the absence of data on POTW flow rates in PCS. The estimated arithmetic mean flow for POTWs associated with the sample MP&M facilities for which flow information is provided in the PCS database is 61.4 million gallons per day (MGD). In response to comments received on the environmental assessment analysis, EPA has revised its approach to assigning a POTW flow value in the absence of data on POTW flow in PCS. Because all POTWs receiving discharges from the sample MP&M facilities for which flow data are not available in the PCS databases are classified as minor dischargers in the PCS database, EPA calculated an arithmetic mean flow for minor POTWs for which either actual or design flow information is available. The estimated mean flow for POTWs that are classified as minor dischargers is 1 MGD. EPA will use this estimate for all POTWs that receive discharges from the sample MP&M facilities in the absence of flow data in PCS. Results of the POTW flow analysis are provided in section 17.6.2, DCN 35553, of the public record.

K. Drinking Water Intakes

EPA revised the database of drinking water intakes that it uses for estimating human health effects associated with consumption of contaminated drinking water. The proposed rule used drinking water intakes data derived from EPA's software BASINS 1.0, which was released in May 1996. For the NODA analysis, EPA replaced the older BASINS 1.0 data with information on drinking water intakes from the Safe Drinking Water Information System (SDWIS). SDWIS is being updated on a continuous basis and provides the most comprehensive and up-to-date information on drinking water intake structures, including latitude/longitude data and the number of individuals served by a given drinking water system. This resulted in the reduction of the total number of drinking water supply systems from 6,603 facilities to 6,048 facilities. However, correcting the latitude/longitude information for drinking water intakes changed the receiving reach and the number of households served by each drinking water intake based on the data provided in SDWIS. These changes resulted in a significant increase of the total number of individuals served by some public water supply systems located downstream from MP&M facilities. EPA presents the number of individuals served by public water supply systems affected by MP&M dischargers by reach ID in section 17.7.7, DCN 35744, of the public record.

L. Extrapolation of Sample-Based Results to the National Level

As discussed in the Executive Summary of the proposal EEBA, EPA historically extrapolates baseline conditions, costs, economic impacts, and benefits associated with sample facilities to the total industry population using sample facility weights. The weights are derived as part of the stratification process involved in developing the questionnaire. The sample weights are based on the stratification of the facility population using known variables such as facility size and SIC code or industry sector. Due to the lack of data on non-facility characteristic variables (*e.g.,* receiving water body type and size and size of the affected population), stratification generally does not reflect variables related to these characteristics, even though they may influence the occurrence and magnitude of the expected benefits. The national-level analysis therefore assumes that facilities represented by the sample facility not only have the same technical and economic/financial characteristics but also have the same benefit characteristics. These assumptions may introduce a larger than desired uncertainty in both economic impact and benefits analyses and even cause anomalies in the results.

As discussed in the proposal (66 FR 536), the Agency is currently working on alternative methods to extrapolate the MP&M facility sample to address this issue, and expects to complete this effort as part of the analysis for the final regulation.

One method to extrapolate benefits to the national level is to use post-stratification. Post-stratification would require classifying all sample facilities into several classes or groups called secondary strata. If, for example, occurrence or the size of benefits differs markedly among facilities discharging to different water body types or sizes, then post-stratification of the MP&M sample using such strata would be helpful in improving the precision of benefits estimates. The Agency identified secondary strata and determined the impacts of those characteristics on both benefit occurrence and magnitude. EPA identified the following secondary strata: water body type (i.e., bay, ocean, Great Lakes, lakes, and streams), water body size (as defined by reach flow), and population size in the vicinity of the affected reach. This analysis was performed based on the input data used for the proposed rule analyses because new loading estimates were not available at the time when this analysis was performed. A summary of this analysis appears in section 17.7.5, DCN 35700, of the public record. EPA is seeking comment on the appropriateness of using the listed secondary strata such as water body type, stream flow, and population size in post-stratifying of the MP&M sample.

EPA is also considering use of the Ohio case study results to develop an alternative estimate of the monetary value of national benefits. Specifically, the Agency is considering making a national extrapolation of the Ohio case study results, based on two key factors that affect the occurrence and magnitude of benefits: (1) The estimated change in the MP&M pollutant loadings; and (2) the level of recreational activities on the reaches affected by MP&M discharges. The first factor—the estimated change in total pollutant loadings (measured as toxic pounds removed)—reflects the potential for improvements in surface water quality. Note that changes in total pollutant loadings can be also measured as total suspended solids (TSS) or chemical oxygen demand (COD) removed. The three different measures can be used to develop a range of benefit estimates. The second factor—the level of recreational activity in the relevant geographic areas (i.e., counties where MP&M facilities are located)—reflects the degree to which there is a demand by local residents to use water resources that are likely to be affected by MP&M discharges. Another important factor that impacts the magnitude of benefits is the type and significance of water resources affected by MP&M dischargers. The State of Ohio includes a wide variety of water body types affected by MP&M dischargers, including freshwater streams, large rivers, and the Lake Erie. Therefore the estimated state level benefits may be representative of benefits associated with the majority of water bodies types affected by MP&M discharges. The two variables can be used to develop a range of national level benefits based on the Ohio study results.

The first step in applying this alternative extrapolation method is to develop a measure of benefits per toxic pounds removed. This measure can be developed by simply dividing the state-level benefit estimates by the total number of toxic pounds removed in the state of Ohio ($ per toxic pound removed). Both values are readily available from the Ohio case study. Multiplying the estimated per toxic pound values by the total number of

toxic pounds removed extrapolates the state level benefits to the national level. EPA was unable to apply this methodology to estimating national benefits for the NODA option because new pollutant loading estimates have not been estimated for the MP&M facilities that completed the Ohio case study questionnaire.

The second factor, the number of recreational angling, boating, and wildlife viewing days, can be used to scale up or down the national level estimates developed based on the total number of toxic pounds removed. The appropriate adjustment factor is the ratio of the number of recreational users per reach mile at the national level to the number of recreational users per reach mile in Ohio. Accounting for differences between Ohio and the nation in recreational intensity is necessary because the total user value of water quality improvements is a function of the number of users associated with a particular reach. EPA will also examine recreation valuation literature to determine whether willingness to pay (WTP) for water quality improvements in Ohio is likely to be different compared to other states. If necessary, EPA will develop adjustment factors to reflect variations in the WTP values in different states or regions.

This alternative extrapolation method can be used to determine state-level benefits in addition to the total national benefits. First, the state level analysis would first estimate the state-level number of toxic pounds removed by apportioning the national estimate of toxic pounds removed to each state based on the level of MP&M business activity in a given state (*e.g.,* total revenues associated with MP&M sectors in a given state). Multiplying the estimated per toxic pound benefits by the total number of toxic pounds removed in a given state yields the estimate of state-level benefits. The estimated state level benefits can be adjusted up or down based on the level of recreational activity per reach mile in a given state compared to the level of recreational activity in Ohio. The state-based approach would produce more precise results than a national analysis because some states may have fewer MP&M facilities and a large number of water bodies suitable for recreation, while other states may have a relatively large number of MP&M facilities and fewer water bodies suitable for recreation.

EPA solicits comment on the appropriateness of using the alternative approach to assess the national level benefits, based on extrapolating the Ohio case study results.

VI. Consideration of Preliminary Revised Limitations and Standards

This section describes how EPA developed limitations and standards presented in Section VIII of today's document. The first subsection, VI.A, discusses the limitations and standards; EPA's evaluation of the achievability of these limitations and standards; and its evaluation of factors that commenters suggested would influence the values EPA calculated for the long-term averages. The second subsection, VI.B, describes EPA's consideration of alternatives to the limitations and standards for the total organic pollutants (TOP) parameter. The third subsection, VI.C, describes minor revisions to the statistical methodologies that EPA is considering in developing numerical limitations and standards for the MP&M industry. For the most part, these revisions are consistent with the methodology used in recent effluent limitations guidelines rulemakings for other industries.

This section uses slightly different terminology from that used in the statistical support document and the technical development document (TDD) for the proposal. Rather than using the term ''facility-specific'' for long-term averages and variability factors calculated using each episode data set, this section refers to these as ''episode long-term averages'' and ''episode variability factors.'' As explained in section VI.C, in developing the long-term averages and variability factors, EPA may have used data from more than one episode at a particular facility. In these cases, EPA has calculated separate values for each episode. EPA also has changed the terms ''pollutant-specific long-term average'' and ''pollutant-specific variability factor'' to ''option long-term average'' and ''option variability factor'' to refer to estimates for long-term averages and variability factors for each pollutant in an option for a subcategory.

In section VIII of today's document, EPA is presenting limitations and standards in units of concentration (i.e., milligrams per liter) for all subcategories except steel forming and finishing (SFF). For this subcategory, EPA has expressed the limitations and standards as lb/1000 lb (pounds per 1000 pounds of production). To obtain these production-normalized values, EPA used the concentration-based limitations and standards in section VIII, the production values in Table 14–7 of the proposal TDD, and the appropriate conversion factor as described in the proposal statistical support document. However, in its evaluations described in this section VI, EPA used the concentration-based long-term averages, variability factors, and limitations and standards for all subcategories, including the SFF subcategory. The discussion in this Section would not be altered if EPA had used production-normalized data rather than the concentration data in its evaluations of the SFF subcategory data.

Section 19 of the record section contains the documents for the DCNs cited in this section of the NODA. In addition to the hardcopy version of each document, DCN 36092 in section 19.4 contains the electronic files for the public version of those documents.

A. Preliminary Revised Limitations and Standards [1]

In developing the proposed limitations and standards, EPA used only data from EPA sampling episodes. Commenters on the proposal asserted that facilities that were currently operating the BAT model technology could not achieve the levels mandated by the proposed limitations and standards for certain subcategories. This section describes the approach that EPA is considering to address this issue in the final rule. This section also describes EPA's evaluation of factors that commenters suggested would influence the values EPA calculated for the option long-term averages.

1. Approach

This section describes the revised limitations and standards based upon the NODA episodes and EPA's approach for determining the preliminary revised limitations and standards presented in Section VIII of today's document. In general, the preliminary revised daily maximum limitations and standards shown in today's document are the greater (i.e., less stringent) of either the revised daily maximum limitations calculated using the NODA episodes or the daily maximum limitations previously proposed. (Section VI.A.1.d describes the calculation of the long-term average and monthly average limitations and standards.) EPA requests comment on this approach that EPA has used to develop the preliminary revised limitations and standards presented in section VIII of today's document.

[1] In this section, EPA distinguishes between the numerical limitations and standards which it proposed in January, 2001 (''proposed limitations and standards''), the numerical limitations and standards calculated using the NODA episode data base (''revised limitations and standards'') and the numerical limitations and standards which, for a particular pollutant, represent the greater of the revised limitations and standards or the proposed limitations and standards (''preliminary revised limitations and standards'').

a. Revised Limitations and Standards (Based on NODA Episodes)

In its statistical analyses subsequent to the proposal, EPA used a combination of the data from the proposal, additional EPA sampling data, and industry supplied data. The combined episodes are referred to as ''the NODA episodes'' in this Section (*see* section II of today's document for a summary of the more than 70 new data sets). These data are listed in DCN 36000 in section 19.1. The electronic version (in both Excel and SAS formats) is provided by DCN 36091 in section 19.6.

In today's document, EPA's use of the term ''revised limitations'' refers to limitations calculated using the NODA episodes and the modifications to the statistical methodology described in section VI.C. In most cases, the revised limitations and standards were lower than those in the proposal (*see* DCN 36001, section 19.1). This result was contrary to comments on the proposal that had asserted that the values of the proposed limitations and standards were too low and therefore could not be achieved by facilities currently operating the BAT technology. Instead, the additional data submissions from industry generally supported the achievability of the proposed values. Because of industry's concerns about the proposed limitations and standards, EPA performed additional evaluations on the revised limitations and standards.

b. EPA's Evaluation of the Revised Limitations and Standards

EPA compared the data from the NODA episodes to the revised limitations and standards (*see* DCN 36002, section 19.1). Although the NODA data were generally supportive of the achievability of the revised limitations and standards, the evaluation showed that some facilities in the NODA episodes data base might have difficulty in achieving some of the revised values. Thus, as described in the next section, EPA reevaluated the proposed limitations and standards in terms of the NODA episodes. The NODA data were generally supportive of the achievability of the proposed limitations and standards.

c. Determination of Values for Preliminary Revised Limitations and Standards

Based upon its evaluations of the revised and proposed limitations and standards, EPA is considering selecting the greater of the proposed value and the revised value as the limitation/standard in the final rule (*see* section VIII for these preliminary revised limitations and standards). In developing these preliminary revised limitations, EPA first compared the two values of the proposed and revised daily maximum limitations and selected the one with the greater value. In order to have a single long-term average basis for the limitations and standards presented in section VIII of today's document, EPA then selected the long-term average and monthly average limitation corresponding to the daily maximum limitation/standard that had been selected. For a few cases, the proposed and revised daily maximum limitations/standards had the same value, but the proposed and revised monthly average limitations/standards had different values (*see* DCN 36050, section 19.2). In these few cases, EPA selected the greater value of the proposed and revised monthly average limitation/standard and the corresponding long-term average. (The Costs & Loadings model used long-term averages based upon the NODA episodes only, not the greater of the two proposed and revised values.)

The term 'preliminary revised limitations' refers to the limitations selected as a result of these comparisons and the following exceptions.

The first exception to using the greater of the two values is for the case where EPA transferred the option long-term average and/or option variability factors in order to calculate the proposed limitations and standards. At proposal, these transfers were necessary because data were unavailable for some pollutants in some subcategories. Rather than retain these proposed transfers, EPA is considering an approach where the final limitations and standards would be based upon the available data and only using the data transfers described in section VI.C.

The second exception to using the maximum value is for the total organic parameter (TOP). Here, EPA is considering several other methods as discussed in section VI.B and has presented the results from one of these methods as the preliminary revised limitations and standards for TOP in section VIII of today's document.

2. Assessment of Achievability

In order to be responsive to the many comments about the achievability of its proposed limitations and standards for certain subcategories, EPA evaluated the preliminary revised limitations. As explained in the following sections, in evaluating the preliminary revised limitations and standards in this NODA, EPA compared those preliminary revised values to the effluent data from the model technology, effluent from more sophisticated technologies ('BAT+'), and the data excluded because information about influent levels were unavailable (as explained in section VI.C.6). EPA performed this comparison for all subcategories and pollutants (except TOP), not just those corresponding to specific comments.

a. Effluent Data From Model Technology (NODA Episodes)

EPA compared the preliminary revised daily maximum limitations to the effluent data that had influent at treatable levels and used the model technology. As previously explained, the data from these ''NODA episodes'' were a combination of the episodes used in the proposal, more recent EPA sampling episodes, and industry submitted information.

In this evaluation, EPA performed a check of the preliminary revised limitations and standards similar to that discussed in the proposal (66 FR 431). For the nonchromium anodizer and railroad line maintenance subcategories, none of the data from the NODA episodes exceeded the preliminary revised daily maximum limitations. For the other subcategories, EPA found that some values were greater than the preliminary revised daily maximum limitations (*see* DCN 36051, section 19.2). The following paragraphs describes EPA's review of two pollutants and its plans for further review of all regulated pollutants.

For amenable and total cyanides that EPA has proposed to regulate for several subcategories, while ten to fifteen percent of the values are greater than the preliminary revised limitations and standards, EPA notes that some facilities operate the cyanide destruction system better than others. EPA has observed these differences in the operation of cyanide destruction system over many years of evaluating treatment systems for this and other industries. In addition, as described in the proposal, facilities with cyanide treatment would be able to select one of the two cyanides to monitor with approval by the permitting authority. Thus, while EPA intends further evaluation of these data before the final rule, EPA may consider today's preliminary revised limitations and standards to be achievable by facilities that properly operate their cyanide destruction systems (e.g., sufficient detention time for alkaline chlorination).

For TOC, which had about ten and twenty-five percent of the values greater than the preliminary revised limitations and standards for the Oily Wastes and General Metals subcategories,

respectively, EPA notes that treatment systems are not primarily targeting this pollutant. Further, monitoring TOC is only one of several options for monitoring organic pollutants (*see* section VI.B) and facilities may select a different option. Thus, while EPA intends further evaluation of these data before the final rule, EPA may determine that today's preliminary revised limitations and standards to be achievable by facilities that select this option.

For all regulated pollutants in the final rule, EPA plans an engineering review of its data to verify that the limitations and standards are reasonable based upon the design and expected operation of the control technologies and the facility process conditions. As part of that review, EPA plans to examine the range of performance represented by the episode data sets with the model technology. Some episode data sets will demonstrate performance reflecting the best available technology and an effluent quality meeting the limitations. Other episode data sets may demonstrate performance from the same technology, but not reflect the best design and/or operating conditions for that technology. For these facilities, EPA will evaluate the degree to which the facility can upgrade its design, operating, and maintenance conditions to meet the limitations or standards. If such upgrades are not possible, then the limitations and standards would be modified to reflect the lowest levels that the technologies can reasonably be expected to achieve. Even though some individual values may be greater than the final limitations and standards, EPA may determine that they adequately reflect the treatment capabilities of the model technologies. In the following paragraphs, EPA presents three examples and possible considerations for the final rule. These examples are not meant to be exhaustive, but rather provide examples of the types of evaluations and potential outcomes that EPA may consider. EPA solicits comment on these evaluation approaches and additional approaches that could be used.

In the first example, EPA would evaluate limitations where a few episodes contribute a large majority of the values greater than the preliminary revised limitation for a pollutant. In the General Metals subcategory, 78 of the 93 values greater than the copper limitation are all from the same episode (4737D). For the final rule, in its evaluation of cases like this example, EPA will evaluate whether this facility needs to make improvements to optimize its treatment performance. Based upon this review, EPA also may consider the possibility of excluding the data from developing the limitations and standards because they probably reflect less than optimal performance. EPA may also consider retaining the data as a conservative approach in developing the limitations and standards. As an alternative, EPA may consider using only those data to develop the final limitations and standards.

In the second example, EPA would evaluate the analytical methods. In the Shipbuilding Dry Dock subcategory, all the values greater than the HEM limitation are from one episode of self-monitoring data provided by industry (4892D). As explained in section VI.C.8, EPA has excluded all oil and grease data measured by chemical analytical methods that use freon. In cases like this, in addition to evaluating the treatment performance, EPA may investigate whether the analytical method has been incorrectly identified in its database.

In the third example, EPA would evaluate the effect of influent levels on treatment performance. For the oily subcategory, the HEM values greater than the preliminary revised limitation are from two (4872, 4876) of the five episodes. These two episodes are associated with the highest influent values. In examples like this, EPA may investigate the impact on the performance of the technology due to the influent levels.

b. Effluent Data From ''BAT+'' Technology

Because many commentors asserted that some facilities were unable to achieve the low concentration even with more sophisticated technology (''BAT+'') than the option model technology, EPA compared ''BAT+'' data to the preliminary revised daily limitations and standards (*see* DCN 36052, section 19.2). EPA considered data from two types of technology as being ''BAT+ data.'' The first technology, ''CPTF'', is chemical precipitation with clarification using a clarifier followed by additional treatment such as a sand filter which is an additional treatment step following the proposed BAT model technology. The second technology is chemical precipitation with clarification using microfiltration or ultrafiltration (CHUM).

In general, in comparison to the BAT data, EPA found smaller or relatively the same percentages of the BAT+ data had values greater than the preliminary daily maximum limitations. EPA also noted that some episodes, but at different sample points, were considered in both the BAT and BAT+ comparisons. For some of these episodes, if the BAT data were greater than the preliminary revised limitations, then the BAT+ data also were greater than the preliminary revised limitations. EPA does not consider this to be a surprising result. As explained in section VII, addition of a sand filter is not expected to provide much additional removal for the pollutants when clarifiers are operating properly.

For nickel in the General Metals subcategory, EPA notes that, on a percentage basis, more BAT+ values than BAT values were greater than the preliminary revised limitations. EPA intends to investigate this result further before the final rule.

c. Effluent Data Without Influent Information

As another evaluation of the preliminary revised daily limitations and standards, EPA compared the preliminary revised limitations and standards to the self-monitoring data that it had excluded because of the unavailability of information about the influent levels at the facility (*see* section VI.C.6). In general, in comparison to the BAT data, EPA found smaller, or relatively the same, percentages of data with values greater than the preliminary daily maximum limitations (*see* DCNs 36053 and 36054, section 19.2). EPA expects that detailed review of these self-monitoring data will not be possible. However, if any extreme differences are identified, EPA is likely to contact the facilities for more information.

3. Evaluation of Option Long-Term Averages

In addition to comparing the data values to the preliminary revised limitations and standards, EPA has evaluated factors (*e.g.,* influent pollutant concentrations, multiple metals) that the comments assert would affect the achievability of the limitations and standards. EPA specifically focused its attention on the option long-term averages for the metals pollutants, because EPA expects facilities to target their treatment systems to achieve the option long-term averages used to calculate the limitations and standards and because comments indicated that achievability of those pollutants were of primary concern. In these evaluations, EPA used the NODA episodes (*i.e.,* effluent data from the episodes used in the proposal, more recent EPA sampling episodes, and industry submitted data, where the facilities had influent at treatable levels and used the model technology). However, EPA did not find

evidence of dramatic impacts on the option long-term averages. EPA solicits comment on the factors that it evaluated and its analyses described below.

a. Influent

Some commentors stated that the relative concentration levels in the influent would affect the concentration levels in the effluent. In particular, commentors asserted that facilities with more concentrated influents would have more concentrated effluents and would be unable to achieve the proposed limitations and standards that were developed in part using data from facilities with less concentrated influents. EPA notes that, in calculating the proposed limitations and standards, it had already excluded effluent data corresponding to low levels in the influent. EPA's purpose in excluding these effluent data sets was to ensure that the effluent concentrations resulted from treatment and not simply the absence or extremely low levels of that pollutant passing through a treatment system. EPA is still using this criterion in selecting the data used to develop the revised limitations and standards based on the NODA episodes. This type of data editing is explained further in section VI.C.6.a.

To determine whether the remaining effluent concentrations for the metal pollutants could still be affected by varying levels of influent, EPA reviewed graphical displays of the paired influent and effluent values and compared the values of option long-term averages for three subsets of the NODA episodes based upon the averages of their influent values. Because the results are inconclusive and sometimes inconsistent with other results as described in the following sections, EPA is not currently planning any modifications to the limitations and standards that would incorporate varying levels of influent concentrations within a subcategory. EPA solicits comment on the conclusions that should be drawn from these analyses and if any other evaluations of the data should be performed for the final rule.

i. Graphical Displays

For each metal pollutant in each subcategory, the graphical display (*see* DCN 36003, section 19.1) shows both the influent long-term averages (where available) and the corresponding effluent long-term averages for the NODA episodes. (Some influent long-term averages are missing because EPA used other information to determine that the influent was at treatable levels.) DCN 36004 in section 19.1 lists the influent and effluent long-term averages plotted in these graphical displays. EPA would expect to see upward trends for both the influent and effluent long-term averages if more concentrated influent is associated with more concentrated effluent.

In general, EPA did not find any evidence of such trends or any patterns in the influent. Rather, EPA notes that both low and high influent values were often associated with the lowest effluent values. EPA also notedsthat some facilities (such as episode 7038P) with relatively high influent concentrations had relatively low effluent values of that particular pollutant and also had relatively low effluent levels of other pollutants. Thus, the facility's treatment system did not appear to be targeting a single pollutant, but rather, was able to simultaneously treat different metal pollutants to low levels. EPA concludes from these data that some facilities have been successful in treating concentrated wastes. For the final rule, EPA is considering further evaluation of these facilities to ascertain whether the facility operations are different from other ''BAT'' facilities.

EPA also notes that the industry-supplied data appear to be evenly distributed across the range of effluent concentrations which was not consistent with industry comments which stated that industry-supplied data would have higher effluent concentrations than EPA sampling data.

ii. Three Subsets Based on Influent Concentrations

For each pollutant, EPA grouped the NODA episodes into three subsets based on the relative levels of the influent concentrations. The first subset contained the NODA episodes with the lowest 50 percent of the influent averages. The second subset contained the NODA episodes with the highest 50 percent of the influent concentrations. The third subset contained the NODA episodes without any influent data but for which EPA had other information (*e.g.,* production information) indicating treatable levels in the influent.

For each subset, EPA calculated an option long-term average of the effluent data using the median of the episode long-term averages. As the following paragraphs explain, the comparisons were inconclusive and inconsistent for the two subsets with the lowest and highest influent averages (*see* DCN 36005, section 19.1).

EPA noted that the subset with the lowest influent averages did not always correspond to the lowest option long-term average for the effluent data and the subset with the highest influent averages did not always have the highest option long-term average for the effluent data. The pattern of influent and effluent relationships was not consistent for all pollutants within a particular subcategory, nor consistent between subcategories for a particular pollutant.

For some pollutants in some subcategories, there appeared to be a substantial difference between the option long-term averages of the effluent data for the different subsets. For example, for copper in the General Metals subcategory, there was an order of magnitude difference in the option long-term averages of the effluent data for the subsets with the lowest and highest influent averages. In contrast, for other pollutants in some subcategories, the results appeared to be about the same for the three subsets. For example, for nickel in the General Metals subcategory, the option long-term average for the effluent data was approximately 0.2 mg/L for all three subsets.

Contrary to comments received on the proposal, EPA found from these data that lead in the General Metals subcategory had a higher option long-term average for the effluent data from the subset with the lowest influent averages than the option long-term average for the effluent data from the subset with the highest influent averages.

EPA also noted that the results were sometimes inconsistent between subcategories. For example, for the copper effluent data in the General Metals subcategory, there was substantial difference in the option long-term averages for the effluent data for the subsets with the lowest and highest influent values. However, for those two subsets in the Metal Finishing Job Shops subcategory, the option long-term averages for the copper effluent data were similar. While EPA considers the wastestreams to be different between the two subcategories, the range between the minimum and maximum episode long-term averages for copper are similar (see DCNs 36006 and 36007, section 19.1).

The third subset (*i.e.,* the subset without any influent data) did not have results that were consistently like either of the other two subsets which made it difficult to evaluate. For the final rule, EPA will consider whether it has enough information to assume that those episodes should be assigned to either of the other subsets for its evaluation.

b. Industry Supplied Data

Some commentors stated that EPA sampling data were responsible for the

low values of the proposed limitations and standards. To evaluate these comments, EPA calculated the option long-term averages using only the industry supplied effluent data (*i.e.,* the paired influent/effluent data and the self-monitoring data) from the NODA episodes. Again, the option long-term averages were lower than those calculated using all of the NODA episodes. Because the paired influent/effluent data were not collected in order to demonstrate compliance, EPA used just only the self-monitoring (compliance) data and still obtained option long-term averages that were generally lower than the values using all of the NODA episodes. Generally, as shown in DCN 36008 in section 19.1, the highest option long-term averages resulted from using only the EPA sampling episode data.

c. Optimum pH

Some commenters reported that different metals pollutants are associated with different optimal pH values and that it was not possible to achieve the low levels of the limitations and standards simultaneously using a single-stage chemical precipitation system. Ideally, in order to remove a particular pollutant, a facility would target its pH to the optimum pH level for chemically precipitating that metal. For example, cadmium has an optimum pH of about 11.4, while chromium, copper, lead, manganese, and zinc have optimum pH of about 9 to 9.5. If optimum pH were a factor in achieving low levels, a facility that targeted its system at a pH of 9 would be expected to have relatively lower effluent levels of chromium, copper, lead, manganese, and zinc than a facility that targeted a pH of 11.4 to treat cadmium, but also had these other metals present at treatable levels.

EPA examined the target pH values for the facilities that supplied that information (*see* DCN 36009, section 19.1). Most facilities target their systems in the pH range of 8.5 to 10.5. For some facilities (generally those that EPA sampled), EPA had the pH values targeted by the facility and the actual operational pH values during the EPA sampling episode. EPA identified several facilities where the target pH range did not overlap its operational range (*see* DCN 36010, section 19.1). Thus, EPA questions the reliability of the reported target pH ranges. However, the target pH ranges were the best information available, because few facilities had supplied the operational ranges corresponding to the influent data. EPA compared the midpoint of the target pH ranges to the episode long-term averages from the NODA facilities. In reviewing the midpoint pH targets to the long-term averages (*see* DCN 36011, section 19.1), EPA notes that for a given pH target, the episode long-term averages vary substantially. Contrary to comments received on the proposal, EPA found that the highest episode long-term averages are sometimes associated with facilities that target the optimum pH for the pollutant (*see* DCN 36012, section 19.1). In addition, EPA notes that facilities where the midpoint, of their target pH values, were outside the accepted range for some pollutants had the lowest long-term averages for those pollutants. In a further analysis, EPA calculated option long-term averages using only episodes associated with target pH ranges of 9.0 to 9.5. By excluding episodes outside this pH range and episodes where pH was unavailable, EPA generally had lower option long-term averages than those calculated with all the NODA episodes. Thus, EPA has not modified its criteria to consider pH in selecting the data for the preliminary revised limitations and standards.

d. Minimum Solubility

In addition to evaluating the available pH targets at the facilities, EPA also considered the minimum solubility points associated with a single-stage chemical precipitation system. These theoretical values were identified in ''Engineering and Design—Precipitation/ Coagulation/ Flocculation'' (*see* (1) *www.usace.army.mil/inet/usace-docs/eng-manuals/em1110–1–4012/chap2.pdf,* and (2) DCN 36013, section 19.1) and is the theoretical solubility in a pure solution at standard temperature. EPA compared these theoretical solubilities to the values that were used in determining treatable levels of influent. As explained in section VI.C.6.a, EPA defined its treatable levels of influent as ten times the minimum levels in EPA Method 1620.

For cadmium, chromium, copper, nickel, and tin, the theoretical solubilities were less than the treatable levels. Thus, for those metals, the effluent data used in EPA's analyses were associated with influent levels that were greater than the theoretical solubilities, and therefore, the metals theoretically should precipitate.

For lead, manganese, silver, and zinc, the theoretical solubilities are greater than the treatable levels. Lead, manganese, and zinc have approximately the same optimal pH of 9.5 while silver has an optimal pH of 13+. All four metals have relatively high theoretical solubilities: 2.1 mg/L (lead), 1.2 mg/L (manganese), 13.3 mg/L (silver), and 1.1 mg/L (zinc). For zinc, as explained in section III.A, EPA is considering using data from the sampling of zinc platers to set the zinc limitations and standards. If EPA determines that this approach is appropriate, the final limitations and standards will be more than double the theoretical solubility and similar to those for the metal finishing industry in 40 CFR part 433. The solubilities for lead and silver are substantially greater than the daily maximum limitations of 0.69 mg/L (lead) and 0.43 mg/L (silver) that EPA established for the metal finishing industry in 40 CFR part 433. The industry has successfully complied with the daily maximum limitations for zinc, lead, and silver since they were promulgated in the 1980s. EPA concludes that EPA's model technology is not completely reliant on the theoretical solubilities as other mechanisms (*e.g.,* co-precipitation, mixed metals, and sulfides) may help to lower the concentration in the dissolved phase. Further, as explained in section VI.A.1, EPA evaluated the achievability of the limitations by comparing several types of data to the preliminary revised limitations and standards. As a result of that comparison, manganese was one of the pollutants with the greatest difference between the daily maximum limitation/standard and the daily values. EPA is considering whether manganese should be regulated. Based on this analysis, EPA has not adjusted its criteria to consider theoretical solubilities in developing the preliminary revised limitations and standards.

e. Sample Size

EPA also evaluated comments that stated that episode data sets with smaller sample sizes were associated with lower effluent concentrations and lower variability. While this was true for some smaller episode data sets, other episode data sets of similar size had the highest concentrations and highest variability. Also, the largest data sets were sometimes associated with the lowest concentrations and lowest variability. Thus, EPA has not modified its criteria to consider sample size.

f. Relationship to Total Suspended Solids

As previously stated in the proposal, EPA excluded data from chemical precipitation and clarification systems that did not have solids removal indicative of effective treatment. In general, EPA identified as having poor solids removal systems that did not achieve at least 90 percent removal of

total suspended solids (TSS) and had effluent TSS concentrations greater than 50 milligrams per liter. However, indirect dischargers may not target TSS as effectively as direct dischargers as indirect dischargers do not have TSS standards. For this reason, EPA excluded some episode data sets where the average effluent TSS concentrations did not fall below 50 mg/L. In other cases, EPA did not exclude such TSS data because the facility was achieving effective removal of targeted metals. While EPA compared the episode long-term averages of TSS and the metal pollutants, it did not find any trends indicating that TSS was a factor in the effluent. For the final rule, EPA may consider a more thorough analysis of the relationship between TSS and metals removal and solicits comment on this issue.

g. Other Factors

Before the final rule, EPA intends to review its sampling episode reports to determine if there are any other common factors that should be considered in developing the final limitations and standards. Some factors that EPA may evaluate are treatment chemicals, flocculants, whether any special polymers were used, capacity including whether the system was over-designed, and clarifier overflow rates. EPA solicits comment on evaluating these and other factors.

B. Alternative Approaches Considered to TOP Limitations and Standards

In today's document, EPA solicits comment, especially from permit writers and control authorities, as to whether a limitation/standard for the Total Organic Parameter (TOP) is necessary in the final rule. The following sections describe EPA's concerns about adequate characterization of the organic compounds; possible alternatives to the TOP limitations and standards; and three methods of calculating the TOP limitations and standards that EPA is considering for the final rule.

To reduce the burden associated with monitoring for organic pollutants, EPA proposed three alternatives to allow for maximum flexibility while ensuring reductions in the amount of organic pollutants discharged from MP&M facilities. A facility would be required to: (1) Meet a numerical limit for the total sum of a list of specific organic pollutants called ''Total Organics parameter'' or ''TOP'' (similar to the TTO parameter used in the Metal Finishing effluent guidelines); (2) meet a numerical limit for total organic carbon (TOC) as an indicator parameter; or (3) develop and certify the implementation of an organics management plan.

1. Concerns About Adequate Characterization of Organic Compounds

EPA is concerned that TOP limitations and standards may not be adequately characterizing the organic compounds present at facilities in different subcategories. Therefore, EPA is considering whether it should eliminate the option of the TOP limitations and standards in controlling organic discharges. Today's preliminary revised limitations and standards for TOP are based upon all effluent data associated with the options 2, 6, and 10 technologies, regardless of subcategory. Although it has used data corresponding to the option 10 model technology, EPA has not proposed TOP limitations and standards for any option 10 subcategory (i.e., the shipbuilding dry dock and railroad line maintenance subcategories).

Although EPA evaluated organics data from 118 episodes, it only used data from 15 episodes because they were the only episodes with detectable concentrations of one or more of the 47 organic pollutants in the influent. EPA did not have influent data for one of the 15 episodes (7007P). Further, EPA's database contained measurable levels (i.e., were detected) in the effluent for only 10 of the 47 pollutants (*see* DCN 36039, section 19.1). (**Note:** The proposed limitations and standards were based upon 48 organic pollutants, but EPA has excluded benzoic acid from further consideration as explained in section II.C.)

Because of the variability in the type of organic pollutants found at different facilities, EPA is concerned that a thorough evaluation of the TOP limitations and standards may not be possible. For example, EPA notes that the TOP preliminary revised limitations and standards have fairly large values, partly because data from different subcategories and options are combined and partly because the data are combined from different episodes. EPA considers the values of the preliminary revised limitations and standards to be ''large'' because they account for the concentration levels of 47 pollutants, when the episodes had at most 25 of the 47 pollutants at measurable concentrations in the influent, and at most 7 of the 47 pollutants at measurable concentrations in the effluent (this occurred for episode 4851). In other words, although the preliminary revised limitations and standards allows for concentration levels for 47 pollutants, EPA did not find any episode data set which contained all 47 organic constituents in either the influent or effluent. Thus, EPA is considering whether these large values are sufficiently protective of the environment. Conversely, facilities tend to be fairly unique in the types of organic compounds that they generate in the influent. Thus, EPA may not have provided adequate allowance for the discharge of organic constituents from some unique facilities.

2. Consideration of Alternative to TOP Limitations and Standards

Instead of a limit for TOP, EPA is considering another alternative where EPA would provide guidance on developing limitations and standards for the specific organics that would be present in the influent at a particular facility. These limits would be the alternative, instead of TOP limits, to the other two proposed alternatives (i.e., meeting a limit for total organic carbon or implementing the best management plan). EPA solicits comment on this approach.

From those facilities that would prefer to retain the final MP&M TOP limitations and standards, EPA solicits comment from facilities on when they would choose to monitor for the TOP list of pollutants (alternative (1)) rather than meet the TOC limitation (alternative (2)) or develop an organics management plan (alternative (3)). EPA also solicits comment on whether monitoring for TOP, for which each organic compound present in the wastestream must be measured, would be more cost-effective than monitoring for TOC which requires a single measurement. Additionally, EPA solicits comment from permit writers and control authorities on which alternative is preferable and least burdensome to implement.

3. Consideration of Three Methods of Calculating TOP Limitations and Standards

EPA is considering three methods for calculating the TOP limitations and standards. In Method A, EPA would follow the same approach that was used at proposal to calculate the limitations and standards, and incorporate EPA sampling data from the NODA episodes and information from the validation study. By using this method, EPA would calculate the TOP limitations and standards based on an allowance for organic pollutants that were not detected in the effluent in addition to those pollutants that were detected. In addition, EPA would exclude the data for benzoic acid in developing the

limitations and standards for TOP based on the results of the validation study.

In Method B, EPA would calculate the TOP limitations and standards using data only from the organic pollutants detected in the effluent (i.e., not provide an allowance for those not detected). For Method B, EPA also would use the sampling data from the NODA episodes and exclude benzoic acid in developing the limitations and standards for TOP.

By using Method C, as a slight variation on Method B, EPA would include industry self-monitoring data in addition to the EPA sampling data in the NODA episodes. (The self-monitoring data include very few organic constituents.) EPA found little difference in the results from applying the three different methods to develop the preliminary revised limitations and standards (*see* DCN 36014, section 19.1).

Today's preliminary revised limitations and standards correspond to results from the third method, which includes the industry self-monitoring data. EPA notes that this method resulted in somewhat larger values than the other two methods. If the TOP limitations and standards are retained in the final rule, EPA also intends to modify the minimum level for carbon disulfide from 10 ug/L to 5 ug/L to be consistent with the results of the validation study described in section II.C. Thus, these changes will result in slightly lower values for the TOP limitations and standards in the final rule, regardless of which of the three methods is selected for the final rule. EPA solicits comment on the three methods that are being considered in today's document.

C. Consistency of Statistical Methodology With Other Recent Effluent Guidelines

EPA received comments concerning the consistency of the statistical methodology used for the MP&M proposal with that used for other recent effluent guidelines (*e.g.,* Centralized Waste Treatment, Iron and Steel).

As explained in section VI.A.1, the preliminary revised limitations and standards in today's document are the greater of the values of the proposed and revised limitations and standards.

This section discusses other features of the methodology for calculating revised limitations and standards that are consistent with EPA's approach in recent effluent limitations guidelines (ELGs). This section also identifies changes from the proposal that EPA has used in calculating the revised limitations and standards, and that are being considered for the final rule.

In today's document, EPA has used the episode long-term averages and variability factors in the same manner as for the proposal. The option long-term average for a pollutant is the median of the episode long-term averages from the BAT facilities in a particular subcategory. The option daily (or monthly) variability factor is the arithmetic mean of the episode daily (or monthly) variability factors. The daily maximum limitation (or standard) is the product of the option long-term average and the option daily variability factor. The monthly average limitation (or standard) is the product of the option long-term average and the option monthly variability factor. The episode long-term averages and episode variability factors from the NODA episodes are listed in DCN 36015 in section 19.1. The option long-term averages and option variability factors based upon these NODA episodes are listed in DCN 36016 in section 19.1.

1. Variability Factors

In calculating the variability factors, commenters requested that EPA use more of the available data. This section describes the types of additional data sets that EPA considered in developing the revised limitations and standards. The minor changes in calculating the variability factors described in this section are consistent with other recent guidelines and EPA considers them to be appropriate for the MP&M final rule.

To calculate the variability factors for the proposal, EPA used data sets that contained four or more data points. Commenters noted that the minimum of four data points was higher than the three data points that EPA had specified as the minimum sample size in developing the limitations and standards for the Centralized Waste Treatment and the Iron and Steel rules. Commenters also expressed a preference for a minimum of three data points. Most of the data sets contain more than four values, so changing the minimum sample size from four to three values has limited impact on the values of the option variability factors. However, by specifying a minimum of three data points, a few more data sets have been used into calculations of the option variability factors. EPA is considering this change for the final rule and has used it in developing the revised limitations and standards. DCN 36017 in section 19.1 lists the data sets that have been included as a result of this change.

As a result of its evaluation of the variability factors for today's document, EPA intends to investigate whether variability factors for an episode data set should be included if all noncensored values were less than the minimum detection limit in that data set. For the proposal and today's document, EPA has excluded such data sets in calculating the variability factors (see DCN 36018, section 19.1 to identify today's exclusions). As there are a limited number of these data sets, it is likely that their inclusion would have minimal impacts on the values of the option variability factors. However, to include as much data as possible in calculating the option variability factors (which is consistent with requests by commenters and EPA's objectives when the data are appropriate), EPA is considering the inclusion of these data sets for the final rule.

EPA also performed an additional review of the episode variability factors to ensure that all values were greater than 1.0 (i.e., the upper percentile is greater than the long-term average) and that the daily variability factor had a greater value than the corresponding monthly variability factor (i.e., the resulting limitations/standards would be greater for a single daily measurement than for an average of measurements collected throughout the month where one high value can be counterbalanced by lower values). If an episode variability factor failed this review, then EPA excluded both the daily and monthly variability factors calculated from that episode data set in developing the revised limitations and standards.

EPA also reviewed the episode data in greater detail when the lowest and/or highest daily variability factor for a particular pollutant seemed substantially different from the daily variability factors for other episodes. EPA's review of such episode data sets will continue after the NODA.

2. Long-Term Averages

In calculating the option long-term averages for the NODA, EPA has made two changes. As explained below, the first change was to use the delta-lognormal distribution for episode long-term averages. The second change was to compare the option long-term averages to the minimum level in Method 1620 for the metals pollutants. EPA also considered the use of the mean instead of the median for option long-term averages.

a. Use of Modified Delta-Lognormal Distribution

In calculating the long-term averages for each episode data set for the proposal, EPA used arithmetic averages. For the NODA, EPA has used the modified delta-lognormal distribution to

calculate the episode long-term averages. As in the proposal, EPA then calculated the option long-term average as the median of the episode long-term averages. Generally, as shown in DCN 36020 in section 19.1, the resulting option long-term averages have similar or higher values when the episode long-term averages are based on the modified delta-lognormal distribution rather than arithmetic averages. Using the modified delta-lognormal distribution to calculate the episode long-term averages is: (1) Consistent with the regulation for the iron and steel industry and other ELGs; and (2) appears to be appropriate to use in calculating the limitations and standards for the MP&M industry.

b. Comparison to Minimum Levels in Analytical Methods for Metals

For the NODA, EPA has ensured that the option long-term average concentrations (and limitations) do not fall below the specific minimum level in EPA Method 1620 for each metal pollutant. If the option long-term average fell below the minimum level, it was raised to the value of the minimum level in Method 1620, which was used for EPA's sampling of metal pollutants (*see* DCN 36021, section 19.1 which refers to the minimum levels as ''baseline values''). EPA has determined that some laboratories, under certain conditions, can measure to levels lower than those specified in some of the methods. EPA has concluded that these results are quantitatively reliable, and therefore can be used to calculate long-term averages and variability factors. However, EPA also recognizes that not all laboratories consistently measure to these lower levels. To ensure the revised limits reflect ''typical'' laboratory reporting levels for approved methods, EPA established the option long-term averages at values equal to or greater than the minimum levels specified in Method 1620. However, EPA made one exception to these minimum levels by adjusting the minimum level for lead upward to 0.05 mg/L from 0.005 mg/L to correspond to levels achievable by inductively coupled plasma atomic emission (ICP) spectroscopy. This comparison of the option long-term averages to the minimum level in Method 1620 is consistent with other recent effluent guidelines and EPA considers this comparison to be appropriate for the MP&M rulemaking.

c. Mean Versus Median

EPA considered comments that recommended the use of the mean rather than the median in calculating the option long-term average. EPA's use of the median is consistent with other recent guidelines. The median is the value at which half of the episode long-term averages will be above and half will be below. Using the mean would allow a single facility with a much higher or much lower long-term average to significantly influence the option long-term average. Thus, EPA considers that the median is appropriate to use in developing the limitations and standards for the MP&M industry.

3. Autocorrelation

For the final rule, EPA intends to investigate whether autocorrelation is likely to be present in the effluent data. When data are said to be positively autocorrelated, it means that measurements taken at specific time intervals (such as 1 day or 2 days apart) are related. For example, positive autocorrelation would be present in the data if the final effluent concentration of lead was relatively high one day and was likely to remain at similar high values the next and possibly succeeding days. In some industries, measurements in final effluent are likely to be similar from one day to the next because of the consistency from day-to-day in the production processes and in final effluent discharges due to the hydraulic retention time of wastewater in basins, holding tanks, and other components of wastewater treatment systems. To determine if autocorrelation exists in the data, a statistical evaluation is necessary and will be considered before the final rule. To estimate autocorrelation in the data, many measurements for each pollutant would be required with values for equally spaced intervals over an extended period of time. If such data are available for the final rule, EPA intends to perform a statistical evaluation of autocorrelation and if necessary, provide any adjustments to the limitations and standards. This adjustment would increase the values of the variance and monthly variability factor. However, the estimate of the long-term average and the daily variability factor are generally only slightly affected by autocorrelation. The adjustment for autocorrelation is consistent with EPA's assumption for some pollutants in the Iron and Steel effluent limitations guidelines. If EPA determines that autocorrelation is present and that adjustments to estimates using the data from the NODA episodes will result in higher limitations and standards than the preliminary revised limitations and standards in this NODA, EPA is likely to incorporate those adjustments into the final limitations and standards.

4. Continuous and Batch Flow Systems

For each influent and effluent sample point of interest, EPA determined whether wastewater flows were ''continuous'' or ''batch.'' The distinction between flow systems is consistent with the assumptions used for EPA's rule for the Centralized Waste Treatment industry which also had data from some batch flow systems. While this same assumption was used in developing the proposed MP&M limitations and standards, the following explanation further clarifies that assumption.

At sample points associated with continuous flow processes, EPA collected composite samples for all analytes except for hexane extractable material (HEM) for which the analytical method specifies grab samples. Also, if EPA field composited samples of batches for each day at a batch flow system, the statistical analyses used the data as if they were from continuous flow systems. For each sample point associated with a continuous flow process, EPA aggregated all measurements within a day to obtain one value for the day. This daily value was then used in the calculations of long-term averages, variability factors, and limitations and standards.

At sample points associated with batch flow processes, EPA usually collected grab samples of different batches. For each sample point associated with a batch flow process, EPA aggregated the measurements to obtain one value for each batch. This batch value was then used as if it were a daily value.

5. Different Episodes at a Facility

In general, each episode identifier corresponds to a unique facility. For those facilities associated with multiple episodes, EPA has treated each episode as if it were a separate facility in the statistical analysis. While there were few facilities with multiple episodes used for the proposal, the NODA episodes include data from more facilities with multiple episodes. Thus, to provide another opportunity for public comment, the following sections provide EPA's rationale for treating the episodes separately in its analyses. As described in the following sections, these multiple episodes were from different EPA sampling episodes, different treatment trains, paired influent and effluent data from industry, and other industry submitted compliance data.

a. EPA Sampling Episodes

If EPA collected samples from a facility over two or more distinct time

periods, EPA analyzed the data from each time period separately. (All episode numbers that have no letter designation or end with an ''A'' are EPA sampling episodes.) In the documentation, EPA identifies each time period with a distinct ''facility'' identifier. For example, episodes 4805 and 4815 are actually a single facility in the Dry Dock subcategory, but the data from the two episodes are from two time periods. Three other facilities are associated with multiple EPA sampling episodes and they are all in the Metal Finishing Job Shops Subcategory (*see* DCN 36022, section 19.1). In effluent guidelines for other industrial categories including Centralized Waste Treatment, EPA has made similar assumptions for such data, because data from different time periods generally characterize different operating conditions due to changes such as management, personnel, and procedures.

b. Different Treatment Trains

If a facility had entirely separate process and treatment trains which EPA sampled separately, EPA has treated the data as if they were collected from two different facilities because the two trains are operated independently with different wastestreams. In the documentation, the episode identifier is appended with an ''A'' to indicate that the data are from the second treatment train. EPA's assumption for these data is consistent with the Centralized Waste Treatment rule.

c. Paired Influent and Effluent Sampling

EPA received self-monitoring data along with proposal comments from industry with influent and effluent paired concentration data. These data were specifically collected in response to the proposal and generally adhered to EPA's guidelines for collecting such data. Because the sampling and chemical analysis may have been somewhat different from other industry self-monitoring data, EPA has treated these data as separate episodes from the EPA sampling data and industry self-monitoring data. In the documentation, the industry paired data have a ''P'' following the 4-digit episode identifier.

d. Compliance Monitoring Data

In comments on the proposal and from other sources, EPA received compliance monitoring data from industry. These data are sometimes referred to as ''Discharge Monitoring Report'' (DMR) or self-monitoring data. In the documentation, self-monitoring data are indicated by a ''D'' appended to the 4-digit episode identifier. At a specific facility, this 4-digit episode identifier is the same as the 4-digit identifier used for EPA sampling data or the paired industry data. In the statistical analyses, the self-monitoring data are treated separately from the EPA sampling data and the paired data. This practice is consistent with other guidelines and is used because the data tend to be associated with different time periods and/or analytical methods than EPA sampling data.

For facilities that submitted self-monitoring data over an extended period, if there are substantial differences between certain time intervals, EPA will reevaluate whether the data should be assumed to be associated with different episodes in the final rule. EPA will consider using DMR data in the development of the final limitations and standards.

6. Inclusion of Effluent Data Based Upon Influent Values

Before including effluent data in the statistical analyses for the limitations and standards, EPA evaluated whether the influent concentrations were at treatable levels and whether the treatment system had efficient removal capability. While this same assumption was used in developing the proposed limitations and standards, EPA is including this discussion because many comments addressed the relationship between influent and effluent concentrations.

a. Evaluation of Treatable Levels

As in the proposal, the effluent data were used if EPA had some information indicating that the influent data were at the ''treatable'' level for the pollutant. As shown in DCN 36023 in section 19.1, this treatable level was defined as ten times the nominal quantitation limit that generally was associated with the analytical method most frequently used to measure samples collected during EPA's sampling episodes. (The nominal quantitation limit is the smallest quantity of an analyte that can be reliably measured with a particular method. The record items in section 19 generally refer to the 'nominal quantitation limit' as the ''baseline value.'') If the influent data were below the treatable level or just slightly above, EPA excluded the effluent data from the analyses for the limitations and standards.

If influent data corresponding to the same time period as the effluent data were unavailable, EPA used different assumptions depending upon the availability of other data about the facility. If influent data from a different time period were available and were at treatable levels, EPA included the effluent data in its analyses. If influent data were unavailable but EPA determined from other information about that facility that it generated the pollutants at treatable levels in the influent (for example, some automakers), then EPA included the effluent data in its analyses.

For the remaining episodes for which information about influent data were unavailable, EPA excluded their data in developing the option long-term averages and option variability factors. The episode long-term averages and variability factors for these episodes are located at DCN 36024 in section 19.1. Although EPA excluded these data from those analyses, EPA has included them in its evaluation of the preliminary revised limitations and standards. This comparison is described in section VI.A.1.c.

EPA applies this concept of ''treatability'' to the influent concentrations so that it selects effluent concentrations resulting from some treatment, rather than the absence, or relatively low levels, of the pollutant in the influent. Although EPA has used the term ''treatability levels,'' it does not mean to imply that lower levels cannot be treated by the model technologies. However, the lower levels may need less treatment than concentrations above the treatability levels that EPA has used in developing today's preliminary revised limitations and standards.

b. Removals

EPA also considered whether the treatment at the facility resulted in negative removals (i.e., the concentrations in the effluent were higher than the concentrations in the influent before treatment). Generally, EPA has excluded data that have negative removals. Exceptions are generally for Total Organic Carbon (TOC) or for removals that are close to zero. EPA requests comment on this approach. These exceptions are listed in DCN 36025 in section 19.1.

7. Minimum Data Values

For organic pollutants and hexane extractable material (HEM) which are measured by Methods 1624B/1625 and 1664 that use the minimum level (ML) concept, EPA has substituted the value of the minimum level for any detected concentration or sample-specific detection limit reported below the minimum level. EPA substituted the minimum level for these values because when an ML is published in a method, the Agency has demonstrated that at least one well-operated laboratory can achieve the ML, and when that laboratory or another laboratory uses

that method, the laboratory is required to demonstrate, through calibration of the instrument or analytical system, that it can make measurements at the ML (defined as the lowest level at which the entire analytical system must give a recognizable signal and an acceptable calibration point for the analyte). In its statistical models, EPA assumes that these substitutions are non-detected concentrations. These substitutions also are consistent with other recent guidelines. EPA considers these substitutions to be appropriate as well for the MP&M industry. Therefore, EPA has incorporated them into calculations of the revised limitations and standards.

8. Oil and Grease

In general, for the proposal and today's document, EPA used self-monitoring data when they were measured by analytical methods specified in or approved under 40 CFR part 136 that facilities are required to use for compliance monitoring. One exception was EPA's exclusion of all self-monitoring data for oil and grease measured by methods that require freon, an ozone-depleting agent, as an extraction solvent. Although EPA excluded oil and grease data from freon-based methods from the proposal, it had done so for other reasons (which are documented elsewhere) than the type of analytical method that was used. However, EPA is excluding some self-monitoring data from the NODA episodes because these data were determined by analytical methods that use freon. The following provides EPA's rationale for these exclusions.

Instead of using data measured by methods that require freon, EPA used only data from its sampling episodes and the self-monitoring data from a more recent method, Method 1664, which uses normal hexane (n-hexane) as the extraction solvent and measures oil and grease hexane extractable material. While developing Method 1664, EPA received comments about potentially differing results using the new method that could bring a permittee into noncompliance under certain circumstances (*see* DCNs 36026 and 36027, section 19.1). Although EPA has determined that the methods are comparable and that direct replacement of the new method is warranted, EPA expects that facilities will choose to use Method 1664 rather than the freon methods as freon becomes more expensive and difficult to obtain. Further, EPA has determined that it collected sufficient data to establish the oil and grease limitations using only the HEM data. Thus, EPA has chosen to develop the oil and grease limitations solely on the HEM measurements from Method 1664.

In evaluating the oil and grease data for today's document, EPA determined that its own sampling data in Phase 1 had been analyzed by EPA Method 413.2, a method utilizing freon. In addition to other reasons for excluding the data (i.e., due to its analytical method and other reasons documented elsewhere), EPA has determined that the data should be excluded because the method was unlikely to produce comparable results to methods approved under 40 CFR part 136 (such as EPA Method 413.1).

9. Data Aggregation

In reviewing its documentation after the proposal, EPA determined that it had incorrectly summarized the data aggregation procedure that EPA used for duplicates and grab samples in the statistical support document for the proposal. EPA determined that it had, in fact, used the same aggregation procedure used in developing its regulations for the Centralized Waste Treatment and the Iron & Steel industries. This procedure averages the values and assumes that the result is noncensored if one or more of the samples in the average has detected concentrations of the pollutant. In addition to using this procedure for the proposed MP&M limitations and standards, EPA has used this aggregation procedure in developing the revised limitations and standards from the NODA episodes.

10. Significant Digits

In presenting the preliminary revised limitations and standard in section VIII of today's document, EPA has rounded the results to three significant digits to conform with its usual procedure for presenting effluent limitations guidelines. The rounding procedure used for today's document rounds up values of five and above, and rounds down values of four and below, and is the same as that used in presenting the regulations for the Iron and Steel industry. This rounding procedure has minor differences from the procedure used at the proposal (*see* DCN 16385, section 10.0).

One exception is with reporting HEM results. Section 14.3 of EPA method 1664A requires reporting of results for HEM below 10mg/L to two significant digits. In section VIII, EPA has presented the limitations and standards for HEM with two significant digits when the corresponding concentration-based limitations were less than 10mg/L.

11. Data Transfers

For the proposal, EPA noted that it had transferred some option long-term averages and variability factors from one subcategory to another in order to calculate some limitations and standards (*see* section 5.3 and appendix C of the proposal statistical support document). Because new data were made available after the proposal, EPA is considering using these data wherever possible rather than transferring the option long-term averages and variability factors from the proposal. Thus, the preliminary revised limitations and standards incorporate these data to the extent possible.

For some subcategories, even with the additional data from the NODA episodes, EPA was unable to calculate the option long-term average and/or the option variability factors (*see* DCN 36028, section 19.1). This could occur for a pollutant in an option where no data were available or the episode data sets had too few noncensored measurements (i.e., the pollutant was not detected at measurable levels). For example, if a pollutant had all noncensored values for all of the episodes in an option, then it was not possible to calculate the option variability factors. The availability of more data allows for more choices in transferring option long-term averages and variability factors, therefore, EPA is considering some different transfers than it used for the proposal. In general, EPA has transferred option long-term averages and variability factors from one subcategory to another with the same model technology. The following describes the transfers that EPA used for today's preliminary revised limitations and standards and those that were used for the proposed limitations and standards.

For oil and grease (as HEM), in the subcategories with the option 2 model technology, only the General Metals (GENL) subcategory had both an option long-term average and option variability factors. For NSPS, EPA transferred those to the Non-Chromium Anodizers (ANO) and Printed Wiring Boards (PWB) subcategories which are also associated with the option 2 model technology. EPA was able to calculate an option long-term average for HEM in the Steel Forming and Finishing (SFF) subcategory (another option 2 subcategory), so only the option variability factors from the GENL subcategory for NSPS were transferred. In the proposal, EPA transferred both the option long-term average and variability factors for all four subcategories.

For total sulfide, the MFJ subcategory is the only subcategory with the option 2 technology that had both an option long-term average and option variability factors. Thus, these values were transferred to the GENL and SFF subcategories. For the PWB subcategory, because EPA was able to calculate an option long-term average, EPA transferred only the option variability factors from the MFJ subcategory for total sulfide. EPA notes that it may not regulate total sulfide in these subcategories for the final rule (*see* section IV.B.2). Since these subcategories all have the same technology basis, EPA has determined that these transfers are more appropriate than the transfers used for the proposal which were from the Oily Wastes subcategory, which uses a different technology basis.

For the SFF subcategory, EPA also was unable to calculate limitations and standards for cadmium and silver. Because the model technology is the same and the concentrations of these pollutants would be most similar to the GENL subcategory, EPA transferred the option long-term averages and option variability factors from this subcategory. EPA notes that as discussed in section IV.B, EPA is considering not regulating cadmium or silver for the SFF subcategory in the final rule. Because EPA transferred the GENL option long-term average and variability factors before the GENL proposed limitations and standards were compared against the revised limitations and standards, the SFF preliminary revised limitations and standards have values that are less than those for the GENL subcategory. This is because the proposed values for the GENL subcategory had greater values than the revised limitations and standards, and thus, EPA selected the proposed limitations and standards as the preliminary revised limitations for the GENL subcategory. However, EPA did not perform this same comparison for the SFF subcategory. For the final rule, EPA is considering whether the SFF subcategory should have the same limitations and standards as the GENL subcategory.

For the ANO subcategory, EPA was unable to calculate limitations and standards for manganese, nickel, and zinc due to insufficient data. Because the model technology is the same, EPA transferred the option long-term averages and option variability factors to the ANO subcategory from the GENL subcategory. These transfers were consistent with EPA's transfers for the proposal. EPA solicits comment on the approach used for data transfers.

12. Transfers of BPT Limitations from Other Rulemakings

For those subcategories for which EPA previously promulgated BPT/BCT limitations for TSS, O&G, and pH under other categorical guidelines, EPA proposed to transfer those values to the rule for the MP&M industry.

In particular, EPA proposed transferring the BPT/BCT limitations for oil and grease (O&G), TSS, and pH from the Metal Finishing effluent guidelines (*see* 40 CFR part 433.13) to the ANO, PWB, and MFJ subcategories. These are summarized in DCN 36060 in section 19.2. .

For the SFF subcategory, EPA proposed the same BPT/BCT limitations for O&G, TSS, and pH as it had proposed for the General Metals subcategory. EPA is now considering whether it should promulgate the less stringent BPT/BCT limitations for O&G, TSS, and pH from the Iron and Steel guidelines (*see* 40 CFR part 420) for this subcategory. These are summarized in DCN 36059 in section 19.2.

For NSPS for TSS and O&G, EPA intends to use the values calculated from its database except for the TSS NSPS for the Metal Finishing Job Shops (MFJ) subcategory. Because the TSS standards calculated from its database were greater than the BPT limitations, EPA is considering transferring the BPT limitations to NSPS. EPA also intends to review its database to determine if changes should be made to the data selection for TSS.

For the final rule, EPA intends to identify O&G limitations and standards calculated from the NODA episodes as ''O&G (HEM)' to indicate that the parameter should be measured as hexane extractable material (HEM). In contrast, EPA intends to retain the previous notation of ''O&G'' for the existing BPT/BCT limitations, and intends to include footnotes or definitions in the final rule that indicate it can be measured as HEM. EPA intends to use the two different notations because the existing BPT/BCT limitations and the limitations/standards calculated using the MP&M database were based upon analytical testing methods that used two different extraction solvents: freon and n-hexane, respectively. EPA has determined that the two methods are comparable (*see* DCNs 36026 and 36027 in section 19.2). Because freon is an ozone-depleting agent and becoming more expensive, EPA believes that facilities will prefer to measure oil and grease as HEM for the existing BPT limitations.

Except for the BPT/BCT limitations that it transferred, EPA notes that it assumed a weekly monitoring frequency in developing the proposed and preliminary revised limitations and standards. For the Metal Finishing guidelines, EPA assumed a monitoring frequency of 10 times a month in developing the BPT/BCT limitations. For the Iron and Steel guidelines, EPA assumed a daily monitoring frequency. These assumed monitoring frequencies are accounted for in the associated costs in assessing economic achievability of each rule. In general, the actual monitoring requirements will be determined by the permitting authority and compliance with the monthly average limitations and standards will be required in the final rule regardless of the number of samples analyzed and averaged. While the assumed monitoring frequency does not affect the calculated values of the option long-term average and the daily maximum limitation, it does affect the value of the monthly average limitation/standard.

13. Data Review for Final Rule

While EPA has reviewed the data for the NODA, EPA will conduct a more detailed engineering and statistical review of the data before the final rule, similar to that performed for other rules. The following paragraphs identify specific data reviews that EPA typically performs before promulgating a final rule.

For the proposal and NODA, EPA assigned various qualifiers to some data. These qualifiers are briefly explained in DCN 36029 in section 19.1 and most are described in section 10 of the proposal TDD. EPA excluded some data associated with some qualifiers (such as effluent associated with extremely low influent values). For the final rule, EPA intends to review the data exclusions as a result of the qualifiers. EPA also intends to reevaluate which data qualifiers justify data exclusions.

Comments on the proposal asserted that sample-specific detection limits were inflated for the influent data. EPA has conducted a brief review of the sample-specific detection limits and found that most appear to be the same as the nominal quantitation limits identified in the analytical methods (*see* DCN 36030, section 19.1). For the final rule, EPA will review the consequences of assuming that the concentration values are equal to the sample-specific detection limits for the few influent sample-specific detection limits that are elevated.

For the final rule, EPA intends to review graphical displays of the daily measurements in the larger episode data sets to evaluate patterns in the data, such as steadily increasing or decreasing

values over time or during certain time intervals. The plots may also indicate data values that should be reviewed further and possibly excluded because they appear to be outliers (*i.e.,* values that stand out as being extremely lower or higher than the others).

EPA also intends to review summary statistics for each episode (*see* DCNs 36031 and 36032, section 19.1). EPA may further review episodes with patterns such as minimum and maximum values far apart or extreme ranges in sample-specific detection limits. EPA will also evaluate whether some episodes appear to have data in ranges different from most other episodes in the same subcategory.

EPA also will review multiple grab measurements taken on the same day and field duplicates for extreme discrepancies between values. These measurements are listed in DCNs 36033 and 36034 in section 19.1. In addition, EPA will review its data listings of daily values (see DCN 36000, section 19.1). Where both influent and effluent are available, EPA will evaluate extreme discrepancies between influent and effluent at particular episodes. EPA also intends to review the EPA sampling data to verify that each sample day is listed for a particular pollutant unless otherwise specifically excluded. EPA will review the data for consistency and any unusual patterns (such as all values being associated with the same noncensored value over a period of time which can indicate nondetected values rather than measured values, lack of sensitivity in the laboratory procedures, or other causes).

VII. Revised Estimates of Costs, Loadings, Economic Impacts, and Cost-Effectiveness

A. Revised National Estimates of Economic Impacts

EPA is providing the results of its preliminary economic analysis results based on revised costs and selected changes in methodologies discussed above in section V. All analyses presented in this section incorporate new the costs and loadings and reflect use of the revised imputation methods and sample weights previously discussed in this document. To separate the effects of changes (i.e., revised costs, baseline loadings, removals, sample weights and imputation methods) from changes to the economic analysis, this section first presents a version of the analysis that applies the same economic impact methodologies used at proposal. The second analysis presents results using the revised cost pass-through coefficients discussed in section V.A of this document. The third analysis presents results based on a number of further changes in economic impact methodologies discussed in section V of this document. All other aspects of the economic analysis methodology remain as described in the proposal EEBA. The final part of this section presents economic impact analysis results for the Sand Filter Option described in section III of this document.

All results presented here remain in 1999 dollars, for purpose of comparison with the results of the proposed rule analysis. The analysis EPA will prepare for the final rule will be presented in 2001 dollars.

1. Results Using the Economic Impact Analysis Methodologies Used at Proposal

This section presents economic impact results using revised technical inputs (i.e., costs, baseline loadings, removals, imputation methods and sample weights), but applying the same economic impact analysis methodologies used at proposal. The analysis includes a larger number of facilities than in the proposed rule analysis (63,909 sample weighted facilities vs 62,752 at proposal). The revised imputation methods for flows allow analysis of additional facilities. In addition, some facilities were reclassified into different subcategories and a new Zinc Platers subcategory is being considered, as described in section III.A.1 of this document. Table VII.A–1 shows the number of facilities in each subcategory assessed as closures under baseline conditions. The differences in the totals between the two analyses reflects the larger number of facilities analyzed, the revised sample weights, and the reclassification of some facilities in different subcategories.

TABLE VII.A–1.—SUMMARY OF CHANGES IN THE TOTAL NUMBER OF DISCHARGERS AND BASELINE CLOSURES DUE TO CHANGES IN COSTS, WEIGHTS AND NUMBERS OF FACILITIES: EIA METHODOLOGIES USED AT PROPOSAL

Subcategory	Total number of dischargers		Number of baseline closures[a]	
	Proposed rule analysis	NODA analysis	Proposed rule analysis	NODA analysis[b]
General Metals	29,975	12,287	3,199	758
Metal Finishing Job Shop	1,530	1,189	286	60
Non-Chromium Anodizing	190	178	40	29
Printed Wiring Board	635	844	3	236
Steel Forming & Finishing	153	153	6	6
Oily Wastes	29,425	47,956	295	2,347
Railroad Line Maintenance	832	832	0	0
Shipbuilding Dry Dock	11	11	0	3
Zinc Platers	NA	458	NA	8
All Categories	62,762	63,909	3,829	3,447

[a] Both the proposed rule analysis and NODA analysis are based on proposed rule low flow cutoffs and exclusions.
[b] Changes in the number of facilities and closures are largely due to changes in the different subcategories and the facilities within them. For details see section III of this document.

The results of the post-compliance impact analyses are presented first for the PSES requirements considered for indirect discharging facilities, and then for the BAT/BPT options considered for direct discharging facilities. The comparisons are based on the Proposed Option and the NODA Option, both of which incorporate the low-flow cutoffs and exclusions of the Proposed Option. The differences in results are therefore due to the revised costs, loads and imputation methods, rather than to any changes in the regulatory option being analyzed. Similar comparisons excluding the proposed flow cut-offs and exclusions are available in section 17.1.1, DCN 35020, of the public record.

Table VII.A–2 presents economic impacts for indirect dischargers. Of the 56,169 indirect discharging facilities potentially subject to regulation after baseline closures, EPA estimates that 329 facilities or 0.6 percent could be expected to close as the result of the proposed rule, based on revised technical inputs. This compares with 179 facility closures or 0.3 percent predicted by the proposal analysis.

TABLE VII. A–2.—INCREMENTAL SEVERE IMPACTS (FACILITY CLOSURES) ON INDIRECT DISCHARGERS DUE TO CHANGES IN COSTS, WEIGHTS AND NUMBERS OF FACILITIES: EIA METHODOLOGIES USED AT PROPOSAL

Subcategory	Total operating in baseline		Number of facility closures due to the rule[a]	
	Proposed rule analysis	NODA analysis	Proposed rule analysis	NODA analysis
General Metals	23,140	10,115	24	93
Metal Finishing Job Shops	1,231	1,105	128	164
Non-Chromium Anodizing	150	113	0	0
Printed Wiring Board	620	604	7	25
Steel Forming & Finishing	105	106	6	6
Oily Wastes	28,219	42,891	14	17
Railroad Line Maintenance	799	802	0	0
Shipbuilding Dry Dock	6	3	0	0
Zinc Platers	NA	429	NA	24
All Categories	54,270	56,169	179	329

[a] Both the proposed rule analysis and NODA analysis are based on proposed rule low flow cutoffs and exclusions.

Another 627 facilities, or one percent of the indirect dischargers operating in the baseline, would experience moderate economic impacts under the proposed rule based on the revised costs, as shown in Table VII.A–3.

TABLE VII.A–3.—INCREMENTAL MODERATE IMPACTS ON INDIRECT DISCHARGERS DUE TO CHANGES IN COSTS, WEIGHTS AND NUMBERS OF FACILITIES: EIA METHODOLOGIES USED AT PROPOSAL

Subcategory	Total operating in baseline		Number of facilities experiencing moderate impacts due to the rule[a]	
	Proosed rule analysis	NODA analysis	Proosed rule analysis	NODA analysis
General Metals	23,140	10,115	153	121
Metal Finishing Job Shops	1,231	1,105	117	150
Non-Chromium Anodizing	150	113	0	24
Printed Wiring Board	620	604	301	293
Steel Forming & Finishing	105	106	4	14
Oily Wastes	28,219	42,891	0	9
Railroad Line Maintenance	799	802	0	0
Shipbuilding Dry Dock	6	3	0	0
Zinc Platers	NA	429	NA	16
All Categories	54,270	56,169	575	627

[a] Both the proposed rule analysis and NODA anaysis are based on proposed rule low flow cutoffs and exclusions.

Governments own 5,005 of the 56,169 indirect discharging facilities in the revised analysis. Of these, 43 incur compliance costs above one percent under the proposed rule, but none of the affected governments experience significant impacts as a result.

Table VII.A–4 presents the results of the same analyses for direct discharging facilities. Of the 4,293 direct dischargers subject to regulation after baseline closures, EPA estimates that 27 facilities or 0.6 percent could be expected to close as the result of the proposed rule.

TABLE VII.A–4.—INCREMENTAL SEVERE IMPACTS (FACILITY CLOSURES) ON DIRECT DISCHARGERS DUE TO CHANGES IN COSTS, WEIGHTS AND NUMBERS OF FACILITIES: EIA METHODOLOGIES USED AT PROPOSAL

Subcategory	Total operating in baseline		Number of facility closures due to the rule[a]	
	Proposed rule analysis	NODA analysis	Proposed rule analysis	NODA analysis
General Metals	3,636	1,444	20	13
Metal Finishing Job Shops	12	24	0	0
Non-Chromum Anodizing	.....	35	.....	0
Printed Wiring Board	11	4	0	0

TABLE VII.A–4.—INCREMENTAL SEVERE IMPACTS (FACILITY CLOSURES) ON DIRECT DISCHARGERS DUE TO CHANGES IN COSTS, WEIGHTS AND NUMBERS OF FACILITIES: EIA METHODOLOGIES USED AT PROPOSAL—Continued

Subcategory	Total operating in baseline		Number of facility closures due to the rule[a]	
	Proposed rule analysis	NODA analysis	Proposed rule analysis	NODA analysis
Steel Forming & Finishing	43	41	0	0
Oily Wastes	911	2,688	0	13
Railroad Line Maintenance	34	31	0	0
Shipbuilding Dry Dock	6	6	0	0
Zinc Platers	NA	21	NA	0
All Categories	4,653	4,293	20	27

[a] Both the proposed rule analysis and NODA analysis are based on proposed rule low flow cutoffs and exclusions.

Another 46 facilities, or one percent of the direct dischargers operating in the baseline, are expected to experience moderate economic impacts under the proposed rule, as shown in Table VII.A–5.

TABLE VII.A–5.—INCREMENTAL MODERATE IMPACTS ON DIRECT DISCHARGERS: EIA METHODOLOGIES USED AT PROPOSAL

Subcategory	Total operating in baseline		Number of facility experiencing moderate impacts due to the rule rule[a]	
	Proposed rule analysis	NODA analysis	Proposed rule analysis	NODA analysis
General Metals	3,636	1,741	34	15
Metal Finishing Job Shops	12	24	0	0
Non-Chromum Anodizing	.....	35	.....	24
Printed Wiring Board	11	4	0	0
Steel Forming & Finishing	43	41	7	7
Oily Wastes	911	2,391	.....	.....
Railroad Line Maintenance	34	31	0	0
Shipbuilding Dry Dock	6	6	0	0
Zinc Platers	NA	21	NA	0
All Categories	4,653	4,293	41	46

[a] Both the proposed rule analysis and NODA analysis are based on proposed rule low flow cutoffs and exclusions.

Governments own 722 of the 4,293 direct discharging facilities in the revised analysis. Of these, 236 (or 33 percent) incur compliance costs above one percent of their baseline cost of service under the proposed rule, but none of the affected governments experience significant impacts as a result.

2. Results With Revised Cost Pass-Through Coefficients

Table VII.A–6 presents economic impacts using the revised cost pass-through coefficients described in section V.A of this document.

TABLE VII.A–6.—INCREMENTAL CLOSURES AND MODERATE IMPACTS FOR NODA OPTION: ORIGINAL CPT VERSUS REVISED CPT[a]

Subcategory	Total operating in baseline	Incremental closures		Incremental moderate impacts	
		CPT used at proposal	Revised CPT	CPT used at proposal	Revised CPT
General Metals	11,559	107	110	121	127
Metal Finishing Job Shops	1,129	164	245	150	150
Non-Chromum Anodizing	148	0	0	24	24
Printed Wiring Board	608	25	28	293	346
Steel Forming & Finishing	148	6	6	14	14
Oily Wastes	45,579	31	31	9	9
Railroad Line Maintenance	832	0	0	0	0
Shipbuilding Dry Dock	9	0	0	0	0
Zinc Platers	450	24	81	16	16
All Categories	60,462	356	500	627	686

[a] Both the proposed rule analysis and NODA analysis are based on proposed rule low flow cutoffs and exclusions. These analyses include new costs, weights, and number of facilities.

Use of the revised cost pass-through coefficients result in an additional 144 closures and 59 moderate impacts.

Table VII.A–7 shows the estimated percentage price increases that result from use of the revised cost pass-through coefficients, by sector. These estimated percentage price increases are estimated for, and apply only to, the segment of the industry sectors that is estimated to incur costs as a result of the MP&M regulation. In all cases, the price increases are less than one percent.

TABLE VII.A–7.—SECTOR PERCENTAGE PRICE INCREASES PREDICTED BY NEW COST PASS-THROUGH COEFFICIENTS (NODA ANALYSIS)

Sector	Percent sector price increase [a]
Aerospace	0.04
Aircraft	0.03
Bus & Truck	0.06
Electronic Equipment	0.04
Hardware	0.08
Household Equipment	0.02
Instruments	0.08
Iron & Steel	0.20
Metal Finishing Job Shops	0.60
Mobile Industrial Equipment	0.17
Motor Vehicle	0.07
Office Machines	0.00
Ordnance	0.12
Other Metal Products	0.04
Precious & Non-Precious Metals	0.03
Printed Wiring Board	0.00
Railroad	0.01
Ships & Boats	0.03
Stationary Industrial Equipment	0.05

[a] Based on an analysis including revised costs and weights, financial data updated using sector-specific producer price indices, and new cost-pass-through coefficients. This analysis does not include other methodology changes discussed in the NODA.

3. Results Based on Revised Economic Impact Methodologies

Section V of this document discusses a number of changes EPA is considering making to the economic impact methodologies. This section presents economic impact analysis results based on a number of these changes, including:

- Use of sector-specific thresholds for the moderate impact analysis tests (pre-tax return on sales (PTRS) and interest coverage ratio (ICR);
- Use of a single test, based on net present value, to assess the potential for closures; this test excludes consideration of liquidation values for all MP&M facilities, including the 219 facilities that reported them in their response to the MP&M survey;
- Including baseline capital outlays in the calculation of cash flow;
- Updating survey data using sector-specific price indices;
- Adjusting labor costs for facilities that report abnormally high labor costs; and
- Limiting post-compliance tax shields to no greater than reported baseline taxes.

These results also include revised costs, imputation methods, and sample weights, and use the revised cost pass-through coefficients.

Table VII.A–8 shows the effects of these methodology changes in combination, compared with results based on the proposal economic impact methodologies combined with revised cost pass-through coefficients.

TABLE VII.A–8.—BASELINE CLOSURES AND INCREMENTAL CLOSURES AND MODERATE IMPACTS FOR THE PROPOSED RULE, WITH AND WITHOUT CHANGES IN ECONOMIC IMPACT ANALYSIS METHODOLOGIES

Subcategory	Total operating in baseline [a]		Incremental closures		Incremental moderate impacts	
	Without changes [b]	With changes [c]	Without changes [b]	With changes [c]	Without changes [b]	With changes [c]
General Metals	11,559	11,435	110	111	127	151
Metal Finishing Job Shops	1,129	1,139	245	520	150	36
Non-Chromium Anodizing	148	148	0	0	24	0
Printed Wiring Board	608	605	28	55	346	56
Steel Forming & Finishing	148	148	6	17	14	17
Oily Wastes	45,579	46,286	31	1	9	0
Railroad Line Maintenance	832	832	0	0	0	0
Shipbuilding Dry Dock	9	9	0	0	0	0
Zinc Platers	450	435	81	93	16	0
All Categories	60,462	61,036	500	797	686	260

[a] See Table VII.A–1 for baseline closures.
[b] Results of revised cost pass-through analysis as reported in Table VII.A–6 are included in the ''Without Changes'' columns.
[c] The results based on revised EIA methodologies also include the revised cost pass-through coefficients.

Use of the new economic impact analysis methodologies results in an increase in estimated closures for the General Metals, Metal Finishing Job Shops, Printed Wiring Board, Steel Forming and Finishing, and Zinc Plater subcategories and in a decrease in estimated closures for the Oily Waste subcategory. This result primarily reflects the recognition of ongoing capital expenditures in the cash flow analysis and use of a single test for closures.

The difference in estimated moderate impacts reflect the lower sector-specific PTRA and ICR thresholds estimated based on industry data. These lower thresholds affected both baseline and moderate impacts, with a net decrease in impacts attributed to the proposed rule. EPA concluded that the revised thresholds provide a more realistic measure of financial distress. As noted by commenters, the thresholds used in the proposal analysis resulted in substantial portions of the MP&M facilities being classified as experiencing financial distress even under baseline conditions. The sector-specific thresholds result in a more reasonable characterization of baseline conditions and of the incremental impacts of the proposed rule on financial stress.

B. Revised National Estimates of Cost-Effectiveness

EPA performed a revised cost-effectiveness analysis based on the revised estimates of costs, loadings and removals described previously. 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 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.

For the proposal, EPA based BPT and BAT limitations on the same technology for all subcategories. Because the Agency does not evaluate the cost-effectiveness of BPT technology (*see* relevant discussion in the Centralized Waste Treatment ELG Proposal; 64 FR 2306) and EPA proposed BAT limitations that are equivalent to BPT limitation, EPA is only providing the cost-effectiveness analysis for indirect dischargers.

Table VII.B–1 summarizes the total cost-effectiveness analysis for the PSES regulatory option applicable to indirect dischargers, by subcategory. This analysis reflects the flow cutoffs and exclusions of the proposed rule, and includes all revised inputs. Estimates of costs and pollutant removals do not include facilities that close in the baseline.

TABLE VII.B–1.—COST-EFFECTIVENESS FOR INDIRECT DISCHARGERS BY SUBCATEGORY

Subcategory	NODA incremental before-tax compliance cost (million $1981)	NODA incremental removals (lbs-eq)	NODA cost-effectiveness ratio ($1981/lb-eq)	Cost-effectiveness ratio, proposal analysis ($1981/lb-eq)
General Metals	300.56	683,305	440	136
Metal Finishing Job Shops	45.14	64,199	703	39
Non-Chromium Anodizing	.....	.....	.....	.....
Oily Wastes	50.58	8,989	5,627	178
Printed Wiring Boards	76.08	138,458	549	68
Railroad Line Maintenance	.....	.....	.....	.....
Shipbuilding Dry Dock	.....	.....	.....	.....
Steel Forming & Finishing	9.69	63,368	153	68
Zinc Platers [a]	38.13	97,304	392	NA
All Indirect Dischargers	520.18	1,055,623	493	108

[a] Assuming no flow cutoff.

C. Results for the Sand Filter Option

EPA is considering a Sand Filter Option for the metal-discharging subcategories, as described in section III of this document. Table VII.C–1 presents economic analysis results for this option. This analysis is based on all revised inputs, revised cost pass-through coefficients, and new economic impact analysis methodologies.

TABLE VII.C–1.—ECONOMIC IMPACT ANALYSIS RESULTS AND COST-EFFECTIVENESS FOR THE SAND FILTER OPTION

Subcategory	Number of facilities operating in the baseline	Incremental closures	Incremental moderate impacts	Incremental before-tax compliance costs (million $1981)	Increment. removals (lbs-eq)	Cost-effect. ratio ($1981/lb-eq) [a]
All Dischargers with Metal-Bearing Dischargers						
General Metals	11,435	1,025	1,323	1,615.19	3,612,966	NA
Metal Finishing Job Shops	1,139	565	47	46.27	94,586	NA
Non-Chromium Anodizing	148	91	0	26.91	2,445,414	NA
Printed Wiring Boards	605	80	56	85.94	161,618	NA
Steel Forming & Finishing	148	19	15	29.12	180,814	NA
Zinc Platers [b]	435	93	0	52.97	164,137	NA
Total	13,910	1,872	1,442	1,856.40	6,659,535	NA
All Indirect Dischargers with Metal-Bearing Dischargers						
General Metals	11,316	1,028	1,498	1,072.14	1,985,066	540
Metal Finishing Job Shops	1,115	577	36	44.65	92,575	482
Non-Chromium Anodizing	113	91	0	6.07	5,622	1,081
Printed Wiring Boards	600	84	60	85.66	161,586	530
Steel Forming & Finishing	106	17	11	13.83	64,136	216

TABLE VII.C–1.—ECONOMIC IMPACT ANALYSIS RESULTS AND COST-EFFECTIVENESS FOR THE SAND FILTER OPTION—Continued

Subcategory	Number of facilities operating in the baseline	Incremental closures	Incremental moderate impacts	Incremental before-tax compliance costs (million $1981)	Increment. removals (lbs-eq)	Cost-effect. ratio ($1981/lb-eq) [a]
Zinc Platers [b]	414	93	12	49.90	163,200	306
Total	13,664	1,889	1,616	1,272.26	2,472,185	515

[a] Cost-Effectiveness is applicable to indirect dischargers only.
[b] Assuming no flow cutoff.

D. Revised National Estimates of Monetized Benefits

EPA is providing preliminary environmental assessment and benefits analysis results based on revised pollutant loadings. All analyses presented in this section incorporate changes to technical inputs including pollutant loadings, sample weights, a larger number of sample MP&M facilities, and reclassification of some facilities into different discharge categories as described in section III.G of today's document. To separate the effects of the revised pollutant loadings and sample weights from benefits analysis changes, EPA first presents a version of the analysis that applies the same benefit analysis methodologies used at proposal. The proposal EEBA describes all aspects of the environmental assessment and benefits analysis methodologies. The second analysis presents benefits results using the revised methodologies and data discussed in section V of today's document but does not incorporate changes in the environmental assessment and benefits analysis methodologies. The third benefits results reflect all changes documented in today's document (e.g., changes in loadings, environmental assessment, and benefits analysis methodologies).

Like the revised estimates of economic impacts, the benefits results presented here use 1999 dollars to enable comparison with the results of the proposed rule analysis. The benefit analysis EPA prepares to accompany the final rule will be presented in 2001 dollars. Benefits results apply to the NODA option only (i.e., benefits were only estimated for Options 2, 6, and 10 with the proposed flow cut-offs and exclusions). The NODA option includes the same exclusions and flow cutoffs as the proposed option thus benefits were not estimated for the basic and advanced treatment options without flow cutoffs.

1. Human Health Benefits

EPA used revised pollutant loading estimates to analyze 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.

1.a Reduced incidence of cancer cases

Table VII.D–1 presents revised total benefits from reduced incidence of cancer cases, including both drinking water and fish exposures.

TABLE VII.D–1.—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$)
Proposed Rule						
Baseline	5.10	N/A[1]	0.13	N/A	5.23	N/A
# Cases/Value	2.86	$13.01	0.08	$0.26	2.94	$13.27
Percent Reduction	43.9	N/A	35.7	N/A	43.9	N/A
NODA Option (Includes Changes to Technical Inputs Only)[2]						
Baseline	0.45	N/A	0.53	N/A	0.98	N/A
# Cases/Value	0.22	$1.34	0.17	$2.10	0.39	$3.45
Percent Reduction	51.5	N/A	67.8	N/A	60.4	N/A
NODA Option With All Changes in Today's Document						
Baseline	4.82	N/A	0.69	N/A	5.51	N/A
# Cases/Value	1.87	$18.00	0.21	$2.96	2.08	$20.95
Percent Reduction	61.2	N/A	69.9	N/A	62.3	N/A

[1] Not Applicable.
[2] The NODA Option analysis (including the NODA option with technical input changes only (*e.g.,* changes in loadings methodology) and the NODA option with all changes in today's Document) does not include cancer effects associated with exposure to lead.
Source: U.S. Environmental Protection Agency.

EPA introduced two methodology changes that affect the estimated incidence of cancer cases. First, EPA corrected the POTW flow assigned to small receiving POTWs with missing flow information. Second, EPA updated the list of drinking water intake sites used for estimating cancer cases from drinking water. These changes are discussed in section V of this document.

EPA estimates that cancer cases under the NODA option with all changes in today's Notice and revised pollutant loadings will decrease from annual baseline levels of 4.82 to 1.87 for drinking water cancer cases and from 0.69 to 0.21 for fish consumption cancer cases, and will result in monetary benefits of $18.00 million and $2.96 million (1999$), respectively, for drinking water and fish consumption cancer cases.

Total benefits from reduced exposure to carcinogens are $20.95 million (1999$) annually under the NODA option with all changes in today's document.

1.b Reductions in Systemic Health Effects

The change in exposure to pollutants through fish and water consumption results in improvements in human health and well-being. One way of measuring these effects is to compare the reduction in pollutant exposure to pollutant-specific health effects thresholds. The Agency used the revised pollutant loading estimates to calculate in-stream pollutant concentrations for 77 pollutants that are toxic to body systems. EPA then compared estimated in-stream pollutant concentrations with risk reference doses to calculate a hazard score. The Agency calculated the distribution of hazard scores for drinking water and fish consumption populations for baseline and post-compliance exposures. The results for the proposed rule showed a movement in populations from higher risk values to lower risk values for both the fish and drinking water analyses. Both analyses show substantial increases in the percentage of the exposed populations that would be exposed to ''no risk of systemic health hazards.'' Results for all options show similar movements in populations from higher risk values to lower risk values for both drinking water and fish consumption populations (*see* section 17.7.1, DCN 35561 and section 17.7.2, DCN 35611).

1.c Benefits From Reduced Exposure to Lead

Table VII.D–2 presents revised benefit estimates associated with reduced exposure to lead. The analysis assessed benefits of reduced lead exposure from consumption of contaminated fish tissue to three sensitive populations: (1) Preschool age children, (2) pregnant women, and (3) adult men and women.

TABLE VII.D–2: NATIONAL LEAD-RELATED BENEFITS

[Millions of 1999 $ per year]

Benefits Category	Children		Adult Men		Adult Women		Total	
	Reduced Cases	Monetary Value	Reduced Cases	Monetary Value	Reduced Cases	Monetary Value	Reduced Cases	Monetary Value
Proposed Rule								
Neonatal Mortality	1.6	$9.33	.....	.....	.....	.....	1.6	$9.33
Avoided IQ loss	489.1	$4.93	.....	.....	.....	.....	489.1	$4.93
Reduced IQ<70	1.7	$0.13	.....	.....	.....	.....	1.7	$0.13
Reduced Pb>20 mg/L	0.1	$0.00	.....	.....	.....	.....	0.1	$0.00
Hypertension	.....	.....	959.8	$1.01	N/A	N/A	959.8	$1.01
CHD	.....	.....	1.2	$0.09	0.4	$0.03	1.6	$0.11
CBA	.....	.....	0.5	$0.14	0.2	$0.03	0.7	$0.17
BI	.....	.....	0.3	$0.08	0.1	$0.02	0.4	$0.10
Mortality	.....	.....	1.7	$9.85	0.4	$2.38	2.1	$12.23
NODA Option (Includes Changes to Technical Inputs Only)								
Neonatal Mortality	0.8	$4.48	.....	.....	.....	.....	0.8	$4.48
Avoided IQ loss	229.4	$2.31	.....	.....	.....	.....	229.4	$2.31
Reduced IQ<70	0.8	$0.06	.....	.....	.....	.....	0.8	$0.06
Reduced Pb>20 mg/L	0.0	$0.00	.....	.....	.....	.....	0.0	$0.00
Hypertension	.....	.....	468.0	$0.49	N/A	N/A	468.0	$0.49
CHD	.....	.....	0.6	$0.04	0.2	$0.01	0.8	$0.06
CBA	.....	.....	0.3	$0.07	0.1	$0.02	0.3	$0.08
BI	.....	.....	0.1	$0.04	0.1	$0.01	0.2	$0.05
Mortality	.....	.....	0.8	$4.88	0.2	$1.17	1.0	$6.05
NODA Option With all Changes in Today's Document								
Neonatal Mortality	0.8	$5.10	.....	.....	.....	.....	0.8	$5.10
Avoided IQ loss	3,345.6	$33.71	.....	.....	.....	.....	3,345.6	$33.71
Reduced IQ<70	11.4	$0.83	.....	.....	.....	.....	11.4	$0.83
Reduced Pb>20 mg/L	0.9	$0.02	.....	.....	.....	.....	0.9	$0.02
Hypertension	.....	.....	507.9	$0.53	N/A	N/A	507.9	$0.53
CHD	.....	.....	0.7	$0.05	0.2	$0.01	0.9	$0.06
CBA	.....	.....	0.3	$0.07	0.1	$0.02	0.4	$0.09
BI	.....	.....	0.2	$0.04	0.1	$0.01	0.2	$0.05
Mortality	.....	.....	0.9	$5.59	0.2	$1.34	1.1	$6.93

Source: U.S. Environmental Protection Agency

EPA estimates that the NODA option with all changes in today's document, including the changes in methodology for estimating lead benefits for children discussed in section V of this document, results in an avoided IQ loss of 3,346 points and an accompanying monetary benefit of $33.71 million (1999$) across all children. In addition, EPA estimates that reduced occurrences of extremely low IQ scores (<70) and reduced incidence of blood-lead levels above 20 mg/dL will reduce the annual cost of compensatory education for children with learning disabilities by $0.85 million (1999$). EPA also estimates a reduced incidence of neonatal mortality by 0.8 case annually. The estimated monetary value of benefits from reduced neonatal mortality is $5.10 million (1999$).

Quantified adult health effects include increased incidence of hypertension (estimated for males only), initial coronary heart disease (CHD), strokes (cerebrovascular accidents (CBA) and atherothrombotic brain infarctions (BI)), and premature mortality.

EPA estimates that the NODA option with all changes in today's document reduces hypertension by an estimated 508 cases annually among males, resulting in benefits of approximately $0.53 million (1999$). Reducing the incidence of initial CHD, strokes, and premature mortality results in estimated benefits of $0.06, $0.14, and $6.93 million (1999$), respectively. Overall, adult lead-related benefits are $7.67 million annually (1999$).

Total benefits from reduced exposure to lead, including both children and adults, are $47.33 million (1999$) annually under the NODA option with all changes in today's document. 1.d Exceedances of Human Health-Based AWQC for Consumption of Water and Organisms

EPA also estimated the effect of MP&M facility discharges by comparing pollutant concentrations in affected waterways to ambient water criteria for the protection of human health. Table VII.D–3 presents results of this analysis.

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

Regulatory Status	Number of Reaches With MP&M Pollutant Concentrations Exceeding Human Health-based AWQC Limits		Number of Benefitting Reaches			
			All AWQC Exceedances Eliminated		Number of AWQC Exceedances Reduced	
	For Consumption of Water and Organisms	For Consumption of Organisms Only	For Consumption of Water and Organisms	For Consumption of Organisms Only	For Consumption of Water and Organisms	For Consumption of Organisms Only
Proposed Rule						
Baseline	10,310	192	N/A	N/A	N/A	N/A
Proposed Option	9,205	71	1,105	121	382	8
NODA Option (Includes Changes to Technical Inputs Only)						
Baseline	4,611	185	N/A	N/A	N/A	N/A
NODA Option	3,667	119	944	66	196	15
NODA Option With all Changes in Today's Document						
Baseline	5,994	209	N/A	N/A	N/A	N/A
NODA Option	4,827	124	1,167	85	233	19

Source: U.S. Environmental Protection Agency

EPA estimates that the NODA option with all changes in today's document eliminates the occurrence of concentrations in excess of human health criteria for consumption of water and organisms on 1,167 of the 5,994 reaches on which baseline discharges are estimated to cause concentrations in excess of AWQC values. Likewise, EPA estimates that under this option the rule eliminates the occurrence of concentrations in excess of human health criteria for consumption of only organisms on 85 of the 209 reaches on which baseline discharges are estimated to cause concentrations in excess of AWQC limits. In addition, EPA expects that partial water quality improvements from reduced occurrence of some pollutant concentrations in excess of AWQC limits will occur at 233 and 19 receiving reaches, respectively, for consumption of water and organisms and for consumption of organisms only.

2. Ecological, Recreational, and Nonuser Benefits

This analysis combines the findings from the aquatic life benefits analysis and the human health AWQC exceedance analysis described previously. Table VII.D–4 presents estimated changes in occurrences of pollutant concentrations exceeding aquatic life and/or human health AWQC values based on the pollutant loading estimates used for the proposed rule analysis and the revised pollutant loading estimates. EPA expects that 6,051 stream reaches will exceed chronic or acute aquatic life AWQC and/or human health AWQC values at the baseline discharge levels based on the NODA analysis. The NODA option with all changes in today's document is expected to eliminate AWQC exceedances on 1,179 of these reaches. Of the remaining 4,872 reaches with concentrations of one or more pollutants that exceed AWQC limits in the baseline, EPA expects that 592 of these reaches will experience partial water quality improvements from reduced occurrence of some pollutant

concentrations in excess of AWQC limits.

TABLE VII.D–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 Exceedances Eliminated	Number of AWQC Exceedances Reduced
Proposed Rule			
Baseline	10, 443	N/A	N/A
Post Compliance	9,258	1,185	1,837
NODA Option (Includes Changes to Technical Inputs Only)			
Baseline	4,663	N/A	N/A
Post Compliance	3,702	960	555
NODA Option With all Changes in Today's Document			
Baseline	6,051	N/A	N/A
Post Compliance	4,872	1,179	592

Source: U.S. Environmental Protection Agency

EPA attached a monetary value to these reduced exceedances based on increased values for recreational fishing. The NODA analysis excludes monetized estimates for additional benefits categories, specifically recreational boating and near-water recreation, and higher estimates for non-use benefits based on these additional benefits categories. EPA was unable to update boating and near-water analysis for the NODA option because valuation of these additional benefits categories is partially based on results from the Ohio case study analysis. As noted in the preceding sections of this document, because of the timing of the NODA, new pollutant loading estimates have not been estimated for the MP&M facilities that completed the Ohio case study questionnaire. The Agency will estimate these additional benefits categories in the final rule analysis. A detailed discussion of the recreational benefits analysis methodology appears in the proposal EEBA. Table VII.D–5 presents the estimated national recreational benefits of the proposed rule, the NODA option with the technical inputs, and the NODA option with all changes in today's document.

EPA estimated recreational fishing benefits of $365.36 million (1999$) for the proposed rule. Based on the revised pollutant loadings, the increased number of MP&M sample facility locations (i.e., use of additional questionnaires), and corrections in POTW flows. EPA estimates recreational fishing benefits of $346.11 million (1999$) for the NODA option with all changes in today's document.

5. Productivity Changes: Cleaner Sewage Sludge (Biosolids)

Under the proposed rule, EPA estimated that 62 POTWs would be able to select the land application disposal based on estimated reductions in sludge contamination. An estimated 1.17 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 estimated $61.3 million (1999$) in annual cost savings for the POTWs expected to upgrade their sludge disposal practices.

Based on the revised loadings and changes in the estimated flow for small POTW facilities, EPA estimates that 39 POTWs would be able to select the lower-cost land application disposal method under the NODA option with all changes in today's document. Only 0.11 million dry metric tons (DMT) of sewage sludge is expected to newly qualify for land application annually under the NODA option with all changes in today's Notice. The annual estimated cost savings for the POTWs expected to upgrade their sludge disposal practices decreases to $5.59 million (1999$) under the NODA option with all changes in today's document. EPA estimates that an additional 28 POTWs that previously met only the land application pollutant limit will be able to meet the more stringent land application concentration limits under the NODA option with all changes in today's document. Commenters raised concerns with EPA's analysis of POTW cost savings and the ability of some POTWs to upgrade their sludge disposal practices. As noted earlier, AMSA recently surveyed the same POTWs as EPA did for the 1997 POTW survey, including asking about disposal practices. EPA is in the process of evaluating this new information. For the final rule, the Agency will consider changes to the POTW benefits analysis based on the new data.

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

EPA estimated that partial benefits under the NODA option for the four categories for which monetary estimates were possible at this time (Categories 1–4 in Table VII.D–5). The benefits for these four categories are $419.97 million (1999$) annually. Enhanced boating and viewing benefits will be estimated for the final rule based on the changes in technical inputs and the methodology changes discussed earlier. Nonuse benefits will be estimated based on ½ recreational benefits.

Estimates detailed in the NODA omit three categories of benefits (Categories 5–7 in Table VII.D–5) that will be

estimated for the final rule, and therefore underestimate the total benefits of the rule. As in the proposal, the NODA results also omit additional benefits to society that may result from reduced MP&M effluent discharges such as swimming; non-cancer health benefits (other than benefits from reduced exposure to lead); and the reduced cost of drinking water treatment for the pollutants with drinking water criteria.

TABLE VII.D–5.—ESTIMATED BENEFITS FROM REDUCED MP&M DISCHARGES (ANNUAL BENEFITS—MILLION $ 1999) [1]

Benefit category	NODA option (changes to technical inputs only)	NODA option with all changes in today's document
1. Reduced Cancer Risk:.		
Fish Consumption	$2.10	$2.96
Water Consumption	$1.34	$18.00
2. Reduced Risk from Exposure to Lead:.		
Children	$6.85	$39.66
Adults	$6.73	$7.67
3. Avoided Sewage Sludge Disposal Costs	$7.68	$5.59
4. Enhanced Fishing	$328.33	$346.11
5. Enhanced Boating	Not Estimated	To Be Estimated
6. Enhanced Viewing	Not Estimated	To Be Estimated
7. Nonuse benefits (½ of Recreational Use	Not Estimated	To Be Estimated
Total Monetized Benefits [1]	Not Estimated	To Be Estimated

[1] See also Chapter 19 of the proposal EEBA (U.S. Environmental Protection Agency).

VIII. Preliminary Revised Limitations and Standards

A. Technology Option 2

Technology Option 2 includes in-process flow control and pollution prevention, segregation of wastewater streams, preliminary treatment steps as necessary (including oils removal using oil-water separation by chemical emulsion breaking), chemical precipitation using lime or sodium hydroxide, and sedimentation using a clarifier.

At proposal EPA based the BPT, BCT, and BAT proposed effluent limitations guidelines on Option 2 for existing direct dischargers in the General Metals, Metal Finishing Job Shops, Non-Chromium Anodizing, Printed Wiring Board, and Steel Forming and Finishing Subcategories. EPA also based the proposed pretreatment standards for existing sources (PSES) on Option 2 for the General Metals, Metal Finishing Job Shops, Printed Wiring Boards, and Steel Forming & Finishing Subcategories.

EPA did not propose PSES nor pretreatment standards for new sources (PSNS) for the Non-Chromium Anodizing Subcategory. EPA proposed new source performance standards (NSPS) for new direct dischargers in the Non-Chromium Anodizing Subcategory based on Option 2. Additionally, at proposal, EPA did not calculate new BPT limitations for TSS or oil and grease for the Non-Chromium Anodizing, Metal Finishing Job Shops, and Printed Wiring Board subcategories. Instead, EPA set them at the same level as in the Metal Finishing effluent guidelines (*see* 40 CFR 433.13). EPA is again not calculating new BPT limitations for TSS or oil and grease in today's document for these subcategories.

Table VIII.A–1 presents the concentration-based preliminary revised limitations and standards for Option 2. However, in the final rule, EPA intends to promulgate limitations and standards in terms of pounds per 1000 pounds of production for the different types of operations in this subcategory. EPA has converted the concentration-based preliminary revised limitations and standards to mass units using the production values in Table 14–7 of the proposal TDD. These Mass based limits for the Steel Forming & Finishing based on Option 2 are presented in the record (*see* section 19.2, DCNs 36056 and 36059).

TABLE VIII.A–1.—PRELIMINARY REVISED LIMITATIONS AND STANDARDS (MG/L) FOR TECHNOLOGY OPTION 2

Analyte	GENL Daily	GENL Monthly	MFJ Daily	MFJ Monthly	PWB Daily	PWB Monthly	ANO Daily	ANO Monthly	SFF Daily	SFF Monthly	ZINC Daily	ZINC Monthly
ALUMINUM	.....	.....	.....	.....	.....	.....	8.20	4.00	.....	.....	.....	.....
AMENABLE CYANIDE	0.140	0.0700	0.140	0.0700	0.140	0.0700	.....	.....	0.140	0.0700	.....	.....
CADMIUM	0.140	0.0900	0.210	0.0900	.....	.....	.....	.....	0.0447	0.0274	.....	.....
CHROMIUM	0.250	0.140	2.80	0.905	0.0795	0.0330	.....	.....	0.0315	0.0151	1.44	0.492
COPPER	0.550	0.280	1.30	0.570	2.15	1.01	.....	.....	0.111	0.0463	.....	.....
CYANIDE	0.362	0.170	0.362	0.170	0.362	0.170	.....	.....	0.362	0.170	.....	.....
LEAD	0.189	0.0853	0.156	0.0945	0.432	0.208	.....	.....	0.803	0.273	.....	.....
MANGANESE	0.475	0.255	0.250	0.100	1.30	0.640	0.475	0.255	0.305	0.216	.....	.....
MOLYBDENUM	0.790	0.490	0.100	0.0829	.....	.....	.....	.....	0.0687	0.0590	.....	.....
NICKEL	0.636	0.339	1.50	0.640	0.411	0.187	0.636	0.339	0.0983	0.0658	.....	.....
OIL AND GREASE (AS HEM) †	23.3	14.4	23.3	14.4	23.3	14.4	23.3	14.4	12.4	7.7	.....	.....
SILVER	0.220	0.0900	0.252	0.0845	.....	.....	.....	.....	0.111	0.0443	.....	.....
TIN	1.40	0.670	1.80	1.40	0.310	0.140	.....	.....	0.0838	0.0444	.....	.....
TOTAL ORGANIC CARBON (TOC)	87.0	50.0	78.0	59.0	101.0	67.0	.....	.....	47.0	37.7	.....	.....
TOTAL ORGANICS PARAMETER	6.65	3.24	6.65	3.24	6.65	3.24	.....	.....	6.65	3.24		
TOTAL SULFIDE	0.676	0.475	0.676	0.475	6.52	4.58	.....	.....	0.676	0.475	.....	.....
TOTAL SUSPENDED SOLIDS †	42.2	21.2	33.2	16.9	83.1	35.9	56.0	23.3	37.4	24.0	.....	.....
ZINC	0.748	0.352	0.677	0.323	0.0364	0.0269	0.748	0.352	1.45	0.582	2.52	1.34

Note: GENL = General Metals, MFJ = Metal Finishing Job Shops, PWB = Printed Wiring Board, ANO = non-chromium anodizing, SFF = Steel Forming & Finishing, Zinc = Zinc Platers

† The values for Oil and Grease (as HEM) were calculated from the NODA episodes. See discussion on BPT limitations and NSPS for these pollutants in section VI.C.12.

B. Technology Option 4

Technology Option 4 includes in-process flow control and pollution prevention, segregation of wastewater streams, preliminary treatment steps as necessary (including oils removal by ultrafiltration), chemical precipitation using lime or sodium hydroxide, and solids separation using a microfilter.

At proposal EPA based the NSPS and PSNS (new source standards) on Option 4 for the General Metals, Metal Finishing Job Shops, Printed Wiring Boards, and Steel Forming and Finishing Subcategories. EPA is currently reviewing whether to promulgate final limits based on the proposed technology option (Option 4) for new sources in the metal-bearing subcategories (*see* section IX.A) or whether Option 2 is sufficient. EPA is not presenting preliminary revised limitations and standards for Option 4 in today's document.

C. Technology Option 6

Technology Option 6 includes in-process flow control, pollution prevention, and oil-water separation by chemical emulsion breaking. At proposal EPA based the BPT, BCT, BAT, PSES, NSPS, and PSNS effluent limitations guidelines and pretreatment standards on Option 6 for the Oily Wastes Subcategory. Option 6 includes in-process flow control, pollution prevention, and oil-water separation by chemical emulsion breaking. Table VIII.C–1 presents the preliminary revised limitations and standards for Option 6.

TABLE VIII.C–1.—PRELIMINARY REVISED LIMITATIONS AND STANDARDS (MG/L) FOR TECHNOLOGY OPTION 6

Analyte	OILY daily	OILY monthly
OIL AND GREASE (AS HEM)	45.9	26.0
TOTAL ORGANIC CARBON (TOC)	633.0	378.0
TOTAL ORGANICS PARAMETER	6.65	3.24
TOTAL SULFIDE	31.3	13.3
TOTAL SUSPENDED SOLIDS	63.0	31.0

Note: OILY = Oily Wastes

D. Technology Option 10

Technology Option 10 includes in-process flow control, pollution prevention, and oil-water separation by dissolved air flotation. At proposal EPA based the BPT, BCT, BAT, and NSPS effluent limitations guidelines and pretreatment standards for the Shipbuilding Dry Dock and Railroad Line Maintenance Subcategories on Option 10. EPA did not propose pretreatment standards for new or existing sources in the Shipbuilding Dry Dock and Railroad Line Maintenance Subcategories. Table VIII.D–1 presents the preliminary revised limitations and standards for Option 10.

EPA proposed limitations and standards for biochemical oxygen demand measured as 5-day biochemical oxygen demand (BOD_5). In examining its data, EPA determined that it had used biochemical oxygen demand data measured as 5-day carbonaceous biochemical oxygen demand ($CBOD_5$). In some cases, BOD_5 will have higher concentration values than $CBOD_5$. Thus, in today's document, EPA is clarifying which form of biochemical oxygen demand it proposed to regulated (i.e., $CBOD_5$).

TABLE VIII.D–1.—PRELIMINARY REVISED LIMITATIONS AND STANDARDS (MG/L) FOR TECHNOLOGY OPTION 10

Analyte	DRYD daily	DRYD monthly	RRL daily	RRL monthly
BOD 5–DAY (CARBONACEOUS)	.....	.....	7.20	5.83
OIL AND GREASE (AS HEM)	34.3	17.5	8.4	6.9
TOTAL SUSPENDED SOLIDS	81.0	44.0	20.5	13.7

Note: DRYD = Shipbuilding Dry Dock, RRL = Railroad Line Maintenance

IX. Consideration of Alternative Options

Based on the data received with comments, data corrections, and changes to certain methodologies for the proposed rule, EPA is presenting cost, pollutant reduction, and economic impact estimates (see section VII of today's document). EPA will consider these revised results in its decisions for the final rule. In the sections below, EPA discusses in detail the options for the General Metals, Metal Finishing Job Shop, Printed Wiring Board, Oily Wastes, Railroad Line Maintenance, and Steel Forming & Finishing.

Commenters requested that EPA consider alternatives to the preferred options selected for the proposal for certain subcategories. As a result of additional data and comments, EPA is reconsidering: (1) the options for BPT/BAT limitations for specified subcategories; and (2) the proposed option for new sources for the metal-bearing subcategories. EPA is also considering: (1) the use of an Environmental Management System for the General Metals Subcategory; (2) a variety of options to reduce economic impacts in several subcategories; and (3) a change in the proposed technology option for the Railroad Line Maintenance Subcategory. These alternatives are discussed in more detail below. In addition, as recommended by the Small Business Advocacy Review Panel for the proposed rule (66 FR 524), EPA may consider a ''no regulation'' option or change in the low wastewater flow exclusions in the final rule for several subcategories ''to reduce any significant economic impacts that are not justified by environmental improvements and to improve the cost-effectiveness of the regulation.'' EPA is also considering the ''no further regulation'' option in the final rule for several subcategories.

A. Consideration of Change in New Source Technology Option for Metal-Bearing Subcategories

EPA is reviewing whether to promulgate final limits based on the proposed technology option for new sources in the metal-bearing subcategories. EPA proposed new source standards for the General Metals, Metal Finishing Job Shops, Printed Wiring Board, and Steel Forming & Finishing subcategories. EPA proposed standards based on the following treatment technology: segregation of chelated wastes, hexavalent chromium reduction (when necessary), cyanide destruction (when necessary), ultrafiltration for oils removals,

incorporation of pollution prevention and water conservation practices, chemical precipitation (by sodium hydroxide), and solids separation by a microfilter (''Option 4''). EPA proposed existing source limits based on ''Option 2''—a similar treatment train except chemical emulsion breaking is used for preliminary treatment of oily wastes and the microfilter is replaced by a lamella slant plate clarifier. EPA notes that it proposed setting new source limits equal to existing source limits for Non-Chromium Anodizing, the other metal-bearing subcategory.

EPA solicited comment and data on two alternative options for new sources in those metal-bearing subcategories (66 FR 534, solicitation 26; 66 FR 536, solicitation 39). The first alternative would establish new source limits for these subcategories based on Option 2 technology with an ultrafilter substituting for chemical emulsion breaking and oil/water separator. The second alternative would establish new source limits completely based on Option 2 with the corresponding new source limits equal to the existing source limits.

EPA received many comments requesting that EPA not set new sources limits based on Option 4 technology. Commenters stated that EPA had under-costed Option 4 technology and that it would be a barrier to entry for new facilities. In addition, commenters questioned the completeness of EPA's database on microfiltration. Commenters noted that EPA transferred limits for several pollutants from Option 2 technology, based on lack of data. EPA did not receive additional sampling data for microfiltration. Therefore, EPA is considering for the final rule, as discussed in the proposal, setting new source limitations and pretreatment standards based on Option 2 technology. This means the final limits would be equal for existing sources and new sources in the subcategories discussed in this section. EPA again solicits comment on basing the new source technology option on Option 2.

B. General Metals Subcategory

In the proposed rule EPA proposed numerical limitations and pretreatment standards for the General Metals Subcategory based on Option 2 technology (see section IX.A above for description of Option 2). EPA selected Option 2 technology based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits as determined at the time of the proposal. These estimates have changed based on public comments as described in previous sections of today's document. Therefore, EPA is reconsidering alternative options to reduce the economic impact, and solicits comment on potential approaches. EPA is also considering promulgating pretreatment standards for new and existing sources as equivalent to 40 CFR part 433 for the General Metals Subcategory.

EPA notes that zinc platers in the General Metals Subcategory are not considered in the following analyses but are analyzed separately (see section 17.5, DCN 17761). EPA is considering the same General Metals Subcategory options for this potential new zinc plater subcategory (see section III.A.1).

1. Consideration of an Environmental Management System Based Alternative for the General Metals Subcategory

In the preamble for the proposal (66 FR 513), EPA solicited comment on offering a pollution prevention alternative with an environmental management system (EMS) component to the Metal Finishing Job Shops Subcategory as well as other subcategories, including the General Metals Subcategory. In response to the solicitation, EPA received a suggestion for an EMS-based alternative for the General Metals subcategory from an industry group formed by several facilities and industry trade associations representing the General Metals Subcategory. The following explains what an EMS is and explains the suggested alternative.

EMSs provide organizations of all types with a structured approach for managing environmental and regulatory responsibilities to improve overall environmental performance, including areas not subject to regulation. EMSs can also help organizations better integrate the full scope of environmental considerations and get better results, by establishing a continuous process of checking to make sure environmental goals are met. EMS implementation ensures that procedures are in place for taking remedial action if problems occur. From a business perspective, benefits may include cost savings, increased operational efficiency and competitiveness, risk reduction, improved internal communication, and improved relations with external parties. EMSs typically incorporate a feedback mechanism that supports measurement of performance against a set of measurable objectives and provides a mechanism for correction or preventive action. EMSs do not replace the need for regulatory and enforcement programs, but they can complement them.

A strong EMS does not just set rules for employees: it tracks performance, fosters proactive identification and correction of problems, and provides a mechanism to prevent problems from recurring. Many organizations are adopting EMSs as a management tool. EPA encourages the use of EMSs because these tools have the potential to improve compliance rates and environmental performance.

In its comments to EPA, an industry group suggested that EPA consider an EMS-based alternative to the final part 438 (MP&M) effluent limits for facilities in the General Metals subcategory (see section 16.4, DCN 17793). The alternative would authorize certain facilities to continue to be subject to part 433 under the circumstances discussed below. Table IX.B–1 provides the conditions for the EMS-based alternative proposed by an industry group.

TABLE IX.B–1.—EMS-BASED ALTERNATIVE PROPOSED BY AN INDUSTRY GROUP

The facility has BAT technology (or its equivalent) in place and shall certify at the time of each permit renewal that it has installed and operates, at a minimum, the equivalent of Best Available Technology used to set BAT/PSES limitations in 40 CFR part 438 Rule and implementation of the following practices:

- Ensure that the wastewater treatment system has established pH set points to optimize metal removal efficiencies and a pH monitoring system;
- Have a system to monitor tank levels or wastewater flow;
- As requested, provide documentation of applicable preventive maintenance of the treatment systems and calibration schedules;
- Maintain for a period of one year and, as requested, provide wastewater treatment system operations logs;
- Maintain for a period of one year and, as requested, provide documentation of wastewater treatment system procedures or protocols;
- Compliance with part 433 monthly average PSNS or NSPS limitations, as appropriate; and
- ISO 14001 Certification or Employment of an Environmental Management System (EMS).

The industry group also suggest the following forfeiture criteria:

A facility would forfeit the right to participate in this EMS-based alternative, if:

TABLE IX.B–1.—EMS-BASED ALTERNATIVE PROPOSED BY AN INDUSTRY GROUP—Continued

• BAT is removed, not operational, or not operated in accordance with the procedures noted above; • monthly average PSNS or NSPS part 433 limitations are exceeded; or • ISO 14001Certification is withdrawn and an EMS program is demonstrated to be inadequate. The industry group suggested that if any of the forfeiture criteria is met, then the permitting authority may find that the facility has forfeited the right to employ the EMS-based alternative, and require that such facility come into compliance with 40 CFR part 438 BAT or PSES limitations no later than six months after such right is withdrawn, with the exception that a longer period of time may be provided to facilities at which construction beyond BAT is required to meet the 40 CFR part 438 BAT or PSES limitations.

Source: Section 16.4, DCN 17793 of the public record.

If EPA were to include such an EMS-based alternative in the final rule, the Agency would consider making the following changes to the industry's suggested plan. First, EPA would consider amending the condition that reads ''ISO 14001 Certification or Employment of an Environmental Management System (EMS)'' to read ''ISO 14001 Certification.'' EPA has some concerns that ''third-party certification'' without some form of accreditation, as required by ISO, may not provide the level of assurance EPA, state, and local agencies would need to allow for this alternative. Second, EPA would consider amending the forfeiture criteria to read as follows:

''A facility would forfeit the right to participate in this EMS-based alternative, if:

• BAT is removed, not operational, or not operated in accordance with the procedures noted above; or

• monthly average PSNS or NSPS Part 433 limitations are exceeded.''

EPA is also considering and solicits comments on the following amendments to the industry plan (*see* Table IX.B–1).

(1) Requiring the permitting authority to determine whether the facility has installed and is operating the equivalent of BAT;

(2) Requiring compliance with the industry plan through the facility's permit;

(3) Requiring facilities to maintain records for a period of at least three years and, as requested, provide documentation of applicable preventive maintenance of the treatment systems and calibration schedules;

(4) Requiring facilities to certify that they have implemented and will continue to comply with the industry plan; and

(5) Requiring facilities to monitor tank levels, in accordance with a system approved by the permitting authority, in addition to having a system to do so.

Additionally, under the industry proposal, the permitting authority would be authorized to find that a facility had forfeited the right to participate in the EMS-based alternative, in one of three circumstances (*e.g.,* ''monthly average PSNS or NSPS part 433 limitations are exceeded). If the permitting authority find that a facility has forfeited the right to participate, the facility would have up to 6 months to come into compliance with 40 CFR part 438 BAT or PSES limitations, with the possibility of an extension. As drafted, this alternative may place an unreasonable resource burden on the permitting authority to make a forfeiture determination before the facility is required to meet the part 438 limitations. In addition, the facility will not have certainty as to the consequences of its failure to meet the EMS-based requirements. To address these concerns, EPA seeks comment on requiring, as part of a permit, that a facility come into compliance with 40 CFR part 438 BAT or PSES limitation within 6 months of failing to meet one or more of three forfeiture conditions identified by industry (*see* Table IX.B–1) or as otherwise determined by the permitting agency. In the absence of such a provision, the facility may be out of compliance for an extended period.

EPA also seeks comment on the extent to which exceedances of monthly average PSNS or NSPS part 433 limitations should require that the facility come into compliance with 40 CFR part 438. In the absence of a clear standard, there will be no firm basis upon which to require that the facility meet 40 CFR part 438.

EPA also seeks comment on the following issues:

• Requiring facilities that forfeit the right to participate in this EMS-based alternative to comply with the new source limits of the Metal Finishing (40 CFR part 433) regulations instead of limits established under 40 CFR part 438.

• Ways in which EPA can ensure compliance with the part 433 limits and standards, as well as compliance with a facility's EMS, if this option were chosen for the final rule.

• What is the frequency of self and third-party auditing? Also, should the regulation requires that the results of all third-party audits must be submitted to the regulatory authority in a timely manner and available to the public upon request?

• What qualifications and certification should the regulation require for the use of third-party auditors?

• To what extent should data on the facility's environmental performance be communicated to the public?

• Should the participating facility provide an opportunity for the public to comment on its environmental aspects, impacts, objectives and targets when developing the EMS?

• Beyond EPA's amendment to the industry-based plan what specific circumstances of noncompliance would trigger a return to 40 CFR part 438?

EPA recognizes that developing an EMS would cause a facility to incur certain costs. Therefore, in addition to soliciting overall comments on this EMS-based alternative, EPA would like to receive any information on the existing costs of EMS implementation for General Metals operations, both on a per-facility and firm basis. Types of costs that could be relevant include staff and consultant costs, certification, documentation and recordkeeping, and costs of upgrading operations to make them conform to the EMS elements (*i.e.,* statement of environmental compliance policy, monitoring and measurement targets, corrective action plan, self-assessment procedure, and personnel trained in accordance with EMS).

EPA is concerned that such an option may only be achievable by larger facilities that currently have or are working toward ISO 14001 Certification. EPA solicits comment on whether small and medium size facilities can or would use an EMS alternative as described above, and whether formal guidance and assistance from the Agency would be necessary to utilize this alternative. EPA also solicits comment from state and local regulators on their need for formal guidance from the Agency to implement this alternative and on the implementation burden, cost, and enforceability of this alternative. EPA also solicits comment on what modifications to a formal ISO 14001 process would be needed to

accommodate small and medium size businesses.

2. No Regulation or No Further Regulation

EPA estimated at proposal that 26 percent of the facilities in the General Metals Subcategory are regulated by existing ELGs. EPA received many comments from industry and Publicly Owned Treatment Works (POTWs) that these facilities are adequately regulated under the current ELGs or that local limits can address water quality concerns in sensitive water bodies. Commenters concluded that the environmental impacts and pollutant loading reductions that would be achieved by the MP&M rule, once corrected for errors, would clearly demonstrate that the costs and impacts associated with the MP&M regulation would not be justified.

Section VII of today's document reports the revised estimates of costs, pollutant reductions, and economic impacts. Briefly, EPA estimates that compliance with the revised limitations and standards would result in facility closures for 91 of 2,055 (4.4%) indirect dischargers. The revised estimates of cost-effectiveness for indirect dischargers increased to $440/pound-equivalent removed. Based on EPA's revised estimates of costs, pollutant removals, economic impacts and benefits discussed in section VII of today's document, EPA is again considering an option of no regulation or no further regulation for indirect dischargers in this subcategory for the final rule. EPA solicits comment on this option.

3. Changes Considered in Regulatory Thresholds

EPA is considering an increase in the 1 million gallon per year (MGY) low flow cutoff used at proposal for indirectly discharging General Metals facilities. As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Therefore, EPA is considering increasing the low flow cutoff at various levels or other regulatory thresholds (*e.g.,* based on facility size such as employment, production, or revenue) to provide relief to indirect dischargers in this subcategory from significant economic impacts.

Table IX.B–2 below shows the national estimates of compliance costs (1999$), pollutant reductions (in pound-equivalents per year), economic impacts, and cost-effectiveness (1981$/pound-equivalent removed) for varying levels of flow cutoff for indirect discharge facilities in the General Metals Subcategory.

TABLE IX.B–2.—SUMMARY FOR LOW FLOW CUTOFF FOR THE INDIRECT DISCHARGERS IN THE GENERAL METALS SUBCATEGORY (ZINC PLATERS NOT INCLUDED)

Flow cutoff	Number of sites	Industry compliance cost (1999$) (millions)	Pollutant reductions (lb-eq.)	Severe economic impacts (facility closures, %)	Cost-effectiveness (1991$/lb.eq.)
1 MGY	2,055	636	1,240,219	91 (4%)	440
2 MGY	1,455	549	1,066,154	91 (6%)	436
3 MGY	1,187	505	1,016,616	79 (7%)	441
6.25 MGY	725	397	634,312	55 (8%)	893

Note: Cost-Effectiveness estimates are not incremental and do not include costs or removals for facilities that close in the baseline and use all NODA changes in economic methodologies.

4. 413 to 433 Upgrade Option

As recommended by the Small Business Advocacy Review Panel for the proposed rule (66 FR 524), EPA is considering regulatory alternatives which reduce significant economic impacts. EPA considers the ''413 to 433 Upgrade Option'' to be an alternative regulatory option. The 413 to 433 Upgrade Option would bring into alignment those facilities currently required to meet the standards of the Electroplating effluent limitations guidelines (ELGs) (40 CFR part 413) with those required to meet the limitations and standards of the Metal Finishing ELGs (40 CFR part 433), rather than promulgating the MP&M limitations and standards provided in today's document. EPA expects such an option (''413 to 433 Upgrade Option'') would significantly reduce EPA's estimate of economic impacts while achieving some environmental improvements over current conditions.

Currently, the only facilities that are still completely covered by the Electroplating ELGs are indirect discharging facilities that were in existence prior to 1982 and have not significantly upgraded their operations. If a facility modified its operations significantly, this would trigger new source standards and the facility would be subject to the Metal Finishing ELGs, which are more stringent than the Electroplating ELGs. In EPA's view most facilities are likely to either be completely covered by the Metal Finishing ELGs or by a combination of the two ELGs to account for new operations in their permit (*see* Table III.E–1 for national estimates).

In the 413 to 433 Upgrade Option, EPA would set limits for all facilities in the General Metals Subcategory that are currently regulated under part 413 equivalent to those in the Metal Finishing ELGs (40 CFR part 433). If EPA determines that the revised MP&M numeric limitations and standards, based on best available control technology, are not economically achievable, EPA may determine that the technology in-place at facilities currently complying with the Metal Finishing ELGs is the best available technology economically achievable. In that case, the limits and standards developed using the technology basis used for the Metal Finishing regulations (*i.e.,* the limits in part 433) would be based on the best available technology economically achievable. In addition, this option may reduce burden on POTWs by clarifying several points of confusion relating to the Metal Finishing regulations that have required significant review over the past 20 years (*e.g.,* when is an operation acid etching versus acid cleaning).

EPA estimates a total annual compliance cost of $7.2 million (1999$) for the 286 indirect General Metals facilities currently covered only by the Electroplating regulations (*see* Table III.E–1 for national estimates) to comply with the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). Of the 286 General Metals facilities regulated by part 413, EPA estimates that there

would be 18 baseline closures and 31 regulatory closures due to the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). These compliance costs are on average less than $31,000/year for each General Metals facility that will upgrade from part 413 to 433. EPA also estimates annual reduction in pollutants discharged to POTWs of approximately 35,000 pound-equivalents (approximately 148 PE-removed/facility-year). This would result in an approximate cost-effectiveness number of $120/pound-equivalent removed (1981$). EPA solicits comment on this option, including the difficulty in interpreting part 413 and 433 applicability, cost of upgrading treatment systems, facility space constraints, possible POTW burden, improvements to sludge quality, and economic impacts.

EPA also notes that there was a group of facilities identified in the original Electroplating effluent guidelines that received a reduced set of limitations (*i.e.,* fewer parameters and different controls on cyanide) based on economic impacts (these facilities discharge less than 10,000 gallons per day). EPA will assess the economic impact on these facilities to determine if there is a need to reduce the economic burden associated with this option, if chosen for the final regulation. Table IX.B–3 provides EPA's national estimate of facilities that are currently covered under the Electroplating regulations (40 CFR part 413) that discharge less than 10,000 gallons per day.

TABLE IX.B–3.—NATIONAL ESTIMATE OF FACILITIES DISCHARGING LESS THAN 10,000 GALLONS PER DAY THAT ARE CURRENTLY COVERED UNDER THE ELECTROPLATING ELGS (40 CFR PART 413)[a]

MP&M subcategory	Assuming facility operation 250 days/year		Assuming facility operation 360 days/year	
	Direct discharges	Indirect discharges	Direct discharges	Indirect discharges
General Metals	50[b] (None are Zinc Platers)	363[c] (29 are Zinc Platers)	78[b] (None are Zinc Platers)	384[c] (29 are Zinc Platers)
Metal Finishing Job Shops	0	148[c] (None are Zinc Platers)	0	217[c] (12 are Zinc Platers)
Printed Wiring Board	0	524	0	531
Oily Waste	0	7	0	0

[a] These national estimates include facilities that are regulated under 40 CFR part 413, 40 CFR parts 413 and 433, and 40 CFR parts 413, 433, and other ELGs.
[b] These sites have both direct and indirect discharges but indicated coverage under Part 413 in their survey response.
[c] These national estimates also include ''Zinc Platers'' (*see* section III.A.1).

EPA solicits comment on these national estimates of facilities and their economic condition.

C. Metal Finishing Job Shops Subcategory

In the proposed rule EPA proposed numerical limitations and pretreatment standards for the Metal Finishing Job Shops Subcategory based on Option 2 technology (*see* section IX.A above for description of Option 2). EPA selected Option 2 technology based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits as determined at the time of the proposal. These estimates have changed based on public comments as described in previous sections of today's document. Therefore, EPA solicits comment on the following alternative options. In addition, EPA will continue to consider the Pollution Prevention Alternative described in the proposal (66 FR 512).

EPA notes that zinc platers in the Metal Finishing Job Shops Subcategory are not considered in the following analyses but are analyzed separately (*see* section 17.5, DCN 17761). EPA is considering the same Metal Finishing Job Shops Subcategory options for this potential new zinc plater subcategory (*see* section III.A.1).

1. No Further Regulation

One option considered in the proposed rule was no further regulation for the Metal Finishing Job Shops Subcategory. All facilities in this subcategory are currently regulated under the Electroplating (40 CFR part 413) or Metal Finishing (40 CFR part 433) regulations. EPA received many comments from industry and Publicly Owned Treatment Works (POTWs) that metal finishing job shops are adequately regulated under the current regulations and that local limitations can address water quality concerns in sensitive water bodies, including monitoring for pollutants not covered by federal standards. Commenters concluded that the environmental impacts and pollutant loading reductions that would be achieved by the MP&M rule, once corrected for errors, would clearly demonstrate that the costs and impacts associated with the MP&M regulation would not be justified.

As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Briefly, EPA estimates that compliance with the revised limitations and standards would result in facility closures for 12 of 24 (50%) direct dischargers and for 508 of 1165 (44%) indirect dischargers. In addition, EPA performed a sensitivity analysis to determine the economic effects of the proposal if facilities could pass zero percent of compliance costs to customers. This would increase closures for indirect dischargers in this subcategory by 15%. The revised estimates of cost-effectiveness for indirect dischargers increased to $500/pound-equivalent removed.

Based on EPA's revised estimates of costs, pollutant removals, economic impacts and benefits discussed in section VII of today's document, EPA is again considering an option of no further regulation for this subcategory for the final rule. An EPA decision not to promulgate further regulations would based on a determination that the regulations were not economically achievable. EPA solicits comment on this option.

2. 413 to 433 Upgrade Option

As described in section IX.B.4, EPA is considering an upgrade option (''413 to 433 Upgrade Option'') which would bring into alignment those facilities

currently required to meet the standards of the Electroplating effluent limitations guidelines (ELGs) (40 CFR part 413) with those required to meet the limitations and standards of the Metal Finishing ELGs (40 CFR part 433), rather than promulgating the MP&M limitations and standards provided in today's document. EPA expects the 413 to 433 Upgrade Option would significantly reduce EPA's estimate of economic impacts while achieving some environmental improvements over current conditions.

EPA estimates a total annual compliance cost of $1.4 million (1999$) for the 278 indirect Metal Finishing Job Shop facilities currently covered only by the Electroplating regulations (*see* Table III.E–1 for national estimates) to comply with the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). Of the 278 Metal Finishing Job Shop facilities regulated by part 413, EPA estimates that there would be no baseline closures and 24 regulatory closures due to the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). These compliance costs are on average less than $5,600/year for each Metal Finishing Job Shop facility that will upgrade from part 413 to 433. EPA also estimates annual reduction in pollutants discharged to POTWs of approximately 35,000 pound-equivalents (approximately 138 PE-removed/facility-year). This would result in an approximate cost-effectiveness number of $23/pound-equivalent removed (1981$). EPA solicits comment on this option, including the difficulty in interpreting parts 413 and 433 applicability, cost of upgrading treatment systems, facility space constraints, possible POTW burden, improvements to sludge quality, and economic impacts.

EPA also notes that there was a group of facilities identified in the original Electroplating effluent guidelines that received a reduced set of limitations (*i.e.,* fewer parameters and different controls on cyanide) based on economic impacts (these facilities discharge less than 10,000 gallons per day). EPA will assess the economic impact on these facilities to determine if there is a need to reduce the economic burden associated with this option, if chosen for the final regulation. Table IX.B–3 provides EPA's national estimate of facilities that are currently covered under the Electroplating regulations (40 CFR part 413) that discharge less than 10,000 gallons per day. EPA solicits comment on these national estimates of facilities and their economic condition.

3. Changes Considered in Regulatory Thresholds

EPA is reconsidering the use of a low flow cutoff for indirectly discharging Metal Finishing Job Shops. In the proposal, EPA discussed the use of a 1 million gallon per year low flow exclusion for these sites (66 FR 466). However, at the time of proposal EPA did not select this alternative because, based on the cost, pollutant reductions, and economic impact estimates at the time, ''the Agency concluded that the pollutant reductions associated with Option 2 were feasible and achievable and the economic impacts were not substantially mitigated under the 1 MGY flow cutoff.'' As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Therefore, EPA is reconsidering the use of a low flow cutoff at various levels or other regulatory threshold (*e.g.,* based on facility size such as employment, production, or revenue) to provide relief to facilities in this subcategory from significant economic impacts.

Table IX.C–1 below shows the national estimates of compliance costs (1999$), pollutant reductions (in pound-equivalents per year), economic impacts, and cost-effectiveness (1981$/pound-equivalent removed) for varying levels of flow cutoff for indirect discharge facilities in the Metal Finishing Job Shops Subcategory.

TABLE IX.C–1.—SUMMARY FOR LOW FLOW CUTOFF FOR THE INDIRECT DISCHARGERS IN THE METAL FINISHING JOB SHOPS SUBCATEGORY (NOT INCLUDING ZINC PLATERS)

Flow cutoff	Number of sites	Industry compliance cost (1999$) (millions)	Pollution reductions (lb-eq)	Severe economic impacts (facility closurs, %)	Cost-effectiveness (1981$/lb.eq.)
No Cutoff	1,165	151	93,190	508 (44%)	500
1 MGY	547	94	77,644	278 (51%)	383
2 MGY	421	80	73,324	176 (42%)	316
3 MGY	235	56	50,090	176 (75%)	282
6.25 MGY	142	43	47,953	117	186

Note: Cost-Effectiveness estimates are not incremental and do not include costs or removals for facilities that close in the baseline and use all NODA changes in economic methodologies.

D. Printed Wiring Board Subcategory

In the proposed rule, EPA set numerical limits and pretreatment standards for the Printed Wiring Board Subcategory based on Option 2 technology (*see* section IX.A above for description of Option 2). EPA selected Option 2 based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits as estimated at the time of the proposal. These estimates have changed based on public comments as described in previous sections of today's document. Therefore, EPA is considering alternative options to reduce the economic impact, and solicits comment on potential approaches.

1. No Further Regulation

EPA is considering the same types of alternative options for the Printed Wiring Board Subcategory as it is for the Metal Finishing Job Shops Subcategory. That is, EPA is considering a ''No Further Regulation'' option and an option that would include the use of a low flow cutoff (or other regulatory threshold) to reduce the economic impacts estimated for this subcategory. EPA is also considering clarifying the part 433 regulations to reduce the burden on permit writers and upgrading all sites to meet the part 433 regulations.

EPA received many comments from industry and Publicly Owned Treatment Works (POTWs) that indirect discharging printed wiring board sites are adequately regulated under the current regulations and that local limitations can address water quality concerns in sensitive water bodies. Commenters concluded that the environmental impacts and pollutant

loading reductions that would be achieved by the MP&M rule, once corrected for errors, would clearly demonstrate that the costs and impacts associated with the MP&M regulation would not be justified.

As shown in section VII of today's document, EPA estimates severe economic impacts (facility closures) for 62 of 840 (7%) indirect dischargers (or when baseline closures are included, EPA estimates 10% closures). EPA notes that the revised estimates of cost-effectiveness for indirect dischargers are high as well ($455/pound-equivalent removed). Based on EPA's revised estimates of costs, pollutant removals, economic impacts and benefits discussed in section VII of today's document, EPA is considering an option of no further regulation for indirect dischargers in this subcategory for the final rule. EPA solicits comment on this option.

2. 413 to 433 Upgrade Option

As described in Section IX.B.4, EPA is considering an upgrade option (''413 to 433 Upgrade Option'') which would bring into alignment those facilities currently required to meet the standards of the Electroplating effluent limitations guidelines (ELGs) (40 CFR part 413) with those required to meet the limitations and standards of the Metal Finishing ELGs (40 CFR part 433), rather than promulgating the MP&M limitations and standards provided in today's document. EPA expects the 413 to 433 Upgrade Option would significantly reduce EPA's estimate of economic impacts while achieving some environmental improvements over current conditions.

EPA estimates a total annual compliance cost of $0.33 million (1999$) for the 354 indirect Printed Wiring Board facilities currently covered only by the Electroplating regulations (*see* Table III.E–1 for national estimates) to comply with the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). Of the 354 Printed Wiring Board facilities regulated by Part 413, EPA estimates that there would be three baseline closures and 18 regulatory closures due to the 413 to 433 Upgrade Option (*see* section 17.1.7, DCN 35080). These compliance costs are on average less than $1,000/year for each Printed Wiring Board facility that will upgrade from Part 413 to 433. EPA also estimates annual reduction in pollutants discharged to POTWs of approximately 35,000 pound-equivalents (approximately 105 PE-removed/facility-year). This would result in an approximate cost-effectiveness number of $6/pound-equivalent removed (1981$). EPA solicits comment on this option, including the difficulty in interpreting parts 413 and 433 applicability, cost of upgrading treatment systems, facility space constraints, possible POTW burden, improvements to sludge quality, and economic impacts.

EPA also notes that there was a group of facilities identified in the original Electroplating effluent guidelines that received a reduced set of limitations (*i.e.,* fewer parameters and different controls on cyanide) based on economic impacts (these facilities discharge less than 10,000 gallons per day). EPA will assess the economic impact on these facilities to determine if there is a need to reduce the economic burden associated with this option, if chosen for the final regulation. Table IX.B–3 provides EPA's national estimate of facilities that are currently covered under the Electroplating regulations (40 CFR part 413) that discharge less than 10,000 gallons per day. EPA solicits comment on these national estimates of facilities and their economic condition.

3. Printed Wiring Board Direct Dischargers

In addition, EPA estimates no facility closures for direct dischargers in this subcategory associated with estimated MP&M compliance costs, however, based on today's revised analysis EPA currently estimates only four direct discharge printed wiring board facilities nationwide. Based on this revised estimate and the low level of estimated pollutant removals for these sites (*i.e.,* approximately 536 pounds of O&G and TSS, 12,000 pounds of COD, and 39 pounds of toxics and non-conventional pollutants), EPA is considering whether or not revised nationally-applicable regulations are necessary at this time because of the small number of facilities in this subcategory. The Agency concluded that the current limitations and the addition of water-quality based local limits established for individual NPDES permits may more appropriately address individual conventional, toxic and nonconventional pollutants that may be present at these four facilities.

4. Changes Considered in Regulatory Thresholds

As discussed in section IX.C above, EPA may also consider the use of a low flow exclusion or other regulatory threshold to reduce significant economic impacts; however, the Agency notes that based on the analyses presented in today's document, the low flow cutoff does not reduce the economic impacts to these sites. Table IX.D–1 below summarizes the national estimates of compliance costs (1999$), pollutant reductions (in pound-equivalents per year), economic impacts, and cost-effectiveness (1981 $/pound-equivalent removed) for varying levels of low flow cutoff for indirect discharge facilities in the Printed Wiring Board Subcategory.

TABLE IX.D–1.—SUMMARY FOR LOW FLOW CUTOFF FOR THE INDIRECT DISCHARGERS IN THE PRINTED WIRING BOARD SUBCATEGORY

Flow cutoff	Number of sites	Industry compliance cost (1999$) (millions)	Pollution reductions (lb-eq.)	Severe economic impacts (facility closures, %)	Cost-effectiveness (1981$/lb.eq)
No Cutoff	840	175	153,653	62 (7%)	455
1 MGY	352	123	152,163	62 (18%)	447
2 MGY	263	111	143,464	62 (24%)	439
3 MGY	213	103	138,152	37 (17%)	364
6.25 MGY	173	94	129,813	31 (18%)	337

Note: Cost-Effectiveness estimates are not incremental and do not include costs or removals for facilities that close in the baseline and use all NODA changes in economic methodologies.

E. Oily Wastes Subcategory

In the proposed rule, EPA set numerical limits and pretreatment standards for the Oily Wastes Subcategory based on Option 6 technology, including a low flow exclusion of 2 million gallons per year (MGY) or less for indirect discharging facilities. EPA based Option 6 on in-process flow control, pollution prevention, and oil-water separation by chemical emulsion breaking followed by gravity separation and oil skimming. EPA selected Option 6 limitations and standards based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits estimated at the time of the proposal. These estimates have changed based on public comments as described in previous sections of today's document. In addition, as discussed in section III.A.1 of today's document, the number of Oily Wastes facilities, prior to a low flow exclusion, has increased from approximately 29,000 facilities to nearly 44,000 facilities due to the change in EPA's subcategorization scheme and the change to the definition of ''oily operations'' (*see* section IV.A for the revised definition). EPA is considering alternative options to reduce the burden on POTWs. EPA solicits comment on the following potential approaches.

1. No Regulation or No Further Regulation

EPA estimated at proposal that less than 1 percent of the facilities in the Oily Wastes Subcategory are regulated by existing ELGs. EPA received many comments from industry and Publicly Owned Treatment Works (POTWs) that these facilities are adequately regulated under the current ELGs or that local limits can address water quality concerns in sensitive water bodies. Commenters concluded that the environmental impacts and pollutant loading reductions that would be achieved by the MP&M rule, once corrected for errors, would clearly demonstrate that the costs and impacts associated with the MP&M regulation would not be justified.

As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Briefly, EPA estimates that compliance with the revised limitations and standards would result in facility closures for 1 of 288 (0.3%) indirect dischargers. The revised estimates cost-effectiveness for indirect dischargers increased to $2,963/pound-equivalent removed. Based on EPA's revised estimates of costs, pollutant removals, economic impacts and benefits discussed in section VII of today's document, EPA is again considering an option of no regulation or no further regulation for indirect dischargers in this subcategory for the final rule. EPA solicits comment on this option.

2. Changes Considered in Regulatory Thresholds

EPA proposed a low flow exclusion for indirect discharge facilities in the Oily Wastes Subcategory based on the large burden to permit writers and the small number of pound-equivalents that would be removed by facilities with annual wastewater flows of less than or equal to 2 MGY (66 FR 470). For the final rule, based on these same considerations, EPA is considering whether it either should not establish pretreatment standards for indirect dischargers or limit the applicability of the standard by increasing the flow cutoff. EPA notes that for all levels of low flow exclusions presented in today's document for these sites, the pollutant reductions (in pound-equivalents) per facility per year are low. Specifically, the 6.25 MGY flow cut-off results in 13 pound-equivalents/facility-yr, which is lower than those projected for the Industrial Laundries ELG and the Landfills ELG, for which EPA determined national regulations were not warranted. These low pollutant reductions per facility per year may not justify the additional permitting burden associated with these facilities. POTWs commenting on the proposed rule have stated that even with a low flow exclusion they would still incur increased burden when trying to identify those facilities above and below the low flow cutoff. In addition, POTWs can set local limits to control the small quantity of pollutants being discharged from the oily wastes facilities in their jurisdiction. EPA solicits comment on this option.

Table IX.E–1 below summarizes the national estimates of compliance costs (1999$), pollutant reductions (in pound-equivalents per year), economic impacts, and cost-effectiveness (1981 $/pound-equivalent removed) for varying levels of low flow cutoff for indirect discharge facilities in the Oily Wastes Subcategory.

TABLE IX.E–1.—SUMMARY FOR LOW FLOW CUTOFF FOR INDIRECT DISCHARGERS IN THE OILY WASTES SUBCATEGORY

Flow cutoff	Number of sites	Industry compliance cost (1999$) (millions)	Pollutant reductions (lb-eq.)	Severe economic impacts (facility closures)	Cost-effectiveness (1981 $/lb.eq.)
2 MGY	288	85	14,385	1	2,963
3 MGY	233	45	7,941	0	2,781
6.25 MGY	146	23	1,903	0	2,037

Note: Cost-Effectiveness estimates are not incremental and do not include costs or removals for facilities that close in the baseline and use all NODA changes in economic methodologies.

F. Railroad Line Maintenance Subcategory

In the proposed rule, EPA set numerical limitations and standards for the Railroad Line Maintenance Subcategory based on Option 10 technology. EPA based Option 10 on the end-of-pipe treatment technologies included in Option 9 (chemical emulsion breaking followed by DAF) plus in-process flow control and pollution prevention technologies, which allow for recovery and reuse of materials along with water conservation. EPA selected Option 10 limitations and standards based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits estimated at the time of the proposal. These estimates have changed based on public comments as described in previous sections of today's document. Therefore, EPA is considering alternative options to reduce the burden on POTWs. EPA solicits comment on the following potential approaches.

1. Options for Changing BPT and BAT Technologies

As discussed in section II.B of today's document, EPA received comment and data from the American Association of

Railroads (AAR) on the direct discharge railroad line maintenance facilities (*see* section 15.1 of the public record for the AAR surveys). EPA is reviewing alternative options for these facilities in the Railroad Line Maintenance Subcategory based on this data. In the proposal (66 FR 458), EPA estimated that 91 percent of the estimated 34 direct discharge railroad line maintenance facilities utilized Dissolved Air Flotation (DAF) at their sites. Therefore, EPA based the BPT and BAT limitations on DAF technology plus in-process pollution prevention techniques. However, commentors provided data confirming 28 direct discharging railroad line maintenance sites (27 sites from the AAR survey and one site from EPA's sampling program (Episode 6179)), of which only five are currently employing DAF technology. According to this data, the prevalent technology at these sites is oil-water separation. Therefore, in light of this new data, EPA is considering changing the basis of the BPT and BAT limitations to oil-water separation technology such as chemical emulsion breaking followed by oil skimming (i.e., proposed technology Option 6). This is the technology that EPA proposed for the Oily Wastes Subcategory.

EPA intends to analyze Option 6 for the direct discharge facilities in the Railroad Line Maintenance Subcategory for the final rule. Once EPA has estimated costs of compliance, pollutant reductions achieved, economic impacts, cost-effectiveness, and environmental benefits associated with this option for the final rule, the Agency will then determine if this option is economically achievable and if the costs are justified by the environmental improvements.

2. Railroad Overhaul/Rebuilding Operations Facilities

EPA noted in the proposal that the Railroad Line Maintenance Subcategory does not include railroad manufacturing operations or railroad overhaul/rebuilding facilities (66 FR 442). EPA identified 5 facilities in the General Metals Subcategory and 11 facilities in the Oily Waste Subcategory as definitely performing railroad overhaul/rebuilding operations. EPA also identified 111 other facilities that may be performing railroad overhaul/rebuilding operations (*see* section 16.1, DCN 17755). EPA solicits comment on EPA's estimate of facilities performing railroad overhaul/rebuilding operations and an appropriate definition for ''railroad overhaul/rebuilding operations.'' AAR concluded that there are fewer than 10 of these facilities performing railroad overhaul/rebuilding operations in the United States and that all are indirect dischargers. AAR further states that these facilities are already sufficiently regulated by their respective POTWs (*see* section 15.1, DCN 30300.A3; section 12.4.3, DCN 17785).

If in the final rule EPA were to agree with the AAR estimate of facilities performing railroad overhaul/rebuilding operations, EPA may consider whether or not revised nationally-applicable regulations are necessary at this time for facilities performing railroad overhaul/rebuilding operations because of the small number of these facilities (i.e., AAR estimate is less than 10). EPA solicits comment on whether current limitations, standards, and POTW local controls with the addition of water-quality based local limits established for individual NPDES permits (either for the POTWs accepting indirect discharges from these facilities or for any direct dischargers) may more appropriately address individual conventional, toxic and nonconventional pollutants that may be present at these facilities.

G. Steel Forming & Finishing Subcategory

In the proposed rule EPA proposed numerical limitations and pretreatment standards for the Steel Forming & Finishing Subcategory based on Option 2 technology (*see* section IX.A above for description of Option 2). EPA selected Option 2 technology based on the national estimates of costs, pollutant removals, economic impacts, and environmental benefits as determined at the time of the proposal. These estimates have changed based on public comments and additional data collection as described in previous sections of today's document. Therefore, EPA is considering alternative options to reduce the economic impact, and solicits comment on potential approaches.

1. No Further Regulation

EPA estimated at proposal that all facilities in this subcategory have permits or other control mechanisms under the existing Iron and Steel Manufacturing regulation (40 CFR part 420). EPA received many comments from industry and Publicly Owned Treatment Works (POTWs) that these facilities are adequately regulated under the current ELGs or that local limits can address water quality concerns in sensitive water bodies. Commenters concluded that the environmental impacts and pollutant loading reductions that would be achieved by the MP&M rule, once based on data from sampling SFF sites, would clearly demonstrate that the costs and impacts associated with the MP&M regulation would not be justified.

As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Briefly, EPA estimates that compliance with the revised limitations and standards would result in facility closures for 7 of 41 (17%) direct dischargers and for 10 of 112 (9%) indirect dischargers. The revised estimates of cost-effectiveness for indirect dischargers increased to $153/pound-equivalent removed. The estimate of cost-reasonableness for direct dischargers is $28/pound-conventional pollutants (O&G + TSS). Based on EPA's revised estimates of costs, pollutant removals, economic impacts and benefits discussed in section VII of today's document, EPA is again considering an option of no further regulation for direct and indirect dischargers in this subcategory for the final rule. An EPA decision not to promulgate further regulations would be based on a determination that the regulations were not economically achievable. If EPA were to select the ''no further regulation'' option, the facilities in this subcategory would continue to be regulated by the Iron and Steel ELGs (40 CFR part 420). EPA solicits comment on this option.

3. Changes Considered in Regulatory Thresholds

EPA is reconsidering the use of a low flow cutoff used for indirectly discharging Steel Forming & Finishing facilities. As discussed in section VII of today's document, EPA's current estimates of costs, pollutant reductions, and economic impacts differ from those calculated for the proposal. Therefore, EPA is reconsidering the use of a low flow cutoff at various levels or other regulatory threshold (e.g., based on facility size such as employment, production, or revenue) to provide relief to indirect dischargers in this subcategory from significant economic impacts.

Table IX.G–1 below shows the national estimates of compliance costs (1999$), pollutant reductions (in pound-equivalents per year), economic impacts, and cost-effectiveness (1981$/pound-equivalent removed) for varying levels of flow cutoff for indirect discharge facilities in the Steel Forming & Finishing Subcategory.

TABLE IX.G–1.—SUMMARY FOR LOW FLOW CUTOFF FOR THE INDIRECT DISCHARGERS IN THE STEEL FORMING & FINISHING SUBCATEGORY

Flow cutoff	Number of sites	Industry compliance cost (1999$) (millions)	Pollutant reductions (lb-eq.)	Severe economic impacts (facility closures, %)	Cost-effectiveness (1981$/lb.eq.)
No Cutoff	112	22.1	61,015	10 (9%)	153
1 MGY	90	20.9	60,733	10 (11%)	141
2 MGY	77	19.1	59,418	10 (13%)	131
3 MGY	74	19.0	59,383	7 (9%)	126
6.25 MGY	54	16.0	47,671	7 (13%)	117

Note: Cost-Effectiveness estimates are not incremental and do not include costs or removals for facilities that close in the baseline and use all NODA changes in economic methodologies.

X. Solicitation of Comment

The following discussion summarizes those issues raised by new information and comments on the proposal for which EPA is requesting comment.

1. Zinc Platers. EPA solicits comment on whether EPA should: (1) Establish a separate subcategory for zinc platers; (2) further subcategorize the proposed subcategories to provide a segment for zinc platers; or (3) retain the proposed subcategorization scheme but establish a zinc limitation based on data specific to zinc platers. EPA also solicits comment on the burden to permit writers and control authorities associated with each approach.

2. Subcategorization of Unit Operations. EPA solicits comment on the methodology for subcategorization of unit operation concentrations used for today's document.

3. Boron Removals. EPA solicits comment on the approach used to estimate boron removals.

4. Molybdenum Removals. EPA received comments regarding the selection of molybdenum as a regulated pollutant. Similar to the comments on tin, the comments revolved around whether or not molybdenum can be precipitated using hydroxide precipitation as is used in EPA's proposed BAT technology. EPA has reviewed literature to find out whether or not molybdenum will precipitate using either hydroxide or sulfide precipitation, and has found that molybdenum does not form metal hydroxide precipitates (*see* memorandum titled ''Molybdenum,'' section 16.2, DCN 17754). The sampled hydroxide precipitation treatment systems did not show a consistent ability to remove molybdenum from waste water. Molybdenum is, however, present in waste waters as described above and is removed incidentally in waste treatment systems. EPA is reviewing the removal mechanisms for molybdenum. EPA is considering not regulating molybdenum in the final rule but is considering taking credit for incidental removals. EPA solicits comment on this change.

5. EPA solicits comment on EPA's current method for imputing missing flow and production.

6. EPA Sensitivity Analyses. EPA is soliciting comment on the sensitivity analyses described in Section III.E. These sensitivity analysis examine baseline pollutant loadings and facilities that do not report treatment-in-place and may have low concentration raw wastewater characteristics.

7. Numbers of facilities currently regulated. EPA solicits comment on its estimates of the numbers of facilities currently regulated by the part 413, part 433, or both regulations (*see* Table III.E–1).

8. Low Concentration Facilities. EPA is soliciting data at the unit operation level from ''low concentration'' facilities that do not currently have treatment for metal-bearing wastewaters on-site. In addition, EPA is soliciting comment on how to address these facilities in the analysis of pollutant loadings and reductions.

9. Monitoring Costs. EPA is using a cost of $13,400 per facility to incorporate monitoring costs for the pollutants not already regulated under the Metal Finishing regulations. EPA solicits comment on the Agency's cost estimates for compliance monitoring used in today's document.

10. Addition of a Sand Filter for Metal-Bearing Subcategories. EPA solicits comment on the addition of a sand filter to the BAT proposed technology option for metal-bearing subcategories and on the sand filter cost module and national cost estimates for Option 2 + Sand Filter. EPA also solicits comments on whether the addition of a sand filter is necessary for facilities to achieve the revised limits consistently and the economic achievability of this option.

11. Oily Operations Definition. EPA solicits comment on the intended additions to the definition of oily operations. Also, EPA did not include paint stripping due to the elevated levels of metal constituents from these sources that are contained in EPA's sampling data. However, EPA solicits comment on whether paint stripping for non-lead based paints should be included in the definition of oily operations. EPA also solicits comment on the definition for iron phosphate conversion coating and on the need for a definition for ''wet air pollution control for organic constituents'' to distinguish it from wet air pollution control for metals or particulates.

12. Printed Wiring Board Subcategory—Changes to Applicability. EPA solicits comment on these intended revisions to the codified applicability language used to include printed wiring board job shops and whether EPA should include a definition to identify printed wiring assembly facilities in the General Metals Subcategory applicability statement.

13. Treatability of Tin, Molybdenum, Manganese. EPA solicits comment and data on the removal of tin, molybdenum, and manganese through chemical precipitation and other possible removal mechanisms. EPA also solicits on EPA's intention to possibly exclude these pollutants from regulation.

14. Total Sulfide. EPA solicits comment on the intention to not regulate total sulfide for the metal-bearing subcategories. EPA also solicits comment on the most appropriate analytical method for total sulfide.

15. Steel Forming & Finishing Subcategory. EPA solicits comment on the pollutants selected for regulation for the Steel Forming & Finishing Subcategory. EPA also solicits comment on the inclusion of the continuous electroplating operations on steel sheet and strip into the MP&M regulation.

16. Calculation of the Total Organics Parameter. EPA solicits comment on alternative approaches the Agency is considering for calculating the Total Organics Parameter (TOP). EPA also

solicits comment from facilities as to when they would choose to monitor for the TOP list of pollutants rather than design and implement a best management plan for their organic chemicals. Finally, EPA solicits comment, especially from permit writers and control authorities, on whether the Agency should provide guidance to permit writers on how to develop a facility-specific TOP limit for facilities that choose the TOP limit as their method for complying (as opposed to meeting a limit for total organic carbon or implementing the best management plan).

17. Validation Study for Seven Organic Pollutants. EPA is soliciting comment on the validation studies for six semivolatile organic pollutants (aniline, 3,6-dimethylphenanthrene, 2-isopropylnaphthalene, 1-methylfluorene, 2-methylnaphthalene, and 1-methylphenanthrene) and one volatile organic pollutant (carbon disulfide) to EPA Methods 624 and 1624B and EPA Methods 625 and 1625.

18. New Source Limits Set Equal to Existing Source Limits. EPA solicits comment on basing the new source standards (NSPS and PSNS) for the metal-bearing subcategories for the final rule on the same technology option as used for the existing source limits and standards (i.e., Option 2). EPA notes that after the compliance deadline has passed, having new source limitations equal to existing source limitations will reduce the need for new source determinations by permit writers and control authorities.

19. EMS Alternative for General Metals Facilities. EPA solicits comment on the industry suggested EMS Alternative and EPA's amendments (*see* section IX.B).

20. No Regulation Options. EPA solicits comment on the ''no further regulation'' option considered for indirect discharge Metal Finishing Job Shops, Printed Wiring Board, General Metals, Zinc Platers, and Steel Forming & Finishing subcategories. EPA solicits comment on the option that would bring into alignment those facilities in the previously mentioned subcategories (including General Metals), direct or indirect, which are currently unregulated or required to meet the standards of the Electroplating effluent limitations guidelines (ELGs) (40 CFR part 413) with those required to meet the limitations and standards of the Metal Finishing ELGs (40 CFR part 433), without requiring the MP&M limitations and standards provided in today's document. EPA also solicits comment on whether this would better clarify implementation issues for control authorities. EPA solicits comment on the estimate of sites currently regulated under the part 413 regulations with less than 10,000 gallons per day of process wastewater flow and the economic condition of these facilities. In addition, EPA solicits comment on a ''no regulation'' option for indirect discharge sites in the Oily Wastes Subcategory.

21. Inclusion or Change to the Low Flow Cutoff. EPA solicits comment on the possible changes discussed to include a low flow cutoff for indirect discharge sites in the Metal Finishing Job Shops, Printed Wiring Board, and Steel Forming & Finishing subcategories and to change the level of the proposed low flow cutoff for the indirect discharge sites in the General Metals and Oily Wastes subcategories. EPA is also requesting comment on other possible types of regulatory threshold that could be used to reduce economic impacts on these facilities and on the ability of permit writers and control authorities to implement other thresholds.

22. Commentors on the MP&M proposal stated that many source water suppliers have recently begun adding chemicals to the water to reduce corrosion and leaching of metals from piping into the water, which may increase concentrations of other metals in the raw water. For example, many water suppliers now add zinc phosphate compounds to reduce leaching of copper and lead from piping. If the comments were correct in their assertions that more concentrated influent is associated with higher effluent levels, EPA would expect to see upward trends for both the influent and effluent long-term averages. In general, EPA did not find any evidence of such trends or any patterns in the influent. Rather, EPA noted that the lowest and highest influent values were associated with the lowest effluent values. EPA modeling currently predicts that a slightly higher metal influent concentrations should not affect effluent metal concentrations for properly operated BAT metals treatment systems. EPA solicits comment on whether or not EPA needs to account for elevated metals concentrations in source water and possible ways to account for this source water concentrations in its analysis. EPA also solicits comment on its proposal to allow MP&M indirect discharge facilities to apply for a waiver that would allow them to reduce their monitoring burden (*see* 66 FR 509). EPA proposed that 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.

23. EPA is considering a revised methodology that will take into account both the hexavalent chromium converted in chrome reduction treatment and the trivalent chromium removed end-of-pipe in future estimates of chromium toxic pound-equivalents removed. For this methodology, the hexavalent chromium toxic weighting factor (TWF), not the trivalent chromium TWF, will be applied to the amount of hexavalent chromium that is converted to trivalent chromium in chrome reduction treatment. The toxic pound-equivalents removed by the chrome reduction treatment system will be equal to the toxic pound-equivalents of hexavalent chromium converted, minus the toxic-pound equivalents of trivalent chromium formed. The toxic pound-equivalents removed by the end-of-pipe treatment system will be equal to the toxic pound-equivalents of trivalent chromium removed in the end-of pipe treatment system. The total toxic-pound equivalents of chromium removed in treatment will be equal to the toxic-pound equivalents converted by chrome reduction treatment plus the toxic-pound equivalents removed by the end-of pipe treatment system. EPA is considering similar methodology changes in cyanide treatment for total and amenable cyanide. EPA solicits comments on these possible changes in methodologies for the final rule.

24. EPA solicits comment on the revised number of direct dischargers in the Non-Chromium Anodizing subcategory. At proposal EPA estimated no direct dischargers in the Non-Chromium Anodizing subcategory. After re-analysis of the wastewater disposal methods reported in survey questionnaires, EPA now estimates 35 direct dischargers in the Non-Chromium Anodizing subcategory.

25. EPA solicits comment on how it enumerates direct and indirect discharging facilities. Currently, EPA labels facilities as direct dischargers if any of their wastewater effluent is discharged directly to surface waters of the United States. In particular, EPA solicits comments on how to handle facilities that are both indirect and direct dischargers.

26. EPA solicits comment on EPA's approach for the development of preliminary revised limitations and standards presented in section VIII of today's document.

Dated: May 24, 2002.

Diane C. Regas,

Acting Assistant Administrator.

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